SU Quick Installation Guide (HW Revision E and higher)

This Quick Installation Guide is intended for experienced installers. For more detailed information please refer to the relevant sections in the *System Manual*.

SU Package Content

Check that the package contains:

- IDU Indoor Unit with a wall mounting kit.
- Mains power cord.
- Outdoor Unit.
- Pole mounting kit for the Outdoor Unit.
- Two sets of stickers (attached to the IDU). Each set includes two stickers, one with the ODU's MAC address and one with the S/N details.
- CD
- This Quick Installation Guide.

Optional Materials (available from the supplier)

- Cable kit (including one crimped shielded connector and one shielded un-crimped connector)
- Tilt Accessory Kit (refer to the *Pole Mounting the ODU with the Tilt Accessory* section in the *System Manual.)*
- A special Y-cable

Additional Equipment and Tools required for Installation

- Indoor-to-outdoor Category 5E Ethernet cable and two shielded RJ-45 connectors (for 3rd party cables use only Category 5E cables approved by the supplier). The length of the Indoor-to-Outdoor cable should not exceed 90 meters. The length of the Indoor-to-Outdoor cable, together with the length of the Ethernet cable connecting the IDU to the data equipment, should not exceed 100 meters.
- Ethernet cable (straight) for connecting to a hub/switch.
- Crimping tool for RJ-45 connectors.
- Antenna and RF Cable (for SU-E units)
- Grounding cable with an appropriate termination.
- Mains plug adapter or termination plug (if the power plug on the supplied AC power cord does not fit local power outlets).
- Portable PC with Ethernet card and Telnet or Configuration Utility SW, and a crossed Ethernet cable.
- Installation tools and materials, including appropriate means (e.g. a pole) for installing the outdoor equipment.
- To connect directly to the ODU for configuration/performance monitoring: A special Y-cable and a Notebook.

WARNING:	ONLY experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities should install outdoor units and antennas. Failure to do so may void the equipment warranty and may expose the end user or Service Provider to legal and financial liabilities. The manufacturer and its resellers or distributors are not liable for injury, damage or regulation violations associated with the installation of Outdoor Units or antennas.

ATTENZIONE: SOLO professionisti esperti che hanno familiarità con le norme di costruzione locali e coi codici di sicurezza e, ove applicabile, sono autorizzati dalle autorità governative competenti possono installare unità esterne ed antenne. Assicurarsi che le unità esterne, antenne e strutture di supporto siano installate correttamente per eliminare ogni pericolo fisico a persone o cose. In caso contrario, ciò può invalidare la garanzia del prodotto e può esporre l'utente finale o il fornitore di servizi a responsabilità legali ed economiche. Anche quando la messa a terra non è obbligatoria in base alla normativa regolatoria applicabile e ai codici nazionali, è obbligatorio garantire che l'unità esterna e il palo dell'antenna siano messi a terra e idonei dispositivi di protezione contro i fulmini siano utilizzati in modo da fornire protezione contro le sovratensioni e le scariche statiche. In ogni caso, il Fornitore e i suoi rivenditori non sono responsabili per eventuali danni fisici, danni ad oggetti o violazioni del regolamento associati con o causati dall' installazione, la messa a terra o di protezione contro i fulmini.

Installation Guidelines

1. Select the optimal locations for the equipment using the following guidelines:
   a. The antenna (integrated on the front panel of SU-A ODU or external for SU-E ODU) should provide a direct, or near line of sight, with the Base Station antenna. The antenna should be aligned to face the Base Station. The higher the placement of the antenna, the better the achievable link quality. The location of the outdoor unit should enable easy access to the unit for installation and testing. IN SU-E units, the antenna should be installed as close as possible to the ODU (to ensure that the antenna's characteristics are not affected the distance must be higher than 10 cm).
   b. The indoor equipment should be installed as close as possible to the location where the indoor-to-outdoor cable enters the building. The location of the indoor equipment should take into account its connection to a power outlet and the user's equipment.
2. Mount the ODU unit using the clamp (and optional tilt accessory) and threaded rods supplied with the unit. For vertical polarization of an SU-A unit, install the unit with the Polarization Arrow (on the back side) pointing upward. For horizontal polarization install, the unit with the Polarization Arrow pointing sideward and the connectors facing downward.

NOTE: Be sure to insert the threaded rods with the grooves pointing outward, as these grooves enable to use a screwdriver to fasten the bolts to the unit.

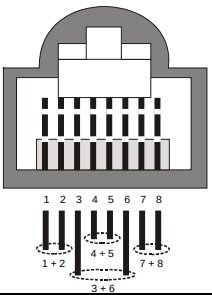
3. Connect a grounding cable between the Ground terminal of the ODU (marked ⏚) and a good ground connection.
4. For SU-E units, install the antenna and connect it to the ODU. The RF connectors should be properly sealed to protect against rain and moisture

Preparing the IDU-ODU Cable

Use a crimp tool for RJ-45 connectors to prepare the wires. Insert them into the appropriate pins and use the tool to crimp the connector. Make sure to do the following:

- Remove as small a length as possible of the external jacket. Verify that the external jacket is well inside the sealing cover when connected to the unit, to ensure good sealing.
- Pull back the shield drain wire before inserting the cable into the RJ-45 connector, to ensure a good connection with the connector's shield after crimping.

