EMC
TEST REPORT

Report No. : TS08100114-EME
Model No. : EWPA1PCIAA
Issued Date : Dec. 15, 2008

Applicant:	**Hangzhou H3C Technologies Co., Ltd.** **310 Liuhe Road, Zhijiang Science Park, Hangzhou 310053, P.R.China**
Test Method/ Standard:	**FCC Part 15 Subpart E Section §15.207、§15.209 、§15.407 and ANSI C63.4/2003.**
Test By:	**Intertek Testing Services Taiwan Ltd.** **No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan**

The test report was prepared by:	Sign on File Sammi Liu/ Assistant
These measurements were taken by:	Sign on File Jacky Chen/ Engineer
The test report was reviewed by:	Jimmie Liu **Name** Jimmie Liu **Title** Engineer

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Summary of Tests

Wireless mini PCI Card
FCC ID: U6I-EWPA1PCIAA

Test	Reference	Results
Peak output power test	15.407 (a)(1)/(2)/(3) DA 02-2138	Pass
Power Spectrum Density test	15.407 (a)(1)/(2)/(3) DA 02-2138	Pass
Peak excursion to average ratio test	15.407(a)(6) DA 02-2138	Pass
Radiated spurious emission test	15.407(b)(1)/(2)/(3)/(6), 15.209	Pass
Dynamic Frequency Selection (DFS) test	15.407(h), FCC 06-96	No required due to this device was only used UNII band of 5150-5250MHz
Additional provisions	15.215(c)	Pass
AC line conducted emission test	15.407(b)(6) 15.207	Pass

1. General information

1.1 Identification of the EUT

Applicant:	Hangzhou H3C Technologies Co., Ltd.
Product:	Wireless mini PCI Card
Model No.:	EWPA1PCIAA
Operating Frequency:	5180MHz ~ 5240MHz
Channel Number:	4 channels
Frequency of Each Channel:	5180MHz+20k MHz; k=0~3
Type of Modulation:	OFDM
Rated Power:	DC 5 V from Notebook PC
Power Cord:	N/A
Data Cable:	N/A
Sample Received:	Oct. 21, 2008
Test Date(s):	Nov. 04, 2008 ~ Nov. 07, 2008
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The EUT is a Wireless mini PCI Card, and was defined as information technology equipment.

The EUT meets special requirements for full modular approval on FCC Public Notice DA 00-1407 and the device is only for OEM integrator, please refer the test result in this report.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”.

1.3 Antenna description

Antenna 1 (Model: SL3089A)

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain: 5dBi @5G
Antenna Type: Dipole antenna
Connector Type: N-Female

Antenna 2 (Model: TQJ-24/58XTJI)

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain: 5dBi @5G
Antenna Type: Dipole antenna
Connector Type: N-Female

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	DELL	Latitude D610	4YWZK1S	FCC DoC Approved
Mouse	IBM	MO09BO	23-021287	FCC DoC Approved

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart E Section §15.207、§15.209、§15.407、DA 02-2138 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

The AC power conducted emissions was invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz (15.207 paragraph).

Radiated emissions were invested cover the frequency range from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz and 10 Hz VBW record Average reading (15.209 paragraph), the Peak reading recorded also on the report.

The EUT setup configurations please refer to the photo of test configuration in item.

2.2 Operation mode

The EUT was transmitted continuously during the test.

With individual verifying, the maximum output power was found at 6 Mbps data rate for 802.11a mode. The final tests were executed under these conditions and recorded in this report individually.

802.11a CH 40 5200 MHz	
Data rate(Mbps)	PK(dBm)
6	16.29
9	16.29
12	16.24
18	16.22
24	16.17
36	16.10
48	16.06
54	16.03

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.
EMI Test Receiver	Rohde & Schwarz	9 kHz~2.75 GHz	ESCS 30
Spectrum Analyzer	Rohde & Schwarz	9 kHz~30 GHz	FSP 30
Spectrum Analyzer	Rohde & Schwarz	20 Hz~40 GHz	FSEK 30
Horn Antenna	EMCO	1 GHz~18 GHz	3115
Horn Antenna	SCHWARZBECK	14 GHz~40 GHz	BBHA 9170
Bilog Antenna	SCHWARZBECK	25 MHz~1.7 GHz	VULB 9160
Pre-Amplifier	MITEQ	100 MHz~26.5 GHz	919981
Pre-Amplifier	MITEQ	26 GHz~40 GHz	828825
Controller	HDGmbH	N/A	HD 100
Antenna Tower	HDGmbH	N/A	MA 240
Turn Table	HDGmbH	N/A	DS 420S
LISN	Rohde & Schwarz	9 kHz~30 MHz	ESH3-Z5

Note: The above equipments are within the valid calibration period.

