## SECTION 25 51 13 – INTEGRATED ROOM AUTOMATION & PROPERTY SERVICES SYSTEM

### PART 1 – GENERAL

1.1 SUMMARY

A. Provide an enterprise wireless, integrated room automation system for the following:

1. Platform software
2. Thermostats and HVAC controls
3. Power and lighting controls
4. Enterprise platform bridge
5. Occupancy detection controls
6. Property Services Interface ROC Platform
7. Solution Software

1.2 ADMINISTRATIVE REQUIREMENTS

A. Code Compliance: Provide products that comply with applicable building, energy, and safety codes.

B. Coordination: Coordinate this work with work of other Sections to assure that units are properly aligned with adjacent work.

C. Pre-installation Meetings: Coordinate with General Contractor and Owner to convene preconstruction meetings as required to assure that controls substrate construction is complete, and suitable for controls installation.

1.3 QUALITY ASSURANCE

A. For each product type, provide products of a single manufacturer, furnished by a single supplier.

B. Regulatory Requirements: Provide products and installation that comply with:

1. NFPA 70
2. Applicable Underwriters Laboratory (UL) standards
3. Other applicable codes and regulations

C. Installer's Qualifications:

1. Provide work by installer trained and certified by manufacturer with minimum five years of experience in installing products comparable to work of this section.

1.4 SUBMITTALS

A. Product Data: For each type of product required for a complete system

1. Include picture or diagram showing product in final installed condition. Show location of displays and user-operable controls.
2. Edit standard product data to reflect only options required as work of this section.

B. Shop Drawings: Show the following:

1. Diagram of component mounting and wiring connection points.
2. Diagram of systems of interacting components, including products of other sections.
3. Accessories: Show accessories required to interface controls with products of other sections.

C. Operation and Maintenance Data

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver control products to weather tight storage facility with operating environmental controls to maintain temperature and relative humidity within control manufacturer's published limits

B. Leave products in factory shipping material until ready to install, unless shipping materials indicate signs of damage. If packages are damaged, inspect products immediately, remove the damaged products from the site, and replace with new products

1.6 SITE CONDITIONS

A. Environmental Limitations: Do not install controls until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and work above ceilings is complete. Do not bring controls into installation space until permanent electrical and HVAC system is ready to operate and maintain ambient temperature and relative humidity conditions within controls manufacturer's published recommendations until construction is complete and turned over to Owner for operation.

B. Field Measurements: Verify locations of controls and adjacent construction by field measurements before installing products.

1.7 WARRANTY

A. Manufacturer's Warranty: All controls manufacturer's standard warranty, including one year warranty against faulty materials and workmanship. Evolve ROC hardware has a one year warranty against faulty materials and workmanship.

**PART 2 – PRODUCTS**

2.1 MANUFACTURERS

A. Basis-of-Design Product. Subject to compliance with requirements, provide products by Evolve Controls, with components and characteristics indicated.

2.2 SYSTEM DESCRIPTION

A. Provide an enterprise wireless, integrated room automation system for the following:

1. Platform software
2. Thermostats and HVAC controls
3. Power and lighting controls
4. Enterprise platform
5. Occupancy detection controls
6. ROC Platform

2.3 PLATFORM SOFTWARE

A. Summary: The ROC module, known as the ROCm, bridges the in-room devices network with our ROC cloud infrastructure.

Configurations: The ROC platform is a cloud-based based solution. The servers and software required for the ROC-based solution reside in the cloud and be managed entirely by Evolve. The in-room solution bridge modules, or ROC modules (henceforth ROCm) will require the appropriate network configuration to reach ROC over the Internet at all times.

B. Quality of Service

1. The system shall continue to operate as expected, in the event of a non-critical failure (such as a site Internet outage).
2. The system shall identify faults that impacts the system's effectiveness (for example, ROCm failure).

