Certification Exhibit

FCC ID: U9O-HCTAG01

FCC Rule Part: 15.249

ACS Project Number: 14-2059

Manufacturer: Synapse Wireless, Inc.
Model: HCTAG01

User Manual

DATA SHEET

HCTAG Series

Model Number: HCTAG01
Part Numbers: HCTAG-ST201

Document Revision v1.1

Wireless Technology to Control and
Monitor Anything from Anywhere™

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1. HCTAG01 OEM Device Overview

The HCTAG01 device is an IEEE 802.15.4, low-power, highly-reliable solution to embedded wireless control and monitoring network needs that require high data rates. The HCTAG01 embeds Synapse's SNAP OS, the industry's first Internet-enabled, wireless mesh network operating system into the Atmel ATMEGA1284RFR2-ZU single-chip AVR® microcontroller with an integrated transceiver that delivers up to 2Mbits/sec. This low-power TAG is intended to be used in Real Time Location Systems using RF technologies with power consumptions as low as 1.0 μA to enable a new generation of battery-driven systems.

SNAP's on-board Python interpreter provides for rapid application development and over-the-air programming, while Atmel's low-power RF single-chip design saves board space and lowers the overall Bill of Materials and power consumption. The HCTAG01 is approved as an FCC Part 15 unlicensed modular transmitters. The modules provide up to 16 channels of operation in the ISM 2.4GHz frequency band. The HCTAG01 device is intended to be a low-power transmitter with a low duty cycle (<14%) operation that can be worn on the body by the user.

This Data Sheet details Part Number HCTAG01:

- 128k flash, 58.5k free for over-the-air uploaded user apps
- One UART port (not externally accessible) for control or transparent data, which surmounts noisy environments
- Low power modes: 1.0 μA with internal timer running
- Spread spectrum (DSSS) technology
- Up to 2 Mbps Data Rate
- 2.4 GHz RF Frequency
- Receive Mode (7 dBm) standard
- Transmit Mode (2-3 dBm) for good low-power range
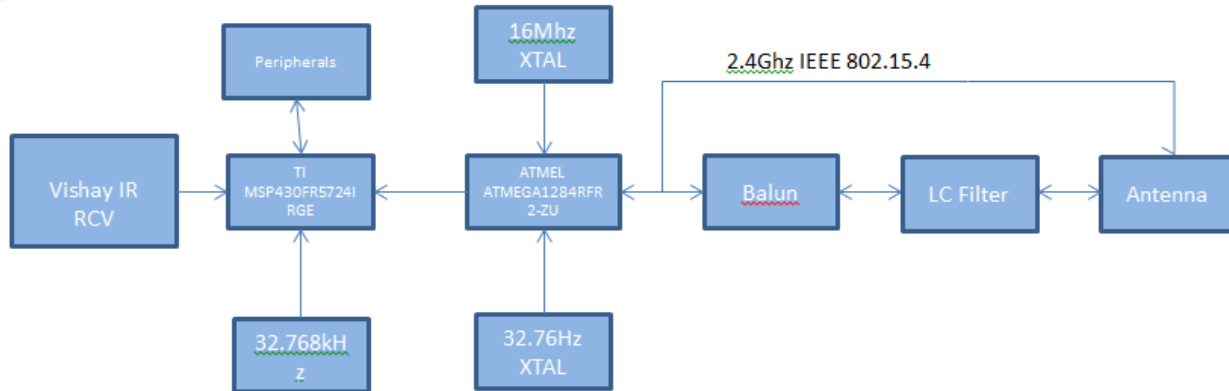- HCTAG01: ANT5320LL24R2400A, ANTENNA,CHIP,2.45GHz,50ohm,2.8dBi GAIN

Figure 1.0 Block diagram showing the major subsystems comprising the HCTAG01

Specifications

Table 1.0 HCTAG01 Specifications		
Performance	Transmit Power Output	3 dBm
	RF Data Rate	250Kbps, 500Kbps, 1Mbps, 2Mbps
	Receiver Sensitivity	-107 dBm (1% PER)
Power Requirements	Supply Voltage	2.7 - 3.6 V
	Transmit Current (Typ@3.0V)	40mA
	Idle/Receive Current (Typ@3.0V)	20mA
	Power-down Current (Typ@3.0V)	1.0uA
General	Frequency	ISM 2.4 GHz
	Spreading Method	Direct Sequence (DSSS)
	Modulation	O-QPSK
	Dimensions	3.25" x 2.0" x 0.375"
	Operating Temperature	-40 to 85 deg C.
	Antenna Option	ANT5320LL24R2400A, Chip
Networking	Topology	SNAP
	Error Handling	Retries and acknowledgement
Available I/O	Number of Channels	16
	UARTS with HW Flow Control	1 Port - 8 total I/O
Agency Approvals	FCC Part 15.247	FCC ID: U9O-HCTAG01

Electrical Characteristics

The HCTAG01 is powered by quantity two AAA Alkaline Battery Cells. They are not intended to be user-replaceable.

2. Agency Certifications

United States (FCC)

WARNING: The HCTAG01 modules have been tested by the FCC for use with other products without further certification (as per FCC Section 2.1091). Changes or modifications to this device not expressly approved by Synapse Wireless Inc. could void the user's authority to operate the equipment.

The HCTAG01 modules comply with Part 15 of the FCC rules and regulations. Compliance with the labeling requirements, FCC notices and antenna usage guidelines is required.

FCC ID: U9O-HCTAG01

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION

FCC Notices

WARNING: The HCTAG01 device has been tested by the FCC for use with other products without further certification (as per FCC Section 2.1091). Changes or modifications to this device not expressly approved by Synapse Wireless Inc. could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
•   Reorient or relocate the receiving antenna.
•   Increase the separation between the equipment and receiver.
•   Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
•   Consult the dealer or an experienced radio/TV technician for help.

RF Exposure Warning:

"This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment is in direct contact with the body of the user under normal operating conditions. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter."