



FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4 : 2003

TEST REPORT (Class II Permissive Change Report)

For

Managed Dualband Access Point

Model : DWL-8200AP

Data Applies To : DWL-8500AP

Trade Name : D-Link

Issued for

D-Link Co.

No.289, Shinhu 3rd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.

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1. TEST REPORT CERTIFICATION

Applicant : D-Link Co.
Address : No.289, Shinhu 3rd Rd., Neihu District, Taipei City 114,
 Taiwan, R.O.C.
Equipment Under Test : Managed Dualband Access Point
Model : DWL-8200AP
Data Applies To : DWL-8500AP
Trade Name : D-Link
Tested Date : November 21 ~ December 19, 2007

APPLICABLE STANDARD	
STANDARD	TEST RESULT
FCC Part 15 Subpart C:2004 AND ANSI C63.4:2003	No non-compliance noted

Approved by:

Reviewed by:

S. B. Lu 

S. B. Lu
 Manager of Hsinchu Laboratory
 Compliance Certification Services Inc.



Jerry Chang
 Test Engineer of Hsinchu Laboratory
 Compliance Certification Services Inc.

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.



2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product Name	Managed Dualband Access Point
Trade Name	D-Link
Model Number	DWL-8200AP
Data Applies To	DWL-8500AP
Model Discrepancy	Both the above models are identical except the trade name and model
Frequency Range	IEEE 802.11a Base mode: 5.745~5.825 GHz Turbo mode: 5.760 GHz / 5.800 GHz IEEE 802.11b/g Base mode: 2.412~2.462 GHz Turbo mode: 2.437 GHz
Transmit Power	IEEE 802.11a Base mode: 21.82 dBm Turbo mode: 20.89 dBm IEEE 802.11b Base mode: 22.39 dBm IEEE 802.11g Base mode: 18.70 dBm Turbo mode: 17.85 dBm
Transmit Data Rate	6, 9, 12, 18, 24, 36, 48, 54, 108 Mbps
Type of Modulation	OFDM (QPSK, BPSK, 16-QAM, 64-QAM)
Frequency Selection	by software / firmware
Antenna Type	The EUT comes with two different antenna for sale , for detail descriptions , please refer to antenna specification. Trade name / Model name: SmartAnt / ALP05-220170 Antenna Type: Dipole Antenna Antenna Gain: IEEE 802.11a: 5.5 dBi IEEE 802.11b/g: 2.5 dBi Trade name / Model name: WHA YU / C037-510589-A Antenna Type: Dipole Antenna Antenna Gain: IEEE 802.11a: 5.0 dBi IEEE 802.11b/g: 2.5 dBi
Power Source	SA06L48-V A4A ; I/P: 100-240V , 0.6A , 50-60Hz ; O/P: 48V , 0.4A SA06-20S48-V-A4A ; I/P: 100-240V , 0.6A , 50-60Hz ; O/P: 48V , 0.4A JTA0703-W395(OA4F)LF ; I/P: 100-240V , 0.6A , 50-60Hz ; O/P: 48V , 0.4A

Remark :

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: KA2DWL8200APA1 filing to comply with Section 15.207,15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
3. For more details, please refer to the User's manual of the EUT.
4. Those changes doesn't influence the radio portion and then only below 1GHz radiated emission was re-did



2.2 DESCRIPTION OF CLASS II CHANGE

The major change filed under this application are :

- 1: ADD CAP position and mount
- 2: Change Hole From NPTH to PTH
- 3: ADD common mode choke
- 4: Isolate fixed hole from PCB ground
- 5: Update PCB layout of Antenna connector area
- 6: Add series model no.: DWL-8500AP

Those changes doesn't influence the radio portion and then only below 1GHz radiated emission was re-did.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CRF 47 2.1046, 2046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.



4. FACILITIES AND ACCREDITATIONS

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd., Chu-Tung Chen. Hsin-Chu, Taiwan 310 R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

4.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.







Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

4.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200118-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 90585 and 90584).

**4.4 TABLE OF ACCREDITATIONS AND LISTINGS**

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP	EN 55014-1, AS/NZS 1044, CNS 13783-1, IEC/CISPR 14-1, IEC/CISPR 22, EN 55022, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, AS/NZS CISPR 22, AS/NZS 3548, IEC 61000-4-2/3/4/5/6/8/11	 200118-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 90585, 90584
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	 R-1229/1189 C-1250/1294
Taiwan	CNLA	FCC Method-47 CFR Part 15 Subpart C,D,E CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, CNS 13803, CISPR 13, CNS 13439, FCC Method-47 CFR Part 15 Subpart B, CISPR 14-1, EN 55014-1, CNS 13783-1, EN 55015, CNS 14115, CISPR 22, EN 55022, VCCI CNS 13438, EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 0240
Taiwan	BSMI	CNS 13803, CNS 13438, CNS 13439, CNS 13783-1, CNS 14115	 SL2-IS-E-0002 SL2-IN-E-0002 SL2-A1-E-0002 SL2-R1-E-0002 SL2-R2-E-0002 SL2-L1-E-0002
Canada	Industry Canada	RSS-GEN Issue 2	 IC 4417-1

* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.



