

# REGULATORY COMPLIANCE REPORT

**TITLE:** FCC & ISED MPE Report for 15.247 & RSS-247 Frequency Hopping Device

FCC ID:EWQ500GC; IC: 864D-500GC

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REV	CCO	DESCRIPTION OF CHANGE	DATE	<u>APPROVALS</u>	
001		INITIAL RELEASE		Engineering	
				Regulatory	

## REVISION HISTORY

002		updated PO		Engineering	
				Regulatory	
				Engineering	
				Regulatory	
				Engineering	
				Regulatory	

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**Test Data Summary****FCC 15.247 / ISED RSS-247; Frequency Hopping Transmitter;**

500GC – Commercial, 902.2MHz – 927.75 MHz

FCC ID:EWQ500GC; IC: 864D-500GC ISED Device HVIN/Models: 5U, 6U

OATS Registration Number: FCC 90716/ISED 864D-1; 500051-0 NVLAP, ICSI; 0803.05 A2LA, CKC

Rule	Description	Spec Limit	Max. Reading	Pass/Fail
Parts 2.1091(mobile) & 1.1310	Limits for Maximum Permissible Exposure (MPE)	formula	0.128mW / cm <sup>2</sup> @ 20 cm	Pass
RSS-102i5 Sec. 4, Table 4	RF Field Strength Limits for Devices Used by the General Public	formulas	1.28W/M <sup>2</sup> @ 0.2 M	Pass

*Rule versions: FCC Part 1; FCC Part 2; FCC Part 15, RSS-102 Issue 5 (03-2015); RSS-247 Issue 1 (5-2015); RSS-Gen Issue 4 (12-2014).**Reference docs: ANSI C63.4-2014; ANSI C63.10-2013; DA 00-705 (03-30-2000); OET65 (08-1997); OET65C (06-2001); IEEE C95.3-2002.*

<b>Cognizant Personnel</b>	
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**CONDITIONS DURING TESTING**

No Modifications to the EUT were necessary during the testing.

**ANSI C63.4 - Temperature and Humidity During Testing**

The temperature during testing was within +10° C and +40° C.

The Relative humidity was between 10% and 90%.

RSS-Gen 4.3: Tests shall be performed at ambient temperature

**EQUIPMENT UNDER TEST (EUT) DESCRIPTION**

Itron declares that the EUT tested was representative of a production unit.

**EQUIPMENT UNDER TEST****EUT Module**

Manuf: Itron, Inc.  
Itron p/n: ERG-7000-007, -008  
Serial Number(s) unit 12  
Power source Fresh Batteries were used

**Peripheral Devices**

None

**2.1091(mobile) & 1.1310 /****RSS-102 Sec 4 (table4) - Canada Safety Code 6; Table 5****Maximum Permissible Exposure (MPE)**

2.1091. Radiofrequency radiation exposure evaluation: mobile devices. (a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular § 1.1307(b). (b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

1.1307 (b) In addition to the actions listed in paragraph (a) of this section, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the preparation of an Environmental Assessment (EA) if the particular facility, operation or transmitter would cause human exposure to levels of radiofrequency radiation in excess of the limits in §§1.1310 and 2.1093 of this chapter.

1.1310. Radiofrequency radiation exposure limits. - (e) Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields. (The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter. )

2.1093. Radiofrequency radiation exposure evaluation: portable devices.

Power level	Field <sup>(1)</sup> strength (dBuV/m)	EIRP <sup>(2)</sup> (dbm)	Conducted <sup>(3)</sup> power (dbm)	Conducted power (milliwatts)	antenna <sup>(4)</sup> gain (dbi)	antenna gain numeric	mW / cm <sup>2</sup> @ 20 cm	W/M <sup>2</sup> @ 0.2 M	Max EIRP (Watts)
0 <sup>(0)</sup>	93.6	-1.6	N/A	N/A	N/A	N/A	0.0001376	0.001376	0.0006918
10	102.4	7.2	6.91	4.91	0.29	1.07	0.001044	0.010441	0.005
24	N/A	23.79	22.33	171.00	1.46	1.40	0.047613393	0.476133928	0.239
27	123.3	28.1	26.64	461.32	1.46	1.40	0.128448527	1.284485272	0.646

(0) see appendix A for more

(1) Field strength (dBuV/m) CKC report 98972-4, page 7 and 14 CKC report 98972-6, page 8 and 15

(2) EIRP (dbm) used [412172 D01 Determining ERP and EIRP v01r01](#) to calculate EIRP

(3) Conducted power (dbm) From Itron Report FCC-7000-005

(4) Antenna gain (dbi) = EIRP-Conducted power

Determine the maximum power density for the general / uncontrolled population minimum separation distance of 20 cm. *The power density is calculated as:*

$P_d$  = power density in  $mW/cm^2$

$P_t$  = transmit power in milliwatts

$$P_d = \frac{P_t \times G}{4 \times \pi \times r^2}$$

G = numeric antenna gain

r = distance between body and transmitter in centimeters.

