

 MOTOROLA SOLUTIONS	 TESTING CERT # 2518.01																														
DECLARATION OF COMPLIANCE: MPE ASSESSMENT																															
EME Test Laboratory 8000 West Sunrise Blvd Fort Lauderdale, FL. 33322	Date of Report: January 15, 2015 Report Revision: B																														
<table border="0"> <tr> <td style="vertical-align: top;">Responsible Engineer:</td> <td>William M. Elliott (Principal Staff EME Test Engineer)</td> </tr> <tr> <td style="vertical-align: top;">Report author:</td> <td>William M. Elliott (Principal Staff EME Test Engineer)</td> </tr> <tr> <td style="vertical-align: top;">Assessment Date(s):</td> <td>07/22/2014</td> </tr> <tr> <td style="vertical-align: top;">Manufacturer/Location:</td> <td>Motorola Solutions, Penang Malaysia</td> </tr> <tr> <td style="vertical-align: top;">Sector/Group/Div.:</td> <td>TETRA</td> </tr> <tr> <td style="vertical-align: top;">Date submitted:</td> <td>03/05/2014</td> </tr> <tr> <td style="vertical-align: top;">DUT Description:</td> <td>806-870 MHz TETRA Mobile Radio</td> </tr> <tr> <td style="vertical-align: top;">TX mode(s):</td> <td>Time Division Multiple Access (TDMA).</td> </tr> <tr> <td style="vertical-align: top;">Max. Power output:</td> <td>SSPD, DMO, TMO, Repeater, Gateway 11.2W; MSPD 6.3W; TEDS 3.6W</td> </tr> <tr> <td style="vertical-align: top;">TX Frequency Bands:</td> <td>806-824 MHz, 851 – 869 MHz</td> </tr> <tr> <td style="vertical-align: top;">Signaling type:</td> <td>PI/4DQPSK (TDMA) 4, 16 or 64 QAM modulation (TEDS mode)</td> </tr> <tr> <td style="vertical-align: top;">Model(s) Certified:</td> <td>PMUF1662A (AZM83UCS6TZ4AN, AZM83UFS6TZ6AN, AZM83UFS6TZ2AN)</td> </tr> <tr> <td style="vertical-align: top;">Classification:</td> <td>Occupational/Controlled Environment</td> </tr> <tr> <td style="vertical-align: top;">FCC ID:</td> <td>AZ492FT5869 Results outside FCC bands are not applicable for FCC compliance demonstration.</td> </tr> <tr> <td style="vertical-align: top;">IC:</td> <td>109U-92FT5869 Results outside IC bands are not applicable for IC compliance demonstration.</td> </tr> </table>		Responsible Engineer:	William M. Elliott (Principal Staff EME Test Engineer)	Report author:	William M. Elliott (Principal Staff EME Test Engineer)	Assessment Date(s):	07/22/2014	Manufacturer/Location:	Motorola Solutions, Penang Malaysia	Sector/Group/Div.:	TETRA	Date submitted:	03/05/2014	DUT Description:	806-870 MHz TETRA Mobile Radio	TX mode(s):	Time Division Multiple Access (TDMA).	Max. Power output:	SSPD, DMO, TMO, Repeater, Gateway 11.2W; MSPD 6.3W; TEDS 3.6W	TX Frequency Bands:	806-824 MHz, 851 – 869 MHz	Signaling type:	PI/4DQPSK (TDMA) 4, 16 or 64 QAM modulation (TEDS mode)	Model(s) Certified:	PMUF1662A (AZM83UCS6TZ4AN, AZM83UFS6TZ6AN, AZM83UFS6TZ2AN)	Classification:	Occupational/Controlled Environment	FCC ID:	AZ492FT5869 Results outside FCC bands are not applicable for FCC compliance demonstration.	IC:	109U-92FT5869 Results outside IC bands are not applicable for IC compliance demonstration.
Responsible Engineer:	William M. Elliott (Principal Staff EME Test Engineer)																														
Report author:	William M. Elliott (Principal Staff EME Test Engineer)																														
Assessment Date(s):	07/22/2014																														
Manufacturer/Location:	Motorola Solutions, Penang Malaysia																														
Sector/Group/Div.:	TETRA																														
Date submitted:	03/05/2014																														
DUT Description:	806-870 MHz TETRA Mobile Radio																														
TX mode(s):	Time Division Multiple Access (TDMA).																														
Max. Power output:	SSPD, DMO, TMO, Repeater, Gateway 11.2W; MSPD 6.3W; TEDS 3.6W																														
TX Frequency Bands:	806-824 MHz, 851 – 869 MHz																														
Signaling type:	PI/4DQPSK (TDMA) 4, 16 or 64 QAM modulation (TEDS mode)																														
Model(s) Certified:	PMUF1662A (AZM83UCS6TZ4AN, AZM83UFS6TZ6AN, AZM83UFS6TZ2AN)																														
Classification:	Occupational/Controlled Environment																														
FCC ID:	AZ492FT5869 Results outside FCC bands are not applicable for FCC compliance demonstration.																														
IC:	109U-92FT5869 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 4.0 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 EME Lab Senior Resource Manager and Laboratory Director Approval Date: 1/16/2015	Digitally signed by Deanna Zakharia DN: cn=Deanna Zakharia, o=Motorola Solutions, ou=Regulatory Compliance Lab, email=deid115@motorolasol.com, c=US Date: 2015.01.16 14:17:27 -0500																														

