

RF EXPOSURE EVALUATION
Maximum Permissible Exposure (MPE)

Applicant Name:
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Date of Testing:
 11/22/2022
Test Report Issue Date:
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Test Site/Location:
 Element Lab. Columbia, MD, USA
Test Report Serial No.:
 1M2211210116-02.RI7

FCC ID:	RI7FN980M
APPLICANT:	Telit Communications S.p.A.

Application Type: Class II Permissive Change
Model: FN980M
EUT Type: Module
FCC Classification: Citizens Band End User Devices (CBE)
FCC Rule Part: FCC Part 1 (§1.1310) and Part 2 (§2.1091)
Test Procedure(s): KDB 447498 D01 v06
Class II Permissive Change: Adding 5G n48 capability
Original Grant Date: 07/27/2022


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.




RJ Ortanez
Executive Vice President



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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 and RSS-102 of Industry Canada.


The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310 and RSS-102: 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 **Telit Module FCC ID: RI7FN980M** supports several LTE and NR bands, including NR band n48 as part of this Class II Permissive Change filing. The n48 band can operate in both standalone (SA) and non-standalone (NSA) scenarios.

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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 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

1.4 Calculated MPE for Max Antenna Gain

The power density limit for General Population/Uncontrolled Exposure at each frequency is determined based on the information in Table 1-1. The following calculation shows the maximum antenna gain for n48 operation at a 20cm distance.

Frequency	3625 MHz		
Limit	1.000 mW/cm ²		
Distance (cm), R =	20 cm		
Power (dBm), P =	22.5 dBm	177.83 mW	
TX Ant Gain (dB), G =	14.5 dBi		
Power Density (S) =	0.997 mW/cm ²	(at 20cm)	
Minimum Distance =	20.0 cm		

Table 1-2. Calculated MPE Data for NR Band n48 with Max Antenna Gain at 20cm

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1.5 Calculated MPE for RF Exposure Compliance

The following calculations show MPE for n48 using the maximum allowed antenna gain that still demonstrates EIRP compliance per §96.41(b). Additionally, a calculation for MPE under LTE Band 13 is included to account for the worst-case EN-DC operation.

Frequency	3625 MHz		
Limit	1.000 mW/cm ²		
Distance (cm), R =	20 cm		
Power (dBm), P =	22.5 dBm	177.83 mW	
TX Ant Gain (dBi), G =	0.5 dBi		
Power Density (S) =	0.040 mW/cm ²	(at 20cm)	
Minimum Distance =	4.0 cm		


Table 1-3. Calculated MPE Data for NR Band n48

Frequency:	777 MHz		
Limit:	0.518 mW/cm ²		
Distance (cm), R =	20 cm		
Power (dBm), P =	24.5 dBm	281.84 mW	
TX Ant Gain (dBi), G =	3.5 dBi		
Power Density (S) =	0.126 mW/cm ²	(at 20cm)	
Minimum Distance =	9.8 cm		

Table 1-4. Calculated MPE Data for LTE Band 13


	Power Density (mW/cm ²)	Limit (mW/cm ²)	Percent MPE Used (%)
Transmitter #1 (NR n48)	0.040	1.000	3.97
Transmitter #2 (LTE B13)	0.1255	0.518	24.23
Total			28.20

Table 1-5. Calculated MPE Data for NSA Scenario (NR n48 + LTE B13)

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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 and Health Canada Safety Code 6. An appropriate RF exposure compliance statement will be placed in the user's manual.

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