

RF Exposure Report

Report No.: FCC_RF_SL19101602-BSS-009_BTR-80N_RF Exposure

FCC ID: B5DM544

Models: BTR-80N-FD, BTR-80N-FE, BTR-80N-HE

Series Model: N/A

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Applicant: Bosch Security Systems, Inc.

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Release Control Record

Issue No.	Description	Date Issued
FCC_RF_SL19101602-BSS-009_BTR-80N_RF Exposure	Original Release	03/03/2020

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	f/1500	30
1500-100,000	1.0	30

f = Frequency in MHz; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user.

So, this device is classified as Mobile Device.

2.4 Antenna Gain

The antenna type is Dipole antenna with 0.5 dBi gain.

Note: The antennas are sleeve dipole antennas. By itself, it has a gain of 2 dBi. However they are not matched to 50 Ohms which is the impedance of the TNC jack/coaxial cable. These antennas naturally have a lot higher impedance than 50 Ohms. The dipole antenna over the range 482 – 518 MHz has about a 2.5 to 1 VSWR match. So about 1dB is loss in matching and another 0.5 due to losses at UHF. So effectively the antenna when combined with the device is about a **0.5 dBi** gain antenna.

2.5 Calculation Result of Maximum Conducted Power

BTR-80N-FD: TX: 482.225-499.975MHz

BTR-80N-FE: TX: 482.225-499.975MHz

BTR-80N-HE: TX: 500.225-517.975MHz

MPE based on worst-case measured Output power

Band	Frequency (MHz)	Max Power (dBm)	Max Power (mW)	Turn-Up Tolerance	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
BTR-80N FD	491.050	21.91	155.24	± 1dB	0.5	20	0.0436	0.327
BTR-80N HE	517.975	23.42	219.79	± 1dB	0.5	20	0.0490	0.345

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. Calculate MPE from condition "f/1500" formula.

3 Conclusion

BTR-80N FD = 0.0436 < **0.327**

BTR-80N HE = 0.0490 < **0.345**

Therefore the maximum calculations of above situations are less than the MPE limit.

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