



Exhibit: RF Exposure – FCC

FCC ID: JQU801800C

Report File #: 7169013070RFE-FCC-000

Client	Kapsch TrafficCom Canada Inc.	
Product	JANUS™ Front Mount Exterior OBU Model: 801800C-TAB	
Standard(s)	FCC KDB 447498 v07	

RF Exposure Calculation (FCC)

Purpose

The purpose of this test is to ensure that the RF energy transmitted at a specified operating distance from the human body meets the criteria to be exempt from routine evaluation. The RF Exposure values are calculated based upon measurements obtained during testing and are compared to the applicable exposure limits for individual RF sources. If multiple RF sources are used within a host product, and they operate simultaneously, an additional exemption criterion based on total exposure from multiple RF sources is also applied. If the exemption criteria are not met, the RF sources may be required to undergo routine evaluation for RF Exposure.

Limit(s) and Method

The test method and exemption limits are defined in FCC KDB 447498 and FCC 1.1307(b)(3) and are applicable to both unintentional and intentional RF sources, whether portable, mobile, or fixed installations.

Individual RF Sources

For individual sources, the following three exemption criteria options are defined. Any of the three options may be used to determine the RF source to be exempt from routine evaluation if it meets the corresponding exemption limit.

Defined in FCC 1.1307(b)(3)(i)(A), Exemption Criteria Option A is based on the maximum time-averaged output power. The requirement is that this measurement must not exceed 1mW, regardless of separation distance, and in the frequency range of 100kHz-100GHz.

Defined in FCC 1.1307(b)(3)(i)(B), Exemption Criteria Option B is based on SAR using the measurement of maximum time-averaged output power or ERP, whichever is greater. This option is applicable to separation distances of 0.5cm-40cm and in the frequency range of 300MHz-6GHz. The limit is defined below:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

Defined in FCC 1.1307(b)(3)(i)(C), Exemption Criteria Option C is based on MPE using the ERP measurement. This option is only applicable for separation distances greater than

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or equal to the wavelength of the frequency under consideration divided by 2π , and in the frequency range of 300kHz-100GHz. The limit is defined below:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R ²
1.34	–	30	35.6 m	–	1.6 m	3,450 R ² /f ²
30	–	300	1.6 m	–	159 mm	3.83 R ²
300	–	1,500	159 mm	–	31.8 mm	0.0128 R ² /f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R ²
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

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Results

The EUT is exempt from routine evaluation of RF exposure based on the following calculations:

Single RF Source 1 Analysis – 915MHz Transmitter

The transmitter has maximum output power at the operating frequency of 915MHz. The transmitter antenna is located 5mm from the EUT enclosure and therefore the separation distance has been taken as 5mm as a worst-case scenario. The peak ERP measured during continuous transmission was also used as a worst-case scenario, no time averaging is considered.

Frequency (MHz): 915.0

Separation Distance (cm): 0.5

ERP (dBm): 3.34

ERP (mW): 2.16

Exemption Criteria Option B:

Threshold Power = 8.13mW

2.16mW < 8.13mW

Option B is applicable.

Contribution Ratio = $2.16/8.13 = 0.265$

Therefore, the RF source is exempt from routine evaluation based on Exemption Criteria Option B with contribution ratio of 0.265.