

RF EXPOSURE EVALUATION

1. PRODUCT INFORMATION

Product Description	Wireless Router
Model Name	CM520-8AF, CM520-87F, CM520-86F, CM520-89F, CM520-91F, CM520-8VF, CM520-8BF, CM520-8CF,
FCC ID	2ARILCM520-8AF

2. EVALUATION METHOD AND LIMIT

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons.

LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE

Frequency Range (MHz)	E-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 ²)*	30
30 -- 300	27.5	0.073	0.2	30
300 -- 1500	--	--	f/1500	30
1500 -- 100,000	--	--	1.0	30

*Note:

1. f= Frequency in MHz * Plane-wave Equivalent Power Density
2. The averaging time for General Population/Uncontrolled exposure to fixed transmitters is not applicable for mobile and portable transmitters. See 47 CFR §§2.1091 and 2.1093 on source-based time-averaging requirement for mobile and portable transmitters.

$$S = \frac{PG}{4\pi R^2}$$

Where:

S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

3. CALCULATION

A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be at least 20 cm and fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated.

LTE Band 2

Test Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	Power Density (mW/cm ²)	Power Density Limit (mW/cm ²)
LTE 1900 (20MHz)	1860.0	22.82	191.43	1.34	1.36	0.0519	1.0
	1880.0	22.58	181.13	1.34	1.36	0.0491	1.0
	1900.0	21.71	148.25	1.34	1.36	0.0402	1.0
LTE 1900 (15MHz)	1900.0	22.92	195.88	1.34	1.36	0.0531	1.0
	1880.0	22.78	189.67	1.34	1.36	0.0228	1.0
	1902.5	22.30	169.82	1.34	1.36	0.0205	1.0
LTE 1900 (10MHz)	1855.0	22.43	174.98	1.34	1.36	0.0211	1.0
	1855.0	22.22	166.72	1.34	1.36	0.0201	1.0
	1905.0	21.57	143.55	1.34	1.36	0.0173	1.0
LTE 1900 (5MHz)	1852.5	22.85	192.75	1.34	1.36	0.0232	1.0
	1880.0	22.62	182.81	1.34	1.36	0.0220	1.0
	1907.5	22.20	165.96	1.34	1.36	0.0200	1.0
LTE 1900 (3MHz)	1851.5	23.24	210.86	1.34	1.36	0.0254	1.0
	1880.0	22.86	193.20	1.34	1.36	0.0233	1.0
	1908.5	21.77	150.31	1.34	1.36	0.0181	1.0
LTE 1900 (1.4MHz)	1850.7	22.90	194.98	1.34	1.36	0.0235	1.0
	1880.0	22.53	179.06	1.34	1.36	0.0216	1.0
	1909.3	21.79	151.01	1.34	1.36	0.0182	1.0

LTE Band 4

Test Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	Power Density (mW/cm ²)	Power Density Limit (mW/cm ²)
LTE 1700 (20MHz)	1720.0	22.52	178.65	1.28	1.34	0.0477	1.0
	1732.5	22.34	171.40	1.28	1.34	0.0458	1.0
	1745.0	22.12	162.93	1.28	1.34	0.0435	1.0
LTE 1700 (15MHz)	1717.5	22.56	180.30	1.28	1.34	0.0482	1.0
	1732.5	22.49	177.42	1.28	1.34	0.0211	1.0
	1747.5	22.47	176.60	1.28	1.34	0.0210	1.0
LTE 1700 (10MHz)	1715.0	22.90	194.98	1.28	1.34	0.0232	1.0
	1732.5	22.70	186.21	1.28	1.34	0.0221	1.0
	1750.0	22.67	184.93	1.28	1.34	0.0220	1.0
LTE 1700 (5MHz)	1712.5	22.81	190.99	1.28	1.34	0.0227	1.0
	1732.5	22.61	182.39	1.28	1.34	0.0217	1.0
	1752.5	21.81	151.71	1.28	1.34	0.0180	1.0
LTE 1700 (3MHz)	1711.5	22.55	179.89	1.28	1.34	0.0214	1.0
	1753.5	22.14	163.68	1.28	1.34	0.0194	1.0
	1753.5	21.87	153.82	1.28	1.34	0.0183	1.0
LTE 1700 (1.4MHz)	1710.7	22.79	190.11	1.28	1.34	0.0226	1.0
	1732.5	22.72	187.07	1.28	1.34	0.0222	1.0
	1754.3	21.71	148.25	1.28	1.34	0.0176	1.0

LTE Band 12

Test Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	Power Density (mW/cm ²)	Power Density Limit (mW/cm ²)
LTE 700 (10MHz)	704	22.74	187.93	1.15	1.30	0.0487	0.4693
	707.5	22.36	172.19	1.15	1.30	0.0447	0.4717
	711.0	22.33	171.00	1.15	1.30	0.0444	0.4740
LTE 700 (5MHz)	701.5	23.43	220.29	1.15	1.30	0.0571	0.4677
	707.5	22.95	197.24	1.15	1.30	0.0227	0.4717
	713.5	22.52	178.65	1.15	1.30	0.0206	0.4757
LTE 700 (3MHz)	700.5	22.98	198.61	1.15	1.30	0.0229	0.4670
	707.5	22.83	191.87	1.15	1.30	0.0221	0.4717
	714.5	22.63	183.23	1.15	1.30	0.0211	0.4763
LTE 700 (1.4MHz)	699.7	22.93	196.34	1.15	1.30	0.0226	0.4665
	707.5	22.33	171.00	1.15	1.30	0.0197	0.4717
	715.3	21.89	154.53	1.15	1.30	0.0178	0.4769

WIFI

Test Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	Power Density (mW/cm ²)	Power Density Limit (mW/cm ²)
802.11b	2462	13.60	22.91	2.0	1.58	0.0072	1
802.11g	2462	11.70	14.79	2.0	1.58	0.0047	1
802.11n20	2462	11.68	14.72	2.0	1.58	0.0046	1
802.11n40	24.37	11.00	12.59	2.0	1.58	0.0040	1

Simultaneous transmission of 802.11b(2462MHz) and LTE Band 2 (1851.5MHz):

	Numeric	Output power (mW)	Power Density (mW/cm ²)	Power Density Limit (mW/cm ²)
LTE Band 2 (1851.5MHz)	1.36	210.86	0.0571	1.0
802.11 b (2462MHz)	1.58	22.91	0.0072	1.0

LTE Band 2 Antenna Gain:1.34dBi(Numeric 1.36) , $\pi=3.14$

WIFI 802.11b(2462MHz) Antenna Gain:2.0dBi(Numeric 1.58), $\pi=3.14$

We can calculate the power density is $0.0643 \text{ mW/cm}^2 < 1.0 \text{ mW/cm}^2$

Note:

1. Only the worst case was recorded in the test report.