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Report On

FCC DFS Testing of the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15E (DFS)

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00234

Document 75933606 Report 25 Issue 1 **May 2016**

Product Service

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REPORT ON

FCC DFS Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15E (DFS)

Document 75933606 Report 25 Issue 1

May 2016

PREPARED FOR

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APPROVED BY

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Authorised Signatory

DATED 05 May 2016

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 47 CFR Part 15E. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

M Russell

UKAS TESTING 0141

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC DFS Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15E (DFS)

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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 Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS to the requirements of FCC 47 CFR Part 15E.

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
Serial Number(s)	IMEI 004401115722627
Hardware Version	PP1
Software Version	A3310
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15E (2015)
Incoming Release Date	Application Form 11 March 2016
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	10749 15 February 2016
Start of Test	13 April 2016
Finish of Test	13 April 2016
Name of Engineer(s)	M Russell
Related Document(s)	KDB 905462 D02 v01r01

Product Service

1.2 TEST REQUIREMENTS

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

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	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 Device or Client With Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidths modes	Master Device or Client with Radar Detection	Client Without Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

Product Service

1.3 BRIEF SUMMARY OF RESULTS

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

Section	Specification Clause	Test Description	Result	Comments/Base Standard
802.11a				
2.1	NA	Calibration of Test Setup	Pass	
2.2	15.407 (h)(2)(iii)(iv)	In-Service Monitoring	Pass	
802.11n - 5 GHz 40 MHz Bandwidth				
2.1	NA	Calibration of Test Setup	Pass	
2.2	15.407 (h)(2)(iii)(iv)	In-Service Monitoring	Pass	
802.11ac - 5 GHz 80 MHz Bandwidth				
2.1	NA	Calibration of Test Setup	Pass	
2.2	15.407 (h)(2)(iii)(iv)	In-Service Monitoring	Pass	

Product Service

1.4 PRODUCT TECHNICAL DESCRIPTION

Refer to Model Description APYHRO00234 Rev 4.0 document.

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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.

The following is provided by the applicant as part of the FCC filing:

- A complete User's Manual and/or Professional Installers Manual.
- A Statement of Conformity for the Client in Non-Associated mode is required. The Form 731 application must include a Cover Letter Attachment stating that the client software and associated drivers will not initiate any transmission on DFS frequencies without initiation by a master. This includes restriction on transmissions for beacons and support for ad-hoc peer-to- peer modes.
- A channel/frequency plan for the device showing the channels that have active scanning or passive scanning. Active scanning is where the device can transmit a probe (beacon) and passive scanning is where the device can listen only without probes.
- Software security description.

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.

Product Service

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 KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r01.

Short Pulse Radar Test Waveform

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 (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\frac{19-10^6}{\text{PRI}_{\mu sec}}\right\}$	60%	30
		Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	-		
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
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Product Service

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 Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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 Number of Trials
6	1	333	9	0.333	300	70%	30

Product Service

SECTION 2

TEST DETAILS

FCC DFS Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC, FeliCa) and GPS
In accordance with FCC 47 CFR Part 15E (DFS)

2.1 CALIBRATION OF TEST SETUP

2.1.1 Specification Reference

FCC 47 CFR Part 15E

2.1.2 Equipment Under Test and Modification State

S/N: IMEI 004401115722627 - Modification State 0

2.1.3 Date of Test

13 April 2016

2.1.4 Environmental Conditions

Ambient Temperature	22.8°C
Relative Humidity	34.8%

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2.1.5 Test Results

802.11a

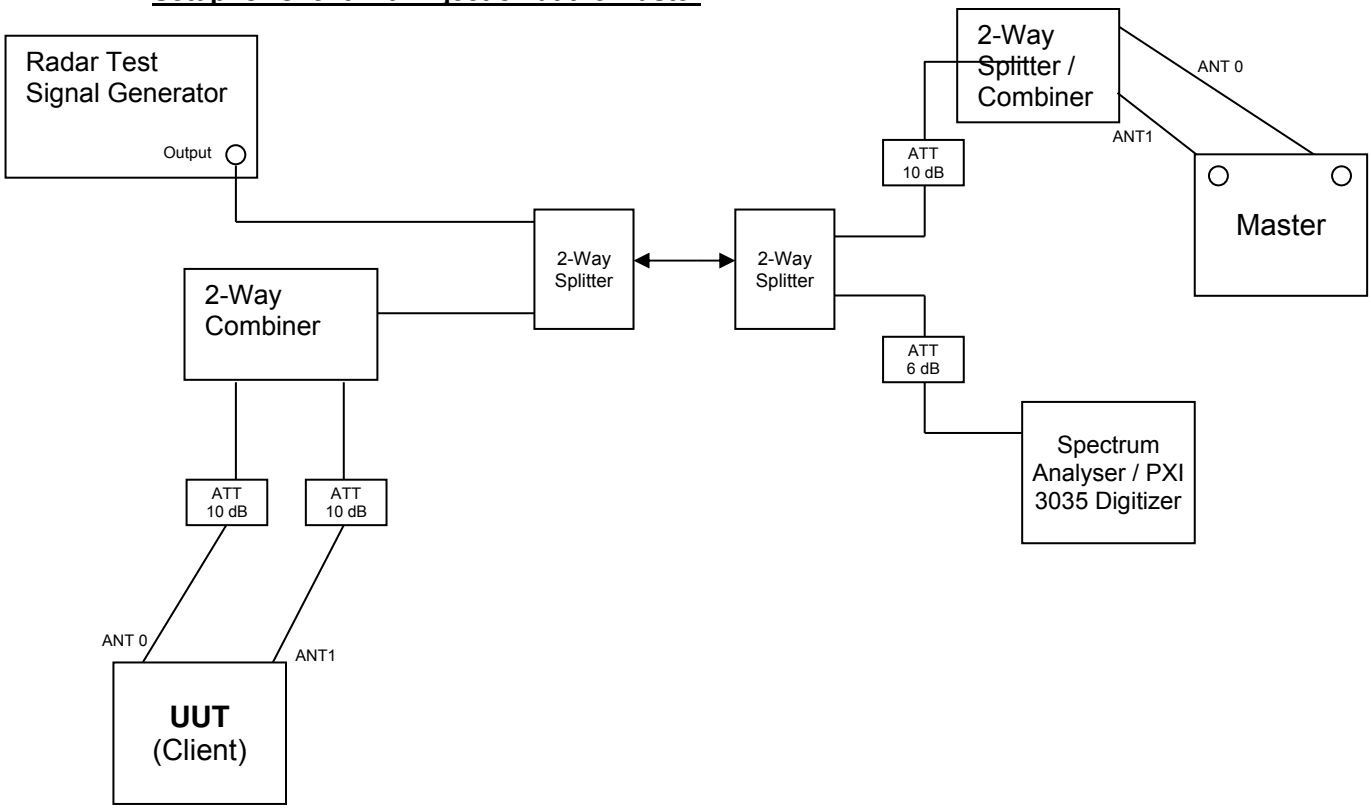
In this test equipment configuration, Radar signals are injected at the Master. The configuration ensures that the Radar pulses are received only by the Master device and not the Client. To calibrate the Radar pulses, the master was replaced by a Spectrum Analyser. The required Radar Waveform, (Type 0), 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 (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



