




Prüfbericht-Nr.: 60407699-001 <i>Test Report No.:</i>		Auftrags-Nr.: 23870406 <i>Order No.:</i>		Seite 1 von 11 Page 1 of 11	
Kunden Referenz-Nr.: N/A <i>Client Reference No.:</i>		Auftragsdatum: 06-07-2020 <i>Order date:</i>			
Auftraggeber: Itron France <i>Client:</i>		Thomas Buttard thomas.buttard@itron.com			
2 Rue de Paris / Immeuble les Montalets, 92190 Meudon France					
Prüfgegenstand: Cyble 5 868mHz <i>Test item:</i>					
Bezeichnung / Typ-Nr.: 00018236 <i>Identification / Type No.:</i>					
Auftrags-Inhalt: Test of Conformance to LoRaWAN™ Specification V1.0.2 for EU 863-870 Band <i>Order content:</i>					
Prüfgrundlage: End Device Certification EU863-870 V1.6 <i>Test specification:</i>					
Wareneingangsdatum: 03-08-2020 <i>Date of receipt:</i>					
Prüfmuster-Nr.: 00018236 <i>Test sample No.:</i>					
Prüfzeitraum: 06-08-2020 - 11-08-2020 <i>Testing period:</i>					
Ort der Prüfung: Lund, Sweden <i>Place of testing:</i>					
Prüflaboratorium: TÜV Rheinland Sweden <i>Testing laboratory:</i>					
Prüfergebnis: PASS <i>Test results:</i>					
Geprüft von: Joel Efraimsson <i>Tested by:</i>	Joel Efraimsson Test Engineer	Kontrolliert von: Kaushendra Tripathi <i>Reviewed by:</i>	Kaushendra Tripathi Senior Project Engineer		
15-09-2020		15-09-2020			
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>
Sonstiges / <i>Other:</i> -					
<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.: 60407699-001
Test Report No.: 60407699-001

Seite 2 von 11
Page 2 of 11

Revisions
Revisions

Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author
0	11-08-2020	Original Report	JE
0	31-08-2020	Reviewed by	AN
1	15-09-2020	Corrected name of product	JE
1	15-09-2020	Reviewed by	KT

Note: Latest revision report will replace all previous reports

Table of contents

1	Product Information	4
	Submitted Documents:.....	5
	Remarks:.....	5
2	Test Equipment	6
3	Summary	7
	Verdicts of functional requirements:	7
	Verdict.....	7
	Supported optional features:	7
	YES / No.....	7
4	Test Case verdicts as per Test Specifications	8
	Test results per test case (OTAA):.....	8
5	Test Results	9
	Detailed test results (OTAA):.....	9
6	PHOTO DOCUMENTATION.....	10

Prüfbericht-Nr.: 60407699-001
Test Report No.: 60407699-001

Seite 4 von 11
Page 4 of 11

1 PRODUCT INFORMATION

General information

Product name:	Cyble 5
Model:	00018236
Description:	LoRa Alliance LoRaWAN compliance testing
Manufacturer SKU	Ittron
Product version	V1.1
Hardware version:	0.1
Software version:	0.2
Contact person:	Thomas Buttard
Email:	thomas.buttard@itron.com

LoRaWAN information

Type of DUT	End Device
LoRa Device Class	A
Geographical area of operation	Europe 868 MHz
Operating frequency	EU 863 - 870 MHz
Adaptive Data Rate (ADR) supported?	Yes
Optional data rates supported?	Yes
Activation possibilities	Over the air
Test According LoRaWAN™ Spec	V1.0.2 (with regional parameters V1.0.2 ref.B)
Output Power	Up to 14 dBm
Number / Type of Antenna(s)	1 / Embedded Shortened Monopole
Antenna Gain	-1.5 dBi
Test sample information	Production unit

