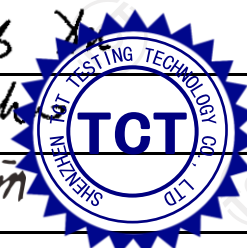


Test Report

Test Report No..... :	TCT220422E057	
Date of issue..... :	May 17, 2022	
Testing laboratory	Shenzhen TCT Testing Technology Co., Ltd.	
Testing location/ address:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China	
Applicant's name..... :	Shenzhen Huafurui Technology Co., Ltd	
Address..... :	Unit 1401 & 1402, 14/F, Jinqi Zhigu Mansion (No. 4 Building of Chongwen Garden), Crossing of the Liuxian Street and Tangling Road, Taoyuan Street, Nanshan District, Shenzhen, P.R. China	
Manufacturer's name ... :	Shenzhen Huafurui Technology Co., Ltd	
Address..... :	Unit 1401 & 1402, 14/F, Jinqi Zhigu Mansion (No. 4 Building of Chongwen Garden), Crossing of the Liuxian Street and Tangling Road, Taoyuan Street, Nanshan District, Shenzhen, P.R. China	
Standard(s)	ETSI EN 301 893 V2.1.1 (2017-05)	
Product Name..... :	Tablet	
Trade Mark	CUBOT	
Model/Type reference..... :	TAB 30	
Rating(s)..... :	Refer to EUT description of page 3	
Date of receipt of test item	Apr. 22, 2022	
Date (s) of performance of test..... :	Apr. 11, 2022 ~ May 17, 2022	
Tested by (+signature) ... :	Brews XU	
Check by (+signature)..... :	Beryl ZHAO	
Approved by (+signature):	Tomsin	



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1. General Product Information

1.1. EUT description

Product Name.....:	Tablet
Model/Type reference.....:	TAB 30
Hardware Version.....:	T30-T618-V1.0
Software Version	CUBOT_TAB_30_P031C_V1.0_20220218
DFS Operation mode	Slave without radar detection
Operation Frequency	5150MHz-5350MHz
Modulation Technology	Orthogonal Frequency Division Multiplexing(OFDM)
(IEEE802.11a/802.11n)	
Modulation Type.....:	256QAM, 64QAM, 16QAM, BPSK, QPSK
Antenna Type.....:	PIFA Antenna
Antenna Gain.....:	1dBi
Rating(s).....:	Adapter Information: Model: HJ-FC001K7-UK Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 5.0V, 3.0A/ DC 9.0V, 2.0A/ DC 12.0V, 1.5A, 18.0W Rechargeable Li-ion Battery DC 3.8V

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2. Model(s) list

None.

1.3. Operation Frequency

RF General Information			
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5150-5250	n (HT20)	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5150-5250	n (HT40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5150-5250	ac (HT20)	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5150-5250	ac (HT40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5150-5250	ac (HT80)	5210	42 [1]
5250-5350		5290	58 [1]

Note 1: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

Note 2: 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

Test channel:

Test Channel Frequencies Configuration		
Frequency Range (MHz)	IEEE Std. 802.11	Test Channel Freq. (MHz)
5150-5350MHz	a/n/ac (HT20)	5180, 5320
5150-5350MHz	n/ac (HT40)	5190, 5310
5150-5350MHz	ac (HT80)	5210, 5290

2. Test Result Summary

Test Item	Test Requirement	Test Method	Limit/Severity	Uncertainty	Result
Nominal Centre frequency	Clause 4.2.1	Clause 5.4.2.2.	$\pm 20\text{ppm}$	$\pm 1 \times 10^{-5}$	PASS
Normal Channel Bandwidth and Occupied Channel Bandwidth	Clause 4.2.2	Clause 5.4.3.2	Clause 4.2.2.2	N/A	PASS
RF output power, power density	Clause 4.2.3	Clause 5.4.4.2	Clause 4.2.3.2	$\pm 1.5 \text{ dB}$	PASS
Transmitter Power Control (TPC)	Clause 4.2.3	Clause 5.4.4.2	Clause 4.2.3.2	$\pm 3 \text{ dB}$	N/A
Transmitter unwanted emissions	Clause 4.2.4	Clause 5.4.5.2 & Clause 5.4.6.2	Clause 4.2.4.1.2 & Clause 4.2.4.2.2	$\pm 3 \text{ dB}$	PASS
Receiver spurious emission	Clause 4.2.5	Clause 5.4.7.2	Clause 4.2.5.2	N/A	PASS
Dynamic Frequency Selection (DFS)	Clause 4.2.6	Clause 5.4.8.2	Clause 4.2.6.2.2.2 & Clause 4.2.6.2.3.2 & Clause 4.2.6.2.4.2 & Clause 4.2.6.2.5.2 & Clause 4.2.6.2.6.2 & Clause 4.2.6.2.6.2	N/A	PASS
Adaptivity Channel Access Mechanism	Clause 4.2.7	Clause 5.4.9.2 & Clause 5.4.9.3	Clause 4.2.7.3.3.3	N/A	PASS
Receiver Blocking	Clause 4.2.8	Clause 5.4.10.2	Clause 4.2.8.4	N/A	PASS
User Access Restrictions	Clause 4.2.9	N/A	Clause 4.2.9.2	N/A	N/A

3. General Information

3.1. Test environment and mode

Item	Normal condition	Extreme condition			
		HHT	LHT	HVLT	LVLT
Temperature	+25°C	+25°C	+25°C	-20°C	-20°C
Voltage	DC 3.8V	DC 4.35V	DC 3.3V	DC 4.35V	DC 3.3V
Humidity	20%-95%				
Atmospheric Pressure:	1008 mbar				
Test Mode:					
Transmitting mode:		Keep the EUT in transmitting mode with modulation.(Max. duty cycle)			
Receiving mode:		Keep the EUT in receiving mode.			

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows: The Worst Case Modulation Configuration

Per-scan all kind of data rate in all channel, and found the follow list which it was worst case and recorded.

Mode	Data rate
802.11a	6Mbps
802.11n (HT20)	MCS0(128 Mbps)
802.11n (HT40)	MCS0(128 Mbps)
802.11ac (HT20)	MCS0(160 Mbps)
802.11ac (HT40)	MCS0(160 Mbps)
802.11ac (HT80)	MCS0(160 Mbps)

3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3.3. Test Instruments List

Radiated Emission				
Name	Model No.	Manufacturer	Date of Cal.	Due Date
Spectrum Analyzer	FSQ40	R&S	Jul. 08, 2021	Jul. 07, 2022
Pre-amplifier	8447D	HP	Jul. 08, 2021	Jul. 07, 2022
Pre-amplifier	LNPA_0118G-45	SKET	Feb. 25, 2022	Feb. 24, 2023
Pre-amplifier	LNPA_1840G-50	SKET	Feb. 25, 2022	Feb. 24, 2023
Broadband Antenna	VULB9163	Schwarzbeck	Sep. 05, 2020	Sep. 04, 2022
Horn Antenna	BBHA 9120D	Schwarzbeck	Sep. 05, 2020	Sep. 04, 2022
Horn Antenna	BBHA 9170	Schwarzbeck	Apr. 11, 2021	Apr. 10, 2023
Coaxial cable	RC_DC18G-N	SKET	Feb. 25, 2022	Feb. 24, 2023
Coaxial cable	RC-DC18G-N	SKET	Feb. 25, 2022	Feb. 24, 2023
Coaxial cable	RC-DC40G-N	SKET	Jul. 08, 2021	Jul. 07, 2022

Conducted Emission				
Name	Model No.	Manufacturer	Date of Cal.	Due Date
Signal Generator	N5182A	Agilent	Jul. 19, 2021	Jul. 18, 2022
Spectrum Analyzer	N9020A	Agilent	Jul. 19, 2021	Jul. 18, 2022
Combiner Box	AT890-RFB	Ascentest	Jul. 08, 2021	Jul. 07, 2022

4. Facilities and Accreditations

4.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

SHENZHEN TONGCE TESTING LAB

Designation Number: CN1205

The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

SHENZHEN TONGCE TESTING LAB

CAB identifier: CN0031

The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

Shenzhen TCT Testing Technology Co., Ltd.

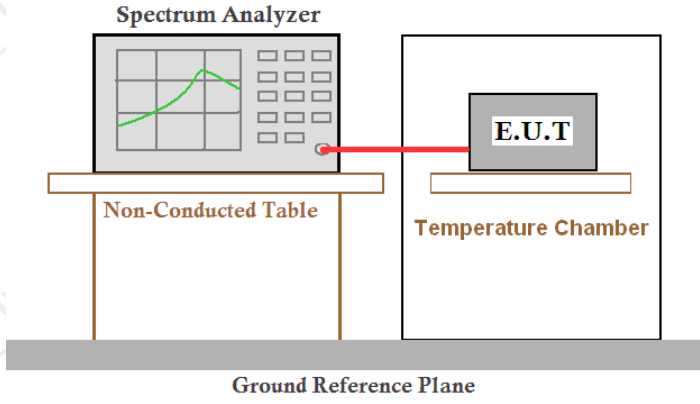
Address: 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

5. Technical requirements

5.1. Nominal Centre frequencies

5.1.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.1
Test Method:	ETSI EN 301 893 clause 5.4.2.2
Limit:	$f_c \pm 20\text{ppm}$
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is positioned on a Non-Conducted Table. A red cable connects the Spectrum Analyzer to the E.U.T. (Equipment Under Test), which is located inside a Temperature Chamber. Both the Non-Conducted Table and the Temperature Chamber are situated on a common Ground Reference Plane.</p>
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was connected to spectrum analyser and operated in an unmodulated test mode. 2. Under normal and extreme test condition of temperature, the center frequency of the EUT has been measured according to the standard. 3. Measure and record the results in the test report.
Test Instrument:	Refer to Item 3.3
Test Mode:	Refer to section 3.1 for details
Test Result:	PASS

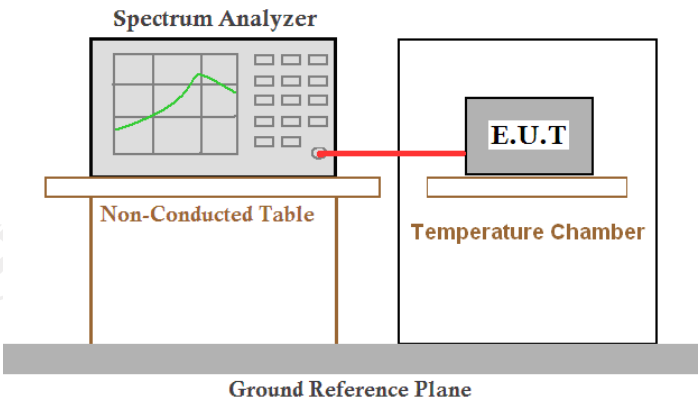
5.1.2. Test Data

5150MHz-5350MHz

Frequency (MHz)	Measured Frequency For Operating Conditions					Maximum Frequency Error (kHz)	Maximum Frequency Error (ppm)
	NC	LVHT	LVL	HVHT	HVLT		
802.11a							
5240	5239.980	5239.974	5239.979	5239.972	5239.977	-28	-5.34
802.11n-VHT40							
5230	5229.920	5229.915	5229.912	5229.918	5229.914	-88	-16.83
802.11ac-VHT80							
5290	5290.000	5289.994	5289.997	5289.991	5289.996	-9	-1.70

5.2. Nominal Channel Bandwidth and Occupied Channel Bandwidth

5.2.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.2
Test Method:	ETSI EN 301 893 clause 5.4.3.2
Limit:	<p>The Nominal Channel Bandwidth for a single Operating Channel shall be 20 MHz.</p> <p>Alternatively, equipment may implement a lower Nominal Channel Bandwidth with a minimum of 5 MHz.</p> <p>The Occupied Channel Bandwidth shall be between 80 % and 100 % of the Nominal Channel Bandwidth</p>
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is positioned on a Non-Conducted Table. A red cable connects the Spectrum Analyzer to the E.U.T. (Equipment Under Test), which is housed within a Temperature Chamber. Both the table and the chamber sit on a common Ground Reference Plane.</p>
Test Procedure:	<p>For the Occupied Bandwidth: The UUT shall be configured to operate at a typical RF power output level.</p> <ol style="list-style-type: none"> 1. The output of the transmitter shall be connected to the spectrum analyzer. 2. Setting the spectrum analyser: Centre Frequency: The centre frequency of the channel under test. RBW=100KHz, VBW=300KHz, Span=2*nominal bandwidth, Detector=RMS, trace mode=Max Hold; 3. Measure and record the results in the test report. 4. Repeat all the frequency of the UUT.
Test Instrument:	Refer to Item 3.3
Test Mode:	Refer to section 3.1 for details
Test Result:	PASS

5.2.2. Test Data**Configuration IEEE 802.11a 6 Mbps**

Frequency (MHz)	Mode	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
5240	802.11a	20	16.42	16-20	Pass

Configuration IEEE 802.11n (HT20) MCS0

Frequency (MHz)	Mode	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
5240	802.11n	20	17.58	16-20	Pass

Configuration IEEE 802.11ac (HT20) MCS0

Frequency (MHz)	Mode	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
5240	802.11ac	20	17.59	16-20	Pass

Configuration IEEE 802.11n (HT40) MCS0

Frequency (MHz)	Mode	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
5230	802.11n	40	36.05	32-40	Pass

Configuration IEEE 802.11ac (HT40) MCS0

Frequency (MHz)	Mode	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
5230	802.11ac	40	36.05	32-40	Pass

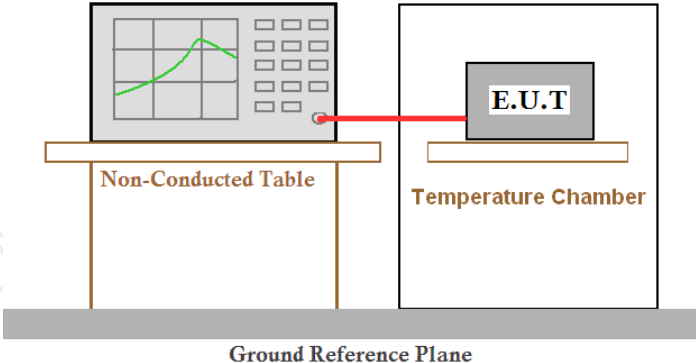
Configuration IEEE 802.11ac (HT80) MCS0

Frequency (MHz)	Mode	Nominal Bandwidth (MHz)	Occupied Bandwidth (MHz)		Result
			Measured (MHz)	Limit (MHz)	
5290	802.11ac	80	75.65	64-80	Pass

5.3. RF output power, Transmit Power Control(TPC) and EIRP spectral density

5.3.1. Transmitter RF output power and power density

5.3.1.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.3																			
Test Method:	ETSI EN 301 893 clause 5.4.4.2																			
Limit:	<div>Table 2: Mean e.i.r.p. limits for RF output power and Power Density at the highest power level (P_H)</div> <table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Mean e.i.r.p. limit for P_H (dBm)</th><th colspan="2">Mean e.i.r.p. density limit (dBm/MHz)</th></tr><tr><th>with TPC</th><th>without TPC</th><th>with TPC</th><th>without TPC</th></tr><tr><td>5 150 to 5 350</td><td>23</td><td>20/23 (see note 1)</td><td>10</td><td>7/10 (see note 2)</td></tr><tr><td>5 470 to 5 725</td><td>30 (see note 3)</td><td>27 (see note 3)</td><td>17 (see note 3)</td><td>14 (see note 3)</td></tr></table> <div><div>NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.</div><div>NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.</div><div>NOTE 3: Slave devices without a <i>Radar Interference Detection</i> function shall comply with the limits for the frequency range 5 250 MHz to 5 350 MHz.</div></div>	Frequency range (MHz)	Mean e.i.r.p. limit for P _H (dBm)		Mean e.i.r.p. density limit (dBm/MHz)		with TPC	without TPC	with TPC	without TPC	5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)	5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)
Frequency range (MHz)	Mean e.i.r.p. limit for P _H (dBm)		Mean e.i.r.p. density limit (dBm/MHz)																	
	with TPC	without TPC	with TPC	without TPC																
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)																
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)																
Test Setup:	<div><div><div>Spectrum Analyzer</div><div></div></div></div>																			
Test Procedure:	Refer to ETSI EN 301 893 clause 5.4.4.2																			
Test Instrument:	Refer to Item 3.3																			
Test Result:	PASS																			

5.3.1.2. Test Data

Test Result of RF Output Power at the Highest Power – P_H

Configuration 802.11a 6 Mbps

Test Conditions				Frequency (MHz)	Max Burst RMS Power (dBm)	Max EIRP (dBm EIRP)	Limit (dBm EIRP)
T nom(°C)	25	V nom(VDC)	3.8	5180	10.67	11.67	23
				5320	10.00	11.00	20
T min(°C)	-20	V max(VDC)	4.35	5180	10.46	11.46	23
				5320	9.86	10.86	20
		V min(VDC)	3.3	5180	10.43	11.43	23
				5320	9.67	10.67	20
T max(°C)	25	V max(VDC)	4.35	5180	10.01	11.01	23
				5320	9.62	10.62	20
		V min(VDC)	3.3	5180	10.50	11.50	23
				5320	9.37	10.37	20
Result					Complied		

Configuration 802.11n (HT20) MCS0

Test Conditions				Frequency (MHz)	Max Burst RMS Power (dBm)	Max EIRP (dBm EIRP)	Limit (dBm EIRP)
T nom(°C)	25	V nom(VDC)	3.8	5180	10.96	11.96	23
				5320	12.17	13.17	20
T min(°C)	-20	V max(VDC)	4.35	5180	10.70	11.70	23
				5320	11.58	12.58	20
		V min(VDC)	3.3	5180	10.15	11.15	23
				5320	11.34	12.34	20
T max(°C)	25	V max(VDC)	4.35	5180	10.56	11.56	23
				5320	11.45	12.45	20
		V min(VDC)	3.3	5180	10.30	11.30	23
				5320	12.06	13.06	20
Result					Complied		

Configuration 802.11ac (HT20) MCS0

Test Conditions				Frequency (MHz)	Max Burst RMS Power (dBm)	Max EIRP (dBm EIRP)	Limit (dBm EIRP)
T nom(°C)	25	V nom(VDC)	3.8	5180	10.95	11.95	23
				5320	10.61	11.61	20
T min(°C)	-20	V max(VDC)	4.35	5180	10.19	11.19	23
				5320	10.34	11.34	20
		V min(VDC)	3.3	5180	10.71	11.71	23
				5320	10.40	11.40	20
T max(°C)	25	V max(VDC)	4.35	5180	10.41	11.41	23
				5320	10.51	11.51	20
		V min(VDC)	3.3	5180	10.48	11.48	23
				5320	10.43	11.43	20
Result					Complied		

Configuration 802.11n (HT40) MCS0

Test Conditions				Frequency (MHz)	Max Burst RMS Power (dBm)	Max EIRP (dBm EIRP)	Limit (dBm EIRP)
T nom(°C)	25	V nom(VDC)	3.8	5190	10.32	11.32	23
				5310	10.17	11.17	20
T min(°C)	-20	V max(VDC)	4.35	5190	10.18	11.18	23
				5310	9.70	10.70	20
		V min(VDC)	3.3	5190	9.84	10.84	23
				5310	9.85	10.85	20
T max(°C)	25	V max(VDC)	4.35	5190	10.04	11.04	23
				5310	10.03	11.03	20
		V min(VDC)	3.3	5190	9.75	10.75	23
				5310	9.39	10.39	20
Result					Complied		

Configuration 802.11ac (HT40) MCS0

Test Conditions				Frequency (MHz)	Max Burst RMS Power (dBm)	Max EIRP (dBm EIRP)	Limit (dBm EIRP)
T nom(°C)	25	V nom(VDC)	3.8	5190	10.37	11.37	23
				5310	10.17	11.17	20
T min(°C)	-20	V max(VDC)	4.35	5190	10.24	11.24	23
				5310	9.84	10.84	20
		V min(VDC)	3.3	5190	9.71	10.71	23
				5310	9.62	10.62	20
T max(°C)	25	V max(VDC)	4.35	5190	10.24	11.24	23
				5310	9.27	10.27	20
		V min(VDC)	3.3	5190	9.90	10.90	23
				5310	9.29	10.29	20
Result					Complied		

Configuration 802.11ac (HT80) MCS0

Test Conditions				Frequency (MHz)	Max Burst RMS Power (dBm)	Max EIRP (dBm EIRP)	Limit (dBm EIRP)
T nom(°C)	25	V nom(VDC)	3.8	5210	10.26	11.26	23
				5290	9.90	10.90	20
T min(°C)	-20	V max(VDC)	4.35	5210	9.69	10.69	23
				5290	9.01	10.01	20
		V min(VDC)	3.3	5210	9.64	10.64	23
				5290	9.23	10.23	20
T max(°C)	25	V max(VDC)	4.35	5210	9.72	10.72	23
				5290	9.70	10.70	20
		V min(VDC)	3.3	5210	10.13	11.13	23
				5290	9.68	10.68	20
Result					Complied		

Test Result of Power Density

Configuration 802.11a 6 Mbps

Test Conditions				Frequency (MHz)	Conducted Power Density [dBm/MHz(EIRP)]	EIRP Power Density Limit [dBm/MHz(EIRP)]
T nom(°C)	25	V nom(VDC)	3.8	5180	-0.07	10
				5320	-0.55	7
Result					Complied	

Configuration 802.11n (HT20) MCS0

Test Conditions				Frequency (MHz)	Conducted Power Density [dBm/MHz(EIRP)]	EIRP Power Density Limit [dBm/MHz(EIRP)]
T nom(°C)	25	V nom(VDC)	3.8	5180	0.18	10
				5320	1.18	7
Result				Complied		

Configuration 802.11ac (HT20) MCS0

Test Conditions				Frequency (MHz)	Conducted Power Density [dBm/MHz(EIRP)]	EIRP Power Density Limit [dBm/MHz(EIRP)]
T nom(°C)	25	V nom(VDC)	3.8	5180	0.15	10
				5320	-0.15	7
Result					Complied	

Configuration 802.11n (HT40) MCS0

Test Conditions				Frequency (MHz)	Conducted Power Density [dBm/MHz(EIRP)]	EIRP Power Density Limit [dBm/MHz(EIRP)]
T nom(°C)	25	V nom(VDC)	3.8	5190	-3.07	10
				5310	-3.61	7
Result					Complied	

Configuration 802.11ac (HT40) MCS0

Test Conditions				Frequency (MHz)	Conducted Power Density [dBm/MHz(EIRP)]	EIRP Power Density Limit [dBm/MHz(EIRP)]
T nom(°C)	25	V nom(VDC)	3.8	5190	-3.14	10
				5310	-3.56	7
Result					Complied	

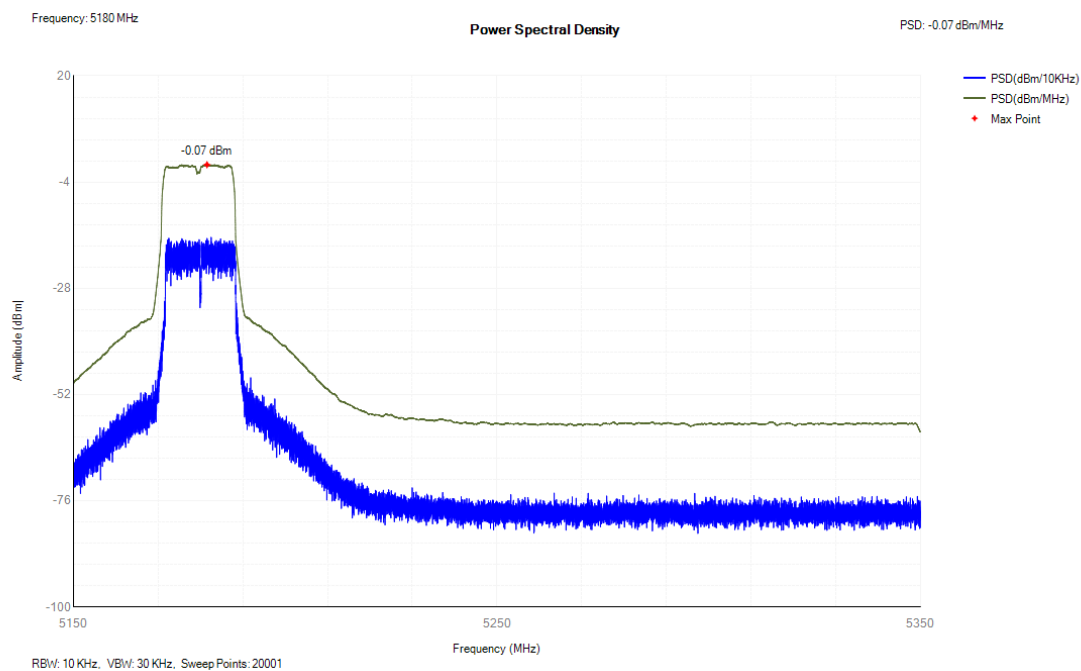
Configuration 802.11ac (HT80) MCS0

Test Conditions				Frequency (MHz)	Conducted Power Density [dBm/MHz(EIRP)]	EIRP Power Density Limit [dBm/MHz(EIRP)]
T nom(°C)	25	V nom(VDC)	3.8	5210	-5.95	10
				5290	-6.90	7
Result					Complied	

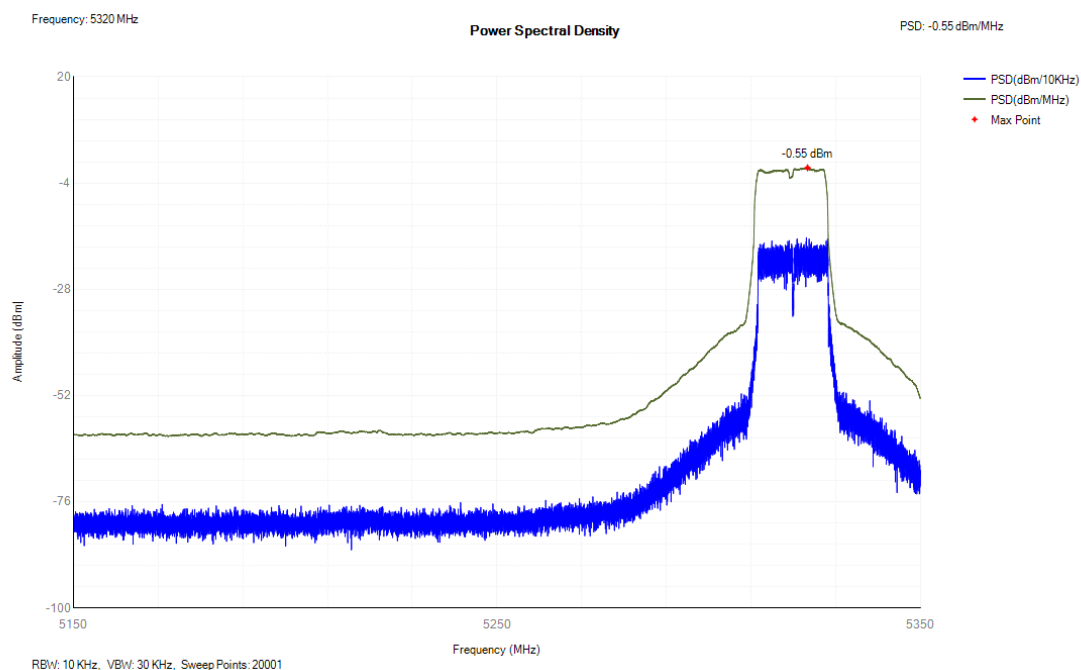
Test plots as follows:

