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## Report On

FCC DFS Testing of the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

In accordance with FCC CFR 47 Part 15E and FCC 06-96

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00206

Document 75925936 Report 24 Issue 1

May 2014



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COMMERCIAL-IN-CONFIDENCE

**REPORT ON**

FCC DFS Testing of the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS  
In accordance with FCC CFR 47 Part 15E and FCC 06-96

Document 75925936 Report 24 Issue 1

May2014

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**DATED**

13 May 2014

**ENGINEERING STATEMENT**

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15E and FCC 06-96. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);



A Galpin

Document 75925936 Report 24 Issue 1





## CONTENTS

Section	Page No
<b>1</b>	<b>REPORT SUMMARY ..... 3</b>
1.1	Introduction ..... 4
1.2	Test Requirements ..... 5
1.3	Brief Summary of Results ..... 6
1.4	Application Form ..... 7
1.5	Product Information ..... 10
1.6	Test Conditions ..... 10
1.7	Deviations from the Standard ..... 10
1.8	Modification Record ..... 10
1.9	DFS Test System ..... 11
<b>2</b>	<b>TEST DETAILS ..... 13</b>
2.1	Calibration of Test Setup ..... 14
2.2	In-Service Monitoring ..... 24
<b>3</b>	<b>TEST EQUIPMENT USED ..... 31</b>
3.1	Test Equipment Used ..... 32
3.2	Support Test Equipment ..... 33
3.3	Measurement Uncertainty ..... 34
<b>4</b>	<b>PHOTOGRAPHS ..... 35</b>
4.1	Test Set-Up Photographs ..... 36
4.2	DFS Test Equipment ..... 36
<b>5</b>	<b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT ..... 37</b>
5.1	Accreditation, Disclaimers and Copyright ..... 38



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## **SECTION 1**

### **REPORT SUMMARY**

FCC DFS Testing of the  
Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM  
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE  
(B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN,  
SRD (NFC, FeliCa) and GPS  
In accordance with FCC CFR 47 Part 15E and FCC 06-96



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## 1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC DFS Testing of the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS to the requirements of FCC CFR 47 Part 15E and FCC 06-96.

Objective	To perform FCC DFS Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Model Number(s)	SHL25
Serial Number(s)	IMEI 004401115170645
Hardware Version	PP1
Software Version	A2270
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15E(2013) FCC 06-96 (2006)
Incoming Release Date	Application Form 24 March 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	10070 10 March 2014
Start of Test	28 April 2014
Finish of Test	28 April 2014
Name of Engineer(s)	A Galpin
Related Document(s)	789033 D01 General UNII Test Procedure ETSI TR 100 028: 2001



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**1.2 TEST REQUIREMENTS**

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without DFS	Client With DFS
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client Without DFS	Client With DFS
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes



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**1.3 BRIEF SUMMARY OF RESULTS**

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15E and FCC 06-96 is shown below.

Section	Spec Clause	Test Description	Result	Comments/Base Standard
802.11(a)				
2.1	NA	Calibration of Test Setup	Pass	
2.2	15.407 (h)(2)(iii)	In-Service Monitoring	Pass	
802.11(n) - 20 MHz BW				
2.1	NA	Calibration of Test Setup	Pass	
2.2	15.407 (h)(2)(iii)	In-Service Monitoring	Pass	
802.11(n) - 40 MHz BW DFS				
2.1	NA	Calibration of Test Setup	Pass	
2.2	15.407 (h)(2)(iii)	In-Service Monitoring	Pass	



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**1.4 APPLICATION FORM**

EQUIPMENT DESCRIPTION	
Model Name/Number	SHL25
Part Number	CA268
Hardware Version	Please refer to handset
Software Version	Please refer to handset
FCC ID	APYHRO00206
Technical Description (Please provide a brief description of the intended use of the equipment)	Quad-band LTE(B1/B3/B17/B18), Dual-band WCDMA(FDD-I/V), Quad-band GSM(850/900/1800/1900), Dual-band CDMA2000(800MHz_BC0, 1900MHz_BC6), Multimode Smartphone with BT, ANT+, WLAN, SRD and GPS

TYPE OF EQUIPMENT
<input type="checkbox"/> Master
<input type="checkbox"/> Client with Radar Detection
<input checked="" type="checkbox"/> Client without Radar Detection
<input type="checkbox"/> Wi-Fi Direct Support

TRANSMITTER TECHNICAL CHARACTERISTICS
FREQUENCY CHARACTERISTICS
<input checked="" type="checkbox"/> 5.150 GHz to 5.250 GHz
<input checked="" type="checkbox"/> 5.250 GHz to 5.350 GHz
<input checked="" type="checkbox"/> 5.470 GHz to 5.725 GHz
<input type="checkbox"/> 5.725 GHz to 5.825 GHz
<input type="checkbox"/> EUT operates in the frequency band 5600 – 5650 MHz?
<input type="checkbox"/> Off Channel CAC Implemented
Off Channel CAC within 5600 – 5650 MHz band                      hours, (1 – 24)
Off Channel CAC outside 5600 – 5650 MHz band                      minutes, (6 – 240)
Note: DFS is not required in the ranges 5.15 – 5.25 GHz and 5.725 – 5.825 GHz



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TRANSMITTER RF POWER CHARACTERISTICS	
Maximum rated transmitter output power as stated by manufacturer (if applicable)	
Conducted Power	14.0 dBm
Maximum Antenna Gain	0 dBi
EIRP	14.0 dBm
Minimum rated transmitter output power as stated by manufacturer (if applicable)	
Conducted Power	dBm
Maximum Antenna Gain	dBi
EIRP	dBm
Is TPC supported?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, provide a description of operation.	
N/A - less than 500mW	

POWER SOURCE	
<input type="checkbox"/> AC mains supply	State voltage
AC supply frequency	(Hz) VAC
<input checked="" type="checkbox"/> DC supply	
Nominal voltage	4.0

SYSTEM ARCHITECTURE			
<input checked="" type="checkbox"/>	Frame Based		
<input type="checkbox"/>	IP Based		
<input type="checkbox"/>	Other	If other please state	
<input checked="" type="checkbox"/>	802.11(a)	Receiver Bandwidth:	20 MHz
<input checked="" type="checkbox"/>	802.11(n) – 20 MHz	Receiver Bandwidth:	20/ 40 MHz
<input checked="" type="checkbox"/>	802.11(n) – 40 MHz	Receiver Bandwidth:	20/ 40 MHz
<input checked="" type="checkbox"/>	802.11(ac) – 20 MHz	Receiver Bandwidth:	20/ 40/ 80 MHz
<input checked="" type="checkbox"/>	802.11(ac) – 40 MHz	Receiver Bandwidth:	20/ 40/ 80 MHz
<input checked="" type="checkbox"/>	802.11(ac) – 80 MHz	Receiver Bandwidth:	20/ 40/ 80 MHz

DECLARATIO	
No parameter or information relating to the detected radar waveforms is available or accessible to the end user.	
<input checked="" type="checkbox"/> True	<input type="checkbox"/> False

