Cisco Solution for Industrial WiFi

Proof-of-concept Report, Products Introduction

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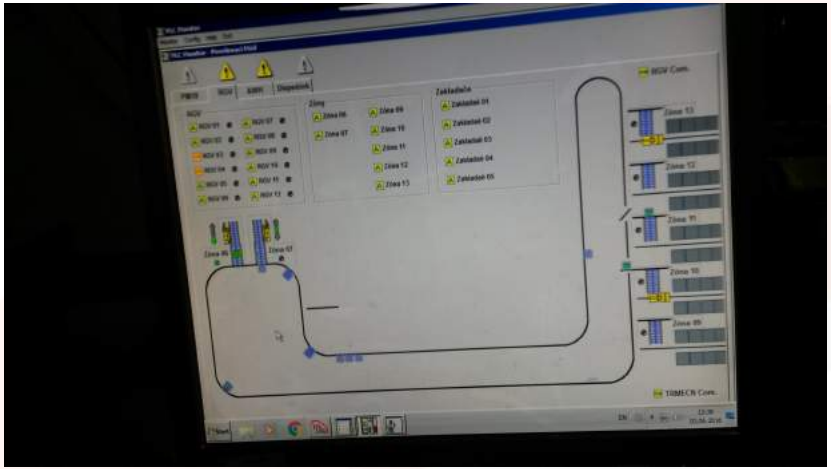
Profinet over WiFi PoC

Project scope

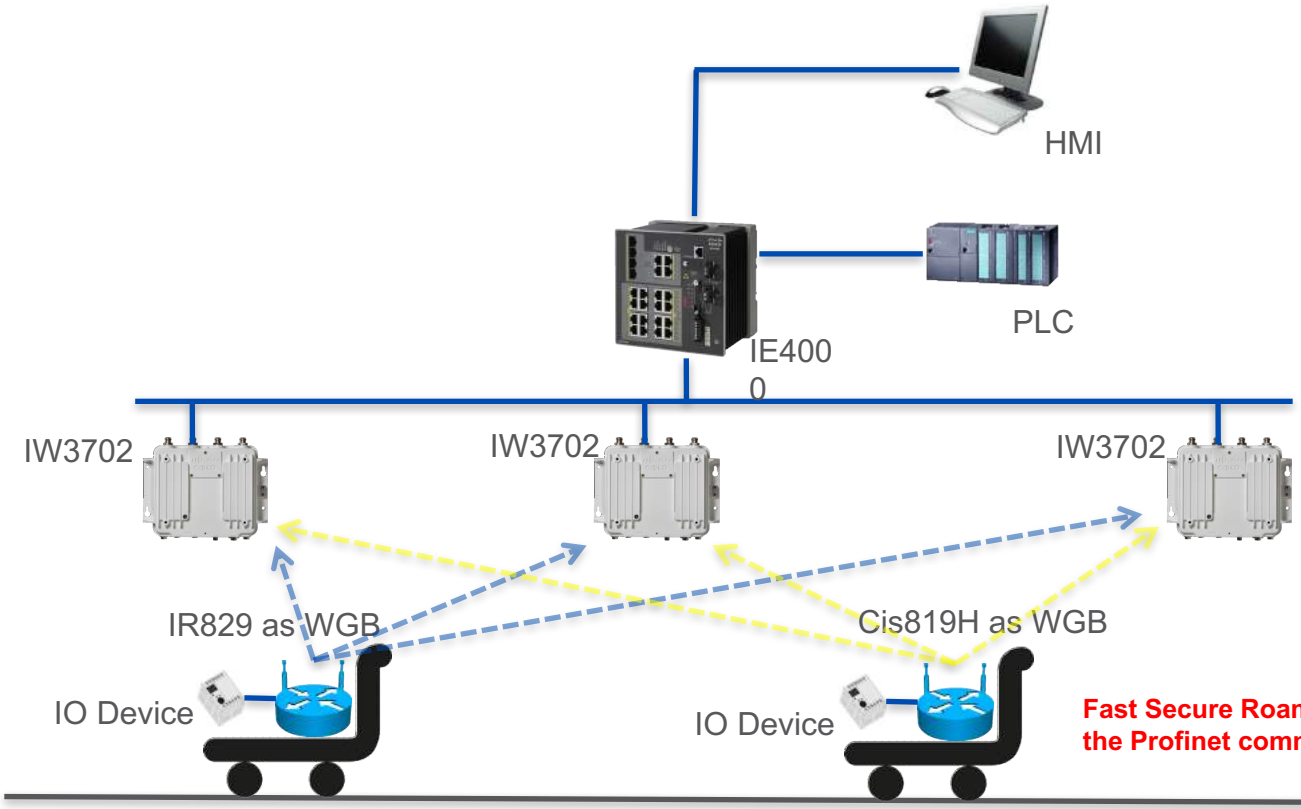
- 1) replacement of existing Profibus communication system Wampfler to new Profinet/WIFI solution, for AWH warehouse

