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2020.0 DEFENDER (LE), 415-01

INFORMATION AND ENTERTAINMENT SYSTEM

NAVIGATION SYSTEM (G2401468)

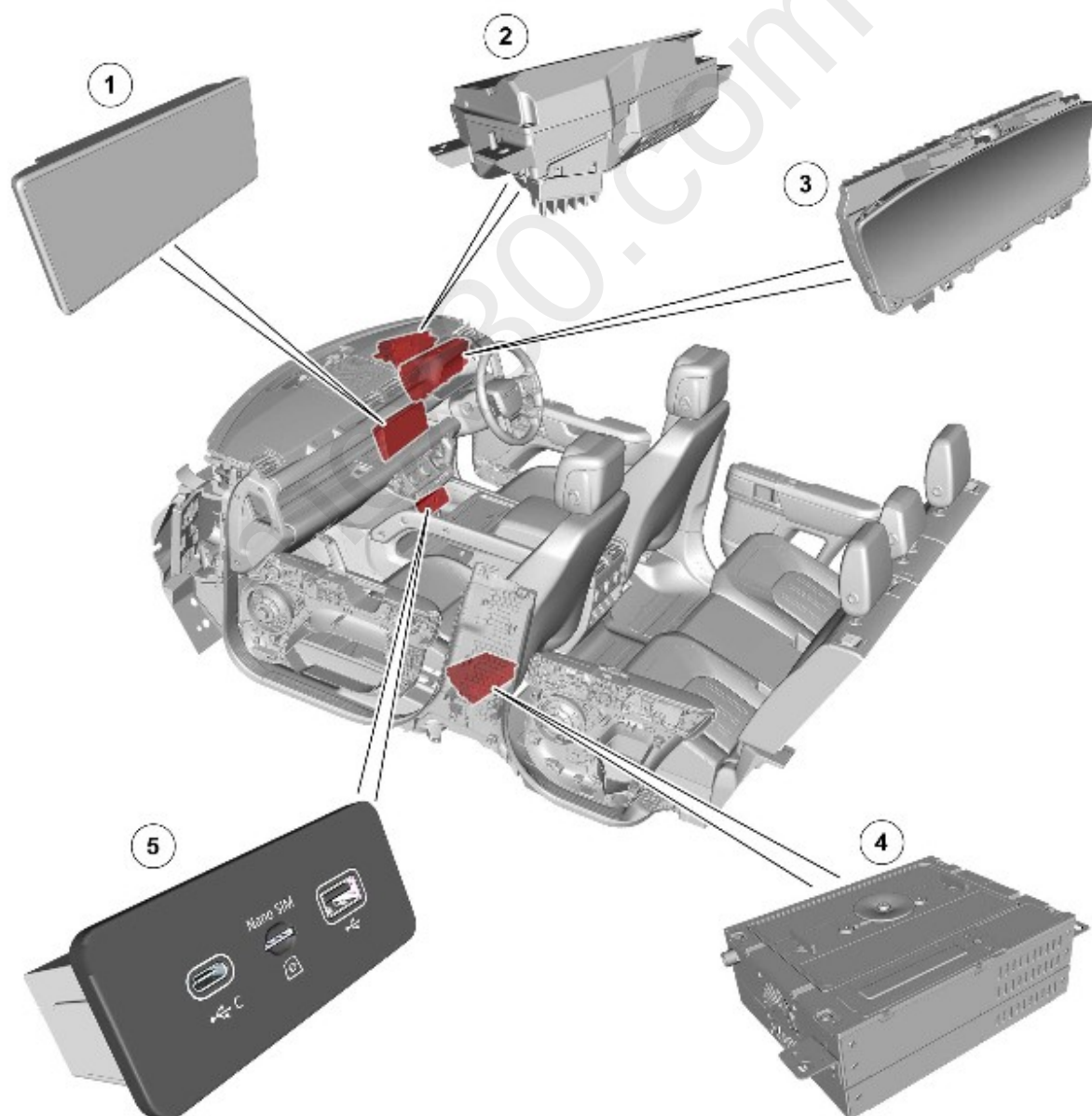
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COMPONENT LOCATION

COMPONENT LOCATION - 1 OF 3

 NOTES:

- Right Hand Drive (RHD) vehicle is shown, Left Hand Drive (LHD) vehicle is similar.
- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.



ITEM	DESCRIPTION
1	Touch Screen (FCDIM)
2	Head Up Display (HUD) (if equipped)
3	Instrument Panel Cluster (IPC)
4	Front Infotainment Control Module (IGM / ICCM)
5	Front portable media interface panel

