




<b>PRÜFBERICHT-NR.:</b> 60407698-001 <i>Test Report No.:</i>		<b>Auftrags-Nr.:</b> 23870406 <i>Order No.:</i>		Seite 1 von 11 Page 1 of 11	
<b>Kunden Referenz-Nr.:</b> N/A <i>Client Reference No.:</i>		<b>Auftragsdatum:</b> 06-07-2020 <i>Order date:</i>			
<b>Auftraggeber:</b> Itron France <i>Client:</i> 2 Rue de Paris / Immeuble les Montalets 92190 Meudon France		Thomas Buttard thomas.buttard@itron.com			
<b>Prüfgegenstand:</b> Cyble 5 865MHz <i>Test item:</i>					
<b>Bezeichnung / Typ-Nr.:</b> 00018235 <i>Identification / Type No.:</i>					
<b>Auftrags-Inhalt:</b> Test of Conformance to LoRaWAN™ Specification V1.0.2 for IN 865-867 Band <i>Order content:</i>					
<b>Prüfgrundlage:</b> End Device Certification Requirements for EU863 870 MHz ISM Band Devices v1.6 <i>Test specification:</i>					
<b>Wareneingangsdatum:</b> 03-08-2020 <i>Date of receipt:</i>					
<b>Prüfmuster-Nr.:</b> A002882199-001 <i>Test sample No.:</i>					
<b>Prüfzeitraum:</b> 06-08-2020 - 11-08-2020 <i>Testing period:</i>					
<b>Ort der Prüfung:</b> Lund, Sweden <i>Place of testing:</i>					
<b>Prüflaboratorium:</b> TÜV Rheinland Sweden <i>Testing laboratory:</i>					
<b>Prüfergebnis:</b> PASS <i>Test results:</i>					
<b>Geprüft von:</b> Joel Efraimsson <i>Tested by:</i>					
15-09-2020 		15-09-2020 			
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sontiges /</b> <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. 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</p>					

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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

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## 1 PRODUCT INFORMATION

### General information

Product name:	Cyble 5
Model:	00018235
Description:	LoRa Alliance LoRaWAN compliance testing
Manufacturer SKU	Ittron
Product version	V1.1
Hardware version:	0.1
Firmware 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	Indian sub-continent
Operating frequency	IN865 - 867 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)	Embedded Shortened Monopole (Internal)
Antenna Gain	-1.5dBi
Test sample information	Production unit

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<b>For OTA activation:</b>	
Serial No of Device with OTAA	00018235
End-device identifier (DevEUI)	000781370000473B
Application identifier (AppEUI)	0007813700000001
Application key (AppKey)	0B42978C93E286408B5C977C4661BC48
<b>For activation by personalization:</b>	
Serial No of Device with ABP	N/A
End-device identifier (DevAddr)	N/A
Application identifier (AppSKey)	N/A
Application key (NwkSKey)	N/A
Default RX2 Window Frequency	866.550 MHz
Default RX2 Window Data Rate	DR2 (SF10, 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)

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## 2 TEST EQUIPMENT

<b>Prüfmittel</b> <i>Test equipment</i>	<b>Marke</b> <i>Brand</i>	<b>Version</b> <i>Version</i>
Comprehensive Testing Environment (CTE)	TUV Rheinland Group	CTE - TMF V47.0 CTE - SIG - LoRa V3.3
Semtech Development Kit (Semtech Gateway) for EU 863-870 Band	Semtech	SX1301-based concentrator reference design >=GW_V_3.1.0
Semtech Development Kit (Semtech Packet Forwarder) for EU 863-870 Band	Semtech	>= PF_V_2.2.0
CYBLE 5	Ittron	V1.1

