DFS Test of MCD2500 802.11a Wireless Camera

To: FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: ULTG06-U2 Rev A





Test of MCD2500 802.11a Wireless Camera

To: FCC 47 CFR Part 15.407 & IC RSS-210 [Limited to Dynamic Frequency Selection (DFS) Test Results]

Test Report Serial No.: ULTG06-U2 Rev A

This report supersedes None

Applicant: Librestream Technologies Inc

110-895 Waverley Street Winnipeg, MB R3T5P4

Canada

Product Function: 802.11a Mobile Collaboration Device

Copy No: pdf Issue Date: 25th May 2010

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.

440 Boulder Court, Suite 200 Pleasanton, CA 94566 USA Phone: +1 (925) 462-0304

Fax: +1 (925) 462-0306

www.micomlabs.com



CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 3 of 33

This page has been left intentionally blank



Serial #: ULTG06-U2 Rev A lssue Date: 25th May 2010

Page: 4 of 33

TABLE OF CONTENTS

AC	CREDITATION, LISTINGS & RECOGNITION	5
1.	TEST RESULT CERTIFICATE	8
2.	REFERENCES AND MEASUREMENT UNCERTAINTY	9
	2.1. Normative References	
3.	PRODUCT DETAILS AND TEST CONFIGURATIONS	
	3.1. Technical Details	
	3.2. Scope of Test Program	
	3.3. Equipment Model(s) and Serial Number(s)	
	3.4. Antenna Details	
	3.5. Test Configurations	15
	3.6. Equipment Modifications	
4.	TEST SUMMARY	
5.	TEST RESULTS	
•	5.1. Dynamic Frequency Selection (DFS)	
	Test Procedure and Setup for Client without Radar Detection Capability	
	5.1.1. Test Set Up:	
	5.2. Dynamic Frequency Selection (DFS) Test Results	20
	5.2.1. In-Service Monitoring for Channel Move Time, Channel Closing	
	Transmission Time and Non-Occupancy Period	
6.	PHOTOGRAPHS	30
	6.1. Dynamic Frequency Selection Test Set-Up	30
7.	TEST FOUIPMENT DETAILS	32



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 5 of 33

ACCREDITATION, LISTINGS & RECOGNITION

MiCOM Labs, Inc. an accredited laboratory complies with the international standard BS EN ISO/IEC 17025. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf



Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).



Presented this 14th day of April 2010.

President & CEO V
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2011

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 6 of 33

LISTINGS

MiCOM Labs test facilities are listed by the following organizations;

North America

United States of America

Federal Communications Commission (FCC) Listing #: 102167

Canada

Industry Canada (IC) Listing #:4143A

Japan Registration

VCCI Membership Number: 2959

- Radiation 3 meter site; Registration No. R-2881
- Line Conducted, Registration Nos. C-3181 & T-1470
- Emissions; Registration Nos. C-3180 & T-1469

RECOGNITION

APEC MRA (Asia-Pacific Economic Community Mutual Recognition Agreement)

Conformity Assessment Body (CAB) - MiCOM Labs

Test data generated by MiCOM Labs is accepted in the following countries under the APEC MRA.

Country	Recognition Body	Phase	CAB Identification No.
Australia	Australian Communications and Media Authority (ACMA)	I	
Hong Kong	Office of the Telecommunication Authority (OFTA)	I	
Korea Ministry of Information and Communication Radio Research Laboratory (RRL)		I	US0159
Singapore	Infocomm Development Authority (IDA)		
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	_	
Vietnam	Ministry of Information and Communications	I	



Serial #: ULTG06-U2 Rev A lssue Date: 25th May 2010

Page: 7 of 33

DOCUMENT HISTORY

Document History				
Revision Date		Comments		
Draft				
Α	25 th May 2010	Initial release.		



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 8 of 33

1. TEST RESULT CERTIFICATE

Applicant: Librestream Technologies Inc Tested By: MiCOM Labs, Inc.

