

WLAN TEST REPORT

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Product Name: Wireless Print Server

FCC Standards: FCC Title 47 CFR Part 15.407

Industry Canada Standards: RSS-247 Issue 2 and RSS-Gen Issue 4

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Drive
Lexington, KY 40510

Client:
Lexmark International, Inc.
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Lexington, KY 40511

Report prepared by



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Report reviewed by



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1 Introduction and Conclusion

The tests indicated in section 2 were performed on the product constructed as described in section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Lexington is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number IC 2042M-1.

2 Test Summary

Page	Test full name	FCC Reference	IC Reference	Result
7	Maximum Output Power	§15.407(a)(1)(2)(3)	RSS-247 (6.2.1) (6.2.2) (6.2.3)	Pass
14	Occupied Bandwidth	§15.407(a)(1)(2)(3)	RSS-247 (6.2.1) (6.2.2) (6.2.3)	Pass
102	Power Spectral Density	§15.407(a)(1)(2)(3)	RSS-247 (6.2.1) (6.2.2) (6.2.3)	Pass
145	Undesirable Emissions (Transmitter)	§15.407(b) (1-8)	RSS-247 (6.2.1) (6.2.2) (6.2.3)	Pass
221	Radiated Spurious Emissions (Receiver)	§15.209	RSS-Gen (7.1.2)	Pass
225	AC Powerline Conducted Emissions	§15.207	RSS-Gen (8.8)	Pass
231	Antenna Requirement per FCC Part 15.203	§15.203	RSS-Gen (8.3)	Pass

3 Description of Equipment Under Test

Equipment Under Test	
Manufacturer	Lexmark International, Inc.
Model Number	LEX-M07-001
Serial Number	Test Sample 3
Receive Date	10/9/2017
Test Start Date	10/9/2017
Test End Date	11/29/2017
Device Received Condition	Good
Test Sample Type	Production
Frequency Band	U-NII-1, 5150 – 5250MHz U-NII-2A, 5250 – 5350MHz U-NII-2C, 5470 – 5725MHz U-NII-3, 5725 – 5850MHz
Mode(s) of Operation	802.11a, n(HT20), n(HT40), ac (VHT80)
Modulation Type	OFDM
Duty Cycle	100%
Transmission Control	Test Commands
Maximum Antenna Gain	Chain A:3.3dBi Chain B: 2.6dBi
Antenna Type (15.203)	PCB Antenna
Operating Voltage	5V via USB

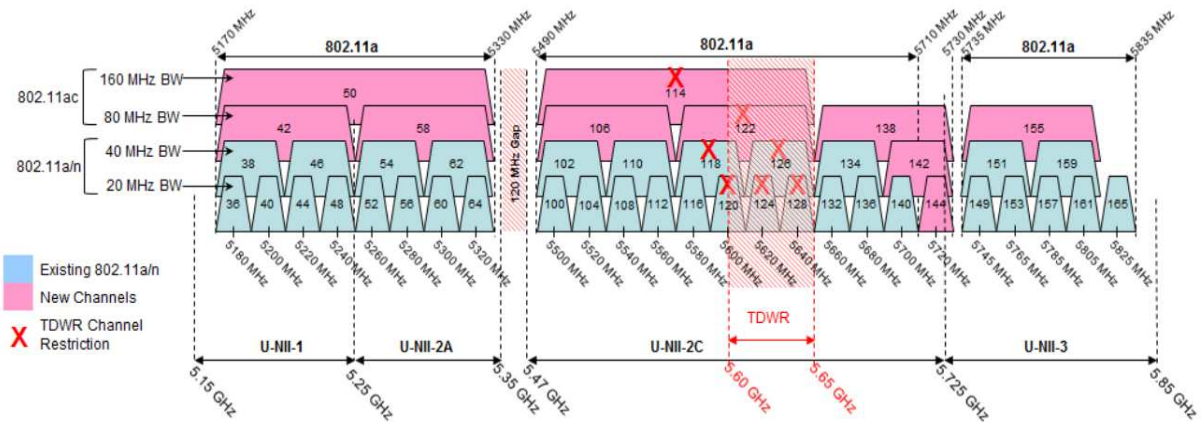
Description of Equipment Under Test
The LEX-M07-001 is a 2.4GHz/5GHz dual band Wi-Fi module supporting 802.11b/g/a/n/ac standards. WiFi function supports 2x2 MU-MIMO. Module hardware also supports Bluetooth 4.2/Bluetooth Low Energy.

3.1 Test Channels:

The following test channels were used during the evaluation:

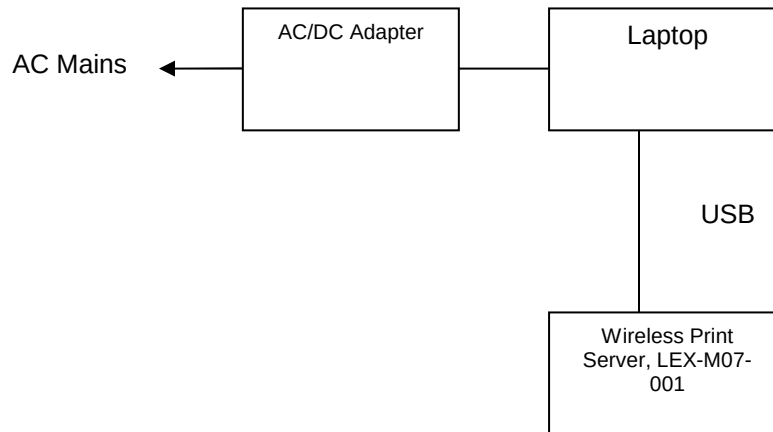
TX Mode	Band	TX Channels	TX Frequencies (MHz)
802.11a	U-NII-1	36, 44, 48	5180, 5220, 5240
	U-NII-2A	52, 60, 64	5260, 5300, 5320
	U-NII-2C	100, 116, 140	5500, 5580, 5700
	U-NII-3	149, 157, 165	5745, 5785, 5825
802.11n (HT20)	U-NII-1	36, 44, 48	5180, 5220, 5240
	U-NII-2A	52, 60, 64	5260, 5300, 5320
	U-NII-2C	100, 116, 140	5500, 5580, 5700
	U-NII-3	149, 157, 165	5745, 5785, 5825
802.11n (HT40)	U-NII-1	38, 46	5190, 5230
	U-NII-2A	54, 62	5270, 5310
	U-NII-2C	102, 110, 134	5510, 5550, 5670
	U-NII-3	151, 159	5755, 5795
802.11ac (VHT80)	U-NII-1	42	5210
	U-NII-2A	58	5290
	U-NII-2C	106, 138	5530, 5690
	U-NII-3	155	5775

3.2 U-NII Bands / Channels:



4 System setup including cable interconnection details, support equipment and simplified block diagram

4.1 EUT Block Diagram:



4.2 Cables:

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	USB Cable	2m	Yes	None	Laptop Computer

4.3 Support Equipment:

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	HP	ProBook 455 G4	5CD7212NG5

5 Maximum Output Power

5.1 Limits

The FCC and ISSED output power limits are shown below:

Operating Band (MHz)	15.407 / RSS-247 Conducted Power Limit	RSS-247 EIRP Limit
5150 - 5250	24dBm (NA for RSS-247)	23dBm or $10 + 10\log(B)$
5250 - 5350	24dBm or $11\text{dBm} + 10\log(B)$	30dBm or $17 + 10\log(B)$
5470 - 5725	24dBm or $11\text{dBm} + 10\log(B)$	30dBm or $17 + 10\log(B)$
5725 - 5825	30dBm	NA

B = 26dB Emission Bandwidth for 15.407 and 99% Bandwidth for RSS-247

5.2 FCC Power Limits:

- § 15.407(1)(iv):** For 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. In addition, 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.
- § 15.407(2):** 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. In addition, 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.
- § 15.407(3):** 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.3 ISED Power Limits:

RSS-247 6.2.1 (5150 – 5250MHz):

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

RSS-247 6.2.2 (5250 – 5350MHz):

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

a) The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b) The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

RSS-247 6.2.3 (5470 – 5600MHz and 5650 – 5725MHz):

The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order

5.4 Test Procedure:

ANSI C63.10:2013

KDB Publication No. 662911 D01 v02r01 (Multiple Transmitter Output)

The maximum output power was measured using a wideband power sensor connected to transmit chain A and B.

5.5 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
Wideband Power Sensor	100155	Rohde&Schwarz	NRP-Z81	9/20/2017	9/20/2018
20dB Attenuator	None	Pasternak	SA6S5W-20	Verify at Time of Use	Verify at Time of Use

5.6 Test Results:

The device was found to be **compliant**. The maximum output power from each transmit chain was less than the limit for each transmit band. The array gain was applied to conducted measurements performed on transmit chain A and B in order to calculate the maximum EIRP for comparison to the RSS-247 limits.

5.7 Test Conditions:

Test Personnel:	<u>Bryan Taylor</u>	Test Date:	<u>10/26/2017 – 11/20/2017</u>
Supervising/Reviewing Engineer:			
(Where Applicable)	<u>NA</u>	Ambient Temperature:	<u>22.7C</u>
Input Voltage:	<u>DC Powered via USB</u>	Relative Humidity:	<u>40.4%</u>
		Atmospheric Pressure:	<u>987.3mbar</u>

5.8 Test Data (802.11a):

Chain A+B 802.11a Maximum Conducted Output Power and EIRP										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted Power (dBm)	Single Antenna Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	15.407 Margin (dB)	RSS-247 Margin (dBm)
36	5180	11.82	12.69	15.29	3.30	21.60	24.00	22.26	8.71	0.66
44	5220	11.84	12.72	15.31	3.30	21.62	24.00	22.25	8.69	0.62
48	5240	12.03	12.71	15.39	3.30	21.70	24.00	22.23	8.61	0.53
52	5260	12.03	12.7	15.39	3.30	21.70	23.95	29.23	8.56	7.53
60	5300	12.01	12.69	15.37	3.30	21.68	23.95	29.23	8.58	7.55
64	5320	11.99	12.64	15.34	3.30	21.65	23.95	29.25	8.61	7.60
100	5500	11.04	11.65	14.37	3.30	20.68	23.95	29.25	9.58	8.57
116	5580	11.06	11.63	14.36	3.30	20.67	23.91	29.25	9.54	8.57
140	5700	10.33	10.96	13.67	3.30	19.98	23.96	29.23	10.29	9.25
149	5745	9.91	10.43	13.19	3.30	19.50	30.00	NA	16.81	NA
157	5785	9.82	10.31	13.08	3.30	19.39	30.00	NA	16.92	NA
165	5825	9.72	10.28	13.02	3.30	19.33	30.00	NA	16.98	NA

Note 1: The total conducted power was found by converting each of the power measurements from chain A and chain B to linear quantities, summing the emissions, then converting back to dBm.

Note 2: The worst case array gain was calculated per KDB662911D01v02r01 for completely correlated signals. Array gain = $G_{ant} + 10\log(N_{ant})$ dBi

Note 3: The EIRP was calculated by adding the total conducted power (in dBm) to the worst case calculated array gain (in dBi).

5.9 Test Data (802.11n, HT20):

Chain A+B 802.11n(HT20) Maximum Conducted Output Power and EIRP										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted Power (dBm)	Single Antenna Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	15.407 Margin (dB)	RSS-247 Margin (dBm)
36	5180	11.43	12.62	15.08	3.30	21.39	24.00	22.47	8.92	1.09
44	5220	11.82	12.71	15.30	3.30	21.61	24.00	22.47	8.70	0.86
48	5240	11.82	12.71	15.30	3.30	21.61	24.00	22.47	8.70	0.86
52	5260	11.79	12.69	15.27	3.30	21.58	24.05	29.47	8.78	7.89
60	5300	11.87	12.74	15.34	3.30	21.65	24.01	29.47	8.68	7.83
64	5320	12.04	12.73	15.41	3.30	21.72	24.03	29.47	8.62	7.75
100	5500	11.43	11.79	14.62	3.30	20.93	24.05	29.47	9.43	8.54
116	5580	11.51	11.86	14.70	3.30	21.01	24.01	29.49	9.32	8.48
140	5700	10.55	11.19	13.89	3.30	20.20	24.07	29.49	10.17	9.28
149	5745	9.98	10.77	13.40	3.30	19.71	30.00	NA	16.60	NS
157	5785	9.78	10.72	13.29	3.30	19.60	30.00	NA	16.71	NA
165	5825	10.05	10.03	13.05	3.30	19.36	30.00	NA	16.95	NA

Note 1: The total conducted power was found by converting each of the power measurements from chain A and chain B to linear quantities, summing the emissions, then converting back to dBm.

Note 2: The worst case array gain was calculated per KDB662911D01v02r01 for completely correlated signals. Array gain = $G_{ant} + 10\log(N_{ant})$ dBi

Note 3: The EIRP was calculated by adding the total conducted power (in dBm) to the worst case calculated array gain (in dBi).

5.10 Test Data (802.11n, HT40):

Chain A+B 802.11n(HT40) Maximum Conducted Output Power										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted Power (dBm)	Single Antenna Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	15.407 Margin (dB)	RSS-247 Margin (dBm)
38	5190	11.46	12.26	14.89	3.30	21.20	24.00	23.00	9.11	1.80
46	5230	11.56	12.54	15.09	3.30	21.40	24.00	23.00	8.91	1.60
54	5270	11.7	16.45	17.70	3.30	24.02	24.00	30.00	6.30	5.98
62	5310	11.83	12.39	15.13	3.30	21.44	27.12	30.00	11.99	8.56
102	5510	10.95	11.43	14.21	3.30	20.52	27.18	30.00	12.97	9.48
110	5550	11	11.45	14.24	3.30	20.55	27.10	30.00	12.86	9.45
134	5670	10.33	10.71	13.53	3.30	19.84	27.15	30.00	13.62	10.16
151	5755	9.94	10.45	13.21	3.30	19.52	27.13	NA	13.92	NA
159	5795	10.06	10.6	13.35	3.30	19.66	27.19	NA	13.84	NA

Note 1: The total conducted power was found by converting each of the power measurements from chain A and chain B to linear quantities, summing the emissions, then converting back to dBm.

Note 2: The worst case array gain was calculated per KDB662911D01v02r01 for completely correlated signals. Array gain = $G_{ant} + 10\log(N_{ant})$ dBi

Note 3: The EIRP was calculated by adding the total conducted power (in dBm) to the worst case calculated array gain (in dBi).

5.11 Test Data (802.11ac, VHT80):

Chain A+B 802.11ac(VHT80) Maximum Conducted Output Power										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted Power (dBm)	Single Antenna Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	15.407 Margin (dB)	RSS-247 Margin (dBm)
42	5210	11.17	12.61	14.96	3.30	21.27	24.00	23.00	9.04	1.73
58	5290	11.34	12.36	14.89	3.30	21.20	24.00	23.00	9.11	1.80
106	5530	12.13	12.74	15.46	3.30	21.77	24.00	30.00	8.54	8.23
138	5690	10.23	10.61	13.43	3.30	19.74	30.17	30.00	16.73	10.26
155	5775	9.33	9.83	12.60	3.30	18.91	30.14	NA	17.54	NA

Note 1: The total conducted power was found by converting each of the power measurements from chain A and chain B to linear quantities, summing the emissions, then converting back to dBm.

Note 2: The worst case array gain was calculated per KDB662911D01v02r01 for completely correlated signals. Array gain = $G_{ant} + 10\log(N_{ant})$ dBi

Note 3: The EIRP was calculated by adding the total conducted power (in dBm) to the worst case calculated array gain (in dBi).

6 Occupied Bandwidth

6.1 Limits

§ 15.407(e), RSS-247 (6.2.4):

Within the 5725 – 5850GHz band, the minimum 6dB bandwidth of U-NII devices shall be at least 500kHz

6.2 Test Procedure:

ANSI C63.10: 2013 was used to measure the 26dB emission bandwidth, the 99% occupied bandwidth, and the 6dB bandwidth.

6.3 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ES126	9/20/2017	9/20/2018
6dB Attenuator	None	Pasternak	SA6S5W-6	Verify at Time of Use	Verify at Time of Use

6.4 Test Results:

The device was found to be **compliant**. All occupied bandwidth measurements were greater than 500kHz in the 5725 – 5850GHz band.

6.5 Test Conditions

Test Personnel:	Bryan Taylor	Test Date:	10/26/2017 – 11/20/2017
Supervising/Reviewing Engineer:			
(Where Applicable)	NA	Ambient Temperature:	22.7C
Input Voltage:	5VDC via USB	Relative Humidity:	40.4%
		Atmospheric Pressure:	987.3mbar

6.6 Test Data (802.11a):

802.11a Bandwidth Measurements							
Ch. No.	Freq (MHz)	Chain A 26dB BW (MHz)	Chain B 26dB BW (MHz)	Chain A 99% BW (MHz)	Chain B 99% BW (MHz)	Chain A 6dB BW (MHz)	Chain B 6dB BW (MHz)
36	5180	20.5	19.72	16.83	16.71	NA	NA
44	5220	19.65	19.72	16.77	16.77	NA	NA
48	5240	19.77	19.77	16.71	16.77	NA	NA
52	5260	19.72	19.77	16.71	16.77	NA	NA
60	5300	19.83	19.72	16.71	16.71	NA	NA
64	5320	19.77	19.72	16.77	16.71	NA	NA
100	5500	19.72	19.72	16.77	16.77	NA	NA
116	5580	19.77	19.54	16.77	16.65	NA	NA
140	5700	19.77	19.77	16.71	16.71	NA	NA
149	5745	19.65	19.67	16.71	16.71	16.71	16.71
157	5785	19.72	19.72	16.71	16.71	16.71	16.71
165	5825	19.77	19.71	16.71	16.71	16.71	16.59

6.7 Test Data (802.11n, HT20):

802.11n(HT20) Bandwidth Measurements							
Ch. No.	Freq (MHz)	Chain A 26dB BW (MHz)	Chain B 26dB BW (MHz)	Chain A 99% BW (MHz)	Chain B 99% BW (MHz)	Chain A 6dB BW (MHz)	Chain B 6dB BW (MHz)
36	5180	20.2	20.02	17.67	17.73	NA	NA
44	5220	20.2	20.02	17.67	17.73	NA	NA
48	5240	20.2	20.02	17.67	17.73	NA	NA
52	5260	20.2	20.02	17.67	17.73	NA	NA
60	5300	20.2	20.02	17.67	17.67	NA	NA
64	5320	20.2	20.08	17.67	17.73	NA	NA
100	5500	20.2	20.02	17.67	17.73	NA	NA
116	5580	20.26	20.02	17.73	17.73	NA	NA
140	5700	20.26	20.08	17.73	17.73	NA	NA
149	5745	20.26	20.14	17.67	17.73	17.79	17.85
157	5785	20.26	20.08	17.73	17.73	17.91	17.79
165	5825	20.2	20.14	17.73	17.73	17.79	17.79

6.8 Test Data (802.11n, HT40):

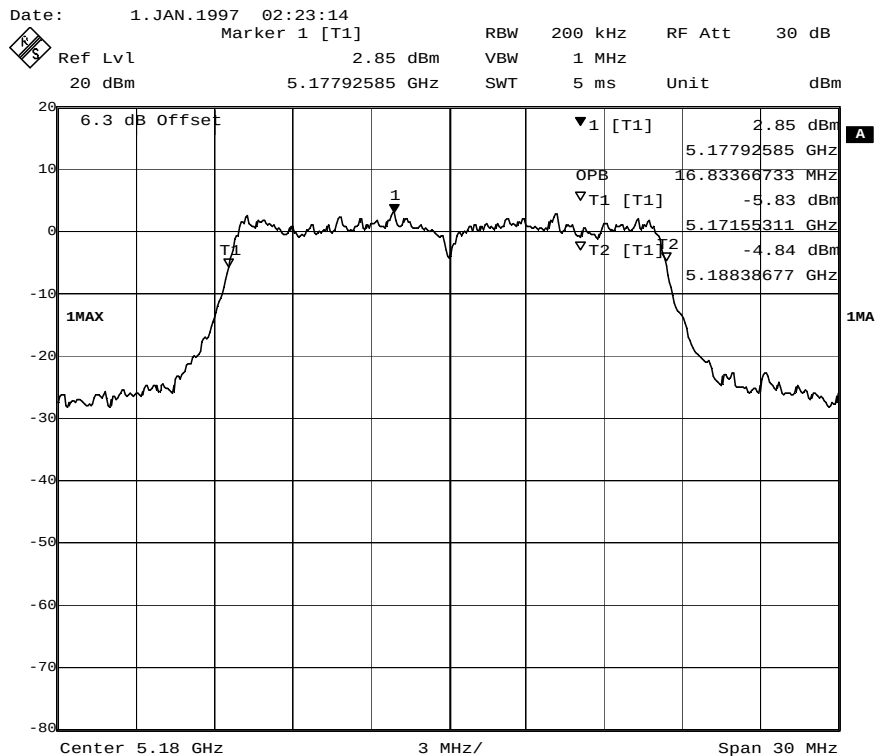
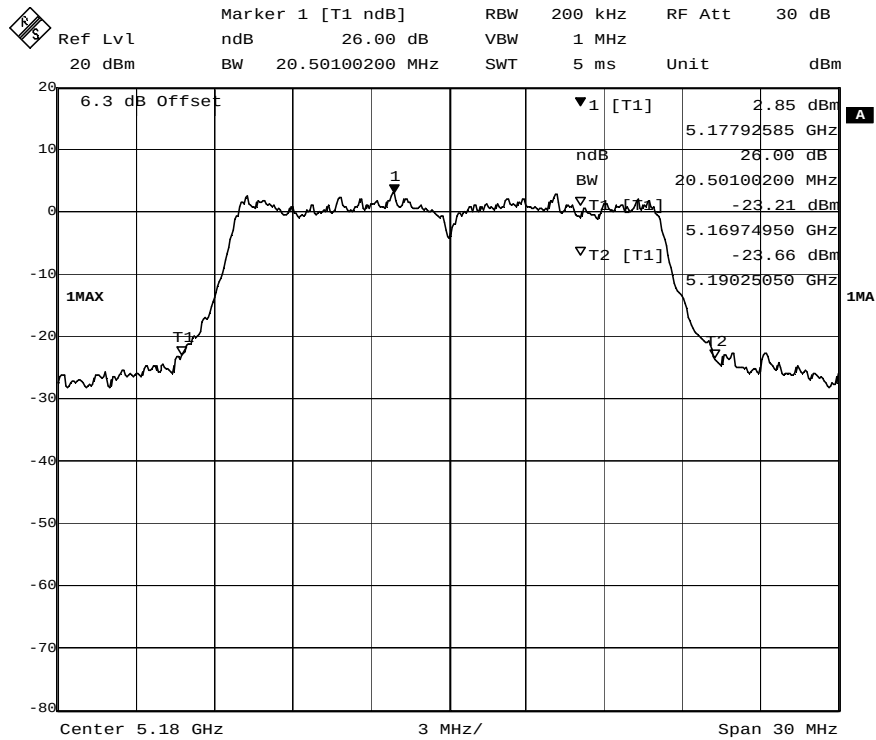
802.11n (HT40) Bandwidth Measurements							
Ch. No.	Freq (MHz)	Chain A 26dB BW (MHz)	Chain B 26dB BW (MHz)	Chain A 99% BW (MHz)	Chain B 99% BW (MHz)	Chain A 6dB BW (MHz)	Chain B 6dB BW (MHz)
38	5190	41	41.12	36.43	36.43	NA	NA
46	5230	40.88	41.24	36.43	36.43	NA	NA
54	5270	40.76	40.88	36.43	36.43	NA	NA
62	5310	40.88	41.48	36.43	36.31	NA	NA
102	5510	41.48	41.48	36.43	36.43	NA	NA
110	5550	41.12	40.76	36.43	36.43	NA	NA
134	5670	41.24	41.48	36.31	36.43	NA	NA
151	5755	41.48	41	36.43	36.31	36.67	36.67
159	5795	41.6	41.24	36.43	36.31	36.67	36.67

6.9 Test Data (802.11ac, VHT80):

802.11ac (VHT80) Bandwidth Measurements							
Ch. No.	Freq (MHz)	Chain A 26dB BW (MHz)	Chain B 26dB BW (MHz)	Chain A 99% BW (MHz)	Chain B 99% BW (MHz)	Chain A 6dB BW (MHz)	Chain B 6dB BW (MHz)
42	5210	82.56	82.08	76.32	76.56	NA	NA
58	5290	82.56	82.08	76.32	76.56	NA	NA
106	5530	82.56	82.08	76.32	76.56	NA	NA
138	5690	82.56	82.08	76.32	76.56	NA	NA
155	5775	82.56	82.08	76.32	76.56	76.80	76.80

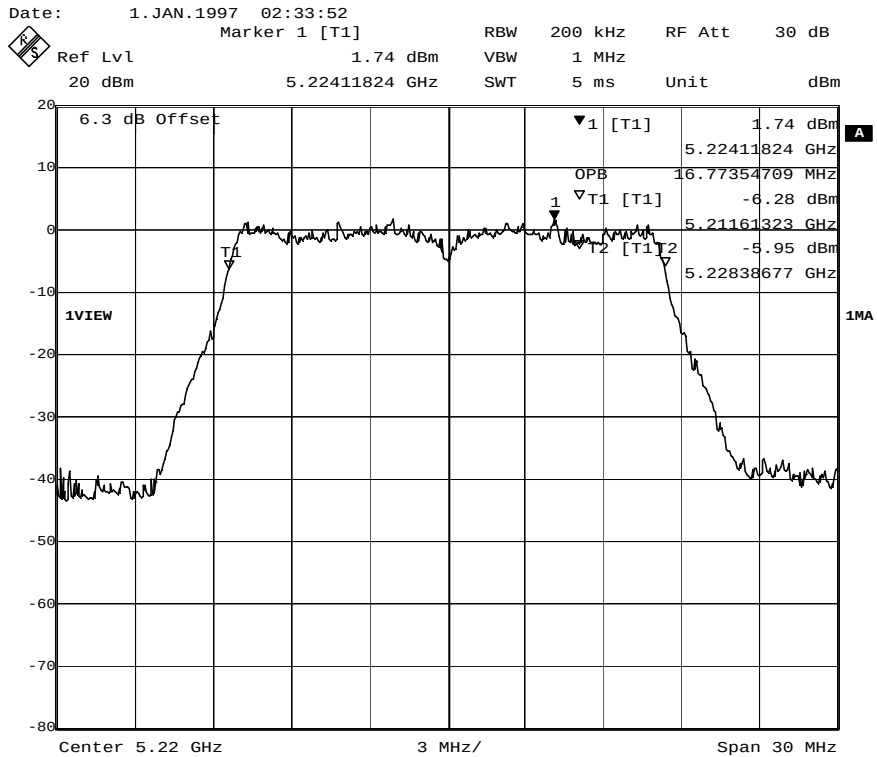
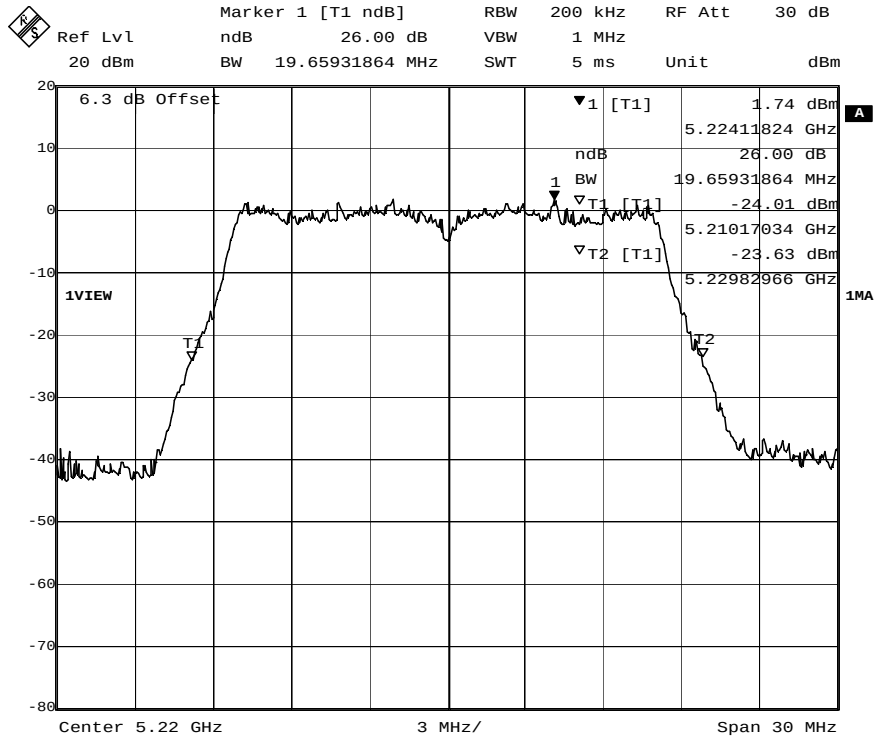
6.10 Bandwidth Plots (802.11a):

Note that the date/time on the instrument plots is incorrect. Testing was not performed in 1997.



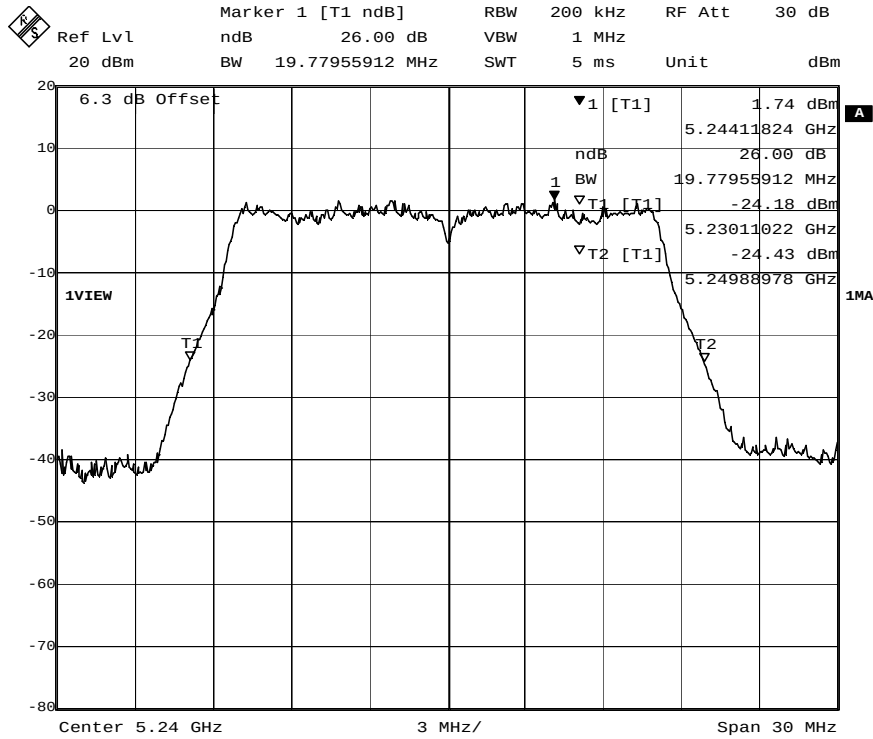
Date: 1. JAN.1997 02:23:56

802.11a	Ch 36	Chain A	26dB BW	20.5MHz	99%BW	16.83MHz
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Date: 1.JAN.1997 02:32:16

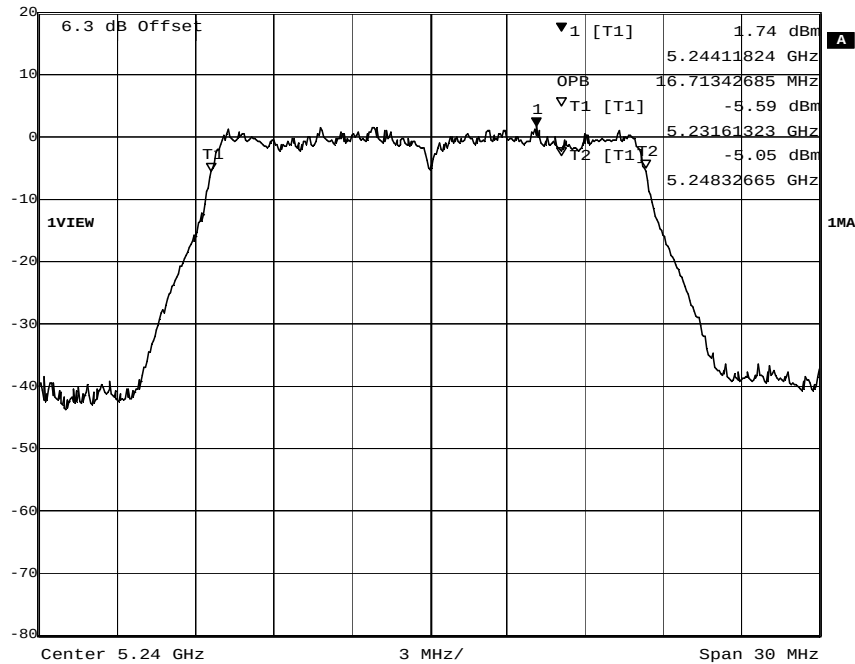
802.11a	Ch 44	Chain A	26dB BW	19.65MHz	99%BW	16.77MHz
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Date: 1.JAN.1997 05:07:23

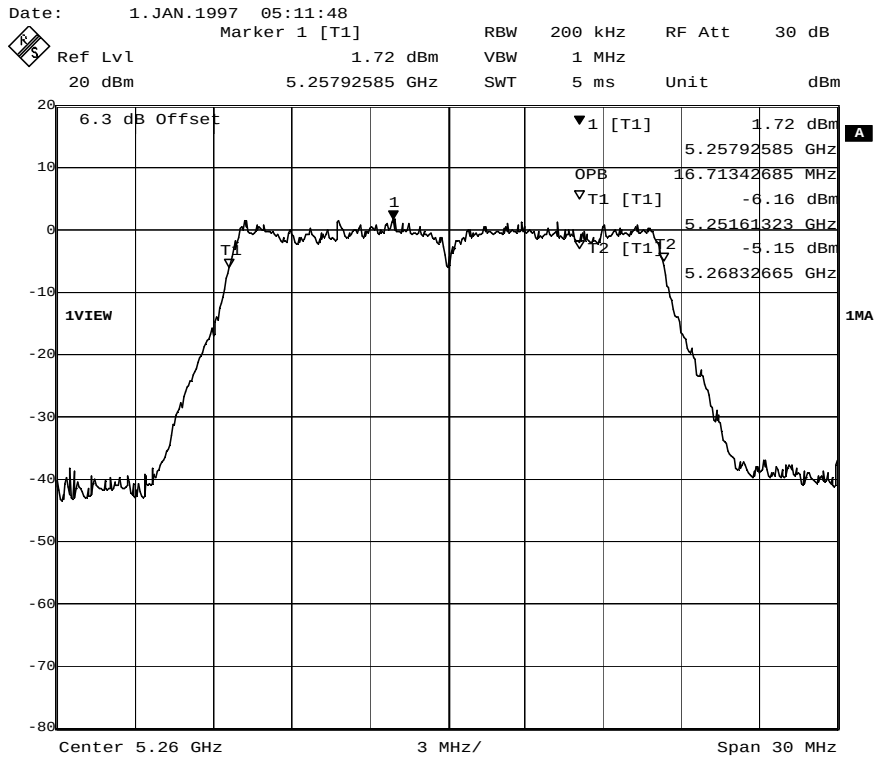
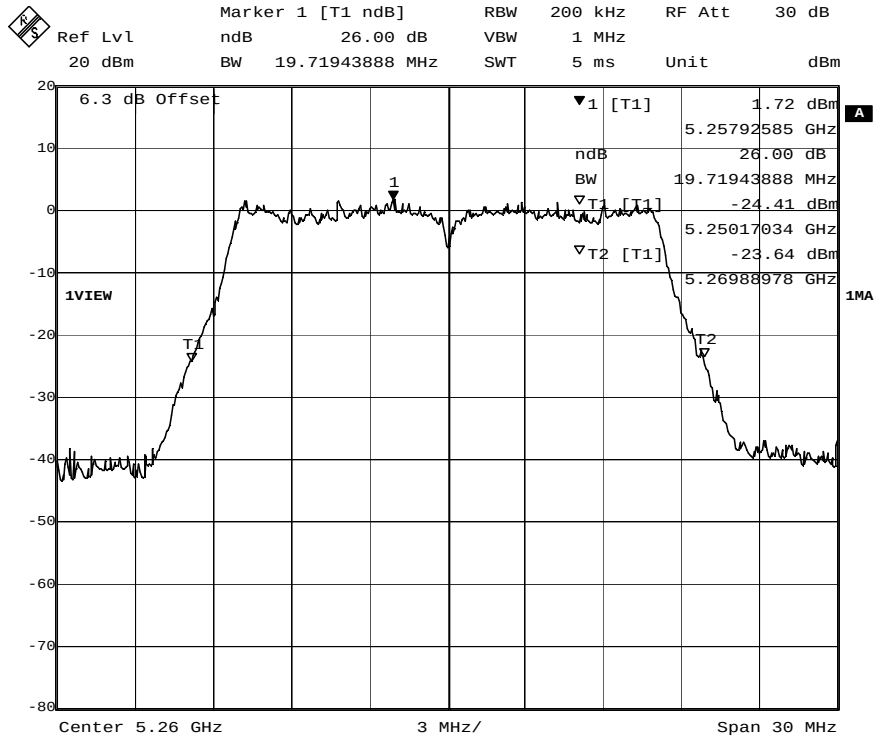
Marker 1 [T1]

Ref Lvl 20 dBm 1.74 dBm RBW 200 kHz RF Att 30 dB
 5.24411824 GHz VBW 1 MHz Unit dBm



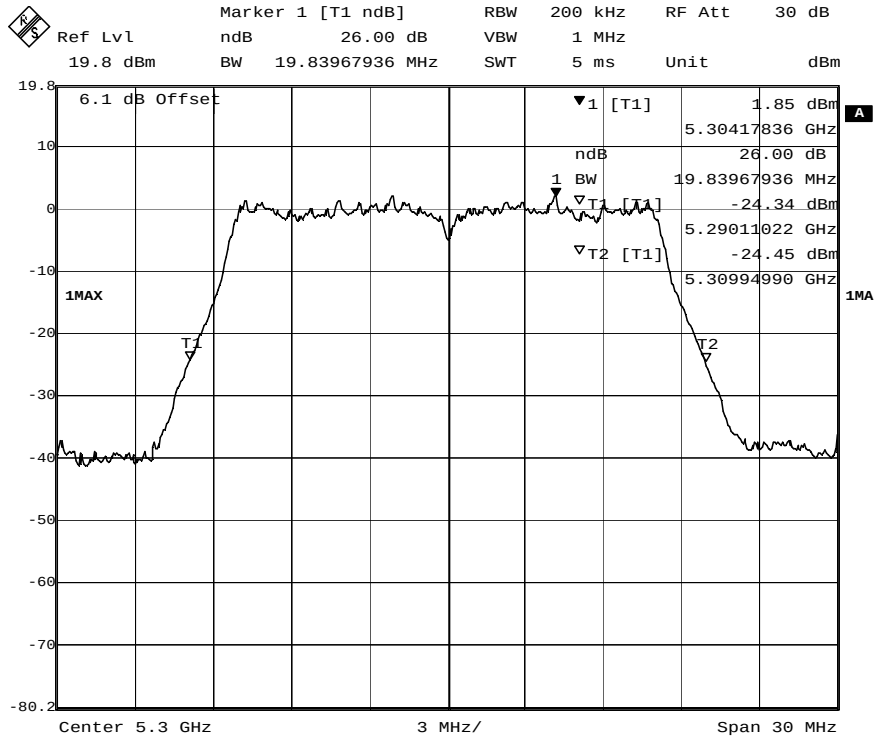
Date: 1.JAN.1997 05:08:18

802.11a	Ch 48	Chain A	26dB BW	19.77MHz	99%BW	16.71MHz
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Date: 1.JAN.1997 05:10:48

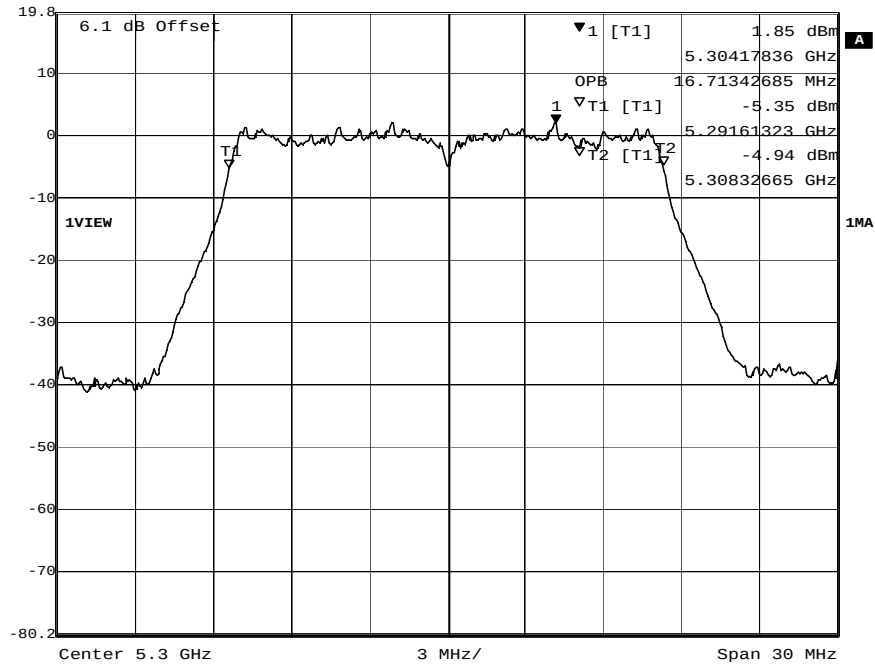
802.11a	Ch 52	Chain A	26dB BW	19.72MHz	99%BW	16.71MHz
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Date: 1.JAN.1997 05:17:06

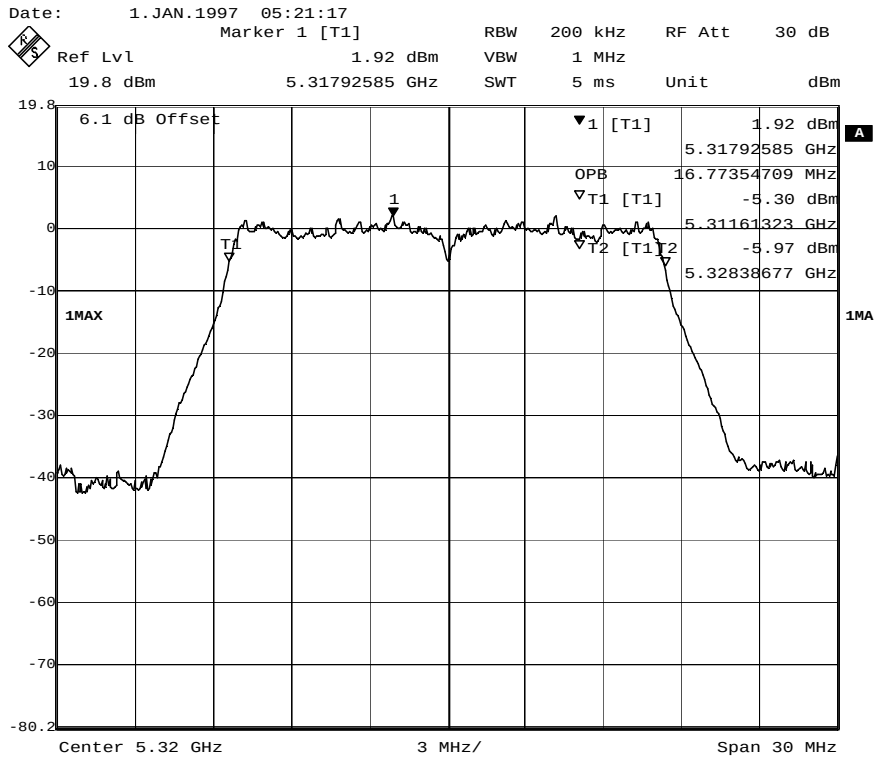
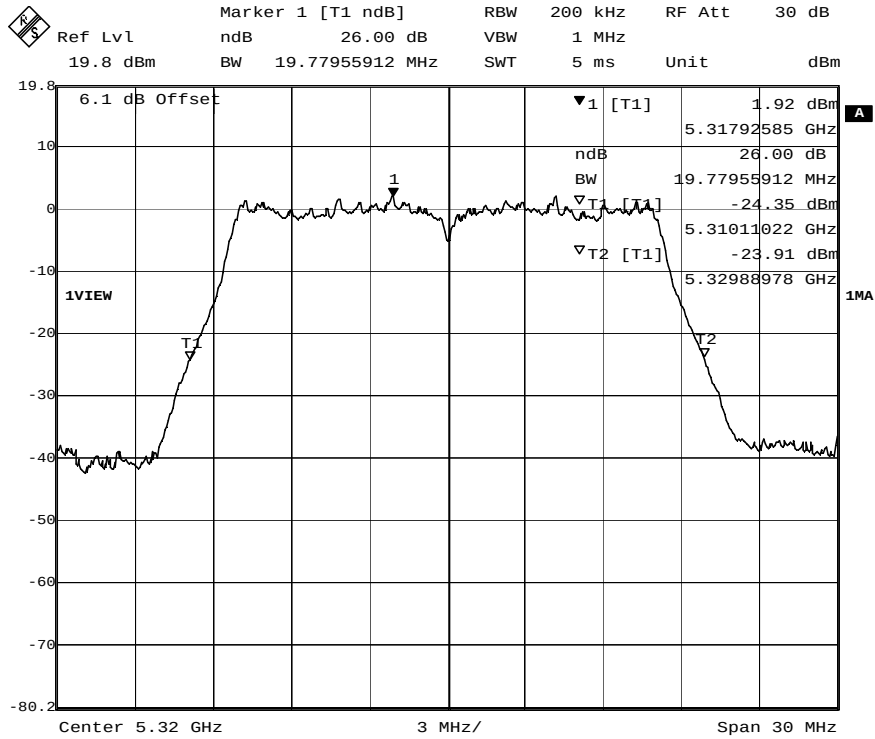
Marker 1 [T1]

Ref Lvl 19.8 dBm 1.85 dBm 5.30417836 GHz RBW 200 kHz RF Att 30 dB VBW 1 MHz Unit dBm SWT 5 ms



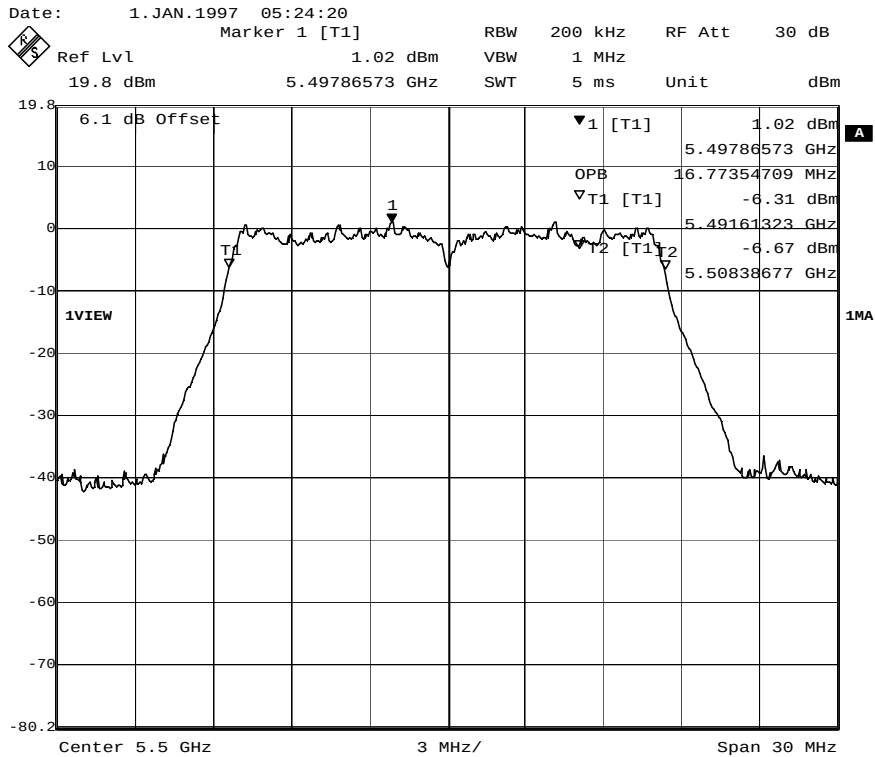
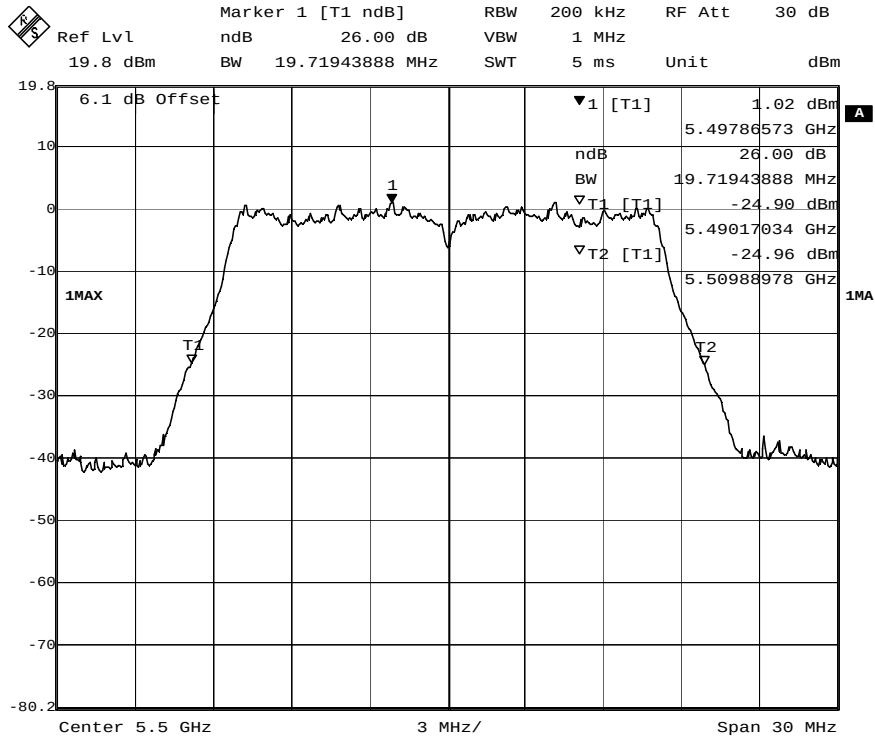
Date: 1.JAN.1997 05:18:18

802.11a	Ch 60	Chain A	26dB BW	19.83MHz	99%BW	16.71MHz
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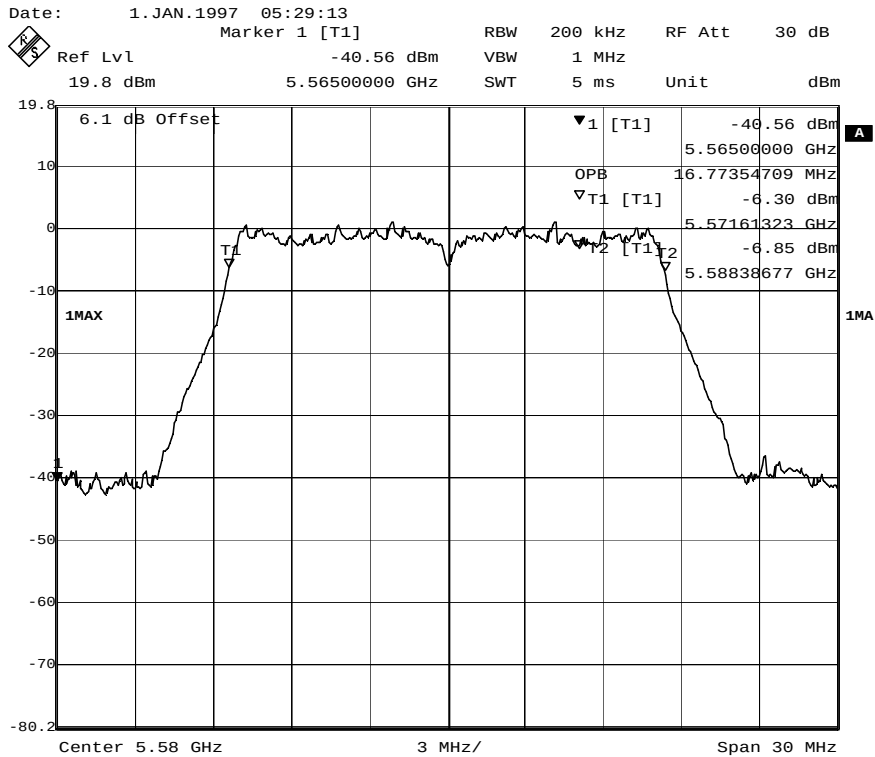
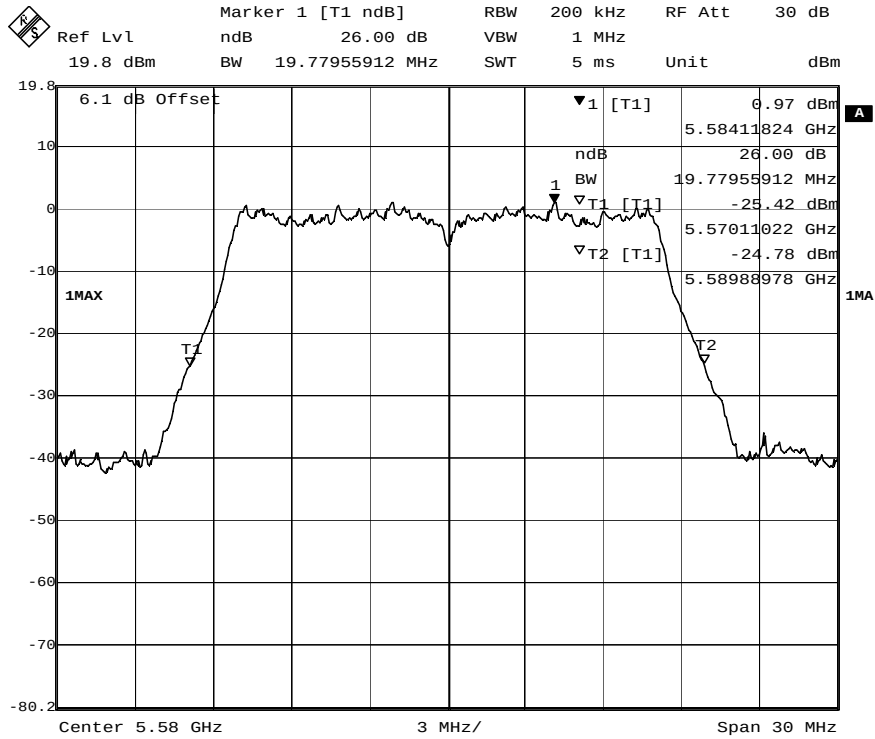
Date: 1.JAN.1997 05:20:03

802.11a	Ch 64	Chain A	26dB BW	19.77MHz	99%BW	16.77MHz
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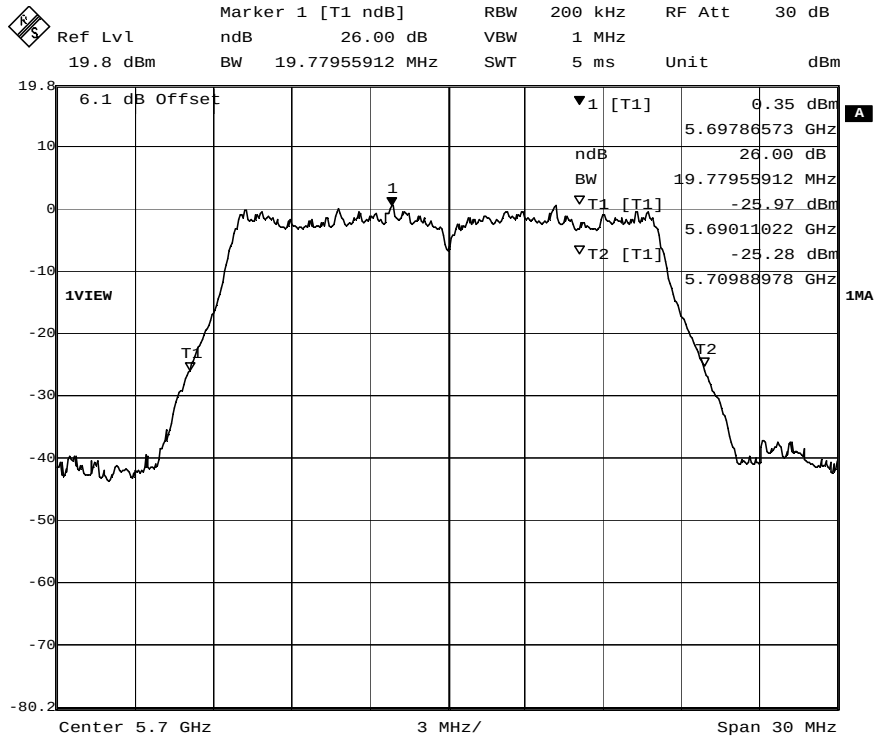
Date: 1.JAN.1997 05:25:42

802.11a	Ch 100	Chain A	26dB BW	19.72MHz	99%BW	16.77MHz
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Date: 1.JAN.1997 05:28:30

802.11a	Ch 116	Chain A	26dB BW	19.77MHz	99%BW	16.77MHz
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Date: 1.JAN.1997 05:32:24

Marker 1 [T1]

Ref Lvl 19.8 dBm 0.35 dBm RBW 200 kHz RF Att 30 dB VBW 1 MHz Unit dBm

5.69786573 GHz

OPB 16.71342685 MHz

▼T1 [T1]

-6.82 dBm

5.69161323 GHz

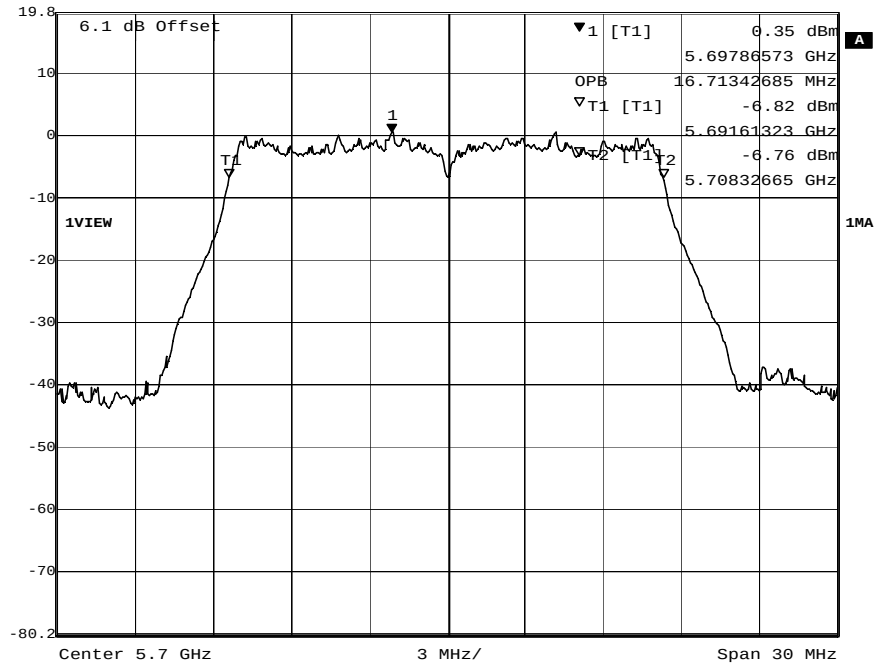
▼T2 [T1]

-6.76 dBm

5.70832665 GHz

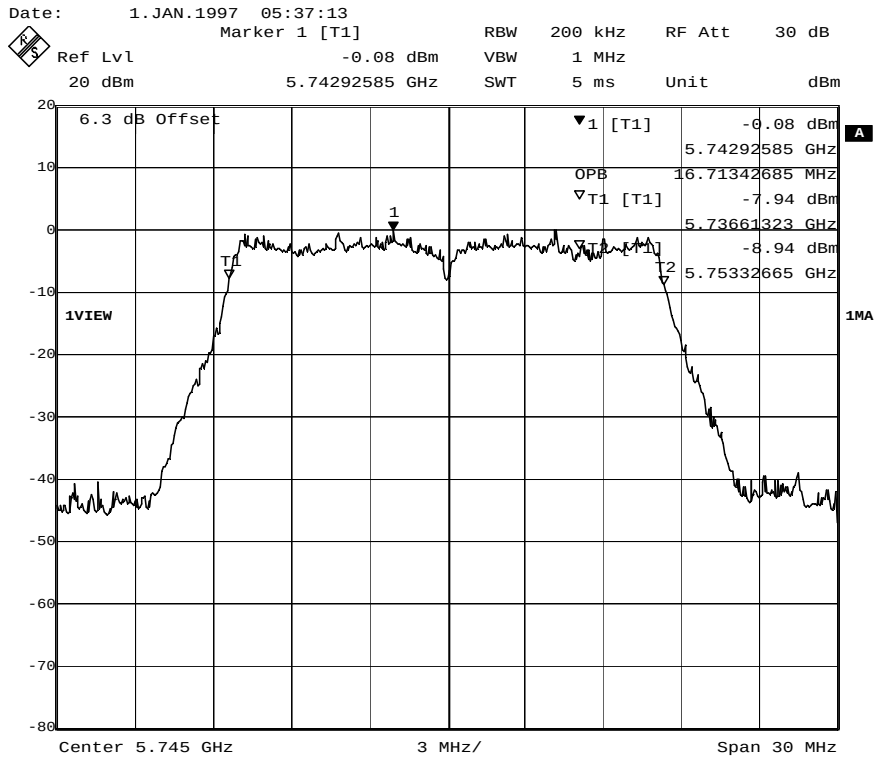
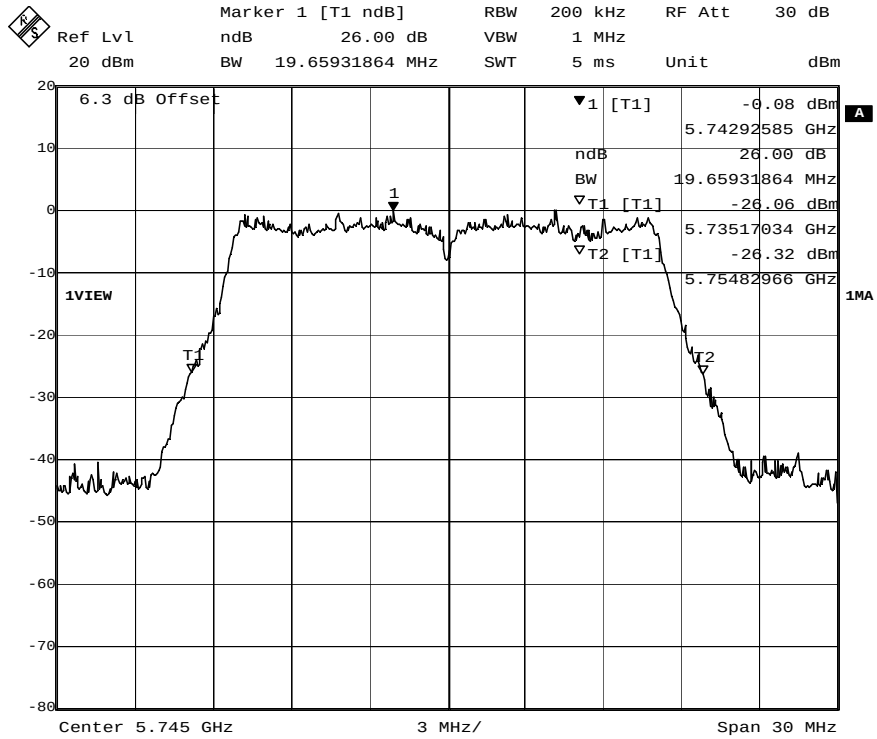
1MA

Center 5.7 GHz 3 MHz/ Span 30 MHz



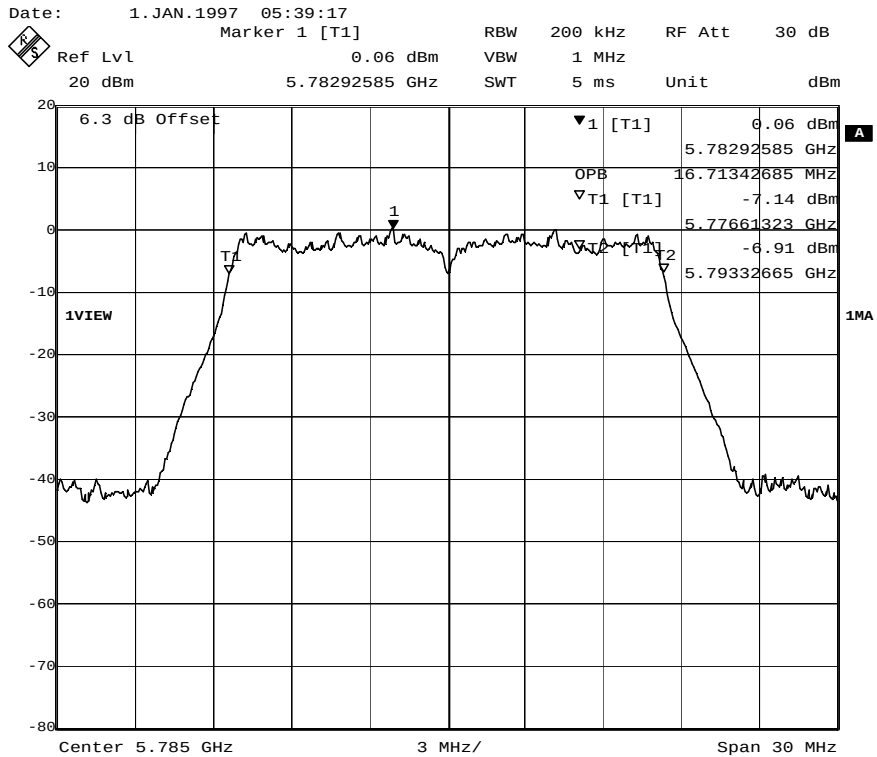
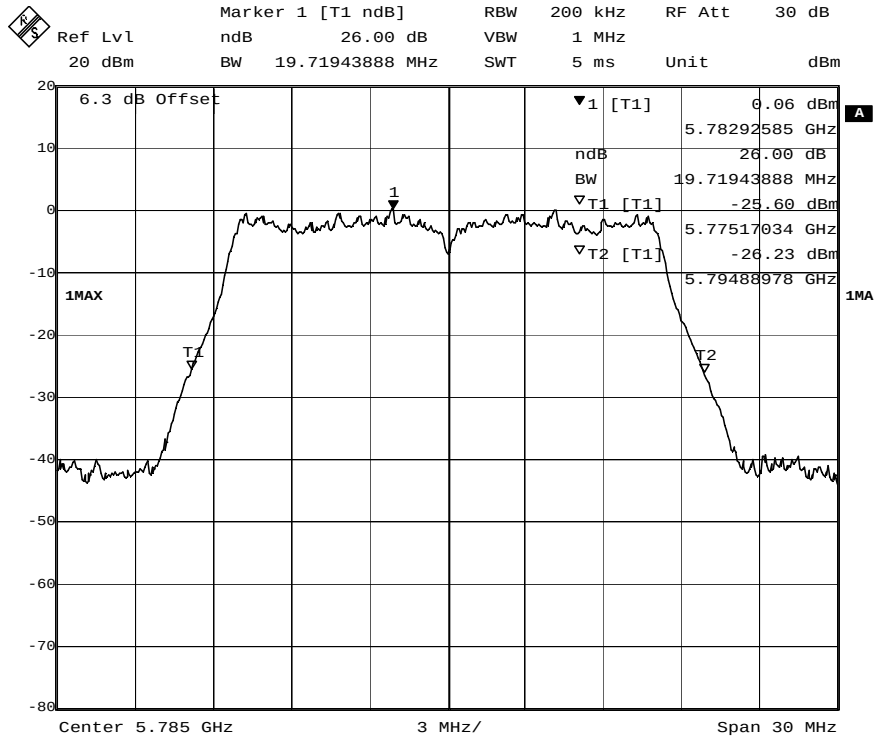
Date: 1.JAN.1997 05:33:27

802.11a	Ch 140	Chain A	26dB BW	19.77MHz	99%BW	16.71MHz
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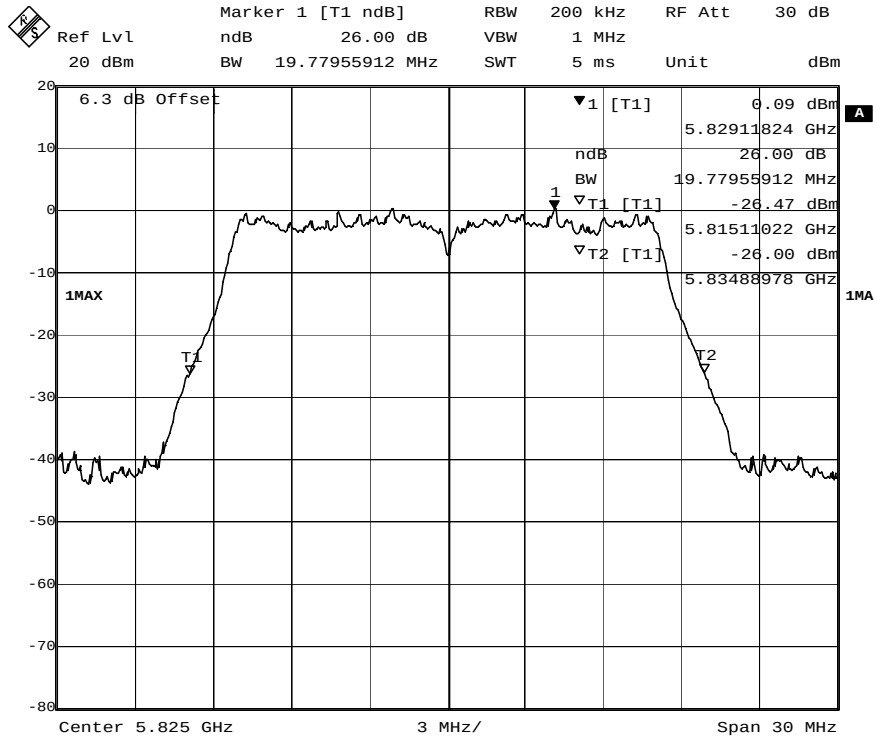
Date: 1.JAN.1997 05:36:43

802.11a	Ch 149	Chain A	26dB BW	19.65MHz	99%BW	16.71MHz
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Date: 1.JAN.1997 05:40:01

802.11a	Ch 157	Chain A	26dB BW	19.72MHz	99%BW	16.71MHz
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Date: 1.JAN.1997 05:42:39

Marker 1 [T1]

Ref Lvl 20 dBm

-42.95 dBm

5.81000000 GHz

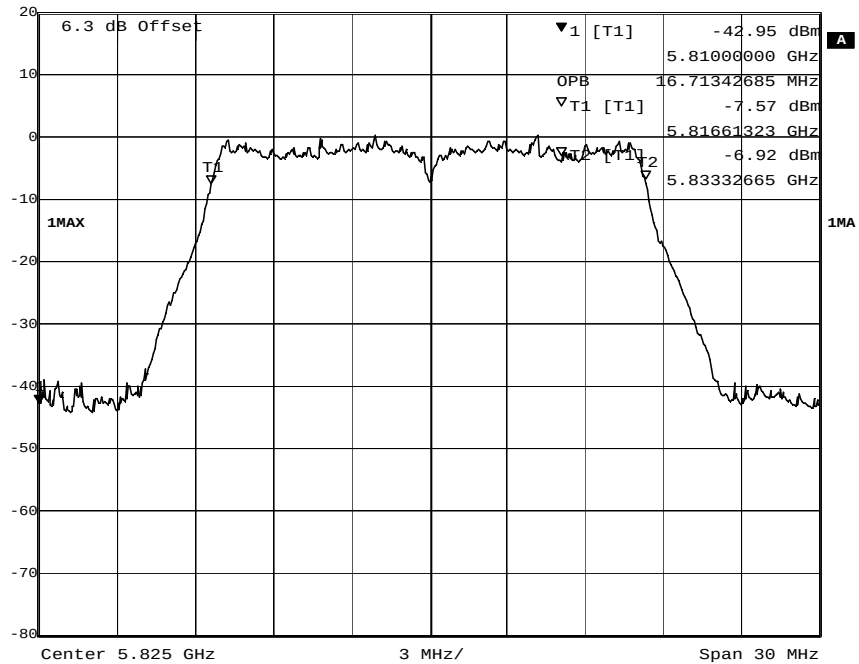
RBW 200 kHz

VBW 1 MHz

RF Att 30 dB

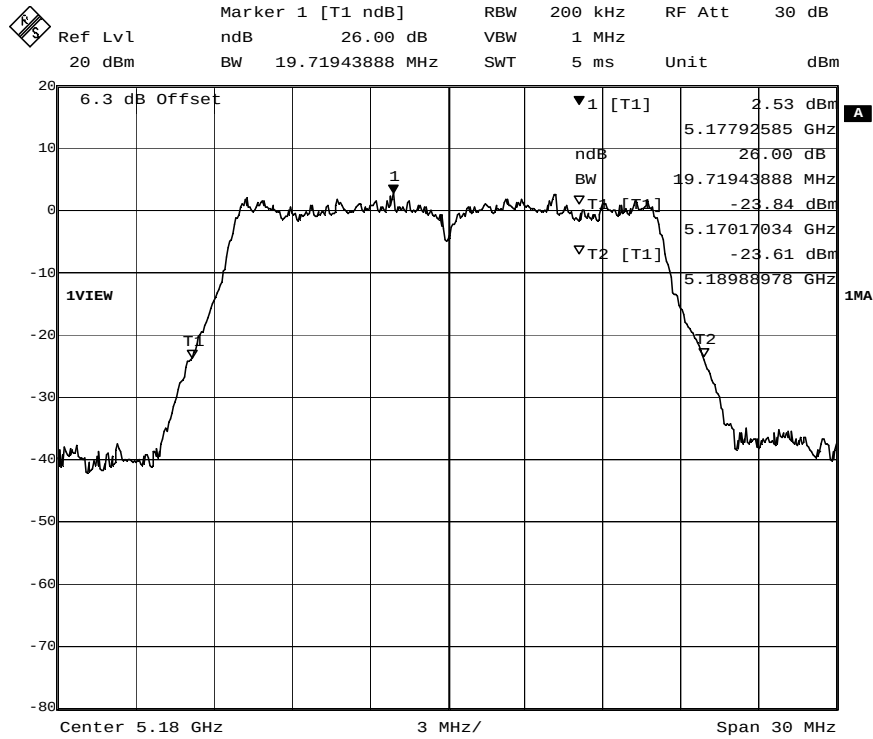
SWT 5 ms

Unit dBm



Date: 1.JAN.1997 05:42:07

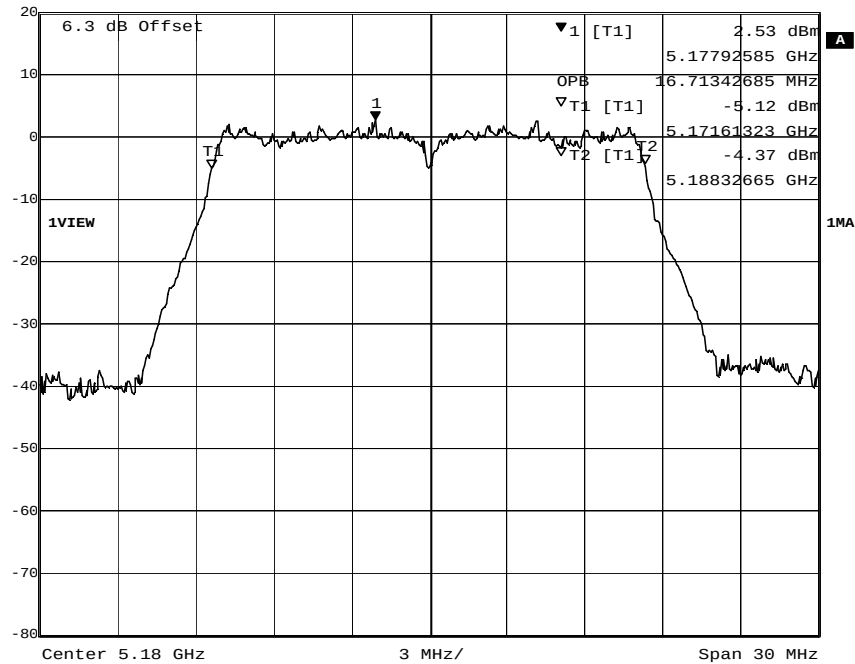
802.11a	Ch 165	Chain A	26dB BW	19.77MHz	99%BW	16.71MHz
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Date: 1.JAN.1997 06:33:27

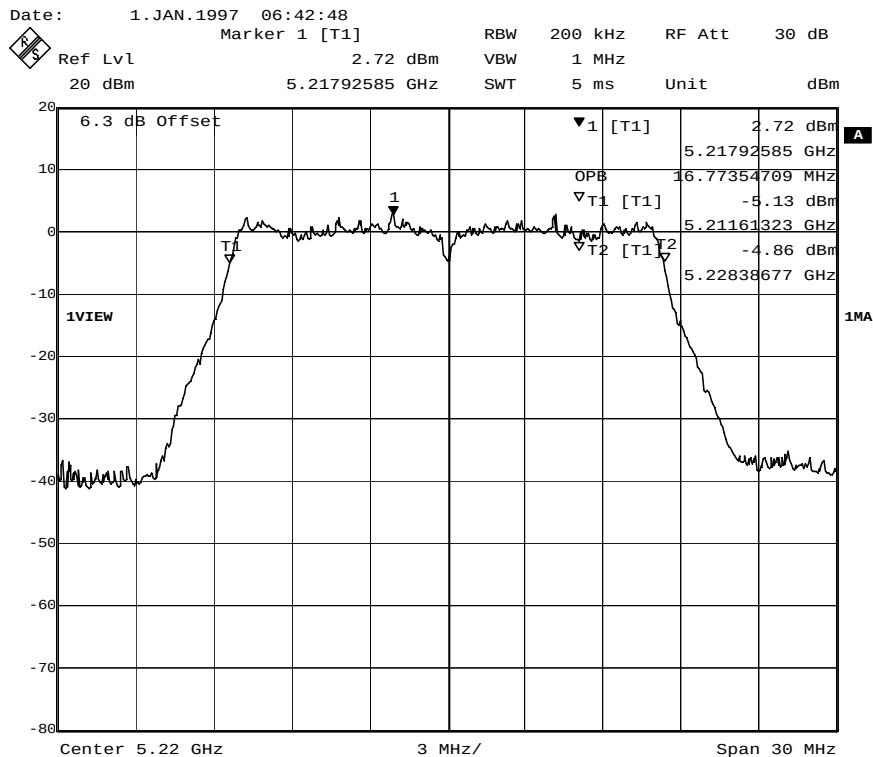
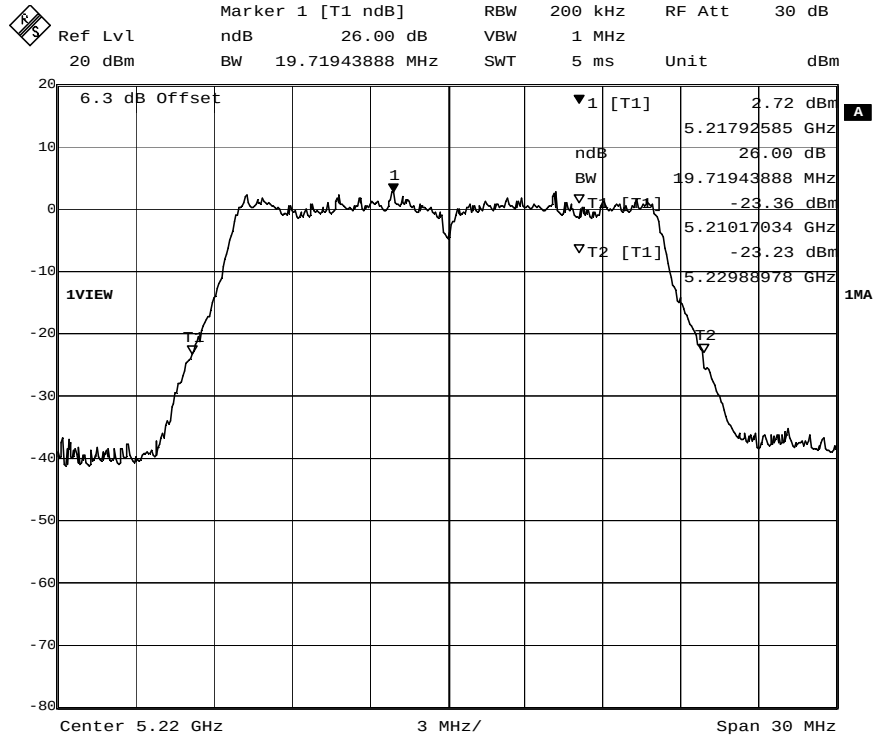
Marker 1 [T1]

Ref Lvl 20 dBm 2.53 dBm RBW 200 kHz RF Att 30 dB
 5.17792585 GHz VBW 1 MHz Unit dBm



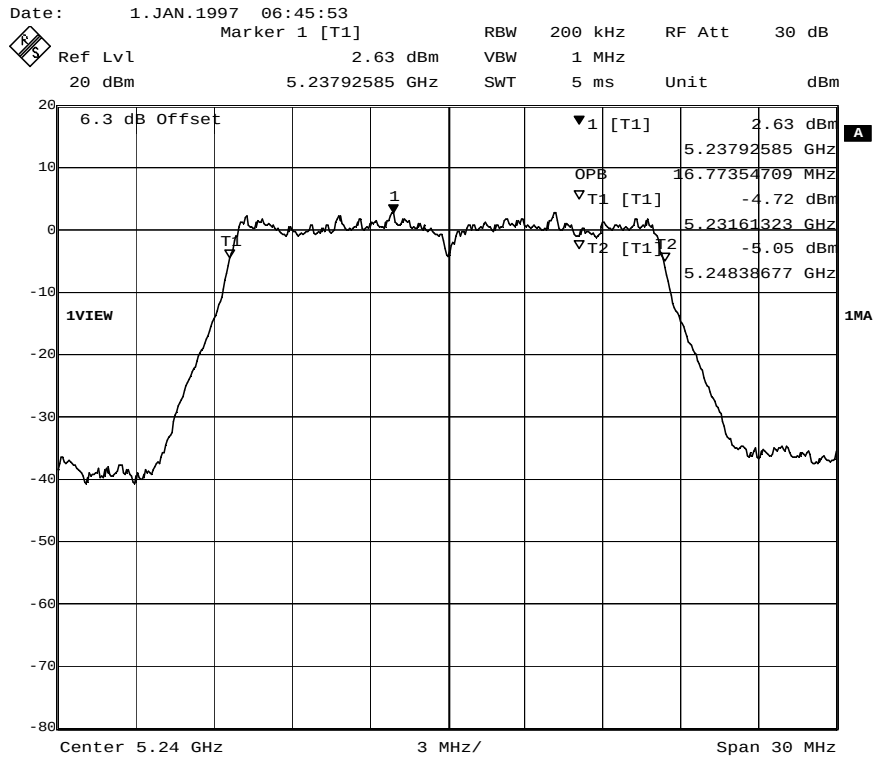
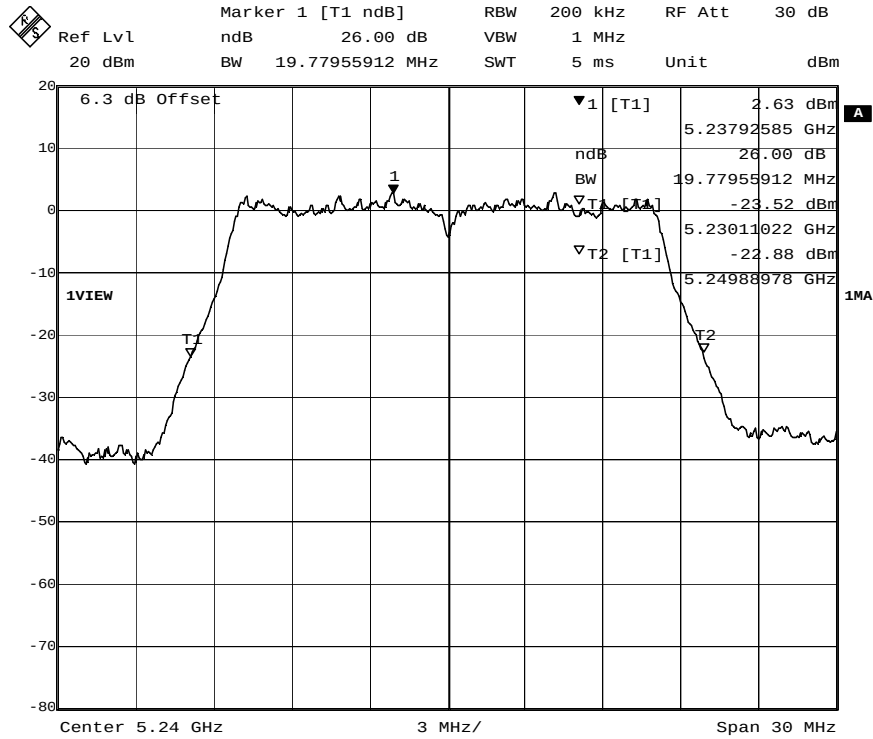
Date: 1.JAN.1997 06:34:32

802.11a	Ch 36	Chain B	26dB BW	19.72MHz	99%BW	16.71MHz
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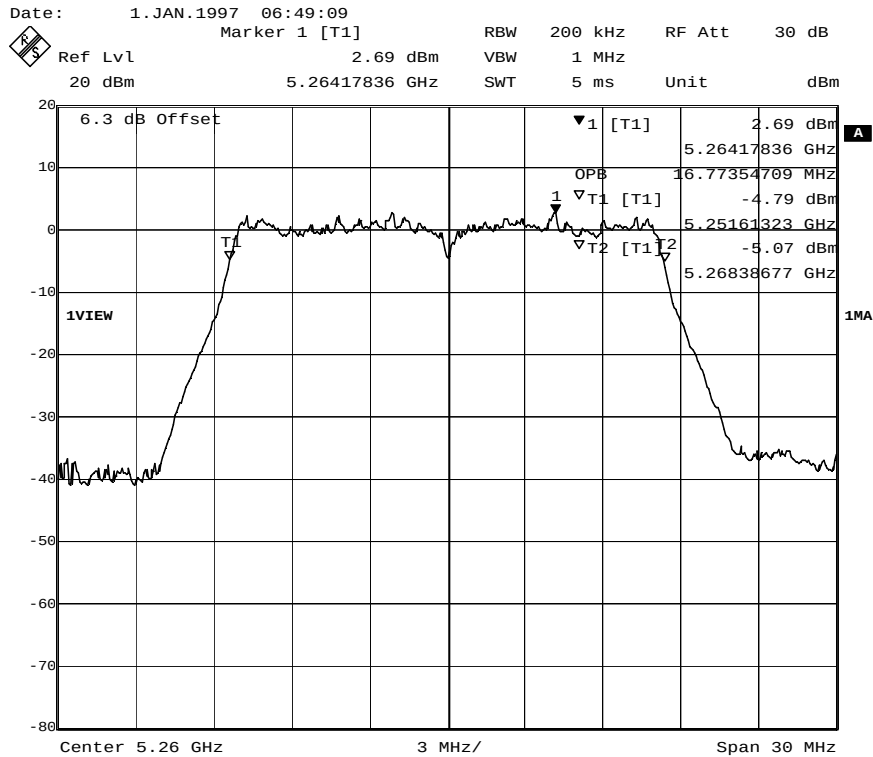
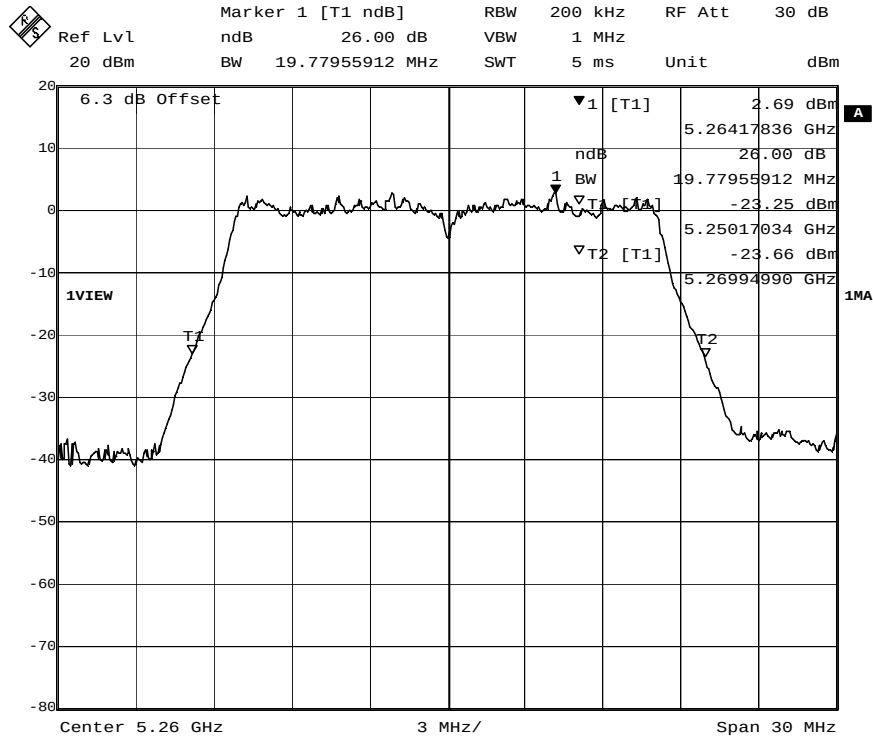
Date: 1.JAN.1997 06:39:05

802.11a	Ch 44	Chain B	26dB BW	19.72MHz	99%BW	16.77MHz
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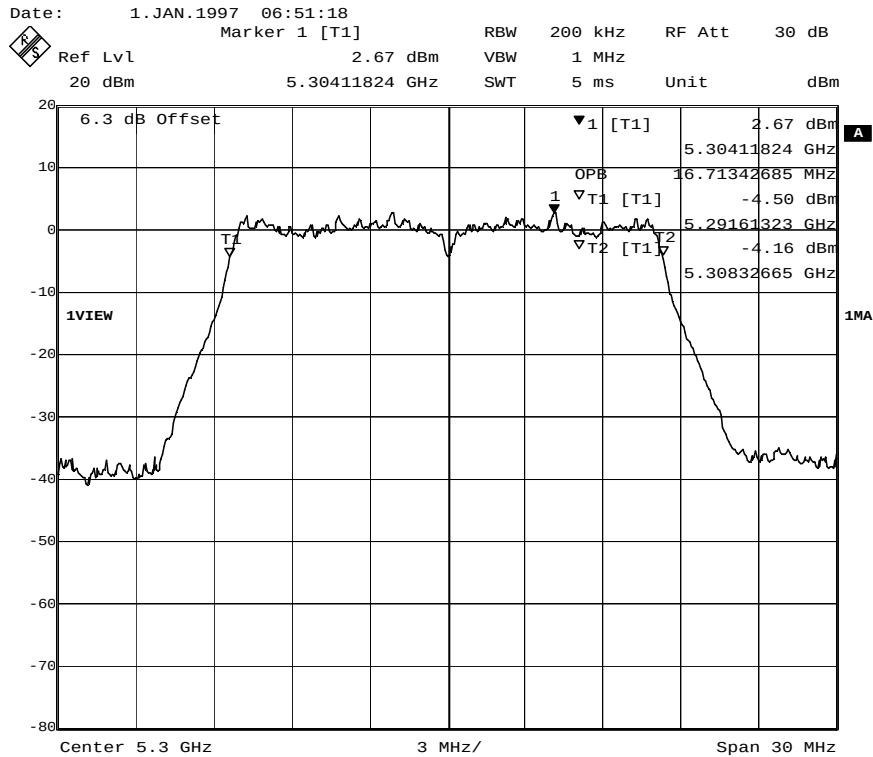
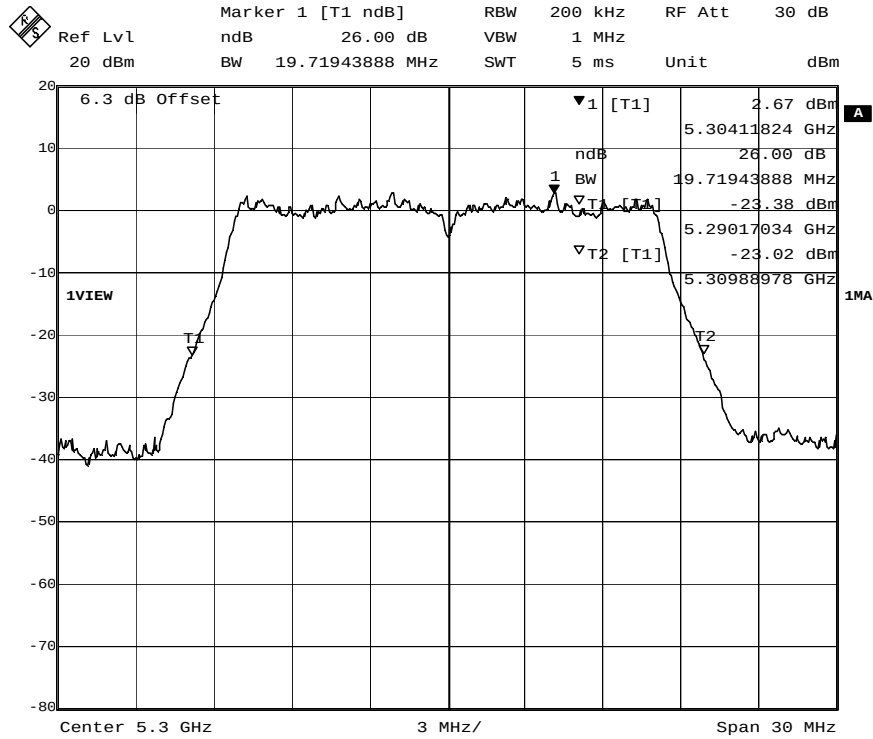
Date: 1.JAN.1997 06:46:16

802.11a	Ch 48	Chain B	26dB BW	19.77MHz	99%BW	16.77MHz
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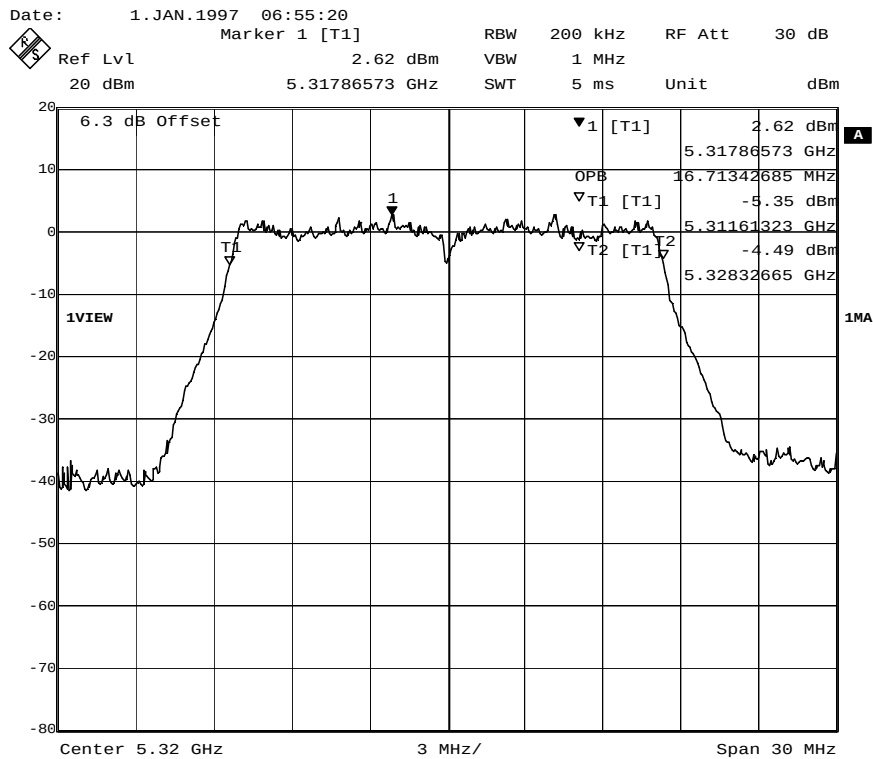
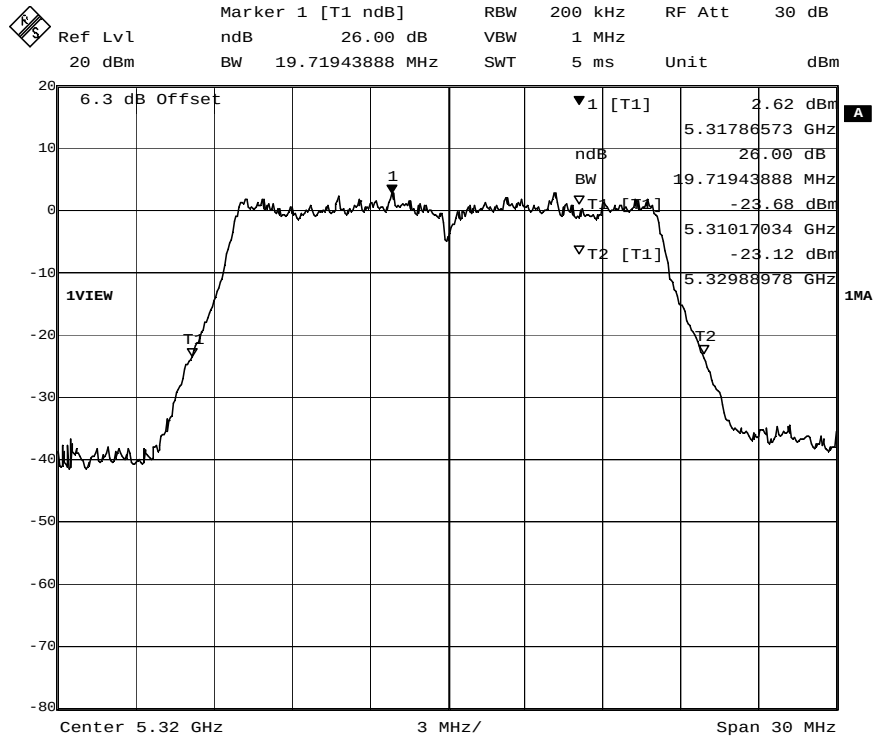
Date: 1.JAN.1997 06:48:14

802.11a	Ch 52	Chain B	26dB BW	19.77MHz	99%BW	16.77MHz
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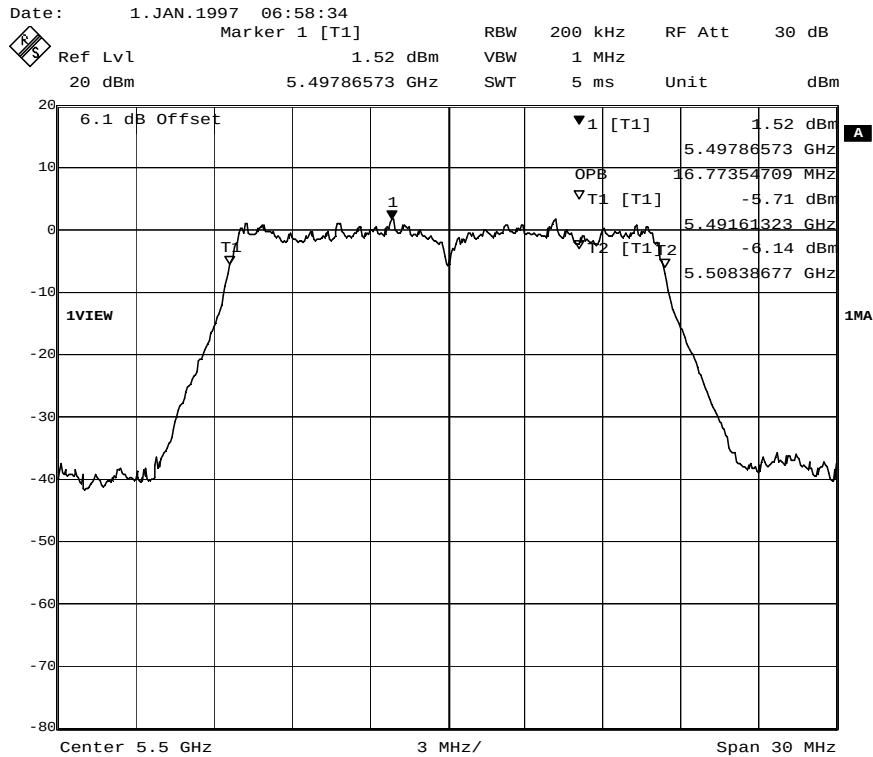
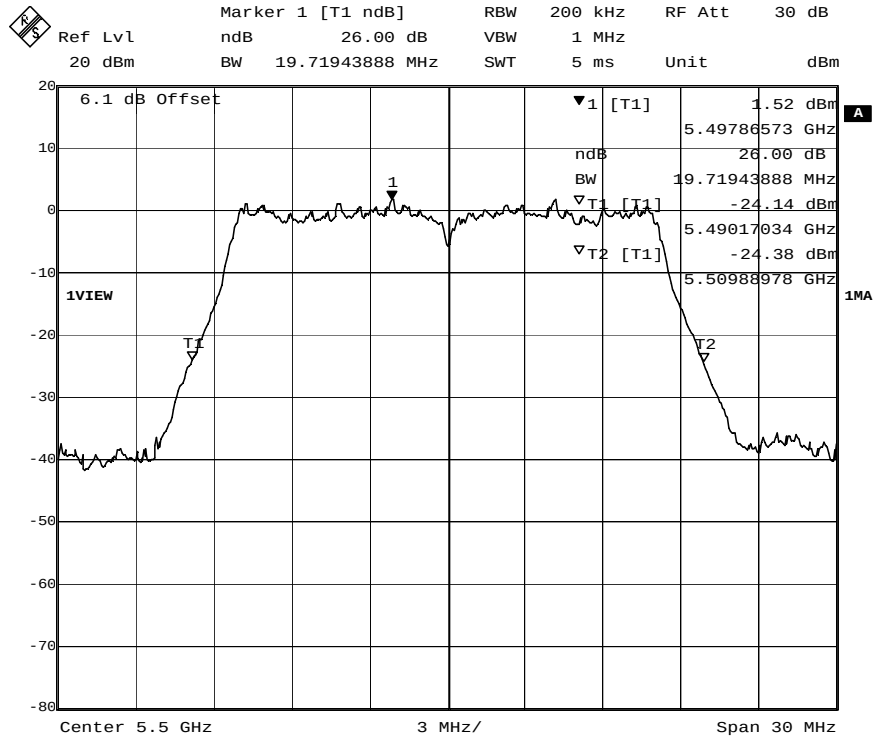
Date: 1.JAN.1997 06:51:43

802.11a	Ch 60	Chain B	26dB BW	19.72MHz	99%BW	16.71MHz
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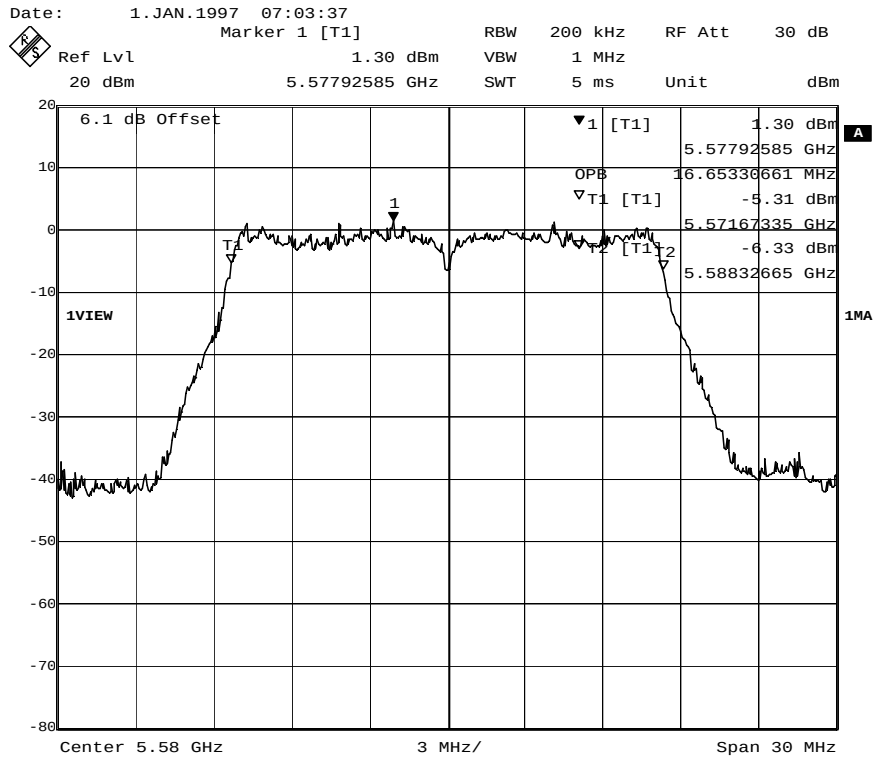
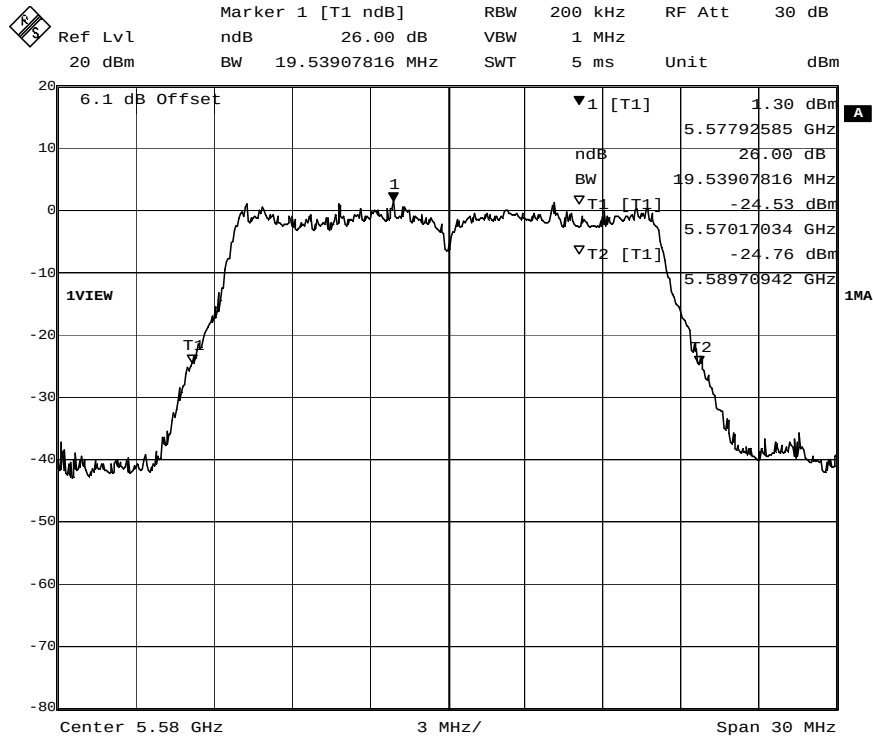
Date: 1.JAN.1997 06:54:42

802.11a	Ch 64	Chain B	26dB BW	19.72MHz	99%BW	16.71MHz
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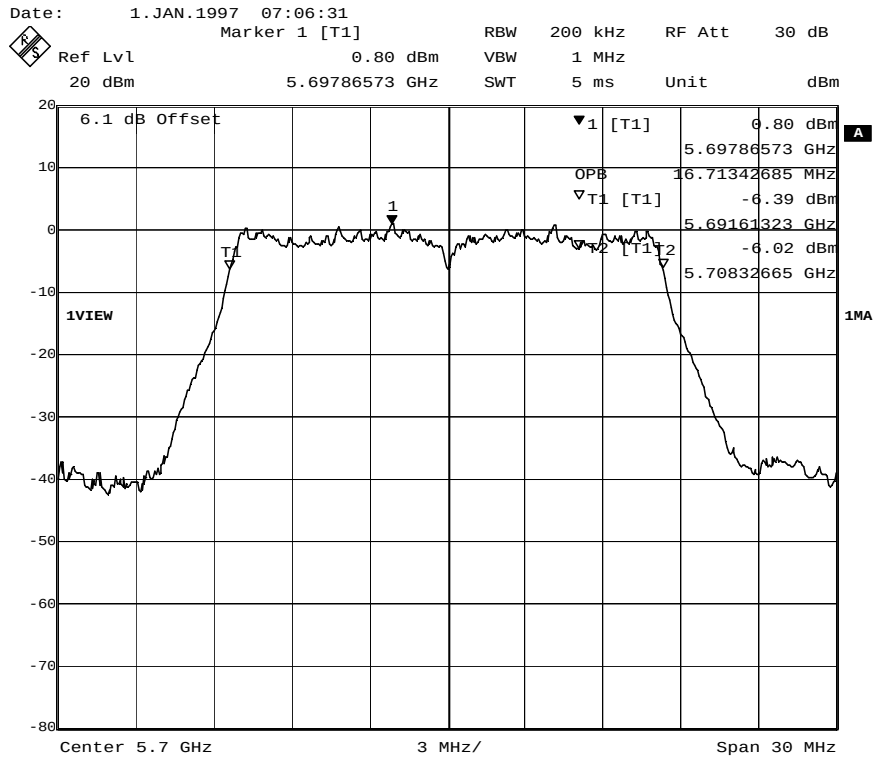
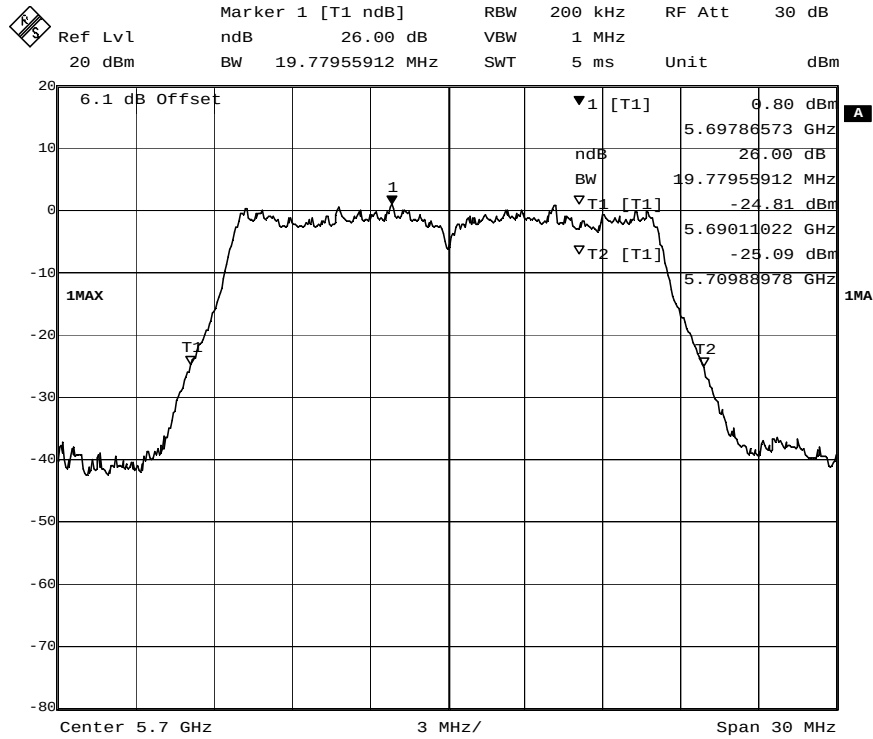
Date: 1.JAN.1997 06:59:21

802.11a	Ch 100	Chain B	26dB BW	19.72MHz	99%BW	16.77MHz
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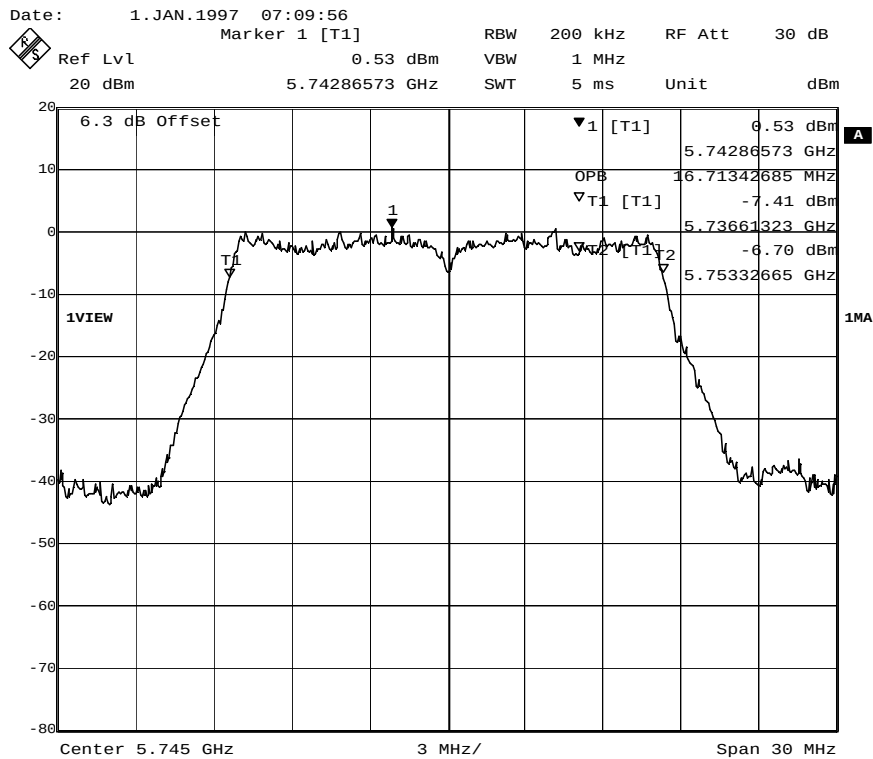
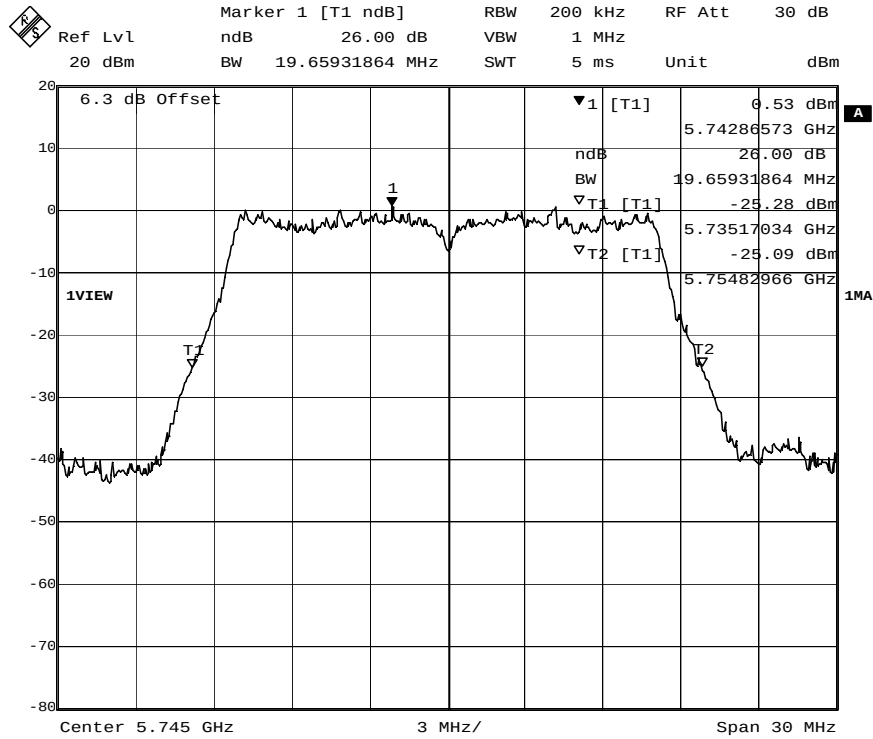
Date: 1.JAN.1997 07:02:58

802.11a	Ch 116	Chain B	26dB BW	19.54MHz	99%BW	16.65MHz
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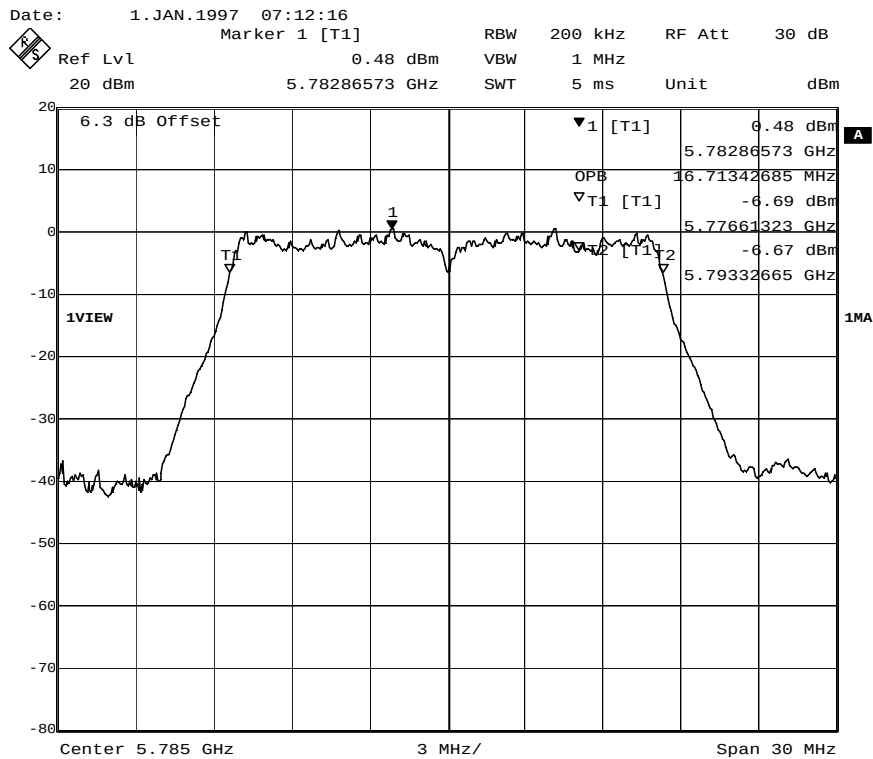
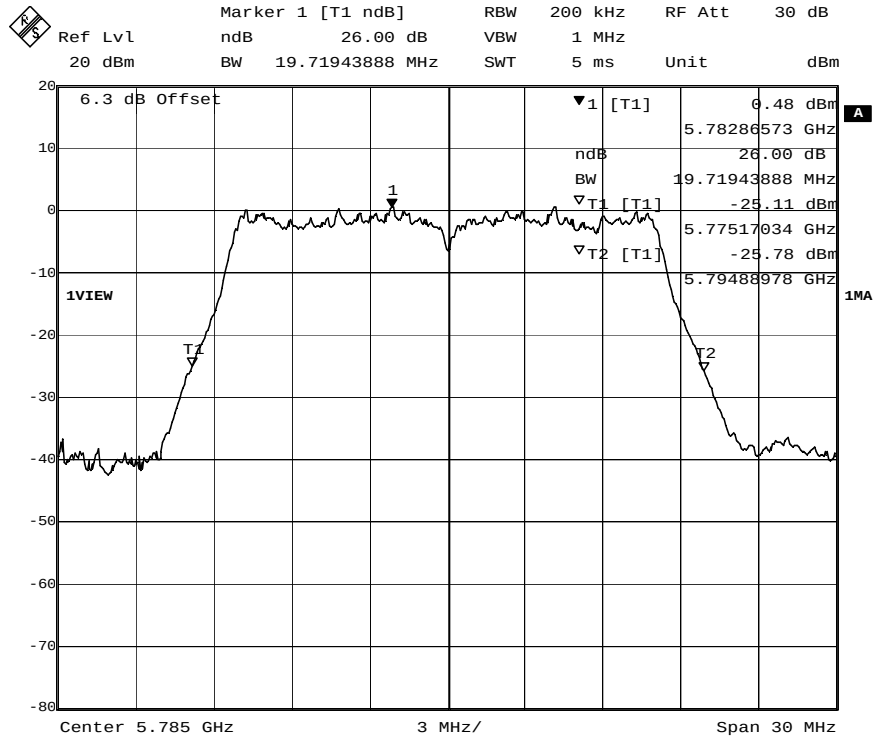
Date: 1.JAN.1997 07:07:09

