CSI SECTION 255110

INTEGRATED ROOM AUTOMATION SYSTEM

This document defines and specifies an integrated room automation system using both wired and wireless modes of communication. The wireless communication required to control the system uses the following technology:

- Radio frequency (RF) Deep Mesh Technology for both in-room and room-server communication.

This specification is provided in the format recommended by the Construction Specifications Institute (CSI).

PART 1—GENERAL

SUMMARY

A. Provide a complete, integrated room automation system using wired or wireless technology for the following:

1. HVAC equipment
2. Lighting
3. Central electronic room access control
4. Integrated LCD displays and room controls
5. Integrated VOIP telephony and room controls
6. Central interface (CI) server application
7. Remote room monitoring and communications
8. Privacy/Service and other guest annunciation such as Butler Call, VIP, ecoMODE® or Valet
9. Drape, Sheer and Shade control.
10. Monitoring of mini-bar, room safe and smoke detectors.

RELATED WORK

A. Examine contract documents for requirements that affect work of this section. Other Specification sections that relate directly to work of this section include, but are not limited to:

11. Division 23—Heating, Ventilating and Air Conditioning (HVAC)
12. Division 26—Electrical Power Wiring to System Hardware
13. Division 27—Communications
14. Division 28—Electronic Safety and Security
15. Division 33—Utilities0.

SUBMITTALS

A. Product Data: Submit the Manufacturer's product data and installation instructions for each component and system.

B. Shop Drawings: Submit list of components and equipment to be supplied, including proposed locations, clearances and power requirements.

C. Operations and Maintenance Manual: Submit the Manufacturer's standard operations and maintenance manual, including emergency maintenance provider.

D. Qualifications: Submit documentation from the Manufacturer and Installer indicating qualifications listed in Section 1.4, Quality Assurance.

E. Warranty: Submit the Manufacturer's standard one-year labor and parts warranty for turnkey installation.

QUALITY ASSURANCE

A. Qualifications of Manufacturer: The Manufacturer shall have a minimum of 20 years documented experience manufacturing integrated room automation systems having similar or more stringent requirements than the system for the current project. The Manufacturer shall submit a list of at least 15 completed projects using similar integrated room automation systems.

B. Qualifications of Installer: Submit a letter signed by the Manufacturer stating that the Installer is licensed by or acceptable to the Manufacturer of the integrated room automation system.

DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened, factory-labeled packages. Store and handle in strict compliance with the Manufacturer's instructions and recommendations. Protect from damage. Sequence deliveries to avoid delays, but minimize on-site storage.

COORDINATION

A. Conference: Convene a pre-installation conference to establish procedures to coordinate this work with related and adjacent work.

B. Coordination: Furnish inserts and anchors that must be built into other work. Work closely with installers of finish materials so that units are properly aligned with adjacent materials.

PART 2—PRODUCTS

MANUFACTURER

A. Acceptable Manufacturer: INNCOM by Honeywell, Contact Bill Russell – 972-235-0299 or via e-mail at bill.russell@inncom.com INNCOM factory (860)739-4468; www.inncom.com.

SYSTEM DESCRIPTION

A. HVAC Controls:

1. **HVAC Type:** The control strategy will be dependent on the type of HVAC equipment that is being proposed. The control equipment shall be compatible with most HVAC equipment with 5 relay control including FCUs, PTACs, WSHPs (Water Source Heat Pump), VTACs (Vertical Terminal Air Conditioners) and pre-qualified VRV/VRF equipment. For the most common lodging HVAC designs, the following control strategies shall be applied:

   a. **Fan Coil Unit (FCU):** The System shall control one 4-pipe Fan-Coil Unit (FCU) in each room. The System shall directly control a 1-, 2-, or 3-speed, line-voltage fan motor with rating of up to 1/2 HP and 2 spring-return control valves or equivalent low voltage (24VAC) controls The System can alternatively control 2 proportional valves that regulate the cold and hot water flow. INNCOM can/will provide the FCU Vendor with an electronic board, an X05B with the X06, X06.DIN or X47 modules to be installed at point of manufacture into the FCUs for control of the proportional valves. Depending on the specific equipment selected, INNCOM may also specify the use of the X47 controller. The System shall provide automatic switchover from heating to cooling operation at each room. Variable Fan Drivers (VFD) are also available for fan control via 0-10VDC or PWM (0-10VDC).

   b. **Packaged Terminal Air Conditioners (PTAC):** The System shall control one PTAC in each room. The System shall directly control a 1-, 2-, or 3-speed, low-voltage interface. The System will also control the compressor and associated heating equipment. INNCOM will provide the PTAC Vendor with the necessary control card or connectors to be installed at point of manufacture or in the rooms. In case of previously installed PTACs, the same equipment can be installed in-place by trained personnel. The System shall provide automatic switchover from heating to cooling operation at each room.

