




TEST REPORT

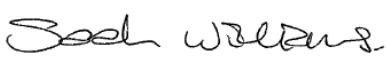
Test Report No. : UL-RPT-RP10011076JD01B

Manufacturer : Siemens AG
Model No. : SCALANCE W786-2IA RJ45
FCC ID : LYHMPCIE1V1
IC Certification No. : 267AA-MPCIE1V1
Test Standard(s) : FCC Part 15.407(h)(2) Subpart E, RSS-210 A9.3 Issue 8 December 2010

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 1.0

Date of Issue: 29 August 2013

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This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its' terms of accreditation.

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1. Customer Information






Company Name:	Siemens AG
Address:	Östliche Rheinbrückenstr. 50 761687 Karlsruhe Germany

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.407
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) - Section 15.407
Specification Reference:	Industry Canada RSS-210 Issue 8 December 2010
Specification Title:	Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment.
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Test Dates:	08 May 2013 to 13 May 2013

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.407(h)(2)	RSS-210 A9.3(a)	Statistical Performance Check – Short Pulse Radar Types 1-4	
Part 15.407(h)(2)	RSS-210 A9.3(a)	Statistical Performance Check – Long Pulse Radar Type 5	
Part 15.407(h)(2)	RSS-210 A9.3(a)	Statistical Performance Check – Frequency Hopping Radar Type 6	
Key to Results			
 = Complied  = Did not comply			

Note(s):

1. Only DFS tests at the lowest EUT bandwidth (20 MHz) are required in accordance with clause 8.3)18) of FCC 06-96.
2. The requirements of DFS apply for the 5250-5350 MHz and 5470–5725 MHz bands.
3. Due to the EUT being declared as almost identical to the W-788-2 variant and incorporating the same radio module, only the statistical performance check was tested to check detection threshold for all radar types. Other operation such as channel shutdown timings, the ability to detect during CAC, and non-occupancy period should be identical to the W788-2 variant (report UL-RPT-RP10011076JD01A).

2.3. Methods and Procedures

Reference:	FCC 06-96
Title:	Compliance Measurement Procedures for Unlicensed-National Information Infrastructure Devices Operating in the 5250-5350 MHz and 5470-5725 MHz Bands Incorporating Dynamic Frequency Selection

2.4. Deviations from the Test Specification

There were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Siemens AG
Model Name or Number:	SCALANCE W786-2IA RJ45
Serial Number:	6GK5786-2HC00-0AA0
FCC ID:	LYHMPCIE1V1
Industry Canada Certification Number:	267AA-MPCIE1V1

3.2. Untested Variants

The customer has declared that the above SCALANCE W786-2IA RJ45 used for testing is also a representative model for the following variants in terms of both hard ware & firmware.

They have declared that these variants only differ in terms of their hardware options (number of radio cards mounted, type of Ethernet /antenna connector, number of radio cards)

Type	Certification Name
SCALANCE W786-1 RJ45	EAPN-W1-RJ-E3
SCALANCE W786-2 RJ45	EAPN-W2-RJ-E3
SCALANCE W786-2IA RJ45	EAPN-W2-RJ-I3
SCALANCE W786-2 SFP	EAPN-W2-SFP-E3

3.3. Description of EUT

The equipment under test was a Wi-Fi WLAN (IEEE 802.11a,n) / U-NII Access Point.

The EUT can be operated in either Master or Client mode depending on the firmware configuration. The testing covered in this report is with a Master configuration only.

3.4. Modifications Incorporated in the EUT

No modifications were made to the EUT during testing.

3.5. Additional Information Related to Testing

Technology Tested:	WLAN (IEEE 802.11a,n) / U-NII Bands	
Type of Unit:	Access Point	
Data rates:	802.11a	6, 9, 12, 18, 24, 36 ,48 & 54 Mbps
	802.11n HT20	MCS0 to MCS23 (3 spatial stream)
	802.11n HT40	MCS0 to MCS23 (3 spatial stream)
Power Supply Requirement(s):	Nominal	12-24 VDC
Maximum Antenna Gain:	4 dBi	
Channel Spacing:	20 MHz	
Transmit Frequency Band:	5150 MHz to 5850 MHz (excluded 5600 MHz to 5650 MHz)	
Transmit Channels Tested:	Channel Number	Channel Frequency (MHz)
	100	5500

3.6. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Access Point (operating in client mode)
Brand Name:	Siemens AG
Model Name or Number:	W788-2
Serial Number:	1P 6GK5788-2FC00-0AA0

Description:	Test Laptop
Brand Name:	Dell
Model Name or Number:	Latitude D610
Serial Number:	CN-0C4708-48643-5CP-2346

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated:

- The EUT was tested as a Master unit connected to a Client transmitting on full power using OFDM modulation as the manufacturer declared this as a representative modulation mode for DFS testing and further declared that the modulation mode used would not impact the results.
- The EUT has three MIMO channels which normally connect to internal antennas. The radar signal was applied to a single port of the radio module only, at the levels defined in FCC 06-96.
- The EUT was operated on channel 5500 MHz.
- The device was tested with a power level of 20 dBm (100 mW). This was designed to simulate the use of an antenna with the minimum specified gain of +4 dBi.
- The DFS detection threshold of -62 dBm was used throughout, as the maximum transmit power was <200 mW.
 - The customer declared the highest gain of the antennas used in the product to be +4 dBi. Since the test is performed conducted, this additional gain which would normally be present in the signal is added to the radar test level.
 - The radar level to be presented at the antenna ports was calculated as:
-62 dBm +4 dBi antenna gain +1 dB to account for variations = -57.0 dBm radar level at internal antenna ports.

FCC 06-96 Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1 and 2)
< 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.	

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- All measurements were made using a conducted link.
- A laptop PC was used to configure the EUT parameters during the testing using a standard web browser and via a terminal application. The laptop was connected to the EUT via Ethernet and serial connections to set EUT parameters.
- The EUT's serial interface was used to report radar detection events.
- When the system required channel loading, a MPEG video file that streamed full motion video at 30 frames per second was downloaded from <http://ntiacsd.ntia.doc.gov/dfs/> and played between 2 laptops. The file was transferred from the master device to the client device during this testing.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Statistical Performance Check – Short Pulse Radar Types 1 - 4

Test Summary:

Test Engineers:	Philip Harrison & Sandeep Bharat	Test Dates:	08 May 2013 & 13 May 2013
Test Sample Serial Number:	6GK5786-2HC00-0AA0		

FCC Reference:	Part 15.407(h)(2)
Industry Canada Reference:	RSS-210 A9.3(a)
Test Method Used:	FCC 06-96 Section 7.8.4.1

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	35 to 39

Note(s):

1. Non-detected radars marked with an asterisk indicate that the type of radar pulse was not detected the first time, but was detected with subsequent trials with the same radar parameters.

