

**MOTOROLA SOLUTIONS**

TESTING CERT # 2518.01

DECLARATION OF COMPLIANCE: MPE/SAR ASSESSMENT

EME Test Laboratory
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Date(s) Tested: 8/24/2011- 8/31/2011; 11/2/2011 - 11/10/2011
Manufacturer/Location: Motorola Solutions, Penang
Date submitted for test: 7/27/2011
DUT Description: VHF, 136-174 MHz, 25-45W, radio with internal GPS and Bluetooth.
Test TX mode(s): CW
Max. Power output: 54W (VHF); 10mW (Bluetooth)
TX Frequency Bands: 136-174 MHz (VHF); 2.402-2.480 GHz (Bluetooth)
Signaling type: FM, and TDMA 1:2, FHSS(BT)
Model(s) Tested: PMUD2567A
Model(s) Certified: PMUD2567A
Serial Number(s): 511TMM0378
Classification: Occupational/Controlled Environment
FCC ID: ABZ99FT3087
Part 90 VHF (150.8-173.4MHz)
Results outside FCC bands are not applicable for FCC compliance demonstration.
IC: 109AB-99FT3087
IC band: VHF (138-174MHz)
Results outside IC bands are not applicable for IC compliance demonstration.

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 3.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola Solutions Inc. EME Laboratory.

I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements.

This reporting format is consistent with the suggested guidelines of the TIA TSB-159 April 2006

The results and statements contained in this report pertain only to the device(s) evaluated herein.

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Approval Date: *11/17/2011*

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mw 11/11/11

Document Revision History

Date	Revision	Comments
11/16/2011	O	Initial release

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1.0 Introduction

This report details the test setup, test equipment and test results of Maximum Permissible Exposure (MPE) performed at Motorola Solutions' outside test site and Specific Absorption Rate (SAR) simulations for product model PMUD2567A.

2.0 Abbreviations / Definitions

BS: Bystander
BT: Bluetooth
4FSK: 4-Level Frequency Shift Keying
CNR: Calibration Not Required
CW: Continuous Wave
DUT: Device Under Test
EME: Electromagnetic Energy
FHSS: Frequency Hopping Spread Spectrum
FM: Frequency Modulation
GPS: Global Positioning System
MPE: Maximum Permissible Exposure
NA: Not Applicable
PB: Passenger Back seat
PF: Passenger Front seat
PTT: Push to Talk
SAR: Specific Absorption Rate
TDMA: Time Division Multiple Access

3.0 Referenced Standards and Guidelines

This product is designed to comply with the following applicable national and international standards and guidelines.

- United States Federal Communications Commission, Code of Federal Regulations; Rule Part 47CFR § 1.1310, § 2.1091 (d) and § 2.1093 for RF Exposure, where applicable.
- Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1999
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1992. Specific to FCC rules and regulations.
- Institute of Electrical and Electronics Engineers (IEEE) C95.3-2002
- Ministry of Health (Canada) Safety Code 6 (2009), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz

4.0 Power Density Limits

Table 1 – Occupational / Controlled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65 Supplement C	ICNIRP	IEEE C95.1 1992/1999	IEEE C95.1 2005	RSS 102 issue 4 - 2010
	mW/cm ²	W/m ²	mW/cm ²	W/m ²	W/m ²
30 - 300	1.0				*10.0
10 - 400		10.0			
100 - 300			1.0	10.0	
300 - 1,500	f/300				f/30
300 - 3,000			f/300	f/30	
400 - 2,000		f/40			
1,500 - 15,000					50.0
1,500 - 100,000	5.0				
2,000 – 300,000		50.0			
3,000 - 300,000			10.0	100.0	

*Power density limit is applicable at frequencies greater than 100MHz

Table 2 – General Population / Uncontrolled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65 Supplement C	ICNIRP	IEEE C95.1 1992/1999	IEEE C95.1 2005	RSS 102 issue 4 – 2010
	mW/cm ²	W/m ²	mW/cm ²	W/m ²	W/m ²
30 – 300	0.2				*2.0
10 – 400		2.0			
100 – 300			0.2		
100 – 400				2.0	
300 – 1,500	f/1,500				f/150
400 – 2,000		f/200		f/200	
300 – 15,000			f/1,500		
1,500 – 15,000					10.0
1,500 – 100,000	1.0				
2,000 – 100,000				10.0	
2,000 – 300,000		10.0			

*Power density limit is applicable at frequencies greater than 100MHz

5.0 N_c Test Channels

The number of test channels are determined by using Equation 1 below. This equation is available in FCC's KDB 447498. The test channels are appropriately spaced across the antenna's frequency range.

Equation 1 – Number of test channels

$$N_c = \text{Round} \{ [100(f_{\text{high}} - f_{\text{low}})/f_c]^{0.5} \times (f_c / 100)^{0.2} \}$$

where N_c is the number of test channels, f_{high} and f_{low} are the highest and lowest frequencies within the transmission band, f_c is the mid-band frequency, and frequencies are in MHz.

6.0 Measurement Equipment

Table 3 - Equipment

Equipment Type	Model #	SN	Calibration Date	Calibration Due Date
Automobile	2003 Ford Crown Victoria, 4-Door	NA	NA	NA
Survey Meter	ETS Model HI-2200	00086887	5/10/2011	5/10/2012
Probe – E-Field	ETS Model E100	00126277		
Probe – H-Field	ETS Model H200	00084225		

E-field measurements are in mW/cm².

H-field measurements are in A/m

7.0 Measurement System Uncertainty Levels

Table 4 - Uncertainty Budget for Near Field Probe Measurements

	Tol. (± %)	Prob. Dist.	Divisor	u_i (± %)	v_i
Measurement System					
Probe Calibration	6.0	N	1.00	6.0	∞
Survey Meter Calibration	3.0	N	1.00	3.0	∞
Hemispherical Isotropy	8.0	R	1.73	4.6	∞
Linearity	5.0	R	1.73	2.9	∞
Pulse Response	1.0	R	1.73	0.6	∞
RF Ambient Noise	3.0	R	1.73	1.7	∞
RF Reflections	8.0	R	1.73	4.6	∞
Probe Positioning	10.0	R	1.73	5.8	∞
Test sample Related					
Antenna Positioning	3.0	N	1.00	3.0	∞
Power drift	5.0	R	1.73	2.9	∞
Combined Standard Uncertainty		RSS		12.2	∞
Expanded Uncertainty (95% CONFIDENCE LEVEL)		$k=2$		24	

8.0 Product and System Description

Model PMUD2567A is a mobile transceiver that utilizes analog and digital two-way radio communications, Bluetooth and GPS technologies. The analog modulation scheme uses narrowband Frequency Modulation (FM). The digital modulation scheme is 4 Level Frequency Shift Keying (4FSK) and Time Division Multiple Access (TDMA). The system can accommodate 2-voice channels in a standard 12.5 kHz channel as used in two-way radio. The TDMA 1:2 protocol allocates portions of the RF signal by dividing time into two slots (2 slots TDMA). Transmission from a unit or base station is accommodated in time-slot lengths of 30 milliseconds and frame lengths of 60 milliseconds. This product also incorporates a Class 1 (10mW max power) BT modem which uses Frequency Hopping Spread Spectrum (FHSS) technology. The Bluetooth radio modem is used to link wireless audio accessories. The maximum transmission duty cycle of 29.3% is imposed by the Bluetooth standard.

The maximum duty cycle for TDMA is 1:2 (50%) and is controlled by software. The FM signal is continuous. However, because of hand shaking or Push-To-Talk (PTT) between users and/or base stations a conservative 50% duty cycle is applied. The TDMA mode was not tested because its duty cycle is inherently 50% and would include an additional 50% duty cycle for PTT.

The intended use of the radio is PTT while the device is properly installed in a vehicle with an external antenna mounted at the roof or trunk.

This device will be marketed to and used by employees solely for work-related operations, such as public safety agencies, e.g. police, fire and emergency medical. User training is the responsibility of these agencies which can be expected to employ the usage instructions, safety information and operational cautions set forth in the user's manual, instructional sessions or other means.

Accordingly this product is classified as Occupational/Controlled Exposure. However, in accordance with FCC requirements, the passengers inside the vehicle and the bystanders external to the vehicle are evaluated to the General Population/Uncontrolled Exposure Limits.

(Note that "Bystanders" as used herein are people other than operator)

9.0 Additional Options and Accessories

Refer to Table 5 for complete list of tested antennas.

PMAN4004B - Optional GPS base.

Below are additional antenna kits which include the tested antennas in Table 5 and optional GPS base.

RAD4214A - Includes GPS base and tested antenna RAD4226A.

RAD4215A - Includes GPS base and tested antenna RAD4225A.

RAD4216A - Includes GPS base and tested antenna RAD4224A.

RAD4217A - Includes GPS base and tested antenna RAD4223A.

RAD4218A - Includes GPS base and tested antenna RAD4227A.

10.0 Test Set-Up Description

Assessments were performed with mobile radio installed in the test vehicle while engine was at idle, at the specified distances and test locations indicated in sections 11.0, 12.0 and Appendix A.

All antennas described in Table 5 were considered in order to develop the test plan for this product. Antennas were installed and tested per their appropriate mount locations (Roof / Trunk) and defined test channels.

11.0 Method of Measurement with trunk mounted antenna(s)

11.1 External/Bystander vehicle MPE measurements

Antenna is located at the center of the trunk. Refer to Appendix A for antenna location and distance.

MPE measurements for bystander (BS) conditions are determined by taking the average of (10) measurements in a 2 m vertical line for each of the (3) bystander test locations indicated in Appendix A with 20 cm height increments, with antenna to probe sensor separation distances of 90 cm directly behind vehicle, 104 cm (45 degree radial) and 110.5 cm (90 degree radial). The separation distance used for testing is defined from the antenna where as the RF safety booklet defines the same distance from the vehicle body to ensure that the assessment is applicable to other vehicles. The measurement probe is positioned orthogonal to antenna (typically parallel to ground with a vertically mounted antenna) and aimed directly at the antenna's axis. These measurements are representative of persons other than the operator standing next to the vehicle.

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

Note: The distance from the centered trunk-mounted antenna to the rear edge of the vehicle is 42cm and the distance from the rear edge of the vehicle to the survey probe sensor is 48cm.

11.2 Internal/Passenger vehicle MPE measurements

Antenna is located toward the center of the trunk at a minimum 85cm from back seat passenger. Users are instructed, per installation manual, to mount antennas on the roof only if a minimum 85cm cannot be achieved. Refer to Appendix A for antenna location and distance.

MPE measurements for passenger front seat (PF) and back seat (PB) conditions are determined by taking the average of the (3) measurements (Head, Chest, and Lower Trunk) inside the vehicle for both the front and back seats.

The back seat is a bench seat and therefore each position (Head, Chest & Lower Trunk) were scanned across (horizontally) the seat starting from the middle of the seat to the edge of the seat stopping 20 cm from the vehicle door. Similar process was used in the front bucket seat.

The probe handle is oriented parallel (horizontal) to the ground and pointed towards the back of the vehicle. The probe handle is not oriented normal to the seat surface. The probe head (incorporating the field sensors) is scanned continuously (using the max-hold function available in the meter) along three test axes which are parallel to the seat angle (intended as the line determined by the intersection of the plane of the seat and the plane of the backrest) and are 20 cm from the seat surface. One test axis is at the Head height, another is at the Chest height, and another is at the Lower Trunk height. The maximum field level value recorded for each test axis is logged. The MPE is determined by averaging these three maximum values regardless of the geometrical location where they were observed. For instance, the locations of the three maxima may lie on different vertical (relative to ground) lines.

This approach leads to results that are representative of the exposure of vehicle occupants since it is based on an average across the body portions closest to the antenna for both trunk and roof mount positions, and is conservatively biased because the highest results for each test axis are combined, e.g. the highest head exposure could be in the middle of the seat while the highest lower trunk exposure could be closer to the door

12.0 Method of Measurement with roof mounted antenna(s)

12.1 External/Bystander vehicle MPE measurements

Antenna is located at the center of the roof. Refer to Appendix A for antenna location and distance.

MPE measurements for bystander (BS) conditions are determined by taking the average of (10) measurements in a 2m vertical line for the test location indicated in Appendix A with 20cm increments at the test distance of 117cm from the antenna under test. The measurement probe is positioned orthogonal to antenna (typically parallel to ground with a vertically mounted antenna) and aimed directly at the antenna's axis. These measurements are representative of persons other than the operator standing next to the vehicle.

Note: Actual test distance was approximately 117cm from centered roof-mounted antenna to the probe element (97cm from antenna to edge of car door and 20cm from the edge of the car door to the survey probe sensor); this is the closest distance that can be achieved to a centered roof-mounted antenna used for MPE compliance assessment herein.

12.2 Internal/Passenger vehicle MPE measurements

Antenna is located at the center of the roof. Refer to Appendix A for antenna location and distance.

MPE measurements for passenger front seat (PF) and back seat (PB) conditions are determined by taking the average of the (3) measurements (Head, Chest, and Lower Trunk) inside the vehicle for both the front and back seats.

The back seat is a bench seat and therefore each position (Head, Chest & Lower Trunk) were scanned across (horizontally) the seat starting from the middle of the seat to the edge of the seat stopping 20 cm from the vehicle door. Similar process was used in the front bucket seat.

The probe handle is oriented parallel (horizontal) to the ground and pointed towards the back of the vehicle. The probe handle is not oriented normal to the seat surface. The probe head (incorporating the field sensors) is scanned continuously (using the max-hold function available in the meter) along three test axes which are parallel to the seat angle (intended as the line determined by the intersection of the plane of the seat and the plane of the backrest) and are 20 cm from the seat surface. One test axis is at the Head height, another is at the Chest height, and another is at the Lower Trunk height. The maximum field level value recorded for each test axis is logged. The MPE is determined by averaging these three maximum values regardless of the geometrical location where they were observed. For instance, the locations of the three maxima may lie on different vertical (relative to ground) lines.

This approach leads to results that are representative of the exposure of vehicle occupants since it is based on an average across the body portions closest to the antenna for both trunk and roof mount positions, and is conservatively biased because the highest results for each test axis are combined, e.g. the highest head exposure could be in the middle of the seat while the highest lower trunk exposure could be closer to the door

13.0 MPE Calculations

The final MPE results for this mobile radio are presented in section 15.0 Tables 6 - 17. These results are based on 50% duty cycle for PTT.

Below is an explanation of how the MPE results are calculated. Refer to Appendix D for MPE measurement results and calculations.

External to vehicle (Bystander) - 10 measurements are averaged over the body (Avg_over_body).
Internal to vehicle (Passengers) - 3 measurements are averaged over the body (Avg_over_body).

The Average over Body test methodology is consistent with IEEE/ANSI C95.3-2002 guidelines.

Therefore;

Equation 2 – Power Density Calculation (Calc._P.D.)

$$\text{Calc.}_P.D. = (\text{Avg_over_body}) * (\text{probe_frequency_cal_factor}) * (\text{duty_cycle})$$

Note 1: The highest “average” cal factors from the calibration certificates were selected for the applicable frequency range. Linear interpretation was used to determine “probe_frequency_cal_factor” for the specific test frequencies.

Note 2: The E-field probe calibration certificate’s frequency cal factors were determined by measuring V/m. The survey meter’s results were measured in power density (mW/cm²) and therefore the “probe_frequency_cal_factor” was squared in equation 2 to account for these results.

Note 3: The H-field probe calibration certificate’s frequency cal factors were determined by measuring A/m. The survey meter’s results were measured in A/m and therefore the “Avg_over_body” A/m results were converted to power density (mW/cm²) using the equation 3. H-field measurements are only applicable to frequencies below 300MHz.

Equation 3 – Converting A/m to mW/cm²

$$mW/cm^2 = (A/m)^2 * 37.699$$

Equation 4 – Power Density Maximum Calculation

$$Max_Calc._P.D. = P.D._calc * \frac{max_output_power}{initial_output_power}$$

Note 4; For initial output power > max_output_power; max_output_power / initial output power = 1

14.0 Antenna Summary

Table 5 below summarizes the tested antennas and their descriptions, mount location (roof/trunk), overlap of FCC bands, number of test channels per FCC KDB 447498 (FCC N_c) and actual number of tested channels (Actual N_c). This information was used to determine the test configurations presented in this report.

Table 5

#	Antenna Model	Frequency Range (MHz)	Physical Length (cm)	Gain (dBi)	Remarks	Mount Location (Roof/Trunk)	Overlap FCC Bands	FCC N _c	Actual N _c
1	HAD4006A	136-144	52.0	2.15	1/4 wave, wire	R/T	NA	3	3
2	HAD4007A	146-150.8	49.0	2.15	1/4 wave, wire	R/T	150.8	2	3
3	HAD4008A	150.8-162	45.5	2.15	1/4 wave, wire	R/T	150.8-162	3	3
4	HAD4009A	162-174	43.0	2.15	1/4 wave, wire	R/T	162-173.4	3	3
5	*HAD4022A	132-174	130.0 118.3 113.8 102.7 96.5 89.9	5.15	5/8 wave, wire	R/T	150.8-173.4	5	6
6	RAD4226A	136-144	50.4	2.15	1/4 wave, wire	R/T	NA	3	3
7	RAD4225A	146-150.8	47.5	2.15	1/4 wave, wire	R/T	150.8	2	3
8	RAD4224A	150.8-162	44.2	2.15	1/4 wave, wire	R/T	150.8-162	3	3
9	RAD4223A	162-174	41.0	2.15	1/4 wave, wire	R/T	162-173.4	3	3
10	RAD4227A	146-172	88.0	5.15	5/8 wave, wire	R/T	150.8-172	4	5

* Antennas trimmed per test frequency.

15.0 Test Results Summary

The following tables below summarize the MPE results for each test configuration: antenna location, test positions (BS-Bystander, PB-Passenger Back seat, PF-Passenger Front seat), E/H field measurements, angle, antenna model & freq. range, maximum output power, initial power, TX frequency, max calculated power density results, applicable FCC/IEEE/ICNIRP specification limits and % of the applicable specification limits.

Table 6

Bystander MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Roof	BS	E	0	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.047	0.2	23.4
						52.8	143.9875	0.045	0.2	22.5
						52.2	150.8000	0.046	0.2	22.8
						52.1	158.3000	0.060	0.2	29.8
						53.1	165.9875	0.060	0.2	30.1
						53.2	173.4000	0.067	0.2	33.7
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.051	0.2	25.6
						52.2	150.8000	0.057	0.2	28.7
						52.2	157.9875	0.069	0.2	34.3
						52.5	164.9875	0.052	0.2	26.0
						53.6	171.9875	0.047	0.2	23.7
				HAD4006A, (136-144MHz)	54.0					
						52.6	136.0125	0.071	0.2	35.6
						52.6	140.0125	0.067	0.2	33.4
						52.8	143.9875	0.069	0.2	34.3
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.071	0.2	35.4
						52.0	148.4000	0.068	0.2	34.0
						52.2	150.8000	0.071	0.2	35.7
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.066	0.2	33.1
						52.0	156.4000	0.083	0.2	41.4
						52.7	161.9875	0.068	0.2	34.0
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.064	0.2	32.0
						53.4	167.7000	0.067	0.2	33.4
						53.2	173.4000	0.076	0.2	38.2
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.060	0.2	30.0
						52.6	140.0125	0.062	0.2	31.1
						52.8	143.9875	0.073	0.2	36.3
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.064	0.2	31.9
						52.0	148.4000	0.067	0.2	33.5
						52.2	150.8000	0.072	0.2	35.9
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.056	0.2	28.2
						52.0	156.4000	0.071	0.2	35.5
						52.7	161.9875	0.069	0.2	34.5
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.049	0.2	24.6
						53.4	167.7000	0.059	0.2	29.5
						53.2	173.4000	0.069	0.2	34.7

Table 7

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Roof	PB	E	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.022	0.2	11.0
						52.8	143.9875	0.039	0.2	19.6
						52.2	150.8000	0.026	0.2	12.9
						52.1	158.3000	0.012	0.2	6.0
						53.1	165.9875	0.040	0.2	19.9
						53.2	173.4000	0.033	0.2	16.4
				RAD4227A (146-172MHz)	54.0	52.2	146.0125	0.057	0.2	28.4
						52.2	150.8000	0.050	0.2	25.0
						52.2	157.9875	0.019	0.2	9.4
						52.5	164.9875	0.042	0.2	21.0
						53.6	171.9875	0.024	0.2	12.2
				HAD4006A (136-144MHz)	54.0	52.6	136.0125	0.078	0.2	39.0
						52.6	140.0125	0.188	0.2	94.1
						52.8	143.9875	0.131	0.2	65.6
				HAD4007A (146-150.8MHz)	54.0	52.2	146.0125	0.078	0.2	38.8
						52.0	148.4000	0.037	0.2	18.4
						52.2	150.8000	0.062	0.2	31.0
				HAD4008A (150.8-162MHz)	54.0	52.2	150.8000	0.057	0.2	28.7
						52.0	156.4000	0.034	0.2	17.1
						52.7	161.9875	0.064	0.2	32.1
				HAD4009A (162-174MHz)	54.0	52.7	162.0125	0.066	0.2	33.0
						53.4	167.7000	0.059	0.2	29.7
						53.2	173.4000	0.043	0.2	21.3
				RAD4226A (136-144MHz)	54.0	52.6	136.0125	0.075	0.2	37.3
						52.6	140.0125	0.198	0.2	99.2
						52.8	143.9875	0.138	0.2	69.0
				RAD4225A (146-150.8MHz)	54.0	52.2	146.0125	0.071	0.2	35.3
						52.0	148.4000	0.040	0.2	19.9
						52.2	150.8000	0.067	0.2	33.6
				RAD4224A (150.8-162MHz)	54.0	52.2	150.8000	0.052	0.2	25.9
						52.0	156.4000	0.027	0.2	13.7
						52.7	161.9875	0.068	0.2	33.8
				RAD4223A (162-174MHz)	54.0	52.7	162.0125	0.051	0.2	25.4
						53.4	167.7000	0.053	0.2	26.4
						53.2	173.4000	0.039	0.2	19.7

Table 8

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Roof	PF	E	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.005	0.2	2.5
						52.8	143.9875	0.014	0.2	6.8
						52.2	150.8000	0.009	0.2	4.3
						52.1	158.3000	0.012	0.2	6.0
						53.1	165.9875	0.020	0.2	10.0
						53.2	173.4000	0.015	0.2	7.4
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.022	0.2	11.2
						52.2	150.8000	0.026	0.2	12.9
						52.2	157.9875	0.015	0.2	7.7
						52.5	164.9875	0.018	0.2	9.2
						53.6	171.9875	0.005	0.2	2.4
				HAD4006A (136-144MHz)	54.0					
						52.6	136.0125	0.027	0.2	13.6
						52.6	140.0125	0.039	0.2	19.7
						52.8	143.9875	0.041	0.2	20.5
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.041	0.2	20.7
						52.0	148.4000	0.035	0.2	17.3
						52.2	150.8000	0.033	0.2	16.4
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.029	0.2	14.7
						52.0	156.4000	0.031	0.2	15.4
						52.7	161.9875	0.032	0.2	16.1
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.029	0.2	14.4
						53.4	167.7000	0.020	0.2	9.9
						53.2	173.4000	0.013	0.2	6.6
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.027	0.2	13.6
						52.6	140.0125	0.043	0.2	21.4
						52.8	143.9875	0.046	0.2	23.0
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.021	0.2	10.3
						52.0	148.4000	0.028	0.2	13.8
						52.2	150.8000	0.034	0.2	17.2
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.031	0.2	15.5
						52.0	156.4000	0.026	0.2	12.9
						52.7	161.9875	0.034	0.2	16.9
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.019	0.2	9.3
						53.4	167.7000	0.017	0.2	8.3
						53.2	173.4000	0.008	0.2	4.1

Table 9

Bystander MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Roof	BS	H	0	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.035	0.2	17.7
						52.8	143.9875	0.045	0.2	22.5
						52.2	150.8000	0.043	0.2	21.4
						52.1	158.3000	0.055	0.2	27.5
						53.1	165.9875	0.060	0.2	29.9
						53.2	173.4000	0.064	0.2	32.0
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.060	0.2	30.0
						52.2	150.8000	0.058	0.2	29.0
						52.2	157.9875	0.060	0.2	30.2
						52.5	164.9875	0.052	0.2	25.8
						53.6	171.9875	0.046	0.2	23.1
				HAD4006A (136-144MHz)	54.0					
						52.6	136.0125	0.077	0.2	38.6
						52.6	140.0125	0.077	0.2	38.6
						52.8	143.9875	0.081	0.2	40.7
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.080	0.2	40.2
						52.0	148.4000	0.072	0.2	36.1
						52.2	150.8000	0.070	0.2	34.9
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.070	0.2	34.9
						52.0	156.4000	0.077	0.2	38.4
						52.7	161.9875	0.068	0.2	33.8
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.070	0.2	34.8
						53.4	167.7000	0.055	0.2	27.4
						53.2	173.4000	0.080	0.2	39.9
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.065	0.2	32.4
						52.6	140.0125	0.071	0.2	35.4
						52.8	143.9875	0.081	0.2	40.7
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.074	0.2	37.0
						52.0	148.4000	0.070	0.2	35.0
						52.2	150.8000	0.072	0.2	35.9
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.056	0.2	28.1
						52.0	156.4000	0.067	0.2	33.3
						52.7	161.9875	0.068	0.2	33.8
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.047	0.2	23.7
						53.4	167.7000	0.058	0.2	28.9
						53.2	173.4000	0.070	0.2	34.8

Table 10

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Roof	PB	H	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.011	0.2	5.4
						52.8	143.9875	0.017	0.2	8.5
						52.2	150.8000	0.020	0.2	10.2
						52.1	158.3000	0.011	0.2	5.3
						53.1	165.9875	0.040	0.2	20.2
						53.2	173.4000	0.035	0.2	17.3
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.028	0.2	14.2
						52.2	150.8000	0.038	0.2	18.9
						52.2	157.9875	0.016	0.2	8.2
						52.5	164.9875	0.031	0.2	15.6
						53.6	171.9875	0.018	0.2	9.2
				HAD4006A (136-144MHz)	54.0					
						52.6	136.0125	0.068	0.2	34.1
						52.6	140.0125	0.098	0.2	49.0
						52.8	143.9875	0.068	0.2	33.9
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.048	0.2	24.2
						52.0	148.4000	0.028	0.2	14.2
						52.2	150.8000	0.038	0.2	18.9
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.033	0.2	16.4
						52.0	156.4000	0.024	0.2	11.9
						52.7	161.9875	0.037	0.2	18.3
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.032	0.2	15.9
						53.4	167.7000	0.045	0.2	22.6
						53.2	173.4000	0.026	0.2	13.0
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.033	0.2	16.7
						52.6	140.0125	0.082	0.2	41.2
						52.8	143.9875	0.075	0.2	37.4
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.043	0.2	21.5
						52.0	148.4000	0.024	0.2	12.1
						52.2	150.8000	0.038	0.2	18.9
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.033	0.2	16.4
						52.0	156.4000	0.024	0.2	11.9
						52.7	161.9875	0.037	0.2	18.3
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.023	0.2	11.7
						53.4	167.7000	0.040	0.2	20.1
						53.2	173.4000	0.026	0.2	13.0

Table 11

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for roof mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Roof	PF	H	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.006	0.2	3.1
						52.8	143.9875	0.011	0.2	5.4
						52.2	150.8000	0.011	0.2	5.4
						52.1	158.3000	0.013	0.2	6.7
						53.1	165.9875	0.010	0.2	5.0
						53.2	173.4000	0.012	0.2	6.2
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.028	0.2	14.2
						52.2	150.8000	0.028	0.2	14.2
						52.2	157.9875	0.020	0.2	9.9
						52.5	164.9875	0.013	0.2	6.5
						53.6	171.9875	0.007	0.2	3.7
				HAD4006A (136-144MHz)	54.0					
						52.6	136.0125	0.025	0.2	12.3
						52.6	140.0125	0.033	0.2	16.7
						52.8	143.9875	0.055	0.2	27.5
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.048	0.2	24.2
						52.0	148.4000	0.055	0.2	27.3
						52.2	150.8000	0.054	0.2	27.2
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.043	0.2	21.5
						52.0	156.4000	0.024	0.2	11.9
						52.7	161.9875	0.020	0.2	9.8
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.016	0.2	8.1
						53.4	167.7000	0.016	0.2	7.8
						53.2	173.4000	0.015	0.2	7.7
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.025	0.2	12.3
						52.6	140.0125	0.033	0.2	16.7
						52.8	143.9875	0.055	0.2	27.5
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.054	0.2	27.2
						52.0	148.4000	0.049	0.2	24.3
						52.2	150.8000	0.048	0.2	24.2
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.043	0.2	21.5
						52.0	156.4000	0.021	0.2	10.5
						52.7	161.9875	0.020	0.2	9.8
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.016	0.2	8.1
						53.4	167.7000	0.013	0.2	6.3
						53.2	173.4000	0.019	0.2	9.3

Table 12

Bystander MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Trunk	BS	E	0	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.108	0.2	54.1
						52.8	143.9875	0.128	0.2	64.2
						52.2	150.8000	0.111	0.2	55.6
						52.1	158.3000	0.109	0.2	54.6
						53.1	165.9875	0.124	0.2	62.1
						53.2	173.4000	0.126	0.2	63.0
				RAD4227A (146-172MHz)	54.0	52.2	146.0125	0.115	0.2	57.7
						52.2	150.8000	0.112	0.2	56.1
						52.2	157.9875	0.100	0.2	50.2
						52.5	164.9875	0.095	0.2	47.6
						53.6	171.9875	0.074	0.2	37.1
				HAD4006A (136-144MHz)	54.0	52.6	136.0125	0.118	0.2	59.2
						52.6	140.0125	0.157	0.2	78.3
						52.8	143.9875	0.151	0.2	75.7
				HAD4007A (146-150.8MHz)	54.0	52.2	146.0125	0.144	0.2	72.2
						52.0	148.4000	0.129	0.2	64.4
						52.2	150.8000	0.123	0.2	61.3
				HAD4008A (150.8-162MHz)	54.0	52.2	150.8000	0.103	0.2	51.5
						52.0	156.4000	0.097	0.2	48.3
						52.7	161.9875	0.114	0.2	56.8
				HAD4009A (162-174MHz)	54.0	52.7	162.0125	0.100	0.2	50.2
						53.4	167.7000	0.114	0.2	57.0
						53.2	173.4000	0.128	0.2	64.0
				RAD4226A (136-144MHz)	54.0	52.6	136.0125	0.107	0.2	53.6
						52.6	140.0125	0.131	0.2	65.7
						52.8	143.9875	0.158	0.2	78.8
				RAD4225A (146-150.8MHz)	54.0	52.2	146.0125	0.134	0.2	67.0
						52.0	148.4000	0.133	0.2	66.5
						52.2	150.8000	0.127	0.2	63.6
				RAD4224A (150.8-162MHz)	54.0	52.2	150.8000	0.076	0.2	37.8
						52.0	156.4000	0.087	0.2	43.4
						52.7	161.9875	0.112	0.2	56.0
				RAD4223A (162-174MHz)	54.0	52.7	162.0125	0.038	0.2	19.0
						53.4	167.7000	0.091	0.2	45.3
						53.2	173.4000	0.114	0.2	57.1
Trunk	BS	E	45	RAD4226A (136-144MHz)	54.0	52.8	143.9875	0.204	0.2	*102.0
			90			52.8	143.9875	0.164	0.2	81.8
Trunk	BS	E	45	HAD4009A (162-174MHz)	54.0	53.2	173.4000	0.162	0.2	81.0
			90			53.2	173.4000	0.141	0.2	70.4

Note - * Results required SAR simulations

Table 13

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Trunk	PB	E	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.029	0.2	14.4
						52.8	143.9875	0.159	0.2	79.3
						52.2	150.8000	0.186	0.2	93.1
						52.1	158.3000	0.351	0.2	*175.3
						53.1	165.9875	0.453	0.2	*226.7
						53.2	173.4000	0.382	0.2	*191.2
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.505	0.2	*252.6
						52.2	150.8000	0.531	0.2	*265.5
						52.2	157.9875	0.642	0.2	*320.9
						52.5	164.9875	0.506	0.2	*252.8
						53.6	171.9875	0.217	0.2	*108.3
				HAD4006A (136-144MHz)	54.0					
						52.6	136.0125	0.745	0.2	*372.7
						52.6	140.0125	0.729	0.2	*364.4
						52.8	143.9875	0.873	0.2	*436.4
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.950	0.2	*475.0
						52.0	148.4000	0.800	0.2	*399.8
						52.2	150.8000	0.716	0.2	*357.8
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.636	0.2	*318.1
						52.0	156.4000	1.062	0.2	*531.2
						52.7	161.9875	0.747	0.2	*373.6
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.754	0.2	*377.0
						53.4	167.7000	0.856	0.2	*427.8
						53.2	173.4000	0.504	0.2	*251.9
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.661	0.2	*330.3
						52.6	140.0125	0.583	0.2	*291.7
						52.8	143.9875	0.828	0.2	*414.2
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.824	0.2	*412.1
						52.0	148.4000	0.782	0.2	*391.2
						52.2	150.8000	0.790	0.2	*394.8
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.569	0.2	*284.5
						52.0	156.4000	1.008	0.2	*503.8
						52.7	161.9875	0.766	0.2	*382.9
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.298	0.2	*148.8
						53.4	167.7000	0.647	0.2	*323.7
						53.2	173.4000	0.542	0.2	*270.8

Note - * Results required SAR simulations.

Table 14

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Trunk	PF	E	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.005	0.2	2.5
						52.8	143.9875	0.010	0.2	5.1
						52.2	150.8000	0.019	0.2	9.5
						52.1	158.3000	0.041	0.2	20.5
						53.1	165.9875	0.078	0.2	39.0
						53.2	173.4000	0.115	0.2	57.4
				RAD4227A (146-172MHz)	54.0	52.2	146.0125	0.026	0.2	12.9
						52.2	150.8000	0.053	0.2	26.7
						52.2	157.9875	0.053	0.2	26.5
						52.5	164.9875	0.077	0.2	38.6
						53.6	171.9875	0.077	0.2	38.3
				HAD4006A (136-144MHz)	54.0	52.6	136.0125	0.036	0.2	17.8
						52.6	140.0125	0.024	0.2	12.0
						52.8	143.9875	0.065	0.2	32.4
				HAD4007A (146-150.8MHz)	54.0	52.2	146.0125	0.078	0.2	38.8
						52.0	148.4000	0.102	0.2	51.1
						52.2	150.8000	0.103	0.2	51.7
				HAD4008A (150.8-162MHz)	54.0	52.2	150.8000	0.090	0.2	44.8
						52	156.4000	0.110	0.2	54.8
						52.7	161.9875	0.115	0.2	57.5
				HAD4009A (162-174MHz)	54.0	52.7	162.0125	0.118	0.2	59.2
						53.4	167.7000	0.142	0.2	71.0
						53.2	173.4000	0.166	0.2	82.9
				RAD4226A (136-144MHz)	54.0	52.6	136.0125	0.027	0.2	13.6
						52.6	140.0125	0.046	0.2	23.1
						52.8	143.9875	0.046	0.2	23.0
				RAD4225A (146-150.8MHz)	54.0	52.2	146.0125	0.048	0.2	24.1
						52.0	148.4000	0.066	0.2	32.9
						52.2	150.8000	0.084	0.2	42.2
				RAD4224A (150.8-162MHz)	54.0	52.2	150.8000	0.072	0.2	36.2
						52.0	156.4000	0.115	0.2	57.4
						52.7	161.9875	0.100	0.2	49.9
				RAD4223A (162-174MHz)	54.0	52.7	162.0125	0.046	0.2	22.8
						53.4	167.7000	0.140	0.2	70.2
						53.2	173.4000	0.149	0.2	74.7

Table 15

Bystander MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Trunk	BS	H	0	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.103	0.2	51.5
						52.8	143.9875	0.126	0.2	63.2
						52.2	150.8000	0.109	0.2	54.6
						52.1	158.3000	0.125	0.2	62.6
						53.1	165.9875	0.123	0.2	61.3
						53.2	173.4000	0.138	0.2	69.1
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.125	0.2	62.5
						52.2	150.8000	0.120	0.2	59.8
						52.2	157.9875	0.117	0.2	58.5
						52.5	164.9875	0.101	0.2	50.6
						53.6	171.9875	0.104	0.2	51.9
				HAD4006A (136-144MHz)	54.0					
						52.6	136.0125	0.119	0.2	59.4
						52.6	140.0125	0.133	0.2	66.3
						52.8	143.9875	0.150	0.2	74.8
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.145	0.2	72.5
						52.0	148.4000	0.140	0.2	70.1
						52.2	150.8000	0.133	0.2	66.7
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.112	0.2	55.8
						52.0	156.4000	0.120	0.2	60.0
						52.7	161.9875	0.121	0.2	60.5
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.116	0.2	57.9
						53.4	167.7000	0.119	0.2	59.7
						53.2	173.4000	0.147	0.2	73.3
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.103	0.2	51.5
						52.6	140.0125	0.116	0.2	58.0
						52.8	143.9875	0.147	0.2	73.3
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.145	0.2	72.5
						52.0	148.4000	0.126	0.2	62.8
						52.2	150.8000	0.125	0.2	62.5
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.085	0.2	42.5
						52.0	156.4000	0.105	0.2	52.3
						52.7	161.9875	0.116	0.2	57.9
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.043	0.2	21.3
						53.4	167.7000	0.122	0.2	61.0
						53.2	173.4000	0.138	0.2	69.1
Trunk	BS	H	45	HAD4006A (136-144MHz)	54.0	52.8	143.9875	0.198	0.2	99.2
			90			52.8	143.9875	0.178	0.2	89.1
Trunk	BS	H	45	HAD4009A (162-174MHz)	54.0	53.2	173.4000	0.192	0.2	96.2
			90			53.2	173.4000	0.173	0.2	86.7

Table 16

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Trunk	PB	H	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.021	0.2	10.3
						52.8	143.9875	0.055	0.2	27.5
						52.2	150.8000	0.074	0.2	37.0
						52.1	158.3000	0.168	0.2	84.1
						53.1	165.9875	0.305	0.2	*152.5
						53.2	173.4000	0.258	0.2	*129.1
				RAD4227A (146-172MHz)	54.0					
						52.2	146.0125	0.242	0.2	*121.1
						52.2	150.8000	0.206	0.2	*102.8
						52.2	157.9875	0.262	0.2	*131.2
						52.5	164.9875	0.323	0.2	*161.3
						53.6	171.9875	0.147	0.2	73.3
				HAD4006A (136-144MHz)	54.0					
						52.6	136.0125	0.376	0.2	*188.1
						52.6	140.0125	0.315	0.2	*157.5
						52.8	143.9875	0.359	0.2	*179.5
				HAD4007A (146-150.8MHz)	54.0					
						52.2	146.0125	0.436	0.2	*218.2
						52.0	148.4000	0.421	0.2	*210.5
						52.2	150.8000	0.325	0.2	*162.4
				HAD4008A (150.8-162MHz)	54.0					
						52.2	150.8000	0.296	0.2	*148.0
						52.0	156.4000	0.412	0.2	*205.8
						52.7	161.9875	0.406	0.2	*203.0
				HAD4009A (162-174MHz)	54.0					
						52.7	162.0125	0.406	0.2	*203.0
						53.4	167.7000	0.545	0.2	*272.6
						53.2	173.4000	0.369	0.2	*184.4
				RAD4226A (136-144MHz)	54.0					
						52.6	136.0125	0.345	0.2	*172.4
						52.6	140.0125	0.286	0.2	*143.1
						52.8	143.9875	0.407	0.2	*203.7
				RAD4225A (146-150.8MHz)	54.0					
						52.2	146.0125	0.436	0.2	*218.2
						52.0	148.4000	0.421	0.2	*210.5
						52.2	150.8000	0.310	0.2	*155.1
				RAD4224A (150.8-162MHz)	54.0					
						52.2	150.8000	0.255	0.2	*127.6
						52.0	156.4000	0.333	0.2	*166.7
						52.7	161.9875	0.374	0.2	*187.1
				RAD4223A (162-174MHz)	54.0					
						52.7	162.0125	0.188	0.2	93.9
						53.4	167.7000	0.457	0.2	*228.4
						53.2	173.4000	0.354	0.2	*176.9

Note - * Results required SAR simulations.

Table 17

Passenger MPE assessment to General Pop. / Uncontrolled Exposure Limits for trunk mounted antennas.

Trunk/ Roof	Test Position	E/H Field	Angle (Degree)	Antenna Model	Max Pwr (W)	Initial Pwr (W)	Tx Freq (MHz)	Max Calc. P.D. (mW/ cm ²)	FCC/ ICNIRP Limit	% To Spec Limit
Trunk	PF	H	NA	HAD4022A (132-174MHz)	54.0	52.6	136.0125	0.006	0.2	3.1
						52.8	143.9875	0.014	0.2	6.9
						52.2	150.8000	0.033	0.2	16.4
						52.1	158.3000	0.028	0.2	13.9
						53.1	165.9875	0.040	0.2	20.2
						53.2	173.4000	0.039	0.2	19.7
				RAD4227A (146-172MHz)	54.0	52.2	146.0125	0.074	0.2	37.0
						52.2	150.8000	0.074	0.2	37.0
						52.2	157.9875	0.053	0.2	26.6
						52.5	164.9875	0.041	0.2	20.4
						53.6	171.9875	0.026	0.2	12.9
				HAD4006A (136-144MHz)	54.0	52.6	136.0125	0.068	0.2	34.1
						52.6	140.0125	0.106	0.2	53.2
						52.8	143.9875	0.090	0.2	44.9
				HAD4007A (146-150.8MHz)	54.0	52.2	146.0125	0.122	0.2	61.2
						52.0	148.4000	0.132	0.2	66.0
						52.2	150.8000	0.113	0.2	56.7
				HAD4008A (150.8-162MHz)	54.0	52.2	150.8000	0.122	0.2	61.2
						52.0	156.4000	0.095	0.2	47.4
						52.7	161.9875	0.047	0.2	23.5
				HAD4009A (162-174MHz)	54.0	52.7	162.0125	0.042	0.2	20.8
						53.4	167.7000	0.069	0.2	34.5
						53.2	173.4000	0.074	0.2	37.2
				RAD4226A (136-144MHz)	54.0	52.6	136.0125	0.038	0.2	19.2
						52.6	140.0125	0.055	0.2	27.6
						52.8	143.9875	0.124	0.2	61.8
				RAD4225A (146-150.8MHz)	54.0	52.2	146.0125	0.122	0.2	61.2
						52.0	148.4000	0.114	0.2	56.9
						52.2	150.8000	0.122	0.2	61.2
				RAD4224A (150.8-162MHz)	54.0	52.2	150.8000	0.097	0.2	48.3
						52.0	156.4000	0.080	0.2	39.8
						52.7	161.9875	0.047	0.2	23.5
				RAD4223A (162-174MHz)	54.0	52.7	162.0125	0.020	0.2	9.8
						53.4	167.7000	0.069	0.2	34.5
						53.2	173.4000	0.068	0.2	33.9

16.0 Conclusion

The assessments for this device were performed with an output power range as indicated in section 15.0 Tables 6 thru 17. The maximum allowable output power is equal to the upper limit of the final test factory transmit power specification of 54W. The highest power density results for the mobile device scaled to the maximum allowable power output are indicated in the Table 18 thru 20 for internal/passenger to the vehicle, and external/bystander to the vehicle.

Table 18: RF Exposure Results for FCC

	150.8-173.4MHz
Passenger - Max Calculated Power Density	1.062 mW/cm ²
Bystander - Max Calculated Power Density	0.192 mW/cm ²

Table 19: RF Exposure Results for IC

	138-174MHz
Passenger - Max Calculated Power Density	1.062 mW/cm ²
Bystander - Max Calculated Power Density	0.204 mW/cm ²

Table 20: RF Exposure Results

	136-174MHz
Passenger - Max Calculated Power Density	1.062 mW/cm ²
Bystander - Max Calculated Power Density	0.204 mW/cm ²

These MPE results herein demonstrate compliance to the FCC/IEEE/ICNIRP Occupational/Controlled Exposure limit. FCC rules require compliance for Passengers and Bystanders to the FCC General Population/Uncontrolled limits. Although MPE is a convenient method of demonstrating compliance, SAR is recognized as the "basic restriction". For those configurations exceeding the MPE limit noted * in section 15 Tables 6 thru 17, compliance to the FCC SAR General Population/ Uncontrolled limit of 1.6mW/g is demonstrated in Appendix E via SAR computational analysis.

The computational results show that this device, when used with the offered antennas in accordance with the user manual instructions, exhibits the maximum peak 1-g average SAR values as indicated in the table below.

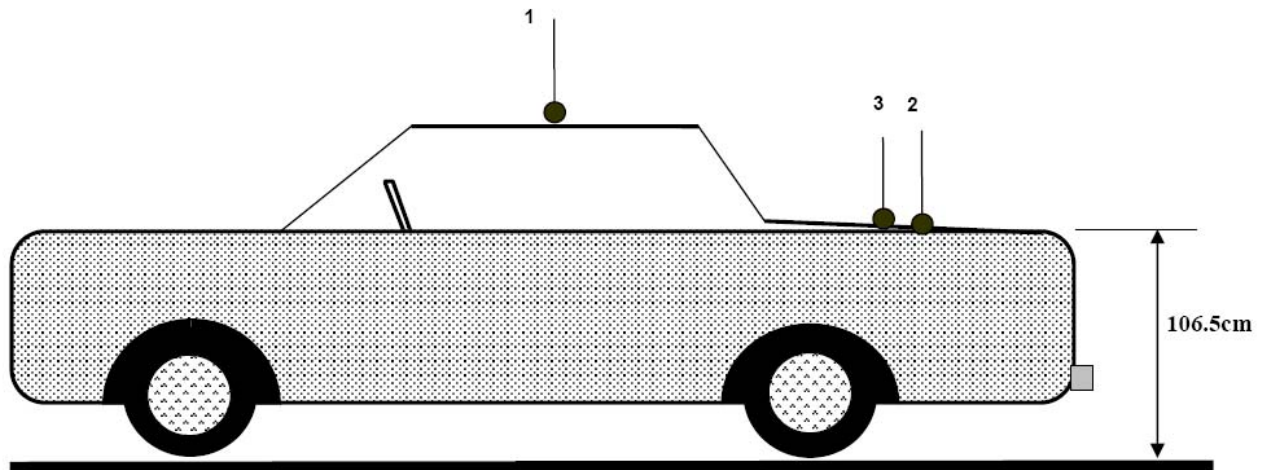
Table 21: Highest SAR simulation result

Maximum peak 1g average SAR	
Frequency (MHz)	SAR
173.4	1.30 mW/g

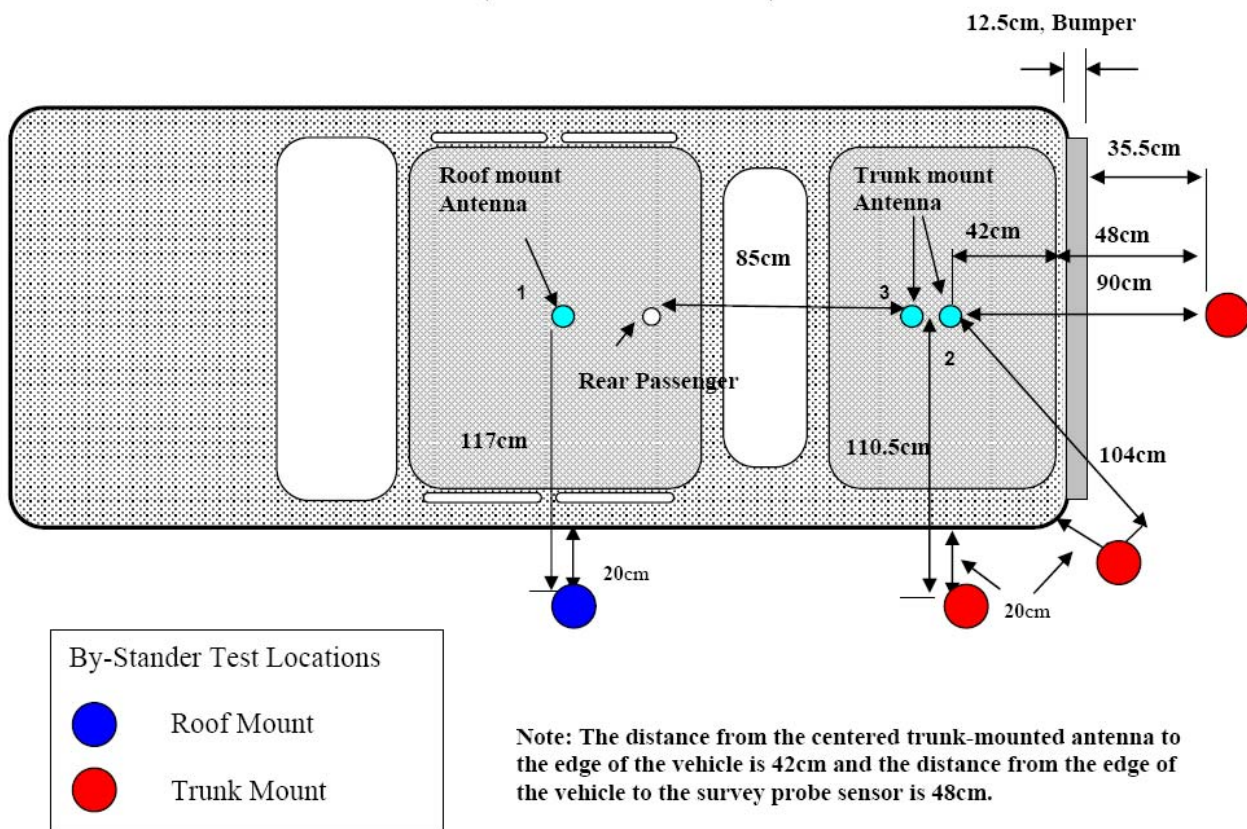
Bluetooth assessment for this device is not required per the guidelines in KDB447498, section 8. Note that the BT device and BT antenna are internal to the vehicular dash mount mobile radio while the UHF antennas are installed externally on the roof or trunk of a vehicle. The separation distance between the BT antenna and UHF antennas greatly exceed 20cm.

