Test of Access One Network OWS 2400-30

To: FCC 47 CFR Part 15.407 (DFS Only)

Report Serial No: STRX14-A3 Rev A

TEST REPORT

FROM

Test of Access One Network OWS 2400-30

To: FCC 47 CFR Part 15.407 (DFS Only)

Test Report Serial No.: STRX14-A3 Rev A

Note: this report only contains DFS test data for the 5,250 to 5,350 MHz and 5470 to 5725 MHz bands. RF Test data for these bands is reported in MiCOM Labs test report STRX14-A4. 2.4 and 5.8 GHz RF test data covering FCC parts 15.247 is reported in the following MiCOM Labs test report;-

STRX01-A4 OWS 2400-30

This report supersedes None

Manufacture: Strix Systems Inc.
26610 Agoura Road
Calabasas,
California, 91302, USA

Product Function: 2.4 and 5 GHz Wireless Access Point

Copy No: pdf **Issue Date:** 24th May 2007

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
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ACCREDITED
CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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ACCREDITATION & LISTINGS

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

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for technical competence in the field of

Electrical Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing.

Presented this 14th day of September 2005.

American Association for Laboratory Accreditation
Corporate SEAL 1978 District of Columbia
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President
For the Accreditation Council
Certificate Number 2381.01
Valid to: November 30, 2007

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

LISTINGS

MiCOM Labs test facilities are listed by the following organizations;

North America

United States of America
Federal Communications Commission (FCC) Listing #: 102167

DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft		
Rev A	24th May 2007	First issue.

1. TEST RESULT CERTIFICATE

Manufacturer	Strix Systems Inc. 26610 Agoura Road Calabasas, California, 91302, USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
EUT:	2.4 & 5 GHz Wireless Access Point	Telephone:	+1 925 462 0304
Model:	Access One Network OWS 2400-30	Fax:	+1 925 462 0306
S/N:	300701, 200816		
Test Date(s):	10th to 11th April & 7th May 2007	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 (DFS Only)	EQUIPMENT COMPLIES
FCC 06-96 Memorandum Opinion and Order	

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.

A2LA ACCREDITED
CERTIFICATE #2381.01

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	Feb 2006	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	Industry Canada RSS-210	Issue 6 Sept. 2005	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment
(iv)	Industry Canada RSS-Gen	Issue 1 Sept. 2005	General Requirements and Information for the Certification of Radiocommunication 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)	CISPR 22/ EN 55022	1997 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(vii)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(viii)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(ix)	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
(x)	A2LA	14th September 2005	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(xi)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices

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.

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the Strix Systems Inc OWS 2400-30 in the frequency range 5,250 to 5,350 MHz and 5,470 to 5,725 MHz bands as a Master and Client device to FCC Part 15.407 DFS regulations and Memorandum Opinion and Order 06-96.
Applicant:	As Manufacturer
Manufacturer:	Strix Systems Inc. 26610 Agoura Road Calabasas, California, 91302, USA
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	STRX14-A3 Rev A
Date EUT received:	10st April 2007
Standard(s) applied:	FCC 47 CFR Part 15.407 (DFS Only)
Dates of test (from - to):	10th to 11th April & 7th May 2007
No of Units Tested:	1
Type of Equipment:	802.11a/b/g Wireless Access Point
Manufacturers Trade Name:	Access One Network
Model:	OWS 2400-30
Software Build	3.0.3
Location for use:	Indoor
Declared Frequency Range(s):	5,250 – 5,350 MHz, 5,470 to 5,725 MHz
Type of Modulation:	OFDM
Declared Nominal Output Power:	802.11a: +26 dBm
EUT Modes of Operation:	Per 802.11 DSSS with OFDM modulation
Transmit/Receive Operation:	Simplex
Rated Input Voltage and Current:	100 to 240 VAC. Single Phase, 50-60 Hz, 1 amp max. DC 12 to 24 Volts, 9 amps max.
Operating Temperature Range:	-30 to +55ºC
ITU Emission Designator:	5,250 to 5,350 MHz 802.11a 17M7W7D 5,470 to 5,725 MHz 802.11a 18M0W7D
Microprocessor(s) Model:	Atheros AR5312
Clock/Oscillator(s):	25 MHz, 40 MHz.
Frequency Stability:	±20 ppm
Equipment Dimensions:	12”x10”x6”
Weight:	12 lbs
Primary function of equipment:	Wireless Access Point

3.2. Scope of Test Program

The scope of the test program was to test the Strix Systems OWS 2400-30 wireless access point in the frequency ranges 5,250 – 5,350 and 5,470 to 5,725 MHz as a Master and Client device for compliance against DFS requirements of FCC 47 CFR Part 15.407 and the FCC specification Memorandum Opinion and Order FCC 06-96.

One frequency was chosen (5,300 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".

U-NII devices operating in the 5,250 – 5,350 MHz and 5,470 to 5,725 MHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

The Strix Systems OWS 2400-30 operates as a Master device with full radar detection and Dynamic Frequency Selection (DFS) capability.

As a Client device, the OWS 2400-30 operates as a "Client Without Radar Detection" as defined in the FCC MO & O 96-06 and was tested per Table 2 of the requirements;- "Applicability of DFS requirements during normal operation".

System testing was performed with the Master device continuously transmitting the designated FCC MPEG (Testfile.mpg) streaming video test file to the client device using the NTIA specified media player (klcodec261f.exe).

The Master device provides, on aggregate, uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.

Strix Systems Inc
Access One Network OWS 2400-30

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT 1 (Master)	Wireless Access Point	Strix Systems	OWS 2400-30	300701
Support	PXI Chassis	Aeroflex	PXI - 1042	300001/004
Support	PXI RF Synthesizer module	Aeroflex	3011	301001/027
Support	PXI SigGen module	Aeroflex	3025	302004/009
Support	8 Port Ethernet Switch	Netgear	FS108P	IDL1693F001B9
EUT 2 (Client)	Wireless Access Point	Strix Systems	OWS 2400-30	200816

3.4. Antenna Details

1. 0 dBi

3.5. Cabling and I/O Ports

Number and type of I/O ports;-

1. 10/100 Ethernet non-shielded cable (2 meters)
2. 115/240Vac 50/60Hz Power

3.6. Test Configurations

Matrix of test configurations

Operational Mode (802.11)	Frequencies (MHz)	Transmission Type
a	5300	Continuous MPEG Transmission

3.7. Equipment Modifications

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

1. NONE

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

3.9. Subcontracted Testing or Third Party Data

1. NONE

4. TEST SUMMARY

List of Measurements

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 Master Device

Section	Test Items	Description	Condition	Result	Test Report Section
7.8.1	Detection Bandwidth	UNII Detection Bandwidth	Conducted	Complies	5.1.8
7.8.2.1	Performance Requirements Check	Initial Channel Availability Check Time	Conducted	Complies	5.1.9
7.8.2.2		Radar Burst at the Beginning of the Channel Availability Check Time	Conducted	Complies	5.1.10
7.8.2.3		Radar Burst at the End of the Channel Availability Check Time	Conducted	Complies	5.1.11
7.8.3	In-Service Monitoring	In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period	Conducted	Complies	5.1.12
7.8.4	Radar Detection	Statistical Performance Check	Conducted	Complies	5.1.13

Tests performed on 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	Conducted	Complies	6.1.1

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*

5. TEST RESULTS

5.1. Dynamic Frequency Selection (DFS)

Test Procedure and Setup

5.1.1. Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna	

5.1.2. DFS Response requirement values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	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.

5.1.3. Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

A minimum of 30 unique waveforms are required for each of the short pulse radar types 2 through 4. For short pulse radar type 1, the same waveform is used a minimum of 30 times. If more than 30 waveforms are used for short pulse radar types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

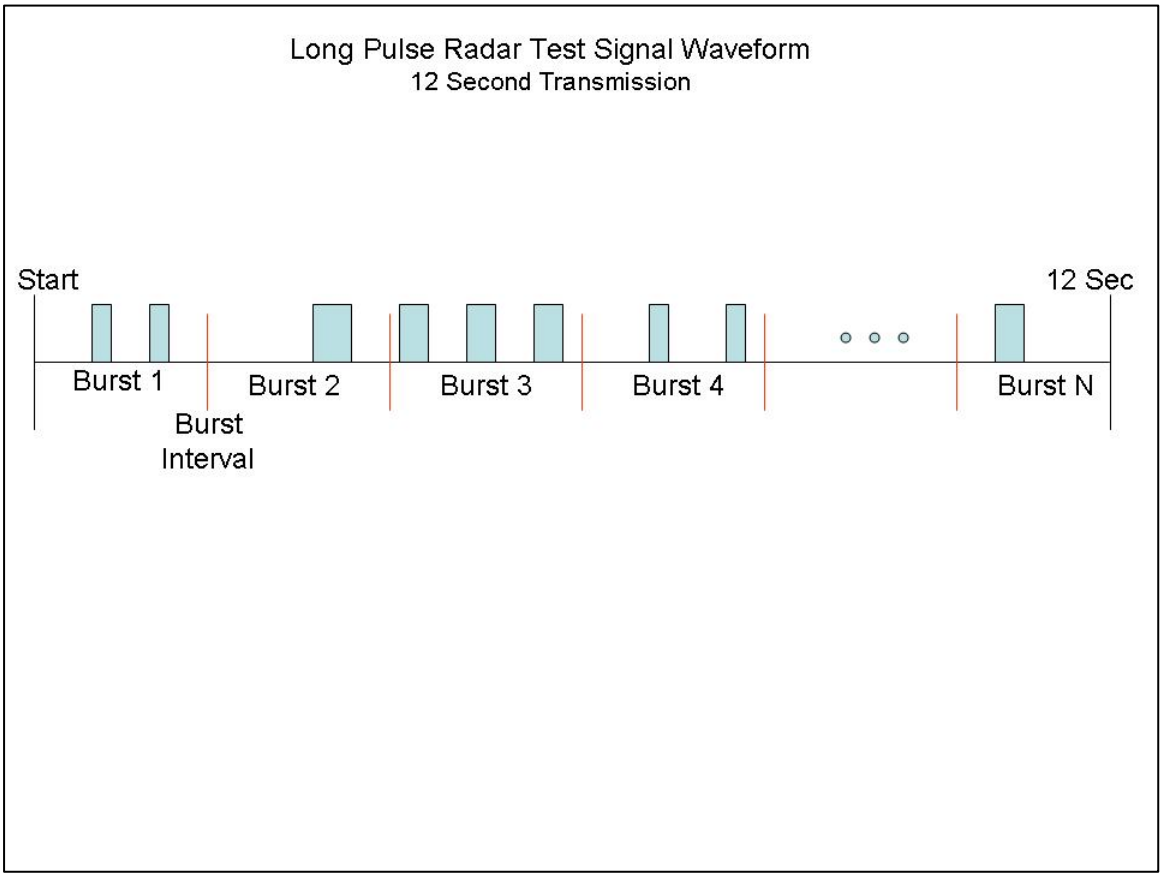
Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.
3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *Burst* will have the same chirp width. Pulses in different *Bursts* may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst_Count*. Each interval is of length (12,000,000 / *Burst_Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst_Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen independently.

A representative example of a Long Pulse radar test waveform:

1) The total test signal length is 12 seconds.
2) 8 *Bursts* are randomly generated for the *Burst_Count*.
3) *Burst* 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) *Bursts* 2 through 8 are generated using steps 3 – 5.
7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Graphical representation of the Long Pulse radar Test Waveform.



5.1.4. Frequency Hopping Radar Test Waveform

Frequency Hopping Radar Test Waveform

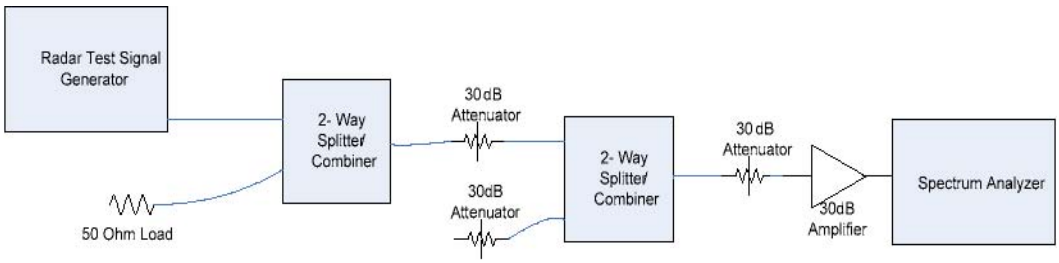
Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

5.1.5. Radar Waveform Calibration

The following equipment setup was used to calibrate the conducted Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) mode at the frequency of the Radar Waveform generator. Peak detection was utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz.
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -61dBm (Ref Section 5.1). The 30dB amplifier gain was entered as an amplitude offset on the spectrum analyzer.

