

FCC PART 15.247
MEASUREMENT AND TEST REPORT

For

X2 Computing Ltd.

Bond Industrial Estate, Wickhamford, EVESHAM, Worcestershire, WR11 7RL, UK

FCC ID: RGCCARBONX2206300

Report Type: Original Report	Product Type: Tablet
Test Engineer: Gardon Zhang	
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Reviewed By: RF Leader	
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The X2 Computing Ltd.'s product, model number: X220 Carbon (FCC ID: RGCCARBONX2206300) or the "EUT" as referred to in this report was a Tablet, which was measured approximately: 325 mm (L) x 197.3 mm (W) x 27.8 mm (H), rated input voltage: DC 7.4V battery and DC 12V charging from adapter.

Adapter information: AC ADAPTER

Model: ADA12400ZA00

Input: AC 100-240V, 50/60Hz, 2A

Output: DC 12V, 4A

Note: the model X220 Carbon has different LCD screens, top covers, batteries capacity, pins, storages, halo LED, cameras and plastic & rubber I/O cover optional, the details information refer to the attached declaration letter which provided and guaranteed by the applicant.

Tested sample information: capacitive touch panel, black top cover, 16000mAh battery, 16pin, 32G storage, halo LED, front & rear camera both and without plastic & rubber I/O cover

** All measurement and test data in this report was gathered from production sample serial number: 1306067 (Assigned by the BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-06-21.*

Objective

This report is prepared on behalf of X2 Computing Ltd. in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP and 15.407 NII submissions with FCC ID: RGCCARBONX2206300.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 802.11b 802.11g and 802.11n-HT20 mode, 11 channels are provided to testing, for 802.11n-HT40 mode, 7 channels are provided to testing.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

EUT for 802.11b 802.11g & 802.11n-HT20 mode were tested with Channel 1, 6 and 11, 802.11n-HT40 mode was tested with channel 3, 6 and 9.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

EUT Exercise Software

DRTU version 1.5.4-0364

The test was performed under:

802.11b: Data rate: 11 Mbps.
802.11g: Data rate: 54 Mbps.
802.11n-HT20: Data rate: HT7.
802.11n-HT40: Data rate: HT7.

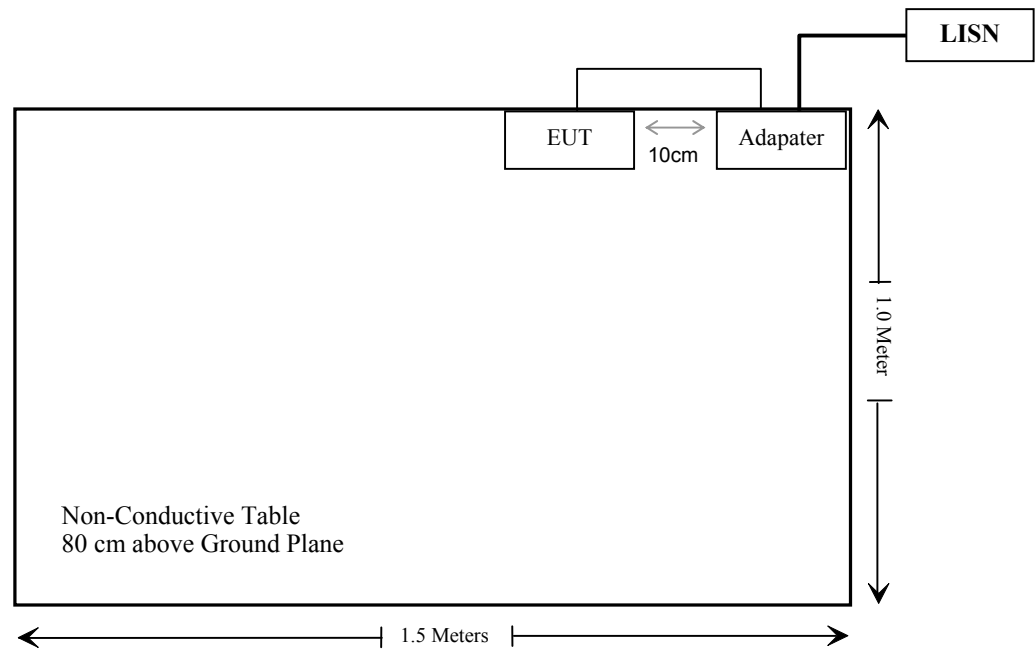
Equipment Modifications

No modification was made to the EUT tested.

