TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Park Air Systems Ltd.
T6T HS 300
300 Watt VHF Gound to Air Transmitter

To: FCC Part 87: 2005

Test Report Serial No:
RFI/RPTE2/RP48505JD02A

Supersedes Test Report Serial No:
RFI/RPTE1/RP48505JD02A

This Test Report Is Issued Under The Authority Of Michael Derby, Operations Manager: 	
Tested By: Charlton Fergus  **pp**	**Checked By: Michael Derby**  **pp**
Report Copy No: PDF01	
Issue Date: 24 May 2007	**Test Dates: 08 August 2006 to 11 August 2006**

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Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

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1. Client Information

Company Name:	Park Air Systems Ltd
Address:	Northfields Market Deeping Peterborough Hants PE6 8UE
Contact Name:	Mr A Horsfield

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification of Equipment Under Test (EUT)

Description:	Amplifier (3 x 100 Watt)
Model Name or Number:	T6T VHF Amplifier
Unique Type Identification:	24-31633001/2
Serial Number:	2M2007
FCC ID Number:	C8LB63300HS
Country of Manufacture:	UK
Date of Receipt:	08 August 2006

Description:	UHF Combiner
Model Name or Number:	T6T UHF Combiner
Unique Type Identification:	24-33633001/2
Serial Number:	2M2003
FCC ID Number:	C8LB63300HS
Country of Manufacture:	UK
Date of Receipt:	08 August 2006

Description:	Driver Assembly
Model Name or Number:	T6T VHF Drive
Unique Type Identification:	24-06633001/3
Serial Number:	3M2003
FCC ID Number:	C8LB63300HS
Country of Manufacture:	UK
Date of Receipt:	08 August 2006

2.2. Description of EUT

The equipment under test is a ground to air transmitter base station operating between 118 MHz and 136.975 MHz at an output power of 300 Watts.

2.3. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

2.4. Additional Information Related to Testing

Intended Operating Environment:	Aeronautical Industry	
Equipment Category:	Long Range High Power Aeronautical Transmitter	
Type of Unit:	Base Station (Fixed Use)	
Power Supply Requirement:	Nominal 115 V, 60 Hz AC Mains supply Nominal 230/240 V, 50 Hz AC Mains supply DC supply of 28 V	
Rated Output Power:	54.8 dBm (conducted)	
Channel Spacing:	25 kHz	
Occupied Bandwidth:	5.56 kHz	
Highest Fundamental Frequency:	136.975 MHz	
Highest Unintentionally Generated Frequency:	410.925 MHz	
Transmit Frequency Range:	118.000 MHz to 136.975 MHz	
Transmit Channels Tested:	**Channel ID**	**Channel Frequency (MHz)**
	Bottom	118.000
	Middle	127.500
	Top	136.975

2.5. Support Equipment

No support equipment was used to exercise the EUT during testing.

3. Test Specification

Reference:	FCC Part 87: 2005 Subpart D (Technical Requirements)
Title:	Code of Federal Regulations, Part 87 (47CFR87) Aviation Services.

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003
Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)
Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)
Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.2. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

There were no deviations from the test specification.

5. Operation of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated.

Transmitting on bottom, middle and top channels.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration unless otherwise stated:

Driver unit controlling three amplifiers which were connected through a combiner to the antenna port.

6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Compliancy Status
Standby Mode AC Mains Conducted Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2005 Section 15.107	AC Mains	Complied
Standby Mode Radiated Emissions	C.F.R. 47 FCC Part 15: 2005 Section 15.109	Enclosure	Complied
Standby Mode Conducted Emissions	C.F.R. 47 FCC Part 15: 2005 Section 15.111	Antenna Terminals	Complied
Transmitter Radiated Emissions	C.F.R. 47 FCC Part 87: 2005 Sections 2.1051 & 87.139	Enclosure	Complied
Transmitter Conducted Spurious Emissions	C.F.R. 47 FCC Part 87: 2005 Sections 2.1051, 2.1057 & 87.139(c)	Antenna Terminals	Complied
Transmitter Conducted Unwanted Emissions	C.F.R. 47 FCC Part 87: 2005 Sections 2.1051, 2.1057 & 87.139(c)	Antenna Terminals	Complied
Transmitter Carrier Output Power	C.F.R. 47 FCC Part 87: 2005 Sections 2.1046(a) & 87.131	Antenna Terminals	Complied
Transmitter 20 dB Bandwidth	C.F.R. 47 FCC Part 87: 2005 Sections 2.1049(c), 87.135 & 87.137	Antenna Terminals	Complied
Transmitter Frequency Stability (Voltage Variation)	C.F.R. 47 FCC Part 87: 2005 Sections 2.1055(d) & 87.133(a)	Antenna Terminals	Complied
Transmitter Frequency Stability (Temperature Variation)	C.F.R. 47 FCC Part 87: 2005 Sections 2.1055(a & b) & 87.133(a)	Antenna Terminals	Complied
Modulation Characteristics	C.F.R. 47 FCC Part 87: 2005 Sections 2.1047(a & b) & 87.141(a)	Antenna Terminals	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 8 for details of measurement uncertainties.

The preliminary emissions scans for the standby condition showed similar emission levels for all three channels therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.

7.2. Test Results

7.2.1. Standby Mode AC Conducted Spurious Emissions: Section 15.107

The EUT was configured for AC mains conducted emission measurements, as described in Section 9 of this report.

Tests were performed to identify the maximum emission levels present on the AC Mains line of the EUT.

Results: - Middle Channel

Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.199368	Neutral	43.9	63.6	19.7	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
See Note Below					

Note(s):

1. Average measurements were not performed as the highest peak level was below the average limit.

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Standby Mode AC Conducted Spurious Emissions: Section 15.107 (Continued)

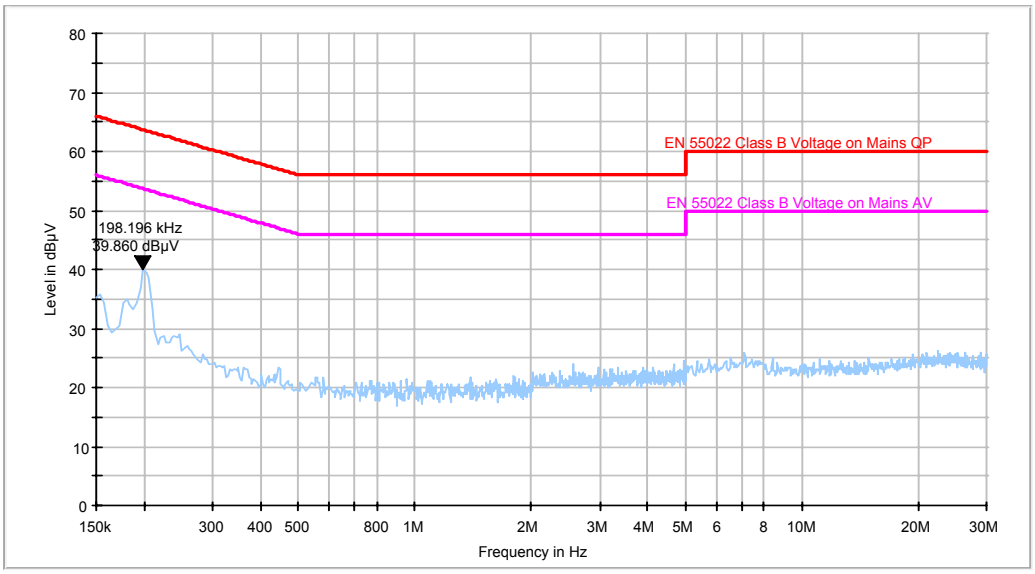

Figure 1: Live - Earth

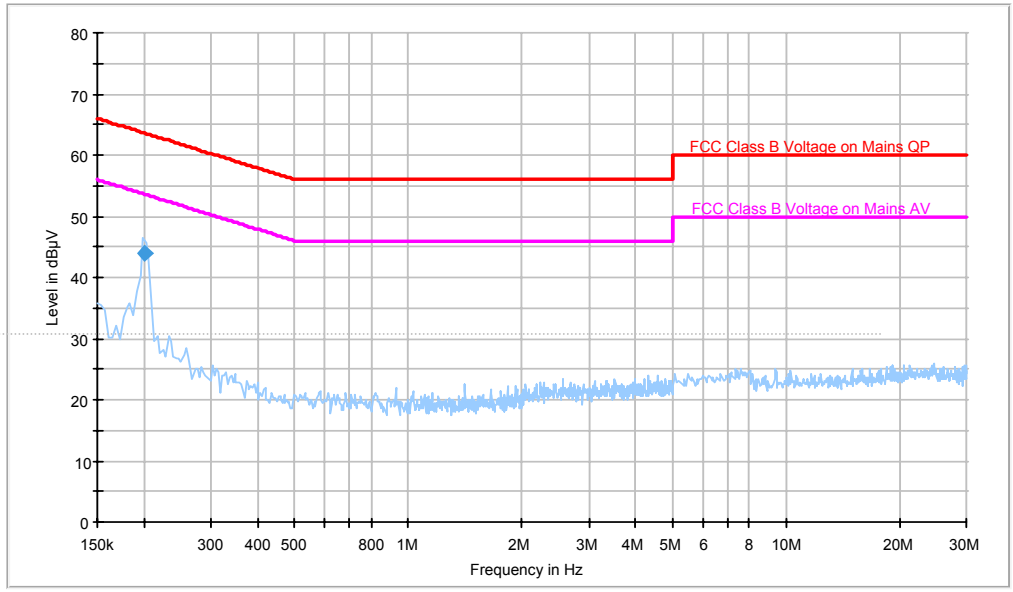

Figure 2: Neutral - Earth

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

7.2.2. Standby Mode Radiated Spurious Emissions: Section 15.109

The EUT was configured for radiated emission measurements, as described in section 9 of this report.

Tests were performed to identify the maximum standby radiated emission levels.

Results: Middle Channel:

Electric Field Strength Measurements (Frequency Range: 30 MHz to 1000 MHz)

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
47.244	Vertical	14.8	40.0	25.2	Complied
63.136	Vertical	12.3	40.0	27.7	Complied
127.986	Vertical	12.8	43.5	30.7	Complied
193.016	Vertical	13.1	43.5	30.4	Complied
213.036	Vertical	16.3	43.5	27.2	Complied
311.313	Vertical	13.6	46.0	32.4	Complied
362.861	Vertical	15.6	46.0	30.4	Complied
508.017	Vertical	26.2	46.0	19.8	Complied
580.586	Vertical	26.0	46.0	20.0	Complied

Note(s):

1. Measurements performed as cabinet radiation, the antenna port was terminated with a 50 Ω load.

2. Measurements were performed using a CISPR quasi peak detector.

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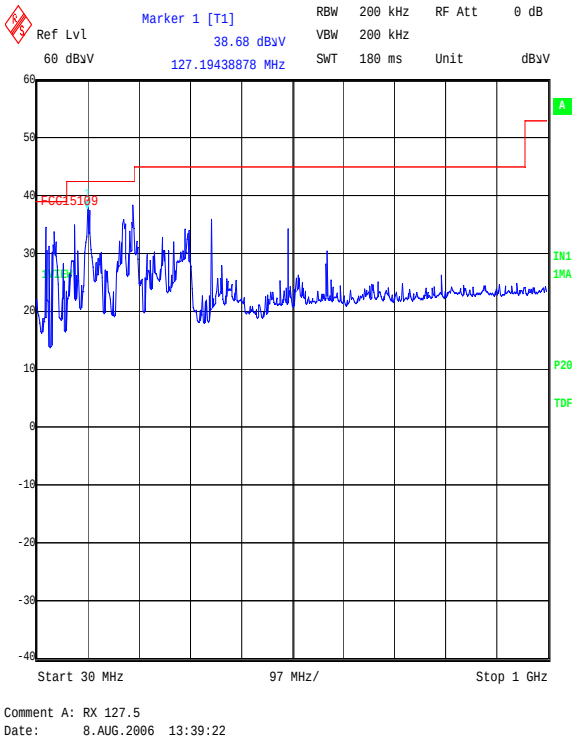
Standby Mode Radiated Spurious Emissions: Section 15.109 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.2.3. Standby Mode Radiated Spurious Emissions: Section 15.109

Results: Middle Channel:

Electric Field Strength Measurements (Frequency Range: 1 GHz to 1.6 GHz)

Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV/m)	Transducer Factor (dB)	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
1.088	Vertical	43.8	-12.8	31.0	54.0	23.0	Complied

Note(s):

1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level is shown here compared to the average limit because this is the more onerous limit.

2. Measurements were performed using a peak detector.

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T6T HS 300
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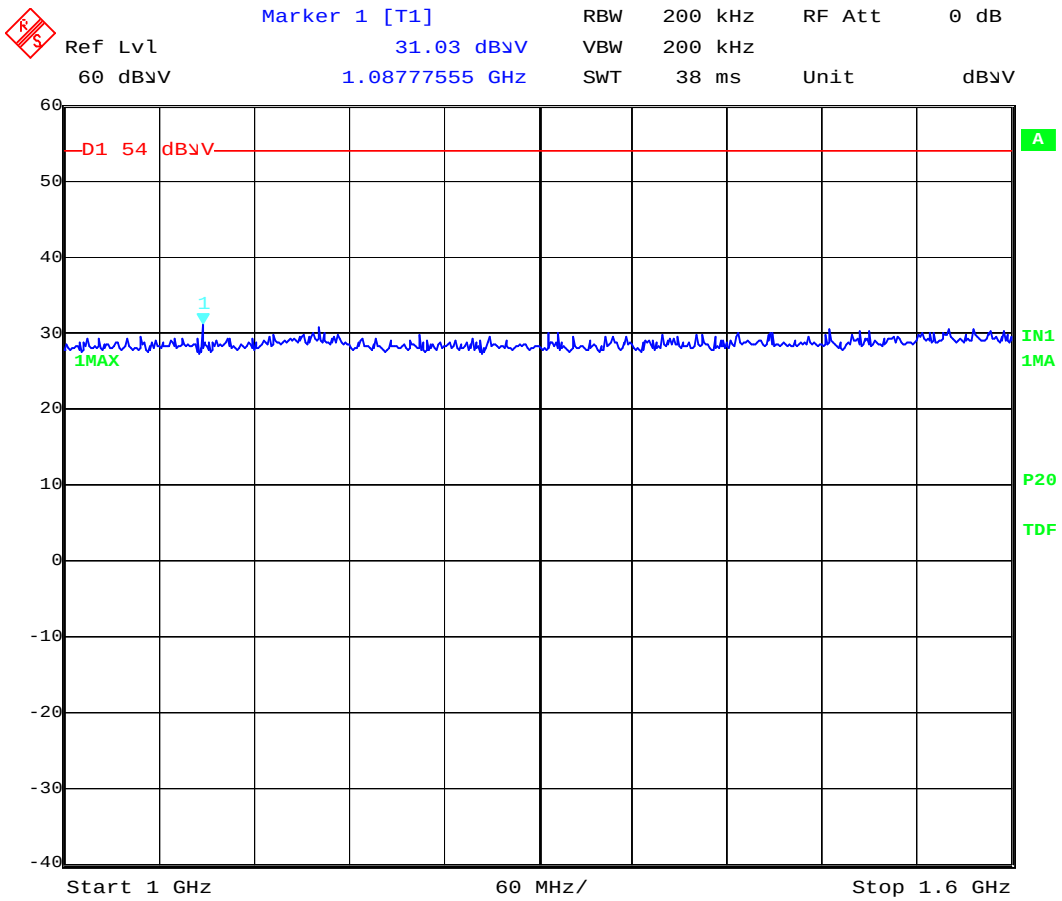
Standby Mode Radiated Spurious Emissions: Section 15.109 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.2.4. Standby Mode Conducted Spurious Emissions: Section 15.111

The EUT was configured as for conducted antenna port emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum standby conducted emission levels.

