

Radio Test Report

for

Cambridge Consultants Limited

**RCOM BS (BASE STATION and
RCOM BCM (MOBILE PART)**

DFS Parameters Only

Document No: TRA-016200-45-06D

Applicant : Cambridge Consultants Limited

Apparatus : RCOM BS (BASE STATION and
RCOM BCM (MOBILE PART)

Specification(s) : 47CFR15.407(h)(2)
Dynamic Frequency Selection (DFS)

FCC ID BS : 2AGHF-RCOMBS001

FCC ID BCM : 2AGHF-RCOMBS001

Industry Canada Number BS : 20816-RCMBS001

Industry Canada Number BCM : 20816- RCOMBCM001

Authorised by :

: Radio Product Manager

Issue Date : **22nd February 2016**

Authorised Copy Number : *PDF*

Total number of pages :80

Contents

Section 1: Introduction	4
1.1 General	4
1.2 Tests Requested By	5
1.3 Manufacturer	5
1.4 Apparatus Assessed	5
1.5 Test Result Summary	6
1.6 Notes Relating To The Assessment	8
1.7 Deviations from Test Standards	8
Section 2: Measurement Uncertainty	9
2.1 Measurement Uncertainty Values	9
Section 3: Modifications	10
3.1 Modifications Performed During Assessment	10
Appendix A: Master Mode Formal Test Results	11
A1 Detection Bandwidth	11
A2 Channel Availability Check Time	12
A3 Off-Channel CAC Time	13
A3 Channel Move Time	14
A4 Channel Closing Transmission Time	15
A5 Non- Occupancy Period	16
A6 Probability of Detection	17
Appendix B: Slave Mode Formal Test Results	18
B1 Detection Bandwidth	18
B2 Channel Availability Check Time	19
B3 Off-Channel CAC Time	20
B4 Channel Move Time	21
B5 Channel Closing Transmission Time	22
B6 Non- Occupancy Period	23
B7 Probability of Detection	24
Appendix C: Supporting Data	25
Appendix D: Additional Test and Sample Details	63
D1 Test samples	64
D2 EUT operating mode during testing	65
D3 EUT Configuration Information	66
D4 List of EUT Ports	67
D5 Details of Equipment Used	68
Appendix E: Additional Information	69
Appendix F: Photographs and Figures	70
Appendix G: DFS Calibration Procedure	72
G.1 Description of calibration setup	72
G.2 Description of calibration procedure	72

Section 1:

Introduction

1.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on samples submitted to the Laboratory.

Test performed at: Element Material Technologies [X]
 Unit E
 South Orbital Trading Park
 Hedon Road
 Hull, HU9 1NJ.
 United Kingdom.

Telephone: +44 (0) 1482 801801
Fax: +44 (0) 1482 801806

 Element Material Technologies []
 Unit 1
 Pendle Place
 Skelmersdale
 West Lancashire, WN8 9PN
 United Kingdom

Telephone: +44 (0) 1695 556666
Fax: +44 (0) 1695 577077

Email: test@element.com
Web site: <http://www.element.com>

Tests performed by: K J Anderson

Report author: K J Anderson

This report must not be reproduced except in full without prior written permission from Element Material Technologies Ltd.

1.2 Tests Requested By

This test report has been prepared on behalf of:

Cambridge Consultants Ltd
Science Park
Milton Road
Cambridge
CB4 0DW

1.3 Manufacturer

Axiom Manufacturing Services Limited
Technology Park
Newbridge
Newport
Gwent
NP11 5AN

1.4 Apparatus Assessed

The following apparatus was assessed between: 14/09/15 and 28/09/15

RCOM BS (BASE STATION)/ RCOM BCM (MOBILE PART)

The EUT is part of a point to multipoint short range radio communications system, identified as RCOM, which operates in the frequency band 5470MHz to 5725MHz. The wireless part of this system comprises of two parts, the BS – Base Station and the BCM – Bot Control Module (EUT). One Base Station can be connected to many BCMs at any one time. The purpose of this radio system is to provide a low data rate, bi-directional, wireless connection to a large number of low speed factory floor machineries which transport goods, in a controlled manner, around the facility. These machineries are unmanned and the purpose of the wireless connection is to issue commands to the machineries and relay status information back, from each of the machineries, to a central point in the factory.

Results in this report only concern Dynamic Frequency Selection (DFS) parameters whilst the EUT was operating in the 5150 MHz to 5350 MHz and 5470 MHz to 5725 MHz WLAN bands. Results of radio performance parameters, other than Dynamic Frequency Selection (DFS) parameters, are not contained within this report and are reported separately in Element Material Technologies test report TRA-016200-45-06A for the Base Station and TRA-016200-45-05A for the BCM.

The Base Station and BCM operate together in Master/Slave mode with the Base station acting as the Master, Complete testing was performed in Master Mode on the Base Station. Only Channel Move Time measurements for the BCM were performed, with the reference radar signal injected into the Base Station and the BCM was monitored for shutdown.

1.5 Test Result Summary

Full details of test results are contained within Appendix A. The following table summarises the results of the assessment.

The statements relating to compliance with the standards below apply ONLY as qualified in the notes and deviations stated in sections 1.5 to 1.6 of this test report.

Full details of test results are contained within Appendices A and B. The following table summarises the results of the assessment.

Master Device (Base Station)

Test Type	Application	47CFR Reference clause	FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r02 Measurement Clause	Appendix N°	Mod No.	Result
Detection Bandwidth	Antenna Port	N/A	7.8.1	A1	0	Pass
Channel Availability Check Time	Antenna Port	15.407(h)(2)(ii)	7.8.2.1 7.8.2.2 7.8.2.3	A2	0	Pass
Off-Channel CAC Time	Antenna Port	15.407(h)(2)(ii)	7.8.2.1 7.8.2.2 7.8.2.3	A3	0	N/A
Channel Move Time	Antenna Port	15.407(h)(2)(iii)	7.8.3	A4	0	Pass
Channel Closing Transmission Time	Antenna Port	15.407(h)(2)(iii)	7.8.3	A5	0	Pass
Non-Occupancy Period	Antenna Port	15.407(h)(2)(iv)	7.8.3	A6	0	Pass
Probability of Detection	Antenna Port	N/A	7.8.4	A7	0	Pass

Slave Device (BCM)

Test Type	Application	47CFR Reference clause	FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r02 Measurement Clause	Appendix N°	Mod No.	Result
Detection Bandwidth	Antenna Port	N/A	7.8.1	B1	0	N/A
Channel Availability Check Time	Antenna Port	15.407(h)(2)(ii)	7.8.2.1 7.8.2.2 7.8.2.3	B2	0	N/A
Off-Channel CAC Time	Antenna Port	15.407(h)(2)(ii)	7.8.2.1 7.8.2.2 7.8.2.3	B3	0	N/A
Channel Move Time	Antenna Port	15.407(h)(2)(iii)	7.8.3	B4	0	Pass
Channel Closing Transmission Time	Antenna Port	15.407(h)(2)(iii)	7.8.3	B5	0	Pass
Non-Occupancy Period	Antenna Port	15.407(h)(2)(iv)	7.8.3	B6	0	Pass
Probability of Detection	Antenna Port	N/A	7.8.4	B7	0	N/A

Note:

Off-Channel CAC Time measurements are not applicable as Off-Channel CAC is not implemented in the EUT.

Tests marked N/A for slave devices are not required for slave devices not incorporating radar detection

1.6 Notes Relating To The Assessment

With regard to this assessment, the following points should be noted:

The results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only.

Particular operating modes, apparatus monitoring methods and performance criteria required by the standards tested to have been performed except where identified in Section 1.6 of this test report (Deviations from Test Standards).

For emissions testing, throughout this test report, "Pass" indicates that the results for the sample as tested were below the specified limit (refer also to Section 2, Measurement Uncertainty).

Where relevant, the apparatus was only assessed using the monitoring methods and susceptibility criteria defined in this report.

All testing with the exception of testing at the Open Area Test Site was performed under the following environmental conditions:

Temperature	: 17 to 23 °C
Humidity	: 45 to 75 %
Barometric Pressure	: 86 to 106 kPa

All dates used in this report are in the format dd/mm/yy.

This assessment has been performed in accordance with the requirements of ISO/IEC 17025.

Testing was performed in accordance with Cambridge Consultants Ltd test suite ref. P1838-S-018 V2.0.

1.7 Deviations from Test Standards

There were no deviations from the test standard.

Section 2:**Measurement Uncertainty****2.1 Measurement Uncertainty Values**

For test data recorded, the following measurement uncertainty was calculated:

The following measurement uncertainty was calculated:

Test type	Quantity	Quantity frequency range	Uncertainty
Radiated electric field emissions 3m alternative test site Effective Radiated Power 3m alternative test site	Amplitude	30MHz to 300MHz Horizontal	±4.6dB
		30MHz to 300MHz Vertical	±5.1dB
		300MHz to 1000MHz Horizontal	±5.2dB
		300MHz to 1000MHz Vertical	±5.5dB
		1GHz to 26.5GHz Horizontal and Vertical	±4.1dB
Conducted emissions	Amplitude	N/A	±0.9 dB
Absolute RF power (via antenna connector)		N/A	±0.9 dB
PSD		N/A	±0.9 dB
Frequency Range	Frequency	9kHz to 26.5GHz	3.611kHz

Section 3:

Modifications

3.1 Modifications Performed During Assessment

No modifications were performed during the assessment

Appendix A:**Master Mode Formal Test Results****A1 Detection Bandwidth**

Details: Channel Availability Check time 20 MHz	
Regulation	47CFR Part 15
Clause	15.407(h)(2)(ii)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.1
Frequency	5.5725 GHz
EUT sample number	S48
Modification state	0
SE in test environment	S47, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

The detection bandwidth was verified as follows:

Test Frequency 5572.5 MHz

Offset (MHz)	Frequency (MHz)	Pulses detected	Detection Bandwidth (MHz)	Limit (MHz)
-10	5562.5	0/10	10.0	≥ 8.9
-6	5566.5	0/10		
-5	5567.5	10/10		
0	5572.5	10/10		
+5	5577.5	10/10		
+6	5578.5	0/10		
+10	5582.5	0/10		

Limit

Minimum 100% of the U-NII 99% transmission power bandwidth.

A2 Channel Availability Check Time

Details: Channel Availability Check time	
Regulation	47CFR Part 15
Clause	15.407(h)(2)(ii)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.2.1, 7.8.2.2 & 7.8.2.3
Frequency	5.5725 GHz
EUT sample number	S48
Modification state	0
SE in test environment	S47, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

The Channel Availability Check time was verified as follows:

Channel	Frequency (MHz)	Measured Channel Availability Check (s)	Limit (s)
8	5572.5 MHz	61.9	≥ 60.0

Plots showing compliance to the requirements are reproduced in Appendix C of this report.

Limits:

Channel Availability Check Time shall be greater than or equal to 60 seconds

A3 Off-Channel CAC Time

The EUT does not implement Off-Channel CAC therefore no testing was performed for this parameter

A3 Channel Move Time

Details: Channel Move Time Master Mode	
Regulation	47CFR Part 15
Clause	15.407(h)(2)(iii)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.3
Frequency range	5.5725 GHz
EUT sample number	S48
Modification state	0
SE in test environment	S47, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

Channel	Frequency (MHz)	Measured Channel Move time (s)	Limit (s)
8	5572.5 MHz	0.026	<10

Plots showing compliance to the requirements are reproduced in Appendix C of this report.

Limits:

The channel move time shall be less than or equal to 10 seconds

A4 Channel Closing Transmission Time

Details: Channel Closing Transmission Time Master Mode	
Regulation	47CFR Part 15
Clause	15.407(h)(2)(iii)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.3
Frequency range	5.5725 GHz
EUT sample number	S48
Modification state	0
SE in test environment	S47, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

Channel	Frequency (MHz)	Measured Closing Transmission time (ms)	Limit (ms)
8	5572.5 MHz	0 + 0	<200 + 60

Plots showing compliance to the requirements are reproduced in Appendix C of this report.

Limits:

The channel closing transmission time shall not exceed 200 milliseconds plus an aggregate of 60 milliseconds over the remaining 10 second period. (See Notes 1 and 2).

Note 1:

Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

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 a Channel move (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.

A5 Non- Occupancy Period

Details: Non Occupancy Period	
Regulation	47CFR Part 15
Clause	15.407(h)(2)(iii)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.3
Frequency range	5.5725 GHz
EUT sample number	S48
Modification state	0
SE in test environment	S47, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

Channel	Frequency (MHz)	Measured Non-Occupancy Time (min)	Limit (min)
8	5572.5 MHz	>35	>30

Plots showing compliance to the requirements are reproduced in Appendix C of this report.

Limits:

The non-occupancy period shall be a minimum of 30 minutes

A6 Probability of Detection

Details: Probability of Detection	
Regulation	47CFR Part 15
Clause	15.407(h)(2)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.4
Frequency range	5.5725 GHz
EUT sample number	S48
Modification state	0
SE in test environment	S47, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

Radar Type	Number of Bursts	Number of Bursts Detected	Detection Probability (%)	Limit of Detection Probability (%)
1	30	30	100	≥ 60 (see note)
2	30	30	100	≥ 60 (see note)
3	30	30	100	≥ 60 (see note)
4	30	30	100	≥ 60 (see note)
5	30	30	100	≥ 80
6	30	28	93.3	≥ 70

Note:

In addition to the limits in the table above, for Type 1 to 4 pulses the average detection probability across the 4 types shall be greater than 80%

Appendix B:

Slave Mode Formal Test Results

B1 Detection Bandwidth

There are no requirements with respect to this test for slave devices without radar detection.