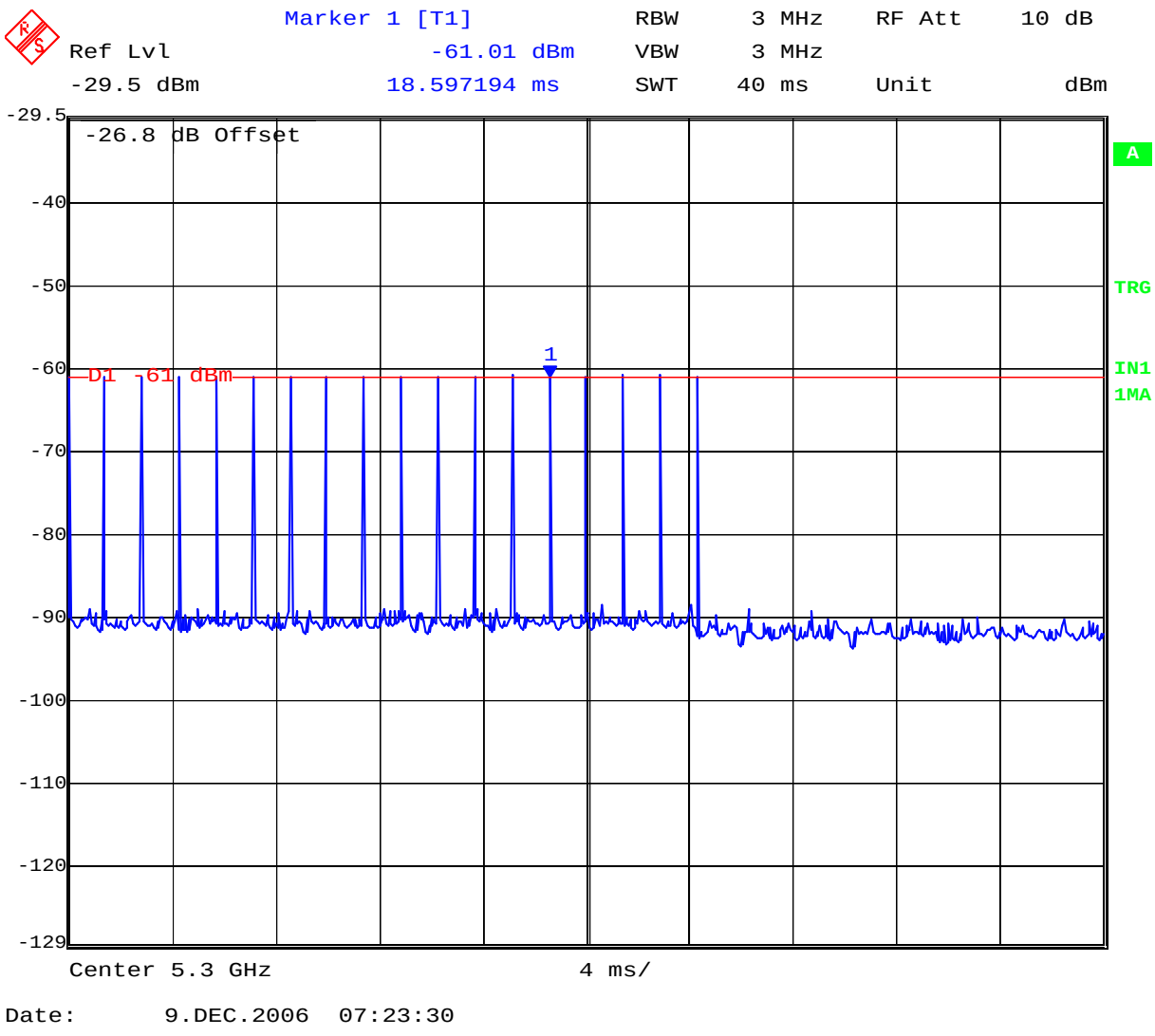


Conducted Calibration Setup

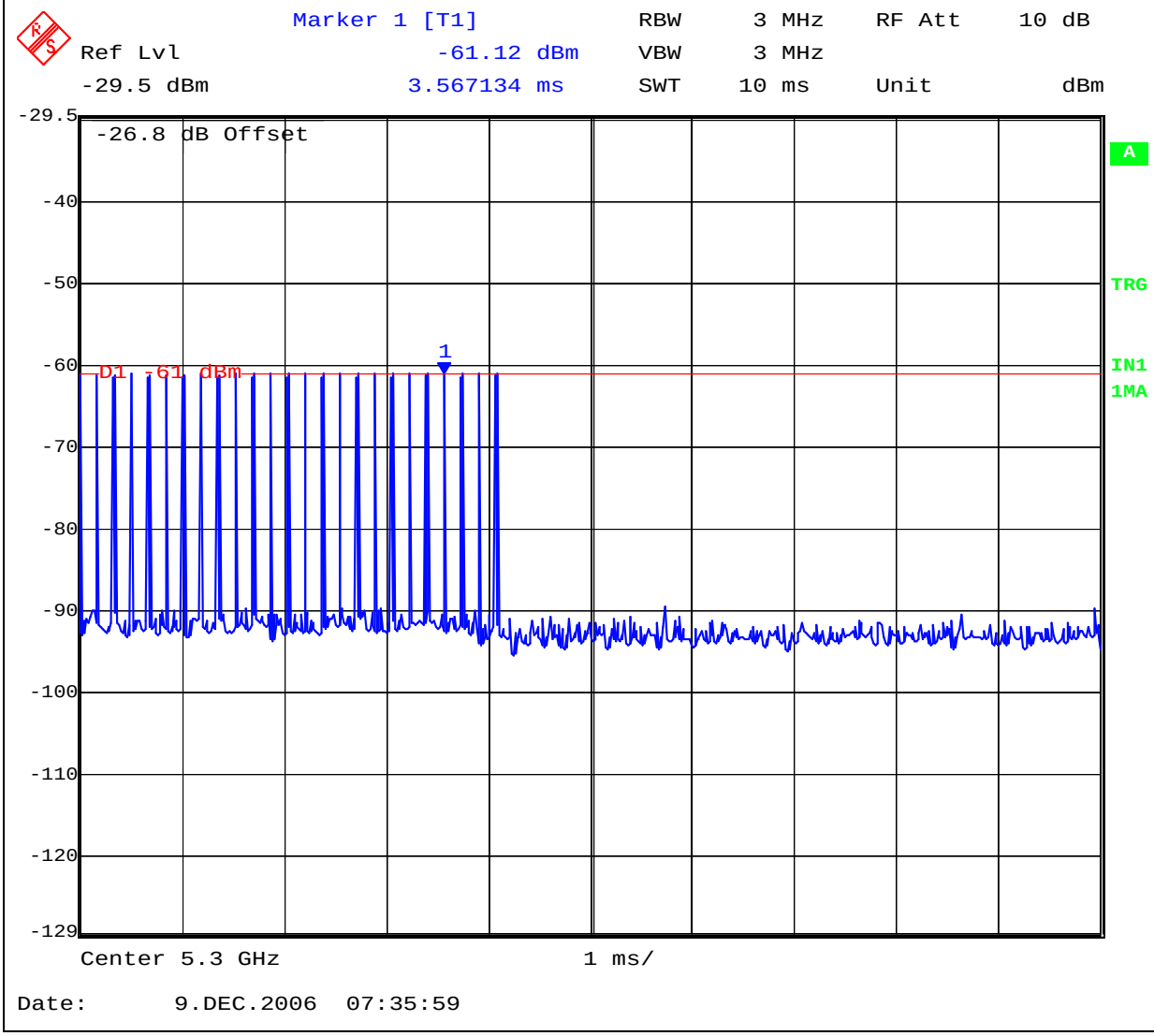
5.1.6. Radar Waveform Calibration Plots

The following are the calibration plots for required radar waveforms

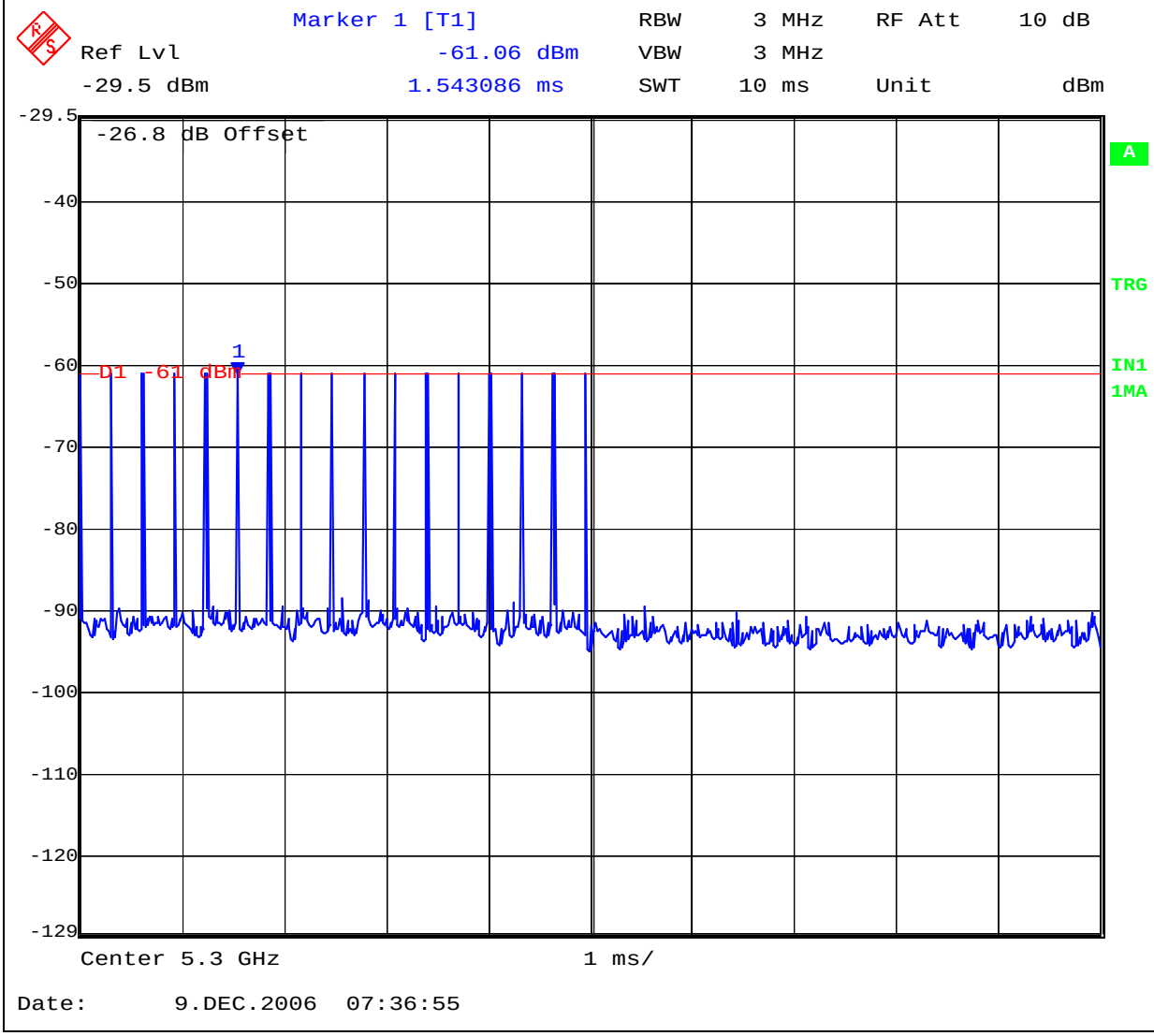
Radar Type 1 - 1uSec Pulse, 700prf, 18 pulses



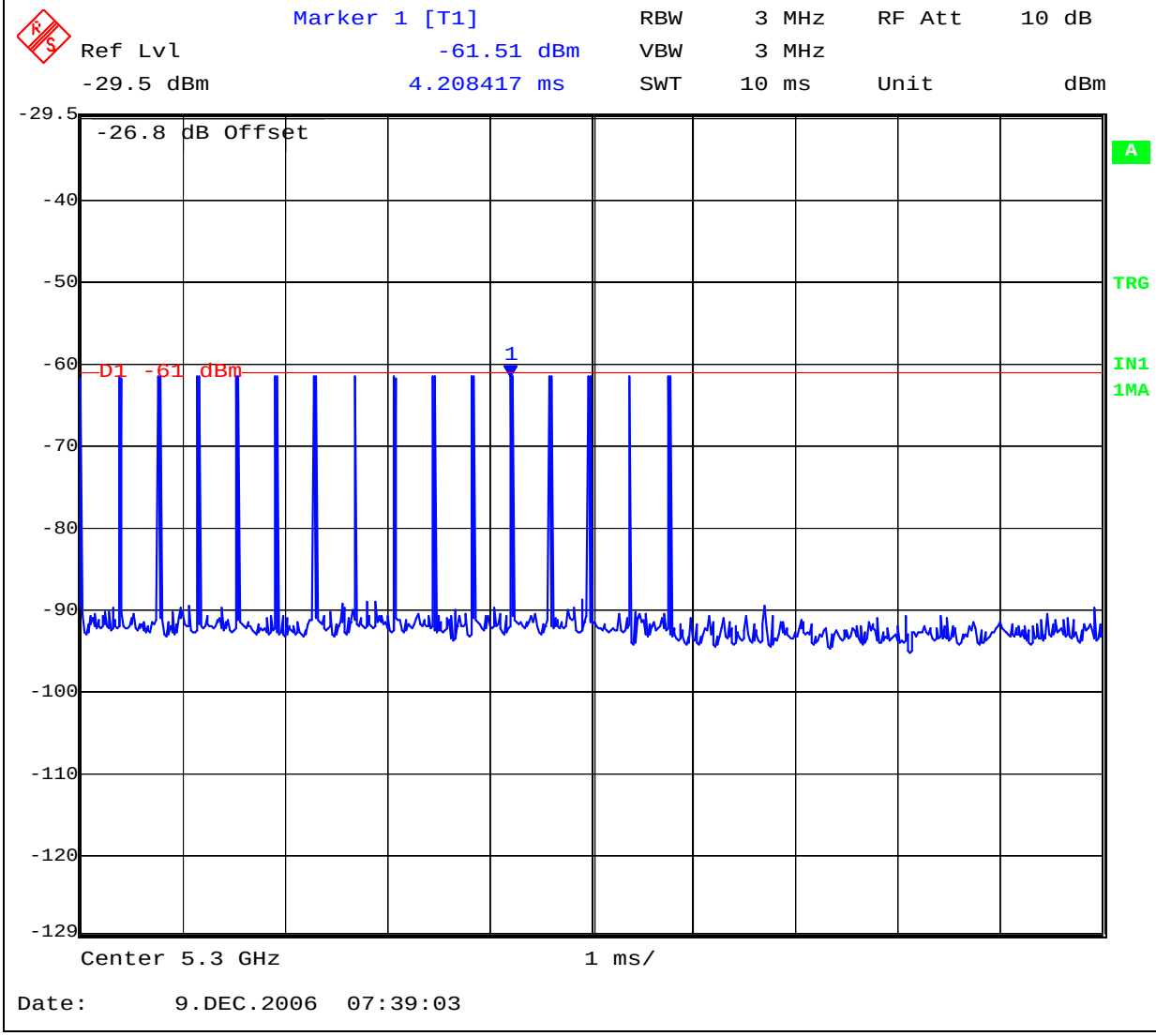
Radar Type 2 - 2.1uSec Pulse Width, 170prf, 25 pulses



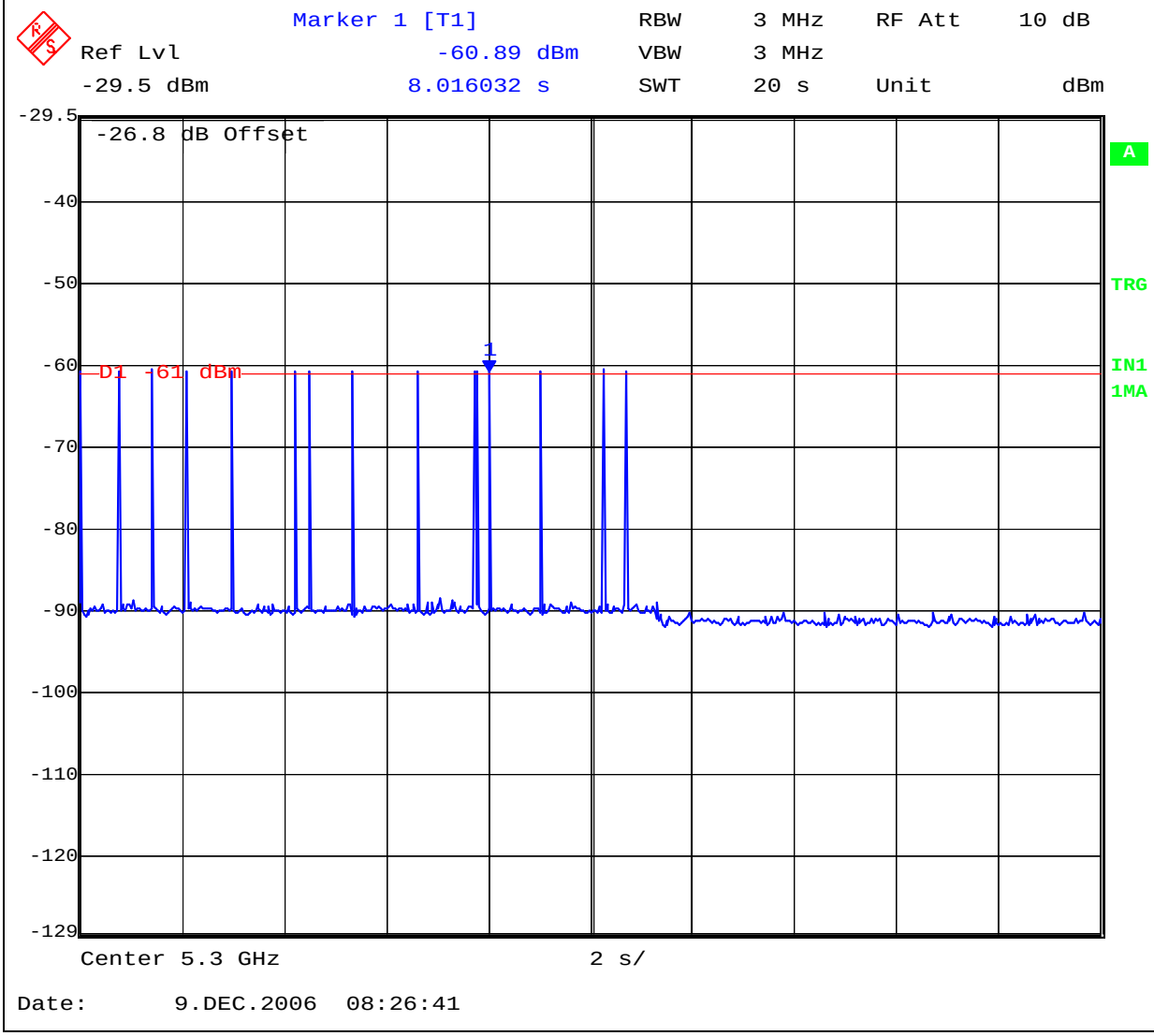
Radar Type 3 - 7.5uSec Pulse Width, 309prf, 17 pulses



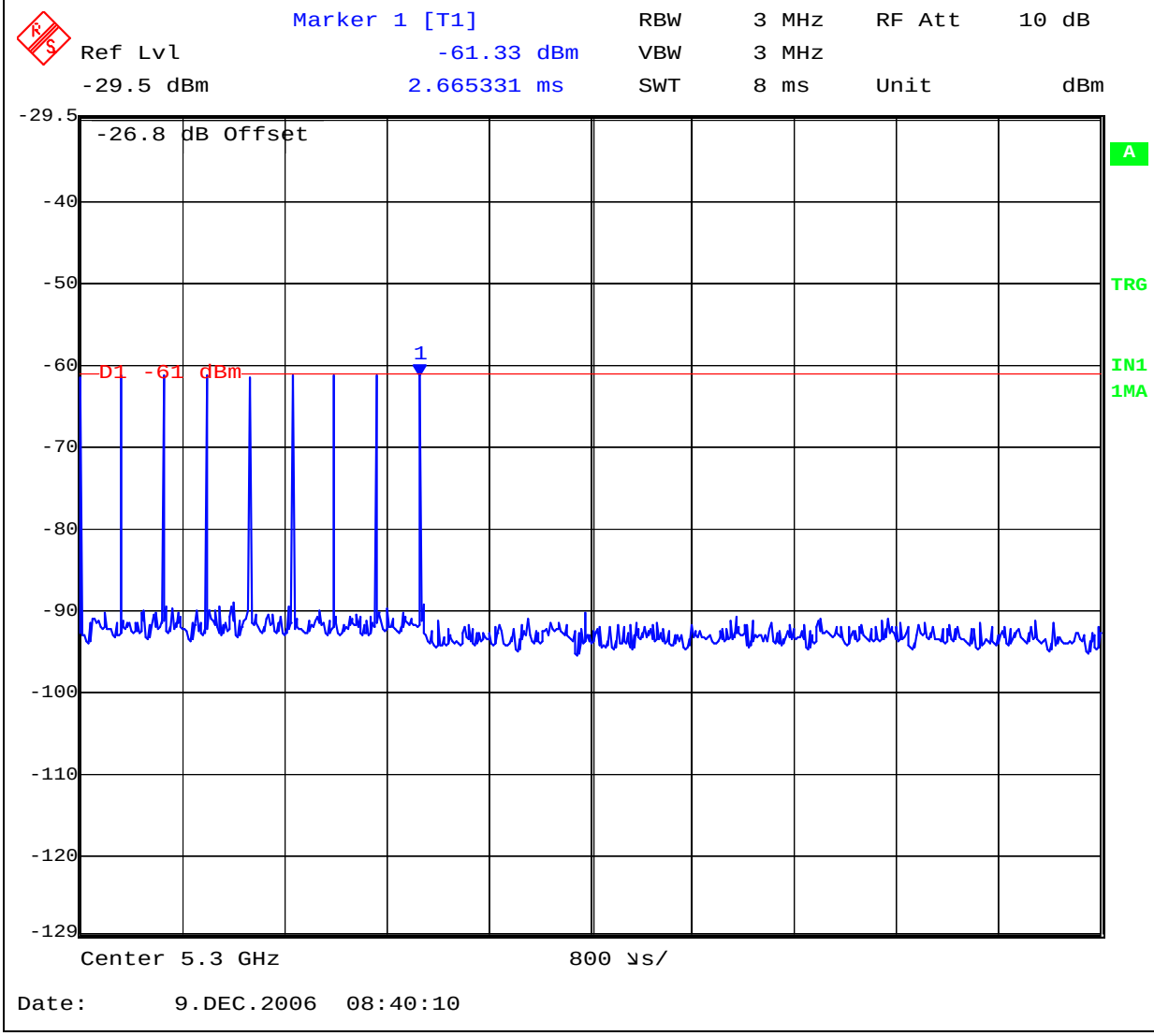
Radar Type 4 - 17.9uSec Pulse Width, 383prf, 16 pulses