Results: Bottom, Middle and Top Channels

Electric Field Strength Measurements (Frequency Range: 10 MHz to 1.6 GHz)

Frequency (GHz)	Actual Level (dBm)	Limit (dBm)	Margin (dBm)	Result
See Note 1 Below				

Note(s):

1. All emissions were at least 20 dB below the specified limit.

2. Measurements were performed using a peak detector.

Test of: **Park Air Systems Ltd.**
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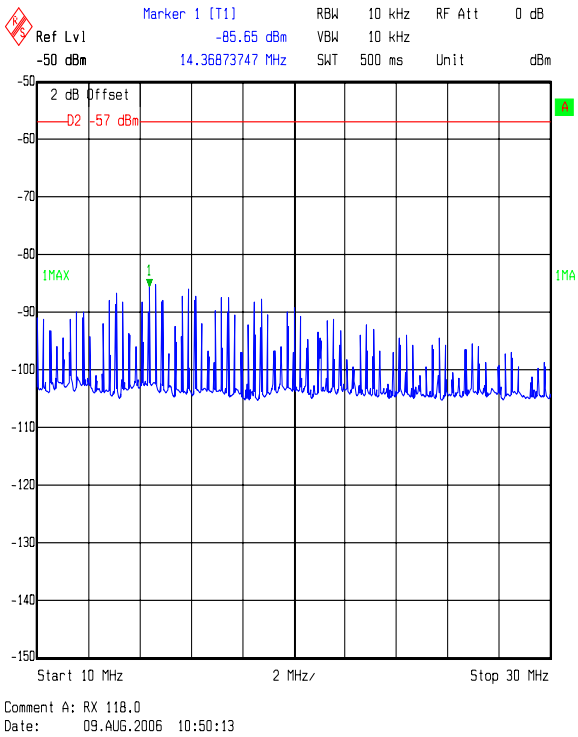
Standby Mode Conducted Spurious Emissions – Bottom Channel: Section 15.111 (Continued)



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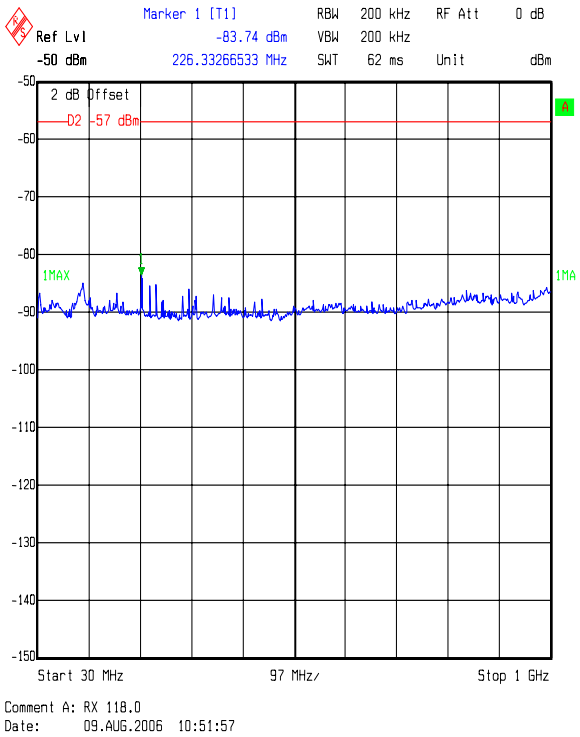

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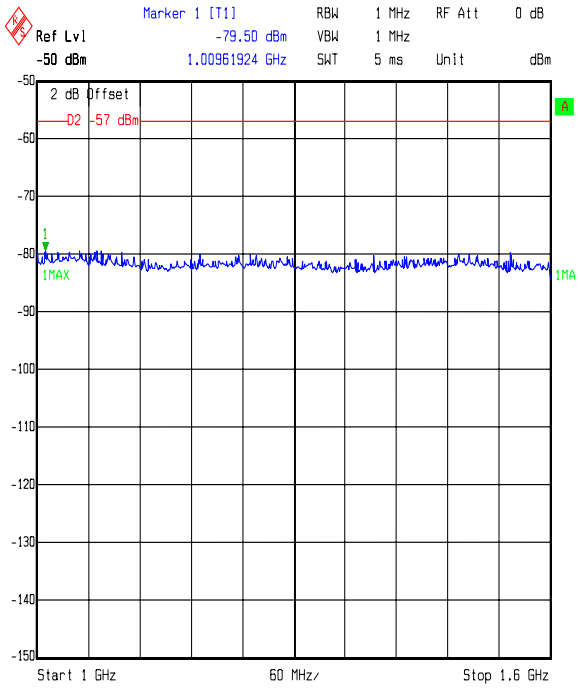

Comment A: RX 118.0
Date: 09.AUG.2006 10:53:15

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
T6T HS 300
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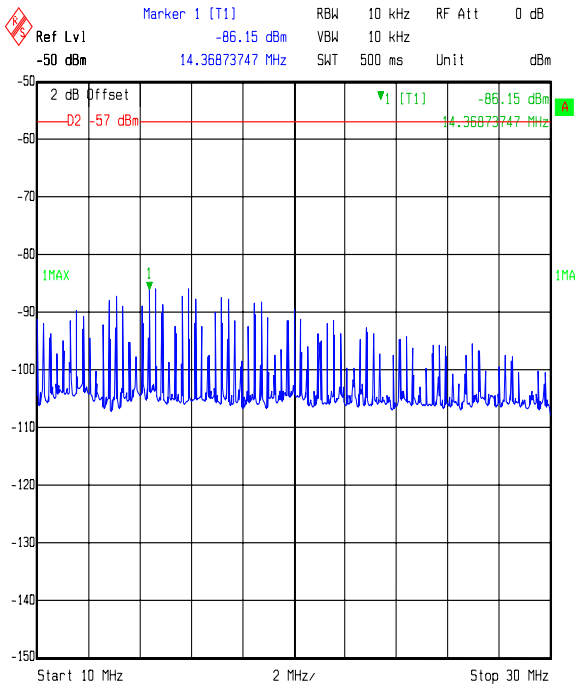
Standby Mode Conducted Spurious Emissions – Middle Channel: Section 15.111 (Continued)



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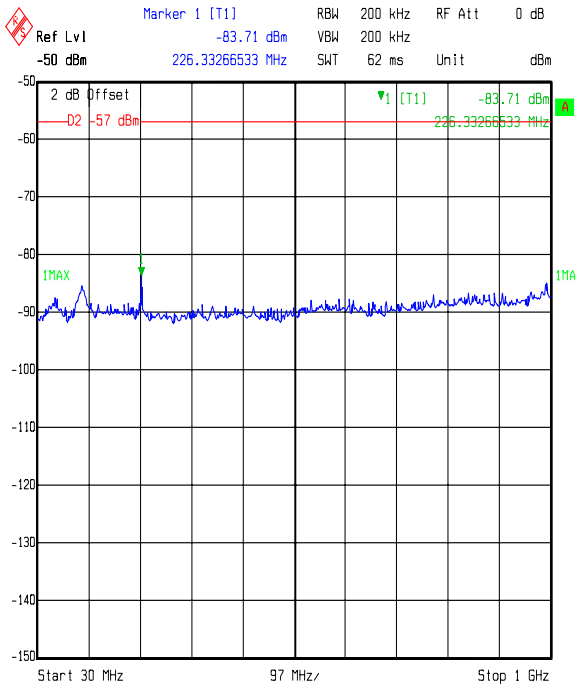

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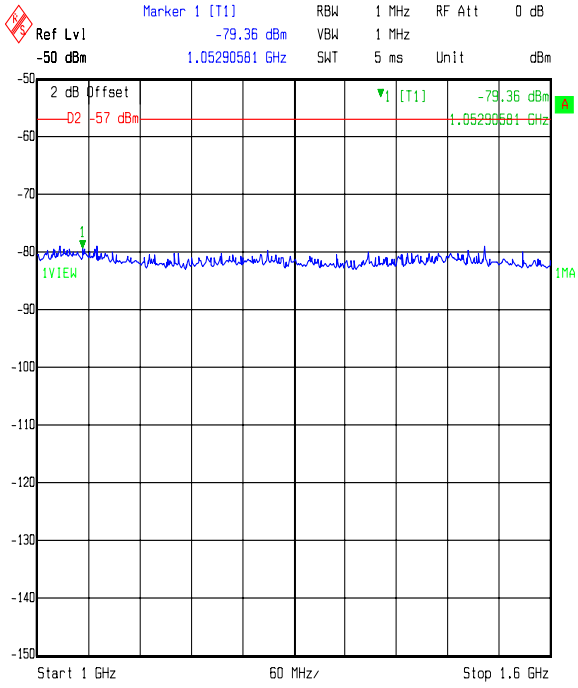

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Test of: **Park Air Systems Ltd.**
T6T HS 300
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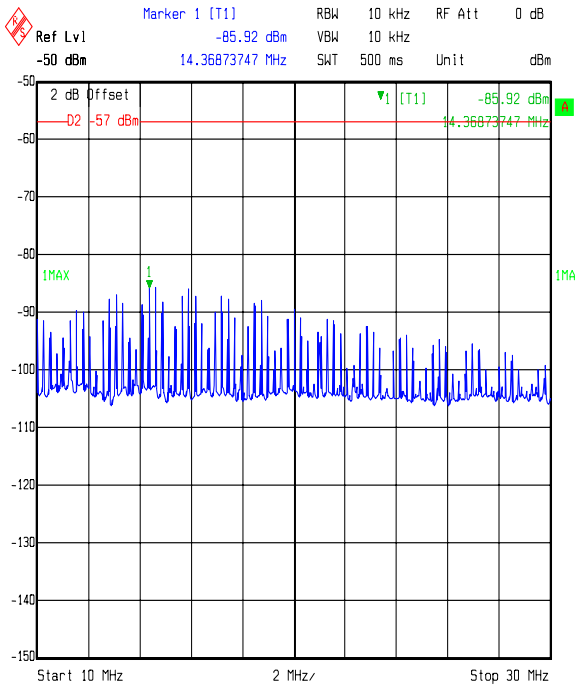
Standby Mode Conducted Spurious Emissions – Top Channel: Section 15.111 (Continued)



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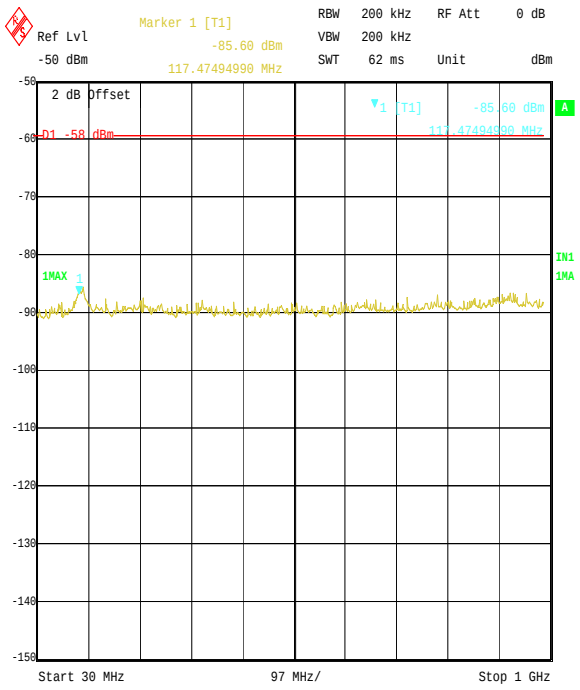

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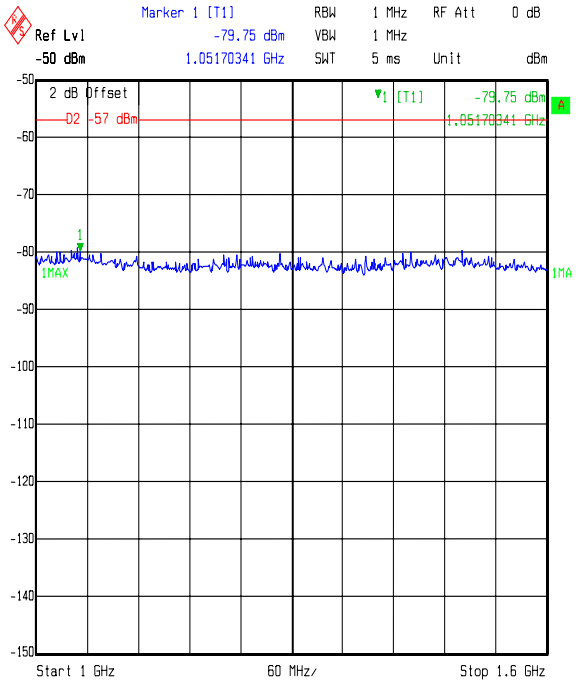

Comment A: RX 136.975
Date: 09.AUG.2006 11:02:11

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

7.2.5. Transmitter Radiated Spurious Emissions: Sections 2.1051 and 87.139

The EUT was configured as for radiated emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum radiated emission levels.

Results: Bottom, Middle and Top Channels

Highest Peak Level:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
See Note 1 Below				

Note(s):

1. All emissions were at least 20 dB below the specified limit.

2. The high level emissions shown in the following plots at 118.000 MHz, 127.194 MHz and 136.975 MHz are the EUT's fundamental transmission frequency for the bottom, middle and top channels and are not measured during this stage of testing.