B2 Channel Availability Check Time

There are no requirements with respect to this test for slave devices without radar detection.

B3 Off-Channel CAC Time

There are no requirements with respect to this test for slave devices without radar detection.

B4 Channel Move Time

Details: Channel Move Time Slave Mode	
Regulation	47CFR Part 15
Clause	15.407(h)(2)(iii)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.3
Frequency range	5.5725 GHz
EUT sample number	S47
Modification state	0
SE in test environment	S48, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

Channel	Frequency (MHz)	Measured Channel Move time (s)	Limit (s)
8	5572.5	0.035	<10

Plots showing compliance to the requirements are reproduced in Appendix C of this report.

Limits:

The channel move time shall be less than or equal to 10 seconds

B5 Channel Closing Transmission Time

Details: Channel Closing Transmission Time Slave Mode	
Regulation	47CFR Part 15
Clause	15.407(h)(2)(iii)
Measurement clause	FCC KDB 905462 D02 v01r02 Clause 7.8.3
Frequency range	5.5725 GHz
EUT sample number	S47
Modification state	0
SE in test environment	S48, S49, S50, S52, S54 and S55
SE isolated from EUT	None
EUT set up	Refer to Appendix D

Channel	Frequency (MHz)	Measured Closing Transmission time (ms)	Limit (ms)
8	5572.5	0.358 + 0	<200 + 60

Plots showing compliance to the requirements are reproduced in Appendix C of this report.

Limits:

The channel closing transmission time shall not exceed 200 milliseconds plus an aggregate of 60 milliseconds over the remaining 10 second period. (See Notes 1 and 2).

Note 1:

Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

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 a Channel move (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.

B6 Non- Occupancy Period

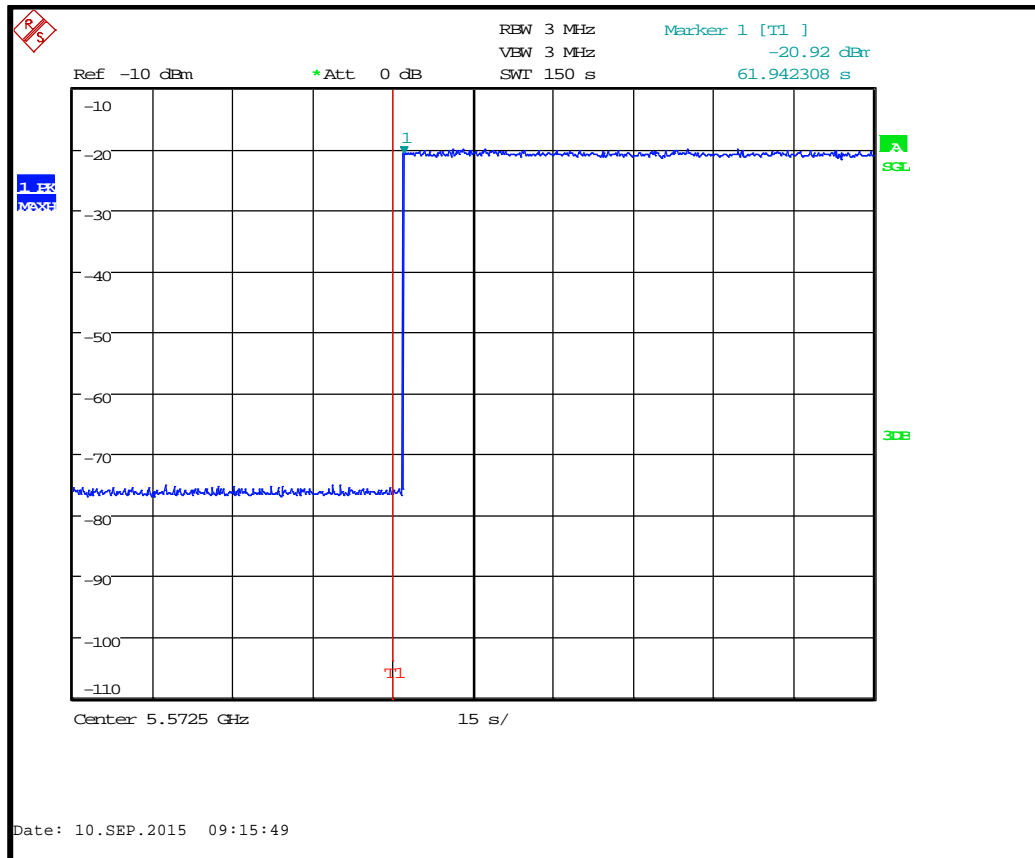
There are no requirements with respect to this test for slave devices without radar detection.

B7 Probability of Detection

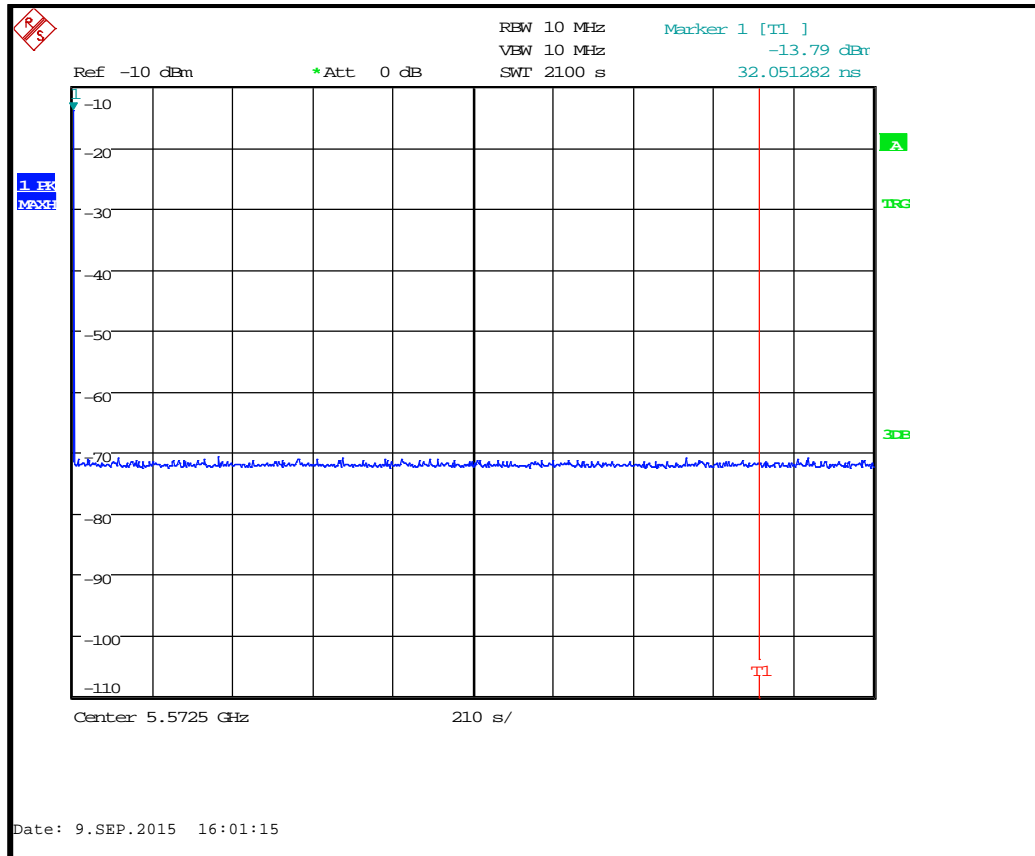
There are no requirements with respect to this test for slave devices without radar detection.

Appendix C:**Supporting Data**

This appendix contains supporting graphical and tabular data relating to the results contained within Appendix B of this report. The automated test plots are presented solely to demonstrate compliance with the relevant test requirement.



1 minute CAC Master



30 minute Non-Occupancy Period Master



Channel Move Time and Transmission Closing Period Master



Channel Move Time and Transmission Closing Period Slave

Radar Type	Pulse Width (us)	PRF (Hz)	PRI	# Pulses
Type 0	1	700	1428	18
Type 1	1	1355	738	72
Type 1	1	1672	598	89
Type 1	1	1859	538	99
Type 1	1	1792	558	95
Type 1	1	1285	778	68
Type 1	1	1066	938	57
Type 1	1	1618	618	86
Type 1	1	1139	878	61
Type 1	1	1433	698	76
Type 1	1	1166	858	62
Type 1	1	1520	658	81
Type 1	1	1931	518	102
Type 1	1	1193	838	63
Type 1	1	1567	638	83
Type 1	1	1114	898	59
Type 1	1	1170	855	62
Type 1	1	507	1971	27
Type 1	1	539	1856	29
Type 1	1	472	2117	25
Type 1	1	648	1543	35
Type 1	1	883	1133	47
Type 1	1	338	2958	18
Type 1	1	522	1917	28
Type 1	1	358	2794	19
Type 1	1	365	2741	20
Type 1	1	531	1882	29
Type 1	1	1101	908	59
Type 1	1	464	2154	25
Type 1	1	381	2628	21
Type 1	1	348	2870	19
Type 2	4.5	6452	155	29
Type 2	3.2	6061	165	23
Type 2	5	5495	182	26
Type 2	2	5556	180	26
Type 2	4.3	6667	150	23
Type 2	4.5	5747	174	23
Type 2	1.2	4902	204	27
Type 2	3.4	4717	212	25
Type 2	1.4	5848	171	23
Type 2	1.8	6452	155	23
Type 2	1.4	5587	179	24
Type 2	4.2	5682	176	29
Type 2	2.5	4808	208	27
Type 2	1.2	6211	161	24
Type 2	5	5556	180	23

Type 2	3.8	6173	162	26
Type 2	4	4348	230	24
Type 2	1.3	5102	196	24
Type 2	2	5848	171	25
Type 2	3.1	5376	186	29
Type 2	1.2	4695	213	25
Type 2	3	6173	162	23
Type 2	2.3	6579	152	27
Type 2	2	5291	189	27
Type 2	2.6	6667	150	26
Type 2	3	5000	200	25
Type 2	2.2	5464	183	23
Type 2	2.9	5405	185	23
Type 2	4.4	6623	151	28
Type 2	1.2	5181	193	23
Type 3	8.3	2179	459	16
Type 3	9	2012	497	17
Type 3	9.4	2890	346	16
Type 3	6	3247	308	16
Type 3	9.5	2874	348	17
Type 3	8.6	2451	408	17
Type 3	8.5	2353	425	17
Type 3	9.6	3817	262	16
Type 3	9.3	2639	379	17
Type 3	7	2519	397	16
Type 3	6.9	3571	280	17
Type 3	8.5	2475	404	17
Type 3	7.2	2513	398	16
Type 3	6.7	2519	397	16
Type 3	6.7	3436	291	16
Type 3	10	2604	384	18
Type 3	8.3	3906	256	16
Type 3	6.9	3003	333	18
Type 3	7.7	2445	409	17
Type 3	6.9	2092	478	17
Type 3	6	2667	375	18
Type 3	6.3	2299	435	16
Type 3	8.5	3650	274	18
Type 3	9.5	3344	299	16
Type 3	8.2	2985	335	16
Type 3	8	2421	413	18
Type 3	10	2232	448	18
Type 3	7.6	2451	408	17
Type 3	9.3	5000	200	18
Type 3	8.9	3876	258	18
Type 4	19.8	4484	223	15
Type 4	16.7	4032	248	12

[illegible]

Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900
Type 6	1	3000	333.3	900

DFS Parameters Types 1 to 4 and 6

Note:

For Types 1 to 4 and Type 6 pulses the following test frequencies were used for the statistical performance check.

