MOTOROLA SOLUTIONS

CERTIFICATE 2518.01

DECLARATION OF COMPLIANCE: MPE ASSESSMENT

EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

Date of Report: December 11, 2015
Report Revision: D

Responsible Engineer:	William Elliott (EME Test Engineer)
Report author:	William Elliott (EME Test Engineer)
Date(s) Tested:	7/25/2015 and 8/1/2015
Manufacturer:	Motorola Solutions Inc.
Date submitted for test:	06/29/2015
DUT Description:	UHF Vehicular Mobile Radio with internal Bluetooth, GPS and WLAN.
Test TX mode(s):	CW
Max. Power output:	48 W (UHF), 7.3 mW (Bluetooth), 17.8 mW (WLAN 802.11b), 13.2 mW (WLAN 802.11g) 8.3 mW (WLAN 802.11n)
TX Frequency Bands:	450–527 MHz; 2.402-2.480 GHz (Bluetooth), 2.412 – 2.462 GHz (WLAN)
Signaling type:	FM; 4FSK 2:1 TDMA (LMR) / FHSS; π/4 DQPSK; 8DPSK; GFSK (Bluetooth) / BPSK; QPSK; 16 QAM; 64 QAM (WLAN)
Model(s) Tested:	PMUE4140B
Model(s) Certified:	PMUE4140B; AAM28TRC9RA1AN; AAM28TRN9WA1AN; AAM28TRN9WA1AN
Serial Number(s):	511TRM4961
Classification:	Occupational/Controlled Environment
FCC ID:	AZ492FT7076 450 – 512 MHz; 2.402-2.480 GHz (Bluetooth), 2.412 – 2.462 GHz (WLAN) This report contains results that are immaterial for FCC equipment approval, which are clearly identified.
IC:	109U-92FT7076 450 – 470 MHz; 2.402-2.480 GHz (Bluetooth), 2.412 – 2.462 GHz (WLAN) This report contains results that are immaterial for IC equipment approval, which are clearly identified.

The MPE results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits. FCC rules require compliance for Passengers and Bystanders to the FCC General Population/Uncontrolled limits. The test results clearly demonstrate compliance with ICNIRP Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).

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.

Deanna Zakharia

Digitally signed by Deanna Zakharia
DN: cn=Deanna Zakharia, o=Motorola Solutions, ou=Regulatory Compliance Lab, email=edc015@motorolasolutions.com, c=US
Date: 2015.12.11 09:47:16 -05'00'

Deanna Zakharia
EME Lab Senior Resource Manager and Laboratory Director

Approval Date: 12/11/2015

Document Revision History

Date	Revision	Comments
09/05/2015	A	Initial Release
10/12/2015	B	Revise for updated WiFi/BT powers
11/24/2015	C	Revise WLAN Freq Range and BT Powers for FCC
12/11/2015	D	Updated a few KDB dates to newest revision

Table of Contents

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 for product model PMUE4140B.

2.0 FCC MPE Summary

Table 1

Equipment Class	Frequency band (MHz)	Passenger (mW/cm²)	Bystander (mW/cm²)
TNB	450 - 512	0.25	0.21
*DSS	2402 – 2480	NA	NA
*DTS	2412 – 2462	NA	NA
*Simultaneous Results		NA	NA

*Note Results not required per KDB 447498

3.0 Abbreviations / Definitions

π/4 DQPSK: Differential Quadrature Phase-Shift Keying with a π/4 offset to phase changes
4FSK: Four Level Frequency Shift Keying
8 DPSK: 8-level Differential Phase-Shift Keying
16 QAM: 16 Quadrature Amplitude Modulation
64 QAM: 64 Quadrature Amplitude Modulation
APCO: Association of Public-Safety Communications Officials
BPSK: Binary Phase-Shift Keying
BS: Bystander
BT: Bluetooth
CNR: Calibration Not Required
CW: Continuous Wave
DUT: Device Under Test
EME: Electromagnetic Energy
FHSS: Frequency Hopping Spread Spectrum
FM: Frequency Modulation
FSK: Frequency Shift Keying
GFSK: Gaussian Frequency-Shift Keying
GPS: Global Positioning System
LMR: Land Mobile Radio
MPE: Maximum Permissible Exposure
NA: Not Applicable
PB: Passenger Backseat
PF: Passenger Front seat
PTT: Push to Talk
QPSK: Quadrature Phase-Shift Keying

TDMA: Time Division Multiple Access
WLAN: Wireless Local Area Network

4.0 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 (Edition 97-01), FCC, Washington, D.C.: August 1997.
- 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
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6 (2015), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- RSS-102 (Issue 5) – Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
- FCC KDB – 447498 D01 General RF Exposure Guidance v06
- FCC KDB – 865664 D02 RF Exposure Reporting v01r02

5.0 Power Density Limits

Table 2 – Occupational / Controlled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65 mW/cm^2	ICNIRP W/m^2	IEEE C95.1 1992/1999 mW/cm^2	IEEE C95.1 2005 W/m^2	RSS-102 Issue 5 2015 W/m^2
10 - 20					10.0
20 – 48					$44.72 / f^{0.5}$
30 – 300	1.0				
48 – 100					6.455
10 – 400		10.0			
100 – 300			1.0	10.0	
100 – 6,000					$0.6455 f^{0.5}$
300 – 1,500	f/300				
300 - 3,000			f/300	f/30	
400 – 2,000		f/40			
1,500 – 15,000					

Table 2 (Cont.) – Occupational / Controlled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65 mW/cm^2	ICNIRP W/m^2	IEEE C95.1 1992/1999 mW/cm^2	IEEE C95.1 2005 W/m^2	RSS-102 Issue 5 2015 W/m^2
1,500 – 100,000	5.0				
2,000 – 300,000		50.0			
3,000 – 300,000			10.0	100.0	
6,000 – 15,000					50.0
15000 – 150,000					50.0
150000 –300,000					$3.33\times10^{-4}\ f$

Table 3 – General Population / Uncontrolled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65 mW/cm^2	ICNIRP W/m^2	IEEE C95.1 1992/1999 mW/cm^2	IEEE C95.1 2005 W/m^2	RSS-102 Issue 5 2015 W/m^2
10 - 20					2.0
20 – 48					$8.944 / f^{0.5}$
30 – 300	0.2				
48 – 300					1.291
10 – 400		2.0			
100 – 300			0.2		
100 – 400				2.0	
300 – 1,500	f/1,500				
300 – 6000					$0.02619\ f^{0.6834}$
400 – 2,000		f/200		f/200	
300 – 15,000			f/1,500		
1,500 – 15,000					
1,500 – 100,000	1.0				
2,000 – 100,000				10.0	
2,000 – 300,000		10.0			
6,000 – 15,000					10.0
15,000 – 150,000					10.0
150,000 - 300,000					$6.67\times10^{-5}\ f$

6.0 N_c Test Channels

The number of test channels is 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

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

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.

7.0 Measurement Equipment

Table 4 - Equipment

Equipment Type	Model #	SN	Calibration Date	Calibration Due Date
Automobile	2003 Ford Crown Victoria, 4-Door	NA	NA	NA
Survey Meter Probe – E-Field	ETS Model HI-2200 ETS Model E100	00086316 000153632	12/10/2014	12/10/2015

E-field measurements are in mW/cm^2.

8.0 Measurement System Uncertainty Levels

Table 5 - 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	

9.0 Product and System Description

Model PMUE4140B is a mobile transceiver that utilizes analog and digital two-way radio communications, WLAN, Bluetooth and GPS technologies. The analog modulation scheme uses narrowband Frequency Modulation (FM). The digital modulation scheme uses 4 Level Frequency Shift Keying (4FSK) and Time Division Multiple Access (TDMA). TDMA allocates portions of the RF signal by dividing time into two slots (2 slot TDMA). The system can accommodate 2-voice channels in a standard 12.5 kHz channel. Transmission from a unit or base station is accommodated in time-slot lengths of 30 milliseconds and frame lengths of 60 milliseconds. This product supports voice in analog mode, and both voice and data modes in digital mode.

This device operates in a half duplex system. A half duplex system only allows the user to transmit or receive. This device cannot transmit and receive simultaneously. The user must stop transmitting in order to receive a signal or listen for a response, regardless of PTT button or use of voice activated audio accessories. This type of operation, along with the RF safety booklet, which instructs the user to transmit no more than 50% of the time, justifies the use of 50% duty factor for this device.

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.

This device incorporates a Bluetooth device which is Frequency Hopping Spread Spectrum (FHSS) technology. The Bluetooth radio modem is used to wirelessly link audio accessories. The maximum transmission duty cycle is imposed by the Bluetooth standard and for this product is 77%.

This device also incorporates a WLAN transmitter including 802.11b, 802.11g and 802.11n. 802.11b uses direct-sequence spread spectrum modulation (DSSS) and Complementary Code Keying (CCK). 802.11g and 802.11n use orthogonal frequency-division multiplexing (OFDM). 802.11g uses Binary Phase-Shift Keying (BPSK), Quadrature Phase-Shift Keying (QPSK), and Quadrature Amplitude Modulation (16QAM, 64QAM). 802.11n uses Modulation and Coding Schemes (MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7). The maximum duty cycle for 802.11b is 99.8%, for 802.11g is 99.2% and for 802.11n is 99.1%.

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 (UHF only). The Bluetooth / WLAN transmitters use a combined antenna that is internal to the radio itself. It is located behind the control head on the left side of the radio. The Bluetooth / WLAN transmitters cannot transmit at the same time.

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)

10.0 Additional Options and Accessories

Refer to Table 6 for complete list of tested antennas.

PMAN4004B – Optional GPS Base

Below are additional antenna kits which include the tested antennas, mounting hardware, and optional GPS base:

PMAE4031A - Includes GPS base and tested antenna PMAE4041A.
PMAE4034A - Includes GPS base and tested antenna PMAE4043A.
PMAE4033A - Includes GPS base and tested antenna PMAE4042A.
HAE6019A - Includes GPS base and tested antenna HAE6029A.
HAE6026A - Includes GPS base and tested antenna HAE6027A.
HAE6024A - Includes GPS base and tested antenna HAE6028A.
HAE6022A - Includes GPS base and tested antenna HAE6029A.
HAE6020A - Includes GPS base and tested antenna HAE6030A.

Below are additional antenna kits that are electrically identical to the tested antennas but have a BNC connector instead of the mini-U connector (tested):

RAE4154A – Identical to tested antenna PMAE4043A with BNC connector
RAE4152A – Identical to tested antenna HAE4003A with BNC connector
HAE6017A – Identical to tested antenna HAE6022A with BNC connector
HAE6018A – Identical to tested antenna HAE6020A with BNC connector
HAE6021A – Identical to tested antenna HAE6022A with BNC connector
HAE6023A – Identical to tested antenna HAE6024A with BNC connector
HAE6025A – Identical to tested antenna HAE6025A with BNC connector
PMAE4037A – Identical to tested antenna PMAE4041A with BNC connector
PMAE4038A – Identical to tested antenna PMAE4043A with BNC connector

11.0 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 6 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.

The system was tested using a 16' Teflon RG58A/U cable attaching the radio to the transmit antenna. This cable is shorter than the 17' ARG-58U cables supplied in the customer kits for

connecting the radio to the transmit antenna. The cable used in the test setup also has lower attenuation over the test frequency range than the cable provided in the customer kits. The use of a shorter cable with lower attenuation in the test setup ensures that the test data is more conservative with regards to the actual installation. Cable losses are reported in Appendix A.

12.0 Method of Measurement with trunk mounted antenna(s)

12.1 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 distance of 90 cm (for rated conducted power from 40 to 110 W), 104 cm (45 degree radial) and 110.5 cm (90 degree radial). The separation distance used for testing is defined from the antenna whereas 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 45º radial at the corner of the trunk, and 90º 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.

12.2 Internal/Passenger vehicle MPE measurements

Antenna is located toward the center of the trunk at a minimum 85cm from backseat 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 backseat (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 backseat 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 Method of Measurement with roof mounted antenna(s)

13.1 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.

13.2 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 backseat (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 backseat 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.

14.0 MPE Calculations

The final MPE results for this mobile radio are presented in section 15.0 Tables 7 - 10. 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.)*

$$Calc.\_P.D. = (Avg\_over\_body) * (probe\_frequency\_cal\_factor) * (duty\_cycle)$$

Note1: 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/cm^2) 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/cm^2) using the equation 3. H-field measurements are only applicable to frequencies below 300MHz.

