

Test of Motorola Mobile Computer VC6096

To: FCC 47 CFR Part 15.407

Test Report Serial No.: LYRS01-A2 Rev A



# TEST REPORT

FROM



Test of Motorola Mobile Computer VC6096

To: FCC 47 CFR Part 15.407

Test Report Serial No.: LYRS01-A2 Rev A

This report supersedes NONE

**Manufacturer:** Motorola Inc.  
One Motorola Plaza  
Holtsville, New York 11742  
USA

**Product Function:** Mobile Wireless Computing

**Copy No:** pdf    **Issue Date:** 2nd December 2008

**This Test Report is Issued Under the Authority of:**

**MiCOM Labs, Inc.**  
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CERTIFICATE #2381.01

**MiCOM Labs is an ISO 17025 Accredited Testing Laboratory**



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## 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](http://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>



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## 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-2

## 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	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	I	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	I	
Singapore	Infocomm Development Authority (IDA)	I	
Taiwan	Directorate General of Telecommunications (DGT)	I	
	Bureau of Standards, Metrology and Inspection (BSMI)	I	

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## DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
A	2 <sup>nd</sup> December 2008	Initial Release

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## 1. TEST RESULT CERTIFICATE

<b>Manufacturer:</b> Motorola Inc. One Motorola Plaza Holtsville, New York 11742 USA	<b>Tested By:</b> MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
<b>EUT:</b> Mobile Wireless Computer	<b>Telephone:</b> +1 925 462 0304
<b>Model:</b> VC6096	<b>Fax:</b> +1 925 462 0306
<b>S/N:</b> 8204500000003 (Engineering Prototype)	
<b>Test Date(s):</b> 19th to 25th November 2008	<b>Website:</b> www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 DFS Only (Non-Radar Detecting Client)	EQUIPMENT COMPLIES

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:

Graeme Grieve  
Quality Manager MiCOM Labs,

Gordon Hurst  
President & CEO MiCOM Labs, Inc.



CERTIFICATE #2381.01

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## 2. REFERENCES AND MEASUREMENT UNCERTAINTY

### 2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	2007	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	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
(iv)	CISPR 22/ EN 55022	2006 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(v)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(vi)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(vii)	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
(viii)	A2LA	14 <sup>th</sup> September 2005	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(ix)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices

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## **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.

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### 3. PRODUCT DETAILS AND TEST CONFIGURATIONS

#### 3.1. Technical Details

Details	Description
Purpose:	Test of the Motorola Mobile Computer VC6096 as a Client Device without radar detection capabilities in the frequency ranges 5,250 to 5,350 MHz, and 5,470 to 5,725 MHz to FCC Part 15.407 DFS requirements only
Applicant:	7 Layers Borsigstrasse 11, 40880 Ratingen, Germany
Manufacturer:	Motorola Inc. One Motorola Plaza Holtsville, New York 11742 USA
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	LYRS01-A2 Rev A
Date EUT received:	14 <sup>th</sup> November 2008
Standard(s) applied:	FCC 47 CFR Part 15.407
Dates of test (from - to):	19th to 25th November 2008
No of Units Tested:	1
Type of Equipment:	802.11a/b/g Wireless LAN (transmitter & receiver)
EUT Modes of Operation:	GSM/GPRS/EDGE/UMTS-HSDPA, WLAN a/b/g, BT, GPS
Location for Use:	Indoor and outdoor operation
Trade Name:	Motorola
Model(s):	VC6096
FCC ID	UZ7V6096
Software Release	2.05
Hardware Release	Rev A
Declared Frequency Range(s):	5,250 to 5,350 MHz 5,470 to 5,725 MHz,
Type of Modulation:	Per 802.11
Declared Nominal O/P Power: (Average Power)	+14 dBm
EUT Modes of Operation:	802.11a/b/g
Transmit/Receive Operation:	Time Division Duplex
Rated Input Voltage and Current:	ac Nom (via ac adapter): 110 – 220Vac 50-60Hz Vmax: 240Vac, Vmin 100Vac Dc Nom: 14.5Vdc Alternative Power Source: Cigarette Lighter Adapter
Operating Temperature Range:	Declared range -20 to +60°C
Frequency Stability:	±20 ppm max
Equipment Dimensions:	24.2 cm (H) X 23.5 cm (W) X 4.95 cm (D) cm
Weight:	2.2 Kg's
Primary function of equipment:	Mobile Wireless Computing

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### 3.2. Scope of Test Program

The scope of this program was to test the Motorola VC6096 Mobile Wireless Computer as a Client Device without Radar detection for compliance with the Dynamic Frequency Selection (DFS) requirements of FCC 47 CFR Part 15.407 and the FCC specification Memorandum Opinion and Order FCC 06-96. The Client configured device was tested with an FCC certified Access Point with full radar detection capability.

Access Point utilized to determine compliance:

<b>Equipment Description (Including Brand Name)</b>	<b>Mfr</b>	<b>Model No.</b>	<b>FCC ID</b>	<b>Serial No.</b>
Wireless Access Point AIRONET 802.11a/b/g	Cisco	AIR-AP1242AG-A-K9	LDK102056	FTX0940B04J

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

DFS Test Methodology: Conducted and Radiated

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### Motorola Mobile Computer VC6096



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### Cisco Systems Access Point (Master Device)

**Model:** AIR-AP1242AG-A-K9



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**Cisco Systems Access Point (Master Device)**

**Model: AIR-AP1242AG-A-K9**



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

Type (EUT/Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Mobile computer acting as client device (non-radar detecting capability)	Motorola	VC6096	8204500000003
Support	ac Adapter	Delta Electronics	EADP-60EB B	OTW0812000065
Support	Access Point (Master)	Cisco Systems	AIR-AP1242AG-A-K9	FTX0940B04J
Support	Laptop	Dell	Inspiron	N/A
Support	Laptop	IBM	Thinkpad	N/A

### 3.4. Antenna Details

Model Number: Motorola FLN4048A

Gain 2.4 GHz operation: 2.3 dBi (peak)

Gain 5 GHz operation: 1.5 dBi (peak)

### 3.5. Cabling and I/O Ports

Number and type of I/O ports

1. USB x 2
2. Mini USB
3. SD Card
4. 10/100 Ethernet LAN
5. WLAN External Antenna (reverse/reverse polarization)
6. WAN External Antenna
7. GPS External Antenna
8. 50 pin Auxiliary Port

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### 3.6. Test Configurations

DFS testing was performed on the customer equipment configured as:-

- 1). Client device without radar detection in accordance with the following table.

Requirement	Operational Modes
	Client Without Radar Detection
DFS Detection Threshold	Not Required
U-NII Detection Bandwidth	Not Required
Channel Closing Transmission Time	Yes
Channel Move Time	Yes
Non-Occupancy	Yes

### 3.7. Equipment Modifications

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

1. Modification made to the FCC Mpeg Video

A modification was required to the FCC Video as the Windows Media Player does not support MPEG file format over the unicast stream.

The MPEG Video was re-sampled into a 30 second wmv file with a different encoding codec.

File Name: FCCCut30E.wmv

File size: 3 MByte

Play Operation: Continuously Looping

### 3.8. Deviations from the Test Standard

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

1. NONE



#### 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 Motorola VC6096 Client Device

Section	Test Items	Description	Condition	Result	Test Report Section
7.8.3	In-Service Monitoring	In-Service Monitoring for Channel Move Time and Channel Closing Transmission Time	Conducted & Radiated	Complies	5.2.1 & 5.3.1
7.8.3	Non-Occupancy Period	30 minute Non-Occupancy Period	Conducted & Radiated	Complies	5.2.2 & 5.3.2

**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 modifications required to bring the product into compliance with the above test matrix



## 5. Dynamic Frequency Selection (DFS)

### 5.1. Test Procedure and Setup

**FCC, Part 15 Subpart C §15.407(h)**  
**FCC 06-96 Memorandum Opinion and Order**

#### 5.1.1. DFS Response requirement values

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
<i>U-NII Detection Bandwidth</i>	Minimum 80% of the 99% power bandwidth See Note 3.

Note 1: The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows:

- For the Short pulse radar Test Signals this instant is the end of the *Burst*.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar *Burst* generated.
- For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

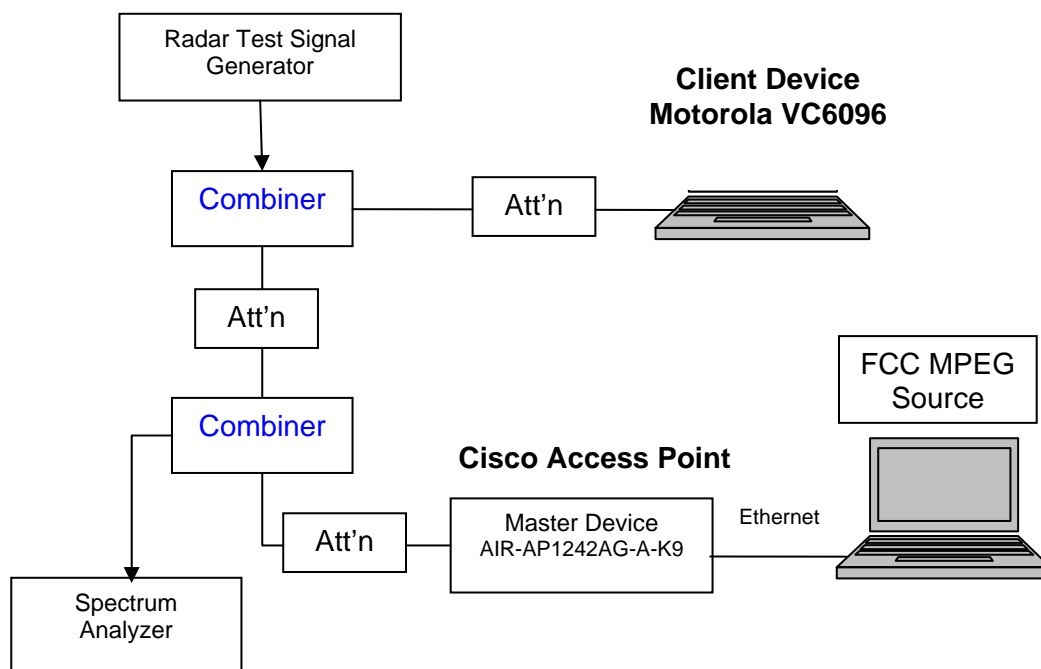
Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate *Channel* changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.

