Evaluation Report: 2016-SGMA-CDTLE20150909_1_MPE_0001_V1.1	
Evaluation report for:	CDTLE:20150909_1
	SSG-002
FCC ID:	2AFCP-002
Client Name:	Sigma Connectivity AB
Client address	Mobilvägen 10
	SE-223 62 Lund, Sweden
Evaluation report for:	CDTLE:20150909_1
According to:	FCC 47 CFR §2.1091
Report Issued By:	Niall Forrester / Technical Manager
Issue Date:	2016-11-15
On Behalf of:	CDTL Europe, Tech Mahindra Ltd.
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Review Date:	2016-11-15

This test report includes no annexes. The total number of pages is 7

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1. GENERAL CONDITIONS

1. This report refers only to the item or items that have undergone the evaluation (see section 3. “Details of Device”).

2. This document supersedes all previous versions of the report. For details, please refer to “Amendment History”

3. This report does not constitute or imply on its own an approval of the device by the Certification Bodies or competent Authorities.

4. This document is only valid if complete; no partial reproduction can be made without previous written permission of Lab.

5. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of the Lab, and the relevant Accreditation Bodies.

6. The evaluation summarised in this report was not performed as part of the accredited scope of the CDTL Europe lab.

2. APPLICANT DETAILS

Table 1 Applicant Details	
Company Name	Sigma Connectivity AB
Address:	Mobilvägen 10
	SE-223 62 Lund
	Sweden
e-mail	info@sigmaconnectivity.se
Telephone:	+46 771 550 500
Contact Name	Cecilia Neikell
e-mail	cecilia.neikell@sigmaconnectivity.se
Telephone:	-

3. DETAILS OF DEVICE

The device is a Wireless Gateway designed to be mounted in the ceiling or on the wall. The gateway communicates with sensors via Bluetooth and transmits data to the cloud via WiFi. It carries a battery backup and is powered via the USB port.

Since the device only carries a single antenna for both WiFi and Bluetooth, simultaneous transmission is not possible.

Table 3.1 Details of device	
Description of device:	Wireless Gateway
Manufacturer:	Sigma Connectivity AB
Model Name:	SSG-002
FCC ID	2AFCP-002
Hardware Version	Revision 2.0

Table 3.2 Wireless Technologies and Frequency Bands supported by the DUT

Technology	Band	Frequency Range (Tx)	Power Class	Modulations	Evaluation Performed
Bluetooth BDR/EDR/BLE	2.4 GHz	2402 MHz – 2480 MHz	1	GFSK	YES
WLAN 802.11 b/g/n	2.4 GHz	2412 MHz – 2462 MHz	N/A	OFDM, DSS	YES
WLAN 802.11 a/n	5 GHz	5150 MHz – 5725 MHz	N/A	BPSK, QPSK, 16QAM, 64QAM	YES

Table 3.3 DUT Transmitter Characteristics

Technology	Band	Max. Avg. Output Power*	Antenna Gain
Bluetooth BDR/EDR/BLE	2.4 GHz	10.0 dBm	2.0 dBi
WLAN 802.11 b/g/n	2.4 GHz	18.0 dBm	2.0 dBi
WLAN 802.11 a/n	5 GHz (low band)	13.0 dBm	0.0 dBi
WLAN 802.11 a/n	5 GHz (high band)	13.0 dBm	0.1 dBi

*These figures represent the maximum average conducted output power attainable by the device type, including manufacturing tolerances. They are based on the manufacturer's own data.

4. EVALUATION

4. 1 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.

See chapter 5 for further details of the tests.

4.2 APPLICABLE STANDARDS

- FCC 47 CFR §2.1091
- FCC 47 CFR §1.1307
- FCC 47 CFR §1.1310
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- IEEE C95.1-2005

5. DETAILED MPE 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)

Since the device is not capable of simultaneous transmissions for any of these technologies, each technology has been evaluated individually.

MPE Calculations for Mobile Equipment

General population/ Uncontrolled use

Technology	Frequency Range (MHz)	[P] (dBm)	P (mW)	[G] (dBi)	G (Numerical)	r (cm)	**S (mW/cm²)**	Limit* (mW/cm²)
Bluetooth BDR/EDR/BLE	2402 - 2480	10.0	10.00	2.0	1.58	20	**0.0031**	1.0
WLAN 802.11b/g/n	2412 - 2472	18.0	63.10	2.0	1.58	20	**0.0198**	1.0
WLAN 802.11a/n	5150 - 5350	13.0	19.95	0.0	1.00	20	**0.0040**	1.0
WLAN 802.11a/n	5470 - 5725	13.0	19.95	0.1	1.02	20	**0.0040**	1.0

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

6. AMENDMENT HISTORY

Version	Date	Author(s)/ Function	Reviewed by	Approved by	Nature of Changes
Initial Draft	2016-10-11	Niall Forrester			
1.0	2016-10-18	Niall Forrester	Afrah Sadiq, Kaushlendra Tripathi	Håkan Sjöberg	First release
1.1	2016-11-15	Niall Forrester	Kaushlendra Tripathi	Håkan Sjöberg	Updated Max. Avg. Output Power figures and related calculations