

January 19, 2000

## RESPONSE TO SAR QUESTIONS

(Based on 1/14/00 Submission)

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

Re: Amended Application for Cellular/PCS Transceiver Certification (EA96222)

Kwok Chan & Frank Coperich:

**Purpose:**

This document responds to SAR questions on the 1/14/00 submission for IHDT56ZZ1 (EA96222).

**Description:**

To facilitate the response to SAR questions, the following includes the original text and the highlighted response. An additional graphic (plot) is included at the end of this document.

Frank:

Motorola, EA 96222 -

The following are based on the supplemental SAR report submitted on 1/14/00 as a result of changes in radiated output for this device.

1. Please clarify if the device described in the supplemental SAR report (the one with a black housing with higher radiated output) replaces the original SAR report originally submitted with a different housing that has lower radiated output or if both units are intended for this filing. The cover letter submitted on 1/14/00 indicates the body-worn accessories, a normal and a slim holster/belt-clip, should be deleted because the unit with the black housing cannot use those two previously tested holster and a third holster accessory is provided with this later unit with the black housing. If the original two holsters are to be deleted, the original unit would have no holsters, please clarify. The supplemental SAR report has included body-worn SAR data for two belt-clips/holsters, a normal and a slim belt-clip/holster. The slim belt-clip looks similar to the one tested previously but the normal belt-clip appears to look a different than that previously tested. Please identify the total number of belt-clips/holsters tested and which ones are for which device/housing etc.

**RESPONSE:**

FCC Type IHDT56ZZ1 will be marketed with two external housings. Three holsters/belt clips are identified with the product. Each housing type can use a unique holster, and the two housings can share a belt clip design. The shared belt clip was tested with both housings. In addition, each housing was tested with its unique holster.

The higher radiated output applies to the IHDT56ZZ1 product. (The same component values changes were made to the identical circuit board used in both housings.) Since the SAR report submitted on 1/14/00 represents the worst case SAR, it actually replaces the previous SAR report. However, the unique holster tested in the earlier submission STILL needs to be specified in the users manual.

**SUMMARY:**

- A) IHDT56ZZ1 is identical electronics in two very similar housings.
- B) SAR report submitted on 1/14/00 represents the worst case.
- C) All three belt clips/holsters were tested and need to be identified in the users manual.

2. FYI - standards committees such as the SCC-34 are currently proposing 5% tolerance for tissue dielectric parameters. It is generally assumed that higher conductivity and lower dielectric constant tend to overestimate SAR. However, if the tissue parameters used during SAR tests vary substantially from those used in calibrating the E-field probe and the measured SAR is quite close to the limit, extensive uncertainty analysis may be needed to support the measurement procedures for determining compliance. For head SAR, which is below 1.0 W/kg; there is sufficient SAR margin to absorb tissue parameter tolerances for the current filing, therefore, no need to respond. For body-worn SAR, the muscle parameter variations are mainly in the PCS band. Since PCS band has lower SAR than AMPS and parameters for AMPS mode are O.K., additional responses are not requested.

FYI for future applications .

3. FYI - Descriptions in section 8 of SAR report indicates maximum SAR is on right side of head but actual data is indicating left side of the head; appears to be a typo carried over from a previous report.

FYI for future applications .

4. FYI - For future filings, SAR contours plots should reveal the entire peak SAR location to avoid any indications of whether the SAR measurement regions might have been terminated abruptly without taking the entire peak SAR location into account. In some situations if the peak SAR is along the side wall of a phantom, separate SAR measurements may be needed to capture the entire peak region for determining 1-g SAR.

FYI for future applications .

5. Based on responses for item #1 above for the belt-clips and holsters, please confirm if the earlier proposed 1 inch separation in the operators manual remains valid for all body-worn configurations. Note: body-worn SAR for the two holsters tested previously have maximum SAR with antenna retracted but the two holsters tested using the unit with black housing has maximum SAR with antenna extended. Please identify the peak SAR location with respect to the device, holster and antenna configurations for the two holsters tested for the unit with the black housing.

#### **RESPONSE:**

For the "slim" belt clip tested, the distance from the antenna to the flat phantom is slightly less than 1 inch. Since this is the closer of the two belt clip styles, and the tested distance is actually less than recommended in the users manual, the SAR at 1 inch will be less than the measured value. Therefore the 1 inch separation distance in the users manual remains valid.

The location of peak SAR for the body worn conditions is near the top of the phone, which is also just below the base of the antenna. All future filings will show a contour plot overlaid on a phone outline for the highest body worn condition.

6. Please confirm that all peak SAR locations have been accounted for during the 1-g averaging procedures for PCS band - maximum SAR is 1.53 W/kg and that particular SAR contour plot has been terminated with a portion of the peak SAR location missing from that plot. That is, problem is in the plot, not in the actual SAR measurement.

#### **RESPONSE:**

The supplied coarse scan contour plot shows the peak SAR location to be at the edge of the scan area. However, the Dasy plot also does not show an asterisk by the 1g average, indicating that the Dasy software was able to perform a proper 1g average. The attached cube scan contour plot of the same scan shows a capture of the peak SAR location. The supplied coarse scan contour plot shows the scan area to be terminated due to the physical boundary of the head phantom in the region of the nose. In

this region the phantom curves away from the phone and thus SAR values beyond the scan area should drop.

7. Muscle dielectric parameters were indicated on only one of the body-worn SAR plots. The rest are indicating brain equivalent parameters, please clarify. The muscle parameters described in the SAR report do not match those muscle or brain values indicated on the plots (variation for PCS is only minor, discrepancies are mainly for 800 MHz band).

**RESPONSE:**

The dielectric values indicated on the plots are the values actually used for the measurements. Unfortunately the conductivity used for some of the body worn 800 MHz measurements is below what is required for muscle simulant. However, the increase in conductivity for using muscle simulant will result in a change to the body worn SAR values, but should not result in a compliance problem since there is a large margin to the standard for these test conditions. Also note that the "slim belt clip" measurement that has the highest overall SAR value, was measured with the proper muscle simulant parameters.

Note: Output is 550 mW ERP for AMPS, 310 mW ERP for Part 22 CDMA and 490 mW EIRP for PCS. Suggested grant comments - Output is ERP for Part 22 and EIRP for Part 24. SAR compliance for body-worn operations is limited to a "normal" and a "slim" holster/belt-clip, as tested and described in the filing, to provide 1 inch or more separation between the device, including its antenna, and a person's body (need revision based on belt-clip response)

Kwok Chan

**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](mailto:A.Bachler@motorola.com)), if there are questions or additional information needed concerning this filing.

Regards,

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01/11/00

## s/n FCD844C2

Ch 600/ Pwr 02/ Antenna Extended

Clyde (left) Phantom; Left Head Section; Position: (80°,180°); Frequency: 1880 MHz

Probe: ET3DV4 - SN1011; ConvF(4.86,4.86,4.86); Crest factor: 1.0; Brain 1900 MHz:  $\sigma = 1.85$  mho/m  $\epsilon_r = 42.1$   $\rho = 1.00$  g/cm<sup>3</sup>

Cube 5x5x7: SAR (1g): 1.53 mW/g, SAR (10g): 0.798 mW/g, (Worst-case extrapolation)

Cube 5x5x7: Dx = 8.0, Dy = 8.0, Dz = 5.0

Penetration depth: 13.1 (11.6, 14.4) [mm]

Powerdrift: 0.25 dB