Equation 3 – Converting A/m to mW/cm^2

$$mW/cm\text{^}2 = (A/m)\text{^}2 * 37.699$$

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

15.0 Antenna Summary

Table 6 below summarizes the tested or evaluated antennas and their descriptions, mount location (roof/trunk/internal), 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 6

#	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	HAE4003A	450-470	16.0	2.15	¼ wave, wire	R	450-470	3	3
2	HAE4004A	470-527	15.0	2.15	¼ wave, wire	R	470-512	4	5
3	HAE4011A	450-470	73.2	5.65	5/8 wave, trap-loaded	R/T	450-470	3	3
4	HAE4012A	470-494	68.5	5.65	5/8 wave, trap-loaded	R/T	470-494	3	3
5	HAE4013A	494-512	64.2	5.65	5/8 wave, trap-loaded	R/T	494-512	3	3
6	HAE6020A	470-527	12.8	2.15	¼ wave, wire	R	470-512	4	5
7	HAE6022A	403-527	27.8	4.15	½ wave, wire	R/T	450-512	5	6
8	HAE6024A	470-494	28.4	5.15	5/8 wave, wire	R/T	470-494	3	3
9	HAE6026A	494-512	27.7	5.15	5/8 wave, wire	R/T	494-512	3	3
10	PMAE4041A	450-470	12.5	2.15	¼ wave, wire	R	450-470	3	3
11	PMAE4033A	450-470	31.2	5.65	5/8 wave, wire	R/T	450-470	3	3
12	PMAE4043A	450-470	76.8	7.15	5/8 wave, trap-loaded	R/T	450-470	3	3
13	*RAE4004ARB	445-470	93.9 90.7 89.0	7.15	5/8 wave, trap-loaded	R/T	445-470	3	3

*Trimmed to Frequency

All quarter-wave antennas are restricted to installation on the roof.

16.0 Test Results Summary

The following tables below summarize the MPE results for each test configuration: antenna location, test positions (BS-Bystander, PB-Passenger Backseat, 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/IC specification limits and % of the applicable specification limits.

Data identified with "NA" are outside the permissible spectrum allowed by Industry Canada, therefore the IC limits are not applicable.

Table 7

Bystander MPE assessment 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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Trunk	BS	E	0	HAE4011A (450 - 470 MHz)	48	48.0	450	0.08	0.30	27	0.23	35	0.17	47
						47.9	460	0.07	0.31	23	0.23	31	0.17	42
						47.3	470	0.05	0.31	16	0.24	21	0.18	29
Trunk	BS	E	0	HAE4012A (470 - 494 MHz)	48	47.3	470	0.08	0.31	24	0.24	32	0.17	44
						47.6	482	0.08	0.32	24	0.24	31	NA	NA
						47.1	494	0.07	0.33	20	0.25	27	NA	NA
Trunk	BS	E	0	HAE4013A (494 - 512 MHz)	48	47.1	494	0.09	0.33	28	0.25	37	NA	NA
						47.5	503	0.10	0.34	30	0.25	41	NA	NA
						47.6	512	0.09	0.34	28	0.26	37	NA	NA
Trunk	BS	E	0	HAE6022A (403-527 MHz)	48	48.0	450	0.13	0.30	42	0.23	56	0.17	74
						48.0	465.5	0.11	0.31	36	0.23	48	0.17	63
						47.5	481	0.10	0.32	32	0.24	42	NA	NA
						47.4	496.5	0.12	0.33	35	0.25	46	NA	NA
						47.6	512	0.14	0.34	41	0.26	55	NA	NA
						47.5	527	0.14	0.35	40	0.26	53	NA	NA
Trunk	BS	E	0	HAE6024A (470 - 494 MHz)	48	47.3	470	0.08	0.31	25	0.24	34	0.17	46
						47.6	482	0.09	0.32	27	0.24	36	NA	NA
						47.1	494	0.10	0.33	31	0.25	41	NA	NA
Trunk	BS	E	0	HAE6026A (494 - 512 MHz)	48	47.1	494	0.11	0.33	33	0.25	44	NA	NA
						47.5	503	0.14	0.34	41	0.25	55	NA	NA
						47.6	512	0.15	0.34	44	0.26	58	NA	NA
Trunk	BS	E	0	PMAE4033A (450 - 470 MHz)	48	48.0	450	0.12	0.30	39	0.23	53	0.17	69
						47.9	460	0.12	0.31	40	0.23	54	0.17	72
						47.3	470	0.11	0.31	34	0.24	45	0.18	61

Table 7 (Cont.)

Bystander MPE assessment 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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Trunk	BS	E	0	PMAE4043A (450- 470 MHz)	48	48.0	450	0.11	0.30	36	0.23	48	0.17	64
						47.9	460	0.10	0.31	33	0.23	43	0.17	58
						47.3	470	0.09	0.31	28	0.24	38	0.18	51
Trunk	BS	E	0	RAE4004ARB (445- 470 MHz)	48	48.0	450	0.08	0.30	26	0.23	35	0.17	46
						47.9	460	0.08	0.31	26	0.23	34	0.17	45
						47.3	470	0.07	0.31	23	0.24	31	0.18	41
Worst Case Overall														
Trunk	BS	E	45	HAE6026A (494 - 512 MHz)	48	47.6	512	0.11	0.34	31	0.26	41	0.19	56
Worst Case IC Band														
Trunk	BS	E	45	HAE6022A (403-527 MHz)	48	48.0	450	0.10	0.30	35	0.23	46	0.17	61
Worst Case Overall														
Trunk	BS	E	90	HAE6026A (494 - 512 MHz)	48	47.6	512	0.08	0.34	22	0.26	30	0.19	41
Worst Case IC Band														
Trunk	BS	E	90	HAE6022A (403-527 MHz)	48	48.0	450	0.08	0.30	26	0.23	34	0.17	45

Table 8

Passenger MPE assessment 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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Trunk	PB	E	NA	HAE4011A (450 - 470 MHz)	48	48.0	450	0.15	0.30	50	0.23	66	0.17	87
						47.9	460	0.12	0.31	40	0.23	53	0.17	71
						47.3	470	0.07	0.31	21	0.24	28	0.18	38
Trunk	PB	E	NA	HAE4012A (470 - 494 MHz)	48	47.3	470	0.09	0.31	28	0.24	37	0.17	51
						47.6	482	0.15	0.32	46	0.24	61	NA	NA
						47.1	494	0.15	0.33	44	0.25	59	NA	NA
Trunk	PB	E	NA	HAE4013A (494 - 512 MHz)	48	47.1	494	0.20	0.33	61	0.25	81	NA	NA
						47.5	503	0.13	0.34	39	0.25	51	NA	NA
						47.6	512	0.10	0.34	29	0.26	38	NA	NA

Table 8 (Cont.)

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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Trunk	PB	E	NA	HAE6022A (403-527 MHz)	48	48.0	450	0.21	0.30	71	0.23	95	0.17	125
						48.0	465.5	0.15	0.31	47	0.23	63	0.17	84
						47.5	481	0.22	0.32	69	0.24	92	NA	NA
						47.4	496.5	0.24	0.33	72	0.25	96	NA	NA
						47.6	512	0.15	0.34	45	0.26	60	NA	NA
						47.5	527	0.14	0.35	41	0.26	54	NA	NA
Trunk	PB	E	NA	HAE6024A (470 - 494 MHz)	48	47.3	470	0.12	0.31	38	0.24	51	0.17	70
						47.6	482	0.21	0.32	64	0.24	85	NA	NA
						47.1	494	0.25	0.33	75	0.25	99	NA	NA
Trunk	PB	E	NA	HAE6026A (494 - 512 MHz)	48	47.1	494	0.21	0.33	64	0.25	85	NA	NA
						47.5	503	0.15	0.34	44	0.25	59	NA	NA
						47.6	512	0.17	0.34	49	0.26	66	NA	NA
Trunk	PB	E	NA	PMAE4033A (450 - 470 MHz)	48	48.0	450	0.19	0.30	65	0.23	86	0.17	114*
						47.9	460	0.20	0.31	67	0.23	89	0.17	118*
						47.3	470	0.16	0.31	51	0.24	68	0.18	91
Trunk	PB	E	NA	PMAE4043A (450- 470 MHz)	48	48.0	450	0.18	0.30	62	0.23	82	0.17	108*
						47.9	460	0.14	0.31	46	0.23	62	0.17	82
						47.3	470	0.12	0.31	37	0.24	49	0.18	66
Trunk	PB	E	NA	RAE4004ARB (445- 470 MHz)	48	48.0	450	0.04	0.30	14	0.23	18	0.17	24
						47.9	460	0.08	0.31	27	0.23	36	0.17	48
						47.3	470	0.06	0.31	18	0.24	24	0.18	32
Trunk	PF	E	NA	HAE4011A (450 - 470 MHz)	48	48.0	450	0.05	0.30	15	0.23	20	0.17	27
						47.9	460	0.05	0.31	16	0.23	22	0.17	29
						47.3	470	0.04	0.31	11	0.24	15	0.18	20
Trunk	PF	E	NA	HAE4012A (470 - 494 MHz)	48	47.3	470	0.04	0.31	14	0.24	19	0.17	26
						47.6	482	0.05	0.32	16	0.24	22	NA	NA
						47.1	494	0.06	0.33	17	0.25	22	NA	NA

Results marked with a "*" require SAR Simulation to demonstrate compliance to the basic requirements

Table 8 (Cont.)

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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Trunk	PF	E	NA	HAE4013A (494 - 512 MHz)	48	47.1	494	0.07	0.33	22	0.25	29	NA	NA
						47.5	503	0.10	0.34	29	0.25	39	NA	NA
						47.6	512	0.06	0.34	17	0.26	22	NA	NA
Trunk	PF	E	NA	HAE6022A (403-527 MHz)	48	48.0	450	0.08	0.30	28	0.23	37	0.17	49
						48.0	465.5	0.08	0.31	26	0.23	35	0.17	46
						47.5	481	0.10	0.32	31	0.24	41	NA	NA
						47.4	496.5	0.14	0.33	41	0.25	55	NA	NA
						47.6	512	0.13	0.34	40	0.26	53	NA	NA
						47.5	527	0.10	0.35	28	0.26	37	NA	NA
Trunk	PF	E	NA	HAE6024A (470 - 494 MHz)	48	47.3	470	0.07	0.31	23	0.24	31	0.17	43
						47.6	482	0.08	0.32	26	0.24	35	NA	NA
						47.1	494	0.11	0.33	33	0.25	45	NA	NA
Trunk	PF	E	NA	HAE6026A (494 - 512 MHz)	48	47.1	494	0.11	0.33	34	0.25	45	NA	NA
						47.5	503	0.14	0.34	43	0.25	57	NA	NA
						47.6	512	0.10	0.34	31	0.26	41	NA	NA
Trunk	PF	E	NA	PMAE4033A (450 - 470 MHz)	48	48.0	450	0.07	0.30	25	0.23	33	0.17	44
						47.9	460	0.09	0.31	29	0.23	38	0.17	51
						47.3	470	0.09	0.31	29	0.24	39	0.18	52
Trunk	PF	E	NA	PMAE4043A (450- 470 MHz)	48	48.0	450	0.06	0.30	20	0.23	27	0.17	36
						47.9	460	0.07	0.31	22	0.23	29	0.17	38
						47.3	470	0.06	0.31	18	0.24	23	0.18	31
Trunk	PF	E	NA	RAE4004ARB (445- 470 MHz)	48	48.0	450	0.02	0.30	5	0.23	7	0.17	9
						47.9	460	0.03	0.31	9	0.23	13	0.17	17
						47.3	470	0.03	0.31	8	0.24	11	0.18	14

Table 9

Bystander MPE assessment 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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Roof	BS	E	NA	HAE4003A (450 - 470 MHz)	48	48.0	450	0.06	0.30	18	0.23	25	0.17	32
						47.9	460	0.06	0.31	18	0.23	24	0.17	32
						47.3	470	0.06	0.31	19	0.24	25	0.18	33
Roof	BS	E	NA	HAE4004A (470 - 527 MHz)	48	47.3	470	0.06	0.31	20	0.24	27	0.18	36
						47.7	484	0.07	0.32	20	0.24	27	NA	NA
						47.6	498	0.06	0.33	19	0.25	26	NA	NA
						47.6	512	0.06	0.34	18	0.26	23	NA	NA
						47.5	527	0.06	0.35	17	0.26	23	NA	NA
Roof	BS	E	NA	HAE4011A (450 - 470 MHz)	48	48.0	450	0.04	0.30	15	0.23	20	0.17	26
						47.9	460	0.04	0.31	13	0.23	18	0.17	23
						47.3	470	0.03	0.31	11	0.24	14	0.18	19
Roof	BS	E	NA	HAE4012A (470 - 494 MHz)	48	47.3	470	0.05	0.31	17	0.24	23	0.17	31
						47.6	482	0.05	0.32	15	0.24	21	NA	NA
						47.1	494	0.04	0.33	13	0.25	17	NA	NA
Roof	BS	E	NA	HAE4013A (494 - 512 MHz)	48	47.1	494	0.06	0.33	19	0.25	25	NA	NA
						47.5	503	0.06	0.34	17	0.25	23	NA	NA
						47.6	512	0.05	0.34	16	0.26	21	NA	NA

Table 9 (Cont.)

