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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: Mesh3X
Multiple Models: MX3, EX3

Report Type:	**Product Type:**
Original Report	Whole Home Mesh Wi-Fi 6 System

Report Number:	DG2221129-57774E-22A
Report Date:	2023/1/11
Reviewed By:	Fay Hu Project Engineer
Approved By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product Name:		Whole Home Mesh Wi-Fi 6 System
Tested Model:		Mesh3X
Multiple Models:		MX3, EX3
Rated Input Voltage:		12Vdc from adapter
Adapter 1# Information	**Model:**	BN073-A12012E
	Input:	100-240Vac, 50/60Hz, 0.4A
	Output:	DC12V, 1A
Adapter 2# Information	**Model:**	BN073-A12012B
	Input:	100-240Vac, 50/60Hz, 0.4A
	Output:	DC12V, 1A
Serial Number:		1SRR
EUT Received Date:		2022/11/30
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):		21.63
Number of Chains	**Transmit:**	1
	Receive:	1
Antenna Gain (dBi)_5.2G▲_Chain 0:		3.03
Antenna Gain (dBi)_5.2G▲_Chain 1:		3.32
Beamforming▲Antenna Gain (dBi):		3
Modulation Type:		OFDM

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	$\pm 1\times10^{-6}$	$\pm 1\times10^{-5}$
RF power conducted	±0.61dB	±1,5dB
RF power radiated	±3.62dB	±6dB
Spurious emissions, conducted	±2.47dB	±3dB
Spurious emissions, radiated	±3.62dB	±6dB
Temperature	±1℃	±2℃
Humidity	±5%	±5%
Time	1%	±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

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

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, the vh20/vht40 were reduced since the identical parameters with 802.11n ht20 and ht40.

For 5150~5250 MHz band (W52), 7 channels were provided. 802.11a /n ht20/ax20 mode was tested with 5180MHz; 802.11n ht40/ax40 mode was tested with 5190MHz; 802.11ac vht80/ax80 mode was tested with 5210 MHz:

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 "mp_tool_8832b▲" 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▲.

Mode	Frequency (MHz)	Data rate (Mbps)	Power level	
			Ant 1(Chain 0)	Ant 2(Chain 1)
802.11 a	5180	6	21	19
	5240	6	21	19
802.11 n20	5180	MCS8	17.5	16
	5240	MCS8	17.5	16
802.11 n40	5190	MCS8	21	20
	5230	MCS8	21	20
802.11 ac20	5180	MCS8	18	16
	5240	MCS8	18	16
802.11 ac40	5190	MCS8	18.5	17
	5230	MCS8	18.5	17
802.11 ac80	5210	MCS8	19	18

Test Mode	Frequency (MHz)	Tones/ RU Index	Data rate (Mbps)	Power level	
				Ant 1 (Chain 0)	Ant 2 (Chain 1)
802.11 ax20	5180	26	MCS8	8	9
		52	MCS8	11	12
		106	MCS8	14	15
		242	MCS8	17.5	18
	5240	26	MCS8	9	9
		52	MCS8	12	12
		106	MCS8	15	15
		242	MCS8	18	18
802.11 ax40	5190	26	MCS8	6	5
		52	MCS8	9	8
		106	MCS8	12	11
		242	MCS8	15	14
		484	MCS8	18	17
	5230	26	MCS8	6	5
		52	MCS8	9	8
		106	MCS8	12	11
		242	MCS8	15	14
		484	MCS8	18	17
802.11 ax80	5210	26	MCS8	3	2
		52	MCS8	6	5
		106	MCS8	9	8
		242	MCS8	12	11
		484	MCS8	15	14
		996	MCS8	18	17

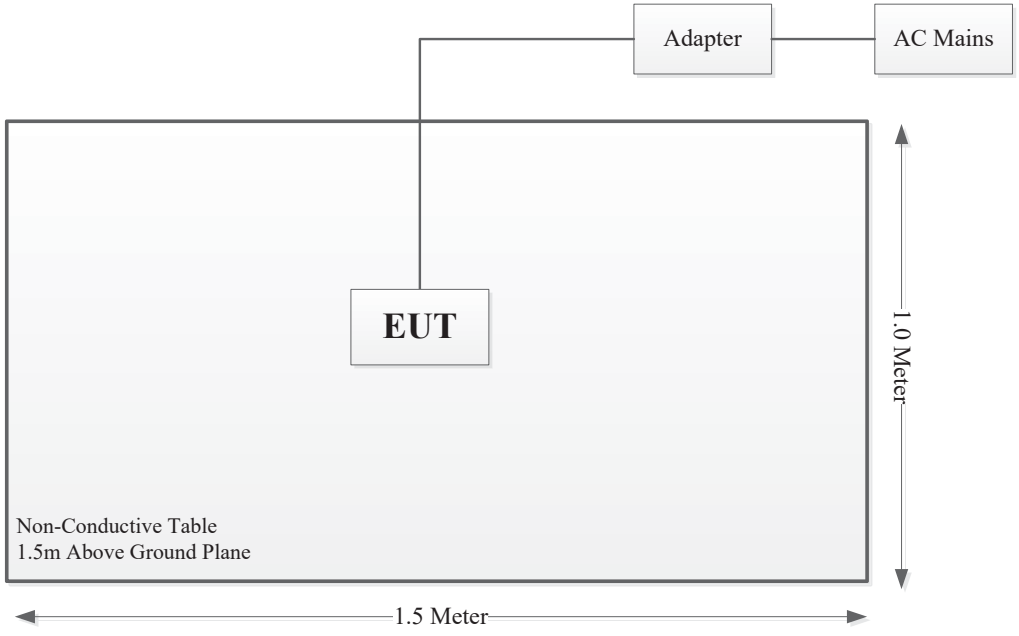
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
Power Cable	No	No	2.8	USB Port of adapter	EUT

Block Diagram of Test Setup



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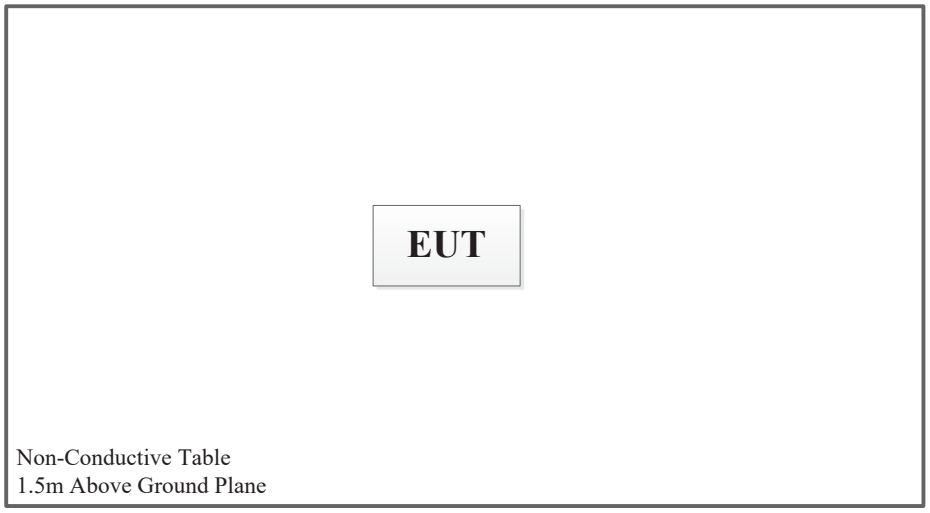


Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated emissions below 1GHz					
EMCO	Passive Loop	6512	9706-1206	2020/3/5	2023/3/4
Sunol Sciences	Antenna	JB3	A060611-2	2020/8/25	2023/8/24
R&S	EMI Test Receiver	ESCI	100224	2022/10/24	2023/10/23
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2022/8/19	2023/8/18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2022/8/19	2023/8/18
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2022/8/19	2023/8/18
Sonoma	Amplifier	310N	185914	2022/8/19	2023/8/18
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2022/9/4	2023/9/3
Agilent	Signal Generator	E8247C	MY43321350	2022/4/1	2023/3/31
Radiated emissions above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2021/10/12	2024/10/11
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2020/12/5	2023/12/4
Agilent	Spectrum Analyzer	E4440A	SG43360054	2022/7/15	2023/7/14
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2022/9/4	2023/9/3
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2022/6/27	2023/6/26
AH	Preamplifier	PAM-0118	469	2022/10/13	2023/10/12
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2022/6/27	2023/6/26
AH	Double Ridge Guide Horn Antenna	SAS-571	1394	2022/5/18	2025/5/17
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2020/12/5	2023/12/4
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2022/9/4	2023/9/3
Agilent	Signal Generator	E8247C	MY43321350	2022/4/1	2023/3/31
Mini Circuits	High Pass Filter	VHF-6010+	31118	2022/6/16	2023/6/15
RF conducted					
R&S	Spectrum Analyzer	FSV40	101947	2022/7/15	2023/7/14
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	OE01201047	2022/5/6	2023/5/5
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	2022/9/4	2023/9/3
Agilent	USB Wideband Power Sensor	U2022XA	MY54170006	2022/4/1	2023/3/31
R&S	Wideband Radio Communication Tester	CMW500	149216	2022/4/1	2023/3/31
BACL	TEMP&HUMI Test Chamber	BTH-150	30022	2022/2/24	2023/2/23
Keysight	MXA Signal Analyzer	N9020	MY48490137	2022/10/24	2023/10/23
Agilent	MXG Analog Signal Generator	N5181A	MY48180151	2022/10/24	2023/10/23
Agilent	MXG Vector Signal Generator	N5182A	MY49060274	2022/10/24	2023/10/23
Tonscend	RF Control Unit	JS0806-2	19G8060171	2022/10/24	2023/10/23

* 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
Temperature:	21.5 ℃	19.9 ℃	19.4~22.5℃
Relative Humidity:	54.0 %	46.0 %	29~60%
ATM Pressure:	101.7 kPa	101.5 kPa	101.3~102.4kPa
Tester:	Bill Yang	Lucky Lu	Fan Fan
Test Date:	2022/12/9	2022/12/7	2022/12/13~2023/1/10

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 do not works on DFS frequency 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 fc ± 20 ppm.

Test Procedure

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

Test Data

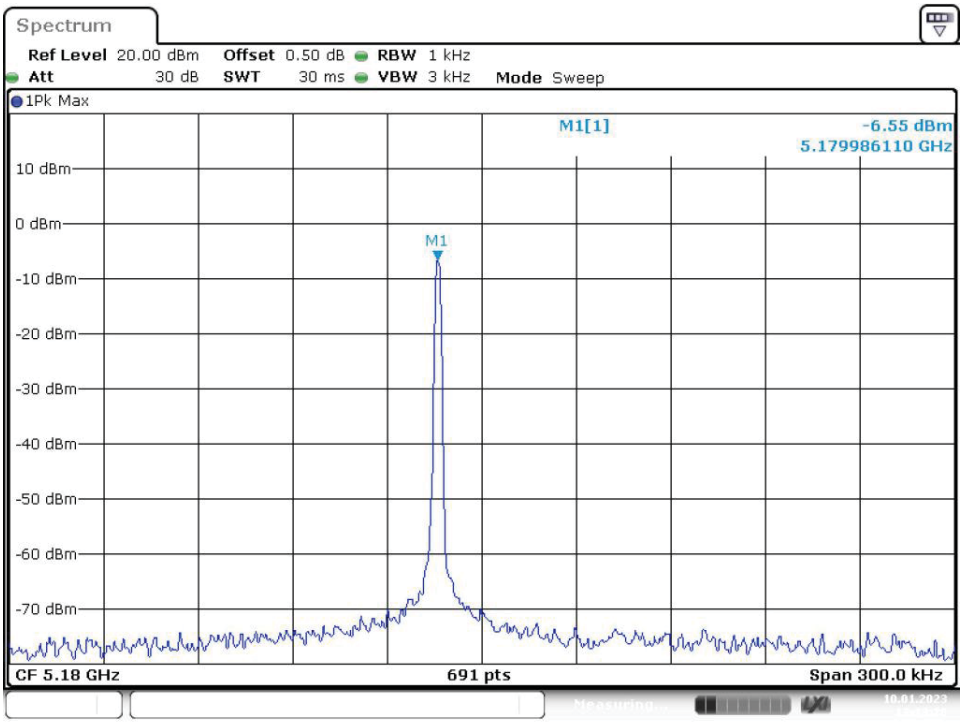
Test Result: *Compliant. Please refer to following table(s) and Plot(s).*

Band (MHz)	Fc (MHz)	Test Condition	F (MHz)	Result (ppm)	Limit (ppm)
5150-5250	5180	NT	5179.98611	-2.68	± 20
		LT	5179.98622	-2.66	
		HT	5179.98601	-2.70	
	5240	NT	5239.98567	-2.73	± 20
		LT	5239.98578	-2.71	
		HT	5239.98559	-2.75	

Note: Result = (F-Fc)/Fc*10^6

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

5180 MHz



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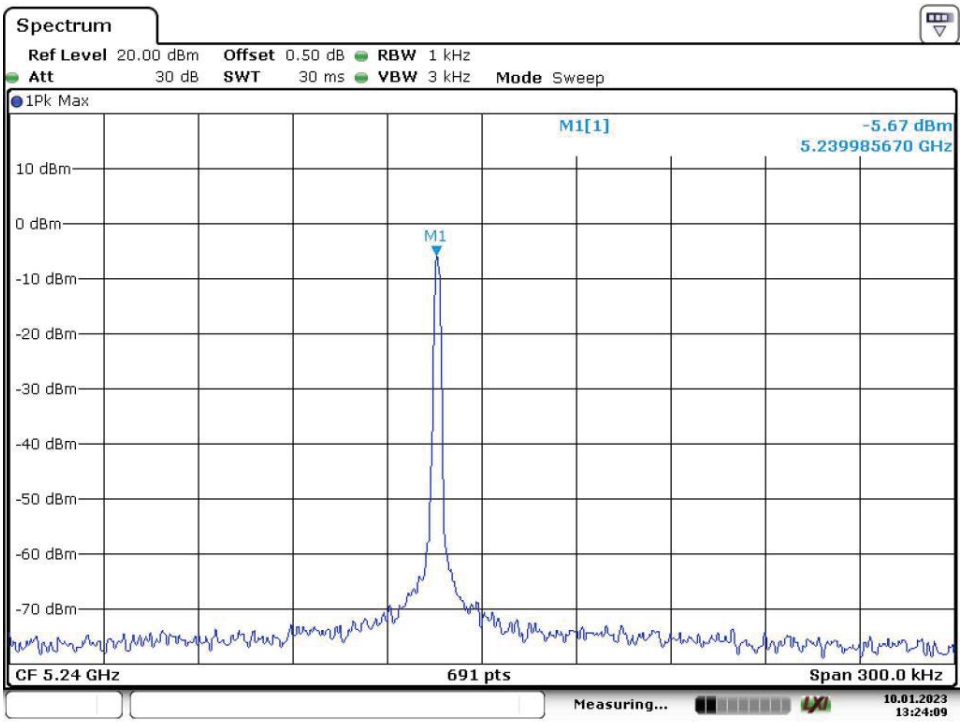
5240 MHz



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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

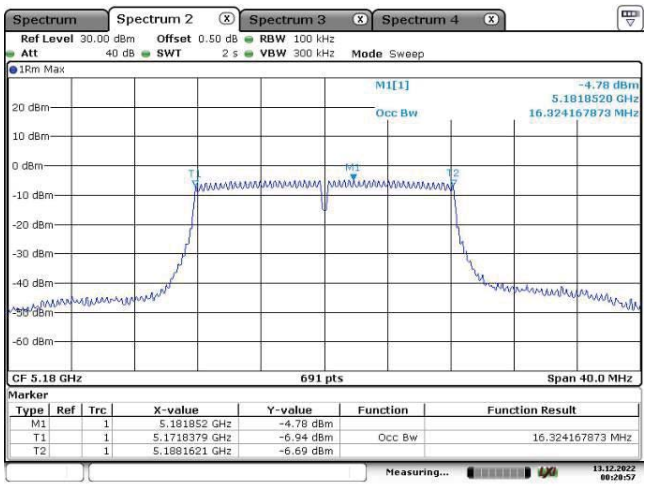
According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.3

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	17.60	16~20	Pass
		5240	20	17.60	16~20	Pass
	802.11 n40	5190	40	36.12	32~40	Pass
		5230	40	36.12	32~40	Pass
	802.11 ac20	5180	20	17.54	16~20	Pass
		5240	20	17.54	16~20	Pass
	802.11 ac40	5190	40	36.01	32~40	Pass
		5230	40	36.01	32~40	Pass
	802.11 ac80	5210	80	75.48	64~80	Pass
	802.11 ax20	5180	20	18.81	16~20	Pass
		5240	20	18.81	16~20	Pass
	802.11 ax40	5190	40	37.63	32~40	Pass
		5230	40	37.63	32~40	Pass
	802.11 ax80	5210	80	75.48	64~80	Pass

802.11 a



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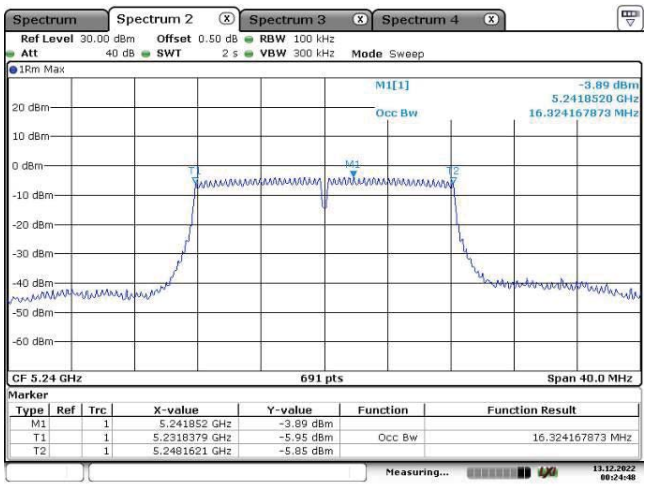

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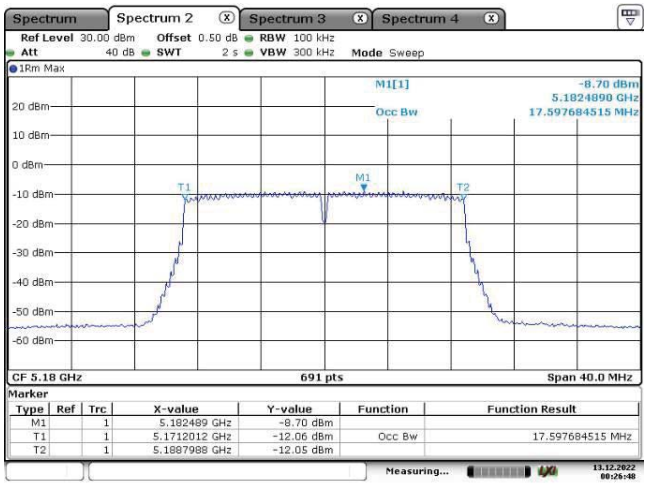
802.11 n20



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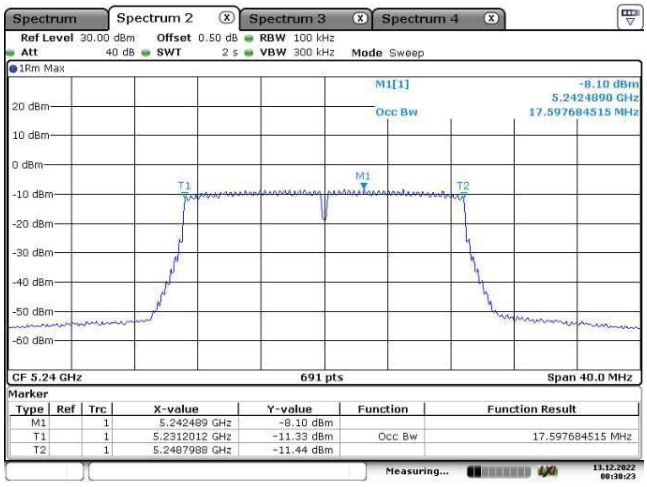

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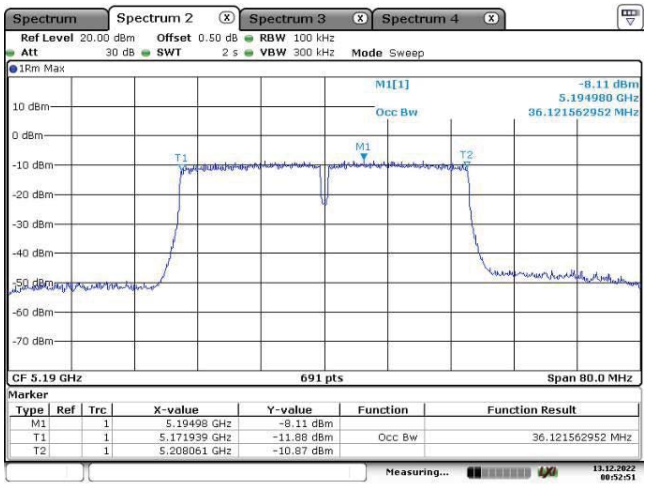
802.11 n40



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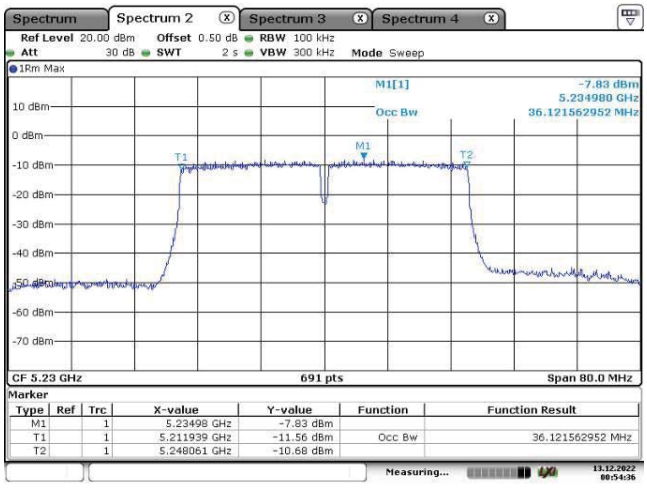

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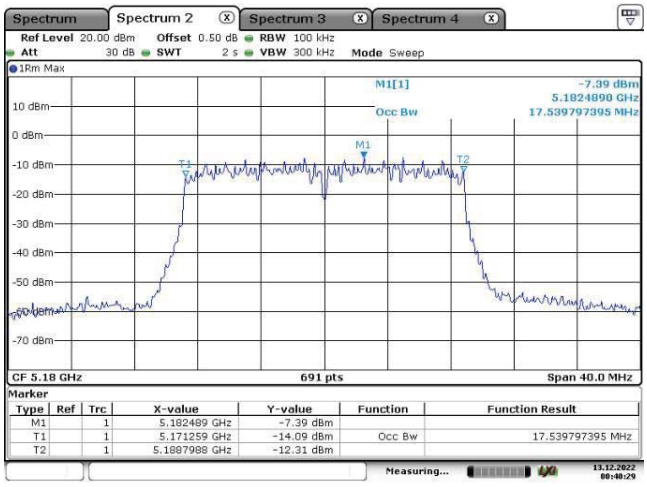

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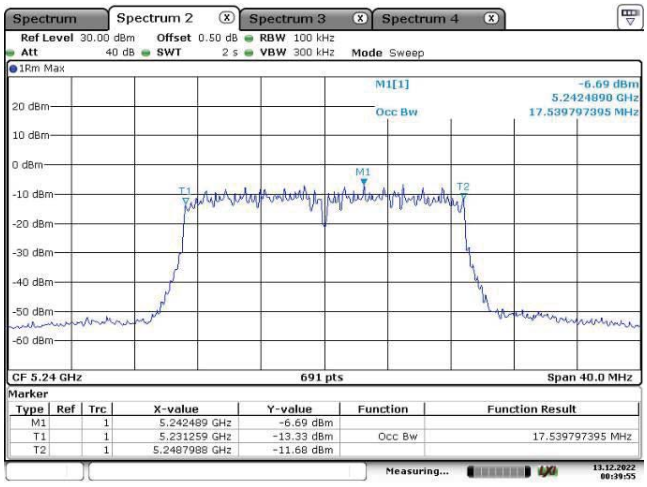

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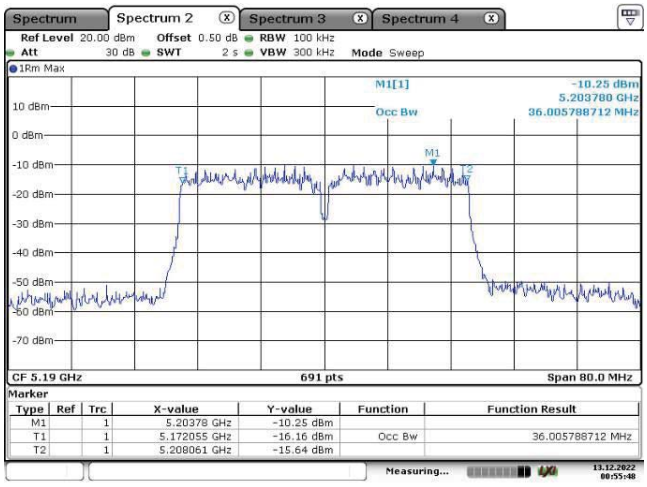

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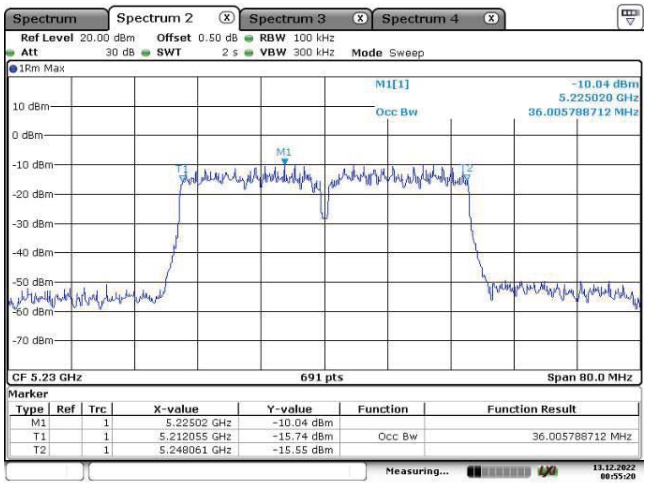

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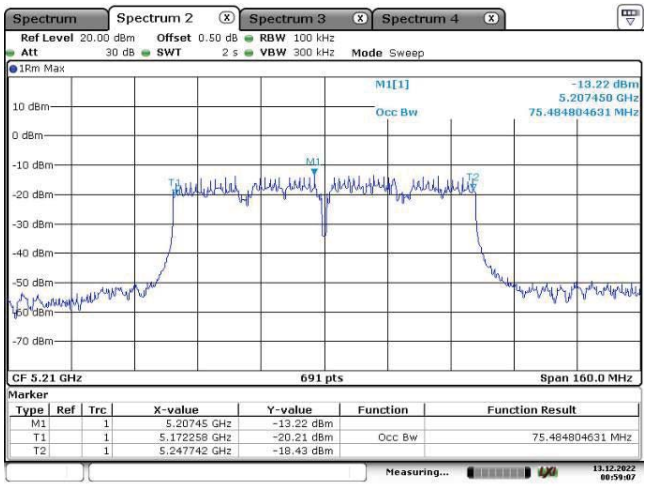
802.11 ac80



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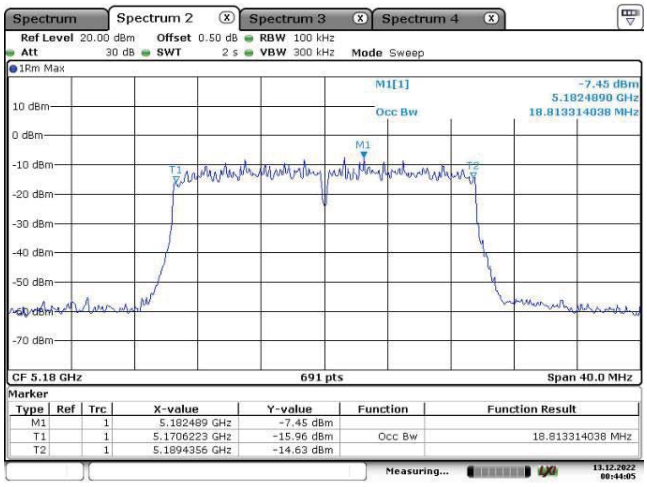
802.11 ax20



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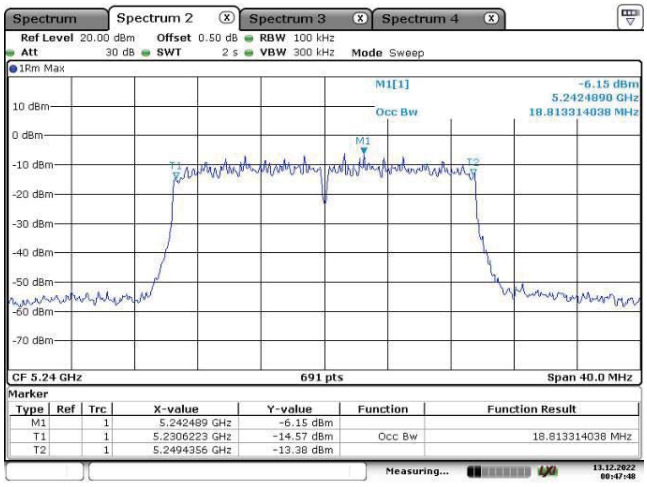

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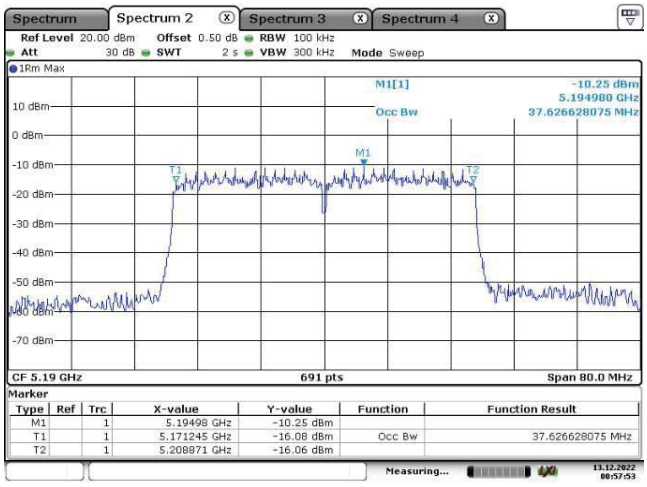
802.11 ax40



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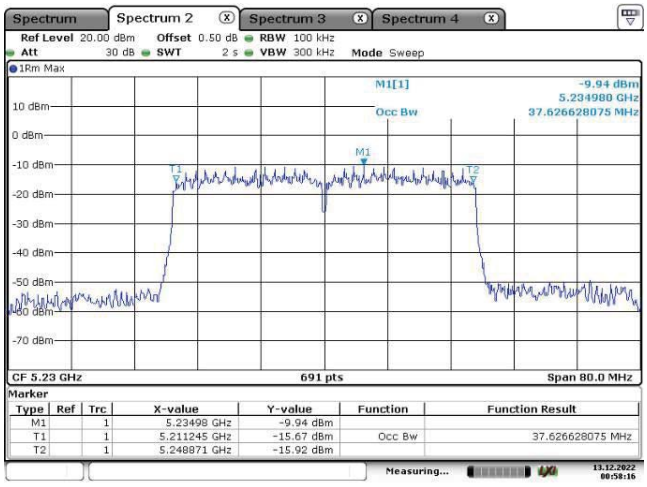

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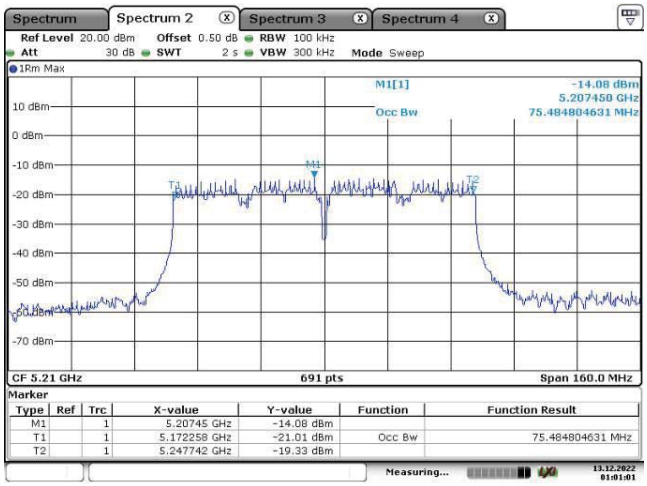
802.11 ax80



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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 MH.

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 *Radar Interference Detection* 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 *Radar Interference Detection* 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) and Plot(s).*

Test Mode	Test Condition	Fc (MHz)	Conducted output power (dBm)		Result_EIRP (dBm)		Limit (dBm)
			Chain 0	Chain 1	Chain 0	Chain 1	
802.11 a	NT	5180	17.55	17.04	20.58	20.36	≤ 23
		5240	17.63	16.93	20.66	20.25	≤ 23
	LT	5180	18.45	17.70	21.48	21.02	≤ 23
		5240	18.47	17.05	21.50	20.37	≤ 23
	HT	5180	16.77	16.62	19.80	19.94	≤ 23
		5240	17.27	16.09	20.30	19.41	≤ 23

Test Mode	Test Condition	Fc (MHz)	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 1	Total	
802.11 n20	NT	5180	14.11	14.25	20.51	≤ 23
		5240	14.06	14.13	20.43	≤ 23
	LT	5180	14.83	14.31	20.91	≤ 23
		5240	14.54	14.19	20.70	≤ 23
	HT	5180	13.51	13.71	19.94	≤ 23
		5240	13.52	13.29	19.74	≤ 23
802.11 n40	NT	5190	14.30	14.59	20.78	≤ 23
		5230	14.54	14.43	20.82	≤ 23
	LT	5190	14.96	14.83	21.23	≤ 23
		5230	15.14	14.61	21.21	≤ 23
	HT	5190	14.18	13.75	20.30	≤ 23
		5230	14.16	14.01	20.42	≤ 23
802.11 ac20	NT	5180	14.07	14.14	20.44	≤ 23
		5240	14.05	13.87	20.29	≤ 23
	LT	5180	14.67	14.62	20.98	≤ 23
		5240	14.58	14.23	20.74	≤ 23
	HT	5180	13.46	13.24	19.68	≤ 23
		5240	13.57	13.33	19.78	≤ 23
802.11 ac40	NT	5190	14.46	14.13	20.63	≤ 23
		5230	14.33	14.21	20.60	≤ 23
	LT	5190	14.92	14.84	21.21	≤ 23
		5230	14.85	14.89	21.20	≤ 23
	HT	5190	13.86	13.83	20.18	≤ 23
		5230	13.78	13.79	20.12	≤ 23
802.11 ac80	NT	5210	14.29	13.95	20.45	≤ 23
	LT	5210	14.85	14.67	21.09	≤ 23
	HT	5210	13.76	13.52	19.97	≤ 23

Test Mode	Test Condition	Fc (MHz)	Tones/ RU Index	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
				Chain 0	Chain 1	Total	
802.11 ax20	NT	5180	26/0	4.76	5.33	11.38	≤ 23
			52/37	7.84	8.46	14.49	≤ 23
			106/53	10.96	11.54	17.59	≤ 23
			242/61	14.08	14.68	20.72	≤ 23
		5240	26/8	5.26	4.53	11.24	≤ 23
			52/40	8.38	7.61	14.34	≤ 23
			106/54	11.45	10.73	17.44	≤ 23
			242/61	14.57	13.88	20.57	≤ 23
802.11 ax20	LT	5180	26/0	5.56	6.45	12.36	≤ 23
			52/37	8.00	9.42	15.10	≤ 23
			106/53	11.20	12.42	18.18	≤ 23
			242/61	15.04	15.32	21.51	≤ 23
		5240	26/8	6.38	5.25	12.18	≤ 23
			52/40	9.10	7.93	14.88	≤ 23
			106/54	11.53	11.13	17.66	≤ 23
			242/61	14.81	14.92	21.20	≤ 23
802.11 ax20	HT	5180	26/0	4.12	4.69	10.74	≤ 23
			52/37	7.60	7.58	13.92	≤ 23
			106/53	10.32	10.58	16.78	≤ 23
			242/61	13.20	14.52	20.24	≤ 23
		5240	26/8	4.62	3.89	10.60	≤ 23
			52/40	8.30	6.41	13.79	≤ 23
			106/54	11.29	10.25	17.13	≤ 23
			242/61	14.17	12.84	19.89	≤ 23

Test Mode	Test Condition	Fc (MHz)	Tones/ RU Index	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
				Chain 0	Chain 1	Total	
802.11 ax40	NT	5190	26/0	1.92	1.84	8.21	≤ 23
			52/37	5.06	4.96	11.34	≤ 23
			106/53	8.13	8.04	14.42	≤ 23
			242/61	11.27	11.58	17.76	≤ 23
			484/65	14.32	14.65	20.82	≤ 23
		5230	26/17	1.85	2.06	8.29	≤ 23
			52/44	4.92	5.13	11.36	≤ 23
			106/56	8.06	8.24	14.48	≤ 23
			242/62	11.13	11.31	17.55	≤ 23
			484/65	14.29	14.46	20.71	≤ 23
802.11 ax40	LT	5190	26/0	2.88	2.72	9.13	≤ 23
			52/37	6.02	5.28	12.00	≤ 23
			106/53	8.45	8.36	14.74	≤ 23
			242/61	11.99	12.46	18.56	≤ 23
			484/65	14.88	15.69	21.63	≤ 23
		5230	26/17	2.73	3.10	9.25	≤ 23
			52/44	6.12	5.77	12.28	≤ 23
			106/56	8.62	9.28	15.29	≤ 23
			242/62	11.69	12.19	18.28	≤ 23
			484/65	15.25	15.18	21.55	≤ 23
802.11 ax40	HT	5190	26/0	1.12	1.04	7.41	≤ 23
			52/37	4.10	4.32	10.54	≤ 23
			106/53	7.01	7.80	13.75	≤ 23
			242/61	10.55	11.34	17.29	≤ 23
			484/65	13.44	14.09	20.11	≤ 23
		5230	26/17	1.05	1.82	7.78	≤ 23
			52/44	4.44	4.41	10.76	≤ 23
			106/56	7.02	7.52	13.61	≤ 23
			242/62	10.89	10.11	16.85	≤ 23
			484/65	14.13	14.22	20.51	≤ 23

Test Mode	Test Condition	Fc (MHz)	Tones/ RU Index	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
				Chain 0	Chain 1	Total	
802.11 ax80	NT	5210	26/0	-1.47	-0.75	5.24	≤ 23
			52/37	1.65	2.33	8.33	≤ 23
			106/53	4.73	5.47	11.45	≤ 23
			242/61	7.87	8.54	14.55	≤ 23
			484/65	10.95	11.62	17.63	≤ 23
			996/67	14.03	14.75	20.74	≤ 23
802.11 ax80	LT	5210	26/0	-0.99	-0.11	5.80	≤ 23
			52/37	2.37	3.05	9.05	≤ 23
			106/53	5.69	5.95	12.15	≤ 23
			242/61	7.95	9.10	14.89	≤ 23
			484/65	11.83	11.70	18.10	≤ 23
			996/67	14.48	15.55	21.38	≤ 23
802.11 ax80	HT	5210	26/0	-1.95	-1.39	4.67	≤ 23
			52/37	0.77	2.17	7.86	≤ 23
			106/53	4.09	4.75	10.76	≤ 23
			242/61	6.91	7.58	13.59	≤ 23
			484/65	9.75	11.38	16.97	≤ 23
			996/67	13.31	14.67	20.37	≤ 23

Note: The antenna Gain was added into the result.