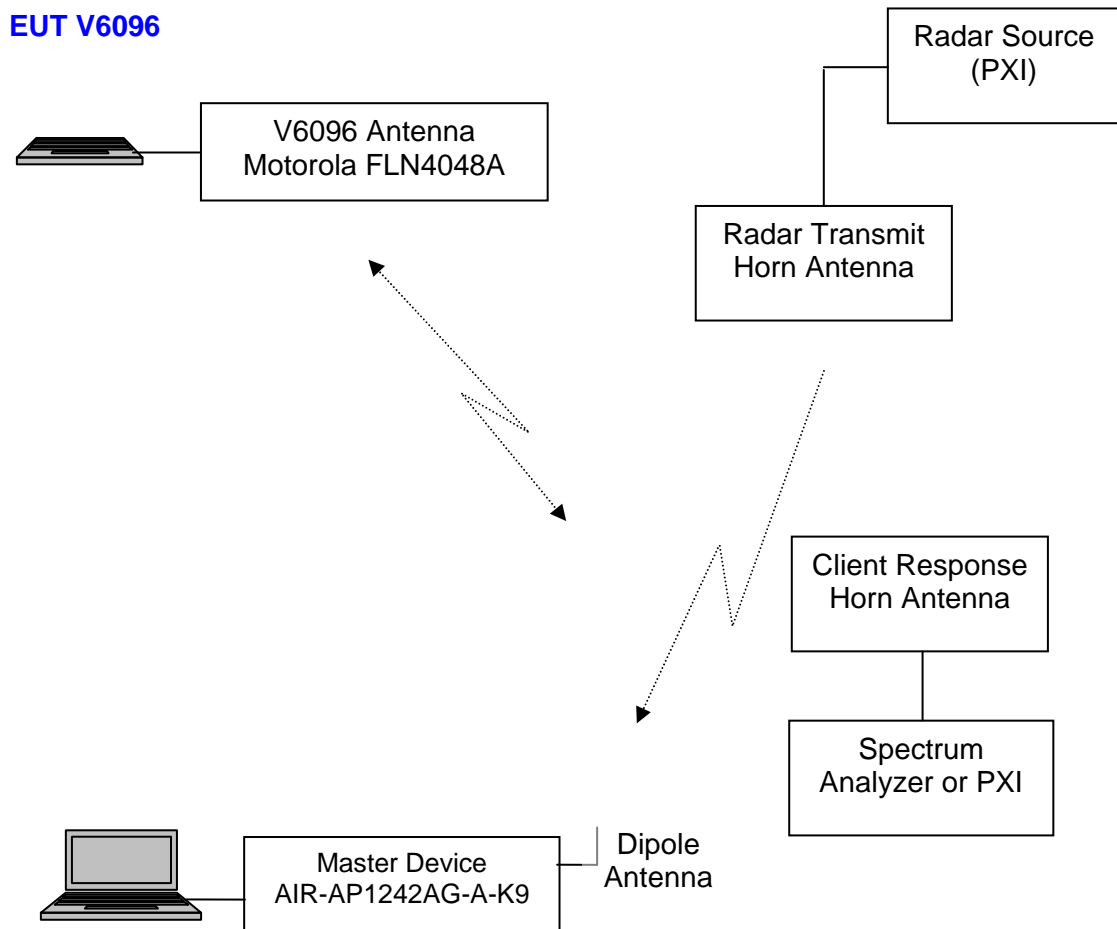
### 5.1.2. Test Set Up

#### Block Diagram(s) of DFS Test Setup

##### 5.1.2.1. *Conducted DFS Test Configuration*



### 5.1.2.2. Radiated DFS Test Configuration



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## 5.2. Conducted Testing

### 5.2.1. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time, Non-Occupancy Time

#### FCC §15.407(h)(2)(iii)

#### Tests Performed on Client Device (without radar detection)

Requirement	Operational Mode Client Without Radar Detection
Channel Closing Transmission Time	Yes
Channel Move Time	Yes
Non-Occupancy Time	Yes

The steps below define the procedure to determine the above mentioned parameters when a radar burst with a level equal to the DFS Detection Threshold is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Master Device was associated with the EUT (Client). Video streaming was implemented from the master device (AP) to the client (EUT).

Access Point Receive Power Level: = -62 dBm +1 = -61 dBm (assumes 0dBi antenna)

#### 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 events above a threshold level of -50 dBm. The test equipment time stamps all captured events with respect to T0 (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 µs 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.





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.

The following plots #1 to #6 show the response of the EUT in two second increments. All client activity takes place within the initial two seconds (Plot #1).

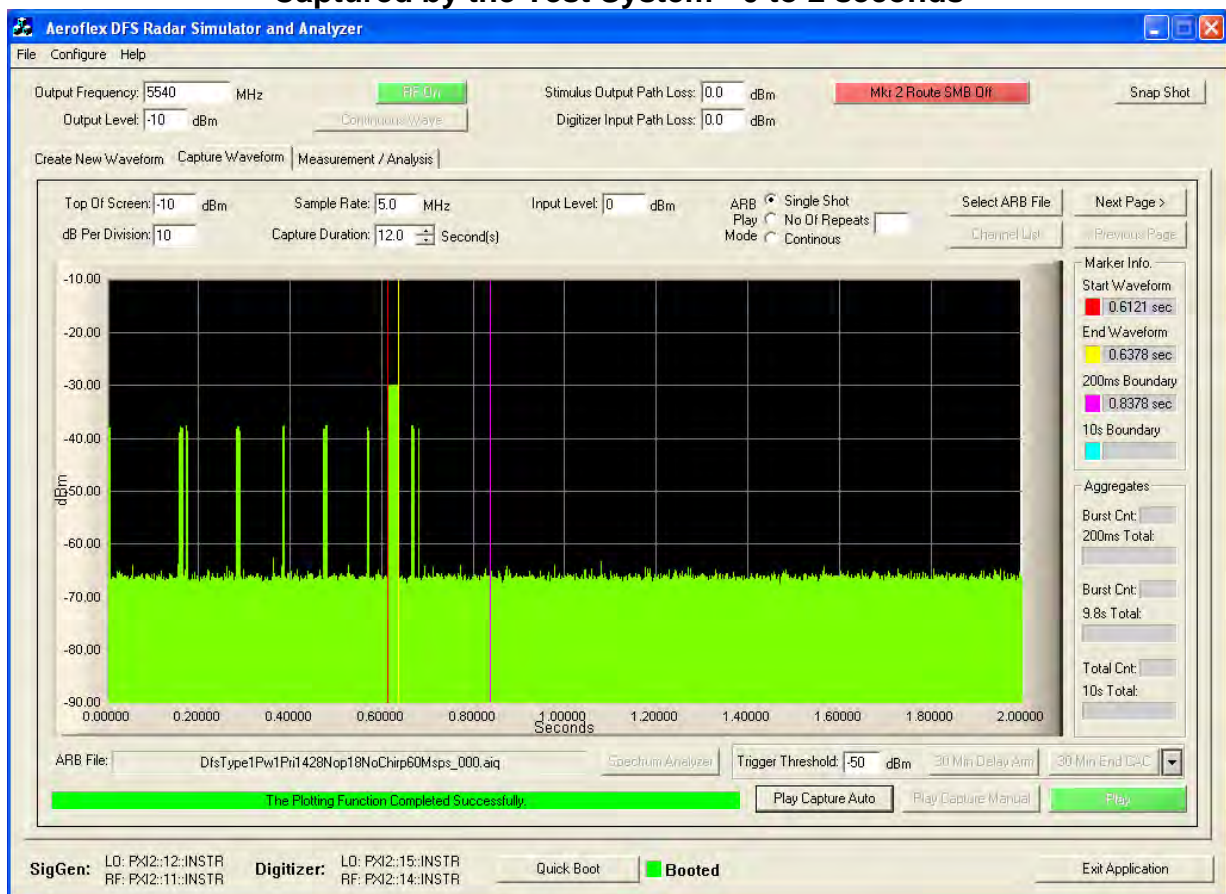
Plot #6 identifies Channel Closing and Channel Move Time. The Channel Closing Time is found at the right hand side at the foot of plot #6 (10s Total). It was found that an aggregate total of 0.386 ms of transmission time accrued.

**Channel Closing Transmission Time = 0.386 mSecs (limit 260 mSecs)**

**Channel Closing Move Time = 0.04335 Secs (limit 10 seconds)**

Plots #7 and #8 zoom into the initial two second period and Plot #8 identifies Channel Move Time

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



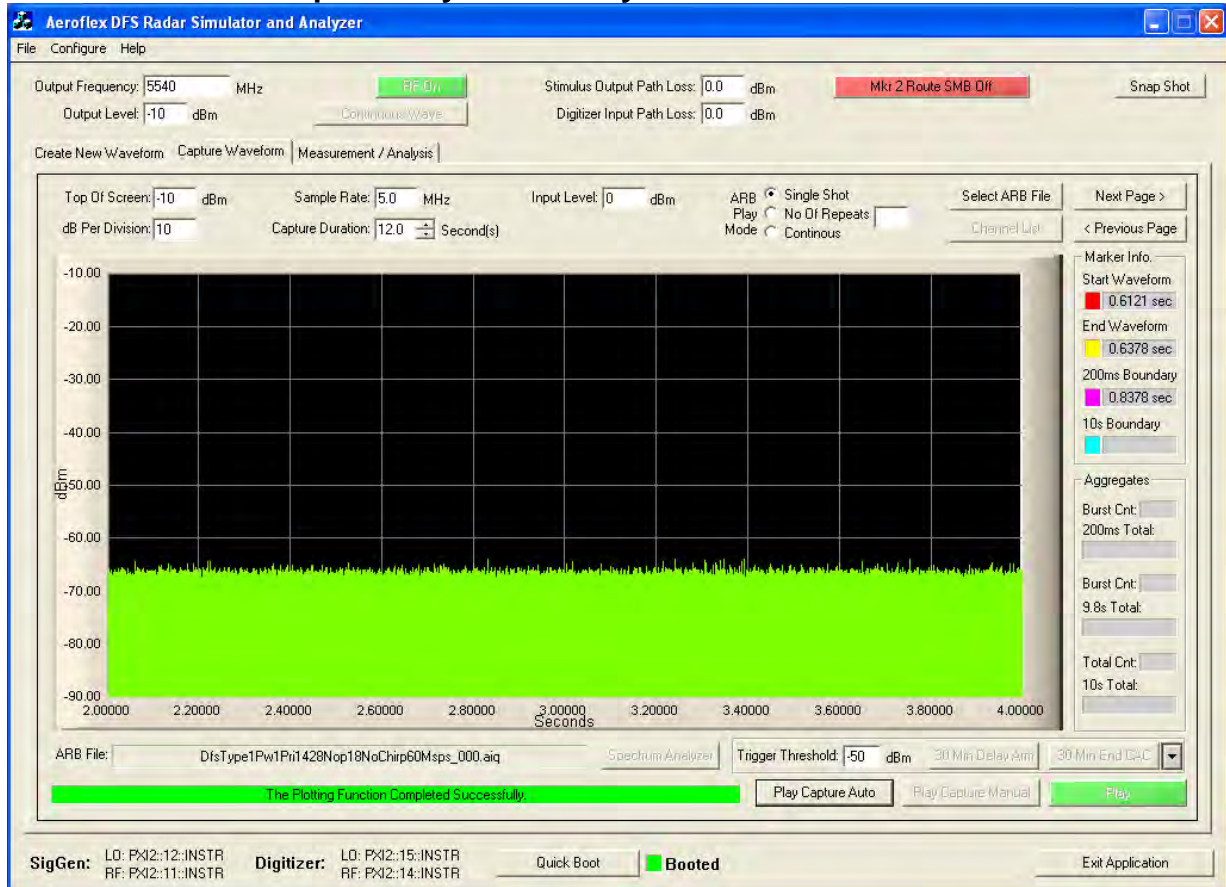
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**Conducted – Plot #2 Channel Move Time, Channel Closing Transmission Time  
for Type 1 Radar  
Captured by the Test System - 2 to 4 seconds**