External I/O Cabling List and Details

Cable Description	Length (m)	From Port	To
Unshielded Undetachable AC Cable	2.0	Adapter	LISN
Unshielded Undetachable DC Cable	1.7	EUT	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance**
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance*
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance*
§15.247(b)(3)	Maximum Peak Output Power	Compliance*
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance*
§15.247(e)	Power Spectral Density	Compliance*

Note: Compliance*: The RF module was test in AEGIS Laboratories with FCC ID: PD9633ANH, which granted on 2009-08-10.

Compliance**: Please refer to SAR report released by BACL, report number: RSZ130621007-20

FCC §15.247 (i) & §2.1093 – RF EXPOSURE

Applicable Standard

FCC§1.1307 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ130621007-20

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT have three PCB antennas arrangement for Wi-Fi, which was permanently attached and the gain was 1.89 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

According to FCC§15.207

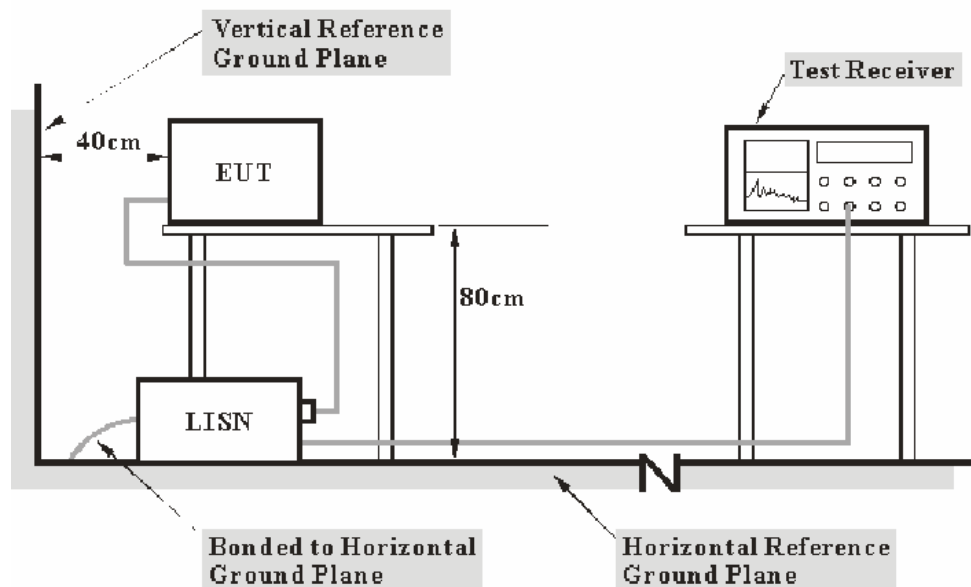
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements may be receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The adapter was connected to a 120 V_{AC}/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
& Schwarz	EMI Test Receiver	ESCS30	100176	2013-06-17	2014-06-17
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2012-08-22	2013-08-22
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2012-08-09	2013-08-09
Rohde & Schwarz	CE Test software	EMC 32	8.95	-	-

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Pulse Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, with the worst margin reading of:

12.0 dB at 0.350000 MHz in the Neutral conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

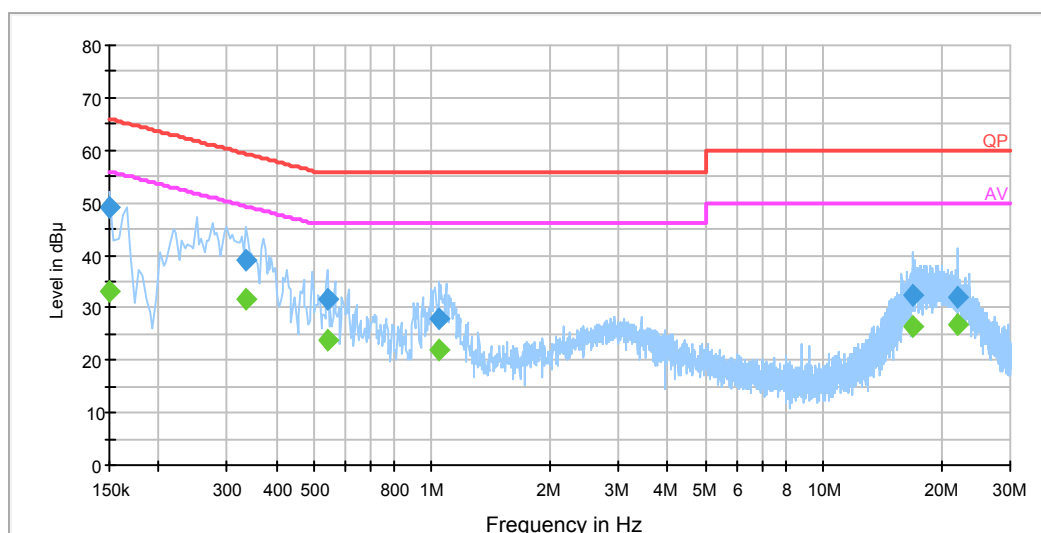
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Gardon Zhang on 2013-07-06.

