



# ConnectCore MP13

System-on-module

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## Hardware Reference Manual

## Revision history—90002551

| Revision | Date         | Description                                                                  |
|----------|--------------|------------------------------------------------------------------------------|
| 1P       | March 2023   | Initial draft.                                                               |
| 2P       | May 2023     | Changed VSYS minimum voltage; added note regarding data matrix on SOM label. |
| A        | October 2023 | Added certifications.                                                        |

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## About the ConnectCore MP13

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The Digi ConnectCore® MP13 System-on-Module (SOM) platform is a highly integrated, cost-effective, connected, secure embedded solution, built on the STM32MP13x MPU family. It integrates memory, power management, the Digi Microcontroller Assist™, pre-certified wireless connectivity and advanced Digi TrustFence device security with a complete, open-source Linux software platform based on the Yocto Project.

### Features and functionality

The ConnectCore MP13 system-on-module is based on the STM32MP133C processor from STMicroelectronics. This processor offers a number of interfaces, most of them multiplexed and not available simultaneously. The module has the following features:

- STM32MP133C ARM Cortex-A7:
  - Cortex-A7 operating at up to 650 MHz.
  - 32 KB L1 instruction cache.
  - 32 KB L1 data cache.
  - 128 KB level 2 unified coherent cache.
- Up to 256 MB, 16-bit DDR3 memory.
- Up to 256 MB, 8-bit SLC NAND flash memory.
- STPMIC1D Power Management IC (PMIC):
  - x4 adjustable buck SMPS converter.
  - x1 boost SMPS.
  - x1 USB OTG compliant power switch.
  - x1 general purpose power switch.
  - x4 adjustable general purpose LDOs.
  - x1 DDR3/general purpose LDO.
  - x1 USB PHY LDO.
- IEEE 802.11 a/b/g/n/ac WLAN interface.
- Bluetooth version 5.0.
- Debug interfaces:
  - System JTAG controller for STM32MP135F.
- STM32MP133C interfaces:
  - x5 I2C.
  - x4 UART.
  - x4 USART.
  - x5 SPI, four I2Ss full-duplex master/slave.
  - x2 SAI.
  - x1 SPDIF Rx.

- x2 SDMMC.
- x1 USB OTG high-speed controller.
- x1 USB high-speed Host with two ports, two high-speed PHYs. The second high-speed PHY can be shared between the USB high-speed Host and the USB OTG high-speed.
- x2 FDCAN.
- x2 Gigabit Ethernet.
- x1 Flexible memory control (FMC) interface.
- x1 Quad-SPI Flash memory interface.
- x2 ADCs with 12-bit max resolution
- x1 digital filter for sigma delta modulator (DFSDM) with 4 channels and 2 filters.

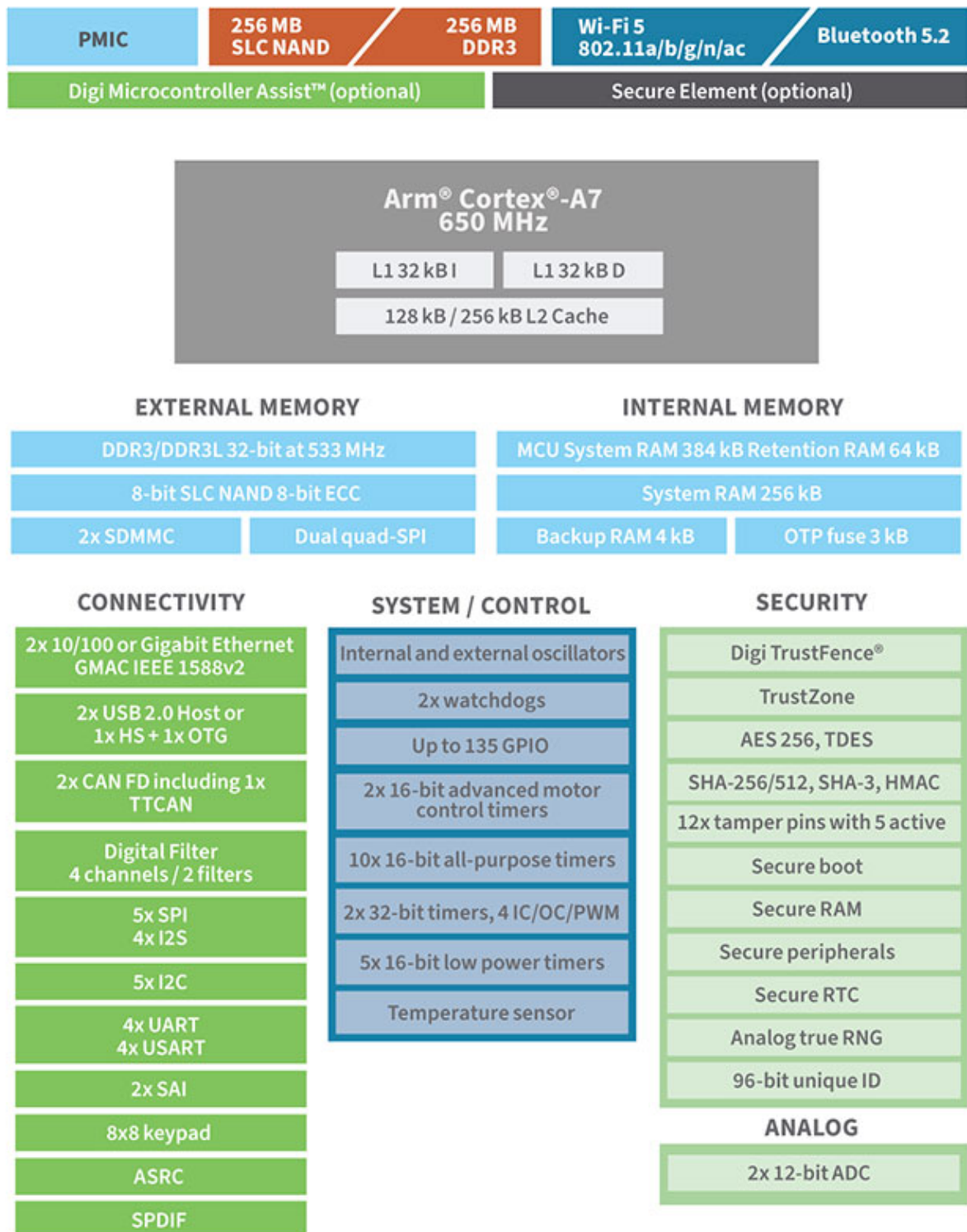
## Safety instructions

- The ConnectCore MP13 module cannot be guaranteed operation due to the radio link and so should not be used for interlocks in safety critical devices such as machines or automotive applications.
- The ConnectCore MP13 module has not been approved for use in (this list is not exhaustive):
  - nuclear applications
  - explosive or flammable atmospheres
- There are no user serviceable components inside the ConnectCore MP13 module. Do not modify the ConnectCore MP13 in any way. Modifications may exclude the module from any warranty and can cause the ConnectCore MP13 to operate outside of regulatory compliance for a given country, leading to the possible illegal operation of the radio.
- Use industry standard ESD protection when handling the ConnectCore MP13 module.
- Take care while handling to avoid electrical damage to the PCB and components.
- Do not expose ConnectCore MP13 module to water or moisture.
- Use this product with the antennas specified in the ConnectCore MP13 module user guides.

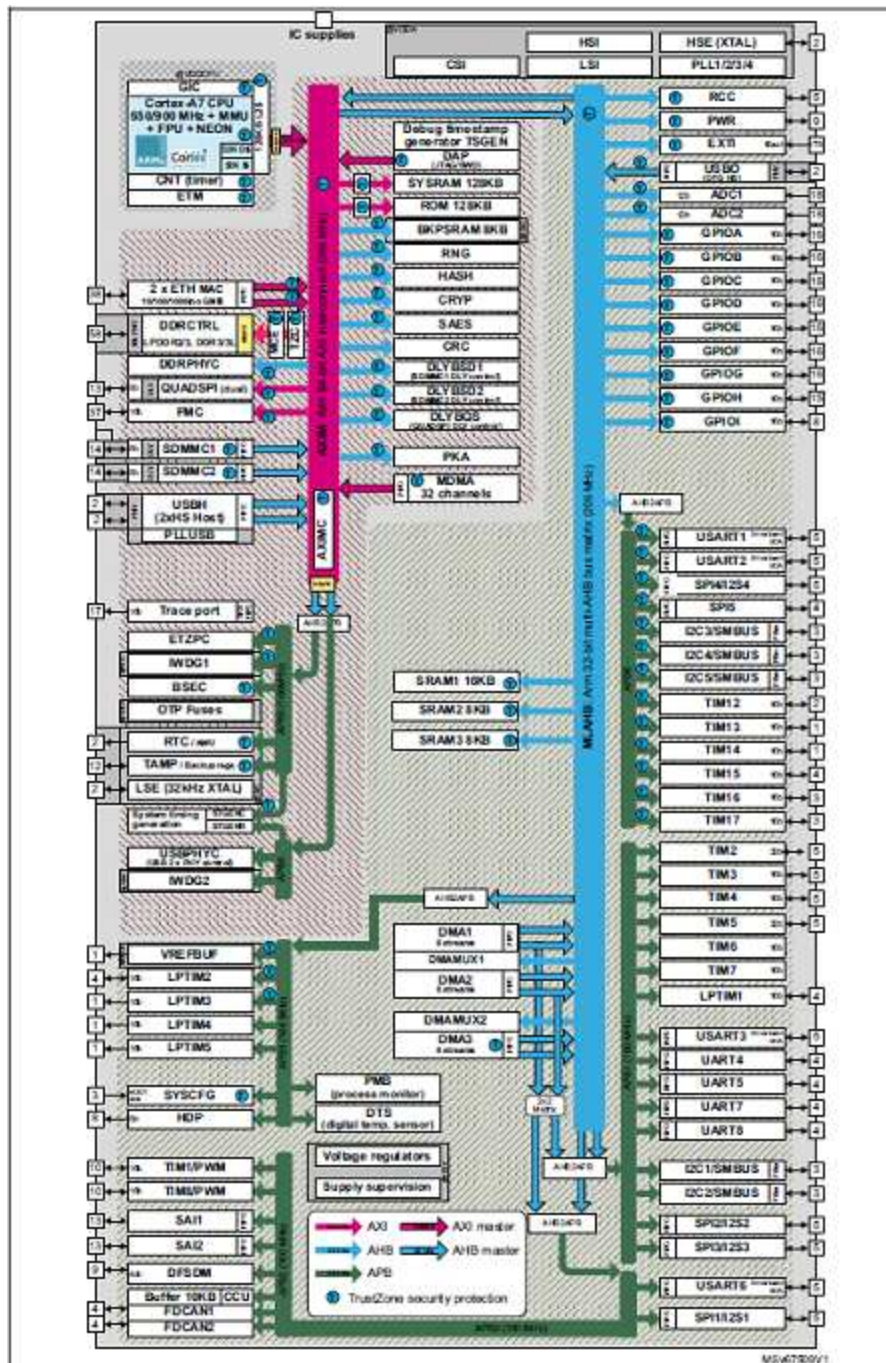
## Block diagrams

The figures below show block diagrams of the ConnectCore MP13 module and of the STMicroelectronics STM32MP13x application processor.

## ConnectCore MP13 module



# STMicroelectronics STM32MP13x application processor



## Power interfaces

### System-on-module power architecture

The ConnectCore MP13 requires two primary power supply inputs: VSYS and VSYS2, which are the input power supplies to the on-module ST STPMIC1 power management IC (PMIC) that generates all required supply voltages for the module as well as the external interfaces.

The following table summarizes the PMIC regulators and switches on the ConnectCore MP13 SOM:

| PMIC regulator | SOM power rail name | Input power supply | Internally used | Externally available |
|----------------|---------------------|--------------------|-----------------|----------------------|
| BUCK1          | -                   | VSYS2              | YES             | NO                   |
| BUCK2          | -                   | VSYS2              | YES             | NO                   |
| BUCK3          | VDD                 | VSYS               | YES             | YES                  |
| BUCK4          | -                   | VSYS               | YES             | NO                   |
| LDO1           | -                   | VSYS               | YES             | NO                   |
| LDO2           | 2V8                 | VSYS               | NO              | YES                  |
| LDO3*          | LDO3                | -                  | NO              | YES                  |
| LDO4           | -                   | VSYS               | YES             | NO                   |
| LDO5           | VDD_SD              | VSYS               | NO              | YES                  |
| LDO6           | 1V8                 | VSYS               | NO              | YES                  |
| PWR_USB_SW     | VBUS_OTG            | -                  | NO              | YES                  |
| PWR_SW         | VBUS_SW             | -                  | NO              | YES                  |
| DDR_REF        | -                   | VSYS2              | YES             | NO                   |
| BOOST          | -                   | VSYS               | YES             | NO                   |

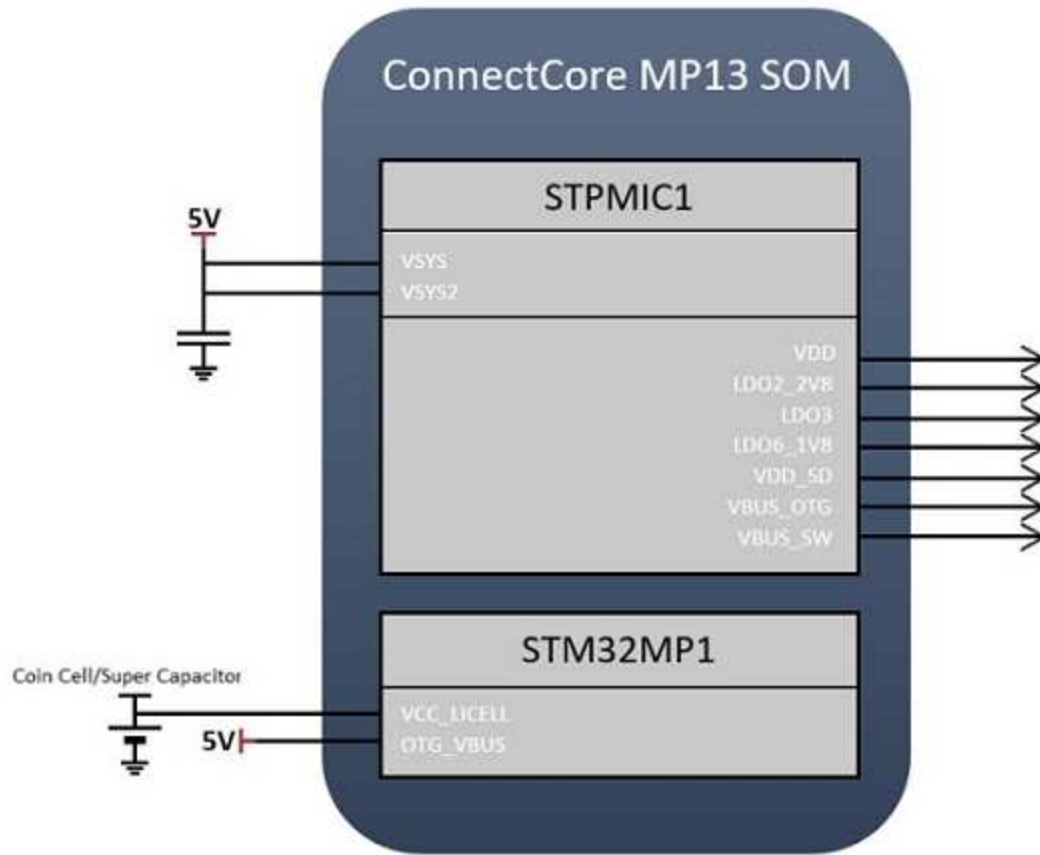
\* This regulator is not available in initial versions of the module.

In addition to the input power supplies of the PMIC, other power domains of the SOM must also be set externally. This allows power management flexibility so you can adapt the input voltage of the different interfaces. The following table lists the input power rails that must be powered externally to the SOM together with the devices/power domains they power:

| Input rail | Internally connected to | Description                                                                  |
|------------|-------------------------|------------------------------------------------------------------------------|
| VCC_LICELL | STM32MP1 CPU, VBAT      | Support for RTC, backup registers, RAM retention and backup SRAM on the CPU. |
| OTG_VBUS   | STM32MP1 CPU, OTG_VBUS  |                                                                              |

## Reference power diagram

The following diagram represents the power architecture of the ConnectCore MP13 module in a typical application:



## Electrical characteristics

### Input power rails

The following table lists the electrical specifications of all input power rails for the ConnectCore MP13:

| Device | SOM power rail | Input voltage (V)    |         |                  |
|--------|----------------|----------------------|---------|------------------|
|        |                | Minimum              | Typical | Maximum          |
| PMIC   | VSYS           | 3.7                  | -       | 5.5              |
|        | VSYS2          | 2.8                  | -       | 5.5              |
| CPU    | VCC_LICELL     | 1.4                  | -       | 3.6              |
|        | OTG_VBUS       | Vss-0.3 <sup>1</sup> | -       | 6.0 <sup>1</sup> |

<sup>1</sup> Absolute maximum ratings.

## Output power rails

The following table lists the electrical specifications of all output power rails for the ConnectCore MP13:

| SOM power rail | Used internally in the SOM | Output voltage |     |     | Accuracy (%) |     | Continuous output current (mA) <sup>1</sup> | Turn-on time (us) |     | Turn-off time (ms) |
|----------------|----------------------------|----------------|-----|-----|--------------|-----|---------------------------------------------|-------------------|-----|--------------------|
|                |                            | Min            | Typ | Max | Min          | Max |                                             | Typ               | Max | Max                |
| VDD            | YES                        | -              | 3.3 | -   | -4           | 4   | 500                                         | 235               | 400 | 1.5                |
| VDD_SD         | NO                         | 1.7            | -   | 3.9 | -2           | 2   | 350                                         | 160               | -   | 3                  |
| LDO2_2V8       | NO                         | 1.7            | -   | 3.3 | -2           | 2   | 350                                         | 160               | -   | 3                  |
| LDO6_1V8       | NO                         | 0.9            | -   | 3.3 | -2           | 2   | 150                                         | 100               | -   | 3                  |
| LDO3           | NO                         | 1.8            | -   | 3.3 | -2           | 2   | 100                                         | 200               | -   | 3                  |
| VBUS_OTG       | NO                         | -              | -   | -   | -            | -   | 500                                         | 3000              | -   | 3                  |
| VBUS_SW        | NO                         | -              | -   | -   | -            | -   | 1000                                        | 3000              | -   | 3                  |

**Note** Some of the electrical characteristics may depend on the configuration and operation mode of the different regulators. For a complete description of the electrical characteristics of the different output power rails (PMIC regulators), see the STPMIC1 datasheet.

<sup>1</sup> The maximum output current involves both external and internal circuitry. For those regulators that are used internally in the SOM, the current available outside will be lower.

## Bootstrap

The ConnectCore MP13 module can be configured to boot from different devices and interfaces as determined by the boot ROM. The configuration of the booting process of the CPU is done through the BOOT pin and OTP bytes.

| BOOT2 | BOOT1 | BOOT0 | Boot mode                |
|-------|-------|-------|--------------------------|
| 0     | 0     | 0     | UART and USB port 1      |
| 0     | 0     | 1     | Serial NOR Flash         |
| 0     | 1     | 0     | eMMC (default SDMMC2)    |
| 0     | 1     | 1     | NAND Flash               |
| 1     | 0     | 0     | Reserved                 |
| 1     | 0     | 1     | SD card (default SDMMC1) |
| 1     | 1     | 0     | UART and USB port 2      |
| 1     | 1     | 1     | Serial NAND Flash        |

## Wireless interfaces

The ConnectCore MP13 System-on-module combines a wireless local area network (WLAN) and Bluetooth dual solution to support IEEE802.11 a/b/g/n/ac WLAN standards and Bluetooth 5, enabling seamless integration of WLAN/Bluetooth and Low Energy technology. Digi also offers a non-wireless variant of the ConnectCore MP13 module.

The following sections include specifications for the wireless interfaces available on the ConnectCore MP13 module.

### WLAN IEEE 802.11a/b/g/n/ac

The following sections specify the performance of the WLAN IEEE 802.11a/b/g/n/ac interface on the ConnectCore MP13 module.