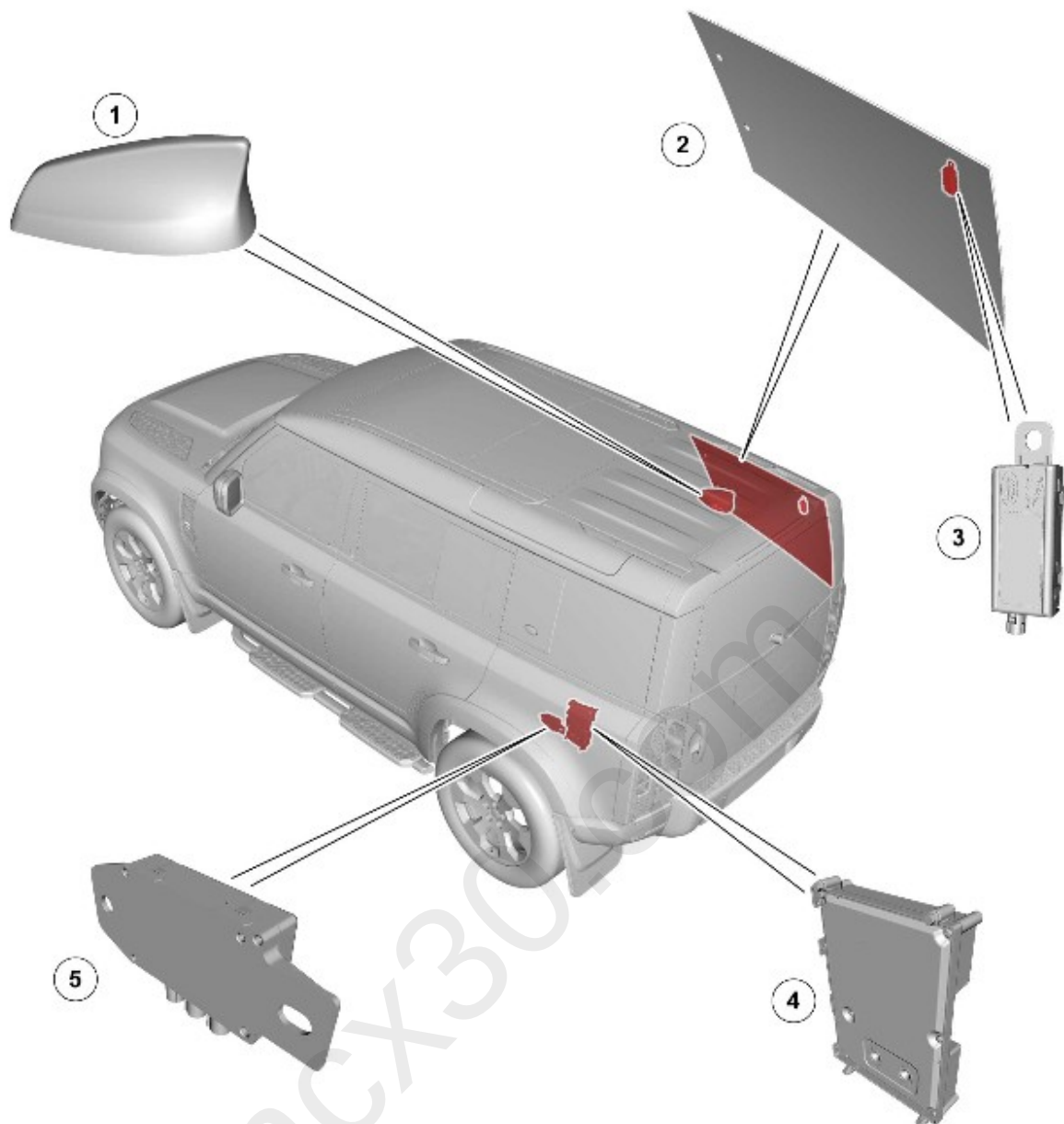
COMPONENT LOCATION - 2 OF 3



NOTE:

Vehicle with 5 doors is shown, vehicle with 3 doors is similar.

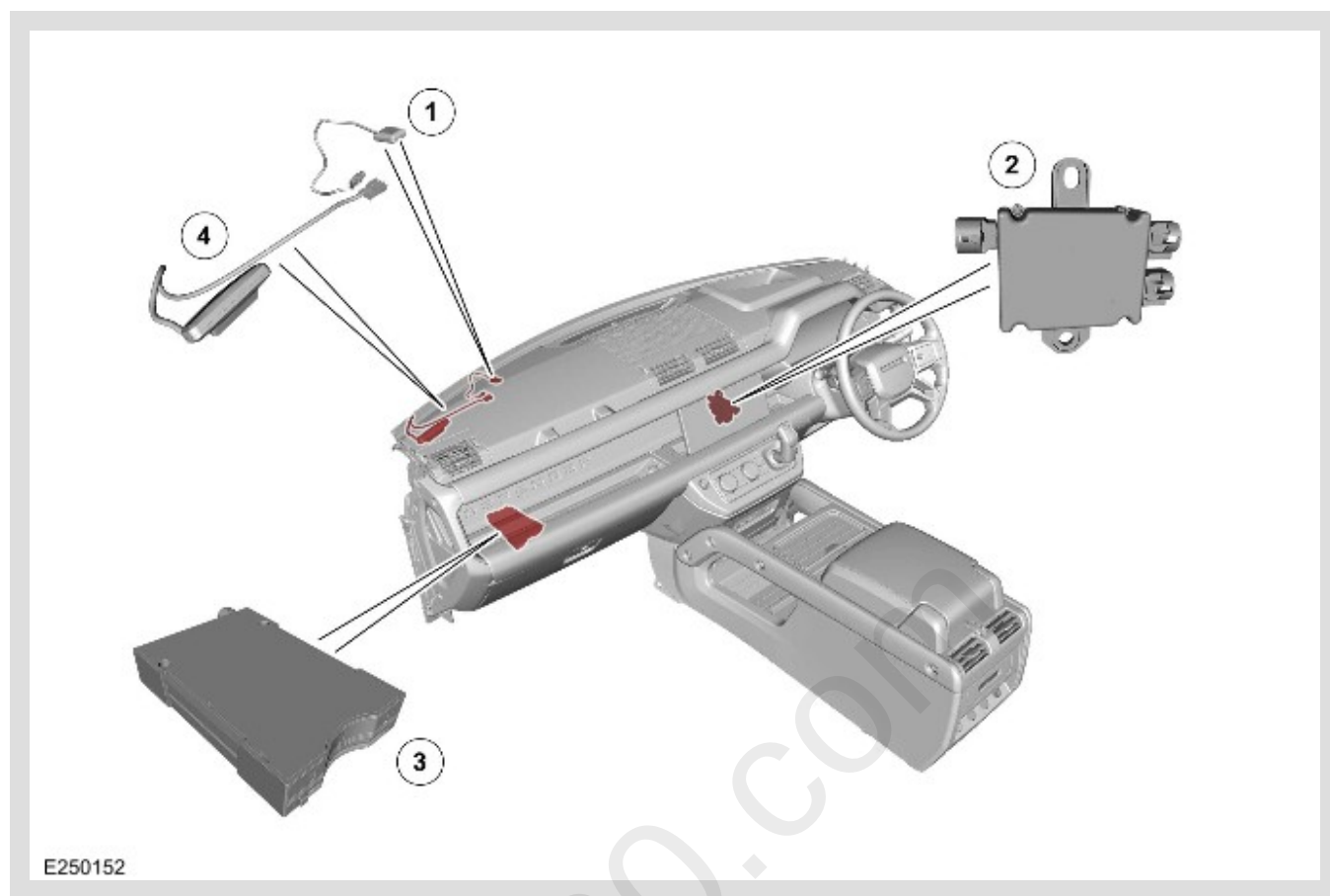
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ITEM	DESCRIPTION
1	Roof pod - Global Navigation Satellite System (GNSS) antenna
2	Right antenna pattern on rear window
3	Antenna amplifier - Frequency Modulation (FM)
4	Audio Amplifier Control Module (AAM)
5	GNSS signal splitter

COMPONENT LOCATION - 3 OF 3 - ELECTRONIC TOLL COLLECTION AND VEHICLE INFORMATION AND COMMUNICATION SYSTEM (VICS) - JAPAN MARKETS ONLY



ITEM	DESCRIPTION
1	Electronic toll collection module antenna
2	Universal Serial Bus (USB) 2.0 Hub
3	Electronic toll collection module
4	VICS beacon antenna

OVERVIEW

NAVIGATION SYSTEM

The navigation system provides audible and visual route guidance information to enable the driver to reach a desired destination. The system allows the driver to choose the route using minor or major roads or highways. The system also allows the driver to select the option of different routes according to market specification. Options available are recommended, shortest, fastest and most economical. Directions to hospitals, museums, monuments and hotels are also available.

The navigation system is integrated with the audio system and shares a number of components common to all systems.

INSTRUMENT PANEL CLUSTER

The IPC displays video turn instructions. The instructions are always displayed when guidance is running.

Depending on the level of IPC installed determines the display available:

- Navigation can display a full screen map in the IPC.
- Navigation can display a mini map in the IPC.

For additional information, refer to: [Instrument Panel Cluster](#) (413-01 Instrument Cluster, Description and Operation).