The average output power of the BT device is 2.93mW; 10mW (max power) * 29.3% (max duty cycle).

Appendix A - Illustration of Antenna Locations and Test Distances



- 1 - Roof (center)
2 - Trunk (center)
3 - Trunk (85cm from back of the back seat)

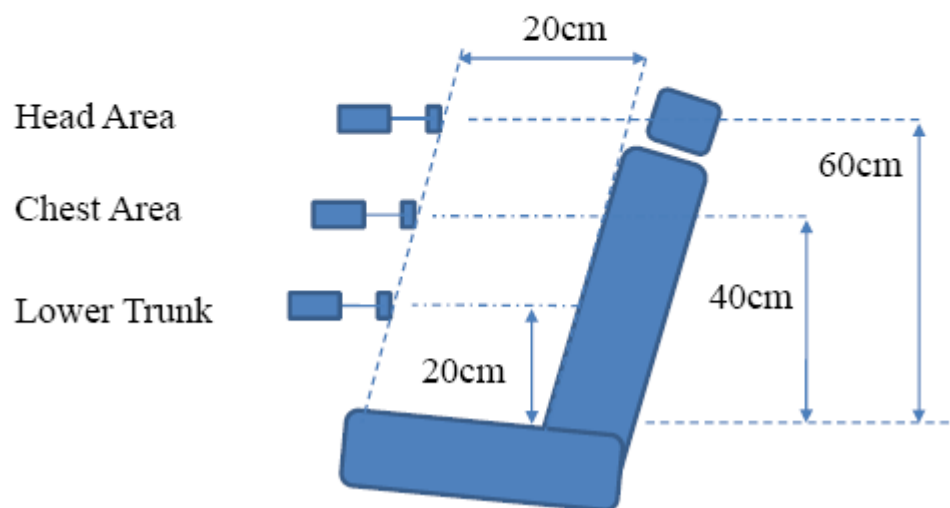


Note: The distance from the centered trunk-mounted antenna to the edge of the vehicle is 42cm and the distance from the edge of the vehicle to the survey probe sensor is 48cm.

Seat scan areas
(Applicable to both front and back seats)

Meter - Probe

 Probe diameter is 5.5cm



Appendix B - Probe Calibration Certificates

Service Test Report
QAF 1126, 03/11
Report ID: 84882



Certificate of Test Conformance

Page 1 of 1

Reference: S 000022195

Customer: AGILENT/MOTOROLA (FL)

The instrument listed below has been tested and verified to Internal Quality Standards. Test data is Not Applicable. Equipment used during instrument testing is controlled by laboratory compliance with ISO/IEC 17025-2005 and ANSI/NCSL Z540-1-1994 using ETS-Lindgren Quality Management System internal procedures.

<u>Manufacturer</u>	ETS-Lindgren	<u>Status In</u>	In Tolerance
<u>Instrument Type</u>	RF Survey Meter	<u>Date Completed</u>	10-May-11
<u>Model</u>	HI-2200	<u>Status Out</u>	Compliant with Internal Quality Standards
<u>Serial Number/ID</u>	00086887		
<u>Remarks</u>			
Calibrated with E100 S/N 00126277 and H200 S/N 00084225			

I would like to take this opportunity to express our appreciation for using ETS-Lindgren for your EMI test equipment services and I am looking forward to continued business with your organization. Please feel free to contact our offices at (512) 531-6400, if you have any questions regarding this report.

Sincerely,

Richard Goodlow

Calibration Supervisor

Date Attested: 10-May-11



Cert I.D.: 84880

Certificate of Calibration Conformance

Page 1 of 4

The instrument identified below has been individually calibrated in compliance with the following standard(s):

IEEE 1309 - 2005, Institute of Electrical and Electronics Engineers, Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas from 9 kHz to 40 GHz

Environment: Laboratory MTE is maintained in a temperature controlled environment with ambient conditions from 18 to 28 C, relative humidity less than 90%. The instrument under test has been calibrated in a suitable environment using an EMCO TEM Cell 5101C, GTEM! 5305 and an RF Shielded EMC Chamber which is conducive to maintaining accurate and reliable measurement quality.

Manufacturer:	ETS-Lindgren	Operating Range:	100kHz - 5GHz
Model Number:	E100	Instrument Type:	Isotropic Probe > 1 GHz
Serial Number/ ID:	00126277	Date Code:	
Tracking Number:	S000022195	Alternate ID:	
Date Completed:	10-May-11	Customer:	AGILENT/MOTOROLA (FL)
Test Type:	Standard Field, Field Strength		
Calibration Uncertainty:	Std Field Method 10kHz - 18000 MHz, +/-0.7 dB, 26.5GHz - 40GHz, +/- 0.95 dB		
k=2, (95% Confidence Level)			

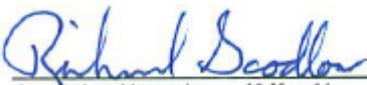
Test Remarks: Special Cal: Calibrated to customer specified frequencies. Calibrated with HI-2200 S/N 00086887.

Calibration Traceability: All Measuring and Test Equipment (MTE) identified below are traceable to the SI units through the National Institute for Standards and Technology (NIST). Calibration Laboratory and Quality System controls are compliant with ISO/IEC 17025-2005 and ANSI/NCSL Z540-1-1994.

Standards and Equipment Used:

Make / Model / Name / S/N / Recall Date				Condition of Instrument Upon Receipt:	
Agilent	8648C	Signal Generator	3623A03573	24-Feb-12	In Tolerance to Internal Quality Standards
Beckton	9200C	RF Voltmeter	324501AE	11-Oct-11	
Hewlett Packard	437B	HP Power Meter	3125U12370	15-Jun-11	On Release: In Tolerance to Internal Quality Standards
Marconi	2022	Signal Generator	119019/077	23-Sep-11	
Rohde & Schwarz	857.8008.02	Power Meter NRVD	100451	17-Mar-12	
Hewlett Packard	83650L	Synthesized Sweep Gen	3844A00422	08-Dec-11	


 Calibration Completed By
 Maynard Reich, Calibration Technician


 Attested and Issued on 10-May-11
 Richard Goodlow, Calibration Supervisor

This document provides traceability of measurements to recognized national standards using controlled processes at the ETS-Lindgren Calibration Laboratory. Uncertainties listed are derived from the methods described by NIST Tech Note 1297. This certificate and report may not be reproduced, except in full, without the written approval of ETS-Lindgren Calibration Laboratory in accordance with ISO/IEC 17025-2005 and ANSI/NCSL Z540-1-1994. QAF 1127 (03/11)



Frequency Response Calibration Factors
Model E100 Serial Number 00126277
Date of Calibration 10 May 2011

Frequency (MHz)	Applied V/m	Probe Reading			Correction Factor			
		X	Y	Z	X	Y	Z	Avg
0.10	7.99	4.55	4.13	4.47	1.76	1.93	1.79	1.83
0.10	20.05	11.31	10.10	11.15	1.77	1.99	1.80	1.85
0.10	70.05	38.46	35.55	39.18	1.81	1.98	1.79	1.86
0.10	123.92	69.33	62.16	68.17	1.79	1.99	1.82	1.87
0.50	7.97	6.16	6.16	6.16	1.30	1.29	1.29	1.29
0.50	20.08	15.52	15.43	15.57	1.29	1.30	1.29	1.29
0.50	70.00	52.90	52.80	53.09	1.33	1.32	1.32	1.32
0.50	124.71	93.40	93.05	93.77	1.34	1.34	1.33	1.34
1.00	7.96	6.83	6.80	6.82	1.17	1.17	1.17	1.17
1.00	20.05	17.11	16.94	17.09	1.17	1.18	1.17	1.18
1.00	70.03	58.97	58.45	58.86	1.19	1.20	1.18	1.19
1.00	125.51	104.76	103.90	104.84	1.20	1.21	1.19	1.20
10.00	7.98	7.82	7.52	7.77	1.02	1.06	1.03	1.04
10.00	19.93	19.47	19.22	19.28	1.02	1.04	1.04	1.03
10.00	69.72	67.45	66.64	67.02	1.03	1.05	1.04	1.04
10.00	125.53	120.59	119.32	120.28	1.04	1.05	1.05	1.05
15.00	8.03	8.05	7.93	7.97	1.00	1.01	1.01	1.01
15.00	20.05	19.95	19.69	19.73	1.00	1.02	1.02	1.01
15.00	69.93	68.85	68.09	68.36	1.02	1.03	1.02	1.02
15.00	125.49	122.99	121.80	121.94	1.02	1.03	1.03	1.03
20.00	8.03	8.30	8.20	8.21	0.97	0.98	0.98	0.98
20.00	20.10	20.60	20.40	20.40	0.98	0.99	0.98	0.98
20.00	70.12	71.17	70.42	70.70	0.99	1.00	0.99	0.99
20.00	125.42	126.75	125.82	126.10	0.99	1.00	0.99	0.99
30.00	8.02	8.20	8.10	8.14	0.98	0.99	0.98	0.98
30.00	20.02	20.30	20.06	20.13	0.99	1.00	0.99	0.99
30.00	70.17	70.60	69.70	70.04	1.00	1.00	1.00	1.00
30.00	125.13	124.97	124.08	124.40	1.00	1.01	1.00	1.01
50.00	8.01	8.23	8.13	8.18	0.98	0.98	0.98	0.98
50.00	20.02	20.54	20.32	20.36	0.98	0.98	0.98	0.98
50.00	70.06	71.48	70.67	71.04	0.98	0.99	0.98	0.99
50.00	125.31	127.59	126.47	127.04	0.98	0.99	0.99	0.99
75.00	7.97	8.17	8.10	8.10	0.97	0.99	0.98	0.98
75.00	20.02	20.53	20.42	20.34	0.97	0.98	0.99	0.98
75.00	69.50	70.77	70.23	70.26	0.99	0.99	0.99	0.99
75.00	124.45	126.26	125.57	125.35	0.99	0.99	0.99	0.99
100.00	7.97	8.19	8.11	8.13	0.97	0.98	0.98	0.98
100.00	20.13	20.56	20.42	20.42	0.98	0.99	0.99	0.98
100.00	69.91	70.80	70.21	70.40	0.99	1.00	0.99	0.99
100.00	124.52	126.26	125.53	125.60	0.98	0.99	0.99	0.99
150.00	8.01	8.16	8.11	8.12	0.98	0.99	0.99	0.99
150.00	19.95	20.21	20.08	20.01	0.99	0.99	1.00	0.99
150.00	69.83	70.46	70.04	69.84	0.99	1.00	1.00	1.00
150.00	124.55	125.17	124.64	124.25	1.00	1.00	1.00	1.00
200.00	7.97	8.38	8.36	8.23	0.95	0.95	0.97	0.96
200.00	19.92	20.88	20.81	20.41	0.95	0.96	0.98	0.96
200.00	69.59	72.50	72.39	71.23	0.96	0.96	0.98	0.97
200.00	124.56	128.97	129.29	127.06	0.97	0.96	0.98	0.97



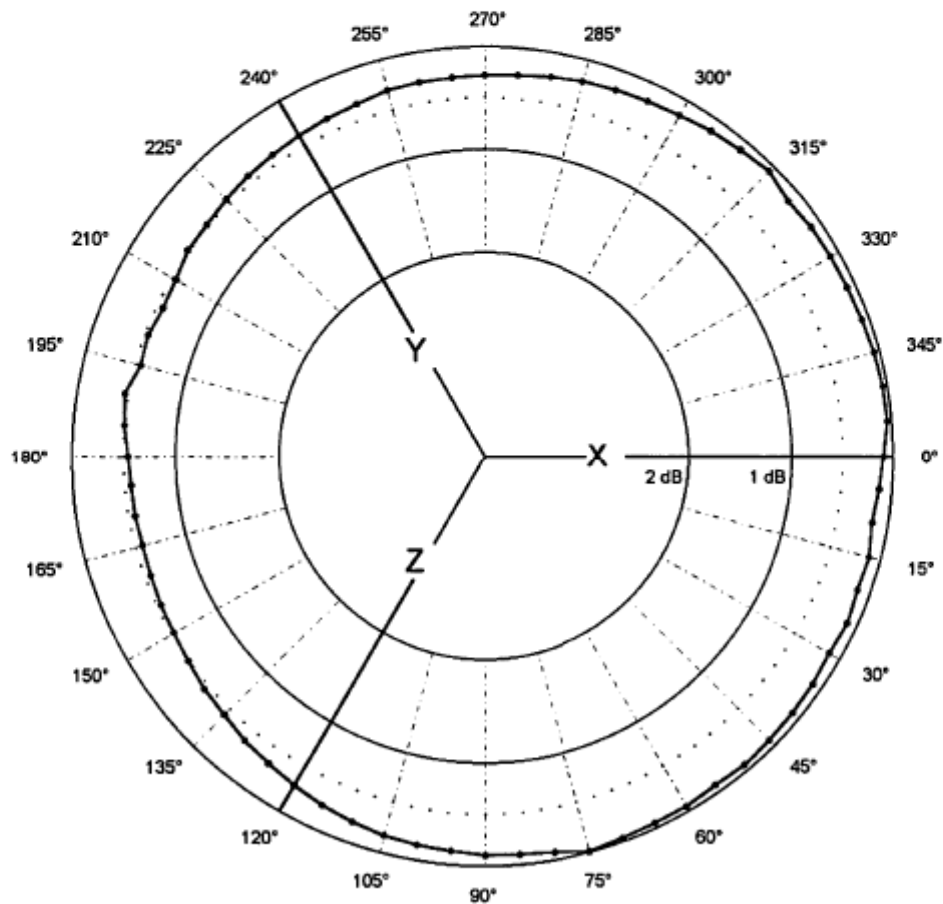
Frequency Response Calibration Factors
Model E100 Serial Number 00126277
Date of Calibration 10 May 2011

Frequency (MHz)	Applied V/m	Probe Reading			Correction Factor			
		X	Y	Z	X	Y	Z	Avg
250.00	8.04	8.29	8.13	8.30	0.97	0.99	0.97	0.98
250.00	20.12	20.73	20.34	20.65	0.97	0.99	0.97	0.98
250.00	70.27	72.21	70.78	72.10	0.97	1.00	0.97	0.98
250.00	125.50	128.72	126.86	129.06	0.98	0.99	0.97	0.98
300.00	8.00	8.27	8.12	8.23	0.97	0.98	0.97	0.98
300.00	19.94	20.56	20.23	20.41	0.97	0.99	0.98	0.98
300.00	70.30	71.90	70.76	71.68	0.98	0.99	0.98	0.98
300.00	124.48	127.44	125.62	127.05	0.97	0.99	0.98	0.98
400.00	8.00	8.24	8.12	8.19	0.97	0.98	0.98	0.98
400.00	20.03	20.53	20.22	20.35	0.98	0.99	0.98	0.98
400.00	69.79	71.15	70.05	70.76	0.98	1.00	0.98	0.99
400.00	125.03	126.95	125.67	126.40	0.99	0.99	0.99	0.99
500.00	7.99	8.11	8.06	8.02	0.99	0.99	1.00	0.99
500.00	20.12	20.38	20.30	20.12	0.98	0.99	1.00	0.99
500.00	70.18	70.78	70.48	70.18	0.99	1.00	1.00	1.00
500.00	124.55	125.52	125.09	124.30	0.99	1.00	1.00	1.00
600.00	7.96	7.84	7.74	7.79	1.02	1.03	1.02	1.02
600.00	20.01	19.61	19.36	19.48	1.02	1.03	1.03	1.03
600.00	70.18	68.55	67.62	68.29	1.02	1.04	1.03	1.03
600.00	124.97	121.80	120.20	121.54	1.03	1.04	1.03	1.03
700.00	7.96	7.62	7.44	7.57	1.05	1.07	1.05	1.06
700.00	20.04	19.05	18.59	18.95	1.06	1.08	1.06	1.06
700.00	69.61	66.10	64.43	65.93	1.05	1.08	1.06	1.06
700.00	125.08	118.72	115.95	118.71	1.05	1.08	1.05	1.06
800.00	7.97	7.55	7.45	7.48	1.05	1.07	1.07	1.06
800.00	19.99	18.86	18.59	18.64	1.06	1.08	1.07	1.07
800.00	70.27	66.19	65.37	65.58	1.06	1.08	1.07	1.07
800.00	124.83	117.02	116.10	116.53	1.06	1.08	1.07	1.07
900.00	7.99	8.05	7.99	7.90	0.99	1.00	1.01	1.00
900.00	19.87	19.97	19.80	19.51	1.00	1.00	1.02	1.01
900.00	70.33	70.31	69.68	69.09	1.00	1.01	1.02	1.01
900.00	124.88	125.13	123.25	121.99	1.00	1.01	1.02	1.01
1000.00	7.99	8.35	8.07	8.29	0.95	0.99	0.96	0.97
1000.00	19.91	20.73	20.02	20.50	0.96	1.00	0.97	0.98
1000.00	69.88	72.46	70.03	72.02	0.96	1.00	0.97	0.98
1000.00	124.64	128.78	124.85	128.46	0.97	1.00	0.97	0.98
2000.00	20.13	20.27	18.83	19.96	0.99	1.07	1.01	1.02
2450.00	20.07	19.16	19.30	19.68	1.05	1.04	1.02	1.04
3000.00	20.01	19.48	18.46	19.39	1.03	1.08	1.03	1.05
3500.00	19.72	20.68	19.85	19.85	0.95	0.99	0.99	0.98
4000.00	20.03	19.85	18.92	20.20	1.01	1.06	0.99	1.02
5000.00	19.74	13.37	13.95	14.54	1.48	1.41	1.36	1.42
5500.00	19.99	15.19	13.96	13.30	1.32	1.43	1.50	1.42
6000.00	20.07	12.82	14.90	15.21	1.57	1.35	1.32	1.41



PROBE ROTATIONAL RESPONSE

Model E100
S/N 00126277
Date 10-May-2011
Time 13:43:11
Variation 0.57 dB



• Isotropic response measured in a 20 V/m field at 400 MHz

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Cert I.D.: 84881

Certificate of Calibration Conformance

Page 1 of 2

The instrument identified below has been individually calibrated in compliance with the following standard(s):

IEEE 1309 - 2005, Institute of Electrical and Electronics Engineers, Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas from 9 kHz to 40 GHz

Environment: Laboratory MTE is maintained in a temperature controlled environment with ambient conditions from 18 to 28 C, relative humidity less than 90%. The instrument under test has been calibrated in a suitable environment using an EMCO TEM Cell 5101C, GTEM! 5305 and an RF Shielded EMC Chamber which is conducive to maintaining accurate and reliable measurement quality.

Manufacturer:	ETS-Lindgren	Operating Range:	5-300MHz / 30mA/m-10A/m
Model Number:	H200	Instrument Type:	Isotropic Magnetic Field Probe (2)
Serial Number/ ID:	00084225	Date Code:	
Tracking Number:	S000022195	Alternate ID:	
Date Completed:	10-May-11	Customer:	AGILENT/MOTOROLA (FL)
Test Type:	Standard Field, Field Strength		
Calibration Uncertainty:	Direct Field Method	1.15dB	
k=2, (95% Confidence Level)			

Test Remarks: Special Cal: Calibrated to customer specified frequencies. Calibrated with HI-2200 S/N 00086887.

Calibration Traceability: All Measuring and Test Equipment (MTE) identified below are traceable to the SI units through the National Institute for Standards and Technology (NIST). Calibration Laboratory and Quality System controls are compliant with ISO/IEC 17025-2005 and ANSI/NCSL Z540-1-1994.

Standards and Equipment Used:**Make / Model / Name / S/N / Recall Date**

Agilent	8648C	Signal Generator	3623A03573	24-Feb-12
Boonton	9200C	RF Voltmeter	324501AE	11-Oct-11
Hewlett Packard	437B	HP Power Meter	3125U12370	15-Jun-11
Marconi	2022	Signal Generator	119019/077	23-Sep-11

Condition of Instrument**Upon Receipt:**

In Tolerance to Internal Quality Standards

On Release:

In Tolerance to Internal Quality Standards


 Calibration Completed By
 Maynard Reich, Calibration Technician


 Attested and Issued on 10-May-11
 Richard Goodlow, Calibration Supervisor

This document provides traceability of measurements to recognized national standards using controlled processes at the ETS-Lindgren Calibration Laboratory. Uncertainties listed are derived from the methods described by NIST Tech Note 1297. This certificate and report may not be reproduced, except in full, without the written approval of ETS-Lindgren Calibration Laboratory in accordance with ISO/IEC 17025-2005 and ANSI/NCSL Z540-1-1994. QAF 1127 (03/11)



Frequency Response Calibration Factors
ETS-Lindgren Model H200 Serial Number 00084225
Date of Calibration 10 May 2011

Frequency (MHz)	Applied Field (A/m)			Indicated Field (A/m)			Correction Factor				Error (dB)		
	X	Y	Z	X	Y	Z	X	Y	Z	AVG	X	Y	Z
10.00	0.079	0.080	0.079	0.076	0.077	0.076	1.04	1.04	1.05	1.04	-0.37	-0.36	-0.39
15.00	0.079	0.080	0.079	0.079	0.080	0.079	1.00	1.00	1.00	1.00	-0.03	-0.03	-0.04
30.00	0.079	0.079	0.079	0.080	0.080	0.079	1.00	0.99	1.00	0.99	0.04	0.06	0.04
50.00	0.080	0.080	0.080	0.081	0.082	0.082	0.98	0.98	0.98	0.98	0.16	0.18	0.20
75.00	0.080	0.080	0.080	0.082	0.083	0.083	0.97	0.96	0.96	0.96	0.26	0.37	0.39
100.00	0.079	0.079	0.079	0.084	0.085	0.086	0.95	0.93	0.92	0.93	0.45	0.63	0.69
150.00	0.080	0.080	0.079	0.086	0.093	0.093	0.94	0.86	0.85	0.88	0.56	1.31	1.42
175.00	0.079	0.079	0.079	0.086	0.095	0.099	0.93	0.83	0.80	0.85	0.66	1.62	1.90
200.00	0.080	0.080	0.080	0.089	0.101	0.109	0.89	0.79	0.73	0.80	0.99	2.08	2.70
250.00	0.080	0.080	0.080	0.101	0.115	0.143	0.79	0.69	0.56	0.68	2.02	3.19	5.07
300.00	0.080	0.080	0.080	0.134	0.116	0.145	0.59	0.68	0.55	0.61	4.54	3.30	5.18

Appendix C - Photos of Assessed Antennas

(Refer to Exhibit 7B)

Appendix D – MPE Measurement Results

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements										DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Bystander (BS) Positions													
										20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	E	0.99	BS	0.03	0.05	0.06	0.04	0.03	0.04	0.09	0.14	0.20	0.24	0.5	0.092	0.046	0.047
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	E	1.00	BS	0.03	0.05	0.05	0.03	0.02	0.05	0.09	0.15	0.19	0.22	0.5	0.088	0.044	0.045
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	E	1.00	BS	0.02	0.03	0.03	0.02	0.03	0.06	0.11	0.16	0.20	0.22	0.5	0.088	0.044	0.046
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	E	0.99	BS	0.03	0.04	0.03	0.03	0.06	0.12	0.17	0.21	0.23	0.24	0.5	0.116	0.057	0.060
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	E	0.98	BS	0.02	0.03	0.02	0.02	0.06	0.14	0.18	0.22	0.25	0.27	0.5	0.121	0.059	0.060
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	E	0.97	BS	0.01	0.01	0.01	0.05	0.13	0.17	0.20	0.24	0.27	0.28	0.5	0.137	0.066	0.067
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	E	1.00	BS	0.04	0.07	0.06	0.04	0.03	0.08	0.12	0.17	0.19	0.19	0.5	0.099	0.050	0.051
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	E	1.00	BS	0.03	0.05	0.04	0.03	0.05	0.10	0.16	0.19	0.23	0.23	0.5	0.111	0.056	0.057
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	E	0.99	BS	0.04	0.05	0.04	0.02	0.08	0.15	0.21	0.26	0.25	0.24	0.5	0.134	0.066	0.069
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	E	0.98	BS	0.02	0.03	0.02	0.02	0.07	0.12	0.15	0.19	0.20	0.21	0.5	0.103	0.050	0.052
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	E	0.97	BS	0.01	0.01	0.01	0.04	0.09	0.12	0.14	0.17	0.18	0.20	0.5	0.097	0.047	0.047
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	BS	0.05	0.15	0.16	0.11	0.08	0.10	0.15	0.20	0.21	0.19	0.5	0.140	0.069	0.071
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	BS	0.04	0.04	0.14	0.10	0.08	0.11	0.17	0.20	0.22	0.20	0.5	0.130	0.065	0.067
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	BS	0.04	0.14	0.16	0.07	0.06	0.10	0.16	0.20	0.21	0.20	0.5	0.134	0.067	0.069
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	BS	0.06	0.09	0.09	0.07	0.06	0.11	0.19	0.23	0.24	0.23	0.5	0.137	0.069	0.071
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	BS	0.05	0.08	0.06	0.04	0.06	0.12	0.18	0.24	0.25	0.23	0.5	0.131	0.066	0.068
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.04	0.07	0.05	0.04	0.08	0.15	0.20	0.25	0.26	0.24	0.5	0.138	0.069	0.071
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.04	0.06	0.05	0.04	0.07	0.14	0.20	0.24	0.22	0.22	0.5	0.128	0.064	0.066
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	E	0.99	BS	0.04	0.06	0.04	0.05	0.12	0.21	0.28	0.30	0.27	0.24	0.5	0.161	0.080	0.083
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	BS	0.03	0.05	0.03	0.04	0.12	0.21	0.21	0.22	0.22	0.21	0.5	0.134	0.066	0.068
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	BS	0.03	0.05	0.03	0.04	0.10	0.17	0.21	0.22	0.20	0.21	0.5	0.126	0.062	0.064
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	BS	0.02	0.03	0.02	0.05	0.14	0.20	0.19	0.22	0.24	0.24	0.5	0.135	0.066	0.067
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	BS	0.02	0.02	0.03	0.09	0.19	0.22	0.24	0.25	0.24	0.25	0.5	0.155	0.075	0.076

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements									DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)	
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Bystander (BS) Positions													
										20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm					200 cm
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	BS	0.05	0.09	0.11	0.09	0.08	0.10	0.14	0.17	0.18	0.17	0.5	0.118	0.058	0.060
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	BS	0.06	0.12	0.10	0.08	0.09	0.08	0.15	0.18	0.17	0.18	0.5	0.121	0.061	0.062
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	BS	0.06	0.10	0.11	0.07	0.08	0.12	0.15	0.20	0.22	0.31	0.5	0.142	0.071	0.073
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	BS	0.05	0.10	0.08	0.05	0.05	0.11	0.17	0.21	0.21	0.20	0.5	0.123	0.062	0.064
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	BS	0.04	0.06	0.06	0.04	0.06	0.12	0.20	0.23	0.25	0.23	0.5	0.129	0.065	0.067
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.04	0.07	0.06	0.04	0.08	0.15	0.22	0.24	0.25	0.24	0.5	0.139	0.070	0.072
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.04	0.05	0.04	0.03	0.06	0.11	0.17	0.20	0.20	0.19	0.5	0.109	0.055	0.056
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	E	0.99	BS	0.04	0.06	0.05	0.03	0.09	0.16	0.24	0.24	0.25	0.22	0.5	0.138	0.068	0.071
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	BS	0.04	0.05	0.04	0.04	0.11	0.19	0.23	0.23	0.21	0.22	0.5	0.136	0.067	0.069
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	BS	0.03	0.04	0.02	0.03	0.08	0.12	0.16	0.17	0.16	0.16	0.5	0.097	0.048	0.049
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	BS	0.02	0.02	0.02	0.04	0.12	0.16	0.20	0.20	0.21	0.20	0.5	0.119	0.058	0.059
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	BS	0.01	0.02	0.03	0.09	0.16	0.20	0.22	0.21	0.22	0.25	0.5	0.141	0.068	0.069
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	H	0.89	BS	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.06	0.08	0.09	0.5	0.048	0.034	0.035
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	H	0.89	BS	0.02	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.08	0.10	0.5	0.054	0.044	0.045
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	H	0.88	BS	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.10	0.5	0.053	0.041	0.043
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	H	0.87	BS	0.03	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.5	0.061	0.053	0.055
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	H	0.86	BS	0.03	0.03	0.04	0.05	0.06	0.06	0.07	0.09	0.11	0.11	0.5	0.065	0.059	0.060
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	H	0.85	BS	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.12	0.5	0.068	0.063	0.064
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	H	0.88	BS	0.03	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.09	0.5	0.063	0.058	0.060
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	H	0.88	BS	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.09	0.09	0.5	0.062	0.056	0.058
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	H	0.87	BS	0.02	0.04	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.10	0.5	0.064	0.058	0.060
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	H	0.86	BS	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.5	0.060	0.050	0.052
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	H	0.85	BS	0.02	0.03	0.03	0.05	0.05	0.06	0.07	0.08	0.09	0.10	0.5	0.058	0.046	0.046

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements										DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Bystander (BS) Positions													
										20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	BS	0.03	0.04	0.05	0.07	0.08	0.08	0.09	0.09	0.09	0.09	0.5	0.071	0.075	0.077
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	BS	0.03	0.04	0.05	0.07	0.08	0.08	0.09	0.09	0.09	0.09	0.5	0.071	0.075	0.077
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	BS	0.03	0.04	0.06	0.07	0.08	0.09	0.09	0.09	0.09	0.09	0.5	0.073	0.080	0.081
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	BS	0.03	0.05	0.06	0.07	0.08	0.08	0.09	0.09	0.09	0.09	0.5	0.073	0.078	0.080
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.09	0.09	0.09	0.5	0.069	0.069	0.072
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.09	0.09	0.09	0.5	0.068	0.067	0.070
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.09	0.09	0.09	0.5	0.068	0.067	0.070
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	H	0.87	BS	0.03	0.04	0.05	0.07	0.08	0.08	0.09	0.09	0.09	0.10	0.5	0.072	0.074	0.077
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.08	0.09	0.10	0.5	0.068	0.066	0.068
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.09	0.09	0.10	0.5	0.069	0.068	0.070
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	BS	0.03	0.03	0.03	0.05	0.06	0.07	0.08	0.08	0.09	0.10	0.5	0.062	0.054	0.055
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	BS	0.03	0.04	0.05	0.07	0.08	0.08	0.09	0.10	0.11	0.11	0.5	0.076	0.079	0.080
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.08	0.08	0.08	0.5	0.065	0.063	0.065
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.09	0.09	0.09	0.5	0.068	0.069	0.071
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	BS	0.03	0.04	0.06	0.07	0.08	0.09	0.09	0.09	0.09	0.09	0.5	0.073	0.080	0.081
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	BS	0.03	0.04	0.05	0.07	0.07	0.08	0.09	0.09	0.09	0.09	0.5	0.070	0.072	0.074
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.09	0.09	0.09	0.5	0.068	0.067	0.070
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.09	0.09	0.09	0.5	0.069	0.069	0.072
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.02	0.03	0.04	0.06	0.07	0.07	0.08	0.08	0.08	0.08	0.5	0.061	0.054	0.056
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	H	0.87	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.08	0.09	0.09	0.5	0.067	0.064	0.067
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	BS	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.08	0.09	0.10	0.5	0.068	0.066	0.068

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements										DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Bystander (BS) Positions													
										20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	BS	0.02	0.03	0.04	0.05	0.06	0.06	0.07	0.08	0.08	0.08	0.5	0.057	0.046	0.047
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	BS	0.02	0.03	0.04	0.06	0.07	0.07	0.08	0.08	0.09	0.10	0.5	0.064	0.057	0.058
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	BS	0.03	0.03	0.05	0.06	0.07	0.08	0.08	0.10	0.10	0.11	0.5	0.071	0.069	0.070
Trunk																							
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	E	0.99	BS	0.03	0.05	0.07	0.11	0.17	0.27	0.37	0.38	0.34	0.34	0.5	0.213	0.105	0.108
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	E	1.00	BS	0.04	0.07	0.11	0.16	0.23	0.34	0.41	0.41	0.38	0.36	0.5	0.251	0.126	0.128
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	E	1.00	BS	0.04	0.07	0.10	0.12	0.17	0.27	0.35	0.38	0.33	0.32	0.5	0.215	0.108	0.111
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	E	0.99	BS	0.04	0.07	0.08	0.11	0.18	0.29	0.35	0.35	0.33	0.33	0.5	0.213	0.105	0.109
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	E	0.98	BS	0.05	0.08	0.09	0.13	0.24	0.37	0.43	0.41	0.38	0.31	0.5	0.249	0.122	0.124
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	E	0.97	BS	0.04	0.06	0.08	0.14	0.25	0.38	0.43	0.43	0.39	0.36	0.5	0.256	0.124	0.126
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	E	1.00	BS	0.08	0.13	0.18	0.21	0.24	0.26	0.29	0.30	0.29	0.25	0.5	0.223	0.112	0.115
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	E	1.00	BS	0.08	0.14	0.17	0.18	0.20	0.25	0.29	0.34	0.30	0.22	0.5	0.217	0.109	0.112
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	E	0.99	BS	0.07	0.10	0.10	0.13	0.18	0.26	0.29	0.32	0.27	0.24	0.5	0.196	0.097	0.100
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	E	0.98	BS	0.04	0.06	0.08	0.12	0.19	0.28	0.32	0.30	0.27	0.23	0.5	0.189	0.093	0.095
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	E	0.97	BS	0.03	0.05	0.06	0.09	0.15	0.22	0.24	0.23	0.23	0.22	0.5	0.152	0.074	0.074
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	BS	0.12	0.18	0.21	0.23	0.25	0.26	0.32	0.30	0.26	0.20	0.5	0.233	0.115	0.118
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	BS	0.16	0.24	0.30	0.31	0.32	0.37	0.39	0.37	0.33	0.26	0.5	0.305	0.153	0.157
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	BS	0.16	0.24	0.29	0.29	0.29	0.33	0.37	0.39	0.34	0.26	0.5	0.296	0.148	0.151
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	BS	0.15	0.23	0.25	0.25	0.26	0.31	0.37	0.38	0.34	0.25	0.5	0.279	0.140	0.144
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	BS	0.12	0.19	0.21	0.19	0.23	0.30	0.36	0.36	0.30	0.22	0.5	0.248	0.124	0.129
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.12	0.18	0.19	0.18	0.22	0.30	0.35	0.34	0.28	0.21	0.5	0.237	0.119	0.123
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.09	0.14	0.16	0.17	0.20	0.25	0.30	0.28	0.23	0.17	0.5	0.199	0.100	0.103
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	E	0.99	BS	0.10	0.14	0.14	0.14	0.18	0.25	0.29	0.27	0.22	0.15	0.5	0.188	0.093	0.097
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	BS	0.08	0.13	0.16	0.19	0.26	0.32	0.35	0.32	0.25	0.18	0.5	0.224	0.111	0.114

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements										DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Bystander (BS) Positions													
										20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	BS	0.08	0.11	0.12	0.18	0.21	0.29	0.32	0.29	0.22	0.16	0.5	0.198	0.098	0.100
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	BS	0.08	0.13	0.15	0.21	0.31	0.38	0.36	0.31	0.22	0.15	0.5	0.230	0.113	0.114
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	BS	0.11	0.14	0.18	0.23	0.33	0.40	0.40	0.34	0.27	0.20	0.5	0.260	0.126	0.128
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	BS	0.09	0.13	0.16	0.21	0.26	0.27	0.29	0.28	0.24	0.18	0.5	0.211	0.104	0.107
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	BS	0.11	0.17	0.23	0.28	0.30	0.31	0.34	0.33	0.28	0.21	0.5	0.256	0.128	0.131
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	BS	0.14	0.22	0.29	0.34	0.35	0.37	0.40	0.39	0.33	0.25	0.5	0.308	0.154	0.158
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	BS	0.12	0.19	0.24	0.26	0.26	0.30	0.34	0.36	0.31	0.21	0.5	0.259	0.130	0.134
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	BS	0.11	0.19	0.24	0.24	0.25	0.29	0.35	0.36	0.31	0.22	0.5	0.256	0.128	0.133
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.11	0.18	0.22	0.22	0.25	0.30	0.37	0.33	0.28	0.20	0.5	0.246	0.123	0.127
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	BS	0.06	0.11	0.13	0.13	0.15	0.18	0.21	0.20	0.17	0.12	0.5	0.146	0.073	0.076
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	E	0.99	BS	0.08	0.11	0.12	0.14	0.17	0.23	0.26	0.25	0.19	0.14	0.5	0.169	0.084	0.087
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	BS	0.08	0.13	0.15	0.18	0.25	0.32	0.35	0.32	0.25	0.18	0.5	0.221	0.109	0.112
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	BS	0.03	0.04	0.04	0.06	0.08	0.11	0.12	0.11	0.09	0.07	0.5	0.075	0.037	0.038
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	BS	0.06	0.10	0.13	0.18	0.25	0.29	0.28	0.24	0.18	0.12	0.5	0.183	0.090	0.091
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	BS	0.08	0.12	0.15	0.21	0.30	0.37	0.36	0.31	0.24	0.18	0.5	0.232	0.113	0.114
45 (corner)																							
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	BS	0.24	0.40	0.48	0.53	0.50	0.46	0.41	0.38	0.33	0.26	0.5	0.399	0.200	0.204
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	BS	0.21	0.37	0.38	0.40	0.42	0.39	0.34	0.30	0.26	0.22	0.5	0.329	0.160	0.162
90 (side)																							
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	BS	0.21	0.40	0.39	0.31	0.31	0.37	0.34	0.33	0.30	0.24	0.5	0.320	0.160	0.164
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	BS	0.16	0.26	0.23	0.27	0.39	0.39	0.35	0.31	0.27	0.23	0.5	0.286	0.139	0.141

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements										DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Bystander (BS) Positions													
										20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	H	0.89	BS	0.03	0.03	0.03	0.05	0.07	0.09	0.11	0.13	0.14	0.14	0.5	0.082	0.100	0.103
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	H	0.89	BS	0.03	0.03	0.04	0.06	0.08	0.11	0.13	0.14	0.15	0.14	0.5	0.091	0.124	0.126
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	H	0.88	BS	0.03	0.03	0.05	0.06	0.08	0.10	0.11	0.13	0.13	0.13	0.5	0.085	0.105	0.109
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	H	0.87	BS	0.04	0.04	0.06	0.08	0.09	0.11	0.12	0.13	0.13	0.12	0.5	0.092	0.121	0.125
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	H	0.86	BS	0.03	0.04	0.06	0.08	0.10	0.11	0.13	0.13	0.13	0.12	0.5	0.093	0.121	0.123
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	H	0.85	BS	0.03	0.04	0.06	0.09	0.10	0.12	0.14	0.15	0.14	0.13	0.5	0.100	0.136	0.138
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	H	0.88	BS	0.05	0.05	0.06	0.08	0.11	0.12	0.12	0.12	0.11	0.09	0.5	0.091	0.121	0.125
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	H	0.88	BS	0.05	0.04	0.06	0.09	0.11	0.12	0.12	0.11	0.10	0.09	0.5	0.089	0.116	0.120
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	H	0.87	BS	0.04	0.04	0.06	0.09	0.11	0.12	0.12	0.12	0.10	0.09	0.5	0.089	0.113	0.117
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	H	0.86	BS	0.03	0.04	0.06	0.08	0.10	0.11	0.12	0.11	0.10	0.09	0.5	0.084	0.098	0.101
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	H	0.85	BS	0.03	0.04	0.06	0.08	0.10	0.11	0.12	0.12	0.11	0.10	0.5	0.087	0.103	0.104
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	BS	0.06	0.06	0.06	0.09	0.11	0.12	0.11	0.10	0.09	0.08	0.5	0.088	0.116	0.119
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	BS	0.07	0.06	0.07	0.09	0.11	0.12	0.12	0.11	0.10	0.08	0.5	0.093	0.129	0.133
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	BS	0.07	0.06	0.07	0.10	0.12	0.13	0.13	0.12	0.10	0.09	0.5	0.099	0.146	0.150
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	BS	0.06	0.06	0.07	0.10	0.12	0.13	0.13	0.12	0.10	0.09	0.5	0.098	0.140	0.145
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	BS	0.06	0.05	0.07	0.10	0.12	0.13	0.13	0.12	0.10	0.08	0.5	0.096	0.135	0.140
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.06	0.05	0.08	0.10	0.12	0.12	0.13	0.11	0.09	0.08	0.5	0.094	0.129	0.133
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.05	0.05	0.07	0.09	0.11	0.12	0.11	0.10	0.09	0.07	0.5	0.086	0.108	0.112
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	H	0.87	BS	0.05	0.05	0.07	0.10	0.11	0.12	0.12	0.11	0.09	0.08	0.5	0.090	0.116	0.120
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	BS	0.04	0.05	0.07	0.10	0.12	0.13	0.12	0.11	0.09	0.08	0.5	0.091	0.118	0.121
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	BS	0.04	0.04	0.07	0.10	0.12	0.12	0.12	0.11	0.09	0.08	0.5	0.089	0.113	0.116
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	BS	0.04	0.05	0.08	0.11	0.13	0.13	0.12	0.10	0.09	0.07	0.5	0.092	0.118	0.119
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	BS	0.05	0.06	0.09	0.12	0.13	0.13	0.13	0.12	0.11	0.09	0.5	0.103	0.144	0.147

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements										DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Bystander (BS) Positions													
										20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	BS	0.06	0.05	0.05	0.08	0.10	0.11	0.11	0.10	0.09	0.07	0.5	0.082	0.100	0.103
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	BS	0.06	0.05	0.06	0.09	0.10	0.11	0.12	0.11	0.09	0.08	0.5	0.087	0.113	0.116
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	BS	0.06	0.06	0.07	0.10	0.12	0.13	0.13	0.12	0.10	0.09	0.5	0.098	0.143	0.147
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	BS	0.06	0.05	0.07	0.10	0.12	0.13	0.13	0.12	0.11	0.09	0.5	0.098	0.140	0.145
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	BS	0.06	0.05	0.07	0.09	0.11	0.12	0.12	0.11	0.10	0.08	0.5	0.091	0.121	0.126
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.05	0.05	0.07	0.10	0.12	0.12	0.12	0.11	0.09	0.08	0.5	0.091	0.121	0.125
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	BS	0.04	0.04	0.06	0.08	0.10	0.10	0.10	0.09	0.08	0.06	0.5	0.075	0.082	0.085
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	H	0.87	BS	0.05	0.04	0.06	0.09	0.11	0.11	0.12	0.10	0.09	0.07	0.5	0.084	0.101	0.105
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	BS	0.04	0.05	0.07	0.10	0.12	0.12	0.12	0.11	0.09	0.07	0.5	0.089	0.113	0.116
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	BS	0.03	0.03	0.04	0.06	0.07	0.08	0.07	0.06	0.05	0.05	0.5	0.054	0.042	0.043
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	BS	0.04	0.05	0.08	0.11	0.13	0.13	0.12	0.11	0.09	0.07	0.5	0.093	0.121	0.122
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	BS	0.05	0.06	0.09	0.11	0.13	0.13	0.13	0.11	0.10	0.09	0.5	0.100	0.136	0.138
45 (corner)																							
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	BS	0.07	0.09	0.11	0.13	0.15	0.14	0.14	0.12	0.10	0.09	0.5	0.114	0.194	0.198
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	BS	0.09	0.11	0.12	0.14	0.14	0.13	0.13	0.12	0.11	0.09	0.5	0.118	0.190	0.192
90 (side)																							
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	BS	0.06	0.09	0.11	0.13	0.14	0.14	0.12	0.11	0.10	0.08	0.5	0.108	0.174	0.178
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	BS	0.08	0.11	0.12	0.13	0.13	0.13	0.12	0.11	0.10	0.09	0.5	0.112	0.171	0.173

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	E	0.99	PB	0.04	0.05	0.04	0.5	0.043	0.021	0.022
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	E	1.00	PB	0.06	0.09	0.08	0.5	0.077	0.038	0.039
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PB	0.01	0.06	0.08	0.5	0.050	0.025	0.026
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	E	0.99	PB	0.05	0.01	0.01	0.5	0.023	0.012	0.012
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	E	0.98	PB	0.06	0.07	0.11	0.5	0.080	0.039	0.040
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	E	0.97	PB	0.05	0.04	0.11	0.5	0.067	0.032	0.033
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	E	1.00	PB	0.09	0.13	0.11	0.5	0.110	0.055	0.057
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PB	0.05	0.11	0.13	0.5	0.097	0.048	0.050
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	E	0.99	PB	0.07	0.03	0.01	0.5	0.037	0.018	0.019
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	E	0.98	PB	0.06	0.07	0.12	0.5	0.083	0.041	0.042
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	E	0.97	PB	0.05	0.03	0.07	0.5	0.050	0.024	0.024
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PB	0.10	0.16	0.20	0.5	0.153	0.076	0.078
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PB	0.30	0.35	0.45	0.5	0.367	0.183	0.188
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PB	0.23	0.29	0.25	0.5	0.257	0.128	0.131
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PB	0.14	0.18	0.13	0.5	0.150	0.075	0.078
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PB	0.08	0.08	0.05	0.5	0.071	0.036	0.037
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	0.14	0.13	0.09	0.5	0.120	0.060	0.062
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	0.12	0.13	0.08	0.5	0.111	0.056	0.057
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	E	0.99	PB	0.07	0.08	0.05	0.5	0.067	0.033	0.034
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PB	0.12	0.13	0.13	0.5	0.127	0.063	0.064
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PB	0.12	0.13	0.14	0.5	0.130	0.064	0.066
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PB	0.16	0.09	0.11	0.5	0.120	0.059	0.059
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PB	0.11	0.04	0.11	0.5	0.087	0.042	0.043

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PB	0.19	0.15	0.10	0.5	0.147	0.073	0.075
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PB	0.30	0.43	0.43	0.5	0.387	0.193	0.198
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PB	0.25	0.30	0.26	0.5	0.270	0.135	0.138
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PB	0.13	0.15	0.13	0.5	0.137	0.068	0.071
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PB	0.05	0.09	0.09	0.5	0.077	0.038	0.040
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	0.09	0.15	0.15	0.5	0.130	0.065	0.067
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	0.07	0.11	0.12	0.5	0.100	0.050	0.052
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	E	0.99	PB	0.04	0.07	0.05	0.5	0.053	0.026	0.027
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PB	0.14	0.13	0.13	0.5	0.133	0.066	0.068
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PB	0.11	0.09	0.10	0.5	0.100	0.050	0.051
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PB	0.09	0.08	0.15	0.5	0.107	0.052	0.053
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PB	0.11	0.04	0.09	0.5	0.080	0.039	0.039
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	E	0.99	PF	0.01	0.01	0.01	0.5	0.010	0.005	0.005
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	E	1.00	PF	0.02	0.03	0.03	0.5	0.027	0.013	0.014
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PF	0.01	0.02	0.02	0.5	0.017	0.008	0.009
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	E	0.99	PF	0.01	0.03	0.03	0.5	0.023	0.012	0.012
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	E	0.98	PF	0.03	0.04	0.05	0.5	0.040	0.020	0.020
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	E	0.97	PF	0.03	0.03	0.03	0.5	0.030	0.015	0.015
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	E	1.00	PF	0.04	0.05	0.04	0.5	0.043	0.022	0.022
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PF	0.03	0.06	0.06	0.5	0.050	0.025	0.026
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	E	0.99	PF	0.02	0.05	0.02	0.5	0.030	0.015	0.015
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	E	0.98	PF	0.02	0.05	0.04	0.5	0.037	0.018	0.018
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	E	0.97	PF	0.01	0.01	0.01	0.5	0.010	0.005	0.005

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.I.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PF	0.05	0.05	0.06	0.5	0.053	0.026	0.027
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PF	0.09	0.08	0.06	0.5	0.077	0.038	0.039
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PF	0.08	0.09	0.07	0.5	0.080	0.040	0.041
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PF	0.06	0.09	0.09	0.5	0.080	0.040	0.041
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PF	0.05	0.09	0.06	0.5	0.067	0.033	0.035
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.04	0.08	0.07	0.5	0.063	0.032	0.033
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.04	0.06	0.07	0.5	0.057	0.028	0.029
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	E	0.99	PF	0.02	0.07	0.09	0.5	0.060	0.030	0.031
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PF	0.03	0.07	0.09	0.5	0.063	0.031	0.032
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PF	0.02	0.06	0.09	0.5	0.057	0.028	0.029
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PF	0.02	0.03	0.07	0.5	0.040	0.020	0.020
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PF	0.02	0.03	0.03	0.5	0.027	0.013	0.013
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PF	0.04	0.06	0.06	0.5	0.053	0.026	0.027
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PF	0.08	0.09	0.08	0.5	0.083	0.042	0.043
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PF	0.06	0.12	0.09	0.5	0.090	0.045	0.046
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PF	0.03	0.05	0.04	0.5	0.040	0.020	0.021
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PF	0.04	0.05	0.07	0.5	0.053	0.027	0.028
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.05	0.06	0.09	0.5	0.067	0.033	0.034
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.04	0.05	0.09	0.5	0.060	0.030	0.031
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	E	0.99	PF	0.03	0.08	0.04	0.5	0.050	0.025	0.026
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PF	0.03	0.08	0.09	0.5	0.067	0.033	0.034

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PF	0.02	0.05	0.04	0.5	0.037	0.018	0.019
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PF	0.01	0.04	0.05	0.5	0.033	0.016	0.017
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PF	0.01	0.02	0.02	0.5	0.017	0.008	0.008
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	H	0.89	PB	0.03	0.03	0.02	0.5	0.027	0.011	0.011
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	H	0.89	PB	0.04	0.03	0.03	0.5	0.033	0.017	0.017
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PB	0.04	0.04	0.03	0.5	0.037	0.020	0.020
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	H	0.87	PB	0.04	0.02	0.02	0.5	0.027	0.010	0.011
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	H	0.86	PB	0.06	0.06	0.04	0.5	0.053	0.040	0.040
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	H	0.85	PB	0.05	0.06	0.04	0.5	0.050	0.034	0.035
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	H	0.88	PB	0.05	0.04	0.04	0.5	0.043	0.027	0.028
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PB	0.06	0.05	0.04	0.5	0.050	0.036	0.038
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	H	0.87	PB	0.05	0.03	0.02	0.5	0.033	0.016	0.016
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	H	0.86	PB	0.06	0.05	0.03	0.5	0.047	0.030	0.031
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	H	0.85	PB	0.04	0.04	0.03	0.5	0.037	0.018	0.018
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PB	0.06	0.06	0.08	0.5	0.067	0.066	0.068
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PB	0.09	0.08	0.07	0.5	0.080	0.096	0.098
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PB	0.07	0.07	0.06	0.5	0.067	0.066	0.068
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PB	0.06	0.05	0.06	0.5	0.057	0.047	0.048
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PB	0.05	0.04	0.04	0.5	0.043	0.027	0.028
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.06	0.05	0.04	0.5	0.050	0.036	0.038
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.06	0.04	0.04	0.5	0.047	0.032	0.033
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	H	0.87	PB	0.05	0.04	0.03	0.5	0.040	0.023	0.024
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PB	0.06	0.05	0.04	0.5	0.050	0.036	0.037

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PB	0.06	0.05	0.03	0.5	0.047	0.031	0.032
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PB	0.07	0.06	0.04	0.5	0.057	0.045	0.045
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PB	0.04	0.05	0.04	0.5	0.043	0.026	0.026
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PB	0.05	0.05	0.04	0.5	0.047	0.033	0.033
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PB	0.08	0.07	0.07	0.5	0.073	0.080	0.082
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PB	0.07	0.07	0.07	0.5	0.070	0.073	0.075
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PB	0.06	0.05	0.05	0.5	0.053	0.042	0.043
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PB	0.05	0.04	0.03	0.5	0.040	0.023	0.024
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.06	0.05	0.04	0.5	0.050	0.036	0.038
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.06	0.04	0.04	0.5	0.047	0.032	0.033
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	H	0.87	PB	0.05	0.04	0.03	0.5	0.040	0.023	0.024
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PB	0.06	0.05	0.04	0.5	0.050	0.036	0.037
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PB	0.05	0.04	0.03	0.5	0.040	0.023	0.023
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PB	0.06	0.06	0.04	0.5	0.053	0.040	0.040
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PB	0.04	0.05	0.04	0.5	0.043	0.026	0.026
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	H	0.89	PF	0.02	0.02	0.02	0.5	0.020	0.006	0.006
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	H	0.89	PF	0.03	0.03	0.02	0.5	0.027	0.011	0.011
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PF	0.03	0.03	0.02	0.5	0.027	0.010	0.011
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	H	0.87	PF	0.03	0.04	0.02	0.5	0.030	0.013	0.013
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	H	0.86	PF	0.03	0.02	0.03	0.5	0.027	0.010	0.010
Roof	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	H	0.85	PF	0.03	0.03	0.03	0.5	0.030	0.012	0.012

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	H	0.88	PF	0.04	0.05	0.04	0.5	0.043	0.027	0.028
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PF	0.05	0.05	0.03	0.5	0.043	0.027	0.028
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	H	0.87	PF	0.04	0.04	0.03	0.5	0.037	0.019	0.020
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	H	0.86	PF	0.03	0.03	0.03	0.5	0.030	0.013	0.013
Roof	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	H	0.85	PF	0.02	0.03	0.02	0.5	0.023	0.007	0.007
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PF	0.04	0.04	0.04	0.5	0.040	0.024	0.025
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PF	0.04	0.05	0.05	0.5	0.047	0.033	0.033
Roof	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PF	0.06	0.07	0.05	0.5	0.060	0.054	0.055
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PF	0.06	0.06	0.05	0.5	0.057	0.047	0.048
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PF	0.07	0.07	0.04	0.5	0.060	0.053	0.055
Roof	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.07	0.07	0.04	0.5	0.060	0.053	0.054
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.06	0.06	0.04	0.5	0.053	0.042	0.043
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	H	0.87	PF	0.05	0.05	0.02	0.5	0.040	0.023	0.024
Roof	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PF	0.05	0.04	0.02	0.5	0.037	0.019	0.020
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PF	0.04	0.04	0.02	0.5	0.033	0.016	0.016
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PF	0.04	0.03	0.03	0.5	0.033	0.015	0.016
Roof	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PF	0.04	0.04	0.02	0.5	0.033	0.015	0.015
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PF	0.05	0.04	0.03	0.5	0.040	0.024	0.025
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PF	0.05	0.05	0.04	0.5	0.047	0.033	0.033
Roof	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PF	0.06	0.06	0.06	0.5	0.060	0.054	0.055
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PF	0.06	0.06	0.06	0.5	0.060	0.053	0.054
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PF	0.06	0.06	0.05	0.5	0.057	0.047	0.049
Roof	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.07	0.06	0.04	0.5	0.057	0.047	0.048

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.06	0.06	0.04	0.5	0.053	0.042	0.043
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	H	0.87	PF	0.04	0.04	0.03	0.5	0.038	0.020	0.021
Roof	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PF	0.04	0.04	0.03	0.5	0.037	0.019	0.020
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PF	0.04	0.04	0.02	0.5	0.033	0.016	0.016
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PF	0.03	0.03	0.03	0.5	0.030	0.013	0.013
Roof	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PF	0.04	0.04	0.03	0.5	0.037	0.018	0.019
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	E	0.99	PB	0.07	0.06	0.04	0.5	0.057	0.028	0.029
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	E	1.00	PB	0.37	0.32	0.24	0.5	0.310	0.155	0.159
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PB	0.39	0.40	0.29	0.5	0.360	0.180	0.186
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	E	0.99	PB	0.63	0.81	0.61	0.5	0.683	0.338	0.351
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	E	0.98	PB	0.66	1.04	1.03	0.5	0.910	0.446	0.453
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	E	0.97	PB	0.78	0.72	0.83	0.5	0.777	0.377	0.382
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	E	1.00	PB	0.94	1.06	0.93	0.5	0.977	0.488	0.505
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PB	1.15	1.08	0.85	0.5	1.027	0.513	0.531
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	E	0.99	PB	1.21	1.49	1.06	0.5	1.253	0.620	0.642
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	E	0.98	PB	0.76	1.18	1.07	0.5	1.003	0.492	0.506
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	E	0.97	PB	0.45	0.40	0.48	0.5	0.443	0.215	0.217
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PB	1.87	1.53	1.00	0.5	1.467	0.726	0.745
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PB	1.55	1.57	1.14	0.5	1.420	0.710	0.729
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PB	1.77	1.84	1.51	0.5	1.707	0.853	0.873
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PB	1.77	2.02	1.72	0.5	1.837	0.918	0.950
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PB	1.49	1.66	1.47	0.5	1.540	0.770	0.800
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	1.53	1.48	1.14	0.5	1.383	0.692	0.716

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	1.39	1.29	1.01	0.5	1.230	0.615	0.636
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	E	0.99	PB	2.02	2.41	1.77	0.5	2.067	1.023	1.062
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PB	1.30	1.74	1.38	0.5	1.473	0.729	0.747
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PB	1.30	1.77	1.39	0.5	1.487	0.736	0.754
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PB	1.09	1.85	2.24	0.5	1.727	0.846	0.856
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PB	1.19	0.72	1.16	0.5	1.023	0.496	0.504
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PB	1.62	1.38	0.90	0.5	1.300	0.644	0.661
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PB	1.26	1.18	0.97	0.5	1.137	0.568	0.583
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PB	1.65	1.75	1.46	0.5	1.620	0.810	0.828
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PB	1.59	1.70	1.49	0.5	1.593	0.797	0.824
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PB	1.60	1.55	1.37	0.5	1.507	0.753	0.782
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	1.74	1.63	1.21	0.5	1.527	0.763	0.790
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PB	1.24	1.18	0.88	0.5	1.100	0.550	0.569
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	E	0.99	PB	1.94	2.34	1.60	0.5	1.960	0.970	1.008
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PB	1.28	1.78	1.47	0.5	1.510	0.747	0.766
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PB	0.51	0.70	0.55	0.5	0.587	0.290	0.298
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PB	0.86	1.40	1.66	0.5	1.307	0.640	0.647
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PB	1.15	0.88	1.27	0.5	1.100	0.534	0.542
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	E	0.99	PF	0.01	0.01	0.01	0.5	0.010	0.005	0.005
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	E	1.00	PF	0.02	0.02	0.02	0.5	0.020	0.010	0.010
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PF	0.05	0.04	0.02	0.5	0.037	0.018	0.019
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	E	0.99	PF	0.13	0.08	0.03	0.5	0.080	0.040	0.041
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	E	0.98	PF	0.17	0.17	0.13	0.5	0.157	0.077	0.078
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	E	0.97	PF	0.24	0.27	0.19	0.5	0.233	0.113	0.115

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	E	1.00	PF	0.07	0.05	0.03	0.5	0.050	0.025	0.026
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	E	1.00	PF	0.17	0.09	0.05	0.5	0.103	0.052	0.053
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	E	0.99	PF	0.17	0.08	0.06	0.5	0.103	0.051	0.053
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	E	0.98	PF	0.15	0.16	0.15	0.5	0.153	0.075	0.077
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	E	0.97	PF	0.17	0.17	0.13	0.5	0.157	0.076	0.077
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PF	0.13	0.04	0.04	0.5	0.070	0.035	0.036
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PF	0.06	0.04	0.04	0.5	0.047	0.023	0.024
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PF	0.23	0.10	0.05	0.5	0.127	0.063	0.065
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PF	0.29	0.09	0.07	0.5	0.150	0.075	0.078
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PF	0.36	0.12	0.11	0.5	0.197	0.098	0.102
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.35	0.18	0.07	0.5	0.200	0.100	0.103
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.28	0.15	0.09	0.5	0.173	0.087	0.090
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	E	0.99	PF	0.37	0.19	0.08	0.5	0.213	0.106	0.110
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PF	0.29	0.26	0.13	0.5	0.227	0.112	0.115
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PF	0.30	0.26	0.14	0.5	0.233	0.116	0.118
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PF	0.29	0.31	0.26	0.5	0.287	0.140	0.142
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PF	0.32	0.37	0.32	0.5	0.337	0.163	0.166
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	E	0.99	PF	0.10	0.04	0.02	0.5	0.053	0.026	0.027
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	E	1.00	PF	0.16	0.05	0.06	0.5	0.090	0.045	0.046
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	E	1.00	PF	0.10	0.11	0.06	0.5	0.090	0.045	0.046
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	E	1.00	PF	0.14	0.09	0.05	0.5	0.093	0.047	0.048
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	E	1.00	PF	0.22	0.10	0.06	0.5	0.127	0.063	0.066
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.29	0.15	0.05	0.5	0.163	0.082	0.084

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	E	1.00	PF	0.25	0.12	0.05	0.5	0.140	0.070	0.072
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	E	0.99	PF	0.21	0.20	0.26	0.5	0.223	0.111	0.115
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	E	0.99	PF	0.24	0.21	0.14	0.5	0.197	0.097	0.100
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	E	0.99	PF	0.11	0.10	0.06	0.5	0.090	0.045	0.046
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	E	0.98	PF	0.26	0.30	0.29	0.5	0.283	0.139	0.140
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	E	0.97	PF	0.29	0.38	0.24	0.5	0.303	0.147	0.149
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	H	0.89	PB	0.05	0.03	0.03	0.5	0.037	0.020	0.021
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	H	0.89	PB	0.08	0.06	0.04	0.5	0.060	0.054	0.055
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PB	0.09	0.06	0.06	0.5	0.070	0.072	0.074
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	H	0.87	PB	0.13	0.10	0.09	0.5	0.107	0.162	0.168
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	H	0.86	PB	0.19	0.15	0.10	0.5	0.147	0.300	0.305
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	H	0.85	PB	0.17	0.15	0.09	0.5	0.137	0.254	0.258
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	H	0.88	PB	0.16	0.12	0.10	0.5	0.127	0.234	0.242
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PB	0.14	0.11	0.10	0.5	0.117	0.199	0.206
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	H	0.87	PB	0.17	0.12	0.11	0.5	0.133	0.254	0.262
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	H	0.86	PB	0.20	0.15	0.10	0.5	0.150	0.314	0.323
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	H	0.85	PB	0.13	0.11	0.07	0.5	0.103	0.145	0.147
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PB	0.23	0.14	0.10	0.5	0.157	0.366	0.376
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PB	0.18	0.14	0.11	0.5	0.143	0.307	0.315
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PB	0.20	0.15	0.11	0.5	0.153	0.351	0.359
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PB	0.22	0.16	0.13	0.5	0.170	0.422	0.436
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PB	0.21	0.16	0.13	0.5	0.167	0.405	0.421
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.18	0.14	0.12	0.5	0.147	0.314	0.325

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.17	0.14	0.11	0.5	0.140	0.286	0.296
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	H	0.87	PB	0.20	0.16	0.14	0.5	0.167	0.396	0.412
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PB	0.22	0.16	0.12	0.5	0.167	0.396	0.406
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PB	0.22	0.16	0.12	0.5	0.167	0.396	0.406
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PB	0.25	0.21	0.13	0.5	0.197	0.539	0.545
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PB	0.20	0.18	0.11	0.5	0.163	0.363	0.369
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PB	0.21	0.13	0.11	0.5	0.150	0.336	0.345
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PB	0.18	0.12	0.11	0.5	0.137	0.279	0.286
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PB	0.21	0.16	0.12	0.5	0.163	0.398	0.407
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PB	0.22	0.17	0.12	0.5	0.170	0.422	0.436
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PB	0.21	0.16	0.13	0.5	0.167	0.405	0.421
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.17	0.14	0.12	0.5	0.143	0.300	0.310
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PB	0.16	0.13	0.10	0.5	0.130	0.247	0.255
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	H	0.87	PB	0.18	0.14	0.13	0.5	0.150	0.321	0.333
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PB	0.21	0.15	0.12	0.5	0.160	0.365	0.374
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PB	0.15	0.11	0.08	0.5	0.113	0.183	0.188
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PB	0.23	0.19	0.12	0.5	0.180	0.452	0.457
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PB	0.20	0.17	0.11	0.5	0.160	0.349	0.354
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	136.0125	54	52.6	CW	H	0.89	PF	0.02	0.02	0.02	0.5	0.020	0.006	0.006
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	143.9875	54	52.8	CW	H	0.89	PF	0.03	0.03	0.03	0.5	0.030	0.013	0.014
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PF	0.05	0.05	0.04	0.5	0.047	0.032	0.033
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	158.3000	54	52.1	CW	H	0.87	PF	0.04	0.04	0.05	0.5	0.043	0.027	0.028
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	165.9875	54	53.1	CW	H	0.86	PF	0.05	0.05	0.06	0.5	0.053	0.040	0.040
Trunk	HAD4022A, 5/8 wave (132-174MHz)	5.15	173.4000	54	53.2	CW	H	0.85	PF	0.05	0.05	0.06	0.5	0.053	0.039	0.039

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	146.0125	54	52.2	CW	H	0.88	PF	0.08	0.07	0.06	0.5	0.070	0.072	0.074
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	150.8000	54	52.2	CW	H	0.88	PF	0.08	0.07	0.06	0.5	0.070	0.072	0.074
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	157.9875	54	52.2	CW	H	0.87	PF	0.06	0.06	0.06	0.5	0.060	0.051	0.053
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	164.9875	54	52.5	CW	H	0.86	PF	0.05	0.05	0.06	0.5	0.053	0.040	0.041
Trunk	RAD4227A, 5/8 wave (146-172MHz)	5.15	171.9875	54	53.6	CW	H	0.85	PF	0.05	0.04	0.04	0.5	0.043	0.026	0.026
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PF	0.07	0.07	0.06	0.5	0.067	0.066	0.068
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PF	0.08	0.09	0.08	0.5	0.083	0.104	0.106
Trunk	HAD4006A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PF	0.08	0.08	0.07	0.5	0.077	0.088	0.090
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PF	0.09	0.09	0.09	0.5	0.090	0.118	0.122
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PF	0.09	0.09	0.10	0.5	0.093	0.127	0.132
Trunk	HAD4007A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.10	0.09	0.07	0.5	0.087	0.110	0.113
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.10	0.09	0.08	0.5	0.090	0.118	0.122
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52	CW	H	0.87	PF	0.08	0.08	0.08	0.5	0.080	0.091	0.095
Trunk	HAD4008A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PF	0.05	0.05	0.07	0.5	0.057	0.046	0.047
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PF	0.05	0.05	0.06	0.5	0.053	0.041	0.042
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PF	0.07	0.07	0.07	0.5	0.070	0.068	0.069
Trunk	HAD4009A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PF	0.07	0.07	0.08	0.5	0.073	0.073	0.074
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	136.0125	54	52.6	CW	H	0.89	PF	0.05	0.05	0.05	0.5	0.050	0.037	0.038
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	140.0125	54	52.6	CW	H	0.89	PF	0.06	0.06	0.06	0.5	0.060	0.054	0.055
Trunk	RAD4226A, 1/4 wave (136-144MHz)	2.15	143.9875	54	52.8	CW	H	0.89	PF	0.09	0.09	0.09	0.5	0.090	0.121	0.124
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	146.0125	54	52.2	CW	H	0.88	PF	0.11	0.09	0.07	0.5	0.090	0.118	0.122
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	148.4000	54	52.0	CW	H	0.88	PF	0.10	0.09	0.07	0.5	0.087	0.110	0.114
Trunk	RAD4225A, 1/4 wave (146-150.8MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.10	0.09	0.08	0.5	0.090	0.118	0.122

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.		Test Pos.	MPE Measurements			DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Ant Loc.	Ant. Model/ Desc.	Ant. Gain (dBi)	Tx Freq (MHz)	Max Pwr (W)	Initial Pwr (W)	Test Mode	E/H Field	Probe Cal. Factor		Passenger Positions						
										Head	Chest	Lower Trunk				
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	150.8000	54	52.2	CW	H	0.88	PF	0.09	0.08	0.07	0.5	0.080	0.093	0.097
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	156.4000	54	52.0	CW	H	0.87	PF	0.08	0.07	0.07	0.5	0.073	0.077	0.080
Trunk	RAD4224A, 1/4 wave (150.8-162MHz)	2.15	161.9875	54	52.7	CW	H	0.87	PF	0.05	0.05	0.07	0.5	0.057	0.046	0.047
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	162.0125	54	52.7	CW	H	0.87	PF	0.04	0.04	0.03	0.5	0.037	0.019	0.020
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	167.7000	54	53.4	CW	H	0.86	PF	0.07	0.07	0.07	0.5	0.070	0.068	0.069
Trunk	RAD4223A, 1/4 wave (162-174MHz)	2.15	173.4000	54	53.2	CW	H	0.85	PF	0.07	0.07	0.07	0.5	0.070	0.067	0.068

MPE calculations are defined in section 13.0.

Appendix E - SAR Simulation Report



COMPUTATIONAL EME COMPLIANCE ASSESSMENT OF THE VHF XPR5550, MODEL #PMUD2567A MOBILE RADIO

November 16, 2011

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Motorola Corporate EME Research Lab, Plantation, Florida

Introduction

This report summarizes the computational [numerical modeling] analysis performed to document compliance of the XPR5550 VHF, Model Number PMUD2567A, Mobile Radio and vehicle-mounted antennas with the Federal Communications Commission (FCC) guidelines for human exposure to radio frequency (RF) emissions. The radio operates in the 136 - 174 MHz frequency band.

This computational analysis supplements the measurements conducted to evaluate the compliance of the exposure from this mobile radio with respect to applicable *maximum permissible exposure* (MPE) limits. All test conditions (33 in total) that did not conform with applicable MPE limits were analyzed to determine whether those conditions complied with the *specific absorption rate* (SAR) limits for general public exposure (1.6 W/kg averaged over 1 gram of tissue and 0.08 W/kg averaged over the whole body) set forth in FCC guidelines, which are based on the IEEE C95.1-1999 standard [1]. The same test conditions were also analyzed to determine compliance with the SAR limits set forth in the ICNIRP [3] guidelines and IEEE Std. C95.1-2005 standard [4] (2.0 W/kg averaged over 10 gram of tissue and 0.08 W/kg averaged over the whole body). In total 66¹ independent simulations have been performed. Sixty four simulations are addressing exposure of passenger and another two simulations are addressing

¹ The number of individual simulations includes: 2 bystander simulations (the front and back bystander orientations) and 64 passenger simulations (the center and side location at the back seat in 32 test conditions).

exposure of bystander to the VHF mobile radio with trunk-mount antennas. For all simulations a commercial code based on Finite-Difference-Time-Domain (FDTD) methodology was employed to carry out the computational analysis. It is well established and recognized within the scientific community that SAR is the primary dosimetric quantity used to evaluate the human body's absorption of RF energy and that MPEs are in fact derived from SAR. Accordingly, the SAR computations provide a scientifically valid and more relevant estimate of human exposure to RF energy.

Method

The simulation code employed is XFDTD™ v7.1, by Remcom Inc., State College, PA. This computational suite features a heterogeneous full body standing model (High Fidelity Body Mesh), derived from the so-called Visible Human [2], discretized in 3 mm voxels. The dielectric properties of 23 body tissues are automatically assigned by XFDTD™ at any specific frequency. The “seated” man model was obtained from the standing model by modifying the articulation angles at the hips and the knees. Details of the computational method and model are provided in the Appendix to this report.

The car model has been imported into XFDTD™ from the CAD file of a sedan car having dimensions 4.98 m (L) x 1.85 m (W) x 1.18 m (H), and discretized with maximum resolution of 5 mm. The Figure 1 below show both the CAD model and the photo of the actual car This CAD model has been incorporated into the IEC/IEEE 62704-2 draft standard.



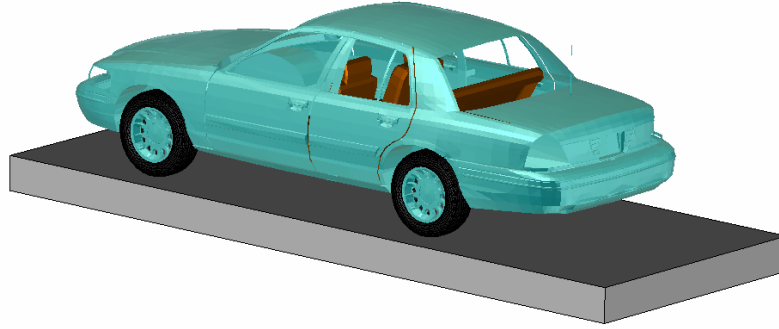


Figure 1: The photo picture of the car used in field measurements and the corresponding CAD model used in simulations

For bystander exposure, the antenna position is in the center of the trunk, so as to replicate the experimental conditions used in MPE measurements. For passenger exposure, the antenna position is also on the trunk and the distance of trunk mounted antenna from the passenger head when the passenger is located in the center of the back seat was set at 85 cm, to replicate the experimental conditions used in MPE measurements. Figures 2 and 3 show the XFDTD™ computational models used for bystander exposure. According to the IEC/IEEE 62704-2 draft standard (December 2010) for exposure simulations from vehicle mount antennas the lossy dielectric slab with 30 cm thickness, dielectric constant of 8 and conductivity of 0.01 S/m has been introduced in the computational model to properly account for the effect of the ground (pavement) on exposure.

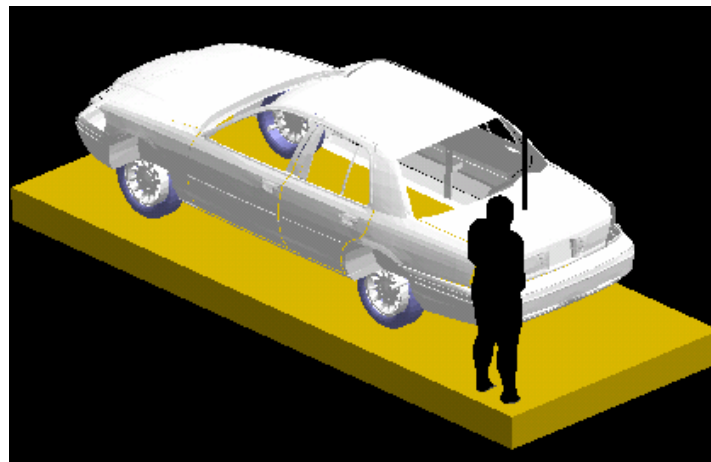


Figure 2: Bystander model exposed to a trunk-mount antenna: Bystander is located at the corner of the car replicating the measurement conditions. The antenna is mounted in the center of the trunk.

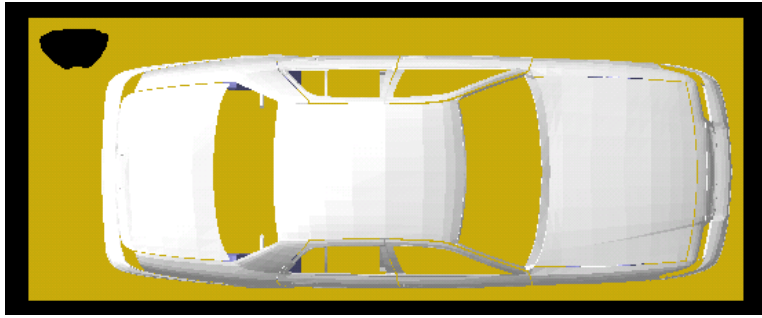


Figure 3: Top view of bystander exposure model relative to the vehicle model that replicates the measurement conditions.

Figure 4 shows some of the XFDTD™ computational models used for passenger exposure to trunk mounted antennas

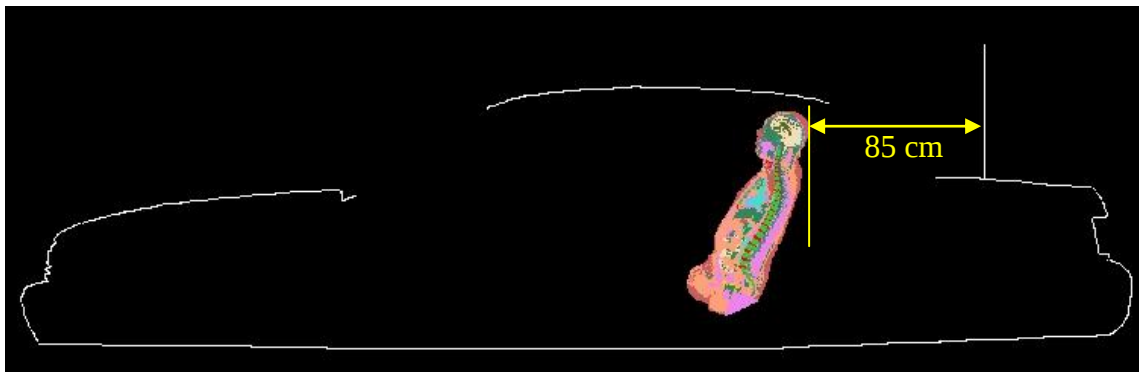
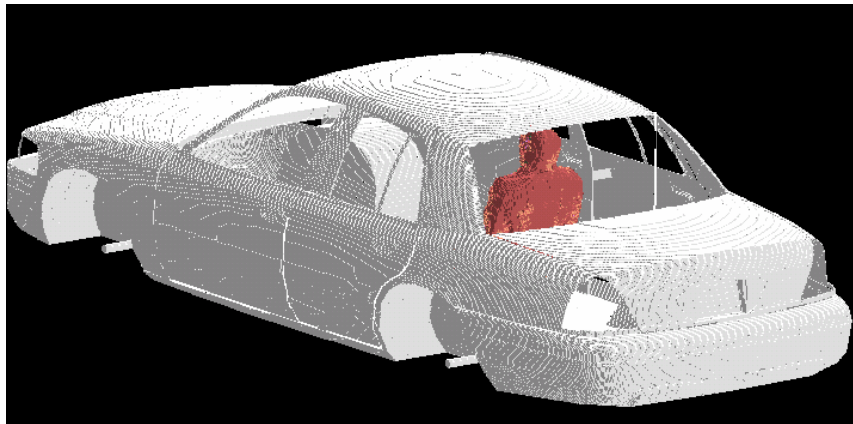


Figure 4: Passenger model exposed to a trunk-mount antenna: XFDTD geometry.
The antenna is mounted at 85 cm from the passenger located in the center of the back seat.

The computational code employs a time-harmonic excitation to produce a steady state electromagnetic field in the exposed body. Subsequently, the corresponding SAR distribution is automatically processed in order to determine the whole-body, 1-g, and 10-g average SAR. The maximum average output power from mobile radio antenna is 54 W. Since the ohmic losses in the cable and in the car materials, as well as the mismatch losses at the antenna feed-point, are neglected, and source-based time averaging (50% talk time) is employed, all computational results are normalized to half of it, i.e., 27 W average net output power.

Results of SAR computations for car passengers

The test conditions requiring SAR computations are summarized in Table I, together with the antenna data, the SAR results, and power density (P.D.) as obtained from the measurements in the corresponding test conditions. The conditions are for antennas mounted on the trunk. The antenna length in Table I includes the 1.8 cm magnetic mount base used in measurements to position the antenna on the vehicle. The same length was used in simulation model. The passenger is located in the center or on the side of the rear seat. 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. All the transmit frequency, antenna length, and passenger location combinations reported in Table I have been simulated individually.

Table I: Results of the SAR computations for passenger exposure (50% talk-time).

Mount location	Antenna Kit #	Antenna length	Freq [MHz]	P.D. (mW/cm ²)	Exposure location	SAR [W/kg]		
						1-g	10-g	WB
Trunk	HAD4006A	53.8 cm	136	0.75	Center	1.29	0.75	0.0446
					Side	1.27	0.76	0.0468
			140	0.73	Center	0.81	0.47	0.0324
					Side	0.85	0.48	0.0350
			144	0.87	Center	0.73	0.42	0.0356
					Side	0.75	0.41	0.0384

Trunk	HAD4007A	50.8 cm	146	0.95	Center	0.75	0.43	0.0345
					Side	0.72	0.30	0.0372
			148.4	0.80	Center	0.79	0.45	0.0334
					Side	0.76	0.27	0.0391
			150.8	0.72	Center	0.75	0.43	0.0307
					Side	0.63	0.30	0.0363
Trunk	HAD4008A	47.3 cm	150.8	0.64	Center	0.73	0.42	0.0305
					Side	0.63	0.30	0.0367
			156.4	1.06	Center	0.56	0.33	0.0261
					Side	0.72	0.37	0.0288
			162	0.75	Center	0.81	0.49	0.0309
					Side	0.76	0.51	0.0301
Trunk	HAD4009A	44.8 cm	162	0.75	Center	0.82	0.49	0.0314
					Side	0.76	0.53	0.0306
			167.7	0.86	Center	0.67	0.40	0.0289
					Side	0.87	0.66	0.0239
			173.4 Fig. 5 & 6	0.50	Center	1.30	0.76	0.0303
					Side	0.75	0.47	0.0269
Trunk	HAD4022A	104.5 cm	158.3	0.35	Center	0.29	0.17	0.0101
					Side	0.31	0.14	0.0115
		98.3 cm	166	0.45	Center	0.43	0.26	0.0132
					Side	0.23	0.12	0.0086
		91.7 cm	173.4 Fig. 7	0.38	Center	0.87	0.51	0.0168
					Side	0.28	0.17	0.0119
Trunk	RAD4223A	42.8 cm	162	0.30	Center	0.81	0.48	0.0305
					Side	0.77	0.54	0.0306
			167.7	0.65	Center	0.66	0.40	0.0289
					Side	0.89	0.67	0.0243
			173.4	0.54	Center	1.29	0.76	0.0310
					Side	0.76	0.47	0.0271
Trunk	RAD4224A	46 cm	150.8	0.57	Center	0.77	0.44	0.0316
					Side	0.64	0.31	0.0371
			156.4	1.01	Center	0.57	0.33	0.0266
					Side	0.72	0.37	0.0289
			162	0.77	Center	0.81	0.49	0.0305
					Side	0.77	0.52	0.0302
Trunk	RAD4225A	49.3 cm	146	0.82	Center	0.77	0.44	0.0353
					Side	0.74	0.31	0.0380
			148.4	0.78	Center	0.80	0.46	0.0339
					Side	0.73	0.25	0.0370
			150.8	0.79	Center	0.78	0.45	0.0318
					Side	0.63	0.30	0.0366

Trunk	RAD4226A	52.2 cm	136	0.66	Center	1.27	0.74	0.0440
					Side	1.28	0.77	0.0471
			140	0.58	Center	0.84	0.48	0.0341
					Side	0.85	0.48	0.0351
			144	0.83	Center	0.74	0.42	0.0358
					Side	0.75	0.41	0.0388
Trunk	RAD4227A	89.8 cm	146	0.51	Center	0.63	0.36	0.0277
					Side	0.54	0.24	0.0285
			150.8	0.53	Center	0.60	0.34	0.0224
					Side	0.40	0.18	0.0240
			158	0.64	Center	0.41	0.24	0.0164
					Side	0.47	0.22	0.0197
			165	0.51	Center	0.56	0.34	0.0184
					Side	0.30	0.24	0.0136
			172	0.22	Center	0.85	0.50	0.0181
					Side	0.27	0.16	0.0132

The SAR distribution in the passenger model in the exposure condition that gave highest 1-g SAR is reported in Figure 5 (173.4 MHz, passenger in the center of the back seat, HAD4009A antenna).

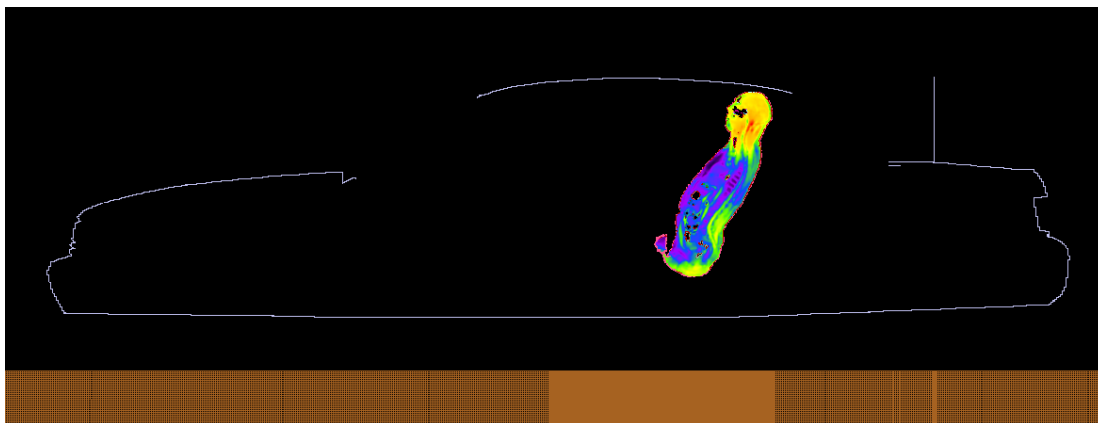


Figure 5. SAR distribution at 173.4 MHz in the passenger located in the center of the back seat, produced by the trunk-mount HAD4009A antenna. The contour plot in the figure is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.

The two pictures below in Figure 6 show the E and H field distributions in the plane of the antenna corresponding to the condition in Figure 5.

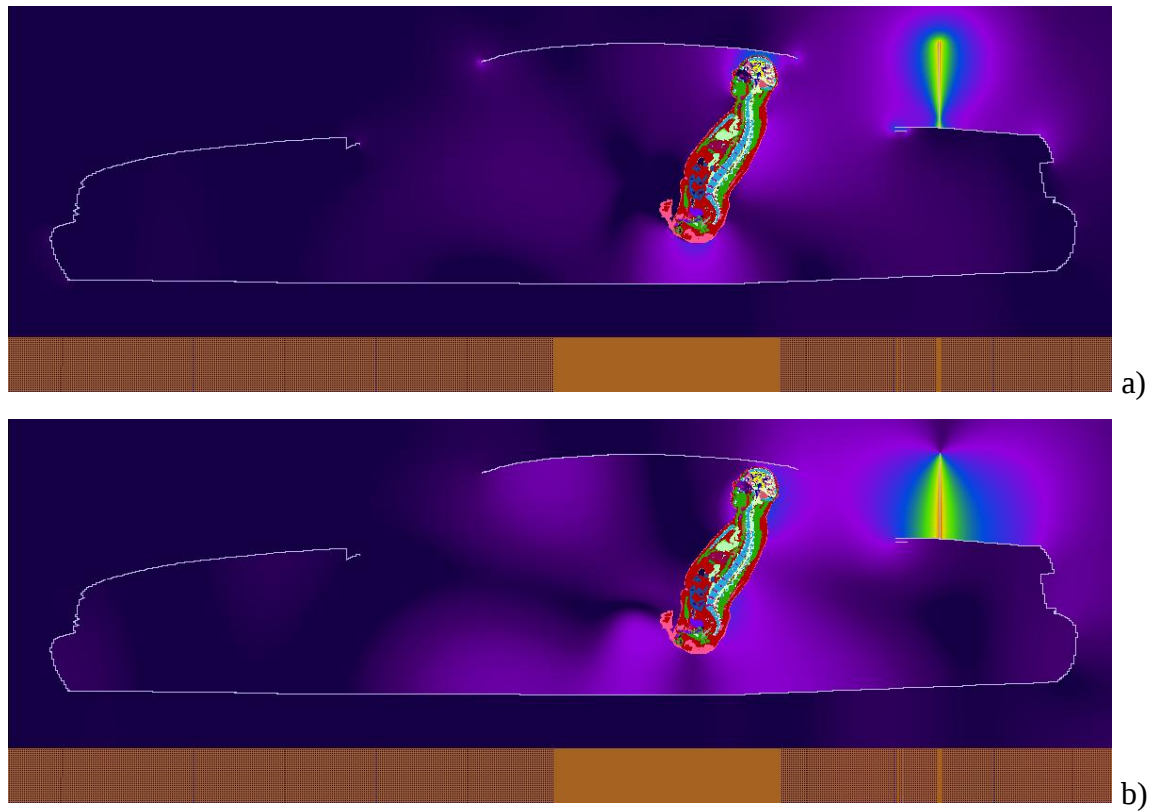


Figure 6. (a) E-field distribution corresponding to exposure condition of Figure 5, and (b) H-field distribution corresponding to exposure condition of Figure 5.

The electric and magnetic field distributions for the passenger exposure configuration and different type of simulated antenna (HAD4022A) relative to the plane where antenna is located are shown in Figure 7.





Figure 7. (a) E-field distribution and (b) H-field distribution in the plane of the trunk mounted antenna (HAD4022A antenna at 173.4 MHz) corresponding to the passenger exposure condition

The highest 10-g SAR was produced in the passenger exposure condition with RAD4226A antenna at 136 MHz (passenger on the side of the back seat). The same condition produced the overall highest whole body average SAR.

Results of SAR computations for bystanders

The test conditions requiring SAR computations are summarized in Table II, together with other relevant information and the SAR results. With trunk mount antennas, the bystander is placed at the corner of the trunk as close as possible to the car while maintaining at least 90 cm separation from the antenna and 20 cm separation from the car. Two cases of bystander - facing towards (Front) or away (Back) from the car - were simulated individually.

Table II: Results of the SAR computations for bystander exposure (50% talk-time).

Mount location	Antenna Kit #	Antenna length	Freq [MHz]	P.D. (mW/cm ²)	Exposure location	SAR [W/kg]		
						1-g	10-g	WB
Trunk	RAD4226A	52.2 cm	144	0.20	Front 45 deg	0.40	0.22	0.0136
					Back 45 deg	0.47	0.30	0.0129

The SAR distribution in the bystander model in the exposure condition that gave highest 1-g SAR and 10-g SAR is reported in Figure 9 (144 MHz, RAD4226A antenna).

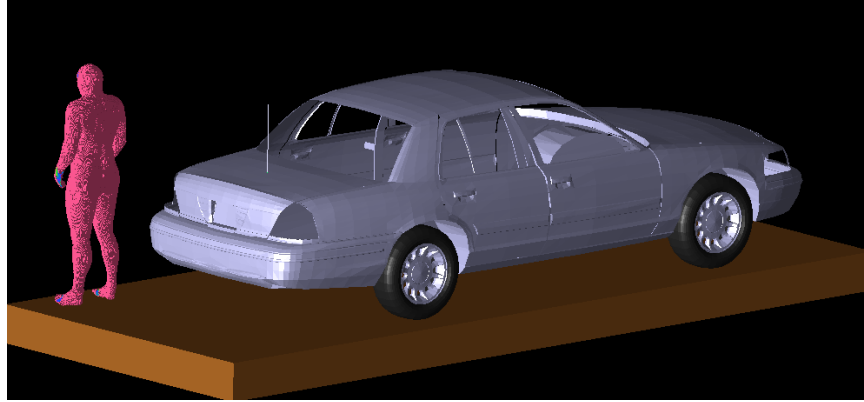


Figure 9. SAR distribution at 144 MHz in the bystander located at the corner of the trunk, produced by the trunk-mount antenna RAD4226A. The contour plot for SAR distribution in the figure is relative to the plane where the peak 1-g average SAR for this exposure condition occurs.

The two pictures below show the E and H field distributions in the plane of the antenna corresponding to the condition represented in Figure 9.

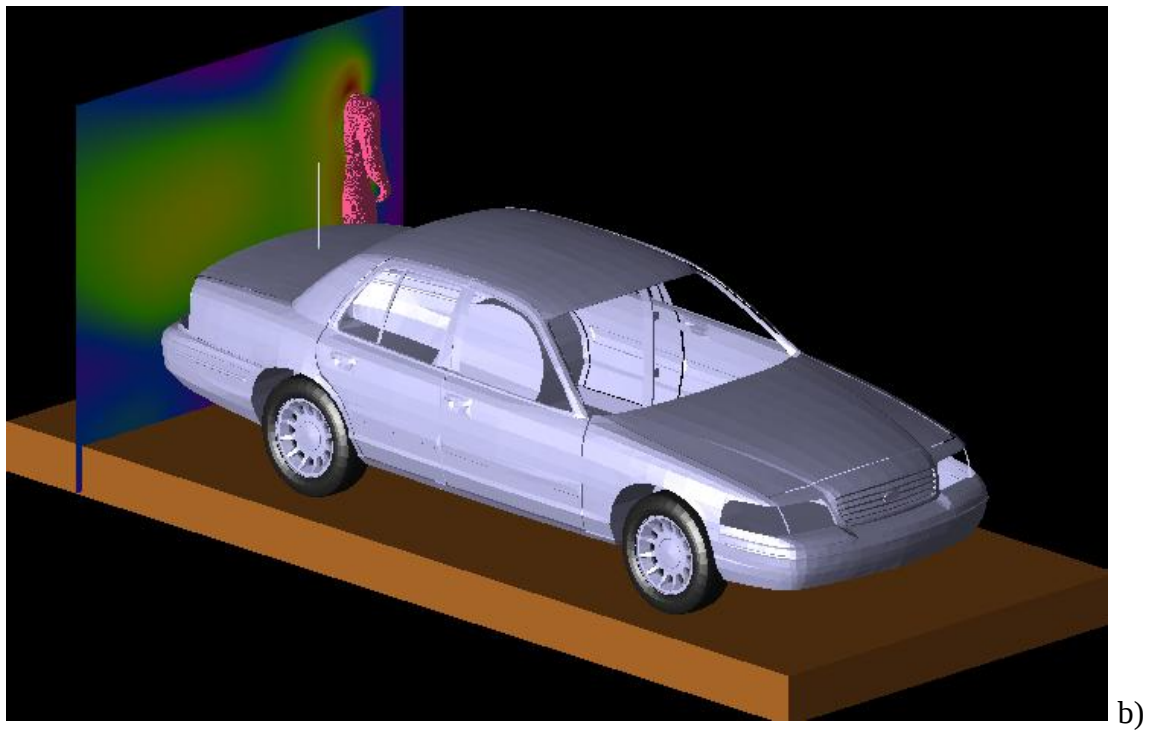
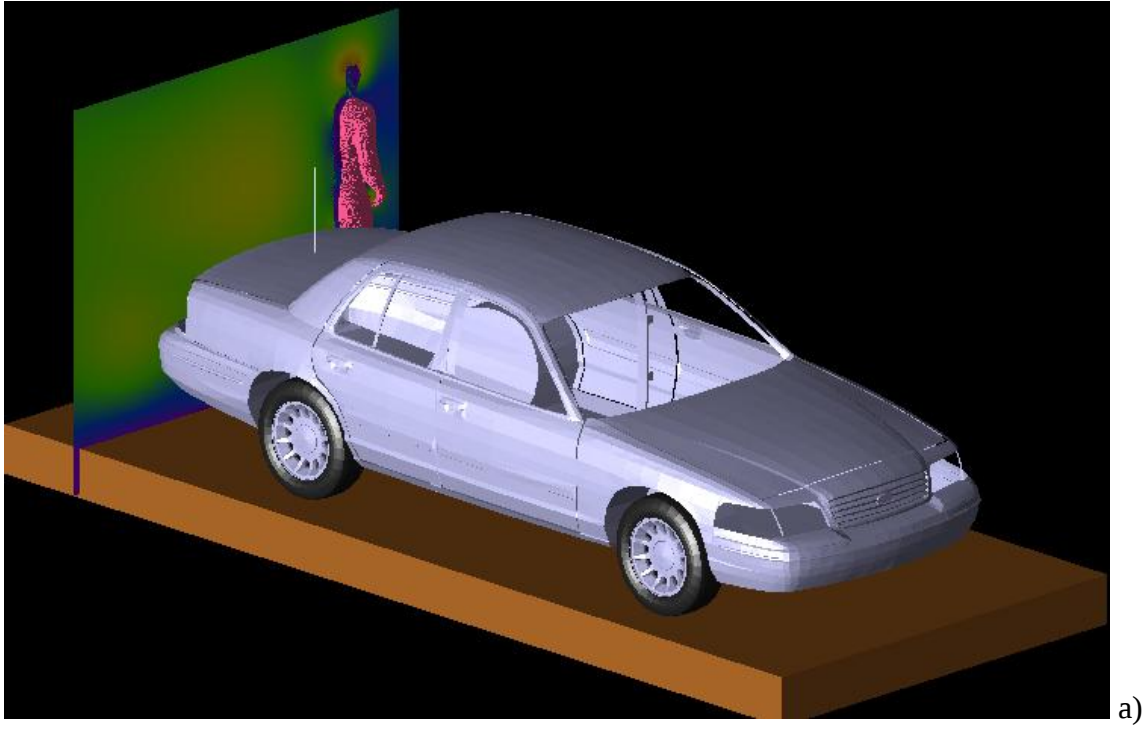


Figure 10. (a) E-field distribution in the plane of the antenna corresponding to exposure condition of Figure 9 and (b) H-field distribution corresponding to exposure condition of Figure 9.

