



MR. Tim Harrington  
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Federal Communications Commission Laboratory  
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Re: Form 731 Confirmation Number: EA596600 with FCC ID ABZ99FT4080

Motorola Inc., 1301 East Algonquin Rd, Schaumburg, IL 60196, herein submits its response to the 1st June 2006 request for information in Correspondence Number 31020.

Q1) RF exposure (RFx) and other exhibits refer to the following various antennas:

HAE4002A (403-430MHz 1/4 wave roof mount antenna; 0dBd gain) HAE4003A (450-470MHz 1/4 wave roof mount antenna; 0dBd gain) HAE4010A (406-420MHz 5/8 wave roof mount antenna; 3.5dBd gain) HAE4011A (450-470MHz 5/8 wave roof mount antenna; 3.5dBd gain) RAE4004A (445-470MHz 5/8 wave roof mount antenna; 5dBd gain) HAD4003A

HAE4002\_  
HAE4003\_  
HAE4010\_  
HAE4011\_  
RAE4004\_RB

Q1a) Please explain differences, and which are covered by this filing and how, or give pointer to within filing if such summary is already there.

R1) There are different models depending on the frequency and the gain required by the customer. HAE4002A and HAE4003A are 1/4 wave antennas with 0 dBd gain but HAE4002A's frequency range is 403 to 430 MHz and HAE4003's frequency range is 450 to 470 MHz. HAE4010A and HAE4011A are 3.5 dBd gain antennas but HAE4010A's frequency range is 406 to 420 MHz and HAE4011A's frequency range is 450 to 470 MHz. RAE4004A is a 5 dBd gain antenna that covers the frequency range from 445 to 470 MHz.

In the User's guide, the antennas are referenced without the suffix (in this case "A") because the antenna could be up-issued and the User Manual not have the latest antenna model number information.

The actual antennas that were tested in the MPE report were the "A" version which is the current version available.

Q1b) Please explain why these are tested as trunk-mount when various exhibits in filing list these as roof-mount.

R1b) The description of the antennas is roof-mount but the antennas can also be installed as trunk-mount. That is why they are tested in both cases.

Q2) Max. output power requested on form 731 and shown in (EMC) Test Report exhibit is 48 W. Per OET/Lab typical practice, power listed on form 731 line item is as shown in test report. FYI we will include a condition on grant that 48 W is the maximum output at the 20-percent above nominal rated output (40 W) as in 90.205(r).

R2) Yes, the advertised power of the radio is 40W but as you indicate, the maximum power is 20% above the rated output power which is 48W, so that's where the radio was tested at.

We prefer the FCC lists the maximum power as 48W on the Grant.

Q3) MPE report 6.1.1 says:

"MPE measurements ... for each of the (4) test positions ..."

We assume "test positions" here is what appear to be designated "Test Locations" in Appdx A figures - correct?

Also "test positions" here is different from "Test Position" of data Tables 1-62 - correct?

R3) Yes, the "test positions" in section 6.1.1 and "Test Locations" in Appendix A are one and the same.

Section 6.1.1 is for trunk mount antennas only and therefore only consists of 3 test locations; 1) directly behind the vehicle, 2) diagonal off the trunk referenced as 45 degree radial in section 6.1.1, 3) along side of the vehicle trunk referenced as 90 degree radial in section 6.1.1. Section 6.1.1 and 6.2.1 have been revised with "test location" for consistency with Appendix A. Additionally Appendix A has been revised to clearly distinguish between the roof mount by-stander test location and the trunk mount by-stander test locations.

Yes, the "test positions" in 6.1.1 are different than the test positions listed in tables 1-62. 6.1.1 refers to the by-stander test locations where "test positions" in tables 1-62 refers to the 1-10 test or measurement positions along the 2m vertical line. An alternative to "Test Positions" for the table is being considered for future reports.

Q4) MPE report 6.2.1 says:

"MPE measurements ... for each of the (4) test positions ..."

As described here, this could be construed to indicate MPE tests were done for 5 antennas, at lo/mid/hi freqs per antenna, at 1 installation-location, at 4 test-locations =  $5 \times 3 \times 1 \times 4 = 60$  bystander MPE data sets.

However summary table in 11.0 of MPE report only shows 18 roof-mount MPE bystander data sets - please explain difference, and revise if appropriate.

R4) Section 6.2 is specifically for roof mount test configurations. Section 6.2.1 explains the by-stander test location, which is 1 not 4. The MPE report has been revised to reflect the single by-stander test location both in section 6.2.1 and Appendix A. This is consistent with the summary table in section 11.0.

R5) MPE report 6.1.1 says:

"MPE measurements ... for each of the (4) test positions ..."

and

"Each of the offered antennas mounted at the center of the trunk were assessed at the rear of the vehicle ... The worst case antenna was then tested at a 45° radial at the corner of the trunk, and 90° radial at the side of the trunk."

As described here, this could be construed to indicate MPE tests were done for 5 antennas, at lo/mid/hi freqs per antenna, at 1 installation-location, at 4 test-locations =  $5 \times 3 \times 1 \times 4 = 60$  bystander MPE data sets.

However summary table in 11.0 of MPE report only shows 20 trunk-mount MPE bystander data sets - please explain difference, and revise if appropriate.

