REPORT ON

FCC CFR 47: Part 15 (Subparts B & C) and Part 87 Testing in support of an Application for Grant of Equipment Authorisation of a Park Air Systems T6T 100W VHF Transmitter

FCC ID: C8LB63100HS

Report No OR613878/01 Issue 2 **July 2005**

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Report No OR613878/01 Issue 2

July 2005

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DATED 4th July 2005

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Park Air Systems Limited	Copy 1
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ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Parts 87 & 15 Subparts B & C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

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UKAS TESTING 0141 Group

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SECTION 1

REPORT SUMMARY

FCC CFR 47: Parts 15 Subparts B & C and Part 87 Testing in support of an Application for Grant of Equipment Authorisation of a Park Air Systems T6T 100W VHF Transmitter

1.1 STATUS

EQUIPMENT UNDER TEST	Park Air Systems T6R VHF Transmitter
OBJECTIVE	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
NAME AND ADDRESS OF CLIENT	Park Air Systems Limited Northfields Ind Estate Market Deeping Peterborough PE6 8UE United Kingdom
TYPE / MODEL NUMBER	T6T HS 100
SERIAL NUMBER	2K5008
DECLARED VARIANTS	None
TEST SPECIFICATION / ISSUE / DATE	FCC CFR 47; Part 15, Subparts B & C: 2003 FCC CFR 47; Part 87: 2004
NUMBER OF ITEMS TESTED	One
SECURITY CLASSIFICATION OF EUT	Commercial In Confidence
INCOMING RELEASE DATE	Declaration of Build Status 22 February 2005
DISPOSAL REFERENCE NUMBER DATE	Packing Note OR613878-01 7 March 2005
ORDER NUMBER DATE	BPE14519 Ref Allan Horsfield 23 February 2005
START OF TEST	28 February 2005
FINISH OF TEST	22 June 2005
RELATED DOCUMENTS	ANSI C63.4: 2001. Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. FCC Part 2.1053: 2003

1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the Park Air Systems T6T 100W VHF Transmitter to the requirements of FCC Specification Parts 15 (Subparts B & C) and Part 87.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of Park Air Systems.

This report is a re-issue of the original test report and replaces report number OR613878-01 Issue 1, dated May 2005. The re-issued report is to include new tests for occupied bandwidth and some typographical errors that were made in the original report.

1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out is shown below.

Test	Spec Clause	Test Description	Result	Comments
2.1	Part 15.209	Spurious Radiated Emissions	Pass	
2.2	Part 15.207	Conducted Emissions on Power Lines	Pass	
2.3	Part 87.139(a)	Spurious Radiated Emissions	Pass	
2.4	Section 2.1049 / Parts 87.135 & 87.137	Bandwidths	Pass	
2.5	Section 2.1047/ Part 87.141	Modulation Characteristics	Pass	
2.6	Part 87.133	Frequency Stability	Pass	
2.7	Part 87.131	Transmitter Output Power	Pass	
2.8	Part 87.139 (a)	Transmitter Unwanted Emissions	Pass	

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a T6T 100W VHF Ground to Air Transmitter. A full technical description can be found in the T6T Transmitter User Guide.

1.4.2 Modes of Operation

Modes of operation of the EUT during testing were as follows:

Mode 1: Transmit Mode

The EUT operates between 118.00MHz – 136.975MHz, and for all testing was set to continuous Transmit mode, on the bottom, middle and top channels in turn.

Bottom Channel:	118.00MHz
Middle Channel:	127.50MHz
Top Channel:	136.975MHz

The EUT was modulated by a 2.5kHz, 135mV source from a HP 8903B Audio Analyser. (Audio Analyser placed outside of the test area)

Mode 2: Idle Mode

The EUT operates between 118.00MHz – 136.975MHz, and for all testing was operated in an idle state, the middle channel of 127.5MHz was set, but was not transmitting.

A 50ohm Termination was connected to the EUT's Antenna Port.

1.5 TEST CONDITIONS

The EUT was set-up simulating a typical user installation on the Alternative Open Field Test Site identified in Appendix A and tested in accordance with the applicable specification.

The EUT was operated powered by a 120V, 60Hz ac mains supply.

The EUT's alternative DC input supply cable was connected but was left un-terminated.

The EUT's Antenna Port was connected to a dummy load during Transmit Mode.

1.6 DEVIATIONS FROM THE STANDARD

Not Applicable

1.7 MODIFICATION RECORD

Not Applicable

1.8 ALTERNATIVE TEST SITE

No alternative Test Site was utilised.

All testing was performed at TUV PS, Segensworth Road, Fareham, Hants PO15 5RH.

SECTION 2

TEST DETAILS

FCC CFR 47: Parts 15 Subparts B & C and Part 87 Testing in support of an Application for Grant of Equipment Authorisation of a Park Air Systems T6T 100W VHF Transmitter

2.1 SPURIOUS RADIATED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47: Part 15 Subpart B, Section 15.209

2.1.2 Equipment Under Test

Park Air Electronics T6T 100W VHF Transmitter

2.1.3 Date of Test

1 March 2005

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.1” within the Test Equipment Used table shown in Section 3.1.

2.1.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector (120kHz Detector Bandwidth).

Emissions identified within the range 1GHz – 1.4GHz were then formally measured using a Peak detector, to measure the Peak and Average values.

The Peak measurement was made with the Measuring system’s Resolution and Video Bandwidth both set to 1MHz.

The Average measurement was made with the Measuring system’s Resolution Bandwidth set to 1MHz and the Video Bandwidth set to 10Hz.

The measurements were performed at a 3m distance unless otherwise stated.

2.1 SPURIOUS RADIATED EMISSIONS - continued

2.1.6 Test Results

Equipment Designation: Unintentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.209 for Spurious Radiated Emissions (30MHz – 1.4GHz).

Measurements were made with the EUT in Mode 2: Idle Mode.

30MHz – 1.4GHz Range

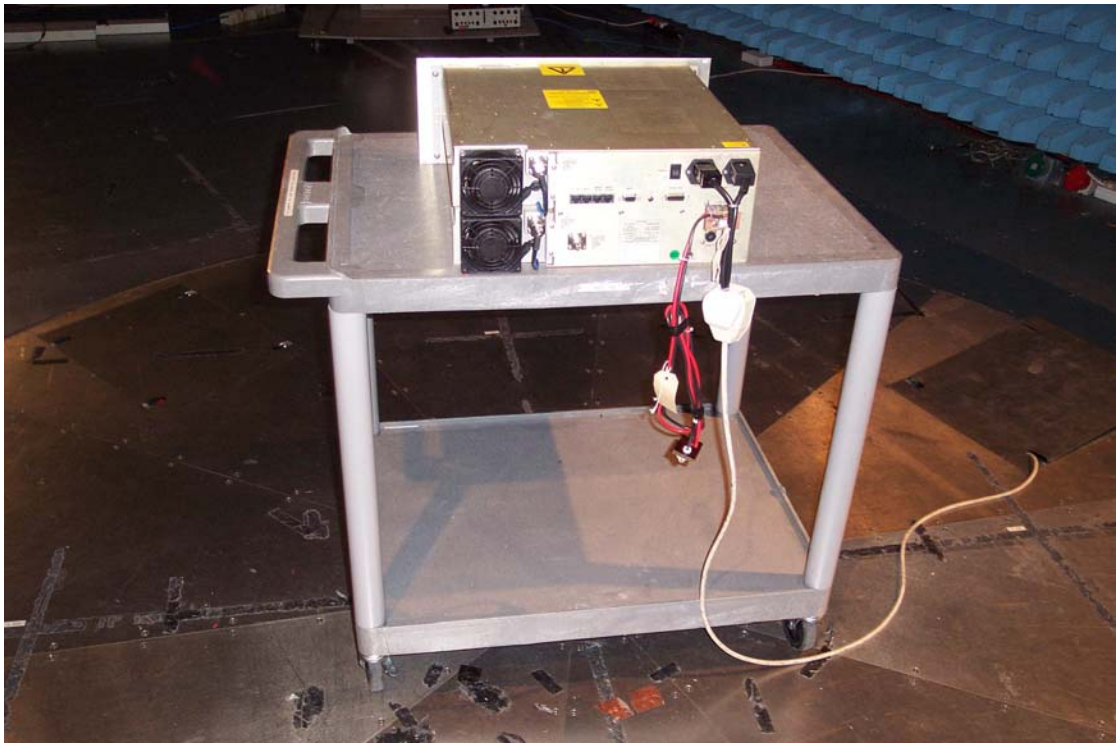
The levels of the six highest emissions measured in accordance with the specification are presented below: -

Emission Frequency	Polarity	Height	Azimuth	Field Strength at 3m		Specification Limit	
MHz		cm	degrees	dBµV/m	µV/m	dBµV/m	µV/m
60.17	Vertical	100	000	9.1	2.9	40.0	100
81.99	Vertical	100	000	7.3	2.3	40.0	100
82.88	Vertical	100	000	5.0	1.8	40.0	100
163.6	Vertical	100	000	7.8	2.5	43.5	150
497.8*	Vertical	100	000	16.6	6.8	46.0	200
937.5*	Vertical	100	000	22.2	12.9	46.0	200

Note: The emissions marked * were System Noise Floor measurements, provided due to lack of EUT emissions.

2.1 SPURIOUS RADIATED EMISSIONS - continued

2.1.7 Test Set Up Photographs



2.2 CONDUCTED EMISSIONS ON POWER LINES

2.2.1 Specification Reference

FCC CFR 47: Part 15 Subpart B, Section 15.207

2.2.2 Equipment Under Test

Park Air Electronics T6T 100W VHF Transmitter

2.2.3 Date of Test

1 March 2005

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.2” within the Test Equipment Used table shown in Section 3.1.

2.2.5 Test Procedure

Test performed in accordance with ANSI C63.4.

Conducted Emission Measurements were undertaken within the semi-anechoic chamber. Emissions were measured on the Live and Neutral Lines in turn.

Emissions were formally measured using a Quasi-Peak and Average Detectors, which meet the CISPR requirements. The details of the worst-case emissions for the Live and Neutral Lines are presented in the tables in Section 2.2.6.

The EUT was supplied from a 120V, 60Hz supply.

2.2 CONDUCTED EMISSIONS ON POWER LINES - continued

2.2.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

Live Line Measurements were made with the EUT in Mode 1.