3. Measurements were performed using a peak detector.

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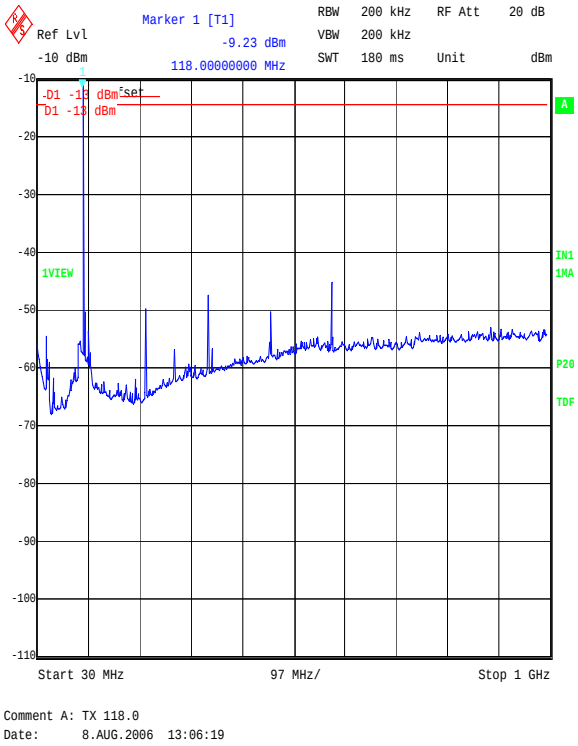
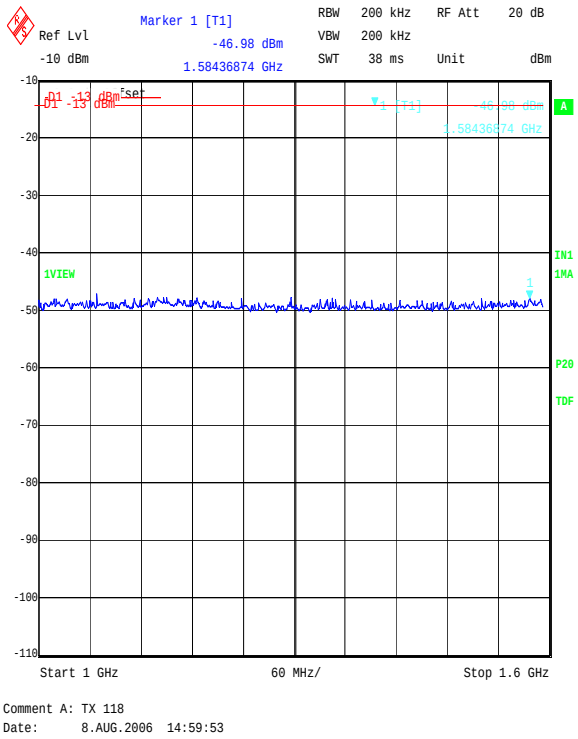
Transmitter Radiated Spurious Emissions – Bottom Channel: Sections 2.1051 and 87.139 (Continued)





Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
T6T HS 300
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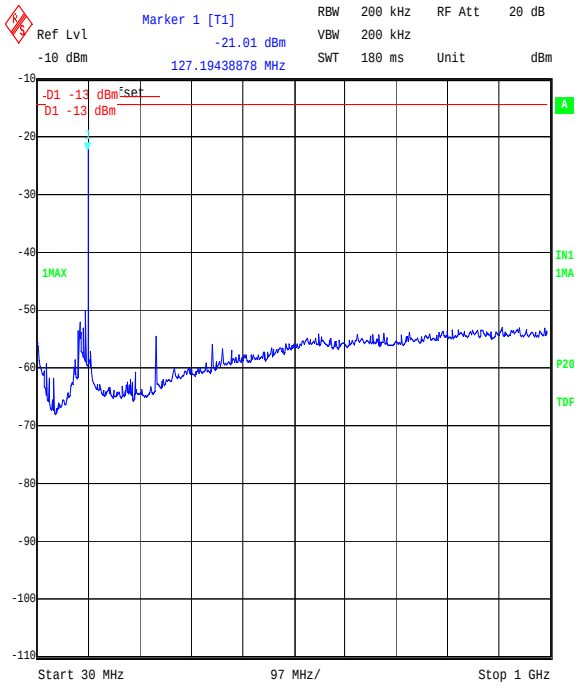
Transmitter Radiated Spurious Emissions – Middle Channel: Sections 2.1051 and 87.139 (Continued)



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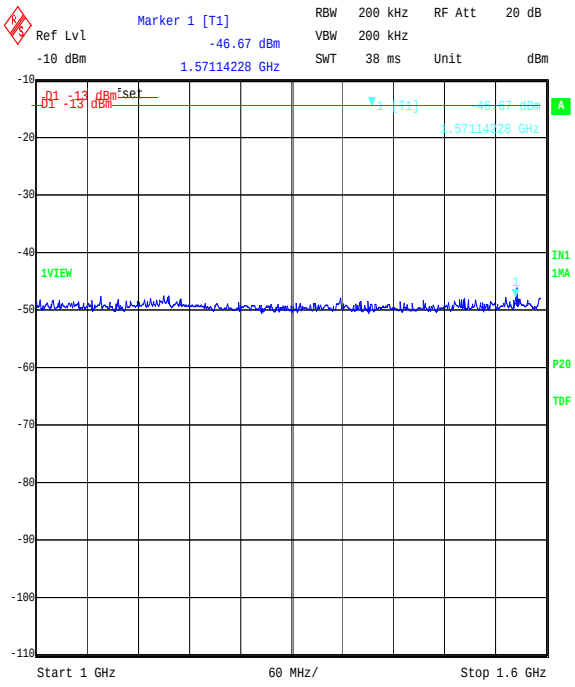

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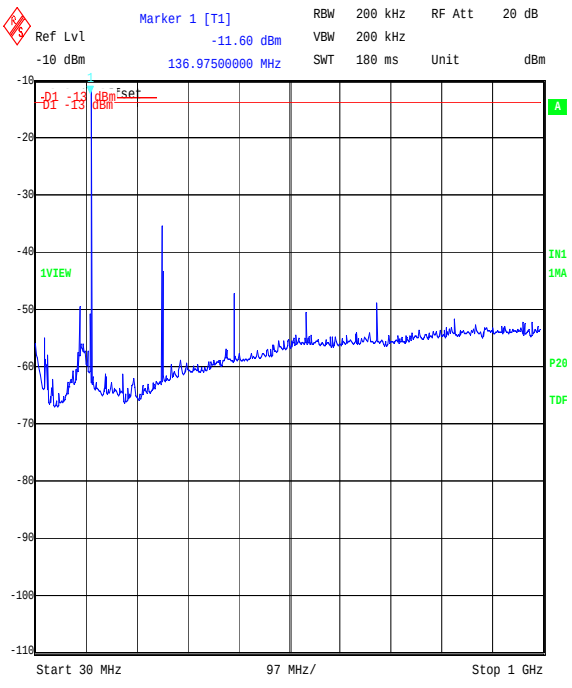

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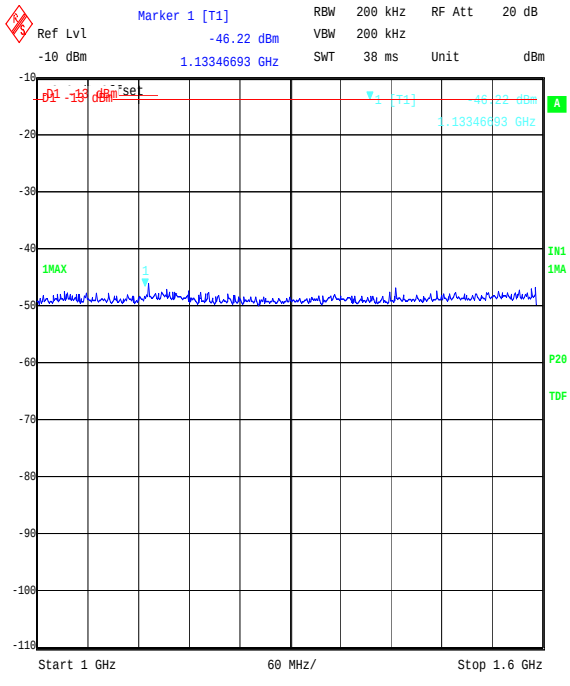
Date: 8.AUG.2006 13:11:46



Comment A: TX 136.975
Date: 8.AUG.2006 14:46:50

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
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7.2.6. Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139

The EUT was configured as for conducted antenna port emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum conducted emission levels.

Results: Bottom Channel

Highest Peak Level:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
48.349	-29.9	-13.0	16.9	Complied
113.495	-27.9	-13.0	14.9	Complied
236.000	-22.7	-13.0	9.7	Complied
354.000	-20.6	-13.0	7.6	Complied

Note(s):

1. Between 114 MHz and 119 MHz, no narrowband emissions were detected using a 3 kHz resolution bandwidth, therefore a further test using a reduced resolution bandwidth of 300 Hz was used in an attempt to identify emissions. No emissions were found using this reduced bandwidth and, consequently, no emissions were identified within at least 20 dB of the limit in the appropriate band.

2. All measurements were performed using a peak detector.

Test of: **Park Air Systems Ltd.**
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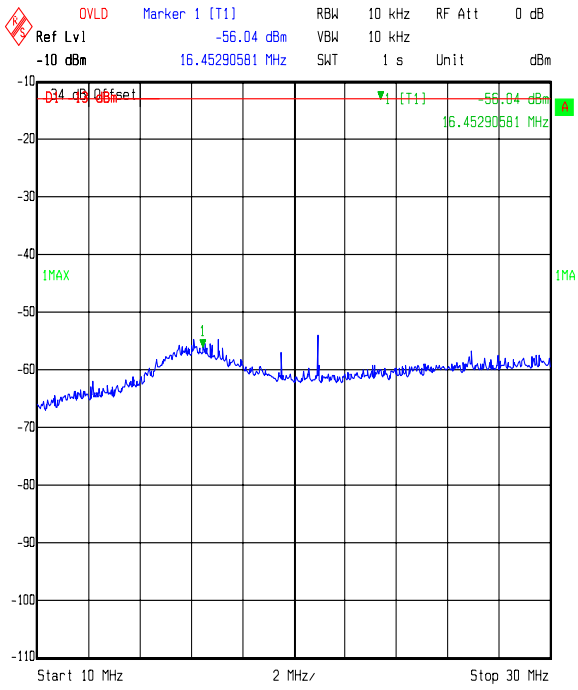
Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)



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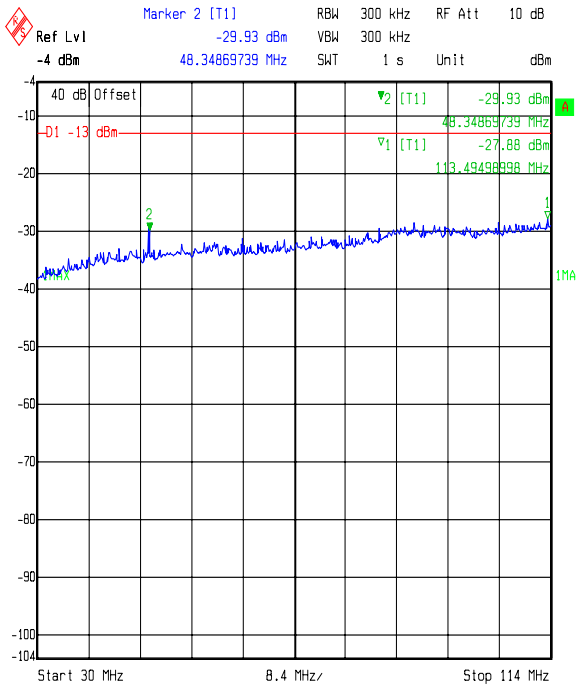

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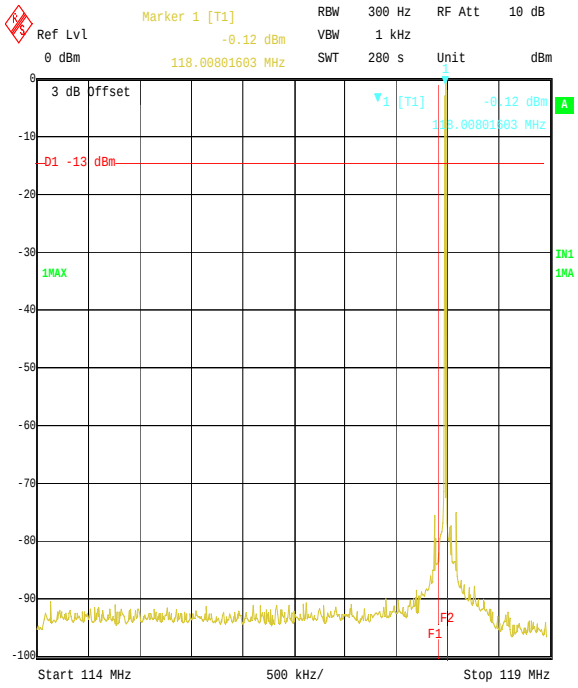

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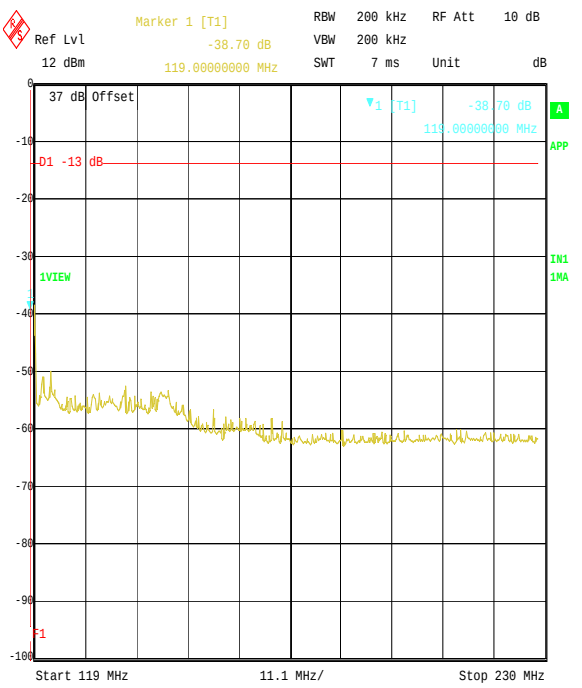

