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ETSI EN 301 893 V2.1.1 (2017-05)

TEST REPORT

For

SHENZHEN TENDA TECHNOLOGY CO.,LTD.

6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052

Tested Model: U11

Report Type:

Original Report

Product Type:

AX900 Wi-Fi 6 Wireless USB Adapter

Report Number: DG2240321-14597E-22B

Report Date: 2024/5/13

Reviewed By: Ivy Tang
Project Engineer

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	DG2240321-14597E-22B	Original Report	2024/5/13

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product Name:	AX900 Wi-Fi 6 Wireless USB Adapter
EUT Model:	U11
Rated Input Voltage:	5Vdc from USB
Serial Number:	RE Test:2J0M-5 RF Conducted Test: 2J0M-3
EUT Received Date:	2024/3/23
EUT Received Status:	Good

Technical Specification

Operation Frequency Range (MHz):		802.11 a/n20/ac20/ax20: 5180-5240 802.11 n40/ac40/ax40: 5190-5230 802.11 ac80/ax80: 5210
RF Output Power (EIRP) (dBm):		18.12
Number of Chains	Transmit:	1
	Receive:	1
Antenna Gain (dBi)▲:		0.5
Modulation Type:		OFDM, OFDMA

Objective

This report is prepared on behalf of *SHENZHEN TENDA TECHNOLOGY CO.,LTD.* in accordance with ETSI EN 301 893 V2.1.1 (2017-05) 5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

The objective is to determine the compliance of EUT with: ETSI EN 301 893 V2.1.1 (2017-05).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 893 V2.1.1 (2017-05) 5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

Measurement Uncertainty

Parameter	F _{lab}	Maximum allow uncertainty
RF Frequency	$\pm 0.82 \times 10^{-7}$	$\pm 1 \times 10^{-5}$
RF power conducted	$\pm 0.61 \text{ dB}$	$\pm 1,5 \text{ dB}$
RF power radiated	$\pm 3.62 \text{ dB}$	$\pm 6 \text{ dB}$
Spurious emissions, conducted	$\pm 2.47 \text{ dB}$	$\pm 3 \text{ dB}$
Spurious emissions, radiated	$\pm 3.62 \text{ dB}$	$\pm 6 \text{ dB}$
Temperature	$\pm 1 ^\circ \text{C}$	$\pm 2 ^\circ \text{C}$
Humidity	$\pm 5\%$	$\pm 5\%$
Time	1%	$\pm 10\%$

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Declarations

The information marked ▲ is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode, which was provided by manufacture. The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80/ax20/ax40/ax80.

For 5150~5250 MHz band (W52), 7 channels were provided:

Frequency (MHz)	Frequency (MHz)
5180	5220
5190	5230
5200	5240
5210	/

Test condition as below:

NT: Normal Temperature 25℃, LT: Low Temperature 0℃, HT: High Temperature +40℃

EUT Exercise Software

Software “CMD” was used and the power level was configured as below. The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power and PSD across all data rates, bandwidths, and modulations[▲].

Band	Mode	Frequency (MHz)	Data rate (Mbps)	Power level
5150-5250MHz	802.11 a	5180	6	19
		5240	6	19
	802.11 n20	5180	MCS8	19
		5240	MCS8	19
	802.11 n40	5190	MCS8	19
		5230	MCS8	19
	802.11 ac20	5180	NSS1 MCS8	19
		5240	NSS1 MCS8	19
	802.11 ac40	5190	NSS1 MCS8	19
		5230	NSS1 MCS8	19
	802.11 ac80	5210	NSS1 MCS8	19
	802.11 ax20	5180	NSS1 MCS8	19
		5240	NSS1 MCS8	19
	802.11 ax40	5190	NSS1 MCS8	19
		5230	NSS1 MCS8	19
	802.11 ax80	5210	NSS1 MCS8	19

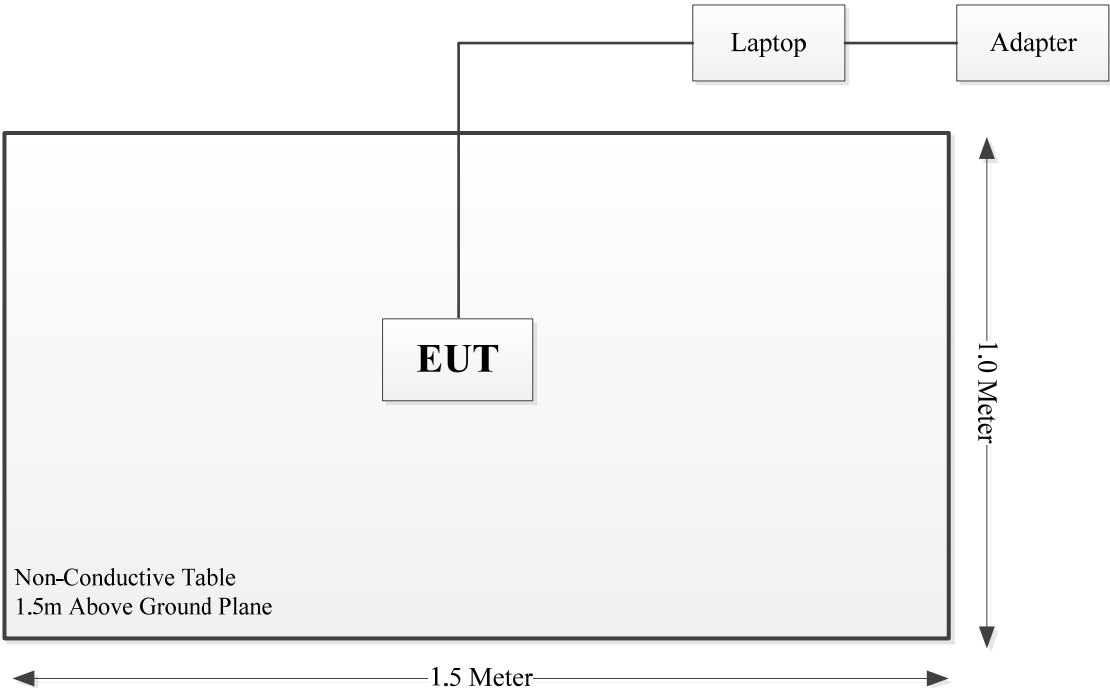
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	E480	PF-1QQYYP 19/06

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
USB Cable	NO	NO	15	EUT	Laptop

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated emissions below 1GHz					
Sunol Sciences	Hybrid Antenna	JB3	A060611-1	2023/9/6	2026/9/5
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2023/8/1	2024/7/31
Sonoma	Amplifier	310N	185914	2023/8/1	2024/7/31
R&S	EMI Test Receiver	ESCI	101121	2023/10/18	2024/10/17
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Micro-Coax	Coaxial Cable	UFA210B	99G1448	2023/9/9	2024/9/8
Agilent	Signal Generator	E8247C	MY43321350	2023/10/18	2024/10/17
Radiated emissions above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2023/9/7	2026/9/6
AH	Horn Antenna	SAS-571	1177	2023/2/22	2026/2/21
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2023/2/22	2026/2/21
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-03 1304	2023/2/22	2026/2/21
Xinhang Macrowave	Coaxial Cable	XH750A-N/J-SMA/J-10M	20231117004 #0001	2023/11/17	2024/11/16
Xinhang Macrowave	Coaxial Cable	XH360A-2.92/J-2.92/J-6M-A	20231208001 #0001	2023/12/11	2024/12/10
Micro-Coax	Coaxial Cable	UFA210B	99G1448	2023/9/9	2024/9/8
Agilent	Signal Generator	E8247C	MY43321350	2023/10/18	2024/10/17
AH	Preamplifier	PAM-0118P	469	2023/8/19	2024/8/18
AH	Preamplifier	PAM-1840VH	191	2023/9/7	2024/9/6
R&S	Spectrum Analyzer	FSV40	101944	2023/10/18	2024/10/17
Sinoscite	Band Rejection Filter	BSF5150-5850MN	0899003	2024/2/21	2025/2/20
Mini-Circuits	High Pass Filter	VHF-6010+	31118	2023/12/1	2024/11/30
RF conducted					
R&S	Spectrum Analyzer	FSP 38	100478	2023/10/18	2024/10/17
R&S	Spectrum Analyzer	FSV40	101589	2023/10/18	2024/10/17
Anritsu	Microwave Peak Power Sensor	MA24418A	12618	2023/9/4	2024/9/3
Eastsheep	Coaxial Attenuator	5W-N-JK-6G-10dB	F-08-EM504	2023/9/10	2024/9/9
E-Microwave	Coaxial DC Block	EMDCB-00033	OE01203218	2024/3/1	2025/3/1
Eastsheep	Coaxial Attenuator	5W-N-JK-6G-10dB	F-08-EM503	2023/9/10	2024/9/9
R&S	Wideband Radio Communication Tester	CMW500	147473	2023/10/18	2024/10/17
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30173	2023/10/18	2024/10/17
Keysight	MXA Signal Analyzer	N9020A	MY48490106	2023/10/18	2024/10/17
Agilent	MXG Vector Signal Generator	N5182A	MY49060274	2023/10/18	2024/10/17
Agilent	MXG Analog Signal Generator	N5181A	MY48180151	2023/10/18	2024/10/17
Tonscend	RF Control Unit	JS0806-2	19G8060171	2023/10/18	2024/10/17

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Test Item:	Radiated emissions (below 1GHz)	Radiated emissions (above 1GHz)	RF conducted	RF conducted (Adaptivity)
Temperature:	23.8℃	22.6℃	25.3~26.4℃	25.3℃
Relative Humidity:	58%	44 %	55~70%	56%
ATM Pressure:	101.1 kPa	100.5 kPa	100.5~100.9kPa	101.1kpa
Tester:	Joe Li	Bill Yang	Stu Song	Harper Shen
Test Date:	2024/4/10	2024/4/13	2024/4/26-2024/5/12	2024/5/3

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 301 893 Clause 4.2.1	Carrier frequencies	Compliant
2	EN 301 893 Clause 4.2.2	Nominal channel bandwidth and occupied channel bandwidth	Compliant
3	EN 301 893 Clause 4.2.3	RF output power	Compliant
		Transmit power control (TPC)	Not applicable*
		Power Density	Compliant
4	EN 301 893 Clause 4.2.4.1	Transmitter unwanted emissions outside the 5 GHz RLAN bands	Compliant
5	EN 301 893 Clause 4.2.4.2	Transmitter unwanted emissions within the 5 GHz RLAN bands	Compliant
6	EN 301 893 Clause 4.2.5	Receiver spurious emissions	Compliant
7	EN 301 893 Clause 4.2.6	Dynamic frequency selection (DFS)	Not applicable**
8	EN 301 893 Clause 4.2.7	Adaptivity	Compliant
9	EN 301 893 Clause 4.2.8	Receiver blocking	Compliant
10	EN 301 893 Clause 4.2.9	User access restrictions	Compliant*
11	EN 301 893 Clause 4.2.10	Geo-location capability	Not applicable*

Note:

Not applicable*: The device without this function.

Not applicable **: The device does not work on DFS band.

Compliant*: Please refer to the product information declared by the manufacturer.

1 – CARRIER FREQUENCIES

Definition

The Nominal Centre Frequency is the centre of the Operating Channel.

Limit

The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range $f_c \pm 20$ ppm.

Test Procedure

According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.2

Test Data

Test Result: Compliant. Please refer to following table(s) and Plot(s).

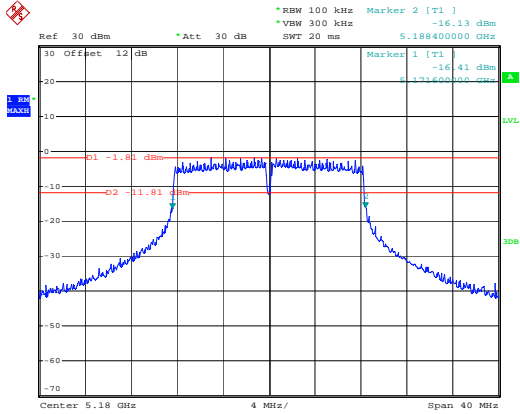
Band (MHz)	Mode	Fc (MHz)	Test Condition	F1 (MHz)	F2 (MHz)	Result (ppm)	Limit (ppm)
5150-5250	802.11 a	5180	NT	5171.60	5188.40	0.00	± 20
			LT	5171.63	5188.44	6.76	
			HT	5171.55	5188.36	-8.69	
		5240	NT	5231.60	5248.40	0.00	± 20
			LT	5231.62	5248.43	4.77	
			HT	5231.57	5248.37	-5.73	
	802.11 n20	5180	NT	5170.96	5188.96	-7.72	± 20
			LT	5170.99	5188.98	-2.90	
			HT	5170.92	5188.93	-14.48	
		5240	NT	5231.04	5248.96	0.00	± 20
			LT	5231.08	5248.99	6.68	
			HT	5231.01	5248.93	-5.73	
	802.11 n40	5190	NT	5171.60	5208.56	15.41	± 20
			LT	5171.61	5208.58	18.30	
			HT	5171.57	5208.52	8.67	
		5230	NT	5211.60	5248.40	0.00	± 20
			LT	5211.63	5248.44	6.69	
			HT	5211.58	5248.37	-4.78	
	802.11 ac20	5180	NT	5170.96	5188.96	-7.72	± 20
			LT	5170.97	5188.99	-3.86	
			HT	5170.94	5188.93	-12.55	
		5240	NT	5230.96	5248.96	-7.63	± 20
			LT	5230.98	5248.99	-2.86	
			HT	5230.95	5248.94	-10.50	
	802.11 ac40	5190	NT	5171.60	5208.56	15.41	± 20
			LT	5171.62	5208.57	18.30	

		5230	HT	5171.58	5208.54	11.56	± 20
			NT	5211.60	5248.40	0.00	
			LT	5211.63	5248.43	5.74	
			HT	5211.58	5248.37	-4.78	
	802.11 ac80	5210	NT	5171.28	5248.72	0.00	± 20
			LT	5171.31	5248.75	5.76	
			HT	5171.26	5248.70	-3.84	
	802.11 ax20	5180	NT	5170.32	5189.68	0.00	± 20
			LT	5170.35	5189.70	4.83	
			HT	5170.30	5189.64	-5.79	
		5240	NT	5230.32	5249.68	0.00	± 20
			LT	5230.35	5249.70	4.77	
			HT	5230.28	5249.66	-5.73	
	802.11 ax40	5190	NT	5170.64	5209.36	0.00	± 20
			LT	5170.67	5209.40	6.74	
			HT	5170.60	5209.32	-7.71	
		5230	NT	5210.80	5249.36	15.30	± 20
			LT	5210.82	5249.38	19.12	
			HT	5210.79	5249.34	12.43	
	802.11 ax80	5210	NT	5170.64	5249.36	0.00	± 20
			LT	5170.67	5249.39	5.76	
			HT	5170.62	5249.31	-6.72	

Note: Result = $(F-F_c)/F_c \cdot 10^6$, where $F = (F_1 + F_2)/2$

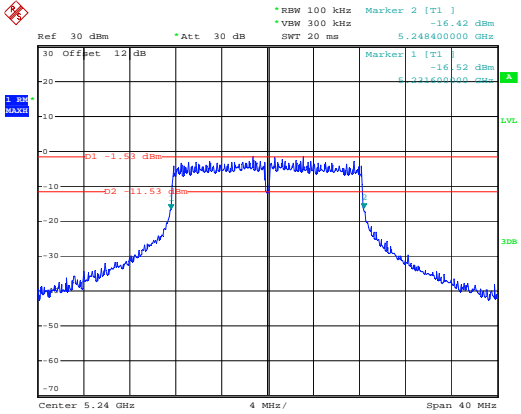
The Normal condition test plots, please refer to following Plots:

802.11 a Low



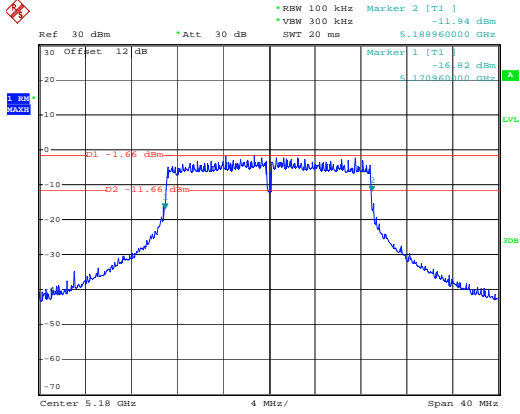
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802.11 a High



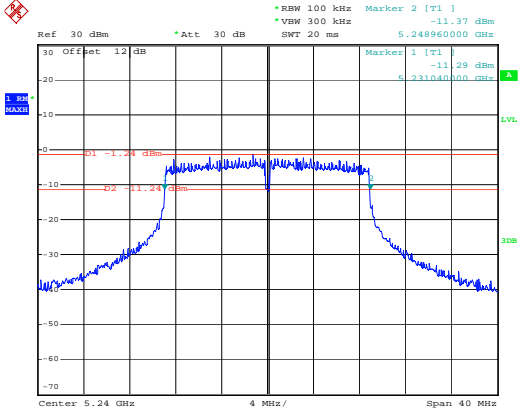
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802.11 n20 Low



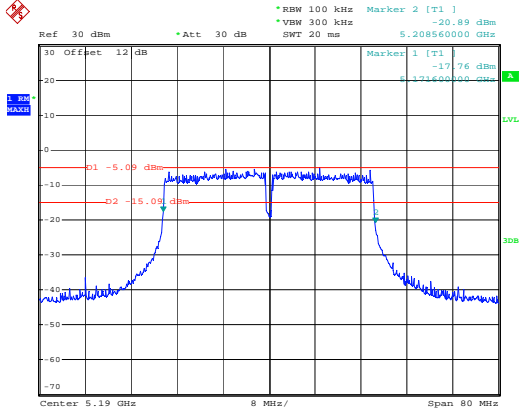
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802.11 n20 High



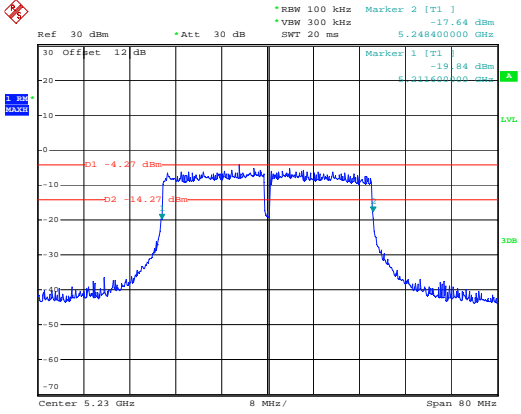
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802.11 n40 Low



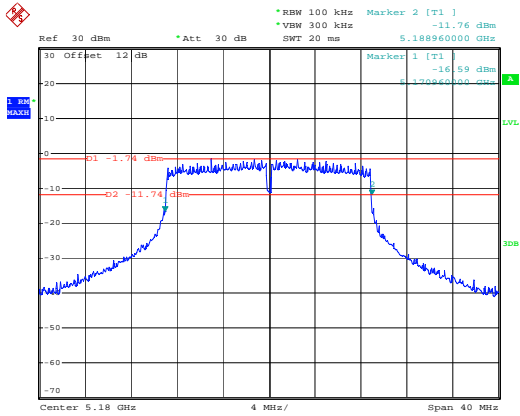
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802.11 n40 High



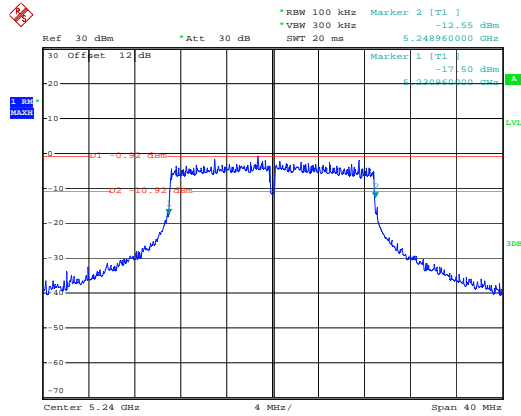
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802.11 ac20 Low



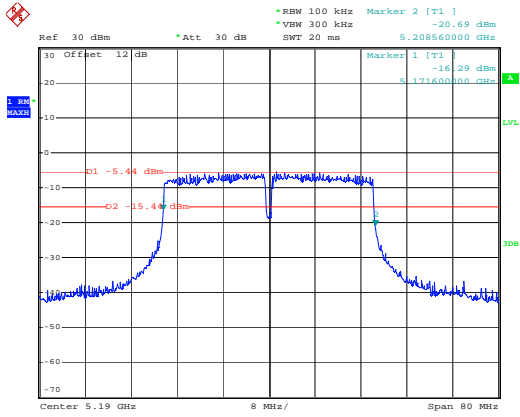
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802.11 ac20 High



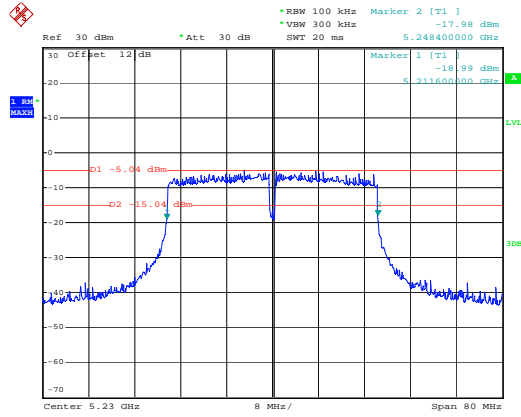
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802.11 ac40 Low



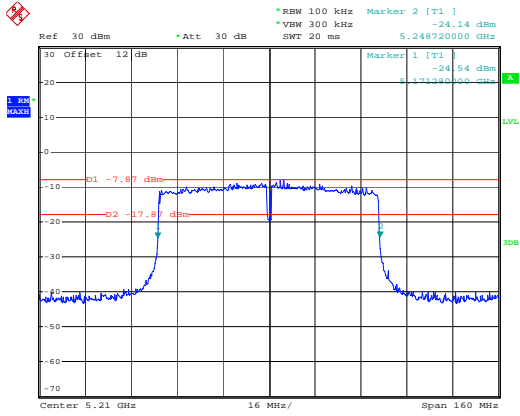
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802.11 ac40 High



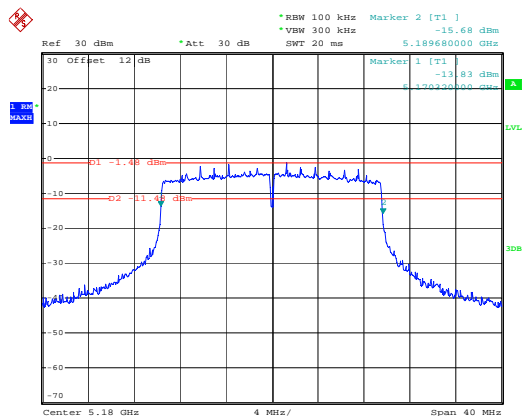
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802.11 ac80



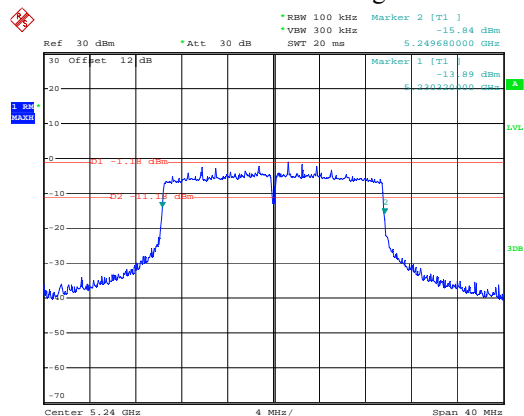
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802.11 ax20 Low



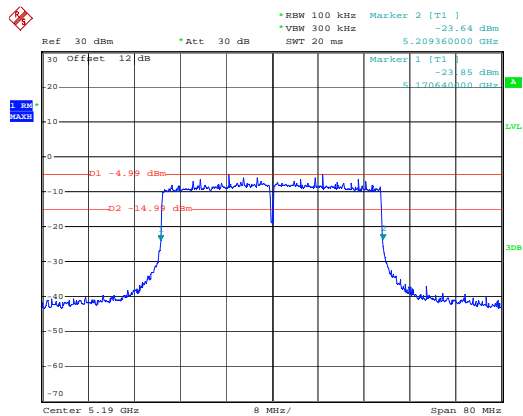
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802.11 ax20 High



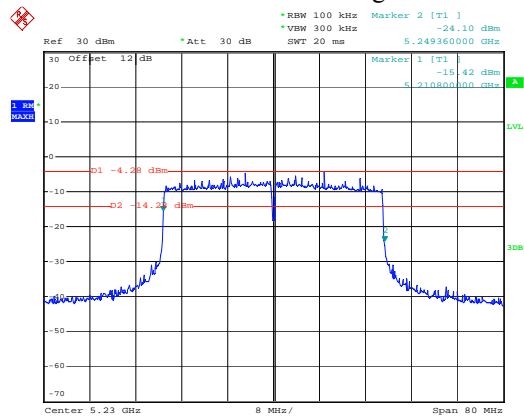
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802.11 ax40 Low



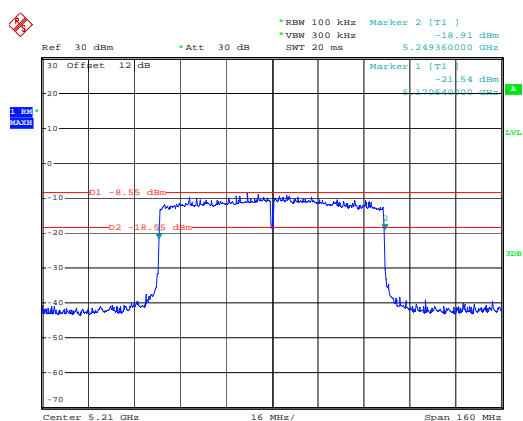
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Date: 26.APR.2024 11:57:52

802.11 ax40 High



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 11:59:25

802.11 ax80



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 13:02:26

2 – NOMINAL CHANNEL BANDWIDTH AND OCCUPIED CHANNEL BANDWIDTH

Definition

The Nominal Channel Bandwidth is the widest band of frequencies, inclusive of guard bands, assigned to a single channel.

The Occupied Channel Bandwidth is the bandwidth containing 99 % of the power of the signal.

When equipment has simultaneous transmissions in adjacent channels, these transmissions may be considered as one signal with an actual Nominal Channel Bandwidth of 'n' times the individual Nominal Channel Bandwidth where 'n' is the number of adjacent channels. When equipment has simultaneous transmissions in non-adjacent channels, each power envelope shall be considered separately.

Limit

The Nominal Channel Bandwidth for a single Operating Channel shall be 20 MHz.

Alternatively, equipment may implement a lower Nominal Channel Bandwidth with a minimum of 5 MHz, providing they still comply with the Nominal Centre Frequencies defined in clause 4.2.1 (20 MHz raster). The Occupied Channel Bandwidth shall be between 80 % and 100 % of the Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.

The Occupied Channel Bandwidth might change with time/payload.

During a Channel Occupancy Time (COT), equipment may operate temporarily with an Occupied Channel Bandwidth of less than 80 % of its Nominal Channel Bandwidth with a minimum of 2 MHz.

Test Procedure

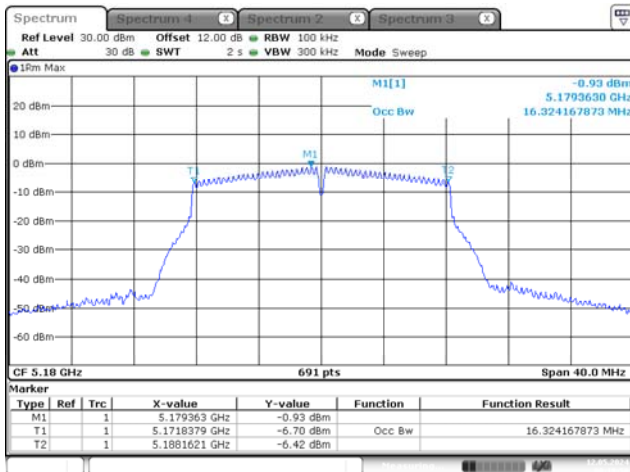
According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.3

Test Data

Test Result: Compliant. Please refer to following table(s) and Plot(s).

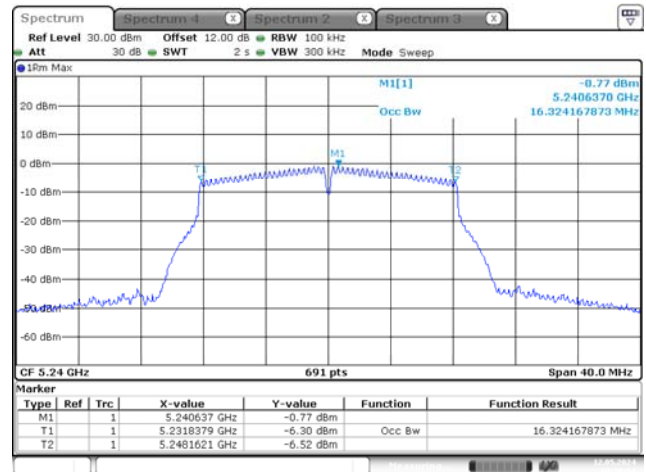
Band (MHz)	Mode	Fc (MHz)	Nominal Channel Bandwidth (MHz)	Result (MHz)	Limit (MHz)	Verdict
5150-5250	802.11 a	5180	20	16.32	16~20	Pass
		5240	20	16.32	16~20	Pass
	802.11 n20	5180	20	17.48	16~20	Pass
		5240	20	17.48	16~20	Pass
	802.11 n40	5190	40	35.89	32~40	Pass
		5230	40	35.89	32~40	Pass
	802.11 ac20	5180	20	17.48	16~20	Pass
		5240	20	17.48	16~20	Pass
	802.11 ac40	5190	40	35.89	32~40	Pass
		5230	40	35.89	32~40	Pass
	802.11 ac80	5210	80	75.48	64~80	Pass
	802.11 ax20	5180	20	18.76	16~20	Pass
		5240	20	18.76	16~20	Pass
	802.11 ax40	5190	40	37.51	32~40	Pass
		5230	40	37.51	32~40	Pass
	802.11 ax80	5210	80	77.34	64~80	Pass

802.11 a Low



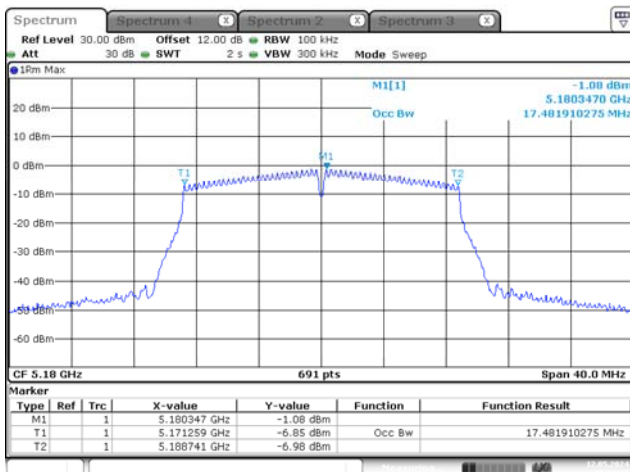
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:18:58

802.11 a High



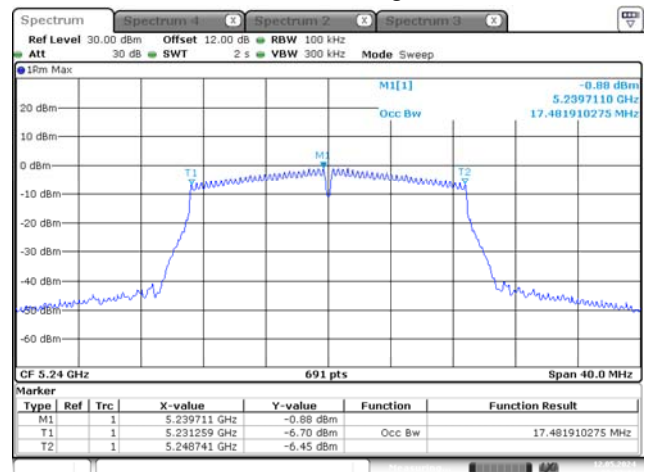
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:20:04

802.11 n20 Low



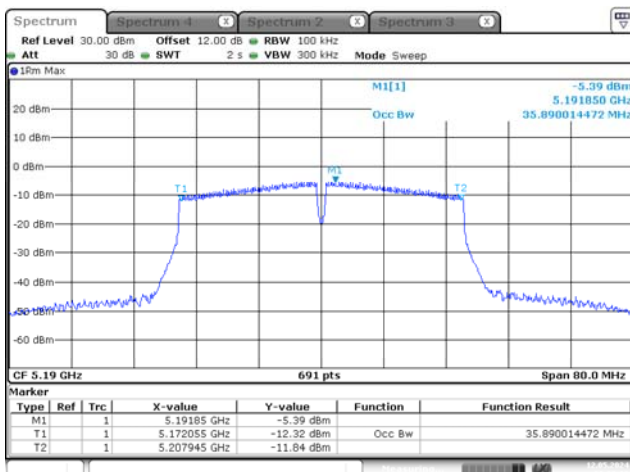
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:21:15

802.11 n20 High



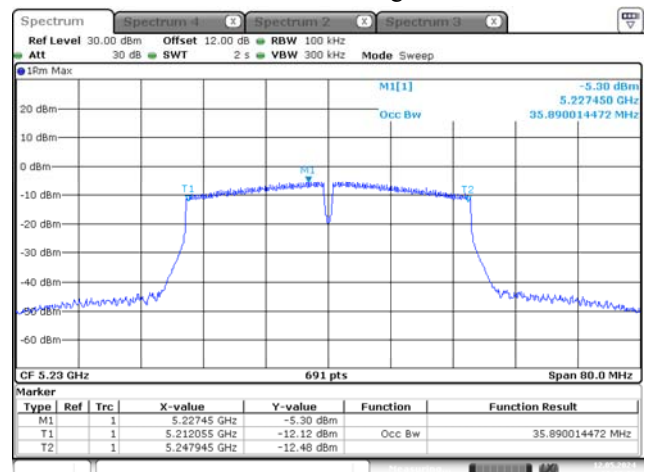
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:22:44

802.11 n40 Low



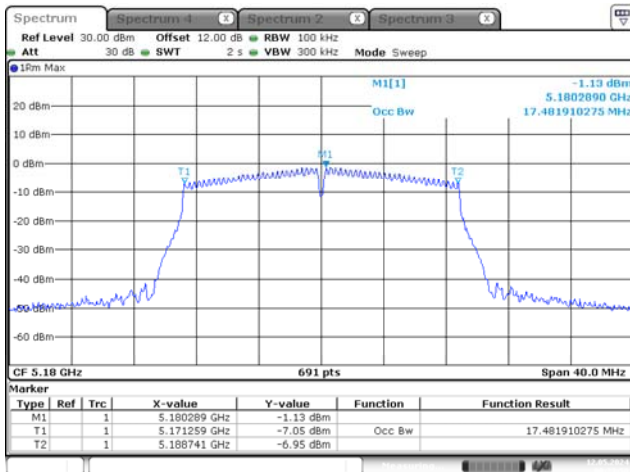
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Date: 12.MAY.2024 00:29:08

802.11 n40 High

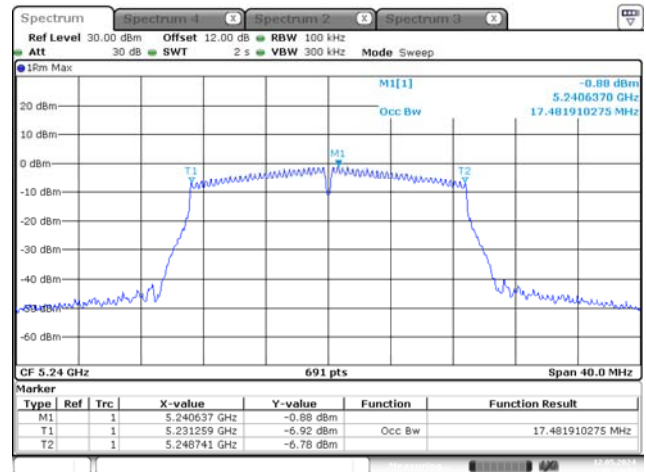


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Date: 12.MAY.2024 00:30:03

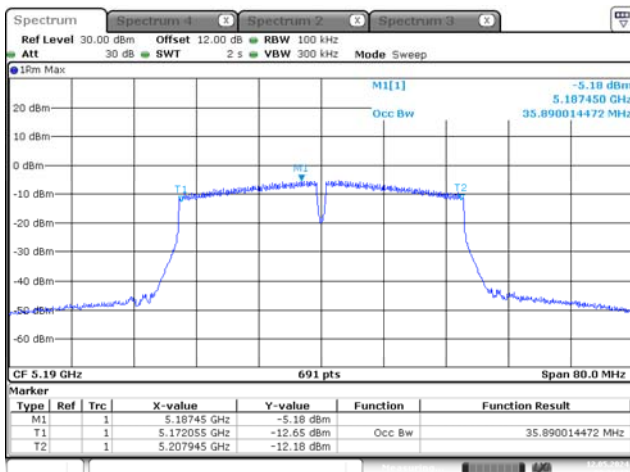
802.11 ac20 Low



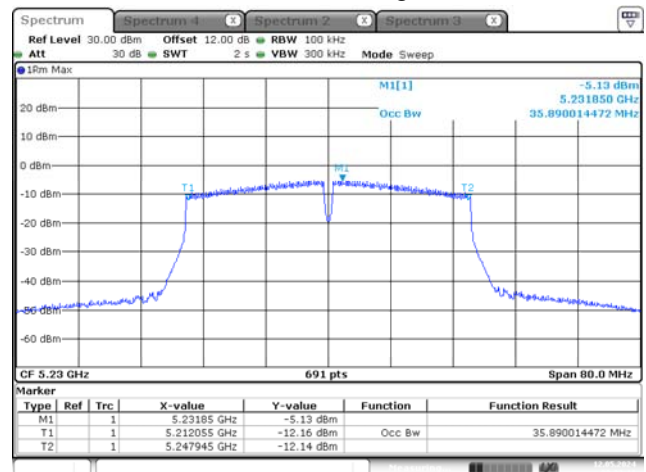
802.11 ac20 High



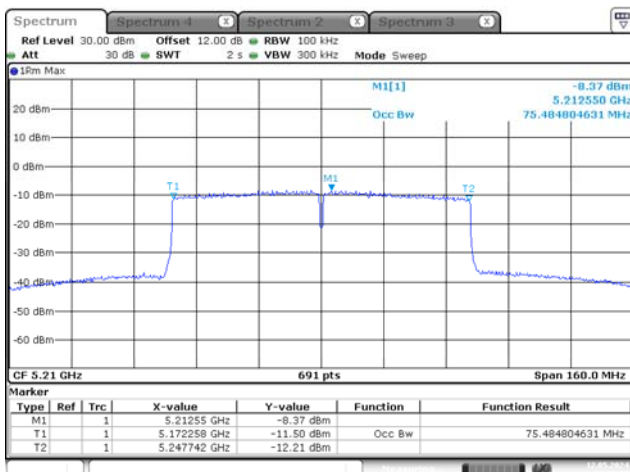
802.11 ac40 Low



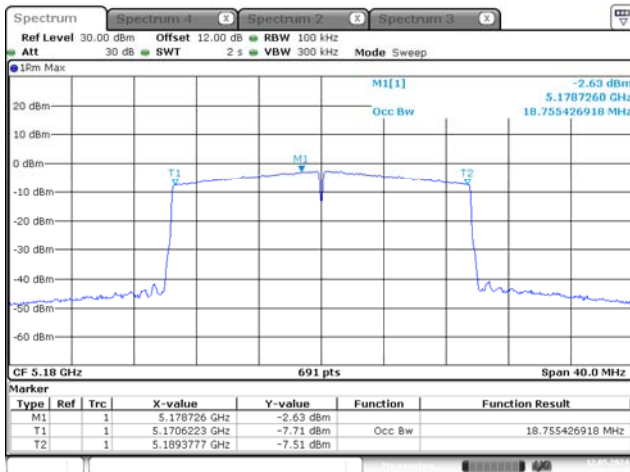
802.11 ac40 High



802.11 ac80

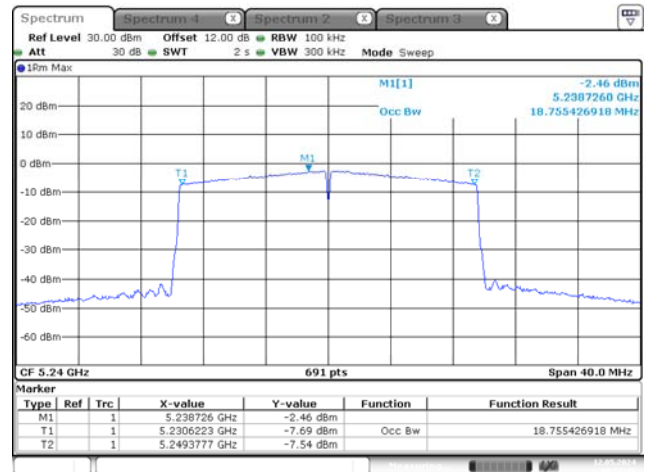


802.11 ax20 Low



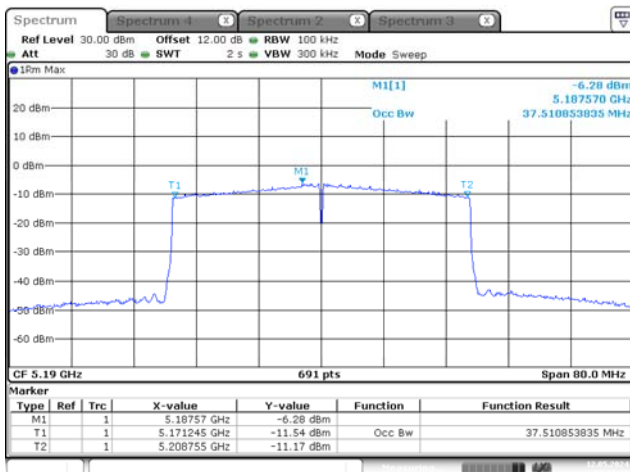
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802.11 ax20 High



