



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 | Signature |

Responsible for the Report:

| 2018-05-24 | Compliance | Kris Lazarov (Senior 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: | 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 ≤ 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(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.

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 |
| | | | |