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Report On

RF Exposure Assessment of the
Park Air Systems Limited

T6-TV and T6-TRV Ground to air transmitter and transceiver for use in
the VHF aeronautical band using 25/8.33kHz channel spacing

FCC ID: C8LT6-TV and C8LT6-TRV
IC ID: 2137AT6TV and 2137AT6TRV

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DATED

29 June 2016

This report has been up issued to Issue 2 and should be read in place of Issue 1. This report has been up issued to correct the EIRP value and recalculate the required compliance boundary.



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CONTENTS

| Section | Page No |
|----------|------------------------------------------------------|
| 1 | REPORT SUMMARY 3 |
| 1.1 | Introduction 4 |
| 1.2 | Regional Requirements 5 |
| 1.3 | Product Information 6 |
| 1.3.1 | Technical Description 6 |
| 1.3.2 | Supported Features 6 |
| 1.3.3 | Antennas 6 |
| 1.4 | Brief Summary of Results 7 |
| 2 | TEST DETAILS 9 |
| 2.1 | Rationale for Assessment of the RF Exposure 10 |
| 2.2 | Test Result Details 11 |
| 3 | DISCLAIMERS AND COPYRIGHT 12 |
| 3.1 | Disclaimers and Copyright 13 |



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SECTION 1

REPORT SUMMARY

RF Exposure Assessment of the
Park Air Systems Limited
T6-TV and T6-TRV Ground to air transmitter and transceiver for use in the VHF aeronautical
band using 25/8.33kHz channel spacing



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RF Exposure Assessment of the Park Air Systems Limited T6-TV and T6-TRV Ground to air transmitter and transceiver for use in the VHF aeronautical band using 25/8.33kHz channel spacing to the requirements of the applied test specifications.

| | |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Objective | To perform RF Exposure Assessment to determine the Equipment Under Test's (EUT's) compliance of the applied rules. |
| Applicant | Park Air Systems Limited |
| Manufacturer | Park Air Systems Limited |
| Manufacturing Description | Ground to air transmitter and transceiver for use in the VHF aeronautical band using 25/8.33kHz channel spacing |
| Model Number(s) | T6-TV and T6-TRV |
| Test Specification/Issue/Date | CFR 47 Pt1.1310 Health Canada Safety Code 6 |



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1.2 REGIONAL REQUIREMENTS

The table below shows the regional requirements that are referenced in this test report. A full list of the requirements is shown in Annex A.

| Report Reference | Regional Requirement |
|------------------|-----------------------------|
| FCC | CFR 47 Pt1.1310 |
| IC | Health Canada Safety Code 6 |



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1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment under test was a Park Air Systems Limited T6-TV and T6-TRV Ground to air transmitter and transceiver for use in the VHF aeronautical band using 25/8.33kHz channel spacing. A full technical description can be found in the manufacturer's documentation.

All reported calculations were carried out on the relevant information supplied for the T6-TV and T6-TRV Ground to air transmitter and transceiver for use in the VHF aeronautical band using 25/8.33kHz channel spacing to demonstrate compliance with the applied test specification(s). The sample assessed was found to comply with the requirements of the applied rules.

1.3.2 Supported Features

The following radio access technologies and frequency bands are supported by the equipment under test.

| | |
|-------------------------|----------------------------|
| Radio Access Technology | Ground to Air Transmitter |
| Frequency Band | 118.000 MHz to 136.975 MHz |

1.3.3 Antennas

The following antennas are supported by the equipment under test.

| No. | Model | Gain (dBi) |
|-----|----------|------------|
| 1 | External | 2.0 |



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1.4 BRIEF SUMMARY OF RESULTS

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields for both General Public and Occupational. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s).

| Required Compliance Boundary (m) | |
|----------------------------------|--------------------|
| Occupational | General Population |
| 1.18 | 2.75 |

Table 1 – Compliance Boundary Results



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| Regional Requirement | Calculated RF exposure level at compliance boundary of 1.18 m | | | | | |
|----------------------|---------------------------------------------------------------|--------|---------------|---------|---------------|--------|
| | S Field (W/m ²) | | E Field (V/m) | | H Field (A/m) | |
| | Result | Limit | Result | Limit | Result | Limit |
| FCC* | 0.7009 | 1.0000 | 51.4018 | 61.4000 | 0.1363 | 0.1630 |
| IC | 7.0085 | 7.0119 | 51.4018 | 51.4156 | 0.1363 | 0.1364 |

* Requirement and Result in mW/cm²

Table 2 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in CFR 47 Pt1.1310 and Health Canada Safety Code 6 at the point of investigation, 1.18 m.

| Regional Requirement | Calculated RF exposure level at compliance boundary of 2.75 m | | | | | |
|----------------------|---------------------------------------------------------------|--------|---------------|---------|---------------|--------|
| | S Field (W/m ²) | | E Field (V/m) | | H Field (A/m) | |
| | Result | Limit | Result | Limit | Result | Limit |
| FCC* | 0.1290 | 0.2000 | 22.0561 | 27.5000 | 0.0585 | 0.0730 |
| IC | 1.2904 | 1.2910 | 22.0561 | 22.0600 | 0.0585 | 0.0585 |

* Requirement and Result in mW/cm²

Table 3 – General Population Results

The calculations show that the EUT complies with the occupational exposure levels described in CFR 47 Pt1.1310 and Health Canada Safety Code 6 at the point of investigation, 2.75 m.



