ESL User Guide

AP903B1
RT903B1
ED903.290S.G

CONFIDENTIAL AND LIABILITY DISCLAIMER

Revision History

Revision	Release Date	Description of Change
0.1	2015/11/24	Initial version

Content Summary

1   Scope

This document is to describe hardware / software features of M2Comm product.
AP903B1 stands for M2Comm access point.
RT903B1 stands for M2Comm router.
ED903.290S.G. stands for M2Comm 2.9" B/W/R EPD Tag.
In the following section, the abbreviations AP / RT / ED will be used to describe product AP903B1 / RT903B1 / ED903.290S.G

2   Product Specifications

AP903B1

RT903B1

ED903.290S.G

AP and RT use MA903A1 RF module to do wireless communication. The MA903A1 has received Federal Communications Commission (FCC) CFR47 Telecommunications, Part 15 Subpart C "Intentional Radiators" 15.247 and modular approval in accordance with Part 15.212 modular Transmitter approval. MA903A1 FCC ID: 2AFXU-MA903A1. ED FCC ID: 2AFXU-ED903-290S-G.
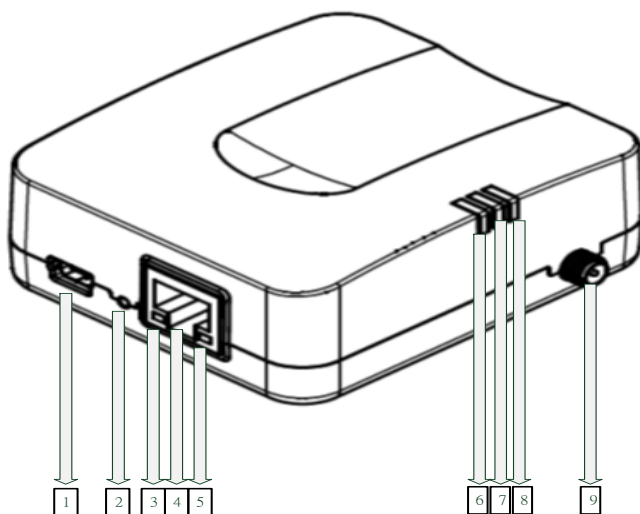
2.1 Hardware Specifications

2.1.1 AP903B1

- Dimension (+/- 0.3mm)

68,0

30,3

78,0

- Outline Structure

1 2 3 4 5   6 7 8   9
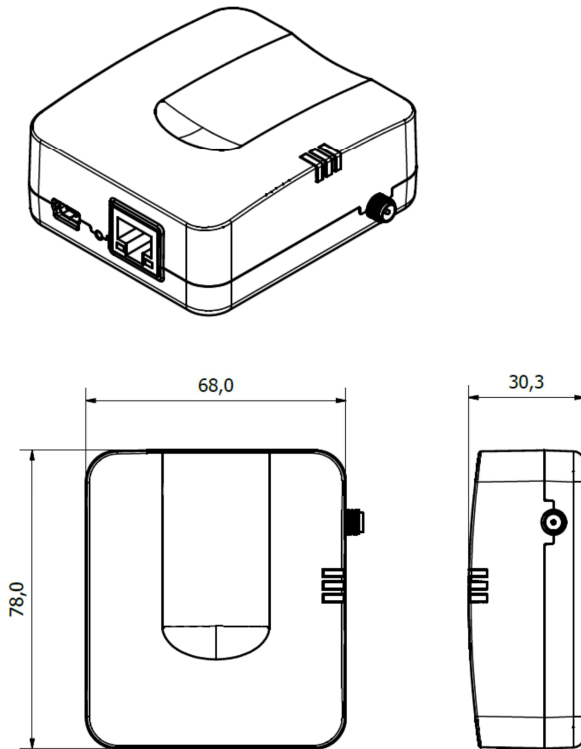
1. Mini-USB Connector : 5VDC input
2. Reset Button
3. Yellow LED : RJ45 Plug-in
4. Ethernet Input Connector
5. Green LED : Ethernet Data Transceiver
6. Blue LED : Device Power-On
7. Green LED : Reserved
8. Red LED: Power on Self-Test Failure
9. External Antenna SMA Female Connector