Bottom Channel Tx: 118.00MHz

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1539	37.8	65.8	36.0	55.8
0.1796	39.8	64.5	37.3	54.5
0.1952	48.2	63.8	43.6	53.8
0.2143	40.7	63.0	36.3	53.0
0.2364	23.6	62.2	23.1	52.2
0.2924	20.9	60.5	17.5	50.5

The margin between the specification requirements and all other emissions were 39.6dB or more below the specified Quasi-Peak limit and 32.9dB or more below the Average limit.

Neutral Line Measurements were made with the EUT in Mode 1.

Bottom Channel Tx: 118.00MHz

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1529	38.0	65.8	35.5	55.8
0.1786	43.5	64.5	41.7	54.5
0.1948	46.4	63.8	41.2	53.8
0.2142	42.4	63.0	37.6	53.0
0.2929	23.8	60.4	19.9	50.4
0.3214	16.6	59.7	13.4	69.7

The margin between the specification requirements and all other emissions were 43dB or more below the specified Quasi-Peak limit and 36.3dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER LINES - continued

2.2.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

Live Line Measurements were made with the EUT in Mode 1.

Middle Channel Tx: 127.50MHz

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1547	38.3	65.7	36.6	55.7
0.1842	38.4	64.3	37.3	54.3
0.1953	47.9	63.8	43.5	53.8
0.2145	40.2	63.0	35.8	53.0
0.2368	24.2	62.2	23.7	52.2
0.2925	20.5	60.4	17.4	50.4

The margin between the specification requirements and all other emissions were 40dB or more below the specified Quasi-Peak limit and 33dB or more below the Average limit.

Neutral Line Measurements were made with the EUT in Mode 1.

Middle Channel Tx: 127.50MHz

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1545	38.0	65.7	36.1	55.7
0.1842	38.7	64.3	37.3	54.3
0.1951	45.8	63.8	40.6	53.8
0.2141	42.6	63.0	37.8	53.0
0.2927	23.9	60.4	20.1	50.4
0.3215	17.6	59.7	14.0	49.7

The margin between the specification requirements and all other emissions were 42dB or more below the specified Quasi-Peak limit and 35.7dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER LINES - continued

2.2.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

Live Line Measurements were made with the EUT in Mode 1.

Top Channel Tx: 136.975MHz

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1538	37.8	65.8	36.1	55.8
0.1836	37.3	64.3	35.9	54.3
0.1949	48.3	63.8	43.7	53.8
0.2143	40.8	63.0	36.4	53.0
0.2366	23.6	62.2	23.0	52.2
0.2924	21.0	60.5	17.6	50.5

The margin between the specification requirements and all other emissions were 39.5dB or more below the specified Quasi-Peak limit and 32.8dB or more below the Average limit.

Neutral Line Measurements were made with the EUT in Mode 1.

Top Channel Tx: 136.975MHz

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1540	38.4	65.8	36.2	55.8
0.1836	39.2	64.3	37.6	54.3
0.1950	46.4	63.8	41.1	53.8
0.2146	42.6	63.0	37.8	53.0
0.2928	23.9	60.4	20.2	50.4
0.3216	17.4	59.7	13.9	49.7

The margin between the specification requirements and all other emissions were 42.2dB or more below the specified Quasi-Peak limit and 35.8dB or more below the Average limit.

2.2 CONDUCTED EMISSIONS ON POWER LINES - continued

2.2.7 **Set Up Photograph –** continued

Conducted Emissions Set Up Photograph

2.3 SPURIOUS RADIATED EMISSIONS

2.3.1 Specification Reference

FCC CFR 47: Part 87.139

2.3.2 Equipment Under Test

Park Air Electronics T6T 100W VHF Transmitter

2.3.3 Date of Test

28 February 2005

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.3” within the Test Equipment Used table shown in Section 3.1.

2.3.5 Test Procedure

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1.4GHz were then formally measured using a Peak detector (120kHz Detector Bandwidth).

The emissions were then substituted and the ERP result compared against an ERP limit of -13dBm.

The measurements and all substitutions were performed at a 3m distance. The height of the substitution antenna was fixed at 150cm.

Note: in the range 300MHz - 1.4GHz, a 300MHz High Pass Filter was placed into the Measurement System.

2.3 SPURIOUS RADIATED EMISSIONS - continued

2.3.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 87.139 for Spurious Radiated Emissions (30MHz – 1.4GHz).

Measurements with the EUT in Mode 1.

The levels of the highest emissions measured in accordance with the specification are presented below: -

Bottom Channel Tx: 118.00MHz

Emission Frequency	Polarity	Height	Azimuth	Raw Peak	ERP Final	Specification Limit
MHz		cm	Degrees	dBm	dBm	dBm
236.00	V	100	137	-75.76	-57.44	-13.0
290.298	H	170	191	-80.66	-61.88	-13.0
354.004	H	100	332	-73.95	-63.52	-13.0
362.879	H	100	122	-83.37	-53.11	-13.0

Middle Channel Tx: 127.50MHz

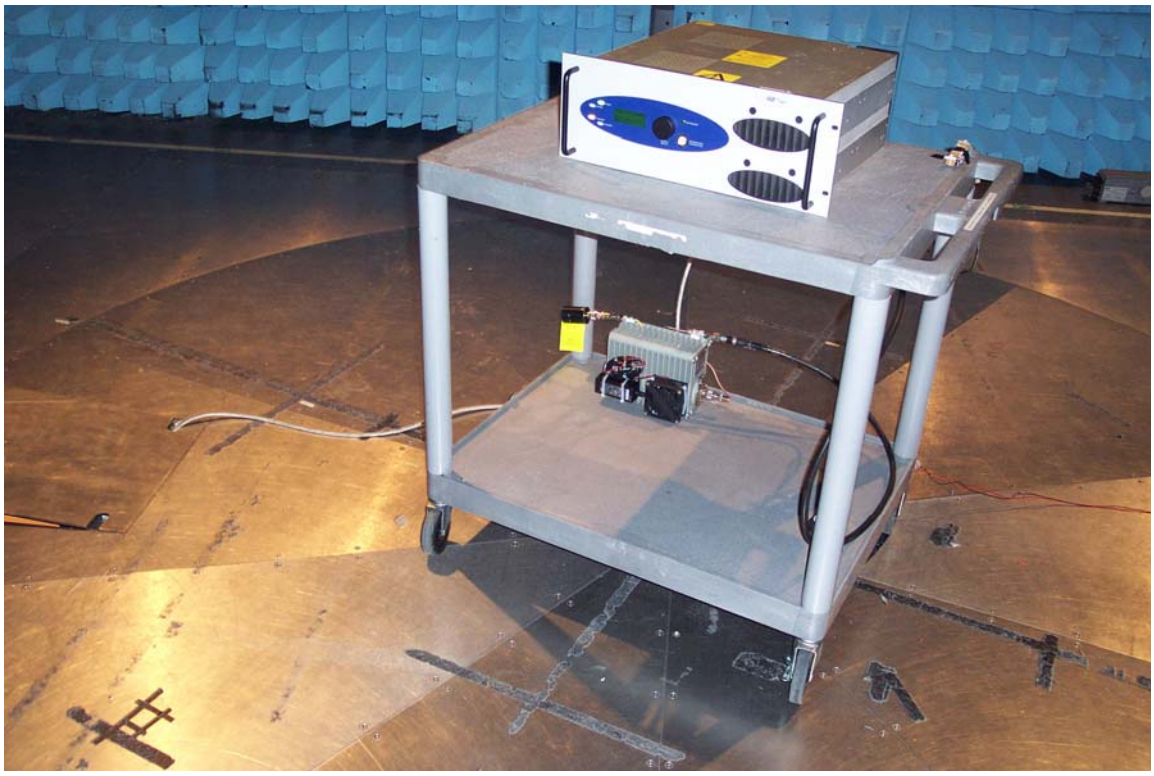
Emission Frequency	Polarity	Height	Azimuth	Raw Peak	ERP Final	Specification Limit
MHz		cm	Degrees	dBm	dBm	dBm
163.480	V	100	153	-78.07	-57.94	-13.0
254.496	V	100	277	-81.59	-63.22	-13.0
381.749	H	161	149	-66.34	-47.16	-13.0

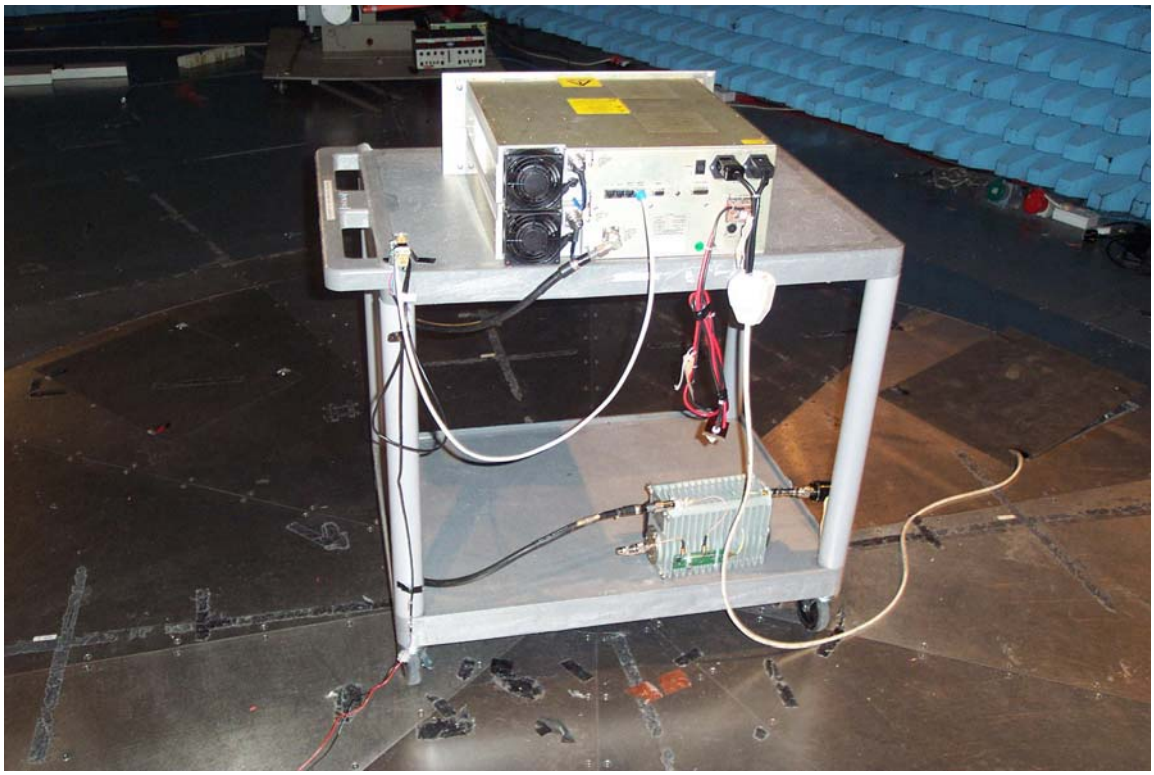
Top Channel Tx: 136.975MHz

Emission Frequency	Polarity	Height	Azimuth	Raw Peak	ERP Final	Specification Limit
MHz		cm	Degrees	dBm	dBm	dBm
157.688	V	100	156	-78.69	-56.43	-13.0
410.921	H	100	143	-84.18	-63.49	-13.0

2.3 SPURIOUS RADIATED EMISSIONS - continued

2.3.7 Test Set Up Photographs





2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

Section 2.1049(c)(1)/ FCC Part 87.135 / Part 87.137

2.4.2 Equipment Under Test

Park Air Electronics T6T 100W VHF transmitter

2.4.3 Date of Test

22 June 2005

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.4” within the Test Equipment Used table shown in Section 3.1.