Product Service

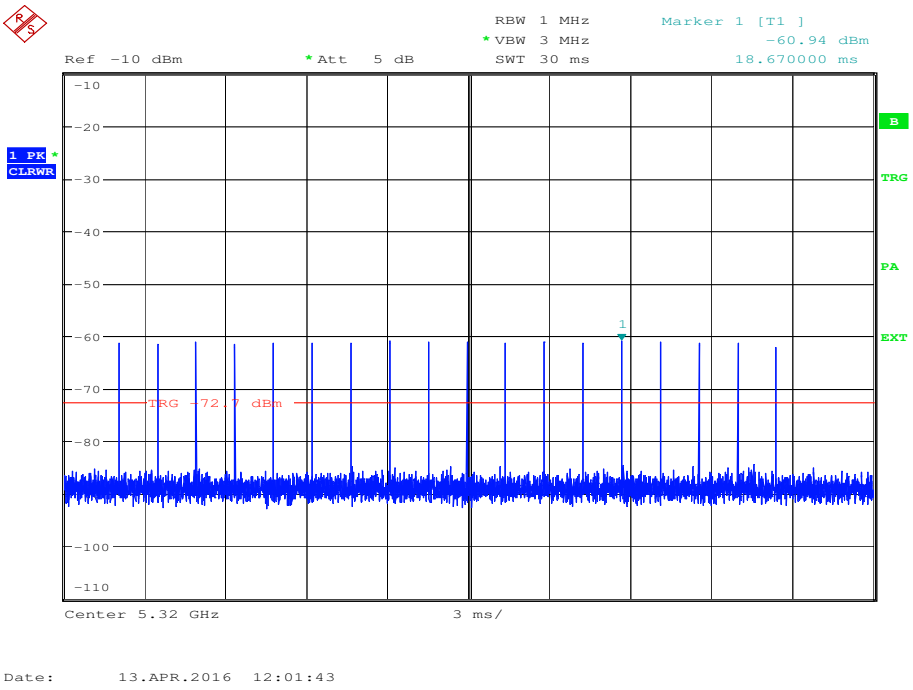
Radar Pulse Type 0

Short Radar Pulse Characteristics

Radar Type	Pulse Width (µs)	PRI (µs)	Number of Pulses
0	1	1428	18

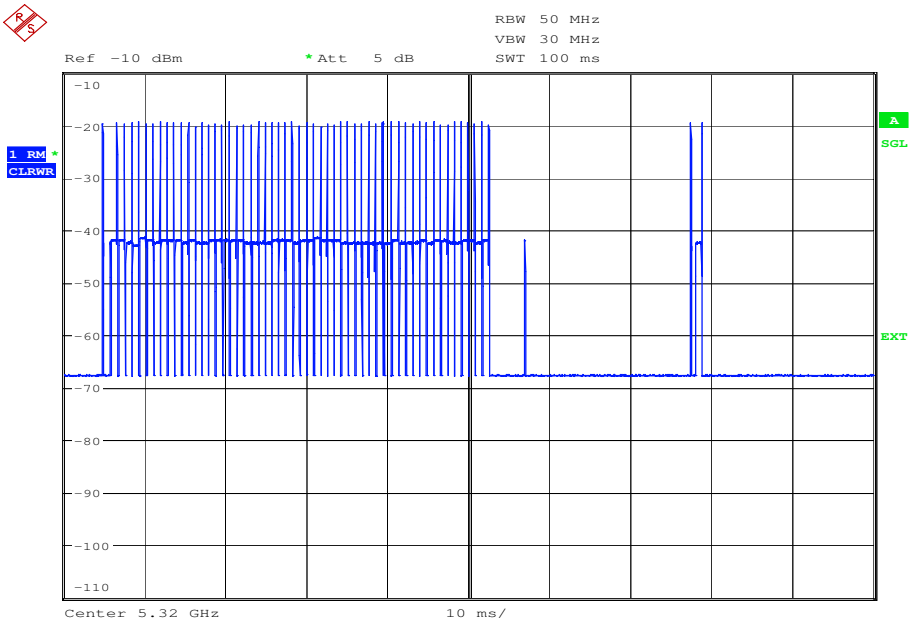
Client without Radar Detection

Radar Type 0 Plot



Product Service

Channel Loading Plot



Date: 13.APR.2016 14:18:30

802.11ac - 5 GHz 80 MHz Bandwidth

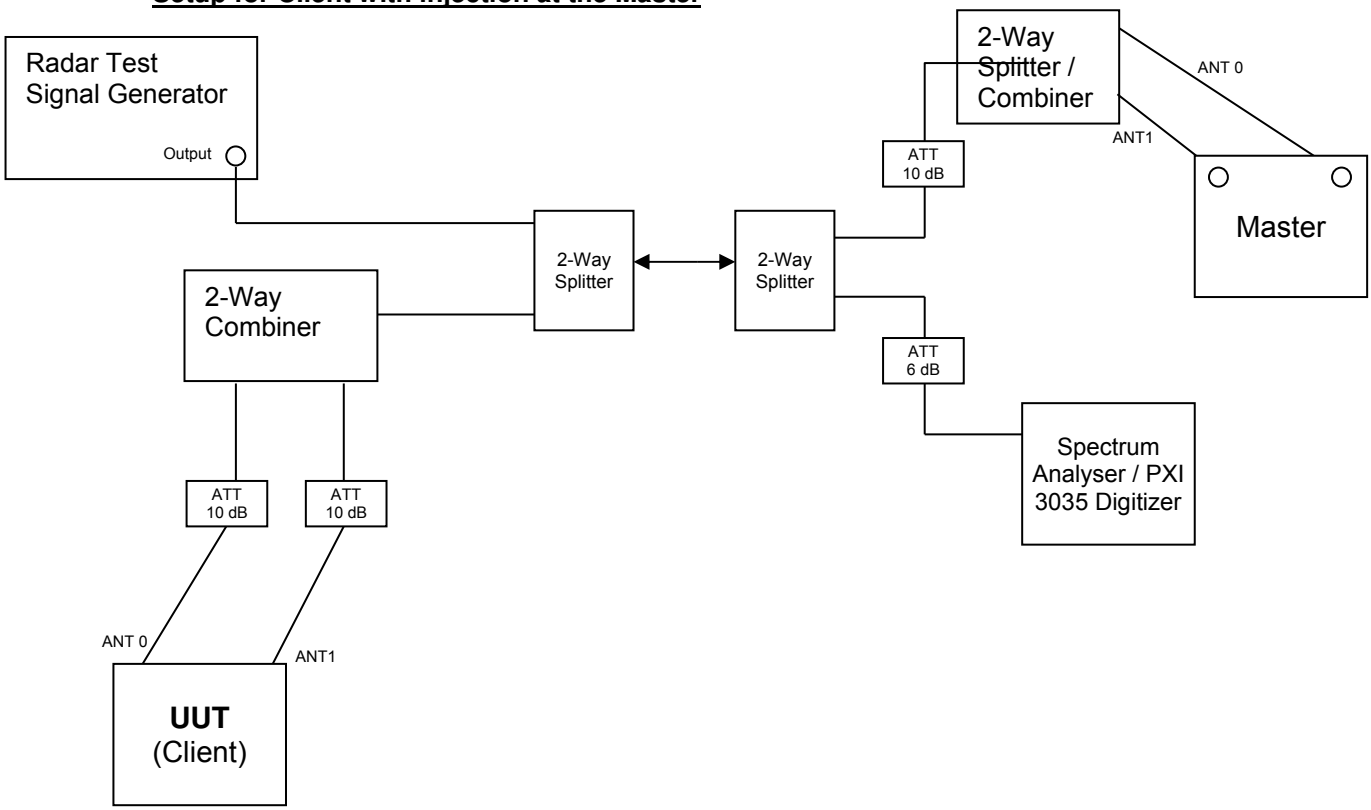
In this test equipment configuration, Radar signals are injected at the Master. The configuration ensures that the Radar pulses are received only by the Master device and not the Client. To calibrate the Radar pulses, the master was replaced by a Spectrum Analyser. The required Radar Waveform, (Type 0), 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 (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