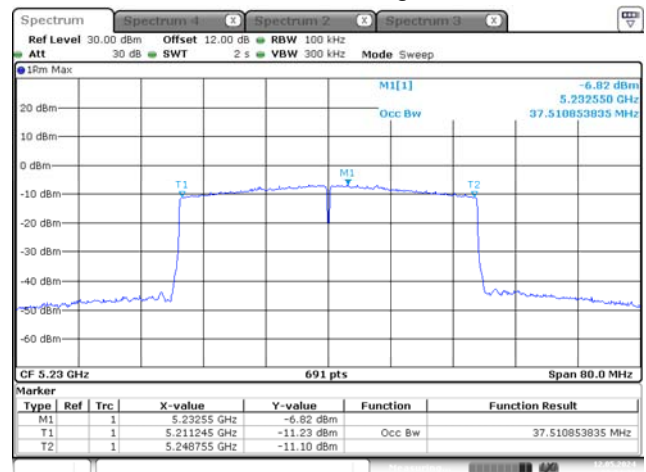
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:27:46

802.11 ax40 Low



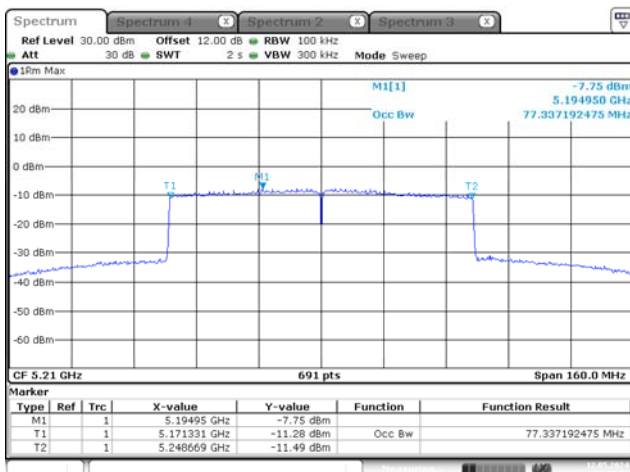
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:33:27

802.11 ax40 High



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:34:31

802.11 ax80



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:37:08

3 – RF OUTPUT POWER, TRANSMIT POWER CONTROL (TPC), POWER DENSITY

Definition

RF Output Power:

The RF Output Power is the mean equivalent isotropically radiated power (e.i.r.p.) during a transmission burst.

Transmit Power Control (TPC):

Transmit Power Control (TPC) is a mechanism to be used by the RLAN device to ensure a mitigation factor of at least 3 dB on the aggregate power from a large number of devices. This requires the RLAN device to have a TPC range from which the lowest value is at least 6 dB below the values for mean e.i.r.p. given in table 2 for devices with TPC.

Power Density:

The Power Density is the mean Equivalent Isotropically Radiated Power (e.i.r.p.) density during a transmission burst.

Limit

TPC is not required for channels whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz.

For devices with TPC, the RF output power and the power density when configured to operate at the highest stated power level of the TPC range shall not exceed the levels given in table 2.

Devices are allowed to operate without TPC. See table 2 for the applicable limits in this case.

Table 2: Mean e.i.r.p. limits for RF output power and Power Density at the highest power level (P_H)

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)
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.				
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.				
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.				

**Table 3: Mean e.i.r.p. limits for RF Output Power
at the lowest power level of the TPC range**

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)
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.	

Test Procedure

According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.4

Test Data

Test Result: Compliant. Please refer to following table(s).

Test Mode	Band (MHz)	Fc (MHz)	Test Condition	Conducted output power (dBm)	Result_EIRP (dBm)	Limit (dBm)
802.11 a	5150-5250	5180	NT	16.44	16.94	≤ 23
			LT	16.58	17.08	
			HT	16.31	16.81	
		5240	NT	17.06	17.56	≤ 23
			LT	17.21	17.71	
			HT	16.92	17.42	
802.11 n20	5150-5250	5180	NT	16.59	17.09	≤ 23
			LT	16.72	17.22	
			HT	16.45	16.95	
		5240	NT	17.46	17.96	≤ 23
			LT	17.62	18.12	
			HT	17.33	17.83	
802.11 n40	5150-5250	5190	NT	16.78	17.28	≤ 23
			LT	16.93	17.43	
			HT	16.65	17.15	
		5230	NT	17.29	17.79	≤ 23
			LT	17.45	17.95	
			HT	17.14	17.64	
802.11 ac20	5150-5250	5180	NT	16.51	17.01	≤ 23
			LT	16.65	17.15	
			HT	16.38	16.88	
		5240	NT	17.32	17.82	≤ 23
			LT	17.46	17.96	
			HT	17.17	17.67	
802.11 ac40	5150-5250	5190	NT	16.54	17.04	≤ 23
			LT	16.68	17.18	
			HT	16.41	16.91	
		5230	NT	17.38	17.88	≤ 23

			LT	17.53	18.03	
			HT	17.24	17.74	
802.11 ac80	5150- 5250	5210	NT	16.37	16.87	≤ 23
			LT	16.52	17.02	
			HT	16.23	16.73	
802.11 ax20	5150- 5250	5180	NT	16.32	16.82	≤ 23
			LT	16.46	16.96	
			HT	16.17	16.67	
		5240	NT	17.13	17.63	≤ 23
			LT	17.26	17.76	
			HT	17.01	17.51	
802.11 ax40	5150- 5250	5190	NT	16.64	17.14	≤ 23
			LT	16.79	17.29	
			HT	16.50	17.00	
		5230	NT	16.78	17.28	≤ 23
			LT	16.92	17.42	
			HT	16.63	17.13	
802.11 ax80	5150- 5250	5210	NT	16.33	16.83	≤ 23
			LT	16.48	16.98	
			HT	16.19	16.69	

Note:

1, The Duty cycle factor was added into the **Conducted Result** by setting the power meter.

2, The Antenna Gain was added into the EIRP.

Power Density

Band (MHz)	Mode	Fc (MHz)	Conducted power density (dBm/MHz)	Result (dBm/MHz)	Limit (dBm/MHz)
5150-5250	802.11 a	5180	7.30	8.50	10
		5240	7.36	8.56	10
	802.11 n20	5180	7.25	7.95	10
		5240	7.40	8.10	10
	802.11 ac20	5180	7.20	7.90	10
		5240	7.29	7.99	10
	802.11 ax20	5180	6.68	7.44	10
		5240	6.81	7.57	10
	802.11 n40	5190	3.46	4.17	10
		5230	3.62	4.33	10
	802.11 ac40	5190	3.17	3.91	10
		5230	3.72	4.46	10
	802.11 ax40	5190	2.71	3.51	10
		5230	2.62	3.42	10
	802.11 ac80	5210	0.81	1.46	10
	802.11 ax80	5210	0.78	1.43	10

Note:

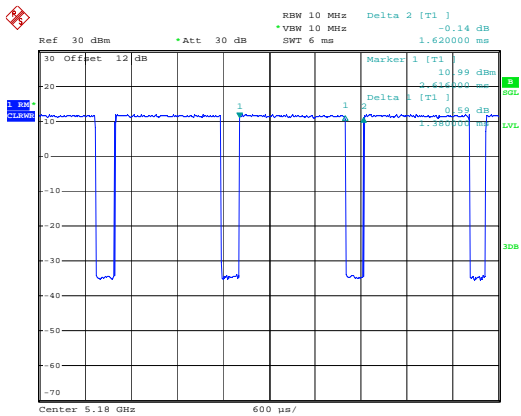
- 1, The antenna gain and duty cycle factor were added into the result.
- 2, Duty cycle factor = $10 \cdot \log(1/\text{duty cycle})$

Duty Cycle:

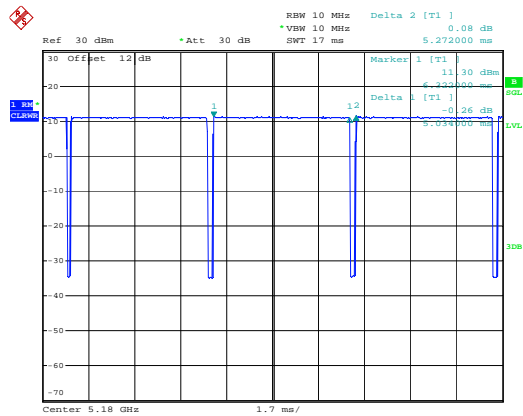
Mode	Ton (ms)	Ton+Toff (ms)	Duty cycle (%)	Duty cycle Factor (dB)
802.11 a	1.380	1.620	85.19	0.70
802.11 n20	5.034	5.272	95.49	0.20
802.11 ac20	5.034	5.272	95.49	0.20
802.11 ax20	3.844	4.082	94.17	0.26
802.11 n40	4.830	5.068	95.30	0.21
802.11 ac40	4.864	5.136	94.70	0.24
802.11 ax40	3.800	4.070	93.37	0.30
802.11 ac80	4.436	4.596	96.52	0.15
802.11 ax80	3.604	3.860	93.37	0.30

Duty Cycle:

802.11 a



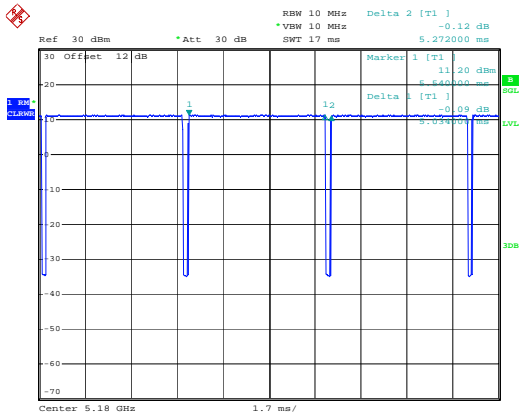
802.11 n20



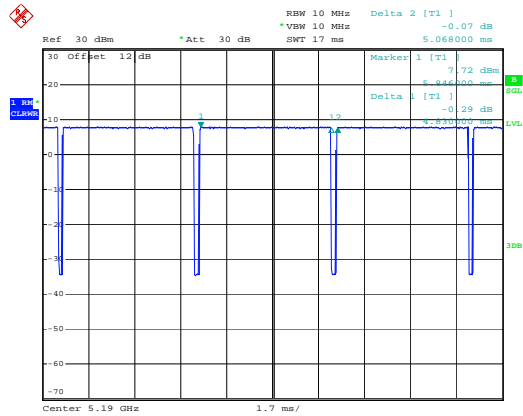
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 14:56:20

ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 14:58:58

802.11 ac20



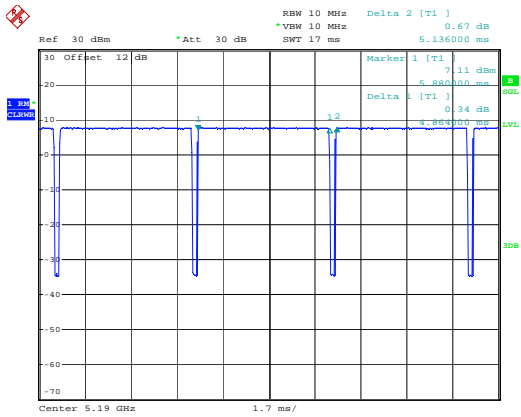
802.11 n40



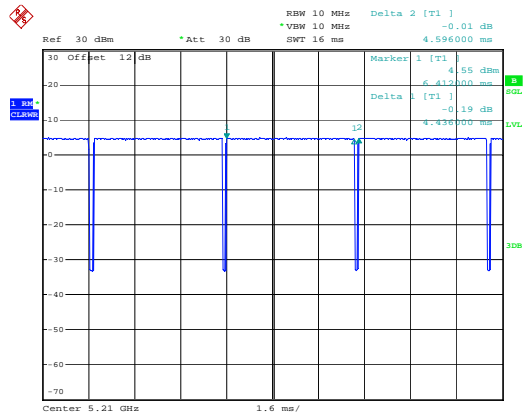
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Date: 26.APR.2024 15:01:02

ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 15:03:46

802.11 ac40



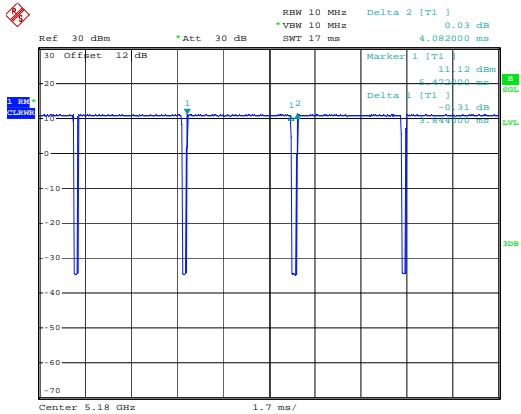
802.11 ac80



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 15:06:05

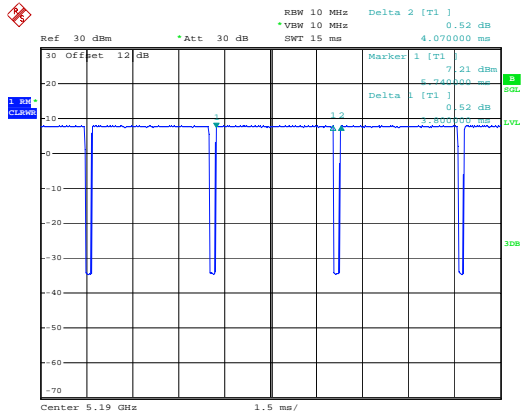
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Date: 26.APR.2024 15:12:42

802.11 ax20



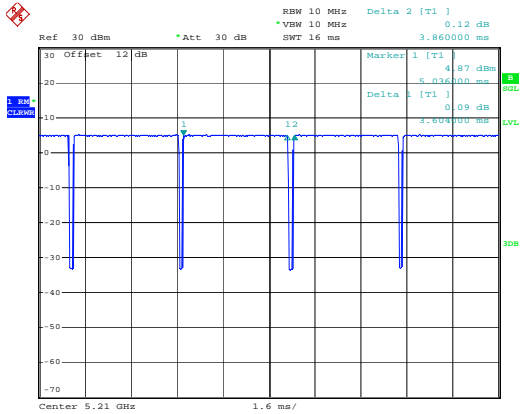
ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 15:02:26

802.11 ax40



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 26.APR.2024 15:09:04

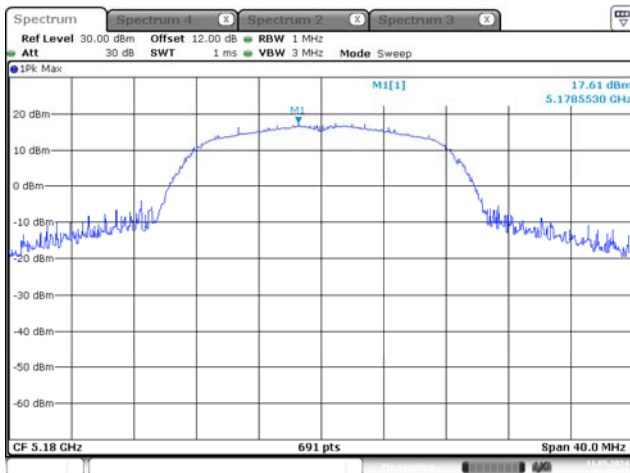
802.11 ax80



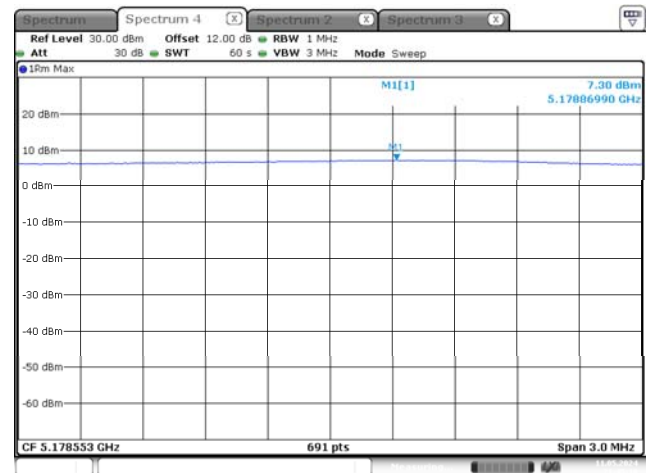
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Date: 26.APR.2024 15:13:54

PSD:

802.11 a-5180 MHz

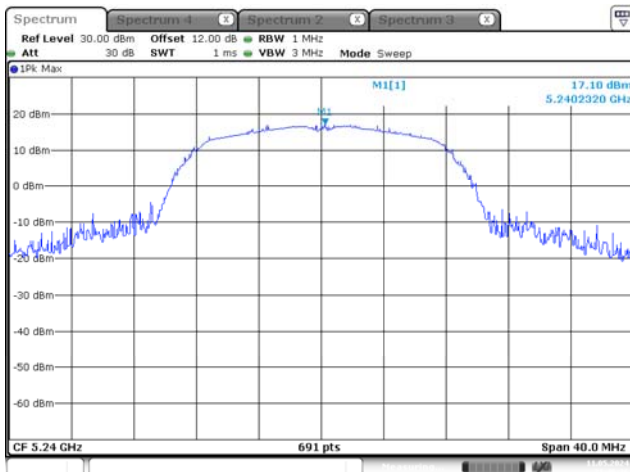


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
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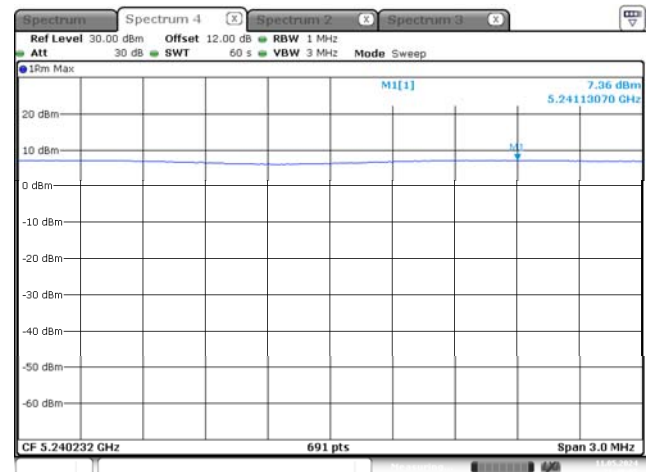


