CE DFS Test Report

Equipment	:	Metrolinq Outdoor 60GHz PTP + 5 GHz
Brand Name	:	IgniteNet
Model No.	:	ML-60-35, ML-60-35-1
Standard	:	EN 301 893 V1.8.1 (2015-03)
Frequency Range	:	5470 MHz – 5725 MHz
Applicant	:	Accton Technology Corporation No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.
Manufacturer	:	Joy Technology (ShenZhen) Corporation HengKeng Ind., Shangpai, Shangwu,Aiqun Rd., Shiyan Town,Shenzhen 518108 China
Operate Mode	:	Master

The product sample received on Nov. 30, 2015 and completely tested on Jan. 25, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in EN 301 893 V1.8.1 (2015-03) and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Sam Chen
SPORTON INTERNATIONAL INC.

Testing Laboratory
1190

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APPENDIX A. TEST PHOTOS ..... A1 ~ A2

Summary of Test Result

Harmonized Standard Requirements and Conformance Test Specifications					
Report Clause	**Ref. Std. Clause**	**Description**	**Measured**	**Limit**	**Result**
3.2	4.7.2.2	DFS: Channel Availability Check	Other Band: P_d>60%	EN 301 893 Table D.1, D.5	Complied
-	4.7.2.3	DFS: Off-Channel CAC - Radar Detection Threshold	N/A	EN 301 893 Table D.1, D.5	N/A
-	4.7.2.3	DFS: Off-Channel CAC - Detection Probability	N/A	EN 301 893 Table D.1, D.5	N/A
3.3	4.7.2.4	DFS: In-service Monitoring	P_d>60%	EN 301 893 Table D.1, D.5	Complied
3.4	4.7.2.5	DFS: Channel Shutdown	CMT < 10sec CCTT < 1sec	EN 301 893 Table D.1	Complied
3.4	4.7.2.6	DFS: Non-occupancy Period	NOP > 30 min	EN 301 893 Table D.1	Complied
-	4.7.2.7	DFS: Uniform Spreading	w/o test (outdoor product)	EN 301 893 Clause 4.7.2.7.2	-
3.1.6	4.9	User Access Restrictions	Manufacturer attestation NOT accessible to user	DFS controls	Complied

Revision History

Report No.	Version	Description	Issued Date
EY5N2614	Rev. 01	Initial issue of report	Feb. 22, 2016

1 General Description

1.1 Information

1.1.1 RF General Information

IEEE Std. 802.11	Channel Bandwidth (MHz)
a, n (HT20), ac (VHT20)	20
n (HT40), ac (VHT40)	40
ac (VHT80)	80
802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation. 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.	

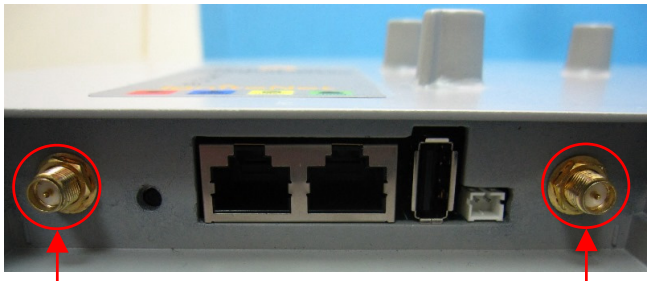
1.1.2 Antenna Information

Ant.	Brand	P/N	Antenna Type	Connector	Antenna Gain (dBi)	Cable Loss (dB)	True Gain (dBi)	Remark
1	IgniteNet	FS5-19N-120	Sector Ant. (PATCH ARRAY)	Type-N	19	1	18	External (5GHz use)

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)		Remark
					5GHz Band 3	60GHz	
2	Accton	123400001084A	Dish Ant.	N/A	17.51	42	Internal (5G&60G use)

Note:
For IEEE 802.11a/n/ac mode (2TX/2RX)
Chain 1 and Chain 2 can be use as transmitting antennas.
Chain 1 and Chain 2 can be used as receiving antennas.

<External antenna>



<Internal antenna>

1.1.3 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	5GHz	60GHz	Remark
ML-60-35	Internal / Dish Ant.	Internal / Dish Ant.	Outdoor use.
ML-60-35-1	External / Sector Ant.	Internal / Dish Ant.	

Note: Only the model: ML-60-35 <Internal antenna> was tested and recorded in the report due to the lowest gain antenna.

1.2 Accessories

N/A

1.3 Support Equipment

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E4300	DoC
2	Notebook	DELL	E4300	DoC
3	WLAN Dongle	LINKSYS	AE6000	Q87-AE6000
4	PoE	ITE	NU24-F240100-I2	N/A

1.4 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- EN 301 893 V1.8.1 (2015-03)

1.5 Testing Location Information

Testing Location					
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973			
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085			
Test Condition		**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
DFS Site		DF01-CB	Eric Fu	20.8°C / 41%	Dec. 16, 2015~Jan. 25, 2016

2 Test Configuration of EUT

2.1 EUT Information

EUT Information				
Operating Mode	☒	Master		
	☐	Slave with radar detection		
	☐	Slave without radar detection		
Software / Firmware Version	1.1.2-8119M			
Communication Mode	☒	IP Based (Load Based)	☐	Frame Based
TPC Function	☐	With TPC	☒	Without TPC
Weather Band (5600~5650MHz)	☐	With 5600~5650MHz	☒	Without 5600~5650MHz

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration		
Frequency Range (MHz)	**IEEE Std.**	**Test Channel Freq. (MHz)**
5470-5725MHz	802.11ac (VHT20)	5500
5470-5725MHz	802.11ac (VHT80)	5530

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Test Item	Dynamic Frequency Selection (DFS)
Test Condition	Conducted measurement at transmit chains The EUT shall be configured to operate at the highest transmitter output power setting. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the lowest gain shall be used.
Modulation Mode	802.11ac (VHT20), 802.11ac (VHT80)

Note: 1. Only the model: ML-60-35 <Internal antenna> was tested and recorded in the report due to the lowest gain antenna.

2. The power of EUT is supplied by PoE. But the PoE is for measurement only, and it would not be marketed.

Equipment	Brand Name	Model Name	FCC ID
PoE	ITE	NU24-F240100-I2	N/A

3 Dynamic Frequency Selection (DFS) Test Result

3.1 General DFS Information

3.1.1 DFS Parameters

Table D.1: DFS requirement values	
Parameter	**Value**
Channel Availability Check Time	60 seconds (see note 1)
Minimum Off-Channel CAC Time	6 minutes (see note 2)
Maximum Off-Channel CAC Time	4 hours (see note 2)
Channel Move Time	10 seconds
Channel Closing Transmission Time	1 second.
Non-occupancy period	Minimum 30 minutes

Note 1: For channels whose nominal bandwidth falls completely or partly within the band 5600 MHz to 5650 MHz, the *Channel Availability Check Time* shall be 10 minutes.
Note 2: For channels whose nominal bandwidth falls completely or partly within the band 5600 MHz to 5650 MHz, the Maximum *Off-Channel CAC Time* shall be 24 hours.

Table D.2: Interference threshold values	
EIRP Spectral Density (dBm/MHz)	**Value (see notes 1 and 2)**
10	-62

Note 1: This is the level at the input of the receiver of a RLAN device with a maximum EIRP density of 10 dBm/MHz and assuming a 0 dBi receive antenna. For devices employing different EIRP spectral density and/or a different receive antenna gain G (dBi) the DFS threshold level at the receiver input follows the following relationship: DFS Detection Threshold (dBm) = -62 + 10 - EIRP Spectral Density (dBm/MHz) + G (dBi), however the DFS threshold level shall not be lower than -64 dBm assuming a 0 dBi receive antenna gain.
Note 2: Slave devices with a maximum e.i.r.p. of less than 23 dBm do not have to implement radar detection unless these devices are used in fixed outdoor point to point or fixed outdoor point to multipoint applications.

Table D.3: Parameters of the reference DFS test signal		
Pulse width W [µs]	**Pulse repetition frequency PRF [pps]**	**Pulses per burst [PPB]**
1	700	18

Table D.4: Parameters of radar test signals						
Radar test signal # (note 1 to 3)	Pulse width W [µs]		Pulse repetition frequency PRF (PPS)		Number of different PRFs	Pulses per burst for each PRF (PPB) (note 5)
	Min	Max	Min	Max		
1	0.5	5	200	1000	1	10 (note 6)
2	0.5	15	200	1600	1	15 (note 6)
3	0.5	15	2300	4000	1	25
4	20	30	2000	4000	1	20
5	0.5	2	300	400	2/3	10 (note 6)
6	0.5	2	400	1200	2/3	15 (note 6)

Note 1: Radar test signals 1 to 4 are constant PRF based signals. See figure D.1. These radar test signals are intended to simulate also radars using a packet based Staggered PRF. See figure D.2.
Note 2: Radar test signal 4 is a modulated radar test signal. The modulation to be used is a chirp modulation with a ±2,5MHz frequency deviation which is described below.
Note 3: Radar test signals 5 and 6 are single pulse based Staggered PRF radar test signals using 2 or 3 different PRF values. For radar test signal 5, the difference between the PRF values chosen shall be between 20 and 50 pps. For radar test signal 6, the difference between the PRF values chosen shall be between 80 and 400 pps. See figure D.3
Note 4: Apart for the Off-Channel CAC testing, the radar test signals above shall only contain a single burst of pulses. See figure D.1, D.2 and D.3. For the Off-Channel CAC testing, repetitive bursts shall be used for the total duration of the test. See figure D.4.
Note 5: The total number of pulses in a burst is equal to the number of pulses for a single PRF multiplied by the number of different PRFs used.
Note 6: For the CAC and Off-Channel CAC requirements, the minimum number of pulses (for each PRF) for any of the radar test signals to be detected in the band 5600 to 5650 MHz shall be 18.

3.1.2 Radar Test Signal Figure

Figure D.1: General structure of a single burst / constant PRF based radar test signal

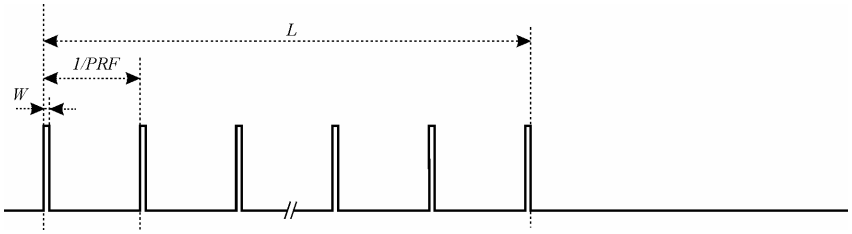


Figure D.2: General structure of a multiple burst / constant PRF based radar test signal

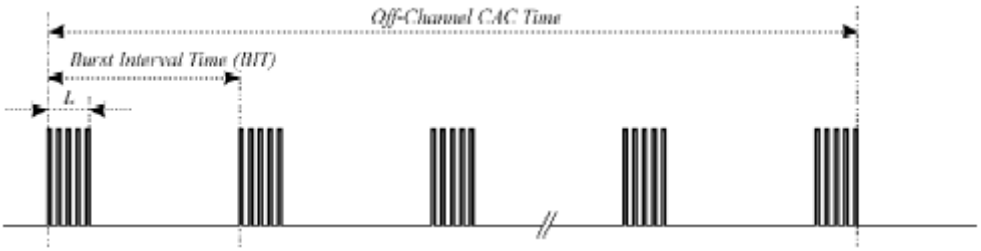


Figure D.3: General structure of a single burst/single pulse based staggered PRF radar test signal

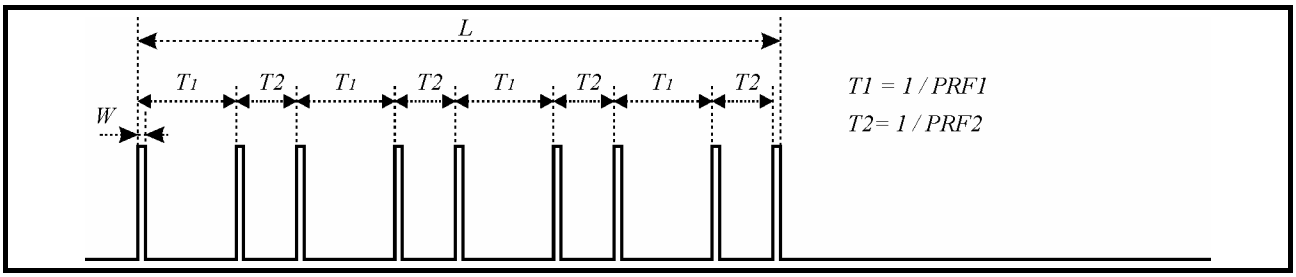


Figure D.4: General structure of a single burst / packet based staggered PRF radar test signal