Product Service

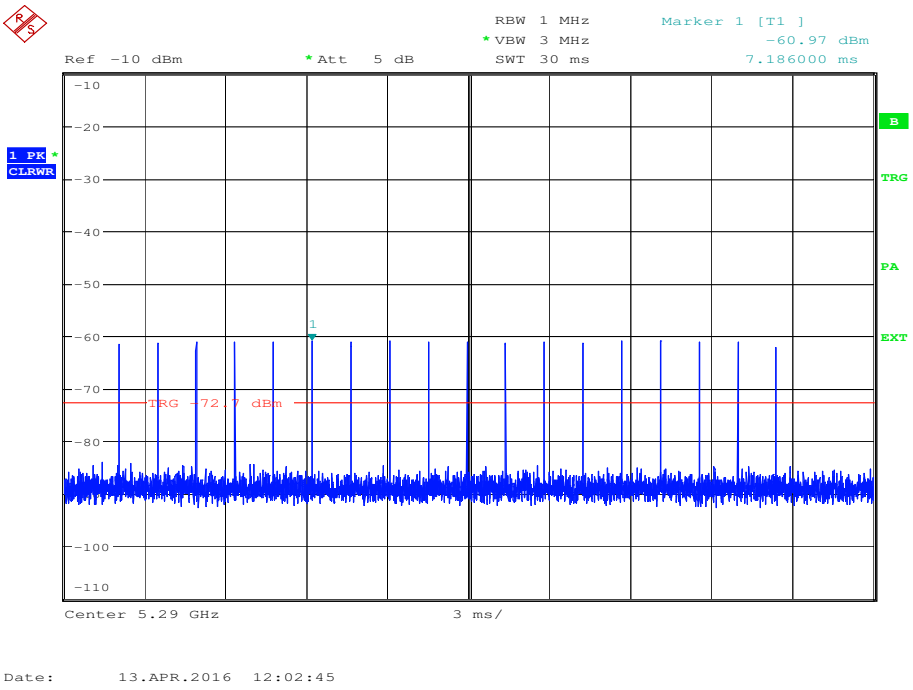
Radar Pulse Type 0

Short Radar Pulse Characteristics

Radar Type	Pulse Width (µs)	PRI (µs)	Number of Pulses
0	1	1428	18

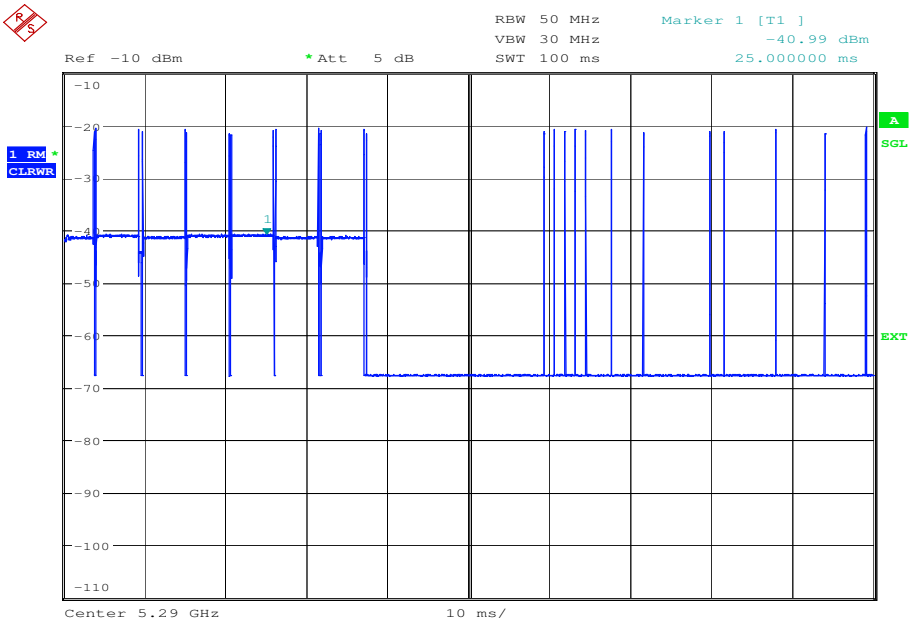
Client without Radar Detection

Radar Type 0 Plot



Product Service

Channel Loading Plot



Date: 13.APR.2016 17:12:13

802.11n - 5 GHz 40 MHz Bandwidth

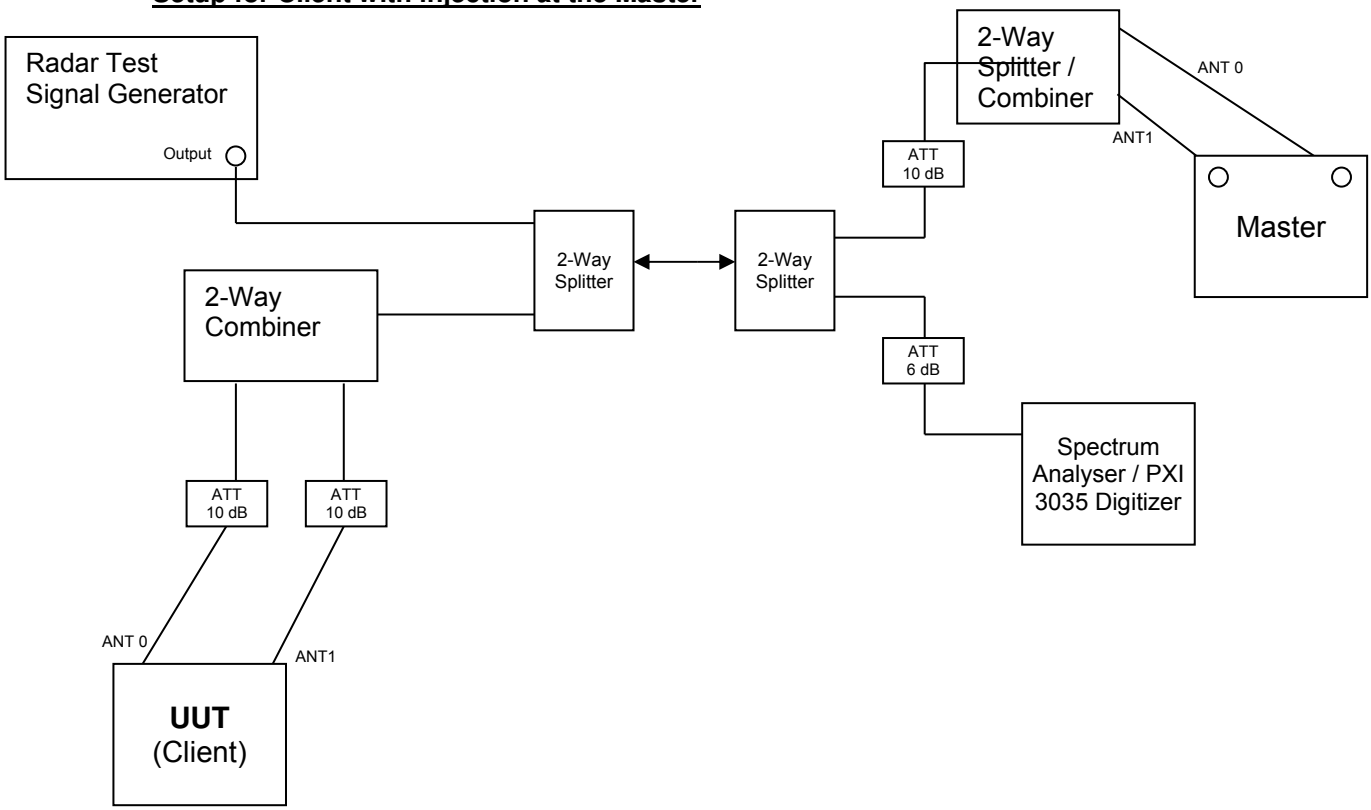
In this test equipment configuration, Radar signals are injected at the Master. The configuration ensures that the Radar pulses are received only by the Master device and not the Client. To calibrate the Radar pulses, the master was