



CTC Laboratories, Inc.

1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China
Tel: +86-755- 27521059 Fax: +86-755- 27521011 Http://www.sz-ctc.org.cn

Appendix for 5G WIFI

Applicant: Launch Tech Co., Ltd.

**Address: Launch Industrial Park, North of Wuhe Avenue,
Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China**

Product Name: AUTO Smart Diagnostic Tool

**Model: OADD-PO0805A, OADD-PO1005A, X-431 PRO3 APEX,
X-431 V+ SmartLink HD, X-431 PRO3S+ SmartLink HD, X-431
PRO3 ACE, X-431 PRO3(PRO3S+ V5.0), X-431 PRO3(PRO3S+ V5),
X-431 PRO5, X-431 PRO3(PRO3S+ ELITE), X-431 PRO3 V+ ELITE,
X-431 PRO3 LINK HD, X-431 PRO(PRO3S V5.0), X-431 PRO(PRO3S
V5), X-431 PRO DYNO, X-431 PRO TT, X-431 PRO(IMMO ELITE),
X-431 PRO(IMMO PLUS)**

FCC ID: XUJX431PROV5

TABLE OF CONTENTS

Appendix A1: Emission Bandwidth	3
Appendix A2: Occupied channel bandwidth	14
Appendix A3: Min emission bandwidth	25
Appendix B: Maximum conducted output power	31
Appendix C: Maximum power spectral density	33
Appendix D: Frequency Stability	49
Appendix E: Duty Cycle	53

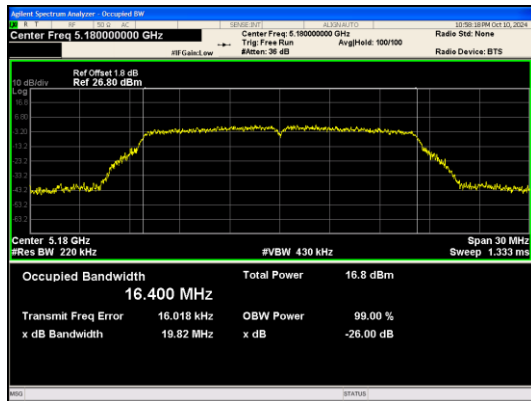
Appendix A1: Emission Bandwidth

Test Result

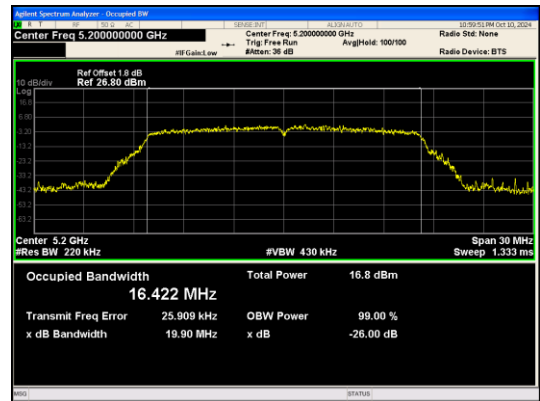
Test Mode	Antenna	Channel	26dB EBW [MHz]	Verdict
802.11a	Ant1	5180	19.82	PASS
		5200	19.90	PASS
		5240	19.75	PASS
		5260	19.63	PASS
		5280	19.52	PASS
		5320	19.81	PASS
		5745	19.760	PASS
		5785	19.800	PASS
		5825	19.800	PASS
802.11n(HT20)	Ant1	5180	20.08	PASS
		5200	20.10	PASS
		5240	20.00	PASS
		5260	20.25	PASS
		5280	20.14	PASS
		5320	20.23	PASS
		5745	20.680	PASS
		5785	20.080	PASS
		5825	20.720	PASS
802.11n(HT40)	Ant1	5190	40.57	PASS
		5230	40.37	PASS
		5270	39.83	PASS
		5310	40.30	PASS
		5755	40.880	PASS
		5795	40.640	PASS
802.11ac(VHT20)	Ant1	5180	20.15	PASS
		5200	20.32	PASS
		5240	20.06	PASS
		5260	20.07	PASS
		5280	19.99	PASS
		5320	20.14	PASS
		5745	20.360	PASS
		5785	20.160	PASS
		5825	20.040	PASS
802.11ac(VHT40)	Ant1	5190	40.32	PASS
		5230	40.17	PASS
		5270	40.18	PASS
		5310	39.96	PASS
		5755	40.320	PASS
		5795	40.320	PASS
802.11ac(VHT80)	Ant1	5210	80.39	PASS
		5290	80.84	PASS