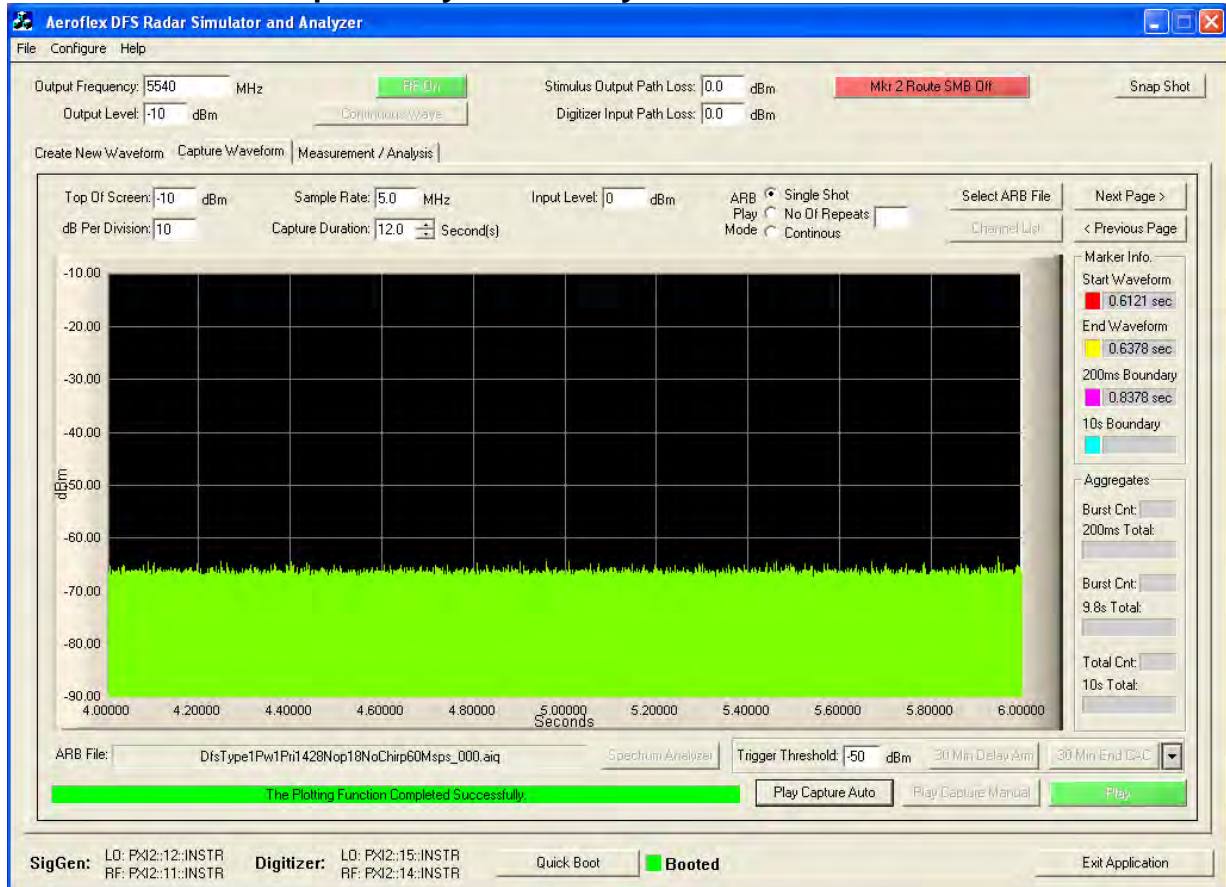


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**Conducted – Plot #3 Channel Move Time, Channel Closing Transmission Time  
for Type 1 Radar  
Captured by the Test System - 4 to 6 seconds**

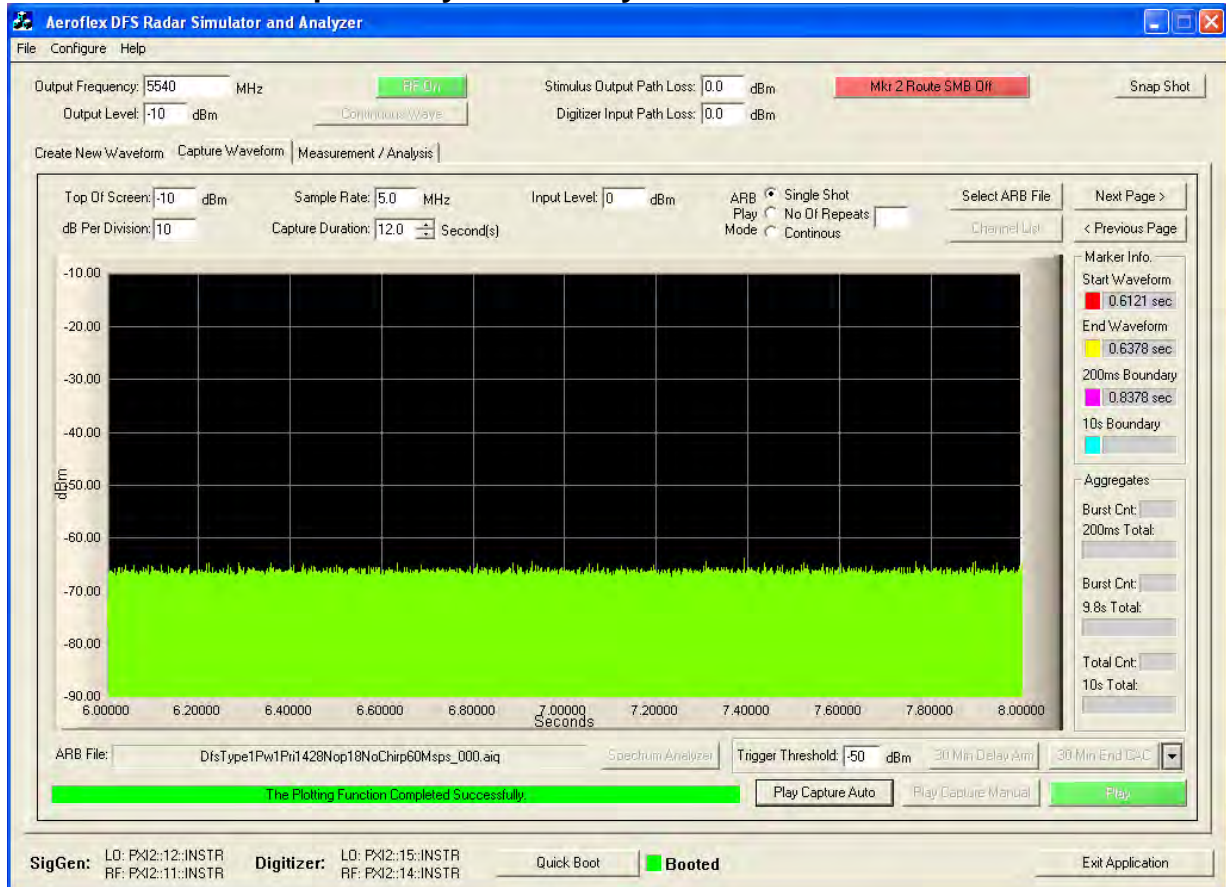


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**Conducted – Plot #4 Channel Move Time, Channel Closing Transmission Time  
for Type 1 Radar  
Captured by the Test System - 6 to 8 seconds**



