FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

For

GPON Terminal

MODEL NUMBER: EchoLife EG8247Q

FCC ID: QISEG8247Q

REPORT NUMBER: 4788418338.1-2

ISSUE DATE: November 08, 2018

Prepared for

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	07/28/2018	Initial Issue	Miller. Ma
V1	11/08/2018	Updated the 6.6.1 section of the report.	Miller. Ma

Description of Test Item	Standard	Results
DFS Detection Threshold	FCC 15.407, KDB 905462 D02	PASS
Channel Availability Check Time	FCC 15.407, KDB 905462 D02	PASS
Non-Occupancy Period	FCC 15.407, KDB 905462 D02	PASS
U-NII Detection Bandwidth	FCC 15.407, KDB 905462 D02	PASS
Channel Closing Transmission Time	FCC 15.407, KDB 905462 D02	PASS
Channel Move Time	FCC 15.407, KDB 905462 D02	PASS
Statistical Performance Check	FCC 15.407, KDB 905462 D02	PASS
Note: N/A is an abbreviation for Not Applicable		

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	HUAWEI TECHNOLOGIES CO., LTD.
Address:	Administration Building, Huawei Technologies Co., Ltd. Bantian, Longgang District, Shenzhen, P.R. China, 518129

Manufacturer Information

Company Name:	HUAWEI TECHNOLOGIES CO., LTD.
Address:	Administration Building, Huawei Technologies Co., Ltd. Bantian, Longgang District, Shenzhen, P.R. China, 518129

EUT Description

EUT Name:	GPON Terminal
Model:	EchoLife EG8247Q
Brand Name:	HUAWEI
Sample Status:	Normal
Sample ID:	12237049
Sample Received Date:	May 22, 2018
Date of Tested:	July 20, 2018~ July 27, 2018

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E 15.407 (h)	PASS

Tested By:

Miller Ma
Engineer Project Associate

Checked By:

Shawn Wen
Operations Leader

Approved By:

Stephen Guo

Operations Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 CFR Part 15, Subpart E, KDB 905462 D02.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules **IC(Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Equipment	GPON Terminal		
EUT Description	The EUT is an GPON Terminal with 2.4GHz and 5GHz WIFI.		
Model Name	EchoLife EG8247Q		
Series M/N	EchoLife EG8245Q; EchoLife HG8247Q5; EchoLife HG8245Q5.		
Model Difference	EchoLife EG8245Q: The model name is different, the CATV module is removed and a USB port is removed. EchoLife HG8247Q5: Only model name is different. EchoLife HG8245Q5: The model name is different, the CATV module is removed and a USB port is removed.		
Radio Technology	IEEE802.11a/n HT20/n HT40/ac HT20/ac HT40/ac HT80		
Modulation	IEEE 802.11a: OFDM(BPSK, QPSK, 16QAM, 64QAM) IEEE 802.11n: OFDM(BPSK, QPSK, 16QAM, 64QAM) IEEE 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256-QAM)		
Operating mode	Master		
Power Supply	Power Adapter	Input	AC 100~240V, 50~60Hz, 0.8A
		Output	12V,2.0A

15.407:U-NIL devices operating in the 5.25-5.35 GHZ band and the 5.47-5.725 GHZ band shall employ a TPC mechanism. The U-NIL device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm A TPC mechanism is not required for systems with an e.i.r.p of less than 500 mw.

U-NII devices operating in the 5.25-5.35 GHZ and 547-5.725 GHZ bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

1. The EUTradio operates in the following bands:
   a.5150-5250MHz
   b.5250-5350MHz
   c.5470-5725MHz
   d.5725-5850MHz.
2. The EUT operates in Master mode and does not support bridge mode and MESH mode.
3. The maximum e.i.r.p of the 5GHZ equipment is 25.80dBm and the minimum possible e.i.r.p is 11.2dBm for the UNII-2A and 2C frequency bands.
4. The channel loading data file will be transferred from the Master Device to the Client Device for all test configurations.
5. Information regarding the parameters of the detected Radar Waveforms is not available to the end user.
6. For the 5250-5350MHZ and 5470-5725MH bands, the Master device provides, on aggregate, uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.

7. The manufacturer is permitted to select the first channel either manually or randomly. The manufacturer may also block DFS channels from use.
8. The Master requires(51.96) seconds to complete its power-on cycle.

5.2. CHANNEL LIST

20 MHz Bandwidth Channel frequencies		
Band	Channel	Frequency (MHz)
UNII-1	36	5180
	40	5200
	44	5220
	48	5240
UNII-2A	52	5260
	56	5280
	60	5300
	64	5320
UNII-2C	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
	144	5720
UNII-3	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

40 MHz Bandwidth Channel frequencies		
Band	Channel	Frequency (MHz)
UNII-1	38	5190
	46	5230
UNII-2A	54	5270
	62	5310
UNII-2C	102	5510
	110	5550
	118	5590
	126	5630
	134	5670
	142	5710
UNII-3	151	5755
	159	5795

80 MHz Bandwidth Channel frequencies		
Band	Channel	Frequency (MHz)
UNII-1	42	5210
UNII-2A	58	5290
UNII-2C	106	5530
	122	5610
	138	5690
UNII-3	155	5775

5.3. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	35 ~ 65%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	23 ~ 28°C
Voltage :	VL	N/A
	VN	AC 120V/60Hz
	VH	N/A

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)	Antenna Technology
0	5150-5850	Omni-Directional	2	SISO&MIMO

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)	Antenna Technology
1	5150-5850	Omni-Directional	2	SISO&MIMO

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)	Antenna Technology
2	5150-5850	Omni-Directional	2	SISO&MIMO

5.5. MEASURING INSTRUMENT AND SOFTWARE USED

R&S TS 8997 Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
Power sensor, Power Meter	R&S	OSP-B157W8	100921	Apr.28,2018	Apr.27,2019
Vector Signal Generator	R&S	SMBV100A	261637	Dec.12,2017	Dec.11,2018
Signal Generator	R&S	SMB100A	178553	Dec.12,2017	Dec.11,2018
Signal Analyzer	R&S	FSV40	A1512015	Dec.12,2017	Dec.11,2018

Software			
Description	Manufacturer	Name	Version
For R&S TS 8997 Test System	Rohde & Schwarz	VMS32	V10.38

Note：R&S TS 8997 test system is used for DFS testing.

6. Dynamic Frequency Selection

6.1. Applicability of DFS requirements

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

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

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	☑Master Device or Client with Radar Detection	☐Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

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

6.2. Limits

(1) DFS Detection Thresholds

Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 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. Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

(2) DFS Response Requirements

Table 4: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
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 facilitating 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. Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

6.3. Parameters of radar test Waveforms

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

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
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^6}{PRI_{\mu sec}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 μsec is selected, the number of pulses would be $\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^6}{3066}\right)\right\}$ = Round up {17.2} = 18.

Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	**Pulse Repetition Frequency (Pulses Per Second)**	**Pulse Repetition Interval (Microseconds)**
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detection
1	35	29	82.9%
2	30	18	60%
3	30	27	90%
4	50	44	88%
Aggregate (82.9% + 60% + 90% + 88%)/4 = 80.2%			

Table 6 – Long Pulse Radar Test Waveform

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

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

Each waveform is defined as follows:

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

A representative example of a Long Pulse Radar Type waveform:

1) The total test waveform length is 12 seconds.
2) Eight (8) Bursts are randomly generated for the Burst Count.
3) Burst 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) Bursts 2 through 8 are generated using steps 3 – 5.

7) Each Burst is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, Burst 1 is randomly generated (1 to 1,500,000 minus the total Burst 1 length + 1 random

PRI interval) at the 325,001 microsecond step. Bursts 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. Burst 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Figure 1 provides a graphical representation of the Long Pulse Radar Test Waveform.

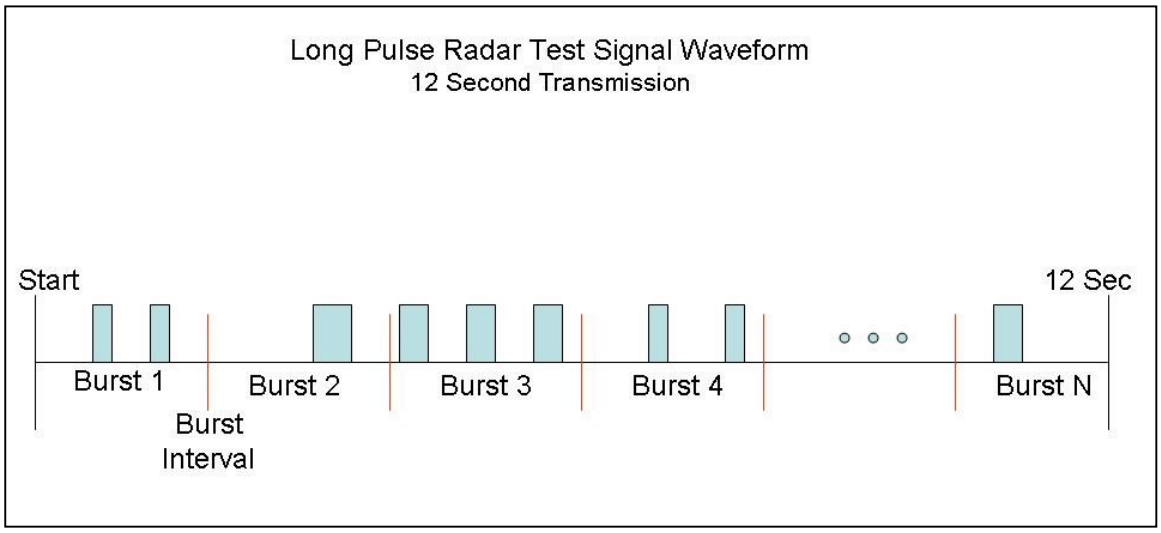


Figure 1: Graphical Representation of a Long Pulse Radar Type Waveform

Table 7 – Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Numberof Pulsesper Burst	Numberof Bursts	Minimum Percentage of Successful Detection	Minimum Number ofTrials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm: [4]

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

6.4. Test Setup

6.4.1. SYSTTEMITEST CONFIGURATON

Description of Test Configuration:
The EUT was configured for testing in an engineering mode which was provided by the manufacturer.
Stream the test file from the Master Device to the Client Device for IP based systems or frame based systems which dynamically allocate the talk/listen ratio.
Software to ping the client is used to simulate data transfer with a minimum channel loading of approximately 17% or greater.EUT Exercise Software
The test was performed under: DOS command, which was provided by the manufacturer.

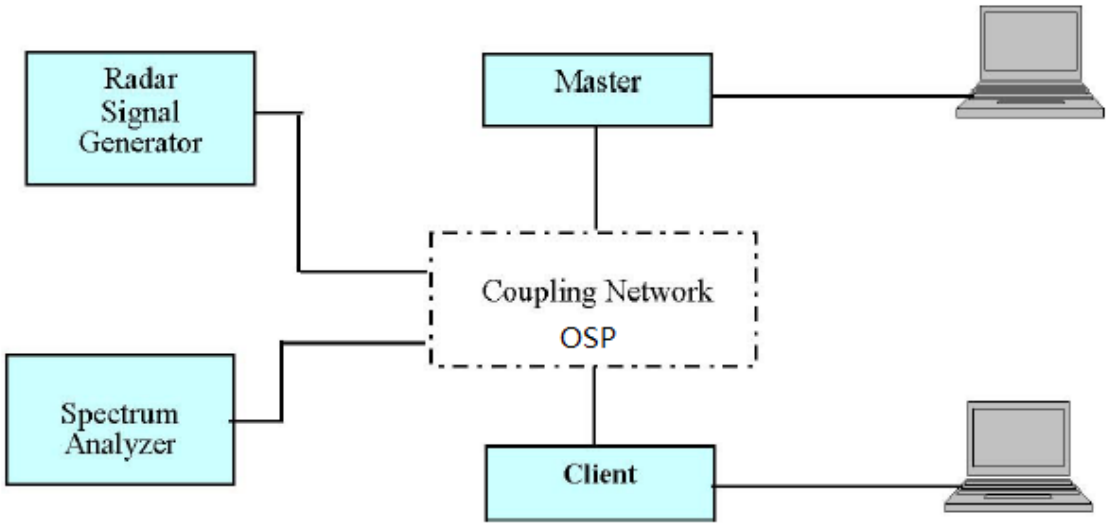
Support Equipment List and Details

Item	Equipment	Brand Name	Model Name	S/N
1	Laptop	Lenovo	E42-80	R303U5EG
2	Desktop computer	Dell	DO7S	--
3	11ac Wireless adapter	net-core	NW392	--

External Cable

Cable No	Cable Description	Shielding Type	Ferrite Core	Cable Length(m)	Remarks
1	RJ-45 Cable	No	No	3	Connect Laptop to EUT

6.4.2. System Block Diagram



6.4.3. Conducted Method

7.2.1 Setup for Master with injection at the Master

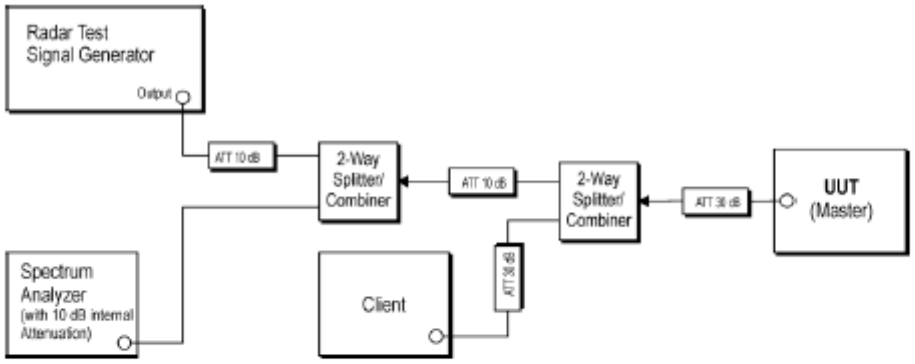


Figure 2: Example Conducted Setup where UUT is a Master and Radar Test Waveforms are injected into the Master

7.2.2 Setup for Client with injection at the Master

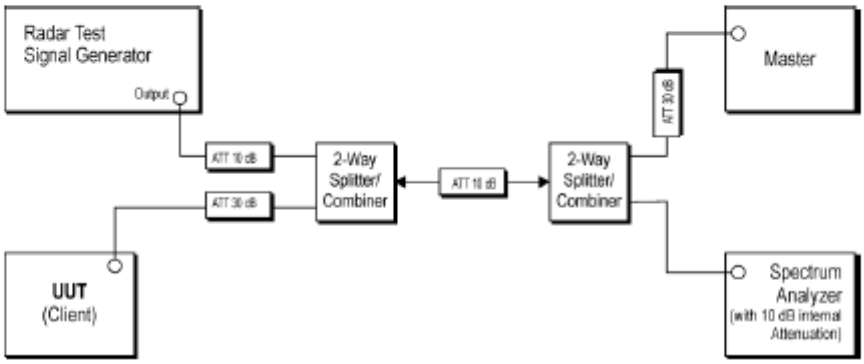


Figure 3: Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Master

7.2.3 Setup for Client with injection at the Client

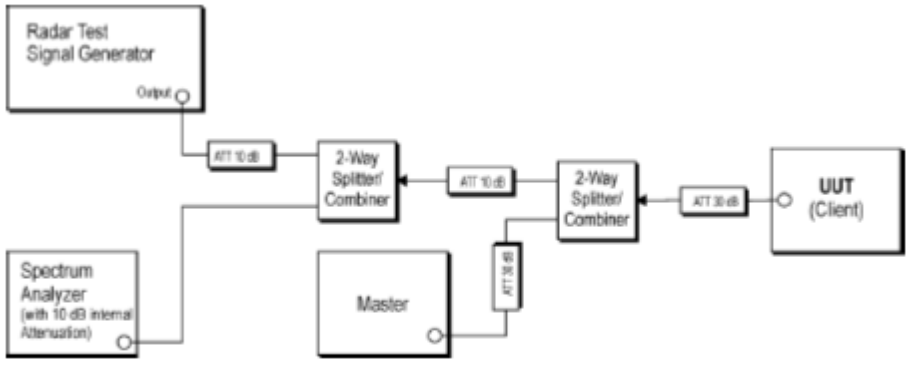


Figure 4: Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Client

6.5. Test Procedure

Please refer to KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02 Clause 7.8.

6.5.1 U-NII Detection Bandwidth

Set up the generating equipment as shown in Figure 8, or equivalent. Set up the DFS timing monitoring equipment as shown in Figure 13 or Figure 14. Set up the overall system for either radiated or conducted coupling to the UUT.

Adjust the equipment to produce a single Burst of any one of the Short Pulse Radar Types 0 – 4 in Table 5 at the center frequency of the UUT Operating Channel at the specified DFS Detection Threshold level found in Table 3.

Set the UUT up as a standalone device (no associated Client or Master, as appropriate) and no traffic. Frame based systems will be set to a talk/listen ratio reflecting the worst case (maximum) that is user configurable during this test.

Generate a single radar Burst, and note the response of the UUT. Repeat for a minimum of 10 trials. The UUT must detect the Radar Waveform within the DFS band using the specified U-NII Detection Bandwidth criterion shown in Table 4. In cases where the channel bandwidth may exceed past the DFS band edge on specific channels (i.e., 802.11ac or wideband frame based systems) select a channel that has the entire emission bandwidth within the DFS band. If this is not possible, test the detection BW to the DFS band edge.

Starting at the center frequency of the UUT operating Channel, increase the radar frequency in 5 MHz steps, repeating the above test sequence, until the detection rate falls below the U-NII Detection Bandwidth criterion specified in Table 4. Repeat this measurement in 1MHz steps at frequencies 5 MHz below where the detection rate begins to fall. Record the highest frequency (denote as FH) at which detection is greater than or equal to the U-NII Detection Bandwidth criterion. Recording the detection rate at frequencies above FH is not required to demonstrate compliance.

Starting at the center frequency of the UUT operating Channel, decrease the radar frequency in 5 MHz steps, repeating the above test sequence, until the detection rate falls below the U-NII Detection Bandwidth criterion specified in Table 4. Repeat this measurement in 1MHz steps at frequencies 5 MHz above where the detection rate begins to fall. Record the lowest frequency (denote as FL) at which detection is greater than or equal to the U-NII Detection Bandwidth criterion. Recording the detection rate at frequencies below FL is not required to demonstrate compliance.

The U-NII Detection Bandwidth is calculated as follows:

U-NII Detection Bandwidth = FH – FL

The U-NII Detection Bandwidth must meet the U-NII Detection Bandwidth criterion specified in Table 4. Otherwise, the UUT does not comply with DFS requirements. This is essential to ensure that the UUT is capable of detecting Radar Waveforms across the same frequency spectrum that contains the significant energy from the system. In the case that the U-NII Detection Bandwidth is greater than or equal to the 99 percent power bandwidth for the measured FH and FL, the test can be truncated and the U-NII Detection Bandwidth can be reported as the measured FH and FL.

6.5.2 Performance Requirements Check

The following tests must be performed for U-NII device certification: Initial Channel Startup Check with a radar Burst at start of Channel Availability Check and with a radar Burst at end of Channel Availability Check; In-Service Monitoring; and the 30 minute Non-Occupancy Period.

6.5.3.1 Initial Channel Availability Check Time

The Initial Channel Availability Check Time tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

a) The U-NII devices will be powered on and be instructed to operate on the appropriate U-NII Channel that must incorporate DFS functions. At the same time the UUT is powered on, the spectrum analyzer will be set to zero span mode with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar (Chr) with a 4 minute sweep time. The spectrum analyzer's sweep will be started at the same time power is applied to the U-NII device.
b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.
c) Confirm that the UUT initiates transmission on the channel
This measurement can be used to determine the length of the power-on cycle if it is not supplied by the manufacturer. If the spectrum analyzer sweep is started at the same time the UUT is powered on and the UUT does not begin transmissions until it has completed the cycle, the power-on time can be determined by comparing the two times.

6.5.3..2 Radar Burst at the Beginning of the Channel Availability Check Time

The steps below define the procedure to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB occurs at the beginning of the Channel Availability Check Time. This is illustrated in Figure 15.
a) The Radar Waveform generator and UUT are connected using the applicable test setup described in the sections on configuration for Conducted Tests (7.2) or Radiated Tests (7.3) and the power of the UUT is switched off.
b) The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence (Tpower_up). The Channel Availability Check Time commences on Chr at instant T1 and will end no sooner than T1 + Tch_avail_check.
c) A single Burst of one of the Short Pulse Radar Types 0-4 will commence within a 6 second window starting at T1. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.
d) Visual indication or measured results on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of Chr for UUT emissions will continue for 2.5 minutes after the radar Burst has been generated.
e) Verify that during the 2.5 minute measurement window no UUT transmissions occurred on Chr. The Channel Availability Check results will be recorded.

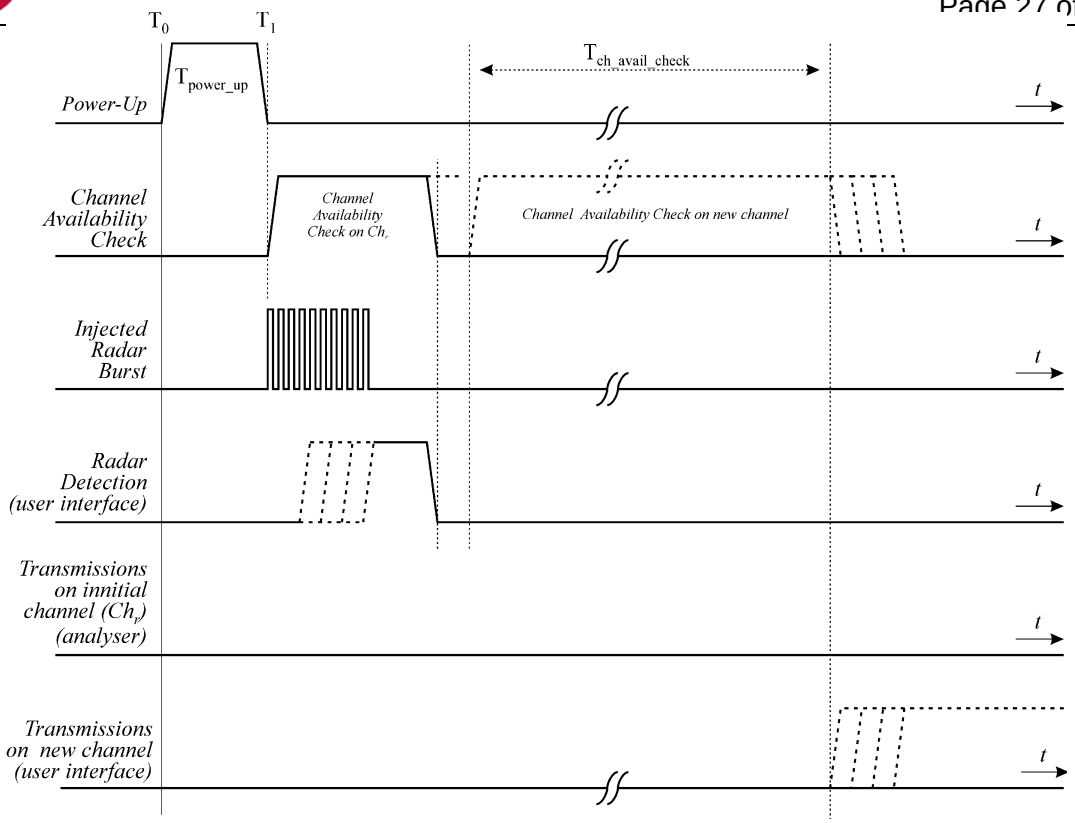


Figure 15: Example of timing for radar testing at the beginning of the Channel Availability Check Time

6.5.3.3 Radar Burst at the End of the Channel Availability Check Time

The steps below define the procedure to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1dB occurs at the end of the Channel Availability Check Time. This is illustrated in Figure 16.

a) The Radar Waveform generator and UUT are connected using the applicable test setup described in the sections for Conducted Tests (7.2) or Radiated Tests (7.3) and the power of the UUT is switched off.
b) The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence (Tpower_up). The Channel Availability Check Time commences on Chr at instant T1 and will end no sooner than T1 + Tch_avail_check.
c) A single Burst of one of the Short Pulse Radar Types 0-4 will commence within a 6 second window starting at T1 + 54 seconds. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.
d) Visual indication or measured results on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of Chr for UUT emissions will continue for 2.5 minutes after the radar Burst has been generated.

e) Verify that during the 2.5 minute measurement window no UUT transmissions occurred on Chr. The Channel Availability Check results will be recorded.

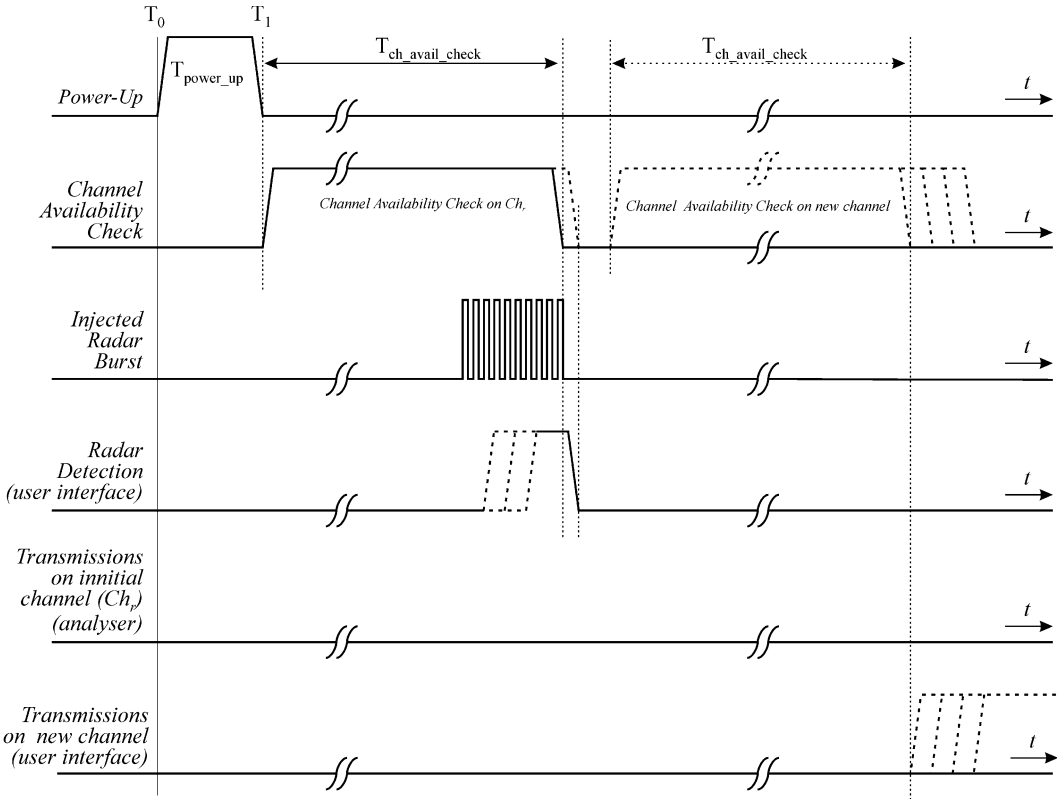


Figure 16: Example of timing for radar testing towards the end of the Channel Availability Check Time

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

These tests define how the following DFS parameters are verified during In-Service Monitoring;
- Channel Closing Transmission Time
- Channel Move Time
- Non-Occupancy Period

The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold + 1dB is generated on the Operating Channel of the U- NII device (In- Service Monitoring).

a) One frequency will be chosen from the Operating Channels of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.
b) In case the UUT is a U-NII device operating as a Client Device (with or without DFS), a U-NII device operating as a Master Device will be used to allow the UUT (Client device) to Associate with the Master Device. In case the UUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will Associate with the UUT (Master). In both cases for conducted tests, the Radar Waveform generator will be connected to the Master Device. For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.
c) Stream the channel loading test file from the Master Device to the Client Device on the test Channel for the entire period of the test.
d) At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Radar Type 0 in Table 5 at levels defined in Table 3, on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.
e) Observe the transmissions of the UUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs. Figure 17 illustrates Channel Closing Transmission Time.
f) When operating as a Master Device, monitor the UUT for more than 30 minutes following instant T2 to verify that the UUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.
g) In case the UUT is a U-NII device operating as a Client Device with In-Service Monitoring, perform steps a) to f).

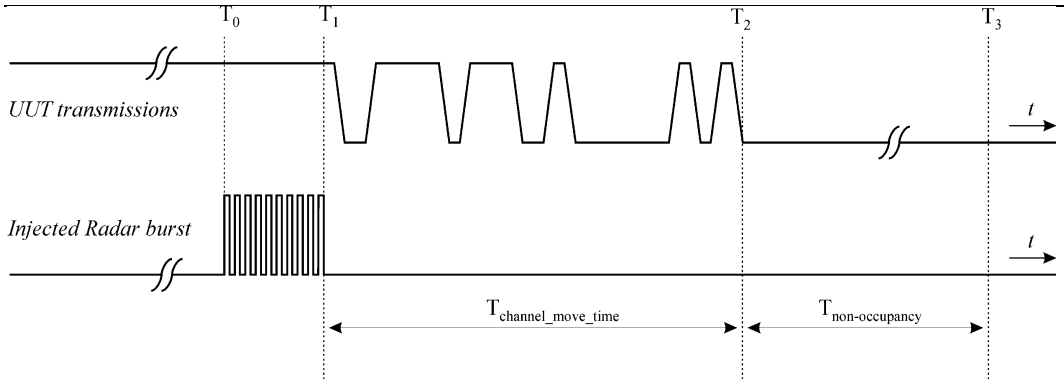


Figure 17: Example of Channel Closing Transmission Time & Channel Closing Time

6.5.5 Statistical Performance Check

The steps below define the procedure to determine the minimum percentage of successful detection requirements found in Tables 5-7 when a radar burst with a level equal to the DFS Detection Threshold + 1dB is generated on the Operating Channel of the U-NII device (In-Service Monitoring).

a) One frequency will be chosen from the Operating Channels of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands.
b) In case the UUT is a U-NII device operating as a Client Device (with or without Radar Detection), a U-NII device operating as a Master Device will be used to allow the UUT (Client device) to Associate with the Master Device. In case the UUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will Associate with the UUT (Master). In both cases for conducted tests, the Radar Waveform generator will be connected to the Master Device. For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.
c) Stream the channel loading test file from the Master Device to the Client Device on the test Channel
for the entire period of the test.
d) At time T0 the Radar Waveform generator sends the individual waveform for each of the Radar Types 1- 6 in Tables 5-7, at levels defined in Table 3, on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.
e) Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 10 seconds for Radar Type 0 to ensure detection occurs.
f) Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 22 seconds for Long Pulse Radar Type 5 to ensure detection occurs.
g) In case the UUT is a U-NII device operating as a Client Device with In-Service Monitoring, perform steps a) to f).

