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: O8

Report Type: Original Report	**Product Type:** 5GHz 23dBi 11ac Outdoor CPE
Report Number:	DG2210607-21788E-22A
Report Date:	2021-07-08
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		5GHz 23dBi 11ac Outdoor CPE
Test Model:		O8
Rated Input Voltage:		DC 12V from adapter
EU Adapter Information	**Model:**	BN073-A12012E
	Input:	AC 100-240V, 50/60Hz, 0.4A
	Output:	DC 12.0V, 1.0A
Serial Number:		DG2210607-21788E-RF-S-8SY
EUT Received Date:		2021.06.08
EUT Received Status:		Good

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	Flab	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 an engineering mode, which is provided by manufacture.

The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80, the vh20/vht40 were reduced since the identical parameters with 802.11n ht20 and ht40. The device doesn't support 5600~5650MHz.

For 5150~5250 MHz band, 7 channels are provided:

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

For 802.11a /n ht20, 5180MHz and 5240 MHz were tested, for 802.11n ht40, 5190MHz and 5230 MHz were tested, for 802.11ac vht80 ,5210 MHz was tested.

For 5470~5725 MHz band, 12 channels are provided:

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
5500	5540	5660
5510	5550	5670
5520	5560	5680
5530	5580	5700

For 802.11a /n ht20, 5500MHz and 5700MHz were tested, for 802.11n ht40, 5510MHz and 5670MHz were tested, for 802.11ac vht80, 5530 MHz was tested.

NT: Normal Temperature 25℃
LT: Low Temperature -30℃
HT: High Temperature 60℃

EUT Exercise Software

Software “Tenda_QCA” was used. 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.

The EUT was tested in engineering mode, and the power level was configured as below.

Band	Mode	Frequency (MHz)	Data rate (Mbps)	Power level
5150-5250	802.11 a	5180	6	1
		5240	6	1
	802.11 n20	5180	MCS0	2
		5240	MCS0	2
	802.11 n40	5190	MCS0	1
		5230	MCS0	1
	802.11 ac20	5180	MCS0	2
		5240	MCS0	2
	802.11 ac40	5190	MCS0	1
		5230	MCS0	1
	802.11 ac80	5210	MCS0	1
5470-5725	802.11 a	5500	6	9
		5700	6	9
	802.11 n20	5500	MCS0	9
		5700	MCS0	9
	802.11 n40	5510	MCS0	8
		5670	MCS0	8
	802.11 ac20	5500	MCS0	9
		5700	MCS0	9
	802.11 ac40	5510	MCS0	8
		5670	MCS0	8
	802.11 ac80	5530	MCS0	8

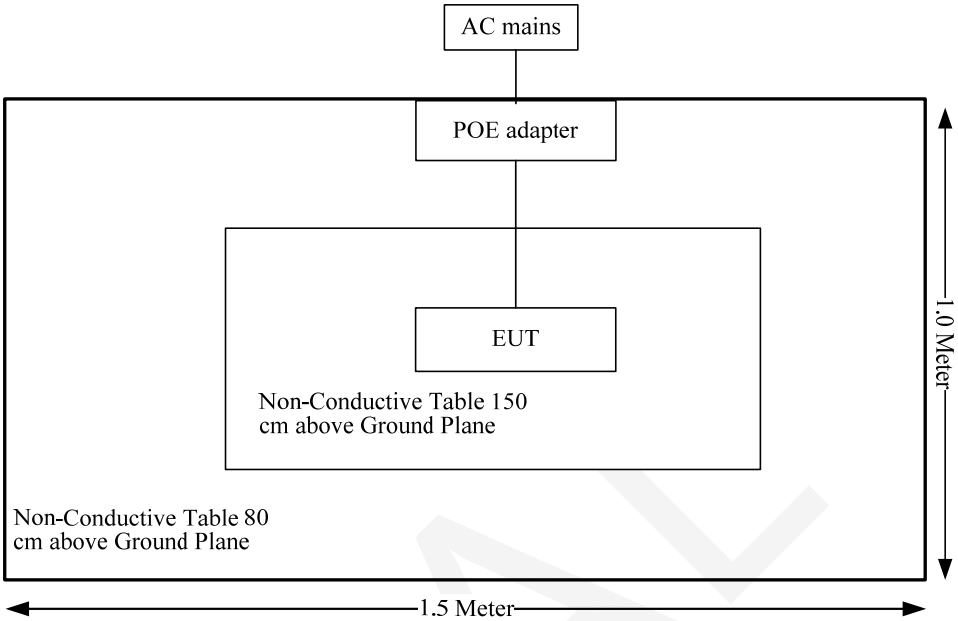
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	Yes	No	1.2	EUT/PoE Adapter	Laptop

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated emissions below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-1	2020-11-10	2023-11-10
R&S	EMI Test Receiver	ESR3	102453	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2021-05-06	2022-05-05
HP	Amplifier	8447D	2727A05902	2020-09-05	2021-09-05
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2020-09-05	2021-09-05
Agilent	Signal Generator	E8247C	MY43321350	2021-04-25	2022-04-24
Radiated emissions above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2020-12-05	2023-12-04
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2020-12-05	2023-12-04
R&S	Spectrum Analyzer	FSV40	101474	2020-07-07	2021-07-07
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-07-07	2021-07-07
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2020-06-27	2021-06-27
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2020-09-05	2021-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2020-06-27	2021-06-27
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020-10-13	2023-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2020-12-05	2023-12-04
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-02 1302	2020-12-05	2023-12-04
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2020-09-05	2021-09-05
Agilent	Signal Generator	E8247C	MY43321350	2021-04-25	2022-04-24
Mini Circuits	High Pass Filter	VHF-6010+	31118	2020-06-16	2021-06-16
RF conducted					
R&S	Spectrum Analyzer	FSV40	101591	2020-06-29	2021-06-28
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2021-05-06	2022-05-05
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	2020-09-06	2021-09-06
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2021-02-24	2022-02-23
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2020-09-12	2021-09-12
HP	Step Attenuator	8494B	1510A05007	2020-09-06	2021-09-06
Agilent	Step Attenuator	8496B	2815A10904	2020-09-06	2021-09-06
R&S	Wideband Radio Communication Tester	CMW500	149216	2020-09-23	2021-09-22

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXG Vector Signal Generator	N5182B	MY51350142	2021-04-25	2022-04-24

* 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	RF conducted
Temperature:	26.9~29.2 °C	25.8~26.9°C
Relative Humidity:	39~62 %	42~49%
ATM Pressure:	100.2~100.6kPa	100~100.7kPa
Tester:	Joker Chen, Jeremy Liang	Tiger Mo
Test Date:	2021.06.22~2021.06.30	2021.06.19~2021.06.28

SUMMARY OF TEST RESULTS

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

Note:
Not applicable: The device without this function.
Compliance*: DG2210607-21788E-22B which was issued by BACL (Dongguan).
Compliance**: 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

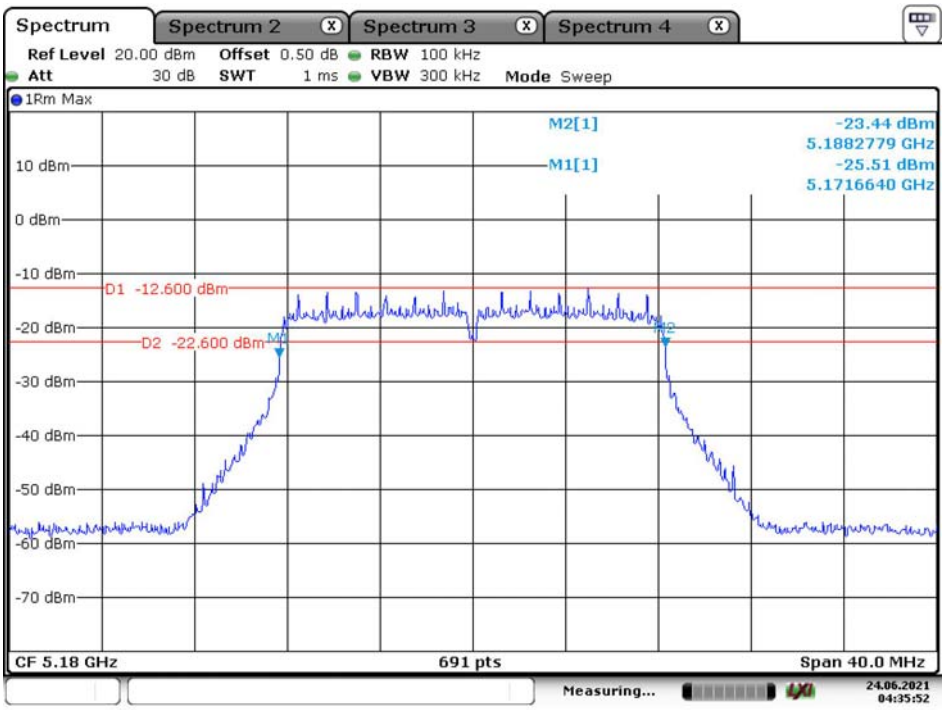
Please refer to following table:

Band	Mode	Fc (MHz)	F1 (MHz)	F2 (MHz)	Result (ppm)	Limit (ppm)
5150-5250	802.11 a	5180	5171.664	5188.278	-5.61	±20
		5240	5231.664	5248.278	-5.54	
	802.11 n20	5180	5171.085	5188.915	-0.04	
		5240	5231.085	5248.915	0.04	
	802.11 n40	5190	5171.708	5208.290	-0.19	
		5230	5211.710	5248.292	0.19	
	802.11 ac20	5180	5171.027	5188.915	-5.60	
		5240	5231.027	5248.915	-5.57	
	802.11 ac40	5190	5171.710	5208.290	0.00	
		5230	5211.710	5248.292	0.19	
	802.11 ac80	5210	5171.560	5248.437	-0.29	
5470-5725	802.11 a	5500	5491.664	5508.278	-5.27	±20
		5700	5691.664	5708.278	-5.09	
	802.11 n20	5500	5491.028	5508.915	-5.26	
		5700	5691.028	5708.915	-5.08	
	802.11 n40	5510	5491.708	5528.290	-0.18	
		5670	5651.710	5688.292	0.18	
	802.11 ac20	5500	5491.028	5508.915	-5.23	
		5700	5691.027	5708.915	-5.12	
	802.11 ac40	5510	5491.708	5528.290	-0.18	
		5670	5651.710	5688.292	0.18	
	802.11 ac80	5530	5491.563	5568.440	0.27	

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

Please refer to following plots:

5.2G A-L



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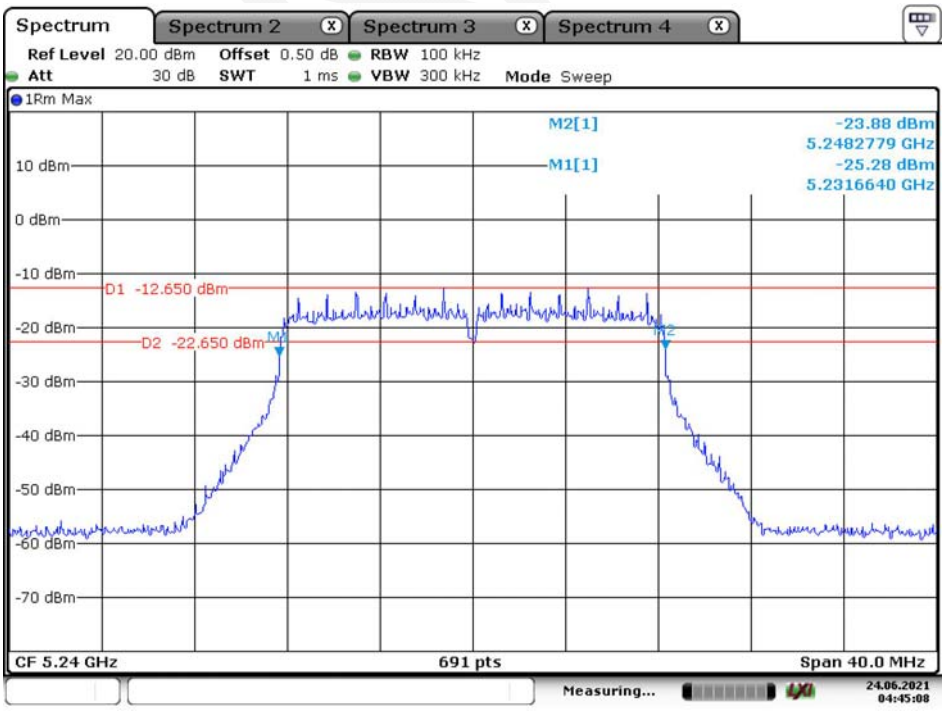

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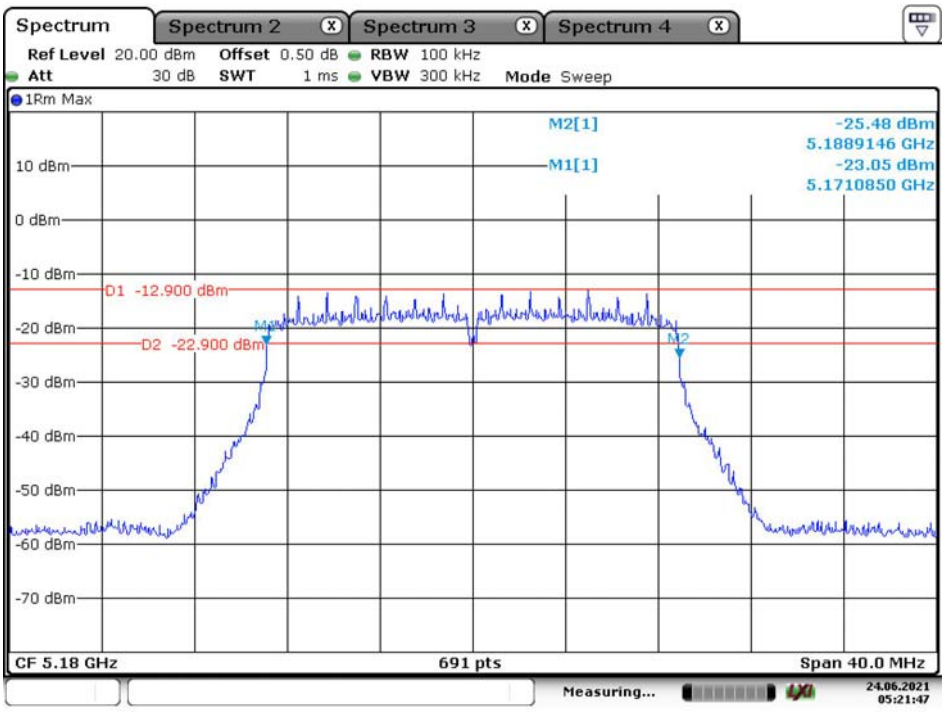

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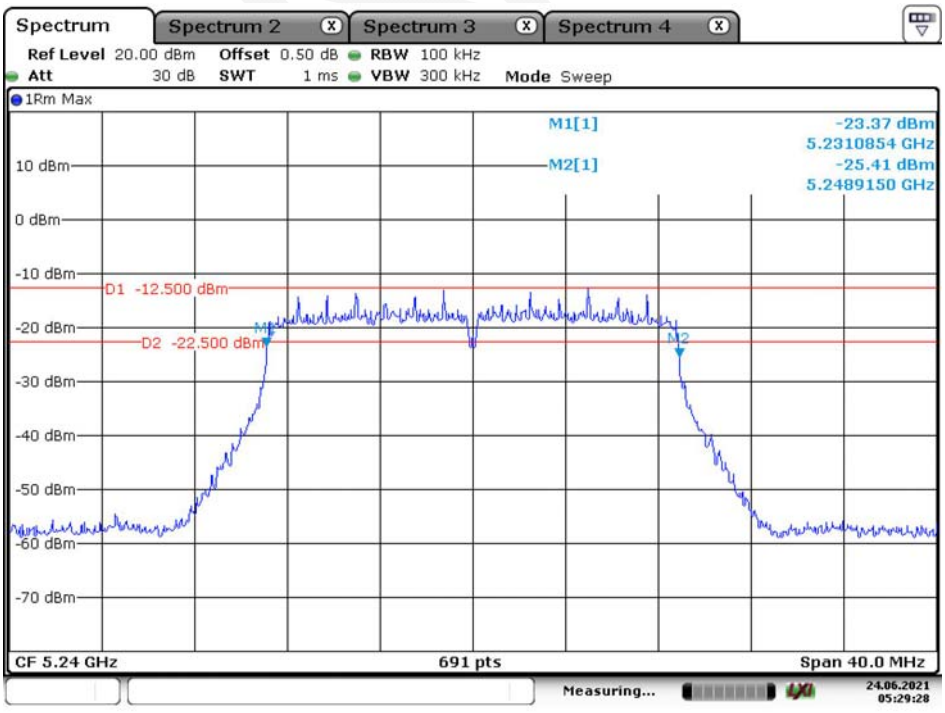

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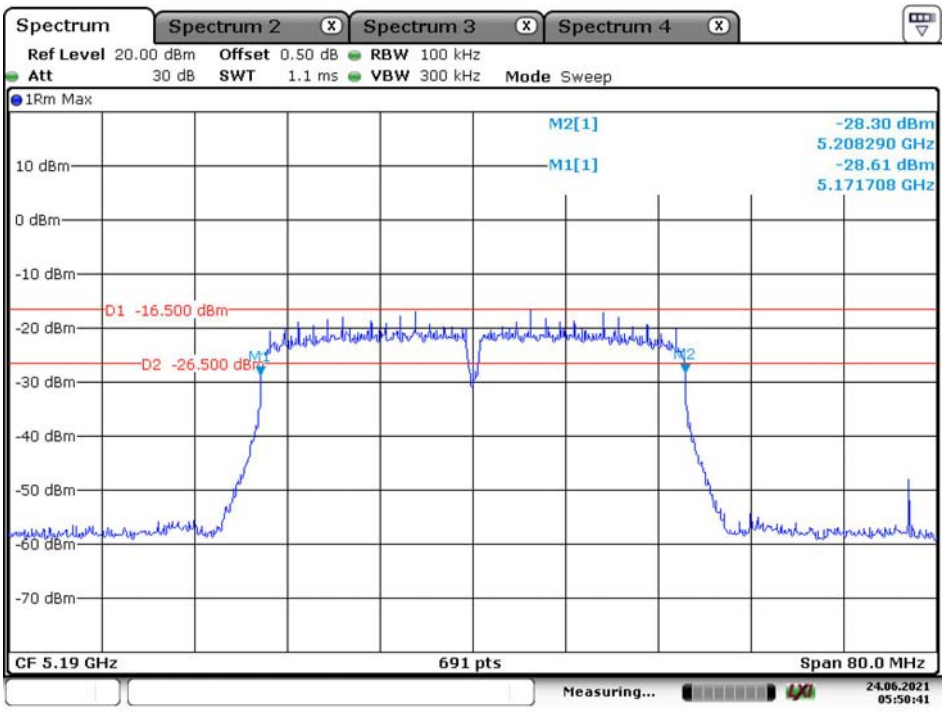

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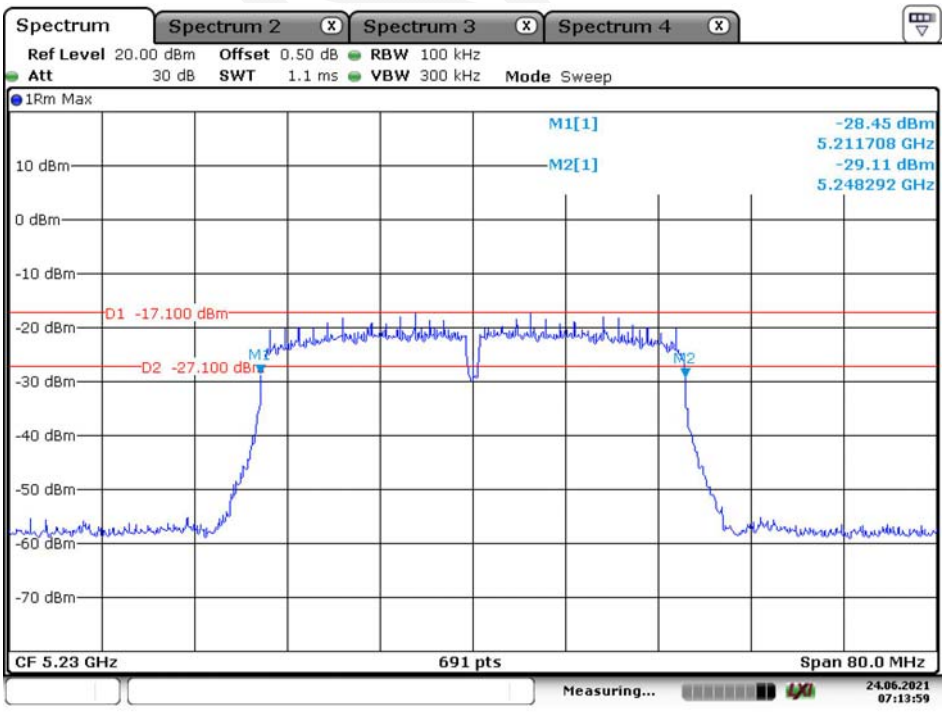

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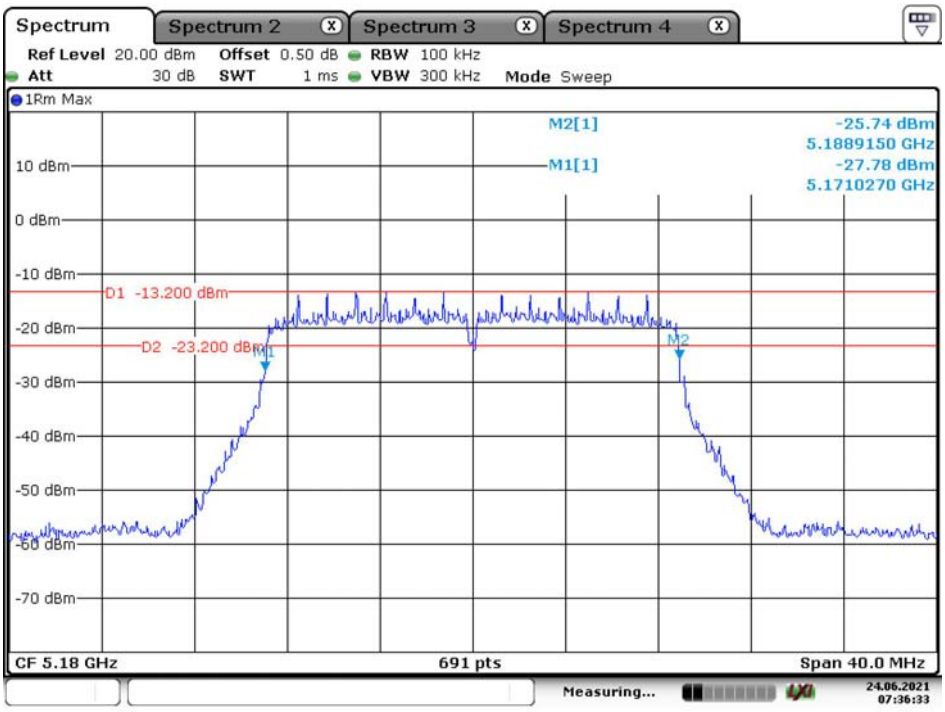

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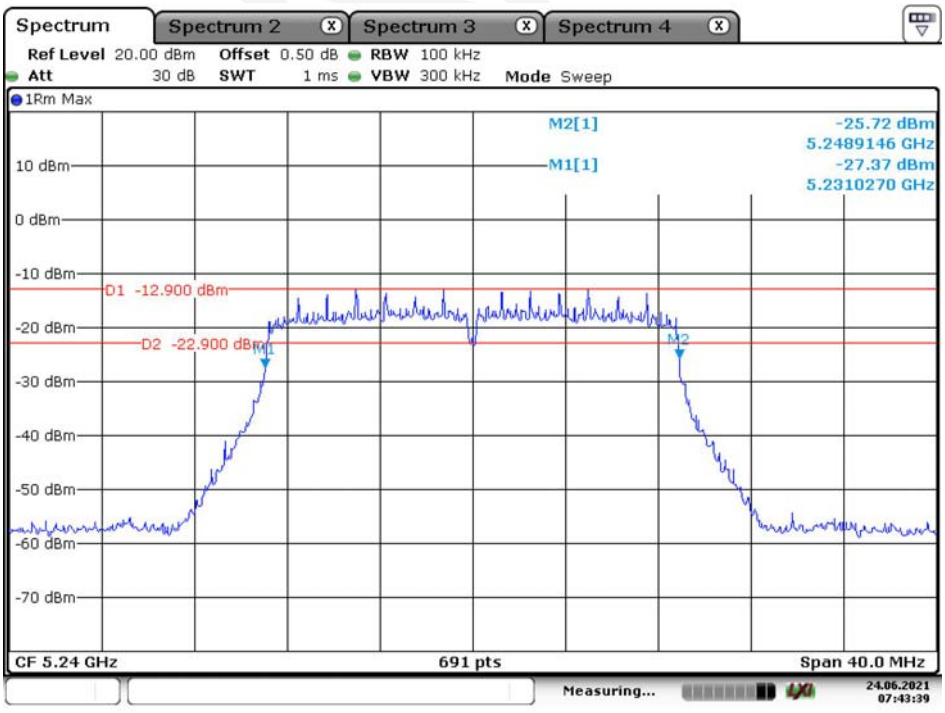

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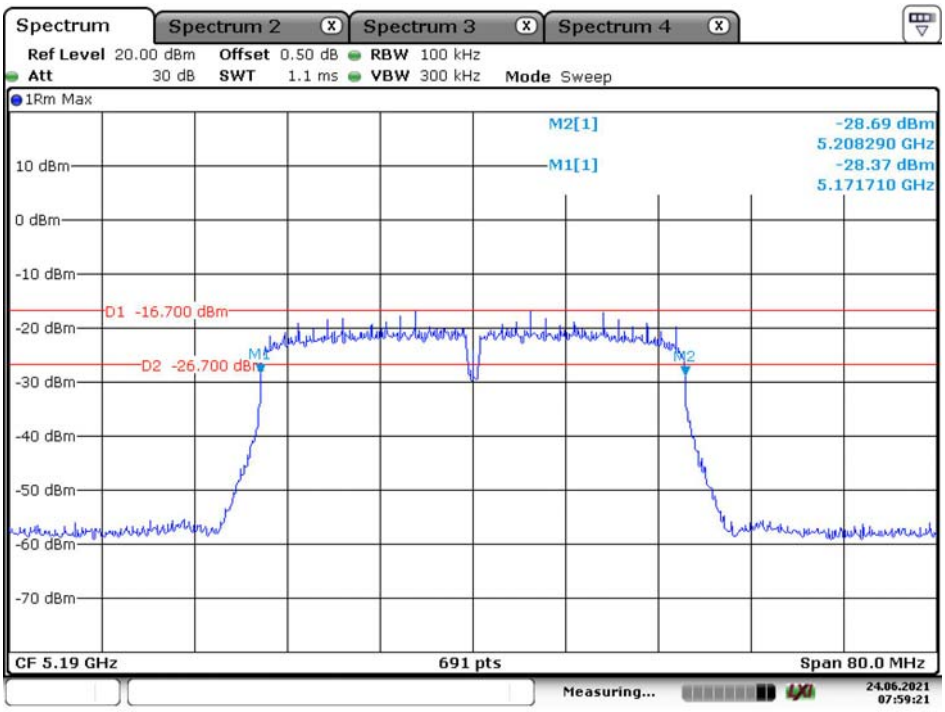

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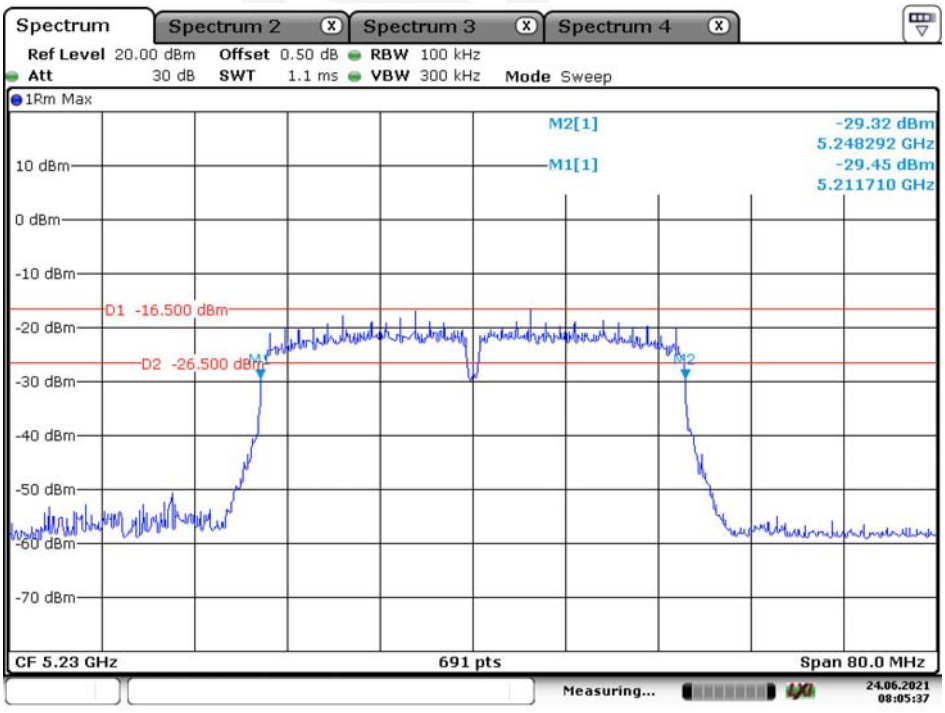

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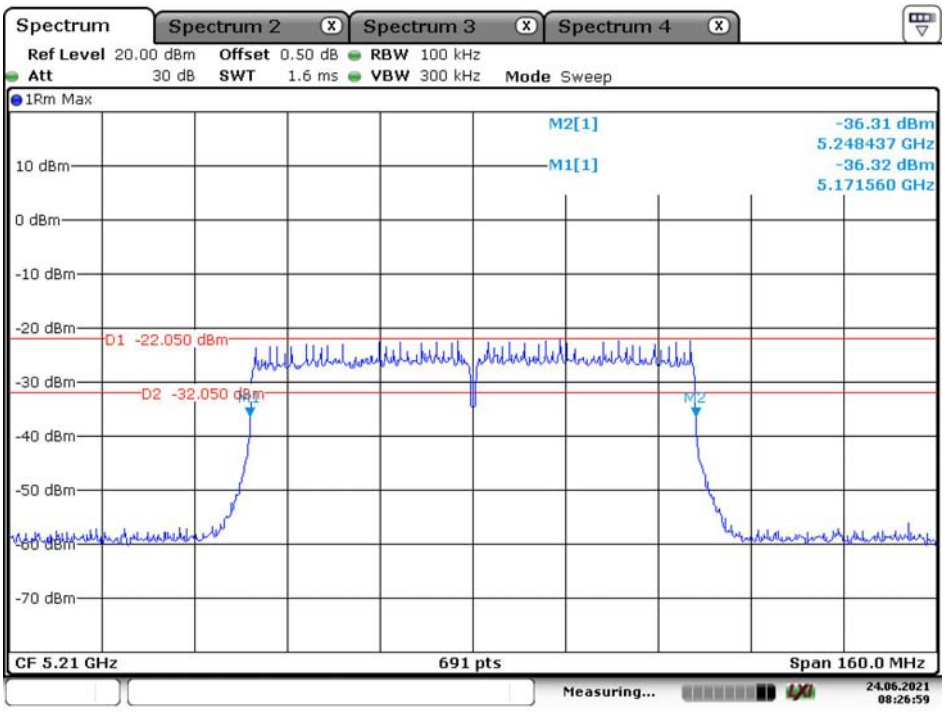

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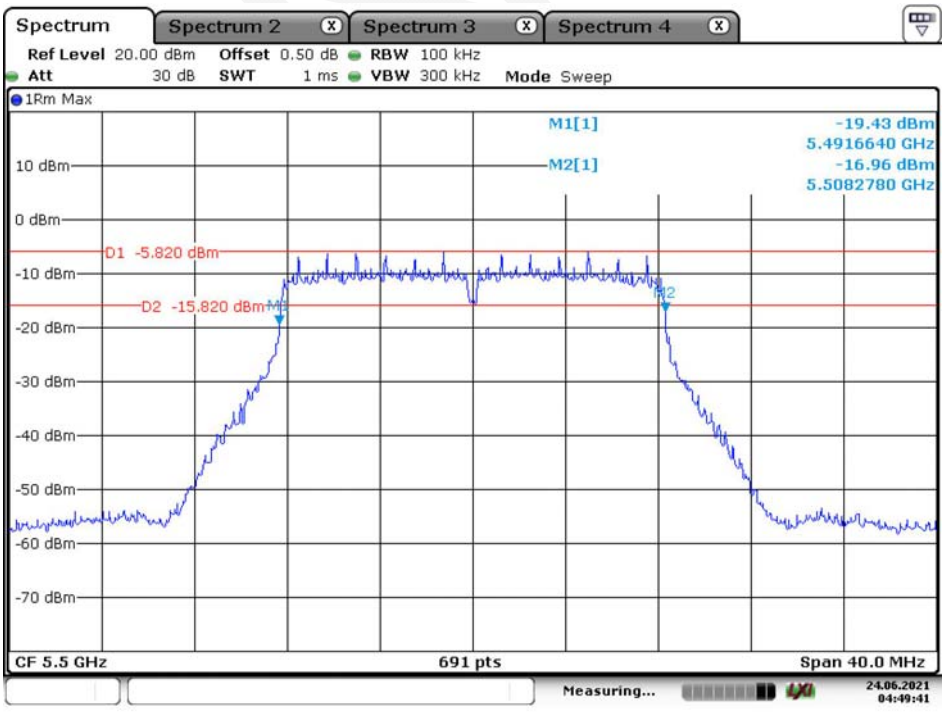
5.6G A-L



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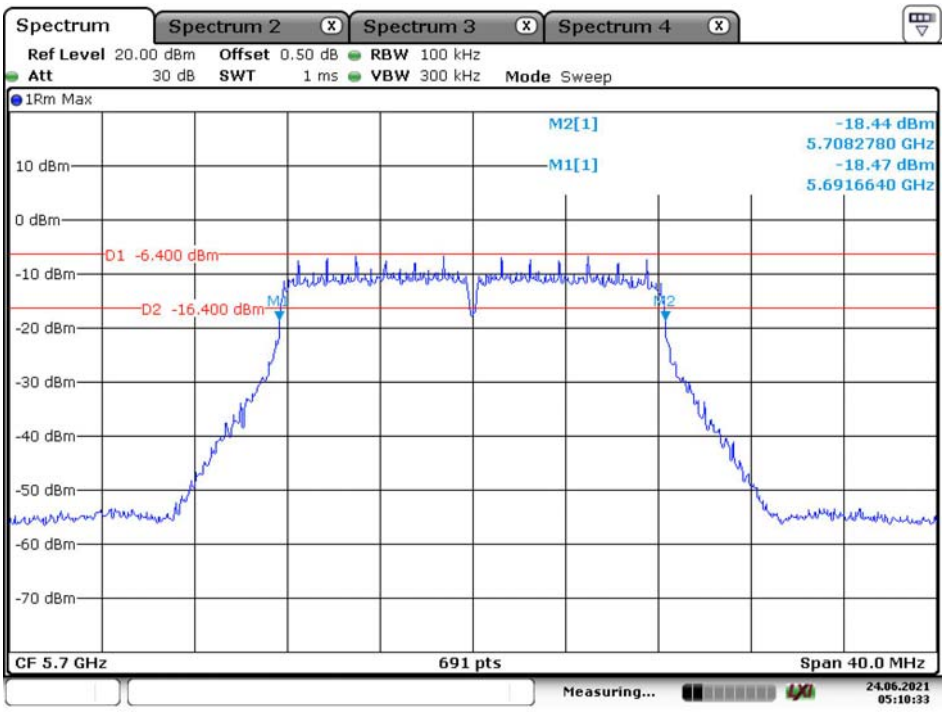

