

SmartNL-RF2000 User Guide



September (Ver. 1.1)

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FCC Information to User

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions:

- (1) the device may not cause interference, and
- (2) the device must accept any interference, including interference that may cause undesired operation of this device.

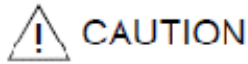
Safety message

Notices for the Safety' should be complied by the users to use the product safely and correctly and prevent the occurrence of any accident or danger.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

1. Supply the power according to the condition described in the product rated power specification.
It may cause the electric shock, fire, malfunction, product damage or deterioration.
2. At first power input, you should check the input power.
It may cause the fire or product damage.
3. When applying the power, you should confirm the completion of checking
If not, it may cause the fire or product damage.
4. Do not keep the product in the place with high humidity or possible hazard to submersion.
It may cause the destruction of insulation or deterioration of product function.
5. At first power input, you should check the input power.
It may cause the fire or product damage.
6. Do not put the product in the fire or boil or disassemble it.
It may cause the fire or explosion.
7. Connect the external signal cable or power cable correctly.
If not, it may cause the fire or product damage.
8. After installation, remove foreign materials (work tools, electric cables, bolt).
It may cause the fire, failure or malfunction.
9. Do not carry out the wiring work while applying the electric current.
It may cause the injury or product damage.



Indicates a potentially hazardous situation which, if not avoided, could result in minor injury or product damage.

1. Do not carry it with overloading.
It may cause the injury or product damage.
2. Nobody is permitted to install, operate or maintain the product except the expert.
It may cause the injury or malfunction.
3. Do not use any external power sources for the SmartNL-RF2000 other than those specified by Sammi information systems. Use of AC adapters or DC/DC converters not approved for use with the SmartNL-RF2000 may result in permanent damage to the RF-Reader.
4. Do not touch the conductor, terminal connection section while applying an electric current.
It may cause serious injury or death by the electric shock.
5. Do not bend of antenna cable.
It may cause the reduction of read range of Tag
6. Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.
7. This equipment must not be co-located or operated in conjunction with any other antenna or transmitter.
8. This equipment complies with FCC radiation exposure limits set forth for uncontrolled equipment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65. This equipment must be installed and operated with at least 20cm and more between the radiator and person's body (excluding extremities: hands, wrists, feet and ankles).

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Overview

This manual is prepared for users to understand the hardware specifications of SmartNL-RF2000 Reader, maintenance and inspections of the system, and trouble shooting required when you use it.

NL-RF2000 is a Fixed Type 900MHz RFID Reader, enables user to use RS232 or Ethernet Interface for efficient and convenient use. It is suitable for various applications such as Logistic, Asset tracking, Stock management, Parking lot management, Healthcare, Security, Transportation and bank system.

User can use up to 4 antennas per one reader, perfect for wide range reading application than longer distance reading application.

1. Checking points when unpacking

1. Please check if the product is broken, transformed or damaged.
2. Please check the types or quantity of the product and setting accessories to check
If there are some missing parts. or not.

2. Check the contents of the carton box:

No.	Item	Quantity	Length	Remark
1	Power Cable	1pcs	5ft	IP65 Cable(Optional)
2	Ethernet Cable	1pcs	15ft	IP65 Cable(Optional)
3	GPIO(with RS-232) Cable	1pcs	15ft	IP65 Cable(Optional)
4	Antenna Cable		50ft	IP65 Cable/max 4pcs(Optional)
5	Antenna with Bracket		-	Max 4pcs (Option)
6	Cigar jack Adapter			Option
7	DC/DC Adapter			Option
8	AC/DC Adapter			Option