802.11a Modulation

5180MHz 802.11 a

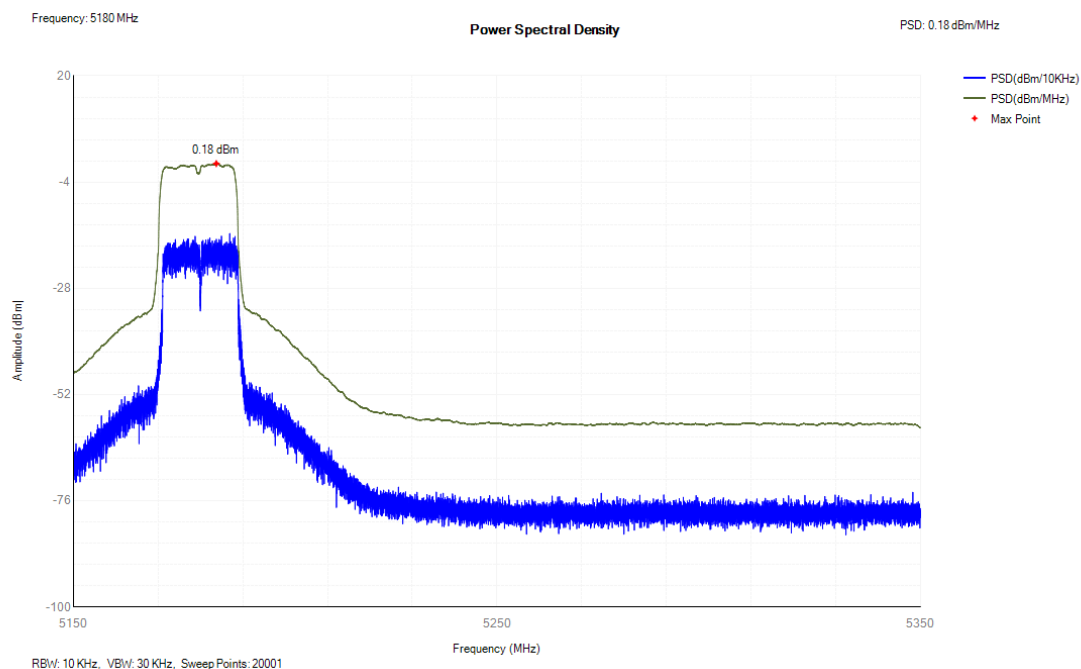


5320MHz 802.11 a

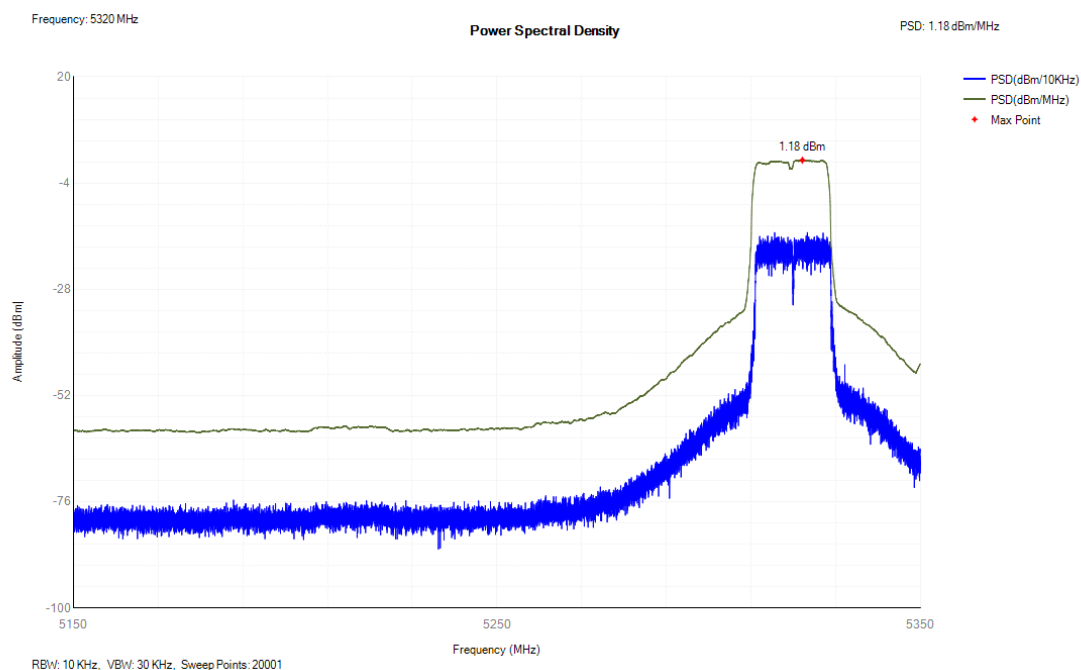


802.11n-HT20 Modulation

5180MHz 802.11 n20

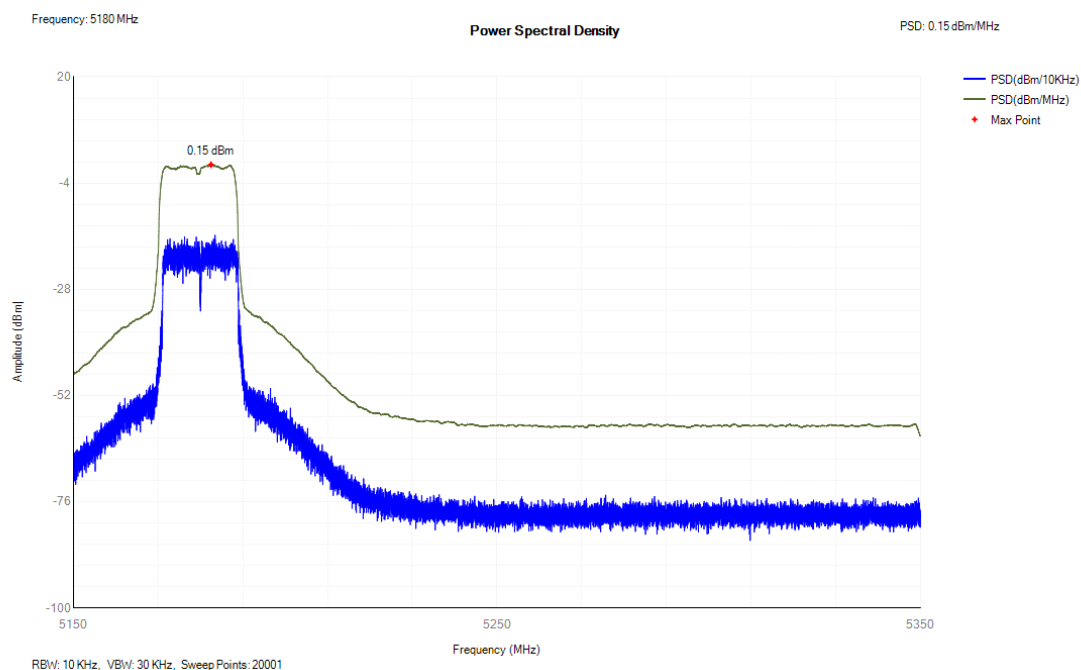


5320MHz 802.11 n20

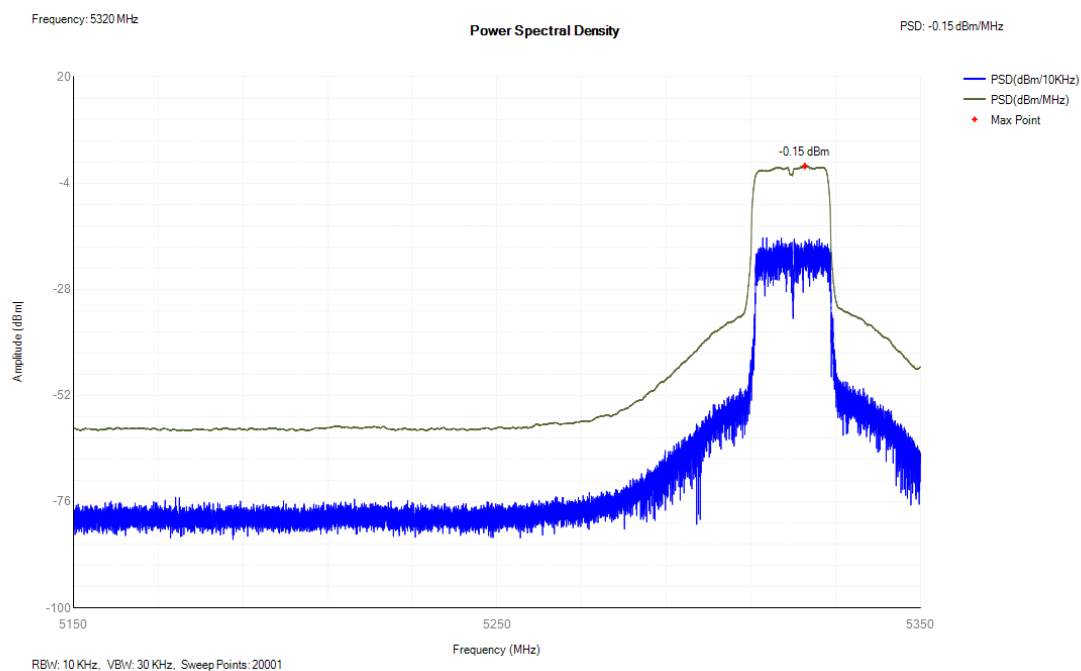


802.11ac-HT20 Modulation

5180MHz 802.11 ac20

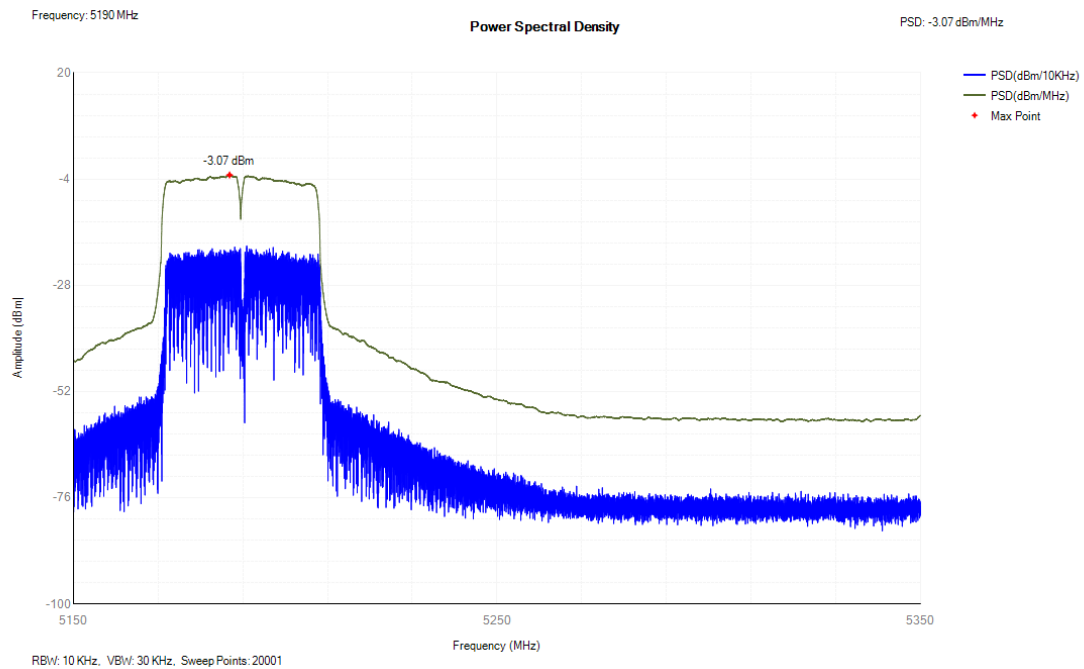


5320MHz 802.11 ac20

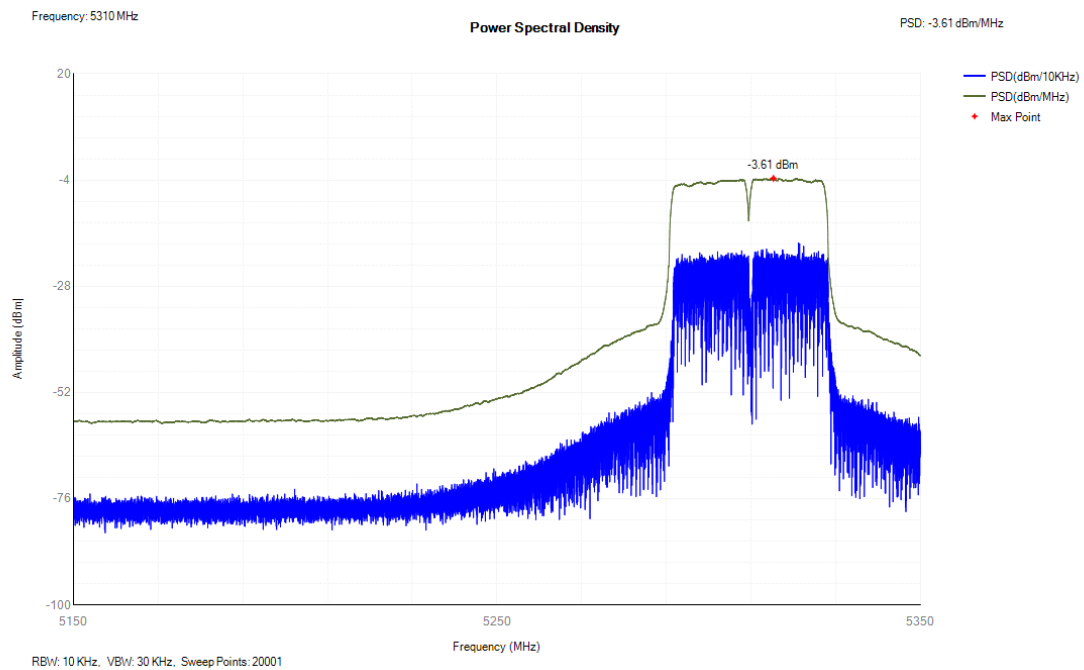


802.11n(HT40) Modulation

5190MHz 802.11 n40

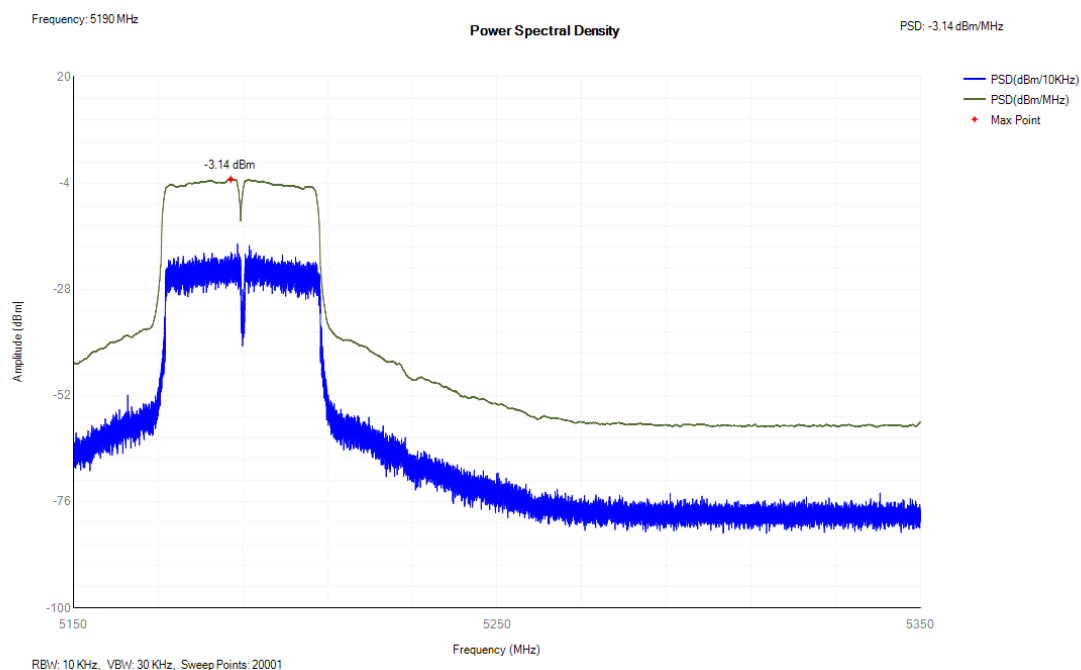


5310MHz 802.11 n40

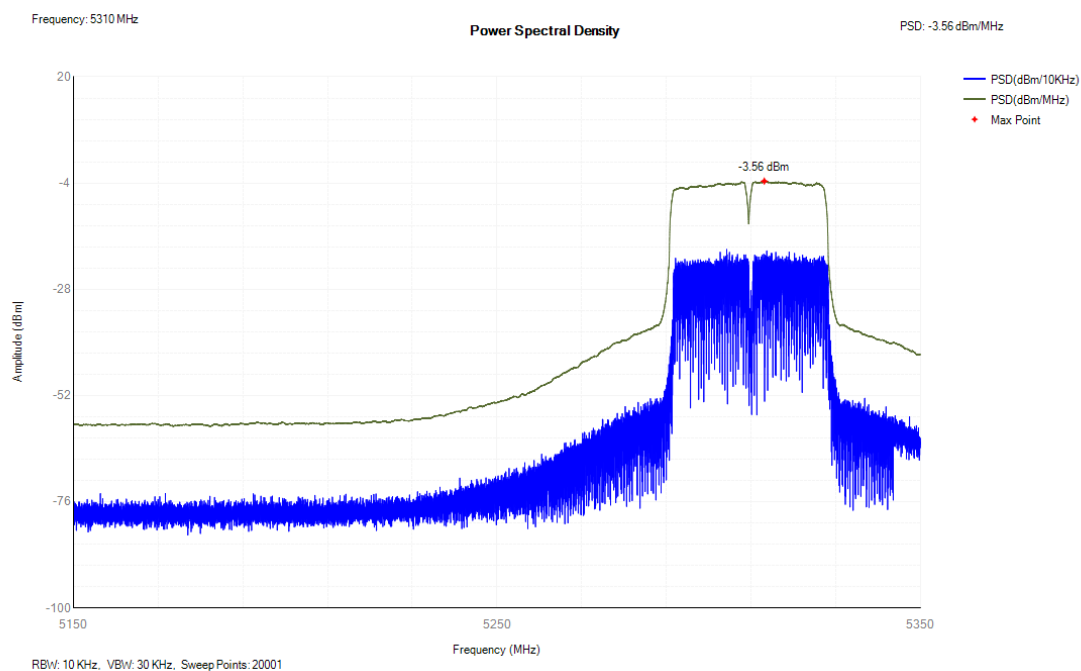


802.11ac(HT40) Modulation

5190MHz 802.11 ac40

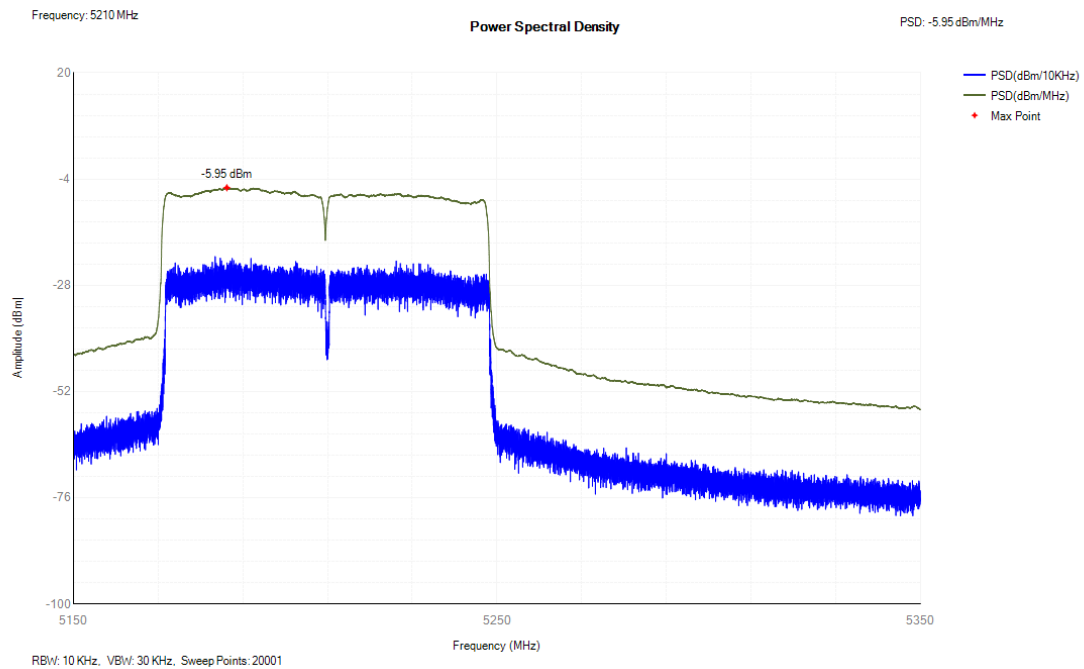


5310MHz 802.11 ac40

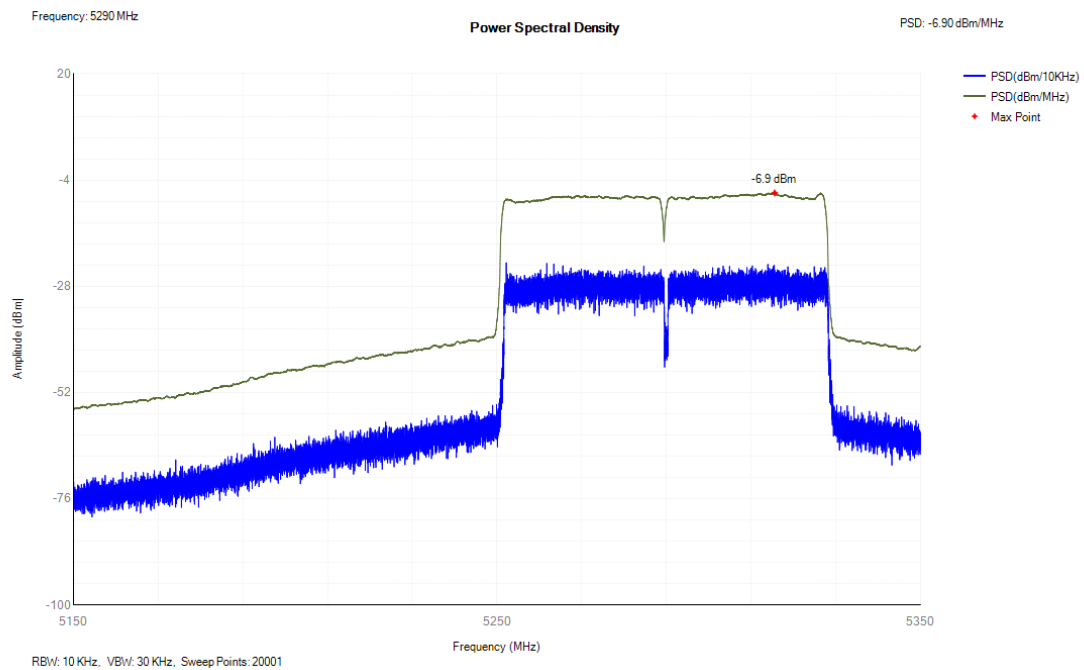


802.11ac (HT80) Modulation

5210MHz 802.11 ac80

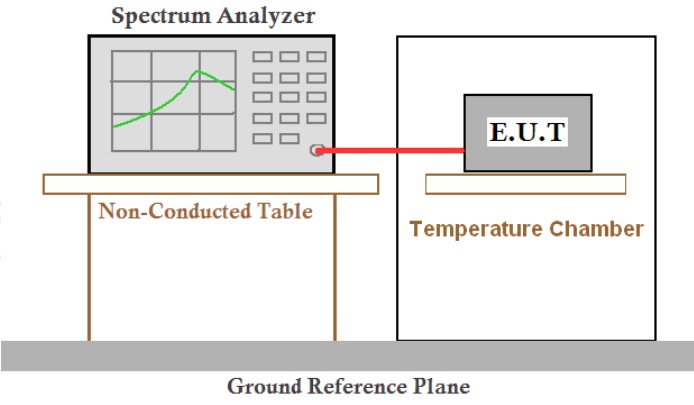


5290MHz 802.11 ac80



5.3.2. Transmit Power Control(TPC)

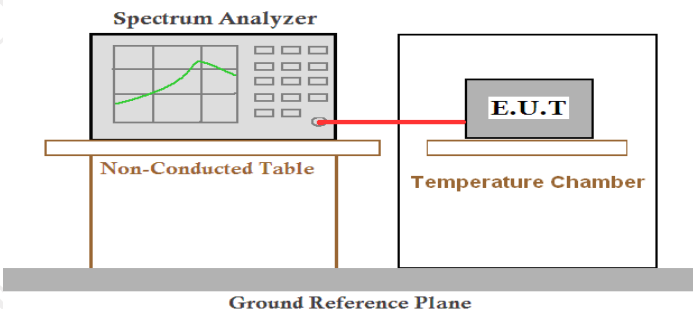
5.3.2.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.3						
Test Method:	ETSI EN 301 893 clause 5.4.4.2						
Limit:	<p>Table 3: Mean e.i.r.p. limits for RF Output Power at the lowest power level of the TPC range</p> <table border="1"> <thead> <tr> <th>Frequency range</th><th>Mean e.i.r.p. (dBm) limit for P_L</th></tr> </thead> <tbody> <tr> <td>5 250 MHz to 5 350 MHz</td><td>17</td></tr> <tr> <td>5 470 MHz to 5 725 MHz</td><td>24 (see note)</td></tr> </tbody> </table> <p>NOTE: Slave devices without a <i>Radar Interference Detection</i> function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.</p>	Frequency range	Mean e.i.r.p. (dBm) limit for P_L	5 250 MHz to 5 350 MHz	17	5 470 MHz to 5 725 MHz	24 (see note)
Frequency range	Mean e.i.r.p. (dBm) limit for P_L						
5 250 MHz to 5 350 MHz	17						
5 470 MHz to 5 725 MHz	24 (see note)						
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is positioned on a Non-Conducted Table. A red cable connects the Spectrum Analyzer to the E.U.T. (Equipment Under Test), which is housed within a Temperature Chamber. Both the table and the chamber are situated on a common Ground Reference Plane.</p>						
Test Procedure:	Refer to ETSI EN 301 893 clause 5.4.4.2						
Test Instrument:	Refer to Item 3.3						
Test Result:	The DUT doesn't support this function. So this test item is not applicable.						

5.4. Transmitter unwanted emissions

5.4.1. Transmitter unwanted emissions outside the 5G RLAN band

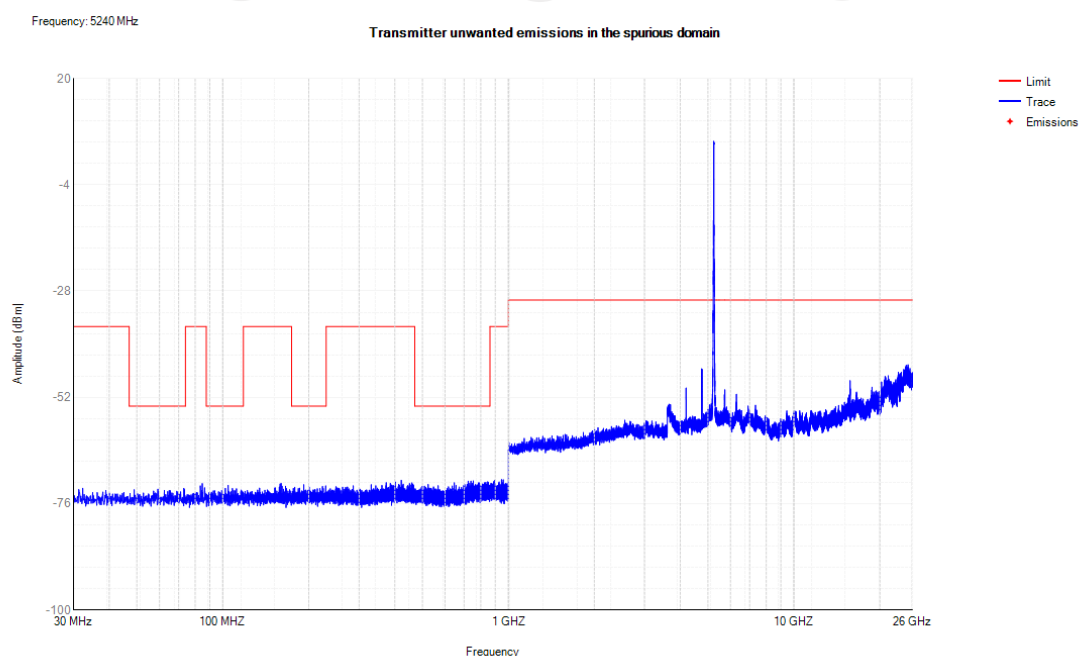
5.4.1.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.4.1																																							
Test Method:	ETSI EN 301 893 clause 5.4.5																																							
Limit:	<p>Table 4: Transmitter unwanted emission limits outside the 5 GHz RLAN bands</p> <table><tr><th>Frequency range</th><th>Maximum power</th><th>Bandwidth</th></tr><tr><td>30 MHz to 47 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr><tr><td>47 MHz to 74 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr><tr><td>74 MHz to 87,5 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr><tr><td>87,5 MHz to 118 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr><tr><td>118 MHz to 174 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr><tr><td>174 MHz to 230 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr><tr><td>230 MHz to 470 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr><tr><td>470 MHz to 862 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr><tr><td>862 MHz to 1 GHz</td><td>-36 dBm</td><td>100 kHz</td></tr><tr><td>1 GHz to 5,15 GHz</td><td>-30 dBm</td><td>1 MHz</td></tr><tr><td>5,35 GHz to 5,47 GHz</td><td>-30 dBm</td><td>1 MHz</td></tr><tr><td>5,725 GHz to 26 GHz</td><td>-30 dBm</td><td>1 MHz</td></tr></table>	Frequency range	Maximum power	Bandwidth	30 MHz to 47 MHz	-36 dBm	100 kHz	47 MHz to 74 MHz	-54 dBm	100 kHz	74 MHz to 87,5 MHz	-36 dBm	100 kHz	87,5 MHz to 118 MHz	-54 dBm	100 kHz	118 MHz to 174 MHz	-36 dBm	100 kHz	174 MHz to 230 MHz	-54 dBm	100 kHz	230 MHz to 470 MHz	-36 dBm	100 kHz	470 MHz to 862 MHz	-54 dBm	100 kHz	862 MHz to 1 GHz	-36 dBm	100 kHz	1 GHz to 5,15 GHz	-30 dBm	1 MHz	5,35 GHz to 5,47 GHz	-30 dBm	1 MHz	5,725 GHz to 26 GHz	-30 dBm	1 MHz
Frequency range	Maximum power	Bandwidth																																						
30 MHz to 47 MHz	-36 dBm	100 kHz																																						
47 MHz to 74 MHz	-54 dBm	100 kHz																																						
74 MHz to 87,5 MHz	-36 dBm	100 kHz																																						
87,5 MHz to 118 MHz	-54 dBm	100 kHz																																						
118 MHz to 174 MHz	-36 dBm	100 kHz																																						
174 MHz to 230 MHz	-54 dBm	100 kHz																																						
230 MHz to 470 MHz	-36 dBm	100 kHz																																						
470 MHz to 862 MHz	-54 dBm	100 kHz																																						
862 MHz to 1 GHz	-36 dBm	100 kHz																																						
1 GHz to 5,15 GHz	-30 dBm	1 MHz																																						
5,35 GHz to 5,47 GHz	-30 dBm	1 MHz																																						
5,725 GHz to 26 GHz	-30 dBm	1 MHz																																						
Test setup:	<p>For conducted emission</p> 																																							
Test procedure:	<ol style="list-style-type: none">The output of the transmitter shall be connected to the spectrum analyzer through an attenuator.Set the Spectrum Analyzer as below: RBW=100KHz, VBW=300KHz when frequency below 1GHz; RBW=1MHz, VBW=3MHz when above 1GHz. Detector=Peak, Trace mode=Max Hold. Frequency range: according to the above table 4Find the peak value of the power envelope and record in the report;Repeat the above procedure for other frequency range																																							
Test Instruments:	Refer to Item 3.3																																							
Test Mode:	Transmitting mode																																							
Test Result	PASS																																							
Remark:	All modulations have been tested, The worst modulation reported only.																																							

5.4.1.2. Test Data

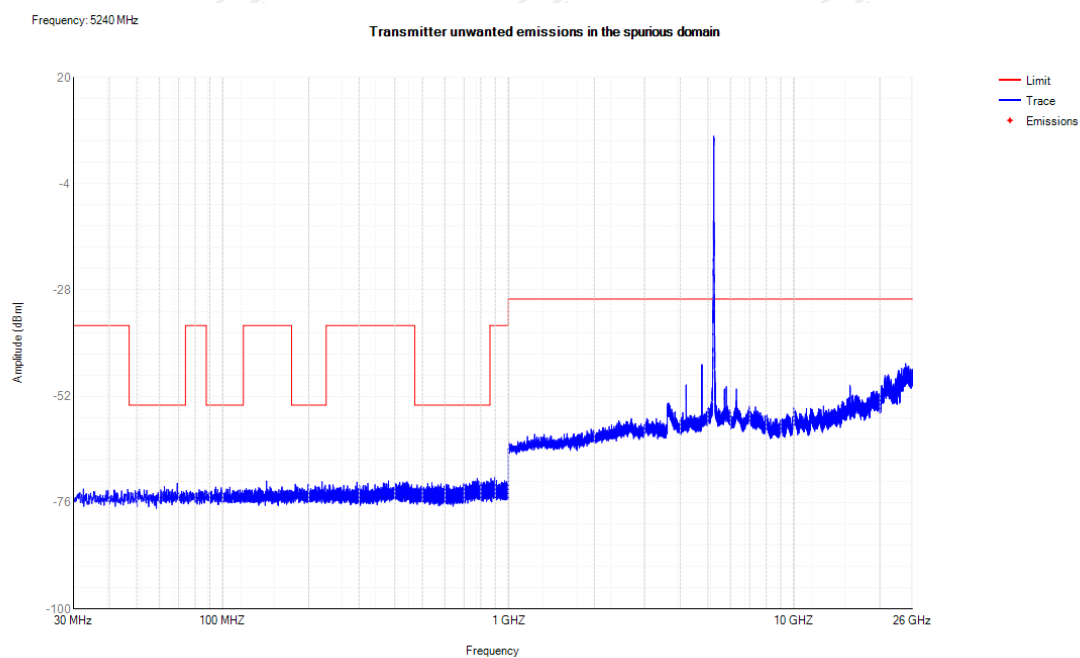
802.11a Modulation

5240MHz 802.11 a



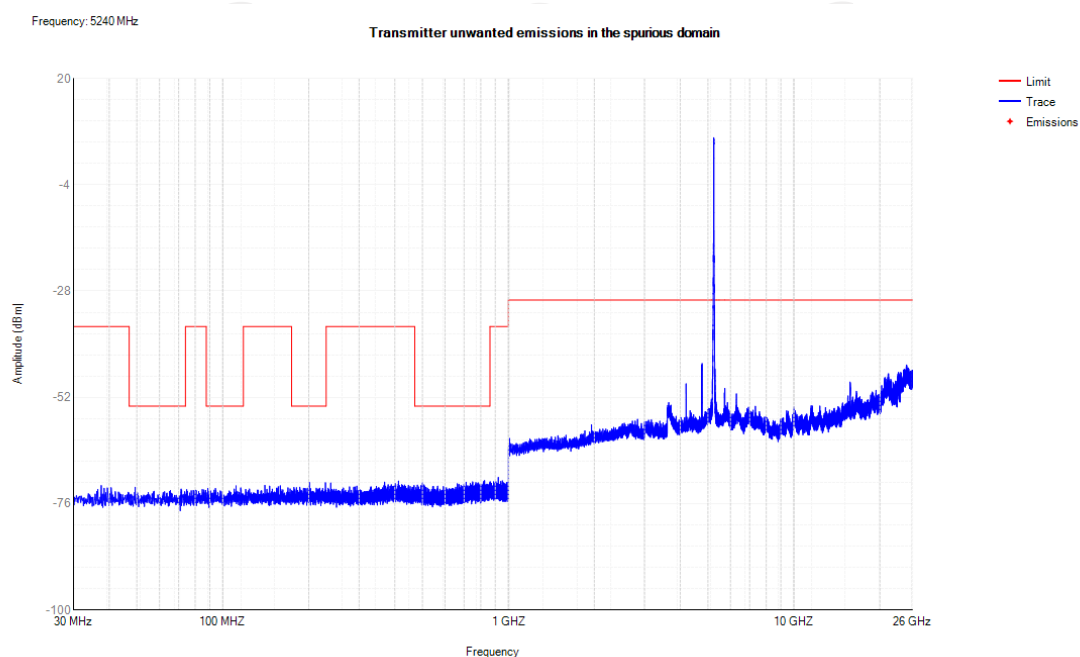
802.11n-HT20 Modulation

5240MHz 802.11n20



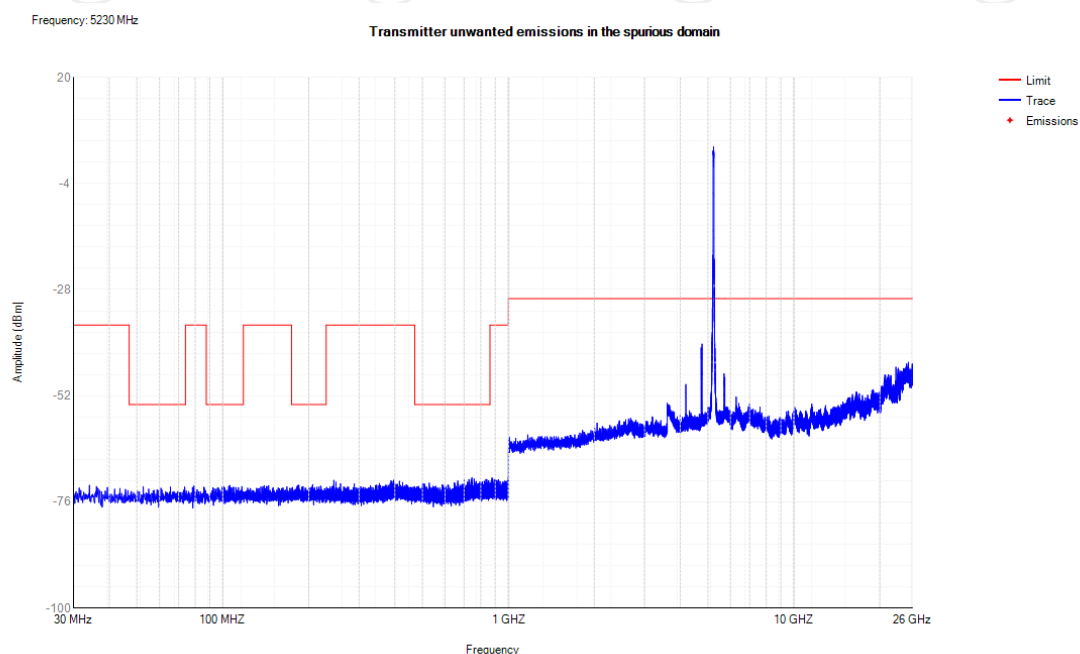
802.11ac-HT20 Modulation

5240MHz 802.11 ac20



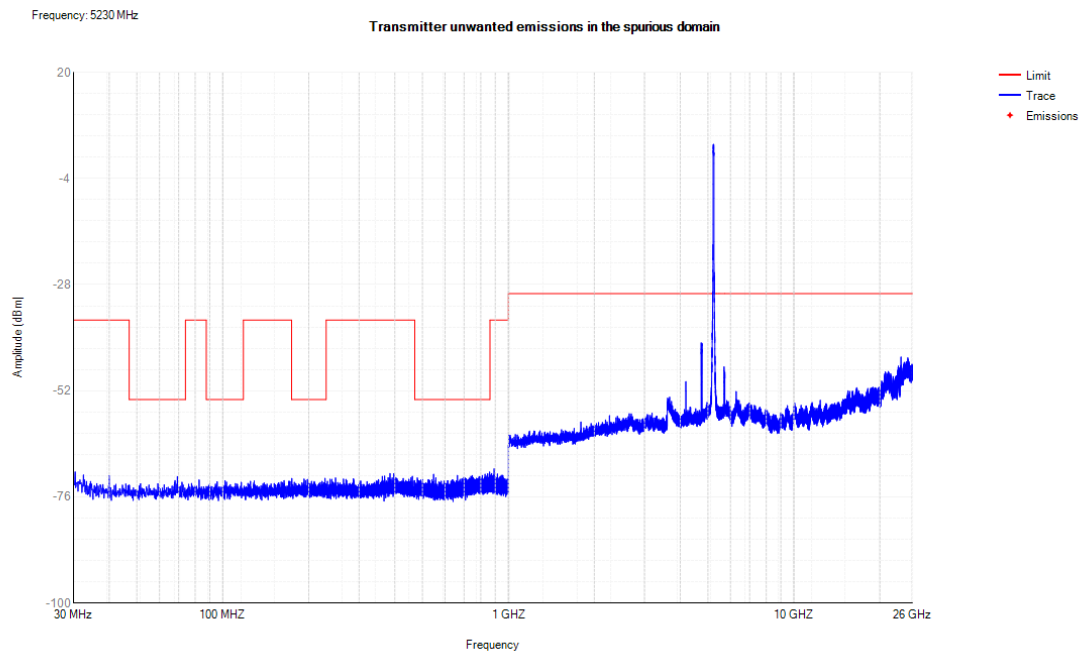
802.11n-HT40 Modulation

5230MHz 802.11 n40



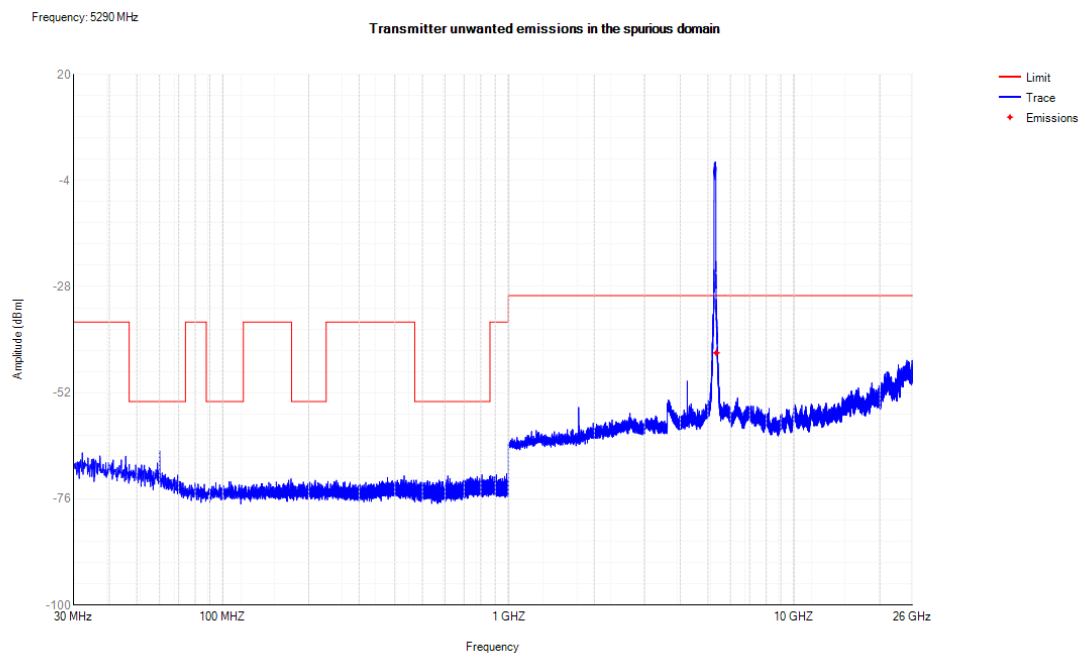
802.11ac-HT40 Modulation

5230MHz 802.11 ac40



802.11ac (HT80) Modulation

5210MHz 802.11 ac80



5.4.2. Transmitter unwanted emissions within the 5G RLAN band

5.4.2.1. Test Specification

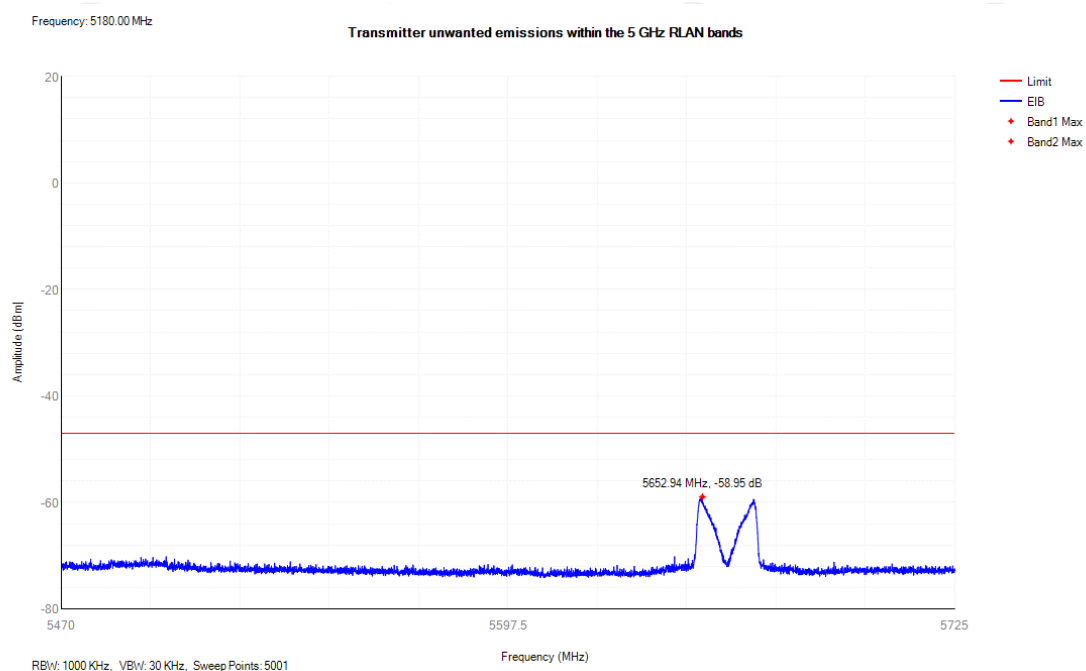
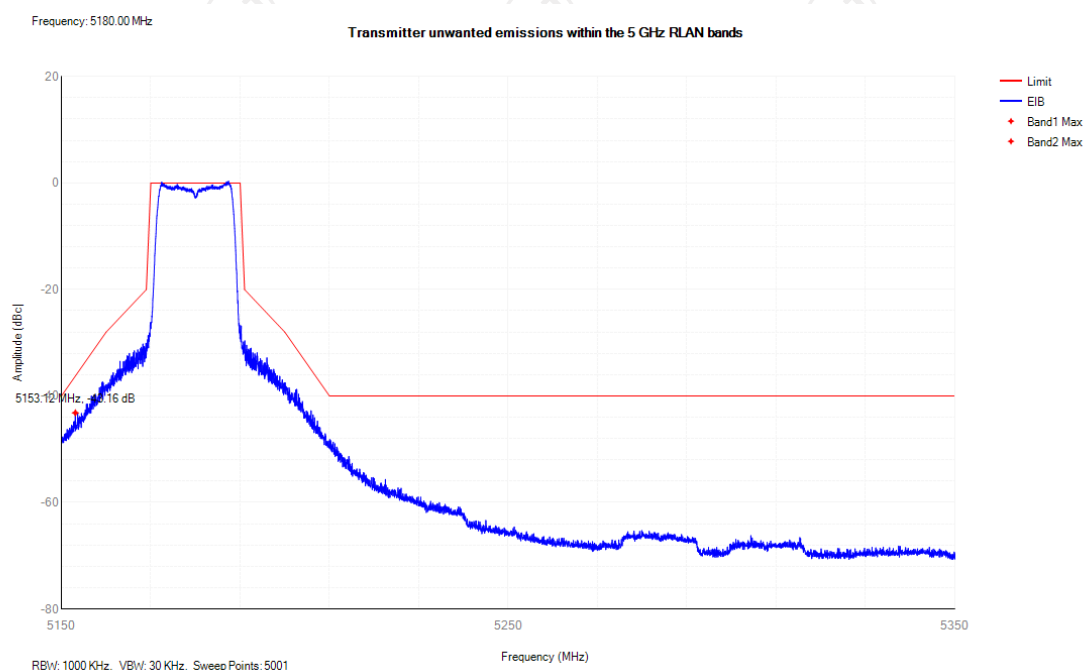
Test Requirement:	ETSI EN 301 893 clause 4.2.4.2
Test Method:	ETSI EN 301 893 clause 5.4.6
Limit:	<p>Figure 1: Transmit spectral power mask</p> <p>The mean Power Density (measured with a 1 MHz measurement bandwidth) of the transmitter unwanted emissions within the 5 GHz RLAN bands shall not exceed the limits of the mask provided in figure 1 or an absolute level of -30 dBm/MHz, whichever is greater. The limits in figure 1 are relative to the maximum Power Density of the RLAN device when measured with a reference bandwidth of 1 MHz.</p>
Test setup:	<p>For conducted emission</p>
Test procedure:	<ol style="list-style-type: none"> 1. The output of the transmitter shall be connected to the spectrum analyzer through an attenuator. 2. According to the above figure 1, calculate the frequencies and limits for each section, and set up the limit 3. Set the Spectrum Analyzer as below: RBW=1MHz, VBW=30kHz, Detector=Peak, Trace = max hold 4. Record the test result.

