# Type1VY-934   Installation Manual
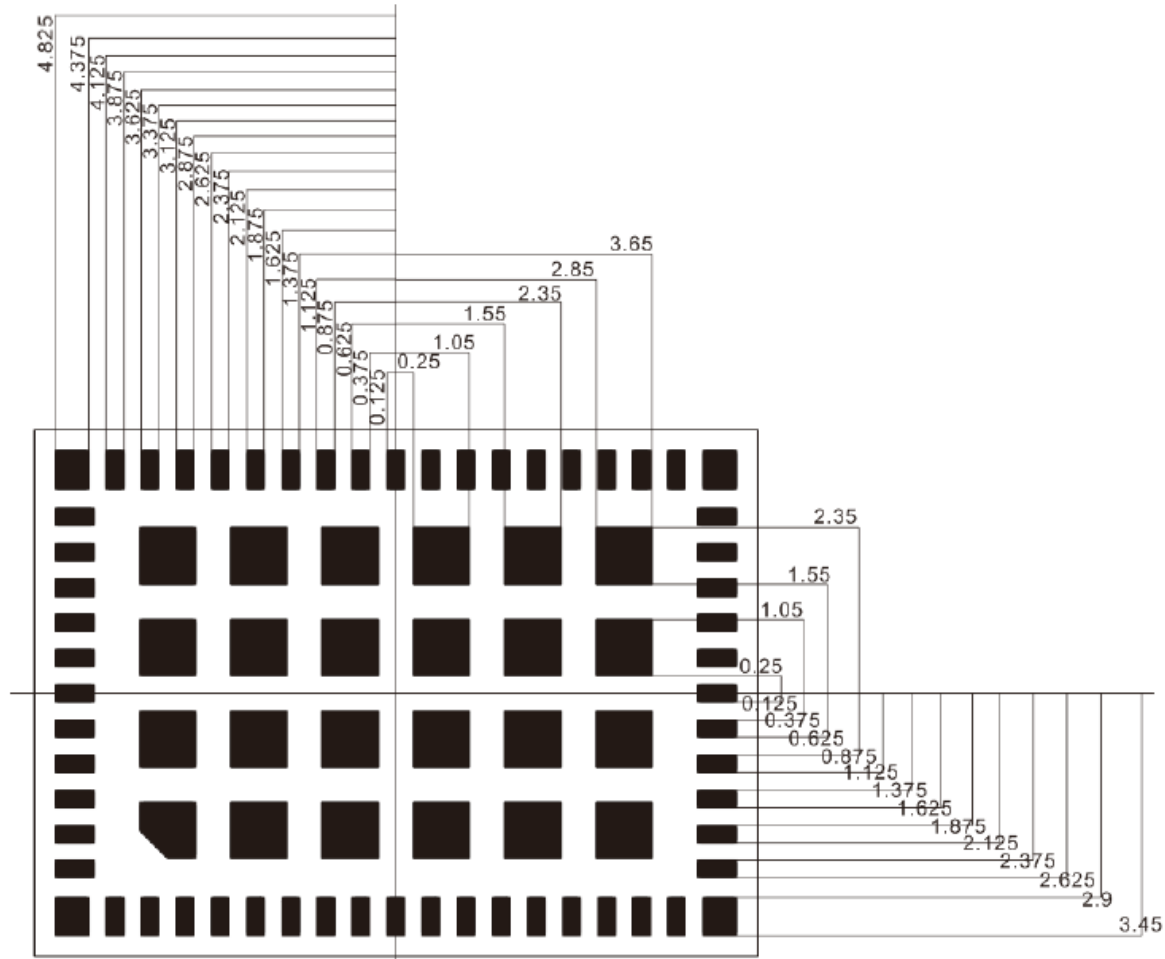
FCC ID of this product is as follows.
FCC ID: VPYLB1VY934

IC No. of this product is as follows.
IC: 772C-LB1VY934

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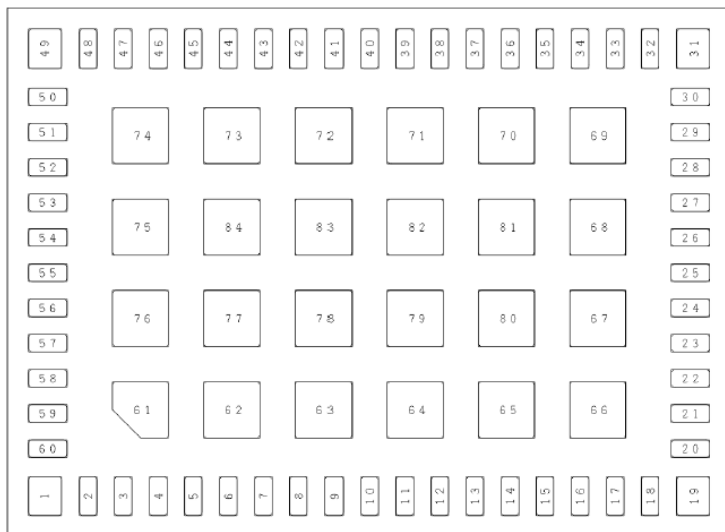3. Supply Voltage
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Unit : mm