AC Adapter



LAN Cable



Data Cable

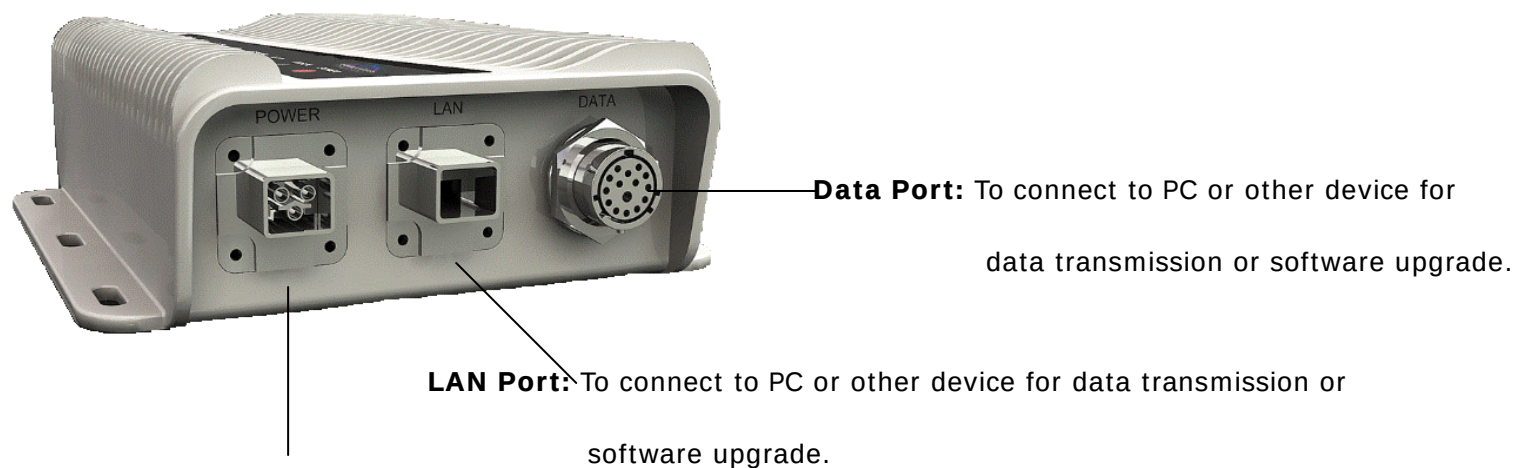
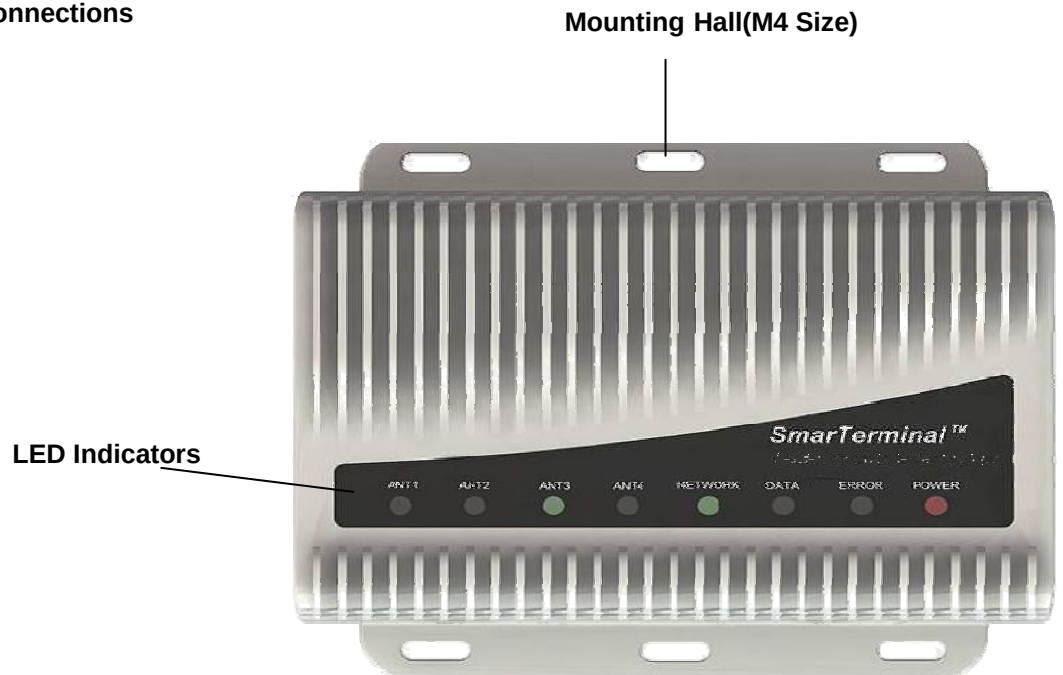


Antenna Cable

3. Specification with feature

1. Performance Characteristics	
Supported Protocols	ISO 18000-6 Type-C, EPC Class 1Gen.2
Operating Frequency	902.75 MHz ~ 927.25 MHz
Hopping Channels	50
Channel Spacing	500KHz
Channel Dwell Time	< 0.4 seconds
Modulation	Phase Reversal-Amplitude Shift Keying (PR-ASK)
Communication Interface	RS-232 & GPIO (Circular, TCP/IP (RJ45)
GPIO Support	4-Input / 7-Output
LED Indicators	ANT1~4, Network, Data, Error, Power
Power Consumption	Active Current <2.3A
RF Output Power	< 1W (30 dBm)
Antenna Interface	4-Ports
Electrical Power	5V DC Only
Operating Temperature	-20 ~ +50 °C
Software Support	Reader Manager (API)
Compliance Certifications	-
2. Physical Characteristics	
Dimensions (LxWxT)	8.8" x 7.559" x 2.677"
Weight	3.462 lb
3. ISO 18000-6 Type-C (EPC Gen.2) Characteristics	
Modulation	PR-ASK
Encoding method	PIE (TX), Miller (RX)
DATA rate	300 kbps
Modulation Depth	90% ~100 %

4. Physical Connections



Power Port: Using DC5V/5A adapter to supply power to RFID reader.



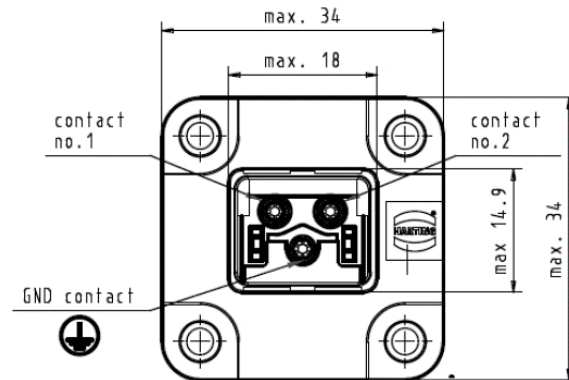
4-1. LED Indicators

LED	Description
ANT1	ON: Antenna1 Connected / OFF: Not Connected.
ANT2	ON: Antenna2 Connected / OFF: Not Connected.
ANT3	ON: Antenna3 Connected / OFF: Not Connected.
ANT4	ON: Antenna4 Connected / OFF: Not Connected.
NETWORK	ON: Network connected between Reader and HOST PC / OFF : Not Connected
DATA	Blinking: Successful tag read/ OFF: Not working
ERROR	ON: Error condition / OFF : Normal
POWER	ON: Turn On / OFF: Turn Off