MISCELLANEOUS	
Power-on cycle time*	N/A
* Time from switching on the UUT to the point at which Channel Availability Check (CAC) commences	



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UNIFORM SPREADING	
Describe how the meter provides, on aggregate, uniform channel loading of the spectrum across all channels.	
N/A	

ANTENNA OPTIONS	
Antenna 1	
Antenna Description:	Integral BT / WLAN strip line antenna
Antenna Model:	GCABBA487AFZZ
Antenna Maximum Gain:	0 dBi
Antenna Frequency Range:	Dual band: 2400MHz -2500MHz, 5100MHz- 5750MHz
Antenna 2	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
Antenna 3	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
Antenna 4	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	
Antenna 5	
Antenna Description:	
Antenna Model:	
Antenna Maximum Gain:	
Antenna Frequency Range:	

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature: *H Murakami*  
 Position held: Supervisor

Name: Hiroyuki Murakami  
 Date: 24<sup>th</sup> March, 2014



Product Service

## **1.5 PRODUCT INFORMATION**

### **1.5.1 Technical Description**

The Equipment Under Test (EUT) was a Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

The EUT is a Client without Radar Detection device.

## **1.6 TEST CONDITIONS**

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. See individual test clauses.

The EUT was powered from a 4.0 V DC supply.

FCC Measurement Facility Registration Number  
90987 Octagon House, Fareham Test Laboratory

## **1.7 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standard were made during testing.

## **1.8 MODIFICATION RECORD**

Modification 0 - No modifications were made to the test sample during testing.



## 1.9 DFS TEST SYSTEM

The DFS system consists of hardware and software. The Hardware uses a PXI chassis with PXI instruments populating the chassis. The instruments used are a Vector Signal Generator, a Digitiser, Frequency References and a Dual Core PC. The measurement and analysis software runs on the PC and controls the instruments within the mainframe via commands on the PXI bus. Various markers are contained within the generated waveforms. The markers are used to trigger the measurement system at the appropriate points. An external trigger is also provided at the SMB output on the Vector Signal Generator which is employed where a Spectrum Analyser is used in place of the Aeroflex Digitiser. These are described within the test procedure for the applicable test.

The Aeroflex DFS software generates the pulses in accordance with FCC 06-96.

### Short Pulse Radar Test Waveform (Types 1-4)

The short pulse radar simulation is a conventional amplitude pulse with varying pulse widths, pulse rate intervals (PRI) and number of pulses. General characteristics for these types and number of repetitions required by the standard are as follows:

Radar Type	Pulse Width ( $\mu$ sec)	PRI ( $\mu$ sec)	Number of Pulses
1	1	1428	18
2	1-5	150-230	23-29
3	6-10	200-500	16-18
4	11-20	200-500	12-16

### FCC 06-96 - Table 5 – Short Pulse Radar Test Waveforms

### Long Pulse Radar Test Waveform (Type 5)

The long pulse radar simulation is a 12 second concatenated series of chirps, chosen randomly. The general characteristics for type 5 and number of repetitions required by the standard are as follows:

Radar Type	Pulse Width ( $\mu$ sec)	Chirp Width (MHz)	PRI ( $\mu$ sec)	Number of Pulses per Burst	Number of Bursts
5	50-100	5-20	1000-2000	1-3	8-20



FCC 06-96 - Table 6 – Long Pulse Radar Test Waveform

A Type 5 Radar sequence is constructed in the following way:

- 1) The user provides the required level based on the calibration and the test frequency.
- 2) The Burst\_Count, (a number between 8 and 20 inclusive), is chosen representing the number of "bursts" (or waveform segments). Type 5 waveform length is 12 seconds, thus each "burst" length will be  $BL = 12 / \text{Burst\_Count}$ .
- 3) Pulse\_Count, a number between 1 and 3 inclusive is chosen for each burst segment (1 through Burst\_Count) representing the number of chirped pulses for each burst segment.
- 4) For each burst segment, the following chirp parameters are randomly chosen (all chirped pulses within a given burst segment are the same, whether 1, 2, or 3 chirped pulses are chosen):
  - a) Frequency width (5 MHz to 20 MHz, a linear and symmetrical ramp)
  - b) Pulse period (50  $\mu\text{s}$  to 100  $\mu\text{s}$ )
  - c) Pulse Rate Interval (1 ms to 2 ms, in 1  $\mu\text{s}$  increments)
  - d) The start of the first pulse in a given burst segment is randomly chosen (in 1  $\mu\text{s}$  increments) between 1  $\mu\text{s}$  and [(the total burst length - (total of all pulse periods within a burst) + (the total space between pulses within a burst)]. Or stated otherwise, 1  $\mu\text{s}$  to [(BL - (Pulse\_Count \* pulse period) + (Pulse\_Count - 1)\* randomly chosen PRI Interval)].

Frequency Hopping Test Waveform (Type 6)

The frequency hopping radar simulation emits 9 1  $\mu\text{s}$  wide amplitude pulses with a 333  $\mu\text{s}$  PRI spacing on a randomly chosen frequency, hops to another randomly chosen frequency, emits another 9 pulses and then continues this sequence for 100 different frequencies chosen using a pseudo random sequence. General characteristics for type 6 and number of repetitions required by the standard are as follows:

Radar Type	Pulse Width ( $\mu\text{sec}$ )	PRI ( $\mu\text{sec}$ )	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)
6	1	333	9	0.333	300

FCC 06-96 - Table 7 – Frequency Hopping Radar Test Waveform

The frequency hopping Radar is generated in the following way:

- a) The user inputs the required level based on the calibration and a frequency within the EUT detection bandwidth.
- b) A sequence of 100 numbers, (n = 1 to 100), are randomly chosen from between 1 to 475 and then removed from the sequence producing 100 unique random numbers.
- c) Frequency assignments are 5250 MHz + n.
- d) If the list generated from steps (b) and (c) does not include at least one frequency which is between 5250 to 5350 MHz or 5470 to 5725 MHz, the list is regenerated.
- e) Secondly, in order to verify that at least one frequency in the list is at the EUT frequency plus or minus 1/2 the EUT detection bandwidth (i.e. at least one of the frequencies in the list must conflict with the EUT's operation such that the EUT will attempt to relocate when the sequence is played), the frequency supplied by the user is inserted into the list, replacing one selection.

Using the supplied Aeroflex software, the pulses are automatically generated and the required numbers of trials are created for each Radar Type – except in the case of Radar Type 1 which has no changeable attributes. The pulses are saved as Arbitrary Waveform files which are then selected by the user for use in the scenario being tested.



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## **SECTION 2**

### **TEST DETAILS**

FCC DFS Testing of the  
Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM  
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDD I, FDD V) & Quad-band LTE  
(B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN,  
SRD (NFC, FeliCa) and GPS  
In accordance with FCC CFR 47 Part 15E and FCC 06-96



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**2.1 CALIBRATION OF TEST SETUP**

**2.1.1 Specification Reference**

FCC CFR 47 Part 15E and FCC 06-96

**2.1.2 Equipment Under Test and Modification State**

SHL25 S/N: IMEI 004401115170645 - Modification State 0

**2.1.3 Date of Test**

28 April 2014

**2.1.4 Environmental Conditions**

Ambient Temperature	22.1°C
Relative Humidity	42.3%



**2.1.5 Test Results**

802.11(a)

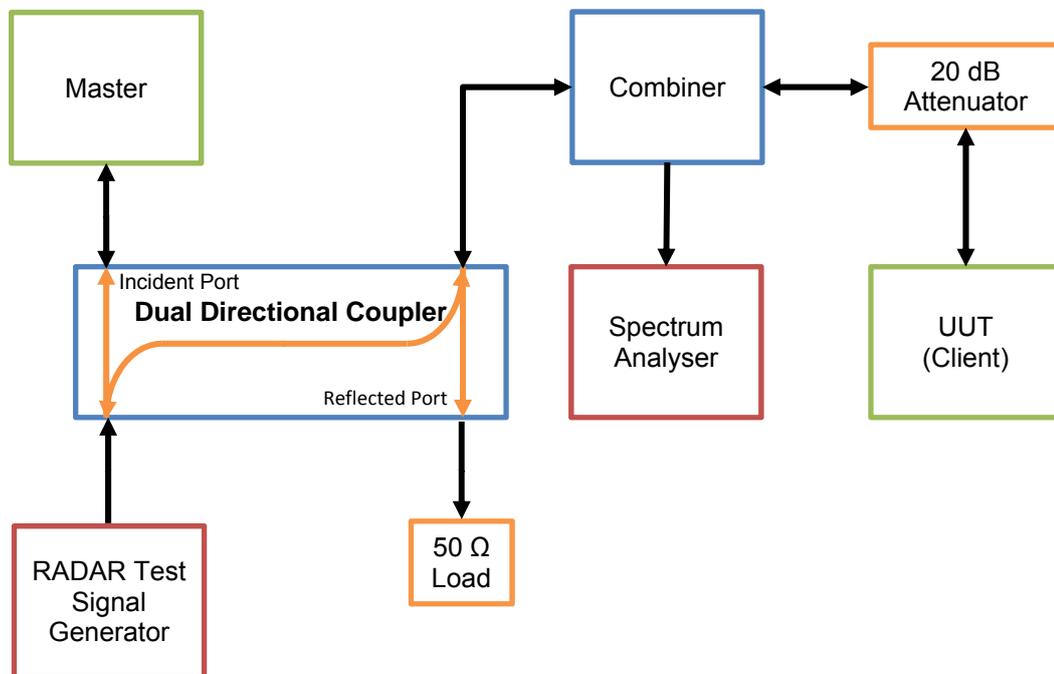
In this test equipment configuration, Radar signals are injected at the Master. The configuration ensures that the Radar pulses are received only by the Master device and not the Client. To calibrate the Radar pulses, the UUT was replaced by a Spectrum Analyser. The required Radar Waveform, (Type 1), was loaded into the Arbitrary Waveform Generator. The Spectrum Analyser was set to zero Span and the RBW and VBW set to 3MHz. The sweep time was set to display the entire burst and triggered on the Radar Burst. The output level of the Radar Signal Generator was adjusted to give the correct level as defined in the table below with the 1dB correction accounted for. Trace data showing the used Radar Pulses was recorded.

DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 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. Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.	

Test Equipment Setup

Setup for Client with injection at the Master





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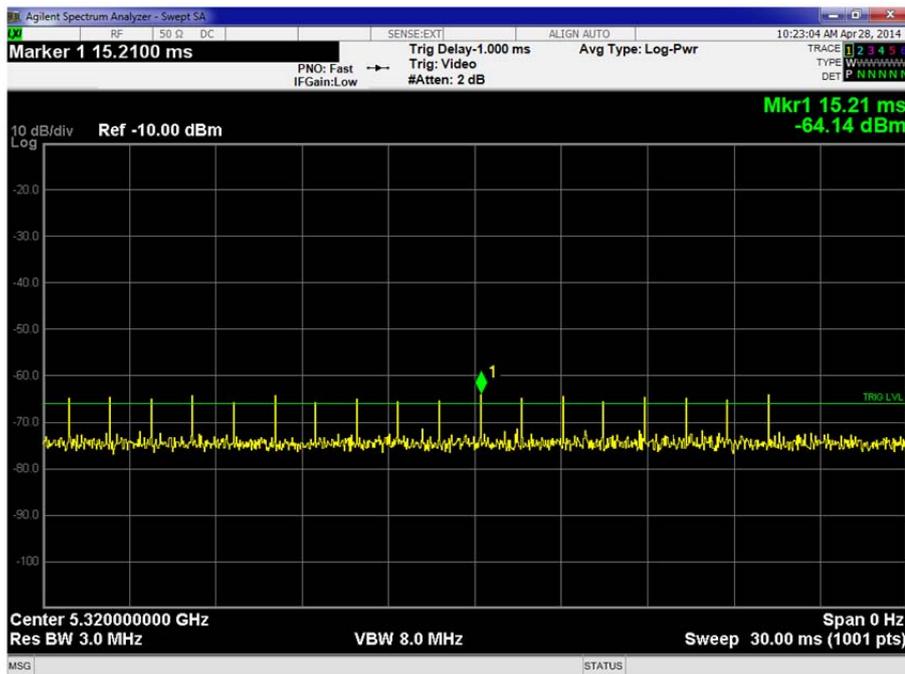
Radar Pulse Type 1

Short Radar Pulse Characteristics

Radar Type	Pulse Width (µs)	PRI (µs)	Number Of Pulses
1	1	1428	18

Client without Radar Detection

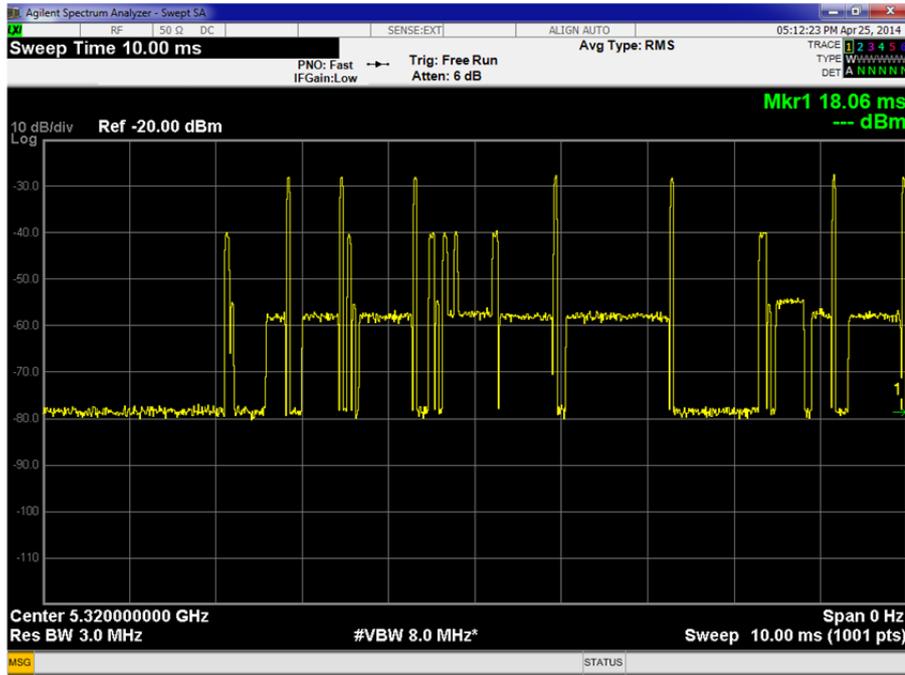
Radar Type 1 Plot





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Channel Loading Plot





802.11(n) - 20 MHz BW

In this test equipment configuration, Radar signals are injected at the Master. The configuration ensures that the Radar pulses are received only by the Master device and not the Client. To calibrate the Radar pulses, the UUT was replaced by a Spectrum Analyser. The required Radar Waveform, (Type 1), was loaded into the Arbitrary Waveform Generator. The Spectrum Analyser was set to zero Span and the RBW and VBW set to 3MHz. The sweep time was set to display the entire burst and triggered on the Radar Burst. The output level of the Radar Signal Generator was adjusted to give the correct level as defined in the table below with the 1dB correction accounted for. Trace data showing the used Radar Pulses was recorded.

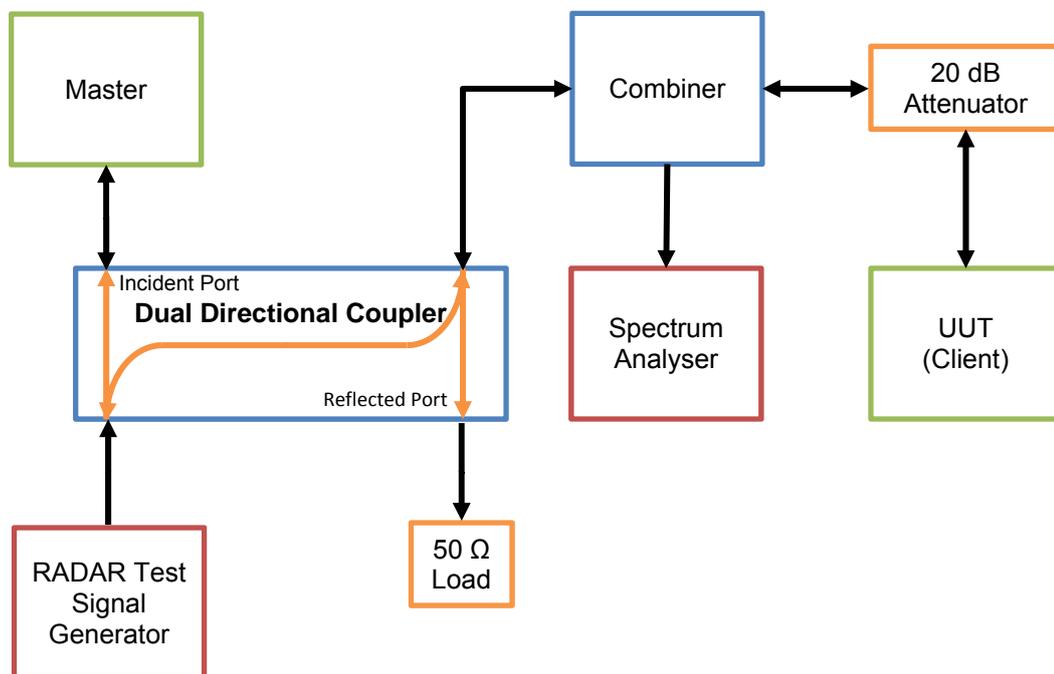
DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 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.  
 Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Test Equipment Setup

Setup for Client with injection at the Master





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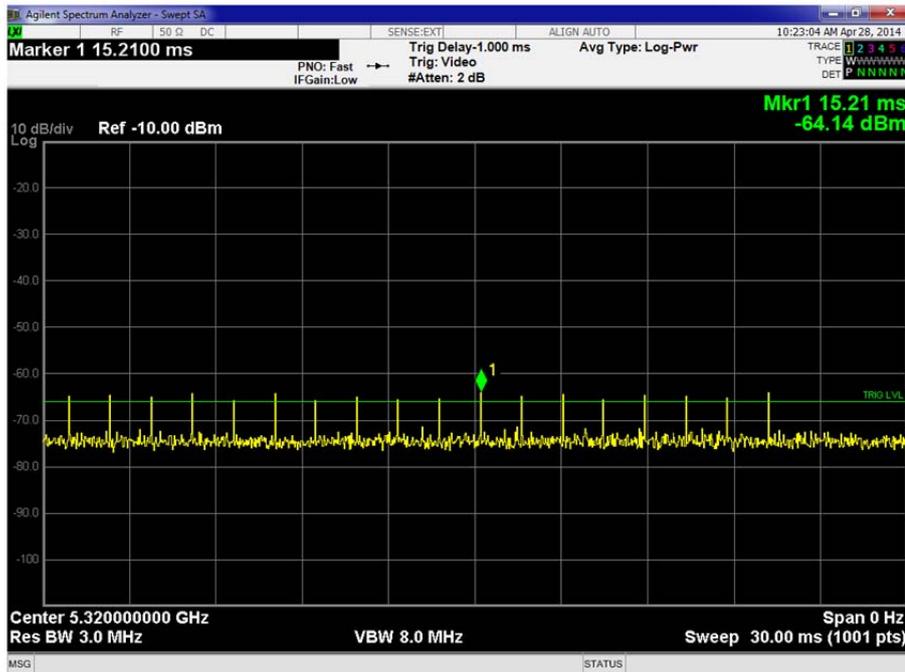
Radar Pulse Type 1