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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Roof	BS	E	NA	HAE6020A (470 - 527 MHz)	48	47.3	470	0.03	0.31	11	0.24	15	0.18	20
						47.7	484	0.04	0.32	11	0.24	15	NA	NA
						47.6	498	0.05	0.33	16	0.25	21	NA	NA
						47.6	512	0.06	0.34	19	0.26	25	NA	NA
						47.5	527	0.06	0.35	18	0.26	24	NA	NA
Roof	BS	E	NA	HAE6022A (403-527 MHz)	48	48.0	450	0.06	0.30	20	0.23	26	0.17	35
						48.0	465.5	0.06	0.31	19	0.23	26	0.17	34
						47.5	481	0.06	0.32	19	0.24	25	NA	NA
						47.4	496.5	0.07	0.33	20	0.25	26	NA	NA
						47.6	512	0.07	0.34	20	0.26	27	NA	NA
						47.5	527	0.07	0.35	20	0.26	27	NA	NA
Roof	BS	E	NA	HAE6024A (470 - 494 MHz)	48	47.3	470	0.05	0.31	16	0.24	22	0.17	30
						47.6	482	0.06	0.32	18	0.24	24	NA	NA
						47.1	494	0.07	0.33	20	0.25	26	NA	NA
Roof	BS	E	NA	HAE6026A (494 - 512 MHz)	48	47.1	494	0.07	0.33	22	0.25	29	NA	NA
						47.5	503	0.07	0.34	22	0.25	29	NA	NA
						47.6	512	0.08	0.34	22	0.26	30	NA	NA

Table 9 (Cont.)

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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Roof	BS	E	NA	PMAE4041A (450 - 470 MHz)	48	48.0	450	0.01	0.30	2	0.23	3	0.17	4
						47.9	460	0.01	0.31	2	0.23	3	0.17	4
						47.3	470	0.03	0.31	8	0.24	11	0.18	14
Roof	BS	E	NA	PMAE4033A (450 - 470 MHz)	48	48.0	450	0.06	0.30	19	0.23	25	0.17	33
						47.9	460	0.06	0.31	21	0.23	28	0.17	37
						47.3	470	0.07	0.31	22	0.24	30	0.18	40
Roof	BS	E	NA	PMAE4043A (450- 470 MHz)	48	48.0	450	0.06	0.30	21	0.23	28	0.17	37
						47.9	460	0.06	0.31	20	0.23	27	0.17	35
						47.3	470	0.06	0.31	20	0.24	26	0.18	35
Roof	BS	E	NA	RAE4004ARB (445- 470 MHz)	48	48.0	450	0.04	0.30	12	0.23	16	0.17	22
						47.9	460	0.04	0.31	15	0.23	19	0.17	26
						47.3	470	0.04	0.31	14	0.24	19	0.18	26

Table 10

Passenger MPE assessment 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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Roof	PB	E	NA	HAE4003A (450 - 470 MHz)	48	48.0	450	0.03	0.30	9	0.23	12	0.17	15
						47.9	460	0.01	0.31	5	0.23	6	0.17	8
						47.3	470	0.01	0.31	4	0.24	6	0.18	8
Roof	PB	E	NA	HAE4004A (470 - 527 MHz)	48	47.3	470	0.02	0.31	5	0.24	7	0.18	9
						47.7	484	0.03	0.32	11	0.24	14	NA	NA
						47.6	498	0.04	0.33	11	0.25	15	NA	NA
						47.6	512	0.03	0.34	10	0.26	13	NA	NA
						47.5	527	0.03	0.35	9	0.26	12	NA	NA
Roof	PB	E	NA	HAE4011A (450 - 470 MHz)	48	48.0	450	0.01	0.30	3	0.23	4	0.17	5
						47.9	460	0.00	0.31	1	0.23	2	0.17	2
						47.3	470	0.00	0.31	1	0.24	1	0.18	2
Roof	PB	E	NA	HAE4012A (470 - 494 MHz)	48	47.3	470	0.00	0.31	2	0.24	2	0.17	3
						47.6	482	0.01	0.32	2	0.24	3	NA	NA
						47.1	494	0.01	0.33	2	0.25	3	NA	NA
Roof	PB	E	NA	HAE4013A (494 - 512 MHz)	48	47.1	494	0.01	0.33	3	0.25	5	NA	NA
						47.5	503	0.01	0.34	3	0.25	4	NA	NA
						47.6	512	0.01	0.34	3	0.26	3	NA	NA
Roof	PB	E	NA	HAE6020A (470 - 527 MHz)	48	47.3	470	0.01	0.31	2	0.24	3	0.18	4
						47.7	484	0.02	0.32	5	0.24	7	NA	NA
						47.6	498	0.02	0.33	6	0.25	8	NA	NA
						47.6	512	0.02	0.34	7	0.26	9	NA	NA
						47.5	527	0.02	0.35	7	0.26	9	NA	NA

Table 10 (Cont.)

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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Roof	PF	E	NA	HAE4004A (470 - 527 MHz)	48	47.3	470	0.02	0.31	7	0.24	9	0.18	12
						47.7	484	0.02	0.32	5	0.24	7	NA	NA
						47.6	498	0.01	0.33	3	0.25	4	NA	NA
						47.6	512	0.01	0.34	4	0.26	5	NA	NA
						47.5	527	0.01	0.35	4	0.26	6	NA	NA
Roof	PF	E	NA	HAE4011A (450 - 470 MHz)	48	48.0	450	0.00	0.30	1	0.23	1	0.17	2
						47.9	460	0.01	0.31	3	0.23	3	0.17	4
						47.3	470	0.00	0.31	1	0.24	2	0.18	2
Roof	PF	E	NA	HAE4012A (470 - 494 MHz)	48	47.3	470	0.01	0.31	2	0.24	2	0.17	3
						47.6	482	0.00	0.32	1	0.24	2	NA	NA
						47.1	494	0.00	0.33	1	0.25	1	NA	NA
Roof	PF	E	NA	HAE4013A (494 - 512 MHz)	48	47.1	494	0.01	0.33	2	0.25	3	NA	NA
						47.5	503	0.00	0.34	1	0.25	2	NA	NA
						47.6	512	0.01	0.34	2	0.26	3	NA	NA
Roof	PF	E	NA	HAE6020A (470 - 527 MHz)	48	47.3	470	0.01	0.31	4	0.24	5	0.18	6
						47.7	484	0.01	0.32	2	0.24	3	NA	NA
						47.6	498	0.01	0.33	3	0.25	4	NA	NA
						47.6	512	0.01	0.34	4	0.26	6	NA	NA
						47.5	527	0.02	0.35	4	0.26	6	NA	NA
Roof	PF	E	NA	HAE6022A (403-527 MHz)	48	48.0	450	0.02	0.30	7	0.23	10	0.17	13
						48.0	465.5	0.02	0.31	7	0.23	10	0.17	13
						47.5	481	0.01	0.32	4	0.24	6	NA	NA
						47.4	496.5	0.02	0.33	5	0.25	7	NA	NA
						47.6	512	0.02	0.34	5	0.26	7	NA	NA
						47.5	527	0.02	0.35	6	0.26	8	NA	NA
Roof	PF	E	NA	HAE6024A (470 - 494 MHz)	48	47.3	470	0.02	0.31	6	0.24	8	0.17	11
						47.6	482	0.02	0.32	5	0.24	6	NA	NA
						47.1	494	0.01	0.33	4	0.25	5	NA	NA

Table 10 (Cont.)

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 Limit	% To FCC Spec Limit	ICNIRP Limit	% To ICNIRP Spec Limit	IC Limit	% To IC Limit
Roof	PF	E	NA	HAE6026A (494 - 512 MHz)	48	47.1	494	0.01	0.33	4	0.25	6	NA	NA
						47.5	503	0.01	0.34	4	0.25	6	NA	NA
						47.6	512	0.02	0.34	6	0.26	8	NA	NA
Roof	PF	E	NA	PMAE4041A (450 - 470 MHz)	48	48.0	450	0.00	0.30	1	0.23	2	0.17	2
						47.9	460	0.00	0.31	2	0.23	2	0.17	3
						47.3	470	0.01	0.31	3	0.24	4	0.18	5
Roof	PF	E	NA	PMAE4033A (450 - 470 MHz)	48	48.0	450	0.02	0.30	8	0.23	11	0.17	14
						47.9	460	0.04	0.31	13	0.23	18	0.17	23
						47.3	470	0.02	0.31	7	0.24	9	0.18	12
Roof	PF	E	NA	PMAE4043A (450- 470 MHz)	48	48.0	450	0.01	0.30	4	0.23	5	0.17	7
						47.9	460	0.01	0.31	4	0.23	5	0.17	7
						47.3	470	0.01	0.31	4	0.24	5	0.18	6
Roof	PF	E	NA	RAE4004ARB (445- 470 MHz)	48	48.0	450	0.00	0.30	1	0.23	1	0.17	1
						47.9	460	0.01	0.31	3	0.23	4	0.17	5
						47.3	470	0.00	0.31	2	0.24	2	0.18	3

Assessment of Bluetooth / WLAN Radio and Simultaneous Transmission

The combined Bluetooth / WLAN antenna is located in the control head therefore Basic Restriction SAR was used for exposure conditions less than 20cm.

Both the Bluetooth and WLAN transmitters qualify for the standalone SAR exclusion.

Per guidelines in KDB 447498, the following formula was used to determine the test exclusion for standalone Bluetooth and WLAN transmitter;

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *[$\sqrt{F_{(GHz)}}$]

Where for Bluetooth:

Max. power = 5.6 mW (7.3mW*77% duty cycle)
Min. test separation distance = 50mm
F(GHz) = 2.48 GHz

= 0.28, which is ≤ 3 for 1-g SAR therefore the standalone exclusion applies for Bluetooth.

For WLAN:

Max. power = 17.8 mW (17.8 mW*99.8% duty cycle)
Min. test separation distance = 50mm
F(GHz) = 2.462 GHz

= 0.6, which is ≤ 3 for 1-g SAR therefore the standalone exclusion applies for Bluetooth.

Since WLAN source based average power is greater than Bluetooth and they both cannot transmit at the same time, the WLAN transmitter will be used to evaluate simultaneous transmission test exclusion.

Per guidelines in KDB 447498, the following formula was used to determine the estimated SAR of an antenna that transmits simultaneously with other antennas:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *[√F(GHz)/X]

= 0.07 which is < 0.4 W/kg (1g)

Where:
X = 7.5 for 1g-SAR; 18.75 for 10g
Max. power = 17.8 mW (17.8 mW*99.8% duty cycle)
Min. test separation distance = 50 mm
F(GHz) = 2.462 GHz

Pursuant to the guidance in KDB 447498 Section 7.2, the simultaneous transmission test exclusion applies if:

"The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0."

For this device:

Σ Highest Estimated SAR (only WLAN) / 1.6 = 0.07 / 1.6 = 0.04

The worst case power density measured for the operator front seat condition, where the simultaneous conditions would be the worst, when using the HAE4026A antenna mounted on the trunk is .14 mW/cm^2 at 503 MHz where the MPE limit is .34 mW/cm^2. Therefore,

Σ MPE Ratio (only one antenna transmitting) is 0.14/0.34 = 0.41

Exclusion evaluation: 0.04 + 0.41 = 0.45 which is < 1

Therefore, the simultaneous transmission RF exposure test exclusion does apply in this case.

