



Radio Frequency Exposure Evaluation Report

FOR:

BI Incorporated

Model Name:

LC875

Product Description:

Tracking device

FCC ID:

CSQ-LC875

Applied Rules and Standards:

CFR 47 Part 2.1093

FCC KDB 447498 D01 General RF Exposure Guidance v06

Test Report #:

SAR_EX_BIINC-007-18001_FCC

DATE:

08/08/2018



A2LA Accredited

IC recognized #
3462B-2

CETECOM Inc.

411 Dixon Landing Road • Milpitas, CA 95035 • U.S.A.

Phone: + 1 (408) 586 6200 • Fax: + 1 (408) 586 6299 • E-mail: info@cetecom.com • <http://www.cetecom.com>

CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

Contents

1. Assessment	3
2. Administrative Data	4
2.1. Identification of the Testing Laboratory Issuing the Test Report	4
2.2. Identification of the Client.....	4
2.3. Identification of the Manufacturer.....	4
3. Equipment under Assessment	5
4. FCC Exemption Limits for Routine Evaluation	6
4.1. FCC SAR test exclusions are set by KDB 447498 D01 General RF Exposure Guidance v06 6	
5. Stand-Alone SAR Evaluation Exclusion.....	7
5.1. Declaration of maximum data transmitted	7
5.2. Calculation of worst case load based duty cycle	7
5.3. SAR exclusion calculation.....	7
6. Revision History.....	8

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.

The device meets the requirements for SAR exclusion as stipulated by the above given FCC/ISED rules.

Responsible for Testing Laboratory:

08/08/2018	Compliance	James Donnellan (Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

08/08/2018	Compliance	Issa Ghanma (EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3.
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2. Administrative Data

2.1. Identification of the Testing Laboratory Issuing the Test Report

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:	James Donnellan
Responsible Project Manager:	Cathy Palacios

2.2. Identification of the Client

Applicant's Name:	BI Incorporated
Street Address:	6265 Gunbarrel Ave, Suite B
City/Zip Code	Boulder CO / 80301
Country	USA

2.3. Identification of the Manufacturer

Applicant's Name:	Same as applicant
Street Address:	-----
City/Zip Code	-----
Country	-----

3. Equipment under Assessment

Module Name:	SARA-U201		
Module FCC ID:	XPY1CGM5NNN		
Max. documented values from the modular grant:	Band	Frequency range (MHz)	Output Power (Watts)
	GSM 850	824.2 – 848.8	1.819
	GSM 1900	1850.2 – 1909.8	0.955
	WCDMA II	1852.4 – 1907.6	0.229
	WCDMA V	826.4 – 846.6	0.259
Minimum distance of antenna or radiating parts to user	14.4mm extremity (ankle worn)		
Other Radios included in the device:	GPS, proprietary 2.4 GHz receive only radio.		
Co-located Transmitters/ Antennas:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Exposure Category:	<input type="checkbox"/> Occupational/ Controlled <input checked="" type="checkbox"/> General Population/ Uncontrolled		
Device Category	<input type="checkbox"/> Fixed Installation <input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Mixed Mobile and Portable		

4. FCC Exemption Limits for Routine Evaluation

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

KDB 447498 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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}]$$
$$\leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR, 30 where}$$

- $f(\text{GHz})$ 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 ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

5. Stand-Alone SAR Evaluation Exclusion

5.1. Declaration of maximum data transmitted

- BI Incorporated declared maximum 848 bits transmitted per minute by the product in the document "BI_LOC8_GSM_LC-875_FCC-RF Exposure 06212018.pdf"
- BI Incorporated declared 1 retry before transmission timeout in case a transmission fails "BI_LOC8_GSM_LC-875_FCC-RF Exposure 06212018.pdf"

5.2. Calculation of worst case load based duty cycle

- Minimum net data rate at GPRS is 8 kbps for CS-1 code rate ½ for one timeslot. As for UMTS and all other GPRS/EGPRS modes the data rate is higher this will lead to the worst case DC.
- In each minute 848 bits are being transmitted worst case based on above declaration
- Utilization factor UF of the available capacity 8 kbps with one timeslot:
 $UF = 848 \text{ (Bits/min)} / (8 \times 1024 \text{ Bits}) / (\text{s}) = 0.104 \text{ (s/min)} = 0.104 \text{ s} / 60 \text{ s} = 0.0017$
- Considering the 1 timeslot transmission in calculating actual RF duty cycle for GPRS:
 $DC = 0.0017 / 8 = 0.021 \%$
- With a maximum 1 retransmission per minute this will double to 0.042% worst case duty cycle

5.3. SAR exclusion calculation

According to KDB 447498, SAR evaluation can be excluded if the following equation is satisfied:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 7.5$$

Band/Technology	Frequency [GHz]	Max. Output Power [mW]	Applying duty cycle correction factor [mW]	Distance [mm]	P/D*SQRT(F) at 14.4mm	≤ 7.5
GPRS 850	0.8488	1819	0.76	14.4	0.05	Pass
GPRS 1900	1.9098	955	0.40	14.4	0.04	Pass
WCDMA II	1.9076	229	0.10	14.4	0.01	Pass
WCDMA V	0.8466	259	0.11	14.4	0.01	Pass

- F: Frequency.
- P: Max. Output Power [mW].
- D: Distance.
- SQRT(F): Square root(Frequency)

6. Revision History

Date	Report Name	Changes to report	Report prepared by
2018-08-08	SAR_EX_KORET-017-18001_FCC	Initial Version	Issa Ghanma