
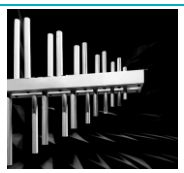
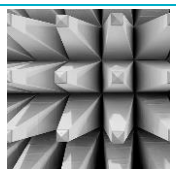

CTC advanced member of RWTÜV group

Bundesnetzagentur

BNetzA-CAB-02/21-102

TEST REPORT

Test report no.: 1-6596/18-01-03

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-03

Testing laboratory

CTC advanced GmbH
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Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-03

Applicant

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06851 Connecticut / UNITED STATES
Contact: Michael Fass
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Phone: +1 20 38 22 77 22

Manufacturer

Datto, Inc.
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Test standard/s

FCC - Title 47 CFR Part 15	FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence - Exempt Local Area Network (LE-LAN) Devices

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**WLAN Access Point IEEE 802.11 a/b/g/n/ac (160MHz)**
Model name:	**A62 (AP62)**
FCC ID:	**WT8OMA62**
IC:	**10103A-OMA62**
Frequency:	UNII bands; 5150MHz to 5350MHz, 5470MHz to 5600MHz & 5650MHz to 5725MHz
Technology tested:	WLAN (DFS only)
Antenna:	four integrated antennas
Power supply:	PoE Input 48-54V/0,5A ; 24V/1A
Temperature range:	0°C to +40°C

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

cn=Rene Oelmann, o=CTC advanced GmbH, ou=OEL-171123, email=rene.oelmann@ctcadvanced.com, c=DE
2018.10.24 13:50:05 +02'00'

René Oelmann
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Test performed:

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Datum: 2018.10.24 11:19:36 +02'00'

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Lab Manager
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1 Table of contents

2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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2.2 Application details

Date of receipt of order:	2018-08-07
Date of receipt of test item:	2018-09-20
Start of test:	2018-09-24
End of test:	2018-10-11
Person(s) present during the test:	-/-

2.3 Test laboratories sub-contracted

None

3 Test standard/s and references

Test standard	Date	Description
FCC - Title 47 CFR Part 15		FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 247 Issue 2	February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence - Exempt Local Area Network (LE-LAN) Devices

Guidance	Version	Description
UNII: KDB 789033 D02	v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E
ANSI C63.10-2013	-/-	American national standard of procedures for compliance testing of unlicensed wireless devices
KDB 662911 D01	v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
UNII: KDB 905462 D02	v02	Compliance measurement procedures for unlicensed - national information infrastructure devices operating in the 5250 - 5350 MHz and 5470 - 5725 MHz bands incorporating dynamic frequency selection
UNII: KDB 905462 D03	v01r02	Client Without DFS New Rules
UNII: KDB 905462 D04	v01	Operational Modes for DFS Testing New Rules

4 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+22 °C during room temperature tests No testing required under extreme conditions. No testing required under extreme conditions.
Relative humidity content	:		45 %
Barometric pressure	:		not relevant for this kind of testing
Power supply	:	V_{nom} V_{max} V_{min}	PoE Input 48-54V/0,5A ; 24V/1A No testing required under extreme conditions. No testing required under extreme conditions.

5 Test item

5.1 General description

Kind of test item	:	WLAN Access Point IEEE 802.11 a/b/g/n/ac (160MHz)
Type identification	:	A62 (AP62)
HMN	:	A62 (AP62)
PMN	:	A62 (AP62)
HVIN	:	10103A-OMA62
FVIN	:	6.5
S/N serial number	:	A1817016971
Hardware status	:	Not provided
Software status	:	Not provided
Firmware status	:	Ng6.5
Frequency band	:	UNII bands; 5150MHz to 5350MHz, 5470MHz to 5600MHz & 5650MHz to 5725MHz*
Type of radio transmission Use of frequency spectrum	: :	OFDM
Type of modulation	:	BPSK, QPSK, 16 – QAM, 64 – QAM
Channel bandwidth (B)	:	20MHz, 40MHz, 80MHz & 160MHz*
Antenna	:	four integrated antennas; ANT-1: 6525A0041300 (max. Gain 4.5 dBi), ANT-2: 6525A0042300 (max Gain 4.2 dBi), ANT-3: 6525A0041300 (max. Gain 4.4 dBi), ANT-4: 6525A0042300 (max Gain 4.4 dBi) Antenna information provided by customer: -OM_A62_antenna testing report_20170815 (3) Note: Calculation of the Interference Threshold is based on the lowest peak gain provided by the customer (4.2dBi). The lowest peak gain is considered to represent the worst case as it is less possible lower level interference signals pass the internal threshold.
Power supply	:	PoE Input 48-54V/0,5A ; 24V/1A
Temperature range	:	0°C to +40°C

* Note: The DUT contains two different radio modules. Each radio module is assigned to a different operating frequency range (5150MHz to 5350MHz or 5470MHz to 5725MHz).
Radio1 operating in the 5150MHz to 5350MHz band supports bandwidth up to 160MHz.
Radio2 operating in the 5470MHz to 5725MHz band supports bandwidth up to 80MHz.

5.2 Additional information

Test setup and EUT photos are included in test report: 1-6596/18-01-01_AnnexA
1-6596/18-01-01_AnnexB
1-6596/18-01-01_AnnexD

6 Measurement uncertainty

Measurement uncertainty	
Test case	**Uncertainty**
Frequency accuracy (radar burst)	0.1 Hz
Level accuracy (radar burst)	± 0.8 dB

7 Summary of measurement results

☐	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☒	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
DFS-Testing	CFR Part 15, FCC 06-96	Pass	2018-10-24	DFS only

Test Standard Clause	Test Case	Bandwidth	C	NC	NA	NP	Remark
7.8.1*3	U-NII Detection Bandwidth	20 MHz 40 MHz 80 MHz 160 MHz	☒	☐	☐	☐	*1*3
§15.407 (h)(2) (ii) & 7.8.2*3	Channel Availability Check Time	80 MHz	☒	☐	☐	☐	*1
§15.407 (h)(2) (iv) & 7.8.3*3	Non-Occupancy Period	20 MHz	☒	☐	☐	☐	*2
§15.407 (h)(2) (iii) & 7.8.2*3	Channel Move Time / Channel Closing Transmission Time	80 MHz 160 MHz	☒	☐	☐	☐	*2
7.8.3 & 7.8.4*3	In-Service Monitoring / Statistical Performance Check	20 MHz 40 MHz 80 MHz 160 MHz	☒	☐	☐	☐	*2

Abbreviations/References:

C	Compliant
NC	Not compliant
NA	Not applicable
NP	Not performed
*1	Prior to use of a channel
*2	During normal operation
*3	As per 9.2.2 Note 3 this test was performed with no data traffic

8 Additional comments

Reference documents:	- OM_A62_antenna testing report_20170815 (3) - Customer Questionnaire- Open-Mesh A62
Special test descriptions:	All tests except the In-Service Monitoring are conducted with Pulse Type 0.
Configuration descriptions:	Iperf was used to generate the required channel load (duty cycle greater 17 percent).
DFS functionality:	☒ Master device ☐ Client with radar detection ☐ Client without radar detection

9 RF measurements

9.1 Description of test setup

9.1.1 Conducted measurements

Setup

Figure 1 shows a setup whereby the UUT is a RLAN device operating in slave mode, without Radar Interference Detection function. This setup also contains a RLAN device operating in master mode. The radar test signals are injected into the master device. The UUT (slave device) is associated with the master device.