17.0 Conclusion

The assessments for this device were performed with an output power range as indicated in section 15.0 Tables 7 - 10. The maximum allowable output power is equal to the upper limit of the final test factory transmit power specification of 48W. The highest power density results (with regards to the applicable limits) for the mobile device scaled to the maximum allowable power output are indicated in the Table 11 for internal/passenger to the vehicle, and external/bystander to the vehicle.

Table 11: Maximum MPE RF Exposure Summary

Designator	Frequency (MHz)	Passenger (mW/cm^2)	Bystander (mW/cm^2)
Overall	450 – 512 MHz	0.25	0.15
FCC	450 – 512 MHz	0.25	0.15
IC	450 – 470 MHz	0.21	0.13

These MPE results herein demonstrate compliance to the FCC Occupational/Controlled Exposure limits. FCC rules require compliance for Passengers and Bystanders to the FCC General Population/Uncontrolled limits.

These MPE results demonstrate compliance to Industry Canada and ICNIRP Occupational / Controlled Exposure limits.

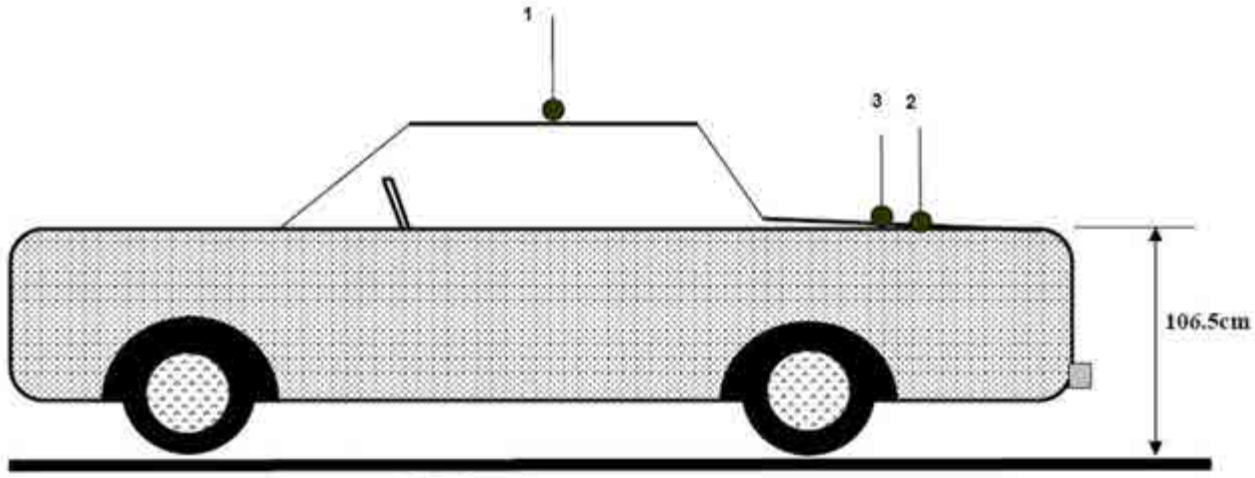
However, the configurations noted with a "*" in Table 8 exceed the Industry Canada General Population / Uncontrolled MPE limits required for Bystanders and Passengers.

Although MPE is a convenient method of demonstrating RF Exposure requirements, SAR is recognized as the "basic restriction". For those configurations noted "*" in Table 8, compliance to the IC General Population / Uncontrolled SAR 1g limit of 1.6 W/kg is demonstrated through SAR computational analysis.

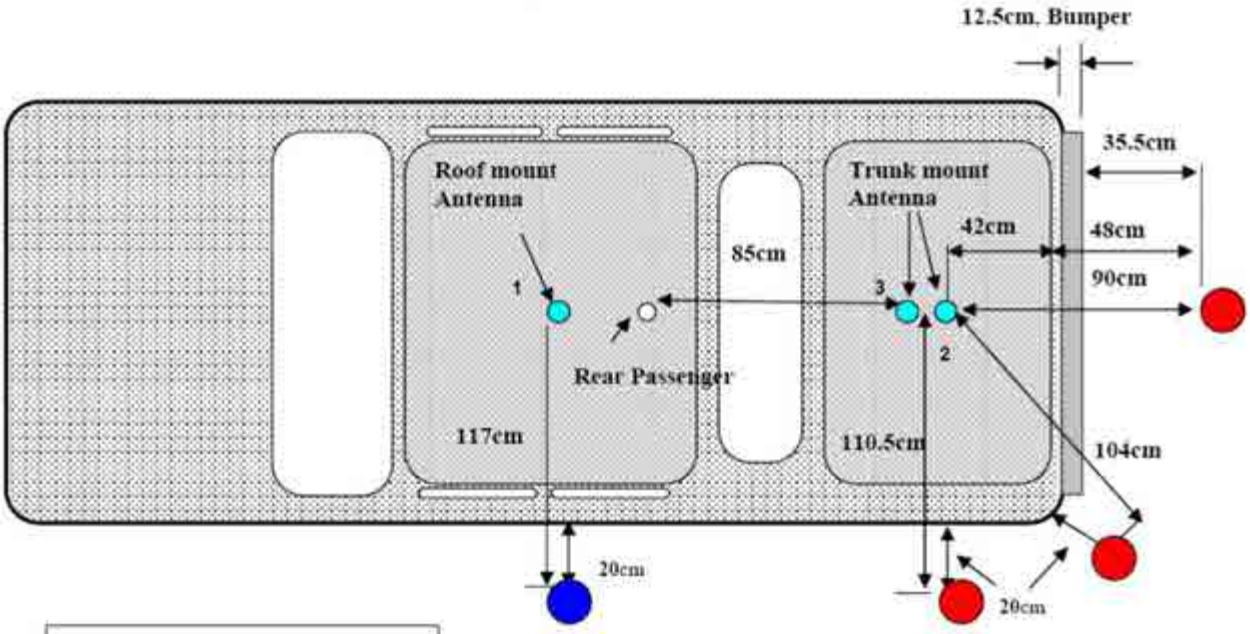
The computational results show that this device, when used with the offered antennas in accordance with the user manual instructions, exhibits the maximum peak average SAR values indicated in the Table below for the configurations requiring SAR analysis.

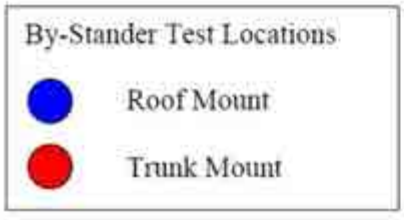
Maximum peak average SAR	
RF Exposure Results for 450 – 470 MHz (1g)	1.12 W/kg

Appendix A - Antenna Locations, Test Distances, and Cable Losses



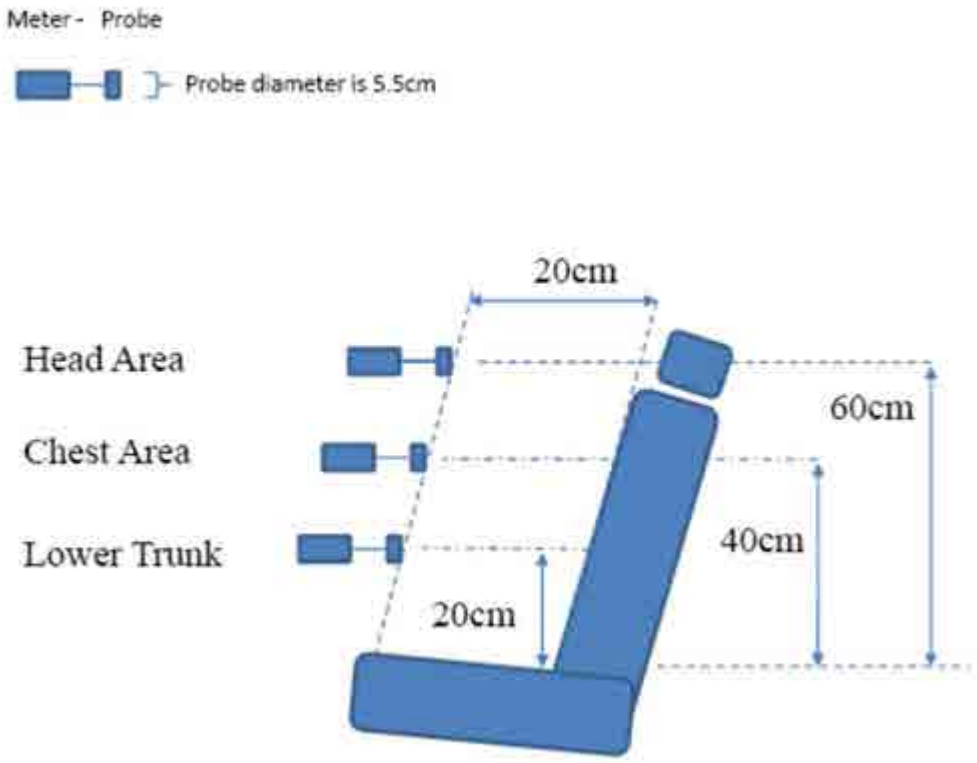
1 - Roof (center)
2 - Trunk (center)
3 - Trunk (85cm from back of the back seat)





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)



Cable Losses

Test Cable	**Customer Cable**
Teflon RG58A/U Loss Per 100 Feet	ARG-58U Loss Per 100 Feet
160 MHz - 5 dB	200 MHz - 6.0 dB
450 MHz - 9 dB	400 MHz - 8.8 dB
1 GHz - 13.8 dB	1 GHz - 14.9 dB

Appendix B - Probe Calibration Certificates

Service Test Report
QAF 1126, 03/11
Report ID: 106049

ETS·LINDGREN
An ESCO Technologies Company
1301 Arrow Point Drive
Cedar Park, Texas 78613
(512) 531-6400

ETS·LINDGREN
An ESCO Technologies Company
Tracking # S000031863
Equipment Check
Attested by GC Date: 10-Dec-14
www.ets-lindgren.com

Certificate of Test Conformance

Page 1 of 1

Reference: S 000031863

Customer: AGILENT/MOTOROLA - 8000 West Sunrise Blvd. Plantation, FL. 33322

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.

Manufacturer	ETS-Lindgren
Instrument Type	RF Survey Meter
Model	HI-2200
Serial Number/ID	00086316 / BBBBD050

Status In
In Tolerance
Date Completed
10-Dec-14
Status Out
Compliant with Internal Quality Standards

Remarks
Functional test performed with customer's probes s/n 00142394 and 00153632.

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,

George Cisneros
Calibration Supervisor

Date Attested: 10-Dec-14

ETS-LINDGREN
An ESCO Technologies Company
1301 Arrow Point Drive
Cedar Park, Texas 78613
(512) 531-6400

ETS-LINDGREN
An ESCO Technologies Company
Track# S000031863 Ltd Cal ☐
By SS Date 10-Dec-14
Next Cal Due
www.ets-lindgren.com

Cert I.D.: 106048

Certificate of Calibration Conformance

The instrument identified below has been individually calibrated in compliance with the following standard(s):
IEEE 1309 - 2013, 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:	*00153632*	**Date Code:**	
Tracking Number:	S 000031863	**Alternate ID:**	AAAA244
Date Completed:	10-Dec-14	**Customer:**	AGILENT/MOTOROLA - 8000 West Sunrise Blvd. Plantation, FL. 33322
Test Type:	Standard Field, Field Strength		

Calibration Uncertainty: Std Field Method 100kHz - 6 GHz, +/-0.7 dB, Isotropicity +/- 0.86
k=2, (95% Confidence Level)

Test Remarks: Probe received in tolerance thus before and after data are the same.
Probe calibrated with HI-2200 s/n 00086316.
Special Cal data provided per customer.