#### **Modulation and data rates**

The following tables list modulation values for the ConnectCore MP13 module, which supports the following WLAN standards:

| Mode    | Modulation & coding | Rate     |
|---------|---------------------|----------|
| 802.11b | DBPSK               | 1 Mbps   |
|         | DQPSK               | 2 Mbps   |
|         | CCK                 | 5.5 Mbps |
|         | CCK                 | 11 Mbps  |

| Mode     | Modulation & coding | Rate    |
|----------|---------------------|---------|
| 802.11ga | BPSK-1/2            | 6 Mbps  |
|          | BPSK-3/4            | 9 Mbps  |
|          | QPSK-1/2            | 12 Mbps |
|          | QPSK-3/4            | 18 Mbps |
|          | 16QAM-1/2           | 24 Mbps |
|          | 16QAM-3/4           | 36 Mbps |
|          | 64QAM-2/3           | 48 Mbps |
|          | 64QAM-3/4           | 54 Mbps |
| 802.11n  | BPSK-1/2            | MCS0    |
|          | QPSK-1/2            | MCS1    |
|          | QPSK-3/4            | MCS2    |
|          | 16QAM-1/2           | MCS3    |
|          | 16QAM-3/4           | MCS4    |
|          | 64QAM-2/3           | MCS5    |
|          | 64QAM-3/4           | MCS6    |
|          | 64QAM-5/6           | MCS7    |
| 802.11ac | BPSK-1/2            | MCS0    |
|          | QPSK-1/2            | MCS1    |
|          | QPSK-3/4            | MCS2    |
|          | 16QAM-1/2           | MCS3    |
|          | 16QAM-3/4           | MCS4    |
|          | 64QAM-2/3           | MCS5    |
|          | 64QAM-3/4           | MCS6    |
|          | 64QAM-5/6           | MCS7    |
|          | 256QAM-3/4          | MCS8    |
|          | 256QAM-5/6          | MCS9    |

**Data rate (Mbps) - Non Short Guard Interval (Non-SGI)**

| Data rate (Mbps) |      | 802.11b |         | 802.11ga |           | 802.11n  |           | 802.11ac |           |            |
|------------------|------|---------|---------|----------|-----------|----------|-----------|----------|-----------|------------|
|                  |      | DBPSK   | CCK     | BPSK-1/2 | 64QAM-3/4 | BPSK-1/2 | 64QAM-5/6 | BPSK-1/2 | 64QAM-5/6 | 256QAM-5/6 |
| Modulation       |      | 1 Mbps  | 11 Mbps | 6 Mbps   | 54 Mbps   | MCS0     | MCS7      | MCS0     | MCS7      | MCS9       |
| 2.4 GHz          | HT20 | 1       | 11      | 6        | 54        | 6.5      | 65        | 6.5      | 65        |            |
|                  | HT40 |         |         |          |           | 13.5     | 135       | 13.5     | 135       | 180        |
| 5 GHz            | HT20 |         |         | 6        | 54        | 6.5      | 65        | 6.5      | 65        |            |
|                  | HT40 |         |         |          |           | 13.5     | 135       | 13.5     | 135       | 180        |
|                  | HT80 |         |         |          |           |          |           | 29.3     | 292.5     | 390        |

**Data rate (Mbps) - Short Guard Interval (SGI)**

| Mode       |      | 802.11b |         | 802.11ga |           | 802.11n  |           | 802.11ac |           |            |
|------------|------|---------|---------|----------|-----------|----------|-----------|----------|-----------|------------|
|            |      | DBPSK   | CCK     | BPSK-1/2 | 64QAM-3/4 | BPSK-1/2 | 64QAM-5/6 | BPSK-1/2 | 64QAM-5/6 | 256QAM-5/6 |
| Modulation |      | 1 Mbps  | 11 Mbps | 6 Mbps   | 54 Mbps   | MCS0     | MCS7      | MCS0     | MCS7      | MCS9       |
| 2.4 GHz    | HT20 | 1       | 11      | 6        | 54        | 7.2      | 72.2      | 7.2      | 72.2      |            |
|            | HT40 |         |         |          |           | 15       | 150       | 15       | 150       | 200        |
| 5 GHz      | HT20 |         |         | 6        | 54        | 7.2      | 72.2      | 7.2      | 72.2      |            |
|            | HT40 |         |         |          |           | 15       | 150       | 15       | 150       | 200        |
|            | HT80 |         |         |          |           |          |           | 32.5     | 325       | 433.3      |

**RF channels**

The ConnectCore MP13 module supports the following frequency bands:

| RF band | Ch. BW | Ch. spacing | Channel number (Center freq. MHz)                                                                                                 |
|---------|--------|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 2.4 GHz | 20 MHz | 5 MHz       | 1(2412), 2(2417), 3(2422), 4(2427), 5(2432), 6(2437), 7(2442), 8(2447), 9(2452), 10(2457), 11(2462), 12(2467), 13(2472), 14(2484) |
|         | 40 MHz | 5 MHz       | 3(2422), 11(2462)                                                                                                                 |

| RF band | Ch. BW | Ch. spacing | Channel number (Center freq. MHz)                                                                                                                                                                                                                                         |
|---------|--------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 GHz   | 20 MHz | 20 MHz      | 36(5180), 40(5200), 44(5220), 48(5240), 52(5260), 56(5280), 60(5300), 64(5320), 100(5500), 104(5520), 108(5540), 112(5560), 116(5580), 120(5600), 124(5620), 128(5640), 132(5660), 136(5680), 140(5700), 144(5720), 149(5745), 153(5765), 157(5785), 161(5805), 165(5825) |
|         | 40 MHz | 40 MHz      | 38(5190), 46(5230), 54(5270), 62(5310), 102(5510), 110(5550), 118(5590), 126(5630), 134(5670), 142(5710), 151(5755), 159(5795)                                                                                                                                            |
|         | 80 MHz | 80 MHz      | 42(5210), 58(5290), 106(5530), 122(5610), 138(5690), 155(5775)                                                                                                                                                                                                            |

**Note** Dependent upon regulatory bodies.

## 2.4 GHz

| 2.4 GHz band channel # | Center frequency (MHz) | EUROPE (ETSI) | NORTH AMERICA (FCC) | JAPAN        |
|------------------------|------------------------|---------------|---------------------|--------------|
| 1                      | 2412                   | ✓             | ✓                   | ✓            |
| 2                      | 2417                   | ✓             | ✓                   | ✓            |
| 3                      | 2422                   | ✓             | ✓                   | ✓            |
| 4                      | 2427                   | ✓             | ✓                   | ✓            |
| 5                      | 2432                   | ✓             | ✓                   | ✓            |
| 6                      | 2437                   | ✓             | ✓                   | ✓            |
| 7                      | 2442                   | ✓             | ✓                   | ✓            |
| 8                      | 2447                   | ✓             | ✓                   | ✓            |
| 9                      | 2452                   | ✓             | ✓                   | ✓            |
| 10                     | 2457                   | ✓             | ✓                   | ✓            |
| 11                     | 2462                   | ✓             | ✓                   | ✓            |
| 12                     | 2467                   | ✓             | No                  | ✓            |
| 13                     | 2472                   | ✓             | No                  | ✓            |
| 14                     | 2484                   | No            | No                  | 802.11b only |

**5 GHz**

| 5 GHz band channel # | Center frequency (MHz) | EUROPE (ETSI)       | NORTH AMERICA (FCC) | JAPAN     |
|----------------------|------------------------|---------------------|---------------------|-----------|
| 36                   | 5180                   | Indoors             | ✓                   | ✓         |
| 40                   | 5200                   | Indoors             | ✓                   | ✓         |
| 44                   | 5220                   | Indoors             | ✓                   | ✓         |
| 48                   | 5240                   | Indoors             | ✓                   | ✓         |
| 52                   | 5260                   | Indoors / DFS / TPC | DFS                 | DFS / TPC |
| 56                   | 5280                   | Indoors / DFS / TPC | DFS                 | DFS / TPC |
| 60                   | 5300                   | Indoors / DFS / TPC | DFS                 | DFS / TPC |
| 64                   | 5320                   | Indoors / DFS / TPC | DFS                 | DFS / TPC |
| 100                  | 5500                   | DFS / TPC           | DFS                 | DFS / TPC |
| 104                  | 5520                   | DFS / TPC           | DFS                 | DFS / TPC |
| 108                  | 5540                   | DFS / TPC           | DFS                 | DFS / TPC |
| 112                  | 5560                   | DFS / TPC           | DFS                 | DFS / TPC |
| 116                  | 5580                   | DFS / TPC           | DFS                 | DFS / TPC |
| 120                  | 5600                   | DFS / TPC           | DFS                 | DFS / TPC |
| 124                  | 5620                   | DFS / TPC           | DFS                 | DFS / TPC |
| 128                  | 5640                   | DFS / TPC           | DFS                 | DFS / TPC |
| 132                  | 5660                   | DFS / TPC           | DFS                 | DFS / TPC |
| 136                  | 5680                   | DFS / TPC           | DFS                 | DFS / TPC |
| 140                  | 5700                   | DFS / TPC           | DFS                 | DFS / TPC |
| 149                  | 5745                   | SRD                 | ✓                   | No Access |
| 153                  | 5765                   | SRD                 | ✓                   | No Access |
| 157                  | 5785                   | SRD                 | ✓                   | No Access |
| 161                  | 5805                   | SRD                 | ✓                   | No Access |
| 165                  | 5825                   | SRD                 | ✓                   | No Access |

**Note**

DFS = Dynamic Frequency Selection

TPC = Transmit Power Control

SRD = Short Range Devices 25 mW max power

## Transmit power

The following table lists nominal transmit power values for the ConnectCore MP13 module based on Murata LBEE5PK2AE-564 specification.

| RF band | Standard         | Output power (dBm)       |
|---------|------------------|--------------------------|
| 2.4 GHz | 802.11b          | 17 (1Mbps) - 17 (11Mbps) |
|         | 802.11g          | 16 (6Mbps) - 16 (54Mbps) |
|         | 802.11n          | 16 (MCS0) - 14 (MCS7)    |
| 5 GHz   | 802.11a          | 13 (6Mbps) - 14 (54Mbps) |
|         | 802.11n (HT20)   | 16 (MCS0) - 14 (MCS7)    |
|         | 802.11ac (VHT20) | 16 (MCS0) - 13 (MCS8)    |
|         | 802.11n (HT40)   | 14 (MCS0) - 13 (MCS7)    |
|         | 802.11ac (VHT40) | 14 (MCS0) - 11 (MCS9)    |
|         | 802.11ac (VHT80) | 13 (MCS0) - 12 (MCS9)    |

## Antenna ports

The ConnectCore MP13 module has one antenna port on the module via a dedicated U.FL connector. The antenna port supports WLAN and Bluetooth functionality.

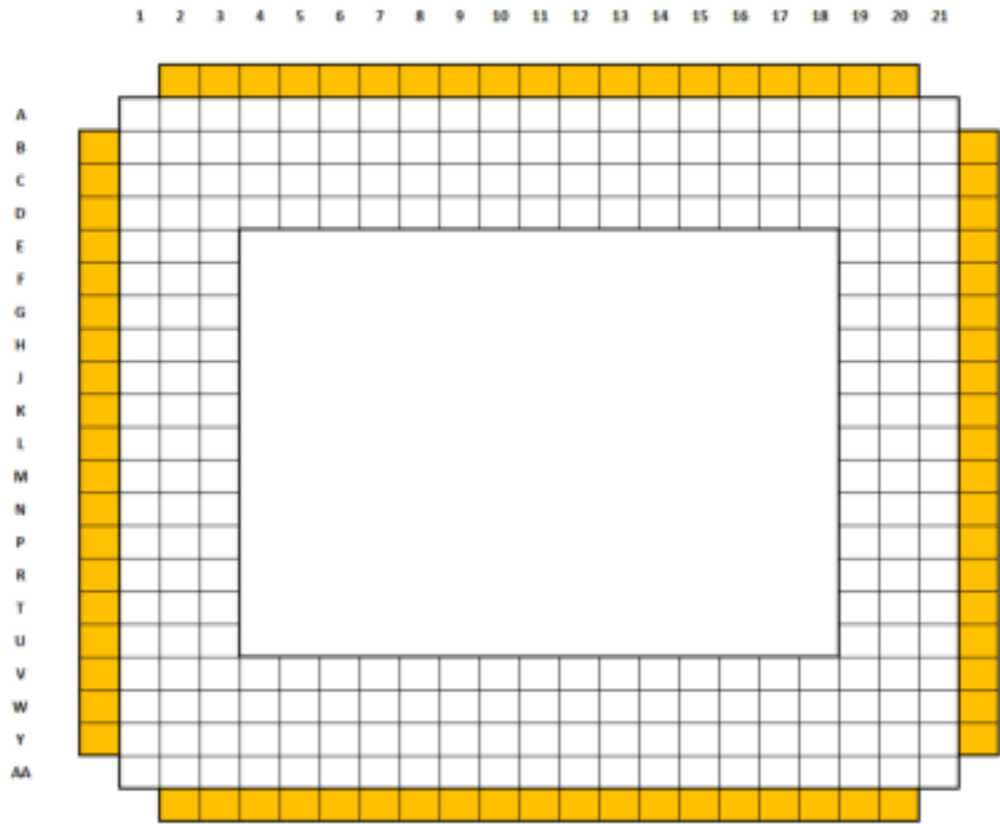
## Bluetooth

The ConnectCore MP13 module supports both Bluetooth and Bluetooth Low Energy protocols:

- Bluetooth 5 with all Bluetooth 4.2 optional features. Bluetooth class 1 and class 2 transmitter operation.
- Integrated WLAN-Bluetooth coexistence.

## Module pinout

The ConnectCore MP13 module has a mixed pad structure. The module provides 245 LGA pins, 76 of them connected to the peripheral castellated pads. The general layout can be found on the following diagram:



White cells: LGA pads  
Orange cells: castellated pads

**Note** Pad A1 is unconnected. This pad is meant for module-orientation purposes; its shape is square, whereas all other pads are circular. Pad A1 should not be soldered down to a corresponding pad on the carrier board.

## External signals and pin multiplexing

The following tables provide the pinout information of the ConnectCore MP13 module. For additional information related to the signals listed in the table, refer to the STMicroelectronics STM32MP1 technical documentation.

---

**Note** The Digi ConnectCore Smart IOMUX tool can dramatically simplify pin configuration and resolution. You can enter the list of interfaces required by your project and use the Smart IOMUX graphical interface to mock up configuration options, resulting in full pin assignment and device tree snippets that match your desired functionality. See the [Smart IOMUX User Guide](#) for more information and download instructions.

---

The microprocessor used on this module, like all CMOS devices, can be driven into a latch-up condition if any I/O pin is driven outside of its associated power rail. Care must be taken to:

- Never drive an I/O pin beyond its positive rail or below ground.
- Never drive an I/O pin from an external power source during the power-on or reset sequences.
- Never hot-swap the module or interrupt its ground connection to external circuitry.



Latch-up is a condition that can cause excessive current draw and result in excessive heating of the microprocessor or its power supplies. This excessive heating can permanently damage the microprocessor and/or its supporting components.

When you use an external supply on the carrier board supporting the ConnectCore MP13 module, make sure this supply is NOT back driving STM32MP1 I/Os while their power rails are not enabled. For example, this can happen when an external 3.3V supply is available on the carrier board and this supply powers components driven by STM32MP1 I/Os. In this case, Digi recommends you enable the external power supply after internal 3.3V is enabled, or add the necessary protection circuitry to avoid back voltage (leakage).

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## Castellated pad signals and multiplexing

