

FCC TEST REPORT

For

Mobile Computer

Model Number: M52 Luna

FCC ID: 2A398-M52

Report Number : WT228000200

Test Laboratory : Shenzhen Academy of Metrology and Quality
Inspection
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TEST REPORT DECLARATION

Applicant : Suzhou MobyData Smart System Co., Ltd.

Address : 3f, building E, Yida science Park, No.11 Jinpu Road, SIP, Suzhou, Jiangsu, China.

Manufacturer : Suzhou MobyData Smart System Co., Ltd.

Address : 3f, building E, Yida science Park, No.11 Jinpu Road, SIP, Suzhou, Jiangsu, China.

EUT Description : Mobile Computer

Model No. : M52 Luna

Trade mark : MobyData

Serial Number : /

FCC ID : 2A398-M52

Test Standards:

FCC Part 15 Subpart E 15.407 (2020)

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

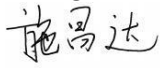
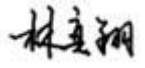
Project Engineer:	 (Zhou Fangai 周芳媛)	Date:	<u>Mar.10, 2022</u>
Checked by:	 (Shi Changda 施昌达)	Date:	<u>Mar.10, 2022</u>
Approved by:	 (Lin Yixiang 林奕翔)	Date:	<u>Mar.10, 2022</u>

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1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
6dB Bandwidth	FCC §15.407 (e)	Pass
26dB Bandwidth	FCC §15.407 (a)	Pass
Maximum Peak Conducted Power	FCC §15.407 (a)	Pass
Maximum Power Spectral Density Level	FCC §15.407 (a)	Pass
Radiated Bandedge and Spurious	15.407 (b) 15.209 15.205	Pass
Conducted emission test for AC power port	15.207	Pass
Antenna Requirment	15.203	Pass

Remark: "N/A" means "Not applicable."

2. GENERAL INFORMATION

2.1. Report Information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

The lab will not be liable for any loss or damage resulting for false, inaccurate, inappropriate or incomplete product information provided by the applicant/manufacturer.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is Accredited Testing Laboratory of FCC with Designation number CN1165 and Site registration number 582918.

The Laboratory is registered to perform emission tests with Innovation, Science and Economic Development (ISED), and the registration number is 11177A.

The Laboratory is registered to perform emission tests with VCCI, and the registration number are C-20048, G20076, R-20077, R-20078 and T-20047.

The Laboratory is Accredited Testing Laboratory of American Association for Laboratory Accreditation (A2LA) and certificate number is 3292.01.

2.3.Measurement Uncertainty

Conducted Emission

9 kHz~150 kHz U=3.7dB k=2

150 kHz~30MHz U=3.3dB k=2

Radiated Emission

30MHz~1000MHz U=4.3dB k=2

1GHz~6GHz U=4.6 dB k=2

6GHz~40GHz U=5.1dB k=2

3. PRODUCT DESCRIPTION

NOTE: The extreme test conditions for temperature and antenna gain were declared by the manufacturer.

3.1. EUT Description

Description : Mobile Computer
Manufacturer : Suzhou MobyData Smart System Co., Ltd.
Model Number : M52 Luna
Operate : U-NII 1(5180~5240 MHz)
Frequency : U-NII 2A(5260~5320 MHz)
U-NII 2C(5500~5700 MHz)
U-NII 3(5745~5825 MHz)
Antenna : PIFA Antenna: 1.5dBi
Designation
Operating voltage : DC3.6V (Low)/DC3.8V (Nominal)/DC4.35V (Max)
Software Version : M09.01.03.20220124
Hardware Version : H236WO_V02
Remark: --

Frequency List:

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5180	52	5260	100	5500	149	5745
40	5200	56	5280	104	5520	153	5765
44	5220	60	5300	108	5540	157	5785
48	5240	64	5320	112	5560	161	5805
				116	5580	165	5825
				120	5600		
				124	5620		
				128	5640		
				132	5660		
				136	5680		
				140	5700		

Table 2 802.11a/802.11n/802.11ac (20MHz) Frequency /Channel operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
38	5190	54	5270	102	5510	151	5755
46	5230	62	5310	110	5550	159	5795
				118	5590		
				126	5630		
				134	5670		

Table 3 802.11n/802.11ac (40MHz BW) Frequency /Channel operations

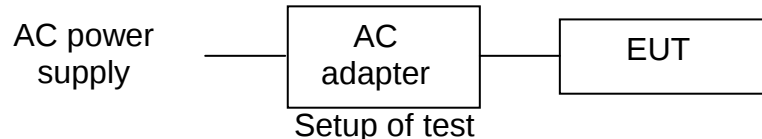
Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5210	58	5290	106	5530	155	5775
				122	5610		

Table 4 802.11ac (80MHz) BW Frequency /Channel operations

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2A398-M52 filing to comply with Section 15.207, 15.209, 15.407 of the FCC Part 15, Subpart E.

3.3. Block Diagram of EUT Configuration



3.4. Operating Condition of EUT

The Radiated spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission (X plane).

Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps

802.11n HT20 mode: MCS0

802.11n HT40 mode: MCS0

802.11ac VHT20 mode: MCS0

802.11ac VHT40 mode: MCS0

802.11ac VHT80 mode: MCS0

802.11a operates in SISO mode. For SISO conducted measurements, the modes tested in this report will be considered as a worst case mode.

802.11n operate in SISO mode. For SISO conducted measurements, the modes tested in this report will be considered as a worst case mode.

802.11ac operate in SISO mode. For SISO conducted measurements, the modes tested in this report will be considered as a worst case mode.

3.5. Directional Antenna Gain

The EUT does NOT support a WIFI MIMO function.

Directional gain need NOT to be considered.

3.6.Support Equipment List

Table 5 Support Equipment List

Name	Model No	S/N	Manufacturer
Adapter for EUT	OP92KAUH	---	ShenZhen KunXing Technology Co., Ltd
Rechargeable Li-ion Polymer Battery for EUT	713965PPV	---	ZHONGSHAN TIANMAO BATTERY CO.,LTD
USB Cable for EUT	---	---	---

3.7.Test Conditions

Date of test : Jan.25, 2022- Mar.10, 2022

Date of EUT Receive : Jan.19, 2022

Temperature: 20°C-25°C

Relative Humidity: 41%-55%

3.8.Special Accessories

Not available for this EUT intended for grant.

3.9.Equipment Modifications

Not available for this EUT intended for grant.

4. TEST EQUIPMENT USED

Table 6 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB9058/05	Test Receiver	R&S	ESCI 3	Sep.24,2021	1 Year
SB4357	AMN	R&S	ENN216	Aug.25,2021	1 Year
SB9549	Shielded Room	Albatross	SR	Sep.24,2021	1 Year
SB15044/01	Test Receiver	R&S	ESW8	Sep.14,2021	1 Year
SB12944	Broadband Antenna	R&S	VULB9163	Jan.08,2021	1 Year
SB18844	Semi Anechoic Chamber	Albatross	9×6×6(m)	Mar.23,2021	1 Year
SB13956	Test Receiver	R&S	ESR26	Feb.05,2021	1 Year
SB13956	Test Receiver	R&S	ESR26	Feb.07,2022	1 Year
SB13961	Horn Antenna	R&S	HF907	Mar.23,2021	1 Year
SB8501/09	Test Receiver	R&S	ESU40	Feb.05,2021	1 Year
SB3435	Horn Antenna	R&S	HF906	Dec.03,2021	1 Year
SB9054/08	Broadband Antenna	Schwarzbeck	VULB 9163	Dec.30,2021	1 Year
SB9555/02	Fully Anechoic Chamber	Albatross	10.0×5.2× 5.4(m)	Aug.25,2021	1 Year
SB9058/03	Pre-Amplifier	R&S	SCU 18	Jan.20,2022	1 Year
SB8501/10	Horn Antenna	R&S	3160-09	Mar.10,2020	3 Years
SB8501/11	Horn Antenna	R&S	3160-09	Mar.09,2020	3 Years
SB8501/12	Horn Antenna	R&S	3160-10	Mar.17,2020	3 Years
SB8501/13	Horn Antenna	R&S	3160-10	Mar.10,2020	3 Years
SB8501/14	Pre-Amplifier	R&S	SCU-03	Jan.20,2022	1 Year
SB8501/15	Pre-Amplifier	R&S	SCU-03	Jan.20,2022	1 Year
SB8501/16	Pre-Amplifier	R&S	SCU 26	Jan.20,2022	1 Year
SB8501/17	Pre-Amplifier	R&S	SCU-18	Jan.18,2022	1 Year
SB9060	Signal Analyzer	R&S	FSQ40	May.17, 2021	1 Year

Table 7 Test software

Name	Manufacturer	Version
Bluetooth and WiFi Test System	Shenzhen JS tonscond co.,ltd	2.6.87.0615

5. DUTY CYCLE

5.1.Limits of Duty Cycle

None; for reporting purposes only

5.2.Test Procedure

1. Set span = Zero
2. RBW = 20MHz
3. VBW = 30MHz,
4. Detector = Peak

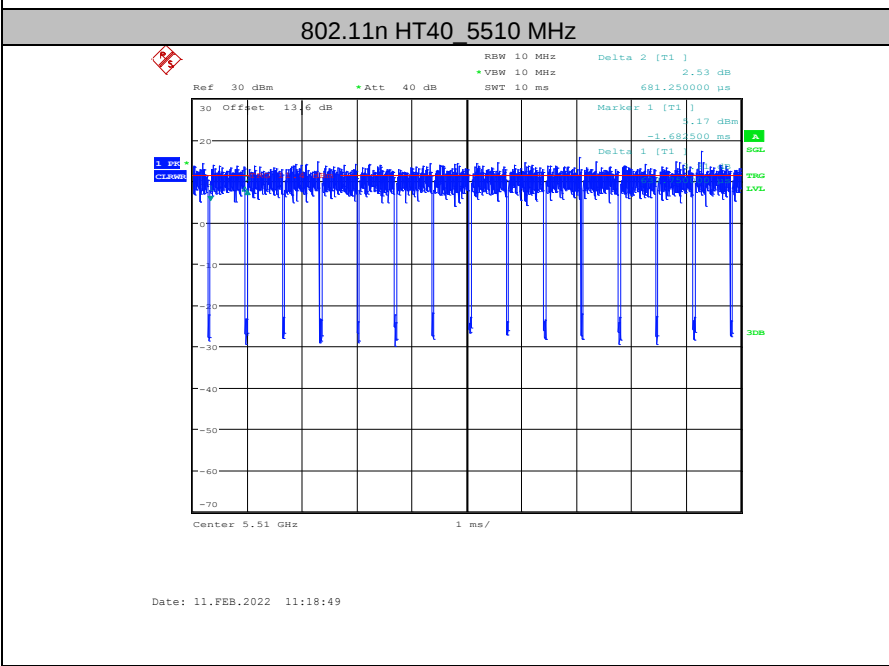
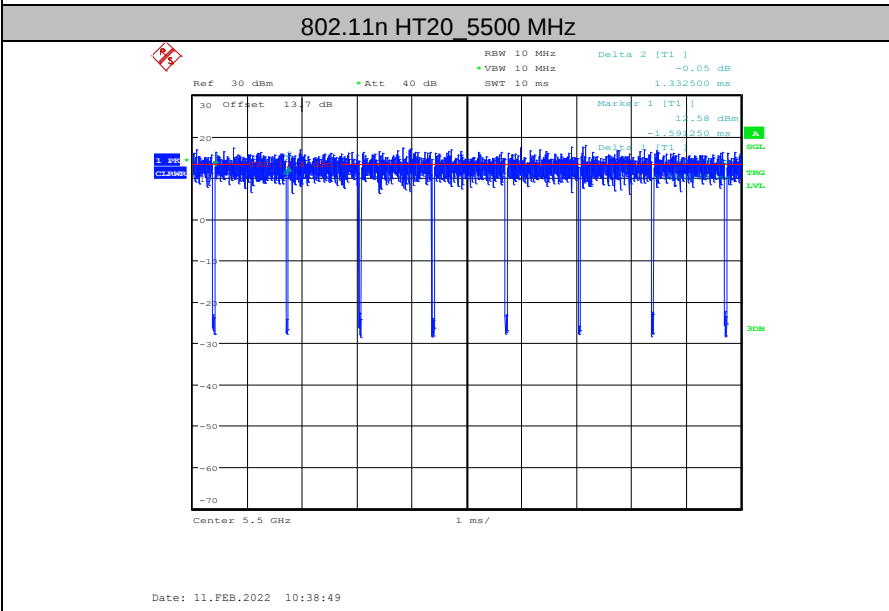
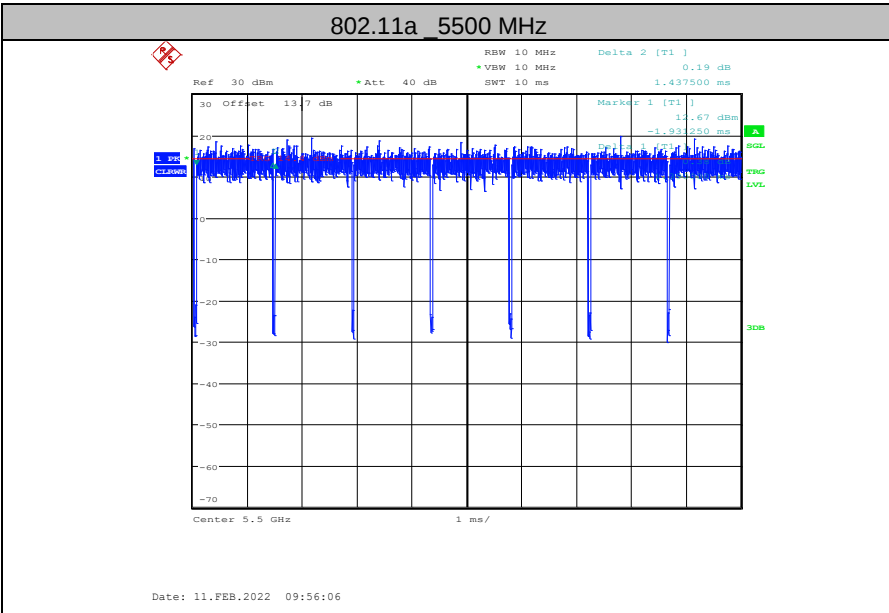
5.3.Test Setup



5.4.Test Data

Table 8 Duty Cycle Test Data

Test Mode	On Time (ms)	Duty Cycle (%)	Duty Factor	1/T Minimum VBW (kHz)
802.11a	1.39	96.53	0.15	0.01
802.11n HT20	1.29	96.99	0.13	0.01
802.11n HT40	0.63	92.65	0.33	0.01
802.11ac VHT20	1.31	96.32	0.16	0.01
802.11ac VHT40	0.65	92.86	0.32	0.01
802.11ac VHT80	0.32	86.49	0.63	0.01



6. 6DB BANDWIDTH MEASUREMENT

6.1.Limits of 6dB Bandwidth Measurement

The minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725-5.85 GHz.

6.2.Test Procedure

The transmitter output was connected to the spectrum analyzer.

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c)Detector = Peak.
- d)Trace mode = max hold.
- e)Sweep = auto couple.
- f)Allow the trace to stabilize.
- g)Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3.Test Setup

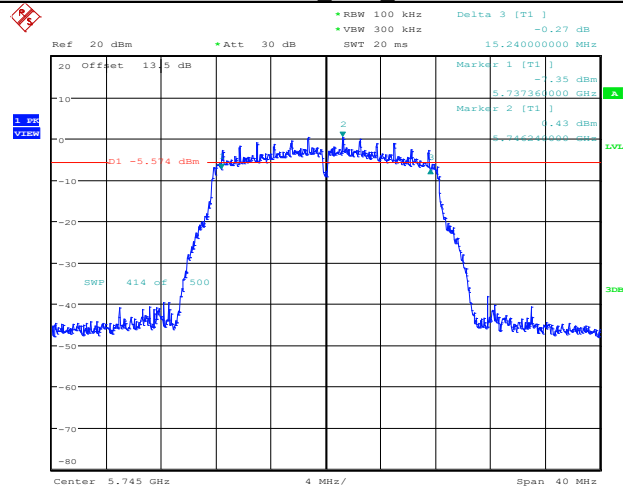


6.4.Test Data

Table 9 6dB Bandwidth Test Data

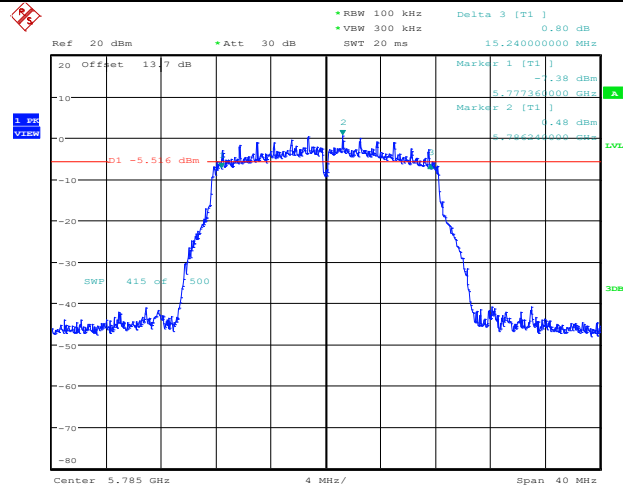
Test Mode	Test Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
802.11a	5745	15.240	0.5	PASS
802.11a	5785	15.240	0.5	PASS
802.11a	5825	15.200	0.5	PASS
802.11n HT20	5745	15.200	0.5	PASS
802.11n HT20	5785	15.240	0.5	PASS
802.11n HT20	5825	15.200	0.5	PASS
802.11n HT40	5755	35.280	0.5	PASS
802.11n HT40	5795	35.280	0.5	PASS
802.11ac VHT20	5745	15.200	0.5	PASS
802.11ac VHT20	5785	15.160	0.5	PASS
802.11ac VHT20	5825	15.240	0.5	PASS
802.11ac VHT40	5755	35.280	0.5	PASS
802.11ac VHT40	5795	35.280	0.5	PASS
802.11ac VHT80	5775	75.520	0.5	PASS

11A Ant1 5745



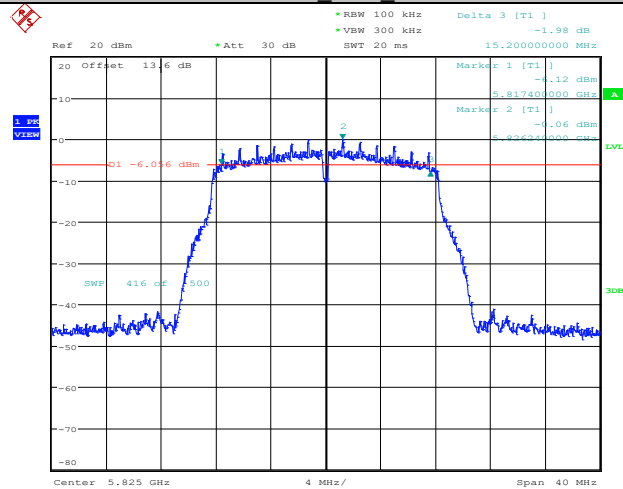
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11A Ant1 5785



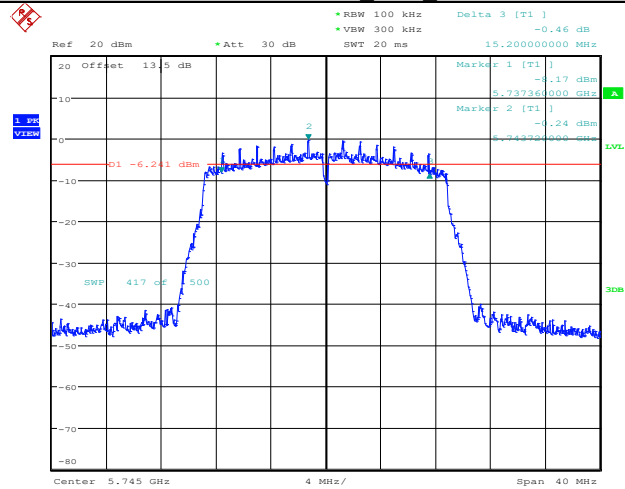
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11A Ant1 5825