Channel Centre Frequency 5572.5 MHz

Offset (MHz)	Frequency (MHz)	Pulses Applied	Detection Bandwidth (MHz)
-5	5567.5	3	10.0
-4	5568.5	2	
-3	5569.5	3	
-2	5570.5	2	
-1	5571.5	3	
0	5572.5	4	
+1	5573.5	3	
+2	5573.5	2	
+3	5585.5	3	
+4	5586.5	2	
+5	5587.5	3	

Tests applied in order from lowest frequency to highest

The following tables describe the 30 randomly generated Type 5 Pulse Bursts used

Burst Number 1

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	16	737526	85	1758	1179	182358	923076
2	2	5	883500	66	1235	0	38209	923076
3	1	13	493255	100	0	0	429721	923076
4	1	14	576314	67	0	0	346695	923076
5	3	20	260900	80	1342	1117	659477	923076
6	1	9	234932	53	0	0	688091	923076
7	2	12	166347	77	1043	0	755532	923076
8	1	20	763474	54	0	0	159548	923076
9	2	16	561840	78	1831	0	359249	923076
10	2	16	189472	70	1684	0	731780	923076
11	3	13	757747	66	1128	1148	162855	923076
12	3	9	69634	84	1457	1475	850258	923076
13	3	6	454354	68	1411	1691	465416	923076
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 2

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	12	178998	61	1088	1463	1151601	1333333
2	1	15	517876	56	0	0	815401	1333333
3	3	14	449618	90	1345	1775	880325	1333333
4	3	10	454793	100	1150	1197	875893	1333333
5	2	11	487775	91	1177	0	844199	1333333
6	3	18	1196150	68	1063	1668	134248	1333333
7	2	20	228059	97	1390	0	1103690	1333333
8	1	7	933142	53	0	0	400138	1333333
9	1	10	983273	64	0	0	349996	1333333
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 3

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	5	286907	94	1042	0	311863	600000
2	2	17	344134	62	1416	0	254326	600000
3	2	9	132016	86	1683	0	466129	600000
4	3	9	583403	92	1099	1813	13409	600000
5	2	18	585554	94	1669	0	12589	600000
6	1	14	110136	54	0	0	489810	600000
7	2	16	434162	74	1225	0	164465	600000
8	3	16	391255	66	1586	1260	205701	600000
9	3	11	456376	73	1786	1378	140241	600000
10	1	19	189570	97	0	0	410333	600000
11	1	18	594845	57	0	0	5098	600000
12	1	7	224251	100	0	0	375649	600000
13	2	7	176007	56	1130	0	422751	600000
14	1	5	574081	57	0	0	25862	600000
15	1	11	84310	62	0	0	515628	600000
16	2	8	26117	94	1055	0	572640	600000
17	2	9	597466	100	1114	0	1220	600000
18	1	18	205281	83	0	0	394636	600000
19	1	9	350792	93	0	0	249115	600000
20	3	10	301531	57	1094	1148	296056	600000

Burst Number 4

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	16	316564	60	0	0	433376	750000
2	3	15	312538	62	1440	1113	434723	750000
3	1	18	72669	79	0	0	677252	750000
4	2	5	91911	59	1227	0	656744	750000
5	3	11	126951	76	1791	1750	619280	750000
6	2	9	608406	73	1213	0	140235	750000
7	2	16	659175	83	1424	0	89235	750000
8	1	19	304448	64	0	0	445488	750000
9	3	7	31381	74	1618	1850	714929	750000
10	1	12	354582	73	0	0	395345	750000
11	3	18	87460	63	1019	1447	659885	750000
12	3	19	590465	66	1186	1092	157059	750000
13	2	10	466475	61	1903	0	281500	750000
14	3	8	128636	67	1169	1835	618159	750000
15	3	13	704004	69	1297	1666	42826	750000
16	3	7	242623	95	1876	1700	503516	750000
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 5

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	8	115223	79	1310	0	683309	800000
2	3	15	42602	70	1177	1890	754121	800000
3	3	20	102836	66	1352	1371	694243	800000
4	1	5	74898	62	0	0	725040	800000
5	3	20	310656	86	1665	916	486505	800000
6	1	20	655483	68	0	0	144449	800000
7	2	18	36149	95	1280	0	762381	800000
8	2	6	396178	98	1195	0	402431	800000
9	2	11	337706	82	1388	0	460742	800000
10	2	10	44048	100	1358	0	754394	800000
11	3	9	692532	78	1375	1526	104333	800000
12	1	7	442407	82	0	0	357511	800000
13	1	9	112341	64	0	0	687595	800000
14	2	13	297893	52	1533	0	500470	800000
15	3	8	445290	59	1885	1505	351143	800000
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 6

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	10	597206	76	0	0	402718	1000000
2	2	19	120418	87	1833	0	877575	1000000
3	1	10	770914	81	0	0	229005	1000000
4	1	9	929690	68	0	0	70242	1000000
5	3	9	39372	59	1301	1213	957937	1000000
6	2	11	623798	95	1898	0	374114	1000000
7	3	14	251003	75	1627	1819	745326	1000000
8	2	9	145762	87	1458	0	852606	1000000
9	2	10	365917	69	950	0	632995	1000000
10	2	18	477652	57	1140	0	521094	1000000
11	3	8	988736	63	1312	1242	8521	1000000
12	1	20	705575	74	0	0	294351	1000000
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 7

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	5	1381560	63	1559	1387	115305	1500000
2	2	14	1493474	76	1546	0	4828	1500000
3	2	14	11211	80	1793	0	1486836	1500000
4	1	20	1111603	84	0	0	388313	1500000
5	2	7	342696	90	1908	0	1155216	1500000
6	2	14	823488	66	1194	0	675186	1500000
7	1	18	204685	68	0	0	1295247	1500000
8	3	9	755470	55	1343	1862	741160	1500000
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 8

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	18	658412	80	0	0	91508	750000
2	3	17	575177	81	1351	1903	171326	750000
3	3	20	94924	50	1376	1896	651654	750000
4	1	5	447207	70	0	0	302723	750000
5	3	5	407603	63	1301	1581	339326	750000
6	2	17	639667	89	1612	0	108543	750000
7	3	5	216785	72	1216	1129	530654	750000
8	1	17	422658	67	0	0	327275	750000
9	1	17	340593	64	0	0	409343	750000
10	2	16	733269	94	1797	0	14746	750000
11	1	19	681292	50	0	0	68658	750000
12	3	13	253678	51	1442	1183	493544	750000
13	1	15	212043	100	0	0	537857	750000
14	3	14	555433	52	1854	1085	191472	750000
15	3	5	540808	97	1141	935	206825	750000
16	3	19	558249	64	1241	1607	188711	750000
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 9

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	18	161649	72	1809	1457	466447	631578
2	1	17	559112	83	0	0	72383	631578
3	1	14	308822	83	0	0	322673	631578
4	3	11	359376	94	1667	1876	268377	631578
5	1	10	603503	57	0	0	28018	631578
6	2	6	167072	94	960	0	463358	631578
7	2	15	63041	97	1307	0	567036	631578
8	3	6	407651	92	1073	956	221622	631578
9	3	5	370087	54	989	991	259349	631578
10	2	20	316259	61	1350	0	313847	631578
11	2	7	404098	85	1655	0	225655	631578
12	1	8	412681	95	0	0	218802	631578
13	1	11	135830	60	0	0	495688	631578
14	3	8	97276	67	1410	1540	531151	631578
15	3	16	40745	62	1260	1625	587762	631578
16	1	19	32240	64	0	0	599274	631578
17	2	6	50688	93	1761	0	578943	631578
18	2	8	151773	99	1262	0	478345	631578
19	3	19	432948	58	1337	1411	195708	631578
20	0	0	0	0	0	0	0	0

Burst Number 10

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	16	468759	54	1288	1925	277866	750000
2	3	9	364728	81	1751	1299	381979	750000
3	3	18	174168	77	1907	1113	572581	750000
4	2	13	427656	56	1078	0	321154	750000
5	2	6	322791	50	1315	0	425794	750000
6	2	10	746396	66	1787	0	1685	750000
7	2	8	530550	64	1136	0	218186	750000
8	2	8	614728	61	1179	0	133971	750000
9	2	16	525827	79	1607	0	222408	750000
10	3	16	416764	59	1102	1075	330882	750000
11	1	13	255793	85	0	0	494122	750000
12	1	9	301718	93	0	0	448189	750000
13	3	13	220453	98	1429	1393	526431	750000
14	1	17	361131	82	0	0	388787	750000
15	3	19	13612	56	1247	1257	733716	750000
16	3	11	327727	64	1599	1474	419008	750000
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 11

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	12	189511	86	0	0	610403	800000
2	2	18	463532	84	1298	0	335002	800000
3	3	9	47875	92	1788	946	749115	800000
4	1	12	208007	69	0	0	591924	800000
5	2	10	526285	62	954	0	272637	800000
6	3	12	343796	69	1491	982	453524	800000
7	2	13	285941	94	1264	0	512607	800000
8	3	5	735645	52	1618	1901	60680	800000
9	1	7	54772	60	0	0	745168	800000
10	1	20	577011	72	0	0	222917	800000
11	1	8	222414	52	0	0	577534	800000
12	1	17	561067	66	0	0	238867	800000
13	3	8	263864	70	1112	1230	533584	800000
14	1	20	563300	68	0	0	236632	800000
15	2	9	265758	84	1116	0	532958	800000
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 12

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	7	106464	74	0	0	560128	666666
2	3	17	555944	80	1863	1439	107180	666666
3	1	11	390786	69	0	0	275811	666666
4	2	14	178903	51	1056	0	486605	666666
5	2	17	511012	73	1551	0	153957	666666
6	1	6	230794	91	0	0	435781	666666
7	3	12	295356	65	1760	1642	367713	666666
8	3	7	126851	78	1548	1771	536262	666666
9	2	15	202436	63	1398	0	462706	666666
10	3	11	71898	99	1091	1395	591985	666666
11	1	15	210949	97	0	0	455620	666666
12	2	11	29313	93	1005	0	636162	666666
13	2	5	244849	72	1147	0	420526	666666
14	1	19	410647	84	0	0	255935	666666
15	3	20	34710	93	1166	984	629527	666666
16	1	7	309391	55	0	0	357220	666666
17	1	16	103823	92	0	0	562751	666666
18	2	10	23091	59	1835	0	641622	666666
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 13

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	17	1071318	85	1443	0	260402	1333333
2	3	8	136665	58	1386	1035	1194073	1333333
3	1	17	308222	52	0	0	1025059	1333333
4	2	19	825111	58	1796	0	506310	1333333
5	1	16	1227750	72	0	0	105511	1333333
6	3	17	38366	60	1227	1552	1292008	1333333
7	1	15	1074283	65	0	0	258985	1333333
8	1	5	557783	63	0	0	775487	1333333
9	2	19	879919	69	1878	0	451398	1333333
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 14

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	17	1385003	61	1899	0	112976	1500000
2	3	12	1496808	51	989	1364	686	1500000
3	3	18	1404742	50	1684	1545	91879	1500000
4	3	11	632092	82	970	1713	864979	1500000
5	1	20	880247	79	0	0	619674	1500000
6	3	12	1155688	71	1662	1111	341326	1500000
7	2	14	1207471	78	1338	0	291035	1500000
8	2	5	400950	92	1506	0	1097360	1500000
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 15

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	9	935957	59	1127	1626	152022	1090909
2	2	10	17864	50	1195	0	1071750	1090909
3	2	13	1040069	91	1289	0	49369	1090909
4	1	5	611608	64	0	0	479237	1090909
5	3	8	185063	91	1288	1221	903064	1090909
6	1	13	861000	56	0	0	229853	1090909
7	2	13	466450	73	1114	0	623199	1090909
8	2	11	620023	86	972	0	469742	1090909
9	1	18	574539	86	0	0	516284	1090909
10	2	17	463979	100	1757	0	624973	1090909
11	2	16	770016	83	1501	0	319226	1090909
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 16

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	19	542986	98	1777	1417	253526	800000
2	1	13	663863	75	0	0	136062	800000
3	2	14	787286	52	1079	0	11531	800000
4	1	8	355973	90	0	0	443937	800000
5	2	20	615405	98	1602	0	182797	800000
6	1	10	565348	71	0	0	234581	800000
7	1	16	697054	56	0	0	102890	800000
8	3	12	419419	82	1354	1753	377228	800000
9	2	16	266712	95	1139	0	531959	800000
10	3	20	351130	52	1080	1673	445961	800000
11	1	12	110900	94	0	0	689006	800000
12	1	5	206535	80	0	0	593385	800000
13	1	6	287412	78	0	0	512510	800000
14	2	11	551158	69	1061	0	247643	800000
15	1	16	439804	100	0	0	360096	800000
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 17

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	13	715146	84	0	0	207846	923076
2	3	5	261291	81	1643	1284	658615	923076
3	2	20	193996	63	1208	0	727746	923076
4	3	5	670408	82	1321	1095	250006	923076
5	3	13	866192	72	1074	1779	53815	923076
6	2	16	29200	68	1075	0	892665	923076
7	3	14	382230	88	1719	1493	537370	923076
8	3	9	750151	71	1312	1118	170282	923076
9	3	12	880635	66	1055	1854	39334	923076
10	2	9	625229	98	1274	0	296377	923076
11	1	5	580533	62	0	0	342481	923076
12	3	11	129528	84	1283	1547	790466	923076
13	2	7	371653	69	1595	0	549690	923076
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 18

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	20	1230300	58	0	0	102975	1333333
2	2	15	1086875	89	1678	0	244602	1333333
3	2	15	193612	91	1309	0	1138230	1333333
4	1	13	107535	87	0	0	1225711	1333333
5	1	13	1048863	79	0	0	284391	1333333
6	1	18	21176	87	0	0	1312070	1333333
7	2	8	341503	84	1870	0	989792	1333333
8	2	17	1053035	76	1299	0	278847	1333333
9	1	10	674676	72	0	0	658585	1333333
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 19

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	12	686231	91	0	0	113678	800000
2	3	12	682383	99	1851	1726	113743	800000
3	1	18	480612	67	0	0	319321	800000
4	2	8	263395	58	1046	0	535443	800000
5	1	14	689731	98	0	0	110171	800000
6	1	7	475511	68	0	0	324421	800000
7	3	12	647783	70	998	1678	149331	800000
8	3	20	22933	64	1479	1817	773579	800000
9	1	16	296682	53	0	0	503265	800000
10	1	6	545706	57	0	0	254237	800000
11	1	15	43287	98	0	0	756615	800000
12	2	9	552239	50	1603	0	246058	800000
13	3	12	570012	65	1593	1308	226892	800000
14	2	17	425621	69	1286	0	372955	800000
15	3	12	60420	65	1550	1303	736532	800000
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 20