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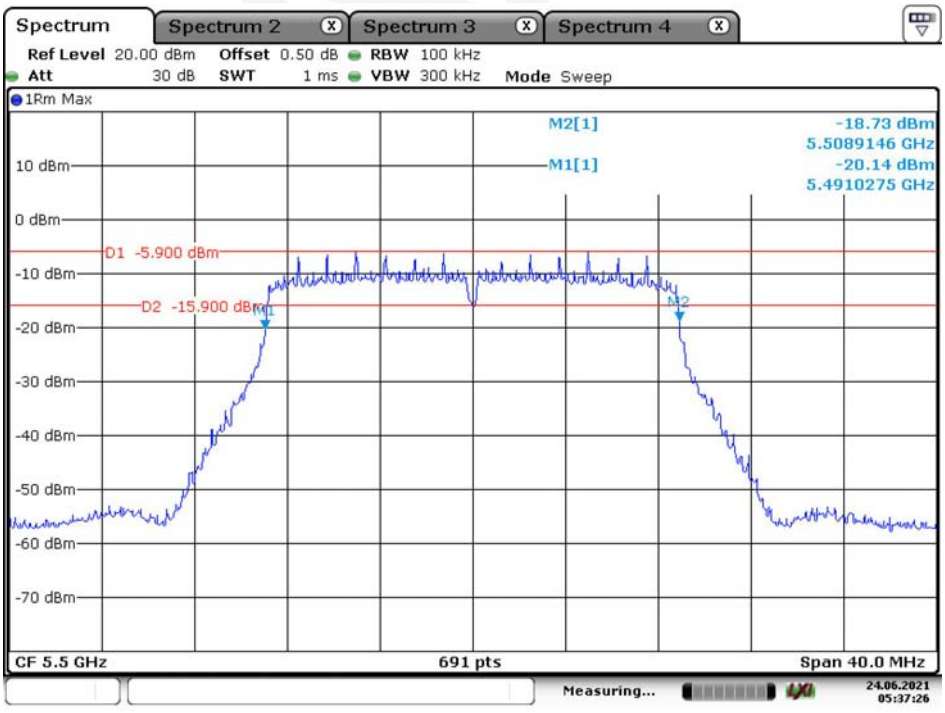

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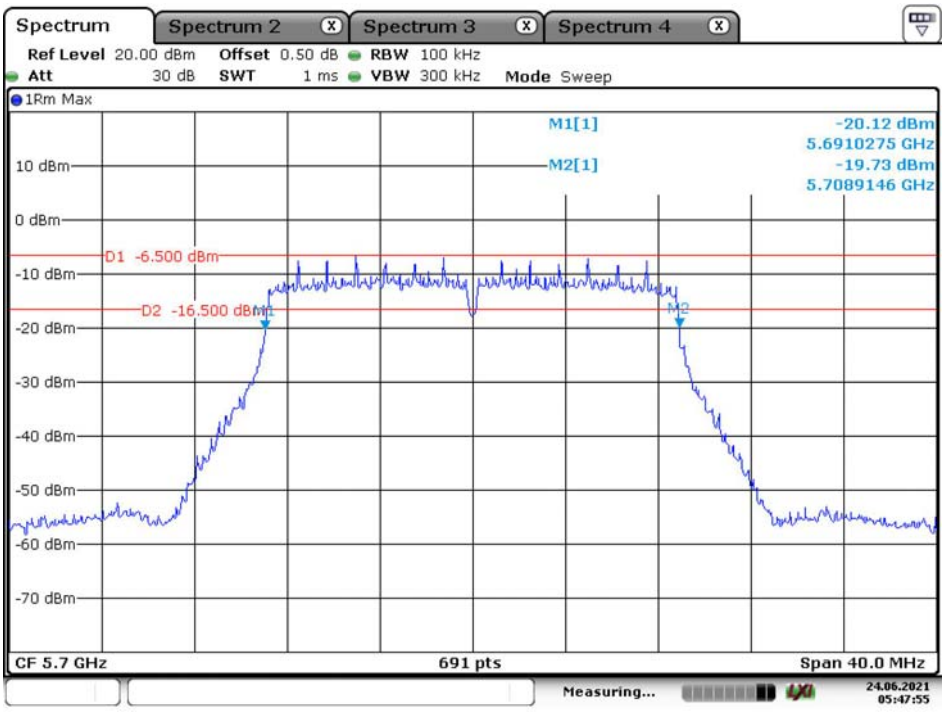

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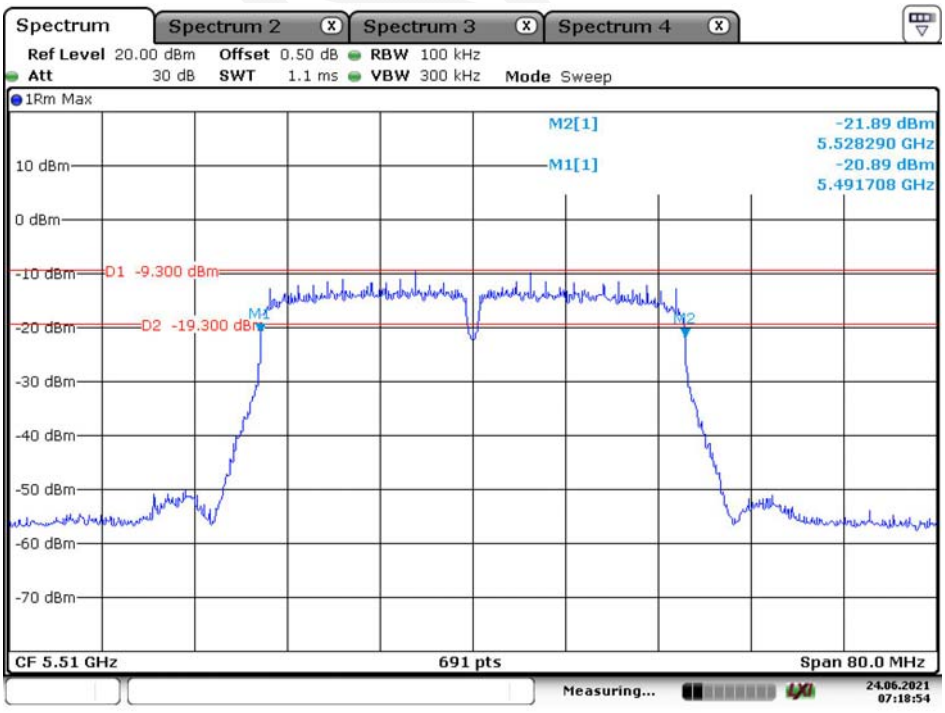

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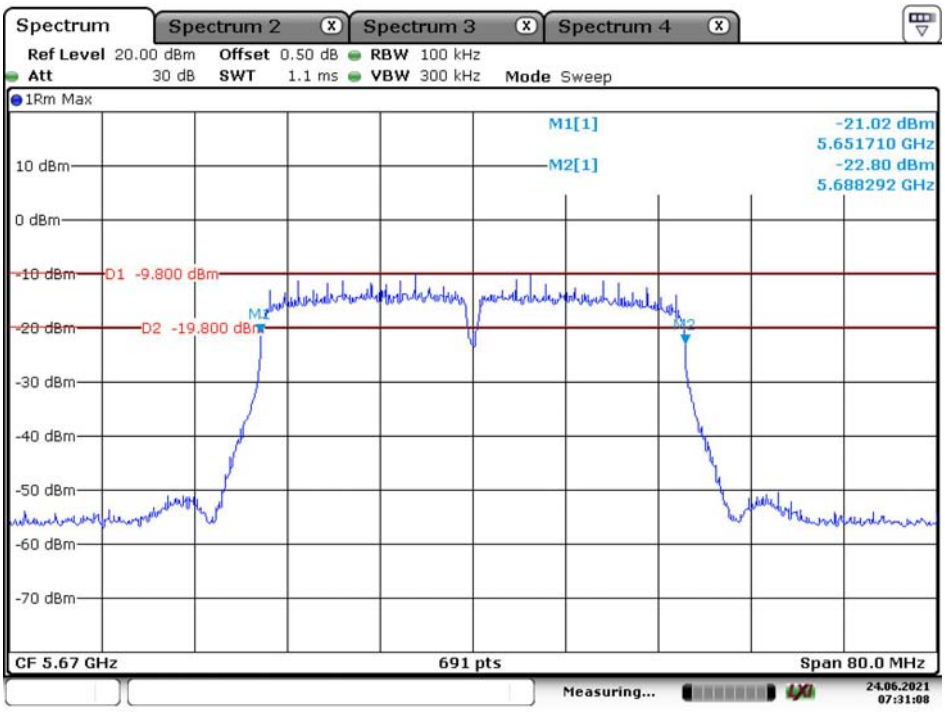

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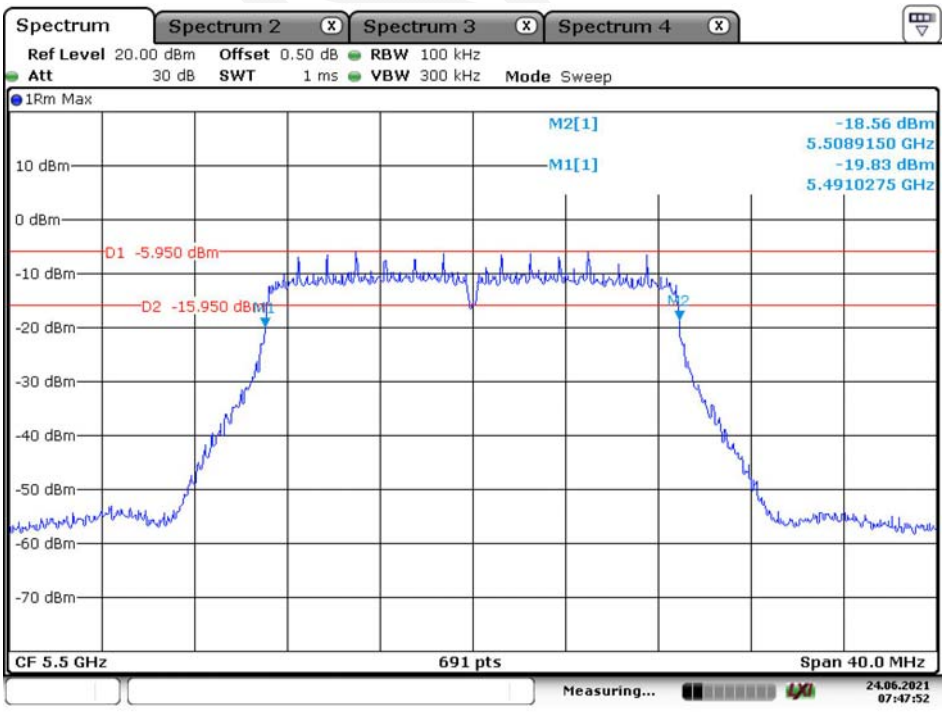

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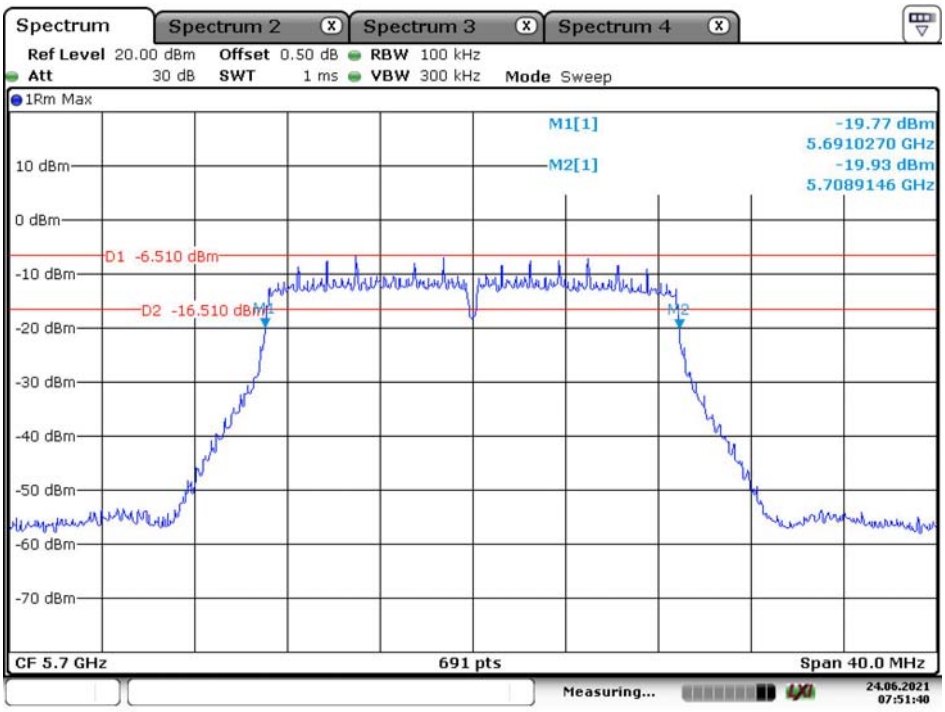

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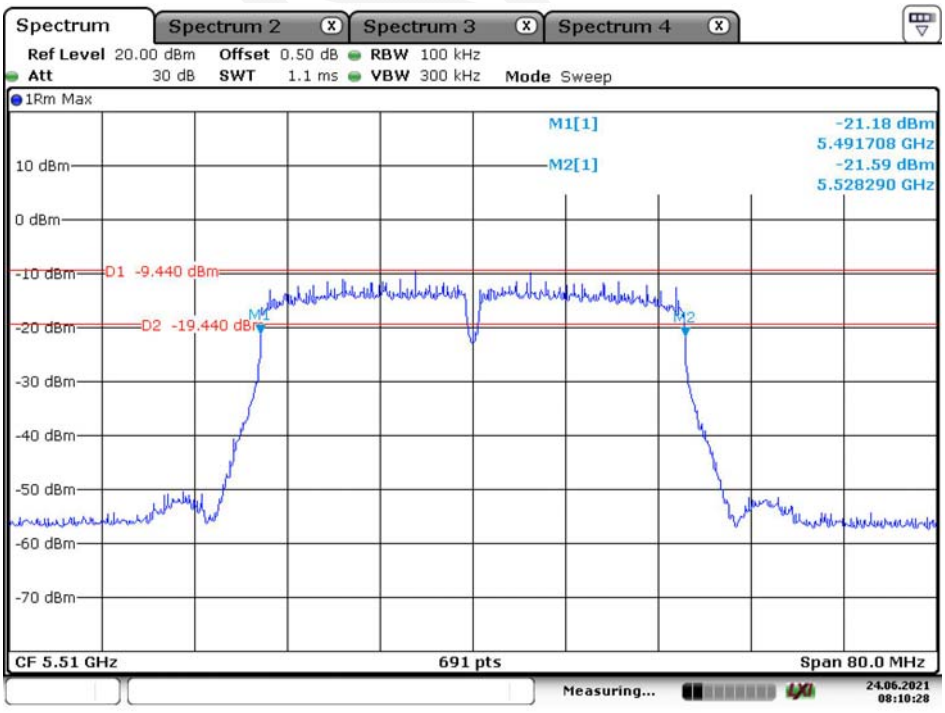

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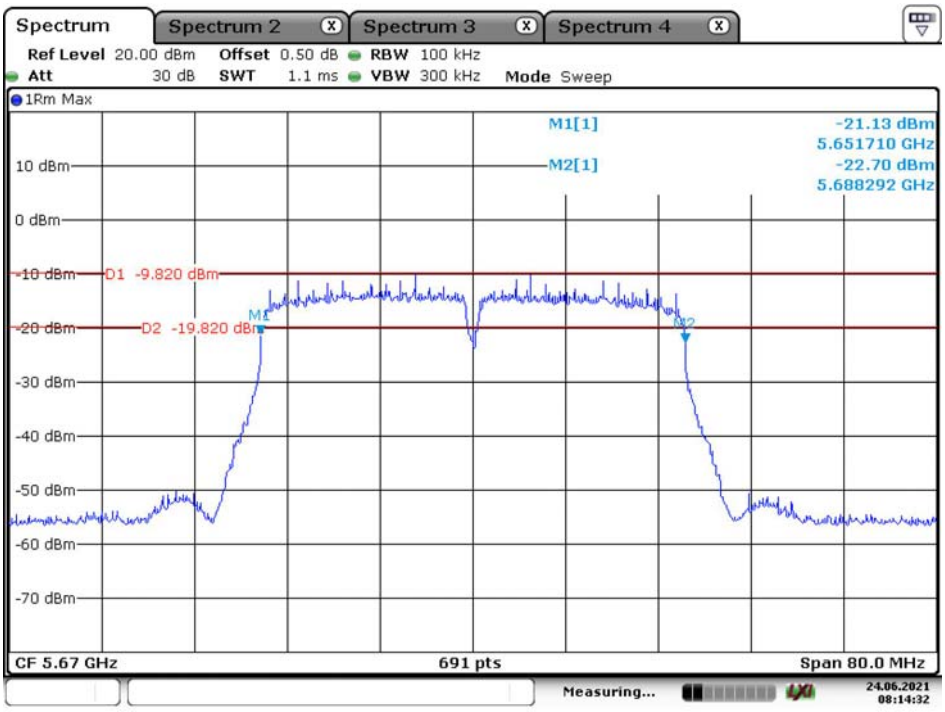

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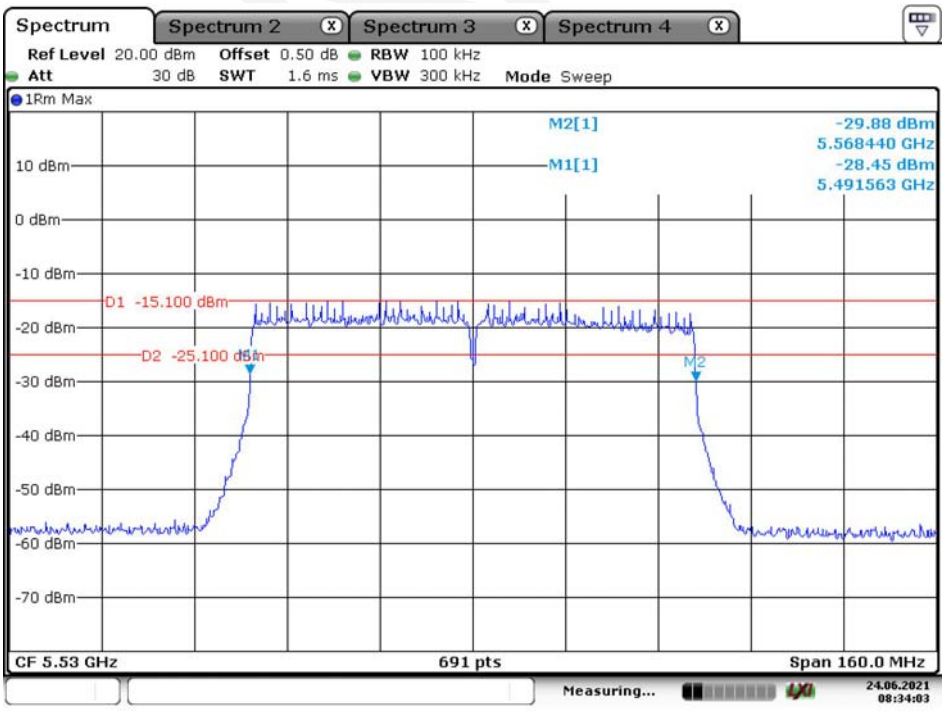
5.6G AC80-L



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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

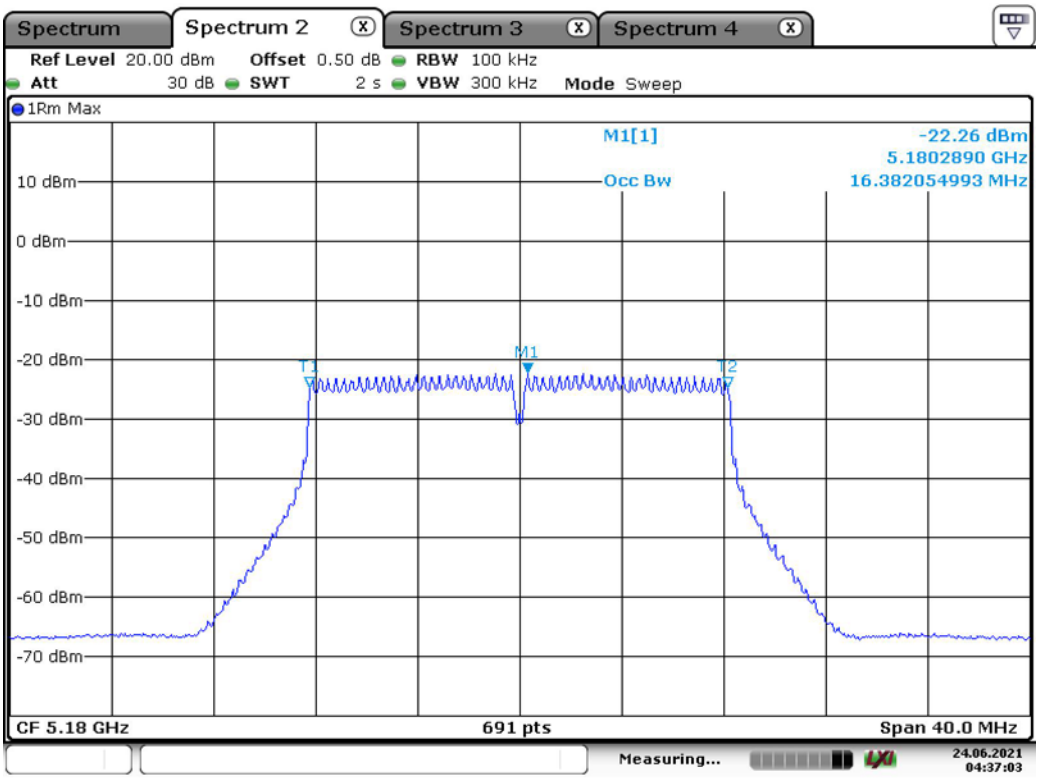
Test Data

Please refer to following table:

Band	Mode	Fc (MHz)	Nominal Channel Bandwidth (MHz)	Result (MHz)	Limit (MHz)
5150-5250	802.11 a	5180	20	16.382	16~20
		5240		16.382	
	802.11 n20	5180	20	17.656	16~20
		5240		17.656	
	802.11 n40	5190	40	36.122	32~40
		5230		36.006	
	802.11 ac20	5180	20	17.656	16~20
		5240		17.598	
	802.11 ac40	5190	40	36.122	32~40
		5230		36.122	
	802.11 ac80	5210	80	75.948	64~80
5470-5725	802.11 a	5500	20	16.382	16~20
		5700		16.382	
	802.11 n20	5500	20	17.656	16~20
		5700		17.656	
	802.11 n40	5510	40	36.006	32~40
		5670		36.006	
	802.11 ac20	5500	20	17.598	16~20
		5700		17.656	
	802.11 ac40	5510	40	36.006	32~40
		5670		36.006	
	802.11 ac80	5530	80	75.716	64~80

Please refer to following plots:

5.2G A-L



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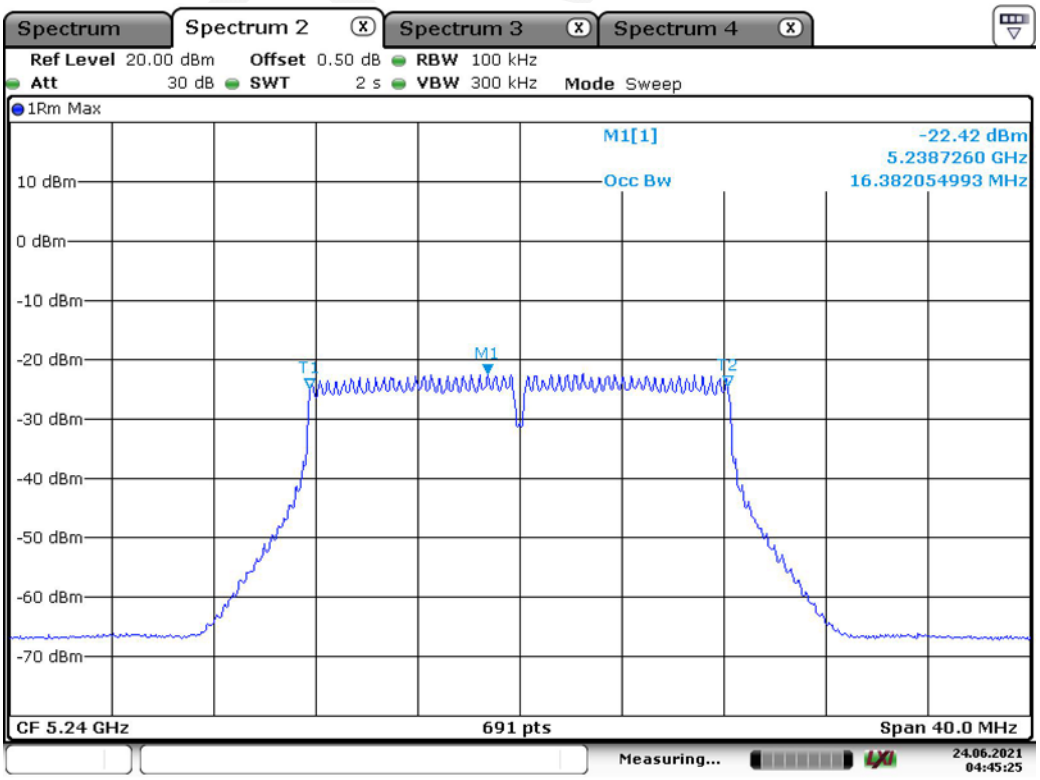
5.2G A-H



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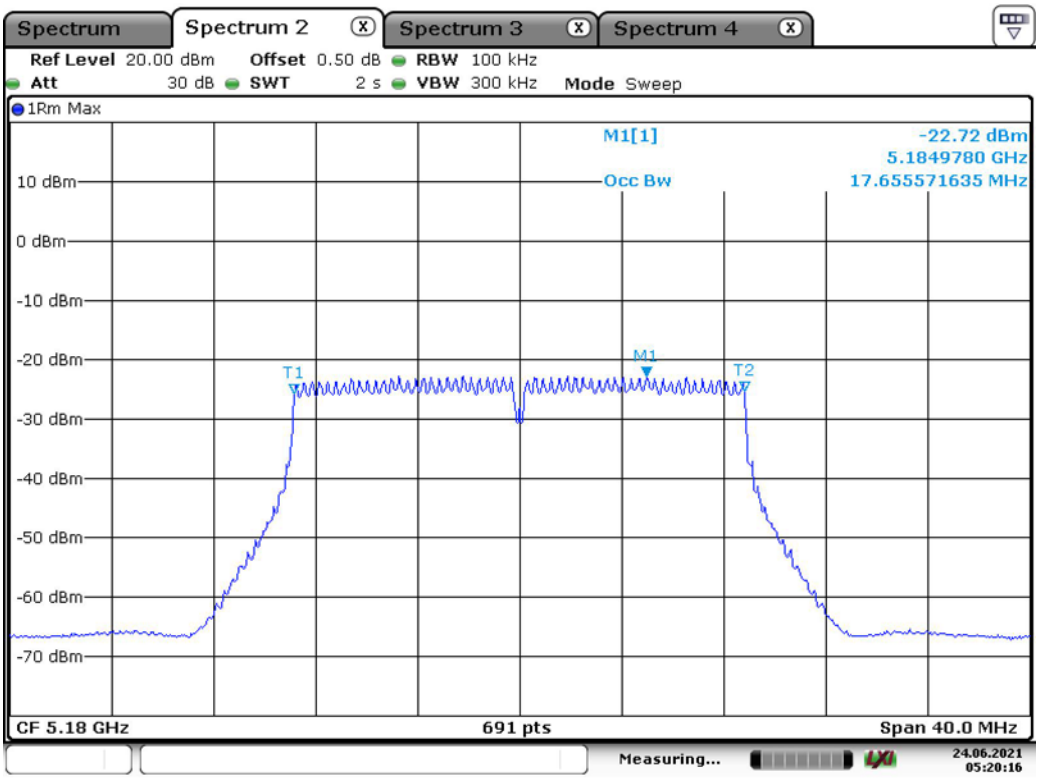
5.2G N20-L



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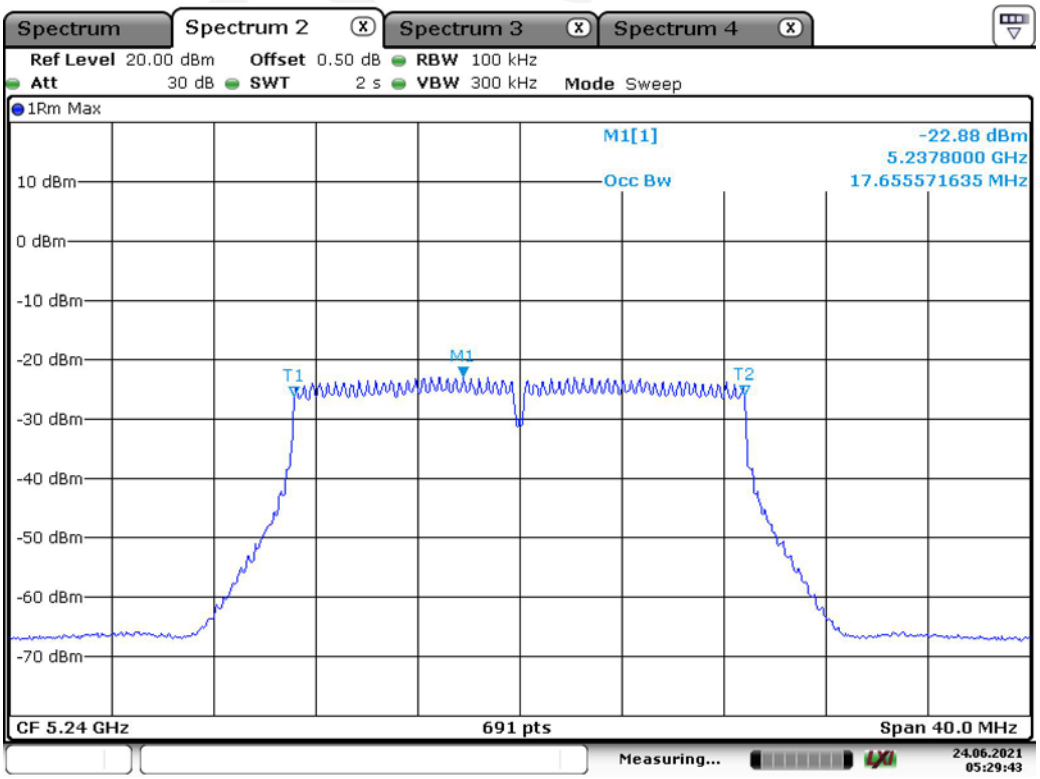

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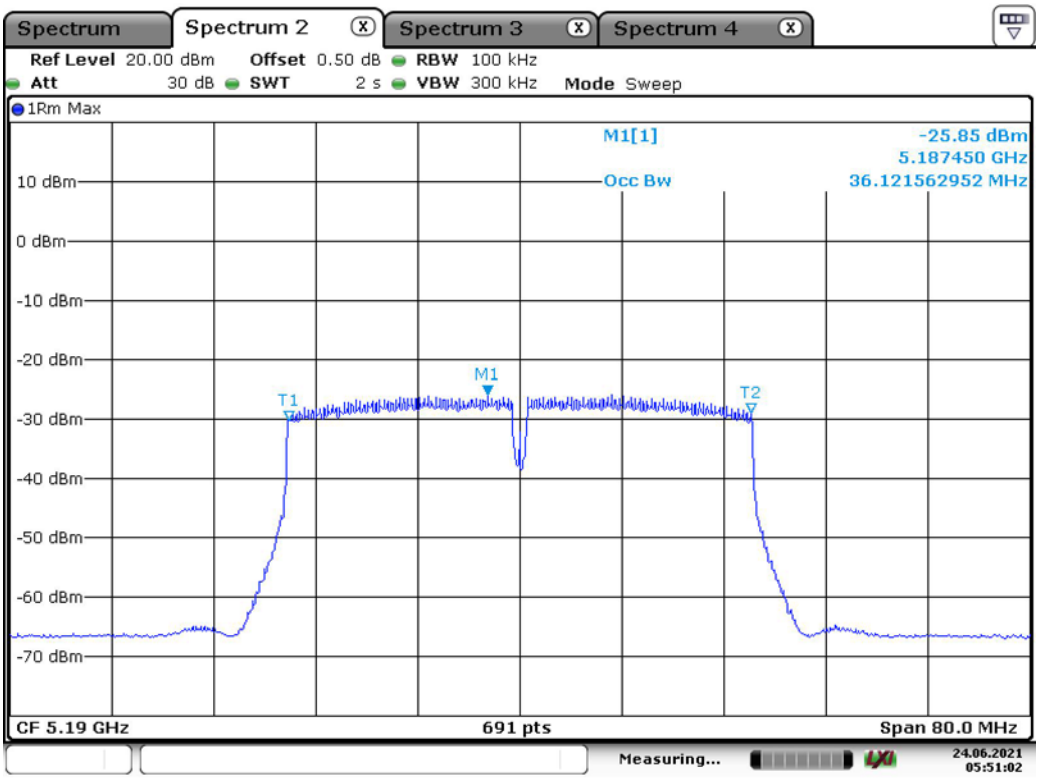