3. Peak Output Power test (FCC 15.407)

3.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1023	hPa

3.2 Test setup & procedure

The power output per FCC §15.407(a) was measured on the EUT using a 50 ohm SMA cable connected to power meter via power sensor. Power was read directly and cable loss correction (3.0dB) was added to the reading to obtain power at the EUT antenna terminals.

3.3 Limit

Operating Frequency (MHz)	Output power limit
5150~5250	< 50 mW (17 dBm) or 4 dBm+10 log B
5250~5350, 5470~5725	< 250 mW (24 dBm) or 11 dBm+10 log B
5725~5825	< 1 W (30 dBm) or 17 dBm+10 log B

Remark: where B is the –26 dB emission bandwidth in MHz.

3.4 Measured data of Maximum Output Power test results

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Output Power (dBm)	Limit (dBm)	Result
				CH PWR		
802.11a	36	5180	6	15.44	17	Pass
	40	5200		16.29	17	Pass
	48	5240		16.05	17	Pass

4. Power Spectrum Density test (FCC 15.407)

4.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1023	hPa

4.2 Test setup & procedure

The power spectrum density per FCC §15.407(a) was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set at 1MHz, the video bandwidth set at 3 MHz. Power spectrum density was read directly and cable loss (3.0 dB)/external attenuator (20 dB) correction was added to the reading to obtain power at the EUT antenna terminals.

4.3 Limitation

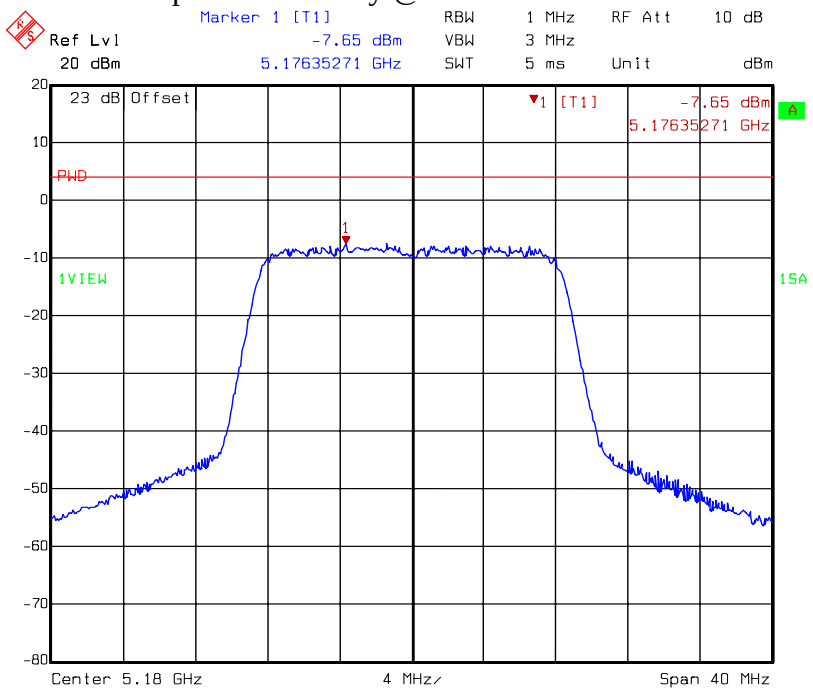
Operating Frequency (MHz)	Power density limit
5150~5250	< 4 dBm/MHz
5250~5350, 5470~5725	< 11 dBm/MHz
5725~5825	< 17 dBm/MHz

4.4 Measured data of Power Spectrum Density test results

Mode	Channel	Frequency (MHz)	Data rate Mbps	PPSD (dBm)	Limit (dBm)	Reault
802.11a	36	5180	6	-7.65	4	Pass
	40	5200		-6.14	4	Pass
	48	5240		-6.09	4	Pass