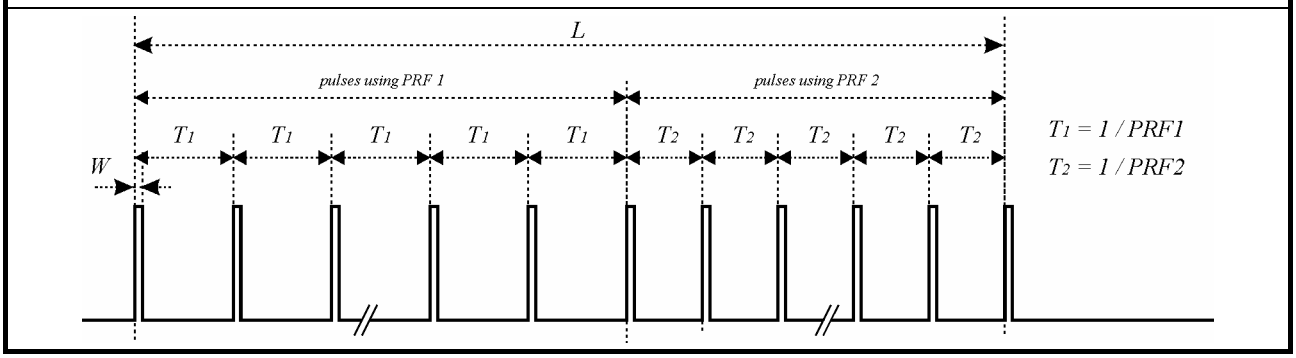
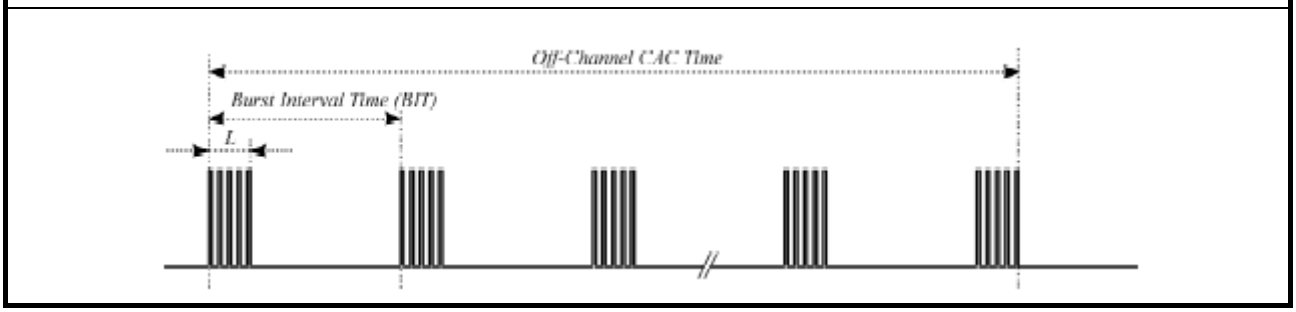


Figure D.5: Structure of a multiple burst / packet based staggered PRF based radar test signal



3.1.3 DFS Technical Requirements Specifications

Requirement	DFS Operational mode		
	Master	Slave without radar detection (see table D.2)	Slave with radar detection (see table D.2)
Channel Availability Check	✔	Not required	✔ (note 2)
Off-Channel CAC (note 1)	✔	Not required	✔ (note 2)
In-Service Monitoring	✔	Not required	✔
Channel Shutdown	✔	✔	✔
Non-Occupancy Period	✔	Not required	✔
Uniform Spreading	✔	Not required	Not required

Note 1: Where implemented by the manufacturer.
Note 2: A slave with radar detection is not required to perform a *CAC* or *Off-Channel CAC* at initial use of the channel but only after the slave has detected a radar signal on a channel by *In-Service Monitoring*.

3.1.4 DFS Threshold Level

DFS Threshold Level		
DFS Threshold level: -64 dBm	☒	at the antenna connector
	☐	in front of the antenna
Note 1: The DFS **Detection Threshold Level** is chosen the worse Interference Detection Threshold level (-64dBm) as the test parameter. Note 2: However, the DFS threshold level shall not be lower than -64 dBm assuming a 0 dBi receive antenna gain. If more than one antenna is intended for this TPC, range or power setting, the antenna gain of the antenna with the lowest gain shall be used.		

3.1.5 Off Channel CAC Feature Implemented

Off Channel CAC Feature Implemented	
☒	No
☐	Yes
	If yes, specify the Off Channel CAC Time: Hours
	If the *Off Channel CAC Time* for the band 5600 MHz to 5650 MHz is different from the *Off-Channel CAC Time* for frequencies outside this band, please specify the *Off-Channel CAC Time* for the band
	If yes, specify the Off Channel CAC Time:5600 MHz to 5650 MHz: Hours
	Minimum Off-Channel CAC Time

3.1.6 User Access Restrictions

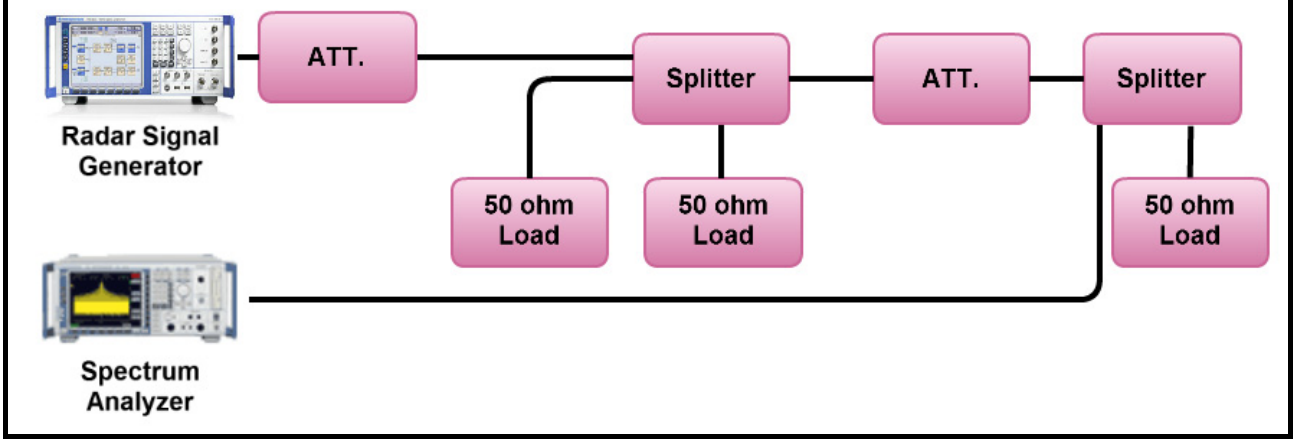
User Access Restrictions	
☒	DFS controls (hardware or software) related to radar detection are NOT accessible to the user

3.1.7 Channel Loading/Data Streaming

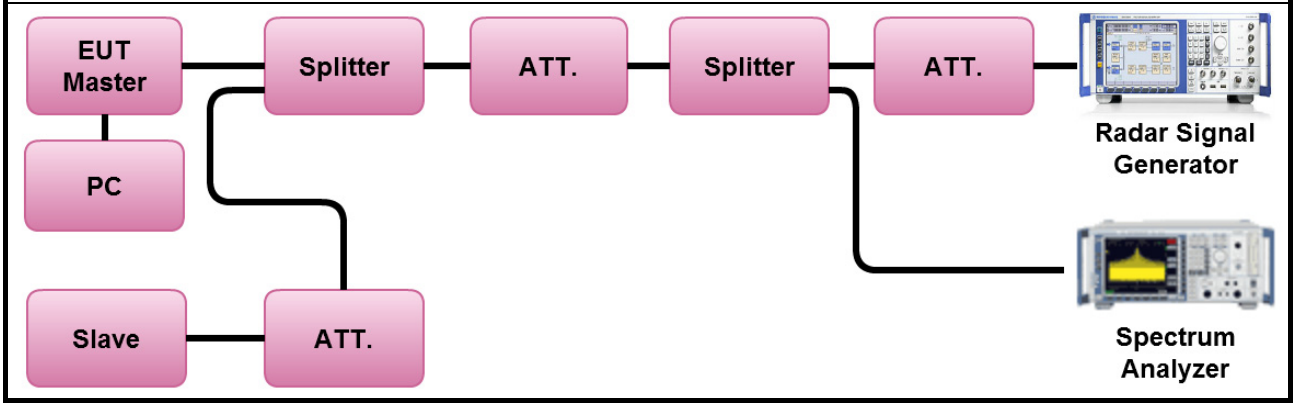
☒	Test transmission sequence is from the Master to the Slave.
	☒ Channel Shutdown, Off-Channel CAC Check and In-Service Monitoring with about 30% loading over 100 ms interval.
	☒ No transmissions on channels being checked during a Channel Availability Check or during an Off Channel CAC check.