802.11a	Ch 140	Chain B	26dB BW	19.77MHz	99%BW	16.71MHz
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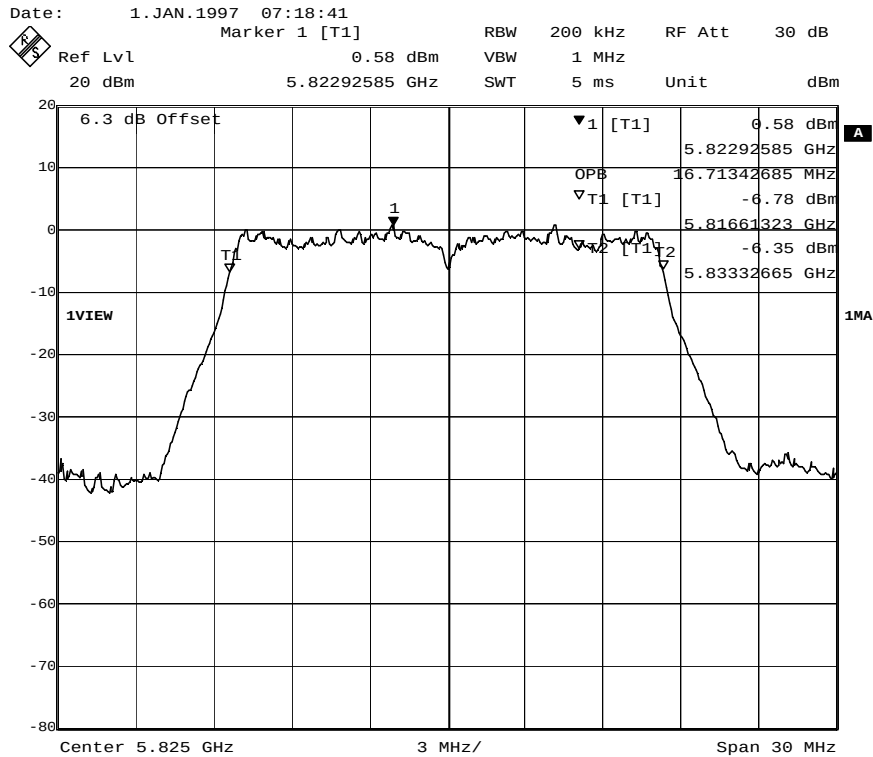
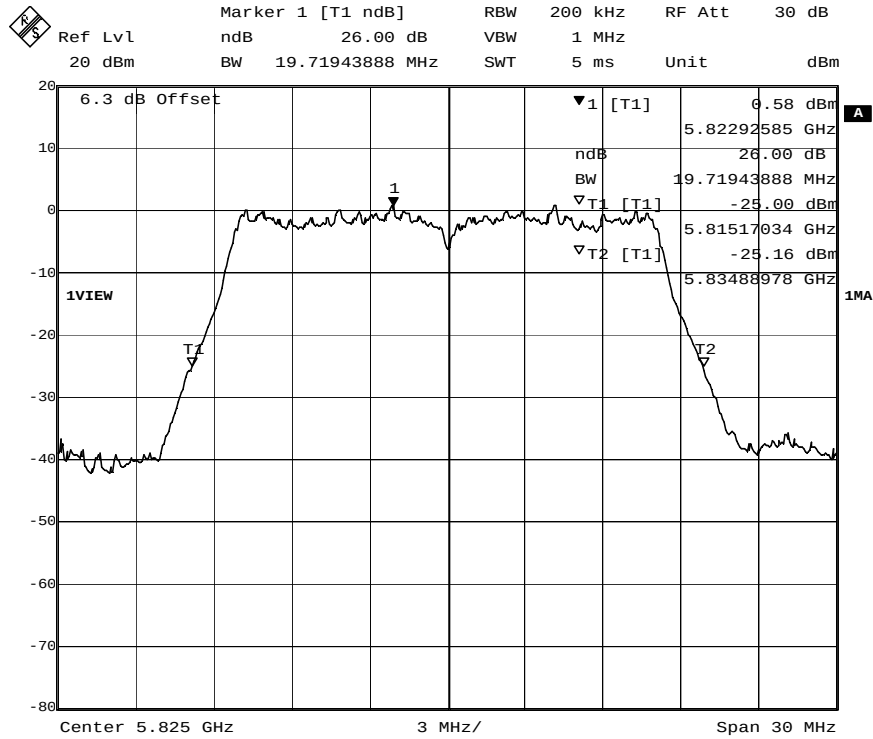
Date: 1.JAN.1997 07:09:01

802.11a	Ch 149	Chain B	26dB BW	19.67MHz	99%BW	16.71MHz
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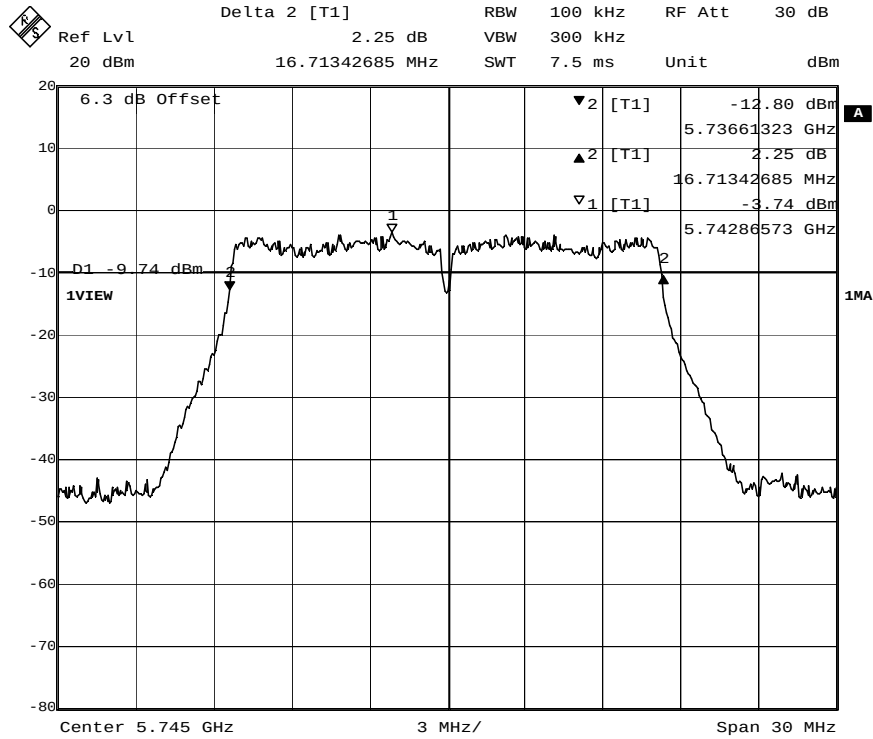
Date: 1.JAN.1997 07:13:47

802.11a	Ch 157	Chain B	26dB BW	19.72MHz	99%BW	16.71MHz
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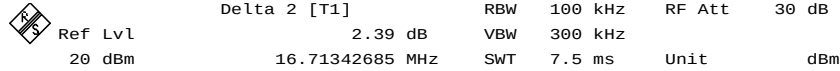


Date: 1.JAN.1997 07:18:00

802.11a	Ch 165	Chain B	26dB BW	19.71MHz	99%BW	16.71MHz
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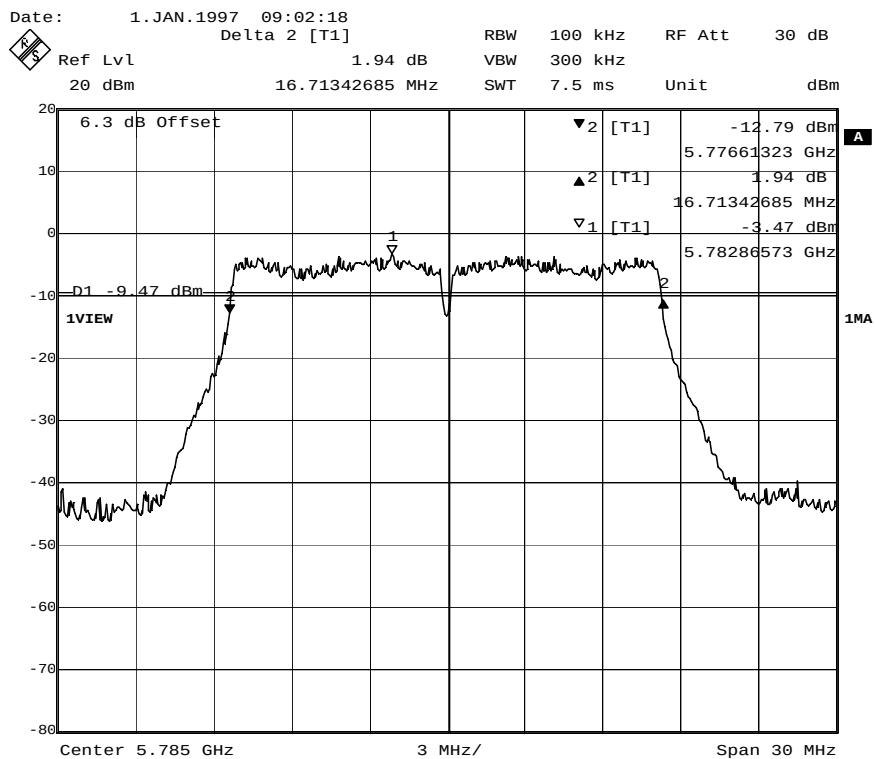
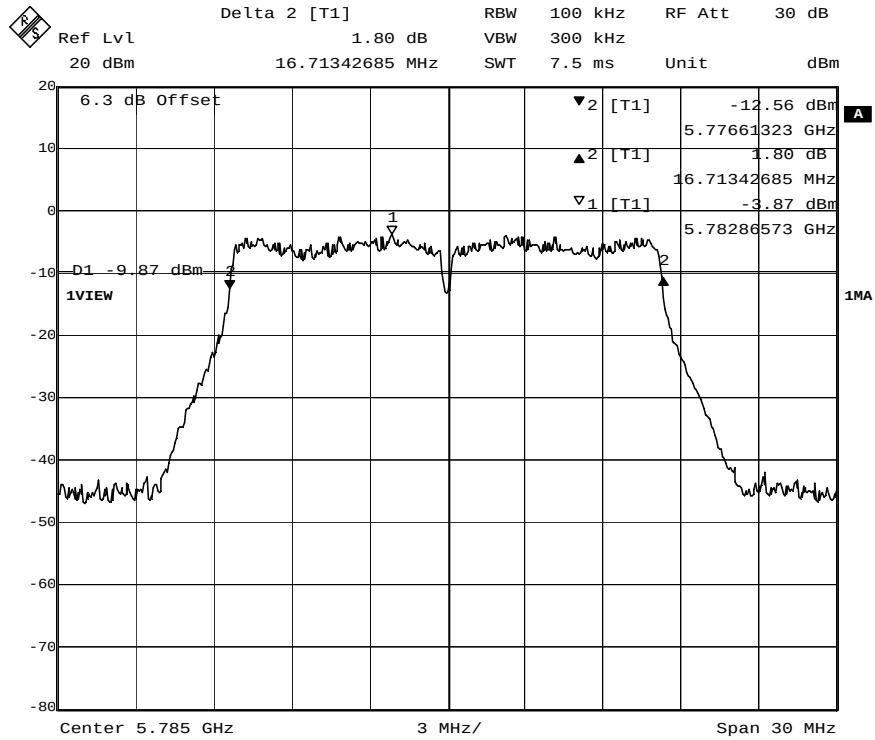


Date: 1.JAN.1997 09:06:25



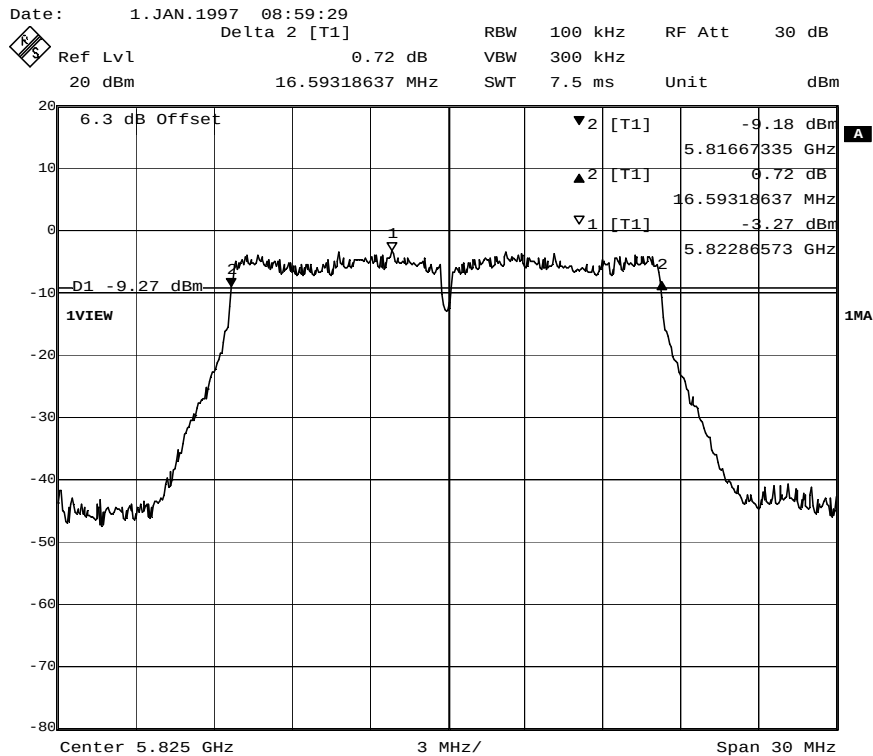
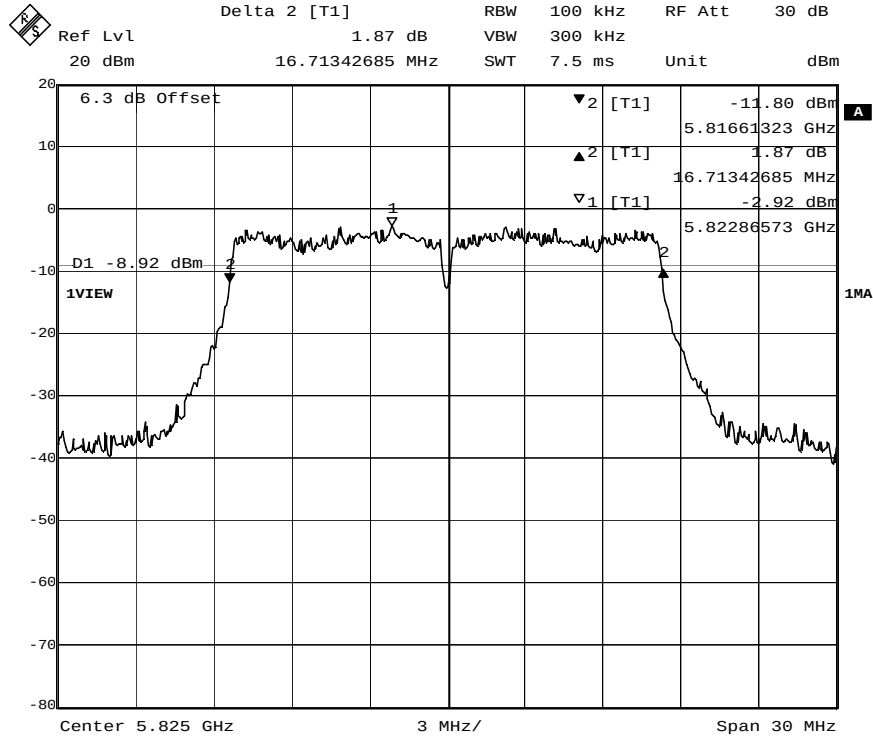
Date: 1.JAN.1997 08:49:13

802.11a	Ch 149	6dB BW Chain A	16.71MHz	6dB BW Chain B	16.71MHz
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Date: 1.JAN.1997 08:53:08

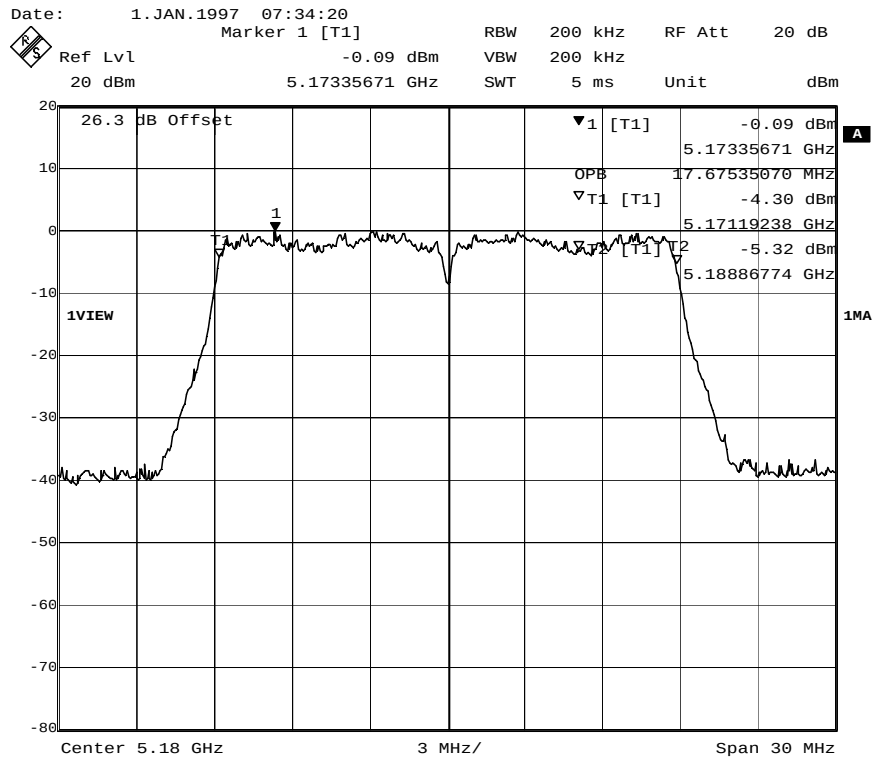
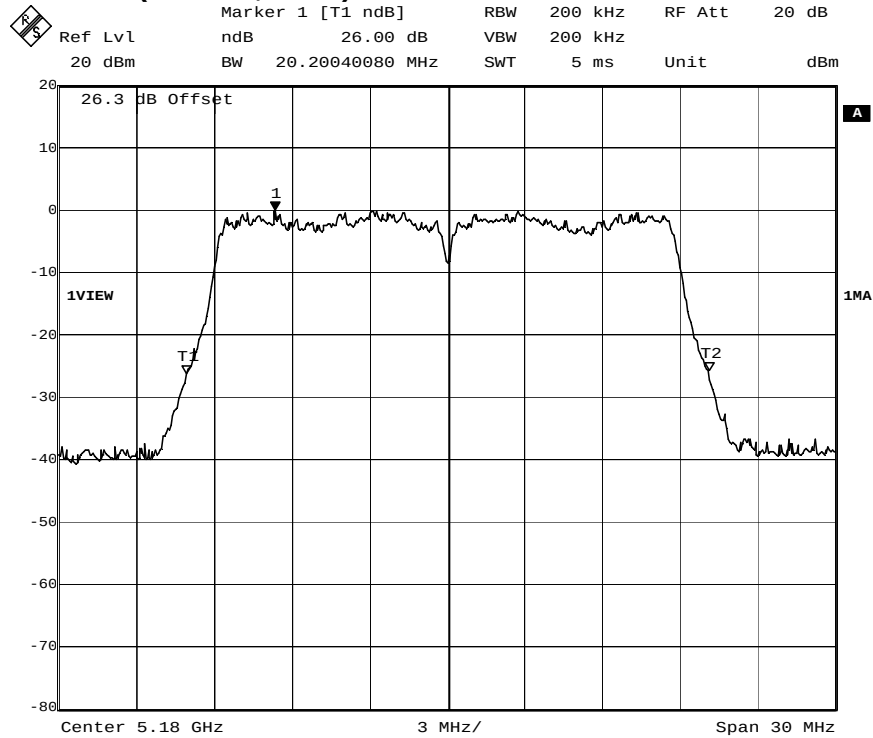
802.11a	Ch 157	6dB BW Chain A	16.71MHz	6dB BW Chain B	16.71MHz
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Date: 1.JAN.1997 08:56:03

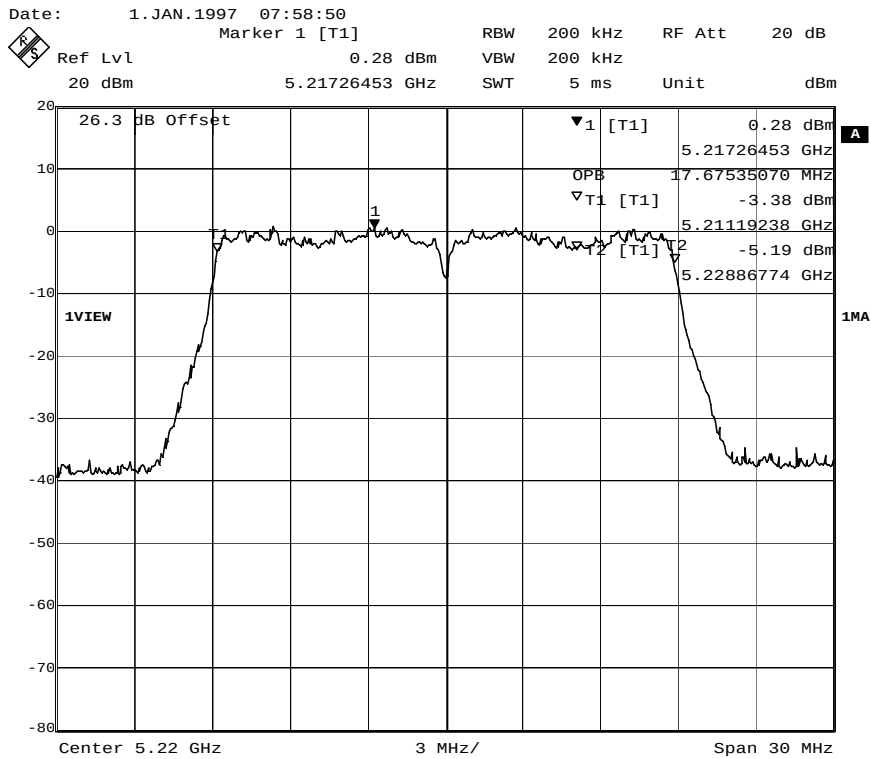
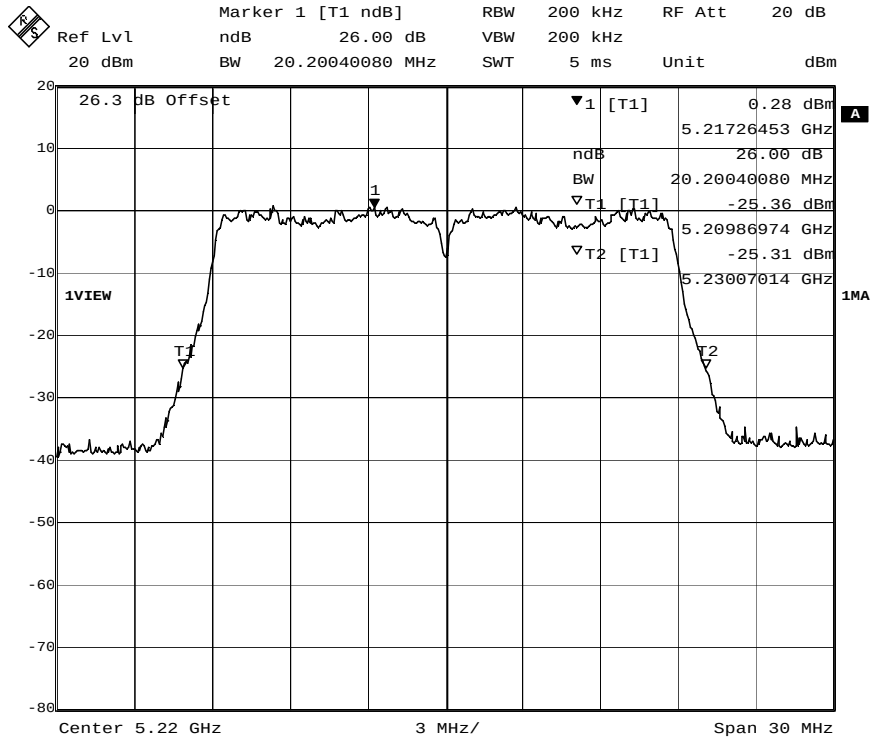
802.11a	Ch 165	6dB BW Chain A	16.71MHz	6dB BW Chain B	16.59MHz
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6.11 Bandwidth Plots (802.11n, HT20):



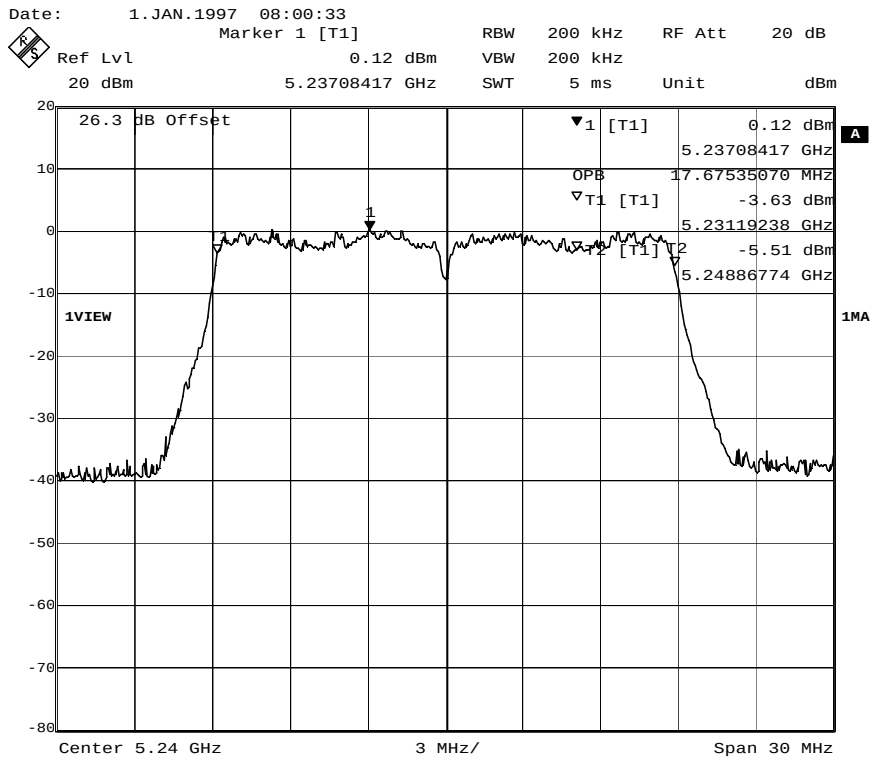
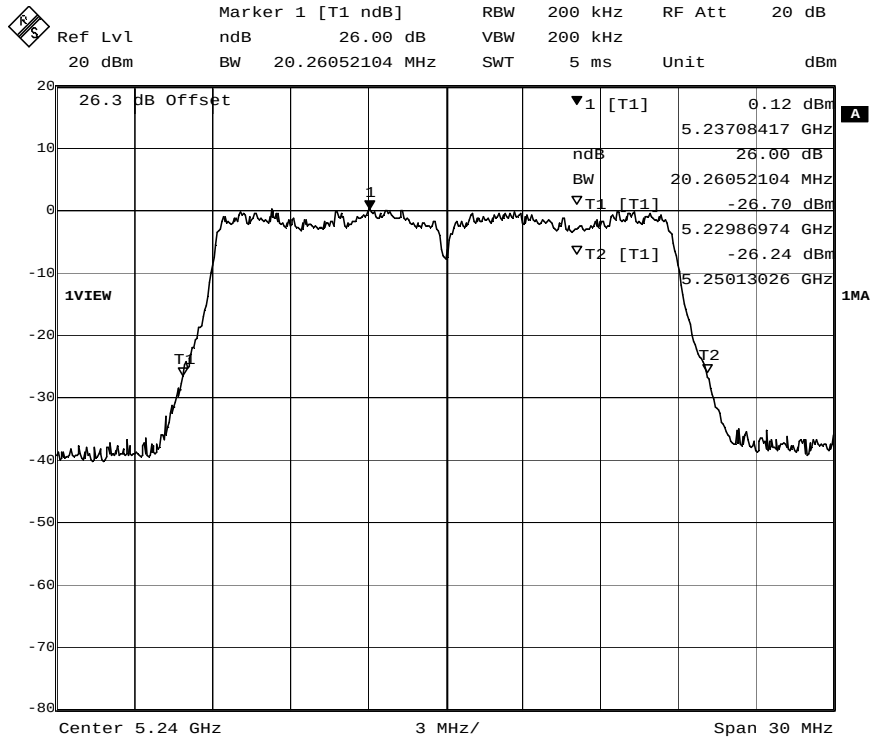
Date: 1.JAN.1997 07:35:37

802.11n20	Ch 36	Chain A	26dB BW	20.2MHz	99%BW	17.67MHz
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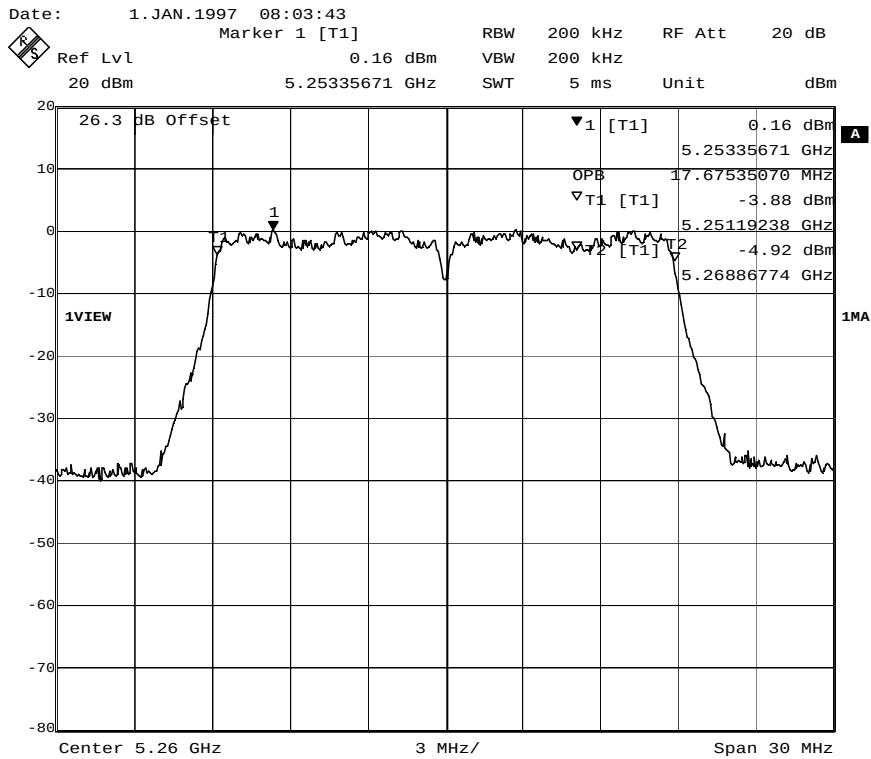
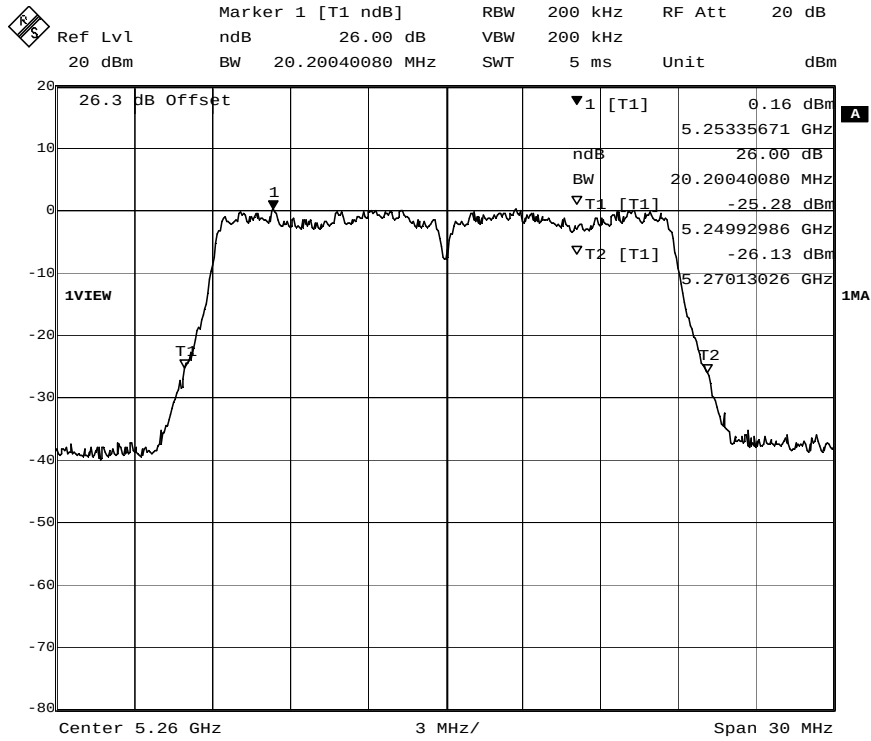
Date: 1.JAN.1997 07:57:29

802.11n20	Ch 44	Chain A	26dB BW	20.2MHz	99%BW	17.67MHz
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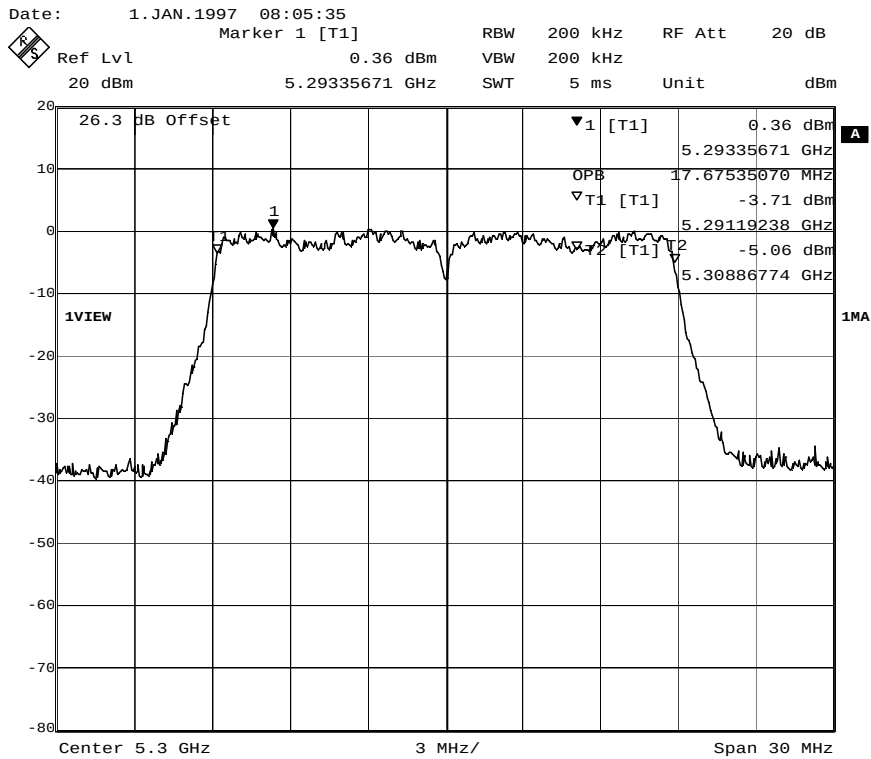
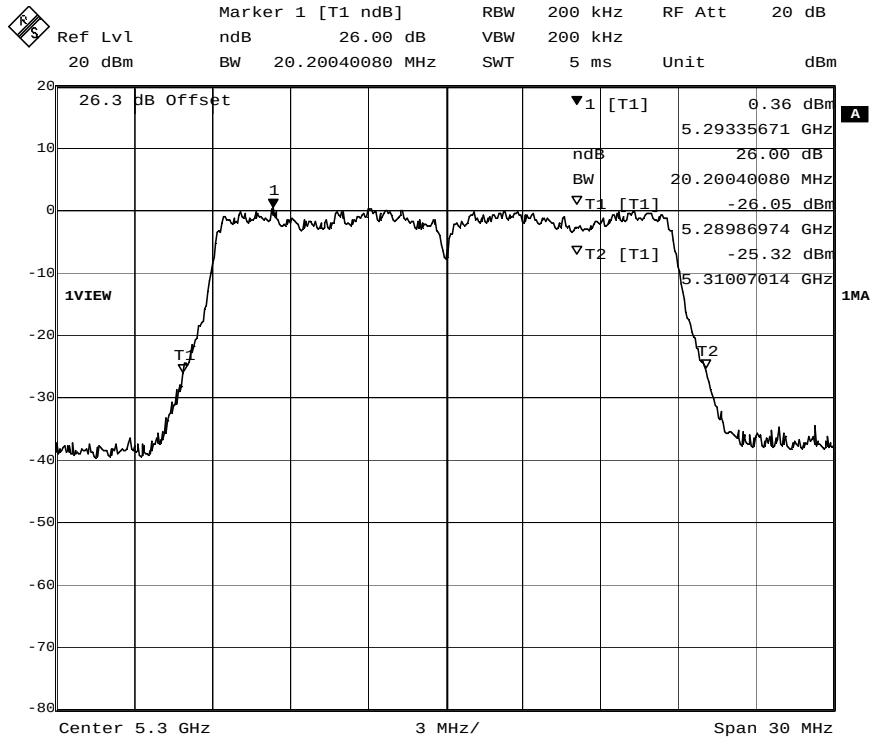
Date: 1.JAN.1997 08:01:14

802.11n20	Ch 48	Chain A	26dB BW	20.2MHz	99%BW	17.67MHz
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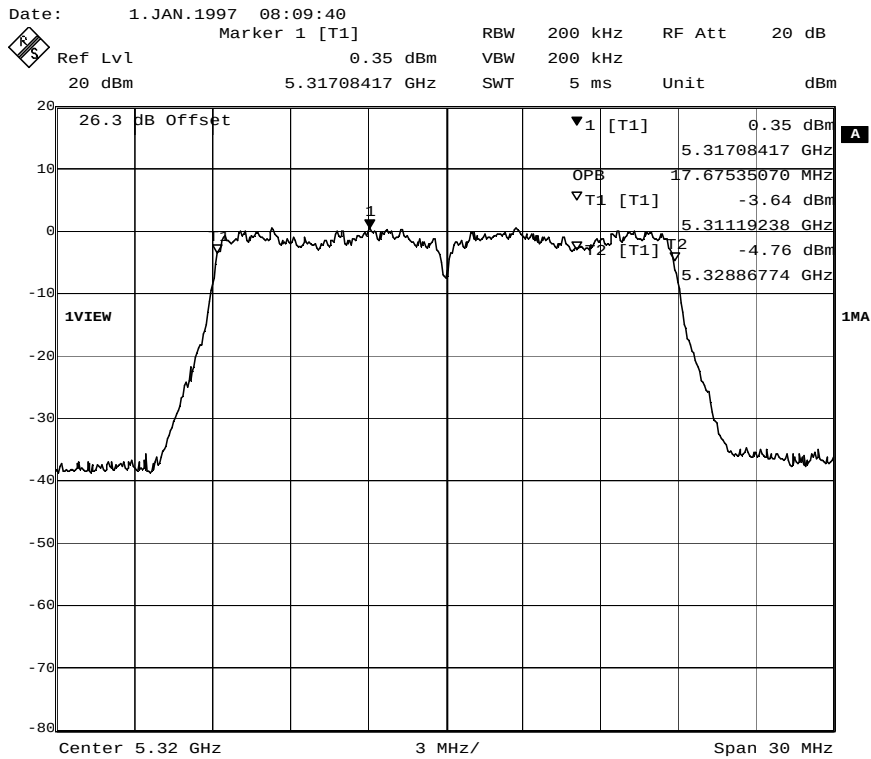
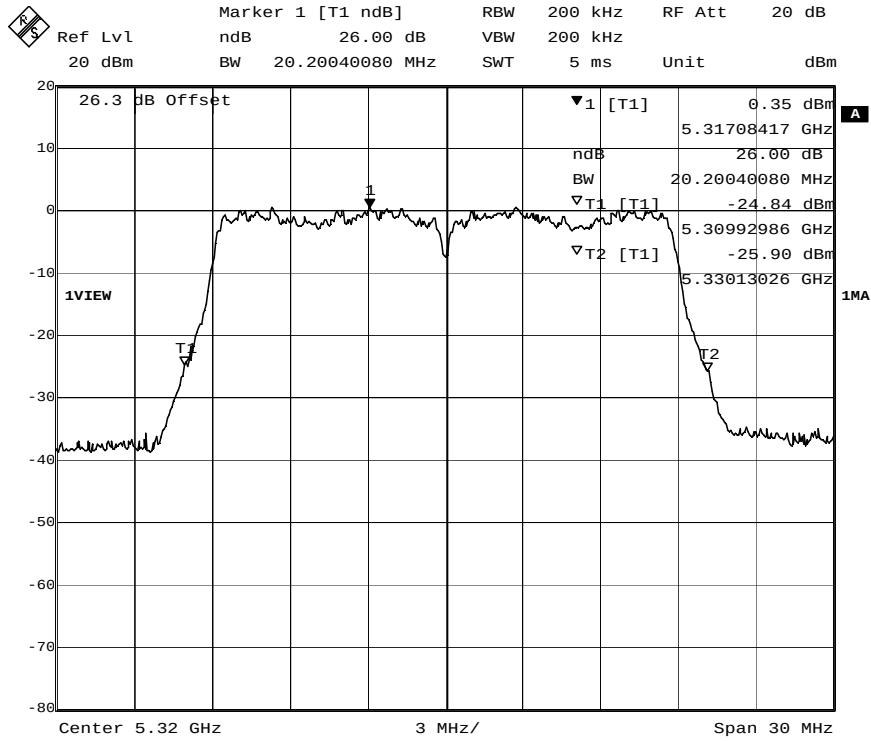
Date: 1.JAN.1997 08:03:10

802.11n20	Ch 52	Chain A	26dB BW	20.2MHz	99%BW	17.67MHz
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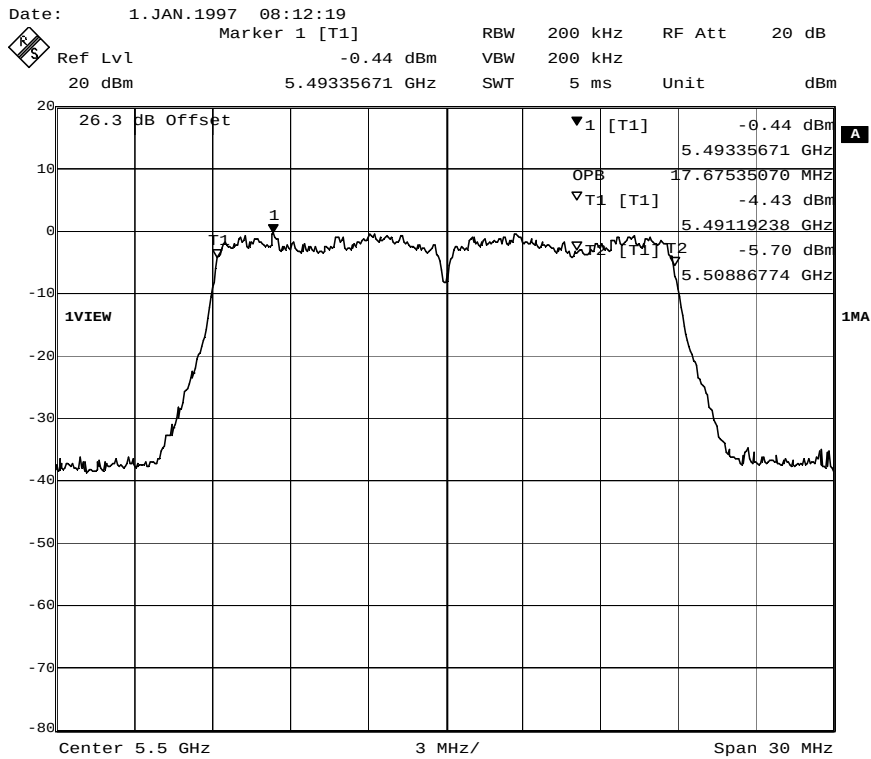
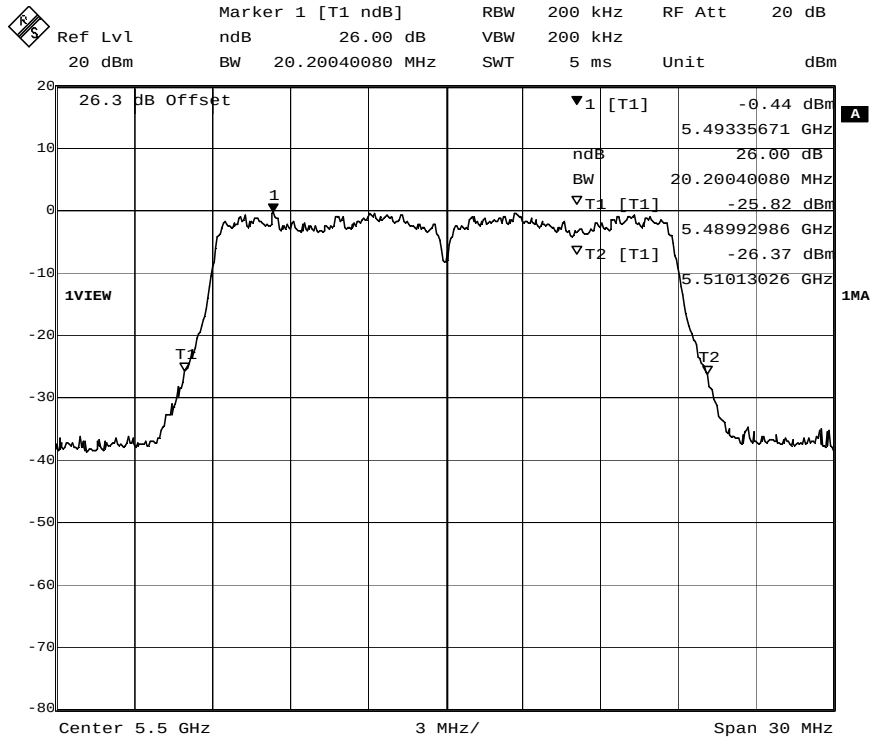
Date: 1.JAN.1997 08:06:19

802.11n20	Ch 60	Chain A	26dB BW	20.2MHz	99%BW	17.67MHz
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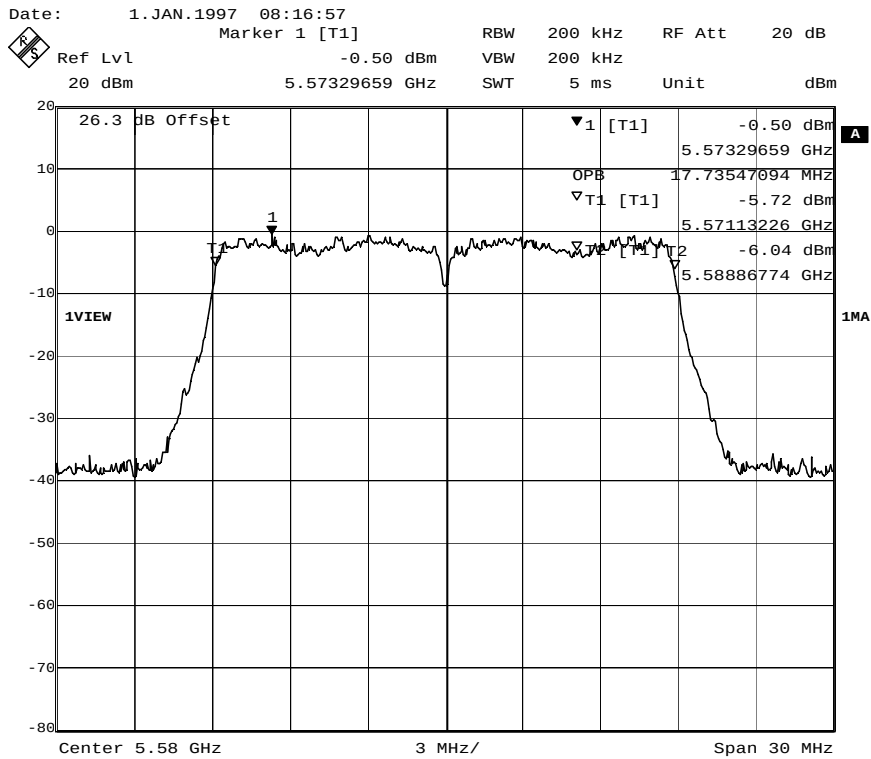
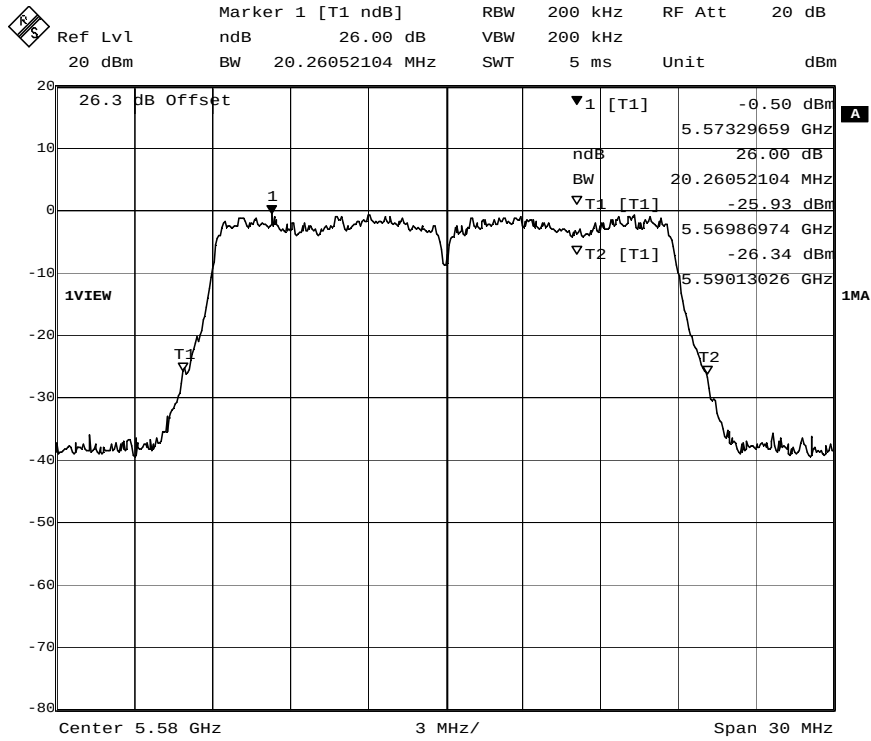
Date: 1.JAN.1997 08:09:04

802.11n20	Ch 64	Chain A	26dB BW	20.2MHz	99%BW	17.67MHz
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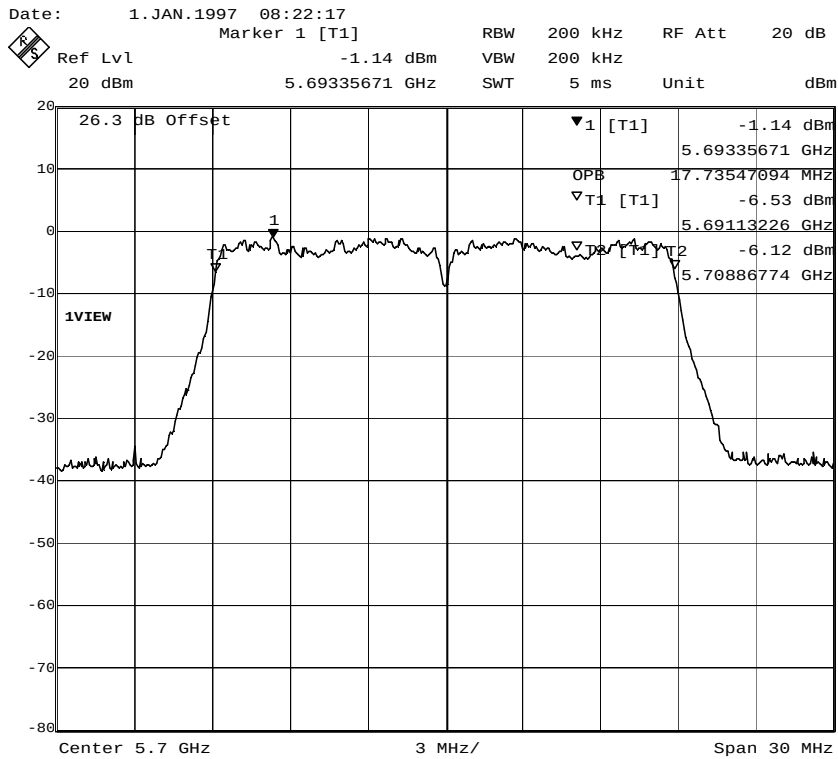
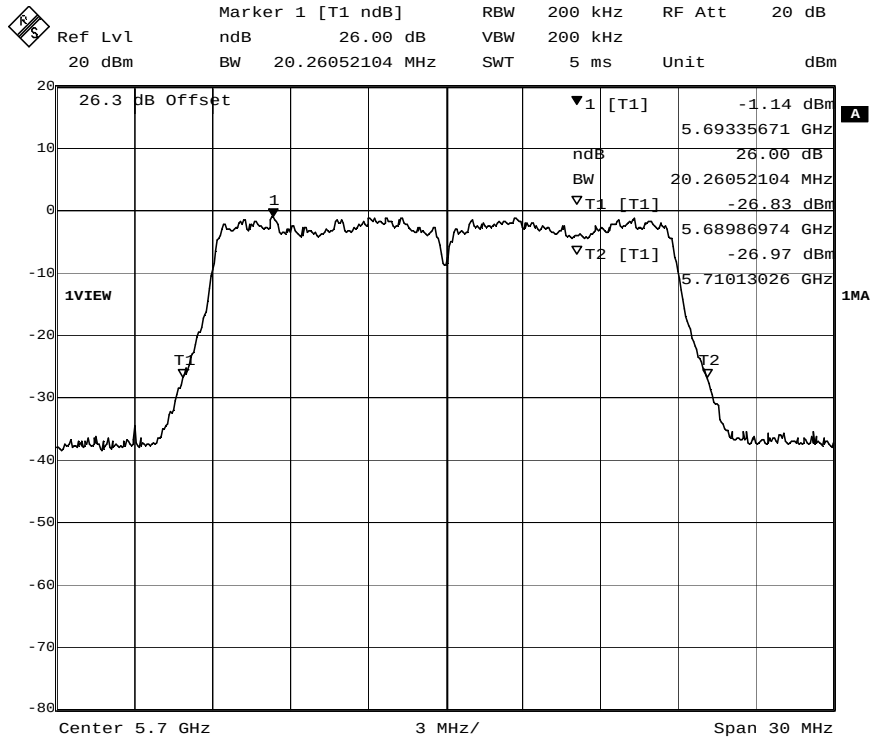
Date: 1.JAN.1997 08:12:48

802.11n20	Ch 100	Chain A	26dB BW	20.2MHz	99%BW	17.67MHz
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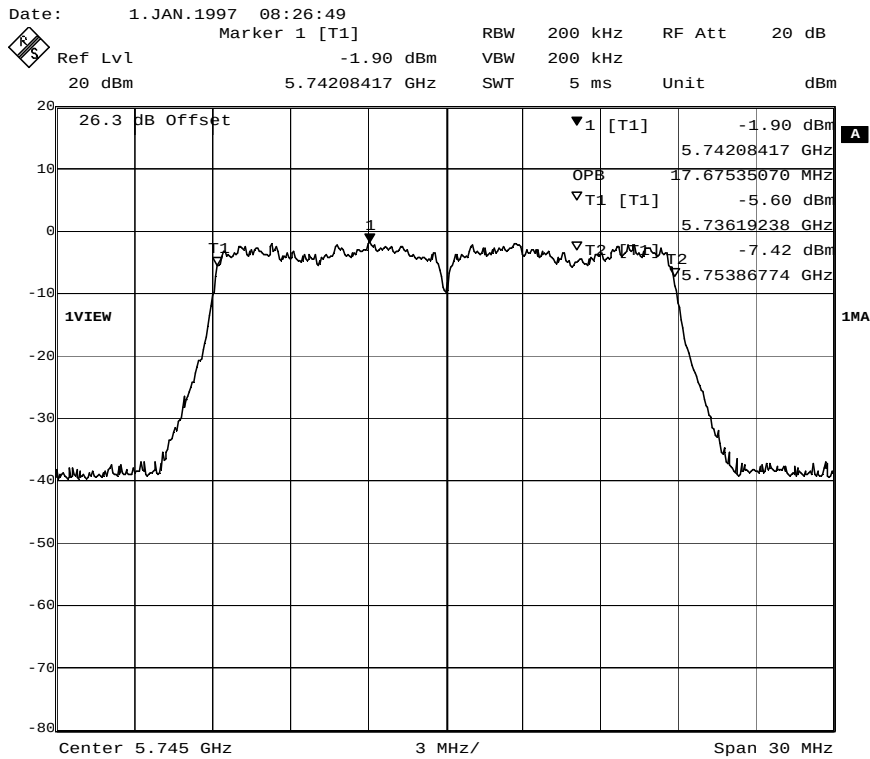
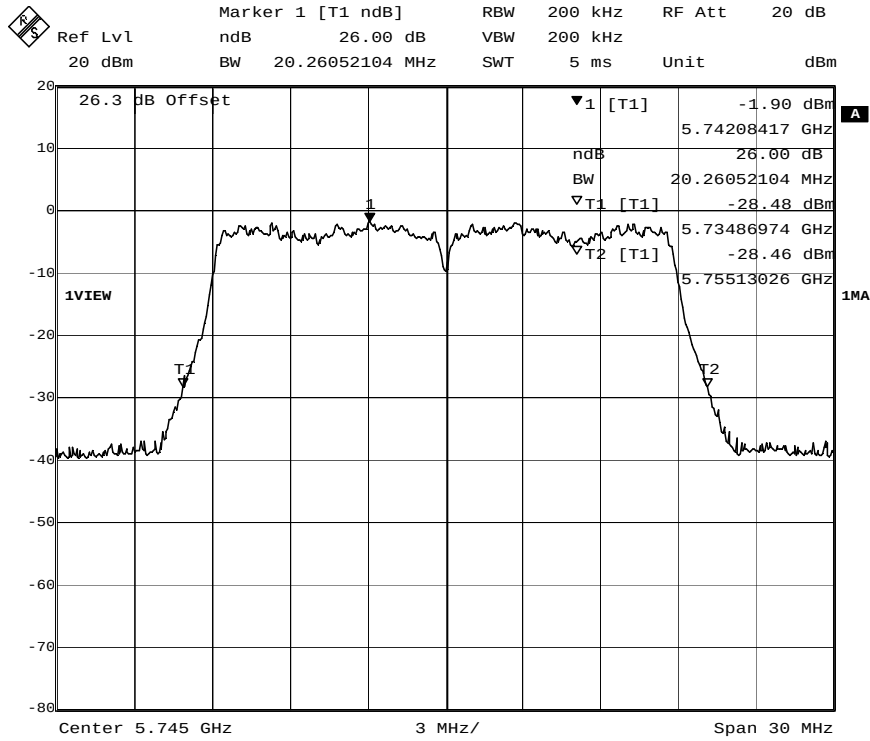
Date: 1.JAN.1997 08:16:12

802.11n20	Ch 116	Chain A	26dB BW	20.26MHz	99%BW	17.73MHz
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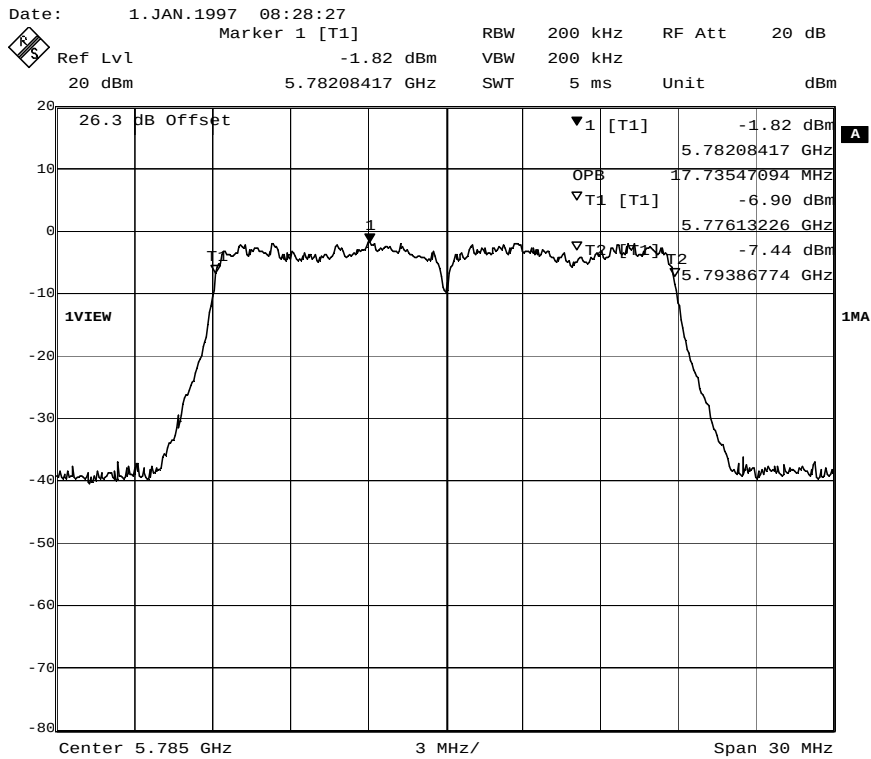
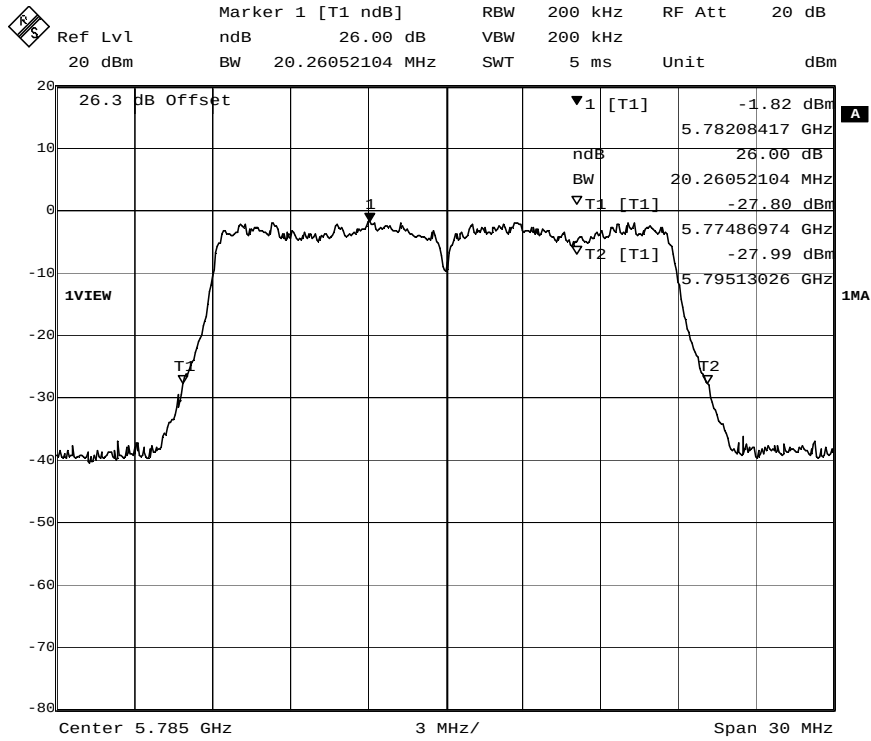
Date: 1.JAN.1997 08:22:47