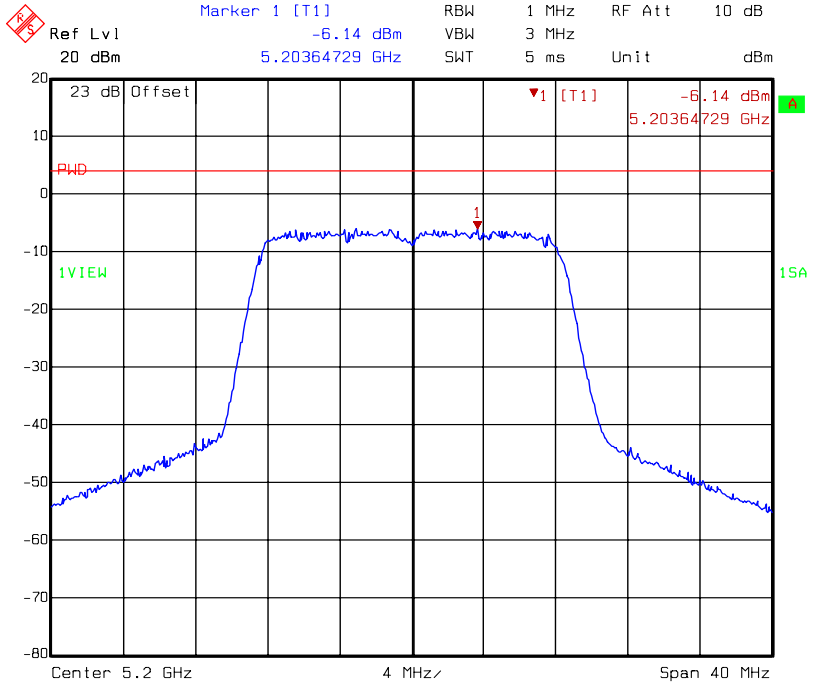
Please see the plot below.

Power Spectrum Density @ 802.11a mode channel 36



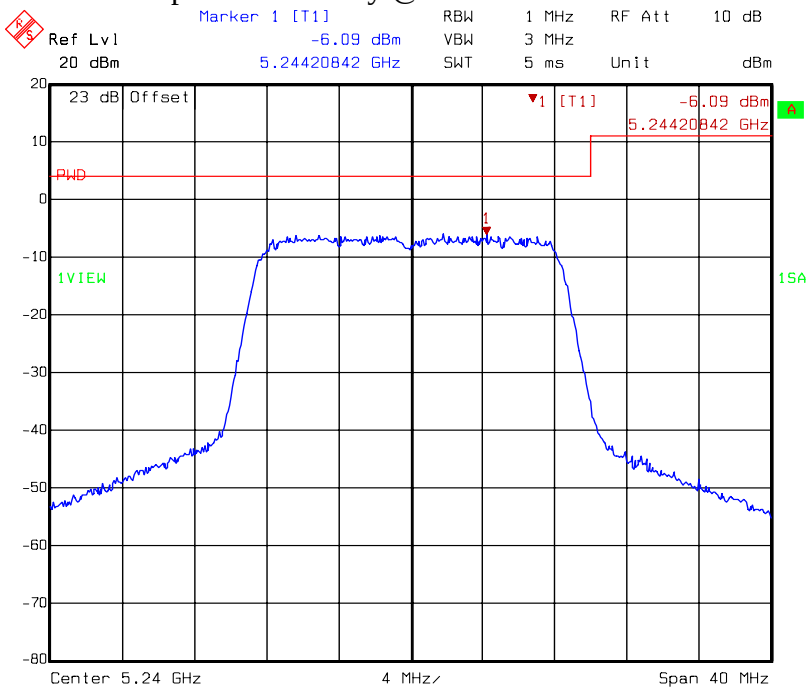
Title: Power Density
Comment A: CH 36 at 802.11a mode 5150-5250
Date: 05.NOV.2008 15:30:00

Power Spectrum Density @ 802.11a mode channel 40



Title: Power Density
Comment A: CH 40 at 802.11a mode 5150-5250
Date: 05.NOV.2008 15:35:00

Power Spectrum Density @ 802.11a mode channel 48



Title: Power Density
Comment A: CH 48 at 802.11a mode 5150-5250
Date: 05.NOV.2008 15:39:23