Test Instruments:	Refer to Item 3.3
Test Mode:	Transmitting mode
Test Result	PASS
Remark:	All modulations have been tested, The worst modulation reported only.

5.4.2.2. Test Data

802.11a Modulation

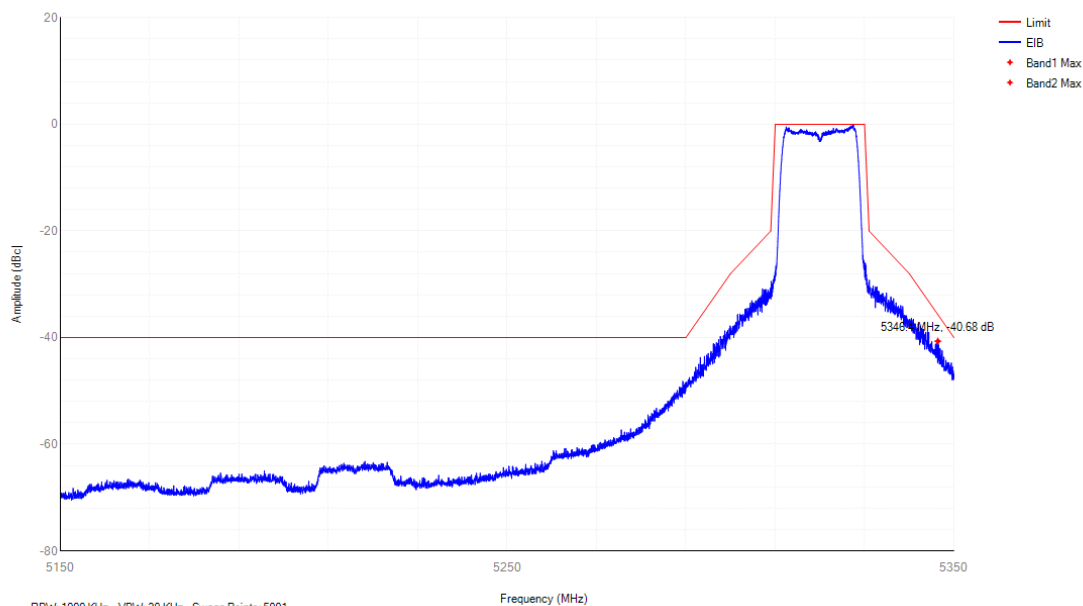
5180MHz 802.11 a



5320MHz 802.11 a

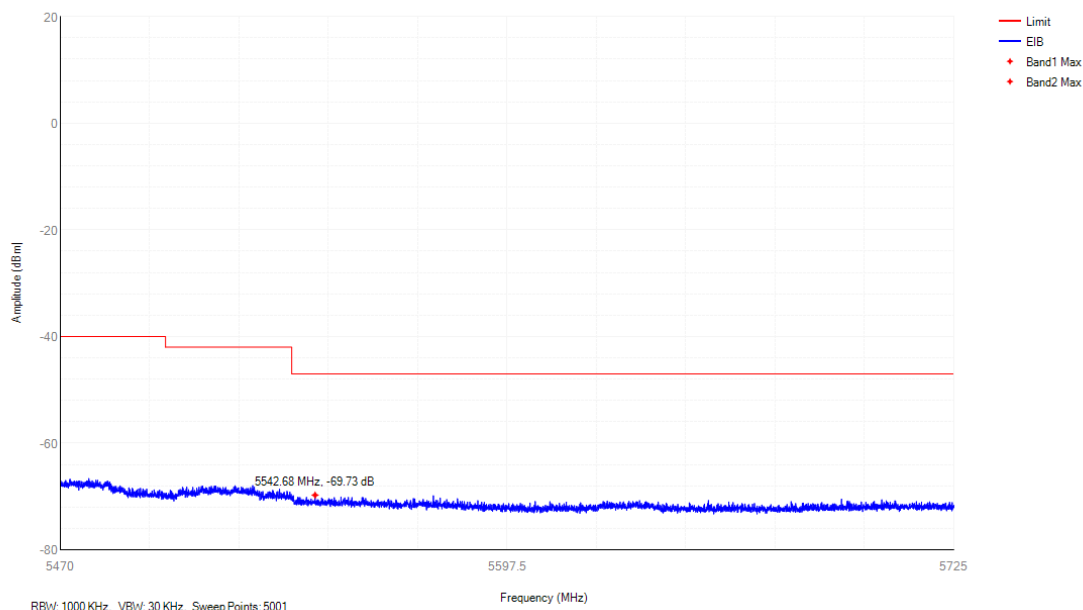
Frequency: 5320.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



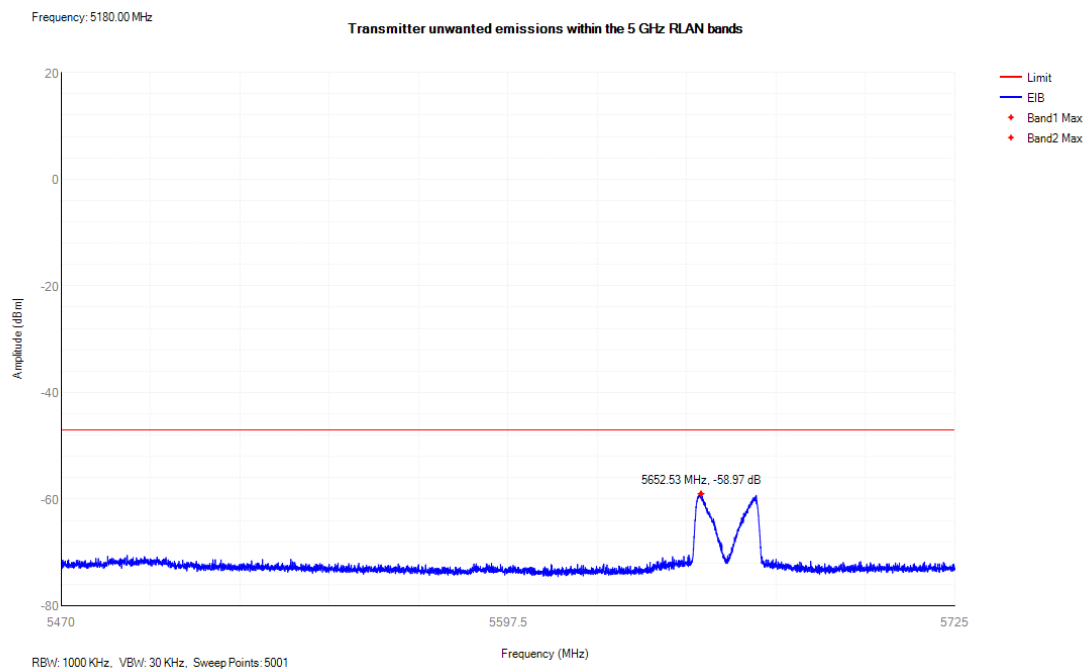
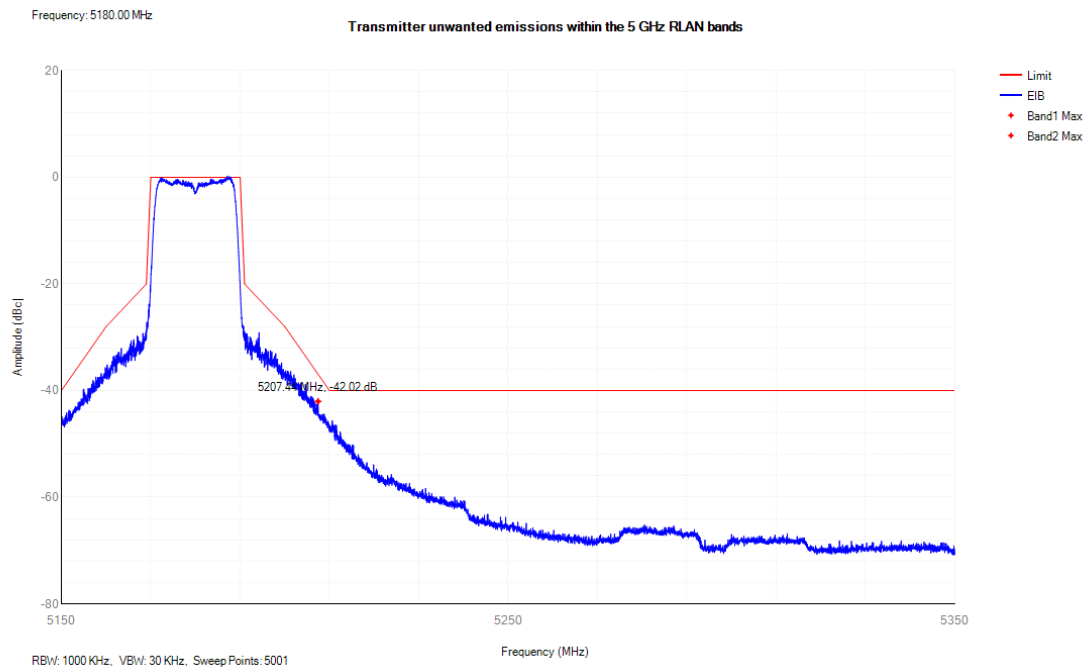
Frequency: 5320.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



802.11n-HT20 Modulation

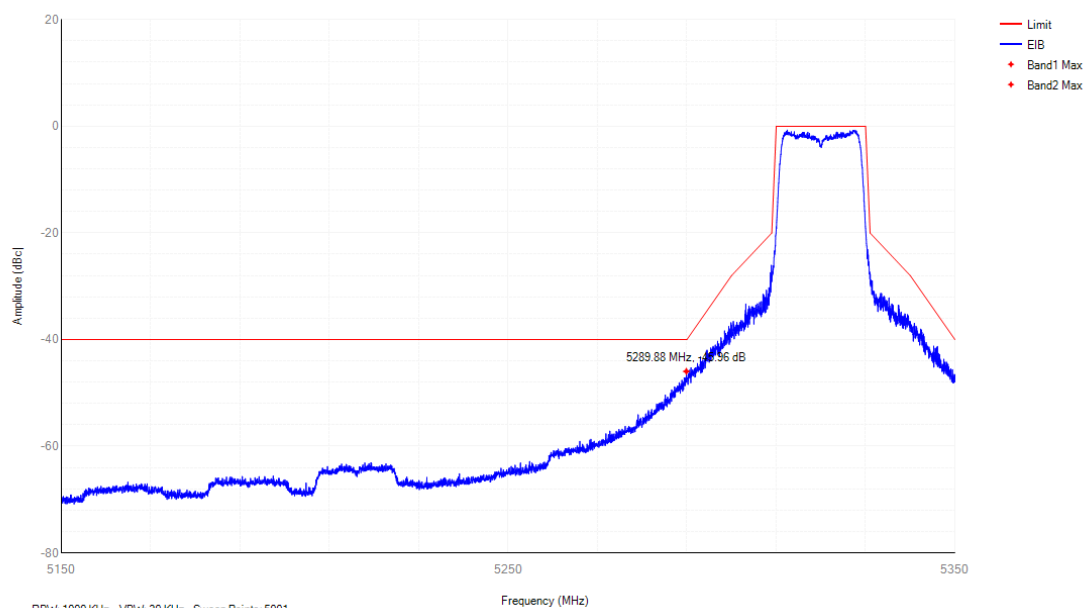
5180MHz 802.11 n20



5320MHz 802.11 n20

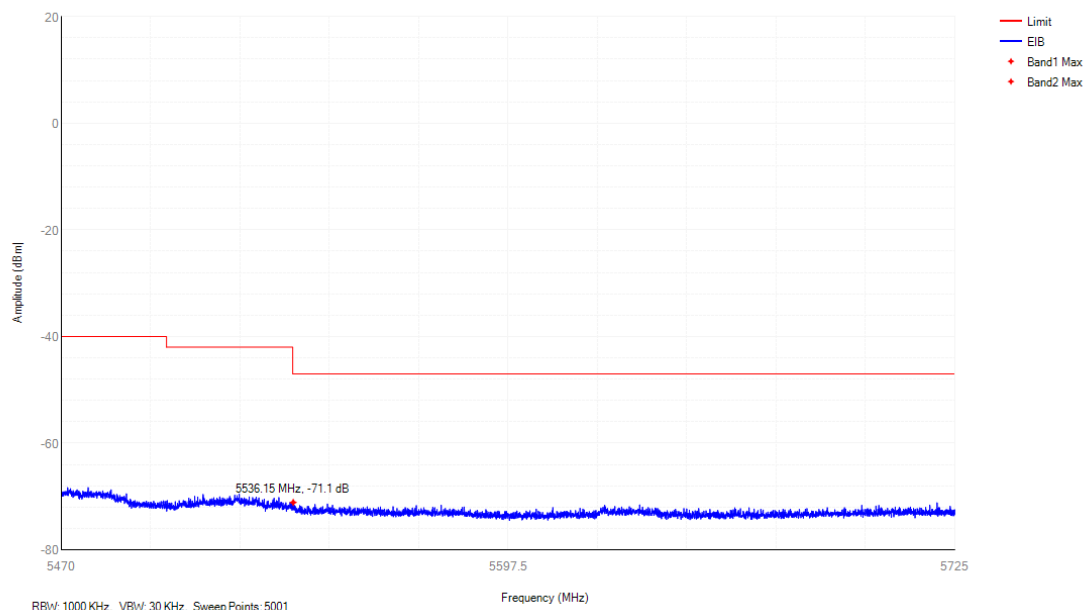
Frequency: 5320.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



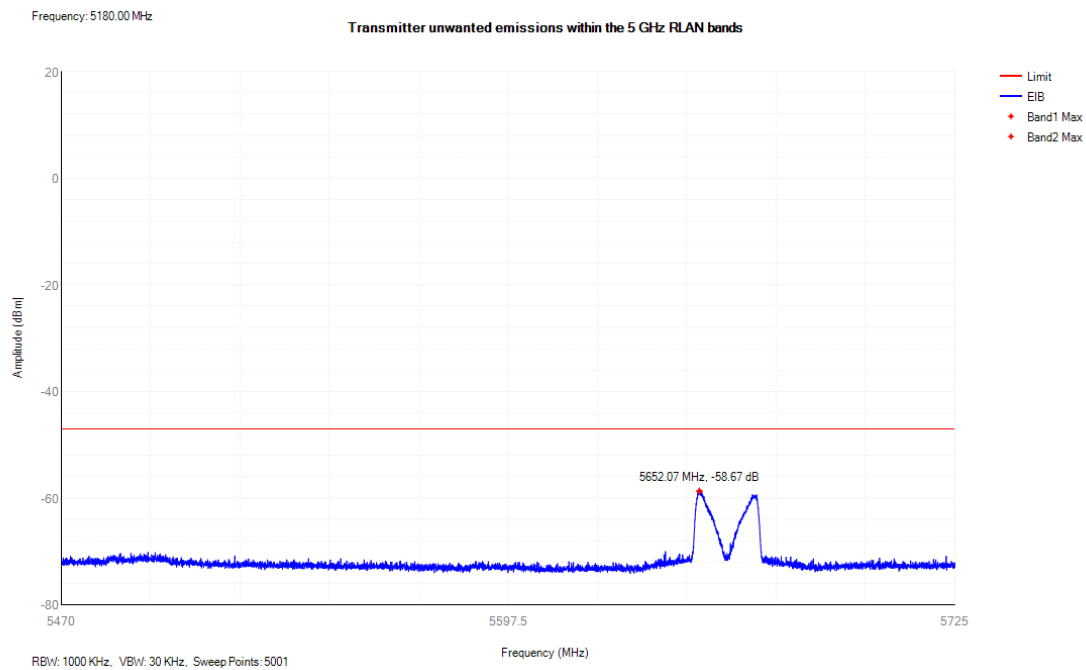
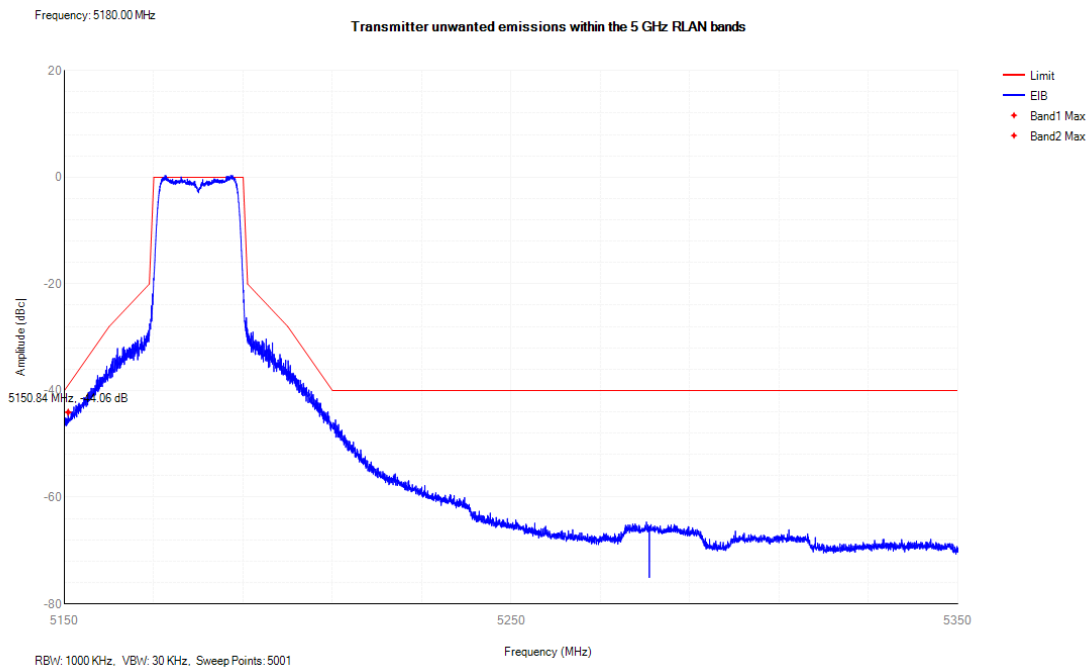
Frequency: 5320.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



802.11ac-HT20 Modulation

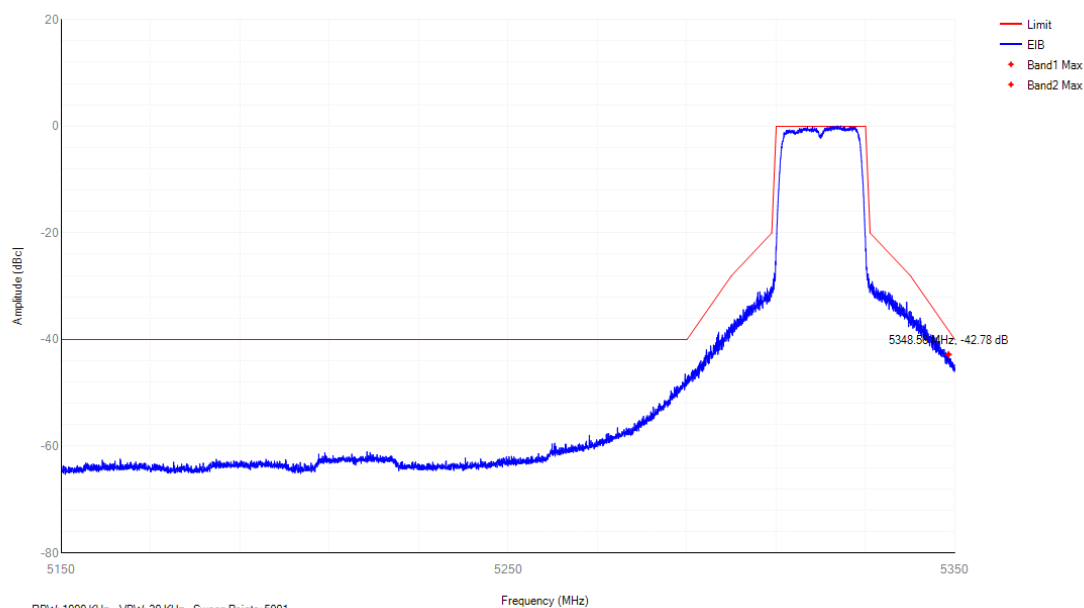
5180MHz 802.11 ac20



5320MHz 802.11 ac20

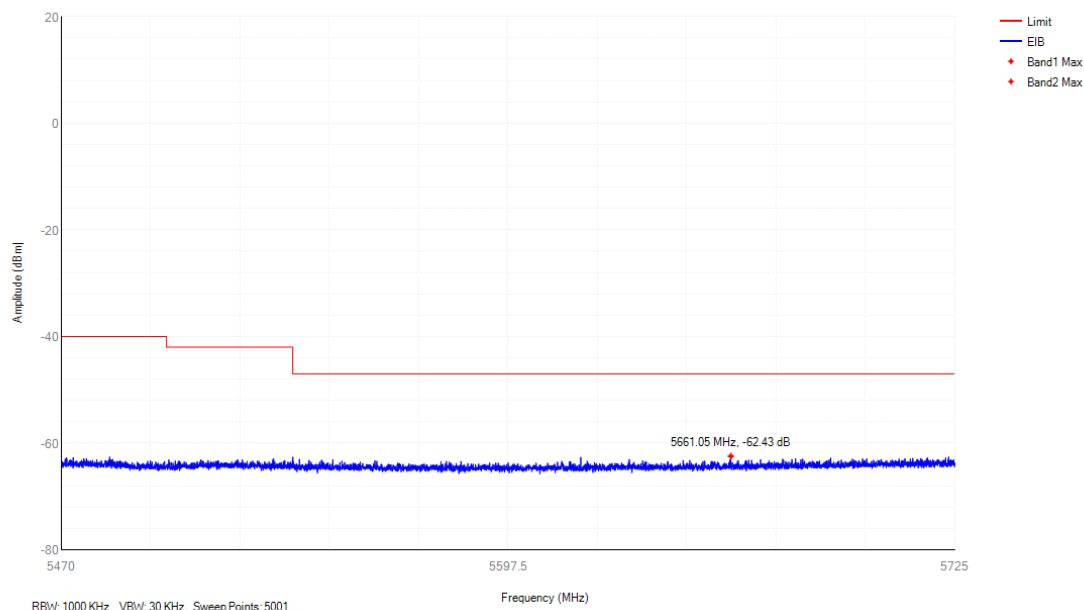
Frequency: 5320.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



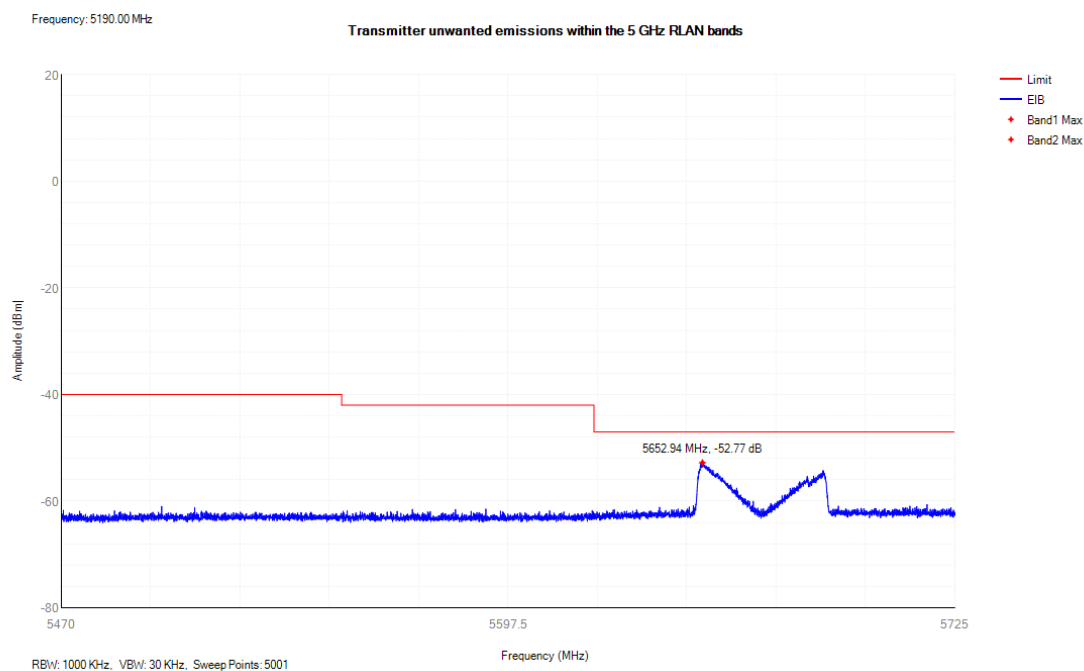
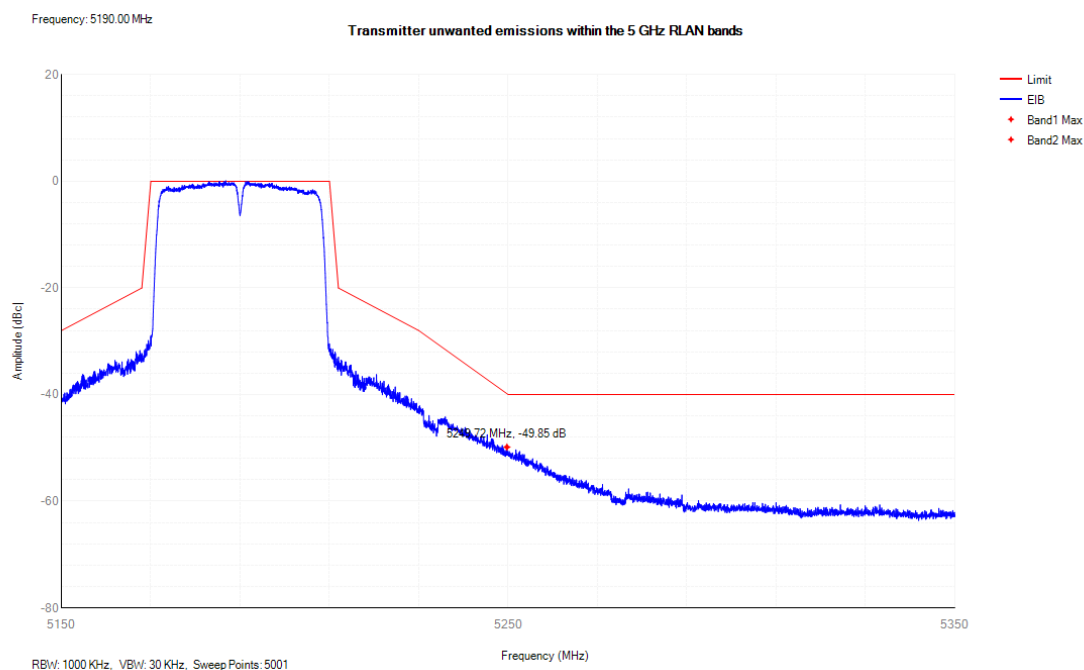
Frequency: 5320.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



802.11n(HT40) Modulation

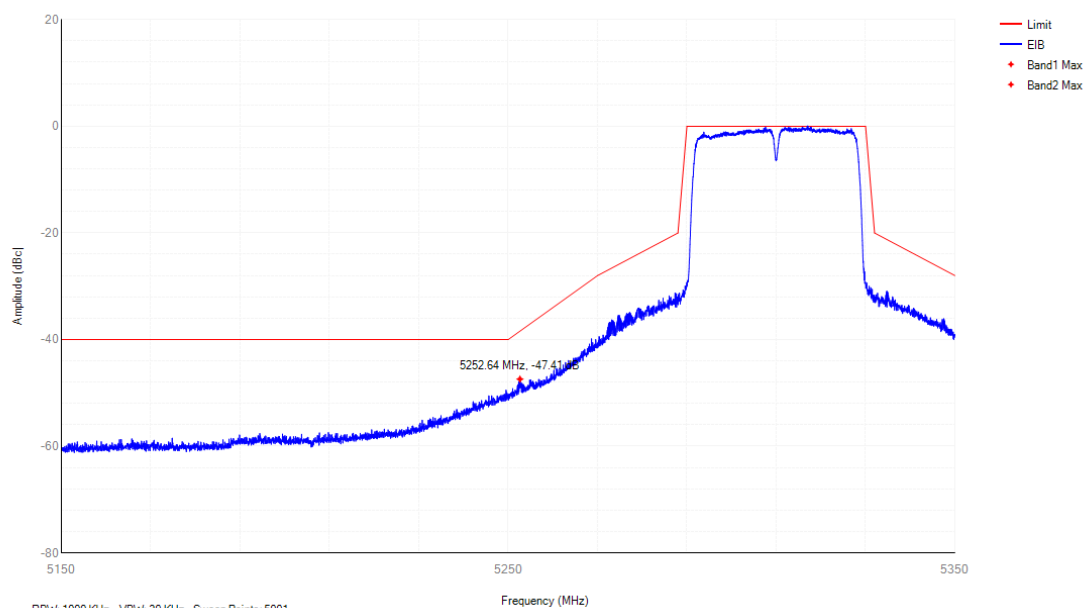
5190MHz 802.11 n40



5310MHz 802.11 n40

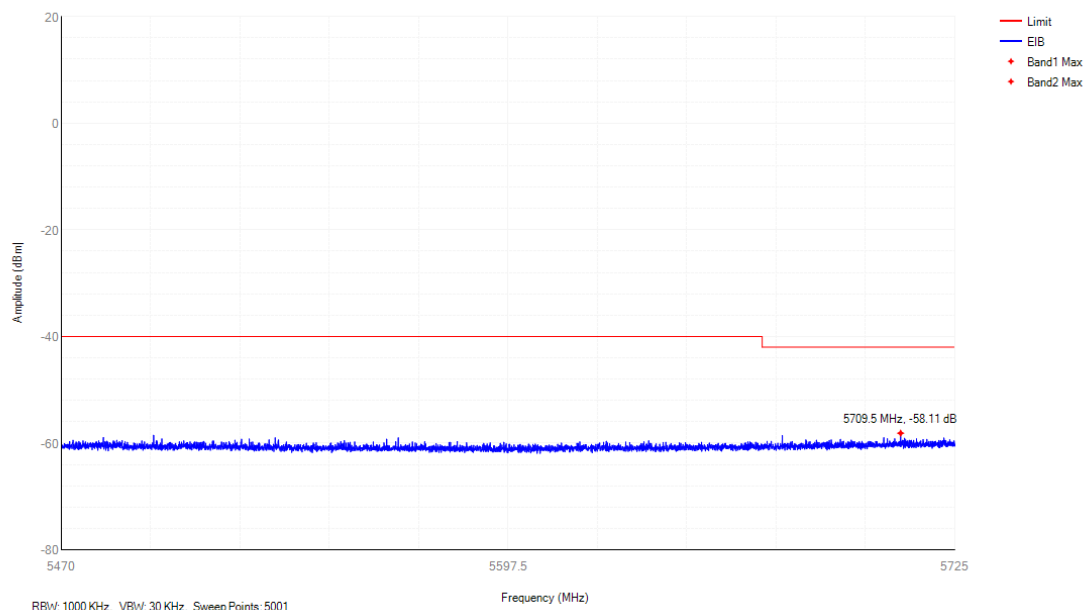
Frequency: 5310.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



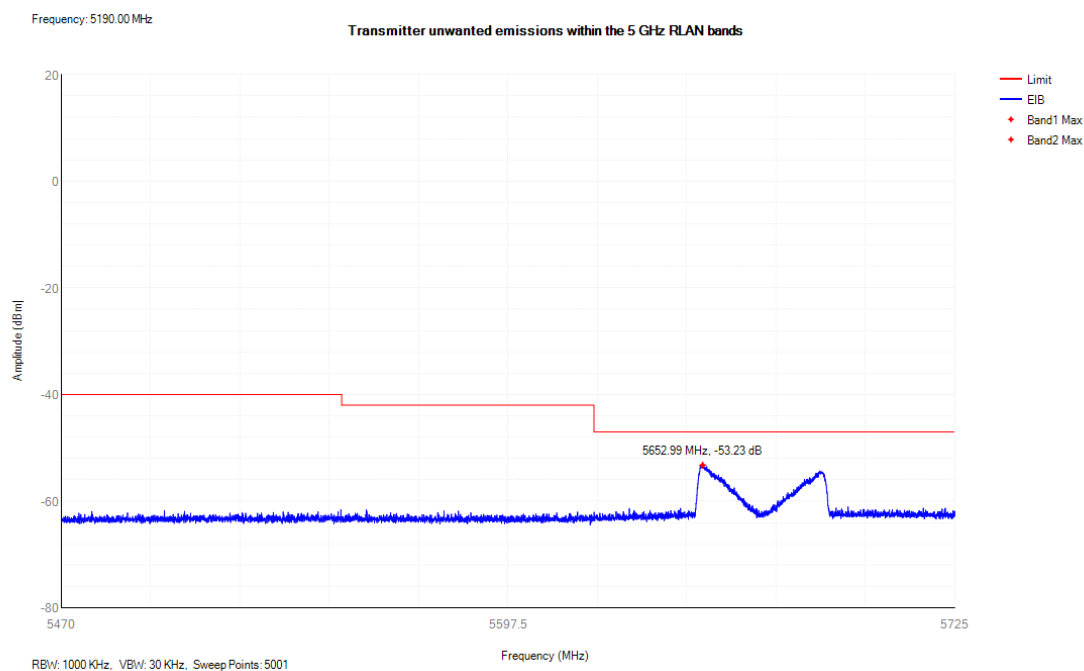
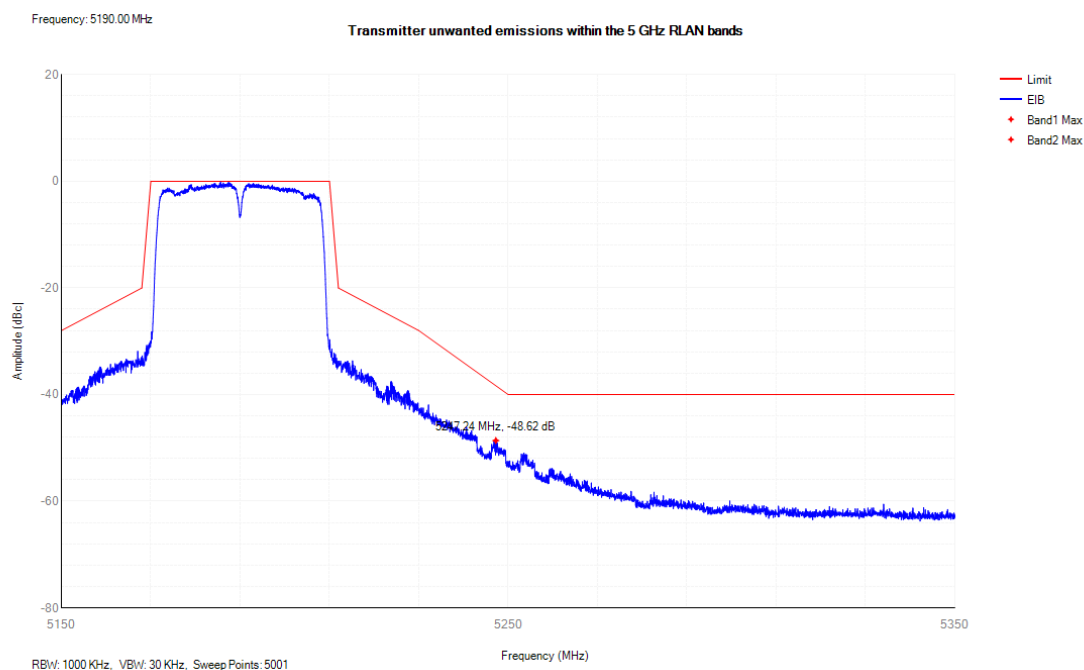
Frequency: 5310.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