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                   | Additional functions | Power group | Comments                                                              |
|-----------------|----------------------|------------------------------|-------------------|-------------------------------------------------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------------|
| 1 / B1          | CPAD1                | VCC_LICELL                   | VBAT              | -                                                                                                     | -                    | VCC_LICELL  | Coin cell supply.                                                     |
| 2 / C1          | CPAD2                | VSYS                         | -                 | -                                                                                                     | -                    | VSYS        | Input power line.                                                     |
| 3 / D1          | CPAD3                | NC                           | -                 | -                                                                                                     | -                    | NC          |                                                                       |
| 4 / E1          | CPAD4                | NC                           | -                 | -                                                                                                     | -                    | -           |                                                                       |
| 5 / F1          | CPAD5                | GND                          | -                 | -                                                                                                     | -                    | -           |                                                                       |
| 6 / G1          | CPAD6                | VSYS                         | -                 | -                                                                                                     | -                    | VSYS        | Input power line.                                                     |
| 7 / H1          | CPAD7                | VSYS2                        | -                 | -                                                                                                     | -                    | VSYS2       | Input power line.                                                     |
| 8 / J1          | CPAD8                | GND                          | -                 | -                                                                                                     | -                    | -           |                                                                       |
| 9 / K1          | CPAD9                | VDD                          | -                 | -                                                                                                     | -                    | VDD         | Output power line.                                                    |
| 10 / L1         | CPAD10               | NC                           | -                 | -                                                                                                     | -                    | -           |                                                                       |
| 11 / M1         | CPAD11               | NC                           | -                 | -                                                                                                     | -                    | -           |                                                                       |
| 12 / N1         | CPAD12               | NC                           | -                 | -                                                                                                     | -                    | -           |                                                                       |
| 13 / P1         | CPAD13               | NRST                         | NRST              | -                                                                                                     | -                    |             | Reset line of the CPU.<br>Recommendation:<br>leave this pin floating. |
| 14 / R1         | CPAD14               | I2S1_WS                      | PA4               | <b>AF2:</b> TIM5_ETR<br><b>AF3:</b> USART2_CK<br><b>AF4:</b> SAI1_SCK_B<br><b>AF5:</b> SPI1_NSS/I2S1_ | ADC1_INP14           | VDD         |                                                                       |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                     | Additional functions                 | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------|----------|
|                 |                      |                              |                   | WS<br><b>AF6:</b> DFSDM1_CKIN1<br><b>AF10:</b> ETH1_PPS_OUT<br><b>AF11:</b> ETH2_PPS_OUT<br><b>AF12:</b> SAI1_SCK_A                                                                                                                     |                                      |             |          |
| 15 / T1         | CPAD15               | I2S1_CK                      | PC3               | <b>AF2:</b> SAI1_CK1<br><b>AF3:</b> DFSDM1_CKOUT<br><b>AF5:</b> SPI1_MISO/I2S1_SDI<br><b>AF6:</b> SPI1_SCK/I2S1_CK<br><b>AF8:</b> UART5_CTS<br><b>AF10:</b> SAI1_MCLK_A<br><b>AF11:</b> ETH1_MII_TX_CLK<br><b>AF12:</b> ETH2_MII_TX_CLK | ADC1_INP13<br>ADC1_INN12<br>TAMP_IN5 | VDD         |          |
| 16 / U1         | CPAD16               | SDMMC1_D1                    | PC9               | <b>AF0:</b> TRACED1<br><b>AF2:</b> TIM3_CH4<br><b>AF3:</b> TIM8_CH4<br><b>AF7:</b> USART3_RTS<br><b>AF8:</b> UART5_CTS<br><b>AF9:</b> FDCAN1_TX<br><b>AF12:</b> SDMMC1_D1<br><b>AF14:</b> LCD_B4                                        | -                                    | VDD         |          |
| 17 / V1         | CPAD17               | SDMMC1_CMD                   | PD2               | <b>AF0:</b> TRACED4<br><b>AF2:</b> TIM3_ETR<br><b>AF4:</b> I2C1_SMBA<br><b>AF5:</b> SPI3_NSS/I2S3_WP<br><b>AF6:</b> SAI2_D1<br><b>AF7:</b> USART3_RX<br><b>AF12:</b> SDMMC1_CMD                                                         | -                                    | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                                                    | Additional functions | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
| 18 / W1         | CPAD18               | PA13                         | PA13              | <b>AF0:</b> DBTRGO<br><b>AF1:</b> DBTRGI<br><b>AF2:</b> MCO1<br><b>AF8:</b> UART4_TX                                                                                                                                                                                   | BOOTFAILN            | VDD         |          |
| 19 / Y1         | CPAD19               | BOOT1                        | BOOT1             | -                                                                                                                                                                                                                                                                      | -                    | VDD         |          |
| 20 / AA2        | CPAD20               | SDMMC1_D0                    | PC8               | <b>AF0:</b> TRACED0<br><b>AF2:</b> TIM3_CH3<br><b>AF3:</b> TIM8_CH3<br><b>AF5:</b> SPI3_MISO/I2S3_SDI<br><b>AF7:</b> USART6_CK<br><b>AF8:</b> USART3_CTS<br><b>AF10:</b> SAI2_FS_B<br><b>AF11:</b> UART5_RTS/UART5_DE<br><b>AF12:</b> SDMMC1_D0<br><b>AF14:</b> LCD_G7 | -                    | VDD         |          |
| 21 / AA3        | CPAD21               | SDMMC1_CLK                   | PC12              | <b>AF0:</b> TRACECLK<br><b>AF8:</b> UART7_TX<br><b>AF10:</b> SAI2_SD_B<br><b>AF12:</b> SDMMC1_CK<br><b>AF14:</b> LCD_DE                                                                                                                                                | -                    | VDD         |          |
| 22 / AA4        | CPAD22               | SDMMC1_D2                    | PC10              | <b>AF0:</b> TRACED2<br><b>AF5:</b> I2C1_SCL<br><b>AF6:</b> SPI3_SCK/I2S3_CK<br><b>AF7:</b> USART3_TX<br><b>AF10:</b> SAI2_MCLK_B<br><b>AF12:</b> SDMMC1_D2                                                                                                             | -                    | VDD         |          |
| 23 / AA5        | CPAD23               | SDMMC1_D3                    | PC11              | <b>AF0:</b> TRACED3<br><b>AF4:</b> I2C1_SDA                                                                                                                                                                                                                            | -                    | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                       | Additional functions                                 | Power group | Comments          |
|-----------------|----------------------|------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------|-------------------|
|                 |                      |                              |                   | <b>AF6:</b> SPI3_MOSI/I2S3_SDO<br><b>AF7:</b> USART3_CK<br><b>AF8:</b> UART5_RX<br><b>AF10:</b> SAI2_SCK_B<br><b>AF12:</b> SDMMC1_D3                                                                      |                                                      |             |                   |
| 24 / AA6        | CPAD24               | UART5_TX                     | PA0               | <b>AF1:</b> TIM2_CH1<br><b>AF2:</b> TIM5_CH1<br><b>AF3:</b> TIM8_ETR<br><b>AF4:</b> TIM15_BKIN<br><b>AF6:</b> SAI1_SD_B<br><b>AF8:</b> UART5_TX<br><b>AF11:</b> ETH1_MII_CRS<br><b>AF12:</b> ETH2_MII_CRS | ADC1_INP7<br>ADC1_INN3<br>ADC2_INP7<br>ADC2_INN3     | VDD         |                   |
| 25 / AA7        | CPAD25               | UART5_RX                     | PF13              | <b>AF1:</b> TIM2_ETR<br><b>AF2:</b> SAI1_MCLK_B<br><b>AF6:</b> DFSDM1_DATIN3<br><b>AF7:</b> USART2_TX<br><b>AF8:</b> UART5_RX                                                                             | ADC1_INP11<br>ADC1_INN10<br>ADC2_INP11<br>ADC2_INN10 | VDD         |                   |
| 26 / AA8        | CPAD26               | USB2_D_P                     | USB_DP2           | -                                                                                                                                                                                                         | USBH_HS_DP2<br>OTG_HS_DP                             |             |                   |
| 27 / AA9        | CPAD27               | USB2_D_N                     | USB_DM2           | -                                                                                                                                                                                                         | USBH_HS_DM2<br>OTG_HS_DM                             |             |                   |
| 28 / AA10       | CPAD28               | GND                          | -                 | -                                                                                                                                                                                                         | -                                                    | -           |                   |
| 29 / AA11       | CPAD29               | OTG_VBUS                     | PI7               | -                                                                                                                                                                                                         | OTG_HS_VBUS                                          |             | Input power line. |
| 30 / AA12       | CPAD30               | I2S1_SDI                     | PA6               | <b>AF1:</b> TIM1_BKIN<br><b>AF2:</b> TIM3_CH1<br><b>AF3:</b> TIM8_BKIN<br><b>AF4:</b> SAI2_CK2                                                                                                            | ADC1_INP17<br>ADC1_INN16<br>TAMP_IN2                 | VDD         |                   |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                           | Additional functions                        | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------|----------|
|                 |                      |                              |                   | <b>AF5:</b> SPI1_MISO/I2S1_SDI<br><b>AF7:</b> USART1_CK<br><b>AF8:</b> UART4_RTS/UART4_DE<br><b>AF9:</b> TIM13_CH1<br><b>AF12:</b> SAI2_SCK_A                                                                                                 |                                             |             |          |
| 31 / AA13       | CPAD31               | USB_OTG_ID                   | PA10              | <b>AF1:</b> TIM1_CH3                                                                                                                                                                                                                          | OTG_HS_ID                                   |             |          |
| 32 / AA14       | CPAD32               | I2S1_SDO                     | PA3               | <b>AF1:</b> TIM2_CH4<br><b>AF2:</b> TIM5_CH4<br><b>AF3:</b> LPTIM5_OUT<br><b>AF4:</b> TIM15_CH2<br><b>AF5:</b> SPI1_MOSI/I2S1_SDO<br><b>AF6:</b> SAI1_FS_B<br><b>AF7:</b> USART2_RX<br><b>AF11:</b> ETH1_MII_COL<br><b>AF12:</b> ETH2_MII_COL | ADC1_INP12<br>ADC1_INN11<br>PVD_IN<br>WKUP6 | VDD         |          |
| 33 / AA15       | CPAD33               | BOOT2                        | BOOT2             | -                                                                                                                                                                                                                                             | -                                           | VDD         |          |
| 34 / AA16       | CPAD34               | JTMS-SWDIO                   | JTMS-SWDIO        | -                                                                                                                                                                                                                                             | -                                           |             |          |
| 35 / AA17       | CPAD35               | USB1_D_P                     | USB_DP1           | -                                                                                                                                                                                                                                             | USBH_HS_DP1                                 |             |          |
| 36 / AA18       | CPAD36               | USB1_D_N                     | USB_DM1           | -                                                                                                                                                                                                                                             | USBH_HS_DM1                                 |             |          |
| 37 / AA19       | CPAD37               | ETH1_MDC                     | PG2               | <b>AF1:</b> MCO2<br><b>AF3:</b> TIM8_BKIN<br><b>AF10:</b> SAI2_MCLK_B<br><b>AF11:</b> ETH1_MDC<br><b>AF13:</b> DCMIPP_D1                                                                                                                      | -                                           | VDD         |          |
| 38 / AA20       | CPAD38               | ETH1_MDIO                    | PA2               | <b>AF1:</b> TIM2_CH3                                                                                                                                                                                                                          | ADC1_INP1                                   | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                                                                                                                             | Additional functions | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|                 |                      |                              |                   | <b>AF2:</b> TIM5_CH3<br><b>AF3:</b> LPTIM4_OUT<br><b>AF4:</b> TIM15_CH1<br><b>AF7:</b> USART2_TX<br><b>AF11:</b> ETH1_MDIO                                                                                                                                                                                                                      | ADC2_INP1            |             |          |
| 39 / Y21        | CPAD39               | JTDO-TRACESWO                | JTDO-TRACESWO     | -                                                                                                                                                                                                                                                                                                                                               | -                    |             |          |
| 40 / W21        | CPAD40               | JTCK-SWCLK                   | JTCK-SWCLK        | -                                                                                                                                                                                                                                                                                                                                               | -                    |             |          |
| 41 / V21        | CPAD41               | JTDI                         | JTDI              | -                                                                                                                                                                                                                                                                                                                                               | -                    |             |          |
| 42 / U21        | CPAD42               | JTRST                        | JTRST             | -                                                                                                                                                                                                                                                                                                                                               | -                    |             |          |
| 43 / T21        | CPAD43               | UART8_TX                     | PE4               | <b>AF1:</b> SPI5_MISO<br><b>AF2:</b> SAI1_D2<br><b>AF3:</b> DFSDM1_DATIN3<br><b>AF4:</b> TIM15_CH1N<br><b>AF5:</b> I2S_CKIN<br><b>AF6:</b> SAI1_FS_A<br><b>AF7:</b> UART7_RTS/UART7_DE<br><b>AF8:</b> UART8_TX<br><b>AF9:</b> QUADSPI_BK2_NCS<br><b>AF10:</b> FMC_NCE2<br><b>AF12:</b> FMC_A25<br><b>AF13:</b> DCMIPP_D3<br><b>AF14:</b> LCD_G7 | -                    | VDD         |          |
| 44 / R21        | CPAD44               | UART8_RX                     | PE0               | <b>AF6:</b> DCMIPP_D12<br><b>AF8:</b> UART8_RX<br><b>AF9:</b> FDCAN2_RX<br><b>AF11:</b> LCD_B1<br><b>AF12:</b> FMC_A11                                                                                                                                                                                                                          | -                    | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                             | Additional functions   | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|----------|
|                 |                      |                              |                   | <b>AF13:</b> DCMIPP_D1<br><b>AF14:</b> LCD_B5                                                                                                                                                                                   |                        |             |          |
| 45 / P21        | CPAD45               | GND                          | -                 | -                                                                                                                                                                                                                               | -                      | -           |          |
| 46 / N21        | CPAD46               | UART8_RTS                    | PE14              | <b>AF1:</b> TIM1_BKIN<br><b>AF4:</b> SAI1_D4<br><b>AF8:</b> UART8_RTS/UART8_DE<br><b>AF9:</b> QUADSPI_BK1_NCS<br><b>AF10:</b> QUADSPI_BK2_IO2<br><b>AF12:</b> FMC_D11/FMC_AD11<br><b>AF13:</b> DCMIPP_D7<br><b>AF14:</b> LCD_G0 | TAMP_IN6               | VDD         |          |
| 47 / M21        | CPAD47               | UART8_CTS                    | PG10              | <b>AF5:</b> SPI5_SCK<br><b>AF6:</b> SAI1_SD_B<br><b>AF8:</b> UART8_CTS<br><b>AF9:</b> FDCAN1_TX<br><b>AF10:</b> QUADSPI_BK2_IO1<br><b>AF12:</b> FMC_NE3<br><b>AF13:</b> DCMIPP_D2                                               | -                      | VDD         |          |
| 48 / L21        | CPAD48               | ETH1_RXD0                    | PC4               | <b>AF2:</b> TIM3_ETR<br><b>AF3:</b> DFSDM1_CKIN2<br><b>AF4:</b> SAI1_D3<br><b>AF5:</b> I2S1_MCK<br><b>AF8:</b> UART5_RTS/UART5_DE<br><b>AF9:</b> SPDIFRX_IN2<br><b>AF11:</b> ETH1_MII_                                          | ADC1_INP4<br>ADC2_INP4 | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                                                                                     | Additional functions           | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------|----------|
|                 |                      |                              |                   | RXD0/ETH1_RGMII_<br>RXD0/ETH1_RMII_RXD0<br><b>AF12:</b> SAI2_D3                                                                                                                                                                                                                                         |                                |             |          |
| 49 / K21        | CPAD49               | ETH1_RX_DV                   | PA7               | <b>AF1:</b> TIM1_CH1N<br><b>AF2:</b> TIM3_CH2<br><b>AF3:</b> TIM8_CH1N<br><b>AF4:</b> SAI2_D1<br><b>AF5:</b> SPI1_SCK/I2S1_CK<br><b>AF7:</b> USART1_<br>CTS/USART1_NSS<br><b>AF9:</b> TIM14_CH1<br><b>AF11:</b> ETH1_MII_RX_<br>DV/ETH1_RGMII_RX_<br>CTL/ETH1_RMII_CRS_<br>DV<br><b>AF12:</b> SAI2_SD_A | ADC1_INP16                     | VDD         |          |
| 50 / J21        | CPAD50               | ETH1_RX_ER                   | PI3               | <b>AF8:</b> SPDIFRX_IN3<br><b>AF11:</b> ETH1_MII_RX_ER                                                                                                                                                                                                                                                  | TAMP_IN4<br>TAMP_OUT5<br>WKUP2 | VDD         |          |
| 51 / H21        | CPAD51               | ETH1_TXD1                    | PG14              | <b>AF1:</b> LPTIM1_ETR<br><b>AF6:</b> SAI2_D1<br><b>AF7:</b> USART6_TX<br><b>AF10:</b> SAI2_SD_A<br><b>AF11:</b> ETH1_MII_<br>TXD1/ETH1_RGMII_<br>TXD1/ETH1_RMII_TXD1                                                                                                                                   | -                              | VDD         |          |
| 52 / G21        | CPAD52               | ETH1_TX_EN                   | PB11              | <b>AF1:</b> TIM2_CH4<br><b>AF3:</b> LPTIM1_OUT<br><b>AF4:</b> I2C5_SMBA<br><b>AF7:</b> USART3_RX<br><b>AF11:</b> ETH1_MII_TX_                                                                                                                                                                           | -                              | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                              | Additional functions     | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------|----------|
|                 |                      |                              |                   | EN/ETH1_RGMII_TX_CTL/ETH1_RMII_TX_EN                                                                                                                                                                                                             |                          |             |          |
| 53 / F21        | CPAD53               | ETH1_REF_CLK                 | PD7               | <b>AF0:</b> MCO1<br><b>AF3:</b> USART2_CK<br><b>AF4:</b> I2C2_SCL<br><b>AF5:</b> I2C3_SDA<br><b>AF9:</b> SPDIFRX_IN0<br><b>AF10:</b> ETH1_MII_RX_CLK/ETH1_RGMII_RX_CLK/ETH1_RMII_REF_CLK<br><b>AF11:</b> QUADSPI_BK1_IO2<br><b>AF12:</b> FMC_NE1 | -                        | VDD         |          |
| 54 / E21        | CPAD54               | ETH1_RXD1                    | PC5               | <b>AF3:</b> DFSDM1_DATIN2<br><b>AF4:</b> SAI2_D4<br><b>AF5:</b> I2S_CKIN<br><b>AF6:</b> SAI1_D4<br><b>AF7:</b> USART2_CTS/USART2_NSS<br><b>AF9:</b> SPDIFRX_IN3<br><b>AF11:</b> ETH1_MII_RXD1/ETH1_RGMII_RXD1/ETH1_RMII_RXD1                     | ADC1_INP10<br>ADC2_INP10 | VDD         |          |
| 55 / D21        | CPAD55               | ETH1_TXD0                    | PG13              | <b>AF1:</b> LPTIM1_OUT<br><b>AF7:</b> USART6_CTS/USART6_NSS<br><b>AF11:</b> ETH1_MII_TXD0/ETH1_RGMII_TXD0/ETH1_RMII_TXD0                                                                                                                         | ADC2_INP6<br>ADC2_INN2   | VDD         |          |
| 56 / C21        | CPAD56               | LTDC_CLK                     | PD9               | <b>AF0:</b> TRACECLK                                                                                                                                                                                                                             | -                        | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                                                                       | Additional functions | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|                 |                      |                              |                   | <b>AF3:</b> DFSDM1_DATIN3<br><b>AF10:</b> SDMMC2_CDIR<br><b>AF11:</b> LCD_B5<br><b>AF12:</b> FMC_D14/FMC_AD14<br><b>AF13:</b> LCD_CLK<br><b>AF14:</b> LCD_B0                                                                                                                              |                      |             |          |
| 57 / B21        | CPAD57               | LTDC_HSYNC                   | PE1               | <b>AF1:</b> LPTIM1_IN2<br><b>AF8:</b> UART8_TX<br><b>AF9:</b> LCD_HSYNC<br><b>AF11:</b> LCD_R4<br><b>AF12:</b> FMC_NBL1<br><b>AF13:</b> DCMIPP_D3<br><b>AF14:</b> DCMIPP_D12                                                                                                              | -                    | VDD         |          |
| 58 / A20        | CPAD58               | LTDC_B6                      | PF9               | <b>AF1:</b> TIM17_CH1N<br><b>AF2:</b> TIM1_CH1<br><b>AF3:</b> DFSDM1_CKIN3<br><b>AF6:</b> SAI1_D4<br><b>AF7:</b> UART7_CTS<br><b>AF8:</b> UART8_RX<br><b>AF9:</b> TIM14_CH1<br><b>AF10:</b> QUADSPI_BK1_IO1<br><b>AF11:</b> QUADSPI_BK2_IO3<br><b>AF12:</b> FMC_A9<br><b>AF14:</b> LCD_B6 | -                    | VDD         |          |
| 59 / A19        | CPAD59               | NC                           | -                 | -                                                                                                                                                                                                                                                                                         | -                    | VDD         |          |
| 60 / A18        | CPAD60               | LTDC_B2                      | PH7               | <b>AF2:</b> SAI2_FS_B<br><b>AF5:</b> I2C3_SDA<br><b>AF6:</b> SPI5_SCK                                                                                                                                                                                                                     | -                    | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                                 | Additional functions | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|                 |                      |                              |                   | <b>AF9:</b> QUADSPI_BK2_IO3<br><b>AF10:</b> ETH2_MII_TX_CLK<br><b>AF11:</b> ETH1_MII_TX_CLK<br><b>AF13:</b> QUADSPI_BK1_IO3<br><b>AF14:</b> LCD_B2                                                                                                  |                      |             |          |
| 61 / A17        | CPAD61               | LTDC_B5                      | PF10              | <b>AF1:</b> TIM16_BKIN<br><b>AF2:</b> SAI1_D3<br><b>AF3:</b> TIM8_BKIN<br><b>AF5:</b> SPI5_NSS<br><b>AF7:</b> USART6_RTS/USART6_DE<br><b>AF8:</b> UART7_RTS/UART7_DE<br><b>AF9:</b> QUADSPI_CLK<br><b>AF13:</b> DCMIPP_HSYNC<br><b>AF14:</b> LCD_B5 | TAMP_IN1             | VDD         |          |
| 62 / A16        | CPAD62               | LTDC_G2                      | PH13              | <b>AF0:</b> TRACED15<br><b>AF2:</b> USART2_CK<br><b>AF3:</b> TIM8_CH1N<br><b>AF4:</b> I2C5_SCL<br><b>AF6:</b> SPI3_SCK/I2S3_CK<br><b>AF8:</b> UART4_TX<br><b>AF13:</b> LCD_G3<br><b>AF14:</b> LCD_G2                                                | -                    | VDD         |          |
| 63 / A15        | CPAD63               | LTDC_G3                      | PF3               | <b>AF3:</b> LPTIM2_IN2<br><b>AF4:</b> I2C5_SDA<br><b>AF5:</b> SPI4_MISO/I2S4_SDI<br><b>AF6:</b> SPI3_NSS/I2S3_                                                                                                                                      | -                    | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                                                                                                                         | Additional functions | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|                 |                      |                              |                   | WS<br><b>AF12:</b> FMC_A3<br><b>AF14:</b> LCD_G3                                                                                                                                                                                                                                                                            |                      |             |          |
| 64 / A14        | CPAD64               | LTDC_B7                      | PB6               | <b>AF0:</b> TRACED6<br><b>AF1:</b> TIM16_CH1N<br><b>AF2:</b> TIM4_CH1<br><b>AF3:</b> TIM8_CH1<br><b>AF4:</b> USART1_TX<br><b>AF6:</b> SAI1_CK2<br><b>AF7:</b> LCD_B6<br><b>AF9:</b> QUADSPI_BK1_NCS<br><b>AF11:</b> ETH2_MDIO<br><b>AF12:</b> FMC_NE3<br><b>AF13:</b> DCMIPP_D5<br><b>AF14:</b> LCD_B7<br><b>AF15:</b> HDP6 | -                    | VDD         |          |
| 65 / A13        | CPAD65               | GND                          | -                 |                                                                                                                                                                                                                                                                                                                             | -                    | -           |          |
| 66 / A12        | CPAD66               | LTDC_B4                      | PH3               | <b>AF4:</b> I2C3_SCL<br><b>AF5:</b> SPI5_MOSI<br><b>AF9:</b> QUADSPI_BK2_IO1<br><b>AF10:</b> ETH1_MII_COL<br><b>AF11:</b> LCD_R5<br><b>AF12:</b> ETH2_MII_COL<br><b>AF13:</b> QUADSPI_BK1_IO0<br><b>AF14:</b> LCD_B4                                                                                                        | -                    | VDD         |          |
| 67 / A11        | CPAD67               | NC                           | -                 | -                                                                                                                                                                                                                                                                                                                           | -                    | VDD         |          |
| 68 / A10        | CPAD68               | LTDC_B3                      | PG15              | <b>AF7:</b> USART6_CTS/USART6_NSS                                                                                                                                                                                                                                                                                           | -                    | VDD         |          |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions                                                                                                                                                                                                              | Additional functions | Power group | Comments                                                                          |
|-----------------|----------------------|------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------------------------|
|                 |                      |                              |                   | <b>AF8:</b> UART7_CTS<br><b>AF9:</b> QUADSPI_BK1_IO1<br><b>AF10:</b> ETH2_PHY_INTN<br><b>AF11:</b> LCD_B4<br><b>AF13:</b> DCMIPP_D10<br><b>AF14:</b> LCD_B3                                                                      |                      |             |                                                                                   |
| 69 / A9         | CPAD69               | LTDC_DE                      | PH9               | <b>AF1:</b> TIM1_CH4<br><b>AF2:</b> TIM12_CH2<br><b>AF5:</b> SPI4_SCK/I2S4_CK<br><b>AF6:</b> DCMIPP_D13<br><b>AF9:</b> LCD_B5<br><b>AF11:</b> LCD_DE<br><b>AF12:</b> FMC_A20<br><b>AF13:</b> DCMIPP_D9<br><b>AF14:</b> DCMIPP_D8 | -                    | VDD         |                                                                                   |
| 70 / A8         | CPAD70               | VCC_MCA                      | -                 | -                                                                                                                                                                                                                                | -                    | VCC_MCA     | Input power line.                                                                 |
| 71 / A7         | CPAD71               | SWD_DIO/MCA_IO7              | -                 | -                                                                                                                                                                                                                                | -                    | VCC_MCA     |                                                                                   |
| 72 / A6         | CPAD72               | SWD_CLK/PWR_IO               | -                 | -                                                                                                                                                                                                                                | -                    | VCC_MCA     | Input power on/off line of the module (active low). Pull this line up to VCC_MCA. |
| 73 / A5         | CPAD73               | MCA_RESET                    | -                 | -                                                                                                                                                                                                                                | -                    | VCC_MCA     | Input reset line of the module (active low). Pull this line up to VCC_MCA.        |
| 74 / A4         | CPAD74               | MCA_VIN_DET                  | -                 | -                                                                                                                                                                                                                                | -                    | VCC_MCA     |                                                                                   |

| Castellated pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP1 pad name | Alternate functions | Additional functions | Power group | Comments |
|-----------------|----------------------|------------------------------|-------------------|---------------------|----------------------|-------------|----------|
| 75 / A3         | CPAD75               | MCA_IO4                      | -                 | MCA GPIO/ADC        | -                    | VCC_MCA     |          |
| 76 / A2         | CPAD76               | MCA_IO0                      | -                 | MCA GPIO/ADC        | -                    | VCC_MCA     |          |