Results: 20 MHz / Radar Type 1

Radar Type	Trial Number	Detected?	Trial Number	Detected?
1	1	Yes	16	Yes
	2	Yes	17	Yes
	3	Yes	18	Yes
	4	Yes	19	Yes
	5	Yes	20	Yes
	6	Yes	21	Yes
	7	Yes	22	Yes
	8	Yes	23	Yes
	9	Yes	24	Yes
	10	Yes	25	Yes
	11	Yes	26	Yes
	12	Yes	27	Yes
	13	Yes	28	Yes
	14	Yes	29	Yes
	15	Yes	30	Yes
Detection level			100 %	

Statistical Performance Check – Short Pulse Radar Types 1 - 4 (continued)**Results: 20 MHz / Radar Type 2**

Radar Type	Trial Number	Number of Pulses per Burst	Pulse Width (μ s)	PRI (μ s)	Detected?
2	1	26	1.2	158	Yes
	2	25	1.2	215	Yes
	3	23	1.5	230	Yes
	4	25	1.6	193	No*
	5	26	1.8	161	Yes
	6	24	1.9	163	Yes
	7	25	2.0	171	Yes
	8	28	2.3	157	Yes
	9	28	2.4	213	Yes
	10	29	2.8	150	Yes
	11	27	2.8	213	Yes
	12	25	3.0	172	No*
	13	25	3.0	178	Yes
	14	23	3.0	185	Yes
	15	28	3.3	188	Yes
	16	24	3.5	230	No*
	17	28	3.6	199	Yes
	18	26	3.6	219	Yes
	19	27	3.7	184	Yes
	20	26	3.7	194	Yes
	21	28	3.7	206	Yes
	22	23	3.8	160	No*
	23	23	3.8	174	Yes
	24	28	3.9	212	Yes
	25	27	3.9	218	Yes
	26	24	3.9	224	No*
	27	29	3.9	229	Yes
	28	26	4.0	151	Yes
	29	25	4.6	202	Yes
	30	29	4.7	164	Yes
Detection Level				83.3 %	

Statistical Performance Check – Short Pulse Radar Types 1 - 4 (continued)**Results: 20 MHz / Radar Type 3**

Radar Type	Trial Number	Number of Pulses per Burst	Pulse Width (µs)	PRI (µs)	Detected?
3	1	18	10.0	463	Yes
	2	18	6.1	394	Yes
	3	18	6.2	421	Yes
	4	17	6.8	364	Yes
	5	18	7.0	322	Yes
	6	18	7.0	451	Yes
	7	18	7.3	330	Yes
	8	18	7.4	314	Yes
	9	16	7.4	464	Yes
	10	17	7.5	210	Yes
	11	18	7.5	262	Yes
	12	16	7.5	408	Yes
	13	16	7.5	415	Yes
	14	16	7.5	465	Yes
	15	16	7.7	229	Yes
	16	18	7.7	396	Yes
	17	18	7.8	304	Yes
	18	17	7.9	260	Yes
	19	17	8.4	236	Yes
	20	18	8.4	358	Yes
	21	18	8.5	268	Yes
	22	17	8.5	449	Yes
	23	16	8.6	216	Yes
	24	17	8.7	263	No*
	25	18	8.8	355	Yes
	26	16	9.2	282	No*
	27	16	9.2	406	Yes
	28	17	9.7	350	Yes
	29	17	9.7	352	Yes
	30	16	9.9	455	Yes
Detection Level				93.3 %	

Statistical Performance Check – Short Pulse Radar Types 1 - 4 (continued)**Results: 20 MHz / Radar Type 4**

Radar Type	Trial Number	Number of Pulses per Burst	Pulse Width (µs)	PRI (µs)	Detected?
4	1	14	11.2	498	Yes
	2	16	11.3	403	Yes
	3	16	11.6	219	Yes
	4	16	11.9	238	Yes
	5	12	13.1	257	Yes
	6	12	13.1	420	Yes
	7	15	13.4	371	Yes
	8	12	13.6	321	Yes
	9	12	13.7	290	Yes
	10	15	13.9	319	Yes
	11	16	14.5	265	Yes
	12	16	14.7	354	Yes
	13	13	14.9	492	Yes
	14	14	15.0	281	Yes
	15	12	15.1	238	Yes
	16	13	16.0	456	Yes
	17	15	16.2	431	Yes
	18	16	16.5	205	Yes
	19	14	16.6	493	Yes
	20	14	16.7	464	Yes
	21	13	16.8	376	Yes
	22	13	17.1	439	Yes
	23	15	17.3	380	Yes
	24	14	17.3	491	No*
	25	16	17.4	226	Yes
	26	14	17.6	386	Yes
	27	13	17.7	240	Yes
	28	12	19.3	286	No*
	29	15	19.4	370	Yes
	30	14	19.7	275	Yes
Detection Level				93.3 %	

Statistical Performance Check – Short Pulse Radar Types 1 - 4 (continued)**Limits:****Table 5 – Short Pulse Radar Test Waveforms**

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

5.2.2. Statistical Performance Check – Long Pulse Radar Type 5**Test Summary:**

Test Engineers:	Philip Harrison & Sandeep Bharat	Test Date:	13 May 2013
Test Sample Serial Number:	6GK5786-2HC00-0AA0		

FCC Reference:	Part 15.407(h)(2)
Industry Canada Reference:	RSS-210 A9.3(a)
Test Method Used:	FCC 06-96 Section 7.8.4.2

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	35

Results: 20 MHz / Radar Type 5

Radar Type	Trial Number	Detected?	Trial Number	Detected?
5	1	Yes	16	Yes
	2	Yes	17	Yes
	3	Yes	18	Yes
	4	Yes	19	Yes
	5	Yes	20	Yes
	6	Yes	21	Yes
	7	Yes	22	Yes
	8	Yes	23	Yes
	9	Yes	24	Yes
	10	Yes	25	Yes
	11	Yes	26	Yes
	12	Yes	27	Yes
	13	Yes	28	Yes
	14	Yes	29	Yes
	15	Yes	30	Yes
Detection level			100 %	

Notes:

Further details of all parameters on which the trials using Radar Type 5 were created and can be found in Appendix 5: Statistical Performance Check– Radar Type 5 Trial Records.

Statistical Performance Check – Long Pulse Radar Type 5 (continued)**Limits:****Table 6 – Long Pulse Radar Test Waveform**

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

5.2.3. Statistical Performance Check – Frequency Hopping Radar Type 6**Test Summary:**

Test Engineers:	Philip Harrison & Sandeep Bharat	Test Date:	09 May 2013
Test Sample Serial Number:	6GK5786-2HC00-0AA0		

FCC Reference:	Part 15.407(h)(2)
Industry Canada Reference:	RSS-210 A9.3(a)
Test Method Used:	FCC 06-96 Section 7.8.4.3

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	35

Note(s):

1. Non-detected radars marked with an asterisk indicate that the type of radar pulse was not detected the first time, but was detected with subsequent trials with the same radar parameters.

