

RF EXPOSURE EVALUATION Maximum Permissible Exposure (MPE)

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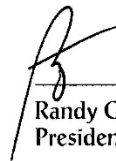
Date of Testing:
 09/16 - 01/24/2022
Test Report Issue Date:
 01/26/2022
Test Site/Location:
 PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
 1M2106010060-01.2AL52

FCC ID:	2AL52CR00LB18
APPLICANT:	Council Rock Enterprises LLC

Application Type: Certification
Module: CR00LB18
EUT Type: Cellular Module
FCC Classification: Citizens Band Category A and B Devices (CBD)
FCC Rule Part: FCC Part 1 (§1.1310) and Part 2 (§2.1091)
Test Procedure(s): KDB 447498 D01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC KDB 447498 D01. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.


 Randy Ortanez
 President





FCC ID: 2AL52CR00LB18	 Proud to be part of element	MAXIMUM PERMISSIBLE EXPOSURE REPORT	Approved by: Technical Manager
Test Report S/N: 1M2106010060-01.2AL52	Test Dates: 09/16 - 01/24/2022	EUT Type: Cellular Module	Page 1 of 6

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1.0 RF EXPOSURE EVALUATION – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Introduction

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules and Regulations.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).


Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	...	...	f/300	6
1500-100,000	...	...	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

Table 1-1. Limits for Maximum Permissible Exposure (MPE)

1.2 EUT Description

The **Council Rock Cellular Module FCC ID: 2AL52CR00LB18** is a module that was originally certified as a Citizens Band End User Device (EUD) under FCC ID: R17LM960. The same module is being re-certified under the new FCC ID: 2AL52CR00LB18 using two different power settings (20dBm and 14dBm) with different high gain antennas where the EIRP's are still in compliance with the requirements of Part 96 to categorize the module as a Category B CBSD. RF exposure compliance data is shown in this report while using 15dBi and 21dBi antenna gains with the 20dBm and 14dBm output power levels, respectively.

The test data contained in this report pertains only to RF exposure of the EUT's LTE Band 48 operation in the CBRS band. This device is evaluated under the mobile condition for RF exposure.

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1.3 Procedure

The procedure used to determine the RF power density was based upon a calculation for determining compliance with the MPE requirements.

The power generated by each transmitter used in this product was initially measured by a power meter or spectrum analyzer and the powers were recorded. Through use of the Friis transmission formula and knowledge of the maximum antenna gain to be used, the power density level is calculated at a distance of 20cm.

Friis Transmission Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4\pi r^2)$

Where,

P_d = Power Density (mW/cm²)

π = 3.1416

P_{out} = output power to antenna (mW)

r = distance between observation point and center of the radiator (cm)

G = gain of antenna in linear scale

Calculated MPE

The power density limit for General Population/Uncontrolled Exposure at each frequency is determined based on the information in Table 1-1.


There is no co-location between the electric fields of any two transmitters therefore following power densities are calculated for each individual transmitter by frequency at 20cm spacing:

Frequency	3625 MHz		
Limit	1.000 mW/cm ²		
Distance (cm), R =	23 cm		
Power (dBm), P =	23 dBm	199.53 mW	
TX Ant Gain (dBi), G =	15 dBi		
Power Density (S) =	0.949 mW/cm ²	(at 23cm)	

Table 1-2. Calculated MPE Data for 20dBm Power Setting

Frequency:	3625 MHz		
Limit:	1.000 mW/cm ²		
Distance (cm), R =	20 cm		
Power (dBm), P =	15.5 dBm	35.48 mW	
TX Ant Gain (dBi), G =	21 dBi		
Power Density (S) =	0.889 mW/cm ²	(at 20cm)	



Table 1-3. Calculated MPE Data for 14dBm Power Setting

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1.4 Summary of Results


Frequency Band [MHz]	Maximum Antenna Gain [dBi]	MPE @ 20cm (mW/cm ²)	Compliant Distance (cm)	Test Result
3550 - 3700	15	0.949	23	PASS
3550 - 3700	21	0.889	20	PASS

Table 1-4. Maximum Permissible Exposure Summary Table

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2.0 CONCLUSION

The device meets the mobile RF exposure limit at a 20cm separation distance as specified in §2.1091 of the FCC Rules and Regulations. An appropriate RF exposure compliance statement will be placed in the user’s manual.

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