To: Kwok Chan/Joe Dichoso
FCC OET Laboratory

Re: FCC ID AXATR-395-A2
Applicant: Ericsson Inc
Correspondence Reference Number: 12462
731 Confirmation Number: EA96056
Date of Original E-Mail: 03/03/2000

Attached after your correspondence is our reply. It consists of SAR/MPE report and wording we plan to place in the Installation Procedure of the Car Kit's user manual.

If you have any questions, feel free to contact me.

Have a good day.

Jim Sponsler
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919-472-6460

Ericsson, EA 96056 -

1. Please review item # 1 of correspondence 11570. The connector in question is on the back of the PHONE, as indicated in the figure included in the manual submitted for this filing. Figure description indicates it is for connecting to external antennas. Latest reply describes a connector on the back of an auto(mobile) for European configurations. European configurations are not relevant for this FCC filing. Please confirm if any external antenna operating configurations are to be available for the device submitted for this FCC filing. If so, information for satisfying MPE compliance or categorical exclusion is needed for the external antenna configurations (see 2.1091). Installation instructions for satisfying MPE requirements (20 cm or more from persons) should be provided for responsible parties to satisfy compliance, copies of such instructions should be submitted. The cable loss and antenna gain will have an impact on whether any specific mobile operating configurations using external vehicle-mo unted antennas would qualify for the categorical exclusion requirements of 2.1091 or routine MPE evaluation is required.

Note: MPE limits are derived from SAR, however, when different antenna configurations or if high gain antennas are used for mobile operating configurations and the antenna is not installed properly to maintain the needed distance, compliance with MPE requirements may not be assured.

2. FYI - Existing provisions of FCC rules may not allow or support the 30% measurement uncertainty recently discussed by the IEEE SCC-34 committee and its proposals on how to account for measurement uncertainties exceeding certain values. These proposals need to be reviewed, along with necessary supporting information and justifications (that have not been generally available), before the FCC can determine if appropriate actions are necessary, which could require rule making procedures and public comments if existing rules are affected. SAR measurement uncertainty issues will continue to be handled on a case-by-case basis until formal procedures are established. In most cases, other applicants have been routinely using somewhat overestimated tissue parameters and other conservative test parameters to ensure compliance without needing detailed uncertainty analysis.

Prepared (also subject responsible if other)		No.		
RT/EUS/VR/X Mark Douglas 919-472-6334		EUS/VR-00:0590/REP		
Approved	Checked	Date	Rev	File
EUS/VR/X Mark Douglas	MGD	2000-03-17	A	T28 World external

E

Addendum to

"SAR Test Report: T28 World for the 1900 MHz GSM band"

Laboratory: Electromagnetic Near Field and Radio Frequency Dosimetry Laboratory
Ericsson, Inc.
7001 Development Drive, P.O. Box 13969,
Research Triangle Park, NC, 27709, USA

Test Responsible: Mark Douglas, Ph.D.
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Statement of Compliance
Ericsson, Inc. declares under its sole responsibility that the that the product

Ericsson T28 World

to which this declaration relates, is in conformity with the appropriate RF exposure standards, recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report.

Ericsson encourages all feedback, both positive and negative, on this test report.

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1. Introduction

This test report provides additional compliance information for the Ericsson T28 World portable telephone. It is an addendum to report EUS/VR-99:5507/REP, "SAR Test Report: T28 World for the 1900 MHz GSM band." Compliance with RF safety guidelines is demonstrated for the case where an external antenna is plugged into the external antenna port on the back of the device. The antenna has a maximum gain of 3 dBi and a minimum separation distance of 20 cm from the body of the user or nearby persons.

2. Device Description

The table below provides information about the device that is pertinent to the demonstration of compliance.

Device model	T28 World
Mode	1900 GSM
Multiple access scheme	TDMA
Maximum output power setting [1]	30 dBm
Factory tolerance in power setting	± 0.5 dB
Duty cycle	1 / 8
Transmitting frequency range	1850-1910 MHz

Restrictions on the antenna gain and distance to nearby persons are given in the following table.

Maximum allowable antenna gain, G	3.0 dBi
Minimum allowable distance between the antenna and nearby persons, d	20 cm

Due to the operating frequency range of this transmitter, the device is classified under part 24 of title 47 of the Code of Federal Regulations, "Personal Communications Services." When an external antenna is connected to the back of the device, the device is classified as a mobile device according to part 2, section 2.1091, due to the minimum 20 cm separation distance [1]. Therefore, the device must comply with maximum permissible exposure (MPE) limits.

According to section 2.1091, the device is categorically excluded from routine environmental evaluation for RF exposure if the effective radiated power (ERP) is less than 3 watts. The highest-possible ERP of this configuration is provided in the following table (assuming that the antenna is 100% efficient and there are no cable or mismatch losses).