C. Modularity

1. Evolve can provide well documented application programming interfaces (APIs) to allow customers to:
   a. Integrate ROC system with other platforms or products
   b. Integrate their own systems into ROC platform via the to control environment as well as access other property services.
   c. The system shall allow the customer access to download the raw data that's used to calculate reports.

D. Security

1. Any agent communicating with the ROC shall be authenticated and verified against a system- wide access control list (ACL) to confirm permissions for any services requested.
2. The system shall use SSL/TLS for all communications over public networks.

E. Scalability

1. The cloud configurations shall be continually monitored for both availability and capacity planning purposes. In the event of a spike in ROC transaction volume, the system shall increase platform capacity in a manner that is seamless and transparent to the property.

F. Upgradeability

1. The cloud shall receive regular updates to improve system performance and reliability. The update process must be seamless and transparent to the property.

G. Manageability

1. The system shall provide the following management capabilities:
   a. Self-service replace and fail of room controls.
   b. Over-the-air (OTA) updates of specific Evolve software driven devices.
2. Remote access to system applications and services via solution software (web, mobile, etc) and web services.

H. Auditing and Logging

1. The system shall record events including, but not limited to, the following types:
   a. Interactions with the solution software (end user applications) via organization personnel or authorized agents.
   b. Interactions with environmental controls and guest experience devices.
   c. Device warnings and failures.

2. The system shall retain logging information based upon predefined retention policies.
   a. Security events (systems, logins, engineering actions).
   b. Device warning and failures.
   c. Guest interactions with the system.

2.4 THERMOSTATS AND HVAC CONTROLS

A. Provide RF thermostat with backlit LCD display and face-mounted pushbuttons.

B. Low Voltage Wireless Communicating Thermostat

1. Design Basis: Evolve Guest Controls, model T-100H.
2. Suitable as controller for furnace, fan coil, heat pump, and PTAC system functions:
   a. Standard Gas/Electric HVAC Systems: 2 stage heating, 2 stage cooling.
   b. Heat Pump HVAC Systems: 3 stage heating, 2 stage cooling.
   c. Fan Coil System: Multi-pipe heating and cooling, multi-speed fan.
   d. Fan System Selector: Gas or electric HVAC systems.
   e. Heat Pump Changeover Valve Control: Selectable for changeover with heat, or changeover with cool.
   f. Heat Pump Emergency Heat: Selectable at thermostat.
   g. Compressor Short-Cycle Protection: 6 minute delay between cycles, adjustable.
   h. Automatic Heating/Cooling changeover.
   i. Fahrenheit or Celsius views.
3. Setpoint Range: 55-90 deg. F (12.8-32.2 deg. C), adjustable at thermostat.
   a. Display: back lit, 2.75 x 1.5 inch (70 x 38 mm), 128 x 64 pixel LCD.
   b. Maximized View: Display room temperature, setpoint, pushbutton functions, and system status indicators including: System OFF, Temperature, and Fan speed.
   c. Minimized View: Display room temperature only.
4. Pushbuttons: Provide pushbutton for programming and selection of functions: Menu, Heat/Cool Mode, Fan Mode, Fahrenheit or Celsius Display, Setpoint Raise, and Setpoint Lower.
5. Signal Range/Frequency: 100 feet (30 m) between nodes. RF technology at 908.42 MHz penetrates building materials without loss of signal.
6. Minimum Wire Size: 18 AWG, for standard thermostat connections: C, R, W1, W2, Y1, Y2, G, B.
7. Power: 24V, 60Hz, 1 phase; extend control power from HVAC unit controls.

2.5 POWER AND LIGHTING CONTROLS

A. Wall Mounted RF Receptacle

1. Design Basis: Evolve Guest Controls, model LOM-15.
2. Suitable as controller for maximum 600 W incandescent lighting loads, maximum 15 A/1,800 W resistance loads, and maximum 1/2 HP motor loads, at 120 V, 60 Hz, one phase.
3. Provide receptacle suitable for standard 2 and 3-prong appliance cords.
4. Provide unit including one un-switched receptacle, and one switched receptacle. Include pushbutton on module to energize/de-energize switched receptacle by pushing button.
5. Include LED to indicate that load is energized.
6. Signal Range/Frequency: 100 feet (30 m) line of sight, at 908.42 MHz.

