
REPORT ON

Limited FCC CFR 47: Parts 15 C Testing in support of an
Application for Grant of Equipment Authorisation
of a Promethean ActivBoard

FCC ID: QAM002

Report No OR612169/02 Issue 2

July 2004


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July 2004

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DATED 28th July 2004

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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 15 B & C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;


T Guy


J Holcombe


G Lawler





CONTENTS

Section	Page No
1	REPORT SUMMARY
1.1	Status..... 4
1.2	Introduction and Declaration of Build Status 6
1.3	Brief Summary of Results 8
1.4	Opinions and Interpretations 9
1.5	Product information 10
1.6	Test Conditions (Configuration)..... 10
1.7	Deviations from the Standard..... 10
1.8	Modification Record 10
2	TEST DETAILS
2.1	Spurious Radiated Emissions Receive 12
2.2	Spurious Radiated Emissions Transmit 14
2.3	Maximum Carrier Field Strength 17
2.4	Spurious Radiated Emissions 18
2.5	Spurious Radiated Emissions Transmit Co-located..... 22
2.6	Power Line Conducted Emissions..... 24
3	TEST EQUIPMENT USED
3.1	Table of Test Equipment Used..... 31
3.2	Measurement Uncertainty 33
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT
4.1	Accreditation, Disclaimers And Copyright 35
APPENDICES	
A	Titchfield FCC Site Compliance Letter 37



SECTION 1

REPORT SUMMARY

Limited FCC CFR 47: Part 15 Testing in support of an
Application for Grant of Equipment Authorisation
of a Promethean ActivBoard

Report OR612169-02 Issue 2 replaced Report OR612169-02 Issue 1.
Issue 2 contains typographical corrections and additional test results.



1.1 STATUS

EQUIPMENT UNDER TEST	Promethean ActivBoard
OBJECTIVE	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
NAME AND ADDRESS OF CLIENT	Promethean Limited TDS House Lower Phillips Road Blackburn BB1 5TH
TYPE NUMBER	PRM-AB2-02 / TDS-AB2-02
SERIAL NUMBER	4043409001
HARDWARE VERSION	525206105
DECLARED VARIANTS	PRM-AB2B-02 / TDS-AB2B-02 PRM-AB2P-02 / PRM-AB2P-02 PRM-AB2BP-02 / TDS-AB2BP-02 PRM-AB260-02 / TDS-AB260-02 PRM-AB260B-02 / TDS-AB260B-02 PRM-AB260P-02 / TDS-AB260P-02 PRM-AB260BP-02 / TDS-AB260BP-02 PRM-AB248-02 / TDS-AB248-02 PRM-AB248B-02 / TDS-AB248B-02 PRM-AB248P-02 / TDS-AB248P-02 PRM-AB248BP-02 / TDS-AB248BP-02

TEST SPECIFICATION / ISSUE / DATE	FCC CFR
47: Part 15 B and C August 2002	

NUMBER OF ITEMS TESTED	One
SECURITY CLASSIFICATION OF EUT	Commercial In Confidence
INCOMING RELEASE DATE	Declaration of Build Status 21 st May 2004
DISPOSAL REFERENCE NUMBER DATE	Held pending disposal Not Applicable Not Applicable
ORDER NUMBER DATE	PE1515 16 th March 2004



START OF TEST

5th March 2004

FINISH OF TEST

17th July 2004

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 Public Notice document (DA 00-705 released 30 March 2000)



1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the Promethean ActiveBoard SRD Radio Module to the requirements of FCC Specification Parts 15.109, 15.207, 15.209 and 15.249.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of Promethean Limited.



1.2.1 DECLARATION OF BUILD STATUS

Manufacturer	TDS Promethean Ltd
Country of origin	United Kingdom
UK Agent	TDS Promethean
Description	ACTIVBoard
Model No	PRM-AB2-02 / TDS-AB2-02
Part No	PRM-AB2-02 / TDS-AB2-02
Serial No	4043409001
Hardware Version	525206105
Build Status	0
Software Issue	391-000-00

Signature	Andrew Oakley
Date	21 st May 2004
D of B S Serial No	Y612169-02

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TUV Product Service as to the accuracy of the information declared in this document by the manufacturer.

BABT Limited formally certifies that the manufacturer's declaration as reproduced in this report, is a true and accurate record of the original received from the applicant.



1.3 BRIEF SUMMARY OF RESULTS

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

Test	Spec Clause	Test Description	Result	Levels/Comments
2.1	15.109	Spurious Radiated Emissions Receive	Pass	
2.2	15.209	Spurious Radiated Emissions Transmit	Pass	
2.3	15.249(a)	Maximum Peak Carrier Field Strength	Pass	Build state 1
2.4	15.249(d)	Spurious and Harmonic Radiated Emissions	Pass	
2.5	15.247 (a) & 15.209	Spurious and Harmonic Radiated Emissions Co-located	Pass	
2.6	15.207	Power Line Conducted Emissions	Pass	



1.4 OPINIONS AND INTERPRETATIONS

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



1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) was a Promethean ActivBoard, which offers 917MHz Short Range Device Functionality connectivity.