		5775	80.800	PASS
--	--	------	--------	------

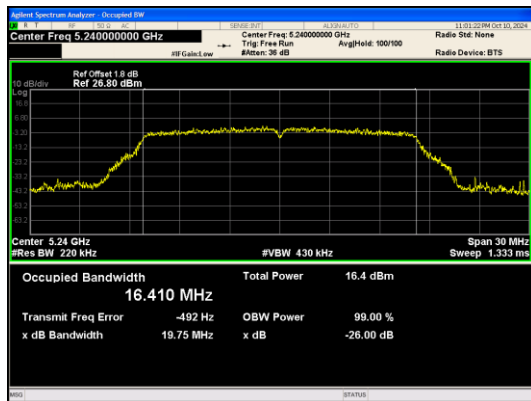
Test Graphs



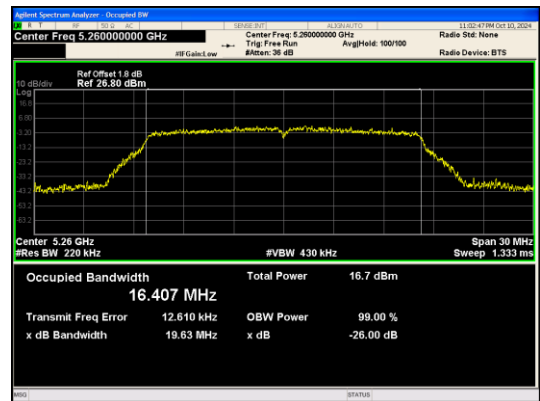
IEEE 802.11a_Channel 36_20MHz_Antenna 1



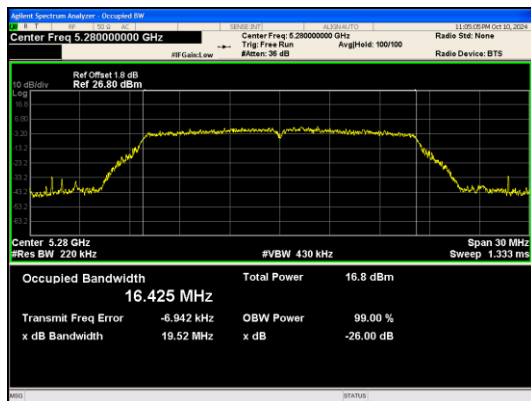
IEEE 802.11a_Channel 40_20MHz_Antenna 1



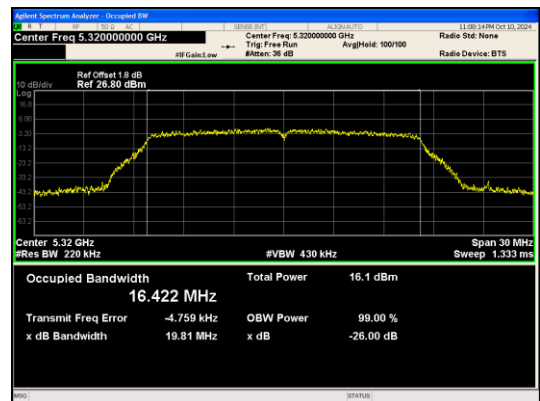
IEEE 802.11a_Channel 48_20MHz_Antenna 1



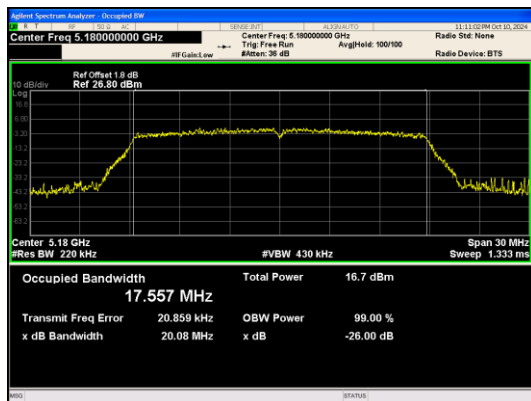
IEEE 802.11a_Channel 52_20MHz_Antenna 1



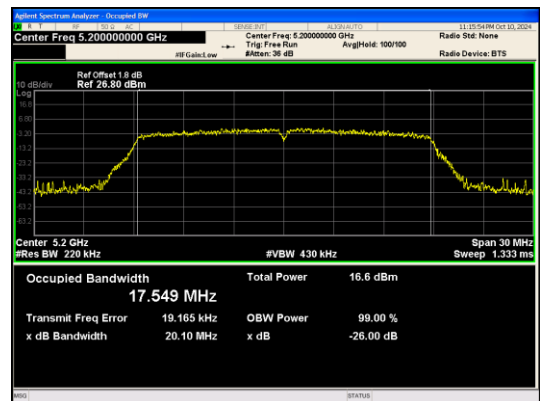
IEEE 802.11a_Channel 56_20MHz_Antenna 1



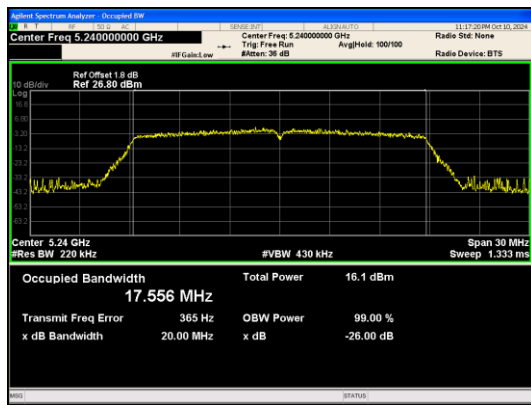
IEEE 802.11a_Channel 64_20MHz_Antenna 1



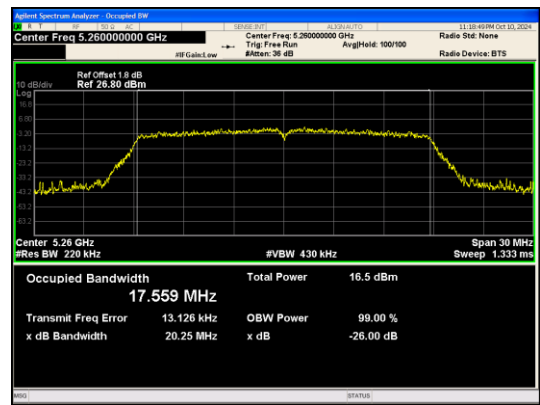
IEEE 802.11n_Channel 36_20MHz_Antenna 1



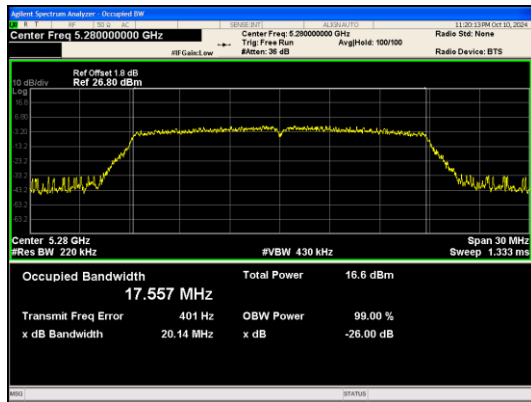
IEEE 802.11n_Channel 40_20MHz_Antenna 1



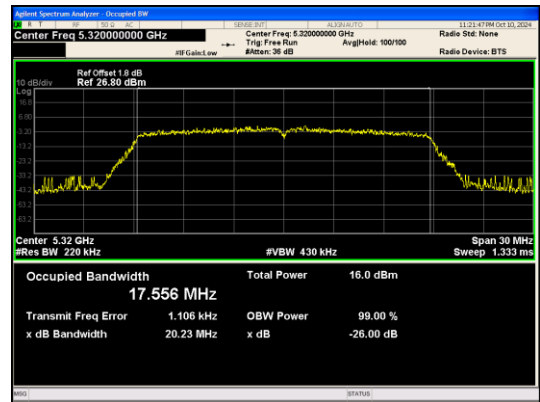
IEEE 802.11n_Channel 48_20MHz_Antenna 1



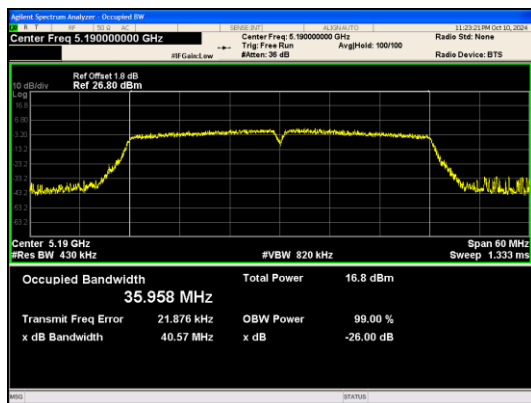
IEEE 802.11n_Channel 52_20MHz_Antenna 1



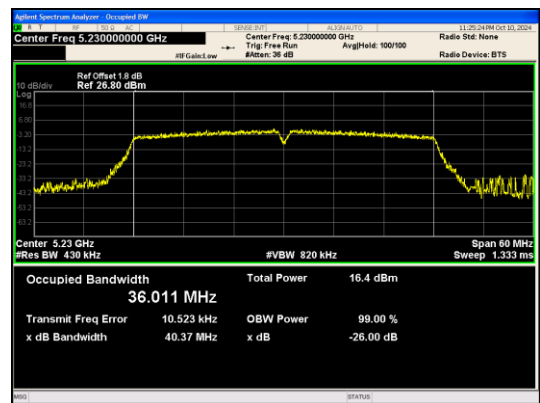
IEEE 802.11n_Channel 56_20MHz_Antenna 1



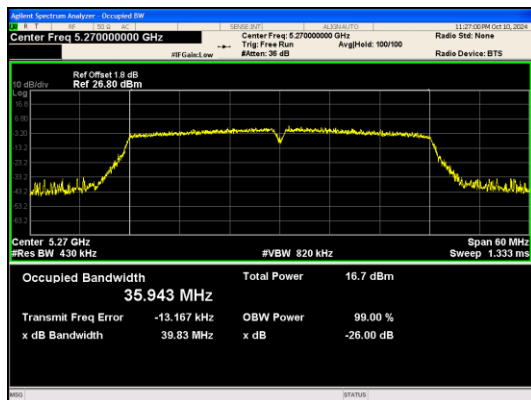
IEEE 802.11n_Channel 64_20MHz_Antenna 1



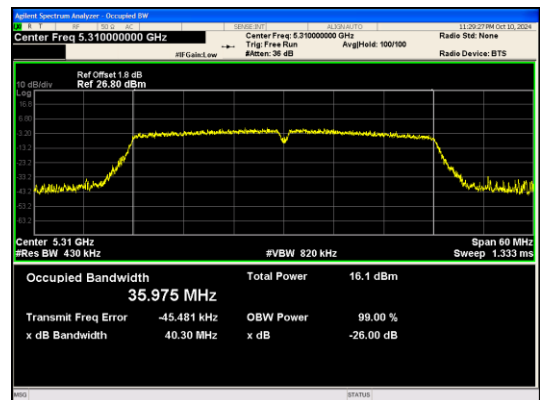
IEEE 802.11n_Channel 38_40MHz_Antenna 1



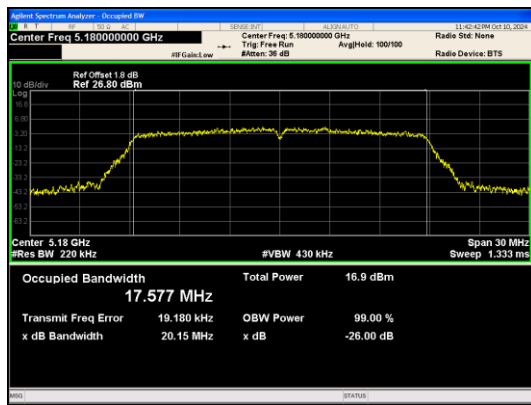
IEEE 802.11n_Channel 46_40MHz_Antenna 1



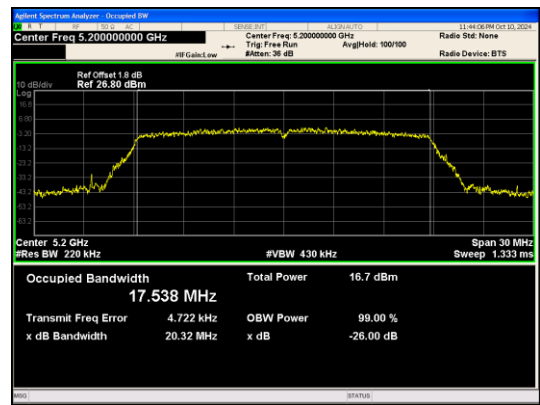
IEEE 802.11n_Channel 54_40MHz_Antenna 1



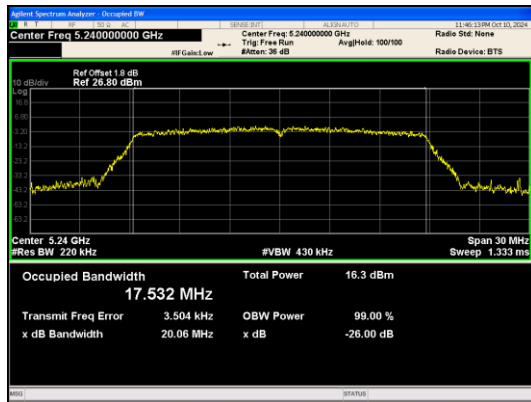
IEEE 802.11n_Channel 62_40MHz_Antenna 1



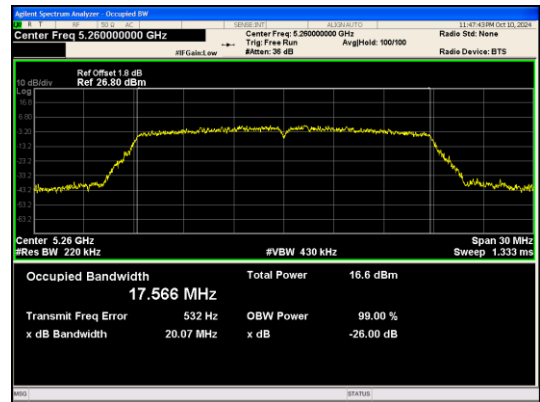
IEEE 802.11ac_Channel 36_20MHz_Antenna 1



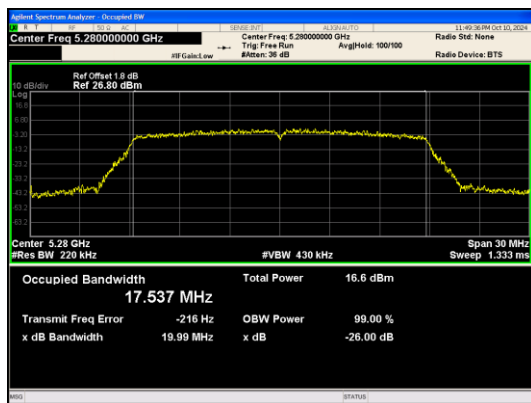
IEEE 802.11ac_Channel 40_20MHz_Antenna 1



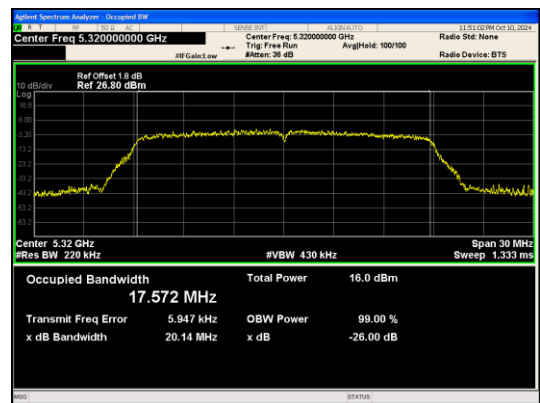
IEEE 802.11ac_Channel 48_20MHz_Antenna 1



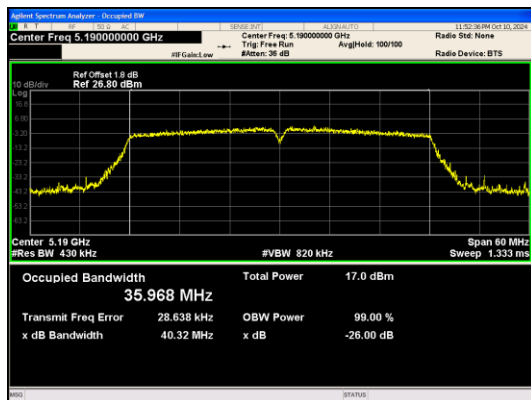
IEEE 802.11ac_Channel 52_20MHz_Antenna 1



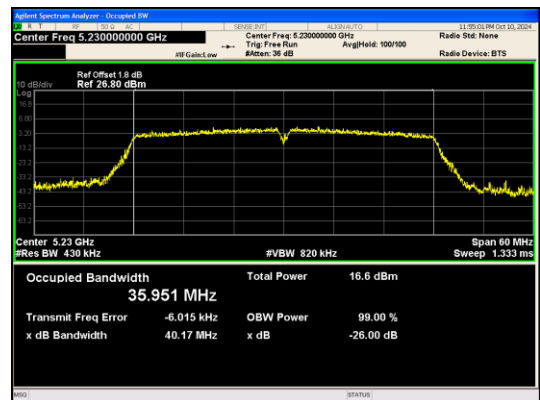
IEEE 802.11ac_Channel 56_20MHz_Antenna 1



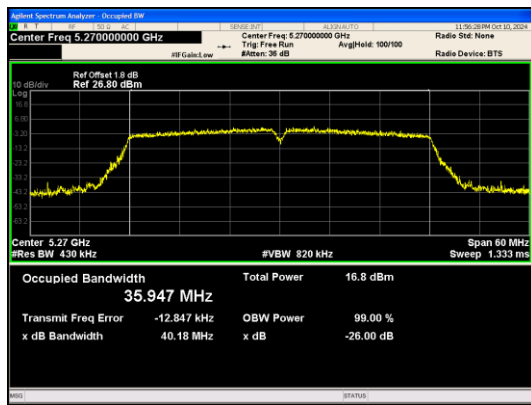
IEEE 802.11ac_Channel 64_20MHz_Antenna 1



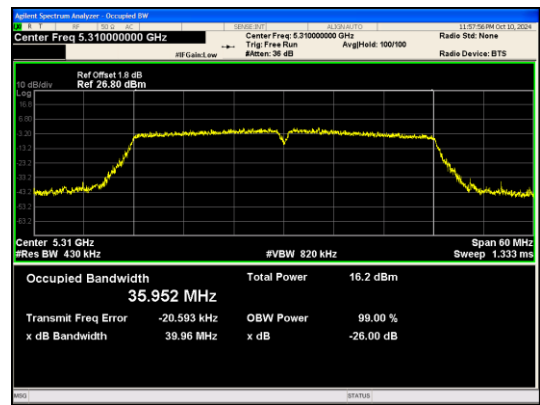
IEEE 802.11ac_Channel 38_40MHz_Antenna 1



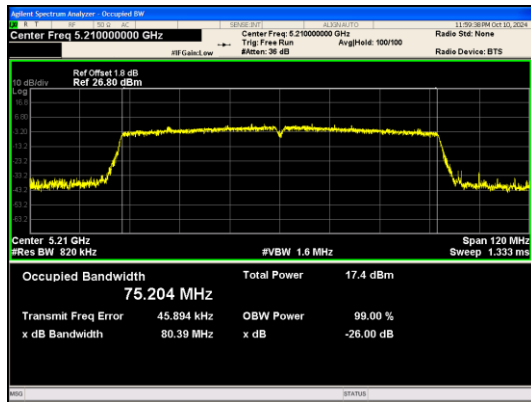
IEEE 802.11ac_Channel 46_40MHz_Antenna 1



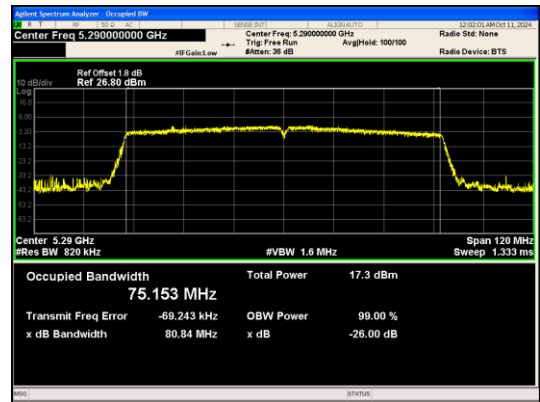
IEEE 802.11ac_Channel 54_40MHz_Antenna 1



