

## GENERAL INFORMATION

FCCID: XKB-MOV

### 1.1. Product description

MOVE/5000

# Move/5000

**Boost sales on-the-go  
with a world  
of Business Apps**

- Create new experiences combining payment and Business Apps on a rich user interface
- Accept the broadest range of payment methods on-the-go
- Meet the most demanding use cases with innovative embedded features



contactless



security



connectivity



touchscreen



barcode



camera



html5 standard



TELUM  
TETRA

The Move/5000 is a game changer, opening the portable payment terminal to a new world of Business Apps.

**Highest Security**

The Move/5000 is PCI-PTS 4.x certified. Its TELIUM Tetra OS uses the latest cryptographic schemes with future-proof key length.

**All Payment options**

The Move/5000 enables NFC couponing and wallet use cases. In addition to EMV Chip & PIN, Swipe & Sign and contactless.

**User-friendly and Intuitive Interface**

Featuring powerful multimedia capabilities and a large 3.5-inch touch screen, the Move/5000 provides best-in-class user experience thanks to a rich interface enabling business Apps.

**Designed for Mobility**

Designed for both indoor and outdoor uses, the pocket-sized Move/5000 comes with extended battery life. It is the perfect business companion for merchants.

**Built-in data capture capabilities**

With its camera barcode scanner and GPS tracking, Move/5000 enables alternative payment schemes and unlimited possibilities for business Apps.

**Maximized network availability**

Providing full spectrum wireless connectivity (3G, GPRS, Dual SIM, Bluetooth and WIFI), the Move/5000 offers the widest touch point flexibility while optimizing communication costs.

**Seamless NFC payment**

The Move/5000 boosts NFC payment by offering to customers a seamless experience through a dedicated card-reader zone and faster transaction flows.

**Electronic signature for payment and business apps**

The Move/5000 offers signature capture capabilities for electronic payments, receipt storage and new business Apps such as contracts, warranty programs or enrollment.

**An OS with secure payment and creative freedom**

Backed by 30 years of experience, the TELIUM Tetra Operating System is the perfect combination of ingenico Group's legacy in payment expertise and openness to the web. It embeds the best security mechanisms to protect transaction privacy, while enabling the deployment of appealing HTML5 web-based rich media business apps.



NAME			Move/5000
Processor	Application & Crypto processor	Cortex A5	●
Memory	Internal External	512 MB Flash, 512 MB RAM MicroSD up to 32GB	● ●
OS		TeLIUM Tetra OS	●
SIM		SIM 1 SIM 2	Option Option
SAM		2 SAM 3rd SAM	● Option
Card readers	Magnetic Smart Card Contactless	ISO 1/2/3, 500K lifespan EMV Level 1, 500K lifespan EMV Level 1 compliant	● ● Option
Display	Color	3.5" backlit, HVGA (480x320 pixels)	●
Touchscreen	Resistive	Finger & stylus (300K lifespan signature)	●
Keypad		16 keys, raised Marking, backlit	●
Audio	Buzzer Audio Jack Speaker	Stereo Mono	● Option Option
Video	Video accelerator	H264 codec	●
Data capture	Positioning Barcode reader Camera	GPS tracking 1D/2D 5M pixels autofocus	Option Option Option
Thermal Printer	Speed in lines/s Paper roll cage	up to 30 lines/s 58 mm width x Ø 40 mm 58 mm width x Ø 25 mm	● ● Option
Terminal connectivity	WAN LAN Multicom	3G and GPRS WiFi and/or Bluetooth WAN + LAN	Option Option Option
Terminal connections	USB Power Supply	Host & Slave Dedicated power Jack	● ●
Battery	LI-Ion	2900mAh	●
Terminal size	Ø 40 mm Ø 25 mm	169 x 78 x 57 mm (6.6x3.1x2.2") 160 x 78 x 47 mm (6.3x3.1x1.9")	● ●
Weight	Terminal + Battery	320 g (11 oz)	●
Environment	Operating Temperature Storage Temperature Operating Humidity	-10°C to +50°C (14°F to 104°F) -20°C to +55°C (-4°F to 131°F) 85% non-condensing at +40°C (104°F)	● ● ●
Accessory	Privacy shield Car Charger Docking station	Factory Mounted Charger 2 RS232 USB Host USB Slave Modem Ethernet 10/100 Base T Bluetooth	Option Option ● Option Option Option Option Option
Security		PCI PTS 4.x Online & Offline certified	●