802.11n20	Ch 140	Chain A	26dB BW	20.26MHz	99%BW	17.73MHz
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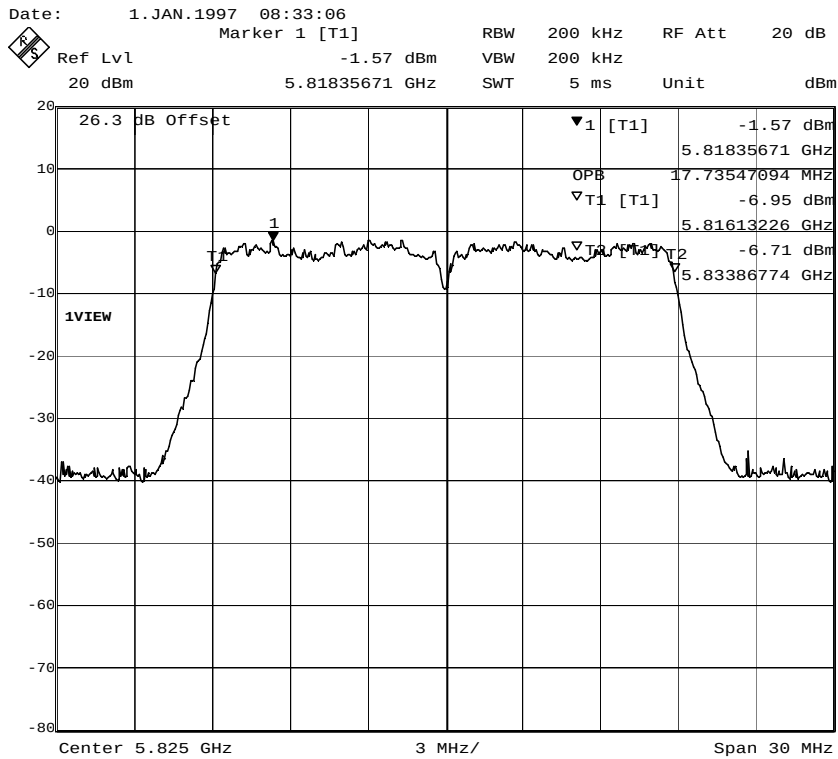
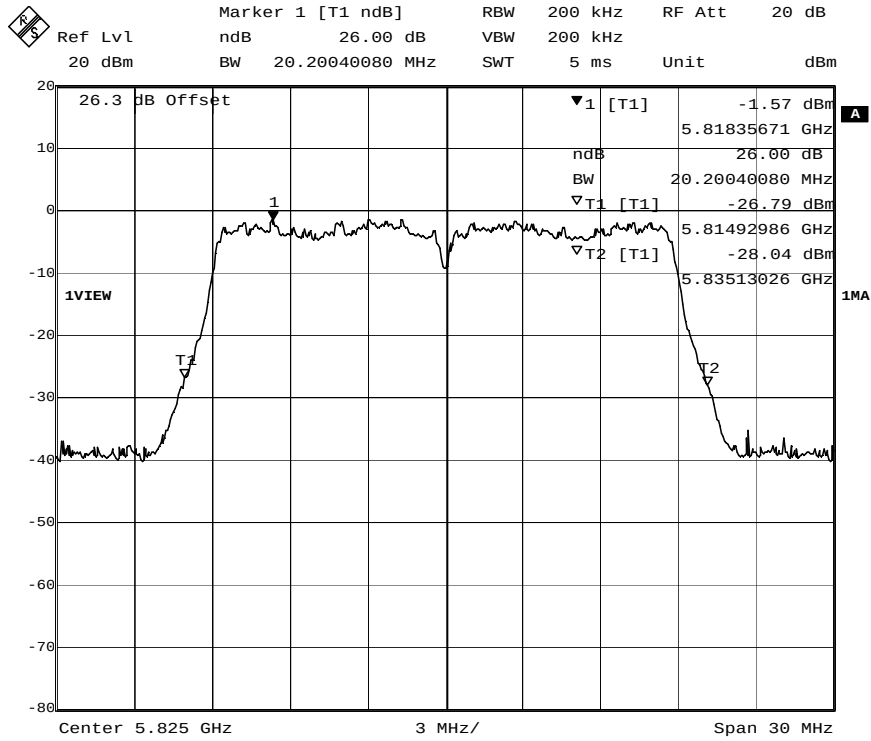
Date: 1.JAN.1997 08:26:13

802.11n20	Ch 149	Chain A	26dB BW	20.26MHz	99%BW	17.67MHz
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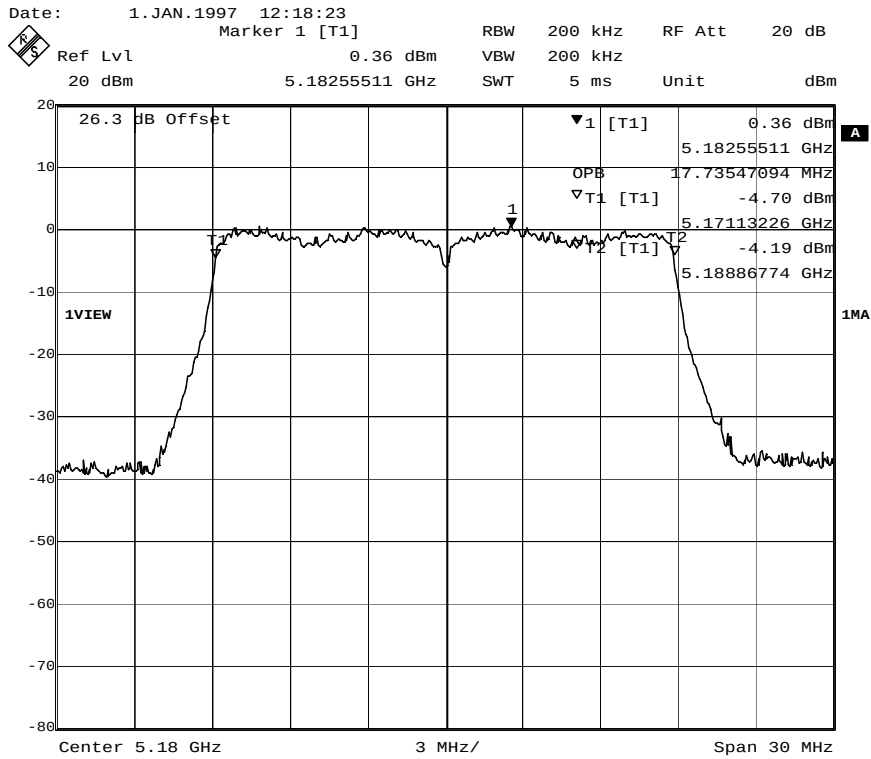
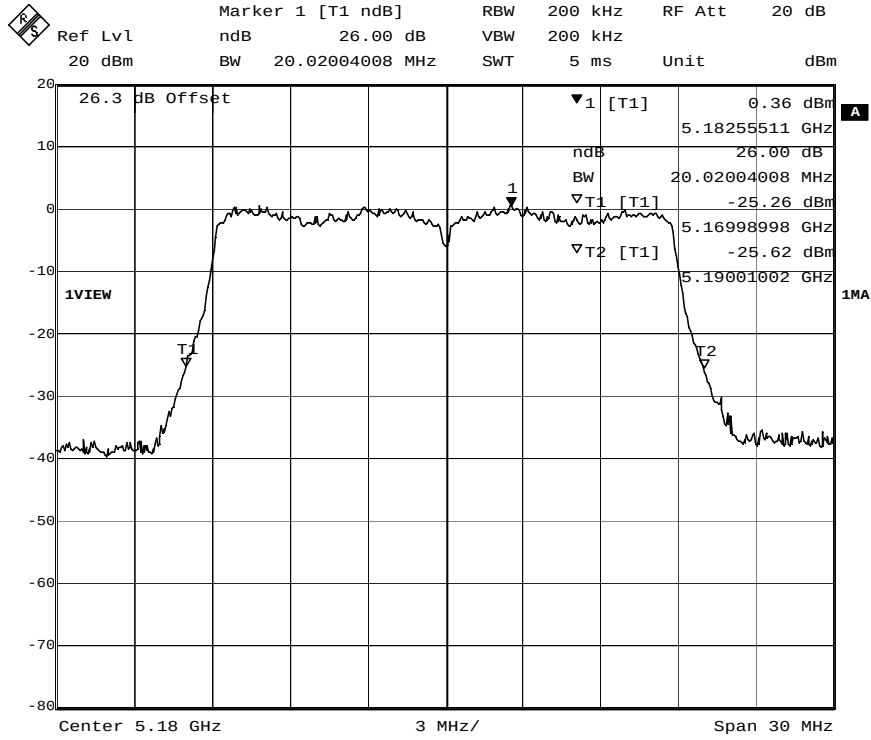
Date: 1.JAN.1997 08:29:19

802.11n20	Ch 157	Chain A	26dB BW	20.26MHz	99%BW	17.73MHz
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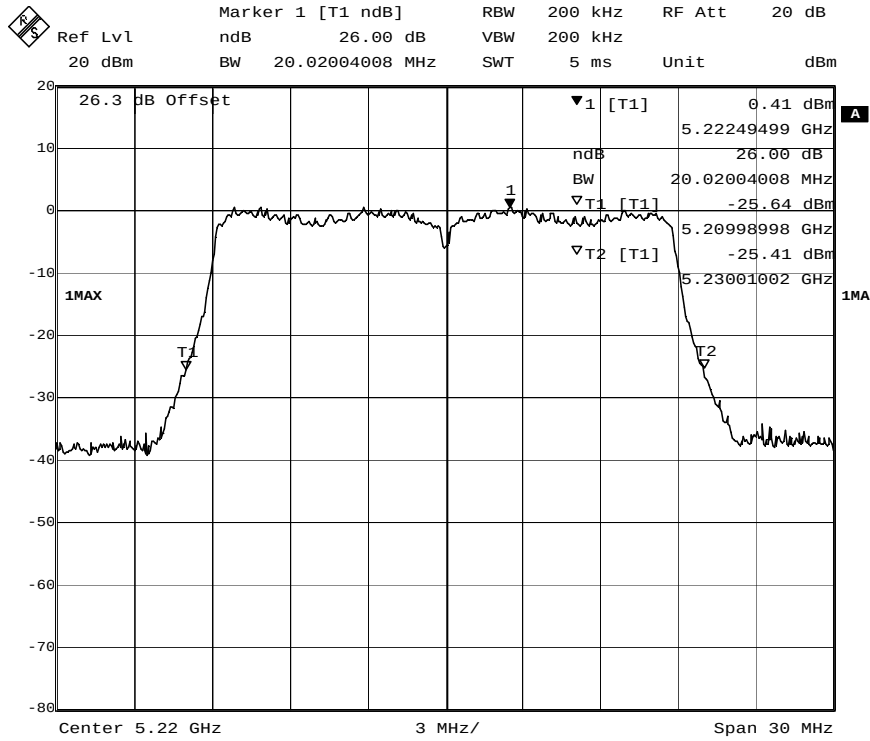
Date: 1.JAN.1997 08:32:14

802.11n20	Ch 165	Chain A	26dB BW	20.2MHz	99%BW	17.73MHz
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Date: 1.JAN.1997 12:16:33

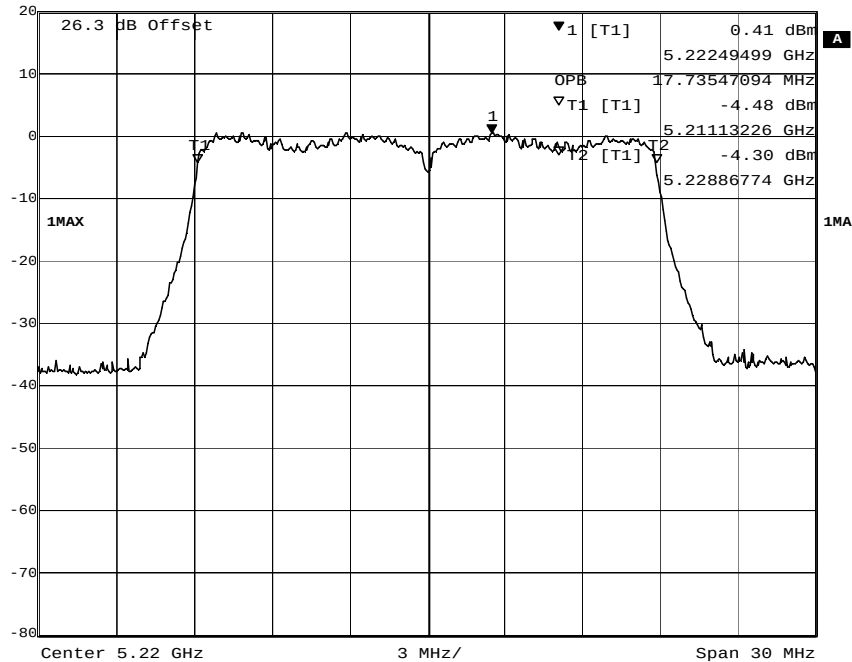
802.11n20	Ch 36	Chain B	26dB BW	20.02MHz	99%BW	17.73MHz
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Date: 1.JAN.1997 12:19:58

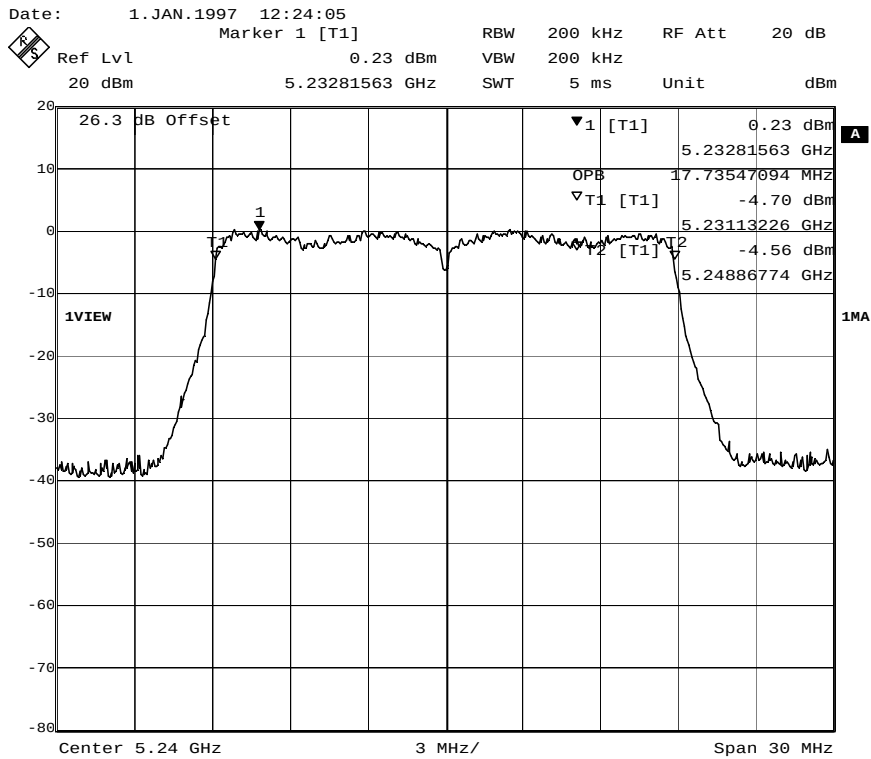
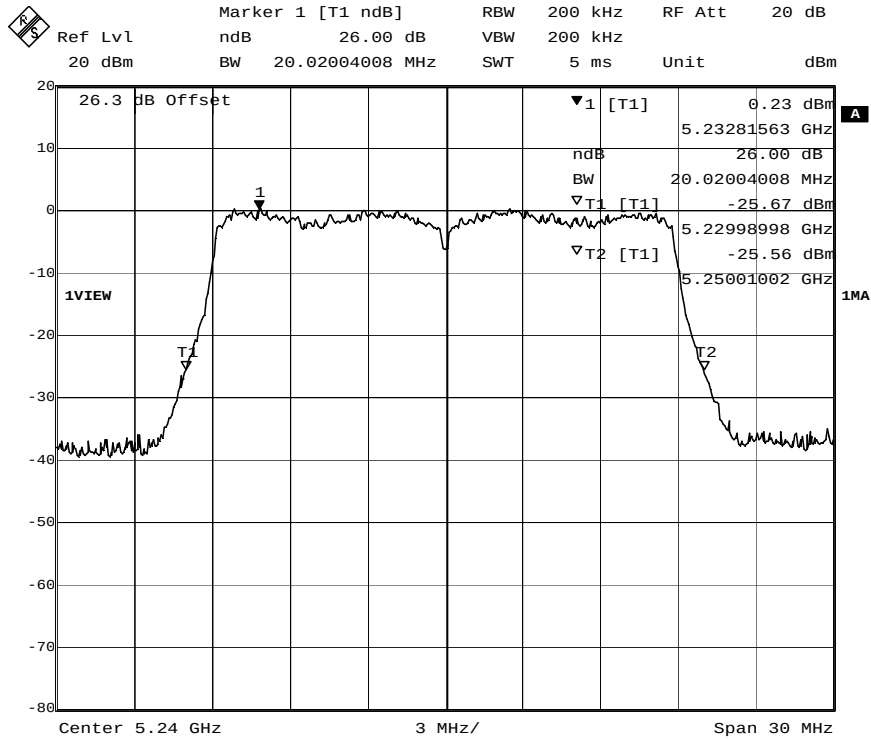
Marker 1 [T1]

Ref Lvl 20 dBm 0.41 dBm RBW 200 kHz RF Att 20 dB
 BW 5.22249499 GHz VBW 200 kHz Unit dBm SWT 5 ms



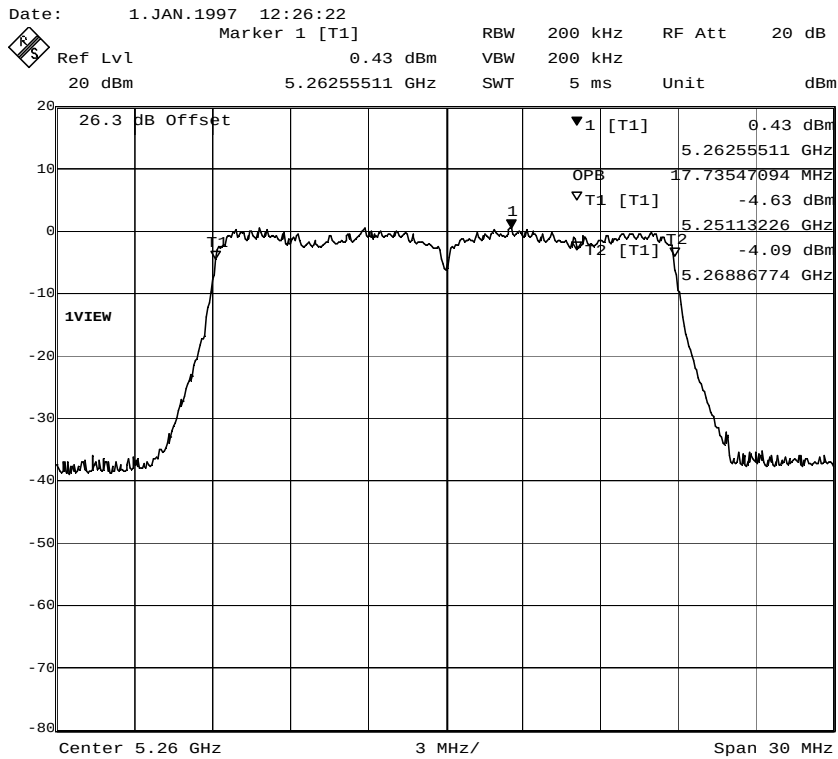
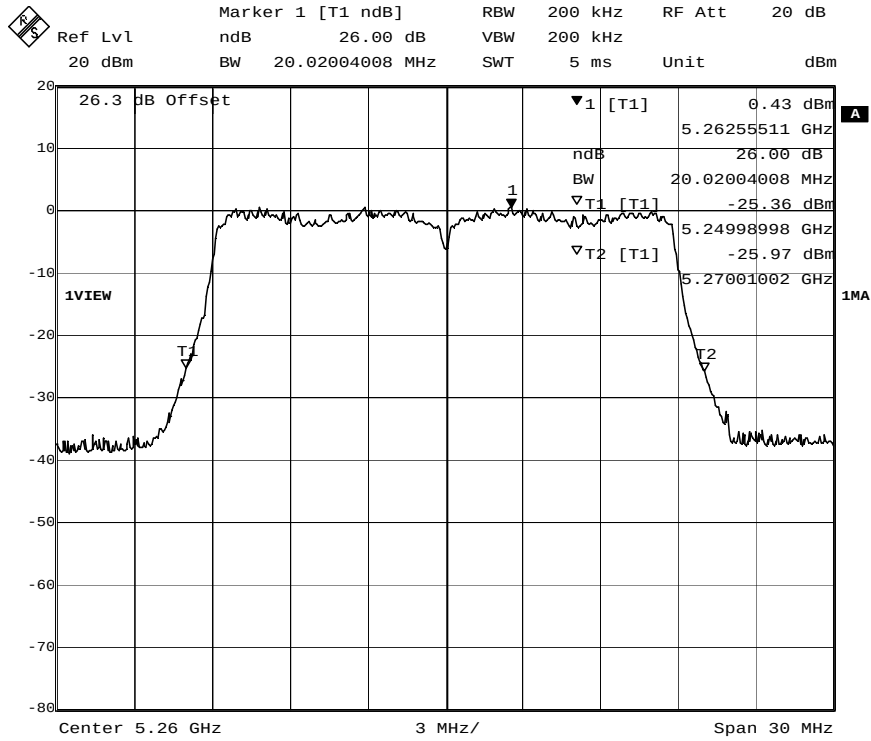
Date: 1.JAN.1997 12:21:09

802.11n20	Ch 44	Chain B	26dB BW	20.02MHz	99%BW	17.73MHz
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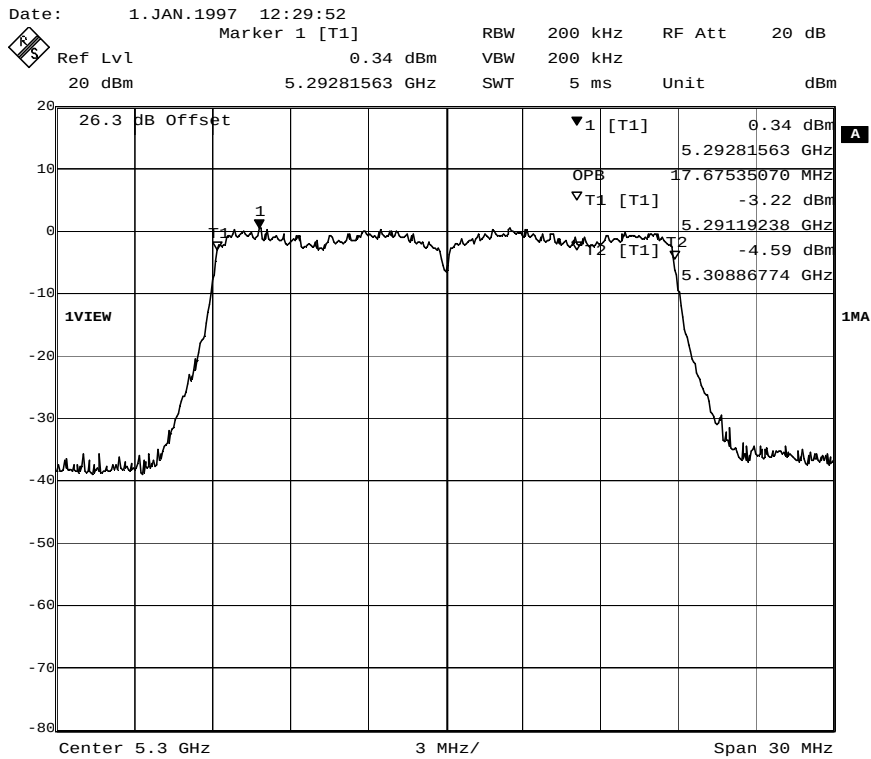
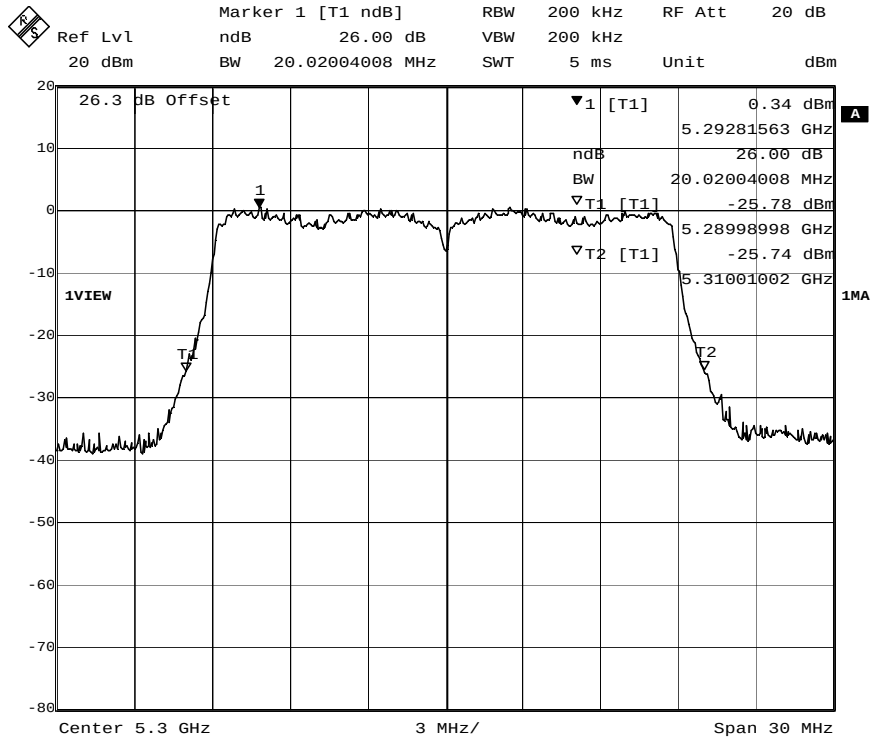
Date: 1.JAN.1997 12:23:04

802.11n20	Ch 48	Chain B	26dB BW	20.02MHz	99%BW	17.73MHz
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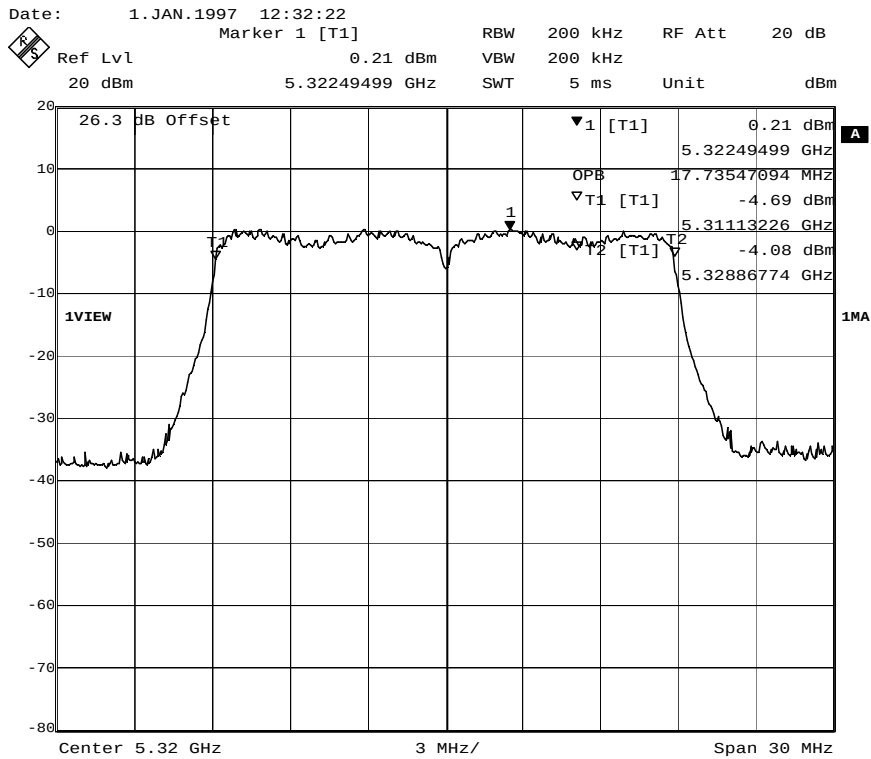
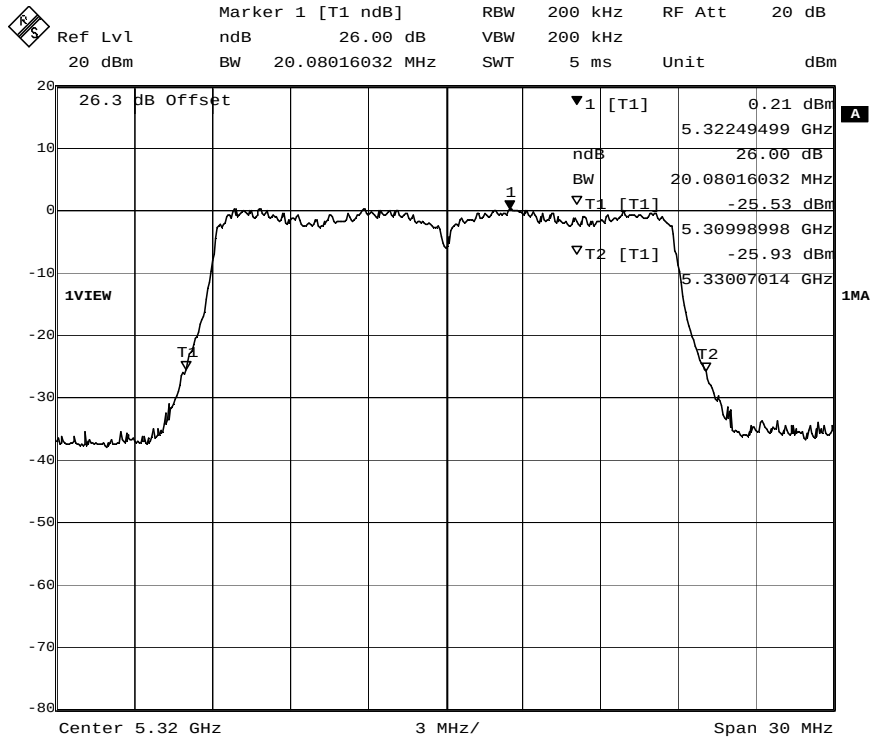
Date: 1.JAN.1997 12:27:03

802.11n20	Ch 52	Chain B	26dB BW	20.02MHz	99%BW	17.73MHz
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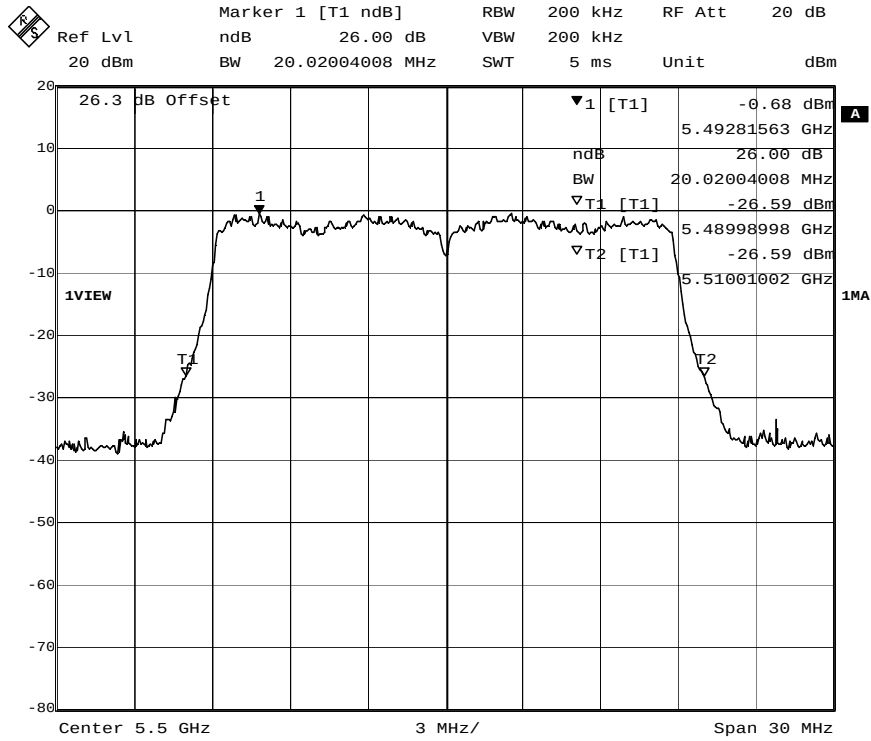
Date: 1.JAN.1997 12:29:08

802.11n20	Ch 60	Chain B	26dB BW	20.02MHz	99%BW	17.67MHz
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Date: 1.JAN.1997 12:33:42

802.11n20	Ch 64	Chain B	26dB BW	20.08MHz	99%BW	17.73MHz
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Date: 1.JAN.1997 12:36:16

Marker 1 [T1]

Ref Lvl 20 dBm

-0.68 dBm

5.49281563 GHz

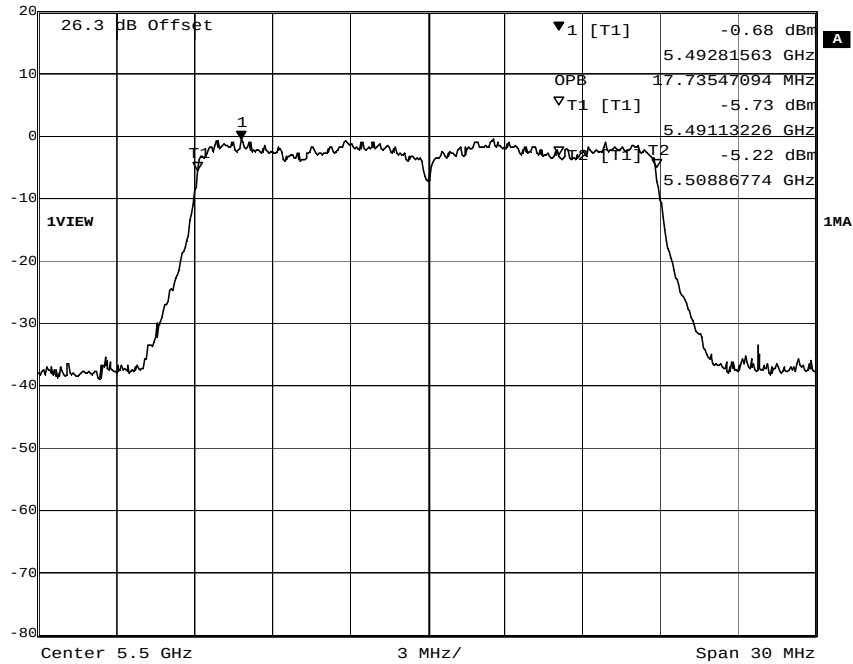
RBW 200 kHz

VBW 200 kHz

RF Att 20 dB

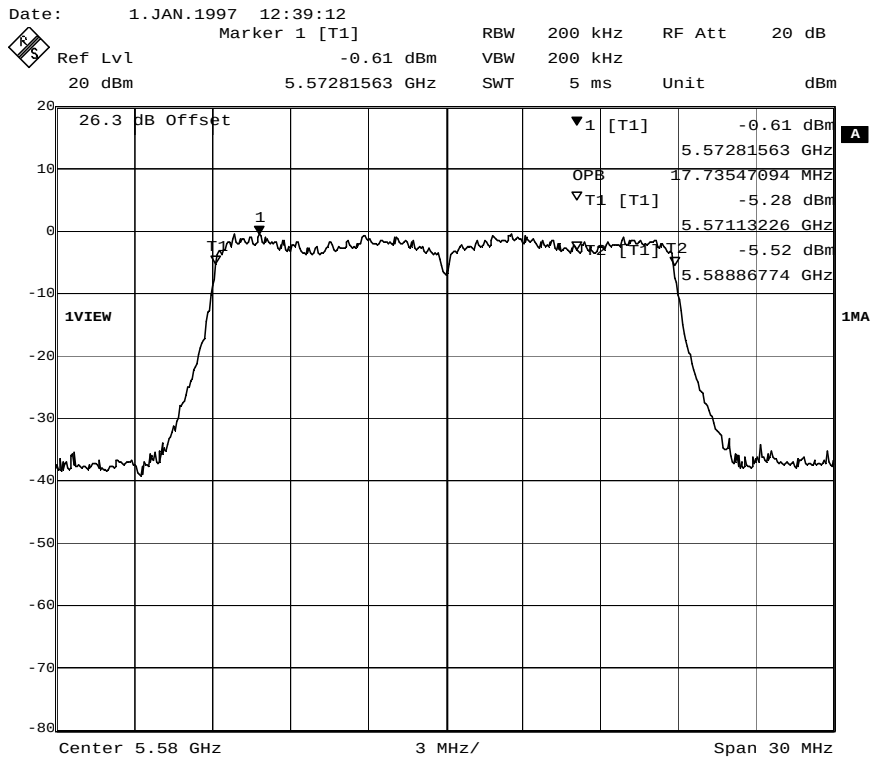
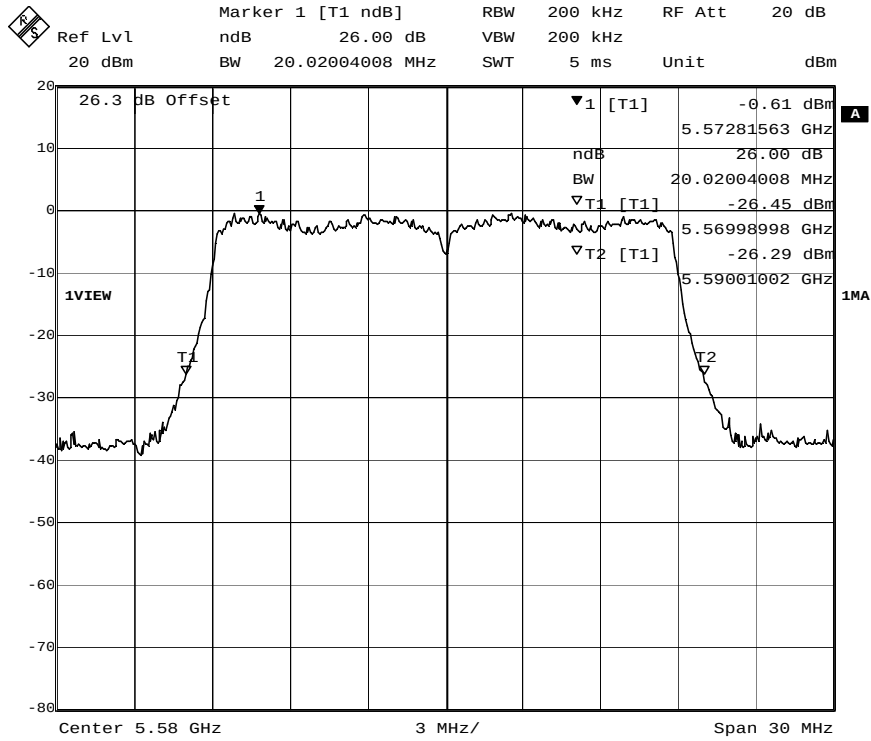
SWT 5 ms

Unit dBm



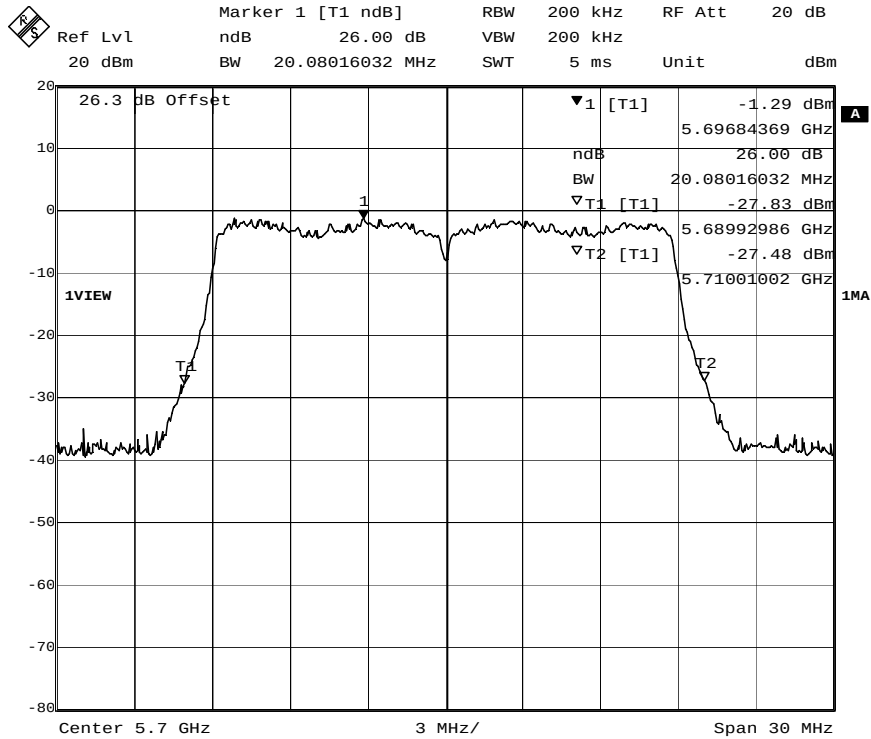
Date: 1.JAN.1997 12:35:28

802.11n20	Ch 100	Chain B	26dB BW	20.02MHz	99%BW	17.73MHz
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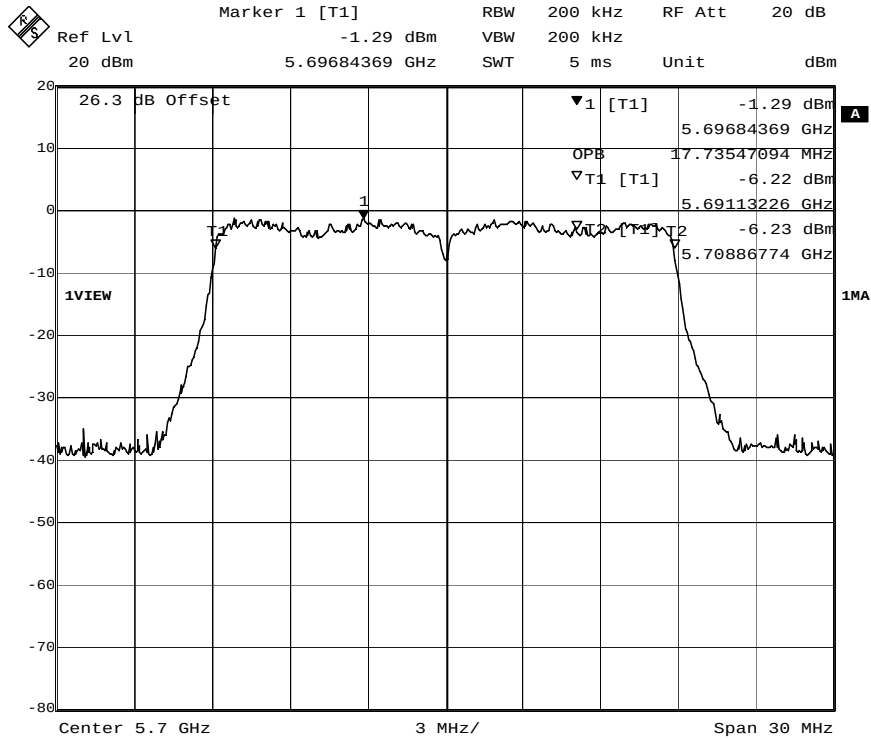


Date: 1.JAN.1997 12:39:49

802.11n20	Ch 116	Chain B	26dB BW	20.02MHz	99%BW	17.73MHz
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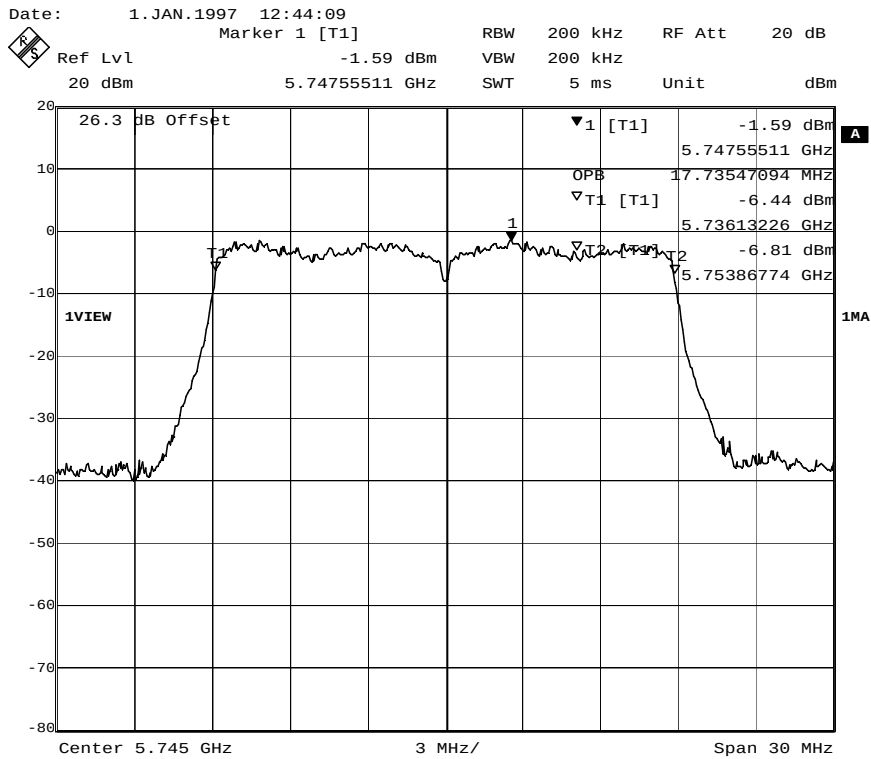
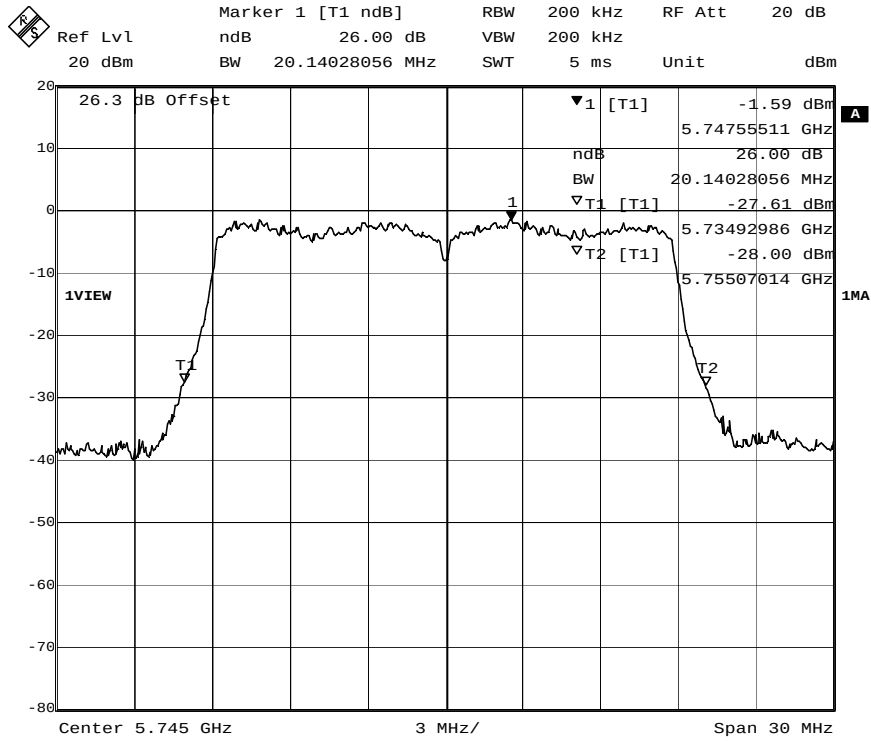


Date: 1.JAN.1997 12:42:11



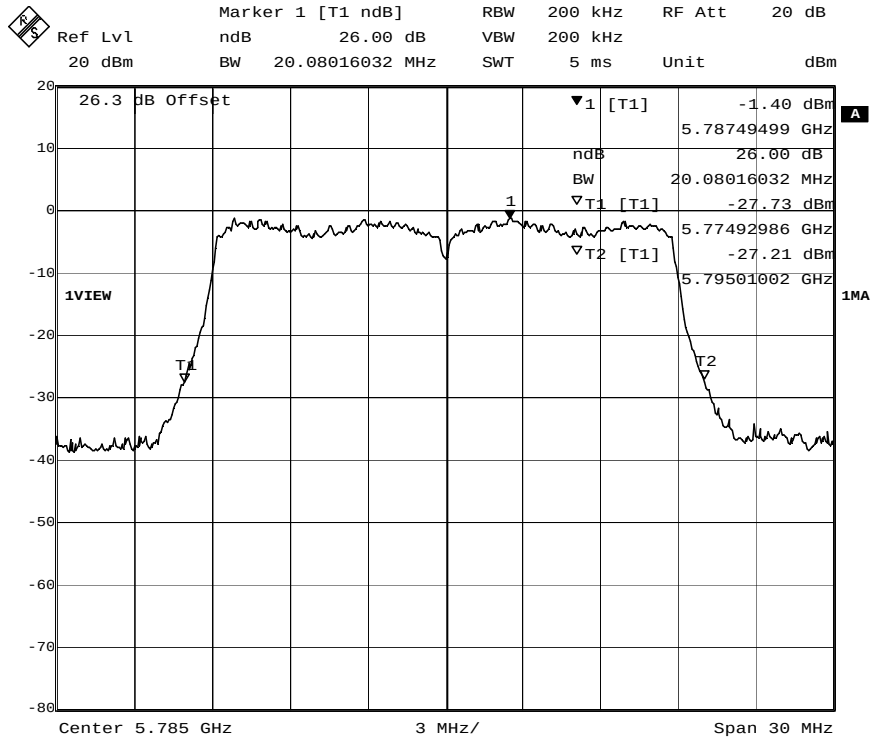
Date: 1.JAN.1997 12:41:44

802.11n20	Ch 140	Chain B	26dB BW	20.08MHz	99%BW	17.73MHz
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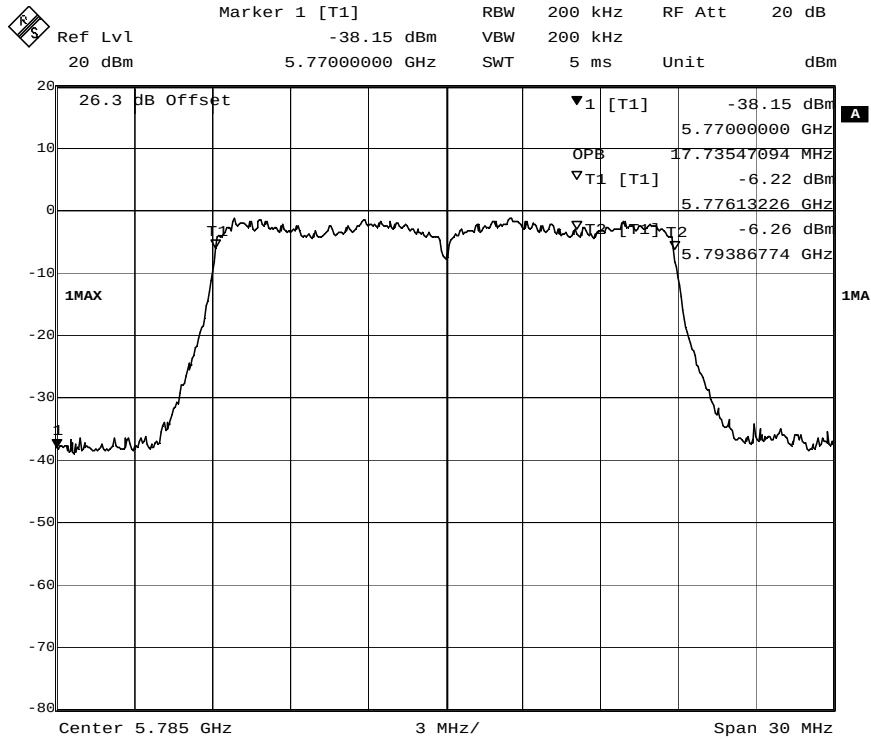


Date: 1.JAN.1997 12:44:51

802.11n20	Ch 149	Chain B	26dB BW	20.14MHz	99%BW	17.73MHz
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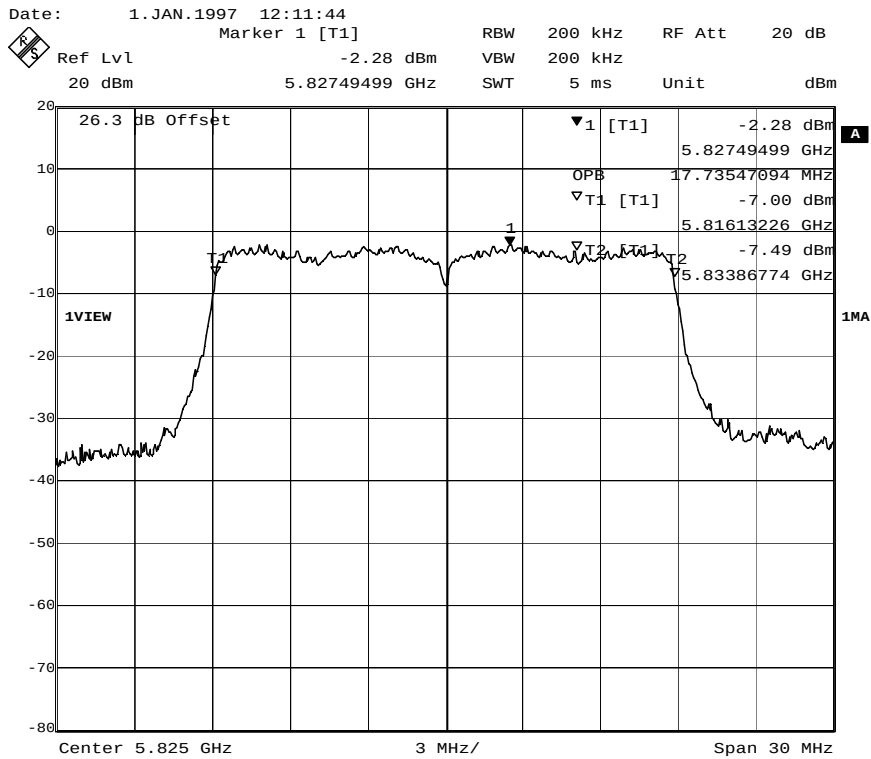
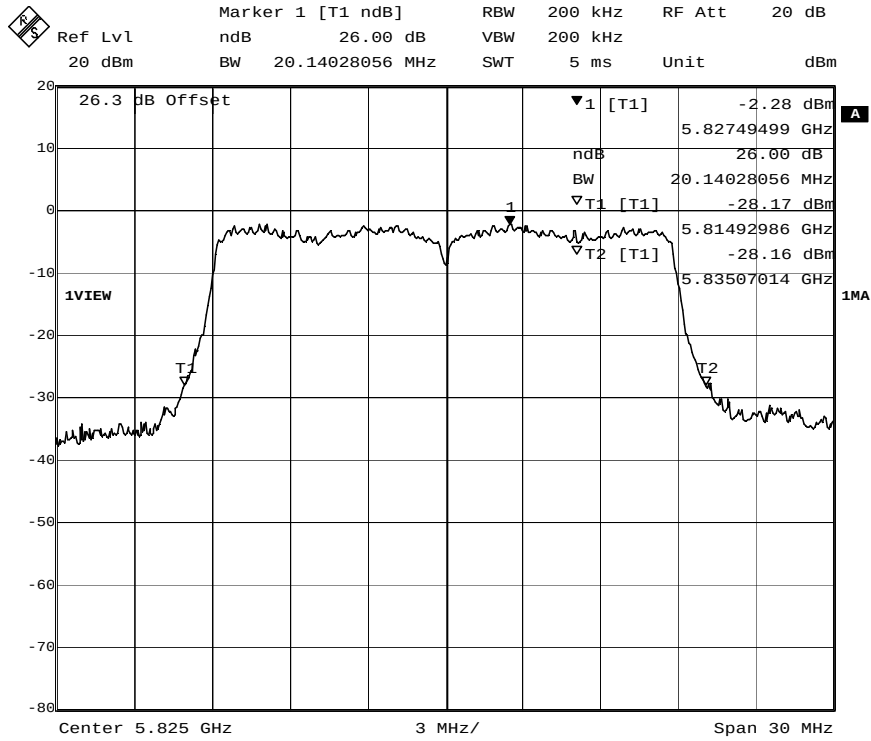


Date: 1.JAN.1997 12:49:13



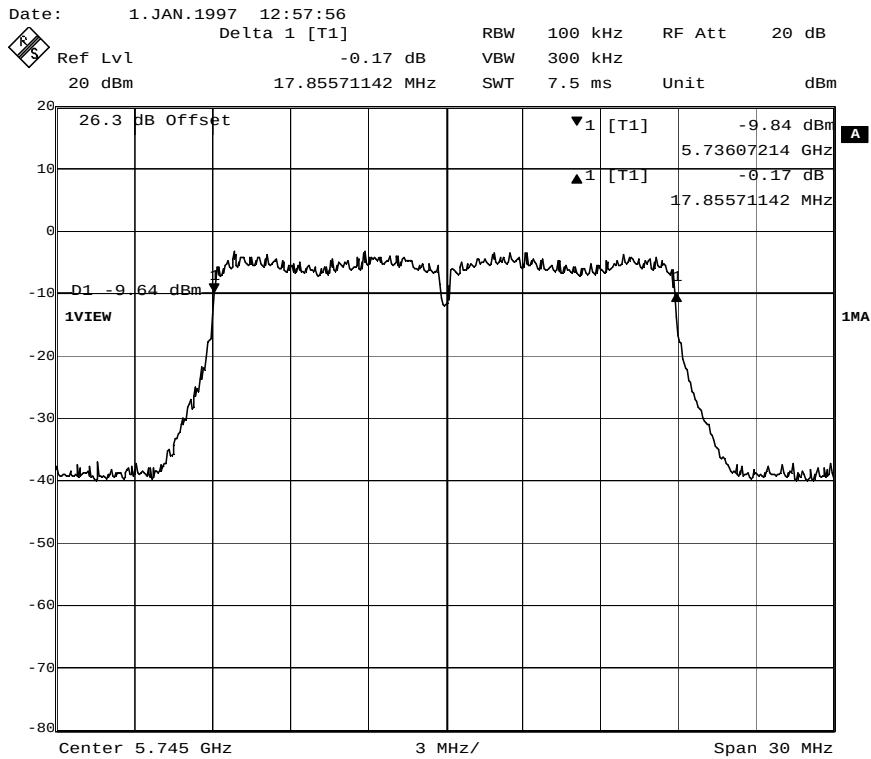
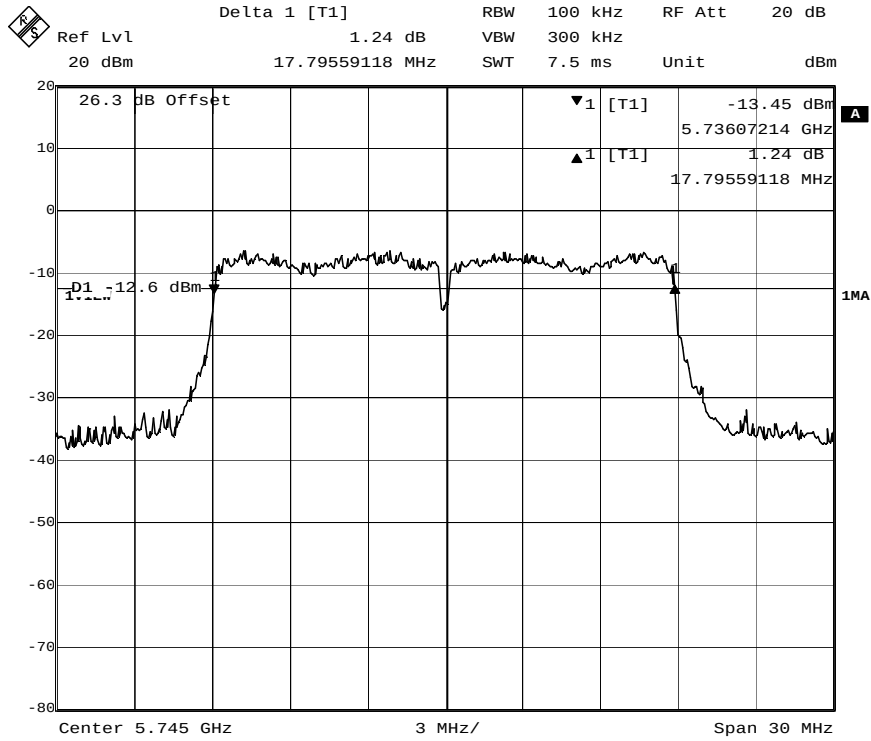
Date: 1.JAN.1997 12:48:21