Radar Type 5



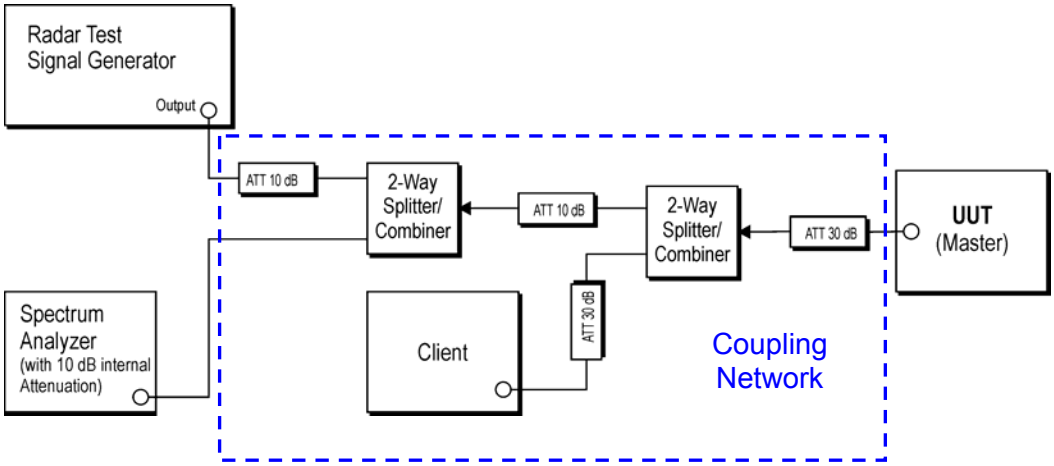
Radar Type 6



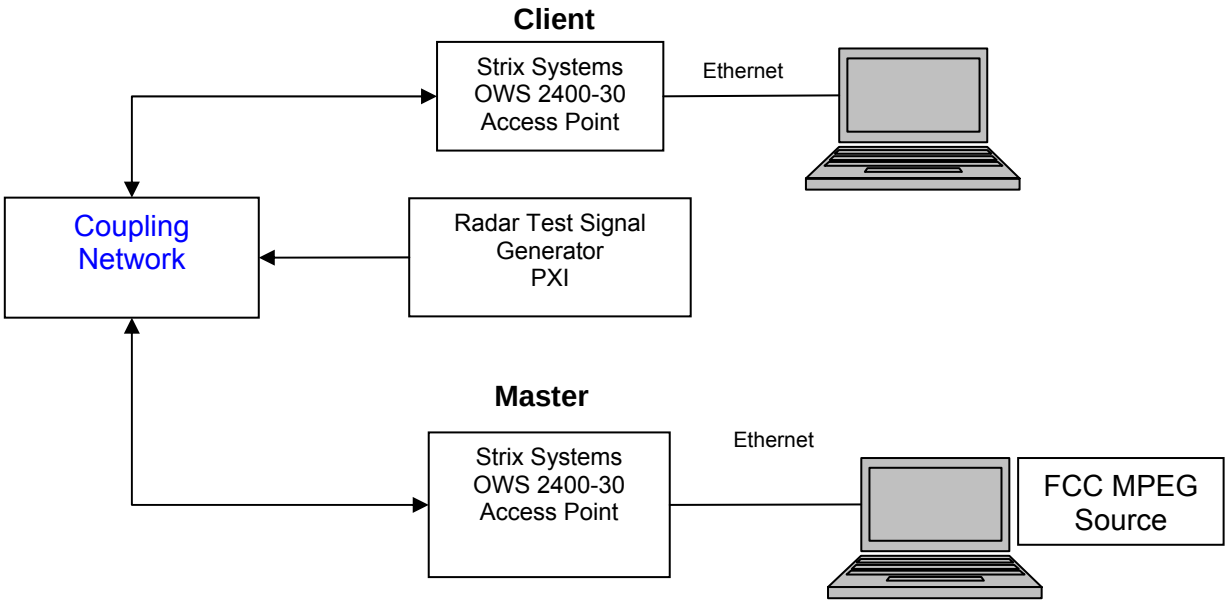
5.1.7. Test Set Up:

Block Diagram(s) of Test Setup

Setup for Conducted Measurements where the EUT is the Master with injection of Radar Test Waveforms at the Master.



Support Equipment Configuration



For the frequency band 5,250 – 5,350 MHz, the Master device provides, on aggregate, uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.

Strix Systems declared a minimum gain antenna of 0 dBi. ;

Radar receive signal level = -62 dBm + minimum antenna gain + 1 dB

= -62 + 0 + 1

Radar receive signal level = -61 dBm

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: Master

5.1.8. UNII Detection Bandwidth:

All UNII channels for this device have identical channel bandwidths and DFS testing was completed in the 5250 - 5350 MHz.

The generating equipment is configured as shown in the Conducted Test Setup above. A single Burst of the short pulse radar Type 1 through 6 was produced at 5300 MHz at a level of -61dBm (Ref Section 5.1). The EUT is set up as a standalone device (no associated Client and no traffic).

A single radar Burst is generated for a minimum of 10 trials, and the response of the EUT is noted. The EUT must detect the Radar Waveform 90% or more of the time.

The radar frequency is increased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The highest frequency at which detection is greater than or equal to 90% is denoted as F_H.

The radar frequency is decreased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The lowest frequency at which detection is greater than or equal to 90% is denoted as F_L.

The U-NII Detection Bandwidth is calculated as follows:

U-NII Detection Bandwidth = $F_H - F_L$

The U-NII Detection Bandwidth must be at least 80% of the EUT transmitter 99% power, otherwise, the EUT does not comply with DFS requirements.

EUT Frequency=5300MHz											
Radar Frequency (MHz)	**DFS Detection Trials (1=Detection, Blank= No Detection)**										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Detection Rate (%)**
5289	1	0	1	0	1	0	0	0	0	1	40%
5290(F_L)	1	1	1	1	1	1	1	1	1	1	100%
5291	1	1	1	1	1	1	1	1	1	1	100%
5292	1	1	1	1	1	1	1	1	1	1	100%
5293	1	1	1	1	1	1	1	1	1	1	100%
5294	1	1	1	1	1	1	1	1	1	1	100%
5295	1	1	1	1	1	1	1	1	1	1	100%
5296	1	1	1	1	1	1	1	1	1	1	100%
5297	1	1	1	1	1	1	1	1	1	1	100%
5298	1	1	1	1	1	1	1	1	1	1	100%
5299	1	1	1	1	1	1	1	1	1	1	100%
5300	1	1	1	1	1	1	1	1	1	1	100%
5301	1	1	1	1	1	1	1	1	1	1	100%
5302	1	1	1	1	1	1	1	1	1	1	100%
5303	1	1	1	1	1	1	1	1	1	1	100%
5304	1	1	1	1	1	1	1	1	1	1	100%
5305	1	1	1	1	1	1	1	1	1	1	100%
5306	1	1	1	1	1	1	1	1	1	1	100%
5307	1	1	1	1	1	1	1	1	1	1	100%
5308	1	1	1	1	1	1	1	1	1	1	100%
5309	1	1	1	1	1	1	1	1	1	1	100%
5310 (F_H)	1	1	1	1	1	1	1	1	1	1	100%
5311	1	1	0	0	1	0	0	0	1	1	50%
Detection Bandwidth = F_H-F_L = 5310 MHz-5290 MHz = 20 MHz											
EUT 99% Bandwidth = 17.62 MHz											
17.62 MHz *80% = 14.096 MHz											

For each frequency step the minimum percentage detection is 90%

5.1.9. Initial Channel Availability Check Time

This test verifies that the EUT does not emit pulse, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms.

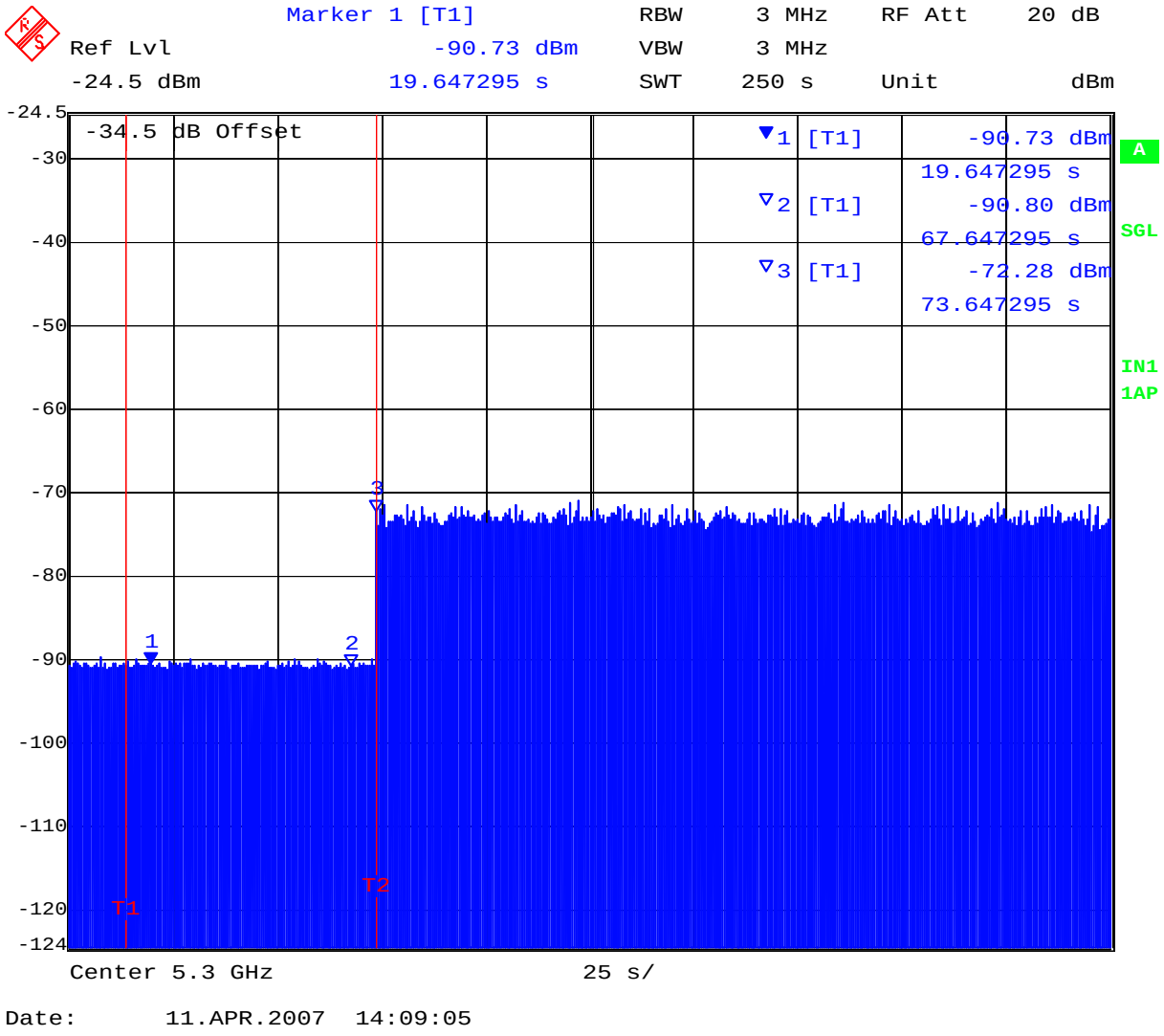
The U-NII device is powered on and be instructed to operate at 5300 MHz. At the same time the EUT is powered on, the spectrum analyzer is set for zero span with a 3 MHz resolution bandwidth at 5300 MHz with a 250 second sweep time. The analyzer's sweep will be started the same time power is applied to the U-NII device.

The EUT should not transmit any pulse or data transmissions until at least 1 minute after the completion of the power-on cycle.

The EUT is powered on at T0. T1 denotes the instant when the EUT has completed its power-up sequence denoted by the analyzer's first vertical red time line (T1) on the following plot. The Channel Availability Check Time commences at instant T1 and will end no sooner than T1 + 60 seconds.

The Master requires 13.7 seconds to complete its power-on cycle.

Initial Channel Availability Check Time during power up of EUT
Ch 5300 MHz



5.1.10. Radar Burst at the Beginning of the Channel Availability Check Time:

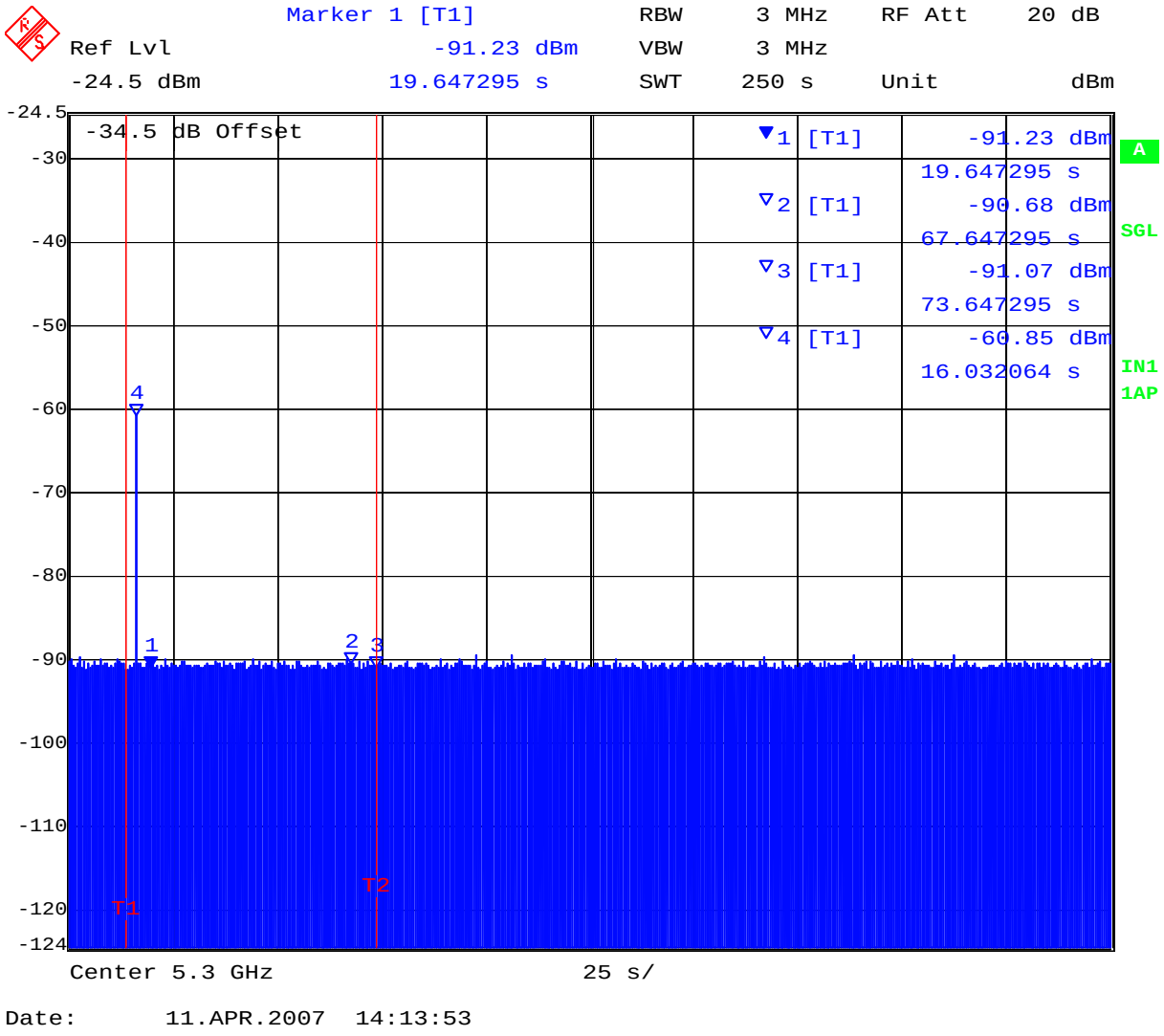
The steps below define the procedure to verify successful radar detection on the selected Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB (-61 dBm Ref Section 5.1) occurs at the beginning of the Channel Availability Check Time.