replaced by a Spectrum Analyser. The required Radar Waveform, (Type 0), 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 (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



Product Service

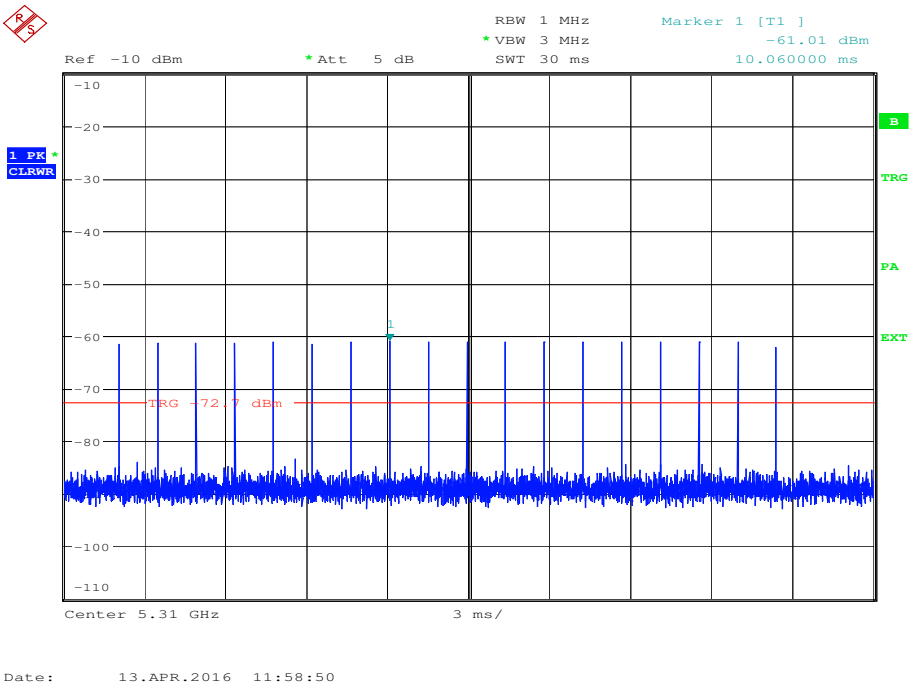
Radar Pulse Type 0

Short Radar Pulse Characteristics

Radar Type	Pulse Width (µs)	PRI (µs)	Number of Pulses
0	1	1428	18

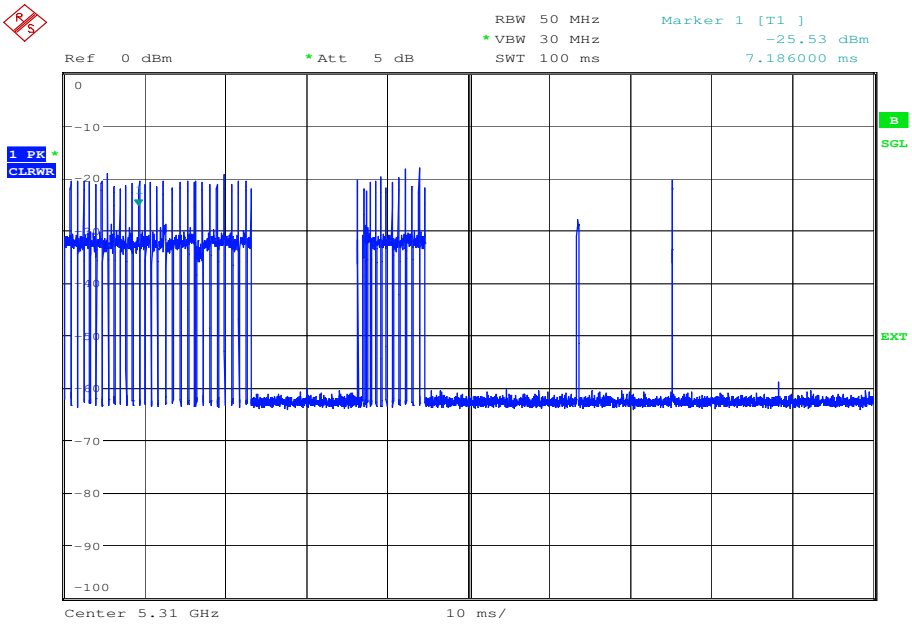
Client without Radar Detection

Radar Type 0 Plot



Product Service

Channel Loading Plot



Date: 13.APR.2016 13:38:56

Product Service

2.2 IN-SERVICE MONITORING

2.2.1 Specification Reference

FCC 47 CFR Part 15E, Clause 15.407 (h)(2)(iii)(iv)