IEEE 802.11ac_Channel 62_40MHz_Antenna 1

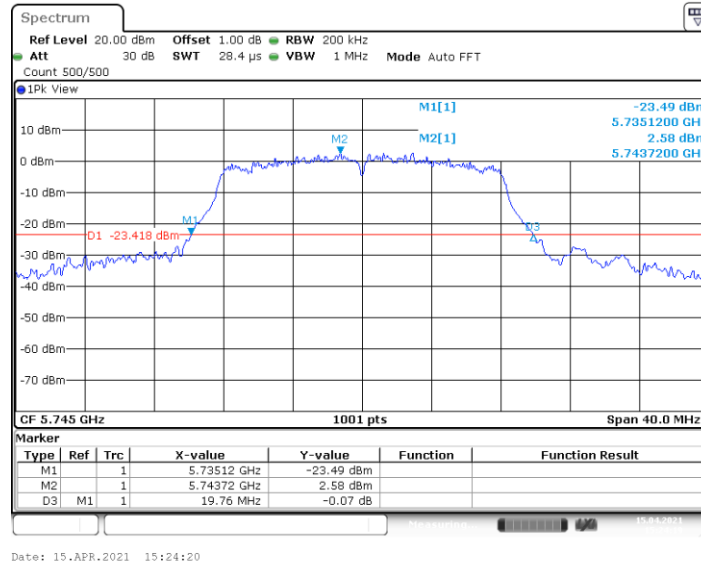


IEEE 802.11ac_Channel 42_80MHz_Antenna 1

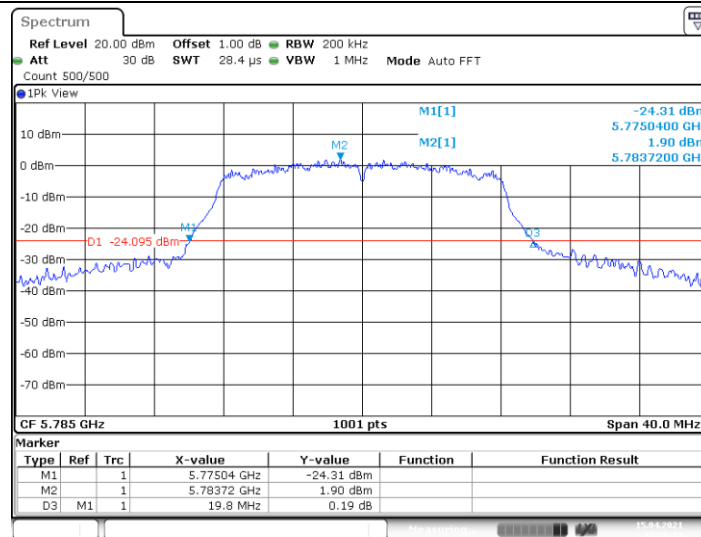


IEEE 802.11ac_Channel 58_80MHz_Antenna 1

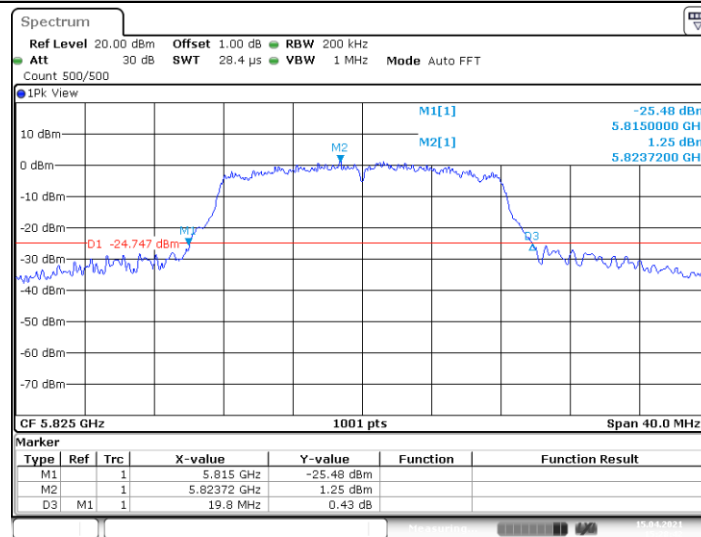
802.11a_Ant1_5745



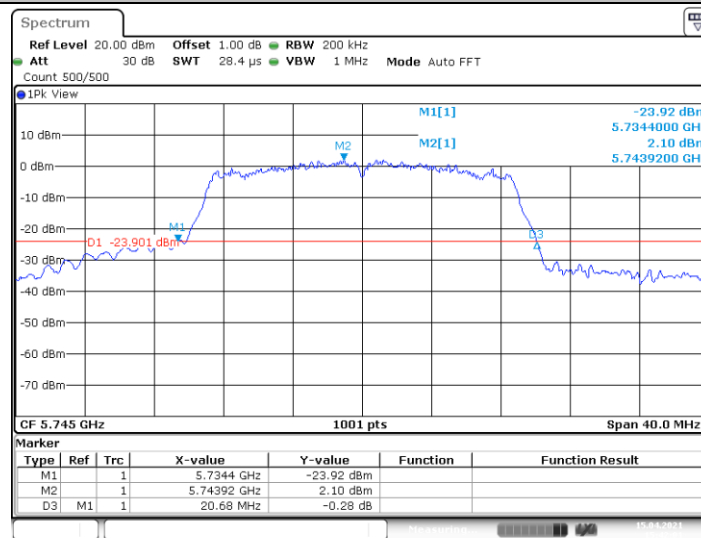
802.11a_Ant1_5785



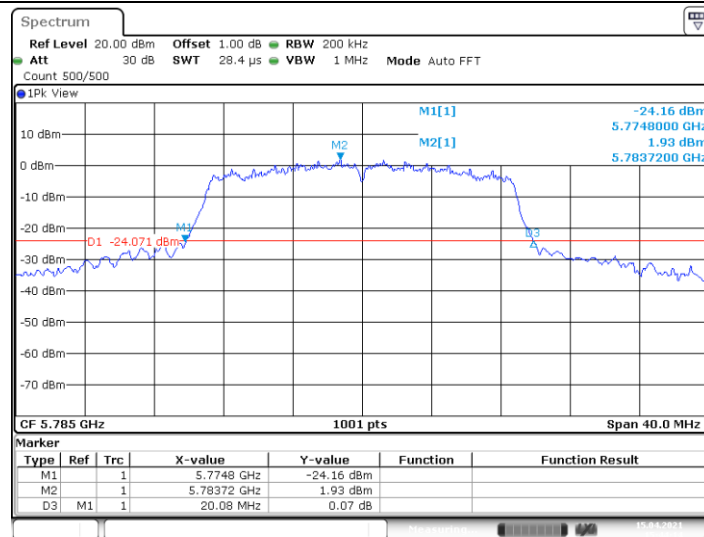
802.11a_Ant1_5825



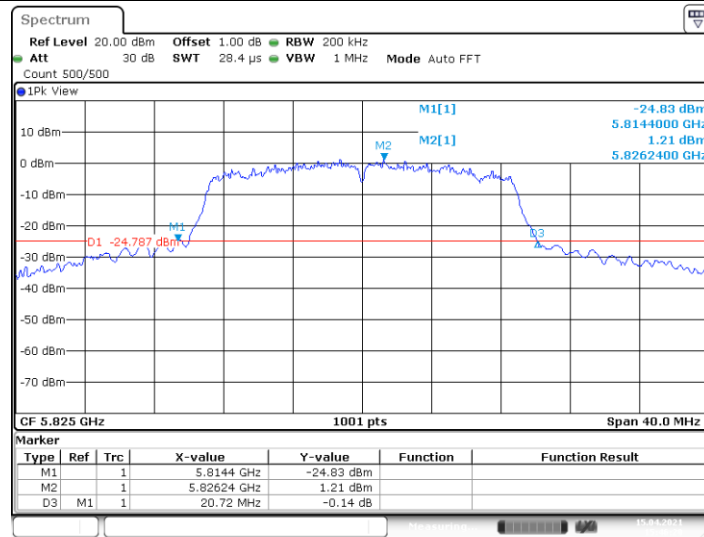
802.11n(HT20)_Ant1_5745



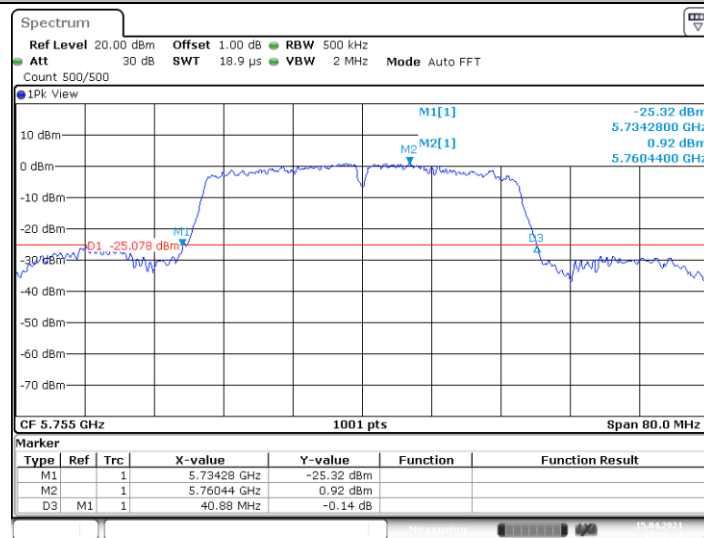
802.11n(HT20)_Ant1_5785



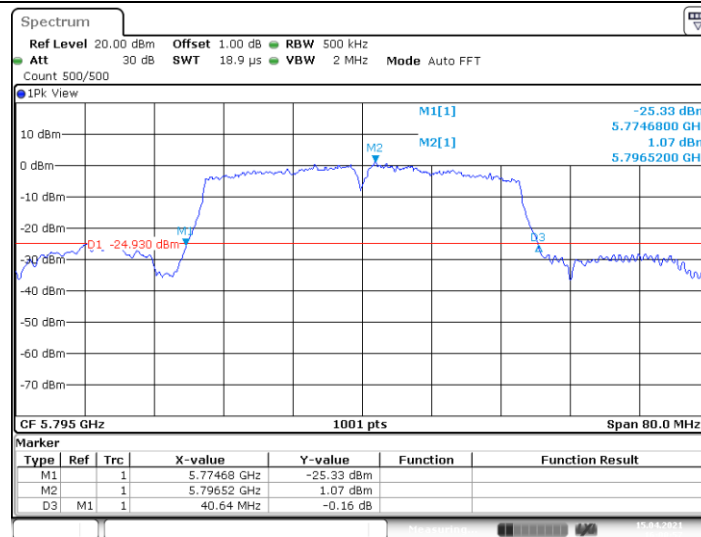
802.11n(HT20)_Ant1_5825



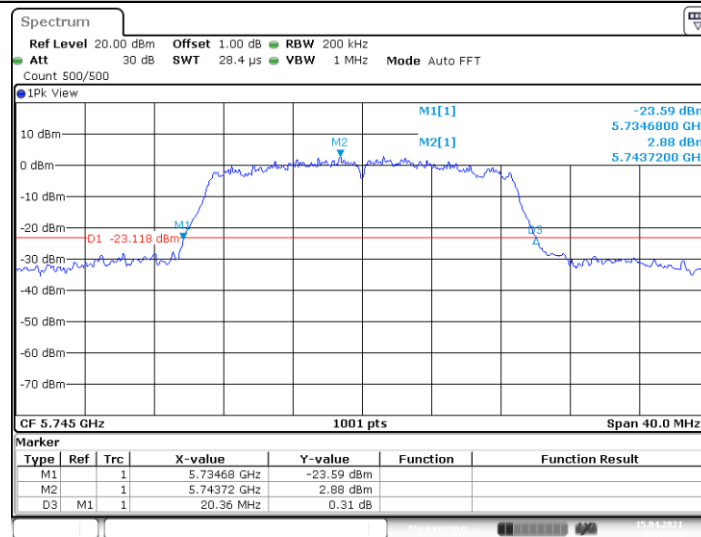
802.11n(HT40)_Ant1_5755



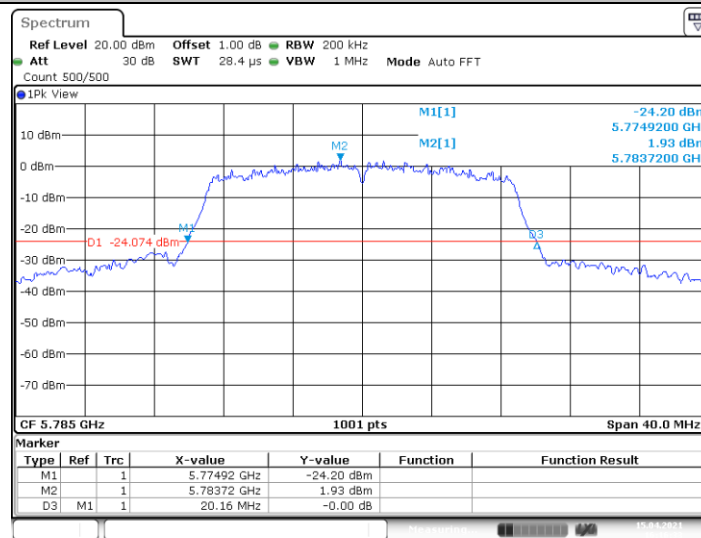
802.11n(HT40)_Ant1_5795



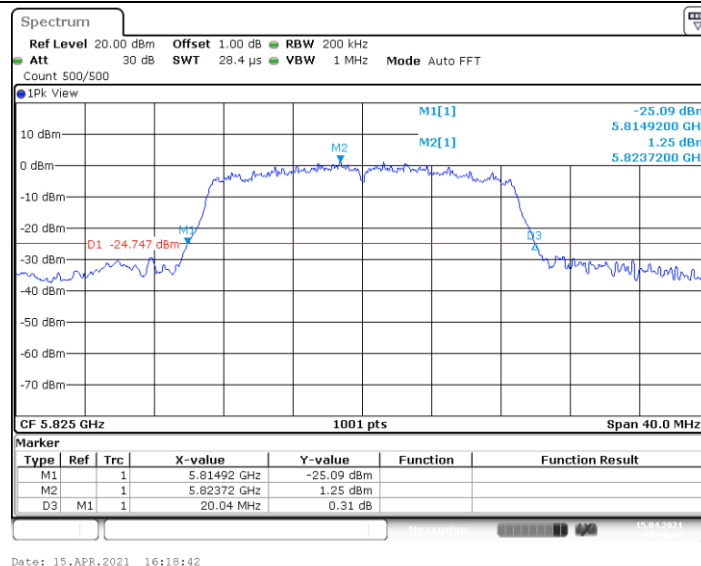
802.11ac(VHT20)_Ant1_5745



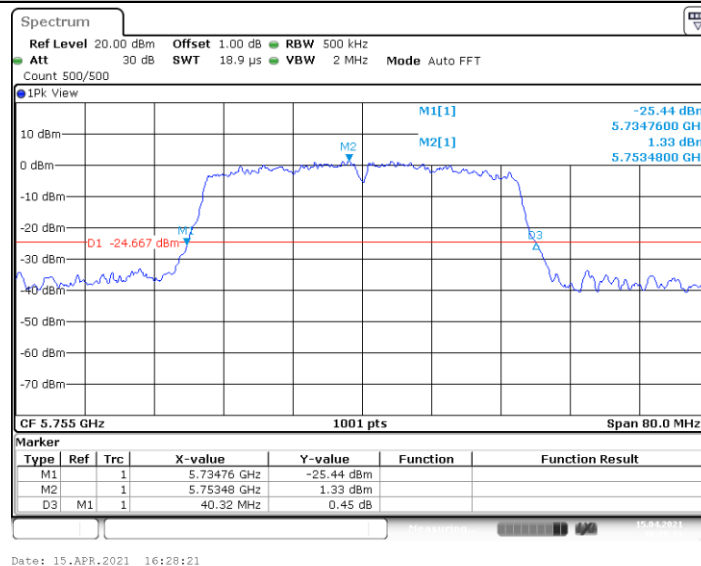
802.11ac(VHT20)_Ant1_5785



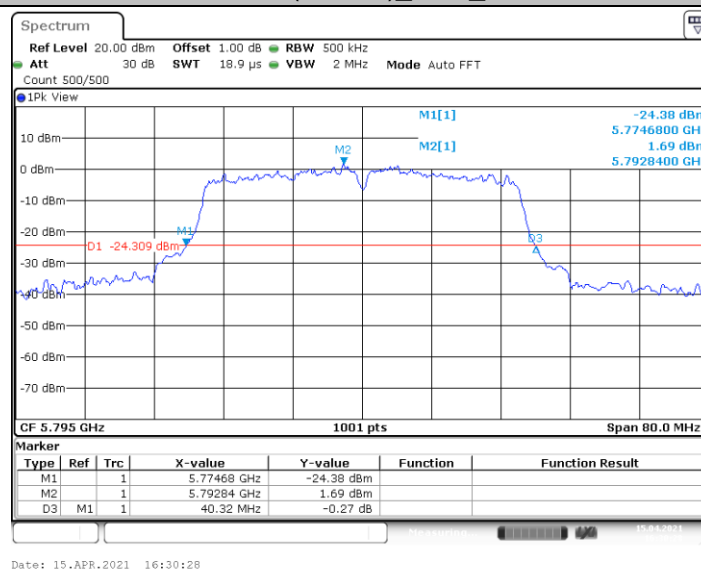
802.11ac(VHT20)_Ant1_5825



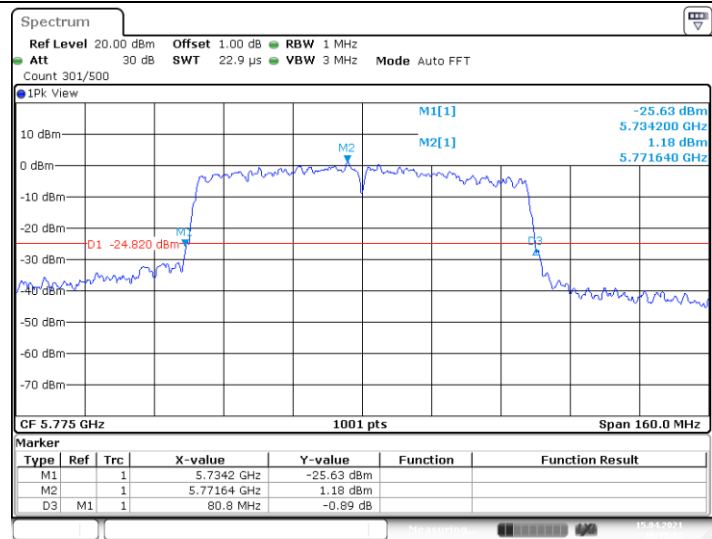
802.11ac(VHT40)_Ant1_5755



802.11ac(VHT40)_Ant1_5795



802.11ac(VHT80)_Ant1_5775