   c. **Water Source Heat Pumps (WSHP):** The System shall control one WSHP in each room. The System shall directly control a 1-, 2-, or 3-speed, line-voltage or low-voltage interface. The System will also control the compressor and associated heating equipment. INNCOM will provide the WSHP Vendor with the necessary control card or connectors to be installed at point of manufacture or in the rooms. In case of previously installed WSHPs, the same equipment can be installed in-place by trained personnel. The System shall provide automatic switchover from heating to cooling operation at each room.

   d. **Vertical Terminal Air Conditioners (VTAC):** The System shall control one VTAC in each room. The System shall directly control a 1-, 2-, or 3-speed, low-voltage interface. The System will also control the compressor and associated heating equipment. INNCOM will provide the VTAC Vendor with the necessary card or connectors to be installed at point of manufacture or in the rooms. In case of previously installed VTACs, the same equipment can be installed in-place by trained personnel. The System shall provide automatic switchover from heating to cooling operation at each room.

   e. **Variable Refrigerant Volume/Variable Refrigerant Flow Units:** The System shall control one VRV/VRF unit in each room. These systems all have unique control sequences which require INNCOM to work closely with their respective manufacturers. Please contact INNCOM for the up-to-date listing of which systems have been pre-qualified.

   f. **Split Systems:** The System shall control one Split System in each room. The System shall directly control a 1-, 2-, or 3-speed, low-voltage interface. The System will also control the

compressor and associated heating equipment. INNCOM can/will provide the Split System Vendor with the necessary control card or connectors to be installed at point of manufacture or in the rooms. In case of previously installed Split Systems, the same equipment can be installed in-place by trained personnel. The System shall provide automatic switchover from heating to cooling operation at each room.

2. **HVAC Control Strategies:** Provision shall be made to prevent the system from switching repeatedly from cooling to heating and back while attempting to maintain a constant target temperature. The System's temperature-control performance shall meet the requirements defined below for proportional valves. The System's humidity-refresh performance shall meet the requirements defined below.

   a. **Temperature Control:** The System in the room shall employ a PID algorithm to minimize fan speed and valve changes and to reduce servo-loop error. Such error, measured as the temperature difference between the set target temperature and the measured room temperature, shall not exceed 1.0° F (+/- 0.5° C) under steady-state conditions and will automatically compensate for changes in the heat/cooling load of the room. The temperature control algorithm shall be capable of using the full resources of the FCU to maintain target temperature. Proportional-only algorithms that set the fan speed in proportion to the error shall not be accepted (as they cause a temperature control error that increases with the fan speed).

   b. **Humidity Refresh:** The System in the room shall be capable of maintaining a maximum level of humidity. The refresh cycle will activate in unoccupied rooms only.

   c. **Humidity Refresh Cycle:** The room air conditioning shall be activated on a pre-defined duty cycle to remove excess humidity. The System shall monitor, via central sensors or individual room sensors, the air temperature and relative humidity. When the relative humidity exceeds a preset threshold, the room AC shall be activated if the AC has been shut down for a period of time that exceeds a programmable time value (for example, if the AC has not run for the last one hour).

   d. **Fan Speed Control:** Fan speed shall be selected automatically by the System to match the heat gain/loss in the room. Fixed-fan operation shall also be available to the guest. Fan speeds shall be field-programmable to allow limiting fan speeds to a desired range of speeds. For example, if the High Fan of the FCU is objectionable to the guest due to the noise level it creates, the System shall be capable of being programmed on a room-by- room basis to maintain Medium Fan speed and not enter into the High Fan speed under any condition. Fan operation shall be configurable to provide for "Continuous Fan" or "Automatic Fan." Continuous Fan means that the fan shall run even when the target temperature has been satisfied. Automatic Fan means that the fan shall run only on active heating or cooling call.

   e. **Multiple HVAC Zone Rooms (Suites):** The System shall be capable of supporting multi-zone rooms, where the rooms are not separated by a door yet each room has multiple HVAC units. The System shall be able to link the thermostats and bedside panel (if provided) in these rooms so that they track. This prevents having one room call for heat while the other is calling for cooling.

   f. **Temperature History:** The System shall have the capability to store the temperature, valve, and fan states for each room for at least three months, with all changes being reported.

   g. **Energy Conservation:**

1) The System shall provide optimized energy conservation measures with minimum inconvenience to the guest. At least four setback strategies shall be employed: two when a room is unrented (either occupied by staff or unoccupied), and two more when a room is rented (either occupied or unoccupied).

2) The System shall obtain rented status automatically from the Property Management System (PMS). No manual data entry shall be required by the hotel to update the room-rented status.

3) The System shall determine room occupancy automatically. The System shall keep the room status as occupied even while the guest is asleep.

4) Setback values and related parameters shall be independently adjustable for rented and unrented modes. For example, a room may be declared unoccupied 15 minutes after door closure if rented and no motion was detected, but it may take only two minutes to return the room to the unoccupied mode if the room is unrented.

5) Reduced on/off switching during the night or "night setback" shall be available for implementation by choice of the property as a means to further reduce energy consumption while the guest is asleep.