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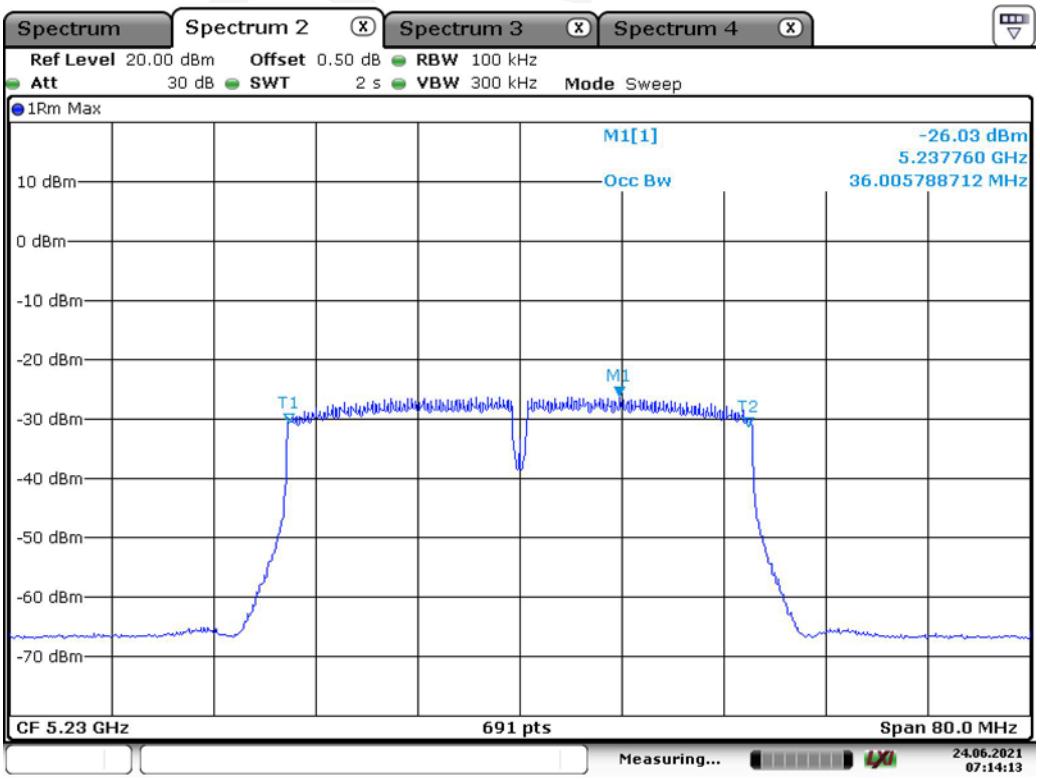

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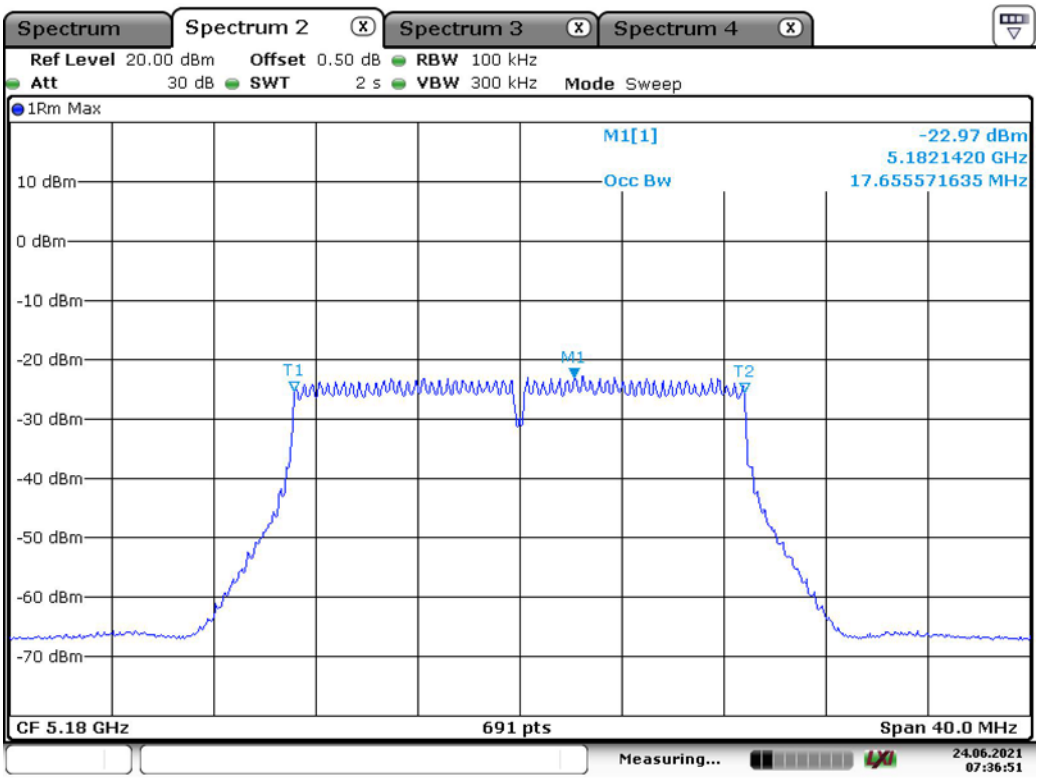

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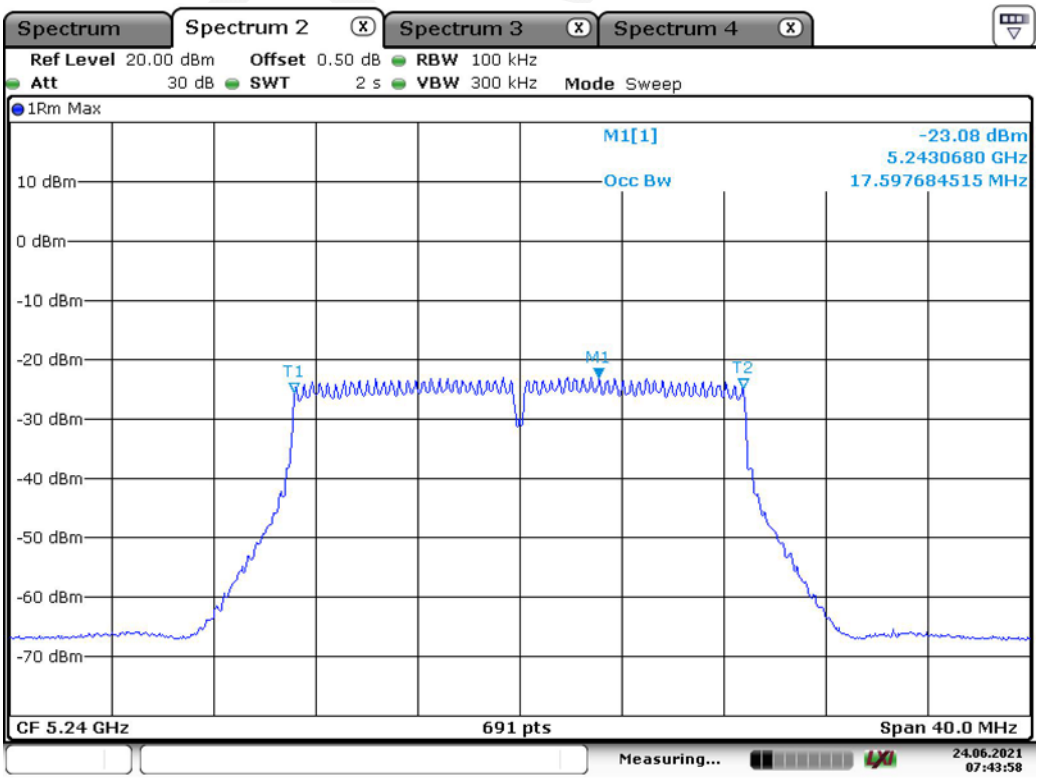

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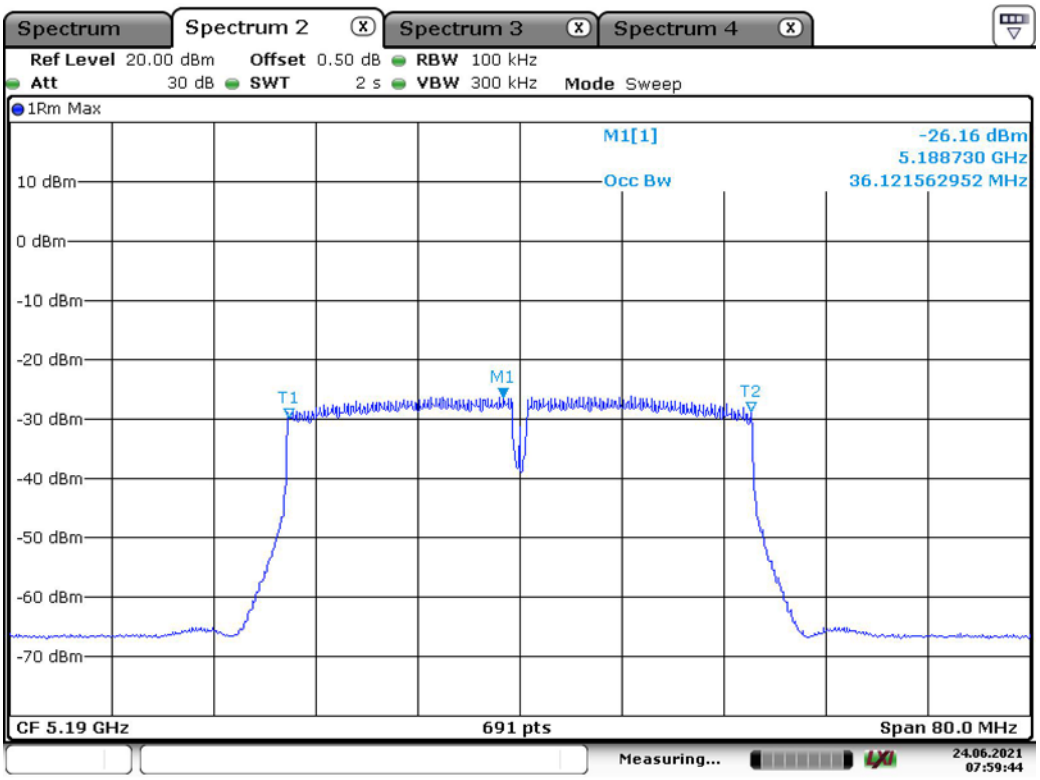

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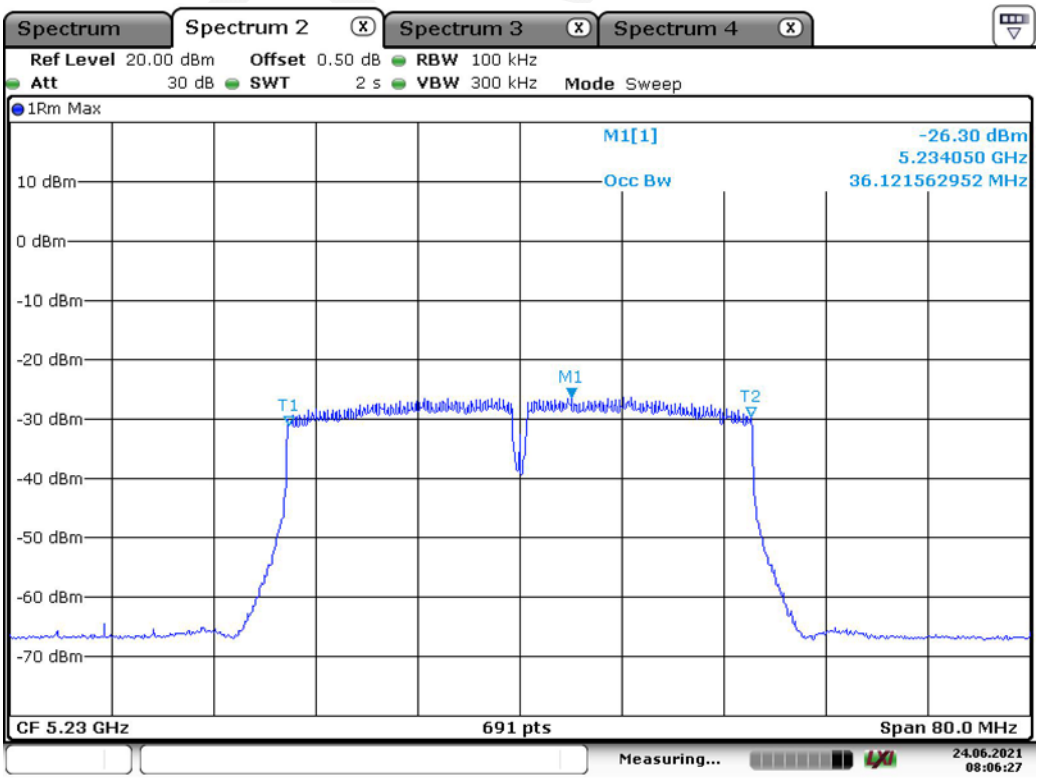

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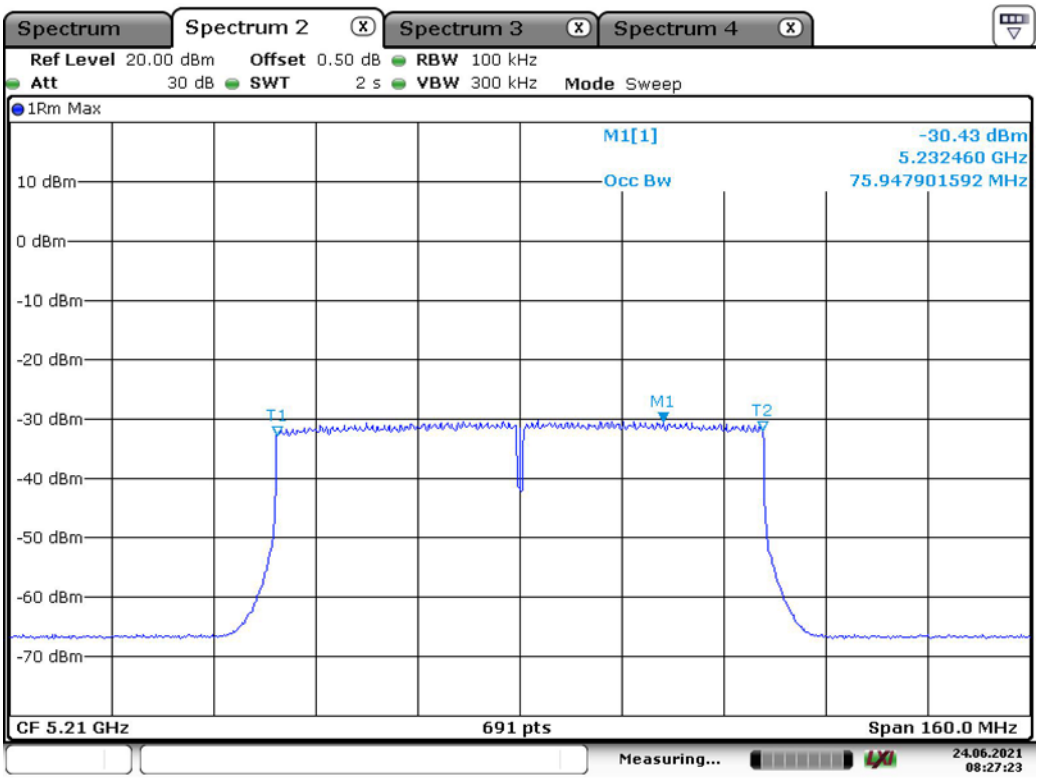

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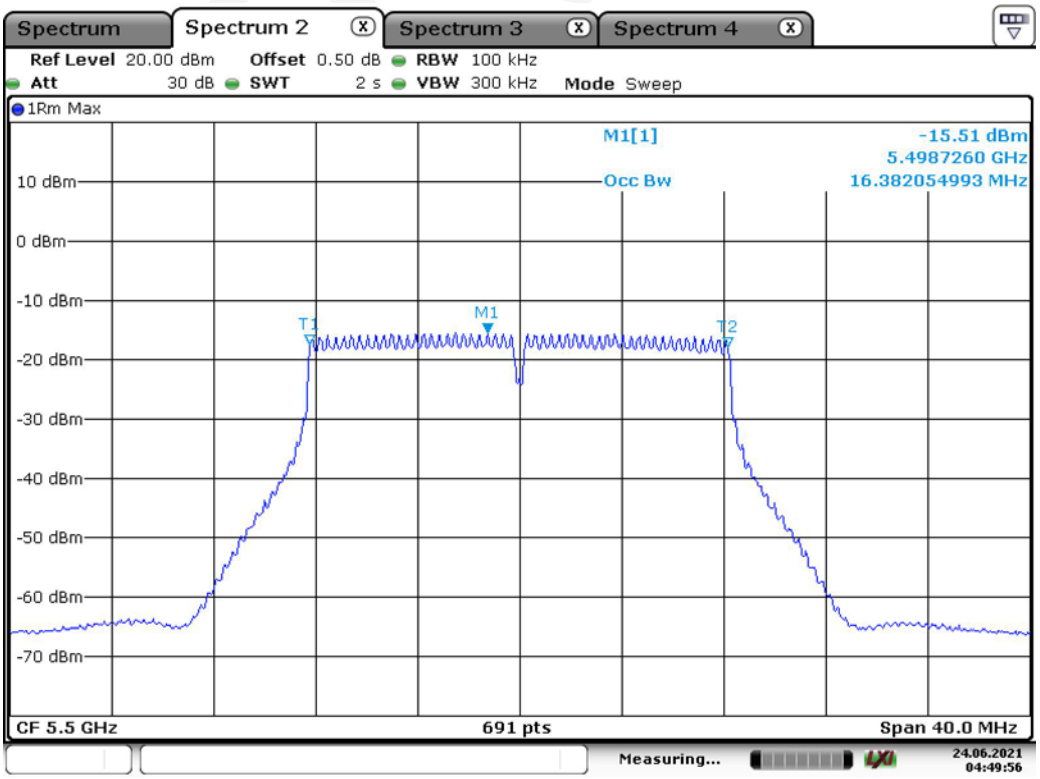
5.6G A-L



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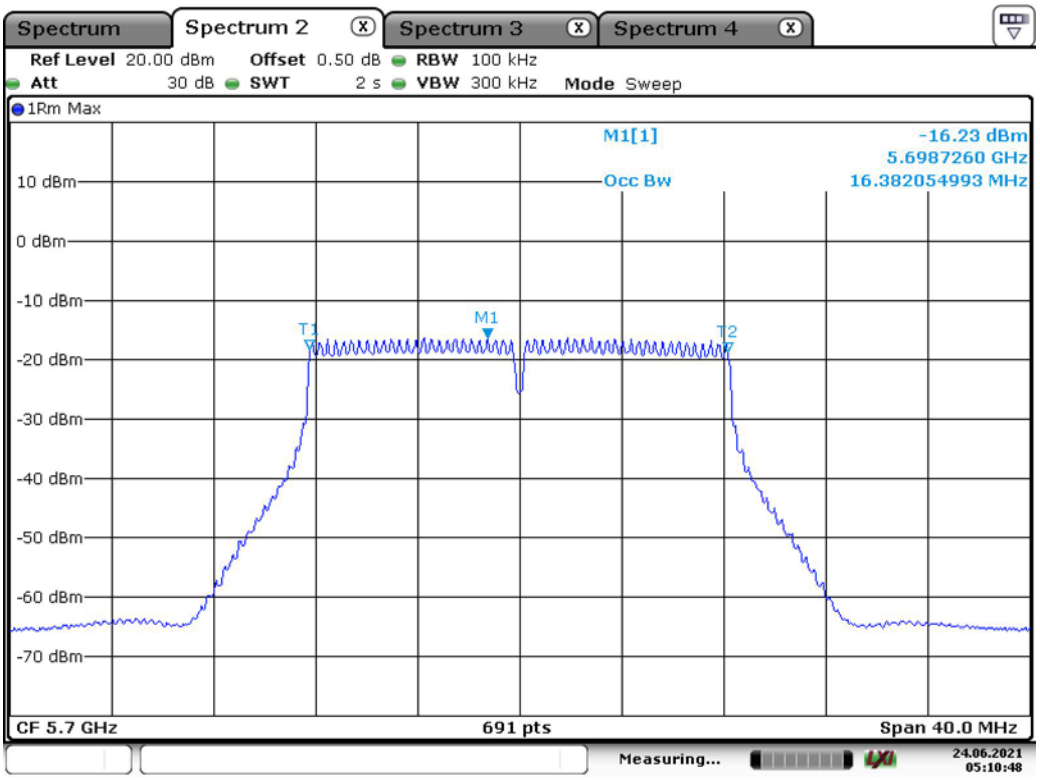

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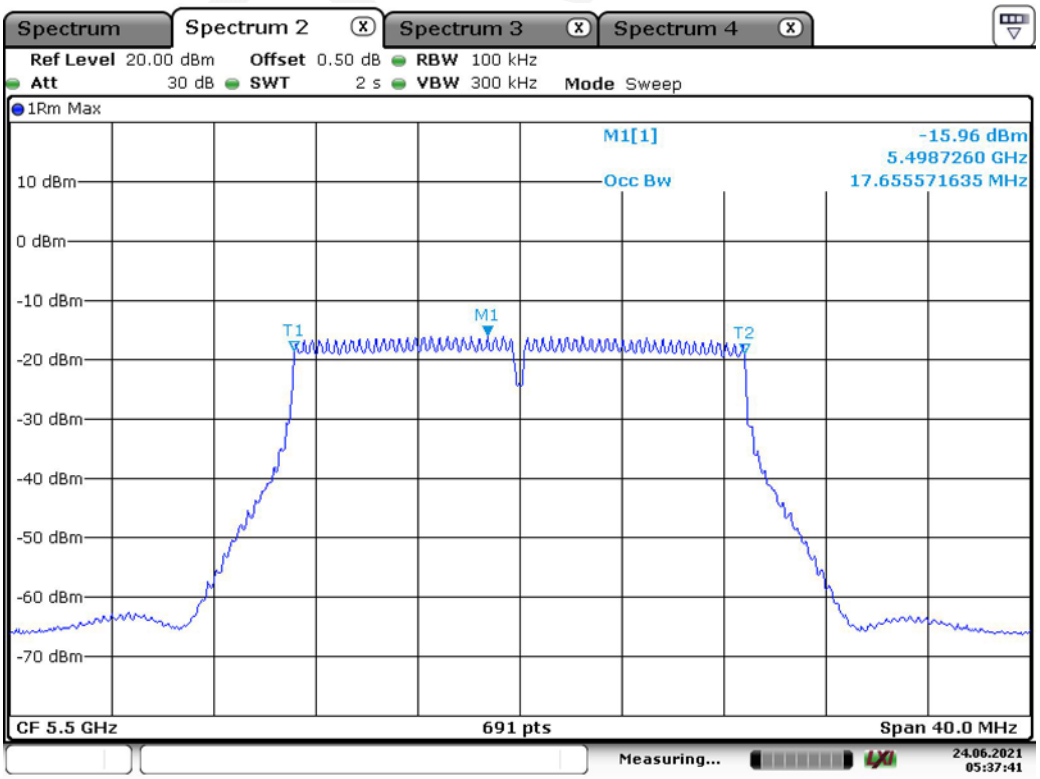

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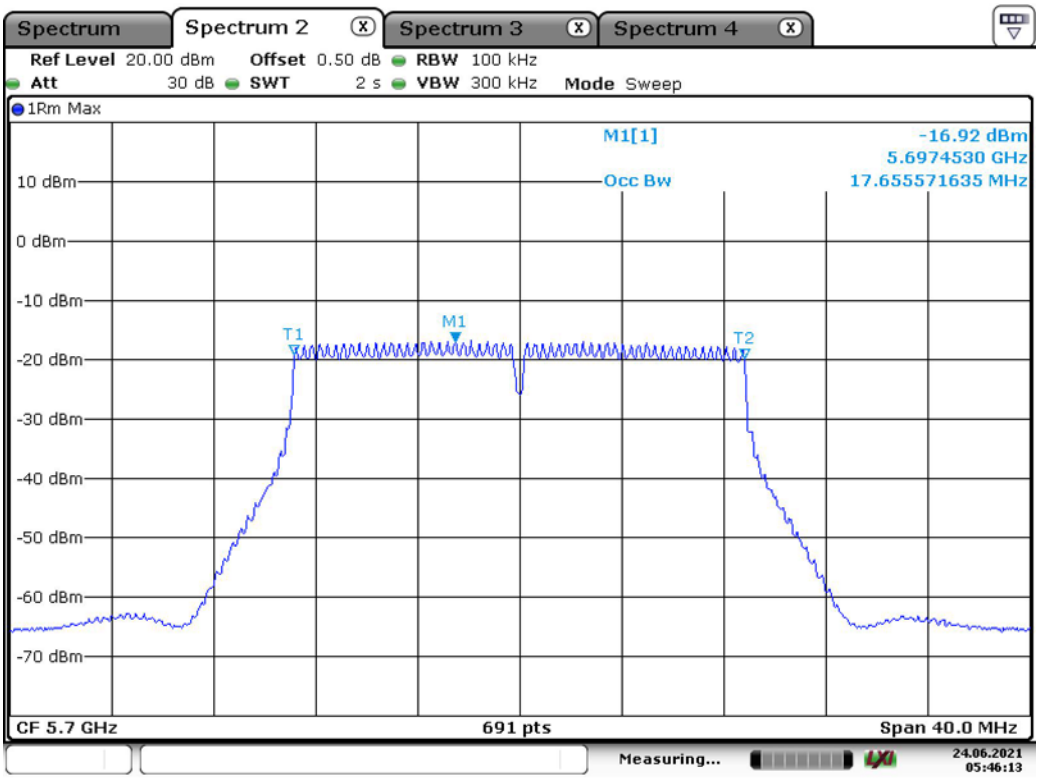

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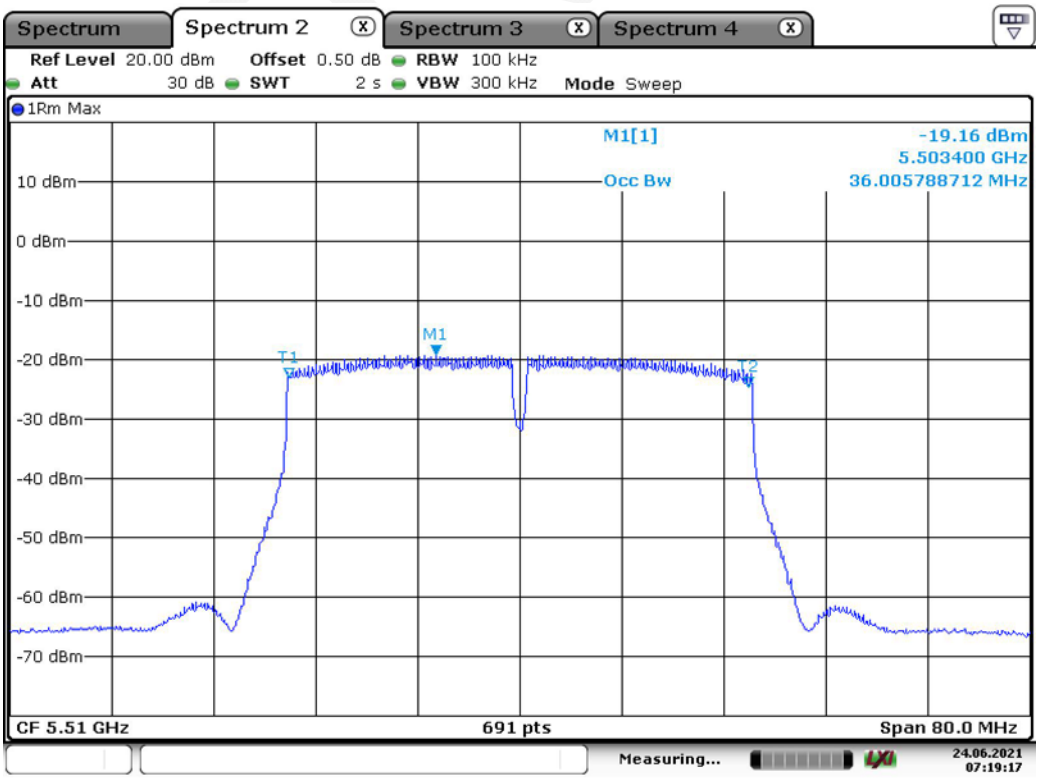

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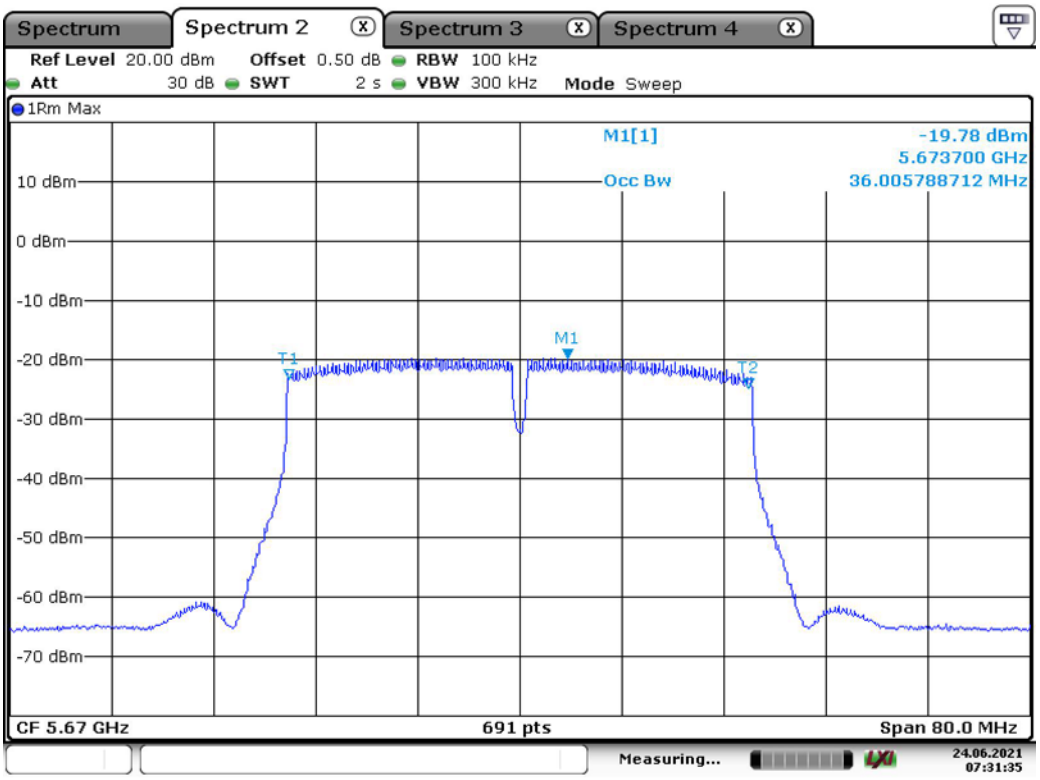

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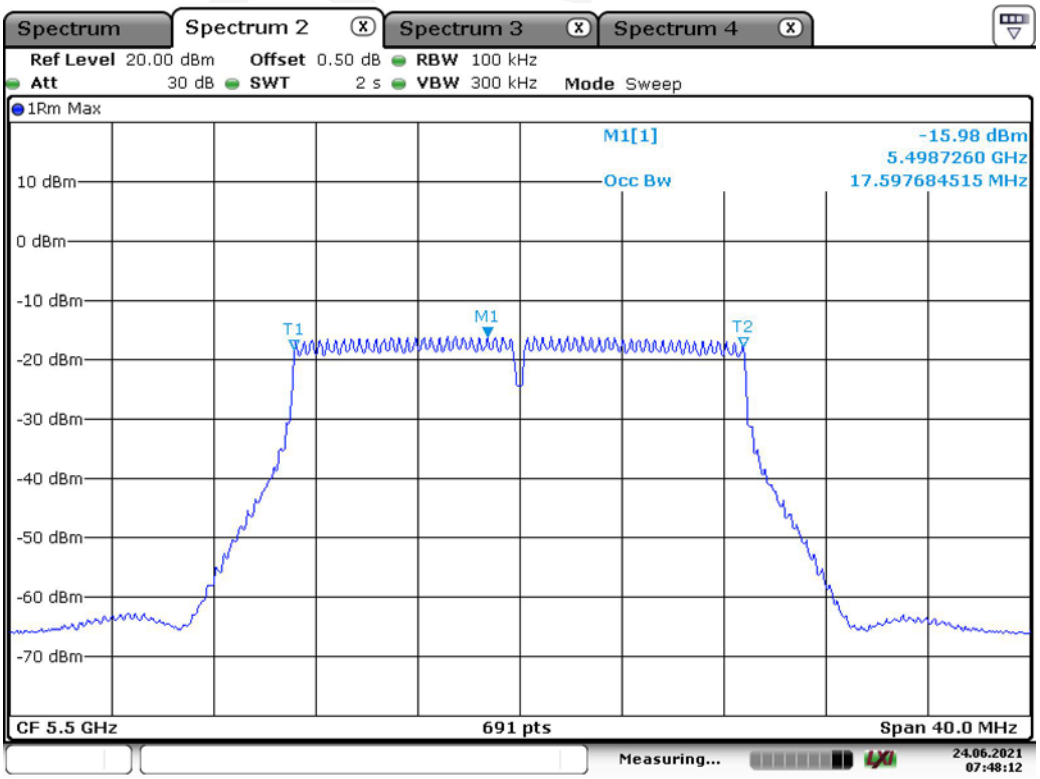

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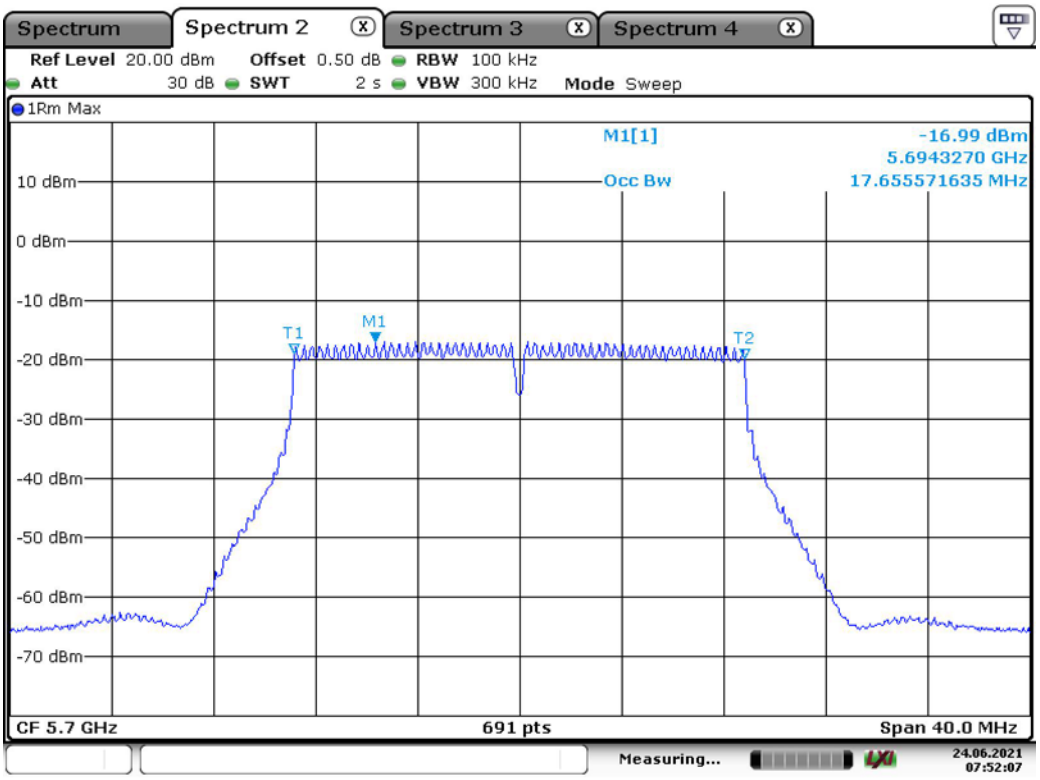