2.4.5 Test Procedure

The EUT is declared as having a class of emission: - A3E, which dictates an emission designator of 6K00A3E, which from 87.137(a) equates to an authorised bandwidth of 25kHz.

The EUT was connected using 50dB of attenuation, to a modulation analyser, which was set to measure modulation depth. The EUT was set to transmit and the audio input frequency to the EUT was varied between 300Hz and 5kHz and the maximum modulation depth response was found to be at 420Hz. The audio analyser output was then adjusted to give 50% modulation depth. The frequency was then adjusted to 2500Hz and the amplitude adjusted 16dB greater than the level which gave 50% modulation depth at 420Hz

The modulation analyser was then replaced with a spectrum analyser and the 99% bandwidth was measured. The measurements were performed on the bottom, middle and top channels.

2.4.6 Test Results

Channel Number/ Frequency	Power Level (W)	Result (kHz)	Authorized Bandwidth (kHz)
118 000 MHz	100	5.160	25
127.500 MHz	100	5.192	25
136.975 MHz	100	5.160	25

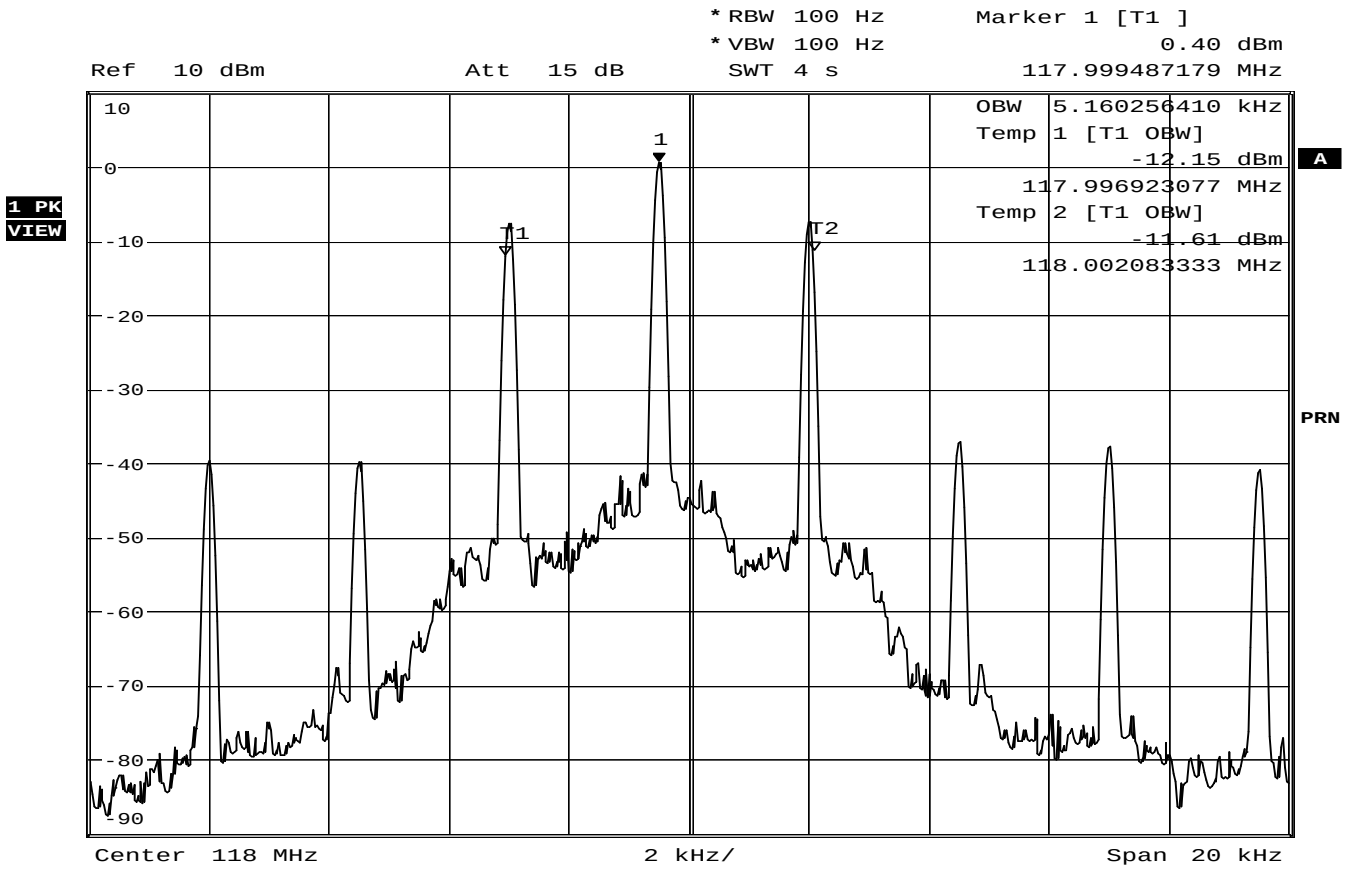
Limit	≤25kHz

See Test results Plots overleaf.

2.4 OCCUPIED BANDWIDTH

2.4.6 Test Results (Continued)

118MHz Maximum Power



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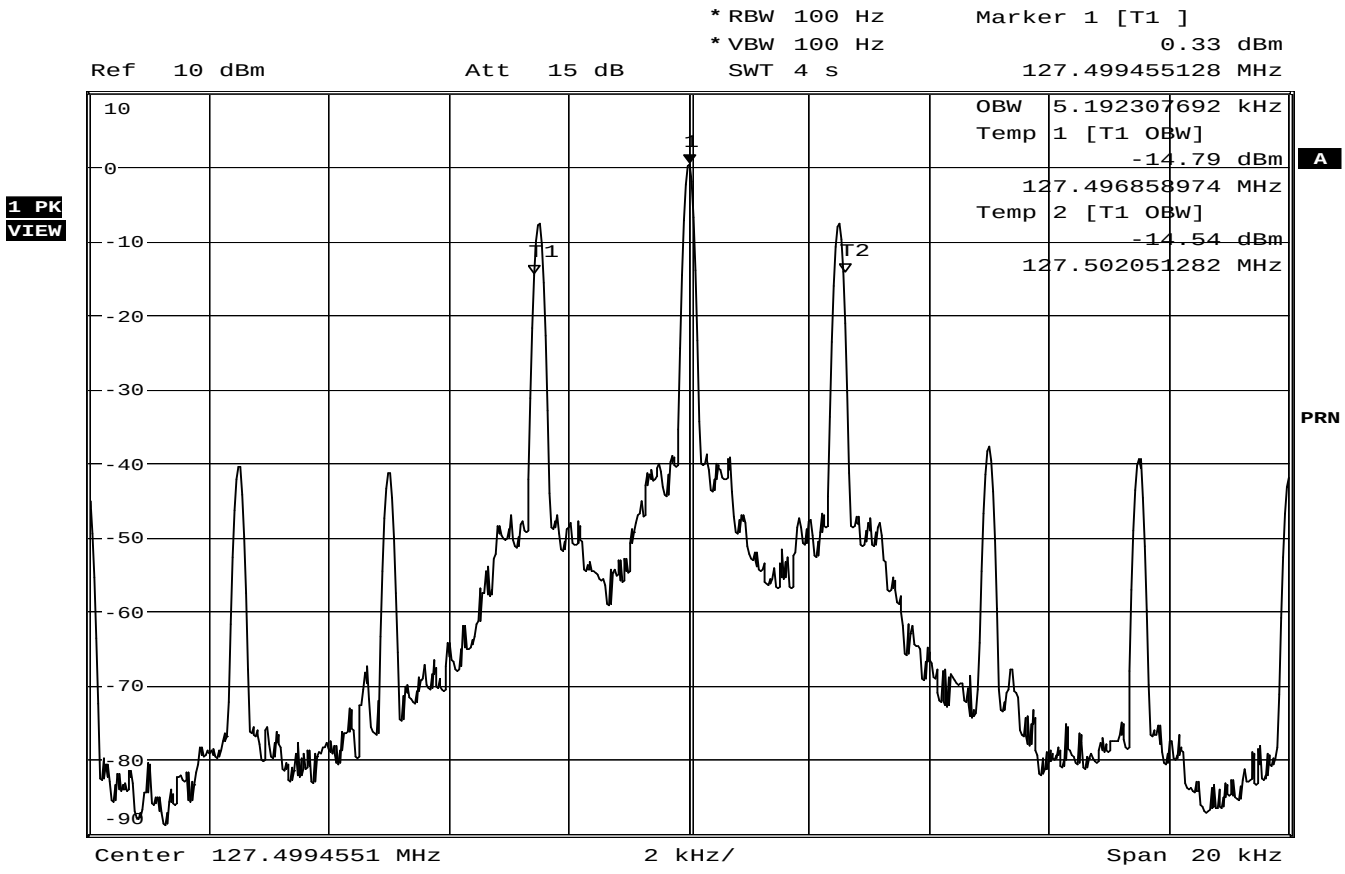
2.4 OCCUPIED BANDWIDTH