4-2. Ports

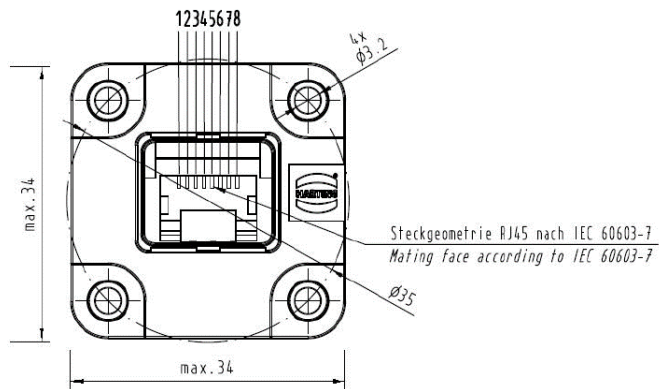
Port	Description
Power	Connect the SmarTerminal approved power supply.
LAN	Insert a standard RJ45 Ethernet cable for connection to an Ethernet network. Insert a cross-connect Ethernet cable for connection to a local PC
Data	Data port have RS-232 and GPIO RS232 Connection to a local PC GPIO connection to an external device.
Antenna	Support up to 4 antenna / Connector type is TNC. If you use an antenna switching at the same time, and Acts as a sequential

4-2-1. Power Ports Assignments



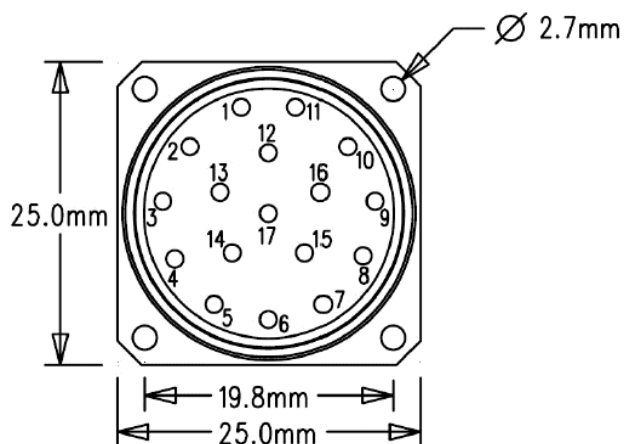
Pin NO.	POWER PORT	Operating Ratings	Option
1	VDC-	DC 5V(3A)	
2	VDC+		
3	GND		

4-2-2. LAN Ports Assignments



Pin NO.	RJ45 Cable Pin No.
1	1
2	2
3	3
4	4
5	5
6	6
7	7

4-2-3. Data Ports Assignments



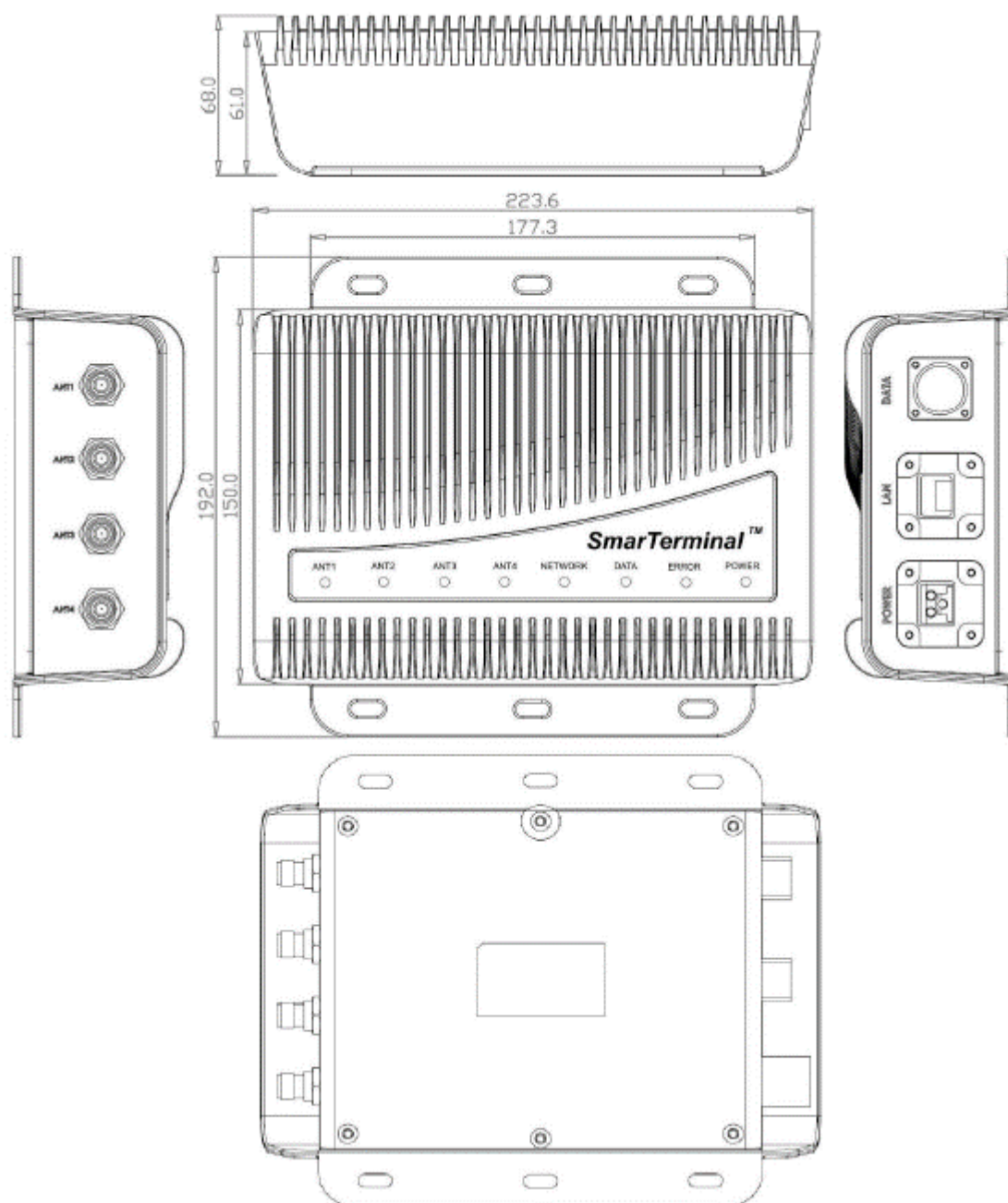
4-2-4. GPIO Interface Specifications

Interface	DC Voltage	Maximum Current
Input	5V – 24VDC	-
Output	5V – 24VDC	Single Output 500mA