HEAD UP DISPLAY

The IPC menu has navigation in the HUD. The HUD shows navigation as a video display. The HUD allows more flexibility of the information displayed. The video display for the HUD is from the IPC on an Automotive Pixel Link 2 (APIX2) signal.

INCONTROL PRO CONNECTED NAVIGATION

The 'InControl Pro Connected Navigation' is embedded within the IGM / ICCM software. 'InControl Pro Connected Navigation' offers a mobile and web companion application for when the driver leaves the vehicle. 'InControl Pro Connected Navigation' is available as a feature of 'InControl Pro Services'.

ELECTRONIC TOLL COLLECTION MODULE ANTENNA – JAPAN ONLY

The electronic toll collection module antenna is located on the left of the instrument panel.

VEHICLE INFORMATION AND COMMUNICATION SYSTEM BEACON ANTENNA – JAPAN ONLY

The VICS beacon antenna is located on the left of the instrument panel. The antenna is attached to the top of the instrument panel with an adhesive pad.

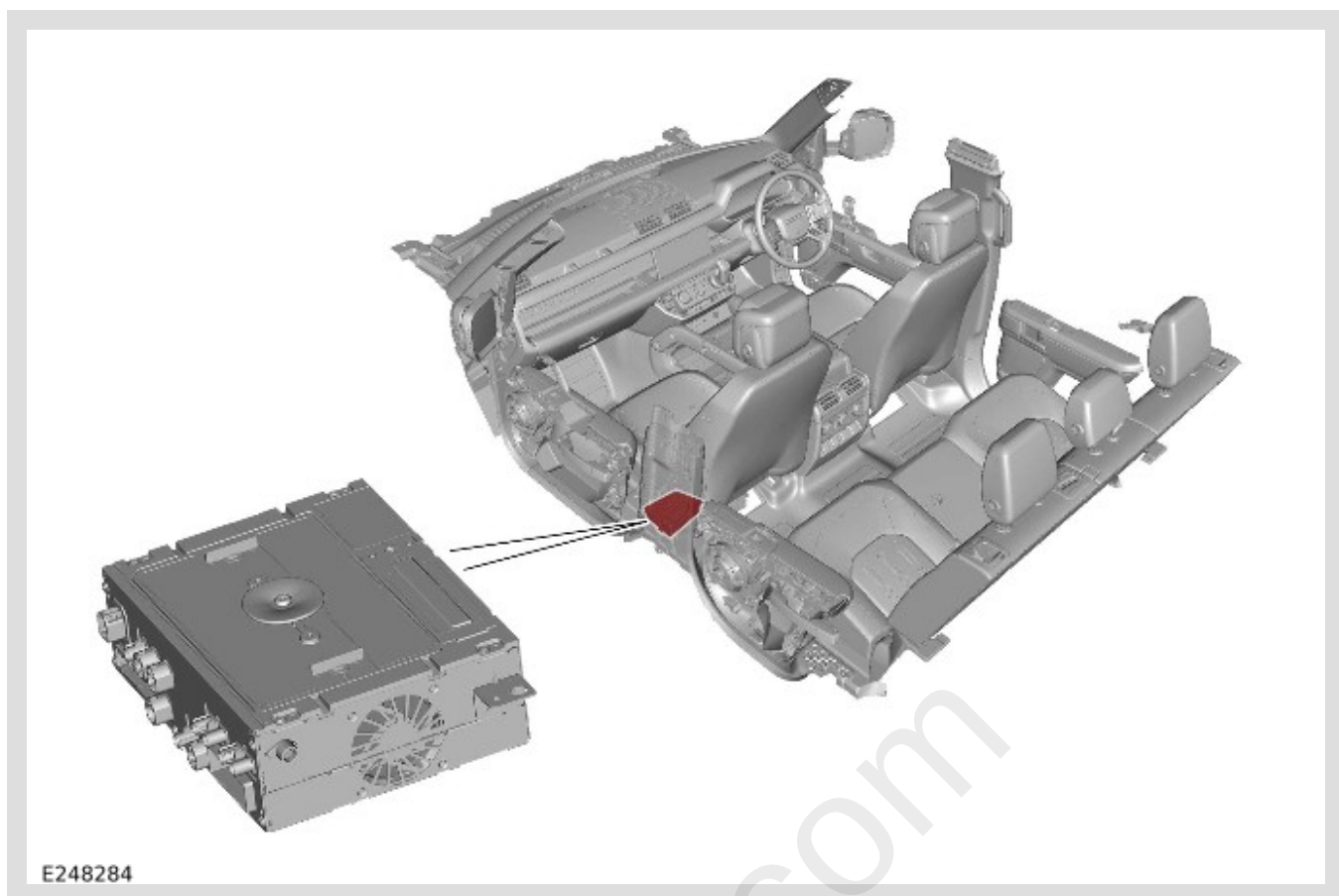
DESCRIPTION

FRONT INFOTAINMENT CONTROL MODULE



NOTES:

- RHD vehicle is shown, LHD vehicle is similar.
- Vehicle with 5 doors is shown, vehicle with 3 doors is similar.



The IGM / ICCM is under the left front row seat.

The IGM / ICCM is connected to other vehicle systems through the High Speed (HS) Controller Area Network (CAN) Human Machine Interface (HMI) systems bus. The IGM / ICCM is connected to the FCDIM through an APIX2 connection. The driver controls the functions of the navigation system by using the FCDIM.

For additional information, refer to: [Audio System](#) (415-01 Information and Entertainment System, Description and Operation).

The IGM / ICCM is connected to the IPC through the HS CAN HMI systems bus.

Vehicles equipped with HUD, the IGM / ICCM is connected to the HUD through the HS CAN HMI systems bus.

Video data is sent to the IPC through an APIX2 data link. The data link allows the navigation data to be displayed depending on the selected format of the IPC.

Navigation data is stored in the IGM / ICCM. The updates of the map are downloaded and the system updated through a USB connection. The USB connection is on the front portable media interface panel located in the front console.

For additional information, refer to: [Navigation System Map Updates - All Markets Excluding China, Japan and Korea](#) (415-01 Information and Entertainment System, Description and Operation).

For additional information, refer to: [Navigation System Map Updates - China Only](#) (415-01 Information and Entertainment System, Description and Operation).

For additional information, refer to: [Navigation System Map Updates - Japan Only](#) (415-01 Information and Entertainment System, Description and Operation).

For additional information, refer to: [Navigation System Map Updates - Korea Only](#) (415-01 Information and Entertainment System, Description and Operation).

 NOTE:

Due to the map data file size, it is recommended that a USB 3.0 memory stick is used to update the map data.

There are different internal storage specifications depending on the vehicle specification.