The following diagram and table show the required wire pair pin-to-pin connections, including the color codes used in cables supplied by the manufacturer.



Wire color	Pin
Blue	1
Blue/white	2
Orange	3
Orange/white	6

Wire color	Pin
Brown	4
Brown/white	5
Green	7
Green/white	8

Connecting the IDU-ODU Cable

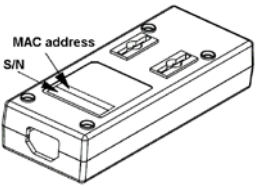
1. Remove the sealing cap of the IDU COM connector.
2. The sealing cap has a special groove allowing to insert an Ethernet cable with an already assembled RJ-45 connector through the cap. To expose the groove, lightly squeeze the cap. Carefully insert the cable with the assembled connector through the groove.
3. Put the sealing cap back in its place to ensure protection against moisture. Make sure that the small protrusion on the side of the cap fits inside the hole on the connector's protective body.
4. Use appropriate sealing material to protect the connection against moisture and humidity.
   Use high quality sealing material such as Scotch® 130C Linerless Rubber Splicing Tape from 3M to ensure protection against dust and water.
   Loop & tie the cable near the unit for strain relief and for routing water away from the unit: use additional cable strips to route the cable such that water can accumulate on the cable bends, away from the unit.

IDU Installation

1. The unit can be placed on a desktop or a shelf. Alternatively, it may be wall-mounted. The drilling template included with the unit can be used to simplify the wall installation process. Route the cable to the location selected for the indoor unit.

Assemble an RJ-45 connector with a protective cover on the indoor end of the cable. Before inserting the cable into the connector, take back the shield drain wire to ensure a good connection with the connector's shield after crimping.

2. Attach the ODU's MAC address and S/N stickers to the bottom of the IDU for future reference. (Save the spare set of stickers for future use).



3. Mount the indoor unit and connect the outdoor-to-indoor cable to its RADIO port. Connect the indoor unit to the AC mains using the power cord supplied with the unit.

NOTE: The indoor unit should be connected to the power source only after it has been connected to the outdoor unit.

The color codes of the power cord are:

Brown	*Phase*	*~*
Blue	*Neutral*	*0*
Yellow/green	*Grounding*	⏚

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4. Use a straight Ethernet cable to connect the ETHERNET port to a Hub/Switch. Use a crossed Ethernet cable to connect directly to a PC's NIC.

Basic Configuration

1. Initial configuration can be performed either via Telnet or using the configuration utility.
2. Connect a PC to the Ethernet port, using a crossed cable. The default SU's IP address is 10.0.0.1. If you use the configuration utility, you can use the Set IP feature to set the SU's IP address based on its MAC address. (Refer to the Configuration Utility Users Guide).
   NOTE: You can also connect directly to the ODU's IDU COM, using the special Y-cable (see instructions below)
3. If you use Telnet for initial configuration, run the Telnet program. Select your permitted access level and enter your Password. Access the *Basic Configuration* menu and configure the basic parameters required to allow connectivity with the base station and to support remote management of the unit. In many installations, most of these parameters should not be changed from their default values. The following list includes the basic parameters and their default values:

Table 1: Basic Configuration

Parameter	Default	Comment
Ethernet Port Negotiation Mode (in Unit Control Parameters)	Auto Negotiation	
IP Address	10.0.0.1	
Subnet Mask	255.0.0.0	
Default Gateway Address	0.0.0.0	
DHCP Options	Disable	
Access to DHCP	From Wireless Only	
Wi2 IP Address	0.0.0.0 (none)	Applicable only to WI^2 installations
ESSID	ESSID1	
Hidden ESSID Support	Disable	
Country Code Select	Depends on factory configuration	Applicable only for 5.4 and 5.8 GHz units. Country Code must comply with local regulations.
User Defined Frequency Subset	A (All)	The list of frequencies is in accordance with the selected Sub Band.
Transmit Power	Depends on HW Revision and Sub Band	Transmit Power cannot be higher than the Maximum Tx Power parameter.
Maximum Tx Power	Depends on HW Revision and Sub Band	Max Tx Power cannot be higher than the upper limit defined in the Sub Band in use.
ATPC Option	Enable	
Antenna Gain (units with external antenna)	Not Set Yet	Must be configured according to actual value, taking into account cable's attenuation.
Best AU Support	Disable	

Parameter	Default	Comment
Preferred AU MAC Address	00-00-00-00-00-00 (none)	Applicable only when Best AU Support is enabled
Maximum Modulation Level	8 (or the highest value supported according to the country code).	Refer to Configuring the Maximum Modulation Level below.
Management-VLAN ID	65535	
Authentication Algorithm	Open System	Availability of security parameters depends on support according to the country code.
Data Encryption Option	Disable	
Security Mode	WEP	
Default Key	Key 1	
Key 1 to Key 4	00…0 (32 zeros, no key)	

4. Reset the unit to apply the changes.

IMPORTANT NOTE (for SU-E models): The unit (without antenna) is delivered with the Antenna Gain parameter configured to "Not Set Yet". The unit will not transmit until the value for the antenna gain is configured. The unit will use this value to calculate its maximum output power for maintaining compliance with maximum EIRP limitations according to the applicable regulations.