## LGA pad signals and multiplexing

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                   | Additional functions | Power group | Comments                                                                          |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------------------------|
| A2      | LGA_A2               | MCA_IO0                      | -                   | MCA GPIO/ADC                                                                                          | -                    | VCC_MCA     |                                                                                   |
| A3      | LGA_A3               | MCA_IO4                      | -                   | MCA GPIO/ADC                                                                                          | -                    | VCC_MCA     |                                                                                   |
| A4      | LGA_A4               | MCA_VIN_DET                  | -                   | -                                                                                                     | -                    | VCC_MCA     |                                                                                   |
| A5      | LGA_A5               | MCA_RESET                    | -                   | -                                                                                                     | -                    | VCC_MCA     | Input reset line of the module (active low). Pull this line up to VCC_MCA.        |
| A6      | LGA_A6               | SWD_CLK/PWR_IO               | -                   | -                                                                                                     | -                    | VCC_MCA     | Input power on/off line of the module (active low). Pull this line up to VCC_MCA. |
| A7      | LGA_A7               | SWD_DIO/MCA_IO7              | -                   | -                                                                                                     | -                    | VCC_MCA     |                                                                                   |
| A8      | LGA_A8               | VCC_MCA                      | -                   | -                                                                                                     | -                    | VCC_MCA     | Input power line.                                                                 |
| A9      | LGA_A9               | LTDC_DE                      | PH9                 | <b>AF1:</b> TIM1_CH4<br><b>AF2:</b> TIM12_CH2<br><b>AF5:</b> SPI4_SCK/I2S4_CK<br><b>AF12:</b> FMC_A20 | -                    | VDD         |                                                                                   |
| A10     | LGA_A10              | LTDC_B3                      | PG15                | <b>AF7:</b> USART6_                                                                                   | -                    | VDD         |                                                                                   |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                  | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|         |                      |                              |                     | CTS/USART6_NSS<br><b>AF8:</b> UART7_CTS<br><b>AF9:</b> QUADSPI_BK1_IO1<br><b>AF10:</b> ETH2_PHY_INTN                                                                                                                                                 |                      |             |          |
| A11     | LGA_A11              | NC                           | -                   | -                                                                                                                                                                                                                                                    | -                    | VDD         |          |
| A12     | LGA_A12              | LTDC_B4                      | PH3                 | <b>AF4:</b> I2C3_SCL<br><b>AF5:</b> SPI5_MOSI<br><b>AF9:</b> QUADSPI_BK2_IO1<br><b>AF10:</b> ETH1_MII_COL<br><b>AF12:</b> ETH2_MII_COL<br><b>AF13:</b> QUADSPI_BK1_IO0                                                                               | -                    | VDD         |          |
| A13     | LGA_A13              | GND                          | -                   | -                                                                                                                                                                                                                                                    | -                    |             |          |
| A14     | LGA_A14              | LTDC_B7                      | PB6                 | <b>AF0:</b> TRACED6<br><b>AF1:</b> TIM16_CH1N<br><b>AF2:</b> TIM4_CH1<br><b>AF3:</b> TIM8_CH1<br><b>AF4:</b> USART1_TX<br><b>AF6:</b> SAI1_CK2<br><b>AF9:</b> QUADSPI_BK1_NCS<br><b>AF11:</b> ETH2_MDIO<br><b>AF12:</b> FMC_NE3<br><b>AF15:</b> HDP6 | -                    | VDD         |          |
| A15     | LGA_A15              | LTDC_G3                      | PF3                 | <b>AF3:</b> LPTIM2_IN2                                                                                                                                                                                                                               | -                    | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                             | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|         |                      |                              |                     | <b>AF4:</b> I2C5_SDA<br><b>AF5:</b> SPI4_MISO/I2S4_SDI<br><b>AF6:</b> SPI3_NSS/I2S3_WS<br><b>AF12:</b> FMC_A3                                                                                   |                      |             |          |
| A16     | LGA_A16              | LTDC_G2                      | PH13                | <b>AF0:</b> TRACED15<br><b>AF2:</b> USART2_CK<br><b>AF3:</b> TIM8_CH1N<br><b>AF4:</b> I2C5_SCL<br><b>AF6:</b> SPI3_SCK/I2S3_CK<br><b>AF8:</b> UART4_TX                                          | -                    | VDD         |          |
| A17     | LGA_A17              | LTDC_B5                      | PF10                | <b>AF1:</b> TIM16_BKIN<br><b>AF2:</b> SAI1_D3<br><b>AF3:</b> TIM8_BKIN<br><b>AF5:</b> SPI5_NSS<br><b>AF7:</b> USART6_RTS/USART6_DE<br><b>AF8:</b> UART7_RTS/UART7_DE<br><b>AF9:</b> QUADSPI_CLK | TAMP_IN1             | VDD         |          |
| A18     | LGA_A18              | LTDC_B2                      | PH7                 | <b>AF2:</b> SAI2_FS_B<br><b>AF5:</b> I2C3_SDA<br><b>AF6:</b> SPI5_SCK<br><b>AF9:</b> QUADSPI_BK2_IO3<br><b>AF10:</b> ETH2_MII_TX_CLK<br><b>AF11:</b> ETH1_MII_TX_CLK<br><b>AF13:</b> QUADSPI_   | -                    | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                                | Additional functions | Power group | Comments          |
|---------|----------------------|------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-------------------|
|         |                      |                              |                     | BK1_IO3                                                                                                                                                                                                                                                            |                      |             |                   |
| A19     | LGA_A19              | NC                           | -                   | -                                                                                                                                                                                                                                                                  | -                    | VDD         |                   |
| A20     | LGA_A20              | LTDC_B6                      | PF9                 | <b>AF1:</b> TIM17_CH1N<br><b>AF2:</b> TIM1_CH1<br><b>AF3:</b> DFSDM1_CKIN3<br><b>AF6:</b> SAI1_D4<br><b>AF7:</b> UART7_CTS<br><b>AF8:</b> UART8_RX<br><b>AF9:</b> TIM14_CH1<br><b>AF10:</b> QUADSPI_BK1_IO1<br><b>AF11:</b> QUADSPI_BK2_IO3<br><b>AF12:</b> FMC_A9 | -                    | VDD         |                   |
| A21     | LGA_A21              | GND                          | -                   | -                                                                                                                                                                                                                                                                  | -                    |             |                   |
| B1      | LGA_B1               | VCC_LICELL                   | VBAT                | -                                                                                                                                                                                                                                                                  | -                    |             | Coin cell supply. |
| B2      | LGA_B2               | MCA_IO1                      | -                   | MCA GPIO/ADC                                                                                                                                                                                                                                                       | -                    |             |                   |
| B3      | LGA_B3               | ETH2_TXD0                    | PF7                 | <b>AF1:</b> TIM17_CH1<br><b>AF7:</b> UART7_TX<br><b>AF8:</b> UART4_CTS<br><b>AF10:</b> ETH1_RGMII_CLK125<br><b>AF11:</b> ETH2_MII_TXD0/ETH2_RGMII_TXD0/ETH2_RMII_TXD0<br><b>AF12:</b> FMC_A18                                                                      | -                    | VDD         |                   |
| B4      | LGA_B4               | ETH2_TXD1                    | PG11                | <b>AF4:</b> SAI2_D3                                                                                                                                                                                                                                                | -                    | VDD         |                   |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                       | Additional functions | Power group | Comments      |
|---------|----------------------|------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|---------------|
|         |                      |                              |                     | <b>AF5:</b> I2S2_MCK<br><b>AF7:</b> USART3_TX<br><b>AF8:</b> UART4_TX<br><b>AF10:</b> ETH2_MII_TXD1/ETH2_RGMII_TXD1/ETH2_RMII_TXD1<br><b>AF12:</b> FMC_A24                                                                                                |                      |             |               |
| B5      | LGA_B5               | MCA_IO2/EXT_VREF             | -                   | MCA GPIO/ADC                                                                                                                                                                                                                                              | -                    |             |               |
| B6      | LGA_B6               | MCA_IO5                      | -                   | MCA GPIO/ADC                                                                                                                                                                                                                                              | -                    |             |               |
| B7      | LGA_B7               | RESERVED                     | -                   | -                                                                                                                                                                                                                                                         | -                    |             | Reserved pad. |
| B8      | LGA_B8               | ETH2_TXD2                    | PG1                 | <b>AF1:</b> LPTIM1_ETR<br><b>AF2:</b> TIM4_ETR<br><b>AF3:</b> SAI2_FS_A<br><b>AF4:</b> I2C2_SMBA<br><b>AF5:</b> SPI2_MISO/I2S2_SDI<br><b>AF6:</b> SAI2_D2<br><b>AF9:</b> FDCAN2_TX<br><b>AF10:</b> ETH2_MII_TXD2/ETH2_RGMII_TXD2<br><b>AF12:</b> FMC_NBL0 | -                    | VDD         |               |
| B9      | LGA_B9               | ETH2_TXD3                    | PE6                 | <b>AF0:</b> MCO2<br><b>AF1:</b> TIM1_BKIN2<br><b>AF2:</b> SAI2_SCK_B<br><b>AF4:</b> TIM15_CH2<br><b>AF5:</b> I2C3_SMBA<br><b>AF6:</b> SAI1_SCK_B                                                                                                          | -                    | VDD         |               |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                   | Additional functions | Power group | Comments                                                             |
|---------|----------------------|------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------------------------------------------------------------------|
|         |                      |                              |                     | <b>AF8:</b> UART4_RTS/UART4_DE<br><b>AF11:</b> ETH2_MII_TXD3/ETH2_RGMII_TXD3<br><b>AF12:</b> FMC_A22                                                                                  |                      |             |                                                                      |
| B10     | LGA_B10              | ETH2_TX_EN                   | PF6                 | <b>AF1:</b> TIM16_CH1<br><b>AF5:</b> SPI5_NSS<br><b>AF7:</b> UART7_RX<br><b>AF9:</b> QUADSPI_BK1_IO2<br><b>AF11:</b> ETH2_MII_TX_EN/ETH2_RGMII_TX_CTL/ETH2_RMII_TX_EN                 | -                    | VDD         |                                                                      |
| B11     | LGA_B11              | ETH2_GTX_CLK                 | PG3                 | <b>AF3:</b> TIM8_BKIN2<br><b>AF4:</b> I2C2_SDA<br><b>AF6:</b> SAI2_SD_B<br><b>AF9:</b> FDCAN2_RX<br><b>AF10:</b> ETH2_RGMII_GTX_CLK<br><b>AF11:</b> ETH1_MDIO<br><b>AF12:</b> FMC_A13 | -                    | VDD         |                                                                      |
| B12     | LGA_B12              | GND                          | -                   | -                                                                                                                                                                                     | -                    |             |                                                                      |
| B13     | LGA_B13              | RF_ANT_EXT                   | -                   | -                                                                                                                                                                                     | -                    |             | External antenna pad. This signal is disconnected inside the module. |
| B14     | LGA_B14              | GND                          | -                   | -                                                                                                                                                                                     | -                    |             |                                                                      |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                     | Additional functions | Power group | Comments          |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------|----------------------|-------------|-------------------|
| B15     | LGA_B15              | NC                           | -                   | -                                                                       | -                    |             |                   |
| B16     | LGA_B16              | GND                          | -                   | -                                                                       | -                    |             |                   |
| B17     | LGA_B17              | NC                           | -                   | -                                                                       | -                    |             |                   |
| B18     | LGA_B18              | NC                           | -                   | -                                                                       | -                    |             |                   |
| B19     | LGA_B19              | NC                           | -                   | -                                                                       | -                    |             |                   |
| B20     | LGA_B20              | NC                           | -                   | -                                                                       | -                    |             |                   |
| B21     | LGA_B21              | LTDC_HSYNC                   | PE1                 | <b>AF1:</b> LPTIM1_IN2<br><b>AF8:</b> UART8_TX<br><b>AF12:</b> FMC_NBL1 | -                    | VDD         |                   |
| C1      | LGA_C1               | VSYS                         | -                   | -                                                                       | -                    | VSYS        | Input power line. |
| C2      | LGA_C2               | VSYS                         | -                   | -                                                                       | -                    | VSYS        | Input power line. |
| C3      | LGA_C3               | MCA_IO3                      | -                   | MCA GPIO/ADC                                                            | -                    | VCC_<br>MCA |                   |
| C4      | LGA_C4               | MCA_IO6/CLKOUT32K            | -                   | MCA GPIO/32KHz output                                                   | -                    | VCC_<br>MCA |                   |
| C5      | LGA_C5               | GND                          | -                   | -                                                                       | -                    |             |                   |
| C6      | LGA_C6               | NC                           | -                   | -                                                                       | -                    | VDD         |                   |
| C7      | LGA_C7               | NC                           | -                   | -                                                                       | -                    | VDD         |                   |
| C8      | LGA_C8               | NC                           | -                   | -                                                                       | -                    | VDD         |                   |
| C9      | LGA_C9               | NC                           | -                   | -                                                                       | -                    | VDD         |                   |
| C10     | LGA_C10              | NC                           | -                   | -                                                                       | -                    | VDD         |                   |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                          | Additional functions                             | Power group | Comments                              |
|---------|----------------------|------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|---------------------------------------|
| C11     | LGA_C11              | GND                          | -                   | -                                                                                                                                                                            | -                                                |             |                                       |
| C12     | LGA_C12              | NC                           | -                   | -                                                                                                                                                                            | -                                                |             |                                       |
| C13     | LGA_C13              | GND                          | -                   | -                                                                                                                                                                            | -                                                |             |                                       |
| C14     | LGA_C14              | NC                           | -                   | -                                                                                                                                                                            | -                                                | VDD         |                                       |
| C15     | LGA_C15              | ETH2_RX_DV                   | PA12                | <b>AF1:</b> TIM1_ETR<br><b>AF2:</b> SAI2_MCLK_A<br><b>AF7:</b> USART1_RTS/USART1_DE<br><b>AF11:</b> ETH2_MII_RX_DV/ETH2_RGMII_RX_CTL/ETH2_RMII_CRS_DV<br><b>AF12:</b> FMC_A7 | -                                                | VDD         |                                       |
| C16     | LGA_C16              | LPO_32K/PI1                  | PI1                 | <b>AF8:</b> SPDIFRX_IN1                                                                                                                                                      | RTC_OUT2/RTC_LSCO<br>TAMP_IN2/TAMP_OUT3<br>WKUP4 | VDD         |                                       |
| C17     | LGA_C17              | PCM_OUT                      | -                   | -                                                                                                                                                                            | -                                                |             | Signal connected to the Wireless MAC. |
| C18     | LGA_C18              | PCM_SYNC                     | -                   | -                                                                                                                                                                            | -                                                |             | Signal connected to the Wireless MAC. |
| C19     | LGA_C19              | GND                          | -                   | -                                                                                                                                                                            | -                                                |             |                                       |
| C20     | LGA_C20              | PCM_CLK                      | -                   | -                                                                                                                                                                            | -                                                |             | Signal connected to the Wireless MAC. |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                   | Additional functions | Power group | Comments           |
|---------|----------------------|------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|--------------------|
| C21     | LGA_C21              | LTDC_CLK                     | PD9                 | <b>AF0:</b> TRACECLK<br><b>AF3:</b> DFSDM1_DATIN3<br><b>AF10:</b> SDMMC2_CD1R<br><b>AF12:</b> FMC_D14/FMC_AD14                                                                        | -                    | VDD         |                    |
| D1      | LGA_D1               | NC                           | -                   | -                                                                                                                                                                                     | -                    |             |                    |
| D2      | LGA_D2               | GND                          | -                   | -                                                                                                                                                                                     | -                    |             |                    |
| D3      | LGA_D3               | LDO2_2V8                     | -                   | -                                                                                                                                                                                     | -                    | 2V8         | Output power line. |
| D4      | LGA_D4               | LDO6_1V8                     | -                   | -                                                                                                                                                                                     | -                    | 1V8         | Output power line. |
| D5      | LGA_D5               | GND                          | -                   | -                                                                                                                                                                                     | -                    |             |                    |
| D6      | LGA_D6               | NC                           | -                   | -                                                                                                                                                                                     | -                    | VDD         |                    |
| D7      | LGA_D7               | GND                          | -                   | -                                                                                                                                                                                     | -                    |             |                    |
| D8      | LGA_D8               | NC                           | -                   | -                                                                                                                                                                                     | -                    |             |                    |
| D9      | LGA_D9               | LDO3                         | -                   | -                                                                                                                                                                                     | -                    | LDO3        | Output power line. |
| D10     | LGA_D10              | GND                          | -                   | -                                                                                                                                                                                     | -                    |             |                    |
| D11     | LGA_D11              | ETH2_REF_CLK                 | PH11                | <b>AF1:</b> SPI5_NSS<br><b>AF2:</b> TIM5_CH2<br><b>AF3:</b> SAI2_SD_A<br><b>AF5:</b> SPI2_NSS/I2S2_WS<br><b>AF6:</b> I2C4_SCL<br><b>AF7:</b> USART6_RX<br><b>AF9:</b> QUADSPI_BK2_IO0 | -                    | VDD         |                    |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                 | Additional functions | Power group | Comments                                        |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-------------------------------------------------|
|         |                      |                              |                     | <b>AF11:</b> ETH2_MII_RX_CLK/ETH2_RGMII_RX_CLK/ETH2_RMII_REF_CLK<br><b>AF12:</b> FMC_A12                                                                                            |                      |             |                                                 |
| D12     | LGA_D12              | VDD_SD                       | -                   | -                                                                                                                                                                                   | -                    | VDD_SD      | Output power line.                              |
| D13     | LGA_D13              | 3V3_RF_EN/PB7                | -                   | -                                                                                                                                                                                   | -                    |             | Signal only available in non-wireless variants. |
| D14     | LGA_D14              | NC                           | -                   | -                                                                                                                                                                                   | -                    |             |                                                 |
| D15     | LGA_D15              | BT_DEV_WAKE                  | -                   | -                                                                                                                                                                                   | -                    |             | Signal connected to the Wireless MAC.           |
| D16     | LGA_D16              | BT_UART_CTS                  | PD3                 | <b>AF2:</b> TIM2_CH1<br><b>AF3:</b> USART2_CTS/USART2_NSS<br><b>AF4:</b> DFSDM1_CKOUT<br><b>AF5:</b> I2C1_SDA<br><b>AF6:</b> SAI1_D3<br><b>AF12:</b> FMC_CLK                        | -                    | VDD         | Signal only available in non-wireless variants. |
| D17     | LGA_D17              | BT_UART_TX                   | PH12                | <b>AF1:</b> USART2_TX<br><b>AF2:</b> TIM5_CH3<br><b>AF3:</b> DFSDM1_CKIN1<br><b>AF4:</b> I2C3_SCL<br><b>AF5:</b> SPI5_MOSI<br><b>AF6:</b> SAI1_SCK_A<br><b>AF9:</b> QUADSPI_BK2_IO2 | -                    | VDD         | Signal only available in non-wireless variants. |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                  | Additional functions   | Power group | Comments                                        |
|---------|----------------------|------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|-------------------------------------------------|
|         |                      |                              |                     | <b>AF10:</b> SAI1_CK2<br><b>AF11:</b> ETH1_MII_CRS<br><b>AF12:</b> FMC_A6                                                                                                                                                            |                        |             |                                                 |
| D18     | LGA_D18              | BT_UART_RX                   | PH8                 | <b>AF0:</b> TRACED9<br><b>AF2:</b> TIM5_ETR<br><b>AF3:</b> USART2_RX<br><b>AF4:</b> I2C3_SDA<br><b>AF12:</b> FMC_A8<br><b>AF15:</b> HDP2                                                                                             | -                      | VDD         | Signal only available in non-wireless variants. |
| D19     | LGA_D19              | BT_UART_RTS                  | PA1                 | <b>AF1:</b> TIM2_CH2<br><b>AF2:</b> TIM5_CH2<br><b>AF3:</b> LPTIM3_OUT<br><b>AF4:</b> TIM15_CH1N<br><b>AF6:</b> DFSDM1_CKIN0<br><b>AF7:</b> USART2_RTS/USART2_DE<br><b>AF11:</b> ETH1_MII_RX_CLK/ETH1_RGMII_RX_CLK/ETH1_RMII_REF_CLK | ADC1_INP3<br>ADC2_INP3 | VDD         | Signal only available in non-wireless variants. |
| D20     | LGA_D20              | PCM_IN                       | -                   |                                                                                                                                                                                                                                      | -                      |             | Signal connected to the Wireless MAC.           |
| D21     | LGA_D21              | ETH1_TXD0                    | PG13                | <b>AF1:</b> LPTIM1_OUT<br><b>AF7:</b> USART6_CTS/USART6_NSS<br><b>AF11:</b> ETH1_MII_TXD0/ETH1_RGMII_TXD0/ETH1_RMII_                                                                                                                 | ADC2_INP6<br>ADC2_INN2 | VDD         |                                                 |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                          | Additional functions     | Power group | Comments                                        |
|---------|----------------------|------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------|-------------------------------------------------|
|         |                      |                              |                     | TXD0                                                                                                                                                                                                                         |                          |             |                                                 |
| E1      | LGA_E1               | NC                           | -                   | -                                                                                                                                                                                                                            | -                        |             | PMIC External LDO gate control line.            |
| E2      | LGA_E2               | WKUP                         | PF8                 | <b>AF1:</b> TIM16_CH1N<br><b>AF2:</b> TIM4_CH3<br><b>AF3:</b> TIM8_CH3<br><b>AF6:</b> SAI1_SCK_B<br><b>AF7:</b> USART6_TX<br><b>AF9:</b> TIM13_CH1<br><b>AF10:</b> QUADSPI_BK1_IO0                                           | WKUP1                    | VDD         |                                                 |
| E3      | LGA_E3               | VDD                          | -                   | -                                                                                                                                                                                                                            | -                        | VDD         | Output power line.                              |
| E19     | LGA_E19              | NC                           | -                   | -                                                                                                                                                                                                                            | -                        | VDD         |                                                 |
| E20     | LGA_E20              | WL_REG_EN                    | PD6                 | <b>AF1:</b> TIM16_CH1N<br><b>AF2:</b> SAI1_D1<br><b>AF6:</b> SAI1_SD_A<br><b>AF8:</b> UART4_TX                                                                                                                               | -                        | VDD         | Signal only available in non-wireless variants. |
| E21     | LGA_E21              | ETH1_RXD1                    | PC5                 | <b>AF3:</b> DFSDM1_DATIN2<br><b>AF4:</b> SAI2_D4<br><b>AF5:</b> I2S_CKIN<br><b>AF6:</b> SAI1_D4<br><b>AF7:</b> USART2_CTS/USART2_NSS<br><b>AF9:</b> SPDIFRX_IN3<br><b>AF11:</b> ETH1_MII_RXD1/ETH1_RGMII_RXD1/ETH1_RMII_RXD1 | ADC1_INP10<br>ADC2_INP10 | VDD         |                                                 |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                              | Additional functions | Power group | Comments                                        |
|---------|----------------------|------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-------------------------------------------------|
| F1      | LGA_F1               | GND                          | -                   | -                                                                                                                                                                                                                                                | -                    |             |                                                 |
| F2      | LGA_F2               | GND                          | -                   | -                                                                                                                                                                                                                                                | -                    |             |                                                 |
| F3      | LGA_F3               | VSYS                         | -                   | -                                                                                                                                                                                                                                                | -                    | VSYS        | Input power line.                               |
| F19     | LGA_F19              | WL_HOST_WAKE                 | -                   | -                                                                                                                                                                                                                                                | -                    |             | Signal connected to the Wireless MAC.           |
| F20     | LGA_F20              | NC                           | -                   | -                                                                                                                                                                                                                                                | -                    | VDD         |                                                 |
| F21     | LGA_F21              | ETH1_REF_CLK                 | PD7                 | <b>AF0:</b> MCO1<br><b>AF3:</b> USART2_CK<br><b>AF4:</b> I2C2_SCL<br><b>AF5:</b> I2C3_SDA<br><b>AF9:</b> SPDIFRX_IN0<br><b>AF10:</b> ETH1_MII_RX_CLK/ETH1_RGMII_RX_CLK/ETH1_RMII_REF_CLK<br><b>AF11:</b> QUADSPI_BK1_IO2<br><b>AF12:</b> FMC_NE1 | -                    | VDD         |                                                 |
| G1      | LGA_G1               | VSYS                         | -                   | -                                                                                                                                                                                                                                                | -                    | VSYS        | Input power line.                               |
| G2      | LGA_G2               | VSYS                         | -                   | -                                                                                                                                                                                                                                                | -                    | VSYS        | Input power line.                               |
| G3      | LGA_G3               | VSYS                         | -                   | -                                                                                                                                                                                                                                                | -                    | VSYS        | Input power line.                               |
| G19     | LGA_G19              | BT_REG_EN                    | PD13                | <b>AF1:</b> LPTIM2_ETR<br><b>AF2:</b> TIM4_CH2<br><b>AF3:</b> TIM8_CH2<br><b>AF4:</b> SAI1_CK1<br><b>AF6:</b> SAI1_MCLK_A                                                                                                                        | -                    | VDD         | Signal only available in non-wireless variants. |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                               | Additional functions        | Power group | Comments                              |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------|---------------------------------------|
|         |                      |                              |                     | <b>AF7:</b> USART1_RX<br><b>AF9:</b> QUADSPI_BK1_IO3<br><b>AF11:</b> QUADSPI_BK2_IO2<br><b>AF12:</b> FMC_A18                                                      |                             |             |                                       |
| G20     | LGA_G20              | GND                          | -                   | -                                                                                                                                                                 | -                           |             |                                       |
| G21     | LGA_G21              | ETH1_TX_EN                   | PB11                | <b>AF1:</b> TIM2_CH4<br><b>AF3:</b> LPTIM1_OUT<br><b>AF4:</b> I2C5_SMBA<br><b>AF7:</b> USART3_RX<br><b>AF11:</b> ETH1_MII_TX_EN/ETH1_RGMII_TX_CTL/ETH1_RMII_TX_EN | -                           | VDD         |                                       |
| H1      | LGA_H1               | VSYS2                        | -                   | -                                                                                                                                                                 | -                           | VSYS2       | Input power line.                     |
| H2      | LGA_H2               | VSYS2                        | -                   | -                                                                                                                                                                 | -                           | VSYS2       | Input power line.                     |
| H3      | LGA_H3               | VSYS2                        | -                   | -                                                                                                                                                                 | -                           | VSYS2       | Input power line.                     |
| H19     | LGA_H19              | PI2                          | PI2                 | <b>AF8:</b> SPDIFRX_IN2                                                                                                                                           | TAMP_IN3/TAMP_OUT4<br>WKUP5 | VDD         |                                       |
| H20     | LGA_H20              | BT_HOST_WAKE                 | -                   | -                                                                                                                                                                 | -                           |             | Signal connected to the Wireless MAC. |
| H21     | LGA_H21              | ETH1_TXD1                    | PG14                | <b>AF1:</b> LPTIM1_ETR<br><b>AF6:</b> SAI2_D1<br><b>AF7:</b> USART6_TX<br><b>AF10:</b> SAI2_SD_A                                                                  | -                           | VDD         |                                       |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                            | Additional functions        | Power group | Comments                                        |
|---------|----------------------|------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------|-------------------------------------------------|
|         |                      |                              |                     | <b>AF11:</b> ETH1_MII_TXD1/ETH1_RGMII_TXD1/ETH1_RMII_TXD1                                                                                                                                      |                             |             |                                                 |
| J1      | LGA_J1               | GND                          | -                   | -                                                                                                                                                                                              | -                           |             |                                                 |
| J2      | LGA_J2               | GND                          | -                   | -                                                                                                                                                                                              | -                           |             |                                                 |
| J3      | LGA_J3               | VSYS2                        | -                   | -                                                                                                                                                                                              | -                           |             | Input power line.                               |
| J19     | LGA_J19              | NC                           | -                   | -                                                                                                                                                                                              | -                           | VDD         |                                                 |
| J20     | LGA_J20              | NC                           | -                   | -                                                                                                                                                                                              | -                           | VDD         |                                                 |
| J21     | LGA_J21              | ETH1_RX_ER                   | PI3                 | <b>AF8:</b> SPDIFRX_IN3<br><b>AF11:</b> ETH1_MII_RX_ER                                                                                                                                         | TAMP_IN4/TAMP_OUT5<br>WKUP2 | VDD         |                                                 |
| K1      | LGA_K1               | VDD                          | -                   | -                                                                                                                                                                                              | -                           | VDD         | Output power line.                              |
| K2      | LGA_K2               | VDD                          | -                   | -                                                                                                                                                                                              | -                           | VDD         | Output power line.                              |
| K3      | LGA_K3               | VDD                          | -                   | -                                                                                                                                                                                              | -                           | VDD         | Output power line.                              |
| K19     | LGA_K19              | WLAN_SD_CLK                  | PE3                 | <b>AF0:</b> TRACED11<br><b>AF2:</b> SAI2_D4<br><b>AF4:</b> TIM15_BKIN<br><b>AF5:</b> SPI4_MISO/I2S4_SDI<br><b>AF8:</b> USART3_RTS/USART3_DE<br><b>AF9:</b> FDCAN1_RX<br><b>AF10:</b> SDMMC2_CK | -                           | VDD         | Signal only available in non-wireless variants. |
| K20     | LGA_K20              | WLAN_SD_D2                   | PB3                 | <b>AF0:</b> TRACED2<br><b>AF1:</b> TIM2_CH2                                                                                                                                                    | -                           | VDD         | 47K pull-up on module connected to VDD.         |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                                                     | Additional functions | Power group | Comments                                                                                |
|---------|----------------------|------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------------------------------|
|         |                      |                              |                     | <b>AF4:</b> SAI2_CK1<br><b>AF5:</b> SPI4_NSS/I2S4_WS<br><b>AF8:</b> SDMMC1_D123DIR<br><b>AF10:</b> SDMMC2_D2<br><b>AF12:</b> SAI2_MCLK_A<br><b>AF13:</b> UART7_RX                                                                                                                       |                      |             | Signal only available in non-wireless variants.                                         |
| K21     | LGA_K21              | ETH1_RX_DV                   | PA7                 | <b>AF1:</b> TIM1_CH1N<br><b>AF2:</b> TIM3_CH2<br><b>AF3:</b> TIM8_CH1N<br><b>AF4:</b> SAI2_D1<br><b>AF5:</b> SPI1_SCK/I2S1_CK<br><b>AF7:</b> USART1_CTS/USART1_NSS<br><b>AF9:</b> TIM14_CH1<br><b>AF11:</b> ETH1_MII_RX_DV/ETH1_RGMII_RX_CTL/ETH1_RMII_CRS_DV<br><b>AF12:</b> SAI2_SD_A | ADC1_INP16           | VDD         |                                                                                         |
| L1      | LGA_L1               | NC                           | -                   | -                                                                                                                                                                                                                                                                                       | -                    | VDD         |                                                                                         |
| L2      | LGA_L2               | GND                          | -                   | -                                                                                                                                                                                                                                                                                       | -                    |             |                                                                                         |
| L3      | LGA_L3               | VREF+                        | VREF+               | -                                                                                                                                                                                                                                                                                       | -                    |             |                                                                                         |
| L19     | LGA_L19              | WLAN_SD_CMD                  | PG6                 | <b>AF0:</b> TRACED3<br><b>AF1:</b> TIM17_BKIN<br><b>AF2:</b> TIM5_CH4<br><b>AF3:</b> SAI2_D1                                                                                                                                                                                            | -                    | VDD         | 47K pull-up on module connected to VDD. Signal only available in non-wireless variants. |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                                                           | Additional functions   | Power group | Comments                                                                                |
|---------|----------------------|------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|-----------------------------------------------------------------------------------------|
|         |                      |                              |                     | <b>AF4:</b> USART1_RX<br><b>AF6:</b> SAI2_SD_A<br><b>AF10:</b> SDMMC2_CMD<br><b>AF15:</b> HDP3                                                                                                                                                                                                |                        |             |                                                                                         |
| L20     | LGA_L20              | WLAN_SD_D1                   | PB15                | <b>AF0:</b> RTC_REFIN<br><b>AF1:</b> TIM1_CH3N<br><b>AF2:</b> TIM12_CH2<br><b>AF3:</b> TIM8_CH3N<br><b>AF4:</b> SAI2_D2<br><b>AF5:</b> SPI4_MOSI/I2S4_SDO<br><b>AF6:</b> DFSDM1_CKIN2<br><b>AF7:</b> UART7_CTS<br><b>AF8:</b> SDMMC1_CKIN<br><b>AF10:</b> SDMMC2_D1<br><b>AF12:</b> SAI2_FS_A | -                      | VDD         | 47K pull-up on module connected to VDD. Signal only available in non-wireless variants. |