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	8	834909	61	0	0	255939	1090909
2	1	12	425297	62	0	0	665550	1090909
3	3	11	576577	89	1635	1656	510774	1090909
4	1	5	258456	80	0	0	832373	1090909
5	2	15	190417	68	1289	0	899067	1090909
6	3	17	969531	65	1514	1745	117924	1090909
7	2	15	786873	50	1219	0	302717	1090909
8	1	12	201823	71	0	0	889015	1090909
9	1	8	1072037	62	0	0	18810	1090909
10	3	20	2956	89	975	1521	1085190	1090909
11	2	11	1070653	86	1292	0	18792	1090909
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 21

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	5	321787	90	1124	0	382791	705882
2	1	15	351712	84	0	0	354086	705882
3	1	16	321066	88	0	0	384728	705882
4	1	19	74014	70	0	0	631798	705882
5	3	7	326925	97	1064	1597	376005	705882
6	2	8	405670	100	1088	0	298924	705882
7	1	6	450684	58	0	0	255140	705882
8	3	6	194403	78	1260	1287	508698	705882
9	3	14	395783	55	1515	1429	306990	705882
10	1	14	414873	65	0	0	290944	705882
11	2	14	314531	84	1507	0	389676	705882
12	3	19	160663	77	1251	1586	542151	705882
13	1	6	277733	50	0	0	428099	705882
14	1	6	703145	63	0	0	2674	705882
15	3	5	77490	96	1426	1733	624945	705882
16	3	14	254809	79	1130	1823	447883	705882
17	3	14	395020	82	1890	1488	307238	705882
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 22

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	5	176658	93	0	0	680391	857142
2	1	5	442273	85	0	0	414784	857142
3	1	7	137748	74	0	0	719320	857142
4	1	9	615553	96	0	0	241493	857142
5	3	7	527237	77	1707	1404	326563	857142
6	1	16	365650	98	0	0	491394	857142
7	1	14	355066	77	0	0	501999	857142
8	1	17	678911	92	0	0	178139	857142
9	3	18	700885	56	1643	995	153451	857142
10	3	16	41243	80	1019	1334	813306	857142
11	2	11	784664	72	1845	0	70489	857142
12	2	17	491123	71	1921	0	363956	857142
13	2	13	343396	53	1530	0	512110	857142
14	2	15	301699	97	1250	0	553999	857142
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 23

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	7	906031	100	1747	0	15098	923076
2	2	5	807419	67	1820	0	113703	923076
3	1	15	759528	77	0	0	163471	923076
4	3	15	375765	58	1439	1639	544059	923076
5	3	10	179550	90	1449	1715	740092	923076
6	2	9	61795	71	1585	0	859554	923076
7	3	15	193822	53	1044	1394	726657	923076
8	1	20	75526	97	0	0	847453	923076
9	3	16	781800	55	1370	1473	138268	923076
10	3	10	599161	77	1201	1100	321383	923076
11	3	16	38511	71	1580	1560	881212	923076
12	3	19	744785	51	1677	1180	175281	923076
13	2	5	376686	74	1651	0	544591	923076
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 24

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	17	123872	78	1249	0	474723	600000
2	3	6	423876	83	1194	1262	173419	600000
3	3	11	70379	97	1793	1004	526533	600000
4	1	17	347493	69	0	0	252438	600000
5	1	19	100298	57	0	0	499645	600000
6	1	19	5065	94	0	0	594841	600000
7	1	5	81908	93	0	0	517999	600000
8	2	14	369200	85	1808	0	228822	600000
9	1	5	310336	50	0	0	289614	600000
10	3	9	510144	72	969	1723	86948	600000
11	3	10	365815	66	1708	1267	231012	600000
12	2	11	95402	78	1764	0	502678	600000
13	1	17	63371	91	0	0	536538	600000
14	1	15	442175	75	0	0	157750	600000
15	2	9	299676	85	1123	0	299031	600000
16	1	17	37168	69	0	0	562763	600000
17	1	14	75656	85	0	0	524259	600000
18	1	20	415682	51	0	0	184267	600000
19	3	16	75568	53	1471	966	521836	600000
20	1	12	30622	52	0	0	569326	600000

Burst Number25

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	13	1130026	70	0	0	69904	1200000
2	2	9	772172	65	1101	0	426597	1200000
3	1	17	1142664	93	0	0	57243	1200000
4	3	9	39982	65	1650	1171	1157002	1200000
5	3	17	515045	90	1323	1442	681920	1200000
6	3	13	188227	60	1502	1018	1009073	1200000
7	1	8	660772	99	0	0	539129	1200000
8	2	17	984822	86	1883	0	213123	1200000
9	3	10	381473	93	1493	1742	815013	1200000
10	3	16	974837	85	1743	1398	221767	1200000
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 26

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	12	921957	69	0	0	1050	923076
2	1	15	83597	76	0	0	839403	923076
3	3	14	718310	80	1870	1736	200920	923076
4	3	15	246948	63	1512	1891	672536	923076
5	1	20	430914	96	0	0	492066	923076
6	3	6	746082	85	1140	1425	174174	923076
7	3	10	737094	80	1538	1746	182458	923076
8	1	16	230329	83	0	0	692664	923076
9	1	9	230517	87	0	0	692472	923076
10	3	5	399875	82	1455	1906	519594	923076
11	1	13	504056	62	0	0	418958	923076
12	1	12	908458	62	0	0	14556	923076
13	1	11	404241	65	0	0	518770	923076
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 27

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	20	761674	94	1513	1103	35428	800000
2	3	5	767213	58	1801	1646	29166	800000
3	2	16	152497	82	1626	0	645713	800000
4	3	8	383910	79	995	1682	413176	800000
5	1	11	471434	90	0	0	328476	800000
6	2	12	678406	55	1351	0	120133	800000
7	3	10	22799	57	1323	1731	773976	800000
8	3	5	313796	79	1186	963	483818	800000
9	3	16	219844	79	1514	1666	576739	800000
10	3	18	129670	82	1118	1424	667542	800000
11	2	17	292265	96	1696	0	505847	800000
12	2	13	682170	52	1400	0	116326	800000
13	1	9	254075	66	0	0	545859	800000
14	3	18	644697	58	1935	1152	152042	800000
15	3	8	794477	54	1159	1618	2584	800000
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 28

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	3	17	513507	75	948	1592	283728	800000
2	1	19	174168	100	0	0	625732	800000
3	1	11	169117	60	0	0	630823	800000
4	2	20	322612	97	1390	0	475804	800000
5	1	10	654661	71	0	0	145268	800000
6	3	20	239036	92	1605	1352	557731	800000
7	2	6	786644	80	1289	0	11907	800000
8	1	15	664506	51	0	0	135443	800000
9	2	6	29499	84	1242	0	769091	800000
10	3	17	163498	92	1691	1506	633029	800000
11	1	16	214111	63	0	0	585826	800000
12	3	12	151417	59	1622	941	645843	800000
13	3	16	494598	98	1594	1121	302393	800000
14	3	12	210049	93	1904	1390	586378	800000
15	1	16	132312	52	0	0	667636	800000
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 29

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	1	20	76200	94	0	0	1257039	1333333
2	1	8	203562	55	0	0	1129716	1333333
3	2	18	1060840	94	1569	0	270736	1333333
4	3	15	981833	67	1574	1686	348039	1333333
5	2	18	1220965	82	1242	0	110962	1333333
6	3	14	170926	67	1655	1817	1158734	1333333
7	3	13	1073644	77	1010	1087	257361	1333333
8	1	12	1129869	56	0	0	203408	1333333
9	2	18	75705	77	1674	0	1255800	1333333
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Burst Number 30

Burst Segment	Number of Pulses	Chirp Width (MHz)	t1 (μs)	Pulse Width t2 (μs)	t3 (μs)	t4 (μs)	t5 (μs)	Total Segment Length (μs)
1	2	7	598925	63	1524	0	599425	1200000
2	1	17	559767	100	0	0	640133	1200000
3	2	5	1039238	78	1048	0	159558	1200000
4	2	9	239824	76	1190	0	958834	1200000
5	1	16	679466	56	0	0	520478	1200000
6	2	13	1067809	81	1203	0	130826	1200000
7	3	20	893302	54	1520	1806	303210	1200000
8	3	14	437946	67	1229	1562	759062	1200000
9	2	14	308018	89	1575	0	890229	1200000
10	1	14	418805	50	0	0	781145	1200000
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0

Notes:

FCC Type 5 Structure

Chirp on time is t2, same for each pulse in a burst segment

If only one chirp pulse in a burst segment then only t1, t2 and t5 are active

If only two chirp pulses in a burst segment then only t1, t2, t3 and t5 are active

Highlighted rows are pulses whose verification plots are contained within Appendix G of this report.

The random Frequencies used for the Type 5 trials are contained within the table below. The first and last trial was chosen to be at the limits of the detection bandwidth.

Channel Frequency (MHz)	5572.5
Trial No.	Random Test Frequency (MHz)
1	5567.5
2	5573.2
3	5576.1
4	5567.9
5	5573.1
6	5571.1

7	5576.3
8	5573.6
9	5571.1
10	5574.5
11	5575.9
12	5569.4
13	5570.3
14	5573.3
15	5568.7
16	5573.3
17	5569.8
18	5573.0
19	5569.9
20	5574.7
21	5577.2
22	5575.4
23	5575.3
24	5572.8
25	5567.9
26	5568.0
27	5567.7
28	5571.7
29	5573.7
30	5577.5

Appendix D:**Additional Test and Sample Details**

This appendix contains details of:

1. The samples submitted for testing.
2. Details of EUT operating mode(s)
3. Details of EUT configuration(s) (see below).
4. EUT arrangement (see below).

Throughout testing, the following numbering system is used to identify the sample and it's modification state:

Sample No: Sxx Mod w

where:

xx	= sample number	eg. S01
w	= modification number	eg. Mod 2

The following terminology is used throughout the test report:

Support Equipment (SE) is any additional equipment required to exercise the EUT in the applicable operating mode. Where relevant SE is divided into two categories:

SE in test environment: The SE is positioned in the test environment and is not isolated from the EUT (e.g. on the table top during REFE testing).

SE isolated from the EUT: The SE is isolated via filtering from the EUT. (e.g. equipment placed externally to the ALSR during REFE testing).

EUT configuration refers to the internal set-up of the EUT. It may include for example:

- Positioning of cards in a chassis.
- Setting of any internal switches.
- Circuit board jumper settings.
- Alternative internal power supplies.

Where no change in EUT configuration is **possible**, the configuration is described as "single possible configuration".

EUT arrangement refers to the termination of EUT ports / connection of support equipment, and where relevant, the relative positioning of samples (EUT and SE) in the test environment.

For further details of the test procedures and general test set ups used during testing please refer to the related document "EMC Test Methods - An Overview", which can be supplied by Element Material Technologies upon request.

D1 Test samples

The following samples of the apparatus were submitted by the client for testing:

Sample No.	Description	Identification
S47	RCOM BCM (MOBILE PART)	P1838-GR-001-204
S48	RCOM BS (BASE STATION)/	P1838-GR-001-192

The following samples of apparatus were supplied by the client as support or drive equipment (auxiliary equipment):

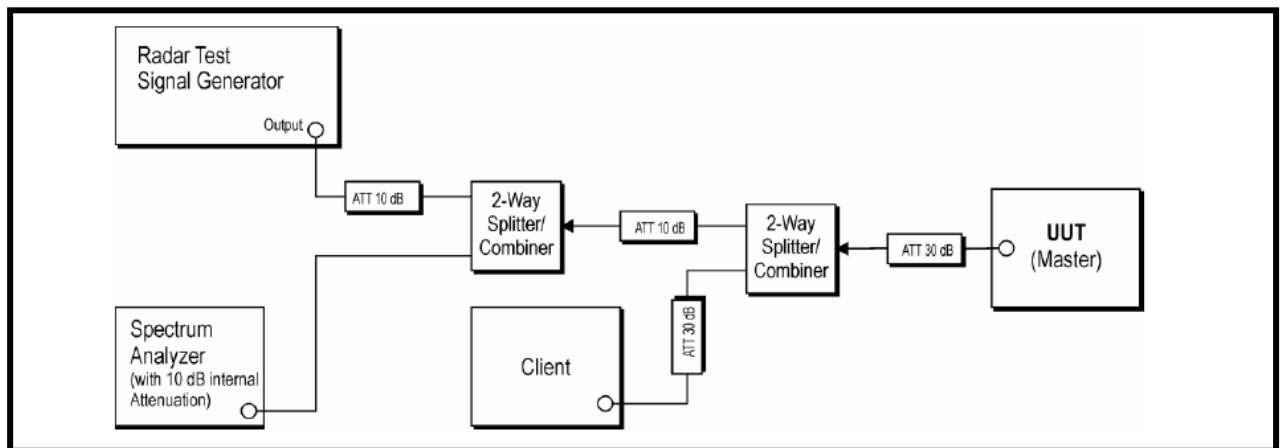
Sample No.	Description
S49	TTi EL302 dc Power Supply
S50	TTi PL320DP dc Power Supply
S52	1 PPS box
S54	Lenovo Thinkpad X61s Laptop
S55	Netgear Ethernet switch FS605