6) The System will also implement setback strategies or cycle off HVAC equipment when exterior doors or windows are opened and the space is trying to maintain a target temperature. Switches will be applied to all active exterior windows and doors. They can be either wired or wireless.

7) The System shall also offer occupancy based lighting control which can also be coupled with a Master Light Switch installed by the entry door.

8) The System can include peak demand controls that will interface with the Building Management System (BMS) or use an integrated peak demand limiting module. Load shedding strategies will be initiated in the following hierarchy: Unrented rooms will be set back first; then rented, unoccupied rooms; and finally rented, occupied rooms. Demand parameters and load shedding sequences shall be adjustable to allow for minimal guest discomfort while optimizing energy conservation efforts.

h. **Digital Thermostat (Model E7)**: the unit features a smart wall plate which stores the room configuration for all controlled devices in the guestroom. This smart wall plate also stores information for ancillary devices/systems such as locks, mini bars, drape controls, etc.

1) The System shall include a wall-mounted, illuminated digital thermostat. The thermostat will be able to display current room temperature, target temperature, and outside temperature in degrees F and degrees C, as well as the humidity level.

2) The thermostat shall be easy to operate and shall allow changing the target temperature in steps of 1° F or 0.5° C. Clear indication shall be provided when the HVAC has been turned off.

3) The thermostat shall have the capacity to work with a built-in Passive Infrared (PIR) motion sensor OR a remote PIR motion sensor OR combinations of both.

4) The thermostat will support in-room voice control.

5) The thermostat shall provide proximity detection and a light sensor to provide a dynamic user interaction with dimmable display.

6) The thermostat shall be capable of directly controlling HVAC units operating on voltages ranging from 24VAC to 277VAC without the requirement of secondary control relays for the higher voltage applications. The thermostat shall include surge protection up to 400 volts for 5 minutes.

7) The thermostat shall also be provided with an RF and Bluetooth transceiver that will allow remote control of lamps that are equipped with RF/BLE receiving modules, an RF/BLE capable Entry Light Switch, and the Electronic Door Lock (EDL).

8) The thermostat shall also be Bluetooth Low Energy ready for integration with Amazon Alexa Control or BLE enabled door locks.

9) The thermostat shall be connectable to the System via RF or a 2-conductor, low-voltage cable. The thermostat shall also have the capability of connecting to the HVAC equipment wirelessly via RF or Infrared signals..

10) The thermostat shall be capable of controlling HVAC units wirelessly RF (Zigbee-compatible) technology.

11) The thermostat shall detect the light level in the room and adjusts the backlight illumination to a subtle glow and display target temperature. Upon approach the thermostat awakens and provides information about the system. The thermostat acts as a nightlight in the guest room.

12) The thermostat shall have 5 control relays, analog 0-10v control and digital L/O that can be addressed for items such as door inputs, condensate overflow switches, etc.

i. **Digital Thermostat (Model E528)**: the unit shall be modular in construction so that each of the modules can be added at a later time if not installed initially.

13) The System shall include a wall-mounted, illuminated digital thermostat. The thermostat will be able to display current room temperature, target temperature, and outside temperature in degrees F and degrees C, as well as the humidity level.

14) The thermostat shall be easy to operate and shall allow changing the target temperature in steps of 1° F or 0.5° C. Clear indication shall be provided when the HVAC has been turned off.

15) The thermostat shall have the capacity to work with a built-in Passive Infrared (PIR) motion sensor OR a remote PIR motion sensor OR combinations of both.

16) The thermostat shall be capable of directly controlling HVAC units operating on voltages ranging from 24VAC to 277VAC without the requirement of secondary control relays for the higher voltage applications. The E528 thermostat shall also be available in a battery operated version to facilitate installation where the provision of power may not be practical.

17) The thermostat shall also be provided with an RF transceiver that will allow remote control of lamps that are equipped with RF receiving modules, an RF capable Entry Light Switch, and the Electronic Door Lock (EDL).

18) The thermostat shall be connectable to the System via RF or a 2-conductor, low-voltage cable. The thermostat shall also have the capability of connecting to the HVAC equipment wirelessly via RF or Infrared signals.

19) The thermostat shall be capable of controlling HVAC units wirelessly RF (Zigbee-compatible) technology.

20) The thermostat shall be capable of having the ecoMODE® button added as an option that the guest can use to opt-in to the property's sustainability practices. 0)

j. **Digital Thermostat (Model E527):** the unit is designed to offer a smaller installation footprint and can be installed over a standard British size back box. It can also be installed on an adapter plate that fits over the opening of a standard thermostat.

1) The System shall include a wall-mounted, illuminated digital thermostat. The thermostat will be able to display current room temperature, target temperature, and outside temperature in degrees F and degrees C, as well as the humidity level.

2) The thermostat shall be easy to operate and shall allow changing the target temperature in steps of 1° F or 0.5° C. Clear indication shall be provided when the HVAC has been turned off.