1.5.2 Modes of Operation

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

Applicable testing was carried out with the EUT transmitting at maximum power or receiving as detailed in Section 1.5.3 "Test Configuration".

1.5.3 Test Configuration

1.5.3.1 Test Configuration – Transmit.

SRD Transmitting on the following channels and frequencies;

Board Channel 1: 915.3MHz

Board Channel 2: 917.8MHz

The Output Power level (controlled by application software) was set to Maximum

1.5.3.2 Test Configuration – Receive

SRD Receiving on the following channel and frequency;

Slate Channel 1: 917.3MHz

1.5.3.3 Test Configuration – Co-transmitting

ActiveBoard with LMX9820 Bluetooth Option. Model No. PRM-AB2B-02 / TDS-AB2B-02

SRD and Bluetooth Transmitting:

SRD

BLUETOOTH

917.3MHZ Slate Channel 1

2.480GHz Channel 78

917.3MHZ Slate Channel 1

2.402GHz Channel 0

1.6 TEST CONDITIONS

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

For all tests, the Promethean ActivBoard was powered via RS232 and AC/DC PSU connection via a test laptop utilising its own internal battery.

1.7 DEVIATIONS FROM THE STANDARD

Not Applicable

1.8 MODIFICATION RECORD

Build State 1: Software updated to Version 3.11 to lower the carrier strength by 5 dB.



SECTION 2

TEST DETAILS

Limited FCC CFR 47: Part 15 Testing in support of an
Application for Grant of Equipment Authorisation
Of a Promethean ActivBoard



2.1 SPURIOUS RADIATED EMISSIONS RECEIVE

2.1.1 Specification Reference

FCC CFR 47: Part 15 Subpart B, Section 15.109

2.1.2 Equipment Under Test

Promethean ActivBoard

2.1.3 Date of Test

5th March 2004

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 Polarisation. 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.

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



2.1 SPURIOUS RADIATED EMISSIONS RECEIVE - continued

2.1.6 Test Results

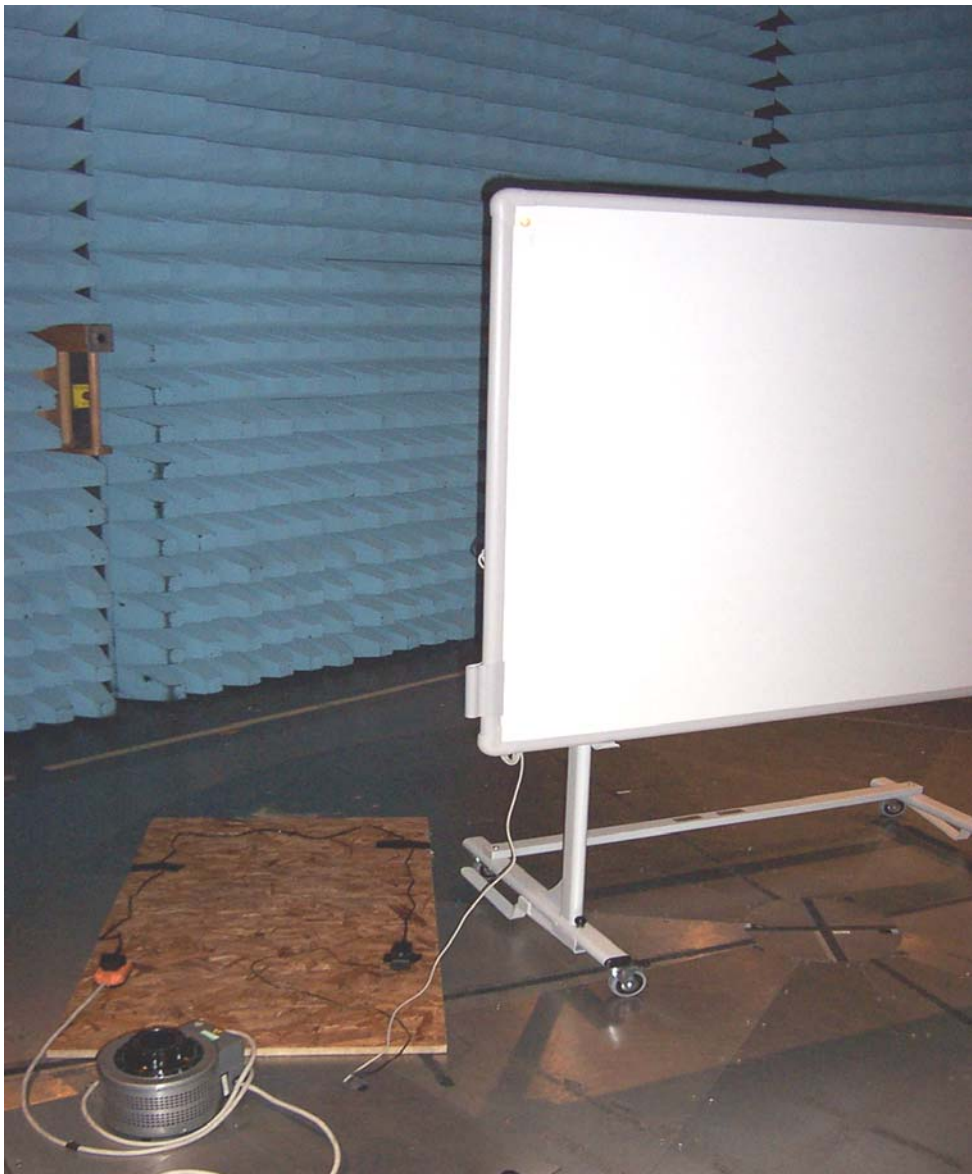
Equipment Designation: Unintentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart B, Section 15.109 for Spurious Radiated Emissions (30MHz – 1GHz).