● Safety Information
 - User should avoid electrical shock hazard
 - If anything is wrong, do not try to fix it or open the housing by yourself. Contact a qualified technician or your retailer
 - Operating Temperature Range : 0~45℃
 - Operating relative humidity: 5~95% (Free of condensed water)
 - AC to DC Adapter Voltage input Range : 100V-240V AC, 50/60Hz
● Used Certificated Module (MA903A1, FCC ID: 2AFXU-MA903A1)
● Radio Frequency Specification
 - Extension 903~927MHz Antenna (The Peak Gain is 2dBi)
● Power Input
 - Mini-USB Interface
 - DC 5 Voltage(+/-0.25V) / 500mA
● Reset Button
● Index LED
 - Green LED (Power On)
 - Ethernet Yellow Only (10Mbps Link)
 - Ethernet Yellow + Green (100Mbps Link)
 - Ethernet Green Flashing (Action Indicator)
● Ethernet Interface
 - 10/100 BaseT
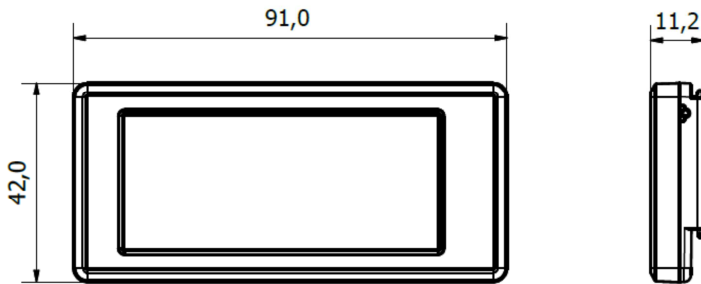 - Static IP

2.1.2 RT903B1

- Dimension (+/- 0.3mm)
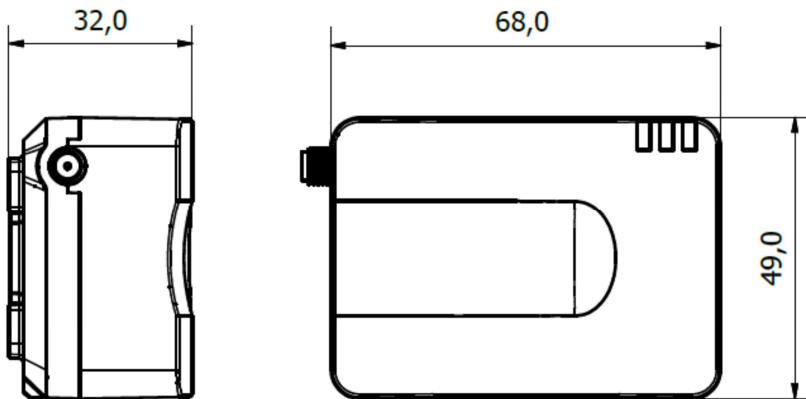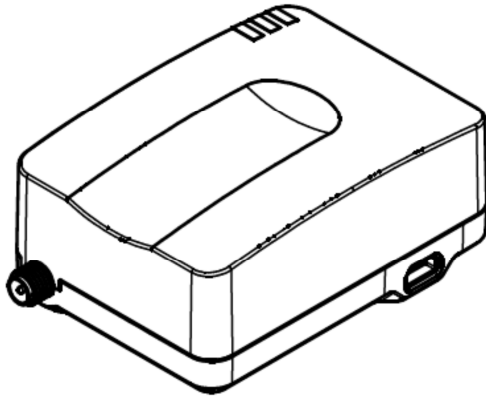
- Outline Structure
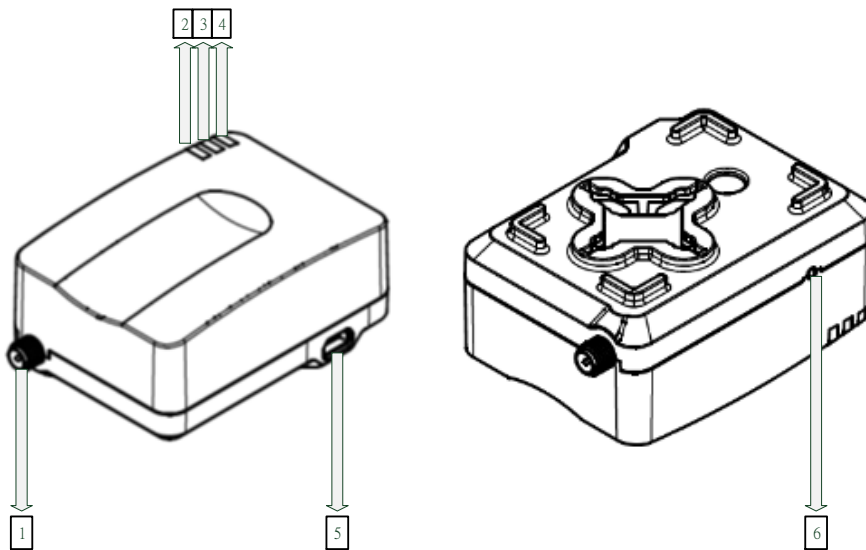
1. External Antenna SMA Female Connector
2. Blue LED : Attached Platanus Network
3. Red LED : Power on Self-Test Failure
4. Green LED : Power-On LED
5. Mini-USB Connector : 5VDC input
6. Reset Button