3) The thermostat shall have the capacity to work with a built-in Passive Infrared (PIR) motion sensor OR a remote PIR motion sensor OR combinations of both.

4) The thermostat shall be capable of controlling HVAC units operating on voltages ranging from 12VDC to 277VAC with the pairing of secondary control relays.

5) The thermostat may be connected to an external RF transceiver that will allow remote control of lamps that are equipped with RF receiving modules, an RF capable Entry Light Switch, and the Electronic Door Lock (EDL).

6) The thermostat shall be connectable to the Integrated Room Automation System (IRAS) via RF or a 2-conductor, low-voltage cable. The thermostat shall also have the capability of connecting to the HVAC equipment wirelessly via RF signals.

7) The thermostat shall be capable of controlling HVAC units wirelessly RF (Zigbee-compatible) technology.

8) The thermostat shall be capable of having the ecoMODE® green button added as an option that the guest can use to opt-in to the property's sustainability practices.

k. **Digital Thermostat (Model E529):** the unit shall be modular in construction so that each of the modules can be added at a later time if not installed initially.

1) The System shall include a wall-mounted, illuminated digital thermostat. The thermostat will be able to display current room temperature, target temperature, and outside temperature in degrees F and degrees C, as well as the humidity level.

2) The thermostat shall be easy to operate and shall allow changing the target temperature in steps of 1° F or 0.5° C. Clear indication shall be provided when the HVAC has been turned off.

3) The thermostat shall have the capacity to work with a built-in Passive Infrared (PIR) motion sensor OR a remote PIR motion sensor OR combinations of both.

4) The thermostat shall be capable of controlling HVAC units operating on voltages ranging from 12VDC to 277VAC with the pairing of secondary control relays. The thermostat shall be battery operated to facilitate installation where the provision of power may not be practical.

5) The thermostat shall also be provided with an RF transceiver that will allow remote control of lamps that are equipped with RF receiving modules, an RF capable Entry Light Switch, and the Electronic Door Lock (EDL).

6) The thermostat shall have the capability of connecting to the HVAC equipment wirelessly via RF signals.

7) The thermostat shall be capable of controlling HVAC units wirelessly RF (Zigbee-compatible) technology.

8) The thermostat shall be capable of having the ecoMODE green button added as an option that the guest can use to opt-in to the property's sustainability practices.

I. MODEVA® Glass Series Digital Thermostats: These units are part of the MODEVA Glass Series Collection and offer touch capacitance function activation. They are available in standard and custom designs.

1) The System shall include a wall-mounted, illuminated digital thermostat. The thermostat will be able to display current room temperature, target temperature, and outside temperature in degrees F and degrees C.

2) The thermostats shall be easy to operate and shall allow changing the target temperature in steps of 1º F or 0.5º C. Clear indication shall be provided when the HVAC has been turned off.

3) The thermostats shall have the capacity to work with a remote Passive Infrared (PIR) motion sensor.

4) The thermostat shall be capable of controlling HVAC units operating on voltages ranging from 12VDC to 277VAC with the pairing of secondary control relays.

5) The thermostat may be connected to an external RF transceiver that will allow remote control of lamps that are equipped with RF receiving modules, an RF capable Entry Light Switch, and the Electronic Door Lock (EDL).

6) The thermostat shall be connectable to the Integrated Room Automation System (IRAS) via a 2-conductor, low-voltage cable. The thermostat shall also have the capability of connecting to the HVAC equipment wirelessly via RF signals by connecting to external RF.

7) The thermostat shall be capable of controlling HVAC units wirelessly RF (Zigbee-compatible) technology.

8) The thermostat shall be capable of having the ecoMODE, Privacy, and Service annunciation touch surfaces as optional functions.

3. Occupancy Detection: The System shall combine inputs from the EDL (Electronic Door Lock) or door-position switch and from a PIR motion detector to determine whether the room is occupied at any time. Activation of any switch on the digital thermostat or any light switch that is controlled by the System while the entry door is closed shall place the room in the occupied mode. The current occupancy state of the room shall be available to the room controller that controls the room HVAC system, as well as to the outside door panel and to a server and its workstations. 0.

B. Lighting Controls:

1. Lighting control strategy is dependent on the building codes in effect at the location of the property and the period during which it is constructed, the intent of the lighting design, and the type of lighting fixtures or lamps being proposed. Most lodging lighting designs employ one or more of the following approaches: 0.

   a. **Welcome Lights:** The overhead lights in the room shall be turned on when the guest enters the room the first time after check-in and, if so chosen by the property management, after each subsequent return to the unoccupied room.

   b. **Master Light Switch:** The switch by the entry door shall be able to act as a master light switch and turn off all lights and lamps when activated by the guest. Each S217 or S217D shall control one circuit and will communicate via low-voltage wiring or wirelessly, via RF, to the L506 or L208 equipped lamps and via low-voltage wiring to other S217, S217D, S-Series, Designer Series, MODEVA, or EVORA switches and Tabletop Controllers that may be installed in the room to control other lighting circuits.