Prüfbericht-Nr.: 60407699-001
Test Report No.: 60407699-001

Seite 5 von 11
Page 5 of 11

For OTA activation:	
Serial No of Device with OTAA	00018236
End-device identifier (DevEUI)	000781370000473C
Application identifier (AppEUI)	0007813700000001
Application key (AppKey)	B30BDE0EF27BA3749CED2FF477C9ADA2
For activation by personalization:	
Serial No of Device with ABP	N/A
End-device identifier (DevAddr)	N/A
Application identifier (AppSKey)	N/A
Application key (NwksKey)	
Default RX2 Window Frequency	869.525MHz
Default RX2 Window Data Rate	DR0 (SF12, 125kHz)
RECEIVE_DELAY1	1 s
RECEIVE_DELAY2	2 s (must be RECEIVE_DELAY1 + 1s)
JOIN_ACCEPT_DELAY1	5 s
JOIN_ACCEPT_DELAY2	6 s
MAX_FCNT_GAP	16384
ADR_ACK_LIMIT	64
ADR_ACK_DELAY	32
ACK_TIMEOUT	2 +/- 1 s (random delay between 1 and 3 seconds)

Submitted Documents:

LoRa Certification Customer Questionnaire document.
LoRa Test Environment log files.

Remarks:

All test cases are tested with Over the Air (OTA)

Prüfbericht-Nr.: 60407699-001
Test Report No.: 60407699-001

Seite 6 von 11
Page 6 of 11

2 TEST EQUIPMENT

Prüfmittel <i>Test equipment</i>	Marke <i>Brand</i>	Version <i>Version</i>
Comprehensive Testing Environment (CTE)	TÜV Rheinland Group	CTE - TMF V47.0 CTE - SIG - LoRa V3.3
Semtech Development Kit IOT868STK1-8 (Semtech Gateway) for EU863-870MHz	Semtech	SX1301-based concentrator reference design >=GW_V3.1.0
Semtech Development Kit IOT868STK1-8 (Semtech Packet Forwarder) for EU863- 870MHz Band	Semtech	>= PF_V_2.2.1
Cyble 5 868MHz	Ittron	Cyble 5 868MHz

Prüfbericht-Nr.: 60407699-001
Test Report No.: 60407699-001

Seite 7 von 11
Page 7 of 11

3 SUMMARY

Verdicts of functional requirements:	Verdict
Test Mode Activation (Activation by Personalization)	PASS
Test Mode Activation (Over the Air Activation)	PASS
Over The Air Activation	PASS
Test Application Functionality	PASS
Cryptography	PASS
Downlink Error Rate	PASS
Downlink Window Timing	PASS
Frame Sequence Number	PASS
Device Status Request MAC command	PASS
MAC Commands	PASS
New Channel Request MAC command	PASS
DIChannelReq MAC command	PASS
Confirmed packets	PASS
RX Parameter Setup Request MAC command	PASS
Packet Error Rate RX1	PASS
Packet Error Rate RX2	PASS
RX Timing Setup Request MAC command	PASS
Link ADR Request MAC command	PASS
TxParamSetupReq MAC command	PASS

Supported optional features:	YES / No
Adaptive Data Rate (ADR)	YES

Overall Test Result: PASS

4 TEST CASE VERIDCTS AS PER TEST SPECIFICATIONS

Test results per test case (OTAA):