3.1.8 Test Setup and Calibration Setup

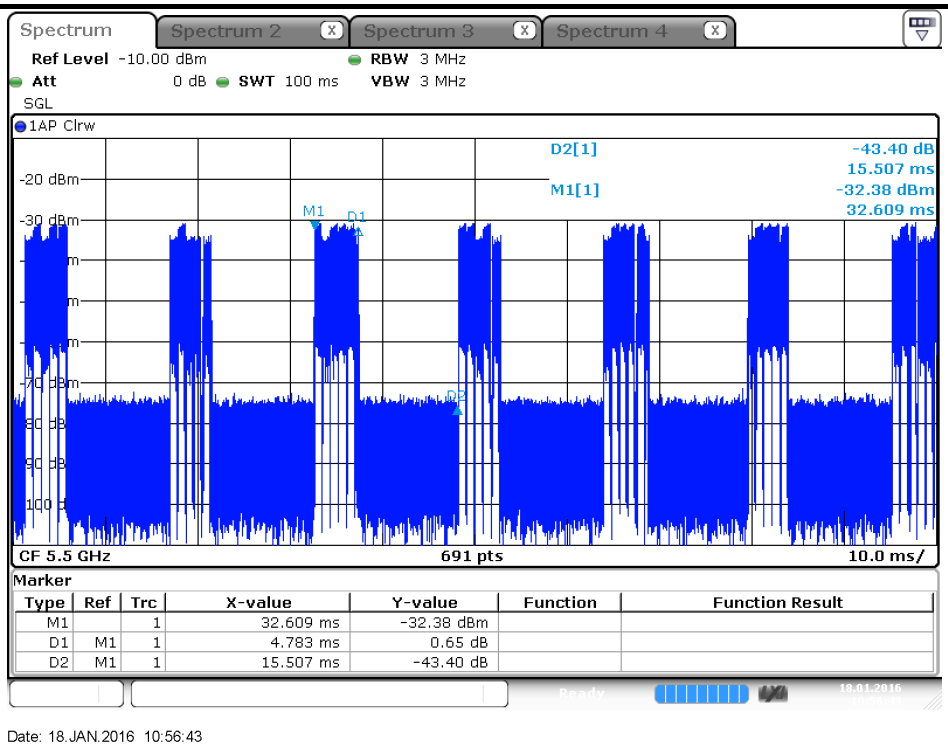
Calibration Setup



Test Setup - Master Conducted Measurement

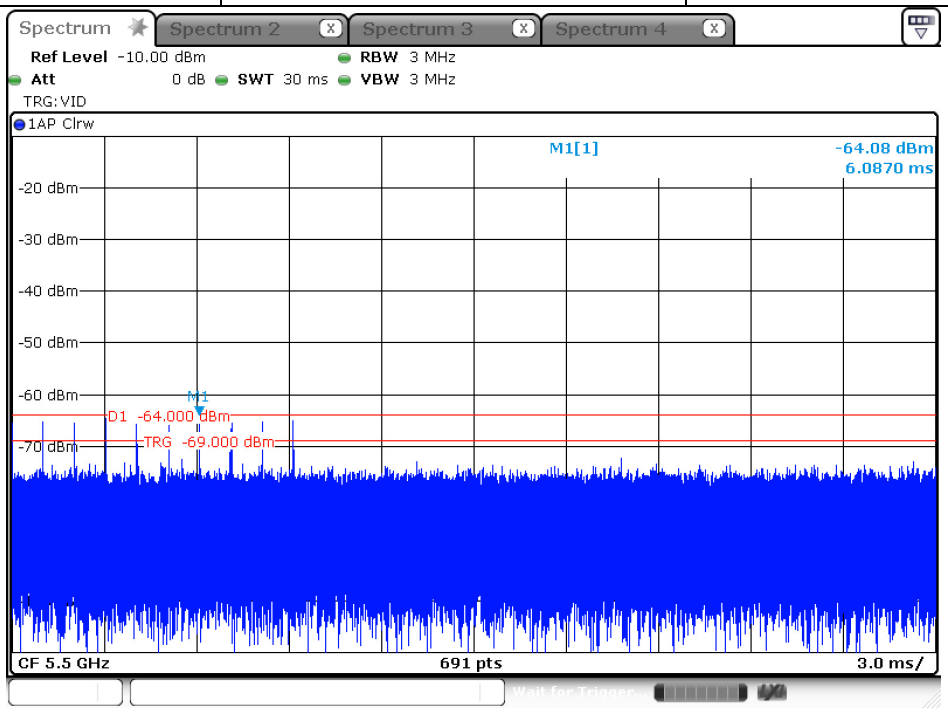


3.1.9 EUT transmitter minimum activity ratio of 30% measured over an interval of 100ms.



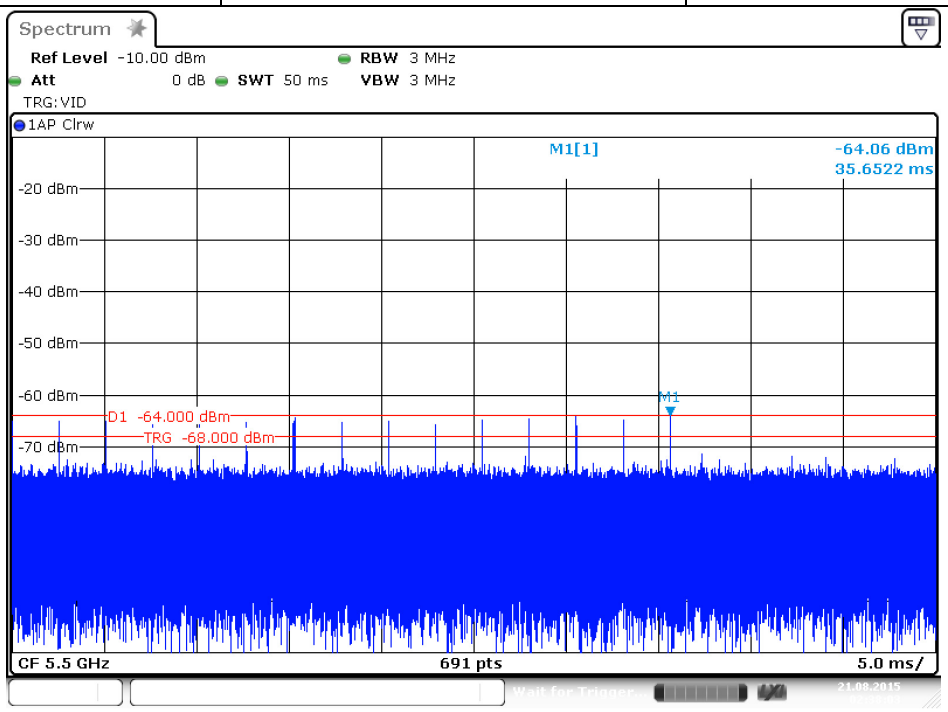
3.1.10 Radar Waveform calibration Plot

Radar test signal #1	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



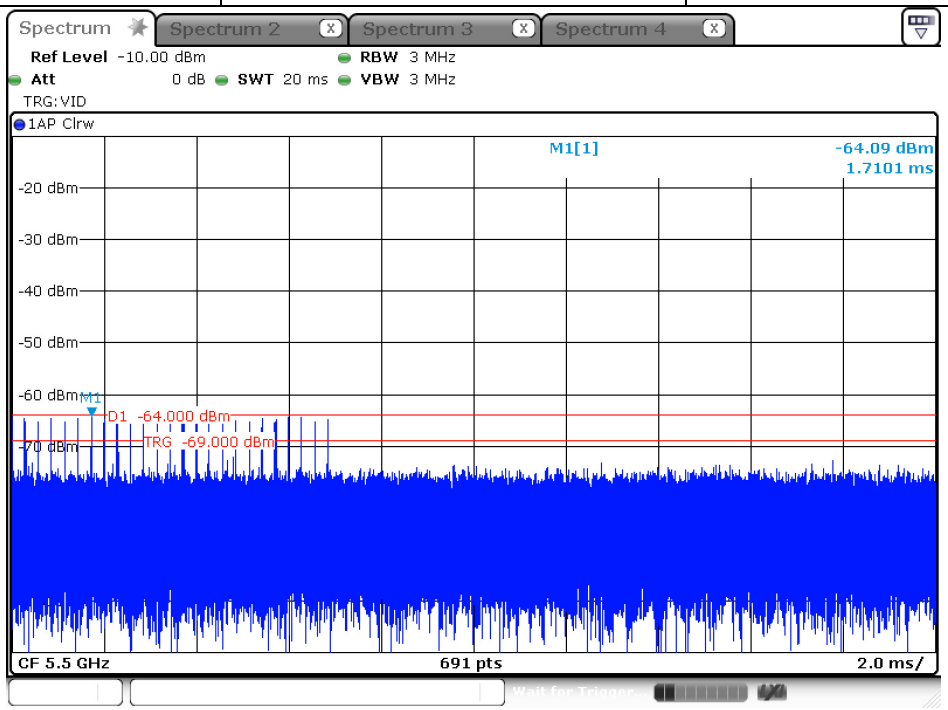
Date: 25.JAN.2016 16:04:37

Radar test signal #2	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



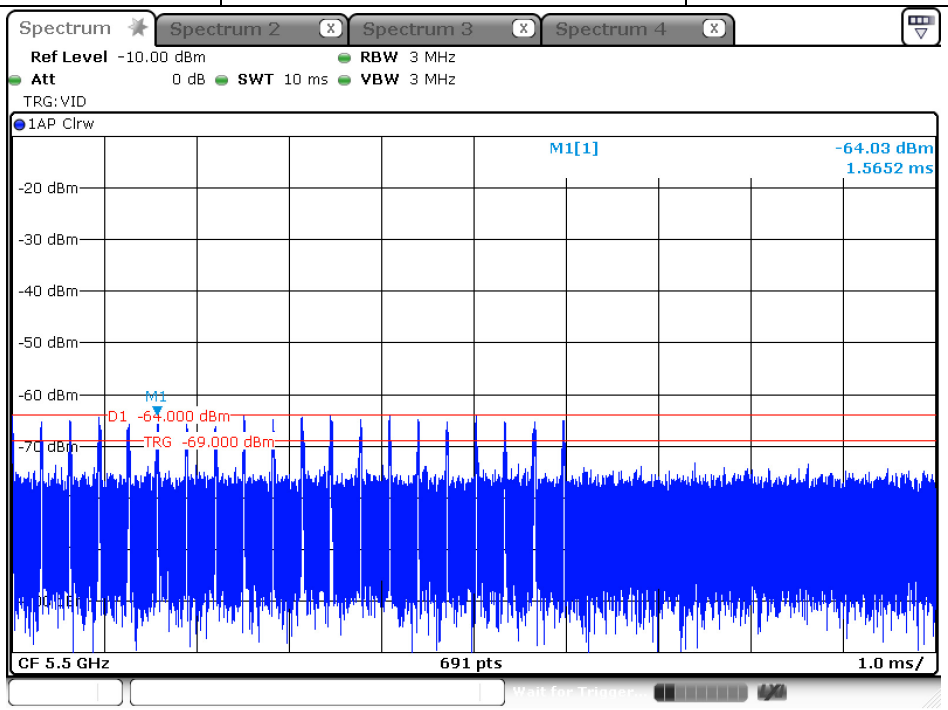
Date: 16.DEC.2015 02:38:03

Radar test signal #3	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



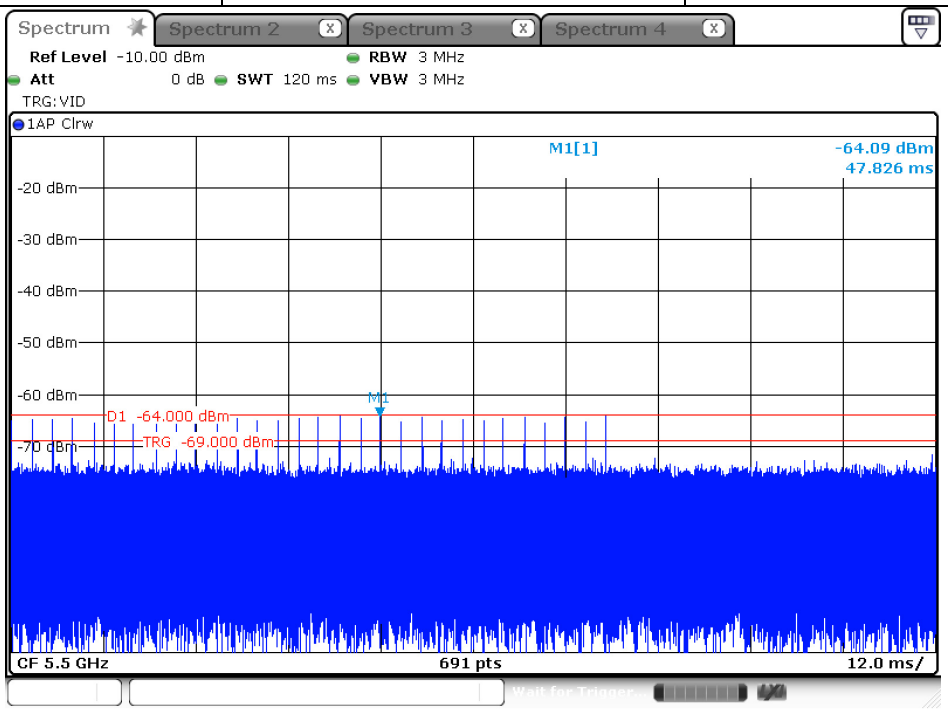
Date: 25.JAN.2016 16:05:36

Radar test signal #4	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



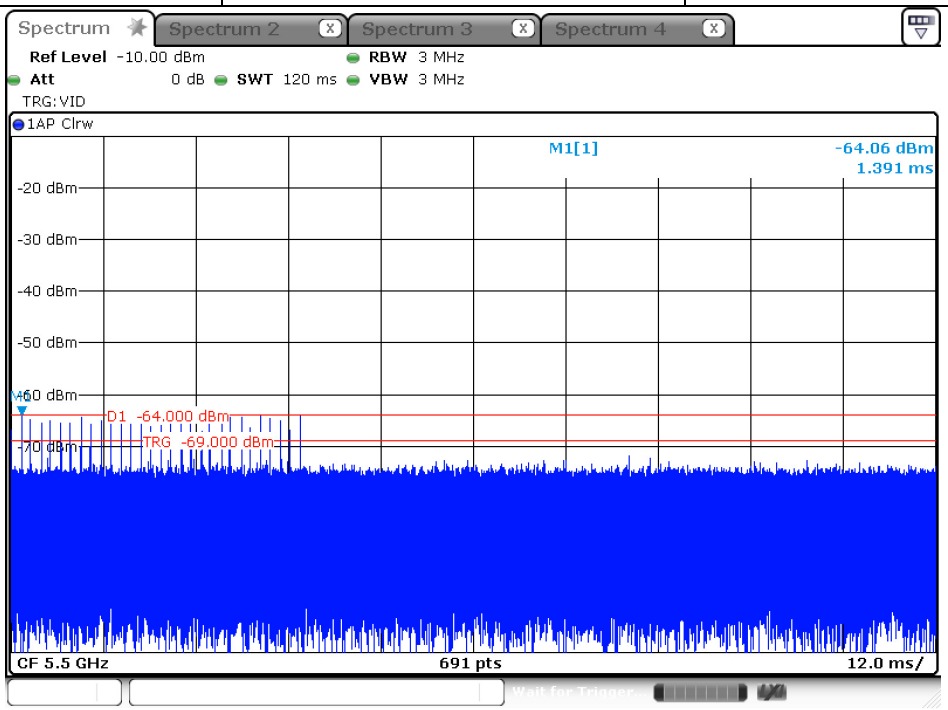
Date: 25.JAN.2016 16:06:03

Radar test signal #5	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



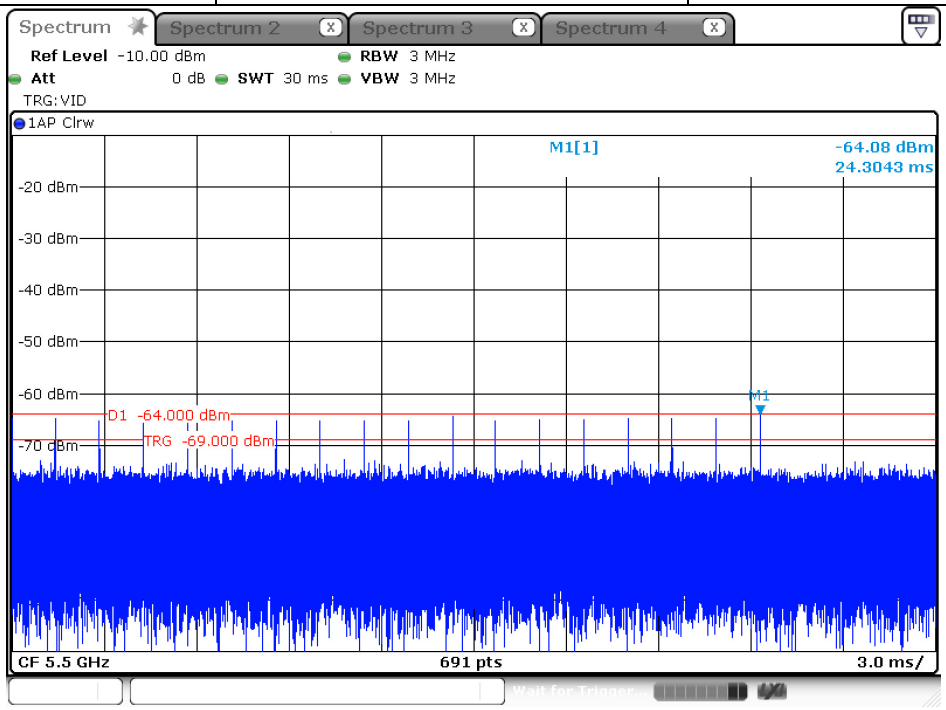