| L21     | LGA_L21              | ETH1_RXD0                    | PC4                 | <b>AF2:</b> TIM3_ETR<br><b>AF3:</b> DFSDM1_CKIN2<br><b>AF4:</b> SAI1_D3<br><b>AF5:</b> I2S1_MCK<br><b>AF8:</b> UART5_RTS/UART5_DE<br><b>AF9:</b> SPDIFRX_IN2<br><b>AF11:</b> ETH1_MII_RXD0/ETH1_RGMII_RXD0/ETH1_RMII_RXD0<br><b>AF12:</b> SAI2_D3                                             | ADC1_INP4<br>ADC2_INP4 | VDD         |                                                                                         |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                          | Additional functions | Power group | Comments                                                                                |
|---------|----------------------|------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------------------------------|
| M1      | LGA_M1               | NC                           | -                   |                                                                                                                                                                                                              | -                    | VDD         |                                                                                         |
| M2      | LGA_M2               | ETH2_MDIO                    | PB2                 | <b>AF1:</b> RTC_OUT2<br><b>AF2:</b> SAI1_D1<br><b>AF5:</b> I2S_CKIN<br><b>AF6:</b> SAI1_SD_A<br><b>AF8:</b> UART4_RX<br><b>AF9:</b> QUADSPI_BK1_NCS<br><b>AF11:</b> ETH2_MDIO<br><b>AF12:</b> FMC_A6         | TAMP_IN7             | VDD         |                                                                                         |
| M3      | LGA_M3               | ETH2_MDC                     | PG5                 | <b>AF1:</b> TIM17_CH1<br><b>AF10:</b> ETH2_MDC<br><b>AF12:</b> FMC_A15                                                                                                                                       | -                    | VDD         |                                                                                         |
| M19     | LGA_M19              | WLAN_SD_D0                   | PB14                | <b>AF0:</b> TRACED0<br><b>AF1:</b> TIM1_CH2N<br><b>AF2:</b> TIM12_CH1<br><b>AF3:</b> TIM8_CH2N<br><b>AF4:</b> USART1_TX<br><b>AF10:</b> SDMMC2_D0<br><b>AF11:</b> SDMMC1_D4                                  | -                    | VDD         | 47K pull-up on module connected to VDD. Signal only available in non-wireless variants. |
| M20     | LGA_M20              | WLAN_SD_D3                   | PB4                 | <b>AF0:</b> TRACED14<br><b>AF1:</b> TIM16_BKIN<br><b>AF2:</b> TIM3_CH1<br><b>AF4:</b> SAI2_CK2<br><b>AF5:</b> SPI4_SCK/I2S4_CK<br><b>AF7:</b> USART3_CK<br><b>AF10:</b> SDMMC2_D3<br><b>AF12:</b> SAI2_SCK_A | -                    | VDD         | 47K pull-up on module connected to VDD. Signal only available in non-wireless variants. |
| M21     | LGA_M21              | UART8_CTS                    | PG10                | <b>AF5:</b> SPI5_SCK<br><b>AF6:</b> SAI1_SD_B                                                                                                                                                                | -                    | VDD         |                                                                                         |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                               | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|         |                      |                              |                     | <b>AF8:</b> UART8_CTS<br><b>AF9:</b> FDCAN1_TX<br><b>AF10:</b> QUADSPI_BK2_IO1<br><b>AF12:</b> FMC_NE3                                                                                                                                                            |                      |             |          |
| N1      | LGA_N1               | NC                           | -                   | -                                                                                                                                                                                                                                                                 | -                    |             |          |
| N2      | LGA_N2               | FDCAN2_RX                    | PB5                 | <b>AF0:</b> TRACED4<br><b>AF1:</b> TIM17_BKIN<br><b>AF2:</b> TIM3_CH2<br><b>AF5:</b> SPI2_MISO/I2S2_SDI<br><b>AF6:</b> I2C4_SMBA<br><b>AF8:</b> SDMMC1_CKIN<br><b>AF9:</b> FDCAN2_RX<br><b>AF11:</b> UART5_RX                                                     | -                    | VDD         |          |
| N3      | LGA_N3               | GND                          | -                   | -                                                                                                                                                                                                                                                                 | -                    |             |          |
| N19     | LGA_N19              | SPI4_MOSI                    | PE11                | <b>AF1:</b> TIM1_CH2<br><b>AF2:</b> USART2_CTS/USART2_NSS<br><b>AF4:</b> SAI1_D2<br><b>AF5:</b> SPI4_MOSI/I2S4_SDO<br><b>AF6:</b> SAI1_FS_A<br><b>AF7:</b> USART6_CK<br><b>AF10:</b> ETH2_MII_TX_ER<br><b>AF11:</b> ETH1_MII_TX_ER<br><b>AF12:</b> FMC_D8/FMC_AD8 | -                    | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                             | Additional functions | Power group | Comments                                                        |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-----------------------------------------------------------------|
| N20     | LGA_N20              | SPI4_MISO                    | PE13                | <b>AF1:</b> TIM1_CH3<br><b>AF4:</b> I2C5_SDA<br><b>AF5:</b> SPI4_MISO/I2S4_SDI<br><b>AF12:</b> FMC_D10/FMC_AD10                                                                                 | -                    | VDD         |                                                                 |
| N21     | LGA_N21              | UART8_RTS                    | PE14                | <b>AF1:</b> TIM1_BKIN<br><b>AF4:</b> SAI1_D4<br><b>AF8:</b> UART8_RTS/UART8_DE<br><b>AF9:</b> QUADSPI_BK1_NCS<br><b>AF10:</b> QUADSPI_BK2_IO2<br><b>AF12:</b> FMC_D11/FMC_AD11                  | TAMP_IN6             | VDD         |                                                                 |
| P1      | LGA_P1               | NRST                         | NRST                | -                                                                                                                                                                                               | -                    | VDD         | Reset line of the CPU. Recommendation: leave this pin floating. |
| P2      | LGA_P2               | VDD                          | -                   | -                                                                                                                                                                                               | -                    | VDD         | Output power line.                                              |
| P3      | LGA_P3               | GND                          | -                   | -                                                                                                                                                                                               | -                    |             |                                                                 |
| P19     | LGA_P19              | USART3_RTS                   | PG8                 | <b>AF1:</b> TIM2_CH1<br><b>AF3:</b> TIM8_ETR<br><b>AF5:</b> SPI5_MISO<br><b>AF6:</b> SAI1_MCLK_B<br><b>AF8:</b> USART3_RTS/USART3_DE<br><b>AF9:</b> SPDIFRX_IN2<br><b>AF10:</b> QUADSPI_BK2_IO2 | TAMP_IN4             | VDD         |                                                                 |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                                  | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|         |                      |                              |                     | <b>AF11:</b> QUADSPI_BK1_IO3<br><b>AF12:</b> FMC_NE2<br><b>AF13:</b> ETH2_CLK                                                                                                                                                                                        |                      |             |          |
| P20     | LGA_P20              | USART3_CTS                   | PG12                | <b>AF1:</b> LPTIM1_IN1<br><b>AF4:</b> SAI2_SCK_A<br><b>AF6:</b> SAI2_CK2<br><b>AF7:</b> USART6_RTS/USART6_DE<br><b>AF8:</b> USART3_CTS<br><b>AF10:</b> ETH2_PHY_INTN<br><b>AF11:</b> ETH1_PHY_INTN<br><b>AF12:</b> ETH2_MII_RX_DV/ETH2_RGMII_RX_CTL/ETH2_RMII_CRS_DV | -                    | VDD         |          |
| P21     | LGA_P21              | GND                          | -                   | -                                                                                                                                                                                                                                                                    | -                    |             |          |
| R1      | LGA_R1               | I2S1_WS                      | PA4                 | <b>AF2:</b> TIM5_ETR<br><b>AF3:</b> USART2_CK<br><b>AF4:</b> SAI1_SCK_B<br><b>AF5:</b> SPI1_NSS/I2S1_WS<br><b>AF6:</b> DFSDM1_CKIN1<br><b>AF10:</b> ETH1_PPS_OUT<br><b>AF11:</b> ETH2_PPS_OUT                                                                        | ADC1_INP14           | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                             | Additional functions     | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------|----------|
|         |                      |                              |                     | <b>AF12:</b> SAI1_SCK_A                                                                                                                                                                                         |                          |             |          |
| R2      | LGA_R2               | FDCAN2_TX                    | PB13                | <b>AF0:</b> TRACECLK<br><b>AF1:</b> TIM1_CH1N<br><b>AF4:</b> LPTIM2_OUT<br><b>AF5:</b> SPI2_NSS/I2S2_WS<br><b>AF6:</b> I2C4_SCL<br><b>AF8:</b> SDMMC1_D123DIR<br><b>AF9:</b> FDCAN2_TX<br><b>AF11:</b> UART5_TX | -                        | VDD         |          |
| R3      | LGA_R3               | GND                          | -                   | -                                                                                                                                                                                                               | -                        |             |          |
| R19     | LGA_R19              | USART3_RX                    | PG4                 | <b>AF0:</b> TRACED1<br><b>AF1:</b> TIM1_BKIN2<br><b>AF4:</b> DFSDM1_CKIN3<br><b>AF8:</b> USART3_RX<br><b>AF10:</b> SDMMC2_D123DIR<br><b>AF12:</b> FMC_A14<br><b>AF15:</b> HDP1                                  | -                        | VDD         |          |
| R20     | LGA_R20              | USART3_TX                    | PD8                 | <b>AF3:</b> USART2_TX<br><b>AF5:</b> I2S4_WS<br><b>AF7:</b> USART3_TX<br><b>AF8:</b> UART4_RX                                                                                                                   | -                        | VDD         |          |
| R21     | LGA_R21              | UART8_RX                     | PE0                 | <b>AF8:</b> UART8_RX<br><b>AF9:</b> FDCAN2_RX<br><b>AF12:</b> FMC_A11                                                                                                                                           | -                        | VDD         |          |
| T1      | LGA_T1               | I2S1_CK                      | PC3                 | <b>AF2:</b> SAI1_CK1<br><b>AF3:</b> DFSDM1_                                                                                                                                                                     | ADC1_INP13<br>ADC1_INN12 | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                                                                                    | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|         |                      |                              |                     | CKOUT<br><b>AF5:</b> SPI1_<br>MISO/I2S1_SDI<br><b>AF6:</b> SPI1_<br>SCK/I2S1_CK<br><b>AF8:</b> UART5_CTS<br><b>AF10:</b> SAI1_MCLK_A<br><b>AF11:</b> ETH1_MII_<br>TX_CLK<br><b>AF12:</b> ETH2_MII_<br>TX_CLK                                                                                                           | TAMP_IN5             |             |          |
| T2      | LGA_T2               | NC                           | -                   | -                                                                                                                                                                                                                                                                                                                      | -                    |             |          |
| T3      | LGA_T3               | NC                           | -                   | -                                                                                                                                                                                                                                                                                                                      | -                    |             |          |
| T19     | LGA_T19              | ETH2_RXD3                    | PA8                 | <b>AF0:</b> MCO1<br><b>AF2:</b> SAI2_MCLK_A<br><b>AF3:</b> TIM8_BKIN2<br><b>AF4:</b> I2C4_SDA<br><b>AF5:</b> SPI5_MISO<br><b>AF6:</b> SAI2_CK1<br><b>AF7:</b> USART1_CK<br><b>AF8:</b> SPI2_<br>MOSI/I2S2_SDO<br><b>AF10:</b> OTG_HS_SOF<br><b>AF11:</b> ETH2_MII_<br>RXD3/ETH2_RGMII_<br>RXD3<br><b>AF12:</b> FMC_A21 | -                    | VDD         |          |
| T20     | LGA_T20              | NC                           | -                   | -                                                                                                                                                                                                                                                                                                                      | -                    | VDD         |          |
| T21     | LGA_T21              | UART8_TX                     | PE4                 | <b>AF1:</b> SPI5_MISO<br><b>AF2:</b> SAI1_D2                                                                                                                                                                                                                                                                           | -                    | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                            | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|         |                      |                              |                     | <b>AF3:</b> DFSDM1_DATIN3<br><b>AF4:</b> TIM15_CH1N<br><b>AF5:</b> I2S_CKIN<br><b>AF6:</b> SAI1_FS_A<br><b>AF7:</b> UART7_RTS/UART7_DE<br><b>AF8:</b> UART8_TX<br><b>AF9:</b> QUADSPI_BK2_NCS<br><b>AF10:</b> FMC_NCE2<br><b>AF12:</b> FMC_A25 |                      |             |          |
| U1      | LGA_U1               | SDMMC1_D1                    | PC9                 | <b>AF0:</b> TRACED1<br><b>AF2:</b> TIM3_CH4<br><b>AF3:</b> TIM8_CH4<br><b>AF7:</b> USART3_RTS<br><b>AF8:</b> UART5_CTS<br><b>AF9:</b> FDCAN1_TX<br><b>AF12:</b> SDMMC1_D1                                                                      | -                    | VDD         |          |
| U2      | LGA_U2               | NC                           | -                   | -                                                                                                                                                                                                                                              | -                    | VDD         |          |
| U3      | LGA_U3               | NC                           | -                   | -                                                                                                                                                                                                                                              | -                    | VDD         |          |
| U19     | LGA_U19              | PA5                          | PA5                 | <b>AF1:</b> TIM2_CH1/TIM2_ETR<br><b>AF2:</b> USART2_CK<br><b>AF3:</b> TIM8_CH1N<br><b>AF4:</b> SAI1_D1<br><b>AF5:</b> SPI1_NSS/I2S1_WS<br><b>AF6:</b> SAI1_SD_A<br><b>AF10:</b> ETH1_PPS_OUT                                                   | ADC1_INP2            | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                             | Additional functions | Power group | Comments               |
|---------|----------------------|------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|------------------------|
|         |                      |                              |                     | <b>AF11:</b> ETH2_PPS_OUT                                                                                                                                                       |                      |             |                        |
| U20     | LGA_U20              | LTDC_R3                      | PB10                | <b>AF1:</b> TIM2_CH3<br><b>AF3:</b> LPTIM2_IN1<br><b>AF4:</b> I2C5_SMBA<br><b>AF5:</b> SPI4_NSS/I2S4_WS<br><b>AF6:</b> SPI2_SCK/I2S2_CK<br><b>AF7:</b> USART3_TX                | -                    | VDD         |                        |
| U21     | LGA_U21              | JTRST                        | JTRST               | -                                                                                                                                                                               | -                    |             |                        |
| V1      | LGA_V1               | SDMMC1_CMD                   | PD2                 | <b>AF0:</b> TRACED4<br><b>AF2:</b> TIM3_ETR<br><b>AF4:</b> I2C1_SMBA<br><b>AF5:</b> SPI3_NSS/I2S3_WS<br><b>AF6:</b> SAI2_D1<br><b>AF7:</b> USART3_RX<br><b>AF12:</b> SDMMC1_CMD | -                    | VDD         |                        |
| V2      | LGA_V2               | GND                          | -                   | -                                                                                                                                                                               | -                    |             |                        |
| V3      | LGA_V3               | BOOT0                        | BOOT0               | -                                                                                                                                                                               | -                    | VDD         | 100K pull-up resistor. |
| V4      | LGA_V4               | GND                          | -                   | -                                                                                                                                                                               | -                    |             |                        |
| V5      | LGA_V5               | ETH2_RXD0                    | PF4                 | <b>AF3:</b> USART2_RX<br><b>AF11:</b> ETH2_MII_RXD0/ETH2_RGMII_RXD0/ETH2_RMII_RXD0<br><b>AF12:</b> FMC_A4                                                                       | -                    | VDD         |                        |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                         | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
| V6      | LGA_V6               | GND                          | -                   | -                                                                                                                                           | -                    |             |          |
| V7      | LGA_V7               | NC                           | -                   | -                                                                                                                                           | -                    | VDD         |          |
| V8      | LGA_V8               | LTDC_R2                      | PG7                 | <b>AF0:</b> TRACED8<br><b>AF1:</b> TIM1_ETR<br><b>AF5:</b> SPI3_MISO/I2S3_SDI<br><b>AF8:</b> UART7_CTS<br><b>AF10:</b> SDMMC2_CKIN          | -                    | VDD         |          |
| V9      | LGA_V9               | LTDC_R5                      | PF5                 | <b>AF0:</b> TRACED12<br><b>AF4:</b> DFSDM1_CKIN0<br><b>AF5:</b> I2C1_SMBA<br><b>AF12:</b> FMC_A5                                            | -                    | VDD         |          |
| V10     | LGA_V10              | NC                           | -                   | -                                                                                                                                           | -                    | VDD         |          |
| V11     | LGA_V11              | GND                          | -                   | -                                                                                                                                           | -                    |             |          |
| V12     | LGA_V12              | SPI4_SCK                     | PE12                | <b>AF1:</b> TIM1_CH3N<br><b>AF5:</b> SPI4_SCK/I2S4_CK<br><b>AF8:</b> UART8_RTS/UART8_DE<br><b>AF12:</b> FMC_D9/FMC_AD9<br><b>AF15:</b> HDP4 | -                    | VDD         |          |
| V13     | LGA_V13              | LTDC_G7                      | PA15                | <b>AF0:</b> TRACED5<br><b>AF1:</b> TIM2_CH1<br><b>AF5:</b> I2S4_MCK<br><b>AF7:</b> UART4_RTS/UART4_DE                                       | -                    | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                                              | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
|         |                      |                              |                     | <b>AF8:</b> UART4_RX<br><b>AF12:</b> FMC_A9<br><b>AF15:</b> HDP5                                                                                                                                                                                                                 |                      |             |          |
| V14     | LGA_V14              | ETH2_RXD1                    | PE2                 | <b>AF0:</b> TRACECLK<br><b>AF1:</b> TIM2_ETR<br><b>AF4:</b> I2C4_SCL<br><b>AF5:</b> SPI5_MOSI<br><b>AF6:</b> SAI1_FS_B<br><b>AF7:</b> USART6_RTS/USART6_DE<br><b>AF9:</b> SPDIFRX_IN1<br><b>AF10:</b> ETH2_MII_RXD1/ETH2_RGMII_RXD1/ETH2_RMII_RXD1<br><b>AF12:</b> FMC_A23       | -                    | VDD         |          |
| V15     | LGA_V15              | ETH2_RXD2                    | PH6                 | <b>AF2:</b> TIM12_CH1<br><b>AF3:</b> USART2_CK<br><b>AF4:</b> I2C5_SDA<br><b>AF5:</b> SPI2_SCK/I2S2_CK<br><b>AF9:</b> QUADSPI_BK1_IO2<br><b>AF10:</b> ETH1_PHY_INTN<br><b>AF11:</b> ETH1_MII_RX_ER<br><b>AF12:</b> ETH2_MII_RXD2/ETH2_RGMII_RXD2<br><b>AF13:</b> QUADSPI_BK1_NCS | -                    | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                              | Additional functions   | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|----------|
| V16     | LGA_V16              | GND                          | -                   | -                                                                                                                                                                                                                                | -                      |             |          |
| V17     | LGA_V17              | ETH1_CLK125                  | PF12                | <b>AF5:</b> SPI1_NSS/I2S1_WS<br><b>AF6:</b> SAI1_SD_A<br><b>AF8:</b> UART4_TX<br><b>AF10:</b> ETH1_MII_TX_ER<br><b>AF11:</b> ETH1_RGMII_CLK125                                                                                   | ADC1_INP6<br>ADC1_INN2 | VDD         |          |
| V18     | LGA_V18              | ETH1_GTX_CLK                 | PC1                 | <b>AF3:</b> DFSDM1_DATIN0<br><b>AF6:</b> SAI1_D3<br><b>AF10:</b> ETH1_MII_RX_DV/ETH1_RMII_CRS_DV<br><b>AF11:</b> ETH1_RGMII_GTX_CLK                                                                                              | ADC2_INP2              | VDD         |          |
| V19     | LGA_V19              | PG0                          | PG0                 | <b>AF9:</b> FDCAN2_TX<br><b>AF12:</b> FMC_A10                                                                                                                                                                                    | -                      | VDD         |          |
| V20     | LGA_V20              | PA11                         | PA11                | <b>AF1:</b> TIM1_CH4<br><b>AF3:</b> I2C5_SCL<br><b>AF5:</b> SPI2_NSS/I2S2_WS<br><b>AF7:</b> USART1_CTS/USART1_NSS<br><b>AF10:</b> ETH2_MII_RXD1/ETH2_RGMII_RXD1/ETH2_RMII_RXD1<br><b>AF11:</b> ETH1_CLK<br><b>AF13:</b> ETH2_CLK | -                      | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                                           | Additional functions | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|----------|
| V21     | LGA_V21              | JTDI                         | JTDI                | -                                                                                                                                                                                                                                                                             | -                    |             |          |
| W1      | LGA_W1               | PA13                         | PA13                | <b>AF0:</b> DBTRGO<br><b>AF1:</b> DBTRGI<br><b>AF2:</b> MCO1<br><b>AF8:</b> UART4_TX                                                                                                                                                                                          | BOOTFAILN            | VDD         |          |
| W2      | LGA_W2               | SDMMC1_D4                    | PH10                | <b>AF0:</b> TRACED0<br><b>AF2:</b> TIM5_CH1<br><b>AF3:</b> SAI2_D3<br><b>AF4:</b> DFSDM1_DATIN2<br><b>AF5:</b> I2S3_MCK<br><b>AF6:</b> SPI2_MOSI/I2S2_SDO<br><b>AF7:</b> USART3_CTS/USART3_NSS<br><b>AF8:</b> SDMMC1_D4<br><b>AF15:</b> HDP0                                  | -                    | VDD         |          |
| W3      | LGA_W3               | SDMMC1_D6                    | PC6                 | <b>AF0:</b> TRACED2<br><b>AF2:</b> TIM3_CH1<br><b>AF3:</b> TIM8_CH1<br><b>AF4:</b> DFSDM1_DATIN0<br><b>AF5:</b> I2S3_MCK<br><b>AF7:</b> USART6_TX<br><b>AF8:</b> SDMMC1_D6<br><b>AF9:</b> SDMMC2_D0DIR<br><b>AF10:</b> SDMMC2_D6<br><b>AF12:</b> FMC_A19<br><b>AF15:</b> HDP2 | -                    | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                                | Additional functions                | Power group | Comments                                                       |
|---------|----------------------|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------|----------------------------------------------------------------|
| W4      | LGA_W4               | NC                           | -                   | -                                                                                                                                                                                                                                                  | -                                   | VDD         |                                                                |
| W5      | LGA_W5               | SDMMC1_D7                    | PC7                 | <b>AF0:</b> TRACED4<br><b>AF2:</b> TIM3_CH2<br><b>AF3:</b> TIM8_CH2<br><b>AF6:</b> I2S2_MCK<br><b>AF7:</b> USART6_RX<br><b>AF8:</b> USART3_CTS<br><b>AF9:</b> SDMMC2_CDIR<br><b>AF10:</b> SDMMC2_D7<br><b>AF12:</b> SDMMC1_D7<br><b>AF15:</b> HDP4 | -                                   | VDD         |                                                                |
| W6      | LGA_W6               | GND                          | -                   | -                                                                                                                                                                                                                                                  | -                                   |             |                                                                |
| W7      | LGA_W7               | NC                           | -                   | -                                                                                                                                                                                                                                                  | -                                   |             |                                                                |
| W8      | LGA_W8               | PMIC_PONKEY_N                | -                   | -                                                                                                                                                                                                                                                  | -                                   | VDD         | PMIC Power ON key.<br>Recommendation: leave this pin floating. |
| W9      | LGA_W9               | NC                           | -                   | -                                                                                                                                                                                                                                                  | -                                   | VDD         |                                                                |
| W10     | LGA_W10              | LTDC_R6                      | PF0                 | <b>AF0:</b> TRACED13<br><b>AF3:</b> DFSDM1_CKOUT<br><b>AF7:</b> USART3_CK<br><b>AF10:</b> SDMMC2_D4<br><b>AF12:</b> FMC_A0                                                                                                                         | -                                   | VDD         |                                                                |
| W11     | LGA_W11              | GND                          | -                   | -                                                                                                                                                                                                                                                  | -                                   |             |                                                                |
| W12     | LGA_W12              | GND                          | -                   | -                                                                                                                                                                                                                                                  | -                                   |             |                                                                |
| W13     | LGA_W13              | ETH2_RX_ER                   | PF11                | <b>AF1:</b> USART2_TX<br><b>AF2:</b> SAI1_D2                                                                                                                                                                                                       | ADC1_INP8<br>ADC1_INN4<br>ADC2_INP8 | VDD         |                                                                |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                      | Additional functions                             | Power group | Comments                                                                                                            |
|---------|----------------------|------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------|
|         |                      |                              |                     | <b>AF3:</b> DFSDM1_CKIN3<br><b>AF6:</b> SAI1_FS_A<br><b>AF12:</b> ETH2_MII_RX_ER                                                                                                                                         | ADC2_INN4                                        |             |                                                                                                                     |
| W14     | LGA_W14              | PWR_ON                       | PWR_ON              | -                                                                                                                                                                                                                        | -                                                |             | CPU core supply enable output. Internally connected to the PMIC. Leave this pin unconnected unless otherwise noted. |
| W15     | LGA_W15              | ETH2_CLK125                  | PH2                 | <b>AF1:</b> LPTIM1_IN2<br><b>AF8:</b> UART7_TX<br><b>AF9:</b> QUADSPI_BK2_IO0<br><b>AF10:</b> ETH2_MII_CRS<br><b>AF11:</b> ETH1_MII_CRS<br><b>AF12:</b> FMC_NE4<br><b>AF13:</b> ETH2_RGMII_CLK125                        | -                                                | VDD         |                                                                                                                     |
| W16     | LGA_W16              | GND                          | -                   | -                                                                                                                                                                                                                        | -                                                |             |                                                                                                                     |
| W17     | LGA_W17              | ETH1_RXD2                    | PB0                 | <b>AF0:</b> DBTRGI<br><b>AF1:</b> TIM1_CH2N<br><b>AF2:</b> TIM3_CH3<br><b>AF3:</b> TIM8_CH2N<br><b>AF4:</b> USART1_RX<br><b>AF5:</b> I2S1_MCK<br><b>AF6:</b> SAI2_FS_A<br><b>AF7:</b> USART1_CK<br><b>AF8:</b> UART4_CTS | ADC1_INP9<br>ADC1_INN5<br>ADC2_INP9<br>ADC2_INN5 | VDD         |                                                                                                                     |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                       | Additional functions   | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|----------|
|         |                      |                              |                     | <b>AF10:</b> SAI2_D2<br><b>AF11:</b> ETH1_MII_RXD2/ETH1_RGMII_RXD2                                                                                                                                        |                        |             |          |
| W18     | LGA_W18              | ETH1_TXD2                    | PC2                 | <b>AF1:</b> SPI5_NSS<br><b>AF5:</b> SPI1_NSS/I2S1_WS<br><b>AF6:</b> SAI2_MCLK_A<br><b>AF7:</b> USART1_RTS/USART1_DE<br><b>AF10:</b> SAI2_CK1<br><b>AF11:</b> ETH1_MII_TXD2/ETH1_RGMII_TXD2                | ADC1_INP15             | VDD         |          |
| W19     | LGA_W19              | ETH1_RXD3                    | PB1                 | <b>AF1:</b> TIM1_CH3N<br><b>AF2:</b> TIM3_CH4<br><b>AF3:</b> TIM8_CH3N<br><b>AF5:</b> SPI1_SCK/I2S1_CK<br><b>AF6:</b> DFSDM1_DATIN1<br><b>AF7:</b> UART4_RX<br><b>AF11:</b> ETH1_MII_RXD3/ETH1_RGMII_RXD3 | ADC1_INP5<br>ADC2_INP5 | VDD         |          |
| W20     | LGA_W20              | ETH1_TXD3                    | PE5                 | <b>AF2:</b> SAI2_SCK_B<br><b>AF3:</b> TIM8_CH3<br><b>AF4:</b> TIM15_CH1<br><b>AF8:</b> UART4_RX<br><b>AF10:</b> ETH1_MII_TXD3/ETH1_RGMII_                                                                 | -                      | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                      | Additional functions                                         | Power group | Comments                                 |
|---------|----------------------|------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------------|------------------------------------------|
|         |                      |                              |                     | TXD3<br><b>AF12:</b> FMC_NE1                                                                                                                                                             |                                                              |             |                                          |
| W21     | LGA_W21              | JTCK-SWCLK                   | JTCK-SWCLK          | -                                                                                                                                                                                        | -                                                            |             |                                          |
| Y1      | LGA_Y1               | BOOT1                        | BOOT1               | -                                                                                                                                                                                        | -                                                            | VDD         | 100K pull-up resistor.                   |
| Y2      | LGA_Y2               | SDMMC1_D5                    | PB12                | <b>AF0:</b> TRACED10<br><b>AF4:</b> I2C2_SMBA<br><b>AF6:</b> DFSDM1_DATIN1<br><b>AF7:</b> UART7_RTS/UART7_DE<br><b>AF8:</b> USART3_RX<br><b>AF11:</b> UART5_RX<br><b>AF12:</b> SDMMC1_D5 | -                                                            | VDD         |                                          |
| Y3      | LGA_Y3               | NC                           | -                   | -                                                                                                                                                                                        | -                                                            | VDD         |                                          |
| Y4      | LGA_Y4               | I2S1_MCK                     | PC0                 | <b>AF2:</b> SAI1_SCK_A<br><b>AF4:</b> SAI1_CK2<br><b>AF5:</b> I2S1_MCK<br><b>AF6:</b> SPI1_MOSI/I2S1_SDO<br><b>AF7:</b> USART1_TX                                                        | ADC1_INP0<br>ADC1_INN1<br>ADC2_INP0<br>ADC2_INN1<br>TAMP_IN3 | VDD         |                                          |
| Y5      | LGA_Y5               | NC                           | -                   | -                                                                                                                                                                                        | -                                                            | VDD         |                                          |
| Y6      | LGA_Y6               | NC                           | -                   | -                                                                                                                                                                                        | -                                                            | VDD         |                                          |
| Y7      | LGA_Y7               | I2C3_SCL                     | PB8                 | <b>AF1:</b> TIM16_CH1<br><b>AF2:</b> TIM4_CH3<br><b>AF4:</b> I2C1_SCL<br><b>AF5:</b> I2C3_SCL<br><b>AF6:</b> DFSDM1_DATIN1                                                               | -                                                            | VDD         | 2.2K pull-up on module connected to VDD. |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                              | Additional functions | Power group | Comments                                 |
|---------|----------------------|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|------------------------------------------|
|         |                      |                              |                     | <b>AF8:</b> UART4_RX<br><b>AF10:</b> SAI1_D1<br><b>AF12:</b> FMC_D13/FMC_AD13                                                                                                    |                      |             |                                          |
| Y8      | LGA_Y8               | I2C3_SDA                     | PH14                | <b>AF3:</b> DFSDM1_DATIN2<br><b>AF4:</b> I2C3_SDA<br><b>AF8:</b> UART4_RX                                                                                                        | -                    | VDD         | 2.2K pull-up on module connected to VDD. |
| Y9      | LGA_Y9               | SPI4_NSS                     | PD10                | <b>AF0:</b> RTC_REFIN<br><b>AF4:</b> I2C5_SMBA<br><b>AF5:</b> SPI4_NSS/I2S4_WS<br><b>AF7:</b> USART3_CK<br><b>AF12:</b> FMC_D15/FMC_AD15                                         | -                    | VDD         |                                          |
| Y10     | LGA_Y10              | GND                          | -                   | -                                                                                                                                                                                | -                    |             |                                          |
| Y11     | LGA_Y11              | VBUS_OTG                     | -                   | -                                                                                                                                                                                | -                    |             | Output power line.                       |
| Y12     | LGA_Y12              | NC                           | -                   | -                                                                                                                                                                                | -                    | VDD         |                                          |
| Y13     | LGA_Y13              | I2C2_SCL                     | PF2                 | <b>AF0:</b> TRACED1<br><b>AF4:</b> I2C2_SCL<br><b>AF6:</b> DFSDM1_CKIN1<br><b>AF7:</b> USART6_CK<br><b>AF9:</b> SDMMC2_D0DIR<br><b>AF11:</b> SDMMC1_D0DIR<br><b>AF12:</b> FMC_A2 | -                    | VDD         |                                          |
| Y14     | LGA_Y14              | I2C2_SDA                     | PF1                 | <b>PF1:</b> TRACED7                                                                                                                                                              | -                    | VDD         |                                          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                   | Additional functions | Power group | Comments           |
|---------|----------------------|------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|--------------------|
|         |                      |                              |                     | <b>AF4:</b> I2C2_SDA<br><b>AF5:</b> SPI3_MOSI/I2S3_SDO<br><b>AF12:</b> FMC_A1<br><b>AF15:</b> HDP7                                                                                                                    |                      |             |                    |
| Y15     | LGA_Y15              | VBUS_SW                      | -                   | -                                                                                                                                                                                                                     | -                    |             | Output power line. |
| Y16     | LGA_Y16              | VBUS_SW                      | -                   | -                                                                                                                                                                                                                     | -                    |             | Output power line. |
| Y17     | LGA_Y17              | NC                           | -                   | -                                                                                                                                                                                                                     | -                    | VDD         |                    |
| Y18     | LGA_Y18              | NC                           | -                   | -                                                                                                                                                                                                                     | -                    |             |                    |
| Y19     | LGA_Y19              | PA14                         | PA14                | <b>AF0:</b> DBTRGO<br><b>AF1:</b> DBTRGI<br><b>AF2:</b> MCO2<br><b>AF10:</b> OTG_HS_SOF                                                                                                                               | -                    | VDD         |                    |
| Y20     | LGA_Y20              | NC                           | -                   | -                                                                                                                                                                                                                     | -                    | VDD         |                    |
| Y21     | LGA_Y21              | JTDO-TRACESWO                | JTDO-TRACESWO       | -                                                                                                                                                                                                                     | -                    |             |                    |
| AA1     | LGA_AA1              | GND                          | -                   | -                                                                                                                                                                                                                     | -                    |             |                    |
| AA2     | LGA_AA2              | SDMMC1_D0                    | PC8                 | <b>AF0:</b> TRACED0<br><b>AF2:</b> TIM3_CH3<br><b>AF3:</b> TIM8_CH3<br><b>AF5:</b> SPI3_MISO/I2S3_SDI<br><b>AF7:</b> USART6_CK<br><b>AF8:</b> USART3_CTS<br><b>AF10:</b> SAI2_FS_B<br><b>AF11:</b> UART5_RTS/UART5_DE | -                    | VDD         |                    |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                       | Additional functions                             | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------|----------|
|         |                      |                              |                     | <b>AF12:</b> SDMMC1_D0                                                                                                                                                                                    |                                                  |             |          |
| AA3     | LGA_AA3              | SDMMC1_CLK                   | PC12                | <b>AF0:</b> TRACECLK<br><b>AF8:</b> UART7_TX<br><b>AF10:</b> SAI2_SD_B<br><b>AF12:</b> SDMMC1_CK                                                                                                          | -                                                | VDD         |          |
| AA4     | LGA_AA4              | SDMMC1_D2                    | PC10                | <b>AF0:</b> TRACED2<br><b>AF5:</b> I2C1_SCL<br><b>AF6:</b> SPI3_SCK/I2S3_CK<br><b>AF7:</b> USART3_TX<br><b>AF10:</b> SAI2_MCLK_B<br><b>AF12:</b> SDMMC1_D2                                                | -                                                | VDD         |          |
| AA5     | LGA_AA5              | SDMMC1_D3                    | PC11                | <b>AF0:</b> TRACED3<br><b>AF4:</b> I2C1_SDA<br><b>AF6:</b> SPI3_MOSI/I2S3_SDO<br><b>AF7:</b> USART3_CK<br><b>AF8:</b> UART5_RX<br><b>AF10:</b> SAI2_SCK_B<br><b>AF12:</b> SDMMC1_D3                       | -                                                | VDD         |          |
| AA6     | LGA_AA6              | UART5_TX                     | PA0                 | <b>AF1:</b> TIM2_CH1<br><b>AF2:</b> TIM5_CH1<br><b>AF3:</b> TIM8_ETR<br><b>AF4:</b> TIM15_BKIN<br><b>AF6:</b> SAI1_SD_B<br><b>AF8:</b> UART5_TX<br><b>AF11:</b> ETH1_MII_CRS<br><b>AF12:</b> ETH2_MII_CRS | ADC1_INP7<br>ADC1_INN3<br>ADC2_INP7<br>ADC2_INN3 | VDD         |          |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                                                                                                             | Additional functions                                 | Power group | Comments          |
|---------|----------------------|------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------|-------------------|
| AA7     | LGA_AA7              | UART5_RX                     | PF13                | <b>AF1:</b> TIM2_ETR<br><b>AF2:</b> SAI1_MCLK_B<br><b>AF6:</b> DFSDM1_DATIN3<br><b>AF7:</b> USART2_TX<br><b>AF8:</b> UART5_RX                                                                                                                   | ADC1_INP11<br>ADC1_INN10<br>ADC2_INP11<br>ADC2_INN10 | VDD         |                   |
| AA8     | LGA_AA8              | USB2_D_P                     | USB_DP2             | -                                                                                                                                                                                                                                               | USBH_HS_DP2<br>OTG_HS_DP                             |             |                   |
| AA9     | LGA_AA9              | USB2_D_N                     | USB_DM2             | -                                                                                                                                                                                                                                               | USBH_HS_DM2<br>OTG_HS_DM                             |             |                   |
| AA10    | LGA_AA10             | GND                          | -                   | -                                                                                                                                                                                                                                               | -                                                    |             |                   |
| AA11    | LGA_AA11             | OTG_VBUS                     | PI7                 | -                                                                                                                                                                                                                                               | OTG_HS_VBUS                                          |             | Input power line. |
| AA12    | LGA_AA12             | I2S1_SDI                     | PA6                 | <b>AF1:</b> TIM1_BKIN<br><b>AF2:</b> TIM3_CH1<br><b>AF3:</b> TIM8_BKIN<br><b>AF4:</b> SAI2_CK2<br><b>AF5:</b> SPI1_MISO/I2S1_SDI<br><b>AF7:</b> USART1_CK<br><b>AF8:</b> UART4_RTS/UART4_DE<br><b>AF9:</b> TIM13_CH1<br><b>AF12:</b> SAI2_SCK_A | ADC1_INP17<br>ADC1_INN16<br>TAMP_IN2                 | VDD         |                   |
| AA13    | LGA_AA13             | USB_OTG_ID                   | PA10                | <b>AF1:</b> TIM1_CH3                                                                                                                                                                                                                            | OTG_HS_ID                                            |             |                   |
| AA14    | LGA_AA14             | I2S1_SDO                     | PA3                 | <b>AF1:</b> TIM2_CH4<br><b>AF2:</b> TIM5_CH4<br><b>AF3:</b> LPTIM5_OUT<br><b>AF4:</b> TIM15_CH2<br><b>AF5:</b> SPI1_                                                                                                                            | ADC1_INP12<br>ADC1_INN11<br>PVD_IN<br>WKUP6          | VDD         |                   |

