

19 September 2007

FAA Spectrum Engineering Division
800 Independence Avenue SW
Washington,
DC 20591

Dear Mr. Frazier,

Please be advised that we shall be making an application to the Federal Communications Commission to obtain an Equipment Authorisation Grant for Park Air Systems new multimode ground based transceiver type M7X under Part 87 rules, in the band 118 MHz to 136.975 MHz.

The standard model M7X, provides 50W AM/ 100W FM RF output power operating in the 100-399.975 MHz band. Employing 25 kHz / 8.33 kHz channel spacing it is intended primarily for military users but the radios are also suitable for civil aeronautical applications. It can be controlled remotely from the M7C Desktop controller via a single E1 data link.

For sales within the United States of America and under the proposed FCC filing C8LBM7X, the radios functionality will be firmware limited as follows:

The equipment will provide up to 50W RF output power in the 118 – 399.975 MHz band.

Transmission shall be disabled in the frequency bands 100- 117.975 MHz and 328.6 – 335.4 MHz.

Operation will be limited to amplitude modulation within a 25 kHz channel spacing.

8.33 kHz channel spacing and FM operation are inhibited.

Our application to the FCC is being made via an accredited test house, Intertek acting as our Conformity Assessment Body. Testing is scheduled to commence in early November 2007

In accordance with FCC regulation 87.147(d) I would be grateful if you could address any concerns or objections to myself.

Yours faithfully,



Allan Horsfield
Consultant Engineer
EMC and Approvals
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Test House:
Intertek Testing & Certification Intertek House, Cleeve Road Leatherhead, Surrey, KT22 7SB. UK Contact Ranjit Bhambra Tel +44 1372 370900, Fax 44 1372 370999, ranjit.bhambra@intertek.com

FAA Notification of FCC Type Acceptance Application M7X.

General

Proposed FCC Number

M7X	50W AM V/U transceiver	C8LBM7X
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Manufacturer	Park Air Systems Ltd. England.
RF Output Power	50W Watts AM
Antenna port	50R N-type connector
Frequency range	100 MHz to 399.975.975 MHz. (TX disabled below 118 MHz and in range 328.6 – 335.4 MHz)
Method of tuning	Frequency selected by front panel keypad and LCD display.
Channelling capability	25 kHz (8.33 kHz disabled).
Emission bandwidth	25 kHz
Occupied bandwidth	Typically less than 5.8 kHz for 2.5 kHz tone.
Emission type	6K00A3E, (only AM waveform installed)
Emission/harmonics	Spurious emissions meet ETSI EN 300 676 (harmonics at less than -36 dBm, non harmonics -46 dBm up to 1 GHz)
Remote Control	M7C Controller provides full control of a connected radio via an E1 data link

Description

The M7 Series cover the VHF and UHF bands from 100 MHz to 399.975 MHz providing ground to air communications for Civil and Defence customers.

They operate in AM, FM, digital Modes compatible with the Civil aviation applications and also offer secure speech and frequency hopping modes for Defence applications. The transmitter provides 50W AM / 100W FM carrier power and a separate Guard Receiver module may be included as an option. All operational controls are located on a single front panel containing a screened assembly. This unit can be removed from the radio if local operation is not required and by combining it with a power supply and interface module it forms the basis of the equipments remote controller (M7C).

To meet the EMC requirements, a mechanical double-barrier approach has been adopted. All circuits are contained within their own, EMC tight, module case. These modules are then located within the chassis which provides a second level of screening.

All radio modules store their serial number, part number and build state in electronic form enabling reporting of this information to the front panel display, remote controller or other system interface.

The M7 series supports waveforms for AM Voice, FM Voice, AM Wide, FM Wide, Link11, Maritime and HQ II, plus additional waveforms can be specified.

The Electronic Protective Measure (EPM) waveforms (HQ II, Talon and Saturn) are provided by a proprietary bought-in module which is fitted within the radio for licensed military operations.

The equipment is available in a number of versions including receive only and transceivers with or without EPM capability.

The M7X for which this application is being made is the standard non EPM V/U transceiver with all limitations being performed in firmware to prevent unauthorised use. These limitations are applied at the factory to all units bearing the FCC ID Label.

Pictures:

Front



Rear



Top view:



A M7C Desktop Controller:



Information for FAA Review of Park Air Systems Ltd. ground based transceiver M7X

1.) FCC identification number: C8LBM7X

2.) Manufacture and model number: Park Air Systems Limited Model M7X

3.) Rated transmitter output power: Limited to 50W

4.) Frequency range (capable of tuning): 100 MHz – 399.975 MHz (Transmit disabled in the bands 100 MHz – 117.975 MHz and 328.6 MHz – 335.4 MHz.