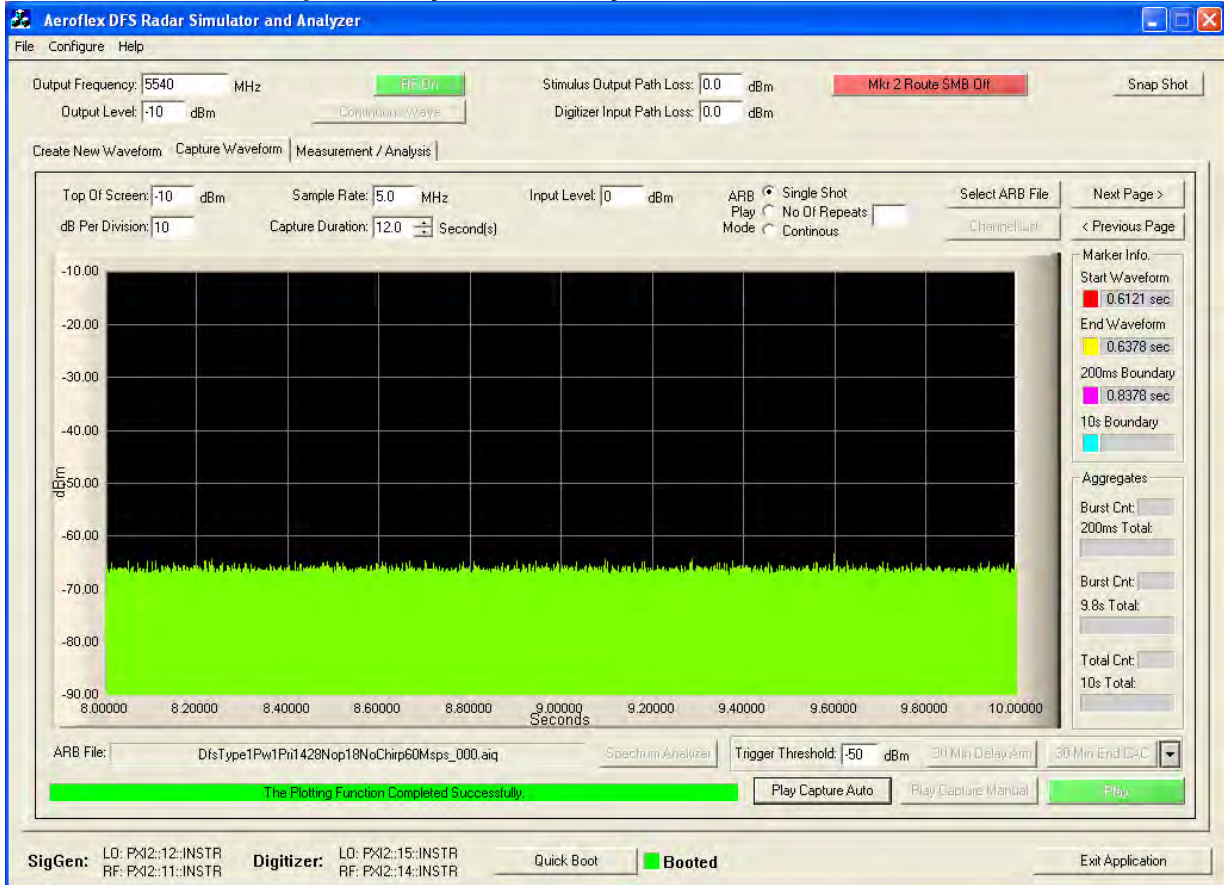
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**Conducted – Plot #5 Channel Move Time, Channel Closing Transmission Time  
for Type 1 Radar  
Captured by the Test System - 8 to 10 seconds**

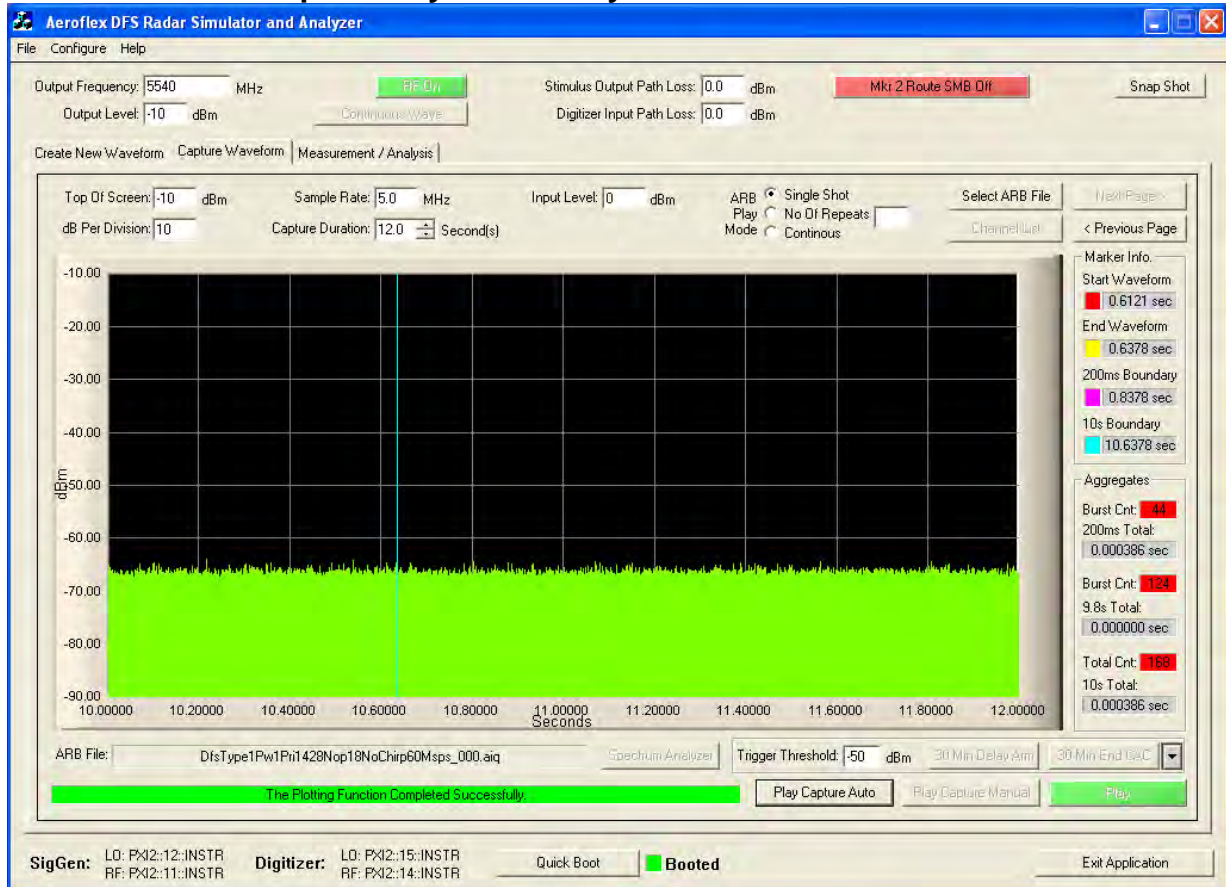


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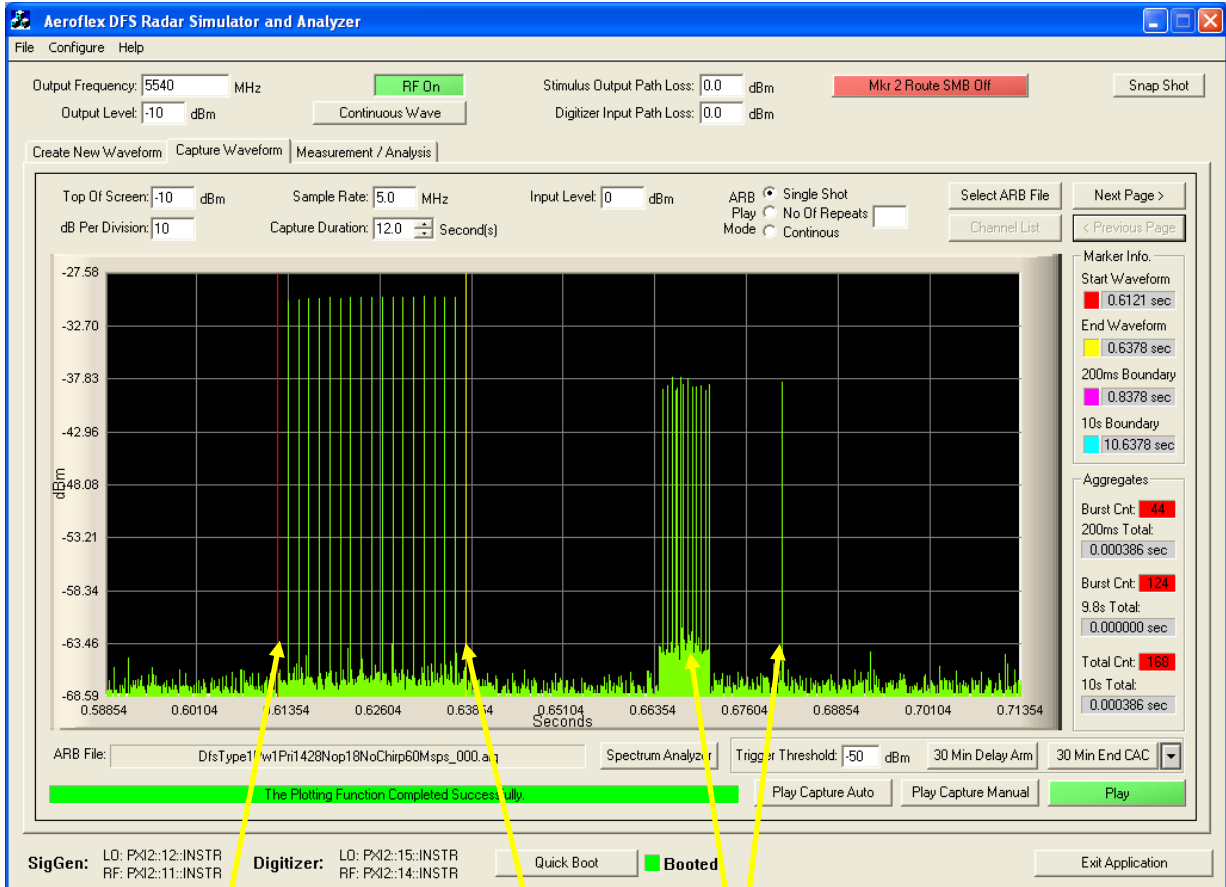
**Conducted – Plot #6 Channel Move Time, Channel Closing Transmission Time  
for Type 1 Radar  
Captured by the Test System -10 to 12 seconds**



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**Conducted – Plot #7 Channel Move Time, Channel Closing Transmission Time for Type 1 Radar**

