



9. RF EXPOSURE TEST

9.1 APPLIED PROCEDURES / LIMIT

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 limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

9.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	Anritsu	ML2487A	6K00004714	Feb. 12, 2009
2	Power Meter Sensor	Anritsu	MA2491A	34138	Feb. 12, 2009

Remark: " N/A" denotes No Model Name , Serial No. or No Calibration specified.

9.1.2 MPE CALCULATION METHOD

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

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

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained



9.1.3 DEVIATION FROM STANDARD

No deviation.

9.1.4 TEST SETUP



9.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



9.1.6 TEST RESULTS

EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11b		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	2.00	1.5849	19.0000	79.4328	0.025058	1
2437	2.00	1.5849	21.5200	141.9058	0.044766	1
2462	2.00	1.5849	22.1200	162.9296	0.051398	1

EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11g		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	2.00	1.5849	23.4000	218.7762	0.069016	1
2437	2.00	1.5849	24.5400	284.4461	0.089733	1
2462	2.00	1.5849	23.8100	240.4363	0.075849	1



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EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT20 Single TX Ant. 0		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	2.00	1.5849	22.5000	177.8279	0.056098	1
2437	2.00	1.5849	24.1100	257.6321	0.081274	1
2462	2.00	1.5849	20.3000	107.1519	0.033803	1

EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT20 Single TX Ant. 1		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	2.00	1.5849	22.0200	159.2209	0.050229	1
2437	2.00	1.5849	23.4200	219.7860	0.069335	1
2462	2.00	1.5849	19.7600	94.6237	0.029850	1

EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT20 Dual TX (Ant. 0 + Ant. 1)		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	4.00	2.5119	25.2769	337.0488	0.168517	1
2437	4.00	2.5119	26.7890	477.4181	0.238698	1
2462	4.00	2.5119	23.0487	201.7756	0.100883	1

Remark :

- (1) The MIMO test requirement, MPE shall measure by using the total sum power of each transmitter chain.



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EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT40 Single TX Ant. 0		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	2.00	1.5849	20.1400	103.2761	0.032580	1
2437	2.00	1.5849	22.9100	195.4339	0.061652	1
2462	2.00	1.5849	19.9000	97.7237	0.030828	1

EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT40 Single TX Ant. 1		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	2.00	1.5849	20.5300	112.9796	0.035641	1
2437	2.00	1.5849	22.6700	184.9269	0.058338	1
2462	2.00	1.5849	18.8600	76.9130	0.024263	1

EUT :	Wireless 11n PCI card	Model Name :	NI22
Temperature :	17 °C	Relative Humidity :	89 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT40 Dual TX (Ant. 0 + Ant. 1)		

Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
2412	4.00	2.5119	23.3497	216.2557	0.108123	1
2437	4.00	2.5119	25.8020	380.3608	0.190172	1
2462	4.00	2.5119	22.4214	174.6368	0.087314	1

Remark :

- (1) The MIMO test requirement, MPE shall measure by using the total sum power of each transmitter chain.