2.2.2 Equipment Under Test and Modification State

S/N: IMEI 004401115722627 - Modification State 0

2.2.3 Date of Test

13 April 2016

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

The test was performed in accordance with KDB 905462 D02 v02, clause 7.8.3.

Client without Radar Detection

The EUT was associated with the FCC Approved Master device FCC ID: UZ7MB82 and FCC ID: Q9DAPIN0224225. A computer 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 0 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 0 Radar burst was sent from the signal generator and its level adjusted until the required level of -62 dBm was achieved. The Spectrum Analyser was then replaced with the UUT.

The UUT was configured to stream the FCC designated MPEG/Audio file using VLC Player. Using the Aeroflex DFS Software, the Radar burst was injected to the Master. 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, (T0)

Purple - End Of 200ms Period, (T0 + 200 ms)

Orange - End Of Channel Move Time, (T0 + 10 seconds)

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Additionally, the PXI digitiser was replaced with a Spectrum Analyser. The external trigger from the Aeroflex DFS test system was used to trigger a 30 minute sweep from the moment the radar burst sequence was injected. It was verified that no transmissions occurred on the test channel during this time period.

2.2.6 Environmental Conditions

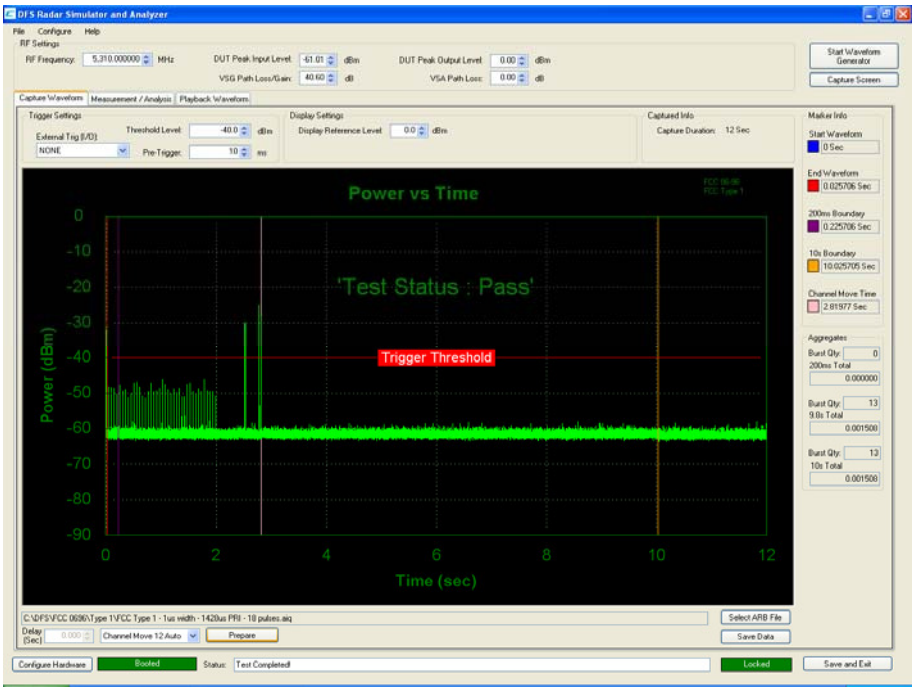
Ambient Temperature	22.8°C
Relative Humidity	34.8%

2.2.7 Test Results

802.11a, In-Service Monitoring Results

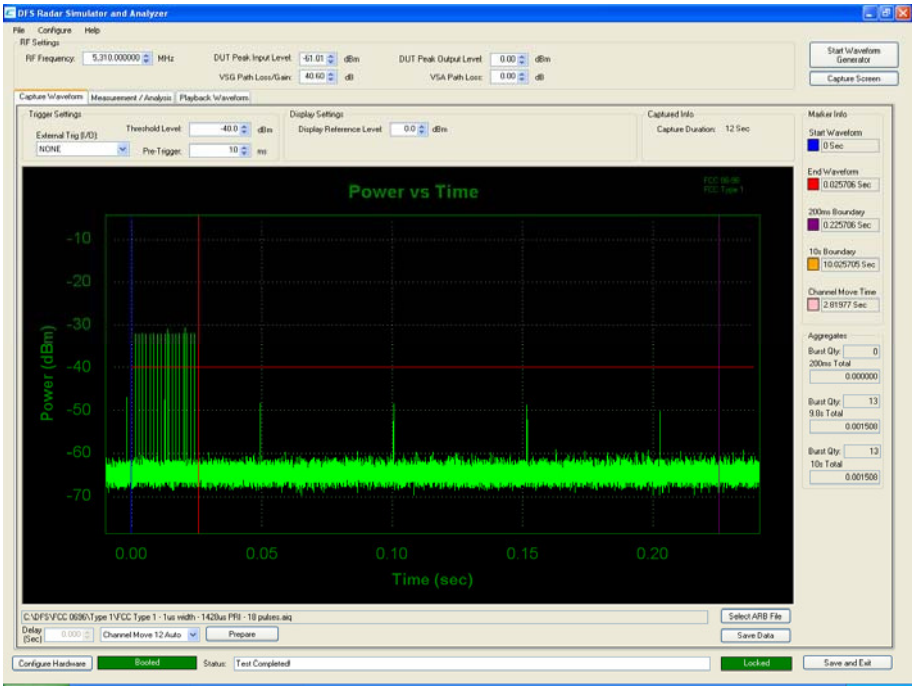
Channel Move Time	2.82 seconds
Channel Closing Time (Aggregate Time During 200ms)	0.00 ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	1.51 ms
Channel Closing Time (Aggregate Time During 10s)	1.51 ms