Figure 1 shows an example

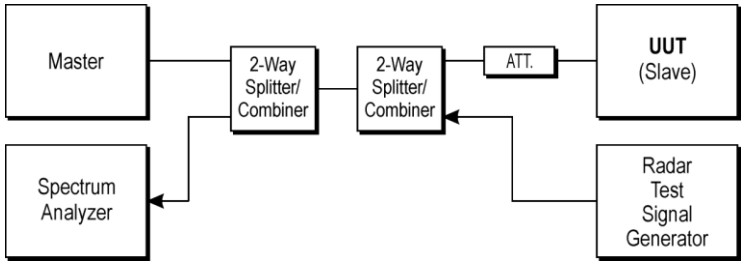


Figure 1: Setup

RPP = SG - CA
(RPP-radar pulse power; SG-signal generator power; CA-loss signal path)

Example calculation:
RPP [dBm] = -30.0 [dBm] – 33.0 [dB] = -63.0 [dBm]

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Vector Signal Generator	SMU200A	R&S	101633	300003496	vlKl!	24.01.2017	23.01.2020
2	n. a.	Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm	FSP30	R&S	100886	300003575	vlKl!	24.01.2017	23.01.2019
3	n. a.	Vektor Signal Generator	SMU200A	R&S	100635	300003894	vlKl!	01.02.2016	01.02.2019
4	n. a.	DFS-test site	div. Splitter, Cables, Attenuators	Mini-Circuits	na	300004557	ev	-/-	-/-
5	n. a.	Notebook	Latitude 15 6000 Series	Dell		300004737	ne	-/-	-/-
6	n. a.	PC	ExOne	F+W	2890296v001	300005102	ne	-/-	-/-
7	n. a.	RF-Cable DFS-Tester No. 1	Enviroflex 316 D	Huber & Suhner	Batch no. 1560522	400001257	ev	-/-	-/-
8	n. a.	RF-Cable DFS-Tester No. 2	Enviroflex 316 D	Huber & Suhner	Batch no. 1560522	400001258	ev	-/-	-/-
9	n. a.	RF-Cable DFS-Tester No. 5	Enviroflex 316 D	Huber & Suhner	Batch no. 1560522	400001261	ev	-/-	-/-
10	n. a.	RF-Cable DFS-Tester No. 6	Enviroflex 316 D	Huber & Suhner	Batch no. 1560522	400001262	ev	-/-	-/-

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

9.2 Parameters of DFS test signals

9.2.1 DFS Detection Thresholds for Master Devices as well as Client Devices With Radar Detection

Maximum Transmit Power EIRP	Value (see note)
≥ 200 mW	-64 dBm
< 200 mW and power spectral density < 10 dBm/MHz	-62 dBm
< 200 mW and That do not meet the power spectral density < 10 dBm/MHz	-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.

9.2.2 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 to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
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.

9.2.3 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.

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 $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\mathrm{PRI}_{\mu\mathrm{sec}}}\right)\right\}$	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.

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

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 Trails
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.

Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trails
6	1	333	9	0.333	300	70%	30

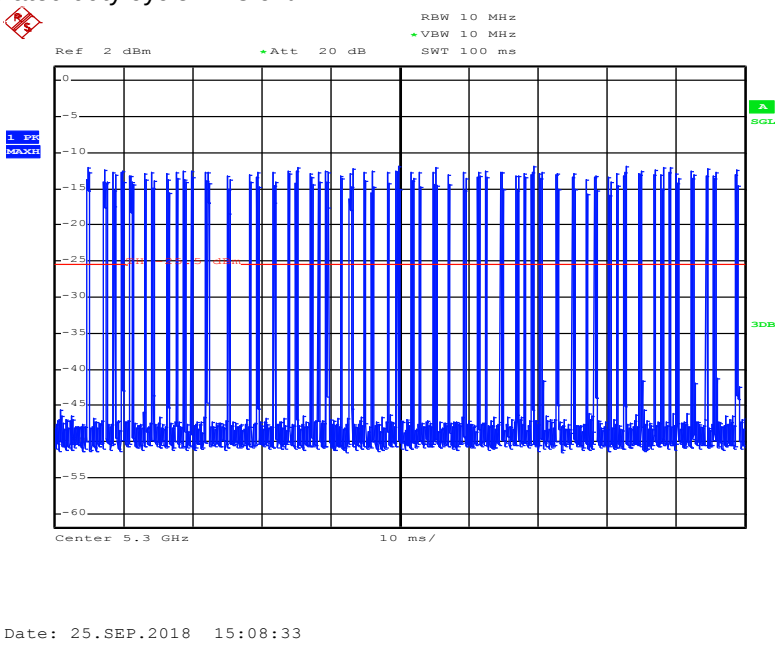
For the Frequency Hopping Radar Type, the same Burst parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined.
The first frequency in a hopping sequence is selected randomly from the group of 475 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.

9.3 Test preparation

9.3.1 Channel loading

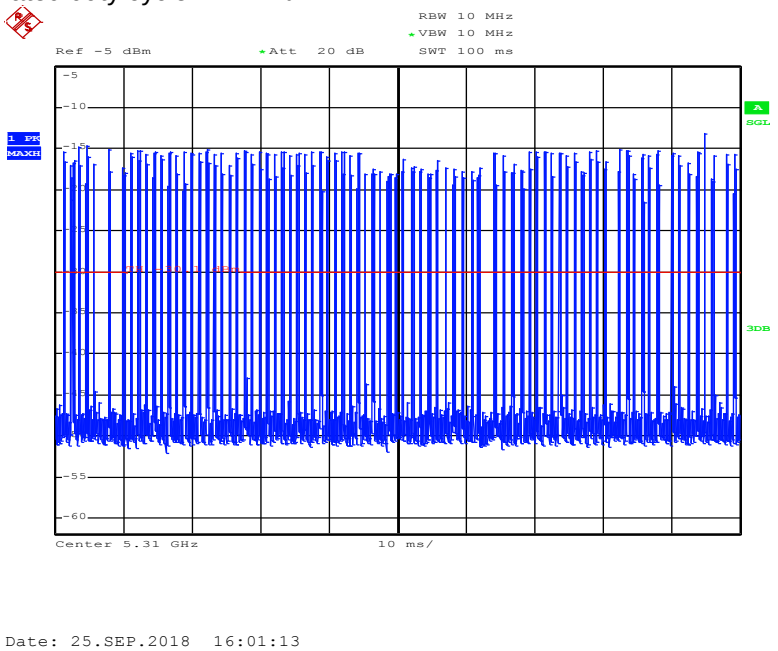
Timing plots are required with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time). This can be done with any appropriate channel BW and modulation type.

