

# 2CX Installation Manual

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FCC ID of this product is as follows.

FCC ID: VPYLBEE5QG2CX

IC No. of this product is as follows.

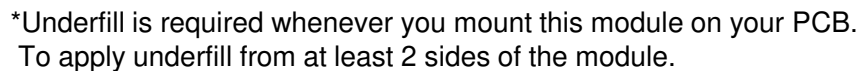
IC: 772C-LBEE5QG2CX

## Contents

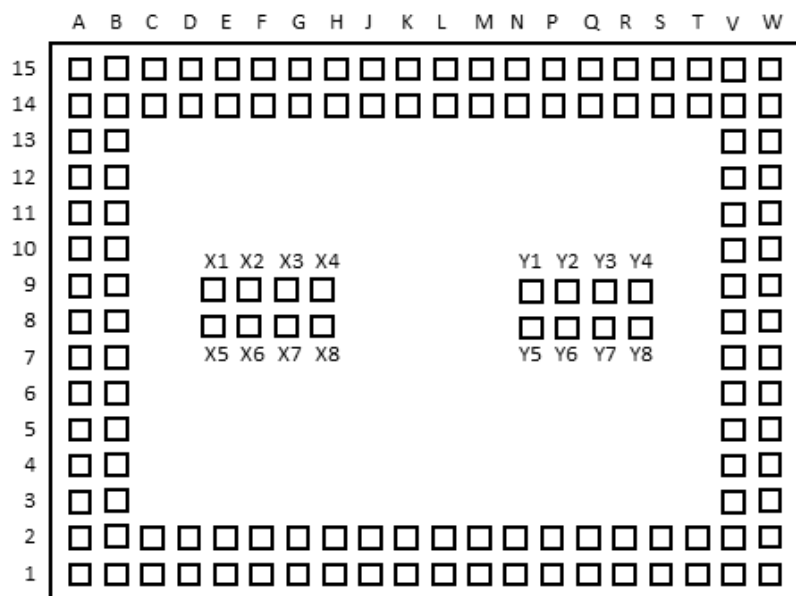
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## 2. PIN Layout



| PinNo. | Description | PinNo. | Description |
|--------|-------------|--------|-------------|
| X1     | GND         | Y1     | GND         |
| X2     | GND         | Y2     | GND         |
| X3     | JTAG_TDO    | Y3     | GND         |
| X4     | JTAG_TRST#  | Y4     | GND         |
| X5     | GND         | Y5     | GND         |
| X6     | JTAG_TCK    | Y6     | GND         |
| X7     | JTAG_TMS    | Y7     | GND         |
| X8     | JTAG_TDI    | Y8     | GND         |

