

Q-MAC ELECTRONICS PTY LTD
TECHNICAL REPORT

DATE: 3 MARCH 1999 REISSUED 25 FEB 2004 WITH REVISED SAFE DISTANCE

TEMPERATURE: 22C

EQUIPMENT UNDER TEST: HF-90 VEHICLE AND PORTABLE
RADIO S/N 1039 TA-90 S/N 1518

TEST EQUIPMENT:
HOLADAY HI – 3002 Broadband Isotropic Field Strength Meter S/N 39236

Calibrated Australian Radiation Lab B007 Due July 1999
Electric Probe STE – 02 S/N 699
Magnetic Probe STH – 02 S/N 391

TEST STANDARD
AS2772.1:1998 Radio Frequency Fields

TEST LIMITS:
AS2772 Occupational Limits 6 minutes average.

<u>FREQ</u>	<u>ELECTRIC FIELD</u>	<u>MAGNETIC FIELD</u>
3740	164 V/m = 2.6×10^4 ESU	0.43 A/m = 0.65 EMU
5058	121 V/m = 1.4×10^4 ESU	0.32 A/m = 0.56 EMU
9326	66 V/m = 4.3×10^3 ESU	0.17 A/m = 0.41 EMU
14662	61 V/m = 3.7×10^3 ESU	0.16 A/m = 0.40 EMU

VEHICLE TEST

HF-90 S/N 1039 with TA-90 and 1.8m helical whip were set up on Land Rover Discovery 9IT 494 and using the electric field probe the limit locus was determined for four operating frequencies.

TEST METHOD

The electric field probe was circled around the antenna at 0m, 0.5m, 1.0m, 1.5m and 2.0m height above antenna base datum whilst the radio was delivering full CW power on the selected frequency.

A radius was established outwith which the limit was never exceeded.

Note that on the surface of a hypothetical cylinder around the antenna the field was found to be fairly constant.

In addition the specified field limits produce the same radius at each frequency.

<u>FREQ</u>	<u>LIMIT</u>	<u>RADIUS</u>
3740	2.6×10^4 ESU	1m
5058	1.4×10^4 ESU	1m
9326	4.3×10^3 ESU	1m
14662	3.7×10^3 ESU	1m

A 1metre safe working distance will be declared for the vehicle mounted antenna system.

BROADBAND ANTENNA TEST:

HF-90 S/N 1039 in a portable configuration with the end fed broadband, was set up in the field and using the electric field probe the limit locus was determined for four operating frequencies.

TEST METHOD

The electric field probe was circled around the horizontally deployed antenna at 5m intervals along its length whilst the radio was delivering full CW power on the selected frequency.

A radius was established outwith which the limit was never exceeded.

Note that the field was so small that the limit was never reached unless the probe was touching the antenna.

In most cases it was not even reached with the probe touching.

This is not very surprising since the antenna has a 1100ohm load box 2/3 of the way along its length and is a traveling wave device producing small local field but by virtue of the very long length producing a satisfactory integrated field at a distance.

A safe working distance of 0.1metre was declared simply to discourage touching of the antenna.

<u>FREQ</u>	<u>LIMIT</u>	<u>RADIUS</u>
3740	2.6×10^4	<0.1m declare 0.2m
5058	1.4×10^4	<0.1m declare 0.2m
9326	4.3×10^3	<0.1m declare 0.2m
14662	3.7×10^3	<0.1m declare 0.2m

NOTE

These safe working distances assume continuous output and are therefore extremely conservative.

The equipment is used for SSB speech and the TX/RX ratio is 10:1, therefore the 6 minute average field exposure (heating equivalent) will be approximately a factor of 50 lower than the limit.

The Magnetic Field readings are not tabled for either antenna since even right next to the antennas the field was 0.005 EMU, two orders of magnitude less than the limit.

WARNING LABELS

The warning labels below will be fitted in designated positions.

Electromagnetic Radiation Exposure warning label for Q-MAC End Fed Broadband Antenna QM7005

Dimensions 30mm x 30mm



Placement Location: On Transformer feedbox of antenna

Electromagnetic Radiation Exposure warning label for Q-MAC Vehicle Whip Antenna QM7131

Dimensions 30mm x 30mm



Placement Location: On Support Insulator of Whip Antenna facing outward

Rod Macduff Technical Director Q-MAC Electronics Pty Ltd