4-2-5. Data Port Pin Assignments

Pin NO.	Description	Pin No.	Description
1	Common+	10	GPIO Input 4
2	Common-	11	GPIO Output 5
3	GPIO Output 1	12	GPIO Output 6
4	GPIO Input 1	13	GPIO Output 7
5	GPIO Output 2	14	Ground
6	GPIO Input 2	15	TXD
7	GPIO Output 3	16	RXD
8	GPIO Input 3	17	
9	GPIO Output 4	-	-

4-3. Reader Physical size



5. Installing the SmartNL-RF2000

This section explains how to choose a mounting location for the SmartNL-RF2000

1) Choosing a Mounting Location

You can mount the SmartNL-RF2000 to a wall or a beam using the mounting h

2) Connecting Cables

2-1) Connect LAN cable to main body LAN port for Ethernet communication.

Connect data cable for serial communication checking with right direction of the connector.



Ex) Push Pull type connector

Connect adapter with power supply code then connect adapter jack to main body.

2-2) Connecting External Antenna Cable (optional)

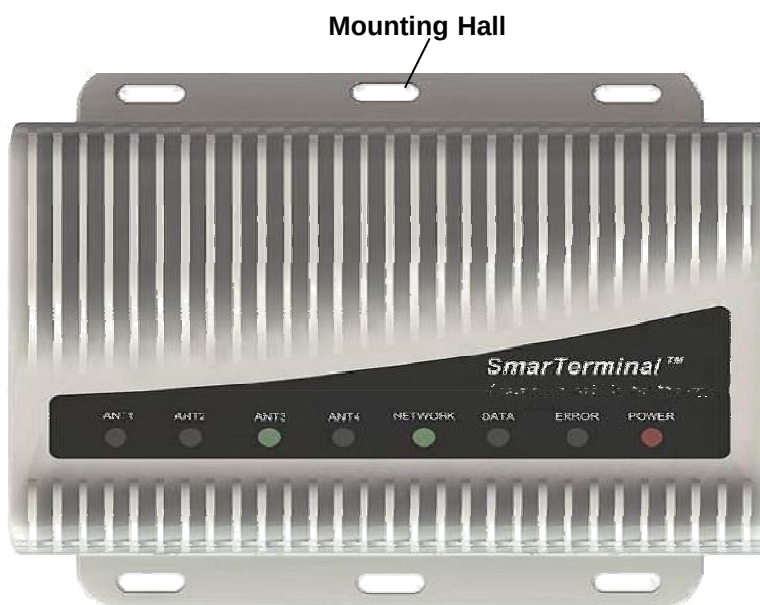
If the SmartNL-RF2000 was purchased with external antenna connector option, screw the connector of the antenna cable.

Antenna cable on the appropriate antenna attachment of the case.

Hand tighten the connector (do not use vice grips for this job).

When tying the coaxial cable, make sure no water can get into it and/or into the equipment it is attached to.

Note: do not bend the cable straight: you should keep a radius of curvature allowing the cable to bend without applying force.



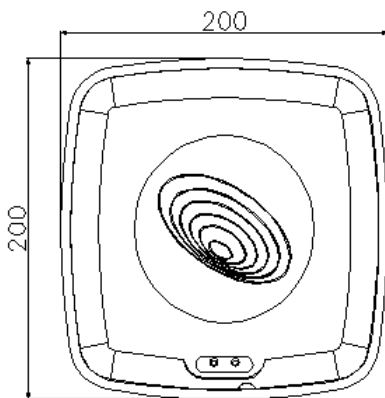
6. Antenna Specification.

6-1 Macro200 Specification.

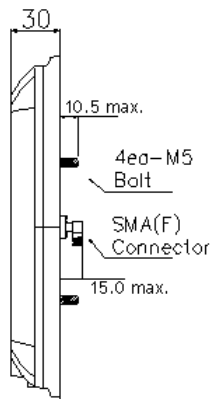
6-1-1 Electrical Specifications.

NO.	Parameters	Spec.	Unit	Remark
1	Frequency	919	MHz	
2	VSWR	1.3 : 1 max.	Ratio	
3	Impedance	50	Ohms	
4	Typical Gain	5.3	dBiL	
5	Polarization	RHCP		
6	Beam Width	70 typical	Deg.	

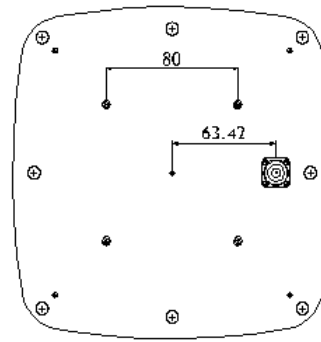
6-1-2. Mechanical Dimensions.



TOP



SIDE



BOTTOM

Tolerance Unless
Otherwise Specified : ± 2.0
Unit : mm

6-2. Macro250 Specification

6-2-1 Scope

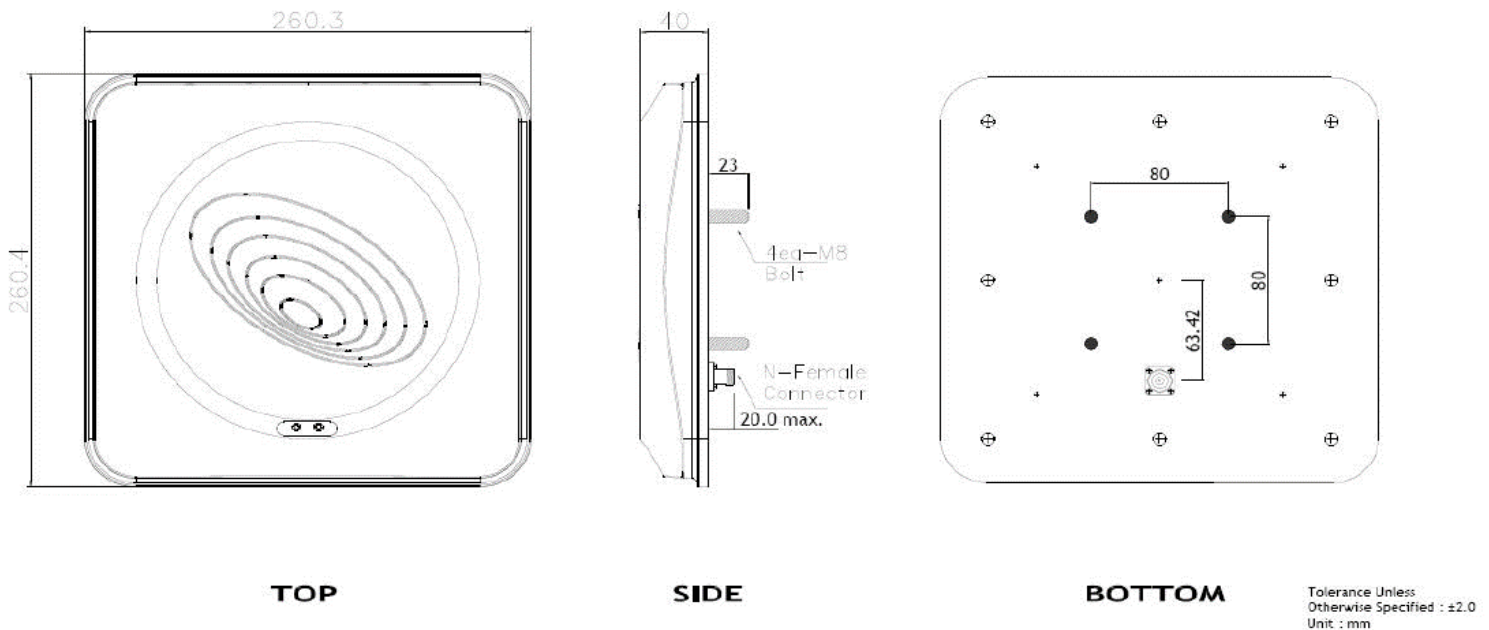
This specification covers the characteristics of the ceramic patch antenna element for the ISM band

6-2-2 Composition and Materials.

1. Substrate : Air & Insulator
2. Electrode Plating : Copper & Aluminum
3. Terminal pin : Heat-resisting ABS

6-2-3 Mechanical Dimensions.

unit: mm



NO.	Parameters	Spec.	Typical value	Unit	Remark
1	Frequency	919		MHz	
2	Band Width @ - 10 dB R.L.	60 min.	80	MHz	
3	VSWR	2.0 : 1 max.	1.1:1	Ratio	
4	Impedance		50	Ohms	
5	Gain @ Zenith	5.0~6.0		dBiL	
6	Axial Ratio	3.0	1.5~2.0	dB	
7	Polarization	RHCP			

6-3. How to install the antenna

When installing it on the metal materials which may cause the reduction of read range of Tag. It is recommended to avoid the metal material (SUS material) for bracket which is needed for the clearance.

1. Review the locations where the Reader products are placed.

Ensure that you have carefully considered the safe distances for product placement for workers and any other personnel that may get in the RF path.

If the Antenna was purchased with bracket option, which the bracket you can locate your antenna to a better or higher position to receive or transmit signals.

2. Mount the antenna that use antenna bracket that it is recommended to use Washers beneath nuts to increase adhesion.
3. Attach the antenna to one of the four antenna ports on the back of the Reader.

Note

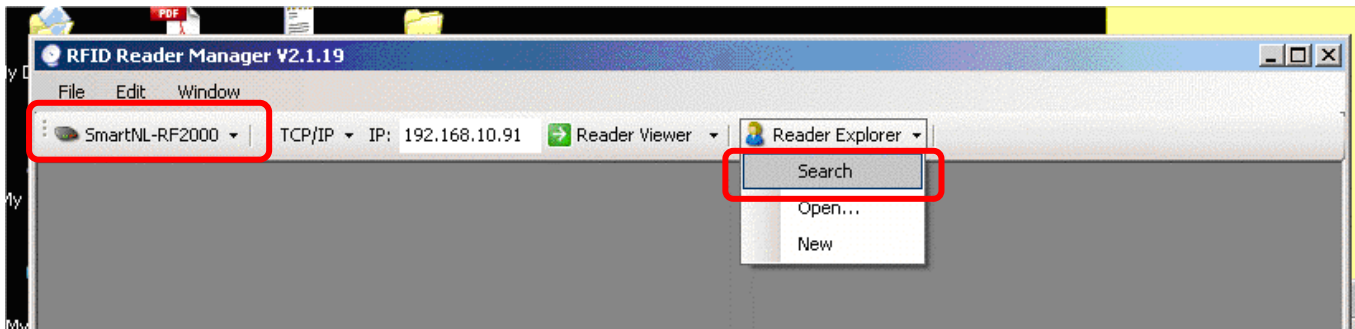
1. Avoid metal material the front side of antenna in 2M due to cause of low performance.
2. Antenna cable per each port should be not tangled and tied up.