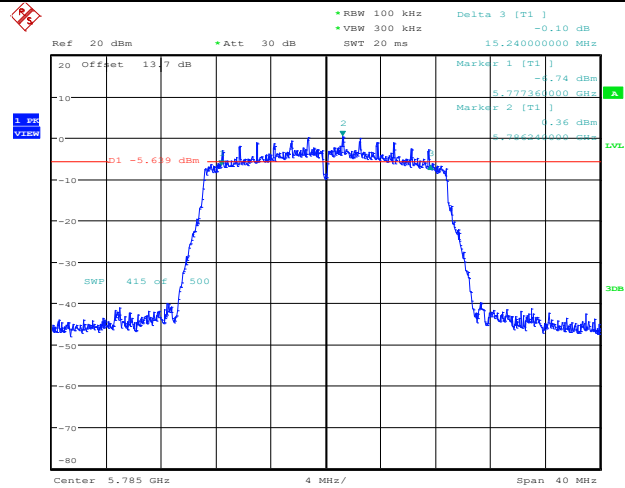
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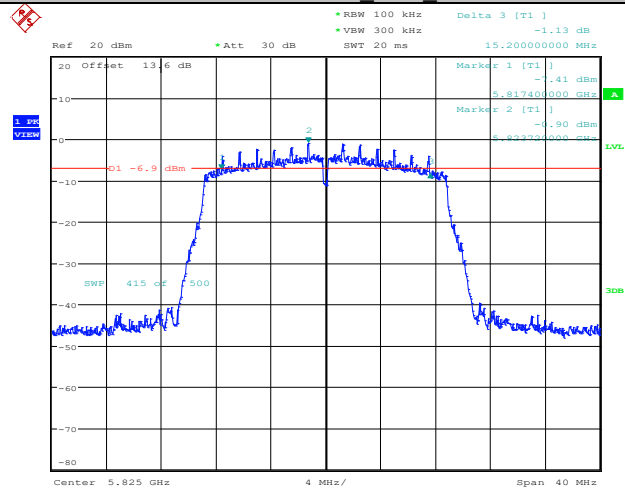
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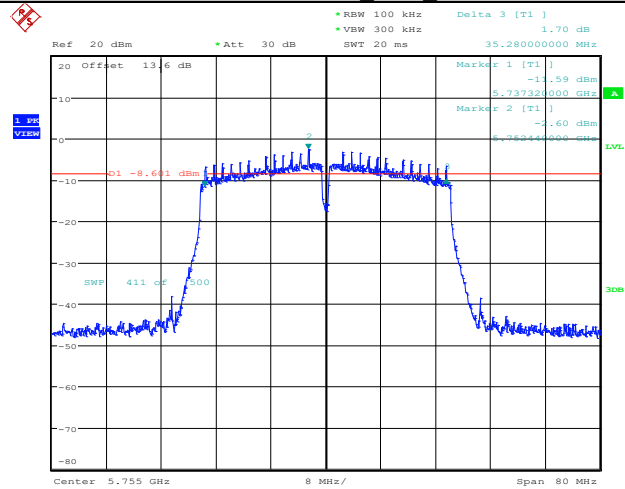
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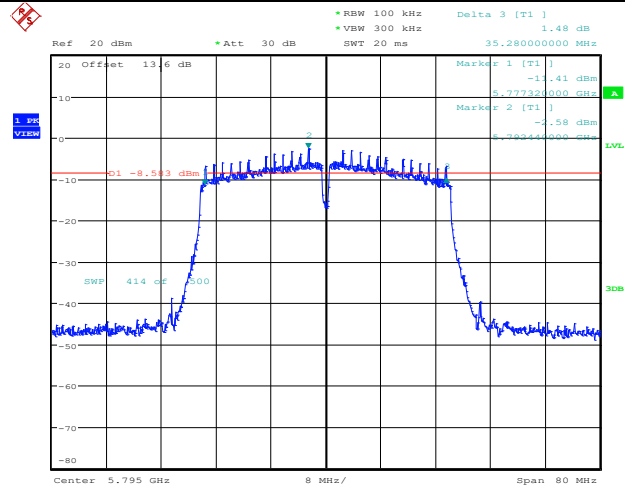
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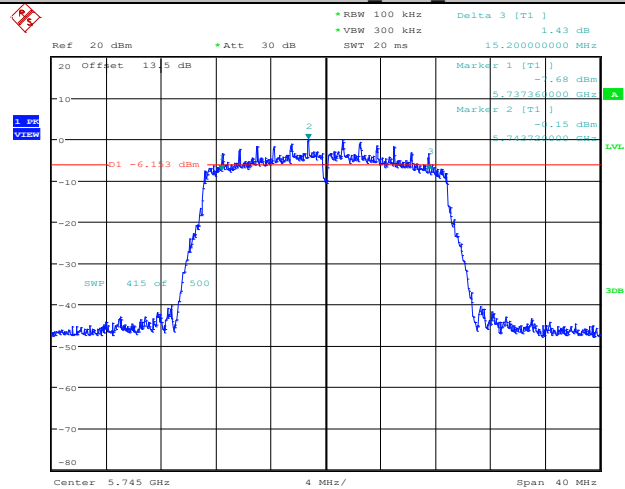
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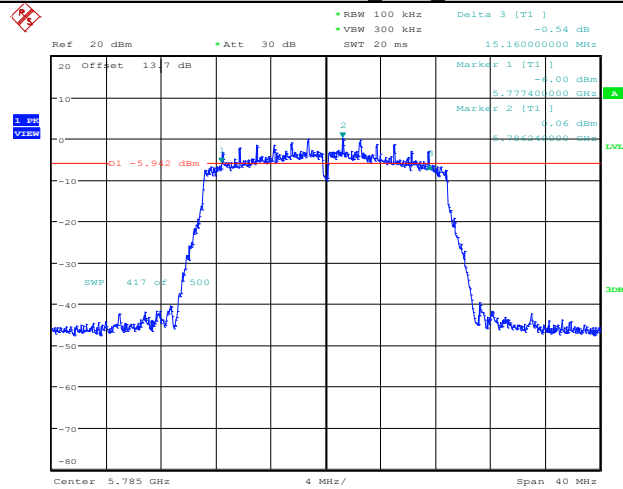
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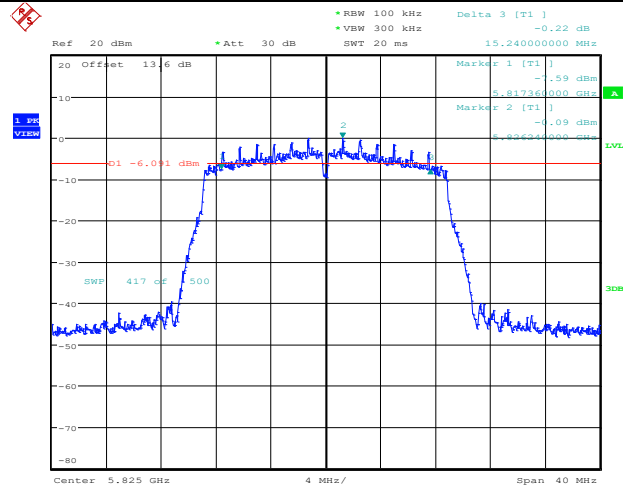
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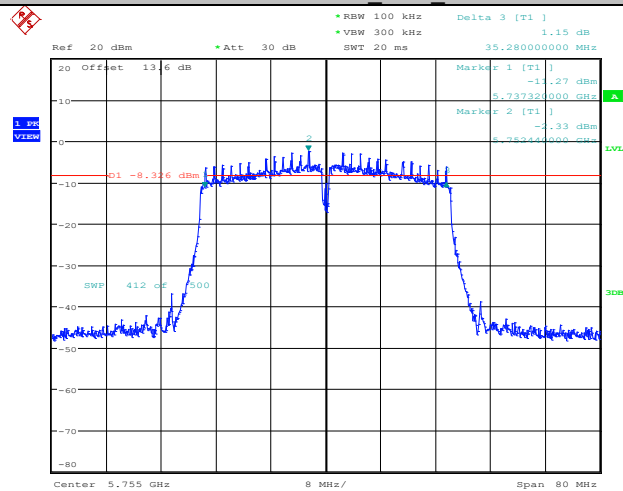
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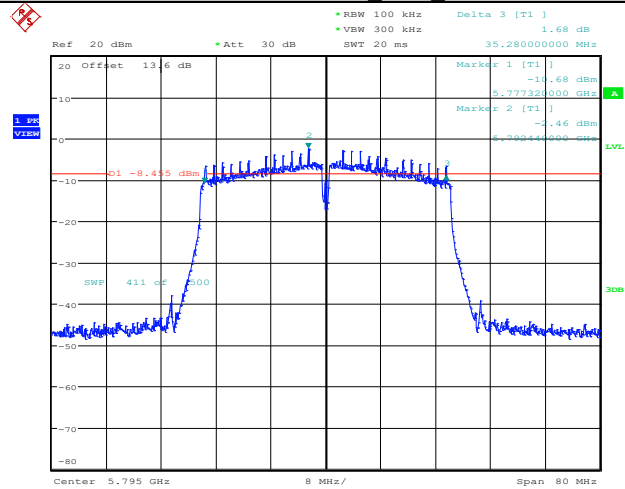
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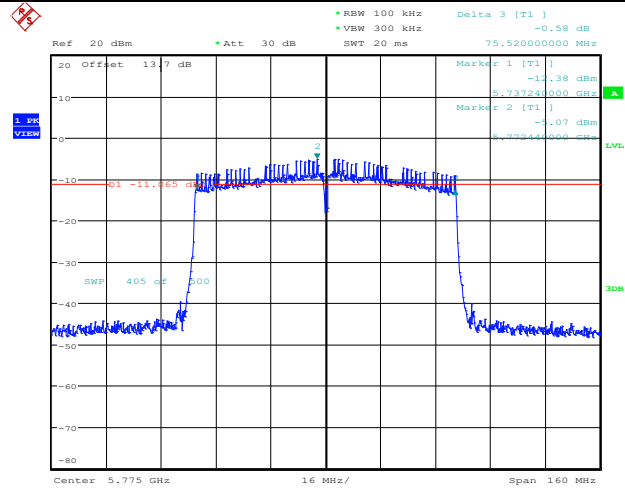
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Date: 11.FEB.2022 14:05:57

11AC80SISO Ant1 5775



Date: 11.FEB.2022 14:34:10

7. 26DB BANDWIDTH MEASUREMENT

7.1.Limits of 26dB Bandwidth Measurement

None; for reporting purposes only.

7.2.Test Setup

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

7.3.Test Setup



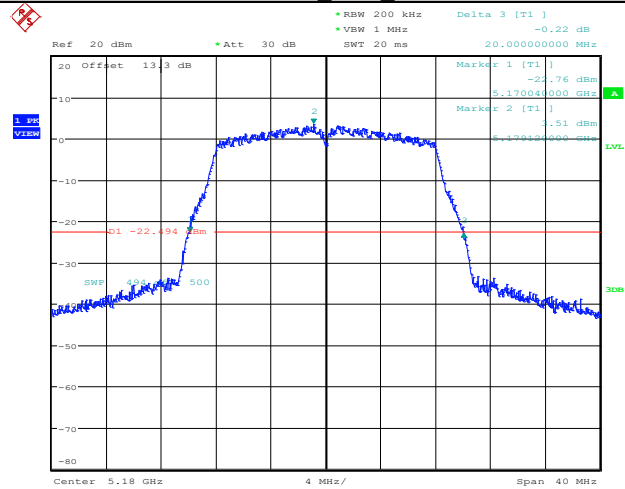
7.4.Test Data

Table 10 26dB Bandwidth Test Data

Test Mode	Test Channel	26dB Bandwidth [MHz]	Limit[MHz]	Verdict
802.11a	5180	20.000	---	PASS
802.11a	5200	20.280	---	PASS
802.11a	5240	20.120	---	PASS
802.11a	5260	20.120	---	PASS
802.11a	5280	20.200	---	PASS
802.11a	5320	20.160	---	PASS
802.11a	5500	20.080	---	PASS
802.11a	5600	20.160	---	PASS
802.11a	5700	20.160	---	PASS
802.11a	5745	20.120	---	PASS
802.11a	5785	20.080	---	PASS
802.11a	5825	20.240	---	PASS
802.11n HT20	5180	20.440	---	PASS
802.11n HT20	5200	20.480	---	PASS
802.11n HT20	5240	20.520	---	PASS
802.11n HT20	5260	20.400	---	PASS
802.11n HT20	5280	20.600	---	PASS
802.11n HT20	5320	20.600	---	PASS
802.11n HT20	5500	20.480	---	PASS
802.11n HT20	5600	20.560	---	PASS
802.11n HT20	5700	20.440	---	PASS
802.11n HT20	5745	20.520	---	PASS
802.11n HT20	5785	20.480	---	PASS
802.11n HT20	5825	20.480	---	PASS
802.11n HT40	5190	41.120	---	PASS
802.11n HT40	5230	41.120	---	PASS
802.11n HT40	5270	41.200	---	PASS
802.11n HT40	5310	41.120	---	PASS
802.11n HT40	5510	41.200	---	PASS
802.11n HT40	5590	41.200	---	PASS
802.11n HT40	5670	41.280	---	PASS
802.11n HT40	5755	41.280	---	PASS
802.11n HT40	5795	41.200	---	PASS
802.11ac VHT20	5180	20.360	---	PASS
802.11ac VHT20	5200	20.560	---	PASS
802.11ac VHT20	5240	20.400	---	PASS
802.11ac VHT20	5260	20.440	---	PASS
802.11ac VHT20	5280	20.440	---	PASS

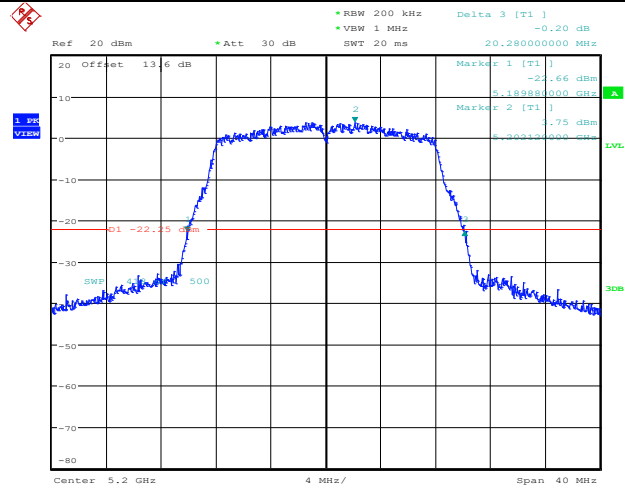
802.11ac VHT20	5320	20.480	---	PASS
802.11ac VHT20	5500	20.480	---	PASS
802.11ac VHT20	5600	20.480	---	PASS
802.11ac VHT20	5700	20.480	---	PASS
802.11ac VHT20	5745	20.520	---	PASS
802.11ac VHT20	5785	20.440	---	PASS
802.11ac VHT20	5825	20.480	---	PASS
802.11ac VHT40	5190	41.280	---	PASS
802.11ac VHT40	5230	41.280	---	PASS
802.11ac VHT40	5270	41.200	---	PASS
802.11ac VHT40	5310	41.440	---	PASS
802.11ac VHT40	5510	41.200	---	PASS
802.11ac VHT40	5590	41.200	---	PASS
802.11ac VHT40	5670	41.120	---	PASS
802.11ac VHT40	5755	41.200	---	PASS
802.11ac VHT40	5795	41.360	---	PASS
802.11ac VHT80	5210	81.920	---	PASS
802.11ac VHT80	5290	81.760	---	PASS
802.11ac VHT80	5530	81.760	---	PASS
802.11ac VHT80	5610	81.920	---	PASS
802.11ac VHT80	5775	81.440	---	PASS

11A Ant1_5180



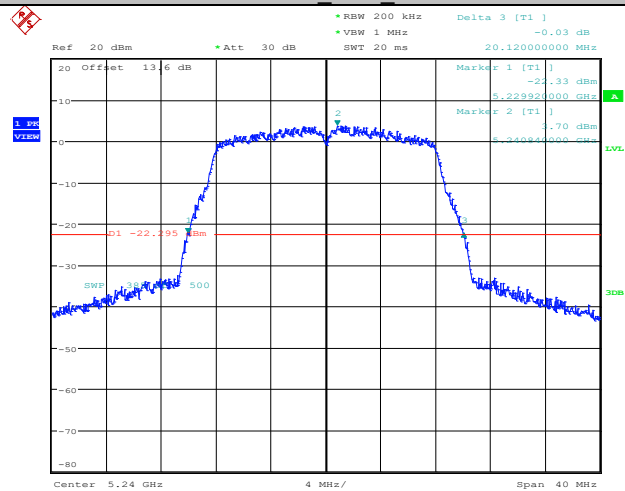
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11A Ant1_5200



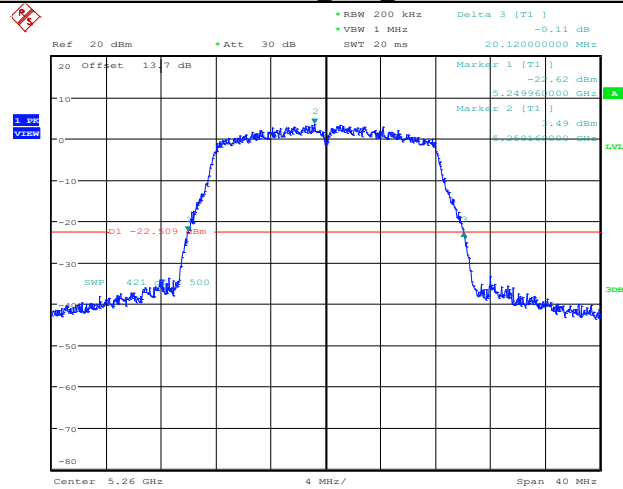
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11A Ant1_5240



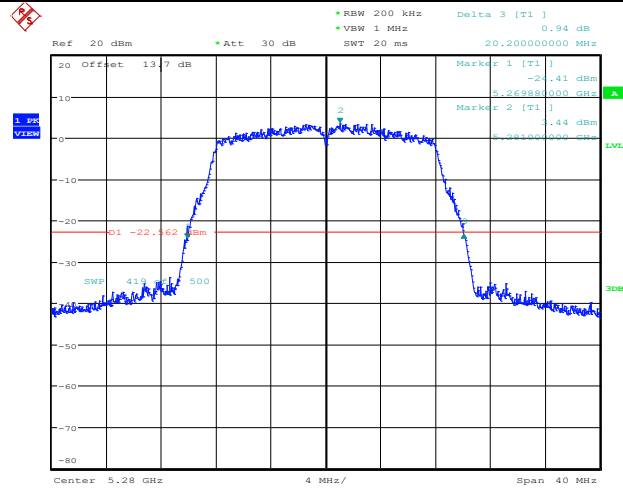
Date: 11.FEB.2022 09:42:44

11A Ant1_5260



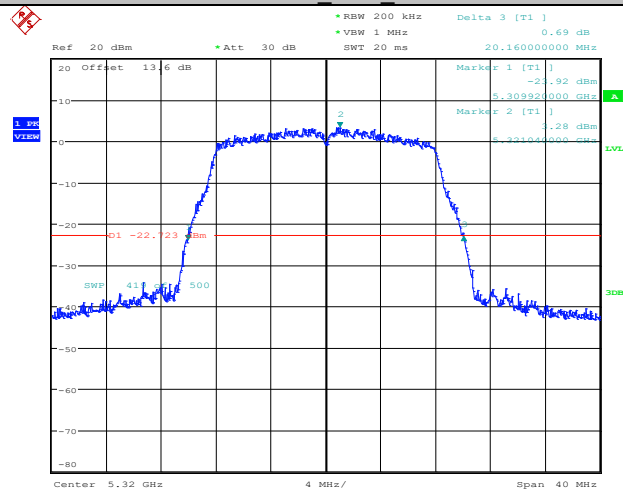
Date: 11.FEB.2022 09:46:07

11A Ant1_5280



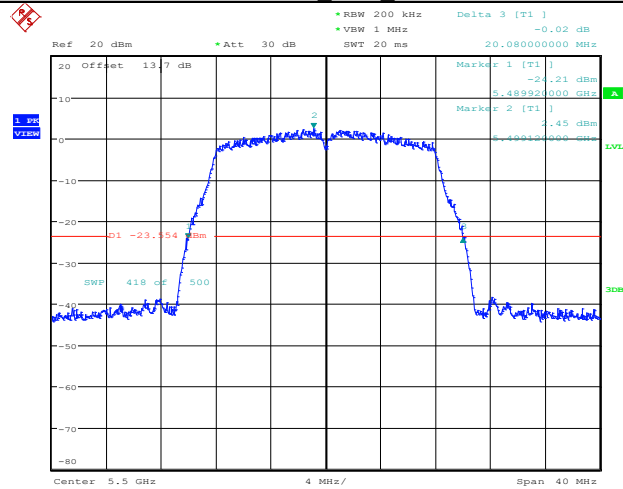
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11A Ant1_5320



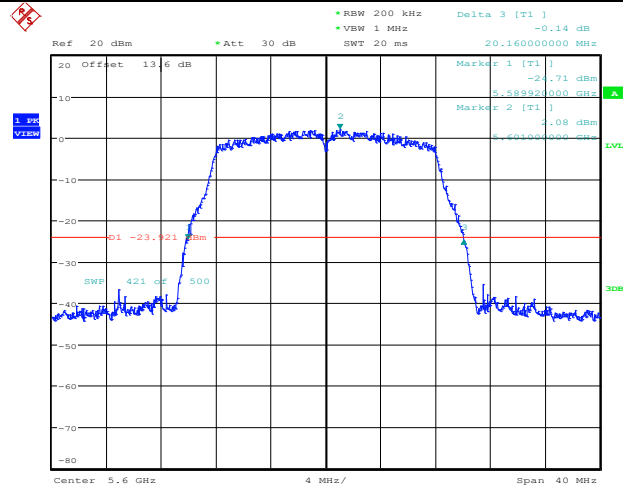
Date: 11.FEB.2022 09:51:36

11A Ant1_5500



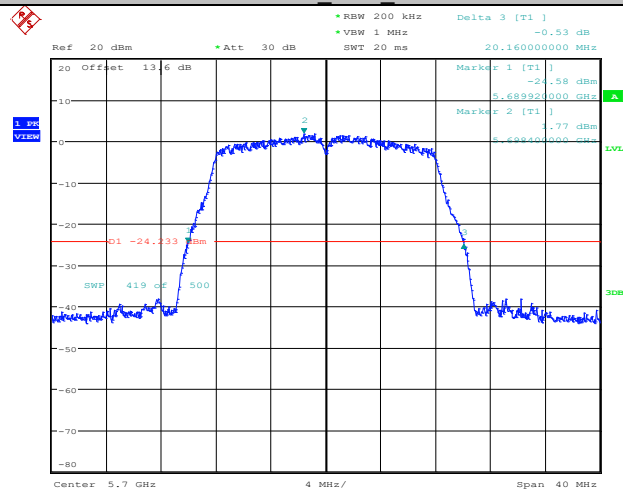
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11A Ant1_5600



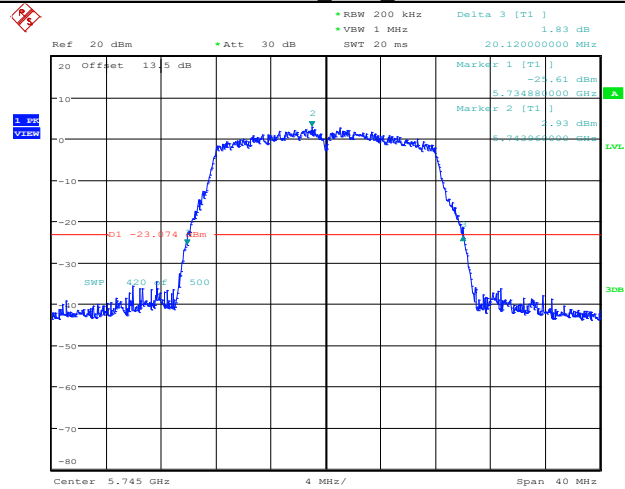
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11A Ant1_5700



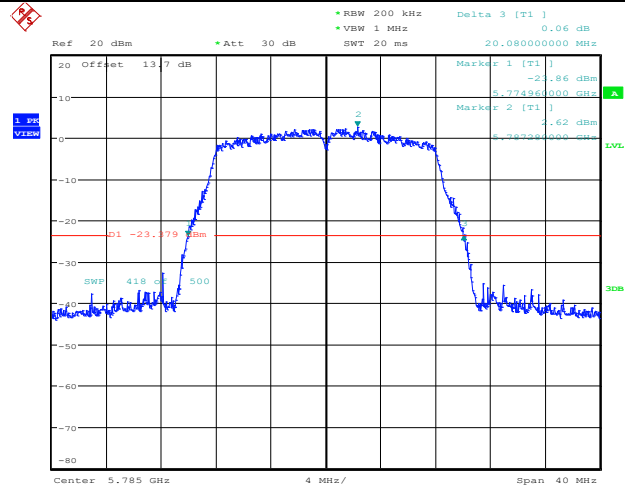
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11A Ant1_5745



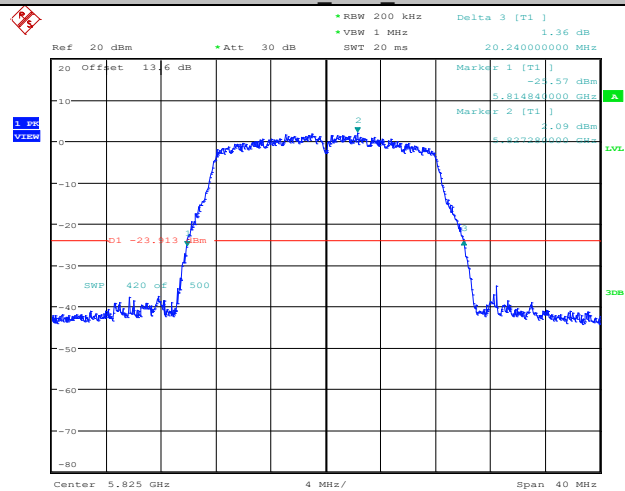
Date: 11.FEB.2022 10:10:39

11A Ant1_5785



Date: 11.FEB.2022 10:13:50

11A Ant1_5825

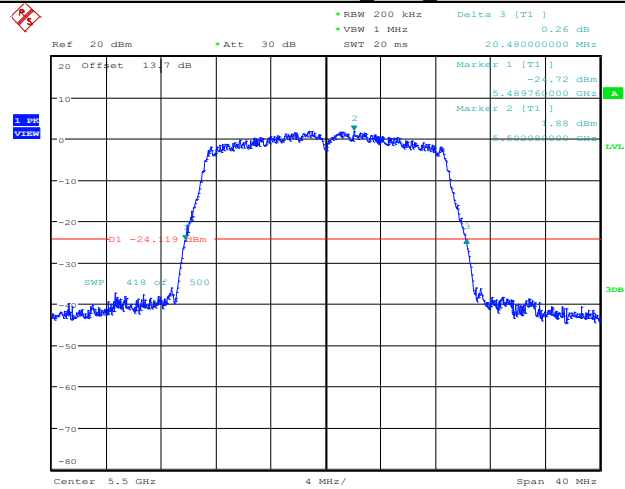


Date: 11.FEB.2022 10:17:28



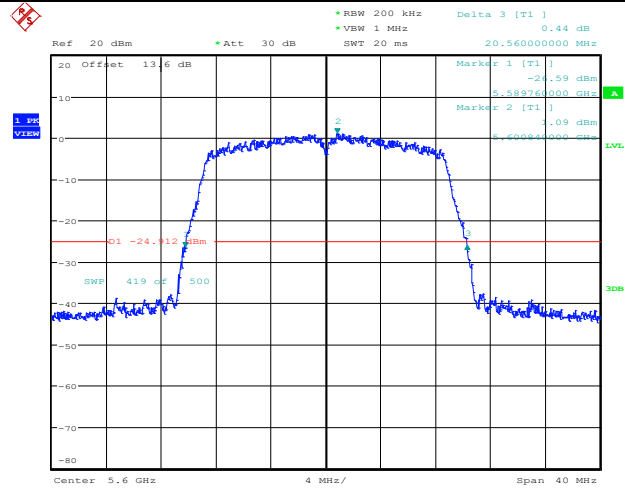


11N20SISO_Ant1_5500



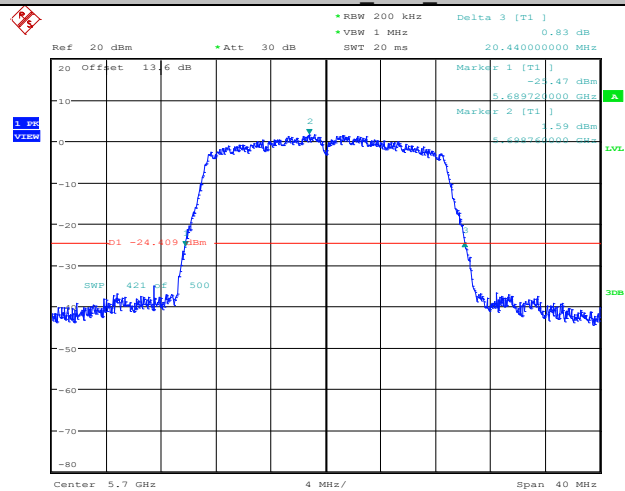
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11N20SISO_Ant1_5600