EUT operation mode: Charging & Transmitting

AC 120V / 60Hz – Line

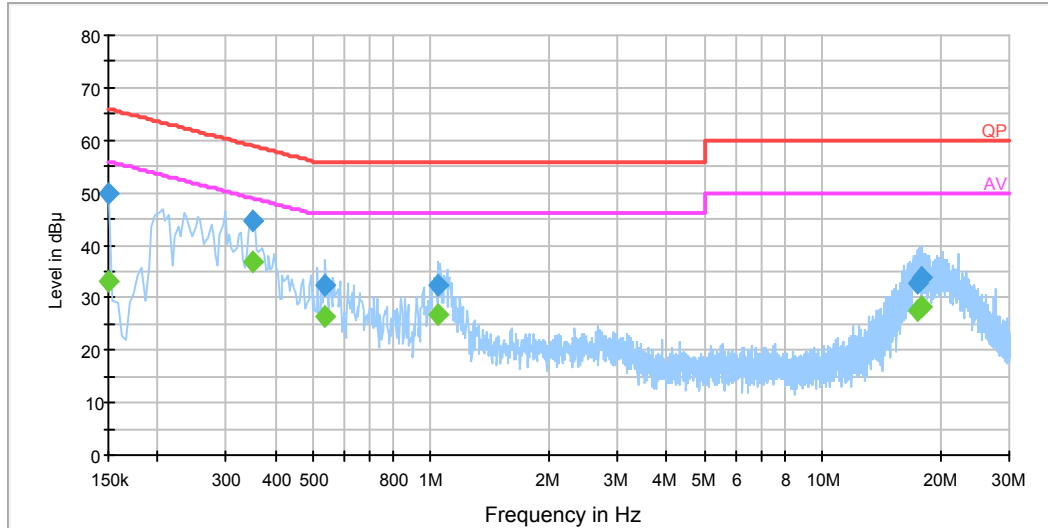
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.150000	49.0	19.5	66.0	17.0	QP
0.334000	31.6	19.5	49.4	17.8	Ave.
0.334000	38.9	19.5	59.4	20.4	QP
0.542000	23.7	19.5	46.0	22.3	Ave.
0.150000	33.0	19.5	56.0	23.0	Ave.
21.918000	27.0	20.1	50.0	23.0	Ave.
16.926000	26.4	20.0	50.0	23.6	Ave.
1.046000	21.9	19.5	46.0	24.1	Ave.
0.542000	31.5	19.5	56.0	24.5	QP
16.926000	32.3	20.0	60.0	27.7	QP
1.046000	27.8	19.5	56.0	28.2	QP
21.918000	31.9	20.1	60.0	28.2	QP

AC 120V / 60Hz – Neutral:

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.350000	37.0	19.5	49.0	12.0	Ave.
0.350000	44.5	19.5	59.0	14.5	QP
0.150000	49.8	19.5	66.0	16.2	QP
1.046000	26.9	19.5	46.0	19.1	Ave.
0.538000	26.3	19.5	46.0	19.7	Ave.
17.966000	28.4	20.1	50.0	21.6	Ave.
17.490000	27.4	20.1	50.0	22.6	Ave.
0.150000	33.2	19.5	56.0	22.8	Ave.
0.538000	32.4	19.5	56.0	23.6	QP
1.046000	32.2	19.5	56.0	23.8	QP
17.966000	33.7	20.1	60.0	26.3	QP
17.490000	32.9	20.1	60.0	27.1	QP

Note:

- 1) Corrected Amplitude = Reading + Correction Factor + Pulse Limiter Attenuation
- 2) Correction Factor = LISN VDF + Cable Loss
The corrected factor has been input into the transducer of the test software.
- 3) Margin = Limit – Corrected Amplitude

