



**LCIE SUD EST**  
Laboratoire de Moirans  
Z.I. Centr'Alp  
170, Rue de Chatagnon  
38430 MOIRANS - FRANCE

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## GENERAL INFORMATION

FCCID: QHKNV2CLUSTER

### 1.1. Product description

Power Node Reader V2 User's Guide



## 3 Power Node Reader Description

The Power Node Reader is designed to be part of a whole "Hot Spot Power Node" system.

The "Hot Spot Power Node" system is designed to emphasize the range of a RFID reader addressing passive tags. The system uses UHF frequency band, following the FCC 15.247 standard (including frequency hopping feature), and ISO 18000-6c protocol.

In this system, the Hot Spot, that includes a RFID reader, pilots many Power Nodes through remote links. The Power Nodes are put close to tags areas, to efficiently energize the tags. The Power node repeats and amplifies the RFID interrogation signal. The Hot Spot transmits the RFID interrogation and receives the backscattered signal from the passive tags.

The remote link to the Power Nodes and the interrogation signals are not transmitted in the same time intervals.

The Power Node radio receives the Hot Spot, RFID interrogation signal, amplifies it and transmits it to the passive tags.  
The Power Node Battery pack has up to three 2400mAH 1850 Lithium Ion Rod type rechargeable batteries.

The number of batteries inserted can vary according to the installation. Usually, when PN are permanently supplied with power from the USB port inlet, only one battery is fitted.

On the bottom of the battery pack a micro USB connector allows to charge and supply power using a 6 port ANKER A2123 USB charger.

It takes typically up to 6 hours to fully recharge the 3 batteries in parallel.



To insure the highest possible level of safety do not replace our recommended PSU or by equivalent ones. In doing so you will also keep the compliance of your system.

A Power Node RFID reader cannot operate on its own.

It needs BLE signals from the Hot Spot V2 to get operation commands and a 2.45GHz analogue signal broadcast to generate its RFID interrogation signal in the 902-928MHz US band or 866-867MHz EU band.

### 3.1 Delivery Pack

The power node is delivered with the following parts:

- A power node Radio Pack refer to [Figure 1](#)
- A Battery and Supply Pack [Figure 2](#)
- A notch cover [Figure 4](#) to easily feed through a Zip-Tie to affix the power node to fixtures side bars
- A specific key to unlock and separate the power pack from the Radio feeding it through two holes
- A Connectors' cover [Figure 3](#) to discreetly hide the cables and connectors from the view of customers.



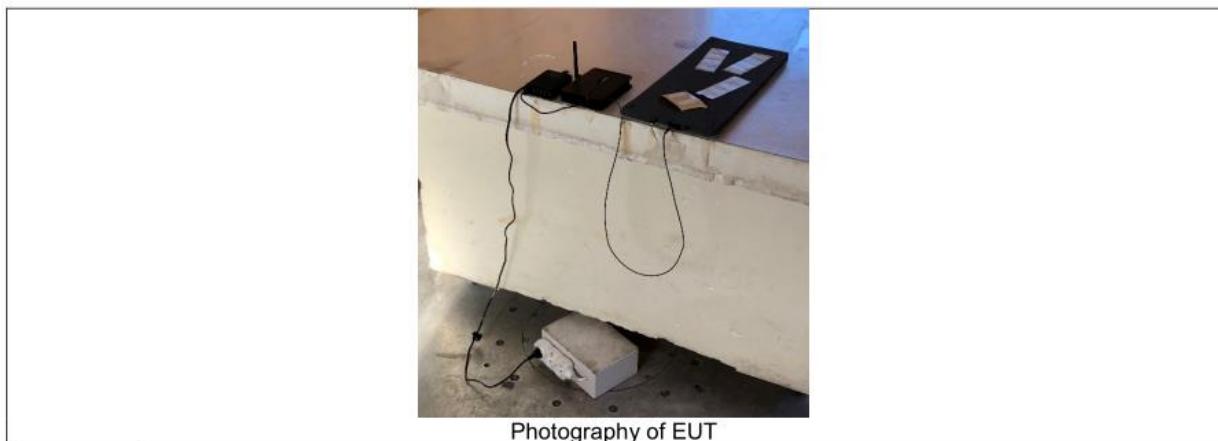
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## 1.2. Tested System Details