Beamforming:

Test Mode	Test Condition	Fc (MHz)	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 1	Total	
802.11 n20	NT	5180	11.54	10.74	20.49	≤ 23
		5240	11.43	11.18	20.64	≤ 23
	LT	5180	11.69	11.30	20.83	≤ 23
		5240	12.08	11.32	21.05	≤ 23
	HT	5180	10.57	10.25	19.74	≤ 23
		5240	10.75	10.41	19.91	≤ 23
802.11 n40	NT	5190	11.44	11.41	20.76	≤ 23
		5230	11.52	11.23	20.71	≤ 23
	LT	5190	11.72	12.18	21.29	≤ 23
		5230	12.22	11.86	21.37	≤ 23
	HT	5190	10.74	10.99	20.20	≤ 23
		5230	11.24	10.46	20.20	≤ 23
802.11 ac20	NT	5180	11.31	11.63	20.80	≤ 23
		5240	11.22	11.06	20.47	≤ 23
	LT	5180	12.01	12.47	21.58	≤ 23
		5240	12.27	11.13	21.07	≤ 23
	HT	5180	10.54	10.86	20.03	≤ 23
		5240	10.73	10.43	19.91	≤ 23
802.11 ac40	NT	5190	11.17	11.27	20.55	≤ 23
		5230	10.98	11.32	20.48	≤ 23
	LT	5190	11.38	12.04	21.05	≤ 23
		5230	12.03	11.88	21.29	≤ 23
	HT	5190	10.75	10.92	20.17	≤ 23
		5230	10.35	11.25	20.15	≤ 23
802.11 ac80	NT	5210	11.24	11.04	20.47	≤ 23
	LT	5210	11.87	11.78	21.16	≤ 23
	HT	5210	10.74	10.65	20.03	≤ 23

Test Mode	Test Condition	Fc (MHz)	Tones/ RU Index	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
				Chain 0	Chain 1	Total	
802.11 ax20	NT	5180	26/0	2.09	2.01	11.38	≤ 23
			52/37	5.14	5.03	14.42	≤ 23
			106/53	8.27	8.15	17.54	≤ 23
			242/61	11.32	11.21	20.60	≤ 23
		5240	26/8	2.01	2.12	11.40	≤ 23
			52/40	5.09	5.26	14.51	≤ 23
			106/54	8.15	8.37	17.59	≤ 23
			242/61	11.20	11.43	20.65	≤ 23
802.11 ax20	LT	5180	26/0	2.87	2.55	12.04	≤ 23
			52/37	5.86	5.81	15.17	≤ 23
			106/53	8.93	8.33	17.97	≤ 23
			242/61	11.62	11.63	20.96	≤ 23
		5240	26/8	2.37	2.66	11.85	≤ 23
			52/40	5.51	5.50	14.84	≤ 23
			106/54	8.99	9.09	18.37	≤ 23
			242/61	11.92	12.21	21.40	≤ 23
802.11 ax20	HT	5180	26/0	1.61	1.95	11.11	≤ 23
			52/37	4.66	4.97	14.15	≤ 23
			106/53	7.43	8.09	17.10	≤ 23
			242/61	11.02	10.91	20.30	≤ 23
		5240	26/8	1.41	1.40	10.74	≤ 23
			52/40	4.61	5.14	14.21	≤ 23
			106/54	7.61	8.25	17.27	≤ 23
			242/61	10.72	10.65	20.02	≤ 23

Test Mode	Test Condition	Fc (MHz)	Tones/ RU Index	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
				Chain 0	Chain 1	Total	
802.11 ax40	NT	5190	26/0	-1.00	-1.12	8.27	≤ 23
			52/37	2.00	2.03	11.35	≤ 23
			106/53	5.00	5.06	14.36	≤ 23
			242/61	8.08	8.15	17.45	≤ 23
			484/65	11.16	11.21	20.52	≤ 23
		5230	26/17	-1.16	-1.13	8.19	≤ 23
			52/44	2.07	2.01	11.37	≤ 23
			106/56	5.13	5.06	14.43	≤ 23
			242/62	8.25	8.27	17.59	≤ 23
			484/65	11.30	11.36	20.66	≤ 23
802.11 ax40	LT	5190	26/0	0.12	-0.08	9.35	≤ 23
			52/37	3.12	2.99	12.39	≤ 23
			106/53	5.96	5.38	15.01	≤ 23
			242/61	8.16	8.87	17.86	≤ 23
			484/65	11.24	12.41	21.19	≤ 23
		5230	26/17	-0.76	-0.97	8.47	≤ 23
			52/44	3.19	3.21	12.53	≤ 23
			106/56	6.25	5.62	15.28	≤ 23
			242/62	8.65	9.07	18.20	≤ 23
			484/65	11.78	12.24	21.35	≤ 23
802.11 ax40	HT	5190	26/0	-1.72	-1.52	7.71	≤ 23
			52/37	1.04	1.47	10.59	≤ 23
			106/53	4.12	4.02	13.40	≤ 23
			242/61	7.60	7.11	16.69	≤ 23
			484/65	10.92	10.65	20.12	≤ 23
		5230	26/17	-1.48	-2.17	7.52	≤ 23
			52/44	0.95	1.21	10.41	≤ 23
			106/56	3.93	3.94	13.27	≤ 23
			242/62	7.05	8.19	16.99	≤ 23
			484/65	10.74	10.64	20.02	≤ 23

Test Mode	Test Condition	Fc (MHz)	Tones/ RU Index	Conducted output power (dBm)		Result_EIRP (dBm)	Limit (dBm)
				Chain 0	Chain 1	Total	
802.11 ax80	NT	5210	26/0	-4.27	-4.38	5.01	≤ 23
			52/37	-1.19	-1.24	8.12	≤ 23
			106/53	2.02	2.07	11.38	≤ 23
			242/61	5.06	5.13	14.43	≤ 23
			484/65	8.11	8.25	17.51	≤ 23
			996/67	11.20	11.34	20.60	≤ 23
802.11 ax80	LT	5210	26/0	-4.03	-3.42	5.62	≤ 23
			52/37	-0.39	-0.04	9.12	≤ 23
			106/53	2.42	2.55	11.82	≤ 23
			242/61	5.46	5.53	14.83	≤ 23
			484/65	8.51	8.89	18.03	≤ 23
			996/67	12.08	11.58	21.17	≤ 23
802.11 ax80	HT	5210	26/0	-4.83	-4.94	4.45	≤ 23
			52/37	-2.31	-1.56	7.41	≤ 23
			106/53	0.82	1.51	10.51	≤ 23
			242/61	4.10	4.49	13.63	≤ 23
			484/65	7.15	8.01	16.93	≤ 23
			996/67	10.40	10.38	19.72	≤ 23

Power Density

Mode	Fc (MHz)	Conducted power density (dBm/MHz)		Result (dBm/MHz)		Limit (dBm/MHz)
		Chain 0	Chain 1	Chain 0	Chain 1	
802.11 a	5180	4.02	4.35	7.26	7.88	≤ 10
	5240	4.95	4.47	8.19	8.00	≤ 10
802.11 n20	5180	-0.10	0.50	7.07		≤ 10
	5240	0.54	0.60	7.43		≤ 10
802.11 n40	5190	-0.13	0.86	7.90		≤ 10
	5230	0.31	0.73	8.04		≤ 10
802.11 ac20	5180	-1.21	-1.21	7.91		≤ 10
	5240	-0.47	-1.03	8.38		≤ 10
802.11 ac40	5190	-3.73	-3.29	6.35		≤ 10
	5230	-3.32	-3.78	6.31		≤ 10
802.11 ac80	5210	-6.67	-5.73	4.42		≤ 10

Mode	Fc (MHz)	Tones/ RU Index (MHz)	Conducted power density (dBm/MHz)		Result (dBm/MHz)	Limit (dBm/MHz)
			Chain 0	Chain 1	Total	
802.11 ax20	5180	26/0	-11.17	-8.49	-0.70	≤ 10
		52/37	-8.03	-5.34	2.45	≤ 10
		106/53	-4.92	-2.21	5.57	≤ 10
		242/61	-1.88	0.89	8.65	≤ 10
	5240	26/8	-9.73	-8.47	-0.12	≤ 10
		52/40	-6.64	-5.36	2.98	≤ 10
		106/54	-3.52	-2.23	6.10	≤ 10
		242/61	-0.46	1.08	9.31	≤ 10
802.11 ax40	5190	26/0	-16.91	-16.66	-7.20	≤ 10
		52/37	-13.87	-13.52	-4.11	≤ 10
		106/53	-10.74	-10.47	-1.02	≤ 10
		242/61	-7.65	-7.35	2.08	≤ 10
		484/65	-4.53	-4.20	5.22	≤ 10
	5230	26/17	-16.51	-16.58	-6.96	≤ 10
		52/44	-13.47	-13.49	-3.90	≤ 10
		106/56	-10.35	-10.34	-0.76	≤ 10
		242/62	-7.23	-7.26	2.34	≤ 10
		484/65	-4.16	-4.18	5.41	≤ 10
802.11 ax80	5210	26/0	-23.48	-22.00	-13.34	≤ 10
		52/37	-20.34	-19.00	-10.28	≤ 10
		106/53	-17.28	-16.00	-7.25	≤ 10
		242/61	-14.16	-13.00	-4.20	≤ 10
		484/65	-11.01	-10.00	-1.14	≤ 10
		996/67	-7.92	-7.00	1.90	≤ 10

Note:
1, The antenna gain and duty cycle factor were added into the result.
2, Duty cycle factor = 10*log(1/duty cycle)

Beamforming:

Mode	Fc (MHz)	Conducted power density (dBm/MHz)		Result (dBm/MHz)		Limit (dBm/MHz)
		Chain 0	Chain 1	Chain 0	Chain 1	
802.11 n20	5180	-2.97	-2.28	7.25		≤ 10
	5240	-2.23	-1.33	8.10		≤ 10
802.11 n40	5190	-2.35	-1.51	8.60		≤ 10
	5230	-1.92	-1.63	8.74		≤ 10
802.11 ac20	5180	-4.11	-3.52	8.32		≤ 10
	5240	-3.35	-3.49	8.70		≤ 10
802.11 ac40	5190	-7.11	-6.24	6.20		≤ 10
	5230	-6.63	-6.67	6.20		≤ 10
802.11 ac80	5210	-9.46	-8.68	4.54		≤ 10

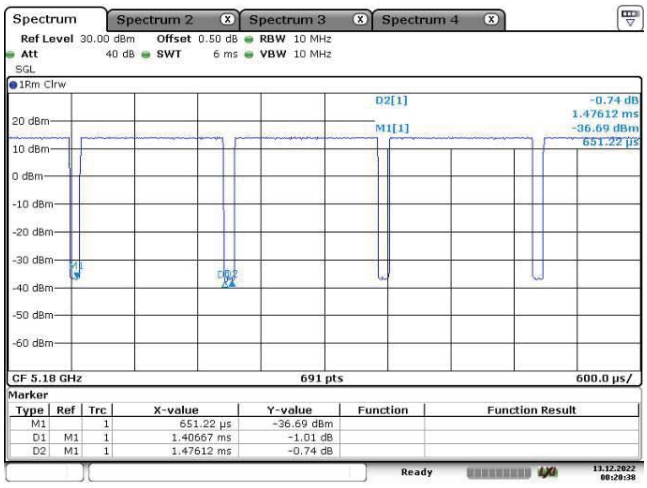
Mode	Fc (MHz)	Tones/ RU Index (MHz)	Conducted power density (dBm/MHz)		Result (dBm/MHz)	Limit (dBm/MHz)
			Chain 0	Chain 1	Total	
802.11 ax20	5180	26/0	-14.06	-13.24	-1.70	≤ 10
		52/37	-10.97	-10.18	1.37	≤ 10
		106/53	-7.83	-6.92	4.58	≤ 10
		242/61	-4.76	-3.89	7.63	≤ 10
	5240	26/8	-13.28	-13.12	-1.27	≤ 10
		52/40	-10.12	-9.91	1.92	≤ 10
		106/54	-7.06	-6.84	4.98	≤ 10
		242/61	-3.93	-3.71	8.11	≤ 10
802.11 ax40	5190	26/0	-19.25	-18.88	-6.48	≤ 10
		52/37	-16.17	-15.75	-3.37	≤ 10
		106/53	-13.06	-12.68	-0.29	≤ 10
		242/61	-9.91	-9.54	2.86	≤ 10
		484/65	-6.88	-6.48	5.90	≤ 10
	5230	26/17	-18.85	-19.48	-6.57	≤ 10
		52/44	-15.77	-16.34	-3.47	≤ 10
		106/56	-12.63	-13.28	-0.36	≤ 10
		242/62	-9.57	-10.12	2.74	≤ 10
		484/65	-6.49	-7.07	5.81	≤ 10
802.11 ax80	5210	26/0	-26.27	-25.47	-13.51	≤ 10
		52/37	-23.13	-22.34	-10.38	≤ 10
		106/53	-20.01	-19.28	-7.29	≤ 10
		242/61	-16.94	-16.15	-4.19	≤ 10
		484/65	-13.86	-13.06	-1.10	≤ 10
		996/67	-10.79	-9.95	1.99	≤ 10

Duty Cycle:

Mode	Ton (ms)	Ton+Toff (ms)	Duty cycle (%)	Duty cycle Factor (dB)
802.11 a	1.41	1.48	95.27	0.21
802.11 n20	0.62	0.70	88.57	0.53
802.11 n40	0.32	0.42	76.19	1.18
802.11 ac20	0.10	0.19	52.63	2.79
802.11 ac40	0.08	0.18	44.44	3.52
802.11 ac80	0.06	0.16	37.50	4.26
802.11 ax20	0.11	0.20	55.00	2.60
802.11 ax40	0.09	0.19	47.37	3.25
802.11 ax80	0.09	0.18	50.00	3.01

Duty Cycle:

802.11 a



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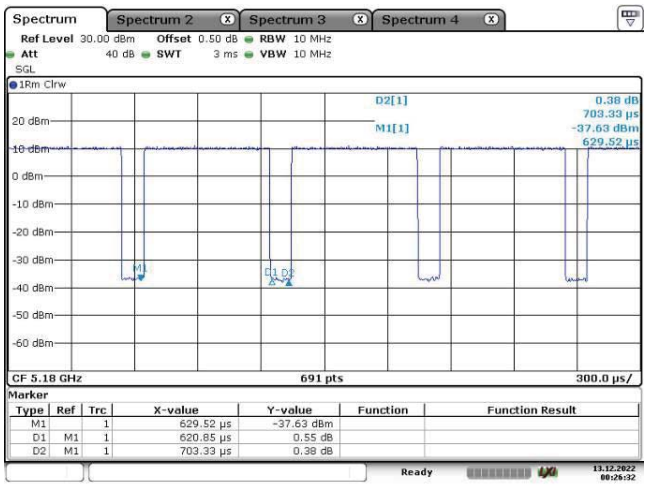

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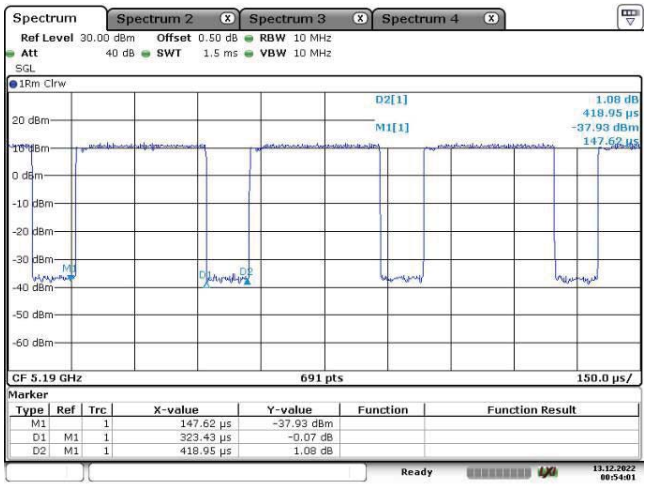

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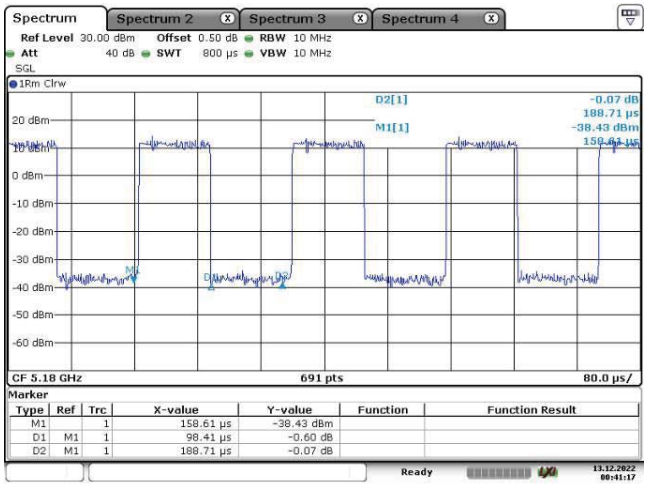

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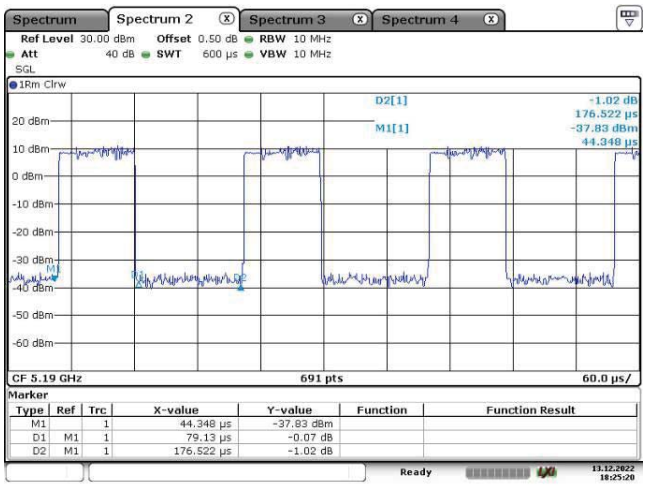

Date: 13.DEC.2022 18:25:21

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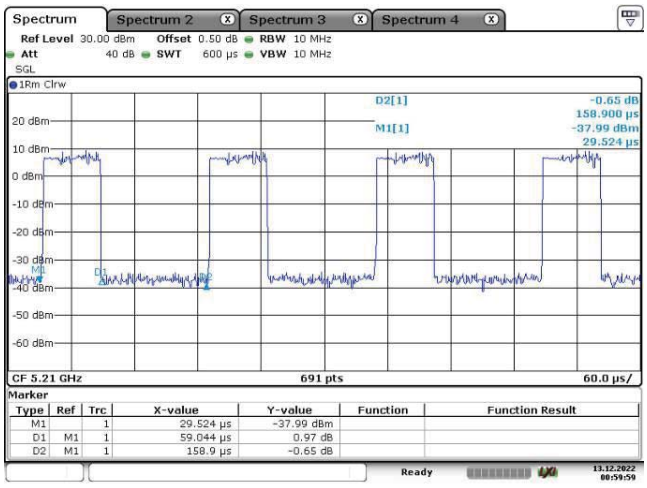

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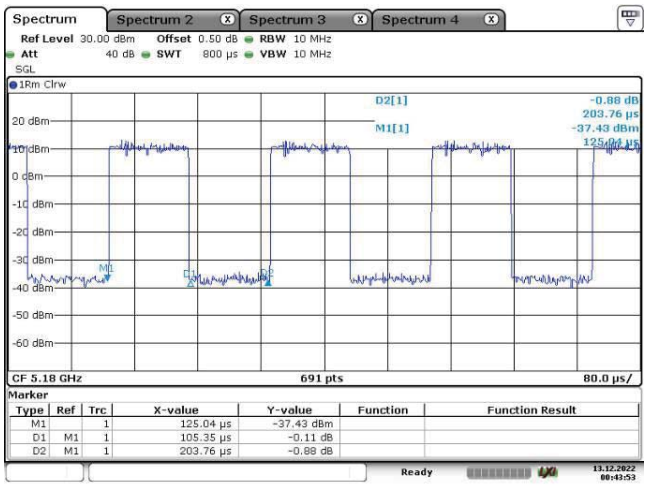

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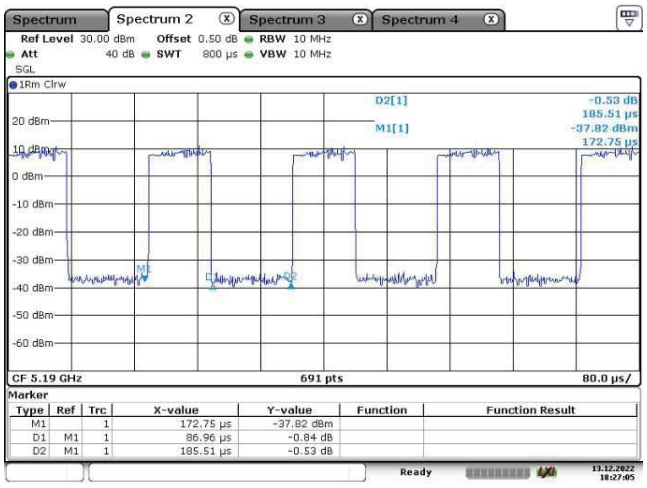

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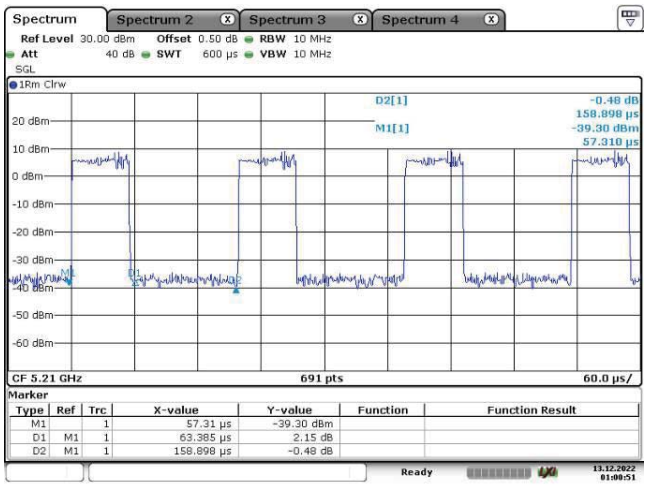

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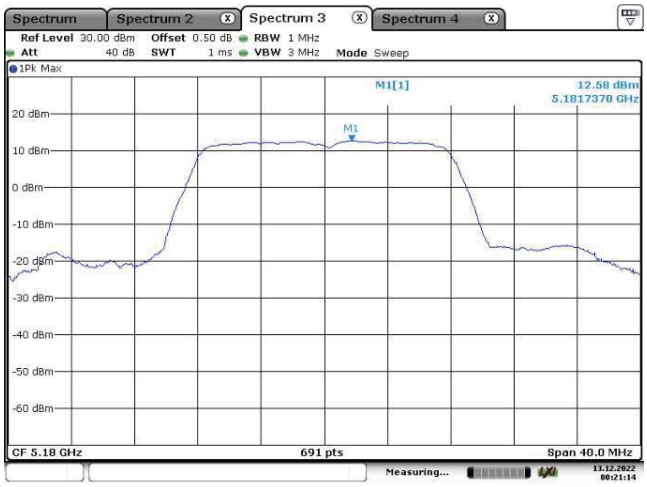

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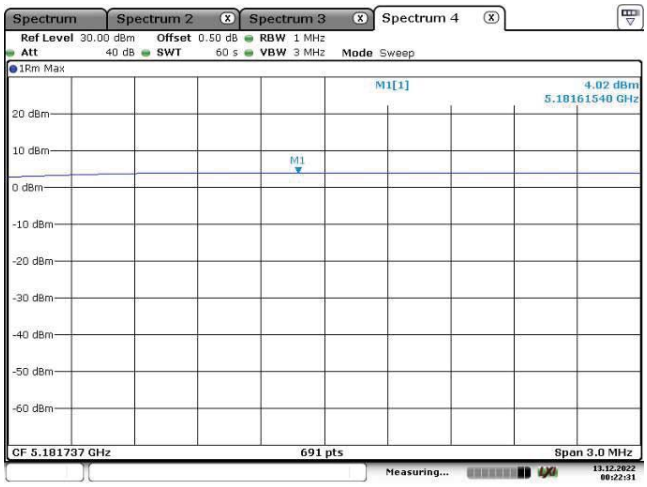

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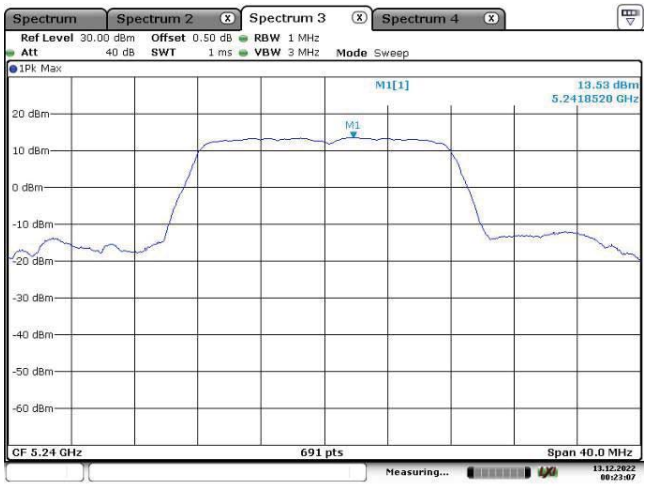

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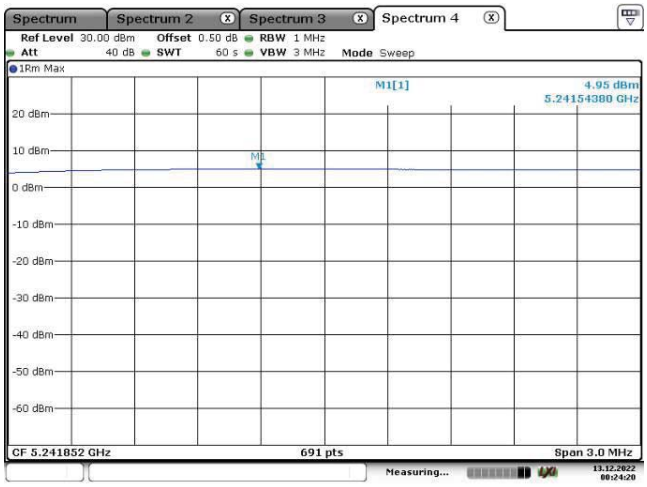

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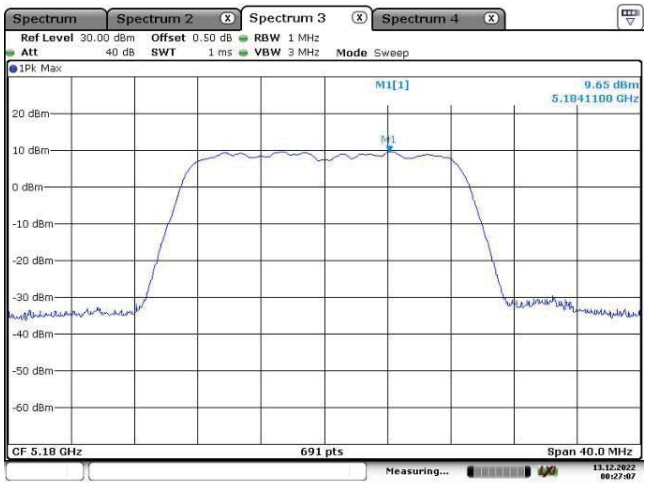

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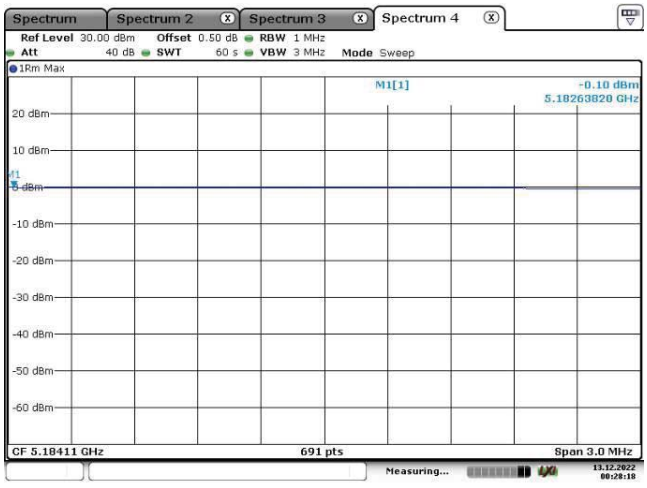

Date: 13.DEC.2022 00:28:19

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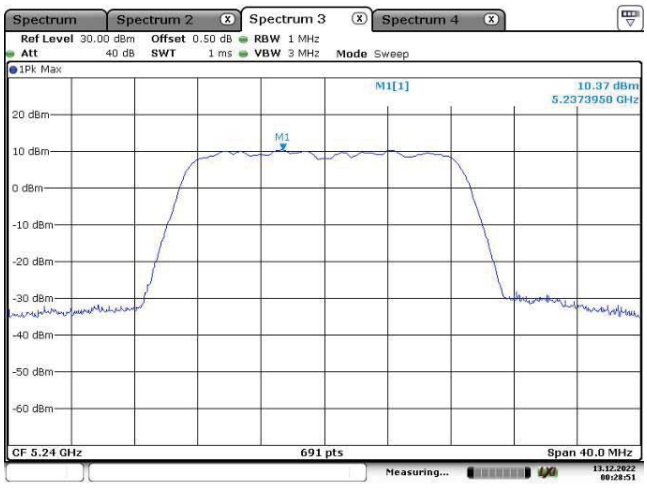

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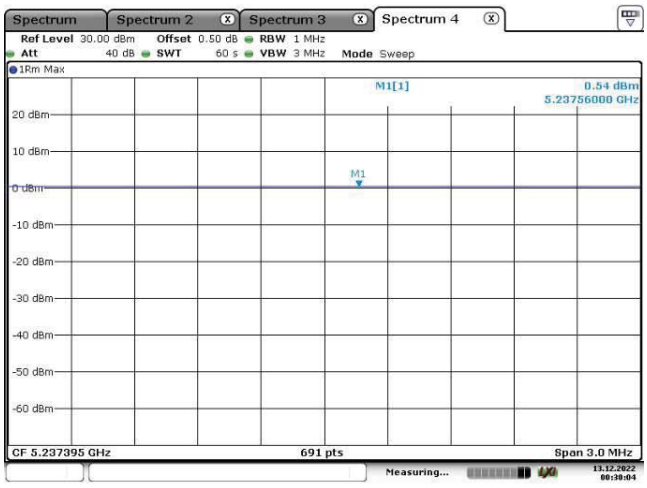

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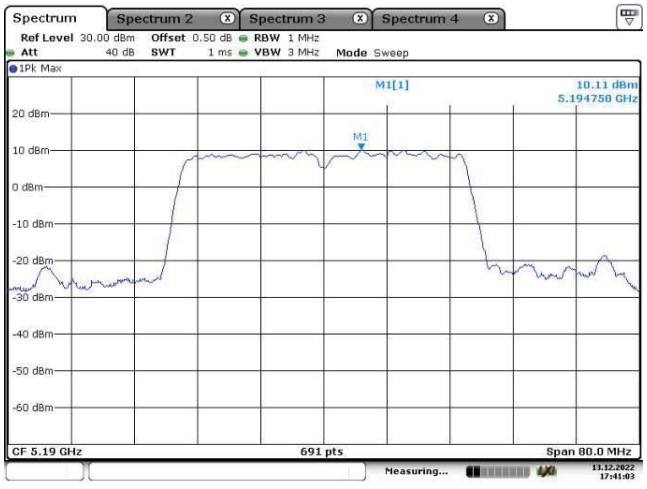

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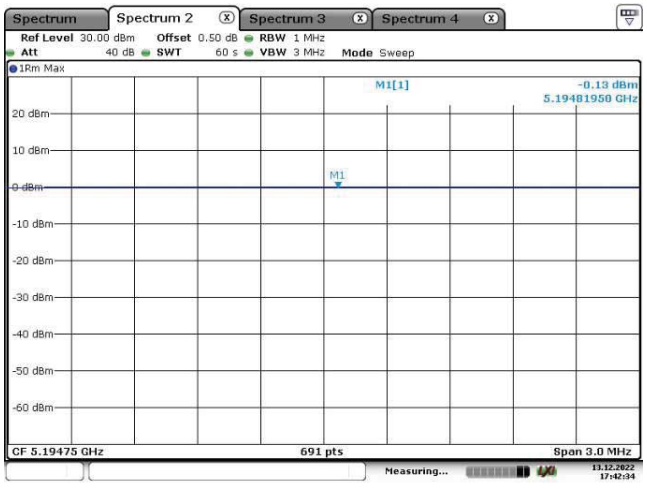

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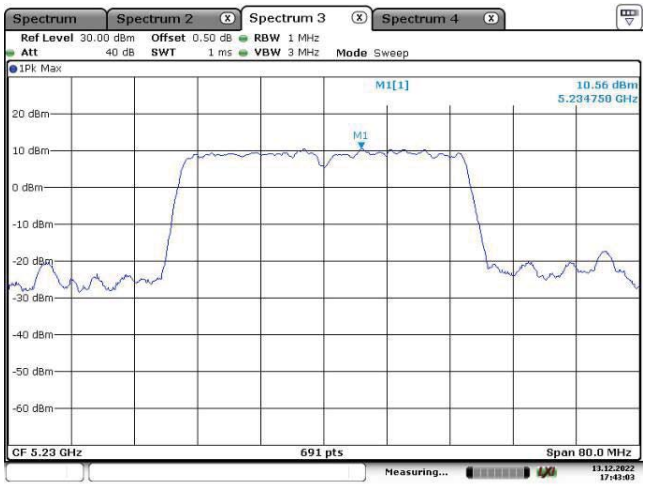

