

# RF Exposure evaluation

FCC ID	2BLGM-A29
Product Name	Surveillance camera
Model/Type reference	A29
Listed Model(s)	Q6, Q7, Q8, V52, A1, A8B, A18, A21, A8S, A22S, A28B, A32, A33, A33-3, R10-30X, R7-30R, R11-30E, V1-30, D6-20, E27C, D8-20, CB54, CB880, CB850, B430, B70, R5, CV331S, CS621SR, CB880, CB870, CB850, CB830
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Mobile Device

## 1. Reference

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

FCC CFR 47 part1 1.1310: Radio frequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radio frequency radiation exposure evaluation: mobile devices

## 2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f2)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500–100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f2)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

\*=Plane-wave equivalent power density

### 3. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

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

### 4. Antenna Information

FLW8189FSA7-A WiFi module can only use antennas certificated as follows provided by manufacturer;

Antenna No.	Type of antenna:	Gain of the antenna (Max.)	Frequency range:
2.4GWIFI	IPEX Antenna	3dBi	2400-2500MHz

### 5. Conducted Peak Output Power

Mode	Channel	Peak Output Power (dBm)	Peak Output Power (mW)
IEEE 802.11b	1	9.42	8.75
	6	9.98	9.95
	11	8.83	7.64
IEEE 802.11g	1	8.77	7.53
	6	9.24	8.39
	11	9.18	8.28
IEEE 802.11n_20	1	8.93	7.82
	6	9.32	8.55
	11	9.22	8.36

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)
GFSK	BLE 1M	0	1.92	1.56
		19	2.33	1.71
		39	2.79	1.9

## 6. Manufacturing Tolerance

IEEE 802.11b			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	9	9	8
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11g			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8	9	9
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n_20			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	8	9	9
Tolerance $\pm$ (dB)	1.0	1.0	1.0

BLE 1M			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	1	2	2
Tolerance $\pm$ (dB)	1.0	1.0	1.0

## 7. Standalone MPE Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance,  $r=20\text{cm}$ , as well as the gain of the used antenna is 3dBi, the RF power density can be obtained.

Mode	Output power		Antenna Gain (dBi)	Antenna Gain(linear)	MPE ( $\text{mW}/\text{cm}^2$ )	MPE Limits ( $\text{mW}/\text{cm}^2$ )
	dBm	mW				
11B	10	10	3	2	0.00397	1.0000
11G	10	10	3	2	0.00397	1.0000
11N(HT20)	10	10	3	2	0.00397	1.0000
BLE 1M	3	1.995	3	2	0.0008	1.0000

Remark:

1. Output power (Peak) including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

## **8. Conclusion**

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

-----End of the report-----