- 2) upgraded visualization



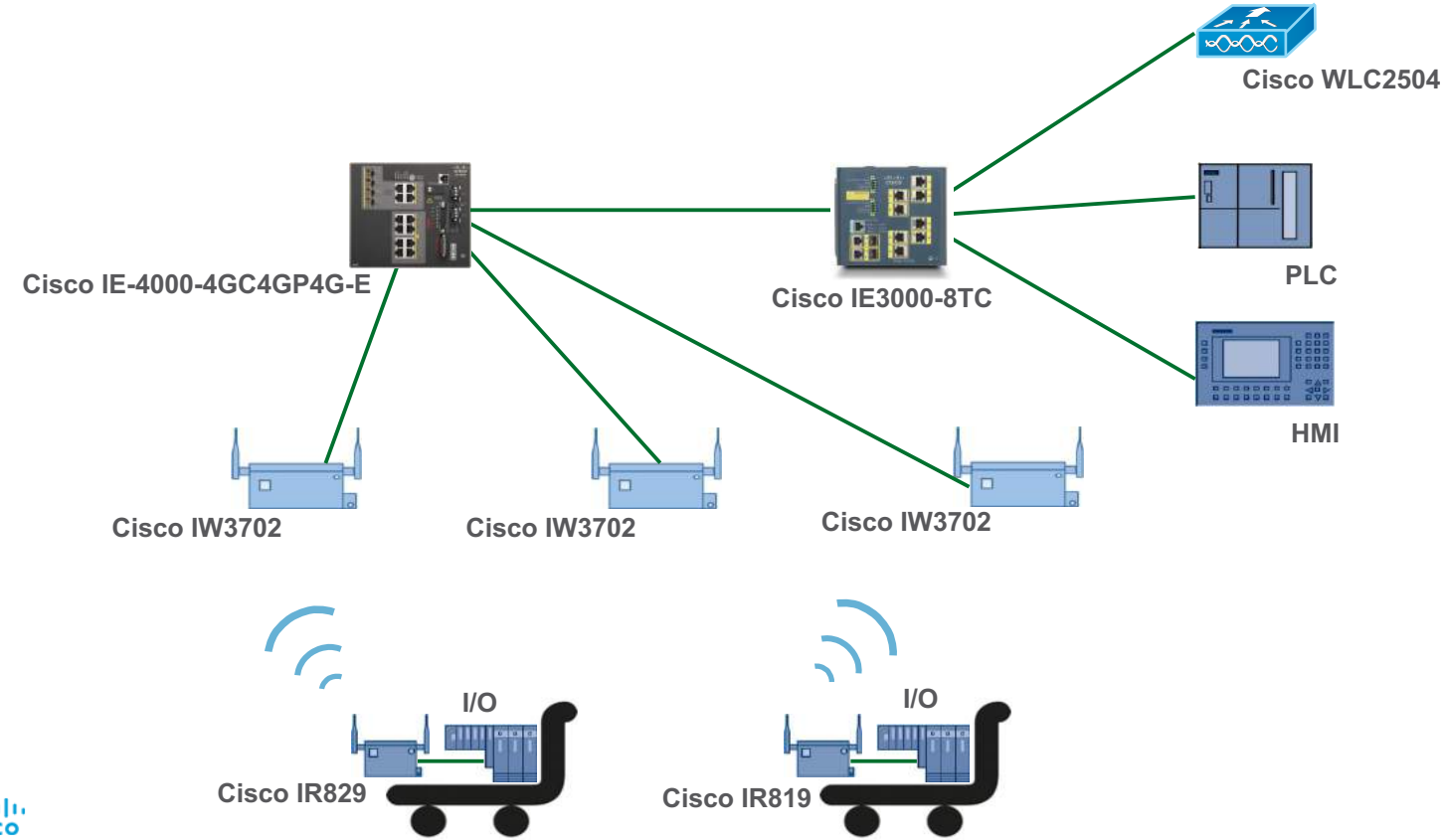
Video from the Operation

Profinet over Wireless PoC Concept