D2 EUT operating mode during testing

During testing, the EUT was initially exercised as described in the following tables:

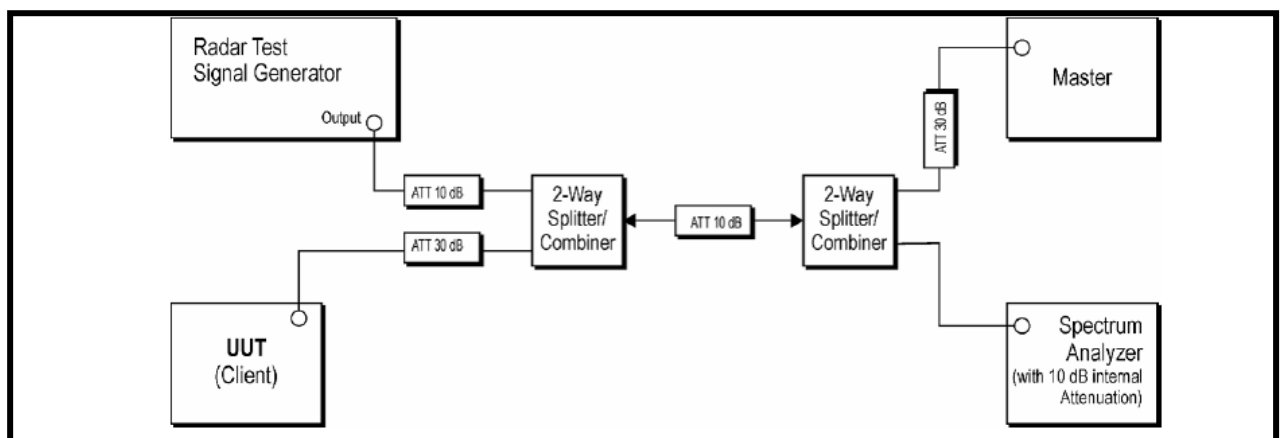
Test	Description of Operating Mode
All Master mode tests detailed in this report	The EUT was operating in Master Mode with maximum data transfer between the EUT and a companion slave device.

The test Setup was as follows:



Test	Description of Operating Mode
Slave Mode Channel Move Time test	The EUT was operating in Slave Mode with maximum data transfer between the EUT and a companion Master device.

The test Setup was as follows:



D3 EUT Configuration Information

The EUT was submitted for testing in one single possible configuration.

D4 List of EUT Ports

The tables below describe the termination of EUT ports:

Sample : S47
 Tests : All Tests

Port	Description of Cable Attached	Cable length	Equipment Connected
dc Power	Twisted pair Unscreened	2.65m	PSU
Bot-PC	CAT 5 UTP	2.0m	S54
Bot-RTC	None	N/A	N/A
Antenna A (Tx/Rx)	Coaxial	1.5m	Companion device via test equipment
Antenna B (Rx)	None (50Ω Termination)	N/A	N/A

Sample : S48
 Tests : All Tests

Port	Description of Cable Attached	Cable length	Equipment Connected
dc Power	Twisted pair Unscreened	1.1	PSU
Optical Ethernet 1	None	N/A	N/A
Optical Ethernet 2	None	N/A	N/A
Electrical Ethernet 1	CAT 5 UTP	2.0	S20
Electrical Ethernet 2	None	N/A	N/A
PPS Out	None	N/A	N/A
PPS in	BNC Coaxial Cable Type RG58	1.0	S10
Antenna A (Tx/Rx)	Coaxial	1.5m	Companion device via test equipment
Antenna B (Rx)	None (50Ω Termination)	N/A	N/A

D5 Details of Equipment Used

RFG No	Type	Description	Manufacturer	Date Calibrated	Calibration Due
REF2152		DFS Test System	Aeroflex	Verified using REF 910	
REF2143		Type K Male to Type K Male Cable 1.5m	Atlantic Microwave	02/02/15	02/02/16
REF2144		Type K Male to Type K Male Cable 1.5m	Atlantic Microwave	02/02/15	02/02/16
REF2145		Type K Male to Type K Male Cable 1.5m	Atlantic Microwave	02/02/15	02/02/16
REF 910	FSU	Spectrum analyser	Rohde and Schwarz	28/05/15	28/05/16

Appendix E:

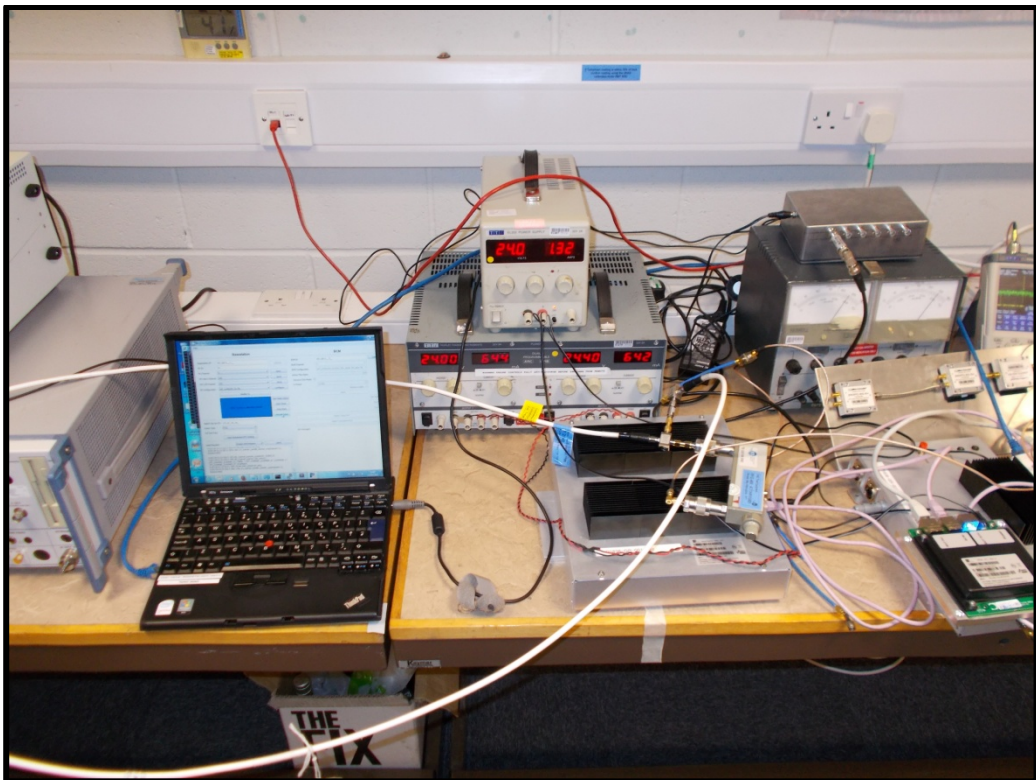
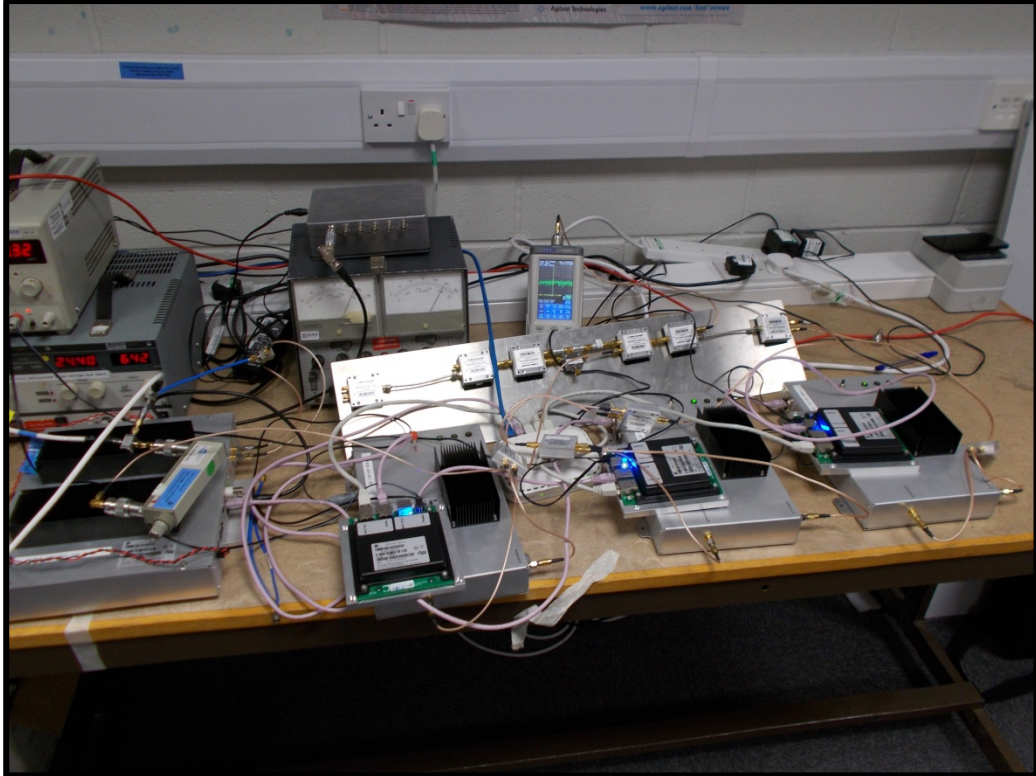
Additional Information

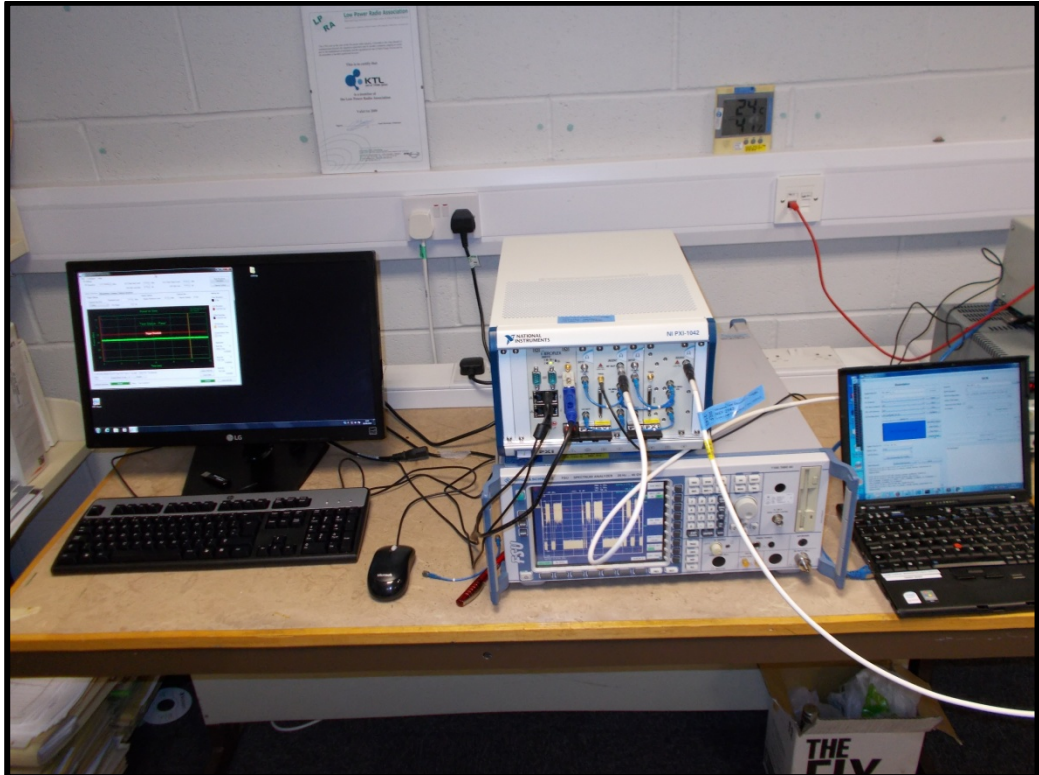
No additional information is included within this test report.

Appendix F:

Photographs and Figures

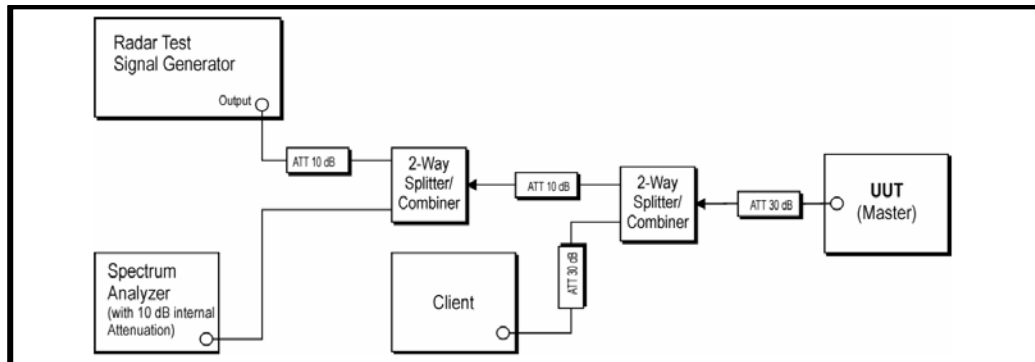
The following photographs showing the general test arrangement are contained within this appendix





Appendix G:**DFS Calibration Procedure****G.1 Description of calibration setup**

The calibration setup used was based on the conducted test setup for a Master device as shown below:



Block diagram of equipment setup

For the purposes of calibration, the UUT is replaced by the Spectrum analyser and the splitter port previously connected to the spectrum analyser terminated in a 50Ω termination. The client was also replaced with a 50Ω termination.

