Radio Frequency Exposure Evaluation Report

FOR:
Trapeze Software Group, Inc.

Model Name:
Ranger 4 EVDO A

Product Description:
Rugged and compact vehicular compute

FCC ID: RZ3RAN45728A

Per:

CFR Part Part1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06

Report number: EMC_TRAPZ_006_18001_FCC_MPE

DATE: 02/23/2018

***CETECOM* Inc.**
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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091) under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).
In addition, maximum antenna gain or minimum distance towards the human body is calculated, respectively, where relevant.

The device meets the limits as stipulated by the above given FCC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Report reviewed by: TCB Evaluator

Date	Section	Name	Signature
02/23/2018	Compliance	James Donnellan (Lab Manager)	

Responsible for the Report:

Date	Section	Name	Signature
02/23/2018	Compliance	Issa Ghanma (EMC Engineer)	Digitally signed by ISSA GHANMA DN: cn=ISSA GHANMA, c=US, o=CETECOM Inc., email=issa.ghanma@cetecom.com Date: 2018.02.23 13:18:51 -08'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
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Project Manager:	Laith Saman
Project Engineer:	Issa Ghanma

2.2 Identification of the Client / Manufacturer

Applicant's Name:	Trapeze Software Group, Inc.
Street Address:	10, 2175 29 Street NE
City/Zip Code	Calgary, AB, T17 7H8
Country	Canada
Contact Person:	Stephen Hickle
Phone No.	403-777-3760 x826
e-mail:	stephen.hickle@trapezegroup.com

Identification of the Manufacturer

Manufacturer's Name:	Same as Applicant
Manufacturers Address:	-------
City/Zip Code	-------
Country	-------

3 Equipment under Assessment

Model #:	Ranger 4 EVDO A
HW Version :	4.3
SW Version :	1.03
FCC-ID :	RZ3RAN45728A
Product Description:	Rugged and compact vehicular compute
Regulatory Band:	**WLAN Wi-Fi 2.4GHz:** Nominal band: 2400 MHz – 2483.5 MHz; 2412 MHz (Ch. 1) – 2462 (Ch.11), 11 channels **Cellular:** CDMA BC0 815 – 849 MHz CDMA BC1 1850 – 1910 MHz
Integrated Module Info:	**WLAN Wi-Fi 2.4GHz:** Redpine RS9110-N-11-02 FCC ID: XF6-RS9110N1102 **Cellular**: Sierra Wireless MC5728 FCC ID: N7N-MC5728 **GPS LEA-6H**
Antenna Type and gain:	**WLAN (Wi-Fi):** Flexible printed circuit with 3 dBi **Cellular:** Monopole printed trace with 0.54 dBi at 850MHz and 1.89 dBi at 1900MHz

Maximum Conducted Output Power	**WLAN(Wi-Fi)2.4GHz:** from modular grant 0.0404 Watts **Cellular:** from modular grant 0.9594 Watts
Rated Operating Voltage Range:	Low 6V / Nom 12V / High 36V
Operating Temperature Range:	-30 °C to 65 °C
Sample Revision:	☐Prototype Unit; ■Production Unit; ☐Pre-Production

4 RF Exposure Limits and FCC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC where not indicated differently.

4.1 Power Density Limits acc. to FCC 1.1310(e) :

FCC

Frequency Range (MHz)	Power density (mW/cm²)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1.0	30

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.109(c) (rounded to 1 decimal point):

FCC
operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm (EIRP: 33.9);
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9);

4.3 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm² or W/m²)
P = power input to the antenna (mW or W)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (cm or m)

5 Evaluations

5.1 Analysis to Exclude Routine RF Exposure evaluation for Stand Alone Operation

band	lowest frequency [MHz]	FCC EIRP limit	EIRP in dBm	Verdict
CDMA 800	824.7	33.900	30.36	Exempt
CDMA 1900 PCS	1851.25	36.900	30.99	Exempt
Wi-Fi 2.4GHz	2412	36.900	16.06	Exempt

The single radios are exempt from routine environmental evaluation.

5.2 Analysis of RF Exposure for simultaneous transmission

- Calculations are made for 20cm.
- Evaluations are based on EIRP measured or calculated from known gain and conducted output power.
- Cellular and Wi-Fi can transmit simultaneously

Radio	freq MHz	EIRP in W	US W/m2	Actual W/m2	How much of limit is used up
CDMA 800	**824.7**	**1.09**	**5.498**	**2.161**	**83.87%**
CDMA 1900 PCS	1851.25	1.26	10.00	2.499	55.80%
Wi-Fi 2.4GHz	**2412**	**0.081**	**10.00**	**0.160**	**2.99%**

Conclusion:

- **The worst case simultaneous transmission is CDMA 800 simultaneous with Wi-Fi which is using 86.86% of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.**

6 Revision History

Date	Report Name	Changes to report	Report prepared by
02/22/2018	EMC_TRAPZ_006_18001_FCC_MPE	Initial Release	Issa Ghanma