7.8.4.1 Short Pulse Radar Test

Once the performance requirements check is complete, statistical data will be gathered, to determine the ability of the device to detect the radar test waveforms (Short Pulse Radar Types 1-4) found in Table 5. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trials. The percentage of successful detection is calculated by:

$$\frac{TotalWaveformDetections}{TotalWaveformTrials} \times 100 = \text{Percentage of Successful Detection } Radar\ Waveform\ \text{N} = P_d\text{N}$$

In addition an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1-4 is required and is calculated as follows:

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4}$$

The minimum number of trails, minimum percentage of successful detection and the aggregate minimum percentage of successful detection are found in **Table 5**.

7.8.4.2 Long Pulse Radar Test

Statistical data will be gathered to determine the ability of the device to detect the Long Pulse Radar Type 5 found in Table 6. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trials.

Three subsets of trials will be performed with a minimum of ten trials per subset. The subset of trials differ in where the Long Pulse Type 5 Signal is tuned in frequency:

a) the Channel center frequency (Figure 18);
b) tuned frequencies such that 90% of the Long Pulse Type 5 frequency modulation is within the low edge of the UUT Occupied Bandwidth (Figure 19); and
c) tuned frequencies such that 90% of the Long Pulse Type 5 frequency modulation is within the high edge of the UUT Occupied Bandwidth (Figure 20).

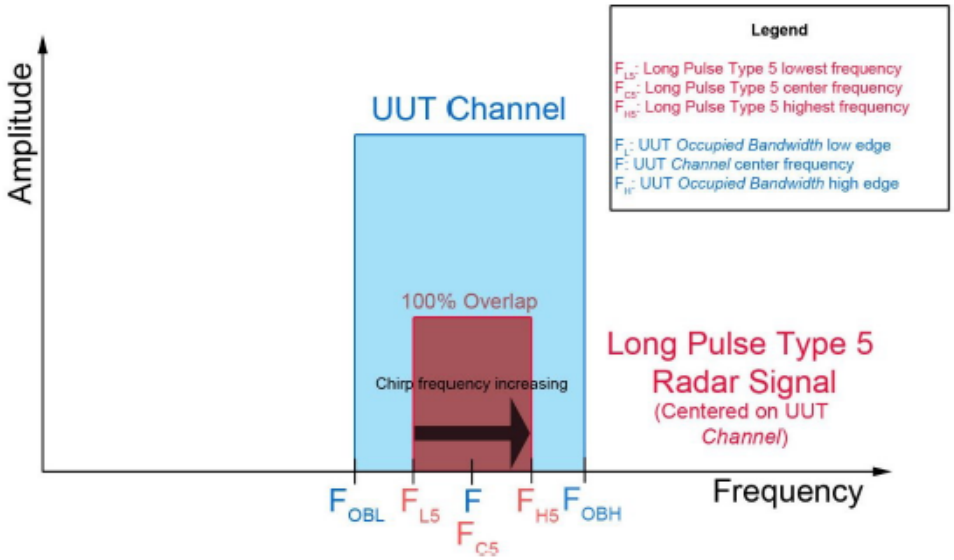


Figure 18: Example of the Relationship Between Long Pulse Type 5 Signal and the U-NII channel when the Signal is Tuned to the UUT Channel Center Frequency

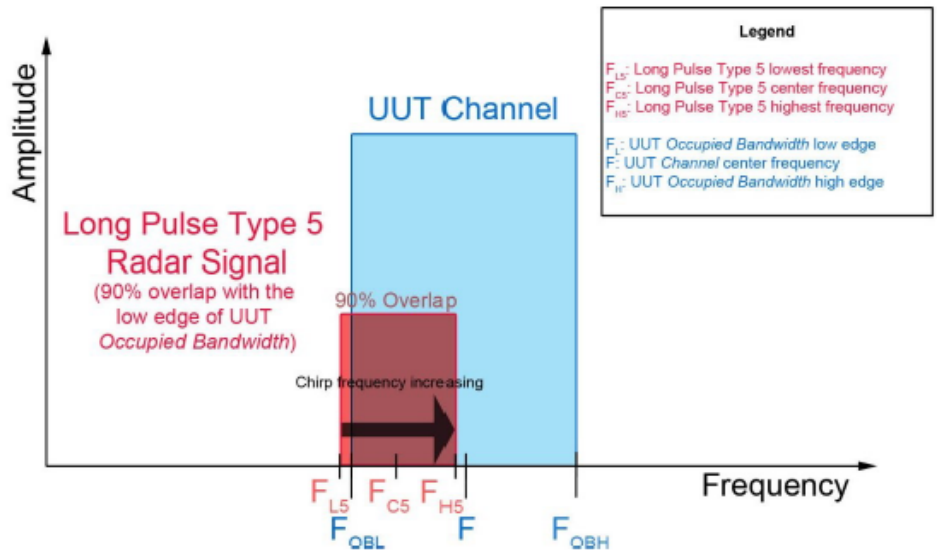


Figure 19: Example of the Relationship Between Long Pulse Type 5 Signal and the U-NII channel when the Signal is Tuned so that 90% of the Radar Signal Overlaps with the Low Edge of the UUT Occupied Bandwidth

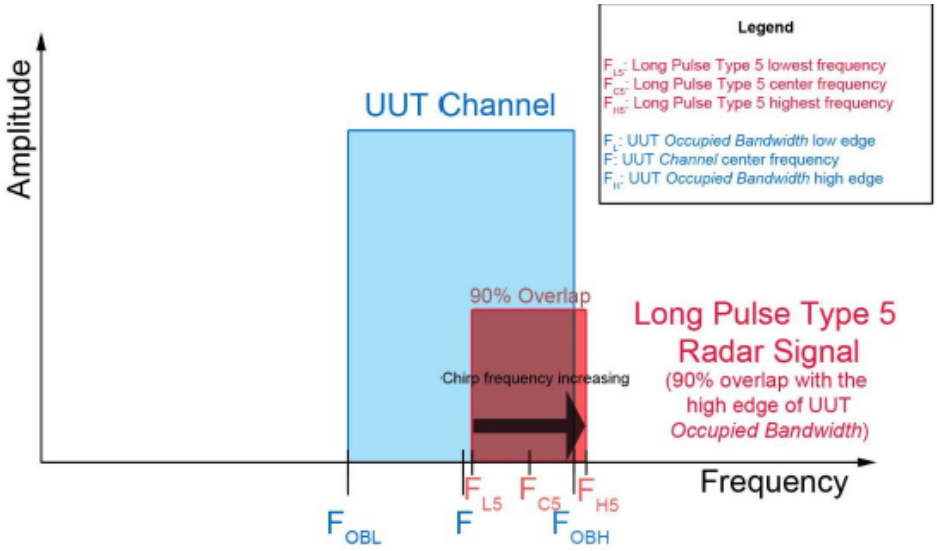


Figure 20: Example of the Relationship Between Long Pulse Type 5 Signal and the U-NII channel when the Signal is Tuned so that 90% of the Radar Signal Overlaps with the High Edge of the UUT Occupied Bandwidth

For subset case 1: the center frequency of the signal generator will remain fixed at the center of the UUT Channel.

For subset case 2: to retain 90% frequency overlap between the radar signal and the UUT Occupied Bandwidth, the center frequency of the signal generator will vary for each of the ten trials in subset case 2.The center frequency of the signal generator for each trial is calculated by:
FL + (0.4 $*$ $Chirp\ Width$ [$in\ MHz$])

For subset case 3: to retain 90% frequency overlap between the radar signal and the UUT Occupied Bandwidth, the center frequency of the signal generator will vary for each of the ten trials in subset case 3.The center frequency of the signal generator for each trial is calculated by:

FH − (0.4 $*$ $Chirp\ Width$ [$in\ MHz$])
The percentage of successful detection is calculated by dividing the sum of the detections for the three subsets by the sum of trials for the three subsets:

$$\frac{TotalWaveformDetections}{TotalWaveformTrials} \times 100$$

7.8.4.3 Frequency Hopping Radar Test
Statistical data will be gathered to determine the ability of the device to detect the Frequency Hopping radar test signal (radar type 6) found in Table 7. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs. The probability of successful detection is calculated by:

$$\frac{TotalWaveformDetections}{TotalWaveformTrials} \times 100$$

6.6. Test Result

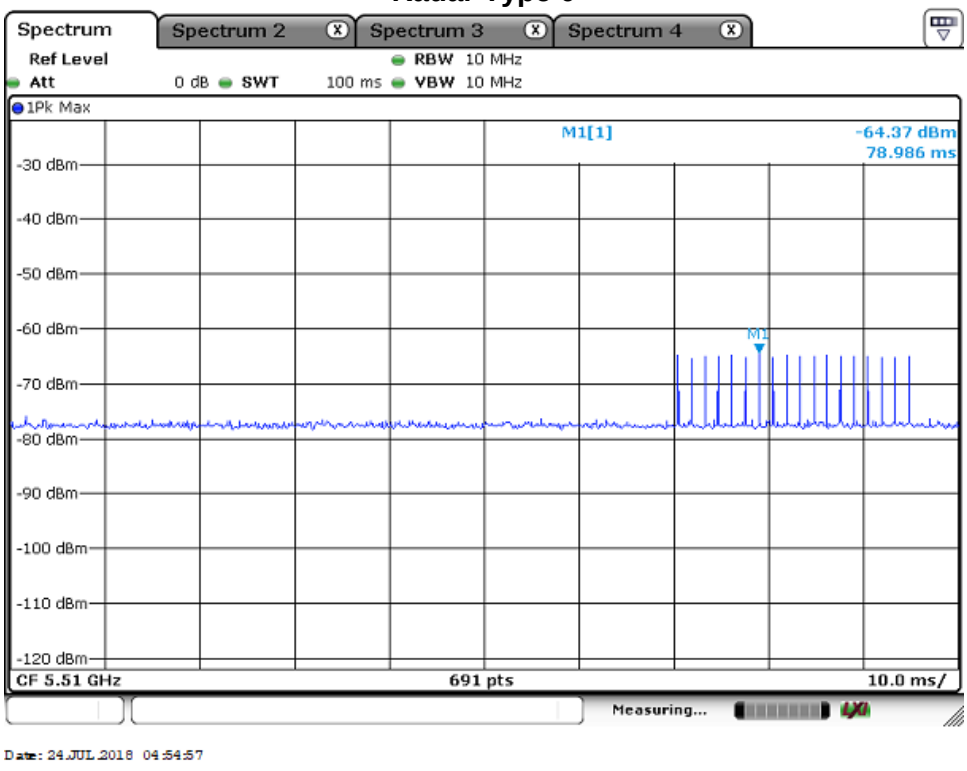
6.6.1. DFS DETECTION THRESHOLD

The EUT operates in 5230-5350 MHZ and 5470-5723 MHZ range
The maximum conducted output power of EUT is 23.8dbm antenna gain is 2.0dBi, the Maximum EIRP=23.8+2=25.8dBm, Therefore the required interference threshold level is -64dbm, the required radiated threshold at antenna port is -64dbm.The calibrated radiated DFS detection threshold level is set to-64dBm, threshold level=-64dBm + antenna gain=-62 dBm.

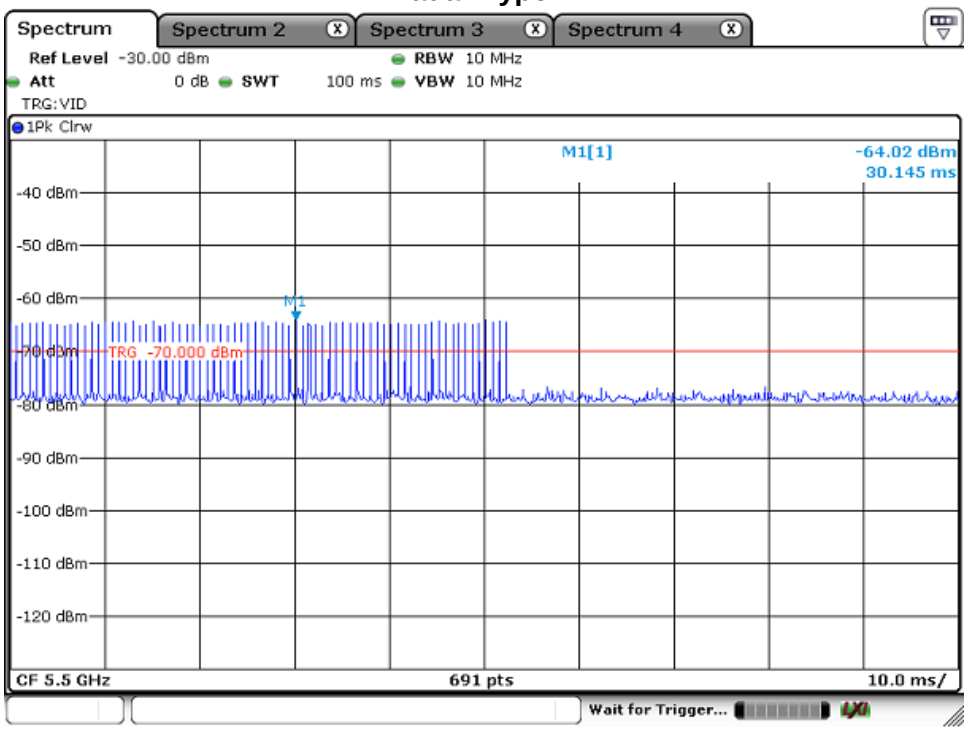
DFS Threshold Level		
DFS Threshold Level Value	**Limit**	**Result**
-64dBm	⩽ -62dBm	Pass

