



Certification Exhibit

FCC ID: U9O-SM220

FCC Rule Part: 47 CFR Part 2.1091

Project Number: 72199033

Manufacturer: Synapse Wireless
Model Name: SM220

RF Exposure

General Information:

Applicant: Synapse Wireless
 Device Category: Mobile
 Environment: General Population/Uncontrolled Exposure

Technical Information (Zigbee radio– FCC 15.247):

**Antenna Type: Low profile Antenna: Data Alliance AL2W1G1
 **Total Antenna Gain: 3 dBi
 *Maximum Transmitter Conducted Power: 19.93 dBm, 98.40mW
 Maximum System EIRP: 22.93 dBm, 196.34 mW
 Exposure Conditions: 20 centimeters
 *Worst Case from original filing report
 **Declared by the customer

RF Exposure Calculation**Table 1: Device Characteristics**

Technical Parameters	Low Profile Antenna
Frequency Range (GHz)	2.405 – 2.480
Frequency Range (MHz)	2405 - 2480
Separation Distance (cm)	20.00
Separation Distance (m)	0.2000
Antenna Gain (dBi)	3
ERP Easily Determined	YES
Conducted Power (dBm)	19.93
Conducted Power (mW)	98.40
Duty Factor (Source-Based) %	100.0
Maximum (Source-Based) Time-Averaged Conducted Power (mW)	98.40
Maximum (Source-Based) Time-Averaged ERP (mW)	119.72
Maximum (Source-Based) Time-Averaged EIRP (mW)	196.34
Maximum Output (mW)	119.72

Test Exemption Criteria

Test exemption is determined by 47 CFR 1.1307(b)(3)(i)(C) where at the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency according to the following table.

For the exemption in Table 1 of 47 CFR 1.1307(b)(3)(i)(C) (table 2 below) to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1: 47 CFR 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.

Table 2: 47 CFR 1.1307(b)(3)(i)(C) MPE– Based Exemption ERP (W)

Technical Parameters	Dipole Antenna
$\lambda / 2\pi$ (m)	0.020
$R \geq \lambda / 2\pi$	YES
Maximum (Source-Based) Time-Averaged ERP (W)	0.1197
ERP Threshold (W)	0.7680
Exemption	YES