

TEST: FCC 47 CFR 1.1310 Maximum Permissible Exposure

ENVIRONMENTAL ASSESSMENT

On the TMAB12-H600 Mobile Transceiver S/N: 19001381

In accordance with

ANSI/IEEE Std C95.1, 1999
OET Bulletin 65 97-01

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Operating and Exposure conditions:

Operating Conditions: Mobile transmitter using vehicle mounted antennas only

Exposure conditions: Occupational/Controlled Exposure.

Minimum Safe Distance calculations:

$$R = (P G / 4 \pi S)^{1/2}$$

Where S = power density in mW per cm²

P = net power input to the antenna in mW

R = distance from the antenna in cm

G = linear gain of antenna relative to an isotropic radiator

Antenna Type: Monopole ($\lambda/4$ whip)

Antenna Gain: 2.15 dBi

Transmitter Power: 25 Watts

Limit: 300 – 1500 MHz: $f/300 \text{ mW/cm}^2$
For $f = 463.725 \text{ MHz}$, $s = 1.546$

Power gain product: $25000 \times 1.64 = 41000 \text{ mW}$

Minimum safe distance: $(41000 / 4\pi \times 1.546)^{1/2} = 46 \text{ cm}$

Antenna Type: Monopole ($5\lambda/8$ whip)

Antenna Gain: 5.15 dBi

Transmitter Power: 25 Watts

Limit: 300 – 1500 MHz: $f/300 \text{ mW/cm}^2$
For $f = 463.725 \text{ MHz}$, $s = 1.546$

Power gain product: $25000 \times 3.27 = 81750 \text{ mW}$

Minimum safe distance: $(81750 / 4\pi \times 1.546)^{1/2} = 65 \text{ cm}$

Test Results:

NAME OF TEST: TRANSMITTER OUTPUT POWER (CONDUCTED)

TEST CONDITIONS: Ambient Temperature 22°C
Relative Humidity 47 %
Standard Voltage 13.8V DC

SPECIFICATION: FCC 47 CFR 2.1046

GUIDE: TIA/EIA-603 2.2.1

MEASUREMENT PROCEDURE:

1. The Equipment Under Test (EUT) was connected to an RF Power meter using a coaxial attenuator with an impedance of 50 Ohms.
2. The unmodulated output power was measured.

MEASUREMENT RESULTS:

Frequency: 463.725 MHz	Manufacturer's Rated Output Power: 25 W nominal
POWER (W)	25
Measurement Uncertainty (dB)	+0.63, -0.68

NAME OF TEST: ENVIRONMENTAL ASSESSMENT

TEST CONDITIONS: Ambient Temperature 22°C
Relative Humidity 47%
Standard Voltage 13.8V DC

SPECIFICATION: FCC 47 CFR 1.1310

GUIDE: ANSI/IEEE Std C95.1, 1999, OET Bulletin 65 97-01

Test Method:

The antenna is mounted on a metallic ground-plane which is placed on a non metallic turntable 1.35 m high and clear of nearby objects. Peak power density readings are taken at 0.2m vertical increments using a calibrated isotropic probe at the calculated safe distance from the antenna. The measurement equipment is operated remotely using fibre optics to reduce field perturbations.

Test Distance metres	0.58 m (distance for $\lambda/4$ whip)	0.81 m (distance for $5\lambda/8$ whip)
	Power Density, mW/cm ²	Power Density, mW/cm ²
Probe Height metres	Result for 25W TX power.	Result for 25W TX power.
0.2	0.067	0.057
0.4	0.025	0.048
0.6	0.070	0.084
0.8	0.070	0.124
1.0	0.161	0.080
1.2	0.340	0.164
1.4	0.458	0.076
1.6	0.630	0.205
1.8	0.423	0.398
2.0	0.196	0.499

Calculations of average power (sum of results/number of results):

Test Distance, m	0.58 m (distance for $\lambda/4$ whip)	0.81 m (distance for $5\lambda/8$ whip)
Body part	Average Power Density, mW/cm ²	Average Power Density, mW/cm ²
Whole Body Probe Height 0.2 to 2.0m	0.244	0.173
Upper Body Probe Height 1.0 to 2.0m	0.315	0.203
Lower Body Probe Height 0.2 to 0.8m	0.058	0.078

Limit, Occupational/Controlled Exposure:

300 – 1500 MHz: $f/300$ mW/cm²

For $f = 463.725$ MHz, $s = 1.546$

Test Equipment Used:

Power Meter:	Rohde and Schwarz NRVS	s/n 841954/005
Isotropic Probe	Holaday HI-422	s/n 95661
Antenna Mast	Tait	
Turntable	Tait	

Information to be placed in User/Installation manual:

Warning:

Warning: RF Exposure Hazard

To comply with FCC RF exposure limits, this product must be installed using an externally mounted antenna with either a 2.15dBi or 5.15dBi gain. This antenna must not be mounted at a location such that any person or persons can come closer than 0.9m (35 inches) to the antenna.

Safety Training Information:

Warning: FCC RF Exposure Limits

This product generates RF (radio frequency) energy during transmissions. This device must be restricted to work-related use in an occupational/controlled exposure environment. The radio operator must have control of the exposure conditions and duration of all persons exposed to the antenna of this transmitter to satisfy FCC RF exposure compliance.

- This device is not approved for general population use.
 - This device must only be used with authorized accessories and antennas.
- The operator must ensure that the minimum safe distance of 0.9m (35 inches) between persons and the antenna is maintained during transmissions. This minimum safe distance is based on the assumption that there is a duty cycle of 50% transmit mode to stand-by or receive modes. The radio is in transmit mode when the PTT (press-to-talk) key on the microphone is pressed and the control head red LED (light emitting diode) glows.

Please refer to the following website for more information on what RF energy is and how to control your exposure to assure compliance with established RF exposure limits.

Website: <http://www.fcc.gov/oet/rfsafety/rf-faqs.html>

END