● Safety Information
   - User should avoid electrical shock hazard
   - If anything is wrong, do not try to fix it or open the housing by yourself. Contact a qualified technician or your retailer
   - Operating Temperature Range : 0~45℃
   - Operating relative humidity: 5~95% (Free of condensed water)
   - AC to DC Adapter Voltage input Range : 100V-240V AC, 50/60Hz
● Used Certificated Module (MA903A1, FCC ID: 2AFXU-MA903A1)
● Radio Frequency Specification
   - Extension 903~927MHz Antenna (The Peak Gain is 2dBi)
● Power Input
   - Mini-USB Interface
   - DC 5 Voltage(+/-0.25V) / 500mA
● Hidden Button (Reset)
● Index LED
   - Green LED (Power On)
   - Blue LED (Sub-G Connection Up)
   - Red LED (Hardware Failure)

2.1.3 ED903.290S.G

- Dimension (+/- 0.25mm)

91,0

42,0

11,2

- Outline Structure

1

2

3

4

5
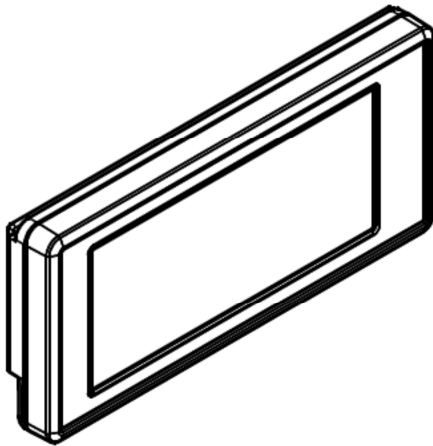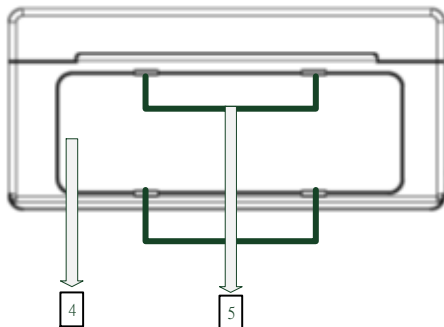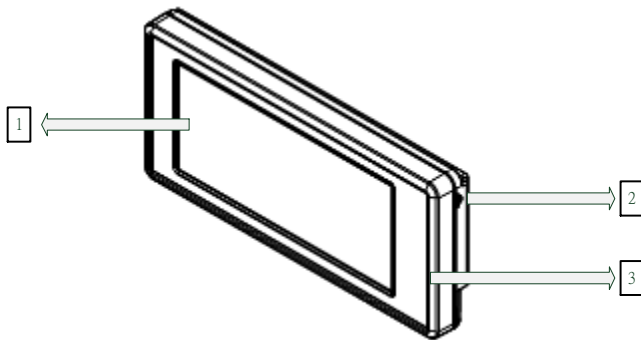
1. 2.9" EPD
2. Hidden Button
3. Anti-Static Case (Surface Impedance $10^9 \sim 10^{12}$ Ω)
4. Cell Battery Cover
5. Disassembly Hole for the Cell Battery Cover

- Safety Information
  - User should avoid electrical shock hazard
  - If anything is wrong, do not try to fix it or open the housing by yourself. Contact a qualified technician or your retailer.
  - Operating Temperature Range : 0~45℃
  - Operating relative humidity: 40~55%
  - DO NOT throw the Cell Battery in municipal waste. The Battery should not be placed in municipal waste.
- Certification: FCC ID: 2AFXU-ED903-290S-G
- Radio Frequency Specification
  - Embedded 903~927MHz PIFA Antenna (Peak Gain 0.3dBi)
- Hidden Button
  - Wake up (Short Press)
  - Deep Sleep (Long Press for 3~5 seconds)
  - Show Device Address Barcode from Main Image(Double-click)
  - Show Main Image from Device Address Barcode(Double-click)
- 3pcs of Dischargeable Lithium CR2032 Batteries
- ED903.290S.G. EPD Specification
  - Support red / black / white color (* note 1)
  - Resolution: 296 x 128 pixels
  - Power Consumption: 20~21mW

*note1: Please keep EPD panel side up in storage. Inappropriate placement in storage might turn EPD panel to slight red. EPD will go back to normal once it is refreshed.

