

## GENERAL INFORMATION

FCCID: 2AC3Z-EGL1101

### 1.1. Product description



HIKOB GATEWAY is the bridge between HIKOB's acquisition system and an IP network. HIKOB GATEWAY collects data from the acquisition nodes or from the embedded sensors directly or through routers.

HIKOB GATEWAY is provisioning data to the customer's information system or business application. HIKOB GATEWAY is also configurable to directly transfer data to HIKOB LIVE PULSE for storage and display. In addition, HIKOB GATEWAY operates information routing to the actuators.

HIKOB GATEWAY connects to IP networks through wired networks (Ethernet) or cellular/wireless networks (3G/HSPA).



#### HIKOB'S SYSTEM OVERVIEW

HIKOB provides wireless autonomous multi-points data acquisition systems. A system is composed of acquisition nodes or embedded sensors (multi-points embedded measure), of a bidirectional wireless acquisition network and of several interfaces for data provisioning.

HIKOB GATEWAY is a component of the acquisition network subsystem.



#### TECHNOLOGY

- 32 bits latest generation micro controller
- ISM bandwidth: 2.4GHz
- IEEE 802.15.4e standardized communication protocol
- Integrated GPS positioning module
- Connectivity with wired or wireless IP networks
- REST-XML API for data integration
- IP67 waterproof
- Power supply: PoE (Power over Ethernet) Ethernet wire

#### FEATURES & BENEFITS

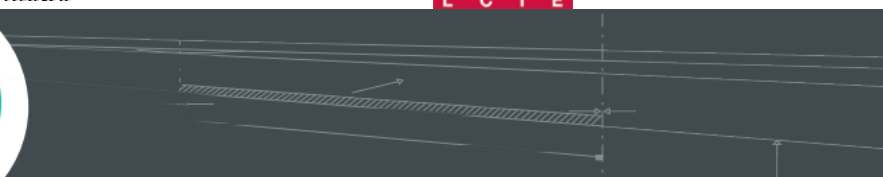
- Self-healing & self-configuring networks
- Synchronisation of all network components (acquisition nodes, embedded sensors and routers)
- Ultra-compact gateway
- Easy handling and installation by third party integrators and installers
- Remote maintenance operations and diagnostic by remoting control (bidirectional acquisition network)
- Omnidirectional integrated radio antenna
- Intelligent management of radio resources especially in disturbed radio environments
- Connectivity with all kind of IP networks
- Manage Over-the-Air (OTA) firmware update of acquisition nodes, embedded sensors, actuators and routers
- Simply add new acquisition nodes, new embedded sensors and HIKOB AZURE LION routers to expand the coverage of the system (no reconfiguration or new calibration required)
- GPS self-location, NTP or GPS synchronisation

#### SYSTEM ARCHITECTURE

- Single-hop architecture: data acquisition system where all acquisition nodes or embedded sensors are in direct range of the gateway
- Multihop architecture: spatially distributed wireless data acquisition system. The network range is expanded with a mesh network of routers with at least one router in range of the gateway

#### EMBEDDED SOFTWARE

- Operating system: HIKOB NET PULSE (Linux-based kernel)
- Intuitive web GUI with remote access
- REST-XML API for data integration



## SPECIFICATIONS



### Microcontroller

Processor	ARM Cortex A8
Operating system	HIKOB NET PULSE (Linux-based kernel)

### IP connectivity

Wired network	Ethernet 100 Mbits/s - Fixed IP address or DHCP
Wireless network	3G/HSPA - VPN (optional)
Protocol	TCP/IP

### Synchronization

Type	NTP or GPS
GPS protocole	L1 frequency GPS module SBAS: WAAS, EGNOS, MSAS

### Software

Applicative personalization features	Via HIKOB NET PULSE plugin
Access control	Black list/white list mecanism via HIKOB NET PULSE
Data access	REST-XML API

### RF communications

Protocole PHY layer	IEEE 802.15.4 PHY
Protocole MAC layer	IEEE 802.15.4e MAC
Radio frequency	ISM 2405-2480MHz
Modulation	DSSS O-QPSK
Data rate	250 kbps
Bandwidth per channel (20dB)	2.8 MHz
Inter-channel spacing	5 MHz
Output TX power	+14 dBm
Sensitivity	-101 dBm
Antenna	Integrated omnidirectionnal antenna

### Power supply

Power supply	PoE via RJ45 connector (IEEE 802.3.af) RJ45 IP68 waterproof connector
Required power	5W

### Electromechanical data

Size	22x12x3,8 cm
Weight	360g
Design	Designed for an outdoor usage
Operating temperature	-40 to +85°C

### Certifications

Fire test	UL94-V0
Waterproof	IP67
CE norm	EN 60950-1 EN 62479 EN 301489-17 EN 301489-1 EN 300328