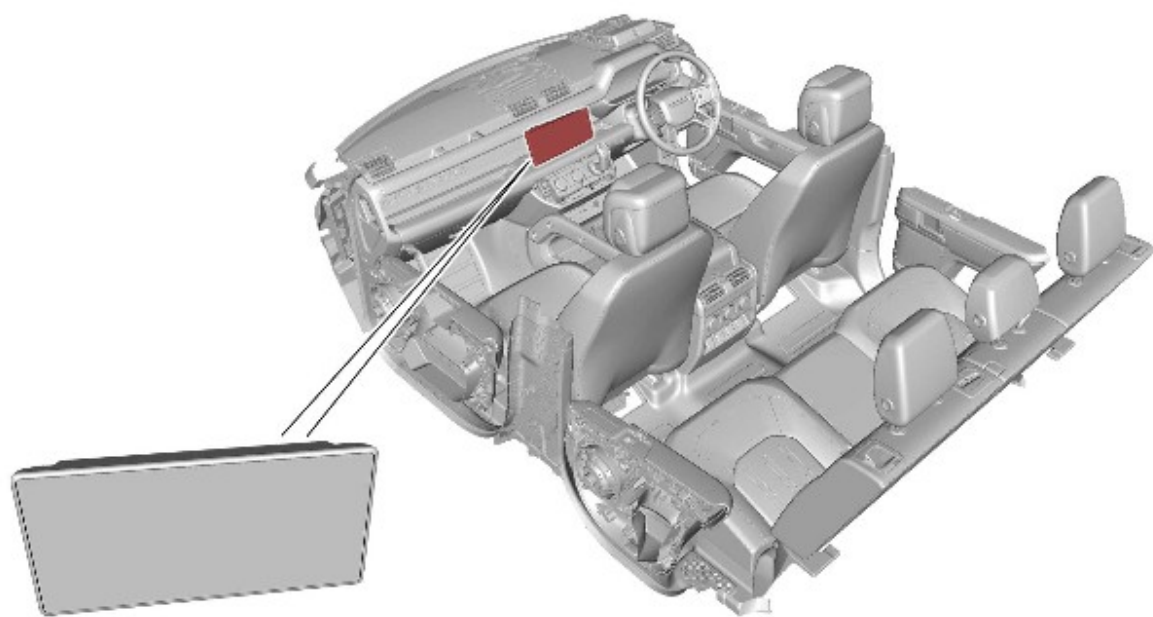
The navigation system incorporates a 'dead reckoning' system. When the GNSS signal is lost, the IGM / ICCM uses other vehicle signals to calculate the position. The signals include:

- Navigation map
- Odometer
- 3D gyroscope
- 3D accelerometer (integrated in the IGM / ICCM)
- Reverse gear.

TOUCH SCREEN

 NOTE:

RHD vehicle is shown, LHD vehicle is similar.

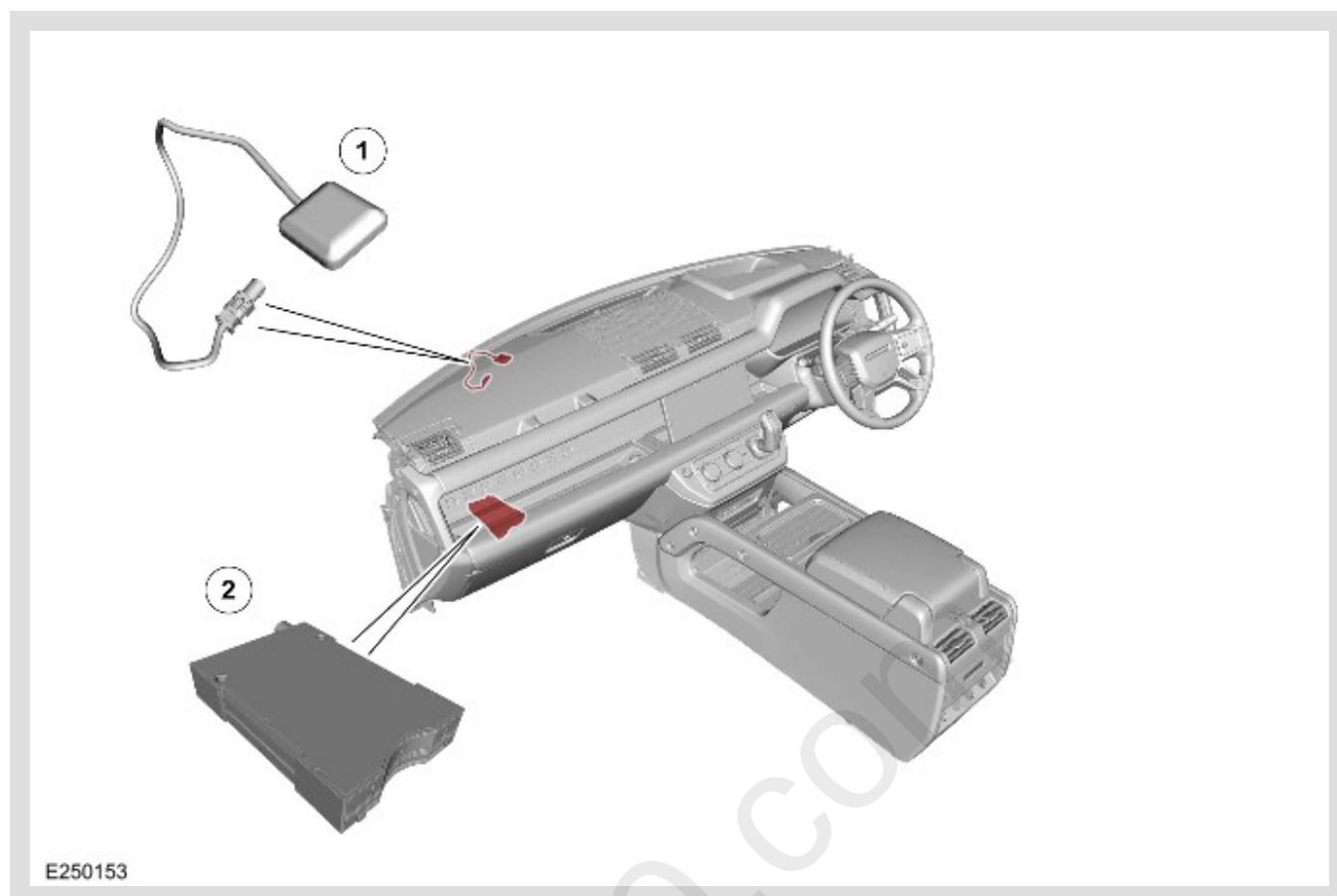


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The FCDIM is located in the center of the instrument panel.

The FCDIM displays map navigation information.