802.11ac(HT40) Modulation

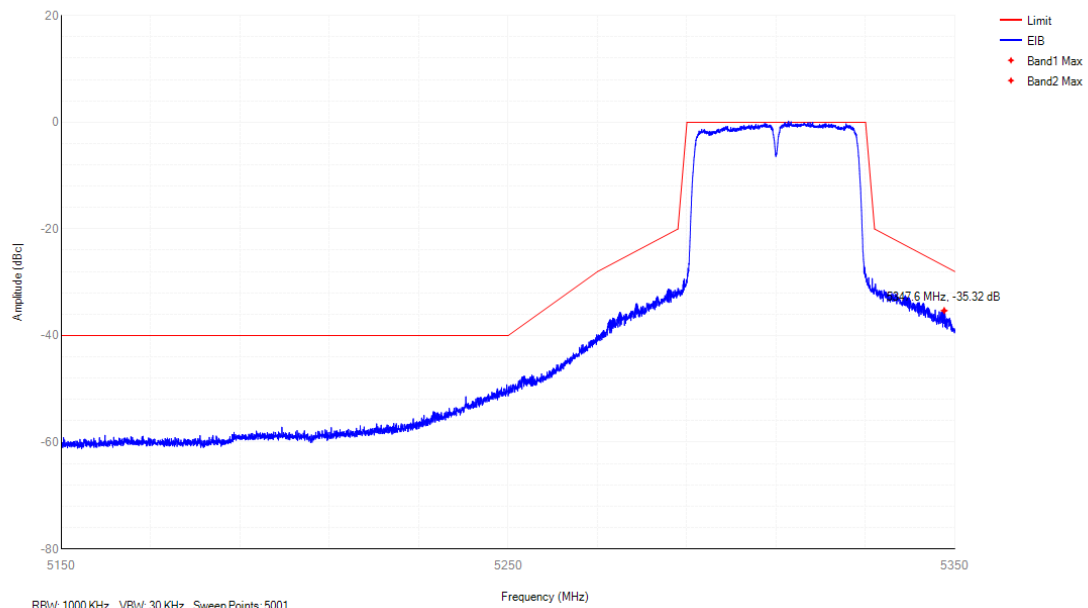
5190MHz 802.11 ac40



5310MHz 802.11 ac40

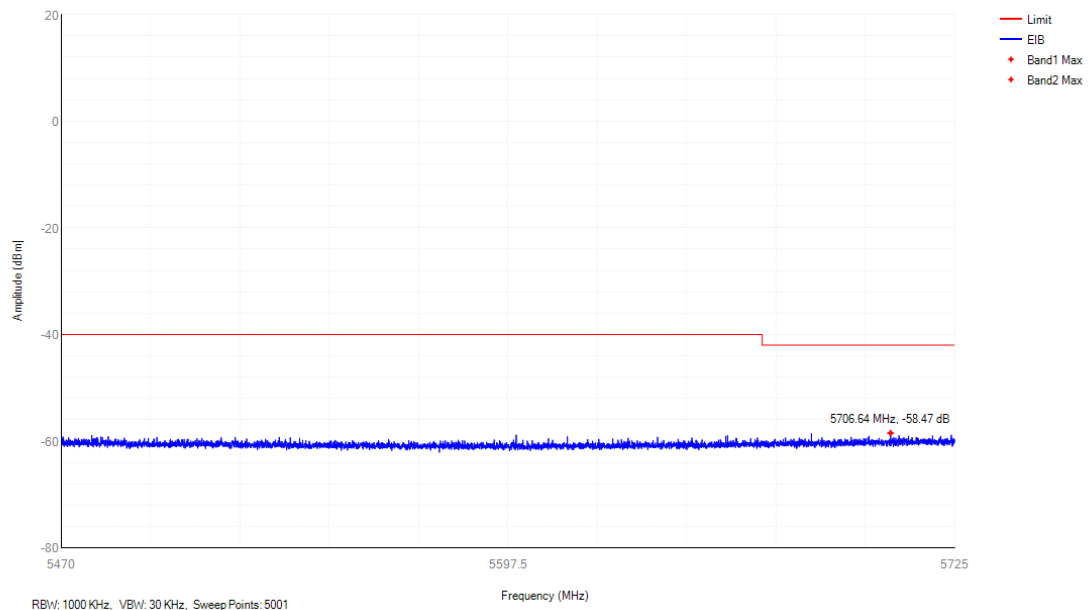
Frequency: 5310.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



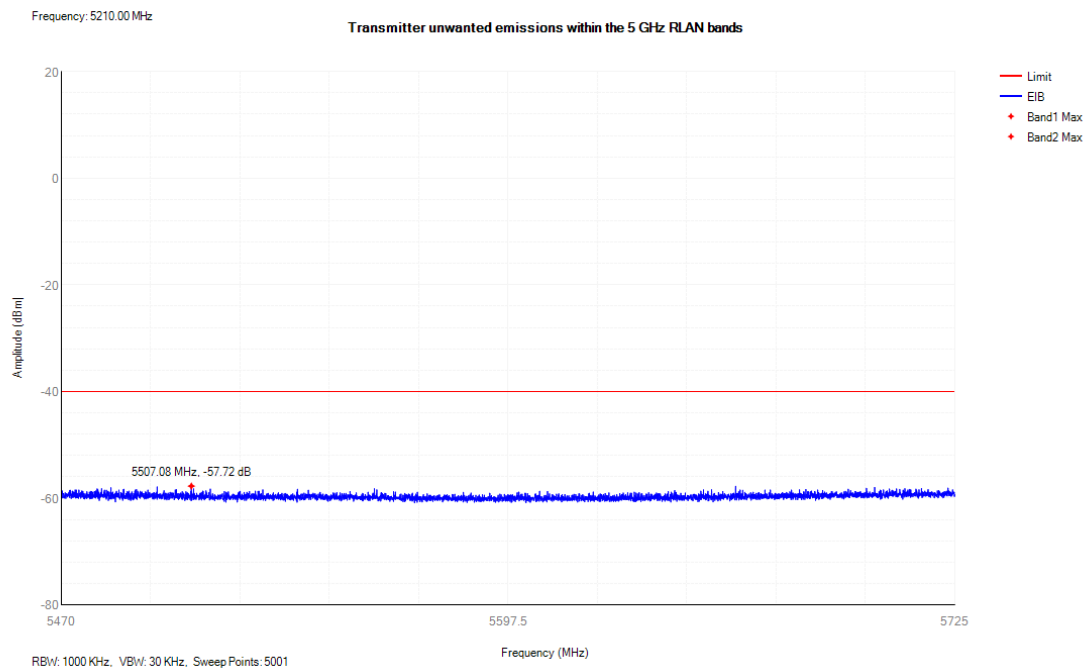
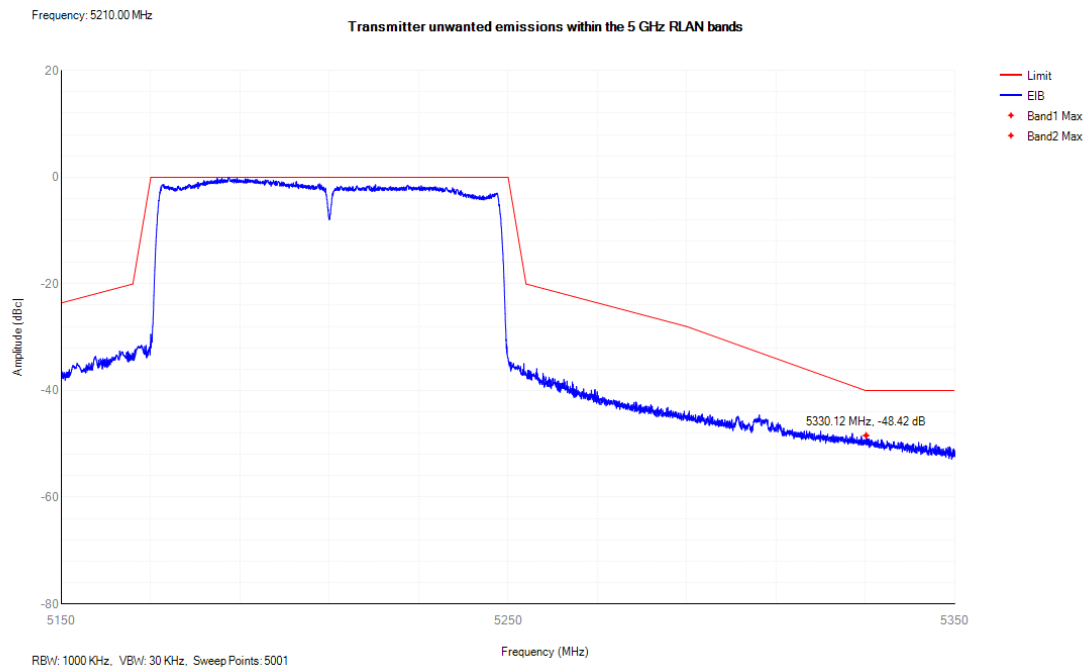
Frequency: 5310.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



802.11ac (HT80) Modulation

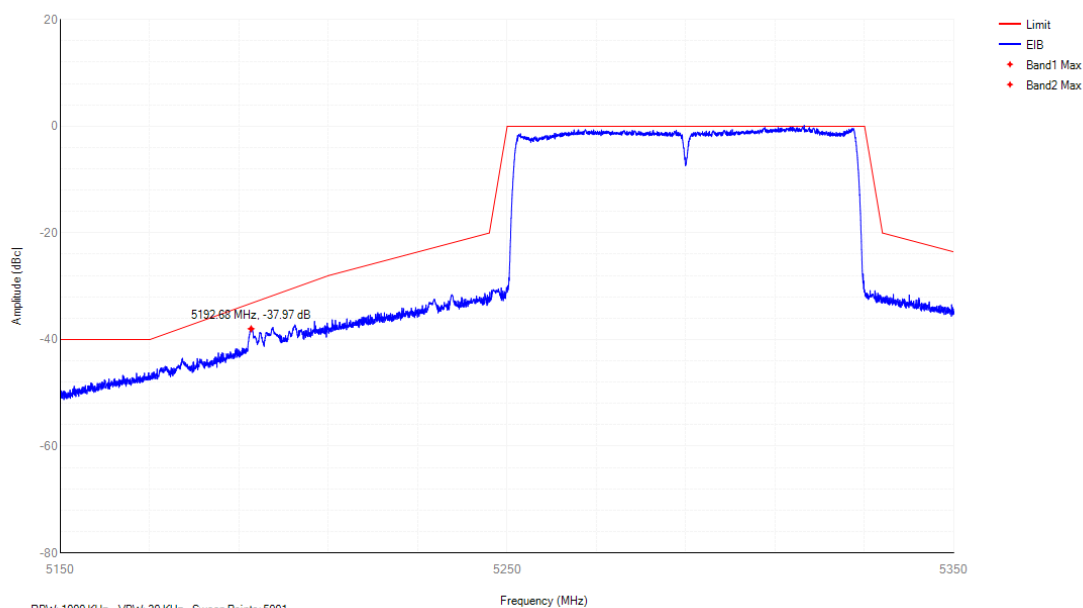
5210MHz 802.11 ac80



5290MHz 802.11 ac80

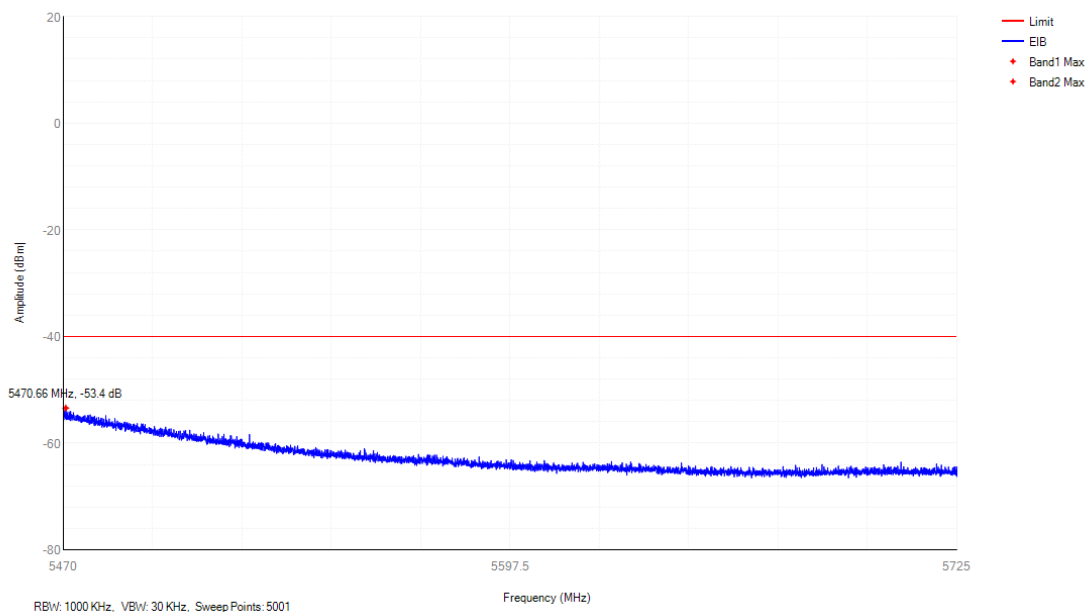
Frequency: 5290.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



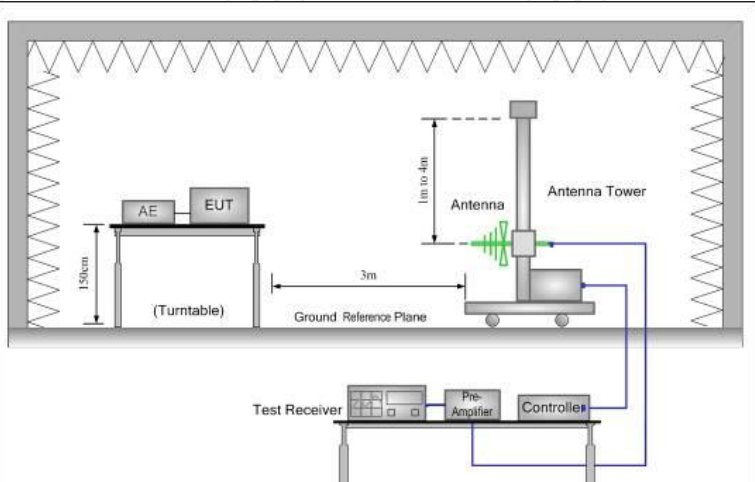
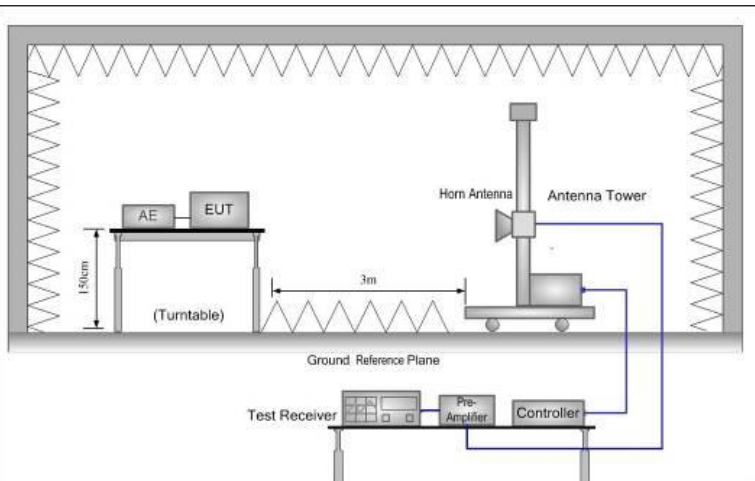
Frequency: 5290.00 MHz

Transmitter unwanted emissions within the 5 GHz WLAN bands



5.5. Receiver spurious emissions

5.5.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.5												
Test Method:	ETSI EN 301 893 clause 5.3.7.2												
Limit:	<table><tr><th colspan="3">Table 5: Spurious radiated emission limits</th></tr><tr><th>Frequency range</th><th>Maximum power</th><th>Measurement bandwidth</th></tr><tr><td>30 MHz to 1 GHz</td><td>-57 dBm</td><td>100 kHz</td></tr><tr><td>1 GHz to 26 GHz</td><td>-47 dBm</td><td>1 MHz</td></tr></table>	Table 5: Spurious radiated emission limits			Frequency range	Maximum power	Measurement bandwidth	30 MHz to 1 GHz	-57 dBm	100 kHz	1 GHz to 26 GHz	-47 dBm	1 MHz
Table 5: Spurious radiated emission limits													
Frequency range	Maximum power	Measurement bandwidth											
30 MHz to 1 GHz	-57 dBm	100 kHz											
1 GHz to 26 GHz	-47 dBm	1 MHz											
Test Setup:	<p>For Radiated Below 1GHz</p> 												
	<p>Above 1GHz</p> 												
Test Mode:	Receive Mode												
Test Procedure:	<p>Below 1GHz test procedure:</p> <ol style="list-style-type: none">1. On the test site as test setup graph above, the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter. The output of the test antenna												

- shall be connected to the measuring receiver.
3. The transmitter shall be switched on, if possible, without modulation under test.
 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
 5. Repeat step 4 for test frequency with the test antenna polarized horizontally.
 6. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved).
 7. The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.4 m above the ground.
 8. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a Non-radiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
 9. Repeat step 7 with both antennas horizontally polarized for each test frequency.
 10. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:
$$\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$
where: Pg is the generator output power into the substitution antenna.

Above 1GHz test procedure:

	Different between above is the test site, change from Semi-Anechoic Chamber to fully Anechoic Chamber, and the test antenna do not need to raise from 1 to 4m, just test in 1.5m height.
Test Instrument:	Refer to Item 3.3
Test Result:	PASS
Remark:	All modulations have been tested, The worst modulation reported only.

5.5.2. Test Data

802.11a Modulation

5240MHz				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Test Result
	polarization	Level dBm(EIRP)		
356.14	Vertical	-72.88	-57.00	PASS
1545.47	V	-61.30	-47.00	
10480.00	V	-65.44	-47.00	
-	V	-	-	
356.14	Horizontal	-73.61	-57.00	
1545.47	H	-61.94	-47.00	
10480.00	H	-64.33	-47.00	
-	H	-	-	

802.11n (HT20) Modulation

5240MHz				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Test Result
	polarization	Level dBm(EIRP)		
355.87	Vertical	-71.48	-57.00	PASS
1539.25	V	-62.27	-47.00	
10480.00	V	-65.39	-47.00	
-	V	-	-	
355.87	Horizontal	-73.47	-57.00	
1539.25	H	-62.63	-47.00	
10480.00	H	-64.21	-47.00	
-	H	-	-	

802.11ac (HT20) Modulation

5240MHz				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Test Result
	polarization	Level dBm(EIRP)		
321.43	Vertical	-72.63	-57.00	PASS
1201.47	V	-61.21	-47.00	
10480.00	V	-65.45	-47.00	
-	V	-	-	
321.43	Horizontal	-74.68	-57.00	
1201.47	H	-62.24	-47.00	
10480.00	H	-64.09	-47.00	
-	H	-	-	

802.11n (HT40) Modulation

5230MHz				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Test Result
	polarization	Level dBm(EIRP)		
363.42	Vertical	-72.97	-57.00	PASS
1537.06	V	-58.69	-47.00	
10460.00	V	-63.55	-47.00	
-	V	-	-	
363.42	Horizontal	-73.64	-57.00	
1537.06	H	-61.28	-47.00	
10460.00	H	-65.76	-47.00	
-	H	-	-	

802.11ac (HT40) Modulation

5230MHz				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Test Result
	polarization	Level dBm(EIRP)		
362.14	Vertical	-74.38	-57.00	PASS
1536.71	V	-58.29	-47.00	
10460.00	V	-65.05	-47.00	
-	V	-	-	
362.14	Horizontal	-73.75	-57.00	
1536.71	H	-62.16	-47.00	
10460.00	H	-65.63	-47.00	
-	H	-	-	

802.11ac (HT80) Modulation

5290MHz				
Frequency (MHz)	Spurious Emission		Limit dBm(EIRP)	Test Result
	polarization	Level dBm(EIRP)		
363.82	Vertical	-77.16	-57.00	PASS
1526.74	V	-65.53	-47.00	
10580.00	V	-62.31	-47.00	
-	V	-	-	
363.82	Horizontal	-73.54	-57.00	
1526.74	H	-63.49	-47.00	
10580.00	H	-65.76	-47.00	
-	H	-	-	

5.6. Dynamic Frequency Selection (DFS)

5.6.1. Radar Detection Threshold

A radar burst using a test signal defined in table D.4 of EN 301 893 is generated on selected channel during the Channel Availability Check Time at a level defined in clause 5.3.8.2.1.1. The test was performed 20 times and each time a unique radar test signal was generated from options provided in table D.4. When selecting these 20 unique radar test signals, the radar test signals #1 to #6 from table D.4 were included as well as variations of pulse width, pulse repetition frequency and number of different PRFs (if applicable) within the ranges given.

Result: N/A, The UUT is a slave device and maximum transmit power less than 200 mW e.i.r.p.

5.6.2. In service Monitoring

5.6.2.1. Test Specification

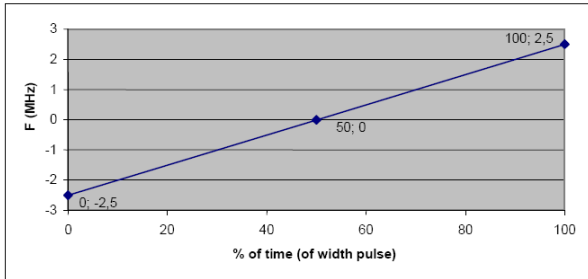
Test Requirement:	ETSI EN 301 893 clause 4.2.6.2.4																																																					
Test Method:	ETSI EN 301 893 clause 5.4.8.2.1.5																																																					
Limit:	<p>The <i>In-Service Monitoring</i> shall be used to monitor each <i>Operating Channel</i>.</p> <p>The <i>In-Service-Monitoring</i> shall start immediately after the RLAN device has started transmissions on a channel.</p> <p>During the <i>In-Service Monitoring</i>, the RLAN device shall be capable of detecting any of the radar test signals that fall within the ranges given by table D.4 with a level above the <i>Radar Detection Threshold</i> defined in table D.2.</p> <p style="text-align: center;">Table D.4: Parameters of radar test signals</p> <table><tr><th rowspan="2">Radar test signal # (see note 1 to note 3)</th><th colspan="2">Pulse width W (μs)</th><th colspan="2">Pulse repetition frequency PRF (PPS)</th><th rowspan="2">Number of different PRFs</th><th rowspan="2">Pulses per burst for each PRF (PPB) (see note 5)</th></tr><tr><th>Min</th><th>Max</th><th>Min</th><th>Max</th></tr><tr><td>1</td><td>0,5</td><td>5</td><td>200</td><td>1 000</td><td>1</td><td>10 (see note 6)</td></tr><tr><td>2</td><td>0,5</td><td>15</td><td>200</td><td>1 600</td><td>1</td><td>15 (see note 6)</td></tr><tr><td>3</td><td>0,5</td><td>15</td><td>2 300</td><td>4 000</td><td>1</td><td>25</td></tr><tr><td>4</td><td>20</td><td>30</td><td>2 000</td><td>4 000</td><td>1</td><td>20</td></tr><tr><td>5</td><td>0,5</td><td>2</td><td>300</td><td>400</td><td>2/3</td><td>10 (see note 6)</td></tr><tr><td>6</td><td>0,5</td><td>2</td><td>400</td><td>1 200</td><td>2/3</td><td>15 (see note 6)</td></tr></table> <p>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.</p> <p>NOTE 2: Radar test signal #4 is a modulated radar test signal. The modulation to be used is a chirp modulation with a $\pm 2,5$ MHz frequency deviation which is described below.</p> <div></div> <p>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 PPS and 50 PPS. For radar test signal #6, the difference between the PRF values chosen shall be between 80 PPS and 400 PPS. See figure D.3.</p> <p>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, figure D.3 and figure D.4. For the Off-Channel CAC testing, repetitive bursts shall be used for the total duration of the test. See figure D.2 and figure D.5. See also clause 4.2.6.2.3, clause 5.4.8.2.1.4.2 and clause 5.4.8.2.1.4.3.</p> <p>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.</p> <p>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 5 600 MHz to 5 650 MHz shall be 18.</p>	Radar test signal # (see note 1 to note 3)	Pulse width W (μs)		Pulse repetition frequency PRF (PPS)		Number of different PRFs	Pulses per burst for each PRF (PPB) (see note 5)	Min	Max	Min	Max	1	0,5	5	200	1 000	1	10 (see note 6)	2	0,5	15	200	1 600	1	15 (see note 6)	3	0,5	15	2 300	4 000	1	25	4	20	30	2 000	4 000	1	20	5	0,5	2	300	400	2/3	10 (see note 6)	6	0,5	2	400	1 200	2/3	15 (see note 6)
	Radar test signal # (see note 1 to note 3)		Pulse width W (μs)		Pulse repetition frequency PRF (PPS)				Number of different PRFs	Pulses per burst for each PRF (PPB) (see note 5)																																												
		Min	Max	Min	Max																																																	
	1	0,5	5	200	1 000	1	10 (see note 6)																																															
	2	0,5	15	200	1 600	1	15 (see note 6)																																															
	3	0,5	15	2 300	4 000	1	25																																															
	4	20	30	2 000	4 000	1	20																																															
	5	0,5	2	300	400	2/3	10 (see note 6)																																															
	6	0,5	2	400	1 200	2/3	15 (see note 6)																																															

Table D.2: Radar Detection Threshold Levels

e.i.r.p. Spectral Density (dBm/MHz)	Value (see note 1 and note 2)
10	-62 dBm
<p>NOTE 1: This is the level at the input of the receiver of an RLAN device with a maximum e.i.r.p. density of 10 dBm/MHz and assuming a 0 dBi receive antenna. For devices employing different e.i.r.p. spectral density and/or a different receive antenna gain G (dBi) the Radar Detection Threshold Level at the receiver input follows the following relationship: DFS Detection Threshold (dBm) = -62 + 10 - e.i.r.p. Spectral Density (dBm/MHz) + G (dBi); however the Radar Detection Threshold Level shall not be less than -64 dBm assuming a 0 dBi receive antenna gain.</p> <p>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 (see clause 4.2.6.1.3).</p>	

The minimum required detection probability associated with a given radar test signal is defined in table D.5.

Table D.5: Detection probability

Parameter	Detection Probability (P_d)	
	Channels whose nominal bandwidth falls partly or completely within the 5 600 MHz to 5 650 MHz band	Other channels
CAC, Off-Channel CAC	99,99 %	60 %
In-Service Monitoring	60 %	60 %
<p>NOTE: P_d gives the probability of detection per simulated radar burst and represents a minimum level of detection performance under defined conditions. Therefore P_d does not represent the overall detection probability for any particular radar under real life conditions.</p>		

Test Setup:

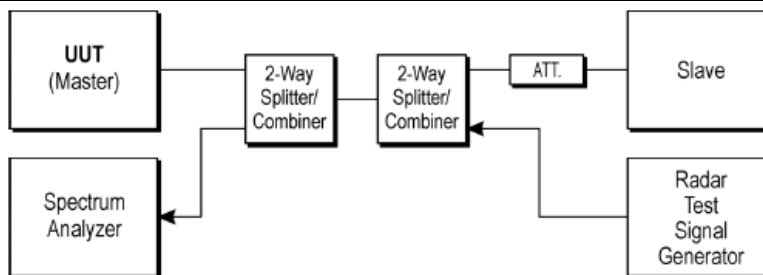


Figure 4: Set-up A

Test Procedure:

1. Test performed with tested device in normal conditions. The UUT was tested as a master device.
2. The test "Set-up A" was used. Radar test signals are injected into the UUT. This set-up also contained an RLAN device operating in slave mode which is associated with the UUT. When performing DFS testing, a power splitter/combiner has been used to combine all the receive chains (antenna inputs) into a single test point. The insertion loss of the splitter/combiner has been taken into account.

Test Instrument:

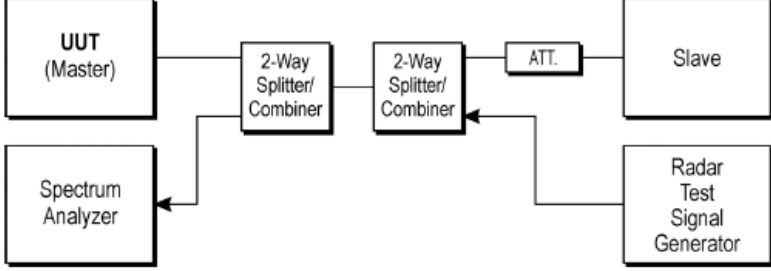
Refer to Item 3.3

Test Result:

N/A, The UUT is a slave device and maximum transmit power less than 200 mW e.i.r.p.

5.6.3. Channel Shutdown and Non-Occupancy period

5.6.3.1. Test Specification

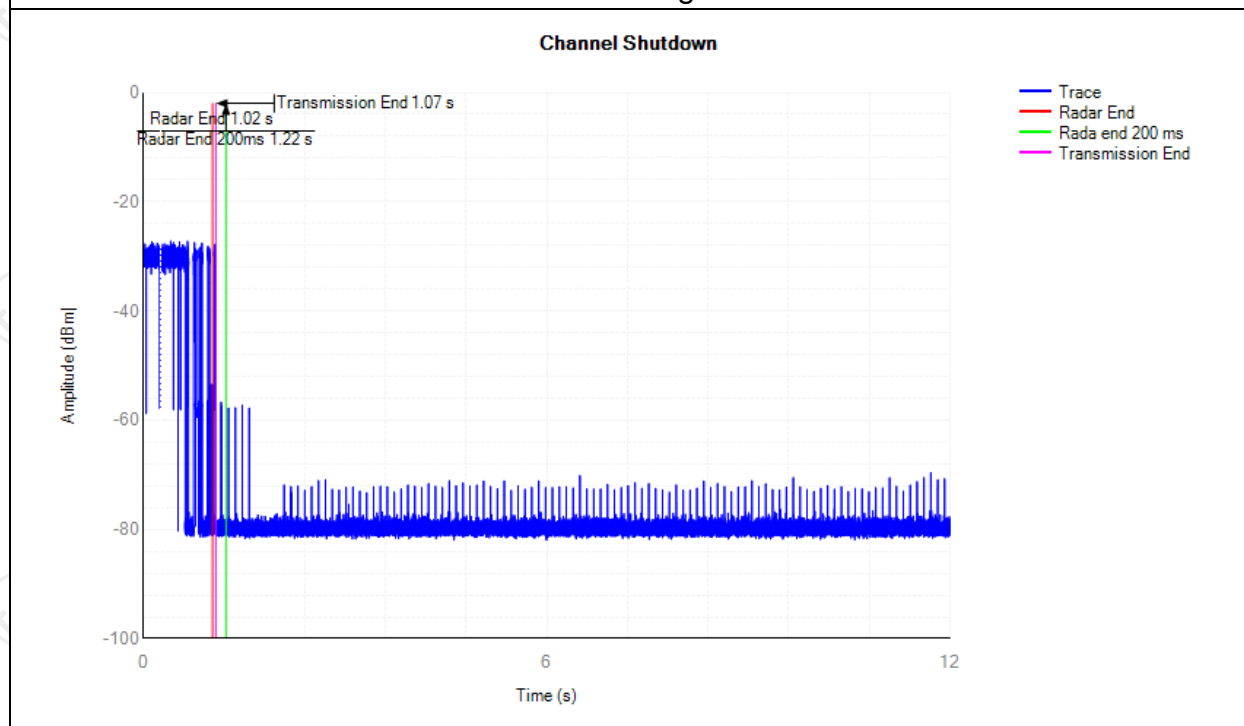
Test Requirement:	ETSI EN 301 893 clause 4.2.6.2.5 and 4.2.6.2.6														
Test Method:	ETSI EN 301 893 clause 5.4.8.2.1.6														
Limit:	<p>The <i>Channel Move Time</i> shall not exceed the limit defined in table D.1. The <i>Channel Closing Transmission Time</i> shall not exceed the limit defined in table D.1. The <i>Non-Occupancy Period</i> shall not be less than the value defined in table D.1.</p> <p style="text-align: center;">Table D.1: DFS requirement values</p> <table border="1"> <thead> <tr> <th>Parameter</th><th>Value</th></tr> </thead> <tbody> <tr> <td>Channel Availability Check Time</td><td>60 s (see note 1)</td></tr> <tr> <td>Minimum Off-Channel CAC Time</td><td>6 minutes (see note 2)</td></tr> <tr> <td>Maximum Off-Channel CAC Time</td><td>4 hours (see note 2)</td></tr> <tr> <td>Channel Move Time</td><td>10 s</td></tr> <tr> <td>Channel Closing Transmission Time</td><td>1 s</td></tr> <tr> <td>Non-Occupancy Period</td><td>30 minutes</td></tr> </tbody> </table> <p>NOTE 1: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the <i>Channel Availability Check Time</i> shall be 10 minutes. NOTE 2: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the <i>Off-Channel CAC Time</i> shall be within the range 1 hour to 24 hours.</p>	Parameter	Value	Channel Availability Check Time	60 s (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 s	Channel Closing Transmission Time	1 s	Non-Occupancy Period	30 minutes
Parameter	Value														
Channel Availability Check Time	60 s (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 s														
Channel Closing Transmission Time	1 s														
Non-Occupancy Period	30 minutes														
Test Setup:	 <p style="text-align: center;">Figure 4: Set-up A</p>														
Test Procedure:	<p>1. Test performed with tested device in normal conditions. The UUT was tested as a master device.</p> <p>2. The test “Set-up A” was used. Radar test signals are injected into the UUT. This set-up also contained an RLAN device operating in slave mode which is associated with the UUT. When performing DFS testing, a power splitter/combiner has been used to combine all the receive chains(antenna inputs) into a single test point. The insertion loss of the splitter/combiner has been taken into account.</p>														
Test Instrument:	Refer to Item 3.3														
Test Result:	PASS														

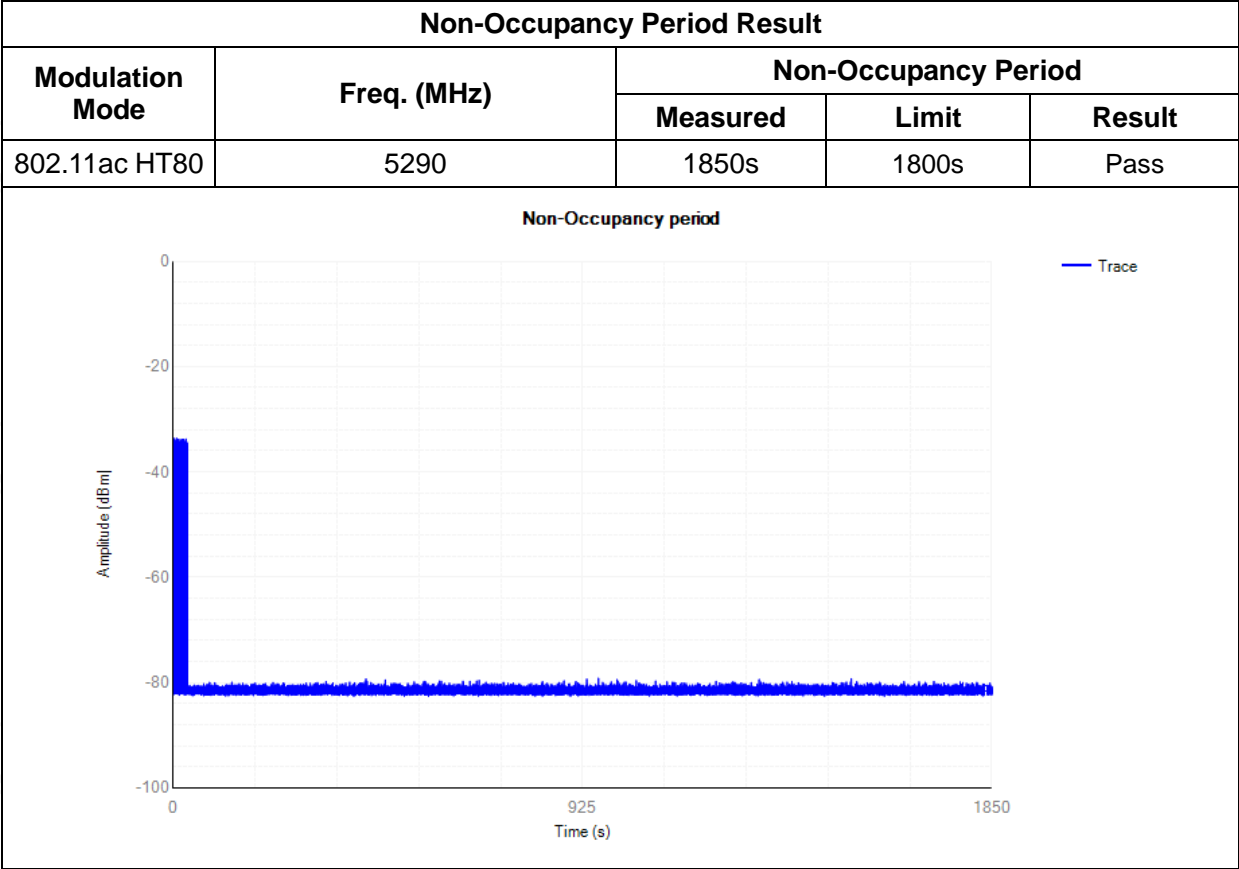
Note: While the UUT was transmitting a test transmission sequence in accordance with clause 5.3.1.2 on the selected channel at a certain time T0, a single burst test signal was generated on selected channel using the reference DFS test signal defined in table D.3 and at a level of up to 10 dB above the level defined in clause 5.4.8.2.1.1. T1 denotes the end of the radar burst. The transmissions of the UUT following the end of the burst (T1) on the selected channel were observed for a period greater than to the Channel Move Time defined in table D.1. The aggregate duration (Channel Closing Transmission Time) of all transmissions from the UUT on selected channel during the Channel Move Time was compared to the limit defined in table D.1. T2 denotes the instant when the UUT has ceased all transmissions on the selected channel. Following instant T2, the selected channel was observed for a period equal to the Non-Occupancy Period (T3-T2) to verify that the UUT does not resume any transmissions on this channel.

