# MPE exemption letter according Interim procedure KDB 447498 D04

| Customer | Product | Model | Type | HW Status | SW status | FCC ID |
|---|---|---|---|---|---|---|
| Continental Automotive<br>Siemensstrasse 12<br>93055, Regensburg<br>Germany | Telematic Control Unit | BSRF_EA_RW0 | -- | C5.2 | V19.06 | KR5-BSRFEARW0 |

Declared minimum distance to human body according to customer ≥ 20 cm according customer's document "MPE Information Requirements_external antenna_ ROW variants_v1.3".
The customer thus declares that the device is not body-worn.

**RF Exposure Test Exemptions for Single Source**

According 1.1307(b)(3)(i)(C) Option C – ERP frequencies above 300 kHz but at distances R > λ/2π can be exempted as follows:

TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

| **RF Source Frequency** | | | **Minimum Distance** | | | **Threshold ERP** |
|---|---|---|---|---|---|---|
| $f_L$ MHz | | $f_H$ MHz | $\lambda_L / 2\pi$ | | $\lambda_H / 2\pi$ | W |
| 0.3 | – | 1.34 | 159 m | – | 35.6 m | 1,920 $R^2$ |
| 1.34 | – | 30 | 35.6 m | – | 1.6 m | 3,450 $R^2/f^2$ |
| 30 | – | 300 | 1.6 m | – | 159 mm | 3.83 $R^2$ |
| 300 | – | 1,500 | 159 mm | – | 31.8 mm | 0.0128 $R^2f$ |
| 1,500 | – | 100,000 | 31.8 mm | – | 0.5 mm | 19.2$R^2$ |
| Subscripts L and H are low and high; λ is wavelength.<br>From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns. | | | | | | |

Calculation based on external document "MPE Information Requirements_external antenna_ ROW variants_v1.3".

| Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Band | Technology | Frequency (MHz) | λ/2π (m) | R (m) | R ≥ λ/2π fulfilled | Threshold ERP (W) | Cond. PWR incl. Tolerance (dBm) | Duty cycle (%) | Cond. PWR incl. Duty cycle (dBm} | Maximum Antenna Gain (dBi) | EIRP (dBm) | ERP (dBm) | ERP (W) | MPE Exemption fulfilled |
| GSM 850 | CS | 824.2 | 0.058 | 0.200 | yes | 0.422 | 32.6 | 12.5 | 23.6 | 1.2 | 24.8 | 22.6 | 0.183 | yes |
| | | 836.5 | 0.057 | 0.200 | yes | 0.428 | 32.6 | 12.5 | 23.6 | 1.2 | 24.8 | 22.6 | 0.183 | yes |
| | | 848.8 | 0.056 | 0.200 | yes | 0.435 | 32.6 | 12.5 | 23.6 | 1.2 | 24.8 | 22.6 | 0.183 | yes |
| | GPRS 1UL slot | 824.2 | 0.058 | 0.200 | yes | 0.422 | 32.6 | 12.5 | 23.6 | 1.2 | 24.8 | 22.6 | 0.183 | yes |
| | | 836.5 | 0.057 | 0.200 | yes | 0.428 | 32.6 | 12.5 | 23.6 | 1.2 | 24.8 | 22.6 | 0.183 | yes |
| | | 848.8 | 0.056 | 0.200 | yes | 0.435 | 32.6 | 12.5 | 23.6 | 1.2 | 24.8 | 22.6 | 0.183 | yes |
| | GPRS 2UL slot | 824.2 | 0.058 | 0.200 | yes | 0.422 | 31.1 | 25.0 | 25.1 | 1.2 | 26.3 | 24.1 | 0.259 | yes |
| | | 836.5 | 0.057 | 0.200 | yes | 0.428 | 31.1 | 25.0 | 25.1 | 1.2 | 26.3 | 24.1 | 0.259 | yes |
| | | 848.8 | 0.056 | 0.200 | yes | 0.435 | 31.1 | 25.0 | 25.1 | 1.2 | 26.3 | 24.1 | 0.259 | yes |
| | GPRS 3UL slot | 824.2 | 0.058 | 0.200 | yes | 0.422 | 29.1 | 37.5 | 24.8 | 1.2 | 26.0 | 23.9 | 0.245 | yes |
| | | 836.5 | 0.057 | 0.200 | yes | 0.428 | 29.1 | 37.5 | 24.8 | 1.2 | 26.0 | 23.9 | 0.245 | yes |
| | | 848.8 | 0.056 | 0.200 | yes | 0.435 | 29.1 | 37.5 | 24.8 | 1.2 | 26.0 | 23.9 | 0.245 | yes |
| | GPRS 4UL slot | 824.2 | 0.058 | 0.200 | yes | 0.422 | 28.1 | 50.0 | 25.1 | 1.2 | 26.3 | 24.1 | 0.259 | yes |
| | | 836.5 | 0.057 | 0.200 | yes | 0.428 | 28.1 | 50.0 | 25.1 | 1.2 | 26.3 | 24.1 | 0.259 | yes |
| | | 848.8 | 0.056 | 0.200 | yes | 0.435 | 28.1 | 50.0 | 25.1 | 1.2 | 26.3 | 24.1 | 0.259 | yes |

| Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Band | Technology | Frequency (MHz) | λ/2π (m) | R (m) | R ≥ λ/2π fulfilled | Threshold ERP (W) | Cond. PWR incl. Tolerance (dBm) | Duty cycle (%) | Cond. PWR incl. Duty cycle (dBm} | Maximum Antenna Gain (dBi) | EIRP (dBm) | ERP (dBm) | ERP (W) | MPE Exemption fulfilled |
| GSM 1900 | CS | 1850.2 | 0.026 | 0.200 | yes | 0.768 | 28.7 | 12.5 | 19.7 | 2.7 | 22.4 | 20.2 | 0.105 | yes |
| | | 1880.0 | 0.025 | 0.200 | yes | 0.768 | 28.7 | 12.5 | 19.7 | 2.7 | 22.4 | 20.2 | 0.105 | yes |
| | | 1909.8 | 0.025 | 0.200 | yes | 0.768 | 28.7 | 12.5 | 19.7 | 2.7 | 22.4 | 20.2 | 0.105 | yes |
| | GPRS 1UL slot | 1850.2 | 0.026 | 0.200 | yes | 0.768 | 28.7 | 12.5 | 19.7 | 2.7 | 22.4 | 20.2 | 0.105 | yes |
| | | 1880.0 | 0.025 | 0.200 | yes | 0.768 | 28.7 | 12.5 | 19.7 | 2.7 | 22.4 | 20.2 | 0.105 | yes |
| | | 1909.8 | 0.025 | 0.200 | yes | 0.768 | 28.7 | 12.5 | 19.7 | 2.7 | 22.4 | 20.2 | 0.105 | yes |
| | GPRS 2UL slot | 1850.2 | 0.026 | 0.200 | yes | 0.768 | 27.2 | 25.0 | 21.2 | 2.7 | 23.9 | 21.7 | 0.149 | yes |
| | | 1880.0 | 0.025 | 0.200 | yes | 0.768 | 27.2 | 25.0 | 21.2 | 2.7 | 23.9 | 21.7 | 0.149 | yes |
| | | 1909.8 | 0.025 | 0.200 | yes | 0.768 | 27.2 | 25.0 | 21.2 | 2.7 | 23.9 | 21.7 | 0.149 | yes |
| | GPRS 3UL slot | 1850.2 | 0.026 | 0.200 | yes | 0.768 | 25.2 | 37.5 | 20.9 | 2.7 | 23.6 | 21.5 | 0.141 | yes |
| | | 1880.0 | 0.025 | 0.200 | yes | 0.768 | 25.2 | 37.5 | 20.9 | 2.7 | 23.6 | 21.5 | 0.141 | yes |
| | | 1909.8 | 0.025 | 0.200 | yes | 0.768 | 25.2 | 37.5 | 20.9 | 2.7 | 23.6 | 21.5 | 0.141 | yes |
| | GPRS 4UL slot | 1850.2 | 0.026 | 0.200 | yes | 0.768 | 24.2 | 50.0 | 21.2 | 2.7 | 23.9 | 21.7 | 0.149 | yes |
| | | 1880.0 | 0.025 | 0.200 | yes | 0.768 | 24.2 | 50.0 | 21.2 | 2.7 | 23.9 | 21.7 | 0.149 | yes |
| | | 1909.8 | 0.025 | 0.200 | yes | 0.768 | 24.2 | 50.0 | 21.2 | 2.7 | 23.9 | 21.7 | 0.149 | yes |

| Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Band | Technology | Frequency (MHz) | λ/2π (m) | R (m) | R ≥ λ/2π fulfilled | Threshold ERP (W) | Cond. PWR incl. Tolerance (dBm) | Duty cycle (%) | Cond. PWR incl. Duty cycle (dBm} | Maximum Antenna Gain (dBi) | EIRP (dBm) | ERP (dBm) | ERP (W) | MPE Exemption fulfilled |
| FDDII | WCDMA | 1852.4 | 0.026 | 0.200 | yes | 0.768 | 22.7 | 100.0 | 22.7 | 2.7 | 25.4 | 23.3 | 0.211 | yes |
| | | 1880.0 | 0.025 | 0.200 | yes | 0.768 | 22.7 | 100.0 | 22.7 | 2.7 | 25.4 | 23.3 | 0.211 | yes |
| | | 1907.6 | 0.025 | 0.200 | yes | 0.768 | 22.7 | 100.0 | 22.7 | 2.7 | 25.4 | 23.3 | 0.211 | yes |
| FDDIV | WCDMA | 1712.4 | 0.028 | 0.200 | yes | 0.768 | 22.7 | 100.0 | 22.7 | 2.4 | 25.1 | 23.0 | 0.197 | yes |
| | | 1732.4 | 0.028 | 0.200 | yes | 0.768 | 22.7 | 100.0 | 22.7 | 2.4 | 25.1 | 23.0 | 0.197 | yes |
| | | 1752.6 | 0.027 | 0.200 | yes | 0.768 | 22.7 | 100.0 | 22.7 | 2.4 | 25.1 | 23.0 | 0.197 | yes |
| FDDV | WCDMA | 826.4 | 0.058 | 0.200 | yes | 0.423 | 23.6 | 100.0 | 23.6 | 1.2 | 24.8 | 22.7 | 0.184 | yes |
| | | 836.6 | 0.057 | 0.200 | yes | 0.428 | 23.6 | 100.0 | 23.6 | 1.2 | 24.8 | 22.7 | 0.184 | yes |
| | | 846.6 | 0.056 | 0.200 | yes | 0.433 | 23.6 | 100.0 | 23.6 | 1.2 | 24.8 | 22.7 | 0.184 | yes |

| Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Band | Technology | Frequency (MHz) | λ/2π (m) | R (m) | R ≥ λ/2π fulfilled | Threshold ERP (W) | Cond. PWR incl. Tolerance (dBm) | Duty cycle (%) | Cond. PWR incl. Duty cycle (dBm} | Maximum Antenna Gain (dBi) | EIRP (dBm) | ERP (dBm) | ERP (W) | MPE Exemption fulfilled |
| B02 | LTE | 1850.0 | 0.026 | 0.200 | yes | 0.768 | 22.2 | 100.0 | 22.2 | 2.7 | 24.9 | 22.8 | 0.188 | yes |
| | | 1880.0 | 0.025 | 0.200 | yes | 0.768 | 22.2 | 100.0 | 22.2 | 2.7 | 24.9 | 22.8 | 0.188 | yes |
| | | 1910.0 | 0.025 | 0.200 | yes | 0.768 | 22.2 | 100.0 | 22.2 | 2.7 | 24.9 | 22.8 | 0.188 | yes |
| B04 | LTE | 1710.0 | 0.028 | 0.200 | yes | 0.768 | 22.2 | 100.0 | 22.2 | 2.4 | 24.6 | 22.5 | 0.176 | yes |
| | | 1732.5 | 0.028 | 0.200 | yes | 0.768 | 22.2 | 100.0 | 22.2 | 2.4 | 24.6 | 22.5 | 0.176 | yes |
| | | 1755.0 | 0.027 | 0.200 | yes | 0.768 | 22.2 | 100.0 | 22.2 | 2.4 | 24.6 | 22.5 | 0.176 | yes |
| B05 | LTE | 824.0 | 0.058 | 0.200 | yes | 0.422 | 23.1 | 100.0 | 23.1 | 1.2 | 24.3 | 22.2 | 0.164 | yes |
| | | 836.5 | 0.057 | 0.200 | yes | 0.428 | 23.1 | 100.0 | 23.1 | 1.2 | 24.3 | 22.2 | 0.164 | yes |
| | | 849.0 | 0.056 | 0.200 | yes | 0.435 | 23.1 | 100.0 | 23.1 | 1.2 | 24.3 | 22.2 | 0.164 | yes |
| B07 | LTE | 2500.0 | 0.019 | 0.200 | yes | 0.768 | 21.8 | 100.0 | 21.8 | 3.0 | 24.8 | 22.7 | 0.184 | yes |
| | | 2535.0 | 0.019 | 0.200 | yes | 0.768 | 21.8 | 100.0 | 21.8 | 3.0 | 24.8 | 22.7 | 0.184 | yes |
| | | 2690.0 | 0.018 | 0.200 | yes | 0.768 | 21.8 | 100.0 | 21.8 | 3.0 | 24.8 | 22.7 | 0.184 | yes |