5. Additional provisions test (FCC 15.215)

5.1 Operating environment

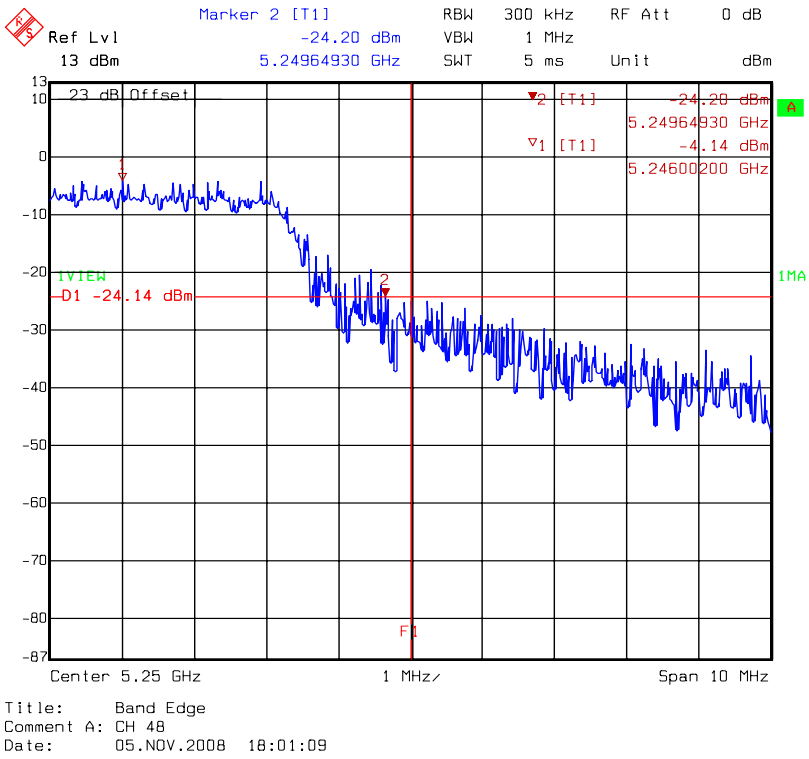
Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1023	hPa

5.2 Procedure of test setup & limitation

The additional provisions mean the device must be designed to ensure that the 20dB bandwidth of the emission or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

This requirement per FCC §15.215 (c) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 300kHz (approximately 1% of the emission bandwidth), the video bandwidth set at 1MHz (VBW > RBW).

5.3 Measured data of Power Spectrum Density test results



6. Peak excursion to average ratio test (FCC 15.407)

6.1 Operating environment

Temperature: 25 ℃
Relative Humidity: 50 %
Atmospheric Pressure: 1023 hPa

6.2 Test setup & procedure

The power spectrum density per FCC §15.407(a)(6) was measured from the antenna port of the EUT. Using a 50ohm spectrum analyzer with the RBW=1MHz, VBW=3MHz for peak measurement and RBW=1MHz, VBW=10kHz for average measurement. Peak excursion to average ratio was read directly.

6.3 Limitation

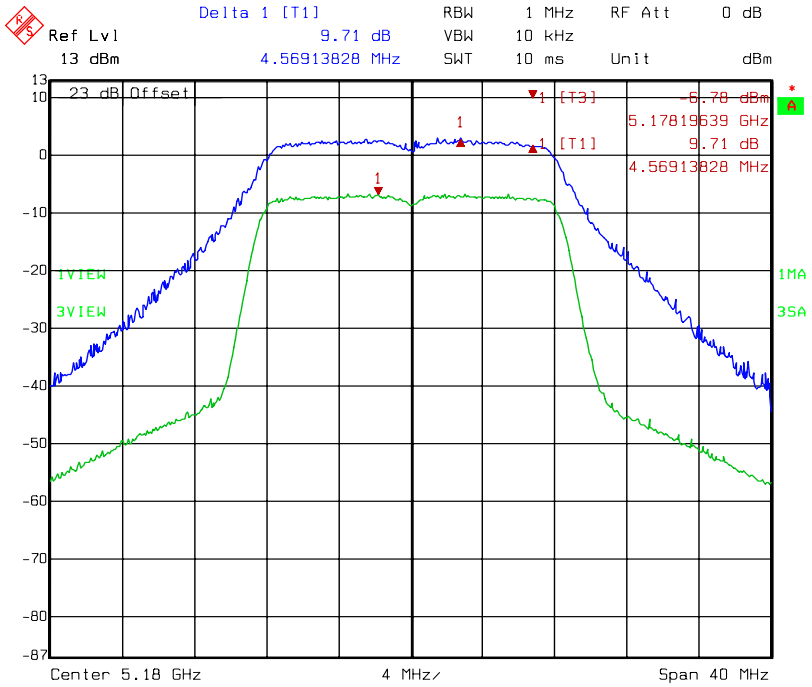
Operating Frequency (MHz)	Peak excursion to average ratio limit
5150~5250	<13dB
5250~5350, 5470~5725	<13dB
5725~5825	<13dB