G.2 Description of calibration procedure**G.2.1 Determination of DFS Detection Threshold levels**

The DFS threshold used for the tests was -64 dBm (increased by 1 dB to -63dBm during test to account for variances) for both Master and Slave device testing

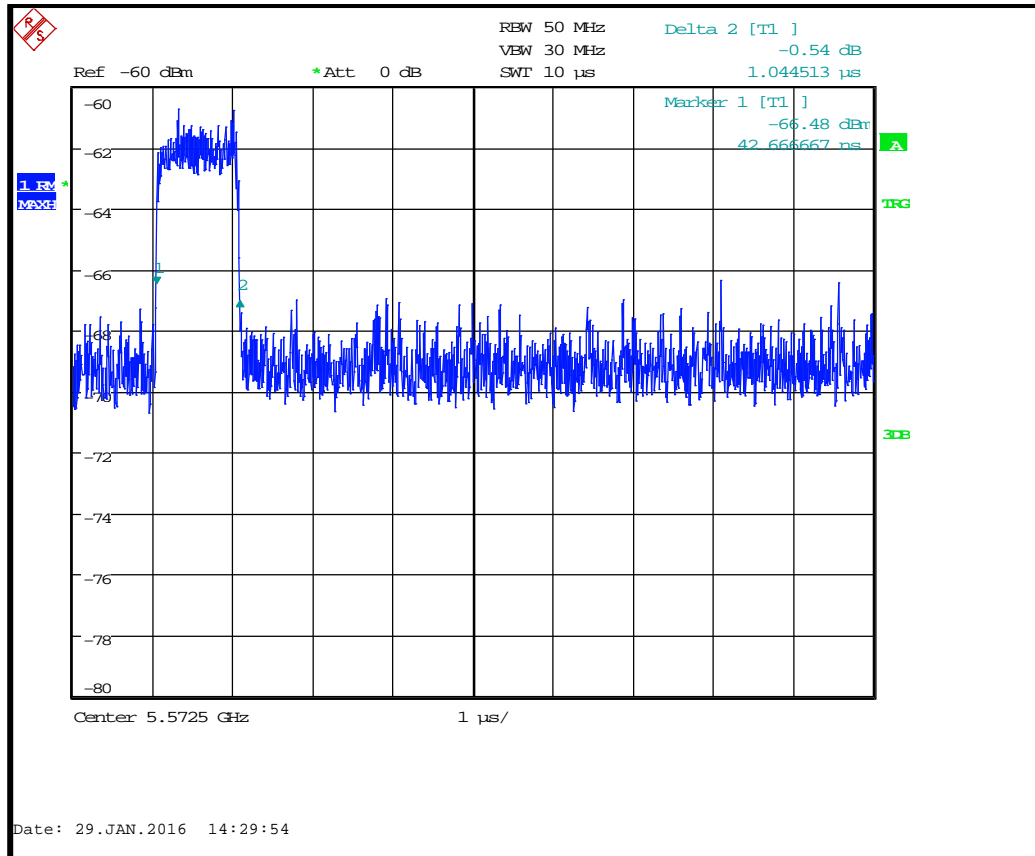
This level is based on the following parameters:

Master:	Maximum conducted power	9.4 dBm
	Maximum antenna gain	16.0 dBi
Therefore	Maximum EIRP	25.4 dBm (347mW)
Slave:	Maximum conducted power	15.1 dBm
	Maximum antenna gain	6.0 dBi
Therefore	Maximum EIRP	21.1 dBm (129mW)
	Maximum PSD	7.1 dBm/MHz

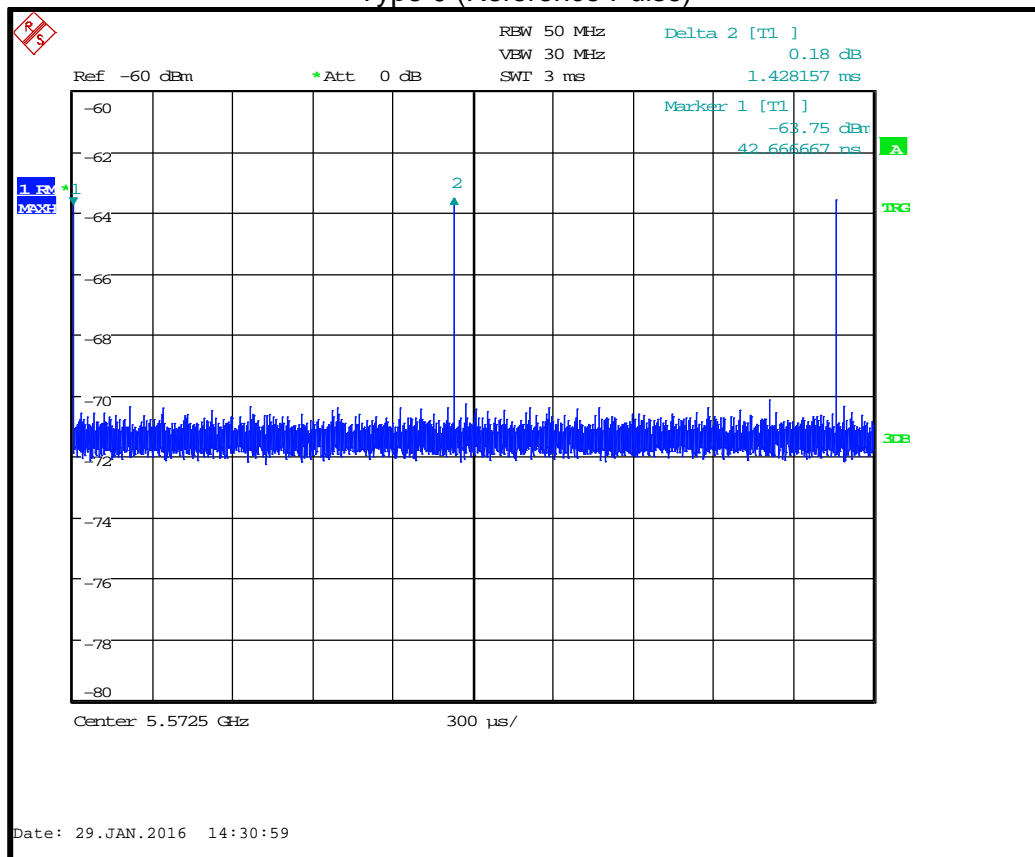
Note: The Slave could have been tested to the less stringent -62 dBm level however the client declared that the test shall be performed at the -64 dBm threshold.

G.2.2 Verification of the test pulses

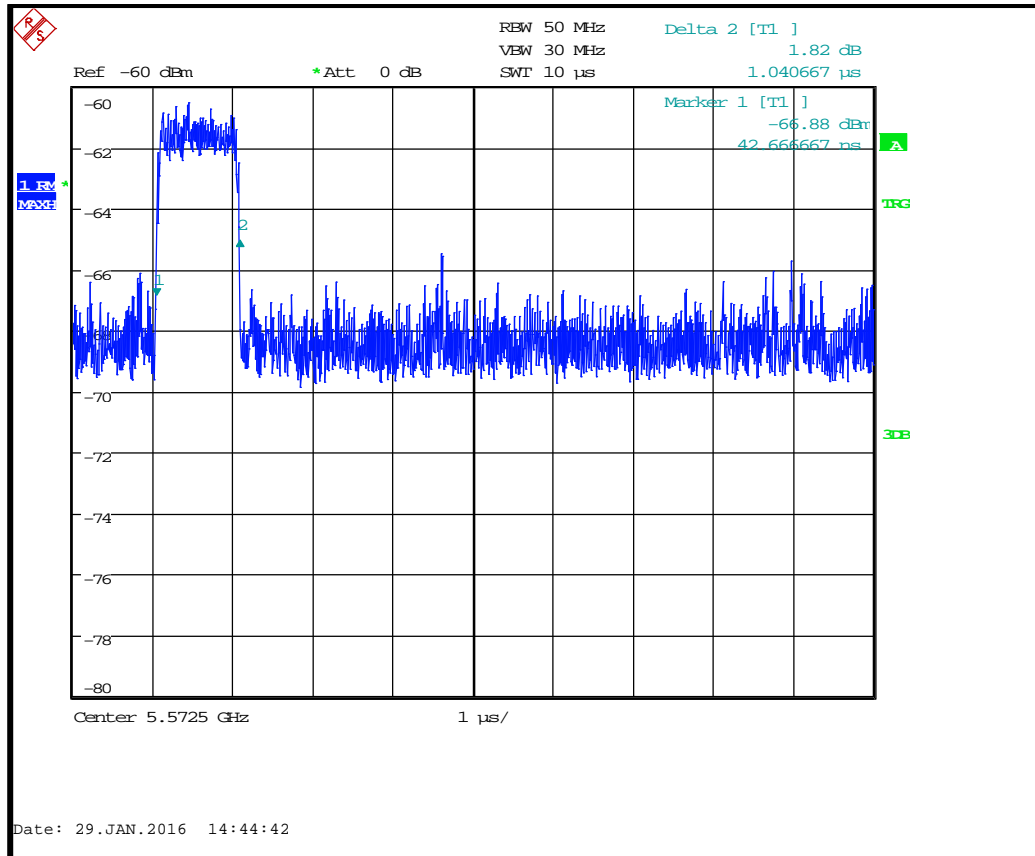
For the Short Pulse Radar Types (Types 0 to 4), spectrum analyser plots of the burst of pulses on the Channel frequency are provided below:



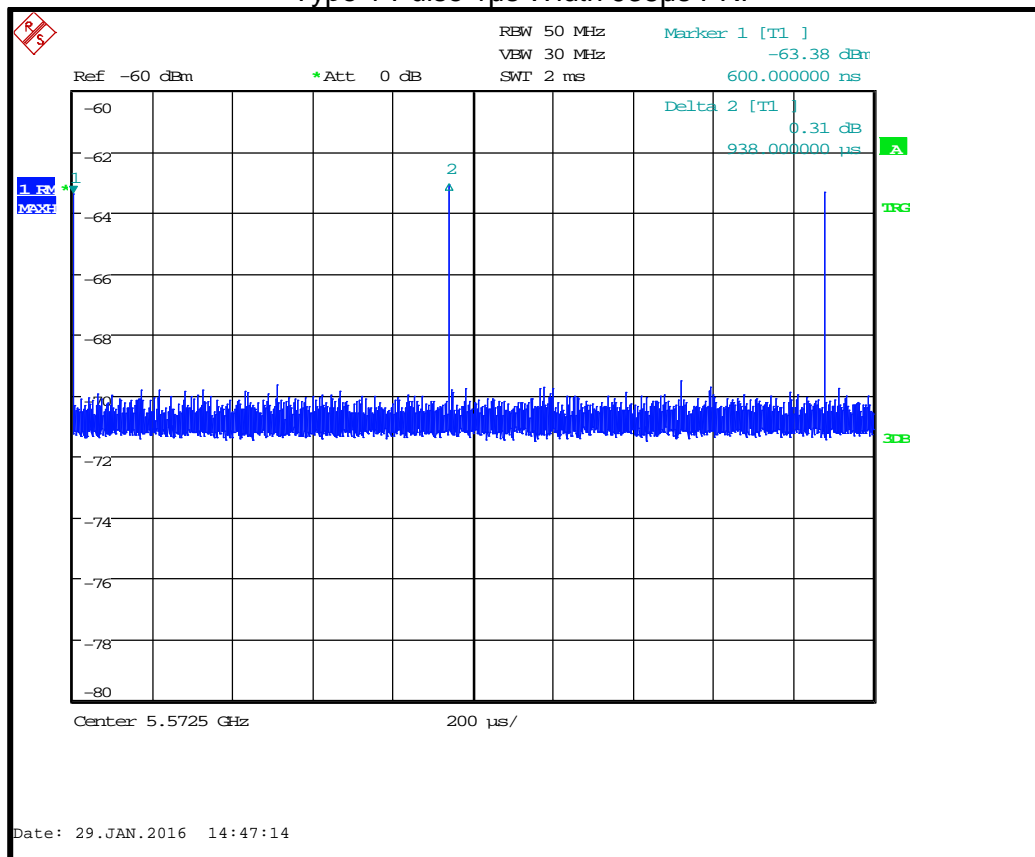
Type 0 (Reference Pulse)



