TEST REPORT

according to

FCC CFR Title 47 Part 15 Subpart E(15.407)

Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8

Applicant	: Qualcomm Atheros, Inc.
Address	: 1700 Technology Drive, San Jose, CA95110
Equipment	: 802.11 a/b/g/n/ac+ BT 4.1 M.2 Type Card
Model No.	: QCNFA34AC(NFA344), QCNFA34AC(NFA345)
FCC ID	: PPD-QCNFA34AC
IC	: 4104A-QCNFA34AC

The test result refers exclusively to the test presented test model / sample.,

- Without written approval of ***Cerpass Technology (Suzhou) Co.,Ltd.*** the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Rules and Regulations Part 15/RSS-210. The test report has been issued separately.
- The test report must not be used by the clients to claim product certification approval by ***NVLAP*** or any agency of the Government.

Contents

History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

FCC CFR Title 47 Part 15 Subpart E(15.407)

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I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4** The equipment was ***passed*** the test performed according to **FCC Rules and Regulations Part 15 Subpart E (15.407)& Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8.**

The test was carried out on Dec 05, 2014 at ***Cerpass Technology (Suzhou) Co.,Ltd***

Signature

Miro Chueh/ Technical director

1. Report of Measurements and Examinations

1.1 List of Measurements and Examinations

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart E	PASS
Canada RSS-210: 2010	PASS

2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Product	802.11 a/b/g/n/ac+ BT 4.1 M.2 Type Card
Model No.	QCNFA34AC(NFA344), QCNFA34AC(NFA345)
Variant No. Description	NFA344: This SKU supports 2T2R MIMO NFA345: This SKU supports 1T2R
Host Type	Notebook Computer
Host Model	Lenovo Yoga 3 14xxxx; 80JHxxxx; 80KQxxxx (“x”=0- 9, A- Z, a-z, any symbol or blank for marketing use only)
Antenna Type	PIFA
Antenna Peak Gain	2400- 2500MHz: 0.95dBi 5150- 5850MHz: 1.55dBi
Power Supply	DC 3.3V from host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM BT-LE (GFSK) for DTS 256QAM for OFDM in 11ac mode and 11n (HT20), 11n (HT40) mode of 2.4GHz Band
Modulation technology	DSSS, OFDM, DTS
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n : up to 400Mbps 802.11ac: up to 866.7Mbps BT-LE(GFSK): 1Mbps
Operating Frequency	**For 15.407:** 802.11a: 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.5~5.72GHz
	For 15.247: 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.745 ~ 5.825GHz BT-LE(GFSK): 2.402 ~ 2.480GHz
Number of channel	**For 15.407:** 20 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 10 for 802.11n (HT40), 802.11ac (VHT40) 5 for 802.11ac (VHT80)

	For 15.247(2.4GHz): 11 for 802.11b, 802.11g, 802.11n (HT20), 802.11n_256QAM(BW20) 7 for 802.11n (HT40), 802.11n_256QAM(BW40) 40 for BT-LE(GFSK) **For 15.247(5GHz):** 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)

2.2 Antenna list

Manufacturer	Part Number
HongLin Electronics Co., Ltd	Tx1 Antenna: DC33001DB00 / Tx2 Antenna: DC33001DB10
LUXSHARE-ICT	Tx1 Antenna: DC33001D900 / Tx2 Antenna: DC33001D910

2.3 Carrier Frequency of Channels

For 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	108	5540
40	5200	112	5560
44	5220	116	5580
48	5240	120	5600
52	5260	124	5620
56	5280	128	5640
60	5300	132	5660
64	5320	136	5680
100	5500	140	5700
104	5520	144	5720

For 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency(MHz)	Channel	Frequency(MHz)
38	5190	110	5550
46	5230	118	5590
54	5270	126	5630
62	5310	134	5670
102	5510	142	5710

For 802.11ac (VHT80):

Channel	Frequency(MHz)	Channel	Frequency(MHz)
42	5210	138	5690
58	5290	---	---
106	5530	---	---
122	5610	---	---

2.4 General Information of Test

Test Site:	Cerpass Technology (Suzhou) Co.,Ltd
Test Site Location :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
NVLAP LAB Code :	200814-0
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30MHz Radiation: from 30MHz to 25000MHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.