2.4.6 Test Results (Continued)

127.5MHz Maximum Power



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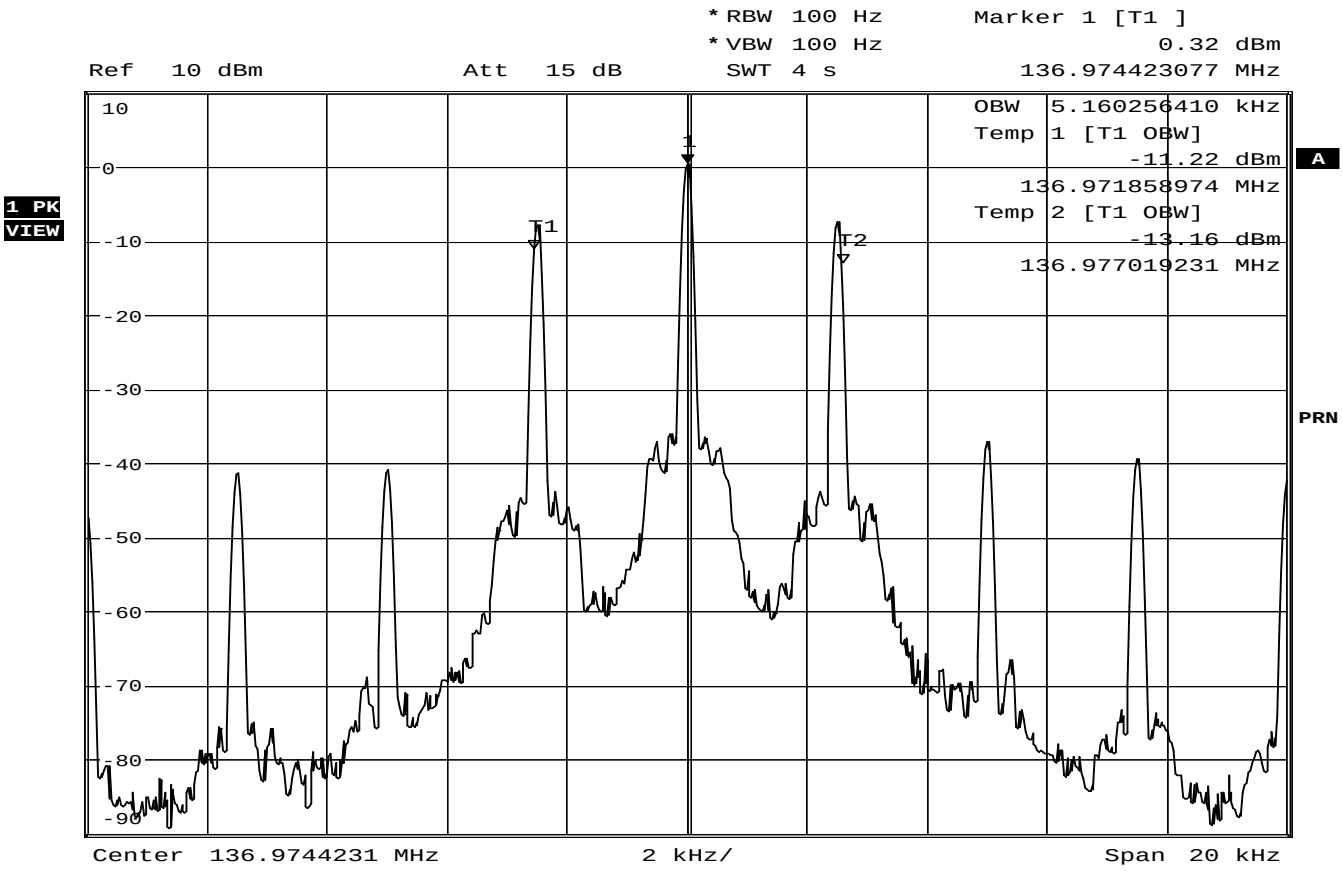
2.4 OCCUPIED BANDWIDTH

2.4.6 Test Results (Continued)

136.975MHz Maximum Power



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2.5 MODULATION CHARACTERISTICS

2.5.1 Specification Reference

Section 2.1047/ Part 87.141

2.5.2 Equipment Under Test

Park Air Electronics T6T 100W VHF Transmitter

2.5.3 Date of Test

1 March 2005

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.5” within the Test Equipment Used table shown in Section 3.1.

2.5.5 Test Procedure

2.1047(a)

The EUT was connected to the modulation analyser via two, 30dB attenuators. The modulation analyzer was set to measure AM. Using an audio analyser, an audio tone of 2500Hz was input into the EUT and the amplitude was adjusted to give a modulation depth of 80%. The demodulated audio from the modulation analyzer was fed back into the measuring section of the audio analyser, which was adjusted to measure rms voltage. The audio analyser output frequency was then adjusted between 100Hz and 5000Hz and the demodulated audio from the modulation analyser was measured and recorded. The results are shown in the table below. The test was performed on the centre channel at the maximum power output level.

2.5 MODULATION CHARACTERISTICS

2.5.6 Test Results

2.1047(a)

Modulating Frequency (Hz)	Demodulated Audio Voltage (V)
	127.5 MHz
100	0.199
200	2.002
300	0.492
400	0.609
500	0.615
1000	0.606
1500	0.602
2000	0.596
2500	0.579
3000	0.051
3500	0.029
4000	0.022
4500	0.022
5000	0.022

2.5 MODULATION CHARACTERISTICS

2.5.6 Test Results

2.1047(b)

The EUT was connected to the modulation analyser via two, 30dB attenuators. The modulation analyser was set to measure AM. The demodulated audio input from the modulation analyser was connected to the audio analyser input. A range of test voltages was established to show the limiting characteristics of the EUT's modulating circuitry. With the voltage range determined, the modulating frequency to the EUT from the audio analyser was varied over the range 300Hz to 5kHz. The EUT was tested on the centre channel at its maximum output power level. The test results are shown below.

350Hz

Audio Input Voltage (mV)	Modulation Depth (%)
	127.5 MHz
65	52.8
95	76.3
100	80.3
105	81.8
110	81.8
115	81.9
125	82.1
150	82.6

600Hz

Audio Input Voltage (mV)	Modulation Depth (%)
	127.5 MHz
65	54.8
95	73.9
100	82.3
105	85.9
110	86.3
115	86.2
125	86.3
150	86.5

2.5 MODULATION CHARACTERISTICS

2.5.6 Test Results

2.1047(b)

1000Hz

Audio Input Voltage (mV)	Modulation Depth (%)
	127.5 MHz
65	55.1
95	77.9
100	82.1
105	85.7
110	85.6
115	85.9
125	86.2
150	86.3

2000Hz

Audio Input Voltage (mV)	Modulation Depth (%)
	127.5 MHz
65	54.0
95	75.6
100	79.7
105	83.1
110	83.2
115	83.4
125	83.6
150	83.6

2.5 MODULATION CHARACTERISTICS

2.5.6 Test Results

2.1047(b)

3000Hz

Audio Input Voltage (mV)	Modulation Depth (%)
	127.5 MHz
65	1.21
95	1.42
100	1.41
105	1.40
110	1.41
115	1.40
125	1.38
150	1.32

4000Hz

Audio Input Voltage (mV)	Modulation Depth (%)
	127.5 MHz
65	0.17
95	0.17
100	0.17
105	0.17
110	0.17
115	0.17
125	0.17
150	0.17

2.5 MODULATION CHARACTERISTICS

2.5.6 Test Results

2.1047(b)

5000Hz

Audio Input Voltage (mV)	Modulation Depth (%)
	127.5 MHz
65	0.17
95	0.17
100	0.17
105	0.17
110	0.17
115	0.17
125	0.17
150	0.17

87.141(a)

The EUT was connected to the modulation analyzer via two, 30dB attenuators. The modulation analyzer was set to measure AM. The frequency for which a constant given input yielded the highest depth of modulation as determined in 2.1049 (c). This frequency was 420Hz. The input level to the EUT was increased and the depth of modulation was monitored.

Test Frequency (Hz)	Maximum Modulation Depth (%)
420	90.8

Limit for Maximum Modulation Depth	<100%

2.6 FREQUENCY STABILITY

2.6.1 Specification Reference

Part 87.133 (a)

2.6.2 Equipment Under Test

Park Air Electronics T6T 100W VHF Transmitter

2.6.3 Date of Test

18th March 2005

2.6.4 Test equipment

The major items of test equipment used for the above tests are identified as “Section 2.6” within the Test Equipment Used table shown in Section 3.1.

2.6.5 Test Procedure

The EUT was transmitted without modulation and the frequency error was measured using a frequency counter. The measurement was repeated at minimum and maximum voltage extremes and at minimum and maximum temperature extremes.

2.6.6 Test Results

EUT complies with Part 87.133 (a)

Test Conditions	Frequency Drift (Hz)		
	118 MHz	127.5 MHz	136.975 MHz
+55ºC / 28V	-502	-551	-606
+50ºC / 28V	-538	-577	-615
+40ºC / 28V	-538	-583	-625
+30ºC / 28V	-517	-560	-603
+20ºC / 23.8V	-514	-548	-588
+20ºC / 28V	-511	-549	-584
+20ºC / 32.2V	-509	-549	-581
+10ºC / 28V	-472	-513	-559
+0ºC / 28V	-423	-458	-507
-10ºC / 28V	-327	-483	-510
-20ºC / 28V	-277	-411	-380
-30ºC / 28V	-290	-349	-279
Maximum Frequency Drift	-538	-583	-625

2.6 FREQUENCY STABILITY

2.6.6 Test Results – continued

Test Conditions	Frequency Drift (Hz)		
	118 MHz	127.5 MHz	136.975 MHz
+55ºC / 120V	-477	-479	-499
+50ºC / 120V	-463	-500	-538
+40ºC / 120V	-472	-510	-546
+30ºC / 120V	-455	-482	-500
+20ºC / 102V	-410	-447	-492
+20ºC / 120V	-408	-447	-491
+20ºC / 138V	-410	-449	-491
+10ºC / 120V	-400	-428	-479
+0ºC / 120V	-429	-472	-507
-10ºC / 120V	-332	-496	-387
-20ºC / 120V	-243	-354	-265
-30ºC / 120V	-255	-338	-244
Maximum Frequency Drift	-477	-510	-546

Limit	± 20 ppm or 2.36kHz

2.7 TRANSMITTER OUTPUT POWER

2.7.1 Specification Reference

Part 87.131

2.7.2 Equipment Under Test

Park Air Electronics T6T 100W VHF Transmitter

2.7.3 Date of Test

10th March 2005

2.7.4 Test equipment used

The major items of test equipment used for the above tests are identified as “Section 2.7” within the Test Equipment Used table shown in Section 3.1.