6.4 Measured data of Peak excursion to average ratio test results

Mode	Channel	Frequency (MHz)	Data rate Mbps	PEAR (dBm)	Limit (dBm)
802.11a	36	5180	6	9.71	13
	40	5200		10.25	13
	48	5240		9.36	13

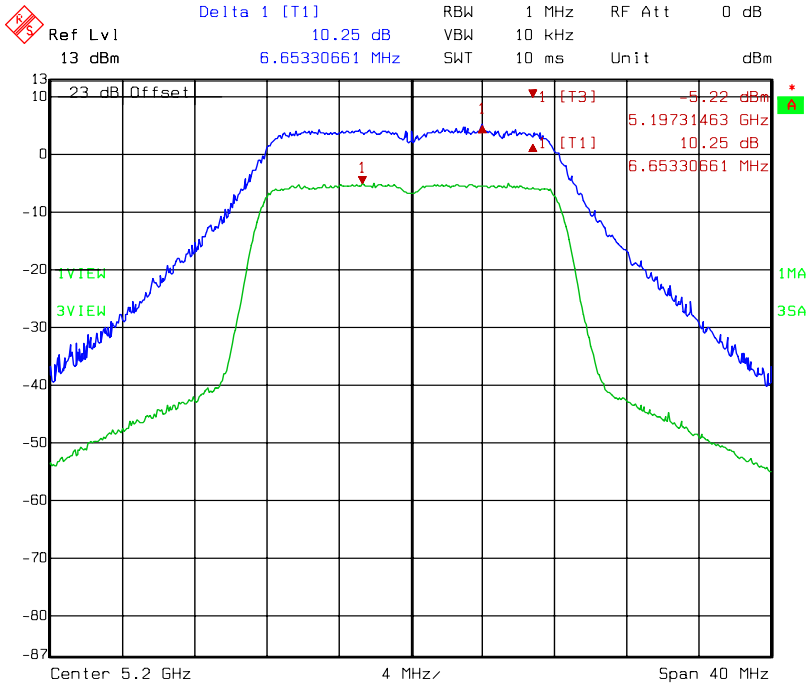
Please see the plot below.

Peak excursion to average ratio @ 802.11a mode channel 36



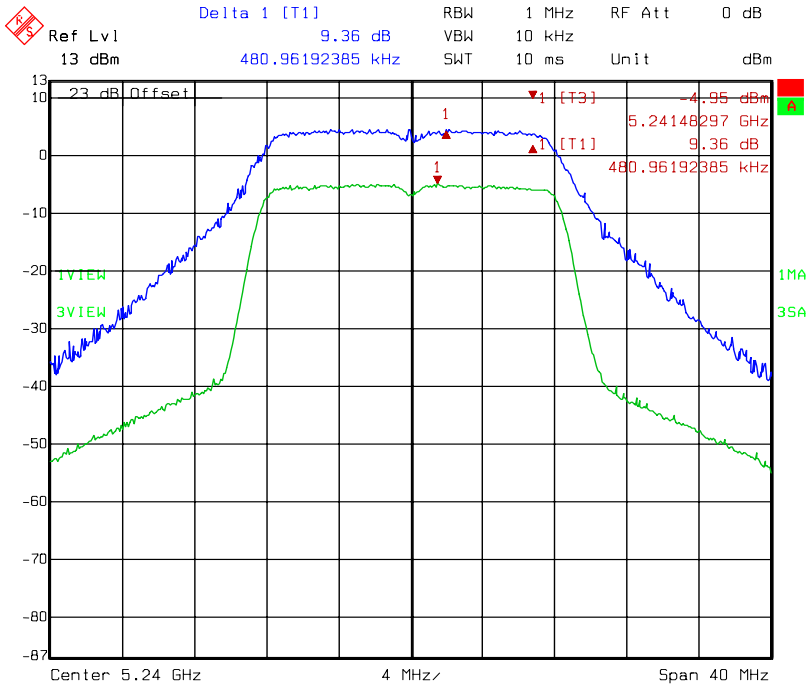
Title: PK Excursion AV
Comment A: CH 36 at 802.11a mode 5150-5250
Date: 05.NOV.2008 15:29:36

