

# User Manual

## Telematics Subaru T26

### FCC ID: KR5-T26SBRNB84G

### IC: 7812D-T26SBRNB84G

<Hint for the user of this template:  
Replace all yellow shaded text by the project specific information.  
Do not change formatting like text size or bold etc.  
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Use light grey shading also for added or modified template text.>

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## TERMS AND ACRONYMS

CDMA	Code Division Multiple Access
DCM	Data Connectivity Module
DRX	Discontinuous Reception
ES	Engineering Sample
FDD	Frequency Division Duplex
GLONASS	GLOBal'naya NAVigatsionnaya Sputnikovaya Sistema
GNSS	Global Navigation Satellite System
GPIO	General Purpose Input Output
GSM	Global System for Mobile
HU	Head Unit
HSIC	High Speed Inter-Chip
LTE	Long Term Evolution
MP	Mass Production
NAD	Network Access Device
OEM	Original Equipment Manufacturer
PCB	Printed Circuit Board
PHY	Physical Layer
SIM	Subscriber Identity Module
TDD	Time Division Duplex
TSP	Telematics Service Provider
UMTS	Universal Mobile Telecommunication System
WCDMA	Wideband Code Division Multiple Access

## 1. INTRODUCTION

The Telematics Control Unit (TCU) described herein is a vehicle mounted Telematics control unit designed and manufactured by Continental for exclusive use by a premium automotive OEM. The product name has been designated by the customer as Subaru T26.

### 1.1 PURPOSE AND SCOPE

This document aims to describe the device operating principles and provide installation instruction to OEM to insure safe use of the device.

### 1.2 PRODUCT DESCRIPTION

Subaru T26NAM is a proprietary DCM designed and manufactured by Continental Automotive. The DCM includes an integrated Network Access Device (NAD) that is also designed and produced by Continental.

The DCM will be installed as a vehicle mounted wireless devices into Subaru vehicles during the OEM's factory assembly process and will not be accessible without use of special tools.

The DCM functionalities are accomplished by 2G/3G/4G technologies (Voice & Data) and defined service feature.

The DCM comprises of the following subsystem components:

- Power supply
- Vehicle micro-controller (VuC)
- Network Access Device (NAD)
- Vehicle interface / communications
- Battery
- Integrated WiFi circuit

## 2. TCU FUNCTIONALITY

The Subaru T26 TCU provides 4G advanced connectivity to the vehicle and interfaces to the vehicle head unit Ethernet bus. The TCU is designed to

- initiate automatic emergency calls if an automatic emergency call trigger is received;
- allow initiation of a Manual Emergency Call by a car occupant;
- allow manual initiation of Roadside Assistance or Information Calls by a car occupant;
- establish Data Packet Connection with telematics service;
- establish Data Packet Connection to support the internet connection of Head Units.
- establish Data Packet Connection to support the internet connection of devices through Wi-Fi.

## 3. PRODUCT KEY FEATURES

### 3.1 AIR INTERFACE SUPPORT

- 3GPP Rel. 10
- LTE FDD CAT4 (up to 50-Mbps UL/150-Mbps DL)
- UMTS: HSUPA CAT 6 (up to 5.76-Mbps), HSPA CAT14 (up to 21-Mbps)
- GSM: EGPRS Rel-9 236.5kbps (MSC33)
- VoLTE - HD Voice
- Embedded Qualcomm Gen8C GNSS
- GPS/GLONASS/Galileo/BeiDou Receiver
- SBAS supported: EGNOS/MSAS/QZSS/WAAS/GAGAN
- Able to track ~40 channels simultaneously
- 10 Hz update rate (under development)
- Position Accuracy of < 6m @ 95% (open sky)
- Acquisition Sensitivity of -149 dBm
- Tracking Sensitivity of -163 dBm
- TTFF Cold/Warm/Hot (open sky, mean) = 29 sec / 27 sec / 1 sec

NAD Model Name	Region	FDD and TDD LTE	UMTS	GSM
FE3NA0031	NA	2, 4, 5, 7, 12, 13	2, 4, 5	2, 5

