

RF Exposure Evaluation declaration

Product Name : 802.11 a/b/g/n RTL8192DU Module
Model No. : RTL8192DU
FCC ID : RK9-RTL8192DU

Applicant : CastleNet Technology Inc.

Address : No.64,Chung-Shan Rd. Tu-Cheng District, New Taipei City, Taiwan

Date of Receipt : May 02., 2012

Date of Declaration : June 29, 2012

Report No. : 125068R-RFUSP32V01

The declaration results relate only to the samples calculated.

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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 : 802.11 a/b/g/n RTL8192DU Module
 Test Item : RF Exposure Evaluation
 Test Site : No.3 OATS

802.11b (1Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (4.77dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412.00	75.3356	0.044950
6	2437.00	91.8333	0.054794
11	2462.00	104.9542	0.062623

The RF exposure at 20 cm is below limit.

802.11g (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (4.77dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412.00	149.6236	0.089275
6	2437.00	185.3532	0.110594
11	2462.00	209.4112	0.124948

The RF exposure at 20 cm is below limit.

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (3.77dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745.00	81.4704	0.038613
157	5785.00	73.9605	0.035053
165	5825.00	67.7642	0.032117

The RF exposure at 20 cm is below limit.

802.11n-20MHz_21.7Mbps - 2.4G Band
Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (4.77dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	236.0478	0.140841
06	2437.00	259.4179	0.154786
11	2462.00	288.4032	0.172080

The RF exposure at 20 cm is below limit.

802.11n-40MHz_45Mbps - 2.4G Band
Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (4.77dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
03	2422.00	189.2344	0.112910
06	2437.00	222.8435	0.132963
09	2452.00	222.3310	0.132657

The RF exposure at 20 cm is below limit.

802.11n-20MHz_21.7Mbps - 5G Band
Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (3.77dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745.00	105.1962	0.049858
157	5785.00	86.4968	0.040995
165	5825.00	79.9834	0.037908

The RF exposure at 20 cm is below limit.

802.11n-40MHz_45Mbps - 5G Band
Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (3.77dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
151	5755.00	123.5947	0.058577
159	5795.00	103.7528	0.049173

The RF exposure at 20 cm is below limit.

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (4.48dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180.00	42.7563	0.023863
44	5220.00	36.3915	0.020311
48	5240.00	34.7536	0.019397
52	5260.00	49.0908	0.027399
60	5300.00	44.4631	0.024816
64	5320.00	47.6431	0.026591
100	5500.00	38.9942	0.021764
116	5580.00	30.6196	0.017090
140	5700.00	22.1820	0.012380

The RF exposure at 20 cm is below limit.

802.11n-20MHz_21.7Mbps
Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (4.48dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180.00	40.1791	0.022425
44	5220.00	36.1410	0.020171
48	5240.00	35.7273	0.019940
52	5260.00	95.4993	0.053300
60	5300.00	78.1628	0.043625
64	5320.00	66.8344	0.037302
100	5500.00	51.1682	0.028558
116	5580.00	34.8337	0.019442
140	5700.00	21.7270	0.012126

The RF exposure at 20 cm is below limit.

802.11n-40MHz_45Mbps**Output Power Into Antenna & RF Exposure Evaluation Distance_20cm (4.48dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190.00	14.1254	0.007884
46	5230.00	13.9959	0.007811
54	5270.00	37.9315	0.021170
62	5310.00	30.4789	0.017011
102	5510.00	54.8277	0.030601
110	5550.00	36.6438	0.020452
134	5670.00	25.7040	0.014346

The RF exposure at 20 cm is below limit.