**MOVE/5000 is a Point of sales Terminal integrating a 3G module and a Contactless reader.**

<b>Hand Held Unit</b>	
<ul style="list-style-type: none"><li>• <b>3G</b></li></ul>	<ul style="list-style-type: none"><li>- Module HL8548 FCC ID: N7NHL8548 IC: 2417C-HL8548</li><li>- Frequency operation band: Quad band 2G (850/900/1800/1900) pentaband 3G (800/850/900/1900/2100)</li><li>- Antenna gain: 0dBi</li></ul>
<ul style="list-style-type: none"><li>• <b>Contactless</b></li></ul>	<ul style="list-style-type: none"><li>- ISO14443</li><li>- 13.56MHz</li><li>- &lt;60dB<math>\mu</math>V/m @ 3meters</li><li>- Antenna gain: 0dBi</li></ul>

<b>3G module</b>
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The 3G module is the HL8 from Sierra wireless. Its FCC Id is: N7NHL8548 and IC: 2417C-HL8548  
The antenna is integrated and is a monopole antenna type.

## Compact, Flexible, and Future Proof 2G, 3G, and 4G Essential Modules

Sierra Wireless AirPrime® HL embedded modules offer everything device manufacturers need to meet essential connectivity requirements for machine-to-machine (M2M) applications such as healthcare, point of sale terminals, fleet management, tracking, and consumer electronics. Key differentiators include a common form factor, small size, low-power consumption, enhanced RF performance, optional GNSS (GPS and GLONASS), and worldwide coverage.

### COMPACT: THE SMALLEST 2G TO 4G FORM FACTOR ON THE MARKET

The HL Series is the smallest module on the market sharing a common form factor across 2G, 3G, and 4G technologies. Now, with just one PCB design, device manufacturers can easily integrate voice and data connectivity and deploy in any region, on any wireless mobile network.

### FLEXIBLE: SOLDER DOWN OR CHOOSE THE SNAP-IN SOCKET TO SWITCH MODULES ANY TIME

The compact form factor offers the choice of soldering down the module for efficient high-volume production or, using a snap-in socket on the same solder pads for total flexibility in prototyping or smaller volume runs. The innovative snap-in socket allows device manufacturers to deploy or change modules at any point in the production and product life cycles.

### FUTURE PROOF: INTELLIGENT PIN-TO-PIN COMPATIBILITY TO SUPPORT EVOLVING TECHNOLOGIES

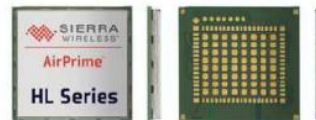
The core and extension pins on the common form factor enables forward and backward compatibility between the different 2G, 3G, and 4G module variants. This means that the mechanical pin location delivers the same function across the series. The optional custom pins allow for new features as technology evolves making it the most future proof module on the market.



### EASY TO INTEGRATE AND MANAGE

The HL Series can be managed remotely with AirVantage® Management Service, enabling device manufacturers to securely upgrade device firmware over-the-air. This can extend the life of your products and solutions by future-proofing remote assets, expanding service quality, and saving customers time and operating costs.

## Essential



*The more we talked with Sierra Wireless, the more confident we became that they really understood what we needed to not only build and launch a new generation of outdoor lighting fixtures, but to also grow and evolve them over time.*