### Equipment under test (EUT):

Power Node V2

Serial Number: 16577-A0



### Power supply:

During all the tests, EUT is supplied by  $V_{nom}$ : 3.7VdC

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

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Internal Supply	Battery	-	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	USB to $\mu$ USB (5VDC)	0.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
Access	Input/Output(RFID antenna) x 8	0.5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Only 1 linked with antenna
Access	Jack	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not used
Access	SMA (Receiver antenna)	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.45 GHz not tested in this report



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**Voltage table used:**

Type	Measurement performed:	
<input type="checkbox"/> AC	<input type="checkbox"/> 110VAC/60Hz	<input type="checkbox"/> 240VAC/50Hz
<input type="checkbox"/> DC	<input type="checkbox"/> +....VDC	<input type="checkbox"/> -....VDC
<input checked="" type="checkbox"/> USB (Laptop auxiliary)	<input checked="" type="checkbox"/> 110VAC/60Hz (Power Port 6)	<input checked="" type="checkbox"/> 240VAC/50Hz (Power Port 6)



**Inputs/outputs – Power supply:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Access1	AC/USB	1.5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Access2	USB	0.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
Access3	USB	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not linked
Access4	USB	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not linked
Access5	USB	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not linked
Access6	USB	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not linked
Access7	USB	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not linked

**Auxiliary equipment used during test:**

Type	Reference	Sn	Comments
Hot Spot V2	-	16540-A0	-
Laptop	Dell latitude	-	-



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**Equipment information:**

Frequency band:	[902 – 928]* MHz		
Spectrum Modulation:	<input checked="" type="checkbox"/> FHSS		
Number of Channel:	See the following table.		
Spacing channel:	500kHz		
Channel bandwidth:	500kHz		
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated
Antenna connector:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Temporary for test
		<input checked="" type="checkbox"/> 1	
Transmit chains:	Single antenna Gain 1: 2dBi*		
Beam forming gain:	No		
Receiver chains	1		
Type of equipment:	<input type="checkbox"/> Stand-alone	<input checked="" type="checkbox"/> Plug-in	<input type="checkbox"/> Combined
Ad-Hoc mode:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Dwell time:	800µs		
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty
Equipment type:	<input checked="" type="checkbox"/> Production model	<input type="checkbox"/> Pre-production model	
Operating temperature range:	Tmin:	<input checked="" type="checkbox"/> -20°C	<input type="checkbox"/> 0°C
	Tnom:	20°C	
	Tmax:	<input type="checkbox"/> 35°C	<input checked="" type="checkbox"/> 55°C
Type of power source:	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input checked="" type="checkbox"/> Battery (internal)
Operating voltage range:	Vnom:	<input checked="" type="checkbox"/> 230V/50Hz	<input checked="" type="checkbox"/> 3.7Vdc (internal battery)

\*See the Antenna information in §2.3

**2.2. EUT CONFIGURATION**

Following commands with the specific test software "" is used to set the product:

- Permanent emission with modulation in Hopping mode.

**Channel plan:**

Channel	Channel Frequency (MHz)
Cmin:	902.75
-	903.25
-	903.75
-	904.25
-	904.75
-	905.25
-	905.75
-	906.25
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-	912.25
-	912.75
-	913.25
-	913.75
-	914.25
-	914.75

Cmid	
-	915.25
-	915.75
-	916.25
-	916.75
-	917.25
-	917.75
-	918.25
-	918.75
-	919.25
-	919.75
-	920.25
-	920.75
-	921.25
-	921.75
-	922.25
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-	923.25
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-	925.25
-	925.75
-	926.25
-	926.75
Cmax	927.25



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### **1.3. Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 or/and ANSI C63.10, FCC Part 15 SubPart 15C.

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: **February 26, 2019 to February 27, 2019.**

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 or/and ANSI C63.10.

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, as compliant with test site criteria and competence in 47 CFR Part 15/ANSI C63.4 and EN55032/CISPR32 norms for 89/336/EEC European EMC Directive application. All pertinent data for this test facility remains unchanged.