7. Trouble shooting

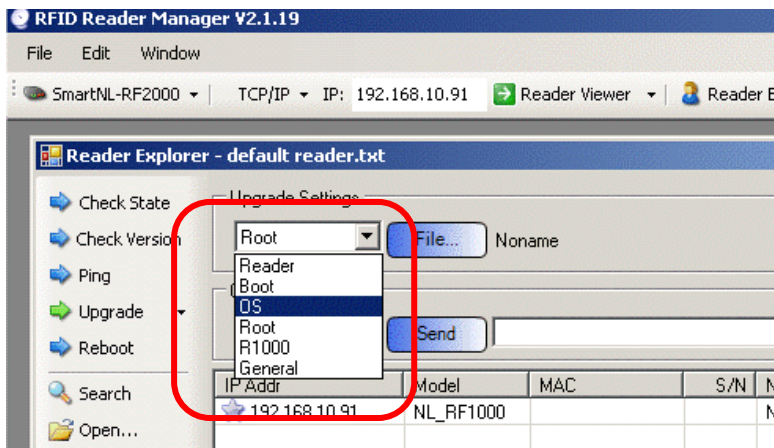
Problem	Possible Causes	Corrective Action
Reader is not reading tags.	The tag is out of its read range.	1. Ensure antenna is properly connected. 2. Ensure reader is connected to your computer. 3. Ensure computer is plugged into AC outlet and computer is On. 4. Ensure tag is within range of antenna.
Reader error LED stays lit on	1. Block read fail 2. Block write fail 3. Abnormal disconnected between RF-Reader and HOST PC	1. Turn LED lights off when receive new command.
Cannot connect to the reader.	IP address mismatched	1. set the proper IP address

8. Firmware upgrade

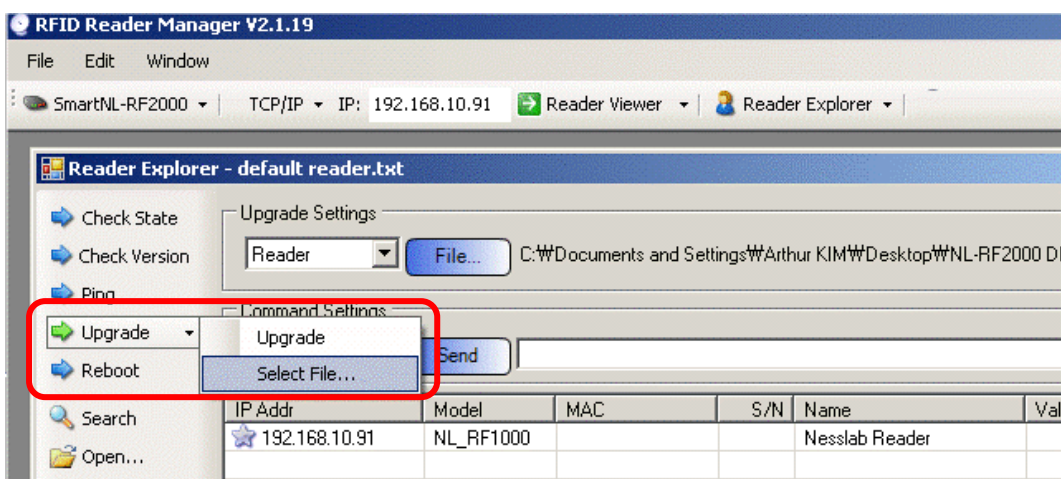
- 1) Please choose model no. you want to use
- 2) Please click the search button



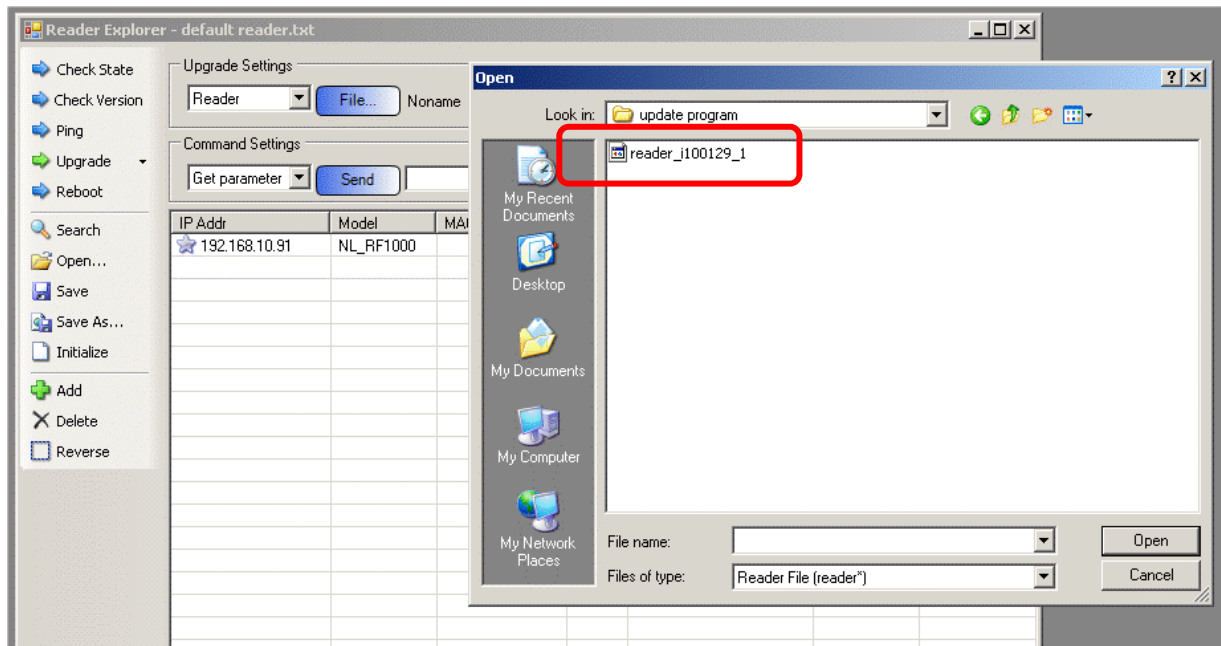
- 3) Please choose the item you want to upgrade