Results: 20 MHz / Radar Type 6

Radar Type	Trial Number	Detected?	Trial Number	Detected?
6	1	Yes	16	Yes
	2	Yes	17	Yes
	3	Yes	18	Yes
	4	Yes	19	Yes
	5	Yes	20	Yes
	6	Yes	21	Yes
	7	Yes	22	Yes
	8	No*	23	Yes
	9	Yes	24	No*
	10	Yes	25	Yes
	11	Yes	26	Yes
	12	Yes	27	Yes
	13	Yes	28	Yes
	14	Yes	29	Yes
	15	Yes	30	Yes
Detection level			93.3 %	

Limits:**Table 7 – 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

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Confidence Level (%)	Calculated Uncertainty
Dynamic Frequency Selection (DFS) – Radar Amplitude	95%	± 2.17 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

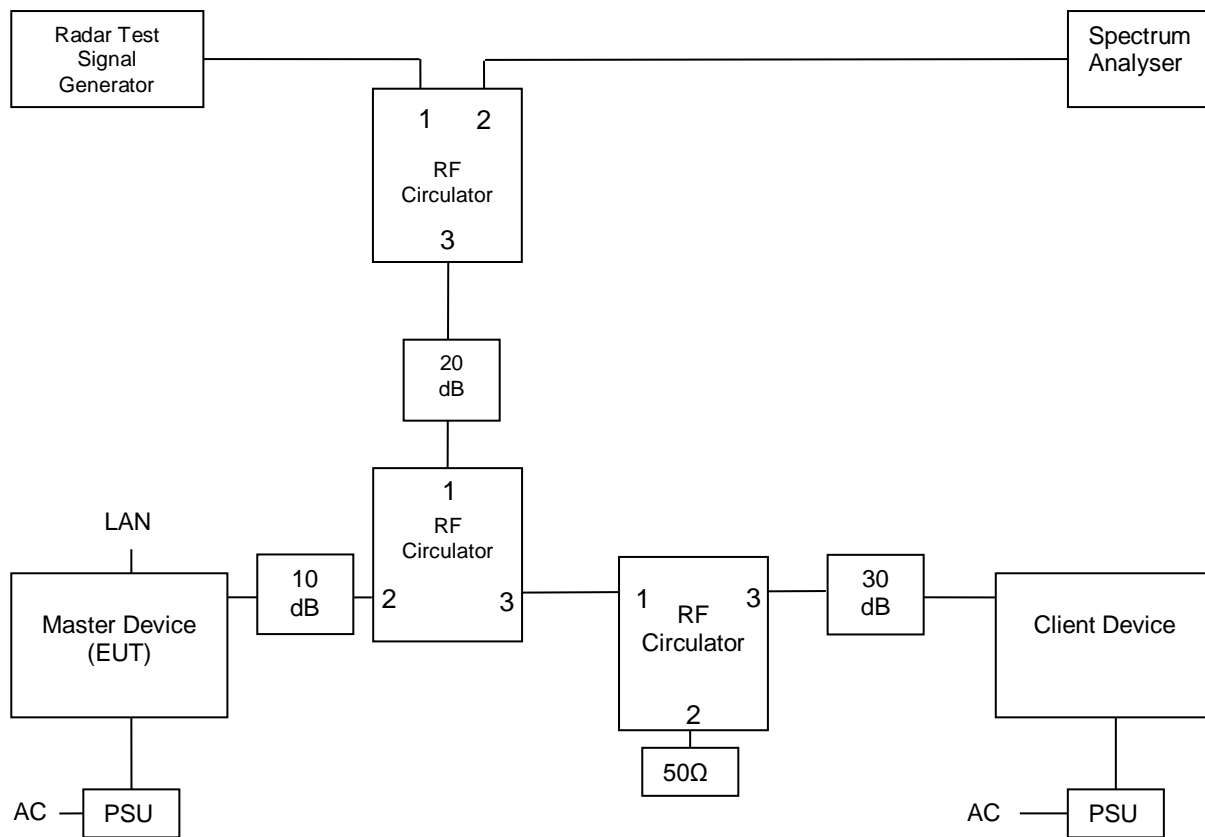
Appendix 1. Test Equipment Used

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1631	DFS Test System	Aeroflex	PXI 3000	300110/291	11 Jun 2015	24
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	07 Feb 2014	12
A248	Step Attenuator	Narda	743-60	01411	Calibrated before use	-
A030	Step Attenuator	Narda	445-69	01544	Calibrated before use	-
A163	Step Attenuator	Narda	743-80	01344	Calibrated before use	-
A2179	Coaxial Circulator	Atlantec	ACC-20130-SF-SF-SF	120409230	Calibrated before use	-
A2182	Coaxial Circulator	Atlantec	ACC-20130-SF-SF-SF	120409231	Calibrated before use	-
A2183	Coaxial Circulator	Atlantec	ACC-20130-SF-SF-SF	120409232	Calibrated before use	-

Appendix 2. Monitoring Methods Diagrams

All tests were performed as conducted measurements using the setups as shown below

Setup Diagram – EUT – Master, Radar Injection at Master



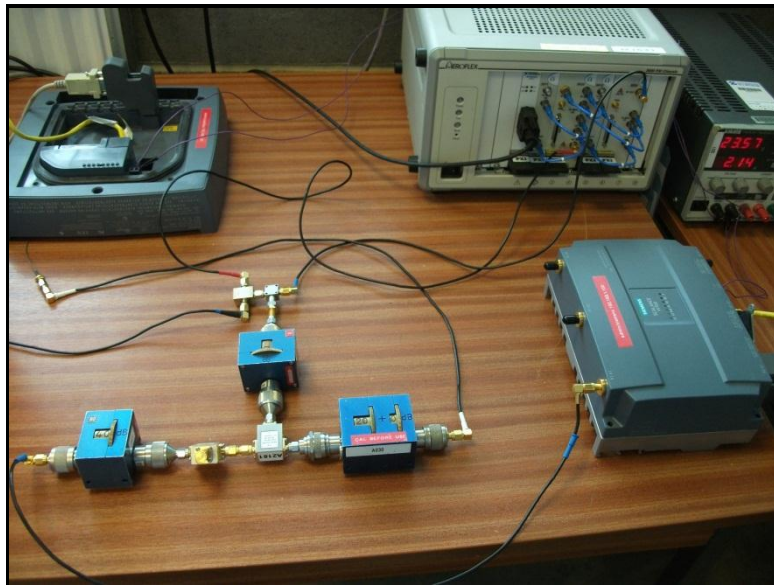
Note: The circulators have approximately 18 dB loss in the reverse direction.

Appendix 3. Radar Type 1-6 Calibration and Verification Data

All radars were generated and produced by an Aeroflex DFS test system. The radar pulse generation of this system has previously been verified by the FCC (see Appendix 4).

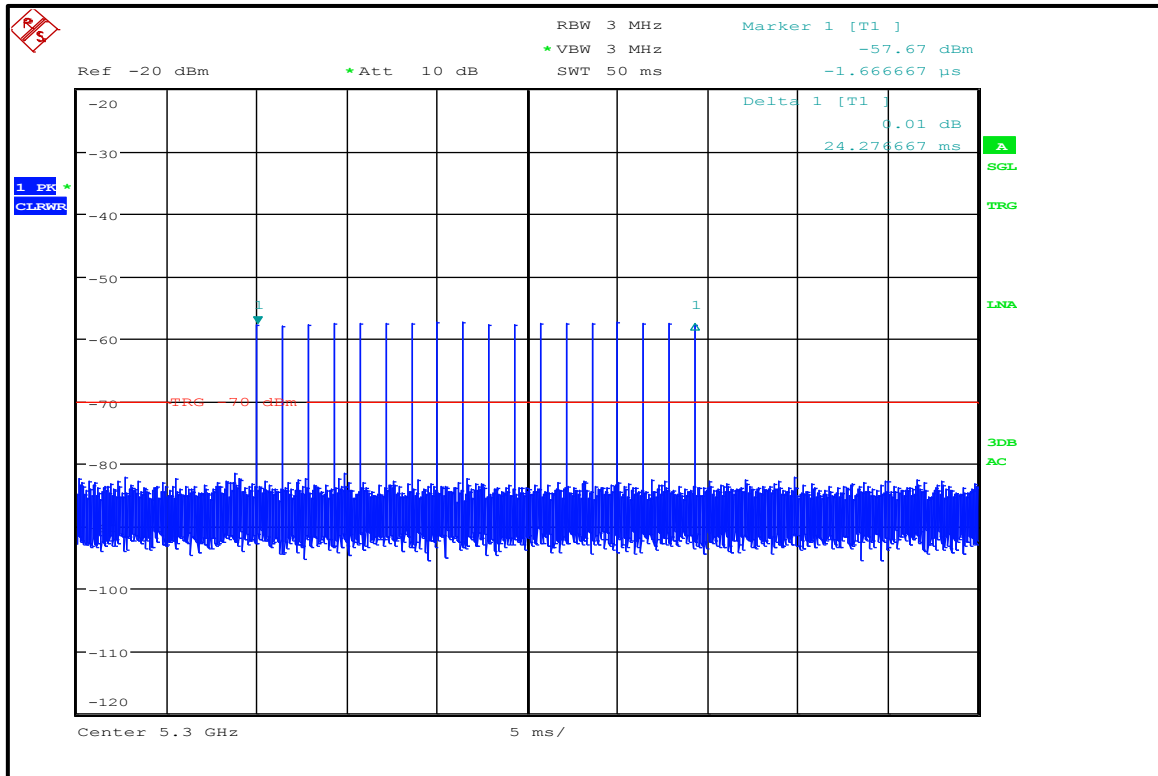
The radar amplitude was calibrated using the setup diagram above. The spectrum analyser was replaced by a 50Ω load. The EUT was replaced by a spectrum analyser. The radar pulses types 1-4 were then played back by the Aeroflex DFS test system. The amplitude was measured on the spectrum analyser using a 3 MHz RBW/VBW. The path loss was then put into the Aeroflex test system as an output level offset. The test system output level could then be set in the software to the correct level into the EUT, as calculated in section 4.1, before the tests were performed.

