



**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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> 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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> 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, 2009
2	Power Meter Sensor	Anritsu	MA2491A	34138	Feb. 10, 2009

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

**9.1.2 MPE CALCULATION METHOD**

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

**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 AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2412	2.50	1.7783	19.6000	91.2011	0.032281	1
2437	2.50	1.7783	19.9100	97.9490	0.034670	1
2462	2.50	1.7783	20.3500	108.3927	0.038366	1

EUT :	Wireless 11n AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2412	2.50	1.7783	23.4100	219.2805	0.077616	1
2437	2.50	1.7783	23.9600	248.8857	0.088095	1
2462	2.50	1.7783	24.0500	254.0973	0.089939	1



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EUT :	Wireless 11n AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2412	2.50	1.7783	22.3000	169.8244	0.060111	1
2437	2.50	1.7783	22.2000	165.9587	0.058742	1
2462	2.50	1.7783	21.3000	134.8963	0.047747	1

EUT :	Wireless 11n AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2412	2.50	1.7783	21.7300	148.9361	0.052717	1
2437	2.50	1.7783	21.4300	138.9953	0.049198	1
2462	2.50	1.7783	20.5000	112.2018	0.039715	1



EUT :	Wireless 11n AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2412	5.00	3.1623	25.0346	318.7605	0.200639	1
2437	5.00	3.1623	24.8423	304.9540	0.191948	1
2462	5.00	3.1623	23.9287	247.0981	0.155532	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 AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2422	2.50	1.7783	20.5000	112.2018	0.039715	1
2437	2.50	1.7783	21.3200	135.5189	0.047968	1
2452	2.50	1.7783	21.5200	141.9058	0.050229	1

EUT :	Wireless 11n AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2422	2.50	1.7783	20.1000	102.3293	0.036220	1
2437	2.50	1.7783	21.3000	134.8963	0.047747	1
2452	2.50	1.7783	21.1800	131.2200	0.046446	1



EUT :	Wireless 11n AP/Router	Model Name :	NR22
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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )
2422	5.00	3.1623	23.3149	214.5311	0.135033	1
2437	5.00	3.1623	24.3203	270.4152	0.170209	1
2452	5.00	3.1623	24.3636	273.1257	0.171915	1

Remark :

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