Document Revision History

Date	Revision	Comments
09/08/2014	O	Initial release
01/08/2015	A	Added sales models to Models Certified
01/15/2015	B	Add Receive Only GPS antennas to antenna list

Table of Contents

1.0	Introduction.....	3
2.0	FCC MPE Summary	3
3.0	Abbreviations / Definitions.....	3
4.0	Referenced Standards and Guidelines	3
5.0	Power Density Limits	4
6.0	Product and System Description.....	6
7.0	Assessment Method	7
8.0	MPE Assessment	8
9.0	Conclusion	11

1.0 Introduction

This report contains calculated Maximum Permissible Exposure (MPE) results for product models PMUF1662A (AZM83UCS6TZ4AN, AZM83UFS6TZ6AN, AZM83UFS6TZ2AN).

2.0 FCC MPE Summary

Table 1

Equipment Class	Frequency band (MHz)	*Power Density (mW/cm ²)	% of FCC MPE Limit
TNB	809-824	0.187	34.8
TNB	854-869	0.187	32.9
Simultaneous Results		NA	NA

*Results are based on highest percentage of limit.

3.0 Abbreviations / Definitions

DMO: Direct Mode Operation
DUT: Device Under Test
EME: Electromagnetic Energy
MPE: Maximum Permissible Exposure
MSPD: Multi-Slot Packet Data
SSPD: Single-Slot Packet Data
TDMA: Time Division Multiple Access
TEDS: Tetra Enhanced Data Service
TETRA: Terrestrial Trunked Radio
TMO: Trunked Mode Operation

4.0 Referenced Standards and Guidelines

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

- Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, FCC, Washington, D.C.: 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 (2014), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), Industry Canada RSS-102 Issue 4, 2010

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 4 – 2010 W/m ²	Health Canada Safety Code 6 (2014) W/m ²
10 - 20						10.0
20 – 48						$44.72 / f^{0.5}$
30 – 300	1.0				*10.0	
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	$f/300$				$f/30$	
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		
6,000 – 15,000						50.0
15000 – 150,000						50.0
150000 – 300,000						$3.33 \times 10^{-4} f$

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

Table 3 – General Population / Uncontrolled Exposure Limits

Frequency Range (MHz)	FCC OET Bulletin 65	ICNIRP	IEEE C95.1 1992/1999	IEEE C95.1 2005	RSS 102 issue 4 – 2010	Health Canada Safety Code 6 (2014)
	mW/cm ²	W/m ²	mW/cm ²	W/m ²	W/m ²	W/m ²
10 - 20						2.0
20 – 48						$8.944 / f^{0.5}$
30 – 300	0.2				*2.0	
48 – 300						1.291
10 – 400		2.0				
100 – 300			0.2			
100 – 400				2.0		
300 – 1,500	f/1,500				f/150	
300 – 6000						$0.02619 f^{0.6834}$
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				
6,000 – 15,000						10.0
15,000 – 150,000						10.0
150,000 - 300,000						$6.67 \times 10^{-5} f$

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

6.0 Product and System Description

Models PMUF1662A (AZM83UCS6TZ4AN, AZM83UFS6TZ6AN, AZM83UFS6TZ2AN) are TETRA professional mobile radios for vehicular applications.