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 21:45:18

802.11 a-5240 MHz



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 21:46:17

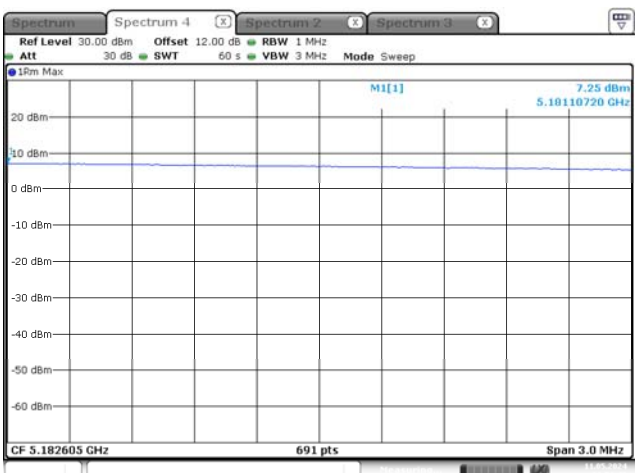


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Date: 11.MAY.2024 21:48:05

802.11 n20-5180 MHz



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 21:49:12

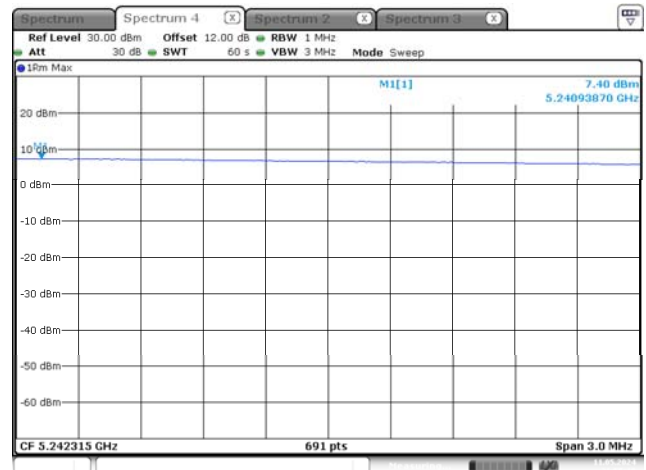


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Date: 11.MAY.2024 21:51:41

802.11 n20-5240 MHz

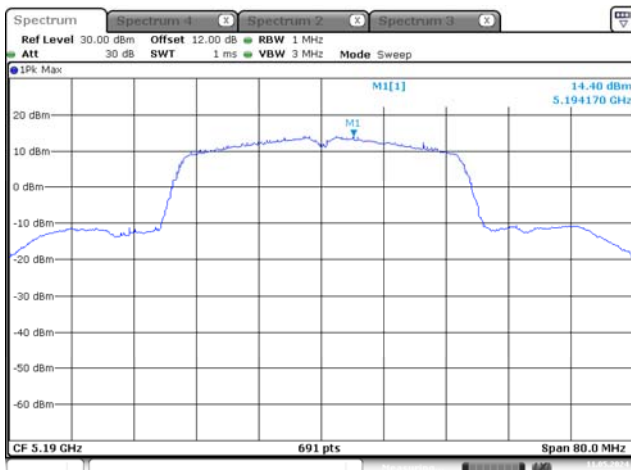


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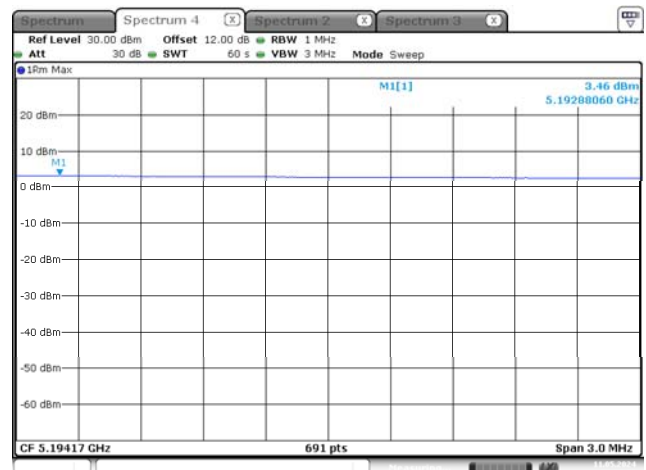


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Date: 11.MAY.2024 21:55:19

802.11 n40-5190 MHz

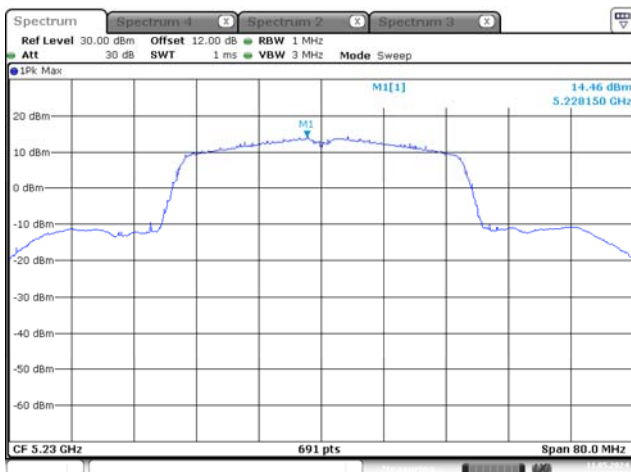


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:28:12

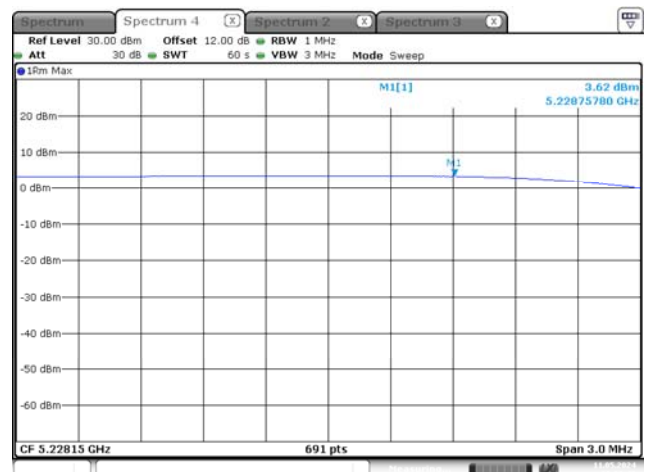


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:30:21

802.11 n40-5230 MHz

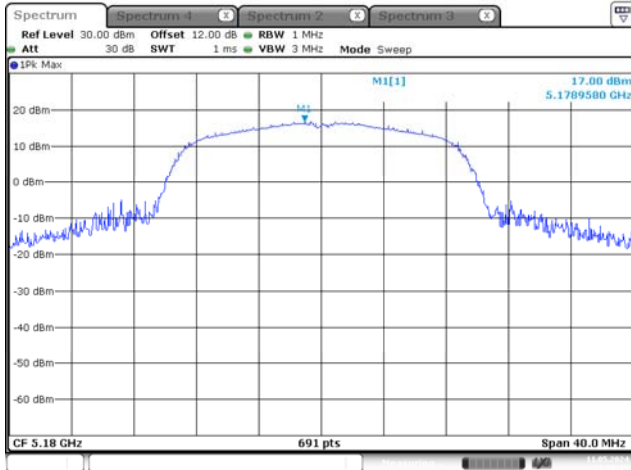


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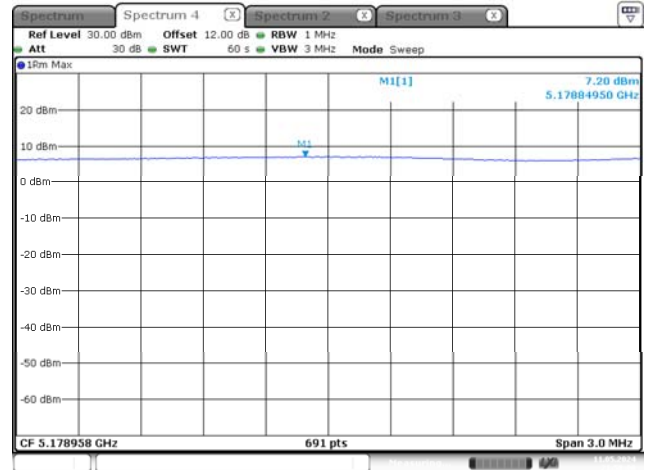


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:33:43

802.11 ac20-5180 MHz

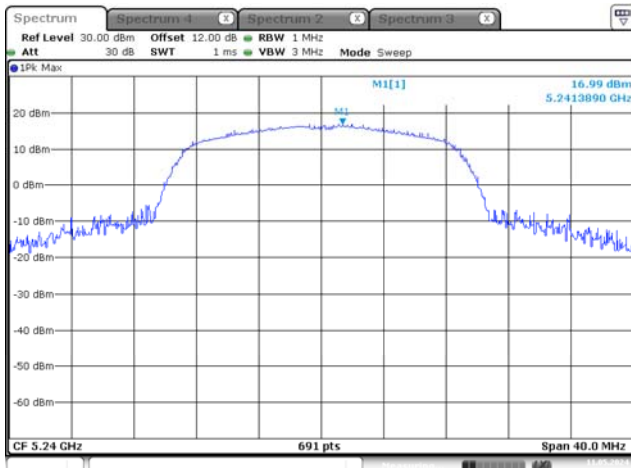


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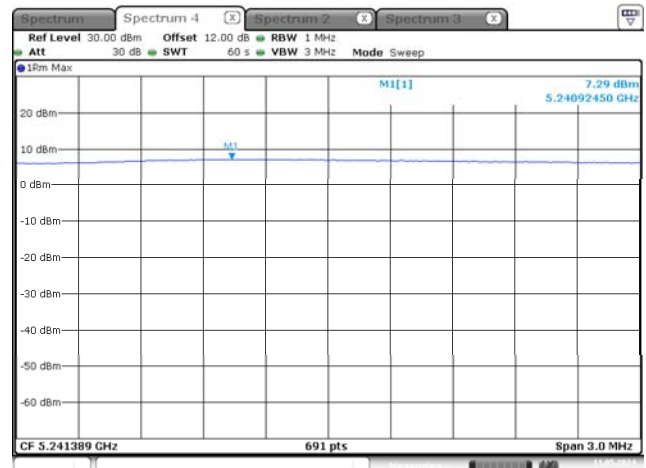


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 21:58:09

802.11 ac20-5240 MHz

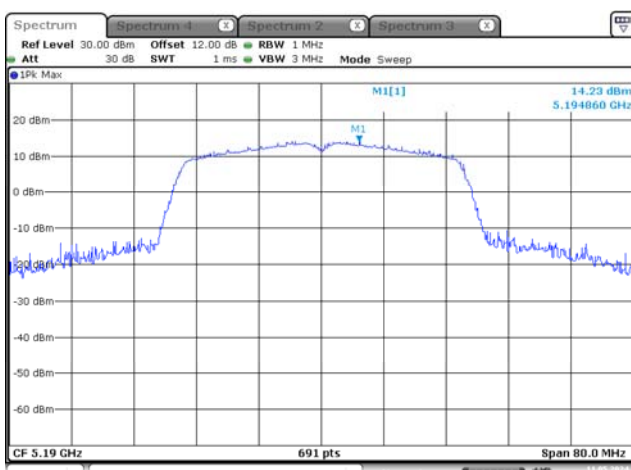


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 21:59:07

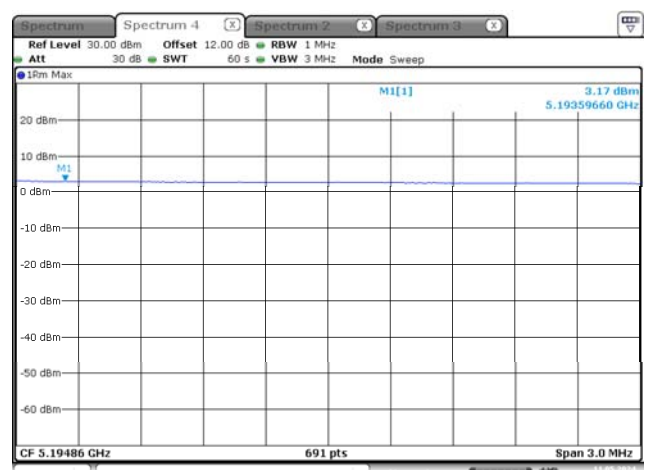


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:00:48

802.11 ac40-5190 MHz

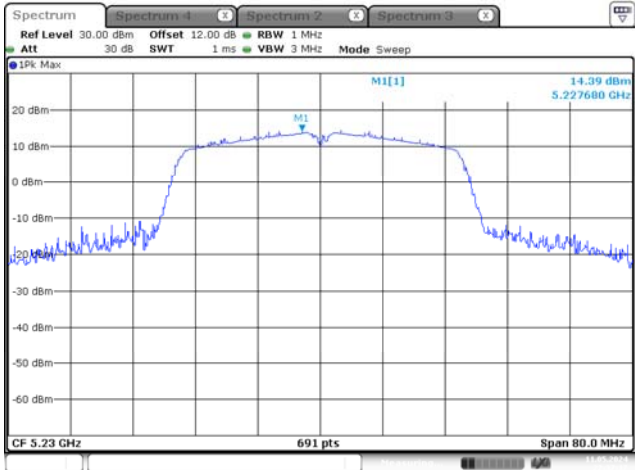


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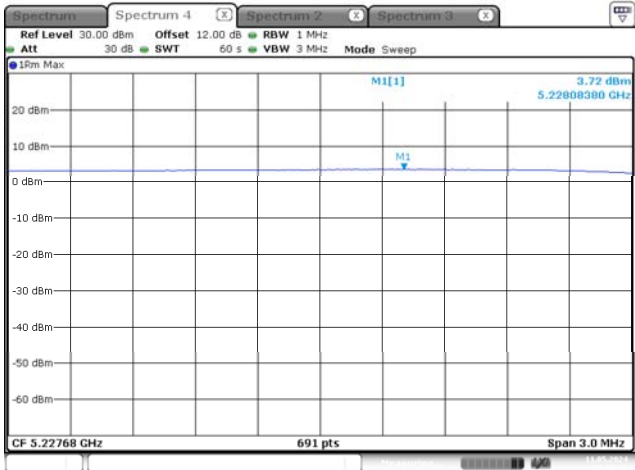


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:36:35

802.11 ac40-5230 MHz

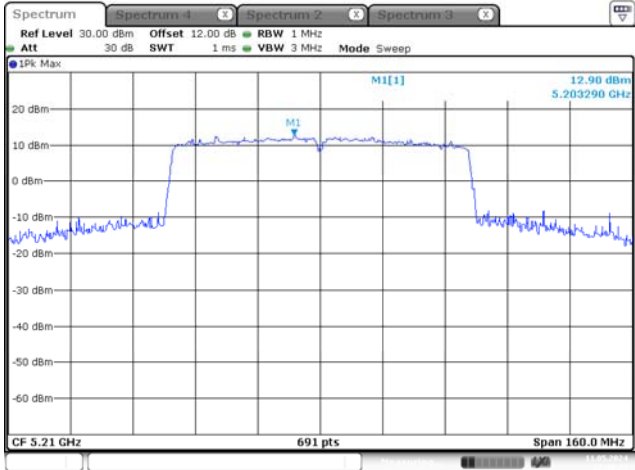


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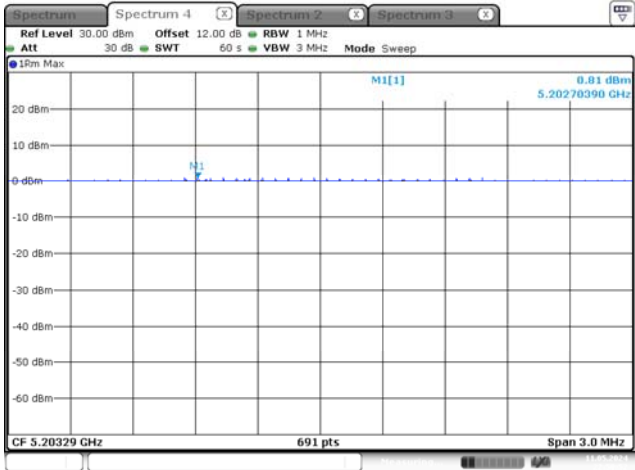