Short Radar Pulse Characteristics

Radar Type	Pulse Width (µs)	PRI (µs)	Number Of Pulses
1	1	1428	18

Client without Radar Detection

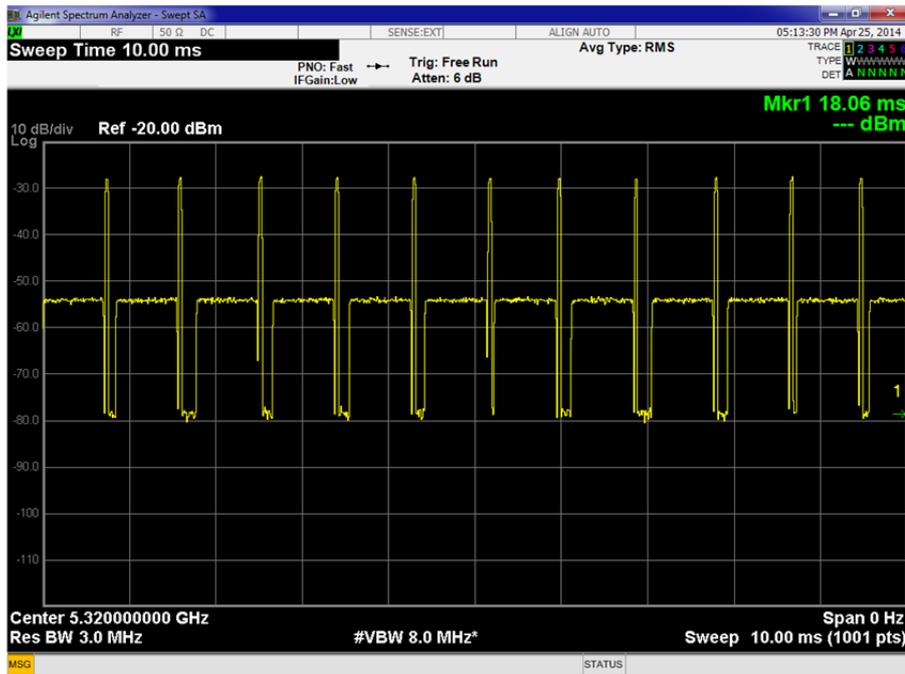
Radar Type 1 Plot





Product Service

Channel Loading Plot





802.11(n) - 40 MHz BW DFS

In this test equipment configuration, Radar signals are injected at the Master. The configuration ensures that the Radar pulses are received only by the Master device and not the Client. To calibrate the Radar pulses, the UUT was replaced by a Spectrum Analyser. The required Radar Waveform, (Type 1), was loaded into the Arbitrary Waveform Generator. The Spectrum Analyser was set to zero Span and the RBW and VBW set to 3MHz. The sweep time was set to display the entire burst and triggered on the Radar Burst. The output level of the Radar Signal Generator was adjusted to give the correct level as defined in the table below with the 1dB correction accounted for. Trace data showing the used Radar Pulses was recorded.

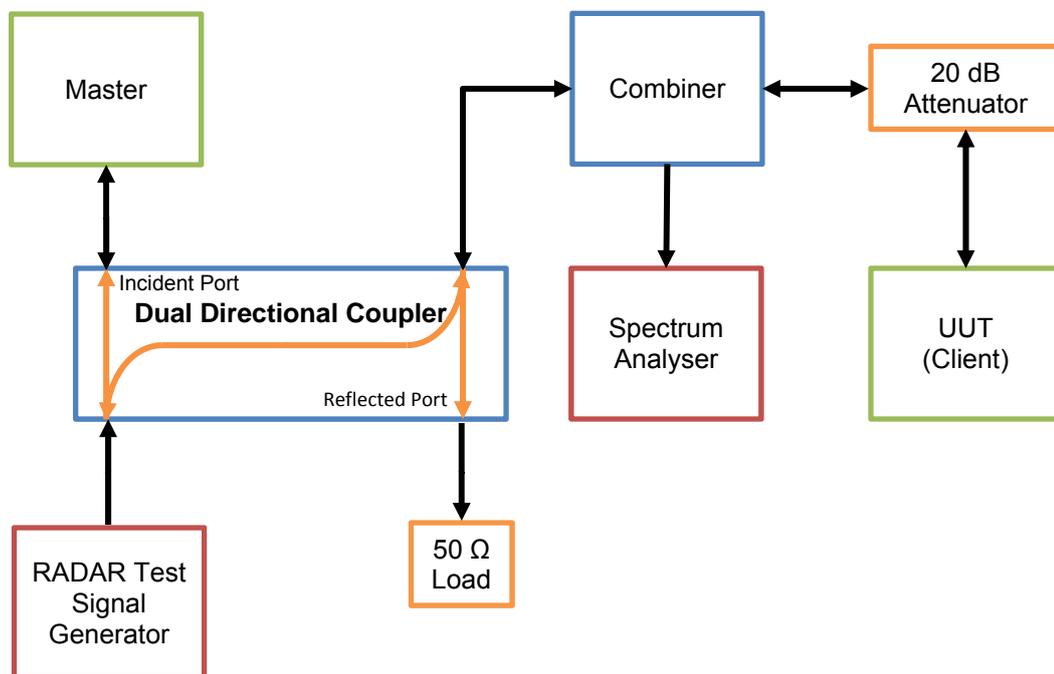
DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 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.  
 Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Test Equipment Setup

Setup for Client with injection at the Master





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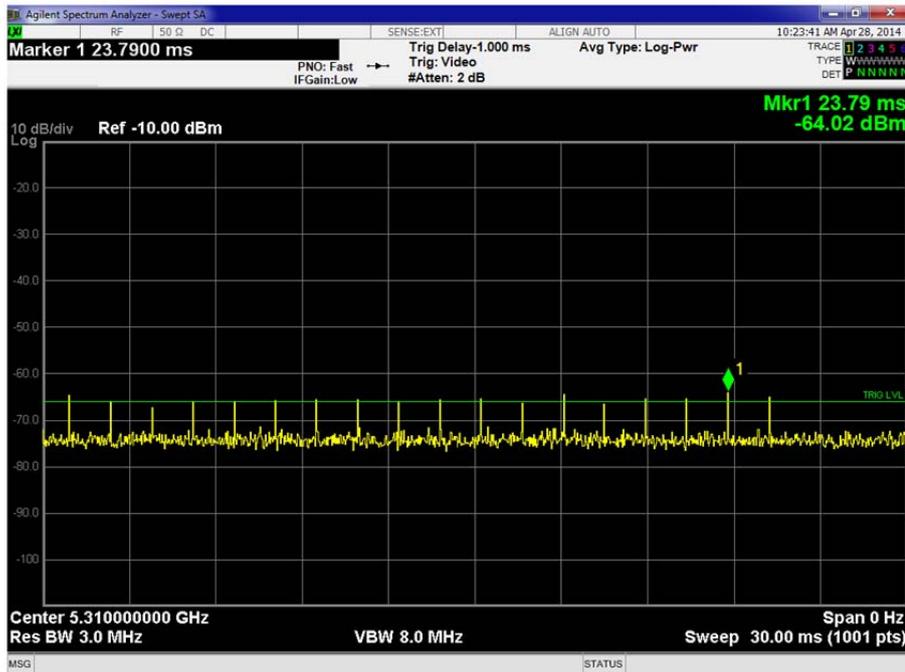
Radar Pulse Type 1

