ALWON

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Attention: Reviewing Engineer

RE: RF exposure information for the equipment (FCC ID: U5SP40)

RF exposure information

The device U5SP40 is to be used only for fixed and mobile applications.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

Frequency Range (MHz)	Power Density (mW/cm^2)	Averaging Time (minutes)
300 – 1500	f/1500	30
1500 – 100.000	1.0	30

The equipment U5SP40 transmits in the following frequency ranges so that the applicable limits are:

Frequency range   **Limit**
1850.2 - 1909.8 MHz   1 mW/cm^2
824.2 - 848.8 MHz   0.54 mW/cm^2

The equipment is a GPRS Class 10, so the maximum duty cicle is 2/8 = 1/4

Under conditions stated above MPE limits can be guaranteed as the calculation below shows:

850 MHz frequency band

Maximum conducted output power: 2.06 W
Duty cicle: 1/4
Equivalente conducted output power = Maximum conducted output power x Duty cicle = 2.06 W x 1/4 = 0.515 W = 515 mW
Maximum antenna gain (as stated in the User's guide) = 3 dBi (numerical gain)

Using the eqution:

$$S = P \cdot G / 4 \cdot pi \cdot R^2$$

Where,

S = power density in mW/cm^2
P = power input to the antenna in mW
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the centre of radiation of the antenna in cm (20 cm Prediction distance)

$$S = 515 \text{ mW} \cdot 2 / 4 \cdot pi \cdot (20 \text{ cm})^2 = 0.21 \text{ mW/cm}^2 < 0.54 \text{ mW/cm}^2 \text{ (limit)}$$

1900 MHz frequency band

Maximum conducted output power: 0.90 W
Duty cicle: 1/4
Equivalente conducted output power = Maximum conducted output power x Duty cicle = 0.90 W x 1/4 = 0.225 W = 225 mW
Maximum antenna gain (as stated in the User's guide) = 3 dBi (numerical gain)

Using the eqution:

$$S = P \cdot G/4 \cdot pi \cdot R^2$$

Where,

S = power density in mW/cm^2
P = power input to the antenna in mW
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the centre of radiation of the antenna in cm (20 cm Prediction distance)

S = 225 mW·2 / 4·pi·(20 cm)^2 = 0.089 mW/cm^2 < 1 mW/cm^2 (limit)

These predictions demonstrate that:

The power density levels at a distance of 20 cm with typical antennas of a gain of less than 3 dBi are below the maximum levels allowed by the FCC rules.

Conclusion:

The equipment U5SP40 complies with the MPE limits if used with antennas with a gain of less than 3 dBi and this antenna is installed to provide a separation distance of at least 20 cm from all the persons.

Warning:

To ensure the compliance with the MPE limits a warning statement has been included in page 21 of the user's guide and the antenna gain has been limitted to 3 dBi.

Signed on behalf of ALWAYS ON ELECTRONICA APLICADA, S.L. by

P.A.

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