Peak excursion to average ratio @ 802.11a mode channel 40



Title: PK Excursion AV
Comment A: CH 40 at 802.11a mode 5150-5250
Date: 05.NOV.2008 15:34:36

Peak excursion to average ratio @ 802.11a mode channel 48



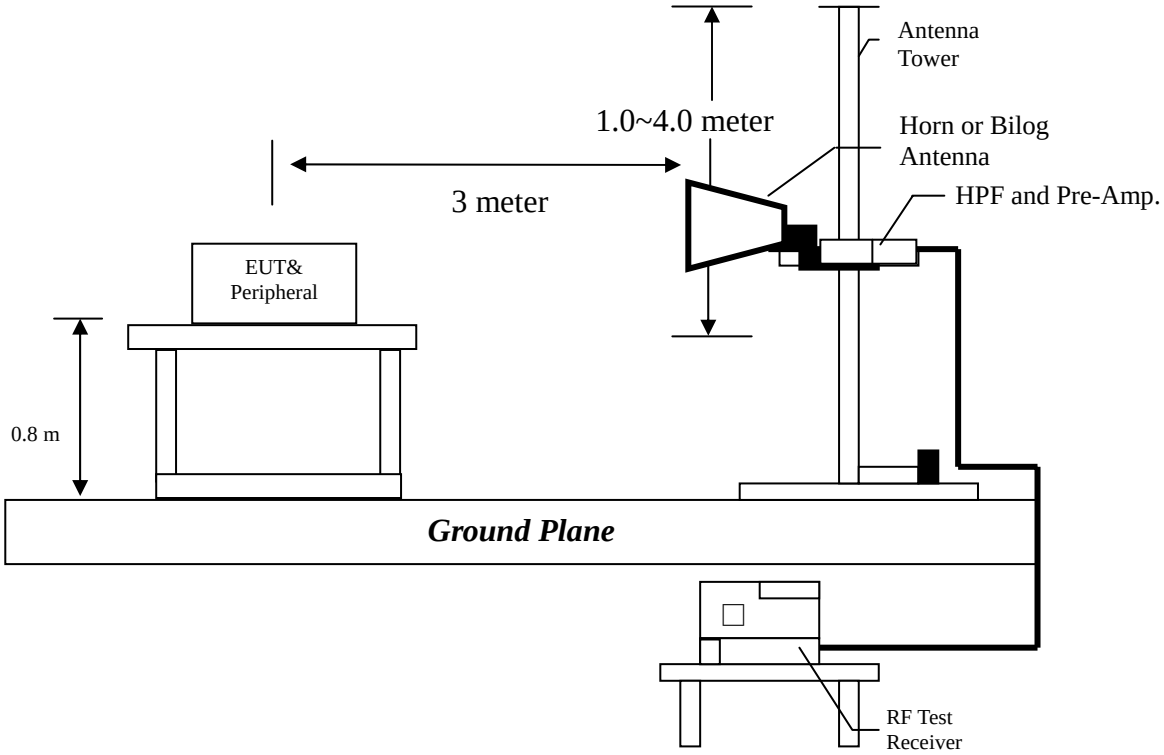
7. Radiated Emission test (FCC 15.205 & 15.209)

7.1 Operating environment

Temperature:	23	℃
Relative Humidity:	58	%
Atmospheric Pressure	1023	hPa

7.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emission measurements were performed from 30MHz to tenth harmonic or 40GHz. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

7.3 Emission limits

The spurious Emission shall test through the 10th harmonic. 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).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of radiated emission measurement is ±3.078 dB.
Expanded uncertainty (k=2) of conducted emission measurement is ±2.02 dB.

7.4 Radiated spurious emission test data

7.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under 802.11a continuously transmitting mode. The worst case occurred at 802.11a Tx channel 40.