ELECTRONIC TOLL COLLECTION SYSTEM – JAPAN ONLY

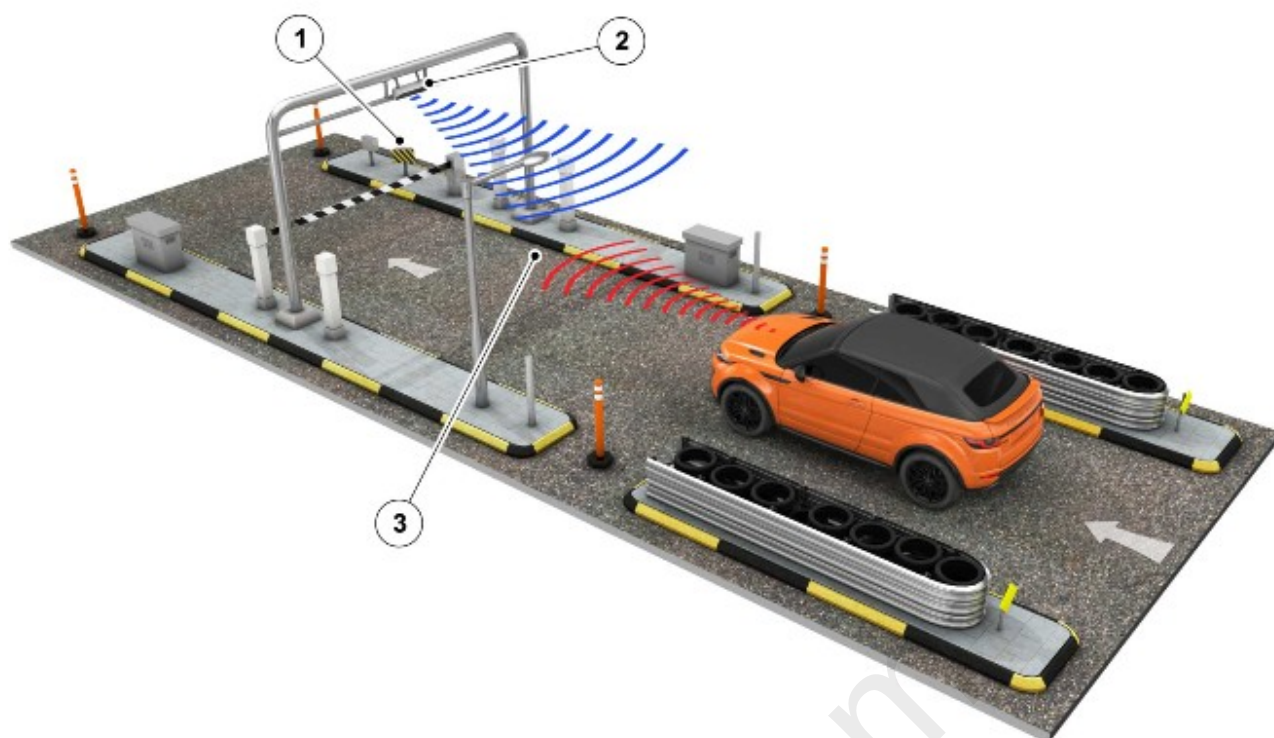


ITEM	DESCRIPTION
1	Electronic toll collection module antenna
2	Electronic toll collection module

The electronic toll collection system comprises an electronic toll collection module and an electronic toll collection module antenna.

An electronic toll collection system credit card is inserted into the electronic toll collection module which reads the data on the card. The electronic toll collection module is connected to the electronic toll collection module antenna. The system allows wireless communication through an electronic toll collection system with the antenna located at the toll gates. The electronic toll collection module sends and receives vehicle information necessary for paying the appropriate toll fees.

The electronic toll collection is a system which makes bi-directional communication, within a short distance through radio beacons, on the 5.8 GHz wireless band. The electronic toll collection communications enable high speed, high capacity data transmission and reception. The system also features high-level security to make sure that the private information of the user is kept safe. The electronic toll collection module also receives VICS information on the 5.8 GHz wireless band.



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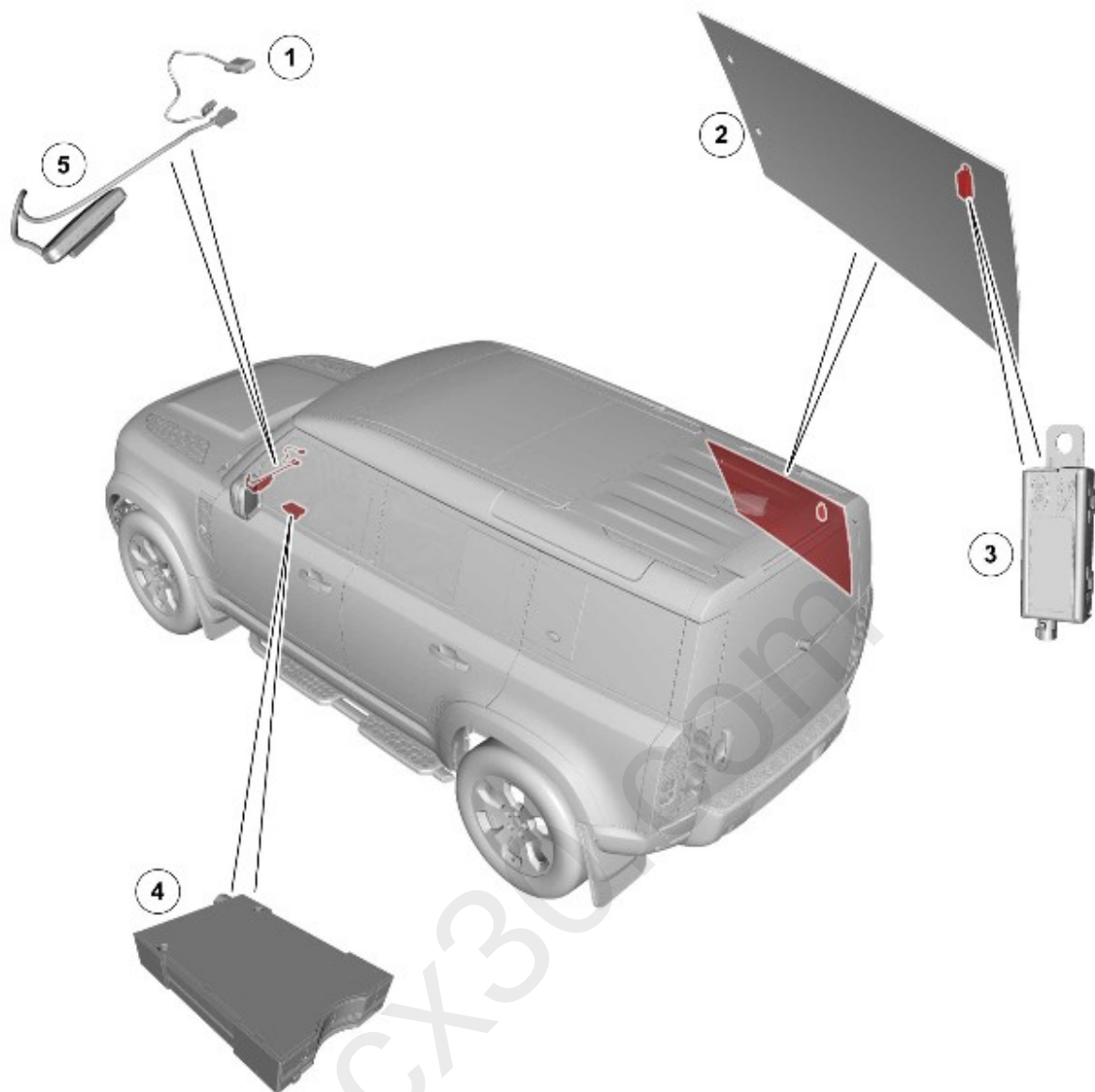
ITEM	DESCRIPTION
1	Roadside display unit
2	Electronic toll collection antenna transmission to vehicle
3	Electronic toll collection transmission to the electronic toll collection antenna

The electronic toll collection module receives a power supply through a fuse in the Rear Junction Box.