Channel Closing Transmission Time and Channel Move Time Result

Modulation Mode	Freq. (MHz)	Radar Type	Channel Closing Transmission Time		Channel Move Time	
			Value	Limit	Move Time	Limit 10s
802.11ac HT80	5290	1	24ms	1000ms	0.0501s	10s

12 sec Timing Plot



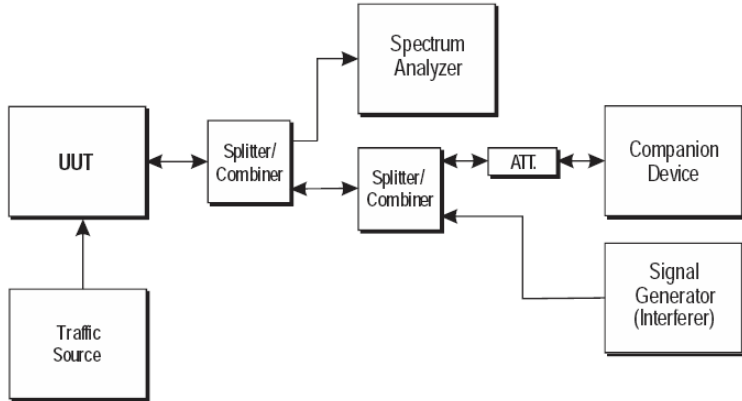


5.6.4. Uniform Spreading**5.6.4.1. Test Specification**

Test Requirement:	ETSI EN 301 893 clause 4.2.6.2.7
Test Method:	N/A
Limit:	<p>Each of the declared Channel Plans (refer to EN301893 clause 3.1) shall make use of at least 60 % of the spectrum available in the applicable sub-band(s).</p> <p>The Uniform Spreading is limited to the usable channels being declared as part of the channel plan.</p> <p>Usable channels do not include channels which are precluded by either:</p> <ol style="list-style-type: none">1) the intended outdoor usage of the RLAN; or2) previous detection of a radar on the channel (Unavailable Channel or Unusable Channel); or3) national regulations; or4) the restriction to only operate in the band 5 150 MHz to 5250 MHz for RLAN devices without a radar detection capability. Each of the Usable Channels shall be used with approximately equal probability. RLAN equipment for which the declared channel plan includes channels whose nominal bandwidth falls completely or partly within the band 5600 MHz to 5650 MHz may omit these channels from the list of Usable Channels at initial power up or at initial installation. Channels being used by other RLAN equipment may be omitted from the list of Usable Channels.
Result:	N/A, The UUT is a slave device.

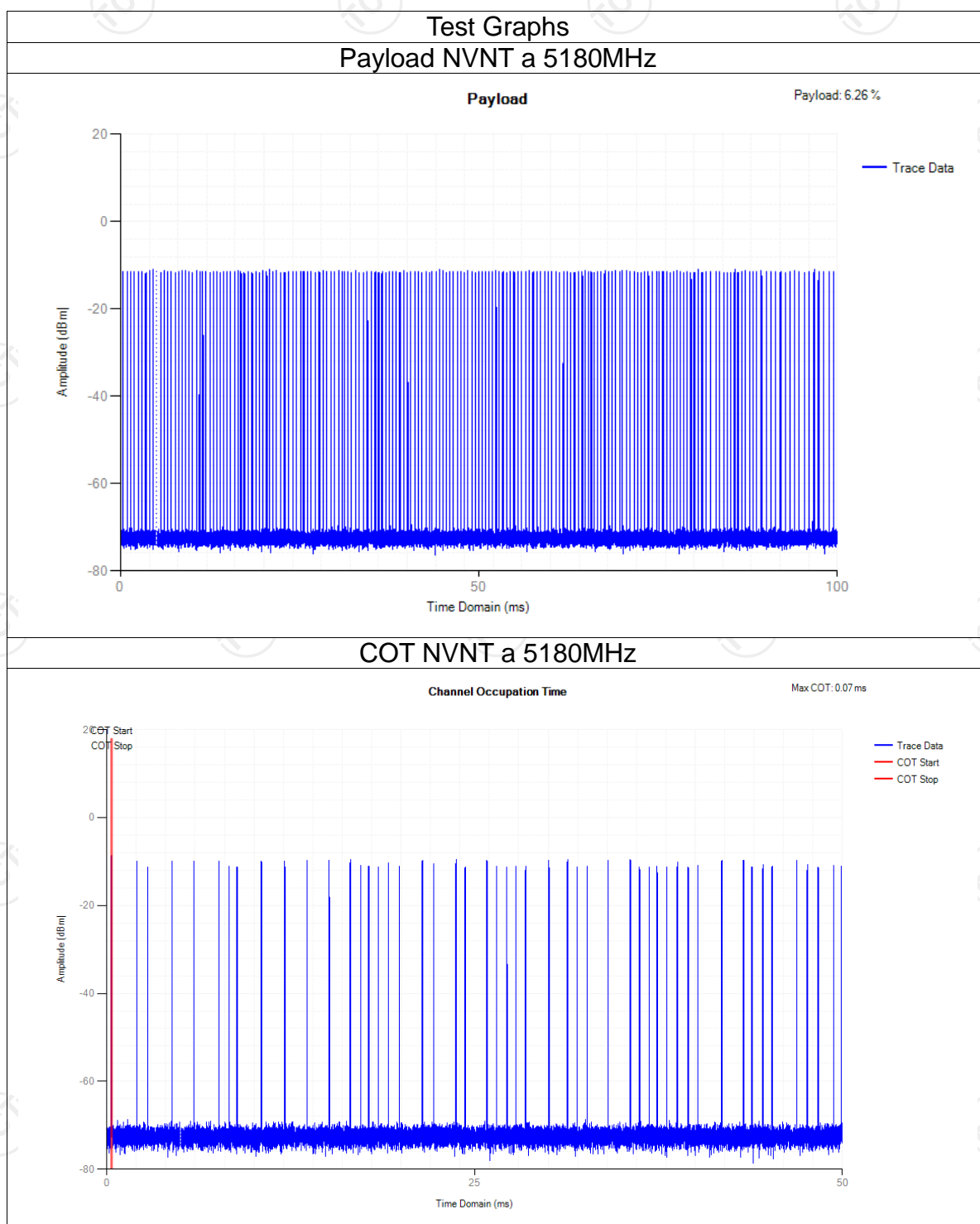
5.7. Adaptivity (Channel Access Mechanism)

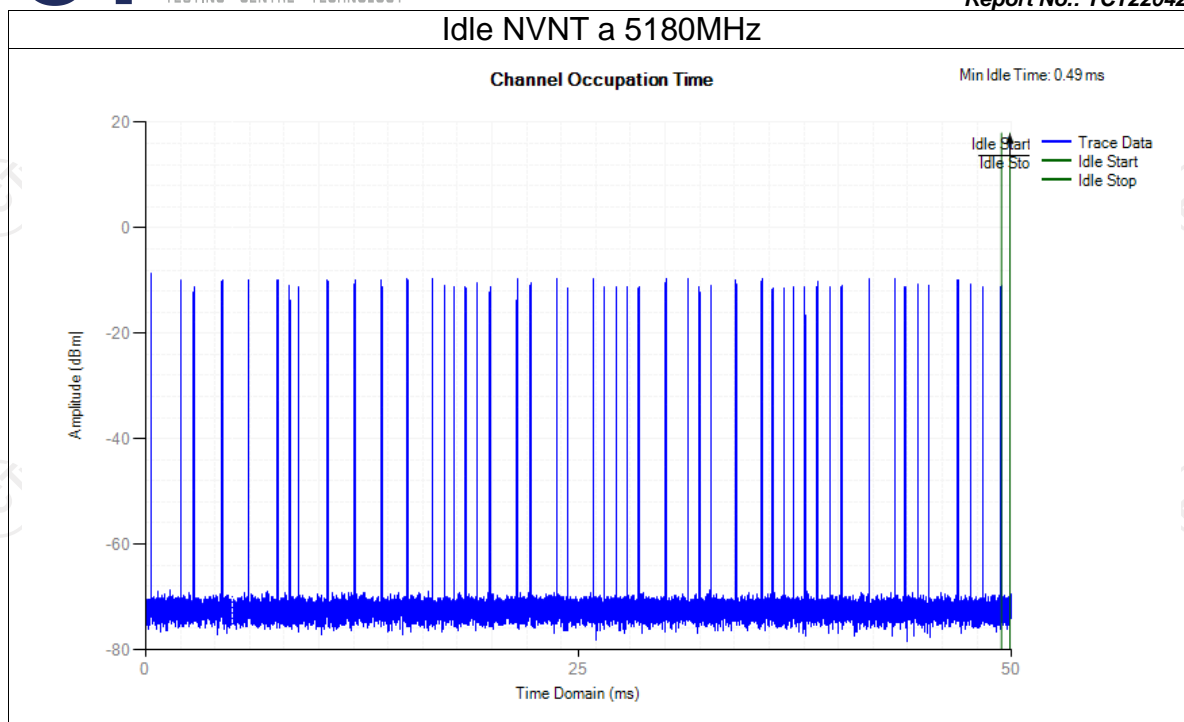
5.7.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.7
Test Method:	ETSI EN 301 893 clause 5.4.9.3
Limit:	<p>The use of Short Control Signalling Transmissions is constrained as follows:</p> <ul style="list-style-type: none"> • within an observation period of 50 ms, the number of Short Control Signalling Transmissions by the equipment shall be equal to or less than 50; and • the total duration of the equipment's Short Control Signalling Transmissions shall be less than 2 500 μs within said observation period.
Test Setup:	 <p>Figure 16: Example Test Set-up for verifying the adaptivity of an equipment</p>
Test Procedure:	Refer to ETSI EN 301 893 clause 5.4.9.3
Test Instrument:	Refer to Item 3.3
Test Result:	PASS
Remark:	All modulations have been tested, The worst modulation reported only.

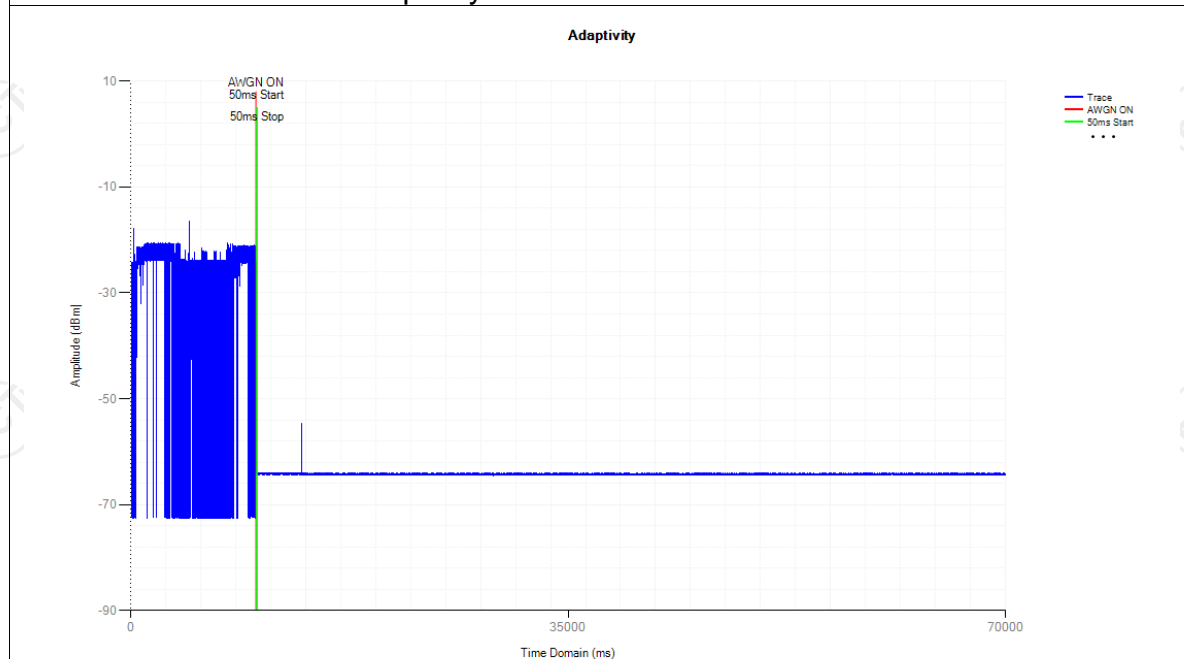
5.7.2. Test Data

Test Mode			802.11a			
Channel	Frequency (MHz)	Interference Level (dBm)	Max COT (ms)	Min Idle Time (ms)	Short transmission (ms)	Result
36	5180	-61.67	0.07	0.49	0	PASS

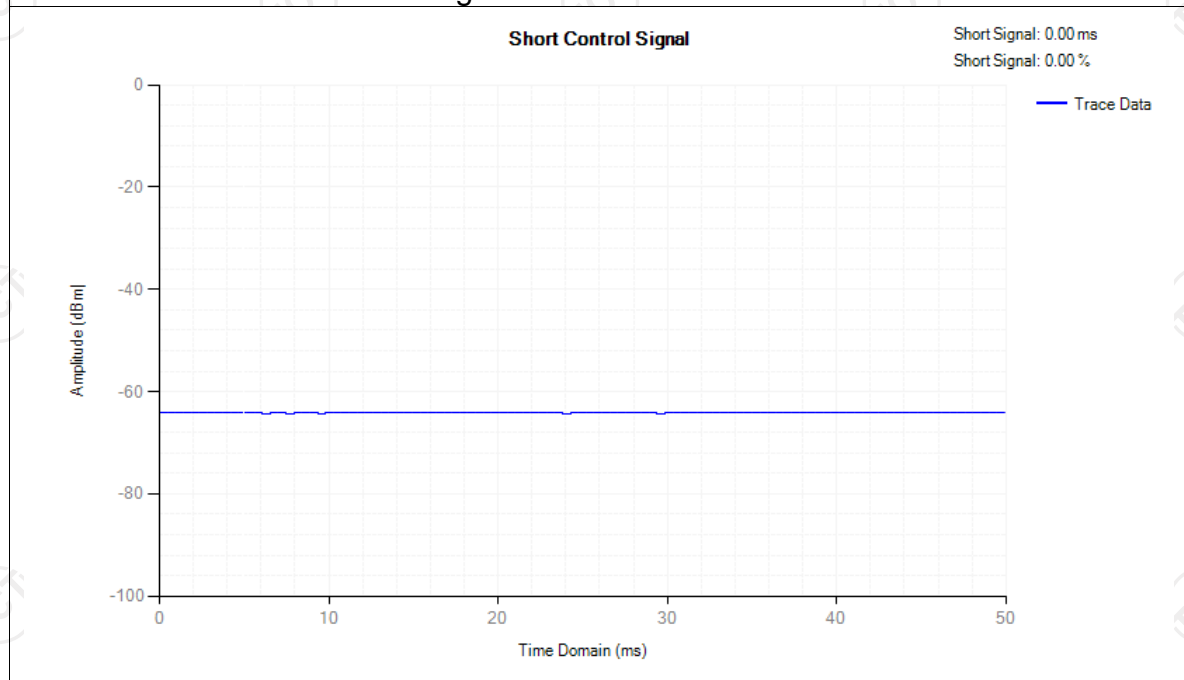




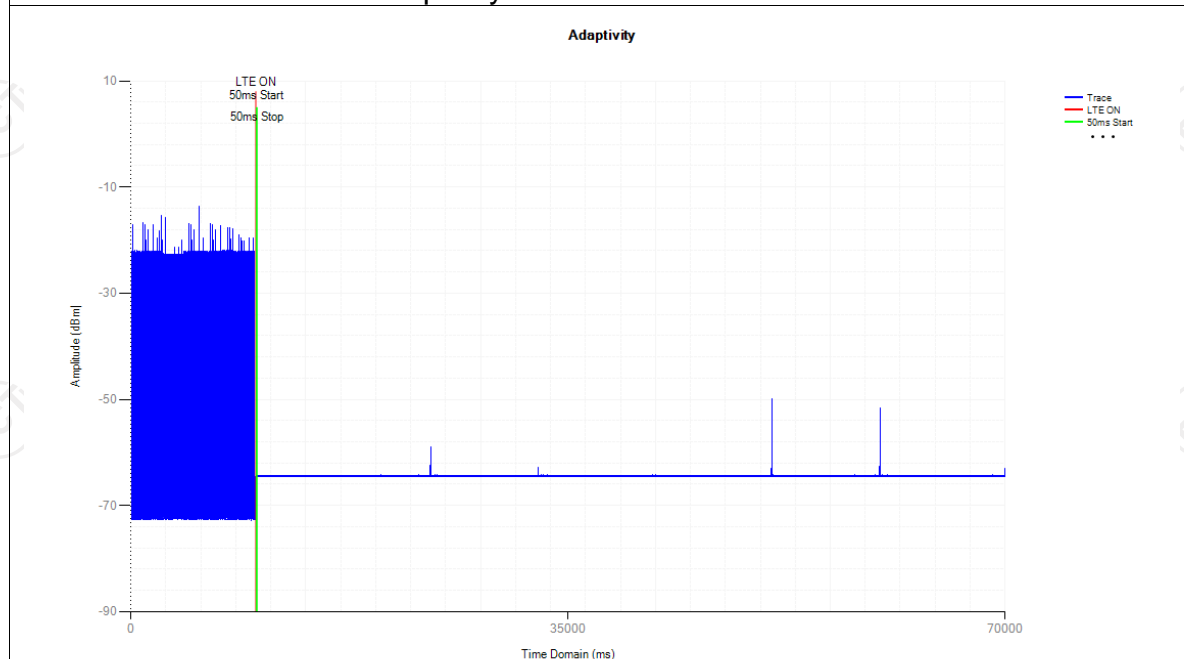
Adaptivity NVNT a 5180MHz AWGN



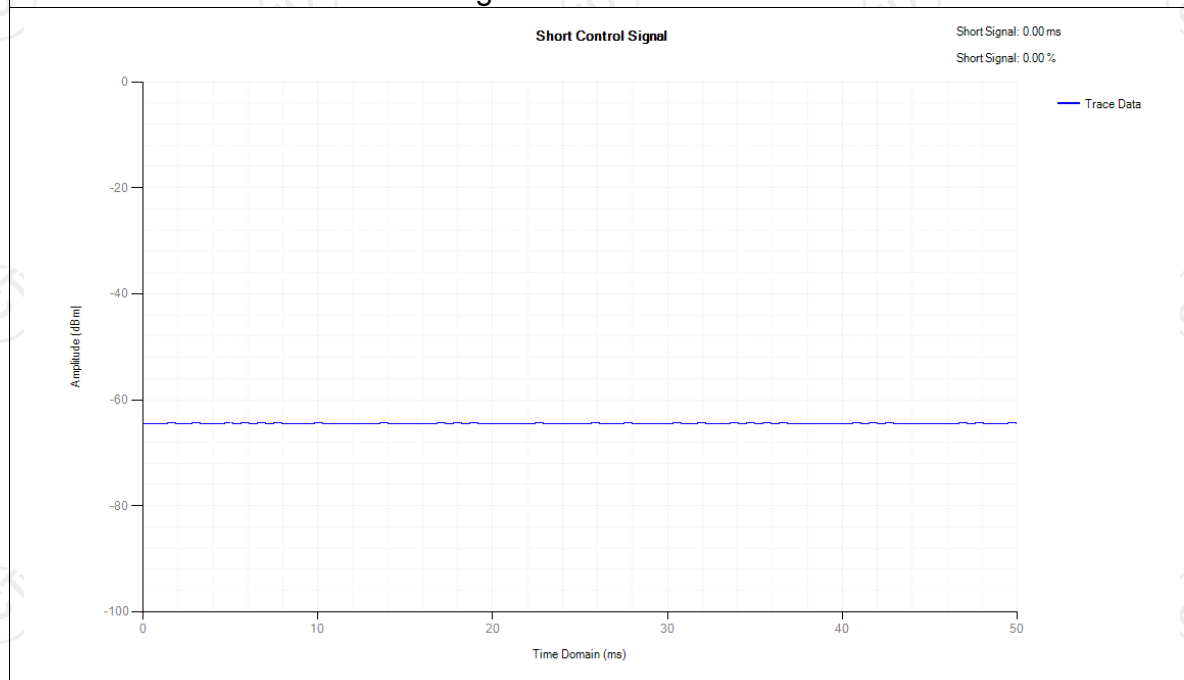
Control Signal NVNT a 5180MHz AWGN



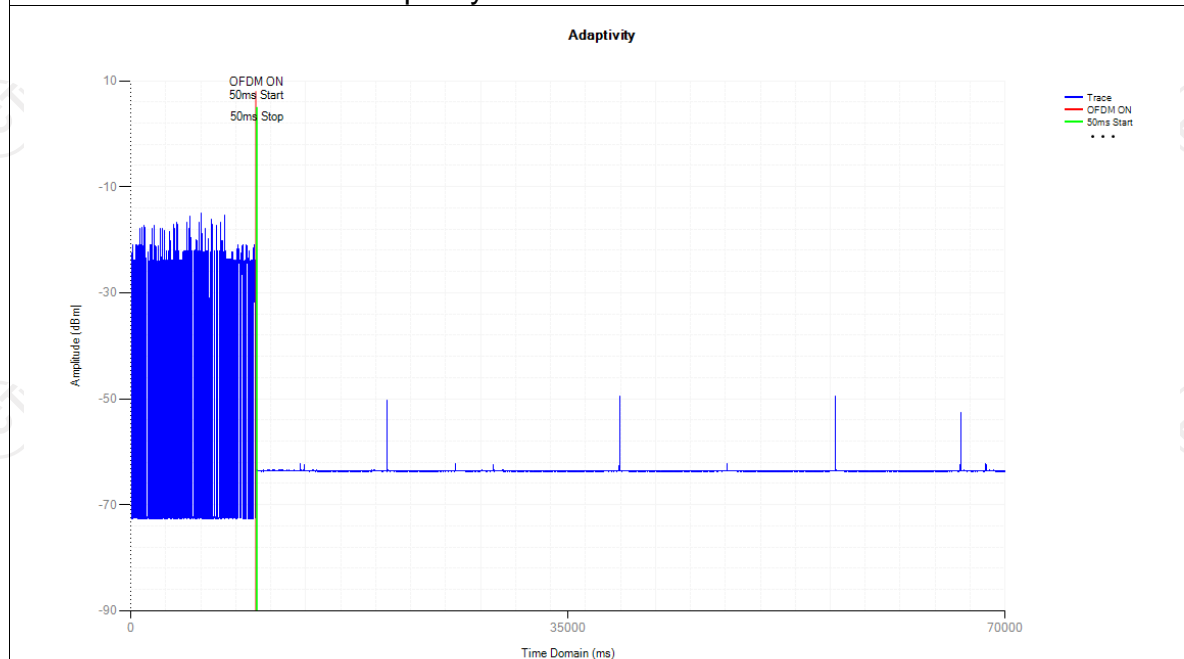
Adaptivity NVNT a 5180MHz LTE



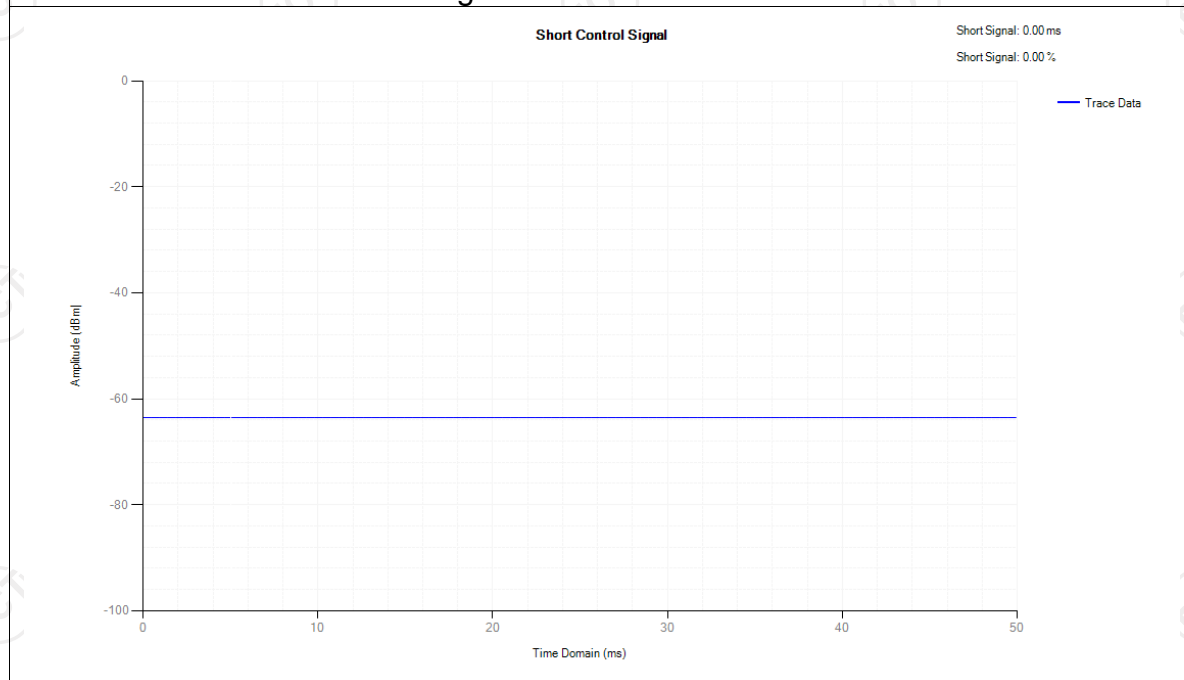
Control Signal NVNT a 5180MHz LTE



Adaptivity NVNT a 5180MHz OFDM



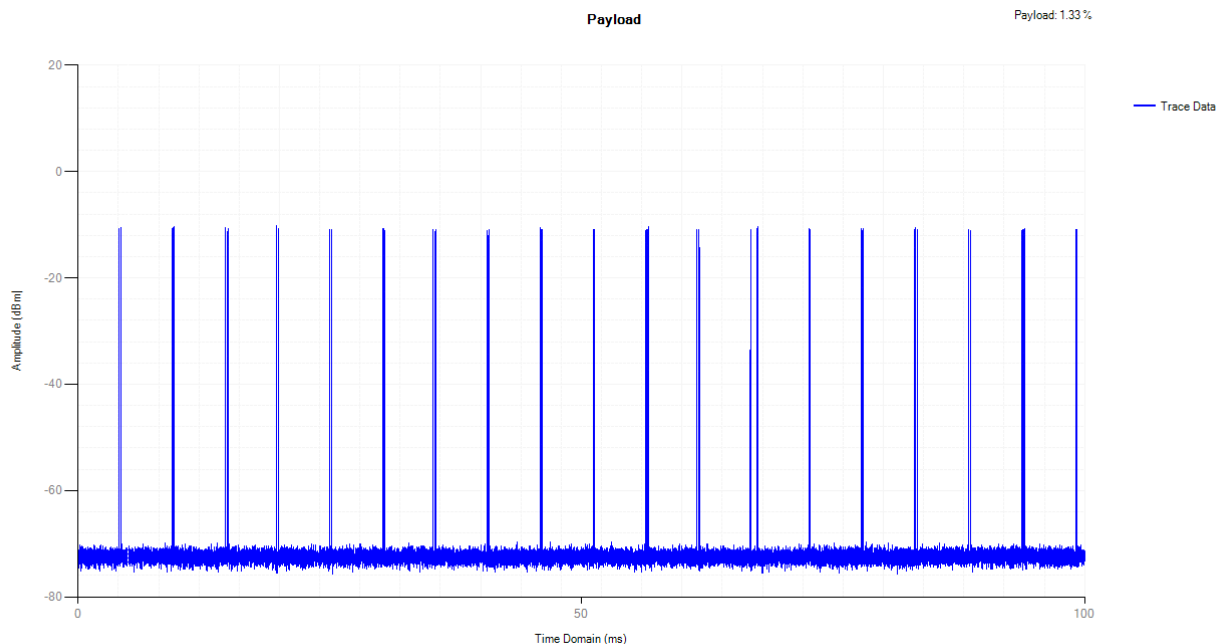
Control Signal NVNT a 5180MHz OFDM



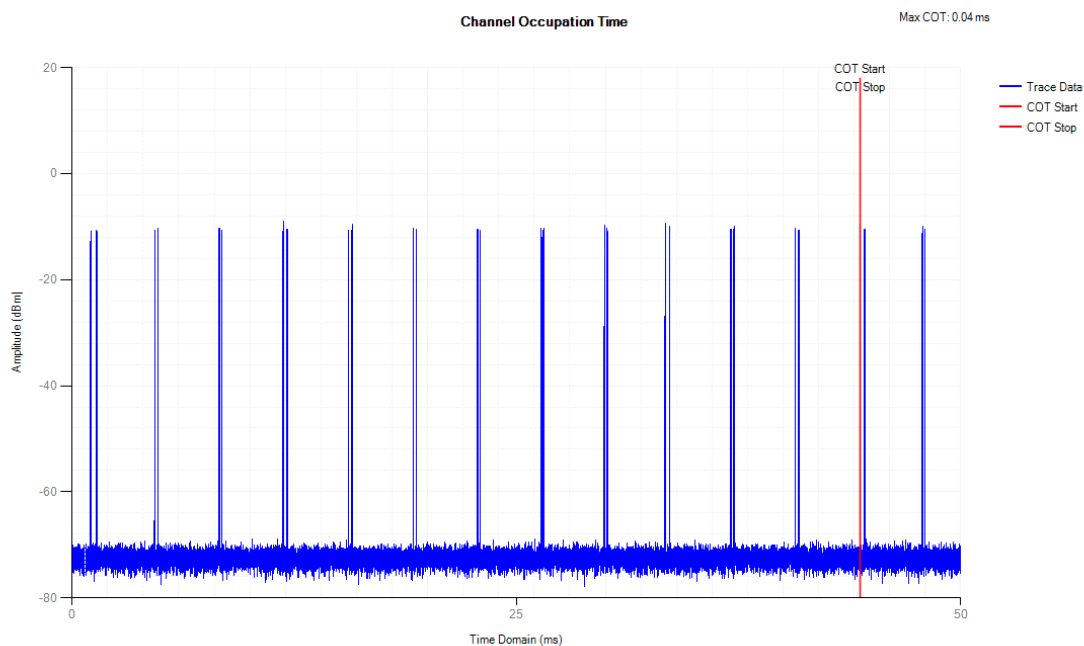
Test Mode			802.11n(HT20)			
Channel	Frequency (MHz)	Interference Level (dBm)	Max COT (ms)	Min Idle Time (ms)	Short transmission (ms)	Result
64	5320	-63.17	0.04	0.09	0	PASS