802.11n20	Ch 157	Chain B	26dB BW	20.08MHz	99%BW	17.73MHz
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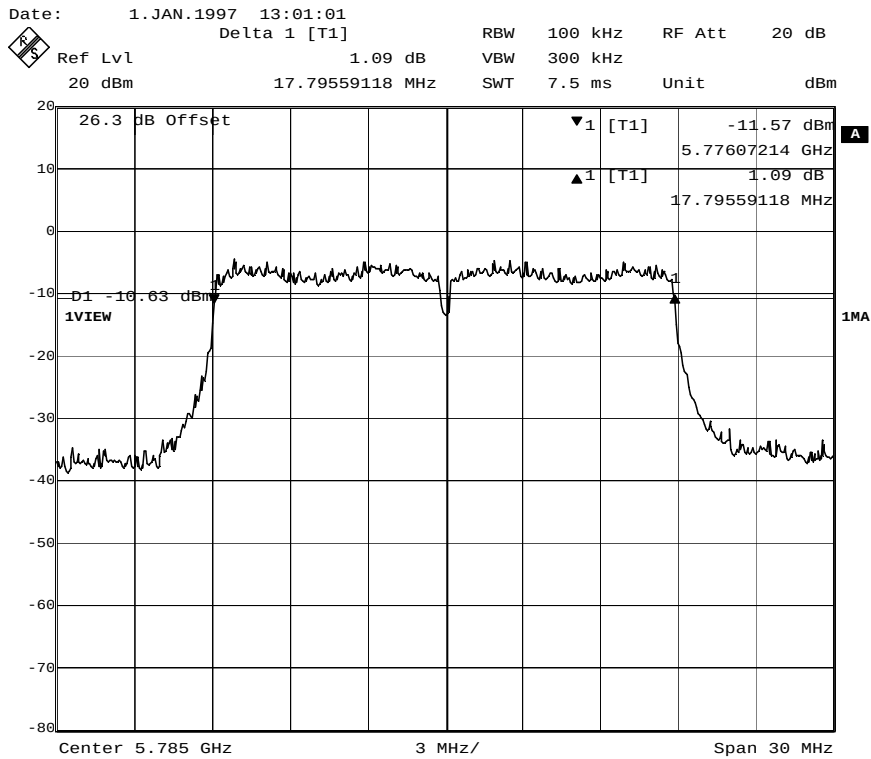
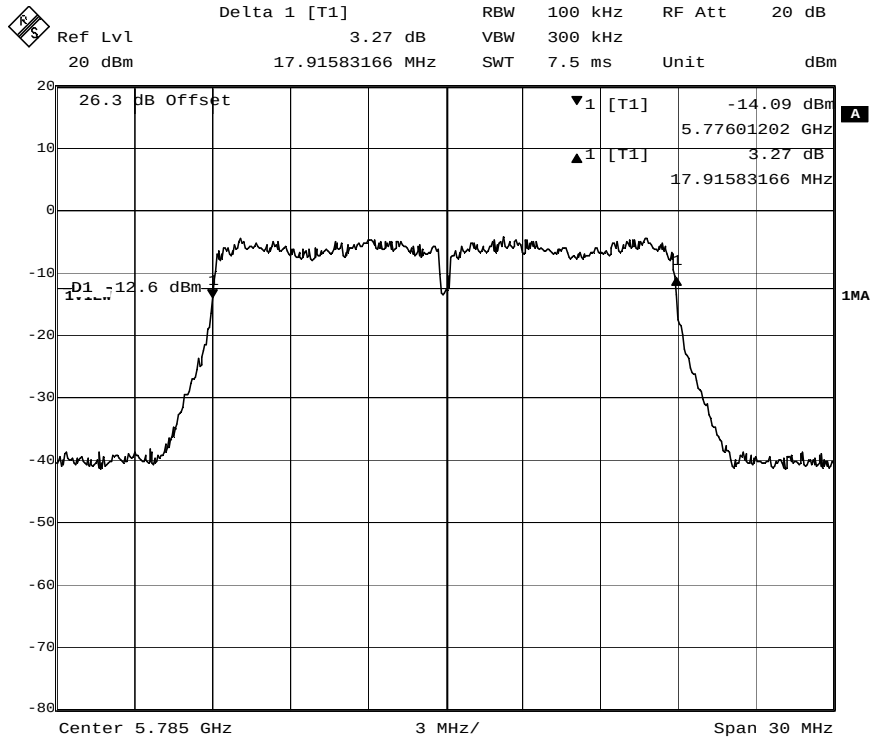
Date: 1.JAN.1997 12:12:58

802.11n20	Ch 165	Chain B	26dB BW	20.14MHz	99%BW	17.73MHz
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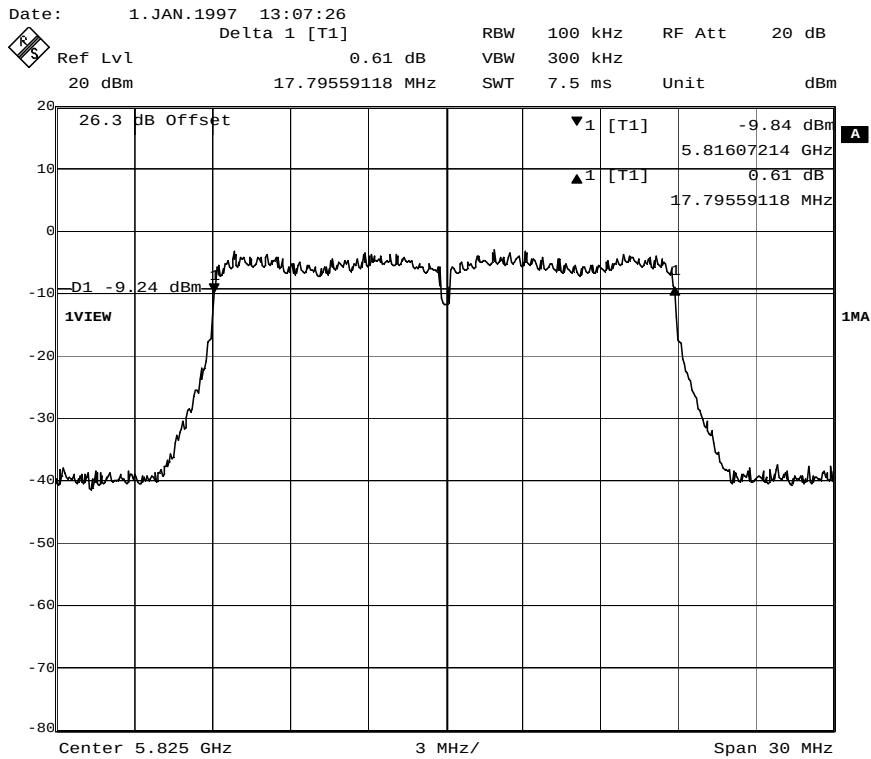
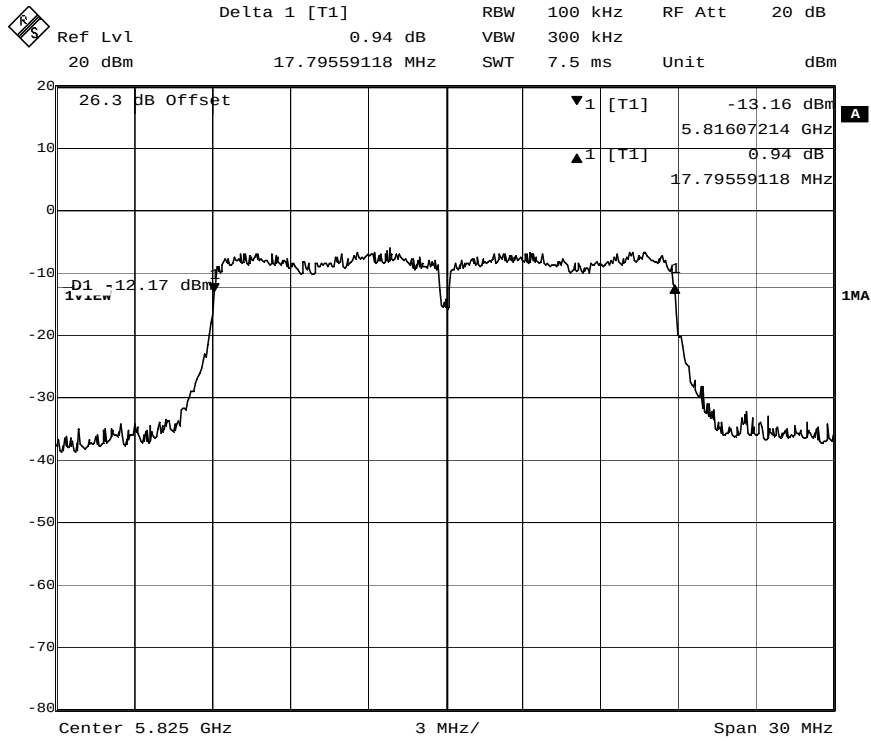
Date: 1.JAN.1997 12:55:03

802.11n20	Ch 149	6dB BW Chain A	17.79MHz	6dB BW Chain B	17.85MHz
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Date: 1.JAN.1997 13:03:01

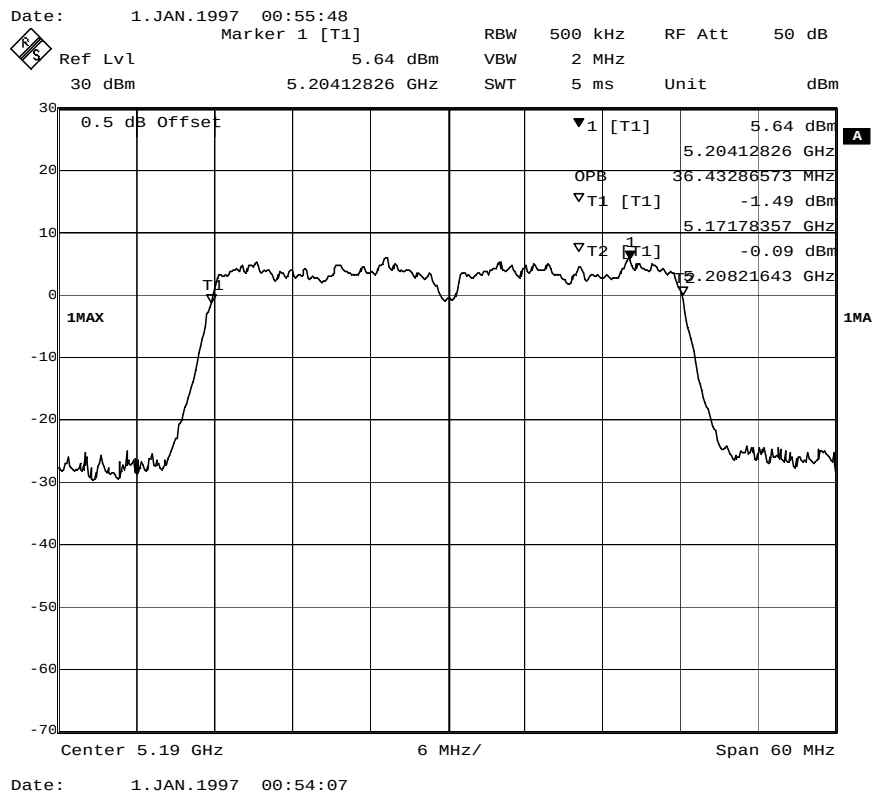
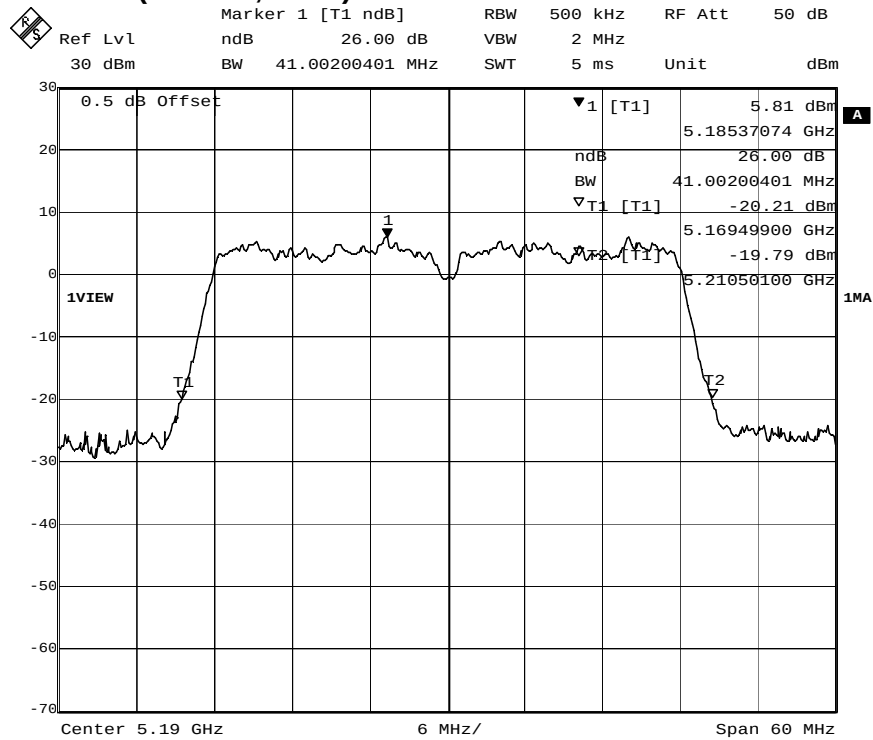
802.11n20	Ch 157	6dB BW Chain A	17.91MHz	6dB BW Chain B	17.79MHz
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Date: 1.JAN.1997 13:05:26

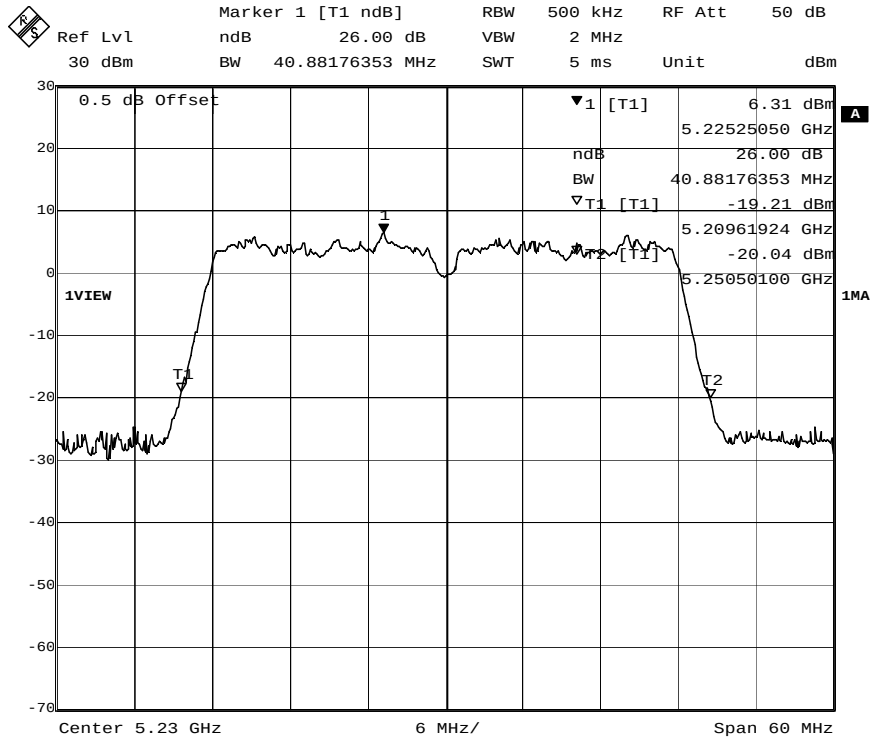
802.11n20	Ch 165	6dB BW Chain A	17.79MHz	6dB BW Chain B	17.79MHz
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6.12 Bandwidth Plots (802.11n, HT40):



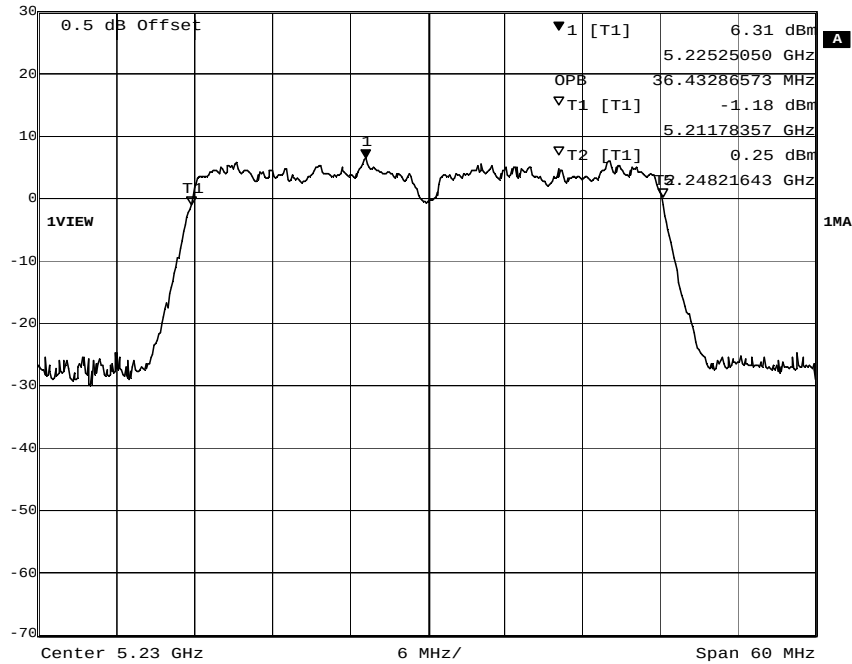
Date: 1.JAN.1997 00:54:07

802.11n40	Ch 38	Chain A	26dB BW	41.00MHz	99%BW	36.43MHz
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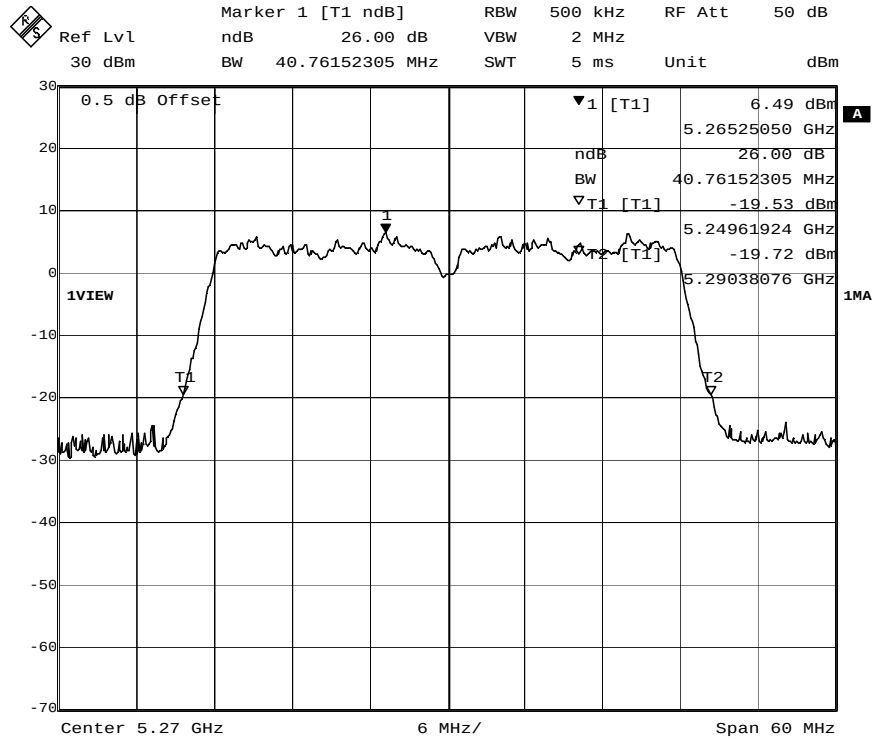
Date: 1.JAN.1997 01:00:35

Ref Lvl 30 dBm Marker 1 [T1] 6.31 dBm RBW 500 kHz RF Att 50 dB
5.22525050 GHz VBW 2 MHz Unit dBm

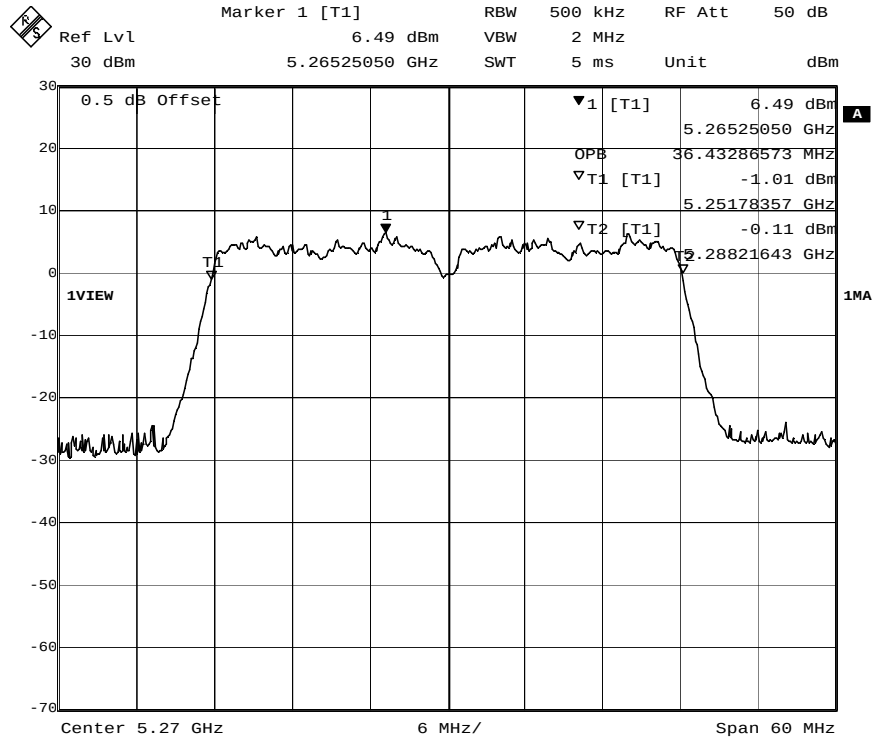


Date: 1.JAN.1997 01:01:19

802.1n40	Ch 46	Chain A	26dB BW	40.88MHz	99%BW	36.43MHz
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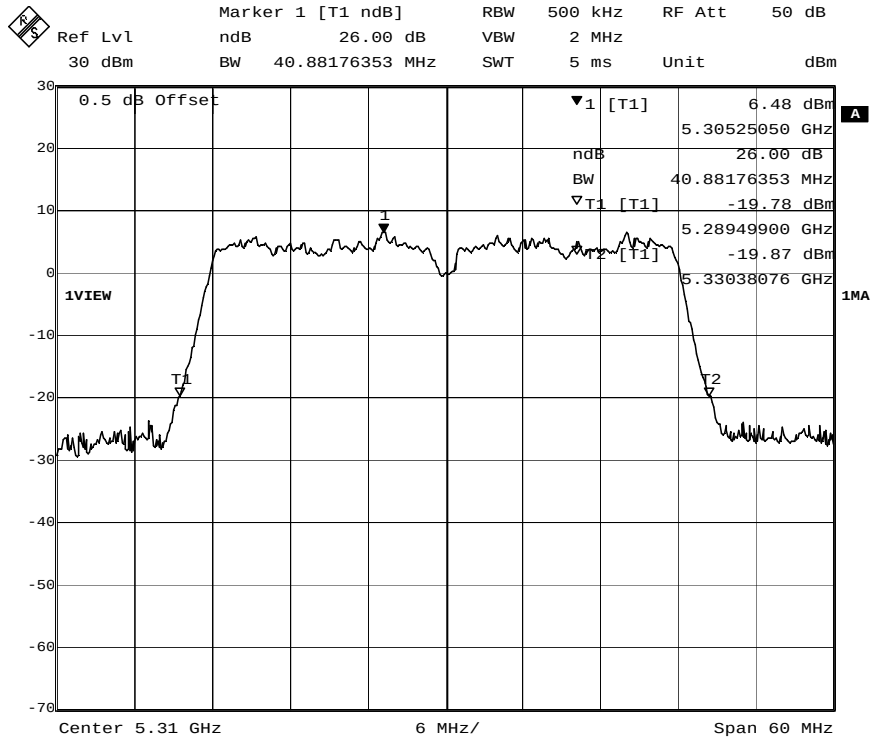


Date: 1.JAN.1997 02:19:48



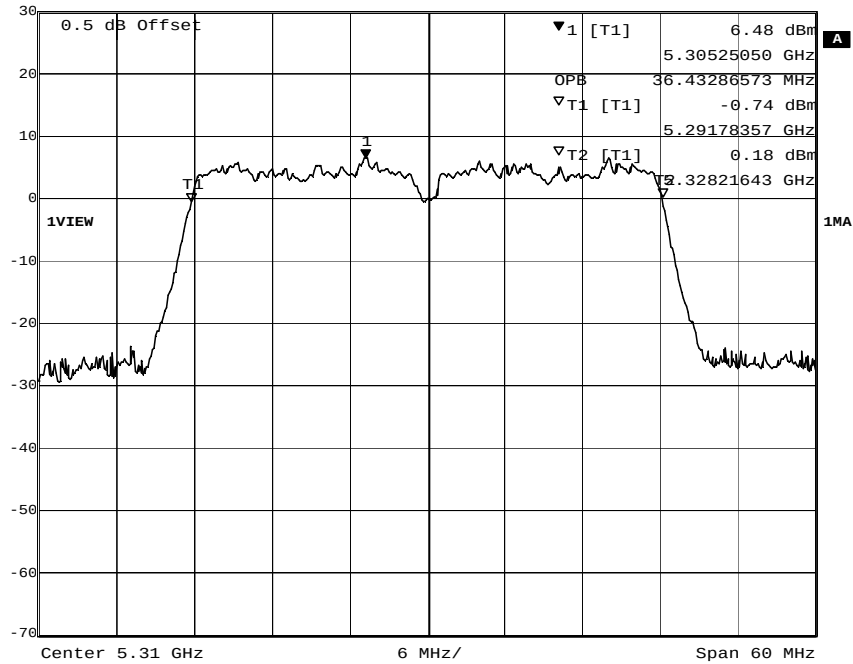
Date: 1.JAN.1997 02:18:54

802.11n40	Ch 54	Chain A	26dB BW	40.76MHz	99%BW	36.43MHz
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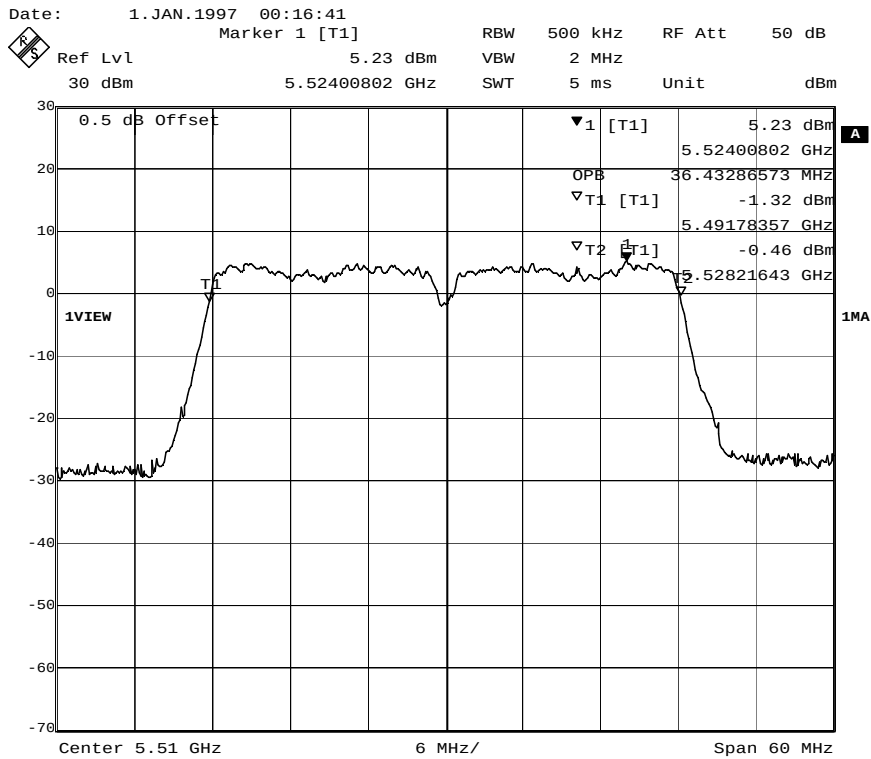
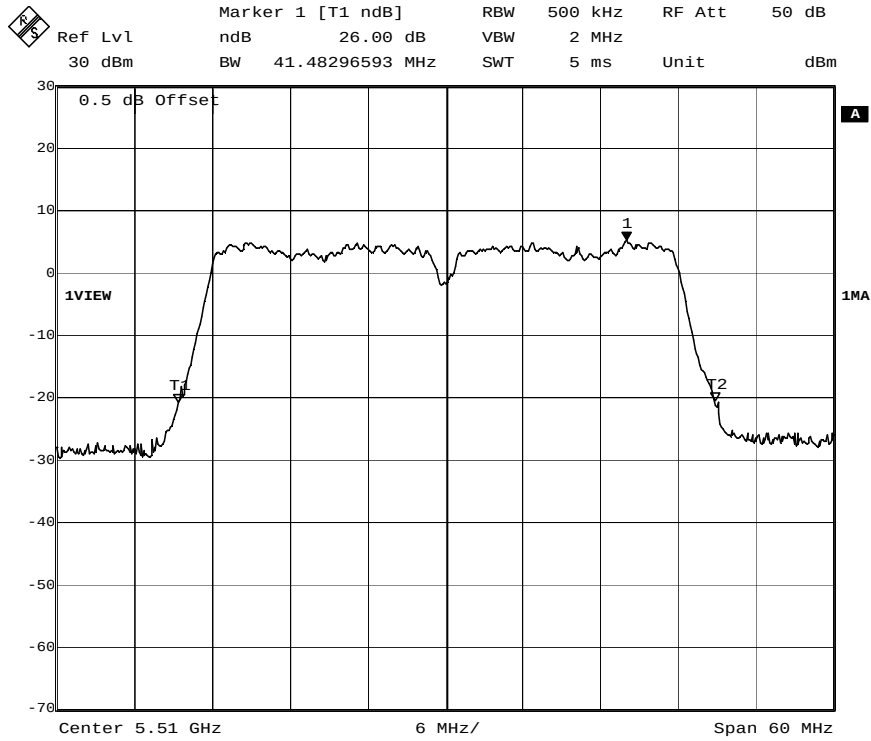
Date: 1.JAN.1997 02:23:36

Marker 1 [T1] 6.48 dBm RBW 500 kHz RF Att 50 dB
30 dBm 5.30525050 GHz VBW 2 MHz Unit dBm



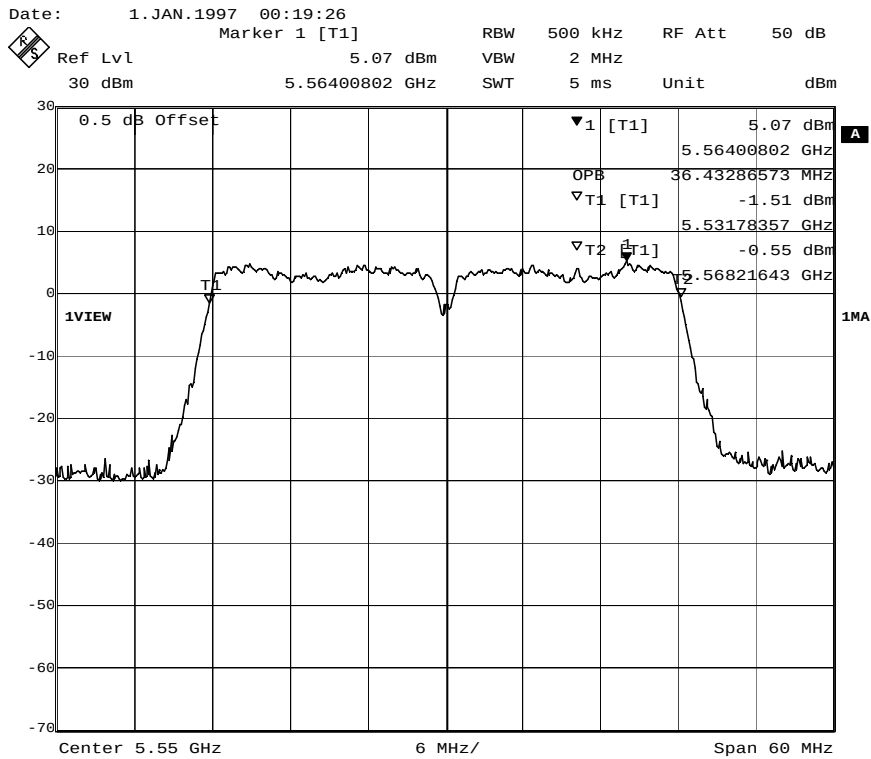
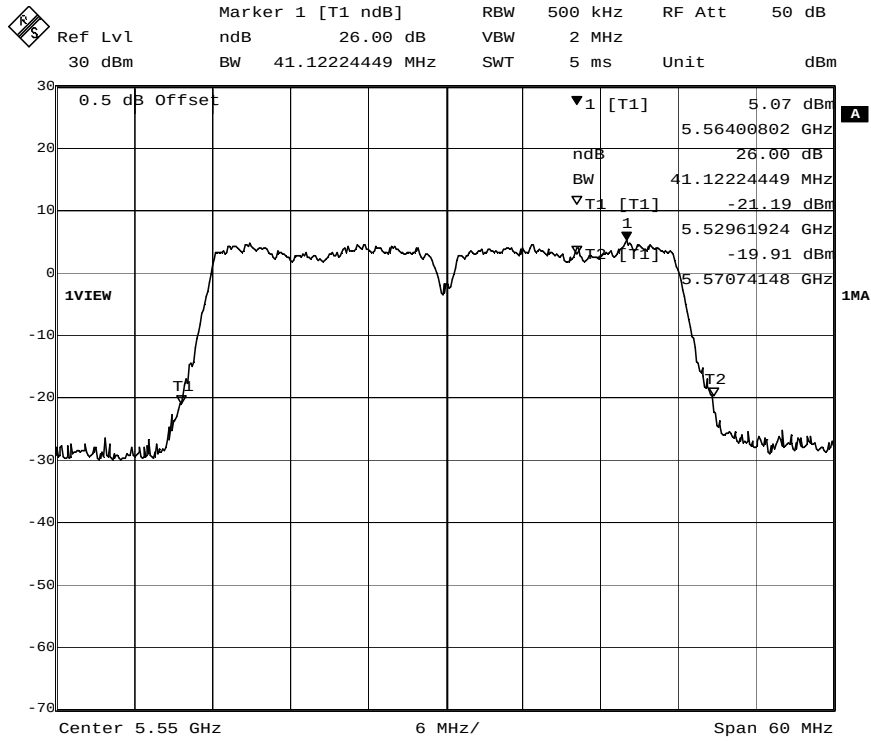
Date: 1.JAN.1997 02:24:34

802.11n40	Ch 62	Chain A	26dB BW	40.88MHz	99%BW	36.43MHz
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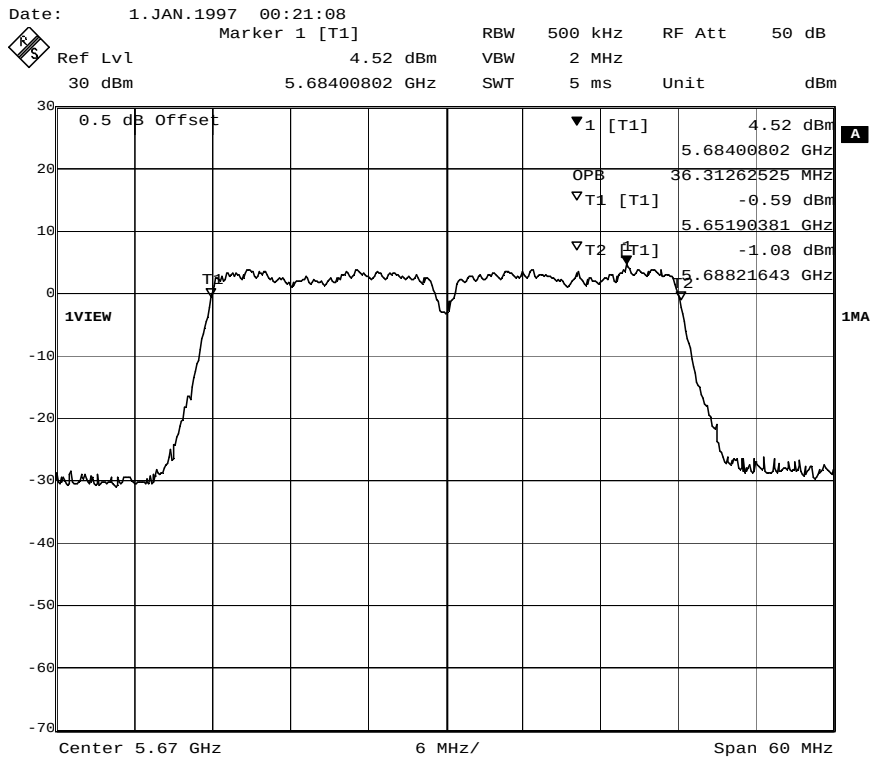
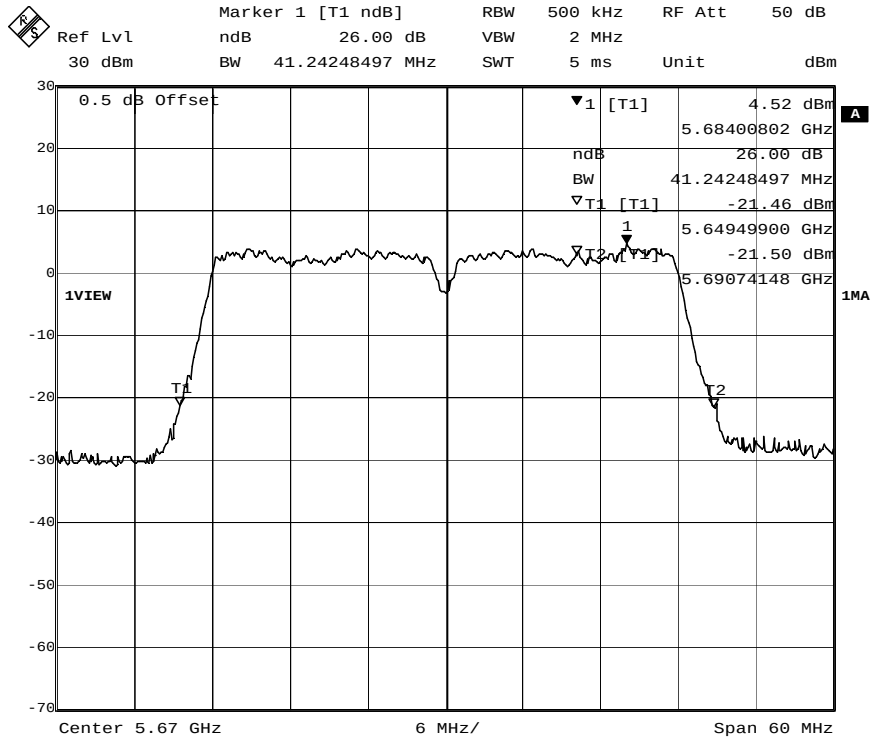
Date: 1.JAN.1997 00:17:09

802.11n40	Ch 102	Chain A	26dB BW	41.48MHz	99%BW	36.43MHz
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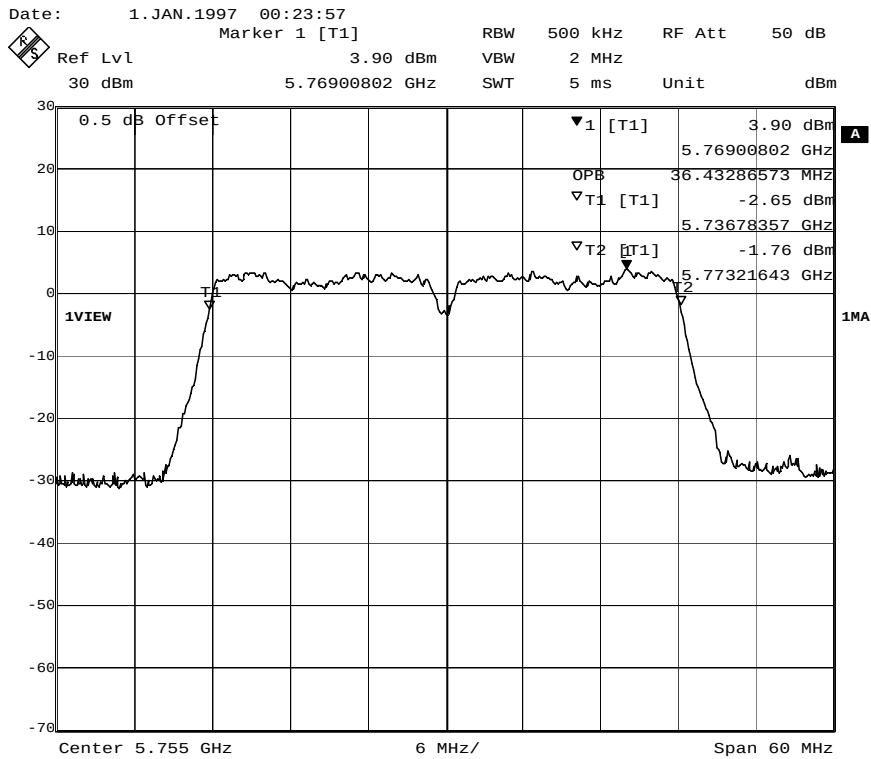
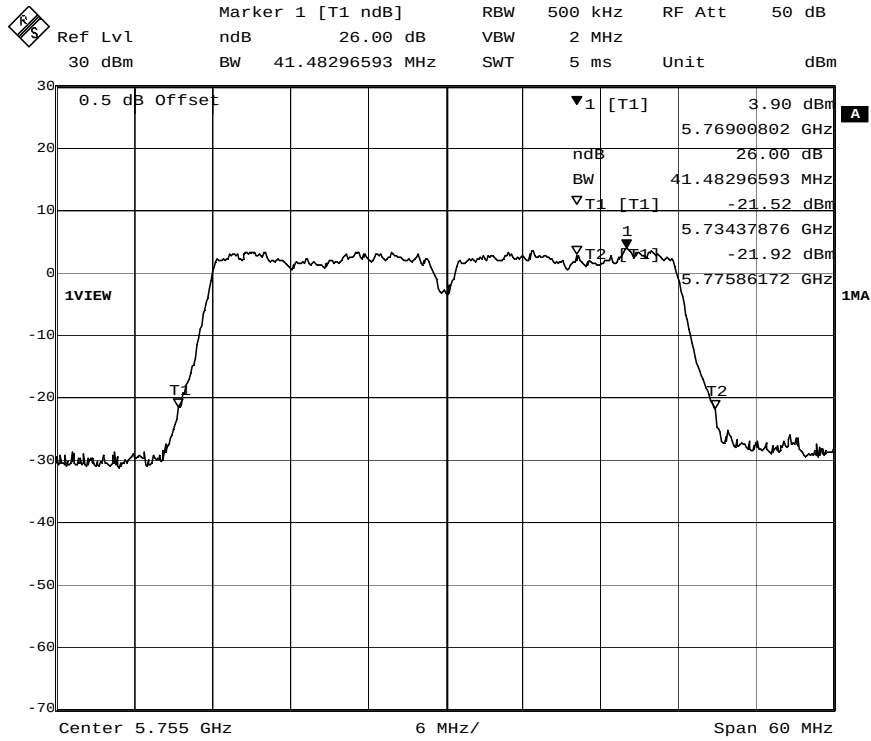
Date: 1.JAN.1997 00:18:55

802.11n40	Ch 110	Chain A	26dB BW	41.12MHz	99%BW	36.43MHz
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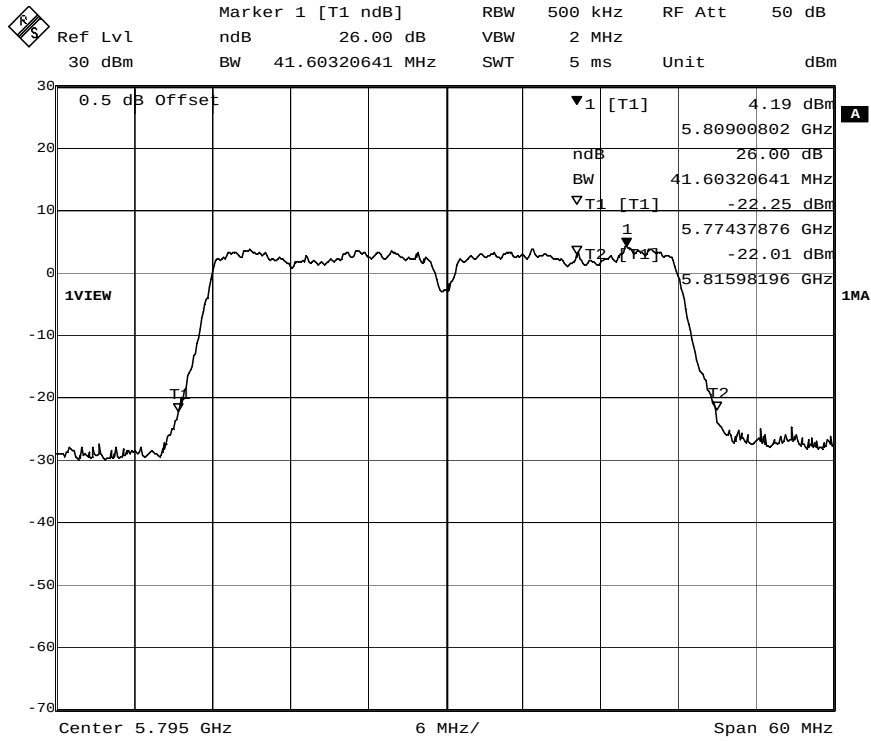
Date: 1.JAN.1997 00:21:35

802.11n40	Ch 134	Chain A	26dB BW	41.24MHz	99%BW	36.31MHz
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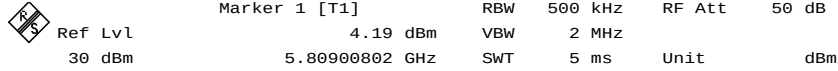


Date: 1.JAN.1997 00:23:22

802.11n40	Ch 151	Chain A	26dB BW	41.48MHz	99%BW	36.43MHz
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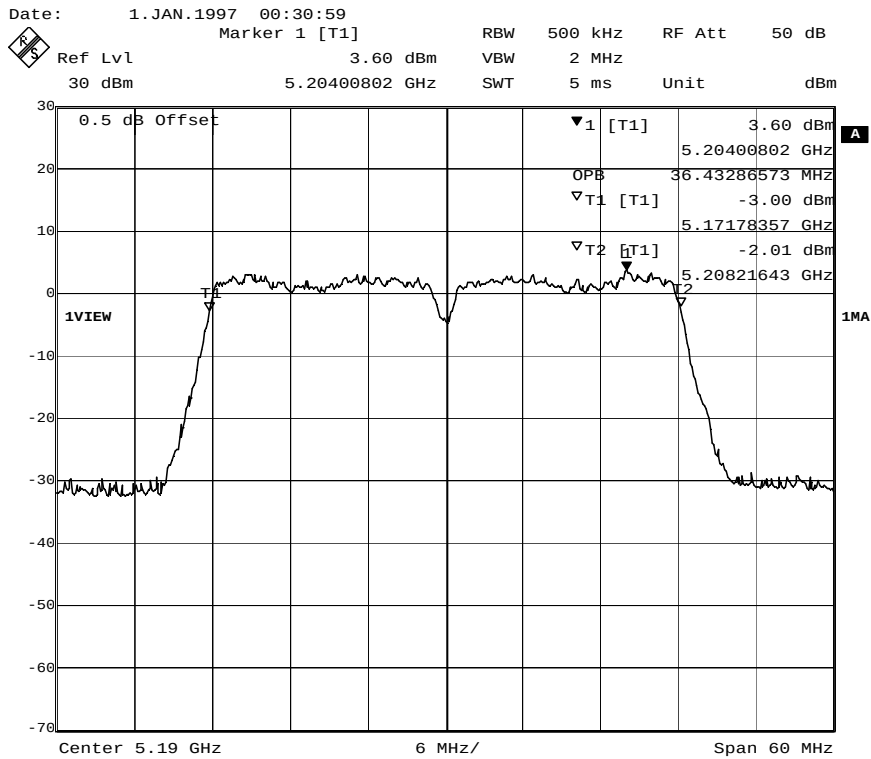
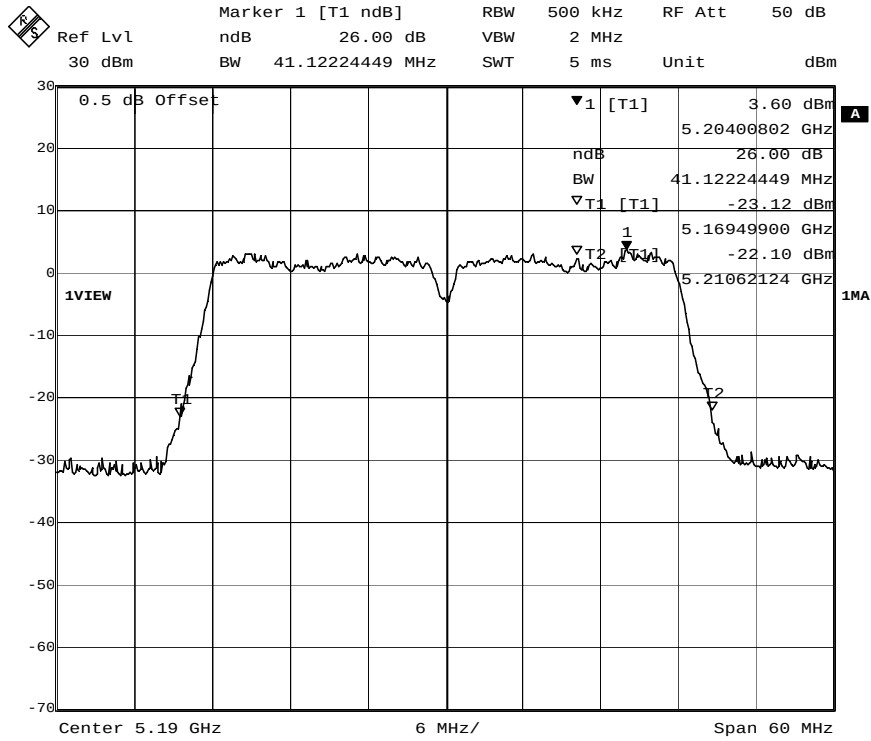


Date: 1.JAN.1997 00:26:45



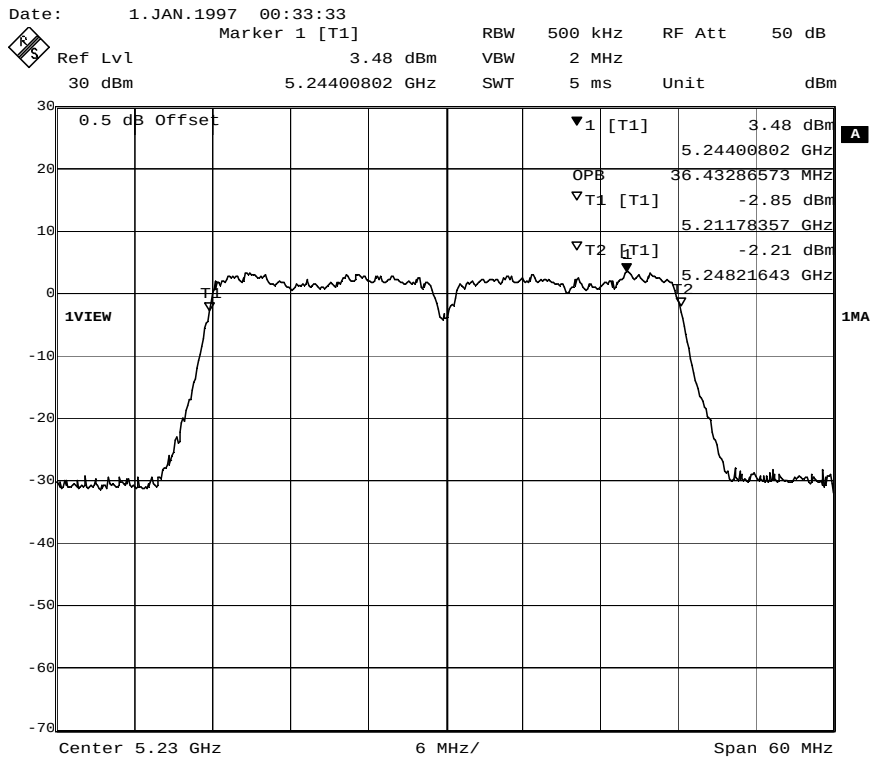
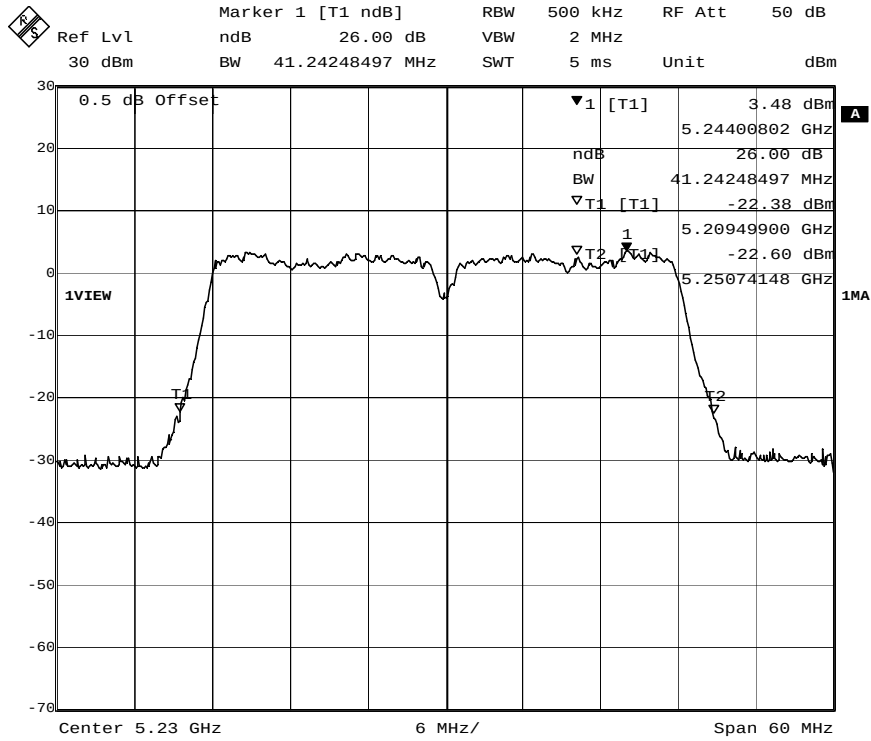
Date: 1.JAN.1997 00:27:18

802.11n40	Ch 159	Chain A	26dB BW	41.60MHz	99%BW	36.43MHz
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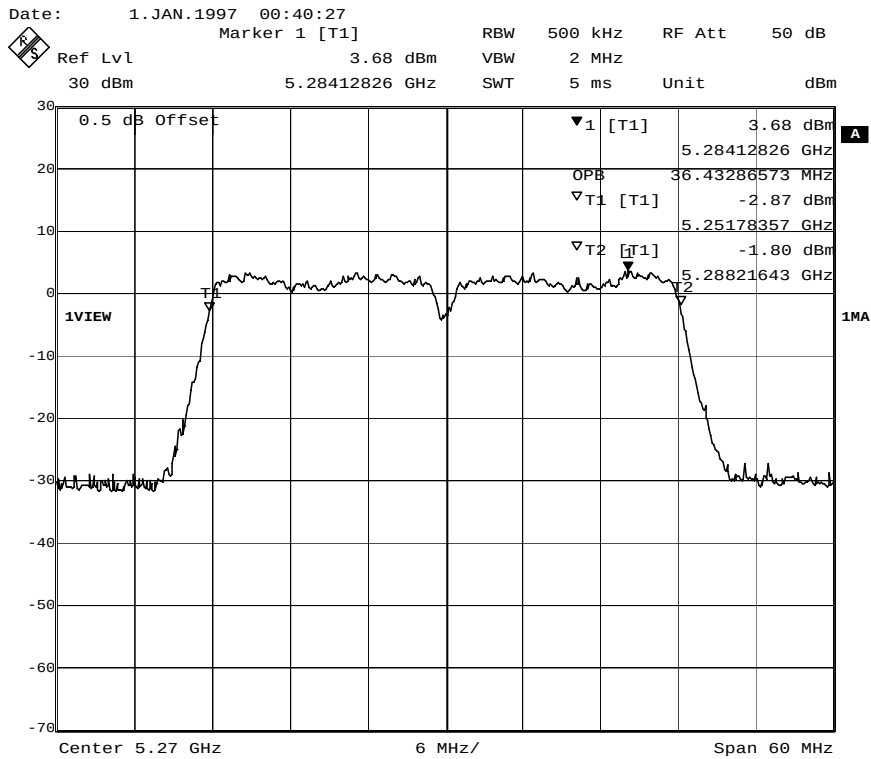
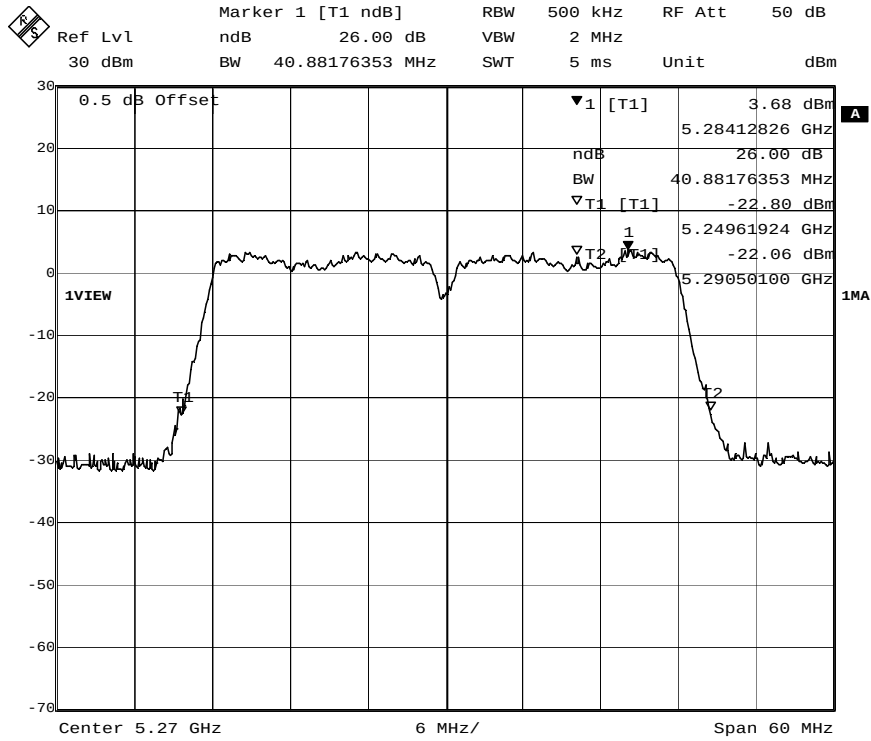
Date: 1.JAN.1997 00:30:19

