



# H.B. Compliance Solutions

## RF Exposure MPE Report

For the

**Aether RF LLC**

**Wiegand Wave**

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**Prepared for:**

Aether RF

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A handwritten signature in black ink, appearing to read 'Hoosamuddin'.

Hoosamuddin Bandukwala



**Cert # ATL-0062-E**

## 1. Equipment Overview

<b>Product Name:</b>	Wiegand Bridge
<b>Model(s) Tested:</b>	100
<b>FCC ID:</b>	2BGQ6WW100
<b>Supply Voltage Input:</b>	Primary Power: +16-24 VAC/VDC)
<b>Frequency Range:</b>	902-928MHz
<b>No. of Channels:</b>	128 Channels
<b>Type(s) of Modulation:</b>	OQPSK
<b>Range of Operation Power:</b>	DSSS- 0.824 (Conducted)
<b>Emission Designator:</b>	N/A
<b>Channel Spacing(s)</b>	None
<b>Test Item:</b>	Pre-Production
<b>Type of Equipment:</b>	Portable
<b>Antenna Requirement (§15.203) :</b>	Type of Antenna: Externa Whip Gain of Antenna: 2.7dBi
<b>Environmental Test Conditions:</b>	Temperature: 15-35°C Humidity: 30-60% Barometric Pressure: 860-1060 mbar
<b>Modification to the EUT:</b>	None

## 2. Applicable Standard

According to §1.1307 the criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter. Test Limits

Evaluated against exposure limits: General Use  X  or Controlled Use

### Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3–3.0 .....	614	1.63	* 100	6
3.0–30 .....	1842/f	4.89/f	* 900/f <sup>2</sup>	6
30–300 .....	61.4	0.163	1.0	6
300–1,500 .....	.....	.....	f/300	6
1,500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	* 100	30
1.34–30 .....	824/f	2.19/f	* 180/f <sup>2</sup>	30
30–300 .....	27.5	0.073	0.2	30
300–1,500 .....	.....	.....	f/1500	30
1,500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz\* = Plane-wave equivalent power density

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in the above table. (Use 300kHz limits for 150kHz)

### 3. Test Results

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where,

S = power density (mW/cm<sup>2</sup>)

P = output power at the antenna terminal (mW)

G = gain of transmit antenna (numeric)

R = distance from transmitting antenna (cm)

#### For DSSS Transmitter

Maximum peak output power at antenna input terminal = 29.16 (dBm)

Maximum peak output power at antenna input terminal = 824.13 (mW)

Antenna gain (typical) = 2.7 (dBi)

Maximum antenna gain = 1.86 (numeric)

Prediction distance = 20 (cm)

Prediction frequency = 928 (MHz)

MPE limit for uncontrolled exposure at prediction frequency = 0.619 (mW/cm<sup>2</sup>)

*Power density at prediction frequency = 0.30496 (mW/cm<sup>2</sup>)*

To solve for the minimum mounting distance required;

$$R = \sqrt{PG/4\pi S}$$

$$R = \sqrt{824.13 \times 1.86 / 4\pi \times 0.2164} = \underline{20 \text{ cm}} \text{ (Based on continuous transmission)}$$

## Simultaneous Transmission Evaluation

### Limit

The sum of the ratios of the peak or spatially averaged results to the applicable frequency dependent MPE limits must be <1 at all locations where users and bystanders can be exposed.

### Calculation

Mode	Bluetooth Power Density/Limit	WiFi Power Density/Limit	$\Sigma$ (Power Density/Limit) of WiFi+Bluetooth
DSSS		0.30496	
Bluetooth	0.00191		0.30687

The DSSS and BLE transmitter, the aggregated (power density/limit) is smaller than 1, and the MPE of 2 collocated transmitters is compliant.

**NOTE: FCC ID for the pre-certified BLE module is X8WBT840F. BLE does not transmit simultaneously with the Spread Spectrum Transmitter.**

## **END OF TEST REPORT**