Frequency Bands		Maximum Power	Modulation
GSM:	EGSM850, Class 4	$< (+32.5\text{dBm} \pm 1\text{dB})$	GMSK, 8PSK
GSM:	EGSM1900, Class 4	$< (+29.5\text{dBm} \pm 1\text{dB})$	
UMTS:	WCDMA FDD II, Class 3	$< (+23.5\text{dBm} \pm 1\text{dB})$	BPSK, QPSK
UMTS:	WCDMA FDD IV, Class 3	$< (+23.5\text{dBm} \pm 1\text{dB})$	
UMTS:	WCDMA FDD V, Class 3	$< (+23.5\text{dBm} \pm 1\text{dB})$	
LTE:	FDD B2, Class3	$< (+23\text{dBm} \pm 1\text{dB})$	QPSK, 16QAM, 64QAM
LTE:	FDD B4, Class3	$< (+23\text{dBm} \pm 1\text{dB})$	
LTE:	FDD B5, Class3	$< (+23\text{dBm} \pm 1\text{dB})$	
LTE:	FDD B7, Class3	$< (+23\text{dBm} \pm 1\text{dB})$	
LTE:	FDD B12, Class3	$< (+23\text{dBm} \pm 1\text{dB})$	
LTE:	FDD B13, Class3	$< (+23\text{dBm} \pm 1\text{dB})$	
GNSS:	1559-1610 MHz	(Receiving only)	

### 3.2 ELECTRICAL SUBSYSTEMS

The device comprises of these main electrical subsystems

- Power Supply subsystem to support internal required rails and power modes.
- Vehicle Interface:
  - Battery input front end for protection, filtering and transient conditioning. (Terminals 18 and 34 corresponding to vehicle battery and ground)
  - Cellular Antenna RF Connectors (Primary, DRX0)
  - GPS input and output
  - Ethernet 100 Base T
  - LIN Input
  - Wakeup in/out
  - Microphone (MIC+/-) input
  - Speaker (SPK+/-) output
- Vehicle microcontroller
- Embedded FE3NA0031 module (NAD = Network Access Device). Core A7 (SoC) on board.
- NAD interface includes module IO, buffering HSM and SIM IC support
- 100BASET1 interface
- Audio subsystem includes analog microphone input and speaker output
- Digital audio interfaces including CODEC and alternate routing for audio to head unit
- Hands Free processing in SoC for emergency phone call

## 4. SOFTWARE SECURITY DESCRIPTION

### 4.1 SECTION IV B:

Continental Radio is configured to act as a master by default, so this section is not applicable.

- 1.- Continental WiFi device is configured to work up to channel 11.
- 2.- Continental WiFi device is configured to work using frequencies up to U-NII-1
- 3.- Continental WiFi device does not support peer-to-peer communication

### 4.2 SECTION IV C:

Continental WiFi device band and power configurations are compliant operations in the U.S. by default.

Continental implementation scans MNC and MCC in periods within one hour and receives immediate updates from the carrier to determine which radio configuration will be set accordingly. If network capabilities cannot be determined, the radio stays off.  
Continental WiFi device is configured to don't use extended frequencies.

## 5. REGULATORY COMPLIANCE NOTES

### 5.1 FCC:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Part §15.21

Users must be advised that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

**FCC Caution:**

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

**Radiation Exposure Statement:**

This device meets the government's requirements for exposure to radio waves.

This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

The exposure standard for wireless device employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. \*Tests for SAR are conducted using standard operating positions accepted by the FCC with the device transmitting at its highest certified power level in all tested frequency bands.

**5.2 INDUSTRY OF CANADA:**

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) L'appareil ne doit pas produire de brouillage; (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC/ISED multi-transmitter product procedures. Cet appareil et son antenne ne doivent pas être situés ou fonctionner en conjonction avec une autre antenne ou un autre émetteur, sauf conformément aux procédures de produits multi-émetteurs FCC/ISED.

**Radiation Exposure Statement:**

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. Additional testing and certification for SAR will be required if the distance limitation cannot be met.

**Déclaration d'exposition aux radiations:**

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps. Des tests et une certification supplémentaires pour le SAR seront requis si la limitation de distance ne peut pas être respectée.