Setup Photographs

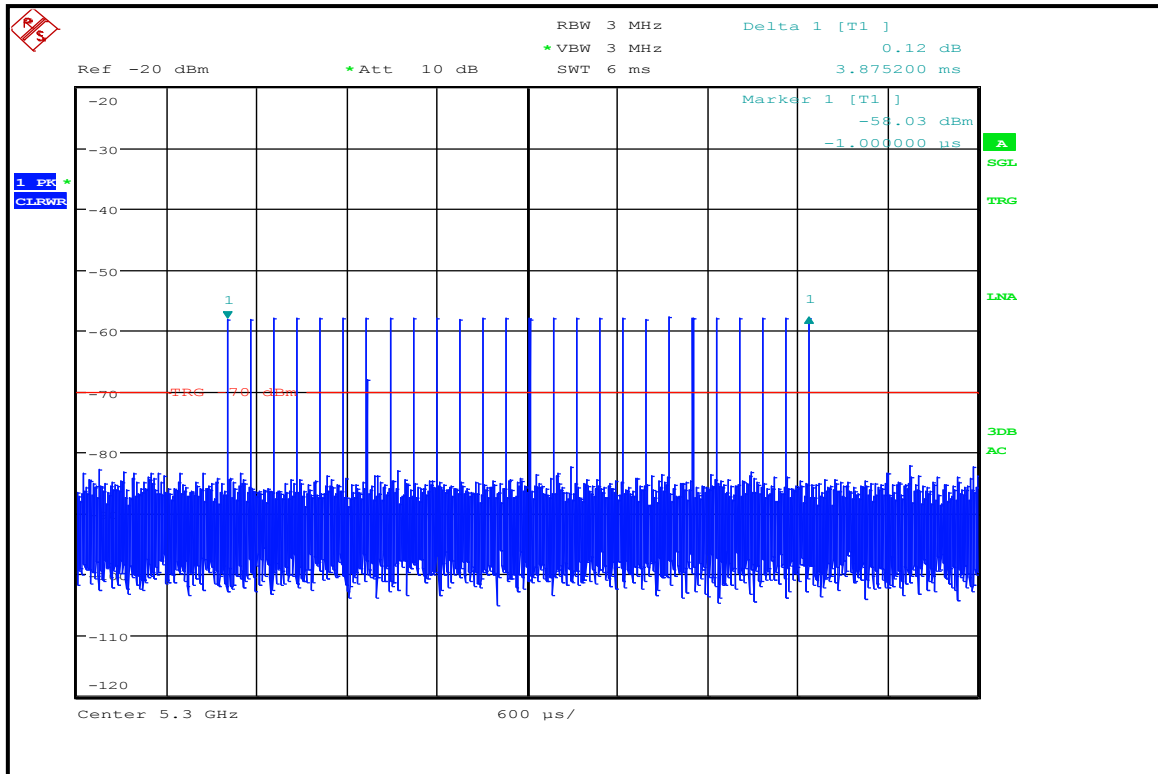


Radar Verification

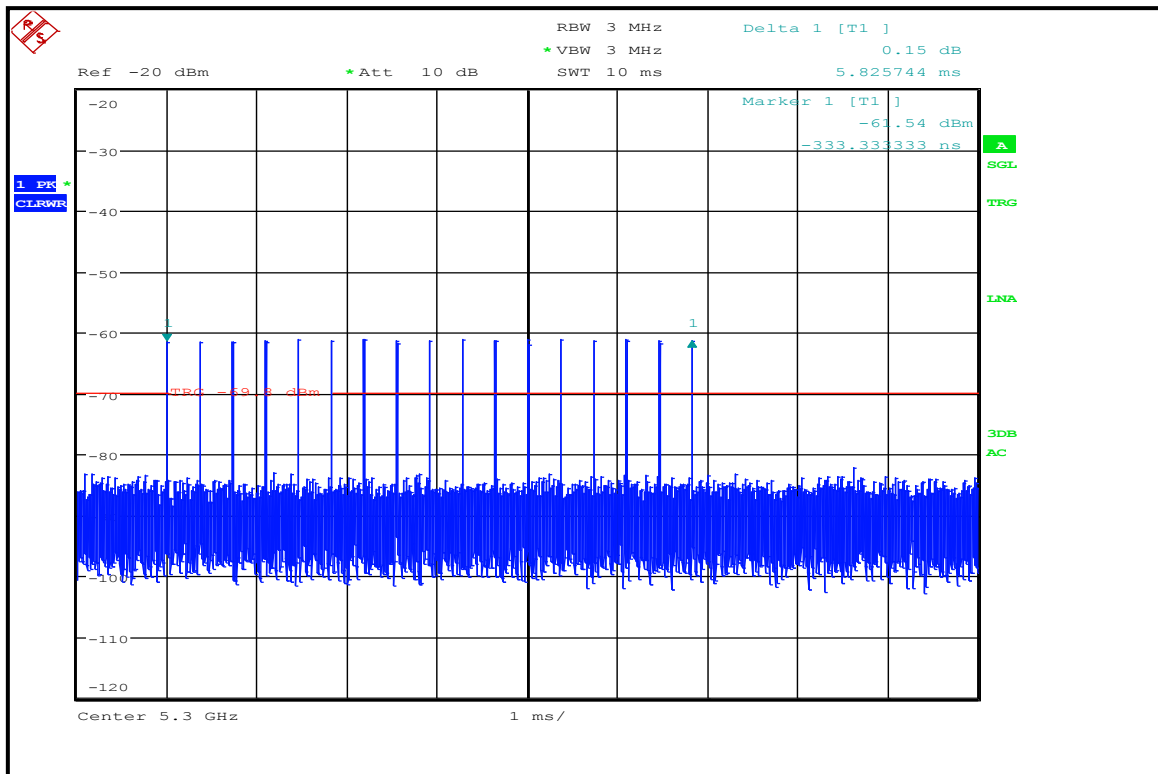
Below are sample plots of the radar waveforms showing timing properties. Once the path loss for the test network was found this was set in the DFS test system and the amplitude at the EUT receiver input could be adjusted as required.



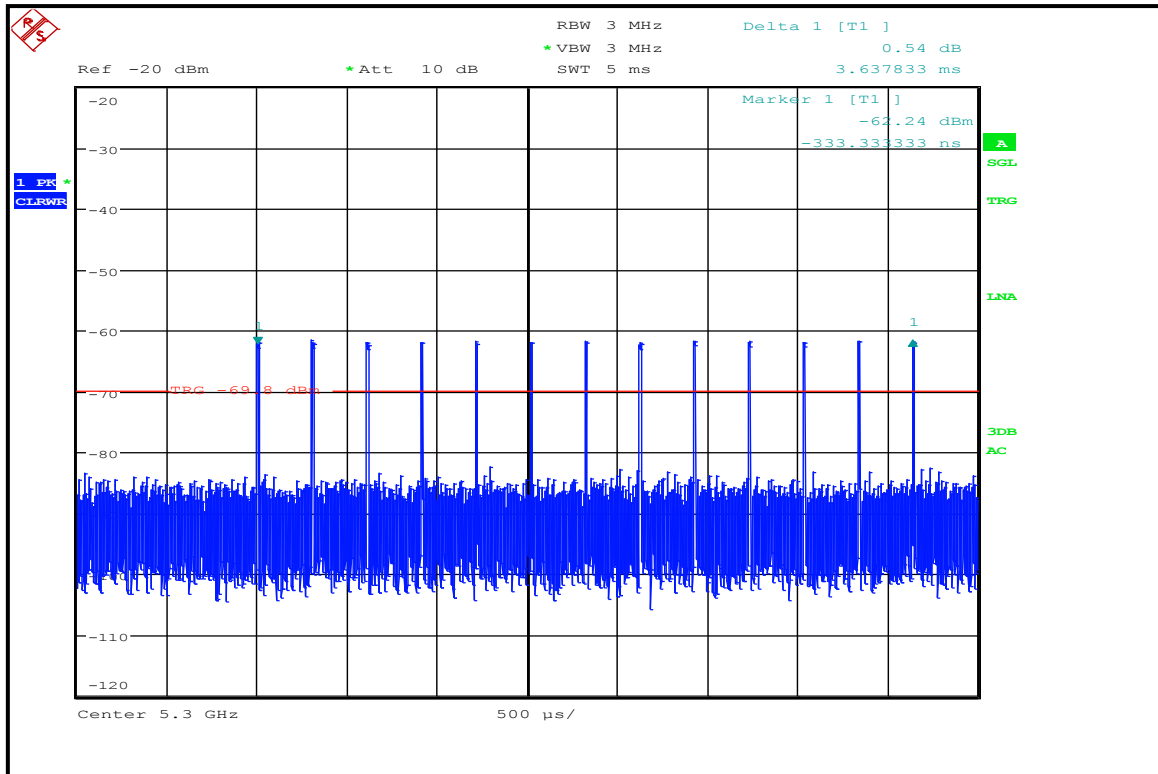
Radar Pulse 1



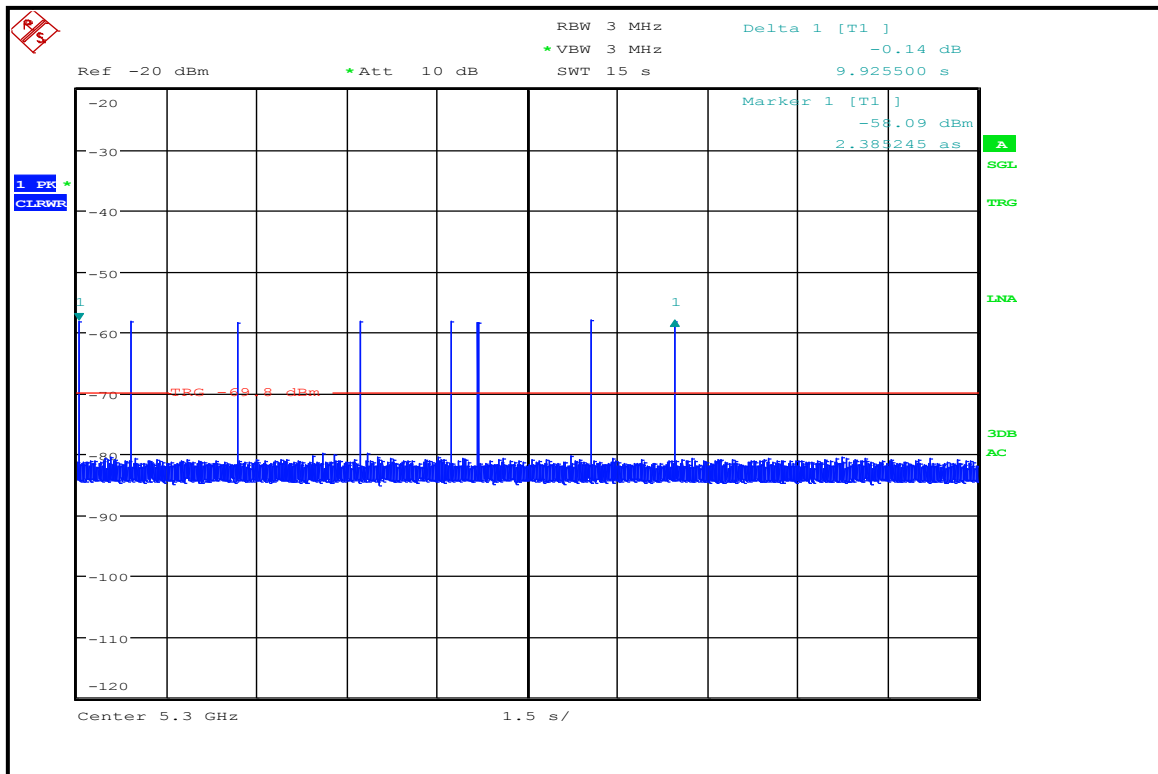
Radar Pulse 2



Radar Pulse 3



Radar Pulse 4



Long Radar Pulse 5

Appendix 4. Test platform confirmation email

From: Andrew Leimer [<mailto:Andrew.Leimer@fcc.gov>]
Sent: Friday, September 23, 2011 4:24 PM
To: Chisham, Steve
Cc: Carey, Tim; Hack, Barry; Rashmi Doshi; Joe Dichoso
Subject: RE: Certification for Aeroflex DFS solution