HT20-Mode: Calculated duty cycle = 18.9%



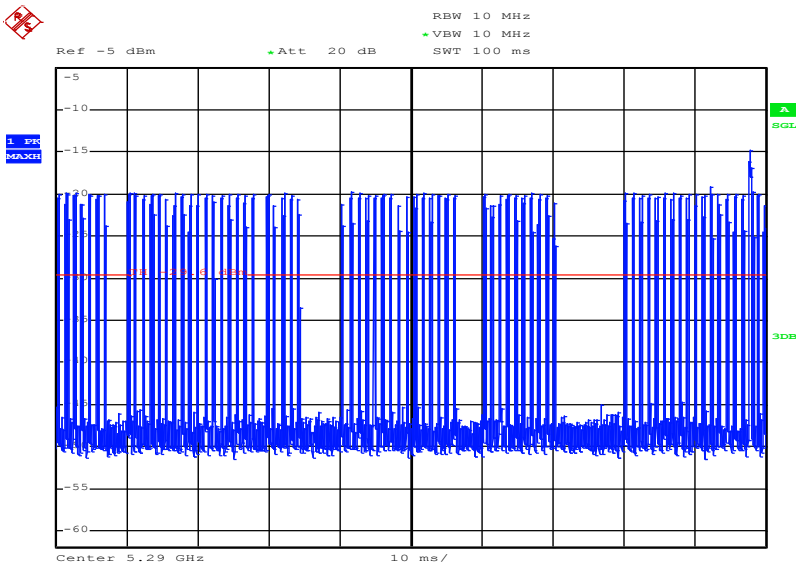
Plot 1

HT40-Mode: Calculated duty cycle = 21.4%



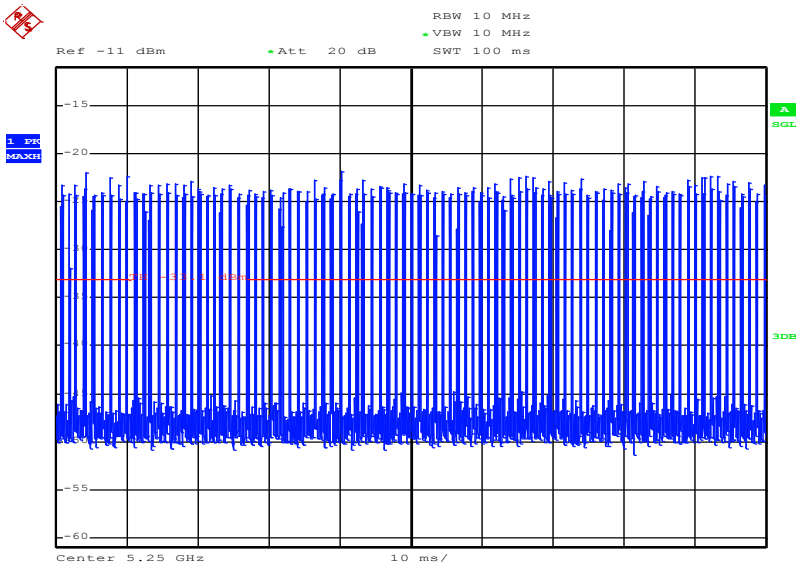
Plot 2

HT80-Mode: Calculated duty cycle = 19.7%



Plot 3

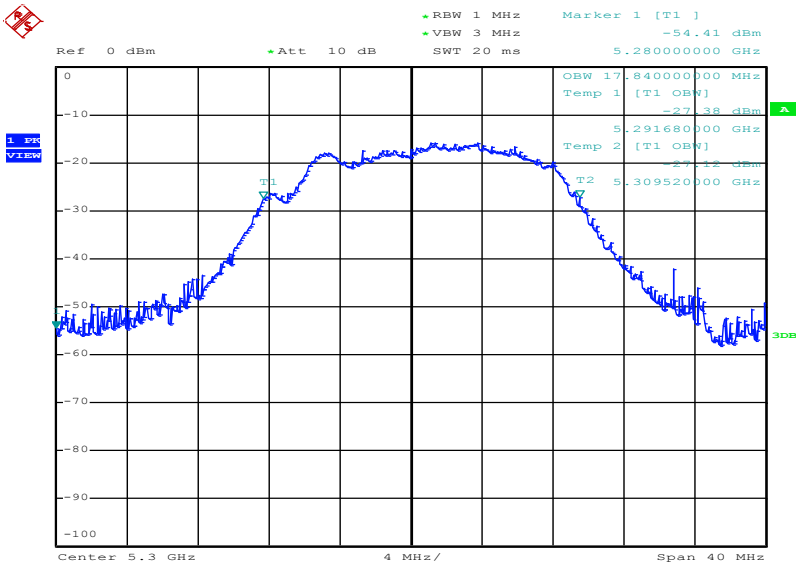
HT160-Mode: Calculated duty cycle = 17.4%