Comment A: TX 118
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Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
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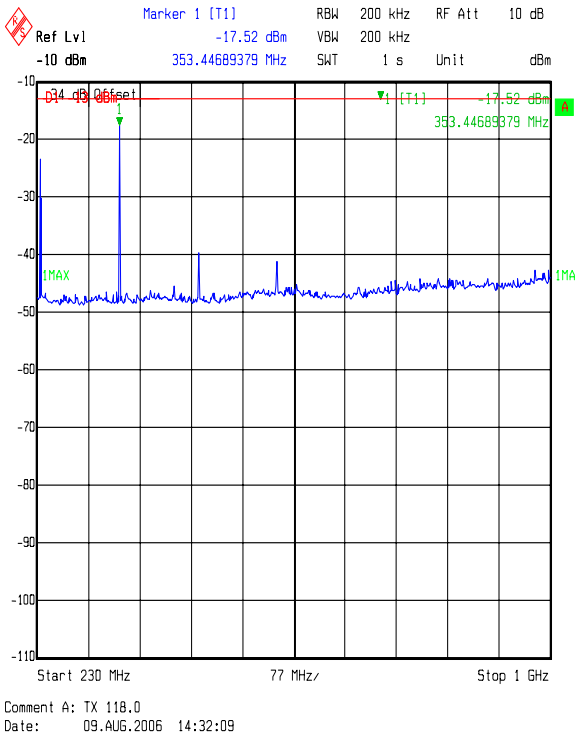
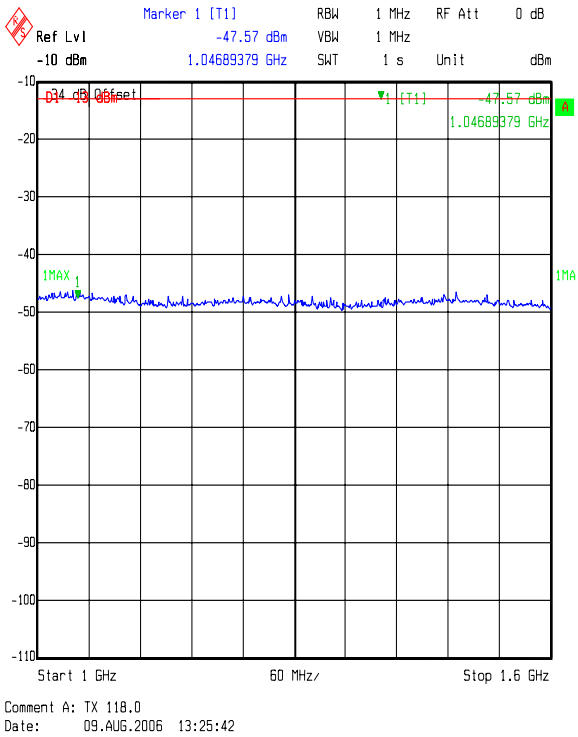
Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)





Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)

Results: Middle Channel

Highest Peak Level:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
125.692	-21.7	-13.0	8.7	Complied
255.000	-22.6	-13.0	9.6	Complied
382.500	-19.7	-13.0	6.7	Complied

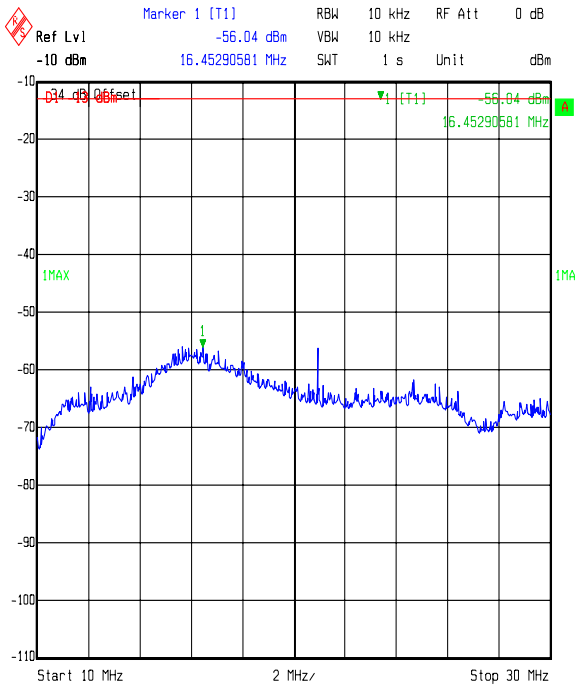
Note(s):

1. Between 126.1 MHz and 128.7625 MHz, no narrowband emissions were detected using a 3 kHz resolution bandwidth, therefore a further test using a reduced resolution bandwidth of 300 Hz was used in an attempt to identify emissions. No emissions were found using this reduced bandwidth and, consequently, no emissions were identified within at least 20 dB of the limit in the appropriate band.

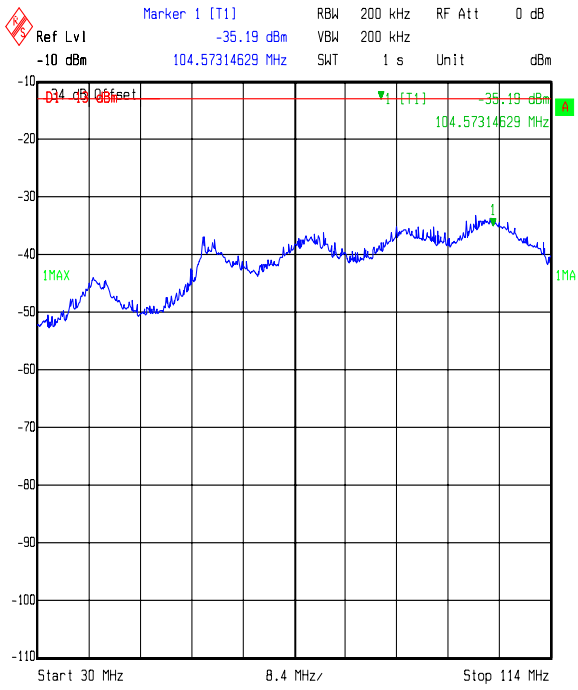
2. All measurements were performed using a peak detector.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

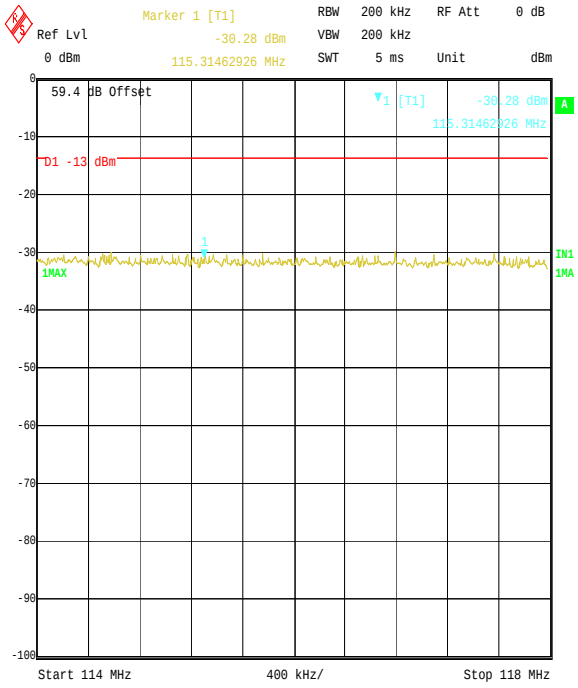
Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)



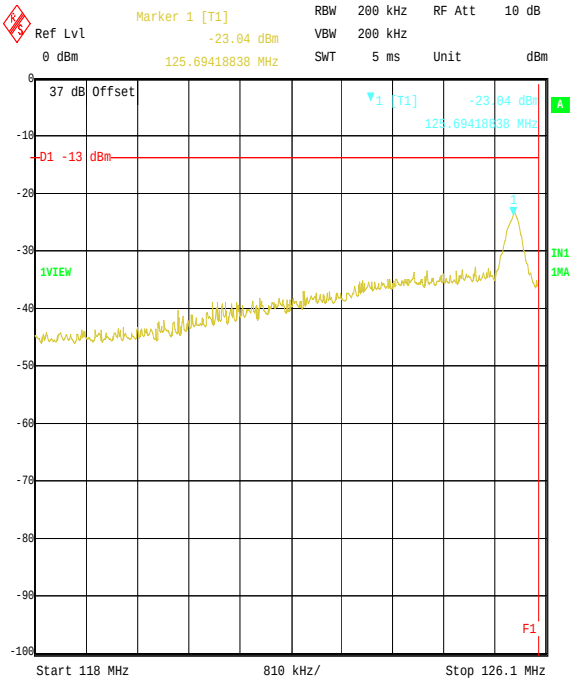
Comment A: TX 127.5
Date: 09.AUG.2006 14:03:28



Comment A: TX 127.5
Date: 09.AUG.2006 14:01:51



Comment A: TX 127.5
Date: 11.AUG.2006 13:01:54

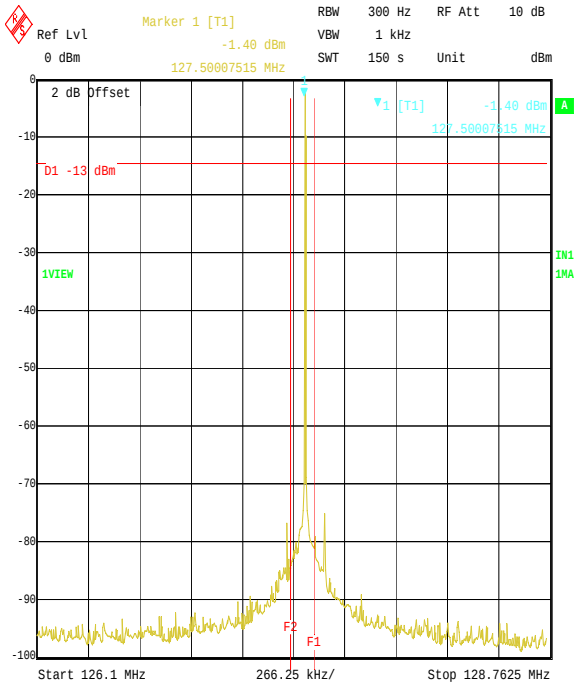


Comment A: TX 127.5
Date: 11.AUG.2006 11:48:21

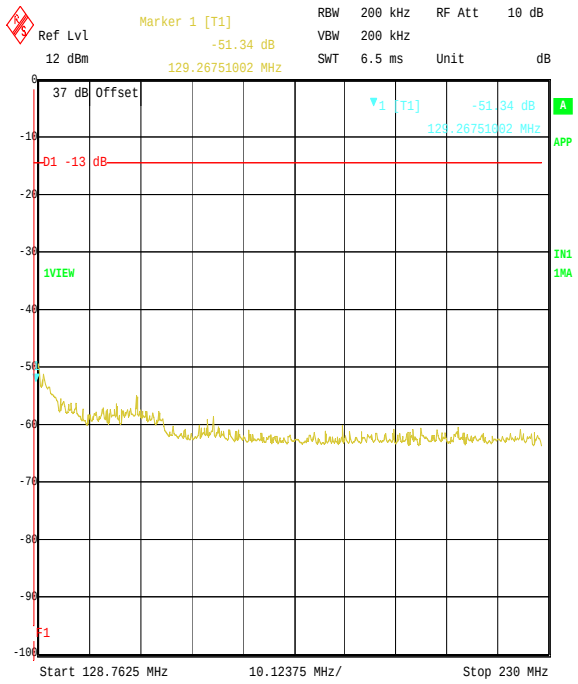
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

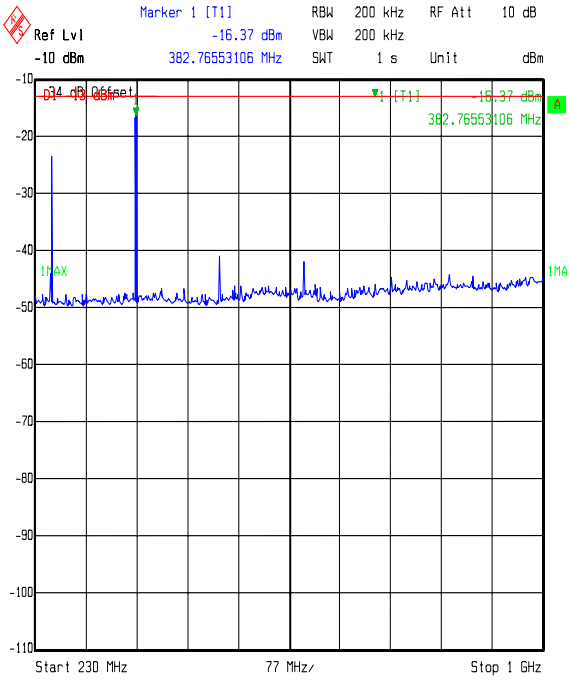
Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)



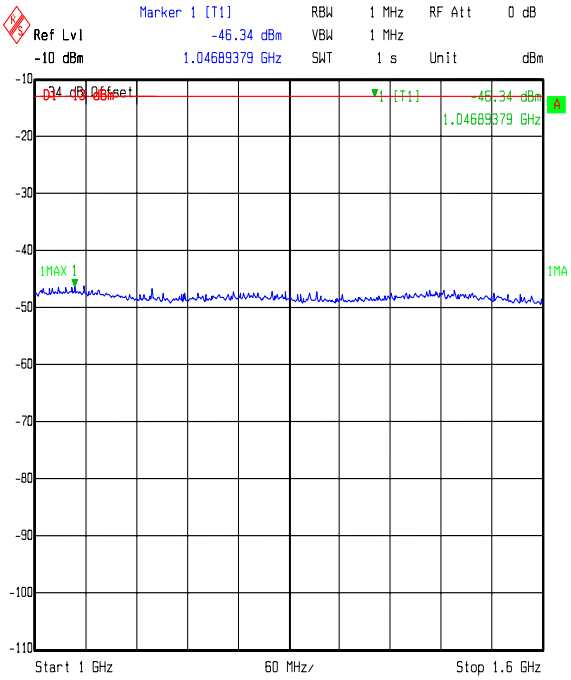
Comment A: TX 127.5
Date: 11.AUG.2006 12:27:25



Comment A: TX 127.5
Date: 11.AUG.2006 11:01:00



Comment A: TX 127.5
Date: 09.AUG.2006 14:33:03



Comment A: TX 127.5
Date: 09.AUG.2006 13:29:42

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)

Results: Top Channel

Highest Peak Level:

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
116.782	-25.1	-13.0	12.1	Complied
135.500	-27.4	-13.0	14.4	Complied
273.950	-22.3	-13.0	9.3	Complied
410.925	-19.9	-13.0	6.9	Complied

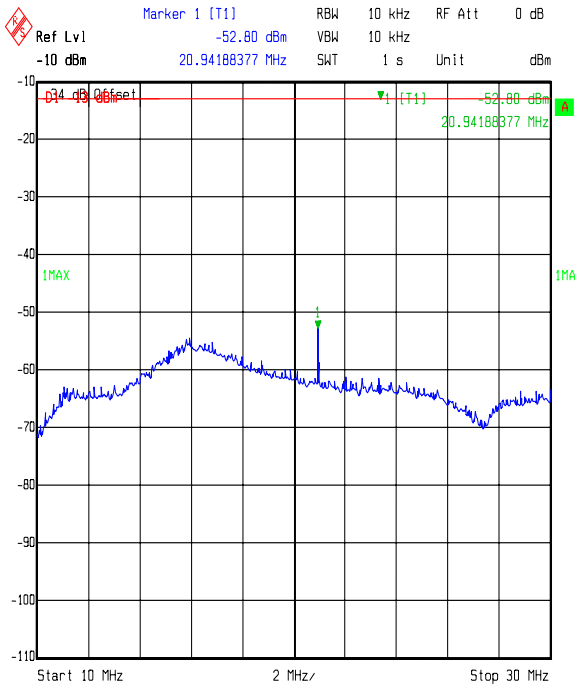
Note(s):

1. Between 135.6 MHz and 138.625 MHz, no narrowband emissions were detected using a 3 kHz resolution bandwidth, therefore a further test using a reduced resolution bandwidth of 300 Hz was used in an attempt to identify emissions. No emissions were found using this reduced bandwidth and, consequently, no emissions were identified within at least 20 dB of the limit in the appropriate band.