EUT Rx on Slate Channel 1 (917.3MHz)

No emissions were detected in Rx mode within 10dB of the limit peak.

2.1.7 Set Up Photograph



Set Up Photograph



2.2 SPURIOUS RADIATED EMISSIONS TRANSMIT

2.2.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.209

2.2.2 Equipment Under Test

Promethean ActivBoard

2.2.3 Date of Test

5th March 2004 & 16-17th July 2004

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.

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 Polarisation's. 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.

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



2.2 SPURIOUS RADIATED EMISSIONS TRANSMIT - continued

2.2.6 Test Results

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.209 for Spurious Radiated Emissions (30MHz – 1GHz).

EUT Tx on Board Channel 1 (915.3MHz)

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

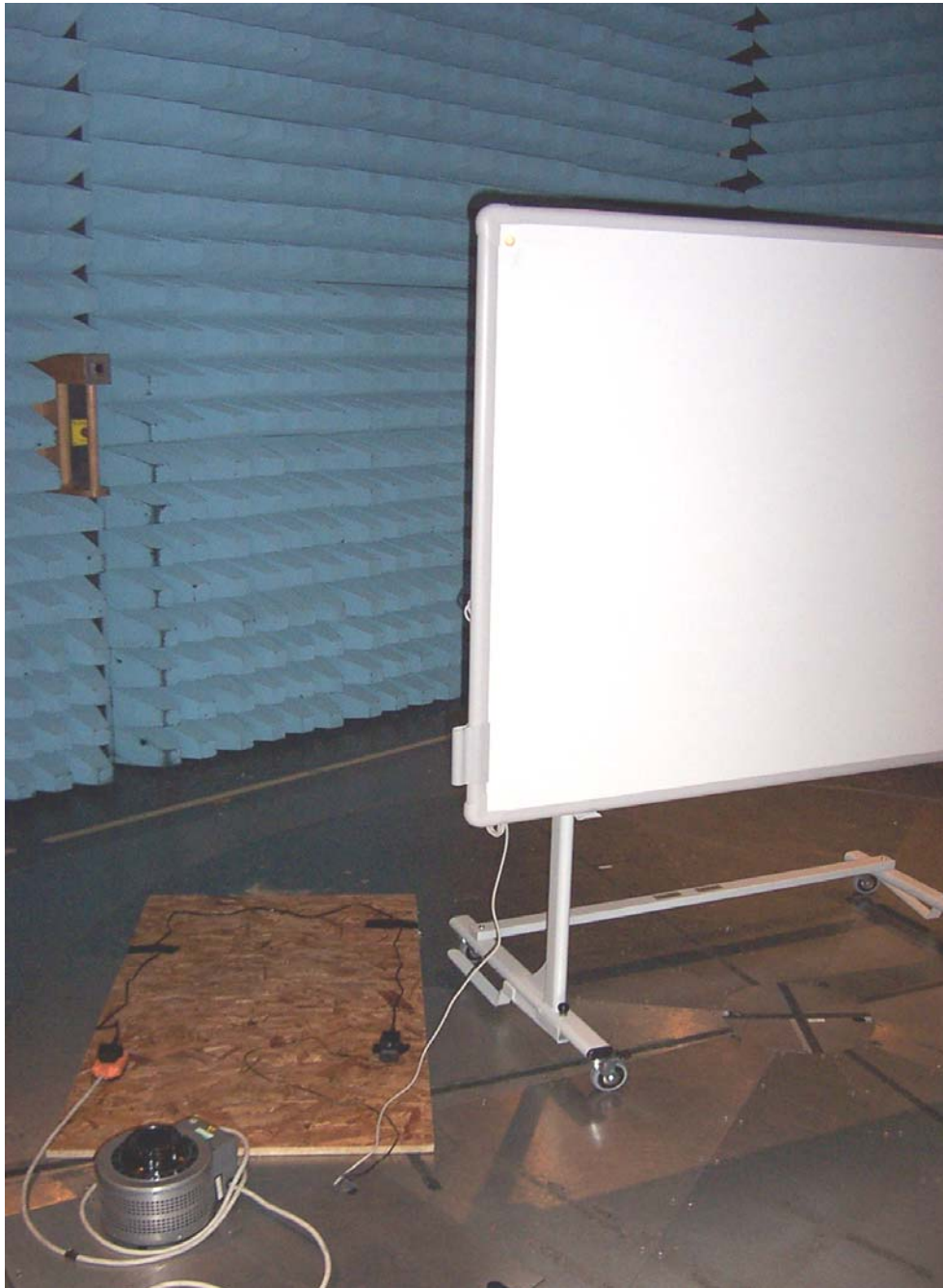
Emission Frequency MHz	Polarisation Horizontal/ Vertical	Height cm	Azimuth degree	Field Strength		Limit	
				dB μ V/m	μ V/m	dB μ V/m	μ V/m
324.4	V	100	178	43.7	153.1	46.0	200.0
471.8	H	100	142	45.8	194.9	46.0	200.0
530.8	V	114	233	43.4	147.9	46.0	200.0
530.9	H	100	118	43.8	154.9	46.0	200.0
796.2	H	115	110	44.6	168.8	46.0	200.0
825.7	H	109	109	43.8	154.9	46.0	200.0