Plot 4

9.3.2 99% Bandwidth to determine the U-NII-bandwidth

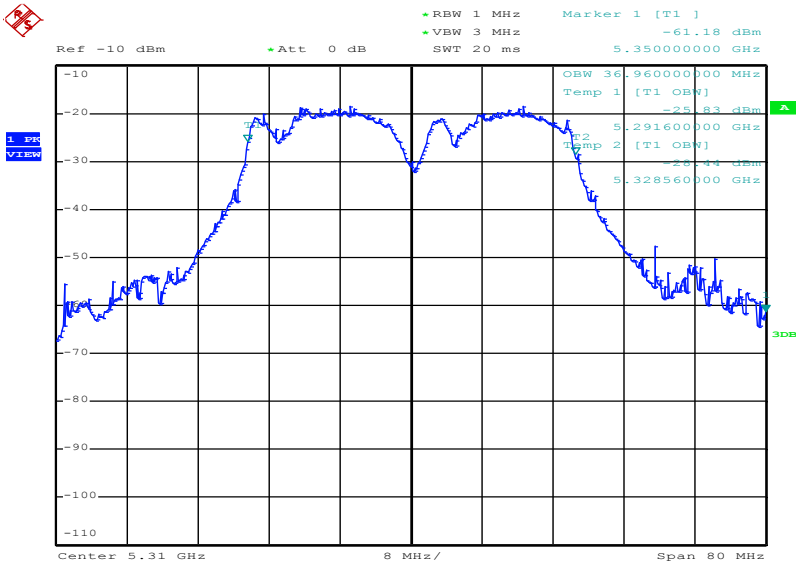
HT20-Mode: 17.8 MHz



Date: 24.SEP.2018 15:07:16

Plot 5

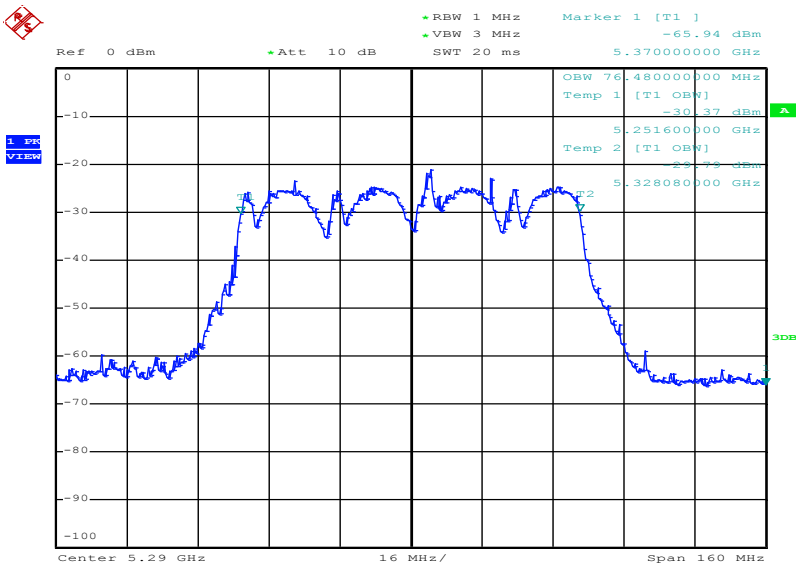
HT40-Mode: 36.7 MHz



Date: 27.SEP.2018 09:20:02

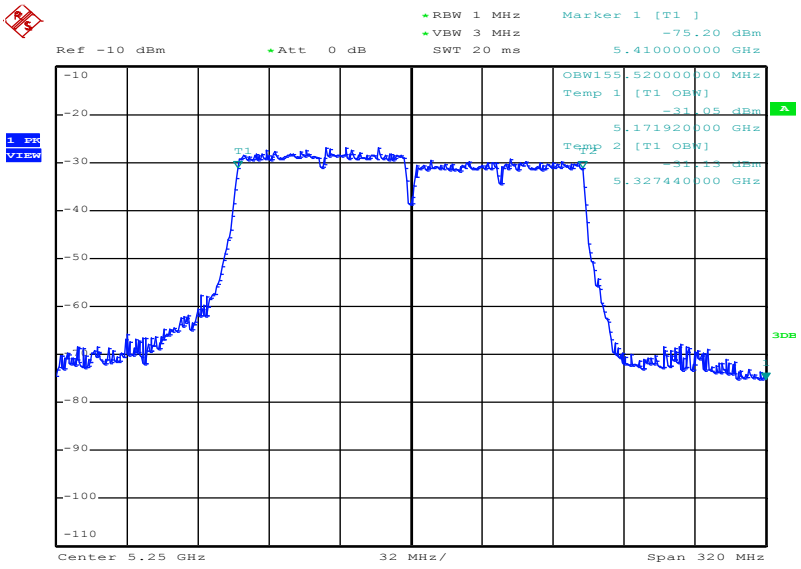
Plot 6

HT80-Mode: 76.5 MHz



Plot 7

HT160-Mode: 155.5 MHz

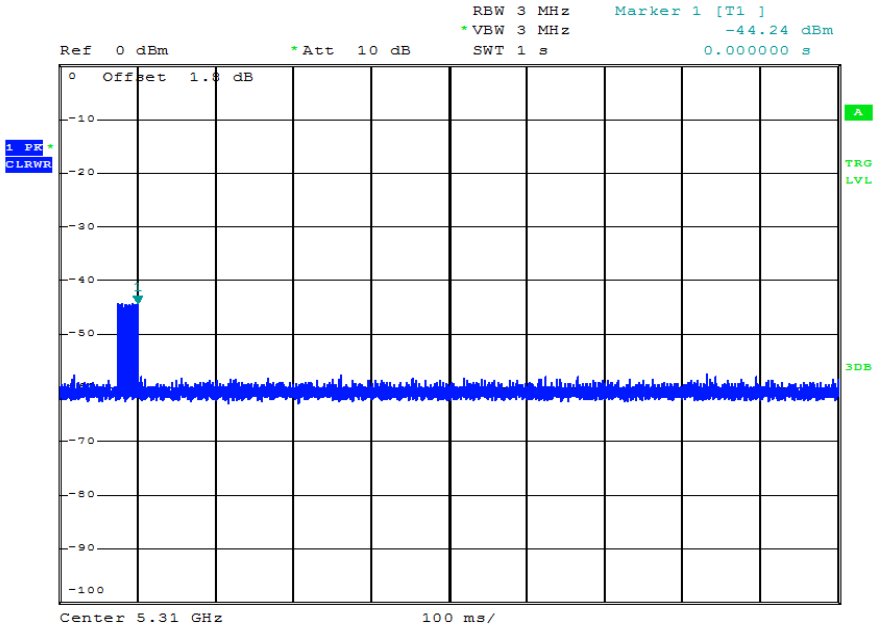


Plot 8

9.3.3 Radar burst timing signal

To accurately determine the channel closing time and channel closing transmission time the spectrum analyser is triggered at the end of the radar burst (see marker at *t* = 0ms).

Example plot



Plot 9

9.4 Test results (prior to use of a channel)

9.4.1 Channel Availability Check Time

9.4.1 Tests with radar burst at the beginning & end of the Channel Availability Check Time

The DUT performs the *Channel Availability Check* sequentially starting on the lowest DFS frequency in the higher sub-band at 5500 MHz and continuous scanning for radars while increasing the centre frequency in 60 or 80 MHz steps after each 60 seconds period. The sub-ranges scanned are highlighted in system log below (see Figure 4)

The system log of the DUT also indicates the status of each channel while the scan is performed. As soon a scan is completed the channel status changes to “available” or “unavailable” whether a radar was detected or not.
A timer indicates for how long the DUT is performing the *Channel Availability Check* respectively, for how long the Channel is “available” or “unavailable”.