Date: 25.JAN.2016 16:06:29

Radar test signal #6	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz

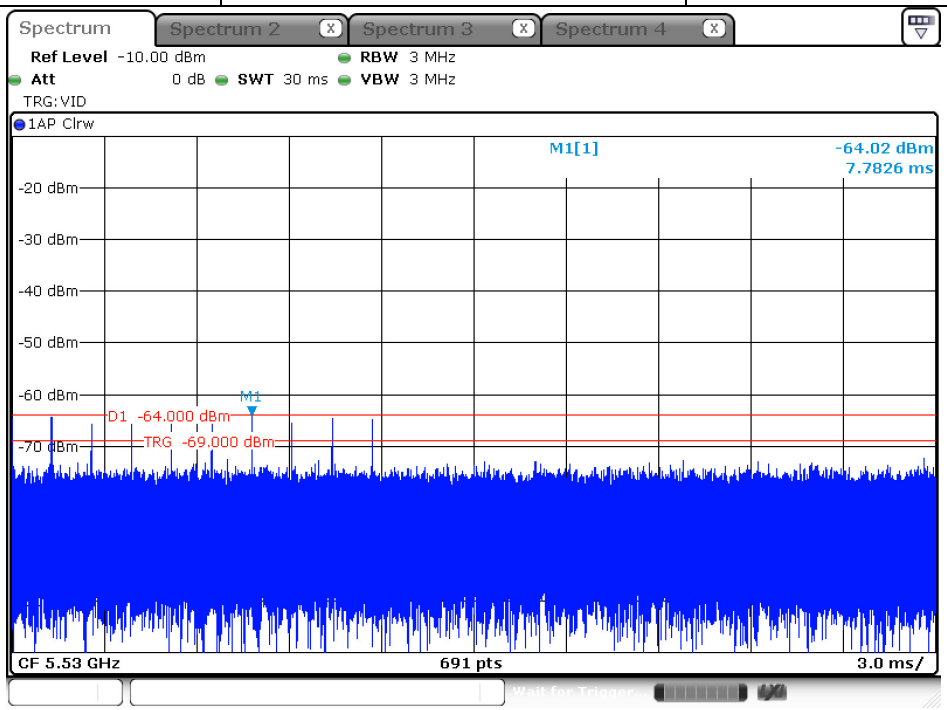


Date: 25.JAN.2016 16:06:50

Radar test signal #REF	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz

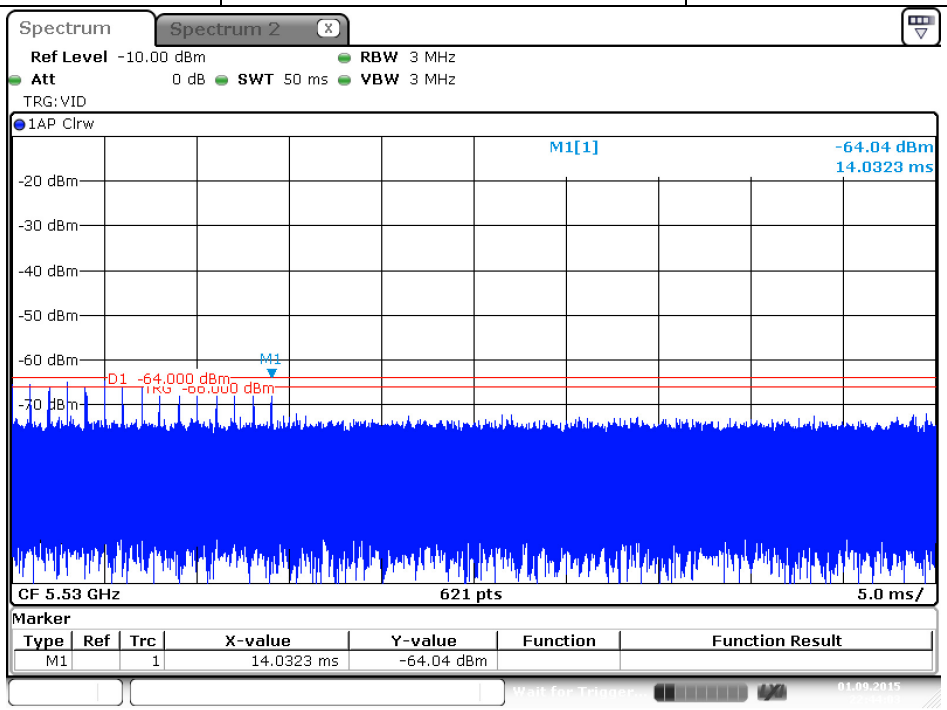


Radar test signal #1	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



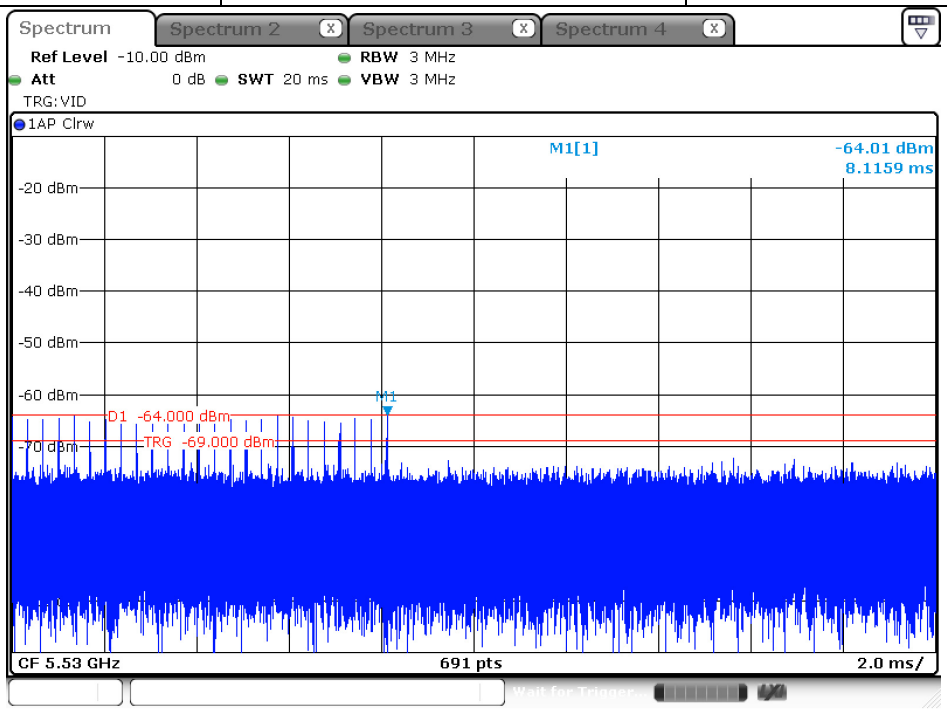
Date: 25.JAN.2016 16:08:11

Radar test signal #2	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



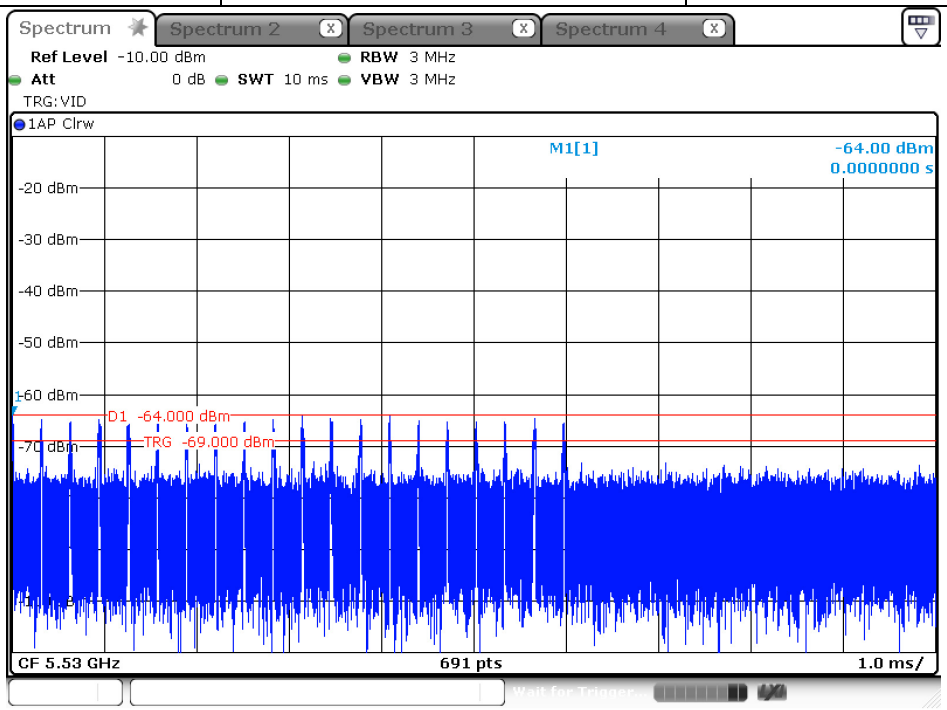
Date:16.DEC.2015 22:44:03

Radar test signal #3	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



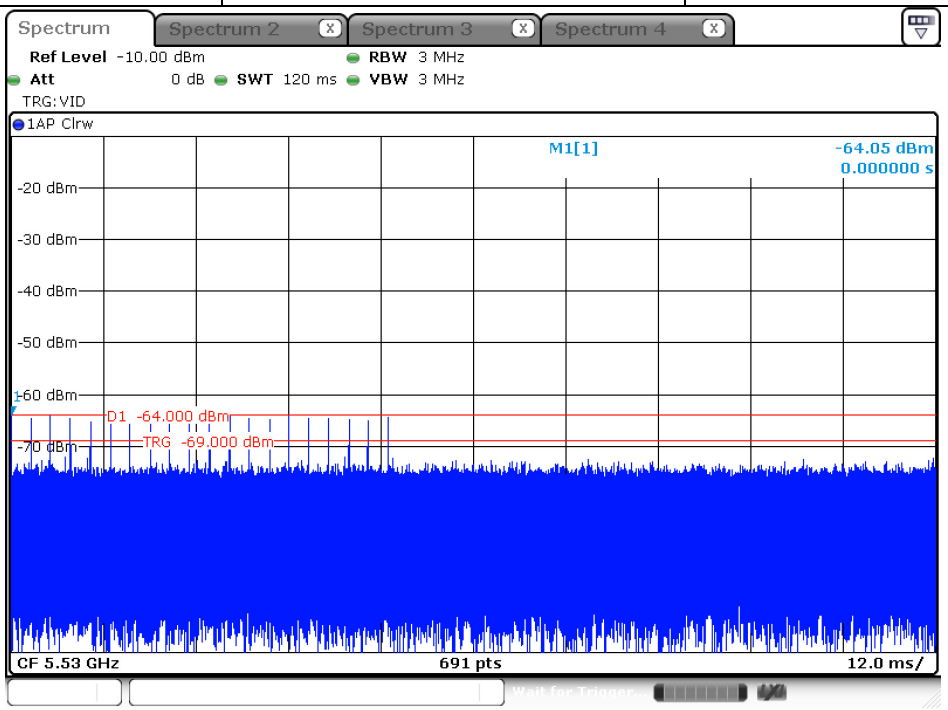
Date: 25.JAN.2016 16:08:48

Radar test signal #4	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



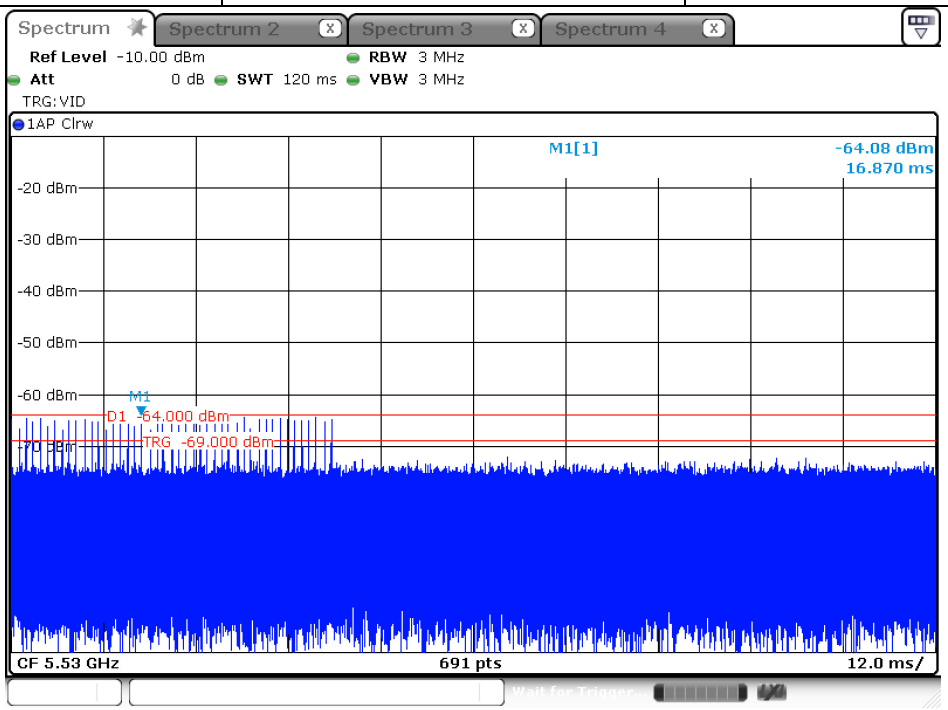
Date: 25.JAN.2016 16:09:11

Radar test signal #5	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



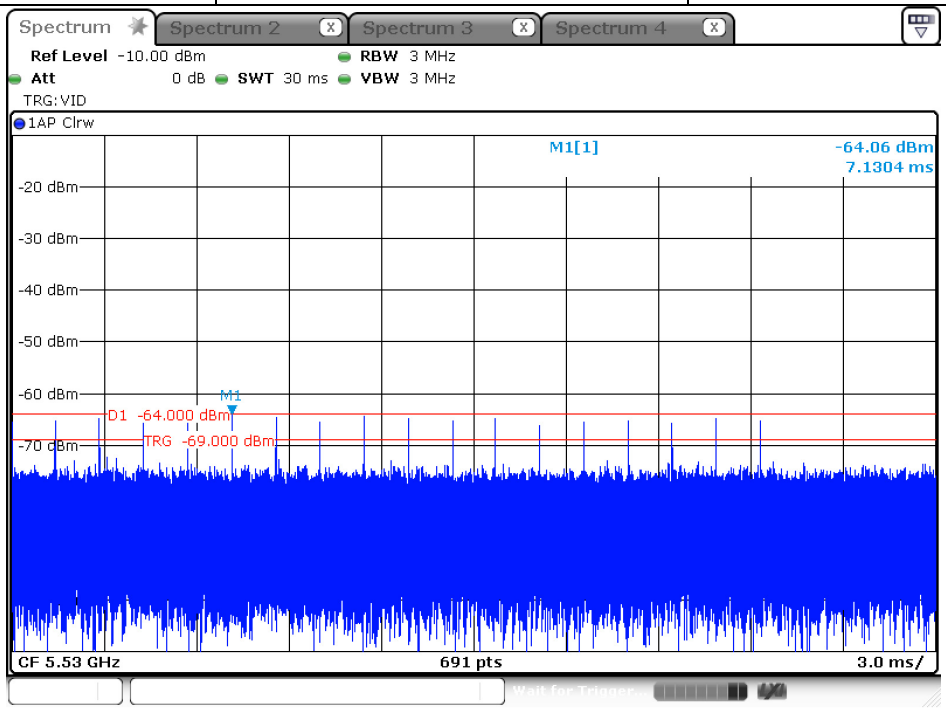
Date: 25.JAN.2016 16:09:35

Radar test signal #6	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