110-895 Waverley Street 440 Boulder Court

Winnipeg, MB R3T5P4 Suite 200
Canada Pleasanton

California, 94566, USA

EUT: 802.11a/b/g Client Device Telephone: +1 925 462 0304

Model: MCD2500 Fax: +1 925 462 0306

S/N: N/A

Test Date(s): 29th to 30th March 2010 Website: www.micomlabs.com

STANDARD(S)

TEST RESULTS

FCC 47 CFR Part 15.407 & IC RSS-210 Annex 9

EQUIPMENT COMPLIES

[Limited to Dynamic Frequency Selection (DFS) test results for client device only]

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

- 1. This document reports conditions under which testing was conducted and the results of testing performed.
- 2. Details of test methods used have been recorded and kept on file by the laboratory.

3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:

CERTIFICATE #2381.01

Graeme Grieve

Quality Manager MiCOM Labs,

Gordon Hurst

President & CEO MiCOM Labs, Inc.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. Any changes will be noted in the Document History section of the report.



Serial #: ULTG06-U2 Rev A lssue Date: 25th May 2010

Page: 9 of 33

2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	2009	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	Industry Canada RSS-210	Issue 7 June 2007	Low Power License-Exempt Radio communication Devices (All Frequency Bands): Category 1 Equipment
(iv)	Industry Canada RSS-Gen	Issue 2 June 2007	General Requirements and Information for the Certification of Radio communication Equipment
(v)	ANSI C63.4	2003	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
(vi)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(vii)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(viii)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(ix)	A2LA	7 th August 2009	Reference to A2LA Accreditation Status – A2LA Advertising Policy



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 10 of 33

2.2. Test and Uncertainty Procedures

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.



Serial #: ULTG06-U2 Rev A lssue Date: 25th May 2010

Page: 11 of 33

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description	
Purpose:	Test of the MCD2500 802.11a Wireless Camera per the	
ruipose.	DFS requirements for a Client device to FCC Part	
	15.407 and Industry Canada RSS-210 Annex 9	
	regulations in the frequency ranges 5250 to 5350 MHz,	
	and 5470 to 5,725 MHz	
Applicant:		
, ppiloana	110-895 Waverley Street	
	Winnipeg, MB R3T5P4 Canada	
Manufacturer:	As Applicant	
Laboratory performing the tests:	MiCOM Labs, Inc.	
	440 Boulder Court, Suite 200	
	Pleasanton, California 94566 USA	
Test report reference number:	ULTG06-U2 Rev A	
Date EUT received:	26 th March 2010	
Standard(s) applied:	FCC 47 CFR Part 15.407 & IC RSS-210	
Dates of test (from - to):	29th to 30th March 2010	
No of Units Tested:	One	
Type of Equipment:	802.11a Wireless Client device	
Applicants Trade Name:	Onsight	
Model(s):	MCD2500	
Radio Firmware Release	2.1.10	
Declared Frequency Range(s):	5,250 to 5,350 MHz	
	5,470 to 5,725 MHz	
Type of Modulation:	Per 802.11a – OFDM	
Declared Nominal Output Power:	802.11a: +12 dBm	
(Average Power)		
EUT Modes of Operation:	Limited to 802.11a	
DFS Operational Mode:	Client device without radar detection capability	
Transmit/Receive Operation:	Time Division Duplex	
Rated Input Voltage and Current:		
Battery	7.2V @ 2A	
Operating Temperature Range:	Declared range -10 to +40°C	
Frequency Stability:	±15 ppm max	
Equipment Dimensions:	7.36" x 5" X 4.25"	
Weight:	2.3 lbs (1040 grams)	
Primary function of equipment:	Mobile Collaboration Device	



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 12 of 33

3.2. Scope of Test Program

The scope of the test program was to test the Librestream Technologies Inc MCD2500 802.11a Mobile Collaboration Device in the frequency ranges 5,250 – 5,350 or 5,470 to 5,725 MHz as a Client device for compliance against the Dynamic Fr4equency Selection (DFS) requirements of FCC 47 CFR Part 15.407 and the FCC specification Memorandum Opinion and Order FCC 06-96.

One frequency was chosen (5,500 MHz) from the operating channels of the UUT within the 5,250 – 5,350 MHz and 5,470 – 5,725 MHz bands for DFS testing per the requirements of FCC specification "Memorandum Opinion and Order FCC 06-96", Section 7.8 "DFS Conformance Test Procedures".