2.2   Software Specifications

2.2.1   Network Architecture
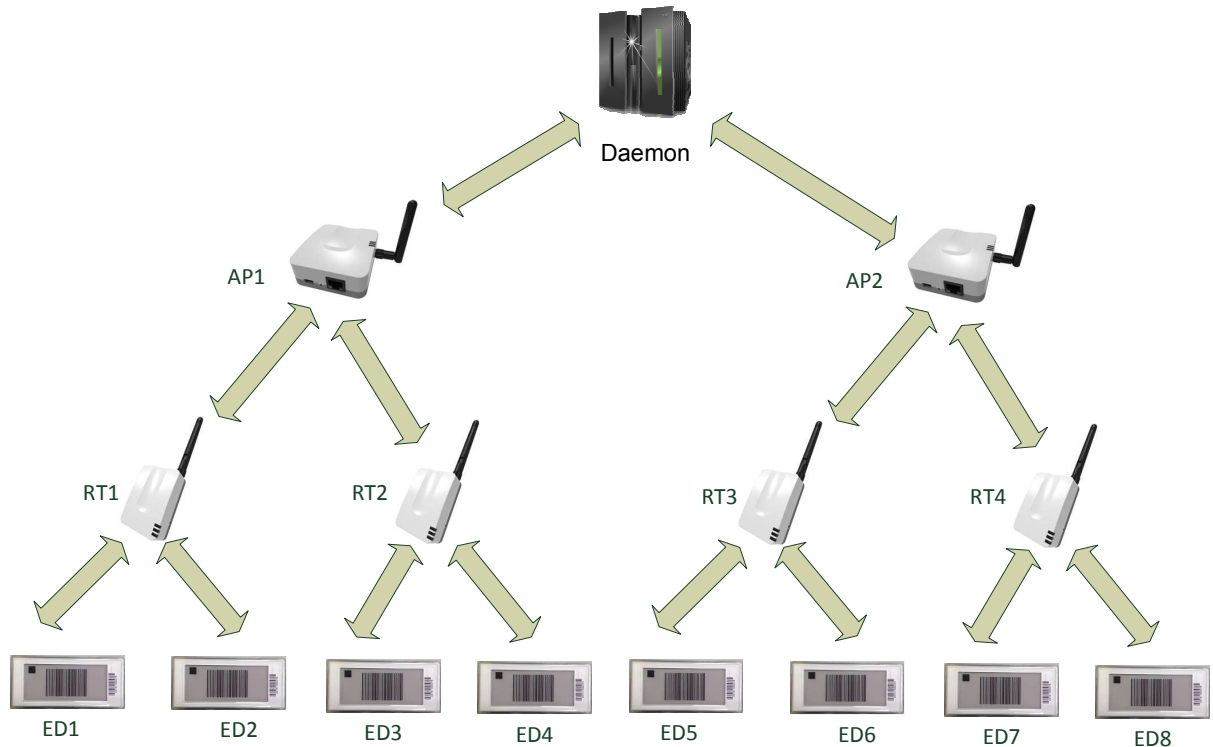
M2C Platanus Network

In Platanus network, Daemon is in charge of coordinating multi-APs' operations. Under each AP, it can support up to 15 RTs. For every RT can support up to 1000 EDs.

Max # of ED under RT	Max # of RT under AP	Max # of Device under Platanus Network
250	60	15000
500	30	15000
1000	15	15000

