

## MPE

FCC ID: 2A18R-CMM1-1A-1

**Applicant:** SmartAuto (China) Automotive Information System Co., Ltd.

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Mobile Device

Refer Standard: FCC Part 2.1091: Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

### FCC MPE Limited:

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Test Data

Predication of MPE limit at a given distance

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

Where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator,  
the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

### Conducted Output Power Results

Mode	Channel	Frequency (MHz)	Max.RF Power(dBm)
802.11b	1	2412	14.98
	6	2437	14.68
	11	2462	14.54
802.11g	1	2412	12.73
	6	2437	13.65
	11	2462	12.27
802.11n20	1	2412	12.50
	6	2437	13.13
	11	2462	12.31

Mode	Channel	Frequency (MHz)	Max.RF Power(dBm)
GFSK	0	2402	5.115
	39	2441	5.373
	78	2480	4.898
$\pi/4$ -DQPSK	0	2402	4.376
	39	2441	4.396
	78	2480	3.696
8- DPSK	0	2402	4.514
	39	2441	4.721
	78	2480	4.062

### Manufacturing tolerance

Mode	Channel	Frequency (MHz)	Max. RF Power(dBm)	Target (dBm)	Tolerance $\pm$ (dB)
802.11b	1	2412	14.98	15	1
	6	2437	14.68	15	1
	11	2462	14.54	15	1
802.11g	1	2412	12.73	13	1
	6	2437	13.65	13	1
	11	2462	12.27	13	1
802.11n20	1	2412	12.50	13	1
	6	2437	13.13	13	1
	11	2462	12.31	13	1

Mode	Channel	Frequency (MHz)	Max. RF Power(dBm)	Target (dBm)	Tolerance ±(dB)
GFSK	0	2402	5.115	5	1
	39	2441	5.373	5	1
	78	2480	4.898	5	1
$\pi/4$ -DQPSK	0	2402	4.376	4	1
	39	2441	4.396	4	1
	78	2480	3.696	4	1
8- DPSK	0	2402	4.514	4	1
	39	2441	4.721	4	1
	78	2480	4.062	4	1

**Calculation results (for FCC): pass**

Mode	Channel	Maximum tune up power(dBm)	Maximum tune up power(mW)	RF distance(cm)	Result (mW/cm2)	Limit (mW/cm2)
802.11b	1	16	39.81	20	0.0079	1.0
	6	16	39.81	20	0.0079	
	11	16	39.81	20	0.0079	
802.11g	1	14	25.12	20	0.0050	
	6	14	25.12	20	0.0050	
	11	14	25.12	20	0.0050	
802.11n20	1	14	25.12	20	0.0050	
	6	14	25.12	20	0.0050	
	11	14	25.12	20	0.0050	
GFSK	0	6	3.98	20	0.0008	
	39	6	3.98	20	0.0008	
	78	6	3.98	20	0.0008	
$\pi/4$ -DQPSK	0	5	3.16	20	0.0006	
	39	5	3.16	20	0.0006	
	78	5	3.16	20	0.0006	
8- DPSK	0	5	3.16	20	0.0006	
	39	5	3.16	20	0.0006	
	78	5	3.16	20	0.0006	

**NOTE:**

Antenna Gain 0dBi=1