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 13 of 33

Librestream Technologies Inc MCD2500 Mobile Collaboration Device (Front)





Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010 Page: 14 of 33

Librestream Technologies Inc MCD2500 Mobile Collaboration Device (Rear)





Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 15 of 33

3.3. Equipment Model(s) and Serial Number(s)

Type (EUT/ Support) Equipment Description (Including Brand Name)		Mfr	Model No.	Serial No.
EUT	Mobile Collaboration Device	Librestream Technologies Inc	MCD2500	N/A
Support	Wireless Access Point	Motorola	AP-7131	8248520900833
Support	Laptop PC	Compaq	Presario	None

3.4. Antenna Details

1. Integral 2dBi; no antennas were tested as part of this compliance program

3.5. <u>Test Configurations</u>

Operational Mode(s)	DFS Test Frequency	
(802.11)	(MHz)	
а	5,500	

3.6. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE



Serial #: ULTG06-U2 Rev A lssue Date: 25th May 2010

Page: 16 of 33

3.7. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 17 of 33

4. TEST SUMMARY

List of Measurements

Dynamic Frequency Selection (DFS)

The following table represents the list of measurements required under the FCC CFR47 Part 15.407(h)(2) and FCC Memorandum Opinion and Order FCC 06-96 (Compliance Measurement procedures for Unlicensed National Information Infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz bands incorporating dynamic frequency selection).

Tests performed on 802.11 a/b/g Client Device

Section	Test Items	Description	Condition	Result	Test Report Section
7.8.3	In-Service Monitoring	In-Service Monitoring for Channel Move Time; Channel Closing Transmission Time; Non- Occupancy Period.	Conducted	Complies	5.2.1

The EUT is a client device without radar detection capability therefore testing was limited to Channel Closing Transmission Time and Channel Move Time

- Note 1: Test results reported in this document relate only to the items tested
- **Note 2:** The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria
- **Note 3:Section 3.7** Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 18 of 33

5. TEST RESULTS

5.1. <u>Dynamic Frequency Selection (DFS)</u>

Test Procedure and Setup for Client without Radar Detection Capability

FCC, Part 15 Subpart C §15.407(h) FCC 06-96 Memorandum Opinion and Order Industry Canada RSS-210 A9.4

Measurement Results - Dynamic Frequency Selection (DFS)

Ambient conditions.

Temperature: 17 to 23 °C Relative humidity: 31 to 57% Pressure: 999 to 1012 mbar

Radio parameters.

Test methodology: Conducted

Device Type: Client without radar detection

Tests Performed for Client Device without radar detection

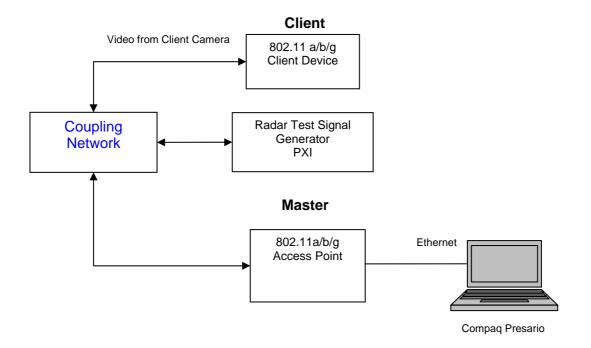
Requirement	Operational Mode	
	Client	
Channel Closing Transmission Time	Yes	
Channel Move Time	Yes	



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 19 of 33

5.1.1. <u>Test Set Up:</u> Block Diagram(s) of Test Setup





Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 20 of 33

5.2. Dynamic Frequency Selection (DFS) Test Results

5.2.1. <u>In-Service Monitoring for Channel Move Time, Channel Closing Transmission</u> <u>Time and Non-Occupancy Period</u> FCC §15.407(h)(2)(iii)

The steps below define the procedure to determine the above mentioned parameters when a radar Burst is generated on the Operating Channel of the device.

As the EUT has a camera that is used in normal operation the video data generated was streamed to the Access Point to provide the required link load conditions.