| PinNo. | Description       | PinNo. | Description                              | PinNo. | Description                    |
|--------|-------------------|--------|------------------------------------------|--------|--------------------------------|
| A1     | GND               | F1     | GND                                      | R14    | GPIO_47                        |
| A2     | GND               | F2     | GND                                      | R15    | GPIO_48                        |
| A3     | GND               | F14    | WL_UART_RXD                              | S1     | HST_SLM_CH1_CTL0PBL_BOOTSPED_1 |
| A4     | GND               | F15    | WLAN_EN                                  | S2     | HST_SLM_CH1_CTL100_TCX0_SEL    |
| A5     | GND               | G1     | GND                                      | S14    | GND                            |
| A6     | GND               | G2     | LF_CLK_IN                                | S15    | GND                            |
| A7     | GND               | G14    | WL_UART_TXD/WDG_DISABLE                  | T1     | GND                            |
| A8     | GND               | G15    | BT_EN                                    | T2     | GND                            |
| A9     | WL_GPIO53         | H1     | XTAL GND                                 | T14    | GND                            |
| A10    | PCIE18_LDO_IN     | H2     | XTAL GND                                 | T15    | 2G_CH1                         |
| A11    | GPIO56            | H14    | GND                                      | V1     | 5G_CH1_LTE-U_RX_AS             |
| A12    | WLMX_LDO_IN       | H15    | LAA_AS_EN                                | V2     | GND                            |
| A13    | WLCX_BT_LDO_IN    | J1     | XTAL GND                                 | V3     | VPH_PA_5G_CH0                  |
| A14    | VDD18_DIO_ID      | J2     | XTALO                                    | V4     | GND                            |
| A15    | GND               | J14    | WL_PA_MUTE                               | V5     | GND                            |
| B1     | GND               | J15    | WL_TXEN                                  | V6     | GND                            |
| B2     | PCIE_TXN          | K1     | XTAL GND                                 | V7     | GND                            |
| B3     | PCIE_REFCLKP      | K2     | XTAL GND                                 | V8     | GND                            |
| B4     | PCIE_REFCLKN      | K14    | LAA_TXEN                                 | V9     | GND                            |
| B5     | PCIE_RXP          | K15    | LAA_RX                                   | V10    | GND                            |
| B6     | PCIE_RXN          | L1     | BT_SENS_TXD/CPU_INT_RESET or BT_HOLD (*) | V11    | GND                            |
| B7     | GND               | L2     | BT_SENS_RXD                              | V12    | VPH_PA_5G_CH1                  |
| B8     | GND               | L14    | GND                                      | V13    | GND                            |
| B9     | GND               | L15    | PCIE_CLKREQ0                             | V14    | GND                            |
| B10    | PCIEP52_LDO_IN    | M1     | BT_UART_TXD                              | V15    | GND                            |
| B11    | RFA16_LDO_IN      | M2     | BT_UART_RTS                              | W1     | GND                            |
| B12    | WL_LED_GPIO_54    | M14    | PCIE_WAKE#                               | W2     | GND                            |
| B13    | WLCX_BT_LDO_IN    | M15    | PCIE_RST#                                | W3     | VPH_PA_2G_CH0                  |
| B14    | GND               | N1     | BT_UART_CTS                              | W4     | GND                            |
| B15    | RFA12_LDO_IN      | N2     | BT_UART_RXD                              | W5     | 2G_CH0                         |
| C1     | GND               | N14    | WLAN_SW_CTRL                             | W6     | GND                            |
| C2     | PCIE_TXP          | N15    | CLK_REF_OUT/BOOTSTRAP_CLK                | W7     | GND                            |
| C14    | ADN_RFACMN_LDO_IN | P1     | COEX_RXD or Power_on_Idle (*)            | W8     | 5G_CH0                         |
| C15    | GND               | P2     | COEX_TXD/BOOT_FROM_ROM                   | W9     | GND                            |
| D1     | GND               | P14    | BT_I250_VS                               | W10    | 5G_CH1_LTE-U_RX_AS             |
| D2     | GND               | P15    | BT_I250_SDO/EDL_MODE                     | W11    | GND                            |
| D14    | GND               | Q1     | WL_TXEN_TO_N79                           | W12    | VPH_PA_2G_CH1                  |
| D15    | RFA17_LDO_IN      | Q2     | N79_TXEN                                 | W13    | GND                            |
| E1     | GND               | Q14    | BT_I250_SCK/ST_SLMBUS_CLK                | W14    | 5G_CH1                         |
| E2     | GND               | Q15    | BT_I250_SDI/ST_SLMBUS_DATA               | W15    | GND                            |
| E14    | CLK_REQ_IN        | R1     | HST_SLM_CH0_CTL0/CLK_REQ_0               |        |                                |
| E15    | GND               | R2     | HST_SLM_CH0_CTL1/CLK_REQ_1               |        |                                |

### 3. Supply Voltage

| 2CX_PIN_Name                   | Min. | Typ. | Max. | unit |
|--------------------------------|------|------|------|------|
| VPH                            | 3.0  | 3.85 | 4.6  | V    |
| VDD18_DIG_IO                   | 1.71 | 1.8  | 2.1  | V    |
| AON_RFACMN_LDO_IN              | 0.9  | 0.95 | 2.1  | V    |
| WLCX_BT_LDO_IN/<br>WLMX_LDO_IN | 0.9  | 0.95 | 2.1  | V    |
| RFA0P8_LDO_IN                  | 0.9  | 0.95 | 2.1  | V    |
| RFA12_LDO_IN                   | 1.3  | 1.35 | 2.1  | V    |
| RFA17_LDO_IN                   | 1.85 | 1.9  | 2.1  | V    |
| PCIE0P92_LDO_IN                | 1.28 | 1.35 | 2.1  | V    |
| PCIE18_LDO_IN                  | 1.85 | 1.9  | 2.1  | V    |

\*VDD18\_DIG\_IO and PCIE0P92\_LDO\_IN and PCIE18\_LDO\_IN don't influence the RF characteristic.

## 6. Antenna

- Please perform the antenna design that followed the specifications of the antenna.
- About the signal line between an antenna and a module

It is a 50-ohm line design.

Fine tuning of return loss etc. can be performed using a matching network.

However, it is required to check "Class1 change" and "Class2 change" which the authorities define then.

The concrete contents of a check are the following three points.

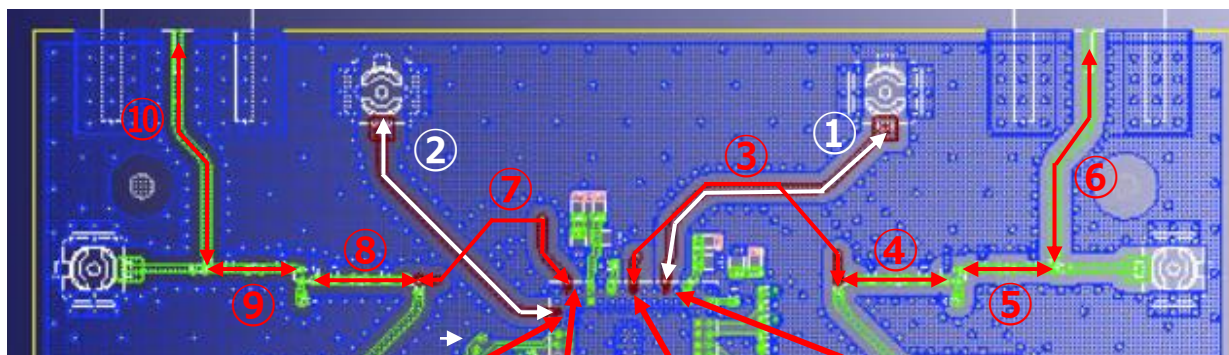
- 1 ) It is the same type as the antenna type of antenna specifications.
- 2 ) An antenna gain is lower than a gain given in antenna specifications.\*
- 3 ) The emission level is not getting worse.