This device is capable of operating in the TX frequency range(s), duty cycle(s), maximum output power(s) and antenna gain(s) presented in Table 4 and Table 5 in section 8.0 MPE Assessment.

These models include GPS antenna models GMAG4253A and GMAG4254A which are not included in the MPE analysis since they are receive only antennas

Tetra 1 Modes

Max Power = 11.2 W

In PTT voice and dispatch services, the radio uses PI/4DQPSK modulation and Time Division Multiple Access (TDMA) with four user channels on a single radio carrier (25% duty cycle). The mobile radio can communicate with other radios in direct-mode operation (DMO) or trunked-mode operation (TMO).

Where network coverage is limited or unavailable, DMO allows the use of one or more terminals to connect in a Repeater mode to allow communication in situations of bad coverage. The worst case duty cycle for DMO Repeater mode is 33%.

The radio also supports a Gateway mode, where one radio with connection to the network [TMO] acts as a relay to radios that do not have connection to the network. The worst case duty cycle in this mode is TMO to DMO at 36%. DMO to TMO duty cycle in Gateway mode is 33%.

There is also a Short Data Service mode at 11.2W that is single-slot packet data with GPRS-like data transfer speeds and worst case duty cycle of 25%

The worst case duty cycle that will be evaluated for compliance at the 11.2W output power is 36% duty cycle for TMO to DMO gateway communication.

Max Power = 6.3W

TETRA also supports a Multi-Slot Packet Data (MSPD) mode that combines four timeslots to make a single data channel for data transfer only at EDGE-like speeds. The worst case duty cycle for MSPD is 95.77% and will be evaluated for compliance at the 6.3W output power.

TETRA 2 Mode

Max Power = 3.6W

The radio also supports Tetra Enhanced Data Service (TEDS) which uses 4, 16 or 64 QAM modulation and ranges of channel spacing to achieve wideband data rates. This mode is data only with no repeater or gateway functionality. The maximum duty cycle for TEDS is the same as MSPD, 95.77%. This mode will not be evaluated for compliance as MSPD has higher output power and same duty cycle. It is the worst case.

Simultaneous transmission is not capable on this device.

7.0 Assessment Method

MPE calculations were used to determine the RF exposure for this device. According to FCC's OET Bulletin 65 Edition 97-01 Section 2, calculations can be made to predict RF field strength and power density levels around typical RF sources. For example, in the case of a single radiating antenna, a prediction for power density in the far-field of the antenna can be made by use of the general Equations (1) or (2) below. These equations are generally accurate in the far-field of an antenna but will over-predict power density in the near field, where they could be used for making a "worst case" or conservative prediction. Equation 2 was used to show compliance for this device.

Equation 1

$$S = \frac{PG}{4\pi R^2} = \frac{EIRP}{4\pi R^2}$$

Where:

- S = power density (mW/cm²)
- P = power input to the antenna (mW)
- G = power gain of the antenna in the direction of interest relative to an isotropic radiator (dBi)
- R = distance to center of radiation of the antenna (cm)
- EIRP = equivalent (or effective) isotropically radiated power

Or Equation 2

$$S = \frac{P_t G}{4\pi d^2 L} F$$

Equation (2) accounts for the maximum duty cycle of the signal, and the factor, F, to provide a worst-case prediction of power density per FCC OET Bulletin 65, Edition 97-01 1997.

Where:

- S = power density (mW/cm²)
- P_t = maximum output power scaled by the maximum duty cycle of the signal
- G = power gain of the antenna in the direction of interest relative to an isotropic radiator (dBi)
- d = distance from antenna (cm)
- L = cable loss (dB)
- F = 1.0

Two separation distances were evaluated. The first one is to demonstrate compliance with the uncontrolled limits for general population (bystanders) at 90cm for all antennas being offered with the product.