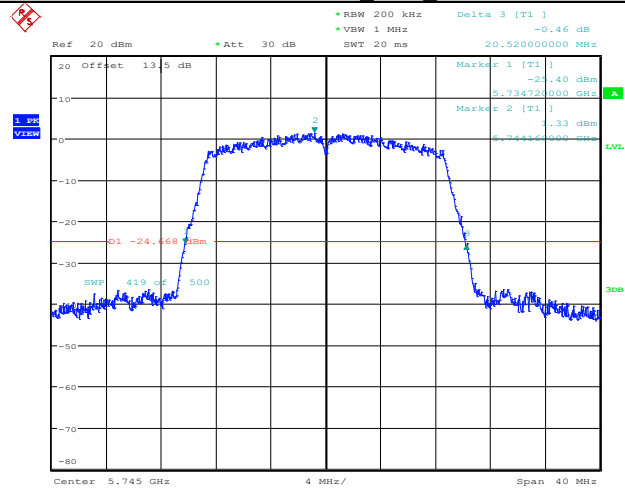
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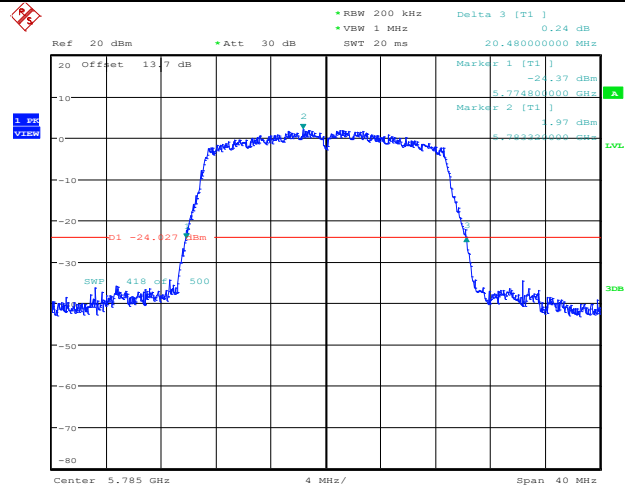
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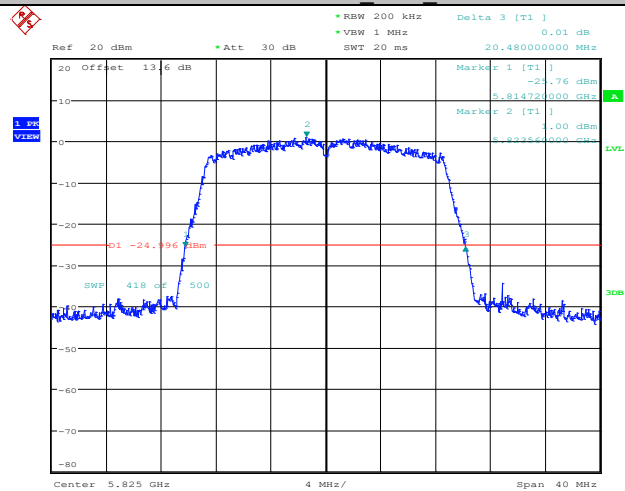
Date: 11.FEB.2022 10:50:07

11N20SISO_Ant1_5785



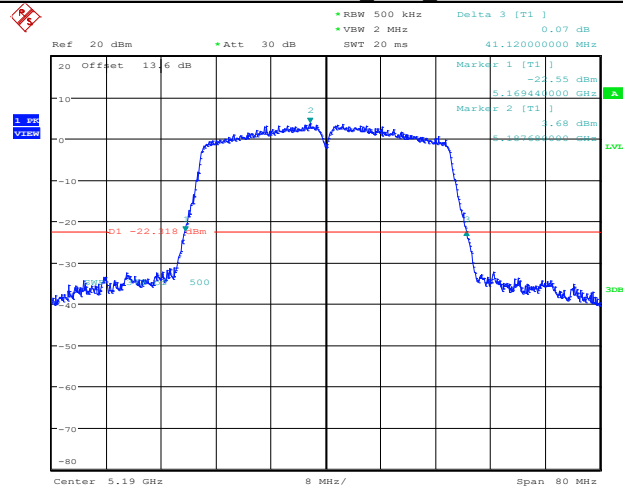
Date: 11.FEB.2022 10:53:00

11N20SISO_Ant1_5825



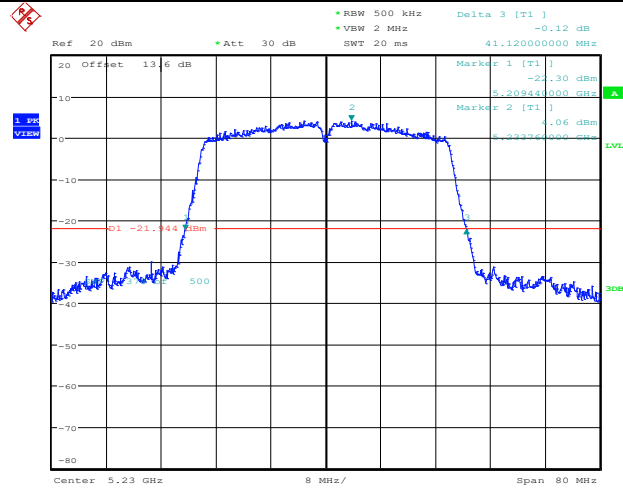
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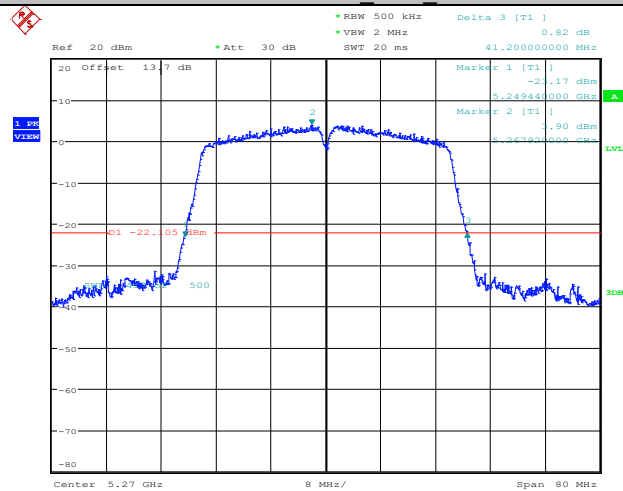
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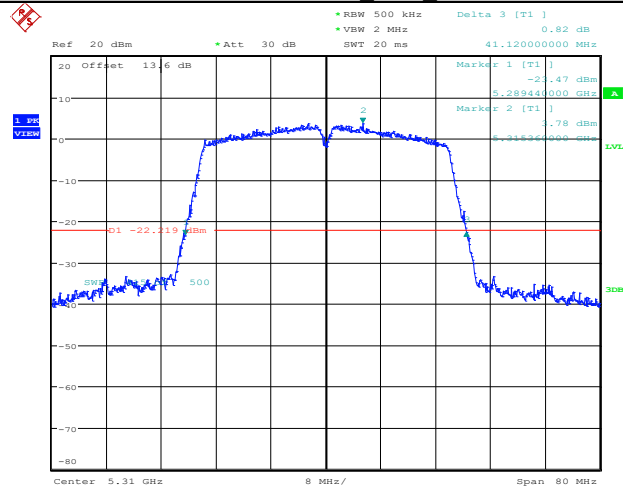
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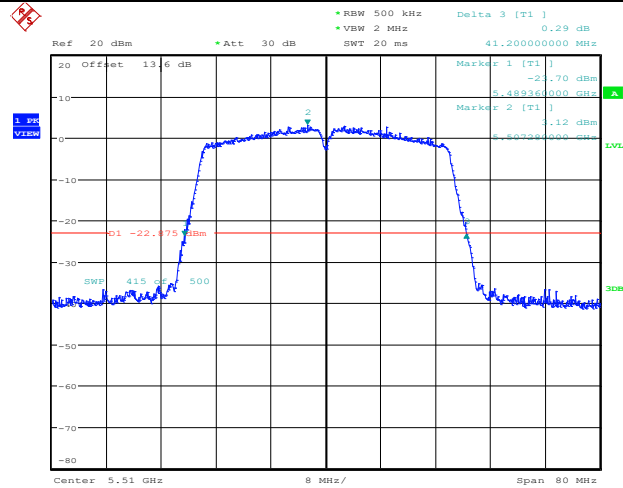
Date: 11.FEB.2022 11:12:34

11N40SISO_Ant1_5310



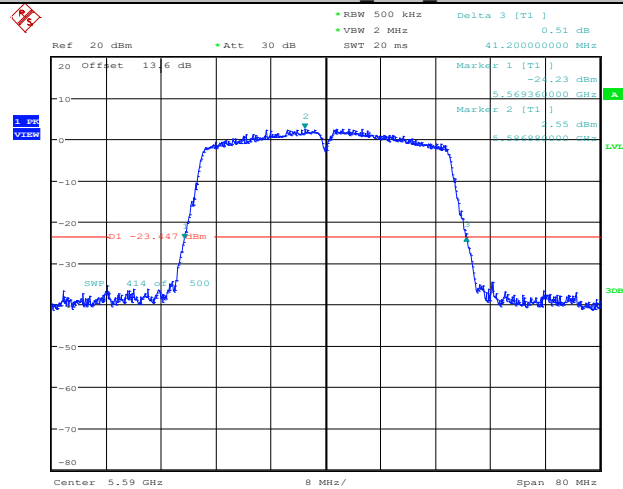
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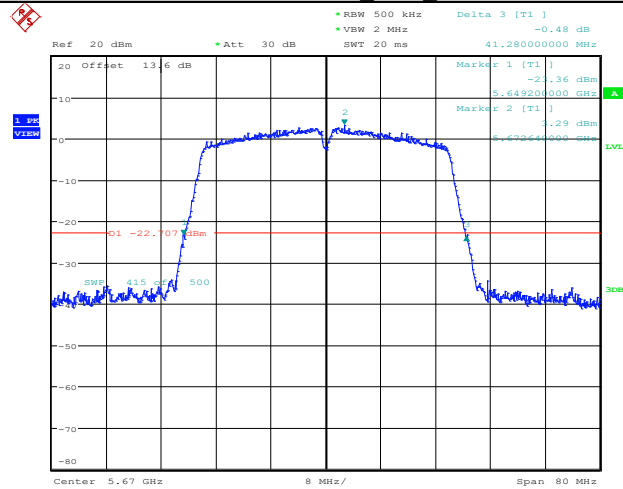
Date: 11.FEB.2022 11:18:08

11N40SISO_Ant1_5590



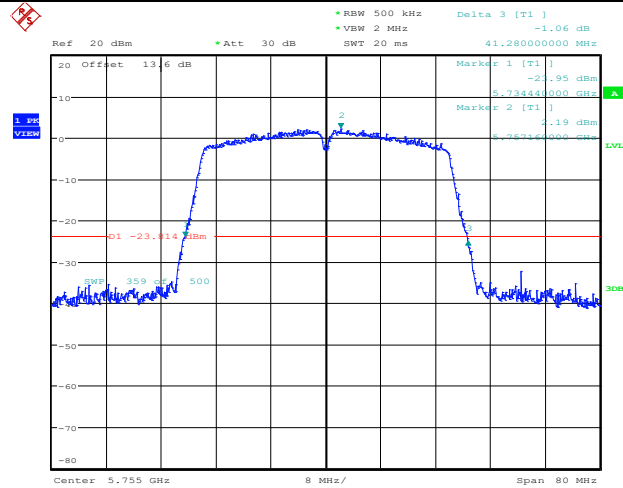
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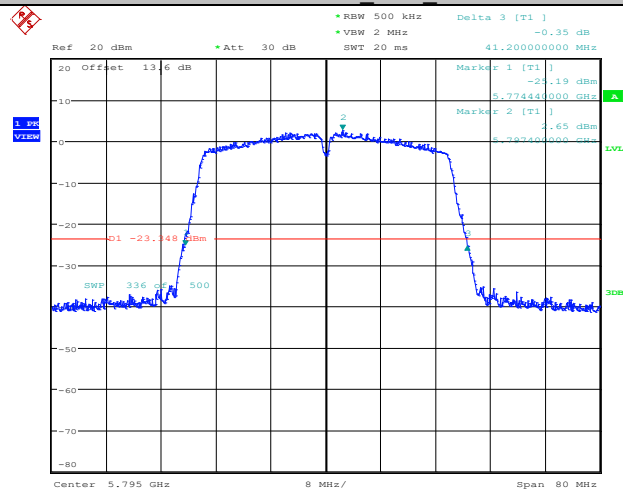
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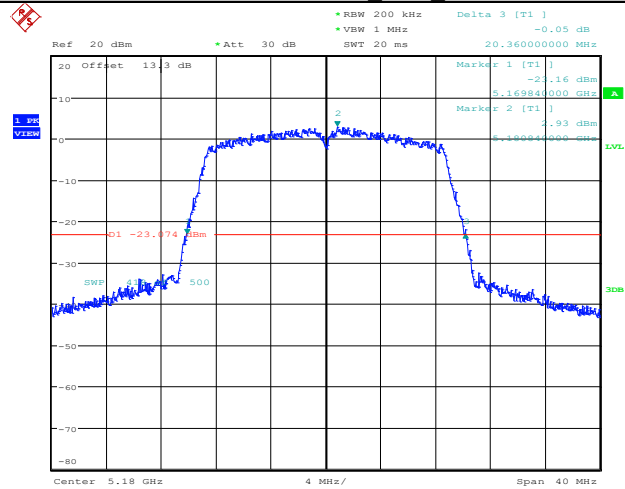
Date: 11.FEB.2022 11:33:26

11N40SISO_Ant1_5795



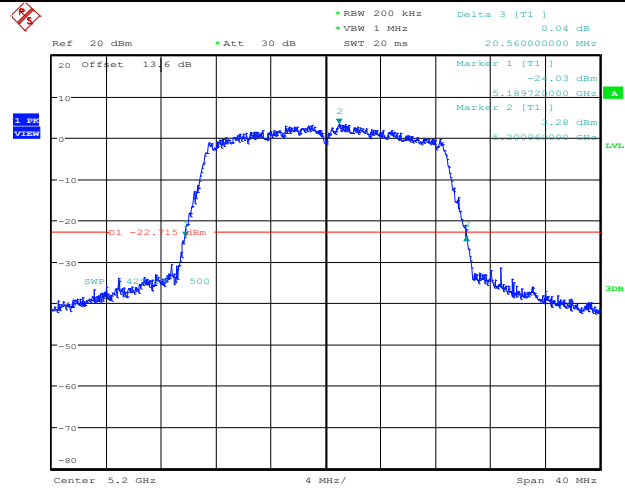
Date: 11.FEB.2022 11:36:11

11AC20SISO Ant1 5180



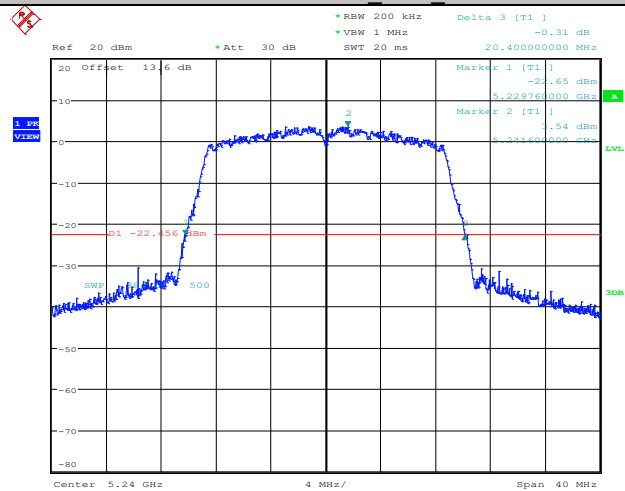
Date: 11.FEB.2022 11:41:17

11AC20SISO Ant1 5200



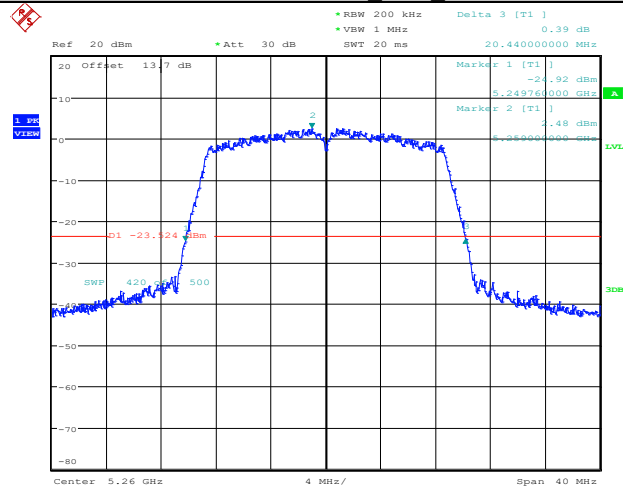
Date: 11.FEB.2022 11:44:22

11AC20SISO Ant1 5240



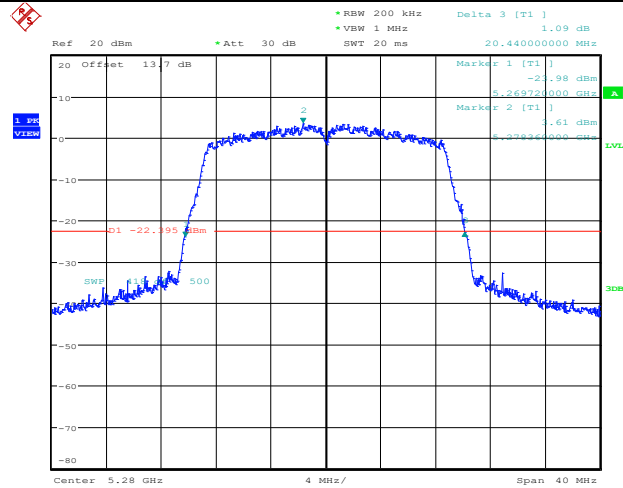
Date: 11.FEB.2022 11:46:55

11AC20SISO Ant1 5260



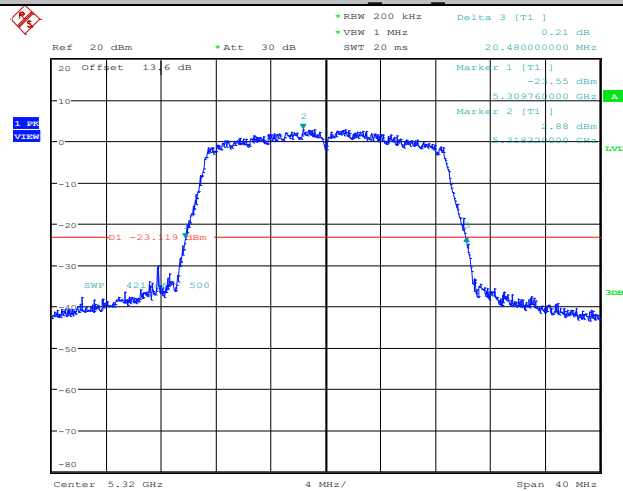
Date: 11.FEB.2022 11:50:21

11AC20SISO Ant1 5280



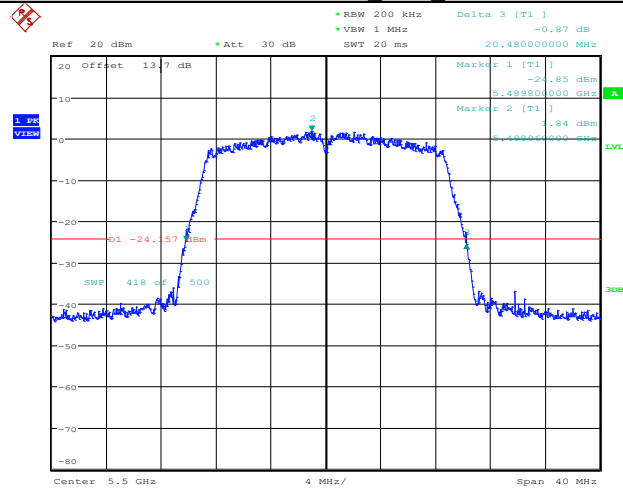
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11AC20SISO Ant1 5320



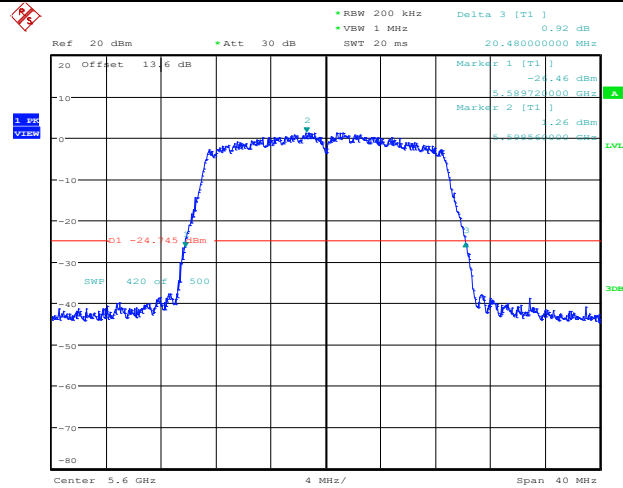
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11AC20SISO Ant1 5500



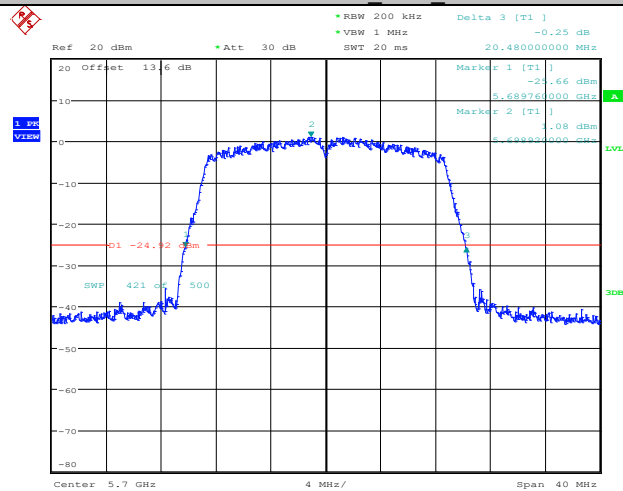
Date: 11.FEB.2022 12:16:00

11AC20SISO Ant1 5600



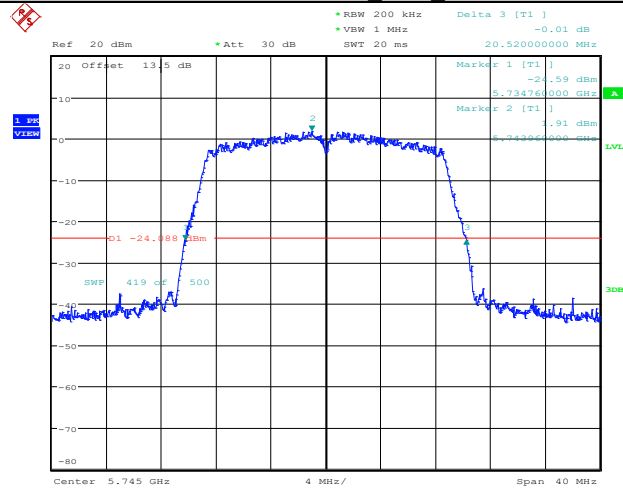
Date: 11.FEB.2022 12:20:28

11AC20SISO Ant1 5700



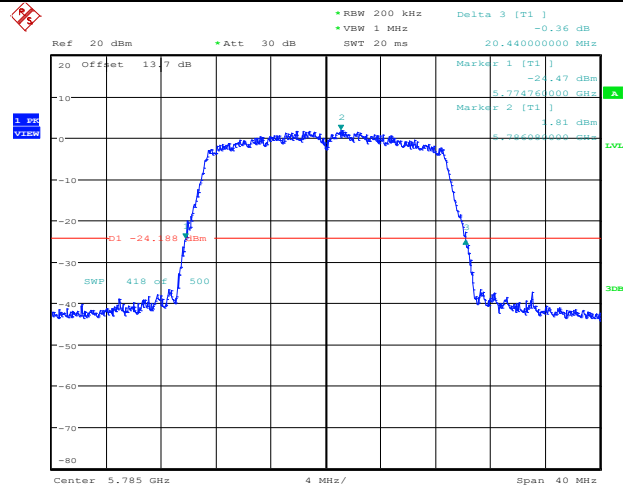
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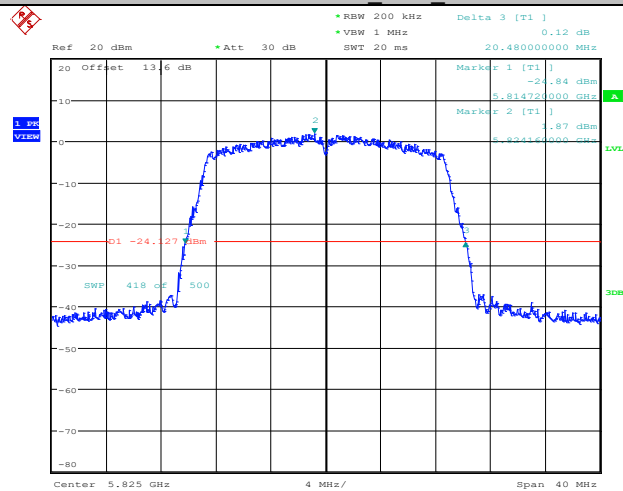
Date: 11.FEB.2022 12:38:27