Calibration Traceability: All Measuring and Test Equipment (M/TE) identified below are traceable to the SI units through the National Institute for Standards and Technology (NIST) or other recognized National Metrology Institute. 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/HP	8648C	Signal Generator	3623A03573	16-Jan-15
Agilent	E4419B	Power Meter	MY45104171	08-Oct-15
Hewlett Packard	E4419B	Power Meter	US39250717	16-Jan-15
Agilent/HP	8648C	Signal Generator	3847A04406	16-Jan-15
Rohde & Schwarz	SMB 100A	Signal Generator	101558	24-Apr-15
Agilent	E9304A	Power Sensor	MY41497709	16-Jan-15
Agilent	E9304A	Power Sensor	MY41497694	16-Jan-15
Agilent	E9304A	Power Sensor	MY41499012	16-Jan-15
HP	E9304A	Power Sensor	MY41497446	06-Aug-15
Agilent	N5181A	MXG Analog Signal Gener	MY50140851	25-Jul-15
Agilent	E4419B	Power Meter	MY40510693	08-Sep-15
Rohde & Schwarz	857.8008.02	Power Meter NRVD	100451	13-Jun-15
Hewlett Packard	83650L	Synthesized Sweep Gen	3844A00422	10-May-15
Rohde & Schwarz	NRV-Z55	Thermal Power Sensor	100352	12-Mar-15
Rohde & Schwarz	NRV-Z55	Thermal Power Sensor	100037	01-May-15
Rohde & Schwarz	NRV-Z55	Thermal Power Sensor	100363	16-Jul-15
Rohde & Schwarz	NRP-Z91	Power Sensor	100734	27-Mar-15
Rohde & Schwarz	NRP-Z91	Power Sensor	100246	27-Mar-15

Condition of Instrument Upon Receipt:
In Tolerance to Internal Quality Standards

On Release:
In Tolerance to Internal Quality Standards

Calibration Completed By
Shawn Schmitt, Calibration Technician

Attested and Issued on 10-Dec-14
George Cisneros, 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. The results in this document relate only to the item(s) listed and should not be considered representative of a population unless otherwise noted. QAF 1127 (03/11)

CALIBRATION REPORT

Electric Field Sensor

Model	*S/N*
E100	00153632
HI-2200	00086316

Date: 10 Dec 2014

New Instrument
_ Other
_ Out of Tolerance
X Within Tolerance

Frequency Response

Frequency Response		*Nominal Field*	*Cal Factor**	*Deviation*
	MHz	*V/m*	(Eapplied/Eindicated)	*dB*
1	1	20	1.07	-0.58
2	15	20	1.00	0.01
3	30	20	1.00	-0.02
4	75	20	0.94	0.50
5	100	20	1.02	-0.21
6	150	20	0.95	0.43
7	200	20	0.95	0.44
8	250	20	0.94	0.57
9	300	20	0.94	0.51
10	400	20	0.93	0.64
11	500	20	0.98	0.21
12	600	20	1.00	-0.02
13	700	20	1.02	-0.14
14	800	20	0.98	0.18
15	900	20	0.98	0.17
16	1000	20	0.93	0.67
17	2000	20	1.03	-0.28
18	2450	20	1.05	-0.43
19	3000	20	1.08	-0.65
20	3500	20	1.09	-0.77
21	4000	20	1.11	-0.93
22	5000	20	0.83	1.59
23	5500	20	0.76	2.39
24	6000	20	0.78	2.21

* Corrected electric field values (V/m) can be obtained by multiplying the Cal Factor with the indicated E field readings.

Linearity

maximum linearity deviation is 0.47 dB

(measurements taken from 0.3 V/m to 800 V/m at 27.12 MHz)

Test Conditions

Calibration performed at ambient room temperature: 23 ±3°C

ETS·LINDGREN
An ESCO Technologies Company

PROBE ROTATIONAL RESPONSE

Model	E100
S/N	00153632
Report	S000031863
Date	Date of Calibration 10 December 2014
Time	04:32:18 PM
Isotropy *	+ 0.215 dB/ -0.215 dB

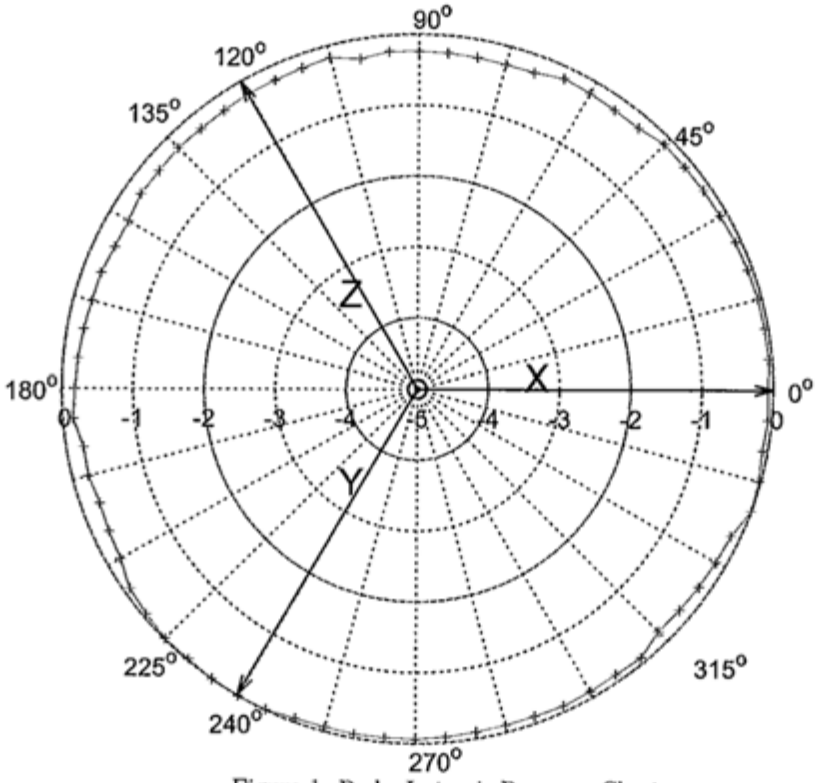


Figure 1: Probe Isotropic Response Chart.

Isotropic response is measured in a 20 V/m field at 400 MHz
*Isotropy is the maximum deviation from the geometric mean as defined by IEEE 1309-2005.

Page 3 of 3

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.			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	Test Pos.	20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm				
Trunk	HAE4011A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	BS	0.004	0.005	0.017	0.048	0.179	0.441	0.543	0.347	0.111	0.052	0.5	0.175	0.080	0.08
Trunk	HAE4011A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	BS	0.006	0.006	0.019	0.041	0.144	0.370	0.465	0.321	0.114	0.070	0.5	0.156	0.072	0.07
Trunk	HAE4011A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	BS	0.004	0.007	0.014	0.024	0.092	0.250	0.320	0.219	0.074	0.062	0.5	0.107	0.050	0.05
Trunk	HAE4012A (470 - 494 MHz)	5.65	470	48	47.3	CW	E	0.93	BS	0.004	0.009	0.032	0.088	0.233	0.422	0.417	0.195	0.071	0.125	0.5	0.160	0.074	0.08
Trunk	HAE4012A (470 - 494 MHz)	5.65	482	48	47.6	CW	E	0.94	BS	0.005	0.009	0.028	0.082	0.200	0.412	0.448	0.224	0.071	0.120	0.5	0.160	0.075	0.08
Trunk	HAE4012A (470 - 494 MHz)	5.65	494	48	47.1	CW	E	0.95	BS	0.005	0.008	0.019	0.057	0.171	0.388	0.409	0.201	0.056	0.074	0.5	0.139	0.066	0.07
Trunk	HAE4013A (494 - 512 MHz)	5.65	494	48	47.1	CW	E	0.95	BS	0.004	0.005	0.020	0.070	0.220	0.528	0.578	0.327	0.076	0.060	0.5	0.189	0.090	0.09
Trunk	HAE4013A (494 - 512 MHz)	5.65	503	48	47.5	CW	E	0.96	BS	0.006	0.013	0.028	0.081	0.243	0.582	0.638	0.375	0.099	0.042	0.5	0.211	0.101	0.10
Trunk	HAE4013A (494 - 512 MHz)	5.65	512	48	47.6	CW	E	0.97	BS	0.009	0.018	0.029	0.081	0.218	0.514	0.560	0.354	0.103	0.045	0.5	0.193	0.094	0.09
Trunk	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	BS	0.051	0.040	0.116	0.213	0.400	0.524	0.550	0.432	0.278	0.149	0.5	0.275	0.125	0.13
Trunk	HAE6022A (403-527 MHz)	4.15	465.5	48	48	CW	E	0.93	BS	0.033	0.044	0.110	0.201	0.319	0.444	0.448	0.355	0.247	0.177	0.5	0.238	0.111	0.11
Trunk	HAE6022A (403-527 MHz)	4.15	481	48	47.5	CW	E	0.94	BS	0.032	0.059	0.110	0.181	0.301	0.415	0.422	0.295	0.193	0.123	0.5	0.213	0.100	0.10
Trunk	HAE6022A (403-527 MHz)	4.15	496.5	48	47.4	CW	E	0.96	BS	0.033	0.063	0.099	0.199	0.333	0.534	0.516	0.342	0.173	0.081	0.5	0.237	0.114	0.12
Trunk	HAE6022A (403-527 MHz)	4.15	512	48	47.6	CW	E	0.97	BS	0.037	0.072	0.094	0.209	0.393	0.641	0.590	0.456	0.257	0.118	0.5	0.287	0.139	0.14
Trunk	HAE6022A (403-527 MHz)	4.15	527	48	47.5	CW	E	0.97	BS	0.039	0.072	0.096	0.214	0.393	0.620	0.599	0.450	0.262	0.119	0.5	0.286	0.139	0.14

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.			MPE Measurements													
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	Test Pos.	20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Trunk	HAE6024A (470 - 494 MHz)	5.15	470	48	47.3	CW	E	0.93	BS	0.024	0.035	0.083	0.153	0.241	0.309	0.321	0.248	0.158	0.100	0.5	0.167	0.078	0.08
Trunk	HAE6024A (470 - 494 MHz)	5.15	482	48	47.6	CW	E	0.94	BS	0.004	0.058	0.096	0.171	0.244	0.360	0.351	0.261	0.165	0.105	0.5	0.182	0.085	0.09
Trunk	HAE6024A (470 - 494 MHz)	5.15	494	48	47.1	CW	E	0.95	BS	0.032	0.060	0.093	0.183	0.290	0.470	0.436	0.300	0.160	0.077	0.5	0.210	0.100	0.10
Trunk	HAE6026A (494 - 512 MHz)	5.15	494	48	47.1	CW	E	0.95	BS	0.035	0.062	0.094	0.197	0.304	0.526	0.465	0.309	0.174	0.076	0.5	0.224	0.106	0.11
Trunk	HAE6026A (494 - 512 MHz)	5.15	503	48	47.5	CW	E	0.96	BS	0.039	0.068	0.104	0.228	0.395	0.639	0.584	0.444	0.242	0.107	0.5	0.285	0.137	0.14
Trunk	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	BS	0.040	0.072	0.102	0.233	0.439	0.668	0.611	0.467	0.271	0.146	0.5	0.305	0.148	0.15
Trunk	PMAE4033A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	BS	0.046	0.036	0.110	0.223	0.401	0.525	0.514	0.384	0.231	0.127	0.5	0.260	0.118	0.12
Trunk	PMAE4033A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	BS	0.042	0.046	0.122	0.251	0.406	0.508	0.501	0.387	0.259	0.160	0.5	0.268	0.124	0.12
Trunk	PMAE4033A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	BS	0.032	0.049	0.125	0.227	0.362	0.441	0.439	0.305	0.180	0.100	0.5	0.226	0.105	0.11
Trunk	PMAE4043A (450- 470 MHz)	7.15	450	48	48	CW	E	0.91	BS	0.011	0.011	0.029	0.085	0.288	0.651	0.692	0.437	0.124	0.055	0.5	0.238	0.109	0.11
Trunk	PMAE4043A (450- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	BS	0.012	0.007	0.038	0.083	0.254	0.551	0.635	0.387	0.127	0.068	0.5	0.216	0.100	0.10
Trunk	PMAE4043A (450- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	BS	0.008	0.017	0.038	0.073	0.229	0.467	0.533	0.343	0.102	0.070	0.5	0.188	0.087	0.09
Trunk	RAE4004ARB (445- 470 MHz)	7.15	450	48	48	CW	E	0.91	BS	0.014	0.008	0.016	0.015	0.060	0.313	0.499	0.456	0.228	0.115	0.5	0.172	0.079	0.08
Trunk	RAE4004ARB (445- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	BS	0.013	0.012	0.027	0.038	0.117	0.381	0.493	0.401	0.157	0.055	0.5	0.169	0.078	0.08
Trunk	RAE4004ARB (445- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	BS	0.010	0.016	0.029	0.042	0.131	0.340	0.457	0.335	0.125	0.044	0.5	0.153	0.071	0.07

