



8th September 2004

Mr. Steven Dayhoff
Authorization & Evaluation Division
Federal Communications Commission Laboratory
7435 Oakland Mills Road
Columbia, MD 21046

Re: Form 731 Confirmation Number: EA144669 with FCC ID: AZ492FT3808

Dear Mr. Dayhoff;

Motorola Inc., 8000 West Sunrise Boulevard, Fort Lauderdale, Florida, herein submits its response to the 13^h August 2004 for information in Correspondence Number 27381.

- Q1) Section 6.1.1 first paragraph does not mention the configurations that are first used prior to the measurements in the second paragraph. Also, please double check the accuracy of the distances stated in the note of the second paragraph. Update as appropriate.
- R1) Each ½ wave antenna was positioned on the center of the trunk and tested at the center frequency for the following three by-stander positions: 1) directly behind the vehicle, 2) off the corner of the trunk (45 degrees from position 1) and 3) the side of the trunk (90 degrees from position 1). The position which presented the highest MPE result was then used to test the band edges.
- The distances noted in section 6.1.1 page 7 are correct and agree with Appendix A on page 40.
- Q2) Please include information on evaluated antennas for selection purposes in the user instructions.
- R2) The Installation Manual (See Exhibit 8c, page iii) requires use of only approved antennas and contains a web page link to view the list. The approved antennas are those evaluated and reported on in the MPE/SAR report as part of this submission package.
- Q3) Installation instructions consistent with the RF exposure evaluation could not be located. Please provide.
- R3) Installation instructions are now attached. See Exhibit 8c.
- Q4) Please detail the duty factor and signal characteristics for the data mode of the radio.
- R4) The duty cycle varies depending on the loading of the system. The data mode is packet based with the maximum packet size of 1500 bytes. The duty cycle

will always be less than 10 % because of the system design restrictions and the normal operating parameters of the radio. The radio and system in which it operates on is never intended to allow a streaming data mode. The standard APCO signaling as specified in TIA/EIA 102.CAAA paragraph 1.3.3.5 with C4FM modulation is utilized.

- Q5) Please provide an additional summary table showing partial body MPE averaged over the upper half of the body for the roof top configurations.
- R5) The highest MPE result (pg 43, table 55) at the roof was re-evaluated using SAR simulations. The SAR simulation result (Appendix D, pg 5, table II) supports compliance for 1g of tissue and whole body SAR averages. During the conference call on 8/26 the FCC agreed to consider the SAR simulations as an alternative to partial body averaging.
- Q6) Please provide details of each of the SAR scans made; include contours and calculation string to obtain the final reported values.
- R6) Scan details: the number of reported scans was increased to include all the conditions that produced peak 1-g or whole body average SAR, passenger or bystander exposure, trunk or roof antenna mount location. Therefore a total of eight scans are reported. Two of them (Fig. 4) coincide because the same exposure condition produced peak 1-g and whole body average SAR.

Calculation string: the SAR is computed and averaged by XFDTD according to the method illustrated in the appendix titled "specific information for SAR computations". In that appendix, point 9a recites "The twelve E-field phasors at the edges of each Yee voxel are combined to yield the SAR associated to that voxel. In particular, the average is performed on the SAR values computed at the 12 edges of each voxel. Notice that in XFDTD™ the dielectric tissue properties are assigned to the voxel edges, thereby allowing said averaging procedure." Point 10a recites "XFDTD™ computes the Specific Absorption Rate (SAR) in each complete cell containing lossy dielectric material and with a non-zero material density. To be considered a complete cell, the twelve cell edges must belong to lossy dielectric materials. The averaging calculation uses an interpolation scheme for finding the averages. Cubical spaces centered on a cell are formed and the mass and average SAR of the sample cubes are found. The size of the sample cubes increases until the total mass of the enclosed exceeds either 1 or 10 grams. The mass and average SAR value of each cube is saved and used to interpolate the average SAR values at either 1 or 10 grams. The interpolation is performed using two methods (polynomial fit and rational function fit) and the one with the lowest error is chosen. The sample cube must meet some conditions to be considered valid. The cube may contain some non-tissue cells, but some checks are performed on the distribution of the non-tissue cells. A valid cube will not contain an entire side or corner of non-tissue cells." Point 12b recites "The input impedance and the total power radiated under the impedance match conditions that occur at the test frequency are provided by XFDTD™. XFDTD™ computes the input impedance by following the method outlined in [8], which consists in performing the integration of the steady-state magnetic field around the feed point edge to compute the steady-state feed point current (I), which is then used to divide the feed-gap steady-state voltage (V). The net rms radiated power is computed as

$$P_{XFDTD} = \frac{1}{2} \text{Re}\{VI^*\}$$

Both the input impedance and the net rms radiated power are provided by XFDTD™ at the end of each individual simulation.”

- Q7) Appendix title "specific information for SAR computations" mention that the vehicle used perfect conductors. Please detail how the passenger seats were handled. Passenger seats are typically not conductive.
- R7) To further clarify how the passenger seats were handled for the SAR computational assessments, page 18 of Appendix D was revised as follows: “The car model is constituted by perfect electric conductor” and “The passenger model is surrounded by air, as the seat, which is made out of poorly conductive fabrics, is not included in the computational model.”
- Q8) Appendix title "specific information for SAR computations" mentioned that the antenna was modeled with a 1 mm radius wire. Please justify since the antenna photographed appear to be much larger.
- R8) The Appendix titled "specific information for SAR computations" reports that “The voxel size in all our simulations was 5 mm, and the antenna radius is always at least 1 mm (1 mm for the short quarter-wave antennas and 1.5 mm for the long gain antennas), so there was no need to specify a “thin wire” material”. The pictures show the HAD4009A antenna, which has a radius of about 1 mm. Page 12 of Appendix D was revised with the following sentence: “Because the field impinges on the bystander or passenger model at a distance of several tens of voxels from the antenna, the details of antenna wire modeling are not expected to have significant impact on the exposure level.”
- Q9) Appendix title "specific information for SAR computations" mentioned that modeled and measured free space values were compared. Measured values could not be located. How were positions of both measurement and modeling controlled/determined. Please provide additional details of both measurement and computation to allow thorough comparison.
- R9) The measured MPE values were presented in the MPE report filed for FCC ID# ABZ99FT3046. Page 18 of Appendix D was revised to add the following statement: “The corresponding MPE measurements are reported in the compliance report relative to FCC ID#ABZ99FT3046.” Two graphs comparing the measured and simulated fields were also included on page 19 of the Appendix.
- Q10) Please confirm that 20 cm spacing to vehicle was worst case for MPE measurements. Were scans made at other distances to verify?
- R10) Distances greater than 20cm from the vehicle would decrease MPE results therefore measurements at greater distances are not necessary. IEEE std C95.1 recommends not making measurements of less than 20cm from a re-radiating object.

- Q11) Please explain how MPE is determined from E and or H field measurements for comparison to limits. Power density appears to be determined for comparison. How is power density determined?
- R11) The Narda probes both measure E and H fields in percent of power density (mW/cm^2). Both by-stander and passenger configurations are assessed by taking 10 or 3 measurements respectively and then averaged. A 50% duty cycle is then applied to the average. In some cases additional scaling is done but only when the initial power is less than maximum power. These calculations are listed in section 11.1.
The final or power density max calc is then compared to the power density MPE for uncontrolled environments in accordance in IEEE Std. C95.1

Contact me at (954) 723-5793 if you require any additional information.

Sincerely,
/s/ Mike Ramnath (signed)
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Email: Mike.Ramnath@motorola.com