EUT Tx on Board Channel 2 (917.8MHz)

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

Emission Frequency MHz	Polarisation Horizontal/ Vertical	Height cm	Azimuth degree	Field Strength		Limit	
				dB μ V/m	μ V/m	dB μ V/m	μ V/m
162.2	H	153	144	43.2	144.5	43.5	150.0
265.4	H	218	140	42.1	127.4	46.0	200.0
471.9	H	103	103	45.9	197.2	46.0	200.0
825.7	H	103	108	41.5	118.9	46.0	200.0
855.2	H	103	109	43.4	147.9	46.0	200.0
884.7	H	102	110	43.1	142.9	46.0	200.0

2.2.7 Set Up Photo



Set Up Photograph



2.3 MAXIMUM CARRIER FIELD STRENGTH

2.3.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.249(a)

2.3.2 Equipment Under Test

Promethean ActivBoard

2.3.3 Date of Test

11th May 2004 & 17th July 2004

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

Test Performed in accordance with ANSI C63.4.

The EUT contains an integral antenna and therefore the Maximum Peak Carrier Power was measured using the field strength method.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then measured using a Peak Detector.

2.3.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 15 Section 249(a) for Maximum Carrier Field Strength.

Measurements were made with the EUT Transmitting.

Carrier Frequency (MHz)	Measured (mV/m)	Margin (mV/m)	Measured (dB μ V/m)	Margin (dB μ V/m)
915.3	19.5	85.8	85.8	8.2
917.8	35.5	91.0	91.0	3.0
Limit	50mV/m		94.0 dB μ V/m	



2.4 SPURIOUS RADIATED EMISSIONS

2.4.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.249(d)

2.4.2 Equipment Under Test

Promethean ActivBoard

2.4.3 Date of Test

5th March 2004 & 16 -17th July 2004

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

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 – 10GHz were then formally measured using Peak and Average Detectors, as appropriate.

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



2.4 SPURIOUS RADIATED EMISSIONS - continued

2.4.6 Test Results

30MHz - 1GHz Frequency Range

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.249(d) for Radiated Emissions (3-MHz – 1GHz).

EUT Tx on Board Channel 1 (915.3MHz)

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

Emission Frequency MHz	Polarisation Horizontal/ Vertical	Height cm	Azimuth degree	Field Strength		Limit	
				dB μ V/m	μ V/m	dB μ V/m	μ V/m
324.4	V	100	178	43.7	153.1	46.0	200.0
471.8	H	100	142	45.8	194.9	46.0	200.0
530.8	V	114	233	43.4	147.9	46.0	200.0
530.9	H	100	118	43.8	154.9	46.0	200.0
796.2	H	115	110	44.6	168.8	46.0	200.0
825.7	H	109	109	43.8	154.9	46.0	200.0

EUT Tx on Board Channel 2 (917.8MHz)

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

Emission Frequency MHz	Polarisation Horizontal/ Vertical	Height cm	Azimuth degree	Field Strength		Limit	
				dB μ V/m	μ V/m	dB μ V/m	μ V/m
162.2	H	153	144	43.2	144.5	43.5	150.0
265.4	H	218	140	42.1	127.4	46.0	200.0
471.9	H	103	103	45.9	197.2	46.0	200.0
825.7	H	103	108	41.5	118.9	46.0	200.0
855.2	H	103	109	43.4	147.9	46.0	200.0
884.7	H	102	110	43.1	142.9	46.0	200.0



2.4 SPURIOUS RADIATED EMISSIONS - continued

2.4.6 Test Results - continued

1GHz - 10GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.249(a) for Radiated Emissions (1GHz – 10GHz).