A single Burst of short pulse of radar Type 1 will commence within a 6 second window starting at T1.

Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5300MHz will continue for 2.5 minutes after the radar burst has been generated.

Verify that during the 2.5 minute measurement window no EUT transmissions have occurred at 5300MHz.

Channel Availability Check Time at the start of the 60 second Check Time
Ch 5300 MHz



5.1.11. Radar Burst at the End of the Channel Availability Check Time:

The steps below define the procedure to verify successful radar detection on the selected Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold occurs at the end of the Channel Availability Check Time.

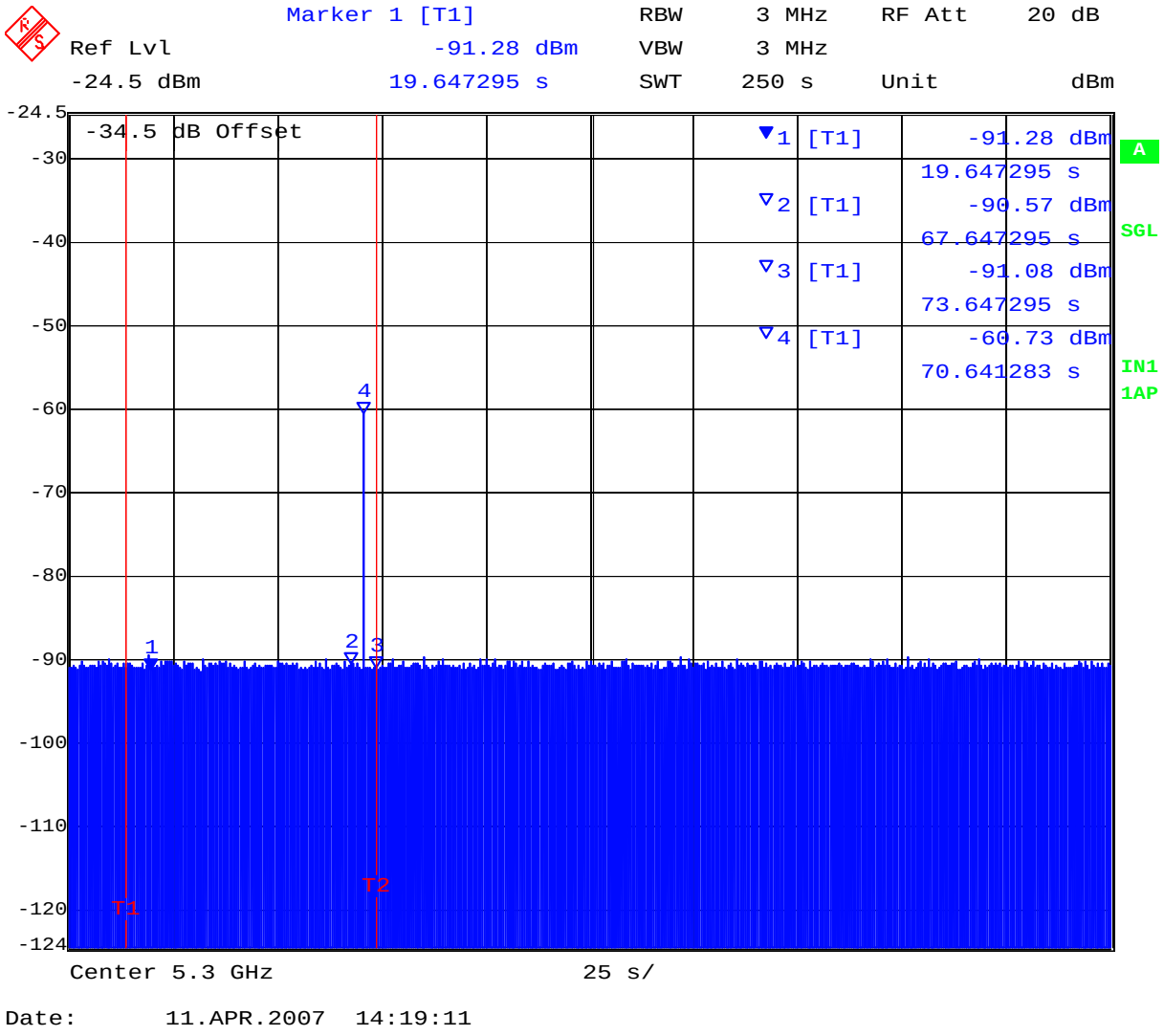
The EUT is powered on at T0. T1 denotes the instant when the EUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T1 and will end no sooner than T1 + 60 seconds.

A single Burst of short pulse of radar type 1 will commence within a 6 second window starting at T1+ 54 seconds.

Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5300MHz will continue for 2.5 minutes after the radar burst has been generated.

Verify that during the 2.5 minute measurement window no EUT transmissions occurred at 5300MHz.

Channel Availability Check Time at the end of the 60 second Check Time
Ch 5300 MHz



5.1.12. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

FCC §15.407(h)(2)(iii)

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 Client Device will associate with the EUT (Master). The requisite MPEG video file ("TestFile.mpg" available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is streamed from the master device (AP) to the client.

Channel Closing Transmission Time - Measurement

A Type 1 waveform was introduced to the EUT, from which a 12 second transmission record was captured, collecting nearly 250M samples of data, which included 60ms of pre-trigger data. This Type 1 waveform had an integral marker built into its construction, marking the start of the waveform play, which directly triggered the PXI digitizer's data capture via the PXI backplane trigger bus.

The test system was setup to capture data for all transmission events above a threshold level of -61dBm. The test equipment time stamps all captured events with respect to T_0 (zero time indicating the start of the measurements sequence) starting the 60 ms pre-trigger period followed by the radar type 1 burst period.

Radar (Type 1) Pre-trigger period 60ms

Type 1 burst period 24.277ms

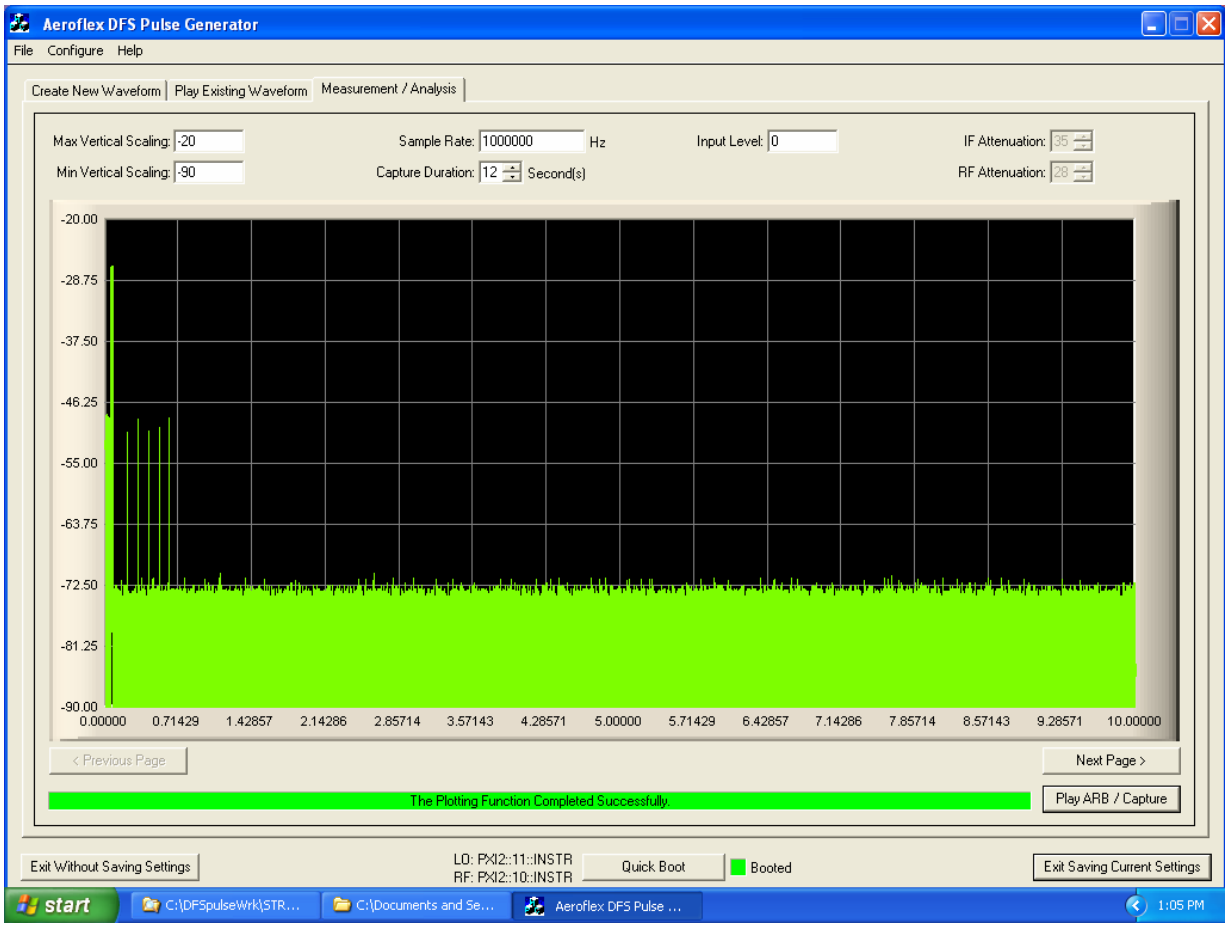
(The period of the 18 pulse burst includes [17 pulses *1.428mS PRI] = 24.276ms. Then add 1µs pulse width for the final pulse.)

Channel Closing Transmission Time starts immediately after the last radar pulse is transmitted i.e. 84.277ms after the start of the trace capture period.

Therefore, pulses seen after this 84.277ms 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 0.938 ms of transmission time accrued.

Channel Closing Transmission Time = 0.938 mSecs (limit 260 mSecs)

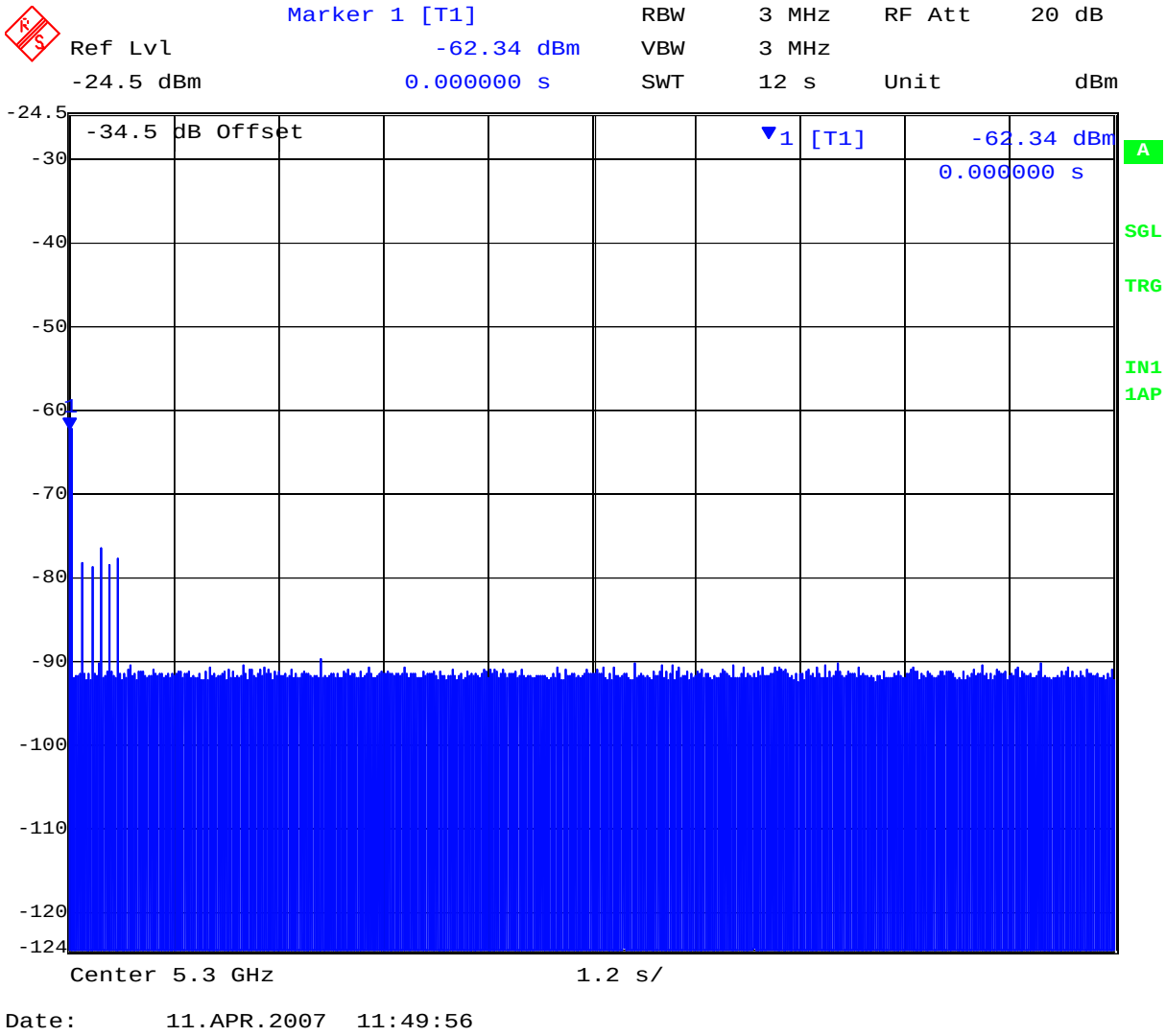
Channel Move Time, Channel Closing Time for Type 1 Radar Captured by Aeroflex PXI Test System



Additionally, a redundant conventional spectrum analyzer screen capture is provided to correlate against the digitizer screen capture for verification purposes.

Note;- no pre-trigger data interval (60 mSecs) was included in the following Spectrum Analyzer plot

Channel Move Time, Channel Closing Time for Type 1 Radar Captured by Spectrum Analyzer



The following data was captured by the Aeroflex PXI test System and is used to calculate the Channel Closing Transmission Time for the EUT with the intervention of Radar Type 1.