2.2.2 Network Construction

● Connection between AP and Router

1. Beacon Frame

AP

2. Join Request
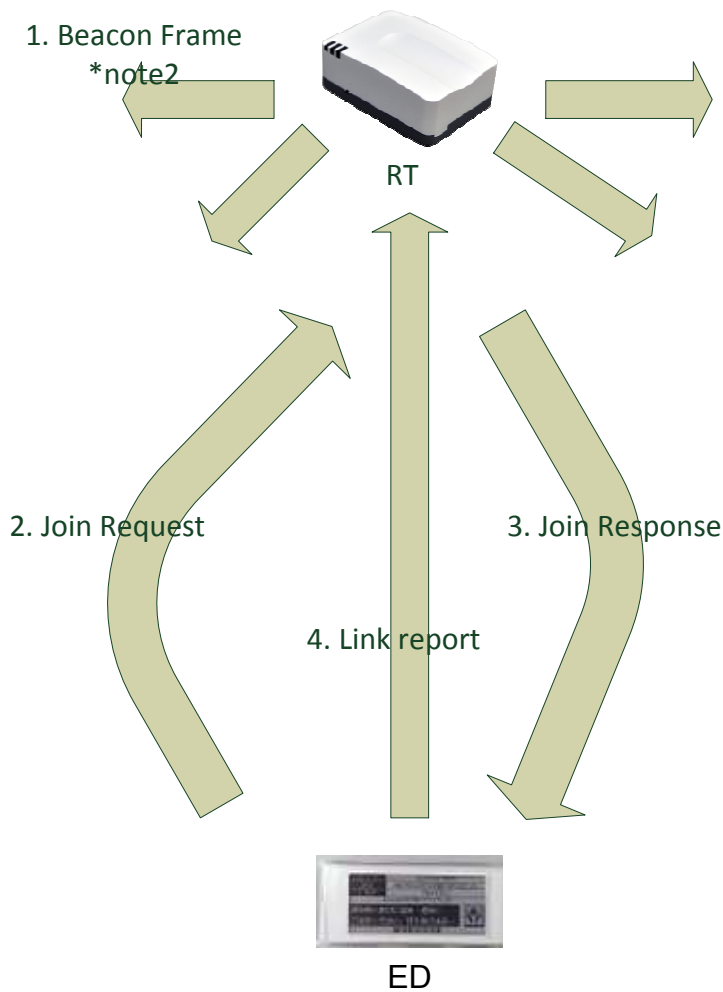
3. Join Response

4. Link report

RT
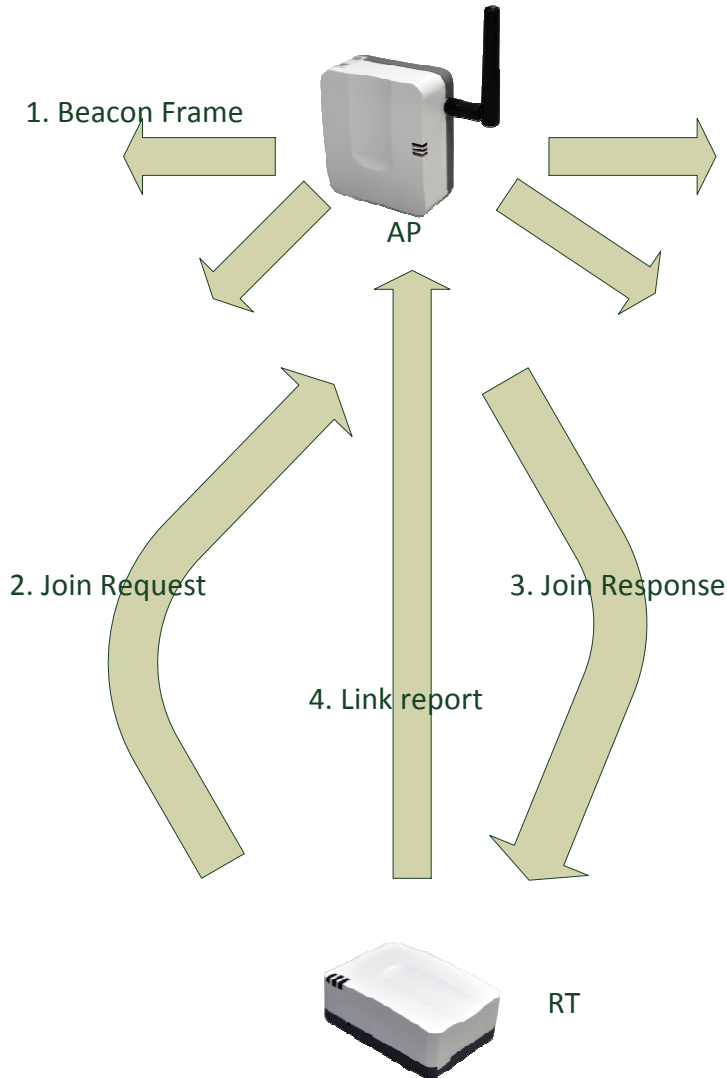
Step 1: AP broadcasts beacon frame with network parameters

Step 2: RT will send out "Join Request" if AP allows new connection

Step 3: AP confirms the connection is accepted by sending "Join Response".

Step 4: RT sends a Link report to notify AP that "Join Response" is received and connection is up now.

● Connection between Router and ED

1. Beacon Frame
*note2

RT

2. Join Request   3. Join Response

4. Link report

ED

Step 1: RT broadcasts beacon frame with network parameters

Step 2: ED will send out "Join Request" if RT allows new connection

Step 3: RT confirms the connection is accepted by sending "Join Response".

Step 4: ED sends a Link report to notify RT that "Join Response" is received and connection is up now.

* note 2: RT will only send out beacon frame when it connects to AP

- Connection between Daemon and AP

TCP/IP
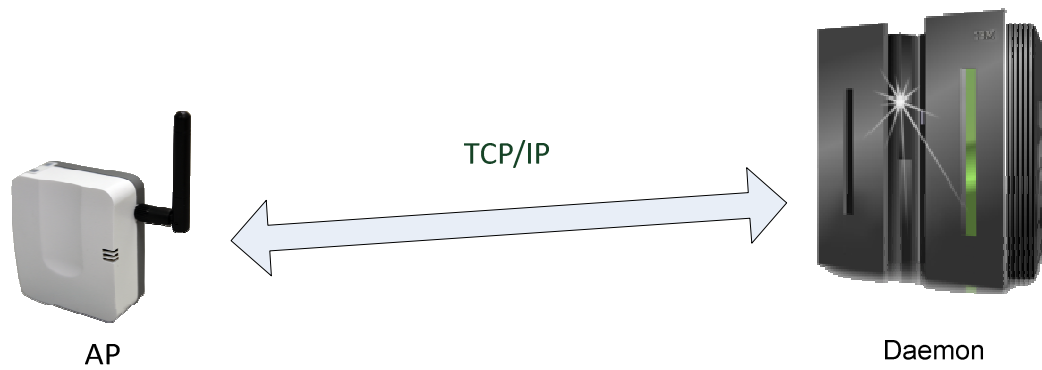
AP   Daemon

Step 1: Specify AP's IP address from Daemon Configuration file.