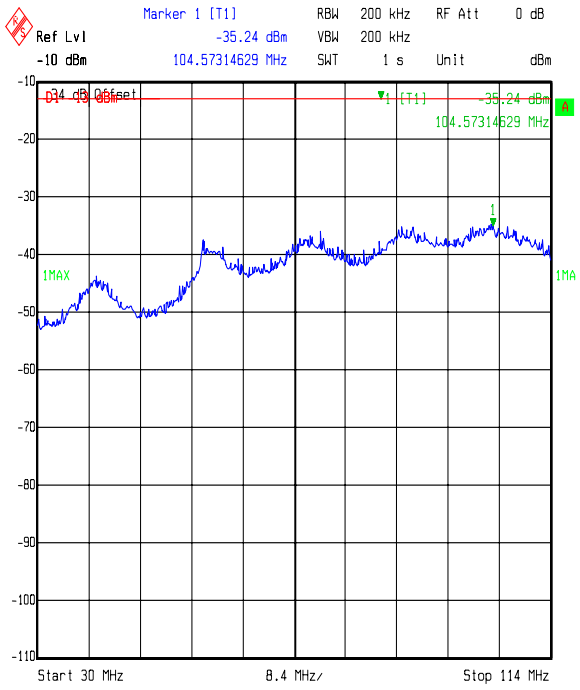
2. All measurements were performed using a peak detector.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

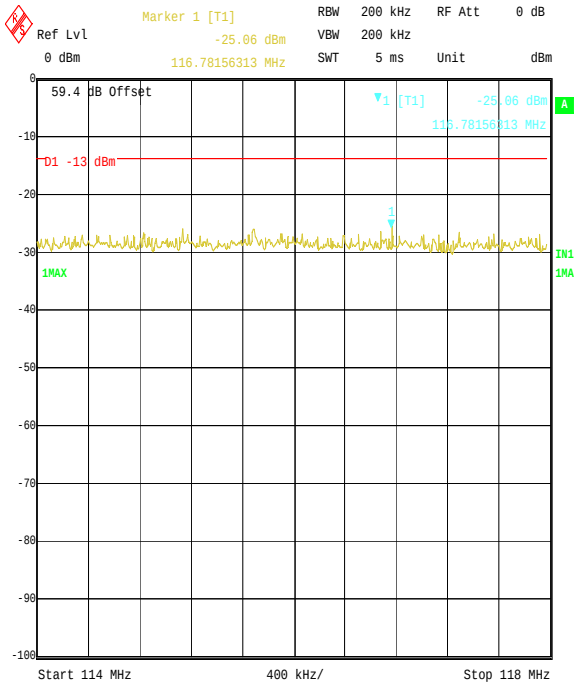
Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)



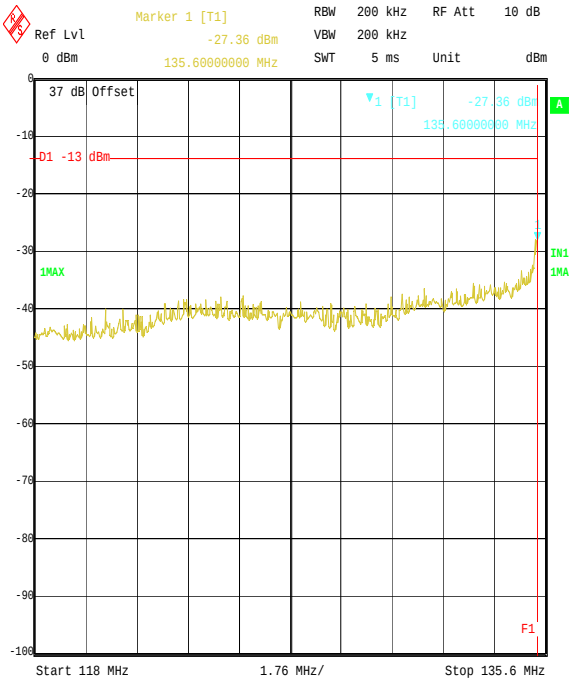
Comment A: TX 136.975
Date: 09.AUG.2006 13:57:59



Comment A: TX 136.975
Date: 09.AUG.2006 13:59:07



Comment A: TX 136.975
Date: 11.AUG.2006 12:47:50

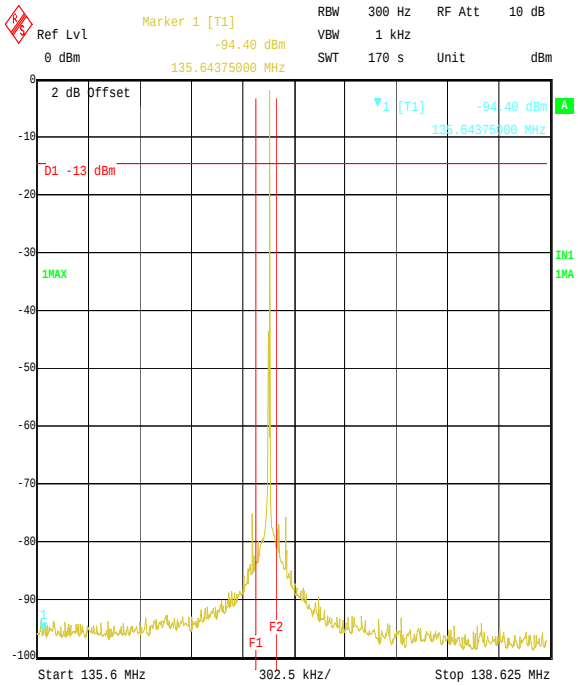


Comment A: TX 136.975
Date: 11.AUG.2006 11:37:19

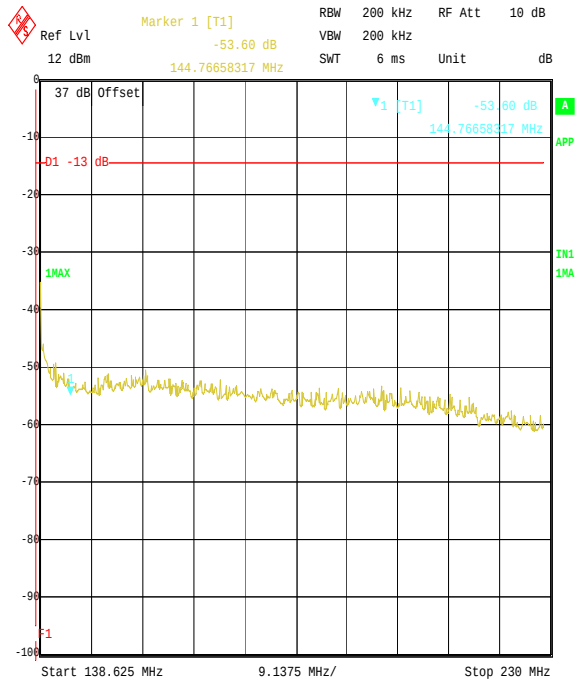
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

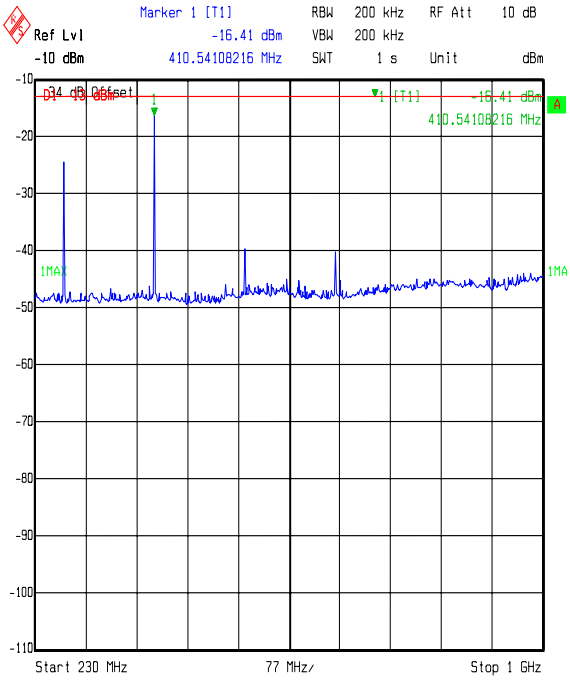
Transmitter Conducted Spurious Emissions: Sections 2.1051 and 87.139 (Continued)



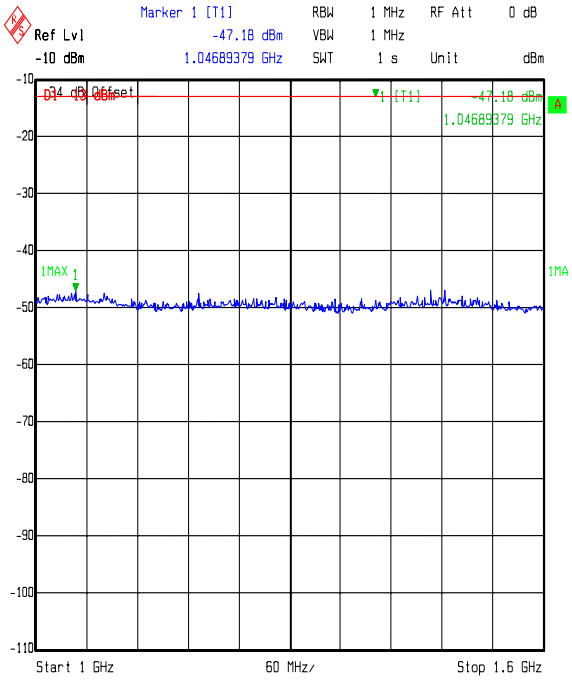
Comment A: TX 136.975
Date: 11.AUG.2006 12:37:32



Comment A: TX 136.975
Date: 11.AUG.2006 11:14:12



Comment A: TX 136.975
Date: 09.AUG.2006 14:34:30



Comment A: TX 136.975
Date: 09.AUG.2006 13:26:56

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

7.2.7. Transmitter Unwanted Emissions (to ±250% of Authorised Bandwidth) Sections 2.1051 & 87.139

The EUT was configured as for conducted antenna port emission measurements as described in section 9 of this report.

Tests were performed to identify the maximum conducted emission levels.

Results: Bottom, Middle and Top Channels

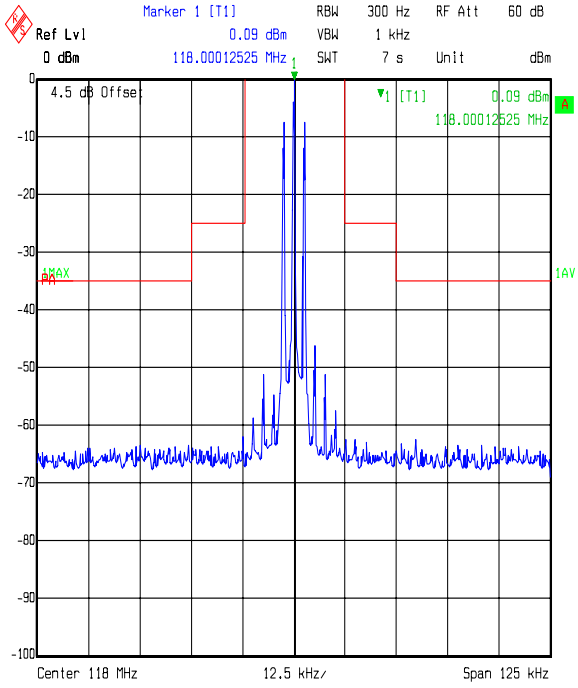
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
See Note Below				

Note(s):

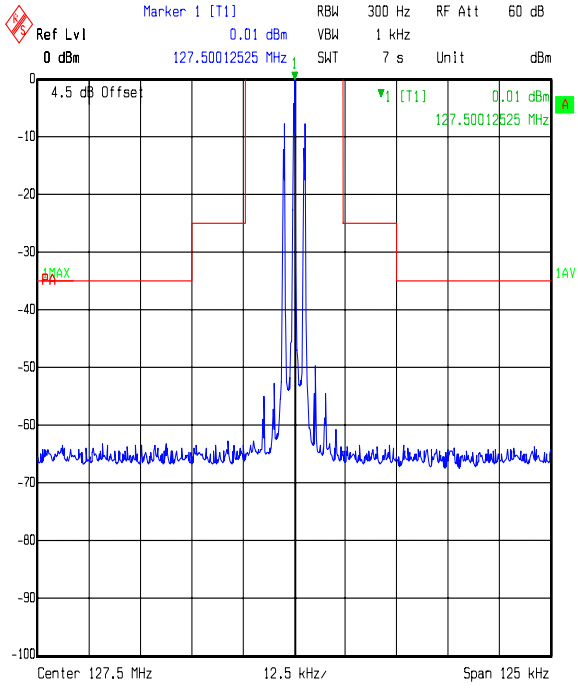
1. All emissions were at least 20 dB below the specified limit.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

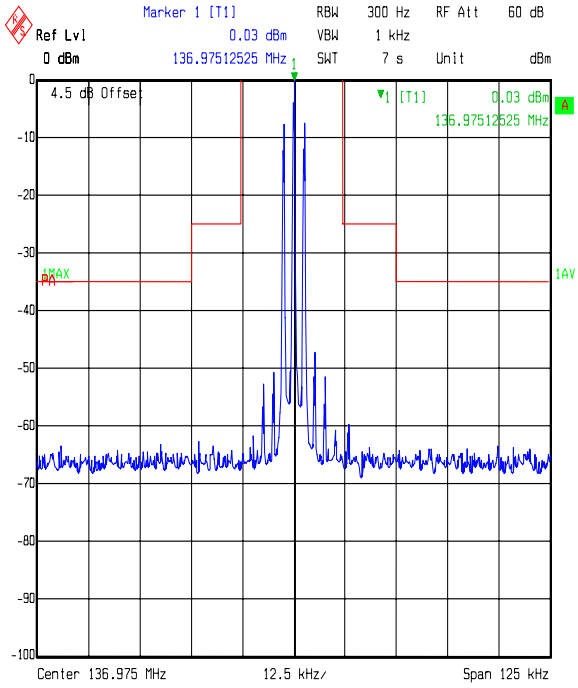
Transmitter Unwanted Emissions (to ±250% of Authorised Bandwidth) Sections 2.1051 & 87.139 (Continued)



Comment A: TX 118
Date: 09.AUG.2006 21:17:01



Comment A: TX 127.5
Date: 09.AUG.2006 21:22:19



Comment A: TX 136.975
Date: 09.AUG.2006 21:25:13

7.2.8. Transmitter Carrier Output Power: Sections 2.1046(a) and 87.131

The EUT was configured as for peak output power as described in section 9 of this report.