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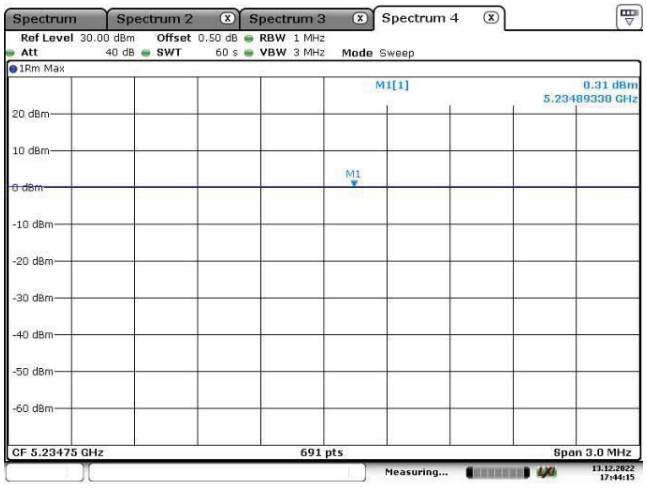

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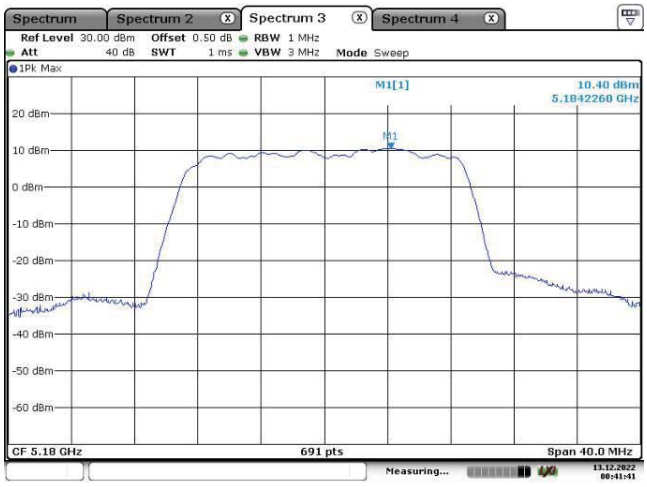

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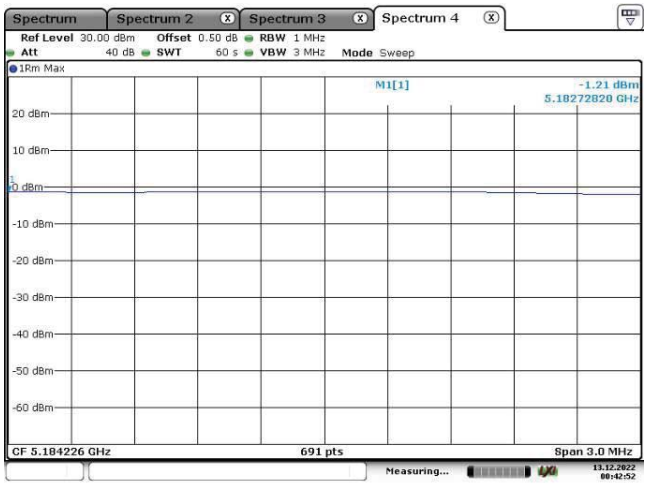

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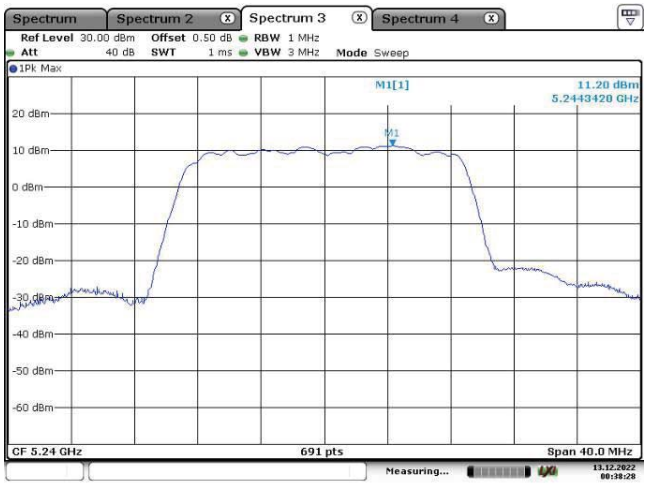

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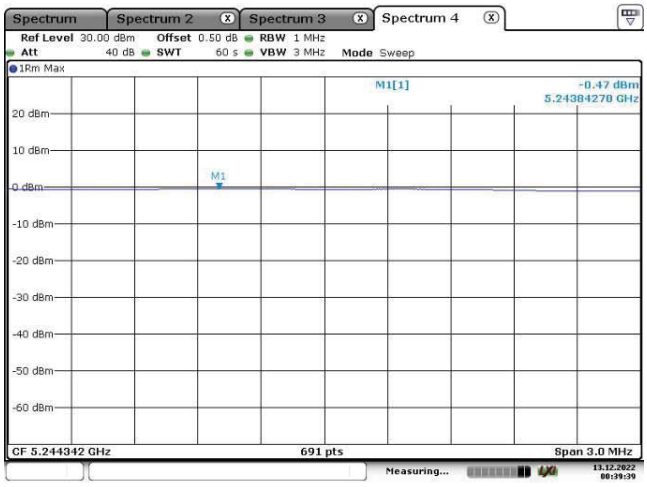

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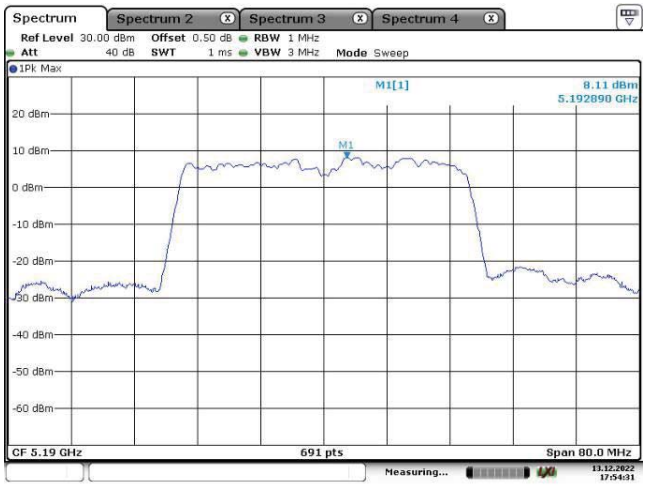

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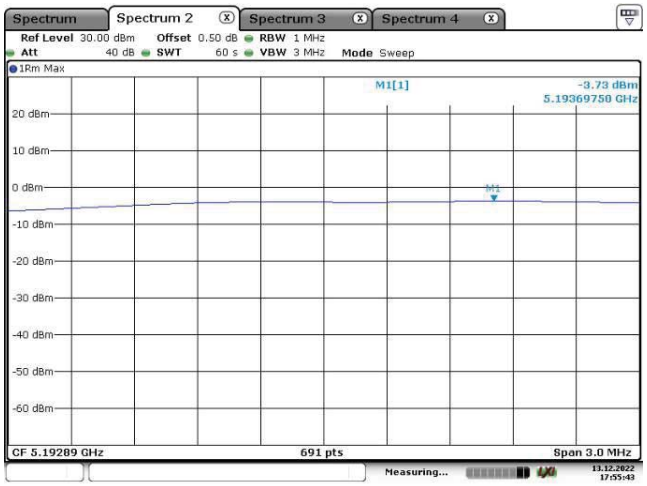

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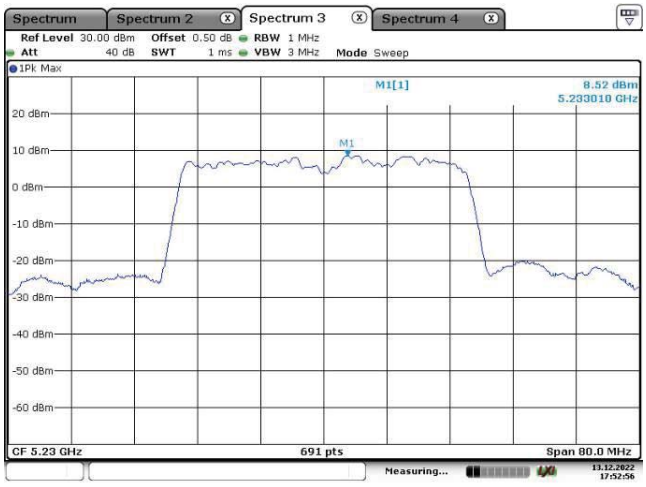

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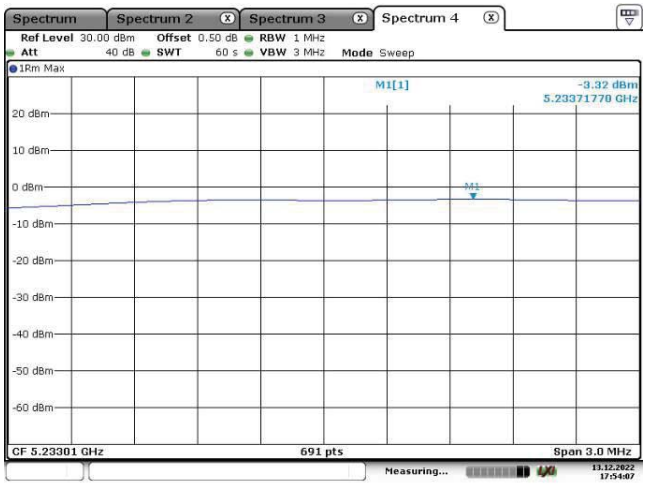

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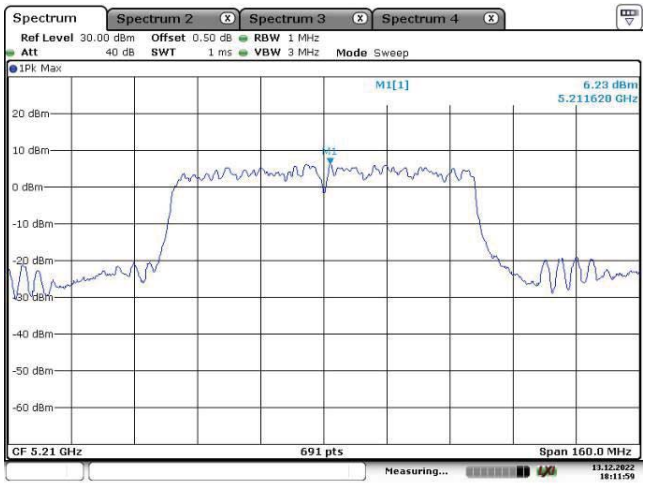

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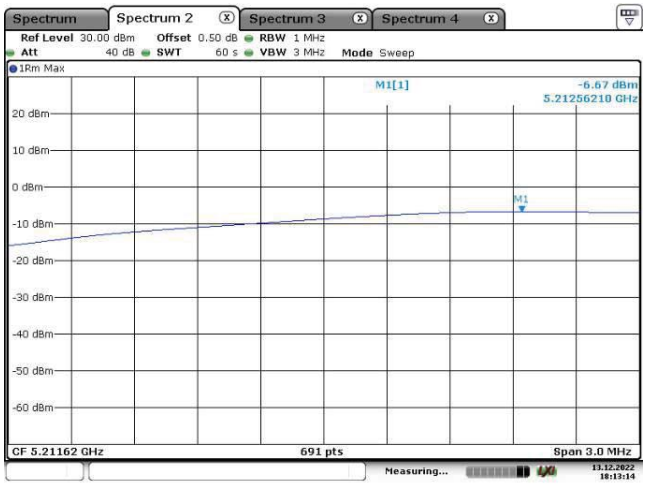

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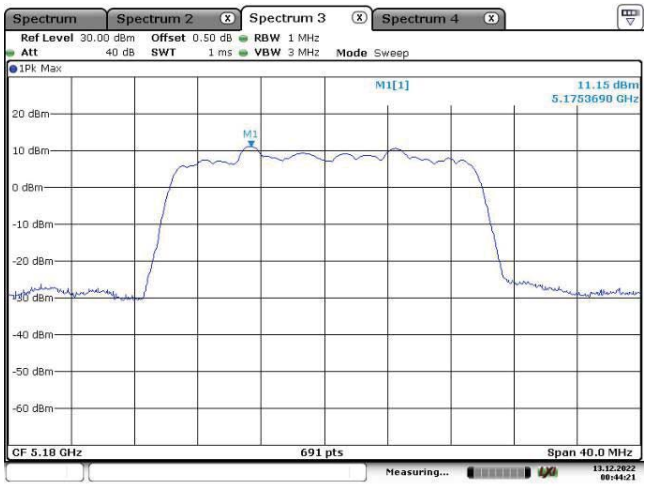

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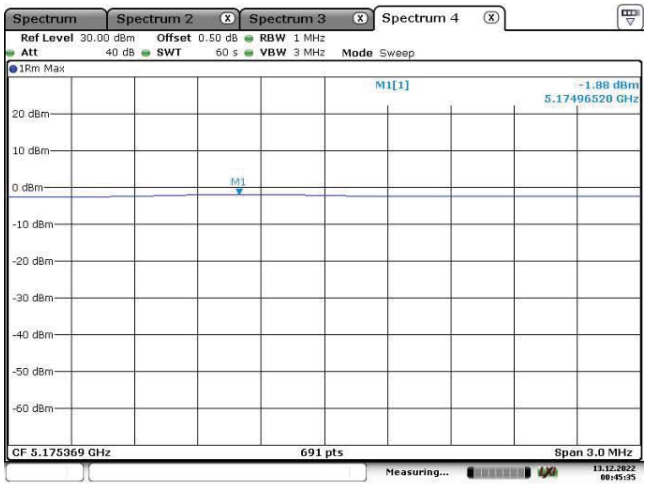

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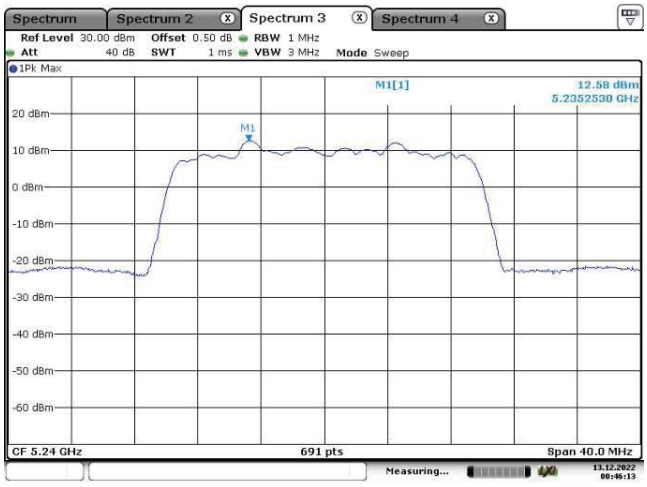

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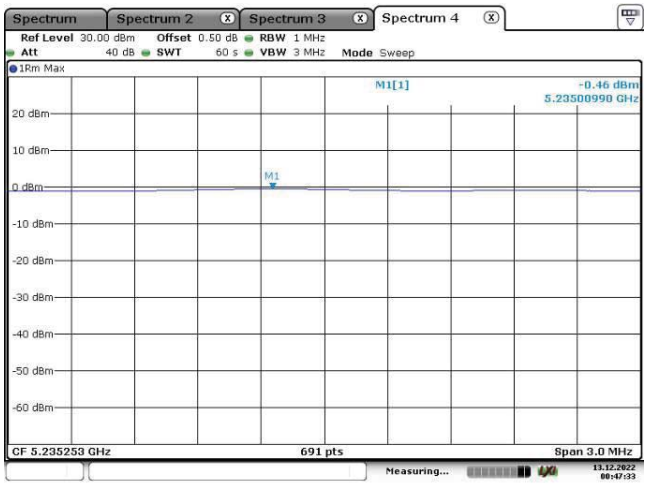

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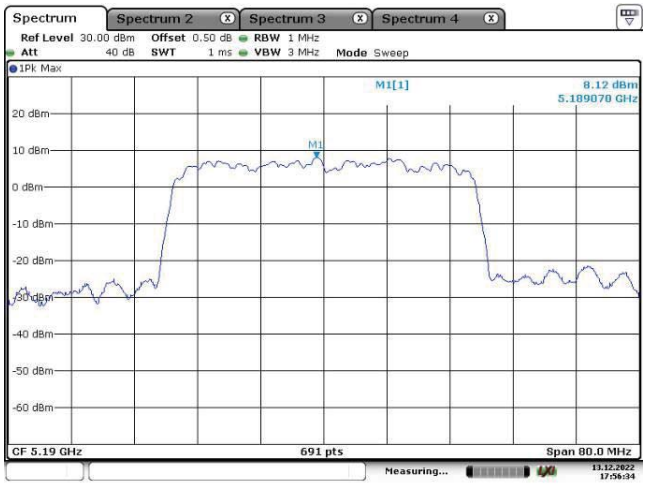

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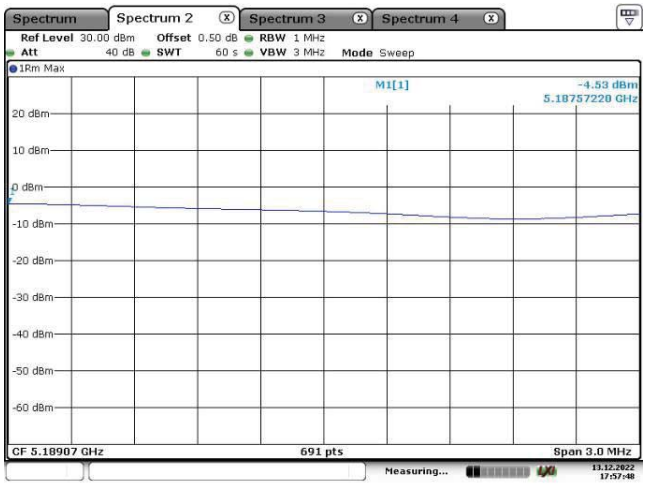

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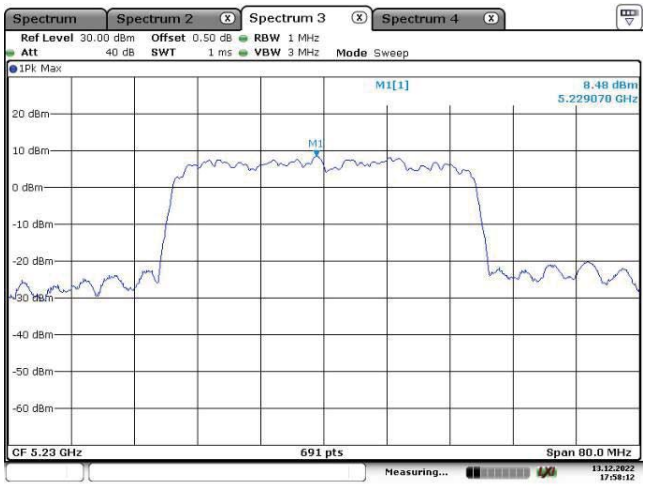

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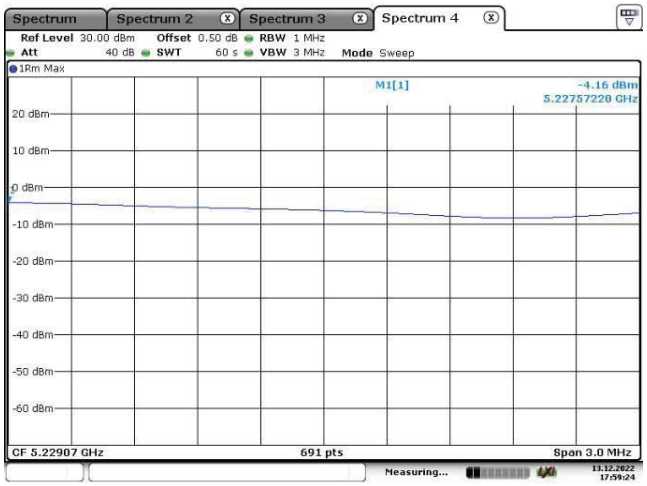

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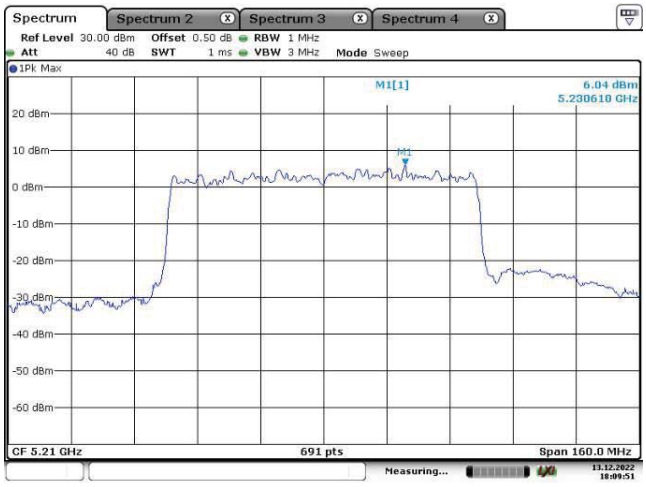

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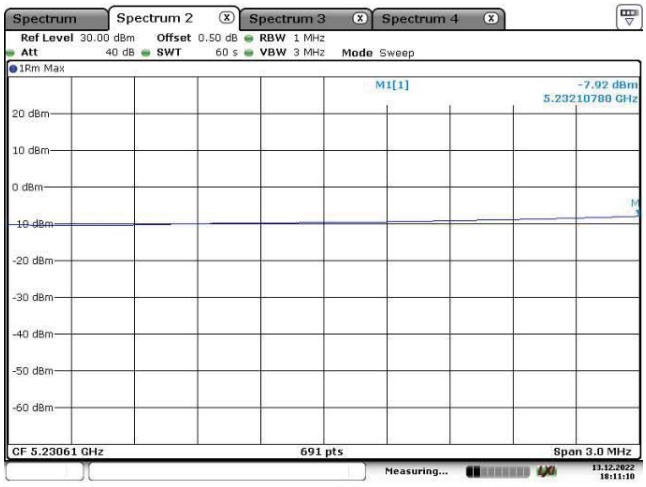

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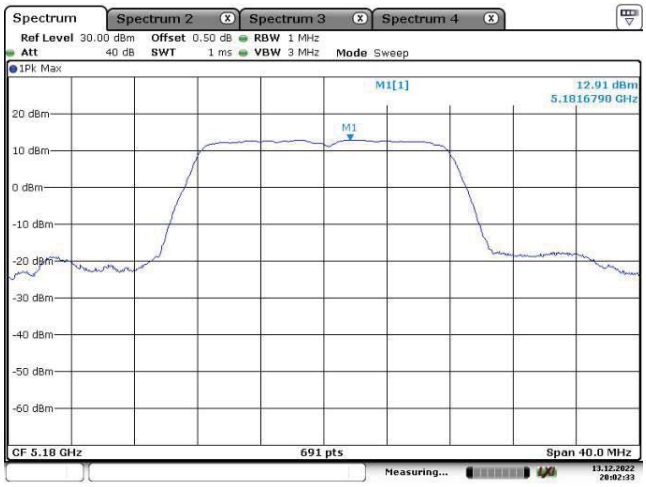

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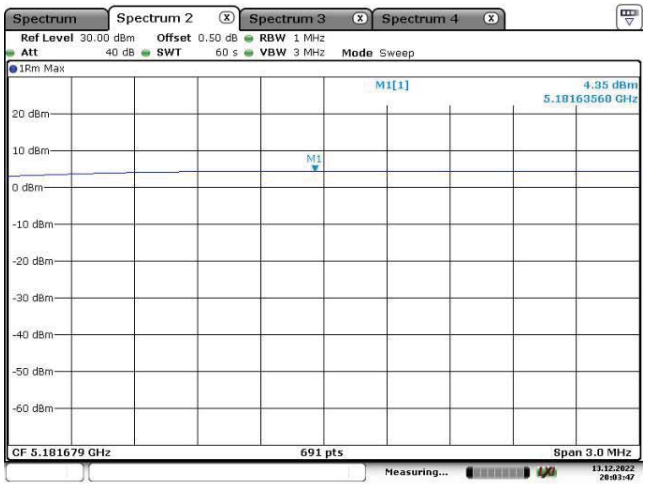

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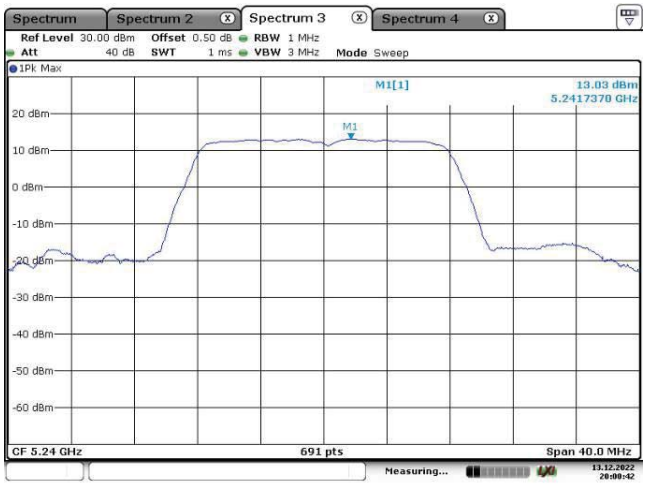

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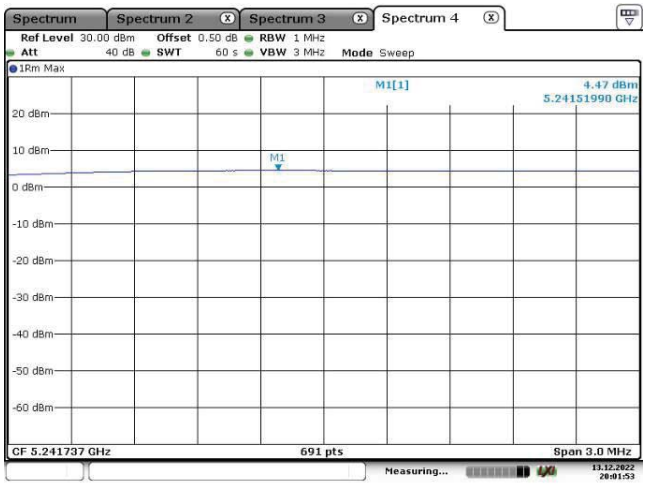

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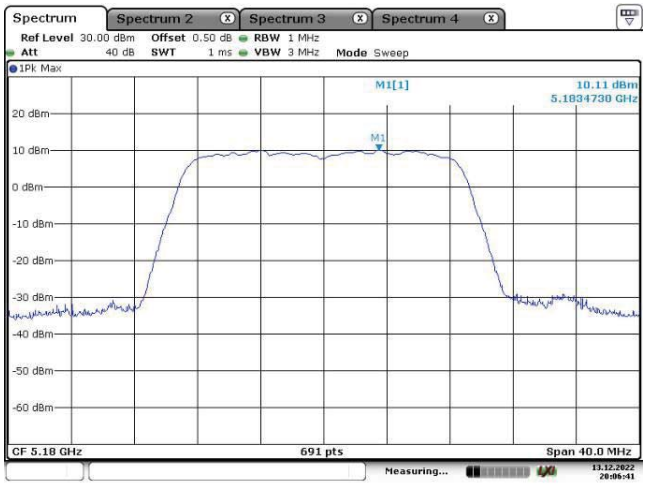

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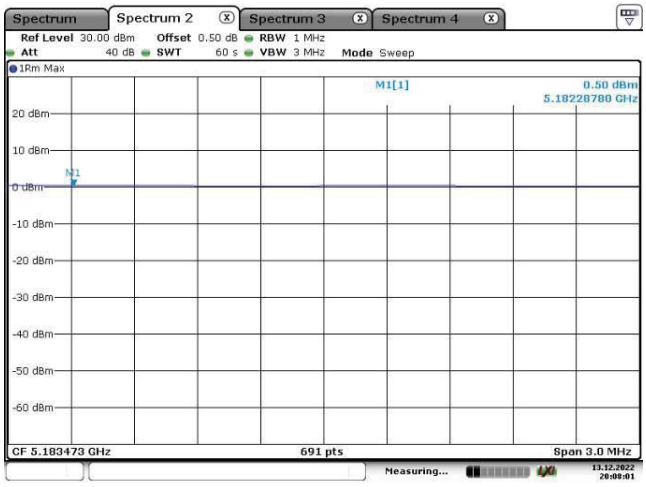

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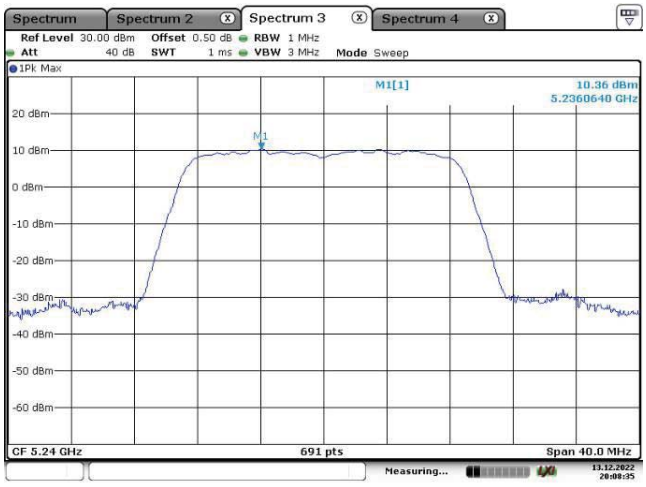

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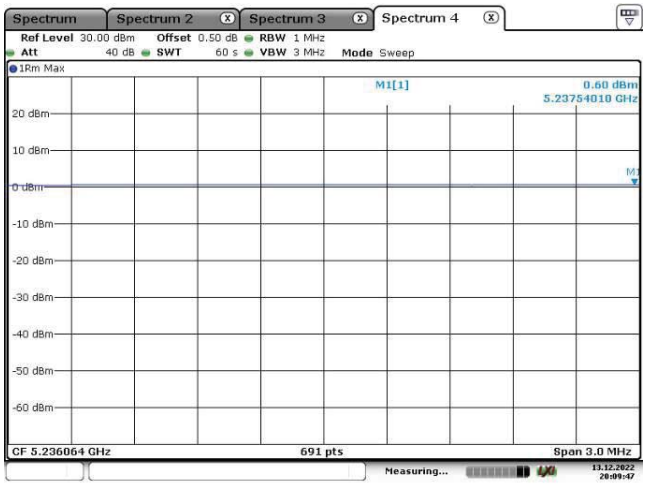

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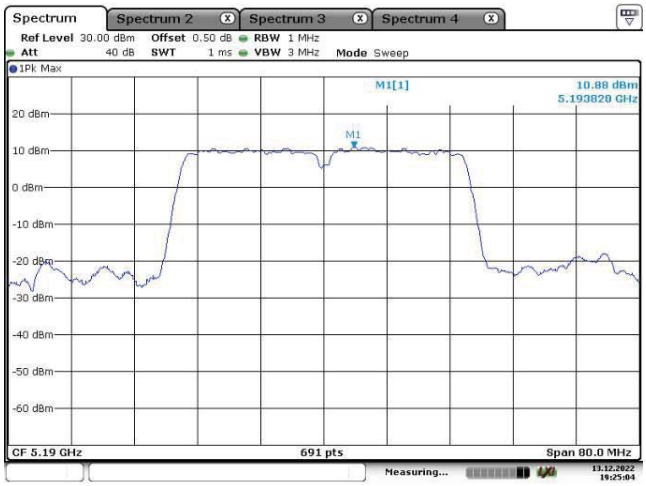

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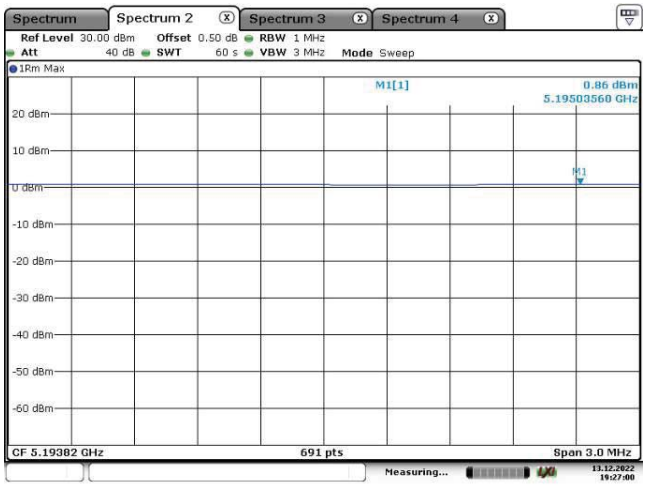

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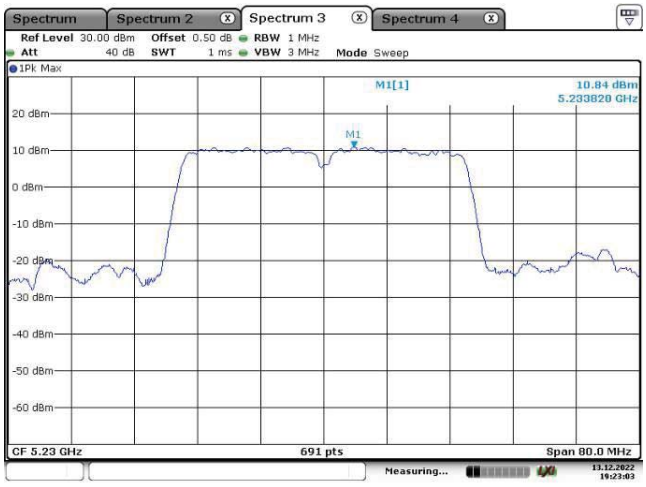

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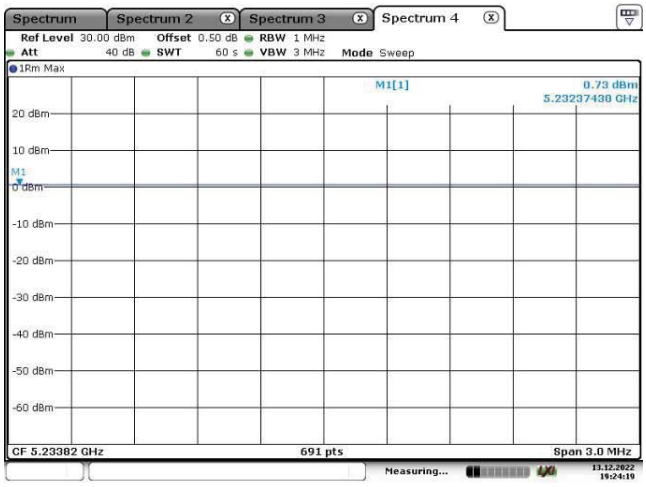

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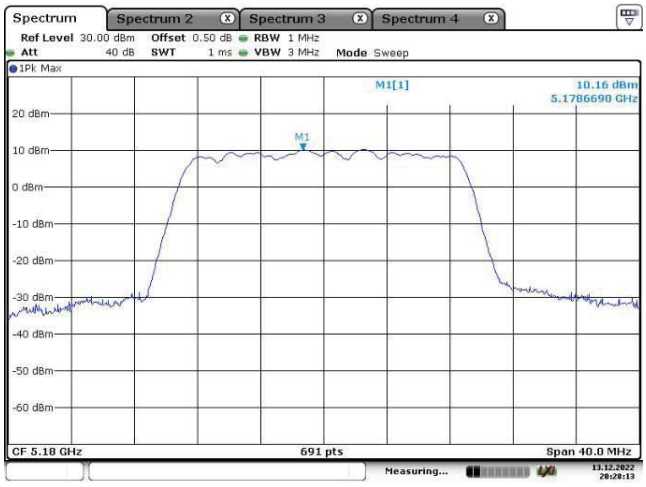