11AC20SISO Ant1 5785



Date: 11.FEB.2022 12:45:55

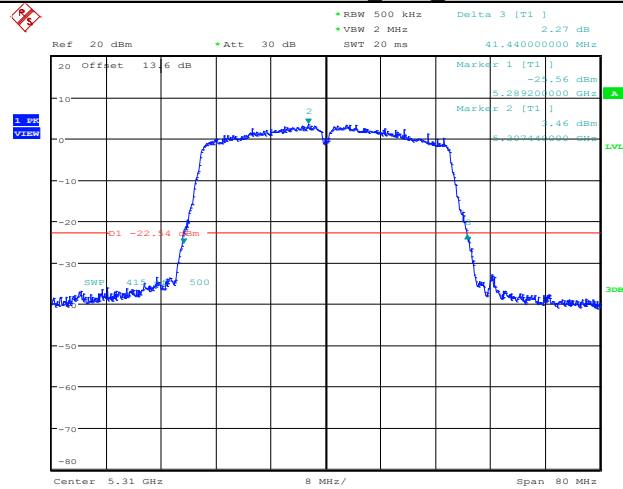
11AC20SISO Ant1 5825



Date: 11.FEB.2022 12:48:38

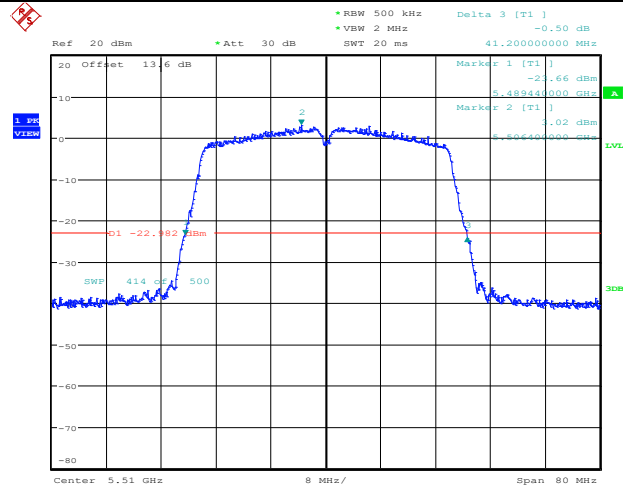


11AC40SISO Ant1 5310



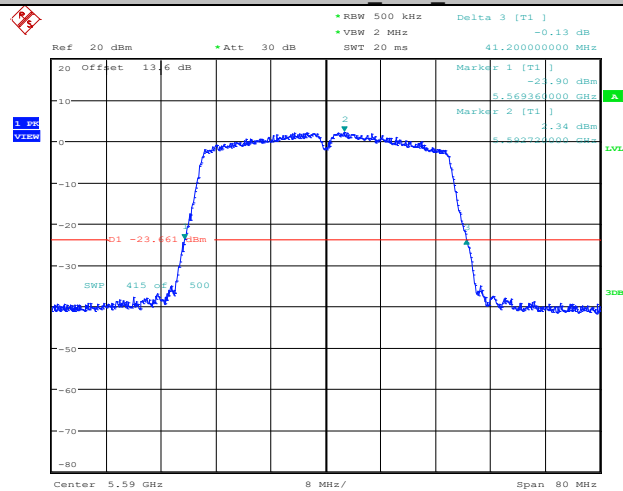
Date: 11.FEB.2022 13:49:17

11AC40SISO Ant1 5510



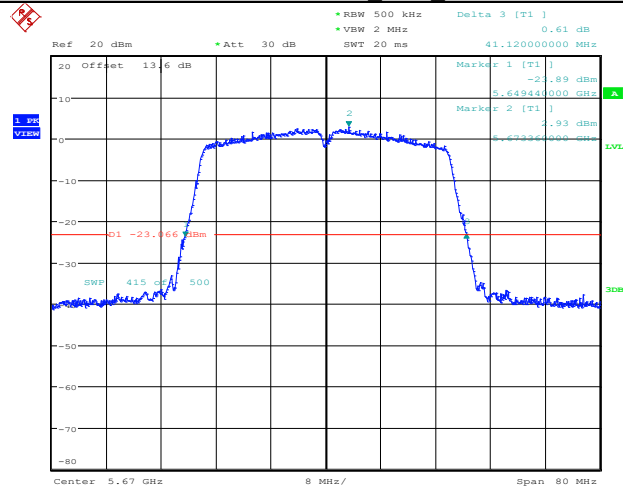
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11AC40SISO Ant1 5590



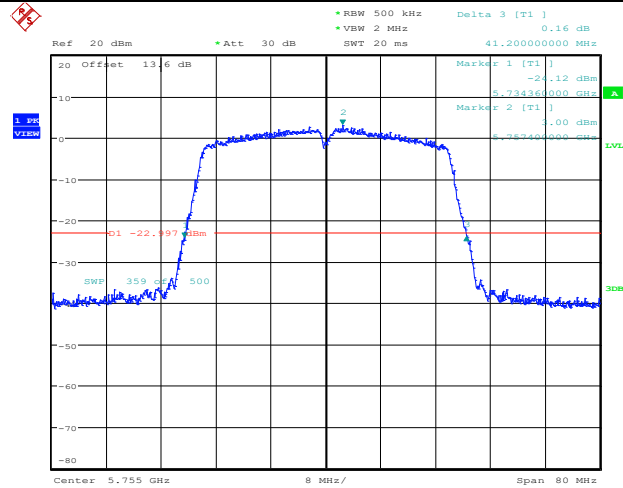
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11AC40SISO Ant1 5670



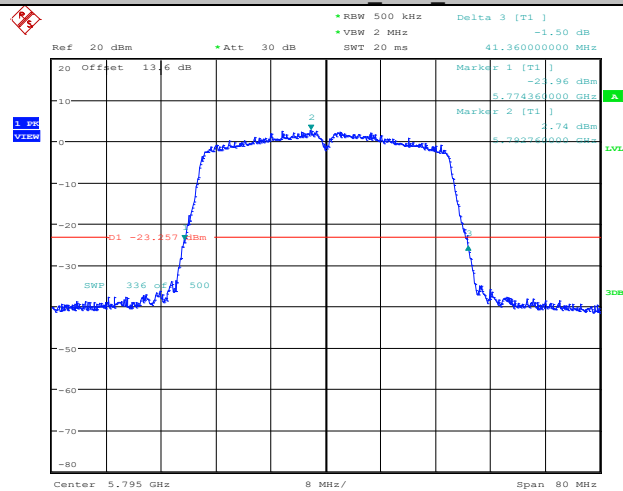
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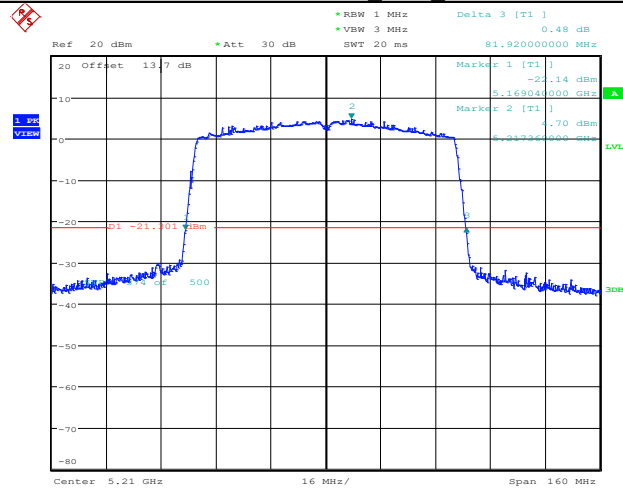
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11AC40SISO Ant1 5795



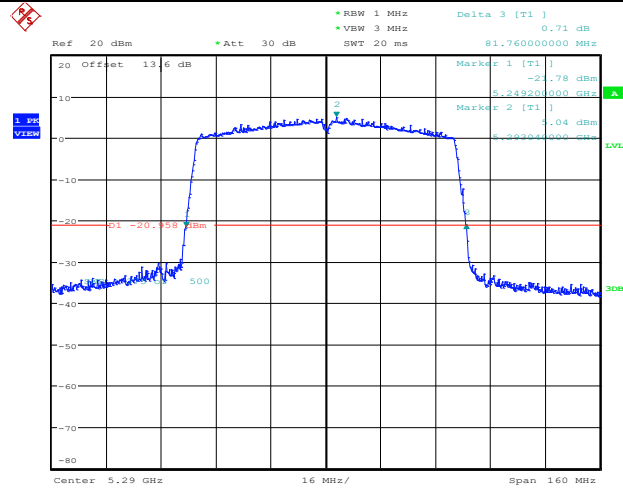
Date: 11.FEB.2022 14:05:38

11AC80SISO Ant1 5210



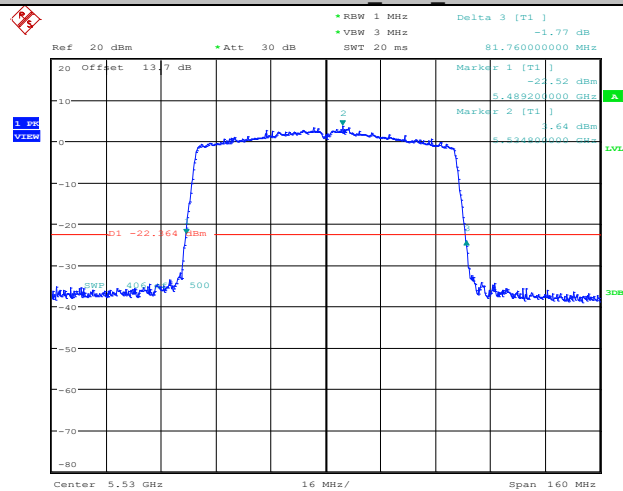
Date: 11.FEB.2022 14:11:34

11AC80SISO Ant1 5290



Date: 11.FEB.2022 14:14:27

11AC80SISO Ant1 5530



Date: 11.FEB.2022 14:19:23



8. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

8.1.Limits of Maximum Conducted Output Power Measurement

CFR 47 (FCC) part 15.407 (a)

For the band 5.15–5.25 GHz.

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz, the maximum antenna gain does not exceed 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

8.2.Test Procedure

(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

The EUT is configured to transmit continuously or to transmit with a constant duty cycle.

At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.

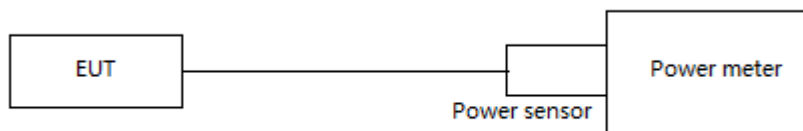
The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(ii) If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in section II.B.

(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(iv) Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g. $10 \log (1/0.25)$ if the duty cycle is 25%). the measurement result.

8.3.Test Setup



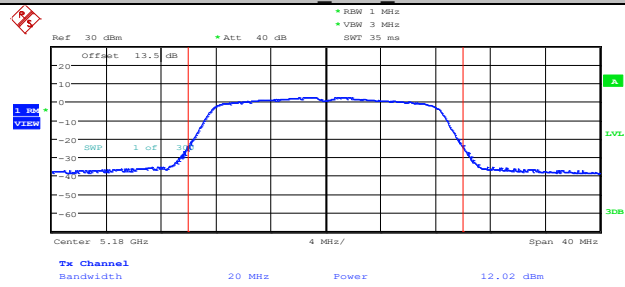
8.4.Test Data

Table 11 Maximum Conducted Output Power Test Data

Test Mode	Test Channel [MHz]	Level [dBm]	10log(1/x) Factor [dB]	Power [dBm]	Limit [dBm]	Verdict
802.11a	5180	12.02	0.15	12.17	<=23.98	PASS
802.11a	5200	12.27	0.15	12.42	<=23.98	PASS
802.11a	5240	12.29	0.15	12.44	<=23.98	PASS
802.11a	5260	11.94	0.15	12.09	<=23.98	PASS
802.11a	5280	12.01	0.15	12.16	<=23.98	PASS
802.11a	5320	12.29	0.15	12.44	<=23.98	PASS
802.11a	5500	11.28	0.15	11.43	<=23.98	PASS
802.11a	5600	10.73	0.15	10.88	<=23.98	PASS
802.11a	5700	10.73	0.15	10.88	<=23.98	PASS
802.11a	5745	10.68	0.15	10.83	<=30	PASS
802.11a	5785	10.79	0.15	10.94	<=30	PASS
802.11a	5825	10.14	0.15	10.29	<=30	PASS
802.11n HT20	5180	10.97	0.13	11.10	<=23.98	PASS
802.11n HT20	5200	11.87	0.13	12.00	<=23.98	PASS
802.11n HT20	5240	12.05	0.13	12.18	<=23.98	PASS
802.11n HT20	5260	11.89	0.13	12.02	<=23.98	PASS
802.11n HT20	5280	12.08	0.13	12.21	<=23.98	PASS
802.11n HT20	5320	11.91	0.13	12.04	<=23.98	PASS
802.11n HT20	5500	10.32	0.13	10.45	<=23.98	PASS
802.11n HT20	5600	10.18	0.13	10.31	<=23.98	PASS
802.11n HT20	5700	10.72	0.13	10.85	<=23.98	PASS
802.11n HT20	5745	10.16	0.13	10.29	<=30	PASS
802.11n HT20	5785	9.94	0.13	10.07	<=30	PASS
802.11n HT20	5825	9.30	0.13	9.43	<=30	PASS
802.11n HT40	5190	11.79	0.33	12.12	<=23.98	PASS
802.11n HT40	5230	11.98	0.33	12.31	<=23.98	PASS
802.11n HT40	5270	11.86	0.33	12.19	<=23.98	PASS
802.11n HT40	5310	11.88	0.33	12.21	<=23.98	PASS
802.11n HT40	5510	10.81	0.33	11.14	<=23.98	PASS
802.11n HT40	5590	10.57	0.33	10.90	<=23.98	PASS
802.11n HT40	5670	10.84	0.33	11.17	<=23.98	PASS
802.11n HT40	5755	10.57	0.33	10.90	<=30	PASS
802.11n HT40	5795	10.64	0.33	10.97	<=30	PASS
802.11ac VHT20	5180	11.66	0.16	11.82	<=23.98	PASS
802.11ac VHT20	5200	11.76	0.16	11.92	<=23.98	PASS
802.11ac VHT20	5240	12.18	0.16	12.34	<=23.98	PASS
802.11ac VHT20	5260	11.81	0.16	11.97	<=23.98	PASS
802.11ac VHT20	5280	11.92	0.16	12.08	<=23.98	PASS
802.11ac VHT20	5320	11.80	0.16	11.96	<=23.98	PASS
802.11ac VHT20	5500	10.91	0.16	11.07	<=23.98	PASS
802.11ac VHT20	5600	10.45	0.16	10.61	<=23.98	PASS
802.11ac VHT20	5700	10.31	0.16	10.47	<=23.98	PASS
802.11ac VHT20	5745	10.49	0.16	10.65	<=30	PASS
802.11ac VHT20	5785	10.70	0.16	10.86	<=30	PASS
802.11ac VHT20	5825	9.97	0.16	10.13	<=30	PASS
802.11ac VHT40	5190	11.50	0.32	11.82	<=23.98	PASS
802.11ac VHT40	5230	11.82	0.32	12.14	<=23.98	PASS
802.11ac VHT40	5270	11.67	0.32	11.99	<=23.98	PASS
802.11ac VHT40	5310	11.76	0.32	12.08	<=23.98	PASS
802.11ac VHT40	5510	10.68	0.32	11.00	<=23.98	PASS
802.11ac VHT40	5590	10.33	0.32	10.65	<=23.98	PASS
802.11ac VHT40	5670	10.51	0.32	10.83	<=23.98	PASS
802.11ac VHT40	5755	10.45	0.32	10.77	<=30	PASS
802.11ac VHT40	5795	10.23	0.32	10.55	<=30	PASS
802.11ac VHT80	5210	12.29	0.63	12.92	<=23.98	PASS
802.11ac VHT80	5290	12.05	0.63	12.68	<=23.98	PASS
802.11ac VHT80	5530	10.99	0.63	11.62	<=23.98	PASS

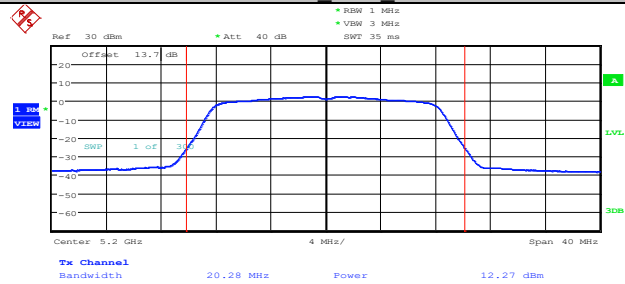
802.11ac VHT80	5610	11.02	0.63	11.65	<=23.98	PASS
802.11ac VHT80	5775	11.71	0.63	12.34	<=30	PASS

11A Ant1_5180



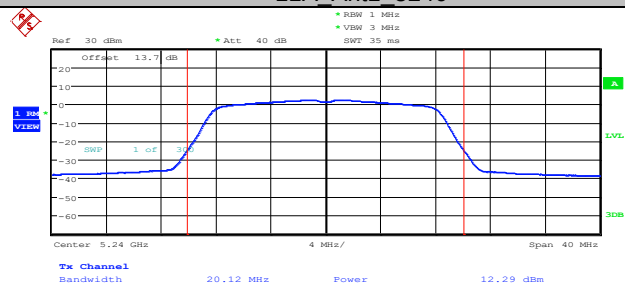
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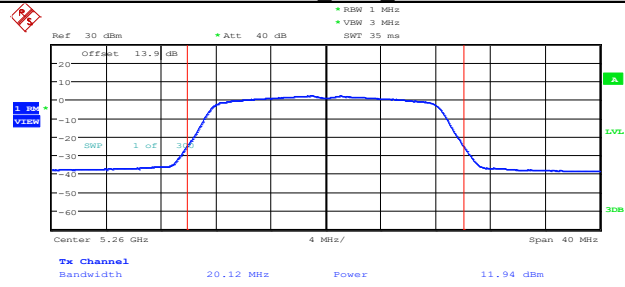
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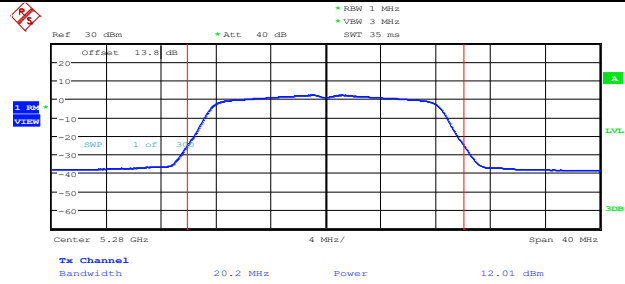
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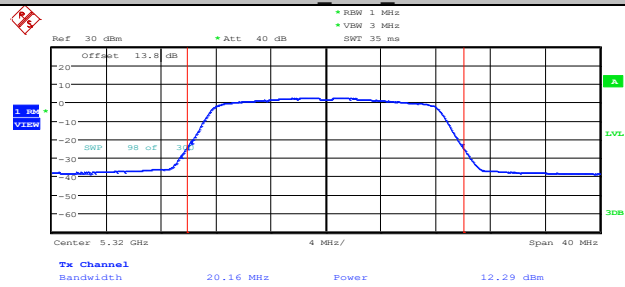
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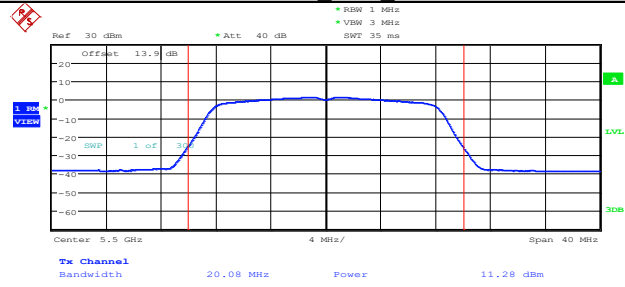
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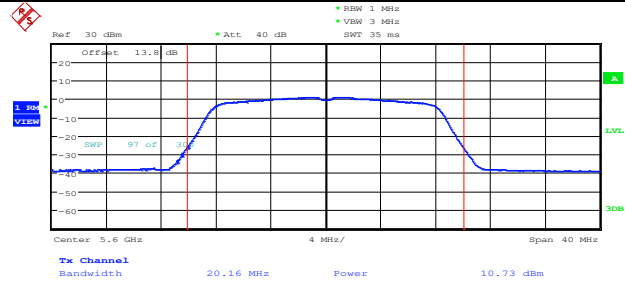
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11A Ant1_5500



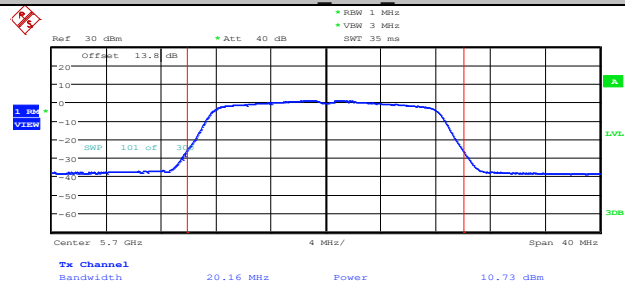
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11A Ant1_5600



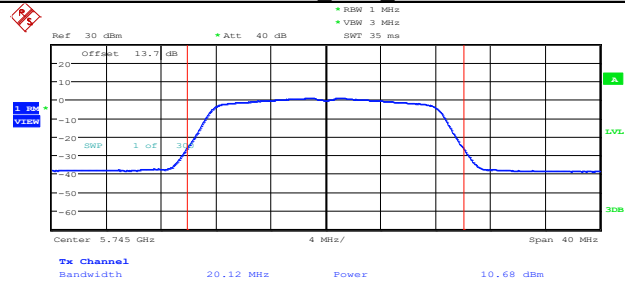
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11A Ant1_5700



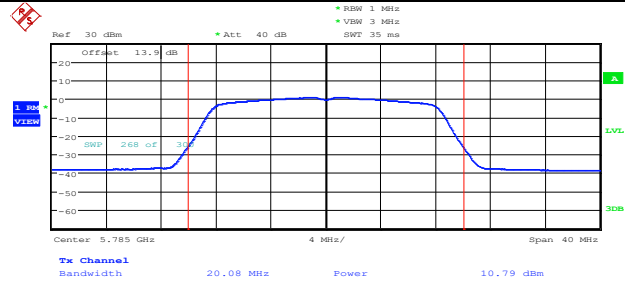
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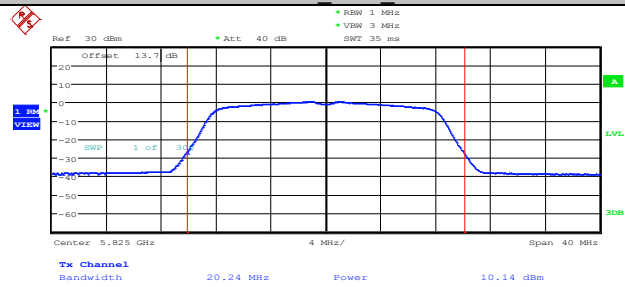
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11A Ant1_5785



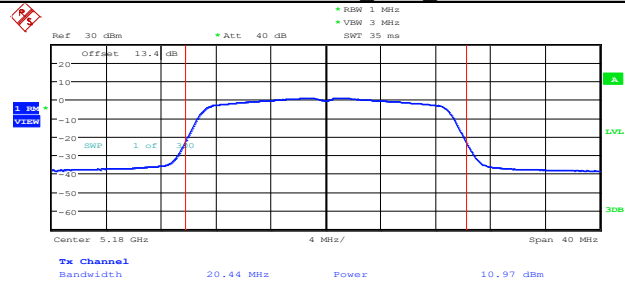
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11A Ant1_5825