\* For the 6GHz band, CBP test is required when using antennas with antenna gains lower than -6.32dBi.

## 6. Antenna

|        | Type | BAND   | Vender | Part number            | Peak Gain |
|--------|------|--------|--------|------------------------|-----------|
| Chain1 | Slot | 6GHz   | SONY   | chain1_slot_6GHz       | -1.14 dBi |
|        |      | 5GHz   | SONY   | chain1_slot_5GHz       | +1.13 dBi |
|        |      | 2.4GHz | SONY   | chain1_slot_2.4GHz     | +1.65 dBi |
|        | Mono | 6GHz   | SONY   | chain1_monopole_6GHz   | -1.25 dBi |
|        |      | 5GHz   | SONY   | chain1_monopole_5GHz   | +0.57 dBi |
|        |      | 2.4GHz | SONY   | chain1_monopole_2.4GHz | +1.60 dBi |
| Chain0 | Mono | 6GHz   | SONY   | chain0_monopole_6GHz   | -1.36 dBi |
|        |      | 5GHz   | SONY   | chain0_monopole_5GHz   | +0.51 dBi |
|        |      | 2.4GHz | SONY   | chain0_monopole_2.4GHz | -0.23 dBi |

### ■ 50-ohm line(microstrip line length)



| No. | Length | No. | Length |
|-----|--------|-----|--------|
| ①   | 13.294 | ⑥   | 8.352  |
| ②   | 11.570 | ⑦   | 9.536  |
| ③   | 13.116 | ⑧   | 3.000  |
| ④   | 3.080  | ⑨   | 2.840  |
| ⑤   | 3.230  | ⑩   | 8.269  |

[mm]

[mm]

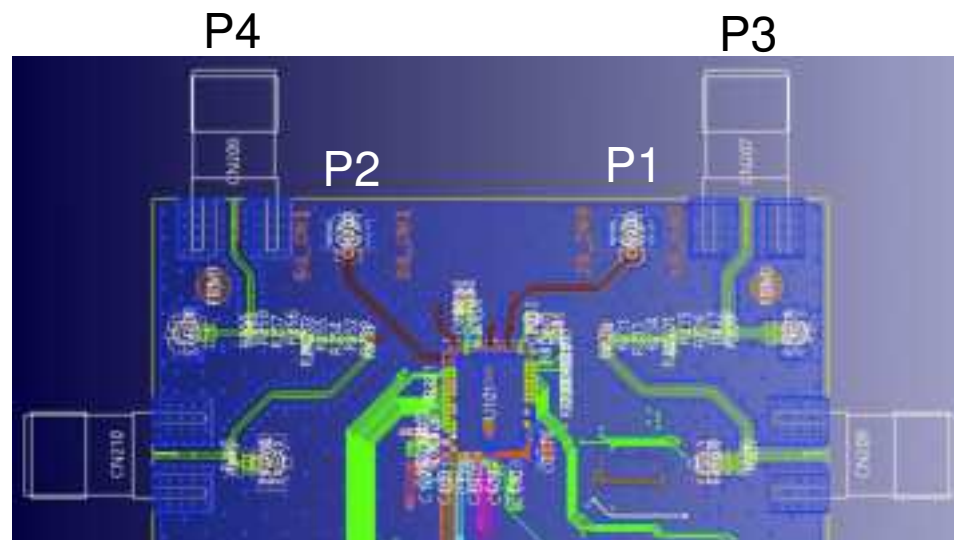
2G CH1 Feeding Point  
5G CH1 Feeding Point  
5G CH0 Feeding Point  
2G CH0 Feeding Point

Representative design / Loss value for this module certification.  
The feeding point is a module pin.  
The connector from the feeding point is part of the antenna.

## 6. Antenna

From the RF OUT of the module Line loss information to each Port of board[dB]

|                              | 2.4GHz | 5GHz               | 6GHz |
|------------------------------|--------|--------------------|------|
| Between 2G CH0 RF OUT and P1 | 0.43   | ----               | ---- |
| Between 2G CH1 RF OUT and P2 | 0.37   | ----               | ---- |
| Between 5G CH0 RF OUT and P3 | ----   | 1.79               | 2.01 |
| Between 5G CH1 RF OUT and P4 | ----   | 1.73 *1<br>1.72 *2 | 1.72 |



\*1 Measured at 5500MHz

\*2 Measured at 5600MHz

Representative design / Loss value for this module certification.

Antennas must be installed in the end product.