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

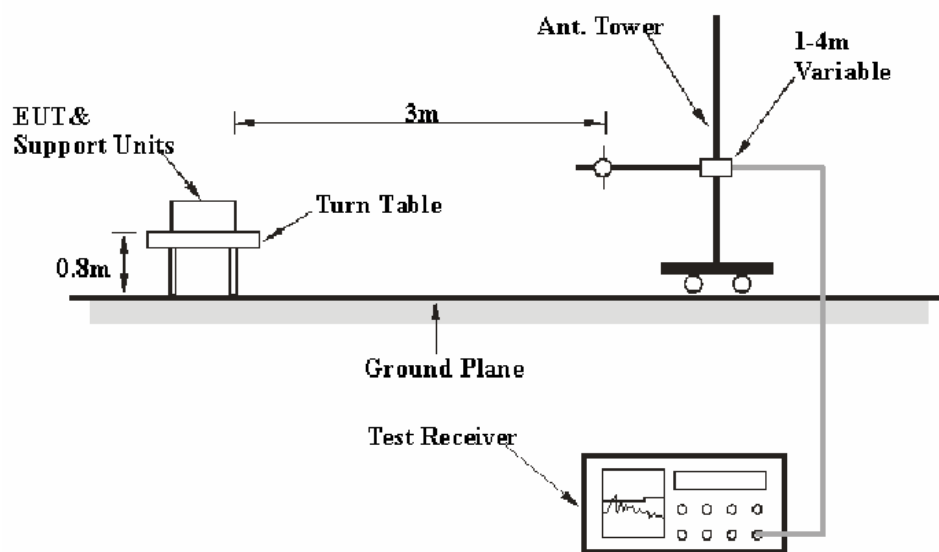
FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) will not be taken into consideration for the test data recorded in the report

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to an AC 120V/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz and peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-08-09	2013-08-09
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the data in the following table, with the worst margin reading of:

0.52 dB at 4874.0 MHz in the **Horizontal** polarization (802.11b mode)

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

in BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Gardon Zhang on 2013-07-03.

EUT operation mode: Transmitting

30 MHz-25 GHz**802.11b mode:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	95.07	PK	62	1.3	H	6.13	101.20	/	/
2412.0	90.25	Ave.	62	1.3	H	6.13	96.38	/	/
2412.0	89.42	PK	158	1.5	V	6.13	95.55	/	/
2412.0	84.31	Ave.	158	1.5	V	6.13	90.44	/	/
4824.0	40.23	Ave.	286	1.4	H	12.40	52.63	54	1.37*
9648.0	23.34	Ave.	185	1.4	H	19.29	42.63	54	11.37
156.1	46.18	QP	124	1.2	V	-14.9	31.28	43.5	12.22
7236.0	24.14	Ave.	184	1.5	V	16.62	40.76	54	13.24
4824.0	43.46	PK	286	1.4	H	12.40	55.86	74	18.14
2388.7	26.81	Ave.	67	1.3	H	6.13	32.94	54	21.06
7236.0	36.26	PK	184	1.5	V	16.62	52.88	74	21.12
2377.1	26.57	Ave.	290	1.3	V	6.13	32.70	54	21.30
2491.4	25.36	Ave.	129	1.4	H	7.21	32.57	54	21.43
2388.7	42.01	PK	67	1.3	H	6.13	48.14	74	25.86
2491.4	40.23	PK	129	1.4	H	7.21	47.44	74	26.56
2377.1	41.20	PK	290	1.3	V	6.13	47.33	74	26.67
9648.0	25.13	PK	185	1.4	H	19.29	44.42	74	29.58
Middle Channel (2437 MHz)									
2437.0	94.25	PK	54	1.6	H	7.21	101.46	/	/
2437.0	88.31	Ave.	54	1.6	H	7.21	95.52	/	/
2437.0	89.27	PK	204	1.4	V	7.21	96.48	/	/
2437.0	84.28	Ave.	204	1.4	V	7.21	91.49	/	/
4874.0	41.02	Ave.	112	1.4	H	12.46	53.48	54	0.52*
9748.0	24.37	Ave.	294	1.5	H	19.40	43.77	54	10.23
156.1	47.40	QP	241	1.3	V	-14.9	32.50	43.5	11.00
7311.0	26.34	Ave.	46	1.3	V	16.49	42.83	54	11.17
4874.0	44.35	PK	112	1.4	H	12.46	56.81	74	17.19
9748.0	35.26	PK	294	1.5	H	19.40	54.66	74	19.34
2491.1	27.36	Ave.	19	1.2	H	7.21	34.57	54	19.43
7311.0	37.26	PK	46	1.3	V	16.49	53.75	74	20.25
2389.7	27.02	Ave.	10	1.3	H	6.13	33.15	54	20.85
2376.8	26.27	Ave.	306	1.3	V	6.13	32.40	54	21.60
2389.7	42.24	PK	10	1.3	H	6.13	48.37	74	25.63
2491.1	40.21	PK	19	1.2	H	7.21	47.42	74	26.58
2376.8	41.24	PK	306	1.3	V	6.13	47.37	74	26.63