The overall maximum peak 1-g SAR in all simulated conditions is 1.30 W/kg, less than the 1.6 W/kg limit, while the overall maximum peak 10-g SAR is 0.77 W/kg, less than the 2.0 W/kg limit. The maximum whole-body average SAR is 0.0471 W/kg, less than the 0.08 W/kg limit.

Conclusions

Under the test conditions described for evaluating passenger and bystander exposure to the RF electromagnetic fields emitted by vehicle-mounted antennas used in conjunction with this mobile radio product, the present analysis shows that the computed SAR values are compliant with the FCC exposure limits for the general public as well as with the corresponding ICNIRP and IEEE Std. C95.1-2005 SAR limits.

References

- [1] IEEE Standard C95.1-1999. *IEEE Standard for Safety Levels with Respect to Human Exposure to RF Electromagnetic Fields, 3 kHz to 300 GHz.*
- [2] http://www.nlm.nih.gov/research/visible/visible_human.html
- [3] ICNIRP (International Commission on Non-Ionising Radiation Protection). 1998. *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz).* Health Phys. 74:494–522.
- [4] IEEE. 2005. *IEEE standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz,* IEEE Std C95.1-2005

APPENDIX: SPECIFIC INFORMATION FOR SAR COMPUTATIONS

This appendix follows the structure outlined in Appendix B.III of the Supplement C to the FCC OET Bulletin 65. Most of the information regarding the code employed to perform the numerical computations has been adapted from the draft IEC/IEEE 62704-1 and 62704-2 standards, and from the XFDTD™ v5.3, v6.4, and v7.1 User Manuals. Remcom Inc., owner of XFDTD™, is kindly acknowledged for the help provided.

1) Computational resources

a) A multiprocessor system equipped with two Intel Xeon X5570 quad-core CPUs and four Tesla C1060 GPUs was employed for all simulations.

b) The memory requirement was from 7 GB to 12 GB. Using the above-mentioned system with 8-cores operating concurrently, the typical simulation would run for 6-10 hours and with all four GPUs activated by the XFDTD version 7.1 this time would be from 60-180 min.

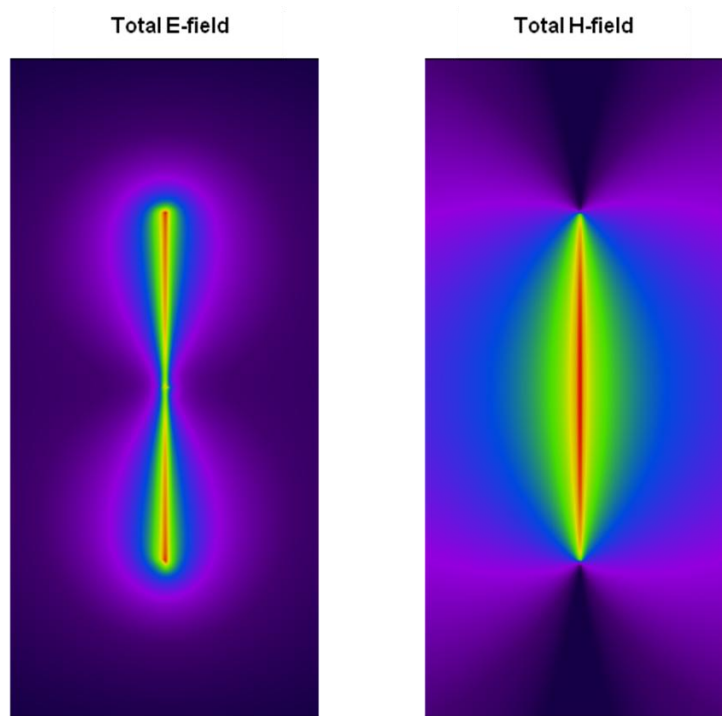
2) FDTD algorithm implementation and validation

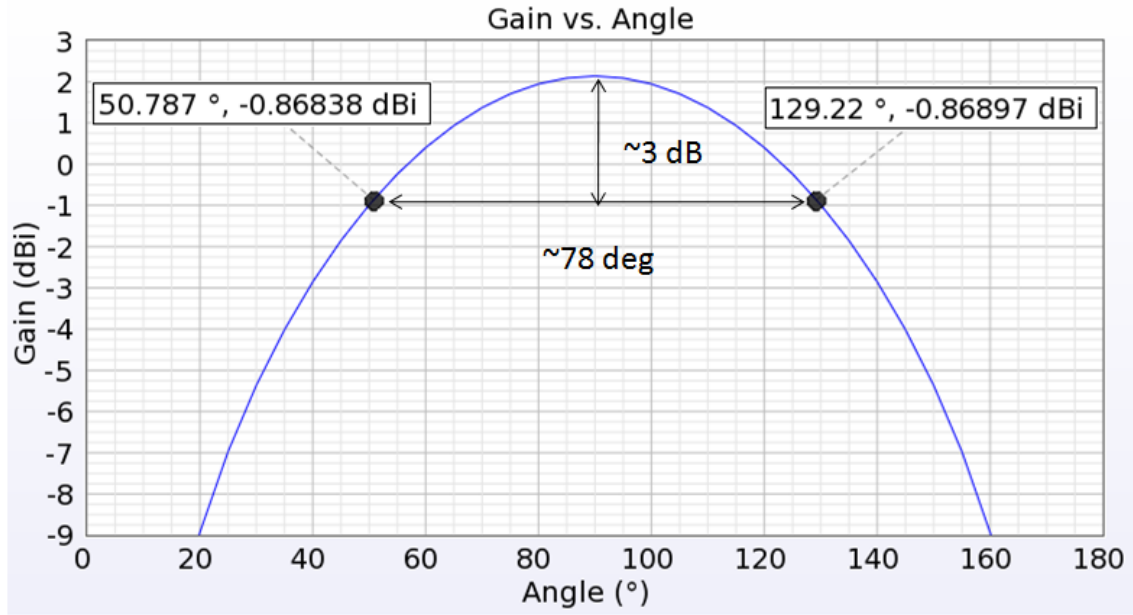
a) We employed a commercial code (XFDTD™ v7.1, by Remcom Inc.) that implements the Yee's FDTD formulation [1]. The solution domain was discretized according to a rectangular grid with an adaptive 3-10 mm step in all directions. Sub-gridding was not used. Seven-layer PML absorbing boundary conditions are set at the domain boundary to simulate free space radiation processes. The excitation is a lumped voltage generator with 50-ohm source impedance. The code allows selecting *wire objects* without specifying their radius. We used a wire to represent the antenna. The car body is modeled by solid metal. We did not employ the "thin wire" algorithm since within the adaptive grid the minimum resolution of 5 mm was specified and used to model the antenna and the antenna wire radius was never smaller than one-fifth of the voxel dimension. In fact, the XFDTD™ manual specifies that "In most cases, standard PEC material will serve well as a wire. However, in cases where the wire radius is important to the calculation and is less than 1/4 the length of the average cell edge, the thin wire material may be used to accurately simulate the correct wire diameter." The maximum voxel dimension in the plane normal to the antenna 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.

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.

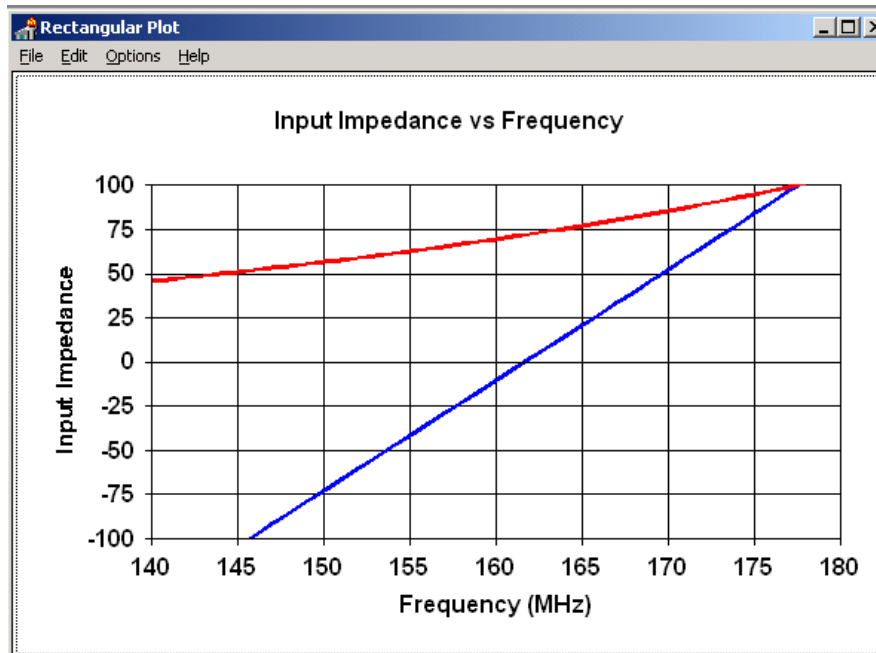
b) XFDTD™ is one of the most widely employed commercial codes for electromagnetic simulations. It has gone through extensive validation and has proven its accuracy over time in many different applications. One example is provided in [3].

We carried out a validation of the code algorithm by running the canonical test case involving a half-wave wire dipole. The dipole is 0.475 times the free space wavelength at 160 MHz, i.e., 88.5 cm long. The discretization used to model the dipole was 5 mm. Also in this case, the “thin wire” model was not needed. The following picture shows XFDTD™ outputs regarding the antenna feed-point impedance ($70.5 - j 6.0$ ohm), as well as qualitative distributions of the total E and H fields near the dipole. The radiation pattern is shown as well (one lobe in elevation). As expected, the 3 dB beamwidth is about 78 degrees.





We also compared the XFDTD™ result with the results derived from NEC [4], which is a code based on the method of moments. In this case, we used a dipole with radius 1 mm, length 88.5 cm, and the discretization is 5 mm. The corresponding input impedance at 160 MHz is $69.5-j10.5$ ohm. Its frequency dependence is reported in the following figure.



This validation ensures that the input impedance calculation is carried out correctly in XFDTD™, thereby enabling accurate estimates of the radiated power. It further ensures that the wire model employed in XFDTD™, which we used to model the antennas, produces physically meaningful current and fields distributions. Both these aspects

ensure that the field quantities are correctly computed both in terms of absolute amplitude and relative distribution.

3) Computational parameters

a) The following table reports the main parameters of the FDTD model employed to perform our computational analysis:

PARAMETER	X	Y	Z
Voxel size	3-10 mm	3-10 mm	1-10 mm
Maximum domain dimensions employed for passenger computations with the trunk-mount antennas	383	861	537
Maximum domain dimensions employed for bystander computations with the trunk-mount antennas	449	791	709
Time step	About 0.7 of the Courant limit (typically 5 ps)		
Objects separation from FDTD boundary (mm)	>20	>2000	>200
Number of time steps	Enough to reach at least -50 dB convergence		
Excitation	Sinusoidal (not less than 10 periods)		

4) Phantom model implementation and validation

a) The FDTD mesh of a male human body was created using digitized data in the form of transverse color images. The data is from the *visible human project* sponsored by the National Library of Medicine (NLM) and is available via the Internet (http://www.nlm.nih.gov/research/visible/visible_human.html). The male data set consists of MRI, CT and anatomical images. Axial MRI images of the head and neck and longitudinal sections of the rest of the body are available at 4 mm intervals. The MRI images have 256 pixel by 256 pixel resolution. Each pixel has 12 bits of gray tone resolution. The CT data consists of axial CT scans of the entire body taken at 1 mm intervals at a resolution of 512 pixels by 512 pixels where each pixel is made up of 12 bits of gray tone. The axial anatomical images are 2048 pixels by 1216 pixels where each pixel is defined by 24 bits of color. The anatomical cross sections are also at 1 mm intervals and coincide with the CT axial images. There are 1871 cross sections. The XFDTD™ High Fidelity Body Mesh uses 3x3x3 mm cells and has dimensions 136 x 87 x 397. Dr. Michael Smith and Dr. Chris Collins of the Milton S. Hershey Medical Center, Hershey, Pa, created the High Fidelity Body mesh. Details of body model creation are given in the *methods* section in [5]. The body mesh contains 23 tissues materials. Measured values for the tissue parameters for a broad frequency range are included with the mesh data. The correct values are interpolated from the table of measured data and entered into the appropriate mesh variables. The tissue conductivity and permittivity variation vs. frequency is included in the XFDTD™ calculation by a multiple-pole approximation to the Cole-Cole approximated tissue parameters reported in [11].

a) The XFDTD™ High Fidelity Body Mesh model correctly represents the anatomical

structure and the dielectric properties of body tissues, so it is appropriate for determining the highest exposure expected for normal device operation.

b) One example of the accuracy of XFDTD™ for computing SAR has been provided in [6]. The study reported in [6] is relative to a large-scale benchmark of measurement and computational tools carried out within the IEEE Standards Coordinating Committee 34, Sub-Committee 2.

5) Tissue dielectric parameters

a) The following table reports the dielectric properties used by XFDTD™ for the 23 body tissue materials in the High Fidelity Body Mesh at 155 MHz..

#	Tissue	ϵ_r	σ (S/m)	Density (kg/m ³)
1	skin	50.5	0.49	1125
2	tendon, pancreas, prostate, aorta, liver, other	59.3	0.63	1151
3	fat, yellow marrow	5.8	0.04	943
4	cortical bone	15.5	0.08	1850
5	cancellous bone	26.0	0.17	1080
6	blood	64.5	1.65	1057
7	muscle, heart, spleen, colon, tongue	73.6	0.84	1059
8	gray matter, cerebellum	71.5	0.73	1035.5
9	white matter	51.4	0.41	1027.4
10	CSF	73.9	2.29	1000
11	sclera/cornea	61.8	0.94	1151
12	vitreous humor	68.6	1.52	1000
13	bladder	19.1	0.28	1132
14	nerve	44.0	0.41	1112
15	cartilage	53.8	0.53	1171
16	gall bladder bile	86.6	1.49	928
17	thyroid	65.9	0.71	1035.5
18	stomach/esophagus	78.5	1.03	1126
19	lung	52.3	0.59	563
20	kidney	72.9	1.02	1147
21	testis	72.6	0.99	1158
22	lens	57.3	0.61	1163
23	small intestine	89.5	1.85	1153

b) The tissue types and dielectric parameters used in the SAR computation are appropriate for determining the highest exposure expected for normal device operation, because they are derived from measurements performed on real biological tissues (XFDTD, Reference Manual Version 6.4, Remcom, Inc.).

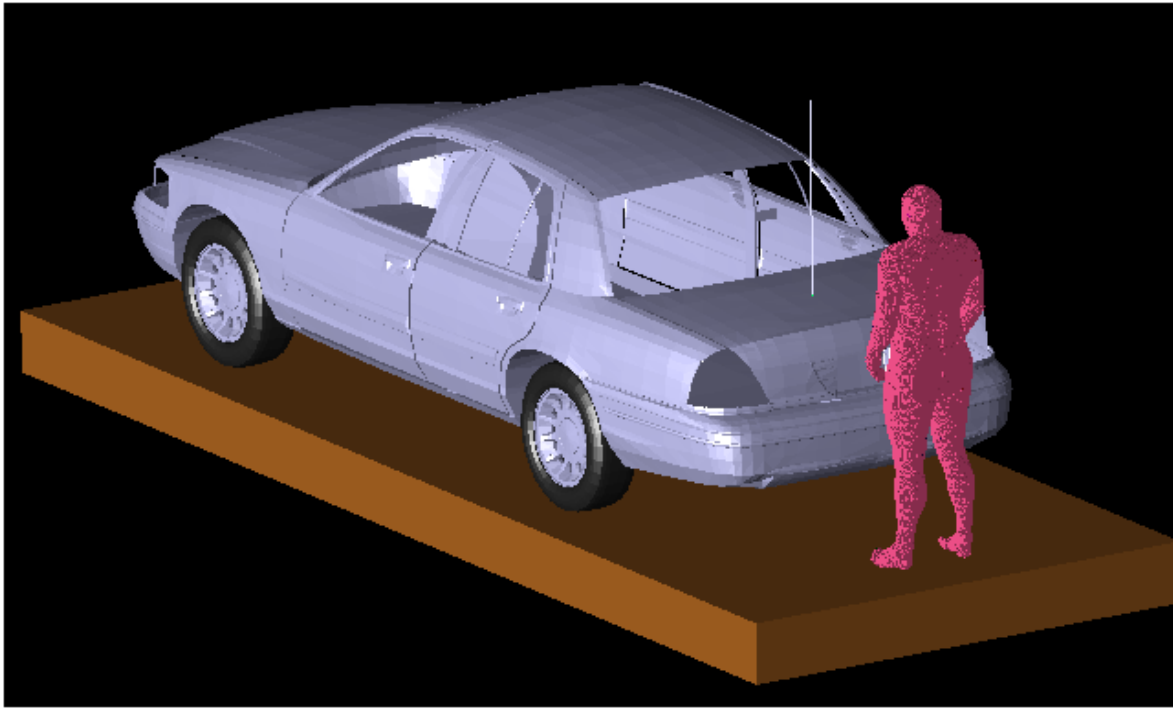
c) The tabulated list of the dielectric parameters used in phantom models is provided at point 5(a). As regards the device (car plus antenna), we used perfect electric conductors.

6) Transmitter model implementation and validation

a) The essential features that must be modeled correctly for the particular test device model to be valid are:

- Car body. The car model is very similar to the car used for MPE measurements, so as to be able to correlate measured and simulated field values. This car model has been developed for the SAR computational draft standard IEC/IEEE 62704-2.
- Antenna. We used a straight wire, even when the gain antenna has a base coil for tuning. All the coil does is compensating for excess capacitance due to the antenna being slightly longer than half a wavelength. We do not need to do that in the model, as we used normalization with respect to the net radiated power, which is determined by the input resistance only. In this way, we neglect mismatch losses and artificially produce an overestimation of the SAR, thereby introducing a conservative bias in the model. This simulation model was also validated by comparing the computed and measured near-field distributions in the condition with antenna mounted on the reference ground plane and showed good agreement experimental data [9].
- Antenna location. We used the same location, relative to the edge of the car trunk, the backseat, or the roof, used in the MPE measurements. The following pictures show a lateral and a perspective view of the bystander and passenger model.



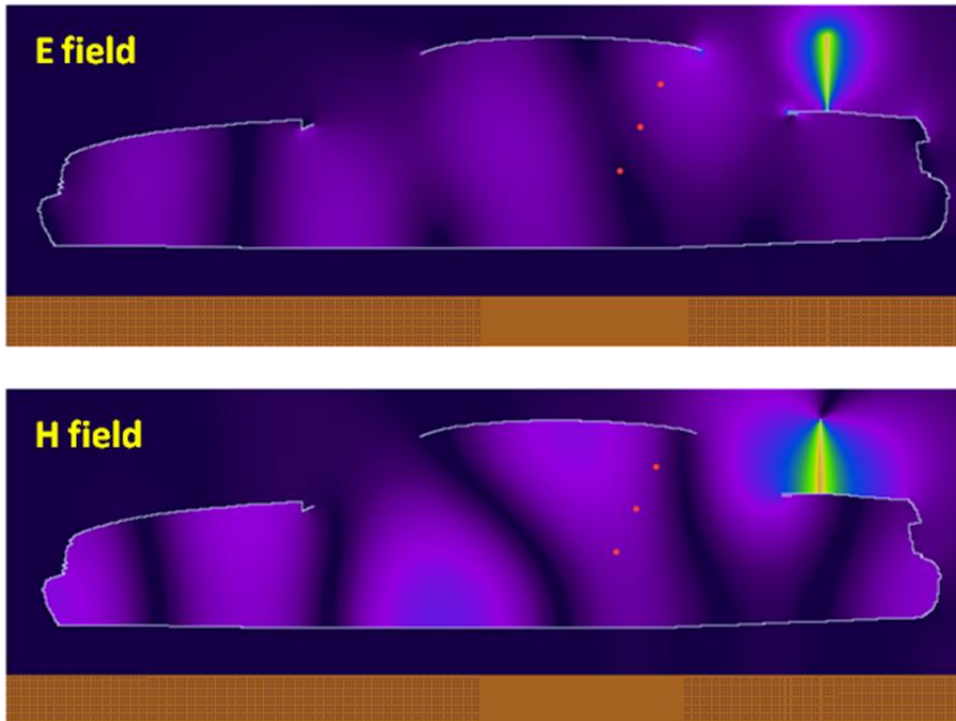


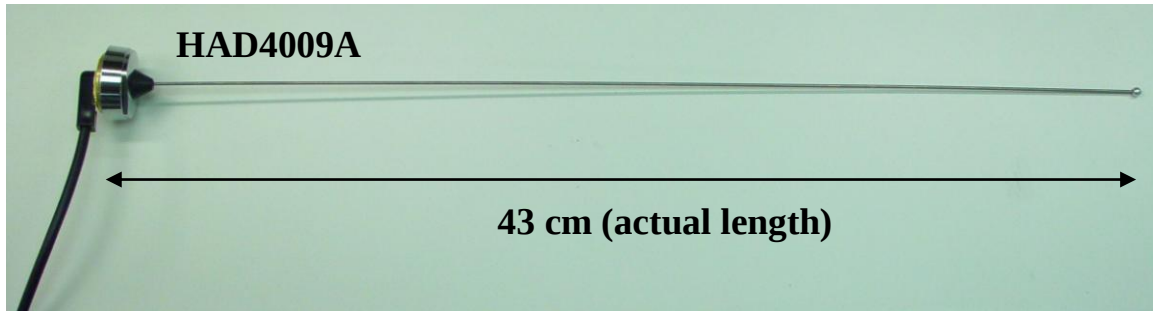
The car model is constituted by perfect electric conductor and does not include wheels in order to reduce its complexity. The passenger model is surrounded by air, as the seat, which is made out of poorly conductive fabrics, is not included in the computational model. The pavement has not been included in the model. The passenger and bystander models were validated for similar antenna and frequency conditions by comparing the MPE measurements at two VHF frequencies (146 MHz and 164 MHz) for antennas used for a VHF mobile radio analyzed previously in 2003 (FCC ID#ABZ99FT3046). The corresponding MPE measurements are reported in the compliance report relative to FCC ID#ABZ99FT3046. The comparison results are presented below, according to following definitions for the equivalent power densities (based on E or H-field):

$$S_E = \frac{|\mathbf{E}|^2}{2\eta}, \quad S_H = \frac{\eta}{2} |\mathbf{H}|^2, \quad \eta = 377 \Omega$$

Passenger with 43 cm monopole antenna (HAD4009A 164 MHz)

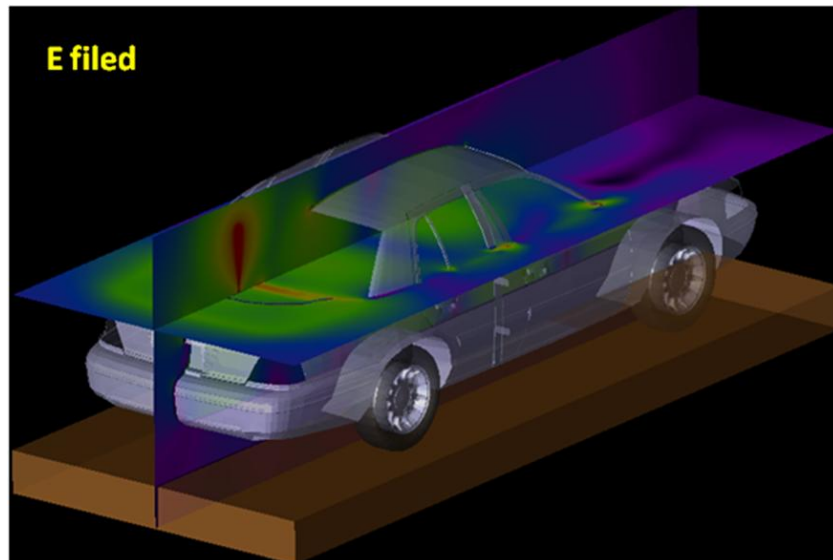
The following figures of the test model show the empty car model, where the red dotted line represents the location of the passenger in the back seat, as it can be observed from the complete model picture above. The comparison has been performed by taking the computed steady-state field values at the red dots locations corresponding to the head, chest, and lower trunk area and comparing them with the corresponding measurements. Such a comparison is carried out at the same average power level (56.5 W) used in the measurements. Steady-state E-field and H-field distributions at a vertical crossing the passenger's head are displayed as well. Finally, a picture of the antenna is shown.

