

January 21, 2000

RESPONSE TO SAR QUESTIONS
(Correspondence Reference Number: 11299)

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, Maryland 21046

Re: Application for Cellular/PCS Transceiver Certification (EA95728)

Kwok Chan & Errol Chang:

Purpose:

This document responds to Correspondence Reference Number 11299, SAR questions on the IHDT5ZX1 (EA95728) application.

Description:

To facilitate the response to SAR questions, the following includes the original text and the highlighted response. In addition to this document the following exhibits were submitted:

- Draft copy of a revised User's manual (refer to user manual exhibit 8b).
- Draft copy of the Installation manual (refer to user manual exhibit 8c)
- Complete SAR report for the "carry phone" application. (uploaded into RF exposure folder)

Re:	FCC ID IHDT5ZX1	
Applicant:		Motorola Inc
Correspondence Reference Number:	11358	
731 Confirmation Number:		EA95728
Date of Original E-Mail:	01/06/2000	

1. FYI - This filing is quite similar to another pending Motorola filing EA 95622. Motorola may want to review comments in both filings.

Response:

Yes, reply comments are similar to those submitted on 1/24/00 for EA95622.

2. This filing is requesting 3.0 W conducted output, based on measurements. The RF exposure information exhibit is indicating a maximum output of 3.8 W. The discrepancy needs to be resolved.

RESPONSE:

The 3.8 W is the maximum that a transceiver can produce. The product is actually phased at 3.0 W. To ensure absolute worst case MPE evaluation, calculations assume 3.1 Watts conducted power.

3. "Transmitter Operation Description" section of exhibit 12, Technical Descriptions paragraph, indicates the entire transmitter is capable of 6.3 W of maximum output. Previous section, "Description", indicates the transmitter is designed to be used with a 3 dB gain roof (vehicle) mounted antenna with 3 W maximum output (less than 6 W EIRP). The RF exposure information exhibit is indicating a maximum EIRP of 5.0 W with 1.2 dB of combined antenna gain and cable loss (no specific antenna gain specified, but implying a minimum of 1.8 dB cable loss). Please clarify discrepancies.

RESPONSE:

The 6.3 Watt level refers to the maximum power that the transmit section (PA device) of the transceiver can produce. Losses between this point and the antenna port are 2.65 dB. This leaves about 0.5 dB headroom to ensure that the transceiver can be "phased" for 3.0 W at the antenna port. The antenna installation guidelines chart includes combination line loss and antenna gain which apply to all installations.

4. At higher than 1.5 W ERP (2.46 W EIRP), this transmitter is not categorically excluded from routine MPE evaluation for demonstrating compliance. The "Technical Description" section has already defined the design of this transmitter is for used with a 3 dB gain roof-mount antenna for vehicle operations. The normal operating conditions for evaluating RF exposure with respect to MPE limits, in this case, would be the intended 3 dBi antenna(s) over a metal ground plane. The following alternatives may be considered -

(a) Applicant demonstrates MPE compliance with respect to the type(s) of antennas intended for this transmitter for supporting worst case exposure conditions. Depending on the final information supplied and whether clearly defined installation requirements are provided to installers, we may need to include the minimum cable loss, maximum antenna gain, antenna types and lengths (or ones tested) on the grant for purposes of satisfying MPE requirements. Antennas with substantially equivalent performance and physical constructions will be allowed.

(b) The applicant specifically requests for an exclusion from routine MPE evaluation with supporting reasons - usually due to transmitter configuration(s) that cannot be properly tested because of technical reasons and difficulties or other factors that will result in RF exposure conditions substantially lower than the applicable limits. In such cases, worst case estimates may be considered according to maximum output power, feasibility of the intended installation and operating requirements for satisfying MPE compliance, maximum antenna gain, antenna type, antenna length that may affect exposure conditions and associated cable losses etc. These similar requirements will be considered as grant conditions for satisfying compliance.

(c) The provided manual information indicates this transmitter is intended for installation on vehicles. If the intended type(s) or category of antennas are known, it would be easier to perform MPE for demonstrating compliance, which will most likely result in less restrictive grant conditions. If there is supporting information to demonstrate it can qualify for an exclusion from routine MPE evaluation due to technical reasons, more restrictive installation and operating conditions are likely for the grant.

RESPONSE:

Motorola reviewed all eleven vehicle installation scenarios currently planned by the OEM automobile manufacturer. In these installations, line loss varied from 6.8 to 9.1 dB. Antennas are typically unity gain (1.5 dB) $\frac{1}{4}$ wave ground planes, combination antennas, or low gain patch antennas. To accommodate the FCC RF exposure guidelines, for all of these installations and future installation scenarios, Motorola provides an antenna installation guideline chart. This chart indicates the recommended distance between the user and all nearby persons, and the antenna for various antenna gain and line loss situations. Please refer to Exhibit 8C page 33 of the draft copy of the installation manual. This information is also included in the response to question 5.

Motorola also intends to market this product in a carry phone application. A complete SAR report was submitted into the RF Exposure folder. In addition, a revised users manual was submitted. Please refer to page 7 of Exhibit 8b for RF exposure information.

5. The 30 cm separation distance proposed in the installation statement - IMPORTANT ... should include both users and nearby persons, please revise accordingly after taking above issues into consideration.