Tests were performed to identify the EUT's maximum conducted transmit power.

Results:

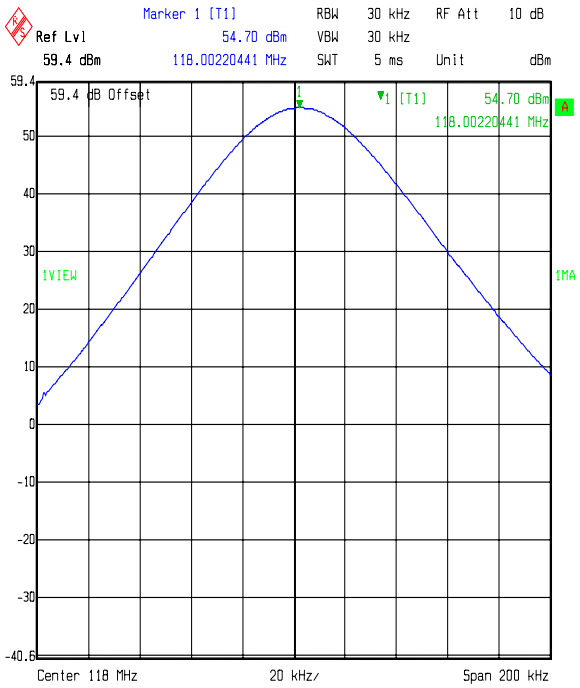
Channel	Frequency (MHz)	Conducted RF O/P Power (dBm)
Bottom	118.000	54.7
Middle	127.500	54.5
Top	136.975	54.5

Note(s):

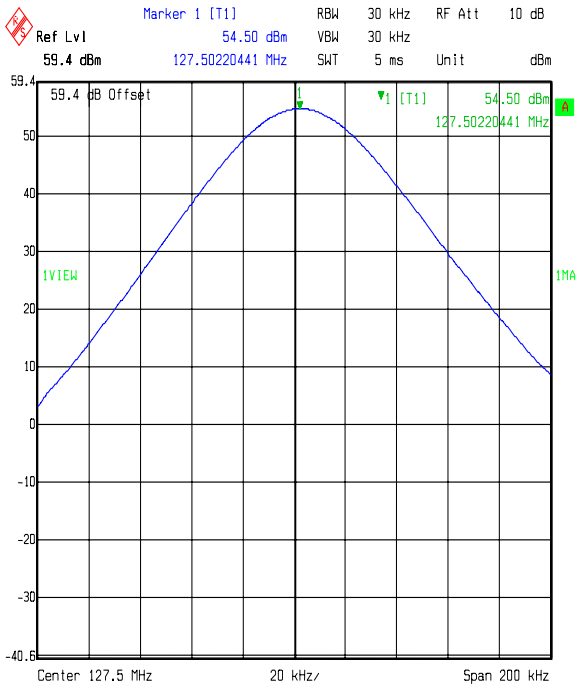
1. *The client has stated that the 200 Watt limit does not apply because the EUT operates as a 300 Watt system (54.8 dBm).*

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

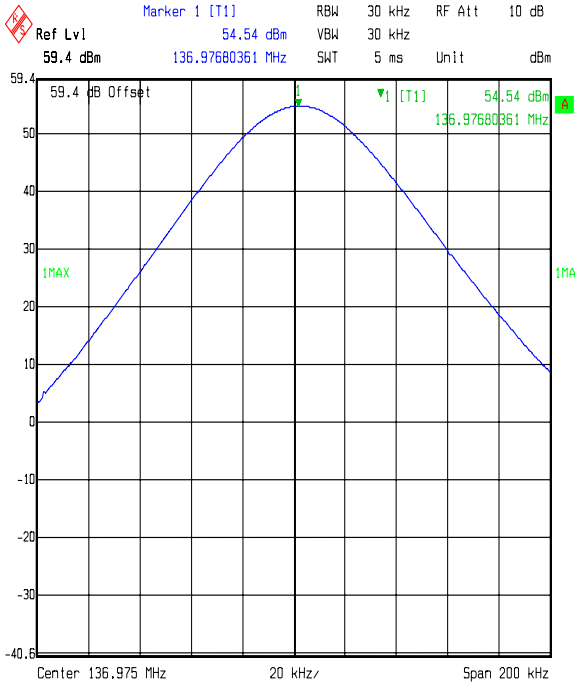
Transmitter Carrier Output Power: Sections 2.1046(a) and 87.131 (Continued)



Comment A: TX 118
Date: 09.AUG.2006 15:52:46



Comment A: TX 127.5
Date: 09.AUG.2006 15:54:47



Comment A: TX 136.975
Date: 09.AUG.2006 15:56:09

7.2.9. Transmitter 20 dB Bandwidth: Sections 2.1049 and 87.135/7

The EUT was configured as for 20 dB bandwidth as described in section 9 of this report.

Tests were performed to identify the 20 dB or 99% bandwidth.

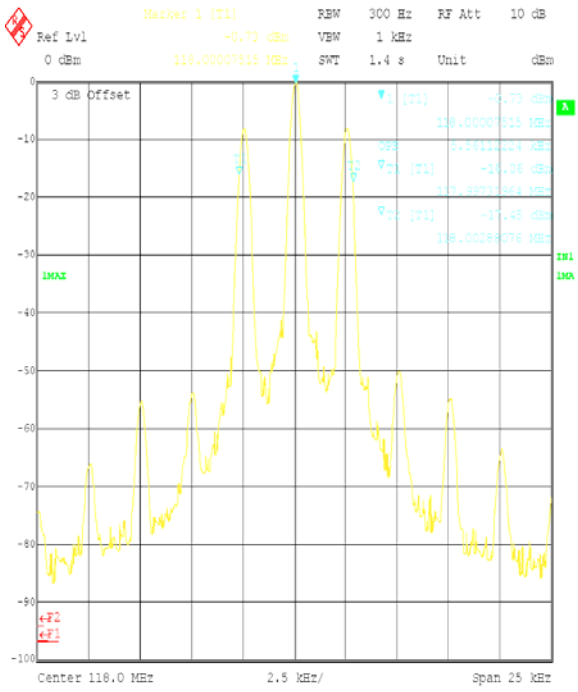
Results:

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)	Result
Bottom	118.000	5.56	25.0	Complied
Middle	127.500	5.56	25.0	Complied
Top	136.975	5.56	25.0	Complied

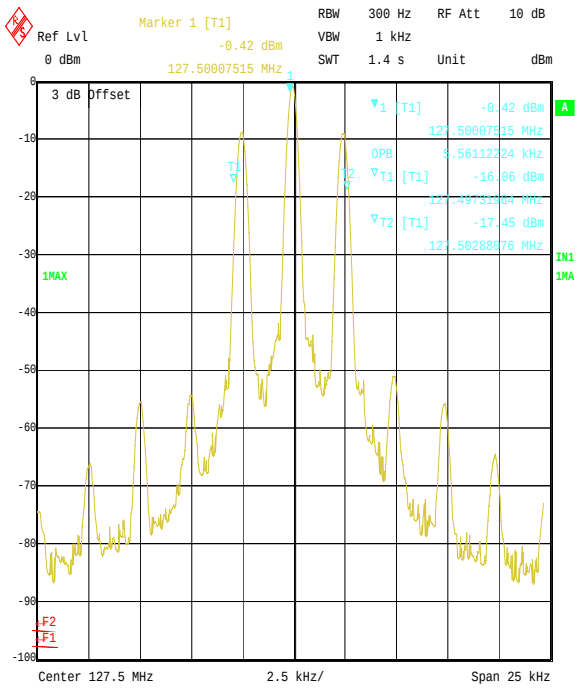
**The authorised bandwidth is the maximum occupied bandwidth to be used by a station, ergo also the limit*

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

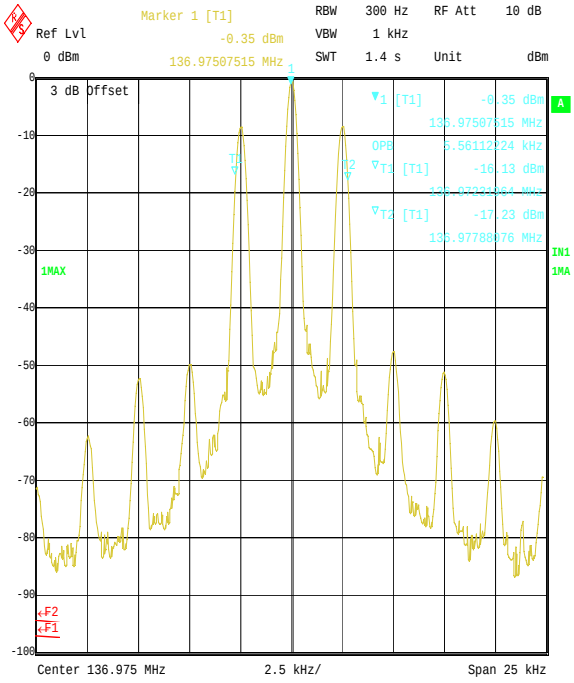
Transmitter 20 dB Bandwidth: Sections 2.1049 and 87.135/7 (Continued)



Comment A: TX 118.0
Date: 11.AUG.2006 13:30:03



Comment A: TX 127.5
Date: 11.AUG.2006 13:34:13



Comment A: TX 136.975
Date: 11.AUG.2006 13:37:49

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

7.2.10. Transmitter Frequency Stability (Temperature Variation): Sections 2.1055 and 87.133

The EUT was configured for frequency stability measurements, as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in ambient temperature.

Results: (AC Mode, temperature variation)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (Hz)	Limit (ppm)	Margin (Hz)	Margin (ppm)	Result
-30	20.950050	50	2.387	419	20	369	17.613	Complied
-20	20.950050	50	2.387	419	20	369	17.613	Complied
-10	20.950050	50	2.387	419	20	369	17.613	Complied
0	20.950050	50	2.387	419	20	369	17.613	Complied
10	20.950050	50	2.387	419	20	369	17.613	Complied
20	20.950050	50	2.387	419	20	369	17.613	Complied
30	20.950050	50	2.387	419	20	369	17.613	Complied
40	20.950050	50	2.387	419	20	369	17.613	Complied
50	20.950050	50	2.387	419	20	369	17.613	Complied

Note(s):

1. *Due to the physical size constraints of the EUT, the whole system could not be tested in the temperature chamber. As per FCC part 2.1055, Measurements Required for Frequency Stability, section b): "Only the portion or portions of the transmitter containing the frequency determining and stabilising circuitry need be subjected to the temperature variation test." The manufacturer's solution for this frequency accuracy test was by measurement of the 20.95 MHz reference oscillator. The justification statement from the manufacturer is:*
   "The frequency dependent stage is in the drive unit which was subjected to the test. The output frequency is directly synthesised from a 20.9500 MHz reference oscillator. Consequently the output frequency stability is the same as the reference stability. It was not possible to measure the output frequency directly, since with no amplifiers connected the drive unit assumes a fault state which inhibits the RF drive output."
   From this, we can determine that while the error in Hz will clearly be different at the transmit frequency, the error in ppm would remain the same.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

Transmitter Frequency Stability (Temperature Variation): Section: Sections 2.1055 and 87.133 (Continued)

Results: (DC Mode 28 V)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (Hz)	Limit (ppm)	Margin (Hz)	Margin (ppm)	Result
20	20.950050	50	2.387	419	20	369	17.613	Complied

Note(s):

1. *As declared and requested by the manufacturer, the power supply uses a regulator prior to frequency generation, therefore the frequency accuracy was measured at nominal temperature with a DC supply but the test for variation over temperature was not repeated for a DC supply.*

2. *Due to the physical size constraints of the EUT, the whole system was not tested in the temperature chamber. As per FCC part 2.1055, Measurements Required for Frequency Stability, section b): "Only the portion or portions of the transmitter containing the frequency determining and stabilising circuitry need be subjected to the temperature variation test." The manufacturer's solution for this frequency accuracy test was by measurement of the 20.95 MHz reference oscillator. The justification statement from the manufacturer is:*
   "The frequency dependent stage is in the drive unit which was subjected to the test. The output frequency is directly synthesised from a 20.9500 MHz reference oscillator. Consequently the output frequency stability is the same as the reference stability. It was not possible to measure the output frequency directly, since with no amplifiers connected the drive unit assumes a fault state which inhibits the RF drive output."
   From this, we can determine that while the error in Hz will clearly be different at the transmit frequency, the error in ppm would remain the same.
   Although the test in DC mode was not performed over temperature, the measurement was performed at the same frequency generation stage, for consistency and direct comparison of frequency error in ppm.

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

7.2.11. Transmitter Frequency Stability (Voltage Variation): Sections 2.1055 and 87.133

The EUT was configured for frequency stability measurements, as described in section 9 of this report.

Tests were performed to identify the maximum frequency error of the EUT with variations in nominal operating voltage.

