

**TUV SUD BABT TCB**

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***RF exposure analysis for the equipment BRCK V1 (FCC ID: 2ACBL002725001; 11959A-002725001)***

The BRCK V1 (FCC ID: 2ACBL002725001; 11959A-002725001) is designed to be installed in mobile exposure host platform.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter except as described in this exhibit.

This device is intended to be co-located with the following transmitter:

Novatel Wireless, MC545 High-Speed Data Modem (FCC ID: NBZNRM-MC545; IC: 3229A-MC545)

**MPE exposure limits**

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

| Frequency Range (MHz) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|-----------------------|-------------------------------------|--------------------------|
| 300 – 1500            | f (MHz) /1500                       | 30                       |
| 1500 – 100.000        | 1,0                                 | 30                       |

The table below is excerpted from RSS-102, Issue 4, 4.2, titled “RF Limits for Devices used by the General Public”:

| Frequency Range (MHz) | Power density (W/m <sup>2</sup> ) | Averaging time (minutes) |
|-----------------------|-----------------------------------|--------------------------|
| 300 – 1500            | f (MHz) /150                      | 6                        |
| 1500 – 100.000        | 10                                | 6                        |

Using the equation  $S = \frac{PG}{4\pi R^2}$  to calculate the exposure to electromagnetic fields

where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)  
P = power input to the antenna (in appropriate units, e.g., mW)  
G = power gain of the antenna in the direction of interest relative to an isotropic radiator  
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Compliance with FCC and IC maximum permissive exposure limits is demonstrated based on the following calculations.

### 1. Standalone operations analysis for BRCK V1 (FCC ID: 2ACBL002725001; 11959A-002725001)

| Frequency band (MHz) | Mode | Antenna output power (dBm) | Antenna output power (mW) | Antenna gain (dBi) | Antenna gain (numerical) | Duty cycle (%) | Evaluation distance (cm) | Power density (mW/cm <sup>2</sup> ) | FCC MPE limit (mW/cm <sup>2</sup> ) | MPE RATIO |
|----------------------|------|----------------------------|---------------------------|--------------------|--------------------------|----------------|--------------------------|-------------------------------------|-------------------------------------|-----------|
| 2400-2483,5          | Wifi | 23,60                      | 229,087                   | 0                  | 1,00                     | 100%           | 20                       | 0,046                               | 1,000                               | 0,046     |

The equipment complies with the FCC MPE limits and the maximum MPE ratio obtained is **0,046**.

### 2. Standalone operations analysis for Novatel Wireless, MC545 High-Speed Data Modem (FCC ID: NBZNRM-MC545; IC: 3229A-MC545)

| Frequency band (MHz) | Mode           | EIRP (mW) | Duty cycle (%) | Evaluation distance (cm) | Power density (mW/cm <sup>2</sup> ) | FCC MPE limit (mW/cm <sup>2</sup> ) | MPE RATIO |
|----------------------|----------------|-----------|----------------|--------------------------|-------------------------------------|-------------------------------------|-----------|
| 824.2 - 848.8 MHz    | GPRS/EDGE 850  | 1230,00   | 25%            | 20                       | 0,062                               | 0,540                               | 0,062     |
| 1850.2 - 1909.8 MHz  | GPRS/EDGE 1900 | 1997,52   | 25%            | 20                       | 0,100                               | 0,540                               | 0,100     |
| 1852.4 - 1907.6 MHz  | 3G FDD II      | 1218,00   | 100%           | 20                       | 0,243                               | 0,540                               | 0,243     |

The equipment complies with the FCC MPE limits and the maximum MPE ratio obtained is 0,243.

### 3. Co-location analysis in mobile exposure conditions

#### 3.1. Co-location with other transmitter in mobile exposure conditions

According to KDB 447498 D01 General RF Exposure Guidance v05r2, 7.2:

*Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is  $\leq 1.0$ .*

Conclusion:

The device BRCK V1 (FCC ID: 2ACBL002725001; 11959A-002725001) is compliant with FCC/IC Limits for Maximum Permissible Exposure (MPE) on standalone operation and when co-located with Novatel Wireless, MC545 High-Speed Data Modem (FCC ID: NBZNRM-MC545; IC: 3229A-MC545):

MPE ratio for BRCK V1 (FCC ID: 2ACBL002725001; 11959A-002725001): 0.046

MPE ratio for Novatel Wireless, MC545 High-Speed Data Modem (FCC ID: NBZNRM-MC545; IC: 3229A-MC545): 0.243

Simultaneous transmission MPE ratio: 0.289

Yours sincerely,



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