VEHICLE INFORMATION AND COMMUNICATION SYSTEM – JAPAN ONLY

NOTE:

Vehicle with 5 doors is shown, vehicle with 3 doors is similar.



E250154

ITEM	DESCRIPTION
1	Electronic toll collection module antenna
2	Right antenna pattern on rear window
3	Antenna amplifier - FM
4	Electronic toll collection Module
5	VICS beacon antenna

Additional information is transmitted on a FM wavelength. The information uses the antennas to pass the signals to the IGM / ICCM.

The VICS supplies information to enable the IGM / ICCM to re-route the navigation guidance. The VICS also can inform the driver of the traffic conditions in the vehicles vicinity.

The Radio Frequency (RF) and infrared transmissions are generally transmitted from road side beacons mainly on expressways. The information transmitted is as follows:

- Traffic congestion.
- Travel time to next intersection.
- Traffic conditions in surrounding areas and expressway turn offs.
- Traffic accidents.
- Speed limits.
- Lane regulations.
- Tire change.
- Parking availability at expressway service areas and parking areas.

Infrared transmissions are transmitted from road side beacons on major trunk roads. The information transmitted is:

- Traffic congestion and travel time.
- Traffic accidents.
- Breakdowns.
- Road work restrictions.
- Parking availability.

The FM transmissions are broadcast as part of the FM multiplex broadcasting system from NHK (Japanese Broadcasting Corporation) FM stations. Information transmitted is:

- Traffic congestion and travel time for wide areas.
- Traffic accidents, road works, speed limits and lane restrictions for a wide area.
- Parking availability information.

The traffic data is split from the normal FM transmissions by the FM antenna amplifier.

The VICS is an unique system for Japan and provides countrywide coverage and broadcasts of real-time traffic and weather information. The VICS has 3 methods of transmitting the traffic data to the vehicle's navigation system:

- FM
- Microwave RF
- Infrared.

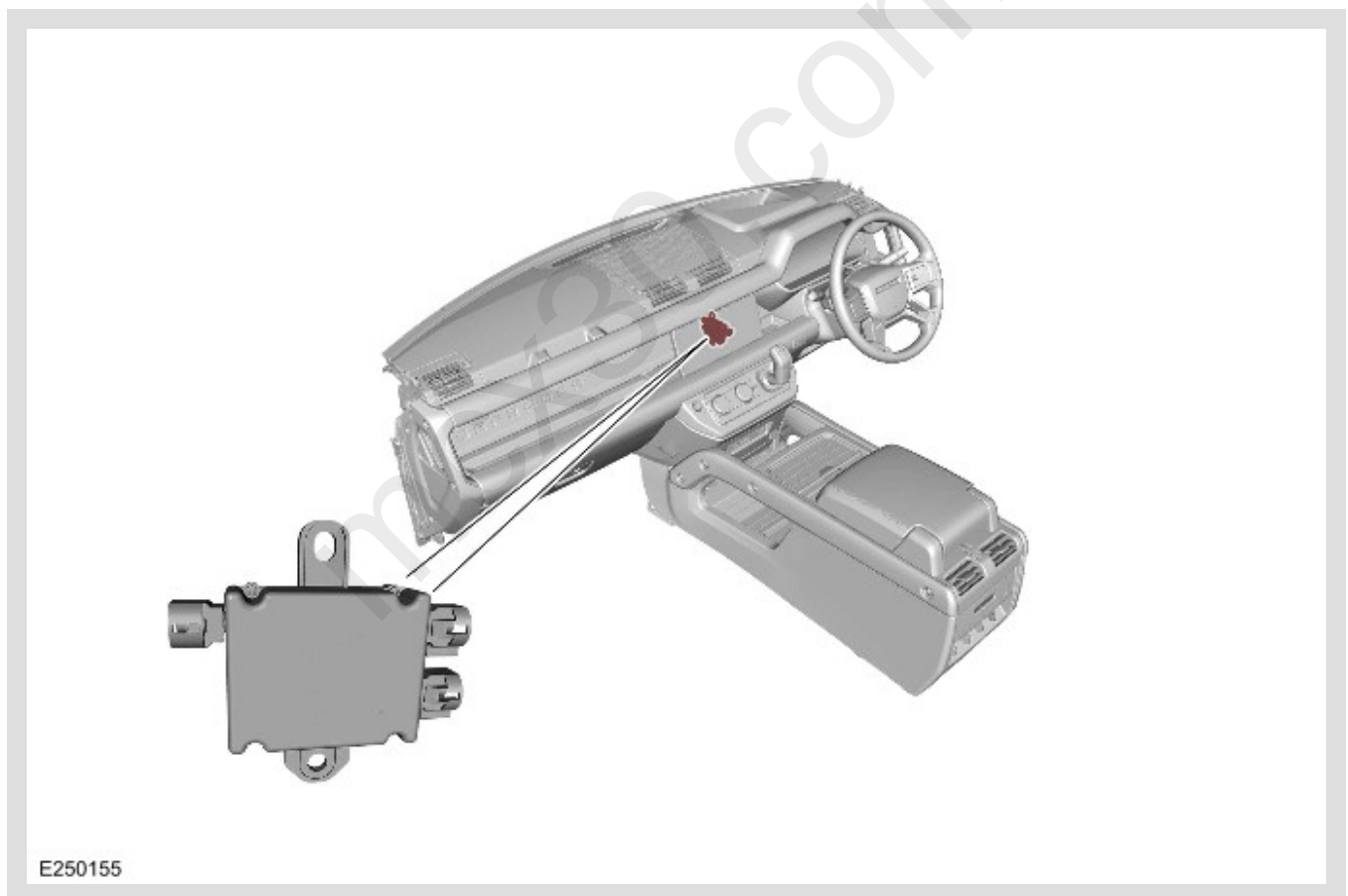
TRANSMISSION	RECEIVING MODULE
FM	FM antenna located in the right rear quarter window
Microwave RF	Electronic toll collection module antenna
Infrared	VICS beacon antenna

For additional information, refer to: [Antenna](#) (415-01 Information and Entertainment System, Description and Operation).

UNIVERSAL SERIAL BUS 2.0 HUB

NOTE:

RHD vehicle is shown, LHD vehicle is similar.