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Date: 11.MAY.2024 22:38:47

802.11 ac80-5210 MHz

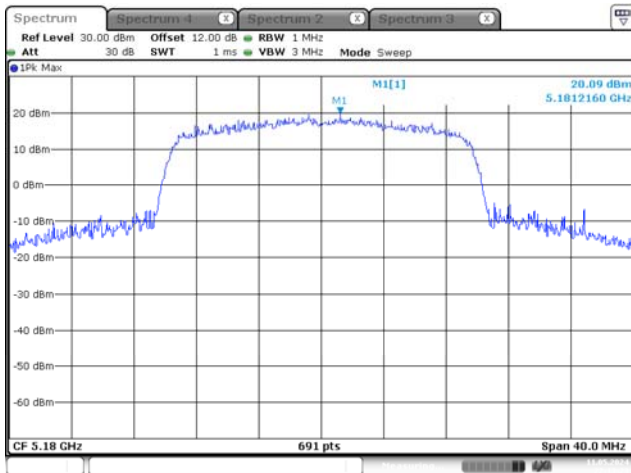


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:48:24

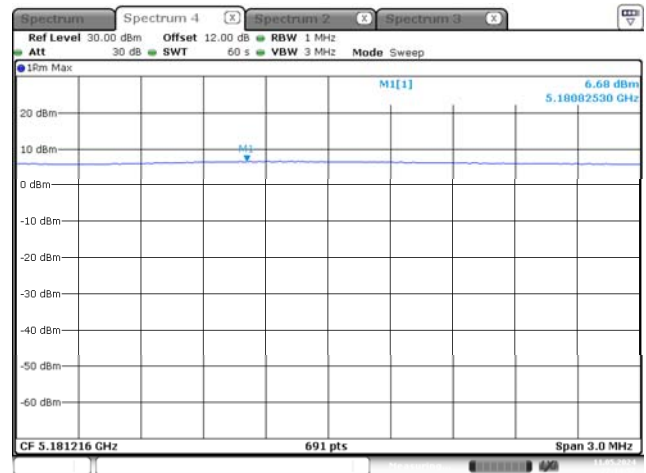


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:50:52

802.11 ax20-5180 MHz

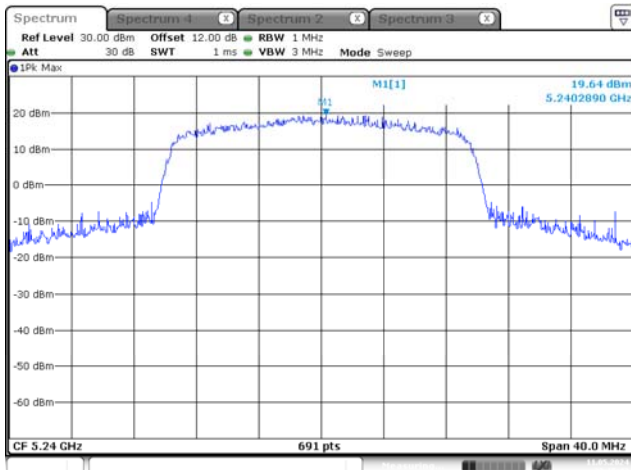


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:13:24

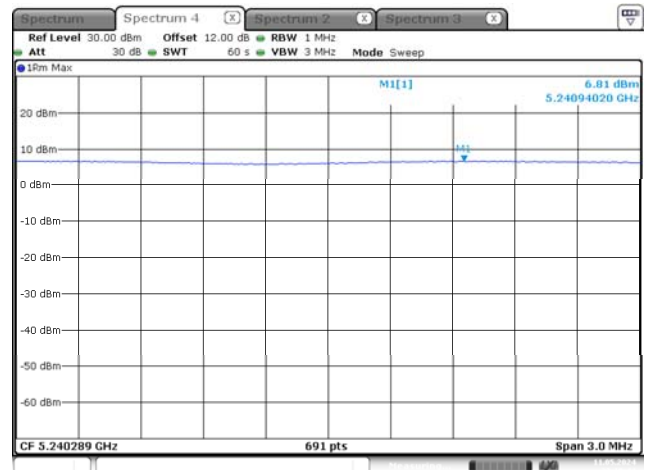


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:14:58

802.11 ax20-5240 MHz

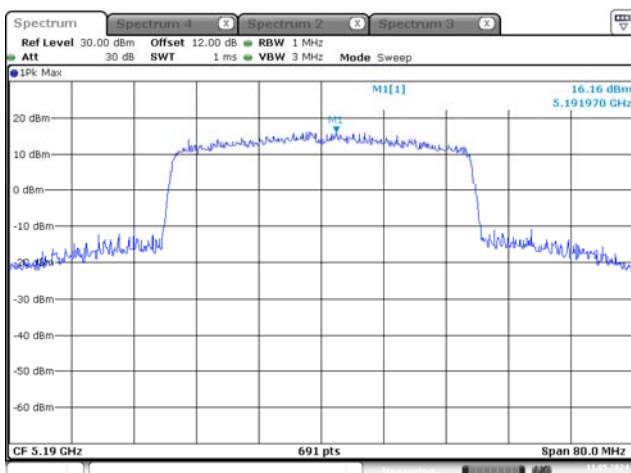


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Date: 11.MAY.2024 22:15:43

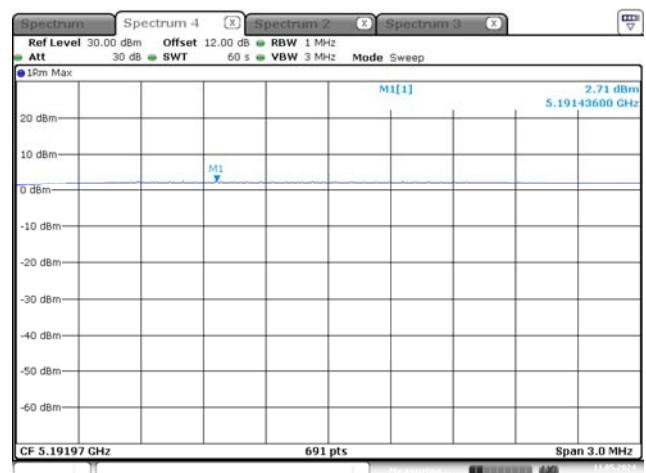


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:18:45

802.11 ax40-5190 MHz

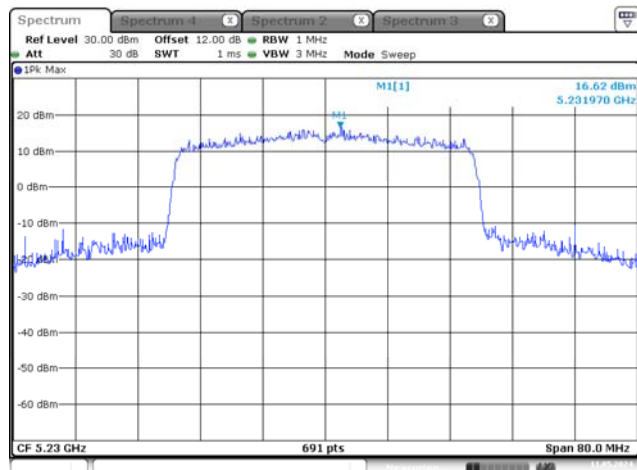


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:41:42

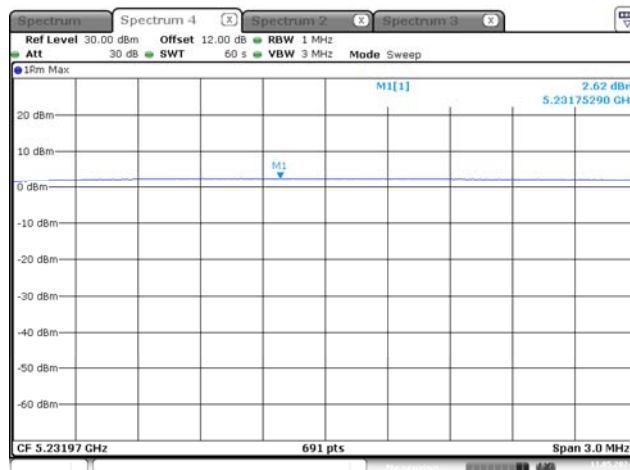


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:43:27

802.11 ax40-5230 MHz

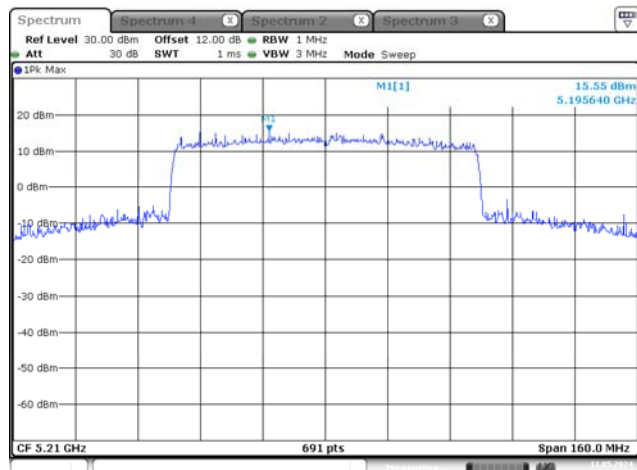


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Date: 11.MAY.2024 22:44:27

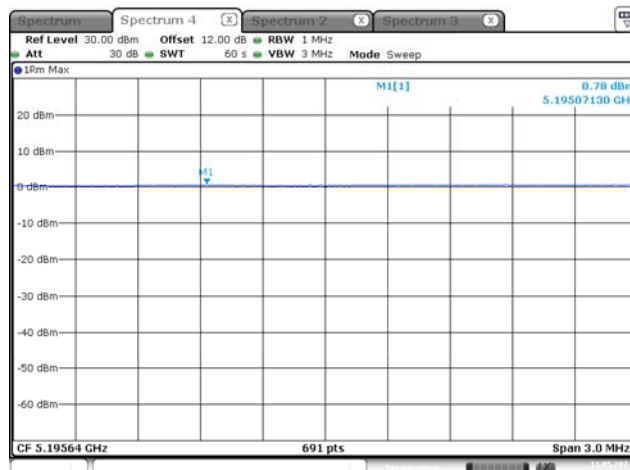


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:45:59

802.11 ax80-5210 MHz



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:54:34



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 22:56:38

4 – TRANSMITTER UNWANTED EMISSIONS OUTSIDE THE 5 GHZ RLAN BANDS

Definition

Transmitter unwanted emissions outside the 5 GHz RLAN bands are radio frequency emissions outside the 5 GHz RLAN bands defined in clause 3.1.

Limit

The level of transmitter unwanted emissions outside the 5 GHz RLAN bands shall not exceed the limits given in table 4.

Table 4: Transmitter unwanted emission limits outside the 5 GHz RLAN bands

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 Procedure

According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.5

Test Data

Test Result: Compliant. Pre-scan all modes, worst case please refer to following tables.

802.11 a 5180 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10360.00	H	48.65	-51.09	13.48	0.40	-38.01	-30.00	8.01
10360.00	V	48.62	-50.56	13.48	0.40	-37.48	-30.00	7.48
94.87	H	32.26	-79.04	0.00	0.11	-79.15	-54.00	25.15
229.36	V	33.10	-74.25	0.00	0.17	-74.42	-54.00	20.42

802.11 a 5240 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10480.00	H	48.51	-51.23	13.32	0.30	-38.21	-30.00	8.21
10480.00	V	48.16	-50.84	13.32	0.30	-37.82	-30.00	7.82
95.20	H	32.05	-79.27	0.00	0.12	-79.39	-54.00	25.39
225.67	V	33.16	-74.08	0.00	0.17	-74.25	-54.00	20.25

802.11 n20 5180 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10360.00	H	48.52	-51.22	13.48	0.40	-38.14	-30.00	8.14
10360.00	V	48.16	-51.02	13.48	0.40	-37.94	-30.00	7.94
95.47	H	32.56	-78.77	0.00	0.12	-78.89	-54.00	24.89
226.64	V	33.16	-74.11	0.00	0.17	-74.28	-54.00	20.28

802.11 n20 5240 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10480.00	H	48.10	-51.64	13.32	0.30	-38.62	-30.00	8.62
10480.00	V	48.06	-50.94	13.32	0.30	-37.92	-30.00	7.92
96.31	H	33.05	-78.32	0.00	0.12	-78.44	-54.00	24.44
225.87	V	32.98	-74.27	0.00	0.17	-74.44	-54.00	20.44

802.11 n40

5190 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10380.00	H	48.16	-51.58	13.44	0.38	-38.52	-30.00	8.52
10380.00	V	48.11	-51.04	13.44	0.38	-37.98	-30.00	7.98
97.23	H	32.54	-78.88	0.00	0.12	-79.00	-54.00	25.00
224.17	V	33.62	-73.58	0.00	0.18	-73.76	-54.00	19.76

802.11 n40

5230 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10460.00	H	48.99	-50.75	13.34	0.31	-37.72	-30.00	7.72
10460.00	V	48.32	-50.71	13.34	0.31	-37.68	-30.00	7.68
92.36	H	32.05	-79.12	0.00	0.11	-79.23	-54.00	25.23
225.39	V	33.01	-74.23	0.00	0.17	-74.40	-54.00	20.40

802.11 ac20

5180 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10360.00	H	47.35	-52.39	13.48	0.40	-39.31	-30.00	9.31
10360.00	V	47.26	-51.92	13.48	0.40	-38.84	-30.00	8.84
96.12	H	33.14	-78.22	0.00	0.12	-78.34	-54.00	24.34
224.70	V	33.21	-74.01	0.00	0.18	-74.19	-54.00	20.19

802.11 ac20

5240 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10480.00	H	47.16	-52.58	13.32	0.30	-39.56	-30.00	9.56
10480.00	V	47.28	-51.72	13.32	0.30	-38.70	-30.00	8.70
93.14	H	32.01	-79.20	0.00	0.11	-79.31	-54.00	25.31
223.92	V	33.06	-74.13	0.00	0.18	-74.31	-54.00	20.31

802.11 ac40

5190 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10380.00	H	48.01	-51.73	13.44	0.38	-38.67	-30.00	8.67
10380.00	V	48.19	-50.96	13.44	0.38	-37.90	-30.00	7.90
93.33	H	33.06	-78.16	0.00	0.11	-78.27	-54.00	24.27
220.14	V	32.75	-74.33	0.00	0.18	-74.51	-54.00	20.51

802.11 ac40

5230 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10460.00	H	48.11	-51.63	13.34	0.31	-38.60	-30.00	8.60
10460.00	V	48.01	-51.02	13.34	0.31	-37.99	-30.00	7.99
92.34	H	33.01	-78.16	0.00	0.11	-78.27	-54.00	24.27
225.36	V	32.86	-74.38	0.00	0.17	-74.55	-54.00	20.55

802.11 ac80

5210 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10420.00	H	48.00	-51.74	13.38	0.35	-38.71	-30.00	8.71
10420.00	V	48.16	-50.93	13.38	0.35	-37.90	-30.00	7.90
95.14	H	33.20	-78.11	0.00	0.12	-78.23	-54.00	24.23
223.64	V	33.41	-73.77	0.00	0.18	-73.95	-54.00	19.95

802.11 ax20

5180 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10360.00	H	48.55	-51.19	13.48	0.40	-38.11	-30.00	8.11
10360.00	V	48.11	-51.07	13.48	0.40	-37.99	-30.00	7.99
95.36	H	32.15	-79.17	0.00	0.12	-79.29	-54.00	25.29
226.34	V	33.21	-74.05	0.00	0.17	-74.22	-54.00	20.22

802.11 ax20

5240 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10480.00	H	47.25	-52.49	13.32	0.30	-39.47	-30.00	9.47
10480.00	V	47.14	-51.86	13.32	0.30	-38.84	-30.00	8.84
89.14	H	32.54	-78.20	0.00	0.10	-78.30	-54.00	24.30
220.39	V	32.65	-74.44	0.00	0.18	-74.62	-54.00	20.62

802.11 ax40

5190 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10380.00	H	47.32	-52.42	13.44	0.38	-39.36	-30.00	9.36
10380.00	V	47.56	-51.59	13.44	0.38	-38.53	-30.00	8.53
92.67	H	33.54	-77.65	0.00	0.11	-77.76	-54.00	23.76
226.37	V	33.16	-74.11	0.00	0.17	-74.28	-54.00	20.28

802.11 ax40

5230 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10460.00	H	47.65	-52.09	13.34	0.31	-39.06	-30.00	9.06
10460.00	V	47.51	-51.52	13.34	0.31	-38.49	-30.00	8.49
95.36	H	32.41	-78.91	0.00	0.12	-79.03	-54.00	25.03
222.32	V	32.59	-74.56	0.00	0.18	-74.74	-54.00	20.74

802.11 ax80

5210 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10420.00	H	47.15	-52.59	13.38	0.35	-39.56	-30.00	9.56
10420.00	V	47.55	-51.54	13.38	0.35	-38.51	-30.00	8.51
91.74	H	33.20	-77.94	0.00	0.11	-78.05	-54.00	24.05
223.32	V	33.06	-74.11	0.00	0.18	-74.29	-54.00	20.29

Note 1: The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

Note 2:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

5 – TRANSMITTER UNWANTED EMISSIONS WITHIN THE 5 GHZ RLAN BANDS

Definition

Transmitter unwanted emissions within the 5 GHz RLAN bands are radio frequency emissions within the 5 GHz RLAN bands defined in clause 3.1.

Limit

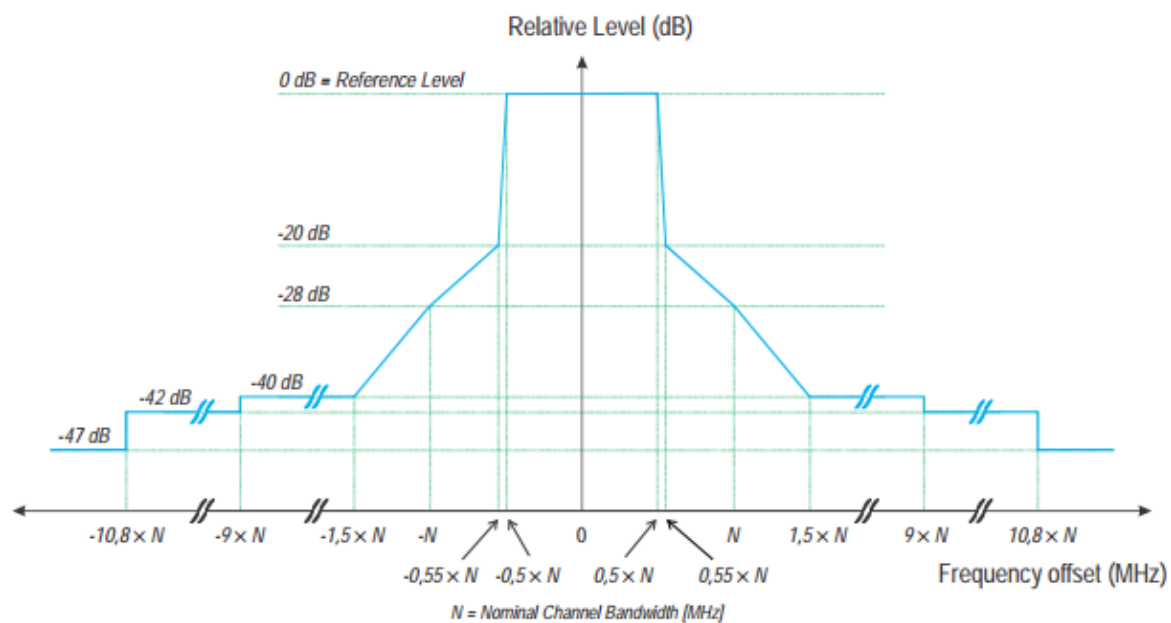


Figure 1: Transmit spectral power mask

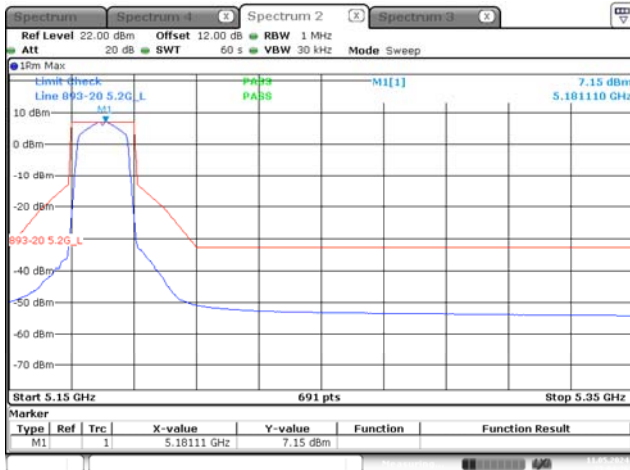
Test Procedure

According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.6

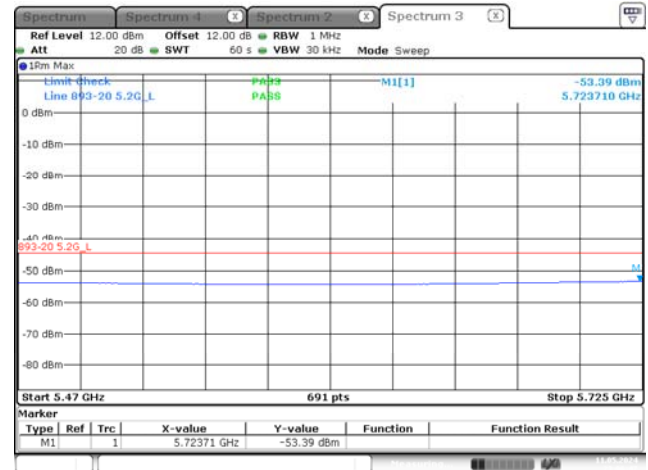
Test Data

Test Result: Compliant. Please refer to following Plots:

802.11 a-5180 MHz

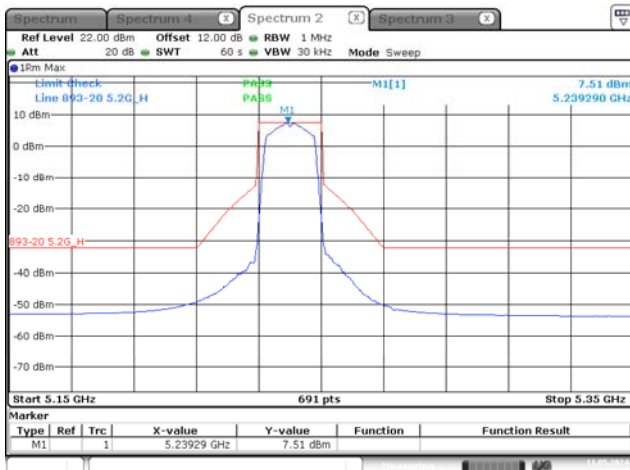


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:04:27

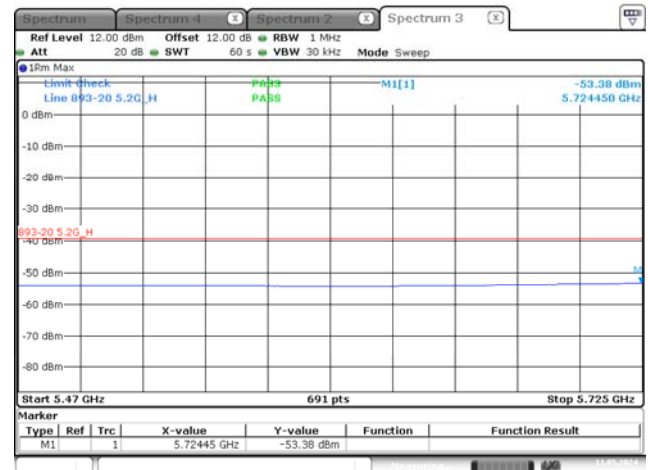


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:06:48

802.11 a-5240 MHz

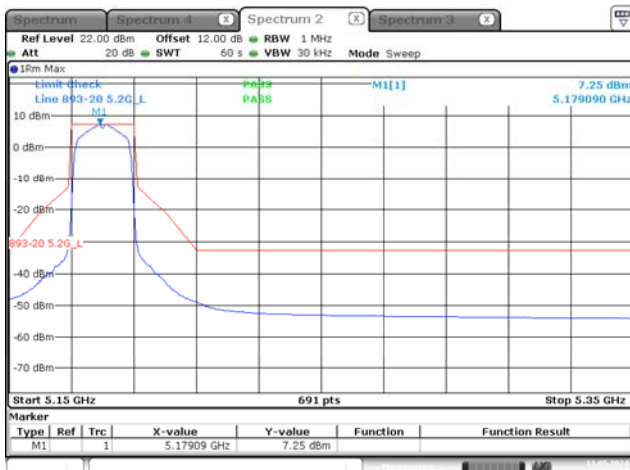


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:08:58

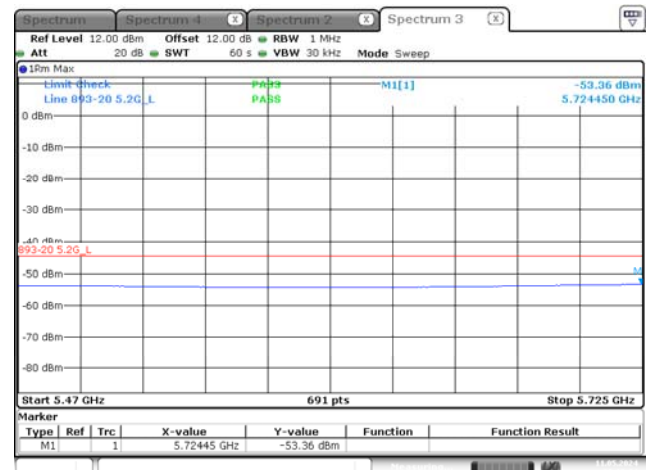


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:10:33

802.11 n20-5180 MHz

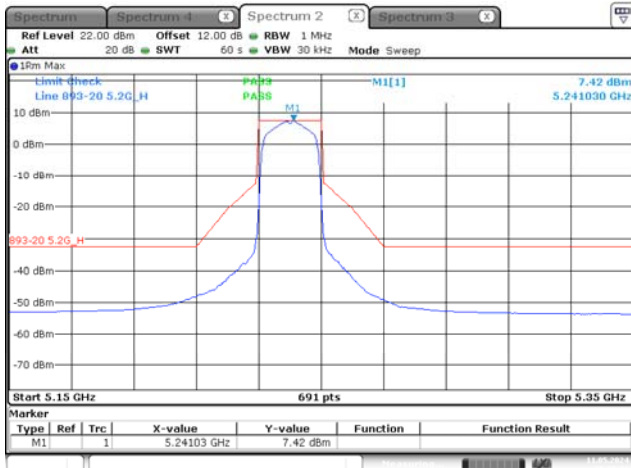


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
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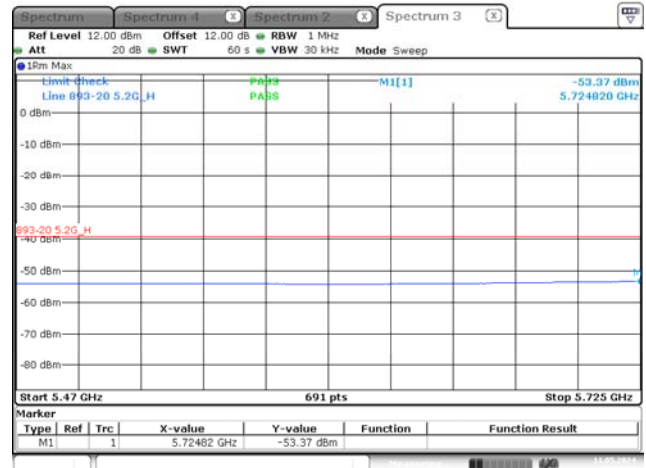