Hello Steve,

The Aeroflex "DXI based DFS test solution" system used for DFS alternative radar signal generation has been approved by the FCC and NTIA.

This approval permits the system to be used by labs in the testing of DFS devices for equipment authorization Certification. It is recommended that applicants that use your system for testing include a statement in the Test Report or a Letter Exhibit stating that the system has FCC and NTIA approval. This E-mail is your record of this approval.

Note that the appropriate term for your system is Approved as the term Certification is reserved for devices gaining equipment authorization through the FCC or a TCB.

Regards,
Andy Leimer

FCC/OET/EACB

Appendix 5. Statistical Performance Check– Radar Type 5 Trial Records

20 MHz – Trial 1

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	92	8	1714	1281	326801
2	1	67	12	-	-	729442
3	3	81	12	1888	1281	1059769
4	2	51	12	1111	-	1212986
5	3	93	14	1405	1831	1312997
6	3	86	16	1157	1779	1095975
7	1	99	10	-	-	547894
8	3	96	10	1877	1581	1124242
9	3	55	9	1067	1794	526969

20 MHz – Trial 2

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	94	17	1977	1167	50975
2	3	84	9	1451	1258	240632
3	2	86	11	1131	-	471578
4	2	96	19	1386	-	308532
5	1	56	8	-	-	197913
6	3	100	12	1092	1763	115601
7	2	86	19	1281	-	590174
8	3	100	19	1351	1744	335693
9	2	55	12	1964	-	77158
10	2	99	13	1723	-	529400
11	2	81	10	1758	-	396315
12	3	92	9	1004	1209	129313
13	3	53	5	1895	1819	64787
14	1	97	10	-	-	9165
15	2	82	20	1648	-	14309
16	3	68	16	1522	1482	339120
17	1	65	19	-	-	66286
18	2	76	10	1106	-	89042
19	2	67	13	1346	-	467916
20	1	70	6	-	-	186379

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 3**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	79	10	1870	1874	966338
2	2	55	15	1980	-	470296
3	2	74	16	1648	-	646829
4	3	59	17	1235	1585	819154
5	3	60	11	1239	1107	605120
6	3	100	10	1298	1383	163154
7	2	100	15	1439	-	8404
8	1	61	11	-	-	684599
9	1	84	5	-	-	863721
10	3	85	7	1285	1231	282789
11	1	89	5	-	-	751535
12	1	74	15	-	-	863082

20 MHz – Trial 4

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	1	83	15	-	-	121970
2	1	66	6	-	-	469021
3	3	66	7	1644	1013	119136
4	1	85	13	-	-	228101
5	2	65	19	1733	-	490888
6	1	50	9	-	-	275291
7	2	61	13	1954	-	263290
8	1	73	7	-	-	20069
9	2	75	19	1545	-	514736
10	1	58	20	-	-	42321
11	2	53	14	1872	-	32264
12	2	58	9	1563	-	596119
13	2	98	13	1158	-	619037
14	3	72	11	1455	1364	560580
15	2	77	20	1108	-	146969
16	1	72	18	-	-	401743
17	3	79	16	1058	1376	172031

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 5**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	59	19	1792	1115	473901
2	2	83	6	1986	-	230395
3	3	81	9	1601	1706	400325
4	1	63	13	-	-	404692
5	3	92	14	1715	1428	659132
6	3	97	8	1454	1783	420442
7	1	83	8	-	-	373647
8	2	84	15	1927	-	222405
9	1	61	15	-	-	300343
10	1	63	9	-	-	577291
11	1	90	6	-	-	485606
12	1	50	10	-	-	197587
13	1	85	16	-	-	432366
14	3	92	13	1564	1363	313281
15	2	68	7	1031	-	385925
16	2	80	9	1724	-	408080
17	3	63	8	1723	1698	47687
18	1	83	15	-	-	603599

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 6**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	95	9	1495	-	595697
2	3	64	14	1199	1692	69143
3	1	87	15	-	-	551301
4	3	54	8	1484	1138	541277
5	1	87	11	-	-	487866
6	2	100	20	1653	-	440531
7	3	95	12	1508	1985	272894
8	3	77	14	1687	1312	395207
9	2	97	17	1176	-	281336
10	1	89	10	-	-	5368
11	2	59	17	1058	-	220131
12	1	95	15	-	-	313029
13	3	66	20	1462	1820	137308
14	2	62	15	1461	-	502169
15	2	82	17	1827	-	145969
16	3	91	14	1637	1003	542293
17	1	65	16	-	-	258185
18	3	85	12	1617	1295	594598
19	3	53	17	1986	1705	37265
20	1	79	13	-	-	140734

20 MHz – Trial 7

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	1	76	12	-	-	748609
2	2	97	18	1608	-	321184
3	1	52	13	-	-	24860
4	1	83	16	-	-	358996
5	2	97	17	1031	-	152709
6	3	85	14	1046	1842	496300
7	3	86	5	1090	1770	430212
8	3	90	9	1619	1295	690550
9	2	50	20	1689	-	744708
10	2	86	18	1048	-	301975
11	3	51	14	1449	1409	139593
12	3	87	8	1350	1098	252731
13	3	82	9	1955	1749	514059

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 8**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	73	17	1244	1188	163771
2	1	61	7	-	-	978447
3	1	66	5	-	-	536036
4	2	100	20	1484	-	349181
5	1	85	6	-	-	581067
6	2	98	15	1361	-	107645
7	1	69	18	-	-	868185
8	1	77	7	-	-	949139
9	3	90	11	1298	1387	1015109
10	2	93	8	1027	-	95972
11	3	77	15	1328	1470	465704

20 MHz – Trial 9

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	88	19	1392	-	255705
2	2	90	19	1910	-	655903
3	1	61	7	-	-	410400
4	1	75	5	-	-	158738
5	1	51	15	-	-	660176
6	2	84	7	1918	-	482299
7	2	78	15	1059	-	328278
8	2	83	19	1432	-	808766
9	2	74	19	1509	-	397353
10	1	88	17	-	-	847653
11	3	81	12	1041	1586	121808
12	2	70	18	1826	-	122671
13	1	61	11	-	-	833569
14	1	68	8	-	-	606563