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	93.10	PK	64	1.5	H	7.21	100.31	/	/
2462.0	88.27	Ave.	64	1.5	H	7.21	95.48	/	/
2462.0	86.84	PK	258	1.3	V	7.21	94.05	/	/
2462.0	82.11	Ave.	258	1.3	V	7.21	89.32	/	/
4924.0	39.54	Ave.	185	1.4	H	12.50	52.04	54	1.96*
9848.0	22.93	Ave.	161	1.3	H	19.39	42.32	54	11.68
7386.0	25.64	Ave.	156	1.4	V	15.91	41.55	54	12.45
156.1	45.91	QP	57	1.1	V	-14.9	31.01	43.5	12.49
4924.0	43.51	PK	185	1.4	H	12.50	56.01	74	17.99
9848.0	34.18	PK	161	1.3	H	19.39	53.57	74	20.43
7386.0	37.58	PK	156	1.4	V	15.91	53.49	74	20.51
2377.7	26.87	Ave.	267	1.3	V	6.13	33.00	54	21.00
2498.1	25.27	Ave.	40	1.5	H	7.59	32.86	54	21.14
2388.6	26.57	Ave.	311	1.3	H	6.13	32.70	54	21.30
2377.7	42.21	PK	267	1.3	V	6.13	48.34	74	25.66
2498.1	40.14	PK	40	1.5	H	7.59	47.73	74	26.27
2388.6	41.57	PK	311	1.3	H	6.13	47.70	74	26.30

802.11g mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	97.33	PK	303	1.4	H	7.21	104.54	/	/
2412.0	84.02	Ave.	303	1.4	H	7.21	91.23	/	/
2412.0	90.28	PK	335	1.4	V	7.21	97.49	/	/
2412.0	77.34	Ave.	335	1.4	V	7.21	84.55	/	/
7236.0	26.45	Ave.	178	1.5	V	16.62	43.07	54	10.93
156.1	47.05	QP	124	1.2	V	-14.9	32.15	43.5	11.35
9648.0	22.37	Ave.	143	1.5	H	19.29	41.66	54	12.34
4824.0	26.57	Ave.	285	1.4	H	12.40	38.97	54	15.03
7236.0	39.56	PK	178	1.5	V	16.62	56.18	74	17.82
9648.0	35.26	PK	143	1.5	H	19.29	54.55	74	19.45
2385.2	26.97	Ave.	164	1.4	H	6.13	33.10	54	20.90
2377.8	26.58	Ave.	151	1.5	V	6.13	32.71	54	21.29
2492.1	25.30	Ave.	130	1.4	H	7.21	32.51	54	21.49
4824.0	38.25	PK	285	1.4	H	12.40	50.65	74	23.35
2385.2	42.24	PK	164	1.4	H	6.13	48.37	74	25.63
2492.1	40.20	PK	130	1.4	H	7.21	47.41	74	26.59
2377.8	41.24	PK	151	1.5	V	6.13	47.37	74	26.63
Middle Channel (2437 MHz)									
2437.0	98.57	PK	348	1.3	H	7.21	105.78	/	/
2437.0	76.27	Ave.	348	1.3	H	7.21	83.48	/	/
2437.0	96.24	PK	254	1.2	V	7.21	103.45	/	/
2437.0	84.31	Ave.	254	1.2	V	7.21	91.52	/	/
156.1	47.24	QP	124	1.2	V	-14.9	32.34	43.5	11.16
7311.0	25.84	Ave.	262	1.3	V	16.49	42.33	54	11.67
9748.0	22.17	Ave.	11	1.4	H	19.40	41.57	54	12.43
4874.0	25.64	Ave.	174	1.5	H	12.46	38.10	54	15.90
7311.0	38.62	PK	262	1.3	V	16.49	55.11	74	18.89
9748.0	34.32	PK	11	1.4	H	19.40	53.72	74	20.28
2495.2	26.36	Ave.	321	1.5	H	7.21	33.57	54	20.43
2373.5	26.66	Ave.	320	1.3	V	6.13	32.79	54	21.21
2388.8	26.57	Ave.	331	1.3	H	6.13	32.70	54	21.30
4874.0	38.26	PK	174	1.5	H	12.46	50.72	74	23.28
2495.2	42.23	PK	321	1.5	H	7.21	49.44	74	24.56
2373.5	41.33	PK	320	1.3	V	6.13	47.46	74	26.54
2388.8	41.24	PK	331	1.3	H	6.13	47.37	74	26.63