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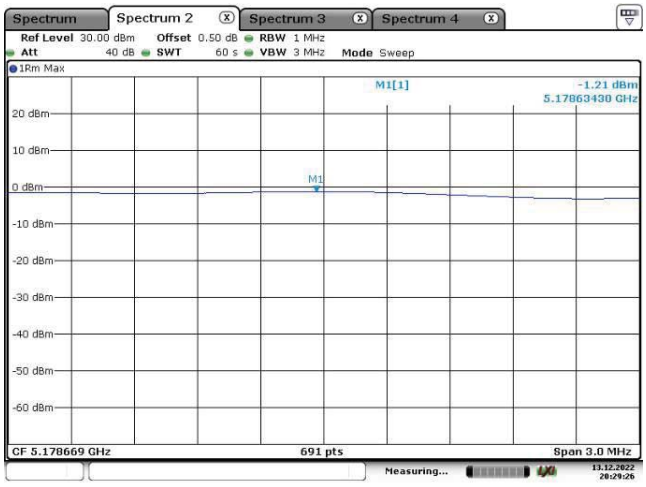

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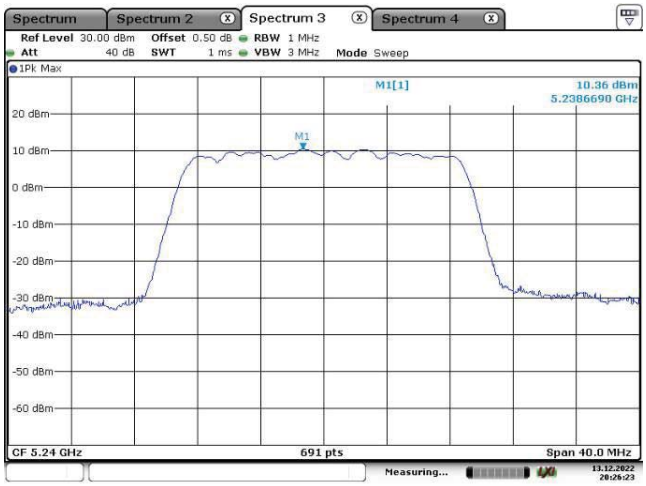
802.11 ac20-H



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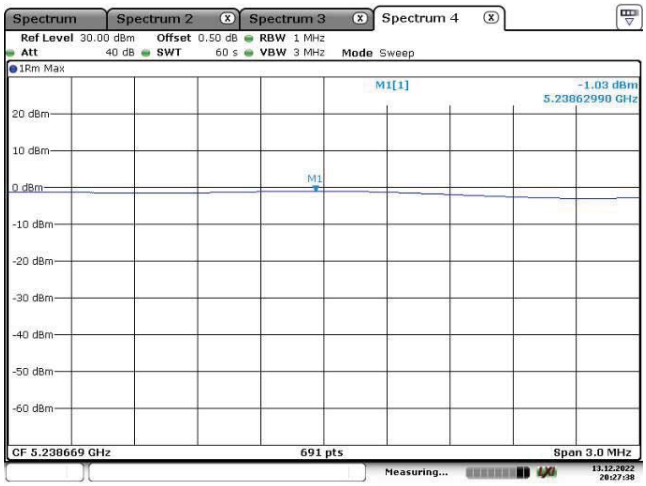

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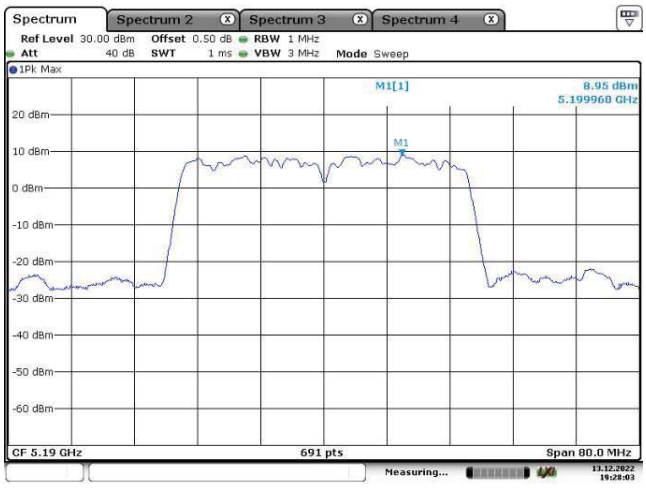

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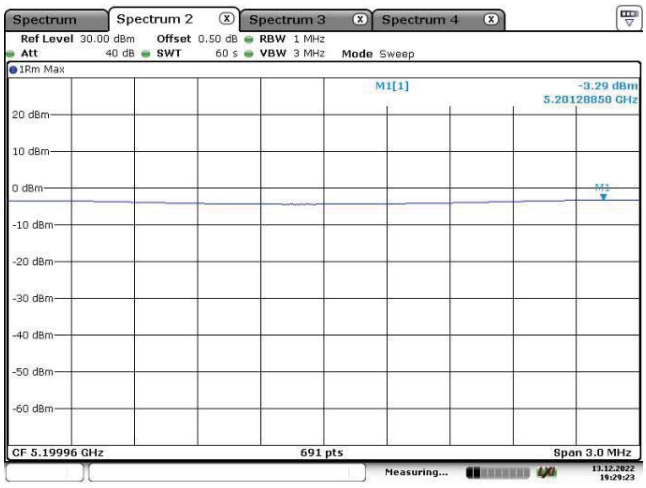

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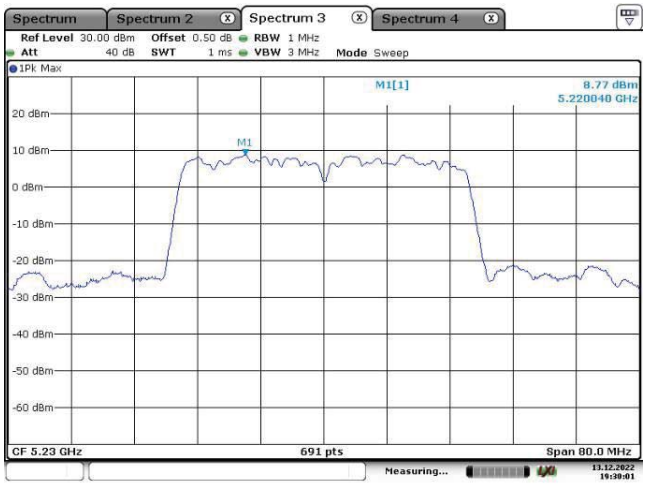

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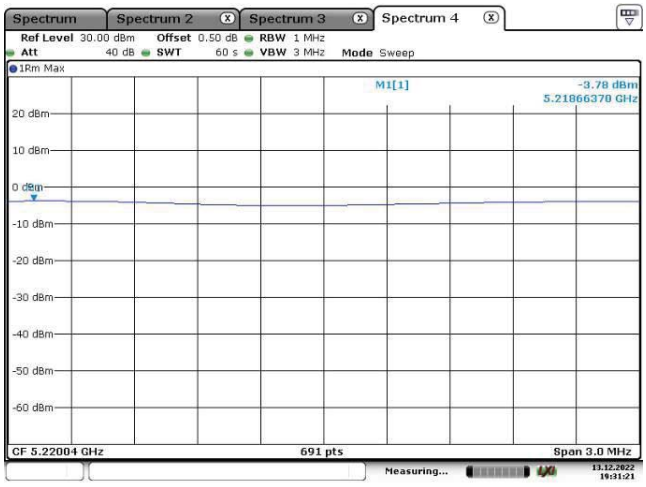

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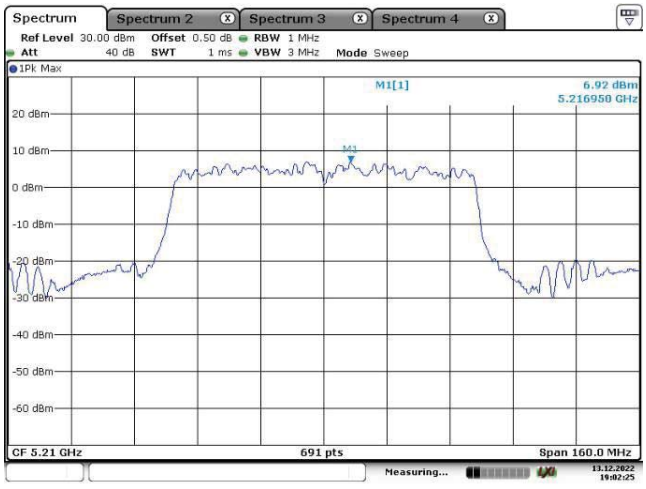

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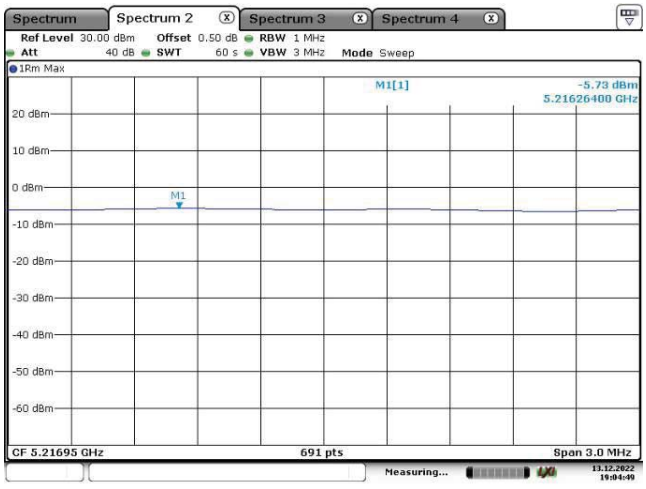

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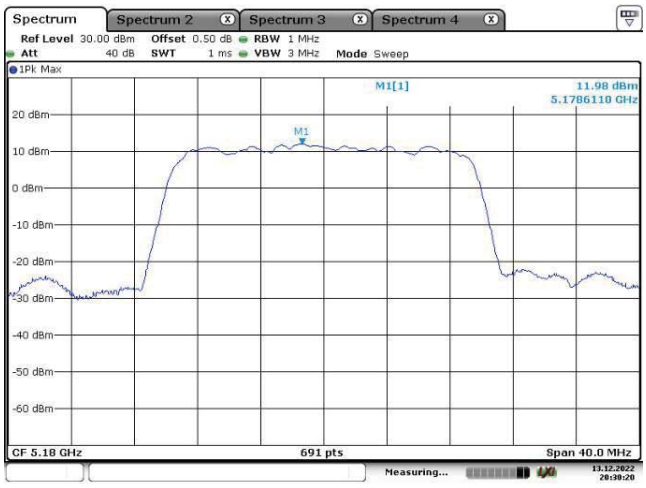

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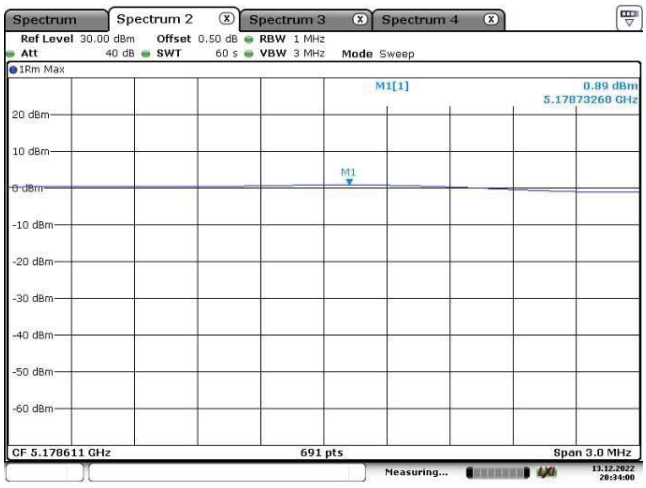

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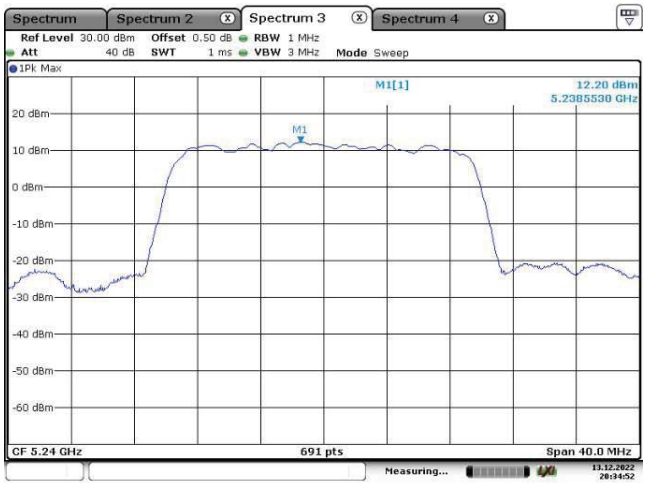

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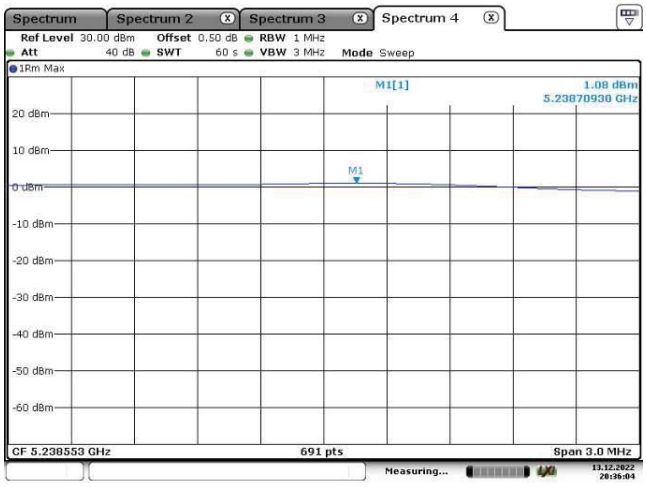

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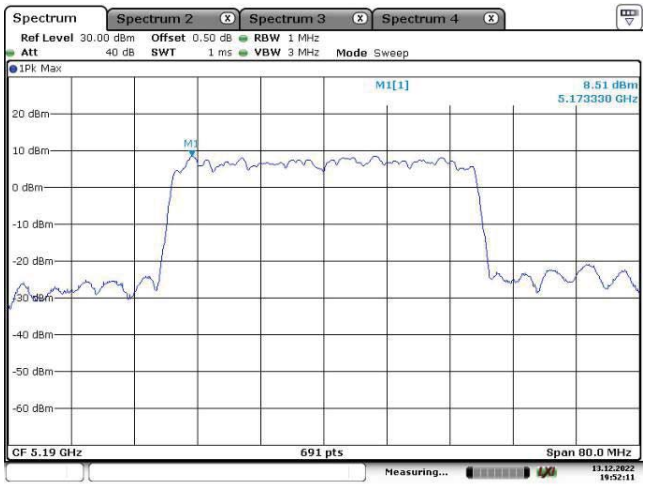

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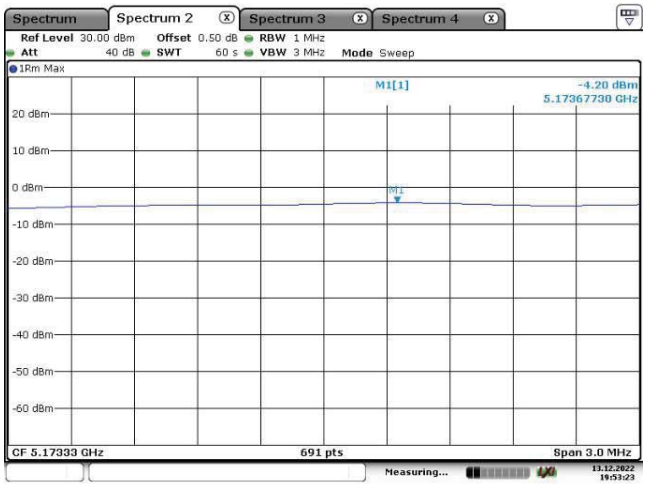

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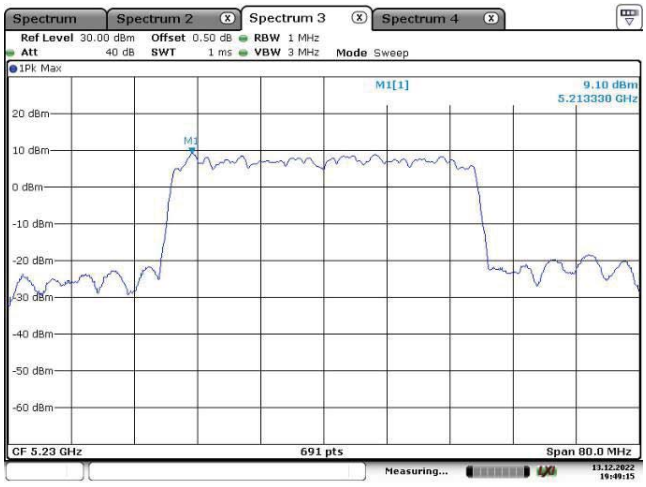

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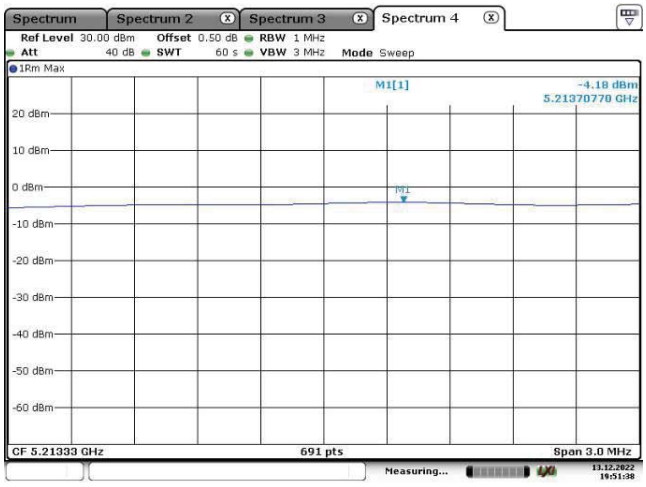

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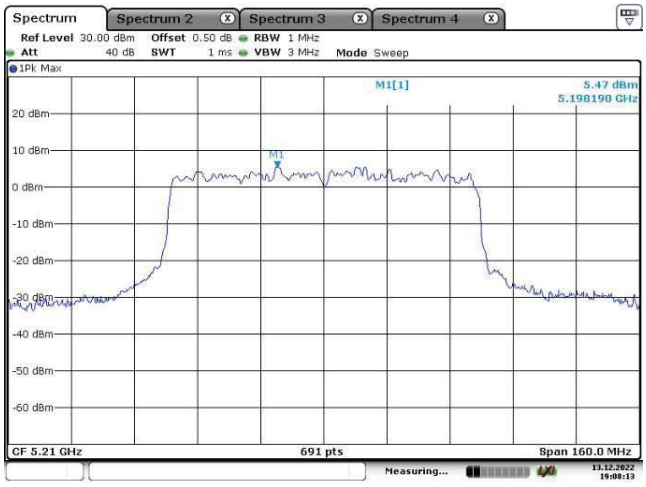

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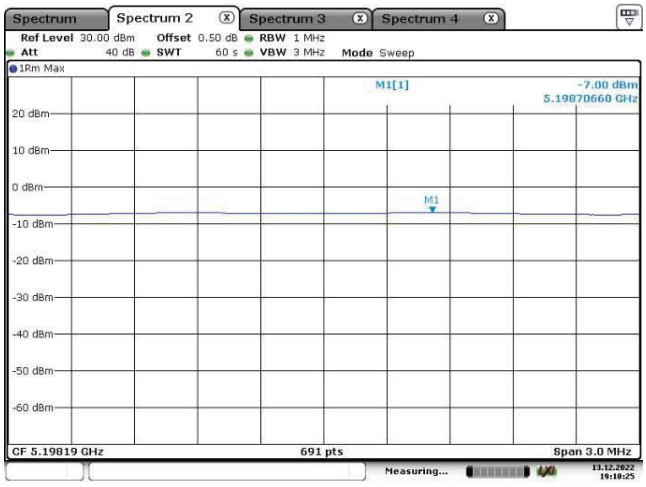

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Beamforming-PSD:

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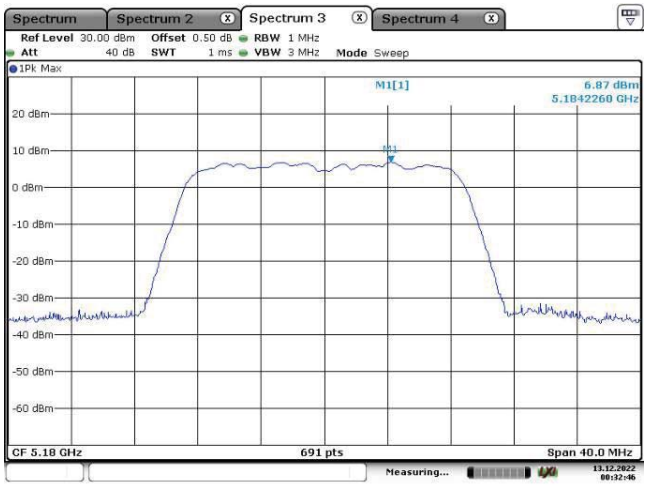

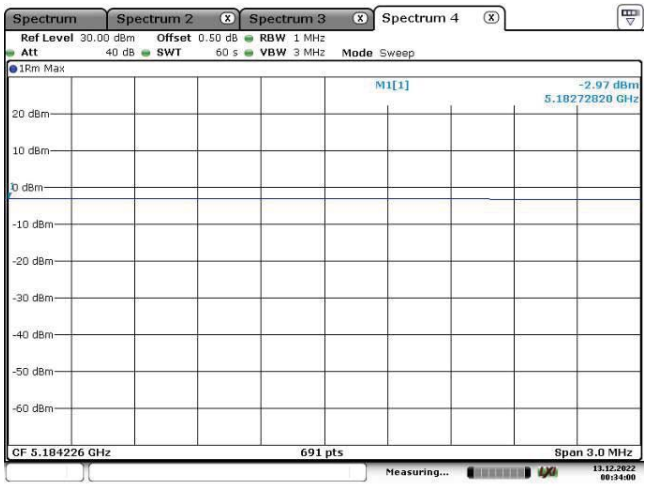

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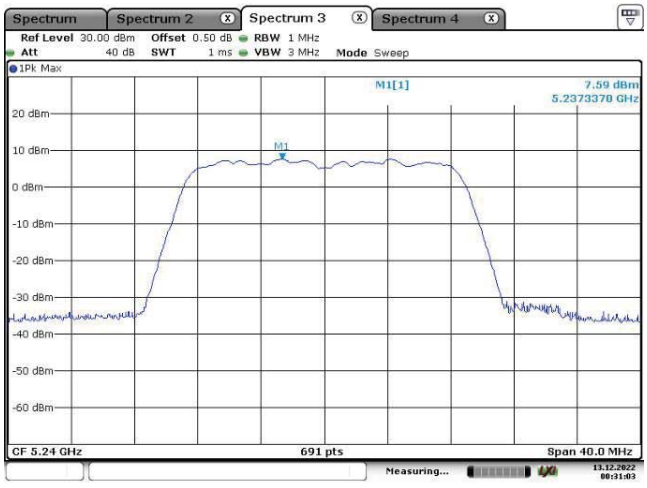

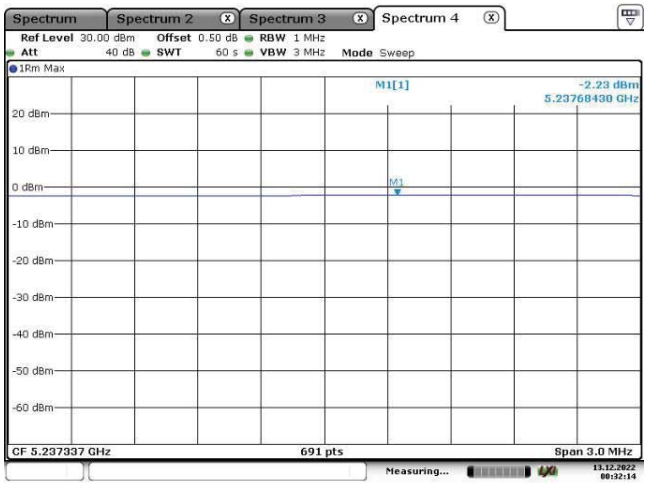

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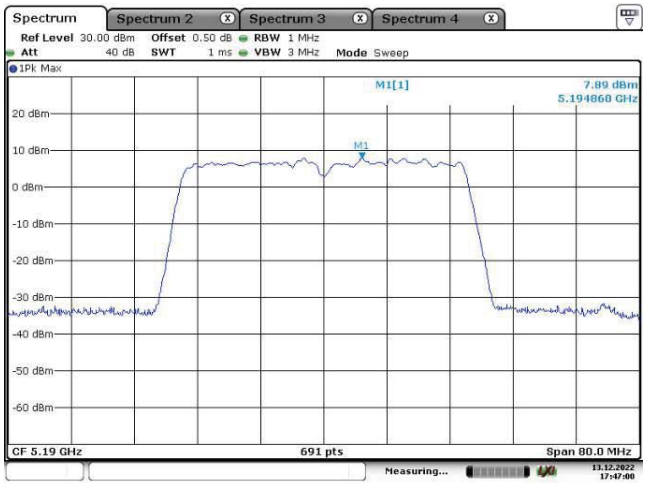

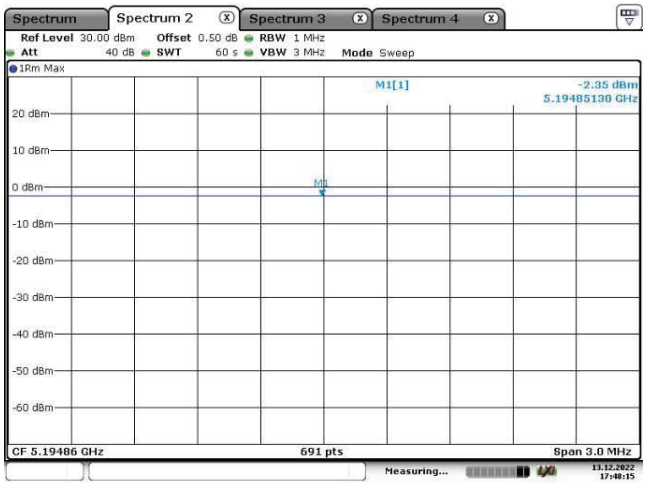

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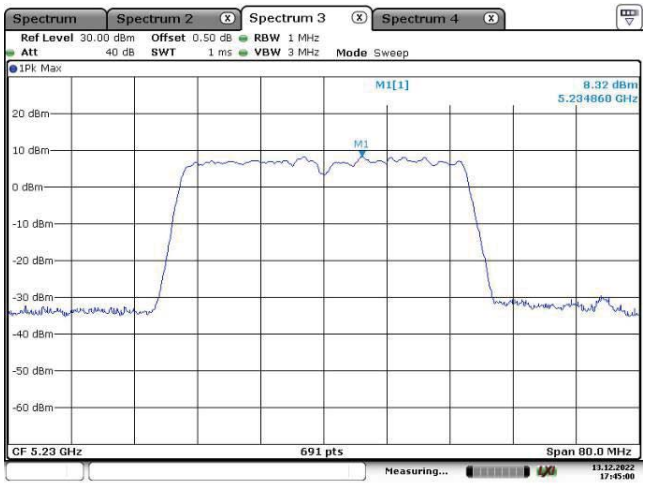

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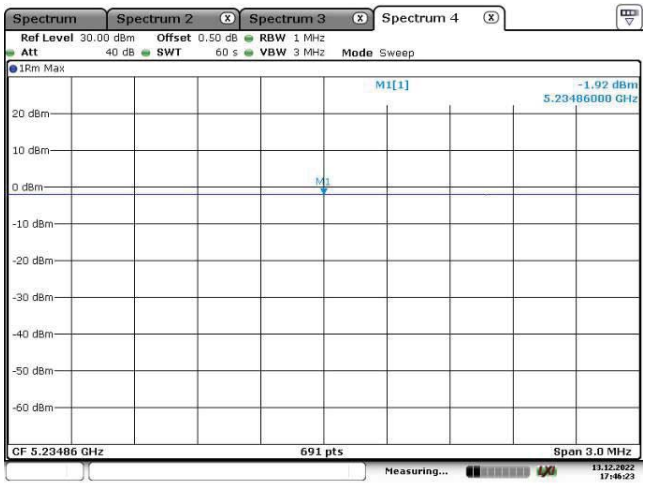

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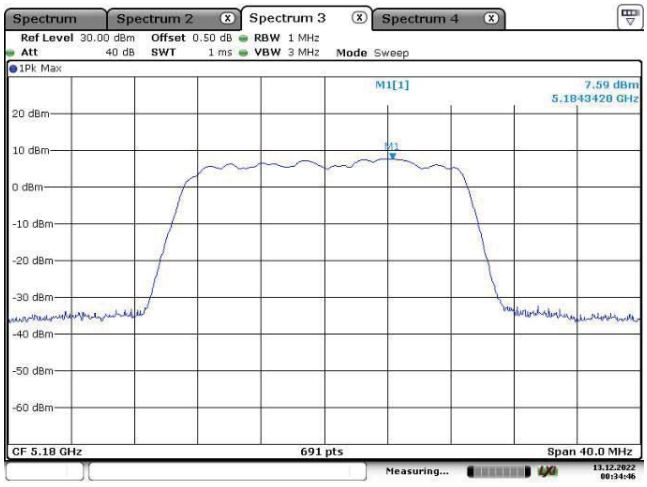

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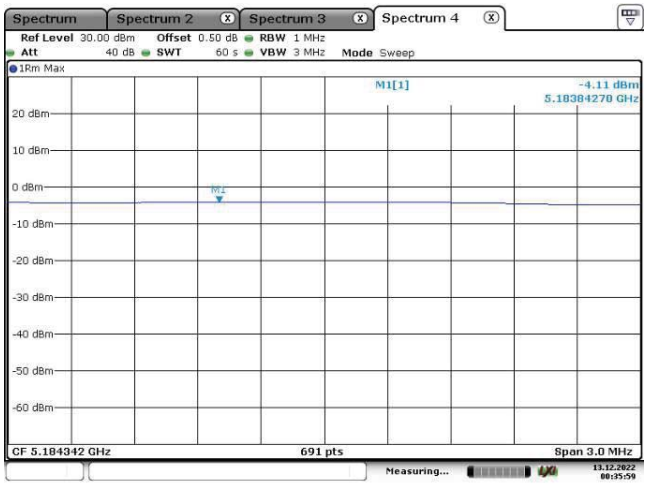

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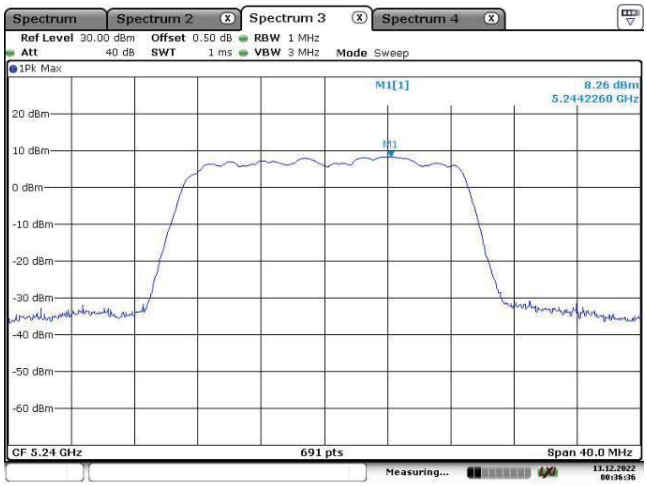

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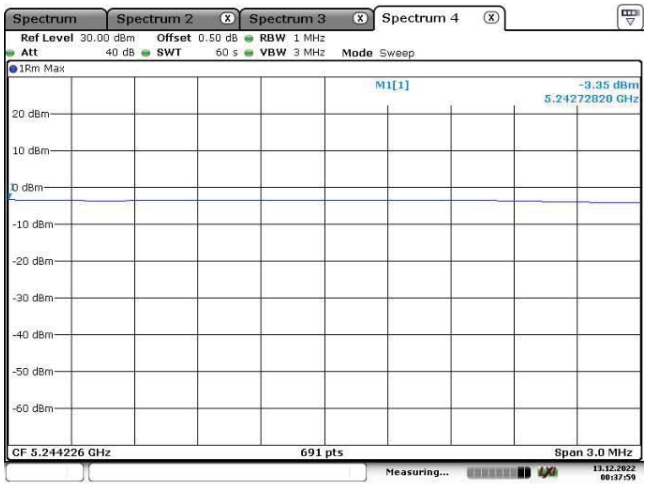

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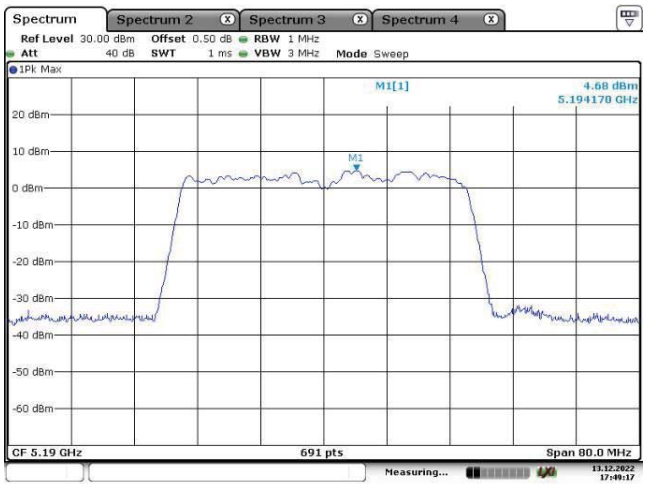

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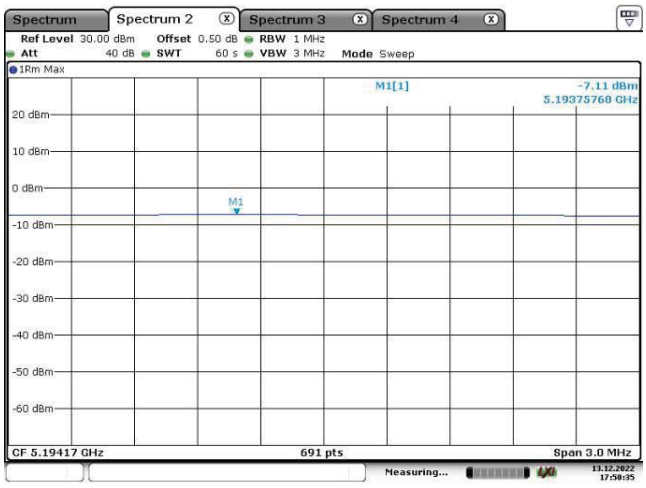

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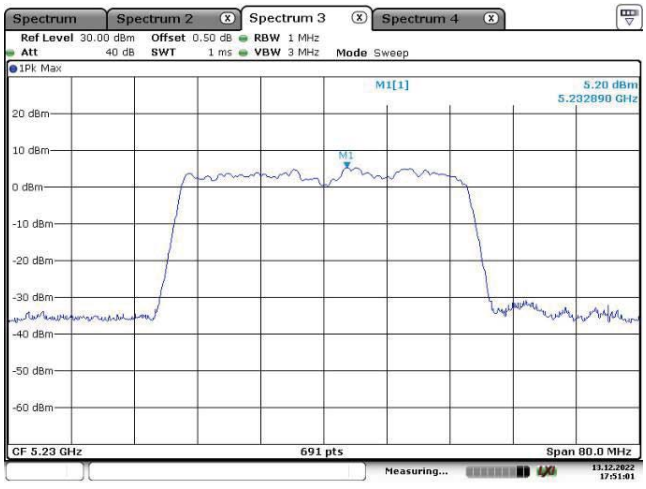

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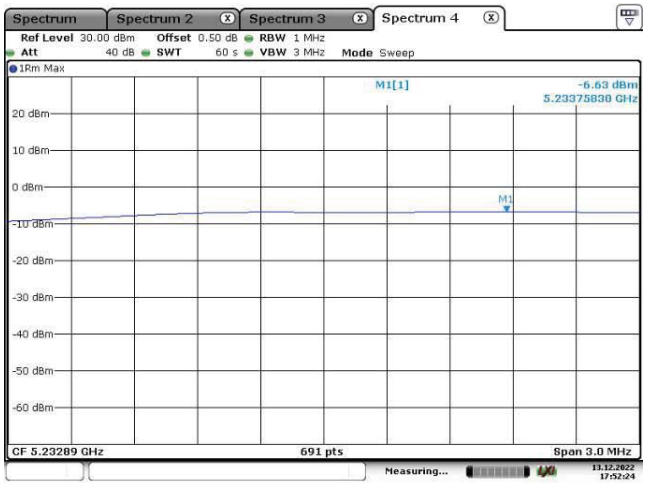