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 10**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	75	13	1879	1554	375118
2	3	59	13	1206	1747	639749
3	3	58	5	1955	1105	385555
4	1	96	20	-	-	721472
5	3	55	9	1706	1318	80954
6	3	65	6	1785	1040	108476
7	1	69	6	-	-	445449
8	2	54	12	1219	-	667720
9	2	54	9	1360	-	46543
10	2	50	6	1849	-	116547
11	3	84	19	1659	1433	439966
12	3	59	14	1276	1217	80066
13	3	91	16	1042	1670	663930
14	2	51	5	1470	-	568701
15	1	60	5	-	-	1664
16	2	63	17	1891	-	141838

20 MHz – Trial 11

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	62	12	1229	-	782467
2	2	50	15	1900	-	936192
3	3	84	13	1117	1471	679960
4	1	83	7	-	-	649610
5	3	57	10	1921	1829	487623
6	2	79	13	1928	-	884759
7	2	51	18	1334	-	617722
8	1	91	20	-	-	279316
9	2	69	6	1610	-	889220
10	2	85	19	1532	-	784957
11	1	55	17	-	-	648083

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 12**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	97	13	1401	-	248388
2	1	71	7	-	-	896732
3	1	78	15	-	-	608945
4	3	96	10	1207	1712	802966
5	1	71	5	-	-	656289
6	1	72	17	-	-	451751
7	1	89	16	-	-	647420
8	2	72	11	1861	-	588348
9	3	70	15	1026	1088	235076
10	1	78	9	-	-	691395
11	1	56	15	-	-	337500
12	1	70	19	-	-	466244
13	1	71	8	-	-	406742

20 MHz – Trial 13

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	87	10	1353	-	167815
2	2	97	8	1233	-	552424
3	1	82	17	-	-	17282
4	3	50	7	1925	1148	504853
5	3	86	10	1427	1417	394945
6	1	87	19	-	-	255078
7	2	71	9	1443	-	100374
8	1	87	19	-	-	509545
9	1	66	13	-	-	480373
10	1	68	16	-	-	140413
11	2	52	13	1827	-	296027
12	1	80	9	-	-	476488
13	2	97	19	1619	-	26357
14	1	64	17	-	-	288890
15	3	67	10	1861	1561	163188
16	1	53	19	-	-	314068
17	1	96	7	-	-	38367
18	3	71	19	1692	1423	356865
19	3	67	16	1158	1373	540349
20	3	99	8	1173	1120	150318

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 14**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	76	11	1882	1510	287008
2	1	78	11	-	-	82842
3	1	56	18	-	-	137050
4	3	62	8	1113	1510	514137
5	1	77	12	-	-	393077
6	1	74	15	-	-	289297
7	1	93	17	-	-	241597
8	3	97	11	1544	1290	325736
9	2	60	8	1042	-	315155
10	1	81	5	-	-	299422
11	3	96	16	1039	1059	364842
12	2	89	8	1029	-	440459
13	3	51	18	1749	1251	343721
14	2	84	8	1947	-	479140
15	1	99	15	-	-	415451
16	1	84	7	-	-	5315
17	1	51	7	-	-	593045
18	3	78	14	1805	1698	472376
19	2	57	8	1515	-	331874

20 MHz – Trial 15

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	89	13	1875	1593	495499
2	2	68	9	1722	-	408586
3	1	88	16	-	-	343867
4	1	93	7	-	-	438956
5	3	84	19	1736	1802	374315
6	3	70	17	1294	1915	149738
7	2	52	12	1086	-	261044
8	2	55	20	1845	-	272948
9	1	74	17	-	-	353612
10	1	88	18	-	-	227736
11	2	77	9	1132	-	119250
12	1	53	5	-	-	500103
13	1	89	10	-	-	404100
14	1	70	12	-	-	158762
15	1	65	14	-	-	82394
16	2	87	8	1814	-	239641
17	2	70	20	1271	-	338917
18	1	78	12	-	-	619449

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 16**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	62	19	1290	1012	347292
2	3	90	8	1508	1805	256742
3	1	64	9	-	-	932167
4	2	62	8	1768	-	799756
5	1	66	18	-	-	800791
6	3	54	12	1801	1729	780190
7	1	57	5	-	-	526151
8	3	62	5	1600	1776	908037
9	3	51	9	1556	1093	307451
10	2	99	14	1601	-	311010
11	1	58	14	-	-	932444
12	3	53	12	1333	1256	206801

20 MHz – Trial 17

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	86	15	1113	-	38628
2	3	65	16	1429	1643	264115
3	3	93	5	1013	1262	422555
4	2	71	12	1223	-	76603
5	2	97	20	1449	-	355235
6	1	59	13	-	-	160484
7	2	85	20	1570	-	347686
8	3	99	8	1905	1682	529797
9	1	84	17	-	-	183569
10	3	97	19	1798	1782	573297
11	3	86	17	1332	1253	425511
12	1	81	7	-	-	136480
13	2	95	10	1924	-	90935
14	3	72	11	1351	1728	76010
15	2	91	10	1957	-	479716
16	1	84	16	-	-	401347
17	1	69	17	-	-	183459
18	3	100	7	1238	1328	118946
19	3	82	16	1454	1383	163644
20	1	93	7	-	-	485215

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 18**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	72	5	1835	-	264365
2	3	72	11	1451	1566	389250
3	3	75	6	1120	1147	59098
4	1	57	16	-	-	171139
5	1	57	19	-	-	427924
6	3	68	20	1682	1508	242909
7	2	97	7	1682	-	802156
8	3	74	11	1106	1743	736885
9	3	82	11	1746	1239	329647
10	1	56	8	-	-	536506
11	3	54	9	1374	1295	149577
12	2	76	13	1485	-	593040
13	3	64	19	1959	1316	329698
14	1	73	14	-	-	734363

20 MHz – Trial 19

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	67	8	1519	1487	1128378
2	2	99	16	1556	-	424275
3	2	76	18	1895	-	461208
4	2	76	7	1855	-	871664
5	1	58	19	-	-	526627
6	2	90	19	2000	-	121358
7	3	81	17	1949	1096	1422248
8	1	89	16	-	-	871713

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 20**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	90	7	1659	-	372794
2	2	55	11	1078	-	323362
3	3	73	5	1467	1727	99808
4	1	58	5	-	-	580118
5	2	99	14	1881	-	392128
6	3	79	16	1945	1161	516297
7	3	78	18	1035	1461	19050
8	1	87	5	-	-	402946
9	2	96	13	1744	-	99363
10	3	74	10	1783	1855	363245
11	2	81	10	1568	-	113498
12	1	50	16	-	-	500738
13	2	74	19	1675	-	59155
14	3	56	11	1265	1135	9788
15	2	99	9	1121	-	34174
16	1	57	12	-	-	73753
17	1	69	7	-	-	183873
18	1	58	20	-	-	311087
19	2	63	17	1272	-	595042
20	1	65	5	-	-	2621

