

Radio Frequency Exposure Evaluation Report

FOR

Synapse Product Development

Marketing Name

Bike Interface Module

Model Name

BIT-01-0-9

Product Description

The Lyft BIM is an LTE connectivity, location and NFC card reader module for use on battery powered shared electric vehicles.

FCC ID: 2ASMP0109

Applied Rules and Standards: CFR 47 Part 2.1093 FCC KDB 447498 D01 General RF Exposure Guidance v06

Test Report #: SAR_EX_SYNAP_035_19001_FCC

DATE: 5/29/2019



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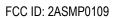
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1 Assessment

The following device was evaluated against the limits for general population uncontrolled exposure specified in CFR 47 Part 2.1093 according to SAR evaluation exclusion requirements specified in FCC regulation as listed in KDB 447498.

Responsible for Testing Laboratory:

		Kris Lazarov	
5/29/2019	Compliance	(Sr. EMC Engineer)	
Date	Section	Name	Signature
Responsible for the	e Report:		
5/29/2019	Compliance	Ghanma, Issa (EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3.

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2 Administrative Data

2.1 <u>Identification of the Testing Laboratory Issuing the Test Report</u>

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Compliance Manager:	Li, Cindy
Responsible Project Manager:	Cathy Palacios

2.2 <u>Identification of the Client</u>

Applicant's Name:	Synapse Product Development
Street Address:	640 Bryant St
City/Zip Code	San Francisco, CA 94107
Country	USA

2.3 <u>Identification of the Manufacturer</u>

Applicant's Name:	Lyft, Inc.
Street Address:	185 Berry St Suite 5000
City/Zip Code	San Francisco, CA 94107
Country	USA

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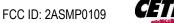


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3 Equipment under Assessment

Model #:	BIT-01-0-9				
Hardware Version:	1.0				
Software Version:	1.0				
Minimum distance of antenna or radiating parts to user	5mm				
Radios included in the device:	 Cellular 4G LTE CAT-1 Module name: Digi XBee Cellular LTE Cat 1 Module number: XBC-V1-UT-001 FCC ID: RI7LE866SV1 IC ID: 5131A-LE866SV1 NFC Module: 13.56 MHz Transceiver (TRF7960ARHBT) WLAN(Wi-Fi): 802.11 b/g/n (Receive only) Module name: Stand-alone Wi-Fi Model number: uBlox NINA-W132 FCC ID: XPYNINAW13 GPS: Module name: uBlox M8 GNSS Antenna Module Model number: uBlox SAM-M8Q 				
Co-located Transmitters/ Antennas:	■ Yes □ No				
Exposure Category:	☐ Occupational/ Controlled ■ General Population/ Uncontrolled				
Device Category:	☐ Fixed Installation ☐ Mobile ☐ Portable ■ Mixed Mobile and Portable				
Power Supply/ Rated Operating Voltage Range:	Low 30 VDC, Nominal 36 VDC, High 42 VDC				
Operating Temperature Range:	Low -20° C, Nominal 25° C, High 50° C				
Sample Revision	□Prototype Unit; ■Production Unit; □Pre-Production				
EUT Dimensions [cm]:	270 x 70 x 40				
Weight (grams) :	400				
EUT Diameter:	■ < 60 cm □ Other				

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4 FCC Exemption Limits for Routine Evaluation

4.1 FCC SAR test exclusions are set by KDB 447498 D01 General RF Exposure Guidance v06

4.1.1 Section: 4.3.1. Standalone SAR test exclusion considerations

a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] \cdot [$\sqrt{f(GHz)}$] \leq 3.0 for 1-g SAR, and \leq 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as *numeric thresholds* in step b) below

The test exclusions are applicable only when the minimum test separation distance is \leq 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is \leq 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

- For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):³²
 - 1) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz
 - 2) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz
- c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):
 - 1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by [1 + log(100/f(MHz))]
 - 2) For test separation distances \leq 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$

4.1.2 Section 4.3.2 Simultaneous transmission SAR test exclusion considerations

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the *reported* standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration.

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5 SAR Exclusion Evaluation

5.1 Standalone

		FCC Standalo	ne Transı	mission SA	AR Exclusion Calculatio	ns @ 5mm		
Radio	Frequency [GHz]	Maximum output power *1 [dBm]	Gain [dBi]	EIRP *2 [dBm]	Applying duty cycle correction factor *3 [dBm]	Corrected power [mW]	Threshold *4	Percentage of limit used up [%]
LTE 4	1.72 – 1.745	23.43	3.05	26.48	8.95	7.9	2.1	70
LTE 13	0.7795 – 0.7845	23.62	- 0.21	23.41	5.88	3.9	0.7	23
NFC	0.01356	18.0	-	-	15.16	32.8	0.7	23

- *1 Maximum output power from the modular grant or client declaration, whichever is the highest.
- *2 Adding the peak gain value to the maximum power.
- *3 Subtracting 10 * Log (1/ Duty Cycle %) from either EIRP, or power declared by client, whichever is the highest, to establish the worst case.

For cellular radio, client declared that the transmitter sends a pulse once every 5000 milliseconds. The pulse length 88.4 milliseconds to send a packet size of 200 bytes.

For NFC radio, (52%) duty cycle were measured and averaged over 6 minutes, using EMPower ETSI Burst Measurement System.

*4 Formula used for threshold calculation described in section 4.1 a) for cellular radio, and in section 4.1 c) 2) of this report, for the NFC radio.

5.2 <u>Simultaneous transmission</u>

The worst case simultaneous transmission for this devise is LTE 4 simultaneous with NFC radio. This configuration is using only up to 93% of the limit – see table in section 5.1 for details.

Conclusion: The sum of 1-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit.

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6 Revision History

Date Report Name		Changes to report	Report prepared by	
5/29/2019	SAR_EX_SYNAP_035_19001_FCC	Initial Version	Ghanma, Issa	