



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. 10, 2010
2	Power Meter Sensor	Anritsu	MA2491A	34138	Feb. 10, 2010

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

9.1.2 MPE CALCULATION METHOD

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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 Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
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	20.5600	113.7627	0.035888	1
2437	2.00	1.5849	20.8800	122.4616	0.038632	1
2462	2.00	1.5849	20.7300	118.3042	0.037321	1

EUT :	Wireless 11n Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
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	25.4700	352.3709	0.111160	1
2437	2.00	1.5849	25.3900	345.9394	0.109132	1
2462	2.00	1.5849	25.0300	318.4198	0.100450	1



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EUT :	Wireless 11n Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT20 Single TX Port. 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	24.7100	295.8012	0.093315	1
2437	2.00	1.5849	24.8500	305.4921	0.096372	1
2462	2.00	1.5849	24.5100	282.4880	0.089115	1

EUT :	Wireless 11n Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT20 Single TX Port. 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	24.4100	276.0578	0.087086	1
2437	2.00	1.5849	24.6500	291.7427	0.092034	1
2462	2.00	1.5849	24.2100	263.6331	0.083167	1



EUT :	Wireless 11n Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT20 Dual TX (Port. 0 + Port. 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	27.5729	571.8590	0.285917	1
2437	4.00	2.5119	27.7615	597.2348	0.298604	1
2462	4.00	2.5119	27.3729	546.1211	0.273048	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 Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT40 Single TX Port. 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)
2422	2.00	1.5849	23.0700	202.7683	0.063966	1
2437	2.00	1.5849	23.1200	205.1162	0.064707	1
2452	2.00	1.5849	23.2600	211.8361	0.066827	1

EUT :	Wireless 11n Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT40 Single TX Port. 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)
2422	2.00	1.5849	22.8900	194.5360	0.061369	1
2437	2.00	1.5849	23.0100	199.9862	0.063089	1
2452	2.00	1.5849	22.9000	194.9845	0.061511	1



EUT :	Wireless 11n Mini Router	Model Name :	NP22
Temperature :	13 °C	Relative Humidity :	64 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	802.11n HT40 Dual TX (Port. 0 + Port. 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)
2422	4.00	2.5119	25.9912	397.3043	0.198643	1
2437	4.00	2.5119	26.0756	405.1024	0.202542	1
2452	4.00	2.5119	26.0940	406.8206	0.203401	1

Remark :

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