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:18:35

802.11 n20-5240 MHz

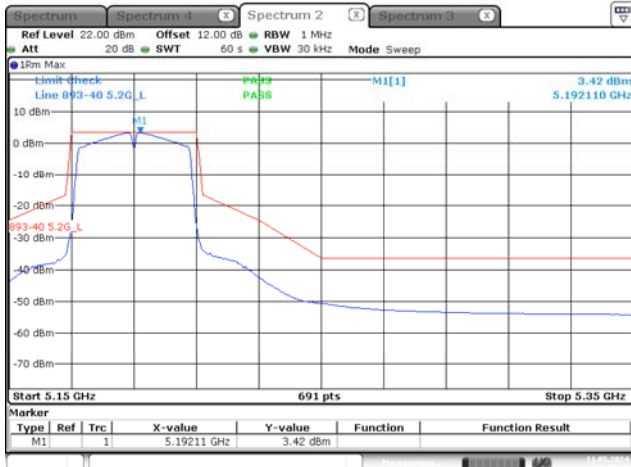


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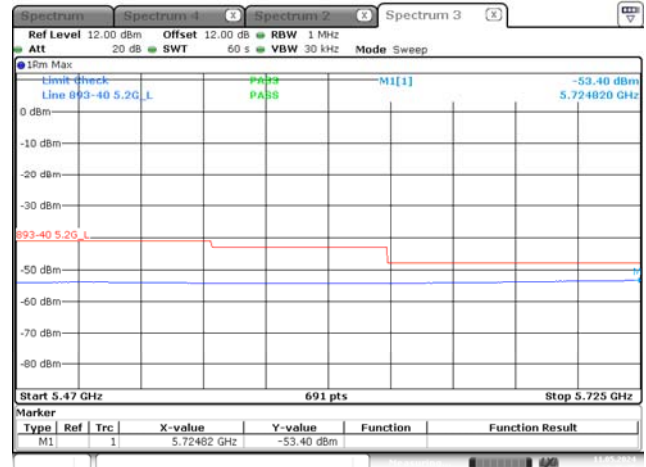


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:22:05

802.11 n40-5190 MHz

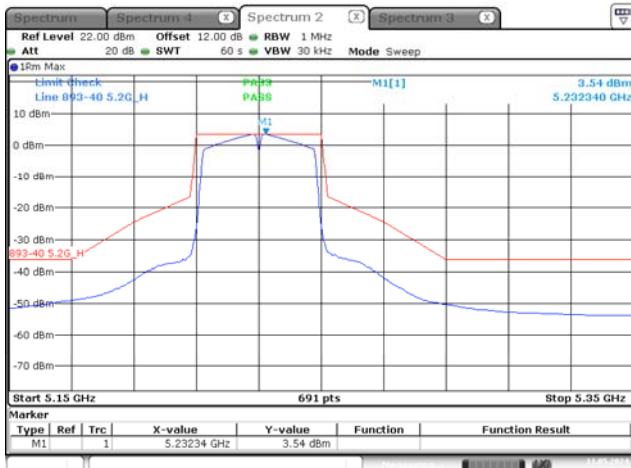


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:45:19

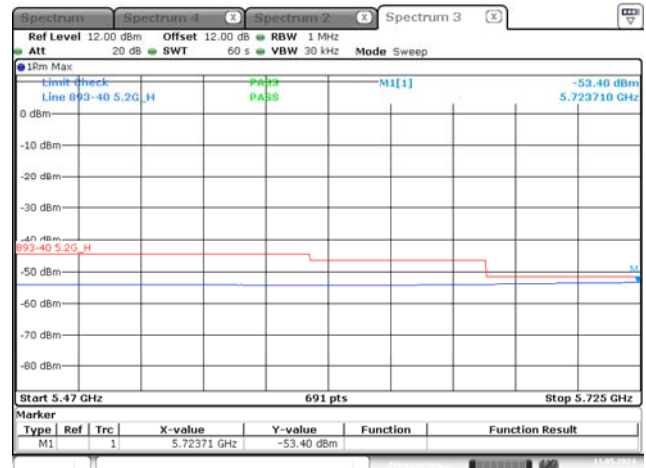


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:46:35

802.11 n40-5230 MHz

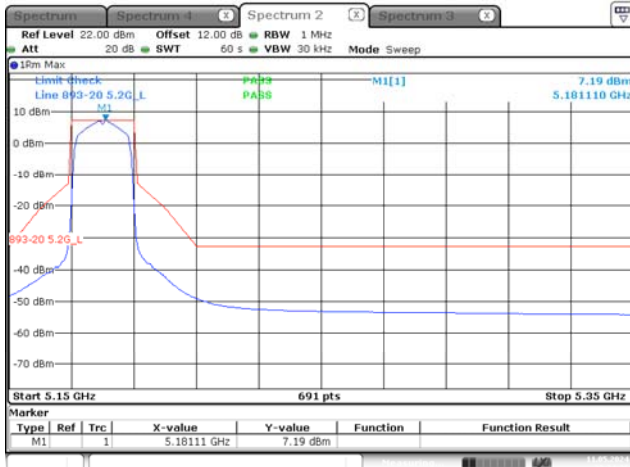


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:51:10

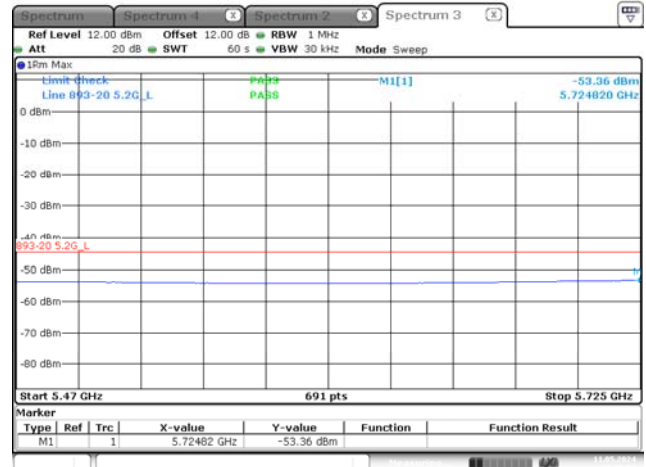


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:52:27

802.11 ac20-5180 MHz

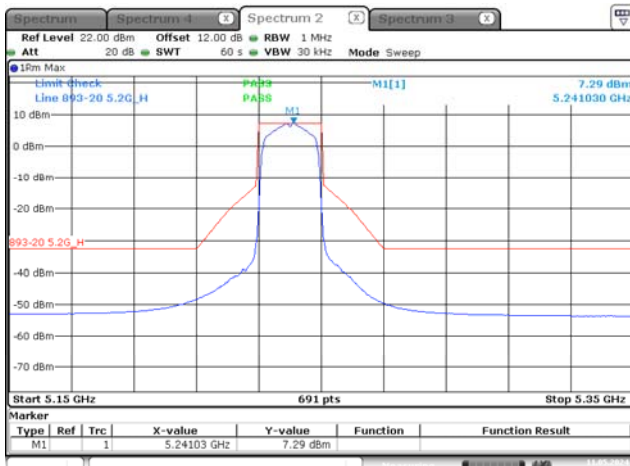


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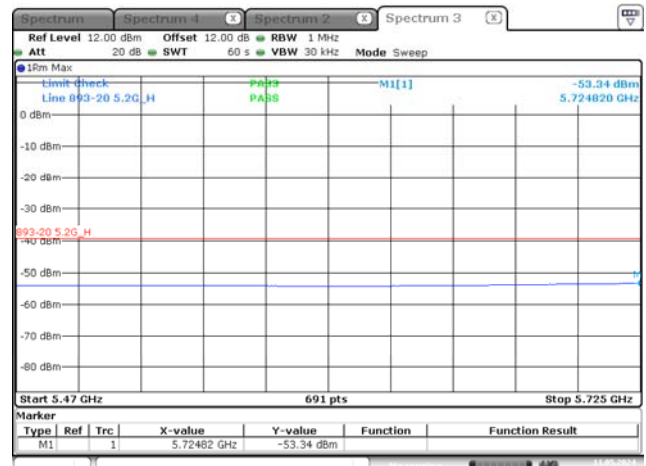


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:25:53

802.11 ac20-5240 MHz

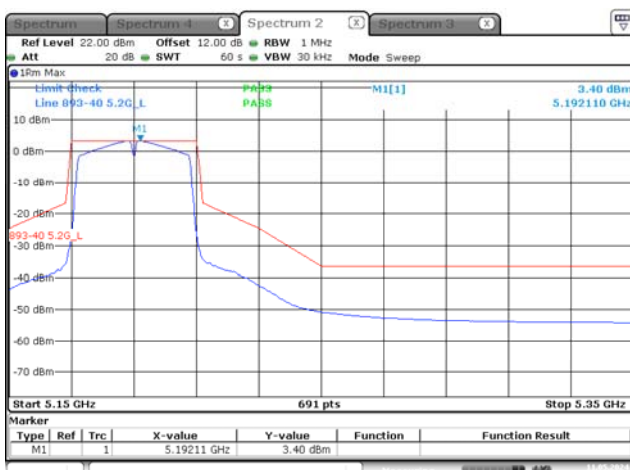


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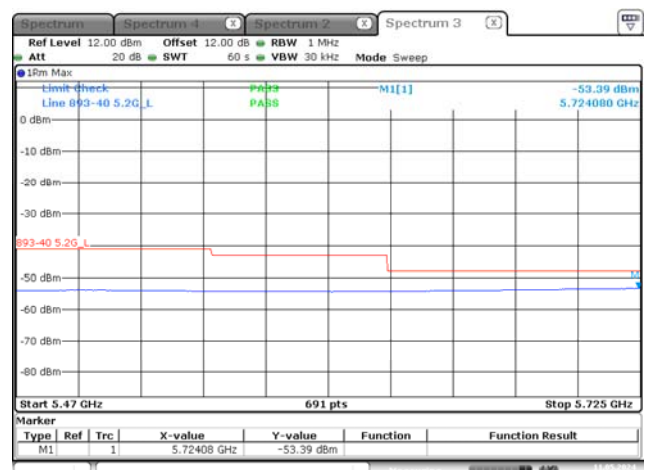


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:29:36

802.11 ac40-5190 MHz

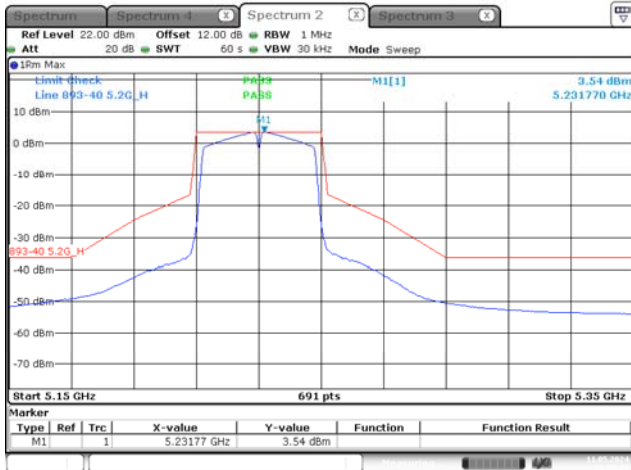


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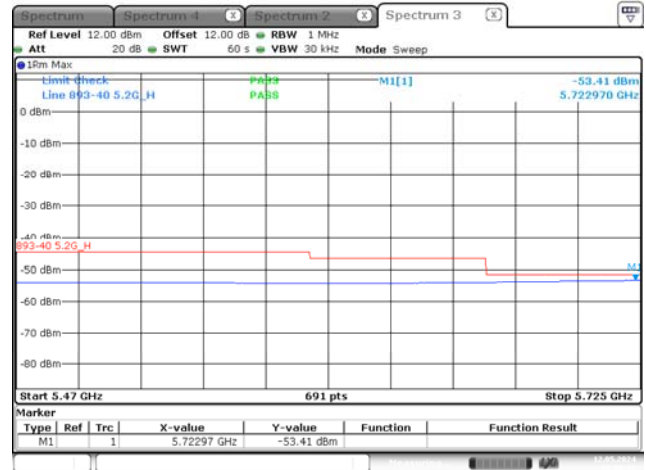


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:56:06

802.11 ac40-5230 MHz



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:59:26

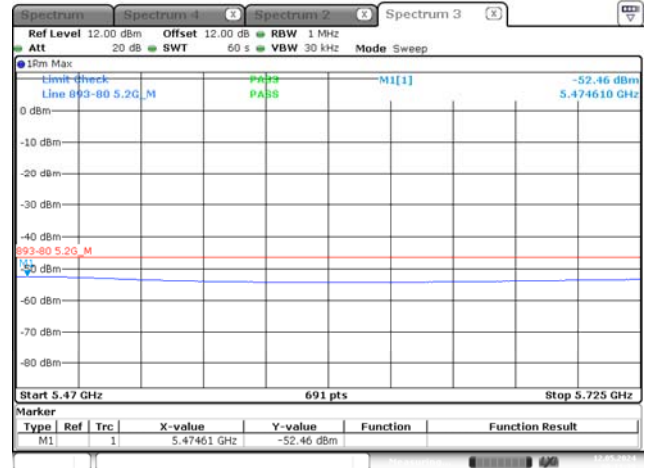


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:00:41

802.11 ac80-5210 MHz



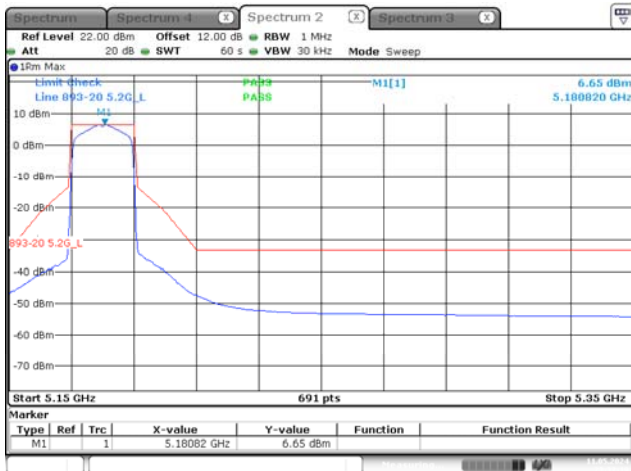
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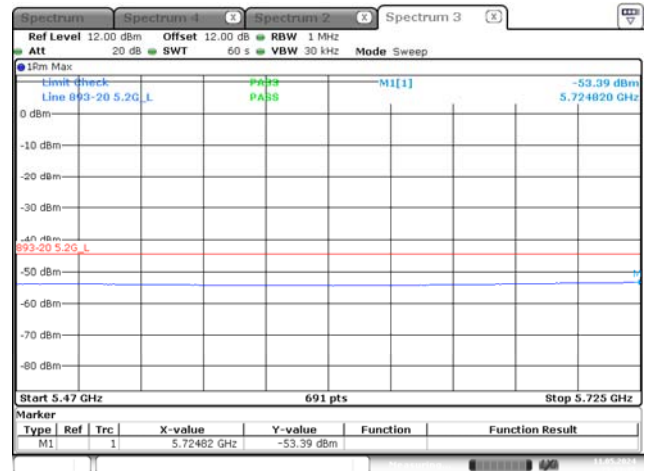
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Date: 12.MAY.2024 00:11:39

802.11ax mode

802.11 ax20-5180 MHz

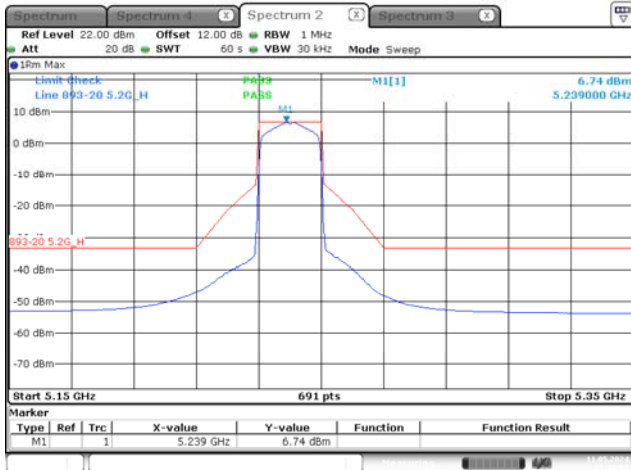


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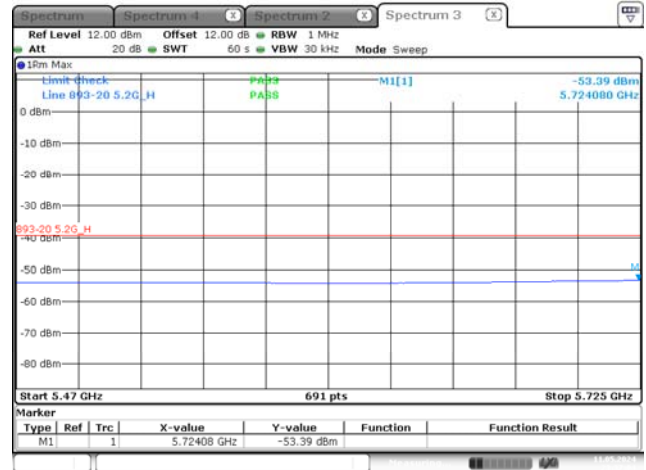


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Date: 11.MAY.2024 23:33:36

802.11 ax20-5240 MHz

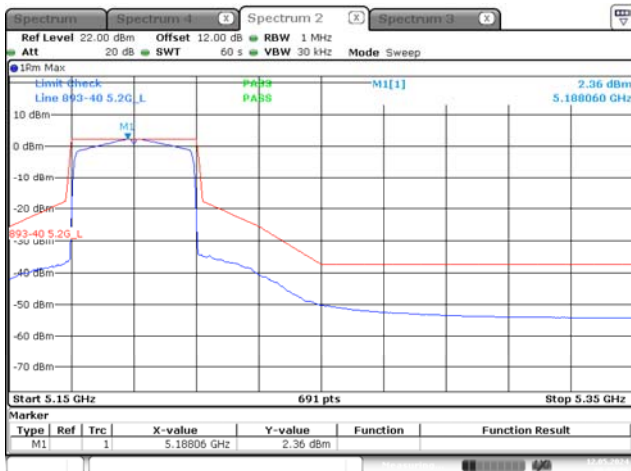


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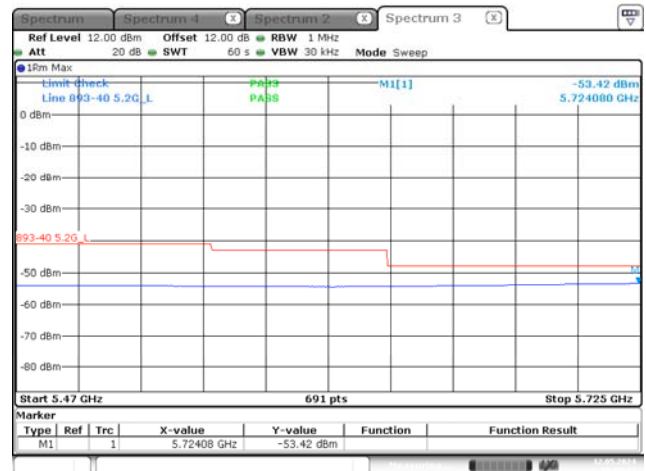