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.			MPE Measurements													
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	Test Pos.	20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
45 Degree																							
Trunk	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	BS	0.036	0.051	0.065	0.151	0.354	0.480	0.438	0.299	0.173	0.100	0.5	0.215	0.104	0.11
45 Degree (IC Band)																							
Trunk	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	BS	0.055	0.065	0.146	0.166	0.280	0.403	0.449	0.365	0.228	0.133	0.5	0.229	0.104	0.10
90 Degree																							
Trunk	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	BS	0.050	0.042	0.033	0.102	0.205	0.337	0.334	0.232	0.134	0.086	0.5	0.156	0.075	0.08
90 Degree (IC Band)																							
Trunk	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	BS	0.060	0.042	0.079	0.051	0.125	0.290	0.390	0.329	0.211	0.119	0.5	0.170	0.077	0.08
Roof	HAE4003A (450 - 470 MHz)	2.15	450	48	48	CW	E	0.91	BS	0.006	0.008	0.015	0.044	0.056	0.085	0.128	0.232	0.308	0.332	0.5	0.121	0.055	0.06
Roof	HAE4003A (450 - 470 MHz)	2.15	460	48	47.9	CW	E	0.92	BS	0.004	0.006	0.015	0.046	0.063	0.078	0.126	0.218	0.304	0.350	0.5	0.121	0.056	0.06
Roof	HAE4003A (450 - 470 MHz)	2.15	470	48	47.3	CW	E	0.93	BS	0.004	0.007	0.016	0.039	0.043	0.066	0.142	0.250	0.325	0.342	0.5	0.123	0.057	0.06
Roof	HAE4004A (470 - 527 MHz)	2.15	470	48	47.3	CW	E	0.93	BS	0.005	0.008	0.014	0.044	0.057	0.070	0.150	0.267	0.348	0.371	0.5	0.133	0.062	0.06
Roof	HAE4004A (470 - 527 MHz)	2.15	484	48	47.7	CW	E	0.94	BS	0.003	0.010	0.021	0.055	0.050	0.097	0.190	0.292	0.340	0.338	0.5	0.140	0.066	0.07
Roof	HAE4004A (470 - 527 MHz)	2.15	498	48	47.6	CW	E	0.96	BS	0.006	0.011	0.028	0.059	0.068	0.108	0.164	0.224	0.306	0.340	0.5	0.131	0.063	0.06
Roof	HAE4004A (470 - 527 MHz)	2.15	512	48	47.6	CW	E	0.97	BS	0.007	0.016	0.028	0.050	0.062	0.099	0.150	0.216	0.282	0.315	0.5	0.123	0.059	0.06
Roof	HAE4004A (470 - 527 MHz)	2.15	527	48	47.5	CW	E	0.97	BS	0.007	0.015	0.028	0.051	0.065	0.098	0.149	0.221	0.290	0.313	0.5	0.124	0.060	0.06

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.			MPE Measurements														
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	Test Pos.	20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	HAE4011A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	BS	0.000	0.001	0.001	0.005	0.012	0.023	0.069	0.184	0.330	0.346	0.5	0.097	0.044	0.04
Roof	HAE4011A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	BS	0.000	0.001	0.003	0.007	0.010	0.020	0.057	0.154	0.290	0.332	0.5	0.087	0.040	0.04
Roof	HAE4011A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	BS	0.001	0.001	0.002	0.006	0.009	0.014	0.044	0.140	0.234	0.250	0.5	0.070	0.033	0.03
Roof	HAE4012A (470 - 494 MHz)	5.65	470	48	47.3	CW	E	0.93	BS	0.001	0.002	0.004	0.012	0.019	0.034	0.112	0.258	0.362	0.332	0.5	0.114	0.053	0.05
Roof	HAE4012A (470 - 494 MHz)	5.65	482	48	47.6	CW	E	0.94	BS	0.000	0.002	0.007	0.011	0.012	0.038	0.110	0.223	0.325	0.315	0.5	0.104	0.049	0.05
Roof	HAE4012A (470 - 494 MHz)	5.65	494	48	47.1	CW	E	0.95	BS	0.001	0.003	0.006	0.012	0.016	0.036	0.088	0.167	0.263	0.264	0.5	0.086	0.041	0.04
Roof	HAE4013A (494 - 512 MHz)	5.65	494	48	47.1	CW	E	0.95	BS	0.001	0.005	0.009	0.024	0.036	0.074	0.147	0.275	0.384	0.323	0.5	0.128	0.061	0.06
Roof	HAE4013A (494 - 512 MHz)	5.65	503	48	47.5	CW	E	0.96	BS	0.002	0.005	0.013	0.024	0.033	0.055	0.129	0.267	0.352	0.312	0.5	0.119	0.057	0.06
Roof	HAE4013A (494 - 512 MHz)	5.65	512	48	47.6	CW	E	0.97	BS	0.003	0.006	0.011	0.017	0.029	0.055	0.124	0.246	0.319	0.292	0.5	0.110	0.053	0.05
Roof	HAE6020A (470 - 527 MHz)	2.15	470	48	47.3	CW	E	0.93	BS	0.002	0.005	0.007	0.024	0.026	0.037	0.080	0.145	0.193	0.211	0.5	0.073	0.034	0.03
Roof	HAE6020A (470 - 527 MHz)	2.15	484	48	47.7	CW	E	0.94	BS	0.002	0.005	0.011	0.028	0.021	0.052	0.107	0.159	0.186	0.189	0.5	0.076	0.036	0.04
Roof	HAE6020A (470 - 527 MHz)	2.15	498	48	47.6	CW	E	0.96	BS	0.004	0.009	0.024	0.046	0.054	0.088	0.140	0.190	0.254	0.293	0.5	0.110	0.053	0.05
Roof	HAE6020A (470 - 527 MHz)	2.15	512	48	47.6	CW	E	0.97	BS	0.007	0.015	0.030	0.046	0.075	0.097	0.159	0.234	0.306	0.345	0.5	0.131	0.064	0.06
Roof	HAE6020A (470 - 527 MHz)	2.15	527	48	47.5	CW	E	0.97	BS	0.007	0.017	0.029	0.051	0.068	0.098	0.161	0.234	0.306	0.345	0.5	0.132	0.064	0.06

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.			MPE Measurements													
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	Test Pos.	20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	BS	0.006	0.009	0.016	0.046	0.062	0.099	0.149	0.267	0.313	0.332	0.5	0.130	0.059	0.06
Roof	HAE6022A (403-527 MHz)	4.15	465.5	48	48	CW	E	0.93	BS	0.004	0.009	0.020	0.054	0.059	0.072	0.146	0.246	0.336	0.341	0.5	0.129	0.060	0.06
Roof	HAE6022A (403-527 MHz)	4.15	481	48	47.5	CW	E	0.94	BS	0.002	0.009	0.017	0.045	0.043	0.084	0.191	0.271	0.320	0.285	0.5	0.127	0.060	0.06
Roof	HAE6022A (403-527 MHz)	4.15	496.5	48	47.4	CW	E	0.96	BS	0.006	0.011	0.028	0.061	0.077	0.122	0.176	0.246	0.310	0.312	0.5	0.135	0.065	0.07
Roof	HAE6022A (403-527 MHz)	4.15	512	48	47.6	CW	E	0.97	BS	0.008	0.018	0.032	0.058	0.080	0.121	0.190	0.283	0.320	0.317	0.5	0.143	0.069	0.07
Roof	HAE6022A (403-527 MHz)	4.15	527	48	47.5	CW	E	0.97	BS	0.007	0.016	0.038	0.063	0.076	0.116	0.200	0.291	0.327	0.317	0.5	0.145	0.070	0.07
Roof	HAE6024A (470 - 494 MHz)	5.15	470	48	47.3	CW	E	0.93	BS	0.004	0.007	0.010	0.035	0.046	0.064	0.140	0.229	0.280	0.275	0.5	0.109	0.051	0.05
Roof	HAE6024A (470 - 494 MHz)	5.15	482	48	47.6	CW	E	0.94	BS	0.003	0.008	0.020	0.044	0.045	0.095	0.183	0.263	0.293	0.273	0.5	0.123	0.058	0.06
Roof	HAE6024A (470 - 494 MHz)	5.15	494	48	47.1	CW	E	0.95	BS	0.005	0.012	0.029	0.057	0.076	0.122	0.181	0.260	0.305	0.303	0.5	0.135	0.064	0.07
Roof	HAE6026A (494 - 512 MHz)	5.15	494	48	47.1	CW	E	0.95	BS	0.006	0.015	0.030	0.076	0.086	0.141	0.200	0.279	0.336	0.311	0.5	0.148	0.070	0.07
Roof	HAE6026A (494 - 512 MHz)	5.15	503	48	47.5	CW	E	0.96	BS	0.006	0.018	0.041	0.089	0.095	0.113	0.197	0.301	0.347	0.306	0.5	0.151	0.073	0.07
Roof	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	BS	0.009	0.020	0.040	0.075	0.100	0.142	0.217	0.308	0.346	0.310	0.5	0.157	0.076	0.08
Roof	PMAE4041A (450 - 470 MHz)	2.15	450	48	48	CW	E	0.91	BS	0.001	0.001	0.002	0.006	0.008	0.012	0.016	0.030	0.039	0.042	0.5	0.016	0.007	0.01
Roof	PMAE4041A (450 - 470 MHz)	2.15	460	48	47.9	CW	E	0.92	BS	0.001	0.001	0.002	0.006	0.008	0.009	0.015	0.029	0.040	0.046	0.5	0.016	0.007	0.01
Roof	PMAE4041A (450 - 470 MHz)	2.15	470	48	47.3	CW	E	0.93	BS	0.002	0.003	0.005	0.016	0.021	0.030	0.060	0.106	0.139	0.148	0.5	0.053	0.025	0.03

MPE calculations are defined in section 13.0.

MPE measurement data for Bystander

D.U.T. Info.							Probe Info.			MPE Measurements													
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	Test Pos.	20 cm	40 cm	60 cm	80 cm	100 cm	120 cm	140 cm	160 cm	180 cm	200 cm	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	PMAE4033A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	BS	0.005	0.008	0.017	0.047	0.067	0.106	0.139	0.238	0.306	0.289	0.5	0.122	0.056	0.06
Roof	PMAE4033A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	BS	0.005	0.007	0.019	0.053	0.070	0.092	0.162	0.284	0.359	0.345	0.5	0.140	0.064	0.06
Roof	PMAE4033A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	BS	0.003	0.009	0.018	0.050	0.061	0.094	0.200	0.329	0.379	0.343	0.5	0.149	0.069	0.07
Roof	PMAE4043A (450- 470 MHz)	7.15	450	48	48	CW	E	0.91	BS	0.001	0.001	0.004	0.019	0.034	0.049	0.107	0.281	0.440	0.442	0.5	0.138	0.063	0.06
Roof	PMAE4043A (450- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	BS	0.001	0.001	0.004	0.015	0.025	0.035	0.099	0.264	0.432	0.447	0.5	0.132	0.061	0.06
Roof	PMAE4043A (450- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	BS	0.001	0.002	0.004	0.014	0.017	0.033	0.102	0.283	0.435	0.421	0.5	0.131	0.061	0.06
Roof	RAE4004ARB (445- 470 MHz)	7.15	450	48	48	CW	E	0.91	BS	0.001	0.002	0.004	0.008	0.008	0.007	0.020	0.103	0.275	0.385	0.5	0.081	0.037	0.04
Roof	RAE4004ARB (445- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	BS	0.001	0.002	0.004	0.009	0.009	0.010	0.041	0.138	0.348	0.403	0.5	0.097	0.044	0.04
Roof	RAE4004ARB (445- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	BS	0.001	0.002	0.003	0.007	0.009	0.013	0.050	0.172	0.336	0.359	0.5	0.095	0.044	0.04