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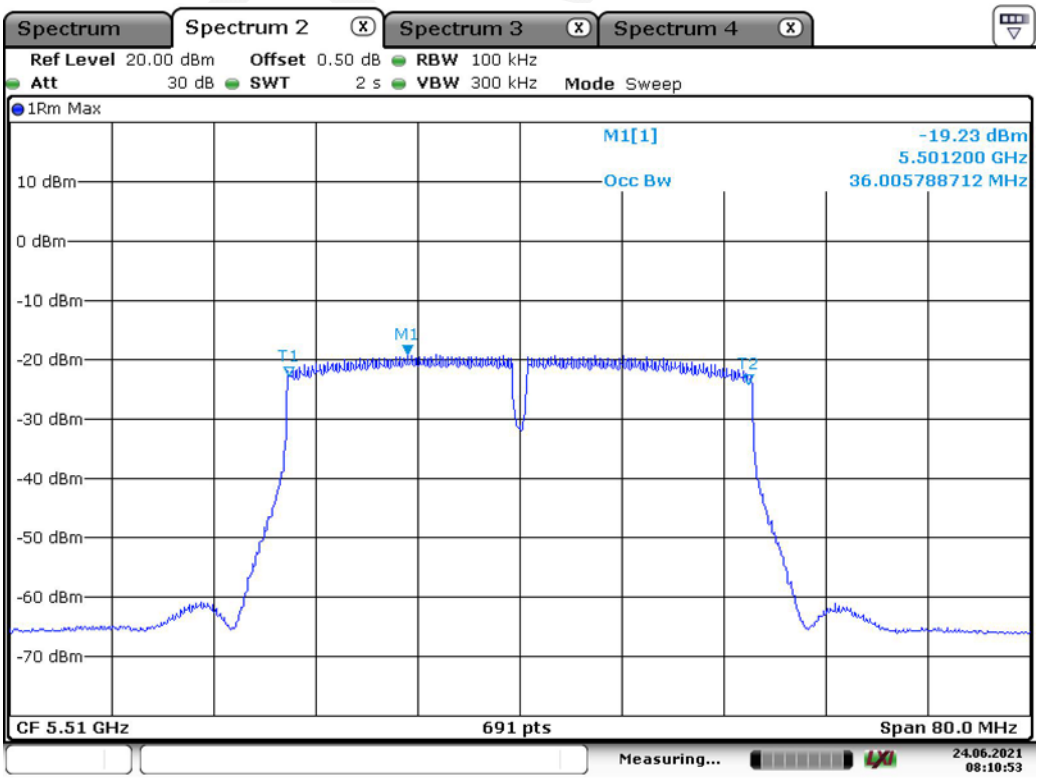

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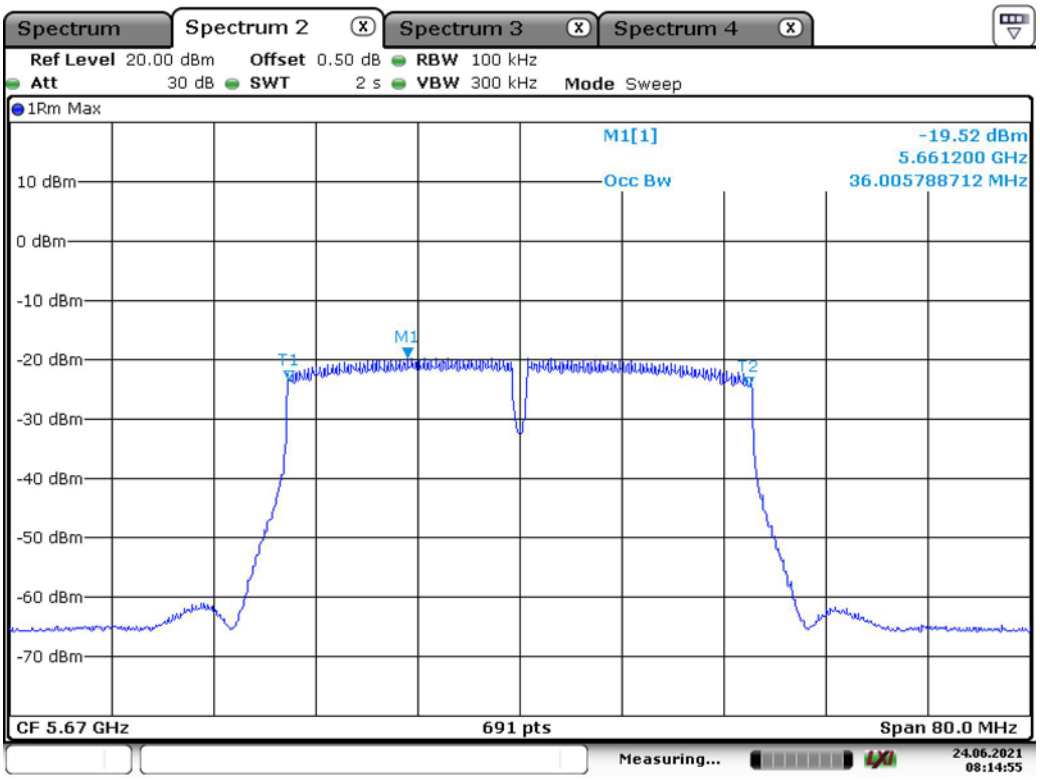
5.6G AC40-H



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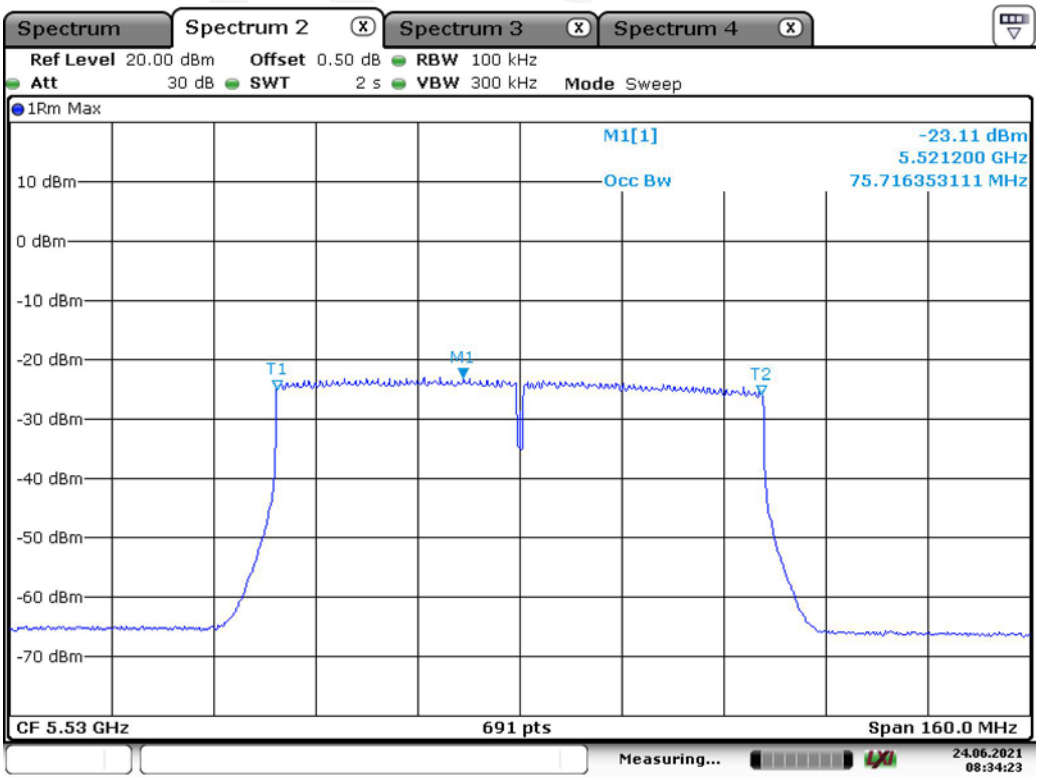
5.6G AC80-L



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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	Mean e.i.r.p. limit		Mean e.i.r.p. density limit	
	dBm		dBm/MHz	
MHz	with TPC	without TPC	with TPC	without TPC
5150 to 5350	23	20 / 23 (see note 1)	10	7 / 10 (see note 2)
5470 to 5725	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 7dBm/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 10dBm/MHz.
NOTE 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 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)
5250 MHz to 5350 MHz	17
5470 MHz to 5725 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

Please refer to following table:

RF Output Power: 802.11 a

Band (MHz)	Fc (MHz)	Test condition	Conducted output power (dBm)	EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 0	
5150-5250	5180	NT	-2.31	18.69	23
		LT	-2.32	18.68	
		HT	-2.35	18.65	
	5240	NT	-2.61	18.39	
		LT	-2.65	18.35	
		HT	-2.60	18.40	
5470-5725	5500	NT	5.80	26.80	27
		LT	5.82	26.82	
		HT	5.84	26.84	
	5700	NT	5.09	26.09	
		LT	5.15	26.15	
		HT	5.16	26.16	

RF Output Power: 802.11 n20

Band (MHz)	Fc (MHz)	Test condition	Result (dBm)	EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 0	
5150-5250	5180	NT	-1.21	19.79	23
		LT	-1.19	19.81	
		HT	-1.23	19.77	
	5240	NT	-1.32	19.68	
		LT	-1.28	19.72	
		HT	-1.25	19.75	
5470-5725	5500	NT	5.79	26.79	27
		LT	5.81	26.81	
		HT	5.84	26.84	
	5700	NT	5.19	26.19	
		LT	5.24	26.24	
		HT	5.32	26.32	

RF Output Power: 802.11 n40

Band (MHz)	Fc (MHz)	Test condition	Result (dBm)	EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 0	
5150-5250	5190	NT	-1.65	19.35	23
		LT	-1.66	19.34	
		HT	-1.68	19.32	
	5230	NT	-1.81	19.19	
		LT	-1.83	19.17	
		HT	-1.86	19.14	
5470-5725	5510	NT	5.52	26.52	27
		LT	5.56	26.56	
		HT	5.59	26.59	
	5670	NT	5.89	26.89	
		LT	5.91	26.91	
		HT	5.94	26.94	

RF Output Power: 802.11 802.11 AC20

Band (MHz)	Fc (MHz)	Test condition	Result (dBm)	EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 0	
5150-5250	5180	NT	-1.29	19.71	23
		LT	-1.26	19.74	
		HT	-1.23	19.77	
	5240	NT	-1.28	19.72	
		LT	-1.24	19.76	
		HT	-1.21	19.79	
5470-5725	5500	NT	5.70	26.70	27
		LT	5.72	26.72	
		HT	5.76	26.76	
	5700	NT	5.22	26.22	
		LT	5.23	26.23	
		HT	5.25	26.25	

RF Output Power: 802.11 802.11 AC40

Band (MHz)	Fc (MHz)	Test condition	Result (dBm)	EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 0	
5150-5250	5190	NT	-1.62	19.38	23
		LT	-1.61	19.39	
		HT	-1.65	19.35	
	5230	NT	-1.79	19.21	
		LT	-1.78	19.22	
		HT	-1.82	19.18	
5470-5725	5510	NT	5.41	26.41	27
		LT	5.45	26.45	
		HT	5.49	26.49	
	5670	NT	5.18	26.18	
		LT	5.21	26.21	
		HT	5.23	26.23	

RF Output Power: 802.11 ac80

Band (MHz)	Fc (MHz)	Test condition	Result (dBm)	EIRP (dBm)	Limit (dBm)
			Chain 0	Chain 0	
5150-5350	5210	NT	-1.89	19.11	23
		LT	-1.87	19.13	
		HT	-1.81	19.19	
5470-5725	5530	NT	5.54	26.54	27
		LT	5.58	26.58	
		HT	5.62	26.62	

Power Density

Band (MHz)	Mode	Fc (MHz)	Conducted power density (dBm/MHz)	EIRP (dBm/MHz)	Limit (dBm/MHz)
			Chain 0	Chain 0	
5150-5250	802.11 a	5180	-14.92	6.19	10
		5240	-15.10	6.01	
	802.11 n20	5180	-14.22	6.80	
		5240	-14.24	6.78	
	802.11 n40	5190	-17.47	3.61	
		5230	-17.48	3.60	
	802.11 ac20	5180	-14.22	6.80	
		5240	-14.26	6.76	
	802.11 ac40	5190	-17.33	3.72	
		5230	-17.52	3.53	
	802.11 ac80	5210	-21.16	0.03	
5470-5225	802.11 a	5500	-7.73	13.38	14
		5700	-7.74	13.37	
	802.11 n20	5500	-7.31	13.71	
		5700	-8.17	12.85	
	802.11 n40	5510	-10.37	10.71	
		5670	-10.94	10.14	
	802.11 ac20	5500	-7.29	13.73	
		5700	-8.17	12.85	
	802.11 ac40	5510	-10.61	10.44	
		5670	-10.93	10.12	
	802.11 ac80	5530	-13.86	7.33	

Note: The antenna gain is 21dBi and duty cycle factor were added into the result.

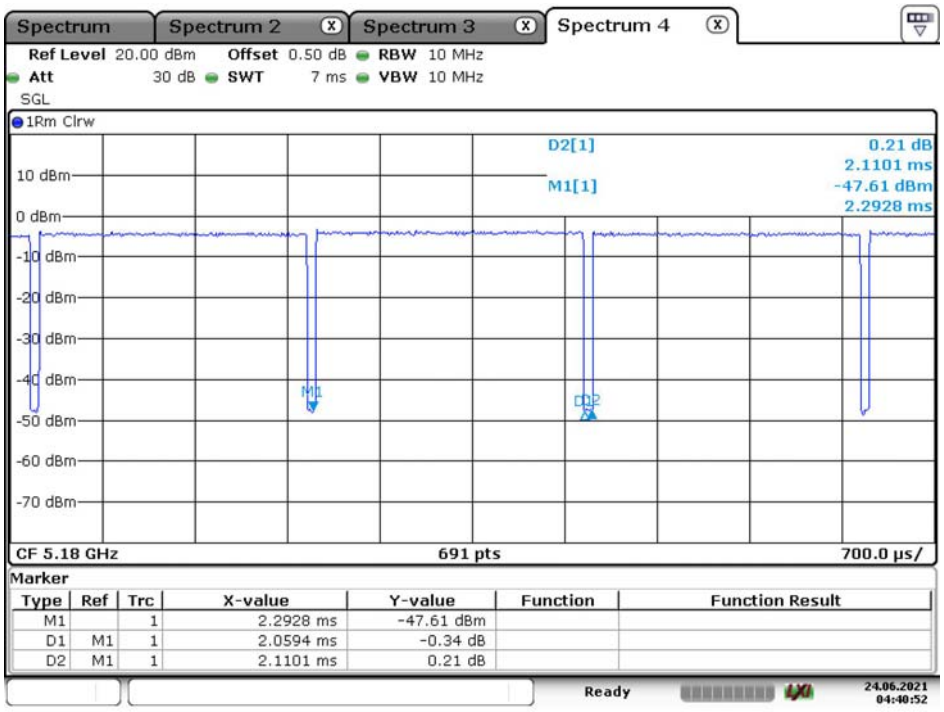
Duty Cycle:

Band (MHz)	Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
5150-5250	802.11 a	2.059	2.110	97.60	0.11
		2.059	2.110	97.60	0.11
	802.11 n20	5.032	5.055	99.54	0.02
		5.032	5.055	99.54	0.02
	802.11 n40	2.435	2.478	98.24	0.08
		2.435	2.478	98.24	0.08
	802.11 ac20	5.009	5.032	99.54	0.02
		5.009	5.032	99.54	0.02
	802.11 ac40	2.449	2.478	98.83	0.05
		2.449	2.478	98.83	0.05
	802.11 ac80	1.159	1.210	95.81	0.19
5470-5225	802.11 a	2.059	2.110	97.60	0.11
		2.059	2.110	97.60	0.11
	802.11 n20	5.032	5.055	99.54	0.02
		5.032	5.055	99.54	0.02
	802.11 n40	2.435	2.478	98.24	0.08
		2.435	2.478	98.24	0.08
	802.11 ac20	5.009	5.032	99.54	0.02
		5.009	5.032	99.54	0.02
	802.11 ac40	2.449	2.478	98.83	0.05
		2.449	2.478	98.83	0.05
	802.11 ac80	1.159	1.210	95.81	0.19

Duty cycle factor = 10*log(1/duty cycle)

Duty cycle:

A



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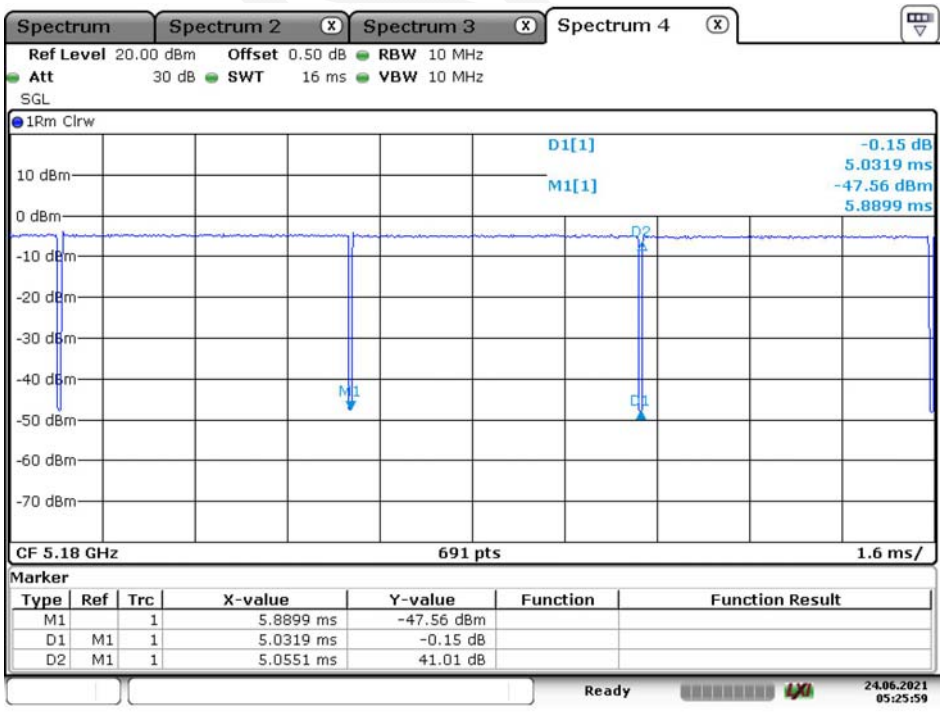

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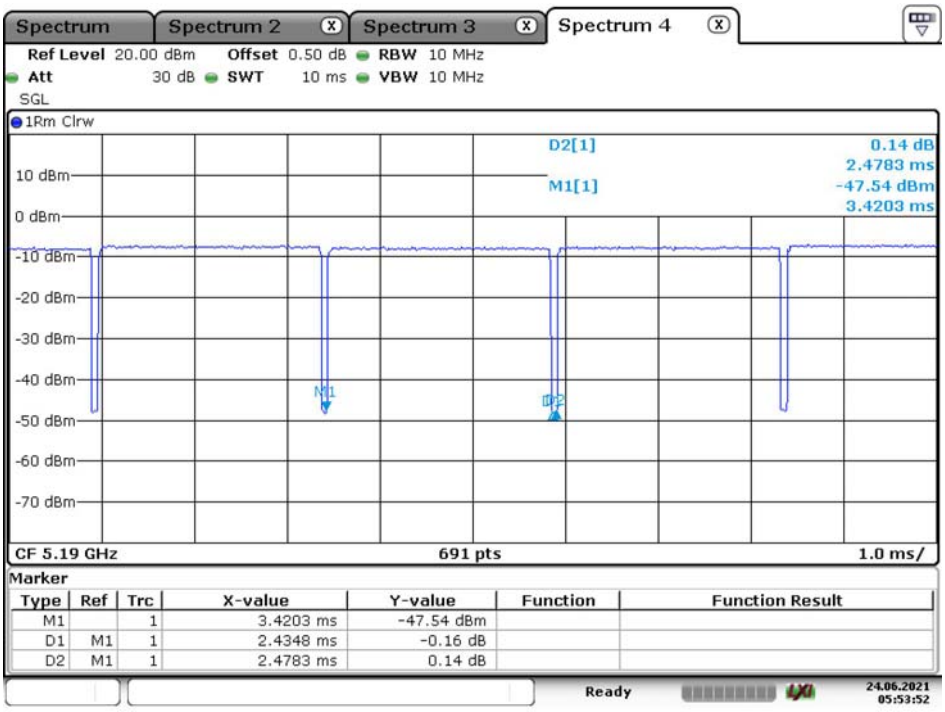

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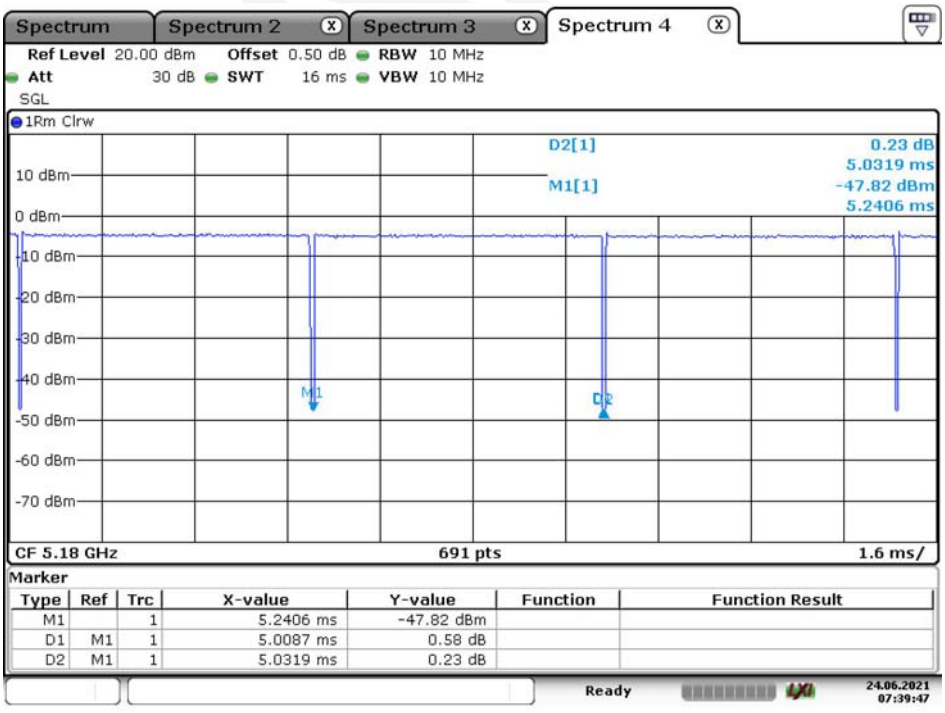
AC20



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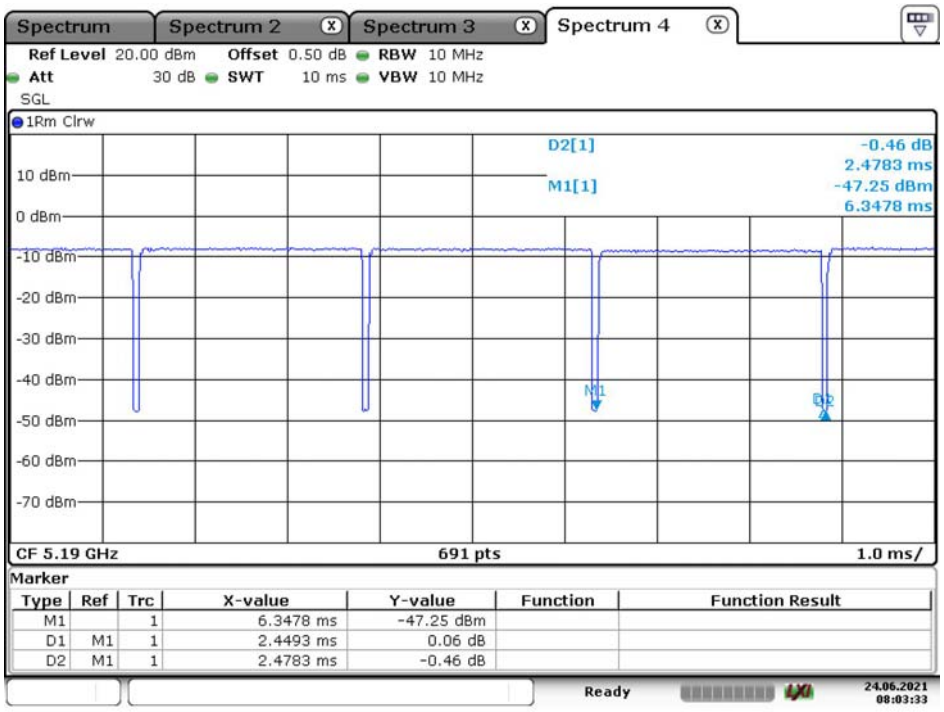

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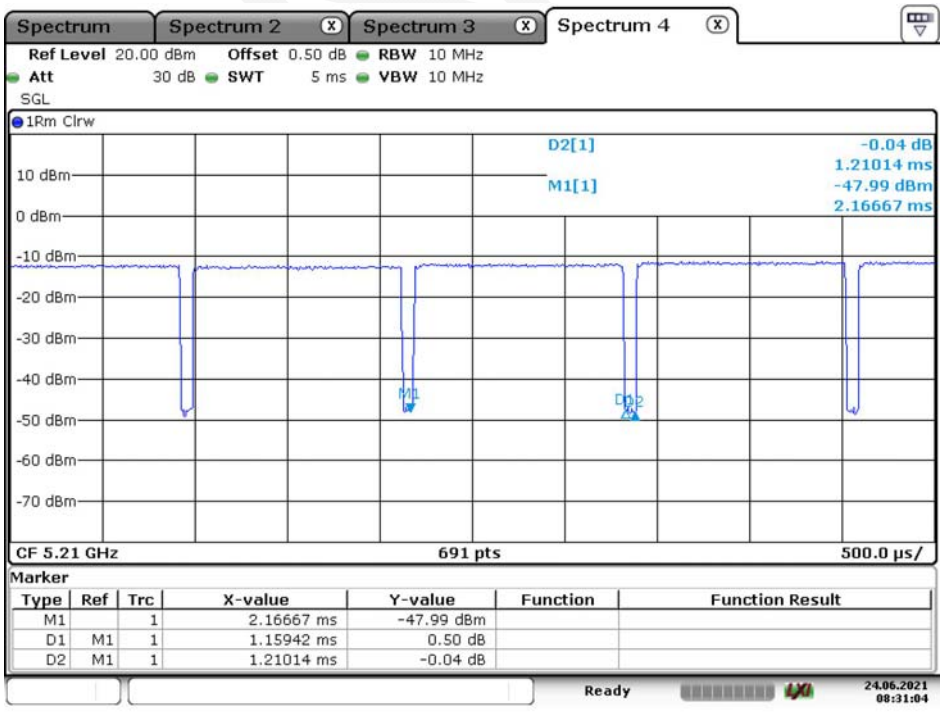

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4 – TRANSMITTER UNWANTED EMISSIONS OUTSIDE THE 5 GHZ RLAN BANDS

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

Pre-scan all test modes and the worst case as below.

Please refer to following table:

802.11 a low channel **5180 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10360.00	H	36.15	-50.93	13.48	0.40	-37.85	-30.00	7.85
10360.00	V	36.51	-50.01	13.48	0.40	-36.93	-30.00	6.93
64.40	H	42.98	-66.78	-7.97	0.23	-74.98	-54.00	20.98
64.40	V	51.26	-58.91	-7.97	0.23	-67.11	-54.00	13.11

802.11 a high channel **5240 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10480.00	H	35.18	-51.86	13.32	0.30	-38.84	-30.00	8.84
10480.00	V	35.29	-51.01	13.32	0.30	-37.99	-30.00	7.99
64.40	H	43.11	-66.65	-7.97	0.23	-74.85	-54.00	20.85
64.40	V	51.17	-59.00	-7.97	0.23	-67.20	-54.00	13.20

802.11 n20 low channel **5180 MHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10360.00	H	35.26	-51.82	13.48	0.40	-38.74	-30.00	8.74
10360.00	V	35.16	-51.36	13.48	0.40	-38.28	-30.00	8.28
64.40	H	42.80	-66.96	-7.97	0.23	-75.16	-54.00	21.16
64.40	V	51.18	-58.99	-7.97	0.23	-67.19	-54.00	13.19

802.11 n20 high channel 5240 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10480.00	H	35.18	-51.86	13.32	0.30	-38.84	-30.00	8.84
10480.00	V	35.62	-50.68	13.32	0.30	-37.66	-30.00	7.66
64.40	H	43.08	-66.68	-7.97	0.23	-74.88	-54.00	20.88
64.40	V	51.05	-59.12	-7.97	0.23	-67.32	-54.00	13.32

802.11 n40 low channel 5190 MHz

Frequenc y (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10380.00	H	35.16	-51.92	13.44	0.38	-38.86	-30.00	8.86
10380.00	V	35.71	-50.78	13.44	0.38	-37.72	-30.00	7.72
64.40	H	42.88	-66.88	-7.97	0.23	-75.08	-54.00	21.08
64.40	V	51.36	-58.81	-7.97	0.23	-67.01	-54.00	13.01

802.11 n40 high channel 5230 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10460.00	H	35.16	-51.89	13.34	0.31	-38.86	-30.00	8.86
10460.00	V	35.76	-50.58	13.34	0.31	-37.55	-30.00	7.55
64.40	H	43.14	-66.62	-7.97	0.23	-74.82	-54.00	20.82
64.40	V	51.53	-58.64	-7.97	0.23	-66.84	-54.00	12.84

802.11 ac20 low channel 5180 MHz

Frequenc y (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10360.00	H	35.28	-51.80	13.48	0.40	-38.72	-30.00	8.72
10360.00	V	35.14	-51.38	13.48	0.40	-38.30	-30.00	8.30
64.40	H	42.88	-66.88	-7.97	0.23	-75.08	-54.00	21.08
64.40	V	51.35	-58.82	-7.97	0.23	-67.02	-54.00	13.02

802.11 ac20 high channel 5240 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10480.00	H	35.69	-51.35	13.32	0.30	-38.33	-30.00	8.33
10480.00	V	36.15	-50.15	13.32	0.30	-37.13	-30.00	7.13
64.40	H	42.83	-66.93	-7.97	0.23	-75.13	-54.00	21.13
64.40	V	51.43	-58.74	-7.97	0.23	-66.94	-54.00	12.94

802.11ac40 low channel 5190 MHz

Frequenc y (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10380.00	H	36.02	-51.06	13.44	0.38	-38.00	-30.00	8.00
10380.00	V	36.25	-50.24	13.44	0.38	-37.18	-30.00	7.18
64.40	H	42.75	-67.01	-7.97	0.23	-75.21	-54.00	21.21
64.40	V	51.44	-58.73	-7.97	0.23	-66.93	-54.00	12.93

802.11 ac40 high channel 5230 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10460.00	H	35.69	-51.36	13.34	0.31	-38.33	-30.00	8.33
10460.00	V	36.16	-50.18	13.34	0.31	-37.15	-30.00	7.15
64.40	H	42.90	-66.86	-7.97	0.23	-75.06	-54.00	21.06
64.40	V	50.99	-59.18	-7.97	0.23	-67.38	-54.00	13.38

802.11 ac80 low channel 5210 MHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
10420.00	H	34.16	-52.90	13.38	0.35	-39.87	-30.00	9.87
10420.00	V	36.29	-50.12	13.38	0.35	-37.09	-30.00	7.09
64.40	H	42.91	-66.85	-7.97	0.23	-75.05	-54.00	21.05
64.40	V	50.97	-59.20	-7.97	0.23	-67.40	-54.00	13.40

802.11 a low channel **5500 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)			
11000.00	H	34.56	-52.52	13.10	0.82	-40.24	-30.00	10.24
11000.00	V	34.79	-51.67	13.10	0.82	-39.39	-30.00	9.39
64.40	H	43.25	-66.51	-7.97	0.23	-74.71	-54.00	20.71
64.40	V	51.40	-58.77	-7.97	0.23	-66.97	-54.00	12.97

802.11 a high channel **5700 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)			
11400.00	H	34.93	-52.80	13.00	1.57	-41.37	-30.00	11.37
11400.00	V	34.46	-51.86	13.00	1.57	-40.43	-30.00	10.43
64.40	H	42.83	-66.93	-7.97	0.23	-75.13	-54.00	21.13
64.40	V	51.28	-58.89	-7.97	0.23	-67.09	-54.00	13.09

802.11 n20 low channel **5500 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)			
11000.00	H	33.91	-53.17	13.10	0.82	-40.89	-30.00	10.89
11000.00	V	33.25	-53.21	13.10	0.82	-40.93	-30.00	10.93
64.40	H	42.90	-66.86	-7.97	0.23	-75.06	-54.00	21.06
64.40	V	51.24	-58.93	-7.97	0.23	-67.13	-54.00	13.13

802.11 n20 high channel 5700 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)			
11400.00	H	34.62	-53.11	13.00	1.57	-41.68	-30.00	11.68
11400.00	V	34.59	-51.73	13.00	1.57	-40.30	-30.00	10.30
64.40	H	42.72	-67.04	-7.97	0.23	-75.24	-54.00	21.24
64.40	V	51.34	-58.83	-7.97	0.23	-67.03	-54.00	13.03

802.11 n40 low channel 5510 MHz

Frequenc y (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)			
11020.00	H	33.71	-53.40	13.04	0.86	-41.22	-30.00	11.22
11020.00	V	33.90	-52.55	13.04	0.86	-40.37	-30.00	10.37
64.40	H	42.90	-66.86	-7.97	0.23	-75.06	-54.00	21.06
64.40	V	51.26	-58.91	-7.97	0.23	-67.11	-54.00	13.11

802.11 n40 high channel 5670 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)			
11340.00	H	33.49	-54.14	12.94	1.46	-42.66	-30.00	12.66
11340.00	V	33.85	-52.49	12.94	1.46	-41.01	-30.00	11.01
64.40	H	42.87	-66.89	-7.97	0.23	-75.09	-54.00	21.09
64.40	V	51.44	-58.73	-7.97	0.23	-66.93	-54.00	12.93

802.11 ac20 low channel 5500 MHz

Frequenc y (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)			
11000.00	H	33.66	-53.42	13.10	0.82	-41.14	-30.00	11.14
11000.00	V	33.84	-52.62	13.10	0.82	-40.34	-30.00	10.34
64.40	H	42.73	-67.03	-7.97	0.23	-75.23	-54.00	21.23
64.40	V	51.17	-59.00	-7.97	0.23	-67.20	-54.00	13.20

802.11 ac20 high channel 5700 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)			
11400.00	H	33.48	-54.25	13.00	1.57	-42.82	-30.00	12.82
11400.00	V	34.29	-52.03	13.00	1.57	-40.60	-30.00	10.60
64.40	H	42.69	-67.07	-7.97	0.23	-75.27	-54.00	21.27
64.40	V	51.28	-58.89	-7.97	0.23	-67.09	-54.00	13.09

802.11ac40 low channel 5510 MHz

Frequenc y (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)			
11020.00	H	34.11	-53.00	13.04	0.86	-40.82	-30.00	10.82
11020.00	V	33.79	-52.66	13.04	0.86	-40.48	-30.00	10.48
64.40	H	43.08	-66.68	-7.97	0.23	-74.88	-54.00	20.88
64.40	V	51.09	-59.08	-7.97	0.23	-67.28	-54.00	13.28

