FCC ID: LHJ:LNADVW, IC: 2807E-LNADVW

Operation Guide for LNADVW Module

1. Product Overview

LNADVW wireless module is a proprietary modem designed and manufactured by Continental Automotive Systems, Inc. The modem will be integrated into Data Connectivity Modules (DCMs) designed and produced by Continental for use by automotive OEMs. DCMs will be installed into vehicles during the OEM's factory assembly process and will not be accessible without use of special tools. Primary use-cases are data-centric with data and voice connections to Telematics Service Providers (TSP). LNADVW also supports WiFi and will be used provide WiFi Hotspot functionality within the vehicle.

Fig. 1. Top view of LNADVW module.

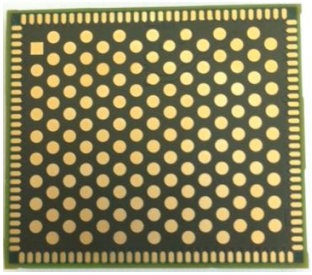

Fig. 2. Bottom view of LNADVW module.

LNADVW Feature Table:

Feature	Description
Cellular Operating Bands	LTE FDD: 17, 4, 2 and 5 WCDMA: II and V
WiFi Operating Bands and Protocols	2.4 GHz: - 802.11b - 802.11g - 802.11n 5 GHz: - 802.11a - 802.11n
Application Interface	USB 4 wire UART 2 wire UART Audio: PCM ACC_POWER_ON pin

	Hardware Reset Pin BOOT_OK status pin MSG indicator pin JTAG Antenna interface (Primary, MIMO)
Data Services	LTE data rates: up to 100MBps DL / 50Mbps UL WiFi data rates: - 802.11a up to 54 Mbit/s - 802.11b up to 11 Mbit/s - 802.11g up to 54 Mbit/s - 802.11n up to 150 Mbit/s

2. Regulatory Compliance Notes

FCC:

This device complies with Part 15, Part 22(H), Part 24(E) and Part 27 of the FCC Rules. The FCC ID for this device is LHJ-LNADVW. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Industry of Canada:

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device."

« Le présent appareil est conforme aux CNR d'Industrie 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, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement. »

This radio transmitter (2807E-LNADVW) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

« Le présent émetteur radio (2807E-LNADVW) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.»

3. Device Installation and User Manual

The LNADVW module is a proprietary product designed and manufactured by Continental Automotive Systems, Inc. for integration into telematics control units manufactured by Continental Automotive Systems, Inc. for automotive OEMs.

i. The module is limited to installation ONLY in an integrated device manufactured by Continental Automotive Systems, Inc.

ii. During manufacturing process of the integrated device, the module is soldered onto the pcb of the integrated device.

iii. The integrated device must provide RF connectors to external antennas or RF traces to connect the LNADVW modules to antennas inside the integrated device.

The typical reference design for the trace layout, including pcb stack-up and trace length is as described and shown in a Figure 3 below:

Typical RF trace layout between the LNADVW module and RF Connector:

- Recommended RF Connector Type: Fakra
- Main LTE/WCDMA antenna connector (MIMO1) is X203.
    - Recommended RF trace length is less than 40 mm.
- Diversity LTE/WCDMA antenna connector (MIMO2) is X202.
    - Recommended RF trace length is less than 45 mm.
- WiFi antenna connector is X201.
    - Recommended RF trace length is less than 50 mm.