2.7.5 Test Procedure

The EUT was set to transmit an unmodulated carrier at it’s maximum power in accordance with the manufacturer’s tune up procedures.

2.7.6 Test Results

EUT complies with Part 87.131

Test Conditions		Transmitter Output Power (Watts)		
		118 MHz	127.5 MHz	136.975 MHz
T_{nom} (+20ºC)	V_{nom} (120 V AC)	127.64	125.89	123.03

Limit	≤ 200 W

2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.1 Specification Reference

FCC Part 87.139 (a)

2.8.2 Equipment Under Test

Park Air Electronics T6T 100W VHF Transmitter

2.8.3 Date of Test

10th March 2005

2.8.4 Test equipment used

The major items of test equipment used for the above tests are identified as “Section 2.8” within the Test Equipment Used table shown in Section 3.1.

2.8.5 Test Procedure

The transmitter output power was reduced using attenuators and the frequency spectrum investigated from 30 MHz to 1.4 GHz. The EUT was set to transmit on full power. The specification requires that the input audio signal level was adjusted to produce 50% modulation. This was measured using a modulation analyser. The input signal to provide 50% modulation was then increased by 16dB for the whole test. The resolution bandwidth was set to 300Hz and the video bandwidth to 1kHz. The spectrum analyser detector was set to RMS and the trace to average.

The maximum path loss across each measurement band was used as the reference level offset to ensure worst case.

2.8.6 Test Results

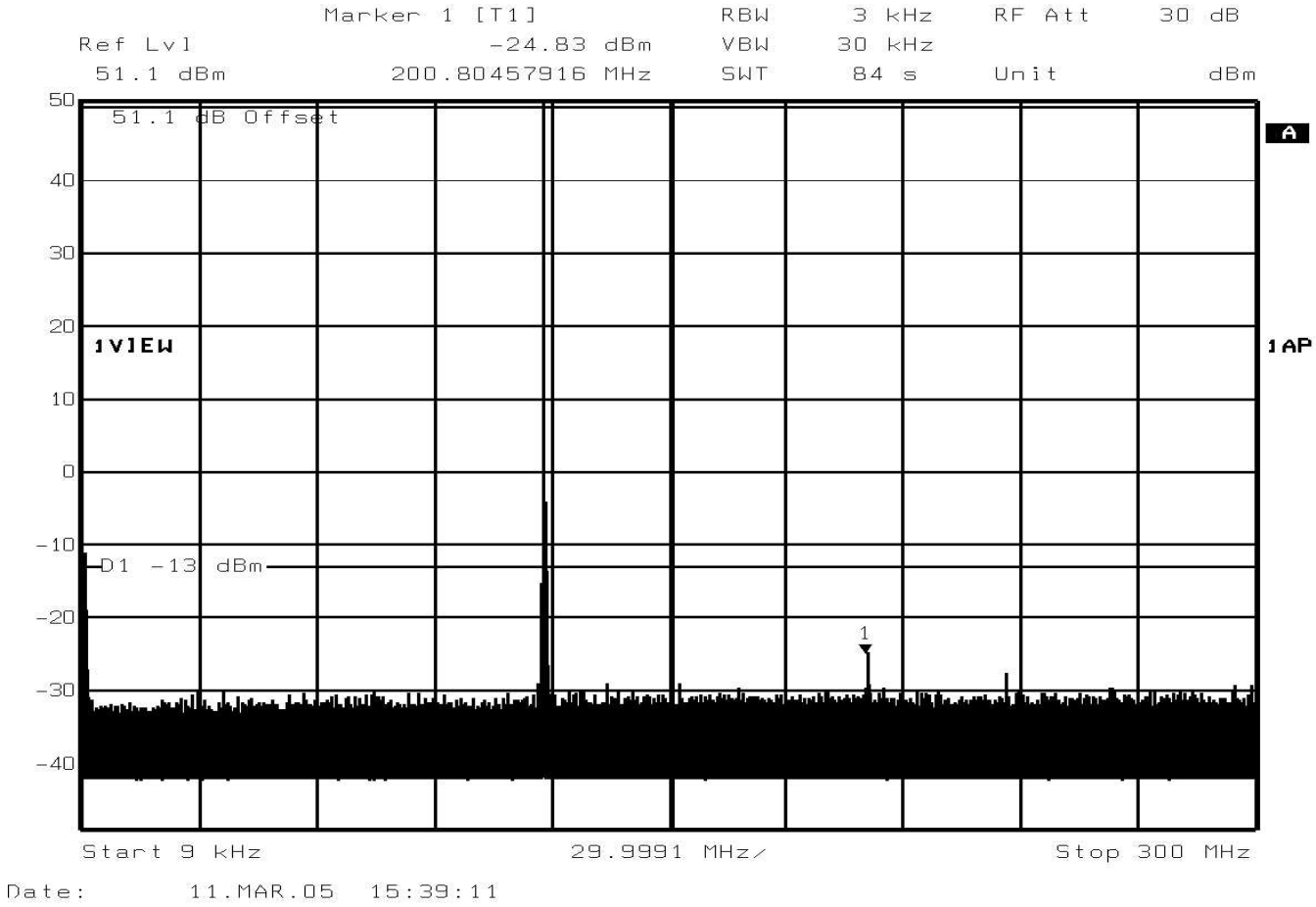
EUT complies with FCC Part 87.139 (a)

The plots recorded are shown on the following pages.

2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

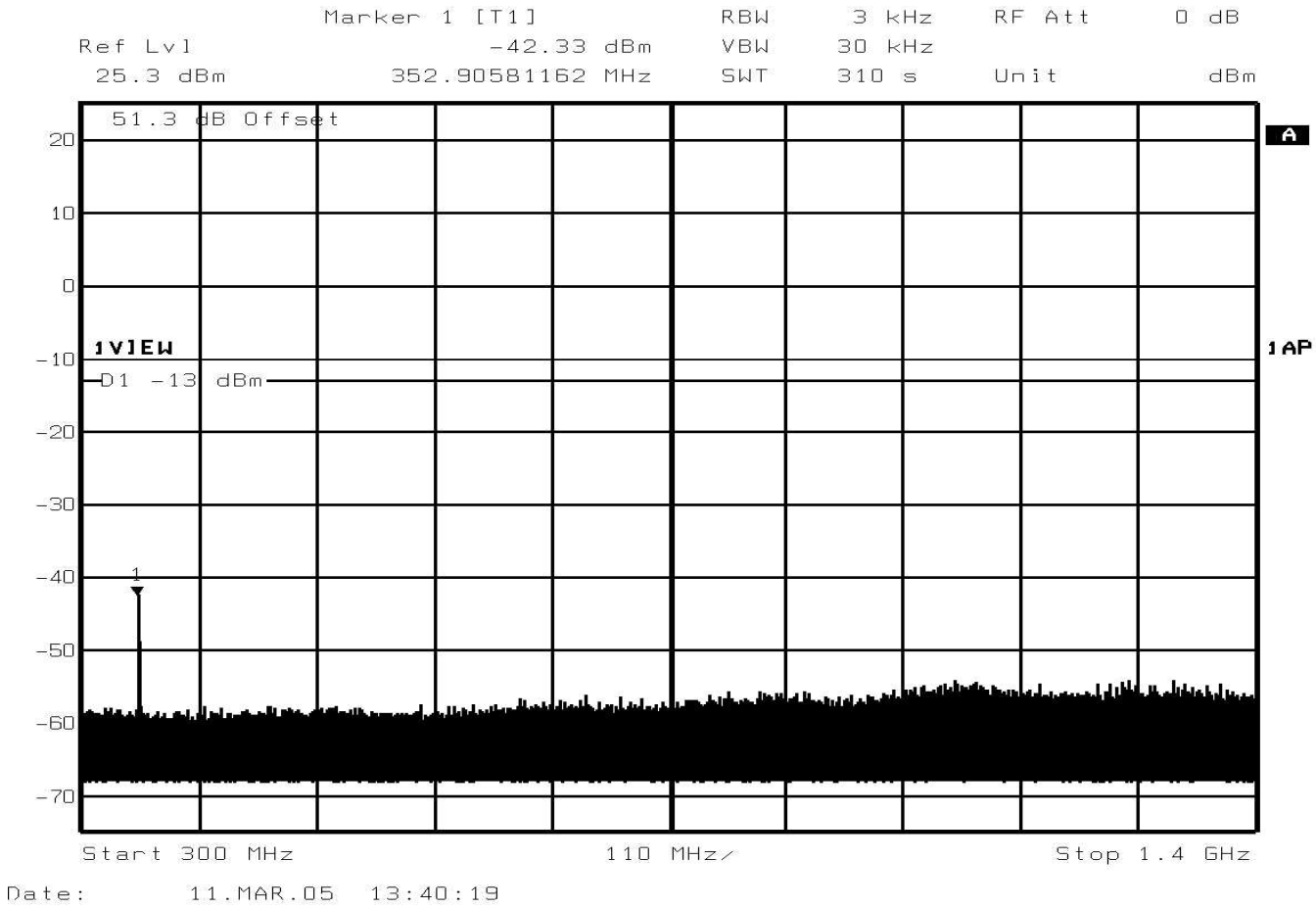
Unwanted Emission (9kHz – 300MHz)
Channel Frequency – 118 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