   c. **Lighting Scenes:** Lighting fixtures and/or lamps may be grouped to turn on/off or dim to preset levels via programmable, low-voltage switches. Other control functions, such as temperature up/down, drapes open/close, and Privacy/Service notification, shall also be available for control through these programmable switches. These lighting scenes and other functions shall be controllable through the following options:

      i. **EVORA™ programmable switches:** These switches shall be available with screwless Decora-style plates in white, eagle almond, light almond, and black plastic finishes as standard colors. Custom colors shall also be available for special ordering upon request. The switches shall be available in configurations of one to five programmable switches per single gang size plate. The switches shall be available with engraved text descriptors or custom icons that visually describe the function assigned to the switch. The switches shall also be equipped with color (blue, amber) LED indicators with programmable brightness levels.

      ii. **Designer Series programmable switches:** These round switches shall be available with screwless, plates in white, eagle almond, light almond, and black plastic finishes as a standard item and in a variety of other materials (glass, metal, composites, and wood) as a custom order. The switches shall be available in configurations of one to six programmable switches per single gang size plate (US standard) or one to four programmable switches per single gang size plate (British/International standard) or in a greater number of switches via custom order for custom size plates. The switches shall be available with silk-screened or engraved standard icons or text descriptors or the plates can be engraved with text or icons that visually describe the function assigned to each switch. The switches shall also be equipped with color LED indicators (standard: blue, red; custom colors by special order) with programmable brightness levels. The switches shall be available for traditional wall installation as well as for installation in millwork or furniture.

iii. **MODDEVA® Glass Series programmable switches:** These touch capacitance switches shall include screwless mounting capability into standard US style single, double, and triple gang back boxes. They shall be available with multiple touch switching surfaces or coupled sliding touch dimmers with matching LEDs; they shall be available in single slider touch dimmer configurations in standard and custom art designs. The switches shall have the option of being equipped with color LEDs, back-lighting of function labels, and indicators with programmable brightness levels. The switches shall be available for traditional wall installation as well as for installation in millwork or furniture.

iv. **Bedside Controllers:** All lighting control shall be available through standard and custom designed controllers that incorporate the S-Series, Designer and Glass programmable switches, Tabletop touch screen devices and remote controller devices such as iPhones and iPads.

v. **Plug Load:** Control supported via load center lighting circuits or Leviton Zigbee plug hardware

vi. **Integration with third party light switche**s: Leviton Zigbee Light switches, and lighting controls shall be such that they can also accept inputs from third party (momentary input) light switches.

vii. **Integrated telephony/control devices:** Lighting control shall also be available through VOIP telephones or an analog telephone integrated with a color touch screen that can be integrated with the INNCOM system.

C. **Access Control:** The System shall seamlessly integrate with select third party (Hafele, Saflok, Salto, TimeLox, or Vingcard) Electronic Door Locks (EDLs) to create a centrally controlled access control system. The integrated access system shall meet the following requirements:

1. **Wireless Link:** The EDL shall communicate with the System via an RF wireless wall-mounted entry light, a wireless ceiling-mounted RF transceiver or a wireless wall-mounted RF transceiver or directly via RF equipped thermostats.

   a. If the locks are equipped with INNCOM approved RF transceivers provided by the respective manufacturers, then the locks shall communicate with INNCOM RF equipped room devices. The information packets shall be received from the locks and transmitted via the common INNCOM backbone network (wired or wireless).

2. **Wireless Wall-Mounted Entry Light:** A wireless wall-mounted entry light (S217, S217D, EVORA or MODEVA) switch will be installed in the guestroom and a wireless transceiver installed in the guestroom side of the lock. The transceiver will be installed by Hafele, Saflok, Salto, TimeLox or Vingcard. The link shall be immune to interference from radio signals generated by two-way communication devices in the property.

3. **Fast Response:** The link between the System and the EDL shall provide a 0.5-second response time to meet the functional requirements defined herein**.**

4. **EDL Battery Life:** The addition of the required circuitry in the EDL to facilitate wireless communication with the System shall not materially reduce the service life of the batteries that power the EDL. Under no condition shall the service life be less than 18 months. A low battery warning shall be provided as a system alarm.

5. **Door Status:** The linked EDL shall report to the System any change in the status of the door opening. Such information shall be used by the System in its Occupancy logic, as defined herein. Note that said link shall alleviate the need for the installation of a separate door contact.

