

Prüfbericht-Nr.: 21287045_001 <i>Test Report No.:</i>	Auftrags-Nr.: 3237718 <i>Order No.:</i>	Seite 1 von 11 Page 1 of 11			
Kunden Referenz-Nr.: 3413603 <i>Client Reference No.:</i>	Auftragsdatum: 08.11.2017 <i>Order date:</i>				
Auftraggeber: <i>Client:</i>	Conbee GmbH Am Knappengraben 18 61273 Wehrheim Germany				
Prüfgegenstand: <i>Test item:</i>	LoRa Alliance Certification by Similarity				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	HybridTAG L500				
Auftrags-Inhalt: <i>Order content:</i>	LoRa Alliance Certification by Similarity assessment				
Prüfgrundlage: <i>Test specification:</i>	LoRa Alliance Process Description Certification Process for LoRaWANDevices V1.0_2041_1				
Wareneingangsdatum: <i>Date of receipt:</i>	n/a				
Prüfmuster-Nr.: <i>Test sample No.:</i>	n/a				
Prüfzeitraum: <i>Testing period:</i>	10.01.2018 - 01.02.2018				
Ort der Prüfung: <i>Place of testing:</i>	Cologne				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland LGA Products GmbH				
Prüfergebnis: <i>Test results:</i>	PASS				
Geprüft von: <i>Tested by:</i>	René Houx 	Kontrolliert von: <i>Reviewed by:</i>	Lourens Koopmans 		
01-02-2018	René Houx <i>Wireless Project Manager</i>	02-02-2018	Lourens Koopmans <i>Senior Expert ICT</i>		
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sontiges / Other:					
<p>All information supplied in this document represents manufacturer supplied information which will be assessed by the ATH to set a verdict regarding the LoRa Alliance Certification by Similarity application. It is the responsibility of the device manufacturer, that the provided information does represent the device correctly. All final decisions regarding a successful listing and certification by similarity will be set by the LoRa Alliance.</p>					
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark</i></p>					

Prüfbericht-Nr.: 21287045_001
Test Report No.: 21287045_001

Seite 2 von 11
Page 2 of 11

Revisions
Revisions

Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author

Note: Latest revision report will replace all previous reports

Table of Content

1	General Device Description	4
2	Submitted Documents.....	5
3	General permissible changes.....	6
4	Primary design changes.....	7
5	Secondary design changes.....	9
6	Device Pictures	11

1 General Device Description

Description of Similarity between referenced devices

Document review according	LoRa Alliance Process Description Certification Process for LoRaWANDevices V1.0_2041_1
Product name	HybridTAG L500
Kind of product	Sensor Device
Series (if any)	HybridTAG
Hardware Version	V1.3
Software Version	V1.4
Firmware Version	V1.4
LoRa Device Class	A
LoRaWAN physical regional	EU 868 MHz
LoRaWAN™ Specification Version	1.0.1
Short Description of Functionality	LoRa sensor and tracking device
Brief description of the differences between the primary and the variant device	The secondary device Conbee HybridTAG L500 design based on the primary LoRa WAN certified EMB-EMB-LR1272E module.

Manufacturer supplied device integration description

Model Conbee HybridTAG L500 design based on the primary LoRa WAN certified EMB-EMB-LR1272E module. The EMB-EMB-LR1272 modules are provided with an embedded LoRaWAN stack specifically developed by EMB that allows being compliant with the latest LoRaWAN specifications. The EMB-EMB-LR1272 modules are preloaded with EBI-LoRa, which allows using the module as a simple, ready-to-use modem controlled by commands over UART. The host controller is solely using those UART commands, hence its LoRaWAN compliance is not affected by Conbee HybridTAG L500 host controller firmware and even won't be affected by future changes in the Conbee HybridTAG L500 host controller firmware. Furthermore Conbee GmbH as module integrator declares that they are not able to apply changes to the EMB-EMB-LR1272E firmware. The access to the EMB-EMB-LR1272E firmware is solely granted to the EMB-EMB-LR1272E manufacturer.

The manufacturer declares this secondary device to have:

- the same LoRa transceiver
- the same LoRa protocol SW version
- the same MCU Core
- the same Clock design and implementation

Prüfbericht-Nr.: 21287045_001
Test Report No.: 21287045_001

Seite 5 von 11
Page 5 of 11

2 Submitted Documents

CertificationBySimilarityDeclaration_Conbee_HybridTAG_L500.pdf

LoRa Certification Customer Questionnaire V1.5 conbee L500.pdf

EMB-LR1272E_LoRa_Test_Report_NIE201611.003.pdf

HybridTAG L500 Infosheet.pdf

HybridTAG L500 picture of product to be used for LoRa® Alliance Webpage.png

L500_1.jpg

L500_2.jpg

Remarks:
None

3 General permissible changes

Any stated change in following section is informative and does not automatically disqualify for Similarity application. The type of changed is reviewed by the test house and according verdict stated.

