RADIO FREQUENCY EXPOSURE REPORT

ADDENDUM TO TEST REPORT 95395-23

Device: Provider Specific Consumer Signal Booster
Model: Cel-Fi D32-2/4

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The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

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Purpose:

To demonstrate compliance with United States, Canada and/or European Union RF Exposure requirements for Portable equipment (devices used ≤20cm from the body) or Mobile equipment (devices used >20cm from the body) with power output below exemption levels and Mobile equipment, where Maximum Permissible Exposure (MPE) Calculations apply.

United States Compliance Requirements (1.1310):

RF Exposure Evaluation Limits
Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*($900/f^2$)	6
30-300	61.4	0.163	1	6
300-1500	---	---	f/300	6
1500-100,000	---	---	5.0	6

RF Exposure Evaluation Limits
General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	---	---	f/1500	30
1500-100,000	---	---	**1.0**	30

** Plane wave equivalent power density*
Limit is calculated based on the mid-band frequency used in the operating frequency range.

Exemption Level: Power output $<60/f_{GHz}$ (mW)

Canadian Compliance Requirements (RSS-102):

RF Exposure Evaluation Limits
Occupational / Controlled Exposure:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (W/m^2)	Averaging Time (minutes)
0.003-1.0	600	4.9	---	6
1.0-10	600/f	4.9/f	---	6
10-30	60	4.9/f	---	6
30-300	60	0.163	10	6
300-1500	$3.54\ f^{0.5}$	$0.0094*f^{0.5}$	f/3	6
1500-15,000	137	0.364	50	6
15,000-150,000	137	0.364	50	$616000/f^{1.2}$

RF Exposure Evaluation Limits
General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (W/m^2)	Averaging Time (minutes)
0.003-1.0	280	2.19	---	6
1.0-10	280/f	2.19/f	---	6
10-30	28	2.19/f	---	6
30-300	28	0.073	2	6
300-1500	$1.585 * f^{0.5}$	$0.0042 * f^{0.5}$	f/150	6
1500-15,000	61.4	0.163	10	6
15,000-150,000	61.4	0.163	10	$616000/f^{1.2}$

**Power density limit applicable >100MHz*

Exemption Level:

Frequency Range (MHz)	Maximum Output Power (Conducted or EIRP)
0.003-1000	≤ 200 mW
1000-2200	≤ 100 mW
2200-3000	≤ 20 mW
3000-6000	≤ 10 mW

European Union Compliance Requirements (ICNIRP):

RF Exposure Evaluation Limits
Occupational / Controlled Exposure:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (W/m^2)	Averaging Time (minutes)
0.00082-0.065	610	24.4	---	6
0.065-1.0	610	1.6/f	---	
1.0-10	610/f	1.6/f	---	6
10-400	61	0.16	10	6
400-2000	$3.0 * f^{0.5}$	$0.008 * f^{0.5}$	f/40	6
2000-300,000	137	0.36	50	6

RF Exposure Evaluation Limits
General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (W/m^2)	Averaging Time (minutes)
0.003-0.150	87	5.0	---	6
0.150-1.0	87	0.73/f	--	6
1.0-10	$87/f^{0.5}$	0.73/f	---	6
10-400	28	0.073	2	6
400-2000	$1.375\ f^{0.5}$	$0.0037*f^{0.5}$	f/200	6
2000-300,000	61	0.16	10	6

**Power density limit applicable >100MHz*

Exemption Level: Power output < 20mW[1]

[1] May vary by product type

Device and Antenna Operating Configuration:

Device operating at maximum output power with continuous transmission of modulated data.
7.2.2. Maximum Power Measurement of Provider Specific Booster test procedure 935210 D04 Provider Specific Booster Measurement DR06-41704, dated 03/06/2014. Max Gain, Max power.
UL= 1850-1915 MHz, 1710-1755MHz,
DL= 1930-1995 MHz, 2110-2155MHz.

Test Procedure:

This equipment is evaluated in accordance with the guidelines set forth in OET Guide 65 & ANSI C95.1 for the US and Health Canada Safety Code 6 & RSS 102 for Canada.

Other Considerations:

MPE calculation performed with highest EIRP at max power and max antenna gain.