EUT Tx on Board Channel 1 (915.3MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz	H/V	cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
1.831	V	143	158	51.4	74.0	42.0	54.0
1.831	H	121	118	52.6	74.0	43.4	54.0
3.661	H	160	213	46.6	74.0	41.1	54.0
3.661	V	124	133	45.3	74.0	39.3	54.0

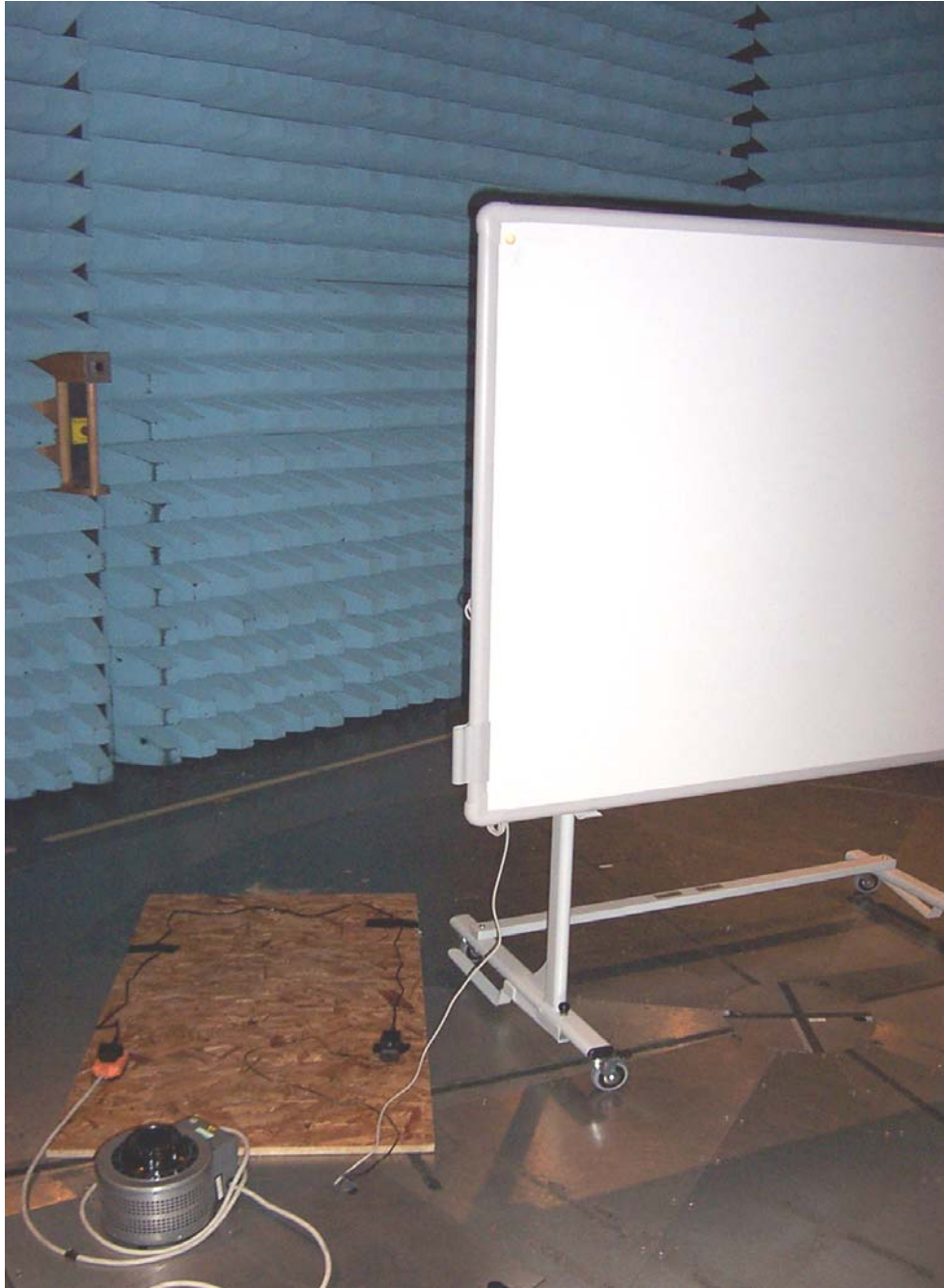
EUT Tx on Board Channel 2 (917.8MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz	H/V	cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
1.835	H	100	0	61.2	74.0	48.9	54.0
2.753	H	100	0	62.9	74.0	51.8	54.0

No other emissions above 2.753GHz were detected.

