

**TUV SUD BABT TCB**

Octagon House,
Segensworth Road,
Fareham,
Hampshire,
PO15 5RL

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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 ²)	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 ²)	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/cm²)
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 ²)	FCC MPE limit (mW/cm ²)	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 ²)	FCC MPE limit (mW/cm ²)	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 ≤ 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,



p.a.

Name:	ERIK HERSMAN
Position:	CEO
Company:	BRCK Inc
Phone:	+1 (407) 427-0412
e-mail:	ERIK@BRCK.COM