Channel Closing Transmission Time - Measurement

A Type 1 waveform was introduced to the EUT, from which a 12 second transmission record was digitally captured, collecting nearly 250M samples of data, which included in excess of 600 ms of pre-trigger data. This Type 1 waveform had an integral marker built into its construction, marking the start of the radar waveform play, which directly triggered the PXI digitizer's data capture via the PXI backplane trigger bus.

The test system was set-up to capture all transmission data for Access Card events above a threshold level of -50 dBm. The test equipment time stamps all captured events with respect to T_0 (zero time indicating the start of the measurements sequence) starting the 612.1 ms pre-trigger period followed by the radar type 1 burst period.

Radar (Type 1) Pre-trigger period 612.1 ms

Type 1 burst period 25.705 ms

(The period of the 18 pulse burst includes [18 pulses *1.428mS PRI] = 25.704 ms. Then add 1 μ s pulse width for the final pulse.)

Channel Closing Transmission Time starts immediately after the last radar pulse is transmitted i.e. 637.8 ms after the start of the trace capture period.



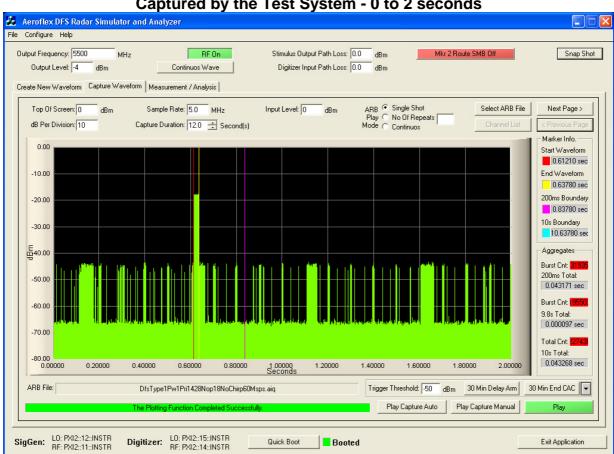
Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 21 of 33

Therefore, pulses seen after this 637.8 ms boundary are identified and totaled to provide an aggregate total of transmissions in order to determine whether the EUT is compliant with the Channel Closing Transmission Time requirements as described in MO&O FCC 06-96. In this case, it was found that an aggregate total of <u>43.268 ms</u> of transmission time accrued. This value is found at the right hand side at the foot of the following plot (10s Total).

Channel Closing Transmission Time = 43.268 mSecs (limit 260 mSecs)

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 0 to 2 seconds



From the plot above it can be seen that the transmission activity within the 200 mS window is 43.171 mS (see 200 mS Total). The following plots identify all additional activity within the remainder of the 10 sec measurement window.

Last EUT Transmitter Activity = 5.170 Seconds Last Radar Activity = 0.6378 Seconds

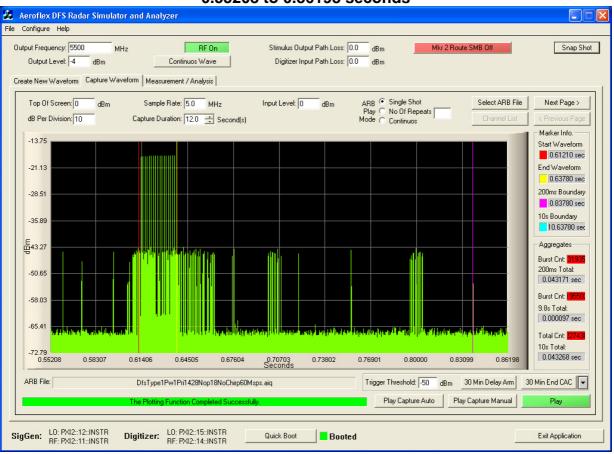
Channel Move Time = Last Transmitter Activity – Last Radar Activity = 5.170 – 0.6378 Channel Move Time = 4.532 secs (Limit 10 secs)



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 22 of 33

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Close up of EUT, AP and Radar Injection Captured by the Test System – 0.55208 to 0.86198 seconds