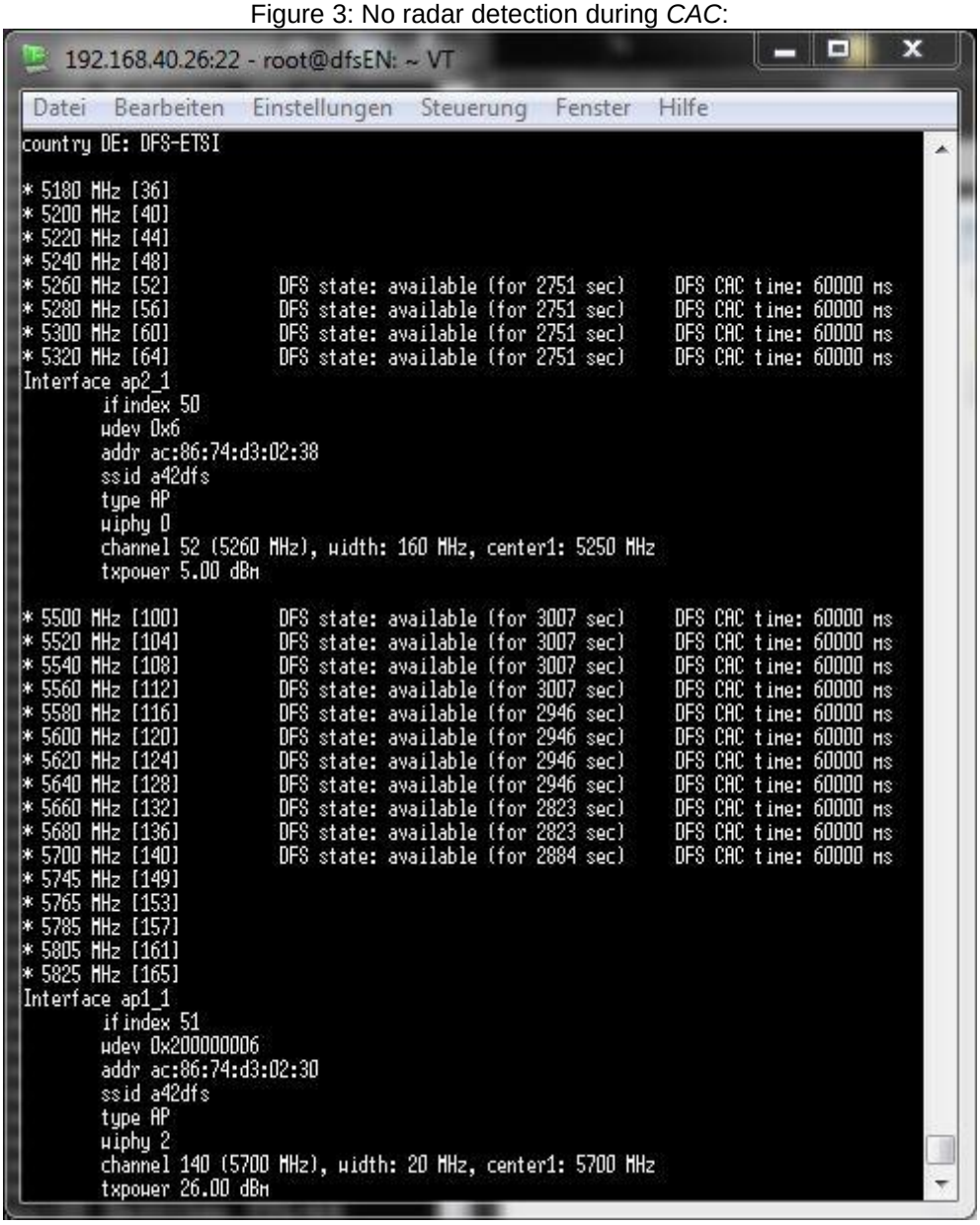
Figure 2: System log – CAC sub-ranges:

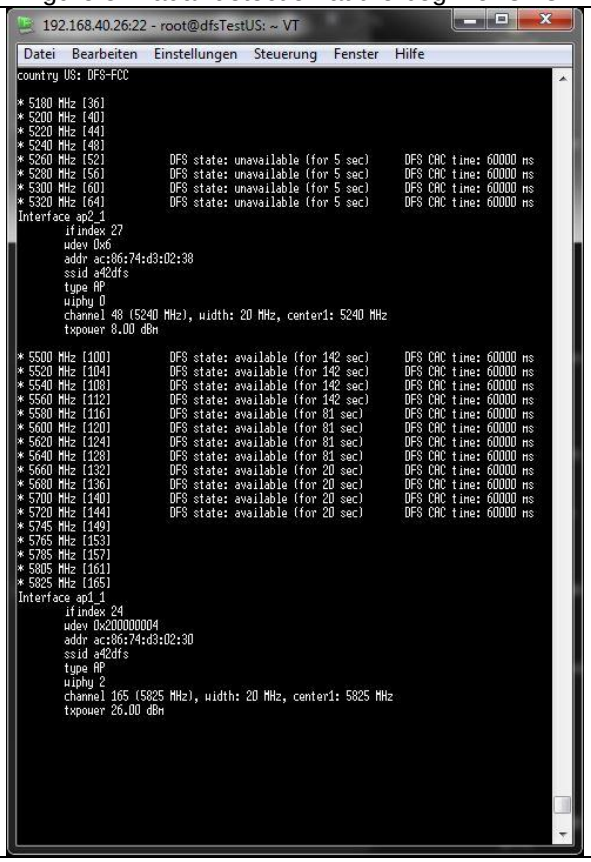
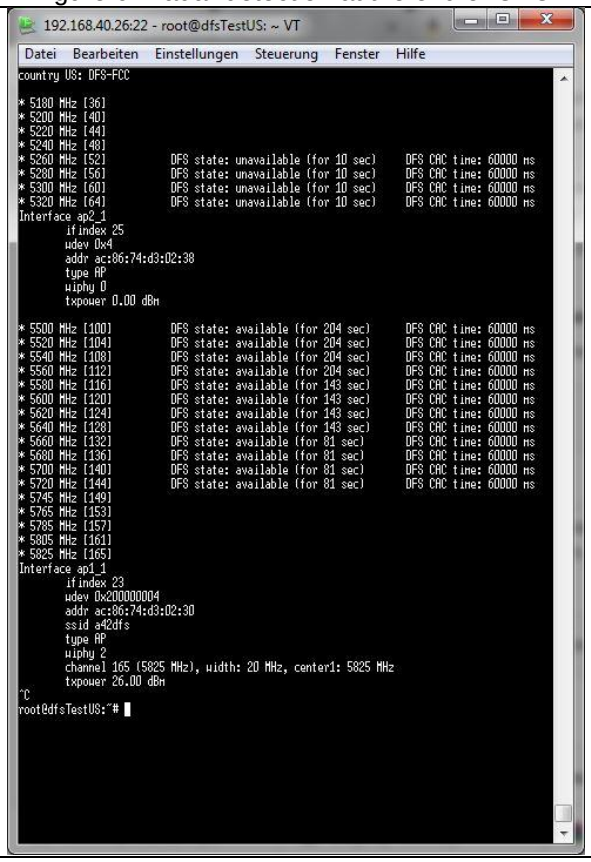
```
country US: DFS-US

* 5180 MHz [36]
* 5200 MHz [40]
* 5220 MHz [44]
* 5240 MHz [48]
* 5260 MHz [52]     DFS state: usable (for 107 sec)     DFS CAC time: 60000 ms
* 5280 MHz [56]     DFS state: usable (for 107 sec)     DFS CAC time: 60000 ms
* 5300 MHz [60]     DFS state: usable (for 107 sec)     DFS CAC time: 60000 ms
* 5320 MHz [64]     DFS state: usable (for 107 sec)     DFS CAC time: 60000 ms
Interface ap2_1
ifindex 18
wdev 0x3
addr ac:86:74:d3:02:38
ssid a42dfs
type AP
wiphy 0
channel 36 (5180 MHz), width: 80 MHz, center1: 5210 MHz
txpower 20.00 dBm

* 5500 MHz [100]    DFS state: available (for 3 sec)    DFS CAC time: 60000 ms
* 5520 MHz [104]    DFS state: available (for 3 sec)    DFS CAC time: 60000 ms
* 5540 MHz [108]    DFS state: available (for 3 sec)    DFS CAC time: 60000 ms
* 5560 MHz [112]    DFS state: available (for 3 sec)    DFS CAC time: 60000 ms
* 5580 MHz [116]    DFS state: unavailable (for 0 sec)    DFS CAC time: 60000 ms
* 5600 MHz [120]    DFS state: unavailable (for 0 sec)    DFS CAC time: 60000 ms
* 5620 MHz [124]    DFS state: unavailable (for 0 sec)    DFS CAC time: 60000 ms
* 5640 MHz [128]    DFS state: unavailable (for 0 sec)    DFS CAC time: 60000 ms
* 5660 MHz [132]    DFS state: usable (for 108 sec)    DFS CAC time: 60000 ms
* 5680 MHz [136]    DFS state: usable (for 108 sec)    DFS CAC time: 60000 ms
* 5700 MHz [140]    DFS state: usable (for 108 sec)    DFS CAC time: 60000 ms
* 5745 MHz [149]
* 5765 MHz [153]
* 5785 MHz [157]
* 5805 MHz [161]
* 5825 MHz [165]
Interface ifcac
ifindex 23
wdev 0x200000003
addr ac:86:74:d3:02:30
type AP
wiphy 2
channel 140 (5700 MHz), width: 20 MHz (no HT), center1: 5700 MHz
txpower 8.00 dBm
```