Date: 15.APR.2021 16:39:02

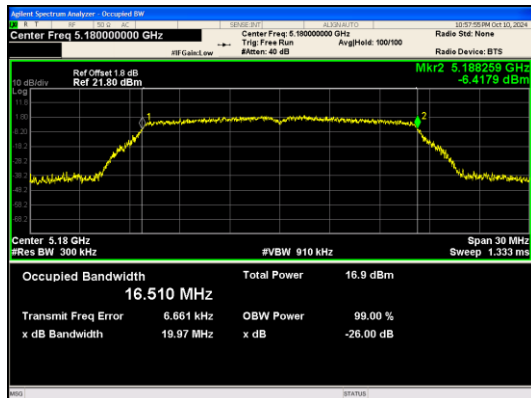
Appendix A2: Occupied channel bandwidth

Test Result

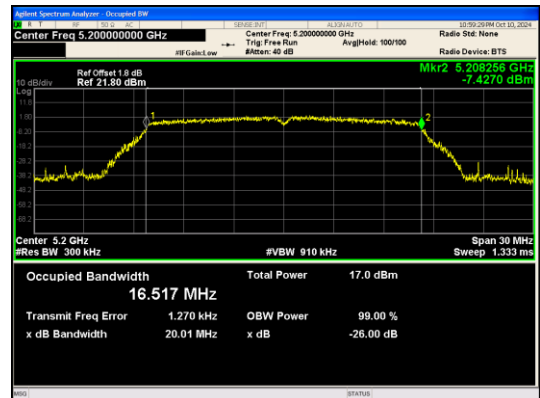
Test Mode	Antenna	Channel	OCB [MHz]	Verdict
802.11a	Ant1	5180	16.510	PASS
		5200	16.517	PASS
		5240	16.535	PASS
		5260	16.515	PASS
		5280	16.470	PASS
		5320	16.540	PASS
		5745	16.943	PASS
		5785	16.783	PASS
		5825	17.103	PASS
802.11n(HT20)	Ant1	5180	17.597	PASS
		5200	17.603	PASS
		5240	17.615	PASS
		5260	17.617	PASS
		5280	17.640	PASS
		5320	17.605	PASS
		5745	17.982	PASS
		5785	18.142	PASS
		5825	18.022	PASS
802.11n(HT40)	Ant1	5190	35.984	PASS
		5230	35.956	PASS
		5270	36.007	PASS
		5310	36.048	PASS
		5755	36.204	PASS
		5795	36.204	PASS
802.11ac(VHT20)	Ant1	5180	17.612	PASS
		5200	17.619	PASS
		5240	17.620	PASS
		5260	17.612	PASS
		5280	17.638	PASS
		5320	17.594	PASS
		5745	17.862	PASS
		5785	17.982	PASS
		5825	17.982	PASS
802.11ac(VHT40)	Ant1	5190	35.986	PASS
		5230	35.997	PASS
		5270	35.917	PASS
		5310	35.948	PASS
		5755	36.044	PASS
		5795	36.523	PASS
802.11ac(VHT80)	Ant1	5210	75.204	PASS
		5290	75.158	PASS