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	97.21	PK	300	1.3	H	7.21	104.42	/	/
2462.0	85.17	Ave.	300	1.3	H	7.21	92.38	/	/
2462.0	97.26	PK	78	1.4	V	7.21	104.47	/	/
2462.0	84.67	Ave.	78	1.4	V	7.21	91.88	/	/
156.1	48.02	QP	231	1.0	V	-14.9	33.12	43.5	10.38
9848.0	22.58	Ave.	193	1.4	H	19.39	41.97	54	12.03
7386.0	24.26	Ave.	295	1.3	V	15.91	40.17	54	13.83
4924.0	25.45	Ave.	88	1.2	H	12.50	37.95	54	16.05
9848.0	34.65	PK	193	1.4	H	19.39	54.04	74	19.96
2383.3	26.51	Ave.	259	1.4	H	6.13	32.64	54	21.36
2485.2	25.27	Ave.	345	1.2	H	7.21	32.48	54	21.52
7386.0	36.54	PK	295	1.3	V	15.91	52.45	74	21.55
2375.0	25.54	Ave.	203	1.2	V	6.13	31.67	54	22.33
4924.0	37.35	PK	88	1.2	H	12.50	49.85	74	24.15
2485.2	40.35	PK	345	1.2	H	7.21	47.56	74	26.44
2383.3	41.24	PK	259	1.4	H	6.13	47.37	74	26.63
2375.0	39.68	PK	203	1.2	V	6.13	45.81	74	28.19

802.11n-HT20 mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	93.27	PK	154	1.6	H	7.21	100.48	/	/
2412.0	82.17	Ave.	154	1.6	H	7.21	89.38	/	/
2412.0	90.21	PK	138	1.4	V	7.21	97.42	/	/
2412.0	79.28	Ave.	138	1.4	V	7.21	86.49	/	/
9648.0	23.01	Ave.	20	1.3	H	19.29	42.30	54	11.70
7236.0	25.16	Ave.	271	1.4	V	16.62	41.78	54	12.22
150.2	45.11	QP	87	1.3	V	-14.9	30.21	43.5	13.29
4824.0	26.57	Ave.	78	1.3	H	12.40	38.97	54	15.03
7236.0	38.14	PK	271	1.4	V	16.62	54.76	74	19.24
9648.0	35.30	PK	20	1.3	H	19.29	54.59	74	19.41
2389.5	26.72	Ave.	252	1.3	H	6.13	32.85	54	21.15
2484.3	25.32	Ave.	202	1.5	H	7.21	32.53	54	21.47
2372.0	25.68	Ave.	20	1.3	V	6.13	31.81	54	22.19
4824.0	39.26	PK	78	1.3	H	12.40	51.66	74	22.34
2484.3	40.21	PK	202	1.5	H	7.21	47.42	74	26.58
2389.5	41.24	PK	252	1.3	H	6.13	47.37	74	26.63
2372.0	39.14	PK	20	1.3	V	6.13	45.27	74	28.73
Middle Channel (2437 MHz)									
2437.0	91.27	PK	21	1.2	H	7.21	98.48	/	/
2437.0	80.29	Ave.	21	1.2	H	7.21	87.50	/	/
2437.0	92.64	PK	97	1.4	V	7.21	99.85	/	/
2437.0	81.37	Ave.	97	1.4	V	7.21	88.58	/	/
9748.0	24.65	Ave.	271	1.3	H	19.40	44.05	54	9.95
7311.0	26.15	Ave.	23	1.3	V	16.49	42.64	54	11.36
156.1	46.37	QP	127	1.1	V	-14.9	31.47	43.5	12.03
4874.0	25.36	Ave.	5	1.2	H	12.46	37.82	54	16.18
7311.0	39.64	PK	23	1.3	V	16.49	56.13	74	17.87
9748.0	35.31	PK	271	1.3	H	19.40	54.71	74	19.29
2387.5	26.82	Ave.	155	1.4	H	6.13	32.95	54	21.05
2374.0	26.43	Ave.	47	1.3	V	6.13	32.56	54	21.44
2484.7	25.14	Ave.	338	1.5	H	7.21	32.35	54	21.65
4874.0	38.26	PK	5	1.2	H	12.46	50.72	74	23.28
2387.5	42.05	PK	155	1.4	H	6.13	48.18	74	25.82
2374.0	41.14	PK	47	1.3	V	6.13	47.27	74	26.73
2484.7	40.03	PK	338	1.5	H	7.21	47.24	74	26.76