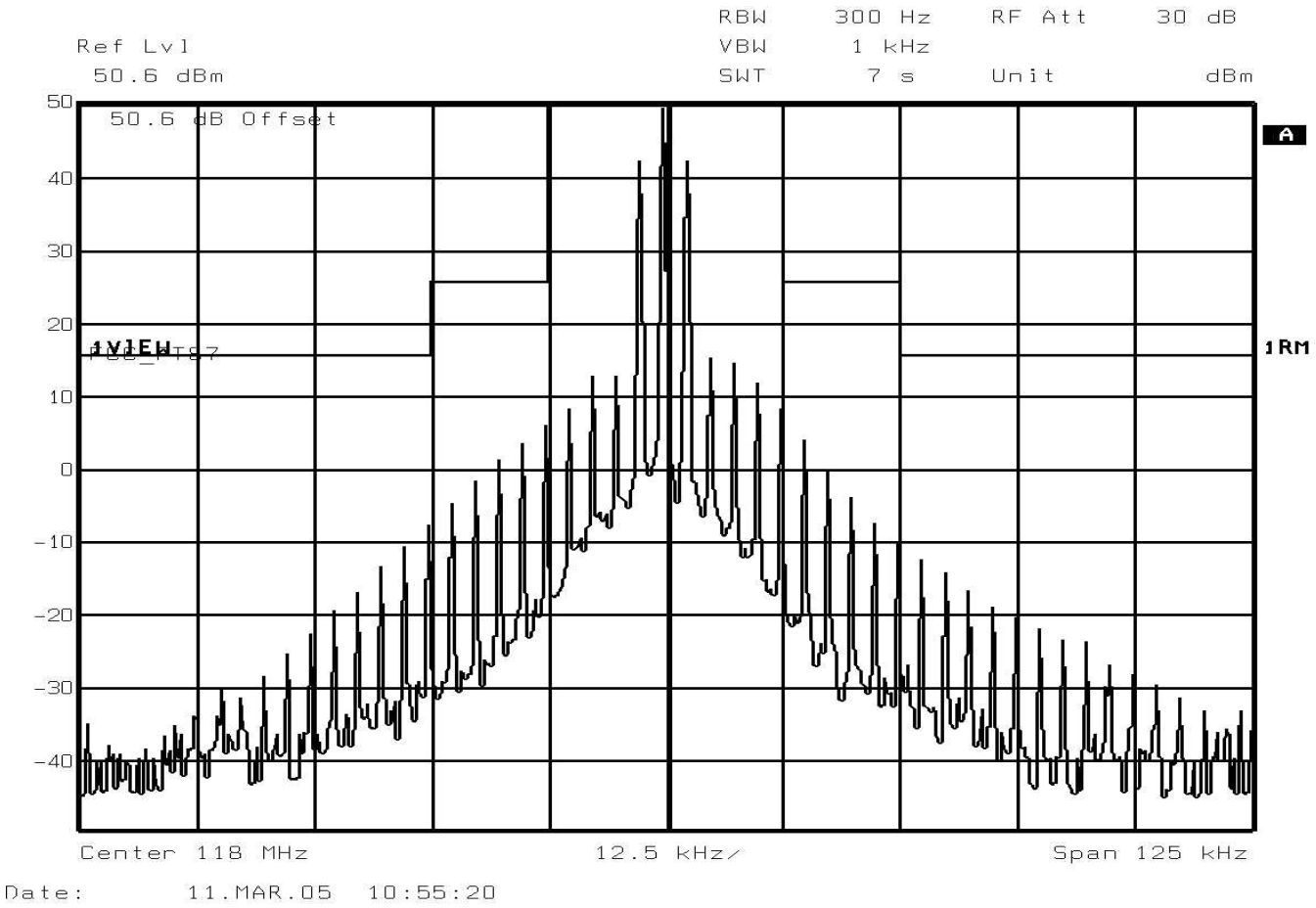
Unwanted Emission (300MHz – 1.4GHz)
Channel Frequency – 118 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

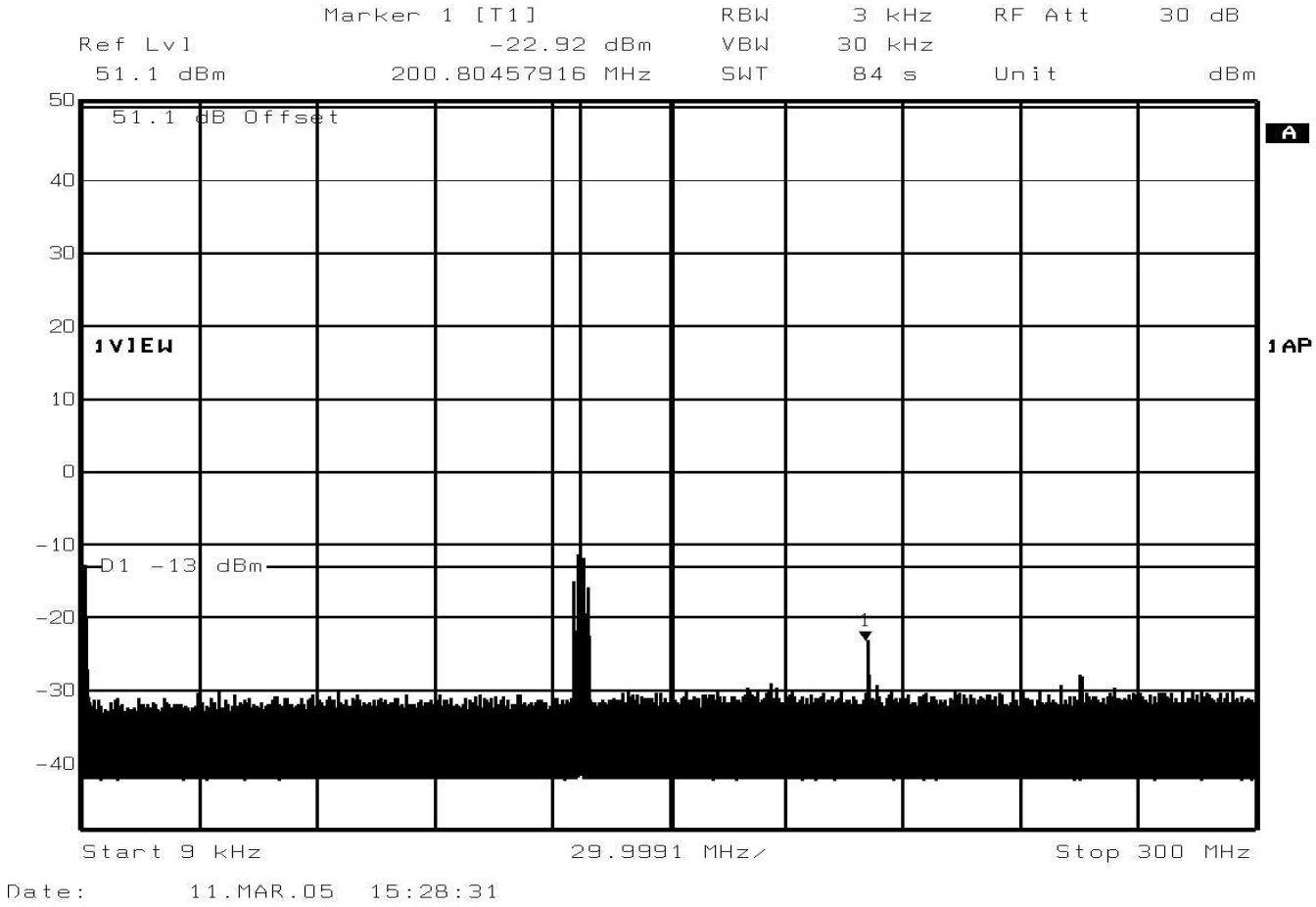
Unwanted Emission (<250% Channel Bandwidth)
Channel Frequency – 118 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

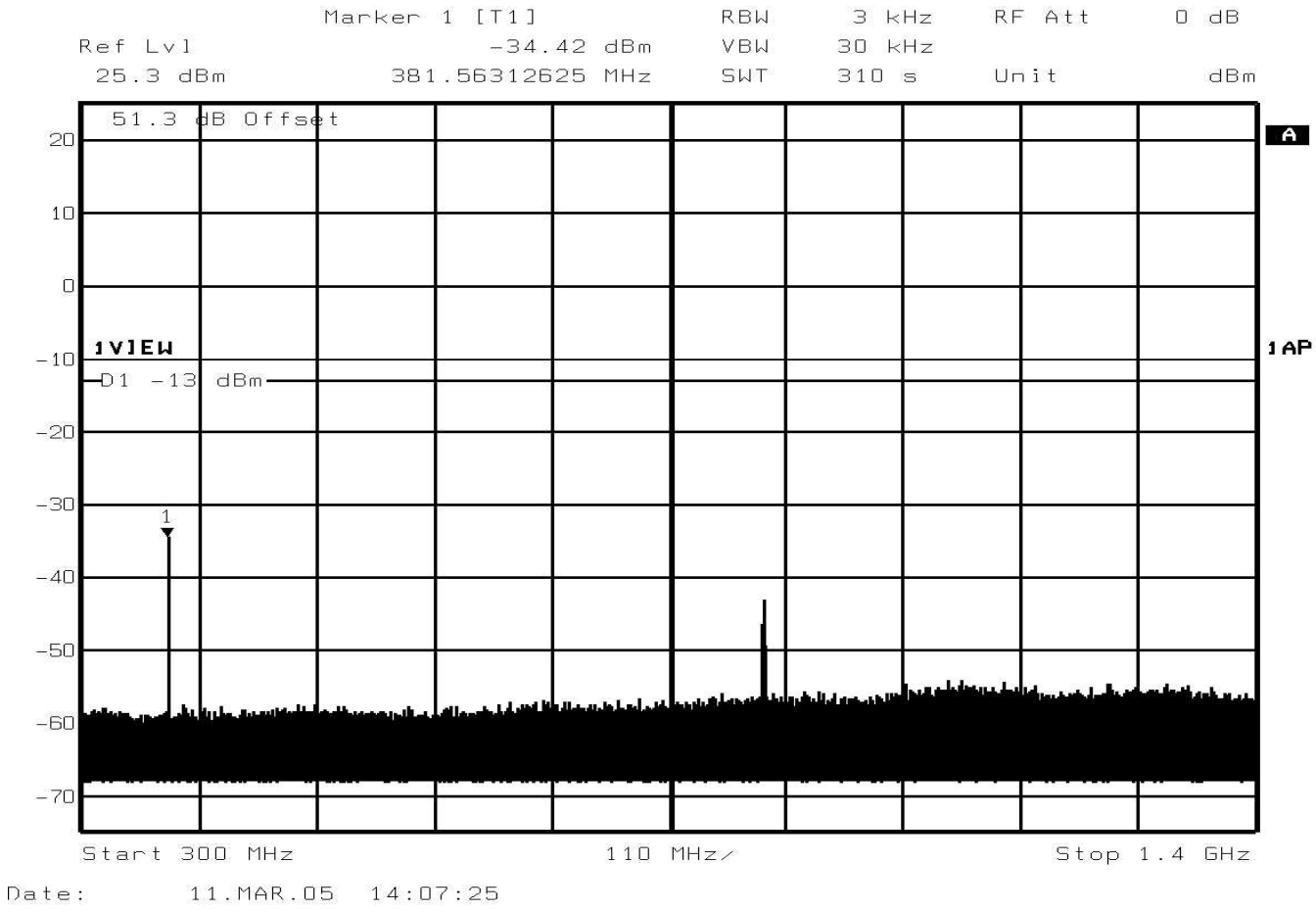
Unwanted Emission (9kHz – 300MHz)
Channel Frequency – 127.5 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