Note:EUT'Maxmun.E.I.R.P≥200 mw

Radar Type 0

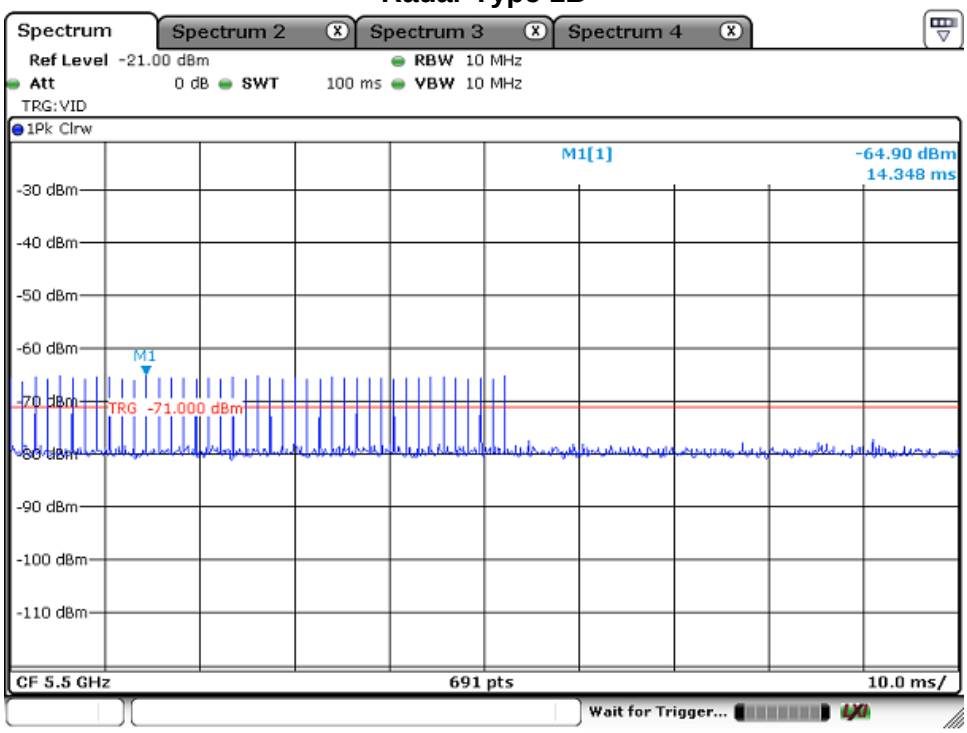


Radar Type 1A



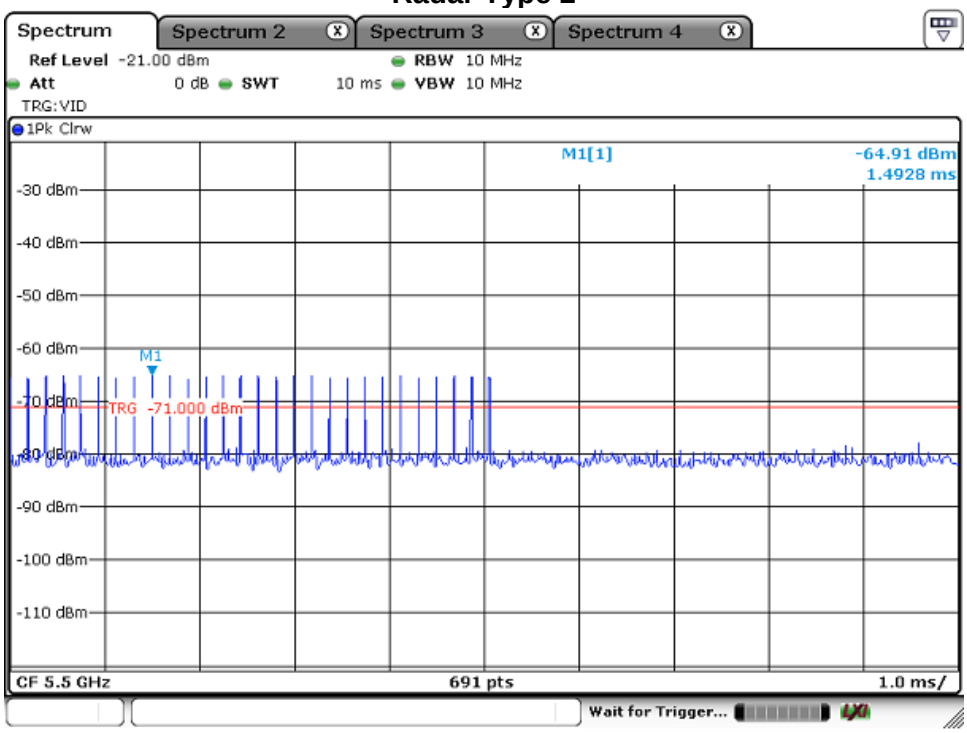
Date: 24.JUL.2018 11:59:50

Radar Type 1B



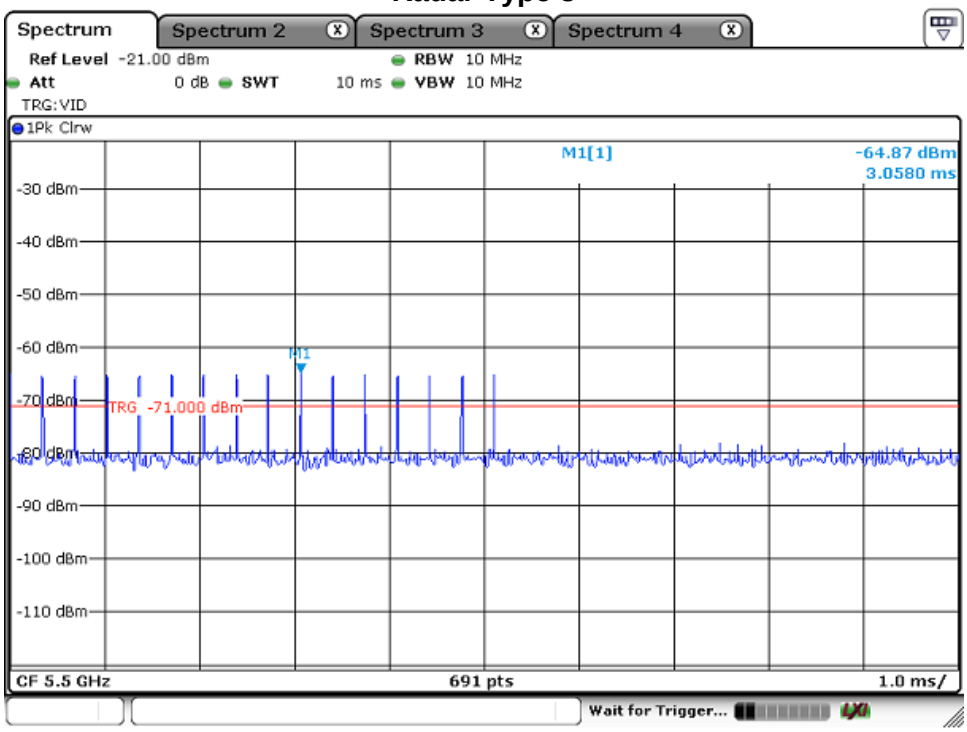
Date: 24.JUL.2018 11:01:10

Radar Type 2



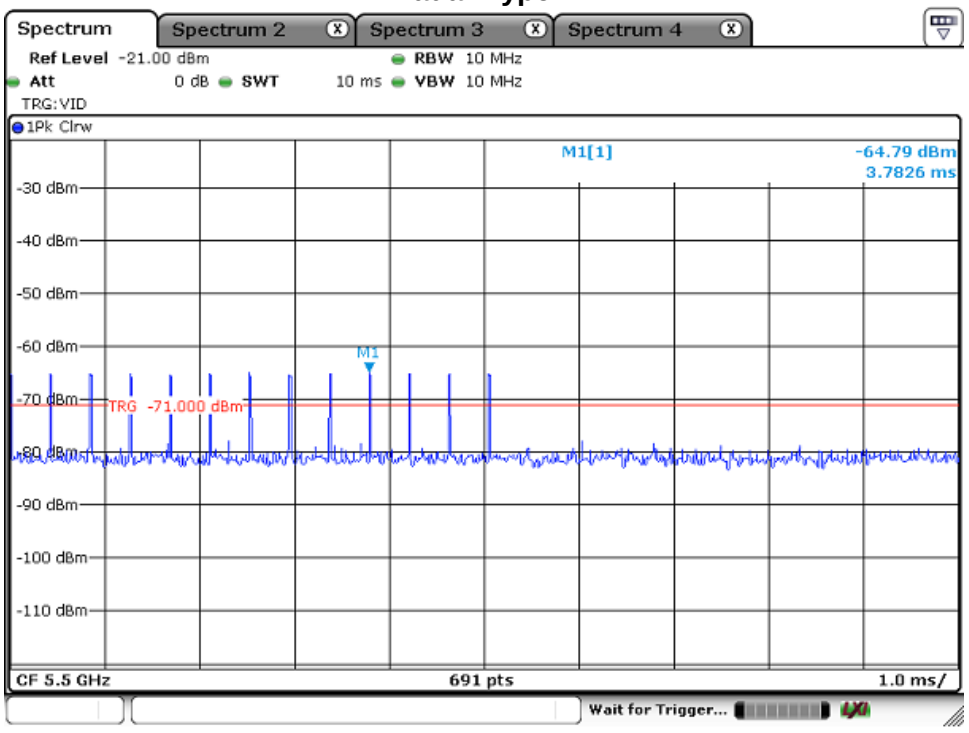
Date: 24.JUL.2018 11:07:40

Radar Type 3



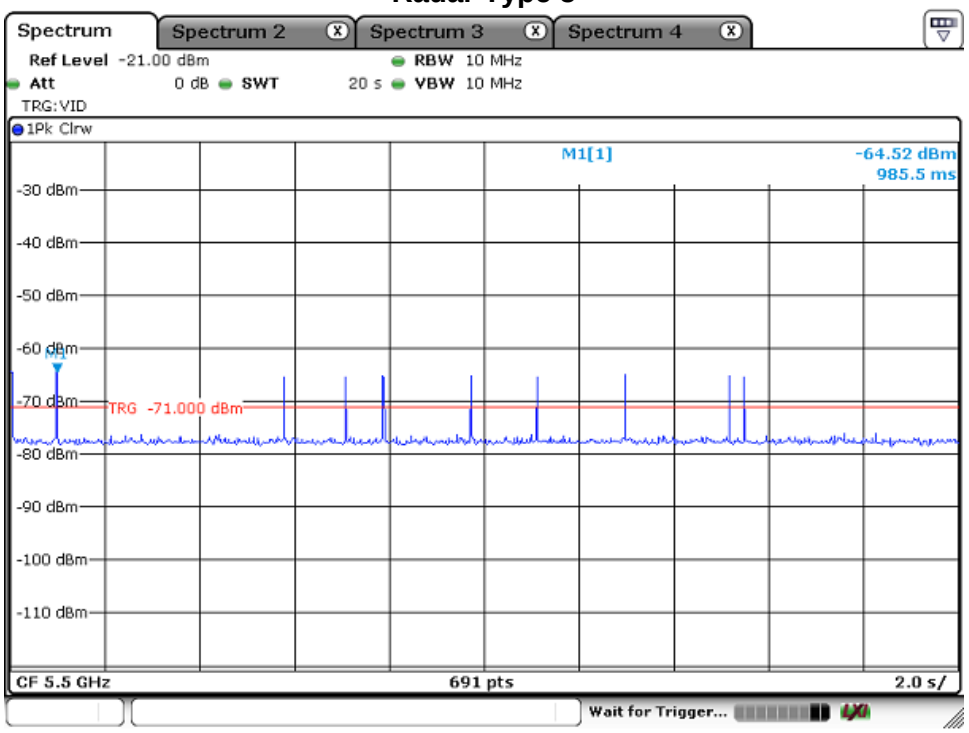
Date: 24.JUL.2018 11:15:43

Radar Type 4



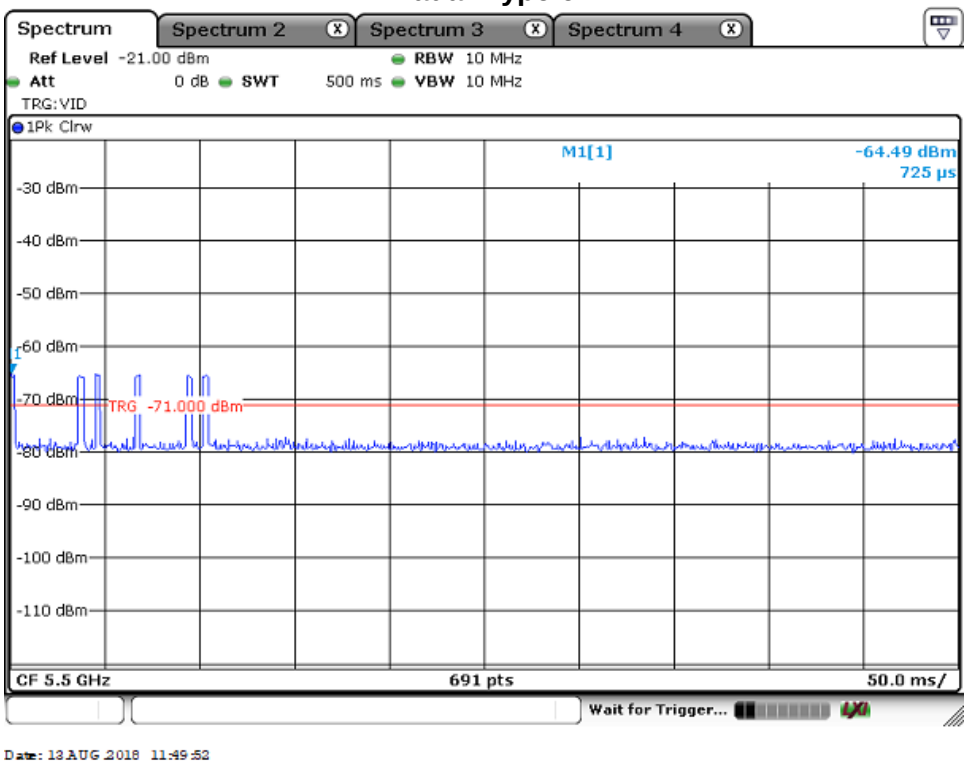
Date: 24.JUL.2018 11:32:18

Radar Type 5



Date: 24.JUL.2018 11:40:39

Radar Type 6



6.6.2. DFS U-NII Detection Bandwidth

DFS U-NII Detection Bandwidth (5500 MHz; 20 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Measured Detection Bandwidth (MHz)	99% Transmission power Bandwidth (MHz)	Overall Result	Overall Comment
5500.000000	0	20.000000	17.800000	PASS	

Detection Bandwidth Detailed Results

Check Frequency (MHz)	Detection count	Percentage of Detection	Minimum Limit	Single Measurement Result	Single Measurement Comment
5485.000000	1 of 10	10 %	90%	FAIL	
5489.000000	0 of 10	0 %	90%	FAIL	
5490.000000	9 of 10	90 %	90%	PASS	Lower Limit
5495.000000	10 of 10	100 %	90%	PASS	
5500.000000	10 of 10	100 %	90%	PASS	
5505.000000	10 of 10	100 %	90%	PASS	
5510.000000	10 of 10	100 %	90%	PASS	Upper Limit
5511.000000	0 of 10	0 %	90%	FAIL	
5515.000000	1 of 10	10 %	90%	FAIL	

Radar level verification

Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	7.35	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	70.35	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-63.00	dBm

U-NII Detection Bandwidth Sweep

Setting	Instrument Value	Target Value
Center Frequency	5.50000 GHz	5.50000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	12.000 s	12.000 s
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 ms	0.000 ms

DFS U-NII Detection Bandwidth (5510 MHz; 40 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Measured Detection Bandwidth (MHz)	99% Transmission power Bandwidth (MHz)	Overall Result	Overall Comment
5510.000000	0	42.000000	36.554308	PASS	

Detection Bandwidth Detailed Results

Check Frequency (MHz)	Detection count	Percentage of Detection	Minimum Limit	Single Measurement Result	Single Measurement Comment
5485.000000	0 of 10	0 %	90%	FAIL	
5488.000000	0 of 10	0 %	90%	FAIL	
5489.000000	10 of 10	100 %	90%	PASS	Lower Limit
5490.000000	10 of 10	100 %	90%	PASS	
5495.000000	10 of 10	100 %	90%	PASS	
5500.000000	10 of 10	100 %	90%	PASS	
5505.000000	10 of 10	100 %	90%	PASS	
5510.000000	10 of 10	100 %	90%	PASS	
5515.000000	10 of 10	100 %	90%	PASS	
5520.000000	10 of 10	100 %	90%	PASS	
5525.000000	10 of 10	100 %	90%	PASS	
5530.000000	10 of 10	100 %	90%	PASS	
5531.000000	10 of 10	100 %	90%	PASS	Upper Limit
5532.000000	0 of 10	0 %	90%	FAIL	
5535.000000	0 of 10	0 %	90%	FAIL	