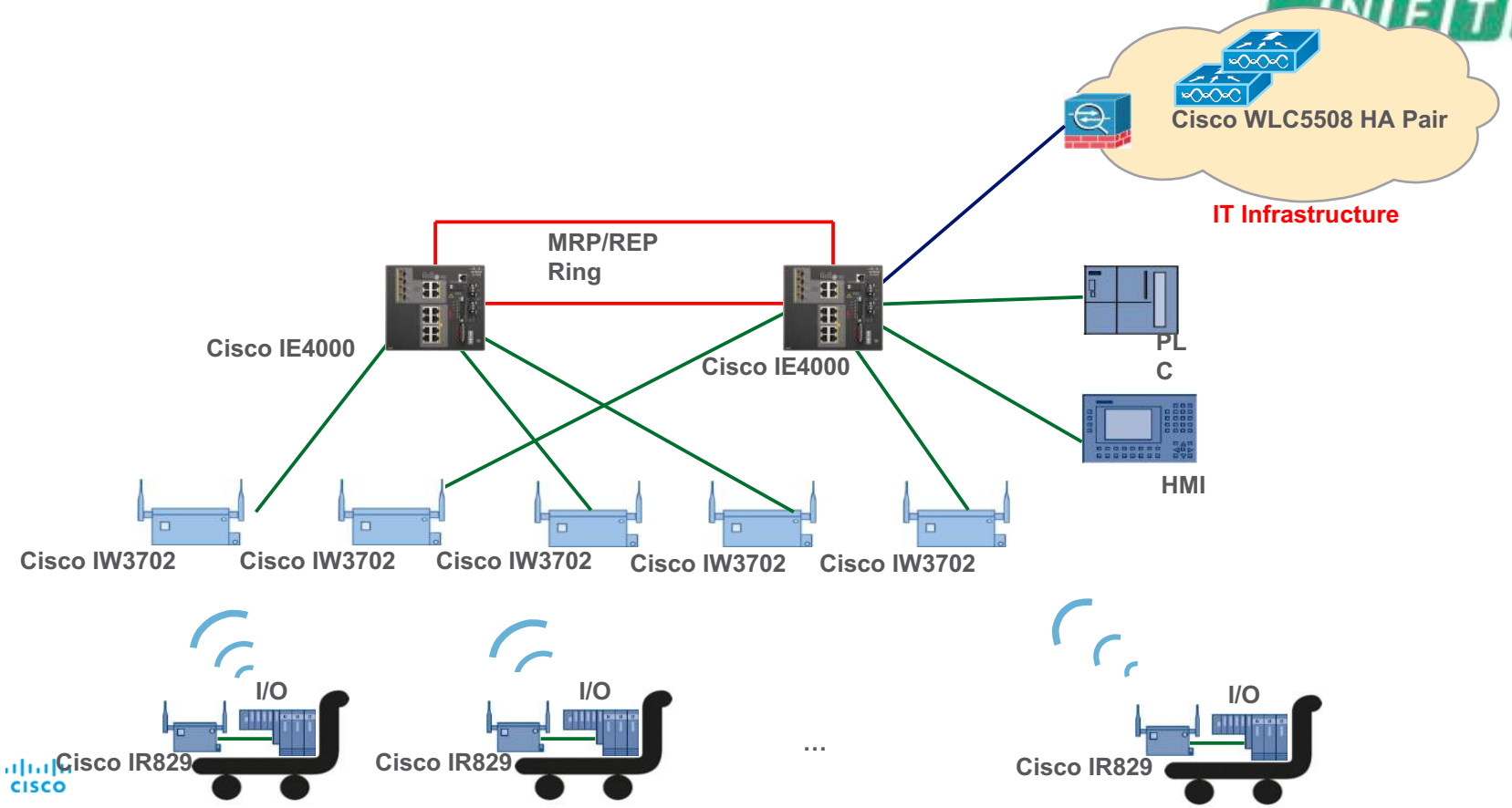


Fast Secure Roaming - critical operation for the Profinet communication (< 100msec)