# 2.PIN Layout

## TOP VIEW



| No | PIN NAME | No | PIN NAME | No | PIN NAME | No | PIN NAME |
|----|----------|----|----------|----|----------|----|----------|
| 1 | GND_SWREG | 23 | GPIO1 | 45 | PCIE_TX_N | 67 | EXPGND |
| 2 | SWREG_IN | 24 | VDD_FEM | 46 | GND | 68 | EXPGND |
| 3 | SWREG_IN | 25 | VDD_FEM | 47 | PCIE_REFCLK_P | 69 | EXPGND |
| 4 | GPIO10 | 26 | GND | 48 | PCIE_REFCLK_N | 70 | EXPGND |
| 5 | BT_RF_KILL | 27 | ANT1 | 49 | GND | 71 | EXPGND |
| 6 | VDDIO_GPIO1 | 28 | GND | 50 | PCIE_RX_N | 72 | EXPGND |
| 7 | VDDIO_GPIO0 | 29 | LTE_SYNC | 51 | PCIE_RX_P | 73 | EXPGND |
| 8 | VDD_3P3 | 30 | LTE_PRI | 52 | GND | 74 | GPIO7 |
| 9 | VDD_3P3 | 31 | GND | 53 | GPIO3 | 75 | GPIO8 |
| 10 | PCIE_CLKREQ_L | 32 | LTE_ACTIVE | 54 | GPIO4 | 76 | GPIO9 |
| 11 | PCIE_RST_L | 33 | BT_UART_TXD | 55 | GPIO5 | 77 | EXPGND |
| 12 | PCIE_WAKE_L | 34 | BT_UART_CTS | 56 | GPIO6 | 78 | EXPGND |
| 13 | GPS_COEX | 35 | BT_UART_RXD | 57 | SWREG_FB | 79 | EXPGND |
| 14 | QoW | 36 | BT_UART_RTS | 58 | SWREG_FB | 80 | EXPGND |
| 15 | BT_WAKE_HOST | 37 | PCM_SYNC | 59 | SWREG_OUT | 81 | EXPGND |
| 16 | BT_WAKE_SLAVE | 38 | PCM_IN | 60 | SWREG_OUT | 82 | EXPGND |
| 17 | BT_EN | 39 | PCM_CLK | 61 | GPIO0 | 83 | EXPGND |
| 18 | WL_EN | 40 | PCM_OUT | 62 | EXPGND | 84 | EXPGND |
| 19 | GND | 41 | VDDIO_AO | 63 | EXPGND | | |
| 20 | ANT0 | 42 | CLK_REQ_OUT | 64 | EXPGND | | |
| 21 | GND | 43 | GND | 65 | EXPGND | | |
| 22 | GPIO2 | 44 | PCIE_TX_P | 66 | WLAN_RF_KILL_L | | |

# 3.Supply Voltage

| Type1VY_PIN_Name | Min. | Typ. | Max. | unit |
|---|---|---|---|---|
| VDD_3P3 | 3.135 | 3.3 | 3.465 | V |
| SWREG_IN | 3.135 | 3.3 | 3.465 | V |
| VDD_FEM | 3.135 | 3.3 | 3.465 | V |
| VDDIO_GPIO * | 3.14<br>1.71 | 3.3<br>1.8 | 3.46<br>1.89 | V |
| VDD_AO * | 3.14<br>1.71 | 3.3<br>1.8 | 3.46<br>1.89 | V |

*VDD_3P3, SWREG_IN and VDD_FEM needs to supply a regulated voltage from host device.

*VDDIO_GPIO and VDDIO_AO don't influence the RF characteristic.

# 4. Power Levels

(Per Antenna port)

| mode | Rate | Channel | MAXIMUM TUNE UP TOLERANCE [dBm] |
|------|------|---------|--------------------------------|
| IEEE 802.11b<br>IEEE 802.11g<br>IEEE 802.11n (HT20) | All Rate | 1~11 | 9.5 |
| IEEE 802.11a<br>IEEE 802.11n (HT20/40)<br>IEEE 802.11ac (VHT20/40/80) | All Rate | (W52/W53) 36~64<br>(W56) 100~144<br>(W58) 149~165 | 9.5 |