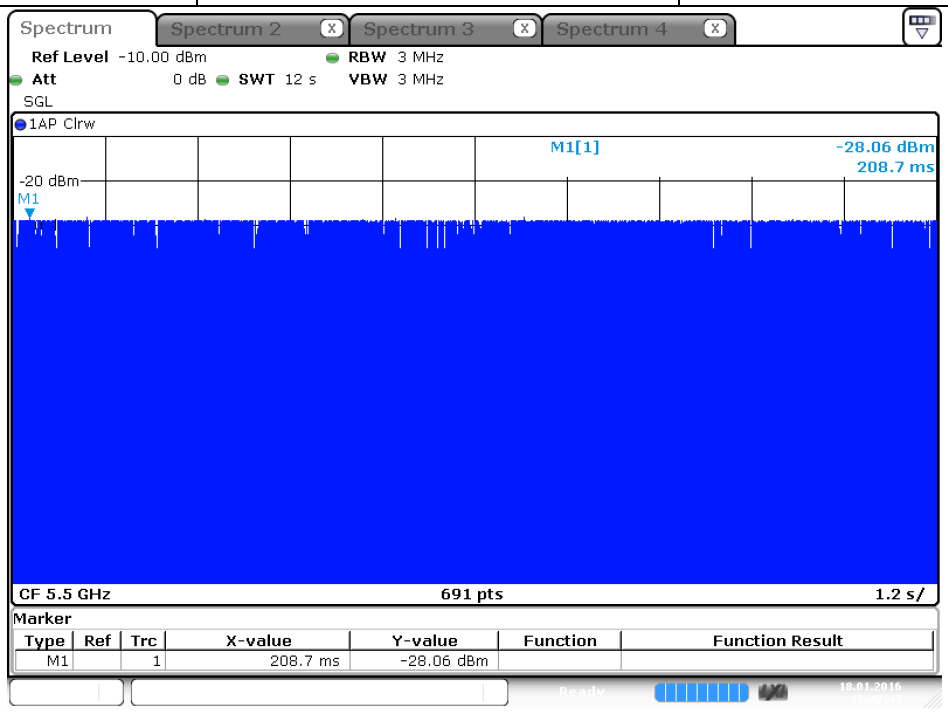
Date: 25.JAN.2016 16:09:50

Radar test signal #REF	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



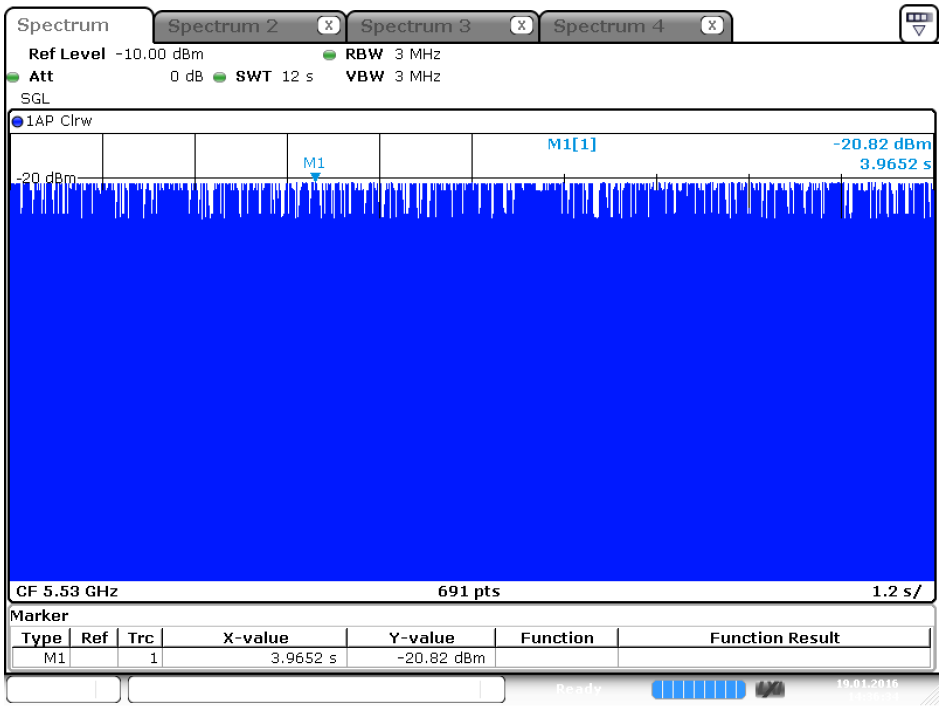
3.1.11 Data traffic Plot

EUT Data traffic Plot	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



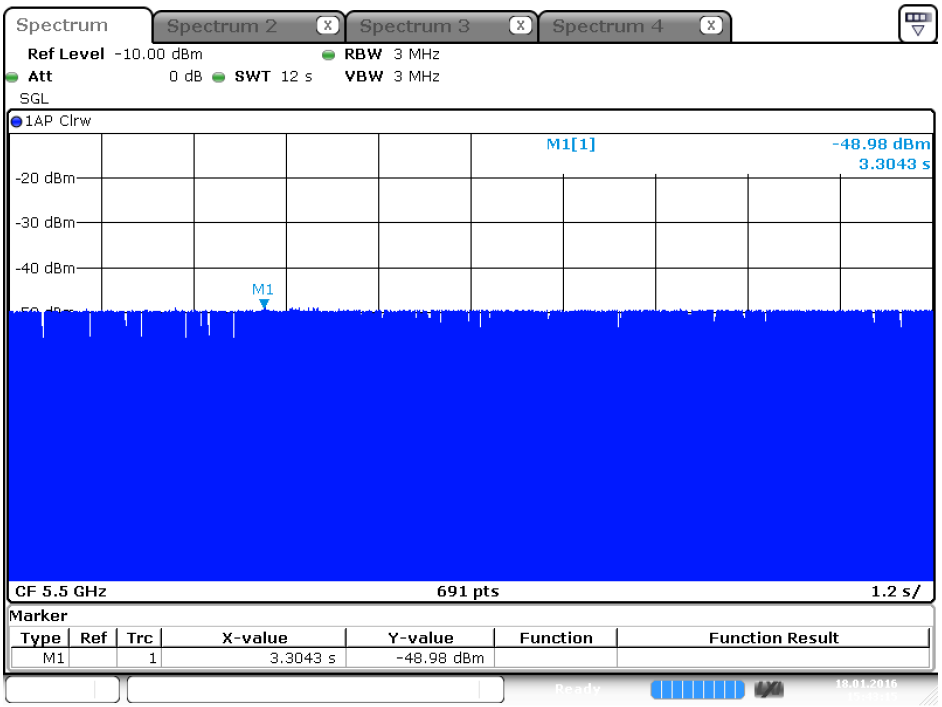
Date: 18.JAN.2016 15:42:46

EUT Data traffic Plot	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



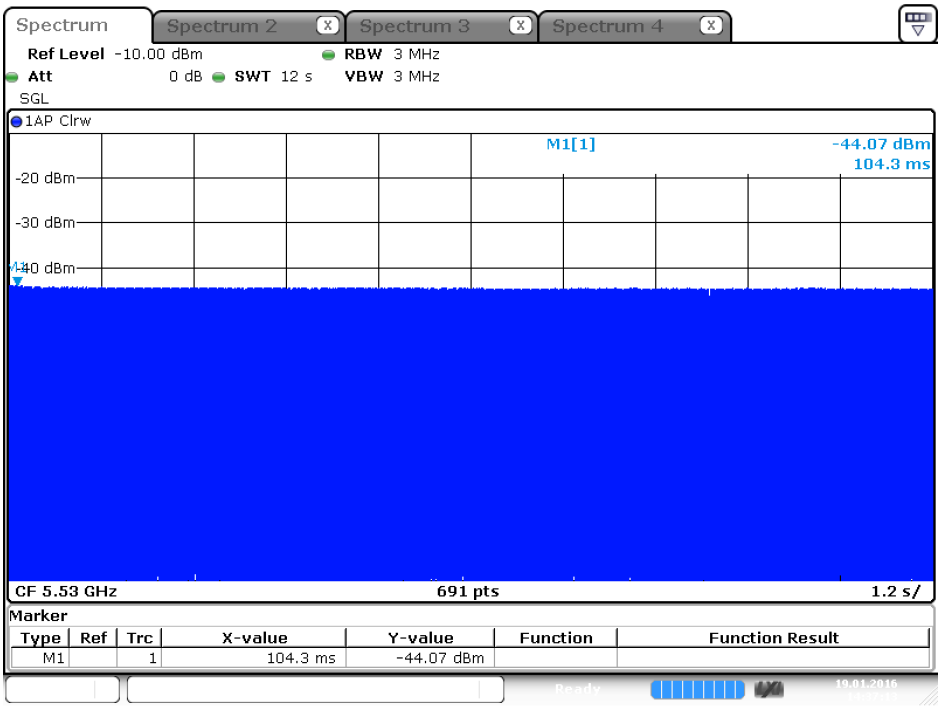
Date: 19.JAN.2016 14:36:33

Slave Data Traffic Plot	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



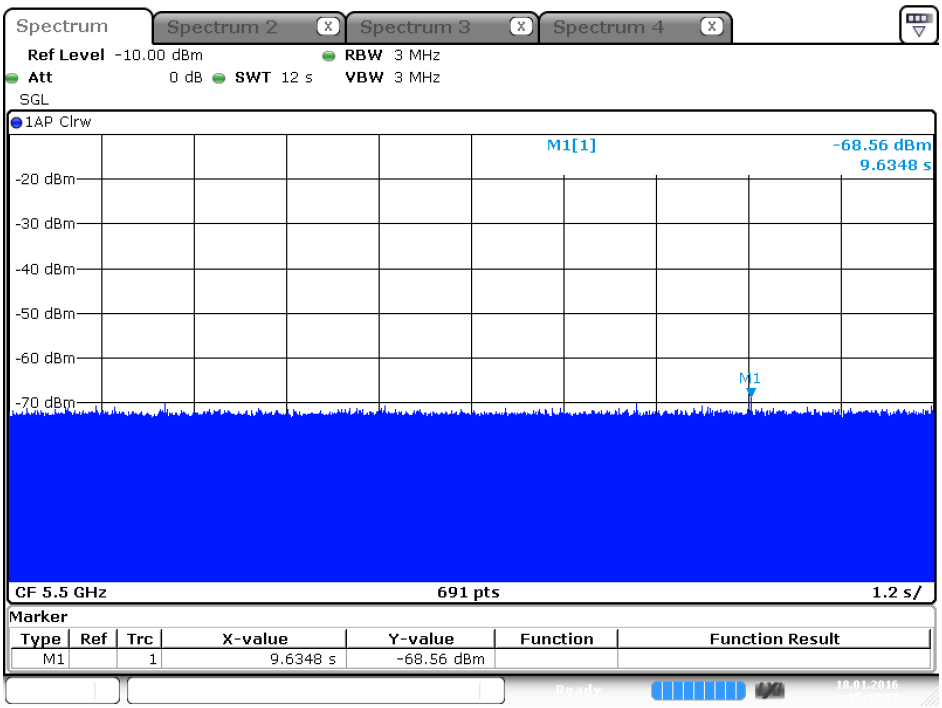
Date: 18.JAN.2016 15:43:14

Slave Data Traffic Plot	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



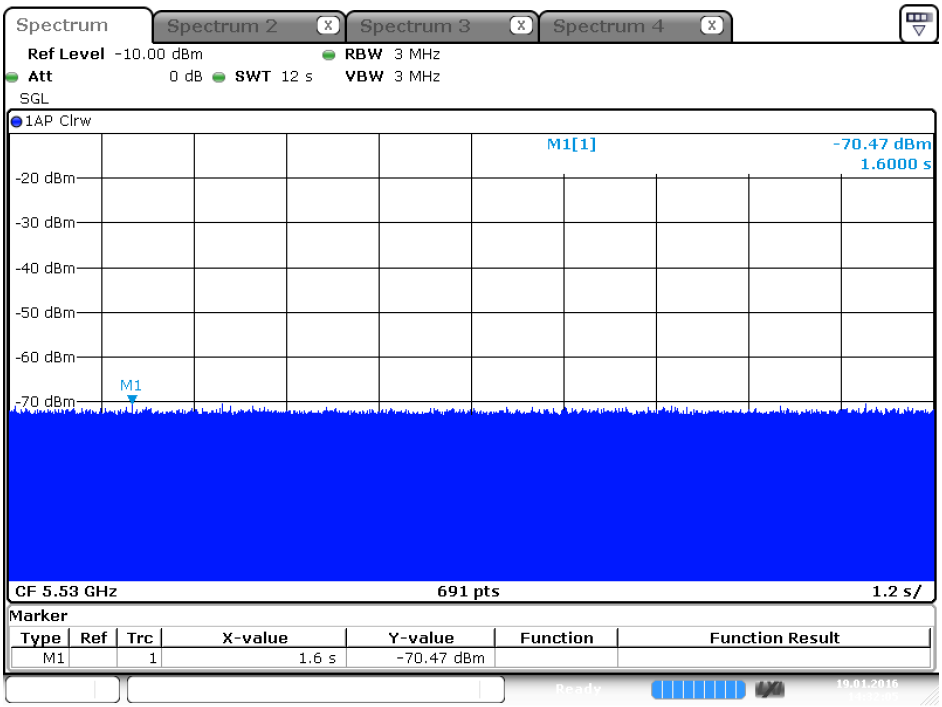
Date: 19.JAN.2016 14:37:13

Without Data Traffic Plot	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



Date: 18.JAN.2016 15:44:58

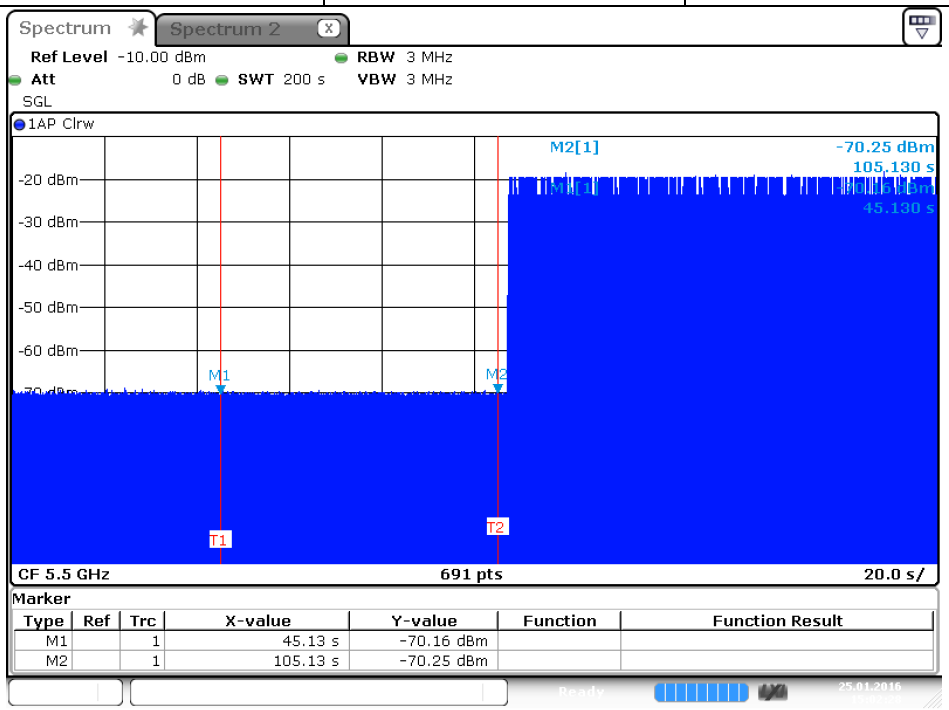
Without Data Traffic Plot	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