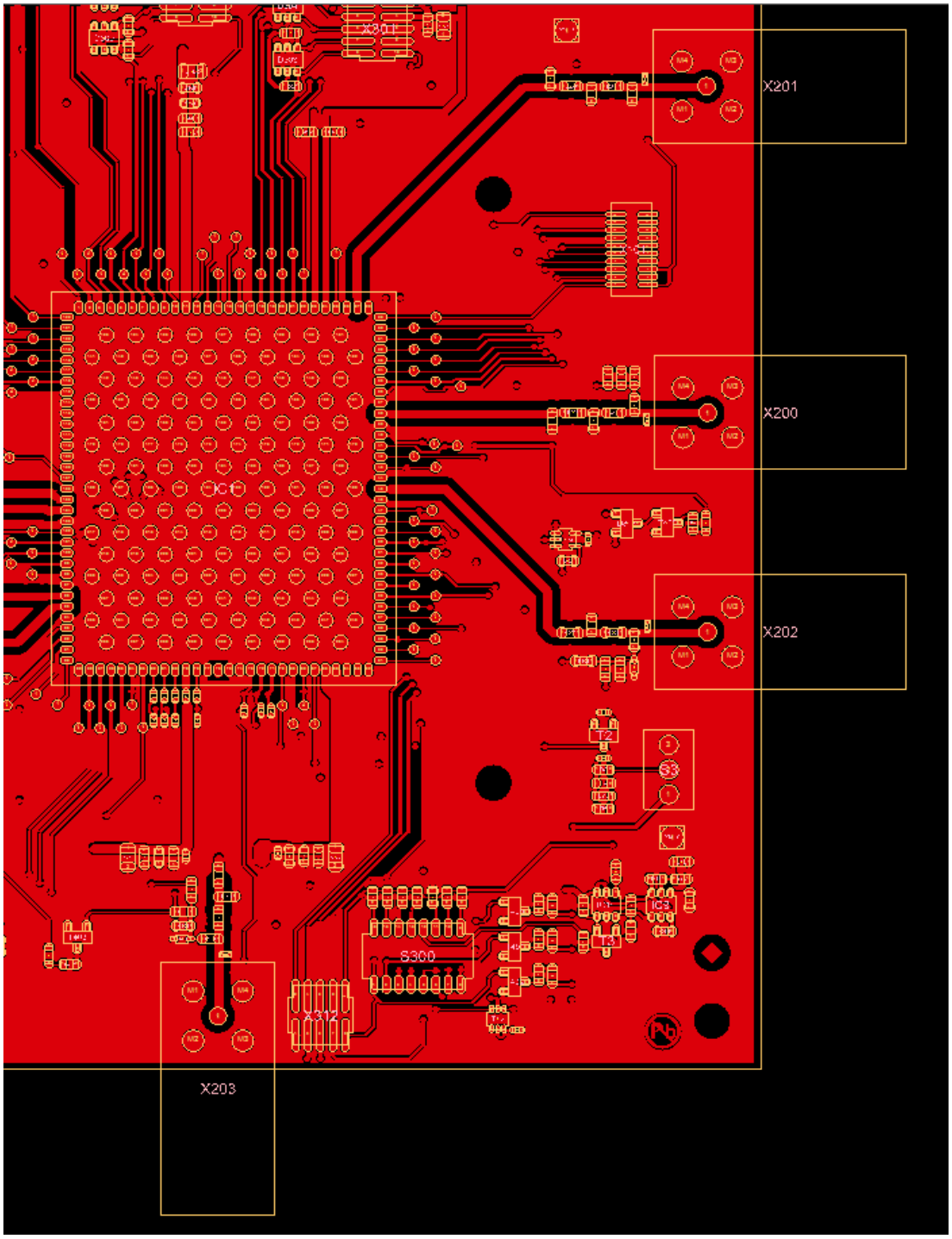

Fig. 3. Typical trace routing recommended for use with the LNADVW module.

- PCB Material: FR 4
- PCB design information:
  - Microstrip on layer 1 with ground on layer 2 / 50 ohm Single Ended Line/ 840 mm W 840 mm
  - Stripline on layer 2 with ground on layers 1&3 / 50 Ohm Single Ended Line/ 405 mm W