**Plot zooms into transmission activity (see Plot #1)**



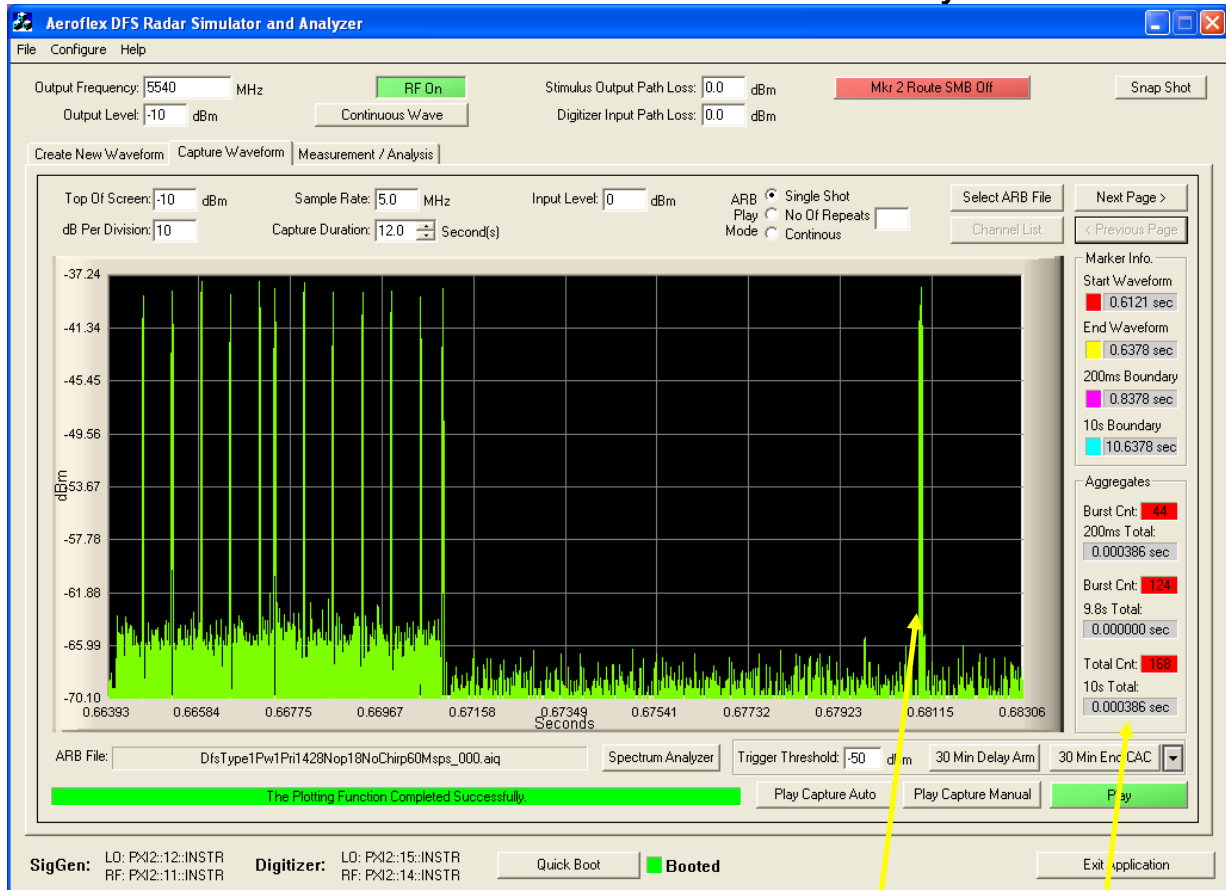
Beginning of radar burst

End of radar burst

Client Activity after radar burst

**Conducted – Plot #8 Channel Move Time, Channel Closing Transmission Time for Type 1 Radar**

**Plot zooms further into transmission activity**



Client Channel Move Time = 0.04335  
 (0.68115 – 0.6378 seconds)

Channel Closing Time  
 (0.386 mseconds)

Last Transmitter Activity = 0.68115 Seconds

Last Radar Activity = 0.6378 Seconds

Channel Move Time = Last Transmitter Activity – Last Radar Activity = 0.68115 – 0.6378

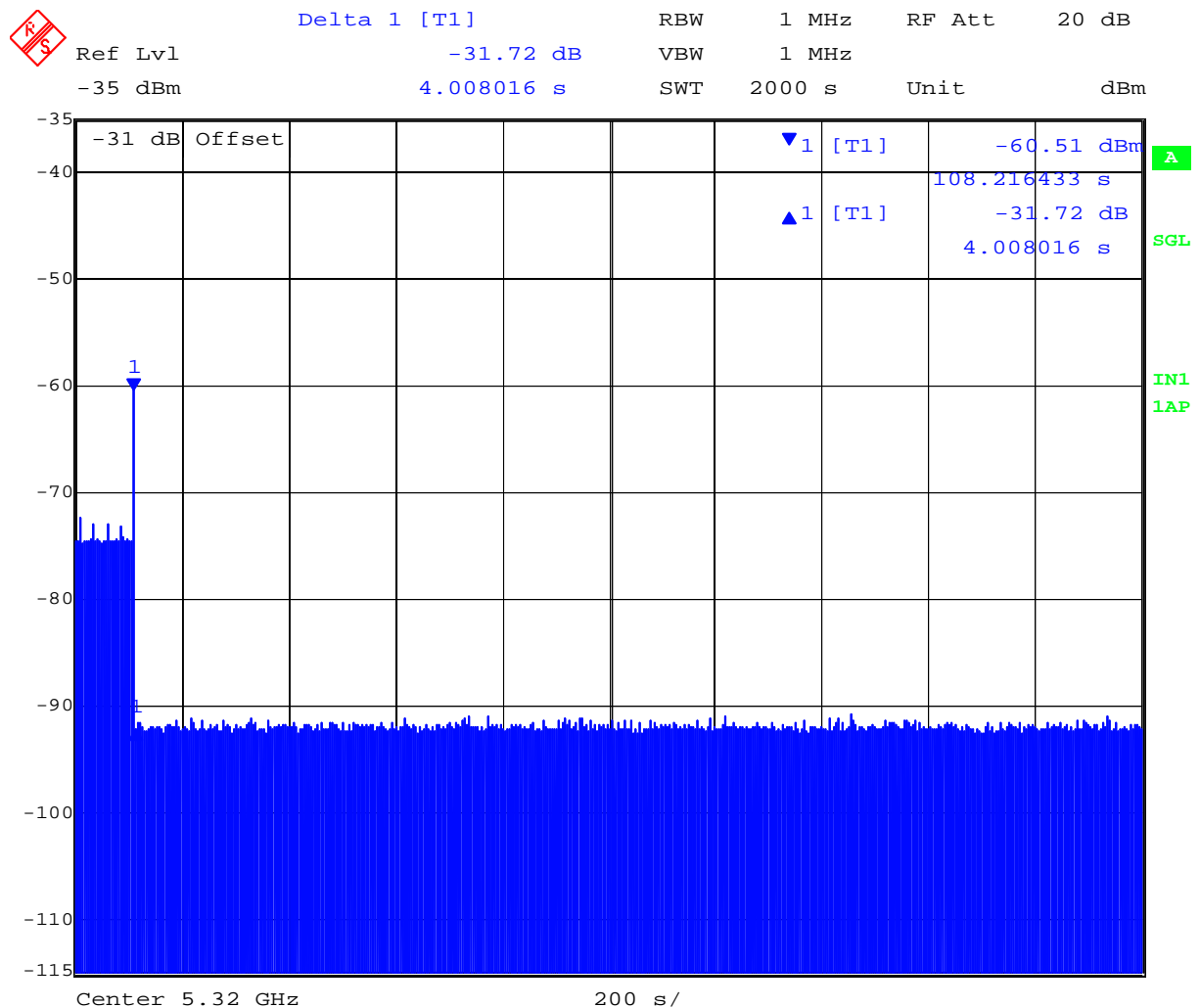
**Channel Move Time = 0.04335 seconds (Limit 10 seconds)**



### 5.2.2. 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.

### Conducted - 30 Minute Non-Occupancy Period Type 1 Radar



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### 5.3. Radiated Testing

#### 5.3.1. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time, Non-Occupancy Time

##### FCC §15.407(h)(2)(iii)

##### Radiated Tests Performed on Client Device (without radar detection)

Requirement	Operational Mode Client Without Radar Detection
Channel Closing Transmission Time	Yes
Channel Move Time	Yes
Non-Occupancy Time	Yes

The steps below define the procedure to determine the above mentioned parameters when a radar burst with a level equal to the DFS Detection Threshold is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Master Device was associated with the EUT (Client). Video streaming was implemented from the master device (AP) to the client (EUT).

Access Point Receive Power Level: = -62 dBm +1 = -61 dBm (assumes 0dBi antenna)

#### 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 events above a threshold level of -50 dBm. The test equipment time stamps all captured events with respect to T0 (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 µs 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.

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.

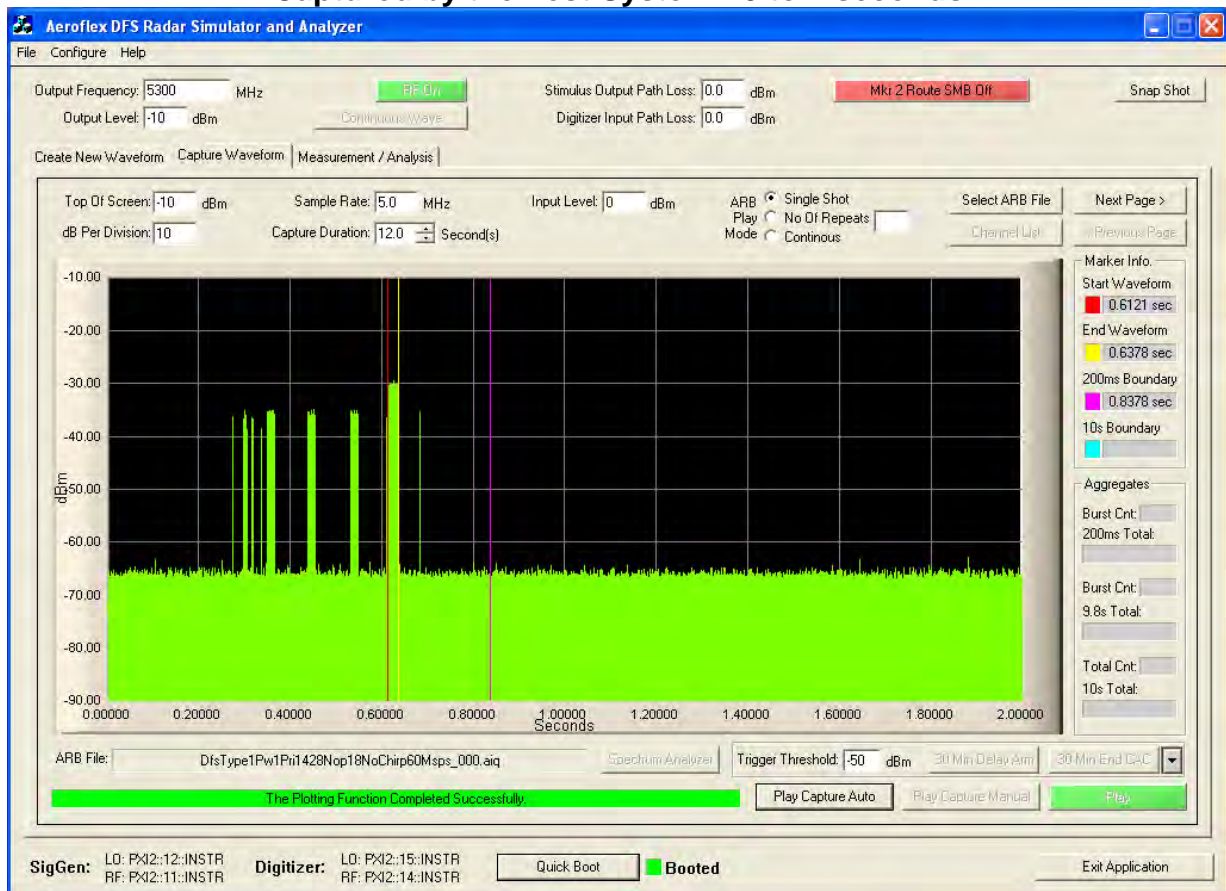
The following plots #1 to #6 show the response of the EUT in two second increments. All client activity takes place within the initial two seconds (Plot #1).