6. **Staff Access Restriction:** In addition to the normal staff access rights as controlled by the door locks, the EDL shall deny access to low-level staff cardkeys when a guest occupies the room.
7. **Staff Access Cancellation:** The System shall allow instantaneous cancellation of any staff card, without affecting the access rights of other staff cards. The cancellation shall take effect in specific rooms, a group of rooms, or the entire property within three seconds. The System shall automatically update the cancellation list in replaced locks to prevent access by unexpired, cancelled staff cards.
8. **Guest Card Cancellation:** The guest card shall be denied access to a room immediately upon the guest checkout, even if the card's date of expiration has not yet been exceeded.
9. **VIP Guest Cards:** The System shall accept pre-issued VIP cards for access to the guestroom. Authorization for the use of VIP cards shall be passed to the System from the Property Management System (PMS). The System shall transmit this authorization to the appropriate EDL.
10. **Alarms and Reports:** The System shall report the following exception conditions:
    b. **Low EDL Battery:** The System shall generate a report of all EDL that have a low battery condition. Replacing the battery in the EDL will automatically clear the alarm condition in the central computer.
    c. **Door Open Too Long:** The System shall generate an alarm if the guestroom door has been left open for a period exceeding a preset time period.
    d. **Door Ajar:** The System shall generate an immediate alarm if the guestroom door is partially closed, but not latched.
    e. **Access History:** Every access or attempted access from any guestroom door shall be reported and stored within 15 seconds at the server level. This data shall be available for retrieval by date, room number, or card number from the EDL server. Staff card access information shall also be accessible for retrieval by staff member name.
11. **Remote Door Control:** The System shall allow authorized staff to unlock EDLs remotely.
12. **Fault Tolerance:** The System shall allow authorized access to the guestroom by both staff and guest, even in the event of power failure to any component of the System.
13. **In-Room Diagnostics:** The System shall provide a simple method of allowing the staff to determine if an access problem is caused by the EDL or by a System component.
14. **Central Diagnostics:** The System shall allow direct diagnostic and programming of parameters in the EDL, if authorized by the EDL manufacturer. Such diagnostics shall be similar to the functions available at the EDL using a hand-held diagnostic tool provided by the EDL manufacturer.
15. **Integrated VOIP Telephony and Room Controls:** The System shall seamlessly integrate the functions of a VOIP instrument with select, programmable guestroom control functions available through the touch-screen interface. The integrated guest control system shall meet the following requirements:
    a. The telephone shall interface with standard Ethernet wiring. No separate/new wiring shall be required.
    b. The screen shall be fully configurable to display the information designated by the client.
    c. The device shall also be able to control other devices that are connected to the local room network. These devices can control temperature, lighting, drapes, and Privacy/Service notification.

D. Central Interface (CI) Server Application:

16. Each guestroom system or sub-system will communicate in real time with a central server running INN*control*™3 application software; or, cloud based INN*control*™5 application software. The software shall provide a comprehensive list of room status information and alarms and shall also interface with other systems in the hotel, including the PMS and the Maintenance Management System (MMS). 0.

a. PMS Interface: The software shall interface with the PMS computer through a serial link or TCP/IP. The PMS will provide the INN*control*™3 software with current sale status of the guestrooms (rented/unrented and check-in/checkout). This information shall be transferred from the INN*control*™3 software to the room within five seconds and will be used to determine the operation of the HVAC, lights, and other loads in the room. The INN*control*™3 server shall also be linked and interfaced with the EDL server.

b. Management Display: The INN*control*™3 application, or terminals connected to the INN*control*™3 server, shall provide access to management to view and control such parameters as room temperature, room target temperature, HVAC operation, light control, and other conditions and statuses. In general, the INN*control*™3 application shall provide access to any function of the room control system that is available to the guest in the room. The System shall be capable of interfacing with the Hotel Ethernet System via TCP/IP interface.

c. 3D Real-Time Display: The INN*control*™3 application, or terminals connected to the INN*control*™ 3 server, shall be able to provide a 3D view of real-time information such as door openings, guest interactions with room automation devices, and other events. The display shall display the property as an accurate representation of the property and the rooms shall be displayed in colors that represent the status of various devices in the rooms. The color display shall also show in gradients of color the aging of guest service requests and equipment alarms.

d. Remote Access/Diagnostics: The application shall provide full support of a remote terminal connected via TCP/IP to the server. The server software architecture shall be of a client/server structure. The remote terminals shall be PCs operating under Windows XP or later. The application shall be capable of running complete diagnostics of the System from a remote service center via dial-up phone lines or TCP/IP.

e. Alarm Outputs: The application software shall be programmable to route alarm conditions to a file, hard disk, third-party interface, or the PMS.

f. The user shall have the option of *not* logging on, which will allow View (read-only) use of the software, or logging on, which will allow Control functions based on the logon identification.

g. The software shall open to a pre-determined default language. It shall also be possible to choose another language available from the list.

h. The INN*control*™3 application, or terminals connected to the INN*control*™3 server, shall provide access to management to view and control such parameters as room temperature, room target temperature, HVAC operation, light control, and other conditions and statuses. In general, the INN*control*™3 application shall provide access to any function of the room control system that is available to the guest in the room. The System shall be capable of interfacing with the Hotel Ethernet System via TCP/IP interface is opened is the 'Quick View' screen. Each guestroom selected for Quick View display shall be represented by a block on the screen. The block shall be numbered to correspond to the actual room number. The resulting menu shall allow the

display of Butler calls, Valet requests, Pick-Up-Tray requests, Privacy/Service indications, SOS indications, and possibly one or two other requests if desired by the property—for example, cab request.

i. All service requests shall be displayed at once on the Quick View screen. The color coding shall allow easy recognition of each type of call.

j. The software shall display Housekeeping Calls to show a list of rooms requesting the indicated service. Other types of information shall also be optionally shown in the communication area, including clean/dirty room status, notifications, and issues to be handled by the front desk.

k. The software shall allow for the display of guest preferences including ADA/hearing impaired rooms, Sabbath rooms, or ecoMODE® rooms.

