

RF Exposure Evaluation declaration

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|--------------|-------------|
| Product Name | WLAN MODULE |
| Model No. | CMN-851 |
| FCC ID | CKECMN851 |

| | |
|-----------|---|
| Applicant | Japan Radio Co.,Ltd. |
| Address | 1011 SW Klickitat Way, Suite 201B, Seattle, WA 98134 U.S.A. |

| | |
|---------------------|--------------------|
| Date of Receipt | Aug. 15, 2011 |
| Date of Declaration | Sep. 29, 2011 |
| Report No. | 118318R-RFUSP46V01 |

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 : WLAN MODULE
 Test Item : RF Exposure Evaluation
 Test Site : No.3 OATS

802.11b (1Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2.1dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|---------------------------------|---|
| 1 | 2412.00 | 46.3447 | 0.014953 |
| 6 | 2437.00 | 43.7522 | 0.014117 |
| 11 | 2462.00 | 43.4510 | 0.014019 |

The RF exposure at 20 cm is below limit.

802.11g (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2.1dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|---------------------------------|---|
| 1 | 2412.00 | 245.4709 | 0.079201 |
| 6 | 2437.00 | 243.2204 | 0.078475 |
| 11 | 2462.00 | 222.3310 | 0.071735 |

The RF exposure at 20 cm is below limit.

802.11n-20MHz_14.4Mbps - 2.4G Band

Output Power Into Antenna & RF Exposure Evaluation Distance (2.1 dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|---------------------------------|---|
| 1 | 2412.00 | 301.3006 | 0.097214 |
| 6 | 2437.00 | 302.6913 | 0.097663 |
| 11 | 2462.00 | 306.1963 | 0.098794 |

The RF exposure at 20 cm is below limit.

802.11n-40MHz_30Mbps - 2.4G Band
Output Power Into Antenna & RF Exposure Evaluation Distance (2.1 dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 03 | 2422.00 | 326.5878 | 0.105373 |
| 06 | 2437.00 | 334.9654 | 0.108076 |
| 09 | 2452.00 | 324.3396 | 0.104648 |

The RF exposure at 20 cm is below limit.

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2.4dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 36 | 5180.00 | 31.7687 | 0.010983 |
| 44 | 5220.00 | 30.9030 | 0.010684 |
| 48 | 5240.00 | 32.0627 | 0.011085 |

The RF exposure at 20 cm is below limit.

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2.4dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 52 | 5260.00 | 31.0456 | 0.010733 |
| 60 | 5300.00 | 32.2849 | 0.011162 |
| 64 | 5320.00 | 32.8095 | 0.011343 |

The RF exposure at 20 cm is below limit.

802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2.4dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 100 | 5500.00 | 20.6538 | 0.007141 |
| 120 | 5600.00 | 19.8153 | 0.006851 |
| 140 | 5700.00 | 20.1372 | 0.006962 |

The RF exposure at 20 cm is below limit.

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

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 36 | 5180.00 | 34.6737 | 0.011988 |
| 44 | 5220.00 | 35.8922 | 0.012409 |
| 48 | 5240.00 | 35.6451 | 0.012323 |

The RF exposure at 20 cm is below limit.

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

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 52 | 5260.00 | 35.4813 | 0.012267 |
| 60 | 5300.00 | 35.0752 | 0.012126 |
| 64 | 5320.00 | 32.2107 | 0.011136 |

The RF exposure at 20 cm is below limit.

802.11n-20MHz_14.4Mbps
802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2.4dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 100 | 5500.00 | 20.3704 | 0.007043 |
| 120 | 5600.00 | 20.1837 | 0.006978 |
| 140 | 5700.00 | 21.8776 | 0.007564 |

The RF exposure at 20 cm is below limit.

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

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|------------------------------|--|
| 38 | 5190.00 | 33.2660 | 0.011501 |
| 46 | 5230.00 | 35.5631 | 0.012295 |

The RF exposure at 20 cm is below limit.

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

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|---------------------------------|---|
| 54 | 5270.00 | 34.9140 | 0.012071 |
| 62 | 5310.00 | 34.9140 | 0.012071 |

The RF exposure at 20 cm is below limit.

802.11n-40MHz_30Mbps
802.11a (6Mbps) Output Power Into Antenna & RF Exposure Evaluation Distance (2.4dBi):

| Channel | Frequency (MHz) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm ²) |
|---------|-----------------|---------------------------------|---|
| 102 | 5510.00 | 19.2309 | 0.006649 |
| 118 | 5590.00 | 19.8153 | 0.006851 |
| 134 | 5670.00 | 21.5774 | 0.007460 |

The RF exposure at 20 cm is below limit.