| Exemption acc. TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Band | Technology | Frequency (MHz) | λ/2π (m) | R (m) | R ≥ λ/2π fulfilled | Threshold ERP (W) | Cond. PWR incl. Tolerance (dBm) | Duty cycle (%) | Cond. PWR incl. Duty cycle (dBm} | Maximum Antenna Gain (dBi) | EIRP (dBm) | ERP (dBm) | ERP (W) | MPE Exemption fulfilled |
| 2.4 GHz | WLAN | 2400.0 | 0.020 | 0.200 | yes | 0.768 | 17.6 | 100.0 | 17.6 | 2.0 | 19.6 | 17.5 | 0.056 | yes |
| | | 2440.0 | 0.020 | 0.200 | yes | 0.768 | 17.6 | 100.0 | 17.6 | 2.0 | 19.6 | 17.5 | 0.056 | yes |
| | | 2480.0 | 0.019 | 0.200 | yes | 0.768 | 17.6 | 100.0 | 17.6 | 2.0 | 19.6 | 17.5 | 0.056 | yes |
| 5 GHz | WLAN | 5150.0 | 0.009 | 0.200 | yes | 0.768 | 11.0 | 100.0 | 11.0 | 6.0 | 17.0 | 14.9 | 0.031 | yes |
| | | 5220.0 | 0.009 | 0.200 | yes | 0.768 | 11.0 | 100.0 | 11.0 | 6.0 | 17.0 | 14.9 | 0.031 | yes |
| | | 5250.0 | 0.009 | 0.200 | yes | 0.768 | 11.0 | 100.0 | 11.0 | 6.0 | 17.0 | 14.9 | 0.031 | yes |
| 5 GHz | WLAN | 5725.0 | 0.008 | 0.200 | yes | 0.768 | 6.0 | 100.0 | 6.0 | 6.0 | 12.0 | 9.9 | 0.010 | yes |
| | | 5785.0 | 0.008 | 0.200 | yes | 0.768 | 6.0 | 100.0 | 6.0 | 6.0 | 12.0 | 9.9 | 0.010 | yes |
| | | 5850.0 | 0.008 | 0.200 | yes | 0.768 | 6.0 | 100.0 | 6.0 | 6.0 | 12.0 | 9.9 | 0.010 | yes |

Remark: Calculation based on internal antenna

**Simultaneous Transmission**

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

| | | WLAN2.4 | WLAN5 U-NII-1 | WLAN5 U-NII-3 |
|---|---|---|---|---|
| | Ratio of Value/Limit | 0.072383 | 0.039778 | 0.012579 |
| GSM 850 | 0.614706 | 0.687089 | 0.654484 | 0.627285 |
| GSM 1900 | 0.194361 | 0.266744 | 0.234138 | 0.206940 |
| WCDMA FDDII | 0.275194 | 0.347577 | 0.314972 | 0.287773 |
| WCDMA FDDIV | 0.256826 | 0.329209 | 0.296603 | 0.269405 |
| WCDMA FDDV | 0.435051 | 0.507434 | 0.474828 | 0.447629 |
| LTE B02 | 0.245267 | 0.317650 | 0.285044 | 0.257846 |
| LTE B04 | 0.228896 | 0.301280 | 0.268674 | 0.241475 |
| LTE B05 | 0.388869 | 0.461252 | 0.428646 | 0.401447 |
| LTE B07 | 0.239684 | 0.312067 | 0.279461 | 0.252263 |

Remark: only maxmimum value in band / mode is shown

| | | |
|---|---|---|
| Maximum-Value | = | 0.687089 |

Maximum value for simultaneous transmission is < 0.69 < 1 = limit fulfilled.

The current version of Test Report CETECOM_TR22-1-0030601T53a_C01 replaces the test report CETECOM_TR22-1-0030601T53a dated 2023-Feb-21. The replaced test report is herewith invalid.

**Conclusion: MPE-Based Exemption fulfilled**

Dipl.-Ing. Ninovic Perez

B.Eng. Martin Nunier

| Version | Applied changes | Date of release |
|---|---|---|
| -- | Inital release | 2023-Feb-21 |
| C01 | | 2023-Mar-31 |