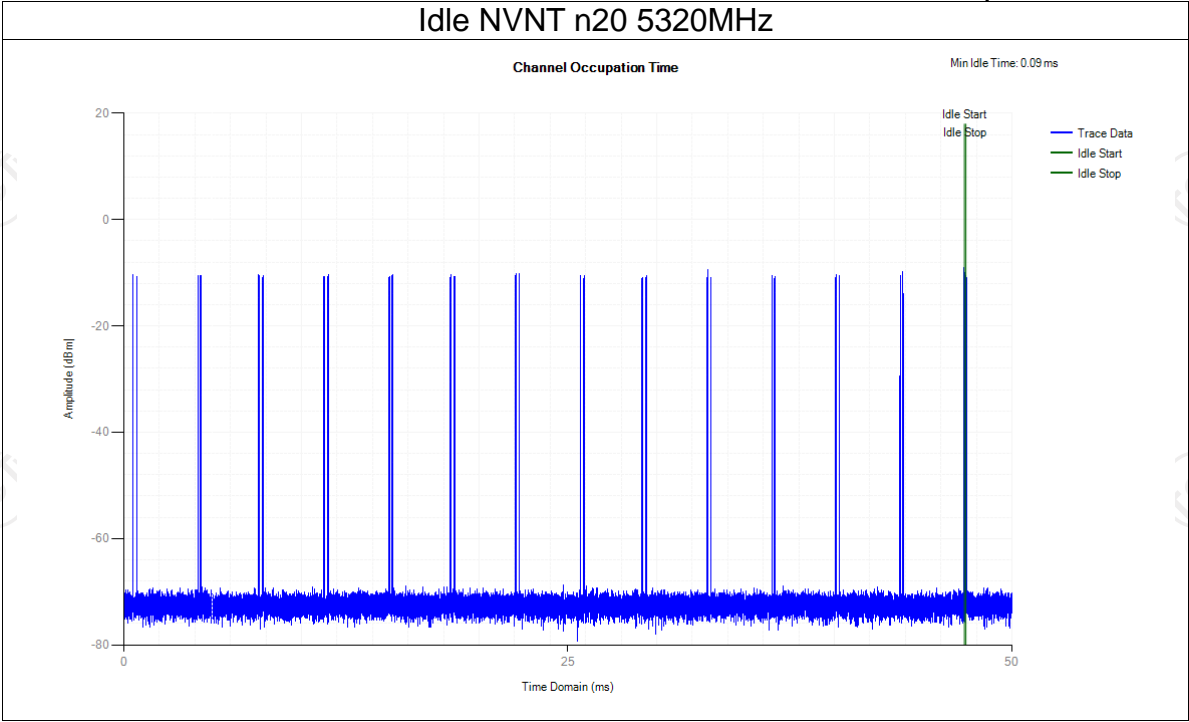
Test Graphs

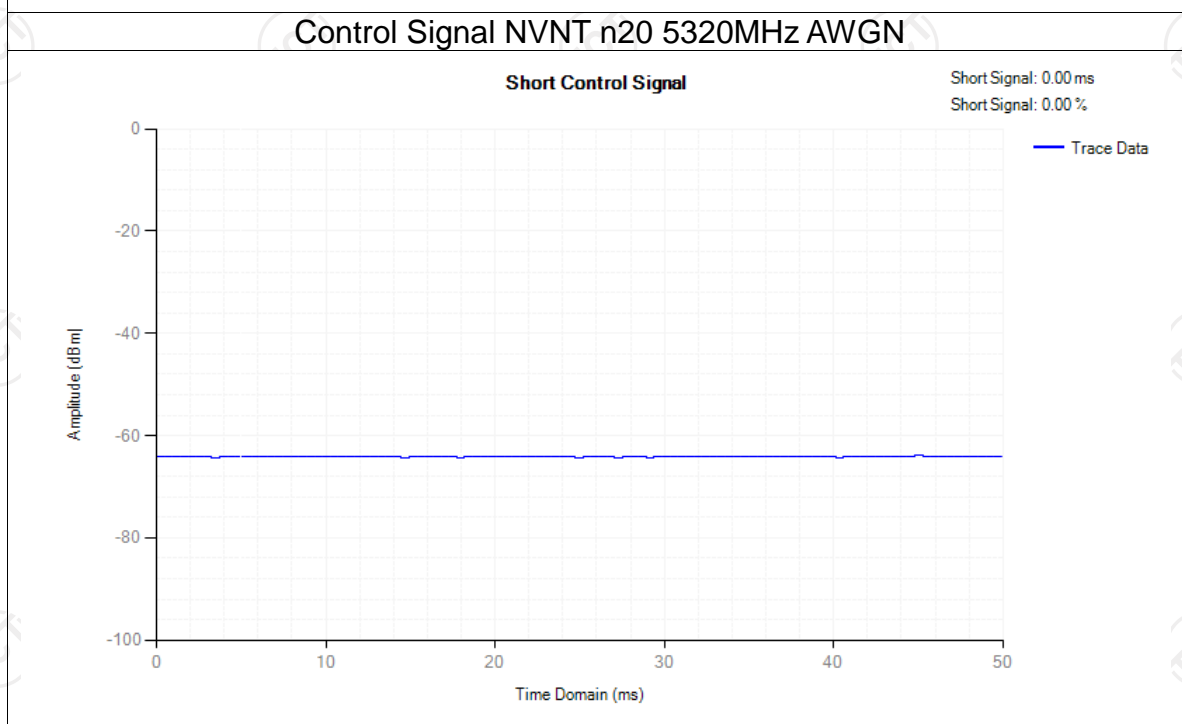
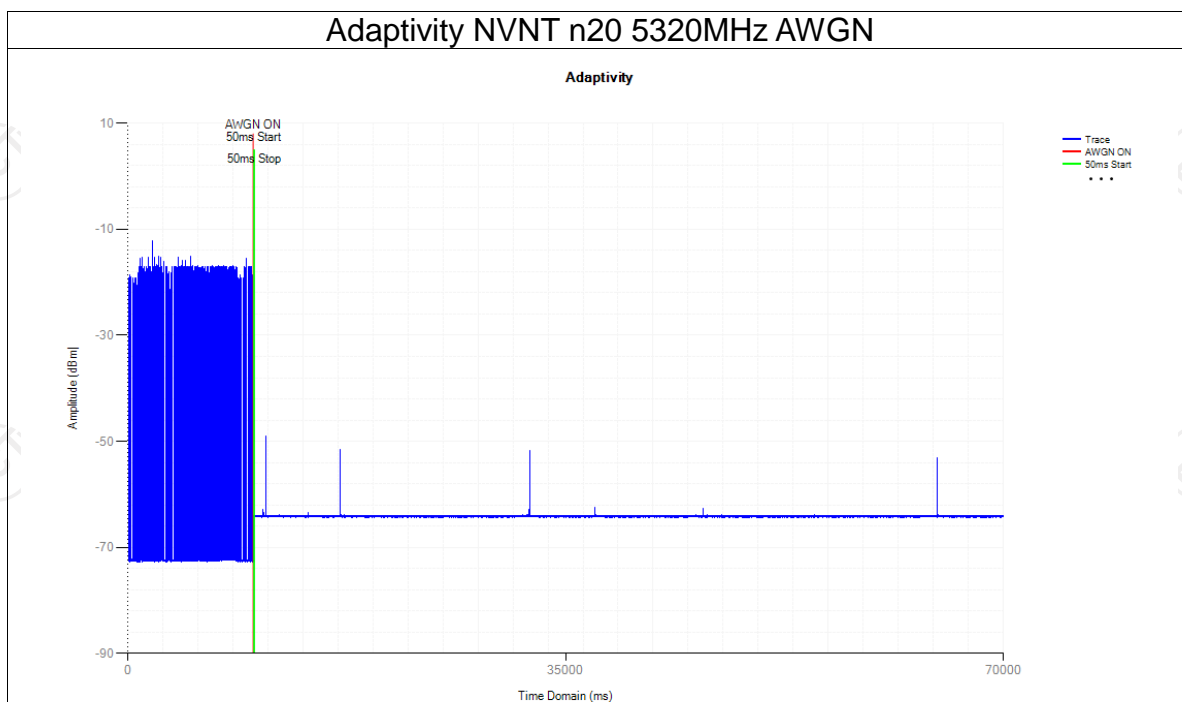
Payload NVNT n20 5320MHz



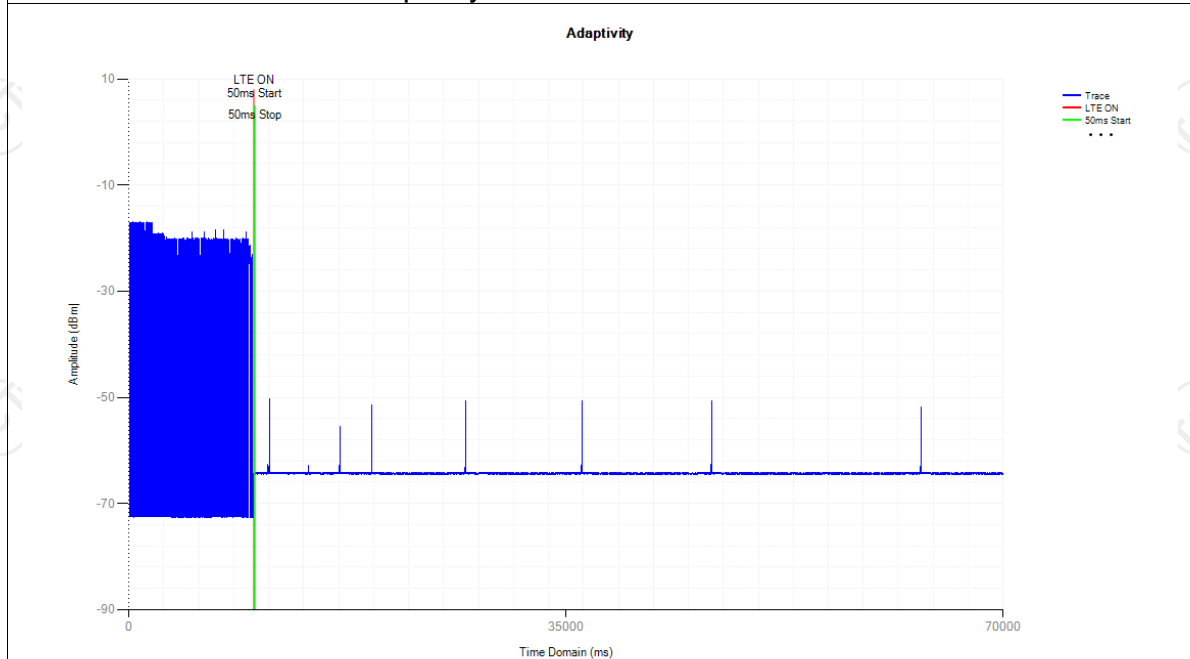
COT NVNT n20 5320MHz



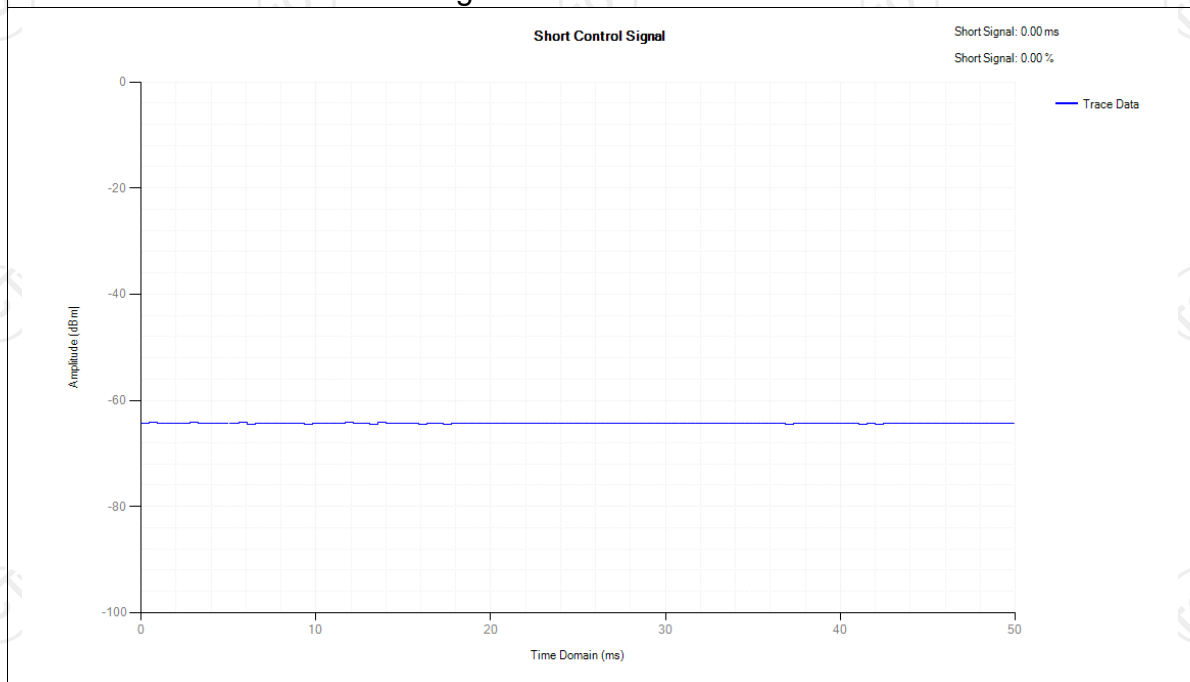


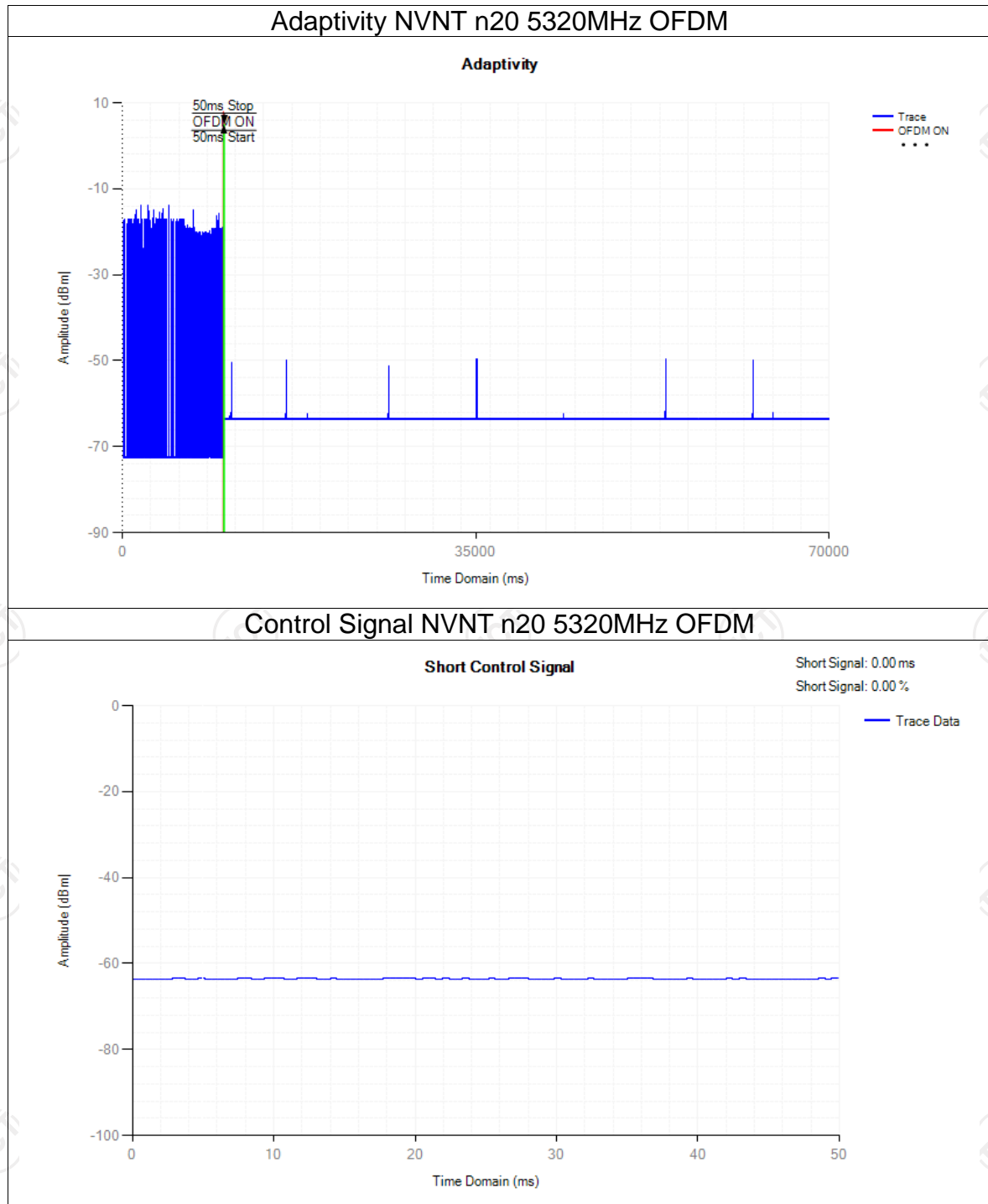


Adaptivity NVNT n20 5320MHz LTE

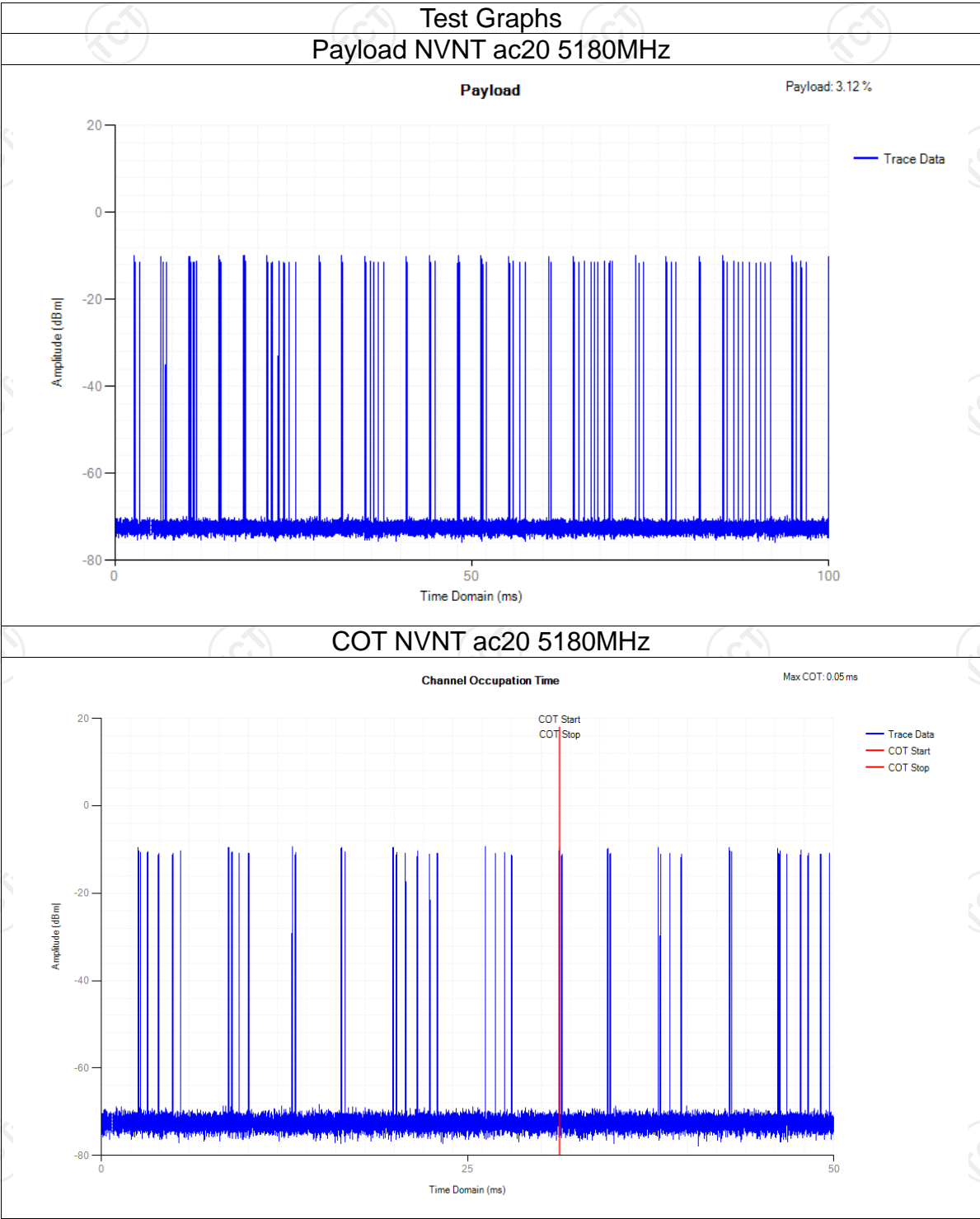


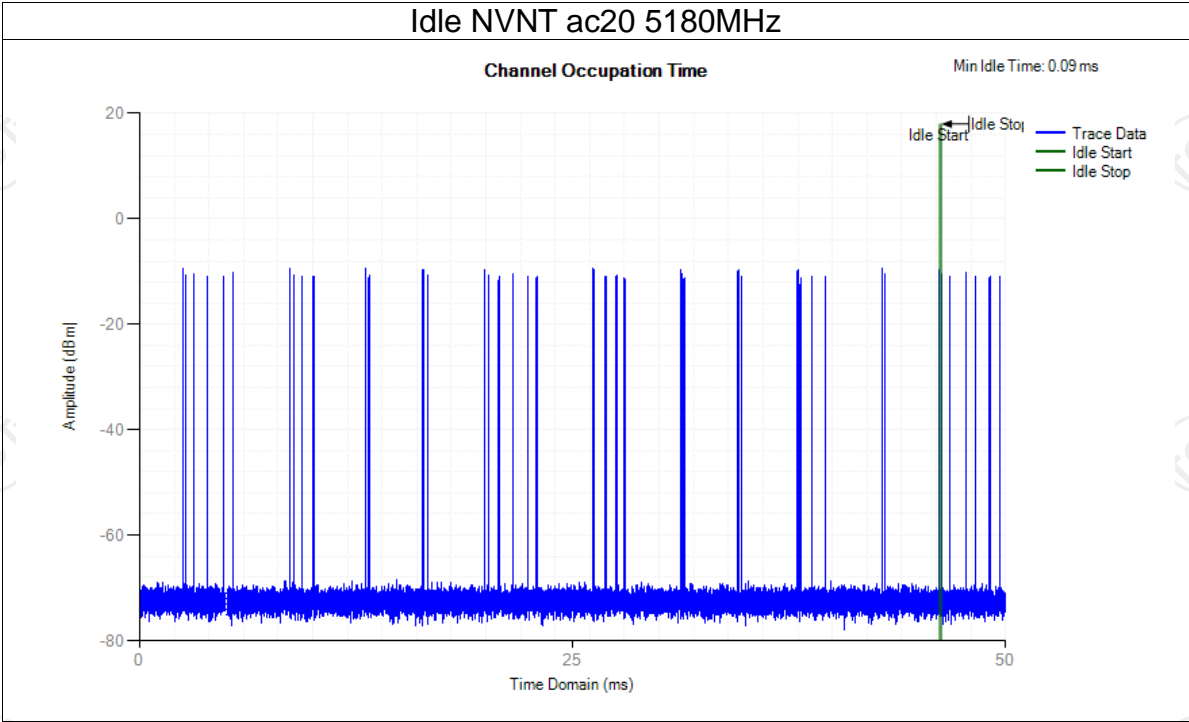
Control Signal NVNT n20 5320MHz LTE

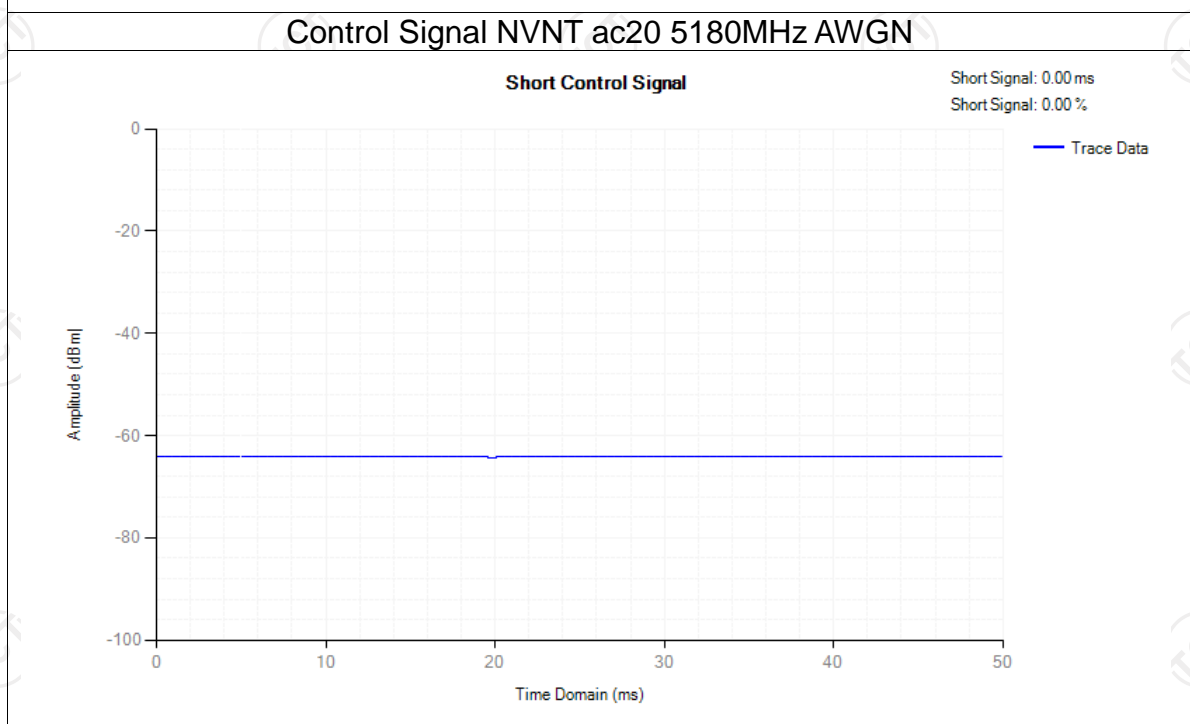
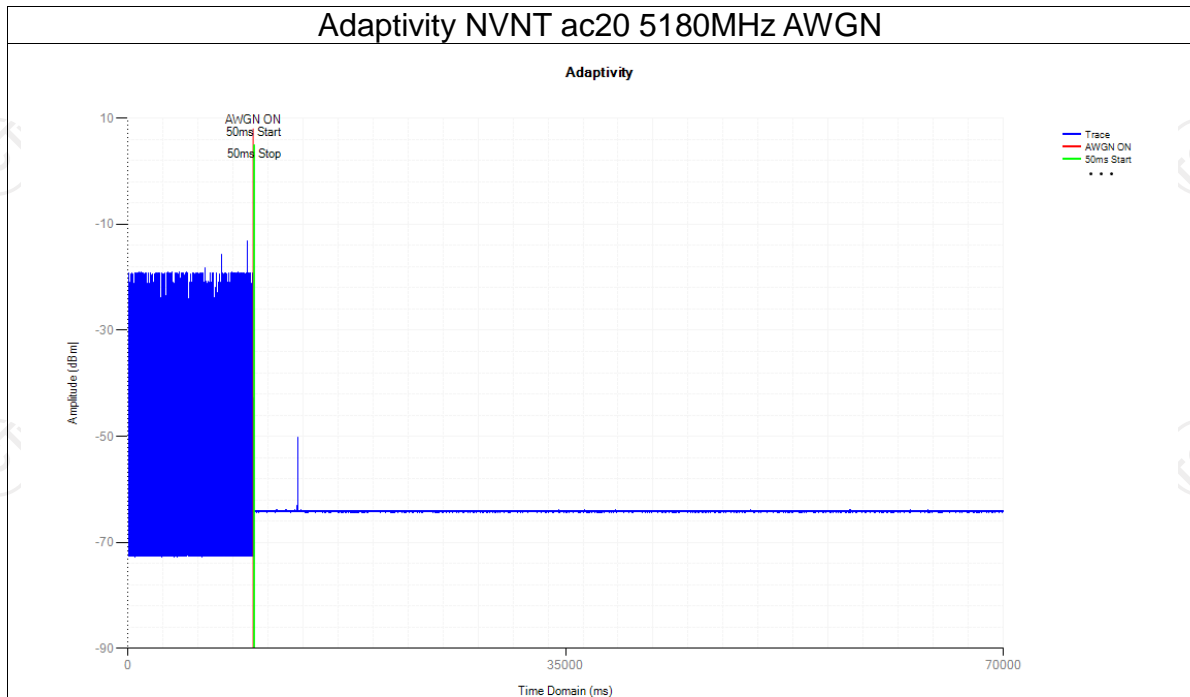




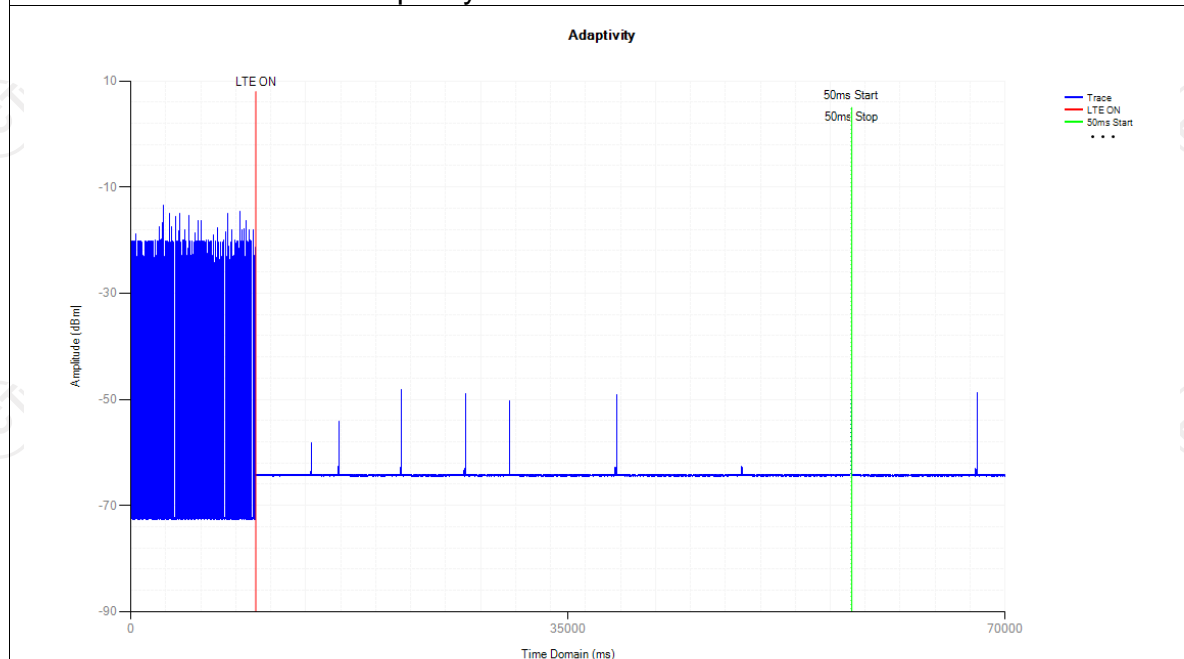
Test Mode			802.11ac(HT20)			
Channel	Frequency (MHz)	Interference Level (dBm)	Max COT (ms)	Min Idle Time (ms)	Short transmission (ms)	Result
36	5180	-61.95	0.05	0.09	0	PASS