Motorola Solutions' weather proof motorcycle enclosures provide 30cm separation distance from the antenna to the enclosure's edge. This is the distance that was evaluated to demonstrate compliance to the controlled limits for the occupational case of a trained motorcycle operator. This evaluation only applies to antennas being offered for motorcycle installation.

8.0 MPE Assessment

Table 4
MPE Calculation Results
Uncontrolled Limits at 90 cm Separation Distance

Antenna #	Tx Frequency (MHz)	User Category	MPE Spec Limit (mW/cm ²)			Duty Cycle (%)	Max Power (W)	Ant Gain, G (dBi)	Cable Loss, L (dB)	Dist., R (cm)	MPE Calc. (mW/cm ²)	Highest Percentage of Lowest Limit
			FCC	ICNIRP	Health Canada Safety Code 6 (2014)							
Tetra 1 TMO / DMO Voice												
PMAF4408A	806.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.00	0.00	90	0.063	24.7
PMAF4408A	809.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.00	0.00	90	0.063	24.7
PMAF4408A	816.50	Uncontrolled	0.54	0.41	0.26	36%	11.2	2.00	0.00	90	0.063	24.5
PMAF4408A	824.00	Uncontrolled	0.55	0.41	0.26	36%	11.2	2.00	0.00	90	0.063	24.4
PMAF4408A	851.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.00	0.00	90	0.063	23.8
PMAF4408A	854.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.00	0.00	90	0.063	23.8
PMAF4408A	860.00	Uncontrolled	0.57	0.43	0.27	36%	11.2	2.00	0.00	90	0.063	23.7
PMAF4408A	869.00	Uncontrolled	0.58	0.43	0.27	36%	11.2	2.00	0.00	90	0.063	23.5
GMAF4412A	806.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.00	0.00	90	0.063	24.7
GMAF4412A	809.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.00	0.00	90	0.063	24.7
GMAF4412A	816.50	Uncontrolled	0.54	0.41	0.26	36%	11.2	2.00	0.00	90	0.063	24.5
GMAF4412A	824.00	Uncontrolled	0.55	0.41	0.26	36%	11.2	2.00	0.00	90	0.063	24.4
GMAF4412A	851.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.00	0.00	90	0.063	23.8
GMAF4412A	854.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.00	0.00	90	0.063	23.8
GMAF4412A	860.00	Uncontrolled	0.57	0.43	0.27	36%	11.2	2.00	0.00	90	0.063	23.7
GMAF4412A	869.00	Uncontrolled	0.58	0.43	0.27	36%	11.2	2.00	0.00	90	0.063	23.5
GMAF4415A	806.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.00	0.00	90	0.063	24.7
GMAF4415A	809.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.00	0.00	90	0.063	24.7
GMAF4415A	816.50	Uncontrolled	0.54	0.41	0.26	36%	11.2	2.00	0.00	90	0.063	24.5
GMAF4415A	824.00	Uncontrolled	0.55	0.41	0.26	36%	11.2	2.00	0.00	90	0.063	24.4
GMAF4415A	851.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.00	0.00	90	0.063	23.8
GMAF4415A	854.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.00	0.00	90	0.063	23.8
GMAF4415A	860.00	Uncontrolled	0.57	0.43	0.27	36%	11.2	2.00	0.00	90	0.063	23.7
GMAF4415A	869.00	Uncontrolled	0.58	0.43	0.27	36%	11.2	2.00	0.00	90	0.063	23.5
GMAF4413A	806.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	5.00	0.00	90	0.125	49.4
GMAF4413A	809.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	5.00	0.00	90	0.125	49.2
GMAF4413A	816.50	Uncontrolled	0.54	0.41	0.26	36%	11.2	5.00	0.00	90	0.125	48.9
GMAF4413A	824.00	Uncontrolled	0.55	0.41	0.26	36%	11.2	5.00	0.00	90	0.125	48.6
GMAF4413A	851.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	5.00	0.00	90	0.125	47.6
GMAF4413A	854.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	5.00	0.00	90	0.125	47.4
GMAF4413A	860.00	Uncontrolled	0.57	0.43	0.27	36%	11.2	5.00	0.00	90	0.125	47.2
GMAF4413A	869.00	Uncontrolled	0.58	0.43	0.27	36%	11.2	5.00	0.00	90	0.125	46.9
GMAF4416A	806.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.14	0.00	90	0.065	25.5
GMAF4416A	809.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.14	0.00	90	0.065	25.5
GMAF4416A	816.50	Uncontrolled	0.54	0.41	0.26	36%	11.2	2.14	0.00	90	0.065	25.3
GMAF4416A	824.00	Uncontrolled	0.55	0.41	0.26	36%	11.2	2.14	0.00	90	0.065	25.2
GMAF4416A	851.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.14	0.00	90	0.065	24.6
GMAF4416A	854.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.14	0.00	90	0.065	24.6
GMAF4416A	860.00	Uncontrolled	0.57	0.43	0.27	36%	11.2	2.14	0.00	90	0.065	24.4
GMAF4416A	869.00	Uncontrolled	0.58	0.43	0.27	36%	11.2	2.14	0.00	90	0.065	24.3