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	91.27	PK	257	1.3	H	7.21	98.48	/	/
2462.0	80.67	Ave.	257	1.3	H	7.21	87.88	/	/
2462.0	92.67	PK	98	1.3	V	7.21	99.88	/	/
2462.0	81.57	Ave.	98	1.3	V	7.21	88.78	/	/
9848.0	22.51	Ave.	40	1.3	H	19.39	41.90	54	12.10
156.1	45.19	QP	124	1.4	V	-14.9	30.29	43.5	13.21
7386.0	24.34	Ave.	165	1.5	V	15.91	40.25	54	13.75
4924.0	26.68	Ave.	290	1.3	H	12.50	39.18	54	14.82
9848.0	34.32	PK	40	1.3	H	19.39	53.71	74	20.29
7386.0	37.26	PK	165	1.5	V	15.91	53.17	74	20.83
2388.2	26.90	Ave.	312	1.3	H	6.13	33.03	54	20.97
2375.1	26.47	Ave.	186	1.4	V	6.13	32.60	54	21.40
2486.5	24.87	Ave.	15	1.4	H	7.21	32.08	54	21.92
4924.0	38.64	PK	290	1.3	H	12.50	51.14	74	22.86
2388.2	42.14	PK	312	1.3	H	6.13	48.27	74	25.73
2375.1	41.21	PK	186	1.4	V	6.13	47.34	74	26.66
2486.5	39.24	PK	15	1.4	H	7.21	46.45	74	27.55

802.11n-HT40 mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2422 MHz)									
2422.0	89.58	PK	131	1.2	H	6.13	95.71	/	/
2422.0	79.57	Ave.	131	1.2	H	6.13	85.70	/	/
2422.0	88.67	PK	108	1.4	V	6.13	94.80	/	/
2422.0	78.95	Ave.	108	1.4	V	6.13	85.08	/	/
7266.0	25.46	Ave.	255	1.4	V	16.62	42.08	54	11.92
156.1	46.28	QP	20	1.1	V	-14.9	31.38	43.5	12.12
9688.0	22.57	Ave.	326	1.4	H	19.29	41.86	54	12.14
4844.0	26.25	Ave.	231	1.4	H	12.40	38.65	54	15.35
9688.0	34.68	PK	326	1.4	H	19.29	53.97	74	20.03
7266.0	37.34	PK	255	1.4	V	16.62	53.96	74	20.04
2387.5	26.78	Ave.	315	1.4	H	6.13	32.91	54	21.09
2483.6	25.17	Ave.	316	1.3	H	7.21	32.38	54	21.62
2376.7	26.15	Ave.	143	1.3	V	6.13	32.28	54	21.72
4844.0	39.26	PK	231	1.4	H	12.40	51.66	74	22.34
2387.5	41.87	PK	315	1.4	H	6.13	48.00	74	26.00
2483.6	39.25	PK	316	1.3	H	7.21	46.46	74	27.54
2376.7	40.24	PK	143	1.3	V	6.13	46.37	74	27.63
Middle Channel (2437 MHz)									
2437.0	90.24	PK	189	1.5	H	7.21	97.45	/	/
2437.0	80.92	Ave.	189	1.5	H	7.21	88.13	/	/
2437.0	89.67	PK	148	1.3	V	7.21	96.88	/	/
2437.0	79.24	Ave.	148	1.3	V	7.21	86.45	/	/
156.1	46.97	QP	165	1.0	V	-14.9	32.07	43.5	11.43
9748.0	22.06	Ave.	48	1.2	H	19.40	41.46	54	12.54
7311.0	24.14	Ave.	323	1.4	V	16.49	40.63	54	13.37
4874.0	24.35	Ave.	175	1.5	H	12.46	36.81	54	17.19
9748.0	35.32	PK	48	1.2	H	19.40	54.72	74	19.28
7311.0	37.16	PK	323	1.4	V	16.49	53.65	74	20.35
2492.5	25.87	Ave.	94	1.3	H	7.21	33.08	54	20.92
2384.2	26.79	Ave.	273	1.3	H	6.13	32.92	54	21.08
2376.6	26.10	Ave.	124	1.4	V	6.13	32.23	54	21.77
4874.0	36.29	PK	175	1.5	H	12.46	48.75	74	25.25
2384.2	42.14	PK	273	1.3	H	6.13	48.27	74	25.73
2492.5	40.31	PK	94	1.3	H	7.21	47.52	74	26.48
2376.6	39.24	PK	124	1.4	V	6.13	45.37	74	28.63