		5775	75.604	PASS
--	--	------	--------	------

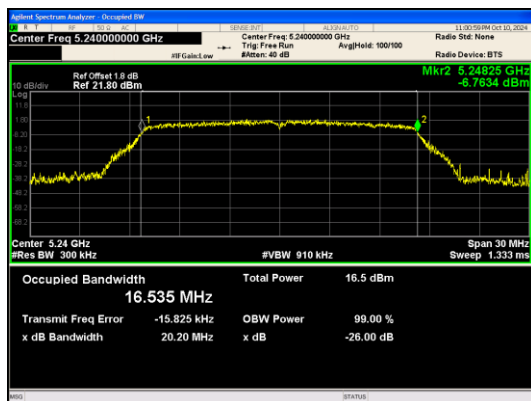
Test Graphs



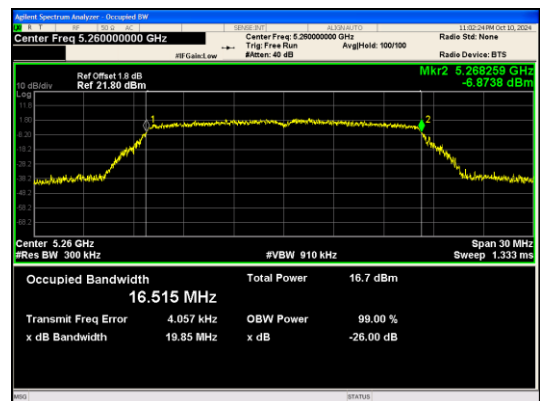
IEEE 802.11a_Channel 36_20MHz_Antenna 1



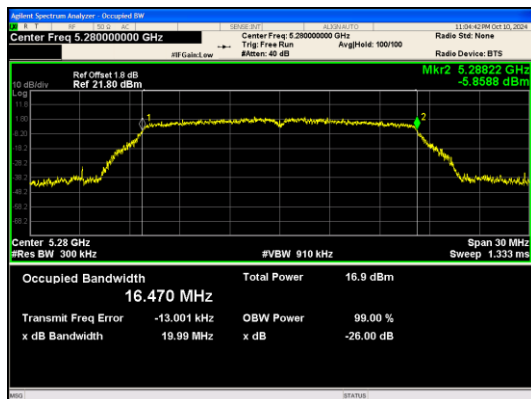
IEEE 802.11a_Channel 40_20MHz_Antenna 1



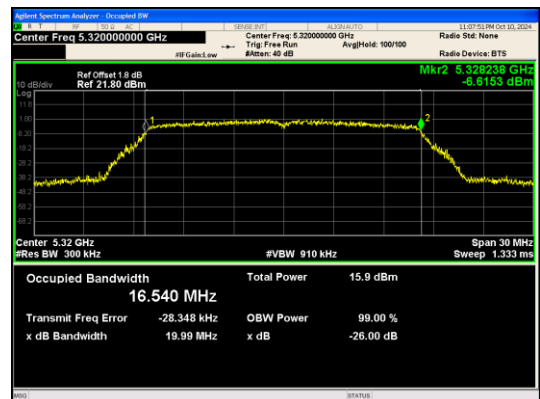
IEEE 802.11a_Channel 48_20MHz_Antenna 1



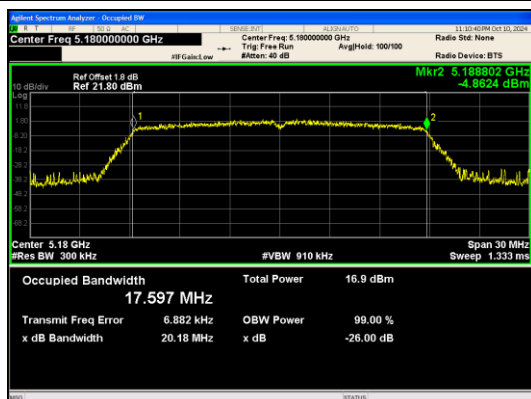
IEEE 802.11a_Channel 52_20MHz_Antenna 1



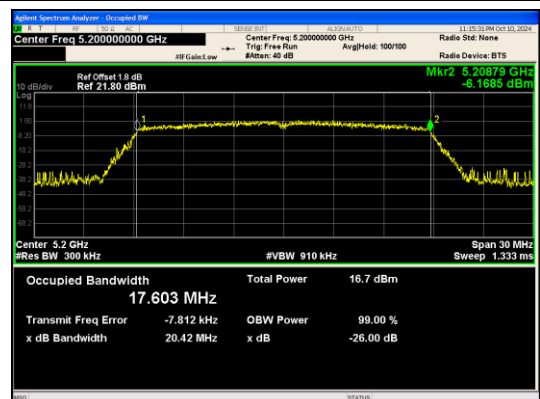
IEEE 802.11a_Channel 56_20MHz_Antenna 1



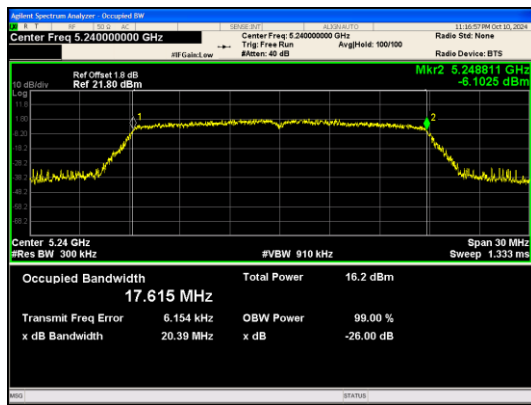
IEEE 802.11a_Channel 64_20MHz_Antenna 1



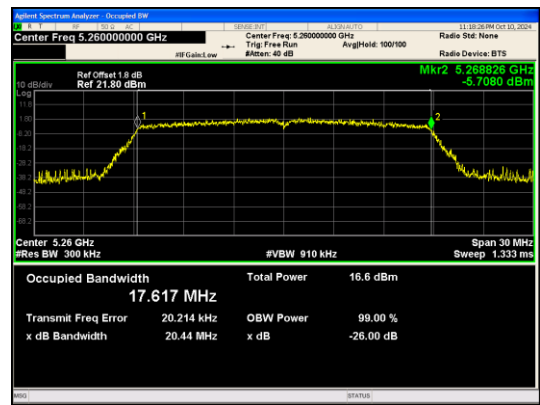
IEEE 802.11n_Channel 36_20MHz_Antenna 1



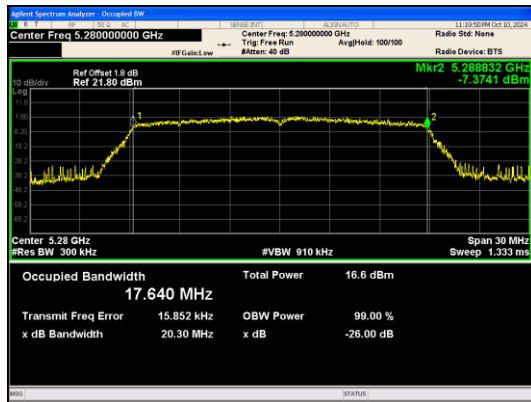
IEEE 802.11n_Channel 40_20MHz_Antenna 1



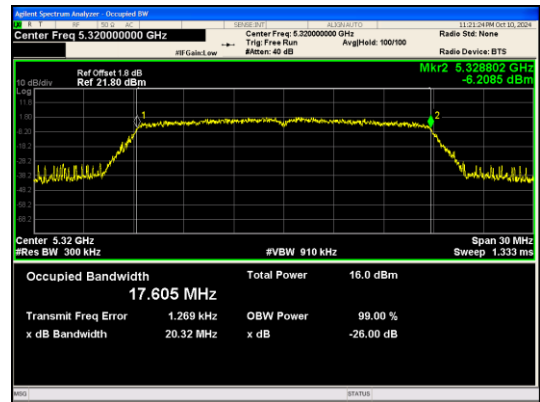
IEEE 802.11n_Channel 48_20MHz_Antenna 1



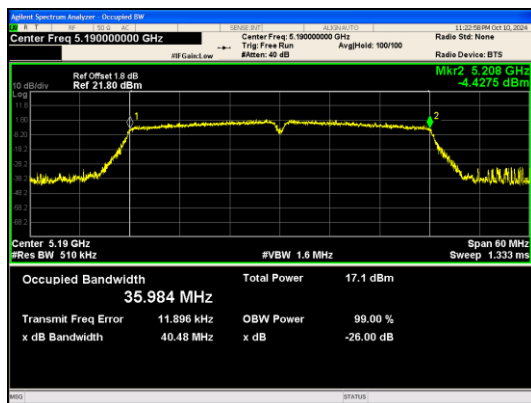
IEEE 802.11n_Channel 52_20MHz_Antenna 1



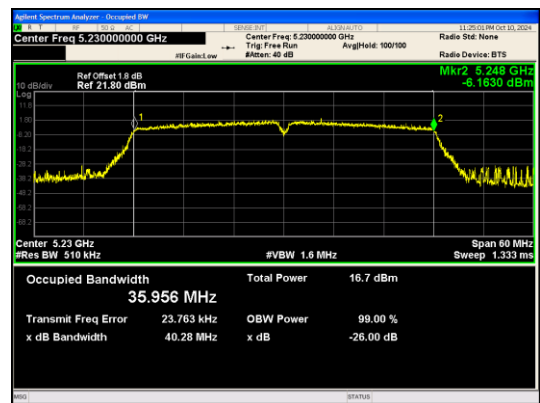
IEEE 802.11n_Channel 56_20MHz_Antenna 1



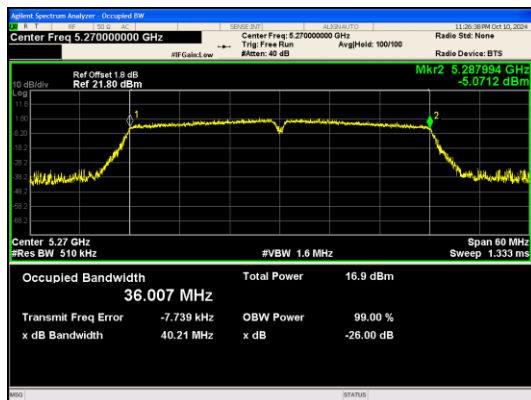
IEEE 802.11n_Channel 64_20MHz_Antenna 1



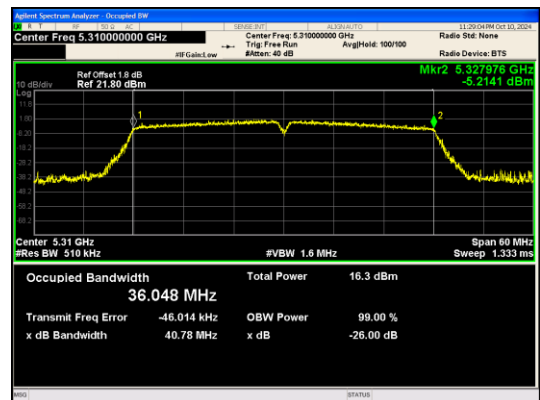
IEEE 802.11n_Channel 38_40MHz_Antenna 1



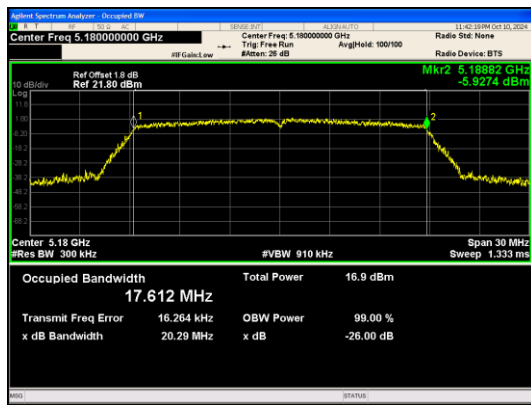
IEEE 802.11n_Channel 46_40MHz_Antenna 1



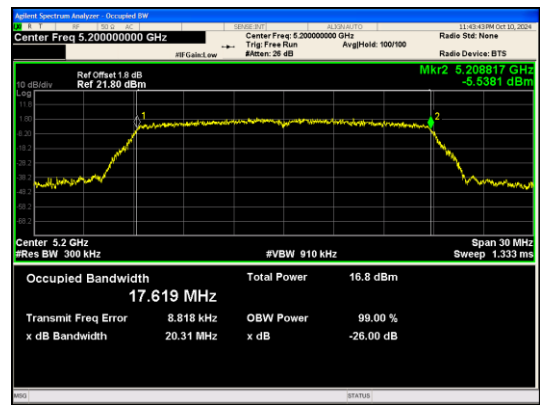
IEEE 802.11n_Channel 54_40MHz_Antenna 1



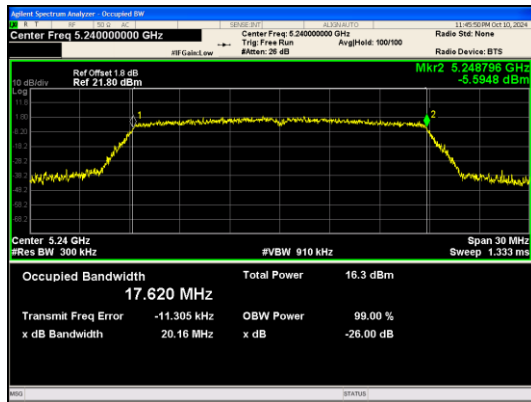
IEEE 802.11n_Channel 62_40MHz_Antenna 1



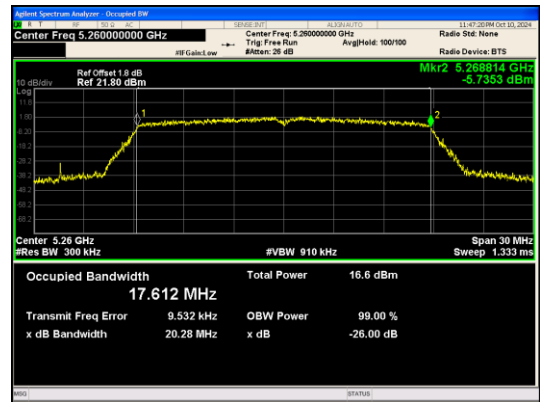
IEEE 802.11ac_Channel 36_20MHz_Antenna 1



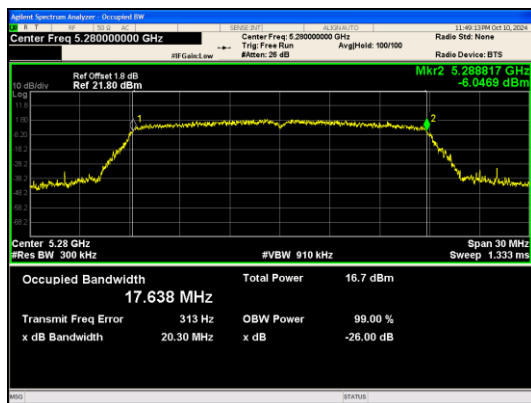
IEEE 802.11ac_Channel 40_20MHz_Antenna 1



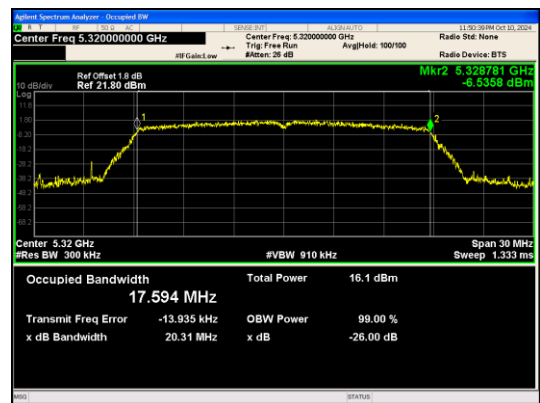
IEEE 802.11ac_Channel 48_20MHz_Antenna 1



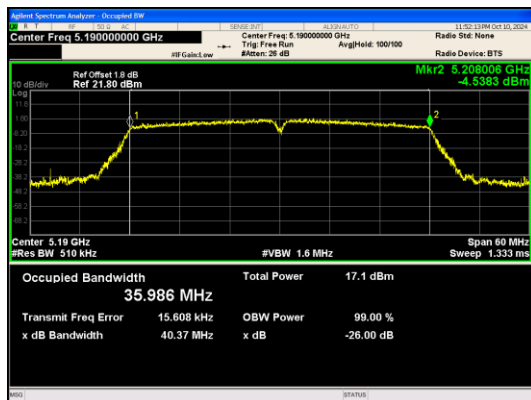
IEEE 802.11ac_Channel 52_20MHz_Antenna 1



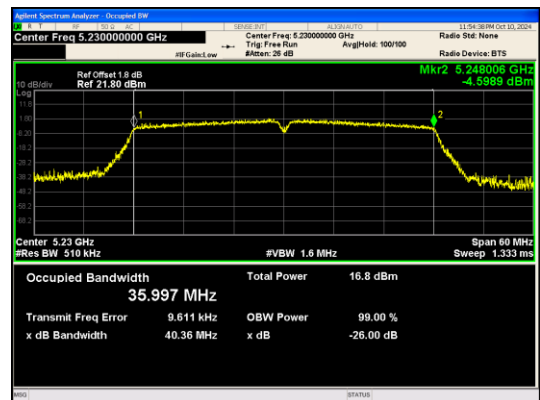
IEEE 802.11ac_Channel 56_20MHz_Antenna 1



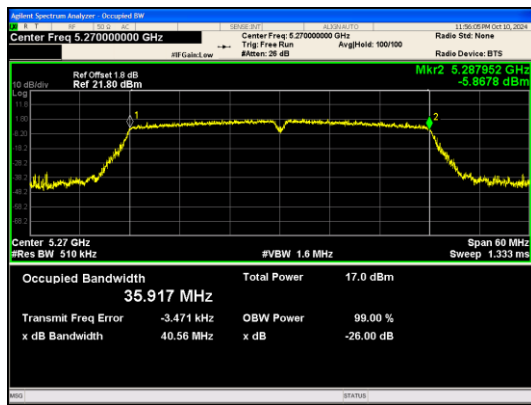
IEEE 802.11ac_Channel 64_20MHz_Antenna 1



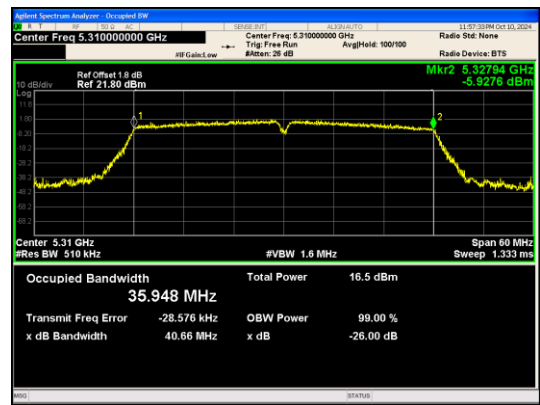
IEEE 802.11ac_Channel 38_40MHz_Antenna 1



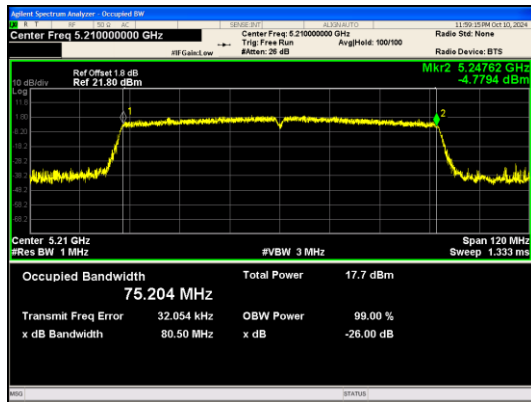
IEEE 802.11ac_Channel 46_40MHz_Antenna 1