| LGA pad | ConnectCore MP13 pad | ConnectCore MP13 signal name | STM32MP135 pad name | Alternate functions                                                                                                                                | Additional functions   | Power group | Comments |
|---------|----------------------|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------|----------|
|         |                      |                              |                     | MOSI/I2S1_SDO<br><b>AF6:</b> SAI1_FS_B<br><b>AF7:</b> USART2_RX<br><b>AF11:</b> ETH1_MII_COL<br><b>AF12:</b> ETH2_MII_COL                          |                        |             |          |
| AA15    | LGA_AA15             | BOOT2                        | BOOT2               | -                                                                                                                                                  | -                      |             |          |
| AA16    | LGA_AA16             | JTMS-SWDIO                   | JTMS-SWDIO          | -                                                                                                                                                  | -                      |             |          |
| AA17    | LGA_AA17             | USB1_D_P                     | USB_DP1             | -                                                                                                                                                  | USBH_HS_DP1            |             |          |
| AA18    | LGA_AA18             | USB1_D_N                     | USB_DM1             | -                                                                                                                                                  | USBH_HS_DM1            |             |          |
| AA19    | LGA_AA19             | ETH1_MDC                     | PG2                 | <b>AF1:</b> MCO2<br><b>AF3:</b> TIM8_BKIN<br><b>AF10:</b> SAI2_MCLK_B<br><b>AF11:</b> ETH1_MDC                                                     | -                      | VDD         |          |
| AA20    | LGA_AA20             | ETH1_MDIO                    | PA2                 | <b>AF1:</b> TIM2_CH3<br><b>AF2:</b> TIM5_CH3<br><b>AF3:</b> LPTIM4_OUT<br><b>AF4:</b> TIM15_CH1<br><b>AF7:</b> USART2_TX<br><b>AF11:</b> ETH1_MDIO | ADC1_INP1<br>ADC2_INP1 | VDD         |          |
| AA21    | LGA_AA21             | GND                          | -                   | -                                                                                                                                                  | -                      |             |          |