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Trunk	HAE4011A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PB	0.329	0.305	0.346	0.5	0.327	0.149	0.15
Trunk	HAE4011A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PB	0.390	0.208	0.201	0.5	0.266	0.123	0.12
Trunk	HAE4011A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PB	0.189	0.140	0.094	0.5	0.141	0.066	0.07
Trunk	HAE4012A (470 - 494 MHz)	5.65	470	48	47.3	CW	E	0.93	PB	0.249	0.181	0.120	0.5	0.183	0.085	0.09
Trunk	HAE4012A (470 - 494 MHz)	5.65	482	48	47.6	CW	E	0.94	PB	0.349	0.439	0.139	0.5	0.309	0.145	0.15
Trunk	HAE4012A (470 - 494 MHz)	5.65	494	48	47.1	CW	E	0.95	PB	0.265	0.491	0.152	0.5	0.303	0.144	0.15
Trunk	HAE4013A (494 - 512 MHz)	5.65	494	48	47.1	CW	E	0.95	PB	0.479	0.547	0.211	0.5	0.412	0.196	0.20
Trunk	HAE4013A (494 - 512 MHz)	5.65	503	48	47.5	CW	E	0.96	PB	0.295	0.295	0.211	0.5	0.267	0.128	0.13
Trunk	HAE4013A (494 - 512 MHz)	5.65	512	48	47.6	CW	E	0.97	PB	0.210	0.217	0.177	0.5	0.201	0.098	0.10
Trunk	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	PB	0.502	0.456	0.452	0.5	0.470	0.214	0.21
Trunk	HAE6022A (403-527 MHz)	4.15	465.5	48	48	CW	E	0.93	PB	0.485	0.233	0.226	0.5	0.315	0.146	0.15
Trunk	HAE6022A (403-527 MHz)	4.15	481	48	47.5	CW	E	0.94	PB	0.543	0.653	0.207	0.5	0.468	0.220	0.22
Trunk	HAE6022A (403-527 MHz)	4.15	496.5	48	47.4	CW	E	0.96	PB	0.409	0.807	0.248	0.5	0.488	0.234	0.24
Trunk	HAE6022A (403-527 MHz)	4.15	512	48	47.6	CW	E	0.97	PB	0.299	0.387	0.259	0.5	0.315	0.153	0.15
Trunk	HAE6022A (403-527 MHz)	4.15	527	48	47.5	CW	E	0.97	PB	0.276	0.338	0.258	0.5	0.291	0.141	0.14

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Trunk	HAE6024A (470 - 494 MHz)	5.15	470	48	47.3	CW	E	0.93	PB	0.328	0.242	0.187	0.5	0.252	0.117	0.12
Trunk	HAE6024A (470 - 494 MHz)	5.15	482	48	47.6	CW	E	0.94	PB	0.505	0.619	0.176	0.5	0.433	0.204	0.21
Trunk	HAE6024A (470 - 494 MHz)	5.15	494	48	47.1	CW	E	0.95	PB	0.478	0.799	0.246	0.5	0.508	0.241	0.25
Trunk	HAE6026A (494 - 512 MHz)	5.15	494	48	47.1	CW	E	0.95	PB	0.365	0.712	0.228	0.5	0.435	0.207	0.21
Trunk	HAE6026A (494 - 512 MHz)	5.15	503	48	47.5	CW	E	0.96	PB	0.304	0.364	0.251	0.5	0.306	0.147	0.15
Trunk	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	PB	0.323	0.419	0.288	0.5	0.343	0.167	0.17
Trunk	PMAE4033A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PB	0.447	0.417	0.414	0.5	0.426	0.194	0.19
Trunk	PMAE4033A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PB	0.662	0.320	0.346	0.5	0.443	0.204	0.20
Trunk	PMAE4033A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PB	0.458	0.318	0.242	0.5	0.339	0.158	0.16
Trunk	PMAE4043A (450- 470 MHz)	7.15	450	48	48	CW	E	0.91	PB	0.378	0.409	0.427	0.5	0.405	0.185	0.18
Trunk	PMAE4043A (450- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	PB	0.374	0.271	0.281	0.5	0.309	0.142	0.14
Trunk	PMAE4043A (450- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	PB	0.355	0.219	0.159	0.5	0.244	0.114	0.12
Trunk	RAE4004ARB (445-470 MHz)	7.15	450	48	48	CW	E	0.91	PB	0.076	0.091	0.104	0.5	0.090	0.041	0.04
Trunk	RAE4004ARB (445-470 MHz)	7.15	460	48	47.9	CW	E	0.92	PB	0.246	0.125	0.165	0.5	0.179	0.082	0.08
Trunk	RAE4004ARB (445-470 MHz)	7.15	470	48	47.3	CW	E	0.93	PB	0.182	0.095	0.078	0.5	0.118	0.055	0.06

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Trunk	HAE4011A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PF	0.104	0.068	0.131	0.5	0.101	0.046	0.05
Trunk	HAE4011A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PF	0.070	0.071	0.183	0.5	0.108	0.050	0.05
Trunk	HAE4011A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PF	0.088	0.095	0.040	0.5	0.074	0.035	0.04
Trunk	HAE4012A (470 - 494 MHz)	5.65	470	48	47.3	CW	E	0.93	PF	0.094	0.136	0.048	0.5	0.093	0.043	0.04
Trunk	HAE4012A (470 - 494 MHz)	5.65	482	48	47.6	CW	E	0.94	PF	0.069	0.192	0.074	0.5	0.112	0.052	0.05
Trunk	HAE4012A (470 - 494 MHz)	5.65	494	48	47.1	CW	E	0.95	PF	0.111	0.124	0.106	0.5	0.114	0.054	0.06
Trunk	HAE4013A (494 - 512 MHz)	5.65	494	48	47.1	CW	E	0.95	PF	0.187	0.124	0.128	0.5	0.146	0.070	0.07
Trunk	HAE4013A (494 - 512 MHz)	5.65	503	48	47.5	CW	E	0.96	PF	0.197	0.193	0.213	0.5	0.201	0.096	0.10
Trunk	HAE4013A (494 - 512 MHz)	5.65	512	48	47.6	CW	E	0.97	PF	0.113	0.145	0.092	0.5	0.117	0.057	0.06
Trunk	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	PF	0.185	0.096	0.266	0.5	0.182	0.083	0.08
Trunk	HAE6022A (403-527 MHz)	4.15	465.5	48	48	CW	E	0.93	PF	0.179	0.128	0.213	0.5	0.173	0.081	0.08
Trunk	HAE6022A (403-527 MHz)	4.15	481	48	47.5	CW	E	0.94	PF	0.157	0.322	0.141	0.5	0.207	0.097	0.10
Trunk	HAE6022A (403-527 MHz)	4.15	496.5	48	47.4	CW	E	0.96	PF	0.290	0.287	0.265	0.5	0.281	0.135	0.14
Trunk	HAE6022A (403-527 MHz)	4.15	512	48	47.6	CW	E	0.97	PF	0.332	0.302	0.194	0.5	0.276	0.134	0.13
Trunk	HAE6022A (403-527 MHz)	4.15	527	48	47.5	CW	E	0.97	PF	0.219	0.156	0.224	0.5	0.200	0.097	0.10

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Trunk	HAE6024A (470 - 494 MHz)	5.15	470	48	47.3	CW	E	0.93	PF	0.165	0.171	0.127	0.5	0.154	0.072	0.07
Trunk	HAE6024A (470 - 494 MHz)	5.15	482	48	47.6	CW	E	0.94	PF	0.130	0.265	0.142	0.5	0.179	0.084	0.08
Trunk	HAE6024A (470 - 494 MHz)	5.15	494	48	47.1	CW	E	0.95	PF	0.222	0.255	0.205	0.5	0.227	0.108	0.11
Trunk	HAE6026A (494 - 512 MHz)	5.15	494	48	47.1	CW	E	0.95	PF	0.238	0.260	0.195	0.5	0.231	0.110	0.11
Trunk	HAE6026A (494 - 512 MHz)	5.15	503	48	47.5	CW	E	0.96	PF	0.282	0.213	0.393	0.5	0.296	0.142	0.14
Trunk	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	PF	0.265	0.195	0.179	0.5	0.213	0.103	0.10
Trunk	PMAE4033A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PF	0.182	0.094	0.215	0.5	0.164	0.075	0.07
Trunk	PMAE4033A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PF	0.143	0.104	0.326	0.5	0.191	0.088	0.09
Trunk	PMAE4033A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PF	0.206	0.223	0.149	0.5	0.193	0.090	0.09
Trunk	PMAE4043A (450- 470 MHz)	7.15	450	48	48	CW	E	0.91	PF	0.149	0.081	0.172	0.5	0.134	0.061	0.06
Trunk	PMAE4043A (450- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	PF	0.101	0.083	0.247	0.5	0.144	0.066	0.07
Trunk	PMAE4043A (450- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	PF	0.138	0.137	0.075	0.5	0.117	0.054	0.06
Trunk	RAE4004ARB (445-470 MHz)	7.15	450	48	48	CW	E	0.91	PF	0.042	0.030	0.032	0.5	0.035	0.016	0.02
Trunk	RAE4004ARB (445-470 MHz)	7.15	460	48	47.9	CW	E	0.92	PF	0.057	0.039	0.092	0.5	0.063	0.029	0.03
Trunk	RAE4004ARB (445-470 MHz)	7.15	470	48	47.3	CW	E	0.93	PF	0.056	0.065	0.038	0.5	0.053	0.025	0.03

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	HAE4003A (450 - 470 MHz)	2.15	450	48	48	CW	E	0.91	PB	0.035	0.067	0.069	0.5	0.057	0.026	0.03
Roof	HAE4003A (450 - 470 MHz)	2.15	460	48	47.9	CW	E	0.92	PB	0.038	0.039	0.015	0.5	0.031	0.014	0.01
Roof	HAE4003A (450 - 470 MHz)	2.15	470	48	47.3	CW	E	0.93	PB	0.019	0.036	0.034	0.5	0.030	0.014	0.01
Roof	HAE4004A (470 - 527 MHz)	2.15	470	48	47.3	CW	E	0.93	PB	0.025	0.043	0.036	0.5	0.035	0.016	0.02
Roof	HAE4004A (470 - 527 MHz)	2.15	484	48	47.7	CW	E	0.94	PB	0.050	0.105	0.062	0.5	0.072	0.034	0.03
Roof	HAE4004A (470 - 527 MHz)	2.15	498	48	47.6	CW	E	0.96	PB	0.035	0.089	0.101	0.5	0.075	0.036	0.04
Roof	HAE4004A (470 - 527 MHz)	2.15	512	48	47.6	CW	E	0.97	PB	0.041	0.085	0.075	0.5	0.067	0.032	0.03
Roof	HAE4004A (470 - 527 MHz)	2.15	527	48	47.5	CW	E	0.97	PB	0.020	0.090	0.078	0.5	0.063	0.030	0.03
Roof	HAE4011A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PB	0.008	0.027	0.026	0.5	0.020	0.009	0.01
Roof	HAE4011A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PB	0.008	0.008	0.011	0.5	0.009	0.004	0.00
Roof	HAE4011A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PB	0.003	0.010	0.004	0.5	0.006	0.003	0.00
Roof	HAE4012A (470 - 494 MHz)	5.65	470	48	47.3	CW	E	0.93	PB	0.013	0.012	0.006	0.5	0.010	0.005	0.00
Roof	HAE4012A (470 - 494 MHz)	5.65	482	48	47.6	CW	E	0.94	PB	0.013	0.020	0.007	0.5	0.013	0.006	0.01
Roof	HAE4012A (470 - 494 MHz)	5.65	494	48	47.1	CW	E	0.95	PB	0.006	0.018	0.019	0.5	0.014	0.007	0.01

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	HAE4013A (494 - 512 MHz)	5.65	494	48	47.1	CW	E	0.95	PB	0.010	0.034	0.026	0.5	0.023	0.011	0.01
Roof	HAE4013A (494 - 512 MHz)	5.65	503	48	47.5	CW	E	0.96	PB	0.015	0.029	0.015	0.5	0.020	0.009	0.01
Roof	HAE4013A (494 - 512 MHz)	5.65	512	48	47.6	CW	E	0.97	PB	0.013	0.026	0.015	0.5	0.018	0.009	0.01
Roof	HAE6020A (470 - 527 MHz)	2.15	470	48	47.3	CW	E	0.93	PB	0.009	0.026	0.011	0.5	0.015	0.007	0.01
Roof	HAE6020A (470 - 527 MHz)	2.15	484	48	47.7	CW	E	0.94	PB	0.034	0.062	0.013	0.5	0.036	0.017	0.02
Roof	HAE6020A (470 - 527 MHz)	2.15	498	48	47.6	CW	E	0.96	PB	0.025	0.058	0.047	0.5	0.043	0.021	0.02
Roof	HAE6020A (470 - 527 MHz)	2.15	512	48	47.6	CW	E	0.97	PB	0.037	0.065	0.046	0.5	0.049	0.024	0.02
Roof	HAE6020A (470 - 527 MHz)	2.15	527	48	47.5	CW	E	0.97	PB	0.035	0.066	0.048	0.5	0.050	0.024	0.02
Roof	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	PB	0.037	0.077	0.071	0.5	0.062	0.028	0.03
Roof	HAE6022A (403-527 MHz)	4.15	465.5	48	48	CW	E	0.93	PB	0.033	0.059	0.020	0.5	0.037	0.017	0.02
Roof	HAE6022A (403-527 MHz)	4.15	481	48	47.5	CW	E	0.94	PB	0.029	0.087	0.047	0.5	0.054	0.026	0.03
Roof	HAE6022A (403-527 MHz)	4.15	496.5	48	47.4	CW	E	0.96	PB	0.031	0.075	0.075	0.5	0.060	0.029	0.03
Roof	HAE6022A (403-527 MHz)	4.15	512	48	47.6	CW	E	0.97	PB	0.043	0.080	0.048	0.5	0.057	0.028	0.03
Roof	HAE6022A (403-527 MHz)	4.15	527	48	47.5	CW	E	0.97	PB	0.041	0.075	0.074	0.5	0.063	0.031	0.03