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 11.MAY.2024 23:37:04

802.11 ax40-5190 MHz

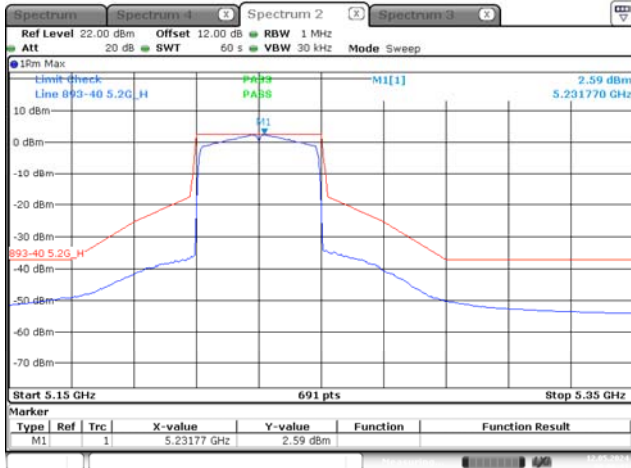


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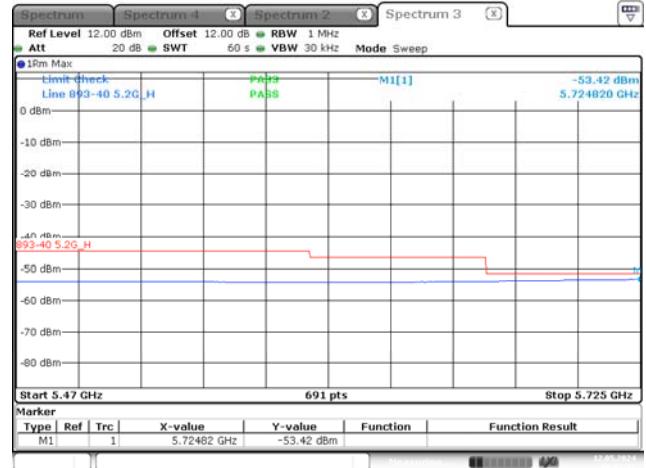


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:04:21

802.11 ax40-5230 MHz

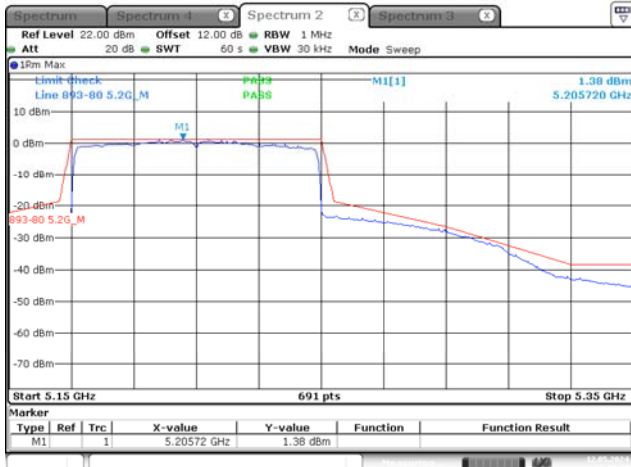


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:06:41

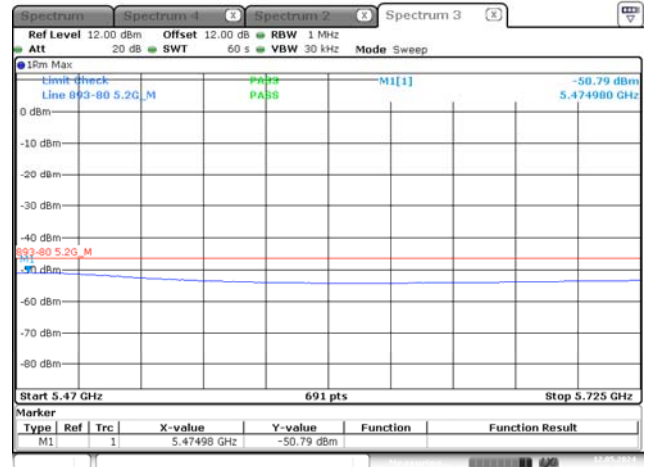


ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:07:57

802.11 ax80-5210 MHz



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:13:42



ProjectNo.:DG2240321-14597E-RF Tester:Stu Song
Date: 12.MAY.2024 00:15:08

6 – RECEIVER SPURIOUS EMISSIONS

Definition

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

Limit

The spurious emissions of the receiver shall not exceed the limits given in table 5.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

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 Procedure

According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.7

Test Data

Test Result: Compliant. Pre-scan all modes, worst case please refer to following tables.

802.11 a**5180****MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1546.20	H	50.32	-68.85	9.78	1.04	-60.11	-47.00	13.11
1554.26	V	50.02	-69.48	9.83	0.99	-60.64	-47.00	13.64
336.98	H	32.89	-75.07	0.00	0.20	-75.27	-57.00	18.27
304.61	V	38.25	-68.61	0.00	0.20	-68.81	-57.00	11.81

802.11 a**5240****MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1487.50	H	50.41	-68.76	9.44	1.33	-60.65	-47.00	13.65
1554.30	V	50.58	-68.92	9.83	0.99	-60.08	-47.00	13.08
337.18	H	34.56	-73.40	0.00	0.20	-73.60	-57.00	16.60
312.17	V	37.65	-68.99	0.00	0.20	-69.19	-57.00	12.19

802.11 n20**5180****MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1447.56	H	50.14	-68.10	9.24	1.27	-60.13	-47.00	13.13
1265.94	V	50.24	-67.97	7.96	1.16	-61.17	-47.00	14.17
315.48	H	33.34	-75.02	0.00	0.20	-75.22	-57.00	18.22
311.09	V	39.40	-67.27	0.00	0.20	-67.47	-57.00	10.47

802.11 n20**5240****MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1497.65	H	50.74	-68.66	9.49	1.35	-60.52	-47.00	13.52
1558.32	V	50.32	-69.17	9.85	0.96	-60.28	-47.00	13.28
318.82	H	31.55	-76.75	0.00	0.20	-76.95	-57.00	19.95
308.91	V	37.66	-69.08	0.00	0.20	-69.28	-57.00	12.28

802.11 n40**5190 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1498.32	H	50.74	-68.68	9.49	1.35	-60.54	-47.00	13.54
1454.48	V	50.38	-68.35	9.27	1.28	-60.36	-47.00	13.36
337.22	H	38.07	-69.89	0.00	0.20	-70.09	-57.00	13.09
312.18	V	40.61	-66.03	0.00	0.20	-66.23	-57.00	9.23

802.11 n40**5230 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1334.52	H	50.24	-67.10	8.54	1.19	-59.75	-47.00	12.75
1598.41	V	50.16	-69.28	10.09	0.69	-59.88	-47.00	12.88
314.38	H	32.00	-76.38	0.00	0.20	-76.58	-57.00	19.58
299.32	V	36.19	-70.81	0.00	0.20	-71.01	-57.00	14.01

802.11 ac20**5180 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1897.65	H	50.90	-65.62	11.78	1.01	-54.85	-47.00	7.85
1338.47	V	50.63	-67.48	8.57	1.19	-60.10	-47.00	13.10
337.54	H	35.62	-72.33	0.00	0.20	-72.53	-57.00	15.53
314.36	V	37.64	-68.94	0.00	0.20	-69.14	-57.00	12.14

802.11 ac20**5240 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1487.60	H	50.04	-69.13	9.44	1.33	-61.02	-47.00	14.02
1225.00	V	50.33	-67.71	7.55	1.12	-61.28	-47.00	14.28
314.67	H	33.41	-74.97	0.00	0.20	-75.17	-57.00	18.17
300.58	V	35.96	-71.01	0.00	0.20	-71.21	-57.00	14.21

802.11 ac40

5190 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1498.26	H	50.47	-68.95	9.49	1.35	-60.81	-47.00	13.81
1335.74	V	50.41	-67.72	8.55	1.19	-60.36	-47.00	13.36
337.22	H	33.72	-74.24	0.00	0.20	-74.44	-57.00	17.44
315.92	V	36.63	-69.90	0.00	0.20	-70.10	-57.00	13.10

802.11 ac40

5230 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1778.54	H	50.58	-67.16	11.04	0.70	-56.82	-47.00	9.82
1659.32	V	50.29	-68.26	10.52	0.72	-58.46	-47.00	11.46
337.36	H	34.63	-73.33	0.00	0.20	-73.53	-57.00	16.53
314.72	V	36.21	-70.36	0.00	0.20	-70.56	-57.00	13.56

802.11 ac80

5210 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1549.20	H	50.46	-68.70	9.80	1.02	-59.92	-47.00	12.92
1236.50	V	50.41	-67.68	7.67	1.13	-61.14	-47.00	14.14
334.67	H	35.20	-72.81	0.00	0.20	-73.01	-57.00	16.01
318.82	V	36.66	-69.79	0.00	0.20	-69.99	-57.00	12.99

802.11 ax20

5180 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1549.00	H	50.74	-68.42	9.79	1.02	-59.65	-47.00	12.65
1205.00	V	50.55	-67.41	7.35	1.10	-61.16	-47.00	14.16
336.87	H	36.31	-71.65	0.00	0.20	-71.85	-57.00	14.85
314.14	V	36.27	-70.32	0.00	0.20	-70.52	-57.00	13.52

802.11 ax20

5240 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1265.90	H	50.18	-67.06	7.96	1.16	-60.26	-47.00	13.26
1635.20	V	50.32	-68.59	10.35	0.70	-58.94	-47.00	11.94
314.58	H	35.17	-73.21	0.00	0.20	-73.41	-57.00	16.41
317.95	V	37.01	-69.47	0.00	0.20	-69.67	-57.00	12.67

802.11 ax40**5190 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1332.50	H	50.48	-66.87	8.53	1.19	-59.53	-47.00	12.53
1245.65	V	50.45	-67.67	7.76	1.14	-61.05	-47.00	14.05
339.63	H	35.87	-72.04	0.00	0.20	-72.24	-57.00	15.24
318.20	V	36.17	-70.30	0.00	0.20	-70.50	-57.00	13.50

802.11 ax40**5230 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1699.32	H	50.20	-67.15	10.80	0.75	-57.10	-47.00	10.10
1254.30	V	50.17	-67.99	7.84	1.14	-61.29	-47.00	14.29
338.47	H	36.21	-71.72	0.00	0.20	-71.92	-57.00	14.92
318.62	V	35.85	-70.61	0.00	0.20	-70.81	-57.00	13.81

802.11 ax80**5210 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1235.29	H	50.49	-66.56	7.65	1.13	-60.04	-47.00	13.04
1226.57	V	50.33	-67.72	7.57	1.12	-61.27	-47.00	14.27
338.23	H	34.95	-72.99	0.00	0.20	-73.19	-57.00	16.19
318.62	V	36.14	-70.32	0.00	0.20	-70.52	-57.00	13.52

Note 1: The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

Note 2:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

8 – ADAPTIVITY

Applicable Standard

Adaptivity (Channel Access Mechanism) is an automatic mechanism by which a device limits its transmissions and gains access to an Operating Channel.

§4.2.7.3.1 Frame Based Equipment:

Frame Based Equipment shall implement a Listen Before Talk (LBT) based Channel Access Mechanism to detect the presence of other RLAN transmissions on an Operating Channel.

§4.2.7.3.2 Load Based Equipment:

Load based Equipment shall implement a Listen Before Talk (LBT) based Channel Access Mechanism to detect the presence of other RLAN transmissions on an Operating Channel.

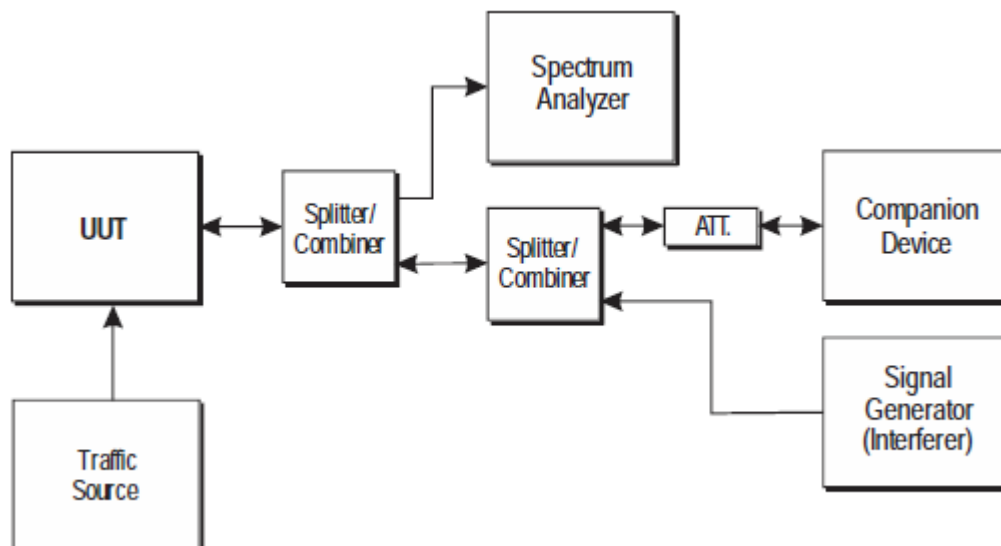
Limit

According to ETSI EN 301 893 V2.1.1 (2017-05) §4.2.7.3.1&§4.2.7.3.2

Test Procedure

According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.9

Block Diagram of Test Setup

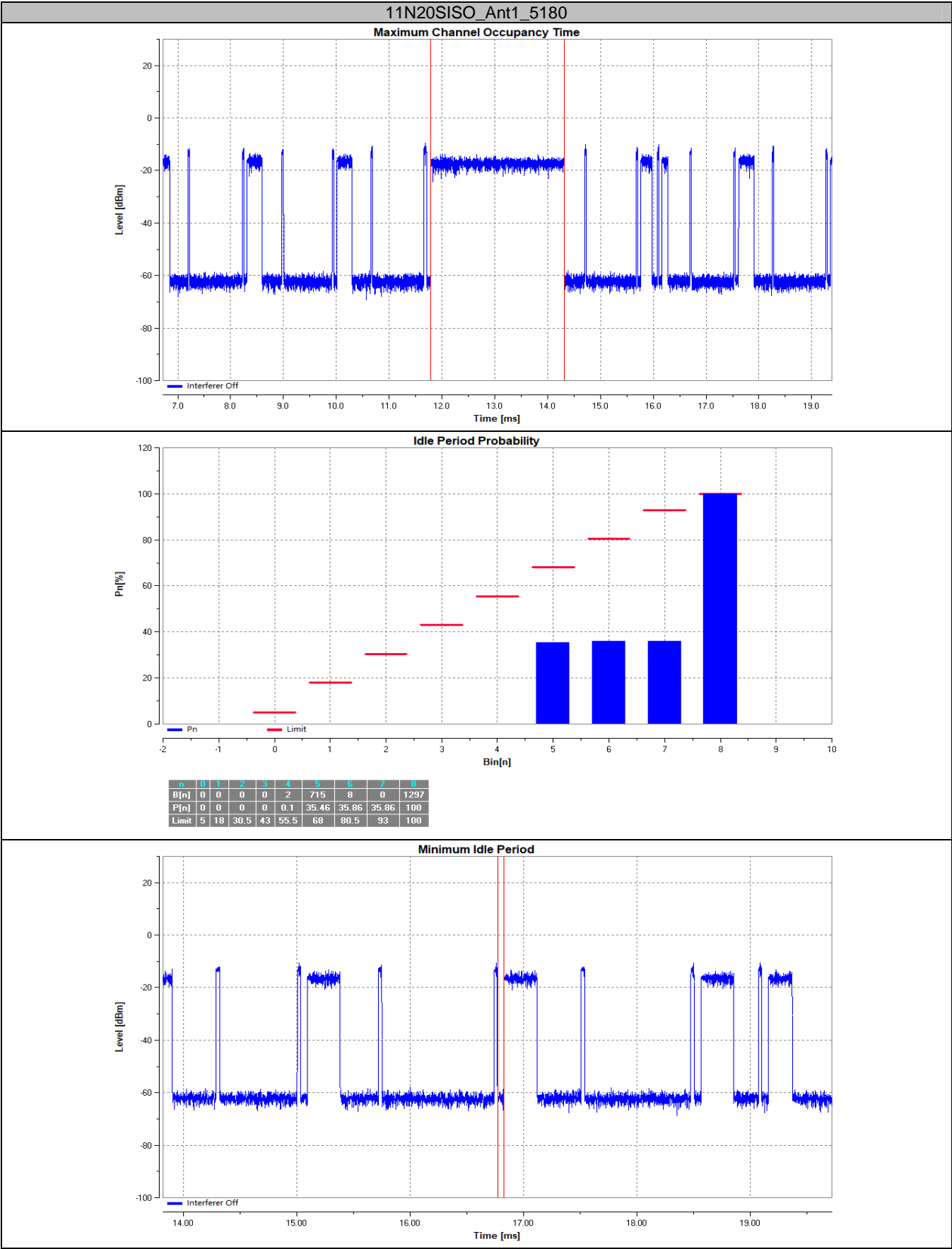


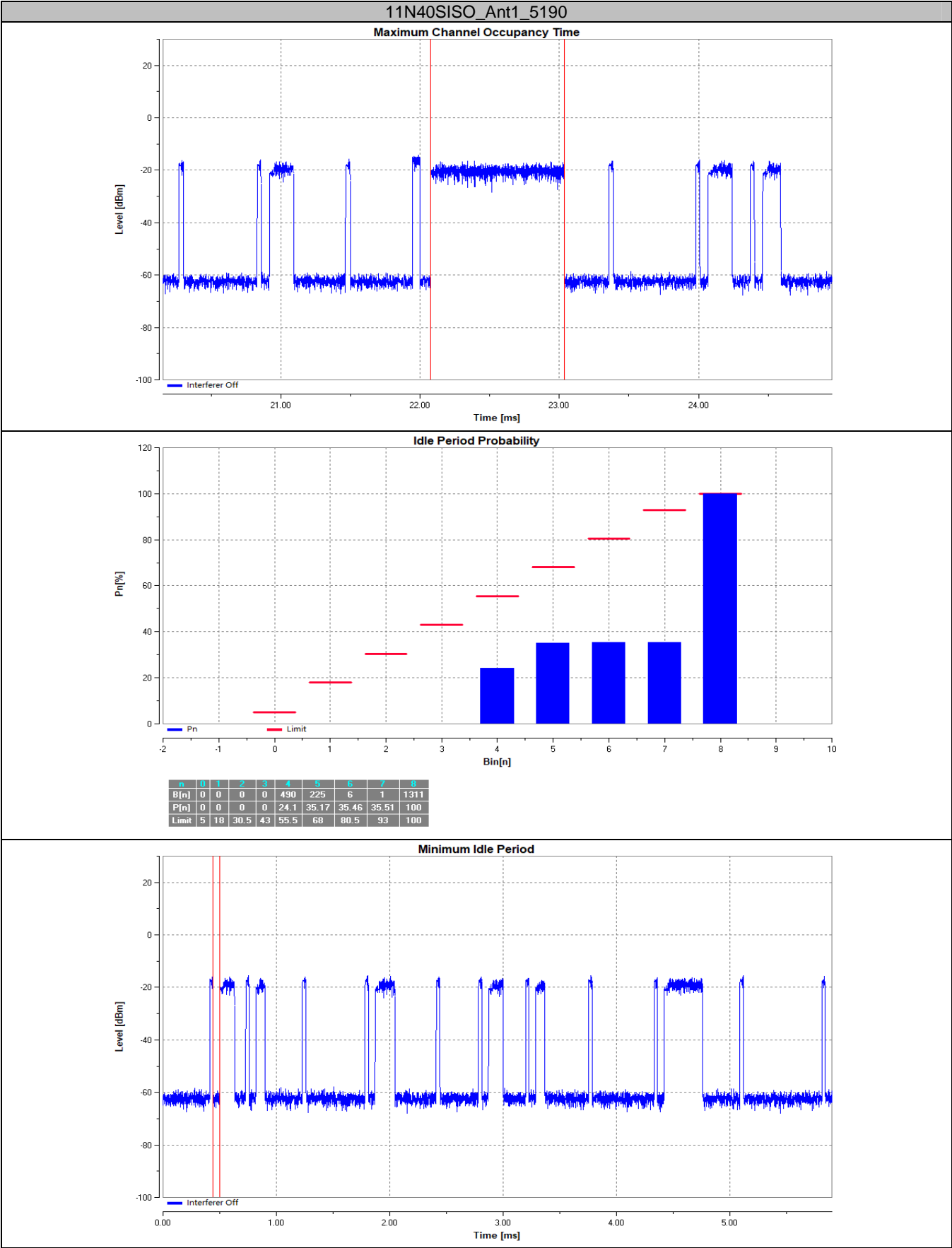
Test Data**Test Result:** Compliant. Please refer to following tables.