Step 2: Execute Daemon

Step 3: TCP connection will be constructed and information starts to exchange between AP and Daemon.

* note3: For more information, please refer to M2C "Daemon User Guide"

2.2.3 Data Transmission / Reception
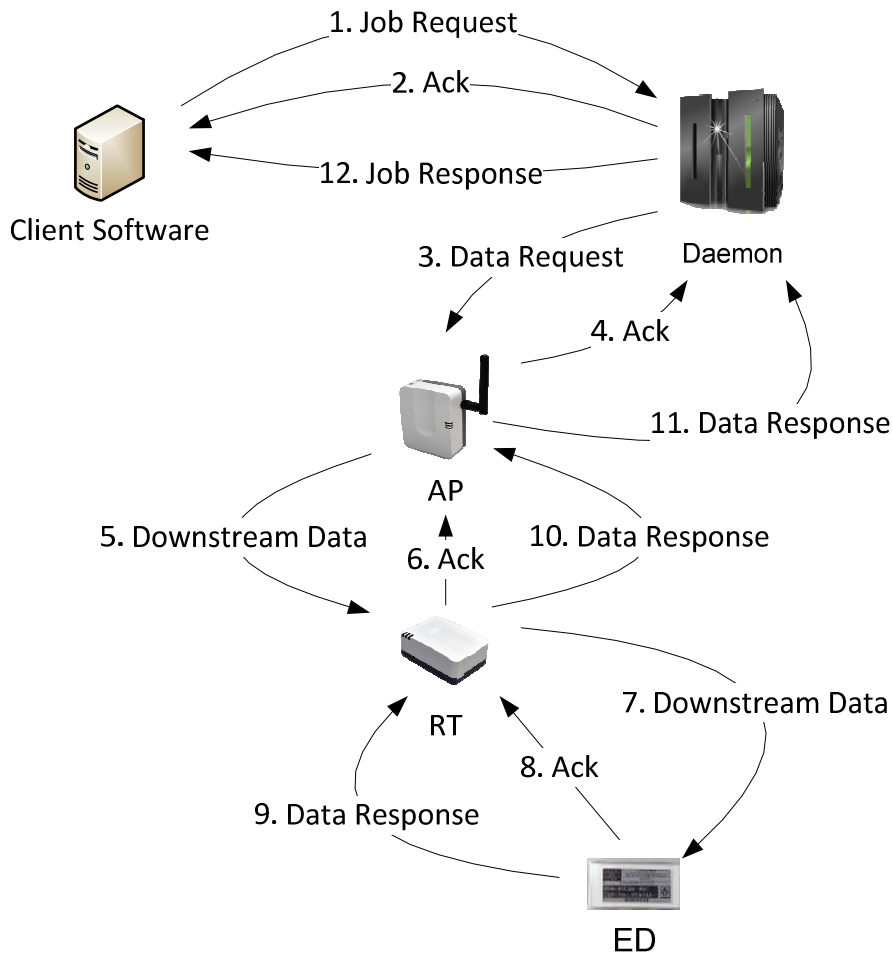
Data (or Request) is initiated from customer software that is integrated with M2C Daemon by TCP connection (* note4).
To utilize limited Radio Frequency resources, M2C designs a reliable data transmission model to increase the success rate of both data transmission / reception. Each transaction between any of two sides is secured by Data-Acknowledgment mechanism.