5. CALIBRATION AND UNCERTAINTY

5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

5.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 1000 MHz	+/- 3.2 dB
Radiated Emission, 1 to 26.5 GHz	+/- 3.2 dB
Power Line Conducted Emission	+/- 2.1 dB

Uncertainty figures are valid to a confidence level of 95%



6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	COMPAQ	N800V	5Y33KSQZM0W4 1YR	DoC
2	Notebook PC	COMPAQ	N800V	5Y31KSQZD1T 1YR	DoC
3	Wireless USB Adapter	NETGEAR	WG111U	-----	PY3WG111U

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

1. Set up all computers like the setup diagram.
2. All of the function are under run.
3. Start test.



7. APPLICABLE LIMITS AND TEST RESULTS

7.1 RADIATED EMISSIONS

7.1.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



§ 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz, However, operation within these frequency bands is permitted under other sections of this Part, e-g, Sections 15.231 and 15.241.

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

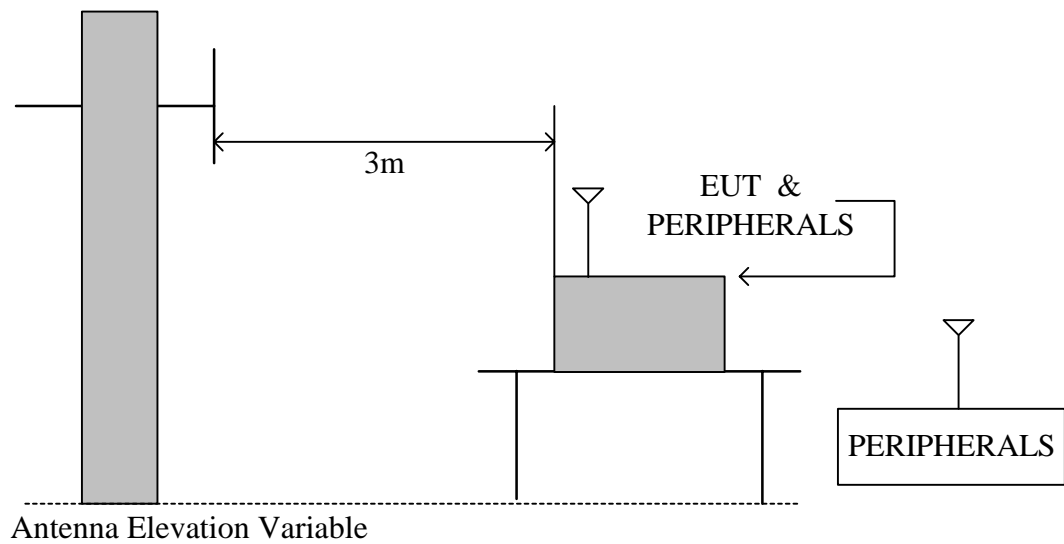
TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