Sample Number: 85701	Rising Edge,	Sample Time Stamp	0.085701	
Sample Number: 85706	Falling Edge,	Sample Time Stamp	0.085706	5E-06
Sample Number: 88148	Rising Edge,	Sample Time Stamp	0.088148	
Sample Number: 88151	Falling Edge,	Sample Time Stamp	0.088151	3E-06
Sample Number: 88152	Rising Edge,	Sample Time Stamp	0.088152	
Sample Number: 88154	Falling Edge,	Sample Time Stamp	0.088154	2E-06
Sample Number: 88155	Rising Edge,	Sample Time Stamp	0.088155	
Sample Number: 88162	Falling Edge,	Sample Time Stamp	0.088162	7E-06
Sample Number: 88163	Rising Edge,	Sample Time Stamp	0.088163	
Sample Number: 88166	Falling Edge,	Sample Time Stamp	0.088166	3E-06
Sample Number: 88167	Rising Edge,	Sample Time Stamp	0.088167	
Sample Number: 88171	Falling Edge,	Sample Time Stamp	0.088171	4E-06
Sample Number: 88172	Rising Edge,	Sample Time Stamp	0.088172	
Sample Number: 88174	Falling Edge,	Sample Time Stamp	0.088174	2E-06
Sample Number: 88175	Rising Edge,	Sample Time Stamp	0.088175	
Sample Number: 88178	Falling Edge,	Sample Time Stamp	0.088178	3E-06
Sample Number: 88179	Rising Edge,	Sample Time Stamp	0.088179	
Sample Number: 88181	Falling Edge,	Sample Time Stamp	0.088181	2E-06
Sample Number: 88182	Rising Edge,	Sample Time Stamp	0.088182	
Sample Number: 88183	Falling Edge,	Sample Time Stamp	0.088183	1E-06
Sample Number: 88184	Rising Edge,	Sample Time Stamp	0.088184	
Sample Number: 88186	Falling Edge,	Sample Time Stamp	0.088186	2E-06
Sample Number: 88187	Rising Edge,	Sample Time Stamp	0.088187	
Sample Number: 88210	Falling Edge,	Sample Time Stamp	0.08821	2.3E-05
Sample Number: 88211	Rising Edge,	Sample Time Stamp	0.088211	
Sample Number: 88213	Falling Edge,	Sample Time Stamp	0.088213	2E-06
Sample Number: 88214	Rising Edge,	Sample Time Stamp	0.088214	
Sample Number: 88218	Falling Edge,	Sample Time Stamp	0.088218	4E-06
Sample Number: 88219	Rising Edge,	Sample Time Stamp	0.088219	
Sample Number: 88222	Falling Edge,	Sample Time Stamp	0.088222	3E-06

Sample Number: 88223 Rising Edge,	Sample Time Stamp	0.088223	
Sample Number: 88226 Falling Edge,	Sample Time Stamp	0.088226	3E-06
Sample Number: 88227 Rising Edge,	Sample Time Stamp	0.088227	
Sample Number: 88228 Falling Edge,	Sample Time Stamp	0.088228	1E-06
Sample Number: 88229 Rising Edge,	Sample Time Stamp	0.088229	
Sample Number: 88238 Falling Edge,	Sample Time Stamp	0.088238	9E-06
Sample Number: 88239 Rising Edge,	Sample Time Stamp	0.088239	
Sample Number: 88242 Falling Edge,	Sample Time Stamp	0.088242	3E-06
Sample Number: 88243 Rising Edge,	Sample Time Stamp	0.088243	
Sample Number: 88246 Falling Edge,	Sample Time Stamp	0.088246	3E-06
Sample Number: 88247 Rising Edge,	Sample Time Stamp	0.088247	
Sample Number: 88250 Falling Edge,	Sample Time Stamp	0.08825	3E-06
Sample Number: 88251 Rising Edge,	Sample Time Stamp	0.088251	
Sample Number: 88259 Falling Edge,	Sample Time Stamp	0.088259	8E-06
Sample Number: 88260 Rising Edge,	Sample Time Stamp	0.08826	
Sample Number: 88270 Falling Edge,	Sample Time Stamp	0.08827	1E-05
Sample Number: 88271 Rising Edge,	Sample Time Stamp	0.088271	
Sample Number: 88274 Falling Edge,	Sample Time Stamp	0.088274	3E-06
Sample Number: 88275 Rising Edge,	Sample Time Stamp	0.088275	
Sample Number: 88278 Falling Edge,	Sample Time Stamp	0.088278	3E-06
Sample Number: 88279 Rising Edge,	Sample Time Stamp	0.088279	
Sample Number: 88282 Falling Edge,	Sample Time Stamp	0.088282	3E-06
Sample Number: 88283 Rising Edge,	Sample Time Stamp	0.088283	
Sample Number: 88286 Falling Edge,	Sample Time Stamp	0.088286	3E-06
Sample Number: 88287 Rising Edge,	Sample Time Stamp	0.088287	
Sample Number: 88290 Falling Edge,	Sample Time Stamp	0.08829	3E-06
Sample Number: 88291 Rising Edge,	Sample Time Stamp	0.088291	
Sample Number: 88299 Falling Edge,	Sample Time Stamp	0.088299	8E-06
Sample Number: 88300 Rising Edge,	Sample Time Stamp	0.0883	
Sample Number: 88302 Falling Edge,	Sample Time Stamp	0.088302	2E-06
Sample Number: 88303 Rising Edge,	Sample Time Stamp	0.088303	
Sample Number: 88306 Falling Edge,	Sample Time Stamp	0.088306	3E-06

Sample Number: 88307 Rising Edge,	Sample Time Stamp	0.088307	
Sample Number: 88309 Falling Edge,	Sample Time Stamp	0.088309	2E-06
Sample Number: 88310 Rising Edge,	Sample Time Stamp	0.08831	
Sample Number: 88317 Falling Edge,	Sample Time Stamp	0.088317	7E-06
Sample Number: 88318 Rising Edge,	Sample Time Stamp	0.088318	
Sample Number: 88321 Falling Edge,	Sample Time Stamp	0.088321	3E-06
Sample Number: 225648 Rising Edge,	Sample Time Stamp	0.225648	
Sample Number: 225649 Falling Edge,	Sample Time Stamp	0.225649	1E-06
Sample Number: 225650 Rising Edge,	Sample Time Stamp	0.22565	
Sample Number: 225652 Falling Edge,	Sample Time Stamp	0.225652	2E-06
Sample Number: 225653 Rising Edge,	Sample Time Stamp	0.225653	
Sample Number: 225657 Falling Edge,	Sample Time Stamp	0.225657	4E-06
Sample Number: 225658 Rising Edge,	Sample Time Stamp	0.225658	
Sample Number: 225660 Falling Edge,	Sample Time Stamp	0.22566	2E-06
Sample Number: 225662 Rising Edge,	Sample Time Stamp	0.225662	
Sample Number: 225665 Falling Edge,	Sample Time Stamp	0.225665	3E-06
Sample Number: 225666 Rising Edge,	Sample Time Stamp	0.225666	
Sample Number: 225668 Falling Edge,	Sample Time Stamp	0.225668	2E-06
Sample Number: 225670 Rising Edge,	Sample Time Stamp	0.22567	
Sample Number: 225677 Falling Edge,	Sample Time Stamp	0.225677	7E-06
Sample Number: 225678 Rising Edge,	Sample Time Stamp	0.225678	
Sample Number: 225689 Falling Edge,	Sample Time Stamp	0.225689	1.1E-05
Sample Number: 225690 Rising Edge,	Sample Time Stamp	0.22569	
Sample Number: 225693 Falling Edge,	Sample Time Stamp	0.225693	3E-06
Sample Number: 225694 Rising Edge,	Sample Time Stamp	0.225694	
Sample Number: 225705 Falling Edge,	Sample Time Stamp	0.225705	1.1E-05
Sample Number: 225706 Rising Edge,	Sample Time Stamp	0.225706	
Sample Number: 225713 Falling Edge,	Sample Time Stamp	0.225713	7E-06
Sample Number: 225714 Rising Edge,	Sample Time Stamp	0.225714	
Sample Number: 225721 Falling Edge,	Sample Time Stamp	0.225721	7E-06
Sample Number: 225722 Rising Edge,	Sample Time Stamp	0.225722	
Sample Number: 225729 Falling Edge,	Sample Time Stamp	0.225729	7E-06
Sample Number: 225730 Rising Edge,	Sample Time Stamp	0.22573	

Sample Number: 225732	Falling Edge,	Sample Time Stamp	0.225732	2E-06
Sample Number: 225733	Rising Edge,	Sample Time Stamp	0.225733	
Sample Number: 225745	Falling Edge,	Sample Time Stamp	0.225745	1.2E-05
Sample Number: 225746	Rising Edge,	Sample Time Stamp	0.225746	
Sample Number: 225749	Falling Edge,	Sample Time Stamp	0.225749	3E-06
Sample Number: 225750	Rising Edge,	Sample Time Stamp	0.22575	
Sample Number: 225757	Falling Edge,	Sample Time Stamp	0.225757	7E-06
Sample Number: 225758	Rising Edge,	Sample Time Stamp	0.225758	
Sample Number: 225761	Falling Edge,	Sample Time Stamp	0.225761	3E-06
Sample Number: 225762	Rising Edge,	Sample Time Stamp	0.225762	
Sample Number: 225825	Falling Edge,	Sample Time Stamp	0.225825	6.3E-05
Sample Number: 225826	Rising Edge,	Sample Time Stamp	0.225826	
Sample Number: 225828	Falling Edge,	Sample Time Stamp	0.225828	2E-06
Sample Number: 328049	Rising Edge,	Sample Time Stamp	0.328049	
Sample Number: 328056	Falling Edge,	Sample Time Stamp	0.328056	7E-06
Sample Number: 328057	Rising Edge,	Sample Time Stamp	0.328057	
Sample Number: 328064	Falling Edge,	Sample Time Stamp	0.328064	7E-06
Sample Number: 328065	Rising Edge,	Sample Time Stamp	0.328065	
Sample Number: 328080	Falling Edge,	Sample Time Stamp	0.32808	1.5E-05
Sample Number: 328081	Rising Edge,	Sample Time Stamp	0.328081	
Sample Number: 328102	Falling Edge,	Sample Time Stamp	0.328102	2.1E-05
Sample Number: 328103	Rising Edge,	Sample Time Stamp	0.328103	
Sample Number: 328112	Falling Edge,	Sample Time Stamp	0.328112	9E-06
Sample Number: 328113	Rising Edge,	Sample Time Stamp	0.328113	
Sample Number: 328124	Falling Edge,	Sample Time Stamp	0.328124	1.1E-05
Sample Number: 328125	Rising Edge,	Sample Time Stamp	0.328125	
Sample Number: 328144	Falling Edge,	Sample Time Stamp	0.328144	1.9E-05
Sample Number: 328145	Rising Edge,	Sample Time Stamp	0.328145	
Sample Number: 328168	Falling Edge,	Sample Time Stamp	0.328168	2.3E-05
Sample Number: 328170	Rising Edge,	Sample Time Stamp	0.32817	
Sample Number: 328172	Falling Edge,	Sample Time Stamp	0.328172	2E-06
Sample Number: 328173	Rising Edge,	Sample Time Stamp	0.328173	
Sample Number: 328176	Falling Edge,	Sample Time Stamp	0.328176	3E-06

Sample Number: 328177	Rising Edge,	Sample Time Stamp	0.328177	
Sample Number: 328180	Falling Edge,	Sample Time Stamp	0.32818	3E-06
Sample Number: 328181	Rising Edge,	Sample Time Stamp	0.328181	
Sample Number: 328189	Falling Edge,	Sample Time Stamp	0.328189	8E-06
Sample Number: 328190	Rising Edge,	Sample Time Stamp	0.32819	
Sample Number: 328192	Falling Edge,	Sample Time Stamp	0.328192	2E-06
Sample Number: 328193	Rising Edge,	Sample Time Stamp	0.328193	
Sample Number: 328200	Falling Edge,	Sample Time Stamp	0.3282	7E-06
Sample Number: 328201	Rising Edge,	Sample Time Stamp	0.328201	
Sample Number: 328202	Falling Edge,	Sample Time Stamp	0.328202	1E-06
Sample Number: 328203	Rising Edge,	Sample Time Stamp	0.328203	
Sample Number: 328229	Falling Edge,	Sample Time Stamp	0.328229	2.6E-05
Sample Number: 430450	Rising Edge,	Sample Time Stamp	0.43045	
Sample Number: 430452	Falling Edge,	Sample Time Stamp	0.430452	2E-06
Sample Number: 430453	Rising Edge,	Sample Time Stamp	0.430453	
Sample Number: 430460	Falling Edge,	Sample Time Stamp	0.43046	7E-06
Sample Number: 430461	Rising Edge,	Sample Time Stamp	0.430461	
Sample Number: 430464	Falling Edge,	Sample Time Stamp	0.430464	3E-06
Sample Number: 430465	Rising Edge,	Sample Time Stamp	0.430465	
Sample Number: 430471	Falling Edge,	Sample Time Stamp	0.430471	6E-06
Sample Number: 430472	Rising Edge,	Sample Time Stamp	0.430472	
Sample Number: 430483	Falling Edge,	Sample Time Stamp	0.430483	1.1E-05
Sample Number: 430484	Rising Edge,	Sample Time Stamp	0.430484	
Sample Number: 430488	Falling Edge,	Sample Time Stamp	0.430488	4E-06
Sample Number: 430489	Rising Edge,	Sample Time Stamp	0.430489	
Sample Number: 430499	Falling Edge,	Sample Time Stamp	0.430499	1E-05
Sample Number: 430500	Rising Edge,	Sample Time Stamp	0.4305	
Sample Number: 430511	Falling Edge,	Sample Time Stamp	0.430511	1.1E-05
Sample Number: 430512	Rising Edge,	Sample Time Stamp	0.430512	
Sample Number: 430516	Falling Edge,	Sample Time Stamp	0.430516	4E-06
Sample Number: 430517	Rising Edge,	Sample Time Stamp	0.430517	
Sample Number: 430519	Falling Edge,	Sample Time Stamp	0.430519	2E-06

Sample Number: 430520	Rising Edge,	Sample Time Stamp	0.43052	
Sample Number: 430521	Falling Edge,	Sample Time Stamp	0.430521	1E-06
Sample Number: 430522	Rising Edge,	Sample Time Stamp	0.430522	
Sample Number: 430524	Falling Edge,	Sample Time Stamp	0.430524	2E-06
Sample Number: 430525	Rising Edge,	Sample Time Stamp	0.430525	
Sample Number: 430528	Falling Edge,	Sample Time Stamp	0.430528	3E-06
Sample Number: 430529	Rising Edge,	Sample Time Stamp	0.430529	
Sample Number: 430535	Falling Edge,	Sample Time Stamp	0.430535	6E-06
Sample Number: 430536	Rising Edge,	Sample Time Stamp	0.430536	
Sample Number: 430537	Falling Edge,	Sample Time Stamp	0.430537	1E-06
Sample Number: 430538	Rising Edge,	Sample Time Stamp	0.430538	
Sample Number: 430540	Falling Edge,	Sample Time Stamp	0.43054	2E-06
Sample Number: 430541	Rising Edge,	Sample Time Stamp	0.430541	
Sample Number: 430552	Falling Edge,	Sample Time Stamp	0.430552	1.1E-05
Sample Number: 430553	Rising Edge,	Sample Time Stamp	0.430553	
Sample Number: 430556	Falling Edge,	Sample Time Stamp	0.430556	3E-06
Sample Number: 430557	Rising Edge,	Sample Time Stamp	0.430557	
Sample Number: 430560	Falling Edge,	Sample Time Stamp	0.43056	3E-06
Sample Number: 430561	Rising Edge,	Sample Time Stamp	0.430561	
Sample Number: 430564	Falling Edge,	Sample Time Stamp	0.430564	3E-06
Sample Number: 430565	Rising Edge,	Sample Time Stamp	0.430565	
Sample Number: 430571	Falling Edge,	Sample Time Stamp	0.430571	6E-06
Sample Number: 430572	Rising Edge,	Sample Time Stamp	0.430572	
Sample Number: 430577	Falling Edge,	Sample Time Stamp	0.430577	5E-06
Sample Number: 430578	Rising Edge,	Sample Time Stamp	0.430578	
Sample Number: 430588	Falling Edge,	Sample Time Stamp	0.430588	1E-05
Sample Number: 430589	Rising Edge,	Sample Time Stamp	0.430589	
Sample Number: 430591	Falling Edge,	Sample Time Stamp	0.430591	2E-06
Sample Number: 430592	Rising Edge,	Sample Time Stamp	0.430592	
Sample Number: 430593	Falling Edge,	Sample Time Stamp	0.430593	1E-06
Sample Number: 430594	Rising Edge,	Sample Time Stamp	0.430594	
Sample Number: 430600	Falling Edge,	Sample Time Stamp	0.4306	6E-06
Sample Number: 430601	Rising Edge,	Sample Time Stamp	0.430601	

Sample Number: 430605	Falling Edge,	Sample Time Stamp	0.430605	4E-06
Sample Number: 430607	Rising Edge,	Sample Time Stamp	0.430607	
Sample Number: 430611	Falling Edge,	Sample Time Stamp	0.430611	4E-06
Sample Number: 430612	Rising Edge,	Sample Time Stamp	0.430612	
Sample Number: 430613	Falling Edge,	Sample Time Stamp	0.430613	1E-06
Sample Number: 430614	Rising Edge,	Sample Time Stamp	0.430614	
Sample Number: 430628	Falling Edge,	Sample Time Stamp	0.430628	1.4E-05
Sample Number: 430629	Rising Edge,	Sample Time Stamp	0.430629	
Sample Number: 430630	Falling Edge,	Sample Time Stamp	0.43063	1E-06
Sample Number: 532850	Rising Edge,	Sample Time Stamp	0.53285	
Sample Number: 532856	Falling Edge,	Sample Time Stamp	0.532856	6E-06
Sample Number: 532857	Rising Edge,	Sample Time Stamp	0.532857	
Sample Number: 532859	Falling Edge,	Sample Time Stamp	0.532859	2E-06
Sample Number: 532860	Rising Edge,	Sample Time Stamp	0.53286	
Sample Number: 532867	Falling Edge,	Sample Time Stamp	0.532867	7E-06
Sample Number: 532868	Rising Edge,	Sample Time Stamp	0.532868	
Sample Number: 532879	Falling Edge,	Sample Time Stamp	0.532879	1.1E-05
Sample Number: 532880	Rising Edge,	Sample Time Stamp	0.53288	
Sample Number: 532887	Falling Edge,	Sample Time Stamp	0.532887	7E-06
Sample Number: 532888	Rising Edge,	Sample Time Stamp	0.532888	
Sample Number: 532896	Falling Edge,	Sample Time Stamp	0.532896	8E-06
Sample Number: 532897	Rising Edge,	Sample Time Stamp	0.532897	
Sample Number: 532900	Falling Edge,	Sample Time Stamp	0.5329	3E-06
Sample Number: 532901	Rising Edge,	Sample Time Stamp	0.532901	
Sample Number: 532911	Falling Edge,	Sample Time Stamp	0.532911	1E-05
Sample Number: 532912	Rising Edge,	Sample Time Stamp	0.532912	
Sample Number: 532923	Falling Edge,	Sample Time Stamp	0.532923	1.1E-05
Sample Number: 532924	Rising Edge,	Sample Time Stamp	0.532924	
Sample Number: 532932	Falling Edge,	Sample Time Stamp	0.532932	8E-06
Sample Number: 532933	Rising Edge,	Sample Time Stamp	0.532933	
Sample Number: 532940	Falling Edge,	Sample Time Stamp	0.53294	7E-06
Sample Number: 532941	Rising Edge,	Sample Time Stamp	0.532941	
Sample Number: 532944	Falling Edge,	Sample Time Stamp	0.532944	3E-06