| Mode | MAXIMUM TUNE UP TOLERANCE [dBm] |
|------|--------------------------------|
| LE | 7.9 |

# 5. Theory of Operation

| Frequency of operation | | | Scan | Ad-hoc mode |
|---|---|---|---|---|
| 2.4GHz | 11b/g/n (HT20) | 2412-2462MHz | Active | Yes |
| W52 | 11a/n/ac ((V)HT20) | 5180-5240MHz | Active | Yes |
| | 11n/ac ((V)HT40) | 5190-5230MHz | Active | Yes |
| | 11ac (VHT80) | 5210MHz | Active | Yes |
| W53 | 11a/n/ac ((V)HT20) | 5260-5320MHz | Passive | No |
| | 11n/ac ((V)HT40) | 5270-5310MHz | Passive | No |
| | 11ac (VHT80) | 5290MHz | Passive | No |
| W56 | 11a/n/ac ((V)HT20) | 5500-5720MHz (*ISED:5600-5650MHz disable) | Passive | No |
| | 11n/ac ((V)HT40) | 5510-5710MHz (*ISED:5600-5650MHz disable) | Passive | No |
| | 11ac (VHT80) | 5530-5690MHz (*ISED:5600-5650MHz disable) | Passive | No |
| W58 | 11a/n/ac ((V)HT20) | 5745-5825MHz | Active | Yes |
| | 11n/ac ((V)HT40) | 5755-5795MHz | Active | Yes |
| | 11ac (VHT80) | 5775MHz | Active | Yes |

End users can not modify the software because F/W & driver are installed in device.

# 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.

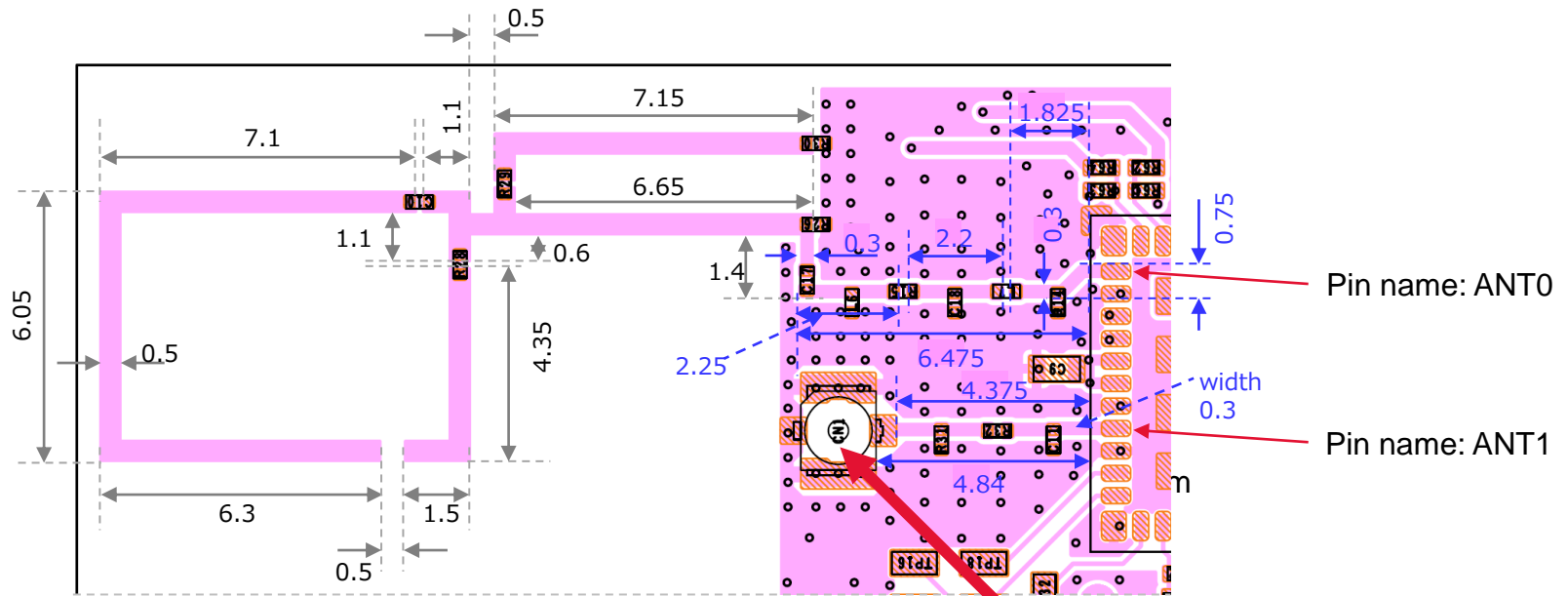The concrete contents of a check are the following three points.

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.

# 6.Antenna

■ Use the antenna below.