A5) Section 6.1 is specifically for trunk mount test configurations. Section 6.1.1 explains the by-stander test locations, which is 3 not 4. The MPE report has been revised to reflect the 3 test locations for by-stander in both section 6.1.1 and Appendix A. All antennas were assessed directly behind the vehicle and the antenna which provided the highest MPE result was then tested at the 45 and 90 degree radials. This is consistent with the summary table in section 11.0.

R6) MPE report 6.1.1 says:

"MPE measurements ... for each of the (4) test positions ... at the test distance of 90cm from the antenna under test."

This appears to contradict where 6.1.1 later says:

"the distance from the trunk-mounted antenna to the edge of the vehicle is 26cm and the distance from the edge of the vehicle's trunk to the MPE vertical line assessment is 34cm" - which gives 50 cm.

Please explain rationale to say antenna-to-test-location spacing is 90 cm, and revise description or re-test if appropriate.

A6) The distance from the edges of the vehicle's trunk to the MPE vertical line assessment is 64cm not 34cm. Section 6.1.1's note has been revised in the MPE report.

Q7) MPE report 6.1.1 says:

"MPE measurements ... for each of the (4) test positions ... at the test distance of 90cm from the antenna under test."

This appears to contradict where 6.1.1 later says:

"The radial distance measured at 45° from corner of trunk to vertical test line is 99.5cm"

Please explain rationale to say antenna-to-test-location spacing is 90 cm, and revise description if appropriate.

R7) Section 6.1.1 states that the antennas assessed at the rear of the vehicle included a 20cm separation distance between the probe sensor and vehicle body, which is consistent with recommendation by IEEE/ANSI std C95.3-2002. IEEE/ANSI std C95.3-2002 recommends a 20cm separation distance between the RF probe and a reradiating source. This same 20cm separation distance is applied to 45 degree radial and is therefore included in 99.5cm distance. Appendix A identifies both the 99.5cm and 20cm distances. The 99.5cm is the closest distance that can be achieved at the 45 degree radial for MPE compliance assessment.

Q8) MPE report 6.1.1 says:

"MPE measurements ... for each of the (4) test positions ... at the test distance of 90cm from the antenna under test."

This appears to contradict where 6.1.1 later says:

"The radial distance measured at 90° from the side of the trunk is 104cm."

Please explain rationale to say antenna-to-test-location spacing is 90 cm, and revise description if appropriate.

R8) Section 6.1.1 states that the antennas assessed at the rear of the vehicle included a 20cm separation distance between the probe sensor and vehicle body, which is consistent with recommendation by IEEE/ANSI std C95.3-2002. IEEE/ANSI std C95.3-2002 recommends a 20cm separation distance between the RF probe and a reradiating source. This same 20cm separation distance is applied the 90 degree radial and is therefore included in 104cm distance. Appendix A identifies both the 104cm and 20cm distances. The 104cm is the closest distance that can be achieved at the 90 degree radial for MPE compliance assessment.

Q9) MPE report 6.1.1 says:

"Each of the offered antennas mounted at the center of the trunk were assessed at the rear of the vehicle while maintaining a twenty (20) centimeter separation distance between the probe sensor and vehicle body."

This appears to contradict where 6.1.1 later says:

"the distance from the trunk-mounted antenna to the edge of the vehicle is 26cm and the distance from the edge of the vehicle's trunk to the MPE vertical line assessment is 34cm ..."

Please explain rationale to say vehicle-to-test-location spacing is 20 cm, and revise description or re-test if appropriate.

R9) Section 6.1.1 states that the test distance is 90cm from the AUT. Section 6.1.1 then states the antennas "were assessed at the rear of the vehicle while maintaining a twenty (20) centimeter separation distance between the probe sensor and vehicle body." Again the 20cm is a recommended separation distance between the RF probe and a reradiating source by IEEE/ANSI std C95.3-2002. The note at the end of section 6.1.1 has been revised, which is consistent with Appendix A and included below.

**"Note: the distance from the trunk-mounted antenna to the edge of the vehicle is 26cm and the distance from the edge of the vehicle's trunk to the MPE vertical line assessment is 64cm (trunk to edge of bumper is 10cm)."**

Q7) MPE report 6.2.1 says:

"MPE measurements ... for each of the (4) test positions ... at the test distance of 90cm from the antenna under test."

This appears to contradict where 6.2.1 later says:

"Actual test distance was 110cm"

Please explain rationale to say antenna-to-test-location spacing is 90 cm, and revise description if appropriate.

R7) Section 6.2 is specifically for roof mount test configurations. Section 6.2.1 explains the by-stander test location, which is 1 not 4. The MPE report has been revised to reflect the single by-stander test location both in section 6.2.1 and Appendix A. The note in section 6.2 is below and again the 20cm is a recommended separation distance between the RF probe and a reradiating source by IEEE/ANSI std C95.3-2002.

**"Note: Actual test distance was 110cm (60cm from antenna to roof edge; 30cm from roof edge to edge of car door; 20cm vertical test line to car door); this is the closest distance that can be achieved to an antenna**

**mounted to the center of the vehicle used for MPE compliance assessment.”**

Q8) Appdx D Table 1 refers to MPE tables 1-4.

However summary table in 11.0 of MPE report shows MPE tables 8, 10 as positions where MPE limit is exceeded. Please confirm which MPE configurations were simulated.

A8) Appendix D table 1 has been revised to reflect the table numbers listed in the summary table in section 11.0.

Please contact me at (847) 538-2230 if you require any additional information.

Sincerely,

**/s/ Larry D. Larsen (signed)**

Engineering Section Manager

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