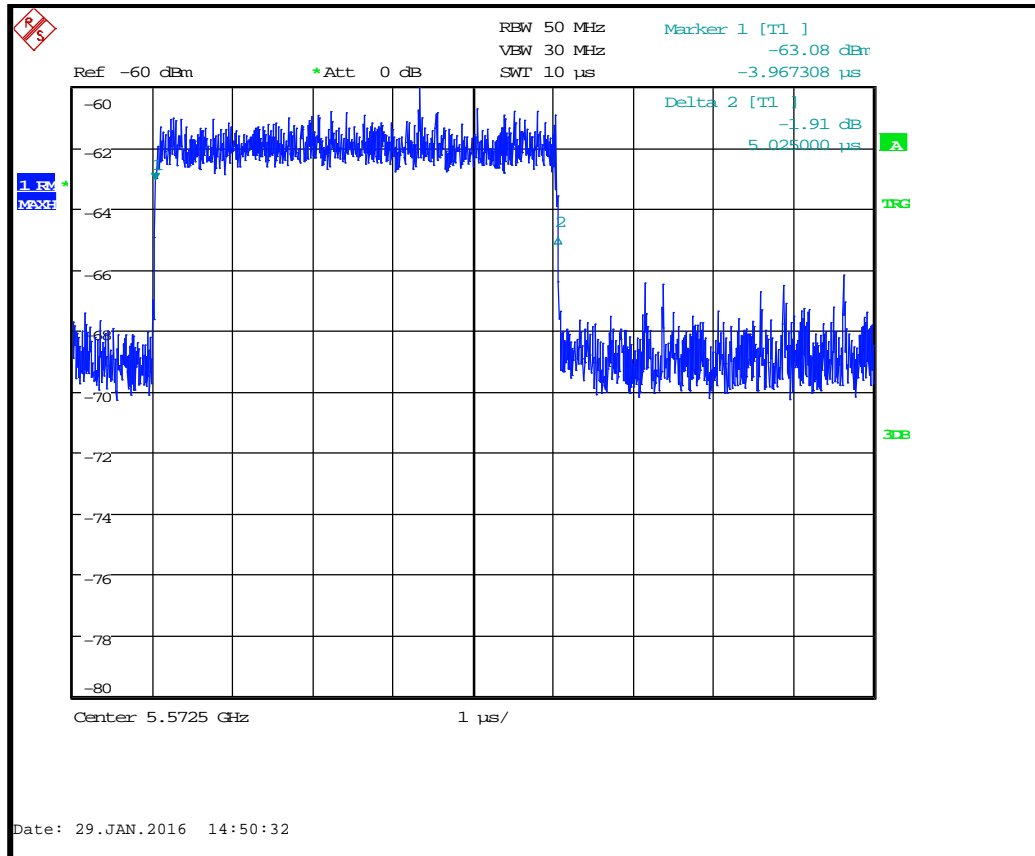
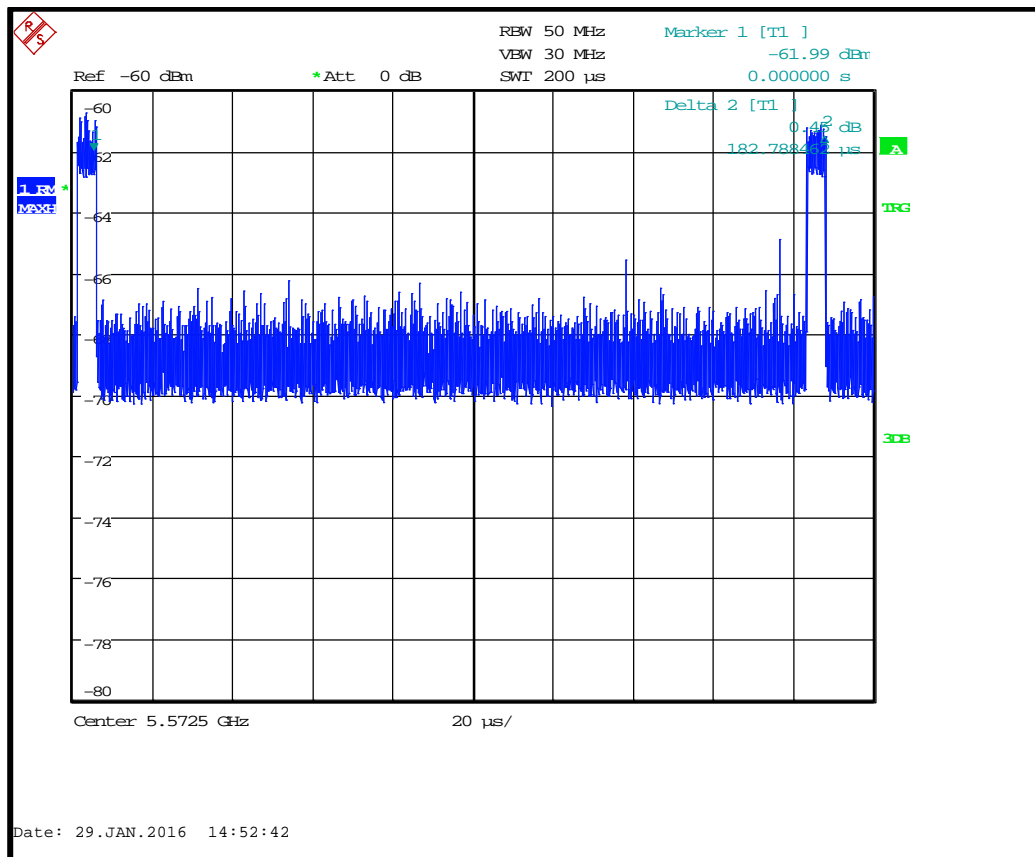
Type 0 (Reference Pulse)

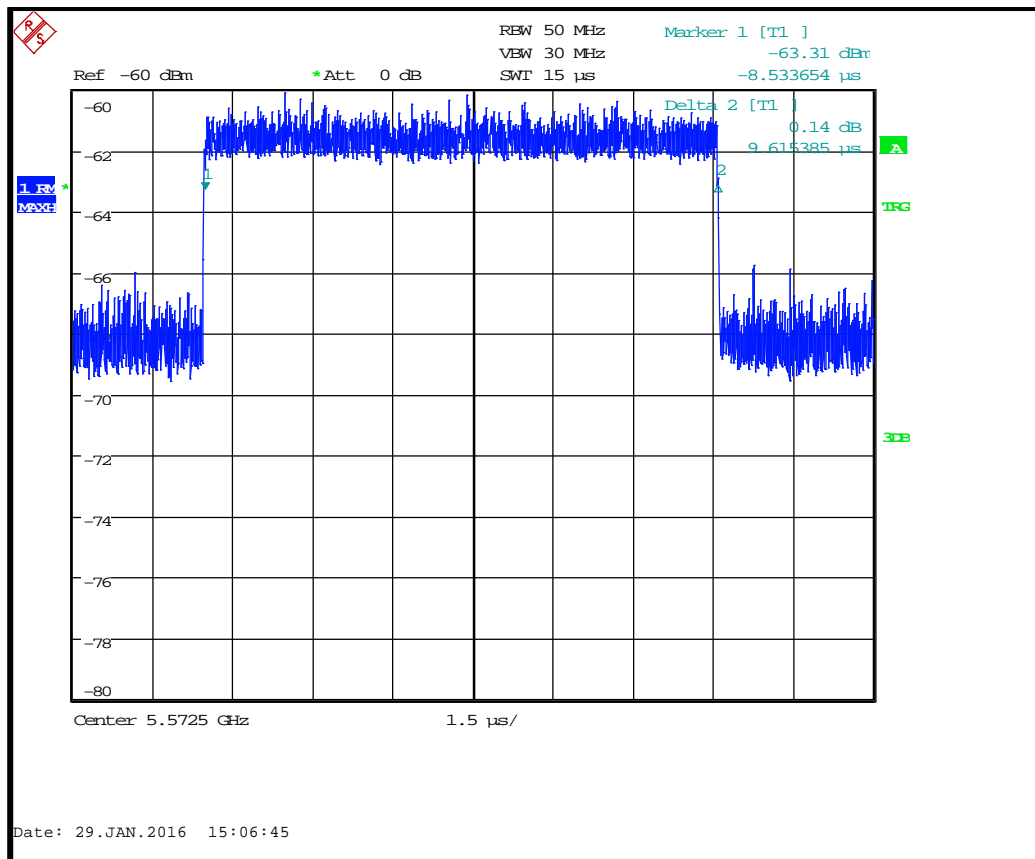
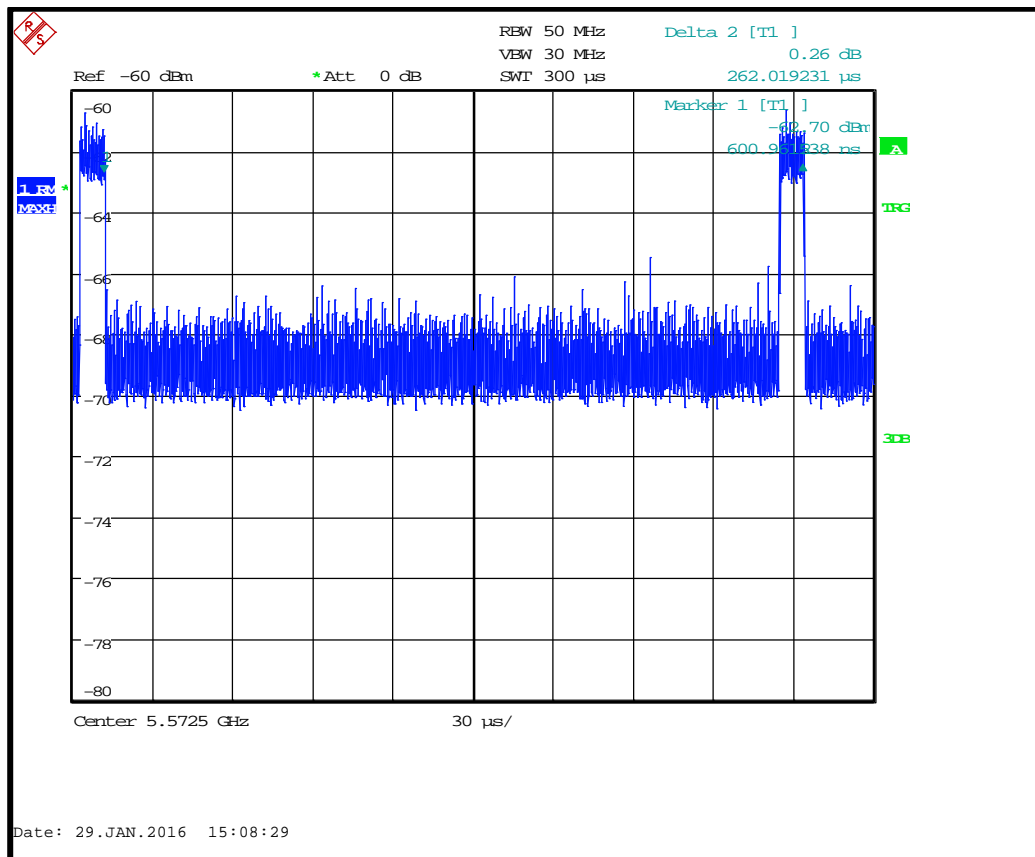