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	HAE6024A (470 - 494 MHz)	5.15	470	48	47.3	CW	E	0.93	PB	0.013	0.054	0.013	0.5	0.027	0.012	0.01
Roof	HAE6024A (470 - 494 MHz)	5.15	482	48	47.6	CW	E	0.94	PB	0.038	0.101	0.029	0.5	0.056	0.026	0.03
Roof	HAE6024A (470 - 494 MHz)	5.15	494	48	47.1	CW	E	0.95	PB	0.028	0.092	0.078	0.5	0.066	0.031	0.03
Roof	HAE6026A (494 - 512 MHz)	5.15	494	48	47.1	CW	E	0.95	PB	0.032	0.087	0.082	0.5	0.067	0.032	0.03
Roof	HAE6026A (494 - 512 MHz)	5.15	503	48	47.5	CW	E	0.96	PB	0.039	0.084	0.057	0.5	0.060	0.029	0.03
Roof	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	PB	0.053	0.087	0.061	0.5	0.067	0.032	0.03
Roof	PMAE4041A (450 - 470 MHz)	2.15	450	48	48	CW	E	0.91	PB	0.006	0.011	0.009	0.5	0.009	0.004	0.00
Roof	PMAE4041A (450 - 470 MHz)	2.15	460	48	47.9	CW	E	0.92	PB	0.008	0.007	0.004	0.5	0.006	0.003	0.00
Roof	PMAE4041A (450 - 470 MHz)	2.15	470	48	47.3	CW	E	0.93	PB	0.008	0.035	0.017	0.5	0.020	0.009	0.01
Roof	PMAE4033A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PB	0.047	0.091	0.059	0.5	0.066	0.030	0.03
Roof	PMAE4033A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PB	0.068	0.074	0.035	0.5	0.059	0.027	0.03
Roof	PMAE4033A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PB	0.017	0.071	0.018	0.5	0.035	0.016	0.02
Roof	PMAE4043A (450- 470 MHz)	7.15	450	48	48	CW	E	0.91	PB	0.013	0.031	0.029	0.5	0.024	0.011	0.01
Roof	PMAE4043A (450- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	PB	0.021	0.018	0.008	0.5	0.016	0.007	0.01
Roof	PMAE4043A (450- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	PB	0.010	0.022	0.011	0.5	0.014	0.007	0.01

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	RAE4004ARB (445-470 MHz)	7.15	450	48	48	CW	E	0.91	PB	0.007	0.005	0.007	0.5	0.006	0.003	0.00
Roof	RAE4004ARB (445-470 MHz)	7.15	460	48	47.9	CW	E	0.92	PB	0.009	0.008	0.008	0.5	0.008	0.004	0.00
Roof	RAE4004ARB (445-470 MHz)	7.15	470	48	47.3	CW	E	0.93	PB	0.004	0.011	0.004	0.5	0.006	0.003	0.00
Roof	HAE4003A (450 - 470 MHz)	2.15	450	48	48	CW	E	0.91	PF	0.030	0.049	0.039	0.5	0.039	0.018	0.02
Roof	HAE4003A (450 - 470 MHz)	2.15	460	48	47.9	CW	E	0.92	PF	0.046	0.069	0.091	0.5	0.069	0.032	0.03
Roof	HAE4003A (450 - 470 MHz)	2.15	470	48	47.3	CW	E	0.93	PF	0.025	0.057	0.033	0.5	0.038	0.018	0.02
Roof	HAE4004A (470 - 527 MHz)	2.15	470	48	47.3	CW	E	0.93	PF	0.040	0.044	0.048	0.5	0.044	0.020	0.02
Roof	HAE4004A (470 - 527 MHz)	2.15	484	48	47.7	CW	E	0.94	PF	0.041	0.038	0.026	0.5	0.035	0.016	0.02
Roof	HAE4004A (470 - 527 MHz)	2.15	498	48	47.6	CW	E	0.96	PF	0.014	0.020	0.023	0.5	0.019	0.009	0.01
Roof	HAE4004A (470 - 527 MHz)	2.15	512	48	47.6	CW	E	0.97	PF	0.023	0.025	0.027	0.5	0.025	0.012	0.01
Roof	HAE4004A (470 - 527 MHz)	2.15	527	48	47.5	CW	E	0.97	PF	0.035	0.022	0.032	0.5	0.030	0.014	0.01
Roof	HAE4011A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PF	0.007	0.007	0.004	0.5	0.006	0.003	0.00
Roof	HAE4011A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PF	0.012	0.017	0.021	0.5	0.017	0.008	0.01
Roof	HAE4011A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PF	0.013	0.003	0.007	0.5	0.008	0.004	0.00

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	HAE4012A (470 - 494 MHz)	5.65	470	48	47.3	CW	E	0.93	PF	0.013	0.008	0.011	0.5	0.011	0.005	0.01
Roof	HAE4012A (470 - 494 MHz)	5.65	482	48	47.6	CW	E	0.94	PF	0.011	0.007	0.007	0.5	0.008	0.004	0.00
Roof	HAE4012A (470 - 494 MHz)	5.65	494	48	47.1	CW	E	0.95	PF	0.004	0.006	0.004	0.5	0.005	0.002	0.00
Roof	HAE4013A (494 - 512 MHz)	5.65	494	48	47.1	CW	E	0.95	PF	0.009	0.024	0.017	0.5	0.017	0.008	0.01
Roof	HAE4013A (494 - 512 MHz)	5.65	503	48	47.5	CW	E	0.96	PF	0.006	0.012	0.010	0.5	0.009	0.004	0.00
Roof	HAE4013A (494 - 512 MHz)	5.65	512	48	47.6	CW	E	0.97	PF	0.005	0.015	0.024	0.5	0.015	0.007	0.01
Roof	HAE6020A (470 - 527 MHz)	2.15	470	48	47.3	CW	E	0.93	PF	0.024	0.019	0.029	0.5	0.024	0.011	0.01
Roof	HAE6020A (470 - 527 MHz)	2.15	484	48	47.7	CW	E	0.94	PF	0.007	0.036	0.008	0.5	0.017	0.008	0.01
Roof	HAE6020A (470 - 527 MHz)	2.15	498	48	47.6	CW	E	0.96	PF	0.019	0.030	0.013	0.5	0.021	0.010	0.01
Roof	HAE6020A (470 - 527 MHz)	2.15	512	48	47.6	CW	E	0.97	PF	0.016	0.031	0.042	0.5	0.030	0.014	0.01
Roof	HAE6020A (470 - 527 MHz)	2.15	527	48	47.5	CW	E	0.97	PF	0.021	0.030	0.041	0.5	0.031	0.015	0.02

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	HAE6022A (403-527 MHz)	4.15	450	48	48	CW	E	0.91	PF	0.061	0.037	0.047	0.5	0.048	0.022	0.02
Roof	HAE6022A (403-527 MHz)	4.15	465.5	48	48	CW	E	0.93	PF	0.052	0.037	0.059	0.5	0.049	0.023	0.02
Roof	HAE6022A (403-527 MHz)	4.15	481	48	47.5	CW	E	0.94	PF	0.030	0.038	0.016	0.5	0.028	0.013	0.01
Roof	HAE6022A (403-527 MHz)	4.15	496.5	48	47.4	CW	E	0.96	PF	0.018	0.077	0.013	0.5	0.036	0.017	0.02
Roof	HAE6022A (403-527 MHz)	4.15	512	48	47.6	CW	E	0.97	PF	0.020	0.043	0.051	0.5	0.038	0.018	0.02
Roof	HAE6022A (403-527 MHz)	4.15	527	48	47.5	CW	E	0.97	PF	0.021	0.045	0.059	0.5	0.042	0.020	0.02
Roof	HAE6024A (470 - 494 MHz)	5.15	470	48	47.3	CW	E	0.93	PF	0.038	0.033	0.046	0.5	0.039	0.018	0.02
Roof	HAE6024A (470 - 494 MHz)	5.15	482	48	47.6	CW	E	0.94	PF	0.046	0.037	0.015	0.5	0.033	0.015	0.02
Roof	HAE6024A (470 - 494 MHz)	5.15	494	48	47.1	CW	E	0.95	PF	0.015	0.045	0.019	0.5	0.026	0.013	0.01
Roof	HAE6026A (494 - 512 MHz)	5.15	494	48	47.1	CW	E	0.95	PF	0.022	0.045	0.023	0.5	0.030	0.014	0.01
Roof	HAE6026A (494 - 512 MHz)	5.15	503	48	47.5	CW	E	0.96	PF	0.021	0.046	0.020	0.5	0.029	0.014	0.01
Roof	HAE6026A (494 - 512 MHz)	5.15	512	48	47.6	CW	E	0.97	PF	0.035	0.039	0.053	0.5	0.042	0.021	0.02

MPE calculations are defined in section 13.0.

MPE measurement data for Passenger

D.U.T. Info.							Probe Info.			Passenger Positions						
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	Test Pos.	Head	Chest	Lower Trunk	DUT Max. TX Factor	Avg. over Body (mW/ cm2)	Calc. P.D. (mW/ cm2)	Max Calc. P.D. (mW/ cm2)
Roof	PMAE4041A (450 - 470 MHz)	2.15	450	48	48	CW	E	0.91	PF	0.006	0.006	0.012	0.5	0.008	0.004	0.00
Roof	PMAE4041A (450 - 470 MHz)	2.15	460	48	47.9	CW	E	0.92	PF	0.008	0.006	0.017	0.5	0.010	0.005	0.00
Roof	PMAE4041A (450 - 470 MHz)	2.15	470	48	47.3	CW	E	0.93	PF	0.014	0.018	0.023	0.5	0.018	0.009	0.01
Roof	PMAE4033A (450 - 470 MHz)	5.65	450	48	48	CW	E	0.91	PF	0.057	0.036	0.069	0.5	0.054	0.025	0.02
Roof	PMAE4033A (450 - 470 MHz)	5.65	460	48	47.9	CW	E	0.92	PF	0.063	0.052	0.147	0.5	0.087	0.040	0.04
Roof	PMAE4033A (450 - 470 MHz)	5.65	470	48	47.3	CW	E	0.93	PF	0.050	0.029	0.059	0.5	0.046	0.021	0.02
Roof	PMAE4043A (450- 470 MHz)	7.15	450	48	48	CW	E	0.91	PF	0.025	0.019	0.032	0.5	0.025	0.012	0.01
Roof	PMAE4043A (450- 470 MHz)	7.15	460	48	47.9	CW	E	0.92	PF	0.021	0.017	0.040	0.5	0.026	0.012	0.01
Roof	PMAE4043A (450- 470 MHz)	7.15	470	48	47.3	CW	E	0.93	PF	0.021	0.017	0.033	0.5	0.024	0.011	0.01
Roof	RAE4004ARB (445-470 MHz)	7.15	450	48	48	CW	E	0.91	PF	0.004	0.004	0.006	0.5	0.005	0.002	0.00
Roof	RAE4004ARB (445-470 MHz)	7.15	460	48	47.9	CW	E	0.92	PF	0.019	0.008	0.026	0.5	0.018	0.008	0.01
Roof	RAE4004ARB (445-470 MHz)	7.15	470	48	47.3	CW	E	0.93	PF	0.009	0.006	0.016	0.5	0.010	0.005	0.00

MPE calculations are defined in section 13.0.

Appendix E – SAR Simulation Report