MPE Calculations

Applicability:

Limit Used	**X**	General Population / Uncontrolled Exposure
		Occupational / Controlled Exposure
RF Exposure Exemption	No	United States
	NA	NA
	NA	NA

Equipment operational details:

Operating Frequency (MHz)	*Measured Output Power (dBm)*	*Antenna Gain (dBi)*	*Antenna Type / Configuration*	*EIRP (dBm)*
1850-1915 NU	20.1	3	integral	23.1
5150-5350 UNII	16.0	6	integral	22.0
			Total	**25.6**

Operating Frequency (MHz)	*Measured Output Power (dBm)*	*Antenna Gain (dBi)*	*Antenna Type / Configuration*	*EIRP (dBm)*
1710-1755 NU	20.3	2	integral	22.3
5150-5350 UNII	16.0	6	integral	22.0
			Total	**25.1**

Operating Frequency (MHz)	*Measured Output Power (dBm)*	*Antenna Gain (dBi)*	*Antenna Type / Configuration*	*EIRP (dBm)*
2110-2155 CU	11.8	0	integral	11.8
5470-5850 UNII	16.5	6	integral	22.5
5725-5850 DTS	17.7	6	Integral	23.7
			Total	**26.3**

Operating Frequency (MHz)	*Measured Output Power (dBm)*	*Antenna Gain (dBi)*	*Antenna Type / Configuration*	*EIRP (dBm)*
1930-1995 CU	11.2	0	integral	11.2
5470-5850 UNII	16.5	6	integral	22.5
5725-5850 DTS	17.7	6	integral	23.7
			Total	**26.3**

Measurements based from EMC Test Report(s): 95395-16, R94995 NII, R94998-DTS

MPE Calculation:

$$Power Density = \frac{EIRP}{4\pi d^2}$$ Given: **EIRP** in *mW* or W and **d** in *cm or m*

Config	Distance (cm)	US (1.1310)		Canada (RSS-102)		EU (ICNIRP)	
		Power Density (mW/cm^2)	Limit (mW/cm^2)	Power Density (W/m^2)	Limit (W/m^2)	Power Density (W/m^2)	Limit (W/m^2)
NU	20	0.072	1	NA	NA	NA	NA

Config	Distance (cm)	US (1.1310)		Canada (RSS-102)		EU (ICNIRP)	
		Power Density (mW/cm^2)	Limit (mW/cm^2)	Power Density (W/m^2)	Limit (W/m^2)	Power Density (W/m^2)	Limit (W/m^2)
CU	20	0.085	1	NA	NA	NA	NA

Total Power Density at 20cm in mW/cm^2 = 0.157

Summary:

MPE Calculation Results:

In the case the equipment meets compliance by MPE Calculations the product is approved for use under mobile conditions without further testing under the condition that any additional collocation or simultaneous transmission requirements (including necessary separation distances) have been met. It is assumed that the manufacturer shall design the equipment such that the minimum separation distance of 20cm (or greater, as listed above) is met or that the manufacturer provides a protection guide (or installation instructions) to the end user such that the antenna(s) may be installed in accordance with the manufacturer's instructions in such a manor to maintain the minimum separation distance.

The Absorption and distribution of Electromagnetic energy in the body is a very complex phenomena that depends on the mass, shape and physiological condition of the body; the orientation of the body with respect to the fields; and, the electrical properties of the body and the environment. Variables that may play a substantial role in possible biological effects are those that characterize the environment (including but not limited to: ambient temperature, air velocity, relative humidity and body insulation); and those that characterize the individual (including but not limited to: age, gender, activity level and existing debilitation or disease). Because innumerable factors may interact to determine specific biological effects of exposure to electromagnetic fields, any protection guide should consider both intended and unintended operational environments and provide guidance for installation and use of the product such that proper separation distances can be maintained. (ANSI C95.1)

References

Federal Communications Commission Knowledge Database (KDB) Publication 447498, "What are the RF exposure requirements and procedures for mobile and portable devices?" As in effect on the issue date of this report.

Federal Communications Commission Bulletin OET 65 Supplement C, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" June 2001

Title 47 Code of Federal Regulations, Part 1.1310, "Radiofrequency radiation exposure limits." As in effect on the issue date of this report.

Title 47 Code of Federal Regulations, Part 2.1091, "Radiofrequency radiation exposure evaluation: mobile devices." As in effect on the issue date of this report.

Health Canada Safety Code 6 Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz, 2009

Health Canada Safety Code 6 Technical Guide, 2009

Industry Canada RSS-102 Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 4, March 2010 (including update December, 2010)

International Commission on Non-Ionizing Radiation Protection. Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). Health Physics 74 (4): 494-522; 1998.

International Commission on Non-Ionizing Radiation Protection Statement on the "Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz). Health Physics 97(3):257-259; 2009.

European Committee for Electrotechnical Standardization. European Normative, EN 50371 Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz) 2002.