802.11a, Overall Power vs Time Display, showing channel closing and move time



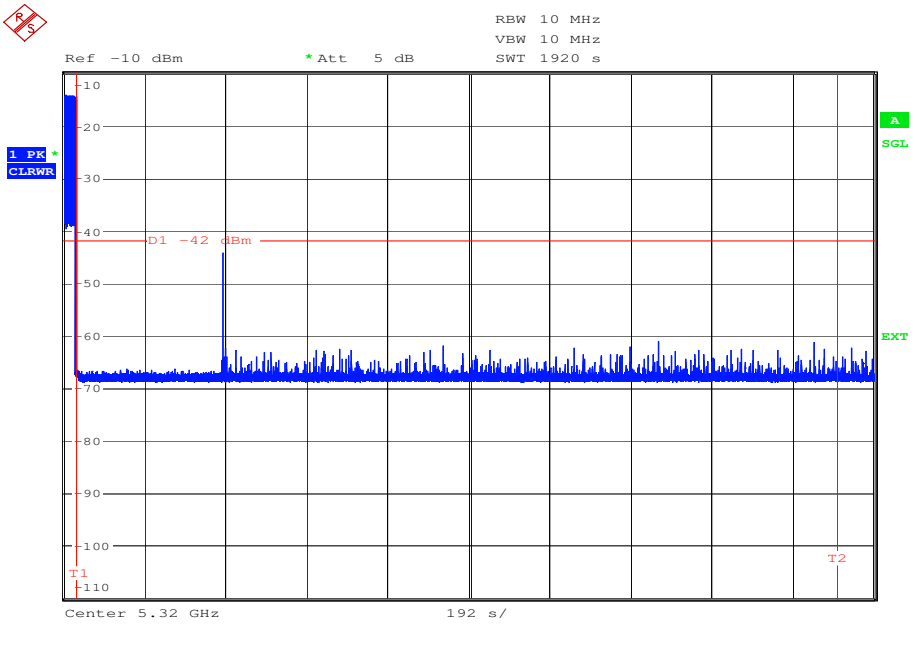
Product Service

802.11a, Zoom of Radar Burst, Access Point and Client Signalling



802.11a, Non-occupancy Period

The EUT did not resume transmissions during the non-occupancy period.



Remarks

Transmissions below the spectrum analyser display line for the Non-occupancy period were confirmed to be control signals of transmissions from an adjacent channel.

Product Service

FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iii)

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

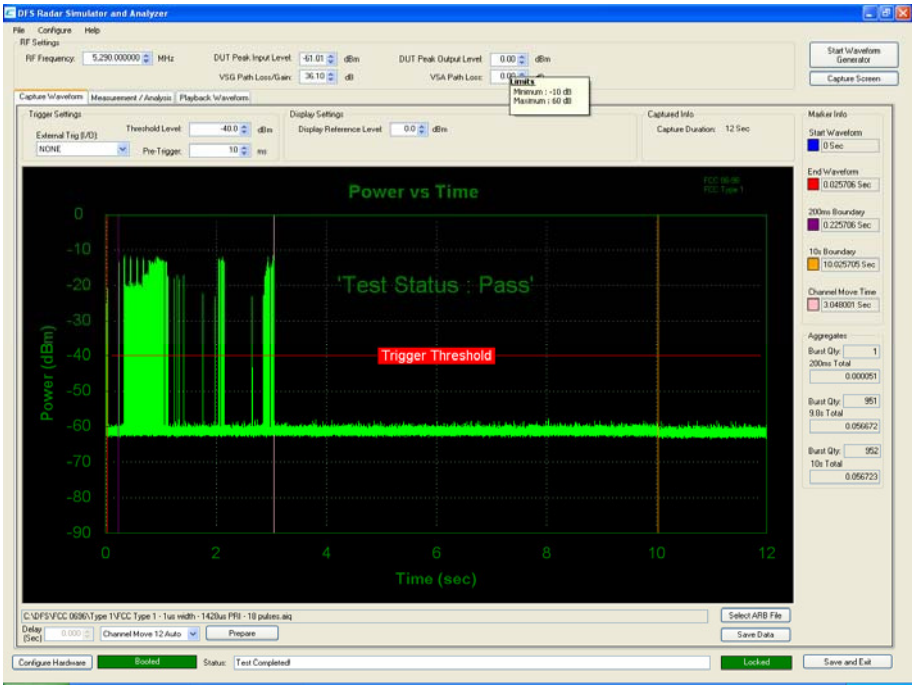
FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iv)

Non-occupancy Period	> 30 minutes

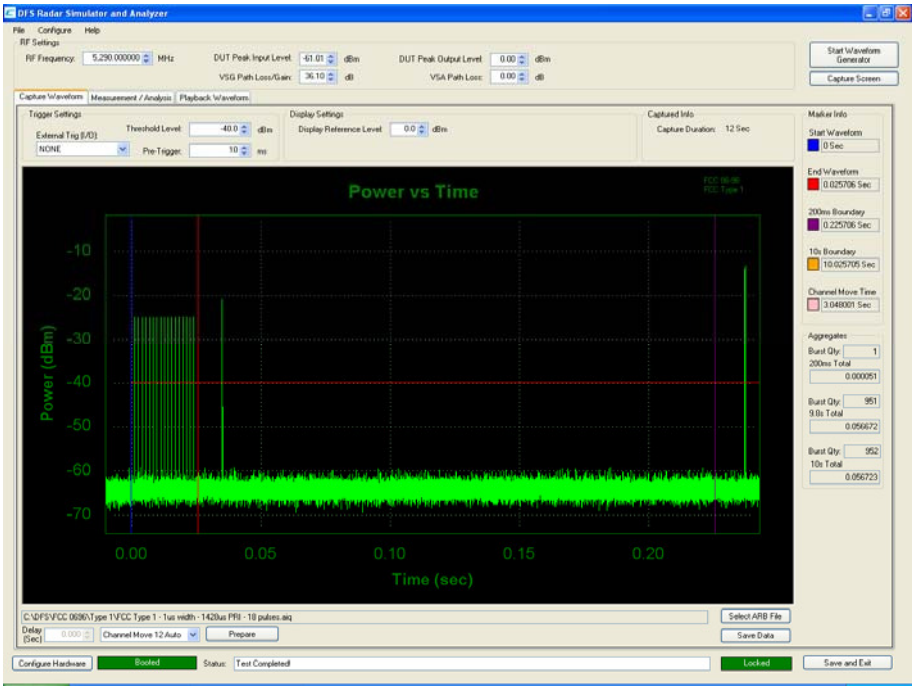
802.11ac - 5 GHz 80 MHz Bandwidth, In-Service Monitoring Results

Channel Move Time	3.05 seconds
Channel Closing Time (Aggregate Time During 200ms)	0.05 ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	56.67 ms
Channel Closing Time (Aggregate Time During 10s)	56.72 ms