802.11 ac40 high channel 5670 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)			
11340.00	H	34.99	-52.64	12.94	1.46	-41.16	-30.00	11.16
11340.00	V	34.86	-51.48	12.94	1.46	-40.00	-30.00	10.00
64.40	H	42.72	-67.04	-7.97	0.23	-75.24	-54.00	21.24
64.40	V	51.16	-59.01	-7.97	0.23	-67.21	-54.00	13.21

802.11 ac80 low channel 5530 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)			
11060.00	H	34.26	-52.92	12.92	0.93	-40.93	-30.00	10.93
11060.00	V	34.56	-51.88	12.92	0.93	-39.89	-30.00	9.89
64.40	H	42.99	-66.77	-7.97	0.23	-74.97	-54.00	20.97
64.40	V	51.22	-58.95	-7.97	0.23	-67.15	-54.00	13.15

802.11 ac80 low channel 5610 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)			
11220.00	H	34.12	-53.32	12.82	1.23	-41.73	-30.00	11.73
11220.00	V	33.89	-52.49	12.82	1.23	-40.90	-30.00	10.90
64.40	H	42.70	-67.06	-7.97	0.23	-75.26	-54.00	21.26
64.40	V	51.35	-58.82	-7.97	0.23	-67.02	-54.00	13.02

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

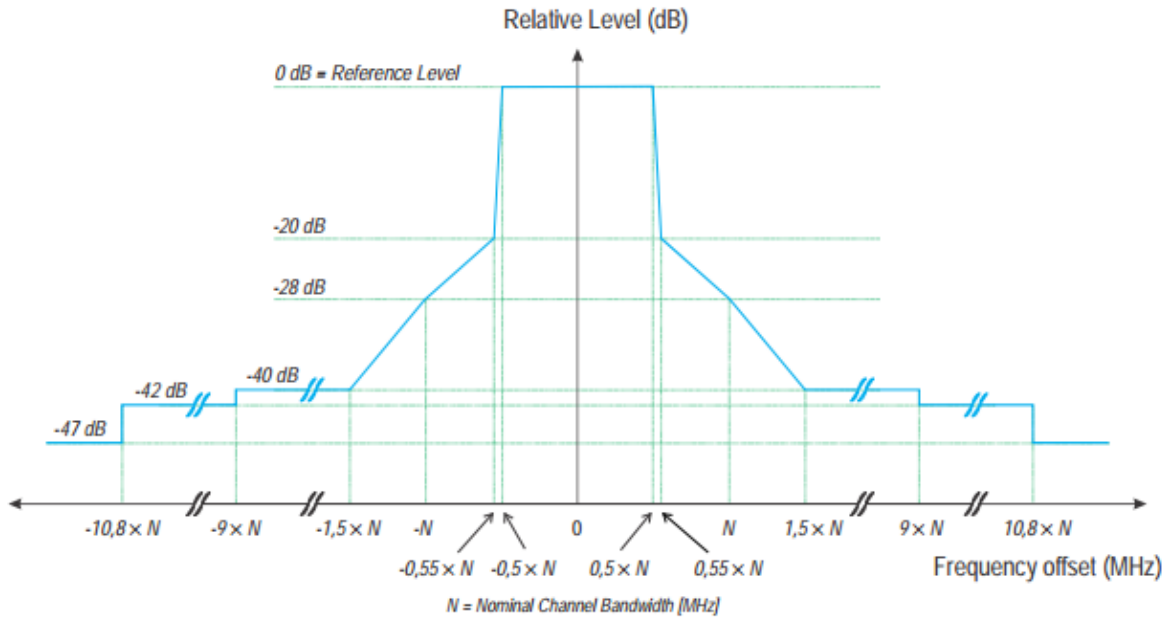


Figure 1: Transmit spectral power mask

Test Procedure

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

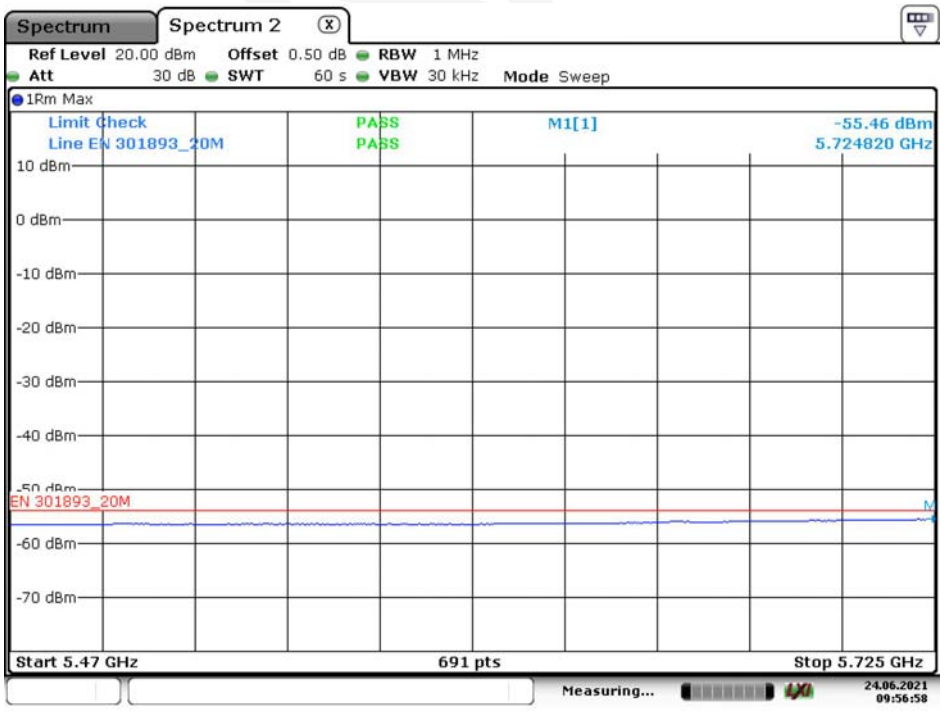
Test Data

Please refer to following plots:

5.2G A-L-1

Date: 24.JUN.2021 09:55:34

5.2G A-L-2



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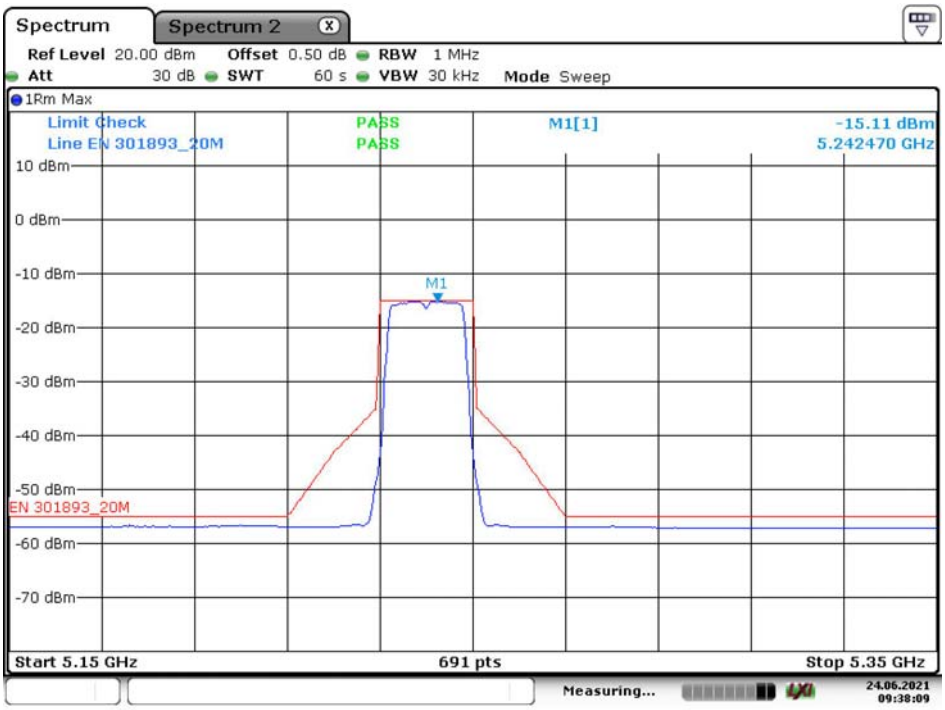
5.2G A-H-1



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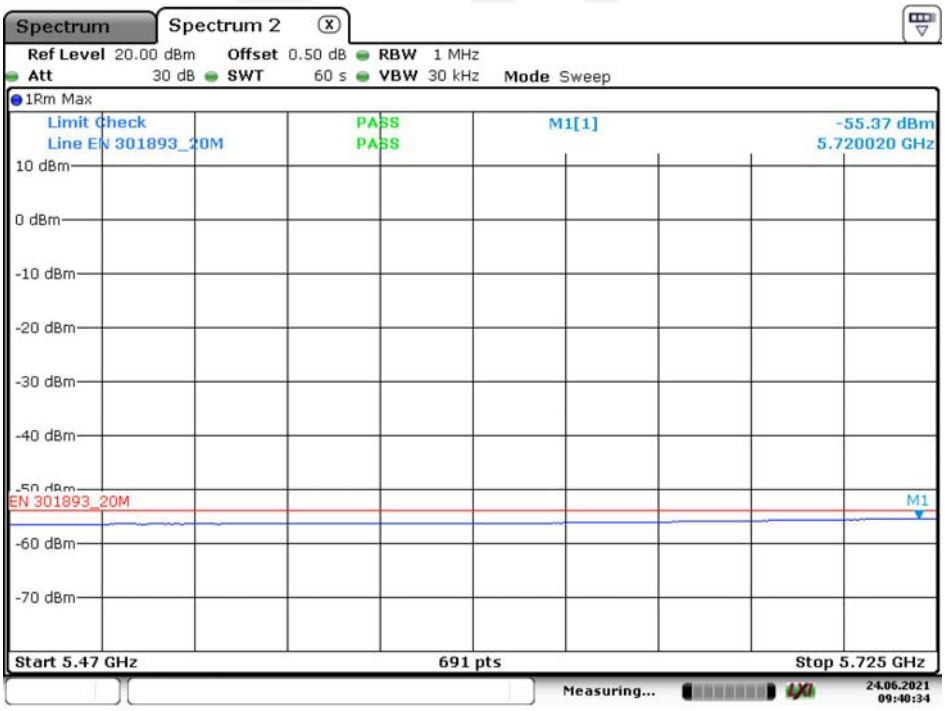
5.2G A-H-2



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5.2G N20-L-1

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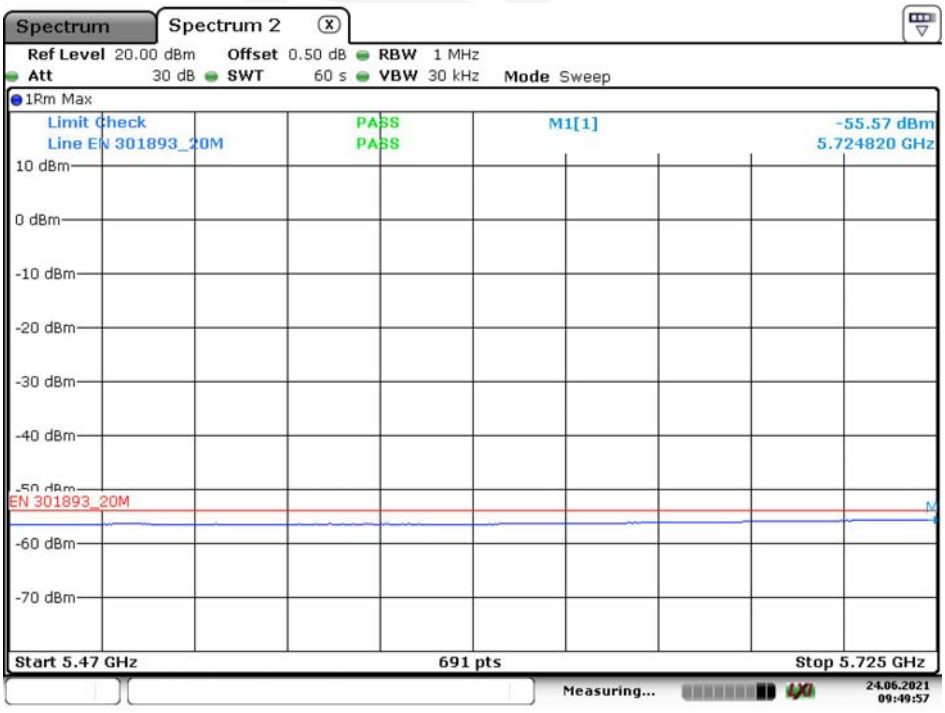
5.2G N20-L-2



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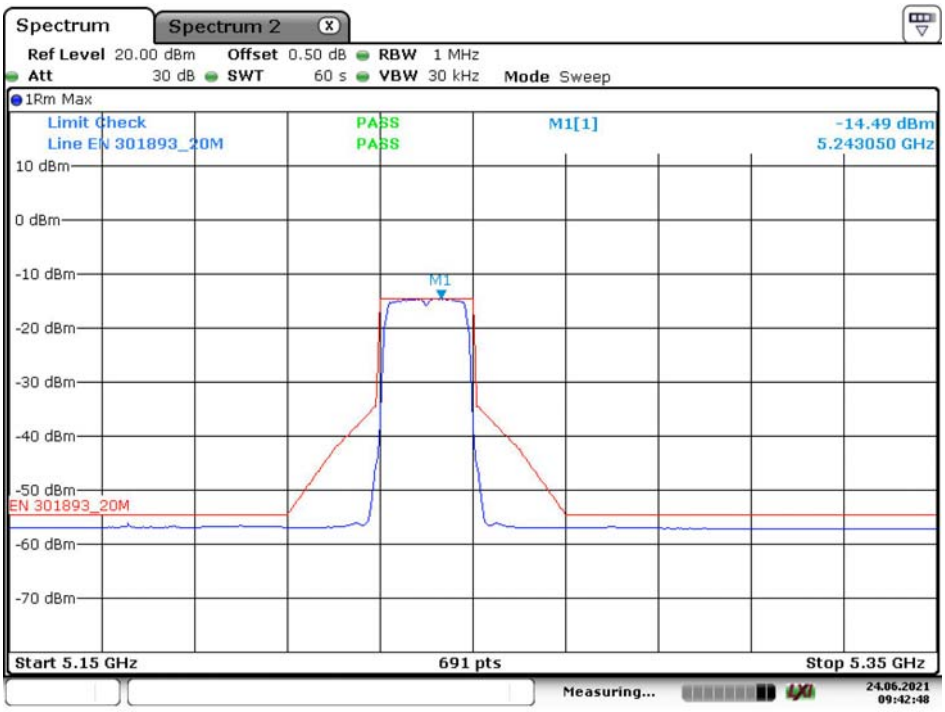
5.2G N20-H-1



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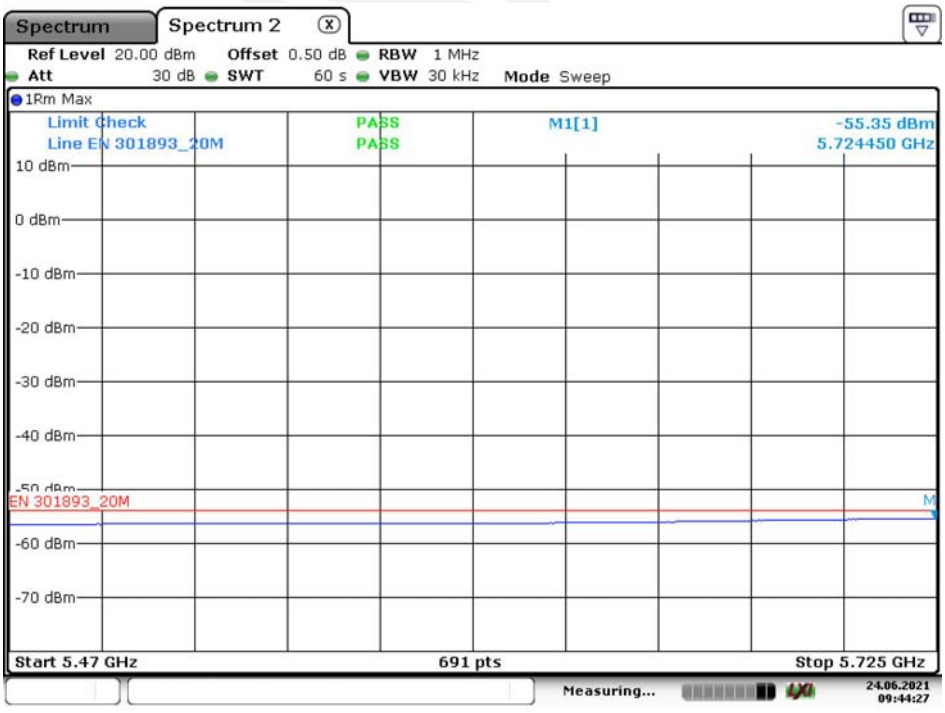
5.2G N20-H-2



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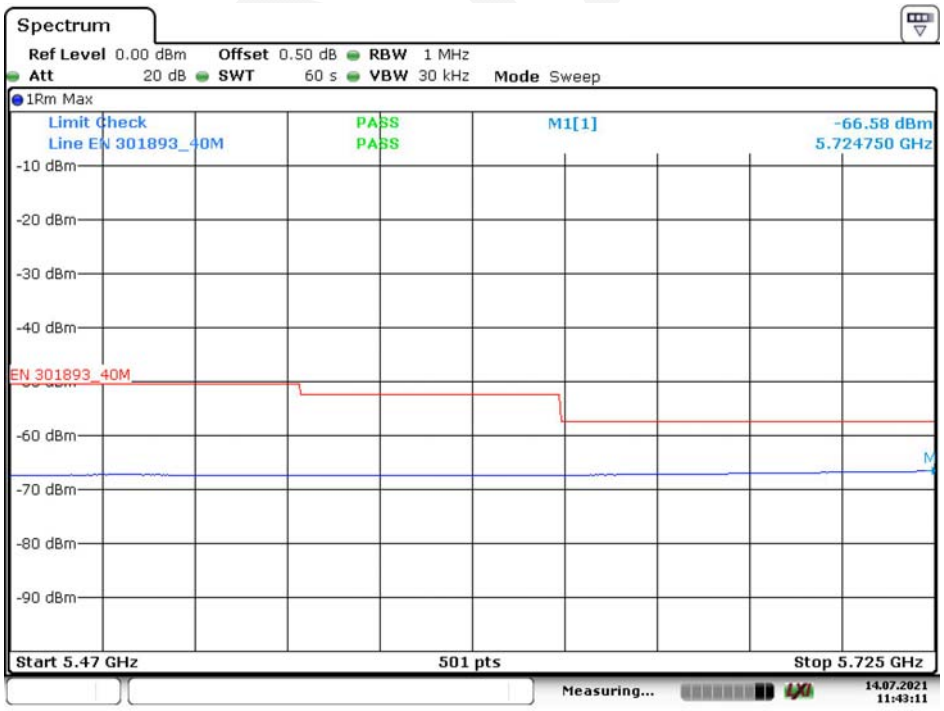
5.2G N40-L-1

Date: 24.JUN.2021 10:29:53

5.2G N40-L-2



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5.2G N40-H-1

Date: 24.JUN.2021 10:24:16

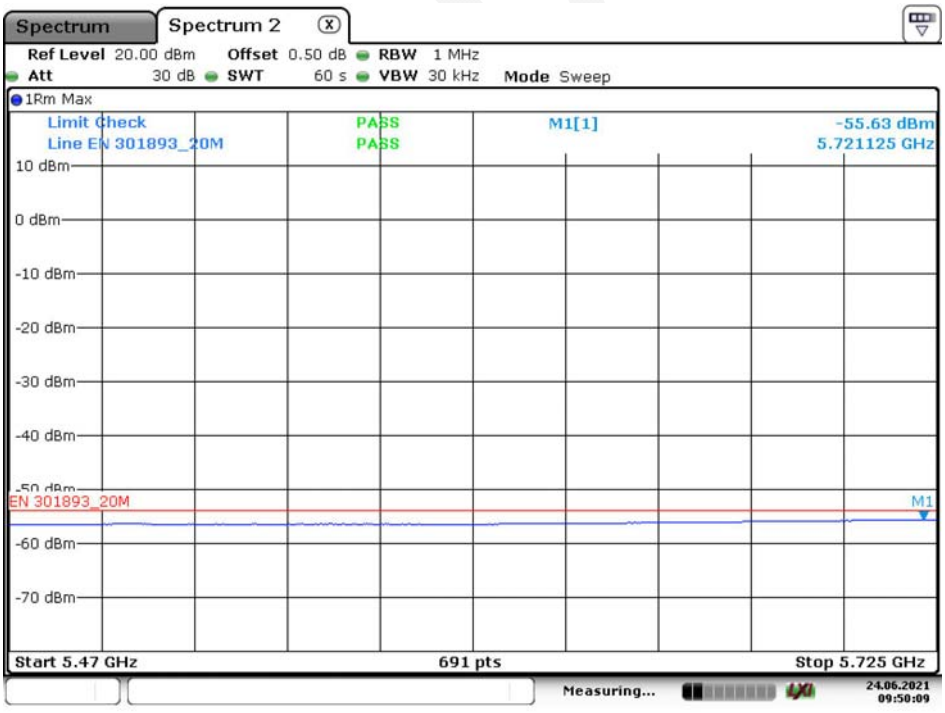
5.2G N40-H-2

Date: 24.JUN.2021 10:25:36

5.2G AC20-L-1

Date: 24.JUN.2021 09:51:31

5.2G AC20-L-2



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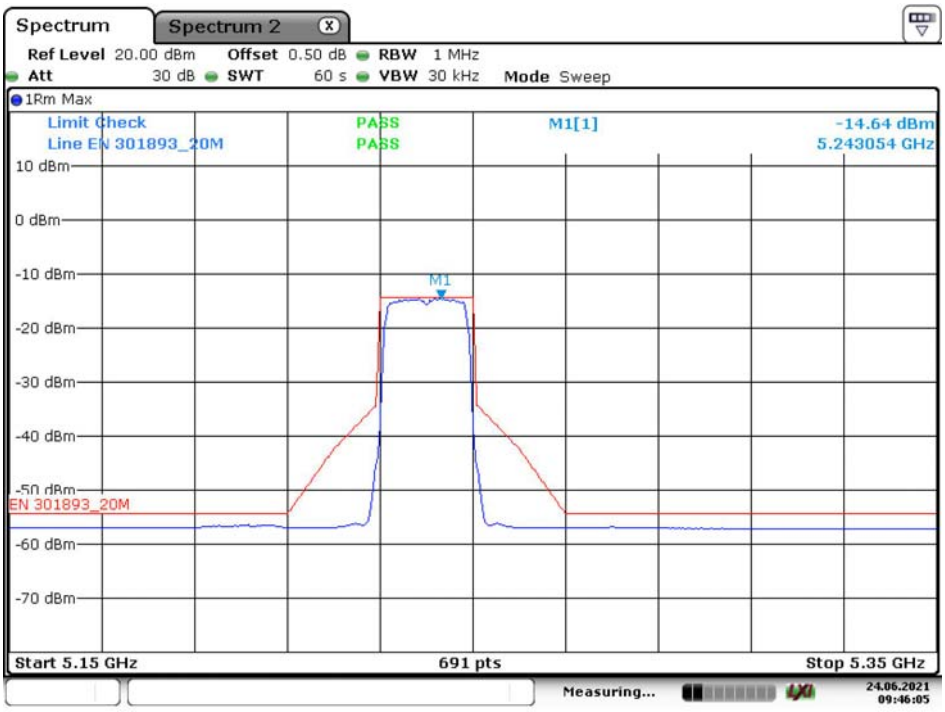

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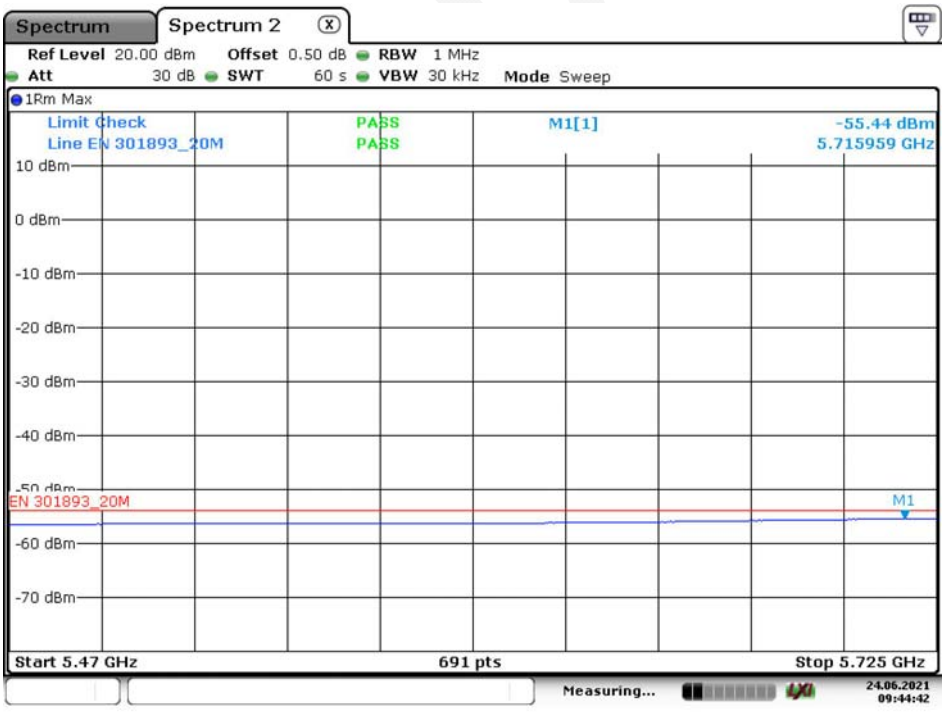

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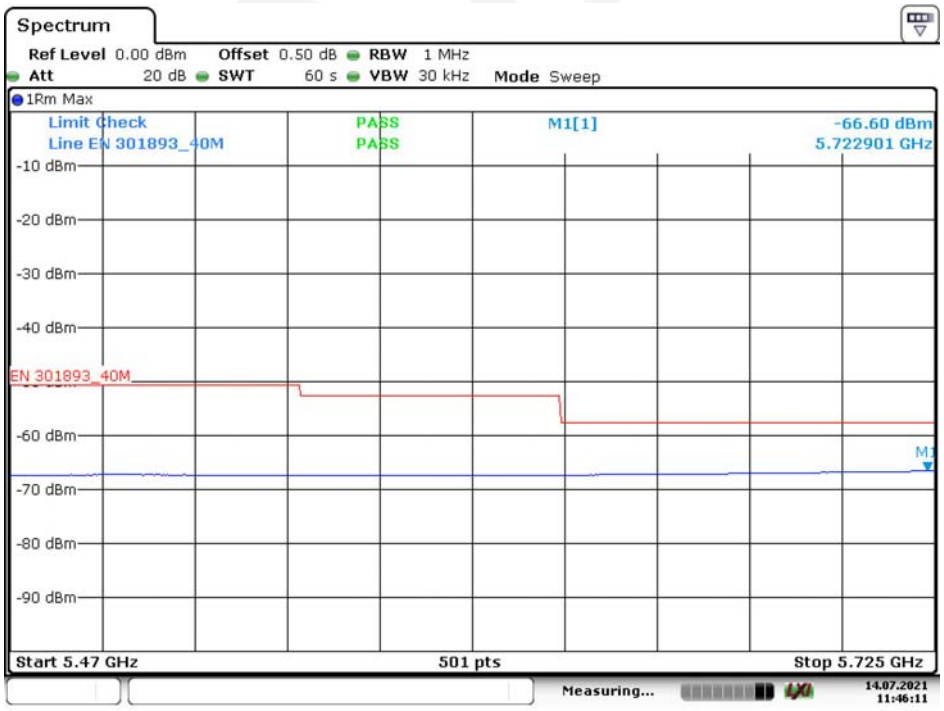

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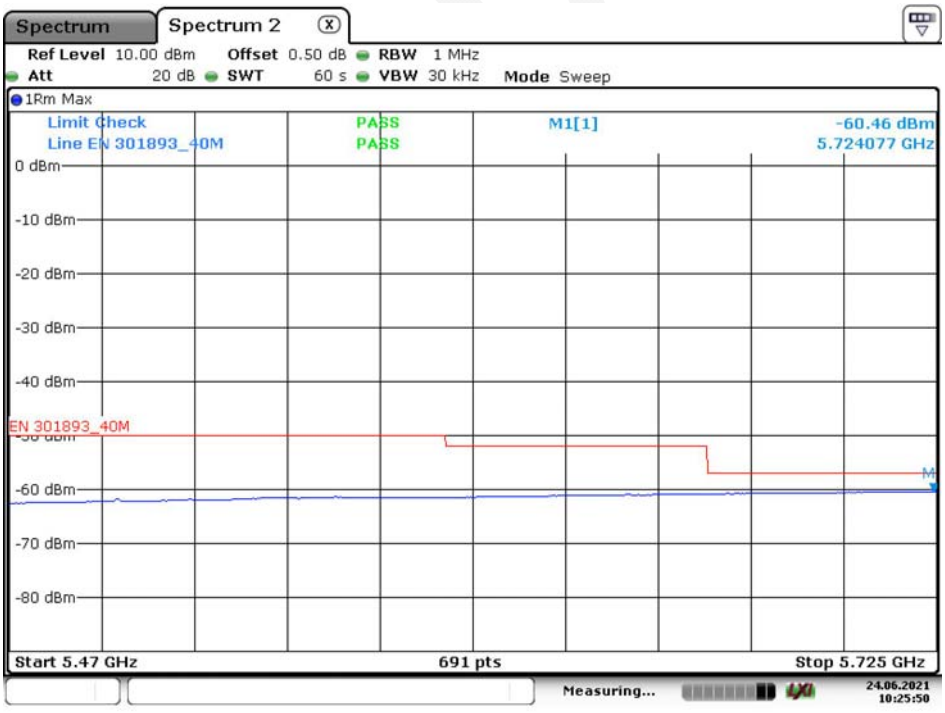
5.2G AC40-H-2



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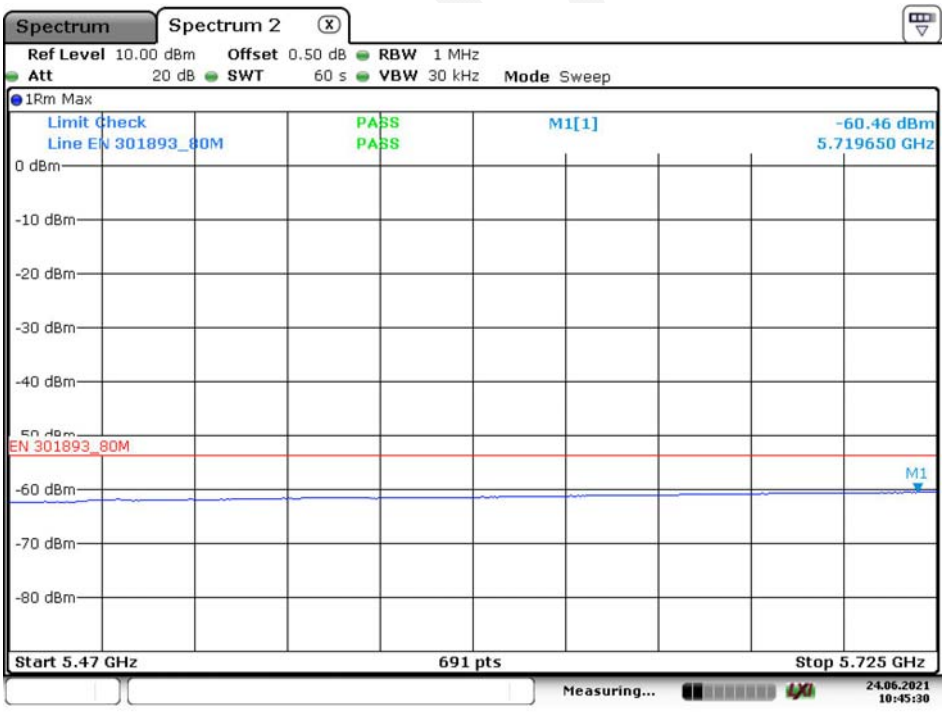

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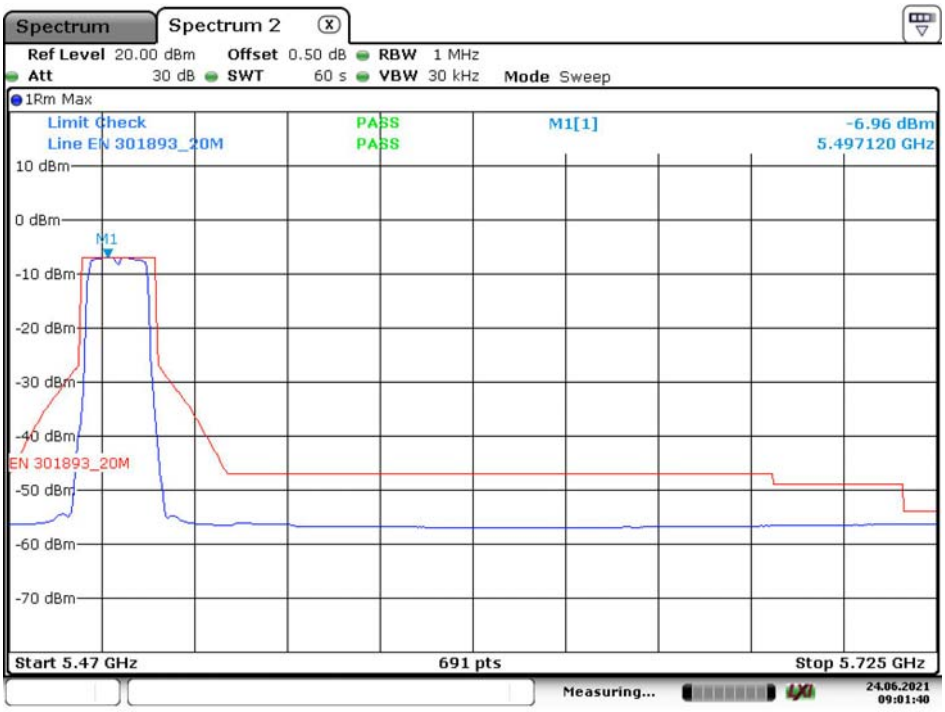

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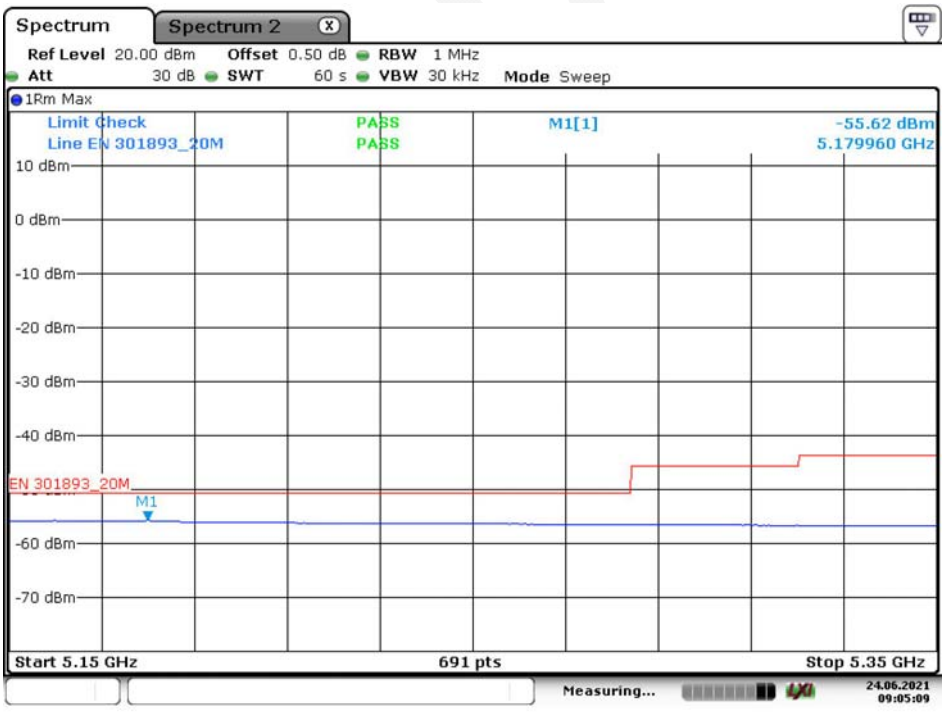