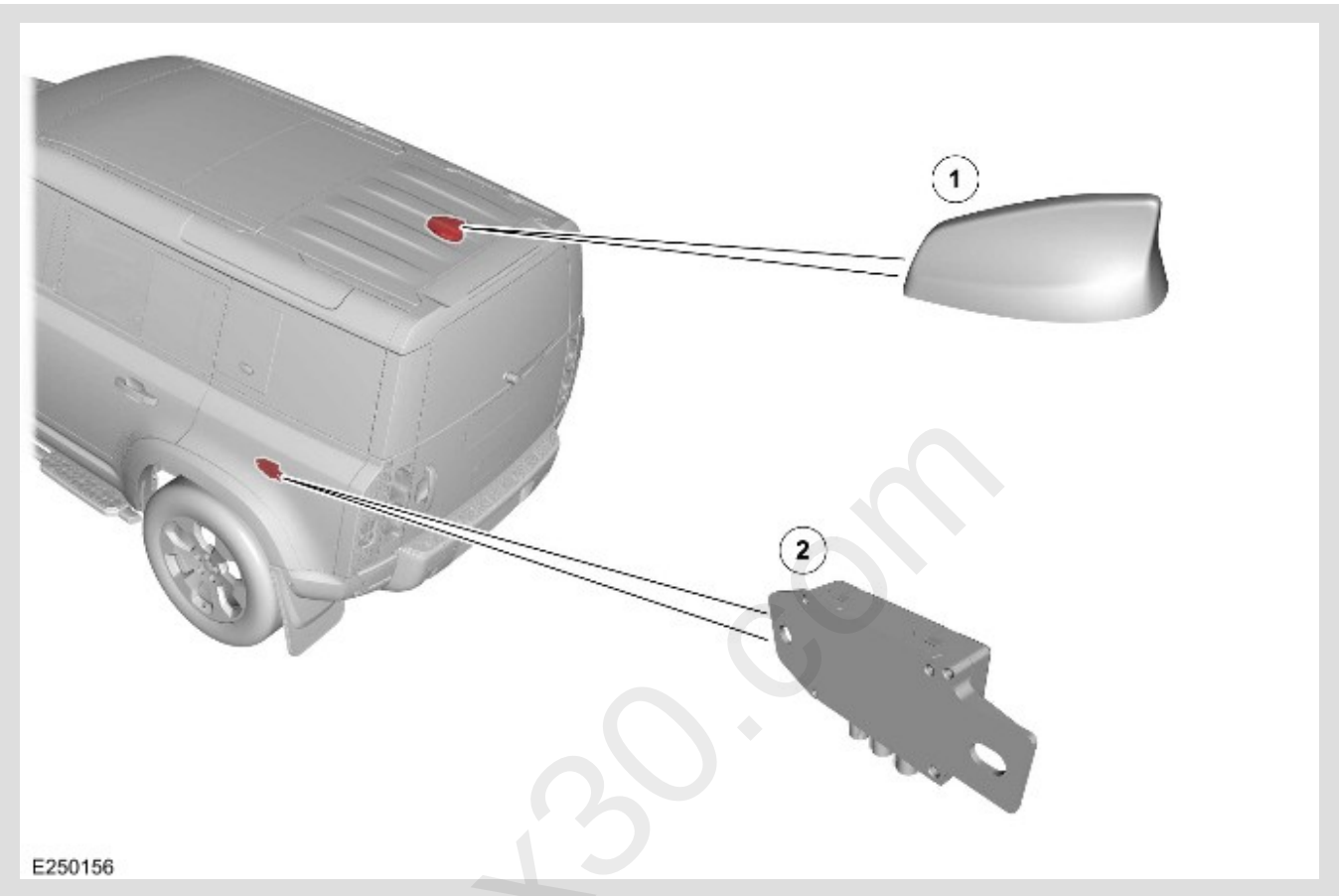
The USB 2.0 Hub is located in the instrument panel.

The USB 2.0 Hub connects the electronic toll collection module to the IGM / ICCM through the front portable media interface panel.

ANTENNAS

 NOTE:

Vehicle with 5 doors is shown, vehicle with 3 doors is similar.



ITEM	DESCRIPTION
1	Roof pod - GNSS antenna
2	GNSS signal splitter

The roof pod contains the GNSS antenna.

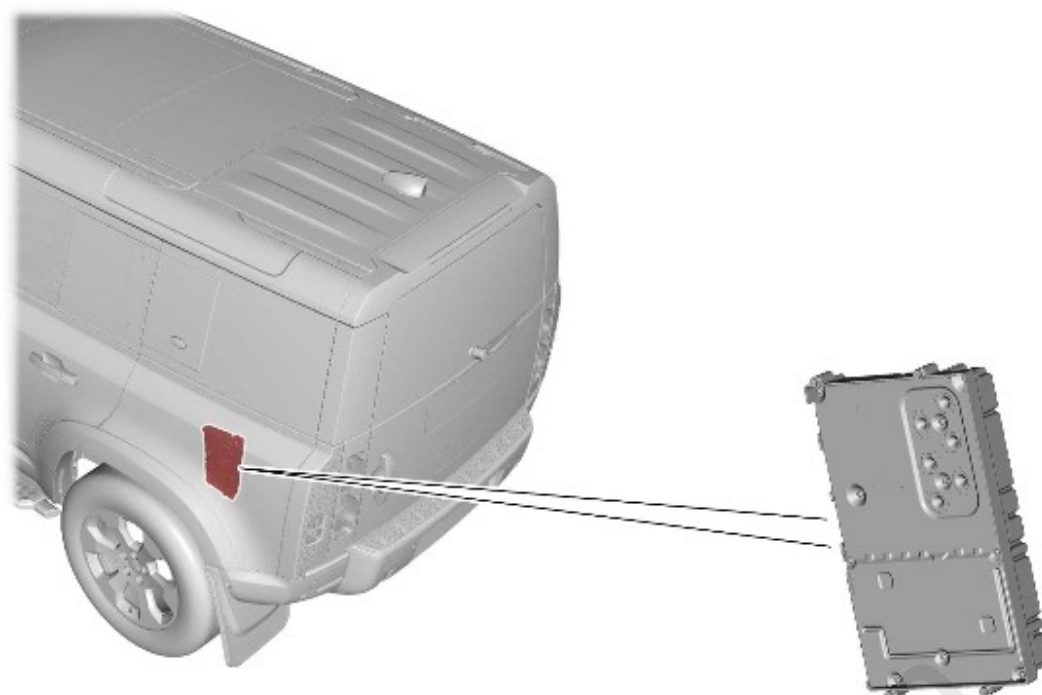
The GNSS signal through the GNSS signal splitter to the IGM / ICCM.

For additional information, refer to: [Antenna](#) (415-01 Information and Entertainment System, Description and Operation).

AUDIO AMPLIFIER CONTROL MODULE

 NOTE:

Vehicle with 5 doors is shown, vehicle with 3 doors is similar.