802.11ac - 5 GHz 80 MHz Bandwidth, Overall Power vs Time Display, showing channel closing and move time

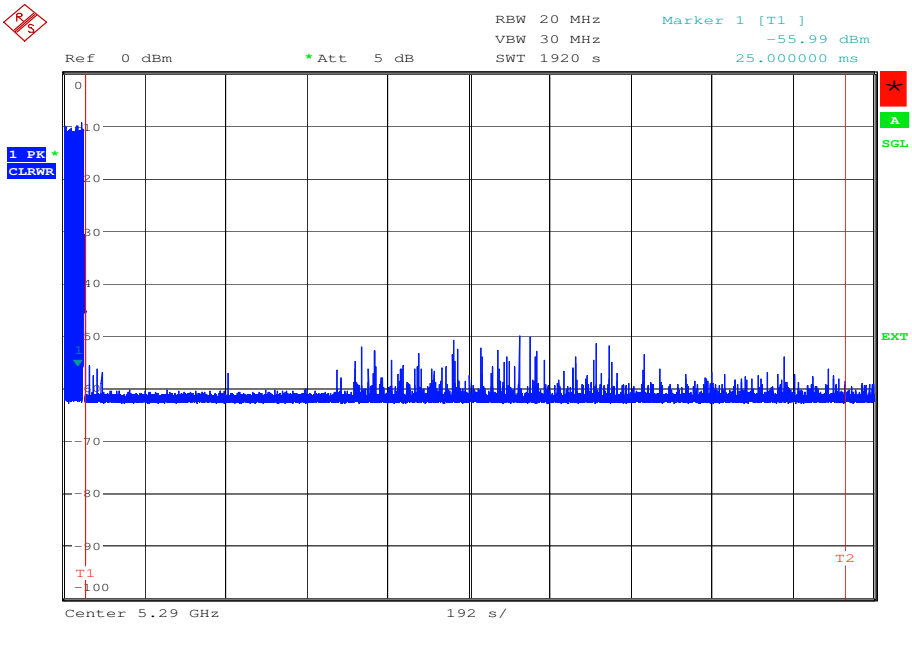


802.11ac - 5 GHz 80 MHz Bandwidth, Zoom of Radar Burst, Access Point and Client Signalling



802.11ac - 5 GHz 80 MHz Bandwidth, Non-occupancy Period

The EUT did not resume transmissions during the non-occupancy period.



Remarks

Transmissions at a reduced amplitude during the Non-occupancy period were confirmed to be control signals of transmissions from an adjacent channel.

FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iii)

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

FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iv)

Non-occupancy Period	> 30 minutes

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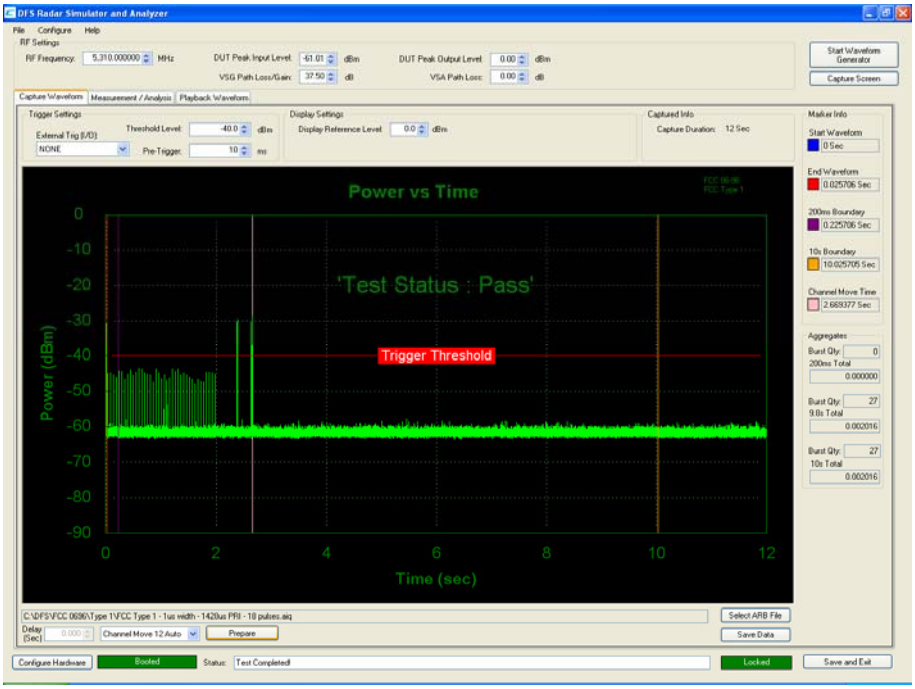
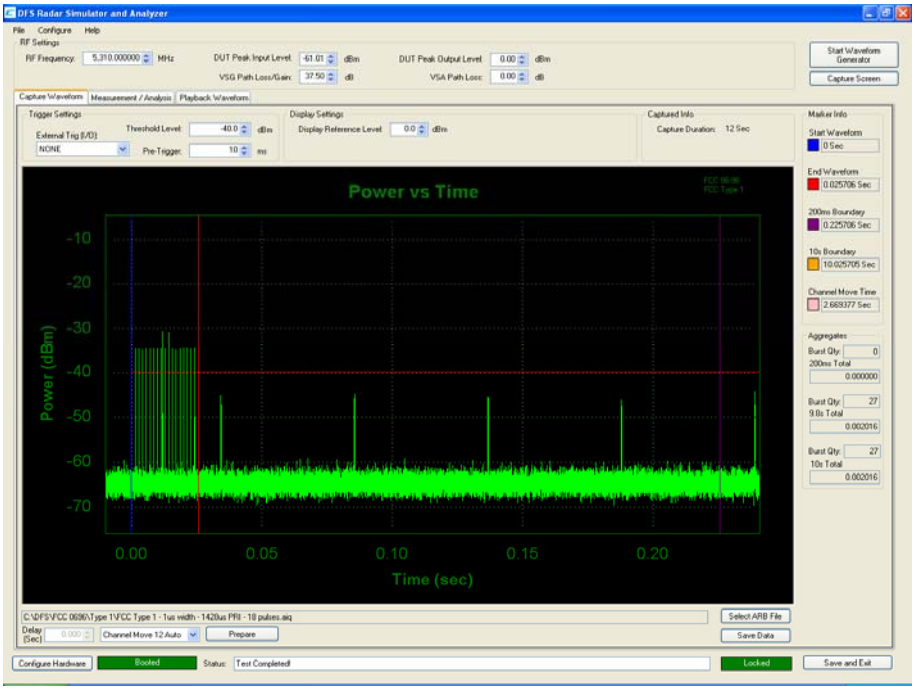
802.11n - 5 GHz 40 MHz Bandwidth, In-Service Monitoring Results