## 1.2. Tested System Details

### Power supply:

During all the tests, EUT is supplied by  $V_{nom}$ : 48VDC

For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
POE Power supply	<input type="checkbox"/> AC <input checked="" type="checkbox"/> DC <input type="checkbox"/> Battery	100-240VAC to 48VDC, 50-60Hz and 0.4A to 0.32A	PSA16U-480 / None	PHIHONG

### Inputs/outputs – Cable for the configuration 1 (see running mode §2.2):

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
POE Power supply	Ethernet power supply	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Reference : PSA16U-480

### Inputs/outputs – Cable for the configuration 2 (see running mode §2.2):

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Antenna access	I/O and SMA cable with a Isolate Galvanic	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	S/N of Isolate Galvanic is 127014
Antenna	N	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Extronics, S/N: 133297
POE Power supply	Ethernet power supply	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Reference : PSA16U-480

### Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop DELL	PRECISION	8P3J5S1	-

### Equipment information:

Type:	ZIGBEE		
Frequency band:	[2400 – 2483.5] MHz		
Sub-band REC7003:	Annex 3 (a)		
Spectrum Modulation:	<input checked="" type="checkbox"/> DSSS		
Number of Channel:	16		
Spacing channel:	5MHz		
Channel bandwidth:	2MHz		
Transmit chains:	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
	<input checked="" type="checkbox"/> Single antenna	<input type="checkbox"/> Symmetrical	<input type="checkbox"/> Asymmetrical
	Gain 1: 3dBi	Gain 2: dBi	Gain 3: dBi
Beam forming gain:	<input type="checkbox"/> Yes: dB		<input checked="" type="checkbox"/> No
Receiver chains	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Type of equipment:	<input checked="" type="checkbox"/> Stand-alone		<input type="checkbox"/> Plug-in
Ad-Hoc mode:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No
Adaptivity mode:	<input checked="" type="checkbox"/> Yes (Load Based)		<input type="checkbox"/> Off mode
	Clear Channel Assessment Time:		None
	q value for Load Based Equipment:		None
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty		<input type="checkbox"/> Intermittent duty
Equipment type:	<input checked="" type="checkbox"/> Production model		<input type="checkbox"/> Prototype
Module reference:	AT86RF231-ZU		

Temperature range:	Tmin:	<input checked="" type="checkbox"/> -20°C	<input type="checkbox"/> 0°C	<input type="checkbox"/> 60°C
	Tnom:	20°C		
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 55°C	<input checked="" type="checkbox"/> 60°C
Test source voltage:	<input type="checkbox"/> AC:	<input checked="" type="checkbox"/> DC: 48	<input type="checkbox"/> Battery:	VDC / Alkaline

CHANNEL PLAN	
Channel	Frequency (MHz)
<b>Cmin: 11</b>	2405
12	2410
13	2415
14	2420
15	2425
16	2430
17	2435
<b>Cmid: 18</b>	2440
19	2445
20	2450
21	2455
22	2460
23	2465
24	2470
<b>Cmax: 25</b>	2475
26*	2480

\*Not used by the provider.

DATA RATE		
Data Rate (Mbps)	Modulation Type	Worst Case Modulation
0.25	O-QPSK	<input checked="" type="checkbox"/>

The EUT is set in the following modes during tests with simulator / software (Unknown):

- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception
- The power is set at 3dBm

Two setup are tested in "Radiated Emission Data" and "Maximum Peak Output Power" and the worst case is selected for all the others tests.

The configuration 1:

EUT is powered by I.T.E Power supply and the antenna is a PCB internal to the EUT.



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The configuration 2:

EUT is powered by I.T.E Power supply and the antenna is deployed. The antenna cables measure 3 meters and they are isolated by an Isolate Galvanic.



### 1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-2003, FCC Part 15 Subpart C.

Radiated testing was performed at an antenna to EUT distance of 10 meters. During testing, all equipment's and cables were moved relative to each other in order to identify the worst case set-up.

### 1.4. Test facility

Tests have been performed from October 13th to 21th, 2014.

This test facility has been fully described in a report and accepted by FCC as compliant with the radiated and AC line conducted test site criteria in ANSI C63.4-2003 in a letter dated March 25<sup>th</sup>, 2008 (registration number 94821). This test facility has also been accredited by COFRAC (French accreditation authority for European Union test lab accreditation organization) according to NF EN ISO/IEC 17025, accreditation number 1-1633 as compliant with test site criteria and competence in 47 CFR Part 15/ANSI C63.4 and EN55022/CISPR22 norms for 89/336/EEC European EMC Directive application. All pertinent data for this test facility remains unchanged.