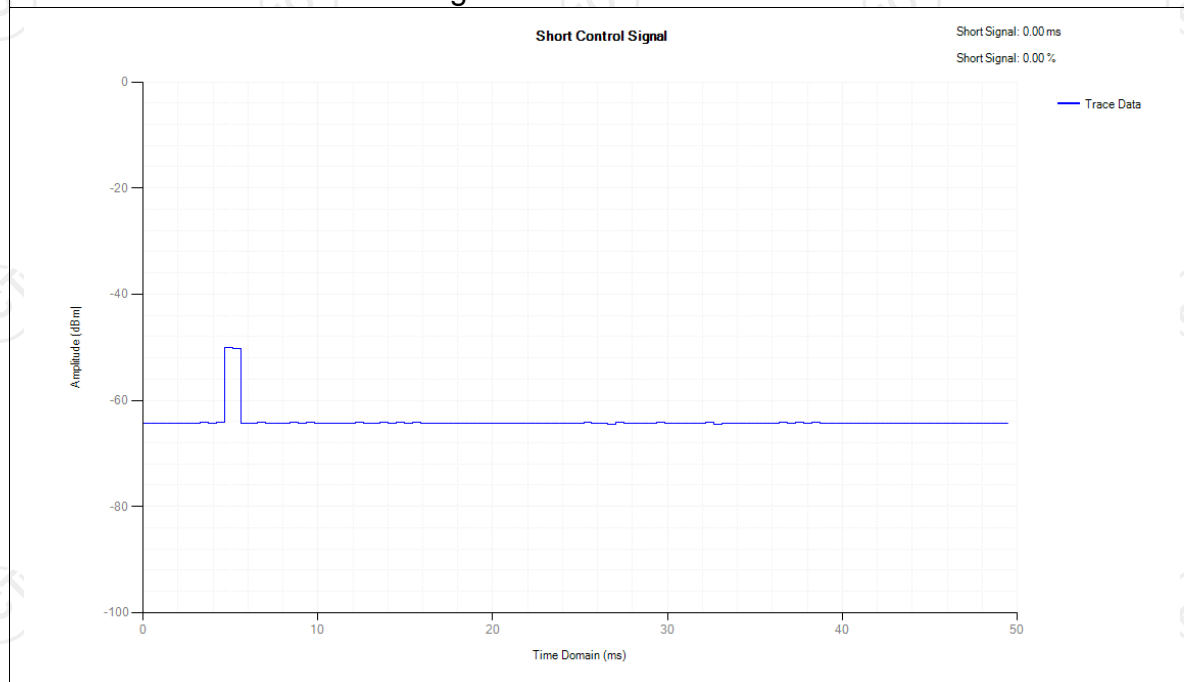




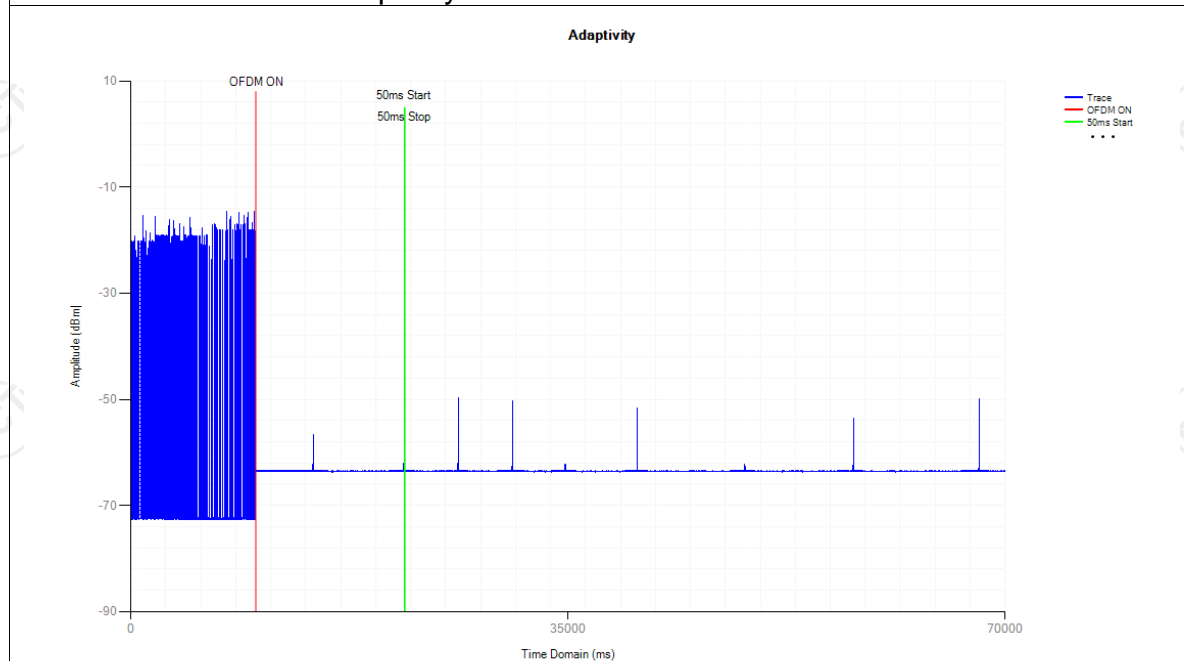
Adaptivity NVNT ac20 5180MHz LTE



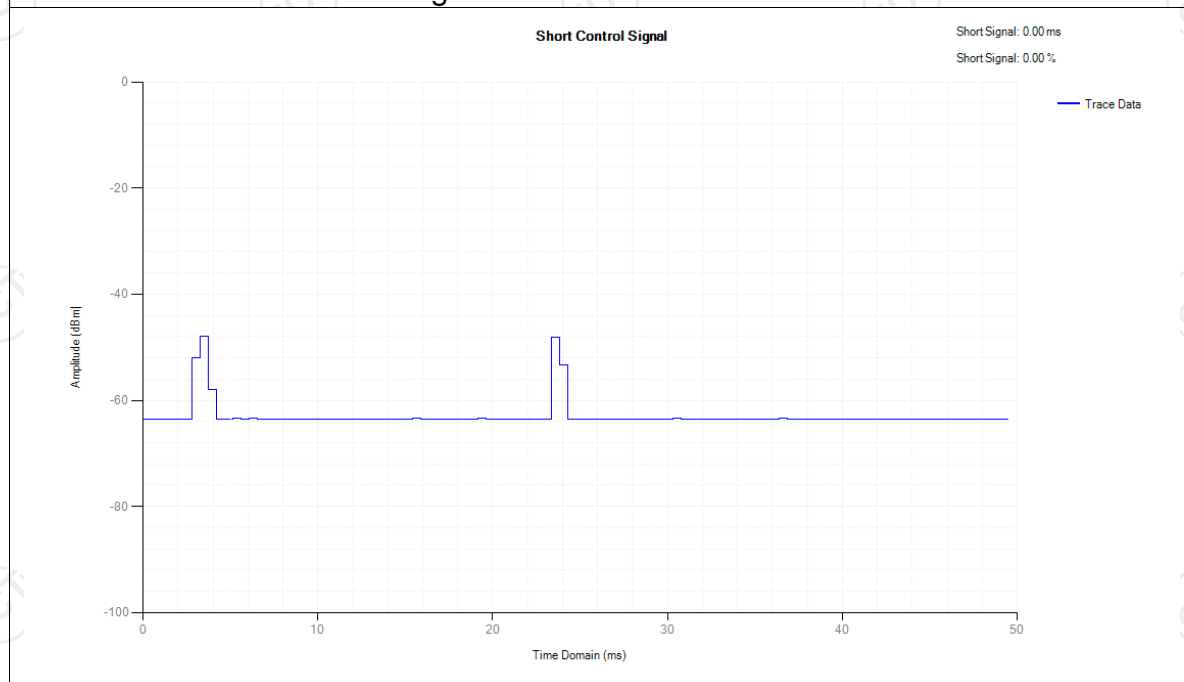
Control Signal NVNT ac20 5180MHz LTE



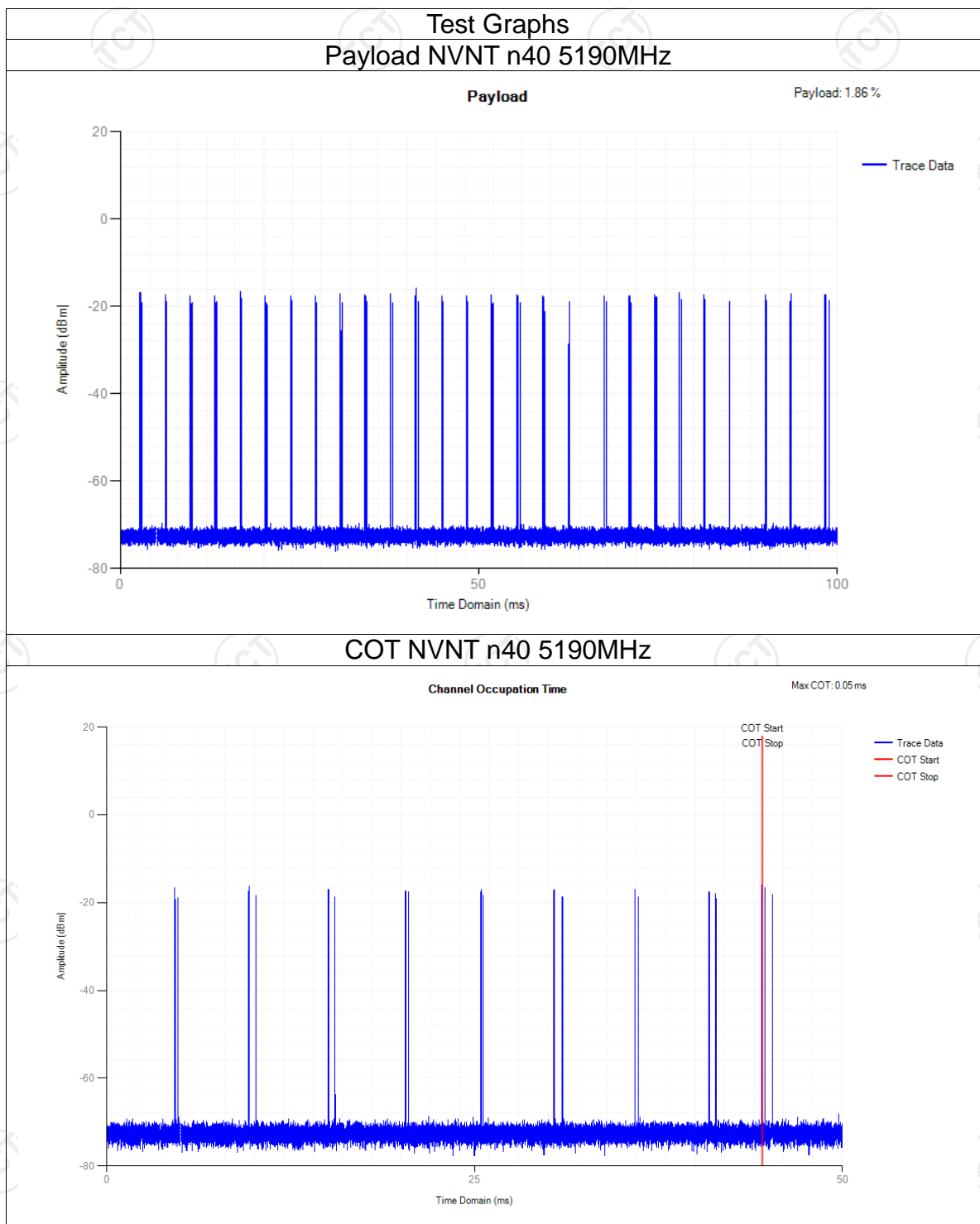
Adaptivity NVNT ac20 5180MHz OFDM

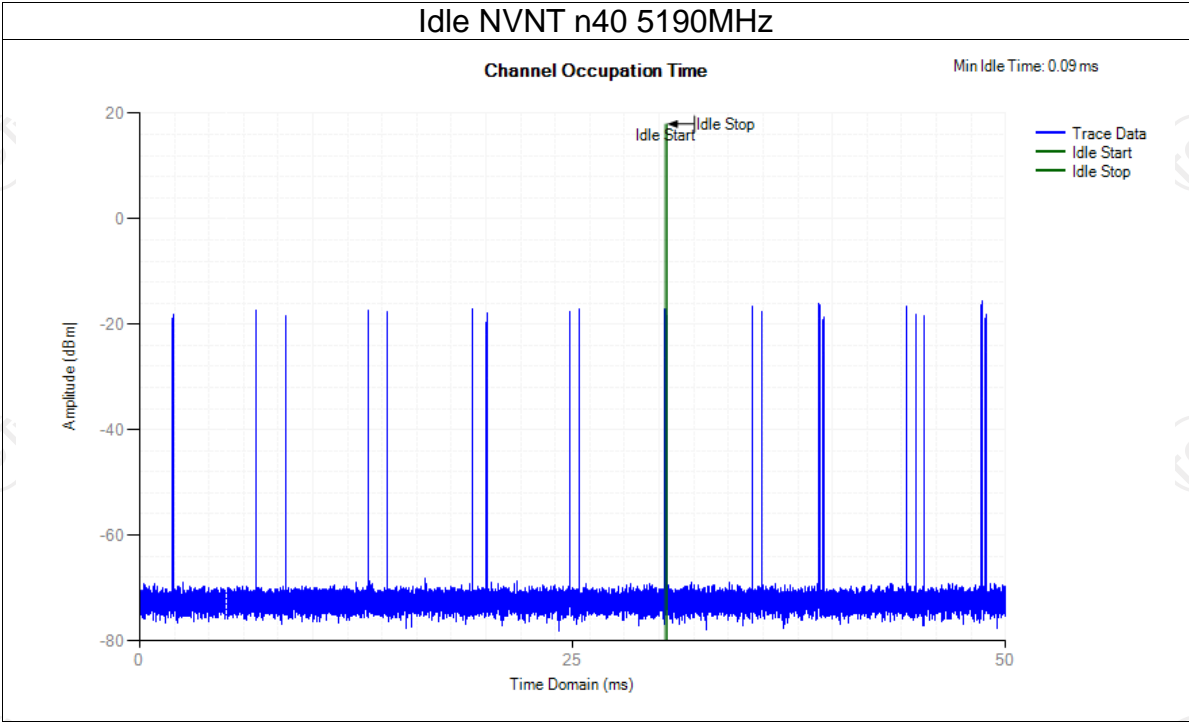


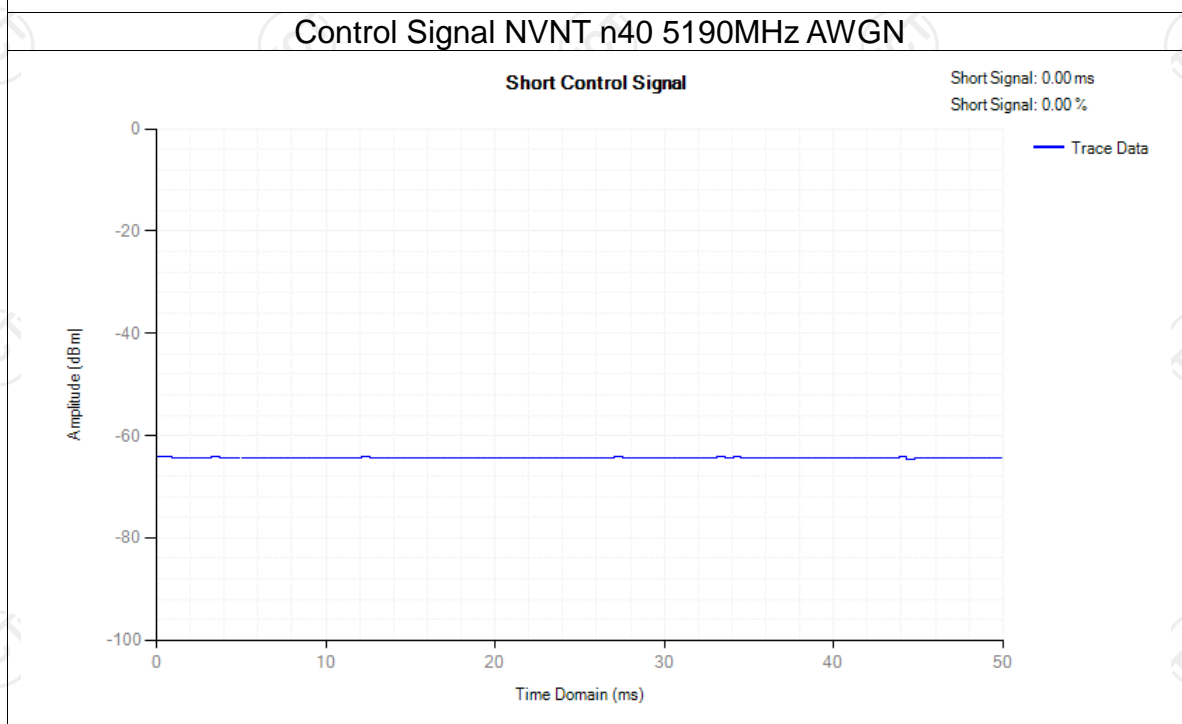
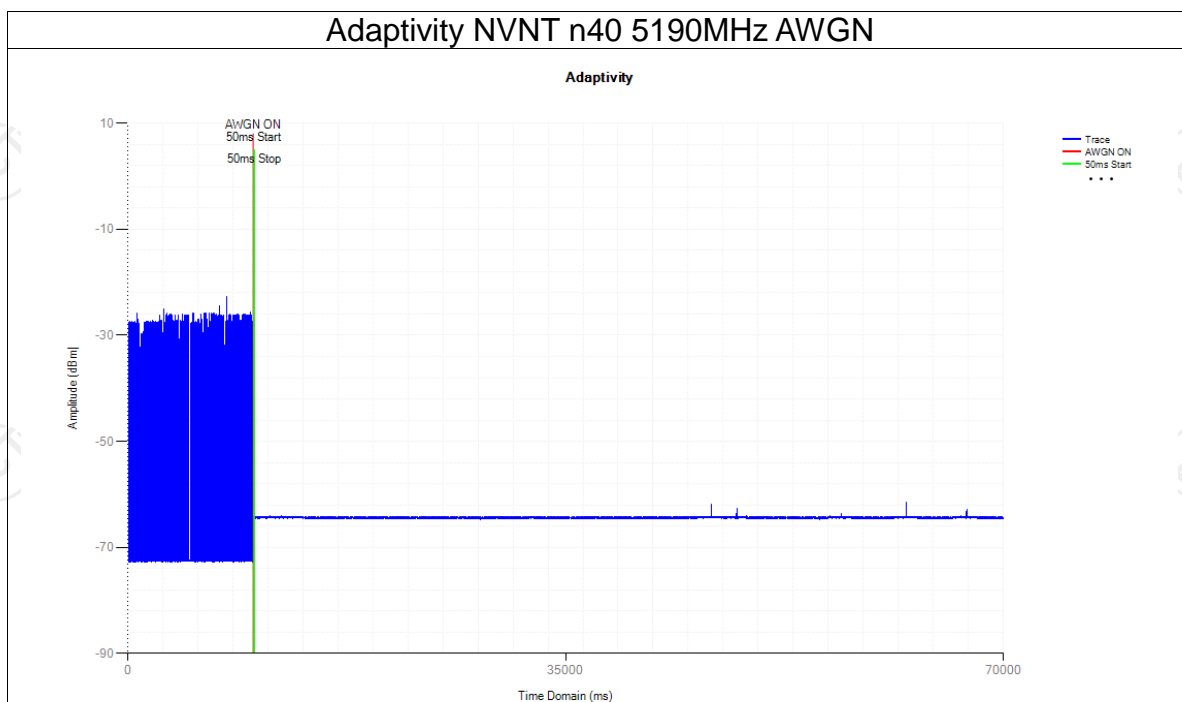
Control Signal NVNT ac20 5180MHz OFDM



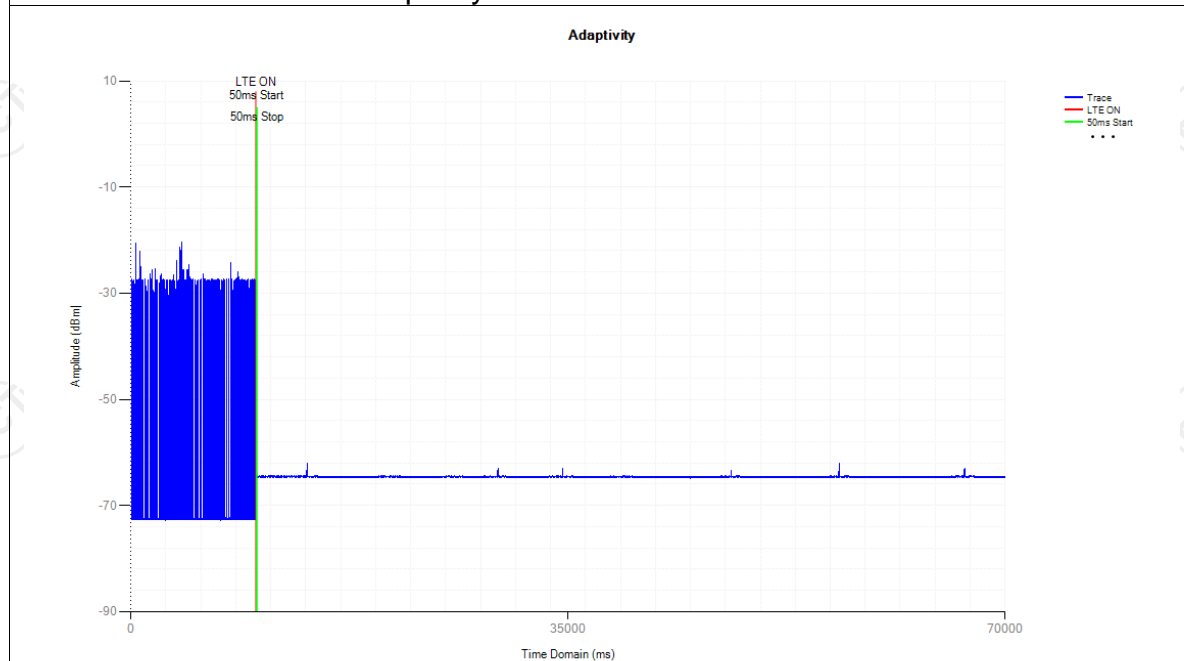
Test Mode			802.11n(HT40)			
Channel	Frequency (MHz)	Interference Level (dBm)	Max COT (ms)	Min Idle Time (ms)	Short transmission (ms)	Result
38	5190	-61.32	0.05	0.09	0	PASS



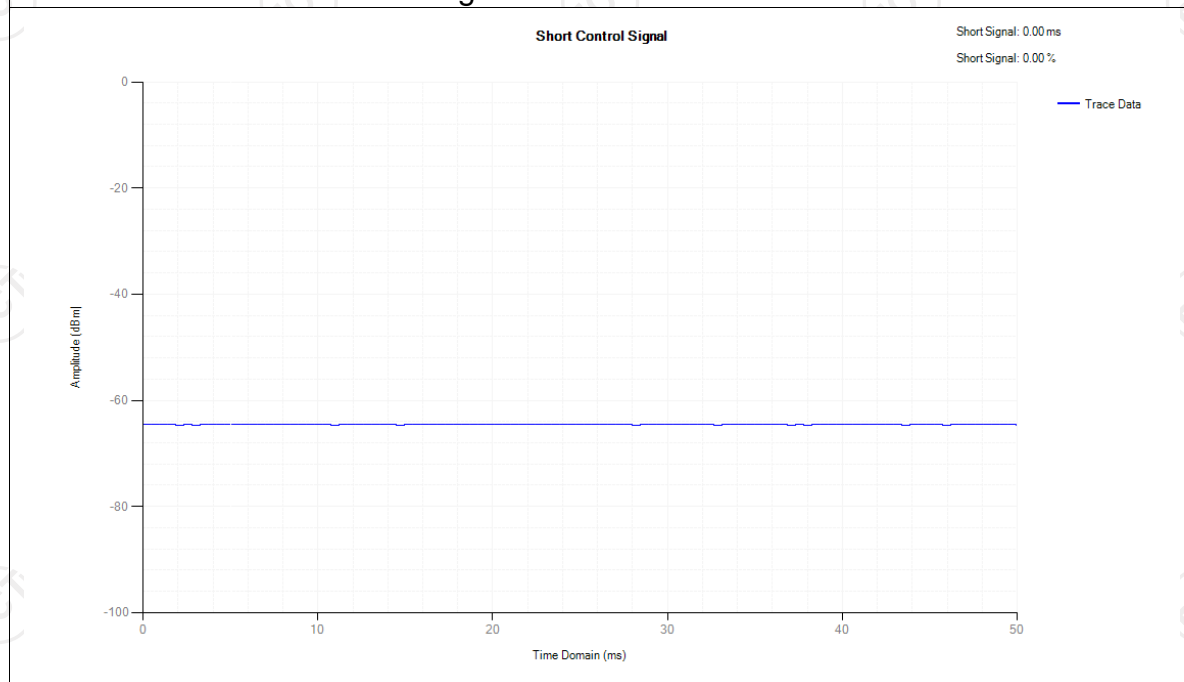


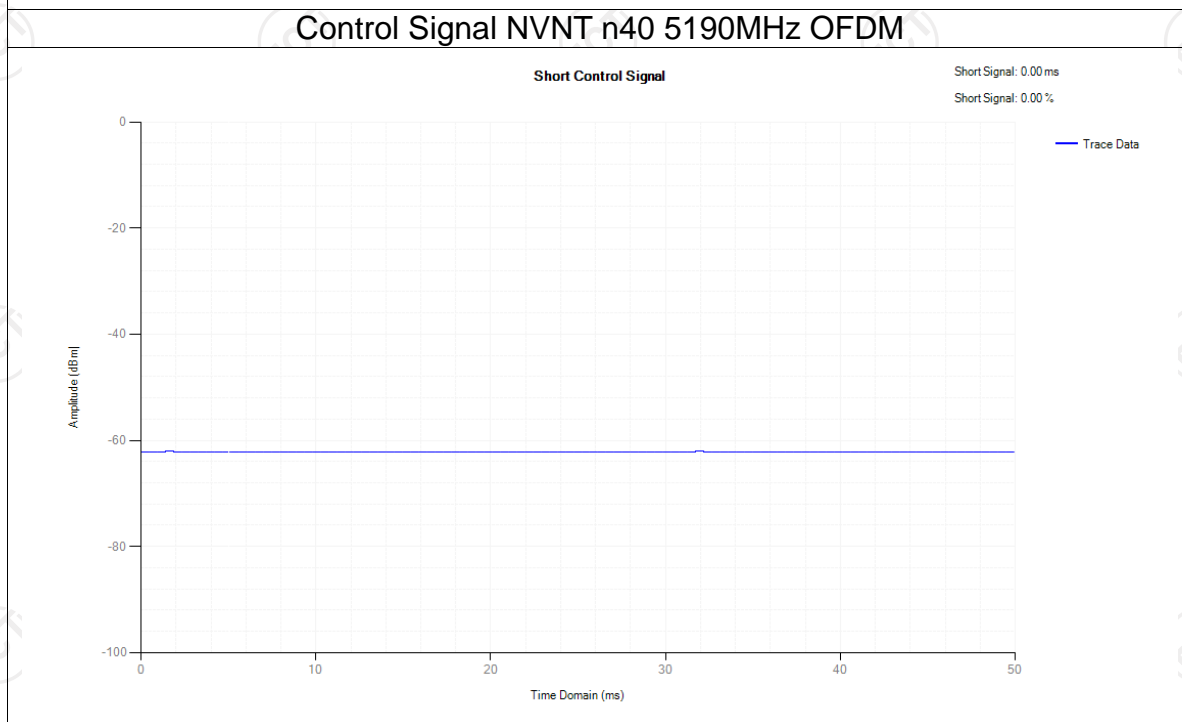
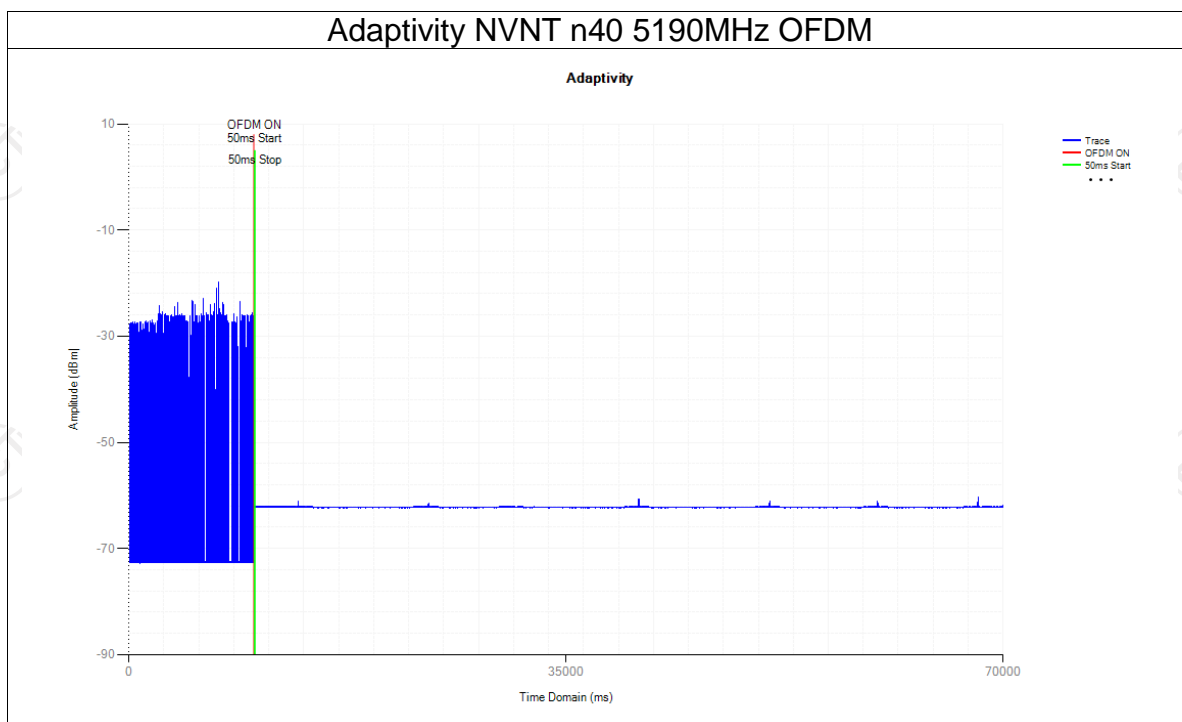


Adaptivity NVNT n40 5190MHz LTE

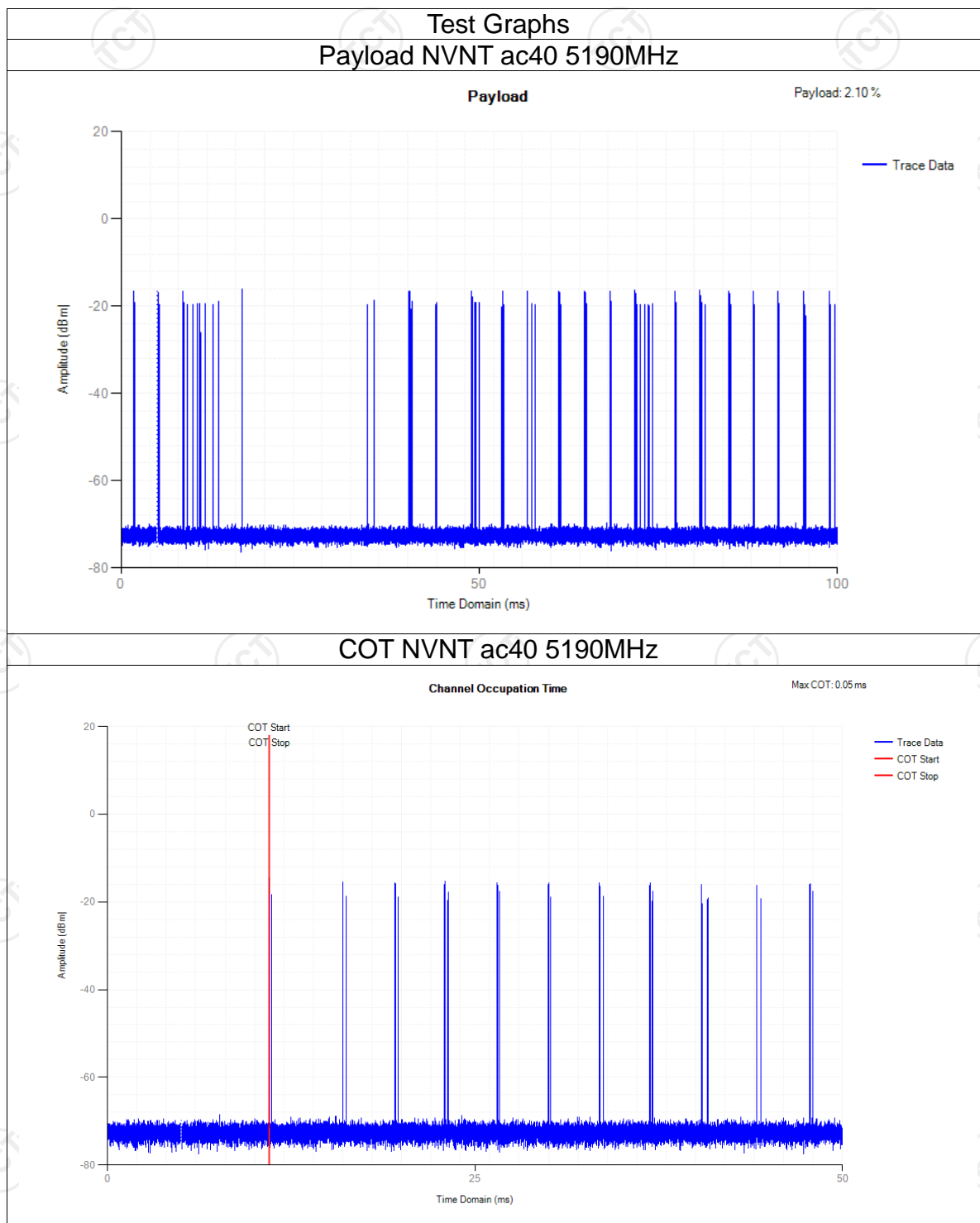


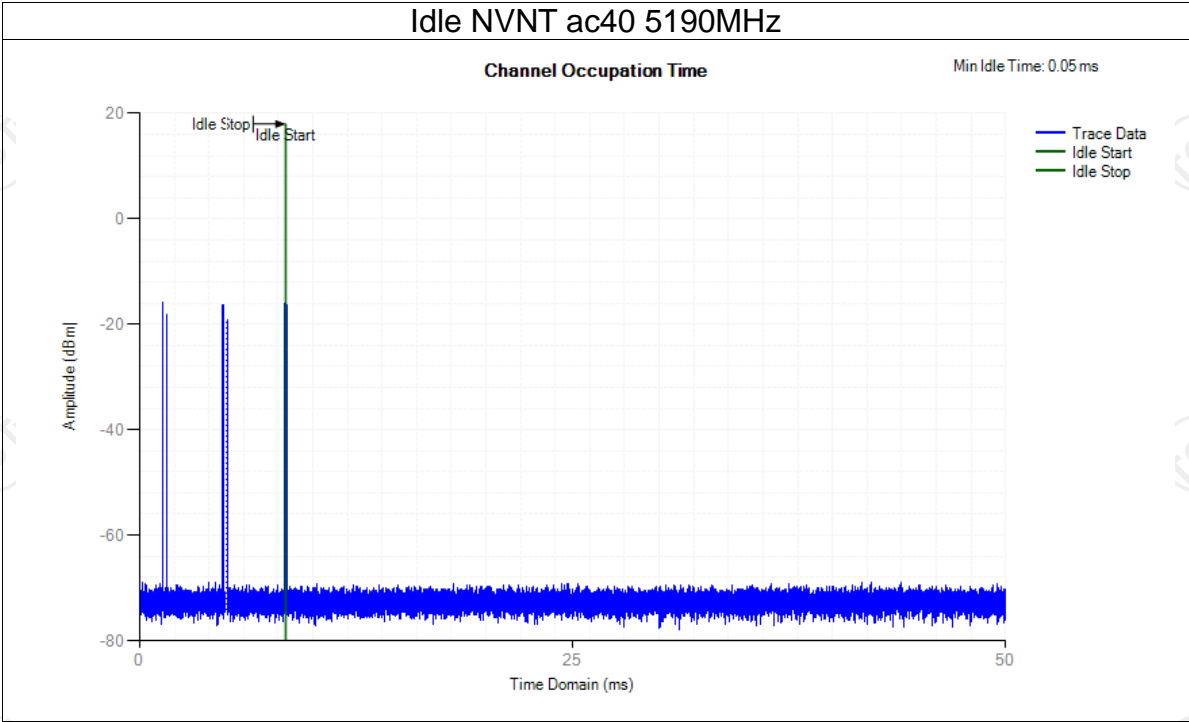
Control Signal NVNT n40 5190MHz LTE

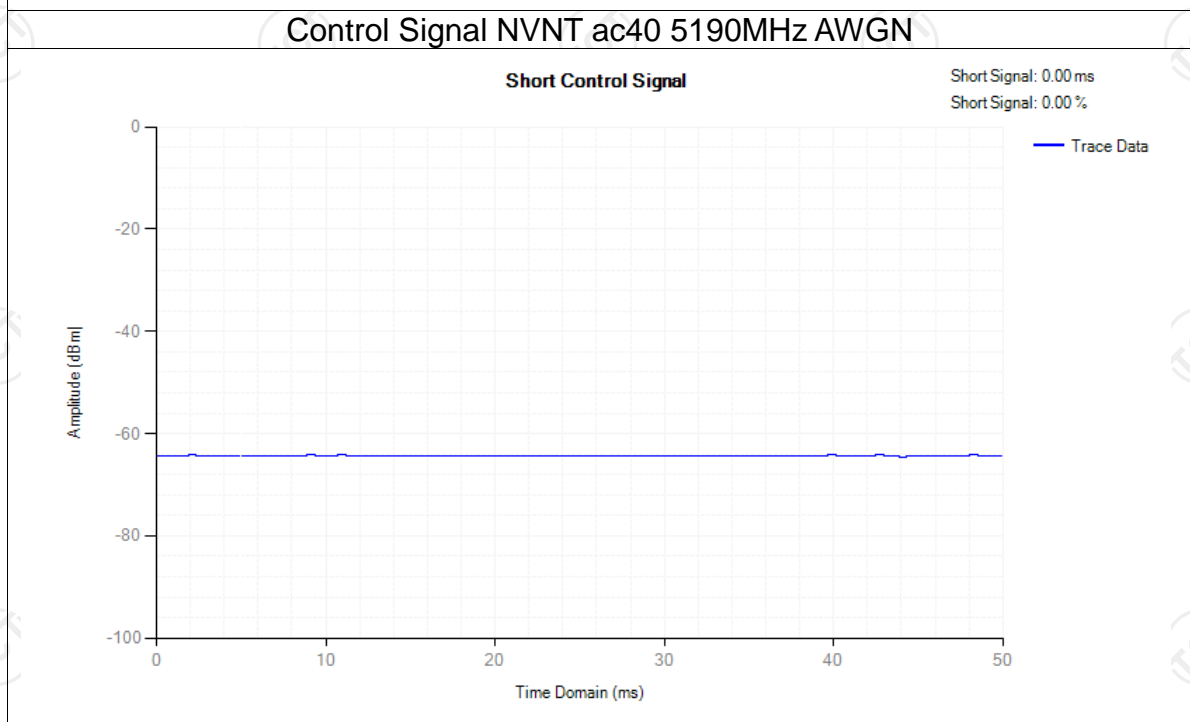
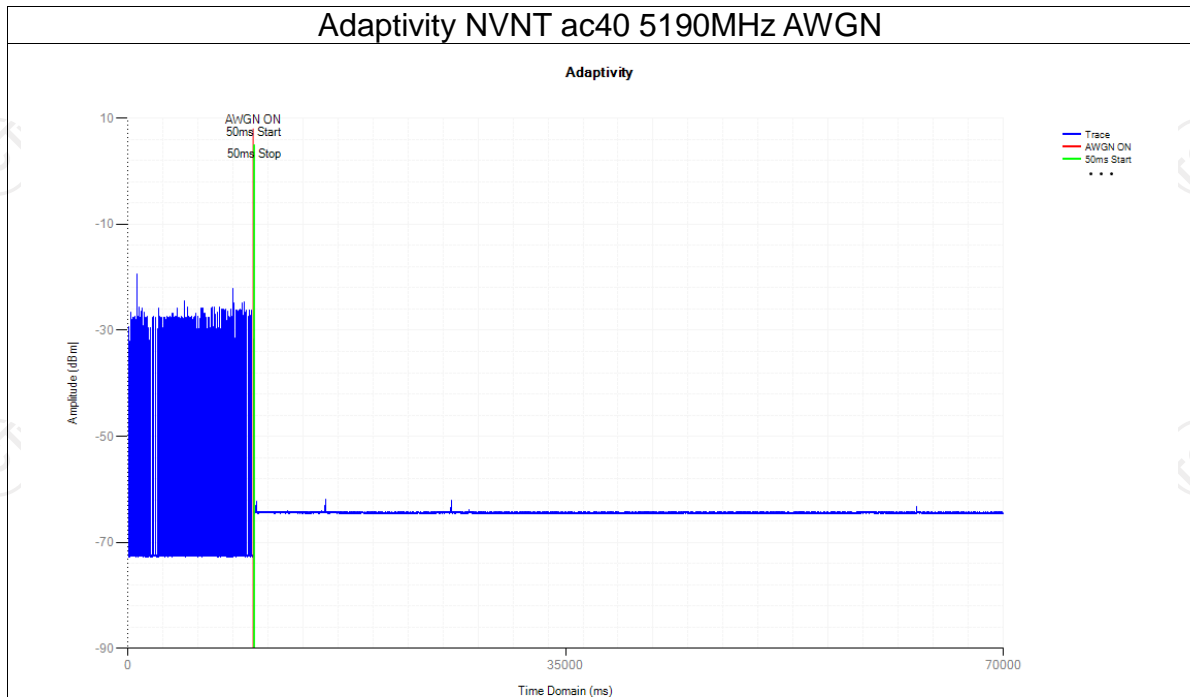




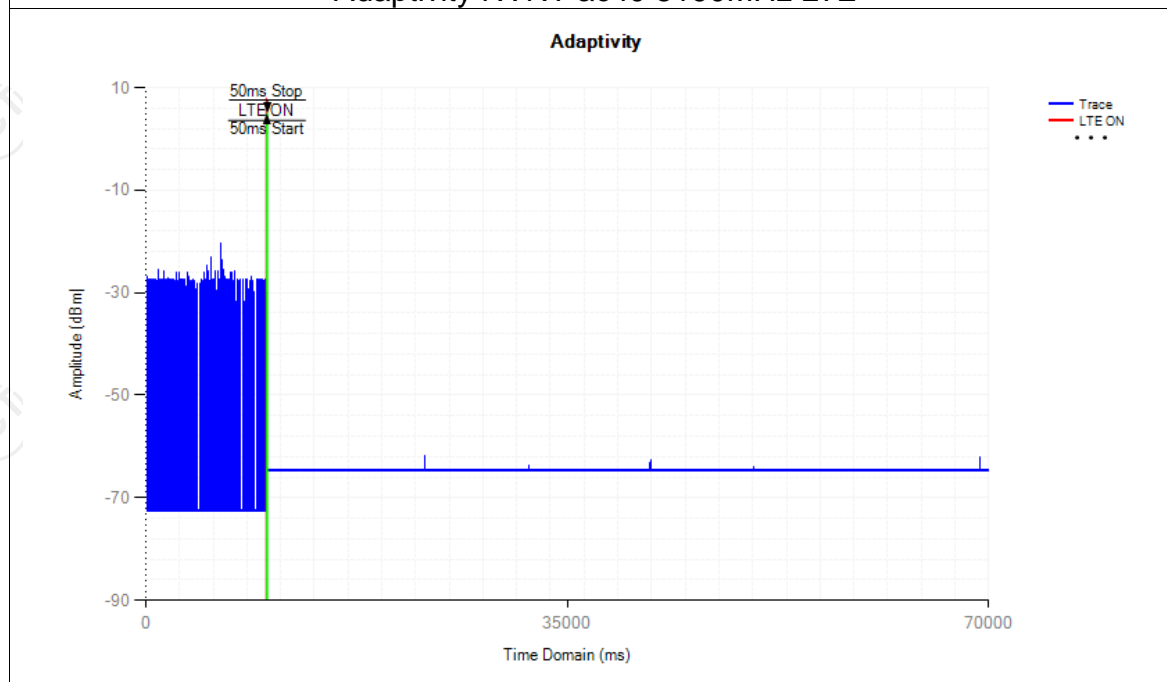
Test Mode			802.11ac(HT40)			
Channel	Frequency (MHz)	Interference Level (dBm)	Max COT (ms)	Min Idle Time (ms)	Short transmission (ms)	Result
38	5190	-61.37	0.05	0.05	0	PASS