TestMode	Antenna	Freq(MHz)	Priority Class	COT Num [n]	Max. COT [ms]	Limit [ms]	Min.Idle Time[ms]	Limit [ms]	Idle Period probability	Verdict
11N20SISO	Ant1	5180	3	10022	2.532	4.000	0.059	0.027	See the graph	PASS
11N40SISO	Ant1	5190	3	10033	0.961	4.000	0.059	0.027	See the graph	PASS

TestMode	Antenna	Freq(MHz)	Interference Type	Add interference Time [ms]	Interference Level [dBm/MHz]	Max. Short Control number [n]	Limit [n]	Max. Short ControlTime [ms]	Limit [ms]	Verdict
11N20SISO	Ant1	5180	AWGN	2100	-74.50	1	50	0.20	2.5	PASS
			OFDM	2100	-74.50	2	50	0.40	2.5	PASS
			LTE	2100	-74.50	2	50	0.40	2.5	PASS
11N40SISO	Ant1	5190	AWGN	2100	-74.50	3	50	0.70	2.5	PASS

Please refer to following plots:

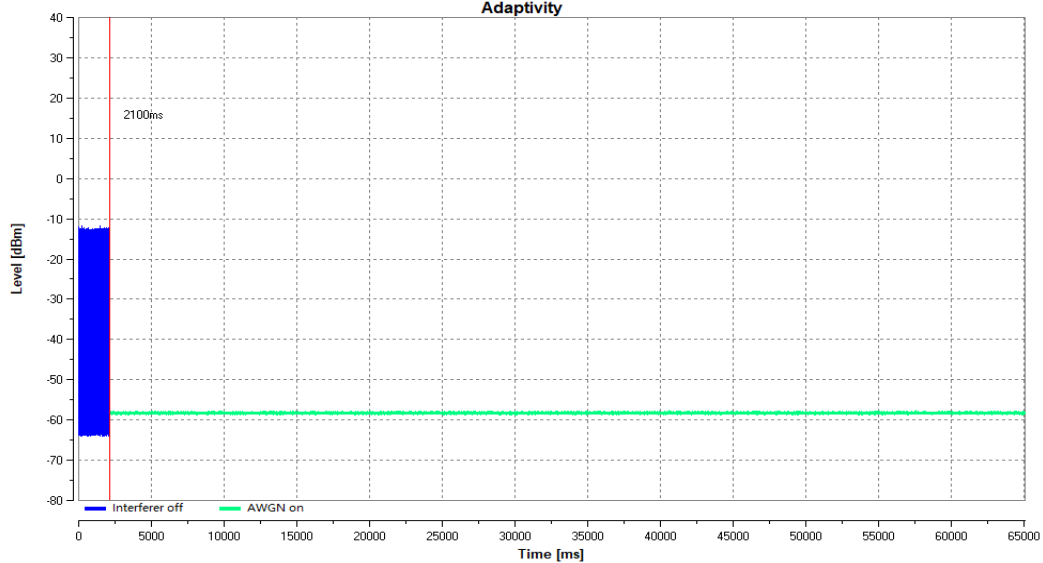




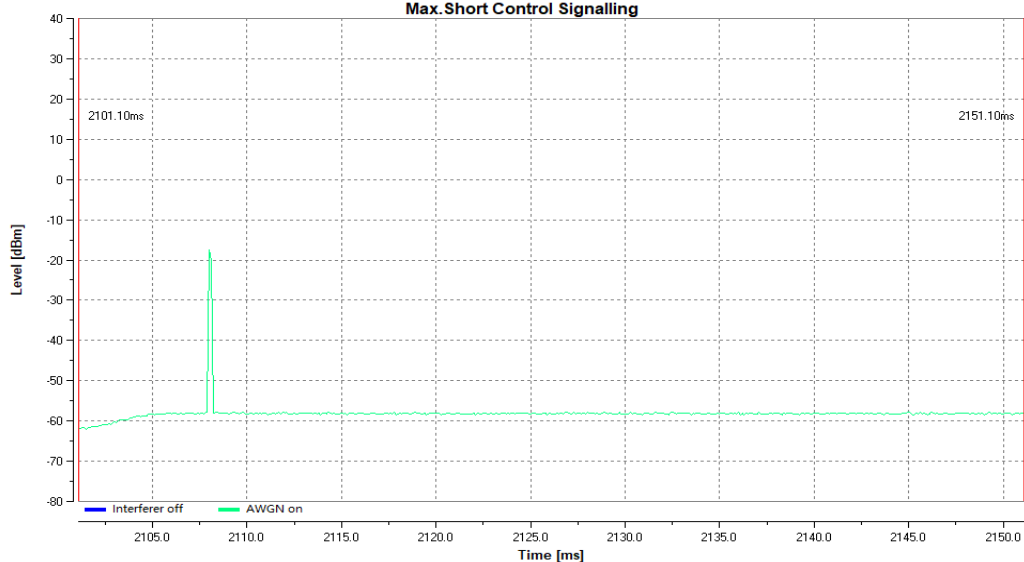
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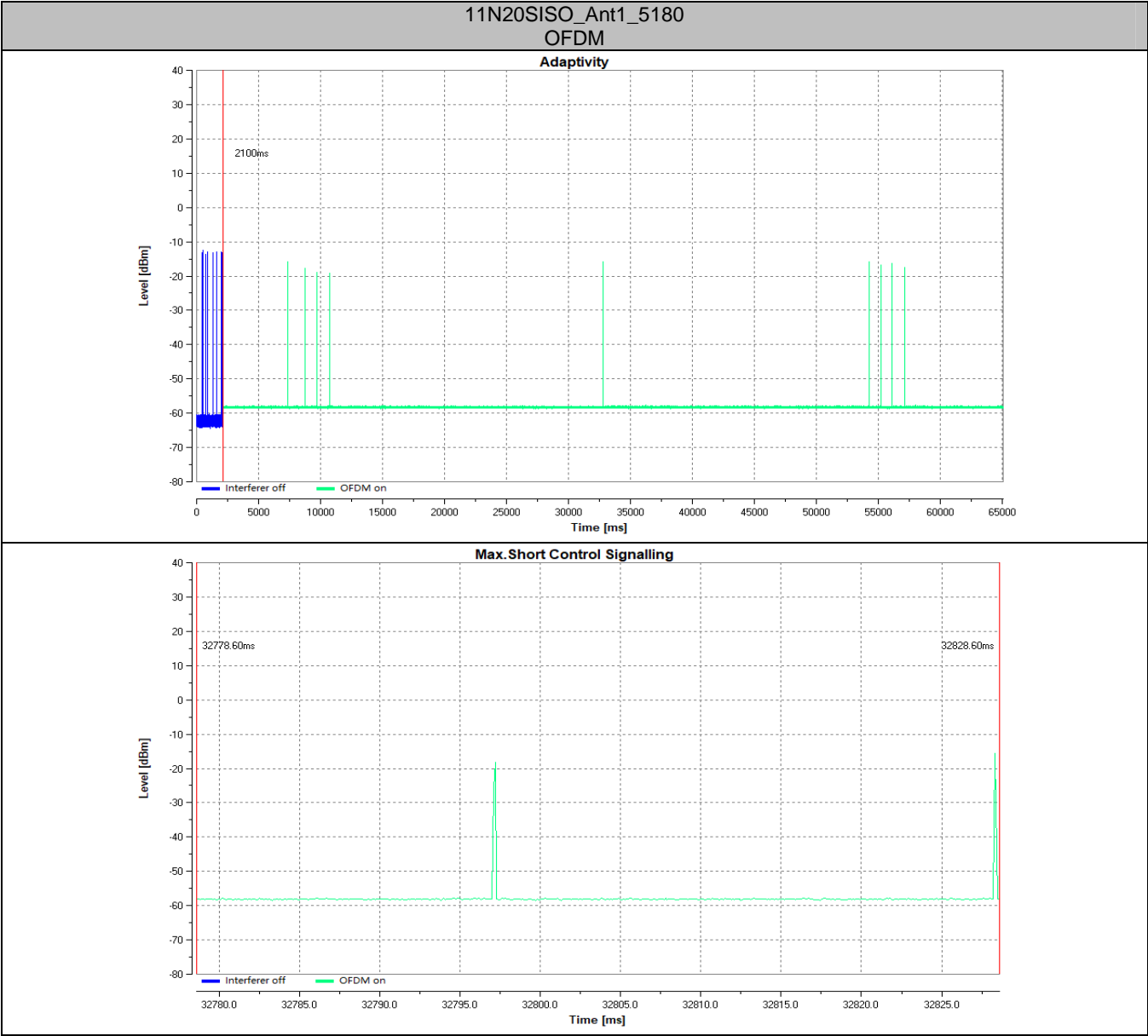
AWGN

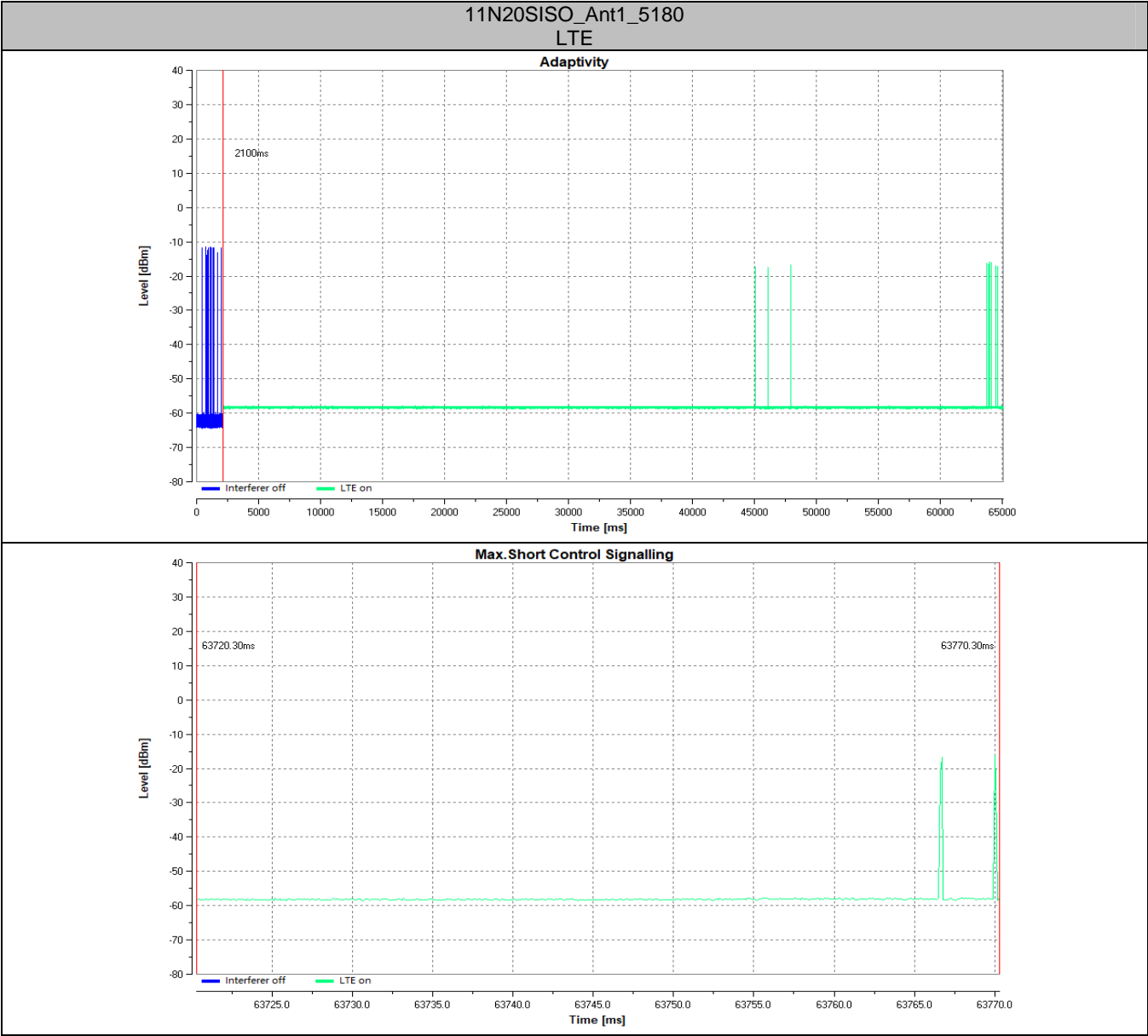
Adaptivity

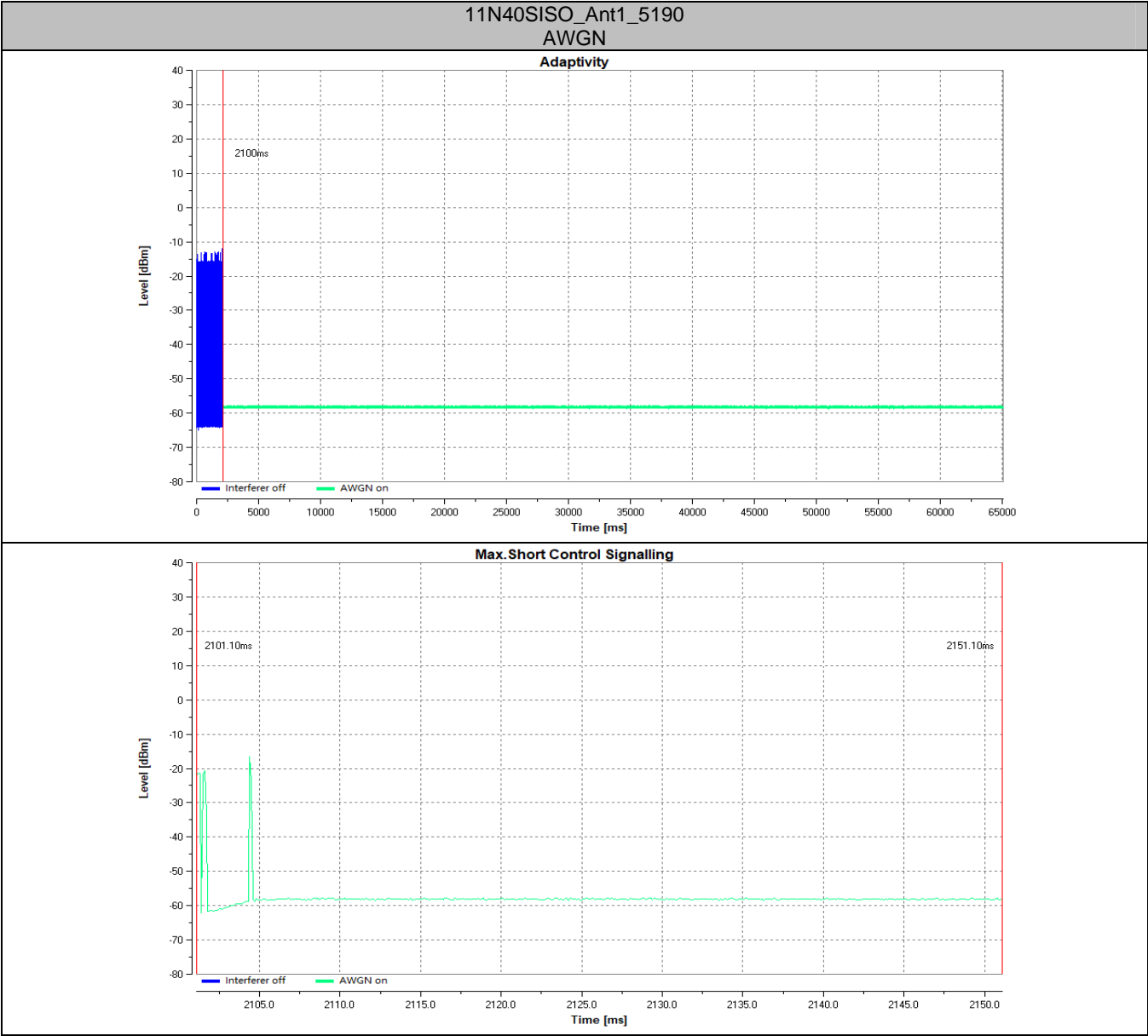


Max. Short Control Signalling









9 – RECEIVER BLOCKING

Applicable Standard

Receiver blocking is a measure of the capability of the equipment to receive a wanted signal on its operating channel without exceeding a given degradation due to the presence of an unwanted input signal (blocking signal) on frequencies other than those of the operating bands provided in table 1.

Limit

The minimum performance criterion shall be a PER of less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment

While maintaining the minimum performance criteria as defined in clause 4.2.8.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 9.

Table 9: Receiver Blocking parameters

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)	
$P_{min} + 6$ dB	5 100	-53	-59	Continuous Wave
$P_{min} + 6$ dB	4 900 5 000 5 975	-47	-53	Continuous Wave

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.

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.

Test Procedure

According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.10

Block Diagram of Test Setup

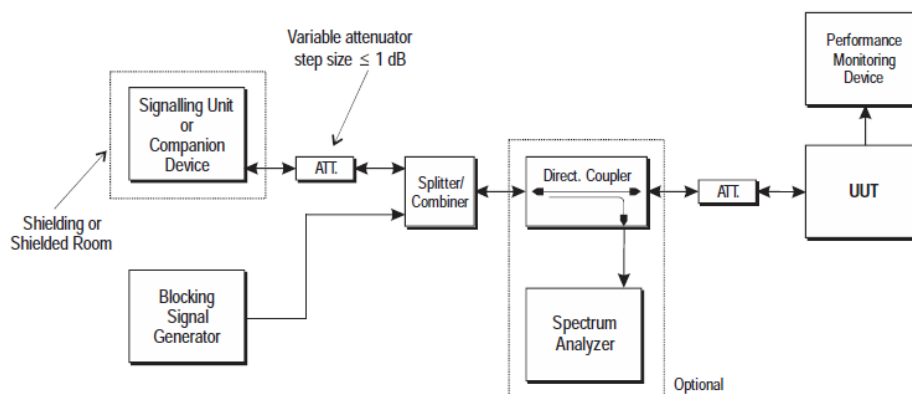


Figure 14: Test Set-up for receiver blocking

Test Data

Test Result: Compliant. Please refer to following tables.

Note: CMW500 was used to monitor the PER, and the worst case as below.

Test Mode	Pmin (dBm)	Wanted signal Power from companion device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Max Blocking Signal Power (dBm)	PER (%)	Limit (%)
802.11 a (5180 MHz)	-95	-89	5100	-53	-48	5.7	≤ 10
			4900	-47	-42	4.9	
			5000	-47	-45	4.2	
			5975	-47	-43	3.6	

EXHIBIT A – EUT PHOTOGRAPHS

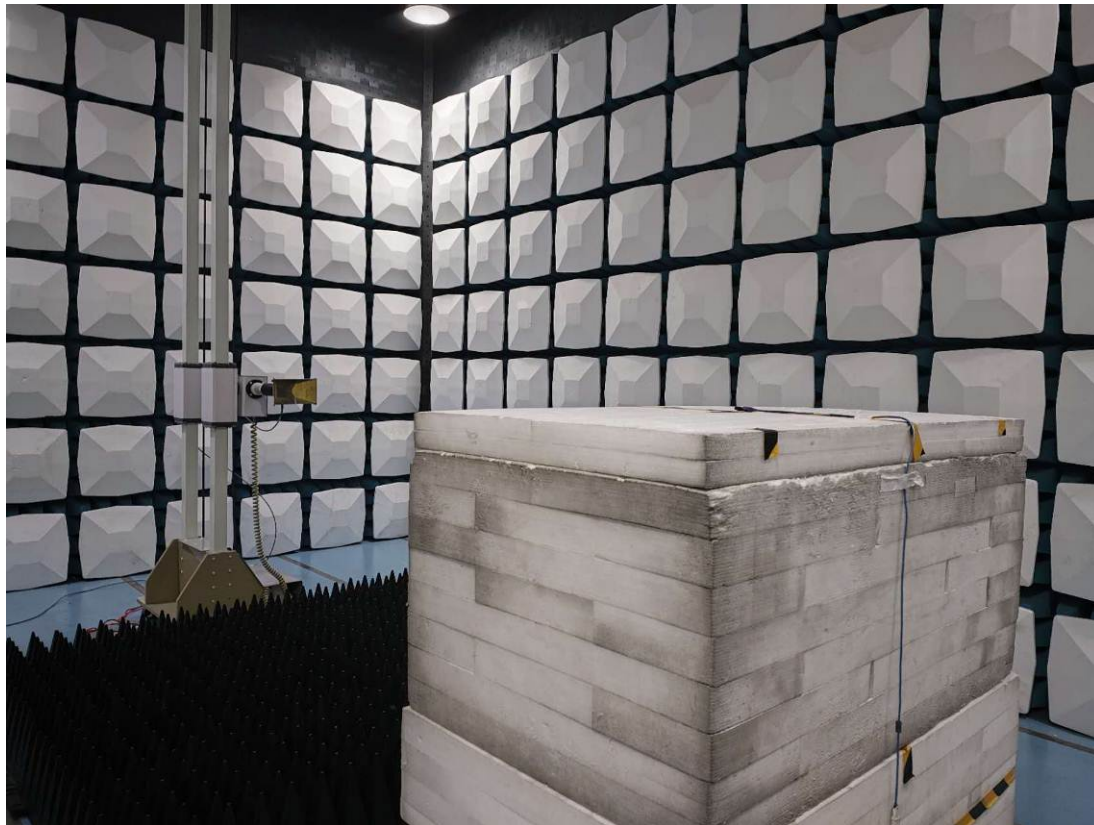
For photos in this section, please refer to report No.: DG2240321-14597E-02 EXHIBIT A.

EXHIBIT B – TEST SET UP PHOTOGRAPHS

Radiated Emission Below 1GHz View



Radiated Emission Above 1GHz View



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