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SECTION 2

TEST DETAILS



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2.1 RATIONALE FOR ASSESSMENT OF THE RF EXPOSURE

The aim of the assessment report is to evaluate the compliance boundary for a set of given input power(s) according to the basic restrictions (directly or indirectly via compliance with reference levels) related to human exposure to radio frequency electromagnetic fields.

The chosen assessment method to establish the compliance boundary in the far-field region is the reference method as defined in the relevant specifications.

The RF exposure assessment is based upon the following criteria:

The T6-TV and T6-TRV Ground to air transmitter and transceiver for use in the VHF aeronautical band using 25/8.33kHz channel spacing operates with the following transmitters active on the antenna ports shown in Section 1.3.3. For each transmitter, the Radio Access Technology (RAT), EIRP inclusive of antenna gain and duty cycle, gain of the antenna and lowest frequency of operation are shown as they contribute to the calculation of S Field, E field and H field values according to the following formulas.

The power flux (S Field):

$$S = \frac{PG_{(\theta, \phi)}}{4\pi r^2}$$

The electric field strength (E Field):

$$E = \frac{\sqrt{30PG_{(\theta, \phi)}}}{r}$$

The magnetic field strength (H Field):

$$H = \frac{E}{\eta_0}$$

Where:

P = Average Power (W)

G = Antenna Gain (dBi)

r = Distance (cm) or (m)

$\eta_0 = 377$



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2.2 TEST RESULT DETAILS

The frequencies shown in the tables below have been chosen based on the lowest possible frequency that the EUT can transmit.

| Antenna Port | Tx No. | Ant No. | RAT | EIRP (W) | Duty Cycle (%) | Gain (dBi) | Frequency (MHz) | RF Exposure Level at compliance boundary of 1.18 m | | |
|--------------|--------|---------|---------------------------|----------|----------------|------------|-----------------|----------------------------------------------------|---------------|---------------|
| | | | | | | | | S Field (W/m ²) | E Field (V/m) | H Field (A/m) |
| 1 | 1 | 1 | Ground to Air Transmitter | 122.631* | 100 | 2.0 | 118.000 | 7.0085 | 51.4018 | 0.1363 |

Table 4 – Occupational Transmitter Summary

| Antenna Port | Tx No. | Ant No. | RAT | EIRP (W) | Duty Cycle (%) | Gain (dBi) | Frequency (MHz) | RF Exposure Level at compliance boundary of 2.75 m | | |
|--------------|--------|---------|---------------------------|----------|----------------|------------|-----------------|----------------------------------------------------|---------------|---------------|
| | | | | | | | | S Field (W/m ²) | E Field (V/m) | H Field (A/m) |
| 1 | 1 | 1 | Ground to Air Transmitter | 122.631* | 100 | 2.0 | 118.000 | 1.2904 | 22.0561 | 0.0585 |

Table 5 – General Population Transmitter Summary

* EIRP has been calculated at 122.63W. This was achieved by measuring the actual conducted carrier power at 53.321W and then adding the declared maximum modulation depth of 95% and the antenna gain of 2dBi.



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SECTION 3

DISCLAIMERS AND COPYRIGHT



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3.1 DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

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ANNEX A

REGIONAL REQUIREMENTS



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| Frequency Range (MHz) | S Field (mW/cm ²) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------|
| 0 - 0.3 | - | - | - |
| 0.3 - 3 | 100 | 614 | 1.63 |
| 3 - 30 | $900/f^2$ | $1842/f$ | $4.89/f$ |
| 30 - 300 | 1 | 61.4 | 0.163 |
| 300 - 1500 | $f/300$ | - | - |
| 1500 - 100000 | 5 | - | - |

Table A.1 – CFR 47 Pt1.1310 Occupational Limits

| Frequency Range (MHz) | S Field (mW/cm ²) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------|
| 0 - 0.3 | - | - | - |
| 0.3 - 3 | 100 | 614 | 1.63 |
| 3 - 30 | $180/f^2$ | $824/f$ | $2.19/f$ |
| 30 - 300 | 0.2 | 27.5 | 0.073 |
| 300 - 1500 | $f/1500$ | - | - |
| 1500 - 100000 | 1 | - | - |

Table A.2 – CFR 47 Pt1.1310 General Population Limits

| Frequency Range (MHz) | Power Density (W/m ²) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) |
|-----------------------|-----------------------------------|-------------------------------|-------------------------------|
| 10 - 20 | 10 | 61.4 | 0.163 |
| 20 - 48 | $44.72/f^{0.5}$ | $129.8/f^{0.25}$ | $0.3444/f^{0.25}$ |
| 48 - 100 | 6.455 | 49.33 | 0.1309 |
| 100 - 6000 | $0.6455*f^{0.5}$ | $15.60*f^{0.25}$ | $0.04138*f^{0.25}$ |
| 6000 - 150000 | 50 | 137 | 0.364 |

Table A.3 – Health Canada Safety Code 6 Occupational Limits

| Frequency Range (MHz) | Power Density (W/m ²) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) |
|-----------------------|-----------------------------------|-------------------------------|-------------------------------|
| 10 - 20 | 2 | 27.46 | 0.0728 |
| 20 - 48 | $8.944/f^{0.5}$ | $58.07/f^{0.25}$ | $0.1540/f^{0.25}$ |
| 48 - 300 | 1.291 | 22.06 | 0.05852 |
| 300 - 6000 | $0.02619*f^{0.6834}$ | $3.142*f^{0.3417}$ | $0.008335*f^{0.3417}$ |
| 6000 - 15000 | 10 | 61.4 | 0.163 |

Table A.4 – Health Canada Safety Code 6 General Population Limits