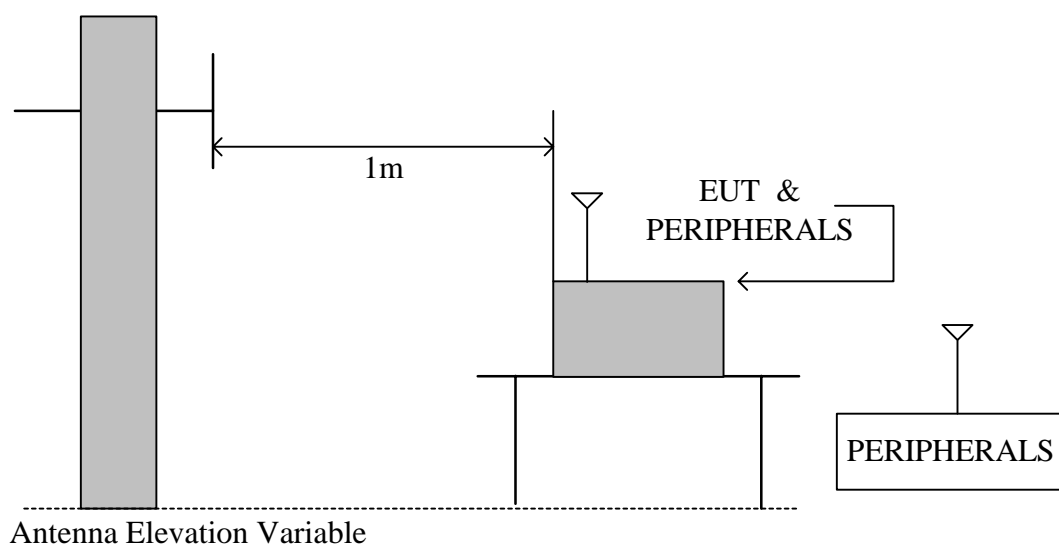
Manufacturer or Type	Model No.	Serial No.	Date of Calibration	Calibration Period	Remark
CHASE BILOG ANTENNA	CBL6112B	2817	October 18, 2007	1 Year	FINAL
R/S SPECTRUM ANALYZER	FSEK30	835253/002	October 25, 2007	1 Year	FINAL
AGILENT SPECTRUM ANALYZER	E4446A	MY433601.32	June 06, 2007	1 Year	FINAL
R/S EMI TEST RECEIVER	ESCS30	835418/008	October 16, 2007	1 Year	FINAL
OPEN SITE	-----	No.2	May 07, 2007	1 Year	FINAL
MIYAZAKI N TYPE COAXIAL CABLE	8D-FB	02	May 16, 2007	1 Year	FINAL
Horn Antenna	AH-118	10089	October 18, 2007	1 Year	FINAL
Horn Antenna	AH-840	03077	February 25, 2007	1 Year	FINAL
Agilent Pre-amplifier	8449B	3008A01471	December 25, 2007	1 Year	FINAL
HP Amplifier	8447D	1937A02748	December 25, 2007	1 Year	FINAL
HP High pass filter	84300/80038	002	CAL. ON USE	1 Year	FINAL
HP High pass filter	84300/80039	003	CAL. ON USE	1 Year	FINAL

TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.





TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 1 meters away from the interference-receiving antenna
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

TEST RESULTS

No non-compliance noted

**7.1.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz**

Product Name	Managed Dualband Access Point	Test Date	2007/11/21
Model	DWL-8200AP	Test By	Jerry Chang
Test Mode	Normal operating	TEMP & Humidity	23°C, 55%

Horizontal polarity								
Frequency (MHz)	Reading (Peak) (dBuV)	Reading (QP) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (QP) (dBuV/m)	Limit (QP) (dBuV/m)	Margin (dB)	Remark
250.19	53.14	N/A	-14.62	38.52	N/A	46.00	-7.48	Peak
350.10	53.84	N/A	-12.02	41.82	N/A	46.00	-4.18	!Peak
375.32	N/A	52.93	-11.78	N/A	41.15	46.00	-4.85	!QP
399.57	N/A	55.90	-11.54	N/A	44.36	46.00	-1.64	!QP
440.31	52.65	N/A	-10.63	42.02	N/A	46.00	-3.98	!Peak
770.11	46.86	N/A	-4.73	42.14	N/A	46.00	-3.86	!Peak
879.72	43.52	N/A	-3.18	40.34	N/A	46.00	-5.66	!Peak
Vertical polarity								
Frequency (MHz)	Reading (Peak) (dBuV)	Reading (QP) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (QP) (dBuV/m)	Limit (QP) (dBuV/m)	Margin (dB)	Remark
56.19	N/A	51.28	-15.33	N/A	35.95	40.00	-4.05	QP
68.80	N/A	55.02	-17.19	N/A	37.83	40.00	-2.17	QP
81.41	N/A	57.58	-18.78	N/A	38.80	40.00	-1.20	QP
106.63	N/A	53.22	-16.99	N/A	36.23	43.50	-7.27	QP
375.32	50.56	N/A	-11.78	38.78	N/A	46.00	-7.22	Peak
399.57	50.53	N/A	-11.54	38.99	N/A	46.00	-7.01	Peak
770.11	47.63	N/A	-4.73	42.91	N/A	46.00	-3.09	Peak
879.72	44.54	N/A	-3.18	41.35	N/A	46.00	-4.65	Peak

Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).



8. ANTENNA REQUIREMENT

8.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used for this product is Dipole antenna. The temporary antenna connector is SmartAnt connector and the peak Gain of this antenna is only 5.5dBi at 5GHz, 2.5dBi at 2.4GHz.



APPENDIX SETUP PHOTOS

RADIATED EMISSION MEASUREMENT SETUP