- 4) Please click the select file button

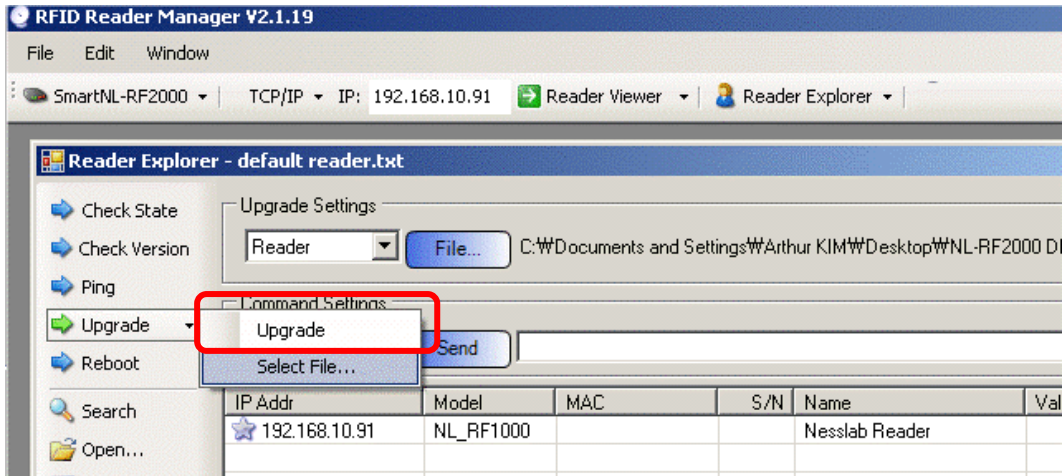


5) Please open the firmware file.



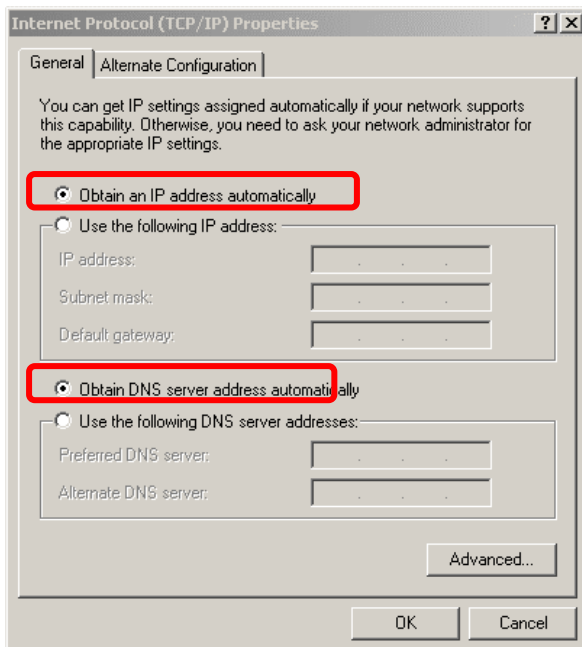
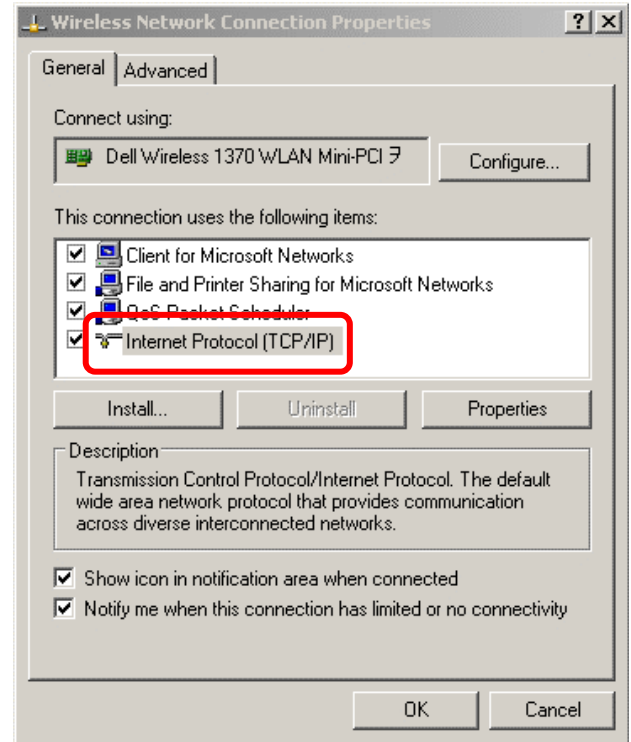
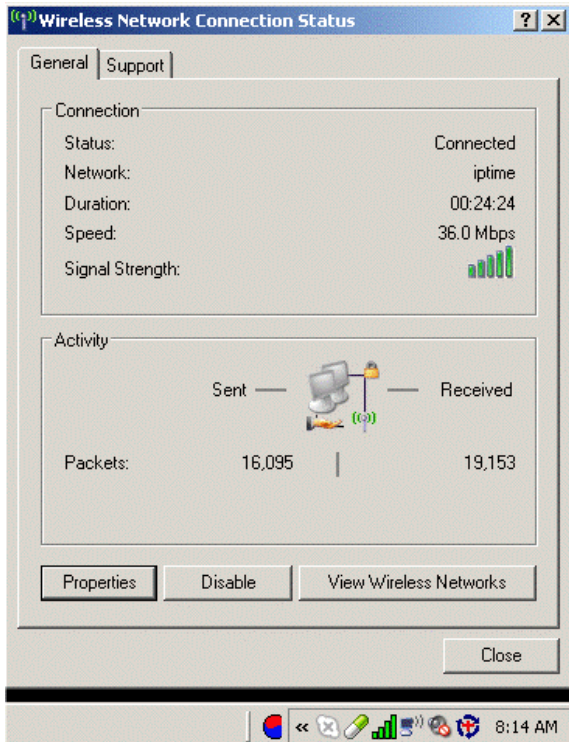
6) Please click the upgrade button