7. Include matching single gang plastic cover plate and screws.
   a. For multi-gang installations, provide décor type multi gang cover plate separately.
8. Color: White, Almond

B. Wall Mounted RF Switch
1. Design Basis: Evolve Guest Controls, model LSM-15.
2. Suitable as controller for maximum 960 W incandescent lighting loads, maximum 15 A/1,800 W resistance loads, and maximum 1/2 HP motor loads, at 120 V, 60 Hz, one phase.
3. Provide dimmer with push ON, hold brighten/push OFF.
4. Signal Range/Frequency: 100 feet (30 m) line of sight, at 908.42 MHz.
5. Include matching single gang plastic switch plate and screws.
   a. For multi-gang installations, provide décor type multi gang switch plate separately.
6. Color: White, Almond, Brown, Black

2.6 ENTERPRISE PLATFORM BRIDGE

A. Overview: The ROC module, or ROCm, is a proprietary embedded PC device that bridges in-room controls and sensor devices with the ROC Platform and allows for the control of and reporting for each room.

B. Physical device
1. The ROCm requires continuous 5V / 1A power supply.
2. The device shall be flexible in terms of connecting to a network:
   a. It shall be equipped and secured to exist on a public or customer-facing network.
   b. It requires a minimum of -65 dBm in each room where the ROCm is present.
3. The device shall support the following network types:
   a. Wi-Fi (802.11b/g/n), using WEP, WPA, WPA2, or no encryption, as required.
   b. 10/100 Mbps Ethernet.
   c. Any network type for which an adapter exists and a driver can be written for GNU ARM/Linux.

C. Device interaction
1. Device shall control in-room devices directed by:
   a. A guest, using a traditional controller or an advanced controller.
   b. Property staff, via Solution Software.
   c. The ROC, for example as a scheduled event.
   d. An integrated system for example PMS.
   e. A third party system with permission to access the Integrated Services Connector (see below).
2. The device shall obtain reports from connected devices and sensors, including (but not limited to):
   a. Thermostat sensor information.
   b. Threshold sensors and occupancy sensors, to trigger energy management states.
3. The device shall perform period health check of connected devices and make status information available to the ROC Platform.

D. ROC Platform
1. The device shall provide a web service, accessible to authorized agents, exposing the following services:
   a. Environmental control.
   b. Property services

E. API
1. ROCm shall provide an API that can be used by third parties to access data or information.

F. Engineering support
1. ROCm shall facilitate the replacement of failed controls and sensors by:
a. Identifying failed devices.
b. Programming (provisioning) replacement devices.
c. Validating replaced device is of the appropriate type and is functioning properly.
2. When directed by Evolve or by property staff, ROCm shall facilitate the distribution of updated firmware to controls and sensors using low-level device communication protocols.

G. Alerts and reporting
1. The ROC platform has a report that a property can access to find out all the ROCm that are not communicating at a particular time and also reports for how long has the ROCm not communicated.
2. The ROCm will perform a period health check of connected devices at a property configured interval. It will report any device failures immediately to the platform, which can be reviewed by appropriate parties..
3. The ROCm also checks the battery status for the battery devices and a report can be generated with the devices that have battery levels below a certain level or is dead.
4. There is build in functionality at the platform level whereby a report can be generated for the rooms where the occupancy has not transitioned over a period of 7 days.

H. Fault tolerance
1. Network availability:
a. In the event of a network connectivity problem, the ROCm will store audit and event logs until it can reach the ROC cloud platform again.
b. In the case of an extended network outage, the device will limit the amount of logs it keeps in order to avoid filling its storage. If necessary, the oldest logs will be dropped to allow the ROCm to continue running.
2. In-room controls shall retain basic functionality if the ROCm is unavailable, though certain API calls may not be available.