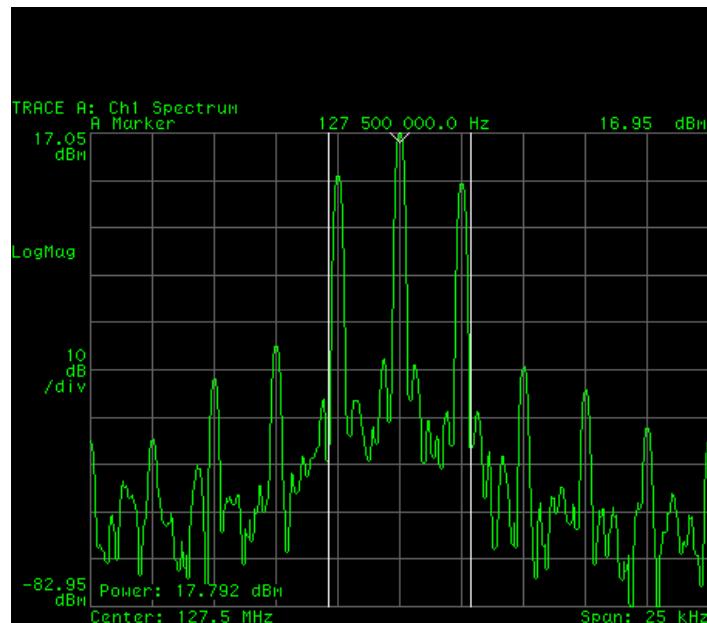
5.) Method of tuning: Frequency selection by front panel key pad and display.

6.) Channelling capability: The equipment operates with 25 kHz channel spacing (8.33 kHz capable but disabled) and can store 400 frequency presets.

7.) Frequency stability (transmitter): 0.15ppm

8.) Emission bandwidth(s): 6K00A3E

99% power bandwidth measured with 2.5 kHz modulation is: 5.7 kHz



9.) Emission type(s):

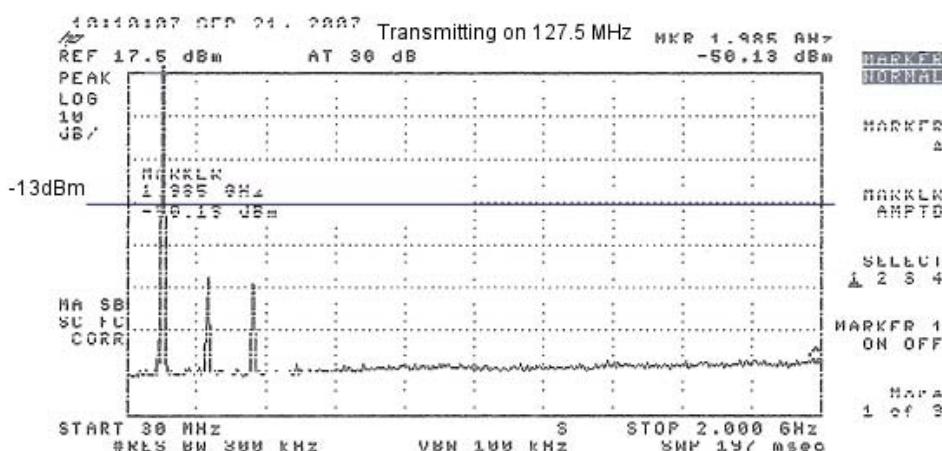
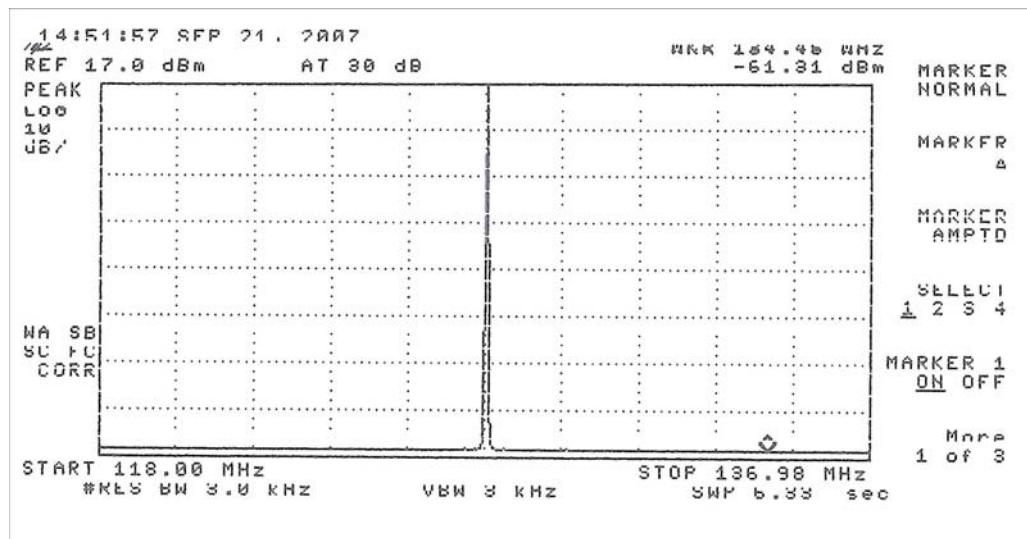
Capable of AM and FM operation but FM will be disabled in firmware under this filing. AM 6K00A3E applied

10.) Spectral emission plots: (1) centred on a frequency in the middle of the frequency range and measured across that range, (2) of frequencies measured out to its corresponding 12th or 13th harmonic.