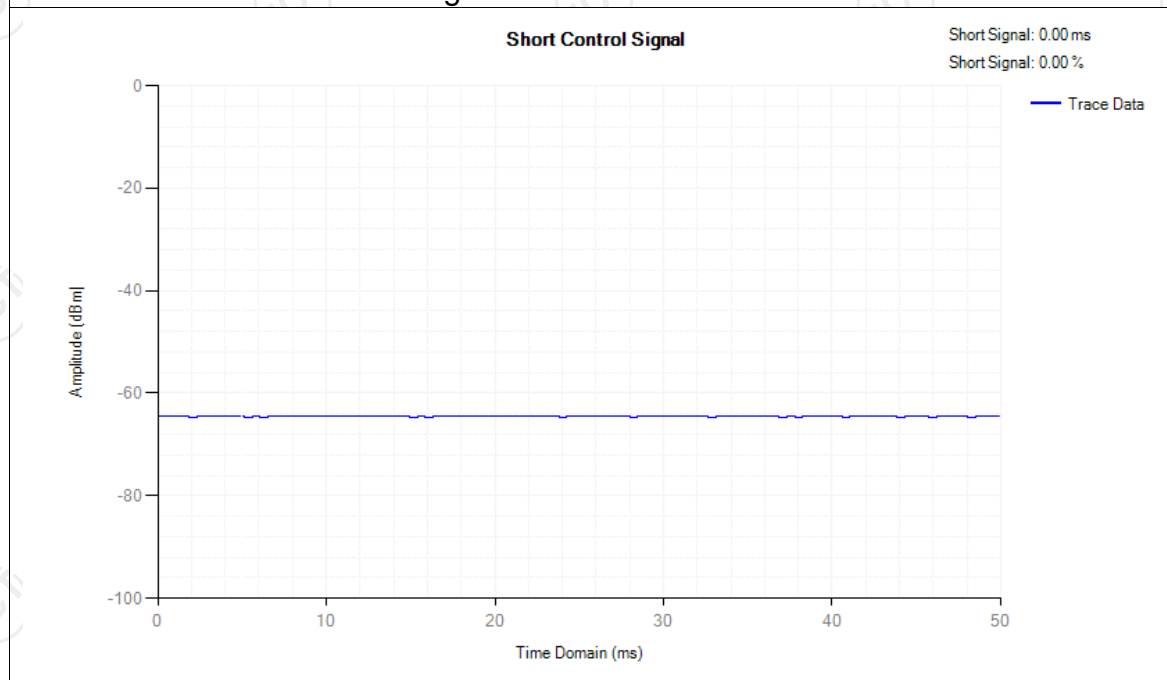




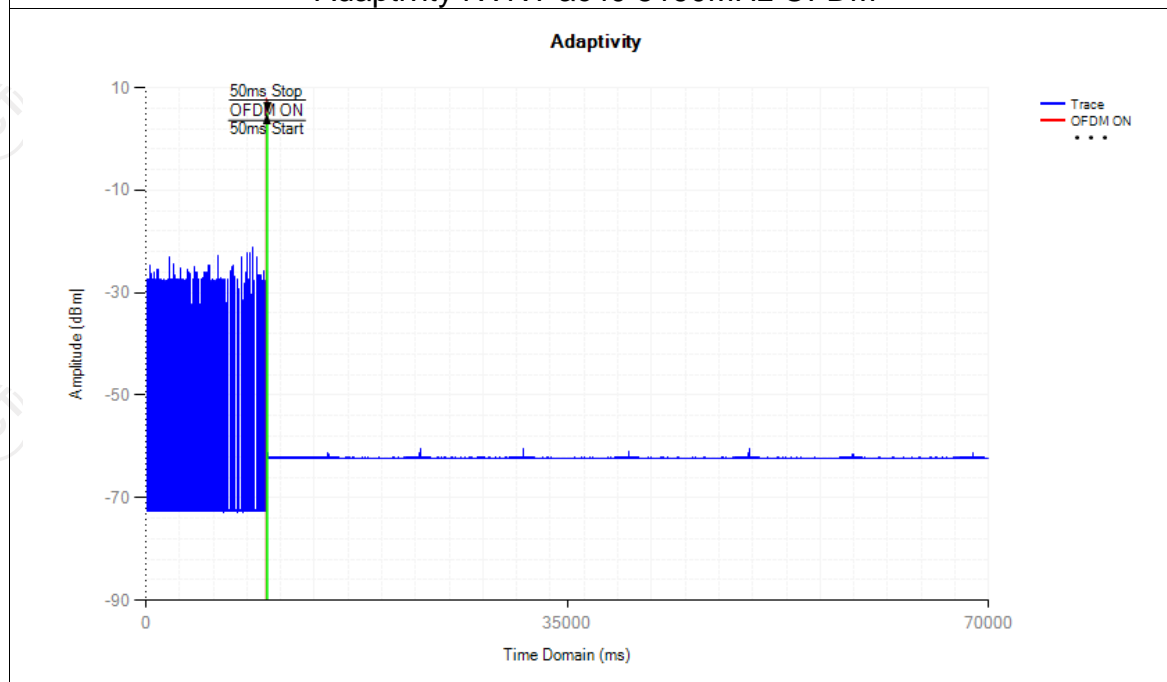
Adaptivity NVNT ac40 5190MHz LTE



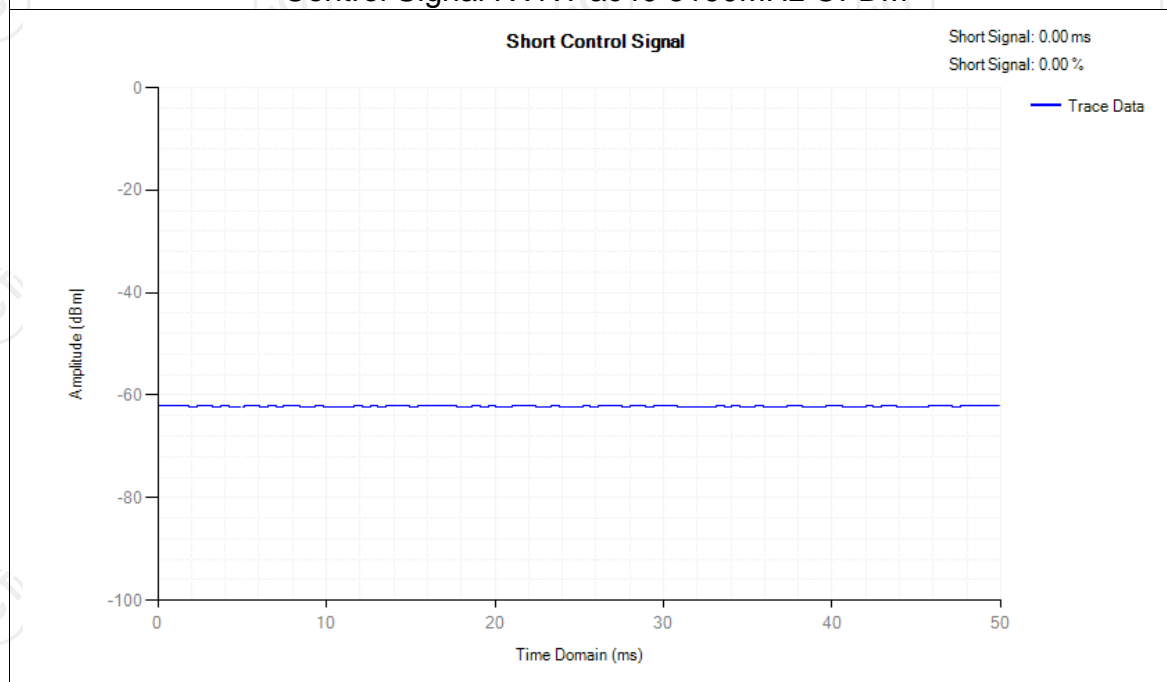
Control Signal NVNT ac40 5190MHz LTE



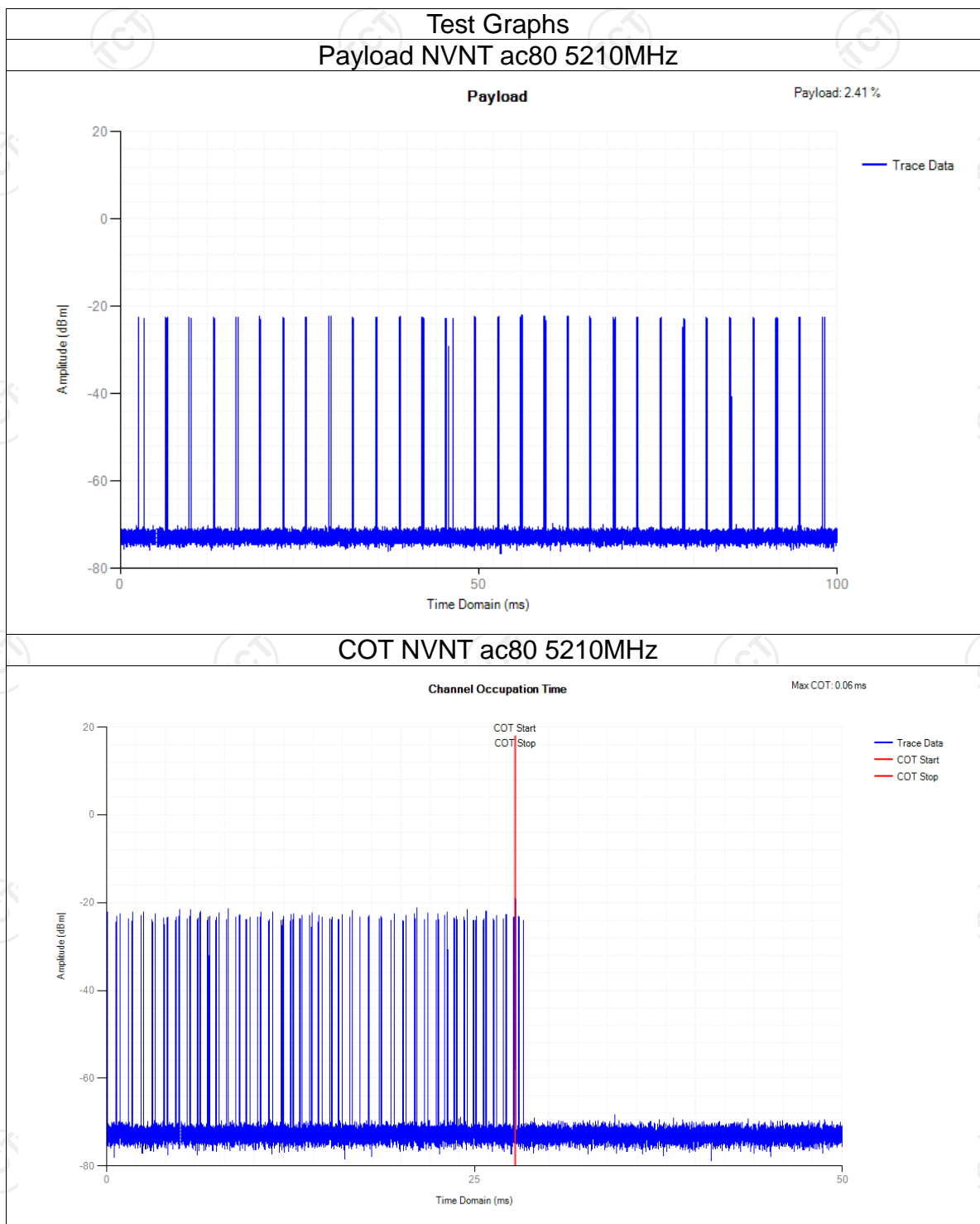
Adaptivity NVNT ac40 5190MHz OFDM

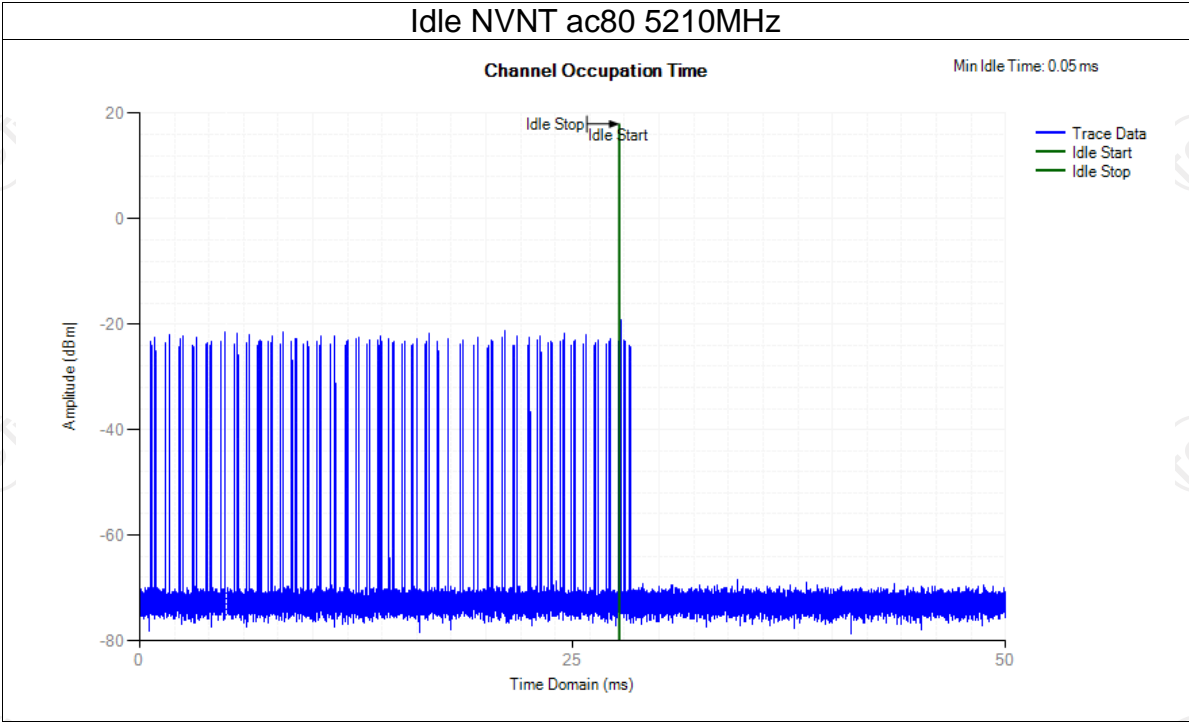


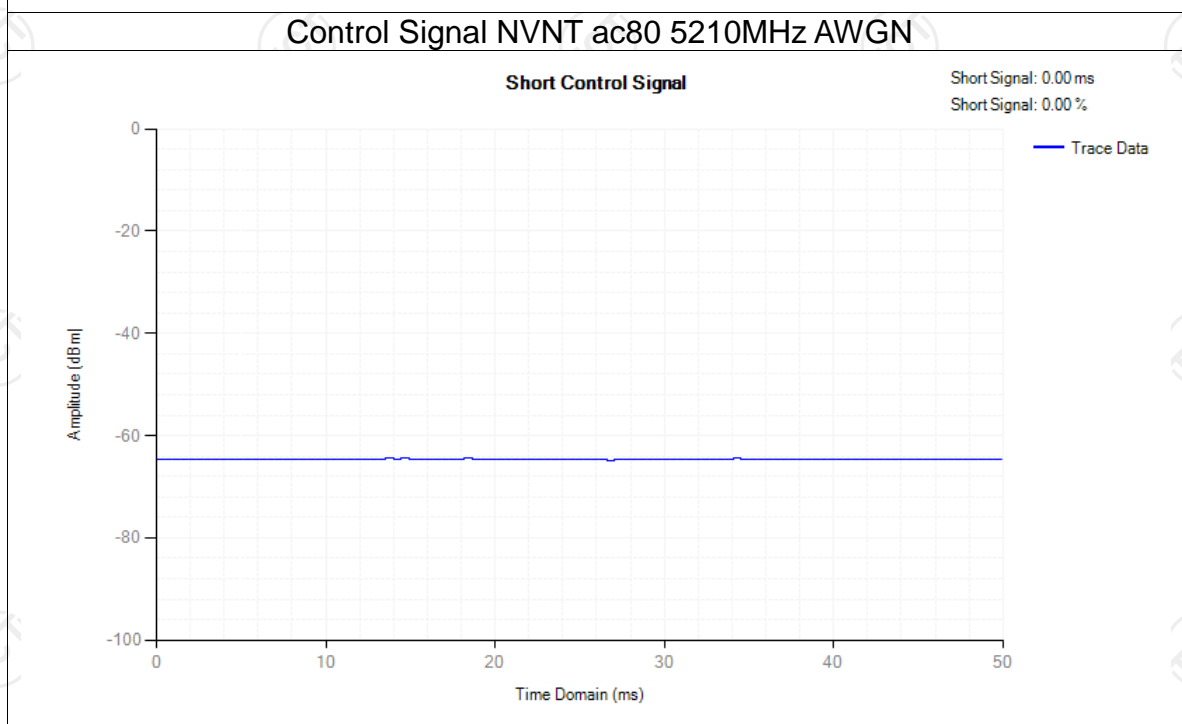
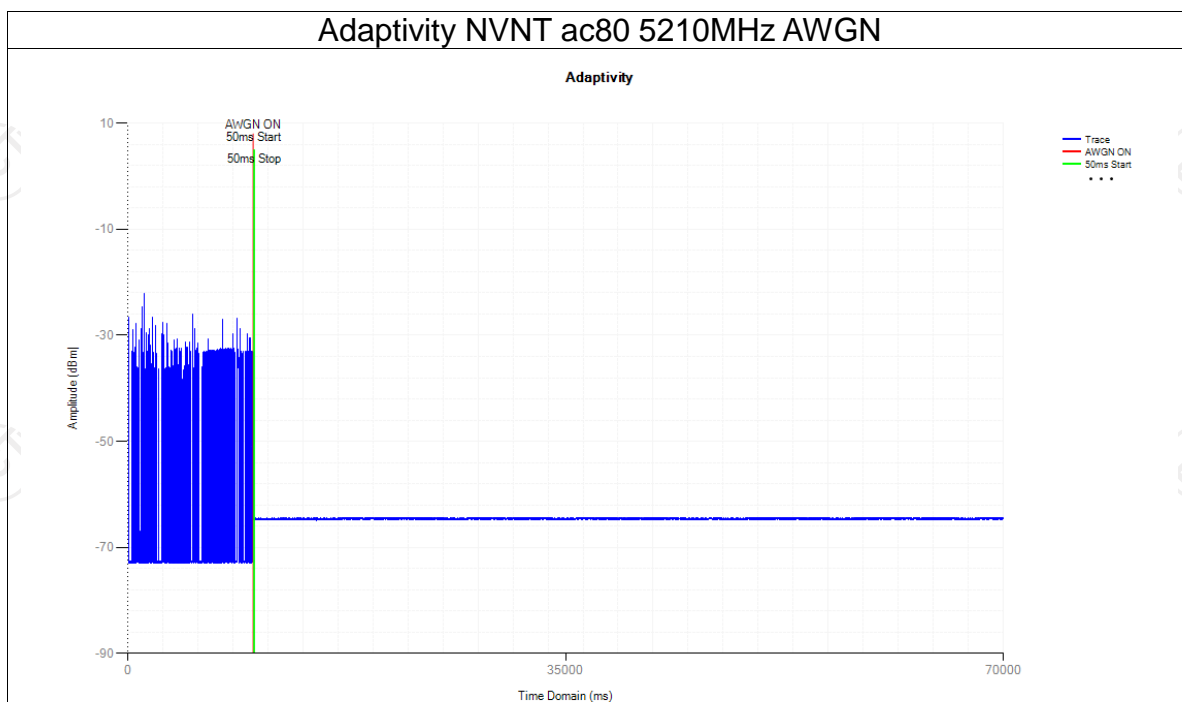
Control Signal NVNT ac40 5190MHz OFDM

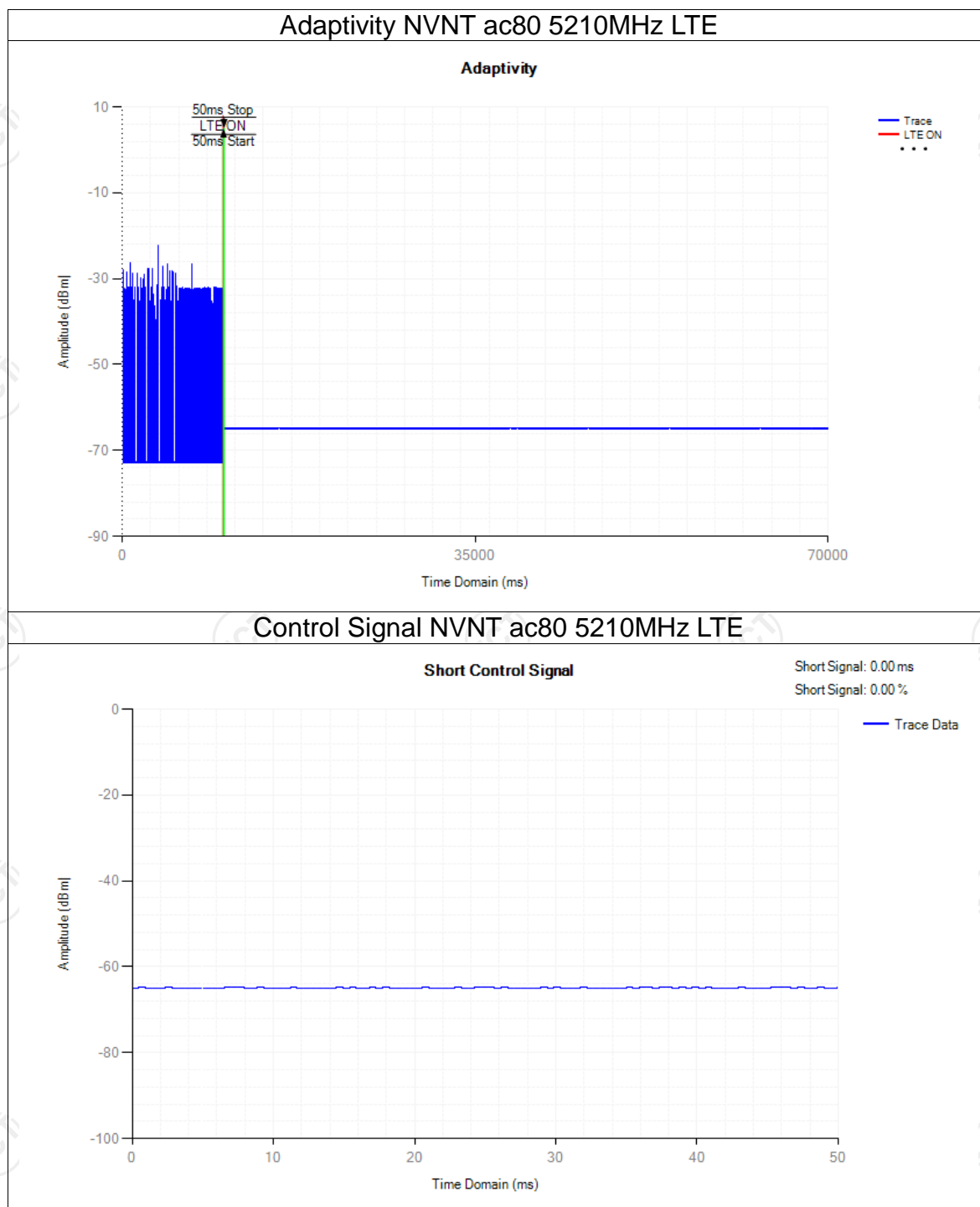


Test Mode			802.11ac(HT80)			
Channel	Frequency (MHz)	Interference Level (dBm)	Max COT (ms)	Min Idle Time (ms)	Short transmission (ms)	Result
42	5210	-61.26	0.06	0.05	0	PASS

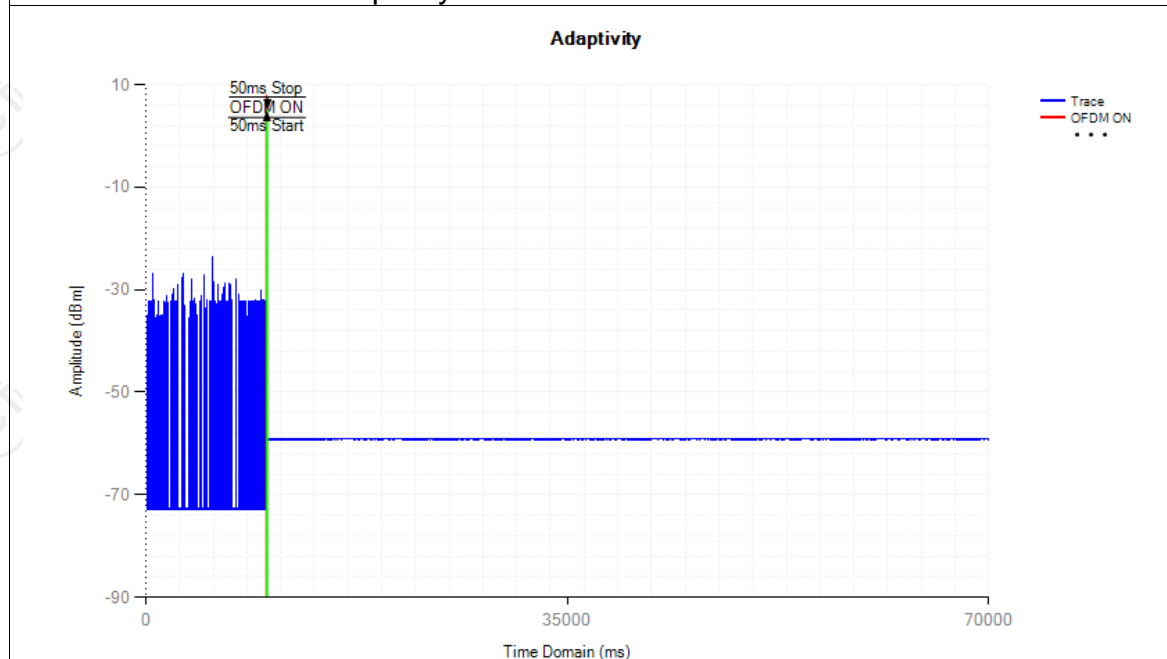




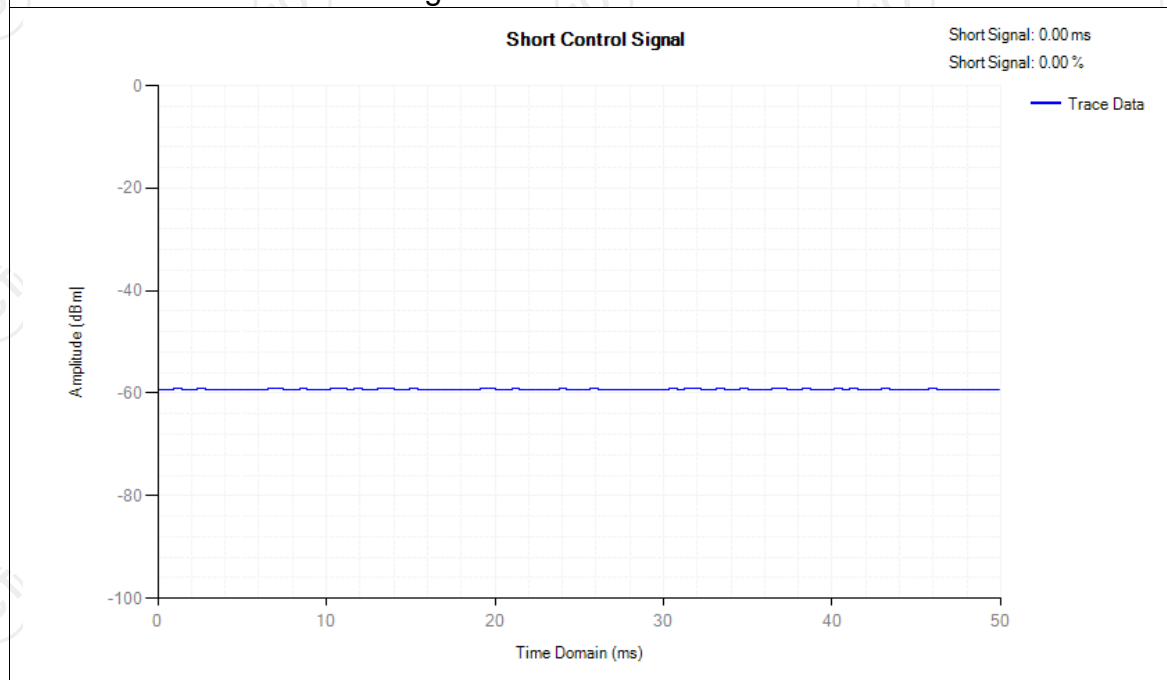




Adaptivity NVNT ac80 5210MHz OFDM



Control Signal NVNT ac80 5210MHz OFDM



5.8. Receiver Blocking

5.8.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.8																	
Test Method:	ETSI EN 301 893 clause 5.4.10.2																	
Limit:	<div>Table 9: Receiver Blocking parameters</div> <table><tr><th rowspan="2">Wanted signal mean power from companion device (dBm)</th><th rowspan="2">Blocking signal frequency (MHz)</th><th colspan="2">Blocking signal power (dBm) (see note 2)</th><th rowspan="2">Type of blocking signal</th></tr><tr><th>Master or Slave with radar detection (see table D.2, note 2)</th><th>Slave without radar detection (see table D.2, note 2)</th></tr><tr><td>Pmin + 6 dB</td><td>5 100</td><td>-53</td><td>-59</td><td>Continuous Wave</td></tr><tr><td>Pmin + 6 dB</td><td>4 900 5 000 5 975</td><td>-47</td><td>-53</td><td>Continuous Wave</td></tr></table> <div>NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal.</div> <div>NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.</div>	Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal	Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	Pmin + 6 dB	5 100	-53	-59	Continuous Wave	Pmin + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)			Blocking signal power (dBm) (see note 2)			Type of blocking signal											
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)															
Pmin + 6 dB	5 100	-53	-59	Continuous Wave														
Pmin + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave														
Test Setup:	<div><div><div>Shielding or Shielded Room</div><div><div>Signalling Unit or Companion Device</div><div>Blocking Signal Generator</div><div>Variable attenuator step size ≤ 1 dB</div><div>ATT</div><div>Splitter/Combiner</div><div>Direct Coupler</div><div>Spectrum Analyzer</div><div>Optional</div><div>ATT</div><div>UUT</div><div>Performance Monitoring Device</div></div></div></div> <div>Figure 18: Test Set-up for receiver blocking</div>																	
Test Mode:	Normal operation Mode																	
Test Procedure:	Refer to ETSI EN 301 893 clause 5.4.10.2																	
Test Instrument:	Refer to Item 3.3																	
Test Result:	PASS																	

5.8.2. Test data

802.11a		5240MHz		
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PASS
Pmin+6dB	5100	-58	CW	
Pmin+6dB	4900	-52	CW	
Pmin+6dB	5000	-52	CW	
Pmin+6dB	5975	-52	CW	
<p><i>Note: 1. Pmin=-77.1dBm, Pmin is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria, which the minimum performance criterion shall be a PER less than or equal to 10 %.</i></p> <p><i>2. Blocking signal power should be equal or greater than -59dBm /-53dBm+Antenna gain, Antenna gain is 1dBi.</i></p> <p><i>3. PER has been monitored is 3.7%.</i></p>				

802.11n (HT20)		5240MHz		
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PASS
Pmin+6dB	5100	-58	CW	
Pmin+6dB	4900	-52	CW	
Pmin+6dB	5000	-52	CW	
Pmin+6dB	5975	-52	CW	
<p><i>Note: 1. Pmin=-76.5dBm, Pmin is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria, which the minimum performance criterion shall be a PER less than or equal to 10 %.</i></p> <p><i>2. Blocking signal power should be equal or greater than -59dBm /-53dBm+Antenna gain, Antenna gain is 1dBi.</i></p> <p><i>3. PER has been monitored is 3.8%.</i></p>				

802.11ac (HT20)		5240MHz		
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PASS
Pmin+6dB	5100	-58	CW	
Pmin+6dB	4900	-52	CW	
Pmin+6dB	5000	-52	CW	
Pmin+6dB	5975	-52	CW	
<p><i>Note: 1. Pmin=-75.6dBm, Pmin is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria, which the minimum performance criterion shall be a PER less than or equal to 10 %.</i></p> <p><i>2. Blocking signal power should be equal or greater than -59dBm /-53dBm+Antenna gain, Antenna gain is 1dBi.</i></p> <p><i>3. PER has been monitored is 4.1%.</i></p>				

802.11n (HT40)		5230MHz		
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PASS
Pmin+6dB	5100	-58	CW	
Pmin+6dB	4900	-52	CW	
Pmin+6dB	5000	-52	CW	
Pmin+6dB	5975	-52	CW	
<p><i>Note: 1. $P_{min}=-75.9\text{dBm}$, P_{min} is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria, which the minimum performance criterion shall be a PER less than or equal to 10 %.</i></p> <p><i>2. Blocking signal power should be equal or greater than -59dBm /-53dBm+Antenna gain, Antenna gain is 1dBi.</i></p> <p><i>3. PER has been monitored is 3.2%.</i></p>				

802.11ac (HT40)		5230MHz		
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PASS
Pmin+6dB	5100	-58	CW	
Pmin+6dB	4900	-52	CW	
Pmin+6dB	5000	-52	CW	
Pmin+6dB	5975	-52	CW	
<p>Note: 1. $P_{min}=-74.1\text{dBm}$, P_{min} is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria, which the minimum performance criterion shall be a PER less than or equal to 10 %.</p> <p>2. Blocking signal power should be equal or greater than -59dBm /-53dBm+Antenna gain, Antenna gain is 1dBi.</p> <p>3. PER has been monitored is 4.2%.</p>				

802.11ac (HT80)		5290MHz		
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PASS
Pmin+6dB	5100	-58	CW	
Pmin+6dB	4900	-52	CW	
Pmin+6dB	5000	-52	CW	
Pmin+6dB	5975	-52	CW	
<p><i>Note: 1. $P_{min}=-71.6\text{dBm}$, P_{min} is the minimum level of wanted signal (in dBm) required to meet the minimum performance criteria, which the minimum performance criterion shall be a PER less than or equal to 10 %.</i></p> <p><i>2. Blocking signal power should be equal or greater than -59dBm /-53dBm+Antenna gain, Antenna gain is 1dBi.</i></p> <p><i>3. PER has been monitored is 3.9%.</i></p>				

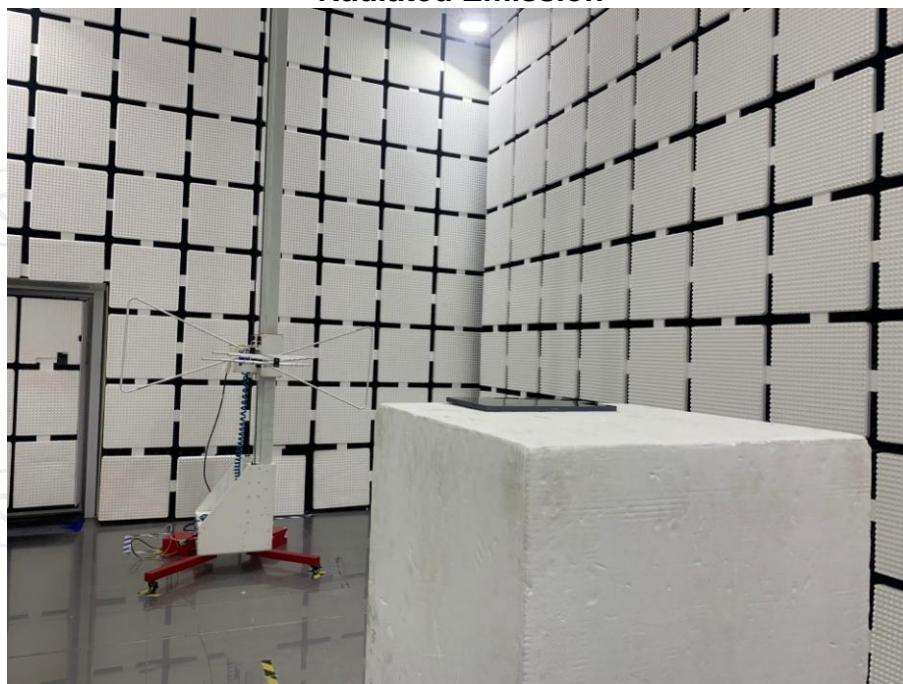
5.9. User Access Restrictions

5.9.1. Test Specification

Test Requirement:	ETSI EN 301 893 clause 4.2.9
Test Method:	ETSI EN 301 893 clause 4.2.6.2
Test Requirement:	DFS Controls (hardware or software) related to radar detection shall not be accessible to the user so that the DFS requirements described in clauses 4.2.6.2.1 to 4.2.6.2.6 can neither be disabled nor altered.
Test Result:	The EUT has no radar detection function and the manufacturer will restrict access for the user to change certain hardware and /or software settings of the equipment.

6. Photographs of Test Configuration

Radiated Emission



7. Photographs of EUT

Refer to the test report No. TCT220422E064

*******END OF REPORT*******