Date: 11.FEB.2022 10:19:02

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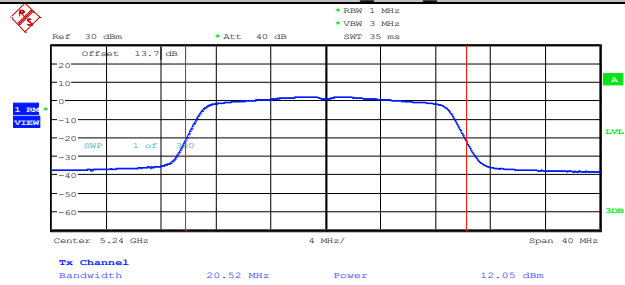
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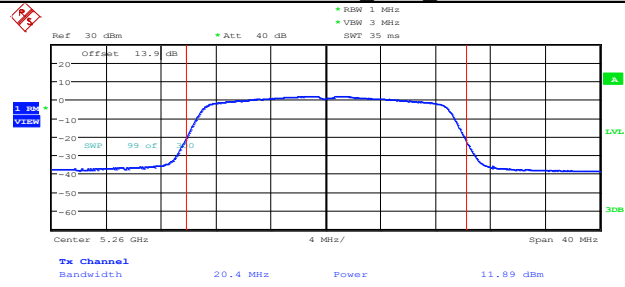
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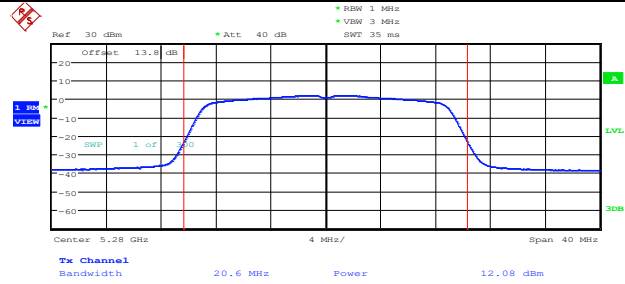
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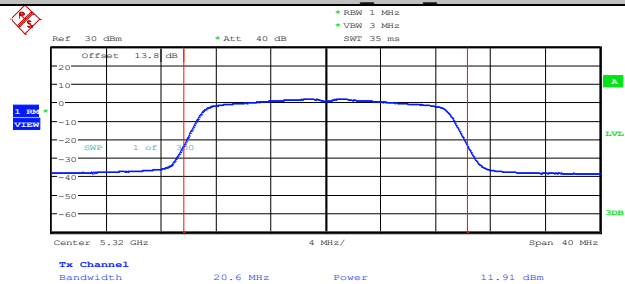
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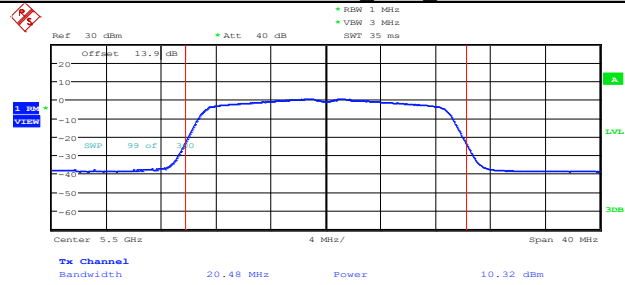
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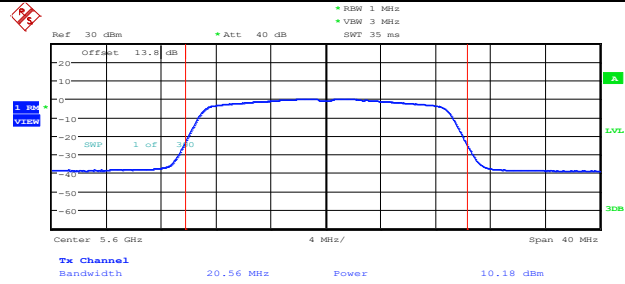
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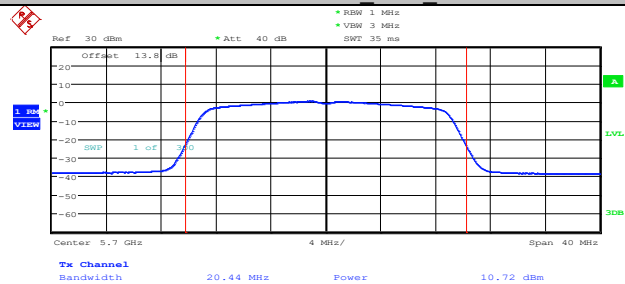
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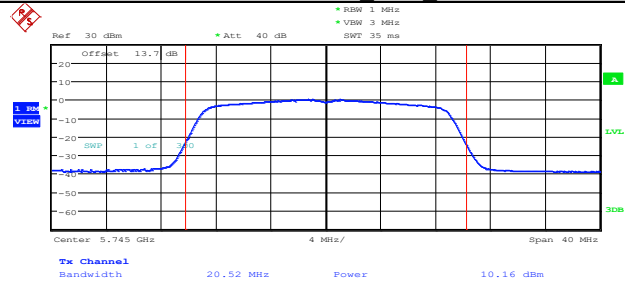
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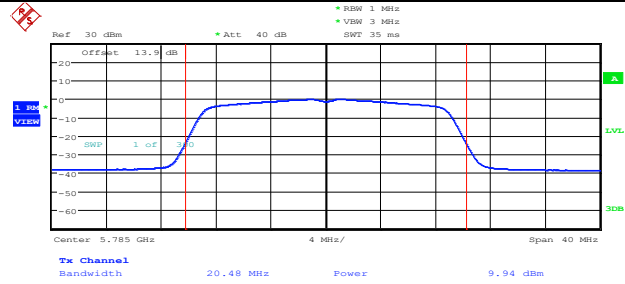
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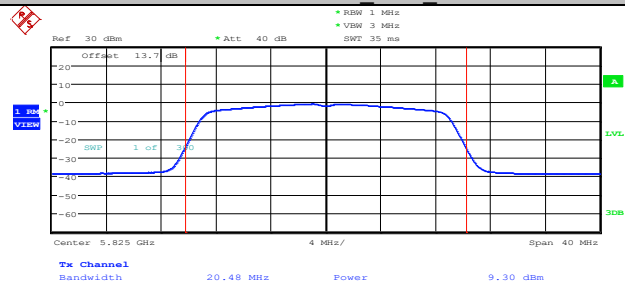
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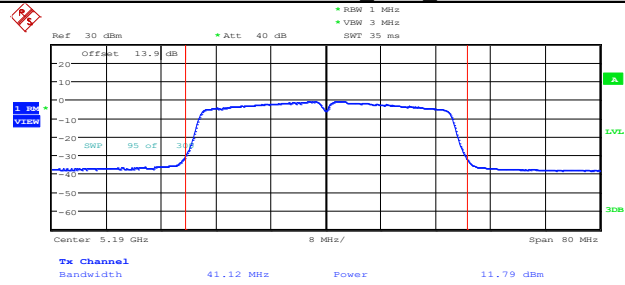
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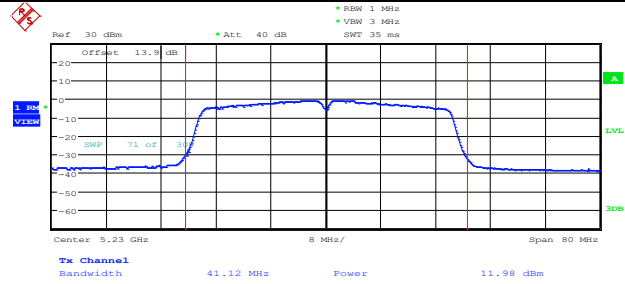
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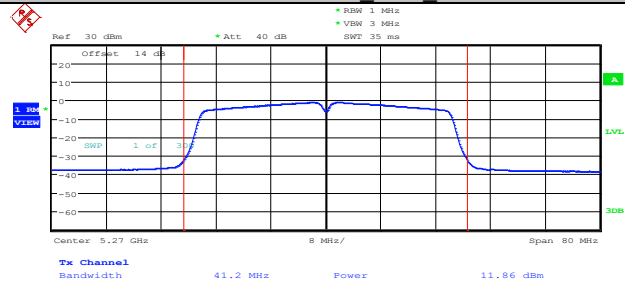
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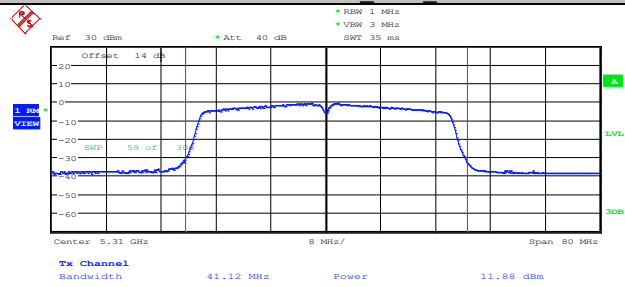
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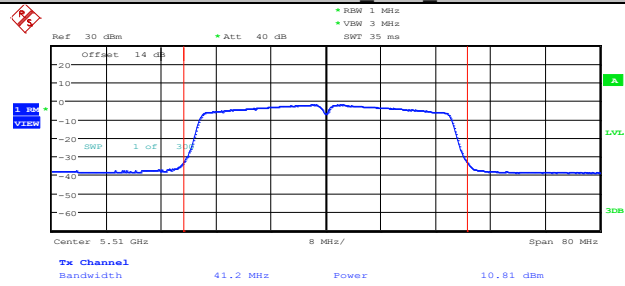
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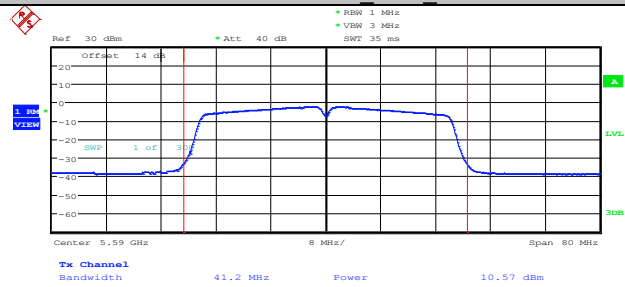
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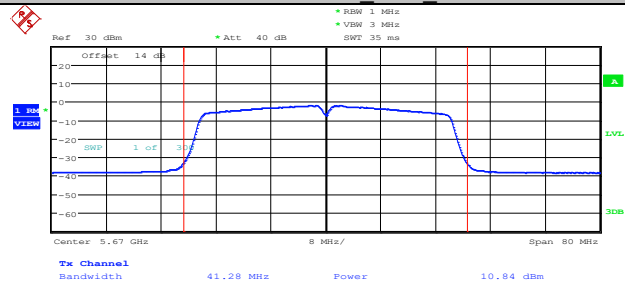
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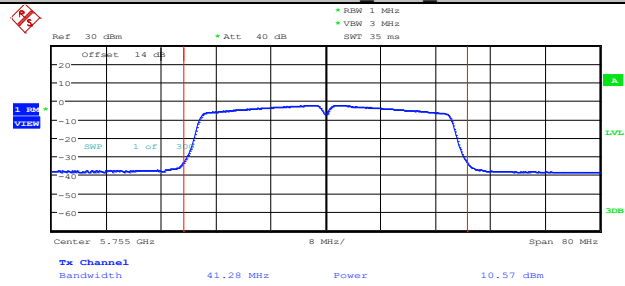
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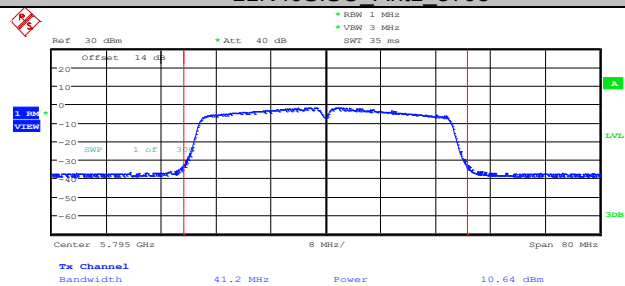
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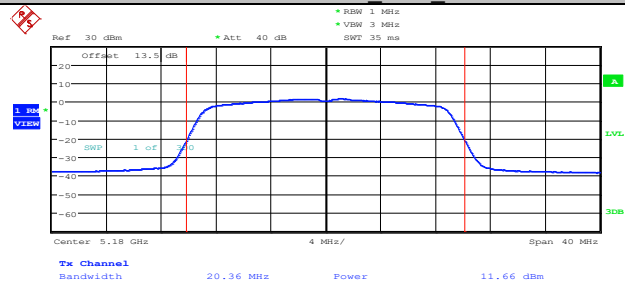
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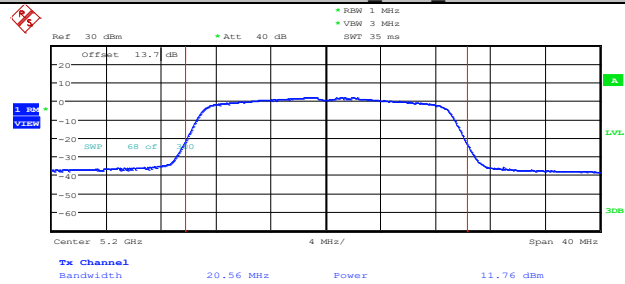
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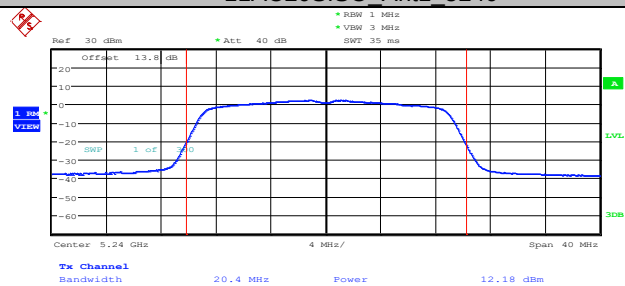
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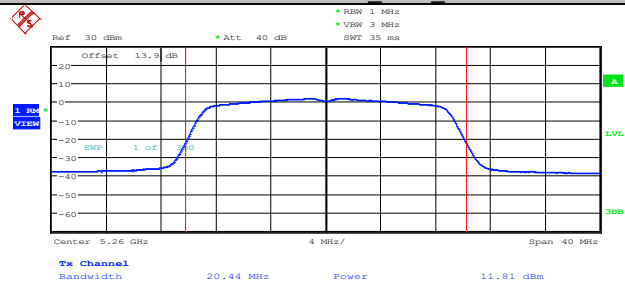
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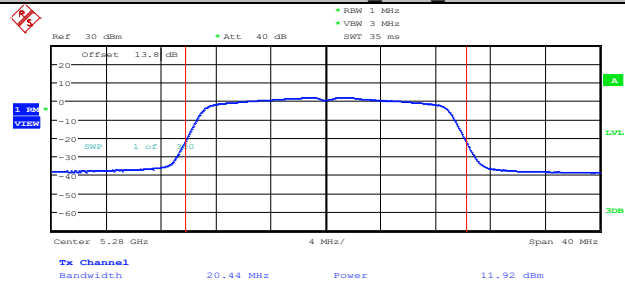
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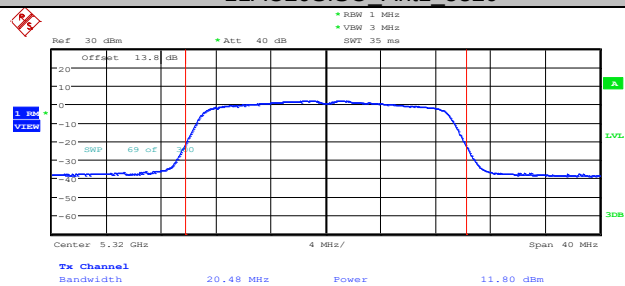
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11AC20SISO Ant1_5280



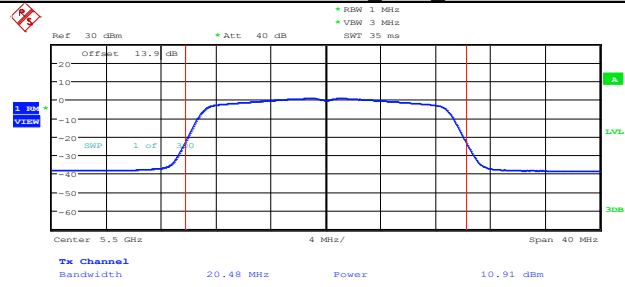
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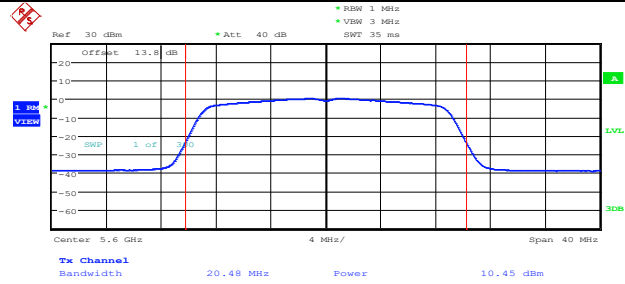
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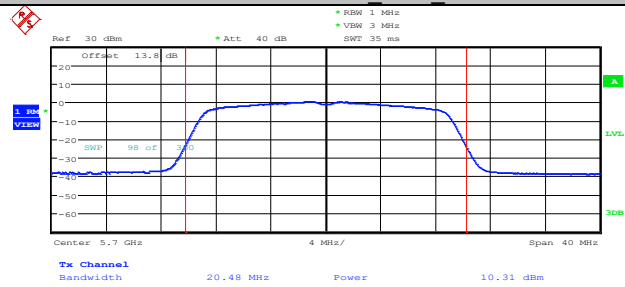
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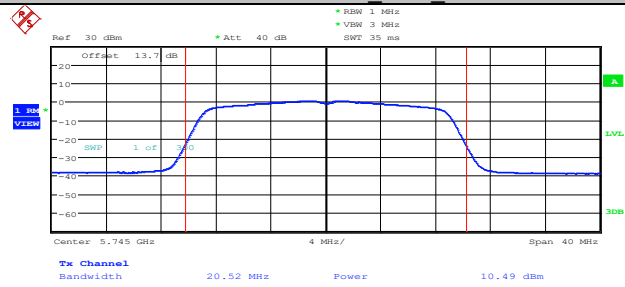
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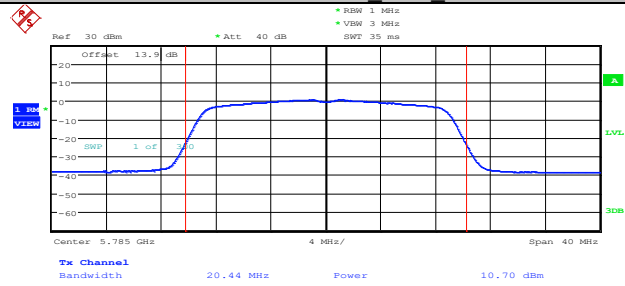
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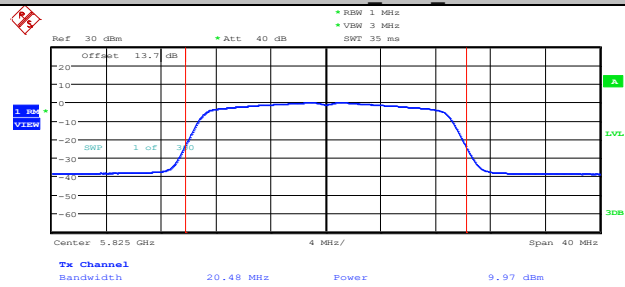
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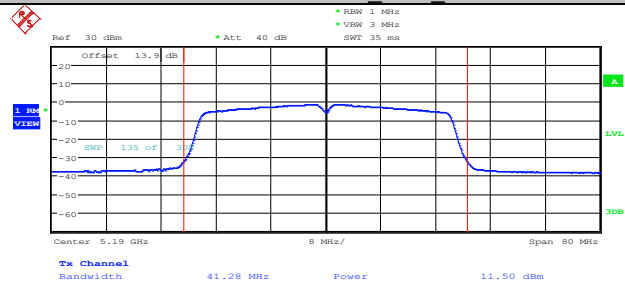
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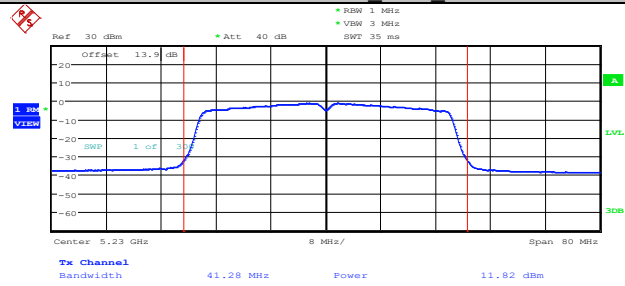
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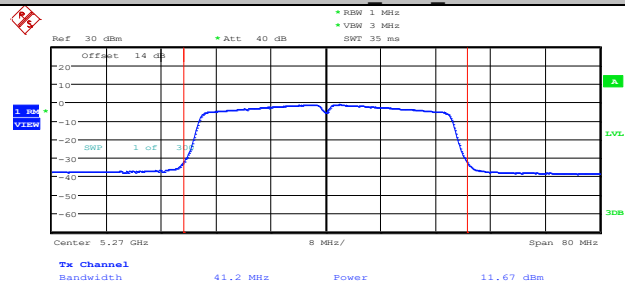
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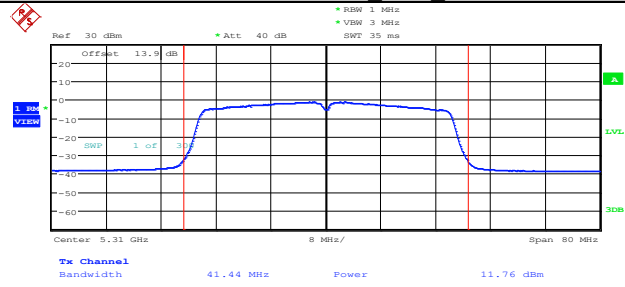
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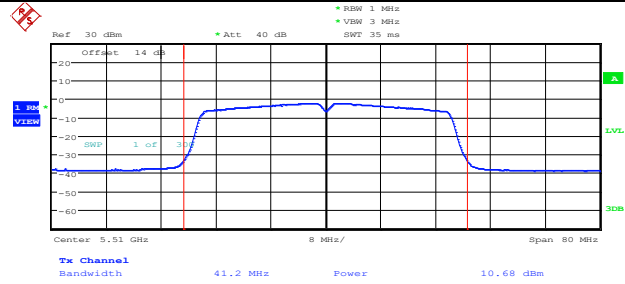
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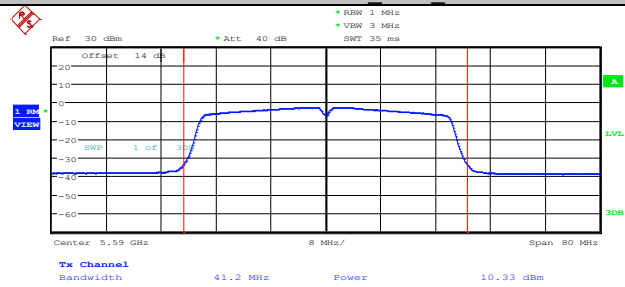
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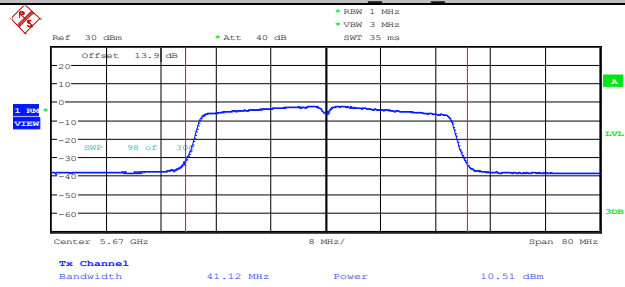
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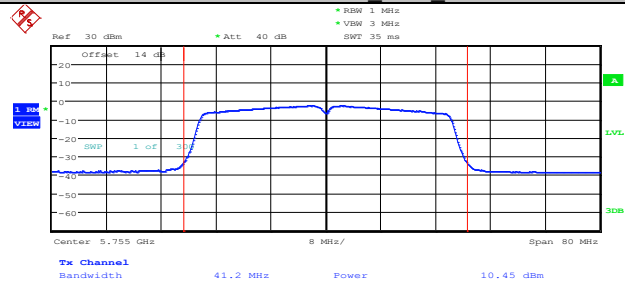
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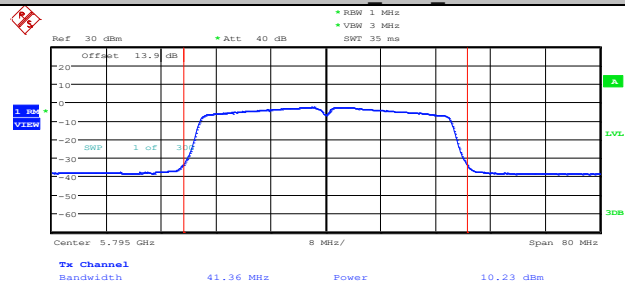
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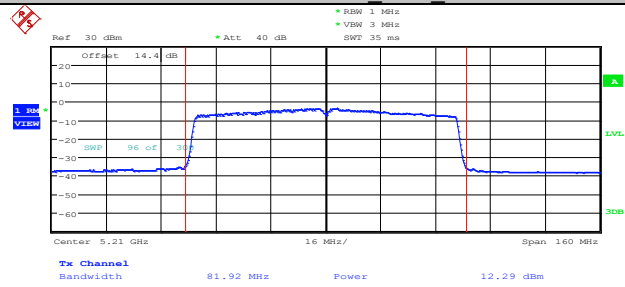
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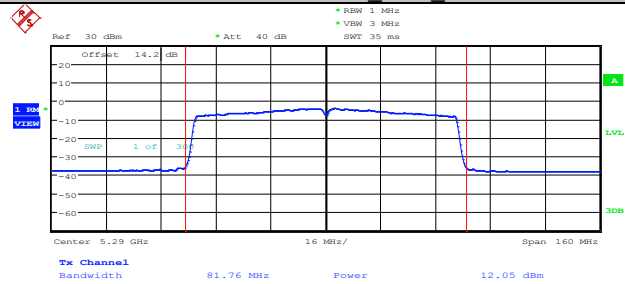
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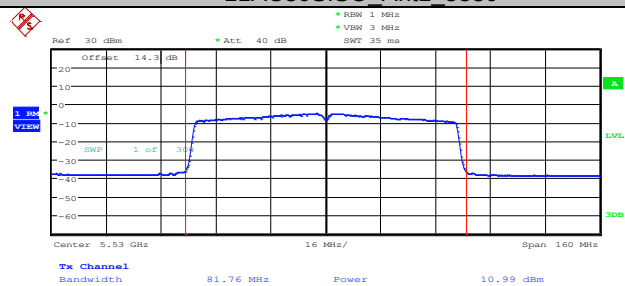
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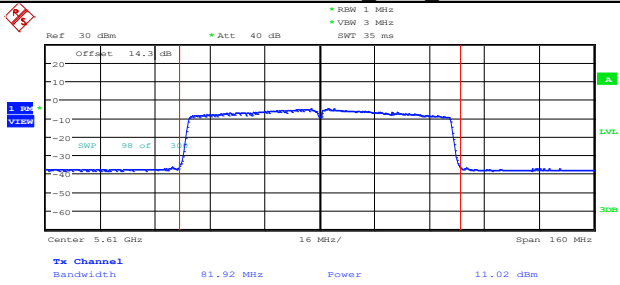
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11AC80SISO Ant1_5530