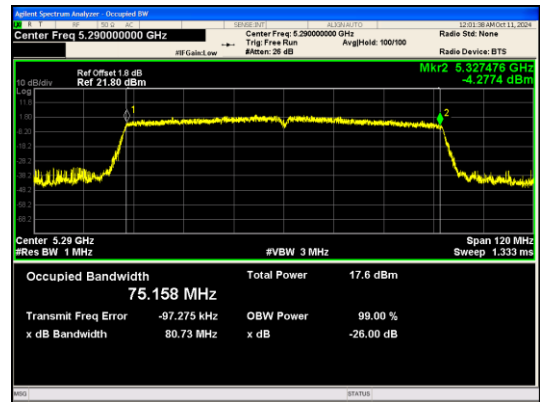
IEEE 802.11ac_Channel 54_40MHz_Antenna 1



IEEE 802.11ac_Channel 62_40MHz_Antenna 1

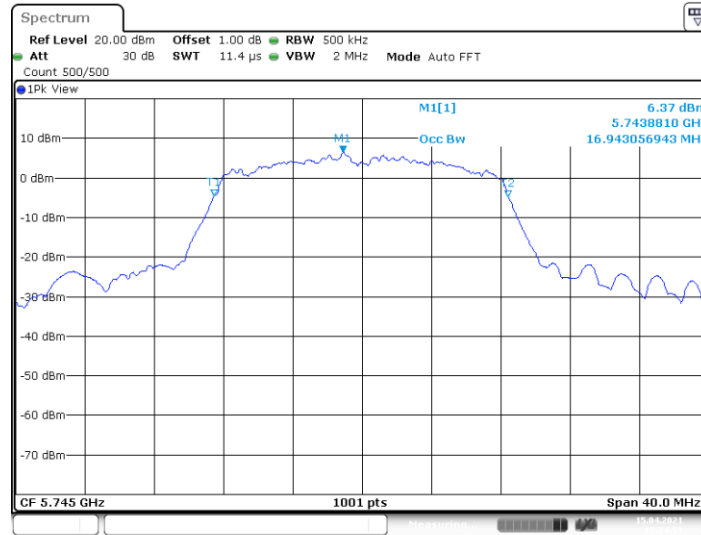


IEEE 802.11ac_Channel 42_80MHz_Antenna 1



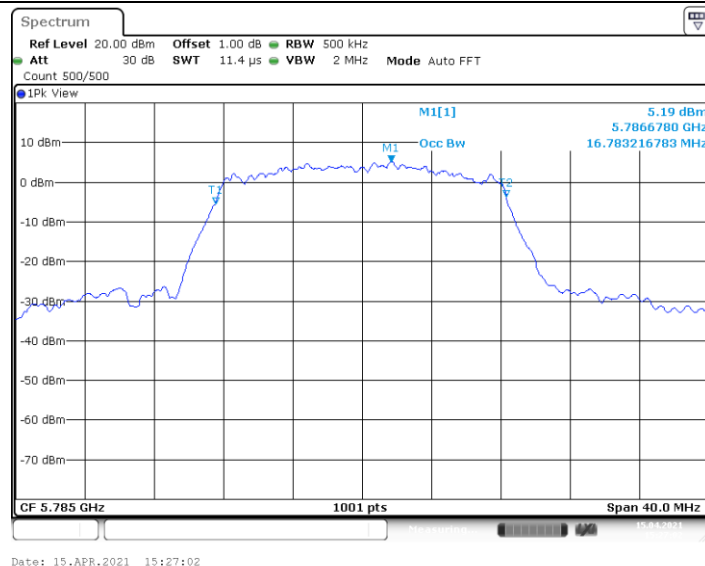
IEEE 802.11ac_Channel 58_80MHz_Antenna 1