Fc=127.500 MHz:

Conducted emissions at antenna port:

In Band 118 -136.975 MHz 50W RF output

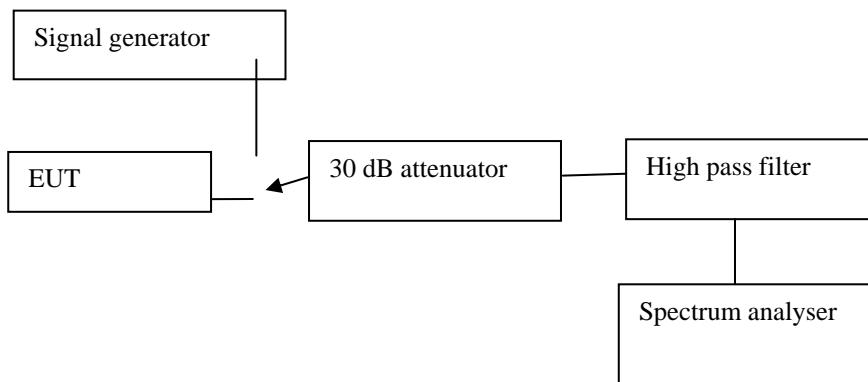


30 MHz to 2 GHz scan for frequency identification. 2nd & 3rd harmonics shown

Harmonics

Harmonics were measured by the substitution method.

Test Setup:



The equipment harmonic level is measured on the spectrum analyser. The attenuator input is then connected to the signal generator which is adjusted to give the same analyser reading as that obtained from the EUT.

The generator level represents the true level of harmonic at the transmitter output.

Reference power measured on the analyser at 127.5 MHz : +17 dBm

Loss in cables and 30 dB attenuator at 127.5 MHz: 30.35 dB

Reference transmitter power output: 47.3 dBm

Harmonic	Harmonic Level at analyser (dBm)	Generator level equivalent to harmonic level (dBm)	Harmonic Level in dBC
2	-46.23	-30	-77.3
3	-54.5	-31.8	-79.1
4	-62.11	-35.8	-83.1
5	-71.1	-45	-92.3
6	-73.21	-47.9	-95.2
7	-79.25	-54.9	-102.2
8	-83.34	-60	-107.3
9	-105.62	-76	-123.3
10	-100.86	-74	-121.3
11	-97.92	-70.3	-117.6
12	-96.24	-69.5	-116.8
13	-94.4	-66.5	-113.8

11.a) Harmonic levels (for avionics only): Not applicable

11.b) Harmonics levels for Ground Transceivers only--- Applicants should submit the harmonic levels for the frequencies listed in Fig.1.

Figure 1. Transmit Frequency Harmonics

Transmit Frequency (MHz)	Harmonic	Resultant Frequency (MHz)
130.625	12	1567.500
131.275	12	1575.300
134.150	12	1609.800
120.925	13	1572.025
121.175	13	1575.275
123.825	13	1609.725

High Order Harmonics

Transmit Frequency (MHz)	Harmonic Number	Harmonic Level at analyser (dBm)	Generator level equivalent to harmonic level (dBm)	Harmonic Level in dBc
130.625	12th	-91.72	-64.3	-111.6
131.275	12th	--93	-66.8	-114.1
134.15	12th	-93.62	-67.2	-114.5
120.925	13th	-93.45	--67	-114.3
121.175	13	-94.18	-68.2	-115.5
123.825	13th	-98.64	-71.8	-119.1

All levels below -64 dBm, -111 dBc

12 Receiver RF Characteristics:

Sensitivity	>10 dB (S+N)/N at -101 dBm standard sensitivity >10 dB (S+N)/N at -107 dBm high sensitivity
Selectivity	< -6 dB at ± 12 kHz >80 dB rejection at ± 25 kHz
Intermodulation:	>80 dB reference 12 dB SINAD for >100 kHz separation
Blocking	>80 dB for 6 dB reduction in 12 dB SINAD, >200 kHz spacing
Cross modulation:	>80 dB at 200 kHz spacing
Spurious	>70 dB typically 100 dB, for signals >50 kHz from channel.
Antenna radiation	< -90 dBm
Audio bandwidth (25 kHz)	+1dB, -2 dB 300-3400 Hz, -30 dB at 4 kHz
RF AGC:	>110 dB

A. Horsfield
Consultant Engineer

21 September 2007

Appendix: Test Equipment

Model	Description	Serial Number	Calibration Date due
HP8595EM	Spectrum Analyser	3801A00192	24-04-09
HP89410A	Vector analyser	3416A01098	3-11-07
IFR2051	Signal generator	203001/942	11-09-08
Bird 8325	30dB attenuator	102	-
HP-450-5N	450 MHz-2 GHz HPF	27450B	-
HP-150-4N	150 MHz to 1 GHz HPF	14808B	-

Equipment under test:
M7X Serial Number 1N2006