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Kunden Referenz-Nr.: 20-0056 <i>Client Reference No.:</i>		Auftragsdatum 27-02-2020 : <i>Order date:</i>			
Auftraggeber: Sensative AB <i>Client:</i>		Lars Jonsson Lars.jonsson@sensative.com +46 70 302 3767			
Prüfgegenstand: Strips LoRa Multisensor <i>Test item:</i>					
Bezeichnung / Typ-Nr.: 1302001 <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: LoRa End Device Certification EU868 Version 1.5 <i>Test specification:</i>					
Wareneingangsdatum: 27-02-2020 <i>Date of receipt:</i>					
Prüfmuster-Nr.: A000245841-001 <i>Test sample No.:</i>					
Prüfzeitraum: 02-03-2020 - 09-03-2020 <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>		Kontrolliert von Kaushlendra Tripathi <i>Reviewed by:</i>			
17-04-2020		17-04-2020			
					
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>
Sontiges / <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>					

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Revisions Revisions			
Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author
0	16-04-2020	Original Report	JE
	17-04-2020	Reviewed by	KT

Note: Latest revision report will replace all previous reports

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1 PRODUCT INFORMATION

The device under test (DUT) is a wireless Semtech Sensor Node for LoRaWAN 1.0.2 Certification testing.

General information	
Product name:	Strips LoRa Multisensor
Model:	1302001
Description:	Multi sensor for smart buildings for door/window, temperature, humidity and water leakage monitoring.
Manufacturer SKU	SENSATIVE
Hardware version:	P1.6
Software version:	1.2
Contact person:	Lars Jonsson
Phone number:	+46 70 302 3767

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?	True
Optional data rates supported?	-
Activation possibilities	Over the air
Test According LoRaWAN™ Spec	V1.0.2 (with regional parameters V1.0.2 ref.B)
Output Power	+12 dBm
Number / Type of Antenna(s)	1
Antenna Gain	+2.3dBi
Test sample information	Production unit

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For OTA activation:	
Serial No of Device with OTAA	5907092
End-device identifier (DevEUI)	70B3D52C000001E8
Application identifier (AppEUI)	70B3D52C000186A0
Application key (AppKey)	c1a569d0628b297bfd8e3eb72d8f18a6
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)

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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
LoRa End device Strips LoRa Multisensor	SENSATIVE	P1.6

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3 SUMMARY

Verdicts of functional requirements:	Verdict
Test Mode Activation (Activation by Personalization)	NA
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	NA
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	NA
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/WAIVER
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

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5 TEST RESULTS

Detailed test results (ABP):

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

6 PHOTO DOCUMENTATION



Photo 1: EUT front view

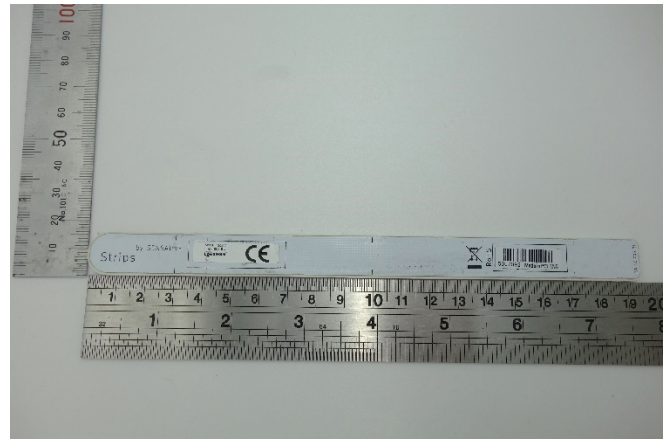


Photo 2: EUT rear view



Photo 3: EUT PCB top view



Photo 4: EUT PCB bottom view