# Module specifications

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The following sections describe the specifications for the ConnectCore MP13 SOM.

|                                    |    |
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| Mechanical specifications .....    | 74 |
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| Socket options .....               | 75 |

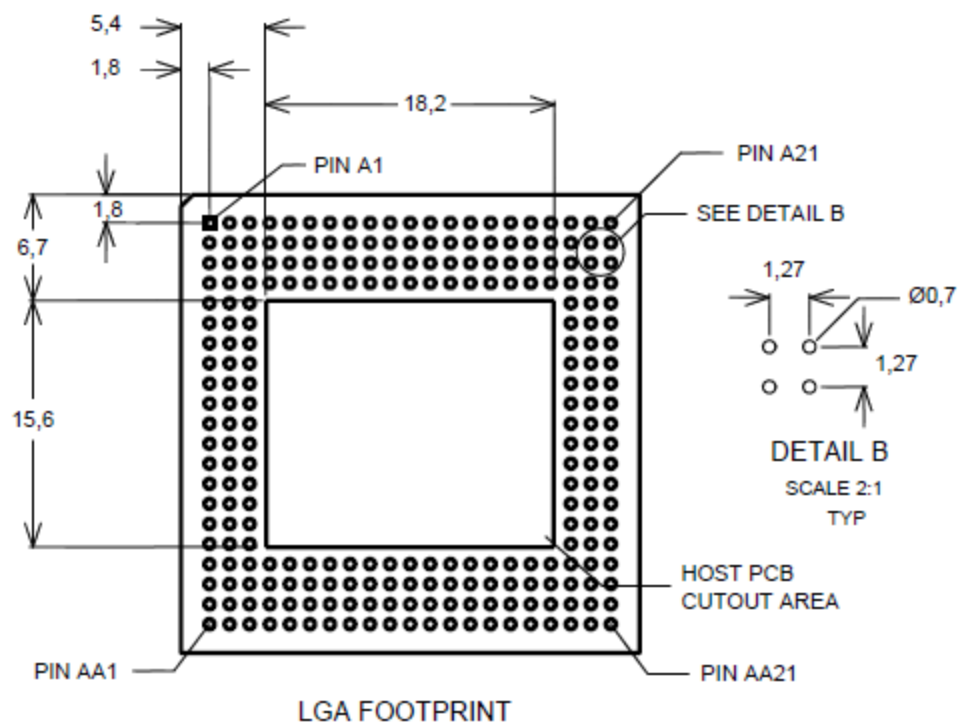
## Mechanical specifications

This section provides mechanical dimensions and host PCB footprint guidance for the Digi SMTplus® form factor of the ConnectCore MP13 module.

### Host PCB footprint and cutout

**Note** Host PCBs must have a cutout to accommodate the components on the bottom side of the module.

#### *Digi SMTplus® LGA mounting*



### Label

The MAC address and serial number of the SOM are encoded in the data matrix on the SOM label.

**Note** See the ConnectCore MP13 product page for mechanical design documents, drawings, and other resources.

## Environmental specifications

Operating temperature: -40 to 85 C.



**CAUTION!** Your final product may require additional thermal management such as passive (heatsink/spreader) or active (airflow) cooling to achieve the maximum operating temperature without exceeding the processor junction temp limit.

## Socket options

For testing, prototyping, and other primarily development-related purposes, Digi International and E-tec Interconnect AG have developed sockets allowing the easy insertion and removal of modules in a carrier board design.

All drawings, user instructions, schematics and PCB footprints are posted on the ConnectCore MP13 technical support website.

**Note** The ConnectCore MP1 Development Board (Digi P/N CC-WMP137-KIT) has been designed to support a RF-LPF246-129M-21AAEW55L-CCMP1 socket, and can be used as a reference design.

All sockets are sold and built by [E-tec Interconnect AG](#). The table below provides an overview of the available part numbers.

| Socket model     | E-tec part number              |
|------------------|--------------------------------|
| ConnectCore MP13 | RF-LPF246-129M-21AAEW55L-CCMP1 |

**Note** Please direct all socket-related purchase inquiries to E-tec Interconnect AG ([info@e-tec.com](mailto:info@e-tec.com)).

# Regulatory information and certifications

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**Note** The ConnectCore MP13 module complies with Part 15 of the United States FCC rules and regulations.

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|                         |    |
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## United States FCC

The ConnectCore MP13 module complies with Part 15 of the FCC rules and regulations. Compliance with the labeling requirements, FCC notices and antenna usage guidelines is required. To fulfill FCC Certification, the OEM must comply with the following regulations:

The system integrator must ensure that the text on top side of the module is placed on the outside of the final product.

The ConnectCore MP13 module may only be used with approved antennas. (See [FCC-approved antennas](#).)