1) ADA/hearing impaired rooms shall be set up such that the entry light flashes 10 times when the doorbell outside the room is pressed. An INNCOM P564 doorbell kit and S217 entry light switch are required for this function.

2) Sabbath rooms are set up such that all automatic functions that would be triggered by guests are suspended and the HVAC does not respond to occupancy information.

3) ecoMODE® rooms are activated when the guest presses the Green Button on the thermostat or ecoMODE® programmed switches or touch surfaces, thus enrolling in the property's sustainability programs.

l. The software shall offer a Dynamic Suite Linking option and it shall display rooms that are linked as suites. The linked rooms shall be color-coded, and the type of link (common door or connecting door) shall be shown displayed in the room blocks.

m. The software shall be able to display as a minimum the following room conditions:

1) **Rented:** Shows which rooms are currently rented.

2) **Occupancy:** Shows which rooms are currently occupied, either by guests or staff.

3) **Rented + Occupancy:** Shows which rooms are rented *and* occupied.

4) **Clean Status:** Shows which rooms have been cleaned and which need cleaning. This option also shows "supervisor required" and "out-of-order."

5) **Dirty Rooms:** Shows which rooms need cleaning. The color coding will indicate the rented and occupancy status for these rooms.

6) **Supervisor Visit Requested:** Shows which rooms have been cleaned and are ready for review by a supervisor.

7) **Out of Order:** Shows which rooms are out of order for any reason (such as equipment needing repair).

8) **Telephone Usage:** Shows which rooms have telephones currently in use.

9) **Safe and Orphaned Valuables:** Shows which rooms have a locked safe and which rooms have "orphaned" (left behind) valuables in the safe.

10) **Minibar Used:** Shows which rooms need replenishment for the minibar.

11) **Measured Room Temperature:** Shows the temperature of each room on the block grid.

12) **Target Room Temperature:** Shows the desired room temperature for each room on the block grid.

13) **AC Mode:** Shows the operational status of the air conditioning system for all rooms on the block grid.

14) **Measured, Target and AC Mode:** Shows all the above on the block grid.

15) **Measured Humidity:** Shows the humidity for each room on the block grid.

16) **HVAC Equipment Operation:** Shows heating, cooling and fan operation for each room on the block grid.

17) **Second Stage Operation:** Shows forced, ready, active and normal status for each room on the block grid.

18) **Peak Demand/Load Shedding/Fire**: Shows high, medium, low, and normal for peak demand/load shedding, and shows HVAC response to fire.

19) **Open Doors or Windows:** Shows which rooms have open doors or windows.

20) **ETM:** Shows rooms that have no energy management devices currently operating.

21) **VIP/Lowered Energy Management (LEM):** Indicates room thermostat is not being controlled by the system.

22) **De-Humidification:** Shows all rooms on the block grid that are being dehumidified.

23) **De-Icing:** Shows all rooms on the block grid that are being de-iced.

24) **HVAC Trouble:** Shows all rooms on the block grid with active HVAC alarms.

25) **Equipment Type:** Shows the HVAC equipment type for all rooms on the block grid.

n. The software shall display diagnostic information for guestroom devices.

o. The software shall have Navigation Tree Displays. The rows of icons allow the user to display property views in the navigation area below the icon bars by clicking on the icon. A room can be selected from the Navigation Tree for display of its statuses. In the Floor View and Network View displays, a plus (+) or minus (-) sign will appear before each room. A plus sign indicates that more information can be displayed by clicking on it.

p. The default icon in the navigation area shall be the Floor View, which shall display a list of hotel floors. Double clicking on a floor shall display a list of rooms on the floor.

q. The software shall have a Network View icon to display the guestrooms organized according to their network connectivity status.

r. The software shall be able to display a graph of the HVAC trend for each room. The display shall show the room's temperature band as a yellow block. The HVAC trend line shall be color-keyed: black (the HVAC is not currently heating or cooling), red (the HVAC is heating), or blue (the HVAC is cooling).

s. The software shall be able to generate reports that show outstanding guest requests at the time of report generation. The report shall be able to be generated in a printable notepad format with the time of day of the report generation shown at the top of the report. The report can be

saved and/or printed, making it convenient for staff to carry as a reminder of outstanding requests.

t. The software shall be able to receive and set guest requests from other INNCOM devices in the property. Whatever the source of the setting, a guest request shall be displayed on every INN*control*™3 screen that has the particular room selected for view. For example, a guest may press a switch in the guestroom to request MUR service. The request will appear on INN*control*™3.