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 21**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	63	15	1049	-	65771
2	2	92	7	1679	-	200840
3	1	76	6	-	-	75522
4	2	81	16	1991	-	197870
5	2	71	19	1965	-	383450
6	3	100	10	1744	1446	481152
7	3	54	5	1199	1493	144288
8	2	52	9	1514	-	294940
9	1	75	14	-	-	178840
10	3	57	15	1759	1383	297038
11	1	86	11	-	-	282674
12	3	65	5	1085	1111	180622
13	1	86	19	-	-	206710
14	1	73	19	-	-	395745
15	1	56	16	-	-	452588
16	3	57	10	1431	1343	204913
17	1	93	16	-	-	622523
18	1	64	15	-	-	242840
19	2	88	17	1935	-	286095

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 22**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	1	61	10	-	-	217492
2	2	65	7	1499	-	134082
3	1	74	9	-	-	464954
4	2	96	9	1115	-	172244
5	3	85	6	1266	1582	64641
6	2	81	15	1755	-	477927
7	1	93	10	-	-	403283
8	3	78	14	1769	1970	506613
9	1	59	13	-	-	372599
10	3	76	17	1518	1081	282753
11	2	82	12	1982	-	448889
12	3	95	15	1266	1701	573769
13	2	69	16	1052	-	105381
14	1	79	5	-	-	25568
15	2	74	7	1438	-	541245
16	2	79	15	1906	-	356715
17	3	55	14	1281	1391	319658
18	2	68	19	1860	-	393340
19	3	75	9	1889	1402	473683
20	3	79	13	1388	1222	288521

20 MHz – Trial 23

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	1	97	12	-	-	72852
2	1	61	9	-	-	377388
3	3	84	18	1860	1077	159658
4	1	76	17	-	-	1133410
5	2	58	11	1411	-	1468896
6	3	78	13	1727	1760	113573
7	2	60	15	1618	-	793208
8	1	73	5	-	-	476717

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 24**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	78	11	1187	1834	459774
2	1	66	15	-	-	546936
3	1	85	15	-	-	609915
4	1	83	16	-	-	1030447
5	2	75	14	1503	-	600634
6	1	67	12	-	-	231839
7	1	77	20	-	-	918189
8	2	75	12	1971	-	681298
9	3	61	7	1454	1521	192511
10	1	63	5	-	-	778930
11	2	53	9	1876	-	459495

20 MHz – Trial 25

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	91	16	1189	-	853916
2	1	93	10	-	-	180143
3	3	89	16	1660	1580	170000
4	1	79	15	-	-	578545
5	2	90	7	1979	-	340551
6	2	64	7	1621	-	755799
7	1	97	15	-	-	461309
8	1	52	15	-	-	641748
9	3	82	16	1370	1774	208356
10	3	70	9	1598	1444	439679
11	2	74	15	1200	-	787878
12	3	63	18	1317	1727	601549
13	1	61	12	-	-	61611
14	3	55	8	1340	1537	449146

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 26**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	3	52	19	1131	1023	843328
2	1	100	7	-	-	641445
3	3	55	12	1652	1303	434001
4	2	80	17	1834	-	397229
5	1	97	15	-	-	127840
6	1	58	19	-	-	272814
7	1	63	19	-	-	912900
8	3	84	14	1274	1790	643933
9	2	80	10	1576	-	8744
10	2	56	5	1420	-	508476
11	2	79	16	1765	-	637838
12	3	88	7	1257	1993	680011
13	3	68	16	1027	1436	736890

20 MHz – Trial 27

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	2	99	16	1198	-	1102710
2	3	71	8	1112	1480	1216040
3	1	50	9	-	-	1003285
4	1	83	13	-	-	686548
5	1	65	5	-	-	1238323
6	2	50	17	1961	-	812609
7	1	81	13	-	-	764236
8	2	50	13	1447	-	1093798
9	2	87	18	1346	-	604669

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 28**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	1	61	20	-	-	618816
2	2	100	5	1039	-	299464
3	3	83	18	1481	1043	181297
4	1	51	19	-	-	510327
5	1	75	19	-	-	215180
6	3	50	16	1305	1505	143310
7	3	84	17	1843	1127	413166
8	1	53	18	-	-	309687
9	2	59	14	1073	-	410934
10	3	59	5	1403	1533	159534
11	3	96	13	1444	1380	213822
12	3	61	20	1733	1686	335693
13	3	83	9	1861	1978	221699
14	2	53	6	1213	-	280366
15	1	91	19	-	-	541475
16	3	91	18	1688	1902	610337
17	3	54	17	1259	1398	469972
18	1	67	18	-	-	531073
19	3	97	15	1765	1407	249718

20 MHz – Trial 29

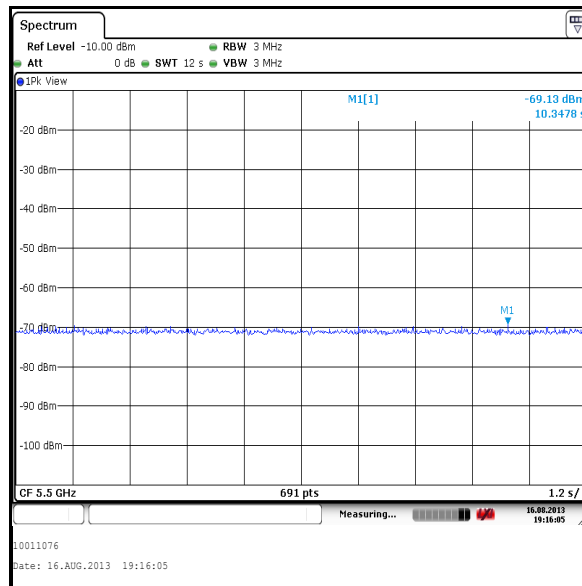
Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	1	85	5	-	-	704477
2	1	75	12	-	-	523178
3	2	73	12	1187	-	617193
4	1	52	17	-	-	843343
5	3	79	12	1601	1579	906707
6	1	86	9	-	-	558315
7	3	63	7	1154	1450	436138
8	3	80	20	1885	1503	1260253

Statistical Performance Check– Radar Type 5 Trial Records (continued)**20 MHz – Trial 30**

Burst Segment	Number of Pulses	Pulse Width (usec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (usec)	Pulse 2-to-3 Spacing (usec)	Starting Location Within Interval (usec)
1	1	96	17	-	-	228887
2	3	58	11	1679	1713	118814
3	1	97	18	-	-	717983
4	2	82	6	1949	-	602406
5	3	56	17	1093	1456	245114
6	1	95	15	-	-	446685
7	1	95	5	-	-	796338
8	3	60	16	1804	1320	186692
9	2	94	16	1974	-	84976
10	1	61	14	-	-	314948
11	1	99	19	-	-	748855
12	3	50	12	1505	1818	254403
13	3	90	9	1772	1120	524563
14	1	51	19	-	-	689167
15	3	88	18	1772	1714	160390

Appendix 6. System Noise floor Reference Plots

As required by section 8.3.18(iii) of FCC 06-96, the following plots show the reference noise floor of the system used during measurement.



Noise floor of test system