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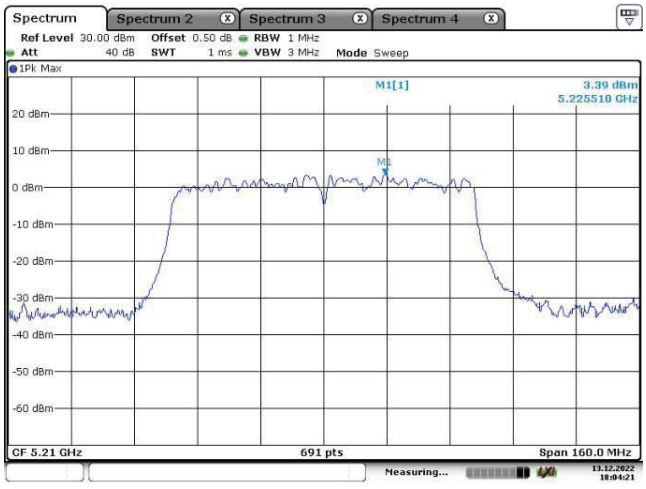

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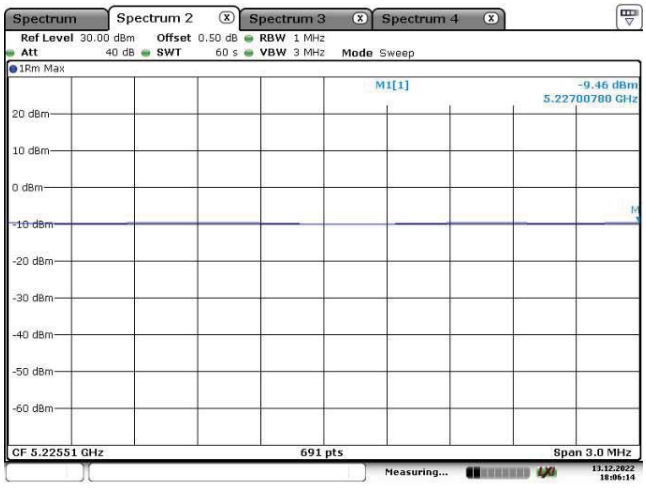

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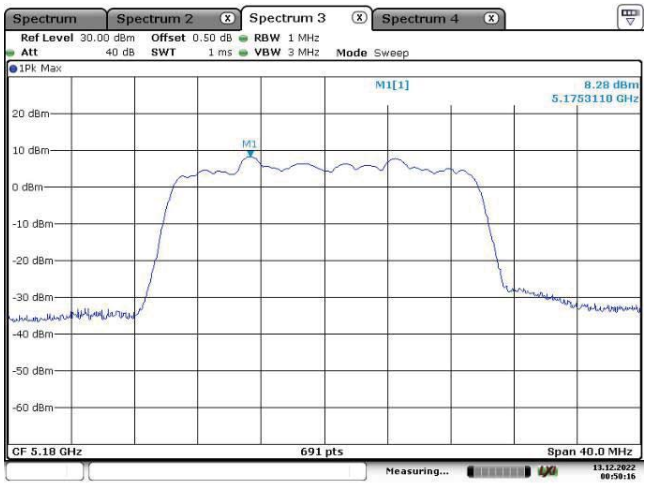

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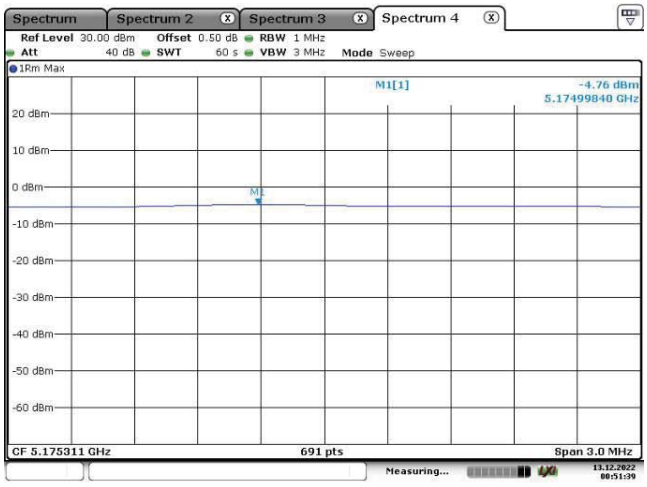

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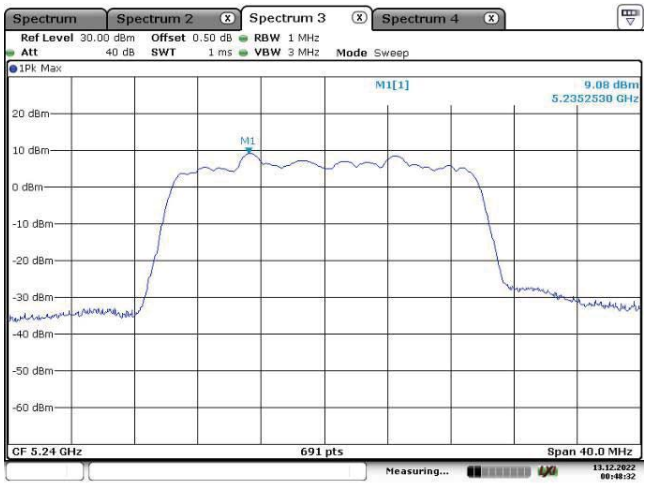

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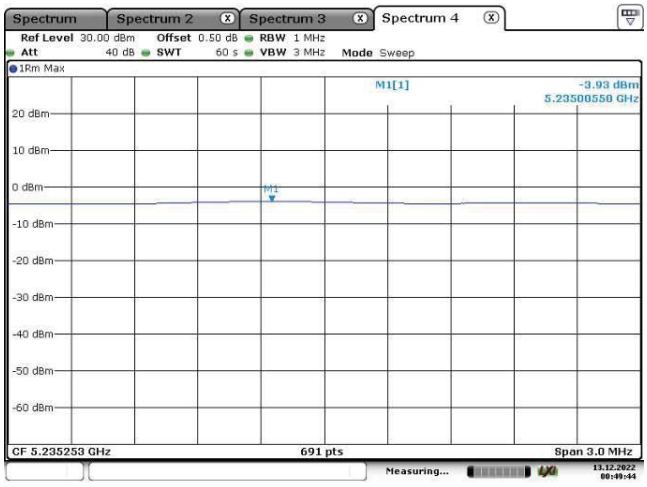

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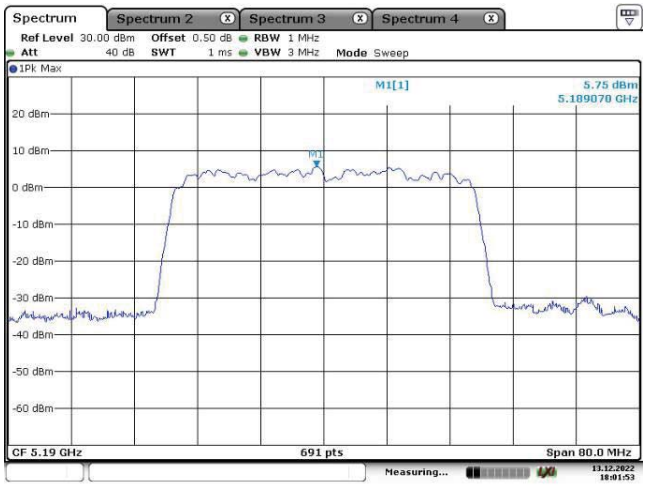

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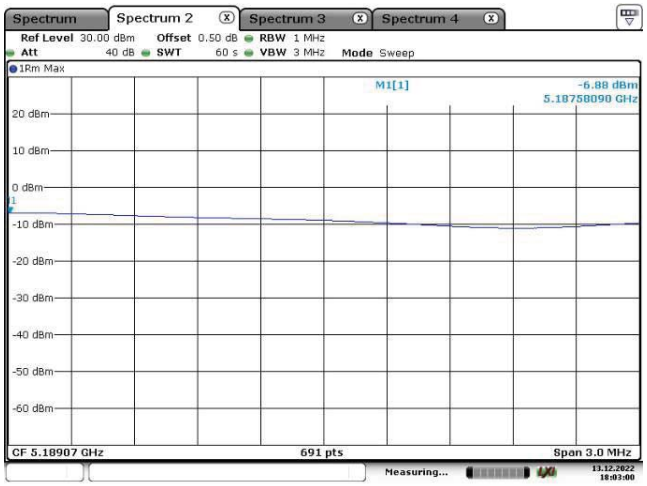

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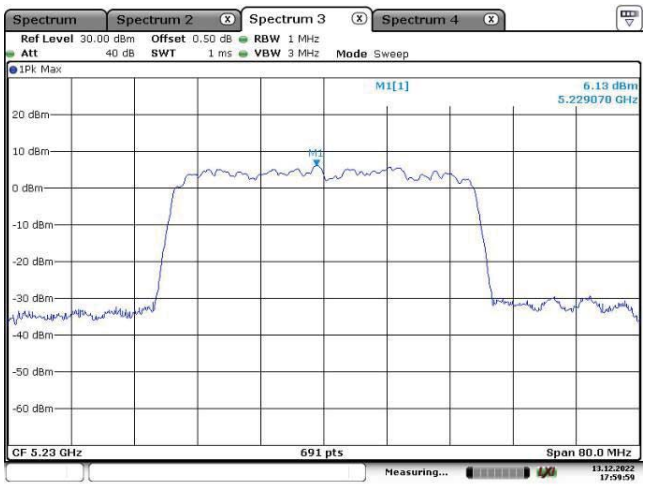

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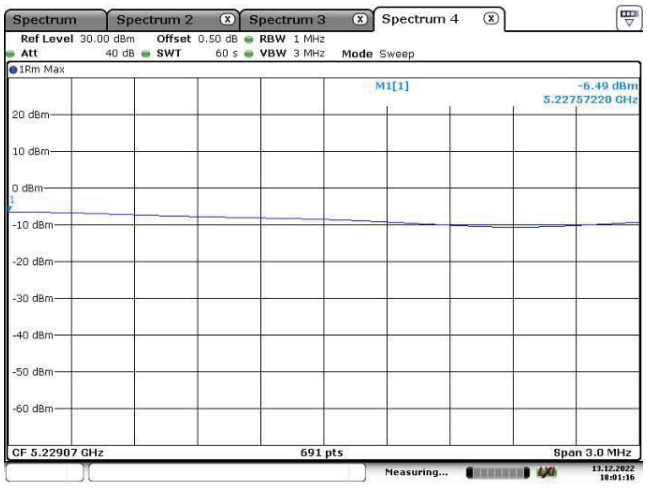

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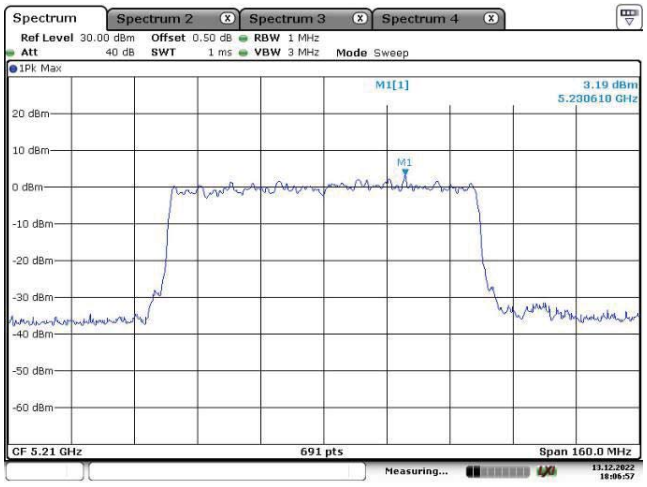

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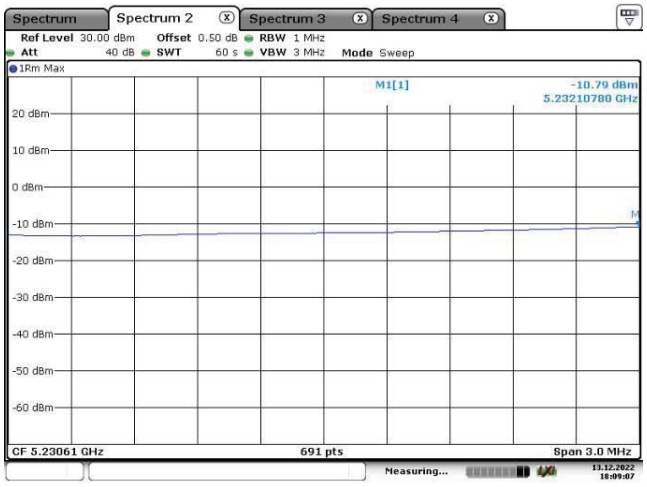

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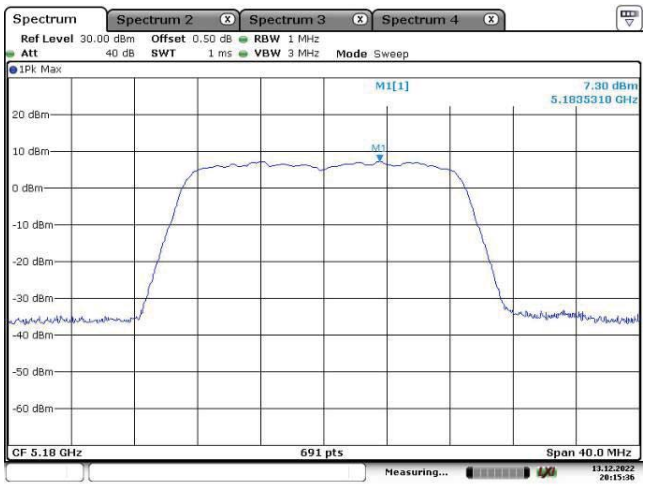

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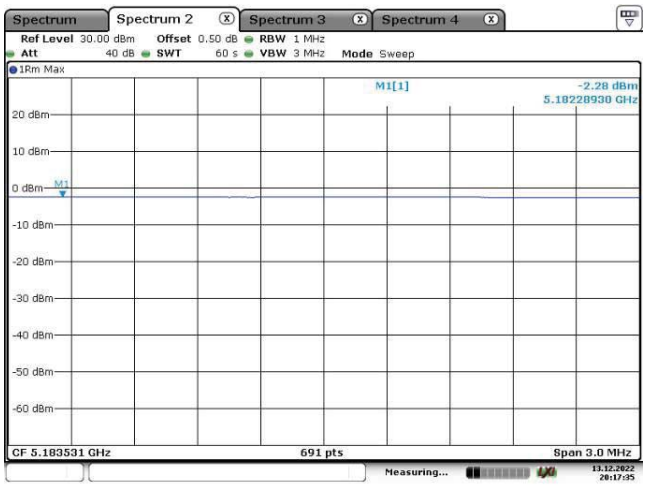

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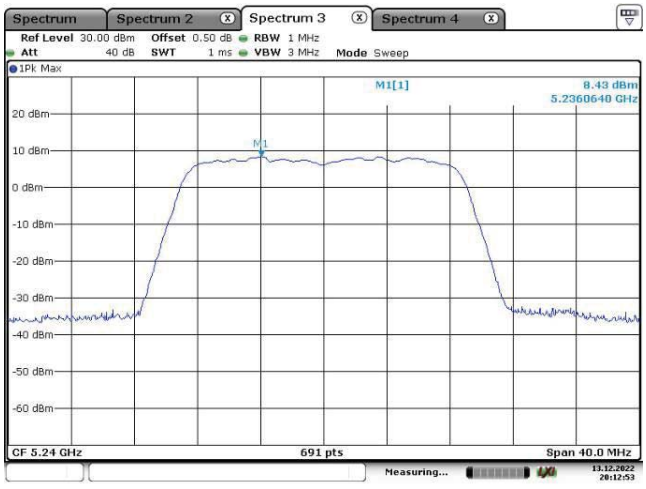

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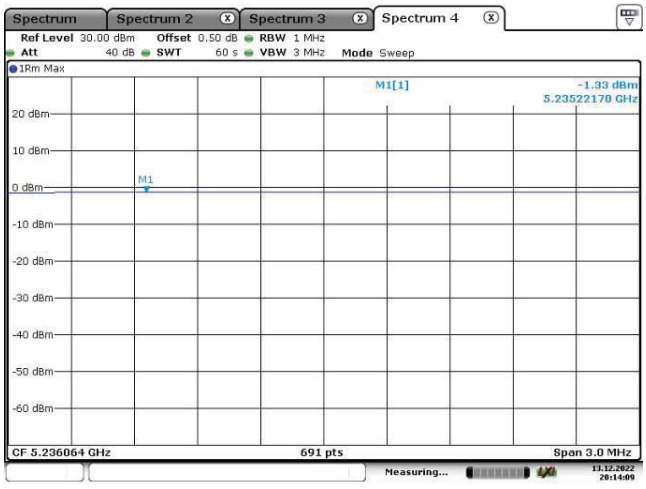

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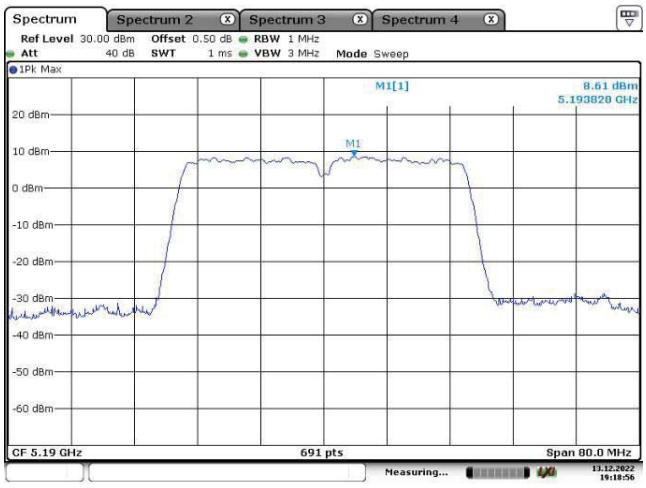

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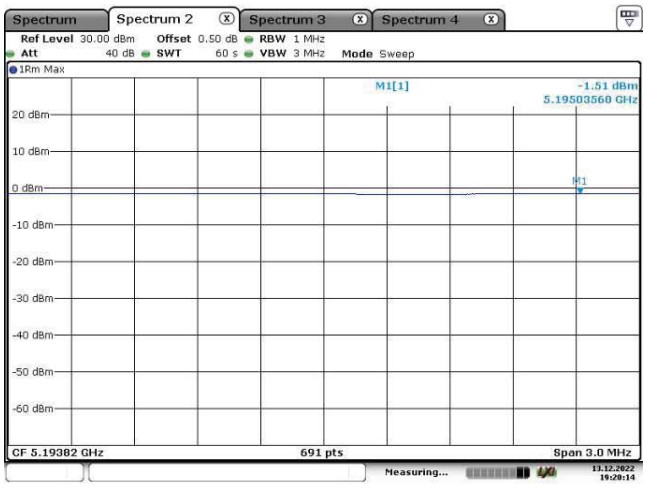

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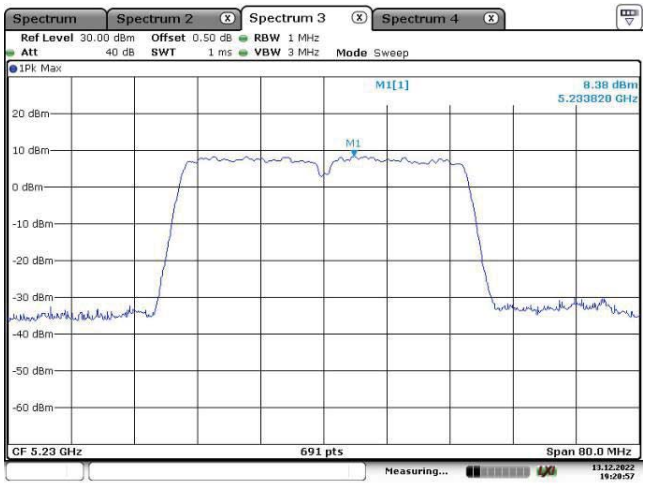

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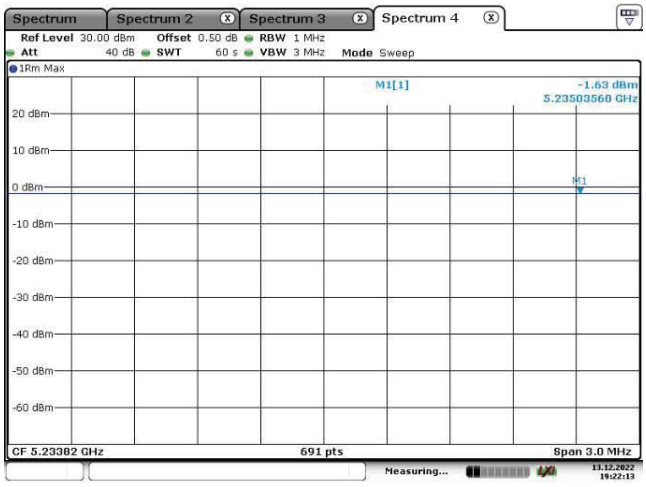

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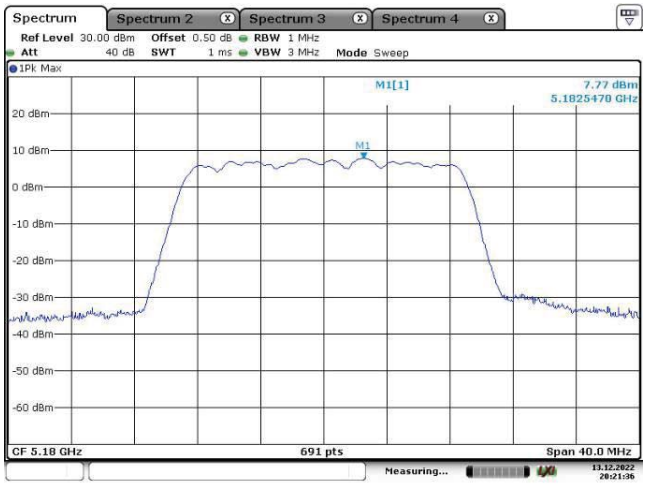
802.11 ac20-L



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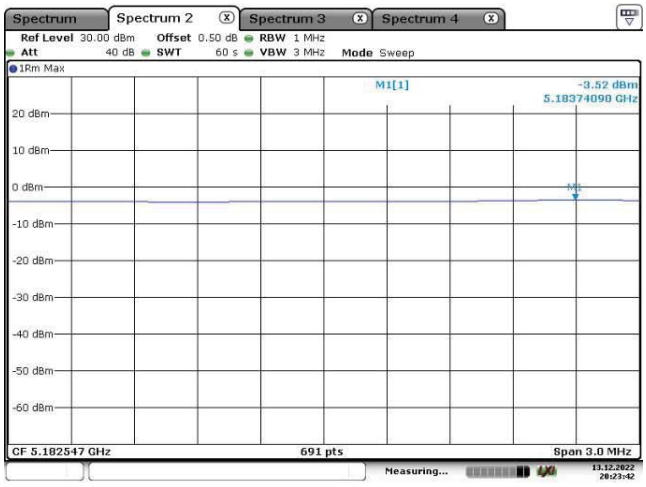

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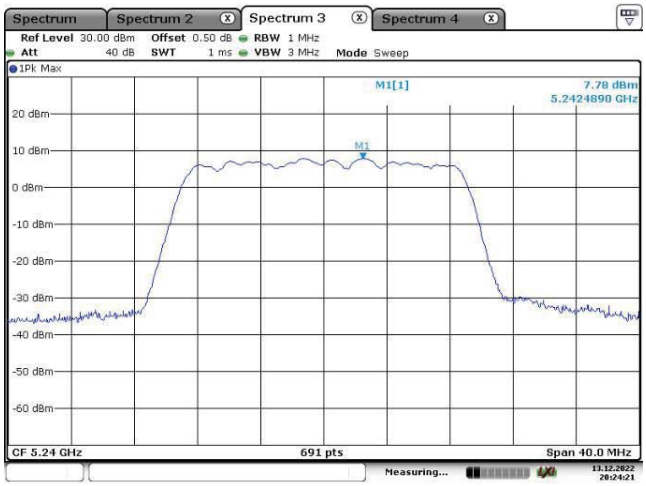

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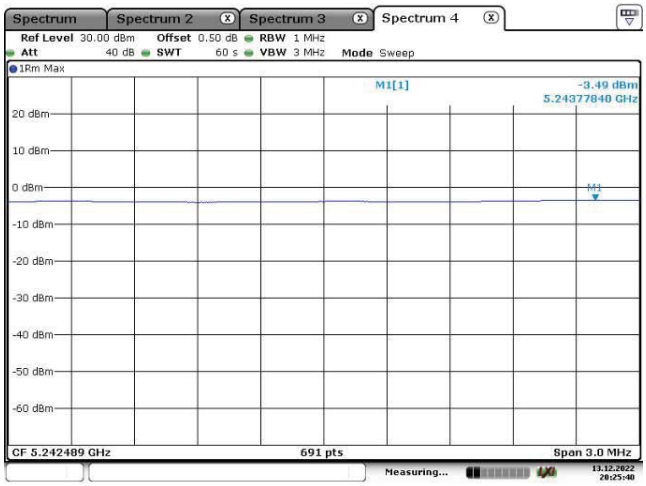

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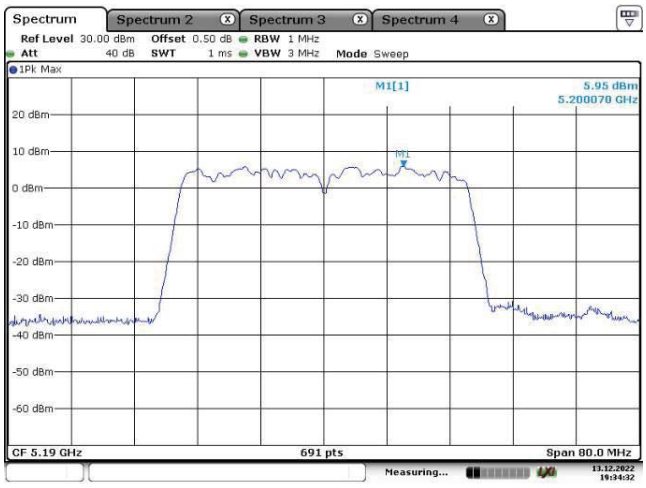

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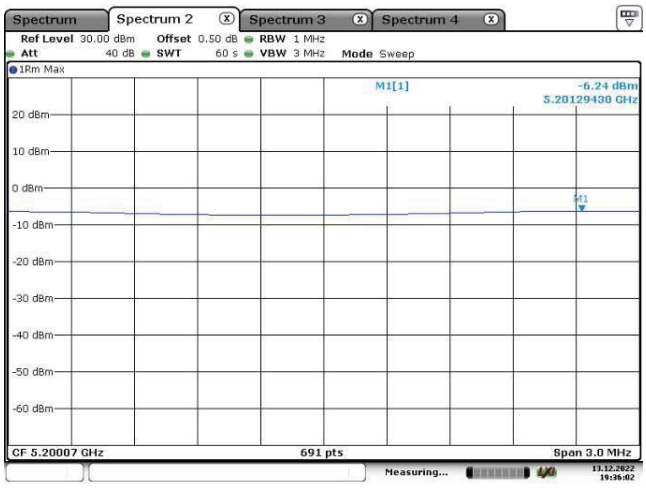

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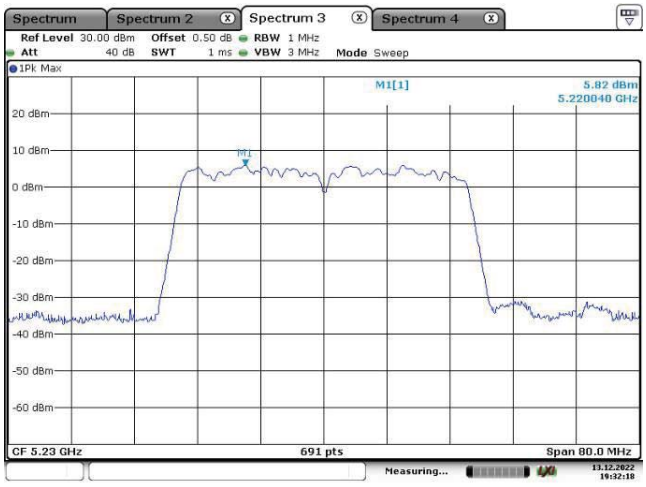

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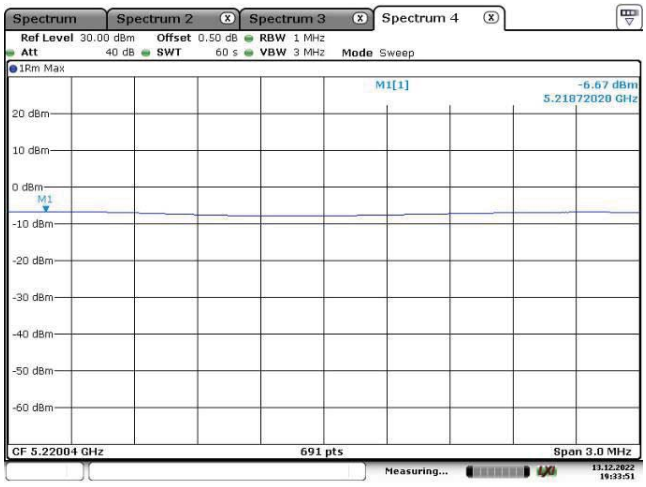

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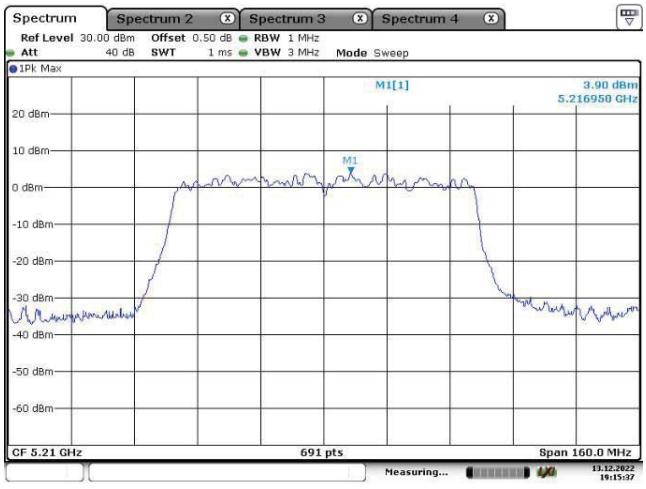
802.11 ac80



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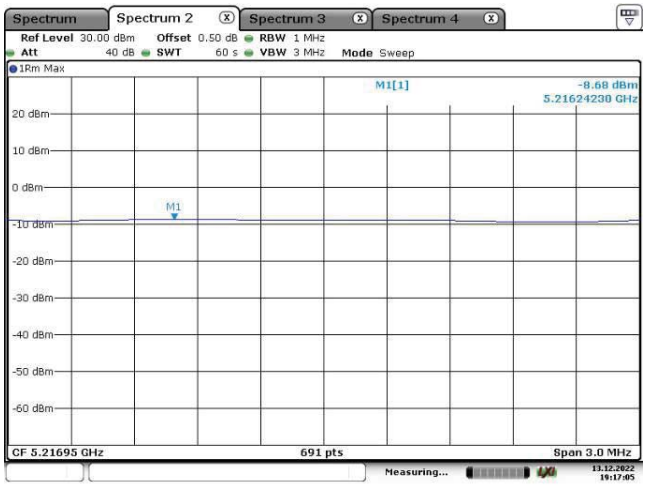

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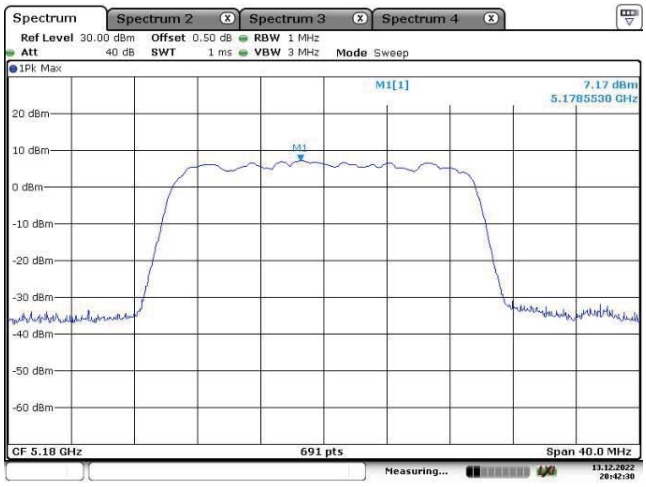

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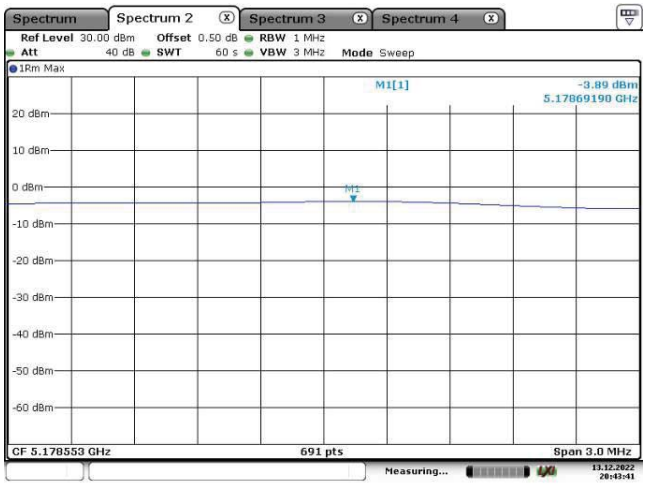

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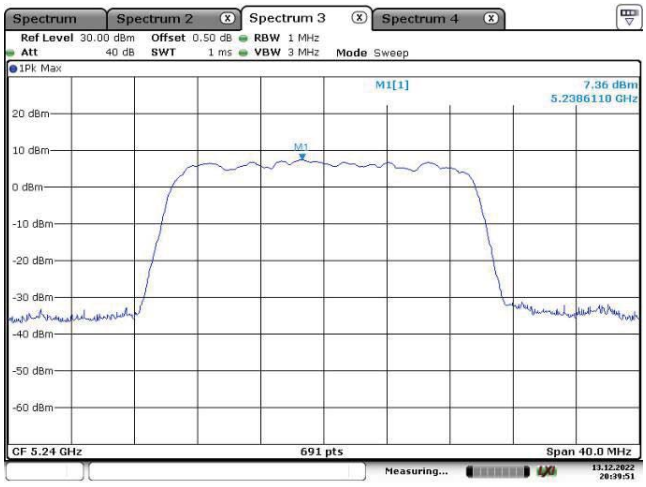
802.11 ax20-H



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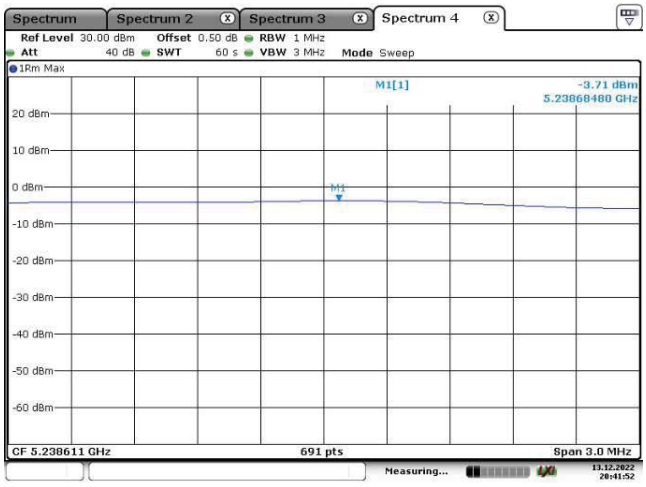

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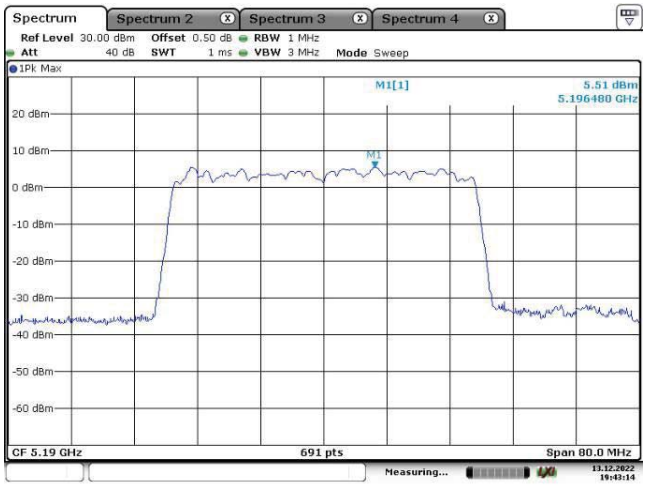