Aligning the Antenna

1. Point the antenna (on the front side of the ODU or external) in the general direction of the Base Station.
2. Verify that the power indication of the unit is on. Verify that the W-LINK LED of the ODU is on, indicating that the unit is associated with an Access Unit. If the W-LINK LED ( ) is off, check that the ESSID and Frequency parameters are correctly configured. If the SU is still not associated with the AU, increase the transmit power level to its maximum value. If the unit is still not associated with the AU, try to improve the quality of the link by changing the direction of the antenna or by placing the antenna at a higher or alternate location.
3. Rotate (and/or tilt if applicable) the antenna until the maximum SNR reading is achieved, where at least 1 green LED of the SNR bar is on: If you encounter prolonged difficulty in illuminating the minimum required number of green LEDs, try to improve the reception quality by placing the antenna at a higher point or in an alternate location.
4. Ensure that the front of the antenna is always facing the Base Station. However, in certain conditions, such as when the line of site to the Base Station is hampered, better reception may be

achieved using a reflected signal. In this case, the antenna is not always directed toward the Base Station.

5. Secure the unit firmly to the pole.

NOTE: In some cases, the antenna may need to be tilted to ensure that the level at which the SU receives transmissions from the AU (and vice versa) is not too high. As a rule of thumb, if the SU is located at a distance of less than 300 meters from the AU, it is recommended to up-tilt the antenna by approximately 10° to 15°. To guarantee a safety margin from the saturation level, the SNR should not be higher than 50dB. The orange LED of the SNR bar indicates that the SNR is higher than 50dB.

Configuring the Maximum Modulation Level

Check the SNR of the SU at the AU. You can use Telnet to view the SNR values in the MAC Address Database, which can be accessed from the Site Survey menu. If the ATPC algorithm is not enabled in both AU and SU, the test should be done with the Initial Power Level at the SU configured to its maximum value. If the SNR is lower than the values required for the maximum modulation level according to the Recommended Maximum Modulation Level table below, it should be changed. It is recommended that a 2 dB margin be added to compensate for possible measurement inaccuracy or variance in the quality of the link.

NOTE: The SNR measurement at the AU is accurate only when receiving transmissions from the applicable SU. Use the Ping Test utility in the Site Survey menu to verify data transmission.

Table 2: Recommended Maximum Modulation

SNR	Maximum Modulation Level
SNR > 23 dB	8
21 dB < SNR < 23 dB	7
16 dB < SNR < 21 dB	6
13 dB < SNR < 16 dB	5
10 dB < SNR < 13 dB	4
8 dB < SNR < 10 dB	3
7 dB < SNR < 8 dB	2
6 dB < SNR < 7 dB	1

Fast Configuration and Antenna Alignment Using the Y-Cable

1. Disconnect the IDU-ODU cable from the ODU.
2. Connect one end of the Y-cable to the ODU's IDU COM connector.
3. On the other end of the Y-cable, connect a Notebook to the PDA connector and the IDU-ODU cable to the IDU connector.

4. From the Notebook, connect to the SU and complete the process of configuring basic parameters.
5. Align the antenna using the instructions above.

Verifying Proper Operation

1. Once you have connected the unit to an Ethernet outlet, verify that the green Ethernet connectivity indicator is on, blinking whenever the unit receives or transmits traffic on the Ethernet port.
2. Verify data connectivity by pinging the Access Unit or by connecting to the Internet.
3. To verify proper operation view the ODU LED indicators:

Table 3: Outdoor Unit LEDs

Name		Description	Functionality
W-LINK		Wireless Link traffic Indication	Green: Unit is associated with an AU, no wireless link activity Blinking Green: Data traffic on the wireless link. Blinking rate is proportional to traffic rate Off: Wireless link disabled
Status		Self-test and power indication	Green: Power is available and self-test passed. Blinking Amber: Testing (not ready for operation) Red: Self-test failed. Fatal error
ETH		Ethernet activity/ connectivity indication	Green: Ethernet link between the indoor and outdoor units is detected, no activity Blinking Green: Ethernet connectivity is OK, with traffic on the port. Blinking rate proportional to traffic rate. Red: No Ethernet connectivity between the indoor and outdoor units.
SNR bar		Received signal strength Indication	Red LED: Signal is too low (SNR < 4dB). 8 green LEDs: Quality of the received signal. Orange LED: Signal is too high (SNR > 50dB).

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to EN300385 rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment notwithstanding use in commercial, business and industrial environments. 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.

FCC Radiation Hazard Warning

To comply with FCC RF exposure requirement, the antenna used for this transmitter must be fixed-mounted on outdoor permanent structures with a separation distance of at least 2 meter from al persons.

R&TTE Compliance Statement

This equipment complies with the appropriate essential requirements of Article 3 of the R&TTE Directive 1999/5/EC.