Test item	Description	Implementation	Result
EU863-870 2.1	Device Activation	Mandatory	PASS
EU863-870 2.2	Test Application Functionality	Mandatory	PASS
EU863-870 2.3	Over The Air Activation	Mandatory	PASS
EU863-870 2.4	Packet Error Rate RX2 Default DR	Mandatory	PASS
EU863-870 2.5.a	AES encryption	Mandatory	PASS
EU863-870 2.5.b	MIC	Mandatory	PASS
EU863-870 2.6	Downlink window timing	Mandatory	PASS
EU863-870 2.7.a	Uplink sequence number	Mandatory	PASS
EU863-870 2.7.b	Downlink sequence number	Mandatory	PASS
EU863-870 2.8	DevStatusReq MAC command	Mandatory	PASS
EU863-870 2.9	MAC Commands	Mandatory	PASS
EU863-870 2.10.a	Read-only default channels	Mandatory	PASS
EU863-870 2.10.b	Addition and removal of multiple channels	Mandatory	PASS
EU863-870 2.10.c & 10.d	Addition and removal of a single channel	Mandatory	PASS
EU863-870 2.11	DL Channel Request MAC command	Mandatory	PASS
EU863-870 2.12.a	Uplink confirmed packets	Mandatory	PASS
EU863-870 2.12.b	Uplink retransmission	Mandatory	PASS
EU863-870 2.12.c	Downlink confirmed packets	Mandatory	PASS
EU863-870 2.12.d	Downlink retransmission	Mandatory	PASS
EU863-870 2.13	RXParamSetupReq MAC command	Mandatory	PASS
EU863-870 2.14	RXTimingSetupReq MAC command	Mandatory	PASS
EU863-870 2.15.a	ADR bit	Mandatory	PASS
EU863-870 2.15.b	TXPower	Mandatory	PASS
EU863-870 2.15.c	Required DataRates	Mandatory	PASS
EU863-870 2.15.d	Optional DataRates	Mandatory	PASS
EU863-870 2.15.e	ChannelMask	Mandatory	PASS
EU863-870 2.15.f	Redundancy	Mandatory	PASS
EU863-870 2.15.g	ADRACKReq bit	Mandatory	PASS
EU863-870 2.15.h	LinkADRReq commands block	Mandatory	PASS
EU863-870 2.16	Packet Error Rate RX1	Mandatory	PASS
EU863-870 2.17	Packet Error Rate RX2	Mandatory	PASS

Prüfbericht-Nr.: 60407699-001
Test Report No.: 60407699-001

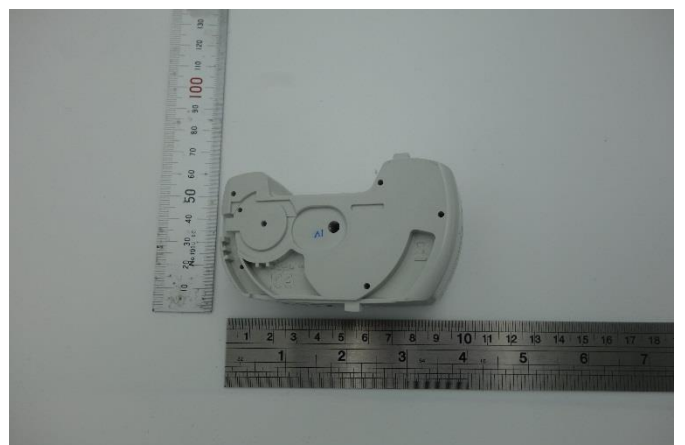
Seite 9 von 11
Page 9 of 11

5 TEST RESULTS

Detailed test results (OTAA):

Test item	Test Case Name	DataRate/ Timing	Limit	Results	Verdict
EU863-870 2.4	Packet Error Rate RX1	SF12BW125	5 %	1.67 %	PASS
EU863-870 2.6	Downlink window timing	-20ms	-	-	PASS
		+20ms	-	-	PASS
EU863-870 2.16	Packet Error Rate RX1	SF12BW125	5 %	3.33 %	PASS
		SF11BW125	5 %	0.00 %	PASS
		SF10BW125	5 %	0.00 %	PASS
		SF9BW125	5 %	0.00 %	PASS
		SF8BW125	5 %	0.00 %	PASS
		SF7BW125	5 %	1.67 %	PASS
		SF7BW250	5 %	0.00 %	PASS
		FSK	5 %	0.00 %	PASS
EU863-870 2.17	Packet Error Rate RX2	SF11BW125	5 %	0.00 %	PASS
		SF10BW125	5 %	0.00 %	PASS
		SF9BW125	5 %	0.00 %	PASS
		SF8BW125	5 %	1.67 %	PASS
		SF7BW125	5 %	0.00 %	PASS
		SF7BW250	5 %	0.00 %	PASS
		FSK	5 %	5 %	PASS

6 PHOTO DOCUMENTATION



Prüfbericht-Nr.: 60407699-001
Test Report No.: 60407699-001

Seite 11 von 11
Page 11 of 11

END OF REPORT