Short Radar Pulse Characteristics

Radar Type	Pulse Width (µs)	PRI (µs)	Number Of Pulses
1	1	1428	18

Client without Radar Detection

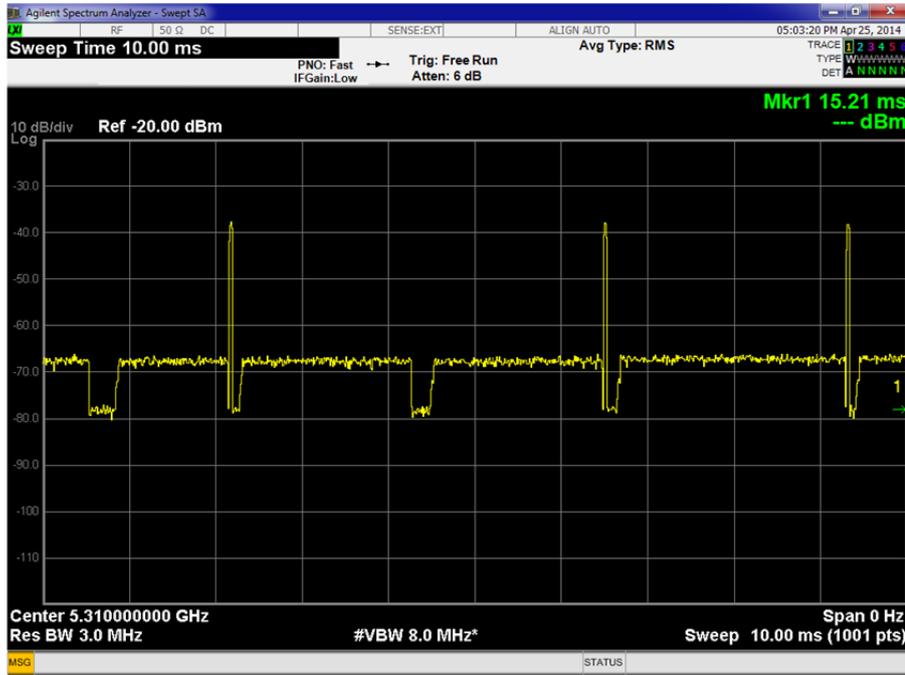
Radar Type 1 Plot





Product Service

Channel Loading Plot





## 2.2 IN-SERVICE MONITORING

### 2.2.1 Specification Reference

FCC CFR 47 Part 15E and FCC 06-96, Clause 15.407 (h)(2)(iii)

### 2.2.2 Equipment Under Test and Modification State

SHL25 S/N: IMEI 004401115170645 - Modification State 0

### 2.2.3 Date of Test

28 April 2014

### 2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.2.5 Test Procedure

Client Without DFS

The EUT was associated with the FCC Approved Master device FCC ID: ????. A laptop was connected via an Ethernet cable to the Master device and the FCC defined audio/video file was streamed to the Client device using Windows Media Player.

Radar Pulse Type 1 was then transmitted and the Spectrum monitored. The transmissions from the UUT were observed for a period of 12 seconds after the final injected Radar Pulse. The Channel Move Time and the Channel Closing Time were measured and recorded.

Initially, the UUT was removed from the test setup and replaced with a Spectrum Analyser. A Type 1 Radar burst was sent from the signal generator and its level adjusted until the required level of -64dBm was achieved. The Spectrum Analyser was then replaced with the UUT.

The UUT was configured to stream the FCC designated MPEG/Audio file using Windows Media Player version 12. Using the Aeroflex DFS Software, the Radar burst was injected to the Master/Client. The test software triggered the capture mechanism of the PXI Digitiser and data was collected of the Radar burst, the Master and Client devices. The data was analysed with the Channel Move time being measured at the final point where transmissions ceased. It was checked that all transmissions stopped within the 10 second period defined from the point of the end of the final Radar pulse + 10 seconds. In addition, the aggregate on time during the first 200ms and the following 9.8 seconds of the Channel Move Time was computed by the Aeroflex DFS Software.

The markers on the trace data correspond to the following time periods:

Red - End Of Radar Burst, (T1)

Purple - End Of 200ms Period, (T1 + 200 ms)

Orange - End Of Channel Move Time, (T1 + 10 seconds)



Product Service

**2.2.6 Environmental Conditions**

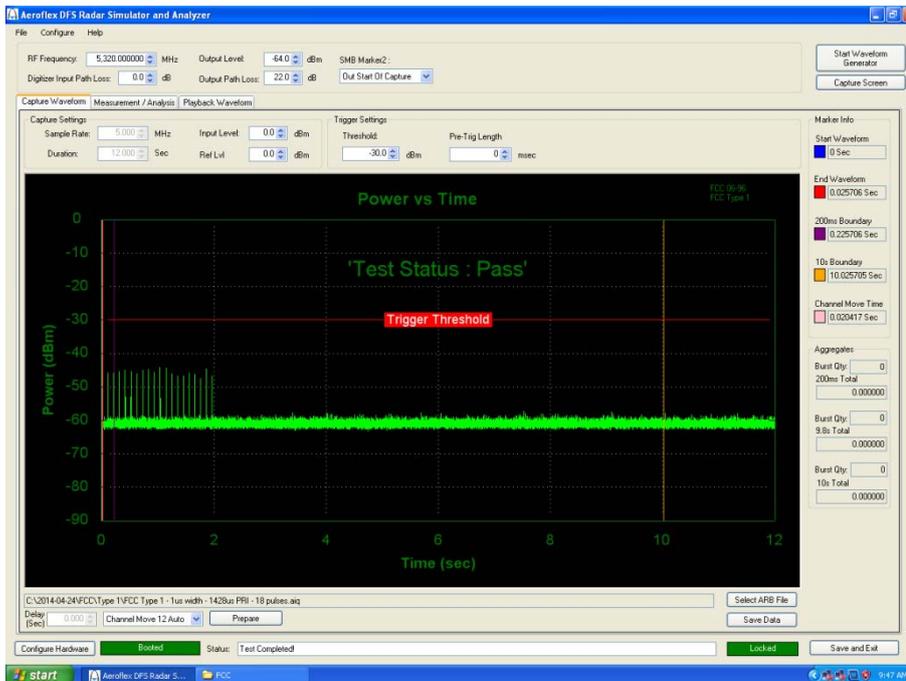
Ambient Temperature 22.1°C  
 Relative Humidity 42.3%

**2.2.7 Test Results**

802.11(a)

Channel Move Time	0.0204 seconds
Channel Closing Time (Aggregate Time During 200ms)	0.00 ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	0.00 ms
Channel Closing Time (Aggregate Time During 10s)	0.00 ms

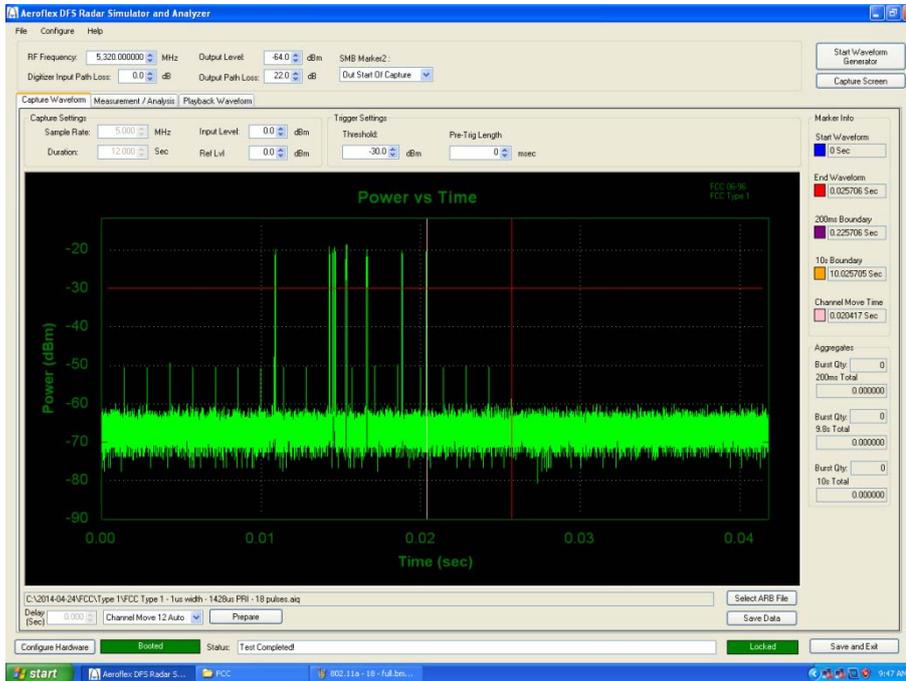
Overall Power vs Time Display, showing channel closing and move time