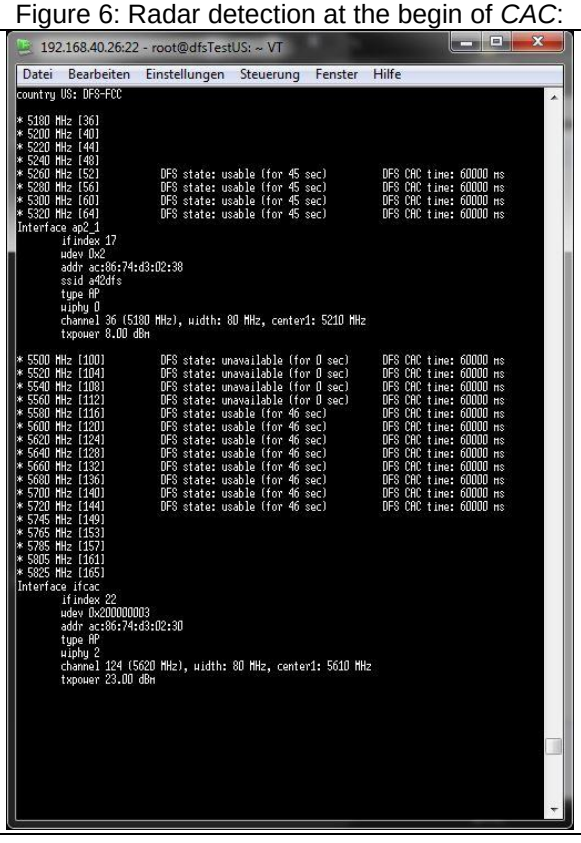
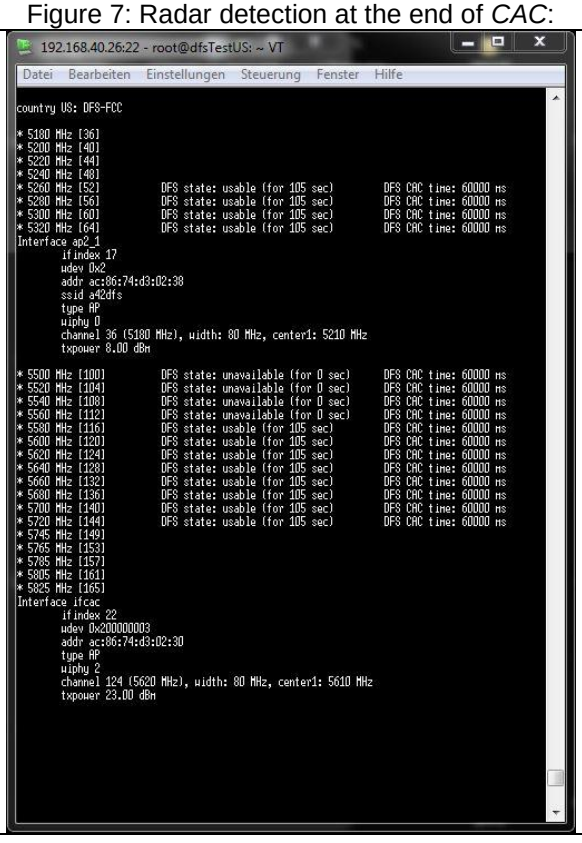
Tests with radar bursts were performed using the above mentioned timer function indicating the 2s window at the beginning respectively the end of the *CAC*. The immediate change in status to “unavailable” when a radar was injected was proof that the *CAC* is performed.

The following system logs show the *CAC* process without radar injection (all channels available after scan), and after injection on channel 60 & 100

Figure 3: No radar detection during *CAC*:



Channel Availability Check Time (U-NII-2B)	
Figure 5: Radar detection at the begin of *CAC*:	Figure 6: Radar detection at the end of *CAC*:
	

Channel Availability Check Time (U-NII-2C)	
Figure 6: Radar detection at the begin of *CAC*:	Figure 7: Radar detection at the end of *CAC*:
	

9.5 Test results (during normal operation)

9.5.1 U-NII Detection Bandwidth

The U-NII Detection Bandwidth was determined according the procedure as described in the correspondent KDB as referenced in section 3 of this test report for any supported bandwidth.

The U-NII Detection Bandwidth must meet the U-NII Detection Bandwidth criterion referenced in section 9.2.2. 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 F_H and F_L, the test can be truncated and the U-NII Detection Bandwidth can be reported as the measured F_H and F_L.

Channel Closing Time (U-NII-2B)

Operating mode	99% Bandwidth (MHz)	F_L (MHz)	F_H (MHz)	U-NII Detection Bandwidth / F_H-F_L (MHz)
HT20	17.2	5290	5310	20
HT40	36.7	5290	5330	40
HT80	76.5	5250	5330	80
HT160	155.5	5250*	5330	80**

* Center frequency for signal bandwidth of 160 MHz.
** Since the lower 80 MHz of the signal bandwidth falls within a non-DFS band (5150 MHz to 5250 MHz) only the upper 80 MHz was considered for testing.