Table 4 (Cont.)

Antenna #	Tx Frequency (MHz)	User Category	MPE Spec Limit (mW/cm ²)			Duty Cycle (%)	Max Power (W)	Ant Gain, G (dBi)	Cable Loss, L (dB)	Dist., R (cm)	MPE Calc. (mW/cm ²)	Highest Percentage of Lowest Limit
			FCC	ICNIRP	Health Canada Safety Code 6 (2014)							
GMAF4411A	806.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.14	0.00	90	0.065	25.5
GMAF4411A	809.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.14	0.00	90	0.065	25.5
GMAF4411A	816.50	Uncontrolled	0.54	0.41	0.26	36%	11.2	2.14	0.00	90	0.065	25.3
GMAF4411A	824.00	Uncontrolled	0.55	0.41	0.26	36%	11.2	2.14	0.00	90	0.065	25.2
GMAF4411A	851.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.14	0.00	90	0.065	24.6
GMAF4411A	854.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.14	0.00	90	0.065	24.6
GMAF4411A	860.00	Uncontrolled	0.57	0.43	0.27	36%	11.2	2.14	0.00	90	0.065	24.4
GMAF4411A	869.00	Uncontrolled	0.58	0.43	0.27	36%	11.2	2.14	0.00	90	0.065	24.3
GMAF4417A	806.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.14	0.00	90	0.065	25.5
GMAF4417A	809.00	Uncontrolled	0.54	0.40	0.25	36%	11.2	2.14	0.00	90	0.065	25.5
GMAF4417A	816.50	Uncontrolled	0.54	0.41	0.26	36%	11.2	2.14	0.00	90	0.065	25.3
GMAF4417A	824.00	Uncontrolled	0.55	0.41	0.26	36%	11.2	2.14	0.00	90	0.065	25.2
GMAF4417A	851.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.14	0.00	90	0.065	24.6
GMAF4417A	854.00	Uncontrolled	0.57	0.43	0.26	36%	11.2	2.14	0.00	90	0.065	24.6
GMAF4417A	860.00	Uncontrolled	0.57	0.43	0.27	36%	11.2	2.14	0.00	90	0.065	24.4
GMAF4417A	869.00	Uncontrolled	0.58	0.43	0.27	36%	11.2	2.14	0.00	90	0.065	24.3
Tetra 1 MSPD												
PMAF4408A	806.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.00	0.00	90	0.094	37.0
PMAF4408A	809.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.00	0.00	90	0.094	36.9
PMAF4408A	816.50	Uncontrolled	0.54	0.41	0.26	96%	6.3	2.00	0.00	90	0.094	36.7
PMAF4408A	824.00	Uncontrolled	0.55	0.41	0.26	96%	6.3	2.00	0.00	90	0.094	36.5
PMAF4408A	851.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.00	0.00	90	0.094	35.7
PMAF4408A	854.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.00	0.00	90	0.094	35.6
PMAF4408A	860.00	Uncontrolled	0.57	0.43	0.27	96%	6.3	2.00	0.00	90	0.094	35.4
PMAF4408A	869.00	Uncontrolled	0.58	0.43	0.27	96%	6.3	2.00	0.00	90	0.094	35.2
GMAF4412A	806.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.00	0.00	90	0.094	37.0
GMAF4412A	809.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.00	0.00	90	0.094	36.9
GMAF4412A	816.50	Uncontrolled	0.54	0.41	0.26	96%	6.3	2.00	0.00	90	0.094	36.7
GMAF4412A	824.00	Uncontrolled	0.55	0.41	0.26	96%	6.3	2.00	0.00	90	0.094	36.5
GMAF4412A	851.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.00	0.00	90	0.094	35.7
GMAF4412A	854.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.00	0.00	90	0.094	35.6
GMAF4412A	860.00	Uncontrolled	0.57	0.43	0.27	96%	6.3	2.00	0.00	90	0.094	35.4
GMAF4412A	869.00	Uncontrolled	0.58	0.43	0.27	96%	6.3	2.00	0.00	90	0.094	35.2
GMAF4415A	806.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.00	0.00	90	0.094	37.0
GMAF4415A	809.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.00	0.00	90	0.094	36.9
GMAF4415A	816.50	Uncontrolled	0.54	0.41	0.26	96%	6.3	2.00	0.00	90	0.094	36.7
GMAF4415A	824.00	Uncontrolled	0.55	0.41	0.26	96%	6.3	2.00	0.00	90	0.094	36.5
GMAF4415A	851.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.00	0.00	90	0.094	35.7
GMAF4415A	854.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.00	0.00	90	0.094	35.6
GMAF4415A	860.00	Uncontrolled	0.57	0.43	0.27	96%	6.3	2.00	0.00	90	0.094	35.4
GMAF4415A	869.00	Uncontrolled	0.58	0.43	0.27	96%	6.3	2.00	0.00	90	0.094	35.2
GMAF4413A	806.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	5.00	0.00	90	0.187	73.9
GMAF4413A	809.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	5.00	0.00	90	0.187	73.7
GMAF4413A	816.50	Uncontrolled	0.54	0.41	0.26	96%	6.3	5.00	0.00	90	0.187	73.2
GMAF4413A	824.00	Uncontrolled	0.55	0.41	0.26	96%	6.3	5.00	0.00	90	0.187	72.8