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/15.205/15.209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2452 MHz)									
2452.0	89.75	PK	289	1.4	H	7.21	96.96	/	/
2452.0	79.57	Ave.	289	1.4	H	7.21	86.78	/	/
2452.0	90.38	PK	201	1.5	V	7.21	97.59	/	/
2452.0	80.47	Ave.	201	1.5	V	7.21	87.68	/	/
156.1	47.91	QP	98	1.1	V	-14.9	33.01	43.5	10.49
9808.0	21.81	Ave.	17	1.4	H	19.29	41.10	54	12.90
7356.0	24.38	Ave.	107	1.2	V	15.91	40.29	54	13.71
4904.0	25.35	Ave.	262	1.5	H	12.46	37.81	54	16.19
2485.0	26.63	Ave.	13	1.2	H	7.21	33.84	54	20.16
9808.0	34.26	PK	17	1.4	H	19.29	53.55	74	20.45
2388.7	26.88	Ave.	258	1.3	H	6.13	33.01	54	20.99
2378.1	26.01	Ave.	213	1.4	V	6.13	32.14	54	21.86
7356.0	36.18	PK	107	1.2	V	15.91	52.09	74	21.91
4904.0	37.68	PK	262	1.5	H	12.46	50.14	74	23.86
2388.7	43.21	PK	258	1.3	H	6.13	49.34	74	24.66
2485.0	41.56	PK	13	1.2	H	7.21	48.77	74	25.23
2378.1	39.21	PK	213	1.4	V	6.13	45.34	74	28.66

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) + cable loss – amplifier factor

Margin = Limit- Corr. Amplitude

*Within measurement uncertainty!

Conducted Spurious Emissions at Antenna Port:

Test data is referred to FCC ID: PD9633ANH granted on 2009-08-10, report No.: INTEL-090526F-Rev.A1, which was tested by AEGIS Laboratories.

FCC §15.247(a) (2) – 6 dB EMISSIONS BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Data

Test data is referred to FCC ID: PD9633ANH granted on 2009-08-10, report No.: INTEL-090526F-Rev.A1, which was tested by AEGIS Laboratories.

FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Data

Test data is referred to FCC ID: PD9633ANH granted on 2009-08-10, report No.: INTEL-090526F-Rev.A1, which was tested by AEGIS Laboratories.

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

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 below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Data

Test data is referred to FCC ID: PD9633ANH granted on 2009-08-10, report No.: INTEL-090526F-Rev.A1, which was tested by AEGIS Laboratories.

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Data

Test data is referred to FCC ID: PD9633ANH granted on 2009-08-10, report No.: INTEL-090526F-Rev.A1, which was tested by AEGIS Laboratories.

DECLARATION LETTER



X2 Computing Ltd.

Bond Industrial Estate, Wickhamford, EVESHAM, Worcestershire, WR11 7RL, UK
Tel: +44 (0)1386 830082 Fax: +44 (0)1386 830032

Attestation Letter

August 1, 2013

To:
Bay Area Compliance Laboratories Corp.
1274 Anvilwood Avenue
Sunnyvale, CA 94089

Dear Sir or Madam:

We, X2 Computing Ltd. hereby declare that our Tablet, Model Number: X220 Carbon, FCC ID: RGCCARBONX2206300, with AUO & Chimei LCD screens; different top cover for Capacitive & Resistive touch panels; different battery cover each of 8000mAh and 160000mAh batteries; the PCBA with same PCB but with 8pin and 12pin pogo connector alternative; with 32G and 16G storage, different color for led lamp each of Halo LED or not; front camera and rear camera both are the optional part; Plastic and Rubber I/O cover is also optional on product.

Best Regards,

Signature:


Robin Daunter
Technical Director

*******END OF REPORT*******