Channel Closing Time (U-NII-2C)

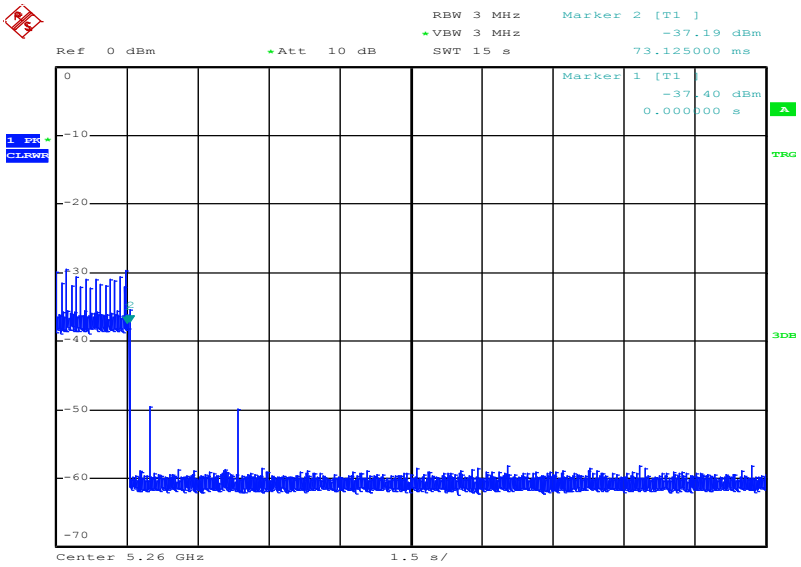
Operating mode	99% Bandwidth (MHz)	F_L (MHz)	F_H (MHz)	U-NII Detection Bandwidth / F_H-F_L (MHz)
HT20	17.2	5290	5310	20
HT40	36.7	5290	5330	40
HT80	76.5	5250	5330	80

9.5.2 Channel move time / channel closing transmission time

After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel not exceeding 60ms.

The test is performed during normal operation with the highest bandwidth supported by the DUT.

Channel Closing Time (U-NII-2B)

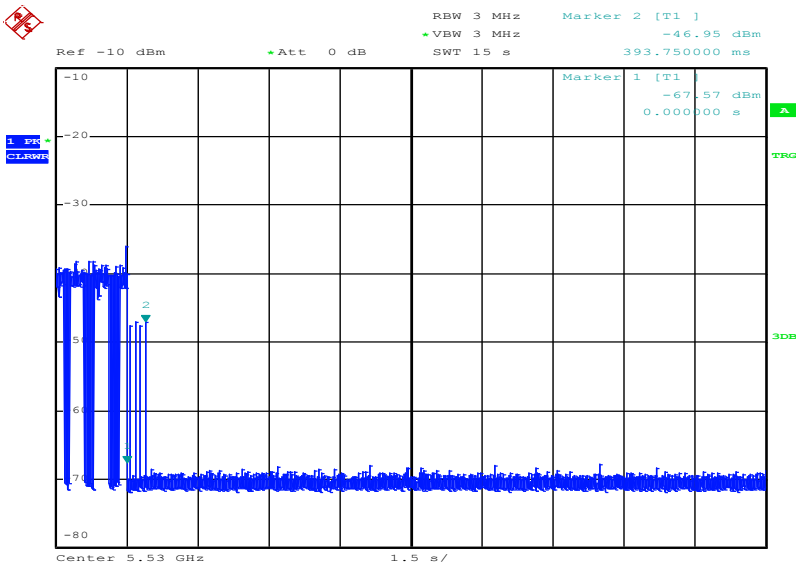


Plot 10

Note: With Marker 1 at the end of the radar pulse (*t* = 0ms) the Channel Closing Time is determined by setting a Delta-Marker to the point where the last transmission occurred.
The Channel Closing Time is 73ms.

The accumulated transmission time is calculated by the number of bins occurring after t = 0ms multiplied with the Time-per-sweep point-factor resulting from the Sweep Time and number of Sweep Points of the Spectrum Analyser.
The Channel Closing Transmission Time after 200ms is 0.0ms.

Channel Closing Time (U-NII-2C)



Plot 11

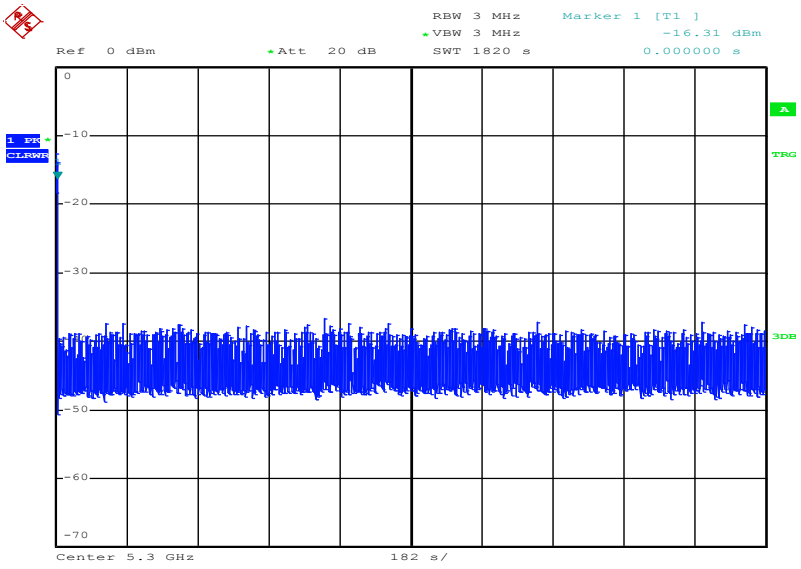
Note: With Marker 1 at the end of the radar pulse (t = 0ms) the Channel Closing Time is determined by setting a Delta-Marker to the point where the last transmission occurred.
The Channel Closing Time is 394 ms.

The accumulated transmission time is calculated by the number of bins occurring after t = 0ms multiplied with the Time-per-sweep point-factor resulting from the Sweep Time and number of Sweep Points of the Spectrum Analyser.
The Channel Closing Transmission Time after 200ms is 0.6ms.

9.5.3 Non-Occupancy Period

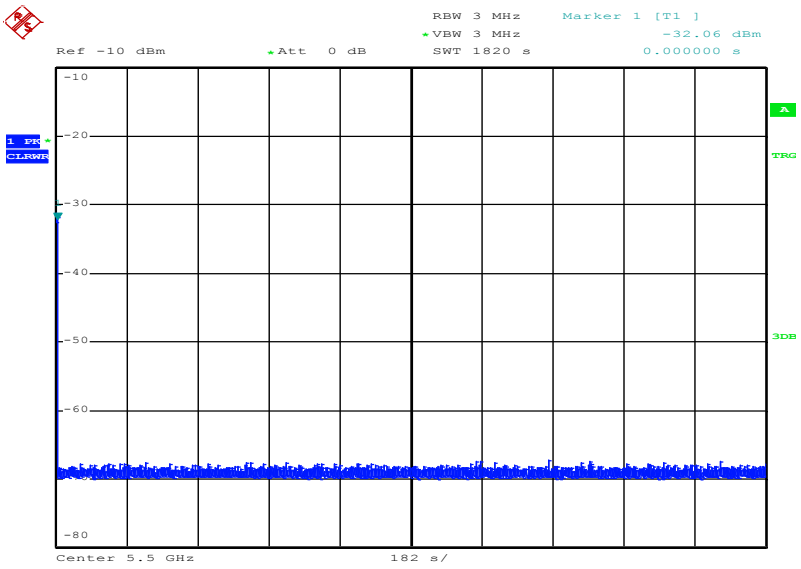
A channel that has been flagged as containing a radar system, either by a channel availability check or in-service monitoring, is subject to a non-occupancy period of at least 30 minutes. The non occupancy period starts at the time when the radar system is detected.