SPURIOUS RADIATED EMISSIONS - continued

2.4.7 Set Up Photograph



Spurious Radiated Emissions Set Up Photograph



2.5 SPURIOUS RADIATED EMISSIONS TRANSMIT - CO-LOCATED

2.5.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Sections 15.247(a) and 15.209

2.5.2 Equipment Under Test

Promethean ActivBoard

2.5.3 Date of Test

3rd March 2004

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

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 – 25GHz were then formally measured using Peak and Average Detectors, as appropriate.

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

Measurements were made with the EUT transmitting on the following Channels

SRD		BLUETOOTH	
917.3MHz	Slate Channel 1	2.480GHz	Channel 78
917.3MHz	Slate Channel 1	2.402GHz	Channel 0



2.5.6 Test Results

EUT Tx on SRD and Bluetooth Channels.

Scans were completed across the relevant frequency range. The emissions detected were those of the Bluetooth and SRD carrier and direct harmonics of those emissions. No inter-modulation products were detected. Carrier harmonics were determined to be the same as previously measured therefore no results are presented here as they are declared above. Below is Top Channel Bluetooth Measurements, which were found to be worst case.

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz	H/V	cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
2.486	H	123	245	73.9	74.0	40.9	54.0
4.9601	H	101	247	56.2	74.0	48.1	54.0

ABBREVIATIONS FOR ABOVE TABLES

H Horizontal Polarisation
 Pol Polarisation
 deg degree

V Vertical Polarisation
 Hgt Height
 Azm Azimuth



2.6 CONDUCTED EMISSIONS ON POWER LINES

2.6.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.207 (Incorporating Co-located Transmitters using Bluetooth)

2.6.2 Equipment Under Test

Promethean ActivBoard

2.6.3 Date of Test

29th March 2004 & 17th July 2004

2.6.4 Test Equipment Used

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

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 Tables 2.3.1 – 2.3.6 respectively.

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



2.6 CONDUCTED EMISSIONS ON POWER LINES - continued

2.6.6 Test Results

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.207 for Power Line Conducted Emissions (0.15MHz – 30MHz).

EUT Tx on Board Channel 1 (915.3MHz) – Live Line

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

Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.2203	44.5	62.7	32.0	52.6
0.2241	44.3	62.5	23.6	52.6
0.4379	36.8	57.1	31.7	47.0
1.0162	38.2	56.0	31.8	46.0
1.3057	38.6	56.0	31.4	46.0
1.5979	38.2	56.0	28.0	46.0

The margin between the specification requirements and all other emissions was 21.3dB or more below the specified Quasi-Peak limit and 23.1dB or more below the Average limit.

EUT Tx on Board Channel 1 (915.3MHz) – Neutral Line

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

Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.1590	50.0	65.7	26.7	55.5
0.1697	49.0	65.0	25.8	54.9
0.1978	46.6	63.6	24.7	53.7
0.2174	45.0	63.0	31.7	52.7
0.2184	45.1	63.0	31.7	52.7
1.162	37.6	56.0	30.1	46.0

The margin between the specification requirements and all other emissions were 22.0dB or more below the specified Quasi-peak limit and 15.5dB or more below the specified Average limit.



2.6 CONDUCTED EMISSIONS ON POWER LINES - continued

2.6.6 Test Results - continued

EUT Tx on Board Channel 2 (917.8MHz) – Live Line

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

Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.724	36.4	56.0	31.9	46.0
1.016	36.8	56.0	30.5	46.0
1.305	37.4	56.0	30.2	46.0
1.380	36.0	56.0	27.3	46.0
1.591	37.0	56.0	30.1	46.0
1.884	36.2	56.0	26.2	46.0

The margin between the specification requirements and all other emissions were 20.4dB or more below the specified Quasi-Peak limit and 14.6dB or more below the Average limit.

EUT Tx on Board Channel 2 (917.8MHz) – Neutral Line

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

Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.435	35.2	57.2	29.9	47.2
0.722	34.8	56.0	29.8	46.0
1.378	34.0	56.0	28.6	46.0
1.876	34.3	56.0	27.5	46.0
3.473	34.2	56.0	24.6	46.0
3.697	34.1	56.0	25.0	46.0
15.209	41.1	60.0	40.3	50.0

The margin between the specification requirements and all other emissions were 23.5dB or more below the specified Quasi-peak limit and 21.7dB or more below the specified Average limit.



2.6 CONDUCTED EMISSIONS ON POWER LINES - continued

2.6.6 Test Results - continued

EUT Tx on SRD Board Top Channel (917.8MHz) and Bluetooth Bottom Channel (2402MHz) – Live Line

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

Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.4387	36.0	57.1	32.1	47.1
0.7311	35.7	56.0	31.7	46.0
1.0232	36.0	56.0	31.9	46.0
1.2427	36.4	56.0	31.4	46.0
1.5360	37.1	56.0	31.2	46.0
15.2093	38.8	60.0	38.2	50.0

The margin between the specification requirements and all other emissions were 21.2dB or more below the specified Quasi-Peak limit and 14.9dB or more below the Average limit.