Radar level verification

Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	-64	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	7.42	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	70.42	dB
This results in the following radar signal level at the DUT	1.00	dBm

U-NII Detection Bandwidth Sweep

Setting	Instrument Value	Target Value
Center Frequency	5.51000 GHz	5.51000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	12.000 s	12.000 s
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 ms	0.000 ms

DFS U-NII Detection Bandwidth (5530 MHz; 80 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Measured Detection Bandwidth (MHz)	99% Transmission power Bandwidth (MHz)	Overall Result	Overall Comment
5530.000000	0	80.000000	76.500000	PASS	

Detection Bandwidth Detailed Results

Check Frequency (MHz)	Detection count	Percentage of Detection	Minimum Limit	Single Measurement Result	Single Measurement Comment
5485.000000	0 of 10	0 %	90%	FAIL	
5489.000000	0 of 10	0 %	90%	FAIL	
5490.000000	10 of 10	100 %	90%	PASS	Lower Limit
5495.000000	10 of 10	100 %	90%	PASS	
5500.000000	10 of 10	100 %	90%	PASS	
5505.000000	10 of 10	100 %	90%	PASS	
5510.000000	10 of 10	100 %	90%	PASS	
5515.000000	10 of 10	100 %	90%	PASS	
5520.000000	10 of 10	100 %	90%	PASS	
5525.000000	10 of 10	100 %	90%	PASS	
5530.000000	10 of 10	100 %	90%	PASS	
5535.000000	10 of 10	100 %	90%	PASS	
5540.000000	10 of 10	100 %	90%	PASS	
5545.000000	10 of 10	100 %	90%	PASS	
5550.000000	10 of 10	100 %	90%	PASS	
5555.000000	10 of 10	100 %	90%	PASS	
5560.000000	10 of 10	100 %	90%	PASS	
5565.000000	10 of 10	100 %	90%	PASS	
5570.000000	10 of 10	100 %	90%	PASS	Upper Limit
5571.000000	0 of 10	0 %	90%	FAIL	
5575.000000	2 of 10	20 %	90%	FAIL	

Radar level verification

Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	7.63	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	70.63	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-63.00	dBm

U-NII Detection Bandwidth Sweep

Setting	Instrument Value	Target Value
Center Frequency	5.53000 GHz	5.53000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	12.000 s	12.000 s
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 ms	0.000 ms

6.6.3. DFS Channel Availability Check

DFS Channel Availability Check (5320 MHz; 20 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Waveform Filename used	CAC Type	Overall Result	Overall Comment
5320.000000	FCC15407_2014-Type0-18.wv	Begin of CAC Phase	PASS	
5320.000000	FCC15407_2014-Type0-18.wv	End of CAC Phase	PASS	

Measurement Detailed Results

DUT Frequency (MHz)	Radar Type No.	Measured Startup time (s)	Configured Startup time (s)	Initial Channel Availability Check Time (s)
5320.000000	0	119.960	---	119.960

DUT Frequency (MHz)	Time of Tx Start (s)	Limit (s)	Result	Comment
5320.000000	0.000	0.00	PASS	No emissions detected; OK
5320.000000	>150.0	>150.0	PASS	See Note 1.
5320.000000	0.000	0.00	PASS	No emissions detected; OK
5320.000000	>150.0	>150.0	PASS	See Note 1.

Radar Pulse verification Summary

Radar Type No.	No. of Pulses	Required No. of Pulses	Required Pulsewidth (us)	Measured Min. PRI (µs)	Measured Max. PRI (µs)
0	18	18	1.0	0.000	0.000
0	18	18	1.0	0.000	0.000

Radar Pulse verification detail (Begin of CAC Phase)

Radar Type No.	Pulse No.	Required Pulsewidth (µs)
0	1	1.000
0	2	1.000
0	3	1.000
0	4	1.000
0	5	1.000
0	6	1.000
0	7	1.000
0	8	1.000
0	9	1.000
0	10	1.000
0	11	1.000
0	12	1.000
0	13	1.000
0	14	1.000
0	15	1.000
0	16	1.000
0	17	1.000
0	18	1.000

Radar Pulse verification detail (End of CAC Phase)

Radar Type No.	Pulse No.	Required Pulsewidth (µs)
0	1	1.000
0	2	1.000
0	3	1.000
0	4	1.000
0	5	1.000
0	6	1.000
0	7	1.000
0	8	1.000
0	9	1.000
0	10	1.000
0	11	1.000
0	12	1.000
0	13	1.000
0	14	1.000
0	15	1.000
0	16	1.000
0	17	1.000
0	18	1.000

Additional Information

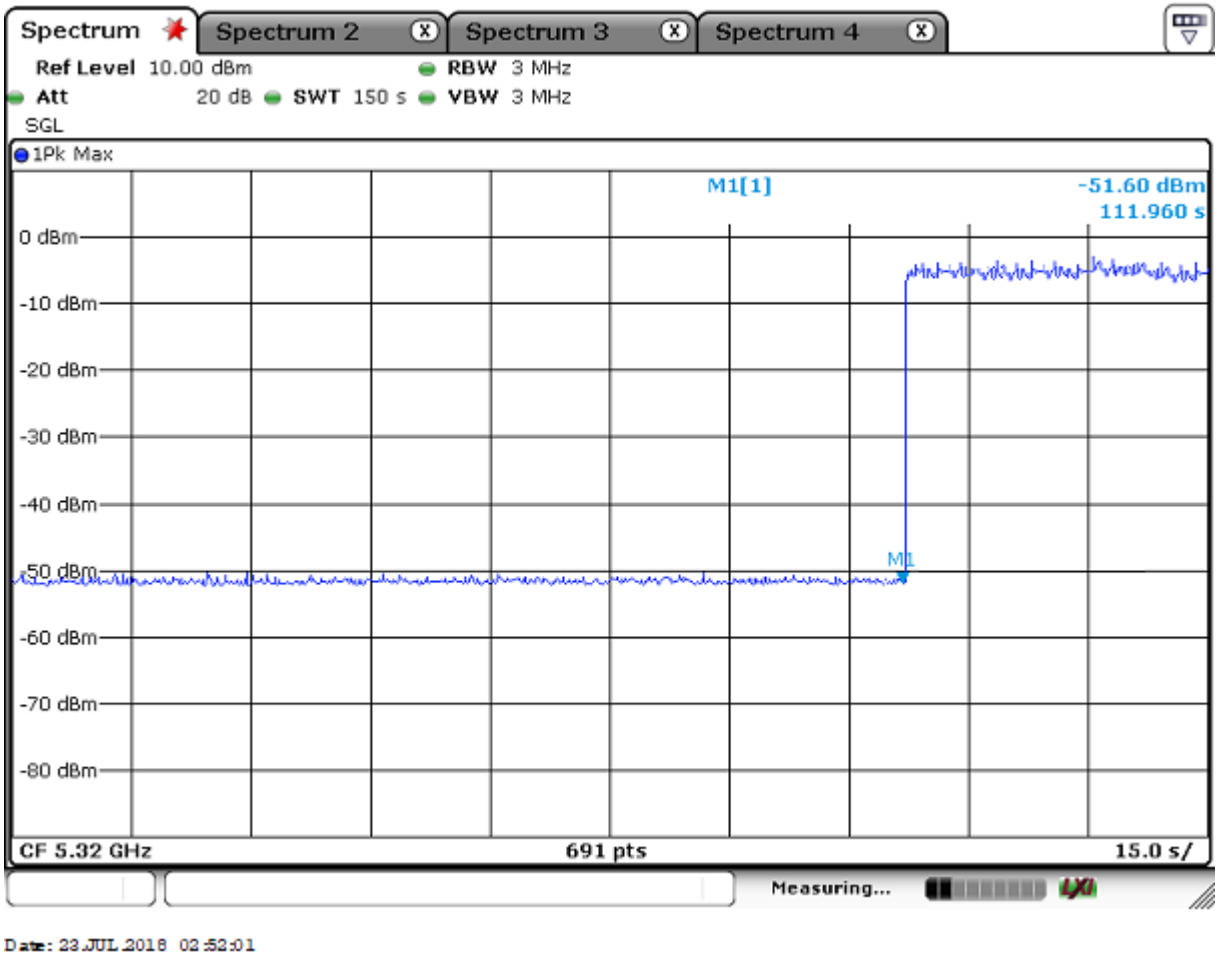
Note	Description
Note 1:	Sweep of Analyser and Radar pulse waveform are triggered at the same time. Therefore, the radar pulses maybe can be seen at the trigger point of the trace. Analysis of the Sweeps excludes the covered time for the radar pulses.
Note 2:	The radar signal is simultaneously evaluated as the analyser sweep after radar injection.

Radar level verification

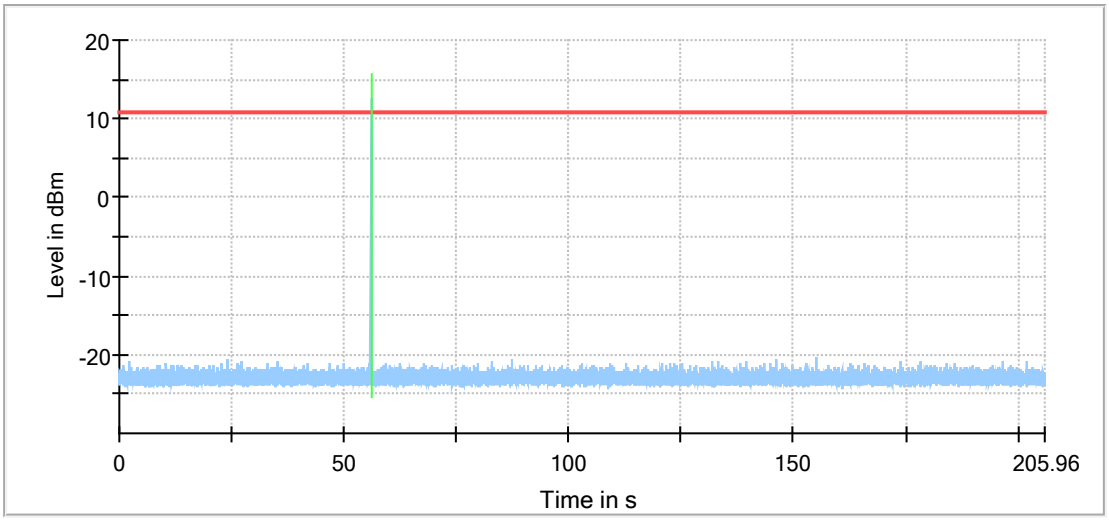
Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	6.66	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	69.66	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-63.00	dBm

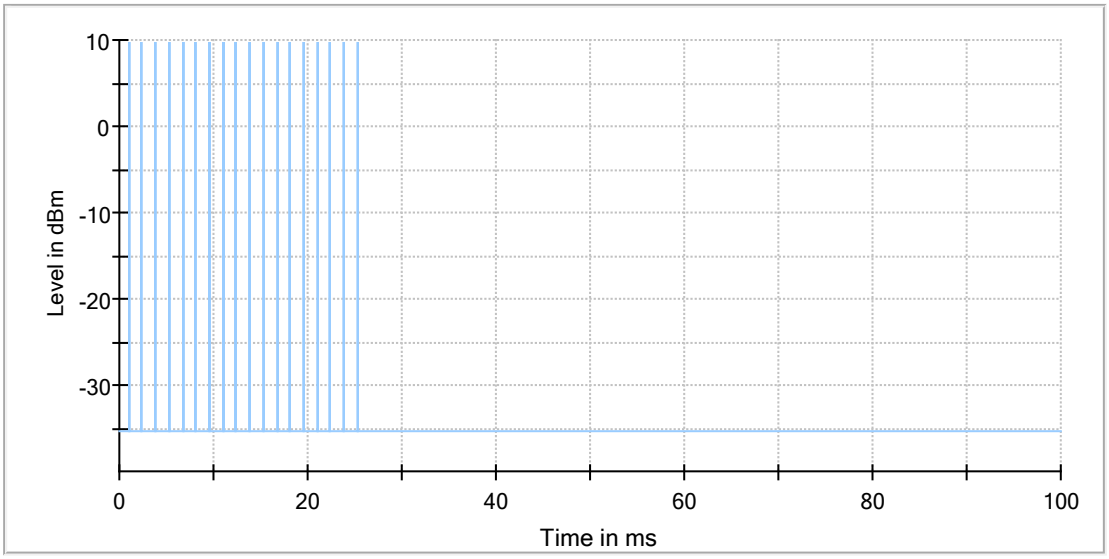
Initial Channel Availability Check Time

DUT Frequency (MHz)	Radar Type No.	Configured Startup time (s)	Initial Channel Availability Check Time (s)
5320.000000	0	---	111.960



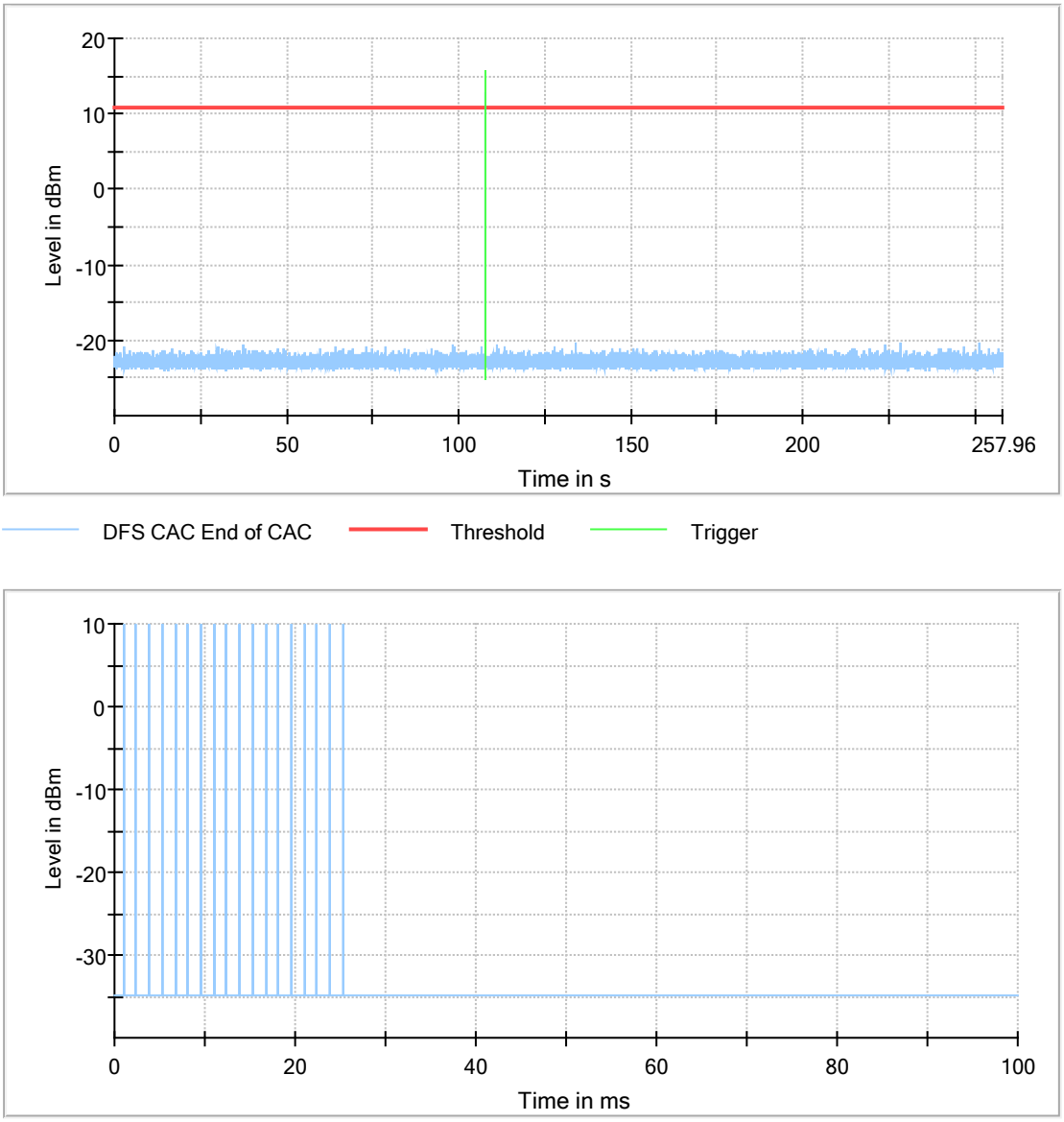
DFS CAC Beginning of CAC





Note: Radar signal injection within 51.960 seconds and 57.960 seconds

DFS CAC End of CAC



Note: Radar signal injection within 105.960 seconds and 111.960 seconds

Startup time

Setting	Instrument Value	Target Value
Center Frequency	5.32000 GHz	5.32000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	1001	~ 1001
Sweeptime	20.000 ms	20.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	Video	Video
Trigger Mode	constant	constant
Trigger Level	80.600 %	80.607 %
Trigger Offset	0.000 ms	0.000 ms