EUT: EWPA1PCIAA
Worst Case: 802.11a Tx at channel 40
Antenna 1: Model: SL3089A

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	249.220	QP	12.22	18.07	30.29	46.00	-15.72
V	364.650	QP	15.06	18.21	33.27	46.00	-12.73
V	399.570	QP	16.40	17.91	34.31	46.00	-11.69
V	566.410	QP	19.53	13.16	32.69	46.00	-13.31
V	599.390	QP	20.71	14.34	35.05	46.00	-10.95
V	798.240	QP	23.19	10.06	33.25	46.00	-12.75
H	231.760	QP	11.74	27.83	39.57	46.00	-6.43
H	298.690	QP	14.17	22.35	36.52	46.00	-9.49
H	365.620	QP	15.48	26.25	41.73	46.00	-4.28
H	399.570	QP	16.74	22.68	39.42	46.00	-6.58
H	599.390	QP	20.84	14.05	34.89	46.00	-11.12
H	800.180	QP	23.62	15.93	39.55	46.00	-6.45

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

EUT: EWPA1PCIAA
Worst Case: 802.11a Tx at channel 40
Antenna 2: Model: TQJ-24/58XTJI

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	365.620	QP	15.06	18.84	33.90	46.00	-12.10
V	399.570	QP	16.40	17.54	33.94	46.00	-12.06
V	499.480	QP	18.43	12.43	30.86	46.00	-15.15
V	596.480	QP	20.71	11.48	32.19	46.00	-13.81
V	800.180	QP	23.29	9.61	32.90	46.00	-13.10
V	942.770	QP	25.13	13.36	38.49	46.00	-7.52
H	182.290	QP	12.08	25.79	37.87	43.50	-5.63
H	199.750	QP	11.27	27.88	39.15	43.50	-4.36
H	231.760	QP	11.74	30.16	41.90	46.00	-4.10
H	365.620	QP	15.48	29.12	44.60	46.00	-1.41
H	399.570	QP	16.74	22.44	39.18	46.00	-6.82
H	800.180	QP	23.62	12.93	36.55	46.00	-9.45

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

7.4.2 Measurement results: frequency above 1GHz

EUT: EWPA1PCIAA
Test Condition: 802.11a Tx at channel 36
Antenna 1: SL3089A

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10360.00	PK	V	33.72	48.15	35.23	49.66	54	-4.34
10360.00	PK	H	33.72	48.15	35.33	49.76	54	-4.24

EUT: EWPA1PCIAA
Test Condition: 802.11a Tx at channel 40
Antenna 1: SL3089A

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10400.00	PK	V	33.72	48.15	35.23	49.66	54	-4.34
10400.00	PK	H	33.72	48.15	35.14	49.57	54	-4.43

EUT: EWPA1PCIAA
Test Condition: 802.11a Tx at channel 48
Antenna 1: SL3089A

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10480.00	PK	V	33.72	48.15	35.06	49.49	54	-4.51
10480.00	PK	H	33.72	48.15	35.59	50.02	54	-3.98

EUT: EWPA1PCIAA
Test Condition: 802.11a Tx at channel 36
Antenna 2: TQJ-24/58XTJI

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10360.00	PK	V	33.72	48.15	35.47	49.90	54	-4.10
10360.00	PK	H	33.72	48.15	35.67	50.10	54	-3.90

EUT: EWPA1PCIAA
Test Condition: 802.11a Tx at channel 40
Antenna 2: TQJ-24/58XTJI

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10400.00	PK	V	33.72	48.15	36.05	50.48	54	-3.52
10400.00	PK	H	33.72	48.15	36.46	50.89	54	-3.11

EUT: EWPA1PCIAA
Test Condition: 802.11a Tx at channel 48
Antenna 2: TQJ-24/58XTJI

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
10480.00	PK	V	33.72	48.15	36.86	51.29	54	-2.71
10480.00	PK	H	33.72	48.15	35.97	50.40	54	-3.60

8. Emission on the band edge §FCC 15.205

The measurement was made to the average and peak field strength of the fundamental frequency. And the spurious emission in the restrict band must also comply with the FCC subpart C 15.209.

8.1 Operating environment

Temperature:	22	℃
Relative Humidity:	56	%
Atmospheric Pressure	1023	hPa

8.2 Test setup & procedure

The output of EUT was connected to spectrum analyzer via a 50ohm cable.