Maximum time-averaged power delivered to the antenna, P_T	21.5 dBm = 141 mW
Effective Isotropic Radiated Power, EIRP	24.5 dBm = 282 mW
Effective (Dipole) Radiated Power, ERP	22.4 dBm = 172 mW

The ERP of this configuration is below 3 watts, indicating that this configuration is categorically excluded from routine environmental evaluation for RF exposure.

[1] Conducted power measured at the antenna port when the device is set to its highest power setting. Measured in the middle of the transmit frequency band.

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3. Determination of Maximum Permissible Exposure (MPE)

It can be easily demonstrated that the configuration specified in this report satisfies MPE limits. Table 1(B) in section 1.1310 of title 47 of the Code of Federal Regulations specifies a maximum power density limit of 1.0 mW/cm^2 at frequencies between 1500 MHz and 100 GHz [2].

An approximate formula for the maximum power density of an antenna is given in IEEE C95.3-1991 [3]. The power density, W, is related to the peak antenna gain, G, the net power delivered to the antenna, P_T, and the distance from the antenna, d, by

$$W = G\,P_T / (4\pi d^2)$$

This equation is appropriate for the radiating near-field and far-field regions of an antenna, and it overestimates the power density in the reactive near-field of an antenna. At a minimum distance of d = 20 cm from the antenna, the maximum power density equates to W = 0.056 mW/cm^2. This is below the 1.0 mW/cm^2 limit.

The configuration specified in this report therefore complies with the appropriate exposure limits.

References

[1] FCC Code of Federal Regulations, 47CFR2.1091, Federal Communications Commission (FCC), October, 1998.

[2] FCC Code of Federal Regulations, 47CFR2.1310, Federal Communications Commission (FCC), October, 1998.

[3] IEEE C95.3-1991, “IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave”, The Institute of Electrical and Electronics Engineers Inc., New York, 1991.

The below text will be included under the 'Installation Procedure' section of the car kit manual. It will replace the third paragraph on page 4. A copy of page 4 is included for your reference.

We recommend that you use an external antenna for best reception. For advice on which antenna to use and for professional installation, please refer to your local car dealer*. The external antenna shall have a gain of 3.0dBi maximum and be installed 20cm (8 inches) minimum from any persons in the vehicle.* Some car manufacturers require that you use an external antenna for your mobile telephone, please consult your car manual. *We recommend installation be performed by the auto manufacturer to ensure compliance with RF exposure requirements and interfere with the operation of the vehicle.*

INSTALLATION PROCEDURE

Note! *Always have your handsfree unit, antenna and cables installed by qualified personnel.*

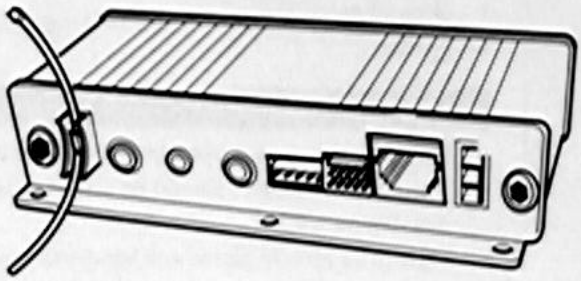
The installation chart on page 90 shows connections and recommended locations for all parts of the handsfree equipment, as well as additional accessories.

We recommend that you use an external antenna for best reception. For advice on which antenna to use and for professional installation, please refer to your local car dealer. Some car manufacturers require that you use an external antenna for your mobile telephone, please consult your car manual.

The holder should be placed so that you can see the display and reach the keys from your normal driving position. However, it should not interfere with the operation of the vehicle, block the driver's view, or distract the driver.

General

1. Mount the electronics unit behind the instrument panel or under the passenger seat. Use the screws delivered with the equipment to mount the electronics unit by the fastening device.



2. The loudspeaker should be mounted on a fixed part of the car interior, e.g. on the wall in the foot space at the passenger side. Connect the loudspeaker to terminal B on the electronics unit.
3. The microphone should be mounted on a fixed part of the car interior. It should be mounted as close to the speaker's mouth as possible and be directed towards him. The distance between the loudspeaker and the microphone should be at least 50 cm. Connect the microphone to terminal D on the electronics unit.

Note! *Do not mount the microphone on the sun visor. Vibrations will cause echoing. You will get the best conditions if you mount the microphone close to the rearview mirror, see installation chart on page 90.*

4. Your handsfree equipment also includes a music mute cable. The cable should be connected to terminal E on the electronics unit. For instructions on how to connect the cable to your car stereo, see your car stereo manual.

We recommend that you use an external antenna for best reception. For advice on which antenna to use and for professional installation, please refer to your local car dealer. *The external antenna shall have a gain of 3.0dBi maximum and be installed 20cm (8 inches) minimum from any persons in the vehicle.* Some car manufacturers require that you use an external antenna for your mobile telephone, please consult your car manual. *We recommend installation be performed by the auto manufacturer to ensure compliance with RF exposure requirements and interfere with the operation of the vehicle.*