2.5 Measurement Uncertainty

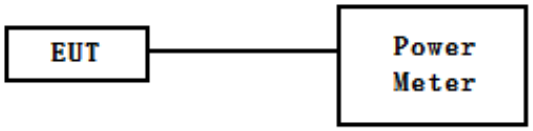
Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE/NEUTRAL	±2.71 dB
Radiated Emission	30 MHz ~ 25GHz	Vertical	±4.11 dB
		Horizontal	±4.10 dB
Occupied Bandwidth	---	---	±7500 Hz
Maximum Peak Output Power	---	---	±1.4 dB
Band Edges	---	---	±2.2 dB
Power Spectral Density	---	---	±2.2 dB

3. Maximum Conducted Power (Average Power)

3.1 Test Procedures

The antenna port（RF output）of the EUT was connected to the input（RF input）of a Spectrum Analyser. Power was read directly from the Spectrum Analyser and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

3.2 Test Setup Layout



3.3 Measurement equipment

Instrument/Ancillary	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Series Power Meter	ANRITSU	ML2495A	1224005	2014/03/27	2015/03/26
Power Sensor	ANRITSU	MA2411B	1207295	2014/03/27	2015/03/26

3.4 Test Results

<NFA344_2T2R SKU1> (Unite: dBm)

Configurations	Mode			
	Channel / Frequency (MHz)			
<SKU1> 5.2GHz WLAN Average Power (Main+ Aux=SUM)	802.11a			
	36/5180	40/5200	44/5220	48/5240
	12.23+12.15=15.20	12.92+12.88=15.91	12.91+12.95=15.94	12.94+12.96=15.96
	802.11n(HT20)			
	36/5180	40/5200	44/5220	48/5240
	11.89+11.79=14.85	12.47+11.95=15.23	12.31+11.94=15.14	12.23+11.97=15.11
	802.11ac(VHT20)			
	36/5180	40/5200	44/5220	48/5240
	11.95+11.87=14.92	12.14+12.32=15.24	12.11+12.21=15.17	12.15+12.01=15.09
	802.11ac(VHT80)			
	42/5210			
	10.91+10.75=13.84			

<table>
<tr><td rowspan="2">Configurations</td><td colspan="8">Mode</td></tr>
<tr><td colspan="8">Channel / Frequency (MHz)</td></tr>
<tr><td rowspan="15"><SKU1>
5.3GHz WLAN
Average Power
(Main+ Aux=SUM)</td><td colspan="8">802.11a</td></tr>
<tr><td colspan="2">52/5260</td><td colspan="2">56/5280</td><td colspan="2">60/5300</td><td colspan="2">64/5320</td></tr>
<tr><td colspan="2">16.31+16.25=19.29</td><td colspan="2">11.93+11.93=14.94</td><td colspan="2">11.96+11.92=14.95</td><td colspan="2">9.82+9.78=12.81</td></tr>
<tr><td colspan="8">802.11n(HT20)</td></tr>
<tr><td colspan="2">52/5260</td><td colspan="2">56/5280</td><td colspan="2">60/5300</td><td colspan="2">64/5320</td></tr>
<tr><td colspan="2">16.29+16.25=19.28</td><td colspan="2">12.31+12.25=15.29</td><td colspan="2">12.38+12.28=15.34</td><td colspan="2">8.92+8.80=11.87</td></tr>
<tr><td colspan="8">802.11n(HT40)</td></tr>
<tr><td colspan="4">54/5270</td><td colspan="4">62/5310</td></tr>
<tr><td colspan="4">15.93+15.83=18.89</td><td colspan="4">11.81+11.75=14.79</td></tr>
<tr><td colspan="8">802.11ac(VHT20)</td></tr>
<tr><td colspan="2">52/5260</td><td colspan="2">56/5280</td><td colspan="2">60/5300</td><td colspan="2">64/5320</td></tr>
<tr><td colspan="2">16.24+16.16=19.21</td><td colspan="2">12.48+12.34=15.42</td><td colspan="2">12.27+12.17=15.23</td><td colspan="2">8.86+8.80=11.84</td></tr>
<tr><td colspan="8">802.11ac(VHT40)</td></tr>
<tr><td colspan="4">54/5270</td><td colspan="4">62/5310</td></tr>
<tr><td colspan="4">15.73+15.77=18.76</td><td colspan="4">11.24+11.26=14.26</td></tr>
<tr><td colspan="8">802.11ac(VHT80)</td></tr>
<tr><td colspan="8">58/5290</td></tr>
<tr><td colspan="8">11.31+11.13=14.23</td></tr>
<tr><td rowspan="15"><SKU1>
5.6GHz WLAN
Average Power
(Main+ Aux=SUM)</td><td colspan="8">802.11a</td></tr>
<tr><td>100/5500</td><td>104/5520</td><td>108/5540</td><td>112/5560</td><td>116/5580</td><td>124/5620</td><td>136/5680</td><td>140/5700</td></tr>
<tr><td>9.93+9.83 =12.89</td><td>16.26+16.06 =19.17</td><td>16.06+15.96 =19.02</td><td>16.19+16.21 =19.21</td><td>16.23+16.17 =19.21</td><td>16.27+16.19 =19.24</td><td>16.11+16.05 =19.09</td><td>8.96+8.80 =11.89</td></tr>
<tr><td colspan="8">802.11n(HT20)</td></tr>
<tr><td>100/5500</td><td>104/5520</td><td>108/5540</td><td>112/5560</td><td>116/5580</td><td>124/5620</td><td>136/5680</td><td>140/5700</td></tr>
<tr><td>8.81+8.71 =11.77</td><td>16.21+16.11 =19.17</td><td>16.06+15.94 =19.01</td><td>16.13+16.15 =19.15</td><td>16.06+16.10 =19.09</td><td>15.87+15.89 =18.89</td><td>16.03+16.07 =19.06</td><td>8.98+8.90 =11.95</td></tr>
<tr><td colspan="8">802.11n(HT40)</td></tr>
<tr><td colspan="4">102/5510</td><td colspan="4">134/5670</td></tr>
<tr><td colspan="4">9.39+9.31=12.36</td><td colspan="4">14.97+14.97=17.98</td></tr>
<tr><td colspan="8">802.11ac(VHT20)</td></tr>
<tr><td>100/5500</td><td>104/5520</td><td>108/5540</td><td>112/5560</td><td>116/5580</td><td>124/5620</td><td>136/5680</td><td>140/5700</td></tr>
<tr><td>8.89+8.73 =11.82</td><td>16.16+16.08 =19.13</td><td>16.08+15.94 =19.02</td><td>16.17+16.13 =19.16</td><td>16.21+16.11 =19.17</td><td>16.22+16.22 =19.23</td><td>16.10+16.06 =19.09</td><td>8.83+8.73 =11.79</td></tr>
<tr><td colspan="8">802.11ac(VHT40)</td></tr>
<tr><td colspan="4">102/5510</td><td colspan="4">134/5670</td></tr>
<tr><td colspan="4">9.33+9.21=12.28</td><td colspan="4">14.87+14.81=17.85</td></tr>
<tr><td colspan="8">802.11ac(VHT80)</td></tr>
<tr><td colspan="4">106/5530</td><td colspan="4">138/5690</td></tr>
<tr><td colspan="4">12.26+12.18=15.23</td><td colspan="4">16.16+16.10=19.14</td></tr>
</table>