Begin of CAC Phase

Setting	Instrument Value	Target Value
Center Frequency	5.32000 GHz	5.32000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	205.960 s	205.960 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	55.960 s	55.960 s

End of CAC Phase

Setting	Instrument Value	Target Value
Center Frequency	5.32000 GHz	5.32000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	257.960 s	257.960 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	107.960 s	107.960 s

6.6.4. DFS In-Service Monitoring

DFS In-Service Monitoring (5530 MHz;80 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Type of Measurement value	Overall Result	Overall Comment
5530.000000	0	Channel Move Time	PASS	
5530.000000	0	Channel Closing Transmission Time	PASS	
5530.000000	0	Non-occupancy period	PASS	

Channel Move Time Detailed Results

DUT Frequency (MHz)	Radar Type No.	CMT Tx Time (s)	CMT Limit (s)	CMT Result	CMT Comment
5530.000000	0	0.446	10.000	PASS	Tx Time value is last trailing edge found within sweep. See Note 1.

Channel Closing Transmission Time Detailed Results

DUT Frequency (MHz)	Radar Type No.	CCTT Type of Value	CCTT No. of Pulses found	CCTT Tx Time (ms)	CCTT Tx Time Limit (ms)
5530.000000	0	first 200 ms	2	1.044	200.000
5530.000000	0	remaining 10.0 second(s) period	3	1.568	60.000

(continuation of the "Channel Closing Transmission Time Detailed Results" table from column 6 ...)

DUT Frequency (MHz)	CCTT Result	CCTT Comment
5530.000000	PASS	See Note 1.
5530.000000	PASS	See Note 1.

Non-occupancy period Detailed Results

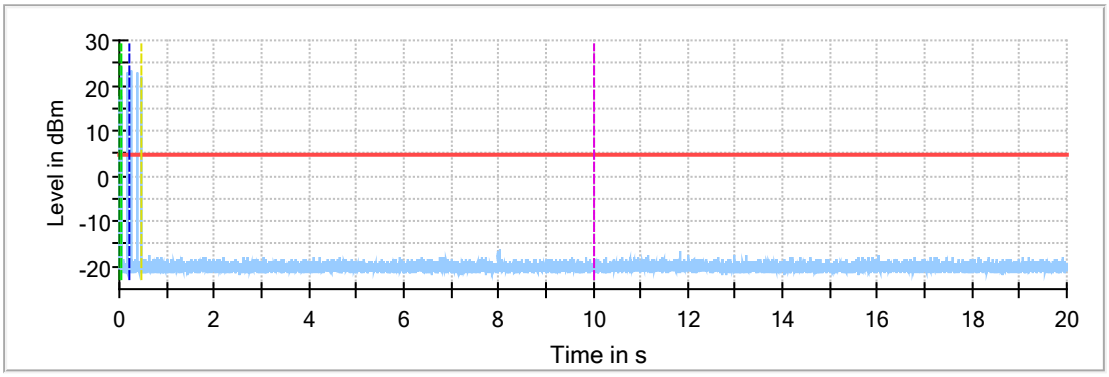
DUT Frequency (MHz)	Radar Type No.	NOP No. of Pulses found	NOP No. of Pulses Limit	NOP Tx Time (s)	NOP Tx Time Limit (s)	NOP Result
5530.000000	0	0	0	0.000	0.000	PASS

Additional Information

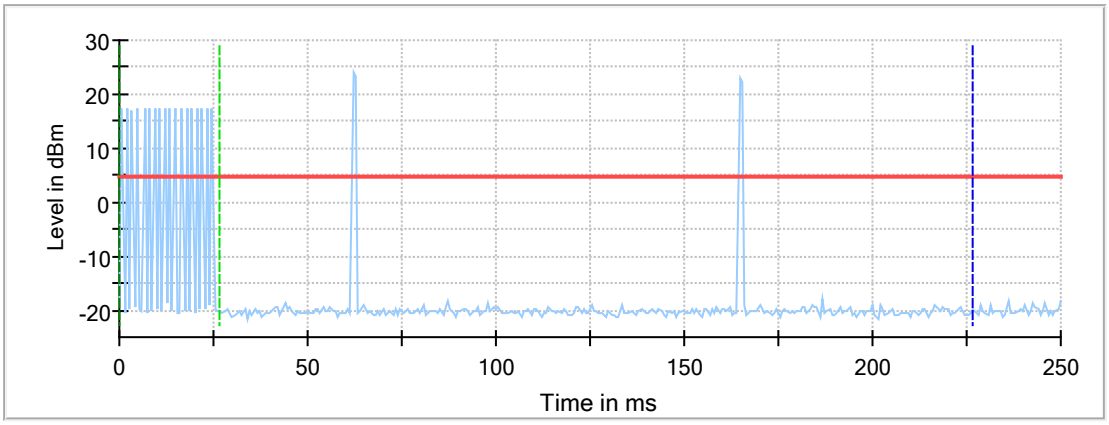
Note	Description
Note 1:	**Because of the radar pulse event at the beginning, the investigation of the trace begins with an offset of 26.7 ms conforming to the end of the Radar burst.**
Note 2:	**Channel move time (CMT) / channel closing transmission time (CCTT) measurement was made with hi resolution video sweep using OSP DAQ channel**
Note 3:	**Because of the substantially higher sampling rate of the video signal the results for CCTT and CMT are more accurate than in the graphics visible. Reached timing accuracy of the video trace: approx 4 µs**
Note 4:	**The Non-Occupancy Period trace starts at the end of the Channel move time trace (20.000 secs.) Labeling of the x-axis (time) is relative to its beginning (0 secs.)**

Radar level verification

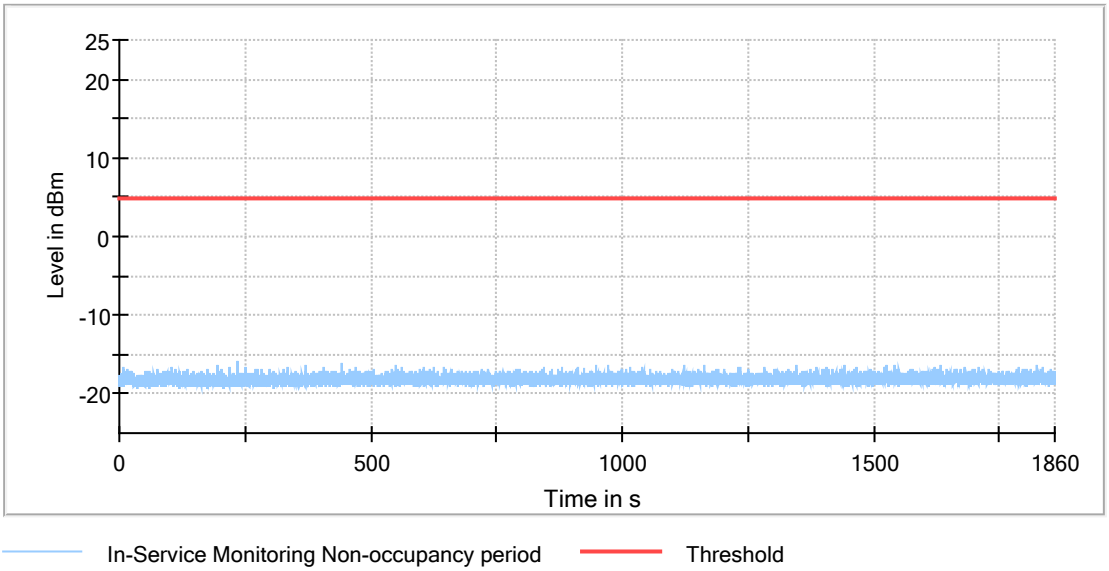
Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	7.13	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	70.13	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-63.00	dBm



In-Service Monitoring Channel Move Time
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time
10sec Channel Move Time Limit
Last measured edge of Channel Closing Tx Time



In-Service Monitoring Channel Move Time first 200ms
Threshold
Start of Radar
Trigger at end of Radar
First 200ms of Channel Closing Tx Time



In-Service Monitoring Channel Move Time

Channel Move Time; Channel Closing Transmission Time

Setting	Instrument Value	Target Value
Center Frequency	5.53000 GHz	5.53000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	20.000 s	20.000 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 ms	0.000 ms

Non-occupancy period

Setting	Instrument Value	Target Value
Center Frequency	5.53000 GHz	5.53000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	1.860 ks	1.860 ks
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off

6.6.5. DFS Statistical Performance Check

Note: that the frequency of the injected signal is varied across the signal 99% bandwidth from trial to trial.

DFS Statistical Performance Check (5500 MHz; 20 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Detection count	Percentage of Detection Px	Detection Limit	Overall Result	Overall Comment
5500.000000	1	28 of 30	93.33%	60.0 %	PASS	
5500.000000	2	25 of 30	83.33%	60.0 %	PASS	
5500.000000	3	25 of 30	83.33%	60.0 %	PASS	
5500.000000	4	28 of 30	93.33%	60.0 %	PASS	
5500.000000	5	27 of 30	90.00%	80.0 %	PASS	
5500.000000	6	29 of 30	96.67%	70.0 %	PASS	

Aggregate Results for Short Pulse Radar Type 1-4

Aggregate Calculation as follows	Aggregate Percentage	Aggregate Limit	Aggregate Result	Aggregate Comment
(P1 + P2 + P3 + P4) / 4	88.33%	80.0 %	PASS	

Detailed Results for Radar Type 1

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	41	1.000	2181.000	25	YES	
2	33	1.000	1400.000	38	No	
3	8	1.000	658.000	81	YES	
4	47	1.000	2767.000	20	YES	
5	26	1.000	717.000	74	YES	
6	14	1.000	778.000	68	YES	
7	35	1.000	1596.000	34	YES	
8	50	1.000	3060.000	18	YES	
9	2	1.000	538.000	99	YES	
10	32	1.000	1303.000	41	YES	
11	4	1.000	578.000	92	YES	
12	6	1.000	618.000	86	YES	
13	25	1.000	620.000	86	YES	
14	17	1.000	838.000	63	YES	
15	49	1.000	2962.000	18	No	
16	37	1.000	1791.000	30	YES	
17	15	1.000	798.000	67	YES	
18	29	1.000	1010.000	53	YES	
19	3	1.000	558.000	95	YES	
20	22	1.000	938.000	57	YES	
21	31	1.000	1205.000	44	YES	
22	1	1.000	518.000	102	YES	
23	16	1.000	818.000	65	YES	
24	11	1.000	718.000	74	YES	
25	12	1.000	738.000	72	YES	
26	19	1.000	878.000	61	YES	
27	10	1.000	698.000	76	YES	
28	43	1.000	2376.000	23	YES	
29	5	1.000	598.000	89	YES	
30	20	1.000	898.000	59	YES	

Detailed Results for Radar Type 2

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	36	2.600	172.000	26	YES	
2	31	2.600	170.000	26	YES	
3	4	1.500	215.000	24	YES	
4	24	2.000	151.000	24	YES	
5	25	3.600	228.000	23	YES	
6	10	1.900	176.000	23	YES	
7	23	3.700	220.000	26	No	
8	32	3.000	170.000	28	No	
9	41	1.400	174.000	24	YES	
10	45	3.400	191.000	28	YES	
11	50	4.700	224.000	29	YES	
12	44	4.200	213.000	26	YES	
13	17	3.100	152.000	25	YES	
14	21	4.300	156.000	27	YES	
15	48	3.300	180.000	24	YES	
16	38	3.000	205.000	24	YES	
17	27	2.200	225.000	26	No	
18	49	3.700	176.000	24	YES	
19	9	2.400	164.000	27	YES	
20	42	1.200	215.000	25	No	
21	3	3.700	201.000	24	YES	
22	1	1.000	208.000	28	YES	
23	28	1.400	195.000	25	YES	
24	12	3.000	226.000	25	YES	
25	6	4.100	210.000	26	No	
26	20	3.200	211.000	24	YES	
27	33	4.000	223.000	27	YES	
28	46	2.600	157.000	24	YES	
29	8	2.600	164.000	27	YES	
30	19	4.500	152.000	25	YES	

Detailed Results for Radar Type 3

rial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	34	8.000	321.000	18	YES	
2	24	7.500	425.000	17	YES	
3	47	6.200	322.000	16	YES	
4	29	8.700	291.000	17	YES	
5	16	6.200	465.000	17	YES	
6	5	8.900	357.000	16	YES	
7	3	6.600	426.000	16	No	
8	12	6.800	397.000	18	YES	
9	13	6.300	234.000	17	YES	
10	2	7.400	287.000	17	YES	
11	25	9.600	334.000	16	YES	
12	23	10.000	353.000	17	YES	
13	37	6.500	223.000	16	No	
14	50	9.000	372.000	17	YES	
15	44	6.100	334.000	17	YES	
16	33	9.200	381.000	17	YES	
17	18	6.200	485.000	17	YES	
18	7	9.600	383.000	17	YES	
19	48	8.900	238.000	17	No	
20	45	9.900	223.000	17	YES	
21	46	8.400	256.000	18	YES	
22	22	7.500	374.000	16	YES	
23	4	8.500	297.000	17	YES	
24	39	6.100	323.000	16	YES	
25	35	8.300	492.000	18	YES	
26	42	6.400	314.000	17	No	
27	15	8.900	352.000	16	YES	
28	49	7.400	226.000	17	No	
29	32	9.900	239.000	16	YES	
30	28	9.400	282.000	16	YES	