※Please firmware upgrades to all in the same way no.3~6

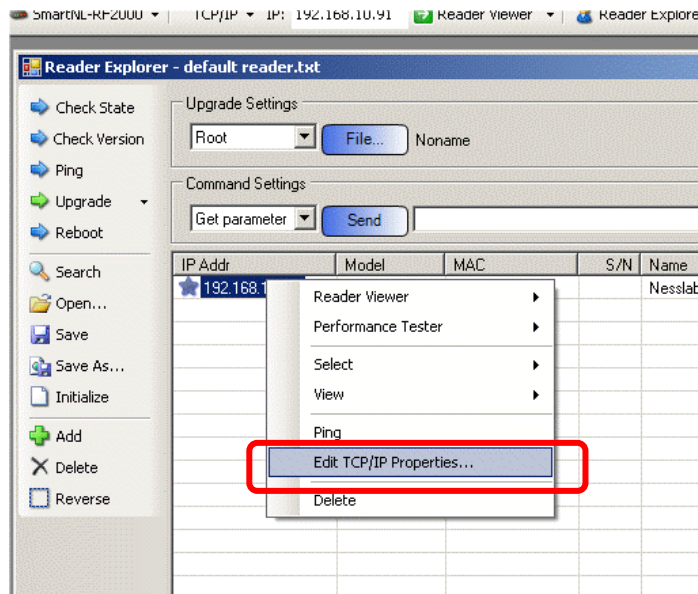


9. DHCP Setting

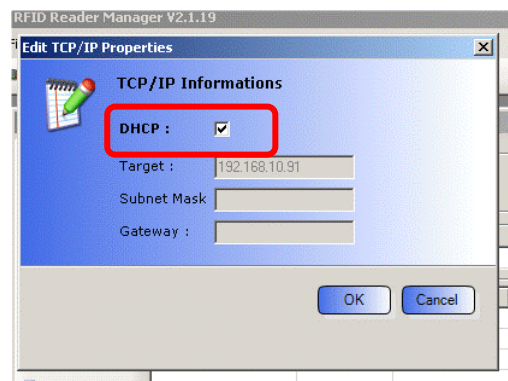
1) Please change your IP address type.



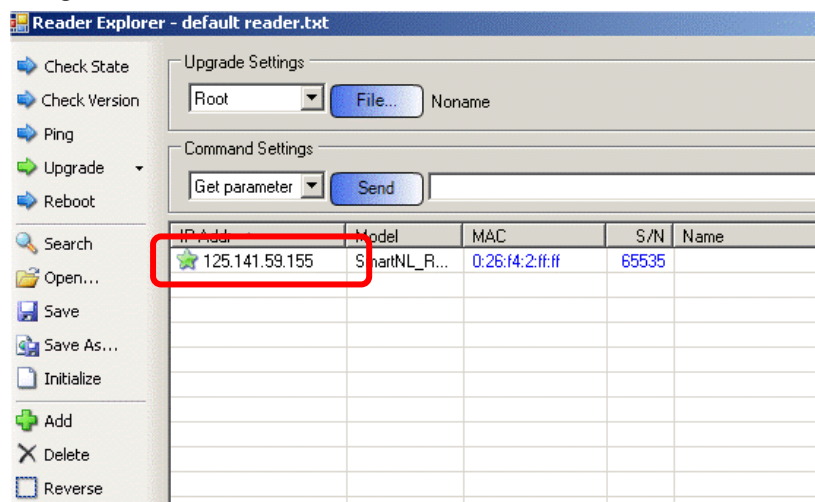
2) Please click Edit TCP/IP Properties..



3) Please Set the DHCP mode



4) IP Address will be reassigned automatically and star is changed from purple to green.



10. Manufacturer Information

If a problem using the equipment Occurs, contact the facility Technical or Systems Support

※ Headquarters

Sammi Information systems Co., Ltd

11F Kolon Aston Bldg, 505-14, Gasan-dong, Guemcheon-gu, Seoul, 153-803, Korea

TEL. +82 2 790-5505 FAX. +82 2 797-9206

※ Marketing and Sales Office

SmarTerminal Computer, Inc.

5300 Orange Ave, Suite212, Cypress CA 90630, USA

TEL. +1 714-761-5300 FAX. +1 562-252-8272

www.smarterminal.com