



H.B. Compliance Solutions

RF Exposure MPE Report

For the

Kubota Tractor Corporation

KAE104

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Prepared for:

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

Hoosamuddin Bandukwala



Cert # ATL-0062-E

1. Equipment Overview

Product Name:	ECU for Auto Steer Tractor
Model(s) Tested:	KAE104
FCC ID:	2BOIZKAE104
Supply Voltage Input:	Primary Power: +12VDC
Frequency Range:	2400-2483.5 MHz
No. of Channels:	BLE (40 Channels), Satellite (4 Channels)
Type(s) of Modulation:	OQPSK
Range of Operation Power:	0.1W
Emission Designator:	N/A
Channel Spacing(s)	N/A
Test Item:	Pre-Production
Type of Equipment:	Mobile
Antenna Requirement (§15.203) :	Type of Antenna: Molex Flex Cable Balance Patch Antenna Gain of Antenna: 3.0dBi
Environmental Test Conditions:	Temperature: 15-35°C Humidity: 30-60% Barometric Pressure: 860-1060 mbar
Modification to the EUT:	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 ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	* 100	6
3.0–30	1842/f	4.89/f	* 900/f ²	6
30–300	61.4	0.163	1.0	6
300–1,500 .....	.....	.....	f/300	6
1,500–100,000 .....	.....	.....	5	6
(B) 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
300–1,500 .....	.....	.....	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/cm²)

P = output power at the antenna terminal (mW)

G = gain of transmit antenna (numeric)

R = distance from transmitting antenna (cm)

For Bluetooth Transmitter

Maximum peak output power at antenna input terminal = 20.0 (dBm)

Maximum peak output power at antenna input terminal = 100.00 (mW)

Antenna gain (typical) = 3.0 (dBi)

Maximum antenna gain = 2.0 (numeric)

Prediction distance = 20 (cm)

Prediction frequency = 2480 (MHz)

MPE limit for uncontrolled exposure at prediction frequency = 1.0 (mW/cm²)

Power density at prediction frequency = 0.03978 (mW/cm²)

To solve for the minimum mounting distance required;

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

$$R = \sqrt{100 \times 2.0 / 4\pi \times 0.00152} = \underline{20 \text{ cm}} \text{ (Based on continuous transmission)}$$

Therefore, at 20cm the spectral power density is less than **the 1.0 mW/cm²** limit for uncontrolled exposure.

END OF TEST REPORT