Table 4 (Cont.)

Antenna #	Tx Frequency (MHz)	User Category	MPE Spec Limit (mW/cm ²)			Duty Cycle (%)	Max Power (W)	Ant Gain, G (dBi)	Cable Loss, L (dB)	Dist., R (cm)	MPE Calc. (mW/cm ²)	Highest Percentage of Lowest Limit
			FCC	ICNIRP	Health Canada Safety Code 6 (2014)							
GMAF4413A	851.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	5.00	0.00	90	0.187	71.2
GMAF4413A	854.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	5.00	0.00	90	0.187	71.0
GMAF4413A	860.00	Uncontrolled	0.57	0.43	0.27	96%	6.3	5.00	0.00	90	0.187	70.7
GMAF4413A	869.00	Uncontrolled	0.58	0.43	0.27	96%	6.3	5.00	0.00	90	0.187	70.2
GMAF4416A	806.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.14	0.00	90	0.097	38.2
GMAF4416A	809.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.14	0.00	90	0.097	38.1
GMAF4416A	816.50	Uncontrolled	0.54	0.41	0.26	96%	6.3	2.14	0.00	90	0.097	37.9
GMAF4416A	824.00	Uncontrolled	0.55	0.41	0.26	96%	6.3	2.14	0.00	90	0.097	37.7
GMAF4416A	851.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.14	0.00	90	0.097	36.8
GMAF4416A	854.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.14	0.00	90	0.097	36.7
GMAF4416A	860.00	Uncontrolled	0.57	0.43	0.27	96%	6.3	2.14	0.00	90	0.097	36.6
GMAF4416A	869.00	Uncontrolled	0.58	0.43	0.27	96%	6.3	2.14	0.00	90	0.097	36.3
GMAF4411A	806.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.14	0.00	90	0.097	38.2
GMAF4411A	809.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.14	0.00	90	0.097	38.1
GMAF4411A	816.50	Uncontrolled	0.54	0.41	0.26	96%	6.3	2.14	0.00	90	0.097	37.9
GMAF4411A	824.00	Uncontrolled	0.55	0.41	0.26	96%	6.3	2.14	0.00	90	0.097	37.7
GMAF4411A	851.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.14	0.00	90	0.097	36.8
GMAF4411A	854.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.14	0.00	90	0.097	36.7
GMAF4411A	860.00	Uncontrolled	0.57	0.43	0.27	96%	6.3	2.14	0.00	90	0.097	36.6
GMAF4411A	869.00	Uncontrolled	0.58	0.43	0.27	96%	6.3	2.14	0.00	90	0.097	36.3
GMAF4417A	806.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.14	0.00	90	0.097	38.2
GMAF4417A	809.00	Uncontrolled	0.54	0.40	0.25	96%	6.3	2.14	0.00	90	0.097	38.1
GMAF4417A	816.50	Uncontrolled	0.54	0.41	0.26	96%	6.3	2.14	0.00	90	0.097	37.9
GMAF4417A	824.00	Uncontrolled	0.55	0.41	0.26	96%	6.3	2.14	0.00	90	0.097	37.7
GMAF4417A	851.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.14	0.00	90	0.097	36.8
GMAF4417A	854.00	Uncontrolled	0.57	0.43	0.26	96%	6.3	2.14	0.00	90	0.097	36.7
GMAF4417A	860.00	Uncontrolled	0.57	0.43	0.27	96%	6.3	2.14	0.00	90	0.097	36.6
GMAF4417A	869.00	Uncontrolled	0.58	0.43	0.27	96%	6.3	2.14	0.00	90	0.097	36.3