Plot #6 identifies Channel Closing and Channel Move Time. The Channel Closing Time is found at the right hand side at the foot of plot #6 (10s Total). It was found that an aggregate total of 0.064 ms of transmission time accrued.

**Channel Closing Transmission Time = 0.064 mSecs (limit 260 mSecs)**

**Channel Closing Move Time = 0.04335 Secs (limit 10 seconds)**

**Radiated – Plot #9 Channel Move Time, Channel Closing Transmission Time for Type 1 Radar  
Captured by the Test System - 0 to 2 seconds**

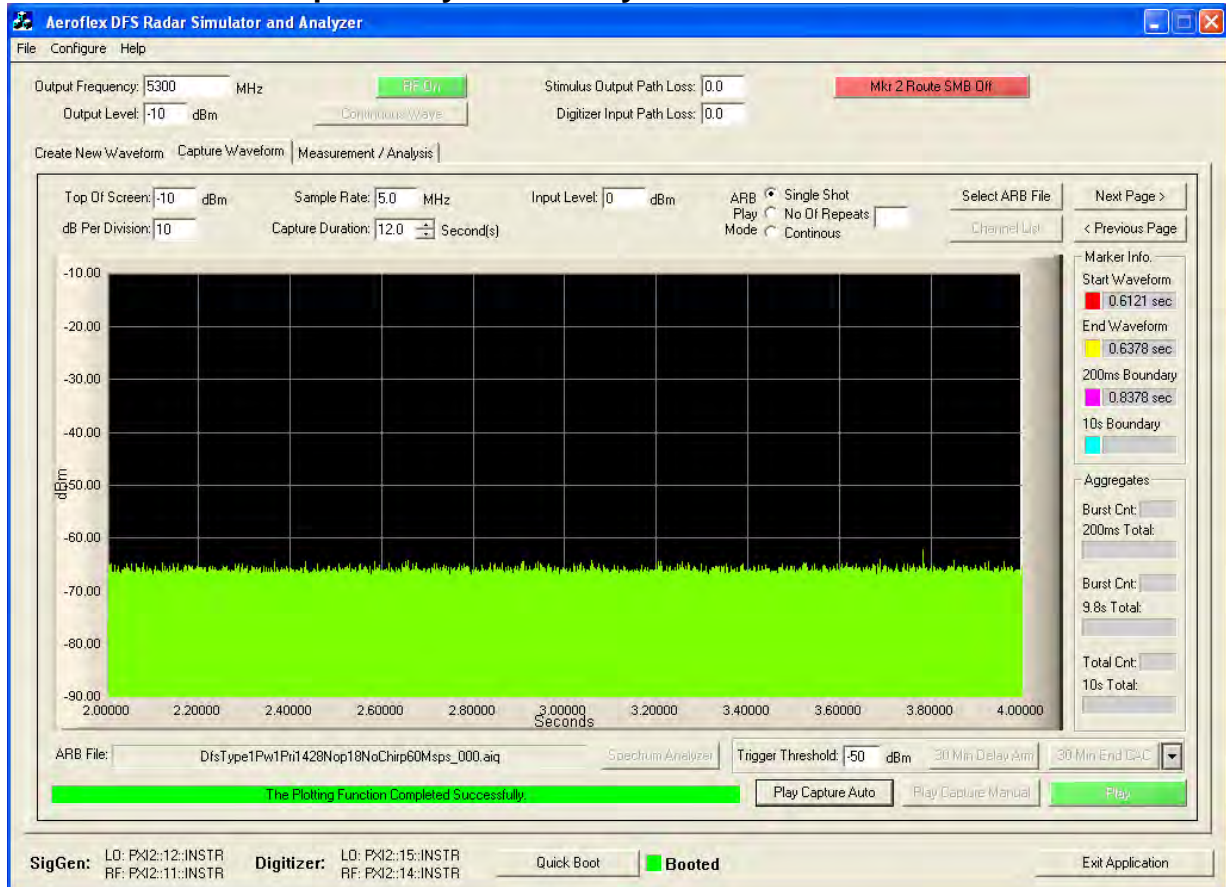


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### Radiated – Plot #10 Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 2 to 4 seconds



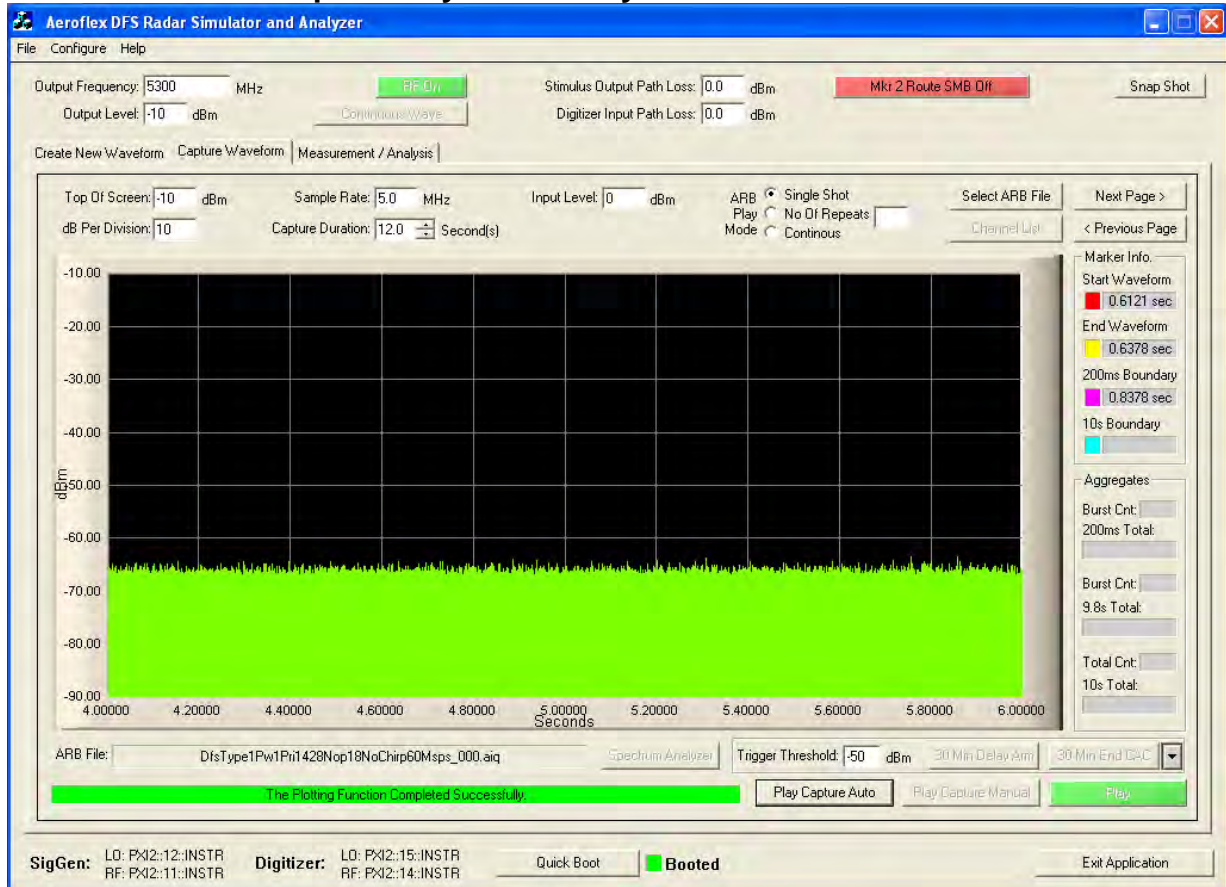
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### Radiated – Plot #11 Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 4 to 6 seconds

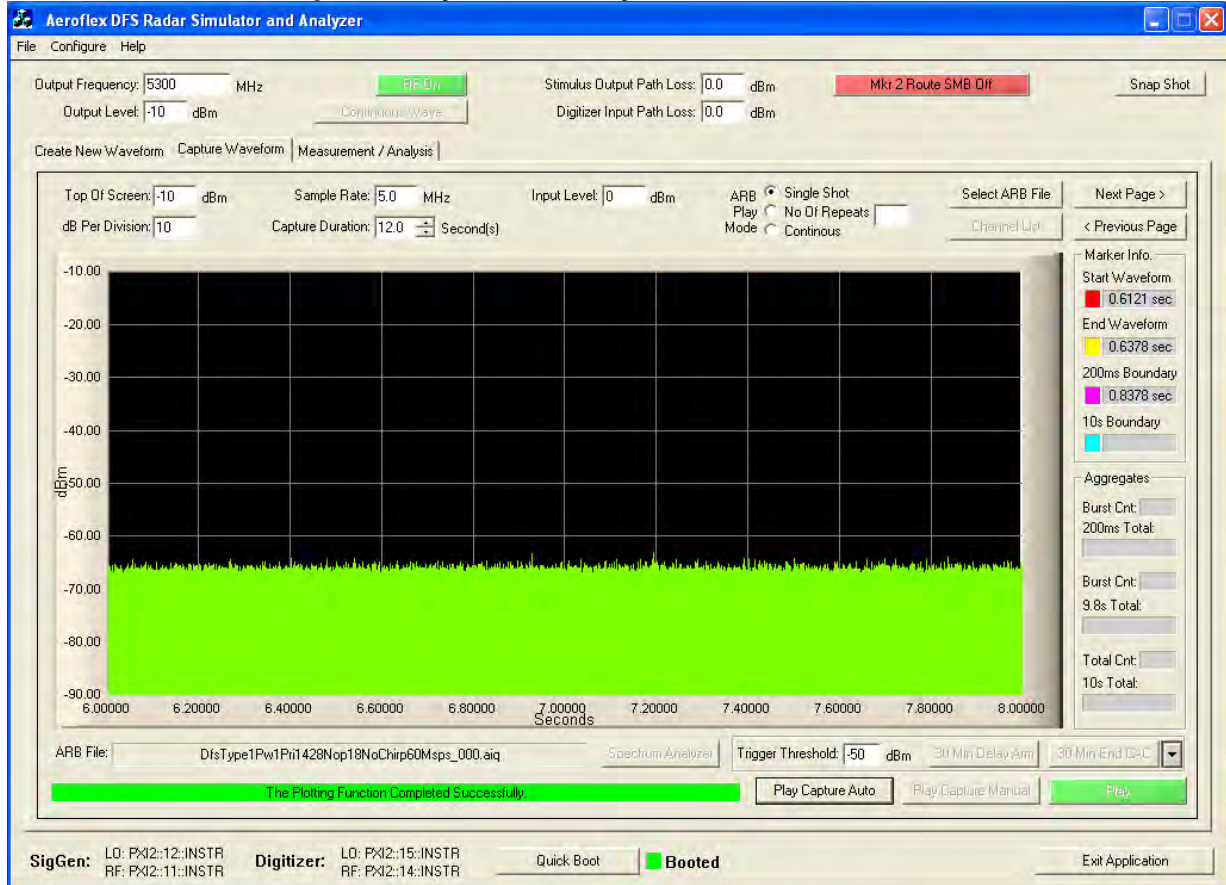


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**Radiated – Plot #12 Channel Move Time, Channel Closing Transmission Time  
for Type 1 Radar  
Captured by the Test System - 6 to 8 seconds**

