

RF Exposure Evaluation declaration

Product Name	Intel® Centrino® Advanced-N 6230
Model No.	62230ANHMW
FCC ID	PD962230ANH

Applicant	Intel Corporation
Address	100 Center Point Circle Suite 200 Columbia, SC 29210

Date of Receipt	Feb. 24, 2012
Date of Declaration	Mar. 23, 2012
Report No.	122428R-RFUSP42V01

The declaration results relate only to the samples calculated.

The declaration shall not be reproduced except in full without the written approval of Quietek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

1. RF Exposure Evaluation

1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product : Intel® Centrino® Advanced-N 6230
 Test Item : RF Exposure Evaluation
 Test Site : No.3 OATS

802.11b (1Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (-1.65dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412.00	42.4620	0.005777
6	2437.00	46.6659	0.006349
11	2462.00	45.3942	0.006176

Power density in column 4 is much lower than the limit (1 mW/cm²).

802.11g (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (-1.65dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412.00	19.4089	0.002641
6	2437.00	35.5631	0.004839
11	2462.00	19.6789	0.002678

Power density in column 4 is much lower than the limit (1 mW/cm²).

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (-0.80dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745.00	25.7040	0.004253
157	5785.00	25.3513	0.004195
165	5825.00	24.7172	0.004090

Power density in column 4 is much lower than the limit (1 mW/cm²).

802.11n-20MHz_14.4Mbps - 2.4G Band
Output Power Into Antenna & RF Exposure Evaluation Distance (-1.65 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412.00	27.3527	0.003722
6	2437.00	40.6443	0.005530
11	2462.00	22.8560	0.003110

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-40MHz_30Mbps - 2.4G Band
Output Power Into Antenna & RF Exposure Evaluation Distance (-1.65 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
03	2422.00	9.5499	0.001299
06	2437.00	32.5087	0.004423
09	2452.00	8.8716	0.001207

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-20MHz_14.4Mbps - 5G Band
Output Power Into Antenna & RF Exposure Evaluation Distance (-0.80 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745.00	21.1836	0.003505
157	5785.00	39.1742	0.006482
165	5825.00	19.8609	0.003286

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-40MHz_30Mbps - 5G Band
Output Power Into Antenna & RF Exposure Evaluation Distance (-0.80 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
151	5755.00	228.0342	0.037734
159	5795.00	223.8721	0.037045

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (0.25 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180.00	39.3550	0.008293
44	5220.00	41.0204	0.008644
48	5240.00	37.6704	0.007938

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (0.25 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
52	5260.00	35.8096	0.007546
60	5300.00	40.2717	0.008487
64	5320.00	42.5598	0.008969

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (0.12 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
100	5500.00	39.8107	0.008142
120	5600.00	43.0527	0.008805
140	5700.00	40.9261	0.008370

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-20MHz_14.4Mbps
Output Power Into Antenna & RF Exposure Evaluation Distance (0.25 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180.00	41.2098	0.008684
44	5220.00	40.2717	0.008487
48	5240.00	36.8978	0.007776

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-20MHz_14.4Mbps

Output Power Into Antenna & RF Exposure Evaluation Distance (0.25 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
52	5260.00	35.5631	0.007494
60	5300.00	35.3183	0.007443
64	5320.00	35.9749	0.007581

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-20MHz_14.4Mbps

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (0.12 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
100	5500.00	36.6438	0.007494
120	5600.00	37.4973	0.007669
140	5700.00	32.6588	0.006679

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-40MHz_30Mbps

Output Power Into Antenna & RF Exposure Evaluation Distance (0.25 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190.00	21.2324	0.004474
46	5230.00	41.0204	0.008644

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-40MHz_30Mbps

Output Power Into Antenna & RF Exposure Evaluation Distance (0.25 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
54	5270.00	35.2371	0.007426
62	5310.00	32.9610	0.006946

Power density in column 4 is much lower than the limit (1 mW/mc2).

802.11n-40MHz_30Mbps

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (0.12 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
102	5510.00	38.1066	0.007793
118	5590.00	40.5509	0.008293
134	5670.00	36.5595	0.007477

Power density in column 4 is much lower than the limit (1 mW/mc2).

1Mbps (GFSK)

Output Power Into Antenna & RF Exposure Evaluation Distance (-1.65 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402.00	3.2434	0.000441
38	2441.00	4.3053	0.000586
79	2480.00	4.4055	0.000599

Power density in column 4 is much lower than the limit (1 mW/mc2).

3Mbps (8DPSK)

Output Power Into Antenna & RF Exposure Evaluation Distance (-1.65 dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402.00	1.5382	0.000209
38	2441.00	2.8576	0.000389
79	2480.00	2.5527	0.000347

Power density in column 4 is much lower than the limit (1 mW/mc2).