<NFA345_1T2R SKU2> (Unite: dBm)

Configurations	Mode			
	Channel / Frequency (MHz)			
<SKU2> 5.2GHz WLAN Average Power (Main)	802.11a			
	36/5180	40/5200	44/5220	48/5240
	14.79	14.66	14.51	14.63
	802.11n(HT20)			
	36/5180	40/5200	44/5220	48/5240
	14.76	14.51	14.43	14.45
	802.11ac(VHT20)			
	36/5180	40/5200	44/5220	48/5240
	14.73	14.59	14.51	14.48
	12.91		14.51	
	802.11ac(VHT80)			
	42/5210			
	11.79			

Configurations	Mode							
	Channel / Frequency (MHz)							
<SKU2> 5.3GHz WLAN Average Power (Tx1)	802.11a							
	52/5260	56/5280	60/5300	64/5320				
	16.73	16.98	16.64	15.83				
	802.11n(HT20)							
	52/5260	56/5280	60/5300	64/5320				
	16.66	16.96	16.81	15.78				
	802.11n(HT40)							
	54/5270		62/5310					
	15.47		14.07					
	802.11ac(VHT20)							
	52/5260	56/5280	60/5300	64/5320				
	19.63	16.91	16.9	15.84				
	802.11ac(VHT40)							
	54/5270		62/5310					
	14.36		14.21					
	802.11ac(VHT80)							
	58/5290							
	11.76							
<SKU2> 5.6GHz WLAN Average Power (Tx1)	802.11a							
	100/5500	104/5520	108/5540	112/5560	116/5580	124/5620	136/5680	140/5700
	14.12	17.00	16.87	16.76	16.98	16.96	16.97	12.87
	802.11n(HT20)							
	100/5500	104/5520	108/5540	112/5560	116/5580	124/5620	136/5680	140/5700
	14.27	17.00	16.84	16.75	16.79	16.92	16.82	12.91
	802.11n(HT40)							
	102/5510				134/5670			
	11.42				14.89			
	802.11ac(VHT20)							
	100/5500	104/5520	108/5540	112/5560	116/5580	124/5620	136/5680	140/5700
	14.09	17.00	16.87	16.73	16.95	16.93	16.94	12.93
	802.11ac(VHT40)							
	102/5510				134/5670			
	11.39				14.77			
	802.11ac(VHT80)							
	106/5530				138/5690			
	11.28				15.79			