Table 5

MPE Calculation Results

Controlled Limits at 30 cm Separation Distance

[Motorcycle Antennas Only]

Antenna #	Tx Frequency (MHz)	User Category	MPE Spec Limit (mW/cm ²)			Duty Cycle (%)	Max Power (W)	Ant Gain, G (dBi)	Cable Loss, L (dB)	Dist., R (cm)	MPE Calc. (mW/cm ²)	Highest Percentage of Lowest Limit
			FCC	ICNIRP	Health Canada Safety Code 6 (2014)							
Tetra 1 TMO / DMO Voice												
PMAF4408A	806.00	Controlled	2.69	2.02	1.83	36%	11.2	2.00	0.00	30	0.565	30.8
PMAF4408A	809.00	Controlled	2.70	2.02	1.84	36%	11.2	2.00	0.00	30	0.565	30.8
PMAF4408A	816.50	Controlled	2.72	2.04	1.85	36%	11.2	2.00	0.00	30	0.565	30.6
PMAF4408A	824.00	Controlled	2.75	2.06	1.85	36%	11.2	2.00	0.00	30	0.565	30.5

Table 5 (Cont.)

Antenna #	Tx Frequency (MHz)	User Category	MPE Spec Limit (mW/cm ²)			Duty Cycle (%)	Max Power (W)	Ant Gain, G (dBi)	Cable Loss, L (dB)	Dist., R (cm)	MPE Calc. (mW/cm ²)	Highest Percentage of Lowest Limit
			FCC	ICNIRP	Health Canada Safety Code 6 (2014)							
PMAF4408A	851.00	Controlled	2.84	2.13	1.88	36%	11.2	2.00	0.00	30	0.565	30.0
PMAF4408A	854.00	Controlled	2.85	2.14	1.89	36%	11.2	2.00	0.00	30	0.565	30.0
PMAF4408A	860.00	Controlled	2.87	2.15	1.89	36%	11.2	2.00	0.00	30	0.565	29.8
PMAF4408A	869.00	Controlled	2.90	2.17	1.90	36%	11.2	2.00	0.00	30	0.565	29.7
GMAF4417A	806.00	Controlled	2.69	2.02	1.83	36%	11.2	2.14	0.00	30	0.584	31.8
GMAF4417A	809.00	Controlled	2.70	2.02	1.84	36%	11.2	2.14	0.00	30	0.584	31.8
GMAF4417A	816.50	Controlled	2.72	2.04	1.85	36%	11.2	2.14	0.00	30	0.584	31.6
GMAF4417A	824.00	Controlled	2.75	2.06	1.85	36%	11.2	2.14	0.00	30	0.584	31.5
GMAF4417A	851.00	Controlled	2.84	2.13	1.88	36%	11.2	2.14	0.00	30	0.584	31.0
GMAF4417A	854.00	Controlled	2.85	2.14	1.89	36%	11.2	2.14	0.00	30	0.584	30.9
GMAF4417A	860.00	Controlled	2.87	2.15	1.89	36%	11.2	2.14	0.00	30	0.584	30.8
GMAF4417A	869.00	Controlled	2.90	2.17	1.90	36%	11.2	2.14	0.00	30	0.584	30.7
Tetra 1 MSPD												
PMAF4408A	806.00	Controlled	2.69	2.02	1.83	96%	6.3	2.00	0.00	30	0.846	46.1
PMAF4408A	809.00	Controlled	2.70	2.02	1.84	96%	6.3	2.00	0.00	30	0.846	46.1
PMAF4408A	816.50	Controlled	2.72	2.04	1.85	96%	6.3	2.00	0.00	30	0.846	45.8
PMAF4408A	824.00	Controlled	2.75	2.06	1.85	96%	6.3	2.00	0.00	30	0.846	45.6