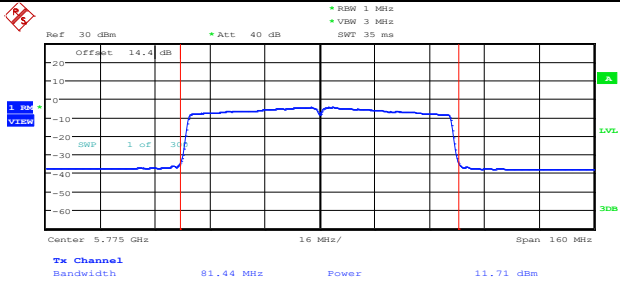
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11AC80SISO_Ant1_5610



Date: 11.FEB.2022 14:27:04

11AC80SISO_Ant1_5775



Date: 11.FEB.2022 14:39:14

9. MAXIMUM POWER SPECTRAL DENSITY LEVEL MEASUREMENT

9.1.Limits of Maximum Power Spectral Density Level Measurement

CFR 47 (FCC) part 15.407 (a)

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.2.Test Procedure

- 1.Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...." (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
 - a) If Method SA-2 or SA-2 Alternative was used, add $10 \log (1/x)$, where x is the duty cycle, to the peak of the spectrum.
 - b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 MHz reference bandwidth.
5. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less

than 1 MHz, or

500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and 789033 D02 General UNII Test Procedures New Rules v01r02 Page 10 integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).

b) Set $VBW \geq 3$ RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500 \text{ kHz}/RBW)$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10 \log (1\text{MHz}/RBW)$ to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections

5.c) and 5.d) above, since $RBW=100$ KHZ is available on nearly all spectrum analyzers.

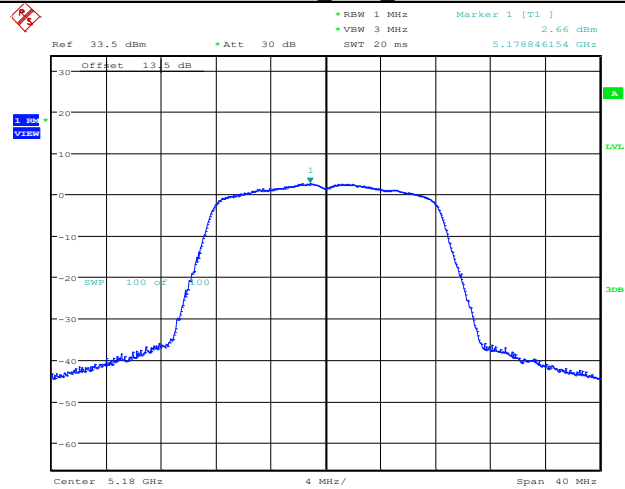
9.3. Test Data

Table 12 Maximum Power Spectral Density Level Test Data

Test Mode	Test Channel [MHz]	Level [dBm/MHz]	10log(1/x) Factor [dB]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
802.11a	5180	2.66	0.15	2.81	<=11	PASS
802.11a	5200	3.31	0.15	3.46	<=11	PASS
802.11a	5240	3.37	0.15	3.52	<=11	PASS
802.11a	5260	3.1	0.15	3.25	<=11	PASS
802.11a	5280	3.08	0.15	3.23	<=11	PASS
802.11a	5320	3.04	0.15	3.19	<=11	PASS
802.11a	5500	1.96	0.15	2.11	<=11	PASS
802.11a	5600	1.55	0.15	1.70	<=11	PASS
802.11a	5700	1.51	0.15	1.66	<=11	PASS
802.11a	5745	-0.37	0.15	-0.22	<=30	PASS
802.11a	5785	-0.29	0.15	-0.14	<=30	PASS
802.11a	5825	-1.21	0.15	-1.06	<=30	PASS
802.11n HT20	5180	1.58	0.13	1.71	<=11	PASS
802.11n HT20	5200	2.44	0.13	2.57	<=11	PASS
802.11n HT20	5240	2.54	0.13	2.67	<=11	PASS
802.11n HT20	5260	2.41	0.13	2.54	<=11	PASS
802.11n HT20	5280	2.6	0.13	2.73	<=11	PASS
802.11n HT20	5320	2.47	0.13	2.60	<=11	PASS
802.11n HT20	5500	1.18	0.13	1.31	<=11	PASS
802.11n HT20	5600	0.64	0.13	0.77	<=11	PASS
802.11n HT20	5700	1.3	0.13	1.43	<=11	PASS
802.11n HT20	5745	-1.42	0.13	-1.29	<=30	PASS
802.11n HT20	5785	-1.17	0.13	-1.04	<=30	PASS
802.11n HT20	5825	-2.03	0.13	-1.90	<=30	PASS
802.11n HT40	5190	-0.18	0.33	0.15	<=11	PASS
802.11n HT40	5230	-0.19	0.33	0.14	<=11	PASS
802.11n HT40	5270	-0.24	0.33	0.09	<=11	PASS
802.11n HT40	5310	-0.13	0.33	0.20	<=11	PASS
802.11n HT40	5510	-1.46	0.33	-1.13	<=11	PASS
802.11n HT40	5590	-1.63	0.33	-1.30	<=11	PASS
802.11n HT40	5670	-1.07	0.33	-0.74	<=11	PASS
802.11n HT40	5755	-3.87	0.33	-3.54	<=30	PASS
802.11n HT40	5795	-3.68	0.33	-3.35	<=30	PASS
802.11ac VHT20	5180	2.37	0.16	2.53	<=11	PASS
802.11ac VHT20	5200	2.45	0.16	2.61	<=11	PASS
802.11ac VHT20	5240	2.87	0.16	3.03	<=11	PASS
802.11ac VHT20	5260	2.42	0.16	2.58	<=11	PASS

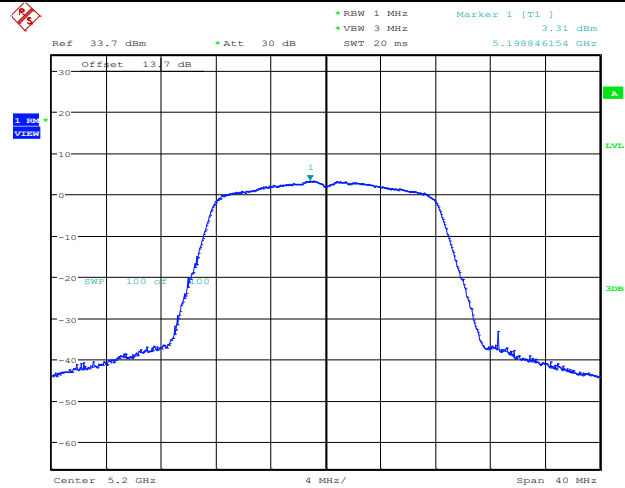
802.11ac VHT20	5280	2.62	0.16	2.78	<=11	PASS
802.11ac VHT20	5320	2.3	0.16	2.46	<=11	PASS
802.11ac VHT20	5500	1.5	0.16	1.66	<=11	PASS
802.11ac VHT20	5600	0.97	0.16	1.13	<=11	PASS
802.11ac VHT20	5700	1.09	0.16	1.25	<=11	PASS
802.11ac VHT20	5745	-0.38	0.16	-0.22	<=30	PASS
802.11ac VHT20	5785	-0.32	0.16	-0.16	<=30	PASS
802.11ac VHT20	5825	-1.13	0.16	-0.97	<=30	PASS
802.11ac VHT40	5190	-0.63	0.32	-0.31	<=11	PASS
802.11ac VHT40	5230	-0.38	0.32	-0.06	<=11	PASS
802.11ac VHT40	5270	-0.43	0.32	-0.11	<=11	PASS
802.11ac VHT40	5310	-0.42	0.32	-0.10	<=11	PASS
802.11ac VHT40	5510	-1.6	0.32	-1.28	<=11	PASS
802.11ac VHT40	5590	-1.91	0.32	-1.59	<=11	PASS
802.11ac VHT40	5670	-1.71	0.32	-1.39	<=11	PASS
802.11ac VHT40	5755	-3.72	0.32	-3.40	<=30	PASS
802.11ac VHT40	5795	-3.96	0.32	-3.64	<=30	PASS
802.11ac VHT80	5210	-2.75	0.63	-2.12	<=11	PASS
802.11ac VHT80	5290	-2.97	0.63	-2.34	<=11	PASS
802.11ac VHT80	5530	-3.97	0.63	-3.34	<=11	PASS
802.11ac VHT80	5610	-3.97	0.63	-3.34	<=11	PASS
802.11ac VHT80	5775	-4.99	0.63	-4.36	<=30	PASS

11A Ant1 5180



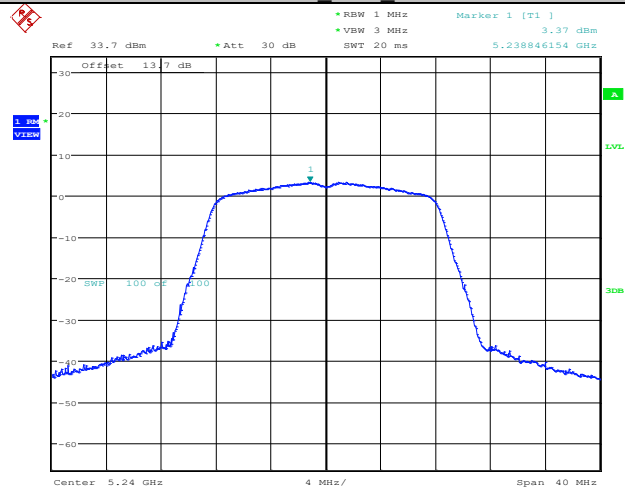
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11A Ant1 5200



Date: 11.FEB.2022 09:41:48

11A Ant1 5240



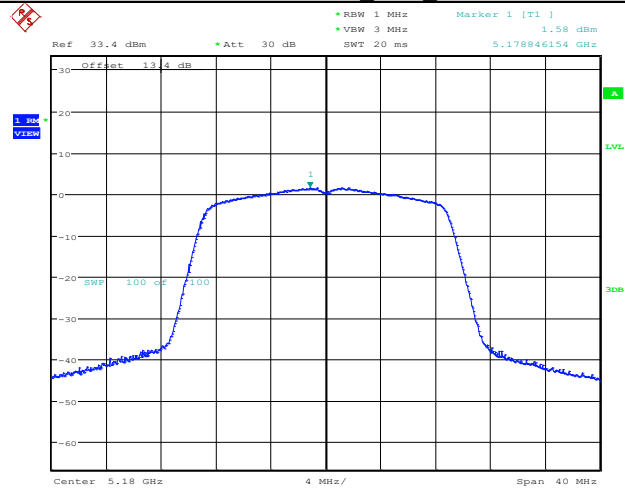
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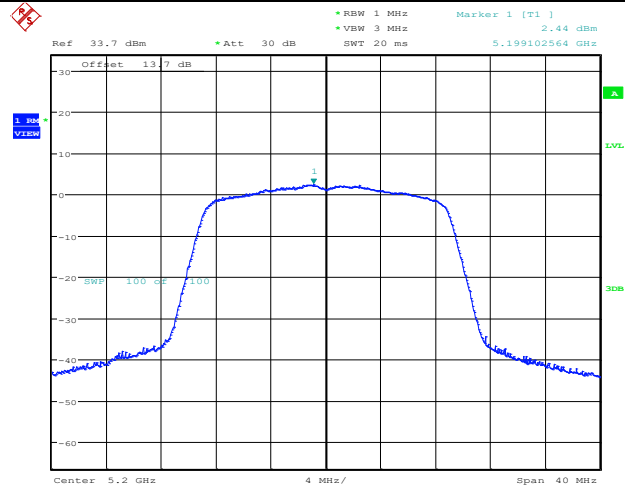


11N20SISO_Ant1_5180



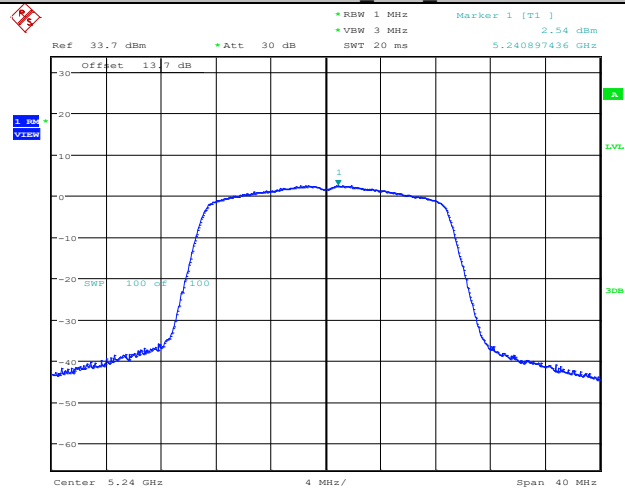
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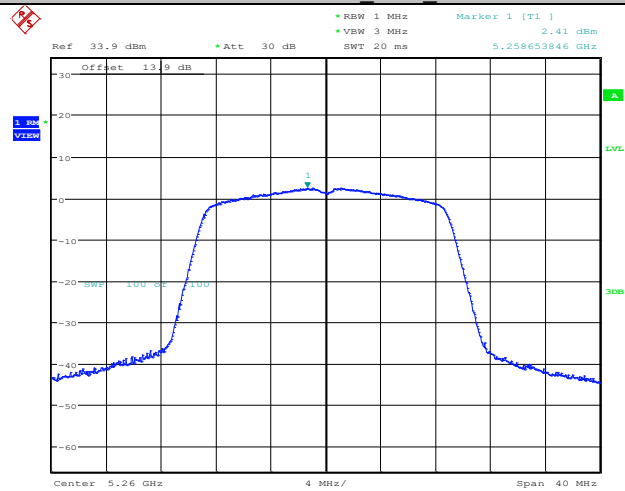
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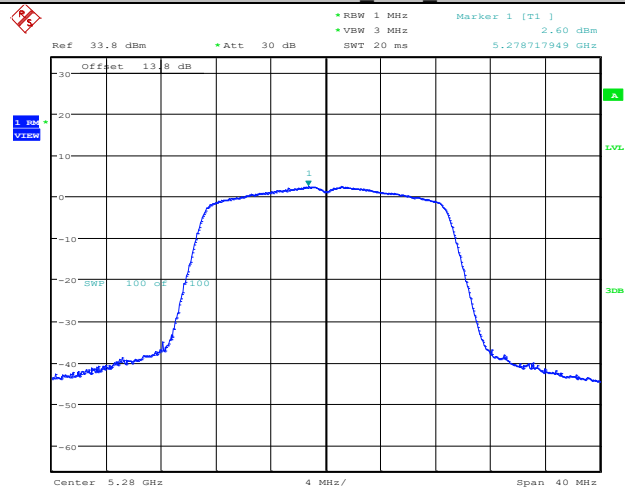
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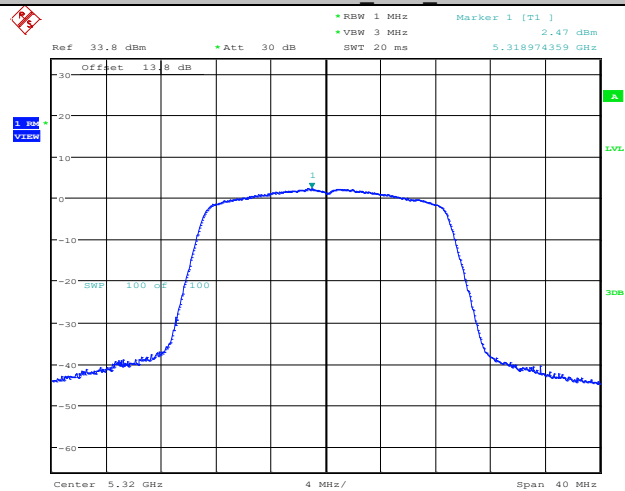
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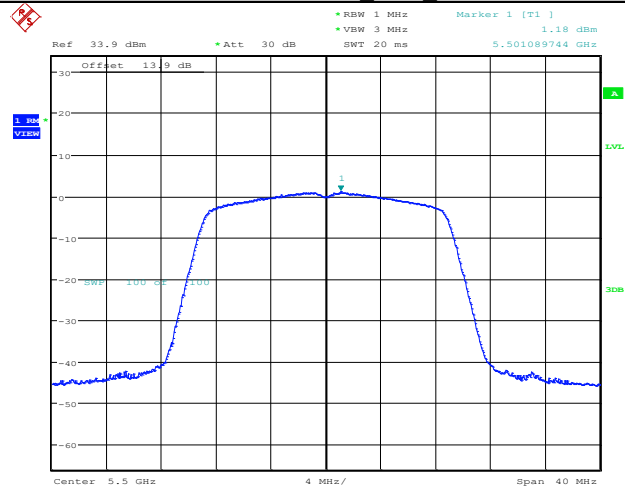
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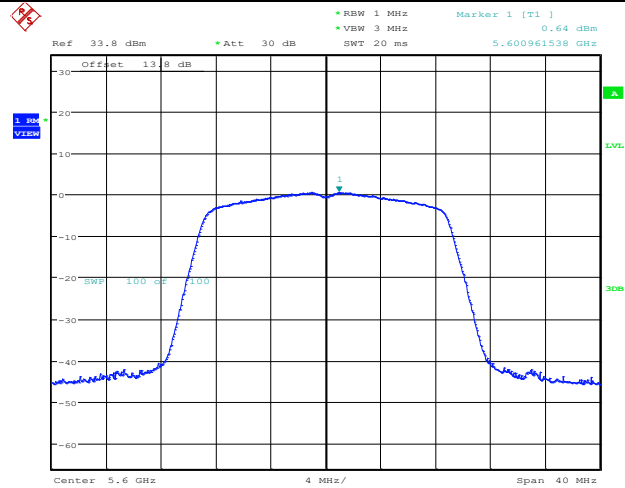
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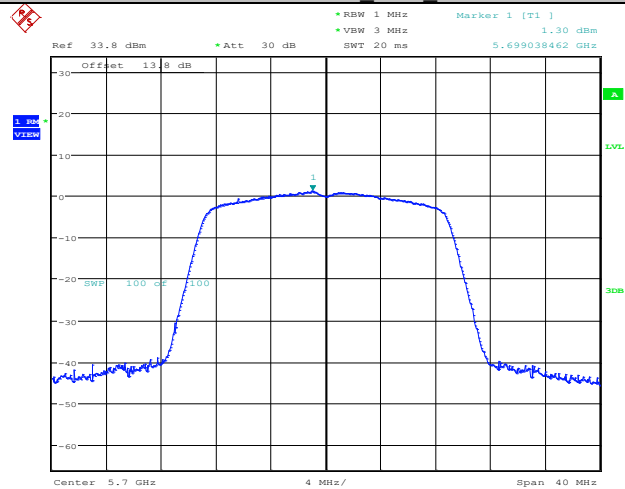
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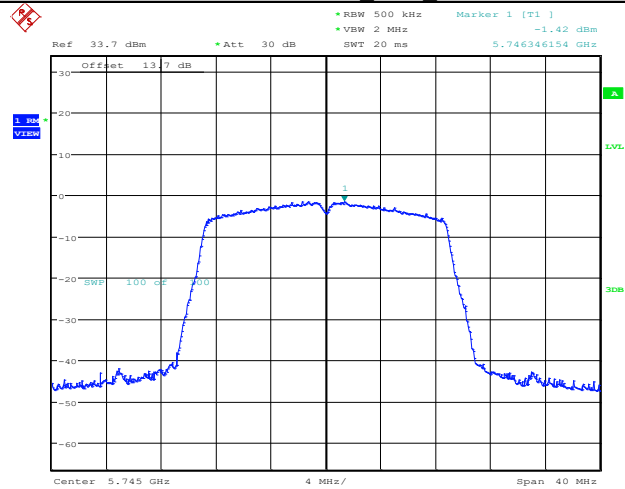
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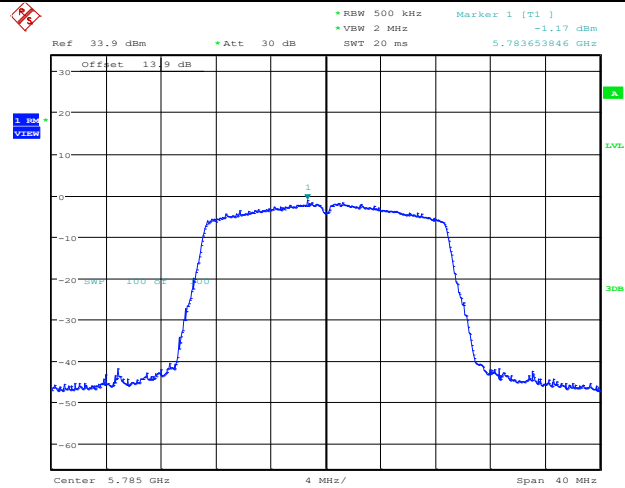
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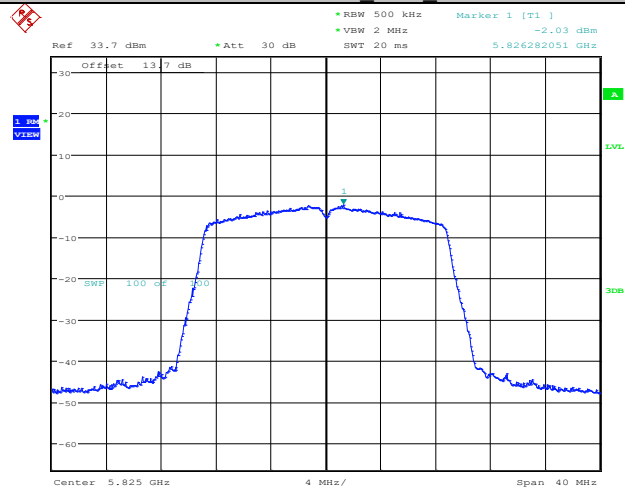
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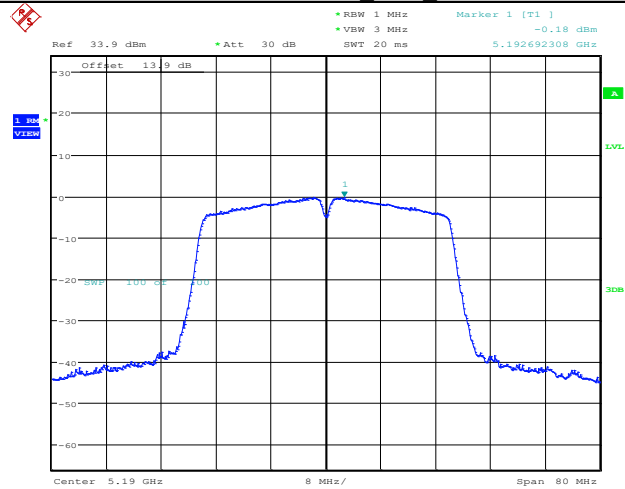
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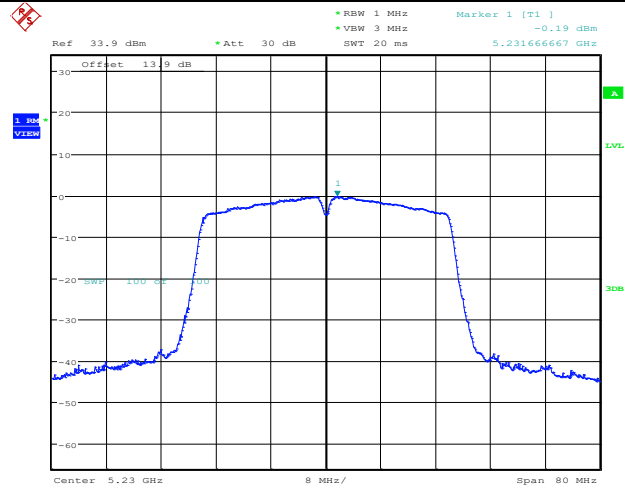
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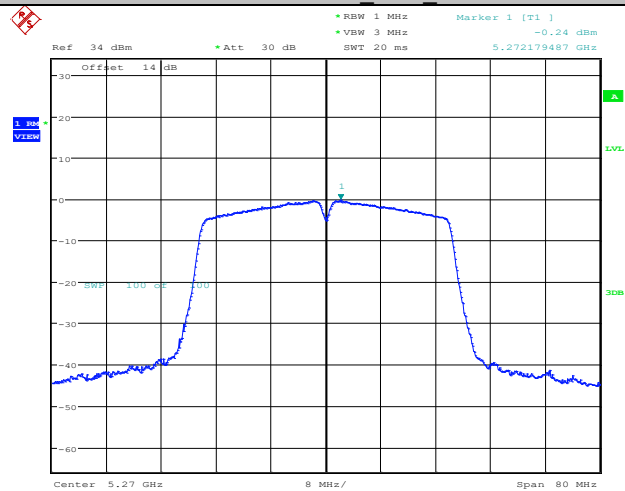
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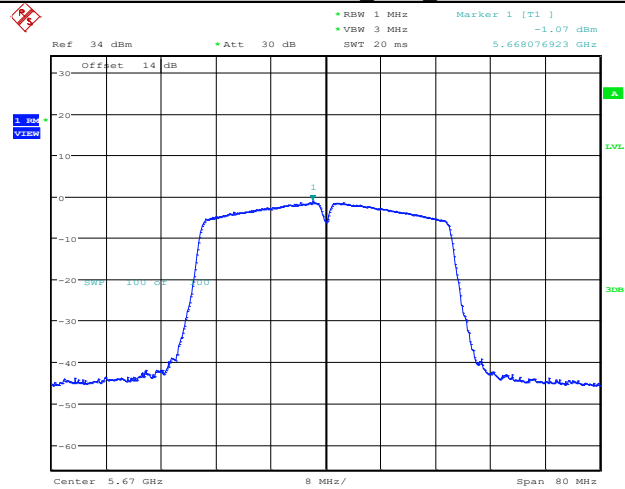
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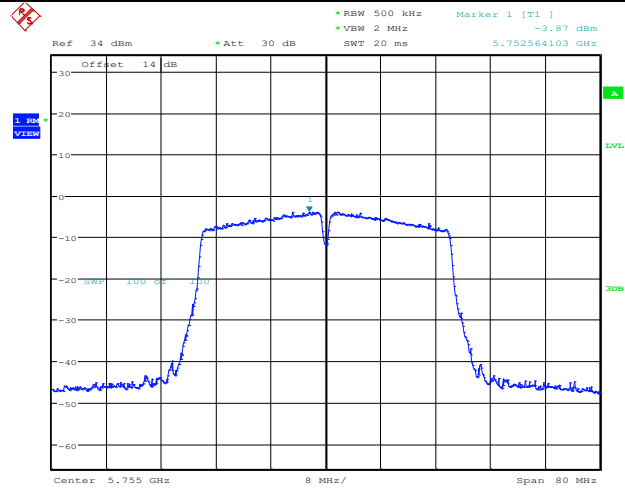