U-NII-2B – 20 MHz



Plot 12

U-NII-2C - 20 MHz



Plot 13

9.5.4 In-Service Monitoring / Statistical Performance Check

To determine the ability of the device to detect the radar test waveforms statistical data is gathered.

A detailed and pulse related evaluation of the test results can be found along with the sample parameter data sheets in the Test Report Annex I.

Short Pulse Radar Test Waveforms

According the table in section 9.2.39.2.2 the minimum percentage of successful detections for Short Pulse Radar Test Waveforms is 60% out of 30 trails. In addition an aggregate minimum percentage of successful detections across all Short Pulse Radar Types 1-4 is required and calculated as follows:

$$P_{sum} = \frac{P_d1 + P_d2 + P_d3 + P_d4}{4}$$

where: P_d is the percentage of successful detections for each radar burst
P_{sum} is the aggregate percentage of successful detections

The minimum percentage of successful aggregate detections across all Short Pulse Radar Types 1-4 is 80%.

U-NII-2B

Results HT20-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
1	30	30	**100**
2	30	30	**100**
3	30	30	**100**
4	30	30	**100**
Aggregate (Radar Types 1-4)			**100**

Results HT40-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
1	30	30	**100**
2	30	30	**100**
3	30	30	**100**
4	30	30	**100**
Aggregate (Radar Types 1-4)			**100**

Results HT80-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
1	30	30	**100**
2	30	30	**100**
3	30	30	**100**
4	30	29	**96.7**
Aggregate (Radar Types 1-4)			**99.2**

U-NII-2B

Results HT160-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
1	30	30	**100**
2	30	30	**100**
3	30	28	**93.3**
4	30	29	**96.7**
Aggregate (Radar Types 1-4)			**97.5**

U-NII-2C

Results HT20-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
1	30	30	**100**
2	30	30	**100**
3	30	30	**100**
4	30	30	**100**
Aggregate (Radar Types 1-4)			**100**

Results HT40-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
1	30	30	**100**
2	30	30	**100**
3	30	30	**100**
4	30	30	**100**
Aggregate (Radar Types 1-4)			**100**

Results HT80-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
1	30	30	**100**
2	30	29	**96.7**
3	30	30	**100**
4	30	30	**100**
Aggregate (Radar Types 1-4)			**99.2**

Long Pulse Radar Test

U-NII-2B

Results HT20-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
5	30	30	**100**

Results HT40-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
5	30	30	**100**

Results HT80-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
5	30	30	**100**

Results HT160-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
5	30	30	**100**

U-NII-2C

Results HT20-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
5	30	30	**100**

Results HT40-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
5	30	30	**100**

Results HT80-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
5	30	30	**100**

Frequency Hopping Radar Test

U-NII-2B

Results HT20-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
6	30	30	**100**

Results HT40-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
6	30	30	**100**

Results HT80-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
6	30	30	**100**

Results HT160-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
6	30	30	**100**

U-NII-2C

Results HT20-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
6	30	30	**100**

Results HT40-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
6	30	30	**100**

Results HT80-Mode:

Radar Type	Number of Trails	Number of Successful Detections	Percentage of Successful Detections
6	30	30	**100**

10 Observations

No observations except those reported with the single test cases have been made.

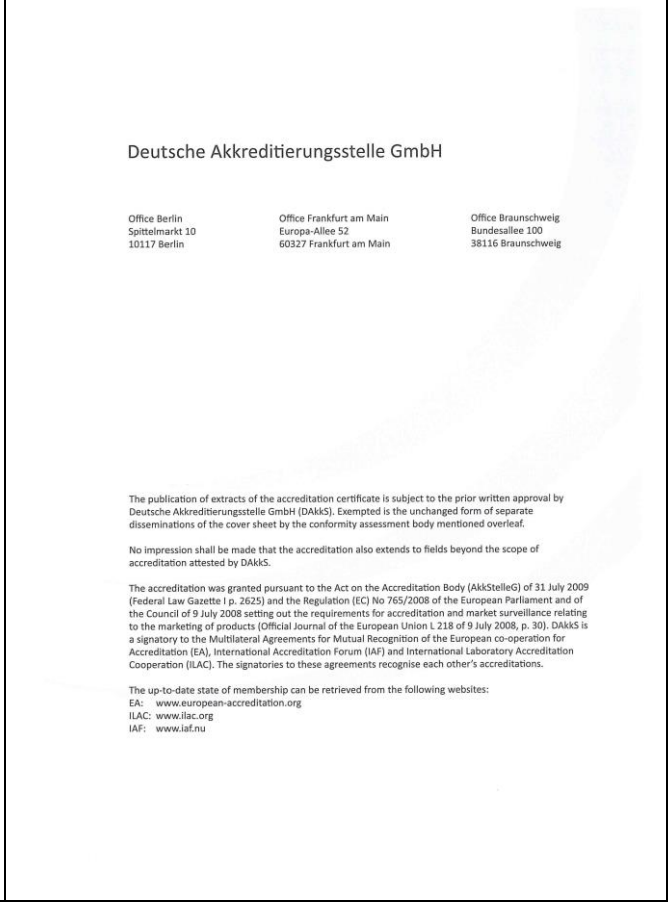
Annex A Glossary

EUT	Equipment under test
DUT	Device under test
UUT	Unit under test
GUE	GNSS User Equipment
EN	European Standard
FCC	Federal Communications Commission
FCC ID	Company Identifier at FCC
IC	Industry Canada
PMN	Product marketing name
HMN	Host marketing name
HVIN	Hardware version identification number
FVIN	Firmware version identification number
EMC	Electromagnetic Compatibility
HW	Hardware
SW	Software
Inv. No.	Inventory number
S/N or SN	Serial number
C	Compliant
NC	Not compliant
NA	Not applicable
NP	Not performed
PP	Positive peak
QP	Quasi peak
AVG	Average
OC	Operating channel
OCW	Operating channel bandwidth
OBW	Occupied bandwidth
OOB	Out of band
DFS	Dynamic frequency selection
CAC	Channel availability check
OP	Occupancy period
NOP	Non occupancy period
DC	Duty cycle
PER	Packet error rate
CW	Clean wave
MC	Modulated carrier
WLAN	Wireless local area network
RLAN	Radio local area network
DSSS	Dynamic sequence spread spectrum
OFDM	Orthogonal frequency division multiplexing

Annex B Document history

Version	Applied changes	Date of release
-/-	Initial Release	2018-10-24

Annex C Accreditation Certificate

first page	last page
	

Note: The current certificate annex is published on the website (link see below) of the Accreditation Body DAkkS or may be received by CTC advanced GmbH on request

https://www.dakks.de/as/ast/d/D-PL-12076-01-03e.pdf

########## END OF TEST REPORT ##########