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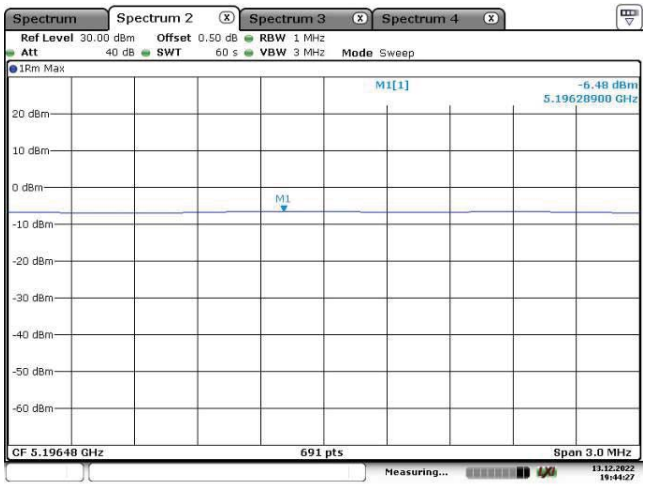

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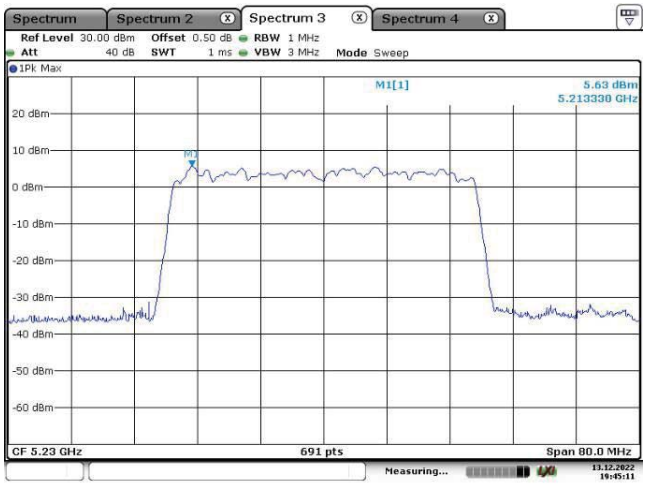
802.11 ax40-H



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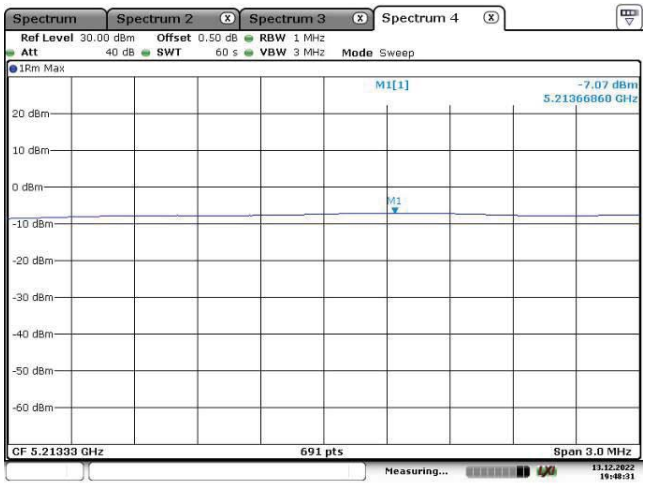

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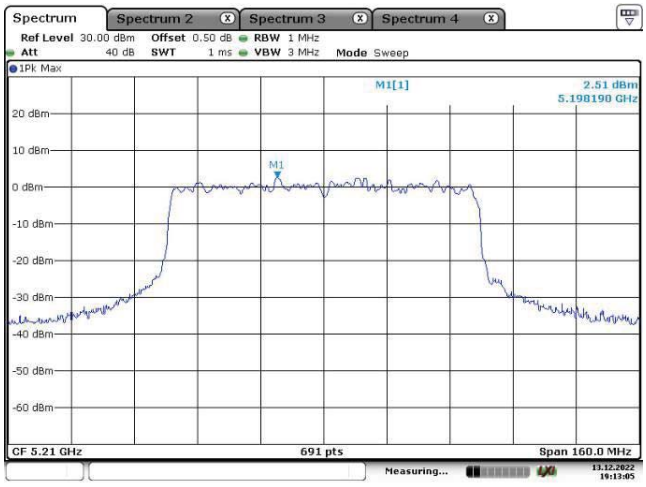
802.11 ax80



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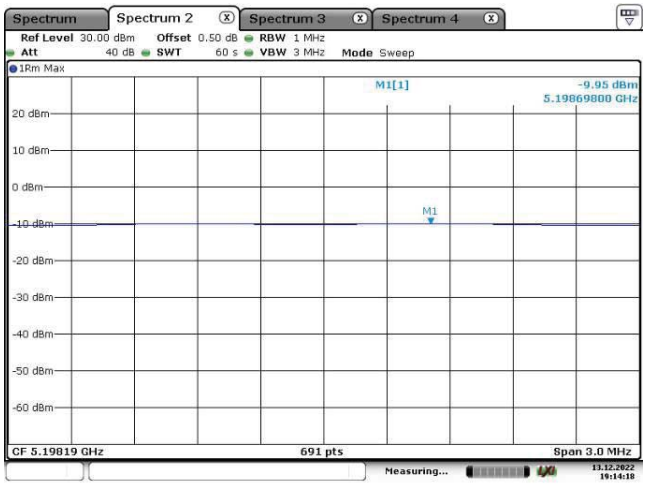


Date: 13.DEC.2022 19:14:18

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-Chain 0 **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)			
94.12	H	51.32	-59.94	0.00	0.15	-60.09	-54.00	6.09
47.41	V	43.06	-50.62	-17.44	0.19	-68.25	-54.00	14.25
10360.00	H	50.32	-49.42	13.48	0.40	-36.34	-30.00	6.34
10360.00	V	49.32	-49.86	13.48	0.40	-36.78	-30.00	6.78

802.11 a-Chain 0 **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)			
94.65	H	51.02	-60.27	0.00	0.15	-60.42	-54.00	6.42
48.55	V	42.62	-51.71	-16.32	0.19	-68.22	-54.00	14.22
10480.00	H	50.26	-49.48	13.32	0.30	-36.46	-30.00	6.46
10480.00	V	49.30	-49.70	13.32	0.30	-36.68	-30.00	6.68

802.11 a-Chain 1 **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)			
93.26	H	50.26	-60.96	0.00	0.16	-61.12	-54.00	7.12
48.69	V	42.61	-51.80	-16.18	0.19	-68.17	-54.00	14.17
10360.00	H	50.33	-49.41	13.48	0.40	-36.33	-30.00	6.33
10360.00	V	49.23	-49.95	13.48	0.40	-36.87	-30.00	6.87

802.11 a-Chain 1 **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)			
94.62	H	51.23	-60.06	0.00	0.15	-60.21	-54.00	6.21
47.66	V	42.74	-51.08	-17.19	0.19	-68.46	-54.00	14.46
10480.00	H	50.33	-49.41	13.32	0.30	-36.39	-30.00	6.39
10480.00	V	49.41	-49.59	13.32	0.30	-36.57	-30.00	6.57

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)			
94.62	H	50.26	-61.03	0.00	0.15	-61.18	-54.00	7.18
48.21	V	44.26	-49.87	-16.65	0.19	-66.71	-54.00	12.71
10360.00	H	50.22	-49.52	13.48	0.40	-36.44	-30.00	6.44
10360.00	V	49.39	-49.79	13.48	0.40	-36.71	-30.00	6.71

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)			
96.24	H	50.62	-60.75	0.00	0.13	-60.88	-54.00	6.88
48.27	V	43.22	-50.95	-16.60	0.19	-67.74	-54.00	13.74
10480.00	H	46.58	-53.16	13.32	0.30	-40.14	-30.00	10.14
10480.00	V	48.25	-50.75	13.32	0.30	-37.73	-30.00	7.73

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)			
97.54	H	50.48	-60.95	0.00	0.12	-61.07	-54.00	7.07
49.62	V	42.55	-52.38	-15.27	0.19	-67.84	-54.00	13.84
10380.00	H	46.25	-53.49	13.44	0.38	-40.43	-30.00	10.43
10380.00	V	47.12	-52.03	13.44	0.38	-38.97	-30.00	8.97

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)			
95.26	H	50.74	-60.58	0.00	0.14	-60.72	-54.00	6.72
49.62	V	42.56	-52.37	-15.27	0.19	-67.83	-54.00	13.83
10460.00	H	46.52	-53.22	13.34	0.31	-40.19	-30.00	10.19
10460.00	V	48.68	-50.35	13.34	0.31	-37.32	-30.00	7.32

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)			
95.62	H	50.41	-60.93	0.00	0.14	-61.07	-54.00	7.07
48.52	V	45.29	-49.02	-16.35	0.19	-65.56	-54.00	11.56
10360.00	H	48.26	-51.48	13.48	0.40	-38.40	-30.00	8.40
10360.00	V	46.32	-52.86	13.48	0.40	-39.78	-30.00	9.78

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)			
95.62	H	50.20	-61.14	0.00	0.14	-61.28	-54.00	7.28
47.85	V	43.26	-50.67	-17.00	0.19	-67.86	-54.00	13.86
10480.00	H	45.62	-54.12	13.32	0.30	-41.10	-30.00	11.10
10480.00	V	47.45	-51.55	13.32	0.30	-38.53	-30.00	8.53

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)			
96.32	H	50.62	-60.75	0.00	0.13	-60.88	-54.00	6.88
48.62	V	42.95	-51.42	-16.25	0.19	-67.86	-54.00	13.86
10380.00	H	48.26	-51.48	13.44	0.38	-38.42	-30.00	8.42
10380.00	V	47.22	-51.93	13.44	0.38	-38.87	-30.00	8.87

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)			
97.58	H	50.60	-60.84	0.00	0.12	-60.96	-54.00	6.96
49.62	V	43.35	-51.58	-15.27	0.19	-67.04	-54.00	13.04
10460.00	H	49.23	-50.51	13.34	0.31	-37.48	-30.00	7.48
10460.00	V	48.26	-50.77	13.34	0.31	-37.74	-30.00	7.74

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)			
95.62	H	51.07	-60.27	0.00	0.14	-60.41	-54.00	6.41
48.65	V	42.60	-51.78	-16.22	0.19	-68.19	-54.00	14.19
10420.00	H	48.65	-51.09	13.38	0.35	-38.06	-30.00	8.06
10420.00	V	47.22	-51.87	13.38	0.35	-38.84	-30.00	8.84

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)			
95.22	H	50.62	-60.70	0.00	0.14	-60.84	-54.00	6.84
49.62	V	44.62	-50.32	-15.27	0.19	-65.78	-54.00	11.78
10360.00	H	49.58	-50.16	13.48	0.40	-37.08	-30.00	7.08
10360.00	V	47.23	-51.95	13.48	0.40	-38.87	-30.00	8.87

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)			
96.30	H	51.04	-60.33	0.00	0.13	-60.46	-54.00	6.46
47.51	V	44.18	-49.56	-17.34	0.19	-67.09	-54.00	13.09
10480.00	H	48.22	-51.52	13.32	0.30	-38.50	-30.00	8.50
10480.00	V	47.14	-51.86	13.32	0.30	-38.84	-30.00	8.84

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)			
96.74	H	50.74	-60.65	0.00	0.13	-60.78	-54.00	6.78
48.59	V	42.85	-51.50	-16.28	0.19	-67.97	-54.00	13.97
10380.00	H	48.26	-51.48	13.44	0.38	-38.42	-30.00	8.42
10380.00	V	47.14	-52.01	13.44	0.38	-38.95	-30.00	8.95

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)			
92.62	H	51.20	-59.98	0.00	0.17	-60.15	-54.00	6.15
49.51	V	44.26	-50.61	-15.38	0.19	-66.18	-54.00	12.18
10460.00	H	48.26	-51.48	13.34	0.31	-38.45	-30.00	8.45
10460.00	V	47.22	-51.81	13.34	0.31	-38.78	-30.00	8.78

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)			
95.79	H	50.70	-60.65	0.00	0.14	-60.79	-54.00	6.79
48.95	V	44.23	-50.33	-15.93	0.19	-66.45	-54.00	12.45
10420.00	H	48.69	-51.05	13.38	0.35	-38.02	-30.00	8.02
10420.00	V	48.74	-50.35	13.38	0.35	-37.32	-30.00	7.32

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

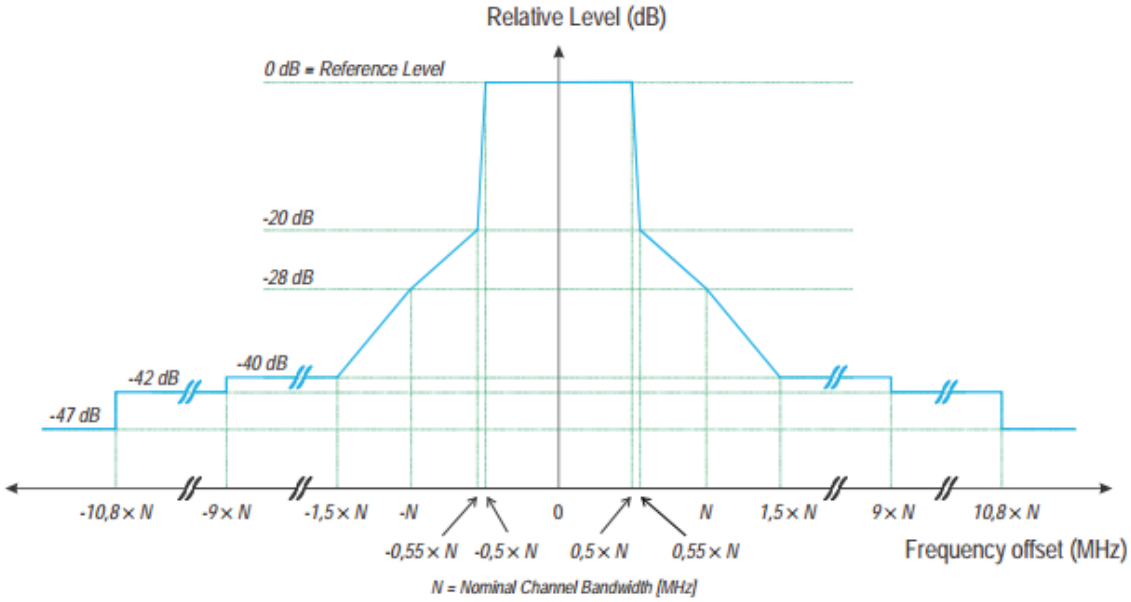


Figure 1: Transmit spectral power mask

Test Procedure

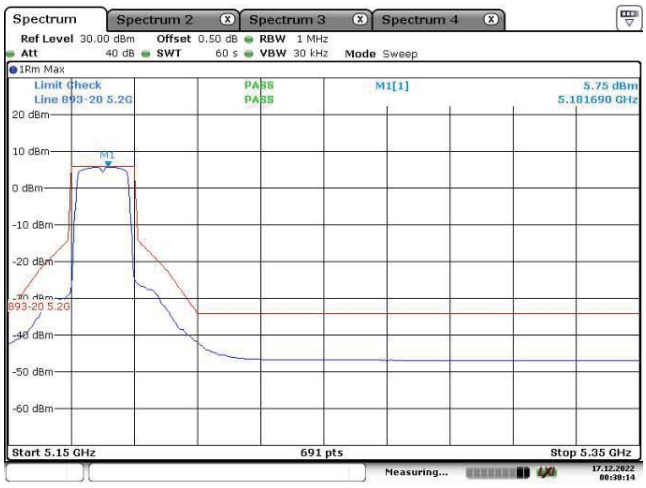
According to ETSI EN 301 893 V2.1.1 (2017-05) §5.4.6

Test Data

Test Result: *Compliant. Please refer to following Plots:*

Chain 0:

802.11 a-L



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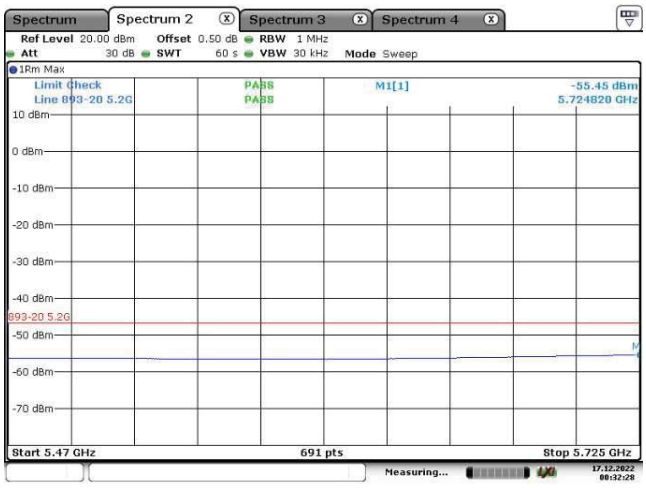

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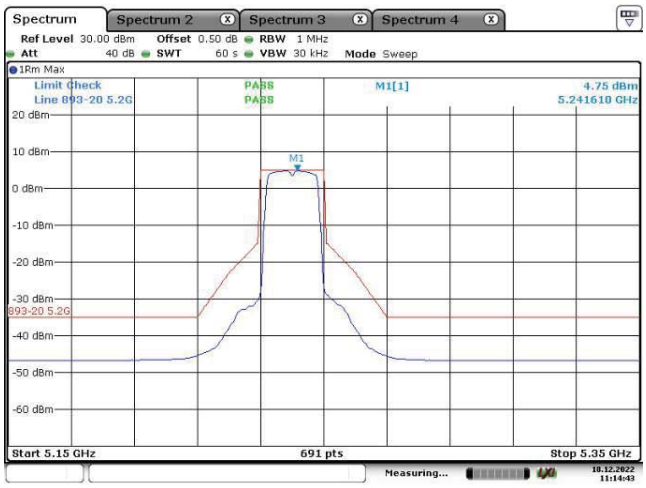

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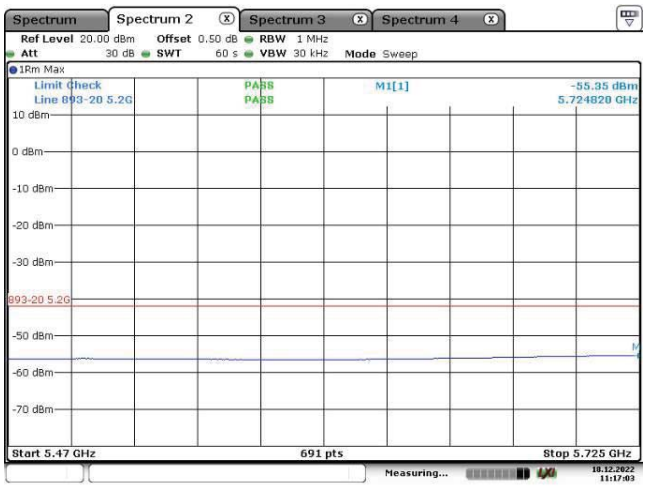

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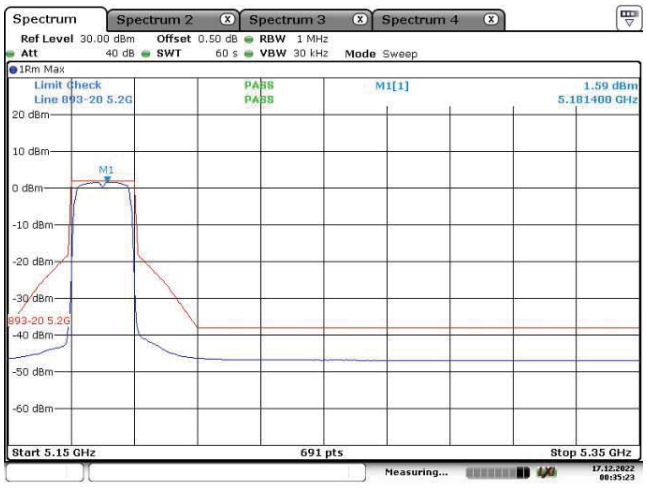

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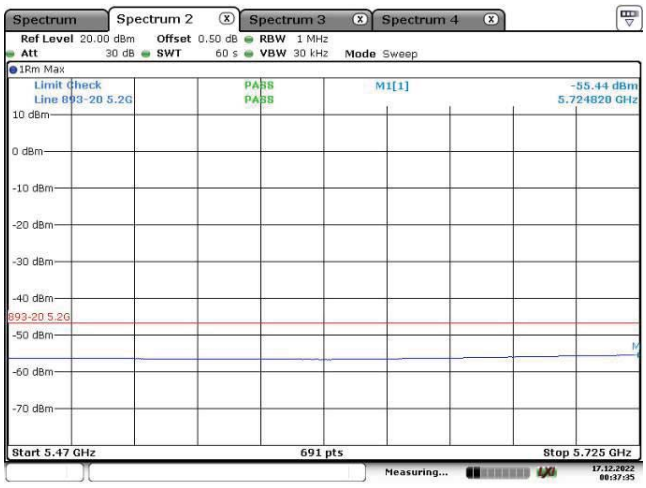

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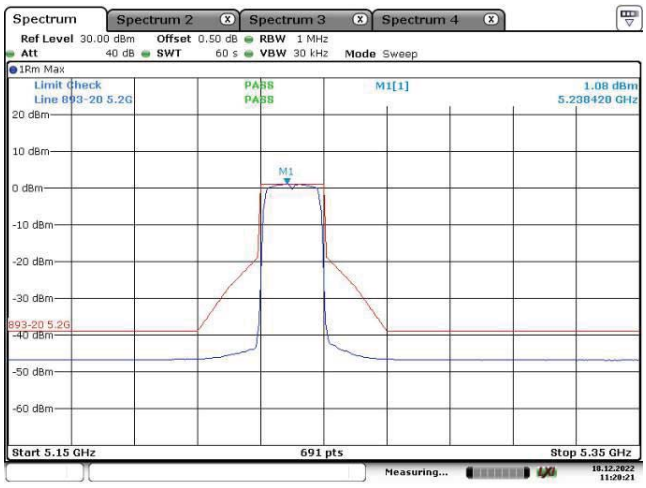

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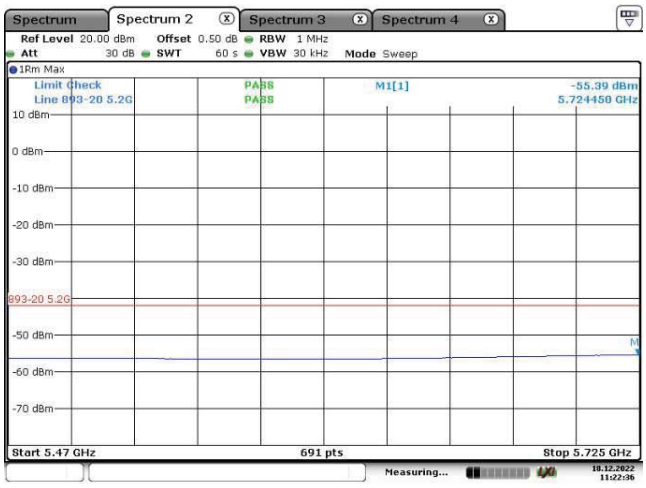

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Date: 18.DEC.2022 10:05:27

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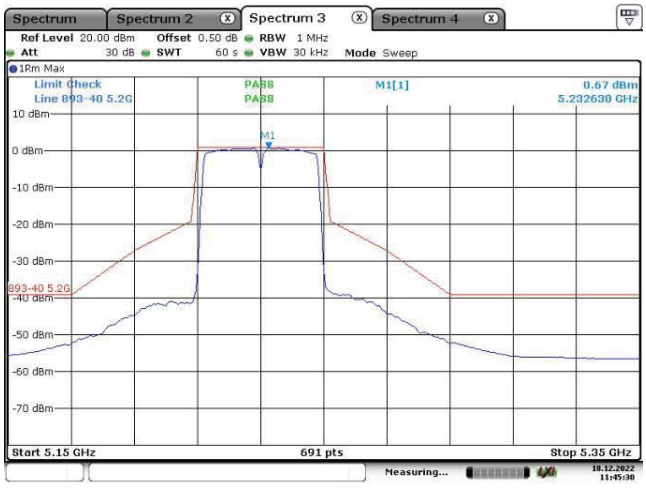

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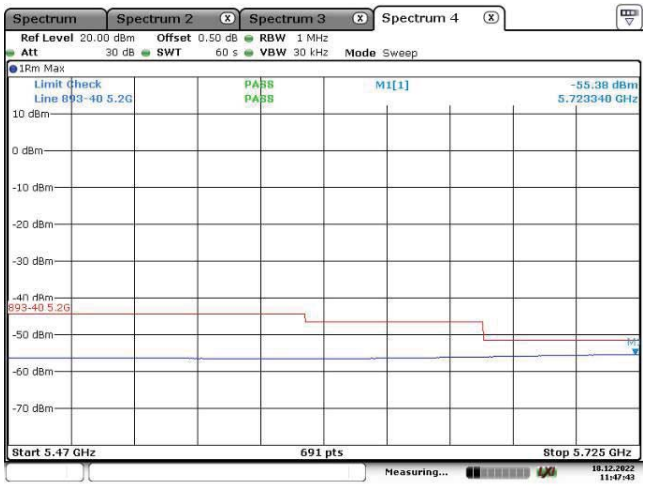

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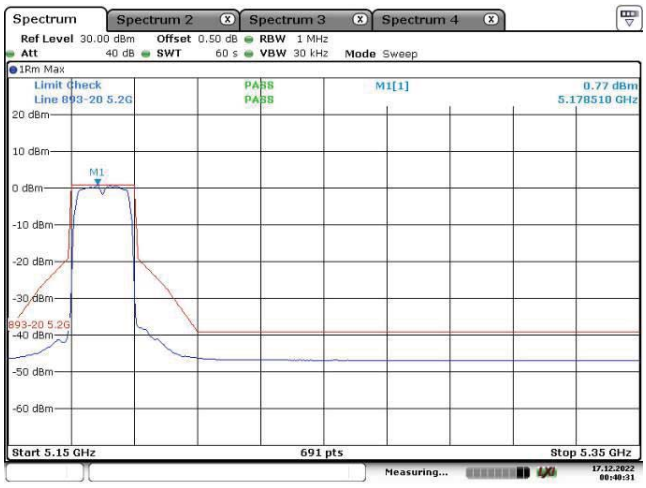

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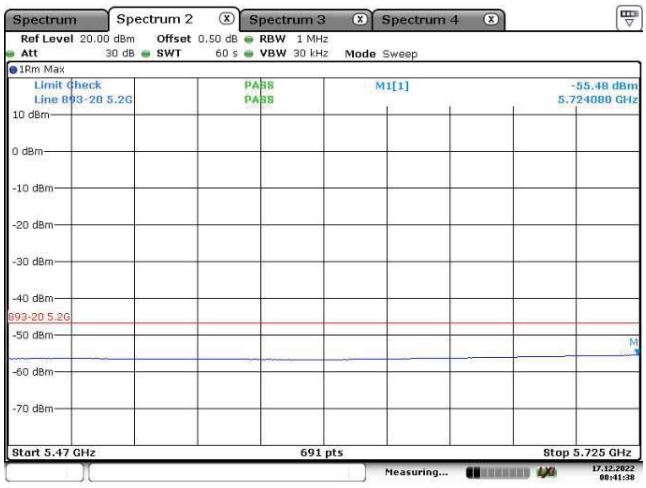

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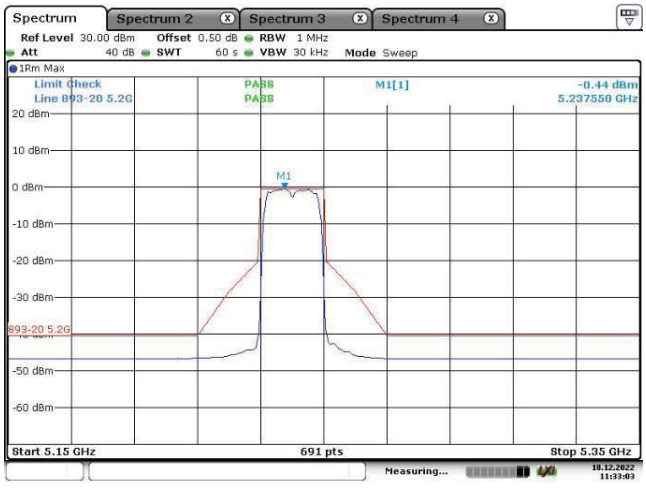

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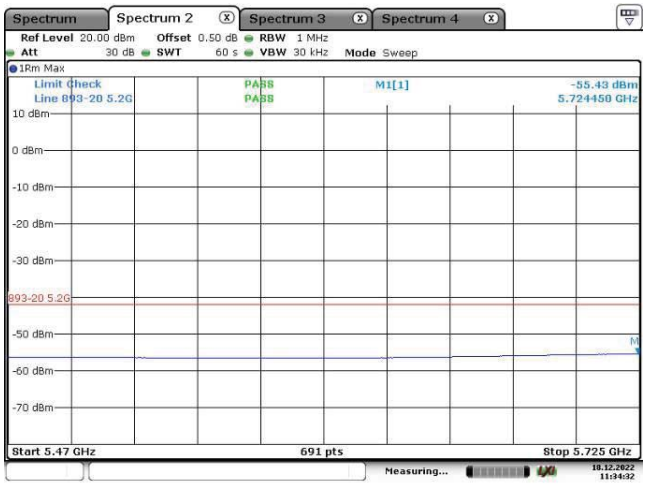

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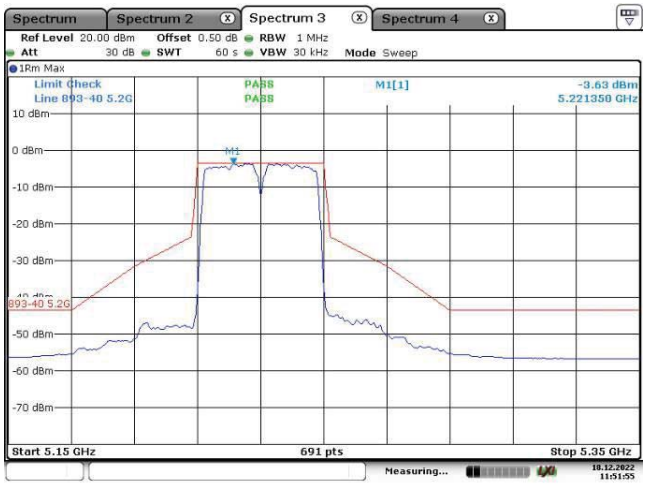
Date: 18.DEC.2022 10:10:02

Date: 18.DEC.2022 10:13:25

802.11 ac40-H



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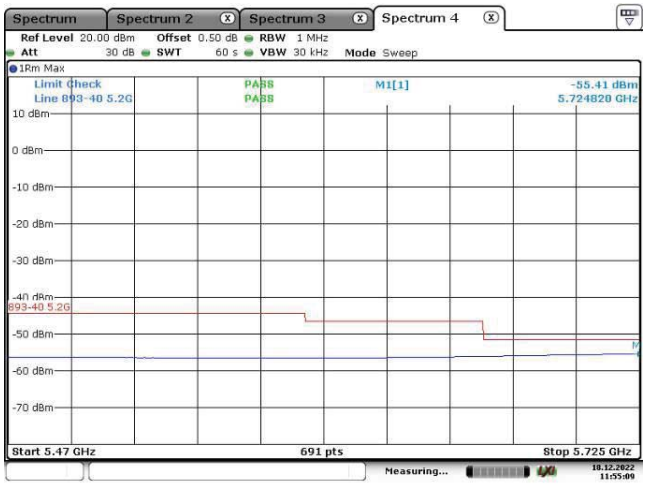

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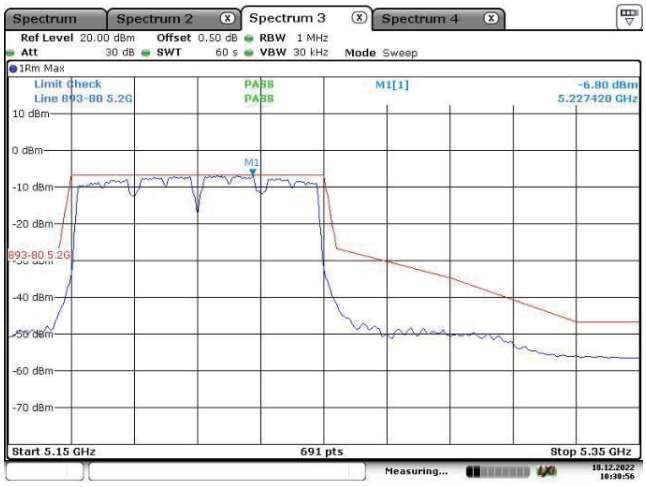

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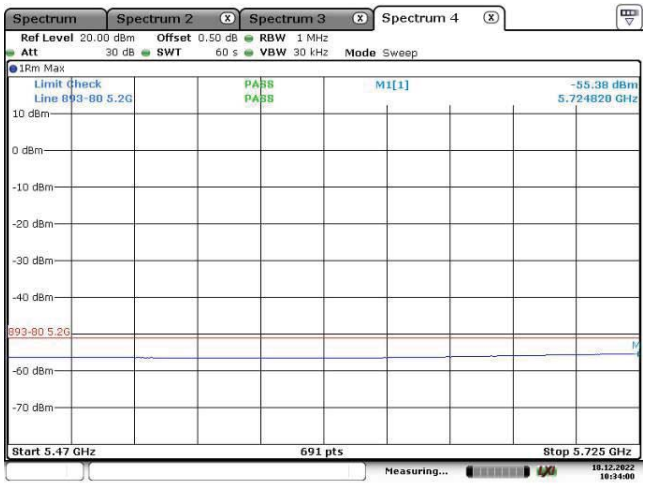

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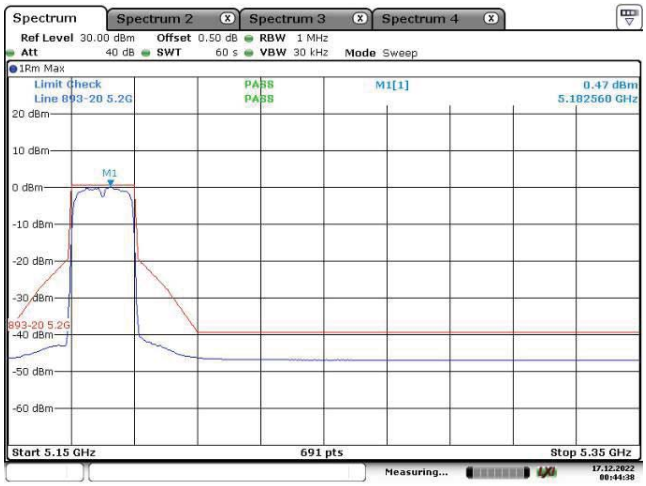

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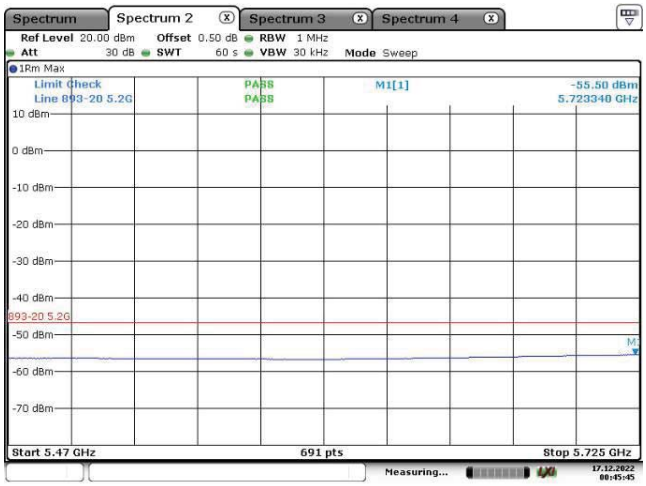

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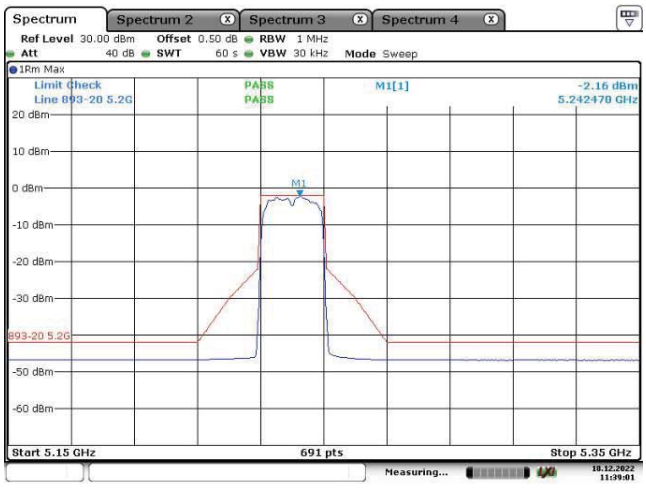