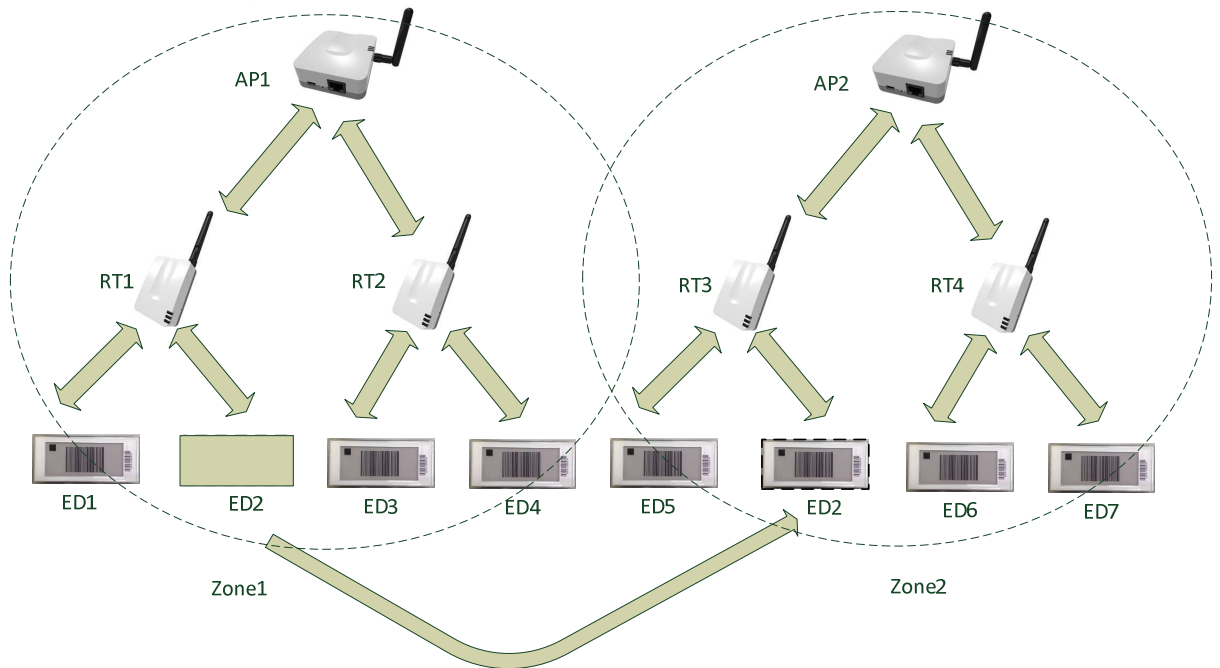* note 4: For more information of Daemon integration, please refer to M2C "Daemon User Guide"