EUT Tx on SRD Board Top Channel (917.8MHz) and Bluetooth Bottom Channel (2402MHz) – Neutral Line

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

Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.7308	33.6	56.0	29.8	46.0
1.0233	33.7	56.0	30.3	46.0
1.3152	33.9	56.0	30.1	46.0
1.5366	33.8	56.0	29.2	46.0
1.8287	34.0	56.0	28.9	46.0
15.2093	38.8	60.0	38.0	50.0

The margin between the specification requirements and all other emissions were 22.2dB or more below the specified Quasi-peak limit and 17.0dB or more below the specified Average limit.



2.6 CONDUCTED EMISSIONS ON POWER LINES - continued

2.6.6 Test Results - continued

EUT Tx on SRD Slate Bottom Channel (917.3MHz) and Bluetooth Top Channel (2480MHz) – Live Line

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

Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.4327	37.2	57.2	33.3	47.2
0.7215	36.7	56.0	32.7	46.0
1.0111	37.3	56.0	32.5	46.0
1.2987	37.9	56.0	33.1	46.0
1.5876	37.7	56.0	32.0	46.0
15.2093	38.4	60.0	37.8	50.0

The margin between the specification requirements and all other emissions were 21.6dB or more below the specified Quasi-Peak limit and 13.9dB or more below the Average limit.

EUT Tx on SRD Slate Bottom Channel (917.3MHz) and Bluetooth Top Channel (2480MHz) – Neutral Line

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

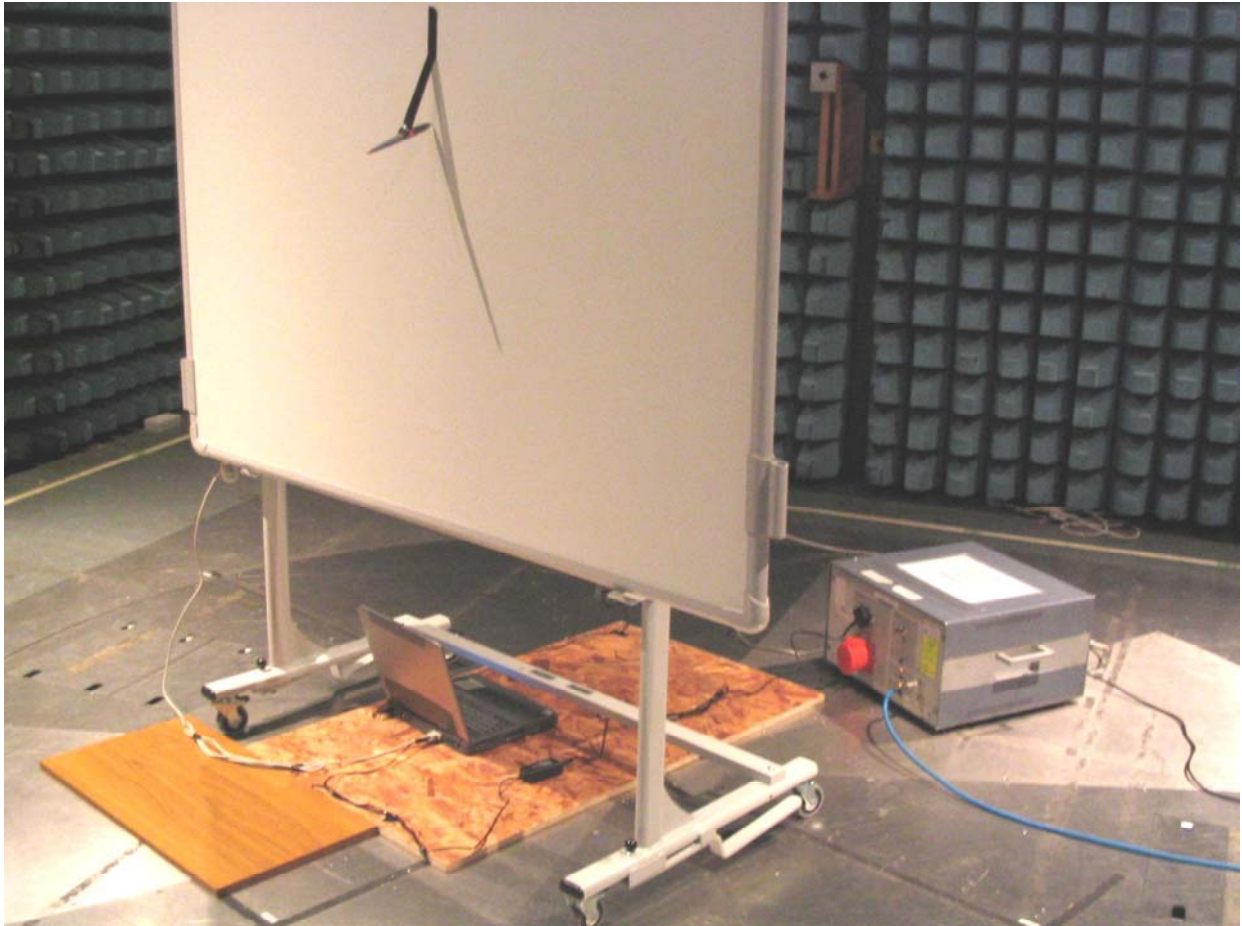
Emission Frequency (MHz)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)
0.4325	35.8	57.2	30.4	47.2
0.7213	34.8	56.0	30.7	46.0
1.0088	35.4	56.0	31.8	46.0
1.5857	35.1	56.0	31.7	46.0
1.8759	34.6	56.0	30.0	46.0
15.2093	41.4	60.0	40.8	50.0