RESPONSE:

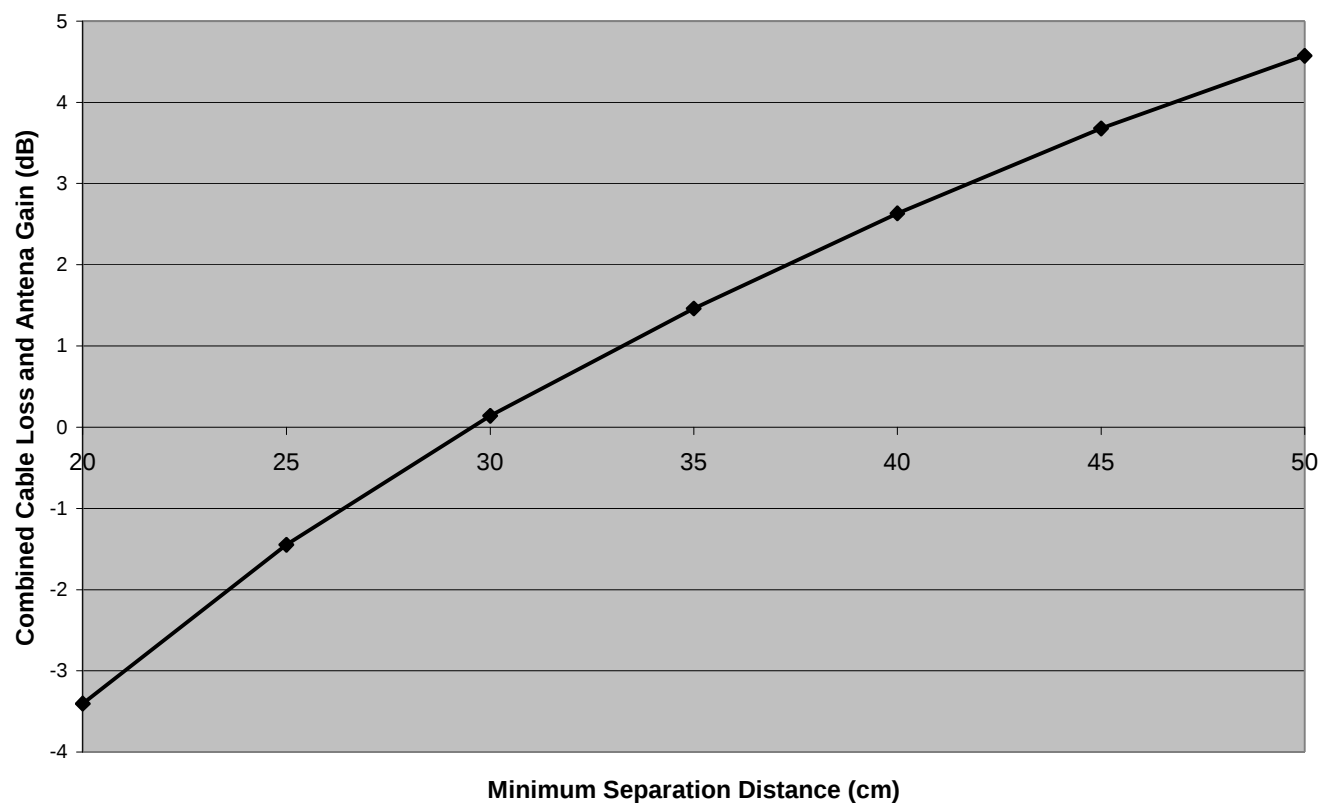
A new installation statement (identical to the one in EA95622) is included in the users manual (page 7 of Exhibit 8b). This statement follows:

ANTENNA INSTALLATION

IMPORTANT:

To meet the FCC's RF Exposure Guidelines, the antenna should be installed to ensure a minimum distance between the body of the user and nearby persons and the antenna. To determine the minimum distance, calculate the combined cable loss and antenna gain and refer to the graph below to identify the required minimum separation distance in centimeters.

Combined Cable Loss and Antenna Gain vs. Minimum Separation Distance



6. The proposed installation requirement calls for 30 cm separation but the users manual is indicating 4 inches (10 cm) separation. Please clarify and revise accordingly.

Response:
 Installation information for the mobile application is provided on page 33 of Exhibit 8c (Installation guide). This information is based on an MPE evaluation.

Separation distance for the carry phone application is based on an SAR measurement. Page 7 of the users manual (Exhibit 8b) contains information for both uses of the IHDT5ZX1.

7. If this is a user installable unit, more detailed installation instructions and requirements should be described in the appropriate manuals for users to maintain the minimum separation distance between the antenna and persons to ensure compliance. The instructions should include maximum allowable antenna gain, minimum cable loss and other installation factors that could potentially affect MPE compliance.

Response:

Yes, installer information includes a chart which specifies MPE compliance with all antenna and cable loss installation combinations. Please refer to page 33 of the Installation guide (Exhibit 8c).

Note: The above is based on the RF exposure aspect of the applications only. Additional information may be requested when the main review occurs at later date.

Contact Information:

Thank you for this special consideration. Please contact me by telephone at (847) 523-6167, by facsimile at (847) 523-2350, or by e-mail (A.Bachler@motorola.com), if there are questions or additional information needed concerning this filing.

Regards,

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