2.7 OCCUPANCY DETECTION CONTROLS

A. Wireless Recessed Communicating Door Sensor
1. Provide Z-Wave certified door sensor.
2. Design Basis: Evolve Guest Controls, model DS-100R.
3. Suitable as component of Z-Wave certified wireless control devices.
4. Supervised magnetic contact transmitter operates as proximity switch that changes state when magnet attached to monitored door is adjacent to sensor.
5. Provide back tamper switch to signal wireless controls when sensor is removed from its mounted position.
6. Provide sensor with low battery power signal.
7. Signal Range/Frequency: 100 feet (30 m) line of sight/908.42 MHz.
8. Control Sequence:
9. As monitored door opens, magnet moves away from sensor, allowing it to return to its default state, and signaling guest room wireless controls that door is open.

10. As monitored door closes, magnet moves approaches sensor, causing it to change to its activated state, and signaling guest room wireless controls that door is closed.
11. Power: Lithium battery with two year life.
12. Recessed; maximum distance of magnet to sensor is 0.59 inch (15 mm).

B. Ceiling Mounted Passive Infrared (PIR) Detection Sensor
1. Provide Z-Wave certified PIR detector.
2. Wireless Communicating Detection Sensor
a. Design Basis: Evolve Guest Controls, model PIR-200.
b. Suitable as controller in Z-Wave certified wireless control device networks.
c. Provide motion recognition algorithm that can distinguish between personal and environmental motion.
d. Provide integral switch to select PIR control output when motion is detected, or when motion is not detected.
e. Provide supervised tamper switch and LED to indicate motion alarm, device tampering, and diagnostic functions.
f. Provide rearm timer to reset detector when there is no motion for two minutes or more.
1) Provide 15 minute walk test period after closing detector cover and allowing two minutes for detector to stabilize. Include logic to cause LED to flash when motion is detected, so that full sensing range of detector can be verified.
g. Signal Range/Frequency: 100 feet (30 m) line of sight, at 908 MHz.
h. Mounting Height: [8 feet (2.40 m)] minimum; [12 feet (3.65 m)] maximum.
i. Motion Sensing Range:
1) 12 feet (3.65 m) radius, 360 degrees, at mounting height 8 feet (2.40 m)
2) 18 feet (5.40 m) radius, 360 degrees, at mounting height 12 feet (3.65 m)
j. Power: Provide 3V lithium battery.
k. Mounting: Single gang electrical box or surface mount.

**PART 3 – EXECUTION**

3.1 PREPERATION

A. Protection of In-Place Conditions: During product installation, provide protection to prevent damage to finished surfaces and installed equipment.

1. Provide repairs or replacement of damaged surfaces and equipment, as determined by Architect

3.2 INSTALLATION

A. Install components and wiring in accordance with NFPA 70 and Division 26 - Electrical.

3.3 SITE QUALITY CONTROL

A. Site Tests and Inspections: Field test and verify product installation conforms to manufacturer's requirements for communication and control functions

B. Program Scene for each programmable pushbutton on each programmable component.

C. Test power and lighting receptacles in accordance with Division 26 – Electrical.

D. Test switching, dimming and multiple control point functions for each device.

E. Submit site test reports, including description of conditions found, remedial actions provided, and final installed conditions.

3.4 CLEANING

A. Clean installed controls and adjacent surfaces and equipment to remove dirt remaining after installation.

3.5 CLOSEOUT ACTIVITIES

A. Demonstration and Training: Furnish services of manufacturer's technical representative to:

1. Verify that wireless controls installation is in accordance with manufacturer's requirements.

2. Review installation with Owner's representatives, and demonstrate care and maintenance activities including configuring and programming of devices and systems.