Results: (AC Mode & DC Mode, voltage variation)

Supply Voltage (V)	Voltage	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (Hz)	Limit (ppm)	Margin (Hz)	Margin (ppm)	Result
102.0	AC	20.950050	50	2.387	419	20	369	17.613	Complied
120.0	AC	20.950050	50	2.387	419	20	369	17.613	Complied
138.0	AC	20.950050	50	2.387	419	20	369	17.613	Complied
23.8	DC	20.950050	50	2.387	419	20	369	17.613	Complied
28.0	DC	20.950050	50	2.387	419	20	369	17.613	Complied
32.2	DC	20.950050	50	2.387	419	20	369	17.613	Complied

Note(s):

1. *Due to the physical size constraints of the EUT, the whole system was not tested in the temperature chamber. As per FCC part 2.1055, Measurements Required for Frequency Stability, section b): "Only the portion or portions of the transmitter containing the frequency determining and stabilising circuitry need be subjected to the temperature variation test." The manufacturer's solution for this frequency accuracy test was by measurement of the 20.95 MHz reference oscillator. The justification statement from the manufacturer is:*
   "The frequency dependent stage is in the drive unit which was subjected to the test. The output frequency is directly synthesised from a 20.9500 MHz reference oscillator. Consequently the output frequency stability is the same as the reference stability. It was not possible to measure the output frequency directly, since with no amplifiers connected the drive unit assumes a fault state which inhibits the RF drive output."
   From this, we can determine that while the error in Hz will clearly be different at the transmit frequency, the error in ppm would remain the same.
   Although the tests at voltage variation were not performed over temperature, the measurement was performed at the same frequency generation stage, for consistency and direct comparison of frequency error in ppm.

7.2.12. Modulation Characteristics: 2.1047 (a & b) 87.141

The EUT was configured for modulation characteristics measurements, as described in section 9 of this report.

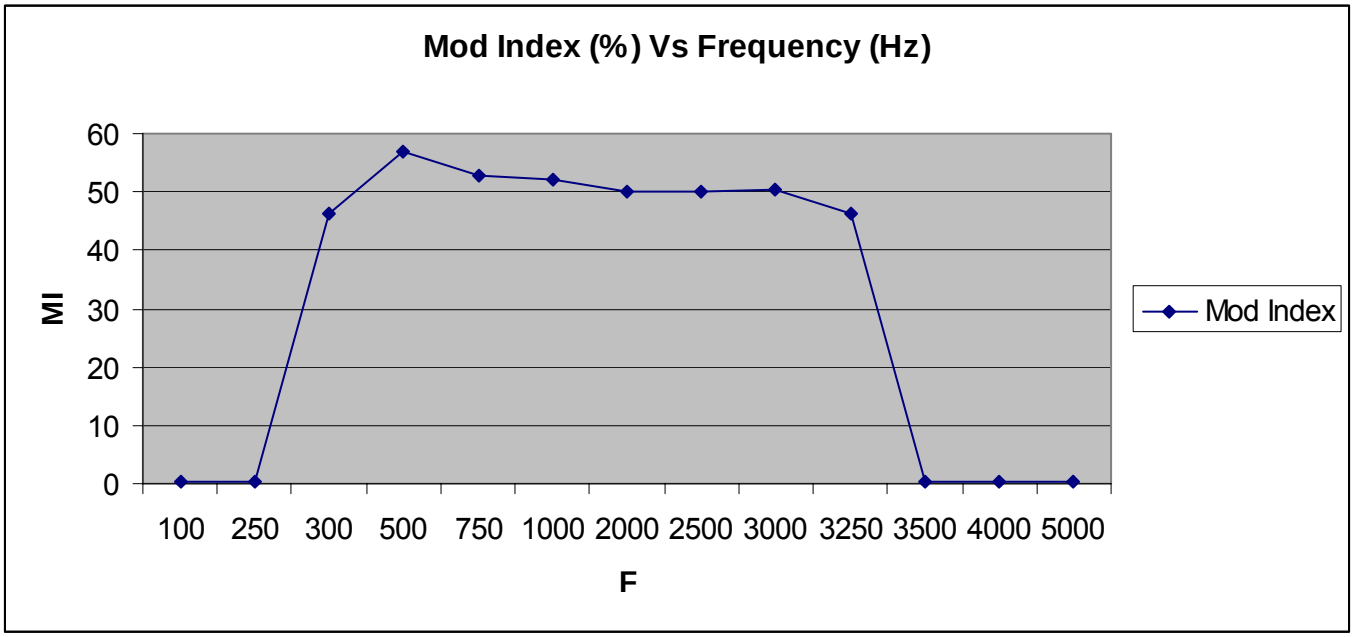
Tests were performed to identify the maximum modulation depth of the EUT with variations in nominal operating frequency.

Results: Middle Channel

Audio Frequency (Hz)	Test Signal Input level (dB)	Modulation Depth (%)	Limit (%)	Results
100	-24.2	0.24	100	Complied
250	-24.2	0.24	100	Complied
300	-24.2	46.42	100	Complied
500	-24.2	57.07	100	Complied
750	-24.2	52.92	100	Complied
1000	-24.2	52.21	100	Complied
2000	-24.2	50.02	100	Complied
2500	-24.2	50.00	100	Calibration Value
3000	-24.2	50.29	100	Complied
3250	-24.2	46.22	100	Complied
3500	-24.2	0.24	100	Complied
4000	-24.2	0.24	100	Complied
5000	-24.2	0.24	100	Complied

Test of: Park Air Systems Ltd.
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: FCC Part 87: 2005

Modulation Characteristics: 2.1047 (a & b) 87.141 (Continued)



Modulation Characteristics: 2.1047 (a & b) 87.141 (Continued)

Results: Middle Channel

Test Signal Input level (dB)	Test Audio Frequency (Hz)	Modulation Depth (%)	Limit (%)	Result
-50	3400	0.24	100	Complied
-40	3400	0.24	100	Complied
-30	3400	0.24	100	Complied
-24	3400	51.14	100	Complied
-22	3400	64.11	100	Complied
-20	3400	75.12	100	Complied
-15	3400	76.57	100	Complied
-10	3400	77.44	100	Complied
-5	3400	77.83	100	Complied
0	3400	78.14	100	Complied
5	3400	78.34	100	Complied
10	3400	78.34	100	Complied

Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

Modulation Characteristics: 2.1047 (a & b) 87.141 (Continued)

Test Signal Input level (dB)	Test Audio Frequency (Hz)	Modulation Depth (%)	Limit (%)	Result
-50	1000	0.24	100	Complied
-40	1000	0.24	100	Complied
-30	1000	0.24	100	Complied
-24	1000	54.01	100	Complied
-22	1000	68.10	100	Complied
-20	1000	80.12	100	Complied
-15	1000	81.57	100	Complied
-10	1000	80.82	100	Complied
-5	1000	74.33	100	Complied
0	1000	71.39	100	Complied
5	1000	70.37	100	Complied
10	1000	73.46	100	Complied

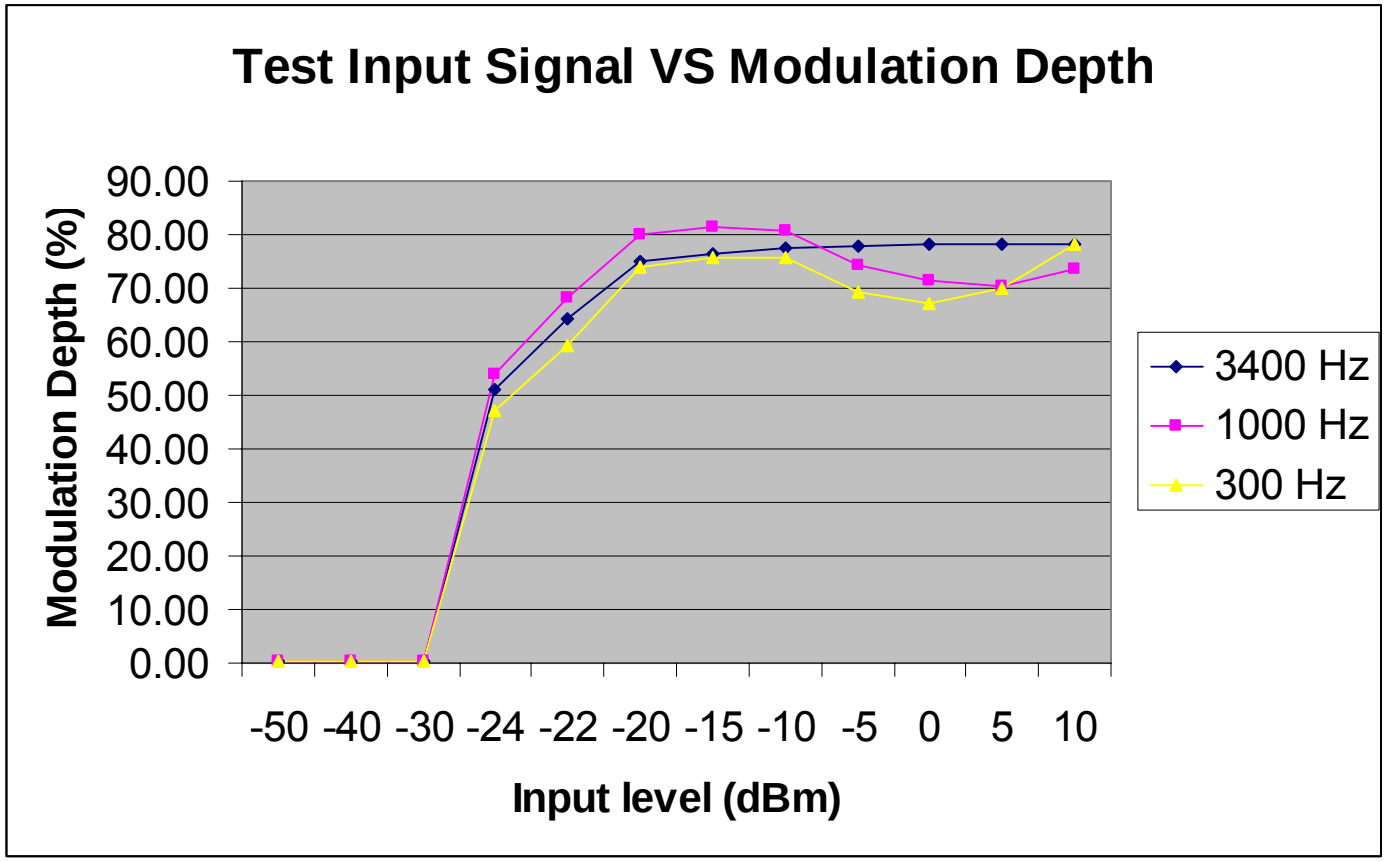
Test of: **Park Air Systems Ltd.**
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: **FCC Part 87: 2005**

Modulation Characteristics: 2.1047 (a & b) 87.141 (Continued)

Test Signal Input level (dB)	Test Audio Frequency (Hz)	Modulation Depth (%)	Limit (%)	Result
-50	300	0.24	100	Complied
-40	300	0.24	100	Complied
-30	300	0.24	100	Complied
-24	300	47.28	100	Complied
-22	300	59.37	100	Complied
-20	300	73.78	100	Complied
-15	300	75.77	100	Complied
-10	300	75.66	100	Complied
-5	300	69.24	100	Complied
0	300	67.05	100	Complied
5	300	69.94	100	Complied
10	300	78.24	100	Complied

Test of: Park Air Systems Ltd.
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: FCC Part 87: 2005

Modulation Characteristics: 2.1047 (a & b) 87.141 (Continued)



8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.72 dB
Carrier Output Power	10 MHz to 1 GHz	95%	±0.28 dB
Conducted Emissions	9 kHz to 40 GHz	95%	±0.46 dB
Frequency Stability	10 MHz to 1 GHz	95%	±11.4 ppm
Occupied Bandwidth	10 MHz to 1 GHz	95%	±11.4 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz to 26 GHz	95%	±2.94 dB
Modulation Characteristics	100 Hz to 6 kHz	95%	±2.83%

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

9. Measurement Methods

9.1. AC Mains Conducted Emissions

AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered, in this instance, with a 230V 50 Hz AC mains supplied via a Line Impedance Stabilisation Network (LISN). This was in agreement with the manufacturer, based on the industrial style power supplies of intended use.

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements
Detector Type:	Peak	Quasi-Peak (CISPR)/Average
Mode:	Max Hold	Not applicable
Bandwidth:	10 kHz*	9 kHz*
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

9.2. Radiated Emissions

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial pre-scans covering the entire measurement band from the lowest generated frequency declared up to the upper frequency detailed in Section 15.33(b) were performed within a screened chamber in order to identify frequencies on which the EUT was generating interference. This determined the frequencies from the EUT that required further examination. In order to minimise the time taken for the swept measurements, a peak detector was used in conjunction with the appropriate detector measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. A limit line was set to the specification limit. Levels within 20 dB of this limit were measured where possible. On occasion, the receiver noise floor came within the 20 dB boundary. On these occasions, the system noise floor may have been recorded.

An open area test site using the appropriate test distance and measuring receiver with a Quasi-Peak detector was used for measurements below 1000 MHz. For measurements above 1000 MHz, average and peak detectors were used.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 - 2001 Clause 5.4.

On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m in the horizontal polarisation. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT. The procedure was repeated for the vertical polarisation.

The final field strength was determined as the indicated level in dBμV plus cable loss and antenna factor.

Radiated Emissions (Continued)

The test equipment settings for radiated emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements Below 1 GHz	Final Measurements Above 1 GHz
Detector Type:	Peak	Quasi-Peak (CISPR)	Peak/Average
Mode:	Max Hold	Not applicable	Not applicable
Bandwidth:	(120 kHz < 1 GHz) (1 MHz > 1 GHz)	120 kHz	1 MHz
Amplitude Range:	100 dB	100 dB	100 dB
Step Size:	Continuous sweep	Not applicable	Not applicable
Sweep Time:	Coupled	Not applicable	Not applicable

9.3. Conducted Antenna Port Emissions

Conducted antenna port emissions measurements were performed in accordance with the standard against the appropriate limits.

Prior to testing being performed, suitable RF attenuators and cables were calibrated for the required frequency range. For each measurement range the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the losses in the measurement set up.

Initial measurements covering the entire measurement band in the form of swept scans were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which final measurements were necessary. To make the final measurements a peak detector was used in conjunction with the appropriate detector IF measuring bandwidth.

Repetitive scans were performed to allow for emissions with low repetition rates.