	HL75xx Series	HL8548	HL6528
<b>FORM FACTOR</b>	LGA	LGA	LGA
<b>AIR INTERFACE</b>	LTE & LTE/HSPA	GSM/GPRS/EDGE/HSD/PA/HSUPA	GSM/GPRS
<b>FREQUENCY BANDS</b>			
<b>LTE</b>	HL7519: B2/B4/B13 HL7528: B1/B3/B5/B7 HL7548: B2/B4/B5/B17 HL7549: B3/B7/B28 HL7588: B2/B4/B5/B13/B17		
<b>HSPA</b>	HL7588: B2/B5	B1/B2/B5/B6/B8	
<b>EDGE</b>		850/900/1800/1900	
<b>GSM/GPRS</b>		850/900/1800/1900	850/900/1800/1900
<b>APPROVALS</b>			
<b>Regulatory</b>	PTCRB, FCC, GCF, IC, KC Mark	CE, FCC, PTCRB, GCF, IC, Anatel, CCC	CE, FCC, PTCRB, GCF, IC, Anatel, CCC
<b>Carrier</b>	Depends on Models: AT&T, Verizon, Rogers, KT, SKT, LGU+...	AT&T, Vodafone, NTT...	Approved in many carriers over the world
<b>CURRENT CONSUMPTION</b>			
<b>Power Supply for Extended Battery Life</b>	2.8V supports	2.8V supports	2.8V supports
<b>Alarm (leakage only)</b>	110µA	40µA	35µA
<b>Standby and Idle (Sleep)</b>	LTE: 1.5 mA	1.2 mA	1 mA
<b>GSM/GPRS max</b>		360 mA	360 mA
<b>HSPA max</b>	HL7588: 560 mA	560 mA	
<b>LTE max</b>	CAT 4: 750 mA		
<b>AUDIO</b>			
<b>Analog Audio</b>			✓
<b>Digital Audio</b>	✓ depends on the variants	✓	✓
<b>Codec</b>	depends on the variants	HR, FR, EFR, AMR	HR, FR, EFR, AMR
<b>Echo Cancellation &amp; Noise Reduction</b>	depends on the variants	✓	✓
<b>DTMF</b>	depends on the variants	✓	✓
<b>INTERFACES</b>			
<b>UART</b>	✓ 8 lines	✓ 8 lines	✓ 8 lines
<b>USB</b>	✓	✓	✓
<b>SPI</b>			✓
<b>ADC</b>	2	2	2
<b>GPIO</b>	8	8	8
<b>Flash LED Output</b>	✓	✓	✓
<b>PWM (Buzzer)</b>	1	1	2
<b>Tx Burst Indicator</b>	✓	✓	✓
<b>SIM Interface 1.8V/3V</b>	✓	1 SIM DSDS support	2 SIM DSDS support
<b>LOCATION SOLUTION</b>		GPS & Glonass Sirf V	GPS & Glonass Sirf V
<b>CLOUD SERVICES</b>			
	FOTA through AVMS	FOTA through AVMS	FOTA through AVMS
<b>INTERNET SERVICES</b>			
	TCP+UDP+FTP+HTTP+HTTPS	TCP+UDP+FTP+HTTP+HTTPS	TCP+UDP+FTP+HTTP+HTTPS
<b>DRIVERS</b>			
	USB drivers for Linux, Android, Win CE, Win8	USB drivers for Linux, Android, Win CE, Win7, Win XP	RIL driver for Win CE & Linux
<b>DEVICE DIMENSIONS</b>			
	22x23x2.5 mm	22x23x2.5 mm	22x23x2.5 mm
<b>TEMPERATURE RANGE</b>			
	- 40°C / + 85°C	- 40°C / + 85°C	- 40°C / + 85°C

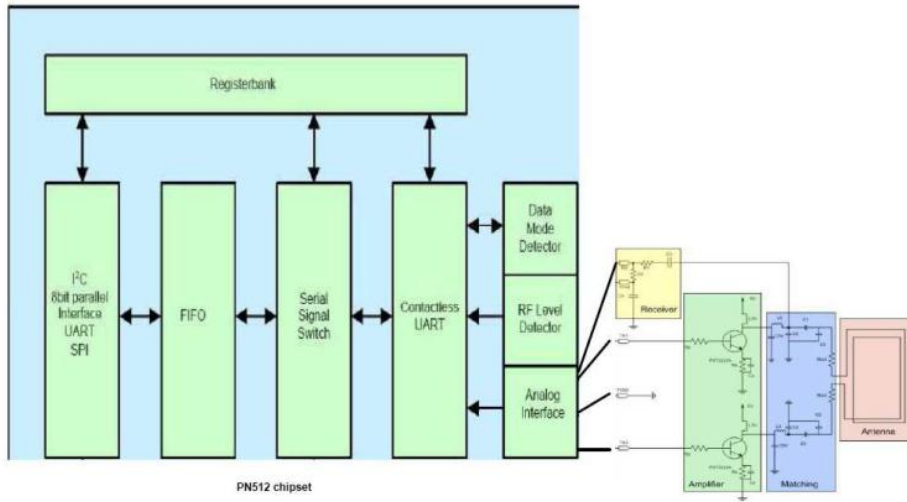
## CONTACTLESS

The Contactless link is used as a card reader. The Contactless part is able to a reader/writer command according to ISO14443 card interface scheme.