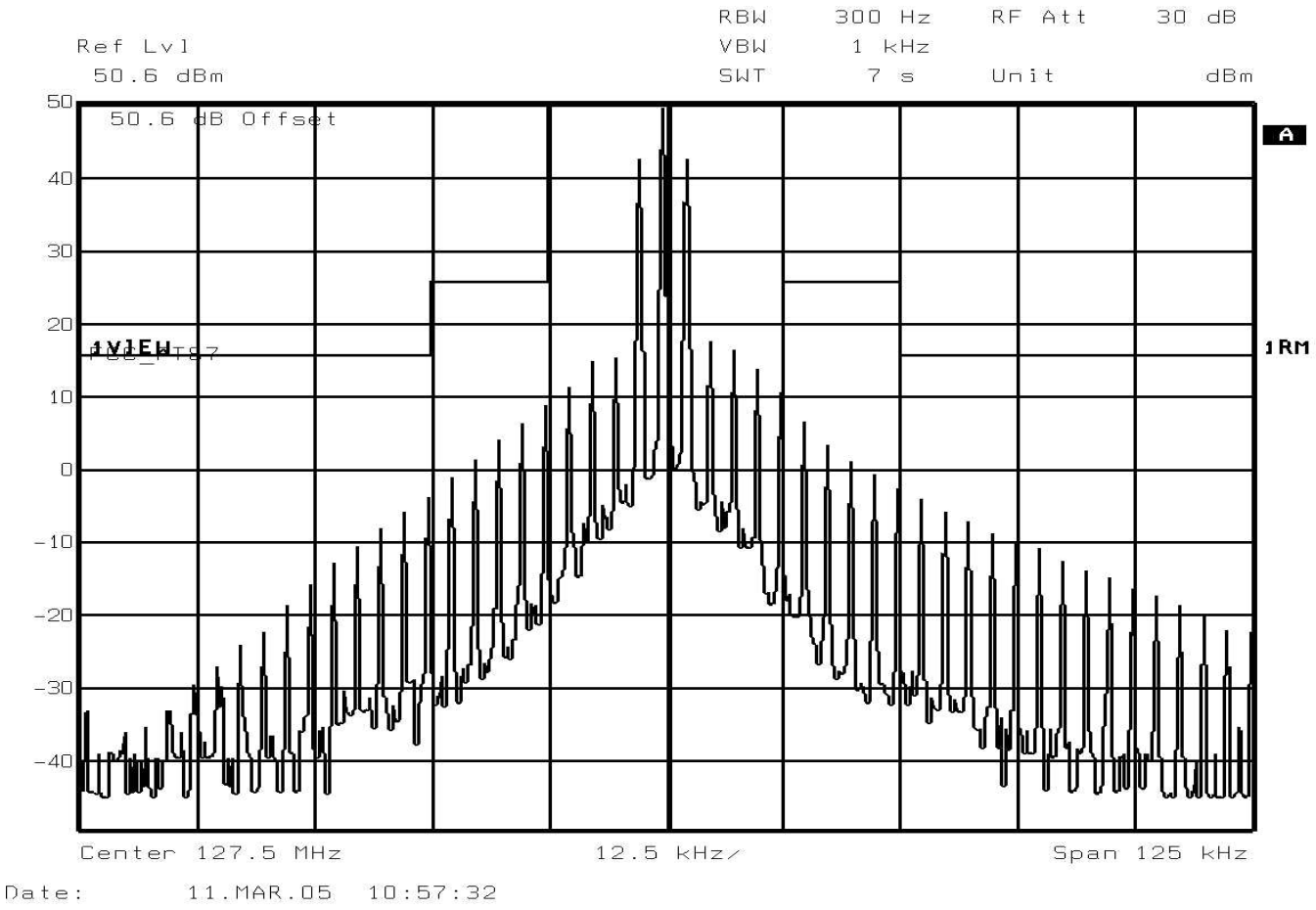
Unwanted Emission (300MHz – 1.4GHz)
Channel Frequency – 127.5 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

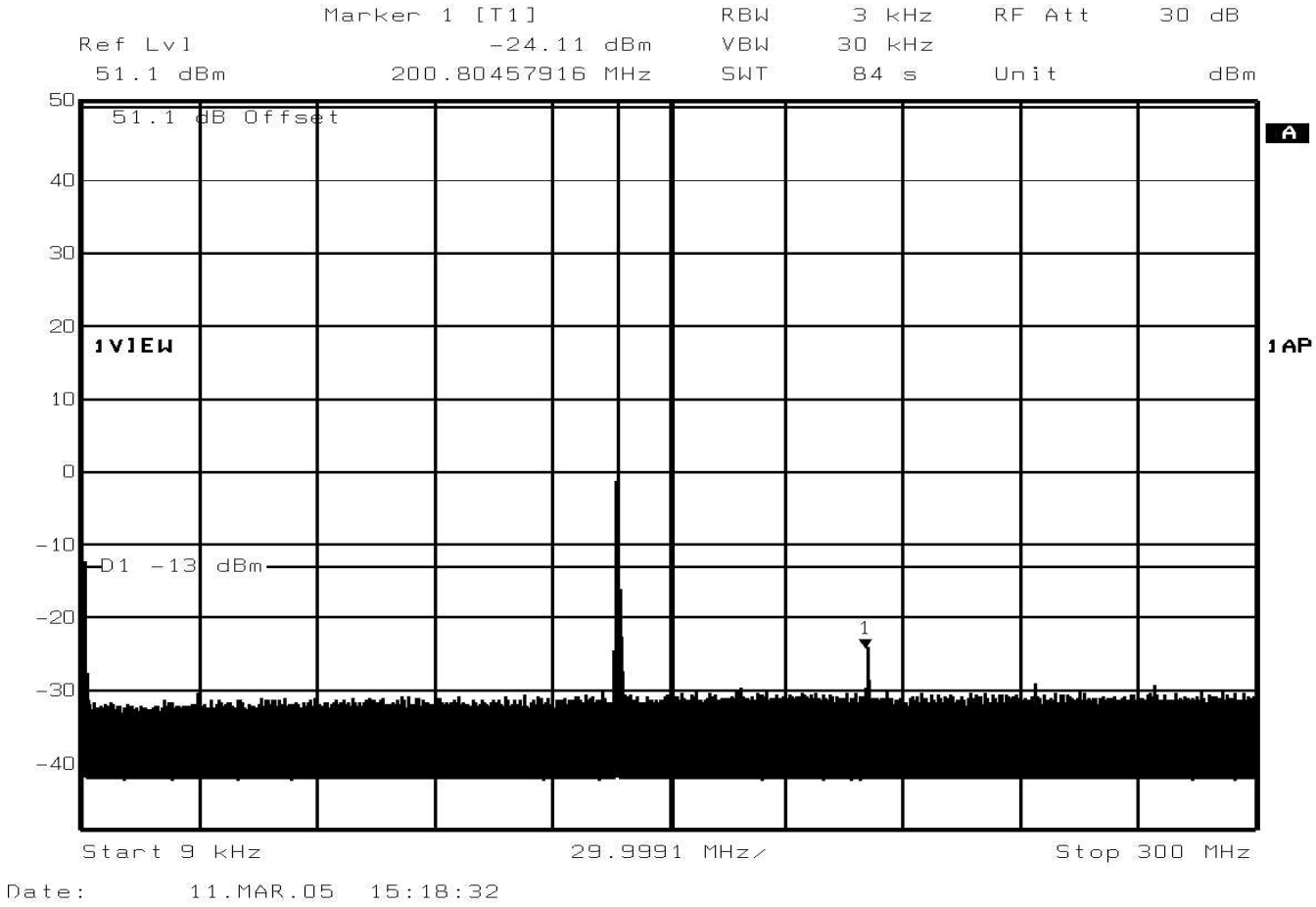
Unwanted Emission (<250% Channel Bandwidth)
Channel Frequency – 127.5 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

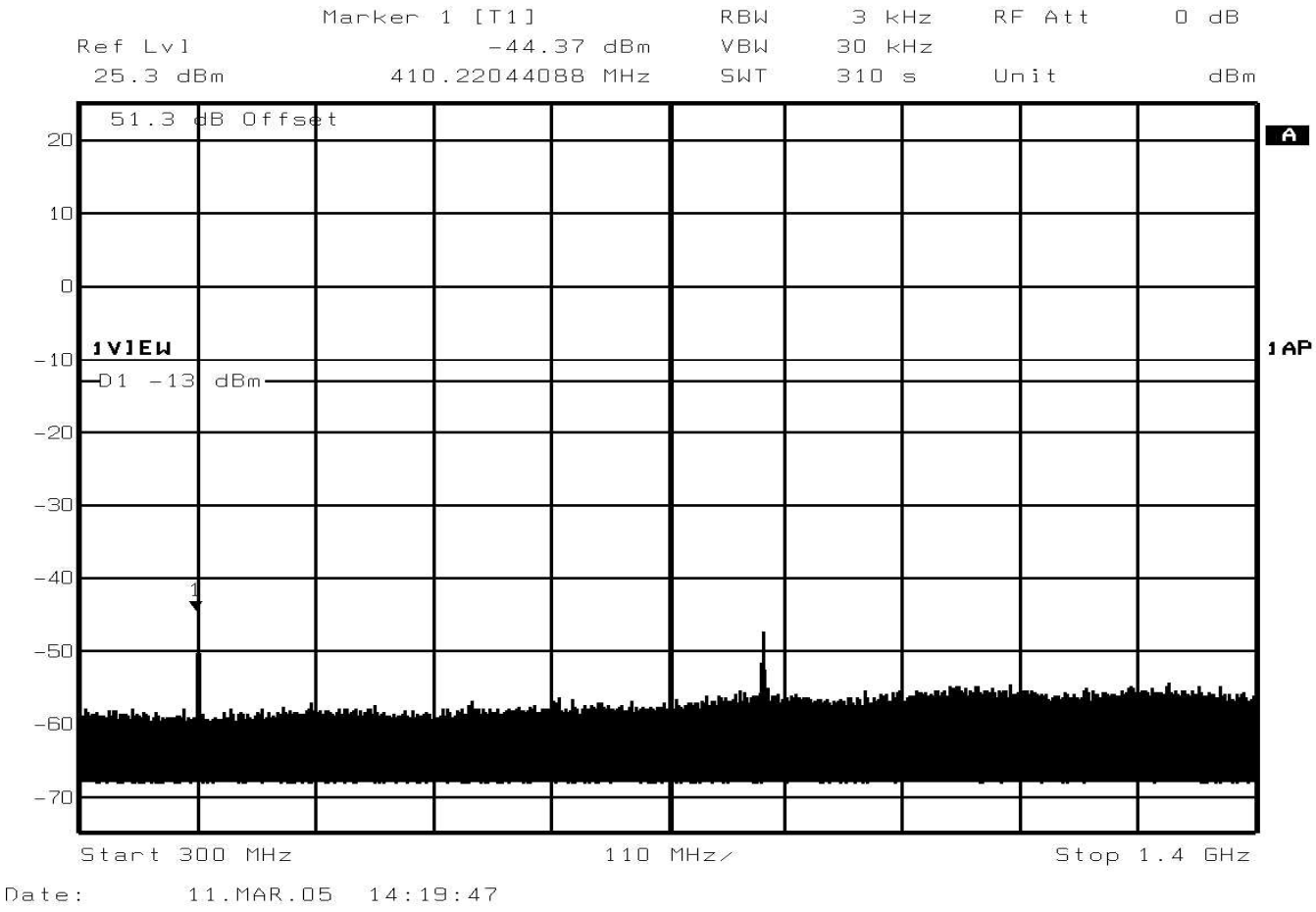
Unwanted Emission (9kHz – 300MHz)
Channel Frequency – 136.975 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