Scans were performed to the upper frequency limits as stated in FCC 15.33(a)(1)

9.4. Peak Output Power

Prior to testing being performed a suitable RF attenuator and cables were calibrated for the required frequencies. For each frequency to be measured, the calibrated level of the attenuator and cable were entered as an offset into a spectrum analyser to compensate for the measurement set up.

To determine the transmitter output power, the EUT was operated at maximum power and a result was obtained from the spectrum analyser using peak detector and trace Max Hold.

9.5. 20 dB Bandwidth

The audio input to the transmitter was connected to a CMS50 audio generator, with output frequency set to 2500 Hz. When keyed, the transmitter's modulation shall be monitored and the audio generator level shall be adjusted to produce 50% modulation.

The amplitude of the generator shall then be adjusted to 16 dB above the level that produced 50% modulation and the audio frequency reset back to 2.5 kHz.

The EUT and spectrum analyser was configured as for conducted antenna port measurements.

To determine the bandwidth, the spectrum analyser was configured with a resolution bandwidth and video bandwidth greater than 1% of the frequency span.

The analyser was set for a maximum hold scan to capture the profile of the signal. The peak point was noted and recorded.

The analyser function 'occupied bandwidth' was used to determine 99% of the channel bandwidth.

9.6. Frequency Stability - FCC Part 2.1055

The EUT was situated within an environmental test chamber and connected directly to the GSM test set via an access port.

Measurements were performed with the EUT operating under extremes of temperature in 10 degree increments, within the range -30 ºC to 50 ºC.

Measurements were also performed at voltage extremes between the declared nominal supply voltage and at the declared endpoint voltages (for hand carried battery operated equipment) or by varying the primary supply voltage from 85% to 115% of the nominal value for all other equipment types.

The requirement was to determine the frequency stability of the device under specified environmental operating conditions.

Measurements were made on the top and bottom channels.

The EUT was switched off for a minimum of 30 minutes between each stage of testing while the environmental chamber stabilised at the next temperature within the stated temperature range.

The frequency error measured was converted to an error in ppm using the following formula as defined by TIA_EIA_603A:-

$$\text{ppm error} = \left(\frac{MCF_{MHz}}{ACF_{MHz}} - 1\right) * 10^6$$

where MCF_{MHz} is the measured carrier frequency in MHz
ACF_{MHz} is the assigned carrier frequency in MHz

The measured ppm had to be less then the relevant limits in order to comply.

9.7. Modulation Characteristics

2.1047(a)

The input level is adjusted to give a modulation depth of 50% at 2.5 kHz. The audio frequency is then varied between 100 Hz and 5 kHz and the demodulated amplitude level is recorded and presented as a characteristic curve based on a 2.5 kHz 0 dB reference level.

2.1047(b)

The transmitter is set to its mid band channel and a test signal at 1 kHz is applied to the line input of the transmitter.

The audio input level is then adjusted from -50 dBm to +10 dBm and the variation in the depth of modulation is observed and recorded.

Tests were repeated for modulating frequencies of 300 Hz and 3.4 kHz

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A047	HP-470-5N High Pass Filter	Aerial Facilities Ltd	HP-470-5N	4015B	Cal before use	-
A063	20dB 20W Attenuator	Narda	MOD 768-20	A063	Cal before use	-
A259	Bilog Antenna	Chase EMC Ltd	CBL6111	1513	03 Mar 2006	12
A1069	ESH3-Z5	Rohde & Schwarz	ESH3-Z5	837469/012	31 Jan 2006	12
A1542	Tunable Bandpass Filter	K&L Microwave, Inc.	5BT-250/500-5-N/N	39 D.C. 9634	Cal before use	-
A1562	DLE 150	BOSCH	DLE 150	0 601 098 342	07 Oct 2005	12
A193	Aerial Low Pass Filter	Aerial Facilities	LP-110-4N	15821B	Cal before use	-
C1077	1m Rosenberger Cable	Rosenberger	FA210A10 10M5050	28462-2	Cal before use	-
C1164	1.5m N-type Cable	Rosenberger Micro-Coax	FA210A10 15007070	43188-1	Cal before use	-
C1166	2m N-Type Cable	Rosenberger Micro-Coax	FA210A10 20007070	43189-02	Cal before use	-
C160	Cables	Rosenberger	UFA210A-1-1181-70x70	None	Cal before use	-
C363	BNC Cable	Rosenberger	RG142	None	Cal before use	-
C393	Cable	RFI	None	None	Cal before use	-
C460	Cable	Rosenberger	UFA210A-1-1182-704704	98H0304	Cal before use	-
C571	C571-N-N-2	Rosenberger	UFA210A-1-788-50x50	97E0934	Cal before use	-
C574	C574-N-N-2	Rosenberger	UFA210A-1-788-50x50	97E0937	Cal before use	-
G011	SMGU Signal Generator	Rohde & Schwarz	SMGU	894 054/004	18 Jan 2005	24
L0816	Environmental Chamber	Unitemp	None Stated	None Stated	03 Oct 2005	12

Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
M1190	Temperature Meter	RS	212-124	None Stated	11 Feb 2006	12
M1242	FSEM30 Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	25 Aug 2005	12
M1263	ESIB7	Rohde & Schwarz	ESIB7	100265	12 Jan 2006	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	21 Feb 2006	12
M512	Radio Analyser	Rohde & Schwarz	CMS 50	827755/007	27 Feb 2006	12
S201	Site 1	RFI	1		12 Jul 2006	12
S202	Site 2	RFI	2	S202-15011990	N/A	N/A
S212	Site 12	RFI	12		N/A	N/A

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

Appendix 2. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\48505JD02\EMICON	Test configuration for measurement of conducted emissions.
DRG\48505JD02\EMIRAD	Test configuration for measurement of radiated emissions.

Test of: Park Air Systems Ltd.
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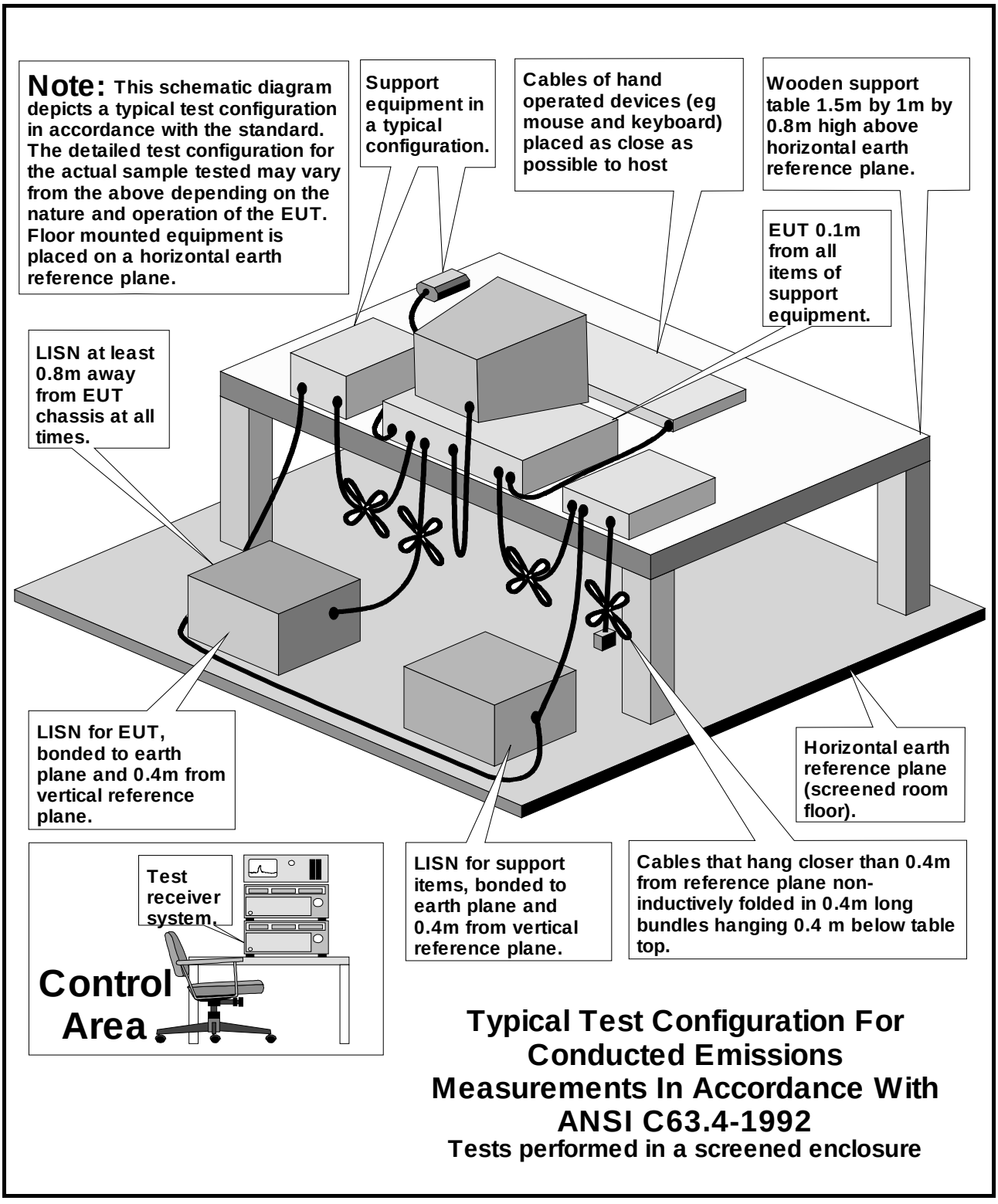
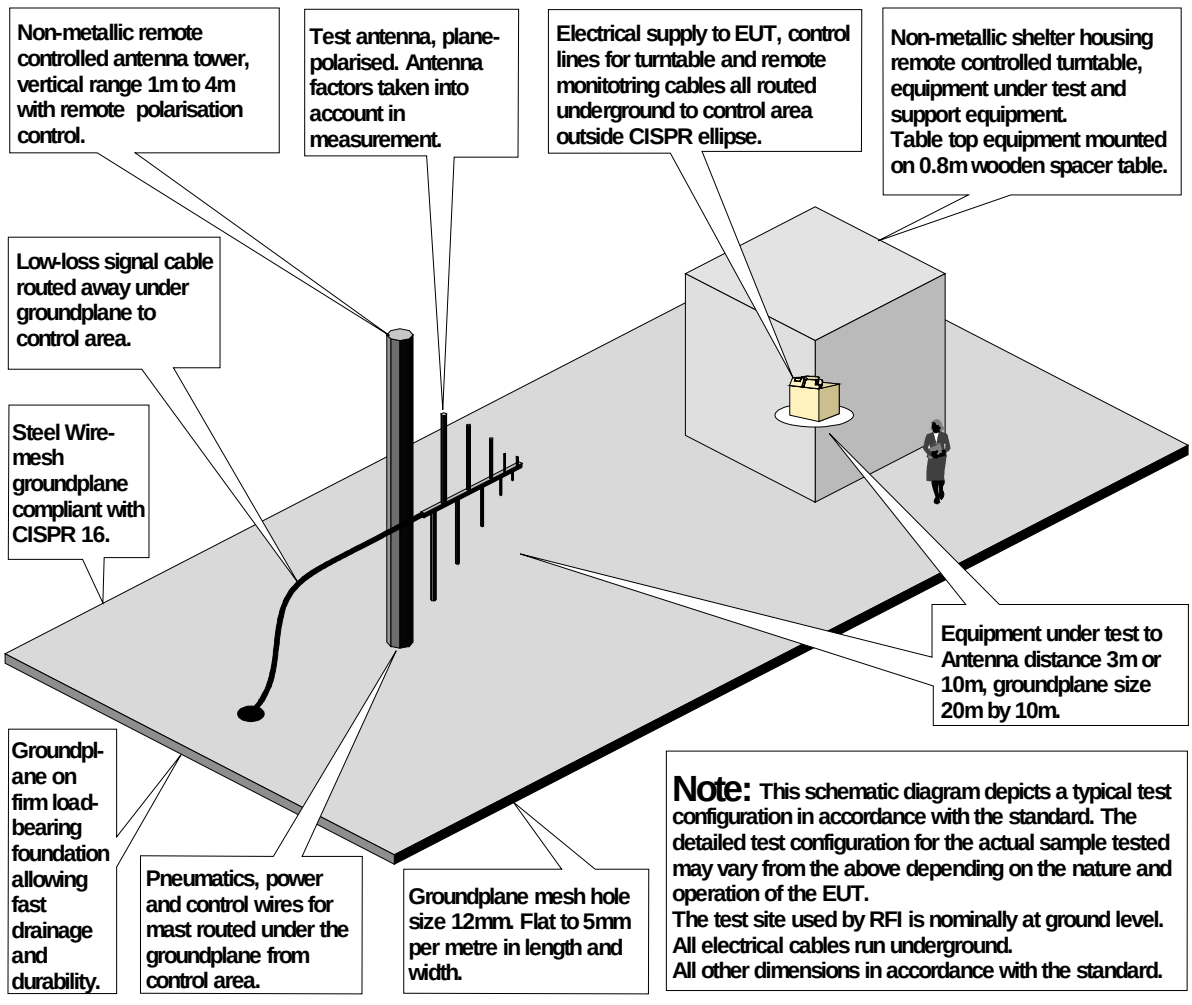
DRG\48505JD02\EMICON



Typical Test Configuration For Conducted Emissions Measurements In Accordance With ANSI C63.4-1992
Tests performed in a screened enclosure

Test of: Park Air Systems Ltd.
T6T HS 300
300 Watt VHF Gound to Air Transmitter
To: FCC Part 87: 2005

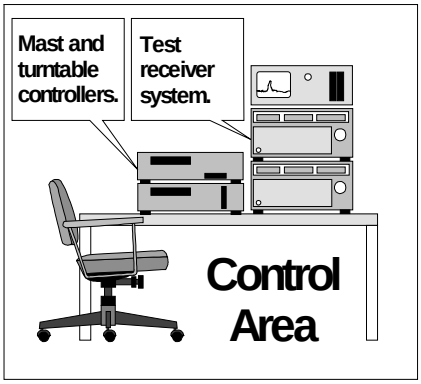
DRG\48505JD02\EMIRAD



Note: This schematic diagram depicts a typical test configuration in accordance with the standard. The detailed test configuration for the actual sample tested may vary from the above depending on the nature and operation of the EUT.
The test site used by RFI is nominally at ground level.
All electrical cables run underground.
All other dimensions in accordance with the standard.

Test Configuration For Radiated Emissions Measurements

Reflection-free area: >60m by 52m (CISPR ellipse)
Groundplane Earthed
Control room outside CISPR ellipse



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