PoC Real Topology



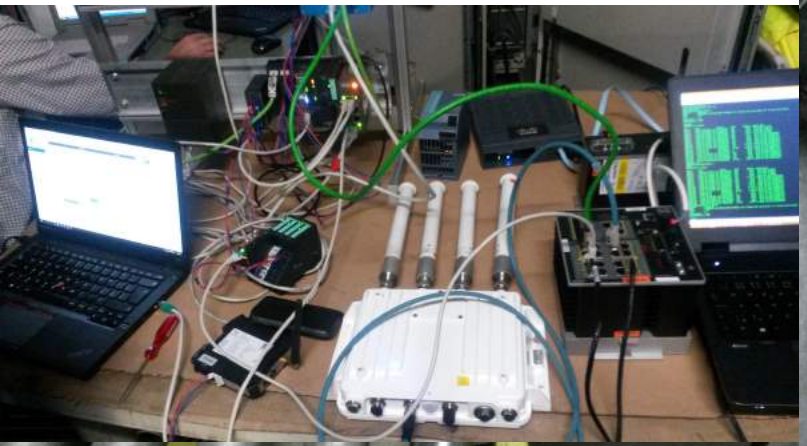
Final Solution Concept



Final Testing Report provided by Profinet Partner Organization

- One week of the monitored Profinet over Wireless testing operation
- Ongoing roaming configuration tuning (BU support)
- **Final result – YES, solution concept approved**

… from the PoC



Industrial WiFi Products

IW3700

IoT Wireless Access Points – Portfolio

Product	1783-WAP	AP1552H	AP1552SA/SD	AP1552WU	IW3702
Product family	AIRIA	AIRCI	AIRCI	AIRCI	AIRIW
Wi-Fi	802.11a/g/n	802.11a/g/n	802.11a/g/n	802.11a/g/n	802.11a/g/n/ac
WirelessHART	No	No	No	Yes	No
ISA100.11a	No	No	Yes	No	No
HazLoc (Class 1, Div 2/Zone 2)	No	Yes	Yes	Yes	No
Sales model	Rockwell branded (Stratix 5100)	Cisco IT channels and OT partners	Exclusive to Honeywell	Exclusive to Emerson	Cisco IT channels and OT partners

