Prüfbericht-Nr.: *Test Report No.:*	60199433-001	**Auftrags-Nr.:** *Order No.:*	23870043	Seite 1 von 5 *Page 1 of 5*
Kunden Referenz-Nr.: Client Reference No.:	330927	**Auftragsdatum** *Order date:*	2018-05-28	
Auftraggeber: *Client:*	Flextronics International Sweden AB Datalinjen 3A 583 30 Linköping Sweden	Johan Botvidzon johan.botvidzon@flex.com +4613287203		
Prüfgegenstand: *Test item:*	iENBL			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	FCC ID: 2AF5R-iENBL111B			
Auftrags-Inhalt: *Order content:*	RF Exposure Evaluation			
Prüfgrundlage: *Test specification:*	FCC 47 CFR §2.1091			
Wareneingangsdatum: *Date of receipt:*	N/A			
Prüfmuster-Nr.: *Test sample No.:*	N/A			
Prüfzeitraum: *Testing period:*	N/A			
Ort der Prüfung: *Place of testing:*	Lund, Sweden			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland Sweden			
Prüfergebnis: *Test results:*	See detail in report			
Geprüft von *Tested by:*	Niall Forrester Test Engineer	**Kontrolliert von** *Reviewed by:*		

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sontiges /
Other:

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.
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Revisions
Revisions

Revision Revision	**Datum** Date	**Anmerkung** Remark	**Verfasser** Author
Draft	2018-11-09	Initial Draft	Niall Forrester
	2019-10-04	Output powers adjusted	

Note: Latest revision report will replace all previous reports

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PRODUCT INFORMATION

1.1 Equipment under Test (EUT) description

Model name:	iENBL
Manufacturer:	Flex
Model number:	iENBL111B
FCC ID:	2AF5R-iENBL111B
Description:	IoT rapid prototyping platform for development within Low Power Wide Area Network Technologies

1.2 Wireless Technologies and Frequency Bands supported by the DUT

Technology	Band	Frequency Range (Tx)	Evaluation Performed
LoRa	US Band	902 MHz – 928 MHz	YES
WLAN 802.11 b/g/n	2.4 GHz	2412 MHz – 2472 MHz	YES
Bluetooth Low Energy	2.4 GHz	2400 MHz – 2483.5 MHz	YES

1.3 Conducted Power and Antenna Gain

Technology	Band	Maximum Conducted Output Power (dBm)	Antenna Gain (dBi)
LoRa	US Band	17.15	-0.03
WLAN 802.11 b/g/n	2.4 GHz	15.02	2.44
Bluetooth Low Energy	2.4 GHz	5.34	2.44

EVALUATION

1.4 Summary

At 20cm, the device is compliant with the “General Population / Uncontrolled” requirements set out in FCC 47 CFR §1.1310 Table 1 (B) for all wireless technologies supported by the device, including supported simultaneous transmission configurations.

1.5 Stand-Alone Calculations

The Power Density at 20cm separation distance has been calculated for each of the transmitter technologies supported by the device according to a re-arrangement of the Friis formula, as below:

$$S = \frac{P * G}{4\pi * r^2}$$

Where:

- “S” is power density in mW/cm²
- “P” is maximum avg. conducted power (incl. tolerances) in mW according to data from the manufacturer
- “G” is the peak antenna gain (numerical) according to data from the manufacturer
- “r” is the separation distance (20 cm)

Technology	Band	Frequency* (MHz)	Power (dBm)	P (mW)	Gain (dBi)	G (Numerical)	r (cm)	S (mW/cm^2)	Limit** (mW/cm^2)
LoRa	US Band	902	17.15	51.88	-0.03	0.99	20	0.0103	0.60
WLAN 802.11 b/g/n	2.4 GHz	2412	15.02	31.77	2.44	1.75	20	0.0062	1.00
Bluetooth Low Energy	2.4 GHz	2400	5.34	3.42	2.44	1.75	20	0.0006	1.00

*The lowest frequency in each band has been chosen, to give the most conservative limit

**The limits listed are from FCC 47 CFR §1.1310 Table 1 (B): “Limits for General Population/Uncontrolled”

From 30MHz to 1500MHz, the limit is f/1500 mW/cm^2 where “f” is the frequency in MHz

From 1500MHz to 100000MHz, the limit is 1.0 mW/cm^2

1.6 Simultaneous Transmissions Calculations

According to KDB 447498 D01 v06 “General RF Exposure Guidance”, clause 7.2:

“Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0”

The MPE Ratio is simply the calculated MPE (i.e. “S” above) for a specific transmitter configuration, divided by the MPE limit at the appropriate frequency

Transmitter Combination	MPE 1	Limit 1	MPE 2	Limit 2	Sum of Ratios
WLAN 802.11 b/g/n 2.4GHz + LoRa US band	0.0062	1.00	0.0103	0.60	0,0234
Bluetooth Low Energy 2.4GHz + LoRa US band	0.0006	1.00	0.0103	0.60	0,0178
No other combinations of transmitters are supported by the device					

*****END OF REPORT*****