802.11n40	Ch 38	Chain B	26dB BW	41.12MHz	99%BW	36.43MHz
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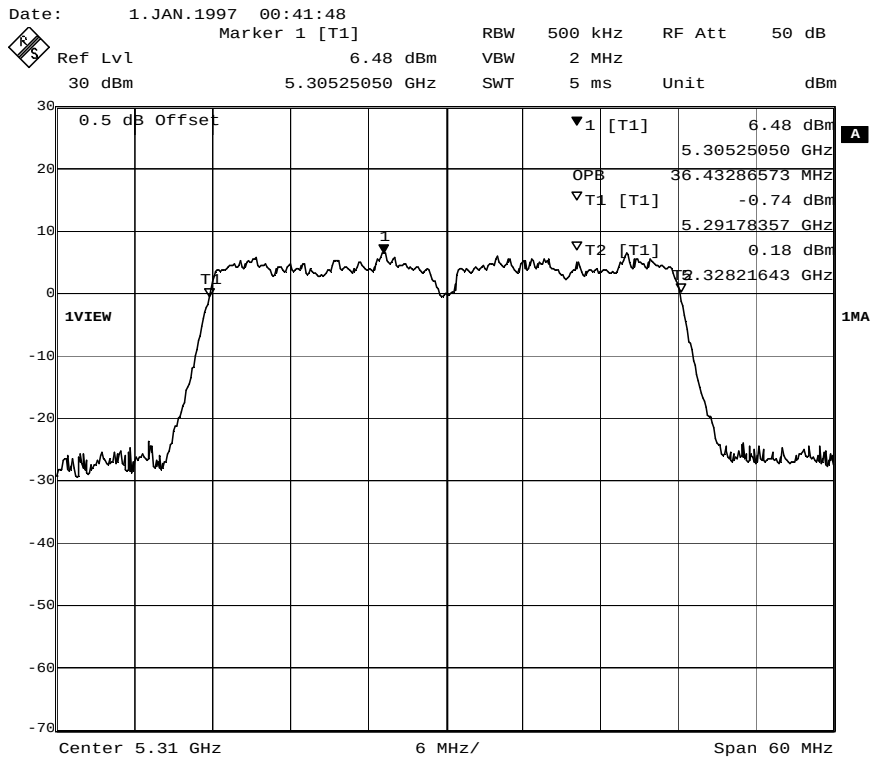
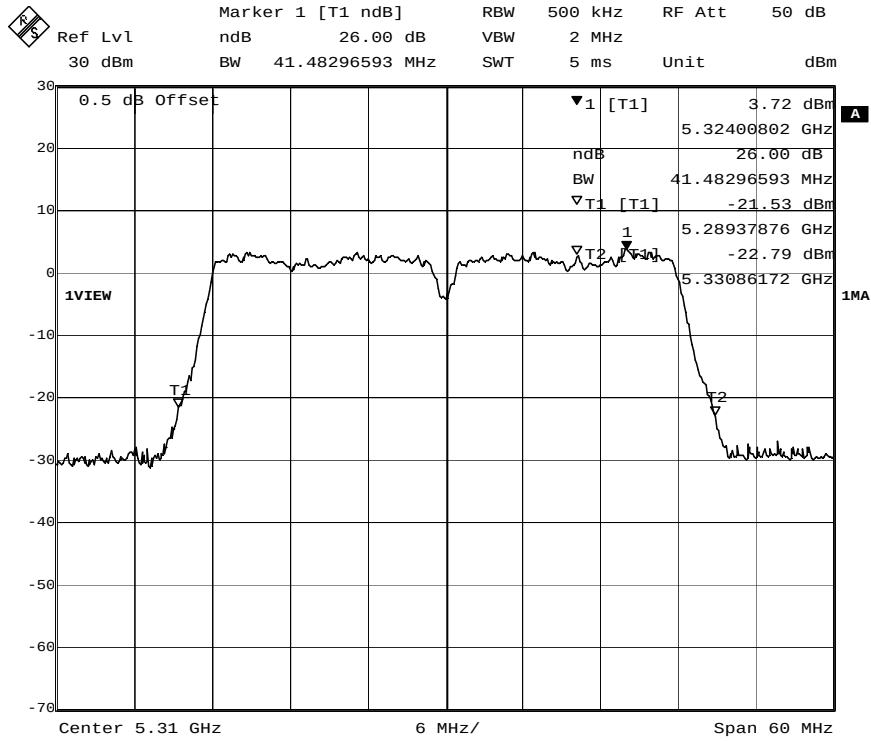
Date: 1.JAN.1997 00:34:02

802.11n40	Ch 46	Chain B	26dB BW	41.24MHz	99%BW	36.43MHz
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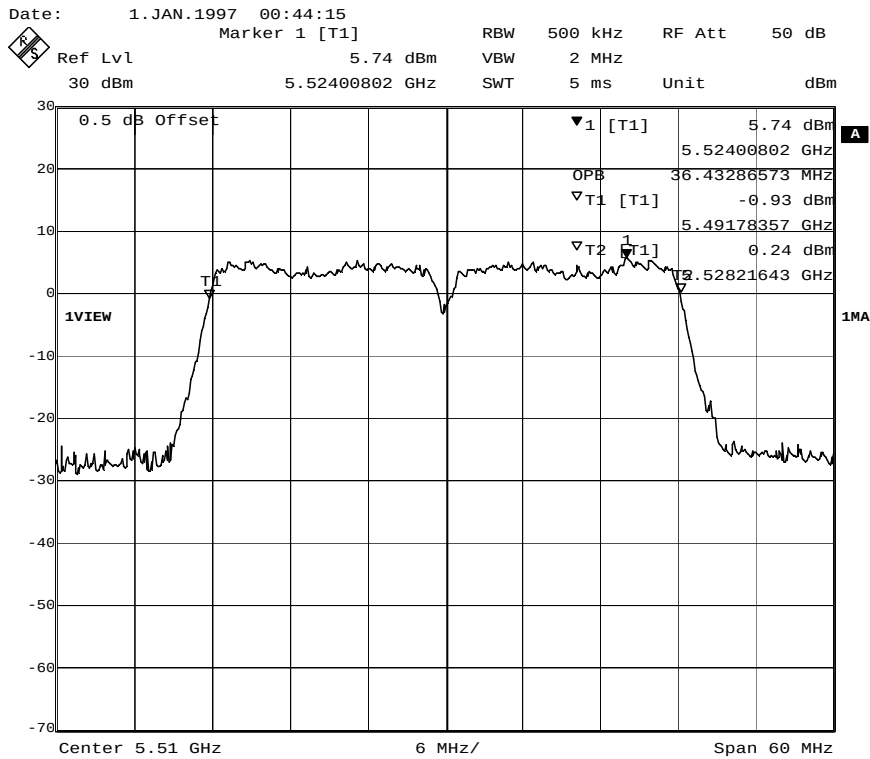
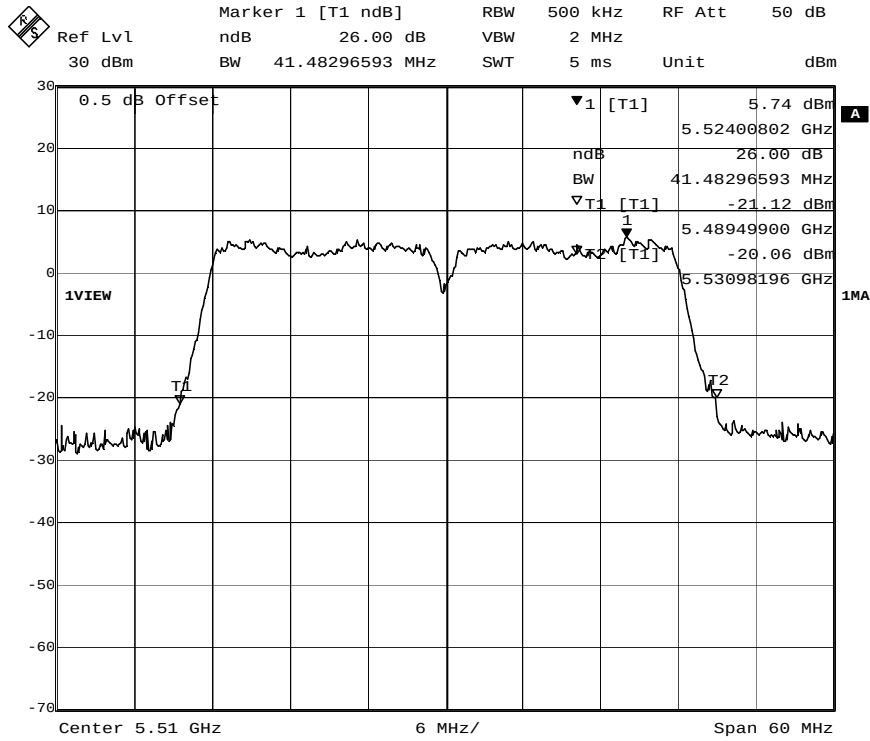
Date: 1.JAN.1997 00:39:58

802.11n40	Ch 54	Chain B	26dB BW	40.88MHz	99%BW	36.43MHz
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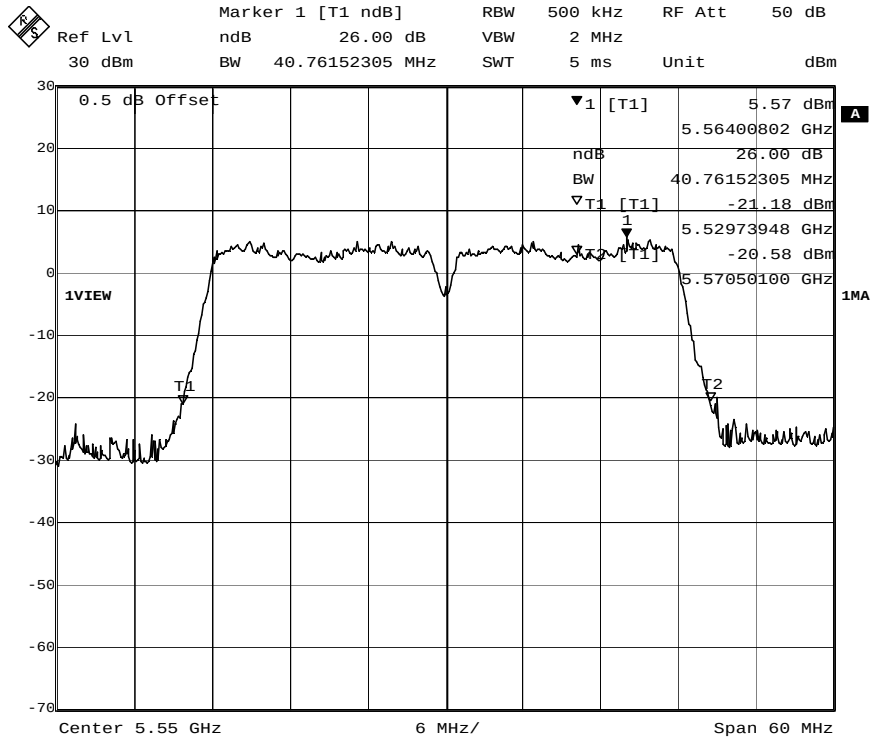
Date: 1.JAN.1997 02:24:34

802.11n40	Ch 62	Chain B	26dB BW	41.48MHz	99%BW	36.43MHz
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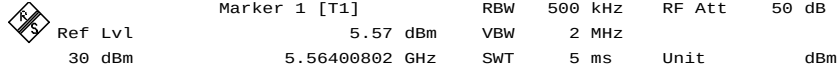


Date: 1.JAN.1997 00:43:49

802.11n40	Ch 102	Chain B	26dB BW	41.48MHz	99%BW	36.43MHz
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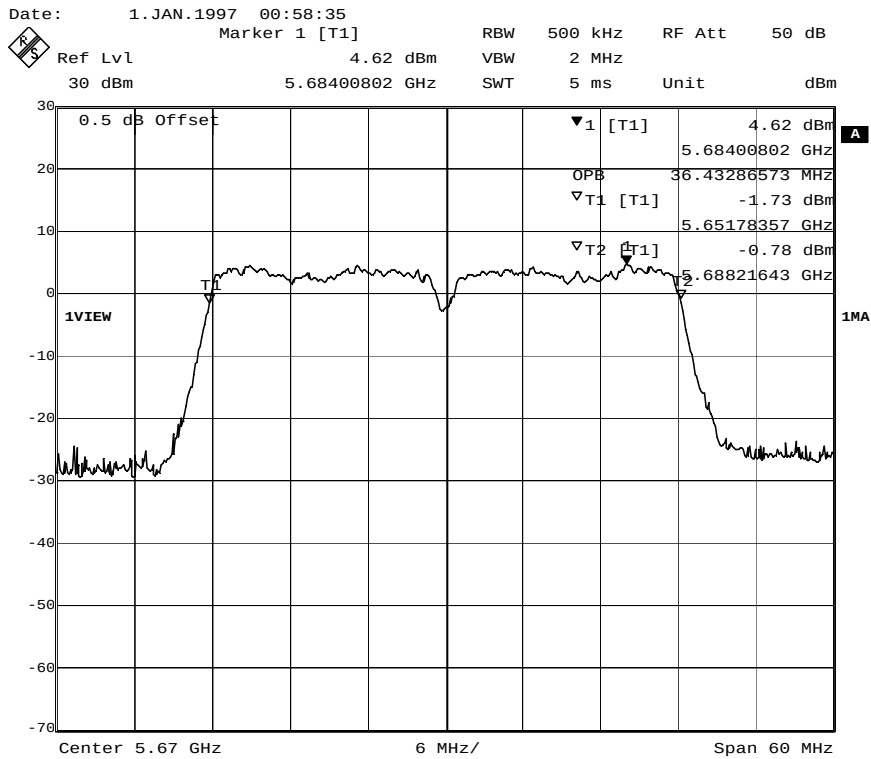
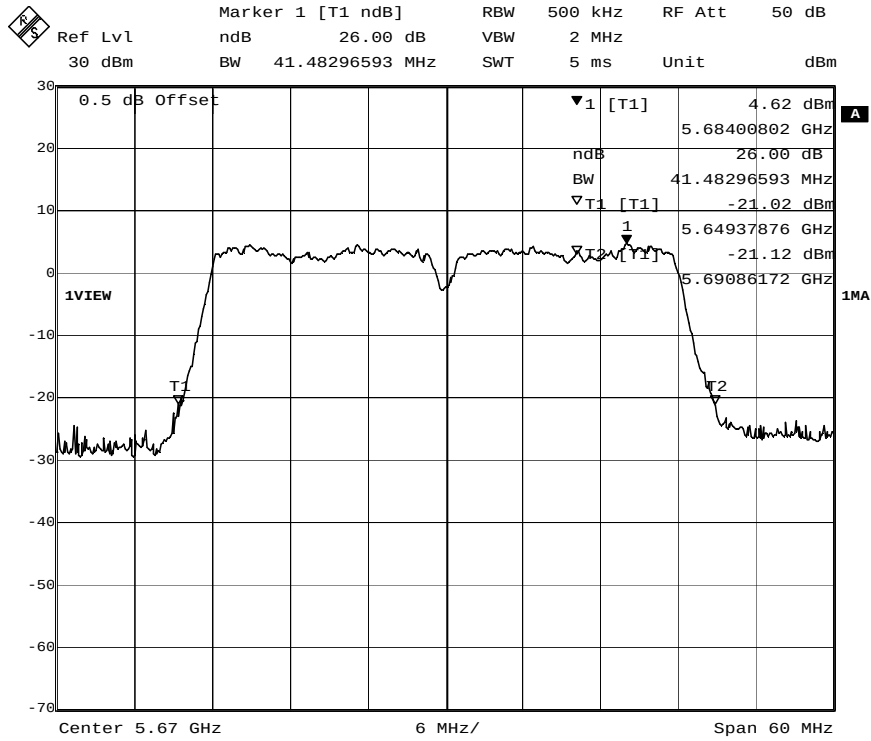


Date: 1.JAN.1997 00:56:33



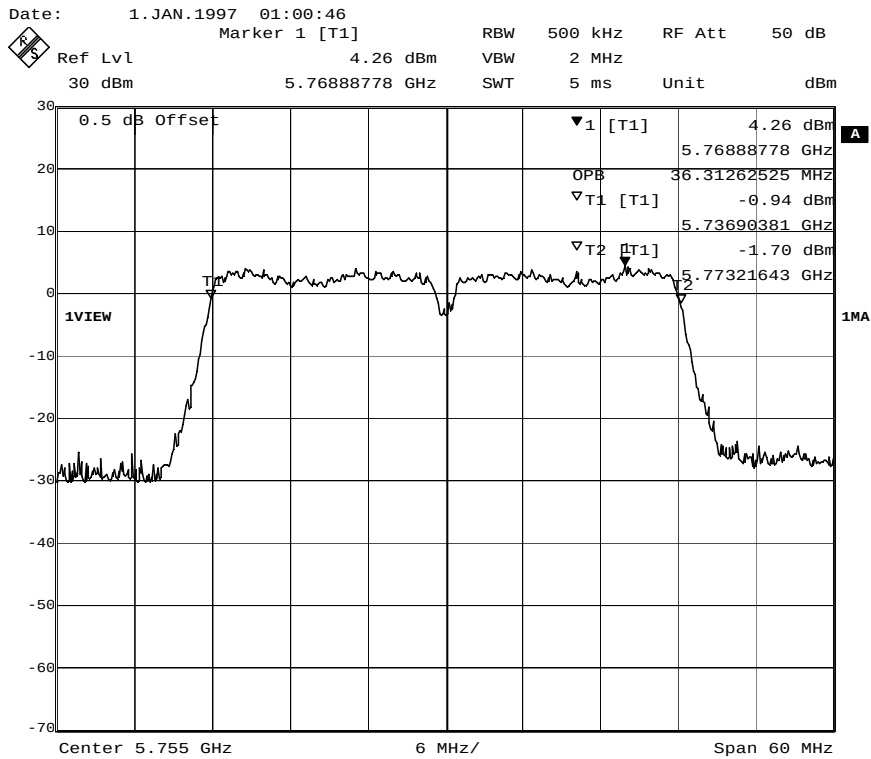
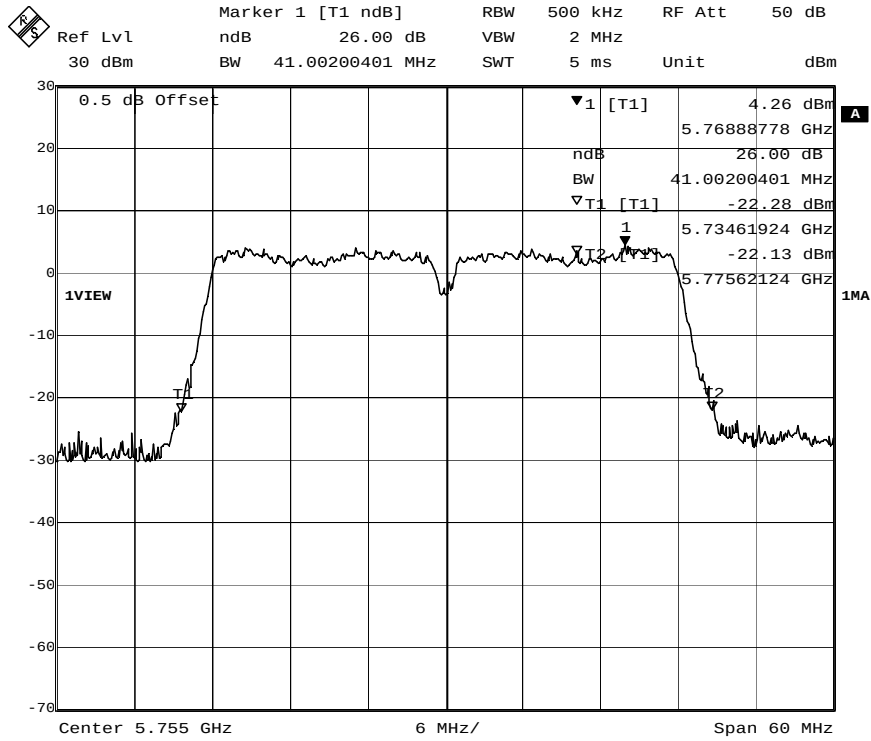
Date: 1.JAN.1997 00:56:02

802.11n40	Ch 110	Chain B	26dB BW	40.76MHz	99%BW	36.31MHz
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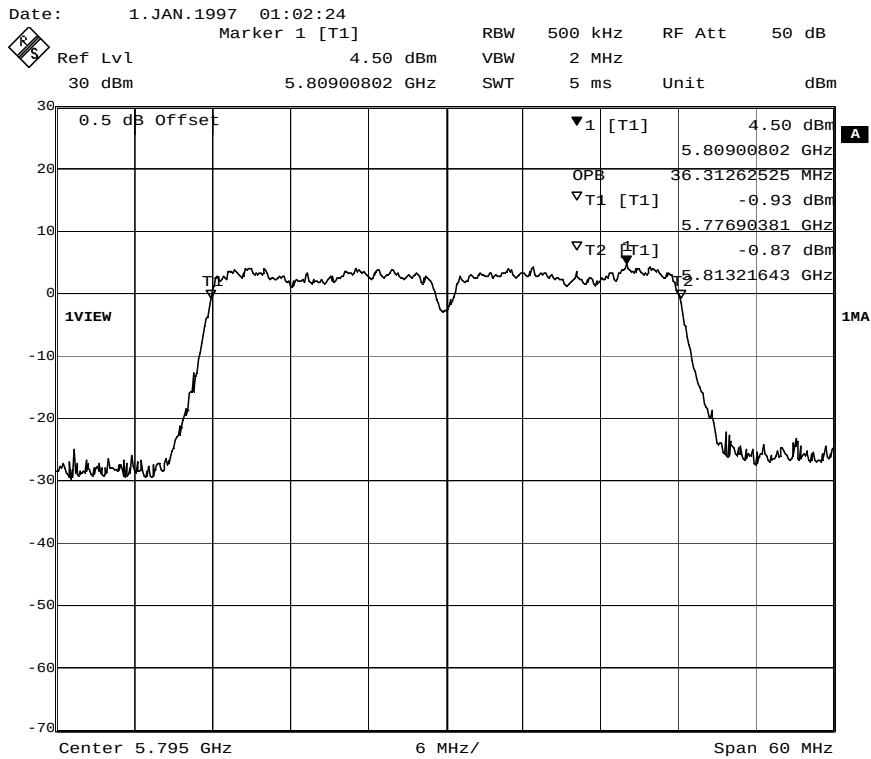
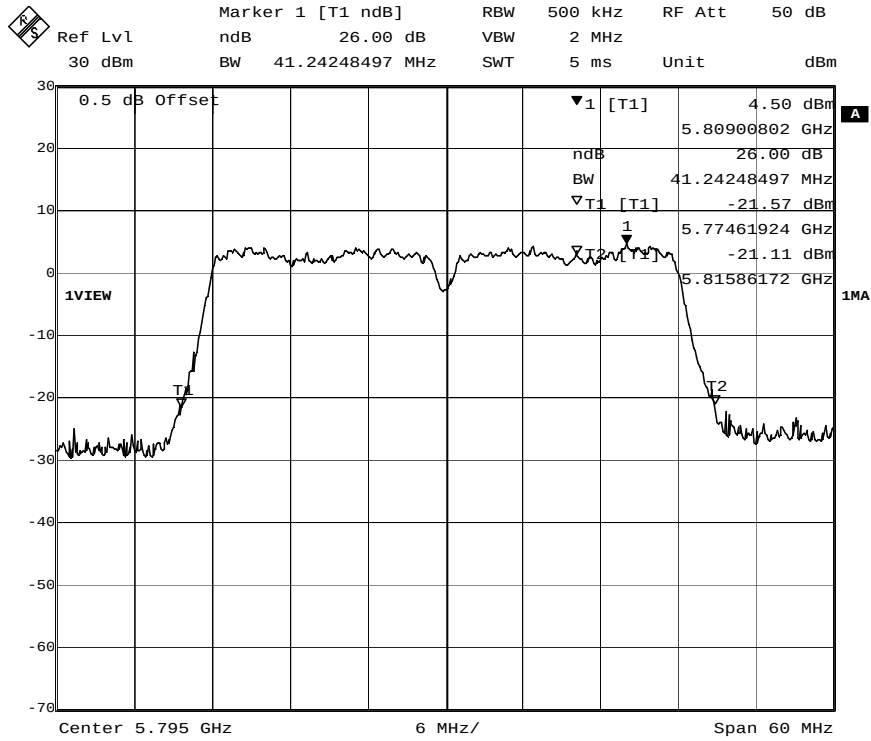
Date: 1.JAN.1997 00:58:59

802.11n40	Ch 134	Chain B	26dB BW	41.48MHz	99%BW	36.43MHz
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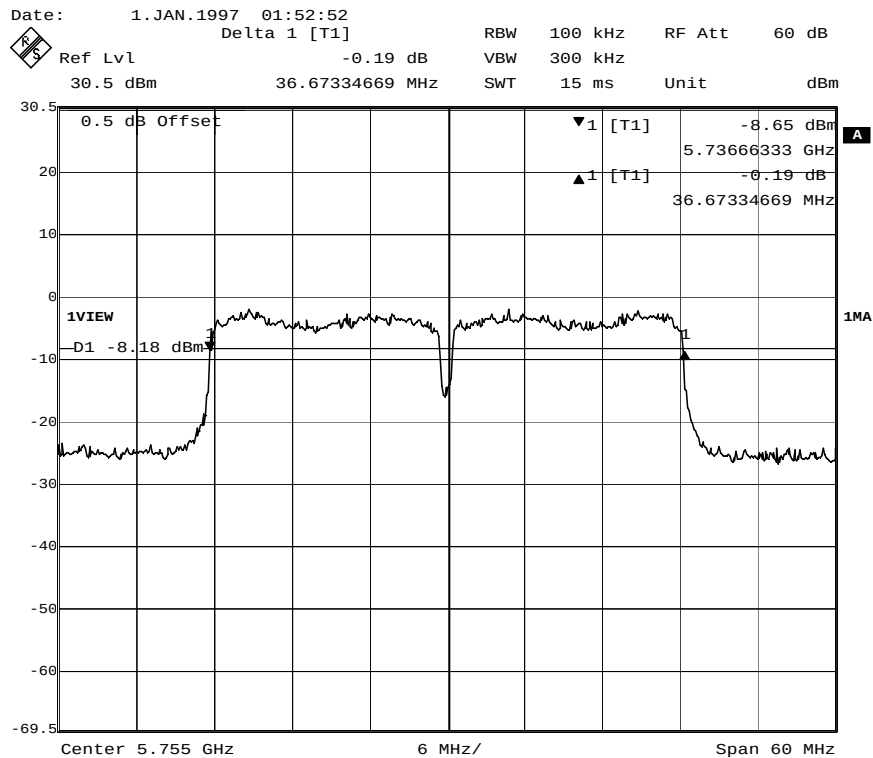
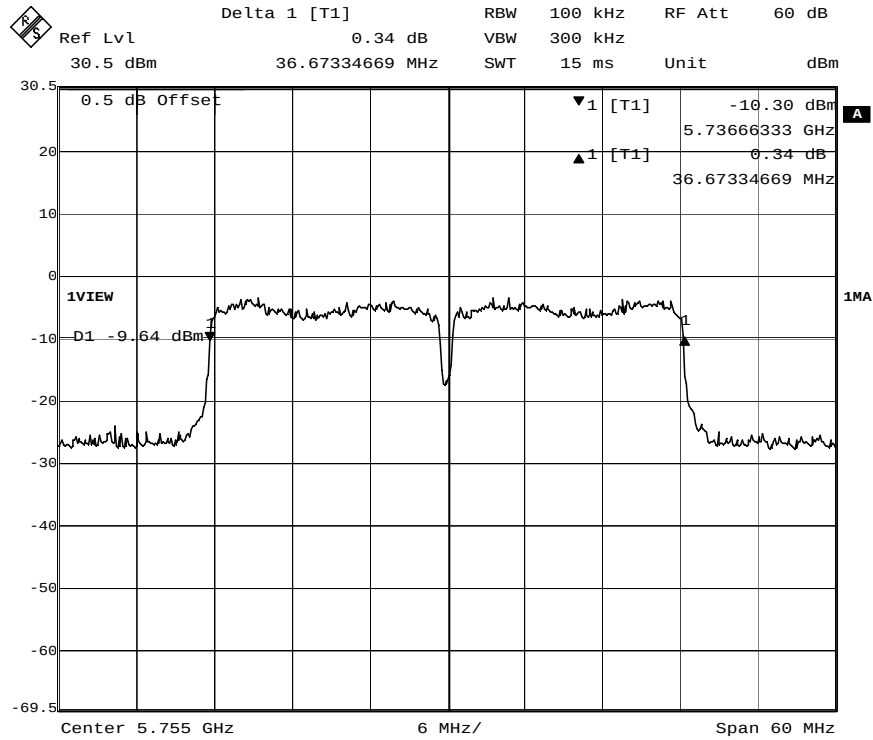
Date: 1.JAN.1997 01:00:16

802.11n40	Ch 151	Chain B	26dB BW	41.00MHz	99%BW	36.31MHz
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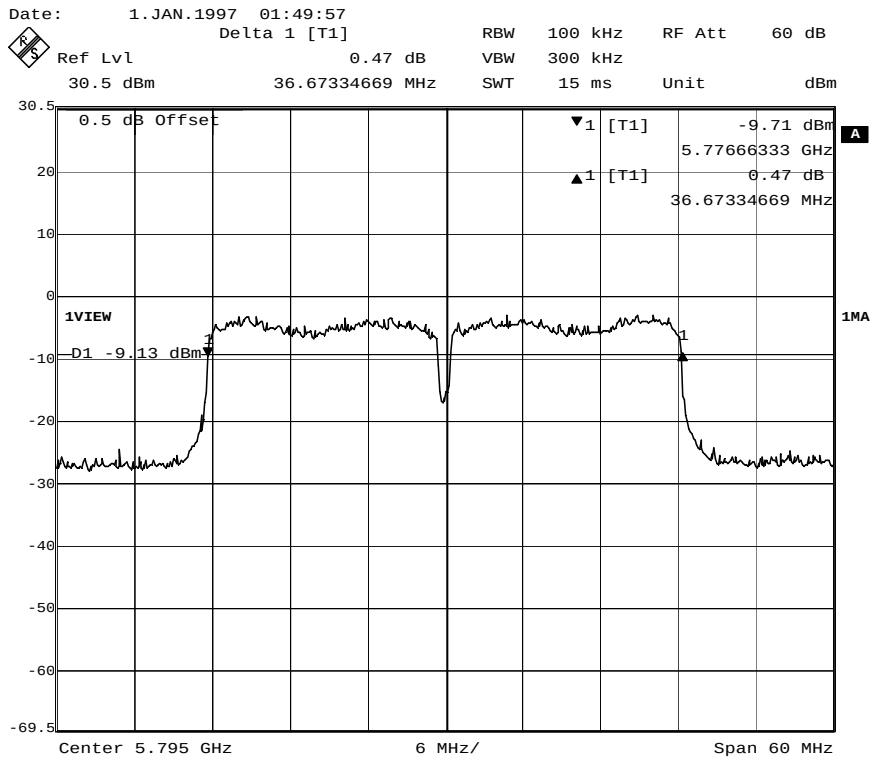
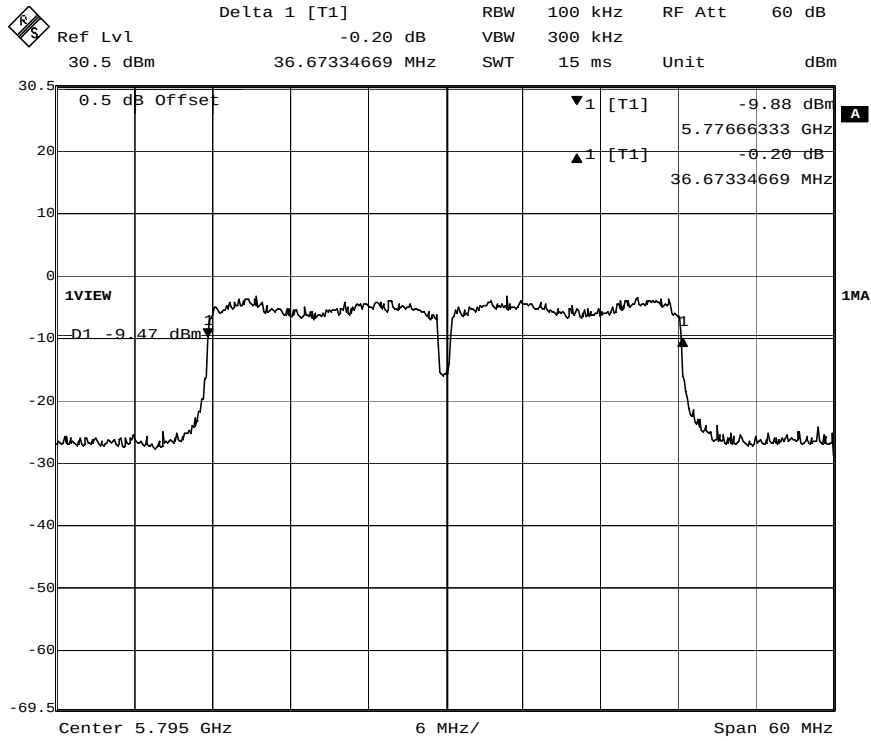
Date: 1.JAN.1997 01:03:18

802.11n40	Ch 159	Chain B	26dB BW	41.24MHz	99%BW	36.31MHz
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Date: 1.JAN.1997 01:59:57

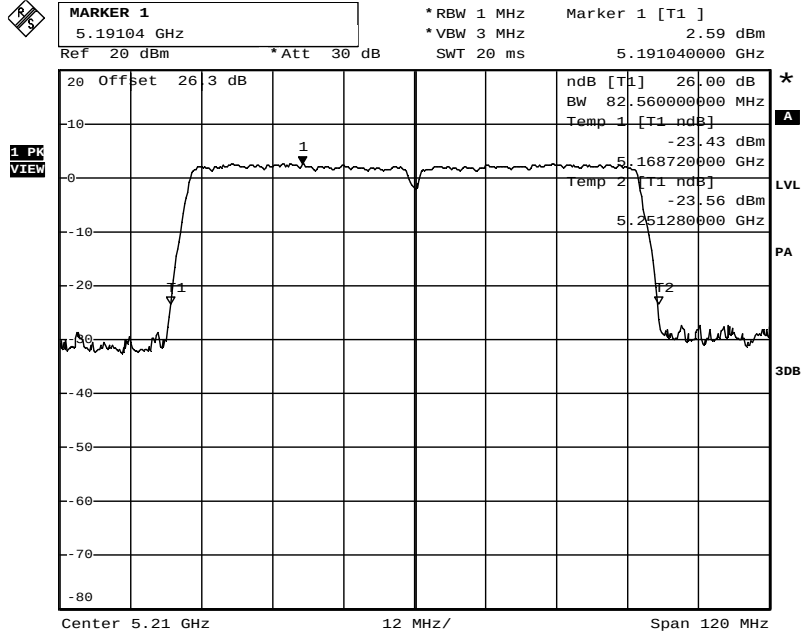
802.11n40	Ch 151	6dB BW Chain A	36.67MHz	6dB BW Chain B	36.67MHz
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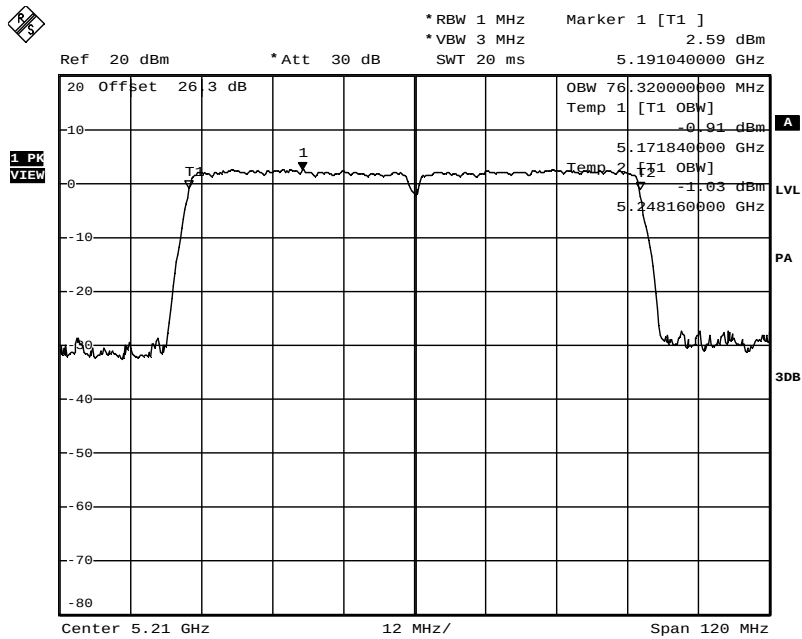
Date: 1.JAN.1997 02:01:55

802.11n40	Ch 159	6dB BW Chain A	36.67MHz	6dB BW Chain B	36.67MHz
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6.13 Bandwidth Plots (802.11ac, VHT-80):

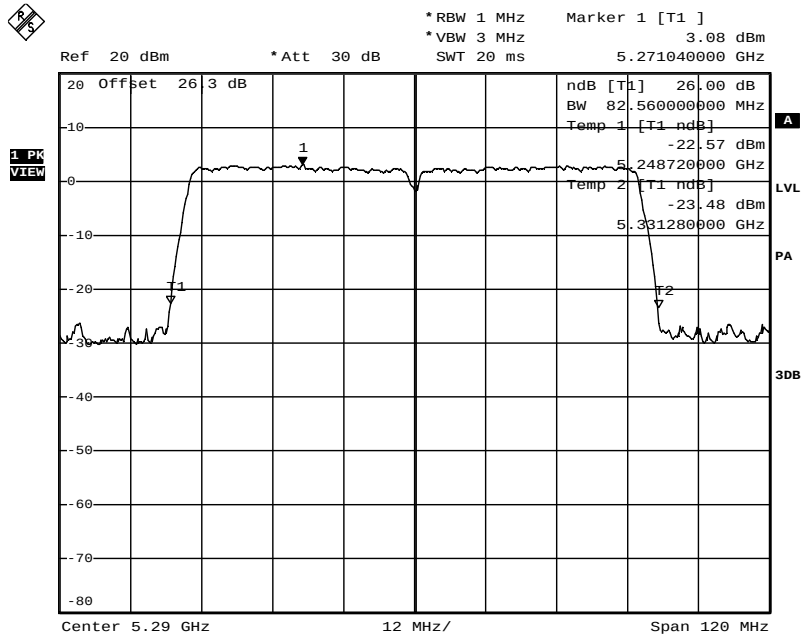


Date: 5.NOV.2017 15:28:12

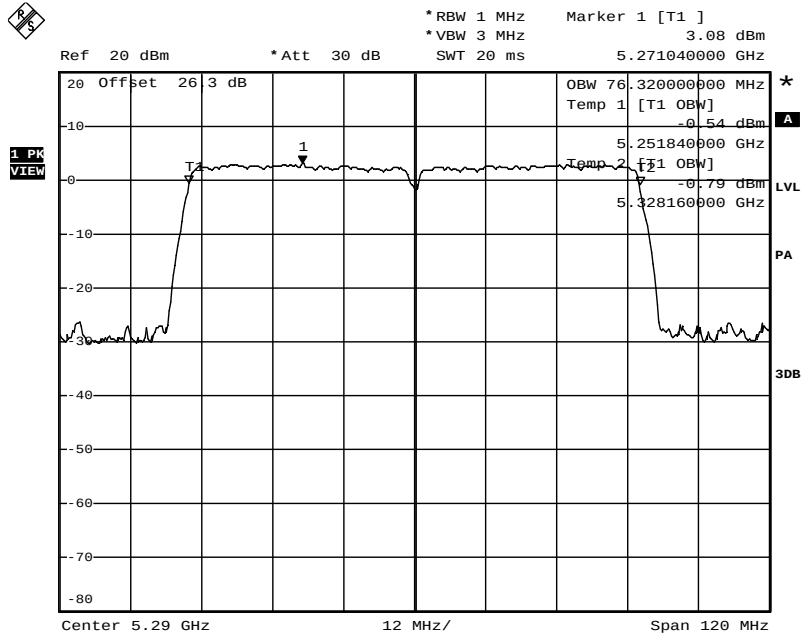


Date: 5.NOV.2017 15:27:31

802.11ac80	Ch 42	Chain A	26dB BW	82.56MHz	99%BW	76.32MHz
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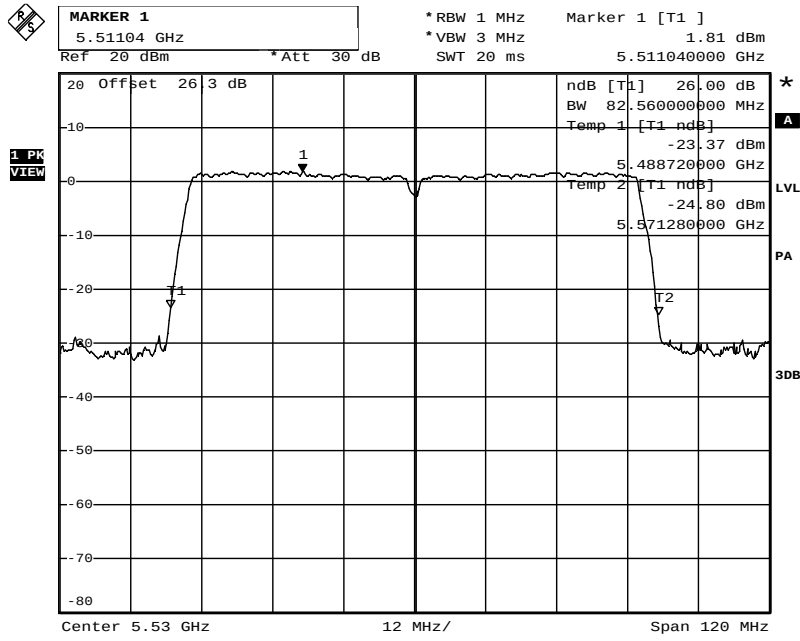


Date: 5.NOV.2017 15:20:57

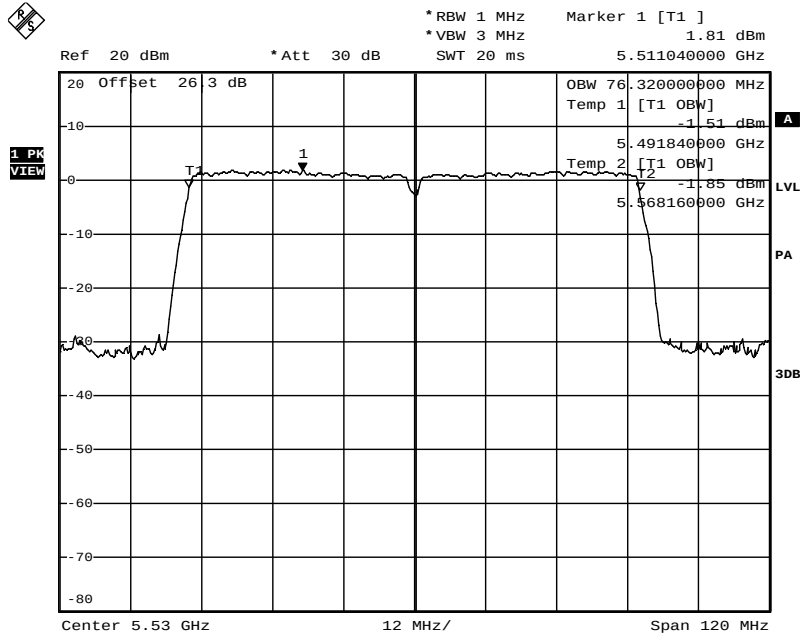


Date: 5.NOV.2017 15:21:48

802.11ac80	Ch 58	Chain A	26dB BW	82.56MHz	99%BW	76.32MHz
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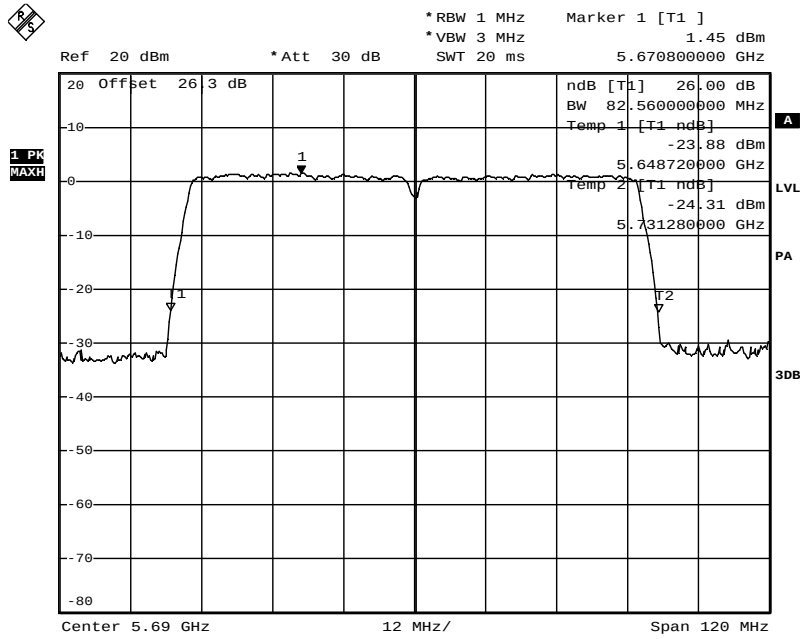


Date: 5.NOV.2017 15:16:30

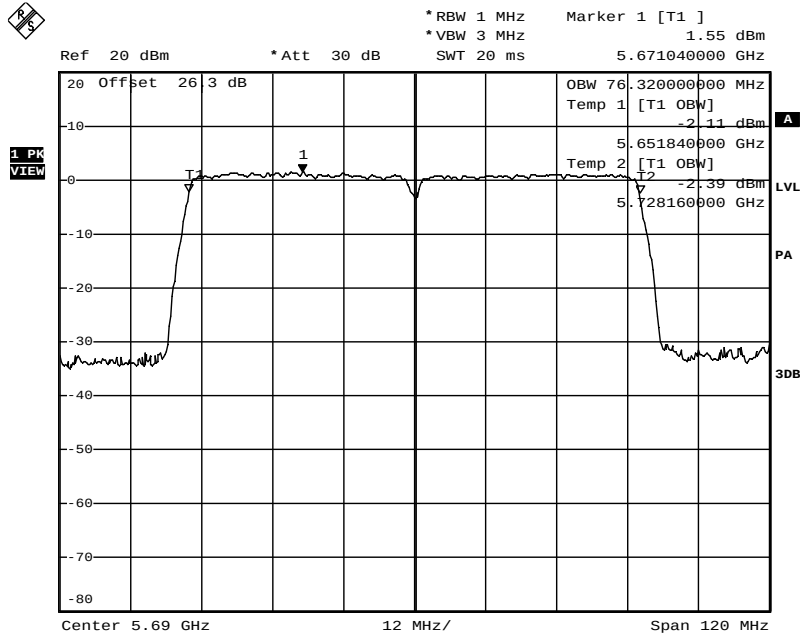


Date: 5.NOV.2017 15:15:57

802.11ac80	Ch 106	Chain A	26dB BW	82.56MHz	99%BW	76.32MHz
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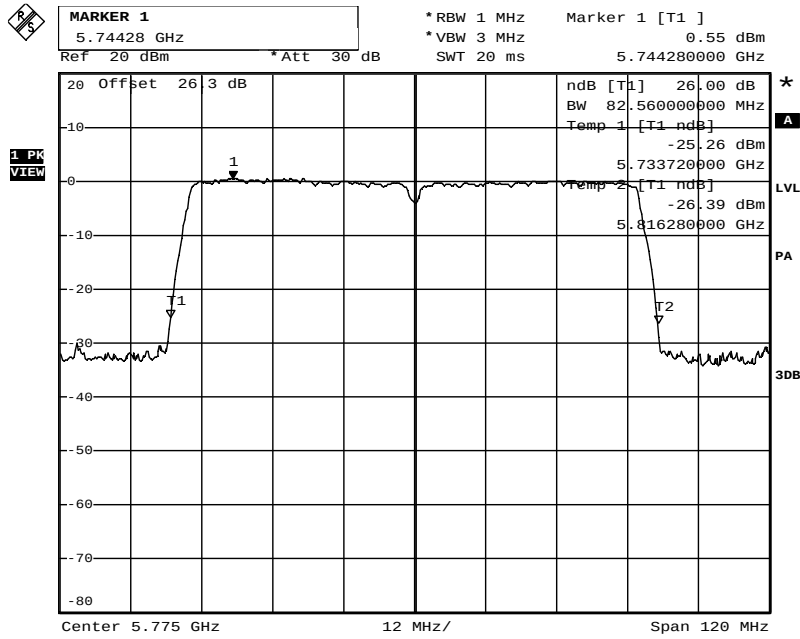


Date: 5.NOV.2017 15:12:55

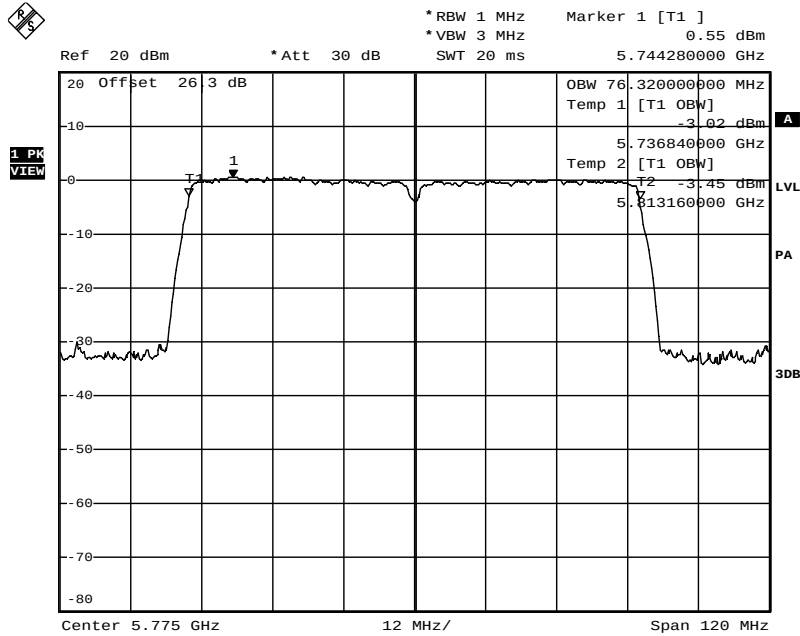


Date: 5.NOV.2017 15:13:37

802.11ac80	Ch 138	Chain A	26dB BW	82.56MHz	99%BW	76.32MHz
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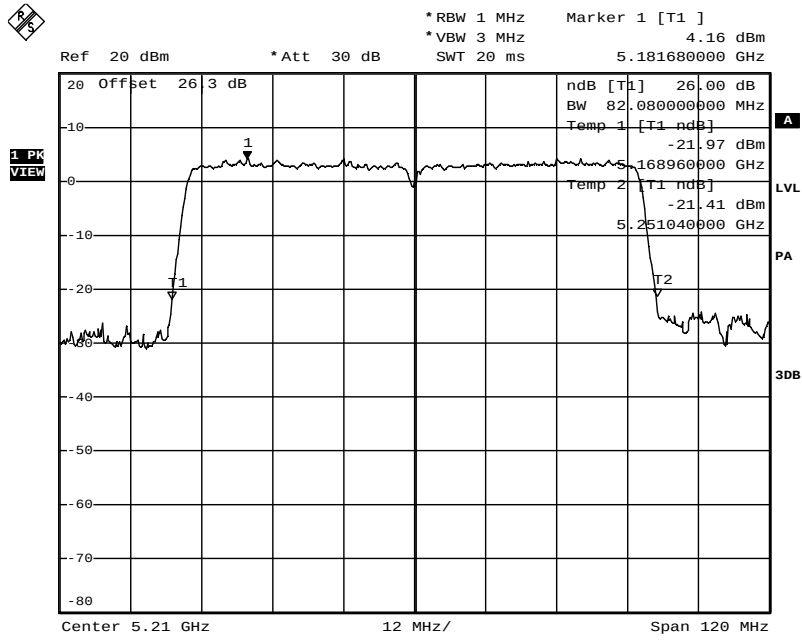


Date: 5.NOV.2017 15:09:50

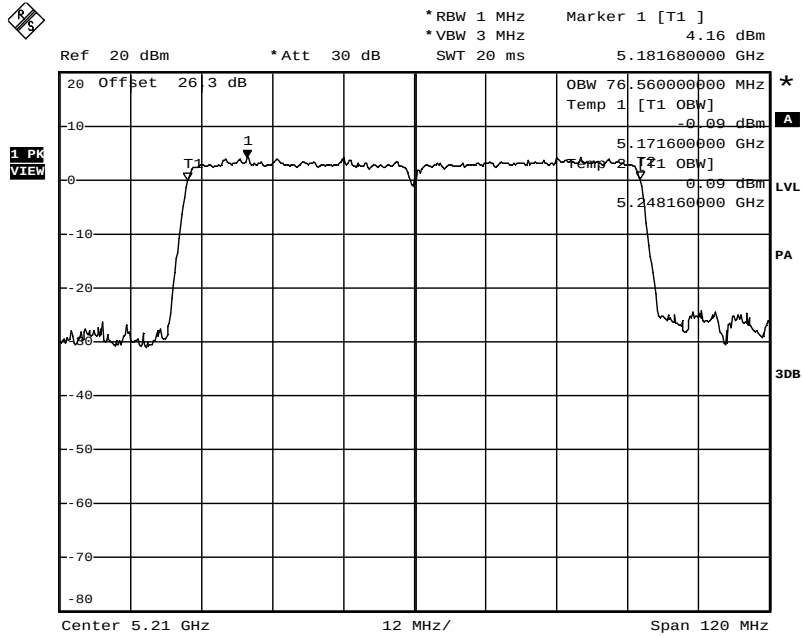


Date: 5.NOV.2017 15:08:57

802.11ac80	Ch 155	Chain A	26dB BW	82.56MHz	99%BW	76.32MHz
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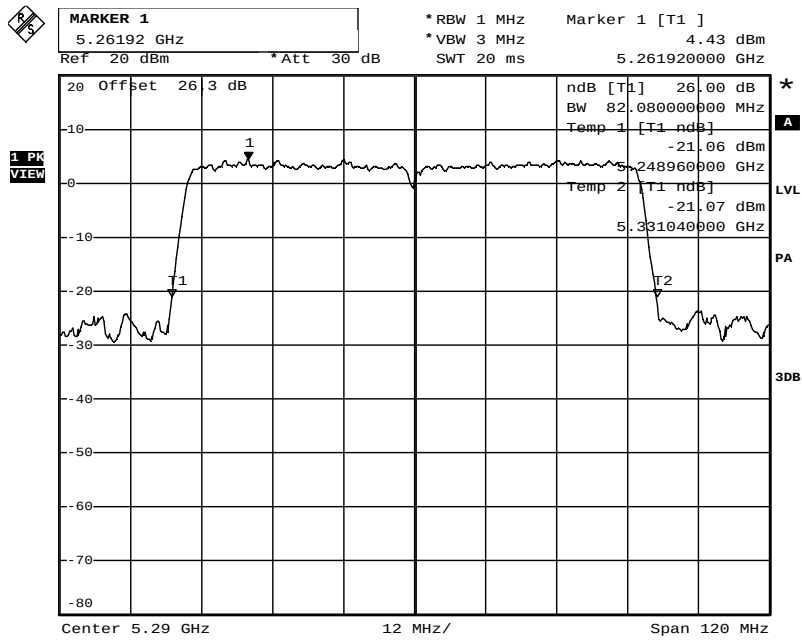


Date: 5.NOV.2017 14:40:21

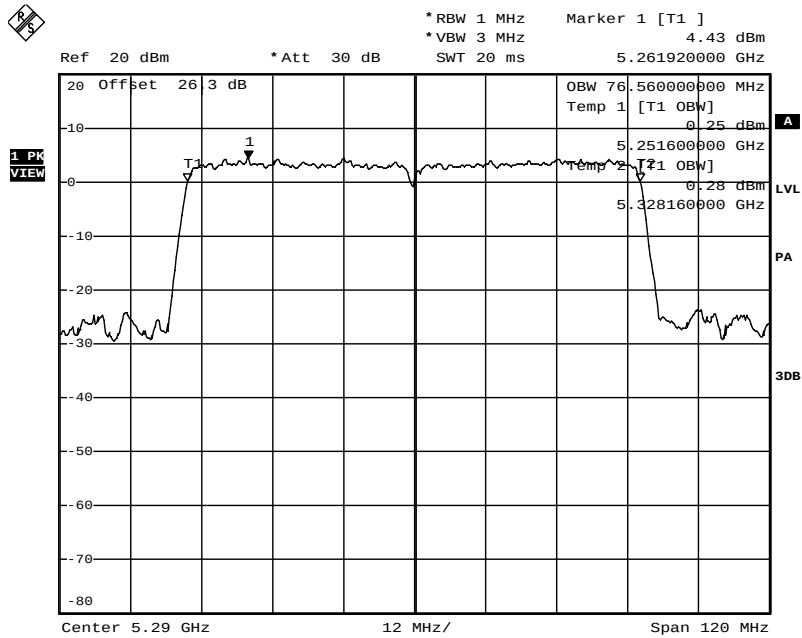


Date: 5.NOV.2017 14:41:11

802.11ac80	Ch 42	Chain B	26dB BW	82.08MHz	99%BW	76.56MHz
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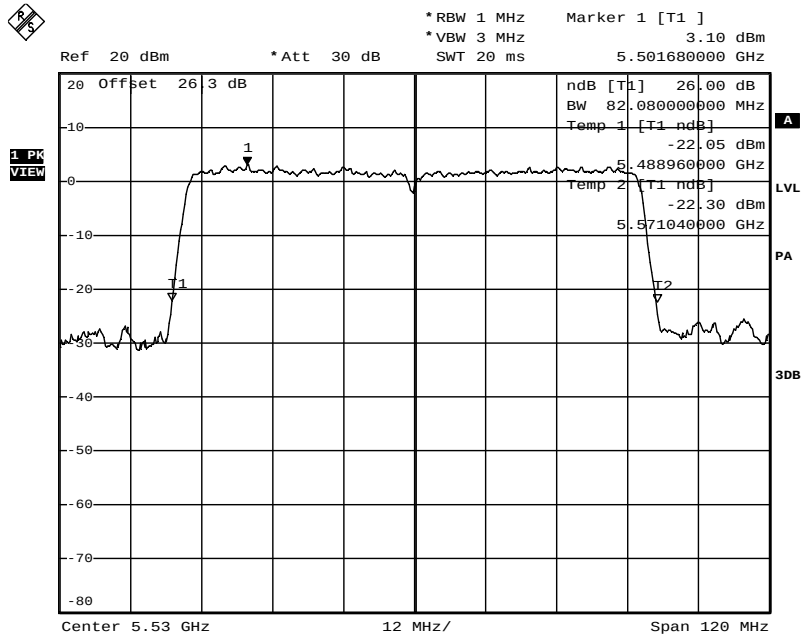


Date: 5.NOV.2017 14:44:02

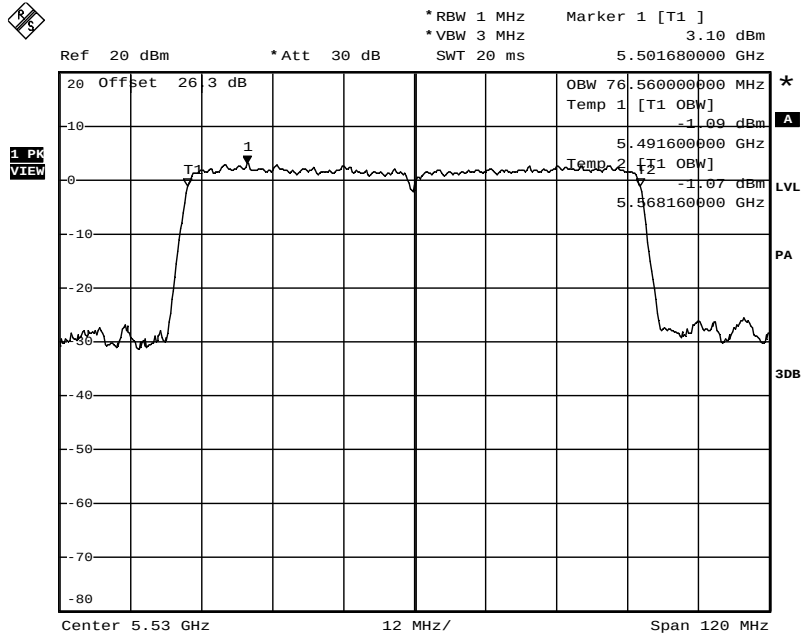


Date: 5.NOV.2017 14:43:19

802.11ac80	Ch 58	Chain B	26dB BW	82.08MHz	99%BW	76.56MHz
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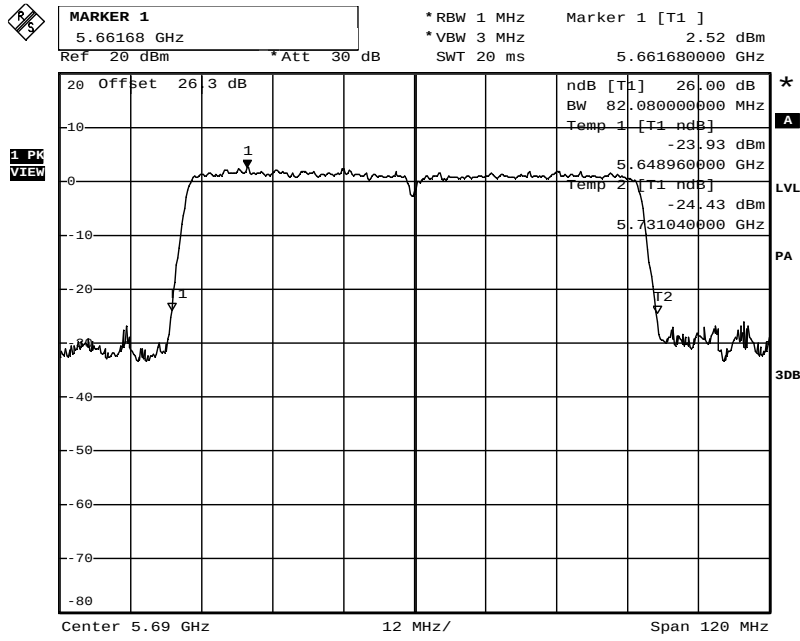