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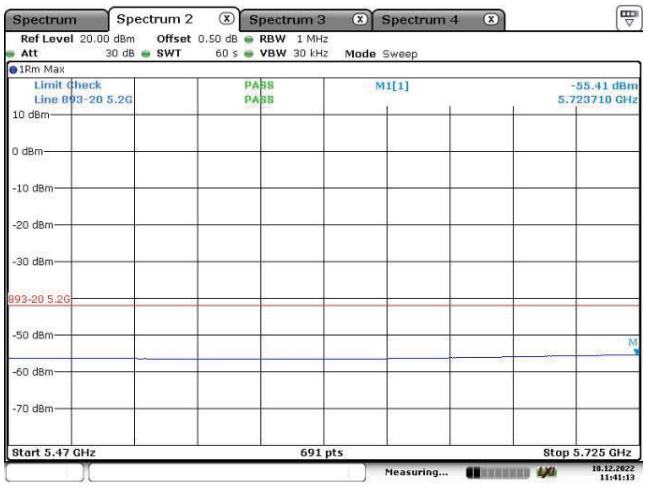

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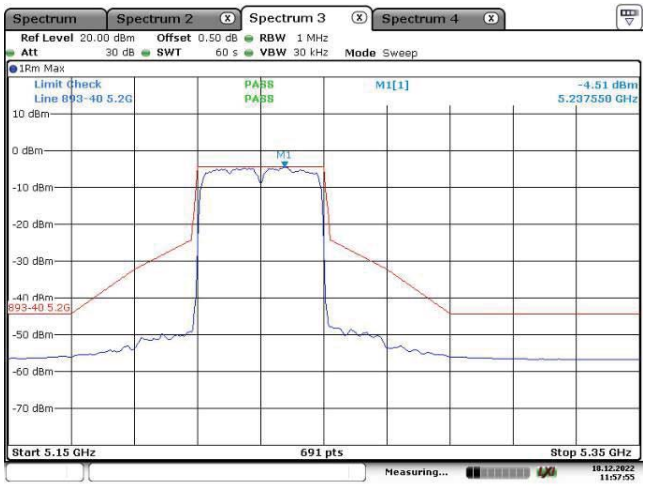

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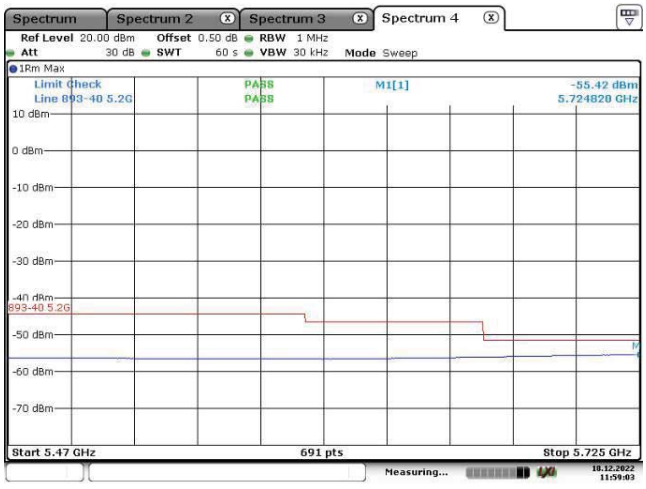

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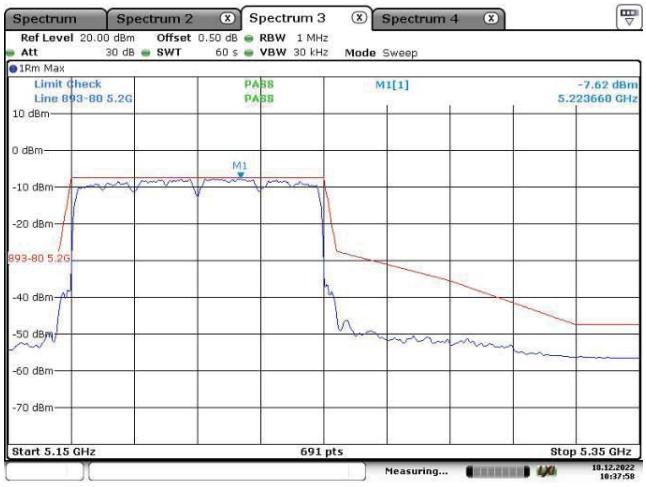

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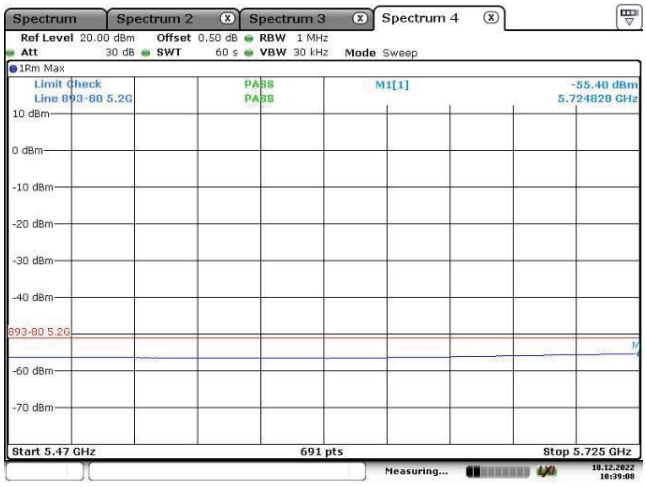

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Chain 0:

802.11 a-L

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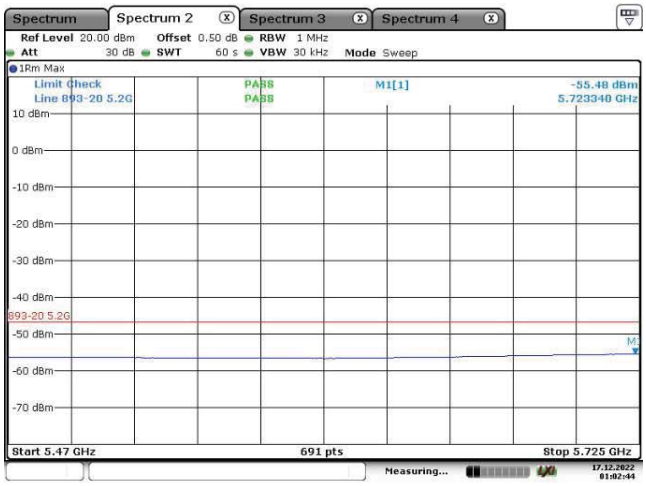

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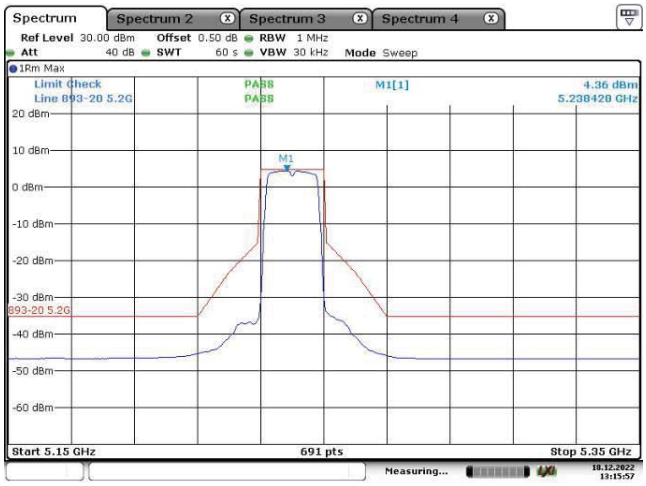

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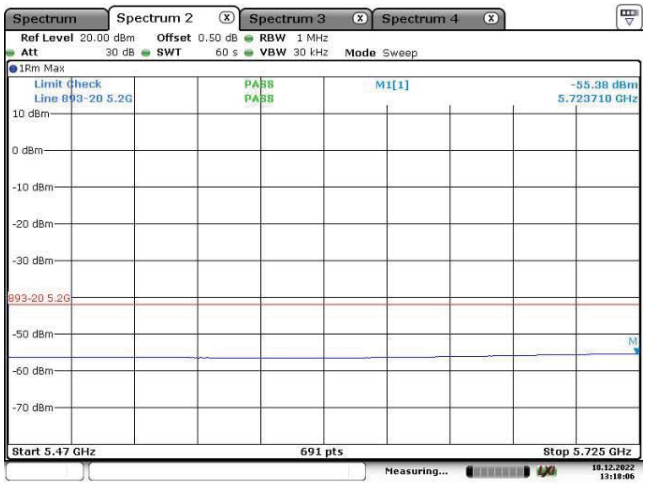

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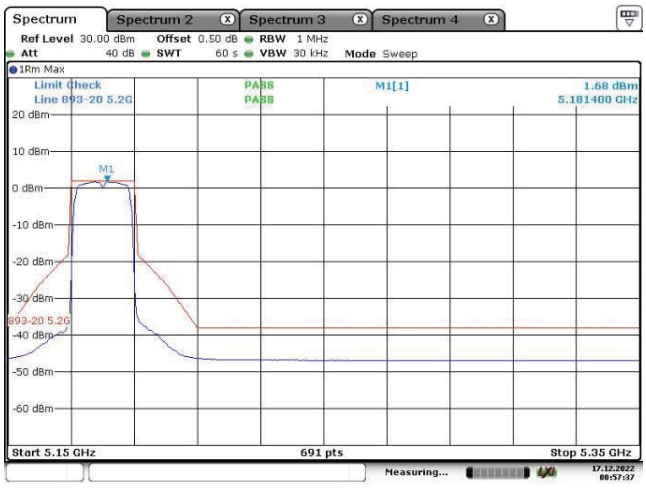

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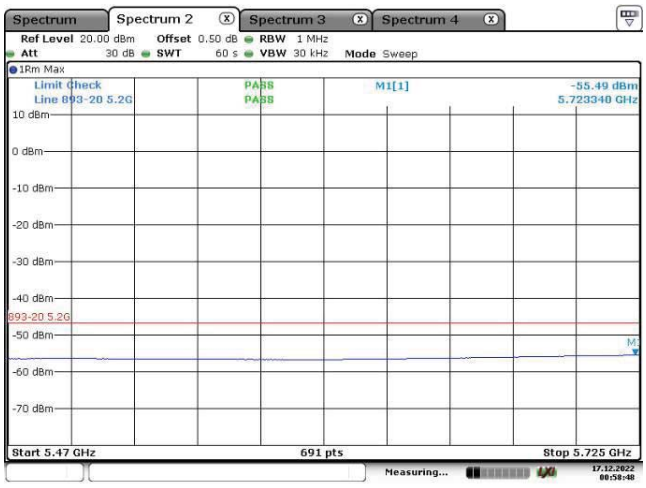

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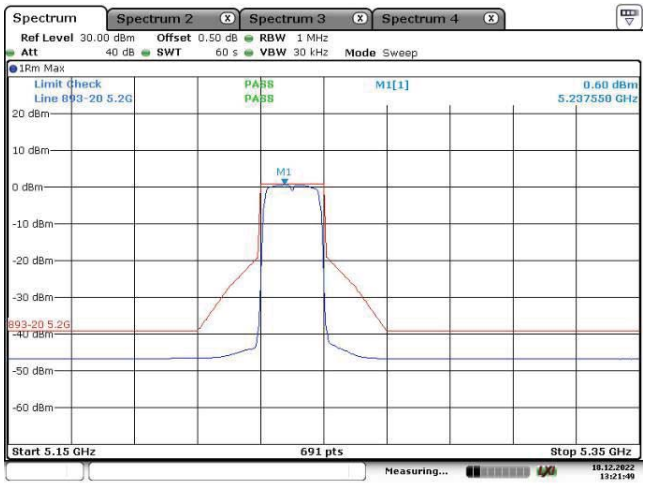

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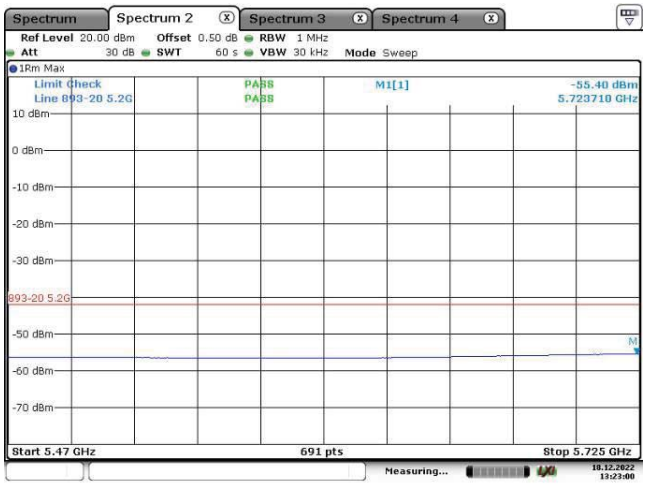

Date: 18.DEC.2022 13:23:00

802.11 n40-L

Date: 18.DEC.2022 10:55:45

Date: 18.DEC.2022 10:58:12

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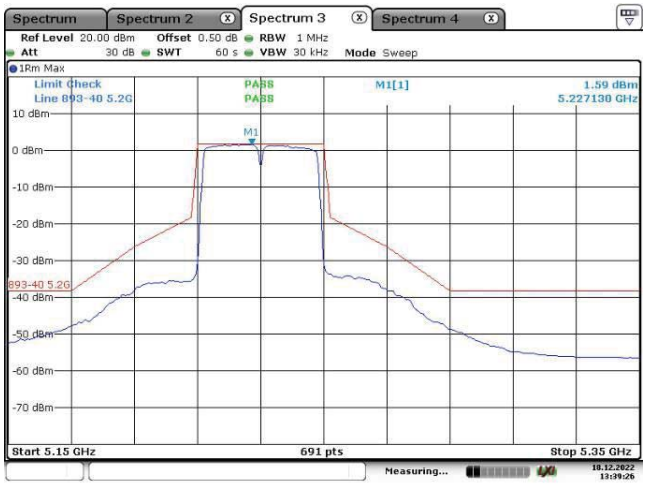

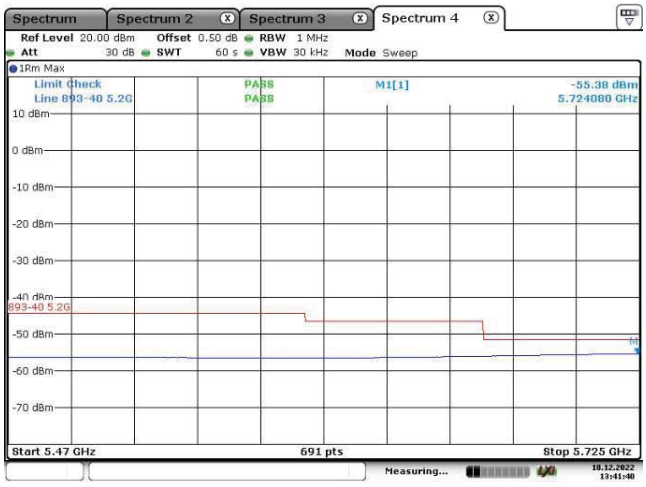

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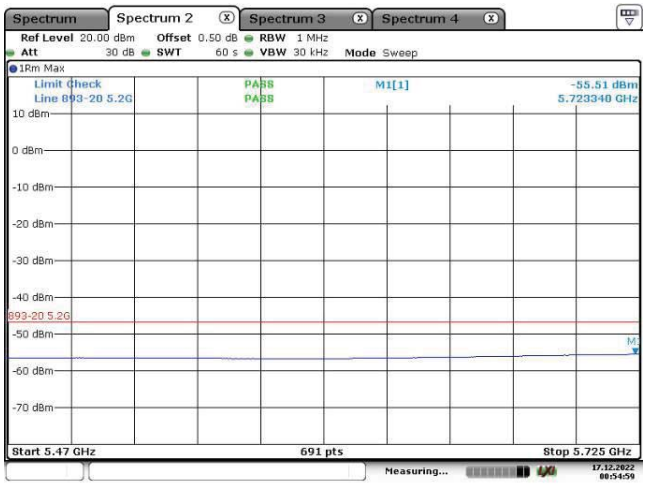

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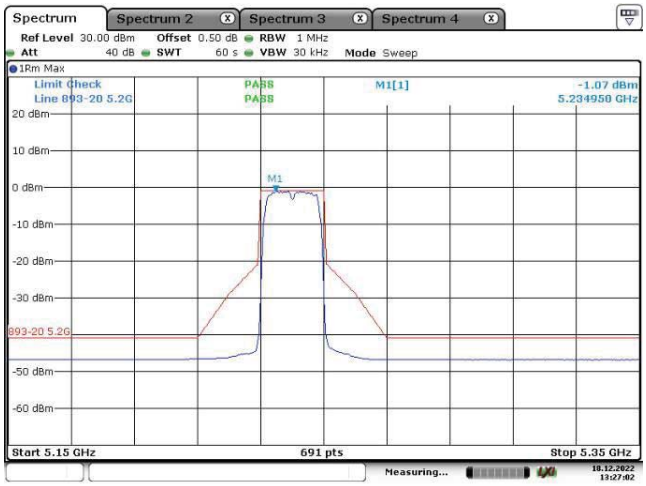

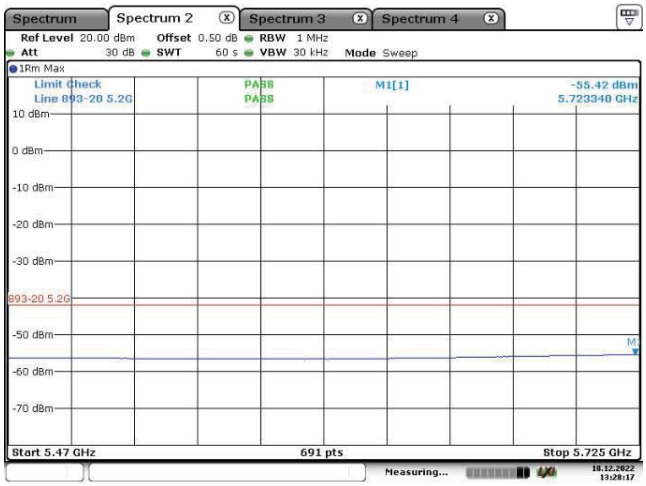

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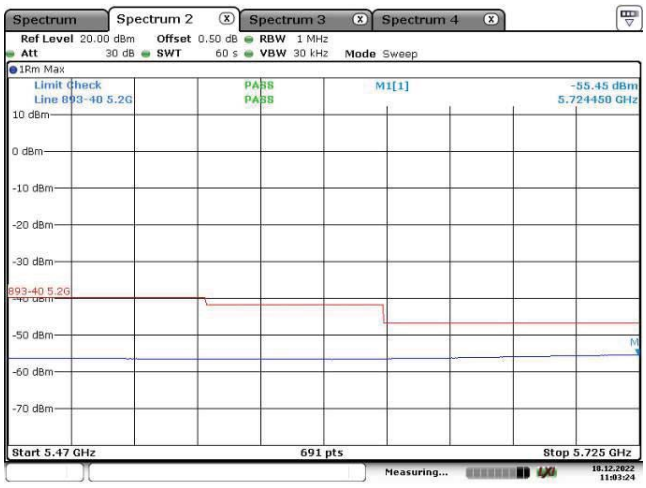

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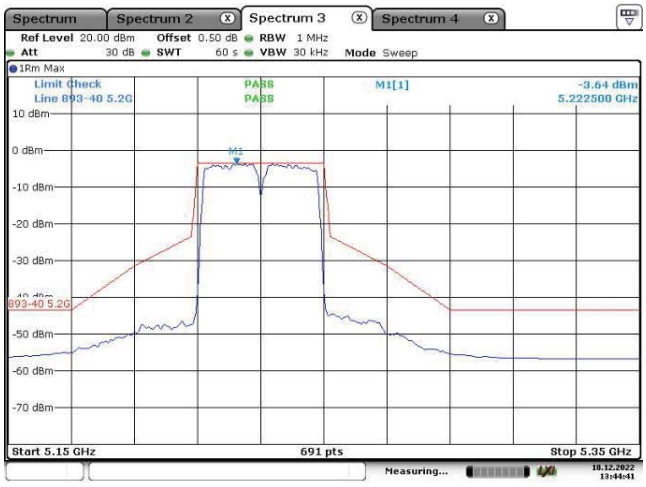

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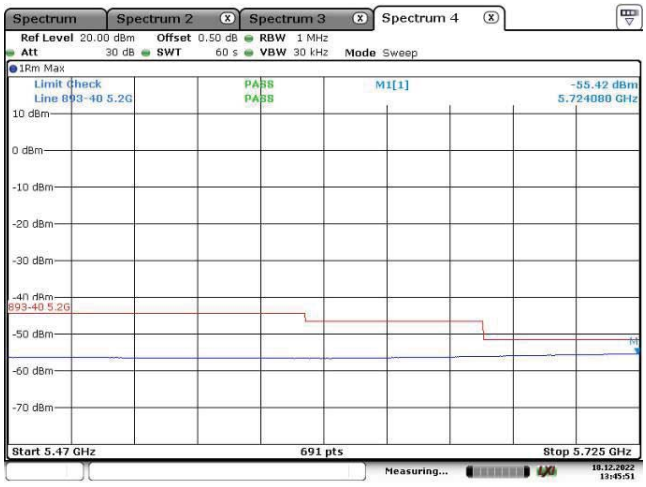

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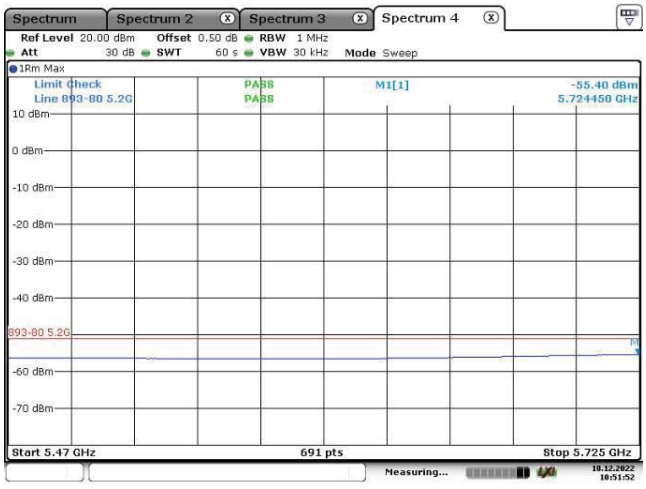
802.11 ac80

Date: 18.DEC.2022 10:49:32



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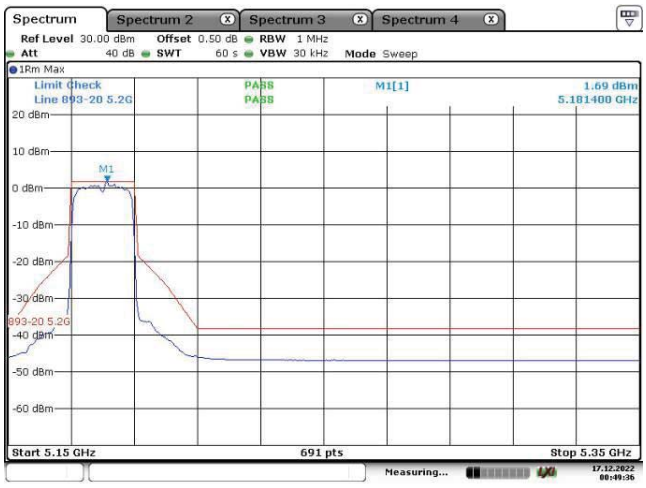

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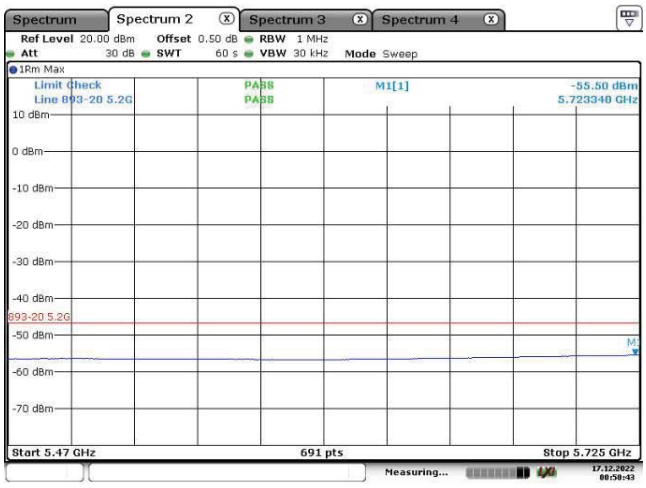

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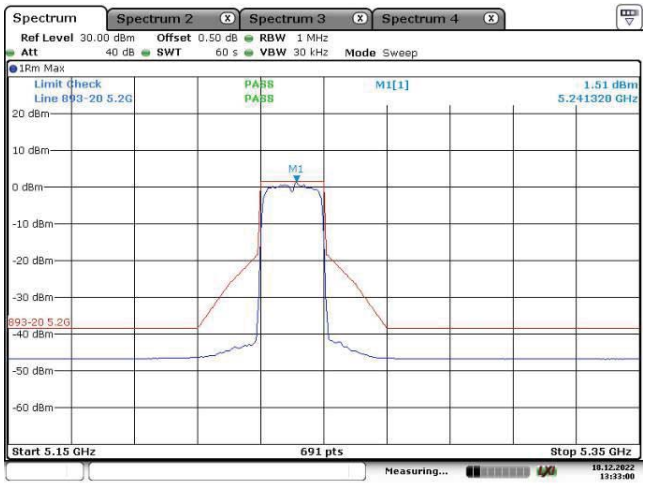

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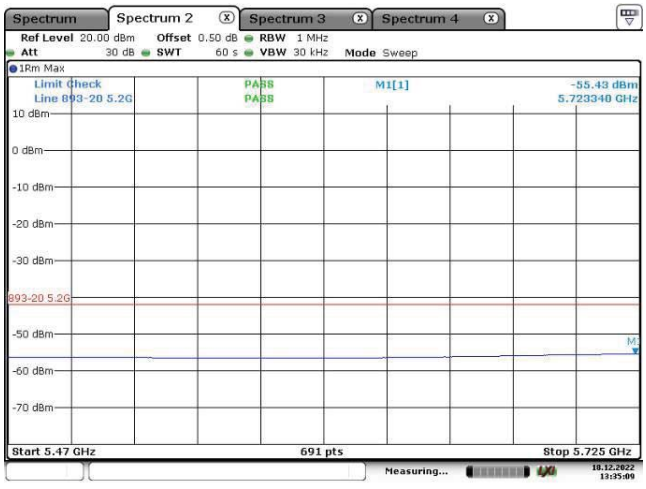

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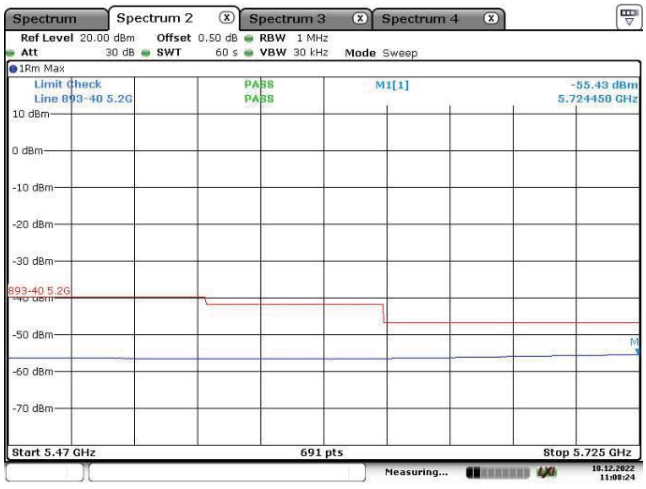

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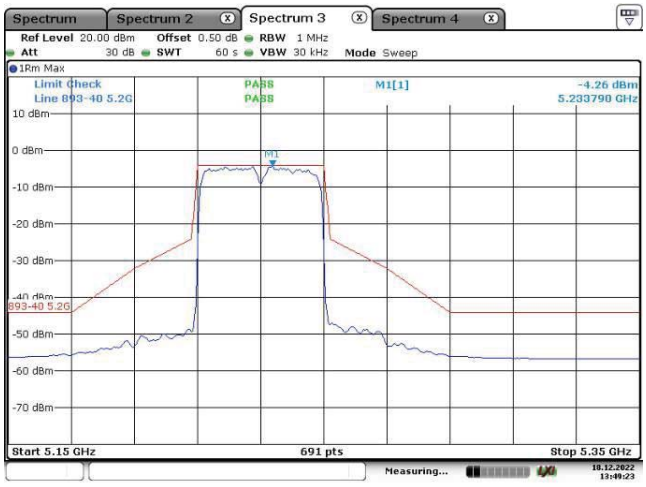

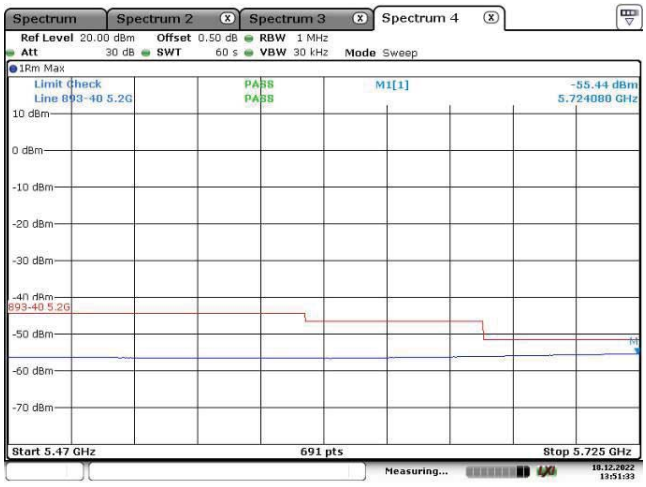

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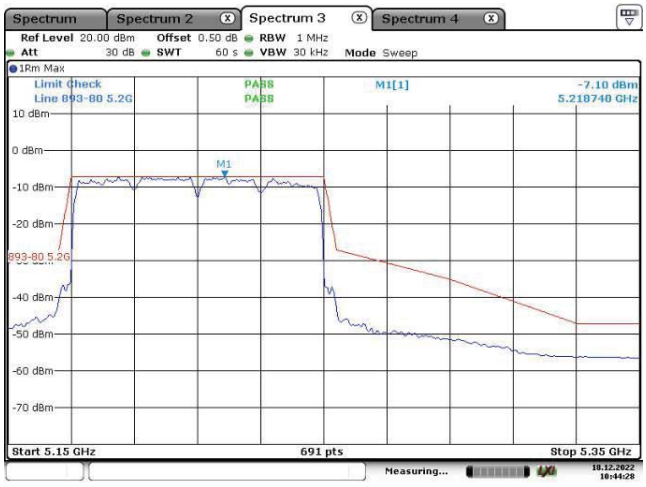
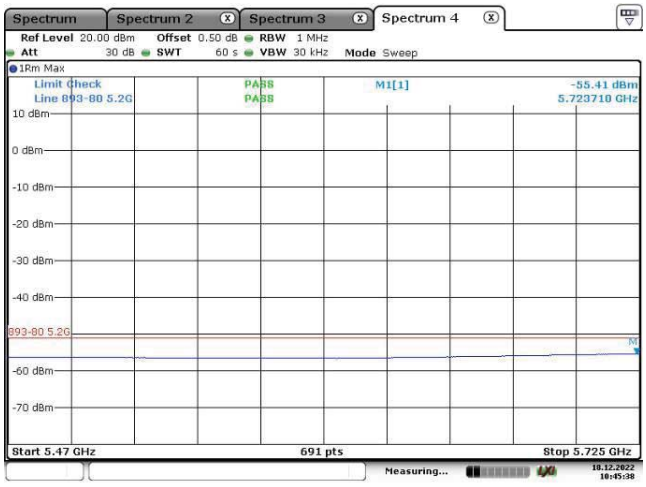




6 – RECEIVER SPURIOUS EMISSIONS

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-Chain 0 **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)			
452.50	H	44.52	-61.55	0.00	0.36	-61.91	-57.00	4.91
49.62	V	45.62	-49.31	-15.27	0.19	-64.77	-57.00	7.77
1149.60	H	51.18	-66.05	7.35	1.05	-59.75	-47.00	12.75
1029.60	V	51.36	-67.89	7.75	0.82	-60.96	-47.00	13.96

802.11 a-Chain 0 **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)			
455.29	H	43.16	-62.87	0.00	0.36	-63.23	-57.00	6.23
49.20	V	43.30	-51.40	-15.68	0.19	-67.27	-57.00	10.27
1073.90	H	51.14	-66.88	7.53	0.95	-60.30	-47.00	13.30
1229.70	V	51.67	-66.39	7.60	1.12	-59.91	-47.00	12.91

802.11 a-Chain 1 **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)			
458.29	H	44.17	-61.82	0.00	0.36	-62.18	-57.00	5.18
47.98	V	43.69	-50.31	-16.88	0.19	-67.38	-57.00	10.38
1152.50	H	51.18	-66.02	7.35	1.06	-59.73	-47.00	12.73
1330.50	V	51.31	-66.85	8.51	1.19	-59.53	-47.00	12.53

802.11 a-Chain 1 **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)			
455.92	H	43.21	-62.81	0.00	0.36	-63.17	-57.00	6.17
49.62	V	43.74	-51.19	-15.27	0.19	-66.65	-57.00	9.65
1124.60	H	51.03	-66.39	7.38	1.04	-60.05	-47.00	13.05
1330.90	V	51.74	-66.42	8.52	1.19	-59.09	-47.00	12.09

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)			
458.88	H	44.19	-61.79	0.00	0.36	-62.15	-57.00	5.15
49.21	V	43.62	-51.08	-15.67	0.19	-66.94	-57.00	9.94
1031.80	H	51.18	-67.50	7.74	0.83	-60.59	-47.00	13.59
1958.60	V	50.96	-67.09	11.92	1.08	-56.25	-47.00	9.25

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)			
455.82	H	43.21	-62.81	0.00	0.36	-63.17	-57.00	6.17
49.60	V	45.08	-49.84	-15.29	0.19	-65.32	-57.00	8.32
1105.74	H	50.43	-67.14	7.39	1.02	-60.77	-47.00	13.77
1170.84	V	50.97	-66.99	7.33	1.07	-60.73	-47.00	13.73

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)			
456.10	H	44.10	-61.92	0.00	0.36	-62.28	-57.00	5.28
49.06	V	43.62	-51.00	-15.82	0.19	-67.01	-57.00	10.01
1108.50	H	51.13	-66.42	7.39	1.03	-60.06	-47.00	13.06
1173.60	V	51.67	-66.29	7.33	1.07	-60.03	-47.00	13.03

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)			
453.92	H	43.28	-62.77	0.00	0.36	-63.13	-57.00	6.13
50.19	V	45.62	-49.72	-14.81	0.19	-64.72	-57.00	7.72
1561.93	H	50.74	-68.34	9.87	0.94	-59.41	-47.00	12.41
1627.03	V	51.28	-67.76	10.29	0.70	-58.17	-47.00	11.17

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)			
457.81	H	43.66	-62.33	0.00	0.36	-62.69	-57.00	5.69
49.66	V	44.52	-50.44	-15.23	0.19	-65.86	-57.00	8.86
1151.90	H	51.44	-65.77	7.35	1.06	-59.48	-47.00	12.48
1278.60	V	50.61	-67.65	8.09	1.17	-60.73	-47.00	13.73

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)			
457.95	H	44.85	-61.14	0.00	0.36	-61.50	-57.00	4.50
49.62	V	43.67	-51.26	-15.27	0.19	-66.72	-57.00	9.72
1149.14	H	50.74	-66.49	7.35	1.05	-60.19	-47.00	13.19
1275.84	V	49.91	-68.34	8.06	1.17	-61.45	-47.00	14.45

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)			
457.99	H	44.62	-61.37	0.00	0.36	-61.73	-57.00	4.73
50.21	V	43.67	-51.69	-14.80	0.19	-66.68	-57.00	9.68
1108.50	H	51.13	-66.42	7.39	1.03	-60.06	-47.00	13.06
1173.60	V	51.67	-66.29	7.33	1.07	-60.03	-47.00	13.03

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)			
452.96	H	43.62	-62.44	0.00	0.36	-62.80	-57.00	5.80
48.16	V	44.59	-49.51	-16.70	0.19	-66.40	-57.00	9.40
1605.79	H	51.49	-67.26	10.14	0.68	-57.80	-47.00	10.80
1485.79	V	51.67	-67.63	9.43	1.33	-59.53	-47.00	12.53

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)			
457.85	H	44.16	-61.83	0.00	0.36	-62.19	-57.00	5.19
47.29	V	43.29	-50.32	-17.56	0.19	-68.07	-57.00	11.07
1530.09	H	51.45	-67.82	9.68	1.15	-59.29	-47.00	12.29
1685.89	V	51.98	-66.17	10.70	0.74	-56.21	-47.00	9.21

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)			
458.29	H	44.71	-61.28	0.00	0.36	-61.64	-57.00	4.64
49.32	V	43.62	-51.14	-15.57	0.19	-66.90	-57.00	9.90
1608.69	H	51.49	-67.22	10.16	0.69	-57.75	-47.00	10.75
1786.69	V	51.62	-66.76	11.06	0.69	-56.39	-47.00	9.39

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)			
458.29	H	43.55	-62.44	0.00	0.36	-62.80	-57.00	5.80
49.61	V	44.20	-50.73	-15.28	0.19	-66.20	-57.00	9.20
1580.79	H	51.34	-67.62	9.98	0.81	-58.45	-47.00	11.45
1787.09	V	52.05	-66.33	11.06	0.69	-55.96	-47.00	8.96

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)			
457.51	H	44.52	-61.48	0.00	0.36	-61.84	-57.00	4.84
50.67	V	43.22	-52.61	-14.59	0.19	-67.39	-57.00	10.39
1487.99	H	51.49	-67.69	9.44	1.33	-59.58	-47.00	12.58
2414.79	V	51.27	-64.68	12.42	1.28	-53.54	-47.00	6.54

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)			
452.85	H	45.20	-60.86	0.00	0.36	-61.22	-57.00	4.22
51.34	V	42.69	-53.82	-14.28	0.19	-68.29	-57.00	11.29
1564.69	H	51.44	-67.62	9.89	0.92	-58.65	-47.00	11.65
1629.79	V	51.98	-67.01	10.31	0.70	-57.40	-47.00	10.40

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)			
459.63	H	44.50	-61.47	0.00	0.36	-61.83	-57.00	4.83
49.05	V	44.32	-50.29	-15.83	0.19	-66.31	-57.00	9.31
1608.09	H	51.75	-66.97	10.16	0.69	-57.50	-47.00	10.50
1734.79	V	50.92	-67.20	10.90	0.73	-57.03	-47.00	10.03

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.