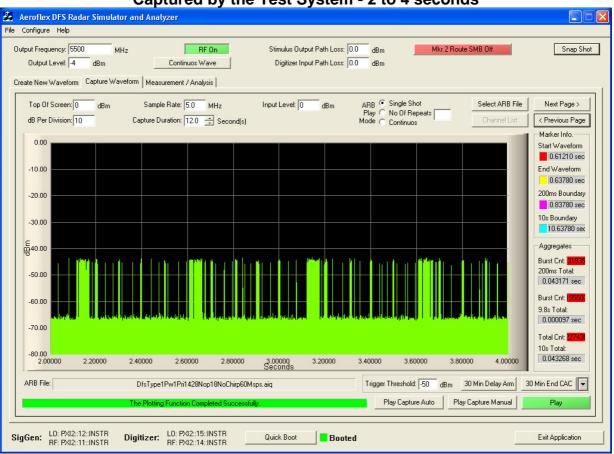




Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 23 of 33

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 2 to 4 seconds

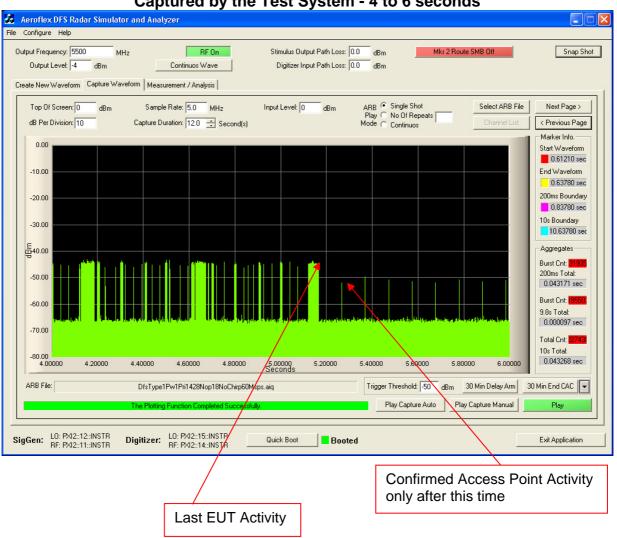




Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 24 of 33

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 4 to 6 seconds



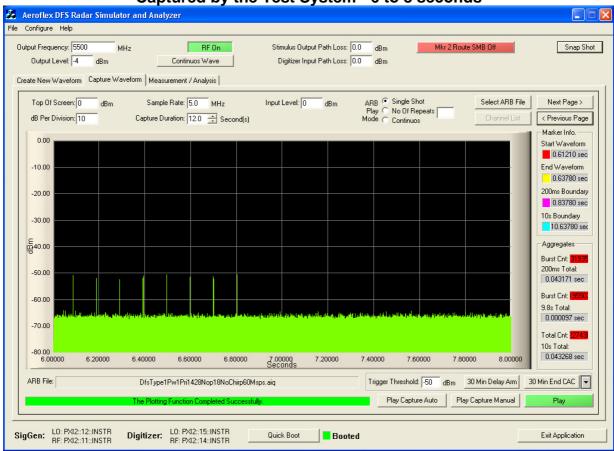
In the above plot the EUT stops transmission before the Access Point.



Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 25 of 33

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 6 to 8 seconds

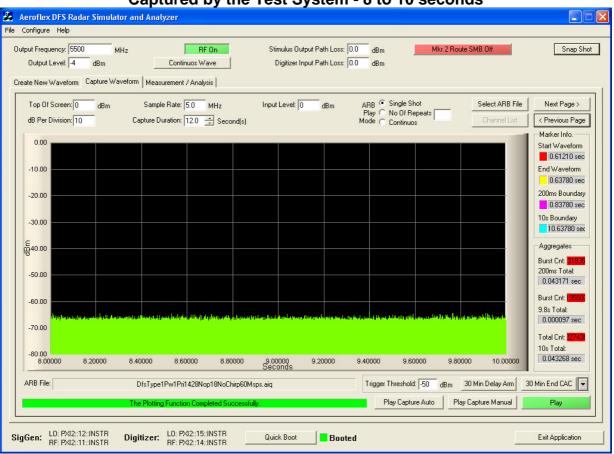




Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 26 of 33

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 8 to 10 seconds

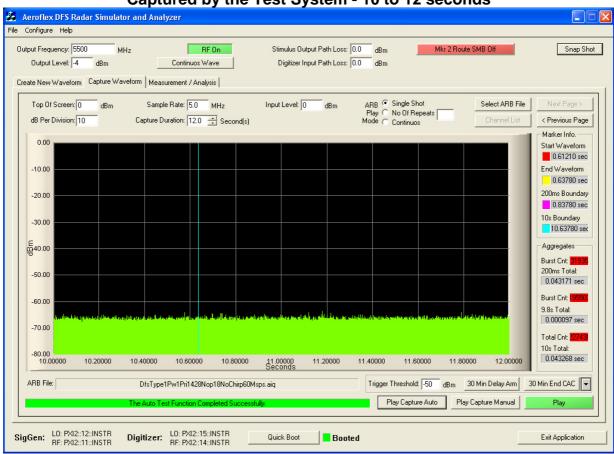




Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 27 of 33

Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 10 to 12 seconds





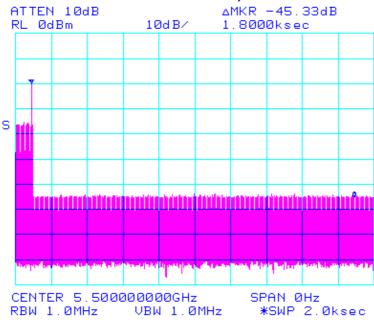
Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 28 of 33

30 Minute Non-Occupancy Period

The EUT is monitored for more than 30 minutes following the channel close/move time to verify no transmissions, including beacons, resume on this Channel. Radar signature #1 was used to trigger the access point.

30 Minute Non-Occupancy Period Type 1 Radar Ch 5,500 MHz





Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 29 of 33

Measurement Uncertainty Time/Power

Measurement uncertainty			
	- Tin	ne 4%	
	- Pow	rer 1.33dB	

Traceability

Test Equipment Used

 $0072,\,0083,\,0098,\,0116,\,0132,\,0158,\,0313,\,0314,\,0193,\,0223,\,0252,\,0253,\,0251,\,0256,\,0328,\,0329$



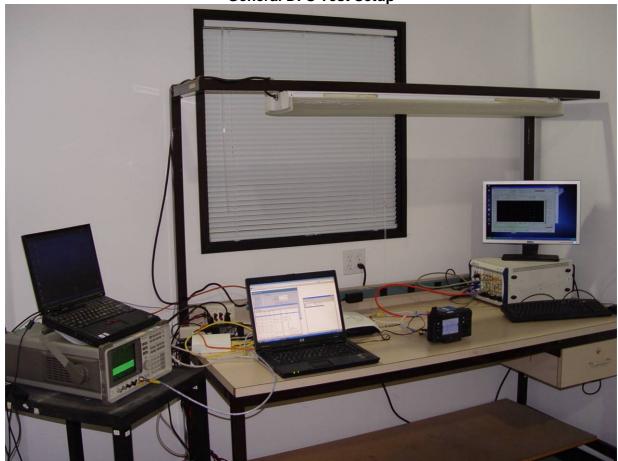
Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 30 of 33

6. PHOTOGRAPHS

6.1. <u>Dynamic Frequency Selection Test Set-Up</u>

General DFS Test Setup





Serial #: ULTG06-U2 Rev A Issue Date: 25th May 2010

Page: 31 of 33

DFS Test Equipment





Serial #: ULTG06-U2 Rev A lssue Date: 25th May 2010

Page: 32 of 33

7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Model #	Serial #
0072	Signal Generator	Hewlett Packard	HP 83640A	2927A00105
0083	Coupler	Hewlett Packard	HP 87301D	3116A00389
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0158	Barometer /Thermometer	Control Co.	4196	E2844
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0223	Power Meter	Hewlett Packard	HP EPM-442A	US37480256
0252	K-Cable	Megaphase	Sucoflex 104	Unknown
0253	K-Cable	Megaphase	Sucoflex 104	Unknown
0256	K-Cable	Megaphase	Sucoflex 104	Unknown
0251	K-Cable	Megaphase	Sucoflex 104	Unknown



440 Boulder Court, Suite 200 Pleasanton, CA 94566, USA Tel: 1.925.462.0304

Fax: 1.925.462.0306 www.micomlabs.com