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### 3 SUMMARY

Verdicts of functional requirements:	Verdict
Cert-Application Activation	PASS
Over The Air Activation	PASS
Channel Plan and Usage	PASS
Cryptography	PASS
Downlink Error Rate	PASS
Receive Window Timing	PASS
Frame Sequence Number	PASS
Confirmed Frames	PASS
Dev Status Request MAC Command	PASS
New Channel Request MAC command	PASS
DL Channel Request MAC command	PASS
RX Parameter Setup Request	PASS
RX Timing Setup Request	PASS
Link ADR Request MAC command	PASS
RX1 Receive Window Test	PASS
RX2 Receive Window Test	PASS
RX Oversized Payload	PASS
Maximum Allowed Payload	PASS
MAC Command(s) in App-Payload (FRMPayload)	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 (OTA):			
Test item	Description	Implementation	Result
IN865-867 2.1.1	Cert Application Activation	Mandatory	PASS
IN865-867 2.1.2	Over The Air Activation	Mandatory	PASS
IN865-867 2.2.1.a	Channel Plan and Usage	Mandatory	PASS
IN865-867 2.2.1.b.i	AES Encryption	Mandatory	PASS
IN865-867 2.2.1.b.ii	Message Integrity Code	Mandatory	PASS
IN865-867 2.2.1.c	Downlink Error Rate	Mandatory	PASS
IN865-867 2.2.1.d	Receive Window Timing	Mandatory	PASS
IN865-867 2.2.1.e.i	Uplink Sequence Number	Mandatory	PASS
IN865-867 2.2.1.e.ii & 2.2.1.e.iii	Downlink Sequence Number & Downlink Sequence Number Rollover	Mandatory	PASS
IN865-867 2.2.2.a	Confirmed Uplinks	Mandatory	PASS
IN865-867 2.2.2.b	Confirmed Uplink Retransmission	Mandatory	PASS
IN865-867 2.2.2.c	Confirmed Downlinks	Mandatory	PASS
IN865-867 2.2.2.d	Confirmed Downlink Retransmission	Mandatory	PASS
IN865-867 2.3.1	Device Status Request	Mandatory	PASS
IN865-867 2.3.2.a	Read-only Default Channels	Mandatory	PASS
IN865-867 2.3.2.b & 2.3.2.c	Addition of A Channel & Removal of A Channel	Mandatory	PASS
IN865-867 2.3.2.d	Addition and Removal of Multiple Channels	Mandatory	PASS
IN865-867 2.3.2.e	Invalid Command Processing	Mandatory	PASS
IN865-867 2.3.3	DLChannelReq	Mandatory	PASS
IN865-867 2.3.4	RX Parameter Setup Request MAC command	Mandatory	PASS
IN865-867 2.3.5	RX Timing Setup Request MAC command	Mandatory	PASS
IN865-867 2.3.6.a	ADR Bit	Mandatory	PASS
IN865-867 2.3.6.b	TX Power	Mandatory	PASS
IN865-867 2.3.6.c.i	Required Data Rates	Mandatory	PASS
IN865-867 2.3.6.c.ii & 2.3.6.c.iii	Optional Data Rates & Unsupported Data Rates	Mandatory	PASS
IN865-867 2.3.6.c.iv & 2.3.6.c.v	Channel Mask Functionality & Disable All Channels	Mandatory	PASS
IN865-867 2.3.6.d	Redundancy	Mandatory	PASS
IN865-867 2.3.6.e	Data Rate Decay	Mandatory	PASS
IN865-867 2.3.6.f.i & 2.3.6.f.ii	Successful Command Block & Unsuccessful Command Block	Mandatory	PASS
IN865-867 2.3.7	RX1 Receive Window Test	Mandatory	PASS
IN865-867 2.3.8	RX2 Receive Window Test	Mandatory	PASS
IN865-867 2.3.9	RX Oversized Payload	Mandatory	PASS
IN865-867 2.3.10	Maximum Allowed Payload (UL)	Mandatory	PASS
IN865-867 2.3.11	MAC Command in App-Payload and FOpts	Mandatory	PASS



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## 5 TEST RESULTS

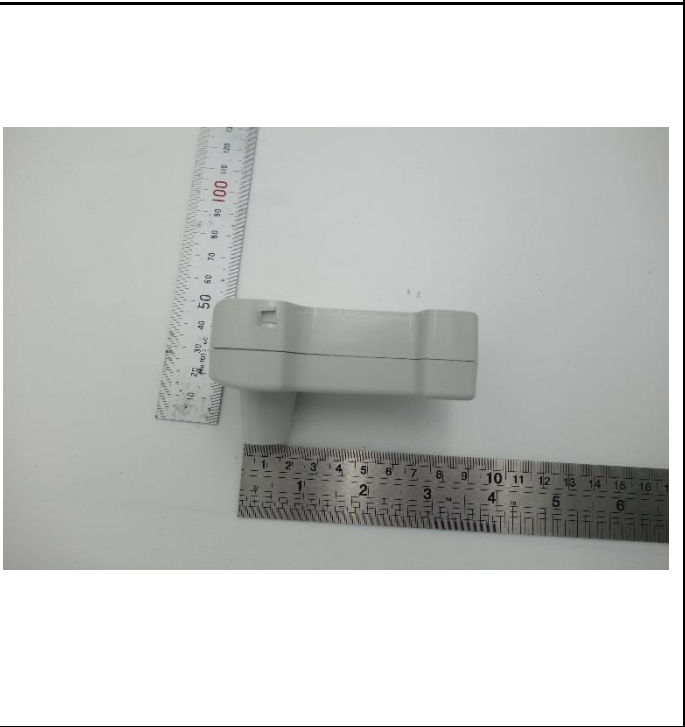
### Detailed test results (OTA):

Test item	Test Case Name	DataRate/ Timing	Limit	Results	Verdict
IN865-867 2.2.1.c	Downlink Error Rate RX2	SF10BW125	5 %	0.00 %	PASS
IN865-867 2.2.1.d	Receive Window Timing	-20ms	-	-	PASS
		+20ms	-	-	PASS
IN865-867 2.3.7	RX1 Receive Window Test	SF12BW125	5 %	0.00 %	PASS
		SF11BW125	5 %	0.00 %	PASS
		SF10BW125	5 %	0.00 %	PASS
		SF9BW125	5 %	0.00 %	PASS
		SF8BW125	5 %	3.33 %	PASS
		SF7BW125	5 %	3.33 %	PASS
		FSK	5 %	5.00 %	PASS
IN865-867 2.3.8	RX2 Receive Window Test	SF7BW125	5 %	1.67 %	PASS
		SF8BW125	5 %	1.67 %	PASS
		SF9BW125	5 %	1.67 %	PASS
		SF10BW125	5 %	0.00 %	PASS
		SF11BW125	5 %	0.00 %	PASS
		SF12BW125	5 %	0.00 %	PASS
		FSK	5 %	0.00 %	PASS

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## 6 PHOTO DOCUMENTATION



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**END OF REPORT**