Date: 5.NOV.2017 14:47:50

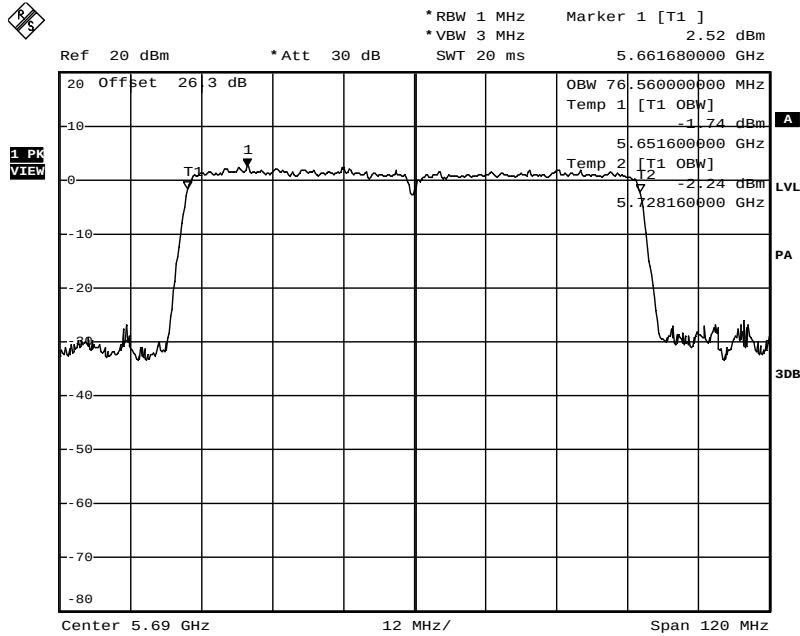


Date: 5.NOV.2017 14:48:50

802.11ac80	Ch 106	Chain B	26dB BW	82.08MHz	99%BW	76.56MHz
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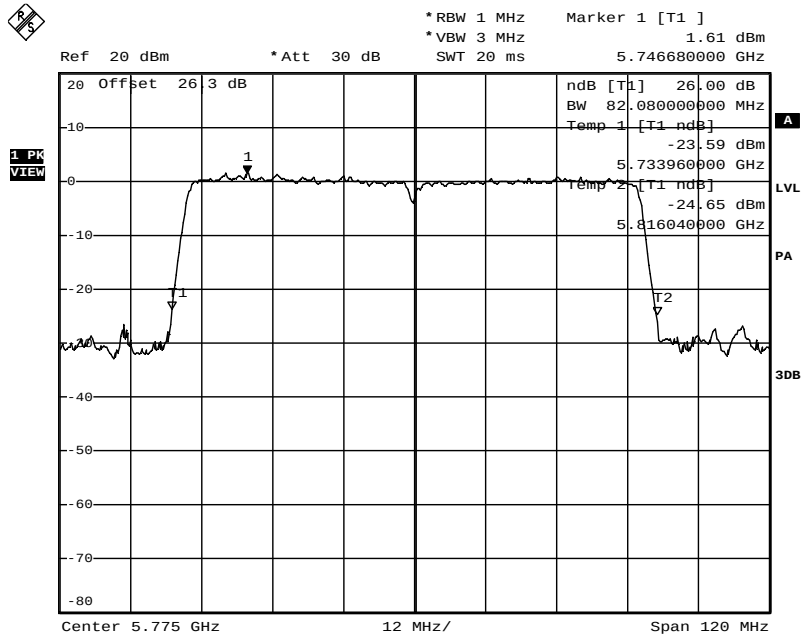


Date: 5.NOV.2017 14:58:28

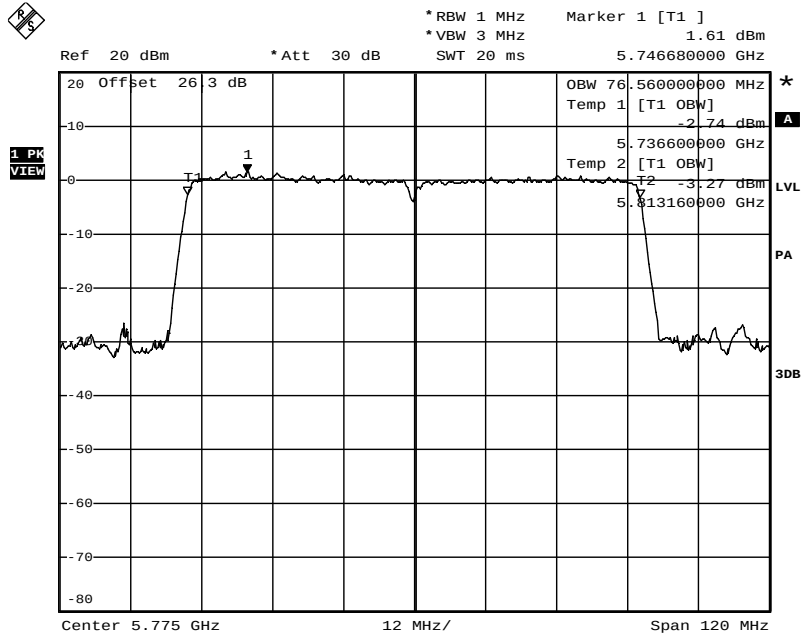


Date: 5.NOV.2017 14:57:09

802.11ac80	Ch 138	Chain B	26dB BW	82.08MHz	99%BW	76.56MHz
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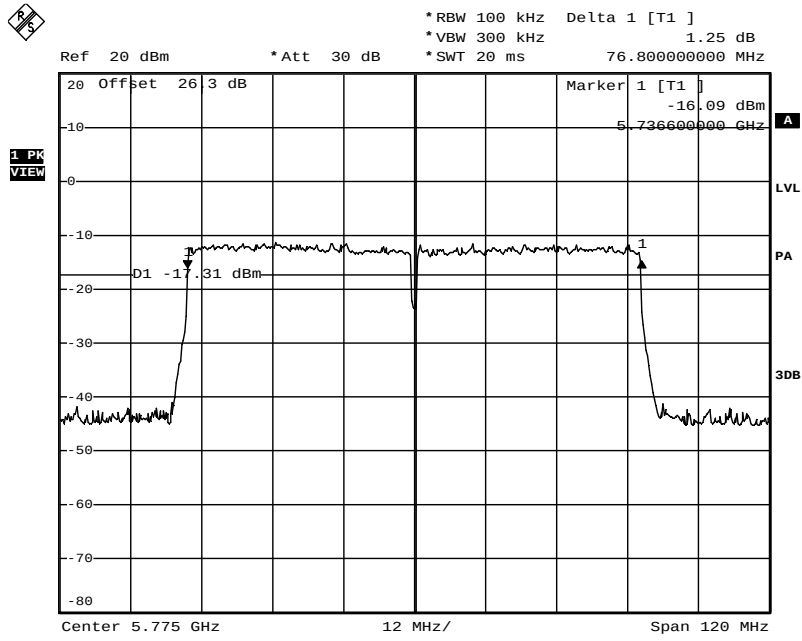


Date: 5.NOV.2017 15:01:56

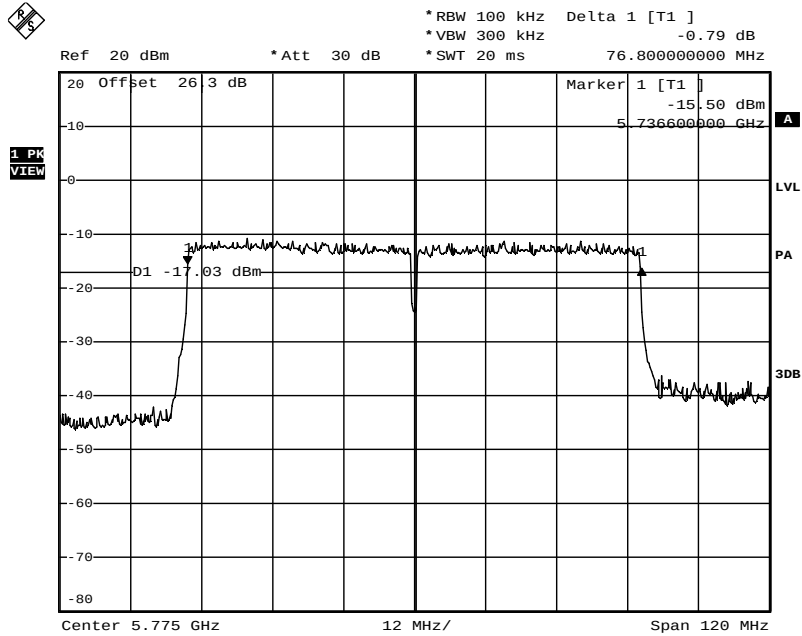


Date: 5.NOV.2017 15:02:40

802.11ac80	Ch 155	Chain B	26dB BW	82.08MHz	99%BW	76.56MHz
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Date: 5.NOV.2017 15:36:16



Date: 5.NOV.2017 15:38:45

802.11ac80	Ch 155	6dB BW Chain A	76.8MHz	6dB BW Chain B	76.8MHz
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7 Power Spectral Density

7.1 Test Limits:

Operating Band (MHz)	15.407 / RSS-247 PSD Limits	RSS-247 EIRP Limit
5150 - 5250	11dBm/MHz	10dBm/MHz (EIRP)
5250 - 5350	11dBm/MHz	
5470 - 5725	11dBm/MHz	
5725 - 5825	30dBm/500kHz	

Note: Until further notice, devices operating under RSS-247 shall not be capable of transmitting in the band 5600-5650 MHz. This restriction is for the protection of Environment Canada's weather radars operating in this band.

7.2 FCC Power Spectral Density Limits:

§ 15.407(1)(iv): For 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. In addition, 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.

§ 15.407(2): 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, 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.

§ 15.407(3): 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

7.3 ISED Power Spectral Density Limits:

RSS-247 6.2.1 (5150 – 5250MHz):

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

RSS-247 6.2.2 (5250 – 5350MHz):

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

a) The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b) The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

RSS-247 6.2.3 (5470 – 5600MHz and 5650 – 5725MHz):

The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

7.4 Test Procedure:

ANSI C63.10:2013

KDB Publication No. 662911 D01 v02r01 (Multiple Transmitter Output)

The Array gain was calculated and applied per section F, 2, d of the MIMO KDB 662911 for unequal antenna gains and completely correlated signals. Antenna 1 with a gain of 3.3dBi and antenna 2 with a gain of 2.6dBi yielded an array gain of 6dBi which was added to the conducted readings to get EIRP.

7.5 Test Equipment Used:

Description	Serial Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	9/20/2017	9/20/2018
20dB Attenuator	None	Pasternak	SA6S5W-20	Verify at Time of Use	Verify at Time of Use

7.6 Test Results:

The device was found to be **compliant**. The peak power spectral density did not exceed the applicable limits.

7.7 Test Conditions:

Test Personnel:	<u>Bryan Taylor</u>	Test Date:	<u>10/26/2017 – 11/20/2017</u>
Supervising/Reviewing Engineer:			
(Where Applicable)	<u>NA</u>	Ambient Temperature:	<u>22.7C</u>
Input Voltage:	<u>5VDC via USB</u>	Relative Humidity:	<u>40.4%</u>
		Atmospheric Pressure:	<u>987.3mbar</u>

7.8 Test Data (802.11a):

Chain A+B 802.11a Peak Power Spectral Density										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted PSD (dBm)	Antenna Array Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 / RSS-247 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	Conducted Margin (dBm)	EIRP Margin (dBm)
36	5180	0.69	0.93	3.82	6.00	9.82	11.00	10.00	-7.18	-0.18
44	5220	-0.17	1	3.46	6.00	9.46	11.00	10.00	-7.54	-0.54
48	5240	-0.14	0.04	2.96	6.00	8.96	11.00	10.00	-8.04	-1.04
52	5260	-0.04	0.99	3.52			11.00		-7.48	
60	5300	0	0.88	3.47			11.00		-7.53	
64	5320	0.14	0.84	3.51			11.00		-7.49	
100	5500	-0.83	-0.18	2.52			11.00		-8.48	
116	5580	-0.72	-0.07	2.63			11.00		-8.37	
140	5700	-1.33	-1.01	1.84			11.00		-9.16	
149	5745	-1.93	-1.13	1.50			30.00		-28.50	
157	5785	-2.15	-1.25	1.33			30.00		-28.67	
165	5825	-1.63	-1.02	1.70			30.00		-28.30	

7.9 Test Data (802.11n, HT20):

Chain A+B 802.11n (HT20) Peak Power Spectral Density										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted PSD (dBm)	Antenna Array Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 / RSS-247 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	Conducted Margin (dBm)	EIRP Margin (dBm)
36	5180	-0.49	0.76	3.19	6.00	9.19	11.00	10.00	-7.81	-0.81
44	5220	0.71	0.71	3.72	6.00	9.72	11.00	10.00	-7.28	-0.28
48	5240	-0.37	0.59	3.15	6.00	9.15	11.00	10.00	-7.85	-0.85
52	5260	-0.16	0.65	3.27			11.00		-7.73	
60	5300	-0.03	0.65	3.33			11.00		-7.67	
64	5320	0.04	0.69	3.39			11.00		-7.61	
100	5500	-0.86	-0.43	2.37			11.00		-8.63	
116	5580	-0.87	-0.4	2.38			11.00		-8.62	
140	5700	-1.51	-1.06	1.73			11.00		-9.27	
149	5745	-2.1	-1.6	1.17			30.00		-28.83	
157	5785	-0.37	-1.7	2.03			30.00		-27.97	
165	5825	-2.06	-1.22	1.39			30.00		-28.61	

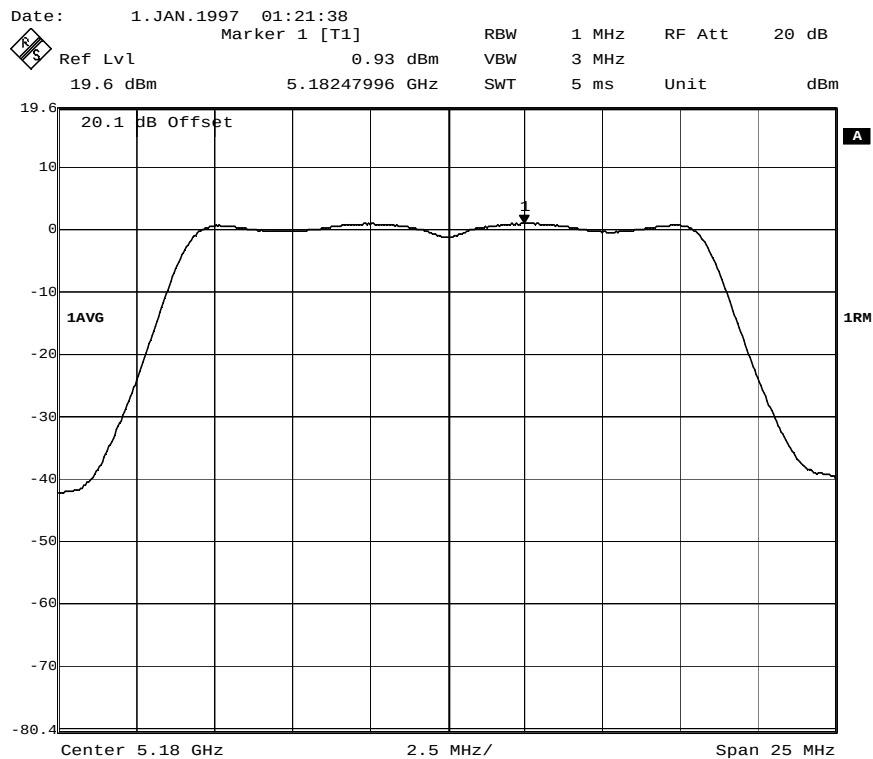
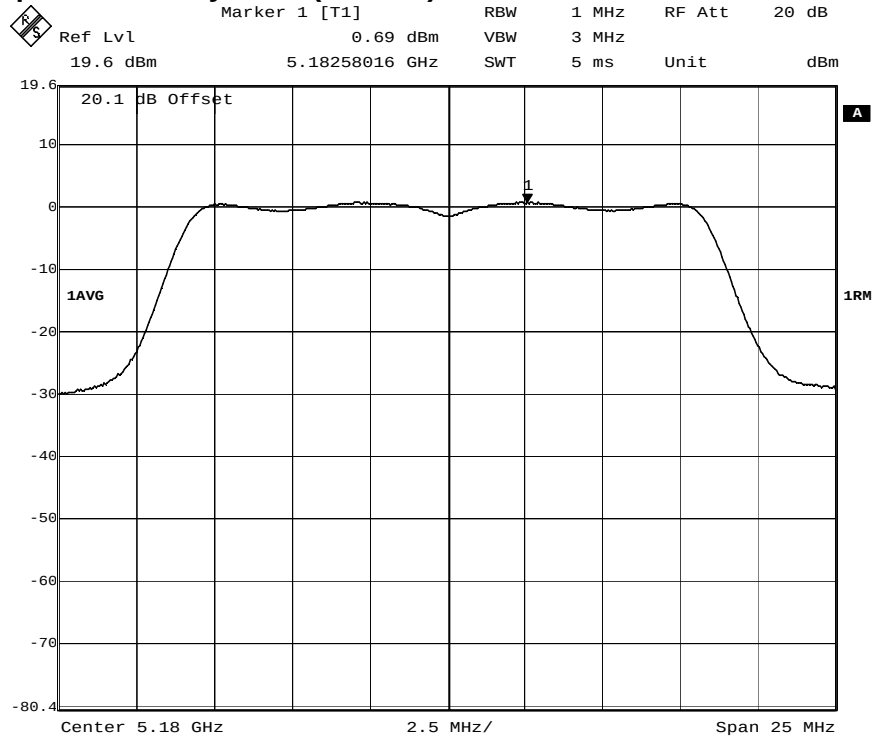
7.10 Test Data (802.11n, HT40):

Chain A+B 802.11n (HT20) Peak Power Spectral Density										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted PSD (dBm)	Antenna Array Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 / RSS-247 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	Conducted Margin (dBm)	EIRP Margin (dBm)
38	5190	-2.85	-2.13	0.54	6.00	6.54	11.00	10.00	-10.46	-3.46
46	5230	-2.81	-2.05	0.60	6.00	6.60	11.00	10.00	-10.40	-3.40
54	5270	-2.67	-2.08	0.65			11.00		-10.35	
62	5310	-0.25	-2.3	1.86			11.00		-9.14	
102	5510	-3.61	-3.18	-0.38			11.00		-11.38	
110	5550	-3.48	-3.09	-0.27			11.00		-11.27	
134	5670	-3.98	-3.86	-0.91			11.00		-11.91	
151	5755	-4.51	-4.54	-1.51			30.00		-31.51	
159	5795	-4.94	-4.14	-1.51			30.00		-31.51	

7.11 Test Data (802.11ac, VHT80):

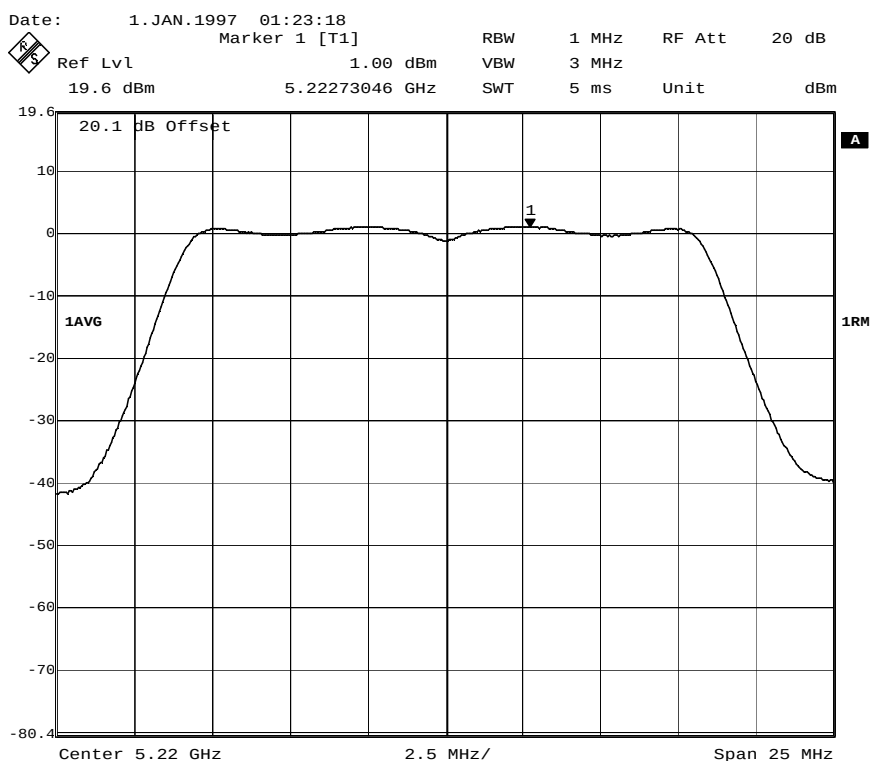
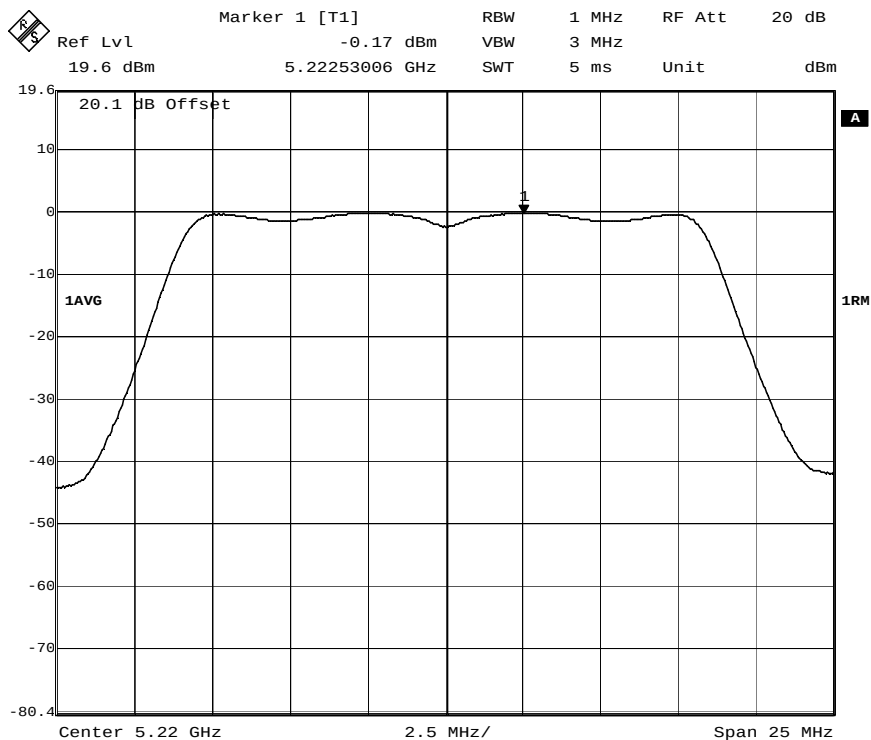
Chain A+B 802.11n (VHT80) Peak Power Spectral Density										
Ch. No.	Freq (MHz)	Chain A (dBm)	Chain B (dBm)	Total Conducted PSD (dBm)	Antenna Array Gain (dBi)	EIRP (Using Array Gain) (dBm)	15.407 / RSS-247 Conducted Limit (dBm)	RSS-247 EIRP Limit (dBm)	Conducted Margin (dBm)	EIRP Margin (dBm)
42	5210	-6.3	-5.69	-2.97	6.00	3.03	11.00	10.00	-13.97	-6.97
58	5290	-6.38	-5.42	-2.86			11.00		-13.86	
106	5530	-7.15	-6.65	-3.88			11.00		-14.88	
138	5690	-7.58	-7.34	-4.45			11.00		-15.45	
155	5775	-8.28	-7.66	-4.95			30.00		-34.95	

7.12 Power Spectral Density Plots (802.11a):

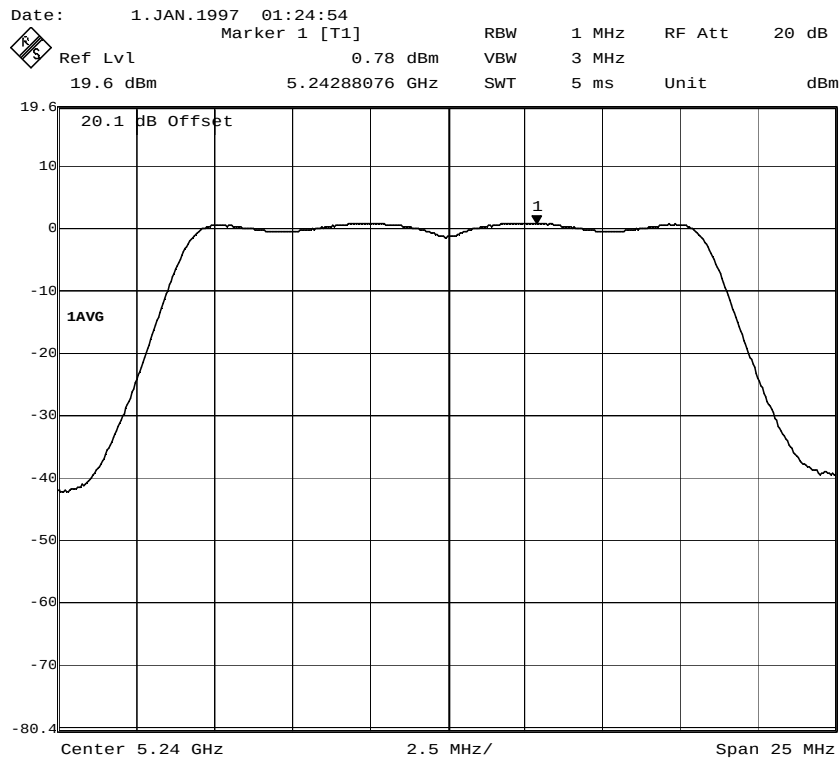
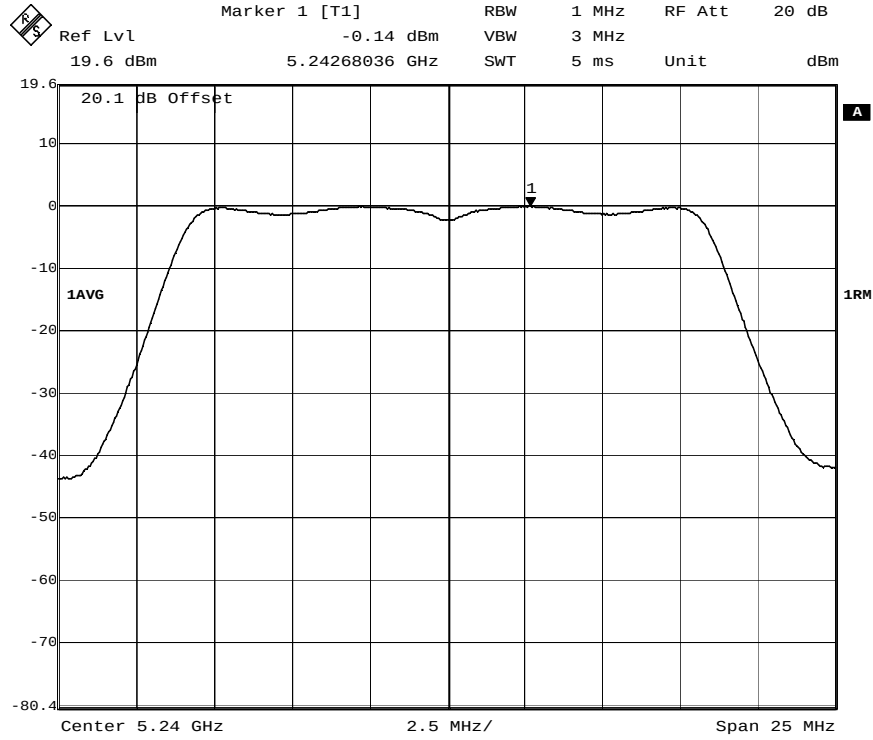


Date: 1.JAN.1997 03:32:08

802.11a Channel 36, Power Spectral Density, Chain A and Chain B

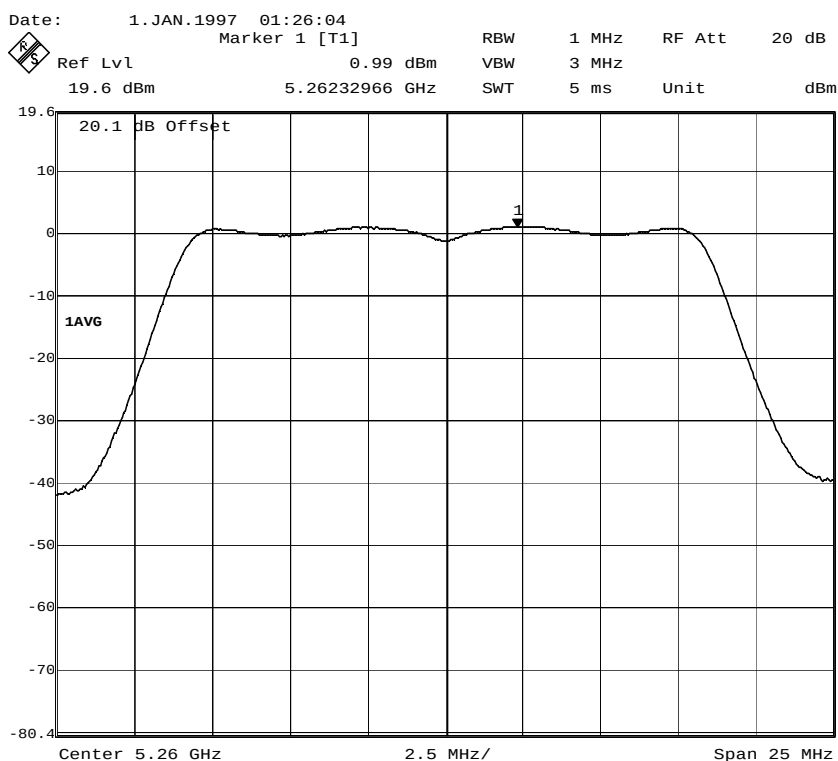
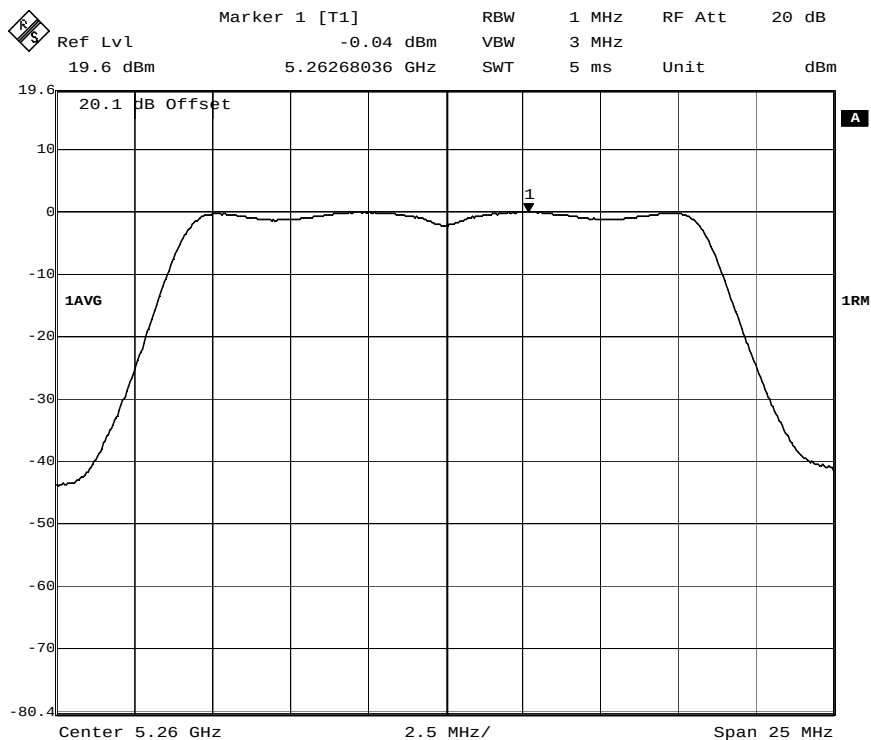


Date: 1.JAN.1997 03:33:59
 802.11a Channel 44, Power Spectral Density, Chain A and Chain B



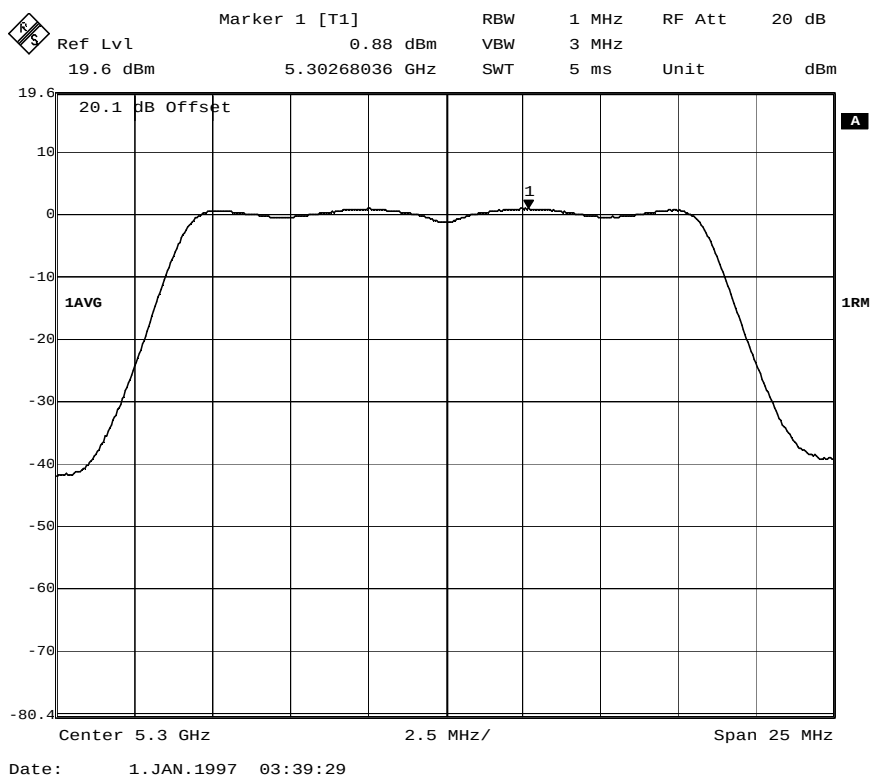
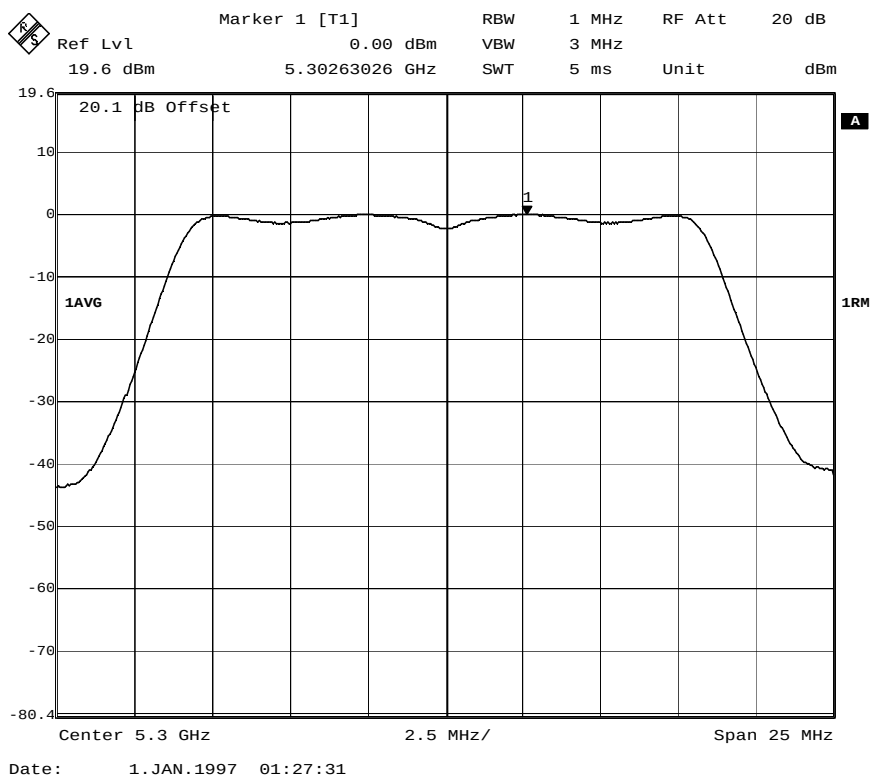
Date: 1.JAN.1997 03:35:30

802.11a Channel 48, Power Spectral Density, Chain A and Chain B

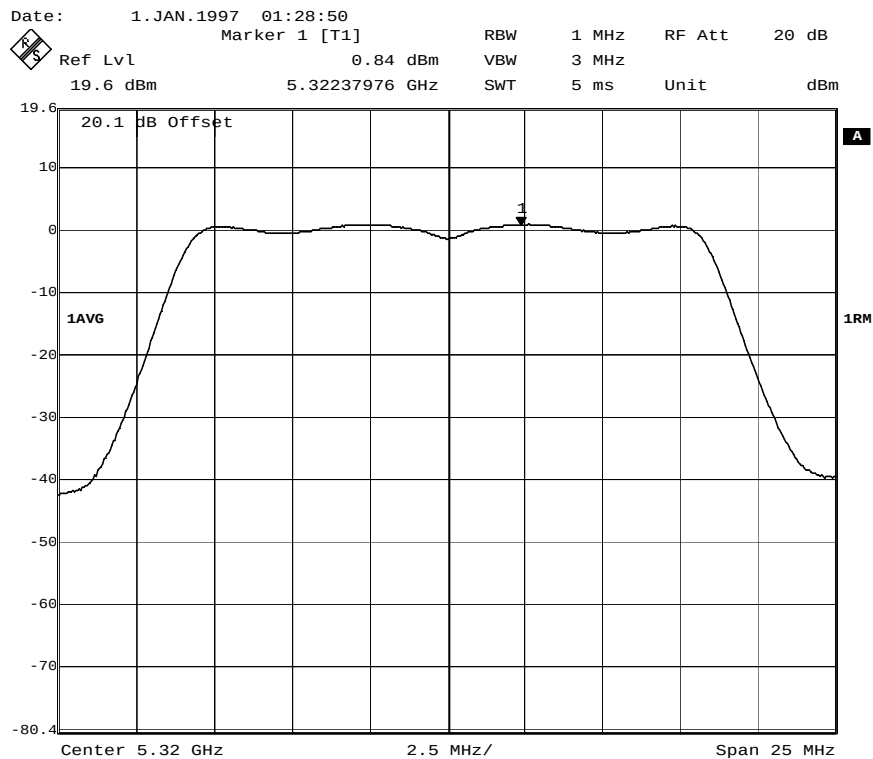
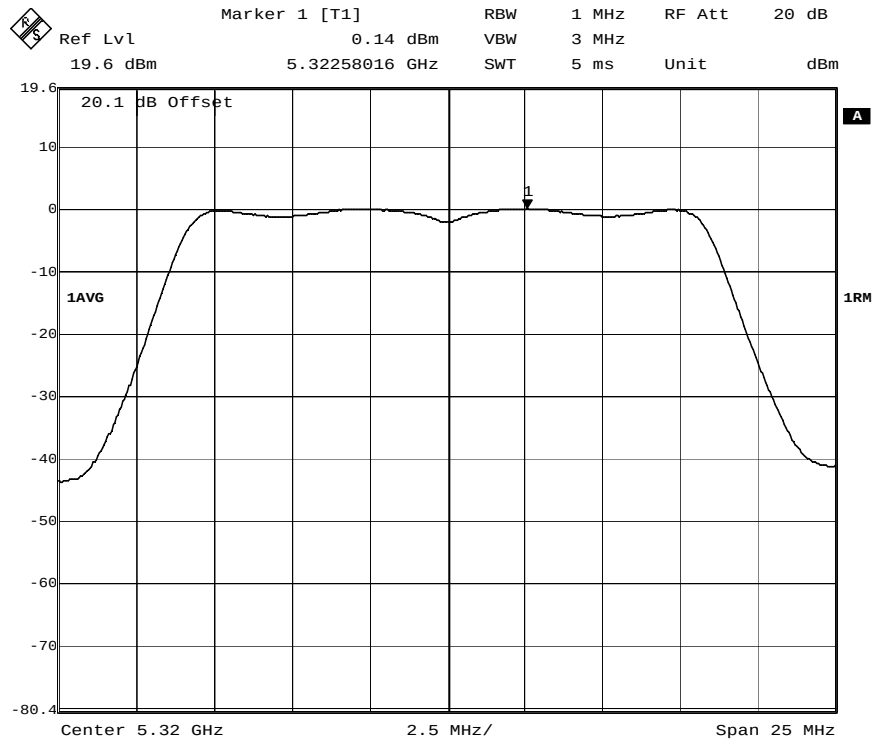


Date: 1.JAN.1997 03:37:30

802.11a Channel 52, Power Spectral Density, Chain A and Chain B

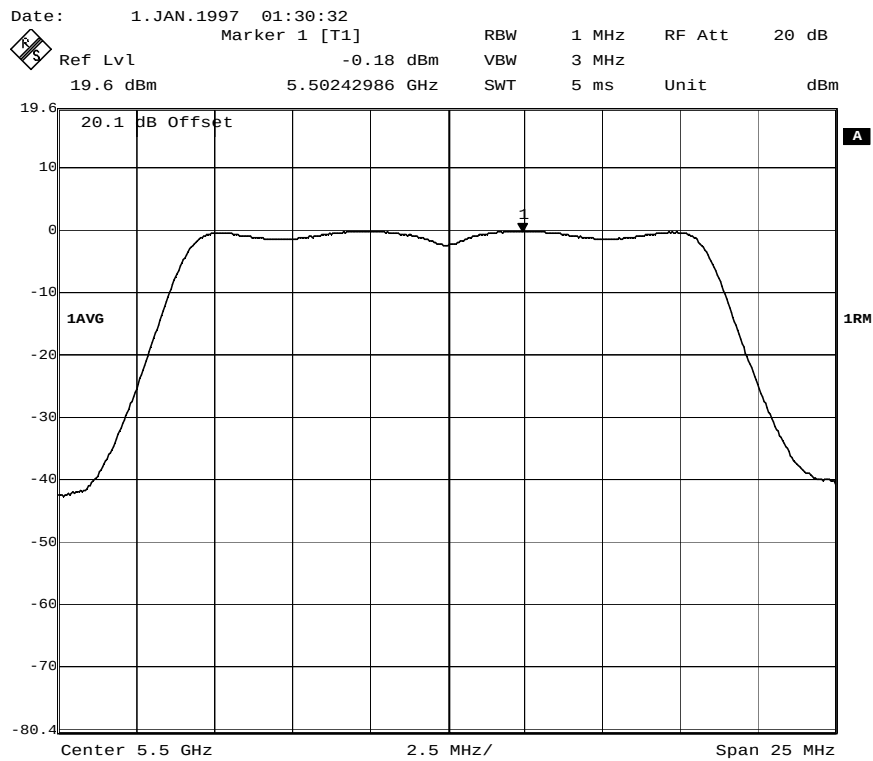
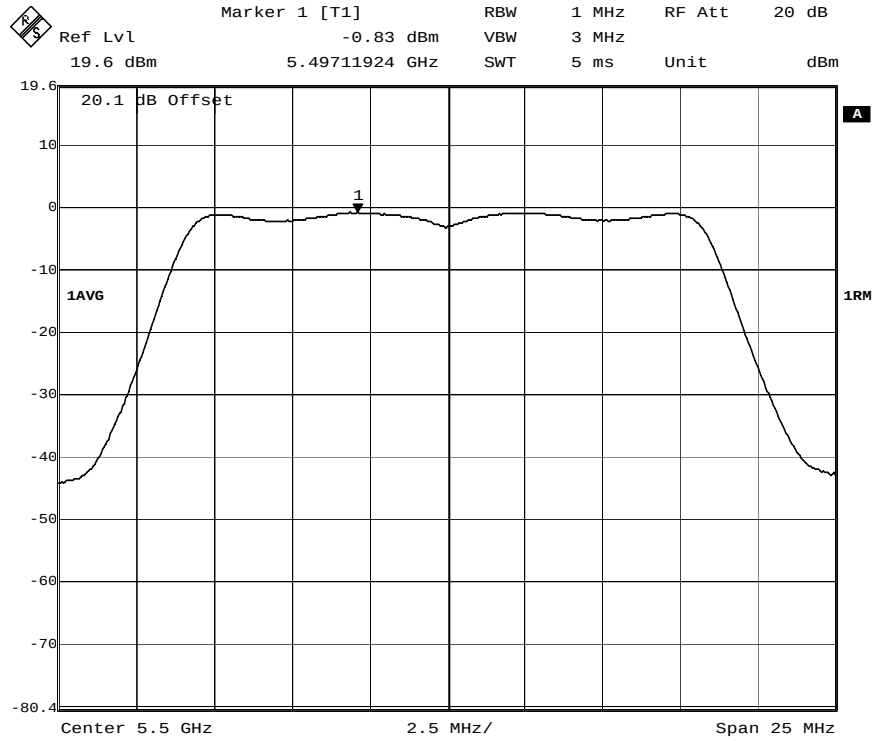


802.11a Channel 60, Power Spectral Density, Chain A and Chain B



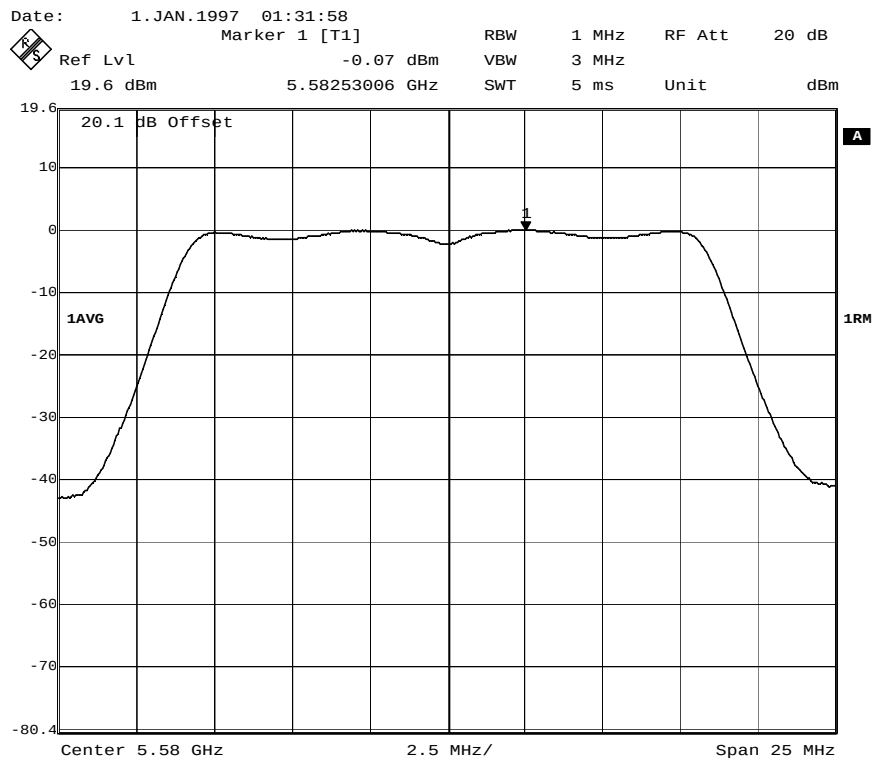
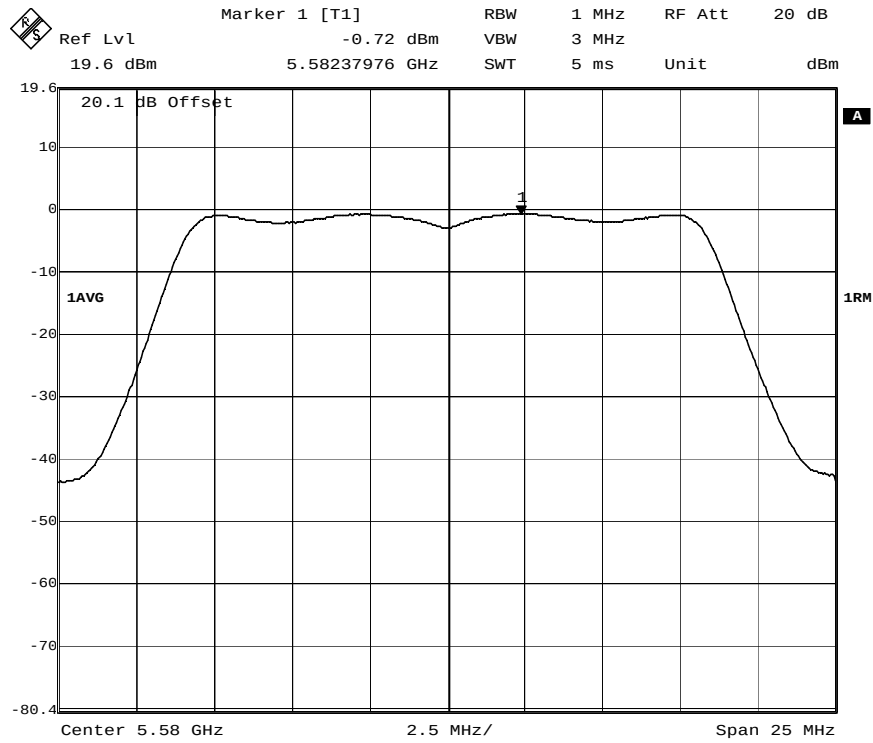
Date: 1.JAN.1997 03:41:37

802.11a Channel 64, Power Spectral Density, Chain A and Chain B



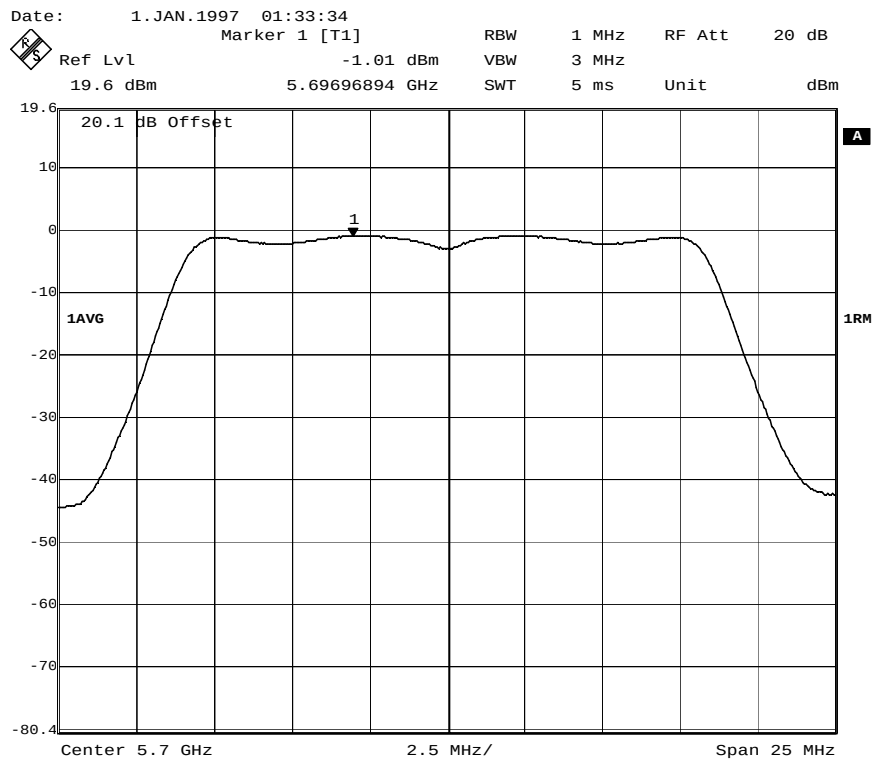
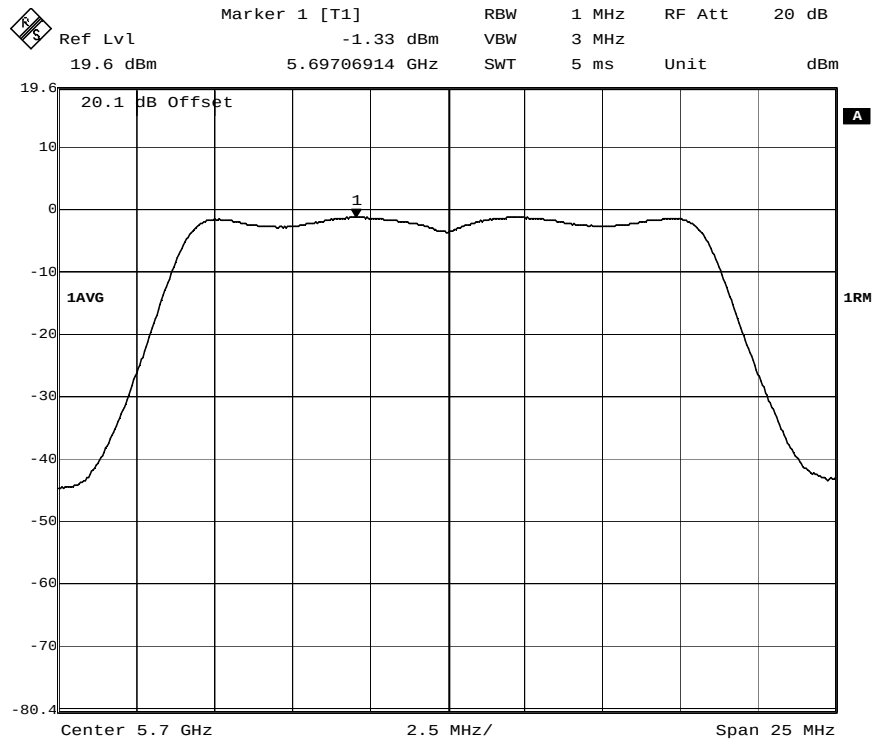
Date: 1.JAN.1997 03:43:30

802.11a Channel 100, Power Spectral Density, Chain A and Chain B



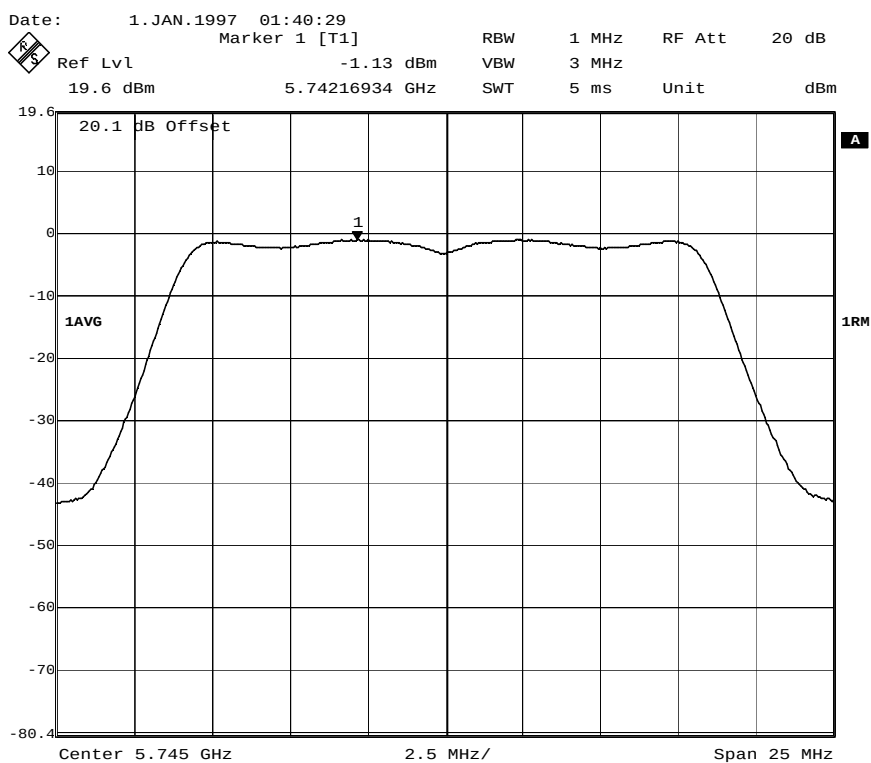
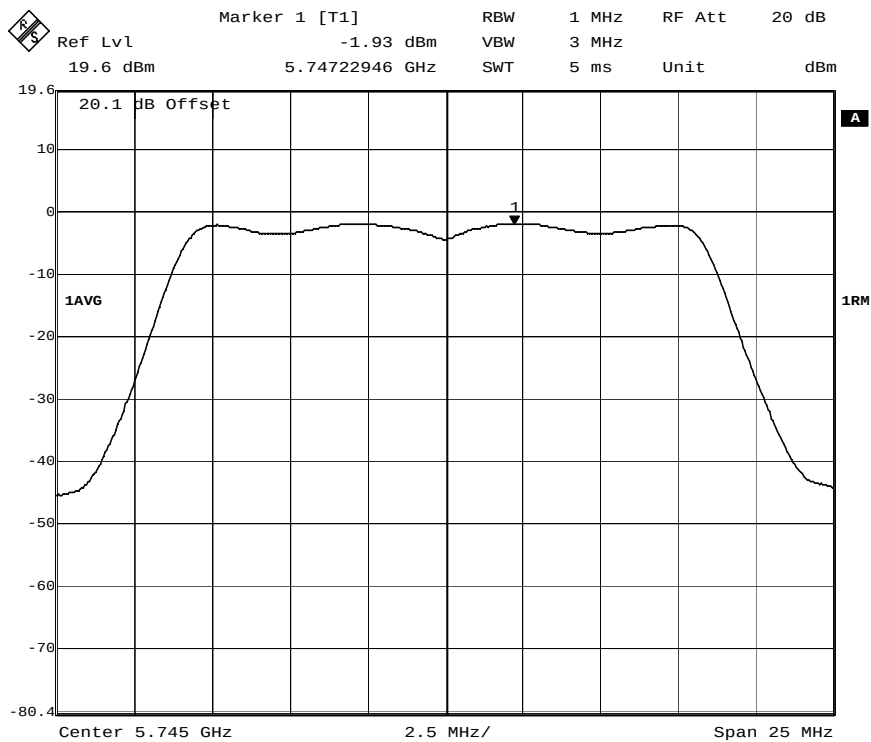
Date: 1.JAN.1997 03:45:45