Product Service

Zoom of Radar Burst, Access Point and Client Signalling



Limit Clause 15.407 (h)(2)(iii) and FCC 06-96, Table 4

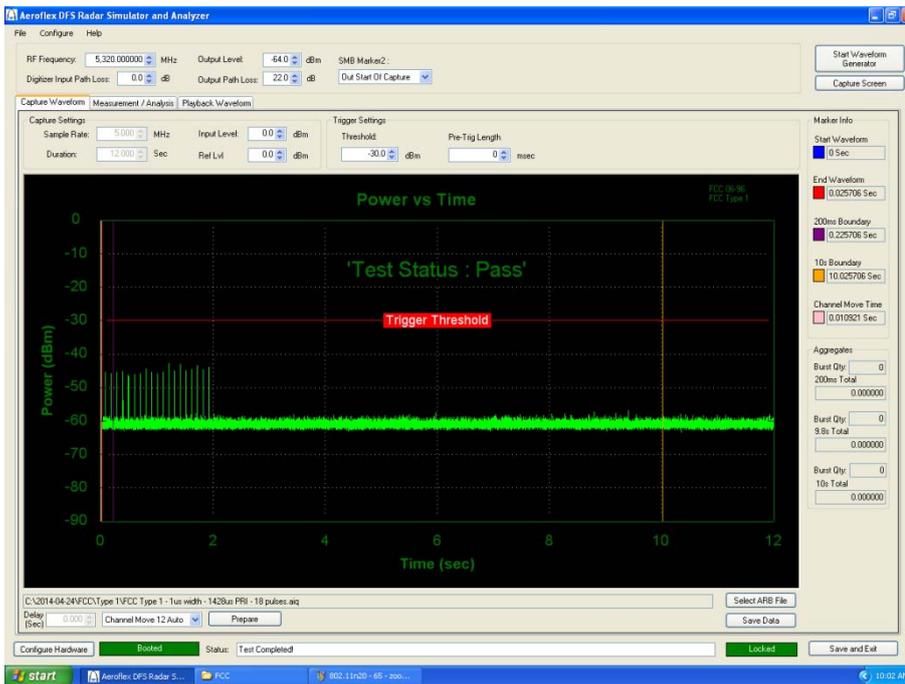
Channel Move Time	<10s
Channel Closing Time (Aggregate Time During 200ms)	<200ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	<60ms



802.11(n) - 20 MHz BW

Channel Move Time	0.0109 seconds
Channel Closing Time (Aggregate Time During 200ms)	0.00 ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	0.00 ms
Channel Closing Time (Aggregate Time During 10s)	0.00 ms

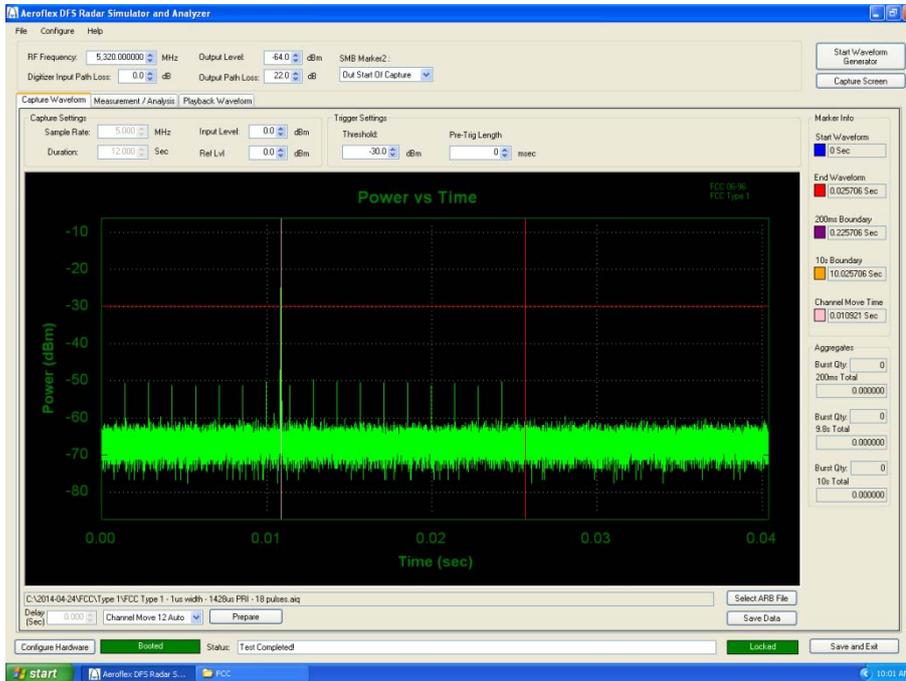
Overall Power vs Time Display, showing channel closing and move time





Product Service

Zoom of Radar Burst, Access Point and Client Signalling



Limit Clause 15.407 (h)(2)(iii) and FCC 06-96, Table 4

Channel Move Time	<10s
Channel Closing Time (Aggregate Time During 200ms)	<200ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	<60ms

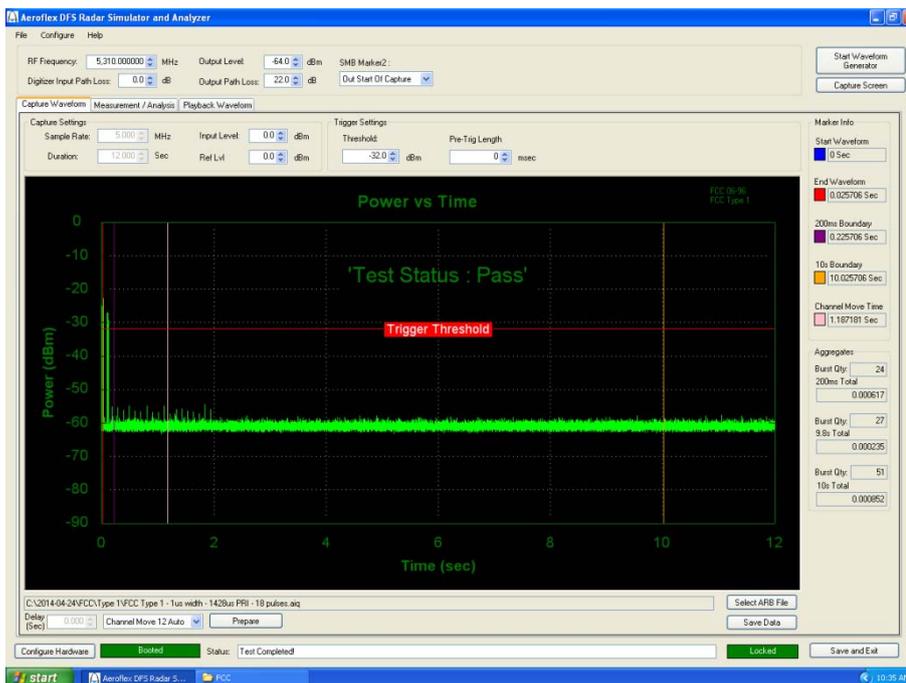


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802.11(n) - 40 MHz BW DFS

Channel Move Time	1.187 seconds
Channel Closing Time (Aggregate Time During 200ms)	0.617 ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	0.235 ms
Channel Closing Time (Aggregate Time During 10s)	0.852 ms