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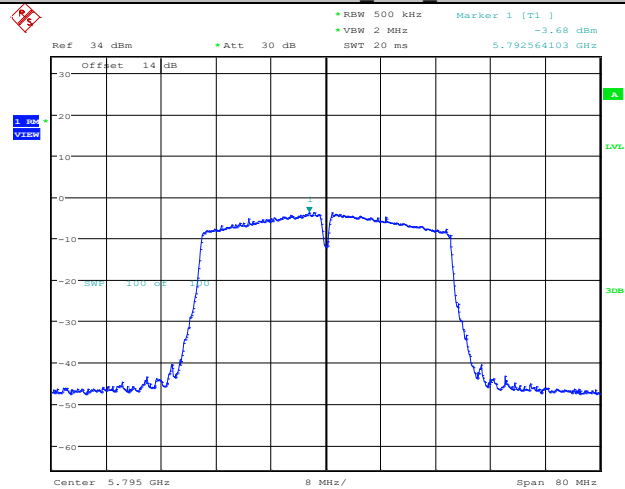
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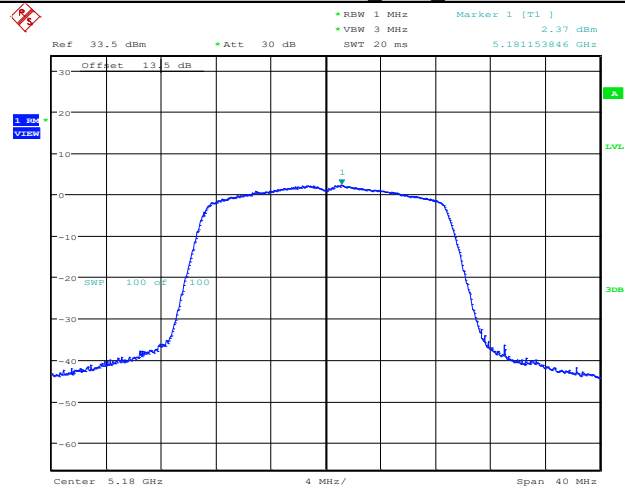
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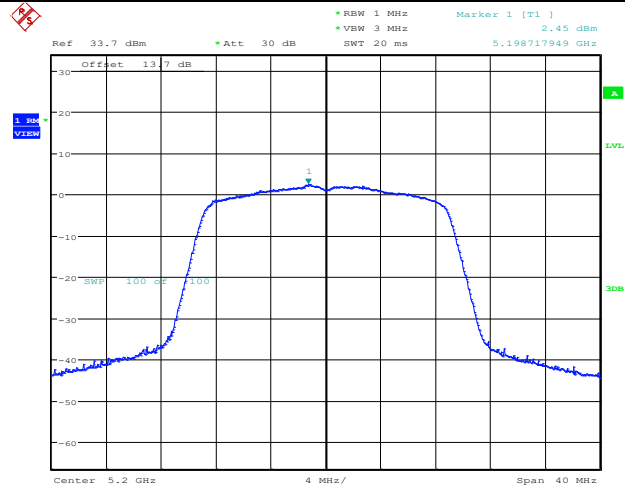
Date: 11.FEB.2022 11:37:48

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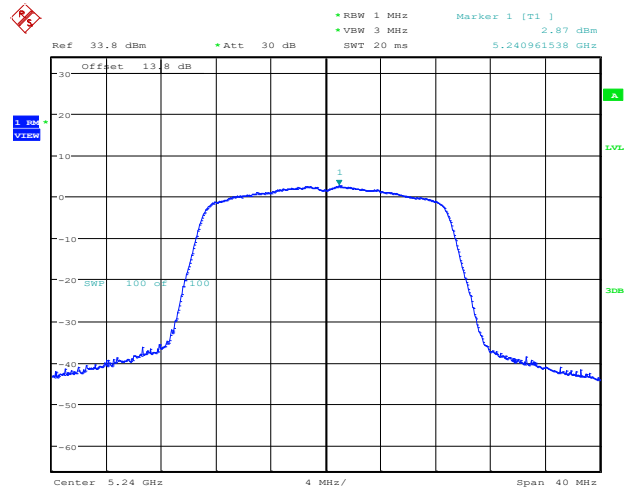
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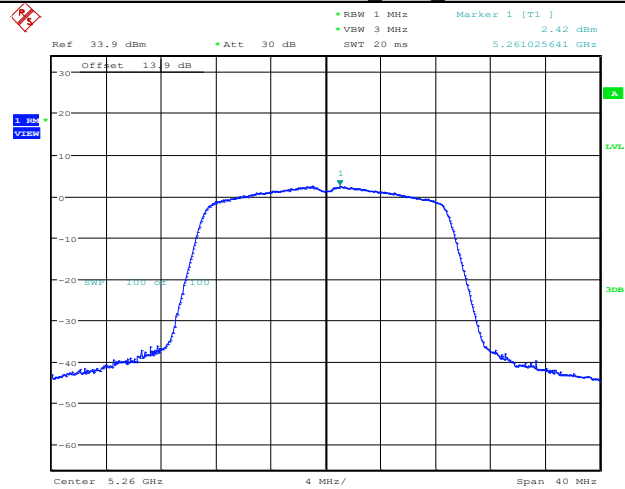
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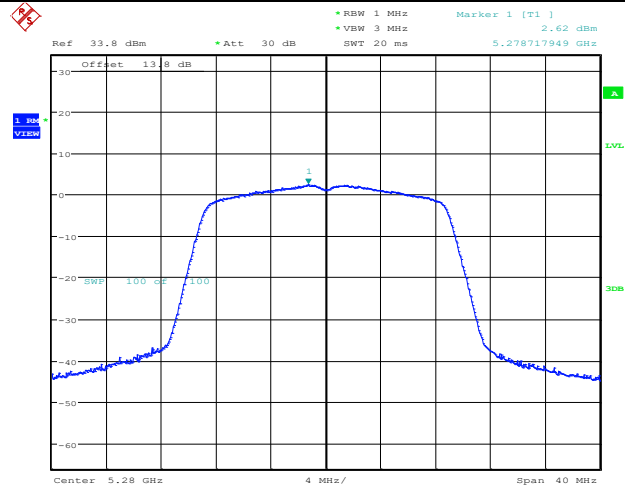
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11AC20SISO Ant1_5260



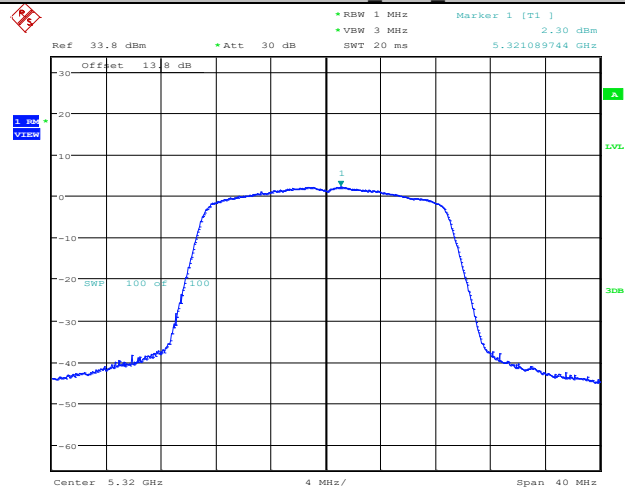
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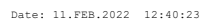
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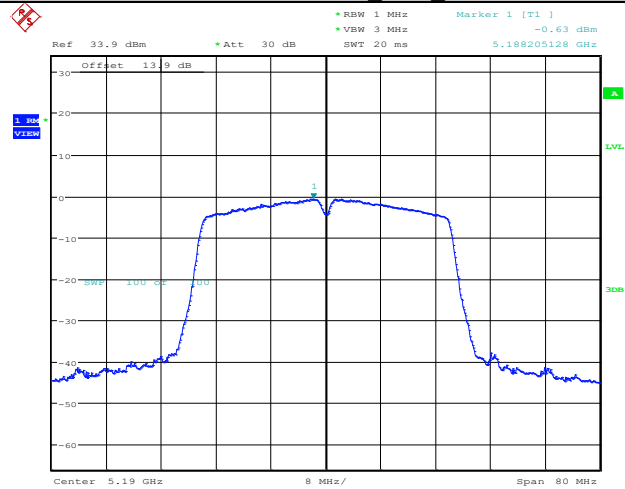


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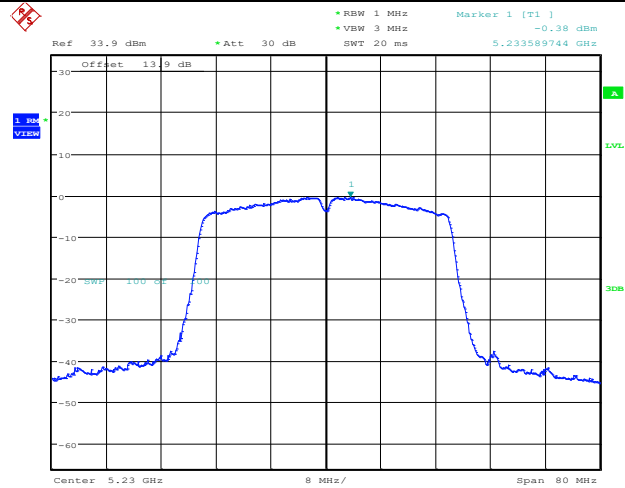


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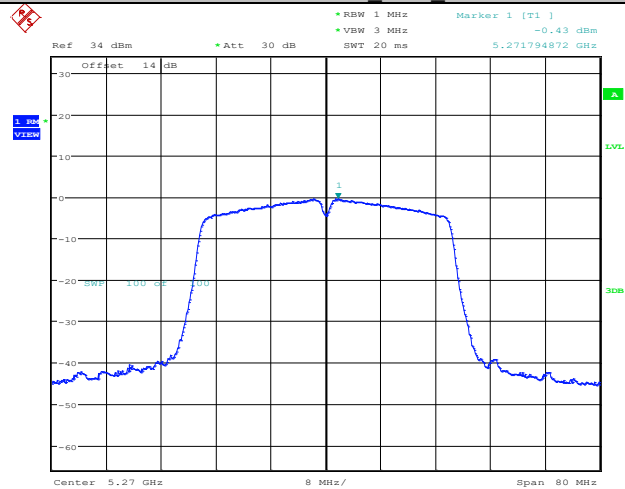
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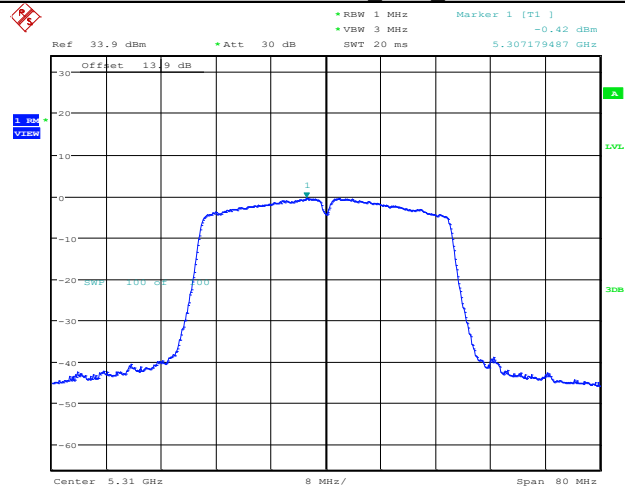
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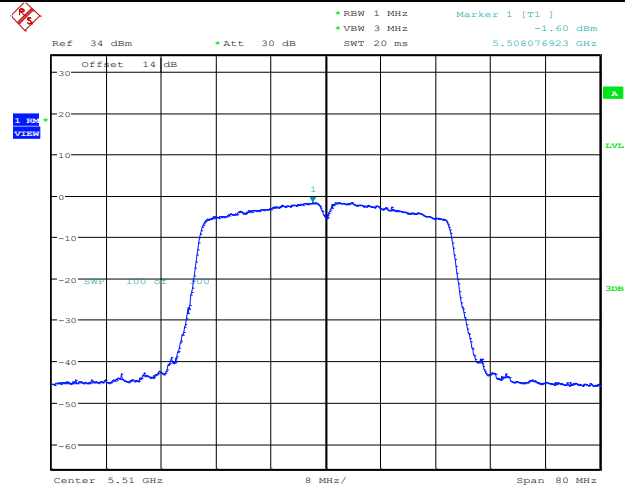
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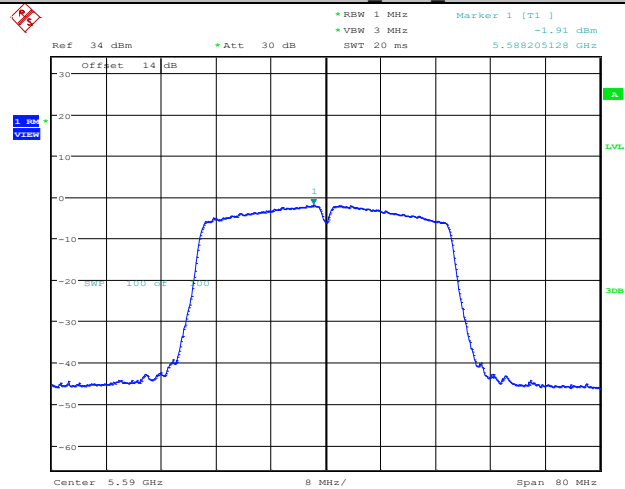
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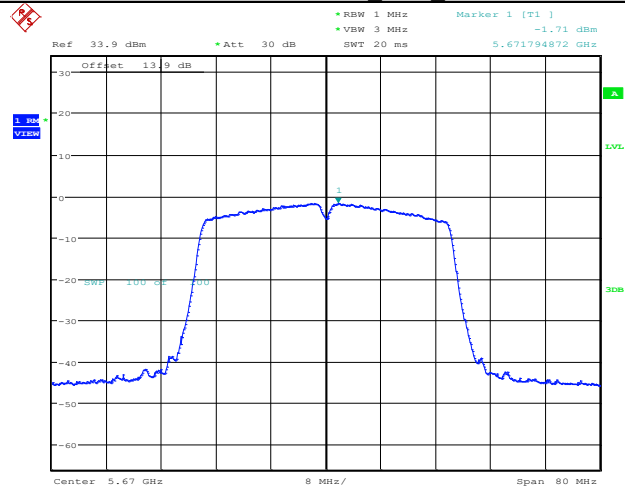
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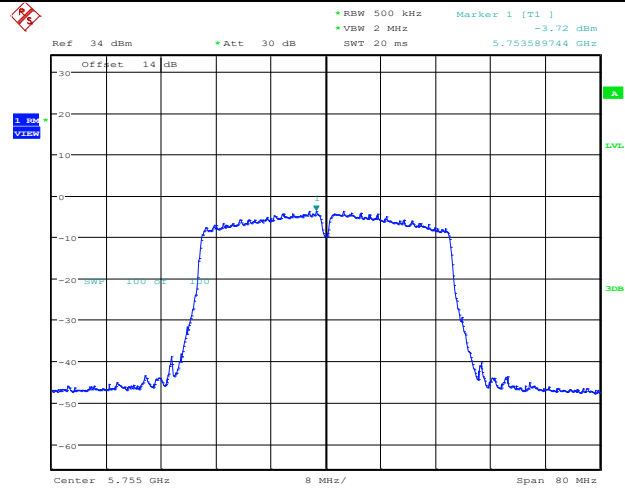
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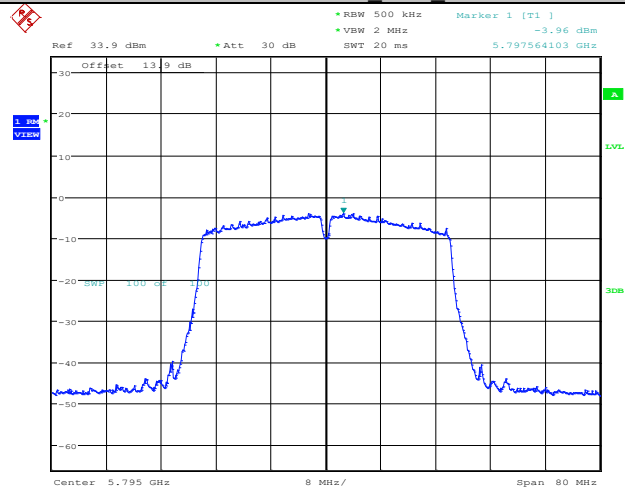
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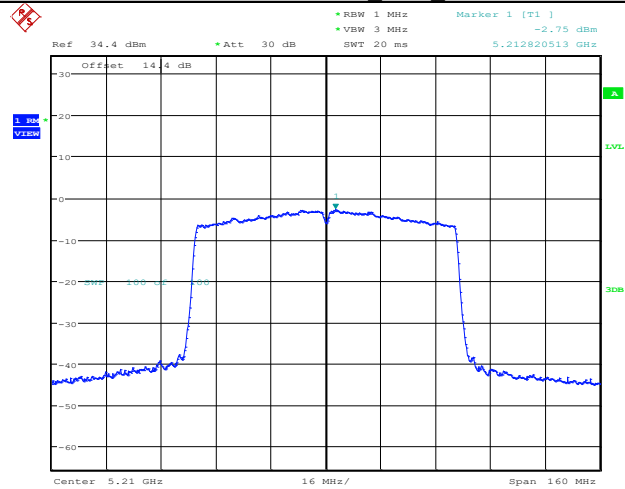
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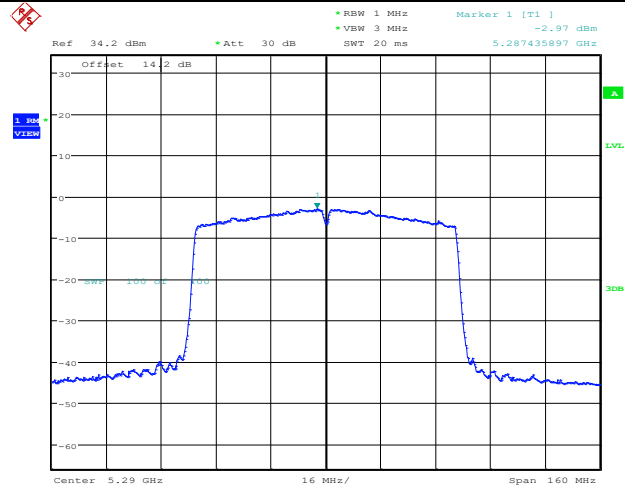
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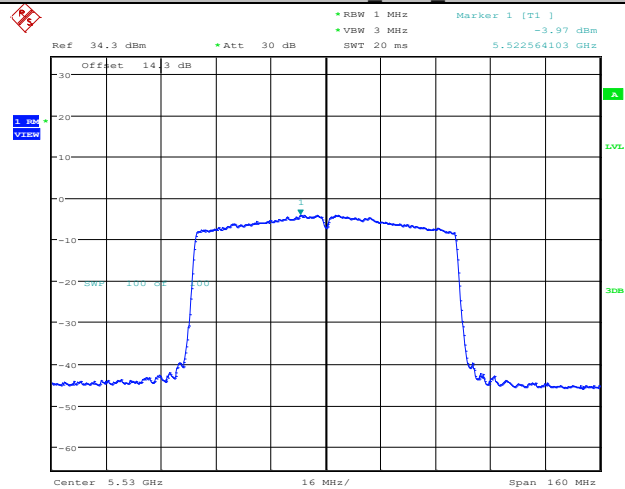
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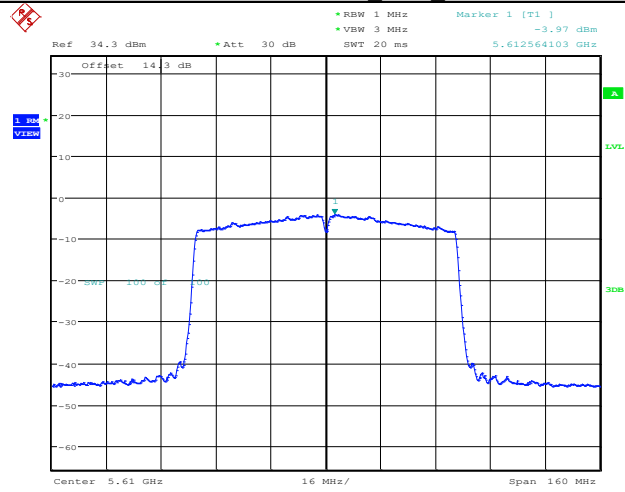
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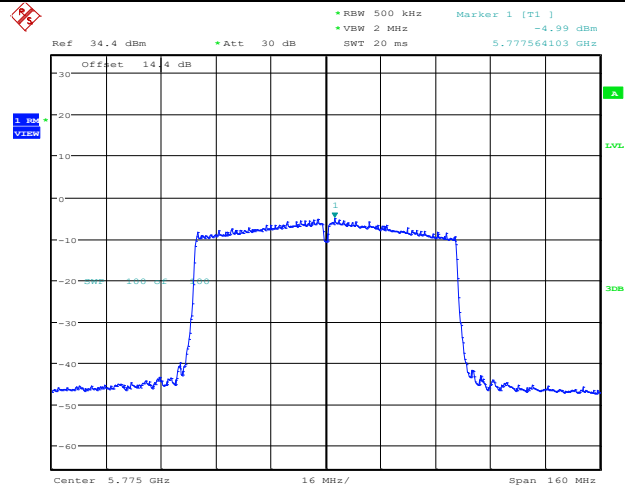
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11AC80SISO Ant1_5610



Date: 11.FEB.2022 14:27:16

11AC80SISO Ant1_5775



Date: 11.FEB.2022 14:39:25

10. RADIATED BANDEDGE AND SPURIOUS MEASUREMENT

10.1. LIMITS OF Radiated Bandedge and Spurious Measurement

FCC Part 15.205 and 15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

FCC Part 15.407(b)

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

10.2. TEST PROCEDURE

1. The testing follows the guidelines in ANSI C63.10-2020
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. For measurement below 1GHz, the EUT was placed on a turntable with 0.8 meter, above ground. For measurement above 1 GHz, test at FAR, the EUT is placed on a non-conductive table, which is 1.5 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f > 1$ GHz for peak measurement.