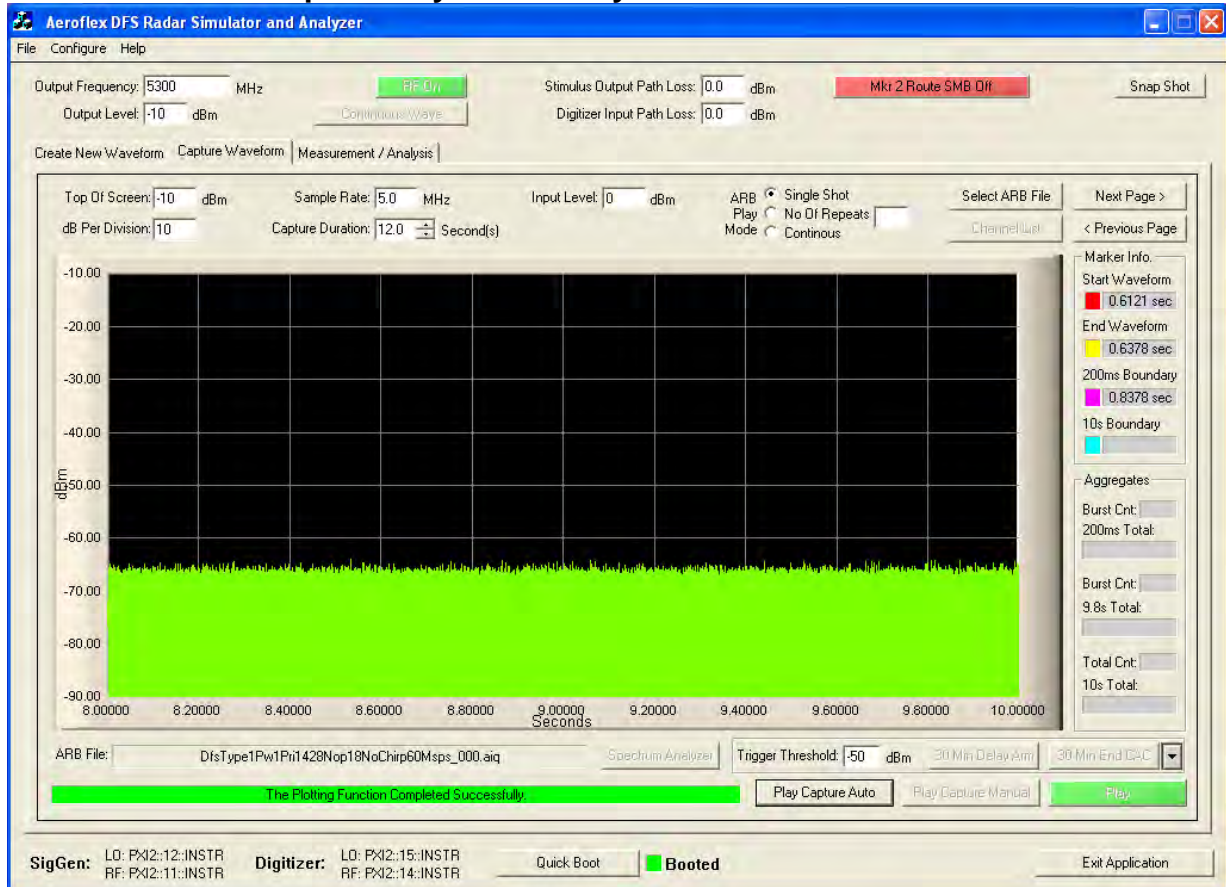


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### Radiated – Plot #13 Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 8 to 10 seconds



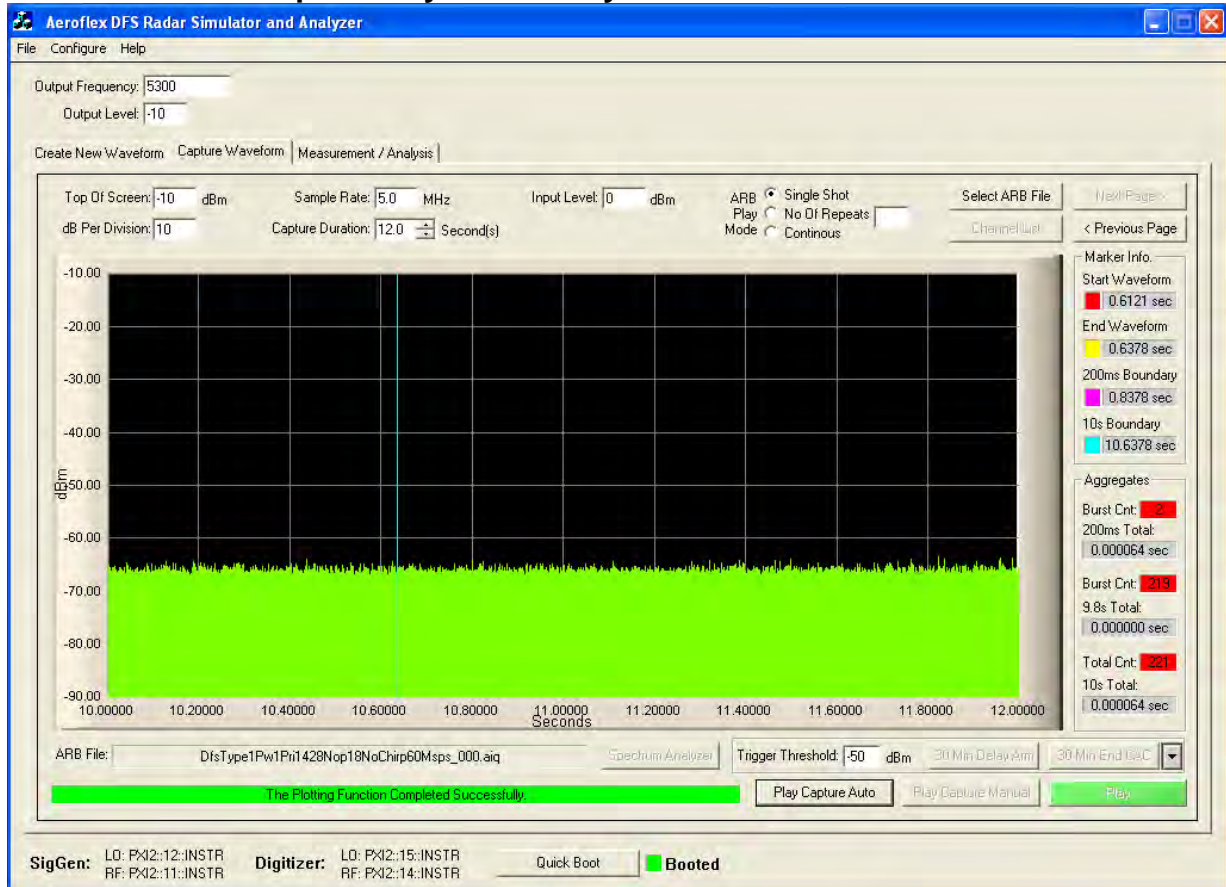
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**Radiated – Plot #14 Channel Move Time, Channel Closing Transmission Time  
for Type 1 Radar  
Captured by the Test System - 10 to 12 seconds**