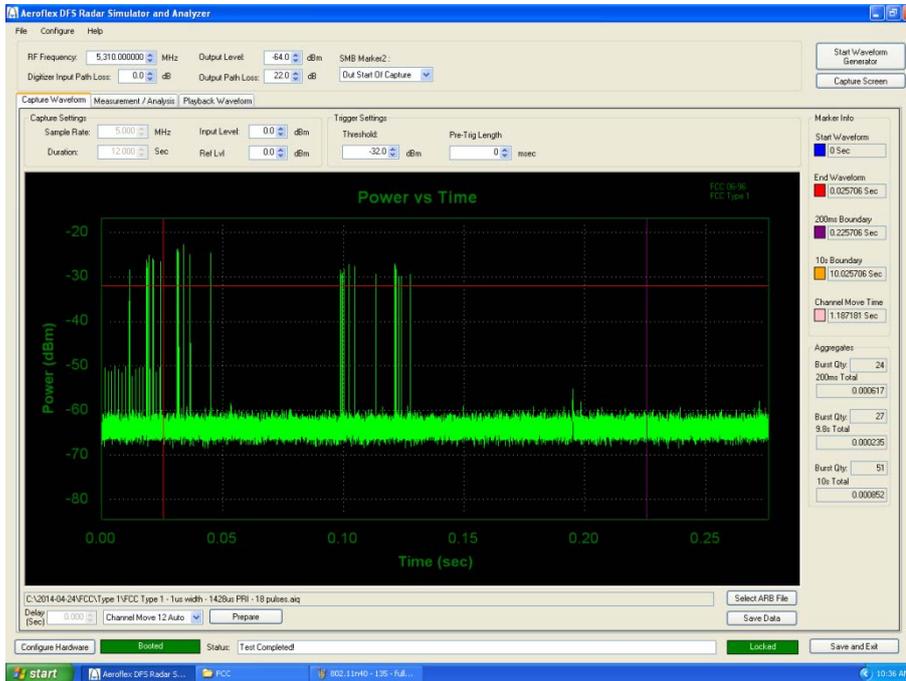
Overall Power vs Time Display, showing channel closing and move time





Product Service

Zoom of Radar Burst, Access Point and Client Signalling



Limit Clause 15.407 (h)(2)(iii) and FCC 06-96, Table 4

Channel Move Time	<10s
Channel Closing Time (Aggregate Time During 200ms)	<200ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	<60ms



Product Service

### **SECTION 3**

#### **TEST EQUIPMENT USED**



Product Service

### 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
<b>Section 2.1 - In-Service Monitoring</b>					
Power Supply Unit	Farnell	LT30-2	41	-	O/P Mon
Multimeter	White Gold	WG022	190	12	28-Oct-2014
Directional Coupler	Hewlett Packard	11692D	451	12	2-Sep-2014
20dB/2W Attenuator	Narda	4772-20	462	-	TU
Hygrometer	Rotronic	I-1000	2891	12	8-Jul-2014
Broadband Amplifier	Mini-Circuits	ZHL-1042J	4051	12	4-Jul-2014
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	27-Feb-2015

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



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### 3.2 SUPPORT TEST EQUIPMENT

Instrument	Manufacturer	Type No.	Serial Number
PXI RF Digitizer	Aeroflex	3035C	303008/5310
PXI RF Synthesizer	Aeroflex	3010C	301010/804
PXI Digital RF Vector Signal Generator	Aeroflex	3025C	30256/171
PXI Computer	Aeroflex	3001C	Not Serialised
DFS RADAR Simulator Analyser Software	Aeroflex	Version 2.1.2	Not Serialised
IP Router	Edimax	BR-642n v2.0	BR6424N07CA01367
802.11a/n Radio Access Point	Motorola	AP-650	10055522200026
Computer	Dell Inc.	DCSM	36Djp2J



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**3.3 MEASUREMENT UNCERTAINTY**

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

Test Discipline	MU
In-Service Monitoring	Time: $\pm 0.47\%$ Power: $\pm 1.29\text{ dB}$



Product Service

## **SECTION 4**

### **PHOTOGRAPHS**

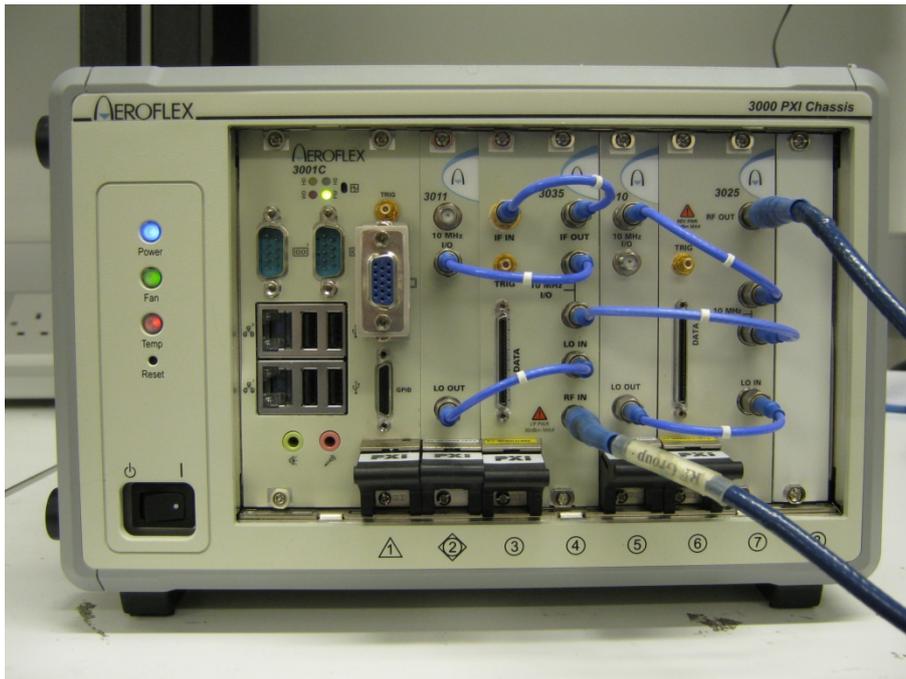


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#### 4.1 TEST SET-UP PHOTOGRAPHS

See test set-up photographs exhibit "75925936 FCC Set Up Photos.pdf".

#### 4.2 DFS TEST EQUIPMENT



Test Set Up



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## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



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## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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

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

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

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