### Labeling requirements



**WARNING!** The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the final product enclosure that displays the contents shown below. Required FCC Label for OEM products containing the ConnectCore MP13 module.

#### Contains FCC ID: MCQ-CCMP1

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.

### Maximum power and frequency specifications (FCC)

| RF band | Peak antenna gain | Technology            | Channel bandwidth | Channel number (Center frequency, MHz)                                                                                                                                                                                                                               |
|---------|-------------------|-----------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.4 GHz | 2.5 dBi           | BT + EDR Bluetooth LE | 1                 | 79 non-overlapping channels: 0 (2400) to 78 (2480)                                                                                                                                                                                                                   |
|         |                   |                       | 2                 | 40 non-overlapping channels: 0 (2402) to 39 (2480)                                                                                                                                                                                                                   |
|         |                   | WLAN                  | 20                | 1(2412), 2(2417), 3(2422), 4(2427), 5(2432), 6 (2437), 7(2442), 8(2447), 9 (2452), 10(2457), 11 (2462)                                                                                                                                                               |
|         |                   |                       | 40                | 3(2422), 4(2427), 5(2432), 6(2437), 7(2442), 8 (2447), 9(2452)                                                                                                                                                                                                       |
| 5 GHz   | 4.6 dBi           | WLAN                  | 20                | 36(5180), 40(5200), 44(5220), 48(5240), 52 (5260), 56(5280), 60(5300), 64 (5320), 100(5500), 104(5520), 108(5540), 112(5560), 116(5580), 120 (5600), 124(5620), 128(5640), 132(5660), 136 (5680), 140(5700), 149 (5745), 153(5765), 157 (5785), 161(5805), 165(5825) |
|         |                   |                       | 40                | 38(5190), 46(5230), 54(5270), 62(5310), 102 (5510), 110(5550), 118(5590), 126(5630), 134                                                                                                                                                                             |

| RF band | Peak antenna gain | Technology | Channel bandwidth | Channel number (Center frequency, MHz)              |
|---------|-------------------|------------|-------------------|-----------------------------------------------------|
|         |                   |            |                   | (5670), 151(5755), 159(5795)                        |
|         |                   |            | 80                | 42(5210), 58(5290), 106(5530), 122(5610), 155(5775) |

## FCC notices

**IMPORTANT:** The ConnectCore MP13 module has been certified by the FCC for use with other products without any further certification (as per FCC section 2.1091). Modifications not expressly approved by Digi could void the user's authority to operate the equipment.

**IMPORTANT:** OEMs must test final product to comply with unintentional radiators (FCC section 15.107 & 15.109) before declaring compliance of their final product to Part 15 of the FCC Rules.

**IMPORTANT:** The ConnectCore MP13 module has been certified for remote and base radio applications. If the module will be used for portable applications, the device must undergo SAR testing. 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 or more of the following measures: Re-orient or relocate the receiving antenna, Increase the separation between the equipment and receiver, Connect equipment and receiver to outlets on different circuits, or Consult the dealer or an experienced radio/TV technician for help.

**IMPORTANT: This module has been tested and found to comply with the following requirements for Modular Approval.**

**Part 15.247 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.**

**Part 15.407 – General technical requirements.**

## FCC-approved antennas

The ConnectCore MP13 module can be installed utilizing antennas and cables constructed with non-standard connectors (RPSMA, RPTNC, and so on).

The modules are FCC approved for fixed base station and mobile applications for the channels indicated in the tables below. If the antenna is mounted at least 20 cm (8 in) from nearby persons, the application is considered a mobile application. Antennas not listed in the table must be tested to comply with FCC Section 15.203 (Unique Antenna Connectors) and Section 15.247 (Emissions).

The following table shows the antenna that was used to certify the ConnectCore MP13 wireless module. This antenna can be replaced by others, however further certification testing is required. The number of tests to be carried out can be decreased by using an antenna of the same type, i.e. dualband omnidirectional dipole, showing lower peak gain. In such case, only a spot check may be required by the certification laboratories to keep current certifications valid according to FCC regulations. If replacing by an antenna with higher gain, complete radiated tests according to FCC regulations are required by the certification laboratories.

**Antenna used to certify the ConnectCore MP13 wireless module**

| Antenna Type | Supplier               | Antenna part no. | Freq. (MHz) | Peak antenna gain (dBi) | Directional gain (dBi) |
|--------------|------------------------|------------------|-------------|-------------------------|------------------------|
| Dipole       | Linx Technologies Inc. | ANT-DB1-RAF-RPS  | 2402-2480   | 2.5                     | 5.51                   |
|              |                        |                  | 5150-5250   | 4.6                     | 7.61                   |
|              |                        |                  | 5250-5350   | 4.6                     | 7.61                   |
|              |                        |                  | 5470-5725   | 4.6                     | 7.61                   |
|              |                        |                  | 5725-5850   | 4.6                     | 7.61                   |
| Dipole       | KYOCERA                | X9001091-W3DRMB  | 2402-2480   | 1.8                     | -                      |
|              |                        |                  | 5150-5250   | 4.0                     | -                      |
|              |                        |                  | 5250-5350   | 4.0                     | -                      |
|              |                        |                  | 5470-5725   | 4.0                     | -                      |
|              |                        |                  | 5725-5850   | 4.0                     | -                      |
| Dipole       | TAOGLAS                | GW.48.A151       | 2402-2480   | 3.42                    | 6.43                   |
|              |                        |                  | 5150-5250   | 4.56                    | 7.57                   |
|              |                        |                  | 5250-5350   | 4.56                    | 7.57                   |
|              |                        |                  | 5470-5725   | 4.56                    | 7.57                   |
|              |                        |                  | 5725-5850   | 4.56                    | 7.57                   |
| PCB          | ETHERTRONICS           | 1001932          | 2402-2480   | 2.5                     | 5.51                   |
|              |                        |                  | 5150-5250   | 5                       | 8.01                   |
|              |                        |                  | 5250-       | 5                       | 8.01                   |

| Antenna Type | Supplier | Antenna part no.     | Freq. (MHz) | Peak antenna gain (dBi) | Directional gain (dBi) |
|--------------|----------|----------------------|-------------|-------------------------|------------------------|
|              |          |                      | 5350        |                         |                        |
|              |          |                      | 5470-5725   | 5                       | 8.01                   |
|              |          |                      | 5725-5850   | 5                       | 8.01                   |
| PCB          | YAGEO    | ANTX100P001B24553    | 2402-2480   | 4.6                     | 7.61                   |
|              |          |                      | 5150-5250   | 4.9                     | 7.91                   |
|              |          |                      | 5250-5350   | 3.9                     | 6.91                   |
|              |          |                      | 5470-5725   | 5.1                     | 8.11                   |
|              |          |                      | 5725-5850   | 5.1                     | 8.11                   |
| PCB          | KYOCERA  | W3P35x8W04-U100D3B0A | 2402-2480   | 2.3                     | -                      |
|              |          |                      | 5150-5250   | 5                       | -                      |
|              |          |                      | 5250-5350   | 5                       | -                      |
|              |          |                      | 5470-5725   | 5                       | -                      |
|              |          |                      | 5725-5850   | 5                       | -                      |
| PCB          | TAOGLAS  | FXP830.07.0100C *    | 2402-2480   | 3.32                    | 6.33                   |
|              |          |                      | 5150-5250   | 4.7                     | 7.71                   |
|              |          |                      | 5250-5350   | 4.7                     | 7.71                   |
|              |          |                      | 5470-5725   | 4.7                     | 7.71                   |
|              |          |                      | 5725-5850   | 4.7                     | 7.71                   |
| PCB          | TAOGLAS  | FXP831.07.0100C      | 2402-       | 3                       | 6.01                   |

| Antenna Type | Supplier | Antenna part no. | Freq. (MHz) | Peak antenna gain (dBi) | Directional gain (dBi) |
|--------------|----------|------------------|-------------|-------------------------|------------------------|
|              |          |                  | 2480        |                         |                        |
|              |          |                  | 5150-5250   | 5.5                     | 8.51                   |
|              |          |                  | 5250-5350   | 5.5                     | 8.51                   |
|              |          |                  | 5470-5725   | 5.5                     | 8.51                   |
|              |          |                  | 5725-5850   | 5.5                     | 8.51                   |

\* Antenna gain in free space

**Note** If using the RF module in a portable application (for example - if the module is used in a hand-held device and the antenna is less than 20 cm (8 in) from the human body when the device is in operation): The integrator is responsible for passing additional SAR (Specific Absorption Rate) testing based on FCC rules 2.1091 and FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, OET Bulletin and Supplement C. The testing results will be submitted to the FCC for approval prior to selling the integrated unit. The required SAR testing measures emissions from the module and how they affect the person.

## RF exposure



**CAUTION!** To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm (8 in) or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance are not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter. The preceding statement must be included as a CAUTION statement in OEM product manuals in order to alert users of FCC RF Exposure compliance.

## Operating frequency

- 802.11 b/g/n: 2412-2462 MHz
- 802.11 a/n/ac : 5150-5250 MHz; 5250-5350 MHz; 5470-5725MHz; 5725-5850 MHz
- Bluetooth : 2402-2480 MHz

## Europe and UK

- 2.412 to 2.472 GHz; 13 channels
- 5.180 to 5.320 GHz; 8 channels
- 5.500 to 5.700 GHz, 8 channels (excludes 5.600 to 5.640 GHz)

## CE mark

The ConnectCore MP13 module is certified for use in several European countries. For information, visit [www.digi.com/resources/certifications](http://www.digi.com/resources/certifications).

If the ConnectCore MP13 module is incorporated into a product, the manufacturer must ensure compliance of the final product with articles 3.1a and 3.1b of the RE Directive (Radio Equipment Directive). A Declaration of Conformity must be issued for each of these standards and kept on file as described in the RE Directive (Radio Equipment Directive).

Furthermore, the manufacturer must maintain a copy of the ConnectCore MP13 module user manual documentation and ensure the final product does not exceed the specified power ratings, antenna specifications, and/or installation requirements as specified in the user manual. If any of these specifications are exceeded in the final product, a submission must be made to a notified body for compliance testing to all required standards.

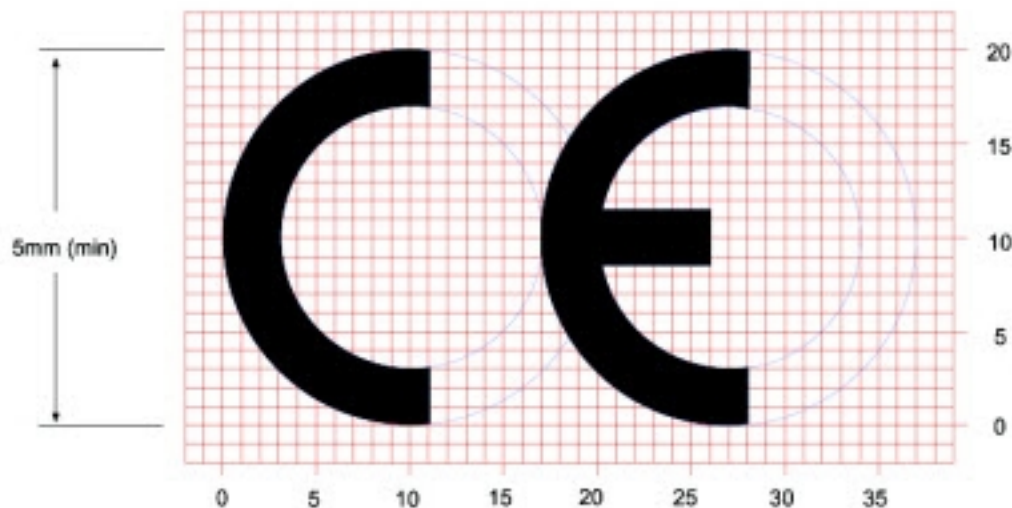
**This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.**

## CE and UKCA OEM labeling requirements

The CE and UKCA markings must be clearly visible and legible when you affix it to the product. If this is not possible, you must attach these marks to the packaging (if any) or accompanying documents.

### CE labeling requirements

The “CE” marking must be affixed to a visible location on the OEM product. The following figure shows CE labeling requirements.



The CE mark shall consist of the initials “CE” taking the following form:

- If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
- The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.
- The CE marking must be affixed visibly, legibly, and indelibly.

**UK Conformity Assessed (UKCA) labeling requirements**

See <https://www.gov.uk/guidance/using-the-ukca-marking> for further details.

You must make sure that:

- if you reduce or enlarge the size of your marking, the letters forming the UKCA marking must be in proportion to the version set out below
- the UKCA marking is at least 5 mm in height – unless a different minimum dimension is specified in the relevant legislation
- the UKCA marking is easily visible, legible (from 1 January 2023 it must be permanently attached)
- the UKCA marking can take different forms (for example, the colour does not have to be solid), as long as it remains visible, legible and maintains the required proportions.

**Important note**

Digi customers assume full responsibility for learning and meeting the required guidelines for each country in their distribution market. Refer to the radio regulatory agency in the desired countries of operation for more information.

**Declarations of Conformity**

Digi has issued Declarations of Conformity for the ConnectCore MP13 module concerning emissions, EMC, and safety. For more information, see <http://www.digi.com/resources/certifications>.

**Important note**

Digi customers assume full responsibility for learning and meeting the required guidelines for each country in their distribution market. Refer to the radio regulatory agency in the desired countries of operation for more information.

**Approved antennas**

The same antennas have been approved for Europe as stated in the FCC table for use with the ConnectCore MP13 module.

**Country list**


|    |    |    |    |    |
|----|----|----|----|----|
| AT | BE | BG | CZ | DK |
| EE | FR | DE | IS | IE |
| IT | EL | ES | CY | LV |
| LI | LT | LU | HU | MT |
| NL | NO | PL | PT | RO |
| SI | SK | TR | FI | SE |
| CH | UK | HR |    |    |

**Note** This device is restricted to indoor use only when operating in the 5150-5350MHz frequency range within all member states.

| Radio Type / Description |                          | Transmitter Frequency (MHz) | Maximum Output Power |
|--------------------------|--------------------------|-----------------------------|----------------------|
| Bluetooth                | BR+EDR                   | 2402 ~ 2480                 | 15.86 dBm            |
|                          | Low Energy               | 2402 ~ 2480                 | 6.88 dBm             |
| WLAN 2.4G                | 802.11b                  | 2412 ~ 2472                 | 19.24 dBm            |
|                          | 802.11g                  | 2412 ~ 2472                 | 19.31 dBm            |
|                          | 802.11n 20               | 2412 ~ 2472                 | 19.54 dBm            |
|                          | 802.11n 40               | 2422 ~ 2462                 | 19.45 dBm            |
| WLAN 5G                  | 802.11a                  | 5150 ~ 5350                 | 22.16 dBm            |
|                          |                          | 5470 ~ 5725                 | 21.99 dBm            |
|                          |                          | 5725 ~ 5850                 | 13.17 dBm            |
|                          | 802.11n_20M 802.11ac_20M | 5150 ~ 5350                 | 22.22 dBm            |
|                          |                          | 5470 ~ 5725                 | 22.00 dBm            |
|                          |                          | 5725 ~ 5850                 | 13.16 dBm            |
|                          | 802.11n_40M 802.11ac_40M | 5150 ~ 5350                 | 22.55 dBm            |
|                          |                          | 5470 ~ 5725                 | 21.82 dBm            |
|                          |                          | 5725 ~ 5850                 | 13.28 dBm            |
|                          | 80211ac_80M              | 5150 ~ 5350                 | 21.52 dBm            |
|                          |                          | 5470 ~ 5725                 | 20.90 dBm            |
|                          |                          | 5725 ~ 5850                 | 13.15 dBm            |

**Canada (IC)**

IC: 1846A-CCMP1

**PMN:** ConnectCore MP13

**HVIN:** 55002163-XX

## Canadian Notice

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-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.

### Avis Canadien

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.

## Labeling requirements

Labeling requirements for Industry Canada are similar to those of the FCC.

### ***Required End Product Labeling***

Any device incorporating this module must include an external, visible, permanent marking or label which states:

“Contains IC : 1846A-CCMP1”

Obligation d'étiquetage du produit final:

Tout dispositif intégrant ce module doit comporter un externe, visible, marquage permanent ou une étiquette qui dit:

“Contient IC : 1846A-CCMP1”

## Transmitters with detachable antennas

This radio transmitter (IC: 1846A-CCMP1) has been approved by Industry Canada to operate with the antenna types listed in the table above with the maximum permissible gain and required antenna impedance for each antenna type 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 (IC: 1846A-CCMP1) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types

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

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the

equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

The ConnectCore MP13 module is for professional (OEM) installation only.

Le module ConnectCore MP13 doit impérativement être installé par un professionnel (OEM).

## RF exposure

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To satisfy Industry Canada RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation.

Pour satisfaire aux exigences d'Industrie Canada concernant l'exposition RF, une distance égale ou supérieure à 20cm doit être respectée entre les antennes de ce produit et les personnes se trouvant à proximité.

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**The preceding statement must be included as a CAUTION statement in OEM product manuals in order to alert users of Industry Canada RF Exposure compliance.**

**Cette information doit être incluse dans le manuel du produit OEM afin d'alerter les utilisateurs sur la nécessité de respecter l'exposition RF d'Industrie Canada.**

## Approved antennas

The same antennas have been approved for Canada as stated in the FCC table for use with the ConnectCore MP13 module.

## Japan

電波法により5GHz帯は屋内使用に限ります。

This device has been granted a designation number by Ministry of Internal Affairs and Communications according to:

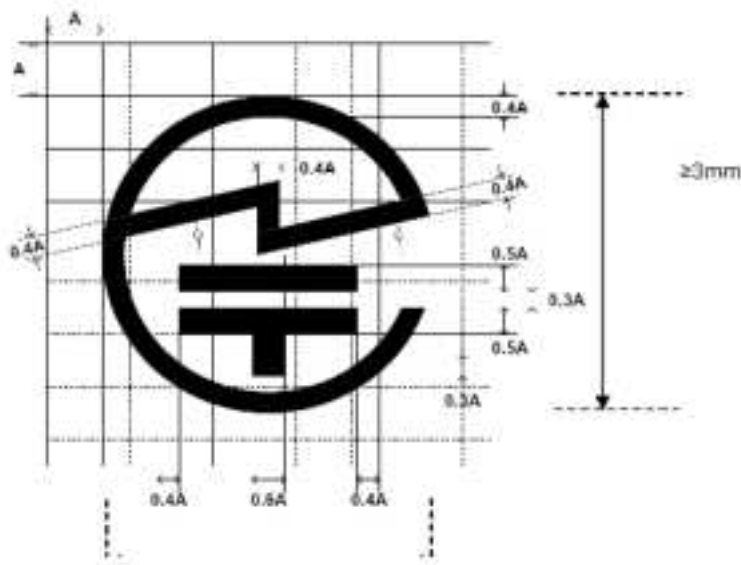
Ordinance concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment (特定無線設備の技術基準適合証明等に関する規則).

- Article 2, Paragraph 1, Item 19, 19-3, 19-3-2 Category: WW, XW, YW
- Model/Name of equipment: ConnectCore MP13
- Radio label marking:
  - R: 210-207701

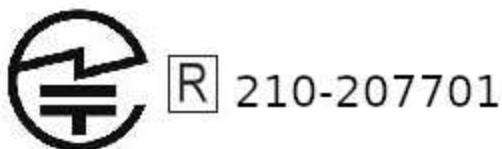
This device should not be modified (otherwise the granted designation number will be invalid).

- 2.412 to 2.472 GHz; 13 channels
- 5.180 to 5.320 GHz; 8 channels
- 5.500 to 5.700 GHz; 11 channels

### Approval Label (MIC Marking)



***Label text***



**Note** Due to space constraints, the ConnectCore MP13 module label doesn't support radio marking for Japan. If space allows, end product label should support radio marking for Japan. If not, radio marking shall be documented in the user manual.

**Note** The warning “Indoor only(5GHz)” must go on the end product – or E Label (Display).

Master station: Indoor only

親局: 当該無線設備の送信は、屋内のみにおいて使用可能である旨

Slave station: The transmission of radio equipment is indoors use only (Except when communicating with 5.2GHz high power base stations or relay stations)

子局:当該無線設備の送信は、5.2GHz帯高出力データ通信システムの基地局または陸上移動中継局と通信する場合を除き、屋内においてのみ可能である旨。

If the device is too small it can be displayed on the user manual and on the packaging or container.