Connected Factory

Connected Oil and Gas

Connected Transportation

Smart & Connected City

Connected Factory

Apple deployment with custom antenna bracket

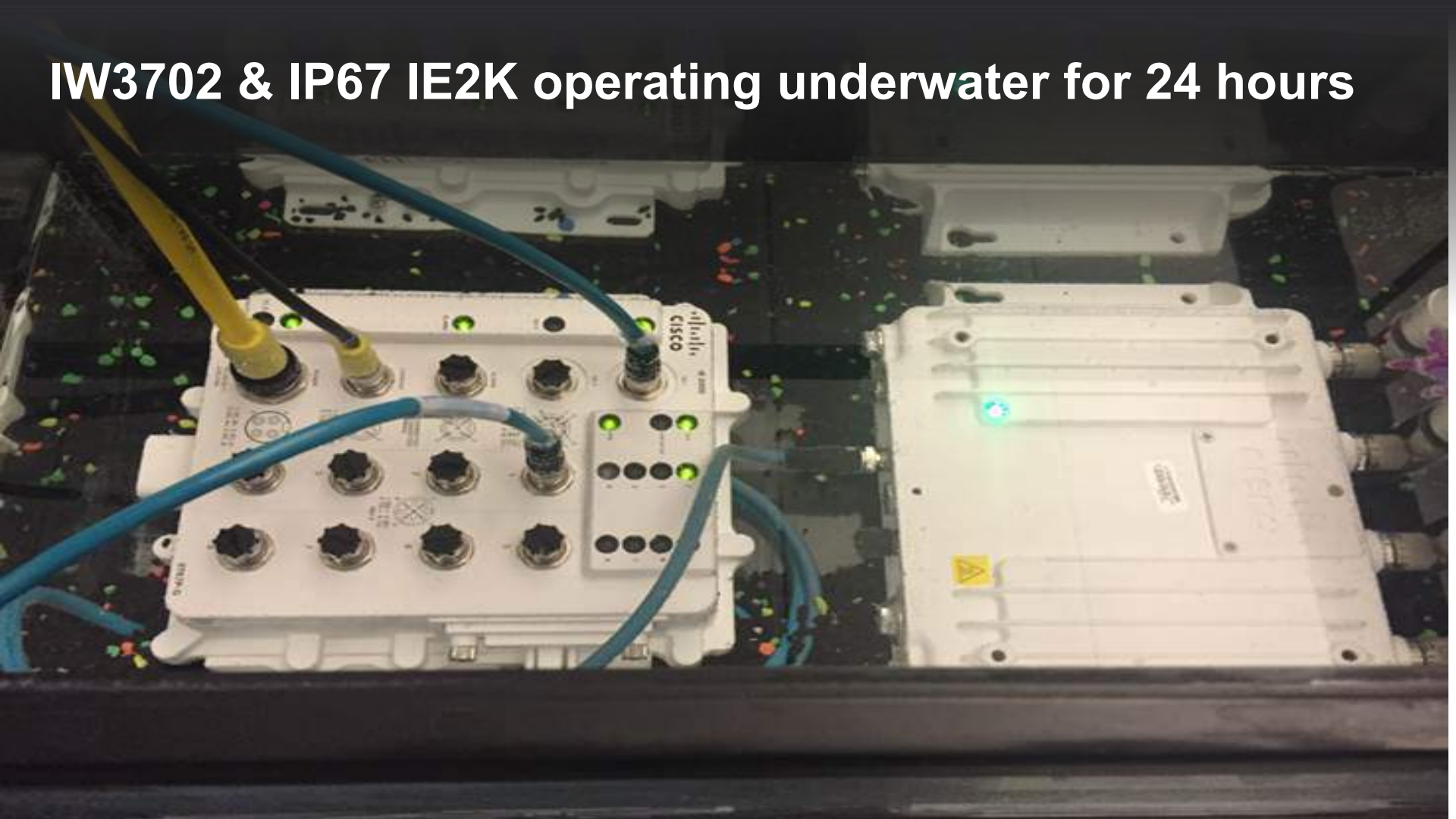
450*IW3702

Department of Technology, San Francisco
Lighting up Market Street for Superbowl 50

75 IW3702 for pilot project

McLaren Technologies, UK
First IW3702 production unit deployment
310*IW3702

IW3702 & IP67 IE2K operating underwater for 24 hours



Boeing and NASA
IW3700 testing for the International Space Station

IW3702 - What Makes it Industrial Grade?

- Extremely rugged IP67-Rated Housing to protect against liquid and dust ingress compliant to EN 60529 standard
- Capable of operating in temperatures from -50 C to +75 C (-40 C for cold start)
- Vibration rated for Transportation and Mining applications
- M12 Ethernet and DC power connectors for vibration and shock resistance
- Versatile RF coverage with external N-type antenna connectors
- Range of 10 V DC to 60 V DC power input in addition to PoE/PoE+ to support a wide variety of power sources

IW 3702 Mechanical Overview

IW3702-2E-UXK9

- PoE IN, Out and DC-IN use M12 connectors, Console is RJ45
- RF connectors are N-Type female Connectors
- Low profile design for easy installation
  - Dimensions (not including connectors)
  - 11.3” X 8” X 2.3 ”
- Weight 6.7 pounds (3Kgs)
- “Hard Points” – are extra screw holes available to mount antennas or accessories
- Equipped with integrated wall mount panel
- Mechanical design to support DIN mount and Pole mount kits
- Rugged IP67 for ingress protection against dust and water immersion
- Fan-less design with no moving parts

IW3702 – 2 Models Based on Antenna Requirements

IW3702-4E-UXK9

Antenna connectors – All 4 on the same side

This model is recommended for deployments with:

- Directional antennas with antenna cables
- Space constraints to install multiple antennas
- Light weight applications requiring only two directly attached antennas

IW3702-2E-UXK9

Antenna connectors – 2 on top and 2 on bottom

This model is recommended for deployments with:

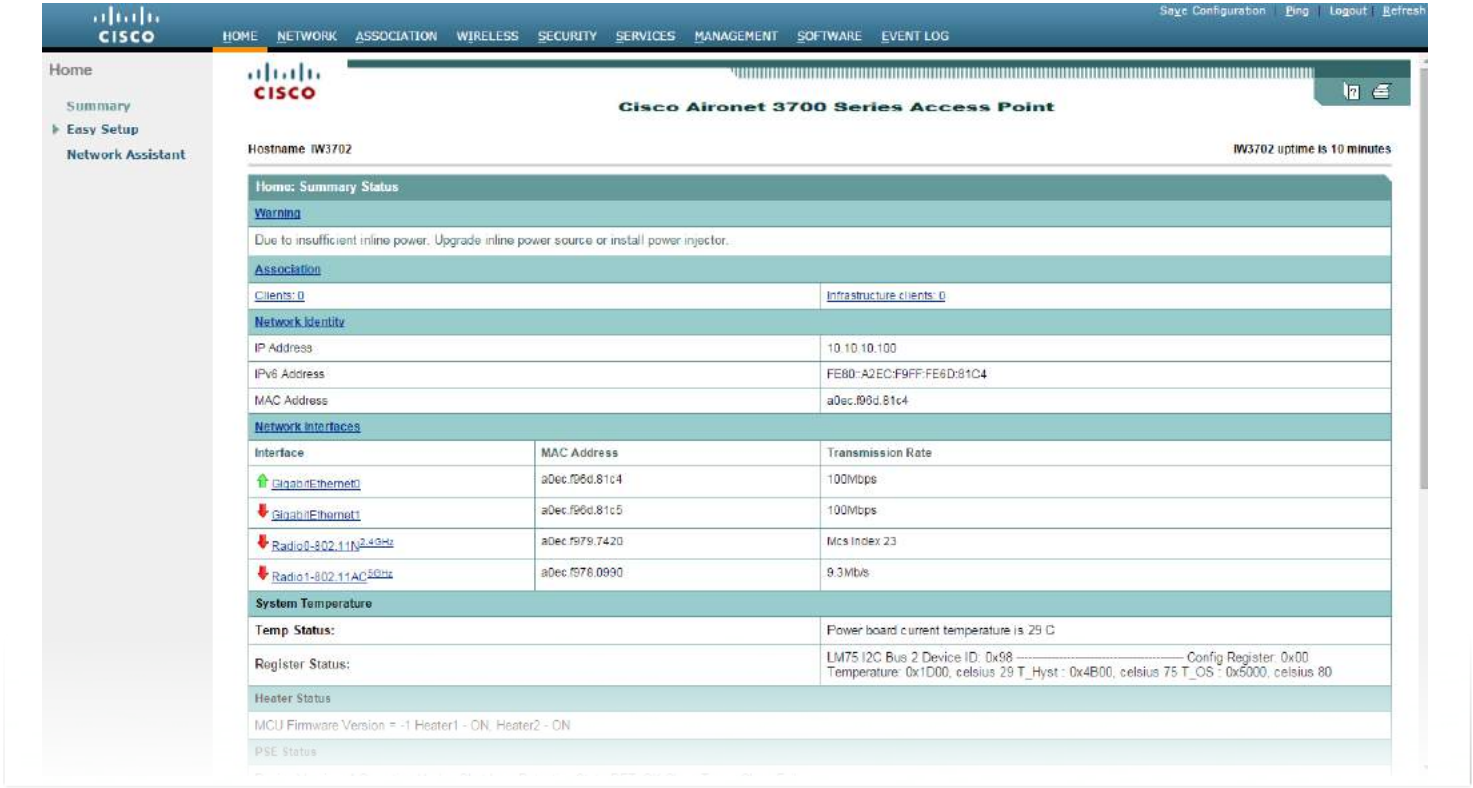
- Individual, directly attached antennas (refer Figure 1 below)
- A need for antenna separation for maximum MIMO performance