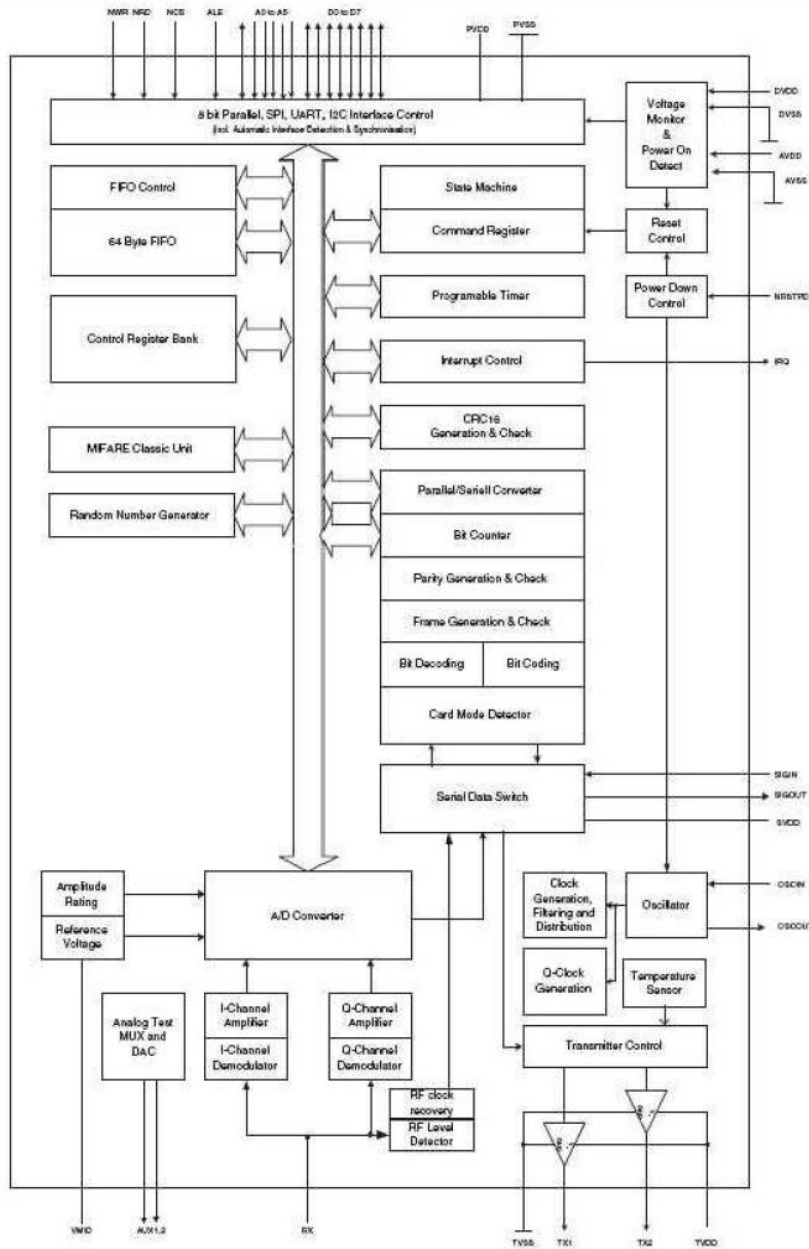
The operating frequency is 13.56MHz

The magnetic field is generated with an antenna; this antenna is integrated and is a 2 turn coil antenna designed on a flex.

The maximum magnetic field strength is below  $<60\text{dB}\mu\text{V/m @ 3meters}$ .  
The 13.56Mhz can transmit in any mode of operation.  
The Contactless design is based on the NXP PN512 Chipset managed by the host processor via SPI.