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The AAM is located behind the rear left loadspace trim.

For additional information, refer to: [Speakers](#) (415-01 Information and Entertainment System, Description and Operation).

OPERATION

The navigation system uses the following components:

- The IGM / ICCM
- The AAM
- The FCDIM
- Roof pod - GNSS antenna
- The IPC
- The HUD (if equipped)
- Front portable media interface panel.

There are 2 types of navigation system available:

- Stored navigation information
- 'InControl Pro Connected Navigation'.

The IPC displays map information from the IGM / ICCM. The HUD (if equipped) also displays map information from the IPC.

The navigation system receives GNSS information through the GNSS antenna. The GNSS signals are used by the navigation system to calculate the position of the vehicle. When the driver has input a desired destination, the navigation system can calculate a route. The route is based on the drivers pre-determined preferences or the default settings in the navigation system.

The navigation system is accessed from the FCDIM home menu.

Navigation is initiated by the driver inputting a destination. The destination can be achieved through the FCDIM by choosing:

- Entering an address.
- A postcode.
- A previous destination.
- A point of interest from the map data stored in the IGM / ICCM.
- The home location.
- A memory stored location.

The driver is then guided to the destination by a scrolling map display and voice guidance.

The GNSS signal is available to the navigation system at all times when the vehicle ignition is in Power Mode 6 (ignition ON).

INCONTROL PRO CONNECTED NAVIGATION

The 'InControl Pro Connected Navigation' is embedded within the IGM / ICCM software. The 'InControl Pro Connected Navigation' offers a mobile and web companion application for when drivers leave their vehicle. 'InControl Pro Connected Navigation' is available as a feature of 'InControl Pro Services'.

'InControl Pro Connected Navigation' has the following features:

- My commute
- Real time traffic flow
- Fuel prices services
- Approach mode
- Online search
- Safety cameras
- Satellite views
- Online routing

- Profiles
- Door to door routing
- Sharing.

The features available are market dependant.

DIAGNOSTICS

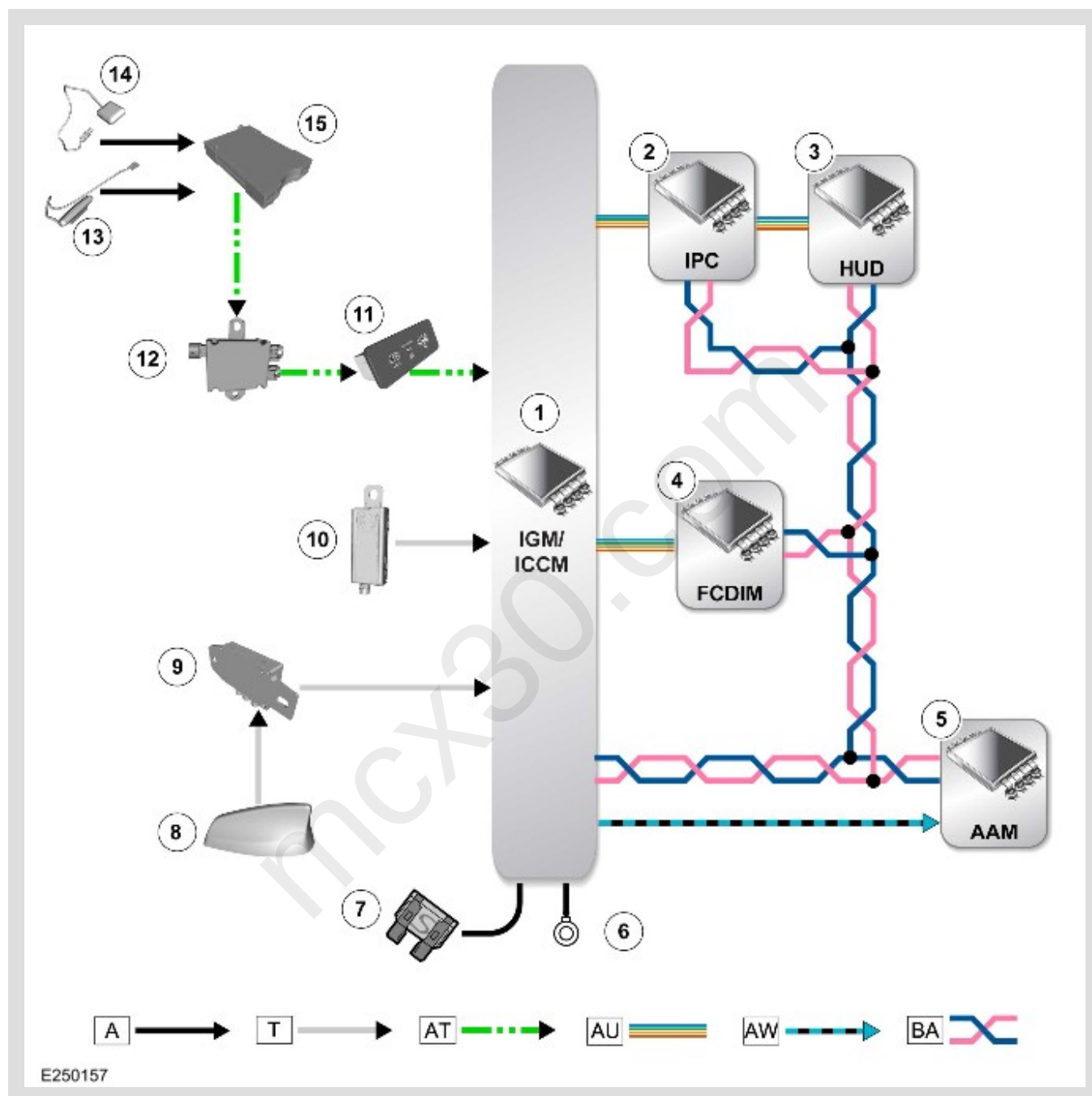
The IGM / ICCM records any Diagnostic Trouble Code(s) (DTC) and related data. Read the DTC and related data with the Jaguar Land Rover (JLR) approved diagnostic equipment.

The JLR approved diagnostic equipment can read live data and activate certain components.

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CONTROL DIAGRAM

CONTROL DIAGRAM - 1 OF 1



A = HARDWIRED: T = CO-AXIAL: AT = USB: AU = APIX2: AW = ETHERNET: BA = HS CAN HMI SYSTEMS BUS.

ITEM	DESCRIPTION
1	IGM / ICCM
2	IPC
3	HUD (if equipped)

ITEM	DESCRIPTION
4	FCDIM
5	AAM
6	Ground
7	Power supply
8	Roof pod - GNSS antenna
9	GNSS signal splitter
10	Antenna amplifier - FM
11	Front portable media interface panel
12	USB 2.0 Hub
13	VICS beacon antenna (Japan only)
14	Electronic toll collection module antenna (Japan only)
15	Electronic toll collection module (Japan only)

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