Figure 1

Environmental Specifications

Description	Specification
Operating temperature	-40 to 158 F (-40 to 70 C) with solar load and still air
Extended operating temperature	-58 to 167 F (-50 to 75 C) without solar loading, still air and cold start limited to -40 C
Operating test temperature	185 F (85 C) for 16 hours
Storage temperature	-40 to 185 F (-40 to 85 C)
Operating type test	+85 C for 10 minutes
Altitude	15,000 ft.
Humidity	5% to 95% (noncondensing)
Low pressure/Vacuum rating	Tested up to 8 psi

Monitoring IW3702 in Autonomous Mode



Easy monitoring of AP using embedded AP GUI

Supported Omnidirectional Antennas

Model	AIR-ANT2524Dx-R[1]	AIR-ANT2524V4C-R[1]	AIR-ANT2544V4M-R[1]	AIR-ANT2547V(G)-N
Ports	1	4	4	1
Type	Dual-band	Dual-band	Dual-band	Dual-band
Environment	Indoor	Indoor	Indoor/outdoor	Indoor/outdoor
Gain, 2.4 GHz	2 dBi	4 dBi	4 dBi	4 dBi
Gain, 5 GHz	4 dBi	4 dBi	4 dBi	7 dBi
Dimensions	6.6” (L) x 0.8” (D)	7.2” x 7.2”	8.6” (L) x 6.3” (D)	11.1” (L) x 1.3” (D)

[1] With optional R-TNC to N-type RF adapter

New qualified antennas

Supported Directional Antennas

Model	AIR-ANT2566P4W-R[1]	AIR-ANT2513P4M-N	AIR-ANT2413P2M-N	AIR-ANT5114P2M-N[2]
Ports	4	4	2	2
Type	Dual-band	Dual-band	Single-band	Single-band
Environment	Indoor/outdoor	Indoor/outdoor	Indoor/outdoor	Indoor/outdoor
Gain, 2.4 GHz	6 dBi	13 dBi	13 dBi	-
Gain, 5 GHz	6 dBi	13 dBi	-	14 dBi
Dimensions	6.3” x 11.0”	14.5” x 20.0”	7.8” x 7.8”	7.8” x 7.8”

[1] With optional R-TNC to N-type RF adapter
[2] Must be deployed in conjunction with at least 4’ of LMR-240 cable, or 8’ of LMR-400 cable, or 12’ of LMR-600 cable to achieve 1 dBi attenuation for compliance

New qualified antennas

IR829

Cisco 829 Industrial Integrated Services Routers

Accelerometer and Gyroscope (HW-Ready)

USB Type A port (Guest OS)

9-32 VDC Power Input Ignition Sense (HW-Ready)

Hidden behind SIM access cover (Hazloc compliance)

Reset

Mini-USB Type B Console Port (*)

Dual SIM

Cellular 0 AUX

GE0 WAN Port (**SFP**)

WLAN 2.4GHz Ant 0

WLAN 5GHz Ant 0

GPS

WLAN 5GHz Ant 1

Cover for expansion slot

S1 (Async 1): RJ-45 RS232 Serial

S0 (Async 0): RJ-45 RS232/RS485 Serial

WLAN 2.4GHz Ant 1

Cellular 0 MAIN

GE1-4 RJ45
Four 10/100/1000 Mbs
30.8W Shared PoE/PoE+ option

IR829 HW Specifications, LEDs and Labels

- Dimensions: 1.73 (H) x 11 (W) x 7.7 (L) in. / 43.9 x 279 x 196 mm
  1.73 x 11 x 10.55 in (43.9 x 279 x 268 mm) with IP54 cable guard
- Weight: 4.5 lbs. (2 kg)
- IP rating: IP40 or IP54 with optional kit guard
- Power requirements:
  Nominal voltage: 12V, 24V DC, Min/max voltage: 9-32V DC input
  Max/Min current: 7.8 A, 2.8 A (12VDC, it's 5.8A/3.3A)

The DC power input range is 9-32V but it can withstand the cold crank down to 6V for a period of time specified in the ISO-7637-2.

Maximum power consumption: 40 Watts without PoE and 70 Watts with PoE

- Environmental Temperature: Type tested at +85° C for 16 hours

-40° to 140° F (-40° to 60° C) in a sealed NEMA cabinet with no airflow
-40° to 158° F (-40° to 70° C) in a vented cabinet with 40 lfm of air
-40° to 167° F (-40° to 75° C) in a forced air enclosure with 200 lfm of air


CISCO