**PN512 Chipset**



**SPI Interface**

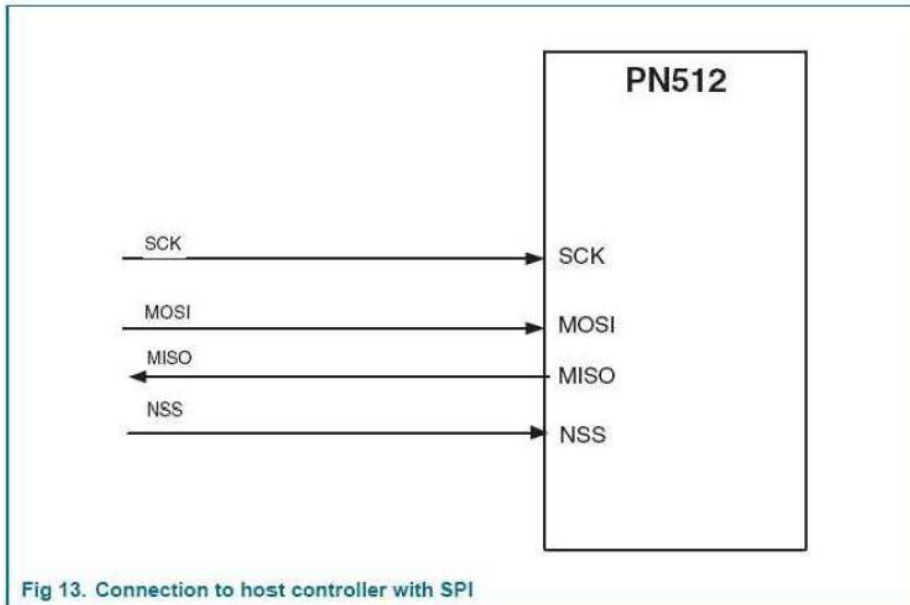


Fig 13. Connection to host controller with SPI

The PN512 acts as a slave during the SPI communication. The SPI clock SCK has to be generated by the master. Data communication from the master to the slave uses the Line MOSI. Line MISO is used to send data back from the PN512 to the master.

On both lines (MOSI, MISO) each data byte is sent by MSB first. Data on MOSI line should be stable on rising edge of the clock line and can be changed on falling edge. The same is valid for the MISO line. Data is provided by the PN512 on falling edge and is stable during rising edge.

## 24.5 Clock frequency

Table 176. Clock frequency

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f <sub>OSCIN</sub>	Clock Frequency		-	27.12	-	MHz
d <sub>FEC</sub>	Duty Cycle of Clock Frequency		40	50	60	%
t <sub>Jitter</sub>	Jitter of Clock Edges		-	-	10	ps, RMS

## 24.6 XTAL oscillator

Table 177. XTAL oscillator

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OH,OSCOUT</sub>	Output Voltage High XTAL2		-	1.1	-	V
V <sub>OL,OSCOUT</sub>	Output Voltage Low XTAL2		-	0.2	-	V
C <sub>IN,OSCIN</sub>	Input capacitance OSCIN		-	2	-	pF

## 24.7 Typical 27.12 MHz crystal requirements

Table 178. XTAL oscillator

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f <sub>XTAL</sub>	XTAL Frequency Range		-	27.12	-	MHz
ESR	XTAL Equivalent Series resistance		-	-	100	Ω
C <sub>L</sub>	XTAL Load capacitance		-	10	-	pF
P <sub>XTAL</sub>	XTAL Drive Level		-	50	100	W



#### 4.1.1 Amplifier Circuit

The Amplifier Circuit (TX-Path) (green box in Fig 1) consists of two emitter amplifiers where the transistors are used as a switch. The TX1 and the TX2 output of the NXP contactless reader chip generates a digital signal which is amplified by the transistors. The signal is directly connected to the matching circuit.

**Note:** The PN5xx has two transceiver pins: TX1 and TX2. By using the amplifier solution, the contactless reader transmission mode should be switched to *asynchronous mode*. This is done by setting the register 0x14 (TXControlReg) to 0x83.

The emitter amplifier consists of a resistor  $R_b$  which is connected to the base of the transistor. The resistor limits the current into the base. The collector of the transistor is connected via an AC – decoupling inductor ( $L5V$ ) to the power supply. The quality factor of this inductor has to be at least more than 20 at 13.56MHz. At the same time the inductance  $L5V$ , in combination with  $C5V$  interacts as a 13.56 MHz oscillator. The resistor  $R_e$  and the capacitor  $C_e$  connect the emitter to GND. The matching circuit is connected to the collector of the transistor.

**Note:** It is possible to use any type of transistor which has a high transition frequency, a small collector capacitance and high total power dissipation. The concrete values of these three factors depend on the requirements of the application

#### 4.1.2 Antenna Matching

Depending on the antenna PCB (red box in Fig 1), the necessary antenna matching (blue box Fig 1) consists of a symmetric arrangement of an EMC – filter ( $L0$  and  $C0$ ) plus a serial and parallel tuning capacitors, from the reader chip point of view. To regulate the quality factor of the antenna, the resistor  $R_q$  is added.