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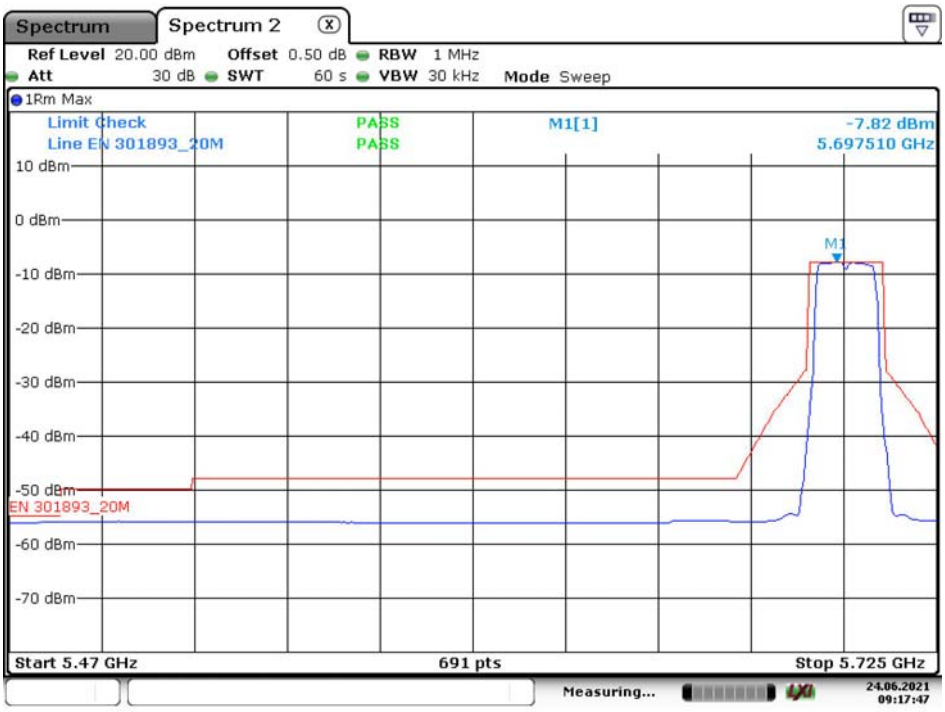

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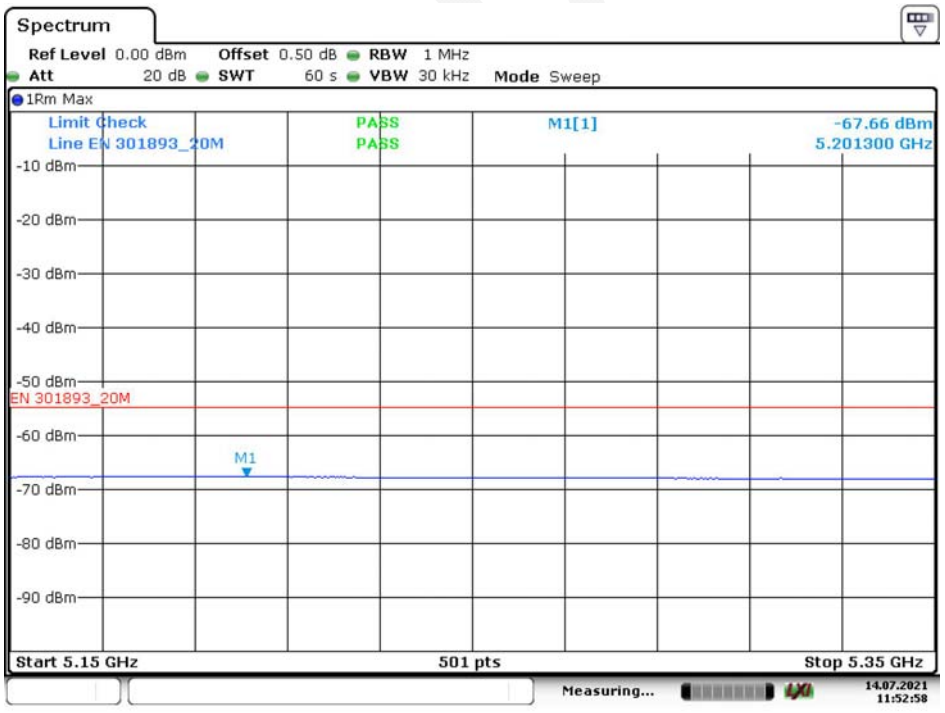

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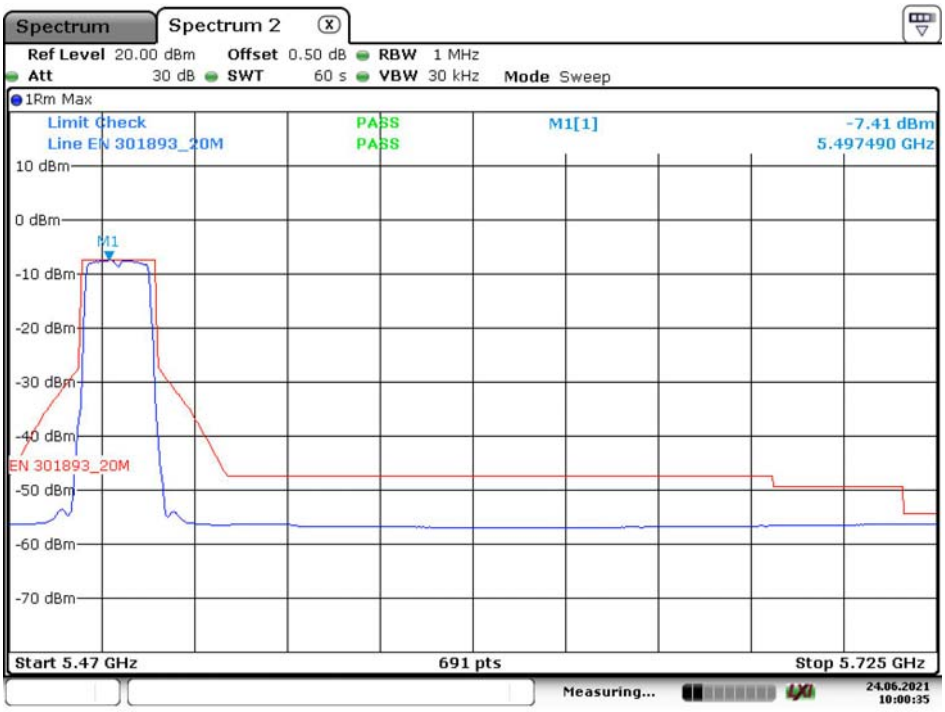

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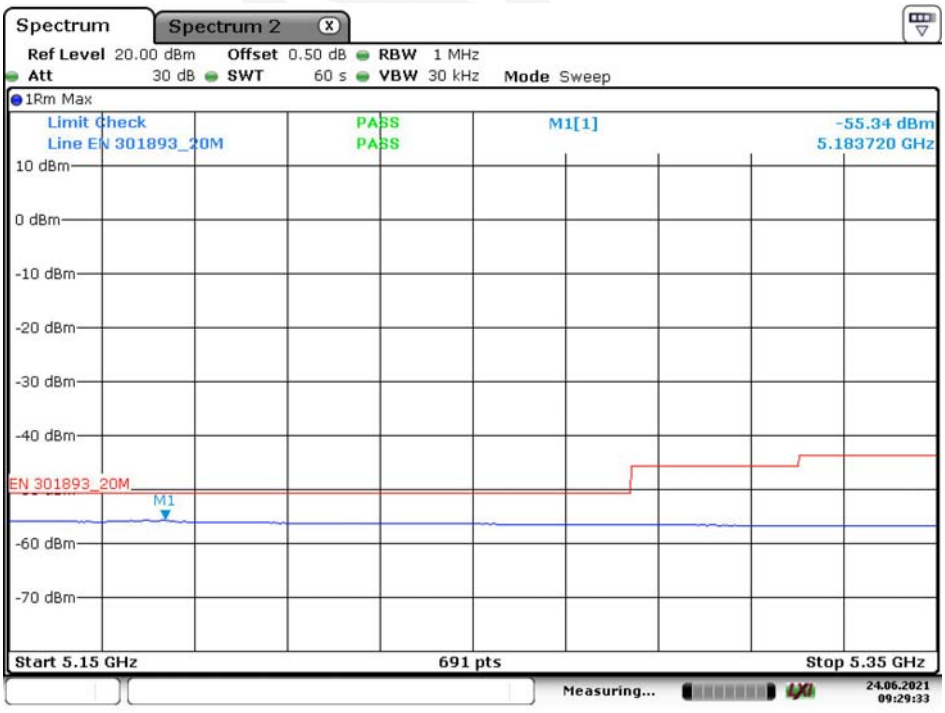

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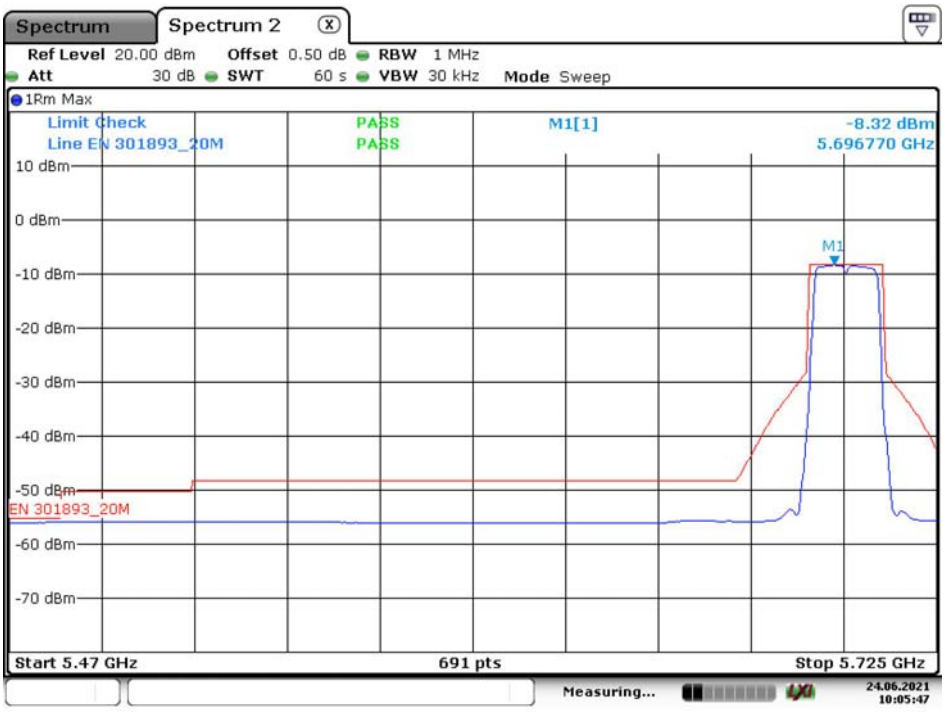

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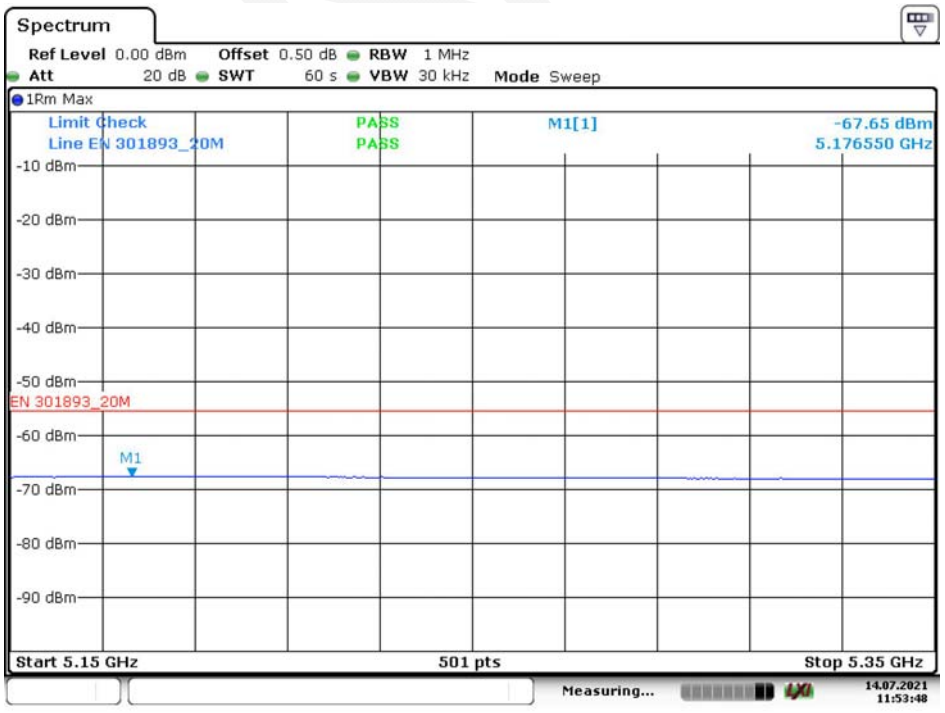

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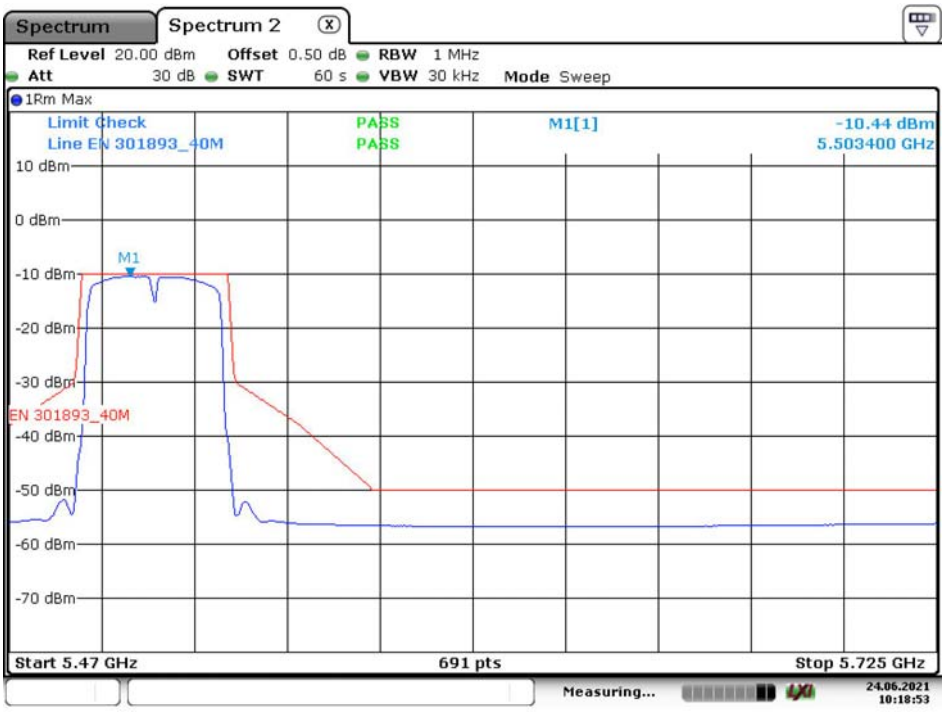

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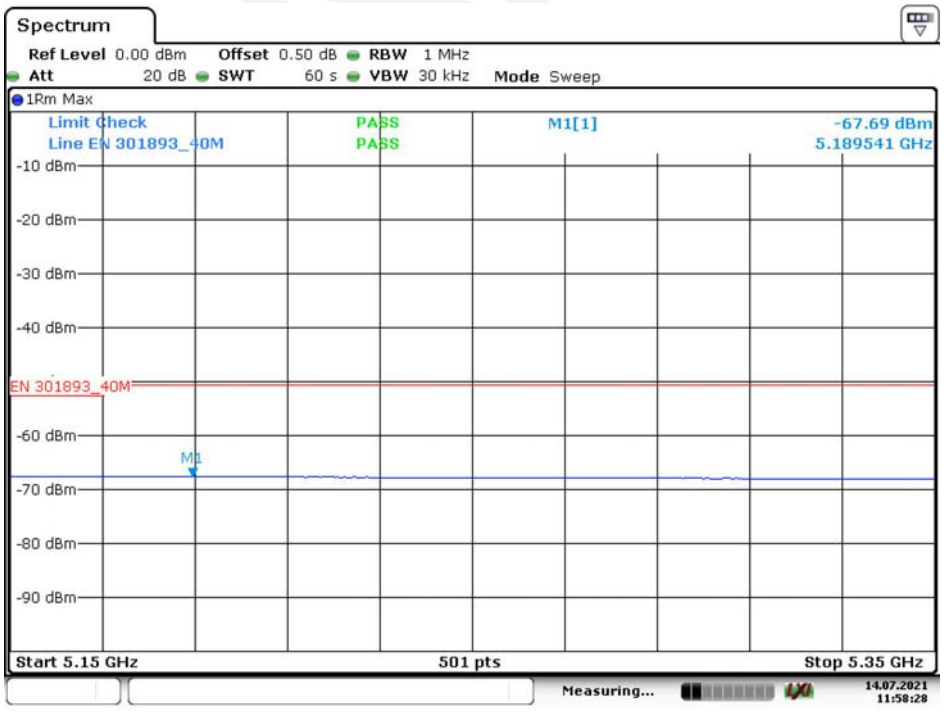

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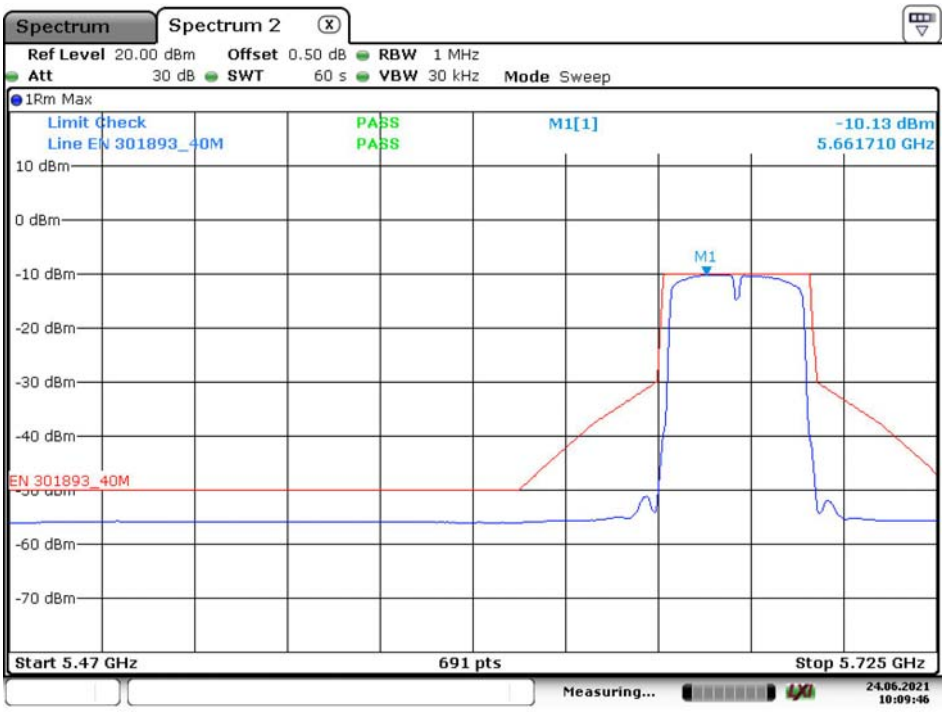

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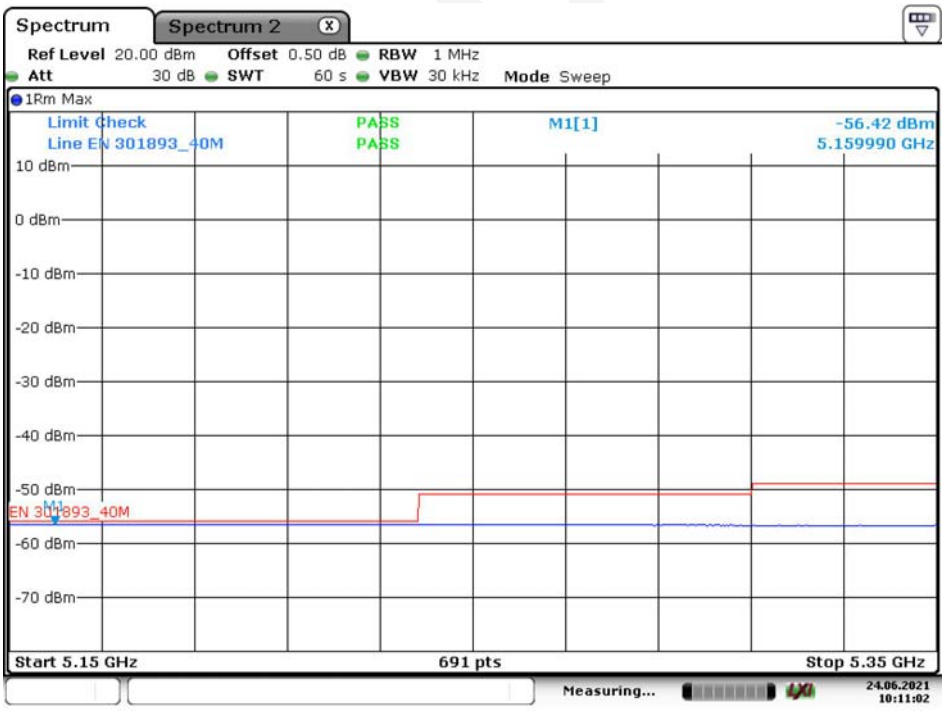

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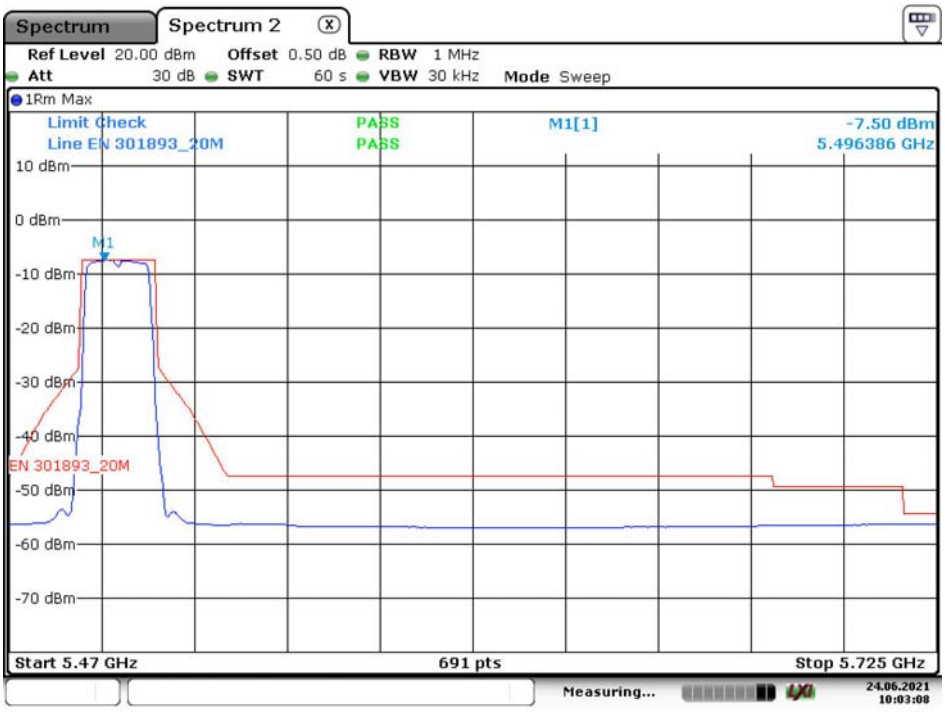

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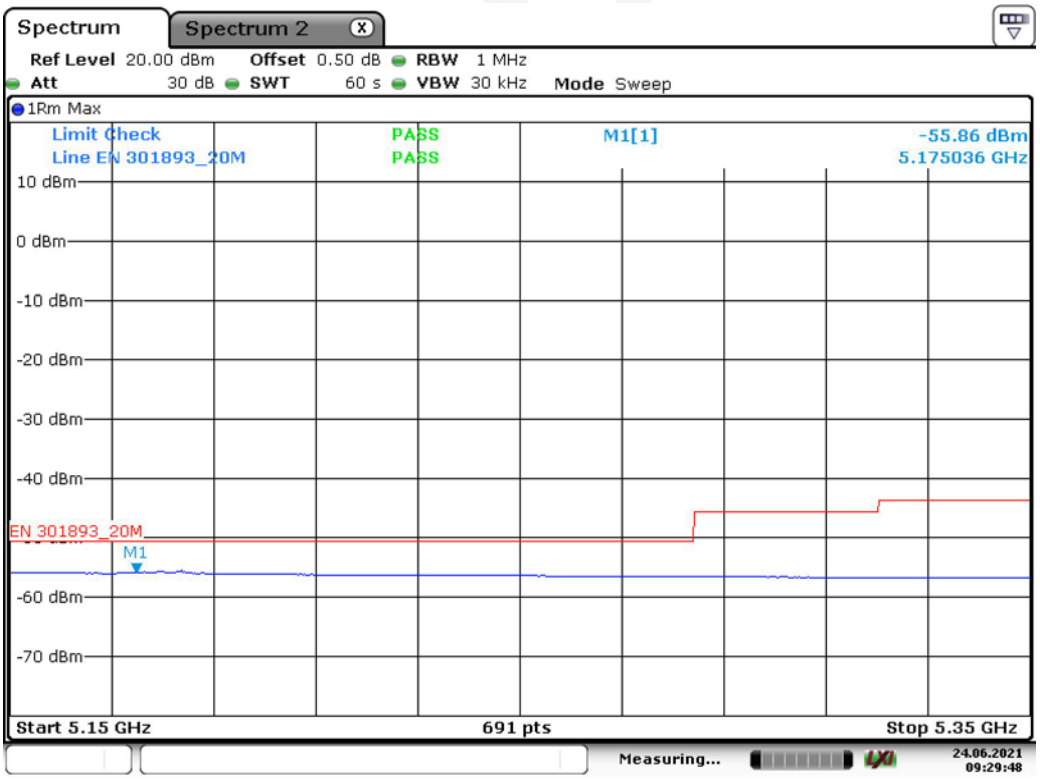

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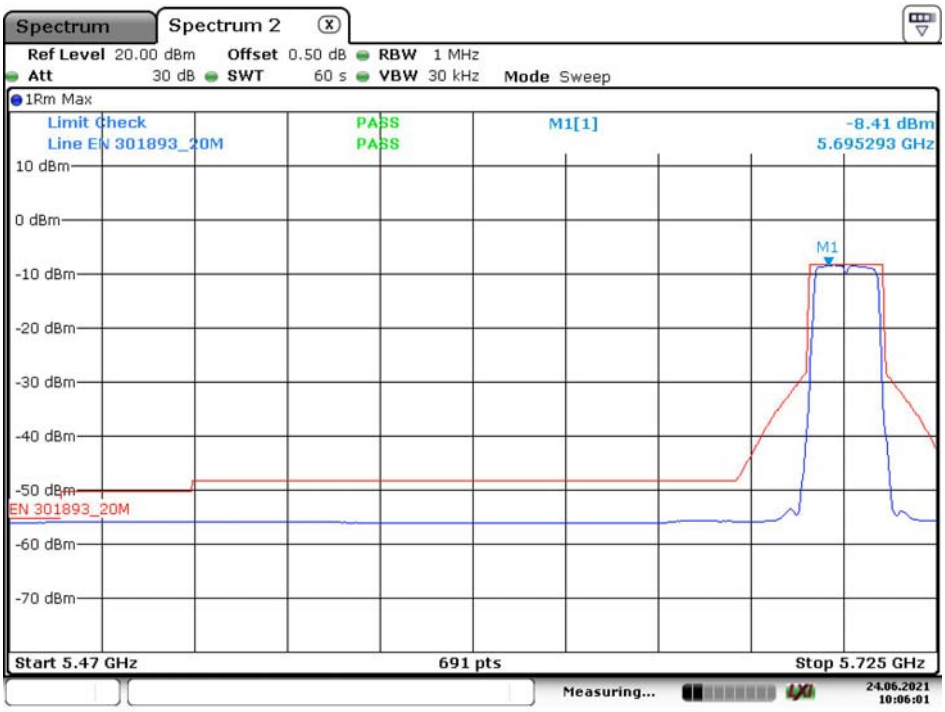

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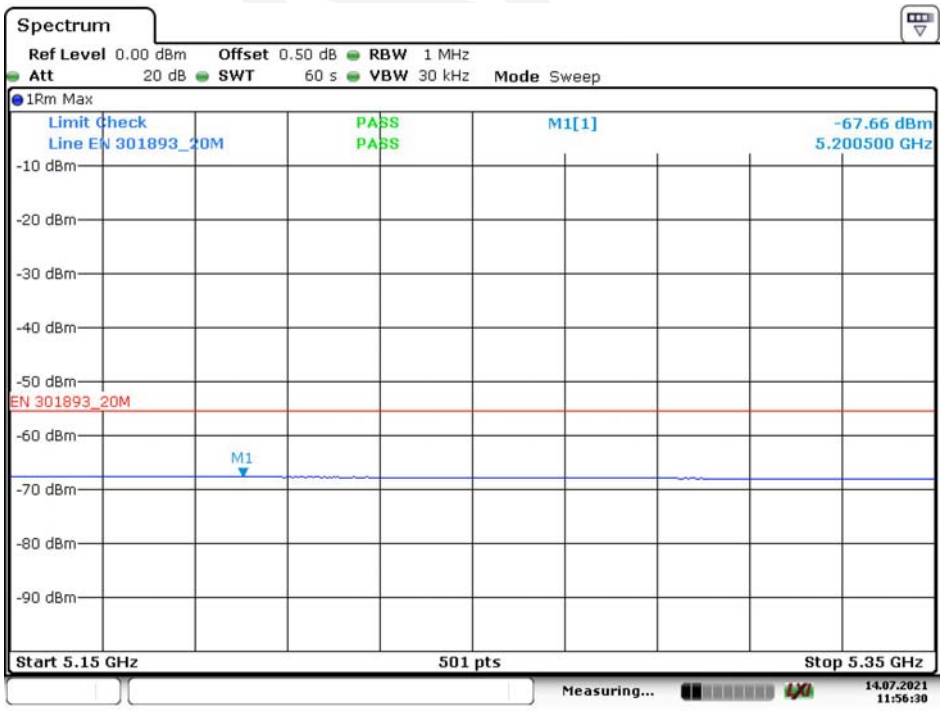

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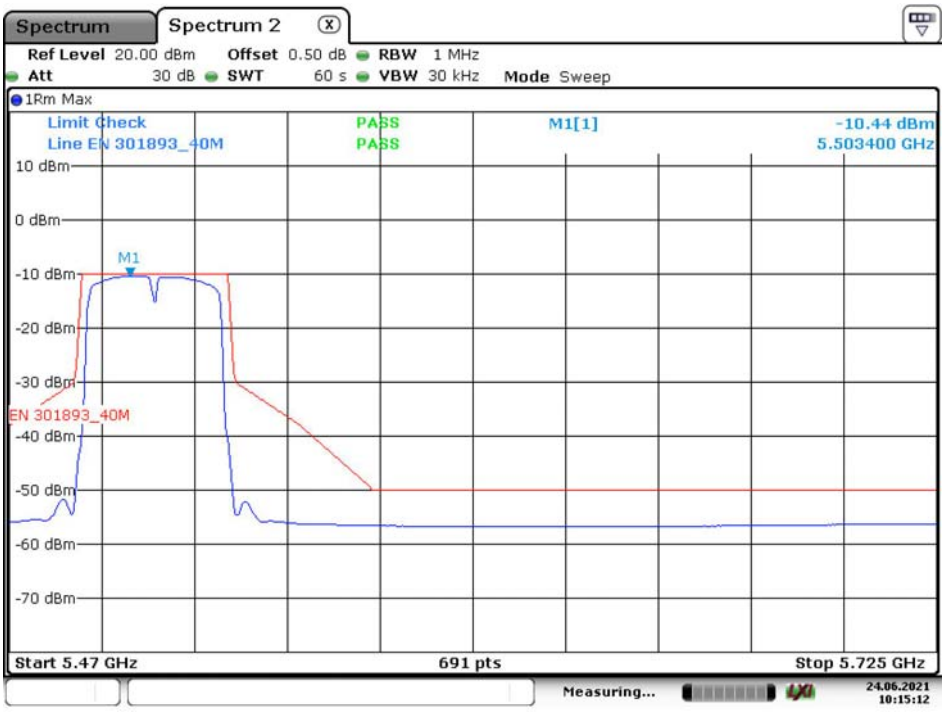

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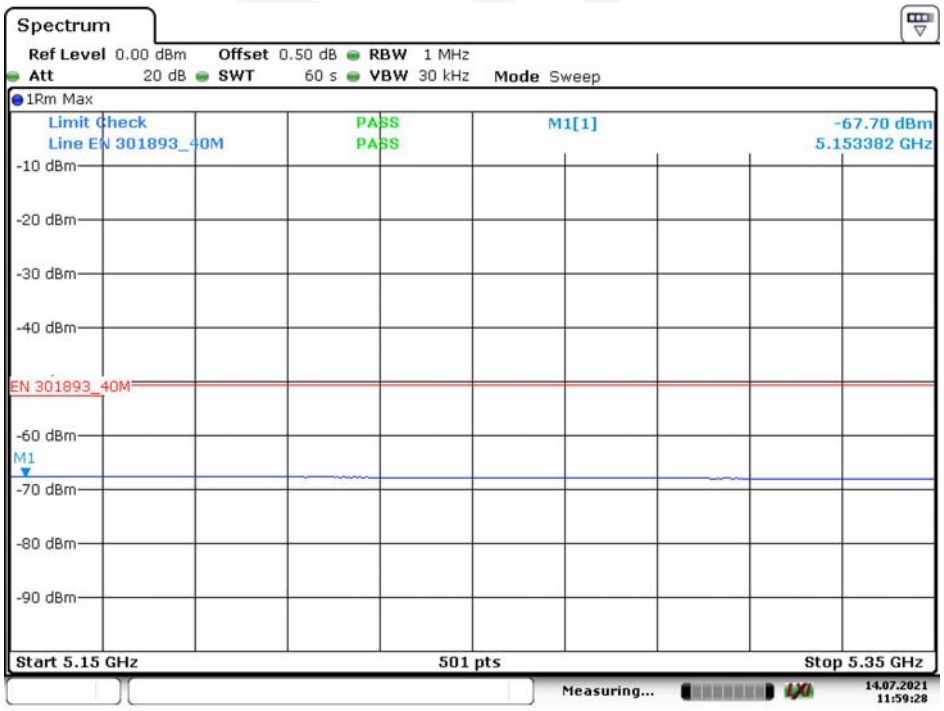