802.11a_Ant1_5745



Date: 15.APR.2021 15:24:51

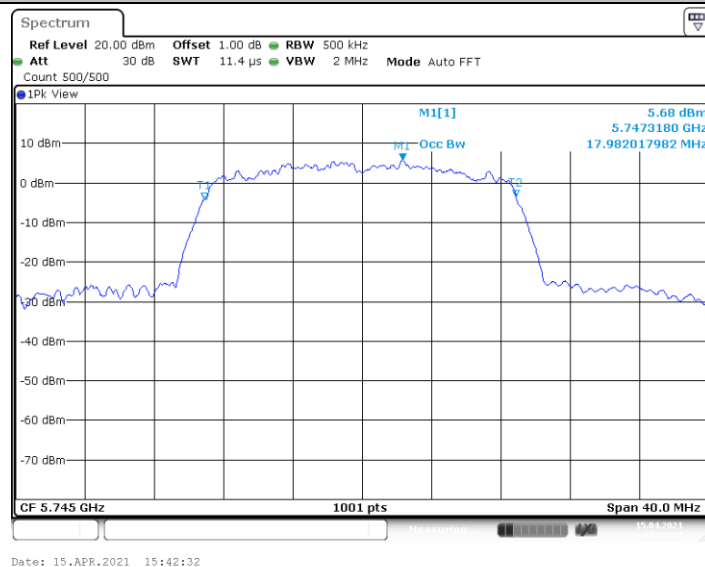
802.11a_Ant1_5785



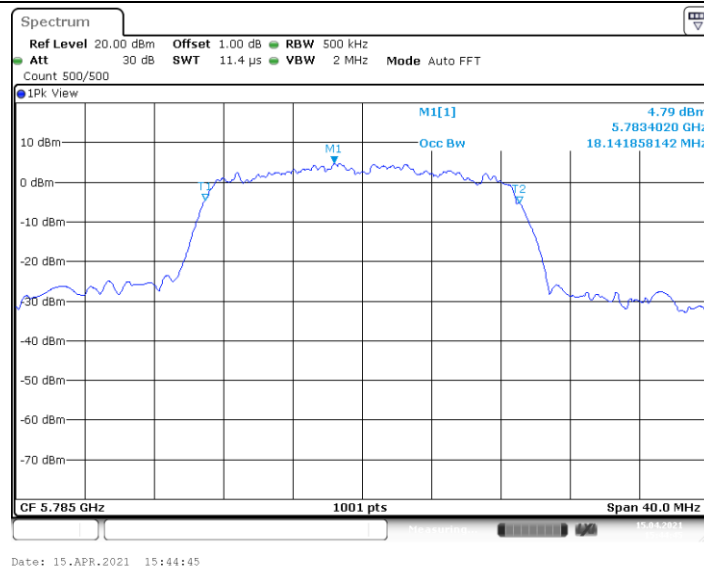
802.11a_Ant1_5825



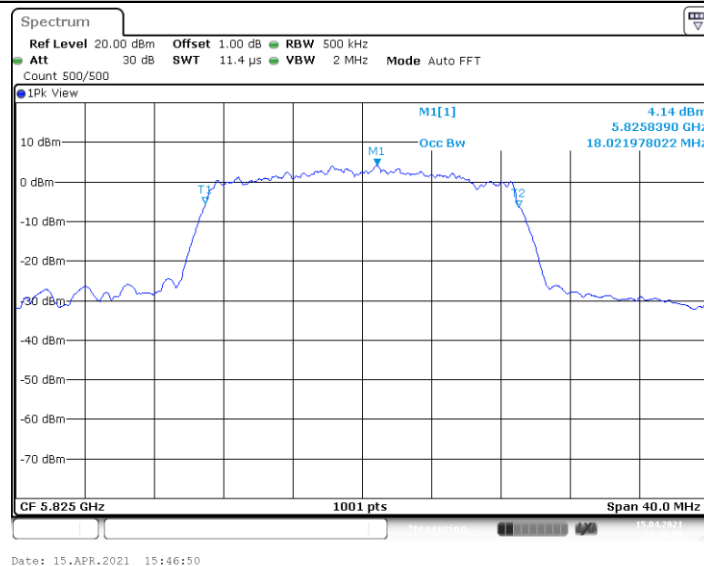
802.11n(HT20)_Ant1_5745



802.11n(HT20)_Ant1_5785



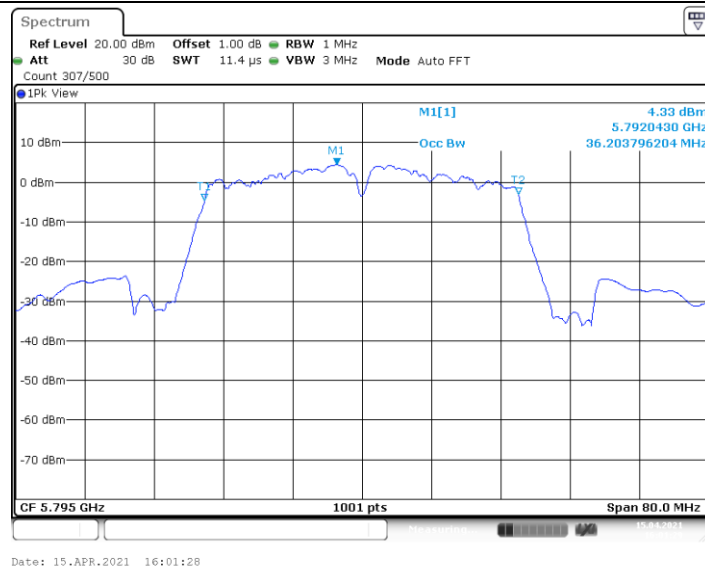
802.11n(HT20)_Ant1_5825



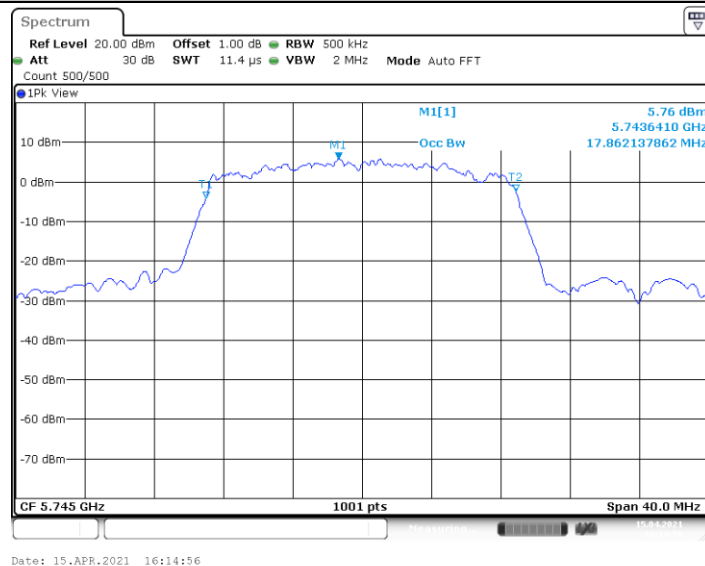
802.11n(HT40)_Ant1_5755



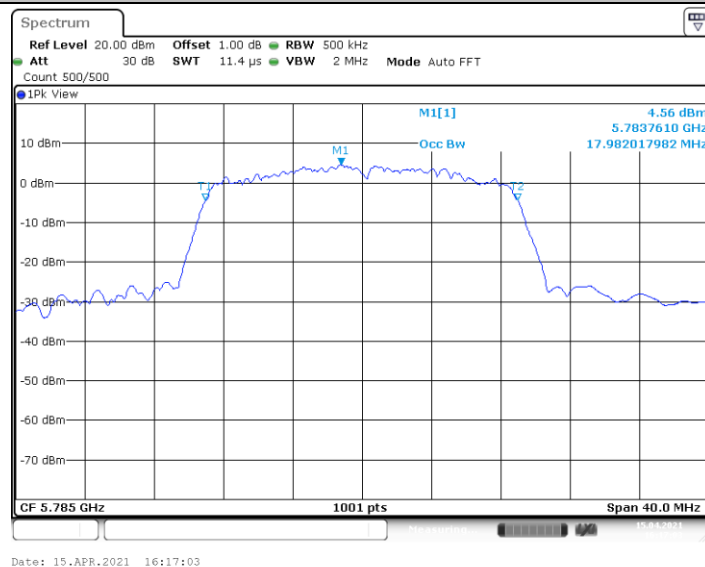
802.11n(HT40)_Ant1_5795



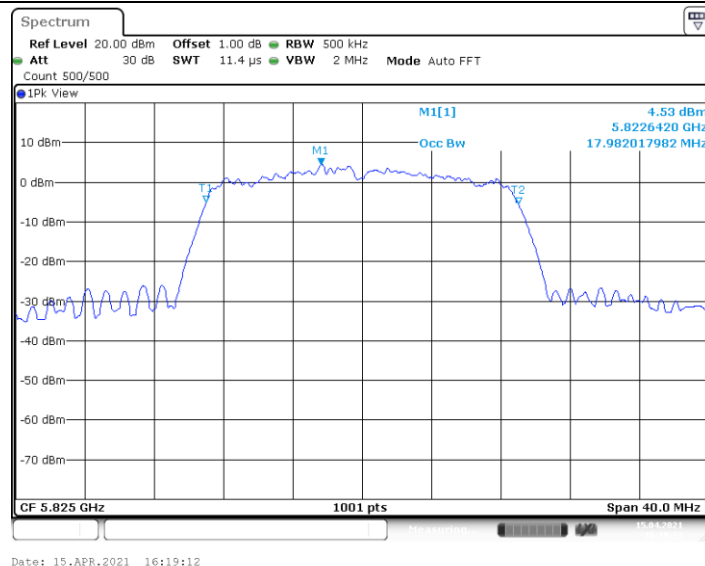
802.11ac(VHT20)_Ant1_5745



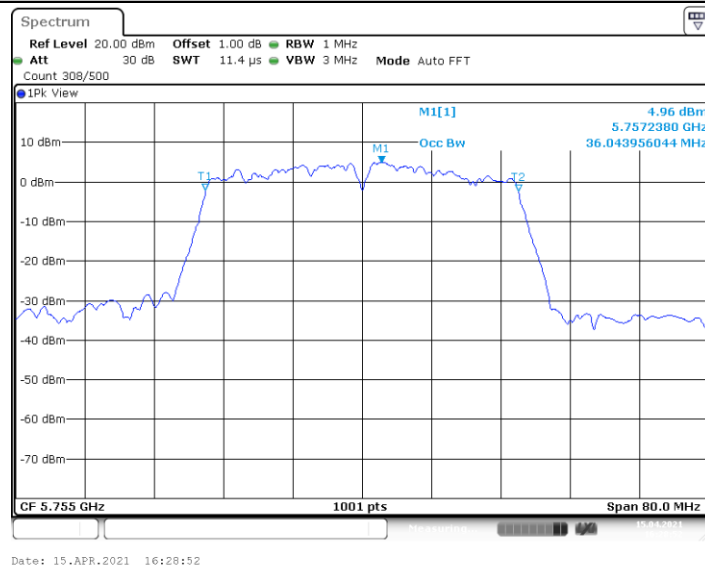
802.11ac(VHT20)_Ant1_5785



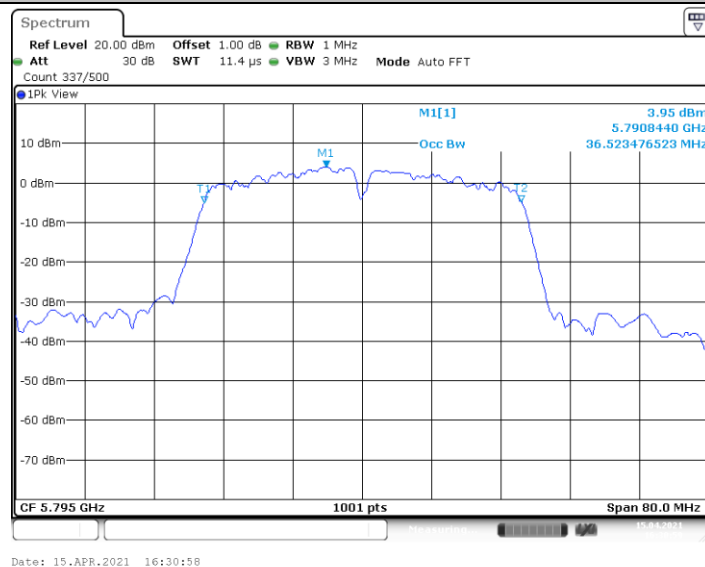
802.11ac(VHT20)_Ant1_5825



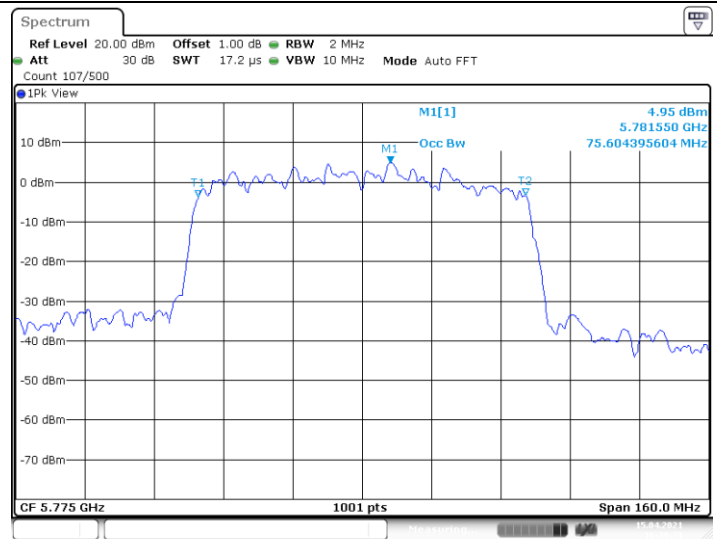
802.11ac(VHT40)_Ant1_5755



802.11ac(VHT40)_Ant1_5795



802.11ac(VHT80)_Ant1_5775



Date: 15.APR.2021 16:39:33

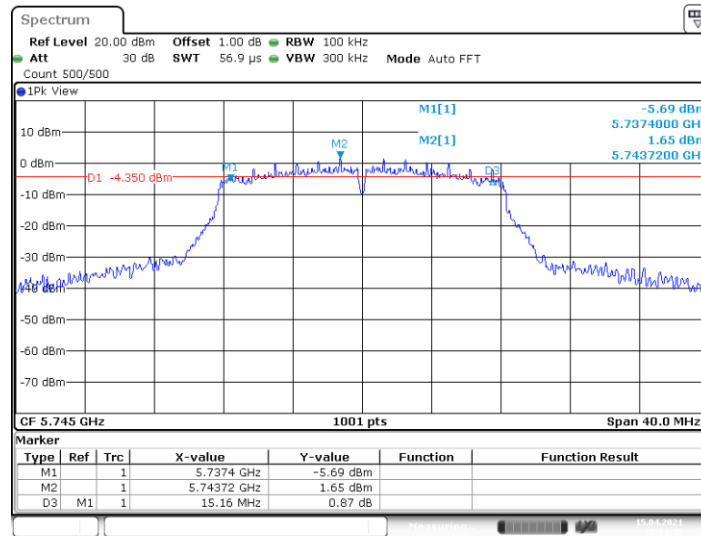
Appendix A3: Min emission bandwidth

Test Result

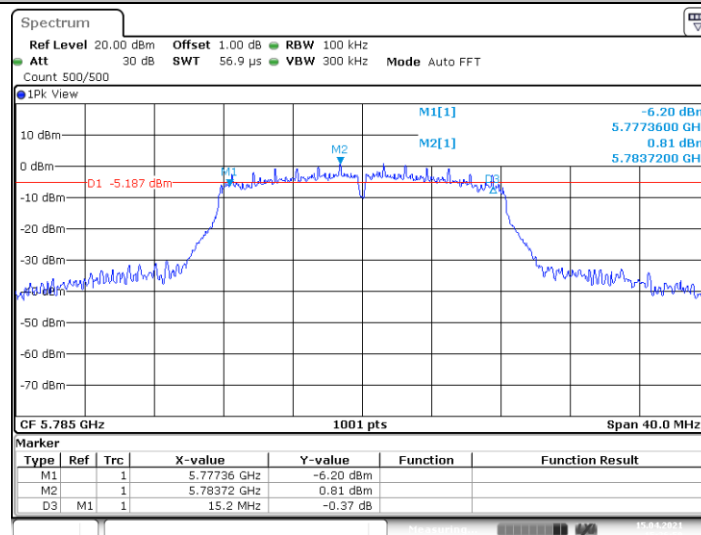
Test Mode	Antenna	Channel	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
802.11a	Ant1	5745	15.160	5737.400	5752.560	≥ 0.5	PASS
		5785	15.200	5777.360	5792.560	≥ 0.5	PASS
		5825	15.200	5817.360	5832.560	≥ 0.5	PASS
802.11n(HT20)	Ant1	5745	15.480	5737.080	5752.560	≥ 0.5	PASS
		5785	15.200	5777.360	5792.560	≥ 0.5	PASS
		5825	15.200	5817.360	5832.560	≥ 0.5	PASS
802.11n(HT40)	Ant1	5755	35.280	5737.320	5772.600	≥ 0.5	PASS
		5795	35.280	5777.320	5812.600	≥ 0.5	PASS
802.11ac(VHT20)	Ant1	5745	15.200	5737.360	5752.560	≥ 0.5	PASS
		5785	15.200	5777.360	5792.560	≥ 0.5	PASS
		5825	15.160	5817.360	5832.520	≥ 0.5	PASS
802.11ac(VHT40)	Ant1	5755	35.280	5737.320	5772.600	≥ 0.5	PASS
		5795	35.280	5777.320	5812.600	≥ 0.5	PASS
802.11ac(VHT80)	Ant1	5775	75.520	5737.240	5812.760	≥ 0.5	PASS