Sample Number: 532945	Rising Edge,	Sample Time Stamp	0.532945	
Sample Number: 532952	Falling Edge,	Sample Time Stamp	0.532952	7E-06
Sample Number: 532953	Rising Edge,	Sample Time Stamp	0.532953	
Sample Number: 532955	Falling Edge,	Sample Time Stamp	0.532955	2E-06
Sample Number: 532956	Rising Edge,	Sample Time Stamp	0.532956	
Sample Number: 532959	Falling Edge,	Sample Time Stamp	0.532959	3E-06
Sample Number: 532960	Rising Edge,	Sample Time Stamp	0.53296	
Sample Number: 532967	Falling Edge,	Sample Time Stamp	0.532967	7E-06
Sample Number: 532968	Rising Edge,	Sample Time Stamp	0.532968	
Sample Number: 532970	Falling Edge,	Sample Time Stamp	0.53297	2E-06
Sample Number: 532971	Rising Edge,	Sample Time Stamp	0.532971	
Sample Number: 532976	Falling Edge,	Sample Time Stamp	0.532976	5E-06
Sample Number: 532977	Rising Edge,	Sample Time Stamp	0.532977	
Sample Number: 532983	Falling Edge,	Sample Time Stamp	0.532983	6E-06
Sample Number: 532984	Rising Edge,	Sample Time Stamp	0.532984	
Sample Number: 532992	Falling Edge,	Sample Time Stamp	0.532992	8E-06
Sample Number: 532993	Rising Edge,	Sample Time Stamp	0.532993	
Sample Number: 532995	Falling Edge,	Sample Time Stamp	0.532995	2E-06
Sample Number: 532996	Rising Edge,	Sample Time Stamp	0.532996	
Sample Number: 533004	Falling Edge,	Sample Time Stamp	0.533004	8E-06
Sample Number: 533005	Rising Edge,	Sample Time Stamp	0.533005	
Sample Number: 533013	Falling Edge,	Sample Time Stamp	0.533013	8E-06
Sample Number: 533014	Rising Edge,	Sample Time Stamp	0.533014	
Sample Number: 533016	Falling Edge,	Sample Time Stamp	0.533016	2E-06
Sample Number: 533017	Rising Edge,	Sample Time Stamp	0.533017	
Sample Number: 533019	Falling Edge,	Sample Time Stamp	0.533019	2E-06
Sample Number: 533020	Rising Edge,	Sample Time Stamp	0.53302	
Sample Number: 533023	Falling Edge,	Sample Time Stamp	0.533023	3E-06
Sample Number: 533024	Rising Edge,	Sample Time Stamp	0.533024	
Sample Number: 533031	Falling Edge,	Sample Time Stamp	0.533031	7E-06
Sample Number: 635251	Rising Edge,	Sample Time Stamp	0.635251	
Sample Number: 635255	Falling Edge,	Sample Time Stamp	0.635255	4E-06

Sample Number: 635256	Rising Edge,	Sample Time Stamp	0.635256	
Sample Number: 635260	Falling Edge,	Sample Time Stamp	0.63526	4E-06
Sample Number: 635261	Rising Edge,	Sample Time Stamp	0.635261	
Sample Number: 635272	Falling Edge,	Sample Time Stamp	0.635272	1.1E-05
Sample Number: 635273	Rising Edge,	Sample Time Stamp	0.635273	
Sample Number: 635288	Falling Edge,	Sample Time Stamp	0.635288	1.5E-05
Sample Number: 635289	Rising Edge,	Sample Time Stamp	0.635289	
Sample Number: 635299	Falling Edge,	Sample Time Stamp	0.635299	1E-05
Sample Number: 635300	Rising Edge,	Sample Time Stamp	0.6353	
Sample Number: 635304	Falling Edge,	Sample Time Stamp	0.635304	4E-06
Sample Number: 635305	Rising Edge,	Sample Time Stamp	0.635305	
Sample Number: 635331	Falling Edge,	Sample Time Stamp	0.635331	2.6E-05
Sample Number: 635333	Rising Edge,	Sample Time Stamp	0.635333	
Sample Number: 635335	Falling Edge,	Sample Time Stamp	0.635335	2E-06
Sample Number: 635336	Rising Edge,	Sample Time Stamp	0.635336	
Sample Number: 635359	Falling Edge,	Sample Time Stamp	0.635359	2.3E-05
Sample Number: 635361	Rising Edge,	Sample Time Stamp	0.635361	
Sample Number: 635368	Falling Edge,	Sample Time Stamp	0.635368	7E-06
Sample Number: 635369	Rising Edge,	Sample Time Stamp	0.635369	
Sample Number: 635384	Falling Edge,	Sample Time Stamp	0.635384	1.5E-05
Sample Number: 635385	Rising Edge,	Sample Time Stamp	0.635385	
Sample Number: 635388	Falling Edge,	Sample Time Stamp	0.635388	3E-06
Sample Number: 635389	Rising Edge,	Sample Time Stamp	0.635389	
Sample Number: 635407	Falling Edge,	Sample Time Stamp	0.635407	1.8E-05
Sample Number: 635409	Rising Edge,	Sample Time Stamp	0.635409	
Sample Number: 635432	Falling Edge,	Sample Time Stamp	0.635432*	2.3E-05

Aggregate Transmission Time = 0.000938 Secs

* Represents the last transmission activity of the EUT. The 0.635432*second time stamp is used to calculate Channel Move Time.

Channel Move Time – Measurement & Calculation Type 1 Radar

The Channel Move Time is calculated using the data captured for the Channel Closing time as follows;-

Channel Move Time = Ft – Pt - Rt

Where;-

Ft = Final transmission activity occurred at 635.432 mSeconds

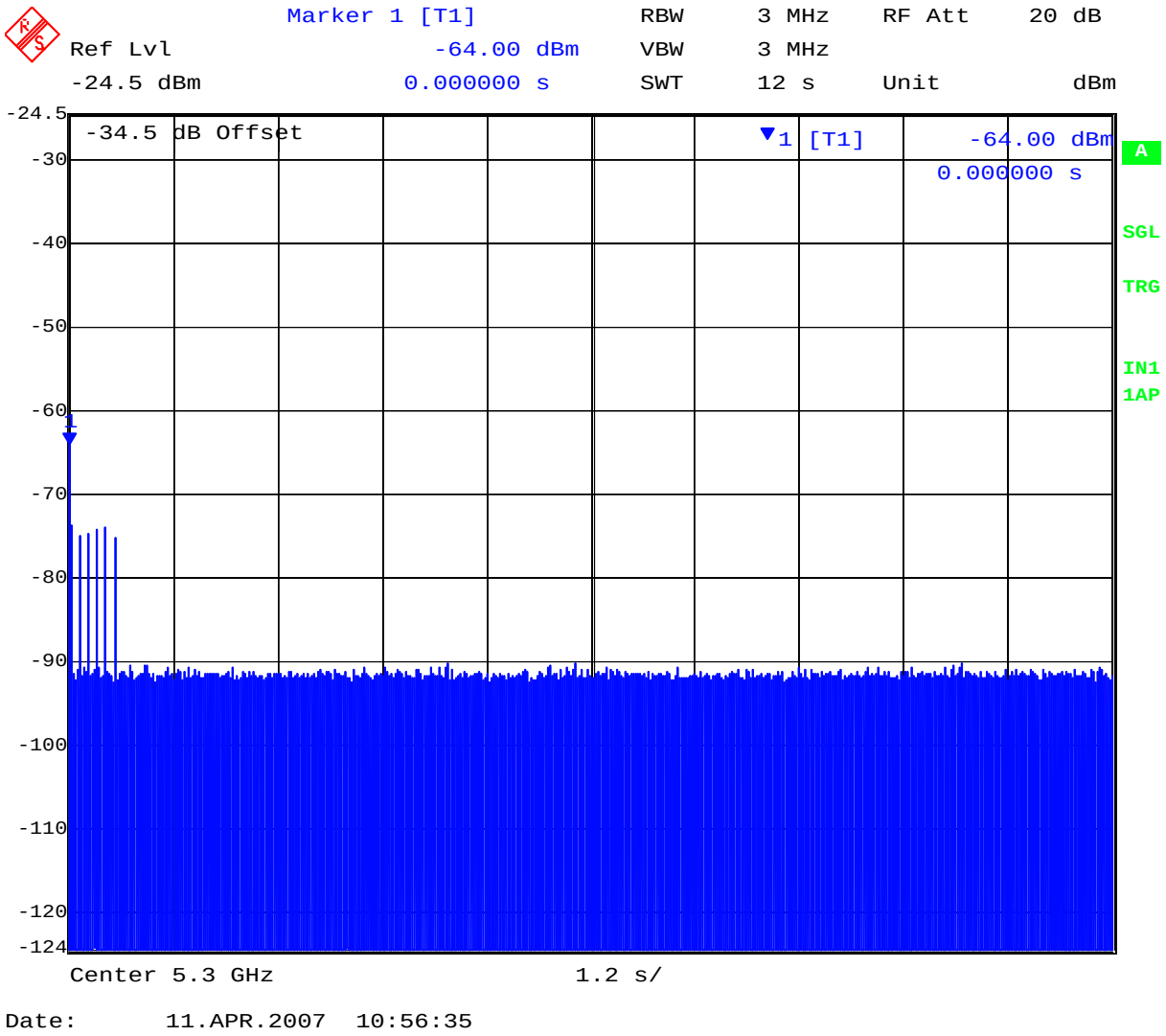
Pt = Pre-trigger information 60 mS

Rt = Type 1 burst period 24.277 mS

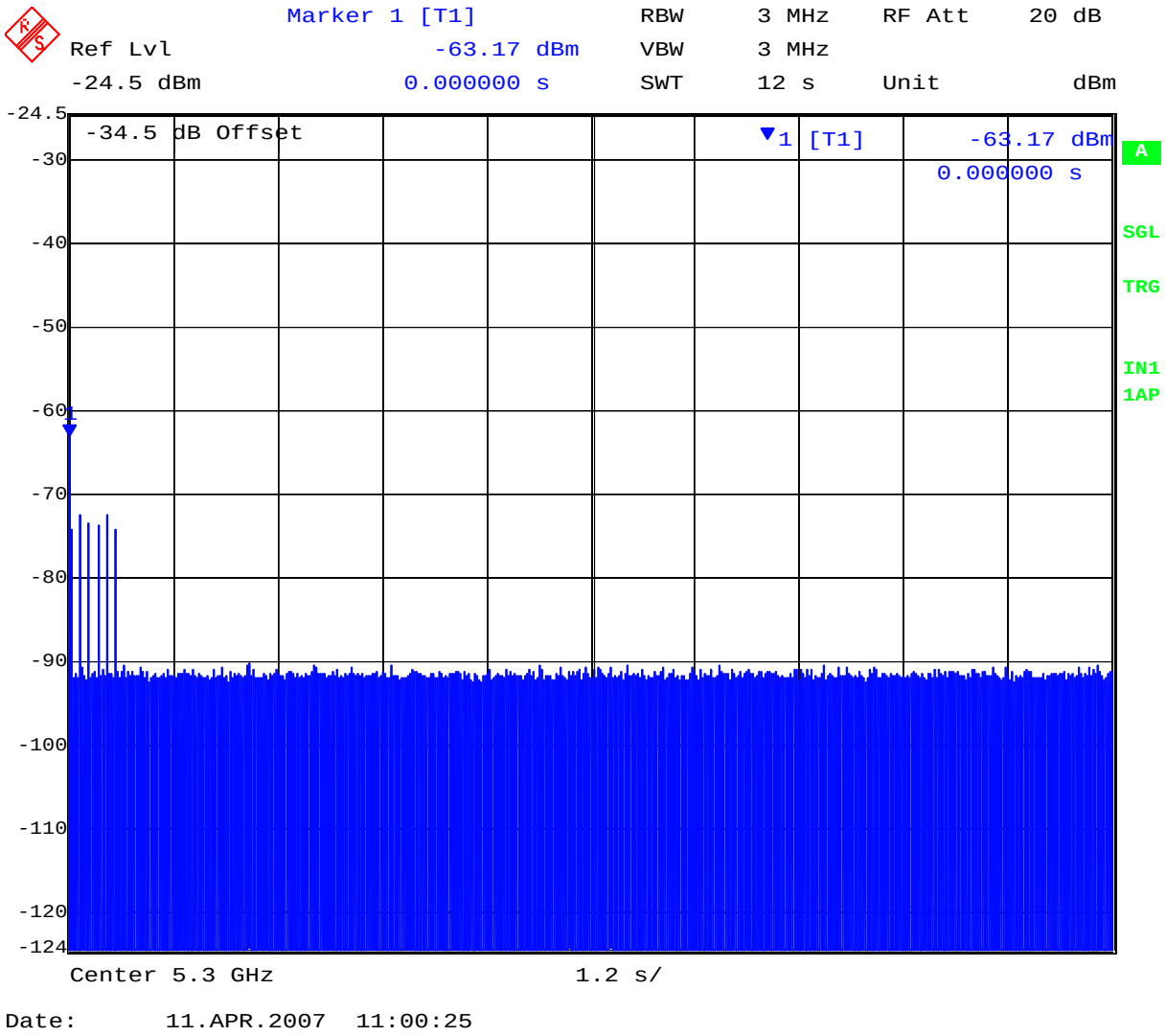
(Rt is the period of the 18 pulse burst includes [17 pulses *1.428mS PRI] = 24.276ms. Then add 1µs pulse width for the final pulse.)

Channel Move Time = 635.432 – 60 – 24.277 = <u>0.551 Seconds (Limit 10 Seconds)</u>

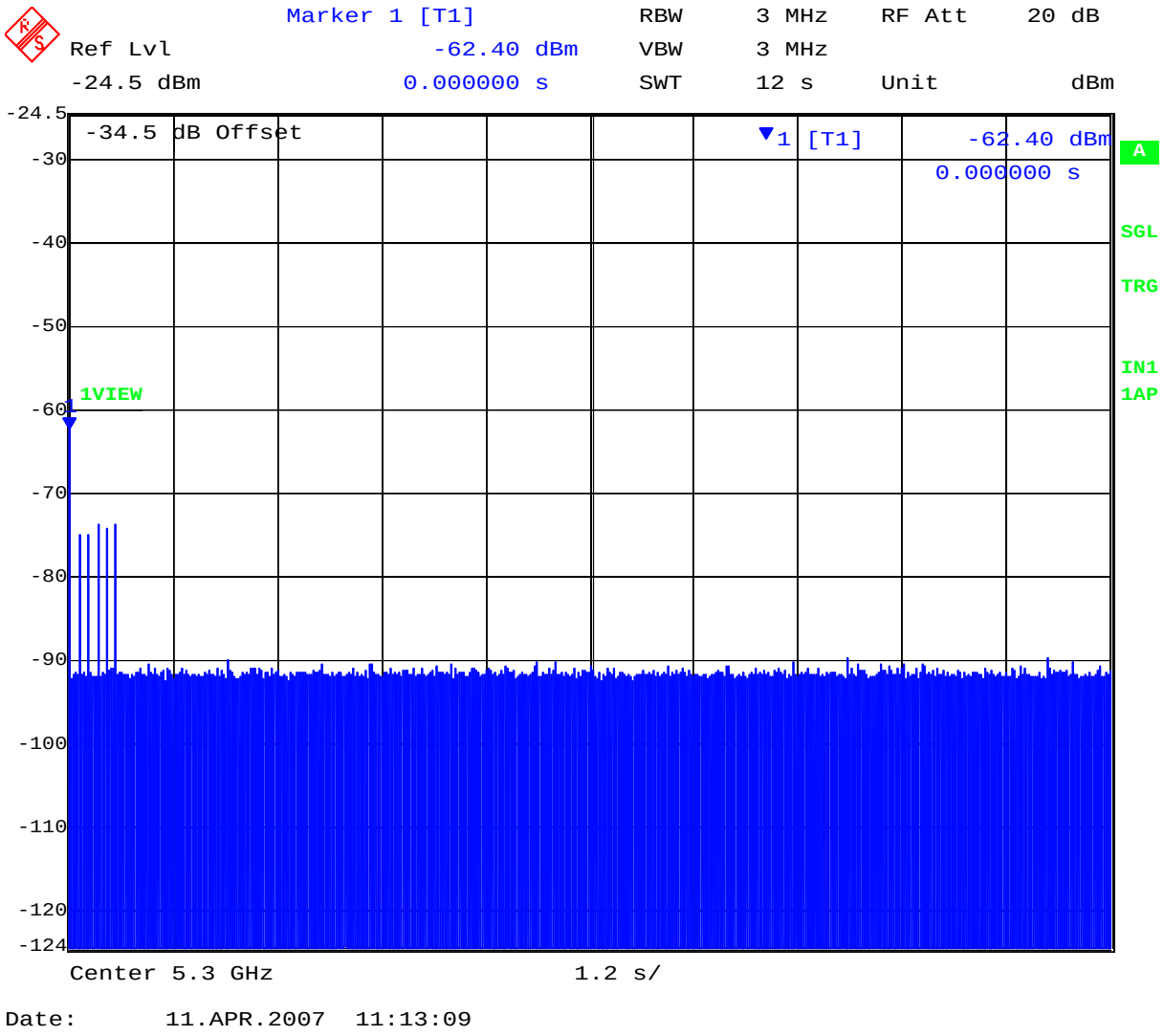
Channel Move Time, Channel closing Transmission Time for Type 2 Radar 1.1µs, 197 prf, 24 pulses