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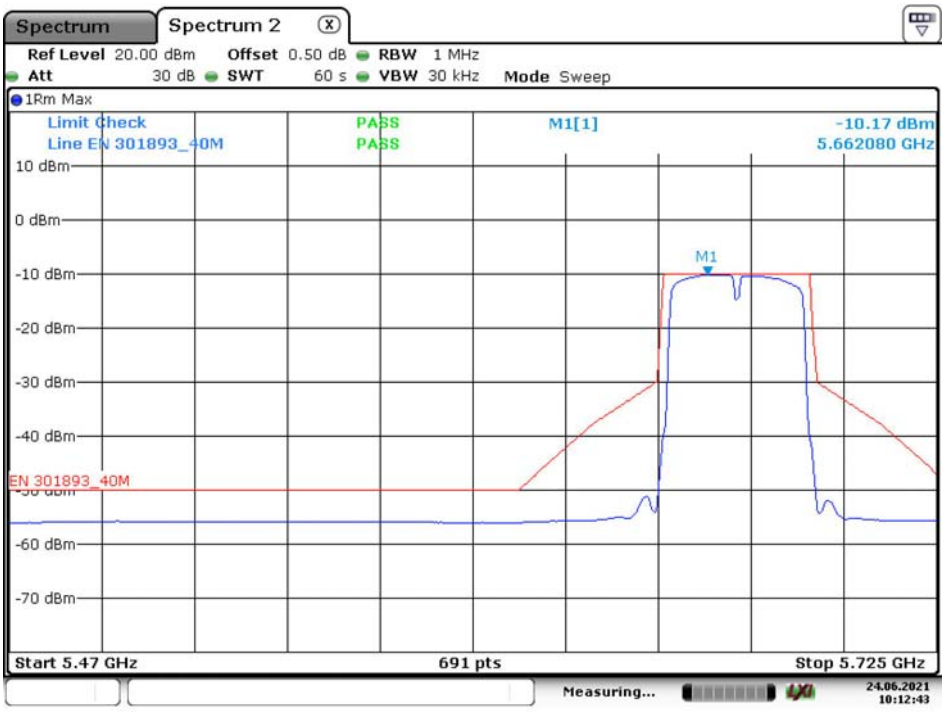

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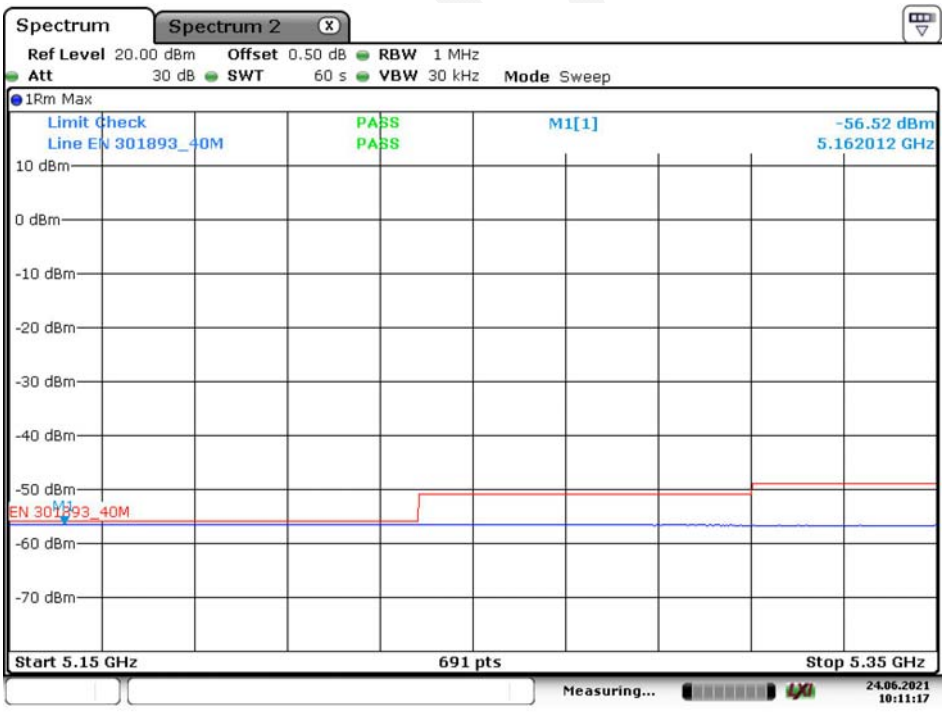

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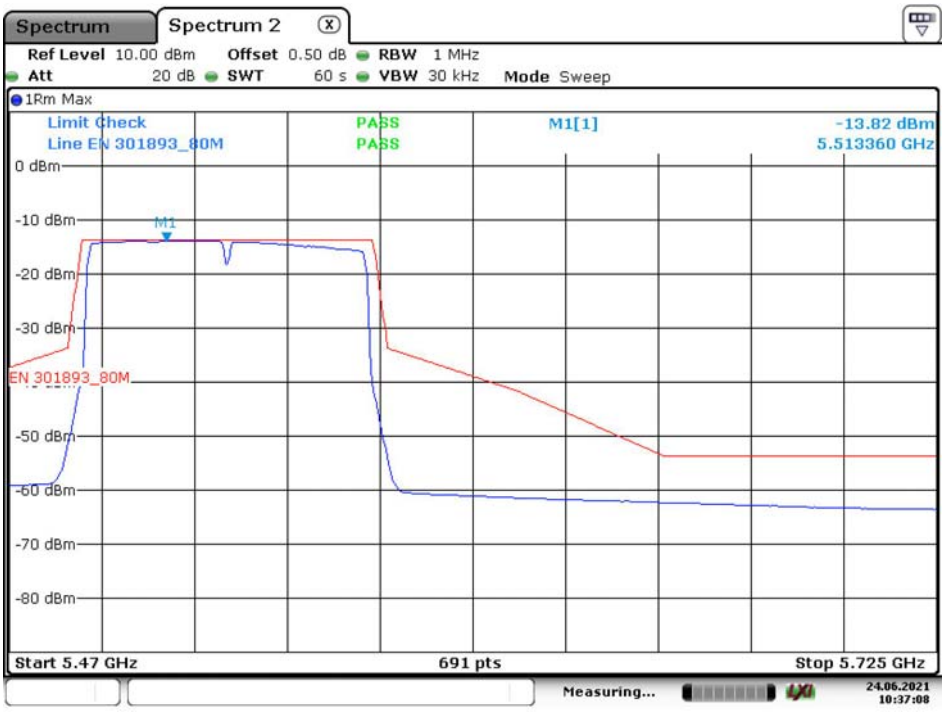
5.6G AC80-L-2



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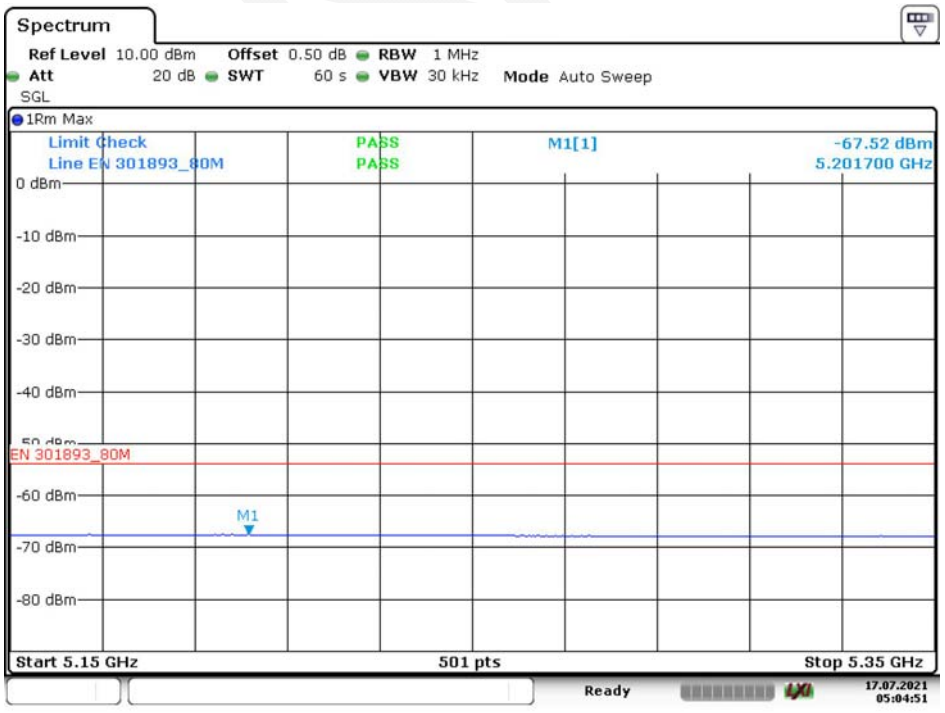

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6 – RECEIVER SPURIOUS EMISSIONS

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

Pre-scan all test modes and the worst case as below.

Please refer to following table:

802.11 a low channel **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)			
1769.00	H	36.59	-67.51	11.01	0.70	-57.20	-47.00	10.20
1769.00	V	39.62	-65.08	11.01	0.70	-54.77	-47.00	7.77
1842.00	H	35.63	-68.04	11.39	0.82	-57.47	-47.00	10.47
1842.00	V	35.17	-68.98	11.39	0.82	-58.41	-47.00	11.41
64.40	H	43.87	-65.89	-7.97	0.23	-74.09	-57.00	17.09
36.30	V	37.50	-44.79	-24.62	0.23	-69.64	-57.00	12.64

802.11 a high channel **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)			
1360.00	H	36.88	-66.67	8.72	1.20	-59.15	-47.00	12.15
1360.00	V	37.16	-67.11	8.72	1.20	-59.59	-47.00	12.59
2000.00	H	37.43	-65.40	12.00	1.13	-54.53	-47.00	7.53
2000.00	V	37.59	-65.64	12.00	1.13	-54.77	-47.00	7.77
64.40	H	43.83	-65.93	-7.97	0.23	-74.13	-57.00	17.13
36.30	V	38.12	-44.17	-24.62	0.23	-69.02	-57.00	12.02

802.11 n20 low channel **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)			
1564.00	H	35.59	-69.13	9.88	0.92	-60.17	-47.00	13.17
1564.00	V	35.48	-69.66	9.88	0.92	-60.70	-47.00	13.70
1769.00	H	39.54	-64.56	11.01	0.70	-54.25	-47.00	7.25
1769.00	V	37.25	-67.45	11.01	0.70	-57.14	-47.00	10.14
64.40	H	44.05	-65.71	-7.97	0.23	-73.91	-57.00	16.91
36.30	V	37.66	-44.63	-24.62	0.23	-69.48	-57.00	12.48

802.11 n20 high channel **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)			
1420.00	H	36.53	-67.15	9.10	1.23	-59.28	-47.00	12.28
1420.00	V	36.81	-67.37	9.10	1.23	-59.50	-47.00	12.50
2415.00	H	36.95	-65.58	12.42	1.28	-54.44	-47.00	7.44
2415.00	V	36.49	-66.21	12.42	1.28	-55.07	-47.00	8.07
64.40	H	43.80	-65.96	-7.97	0.23	-74.16	-57.00	17.16
36.30	V	37.60	-44.69	-24.62	0.23	-69.54	-57.00	12.54

802.11 n40 low channel **5190 MHz**

Frequenc y (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)			
1740.00	H	27.28	-76.64	10.92	0.72	-66.44	-47.00	19.44
1740.00	V	26.59	-77.93	10.92	0.72	-67.73	-47.00	20.73
2410.00	H	28.05	-74.45	12.38	1.29	-63.36	-47.00	16.36
2410.00	V	27.69	-74.99	12.38	1.29	-63.90	-47.00	16.90
64.40	H	43.89	-65.87	-7.97	0.23	-74.07	-57.00	17.07
36.30	V	37.79	-44.50	-24.62	0.23	-69.35	-57.00	12.35

802.11 n40 high channel **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)			
1740.00	H	31.90	-72.02	10.92	0.72	-61.82	-47.00	14.82
1890.00	V	27.46	-75.84	11.73	0.99	-65.10	-47.00	18.10
2410.00	H	27.04	-75.46	12.38	1.29	-64.37	-47.00	17.37
2410.00	V	29.29	-73.39	12.38	1.29	-62.30	-47.00	15.30
64.40	H	43.89	-65.87	-7.97	0.23	-74.07	-57.00	17.07
36.30	V	37.23	-45.06	-24.62	0.23	-69.91	-57.00	12.91

802.11 ac20 low channel **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)			
1625.00	H	36.47	-67.93	10.28	0.70	-58.35	-47.00	11.35
1625.00	V	36.81	-68.19	10.28	0.70	-58.61	-47.00	11.61
1789.00	H	37.25	-66.97	11.07	0.69	-56.59	-47.00	9.59
1789.00	V	37.64	-67.18	11.07	0.69	-56.80	-47.00	9.80
64.40	H	44.07	-65.69	-7.97	0.23	-73.89	-57.00	16.89
36.30	V	37.25	-45.04	-24.62	0.23	-69.89	-57.00	12.89

802.11 ac20 high channel **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)			
1236.00	H	37.26	-66.02	7.66	1.13	-59.49	-47.00	12.49
1236.00	V	37.64	-66.66	7.66	1.13	-60.13	-47.00	13.13
2410.00	H	29.68	-72.82	12.38	1.29	-61.73	-47.00	14.73
2410.00	V	29.31	-73.37	12.38	1.29	-62.28	-47.00	15.28
64.40	H	43.90	-65.86	-7.97	0.23	-74.06	-57.00	17.06
36.30	V	37.52	-44.77	-24.62	0.23	-69.62	-57.00	12.62

802.11ac40 low channel **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)			
1476.00	H	37.98	-66.52	9.38	1.31	-58.45	-47.00	11.45
1476.00	V	37.65	-67.07	9.38	1.31	-59.00	-47.00	12.00
1845.00	H	36.48	-67.15	11.42	0.83	-56.56	-47.00	9.56
1845.00	V	36.56	-67.53	11.42	0.83	-56.94	-47.00	9.94
64.40	H	44.01	-65.75	-7.97	0.23	-73.95	-57.00	16.95
36.30	V	37.63	-44.66	-24.62	0.23	-69.51	-57.00	12.51

802.11 ac40 high channel **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)			
1654.00	H	37.35	-66.77	10.48	0.72	-57.01	-47.00	10.01
1654.00	V	36.89	-67.83	10.48	0.72	-58.07	-47.00	11.07
1821.00	H	36.84	-67.14	11.25	0.75	-56.64	-47.00	9.64
1821.00	V	36.24	-68.28	11.25	0.75	-57.78	-47.00	10.78
64.40	H	43.81	-65.95	-7.97	0.23	-74.15	-57.00	17.15
36.30	V	37.46	-44.83	-24.62	0.23	-69.68	-57.00	12.68

802.11 ac80 low channel **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)			
1652.00	H	36.25	-67.89	10.46	0.72	-58.15	-47.00	11.15
1652.00	V	36.49	-68.25	10.46	0.72	-58.51	-47.00	11.51
2410.00	H	29.16	-73.34	12.38	1.29	-62.25	-47.00	15.25
2410.00	V	29.34	-73.34	12.38	1.29	-62.25	-47.00	15.25
64.40	H	44.12	-65.64	-7.97	0.23	-73.84	-57.00	16.84
36.30	V	37.49	-44.80	-24.62	0.23	-69.65	-57.00	12.65

802.11 a low channel **5500 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)			
1920.00	H	38.91	-63.91	11.84	1.04	-53.11	-47.00	6.11
1920.00	V	37.56	-65.58	11.84	1.04	-54.78	-47.00	7.78
2410.00	H	38.10	-64.40	12.38	1.29	-53.31	-47.00	6.31
2410.00	V	37.84	-64.84	12.38	1.29	-53.75	-47.00	6.75
64.40	H	43.88	-65.88	-7.97	0.23	-74.08	-57.00	17.08
36.30	V	37.61	-44.68	-24.62	0.23	-69.53	-57.00	12.53

802.11 a high channel **5700 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)			
1340.00	H	38.47	-65.17	8.58	1.19	-57.78	-47.00	10.78
1340.00	V	39.56	-64.86	8.58	1.19	-57.47	-47.00	10.47
2250.00	H	38.41	-63.59	11.00	1.19	-53.78	-47.00	6.78
2250.00	V	37.51	-64.39	11.00	1.19	-54.58	-47.00	7.58
64.40	H	44.07	-65.69	-7.97	0.23	-73.89	-57.00	16.89
36.30	V	37.71	-44.58	-24.62	0.23	-69.43	-57.00	12.43

802.11 n20 low channel **5500 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)			
1570.00	H	38.46	-66.24	9.92	0.88	-57.20	-47.00	10.20
1570.00	V	39.05	-66.10	9.92	0.88	-57.06	-47.00	10.06
2410.00	H	37.22	-65.28	12.38	1.29	-54.19	-47.00	7.19
2410.00	V	38.02	-64.66	12.38	1.29	-53.57	-47.00	6.57
64.40	H	43.61	-66.15	-7.97	0.23	-74.35	-57.00	17.35
36.30	V	37.53	-44.76	-24.62	0.23	-69.61	-57.00	12.61

802.11 n20 high channel **5700 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)			
1920.00	H	38.75	-64.07	11.84	1.04	-53.27	-47.00	6.27
1920.00	V	38.45	-64.69	11.84	1.04	-53.89	-47.00	6.89
1320.00	H	36.89	-66.83	8.44	1.19	-59.58	-47.00	12.58
1320.00	V	37.02	-67.54	8.44	1.19	-60.29	-47.00	13.29
64.40	H	43.88	-65.88	-7.97	0.23	-74.08	-57.00	17.08
36.30	V	37.70	-44.59	-24.62	0.23	-69.44	-57.00	12.44

802.11 n40 low channel **5510 MHz**

Frequenc y (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)			
1674.00	H	36.75	-67.18	10.62	0.73	-57.29	-47.00	10.29
1674.00	V	37.24	-67.29	10.62	0.73	-57.40	-47.00	10.40
2241.00	H	36.79	-65.18	10.96	1.18	-55.40	-47.00	8.40
2241.00	V	36.21	-65.66	10.96	1.18	-55.88	-47.00	8.88
64.40	H	43.89	-65.87	-7.97	0.23	-74.07	-57.00	17.07
36.30	V	37.27	-45.02	-24.62	0.23	-69.87	-57.00	12.87

802.11 n40 high channel **5670 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)			
1335.00	H	36.26	-67.40	8.55	1.19	-60.04	-47.00	13.04
1335.00	V	35.89	-68.56	8.55	1.19	-61.20	-47.00	14.20
1476.00	H	36.75	-67.75	9.38	1.31	-59.68	-47.00	12.68
1476.00	V	36.51	-68.21	9.38	1.31	-60.14	-47.00	13.14
64.40	H	43.62	-66.14	-7.97	0.23	-74.34	-57.00	17.34
36.30	V	37.46	-44.83	-24.62	0.23	-69.68	-57.00	12.68

802.11 ac20 low channel 5500 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)			
1463.00	H	36.31	-68.00	9.32	1.29	-59.97	-47.00	12.97
1463.00	V	36.25	-68.34	9.32	1.29	-60.31	-47.00	13.31
1578.00	H	36.74	-67.95	9.97	0.83	-58.81	-47.00	11.81
1578.00	V	36.78	-68.40	9.97	0.83	-59.26	-47.00	12.26
64.40	H	43.65	-66.11	-7.97	0.23	-74.31	-57.00	17.31
36.30	V	37.24	-45.05	-24.62	0.23	-69.90	-57.00	12.90

802.11 ac20 high channel 5700 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)			
1247.00	H	36.75	-66.62	7.77	1.14	-59.99	-47.00	12.99
1247.00	V	36.59	-67.78	7.77	1.14	-61.15	-47.00	14.15
1584.00	H	37.02	-67.65	10.00	0.79	-58.44	-47.00	11.44
1584.00	V	36.46	-68.73	10.00	0.79	-59.52	-47.00	12.52
64.40	H	44.07	-65.69	-7.97	0.23	-73.89	-57.00	16.89
36.30	V	37.25	-45.04	-24.62	0.23	-69.89	-57.00	12.89

802.11ac40 low channel 5510 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)			
1125.00	H	36.99	-66.64	7.38	1.04	-60.30	-47.00	13.30
1125.00	V	36.57	-67.63	7.38	1.04	-61.29	-47.00	14.29
1346.00	H	36.87	-66.74	8.62	1.19	-59.31	-47.00	12.31
1346.00	V	36.74	-67.63	8.62	1.19	-60.20	-47.00	13.20
64.40	H	44.09	-65.67	-7.97	0.23	-73.87	-57.00	16.87
36.30	V	37.55	-44.74	-24.62	0.23	-69.59	-57.00	12.59

802.11 ac40 high channel 5670 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)			
1789.00	H	36.59	-67.63	11.07	0.69	-57.25	-47.00	10.25
1789.00	V	36.26	-68.56	11.07	0.69	-58.18	-47.00	11.18
2363.00	H	36.49	-65.86	11.89	1.27	-55.24	-47.00	8.24
2363.00	V	36.82	-65.61	11.89	1.27	-54.99	-47.00	7.99
64.40	H	43.64	-66.12	-7.97	0.23	-74.32	-57.00	17.32
36.30	V	37.79	-44.50	-24.62	0.23	-69.35	-57.00	12.35

802.11 ac80 low channel 5530 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)			
1454.00	H	36.21	-67.97	9.27	1.28	-59.98	-47.00	12.98
1454.00	V	36.53	-67.98	9.27	1.28	-59.99	-47.00	12.99
1563.00	H	36.45	-68.27	9.88	0.93	-59.32	-47.00	12.32
1563.00	V	36.23	-68.90	9.88	0.93	-59.95	-47.00	12.95
64.40	H	43.90	-65.86	-7.97	0.23	-74.06	-57.00	17.06
36.30	V	37.47	-44.82	-24.62	0.23	-69.67	-57.00	12.67

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.

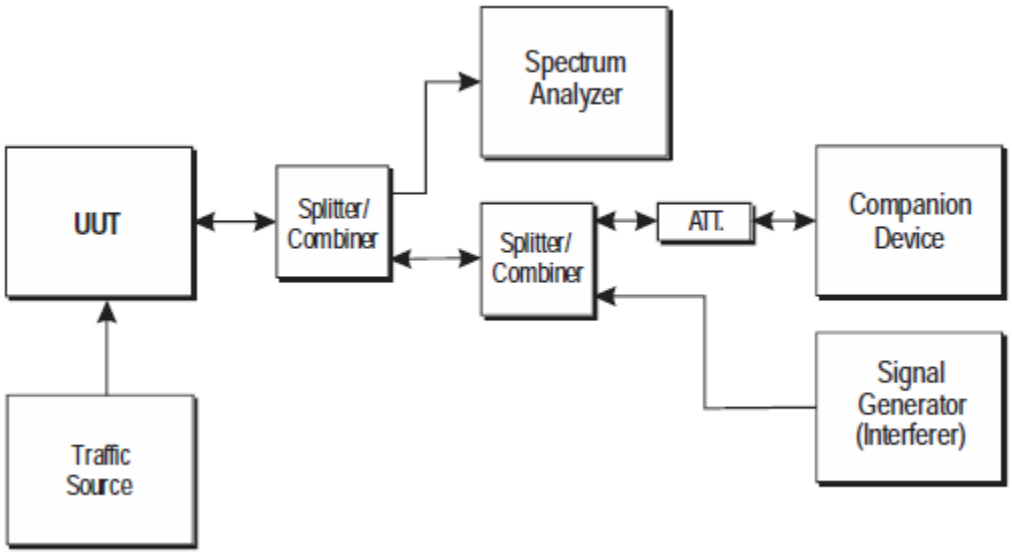
Limit

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

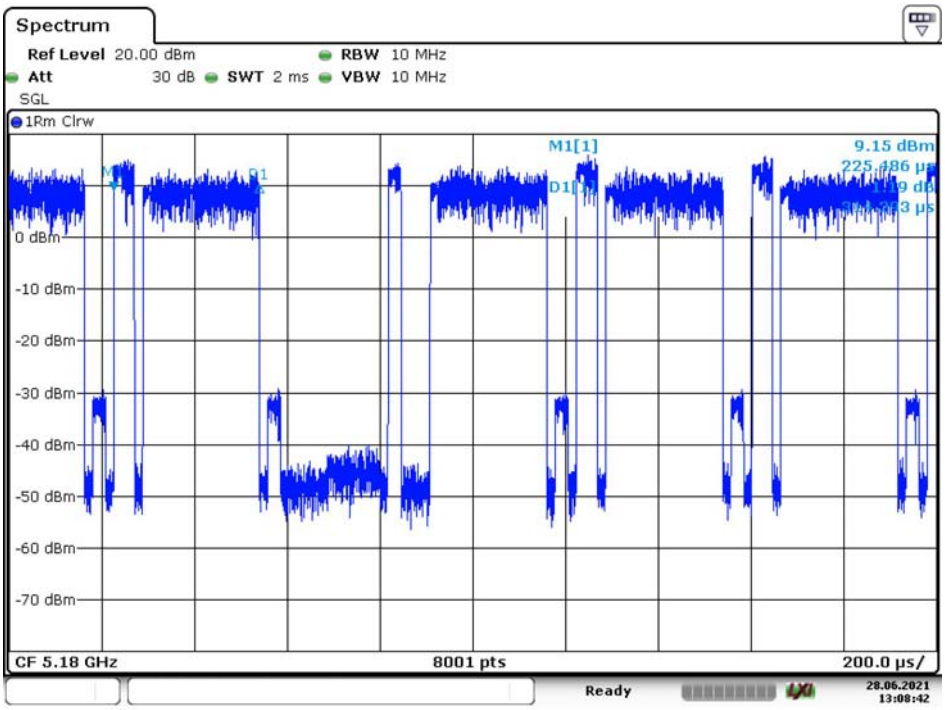
Please refer to following table:

Test Item	Bandwidth (MHz)	Result	Limit
Maximum Channel Occupancy Time (ms)	20	0.314	< 6
	40	0.735	
Minimum Clear Channel Assessment (μs)	20	18.141	> 9
	40	18.364	

Test Item	Bandwidth (MHz)	Interference signal Type	Result	Limit
Short control signalling transmissions in 50ms (ms)	20	AWGN	0.248	< 2.5
		OFDM	0.250	
		LTE	0.250	
	40	AWGN	0.329	
		OFDM	0.256	
		LTE	0.290	
Number of short control signalling transmissions in 50ms	20	AWGN	1	< 50
		OFDM	1	
		LTE	1	
	40	AWGN	1	
		OFDM	1	
		LTE	1	

Please refer to following plots:

COT-20M



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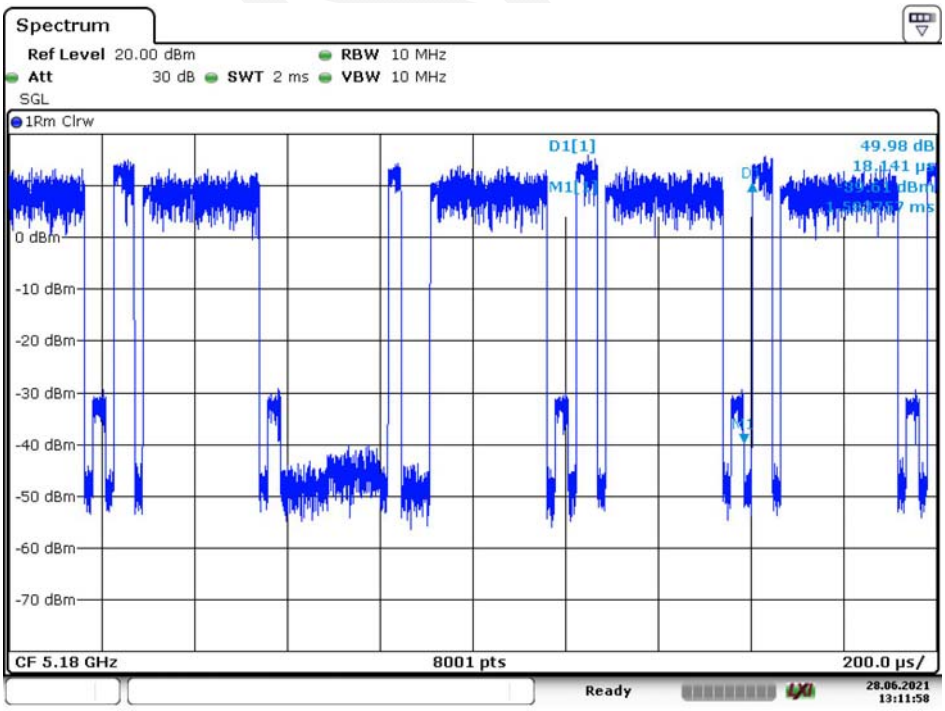
CCA-20M



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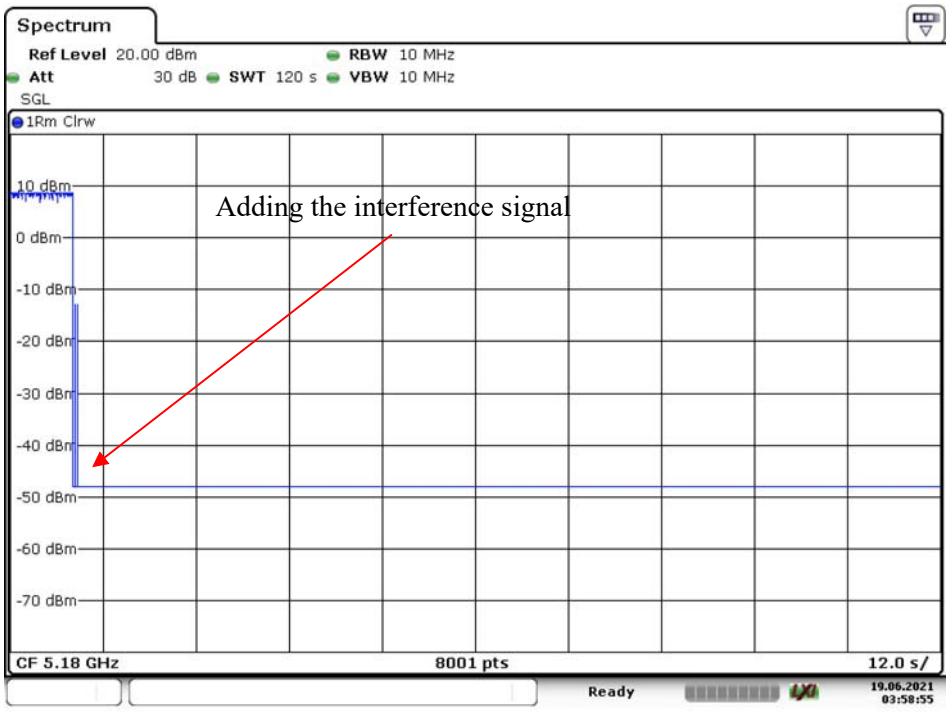
20M AWGN



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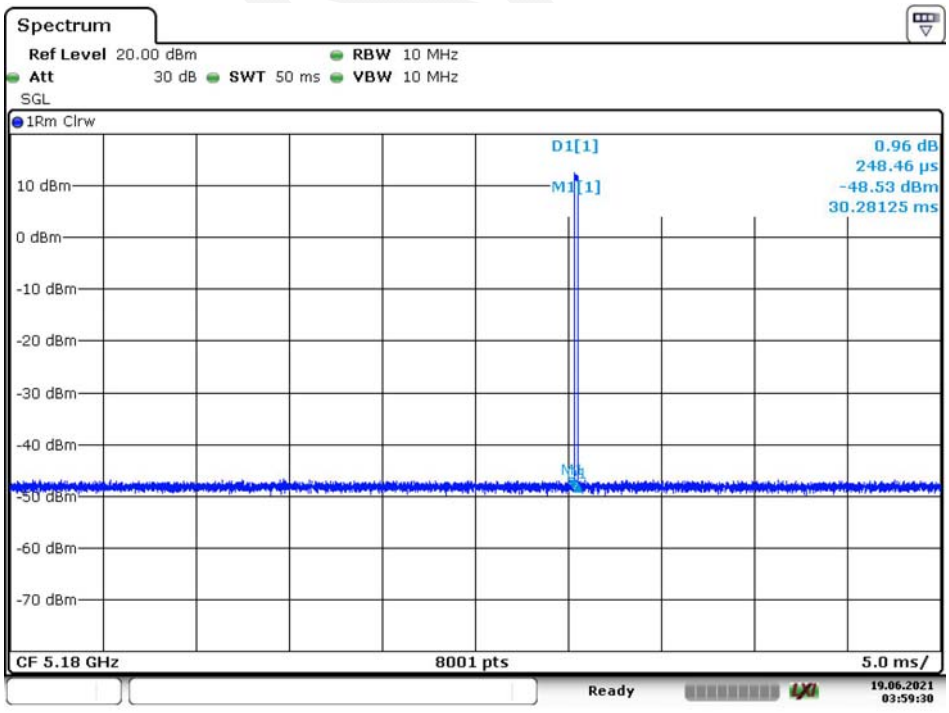
20M AWGN-SCST



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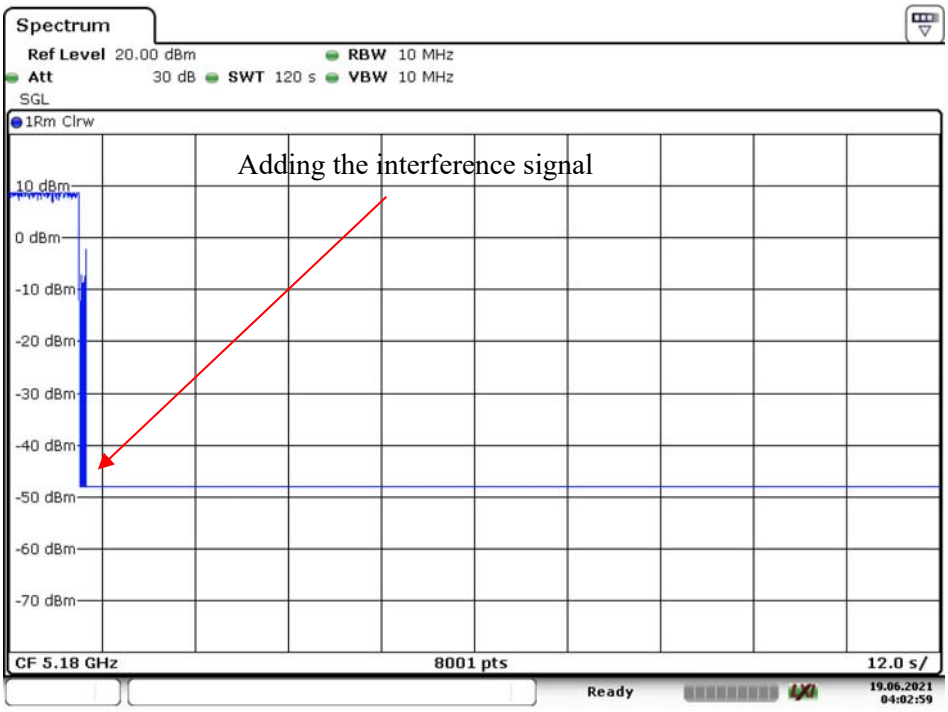
20M LTE