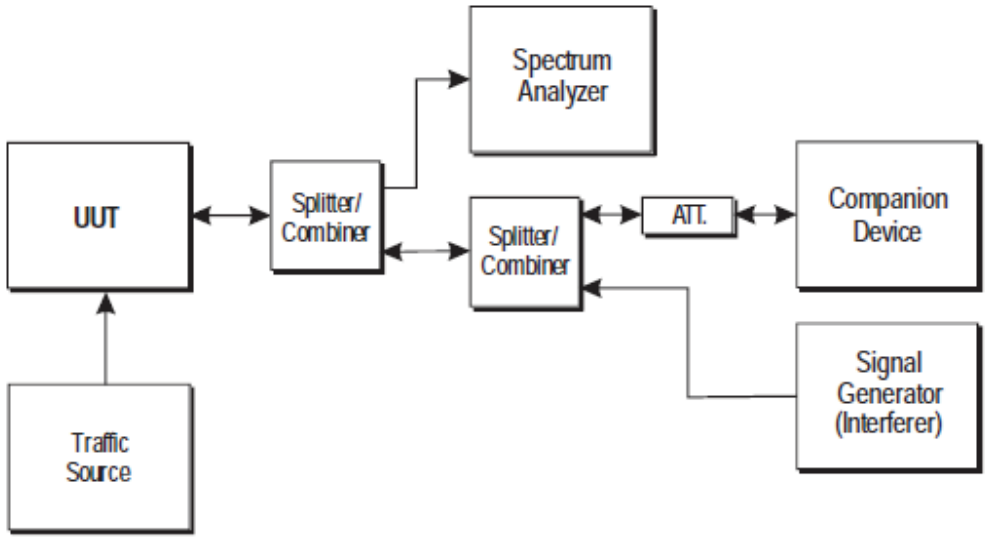
Limit

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.*

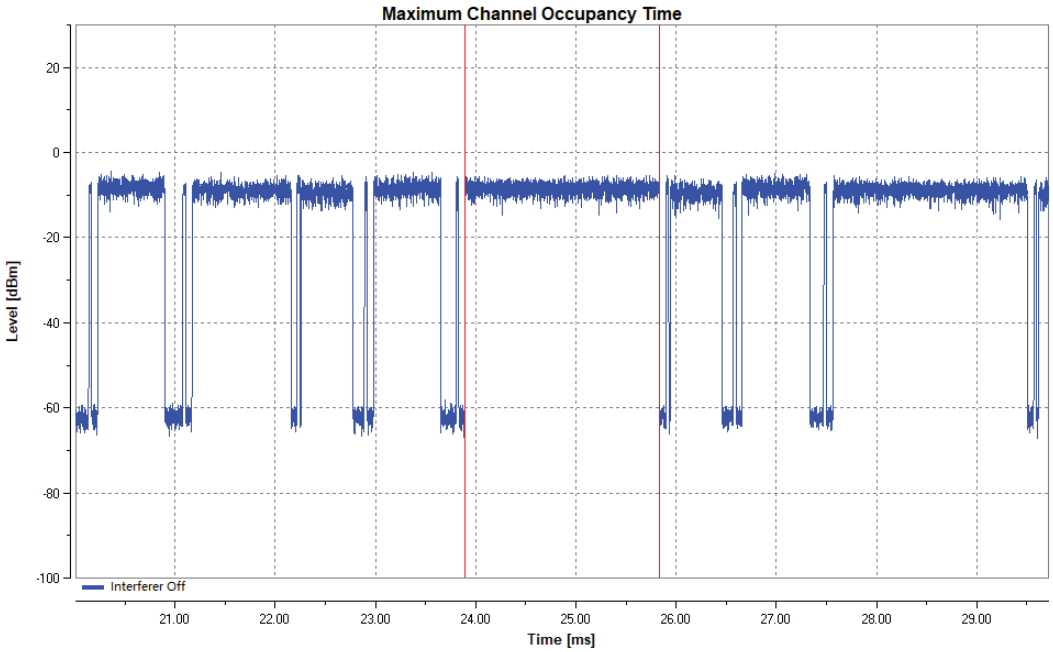
Test Mode	Channel	Priority Class	COT Num [n]	Max. COT [ms]	Limit [ms]	Min.Idle Time[ms]	Limit [ms]	Idle Period probability	Verdict
802.11a	5180	4	10020	1.941	2.000	0.042	0.027	See the graph	PASS
802.11n40	5190	4	10020	0.960	2.000	0.042	0.027	See the graph	PASS

Test Mode	Channel	Interference Type	Add interference Time[ms]	Max.Short Control number[n]	Limit [n]	Max.Short Control Time[ms]	Limit [ms]	Verdict
802.11a	5180	AWGN	2114	0	50	0	2.5	PASS
		OFDM	2114	0	50	0	2.5	PASS
		LTE	2114	0	50	0	2.5	PASS
802.11n40	5190	AWGN	2114	0	50	0	2.5	PASS

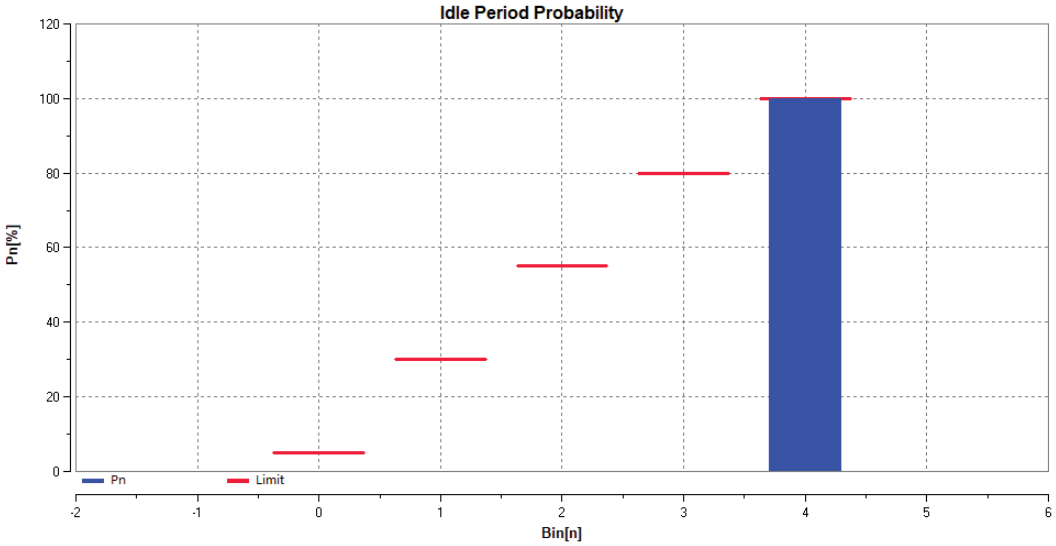
Please refer to following plots:

Test Graphs

802.11 a _5180MHz

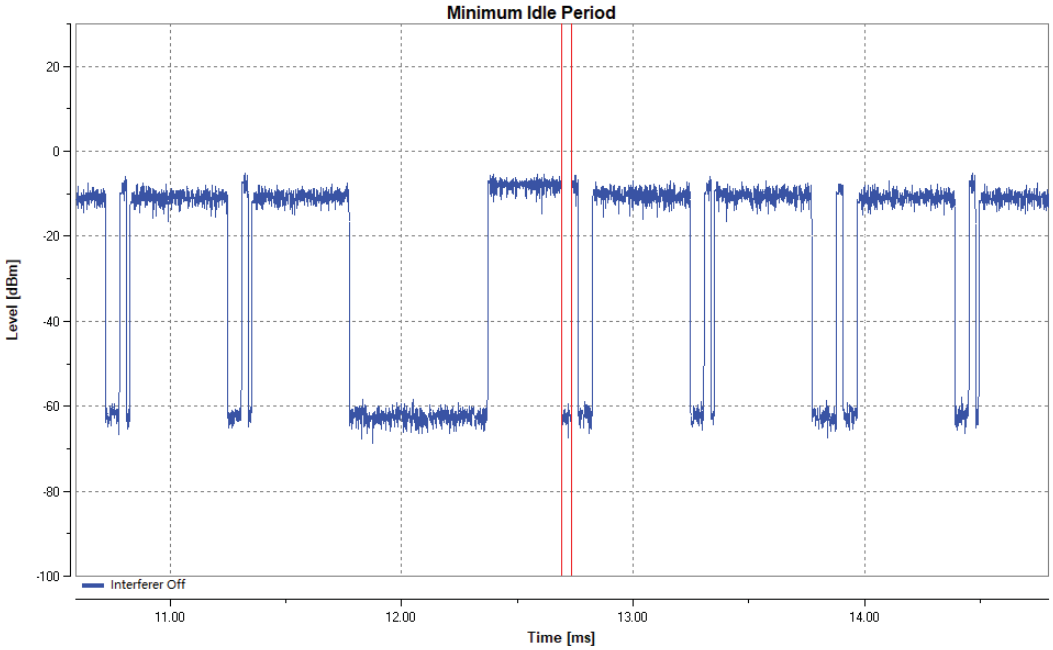


802.11 a _5180MHz

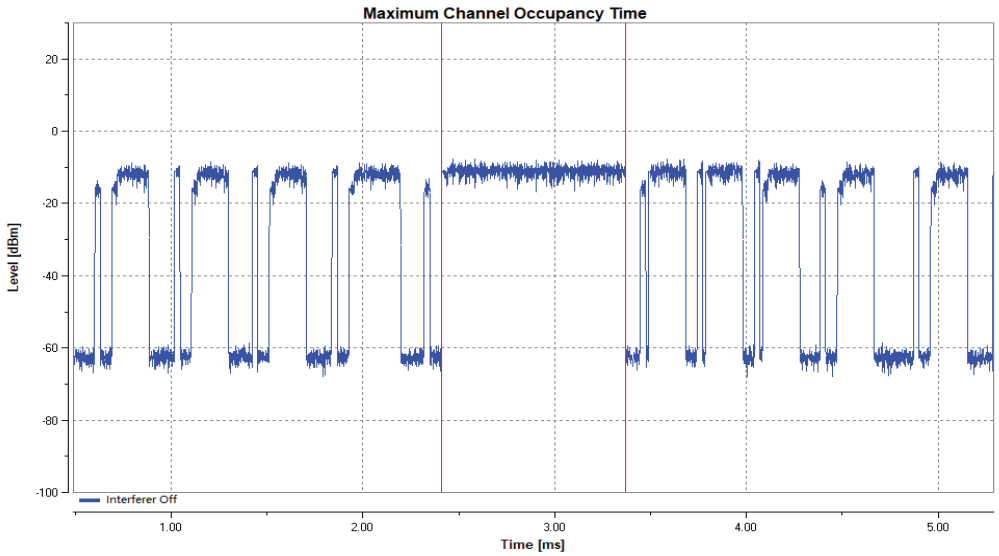


n	0	1	2	3	4
B[n]	0	0	0	13	9995
P[n]	0	0	0	0.13	100
Limit	5	30	55	80	100

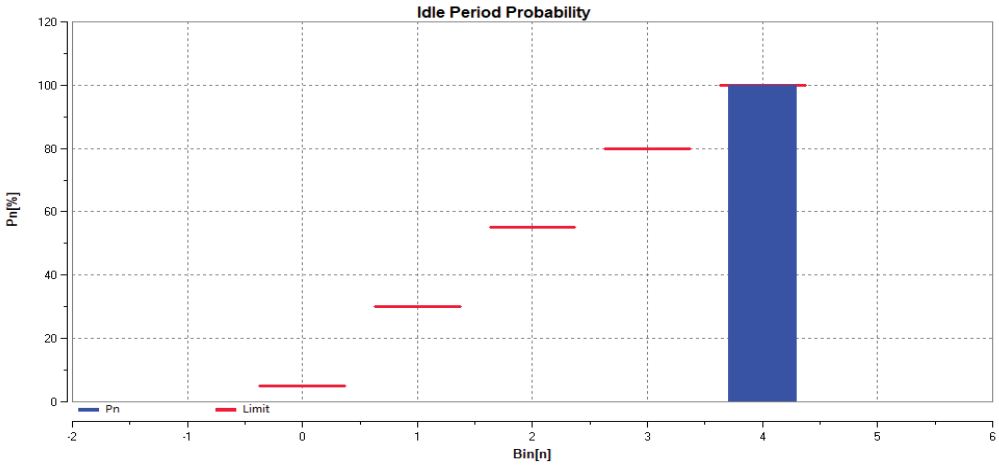
802.11 a _5180MHz



802.11 n40 _5190MHz

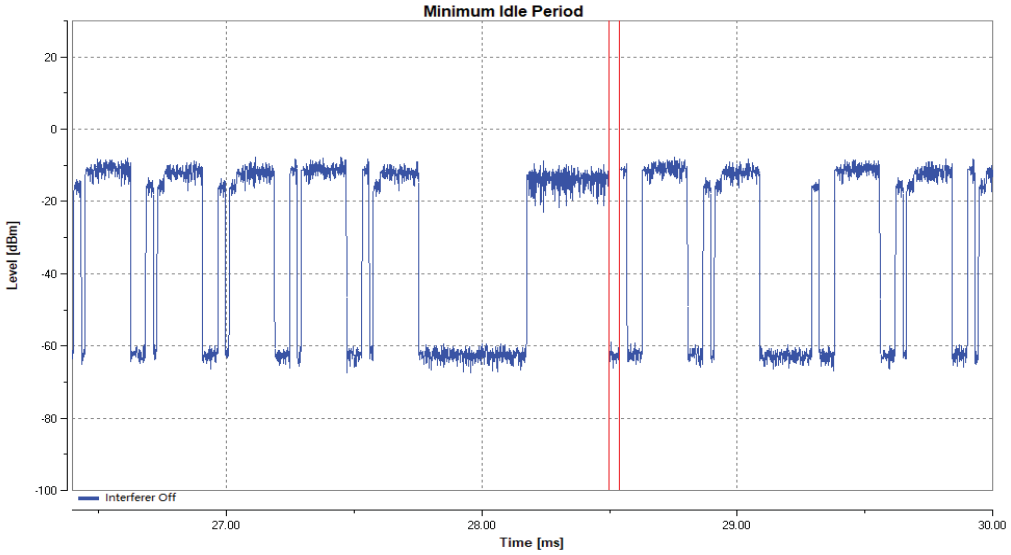


802.11 n40 _5190MHz

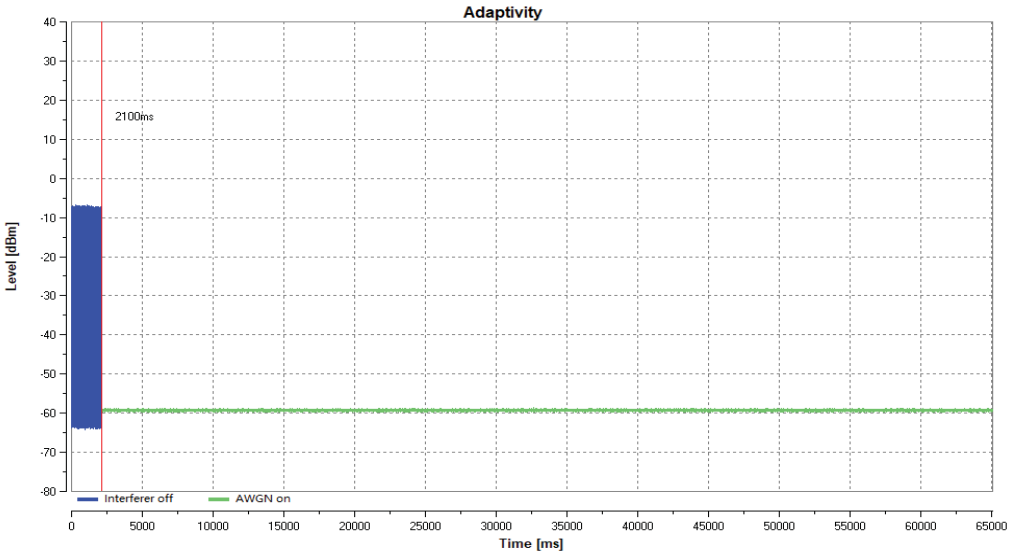


n	0	1	2	3	4
B[n]	0	0	0	9	10055
P[n]	0	0	0	0.09	100
Limit	5	30	55	80	100

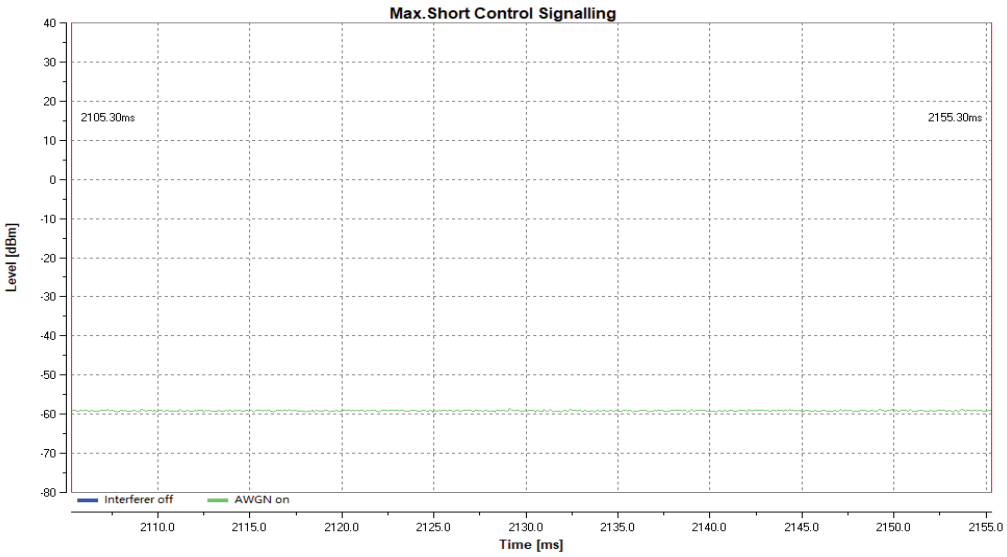
802.11 n40 _5190MHz



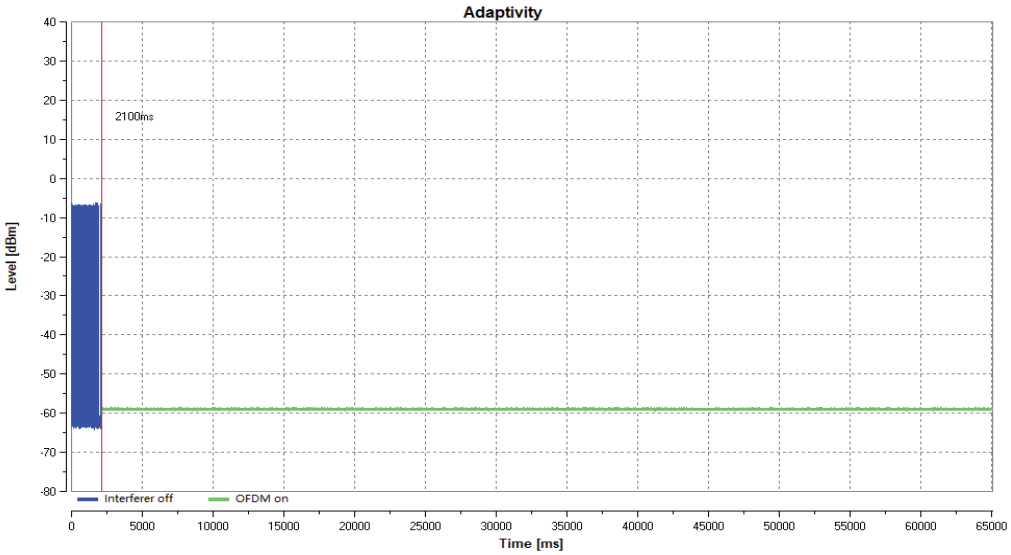
802.11 a _5180MHz AWGN



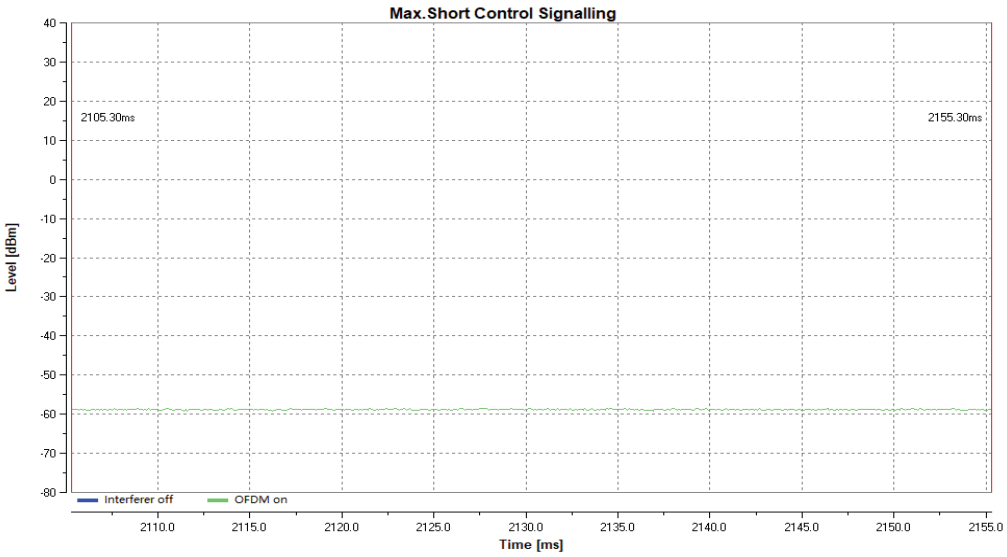
802.11 a _5180MHz AWGN



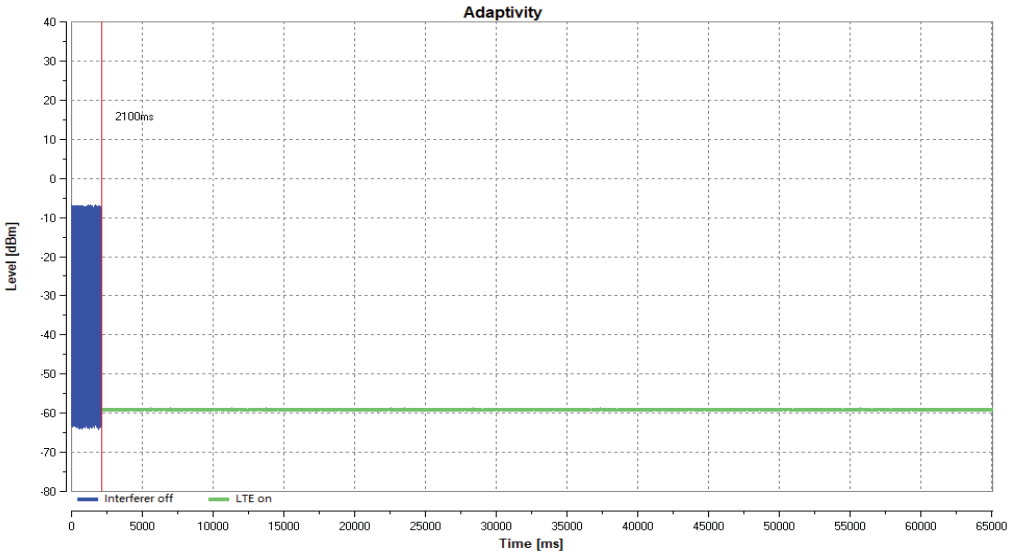
802.11 a _5180MHz OFDM



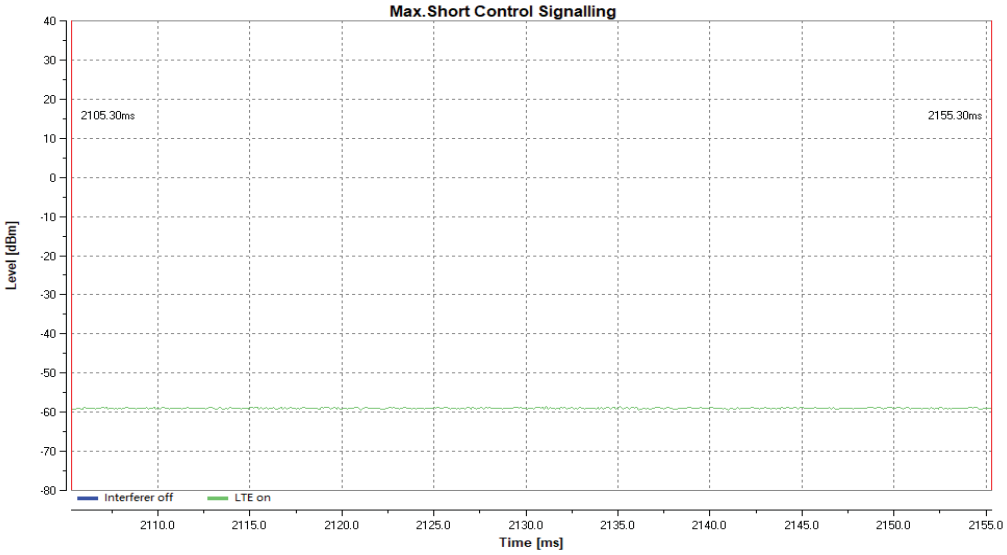
802.11 a _5180MHz OFDM



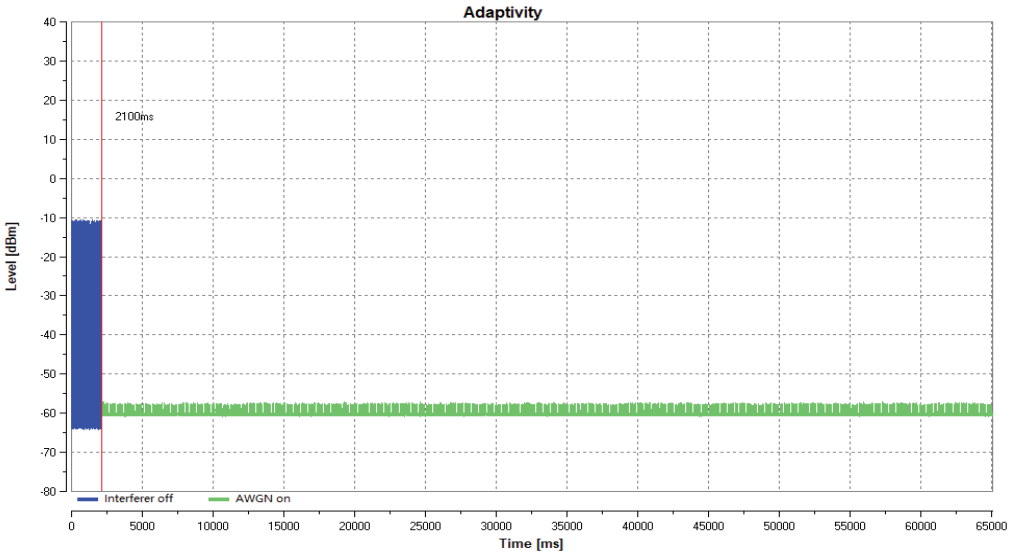
802.11 a _5180MHz LTE



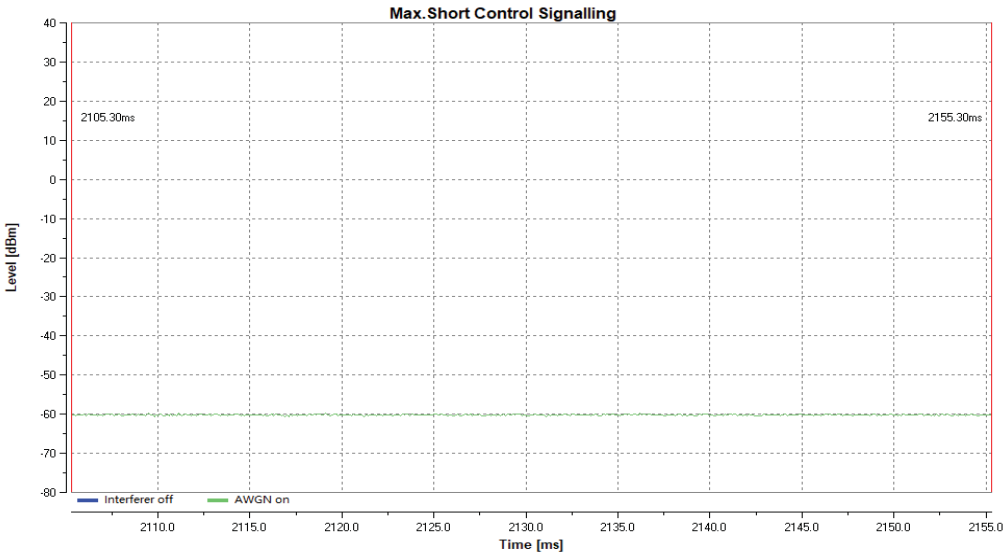
802.11 a _5180MHz LTE



802.11 n40 _5190MHz AWGN



802.11 n40 _5190MHz AWGN



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)	
Pmin + 6 dB	5 100	-53	-59	Continuous Wave
Pmin + 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

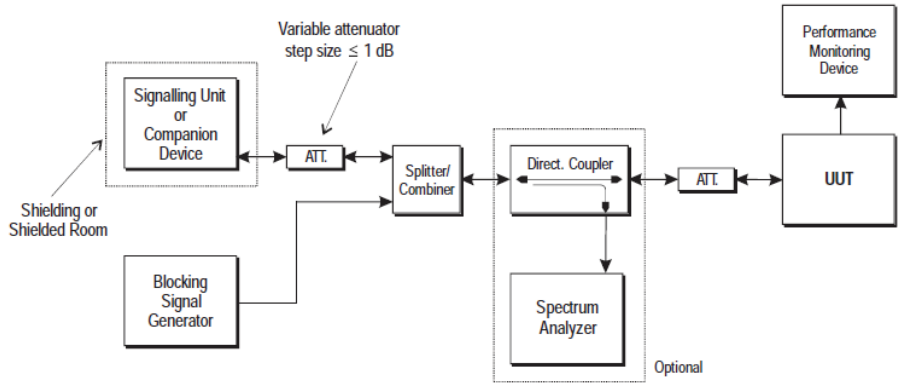


Figure 14: Test Set-up for receiver blocking

Test Data

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

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

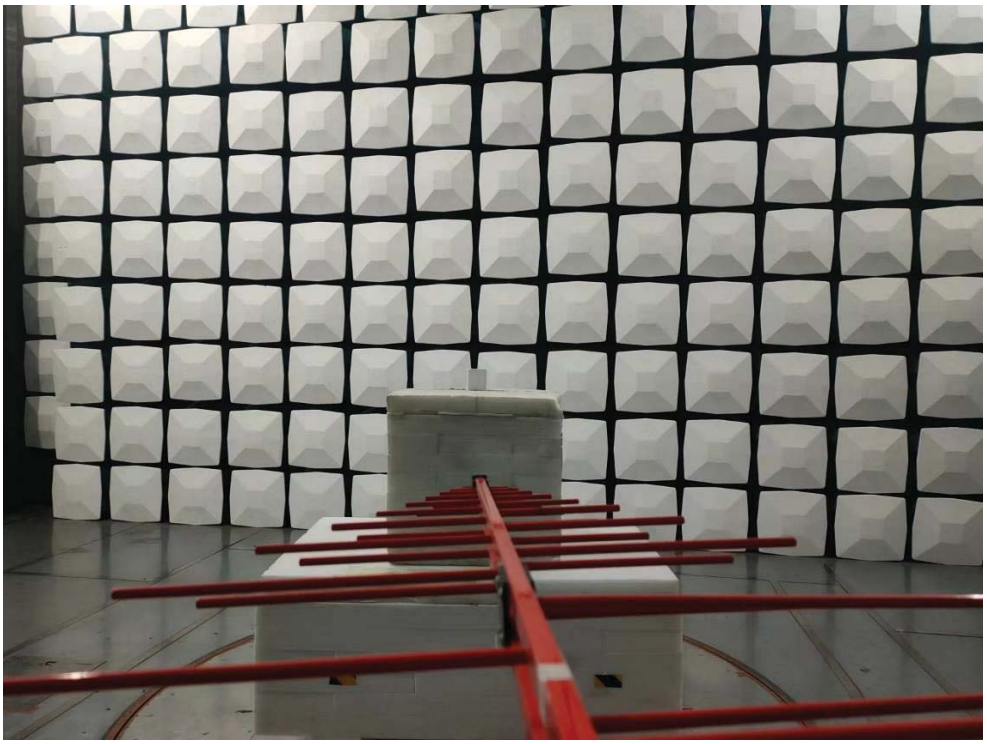
Test Mode	Pmin (dBm)	Wanted signal Power from companion device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Max Blocking Signal Power (dBm)	PER (%)	Limit (%)
802.11 a (5180 MHz)	-91	-85	5100	-53	-46	6.4	≤ 10
			4900	-47	-41	5.8	
			5000	-47	-38	4.6	
			5975	-47	-40	3.7	

EXHIBIT A – EUT PHOTOGRAPHS

For photos in this section, please refer to report No.: DG2221129-57774E-02 EXHIBIT A..

EXHIBIT B – TEST SET UP PHOTOGRAPHS

Radiated Emission Below 1GHz View



Radiated Emission Above 1GHz View

DECLARATION OF SIMILARITY LETTER

SHENZHEN TENDA TECHNOLOGY CO.,LTD.
Add: 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Tel: 86-755-27657098 Fax: 86-755-27657178
E-mail: cert@tenda.cn

DECLARATION OF SIMILARITY

Date: 2022-11-29

To whom it may concern

Dear Sir or Madam:

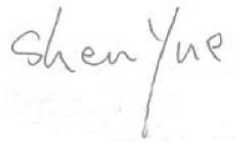
We, SHENZHEN TENDA TECHNOLOGY CO.,LTD., hereby declare that the product: Whole Home Mesh Wi-Fi 6 System, model: MX3,EX3 is electrically identical with the model: Mesh3Xwhich was tested by BACL(Dongguan) with the same electromagnetic emissions and electromagnetic compatibility characteristics.

A description of the differences between those models and that are declared similar are as follows:

They are the same product, and just the different model name, the rest are the same.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature: 

Printed Name: Shen Yue
Title: Engineer

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