FCC Limits:  $902.2MHz / 1500 = 0.602 \text{ mW / cm}^2 @ 20\text{cm}$

IC Limits:  $902.2MHz; 0.02619 \times f^{0.6834} \text{ w/m}^2 = 2.74 \text{ W / M}^2 (@ 0.2M)$

IC max limit for calculation:  $1.31 \times 10^{-2} f^{0.6834} \text{ watts eirp} = 1.37 \text{ watts EIRP}$

#### Power level 0

Max field strength = 93.6 dBuV/m

results:  $P_d = 0.6918 / (4 \times \pi \times 20\text{cm}^2)$   
 $W/M^2 = 10 \text{ times mW/cm}^2$

Max EIRP = 0.0006918 Watts

$= 0.0001376 \text{ mW / cm}^2 @ 20 \text{ cm}$   
 $= 0.001376 \text{ W/M}^2 @ 0.2 \text{ M}$

#### Power level 1 (+10 dBm nominal)

Max antenna gain = -0.29 dBi = 1.07 numeric

Max TX power = 6.91 dBm = 4.91 milliwatts  
 results:  $P_d = (4.91 \times 0.57) / (4 \times \pi \times 20\text{cm}^2)$   
 $W/M^2 = 10 \text{ times mW/cm}^2$

Max EIRP = 0.005 Watts  
 $= 0.001 \text{ mW / cm}^2 @ 20 \text{ cm}$   
 $= 0.010 \text{ W/M}^2 @ 0.2 \text{ M}$

Power level 2 (+24 dBm nominal)

Max antenna gain = -1.46 dBi = 1.40 numeric  
Max TX power = 22.33dBm = 171 milliwatts  
results:  $P_D = (171 \times 1.40) / (4 \times \pi \times 20\text{cm}^2)$   
 $W/M^2 = 10 \text{ times mW/cm}^2$

Max EIRP = 0.239 Watts  
= 0.048 mW / cm<sup>2</sup> @ 20 cm  
= 0.48 W/M<sup>2</sup> @ 0.2 M

Power level 3 (+27 dBm nominal)

Max antenna gain = 1.46 dBi = 1.40 numeric  
Max TX power = 26.64 dBm = 461 milliwatts  
results:  $P_D = (461 \times 1.40) / (4 \times \pi \times 20\text{cm}^2)$   
 $W/m2 = 10 \text{ times mW/cm}^2$

Max EIRP = 0.646Watts  
= 0.128 mW / cm<sup>2</sup> @ 20 cm  
= 1.28 W/M<sup>2</sup> @ 0.2 M

**Appendix A**  
**Programming Mode – maximum allowed for reference**  
 All programmed endpoints, 908 MHz

Rule	Description	Spec Limit	Maximum Permitted <sup>(1)</sup>
Parts 2.1091(mobile) & 1.1310	Limits for Maximum Permissible Exposure (MPE)	0.6053 mW / cm <sup>2</sup> @ 20 cm	0.0001544 mW / cm <sup>2</sup> @ 20 cm
RSS-102i5 Sec. 4, Table 4	RF Field Strength Limits for Devices Used by the General Public	2.7523 W/M <sup>2</sup> @ 0.2 M	0.001544 W/M <sup>2</sup> @ 0.2 M

(1) Maximum based on a maximum field strength of 50 millivolts/m specified in title 47 part 249 (1a)

**CONDITIONS DURING TESTING**

This appendix is based on maximum field strength allowed by Certification to Title 47 part 15.249 (a); therefore a device certified to Title 47 part 15.249 (a) has been certified to produce a field strength of less than 50 millivolts/meter.

**EUT Module**

Manuf: Itron, Inc.  
 Itron p/n: N/A  
 Serial Number(s) N/A  
 Power source N/A

Field <sup>(2)</sup> strength (mV/m)	Field strength (dBuV/m)	EIRP <sup>(1)</sup> (dbm)	mW / cm <sup>2</sup> @ 20 cm	W/M <sup>2</sup> @ 0.2 M	Max EIRP (Watts)	Max EIRP (milliwatts)
50	94	-1.1	0.0001544	0.0015443	0.0007762	0.7762471

(1) EIRP (dbm) used [412172 D01 Determining ERP and EIRP v01r01](#) to calculate EIRP

(2) Field strength based on Certification to Title 47 part 15.249 (a) A device certified to Title 47 part 15.249 (a) has been certified to produce a field strength of less than 50 millivolts/meter.

Determine the maximum power density for the general / uncontrolled population minimum separation distance of 20 cm. *The power density is calculated as:*

$P_d$  = power density in mW/cm<sup>2</sup>

$P_t$  = transmit power in milliwatts

$$P_d = \frac{P_t \times G}{4 \times \pi \times r^2}$$

G = numeric antenna gain

r = distance between body and transmitter in centimeters.

EIRP (milliwatts) =  $P$  (milliwatts) x G (numeric)

$$P_d = \frac{EIRP}{4 \times \pi \times r^2}$$

FCC Limits: 908MHz / 1500 = 0.6053 mW / cm<sup>2</sup> @ 20cm

IC Limits: 908MHz; 0.02619 x f<sup>0.6834</sup> w/m<sup>2</sup> = 2.7523 W / M<sup>2</sup> (@ 0.2M)

IC max limit for calculation: 1.31 x 10-2 f<sup>0.6834</sup> watts eirp = 1.3767 watts EIRP

**Programming level**

Max EIRP (milliwatts)=0.7762

Max EIRP = 0.0007762 Watts

results:  $P_d = 0.7762 / (4 \times \pi \times 20\text{cm}^2) = 0.0001544 \text{ mW / cm}^2 @ 20 \text{ cm}$

W/m2 = 10 times mW/cm<sup>2</sup> = 0.001544 W/M<sup>2</sup> @ 0.2 M