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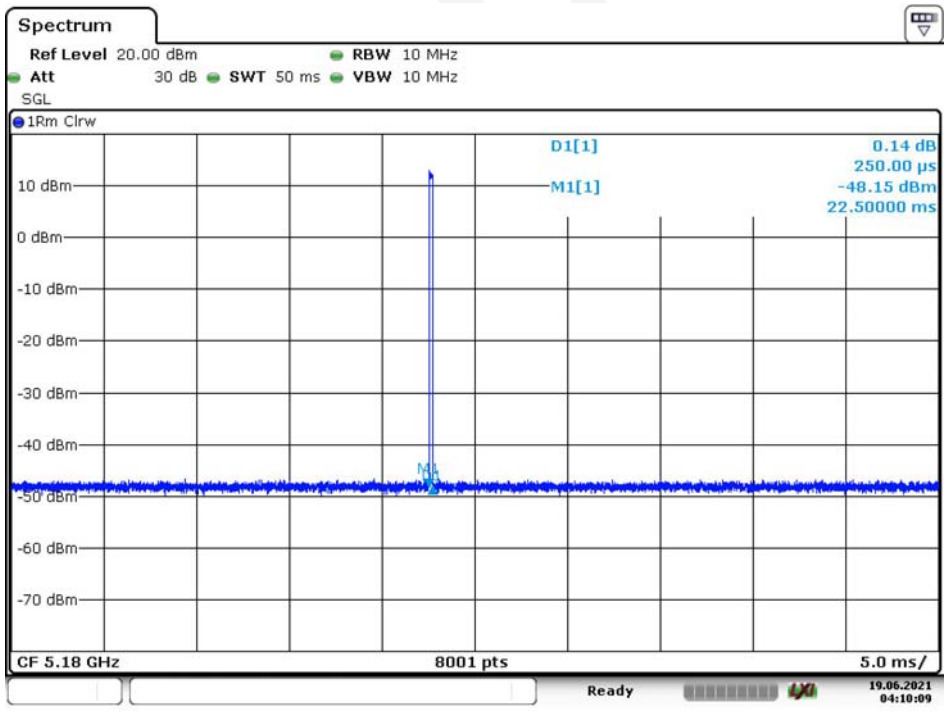
20M LTE-SCST



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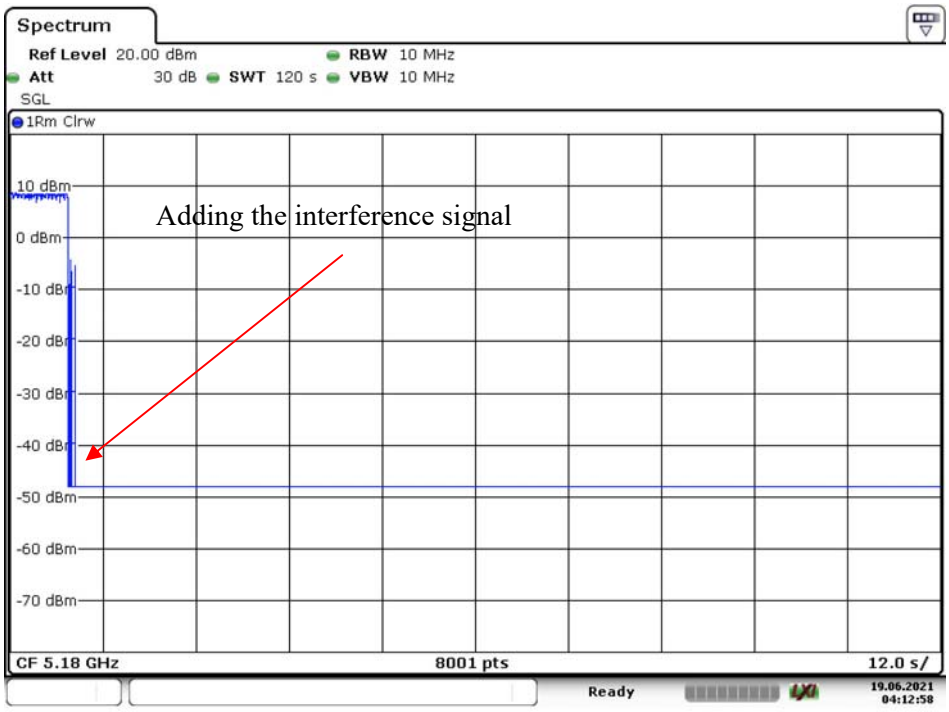
20M OFDM



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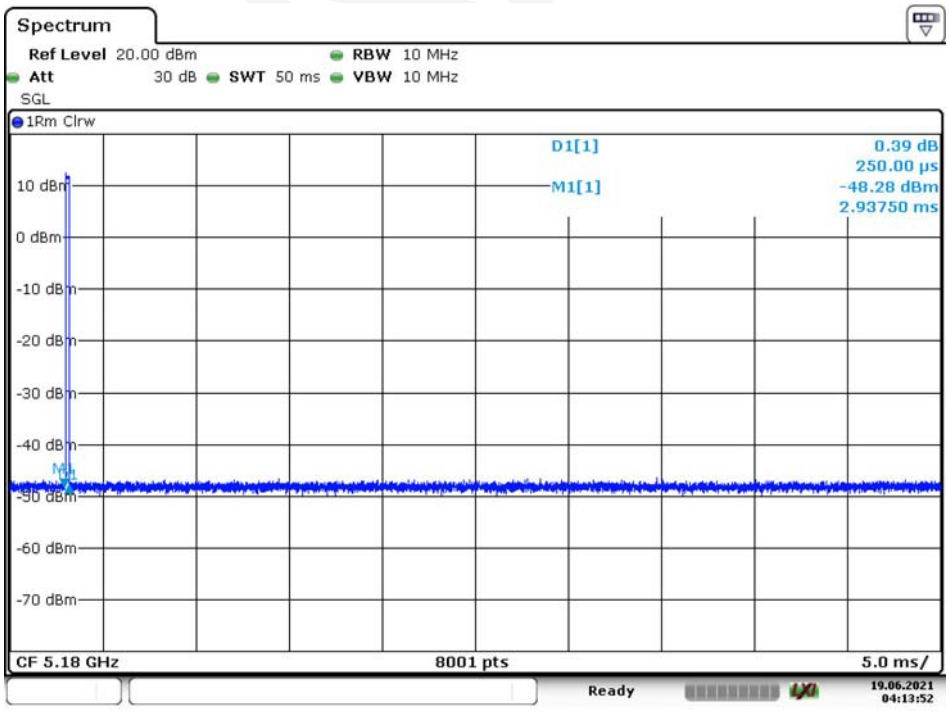
20M OFDM-SCST



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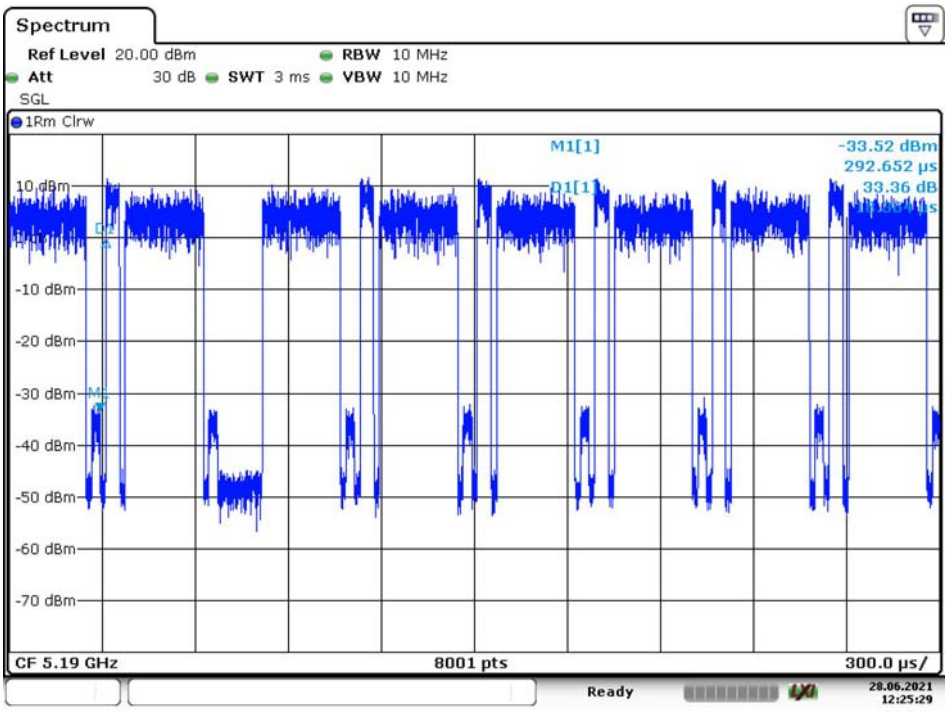
CCA-40M



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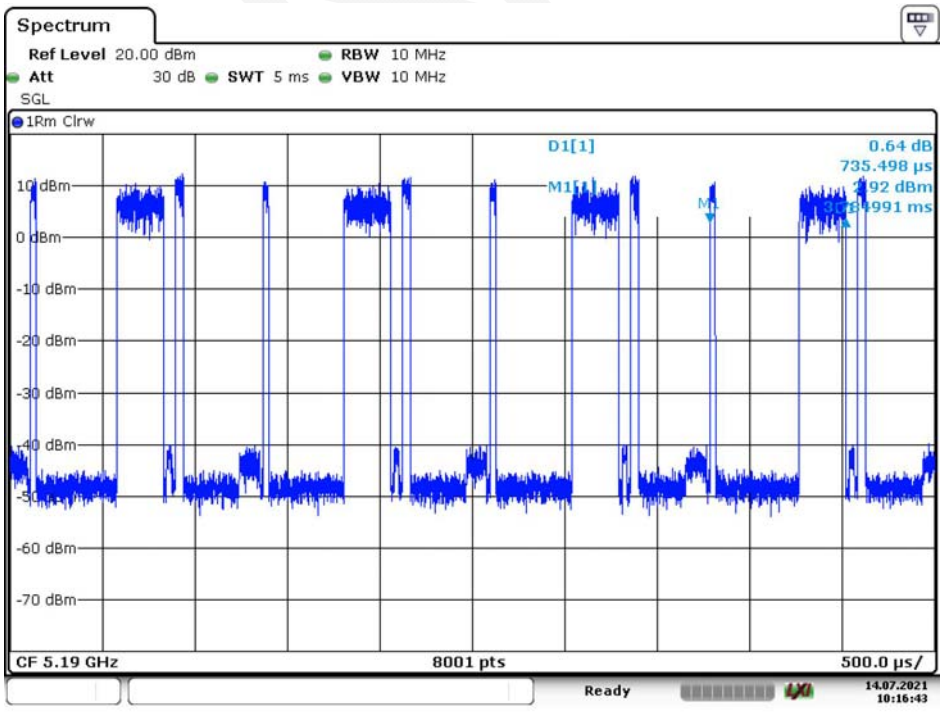
COT-40M



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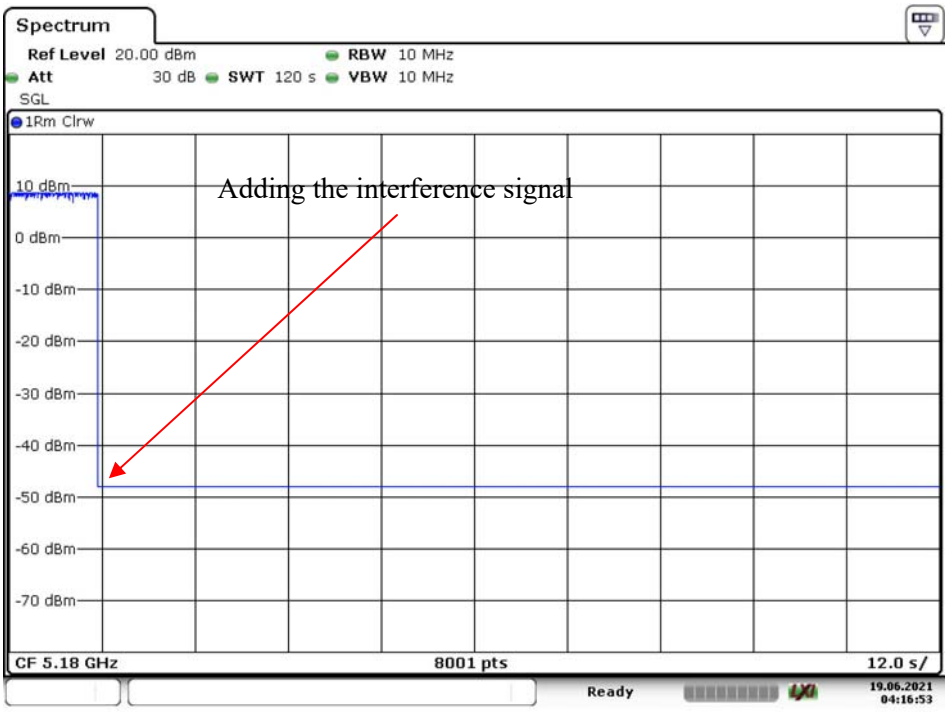
40M 5180 AWGN



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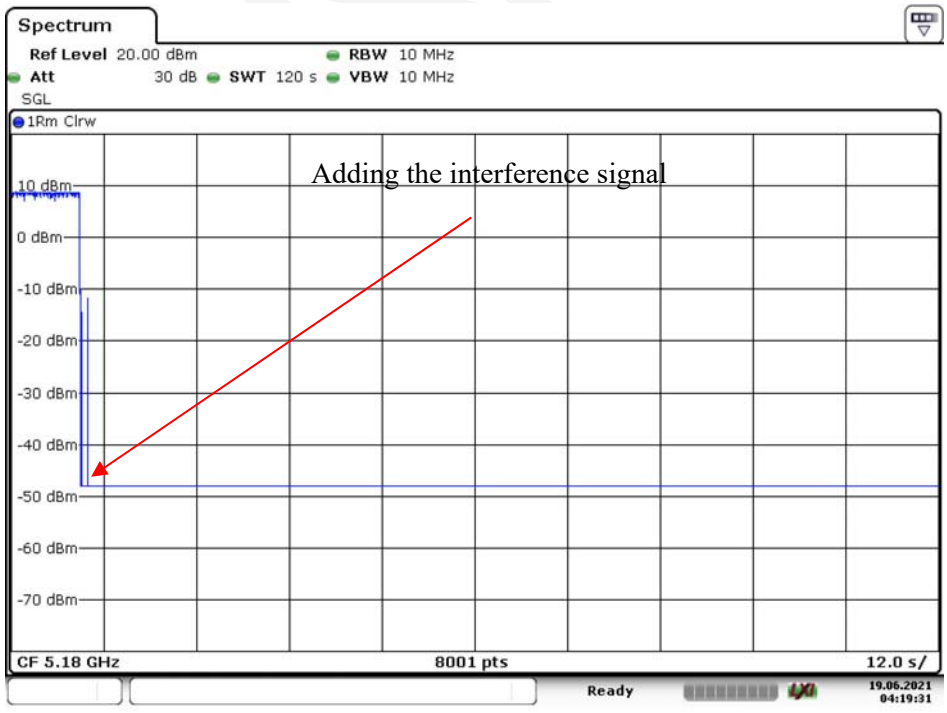
40M 5180 LTE



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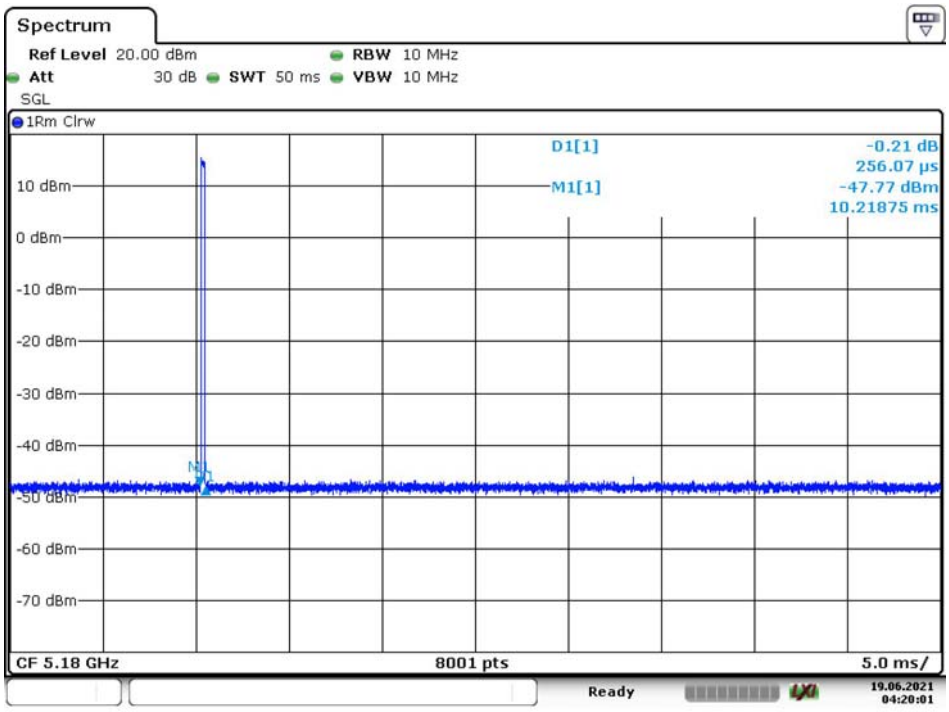

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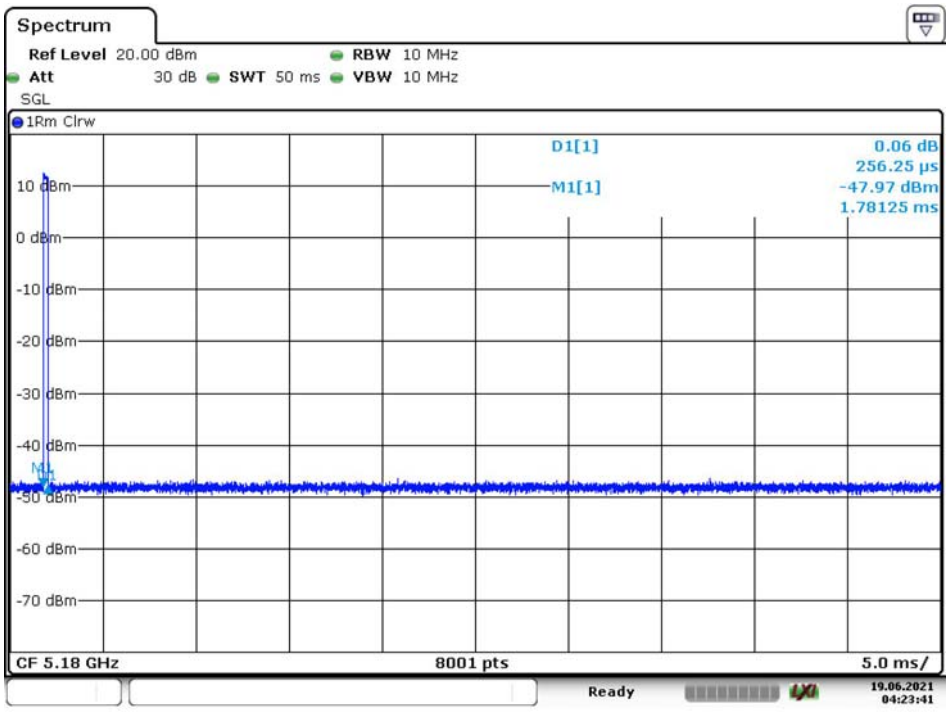
40M 5180 OFDM

Date: 19.JUN.2021 04:22:42

4

40M 5180 OFDM-SCST



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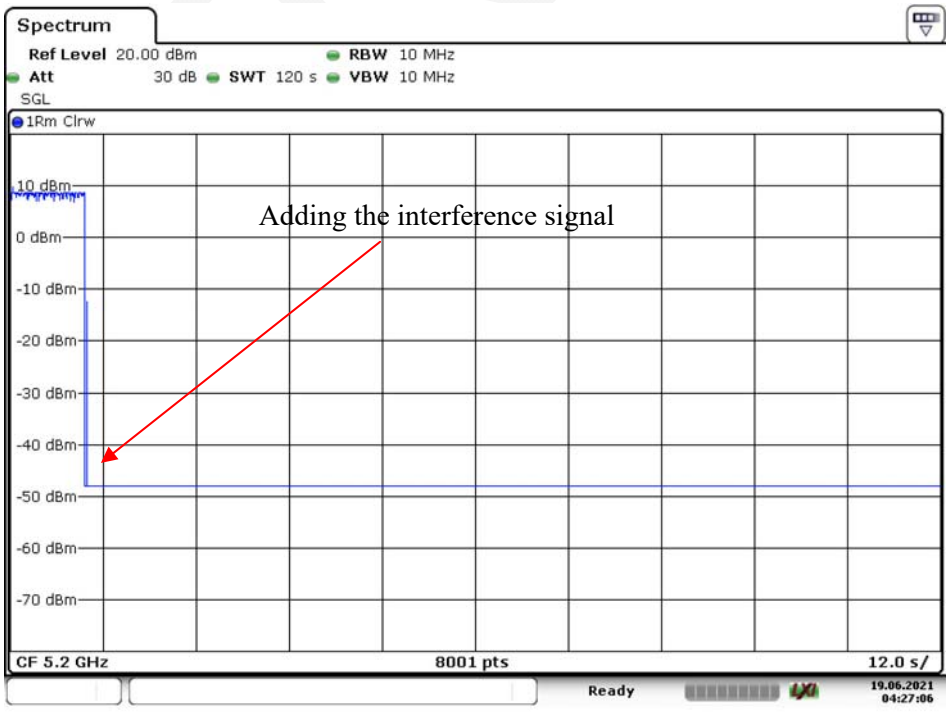
40M 5200 AWGN



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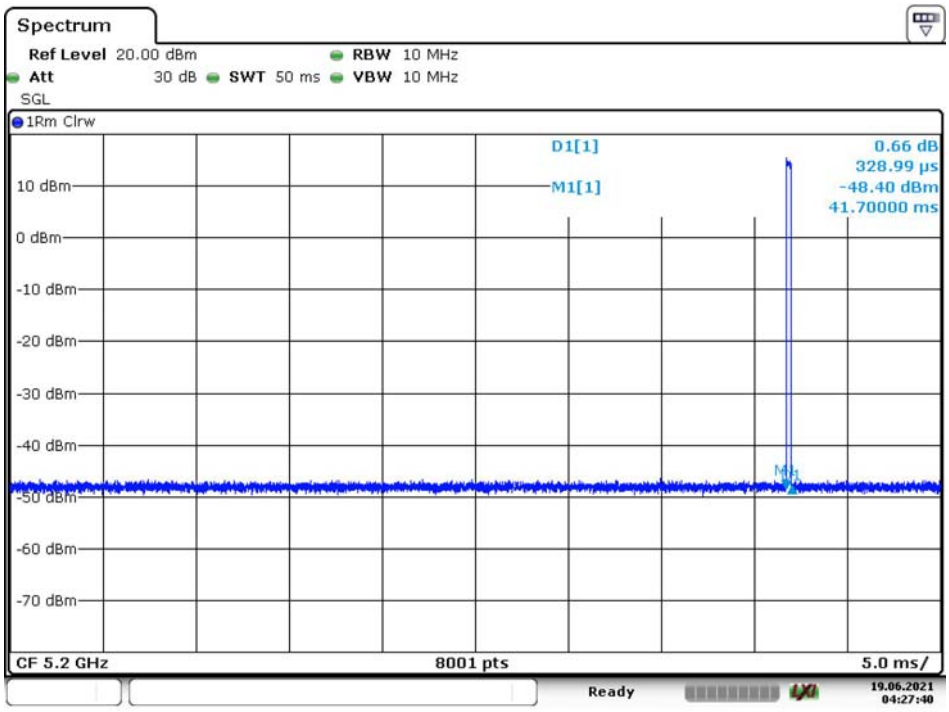
40M 5200 AWGN-SCST



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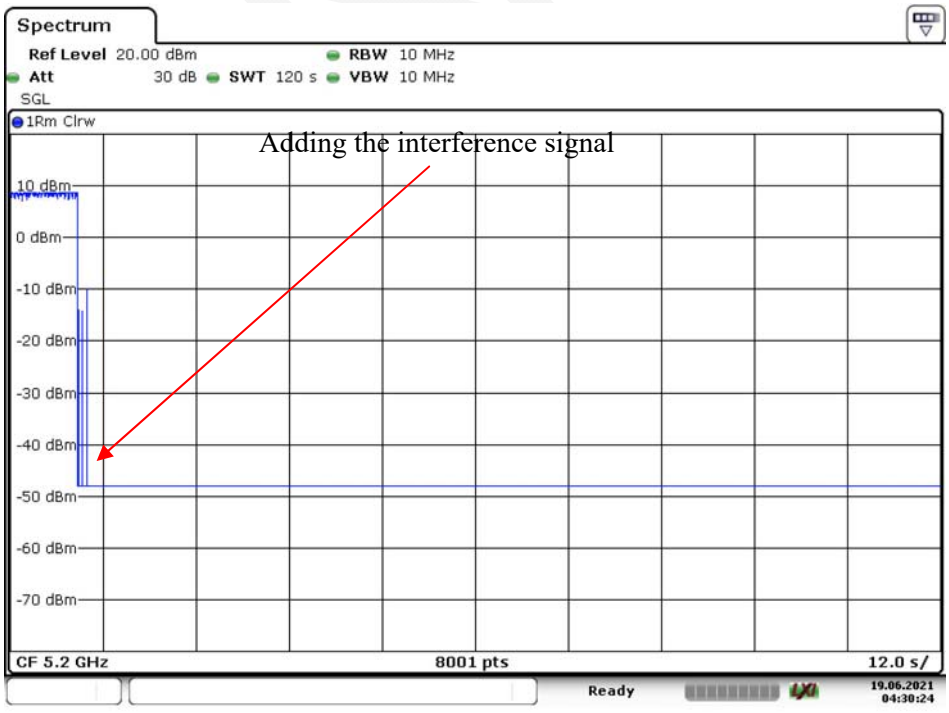
40M 5200 LTE



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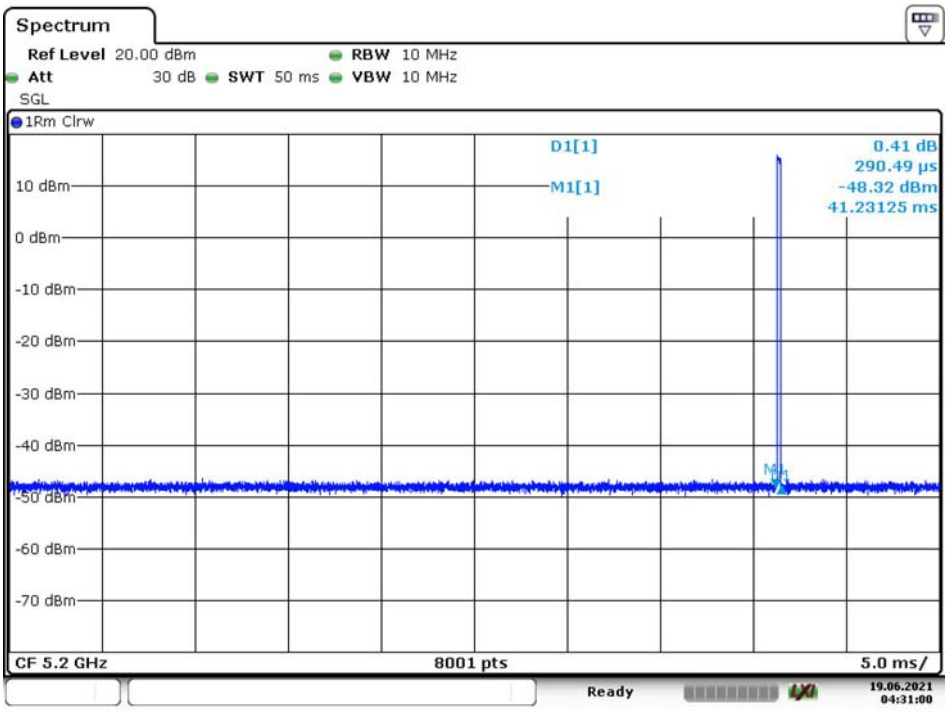
40M 5200 LTE-SCST



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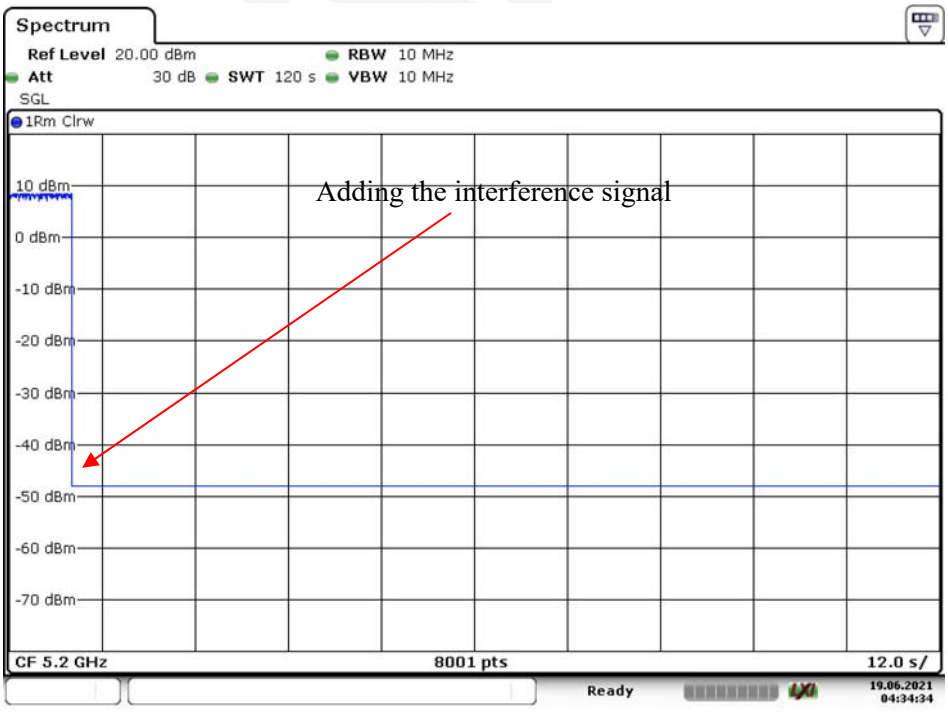
40M 5200 OFDM



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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

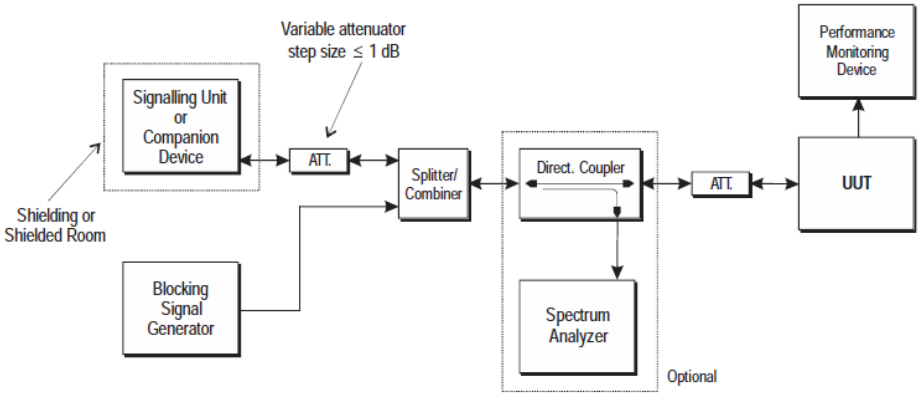


Figure 14: Test Set-up for receiver blocking

Test Data

Please refer to following table:

Mode & Frequency (MHz)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	PER (%)	Limit (%)
802.11 a mode 5180	5100	-53	1.31	≤10
	4900	-47	1.24	
	5000	-47	1.23	
	5975	-47	1.27	
802.11 a mode 5500	5100	-53	1.24	
	4900	-47	1.39	
	5000	-47	1.17	
	5975	-47	1.21	

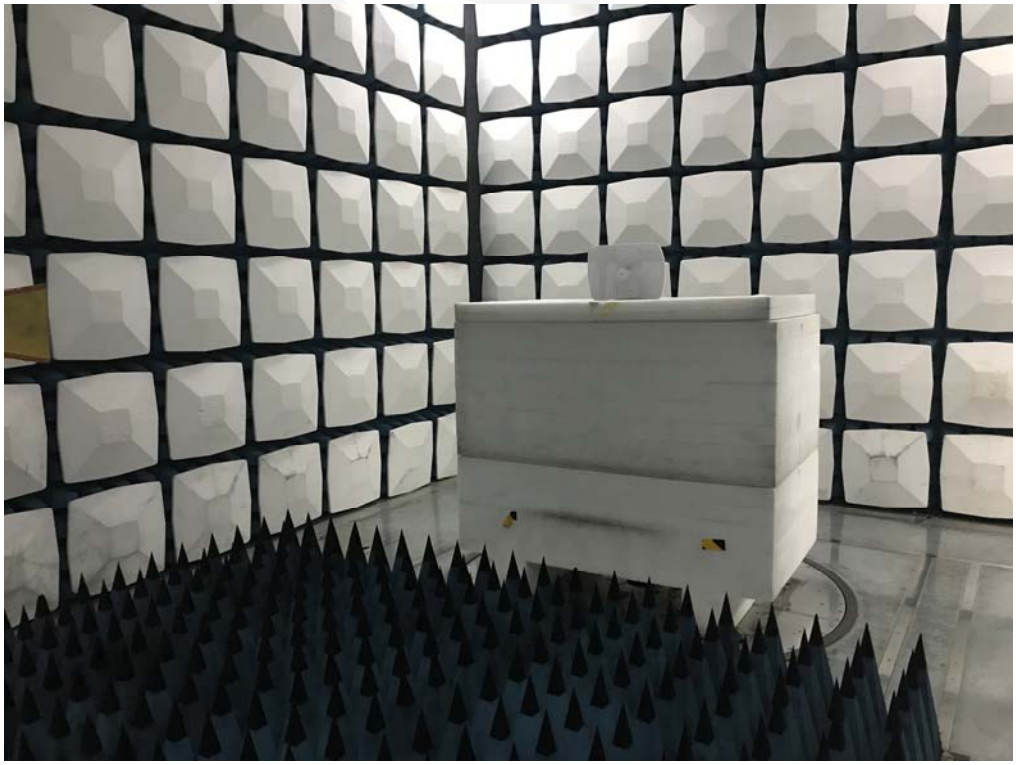
EXHIBIT A – EUT PHOTOGRAPHS

For photos in this section, please refer to report No.: RDG2210607-21788E-02 EXHIBIT A.

EXHIBIT B – TEST SET UP PHOTOGRAPHS

RE below 1G

RE above 1G



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