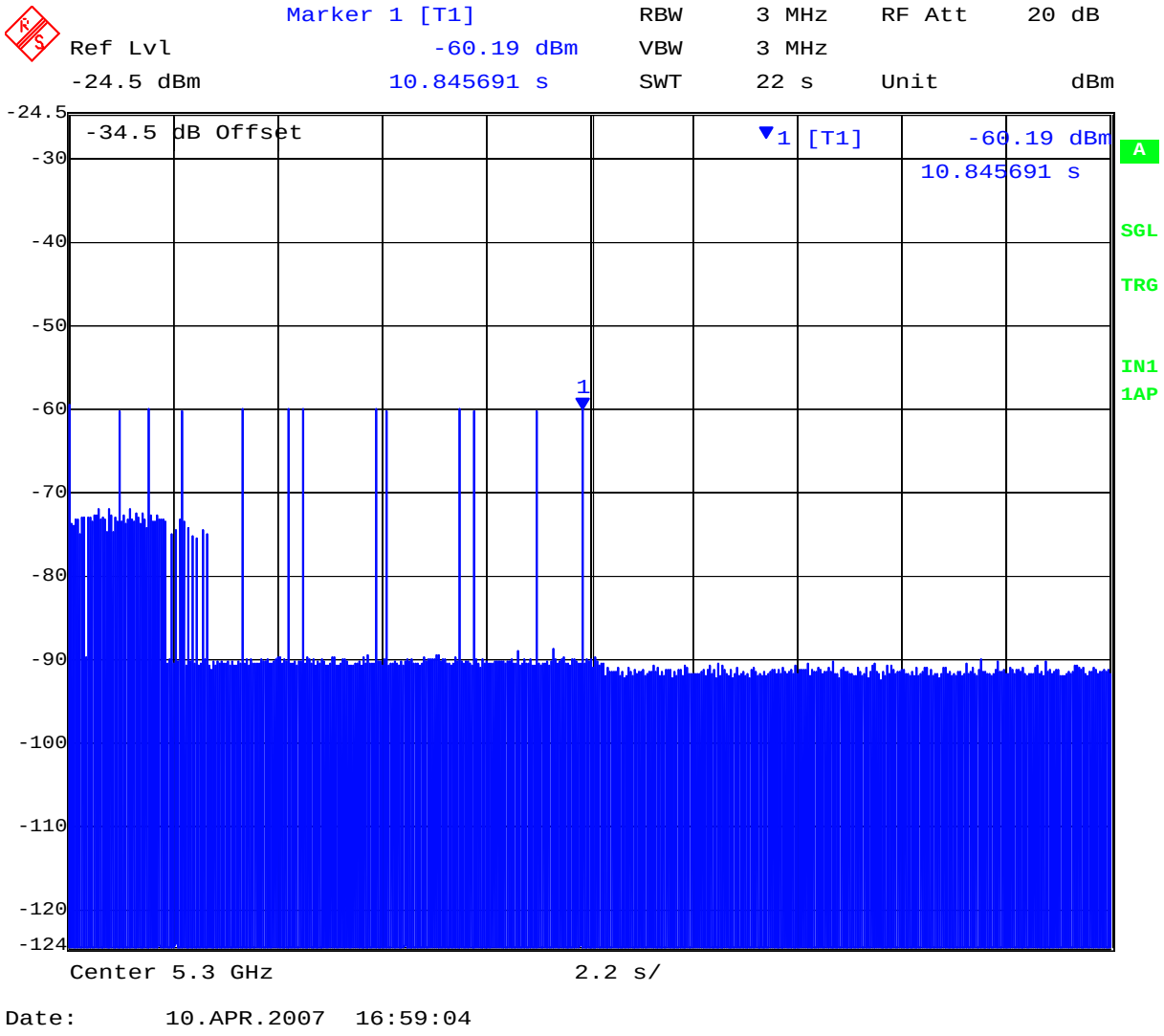
Channel Move Time, Channel closing Transmission Time for Type 3 Radar 6.2 µs, 259 prf, 17 pulses



Channel Move Time, Channel closing Transmission Time for Type 4 Radar 11.6 µs, 283 prf, 13 pulses

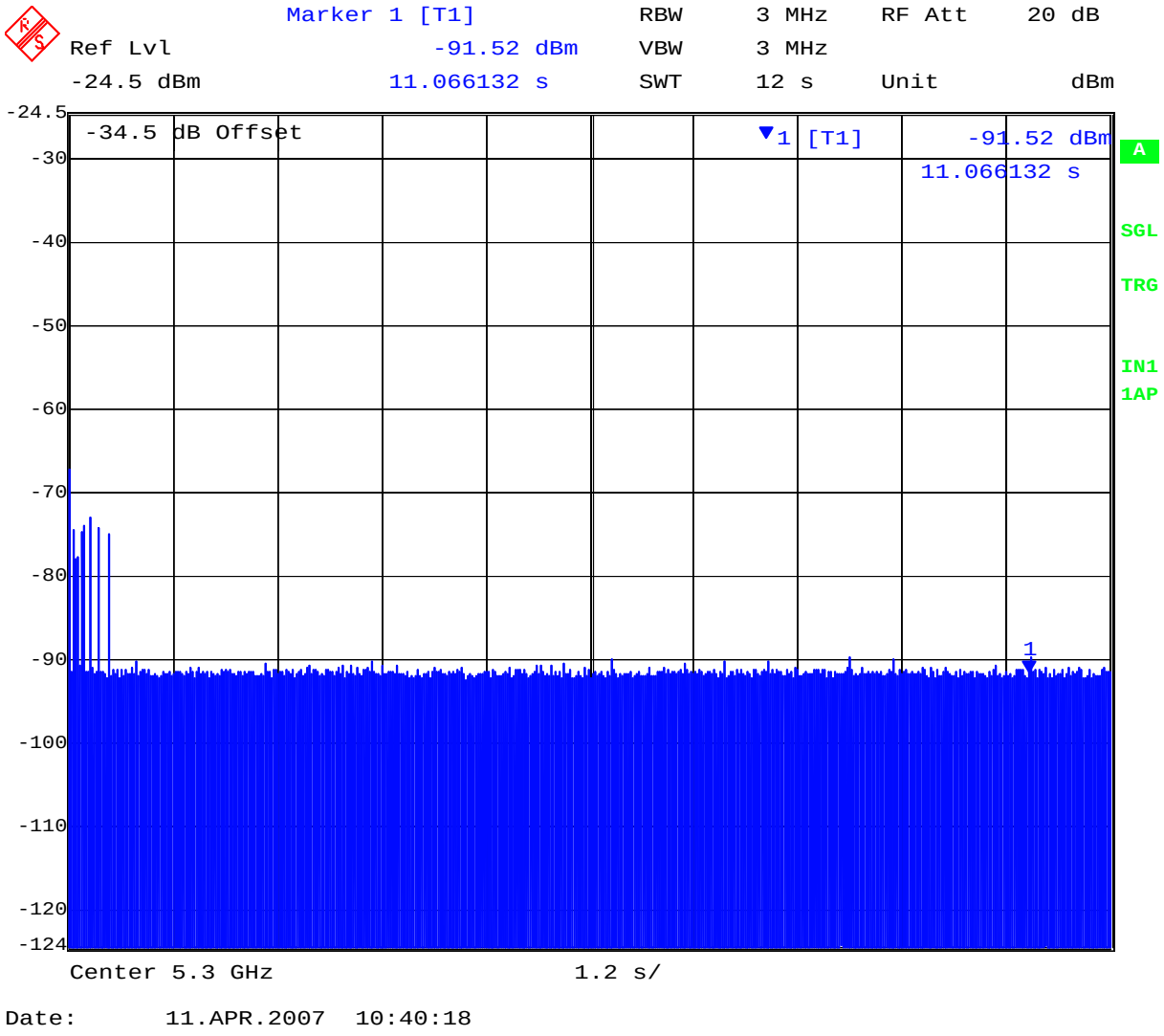


Channel Move Time, Channel closing Transmission Time for Type 5 Radar



With reference to the requirements of FCC MO & O 06-96;- The instant that the Chanel Move Time and Channel Closing Time begins for the long Pulse Radar Test Signal is the instant at the end of the 12 Second period defining the Radar Waveform. From the above plot is can be seen that the EUT stopped transmitting data before completion of the Radar Test Signal, therefore the Channel Closing Time and Channel Move time complies with the requirements.

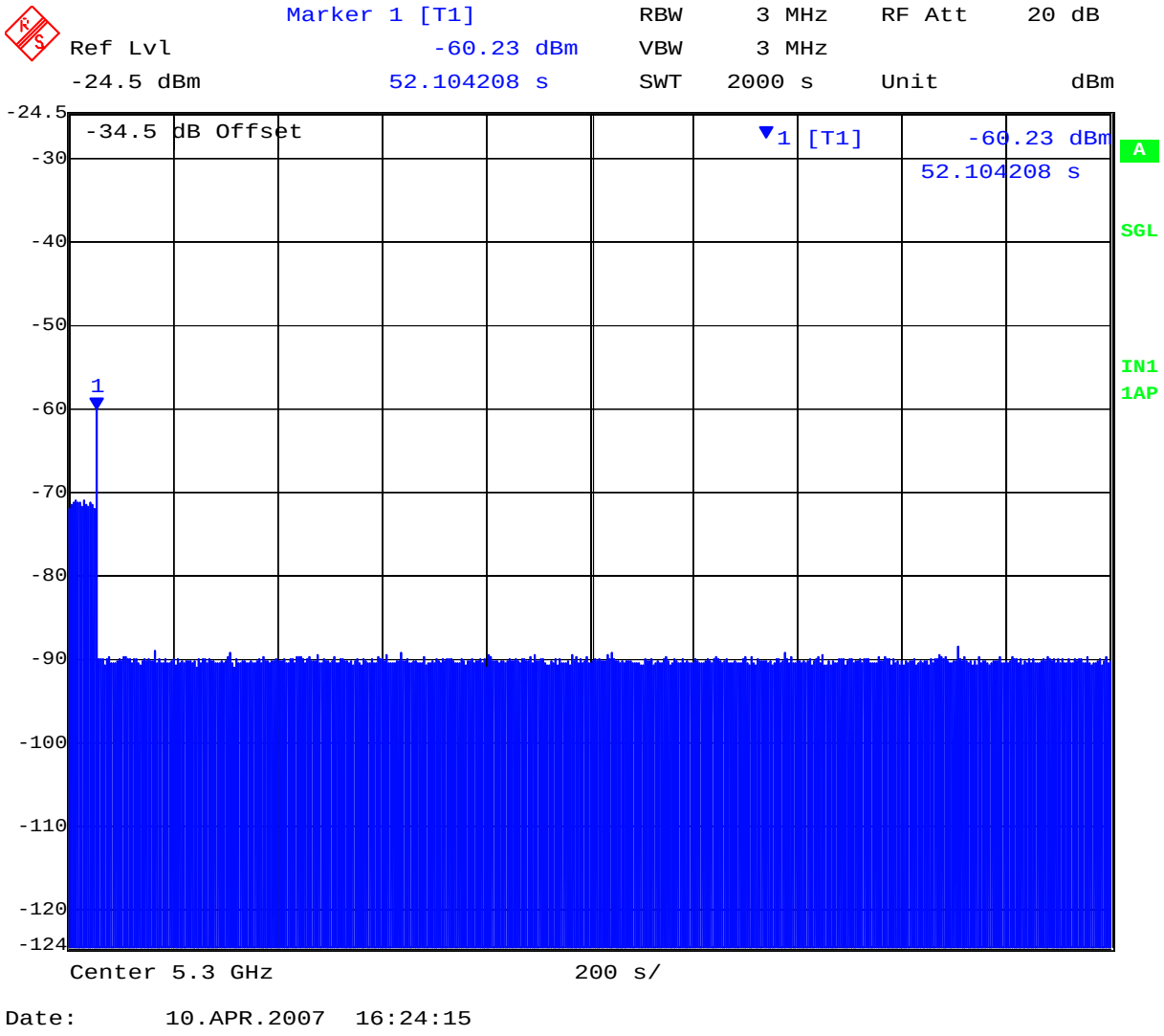
Channel Move Time, Channel closing Transmission Time for Type 6 Radar



30 Minute Non-Occupancy Period

The EUT is monitored for more than 30 minutes following the channel close/move time to verify no transmissions resume on this Channel.

30 Minute Non-Occupancy Period Type 1 Radar
Ch 5300 MHz



5.1.13. Statistical Performance Check

The steps below define the procedure to determine the minimum percentage of detection 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 Client Device will associate with the UUT (Master) at 5300 MHz. Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test.

The Radar Waveform generator sends the individual waveform for each of the radar types 1-6. Statistical data will be gathered to determine the ability of the device to detect the radar test waveforms. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs. The percentage of successful detection is calculated by:

Total # of detections ÷ Total # of Trials × 100 = Probability of Detection

The Minimum number of trails, minimum percentage of successful detection and the average minimum percentage of successful detection are found in the Radar Test Waveforms section.

Radar Type 2 - Verification of Detection

Trail #	Detection = 1, No Detection = 0			
	Type 1	Type 2	Type 3	Type 4
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	1	1	1	1
12	1	1	1	1
13	1	1	1	1
14	1	1	1	1
15	1	1	1	1
16	1	1	1	1
17	1	1	1	1
18	1	1	1	1
19	1	1	1	1
20	1	1	1	1
21	1	1	1	1
22	1	1	1	1
23	1	1	1	1
24	1	1	1	1
25	1	1	1	1
26	1	1	1	1
27	1	1	1	1
28	1	1	1	1
29	1	1	1	1
30	1	1	1	1
Detection Percentage	100% (>60%)	100% (>60%)	100% (>60%)	100% (>60%)

In addition an average minimum percentage of successful detection across all four Short pulse radar test waveforms is required and calculated as follows;

$P_d1 + P_d2 + P_d3 + P_d4 = (100\% + 100\% + 100\% + 100\%) = 100\%$ (> 80%)

Radar Type 5 - Verification of Detection

Trail #	Detection = 1 No Detection = 0
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1
11	1
12	1
13	1
14	1
15	1
16	1
17	1
18	1
19	1
20	1
21	1
22	1
23	1
24	1
25	1
26	1
27	1
28	1
29	1
30	1
Detection Percentage	100% (>60%)

Radar Type 6 - Verification of Detection

Trail #	Detection = 1 No Detection = 0
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1
11	0
12	1
13	1
14	1
15	1
16	1
17	1
18	1
19	0
20	1
21	1
22	1
23	1
24	1
25	1
26	1
27	1
28	1
29	1
30	1
Detection Percentage	93.33% (>60%)

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

6. Client Device Testing

As a Client device, the OWS 2400-30 operates as a "Client Without Radar Detection" as defined in the FCC MO & O 96-06 and was tested per Table 2: Applicability of DFS requirements during normal operation.

6.1.1. In-Service Monitoring for Client Channel Move Time, Client Channel Closing Transmission Time and Non-Occupancy Period

FCC §15.407(h)(2)(iii)

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 Client Device will associate with the EUT (Master). The requisite MPEG video file ("TestFile.mpg" available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is streamed from the master device (AP) to the Client Device.

Client Device Channel Closing Transmission Time - Measurement

A Type 1 waveform was introduced to the Master device, from which a 12 second transmission record was captured for the Client device, collecting nearly 250M samples of data, which included 60ms of pre-trigger data. This Type 1 waveform had an integral marker built into its construction, marking the start of the waveform play, which directly triggered the PXI digitizer's data capture via the PXI backplane trigger bus.

The test system was setup to capture data for all transmission events above a threshold level of -61dBm. The test equipment time stamps all captured events with respect to T_0 (zero time indicating the start of the measurements sequence) starting the 60 ms pre-trigger period followed by the radar type 1 burst period.