E. Room Communications, Monitoring and Control:

1. **Throughput:** The INN*control*™ 3 application server and the network that links it to the rooms shall be able to handle a minimum of five transactions per second per 500 rooms. A transaction is defined as the sending of a command or data to a room from the INNcontrol™3 server and the receipt of acknowledgment of the proper execution of such command back at the INN*control*™3 server. The System and its network shall guarantee a response within five seconds when accessing any room component remotely. Such response shall not be conditional on any other activities that take place at that time anywhere else in the System.
2. **Network Integrity:** The communication in the System shall comply with ISO/OSI standards. The network shall be secure from insertion of commands from external stations. Errors in communications shall be detected and corrected automatically. The addition and removal of stations shall be captured and reported as an alarm by the INN*control*™3 server.
3. **Networking Capabilities:** The System shall be capable of communicating from the INN*control*™3 server to the guestroom devices using:
   - **a.** A single shielded or unshielded twisted pair of wires, Cat3 or better.
   - **b.** A dedicated or shared Ethernet network, running on Cat 6 or fiber.
   - **c.** RF transceivers communicating on a single layer network. In this configuration, devices within a room will communicate with each other in either a wired or wireless or hybrid network and one of those devices shall be designated as the room gateway and will communicate to other room gateways, forming a **Deep Mesh Network** and eventually and in real-time wirelessly connect to an edge router. These edge routers will typically handle the traffic from multiple rooms and then shall communicate to the server via Ethernet.

F. Privacy/Service and Other Guest Annunciation Types.

- **a. Doorbell:** The System shall include a doorbell or a chime in each guestroom.
- **b.** The doorbell shall be activated through a button on a doorplate mounted outside the room. Pressing the button shall activate the bell once, regardless of how long the button is pressed. Once released, the bell shall respond again after a pre-selected delay from the last activation, to reduce guest annoyance. The bell shall not respond if the room has been placed in the Privacy state.
  - **i.** The doorbell shall be available in a variety of form factors including traditional, Designer, EVORA, MODEVA Glass Series, and custom.
- **c.** The interior plate with the chime, Privacy and MUR buttons can be mounted in a single gang box or could be mounted in a 4x4 J box with a double-gang Decora cover so that the entry door package (P564 and S217, S217D or EVORA) provides the guest with the entry light switch and Privacy/Service buttons.

d. The interior plate can be manufactured to match the exterior door bell plate.

e. In suites with multiple entry doors, the System shall link the operation of the doorbells and the Privacy Annunciation operation in such a way as to have all the doorbells disabled when one room in the suite is placed in Privacy state.

f. The doorbell electronics shall be available for integration with equipment provided by the architectural signage provider.

G. Drape control/monitoring of appliances and devices (mini-bar, room safe and smoke detector).

a. The system shall be capable of controlling drapes, sheers and shades through the provision of control outputs to drape and shade motors.

b. The system shall be capable of monitoring mini-bar door openings, safe openings, and the activation of a smoke alarm and reporting their state to the external door panel and the central server.

H. Wiring: All field wiring to the System shall be made through plug-in connectors to facilitate service and diagnostics. The Vendor shall provide as-run wiring diagrams for room wiring and network wiring.

I. Field Programmability:

4. **Parameter Changes:** All room-related parameters, such as target temperature upon check-in, setback temperatures, and the like, shall reside in non-volatile memory in each room and shall be available for programming from the INN*control*™3 server as well as the in-room thermostat or a laptop equipped with a USB connected transceiver. The server shall be able to access rooms on an individual basis, in groups, or in total (i.e., the entire property at one time).
5. **Program Changes:** The application program residing in the room controller shall be modifiable through the INN*control*™3 server computer without the need to visit the room. The program stored in each room shall not be affected by the loss of power, regardless of the duration of the outage.
6. **Power Fail Recovery:** After a power outage, the System throughout the hotel shall start up automatically and will be fully operational within five minutes after restoration of power. In the rooms, all loads controlled by the System will be returned to their previous states, including target temperature, selected fan speed operation, and lights, regardless of the duration of the power outage.
7. **Noise Restriction:** All system components shall be installed in such a manner as to eliminate audible noise to the guest when the System operates while the guest is asleep.
8. **Code Compliance:** Components installed by the Vendor and wiring/installation performed by the Vendor shall comply with the applicable standards and electrical codes.

PART 3—EXECUTION

3.1 INSTALLATION

A. There shall be strict compliance with the Manufacturer's instructions and recommendations. The onset of work shall indicate that the Installer accepts the existing substrates and conditions. System installation shall be coordinated with related and adjacent work.

B. The system shall be tested for proper operation in accordance with the Manufacturer's commissioning guide. Damaged components shall be repaired or replaced until the proper operation is achieved.

C. The Installer shall instruct the Owner's personnel in proper operation and maintenance of the system.

END OF SECTION

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