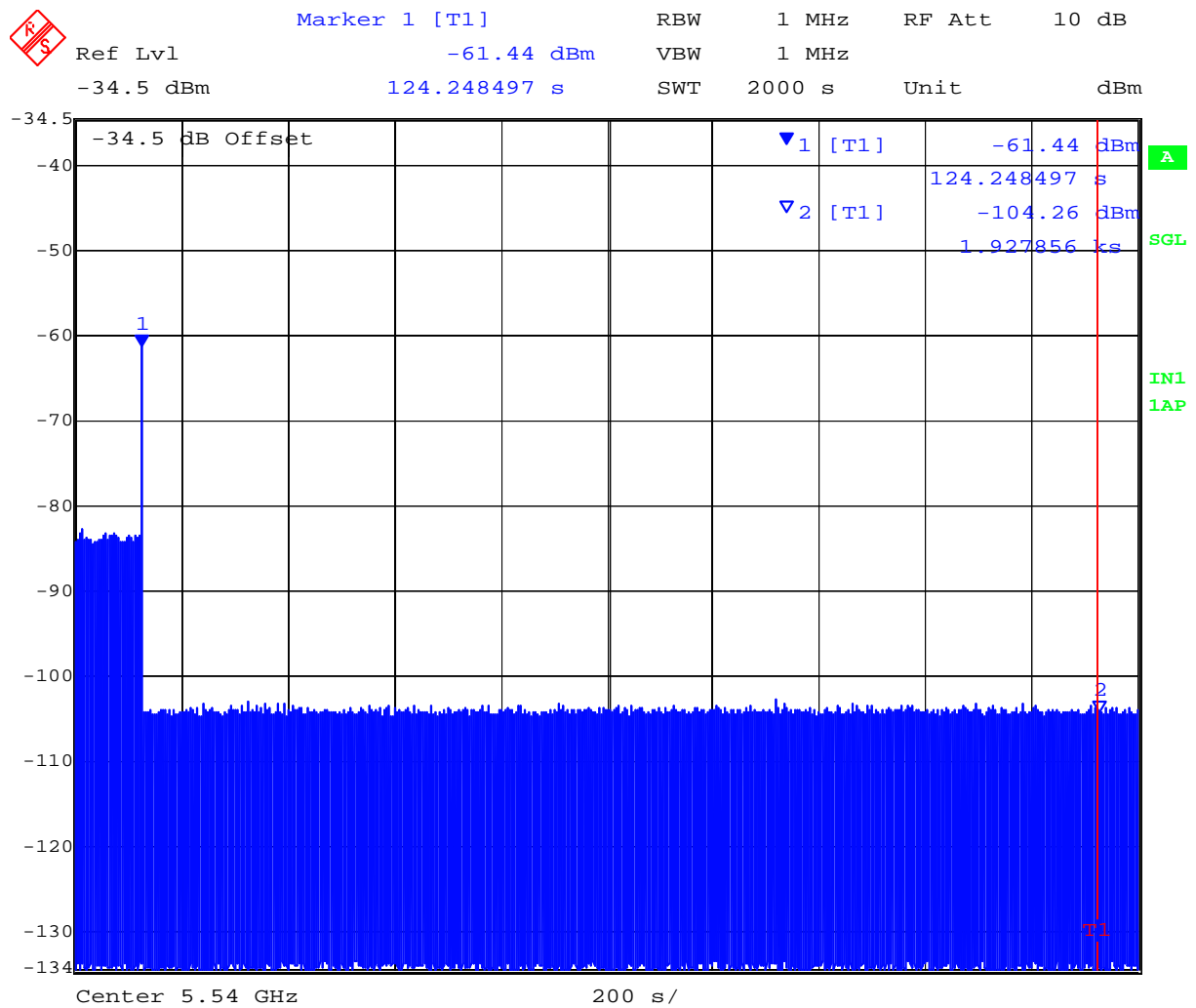
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### 5.3.2. 30 Minute Non-Occupancy Period

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.

### Radiated - 30 Minute Non-Occupancy Period Type 1 Radar



Date: 2.DEC.2008 17:58:32

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**Measurement Uncertainty Time/Power**

Measurement uncertainty	
- Time	4%
- Power	1.33dB

**Traceability**

Test Equipment Used
0072, 0083, 0098, 0116, 0132, 0158, 0313, 0314, 0193, 0223, 0252, 0253, 0251, 0256, 0328, 0329

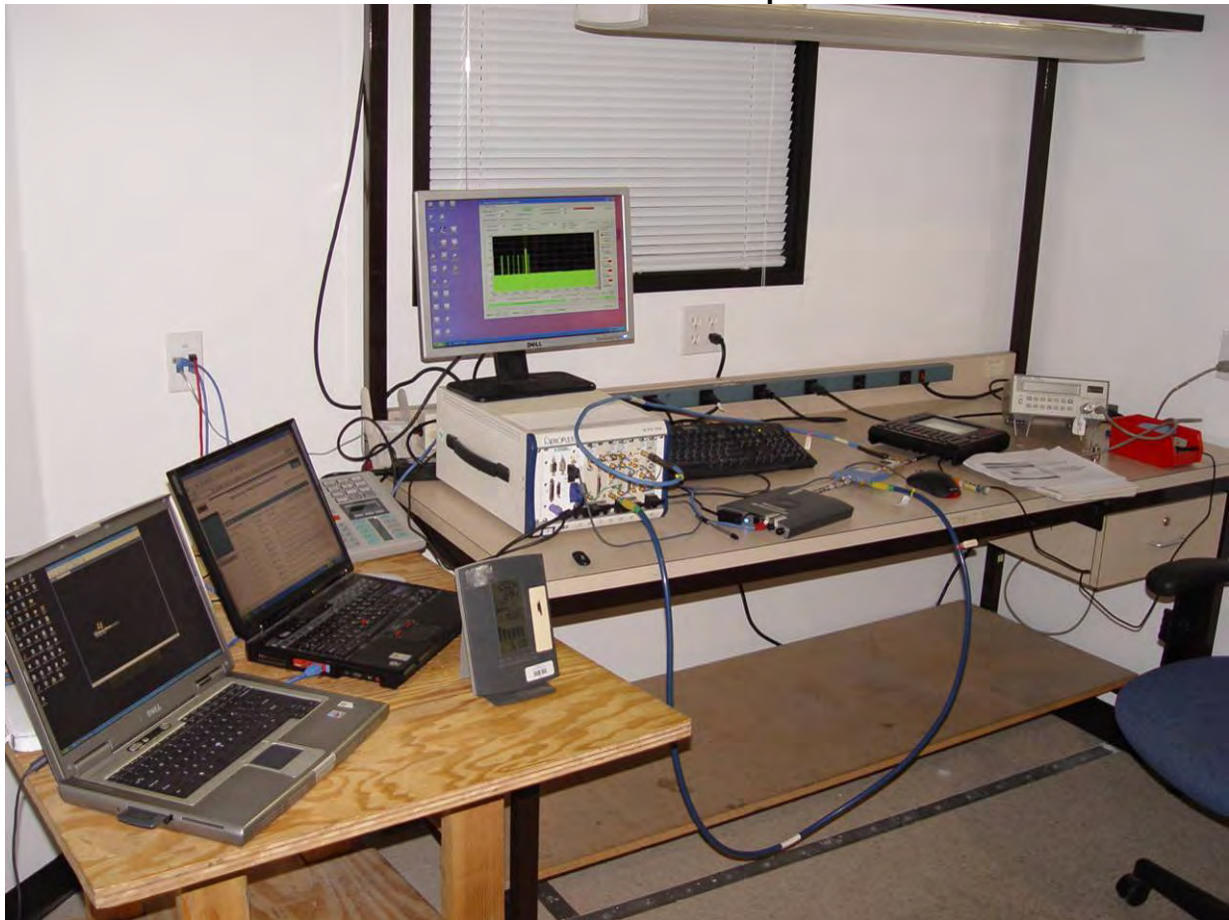
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## 6. PHOTOGRAPHS

### 6.1. Dynamic Frequency Selection – Conducted Test Set-Up

**General DFS Test Setup**



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### Client and Access Point Test Setup



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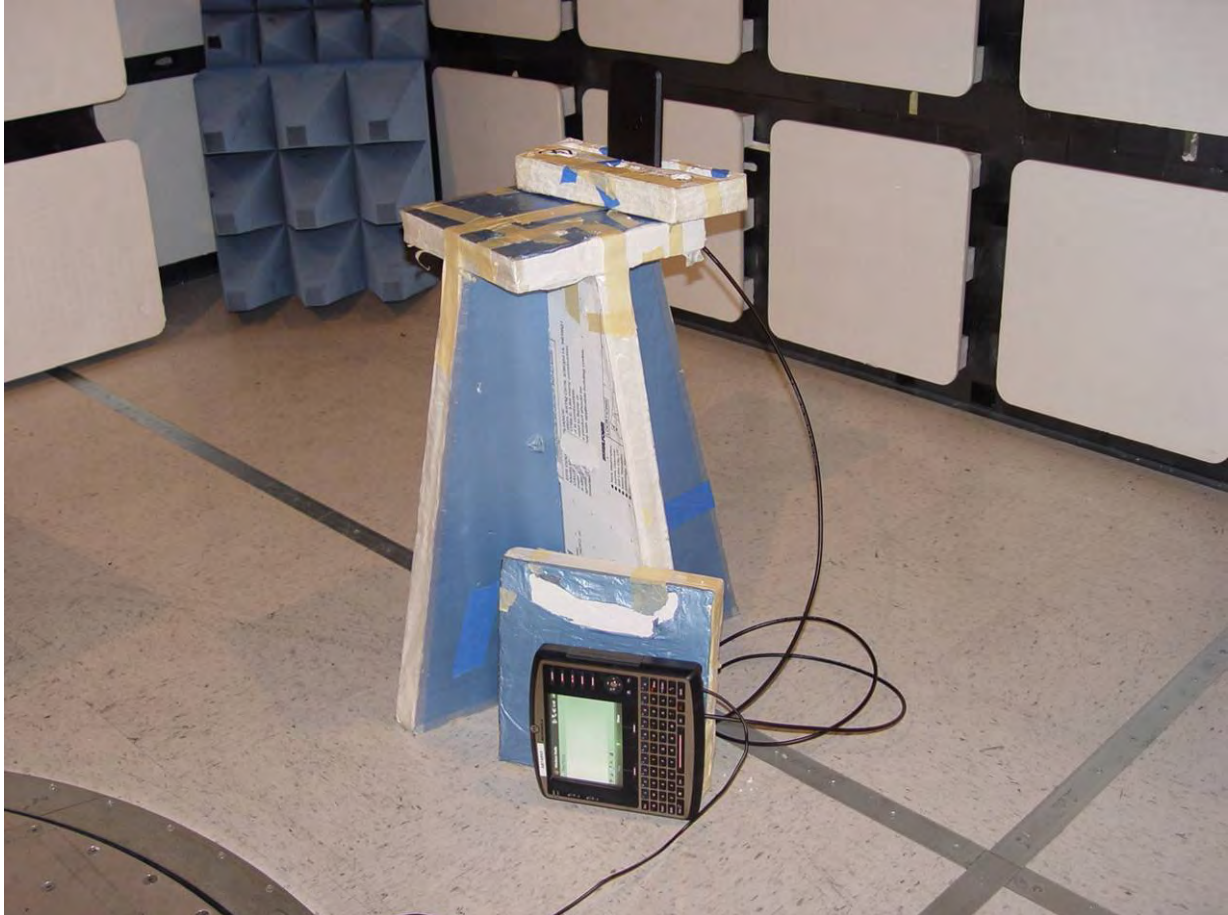
## 6.2. Dynamic Frequency Selection – Radiated Test Set-Up

### General Radiated DFS Test Setup



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**Client Test Setup - Radiated**



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### 6.3. DFS Radar Generator & Receiver

DFS Test Equipment



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#### 6.4. Mobile Wireless Computer



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## 7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0070	Power Meter	Hewlett Packard	437B	3125U11552
0104	Horn Antenna	Electro-Mechanics	3115	9205-3882
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0158	Barometer /Thermometer	Control Co.	4196	E2846
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787- 3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181- 3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0335	Horn Antenna	ETS Lindgren	3117	00066580
0359	PXI	National Instruments/Aeroflex	PXI-1042	300001/004

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