The margin between the specification requirements and all other emissions were 21.3dB or more below the specified Quasi-peak limit and 16.8dB or more below the specified Average limit.



2.6 CONDUCTED EMISSIONS ON POWER LINES - continued

2.6.7 Set Up Photograph



Power Line Conducted Emissions Set Up Photograph



SECTION 3

TEST EQUIPMENT USED AND MEASUREMENT UNCERTAINTY



3.1 TEST EQUIPMENT USED

Item	Instrument	Manufacturer	Type No	Serial No	EMC No	Cal. Due
Section 2.1						
1	Spectrum Analyser	Hewlett Packard	8542E	3617A00165_00154	2286	09/12/2004
2	Bilog Antenna	Schaffner	CBL6143	-	2965	12/09/2005
3	Turntable Controller	No Data	HD 050	050/396	2528	-
4	Screened Room 5	Siemens	EAC54300	NA	2533	-
Section 2.2						
5	Spectrum Analyser	Hewlett Packard	8542E	3617A00165_00154	2286	09/12/2004
6	Bilog Antenna	Schaffner	CBL6143	-	2965	12/09/2005
7	Turntable Controller	No Data	HD 050	050/396	2528	-
8	Screened Room 5	Siemens	EAC54300	NA	2533	-
Section 2.3						
9	Spectrum Analyser	Hewlett Packard	8542E	3617A00165_00154	2286	09/12/2004
10	Bilog Antenna	Schaffner	CBL6143	-	2965	12/09/2005
11	Turntable Controller	No Data	HD 050	050/396	2528	-
12	Screened Room 5	Siemens	EAC54300	NA	2533	-
Sections 2.4 & 2.5						
13	Turntable Controller	No Data	HD 050	050/396	2528	-
14	Screened Room 5	Siemens	EAC54300	NA	2533	-
15	Low Noise Amplifier	Miteq Corp	AMF-3d-001080-18-13P	UNK	2457	-
16	HF Amplifier	Miteq Corp	AMF-4F-080180	492562	2430	-
17	EMI Test Receiver	Rohde & Schwarz	ESIB40	100142/040	2917	11/02/2005
18	Emco 3115 Drg Ant	Emco	3115	97015079	2397	07/07/2005
19	Signal Generator	Marconi	2031	119530069	1979	30/10/2004
20	Signal Generator	Hewlett Packard	8673B	2147A00423	411	02/03/2005

**3.1 TEST EQUIPMENT USED** (continued)

Item	Instrument	Manufacturer	Type No	Serial No	EMC No	Cal. Due
Section 2.6						
21	Transient Limiter	Hewlett Packard	11947A	3107A01649	2244	13/05/2005
22	Three Phase Lisen	Rohde & Schwarz	ESH2-Z5	892107-019	1584	20/10/2004
23	Test Receiver	Rohde & Schwarz	ESH3	872742/002	1020	16/08/2004



3.2 MEASUREMENT UNCERTAINTY

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

IN THE FREQUENCY RANGE 30MHz TO 1000MHz		
TEST	FREQUENCY	AMPLITUDE
For Power Line Conducted Emissions, LISN	$\pm 2 \times 10^{-7} \times$ Centre Frequency	± 3.2 dB calculated in accordance with CISPR 16-4
For Radiated Emissions, Quasi-Peak Measurements taken in Zero Span using the Hewlett Packard EMI Receiver and Bilog Antenna	$\pm 2 \times 10^{-7} \times$ Centre Frequency	5.15dB calculated in accordance with CISPR 16-4
IN THE FREQUENCY RANGE 1GHz TO 10GHz		
TEST	FREQUENCY	AMPLITUDE
For Spurious Radiated Emissions measurements	$\pm 2 \times 10^{-7} \times$ Centre Frequency	± 6.3 dB



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).

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APPENDIX A

TITCHFIELD FCC SITE COMPLIANCE LETTER



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