



APPENDIX I RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

EUT Specification

EUT	300Mbps Wireless N ADSL2+ Modem Router		
Model	DL4322; DL4322D		
RF Module	Realtek	Model:	RTL8192ER-CG
Model Discrepancy	1. All the model numbers (list on this report) are identical, just for marketing purpose only except Antenna.		
	Model Number		Antenna
	DL4322		Fixed
	DL4322D		Detachable
Frequency band (Operating)	☒ 802.11b/g/n HT20: 2.412GHz ~ 2.462GHz 802.11n HT40: 2.422GHz ~ 2.452GHz ☐ Others		
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others		
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)		
Antenna Specification	2.4GHz: Antenna1 Gain : 5.00 dBi (Numeric gain 3.16) For IEEE 802.11b/g Antenna2 Gain : 5.00 dBi (Numeric gain 3.16) For IEEE 802.11b/g MIMO: 5.0 dBi + 5.0 dBi = 8.01 dBi (Numeric gain 6.32) For IEEE 802.11 n		
Maximum Average output power	IEEE 802.11b Mode: 16.39 dBm (43.551 mW) IEEE 802.11g Mode: 15.47 dBm (35.237 mW) IEEE 802.11n HT 20 Mode: 17.08 dBm (51.050 mW) IEEE 802.11n HT 40 Mode: 14.36 dBm (27.290 mW)		
Maximum Tune up Power	IEEE 802.11b Mode: 19.00 dBm (79.433 mW) IEEE 802.11g Mode: 17.00 dBm (50.119 mW) IEEE 802.11n HT 20 Mode: 18.00 dBm (63.096 mW) IEEE 802.11n HT 40 Mode: 16.00 dBm (39.811 mW)		



Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	2014/03/25	Initial Issue	ALL	Scott Hsu



TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P / 1000) \times G}{377 \times (d / 100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \textbf{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

**Maximum Permissible Exposure**

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	79.433	3.16	20	0.0500	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
1	2412	50.119	3.16	20	0.0315	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
1	2412	63.096	6.32	20	0.0794	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	39.811	6.32	20	0.0501	1