Change descriptions – general overview			
Change details		Document review executed	
1	Mother product PCB schematic has changed but Module is same	Change to listed device:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No changes on integrated module PCB.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
2	I/O additions on the dev board	Change to listed device:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No I/O additions on the dev board.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
3	Changes in interfaces that do not affect e.g. display, LED, buttons, switches, location of read pins layout configuration of mother PCB where module is placed etc..	Change to listed device:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
		Type of change: Module has been integrated in end device enclosure. The end device contains reed switches and sensors for acceleration, motion, temperature, humidity, light intensity, ambient light, and magnetic field. Additionally LED's and switches have been integrated in the end device.	
		Permissible change verdict:	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NOT APPLICABLE
4	Product packaging changes (colour, shape, Enclosure form, language etc.)	Change to listed device:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
		Type of change: Altered end device packaging and enclosure, due to module integration in end product.	
		Permissible change verdict:	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NOT APPLICABLE

4 Primary design changes

Any stated change in following section disqualifies for Similarity application.

Change descriptions – Major change verification			
Change details		Document review executed	
1	LoRaWAN protocol changes (V1.0 to V1.0.1 etc..)	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: Identical LoRaWAN version implemented V1.0.1.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
2	SW / FW change in Module	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No software or firmware changes applied to listed module.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
3	Major Bug Fixes	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No major bug fixes applied.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
4	Change in Radio IC	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No changes to radio IC applied.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
5	Change in Power Amplifier or Low Noise Amplifier components on the module or board	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No changes to amplifier components applied.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
6	Change or modification in clock design and implementation	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No changes to clock design applied	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE

Prüfbericht-Nr.: 21287045_001
Test Report No.: 21287045_001

Seite 8 von 11
Page 8 of 11

7	HW changes to Module including layout of PCB	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No HW changes on module including module PCB applied.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE

5 Secondary design changes

Any stated change in following section needs a detailed change description to allow the verification and justified verdict to qualify for the similarity application.

Change descriptions – general Checkpoint overview			
Change details		Document review executed	
1	Stack software (SW/FW)	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: Stack unchanged.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
2	HW version	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: Identical module HW version.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
3	Minor Bug Fixes not affecting LoRaWAN functionality	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No bug fixes applied to original stack.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
4	Microcontroller change which does not affect the LoRaWAN stack	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No changes to the microcontroller applied.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
5	Addition of radio features apart of LoRaWAN (e.g. additional radio implementations)	Change to listed device :	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
		Type of change: Additional GPS/GNSS receiver and Bluetooth 4.2 on device main board. Bluetooth 4.2 will only be used for end device configuration and is not intended for parallel operation with LoRaWAN transmitter. GPS receiver and LoRa transceiver have a time lag between operations.	
		Permissible change verdict:	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NOT APPLICABLE

Prüfbericht-Nr.: 21287045_001
Test Report No.: 21287045_001

Seite 10 von 11
Page 10 of 11

6	Product driver changes	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No product driver changes have been applied. Integrated module control has been implemented via UART commandos.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NOT APPLICABLE
7	Mother board schematic change	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No changes to the motherboard have been applied. This is an initial module integration.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
9	Is the Test mode still part of end device	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: Test mode is not supported by end device.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
10	When 1.0.1 certified: Link ADR decay revision corrected?	Change to listed device :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: Module certified against V1.0.1 revision.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE
11	Firmware Check is needed for Stack	Applicable:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Type of change: No changes on firmware check routine applied. This is an initial module integration.	
		Permissible change verdict:	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NOT APPLICABLE

6 Device Pictures

Device under application

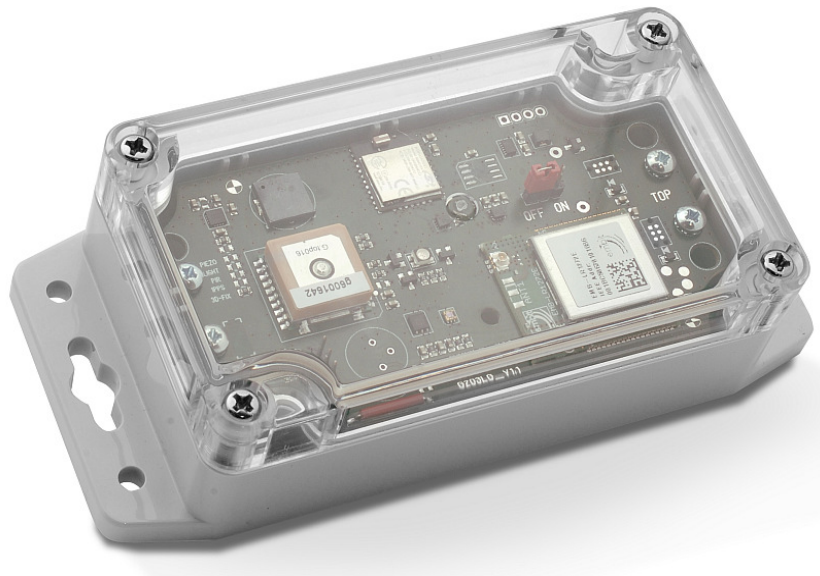


Photo 1: Conbee HybridTAG L500 (top view without label)



Photo 2: Conbee HybridTAG L500 (top view with label)



Photo 3: Conbee HybridTAG L500 (top view with removed cover)