Detailed Results for Radar Type 4

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	24	11.200	265.000	13	YES	
2	42	11.800	291.000	12	YES	
3	22	16.800	391.000	15	YES	
4	36	12.400	226.000	12	YES	
5	19	16.400	354.000	16	YES	
6	6	12.100	433.000	13	YES	
7	14	12.500	359.000	16	No	
8	7	16.400	477.000	14	YES	
9	38	14.600	376.000	14	YES	
10	17	18.100	399.000	14	YES	
11	48	16.700	208.000	13	YES	
12	49	17.400	265.000	12	YES	
13	26	12.900	405.000	16	YES	
14	21	19.100	220.000	13	YES	
15	20	15.000	269.000	15	YES	
16	8	13.300	253.000	14	No	
17	33	14.200	352.000	15	YES	
18	27	18.400	259.000	13	YES	
19	15	16.500	263.000	15	YES	
20	37	13.000	305.000	14	YES	
21	44	12.200	209.000	15	YES	
22	35	14.100	290.000	14	YES	
23	10	16.800	490.000	13	YES	
24	18	13.500	264.000	14	YES	
25	28	12.500	280.000	13	YES	
26	12	15.300	296.000	15	YES	
27	31	18.100	312.000	13	YES	
28	50	16.100	342.000	13	YES	
29	4	12.400	468.000	14	YES	
30	5	15.500	325.000	13	YES	

Detailed Results for Radar Type 5

Trial Number	Random Trial used	Pulse Width (µs)	No. of Pulses	Chirp width (MHz)	Pulses Detected
1	25	73.100	2	19.000000	No
2	50	73.500	1	5.000000	YES
3	8	90.700	1	5.000000	YES
4	36	95.600	2	8.000000	YES
5	14	86.300	3	18.000000	YES
6	43	69.300	2	10.000000	YES
7	40	66.500	3	6.000000	YES
8	9	67.000	2	17.000000	YES
9	23	87.800	2	9.000000	YES
10	46	52.100	2	11.000000	YES
11	41	83.000	2	20.000000	No
12	27	67.900	1	14.000000	YES
13	24	82.600	1	8.000000	YES
14	16	70.900	2	13.000000	YES
15	21	79.300	2	15.000000	YES
16	45	75.100	2	9.000000	YES
17	18	61.800	1	5.000000	YES
18	22	85.500	1	20.000000	No
19	6	60.200	2	14.000000	YES
20	29	52.100	1	20.000000	YES
21	4	69.600	2	15.000000	YES
22	12	58.000	1	17.000000	YES
23	48	96.300	2	7.000000	YES
24	39	73.100	3	15.000000	YES
25	47	82.900	2	16.000000	YES
26	19	50.100	3	9.000000	YES
27	42	50.100	3	12.000000	YES
28	26	72.300	2	7.000000	YES
29	7	66.400	2	6.000000	YES
30	1	54.600	1	12.000000	YES

(continuation of the "Detailed Results for Radar Type 5" table from column 6 ...)

Trial Number	Comment
1	Data of first burst shown; no. of different Bursts = 19
2	Data of first burst shown; no. of different Bursts = 18
3	Data of first burst shown; no. of different Bursts = 15
4	Data of first burst shown; no. of different Bursts = 17
5	Data of first burst shown; no. of different Bursts = 8
6	Data of first burst shown; no. of different Bursts = 11
7	Data of first burst shown; no. of different Bursts = 8
8	Data of first burst shown; no. of different Bursts = 16
9	Data of first burst shown; no. of different Bursts = 17
10	Data of first burst shown; no. of different Bursts = 14
11	Data of first burst shown; no. of different Bursts = 9
12	Data of first burst shown; no. of different Bursts = 8
13	Data of first burst shown; no. of different Bursts = 18
14	Data of first burst shown; no. of different Bursts = 10
15	Data of first burst shown; no. of different Bursts = 15
16	Data of first burst shown; no. of different Bursts = 13
17	Data of first burst shown; no. of different Bursts = 12
18	Data of first burst shown; no. of different Bursts = 16
19	Data of first burst shown; no. of different Bursts = 13
20	Data of first burst shown; no. of different Bursts = 10
21	Data of first burst shown; no. of different Bursts = 11
22	Data of first burst shown; no. of different Bursts = 19
23	Data of first burst shown; no. of different Bursts = 16
24	Data of first burst shown; no. of different Bursts = 20
25	Data of first burst shown; no. of different Bursts = 15
26	Data of first burst shown; no. of different Bursts = 13
27	Data of first burst shown; no. of different Bursts = 10

28	**Data of first burst shown; no. of different Bursts = 20**
29	**Data of first burst shown; no. of different Bursts = 14**
30	**Data of first burst shown; no. of different Bursts = 8**

Detailed Results for Radar Type 6

Trial Number	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	1.000	333.000	9	YES	
2	1.000	333.000	9	YES	
3	1.000	333.000	9	YES	
4	1.000	333.000	9	YES	
5	1.000	333.000	9	YES	
6	1.000	333.000	9	YES	
7	1.000	333.000	9	YES	
8	1.000	333.000	9	YES	
9	1.000	333.000	9	YES	
10	1.000	333.000	9	YES	
11	1.000	333.000	9	YES	
12	1.000	333.000	9	YES	
13	1.000	333.000	9	YES	
14	1.000	333.000	9	YES	
15	1.000	333.000	9	YES	
16	1.000	333.000	9	YES	
17	1.000	333.000	9	YES	
18	1.000	333.000	9	YES	
19	1.000	333.000	9	YES	
20	1.000	333.000	9	No	
21	1.000	333.000	9	YES	
22	1.000	333.000	9	YES	
23	1.000	333.000	9	YES	
24	1.000	333.000	9	YES	
25	1.000	333.000	9	YES	
26	1.000	333.000	9	YES	
27	1.000	333.000	9	YES	
28	1.000	333.000	9	YES	
29	1.000	333.000	9	YES	
30	1.000	333.000	9	YES	

Radar level verification

Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	7.35	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	70.35	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-63.00	dBm

Settings for Radar Type 1 to 4

Setting	Instrument Value	Target Value
Center Frequency	5.50000 GHz	5.50000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	12.000 s	12.000 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	1.000 s	1.000 s

Settings for Long Pulse Radar Type 5 (Simulated)

Setting	Instrument Value	Target Value
Center Frequency	0.00000 mHz	0.00000 mHz
Span	0.000 mHz	0.000 mHz
RBW	0.000 mHz	~ 0.000 mHz
VBW	0.000 mHz	~ 0.000 mHz
SweepPoints	0	~ 0
Sweeptime	0.000 ms	0.000 ms
Reference Level	0.000 dBm	0.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	RMS	RMS
SweepCount	0	0
Filter	3 dB	3 dB
Trace Mode		~
Sweeptype	AUTO	AUTO
Preamp	off	off

Settings for Freq. Hopping Radar Type 6 (Simulated)

Setting	Instrument Value	Target Value
Center Frequency	0.00000 mHz	0.00000 mHz
Span	0.000 mHz	0.000 mHz
RBW	0.000 mHz	~ 0.000 mHz
VBW	0.000 mHz	~ 0.000 mHz
SweepPoints	0	~ 0
Sweeptime	0.000 ms	0.000 ms
Reference Level	0.000 dBm	0.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	RMS	RMS
SweepCount	0	0
Filter	3 dB	3 dB
Trace Mode		~
Sweeptype	AUTO	AUTO
Preamp	off	off

DFS Statistical Performance Check (5510 MHz; 40 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Detection count	Percentage of Detection Px	Detection Limit	Overall Result	Overall Comment
5510.000000	1	30 of 30	100.00%	60.0 %	PASS	
5510.000000	2	26 of 30	86.67%	60.0 %	PASS	
5510.000000	3	29 of 30	96.67%	60.0 %	PASS	
5510.000000	4	30 of 30	100.00%	60.0 %	PASS	
5510.000000	5	30 of 30	100.00%	80.0 %	PASS	
5510.000000	6	30 of 30	100.00%	70.0 %	PASS	

Aggregate Results for Short Pulse Radar Type 1-4

Aggregate Calculation as follows	Aggregate Percentage	Aggregate Limit	Aggregate Result	Aggregate Comment
(P1 + P2 + P3 + P4) / 4	95.83%	80.0 %	PASS	

Detailed Results for Radar Type 1

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	22	1.000	938.000	57	YES	
2	44	1.000	2474.000	22	YES	
3	17	1.000	838.000	63	YES	
4	33	1.000	1400.000	38	YES	
5	4	1.000	578.000	92	YES	
6	43	1.000	2376.000	23	YES	
7	10	1.000	698.000	76	YES	
8	23	1.000	3066.000	18	YES	
9	6	1.000	618.000	86	YES	
10	39	1.000	1986.000	27	YES	
11	30	1.000	1108.000	48	YES	
12	11	1.000	718.000	74	YES	
13	16	1.000	818.000	65	YES	
14	32	1.000	1303.000	41	YES	
15	35	1.000	1596.000	34	YES	
16	15	1.000	798.000	67	YES	
17	42	1.000	2279.000	24	YES	
18	40	1.000	2084.000	26	YES	
19	5	1.000	598.000	89	YES	
20	18	1.000	858.000	62	YES	
21	2	1.000	538.000	99	YES	
22	46	1.000	2669.000	20	YES	
23	50	1.000	3060.000	18	YES	
24	31	1.000	1205.000	44	YES	
25	38	1.000	1888.000	28	YES	
26	48	1.000	2864.000	19	YES	
27	7	1.000	638.000	83	YES	
28	47	1.000	2767.000	20	YES	
29	20	1.000	898.000	59	YES	
30	1	1.000	518.000	102	YES	

Detailed Results for Radar Type 2

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	5	3.700	222.000	26	YES	
2	40	3.400	169.000	28	YES	
3	9	2.400	164.000	27	No	
4	12	3.000	226.000	25	YES	
5	2	2.600	215.000	26	YES	
6	37	1.200	215.000	26	YES	
7	41	1.400	174.000	24	YES	
8	21	4.300	156.000	27	YES	
9	3	3.700	201.000	24	YES	
10	24	2.000	151.000	24	YES	
11	32	3.000	170.000	28	YES	
12	44	4.200	213.000	26	YES	
13	33	4.000	223.000	27	YES	
14	31	2.600	170.000	26	YES	
15	48	3.300	180.000	24	No	
16	46	2.600	157.000	24	YES	
17	19	4.500	152.000	25	YES	
18	27	2.200	225.000	26	YES	
19	10	1.900	176.000	23	YES	
20	42	1.200	215.000	25	YES	
21	34	2.900	207.000	24	YES	
22	30	1.200	214.000	27	YES	
23	8	2.600	164.000	27	No	
24	26	1.100	203.000	28	YES	
25	1	1.000	208.000	28	YES	
26	29	5.000	176.000	26	YES	
27	15	3.700	201.000	29	No	
28	13	2.200	219.000	25	YES	
29	11	4.700	182.000	24	YES	
30	7	4.500	210.000	25	YES	

Detailed Results for Radar Type 3

rial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	9	6.900	347.000	17	YES	
2	44	6.100	334.000	17	YES	
3	37	6.500	223.000	16	YES	
4	30	6.000	300.000	17	YES	
5	27	6.400	276.000	16	YES	
6	21	7.500	365.000	18	YES	
7	18	6.200	485.000	17	YES	
8	4	8.500	297.000	17	YES	
9	48	8.900	238.000	17	YES	
10	19	7.200	223.000	17	YES	
11	16	6.200	465.000	17	YES	
12	11	7.000	272.000	17	No	
13	49	7.400	226.000	17	YES	
14	42	6.400	314.000	17	YES	
15	43	8.900	448.000	17	YES	
16	2	7.400	287.000	17	YES	
17	1	9.800	322.000	18	YES	
18	41	7.000	452.000	17	YES	
19	38	7.000	425.000	18	YES	
20	12	6.800	397.000	18	YES	
21	20	6.200	416.000	17	YES	
22	15	8.900	352.000	16	YES	
23	6	6.600	313.000	16	YES	
24	34	8.000	321.000	18	YES	
25	25	9.600	334.000	16	YES	
26	50	9.000	372.000	17	YES	
27	35	8.300	492.000	18	YES	
28	39	6.100	323.000	16	YES	
29	8	6.800	202.000	18	YES	
30	7	9.600	383.000	17	YES	

Detailed Results for Radar Type 4

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	27	18.400	259.000	13	YES	
2	39	14.800	500.000	15	YES	
3	7	16.400	477.000	14	YES	
4	42	11.800	291.000	12	YES	
5	23	11.300	491.000	16	YES	
6	38	14.600	376.000	14	YES	
7	25	12.000	210.000	14	YES	
8	37	13.000	305.000	14	YES	
9	43	19.500	243.000	13	YES	
10	48	16.700	208.000	13	YES	
11	36	12.400	226.000	12	YES	
12	8	13.300	253.000	14	YES	
13	3	15.000	300.000	13	YES	
14	28	12.500	280.000	13	YES	
15	19	16.400	354.000	16	YES	
16	49	17.400	265.000	12	YES	
17	26	12.900	405.000	16	YES	
18	50	16.100	342.000	13	YES	
19	40	18.200	498.000	12	YES	
20	4	12.400	468.000	14	YES	
21	18	13.500	264.000	14	YES	
22	29	19.000	465.000	15	YES	
23	30	18.600	407.000	14	YES	
24	10	16.800	490.000	13	YES	
25	33	14.200	352.000	15	YES	
26	13	11.100	270.000	14	YES	
27	31	18.100	312.000	13	YES	
28	21	19.100	220.000	13	YES	
29	12	15.300	296.000	15	YES	
30	45	15.300	441.000	13	YES	

Detailed Results for Radar Type 5

Trial Number	Random Trial used	Pulse Width (µs)	No. of Pulses	Chirp width (MHz)	Pulses Detected
1	5	91.700	2	10.000000	YES
2	10	61.400	3	8.000000	YES
3	27	67.900	1	14.000000	YES
4	26	72.300	2	7.000000	YES
5	40	66.500	3	6.000000	YES
6	14	86.300	3	18.000000	YES
7	4	69.600	2	15.000000	YES
8	22	85.500	1	20.000000	YES
9	36	95.600	2	8.000000	YES
10	15	95.900	2	18.000000	YES
11	13	53.400	2	19.000000	YES
12	28	50.300	1	12.000000	YES
13	18	61.800	1	5.000000	YES
14	25	73.100	2	19.000000	YES
15	29	52.100	1	20.000000	YES
16	11	77.000	2	11.000000	YES
17	39	73.100	3	15.000000	YES
18	44	54.500	1	14.000000	YES
19	8	90.700	1	5.000000	YES
20	21	79.300	2	15.000000	YES
21	42	50.100	3	12.000000	YES
22	20	63.100	2	7.000000	YES
23	19	50.100	3	9.000000	YES
24	1	54.600	1	12.000000	YES
25	35	96.900	1	18.000000	YES
26	7	66.400	2	6.000000	YES
27	45	75.100	2	9.000000	YES
28	43	69.300	2	10.000000	YES
29	6	60.200	2	14.000000	YES
30	31	61.900	3	10.000000	YES

(continuation of the "Detailed Results for Radar Type 5" table from column 6 ...)