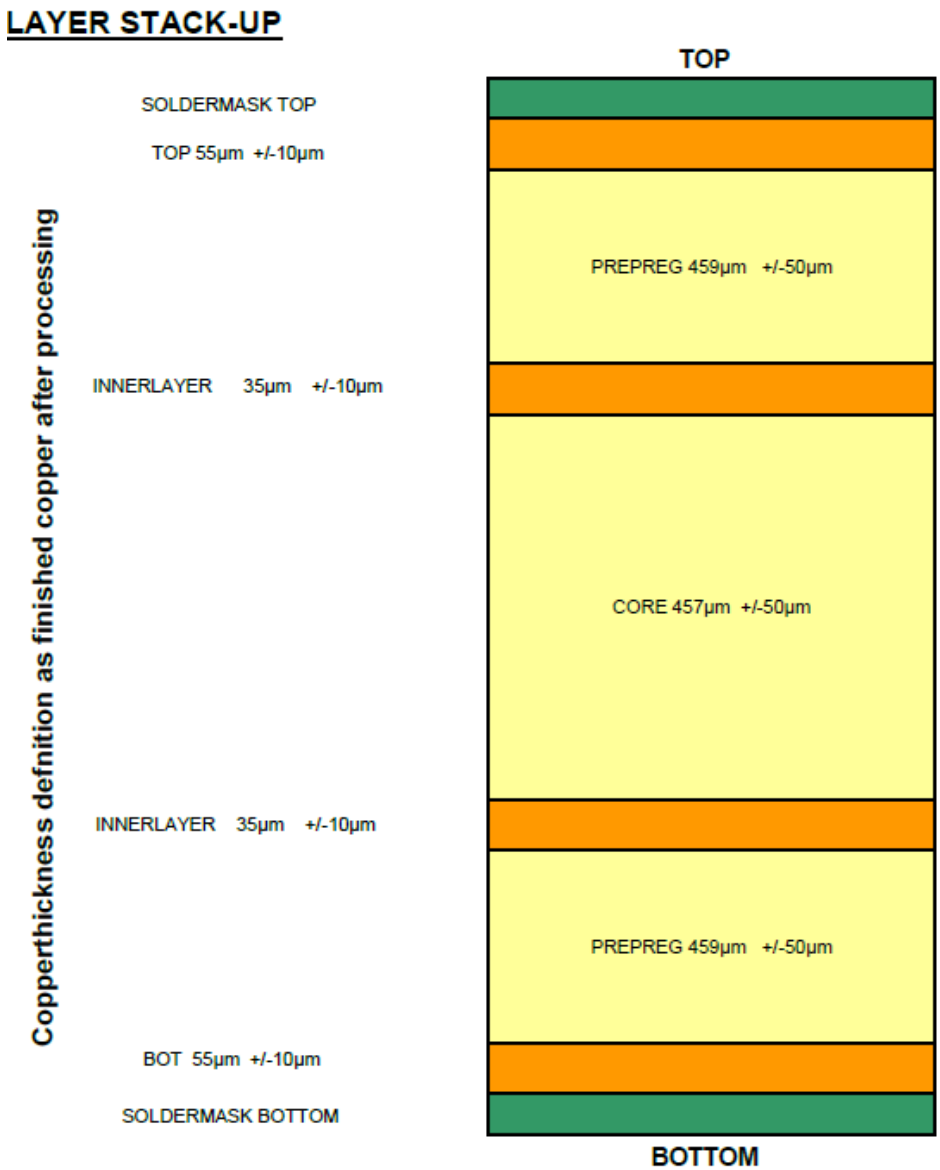

Fig. 4. Recommended PCB stack-up information for use while integrating LNADVW module.

iv. Automotive OEM is responsible for ensuring that the end-user has no manual instructions to remove or install module.

v. The module is limited to installation in mobile applications, according to Part 2.1091(b).

vi. No other operation configurations are allowed.

vii. Changes or modifications to this system by other than a facility authorized by Continental could void authorization to use this equipment.

viii. The module must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter.

ix. The integrator is responsible for fulfilling FCC and IC requirements for the integrated device.

If Continental chooses to re-use modular approval, then the TCU shall be clearly labeled with an external label containing the integrated modem's FCC ID. For example, the label can include text "Contains device with FCC ID: LHJ-LNADVW and IC: 2807E-LNADVW".

4. Antenna requirements for use with LNADVW module:

- The module must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
- The LNADVW module is for use with external antennas ONLY.
- For all LTE/WCDMA operating bands the maximum antenna gain is 6 dBi including cable loss.
- For WiFi 2.4 GHz operating band the maximum antenna gain is 2 dBi including cable loss.
- For WiFi 5 GHz operating band the maximum antenna gain is 6 dBi including cable loss.
- The maximum gain of the antenna path (cable loss + antenna gain) shall not exceed the above mentioned values.

This radio transmitter (FCC ID: LHJ-LNADVW; IC: 2807E-LNADVW) has been approved by FCC and Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

« Le présent émetteur radio (ID: LHJ-LNADVW; IC: 2807E-LNADVW) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un

gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.»

5. Instructions to OEMs:

Continental must instruct the automotive OEM and provide them to include the following information into the car user's manual (i.e. for the DCM):

1. End-users must be provided with transmitter/antenna installation requirements and operating conditions for satisfying RF exposure compliance:

2. A separate section should clearly state "FCC RF Exposure requirements:"

3. Required operating conditions for end users.

4. The antenna used with this device must be installed to provide a separation distance of at least 20cm from all persons, and must not transmit simultaneously with any other transmitter, except in accordance with FCC multi-transmitter product procedures.

5. The Maximum ERP/EIRP and maximum antenna gain required for compliance with Parts 15, 22H, 24E, and 27.

6. Clear instructions describing the other party's responsibility to obtain station licensing.