

Environmental Assessment

For the

TMAA42-B100 External RF Power Amplifier

In accordance with

FCC 47 CFR 1.1310

Report Revision: 1
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FCC ID: CASTMAB1Z

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All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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REVISION HISTORY

Date	Revision	Comments
18-Oct-2005	1	Initial test report

INTRODUCTION

Maximum permissible exposure assessment on the TMAA42-B100 external radio frequency power amplifier in accordance with:

FCC CFR 1.1310

REPORT PREPARED FOR

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DESCRIPTION OF SAMPLE

FCC ID: CASTMAB1Z
Type: TMAB1Z
Product code: TMAA42-B100
Serial Numbers: 13133324
Quantity: 1

The TMAB1Z is an External Radio Frequency Power Amplifier designed to operate in the 136MHz to 174MHz band. It has a fixed output power of 110W, and output impedance of 50 ohms. It has been tested with the TMAB32-B100 (serial number 19057434) mobile, which has the output power fixed at 1 watt. The mobile performs all modulation, and the TMAB1Z is only used to increase the output power of the mobile.

STATEMENT OF COMPLIANCE

The TMAA42-B100 external radio frequency power amplifier was found to conform to the following standards:

FCC 47 CFR 1.1310

TEST CONDITIONS

All testing was performed at the following conditions.

Ambient Temperature	15°C to 30°C
Relative Humidity	20% to 75%
Standard Test Voltage	13.8Vdc

OPERATING AND EXPOSURE CONDITIONS

Operating Conditions: Mobile transmitter using vehicle mounted antennas only

Exposure conditions: Occupational/Controlled Exposure (operator).

Limit: 30 - 300 MHz: 1.0 mW/cm²

General Population/Uncontrolled (passengers and bystanders)

Limit: 30 - 300 MHz: 0.2 mW/cm²

Safe Distance

Recommended Minimum lateral safe distance from the antenna: 110 cm

RECOMMENDED ANTENNAS

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

Antenna Gain: 2.15 dBi

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

Antenna Gain: 5.15 dBi

TEST RESULTS

Evaluation of the MPE requirement for the TMAA42-B100 110W external RF power amplifier is based on measurements that were made on the 50W mobile transceiver¹, which covers the same frequency band.

The increase in power represents a gain of.

$$= 10 \log \left(\frac{110}{50} \right)$$

$$= 3.42\text{dB}$$

or a numeric gain of 2.2

Therefore to represent the results for 110W, the measured results for the 50W mobile have been multiplied by 2.2.

Test Distance metres	$\lambda/4$ antenna			$5\lambda/8$ antenna		
Units	Power Density, mW/cm ²					
Probe Height metres	50W Mobile measured Results	110W Mobile Calculated Results	FCC Duty Cycle Applied	50W Mobile measured Results	110W Mobile Calculated Results	FCC Duty Cycle Applied
0.2	0.018	0.040	0.020	0.009	0.020	0.010
0.4	0.034	0.075	0.037	0.017	0.037	0.019
0.6	0.015	0.033	0.017	0.011	0.024	0.012
0.8	0.032	0.070	0.035	0.007	0.015	0.008
1.0	0.113	0.249	0.124	0.014	0.031	0.015
1.2	0.171	0.376	0.188	0.049	0.108	0.054
1.4	0.303	0.667	0.333	0.098	0.216	0.108
1.6	0.333	0.733	0.366	0.143	0.315	0.157
1.8	0.350	0.770	0.385	0.196	0.431	0.216
2.0	0.340	0.748	0.374	0.281	0.618	0.309
Average			0.188			0.091

1. The MPE report for the 50W mobile can be found at Annex A.

Test Results

MPE Inside Vehicle:

Roof mounted Antenna						
Internal, Front Seat	$\lambda/4$ antenna			$5\lambda/8$ antenna		
	Power Density, mW/cm ²					
	50W Mobile measured Results	110W Mobile Calculated Results	FCC Duty Cycle Applied	50W Mobile measured Results	110W Mobile Calculated Results	FCC Duty Cycle Applied
Head	0.091	0.200	0.100	0.020	0.044	0.022
Upper torso	0.053	0.117	0.058	0.024	0.053	0.026
Lower torso	0.057	0.125	0.063	0.041	0.090	0.045
Average			0.074			0.031
Roof mounted Antenna						
Internal, Back Seat	$\lambda/4$ antenna			$5\lambda/8$ antenna		
	Power Density, mW/cm ²					
	50W Mobile measured Results	110W Mobile Calculated Results	FCC Duty Cycle Applied	50W Mobile measured Results	110W Mobile Calculated Results	FCC Duty Cycle Applied
Head	0.032	0.070	0.035	0.022	0.048	0.024
Upper torso	0.035	0.077	0.039	0.020	0.044	0.022
Lower torso	0.165	0.363	0.182	0.039	0.086	0.043
Average			0.085			0.030

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 antenna mounted centrally on the vehicle roof, with a gain of at least 2.15dBi. This antenna must not be mounted at a location such that any person or persons can come closer than 1.1m (43 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>

TEST EQUIPMENT USED

The following list of equipment represents the equipment used when testing the 50W mobile in August 2004.

Equipment	Type	Serial Number	Calibration date	Calibration Due
RF Power Sensor	Rohde & Schwarz NRV5-Z4	841498/003	2004-03-11	2005-03-11
Power Meter	Rohde & Schwarz NRVS	841954/005	2004-03-11	2005-03-11
Isotropic Field Probe	Holaday HI-422	95661	2002-05-28	2005-05-28
Antenna Mast	Tait Electronics Ltd	-	-	-

MEASUREMENT PROCEDURE

The 50W mobile was tested in accordance with the following procedure.

Field strength measurements were performed with the antenna centrally mounted on the roof of a representative vehicle (Honda Accord 2001 LXI four door sedan, dimensions 185.5 long, 71.5 wide and 57.1 inches high). See Appendix A for details.

External Field strength readings were recorded at a position 20 cms from the car body, to represent the closest position for a bystander. Measurements were taken at 20 cm intervals vertically over a height of 2 metres.

Internal field strength readings were recorded in the front and back seat locations in the areas where the highest field strength is found.

Measurements were made in an area 40cm wide representing the head and upper and lower torso.

Spatial averaging is carried out to determine the MPE result (IEEE C95.1 3.29).

Roof mounted antenna:

1. Position: 90 degrees to side of car, 20 cms from the body, on a line intersecting the roof antenna position.

'Antenna Location Drawing with Test Locations Identified'



External Test Positions ○