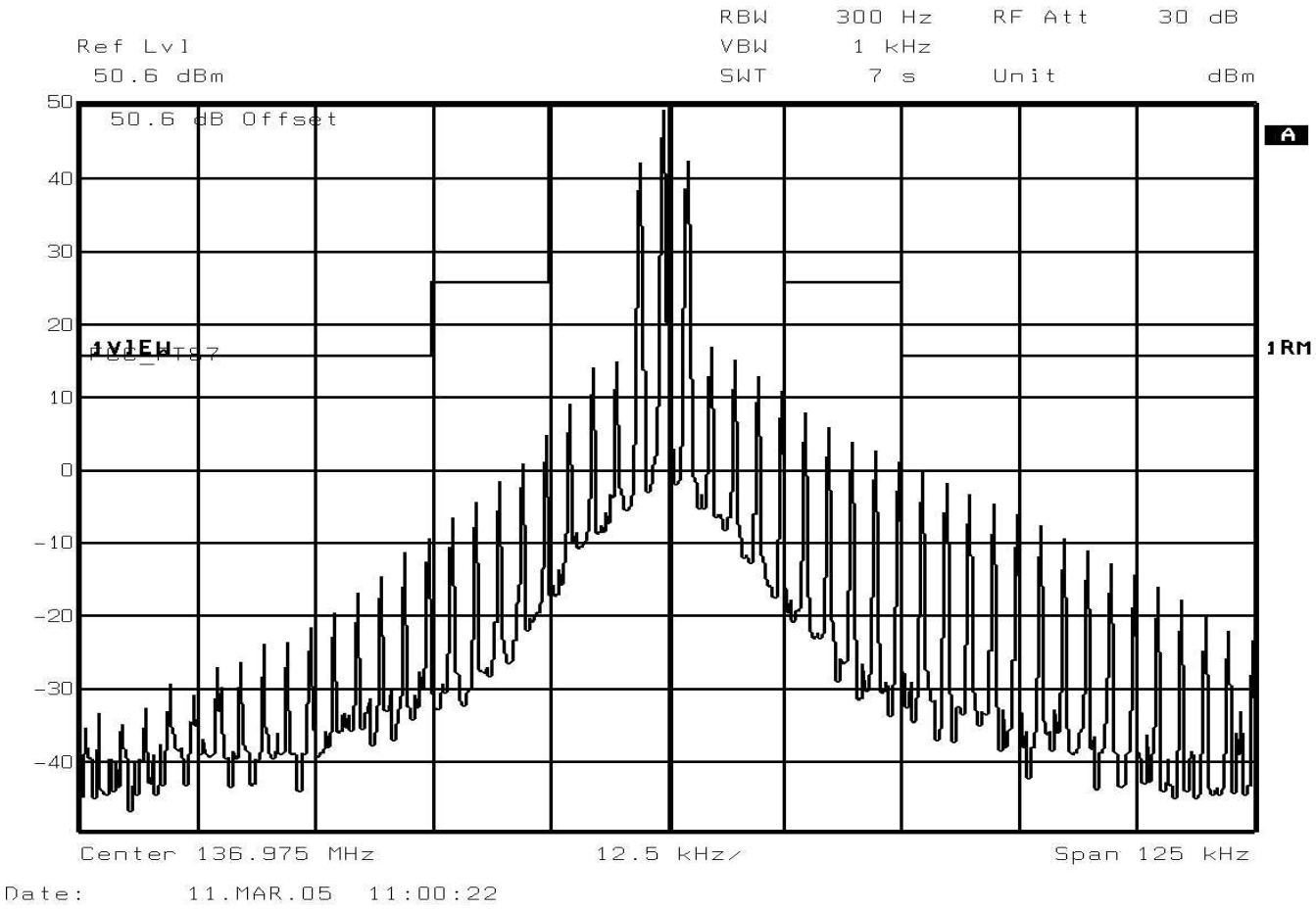
Unwanted Emission (300MHz – 1.4GHz)
Channel Frequency – 136.975 MHz



2.8 TRANSMITTER UNWANTED EMISSIONS

2.8.6 Test Results - Continued

Unwanted Emission (<250% Channel Bandwidth)
Channel Frequency – 136.975 MHz



SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

Instrument	Manufacturer	Type No	EMC / INV No	Cal. Due
Sections 2.1 & 2.3				
Bilog Antenna	Schaffner	CBL6143	2965	12/09/2005
Spectrum Analyser	Hewlett Packard	8542E	2286	08/01/2006
Turntable Controller	TUV	HD 050	2528	TU
Antenna Mast 6m	Emco	1051-2	2182	TU
Screened Room 5	Siemens	EAC54300	2533	TU
Signal Generator	Marconi	2031	1979	11/11/2005
Antenna	Schaffner	CLB 6143	2861	TU
Audio Analyser	Hewlett Packard	8903A	1680	27/04/2005
50ohm /30W Termination	JFW	50T-054N	2794	11/11/2005
Section 2.2				
Test Receiver	Rohde & Schwarz	ESH3	1020	24/09/2005
Spectrum Analyser	Rohde & Schwarz	EZM	1416	TU
Artificial Mains LISN	Rohde & Schwarz	ESH2-Z5	1915	28/04/2005
HP Transient Limiter	Hewlett Packard	11947A	2271	19/08/2005
Audio Analyser	Hewlett Packard	8903A	1680	27/04/2005
50ohm /30W Termination	JFW	50T-054N	2794	11/11/2005
Section 2.4				
Audio Analyser	Hewlett Packard	8903B	1855	11/06/2006
Digital Volt Meter	Fluke	73	2045	14/01/2006
Digital Volt Meter	Fluke	79-3	3789	23/05/2006
Hygrometer	Rotronic	I-1000	3229	25/10/2006
Sensor	Hewlett Packard	11722A	1873	29/06/2005
Modulation Analyser	Hewlett Packard	8901B	1986	10/01/2006
Attenuator	Bird	8321	3807	15/10/2005
Attenuator	Weinschel	48-20-43	2690	17/11/2005
Spectrum Analyser	Rohde & Schwarz	FSU26	4989	16/12/2005
Section 2.5				
Power Attenuator 30dB	Rohde & Schwarz	RBU	2506	15/10/2005
Attenuator,30dB-50W	Bird	8321	3807	15/10/2005
Digital Multi Meter	Fluke	75-Mk3	3866	14/01/2006
Hygromer	Rotronic	I-1000	3232	07/04/2005
Audio Analyser	Hewlett Packard	8903B	1512	27/07/2005
Sensor	Hewlett Packard	11722A	1987	29/05/2005
Modulation Analyser	Hewlett Packard	8901B	1510	02/06/2005

3.1 TEST EQUIPMENT USED

(Continued)

Instrument/Ancillary	Manufacturer	Type No	EMC / INV No	Cal. Due
Sections 2.6				
Power Supply	Hewlett Packard	6269B	978	TU
Hygrometer	Rotronic	I-1000	2807	23/07/2005
Digital Volt Meter	Fluke	75-Mk-3	3866	14/10/2006
Hygrometer	Rotronic	I-1000	3232	21/10/2005
Audio Analyser	Hewlett Packard	8903B	1512	27/07/2005
Attenuator	Bird	8321	3807	15/10/2005
Attenuator	Weinschel	45-20-43	2506	09/09/2005
Sensor	Hewlett Packard	11722A	1987	29/06/2005
Modulation Analyser	Hewlett Packard	8901B	1510	02/06/2005
Section 2.7				
Hygrometer	Rotronic	I-1000	2807	23/07/2005
Power Supply	Hewlett Packard	6269B	978	TU
Digital Volt Meter	Fluke	75-Mk-3	3866	14/10/2006
Attenuator	Weinschel	45-20-43	2506	26/01/2005
Attenuator	Bird	8321	1313	24/11/2005
Modulation Analyser	Hewlett Packard	8901B	1510	02/06/2005
Sensor	Hewlett Packard	11722A	1987	29/06/2005
Section 2.8				
Hygrometer	Rotronic	I-1000	2807	23/07/2005
DC Power Supply	Hewlett Packard	6269B	978	TU
Attenuator 250W, 20dB	Weinschel	45-20-43	2506	09/09/2005
Digital Volt Meter	Fluke	75-Mk-3	3866	14/10/2006
Attenuator 30dBb 50W	Bird	8321	1313	24/11/2005
Spectrum Analyser	Rohde & Schwarz	FSEM	4043	13/01/2006

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 2GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Frequency Stability	Frequency	±46.28Hz
Transmitter Output Power	Amplitude	±0.47dB
Transmitter Unwanted Emission	Amplitude	±1.94dB

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

APPENDIX A

TITCHFIELD FCC SITE COMPLIANCE LETTER

Product Service

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

October 18, 2002

Registration Number: 90987

TUV Product Service Ltd
Segensworth Road
Titchfield
Fareham, Hampshire, PO15 5RH
United Kingdom
Attention: Kevan Adsetts

Re: Measurement facility located at Titchfield
Anechoic chamber (3 meters) and 3 & 10 meter OATS
Date of Listing: October 18, 2002

Gentlemen:

Your request for registration of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC rules. The information has, therefore, been placed on file and the name of your organization added to the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Thomas W Phillips
Electronics Engineer