Date: 19.JAN.2016 14:32:05

3.1.12 Power-Up Cycle Plots

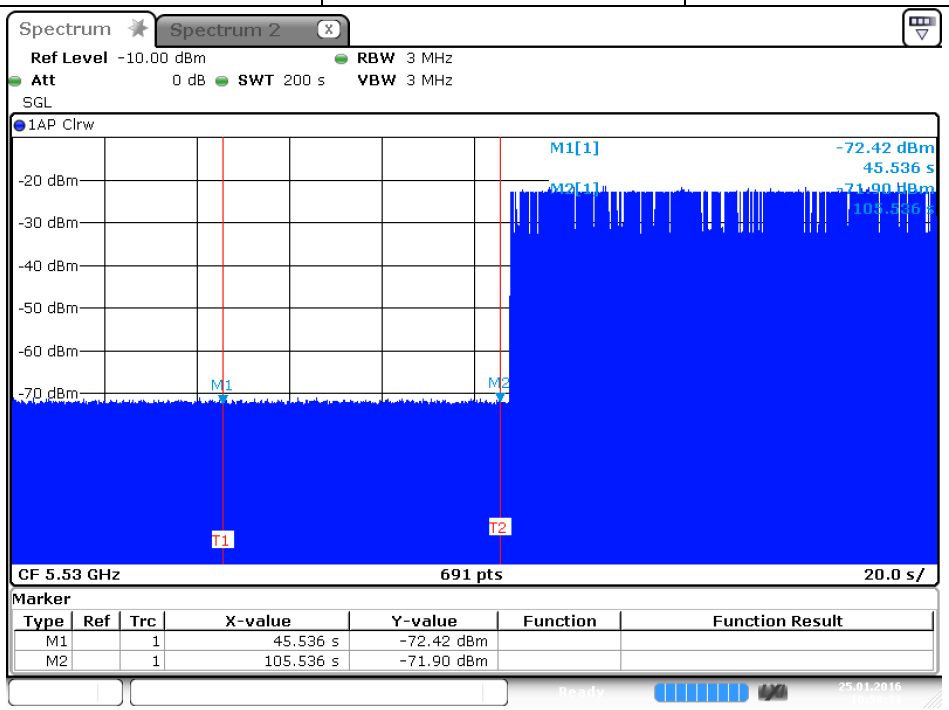
Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz	Power-Up cycle: 45.130 sec



Date: 25.JAN.2016 15:02:28

Note: T1 = Power-up cycle = Marker 2 – 60 sec = 105.130 – 60 = 45.130 sec

Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz	Power-Up cycle: 45.536 sec



Date: 25.JAN.2016 10:58:33

Note: T1 = Power-up cycle = Marker 2 – 60 sec = 105.536 – 60 = 45.536 sec

3.2 Channel Availability Check (CAC)

3.2.1 Channel Availability Check Limit

Channel Availability Check Limit	
☒	The *Channel Availability Check* shall be performed during a continuous period in time (*Channel Availability Check Time*) which shall not be less than the value defined in clause 3.1.1 table D.1.
☒	During the *Channel Availability Check*, the RLAN shall be capable of detecting any of the radar test signals that fall within the ranges given by clause 3.1.1 table D.4 with a level above the *Radar Detection Threshold* defined in clause 3.1.1 table D.2.
☒	The minimum required detection probability is defined in clause 3.1.1 table D.5.

3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method		
☒	Refer as EN 301 893, clause 5.1.3 for test channel. One channel out of the declared channels for this frequency range. If more than one nominal channel bandwidth has been declared for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth. Where the declared channel plan includes channels whose nominal channel bandwidth falls completely or partly within the 5600 MHz to 5650 MHz band, the tests for the *Channel Availability Check* (and where implemented, for the *Off-Channel CAC*) shall be performed on one of these channels in addition to a channel within the band 5470 MHz to 5600 MHz or 5650 MHz to 5725 MHz band.	
☒	Refer as EN 301 893, clause 5.3.8.2.1.2.2 for tests with a radar burst at the beginning of the *Channel Availability Check Time*.	
☒	Refer as EN 301 893, clause 5.3.8.2.1.2.3 for tests with radar burst at the end of the *Channel Availability Check Time*.	
☒	Refer as EN 301 893, clause 5.3.8.2.1.4.2 for tests with *Radar Detection Threshold* (during the *Channel Availability Check*). This test may be facilitated by disabling the Channel Shutdown feature for the duration of the test.	
☒	Refer as EN 301 893, clause 5.3.8.2.1 for conducted measurement.	
	☒	For conducted measurements on devices with multiple transmit chains and receive chains. The power splitter/combiner shall be used to combine all the transmit/receive chains (antenna outputs) into a single test point. The insertion loss of the power splitter/combiner shall be taken into account.
☐	Refer as EN 301 893, clause 5.3.8.2.2 for radiated measurement.	

3.2.4 Test Setup

Refer a clause 3.1.8 in this test report.

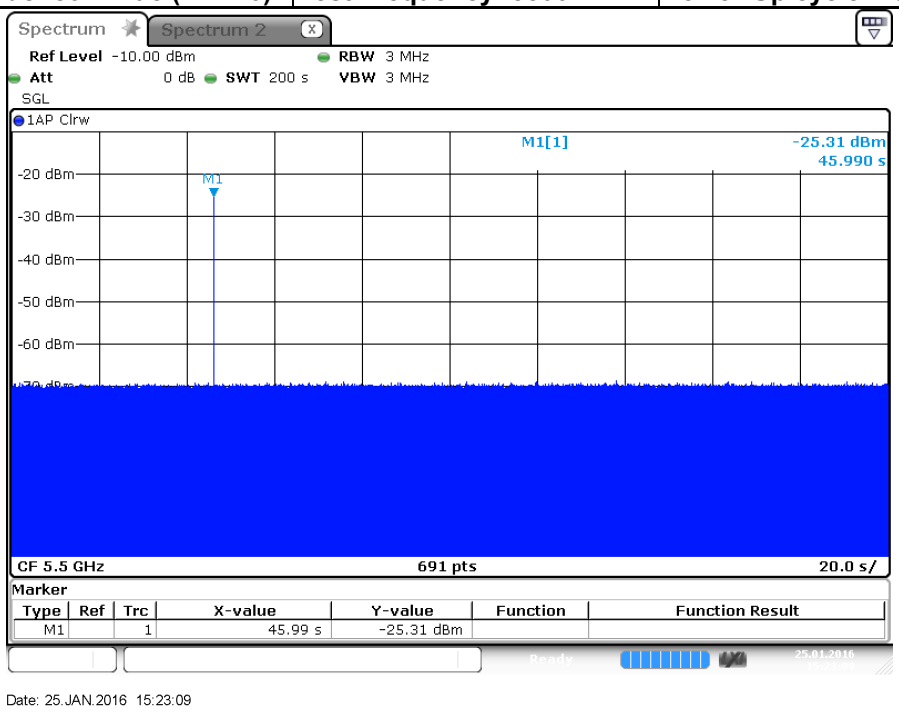
3.2.5 Test Result of Channel Availability Check Time

Channel Availability Check Time Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	**Freq. (MHz)**	**Radar Test Signal**	**Beginning CAC of Timing of radar burst (sec)**	**End CAC of Timing of radar burst (sec)**	**DFS Triggered (Yes/No)**
802.11ac (VHT20)	5500	table D.3	0-2	58-60	Yes
Result		**Complied**			
Note 1: Table D.3: Parameters of the reference DFS test signal.					

Channel Availability Check Time Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	**Freq. (MHz)**	**Radar Test Signal**	**Beginning CAC of Timing of radar burst (sec)**	**End CAC of Timing of radar burst (sec)**	**DFS Triggered (Yes/No)**
802.11ac (VHT80)	5530	table D.3	0-2	58-60	Yes
Result		**Complied**			
Note 1: Table D.3: Parameters of the reference DFS test signal.					

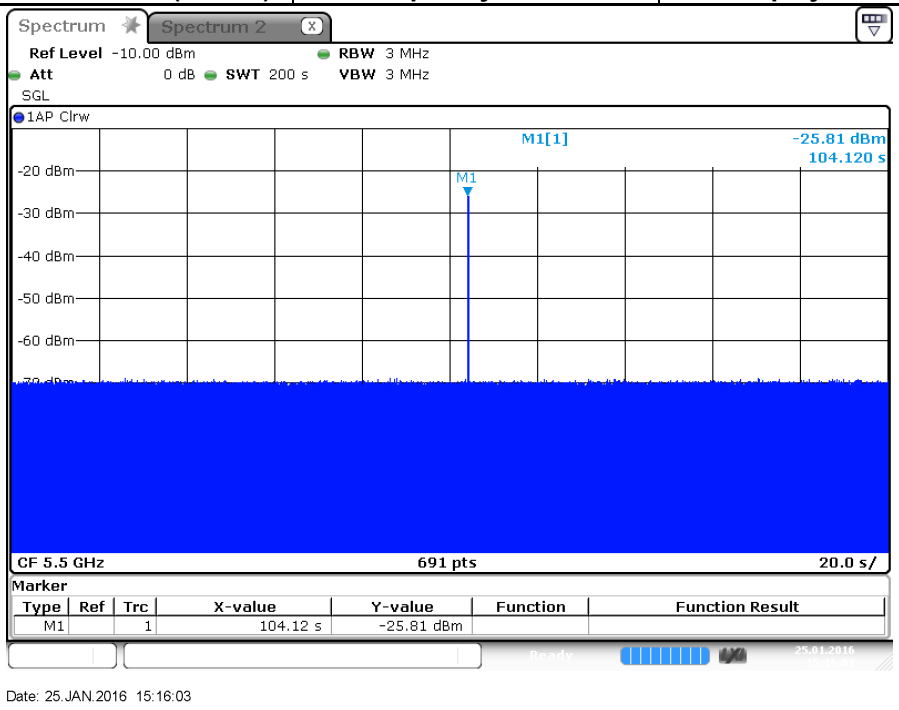
3.2.6 Test Result of Channel Availability Check Time Plots

Beginning CAC of Timing of radar burst (sec): Within 0 to 2 second window		
Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz	Power-Up cycle: 45.130 sec



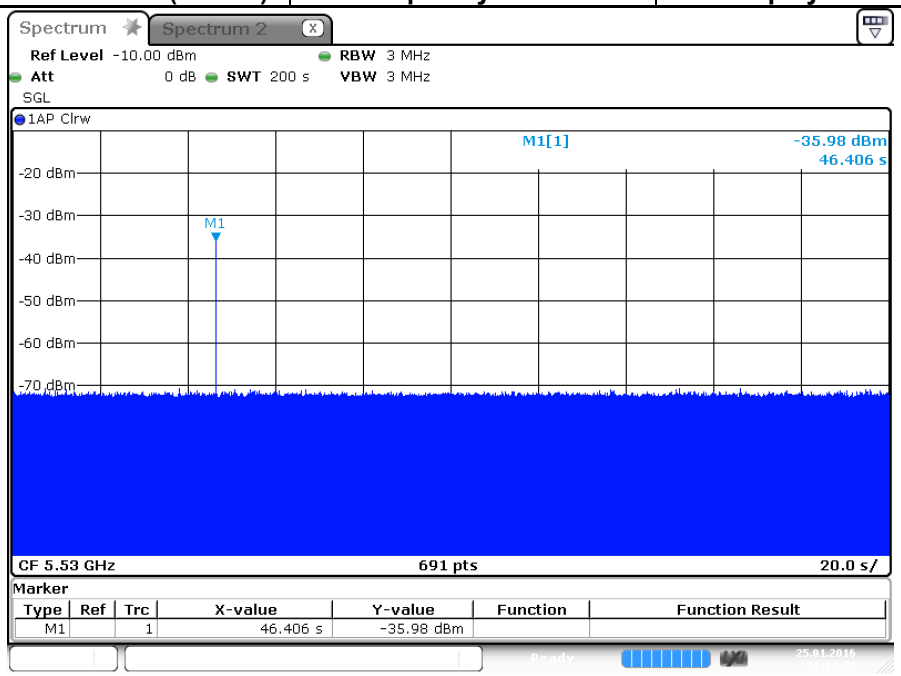
Note: 45.990 sec (radar generated time) - 45.13 sec (Power-up time) = 0.86 sec (radar generated time after power-up time)