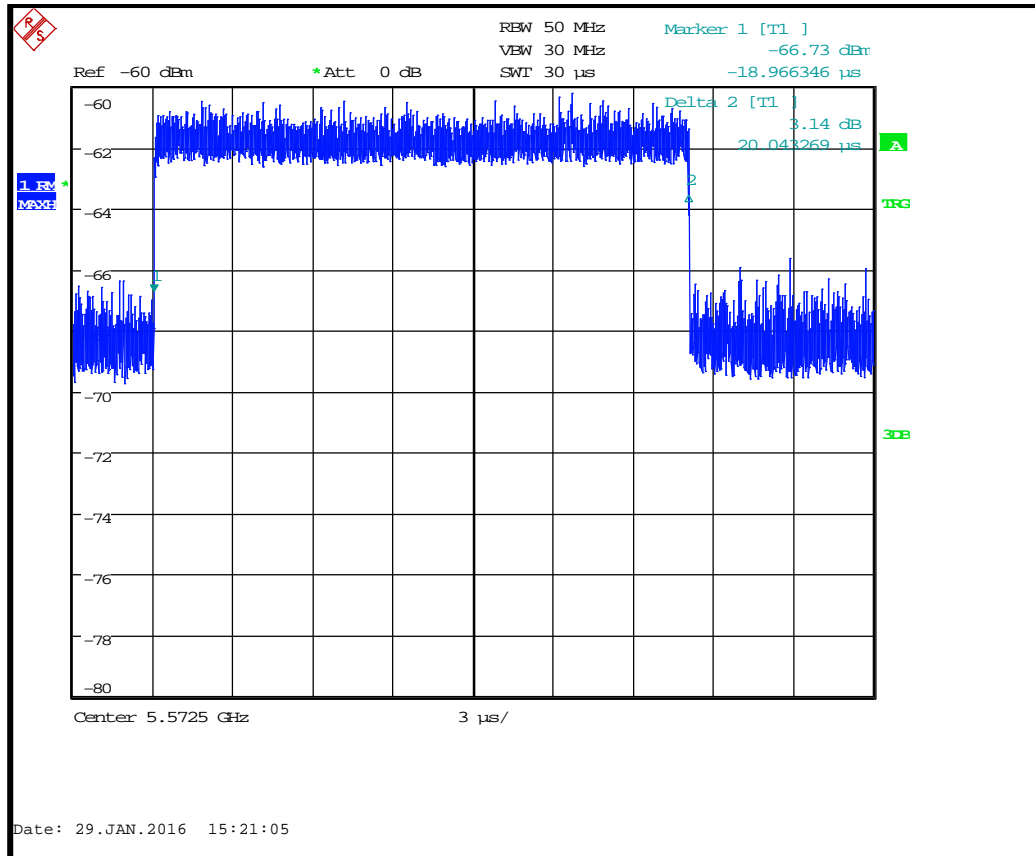
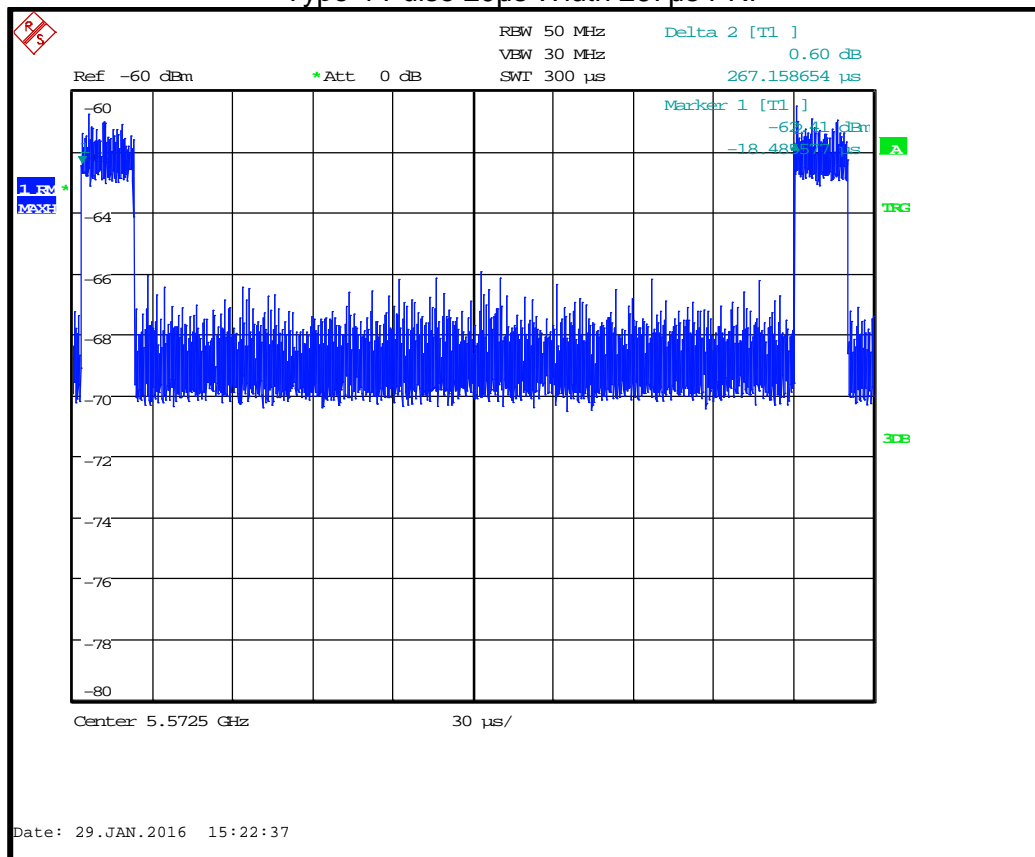
Type 1 Pulse 1µs Width 938µs PRF



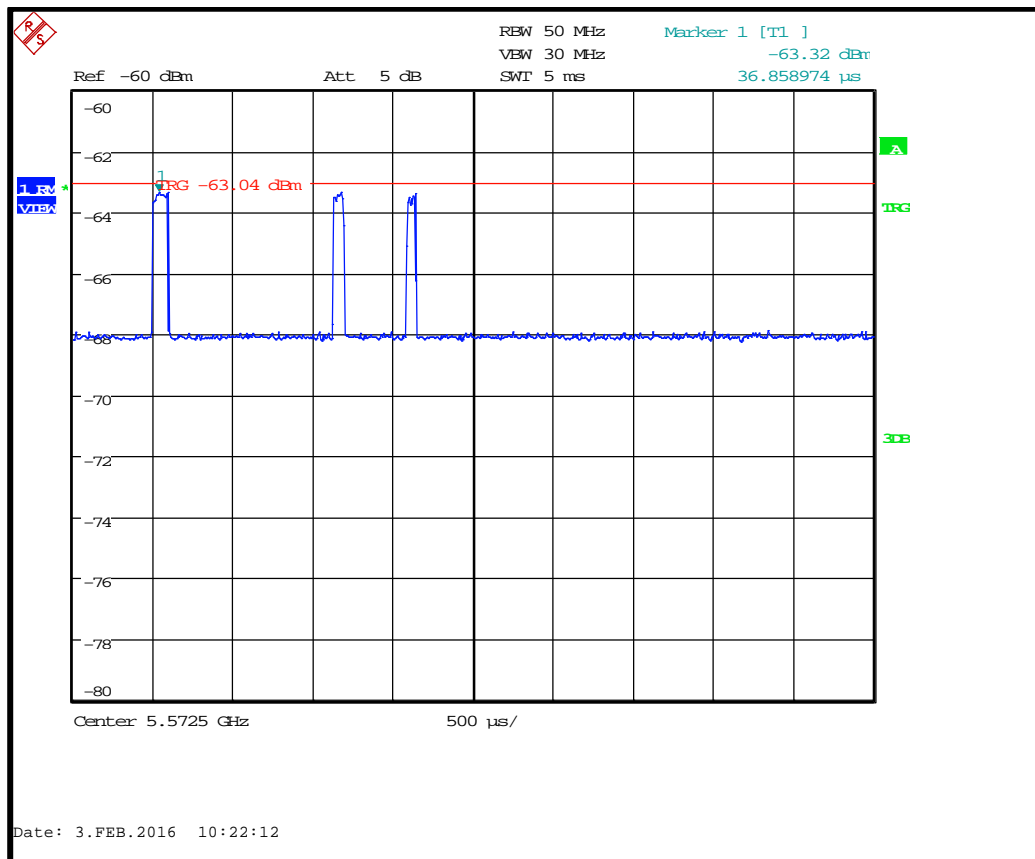
Type 1 Pulse 1µs Width 938µs PRF

Type 2 Pulse 5 μ s Width 182 μ s PRFType 2 Pulse 5 μ s Width 182 μ s PRF

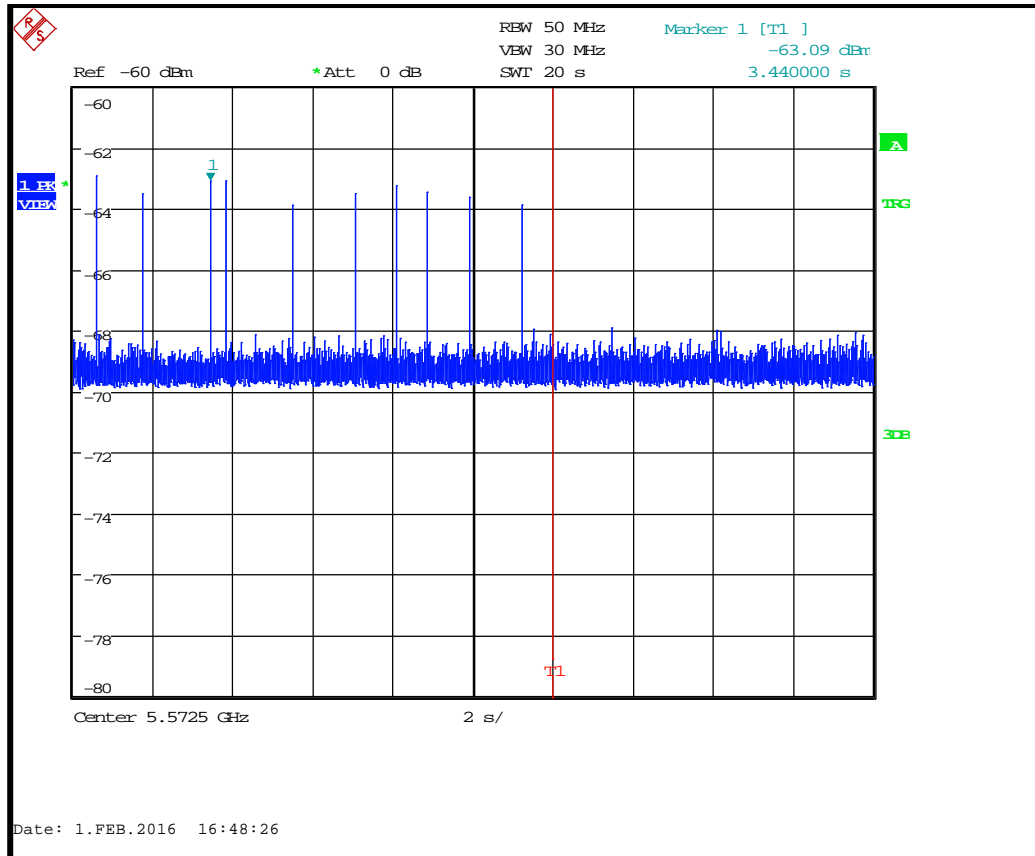
Type 3 Pulse 9.6 μ s Width 262 μ s PRFType 3 Pulse 9.6 μ s Width 262 μ s PRF

Type 4 Pulse 20 μ s Width 267 μ s PRFType 4 Pulse 20 μ s Width 267 μ s PRF

For the Long Pulse Radar (Type 5), a spectrum analyser plot of a single burst (1-3 pulses) on the Channel frequency are provided below along with a plot of the total test length showing between 8 and 20 bursts within the overall 12 seconds test length:



Type 5 – Single Burst

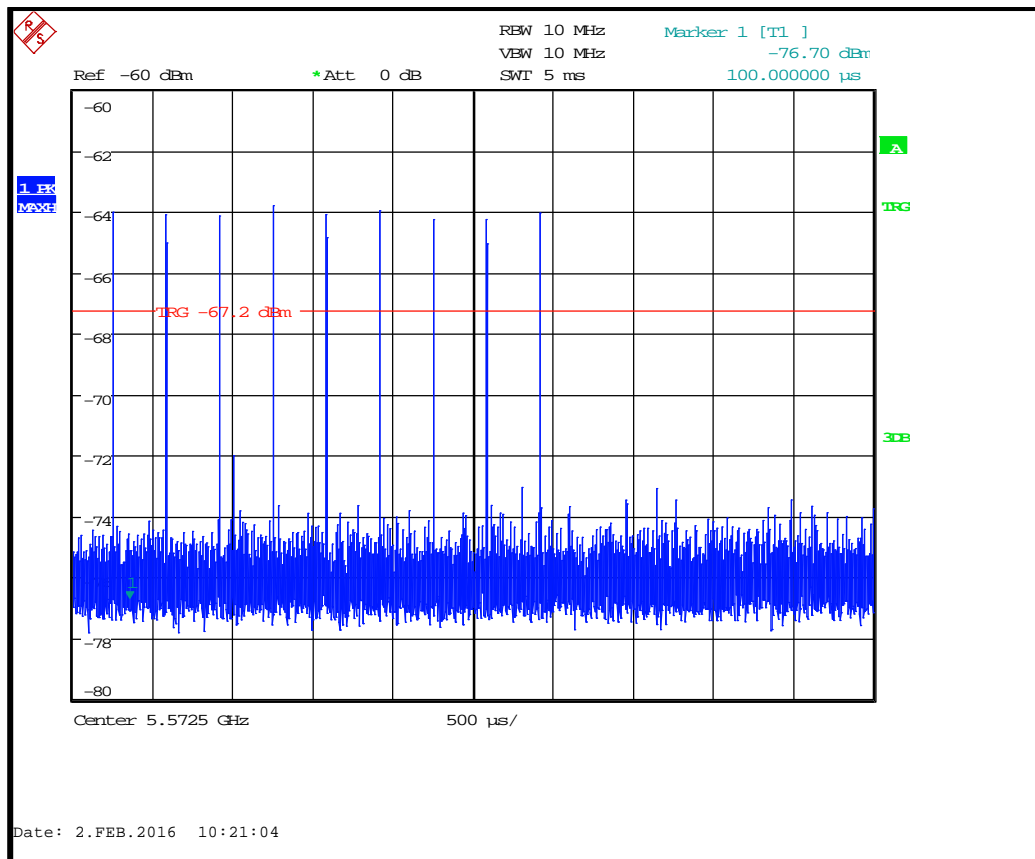


Type 5 - Total Test Length

For the frequency hopping signal Type 6 the signal was generated using a dedicated DFS test system manufactured by Aeroflex. The system comprises a National Instruments PXI chassis containing a system controller card, a vector signal generator card, a vector signal analyser card and a pair of OXCO 10 MHz reference oscillators. The vector signal generator card is controlled by Aeroflex's dedicated DFS test software V2.60.

For the purpose of this test, The U-NII Detection Bandwidth was measured as 10 MHz

A spectrum analyser plot showing 9 pulses on one frequency within the U-NII Detection Bandwidth is provided below:



Type 3 Pulse