Channel Move Time	2.67 seconds
Channel Closing Time (Aggregate Time During 200ms)	0.00 ms
Channel Closing Time (Aggregate Time During +200ms to 10s)	2.02 ms
Channel Closing Time (Aggregate Time During 10s)	2.02 ms

802.11n - 5 GHz 40 MHz Bandwidth,Overall Power vs Time Display, showing channel closing and move time

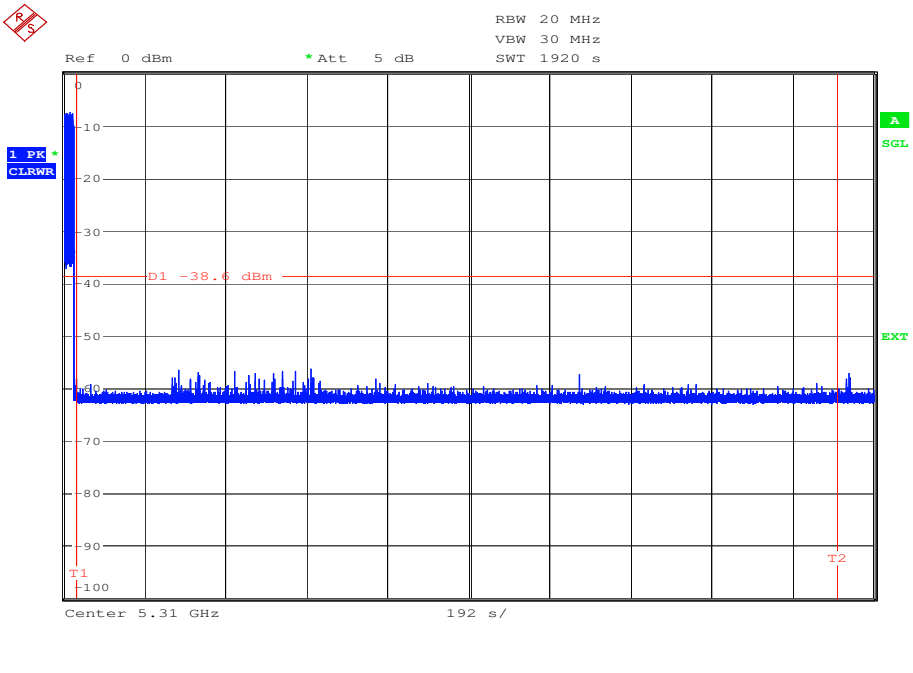


802.11n - 5 GHz 40 MHz Bandwidth, Zoom of Radar Burst, Access Point and Client Signalling



802.11n - 5 GHz 40 MHz Bandwidth, Non-occupancy Period

The EUT did not resume transmissions during the non-occupancy period.



Remarks

Transmissions below the spectrum analyser display line for the Non-occupancy period were confirmed to be control signals of transmissions from an adjacent channel.

FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iii)

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

FCC 47 CFR Part 15, Limit Clause 15.407 (h)(2)(iv)

Non-occupancy Period	> 30 minutes

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
Section 2.2 - In-Service Monitoring					
Multimeter	White Gold	WG022	190	12	24-Nov-2016
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	19-Aug-2016
Power Splitter	Weinschel	1506A	606	12	24-Mar-2017
Step Attenuator	Rohde & Schwarz	DPSP	1672	-	O/P Mon
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	29-Jan-2017
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Combiner/Splitter	Weinschel	1506A	3877	12	30-Mar-2017
PXI RF Digitizer	Aeroflex	3035	4012	24	29-Jan-2018
PXI RF Synthesizer	Aeroflex	3010	4013	24	29-Jan-2018
PXI RF Synthesizer	Aeroflex	3011	4014	24	29-Jan-2018
PXI Digital RF Signal Generator	Aeroflex	3025	4015	24	29-Jan-2018
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4055	-	O/P Mon
1800-6000 MHz Power Splitter	Mini-Circuits	ZN2PD-63-S+	4056	-	O/P Mon
AP-220 Series Wireless Access Point	Aruba Networks	APIN0224	4448	-	TU
802.11(a,n) Access Point	Motorola	AP-650	4452	-	TU

TU – Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment

Product Service

3.2 SUPPORT TEST EQUIPMENT

Instrument	Manufacturer	Type No.	Serial Number
Computer	Dell Inc.	E6510	10388944297

Product Service

3.3 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
In-Service Monitoring	Time: ± 0.47 % Power: ± 1.29 dB

Product Service

SECTION 4

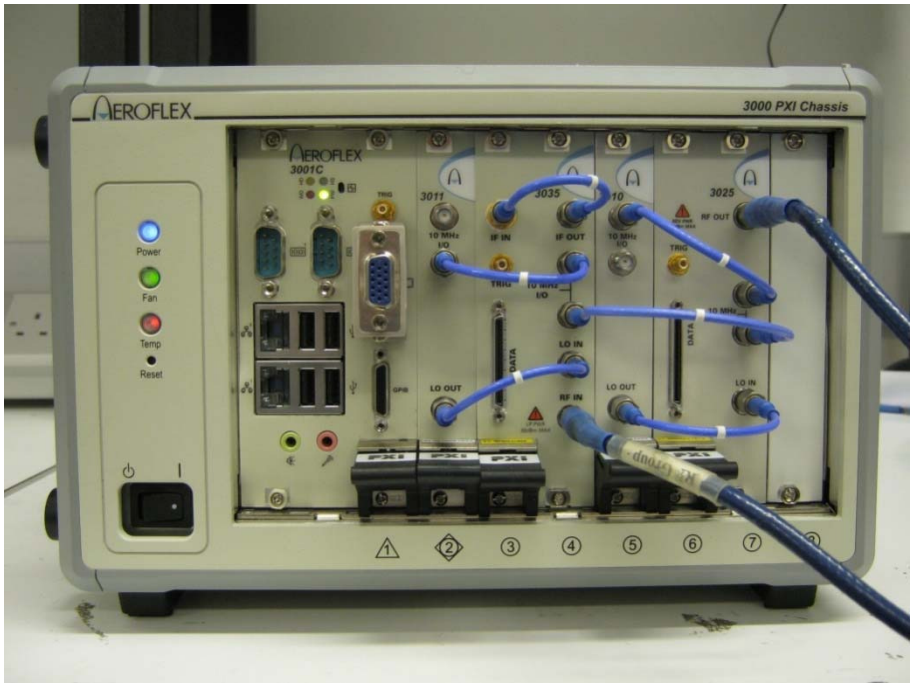
PHOTOGRAPHS

Product Service

4.1 TEST SET-UP PHOTOGRAPHS

See test set-up photographs exhibit “75933606 FCC Set Up Photos.pdf”.

4.2 DFS TEST EQUIPMENT



Test Set Up

Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).