End CAC of Timing of radar burst (sec): Within 58 to 60 second window		
Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz	Power-Up cycle: 45.130 sec



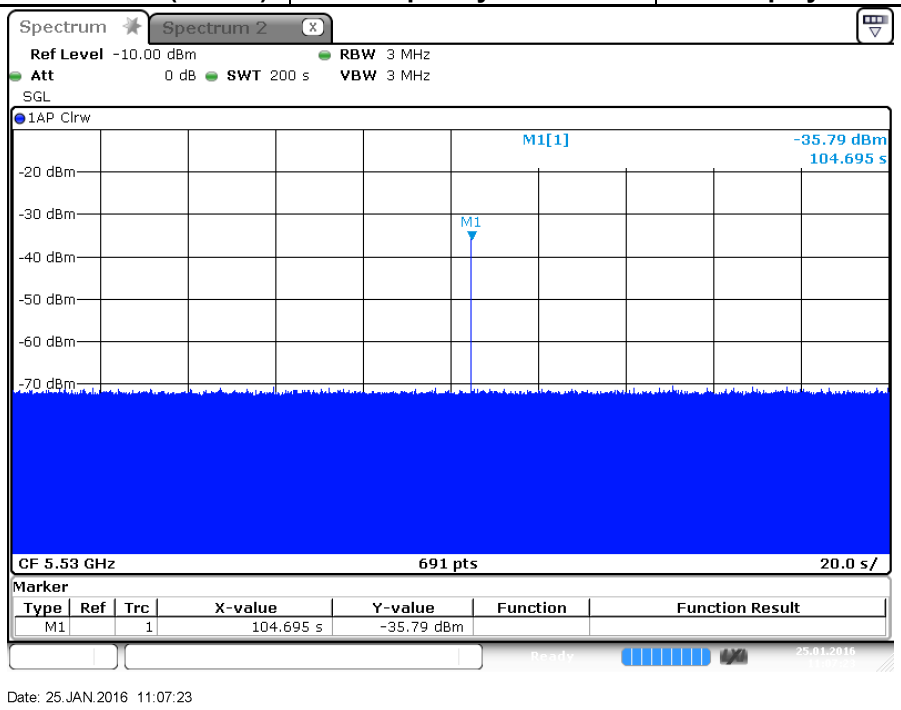
Note: 104.120 sec (radar generated time) - 45.130 sec (Power-up time) = 58.990 sec

Beginning CAC of Timing of radar burst (sec): Within 0 to 2 second window		
Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz	Power-Up cycle: 45.536 sec



Note: 46.406 sec (radar generated time) - 45.536 sec (Power-up time) = 0.870 sec (radar generated time after power-up time)

End CAC of Timing of radar burst (sec): Within 58 to 60 second window		
Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz	Power-Up cycle: 45.536 sec



Note: 104.695 sec (radar generated time) - 45.536 sec (Power-up time) = 59.159 sec

3.2.7 Radar Detection Threshold (during the Channel Availability Check) Result

Radar Detection Threshold (during the Channel Availability Check) Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
802.11ac (VHT20)	5500	1	18	90	60
		2	16	80	60
		3	17	85	60
		4	18	90	60
		5	17	85	60
		6	17	85	60
Result		Complied			

Radar Detection Threshold (during the Channel Availability Check) Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
802.11ac (VHT80)	5530	1	18	90	60
		2	16	80	60
		3	17	85	60
		4	18	90	60
		5	17	85	60
		6	16	80	60
Result		Complied			

3.3 In-service Monitoring

3.3.1 In-service Monitoring Limit

In-service Monitoring Limit	
☒	The *In-Service Monitoring* shall be used to monitor an *Operating Channel*.
☒	The *In-Service-Monitoring* shall start immediately after the RLAN has started transmissions on a channel. During the *In-Service Monitoring*, the RLAN shall be capable of detecting any of the radar test signals that fall within the ranges given by clause 3.1.1 table D.4 with a level above the *Radar Detection Threshold* defined in clause 3.1.1 table D.2.
☒	The minimum required detection probability is defined in clause 3.1.1 table D.5.

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method		
☒	Refer as EN 301 893, clause 5.1.3 for test channel. One channel out of the declared channels for this frequency range. If more than one nominal channel bandwidth has been declared for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth. Where the declared channel plan includes channels whose nominal channel bandwidth falls completely or partly within the 5600 MHz to 5650 MHz band, the tests for the *Channel Availability Check* (and where implemented, for the *Off-Channel CAC*) shall be performed on one of these channels in addition to a channel within the band 5470 MHz to 5600 MHz or 5650 MHz to 5725 MHz band.	
☒	Refer as EN 301 893, clause 5.3.8.2.1.5 for *In-Service Monitoring*.	
☒	Refer as EN 301 893, clause 5.3.8.2.1 for conducted measurement.	
	☒	For conducted measurements on devices with multiple transmit chains and receive chains. The power splitter/combiner shall be used to combine all the transmit/receive chains (antenna outputs) into a single test point. The insertion loss of the power splitter/combiner shall be taken into account.
☐	Refer as EN 301 893, clause 5.3.8.2.2 for radiated measurement.	

3.3.4 Test Setup

Refer a clause 3.1.8 in this test report.

3.3.5 Test Result of In-service Monitoring

In-service Monitoring Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
802.11ac (VHT20)	5500	1	17	85	60
		2	16	80	60
		3	17	85	60
		4	16	80	60
		5	15	75	60
		6	16	80	60
Result		Complied			

In-service Monitoring Result					
Detection Threshold Level (dBm)			-64		
Modulation Mode	Freq. (MHz)	Radar Test Signal (#)	Nr of Times Triggered (# out of 20)	Detection Probability (%)	Detection Probability Limit (%)
802.11ac (VHT80)	5530	1	17	85	60
		2	18	90	60
		3	18	90	60
		4	18	90	60
		5	17	85	60
		6	18	90	60
Result		Complied			

3.4 Channel Shutdown and Non-Occupancy Period

3.4.1 Channel Shutdown and Non-Occupancy Period Limit

Channel Shutdown Limit	
☒	The *Channel Move Time* shall not exceed the limit defined in clause 3.1.1 table D.1.
☒	The *Channel Closing Transmission Time* shall not exceed the limit defined in clause 3.1.1 table D.1.

Non-Occupancy Period Limit	
☒	The *Non-Occupancy Period* shall not be less than the value defined in clause 3.1.1 table D.1.

3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method		
☒	Refer as EN 301 893, clause 5.1.3 for test channel. One channel out of the declared channels for this frequency range. If more than one nominal channel bandwidth has been declared for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth. Where the declared channel plan includes channels whose nominal channel bandwidth falls completely or partly within the 5600 MHz to 5650 MHz band, the tests for the *Channel Availability Check* (and where implemented, for the *Off-Channel CAC*) shall be performed on one of these channels in addition to a channel within the band 5470 MHz to 5600 MHz or 5650 MHz to 5725 MHz band.	
☒	Refer as EN 301 893, clause 5.3.8.2.1.6 for *Channel Shutdown* and *Non-Occupancy period*.	
☒	Refer as EN 301 893, clause 5.3.8.2.1 for conducted measurement.	
	☒	For conducted measurements on devices with multiple transmit chains and receive chains. The power splitter/combiner shall be used to combine all the transmit/receive chains (antenna outputs) into a single test point. The insertion loss of the power splitter/combiner shall be taken into account.
☐	Refer as EN 301 893, clause 5.3.8.2.2 for radiated measurement.	

3.4.4 Test Setup

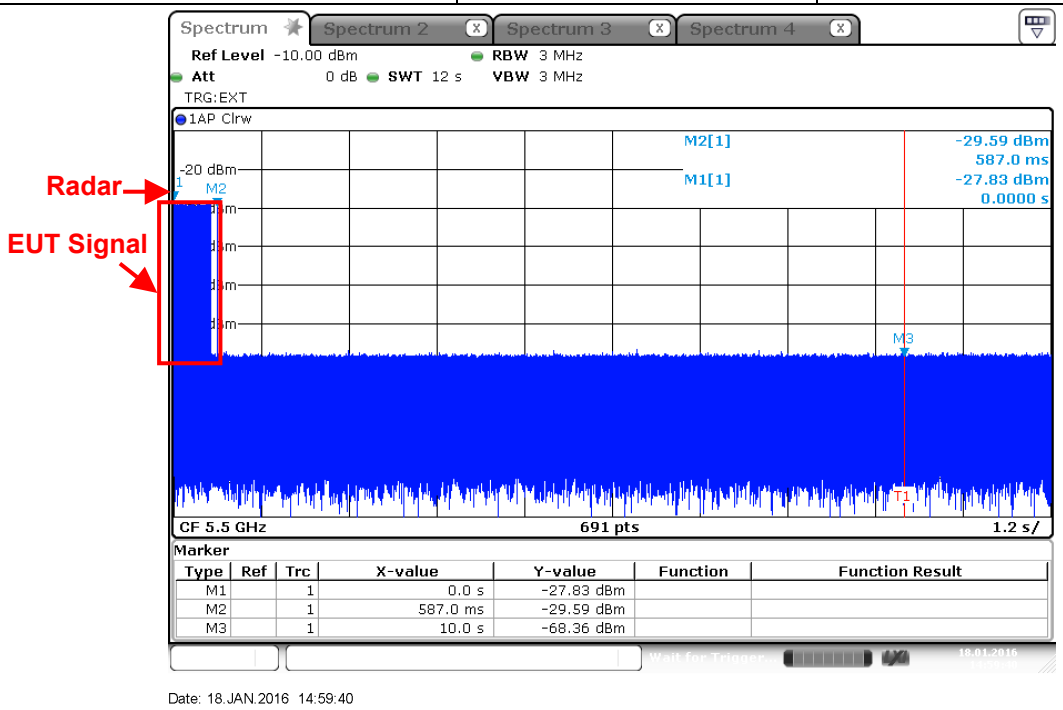
Refer a clause 3.1.8 in this test report.

3.4.5 Test Result of Channel Shutdown

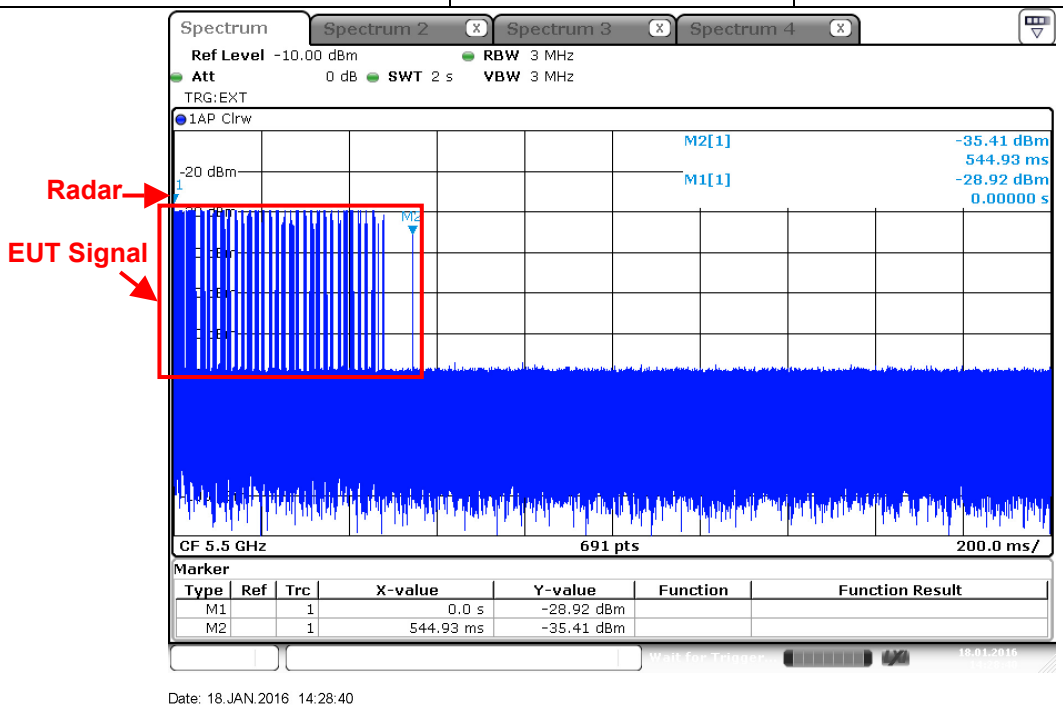
Channel Shutdown and Non-Occupancy Period Result				
Detection Threshold Level (dBm)			-64	
Modulation Mode	**Freq. (MHz)**	**Radar Test Signal**	**Channel Closing Transmission Time (ms)**	**Channel Move Time (s)**
802.11ac (VHT20)	5500	table D.3	298.550	0.587
802.11ac (VHT80)	5530	table D.3	382.608	0.539
Limit			1 sec	10 sec
Result			**Complied**	
Note 1: Table D.3: Parameters of the reference DFS test signal.				

