



Radio Frequency Exposure Evaluation Report

FOR:

HUF

Model Name:

HUFGM2699

Product Description:

General Motors Keyfob

FCC ID: YGOG20TB1

IC ID: 4008C-G20TB1

Applied Rules and Standards:

CFR 47 Part 2.1093

FCC KDB 447498 D01 General RF Exposure Guidance v06

IC RSS-102 Issue 5

Test Report #: SAR_EX_HUFUS-004-17001_FCC

DATE: 2018-05-24



A2LA Accredited

IC recognized #
3462B-1

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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, and ISED RSS-102 Issue 5.

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

Company	Description	Model #
HUF	General Motors Keyfob	HUFGM2699

Responsible for Testing Laboratory:

2018-05-24	Compliance	James Donnellan (Lab Manager)
Date	Section	Name

Responsible for the Report:

2018-05-24	Compliance	Kris Lazarov (Senior EMC Engineer)
Date	Section	Name

The test results of this test report relate exclusively to the test item specified in Section 3.

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2. Administrative Data

2.1. Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
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Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Compliance Manager:	James Donnellan
Responsible Project Manager:	Kris Lazarov

2.2. Identification of the Client

Applicant's Name:	Huf Hülsbeck & Fürst GmbH & Co. KG
Street Address:	Steeger Str. 17
City/Zip Code	Velbert 42551
Country	Germany

2.3. Identification of the Manufacturer

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

3. Equipment under Assessment

Model No	HUFGM2699
HW Version	3.2
SW Version	MRD 130
FCC-ID	YGOG20TB1
IC ID	4008C-G20TB1
FWIN:	MRD 130
HVIN:	HUFGM2699
PMN:	GM MY20 B1 KEYFOB
Product Description	General Motors Keyfob
Device Category	<input type="checkbox"/> Fixed Installation <input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Mixed Mobile and Portable
Frequency Range / number of channels	433.2 MHz to 434.64 MHz / 3 channels
Type(s) of Modulation	ASK / FSK
Modes of Operation	Short term pulsed transmission
Minimum distance of antenna or radiating parts to user	5mm or less
Max. measured radiated power	0.012 mW
Power Supply/ Rated Operating Voltage Range	Vmin: 2.4 VDC/ Vnom: 3 VDC / Vmax: 3.3VDC
Operating Temperature Range	-20 °C to 70 °C
Other Radios included in the device	125 kHz receiver only
Co-located Transmitters/ Antennas	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Sample Revision	<input type="checkbox"/> Prototype <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production
Exposure Category	<input type="checkbox"/> Occupational/ Controlled <input checked="" type="checkbox"/> General Population/ Uncontrolled

4. FCC and IC 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 \leq 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 \leq 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.

4.2. IC SAR test exclusions are set by IC RSS-102 Issue 5

IC RSS-102 Section: 2.5.1 Exemption Limits for Routine Evaluation — SAR Evaluation

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

For a device operating at 450 MHz the SAR exemption limit at distance 5 mm or less is 52 mW

5. Stand-Alone SAR Evaluation Exclusion

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

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$

FCC / IC Standalone Transmission SAR Exclusion Calculations				
d [mm]	Center Frequency [MHz]	Max Power [mW]	FCC / IC Limit @ 5 mm [mW]	SAR Exclusion applicable (Yes/No)
5	433.92	0.012	22 / 52	Yes

Note 1: The Max power is based on measurement documented in CETECOM report # "EMC_HUFUS-004-17001_15.231"

6. Revision History

Date	Report Name	Changes to report	Report prepared by
2018-05-24	SAR_EX_HUFUS-004-17001_FCC	Initial Version	Kris Lazarov