Trial Number	Comment
1	Data of first burst shown; no. of different Bursts = 12
2	Data of first burst shown; no. of different Bursts = 17
3	Data of first burst shown; no. of different Bursts = 8
4	Data of first burst shown; no. of different Bursts = 20
5	Data of first burst shown; no. of different Bursts = 8
6	Data of first burst shown; no. of different Bursts = 8
7	Data of first burst shown; no. of different Bursts = 11
8	Data of first burst shown; no. of different Bursts = 16
9	Data of first burst shown; no. of different Bursts = 17
10	Data of first burst shown; no. of different Bursts = 9
11	Data of first burst shown; no. of different Bursts = 20
12	Data of first burst shown; no. of different Bursts = 9
13	Data of first burst shown; no. of different Bursts = 12
14	Data of first burst shown; no. of different Bursts = 19
15	Data of first burst shown; no. of different Bursts = 10
16	Data of first burst shown; no. of different Bursts = 18
17	Data of first burst shown; no. of different Bursts = 20
18	Data of first burst shown; no. of different Bursts = 12
19	Data of first burst shown; no. of different Bursts = 15
20	Data of first burst shown; no. of different Bursts = 15
21	Data of first burst shown; no. of different Bursts = 10
22	Data of first burst shown; no. of different Bursts = 14
23	Data of first burst shown; no. of different Bursts = 13
24	Data of first burst shown; no. of different Bursts = 8
25	Data of first burst shown; no. of different Bursts = 16
26	Data of first burst shown; no. of different Bursts = 14
27	Data of first burst shown; no. of different Bursts = 13

28	Data of first burst shown; no. of different Bursts = 11
29	Data of first burst shown; no. of different Bursts = 13
30	Data of first burst shown; no. of different Bursts = 12

Detailed Results for Radar Type 6

Trial Number	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	1.000	333.000	9	YES	
2	1.000	333.000	9	YES	
3	1.000	333.000	9	YES	
4	1.000	333.000	9	YES	
5	1.000	333.000	9	No	
6	1.000	333.000	9	YES	
7	1.000	333.000	9	YES	
8	1.000	333.000	9	YES	
9	1.000	333.000	9	YES	
10	1.000	333.000	9	YES	
11	1.000	333.000	9	YES	
12	1.000	333.000	9	YES	
13	1.000	333.000	9	YES	
14	1.000	333.000	9	YES	
15	1.000	333.000	9	YES	
16	1.000	333.000	9	YES	
17	1.000	333.000	9	YES	
18	1.000	333.000	9	YES	
19	1.000	333.000	9	YES	
20	1.000	333.000	9	YES	
21	1.000	333.000	9	YES	
22	1.000	333.000	9	YES	
23	1.000	333.000	9	YES	
24	1.000	333.000	9	YES	
25	1.000	333.000	9	YES	
26	1.000	333.000	9	YES	
27	1.000	333.000	9	YES	
28	1.000	333.000	9	YES	
29	1.000	333.000	9	YES	
30	1.000	333.000	9	YES	

Radar level verification

Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	6.92	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	69.92	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-63.00	dBm

DFS Statistical Performance Check (5530 MHz; 80 MHz)

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Detection count	Percentage of Detection Px	Detection Limit	Overall Result	Overall Comment
5530.000000	1	27 of 30	90.00%	60.0 %	PASS	
5530.000000	2	27 of 30	90.00%	60.0 %	PASS	
5530.000000	3	27 of 30	90.00%	60.0 %	PASS	
5530.000000	4	27 of 30	90.00%	60.0 %	PASS	
5530.000000	5	29 of 30	96.67%	80.0 %	PASS	
5530.000000	6	30 of 30	100.00%	70.0 %	PASS	

Aggregate Results for Short Pulse Radar Type 1-4

Aggregate Calculation as follows	Aggregate Percentage	Aggregate Limit	Aggregate Result	Aggregate Comment
(P1 + P2 + P3 + P4) / 4	90.00%	80.0 %	PASS	

Detailed Results for Radar Type 1

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	23	1.000	3066.000	18	YES	
2	25	1.000	620.000	86	YES	
3	10	1.000	698.000	76	YES	
4	48	1.000	2864.000	19	YES	
5	18	1.000	858.000	62	YES	
6	17	1.000	838.000	63	YES	
7	35	1.000	1596.000	34	No	
8	33	1.000	1400.000	38	YES	
9	24	1.000	522.000	102	YES	
10	21	1.000	918.000	58	YES	
11	41	1.000	2181.000	25	YES	
12	37	1.000	1791.000	30	YES	
13	16	1.000	818.000	65	YES	
14	8	1.000	658.000	81	YES	
15	43	1.000	2376.000	23	YES	
16	47	1.000	2767.000	20	No	
17	44	1.000	2474.000	22	YES	
18	50	1.000	3060.000	18	YES	
19	15	1.000	798.000	67	YES	
20	1	1.000	518.000	102	YES	
21	46	1.000	2669.000	20	YES	
22	7	1.000	638.000	83	YES	
23	12	1.000	738.000	72	YES	
24	13	1.000	758.000	70	YES	
25	45	1.000	2572.000	21	No	
26	19	1.000	878.000	61	YES	
27	22	1.000	938.000	57	YES	
28	9	1.000	678.000	78	YES	
29	27	1.000	815.000	65	YES	
30	6	1.000	618.000	86	YES	

Detailed Results for Radar Type 2

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	22	3.700	226.000	28	YES	
2	18	3.400	163.000	25	YES	
3	32	3.000	170.000	28	YES	
4	7	4.500	210.000	25	YES	
5	15	3.700	201.000	29	YES	
6	39	3.200	208.000	25	YES	
7	24	2.000	151.000	24	No	
8	8	2.600	164.000	27	YES	
9	37	1.200	215.000	26	YES	
10	45	3.400	191.000	28	YES	
11	34	2.900	207.000	24	YES	
12	2	2.600	215.000	26	YES	
13	26	1.100	203.000	28	YES	
14	1	1.000	208.000	28	YES	
15	12	3.000	226.000	25	YES	
16	38	3.000	205.000	24	No	
17	30	1.200	214.000	27	YES	
18	23	3.700	220.000	26	YES	
19	31	2.600	170.000	26	No	
20	44	4.200	213.000	26	YES	
21	41	1.400	174.000	24	YES	
22	19	4.500	152.000	25	YES	
23	43	4.000	216.000	28	YES	
24	21	4.300	156.000	27	YES	
25	9	2.400	164.000	27	YES	
26	27	2.200	225.000	26	YES	
27	33	4.000	223.000	27	YES	
28	49	3.700	176.000	24	YES	
29	28	1.400	195.000	25	YES	
30	40	3.400	169.000	28	YES	

Detailed Results for Radar Type 3

rial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	26	7.700	362.000	17	YES	
2	34	8.000	321.000	18	YES	
3	6	6.600	313.000	16	No	
4	18	6.200	485.000	17	YES	
5	41	7.000	452.000	17	YES	
6	46	8.400	256.000	18	YES	
7	7	9.600	383.000	17	YES	
8	17	9.400	363.000	18	YES	
9	5	8.900	357.000	16	YES	
10	28	9.400	282.000	16	YES	
11	42	6.400	314.000	17	YES	
12	12	6.800	397.000	18	YES	
13	29	8.700	291.000	17	YES	
14	45	9.900	223.000	17	YES	
15	31	8.600	330.000	17	No	
16	24	7.500	425.000	17	YES	
17	40	9.000	302.000	17	YES	
18	30	6.000	300.000	17	YES	
19	19	7.200	223.000	17	YES	
20	9	6.900	347.000	17	YES	
21	25	9.600	334.000	16	YES	
22	16	6.200	465.000	17	YES	
23	4	8.500	297.000	17	No	
24	37	6.500	223.000	16	YES	
25	14	7.300	487.000	16	YES	
26	50	9.000	372.000	17	YES	
27	48	8.900	238.000	17	YES	
28	33	9.200	381.000	17	YES	
29	1	9.800	322.000	18	YES	
30	11	7.000	272.000	17	YES	

Detailed Results for Radar Type 4

Trial Number	Random Trial used	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	34	11.700	466.000	14	YES	
2	4	12.400	468.000	14	YES	
3	40	18.200	498.000	12	YES	
4	18	13.500	264.000	14	No	
5	26	12.900	405.000	16	YES	
6	42	11.800	291.000	12	YES	
7	17	18.100	399.000	14	YES	
8	45	15.300	441.000	13	YES	
9	9	15.000	382.000	13	YES	
10	33	14.200	352.000	15	YES	
11	48	16.700	208.000	13	YES	
12	37	13.000	305.000	14	YES	
13	49	17.400	265.000	12	YES	
14	1	17.900	245.000	13	No	
15	11	11.100	270.000	14	YES	
16	46	14.300	448.000	15	YES	
17	27	18.400	259.000	13	YES	
18	47	15.200	296.000	14	YES	
19	23	11.300	491.000	16	YES	
20	2	15.000	211.000	16	YES	
21	32	18.300	461.000	13	YES	
22	39	14.800	500.000	15	YES	
23	38	14.600	376.000	14	YES	
24	7	16.400	477.000	14	YES	
25	14	12.500	359.000	16	YES	
26	21	19.100	220.000	13	YES	
27	36	12.400	226.000	12	YES	
28	3	15.000	300.000	13	YES	
29	12	15.300	296.000	15	No	
30	5	15.500	325.000	13	YES	

Detailed Results for Radar Type 5

Trial Number	Random Trial used	Pulse Width (µs)	No. of Pulses	Chirp width (MHz)	Pulses Detected
1	23	87.800	2	9.000000	YES
2	39	73.100	3	15.000000	YES
3	13	53.400	2	19.000000	YES
4	43	69.300	2	10.000000	YES
5	11	77.000	2	11.000000	YES
6	17	92.300	1	11.000000	YES
7	30	55.300	3	16.000000	No
8	34	93.500	3	13.000000	YES
9	38	88.400	3	17.000000	YES
10	48	96.300	2	7.000000	YES
11	46	52.100	2	11.000000	YES
12	2	79.400	1	16.000000	YES
13	44	54.500	1	14.000000	YES
14	8	90.700	1	5.000000	YES
15	31	61.900	3	10.000000	YES
16	41	83.000	2	20.000000	YES
17	37	67.700	3	5.000000	YES
18	14	86.300	3	18.000000	YES
19	22	85.500	1	20.000000	YES
20	5	91.700	2	10.000000	YES
21	33	66.100	2	11.000000	YES
22	50	73.500	1	5.000000	YES
23	12	58.000	1	17.000000	YES
24	28	50.300	1	12.000000	YES
25	24	82.600	1	8.000000	YES
26	16	70.900	2	13.000000	YES
27	42	50.100	3	12.000000	YES
28	27	67.900	1	14.000000	YES
29	3	66.900	1	13.000000	YES
30	25	73.100	2	19.000000	YES

(continuation of the "Detailed Results for Radar Type 5" table from column 6 ...)

Trial Number	Comment
1	Data of first burst shown; no. of different Bursts = 17
2	Data of first burst shown; no. of different Bursts = 20
3	Data of first burst shown; no. of different Bursts = 20
4	Data of first burst shown; no. of different Bursts = 11
5	Data of first burst shown; no. of different Bursts = 18
6	Data of first burst shown; no. of different Bursts = 11
7	Data of first burst shown; no. of different Bursts = 11
8	Data of first burst shown; no. of different Bursts = 15
9	Data of first burst shown; no. of different Bursts = 19
10	Data of first burst shown; no. of different Bursts = 16
11	Data of first burst shown; no. of different Bursts = 14
12	Data of first burst shown; no. of different Bursts = 9
13	Data of first burst shown; no. of different Bursts = 12
14	Data of first burst shown; no. of different Bursts = 15
15	Data of first burst shown; no. of different Bursts = 12
16	Data of first burst shown; no. of different Bursts = 9
17	Data of first burst shown; no. of different Bursts = 18
18	Data of first burst shown; no. of different Bursts = 8
19	Data of first burst shown; no. of different Bursts = 16
20	Data of first burst shown; no. of different Bursts = 12
21	Data of first burst shown; no. of different Bursts = 14
22	Data of first burst shown; no. of different Bursts = 18
23	Data of first burst shown; no. of different Bursts = 19
24	Data of first burst shown; no. of different Bursts = 9
25	Data of first burst shown; no. of different Bursts = 18
26	Data of first burst shown; no. of different Bursts = 10
27	Data of first burst shown; no. of different Bursts = 10

28	**Data of first burst shown; no. of different Bursts = 8**
29	**Data of first burst shown; no. of different Bursts = 10**
30	**Data of first burst shown; no. of different Bursts = 19**

Detailed Results for Radar Type 6

Trial Number	Pulse Width (µs)	PRI (µs)	No. of Pulses	Pulses Detected	Comment
1	1.000	333.000	9	YES	
2	1.000	333.000	9	YES	
3	1.000	333.000	9	YES	
4	1.000	333.000	9	YES	
5	1.000	333.000	9	YES	
6	1.000	333.000	9	YES	
7	1.000	333.000	9	YES	
8	1.000	333.000	9	YES	
9	1.000	333.000	9	YES	
10	1.000	333.000	9	YES	
11	1.000	333.000	9	YES	
12	1.000	333.000	9	YES	
13	1.000	333.000	9	YES	
14	1.000	333.000	9	YES	
15	1.000	333.000	9	YES	
16	1.000	333.000	9	YES	
17	1.000	333.000	9	YES	
18	1.000	333.000	9	YES	
19	1.000	333.000	9	YES	
20	1.000	333.000	9	YES	
21	1.000	333.000	9	YES	
22	1.000	333.000	9	YES	
23	1.000	333.000	9	YES	
24	1.000	333.000	9	YES	
25	1.000	333.000	9	YES	
26	1.000	333.000	9	YES	
27	1.000	333.000	9	YES	
28	1.000	333.000	9	YES	
29	1.000	333.000	9	YES	
30	1.000	333.000	9	YES	

Radar level verification

Description	Value	Unit
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-64	dBm
Vector Generator level setting	7.13	dBm
Configured overall pathlost from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	70.13	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-63.00	dBm

Settings for Radar Type 1 to 4

Setting	Instrument Value	Target Value
Center Frequency	5.53000 GHz	5.53000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
Sweeptime	12.000 s	12.000 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	1.000 s	1.000 s

Settings for Long Pulse Radar Type 5 (Simulated)

Setting	Instrument Value	Target Value
Center Frequency	0.00000 mHz	0.00000 mHz
Span	0.000 mHz	0.000 mHz
RBW	0.000 mHz	~ 0.000 mHz
VBW	0.000 mHz	~ 0.000 mHz
SweepPoints	0	~ 0
Sweeptime	0.000 ms	0.000 ms
Reference Level	0.000 dBm	0.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	RMS	RMS
SweepCount	0	0
Filter	3 dB	3 dB
Trace Mode		~
Sweeptype	AUTO	AUTO
Preamp	off	off

Settings for Freq. Hopping Radar Type 6 (Simulated)

Setting	Instrument Value	Target Value
Center Frequency	0.00000 mHz	0.00000 mHz
Span	0.000 mHz	0.000 mHz
RBW	0.000 mHz	~ 0.000 mHz
VBW	0.000 mHz	~ 0.000 mHz
SweepPoints	0	~ 0
Sweeptime	0.000 ms	0.000 ms
Reference Level	0.000 dBm	0.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	RMS	RMS
SweepCount	0	0
Filter	3 dB	3 dB
Trace Mode		~
Sweeptype	AUTO	AUTO
Preamp	off	off

END OF REPORT