Test Graphs

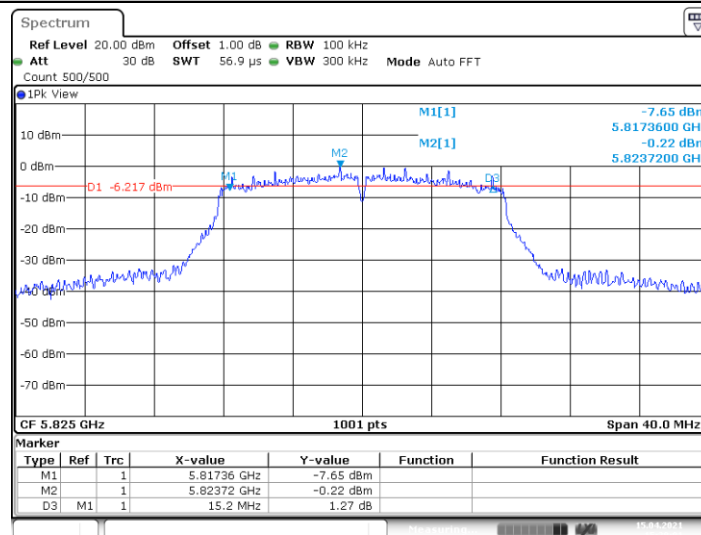
802.11a_Ant1_5745



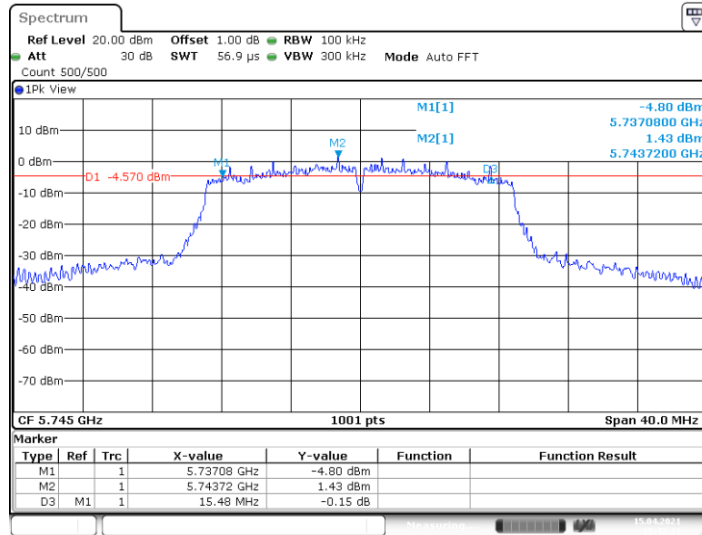
802.11a_Ant1_5785



802.11a_Ant1_5825

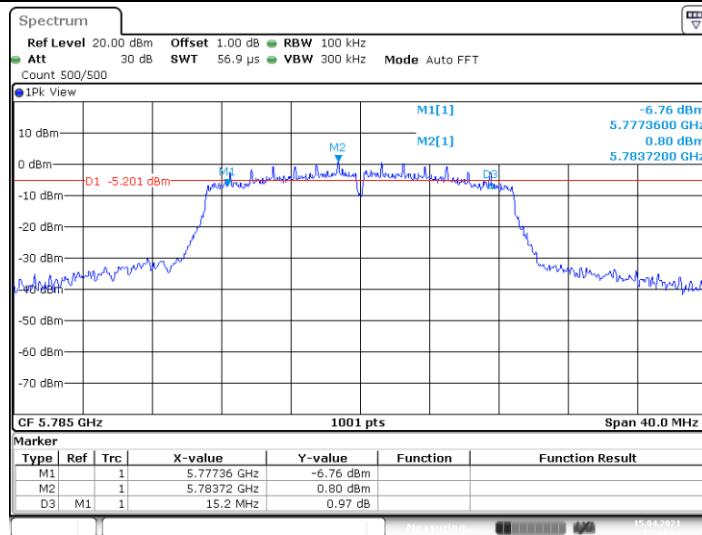


802.11n(HT20)_Ant1_5745



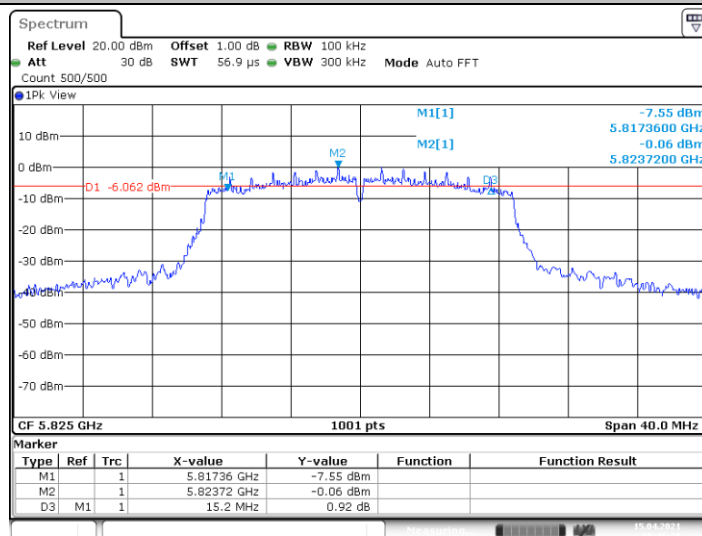
Date: 15.APR.2021 15:42:21

802.11n(HT20)_Ant1_5785



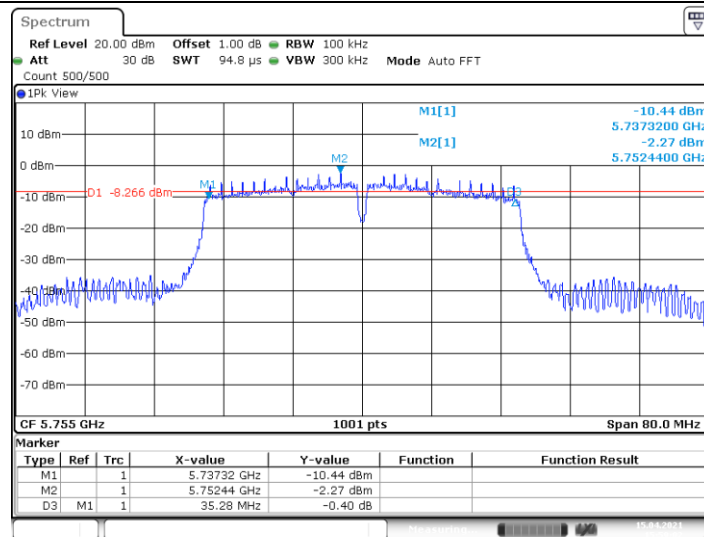
Date: 15.APR.2021 15:44:34

802.11n(HT20)_Ant1_5825

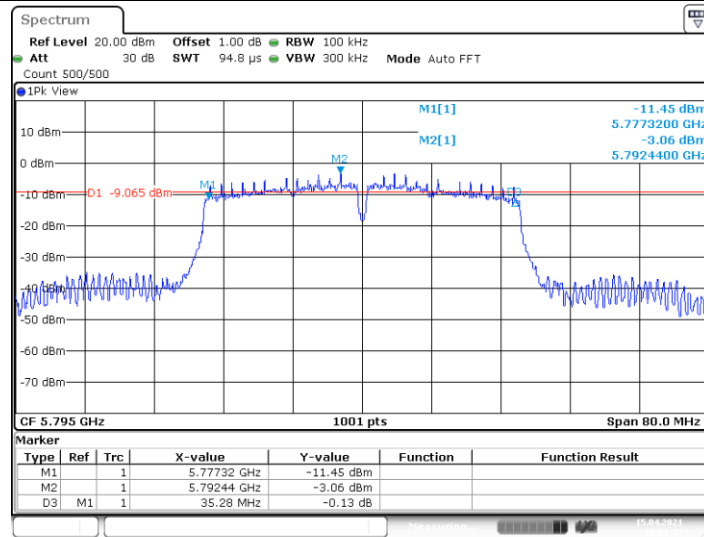


Date: 15.APR.2021 15:46:39

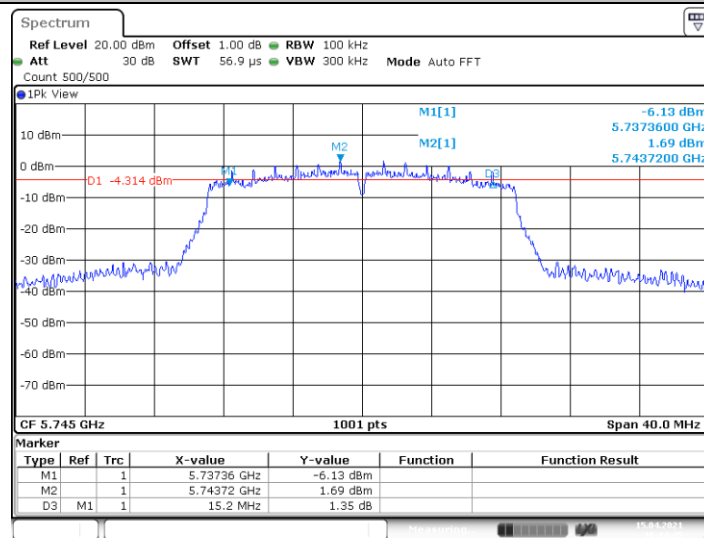
802.11n(HT40)_Ant1_5755



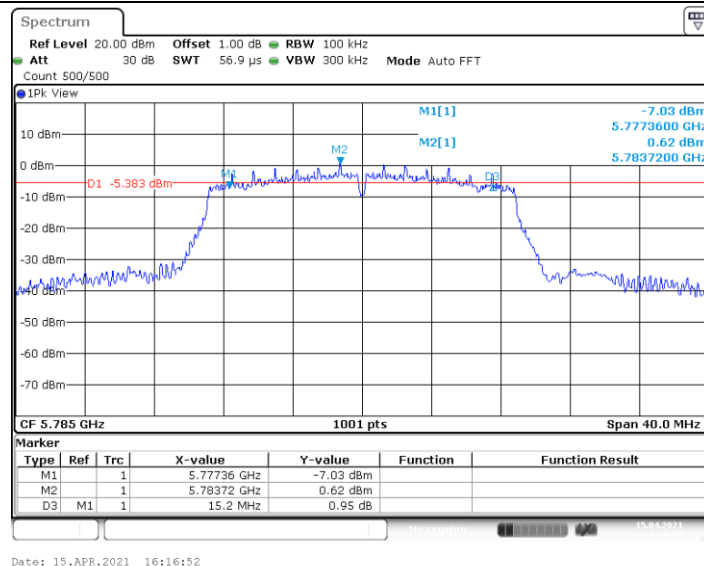
802.11n(HT40)_Ant1_5795



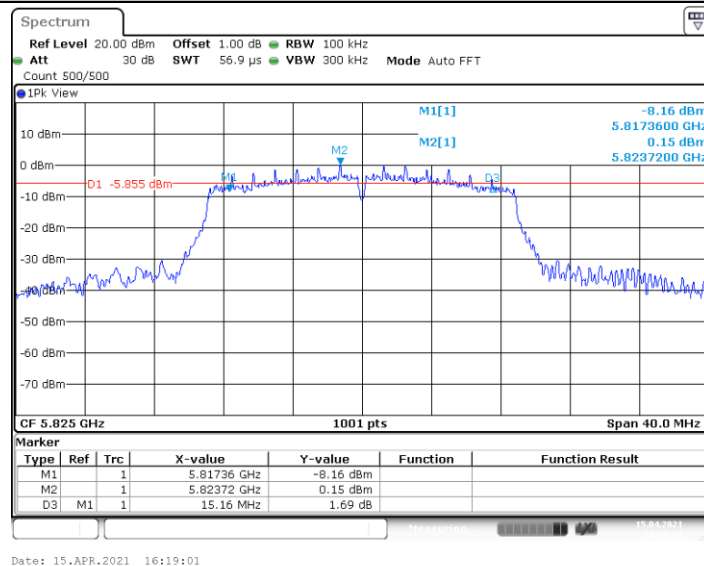
802.11ac(VHT20)_Ant1_5745



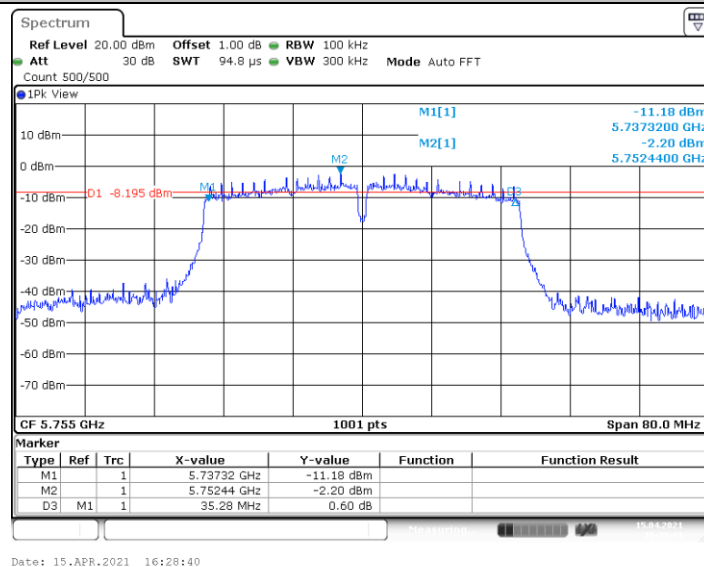
802.11ac(VHT20)_Ant1_5785



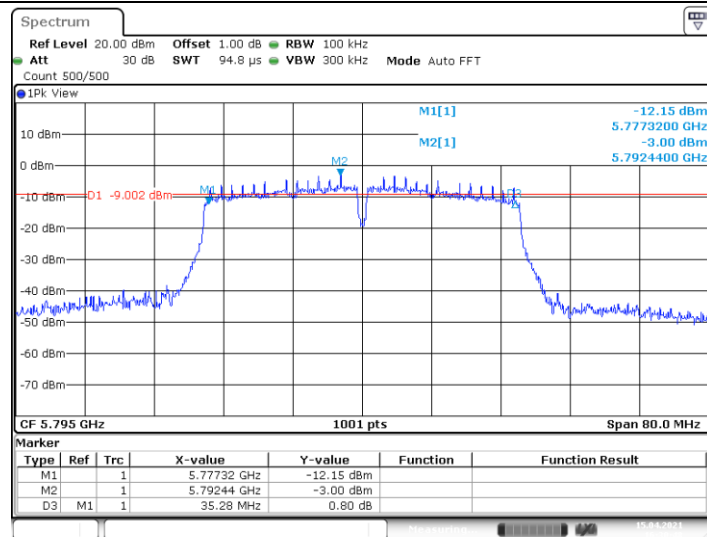
802.11ac(VHT20)_Ant1_5825



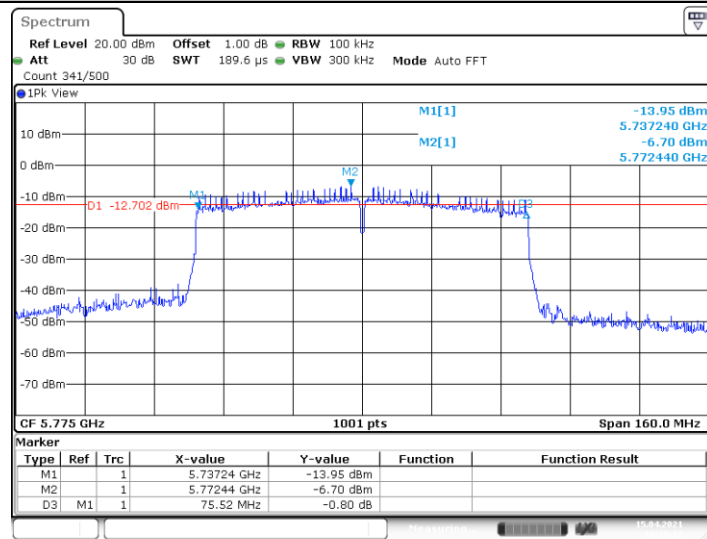
802.11ac(VHT40)_Ant1_5755



802.11ac(VHT40)_Ant1_5795



802.11ac(VHT80)_Ant1_5775



Appendix B: Maximum conducted output power

Test Result

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
802.11a	Ant1	5180	11.49	<=24	PASS
		5200	11.06	<=24	PASS
		5240	10.75	<=24	PASS
		5260	11.17	<=24	PASS
		5280	10.90	<=24	PASS
		5320	10.46	<=24	PASS
		5745	11.95	<=30	PASS
		5785	11.01	<=30	PASS
		5825	10.38	<=30	PASS
802.11n(HT20)	Ant1	5180	11.41	<=24	PASS
		5200	10.79	<=24	PASS
		5240	10.71	<=24	PASS
		5260	11.02	<=24	PASS
		5280	10.73	<=24	PASS
		5320	10.27	<=24	PASS
		5745	11.80	<=30	PASS
		5785	10.92	<=30	PASS
		5825	10.25	<=30	PASS
802.11n(HT40)	Ant1	5190	11.13	<=24	PASS
		5230	10.71	<=24	PASS
		5270	11.12	<=24	PASS
		5310	10.31	<=24	PASS
		5755	10.70	<=30	PASS
		5795	9.85	<=30	PASS
802.11ac(VHT20)	Ant1	5180	11.33	<=24	PASS
		5200	10.89	<=24	PASS
		5240	10.82	<=24	PASS
		5260	11.04	<=24	PASS
		5280	10.97	<=24	PASS
		5320	10.37	<=24	PASS
		5745	11.89	<=30	PASS
		5785	10.91	<=30	PASS
		5825	10.17	<=30	PASS
802.11ac(VHT40)	Ant1	5190	11.18	<=24	PASS
		5230	10.79	<=24	PASS
		5270	11.19	<=24	PASS
		5310	10.41	<=24	PASS
		5755	10.78	<=30	PASS
		5795	9.84	<=30	PASS
802.11ac(VHT80)	Ant1	5210	10.97	<=24	PASS
		5290	10.94	<=24	PASS
		5775	9.51	<=30	PASS

Note: Test results increased RF cable loss by 0.5dB.

The Duty Cycle Factor is compensated in the graph.