The capacitors and the resistors are used to both achieve the required 13.56MHz resonance frequency, and a quality factor for appropriately signal shaping according to ISO/IEC 14443.

The following equations in chapter 4.1.3 are used to calculate the matching components. Please keep in mind, that these values, slightly modified, are also required for fine tuning the components. This is necessary because of the direct influence of the amplifier circuit onto the phase shifting of the two signals on both sides of the antenna matching circuit. The maximum output is reached when the antenna is first tuned to 13.56MHz and the two ends of the antenna tuning circuit, connected to the amplifier, oscillate (in relation to GND) with 180 degree phase shift.

The electrical parameters of the antenna  $L_p$ ,  $R_p$  and  $C_p$  have to be measured first.

**Note:** The matching of the antenna is very strong influenced by its environment. An assembled PCB or other metallic environment, like a display or housing will make a retuning necessary.

#### Antenna

Antenna is integrated and designed on a flex with two turn coil.  
The antenna gain is 0dBi.




## 1.2. Tested System Details

### Power supply:

During all the tests, EUT is supplied by 240V/50Hz or 110V/60Hz  
 For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	<input checked="" type="checkbox"/> AC <input type="checkbox"/> DC <input type="checkbox"/> Battery	100-240V 50/60Hz   5Vdc	PHIHONG PSM05E-050D-R sn: 002	/
Supply2	<input checked="" type="checkbox"/> AC <input type="checkbox"/> DC <input type="checkbox"/> Battery	100-240V 50/60Hz   5Vdc	PHIHONG PSM08E-050D-R sn: 005	/
Supply3	<input type="checkbox"/> AC <input type="checkbox"/> DC <input checked="" type="checkbox"/> Battery	3.6V / 2900Mah	MUS3878 / 1NRC1865QPP	/

### Inputs/outputs - Cable:

EUT						
Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply port 1	DC power supply port	2m	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Access1	USB port (Micro A) (plugged with it's own USB cable)	 0.15m	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/








Base						
Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply port 2	DC power supply port (Plugged from Power supply n°1 & 2)	2m	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/

Power supply n°1 (PHIHONG PSM05E-050D-R)						
Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Mains1	Power supply main port	/	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Secondary1	DC secondary port	2m	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/

Power supply n°2 (PHIHONG PSM08E-050D-R)						
Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Mains 2	Power supply main port	/	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Secondary2	DC secondary port	2m	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/

**Equipment information:**

<b>Frequency band:</b>	[13.553 – 13.567] MHz		
<b>Sub-band REC7003:</b>	Annex9 (f)		
<b>RF mode:</b>	<input type="checkbox"/> Transmitter	<input checked="" type="checkbox"/> Transceiver	<input type="checkbox"/> Receiver <input type="checkbox"/> Standby
<b>Receiver classification § 4.1.1</b>	<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3
<b>Antenna type:</b>	<input type="checkbox"/> External:		<input checked="" type="checkbox"/> Internal:
<b>Extreme temperature range:</b>	<input checked="" type="checkbox"/> Category I (General) -20°C to +55°C	<input type="checkbox"/> Category II (Portable) -10°C to +55°C	<input type="checkbox"/> Category III (Indoor) +5°C to +35°C
<b>Extreme test source voltage:</b>	<input type="checkbox"/> ±15%:	<input checked="" type="checkbox"/> other: $V_{min}$ :3.5Vdc / $V_{nom}$ :3.85Vdc / $V_{max}$ : 4.2Vdc (Battery)	

Configuration ID	Description	Description
1		<p>EUT is powered only by it's own Inner Battery</p> <p>Micro-A cable plugged on EUT</p>
2		<p>EUT is powered by Power supply n°1</p> <p>Micro-A cable plugged on EUT</p>
3		<p>EUT is powered by Power supply n°1</p> <p>Micro-A cable plugged on EUT</p>
4		<p>EUT is powered by Power supply n°1 through base BWN30010055A</p> <p>Micro-A cable plugged on EUT</p>
5		<p>EUT is powered by Power supply n°2 through base BWN30010055A</p> <p>Micro-A cable plugged on EUT</p>

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### **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 on from October 6th to 9th, 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.