**< Chain0 > (Main Antenna)**
- **Pattern on Board**
- **Part number:** Antenna0 1VY DC1231
- **Use the following design on your board to build your antenna.**



Pin name: ANT0

Pin name: ANT1

A sub-antenna is connected here.

(Connector P/N: 20449-001E [maker: I-PEX])

RF line-GND layer thickness
・Sub antenna: 215um
* Design the RF line at 50 ohms.

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# 6.Antenna

■ Use the antenna below.

**< Chain1> (Sub Antenna)**
- **Pattern on flexible substrate + RF cable (External antenna)**
- **Part number:** Antenna1 1VY DC1231  **(* including cable)**
- **Cables length : from 30 to 315mm are available.**

(Connector P/N: 20449-001E [maker: I-PEX])



Unit: mm
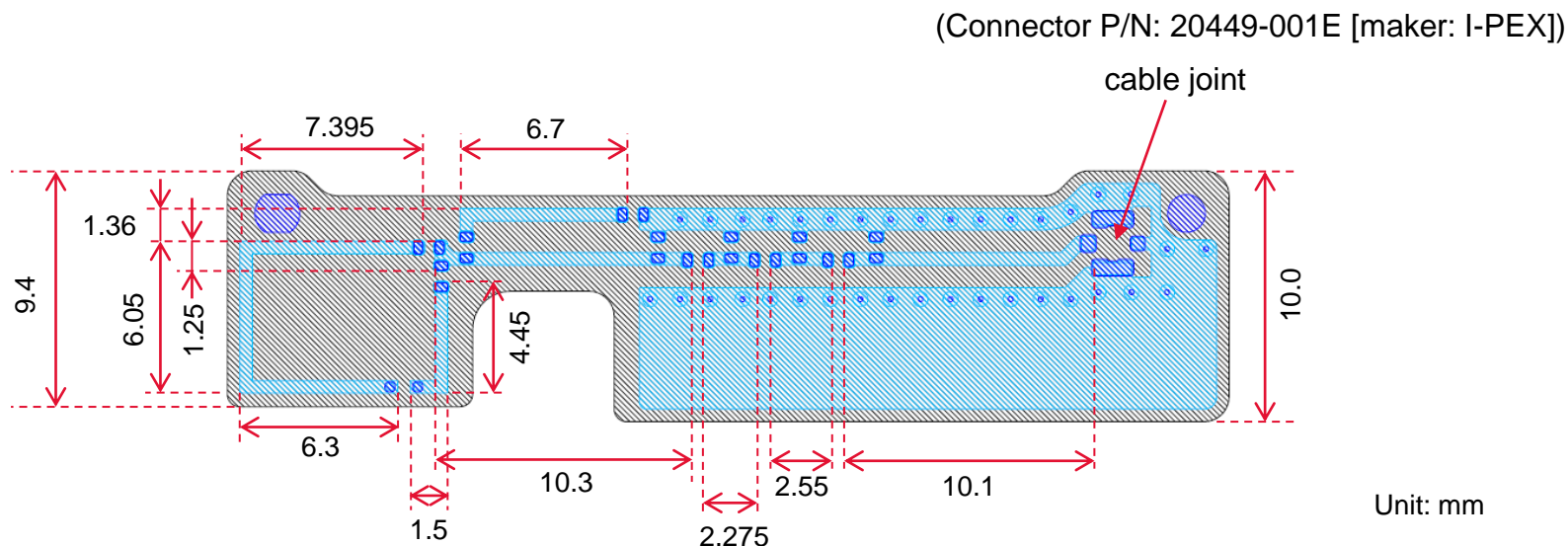
Line width = 0.5mm

RF line-GND layer thickness
・Sub antenna: 38.5um
* Design the RF line at 50 ohms.

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## Recommended constant

| P/N | Memo | Tuning 1 | Tuning 2 | Tuning 3 | Tuning 4 | Matching circuit | | | | | | |
|-----|------|----------|----------|----------|----------|--------|----------|---------|----------|---------|----------|---------|
| | | | | | | Shunt 1 | Series 1 | Shunt 2 | Series 2 | Shunt 3 | Series 3 | Shunt 4 |
| Antenna0 1VY DC1231 | Pattern Antenna | 0ohm | 0.3pF | None | None | 820ohm | 5.6ohm | 820ohm | 0ohm | None | 1.1nH | 0.2pF |
| Antenna1 1VY DC1231 | Sub Antenna (Cable length = 30mm) | 4.7nH | 0.5pF | 0.1pF | 0.1pF | 1kohm | 4.7ohm | 1kohm | 0ohm | None | 1.0nH | 0.3pF |
| | Sub Antenna (Cable length = 315mm) | 4.7nH | 0.5pF | 0.1pF | 0.1pF | 680ohm | 6.8ohm | 680ohm | 0ohm | None | 1.0nH | 0.3pF |



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