ReportNo.:SEFI1111048 FCCID: ZAZR7X1GS

Radio frequency exposure

<u>LIMIT</u>

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1310 of this chapter.

EUT Specification

EUT	Industrial Cellular Router				
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz				
	☐ WLAN: 5.725GHz ~ 5.850GHz				
	☐ Bluetooth: 2.402GHz ~ 2.480 GHz				
	☐ Others:824MHz~849MHz				
	1850MHz~1910MHz				
Device category	Portable (<20cm separation)				
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm²)				
	☐ General Population/Uncontrolled exposure				
	(824MHz~849MHz :S=0.5576mW/cm ²)				
	(1850MHz~1910MHz :S=1mW/cm ²)				
	Single antenna				
	☐ Multiple antennas				
Antenna diversity	☐ Tx diversity				
·	Rx diversity				
	Tx/Rx diversity				
Many authors in account	GPRS 850:33.19dBm				
Max. output power	GPRS 1900:29.67dBm				
Antenna gain (Max)	0.5 dBi (Numeric gain:1.122)				
Evaluation applied					
	☐ SAR Evaluation				
	□ N/A				
Remark:					

- 1. The maximum output power is 33.19 dBm (2084 mW) at 848.8 MHz (withnumeric 1.122 antenna gain.)
- 2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
- For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.

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TEST RESULTS

No non-compliance noted.

Calculation

$$E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = *Distance in meters*

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770d^2}$$

Changing to units of mW and cm, using:

$$P(mW) = P(W) / 1000$$
 and $d(cm) = d(m) / 100$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$
 Equation 1

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

 $S = Power density in mW / cm^2$

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Maximum Permissible Exposure

Modulation Mode	Frequency band (MHz)	Max. Conducted output power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm2)	Limit (mW/cm2)
GPRS850	824-849	33.19	0.5	20	0.465	0.5576
GPRS1900	1850-1910	29.67	0.5	20	0.207	1

NOTE:

Total(Chain0+Chain1), the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

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