Radar (Type 1) Pre-trigger period 60ms

Type 1 burst period 24.277ms

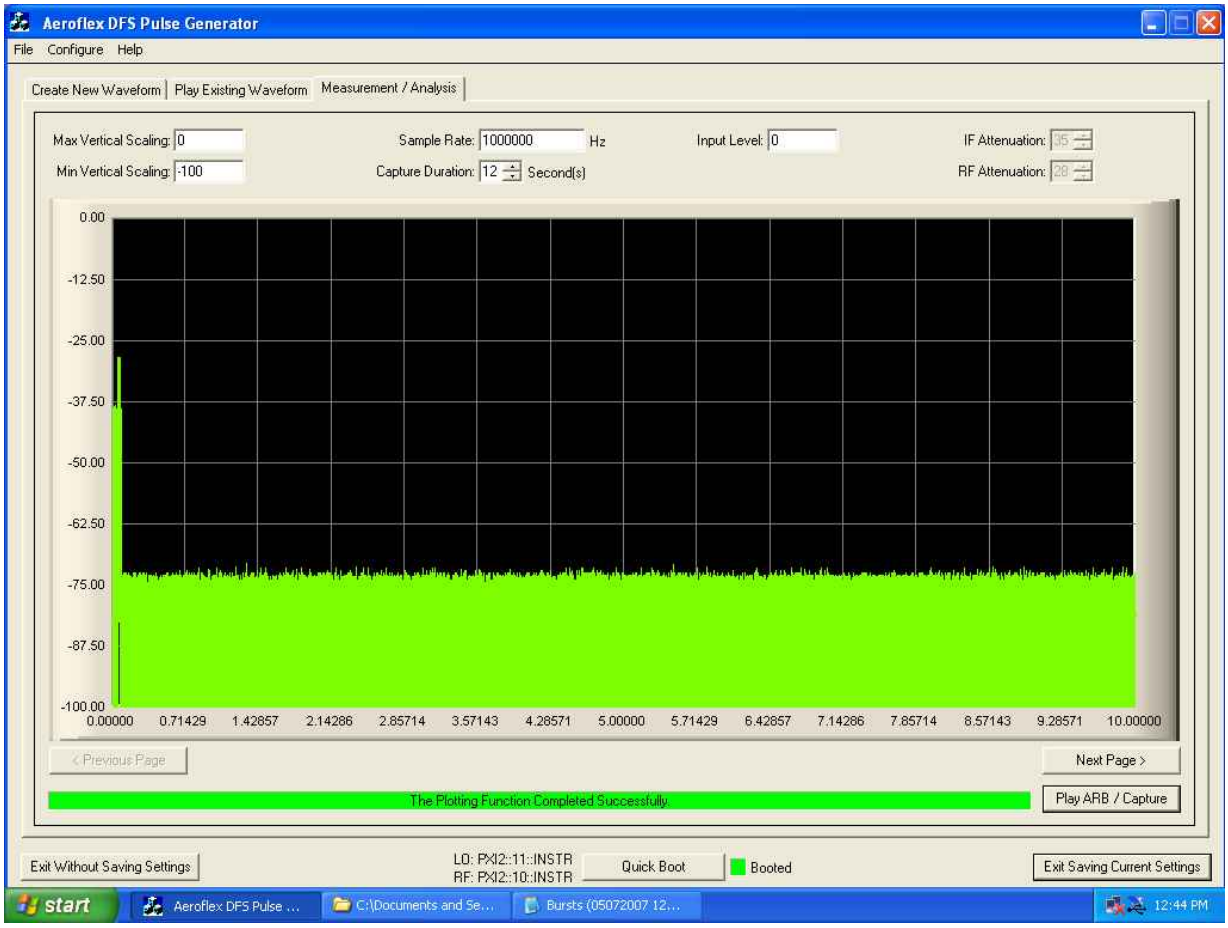
(The period of the 18 pulse burst includes [17 pulses *1.428mS PRI] = 24.276ms. Then add 1µs pulse width for the final pulse.)

Client Device Channel Closing Transmission Time starts immediately after the last radar pulse is transmitted i.e. 84.277ms after the start of the trace capture period.

Therefore, pulses seen after this 84.277ms boundary are identified and totaled to provide an aggregate total of transmissions in order to determine whether the EUT is compliant with the Client Device Channel Closing Transmission Time requirements as described in MO&O FCC 06-96. In this case, it was found that an aggregate total of 0.251 ms of transmission time accrued.

Client Device Channel Closing Transmission Time = 0.251 mSecs (limit 260 mSecs)

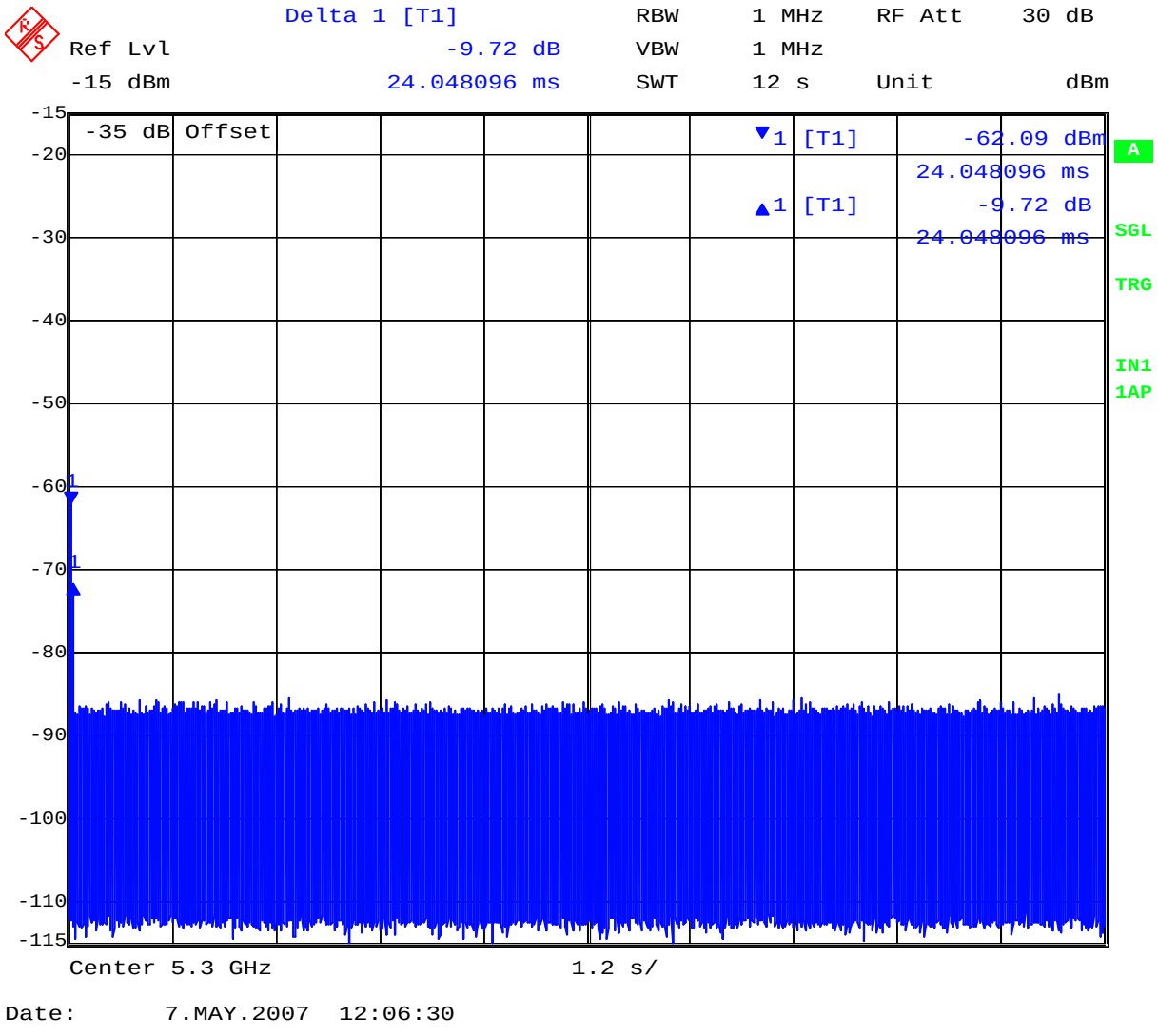
Client Device Channel Move Time, Client Device Channel Closing Time for Type 1 Radar
Captured by Aeroflex PXI Test System



Additionally, a redundant conventional spectrum analyzer screen capture is provided to correlate against the digitizer screen capture for verification purposes.

Note;- no pre-trigger data interval (60 mSecs) was included in the following Spectrum Analyzer plot

Client Device Channel Move Time, Client Device Channel Closing Time for Type 1 Radar
Captured by Spectrum Analyzer



The following data was captured by the Aeroflex PXI test System and is used to calculate the Client Device Channel Closing Transmission Time for the EUT with the intervention of Radar Type 1.

Sample Number: 85701	Rising Edge,	Sample Time Stamp	0.085701	
Sample Number: 85705	Falling Edge,	Sample Time Stamp	0.085705	4E-06
Sample Number: 96419	Rising Edge,	Sample Time Stamp	0.096419	
Sample Number: 96447	Falling Edge,	Sample Time Stamp	0.096447	2.8E-05
Sample Number: 96448	Rising Edge,	Sample Time Stamp	0.096448	
Sample Number: 96580	Falling Edge,	Sample Time Stamp	0.09658	0.000132
Sample Number: 96581	Rising Edge,	Sample Time Stamp	0.096581	
Sample Number: 96583	Falling Edge,	Sample Time Stamp	0.096583	2E-06
Sample Number: 96584	Rising Edge,	Sample Time Stamp	0.096584	
Sample Number: 96635	Falling Edge,	Sample Time Stamp	0.096635	5.1E-05
Sample Number: 96636	Rising Edge,	Sample Time Stamp	0.096636	
Sample Number: 96667	Falling Edge,	Sample Time Stamp	0.096667	3.1E-05
Sample Number: 96668	Rising Edge,	Sample Time Stamp	0.096668	
Sample Number: 96671	Falling Edge,	Sample Time Stamp	0.096671*	3E-06
// Total Burst Count Detected: 174		Aggregate Transmission Time =	0.000251	Secs

* Represents the last transmission activity of the EUT. The 0.096671*second time stamp is used to calculate Client Device Channel Move Time.

Client Device Channel Move Time – Measurement & Calculation Type 1 Radar

The Client Device Channel Move Time is calculated using the data captured for the Client Device Channel Closing time as follows;-

Client Device Channel Move Time = Ft – Pt - Rt

Where;-

Ft = Final transmission activity occurred at 96.671 mSeconds

Pt = Pre-trigger information 60 mS

Rt = Type 1 burst period 24.277 mS

(Rt is the period of the 18 pulse burst includes [17 pulses *1.428mS PRI] = 24.276ms. Then add 1µs pulse width for the final pulse.)

Client Device Channel Move Time = 96.671 – 60 – 24.277 = 12.394 mSeconds (Limit 10 Seconds)

Measurement Uncertainty Time/Power

Measurement uncertainty - Time - Power	 4% 1.33dB

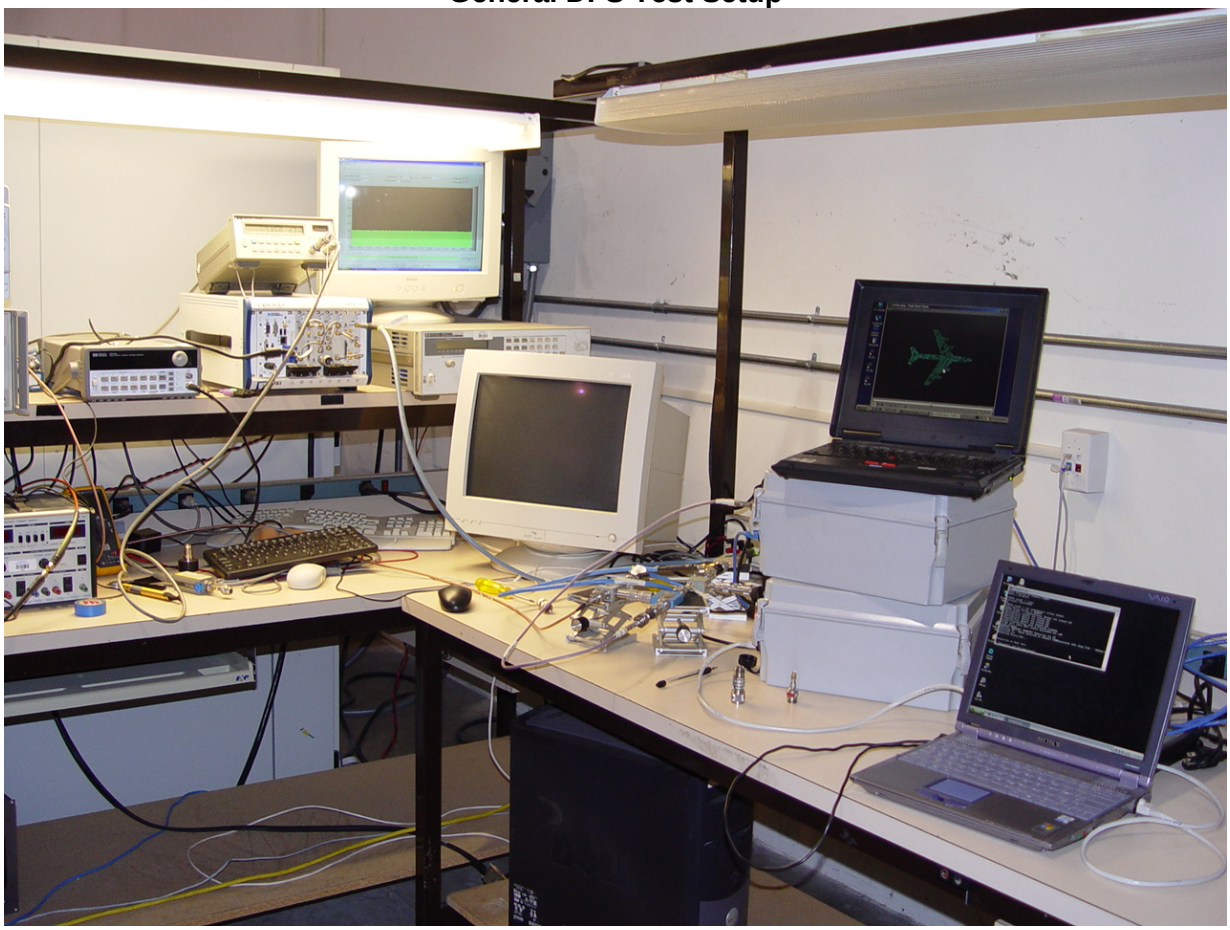
Traceability

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

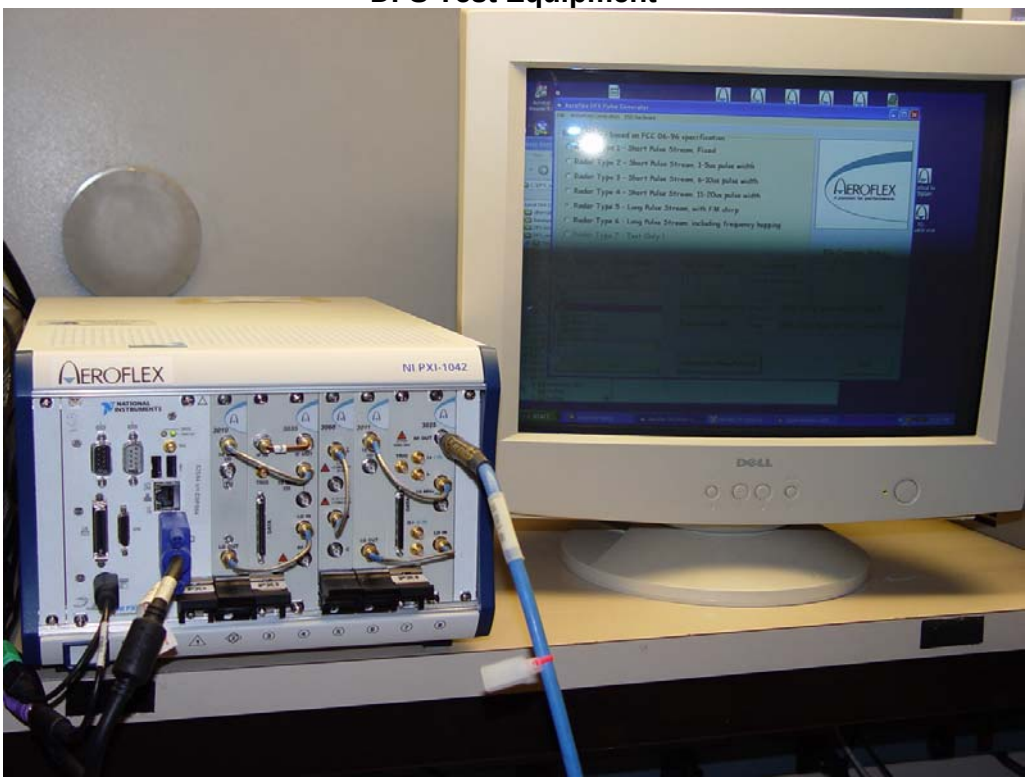
7. PHOTOGRAPHS

7.1. Dynamic Frequency Selection Test Set-Up

General DFS Test Setup



DFS Test Equipment



DFS Test Equipment

8. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
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
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
	Radar Signal Generator	Aeroflex	3025, 3010, 3010/11 Opt 1	
	Analyzer	Aeroflex	3035, 3011, 3010/11 Opt 1	
	PXI Chassis	Aeroflex	82536	
	Coupler	Mini-Circuits		
	30dB N-Type Attenuator			
	10dB N-Type Attenuator			
	10dB N-Type Attenuator			

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