2.2.4 Roaming

- Inter-RT Roaming

AP

RT1

RT2

ED1

ED2

ED3

ED2
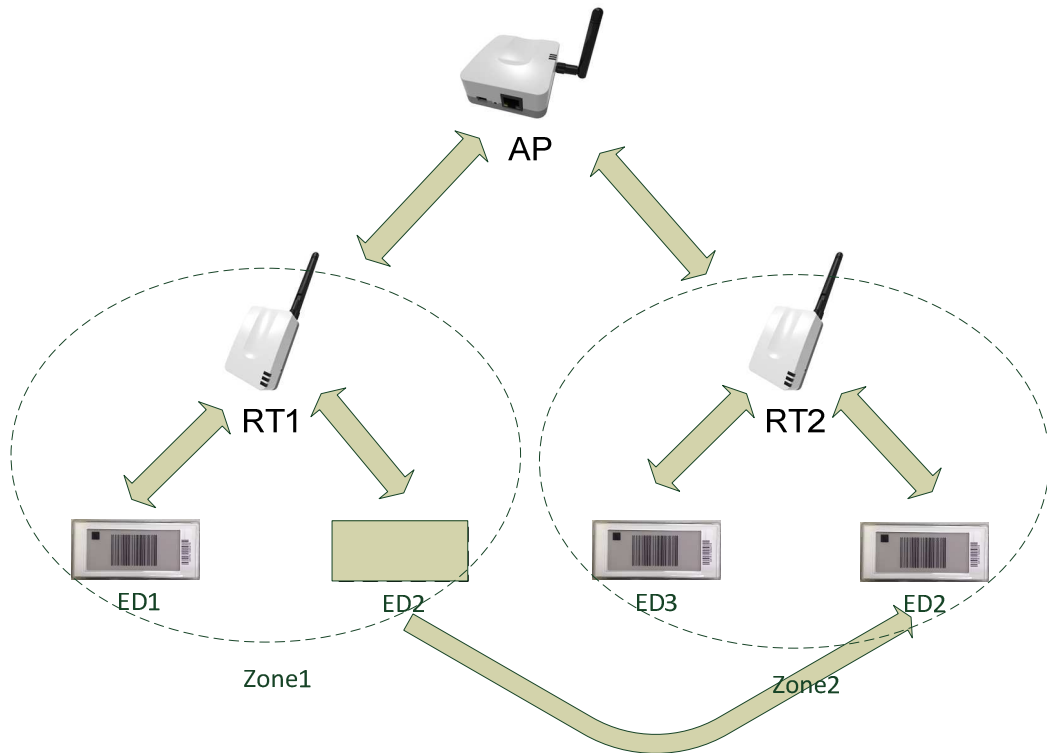
Zone1

Zone2

When ED2 moves from Zone1 to Zone2, ED2 will camp on RT2. The inter-RT roaming process will be completed in 5 seconds.
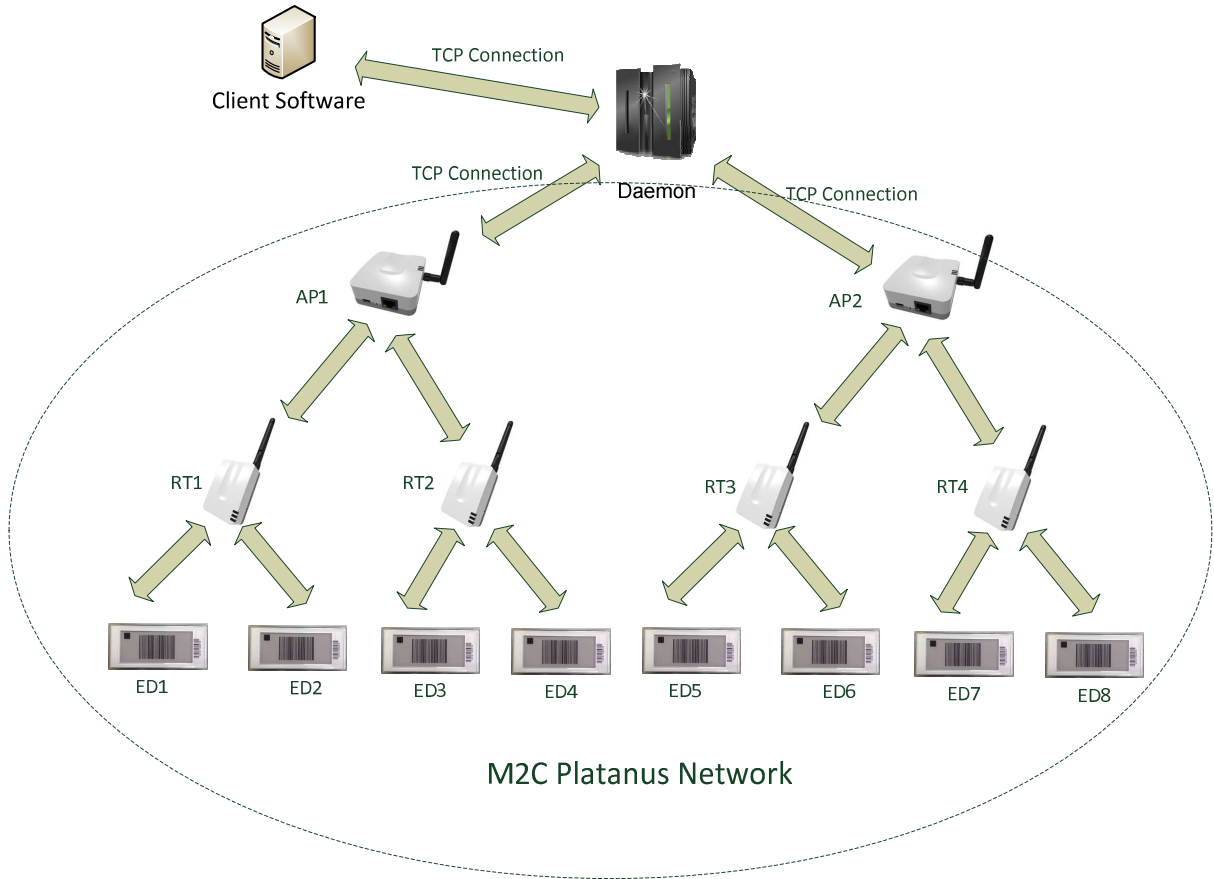
- Inter-AP Roaming

When ED2 moves from Zone1 to Zone2, ED2 will camp on RT3. The inter-AP roaming process will be completed in 8 seconds.

2.2.5 Integration

As a service or job dispatch portal, M2C Daemon software can be installed in PC with average computing power & resource (* note5). M2C Daemon equips with TCP/IP socket that can provide a reliable connection between client (customer) software. Also via M2C Daemon, client software can manipulate M2C Platanus network. For more details regarding to integration with M2C Daemon, please refer to "M2C Daemon User Guide".

* note5: Minimal requirements: intel i5 CPU / 1TB HDD / 8GB DDR3 RAM

TCP Connection

Client Software

TCP Connection

Daemon

TCP Connection

AP1

AP2

RT1

RT2

RT3

RT4

ED1

ED2

ED3

ED4

ED5

ED6

ED7

ED8

M2C Platanus Network

3   CONTACT INFORMATION

M^{2}Communication, Inc. (M2Comm)

4F-3, No.32, Gaotie 2nd Rd.,
Zhubei City, Hsinchu County, Taiwan
Tel: +886-3-657-8939
Fax: +886-3-657-6909
Email: support@m2comm.com.tw