Set RBW = 1 MHz, and VBW=1/T (on time) for average measurement.

10.3.TEST DATA

9 kHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20Db lower than the limit line per 15.31(o) was not reported.

Table 13 Radiated Emission Test Data 9k Hz-30MHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBμV/m)	Level (dBμV/m)	Polarity (Horizontal/ Vertical)	Limit (dBμV/m)	Margin (dB)	Note
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--

30MHz-1GHz

Worst case is shown below for 30MHz-1GHz only.

The emissions don't show in following result tables are more than 20dB below the limits.

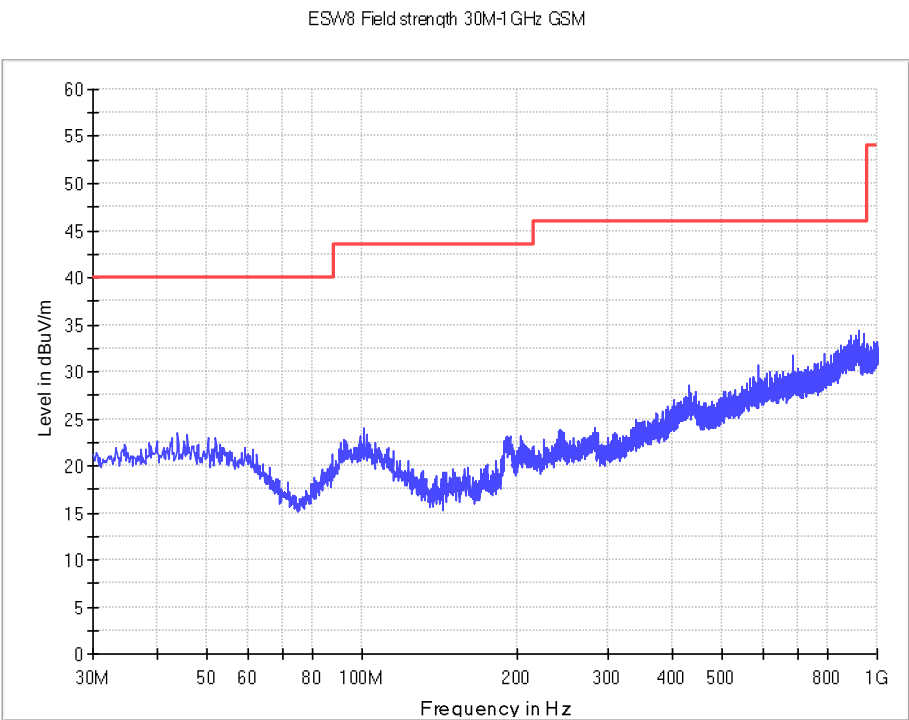
Table 14 Radiated Emission Test Data 30MHz-1GHz

Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBμV/m)	Level (dBμV/m)	Polarity (Horizontal/ Vertical)	Limit (dBμV/m)	Margin (dB)	Note
43.822	0.7	13.6	9.2	23.5	Horizontal	40	16.5	QP
100.931	1.1	13.2	9.8	24.1	Horizontal	43.5	19.4	QP
190.656	1.6	10.6	11.0	23.2	Horizontal	43.5	20.3	QP
432.550	2.5	15.5	10.6	28.6	Horizontal	46	17.4	QP
684.143	3.2	18.5	10.1	31.8	Horizontal	46	14.2	QP
920.823	3.9	21.1	9.3	34.3	Horizontal	46	11.7	QP
58.615	0.8	13.0	14.7	28.5	Vertical	40	11.5	QP
132.578	1.3	10.5	15.8	27.6	Vertical	43.5	15.9	QP
193.323	1.7	10.6	15.6	27.9	Vertical	43.5	15.6	QP
283.291	2.0	12.7	10.0	24.7	Vertical	46	21.3	QP
597.328	3.0	16.6	10.2	29.8	Vertical	46	16.2	QP
922.400	3.9	21.1	9.1	34.1	Vertical	46	11.9	QP

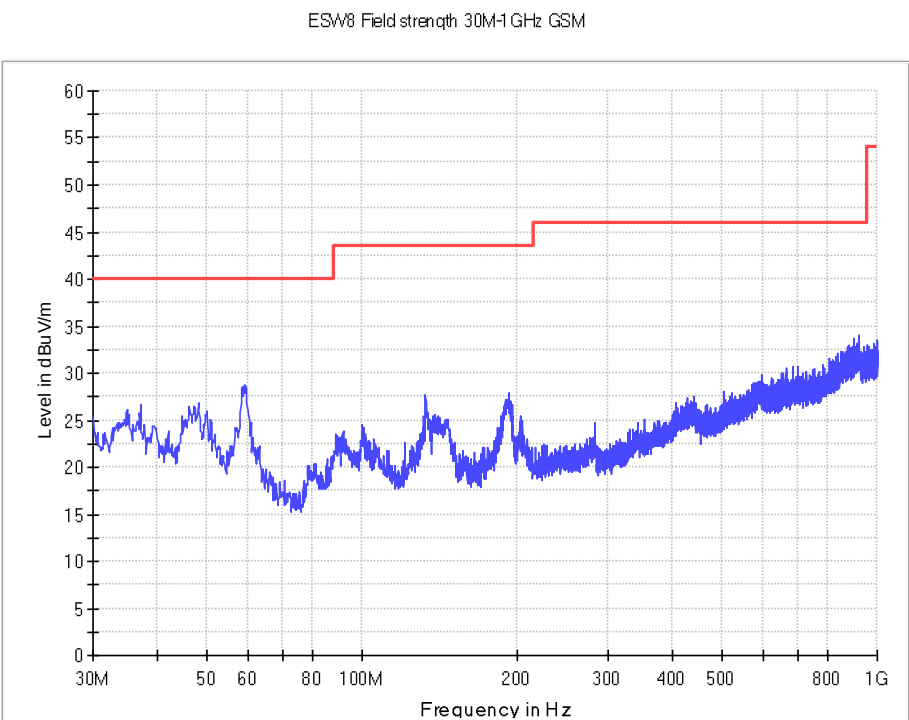
Remark: Emission level (dBμV)=Read Value(dBμV/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)

30MHz-1GHz

Horizontal



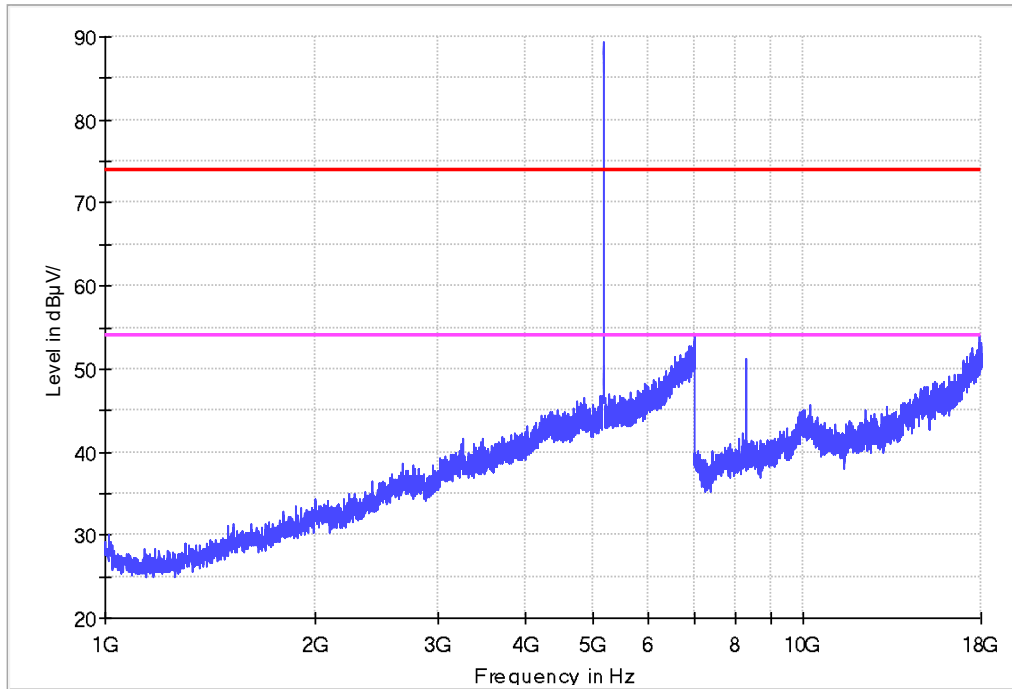
Vertical



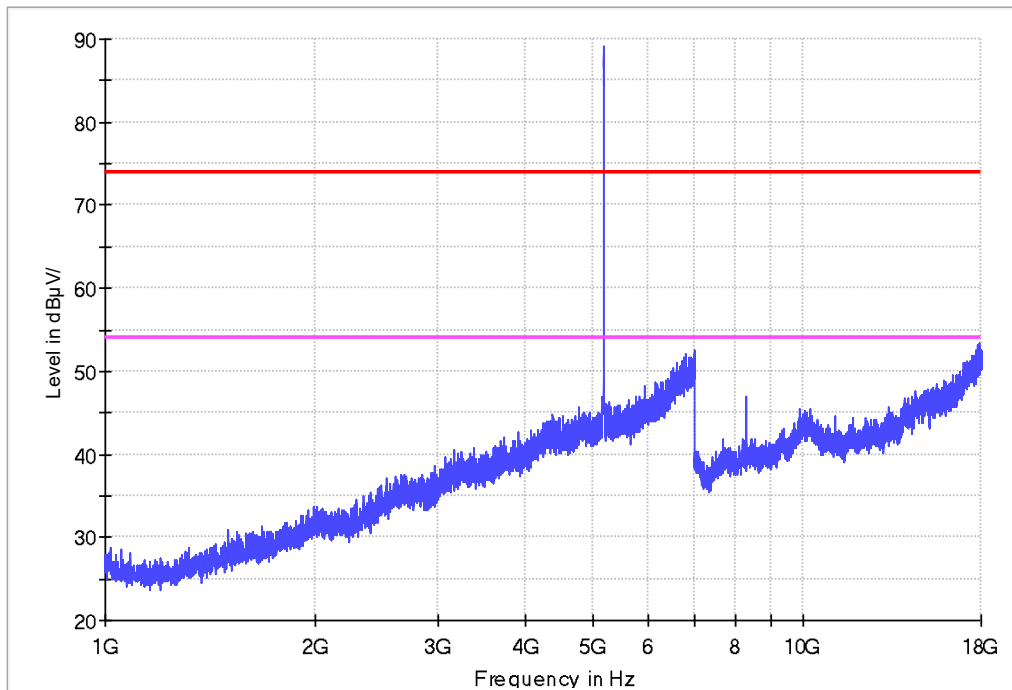
1-18G

11a IN THE 5.2GHz BAND
CH36

Horizontal



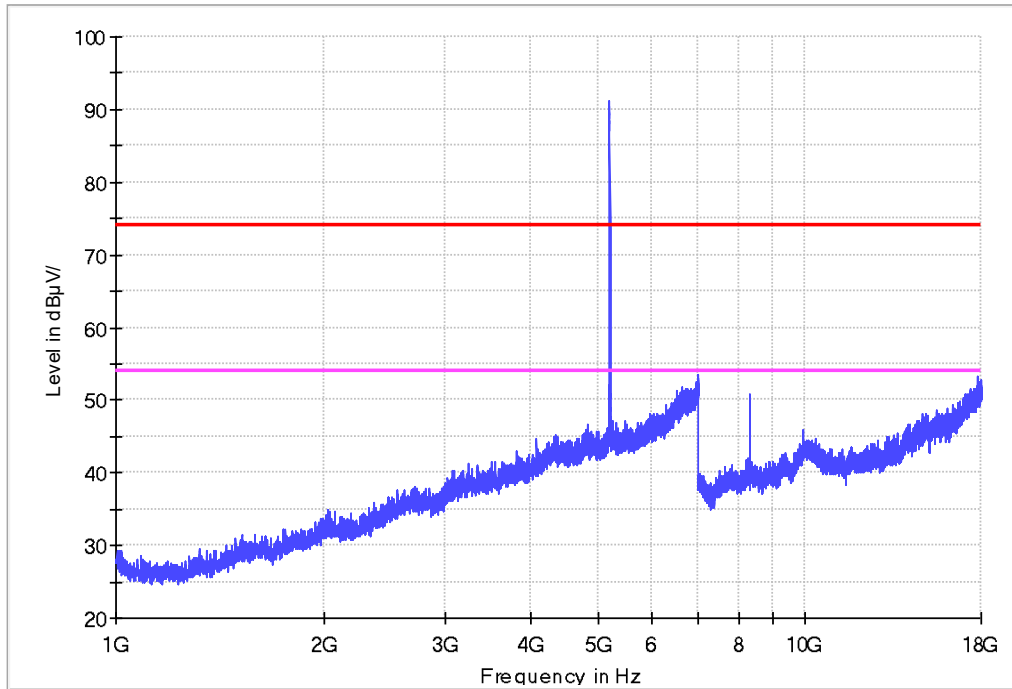
Vertical



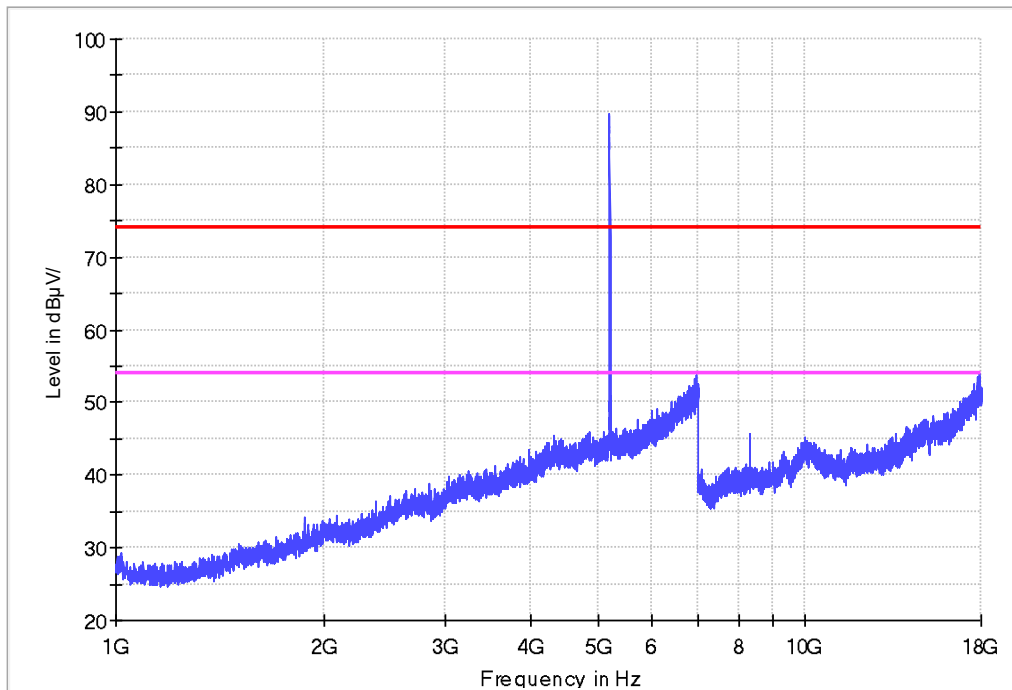
1-18G

11a IN THE 5.2GHz BAND
CH40

Horizontal

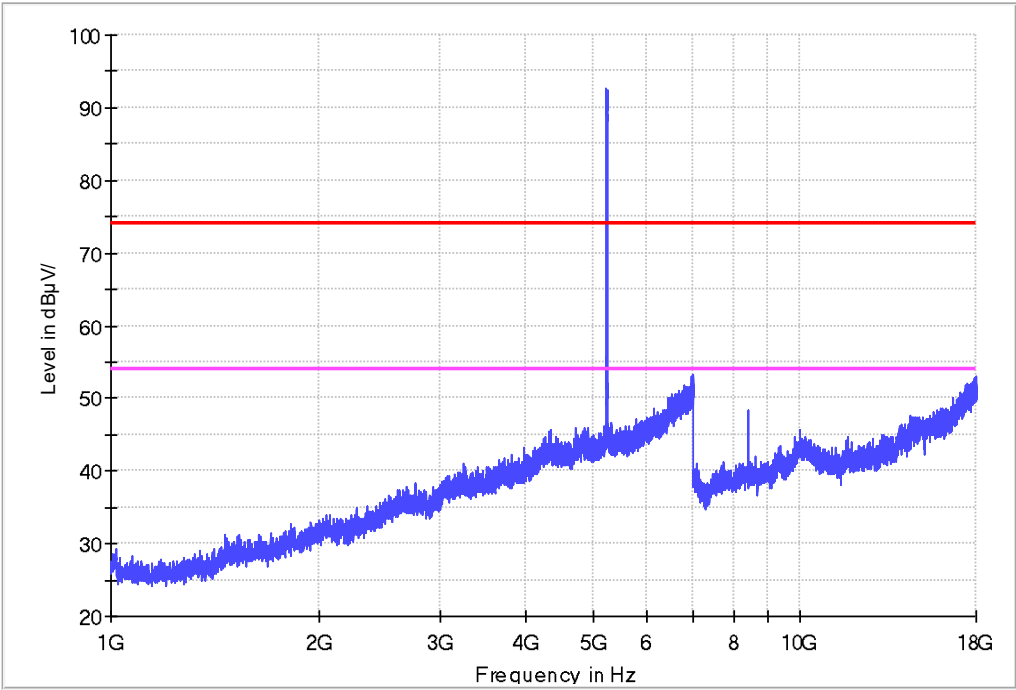


Vertical

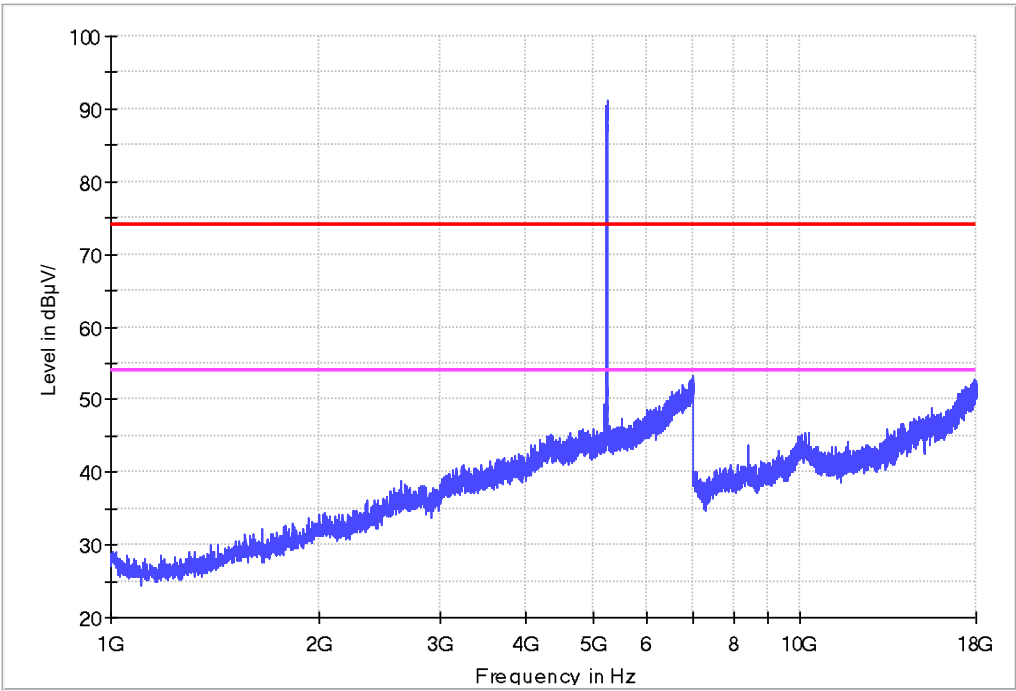


1-18G

11a IN THE 5.2GHz BAND
CH48
Horizontal



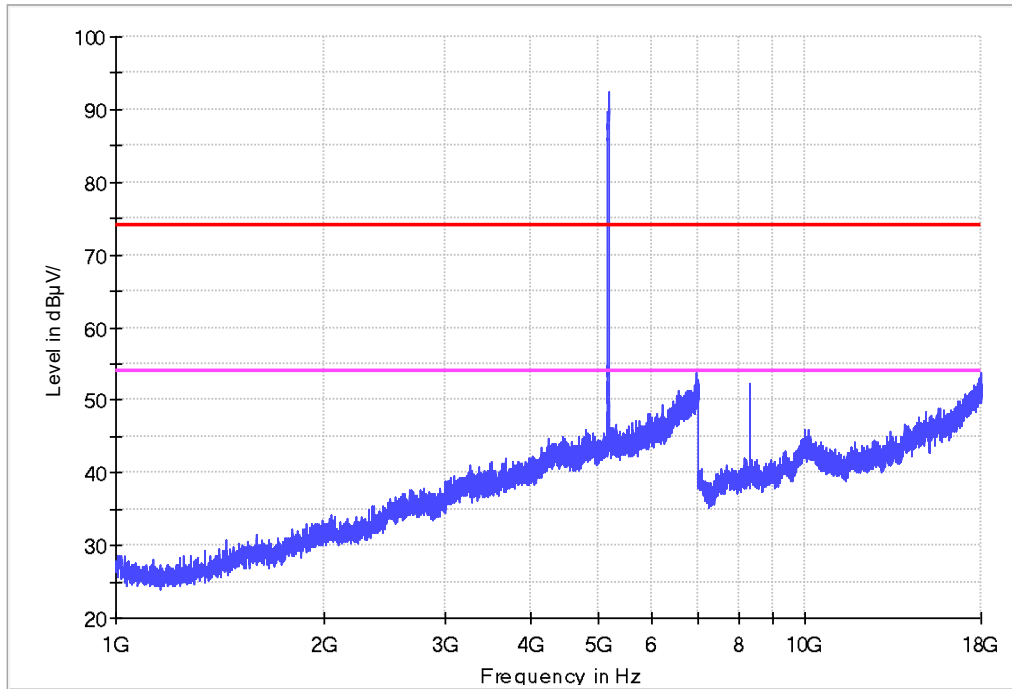
Vertical



1-18G

11n HT20 IN THE 5.2GHz BAND
CH36

Horizontal



Vertical