PMAF4408A	851.00	Controlled	2.84	2.13	1.88	96%	6.3	2.00	0.00	30	0.846	44.9
PMAF4408A	854.00	Controlled	2.85	2.14	1.89	96%	6.3	2.00	0.00	30	0.846	44.8
PMAF4408A	860.00	Controlled	2.87	2.15	1.89	96%	6.3	2.00	0.00	30	0.846	44.7
PMAF4408A	869.00	Controlled	2.90	2.17	1.90	96%	6.3	2.00	0.00	30	0.846	44.4
GMAF4417A	806.00	Controlled	2.69	2.02	1.83	96%	6.3	2.14	0.00	30	0.873	47.6
GMAF4417A	809.00	Controlled	2.70	2.02	1.84	96%	6.3	2.14	0.00	30	0.873	47.6
GMAF4417A	816.50	Controlled	2.72	2.04	1.85	96%	6.3	2.14	0.00	30	0.873	47.3
GMAF4417A	824.00	Controlled	2.75	2.06	1.85	96%	6.3	2.14	0.00	30	0.873	47.1
GMAF4417A	851.00	Controlled	2.84	2.13	1.88	96%	6.3	2.14	0.00	30	0.873	46.4
GMAF4417A	854.00	Controlled	2.85	2.14	1.89	96%	6.3	2.14	0.00	30	0.873	46.3
GMAF4417A	860.00	Controlled	2.87	2.15	1.89	96%	6.3	2.14	0.00	30	0.873	46.1
GMAF4417A	869.00	Controlled	2.90	2.17	1.90	96%	6.3	2.14	0.00	30	0.873	45.9

9.0 Conclusion

The MPE results per the assessment in Table 4 are compliant to the FCC General Population/Uncontrolled RF exposure limits in OET Bulletin 65 for every antenna offered with this product. The results per the assessment in Table 5 are compliant to the FCC Occupational/Controlled RF exposure limits in OET Bulletin 65.

The MPE results per the assessment in Table 4 are also compliant to the ICNIRP general public exposure limits, per ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300GHz) and IEEE C95.1-2005. The results per the assessment in Table 5 are compliant to the ICNIRP occupational exposure limits per ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300GHz) and IEEE C95.1-2005..

Finally, the MPE results per the assessment in Table 4 are compliant with the proposed uncontrolled RF exposure limits found in Health Canada Safety Code 6 (2014). The results per the

assessment in Table 5 are compliant with the controlled RF exposure limits found in Health Canada Safety Code 6.

Table 6: Maximum MPE RF Exposure Summary

Designator	Frequency (MHz)	Operator (mW/cm ²)	Bystander (mW/cm ²)
Overall	806-824 / 851-869	0.873	0.187
FCC	809-824MHz / 854-869MHz	0.873	0.187
IC	806-824MHz / 851-869MHz	0.873	0.187

Results are based on highest percentage of limit.