The setting of spectrum analyzer is:

Peak:	RBW = 100kHz ;	VBW = 100kHz
Average:	RBW = 1MHz ;	VBW = 10Hz

8.3 Test Result

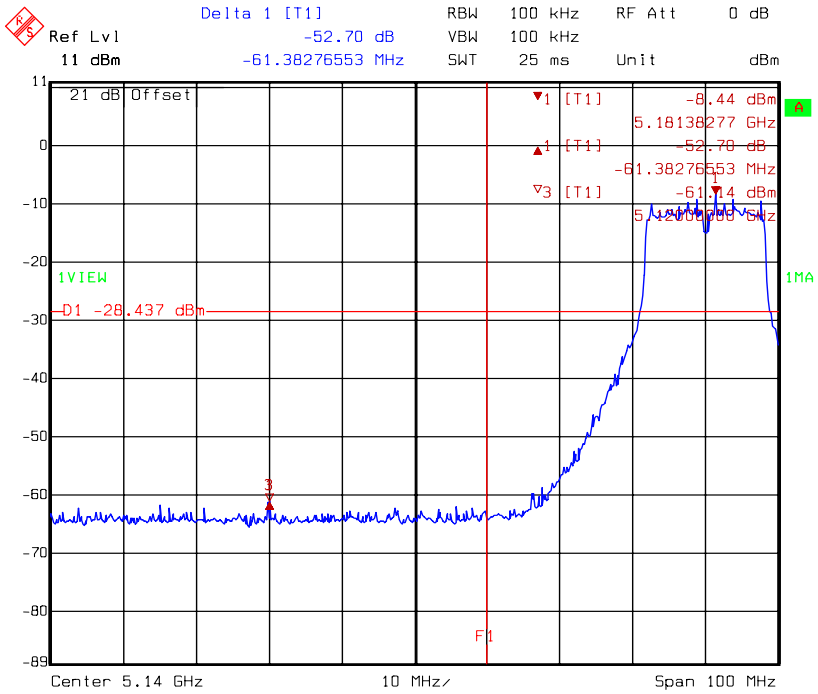
EUT: EWPA1PCIAA
Antenna 1: SL3089A

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
11a 36	PK	102.56	52.70	49.86	74	-24.14
	AV	93.34	54.84	38.50	54	-15.50

EUT: EWPA1PCIAA
Antenna 2: TQJ-24/58XTJI

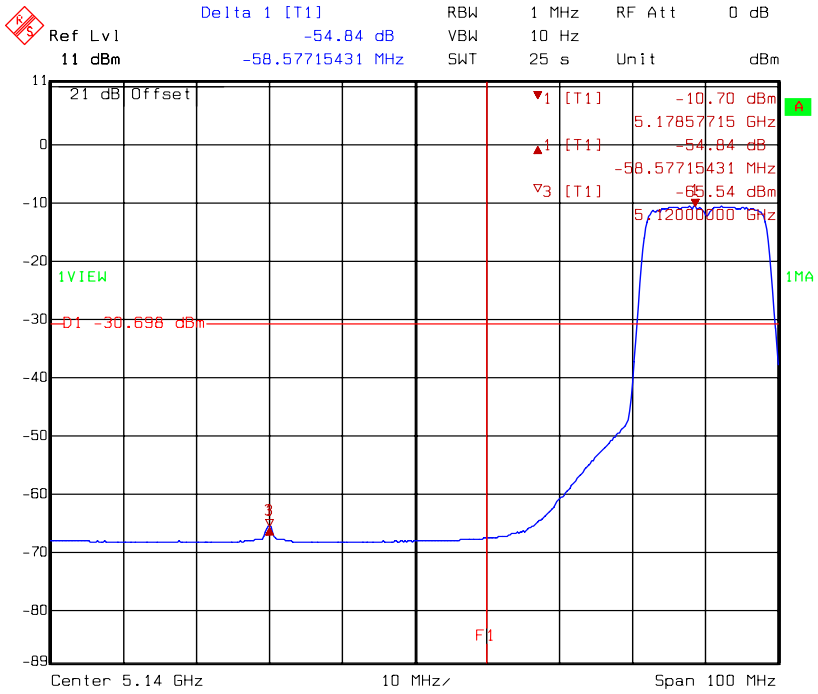
Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental(dBuV)	Between Carrier Max. Power and Loca Max. Emission in Restrict Band (dBc)			
11a ch36	PK	100.61	52.70	47.91	74	-26.09
	AV	90.30	54.84	35.46	54	-18.54

Test mode: 802.11a CH 36 PK



Title: Band Edge
Comment A: CH 36 at 802.11a mode
Date: 05.NOV.2008 17:42:26

Test mode: 802.11a CH 36 AV



Title: Band Edge
Comment A: CH 36 at 802.11a mode
Date: 05.NOV.2008 17:43:43