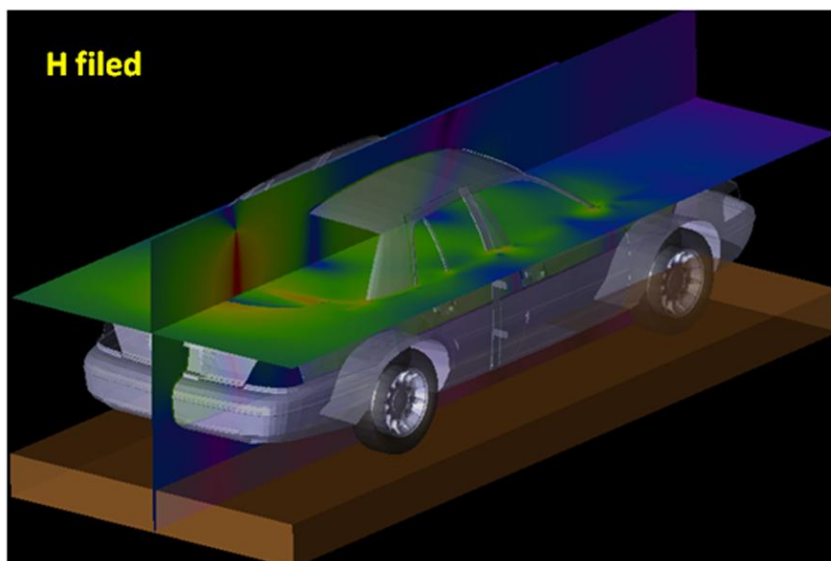




The highest exposure occurs in the middle of the backseat, which is also the case in the measurements. Therefore, the field values were determined on the yellow line centered at the middle of the backseat, approximately at the three locations that are shown by white dots. In actuality, the line is inclined so as to follow the inclination of the passenger's back, as shown previously.

Because the peak exposure occurs in the center of the back seat, that was where we placed the passenger model to perform the SAR evaluations presented in the report. However, it can be observed that the H-field distribution features peaks near the lateral edges of the rear window. That is the reason why we also carried out one SAR computation by placing the passenger laterally in the back seat, in order to determine whether the SAR would be higher in this case.



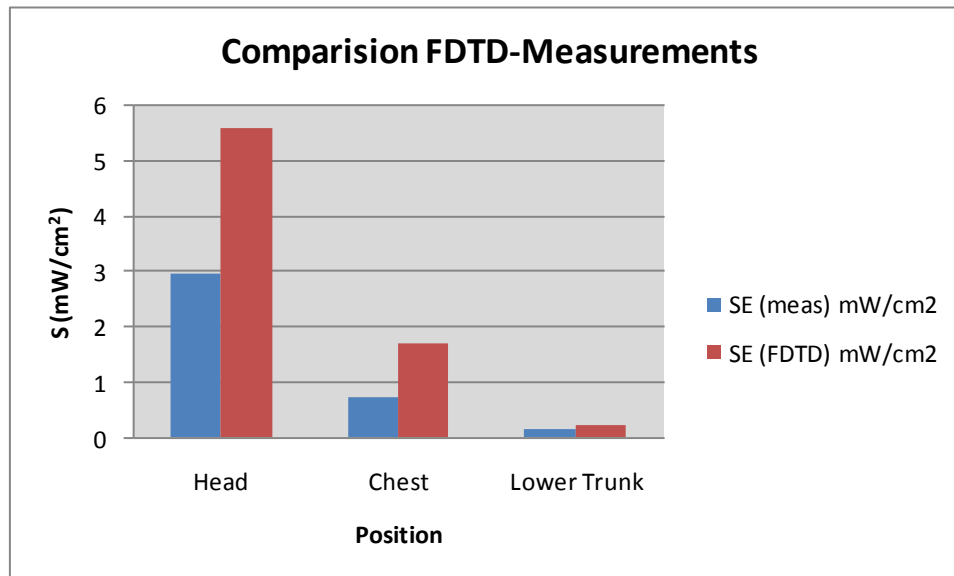


As done in the measurements, the equivalent power density (S) is computed from the E-field, the H-field being much lower. The following table reports the E-field values computed by XFDTD™ at the three locations, and the corresponding power density.

Location	E-field magnitude (V/m)	S (W/m ²)
Head	1.27	2.14E-03
Chest	0.70	6.55E-04
Lower Trunk area	0.20	7.70E-05
Average S		9.57E-04

The input impedance is 24.8-j11.9 ohm, therefore the radiated power (considering the mismatch to the 50 ohm unitary voltage source) is 2.16E-3 W. The scaled-up power density for 56.5 W radiated power is 25.0 W/m², corresponding to 2.50 mW/cm². Measurements gave an average of 1.29 mW/cm², which is a reasonable overestimation considering conservativeness of simulations model. The following table and the graph show a comparison between the simulated power density and the measured one (see also MPE report in FCC ID#ABZ99FT3046, Table 43), normalized to 56.5 W radiated.

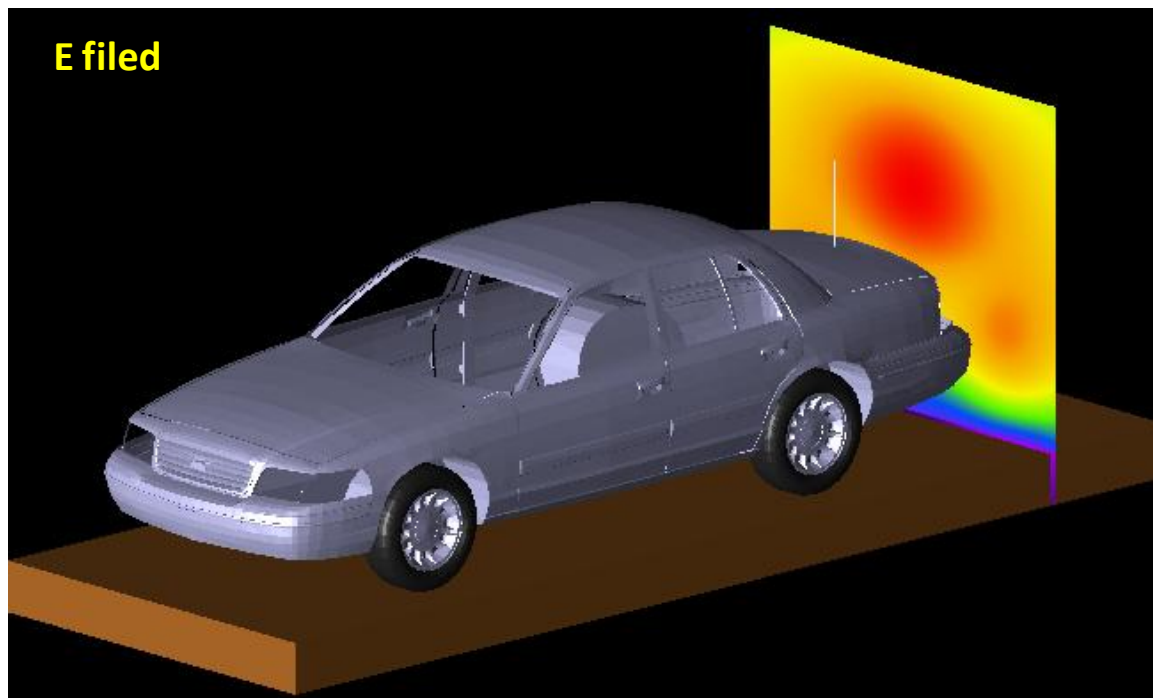
Position	SE (meas) mW/cm ²	SE (FDTD) mW/cm ²
Head	2.98	5.59
Chest	0.74	1.71
Lower Trunk	0.14	0.2

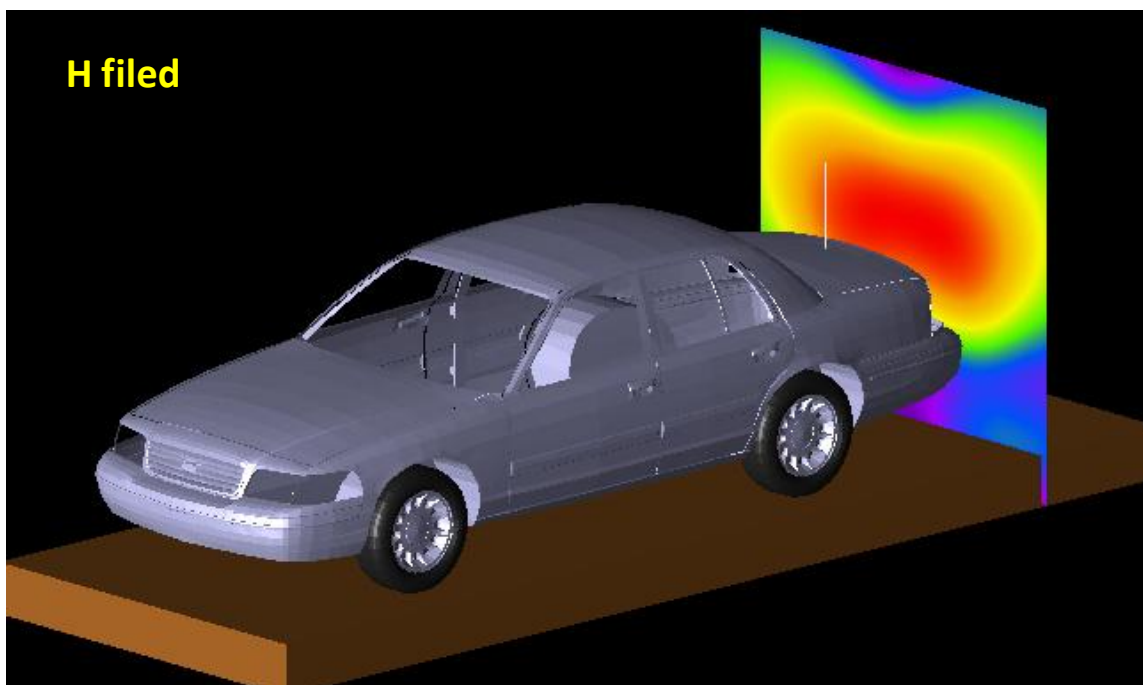


Bystander with 48 cm monopole antenna (HAD4007A 146 MHz)

The following figures show the E-field and H-field distributions across a vertical plane passing for the antenna and cutting the car in half. As done in the measurements, the MPE is computed from both E-field and H-field distributions, along the yellow dotted line at 10 points spaced 20 cm apart from each other up to 2 m in height. These lines and the field evaluation points are approximately indicated in the figures. The E-field and H-field distributions in the vertical plane placed at 60 cm from the antenna, are shown as well. The points where the fields are sampled to determine the equivalent power density (S) are approximately indicated by the white dots. A picture of the antenna is not reported because it is identical to the HAD4009A except for the length.







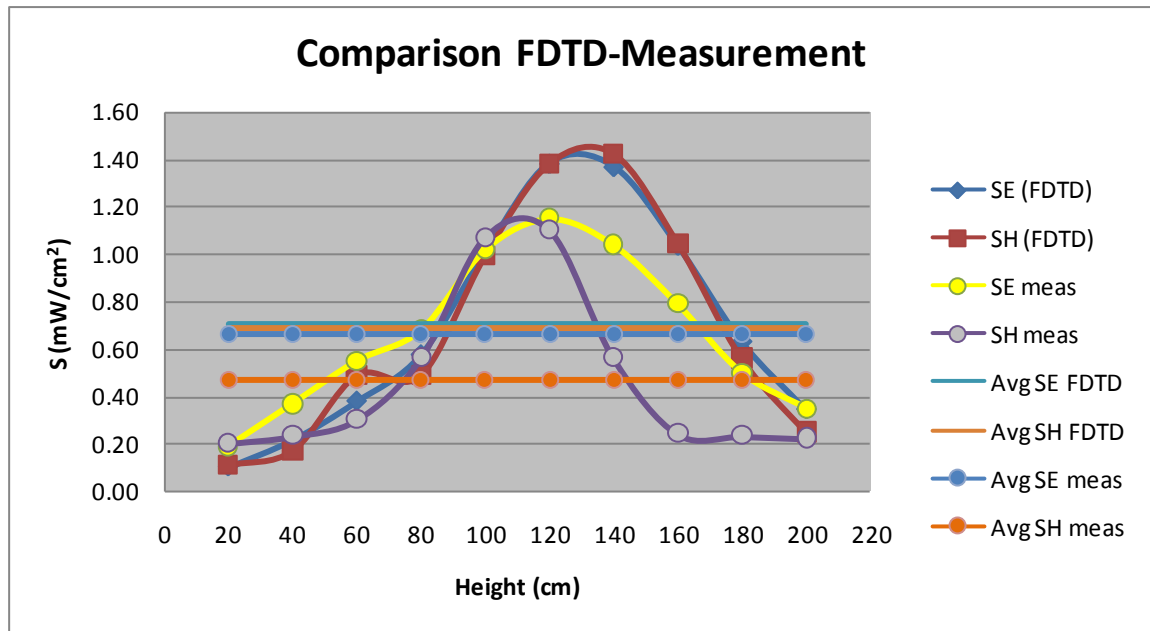
The following table reports the field values computed by XFDTD™ and the corresponding power density values. The average exposure levels are computed as well.

Height (cm)	E (V/m)	S _E (W/m ²)	H (A/m)	S _H (W/m ²)
20	1.84E-01	4.50E-05	5.10E-04	4.89E-05
40	2.71E-01	9.71E-05	6.38E-04	7.68E-05
60	3.58E-01	1.70E-04	1.08E-03	2.20E-04
80	4.42E-01	2.59E-04	1.54E-03	2.20E-04
100	5.85E-01	4.55E-04	1.82E-03	4.48E-04
120	6.86E-01	6.24E-04	1.85E-03	6.23E-04
140	6.82E-01	6.17E-04	1.58E-03	6.42E-04
160	5.93E-01	4.67E-04	1.16E-03	4.72E-04
180	4.63E-01	2.84E-04	7.67E-04	2.52E-04
200	3.41E-01	1.55E-04	4.94E-04	1.11E-04
Average S_E		3.17E-04	Average S_H	3.11E-04

The input impedance is 33.7-j3.0 ohm, therefore the radiated power (considering the mismatch to the 50 ohm unitary voltage source) is 2.40E-3 W. The scaled-up power density values for 53.2 W radiated power are 7.03 W/m² (E), and 6.90 W/m² (H), that correspond to 0.70 mW/cm² (E), and 0.69 mW/cm² (H). Measurements yielded average power density of 0.664 mW/cm² (E), and 0.471 mW/cm² (H), i.e., which are in good agreement with the simulations. The following table and graph show a comparison between the simulated power density and the measured one, based on E (see MPE report in FCC ID#ABZ99FT3046, Table 1) or H fields (see MPE report in FCC

ID#ABZ99FT3046, Table 13), normalized to 53.2 W radiated.

Height (cm)	SE (meas) mW/cm ²	SE (FDTD) mW/cm ²	SH (meas) mW/cm ²	SH (FDTD) mW/cm ²	Avg SE meas mW/cm ²	Avg SE FDTD mW/cm ²	Avg SH meas mW/cm ²	Avg SH FDTD mW/cm ²
20	0.19	0.10	0.2	0.11	0.664	0.703	0.471	0.690
40	0.37	0.22	0.23	0.17				
60	0.55	0.38	0.3	0.49				
80	0.68	0.57	0.56	0.49				
100	1.02	1.01	1.07	0.99				
120	1.15	1.38	1.1	1.38				
140	1.04	1.37	0.56	1.42				
160	0.79	1.03	0.24	1.05				
180	0.5	0.63	0.23	0.56				
200	0.35	0.34	0.22	0.25				



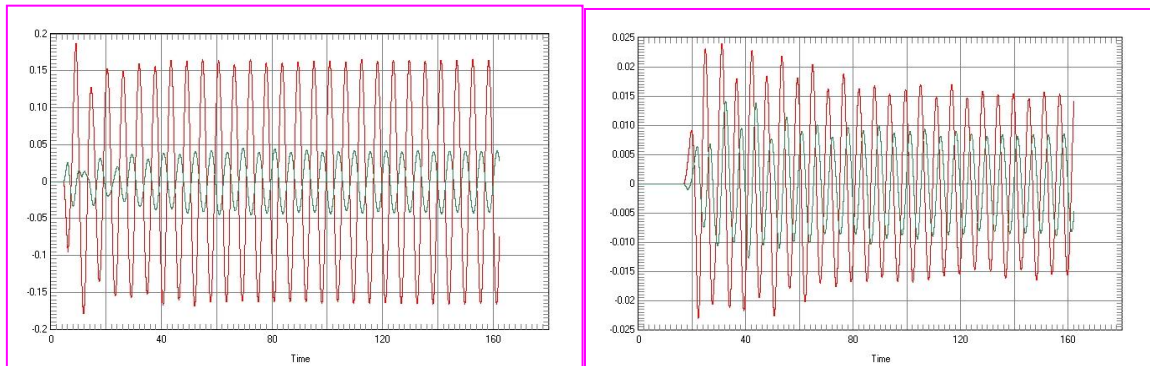
7) Test device positioning

a) A description of the device test positions used in the SAR computations is provided in the SAR report.

b) Illustrations showing the separation distances between the test device and the phantom for the tested configurations are provided in the SAR report.

8) Steady state termination procedures

a) The criteria used to determine that sinusoidal steady-state conditions have been reached throughout the computational domain for terminating the computations are based on the monitoring of field points to make sure they converge. The simulation projects were set to automatically track the field values throughout computational domain by means of XFDTD simulation control feature which ensures that *“convergence is reached when near-zone data shows a constant amplitude sine wave – when all transients have died down and the only variation left is sinusoidal. In this case “convergence” is tested on the average electric field in the space for its deviation from a pure sine wave. XFDTD automatically places points throughout the space for this purpose.”* [XFDTD Reference Manual, version. 6.4 and version 7.1]. This convergence threshold was set to -50 dB. In addition for at least one passenger and one bystander exposure condition, we placed one “field sensor” near the antenna, others between the body and the domain boundary at different locations, and one inside the head of the model. In all simulations, isotropic E-field sensors were placed at opposite sides of the computational domain. We used isotropic E and H field “sensors”, meaning that all three components of the fields are monitored at these points. The following figures show an example of the time waveforms at the field point sensors in two points of the computational domain. We selected points close to antenna as well as furthest one. The highest field levels are observed for the higher index point, as it is closer to the antenna. In all cases, the field reaches the steady-state condition.



c) The XFDTD™ algorithm determines the field phasors by using the so-called “two-equations two-unknowns” method. Details of the algorithm are explained in [7].

9) Computing peak SAR from field components

a) 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.

b) The IEEE Standards Coordinating Committee 34, Sub-Committee 2 draft standard P1529 (June 2000) discusses several algorithms for volumetric SAR averaging. It states that “It is observed that while the 12 components algorithm is the most appropriate from the mathematical point of view, the differences in 1g SAR calculated with either the 12 or 6 component methods are negligible for practical mesh resolutions (below 5mm). On the other hand, it is shown that the 3 components approach may lead to significant errors.” XFDTD™ employs the 12-component method, which is the one recommended in the draft standard, thus providing the best achievable accuracy.

10) One-gram and ten-gram averaged SAR procedures

a) 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.

b) The sample cube increases in odd-numbered steps (1x1x1, 3x3x3, 5x5x5, etc) to remain centered on the desired cell. Since the visible human model employed herein has 5 mm resolution, the one-gram SAR is computed by averaging first over 1x1x1 voxels, corresponding to 0.125 cm^3 (not enough yet), and then over a 3x3x3 voxel cube, corresponding to about 3.4 cm^3 , which is enough to include 1-g, and finally over a 5x5x5 voxel cube, corresponding to about 15.6 cm^3 , which includes 10-g. The 1-g average SAR is computed by interpolating these three data points. This procedure is repeated in the surroundings of each voxel that is constituted by lossy materials, so as to determine the 1-g and/or 10-g SAR distributions.

c) As mentioned at points 10(a) and 10(b), the 1- gram average SAR is determined by interpolating the average SAR for the 1x1x1 , 3x3x3, and the 5x5x5 data points, corresponding to 0.125 cm^3 , 3.4 cm^3 , and 15.6 cm^3 , respectively. Because the interpolation is carried out across three data points, the error introduced should be negligible because the interpolating curve crosses exactly the data points.

11) Total computational uncertainty – We derived an estimate for the uncertainty of FDTD methods in evaluating SAR by referring to [6]. In Fig. 7 in [6] it is shown that the deviation between SAR estimates using the XFDTD™ code and those measured with a compliance system are typically within 10% when the probe is away from the phantom surface so that boundary effects are negligible. In that example, the simulated SAR

always exceeds the measured SAR.

As discussed in 6(a), a conservative bias has been introduced in the model so as to reduce concerns regarding the computational uncertainty related to the car modeling, antenna modeling, and phantom modeling. The results of the comparison between measurements and simulations presented in 6(a) suggest that the present model produces an overestimate of the exposure between 4% and 36%. Such a conservative bias should eliminate the need for including uncertainty considerations in the SAR assessment.

12) Test results for determining SAR compliance

a) Illustrations showing the SAR distribution of dominant peak locations produced by the test transmitter, with respect to the phantom and test device, are provided in the SAR report.

b) 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 average radiated power is computed as

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

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

We normalize the SAR to such a power, thereby obtaining SAR per radiated Watt (*normalized SAR*) values for the whole body and the 1-g SAR. Finally, we multiply such normalized SAR values times the max power rating of the device under test. In this way, we obtain the exposure metrics for 100% talk-time, i.e., without applying source-based time averaging.

c) For mobile radios, 50% source-based time averaging is applied by multiplying the SAR values determined at point 12(b) times a 0.5 factor.

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