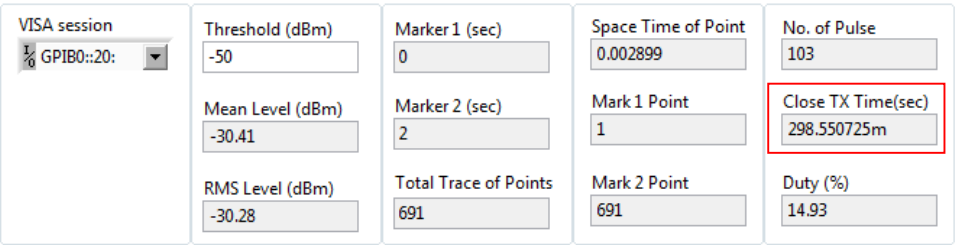
3.4.6 Channel Shutdown Plots

Channel Move Time: < 10 sec		
Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz	Channel Move Time: 0.587 s



Channel Closing Transmission Time: 298.550 ms		Sampling Bins (B): 690
Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz	Number of Sampling Bins (N): 103

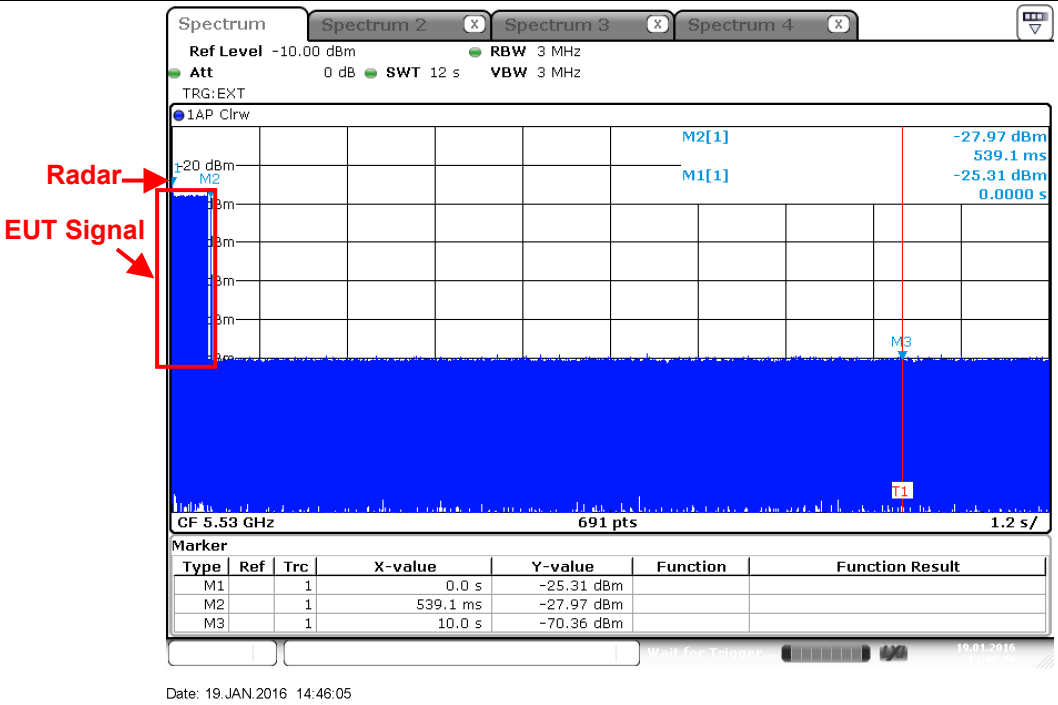




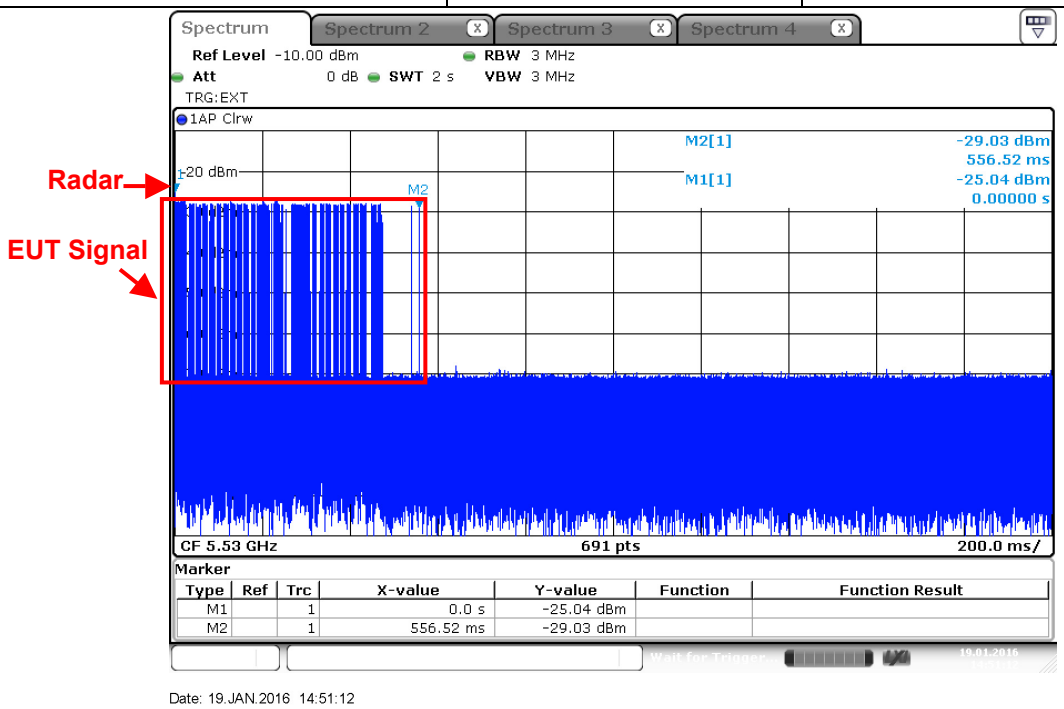
Dwell=S / B=2000ms / 690=2.899ms, C=N x Dwell=103 x 2.899ms=298.550 ms

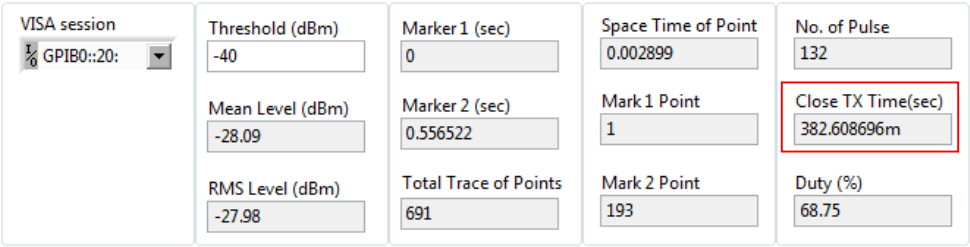
Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.
The Channel Closing Transmission Time is calculated by
Closing Time = N*(Sweep time/Sweep Point-1)
where N is the number of spectrum analyzer sampling bins.

Channel Move Time: < 10 sec		
Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz	Channel Move Time: 0.539 s



Channel Closing Transmission Time: 382.608 ms		Sampling Bins (B): 690
Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz	Number of Sampling Bins (N): 132





Dwell=S / B=2000ms / 690=2.899ms, C=N x Dwell=132 x 2.899ms=382.608 ms

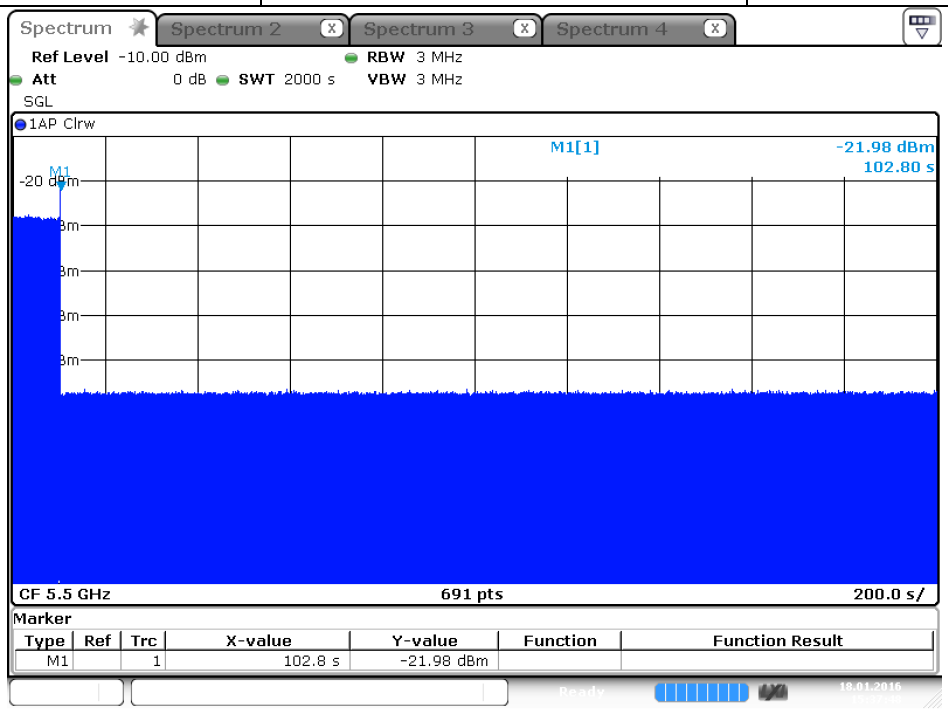
Note: The first sweep point of spectrum analyzer is occupied by radar signal, therefore, the number "Sweep Point-1" should be used for Channel Closing Transmission Time calculation.
The Channel Closing Transmission Time is calculated by
Closing Time = N*(Sweep time/Sweep Point-1)
where N is the number of spectrum analyzer sampling bins.

3.4.7 Test Result of Non-Occupancy Period

Non-Occupancy Period Result			
Detection Threshold Level (dBm)			-64
Modulation Mode	**Freq. (MHz)**	**Radar Test Signal**	**Non-Occupancy Period (min)**
802.11ac (VHT20)	5500	table D.3	>30
802.11ac (VHT80)	5530	table D.3	>30
Limit			30 min
Result			**Complied**
Note 1: Table D.3: Parameters of the reference DFS test signal.			

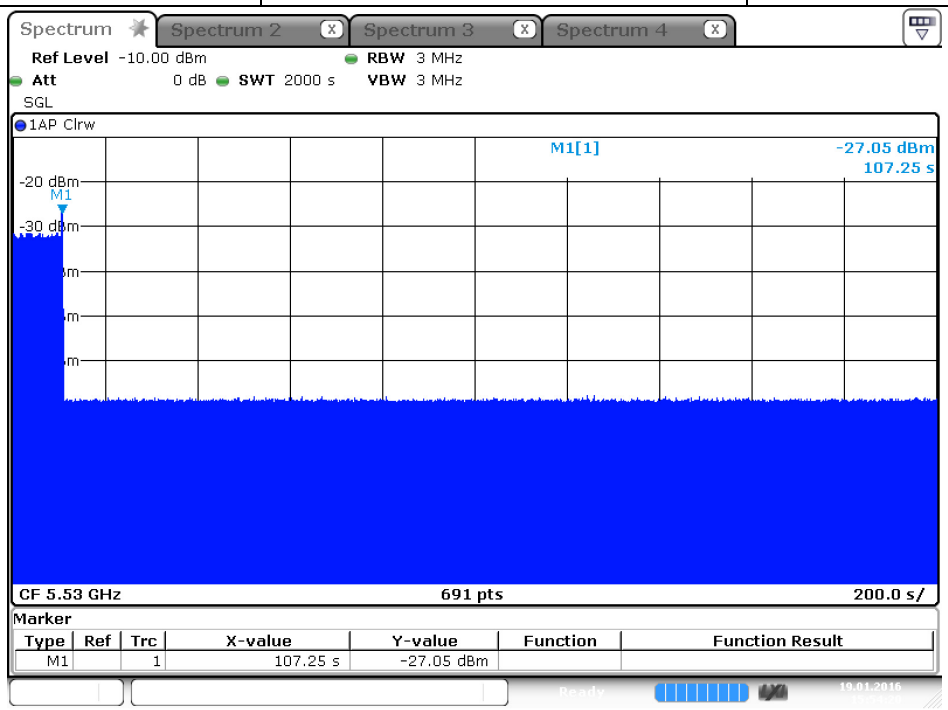
3.4.8 Non-Occupancy Period Plots

Non-Occupancy Period: >30min	Modulation Mode: 802.11ac (VHT20)	Test Frequency: 5500 MHz



Date: 18.JAN.2016 15:37:49

Non-Occupancy Period: >30min	Modulation Mode: 802.11ac (VHT80)	Test Frequency: 5530 MHz



Date: 19.JAN.2016 15:54:20

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (DF01-CB)
Vector Signal generator	R&S	SMU200A	102782	25MHz-6GHz	Nov. 06, 2015	Conducted (DF01-CB)
RF Power Divider	ANAREN	2 Way	DFS-01-DV-02	1GHz ~ 6GHz	Nov. 07, 2015	Conducted (DF01-CB)
RF Power Divider	MTJ	2 Way	DFS-01-DV-03	1GHz ~ 6GHz	Nov. 07, 2015	Conducted (DF01-CB)
RF Power Divider	ANAREN	4 Way	DFS-01-DV-01	1GHz ~ 6GHz	Nov. 07, 2015	Conducted (DF01-CB)
RF Cable-high	Woken	RG402	High Cable-53	1 GHz –18 GHz	Nov. 02, 2015	Conducted (DF01-CB)
RF Cable-high	Woken	RG402	High Cable-54	1 GHz –18 GHz	Nov. 02, 2015	Conducted (DF01-CB)
RF Cable-high	Woken	RG402	High Cable-56	1 GHz –18 GHz	Nov. 02, 2015	Conducted (DF01-CB)

Note: Calibration Interval of instruments listed above is one year.

5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Conducted Emission	1.7 dB	Confidence levels of 95%

Parameter	Uncertainty
RF frequency	$\pm 1.1 \times 10^{-6}$
RF power conducted	±1.0dB
Humidity	±2.5%
Temperature	±0.7°C
Time	±3%
95% confidence level using a coverage factor of k=2	

Appendix A. Test Photos

1. Photographs of Test Configuration

FRONT VIEW

REAR VIEW