802.11a Channel 116, Power Spectral Density, Chain A and Chain B

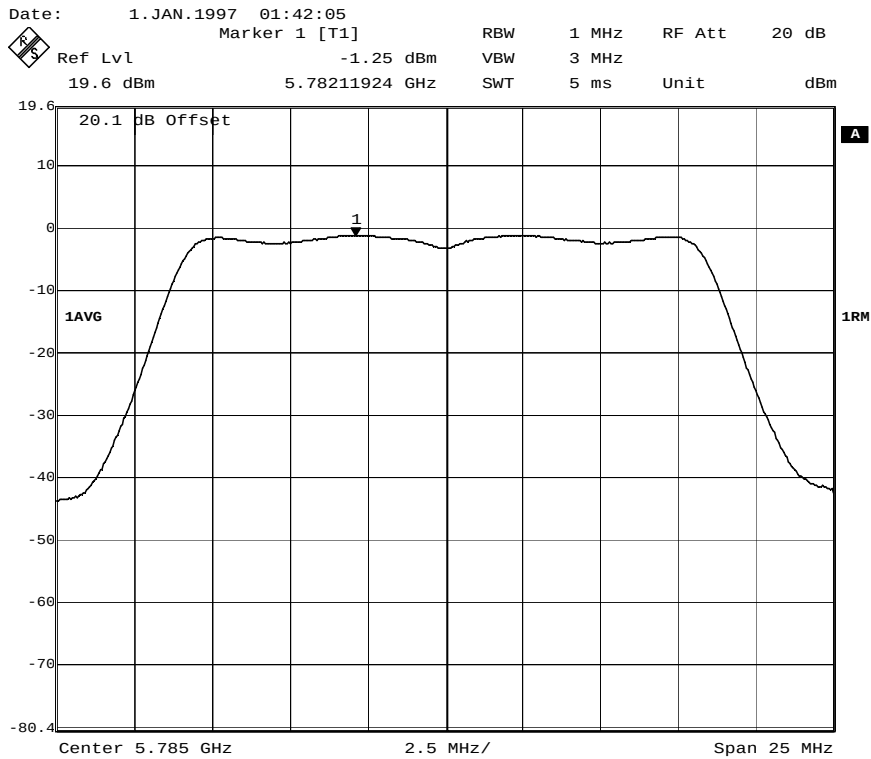
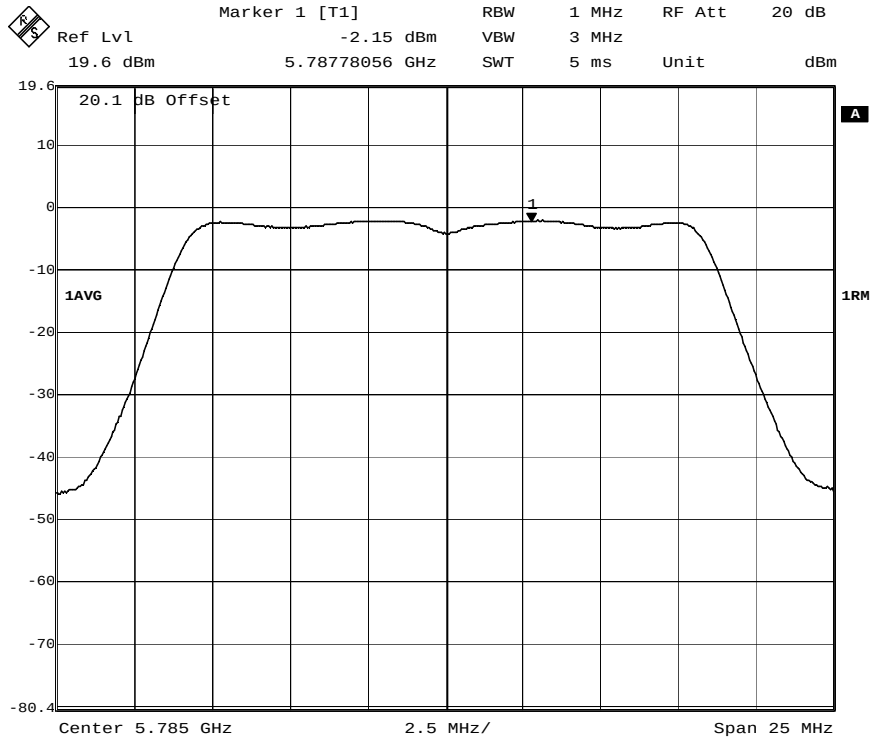


Date: 1.JAN.1997 03:47:16

802.11a Channel 140, Power Spectral Density, Chain A and Chain B

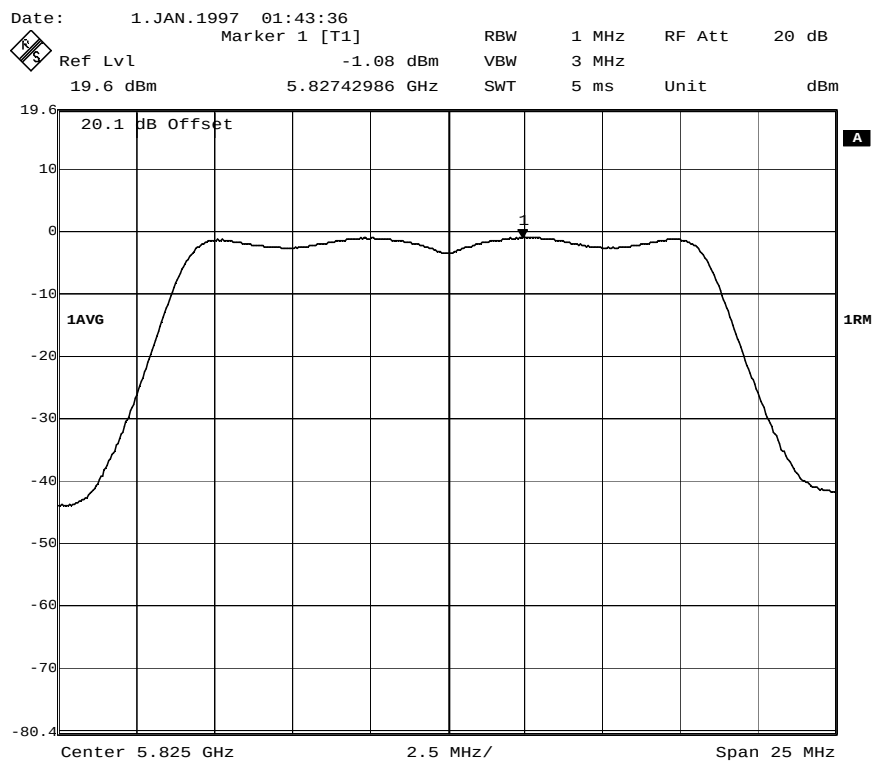
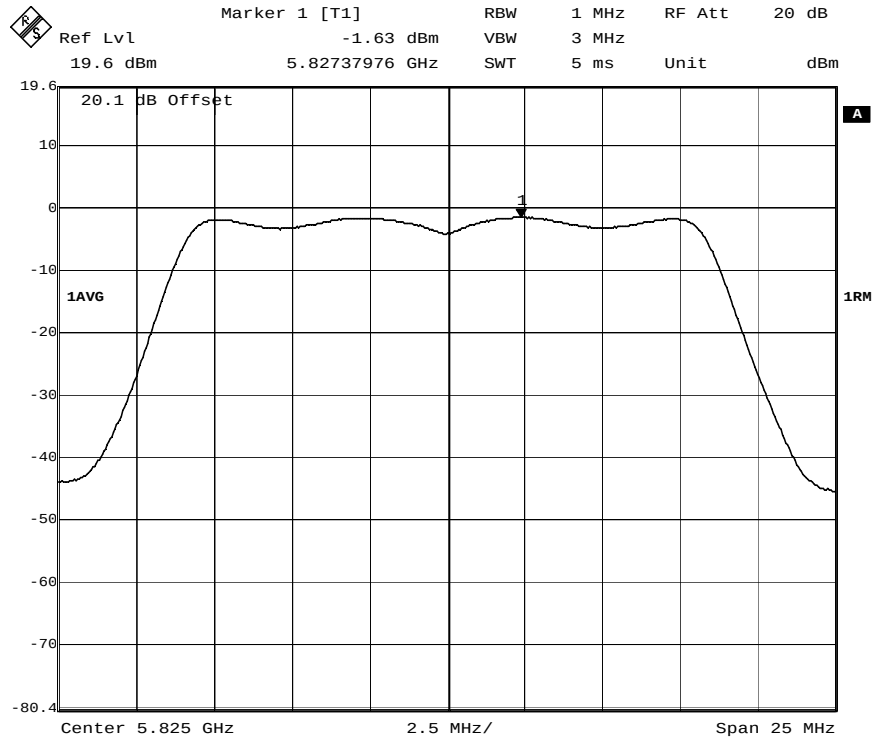


Date: 1.JAN.1997 03:48:49
 802.11a Channel 149, Power Spectral Density, Chain A and Chain B



Date: 1.JAN.1997 03:53:12

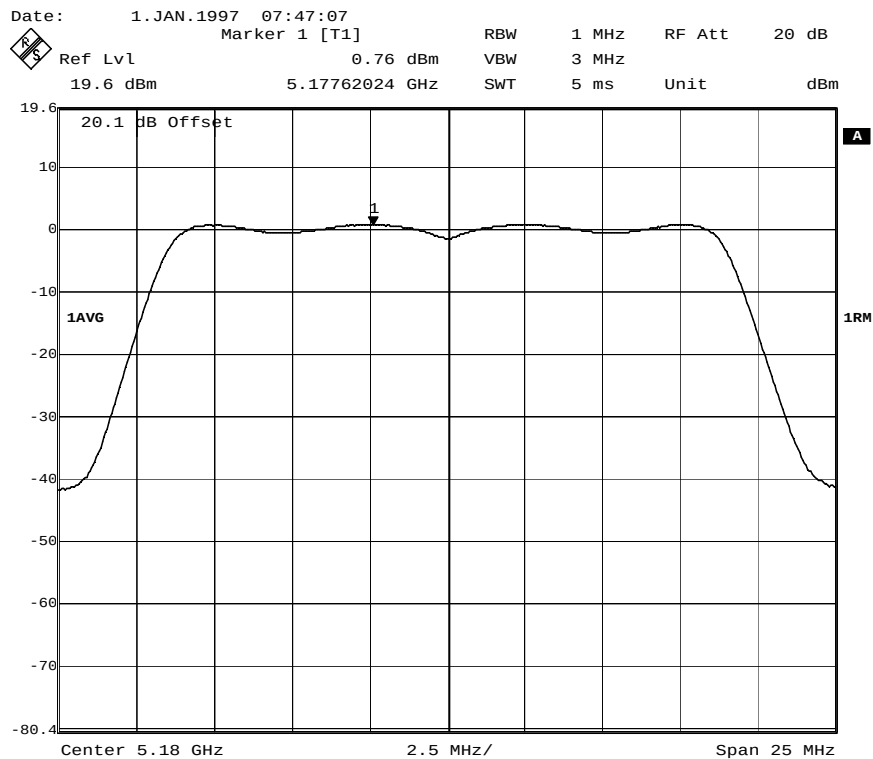
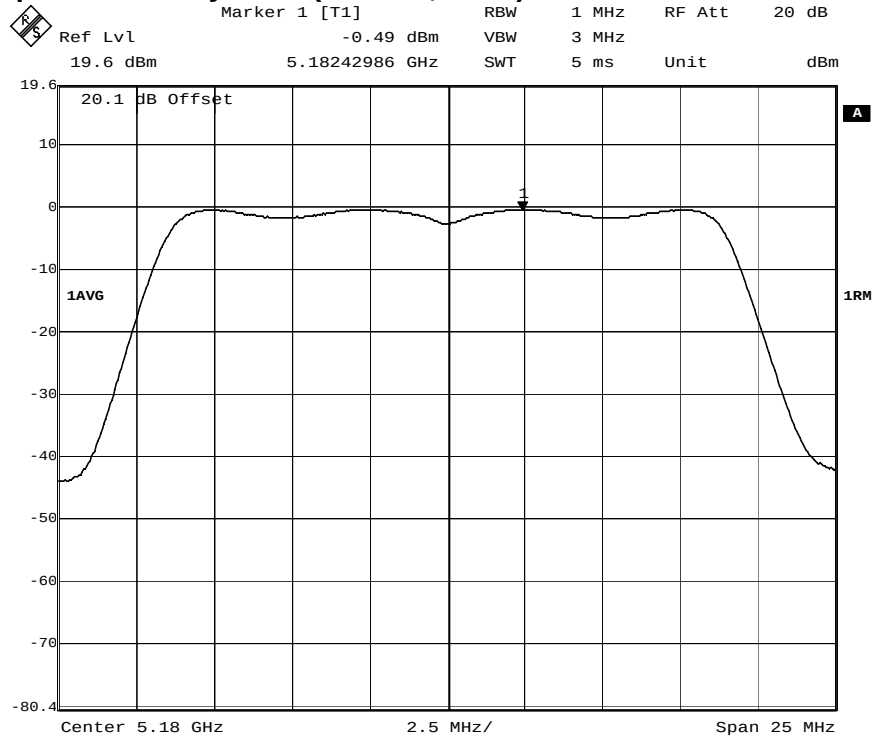
802.11a Channel 157, Power Spectral Density, Chain A and Chain B



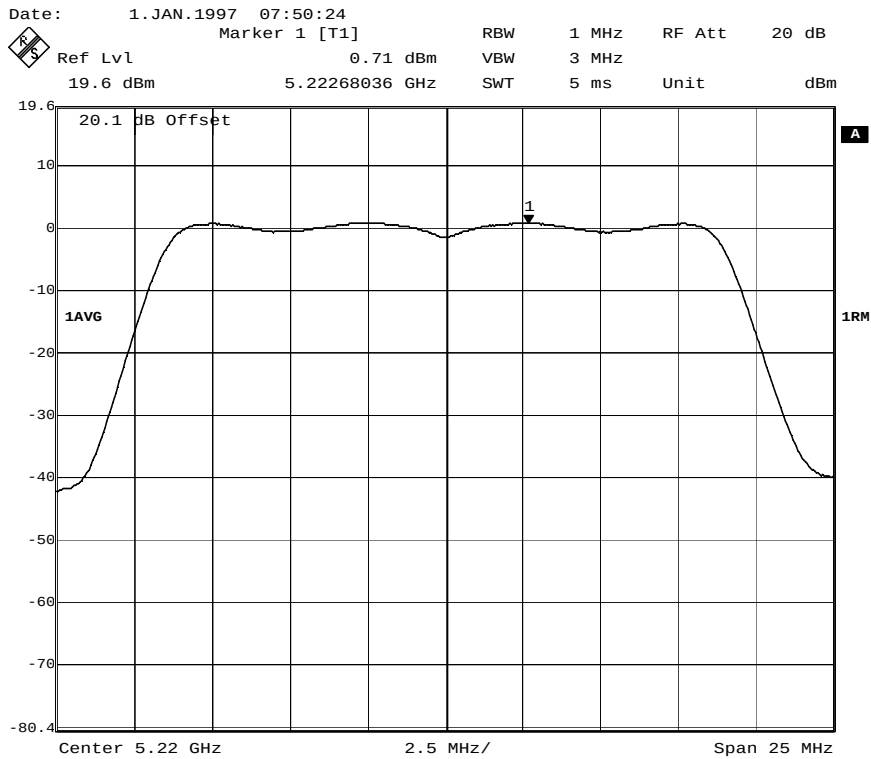
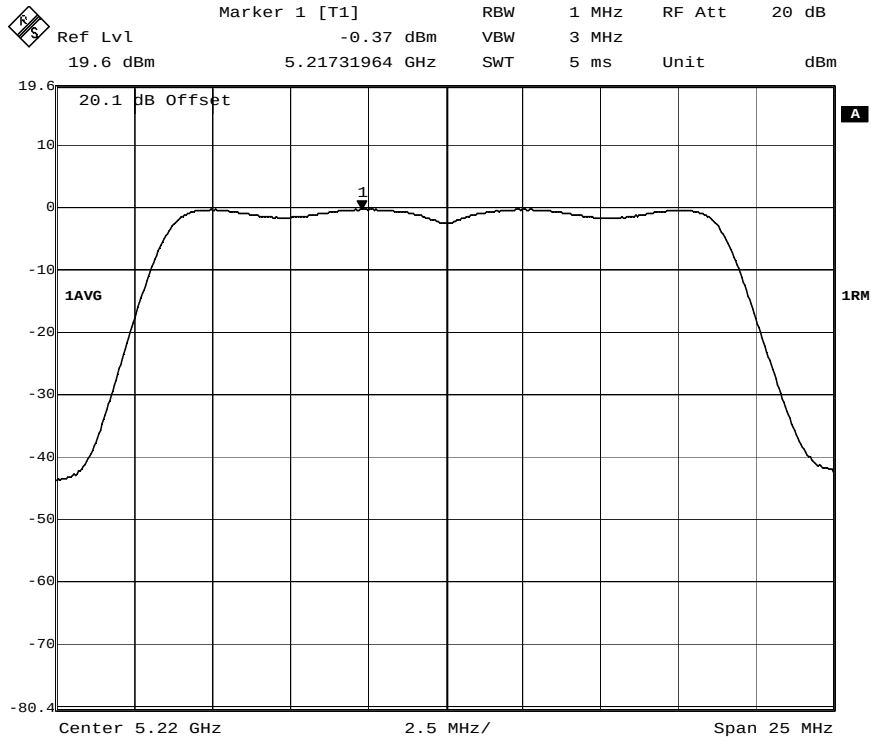
Date: 1 JAN. 1997 03:55:40

802.11a Channel 165, Power Spectral Density, Chain A and Chain B

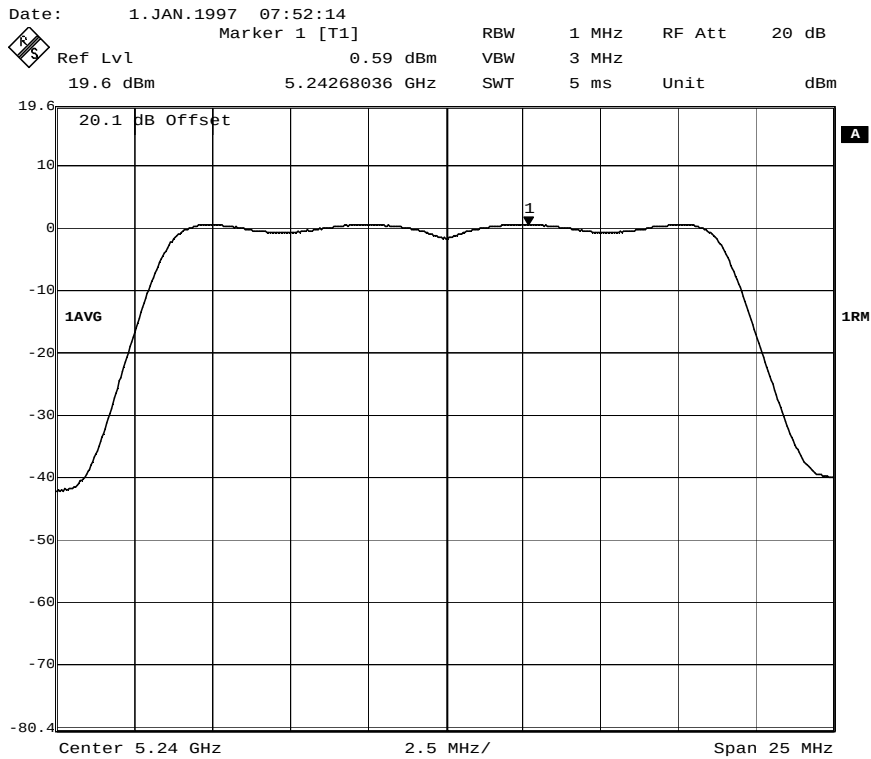
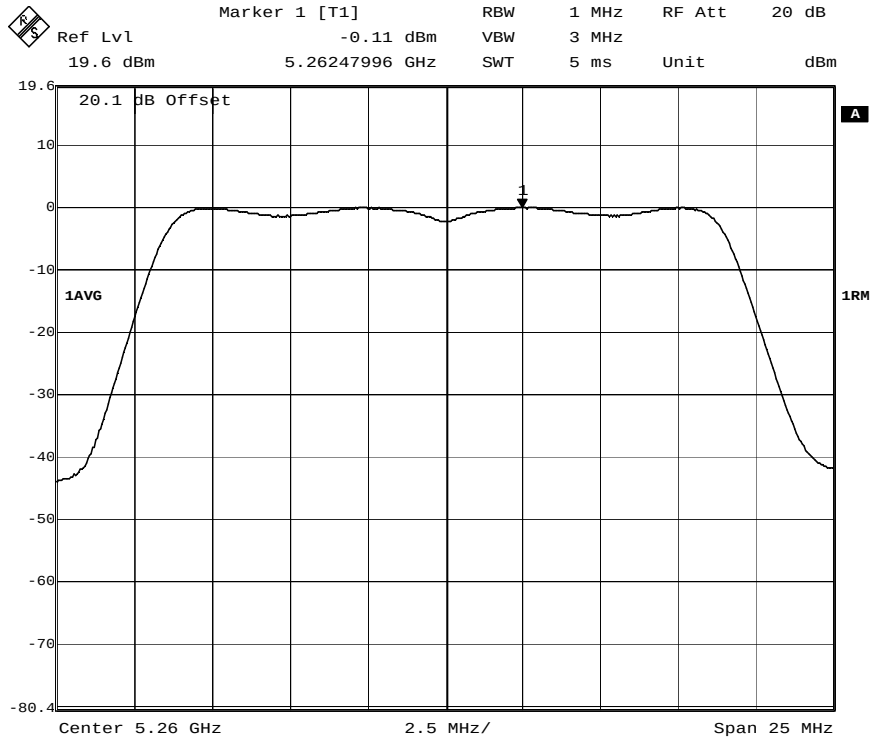
7.13 Power Spectral Density Plots (802.11n, HT20):



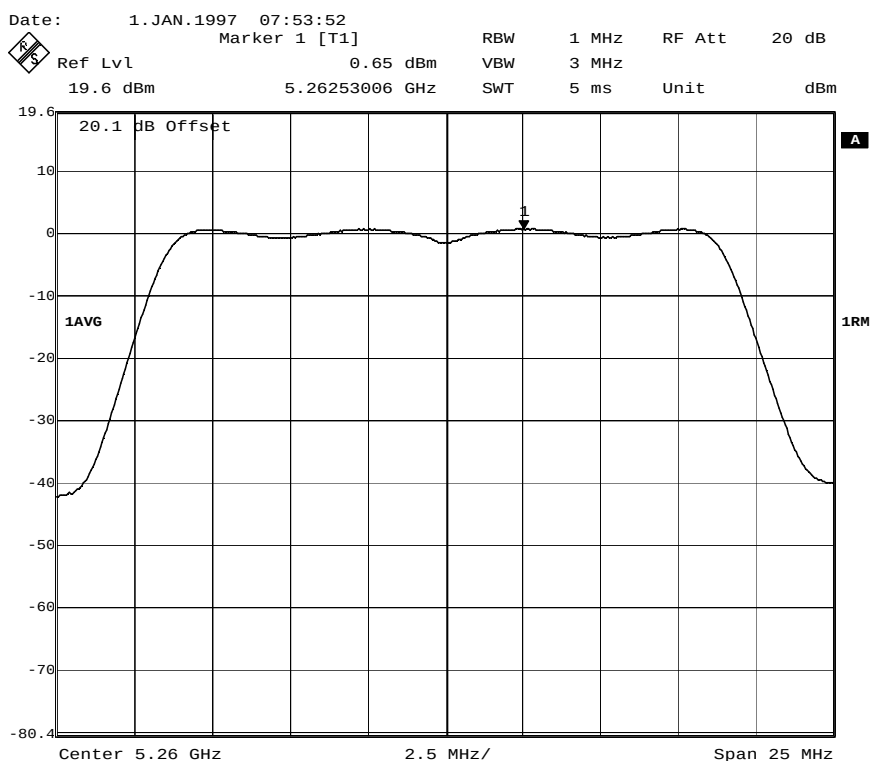
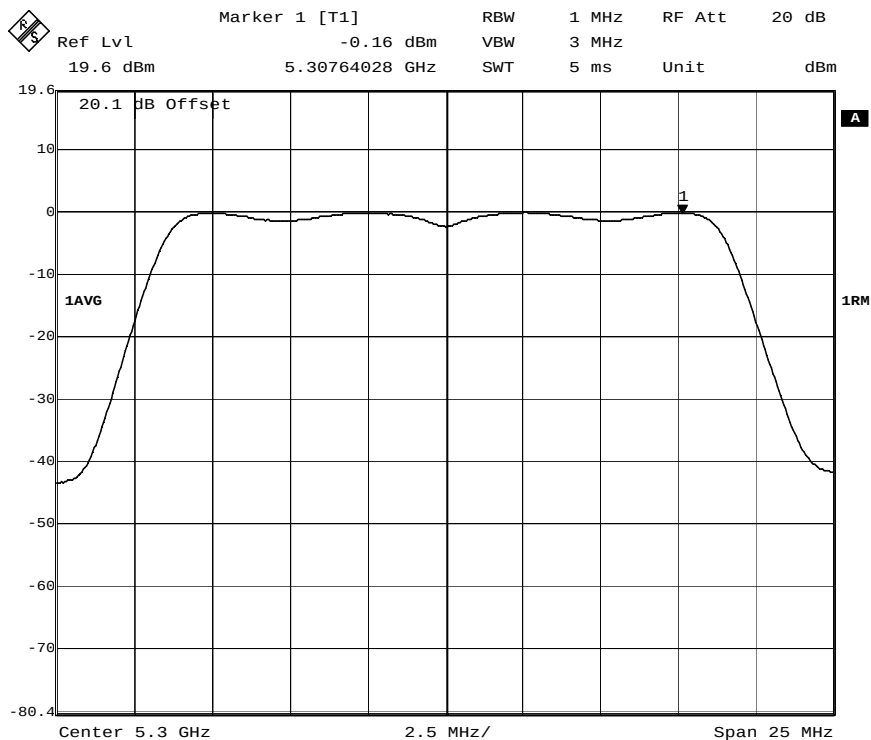
Date: 1.JAN.1997 07:12:51
 802.11n (HT20) Channel 36, Power Spectral Density, Chain A and Chain B



Date: 1.JAN.1997 07:14:41
802.11n (HT20) Channel 44, Power Spectral Density, Chain A and Chain B

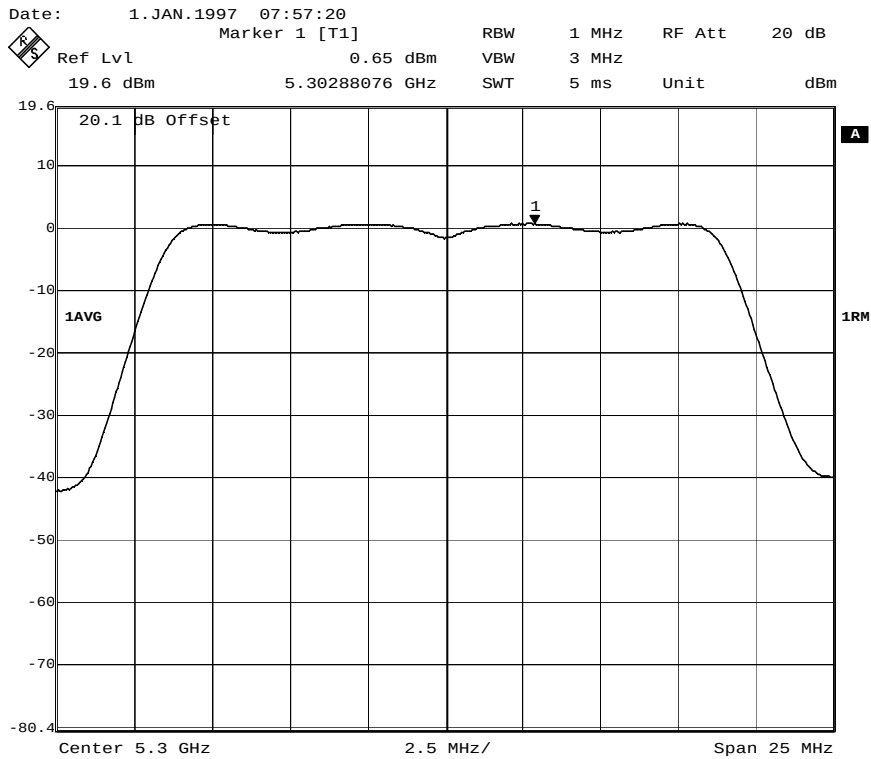
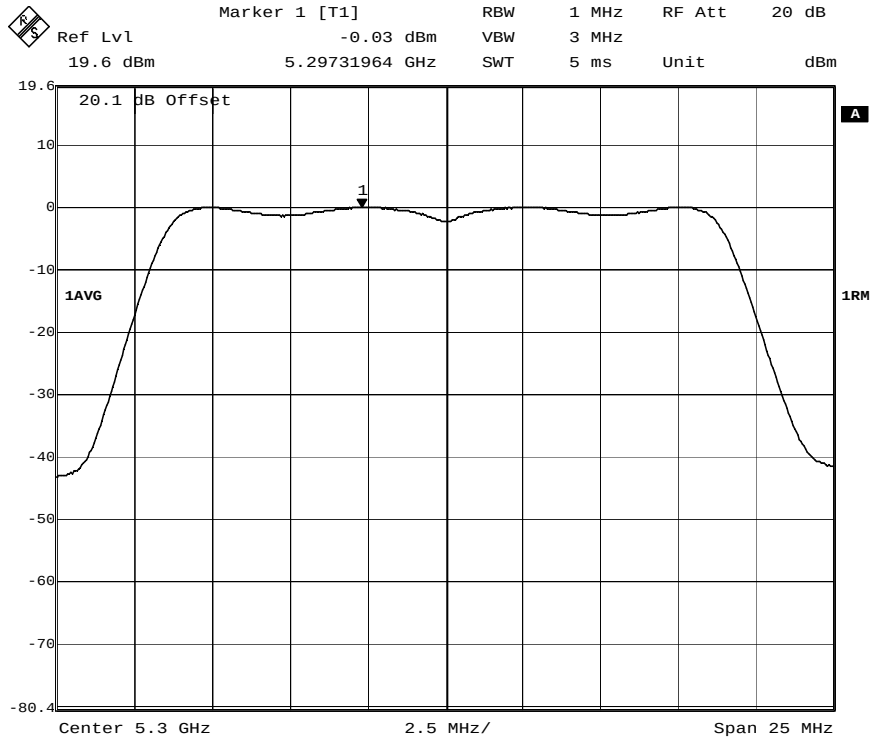


Date: 1.JAN.1997 07:15:50
802.11n (HT20) Channel 48, Power Spectral Density, Chain A and Chain B

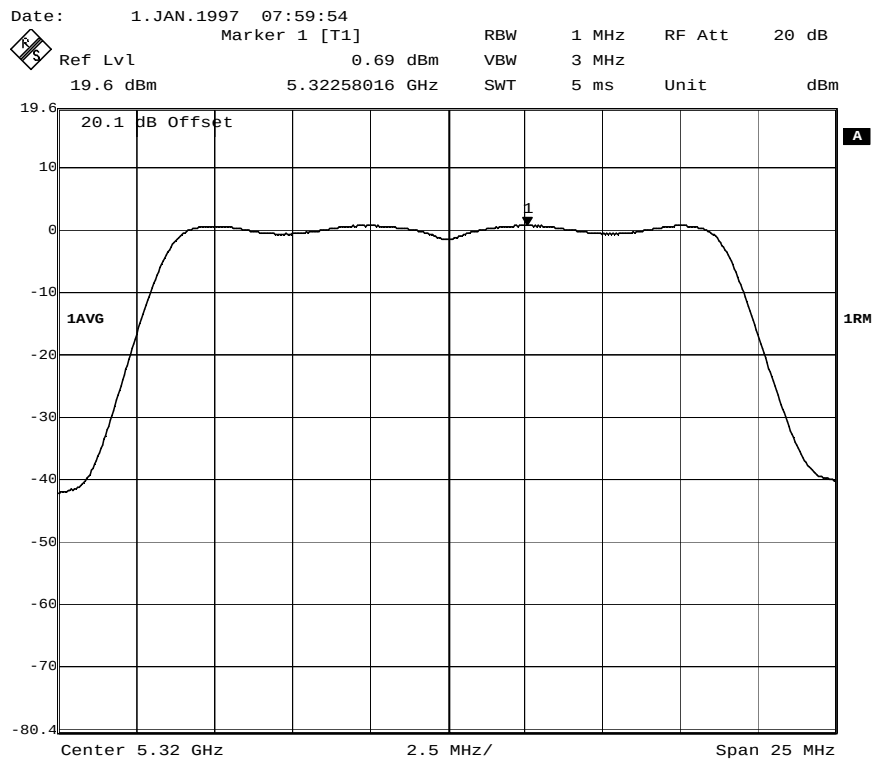
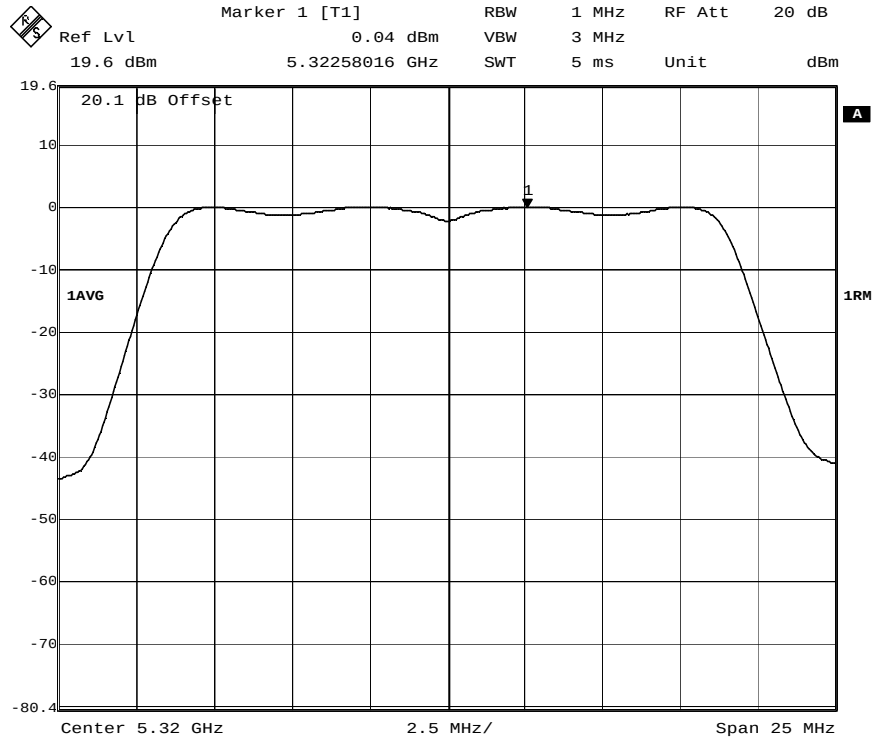


Date: 1.JAN.1997 07:17:23

802.11n (HT20) Channel 52, Power Spectral Density, Chain A and Chain B

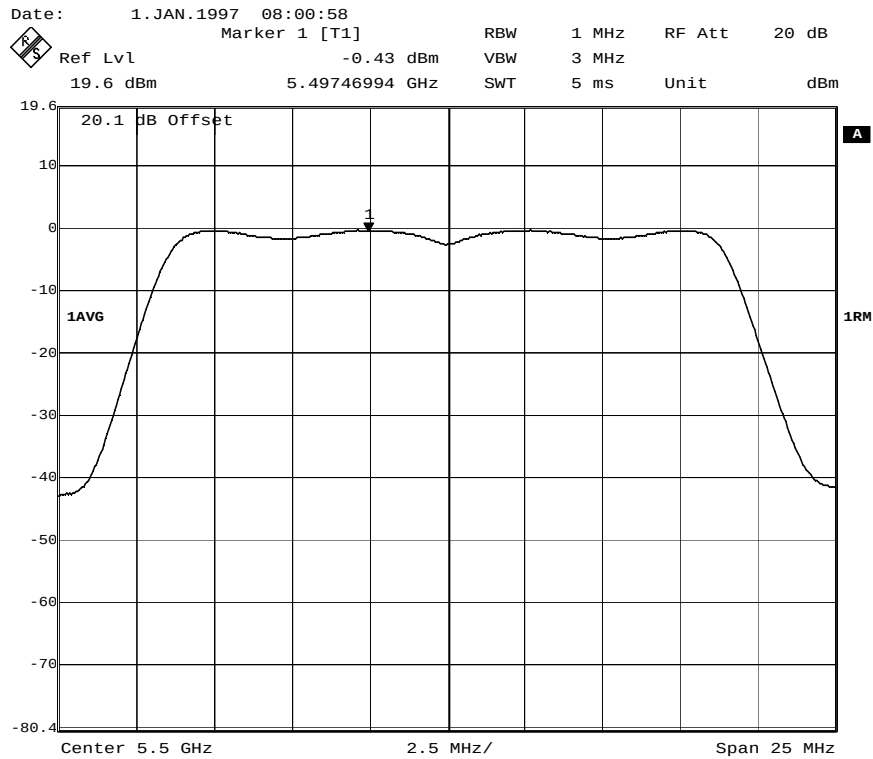
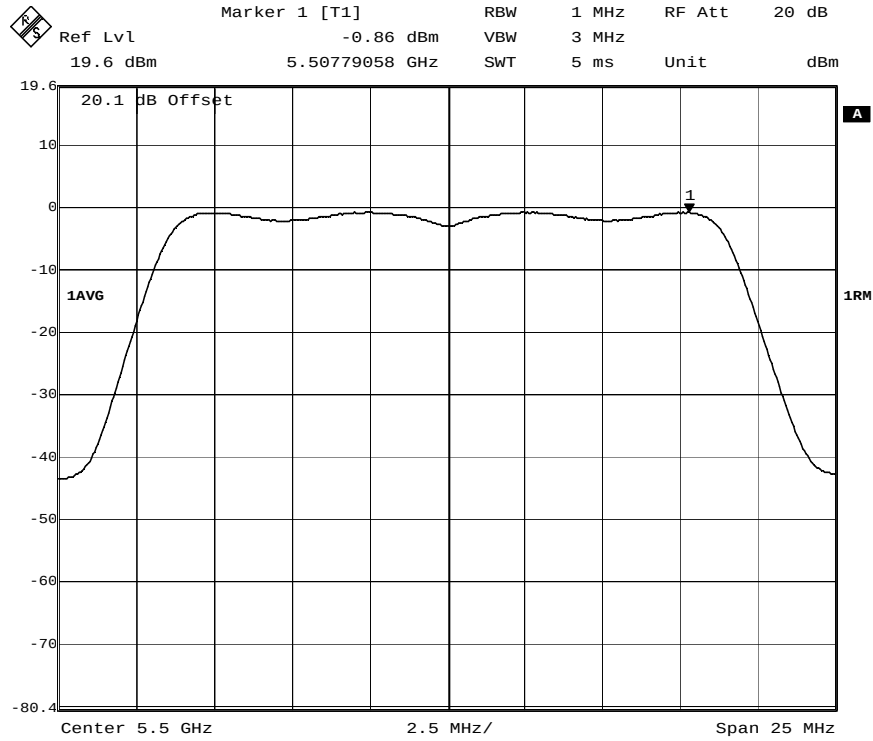


Date: 1.JAN.1997 07:18:53
 802.11n (HT20) Channel 60, Power Spectral Density, Chain A and Chain B



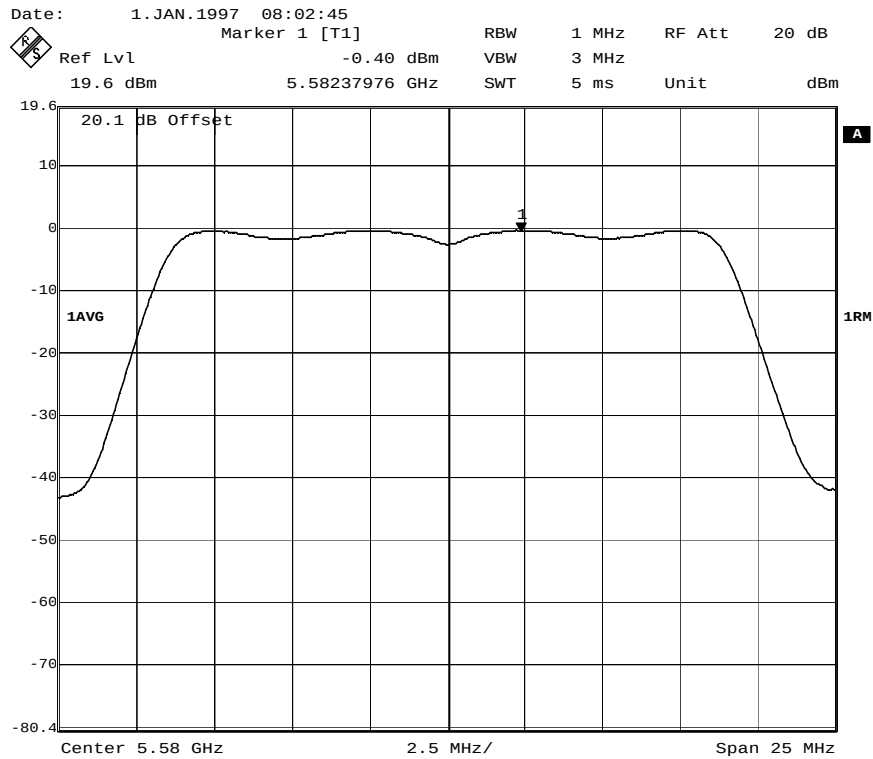
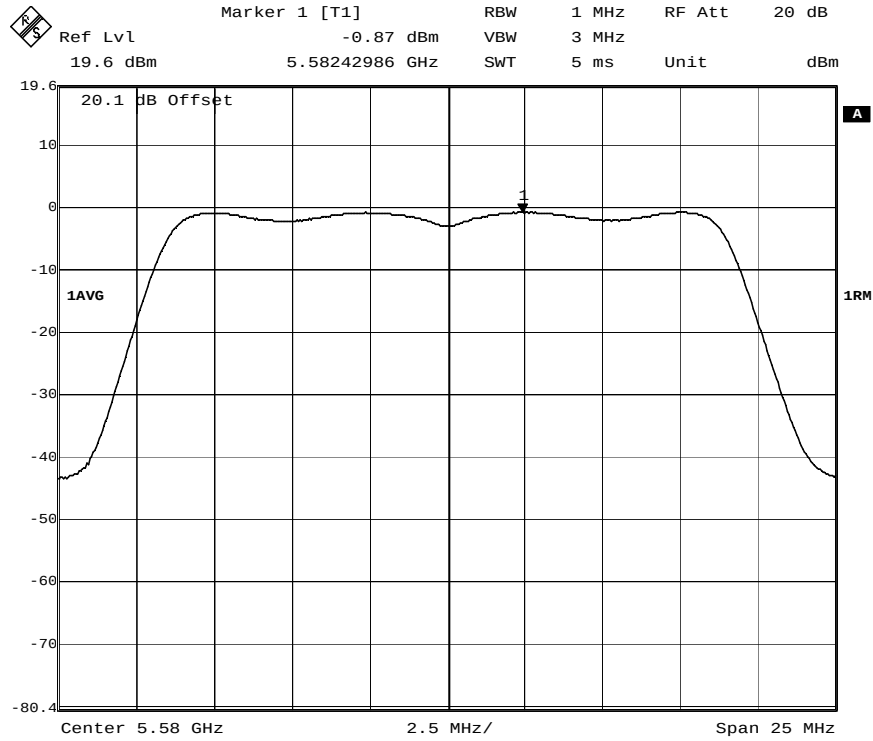
Date: 1.JAN.1997 07:20:07

802.11n (HT20) Channel 64, Power Spectral Density, Chain A and Chain B



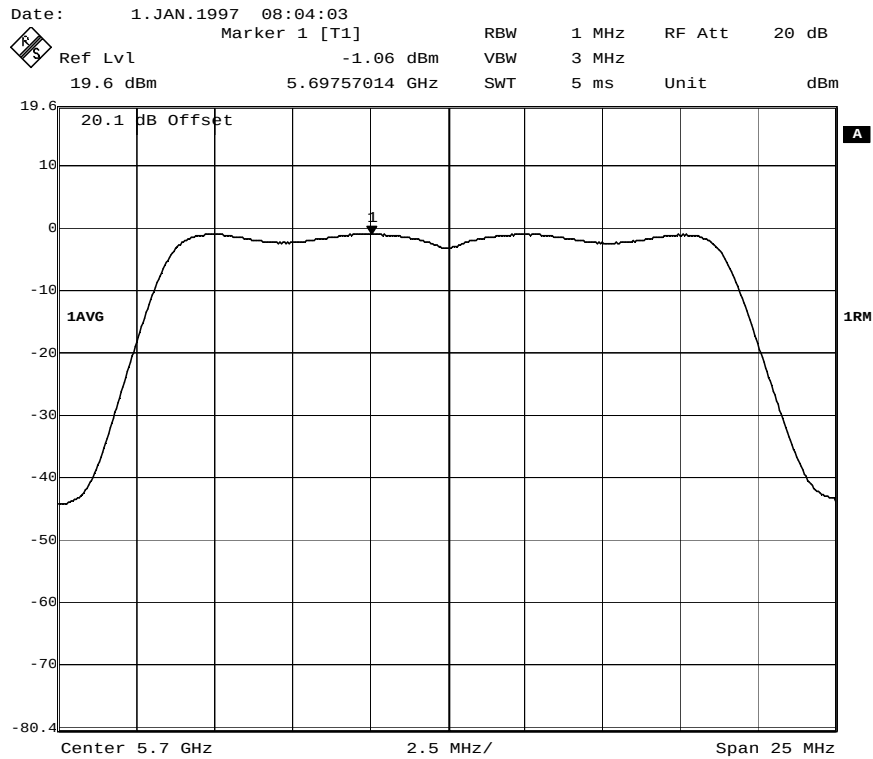
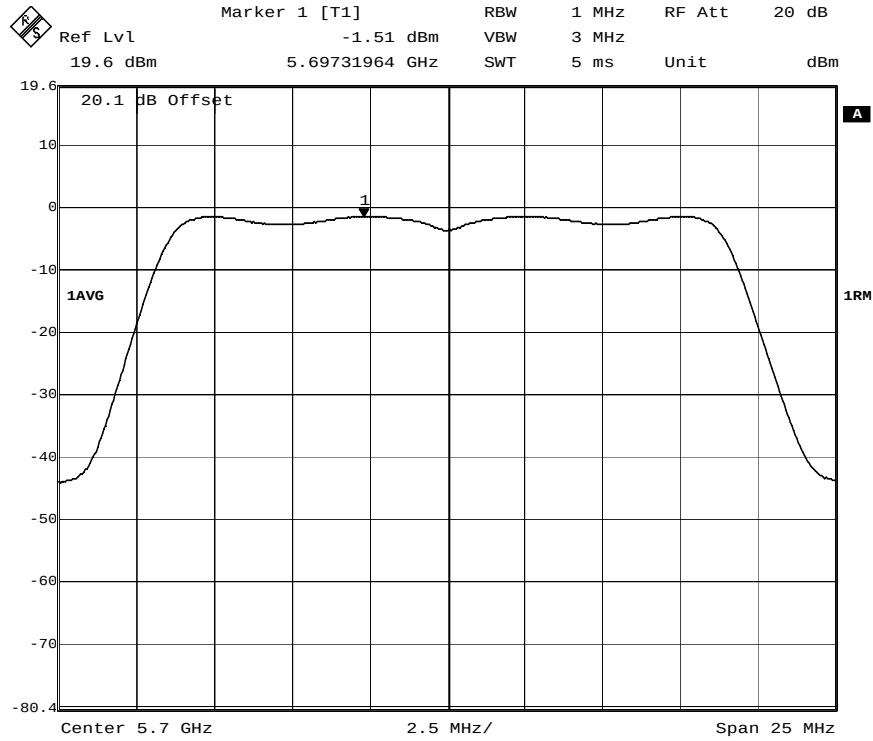
Date: 1.JAN.1997 07:22:09

802.11n (HT20) Channel 100, Power Spectral Density, Chain A and Chain B

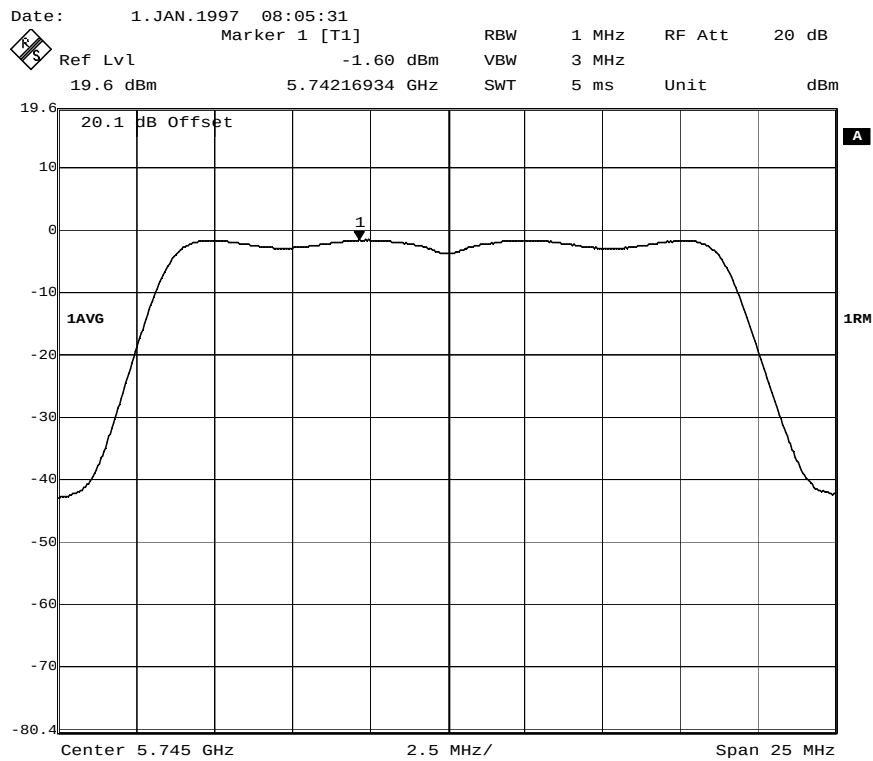
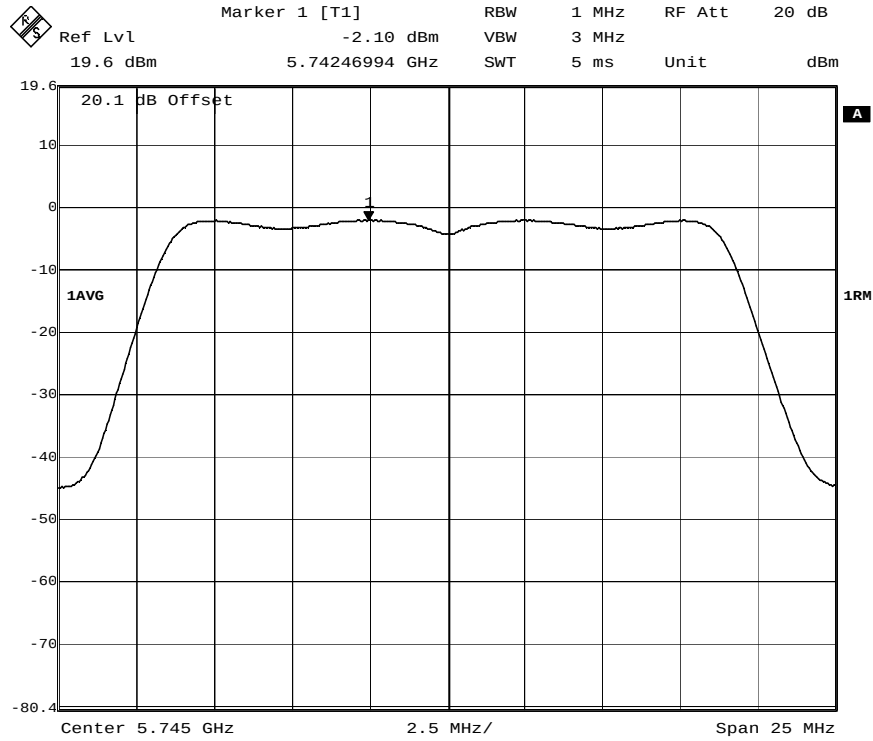


Date: 1.JAN.1997 07:36:58

802.11n (HT20) Channel 116, Power Spectral Density, Chain A and Chain B

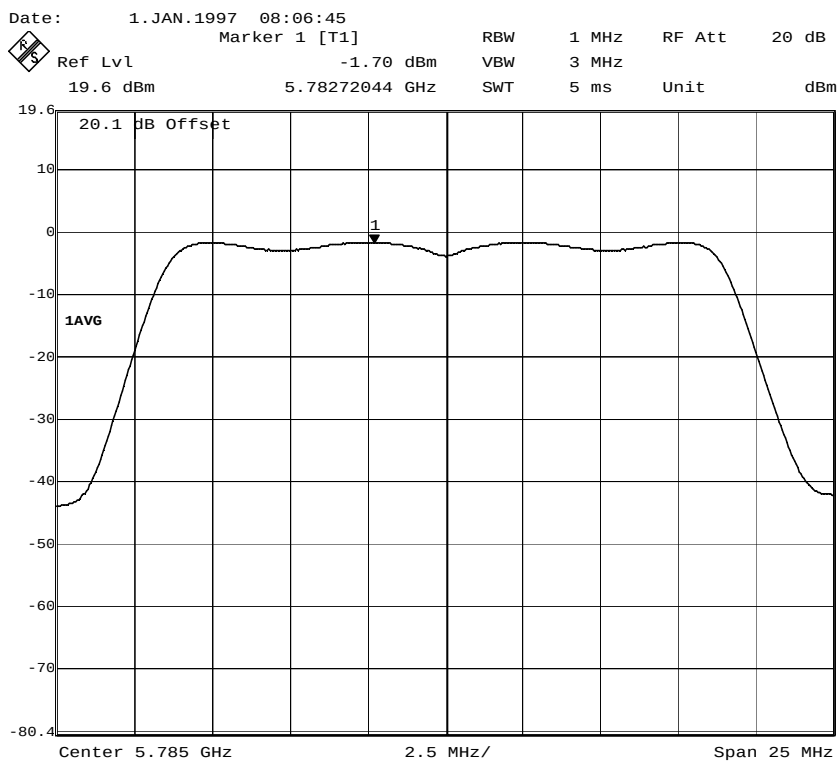
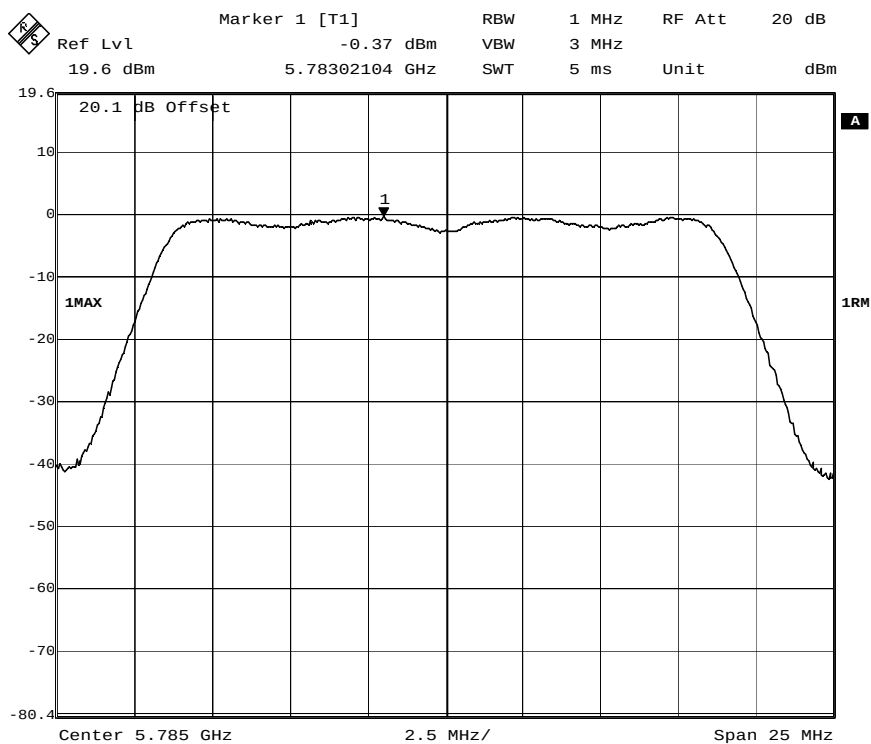


Date: 1.JAN.1997 07:38:46
 802.11n (HT20) Channel 140, Power Spectral Density, Chain A and Chain B



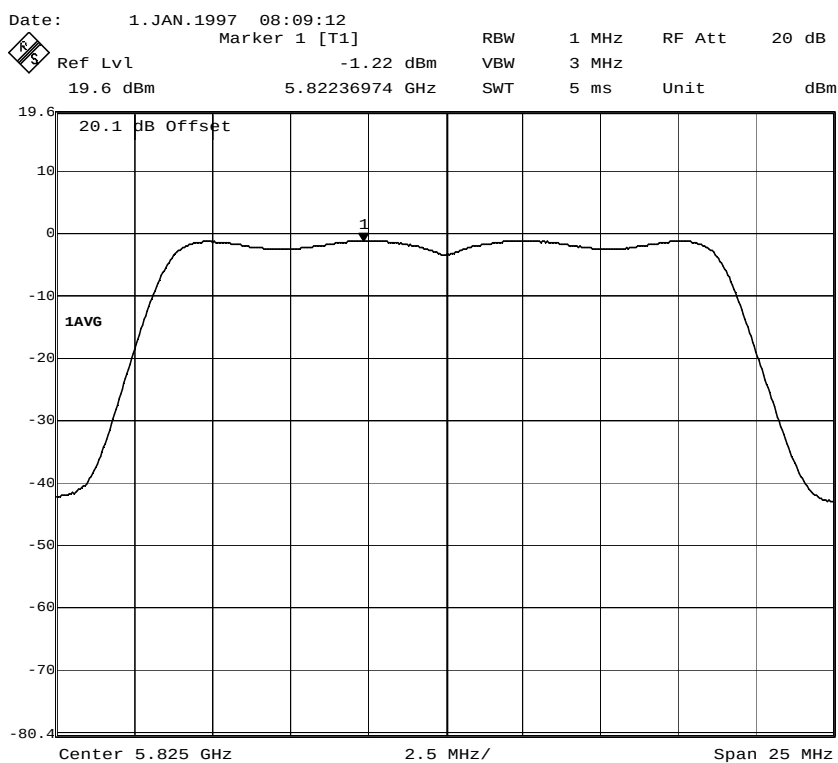
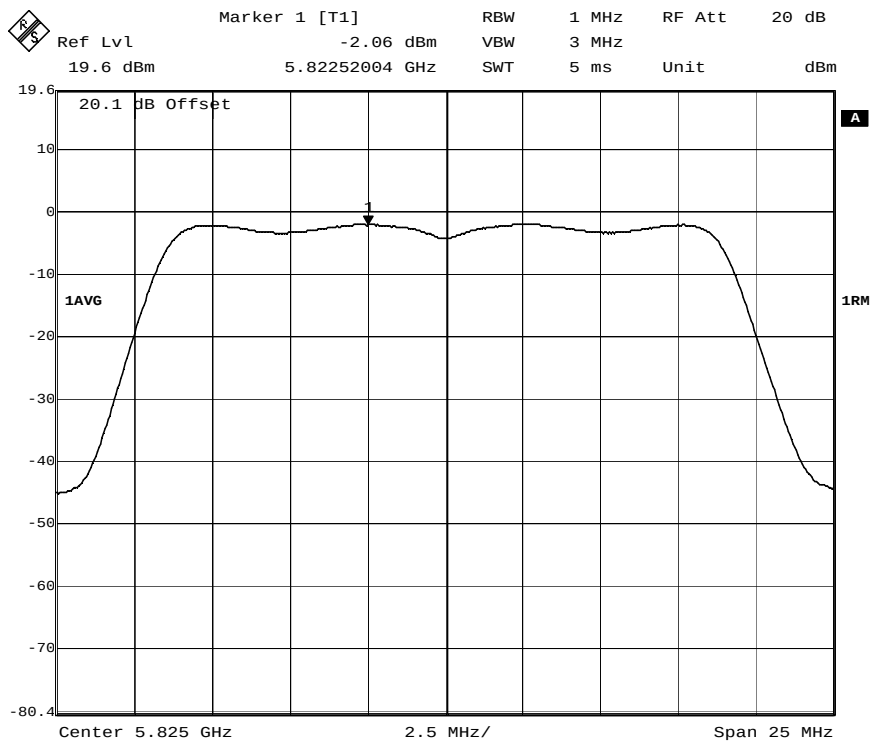
Date: 1.JAN.1997 07:40:54

802.11n (HT20) Channel 149, Power Spectral Density, Chain A and Chain B



Date: 1.JAN.1997 07:43:46

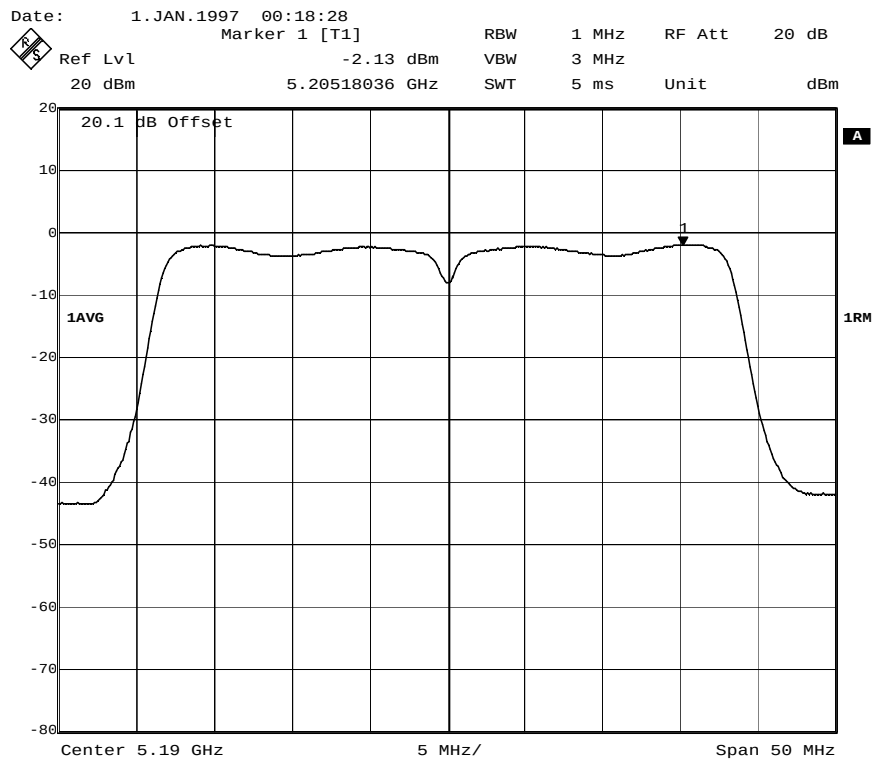
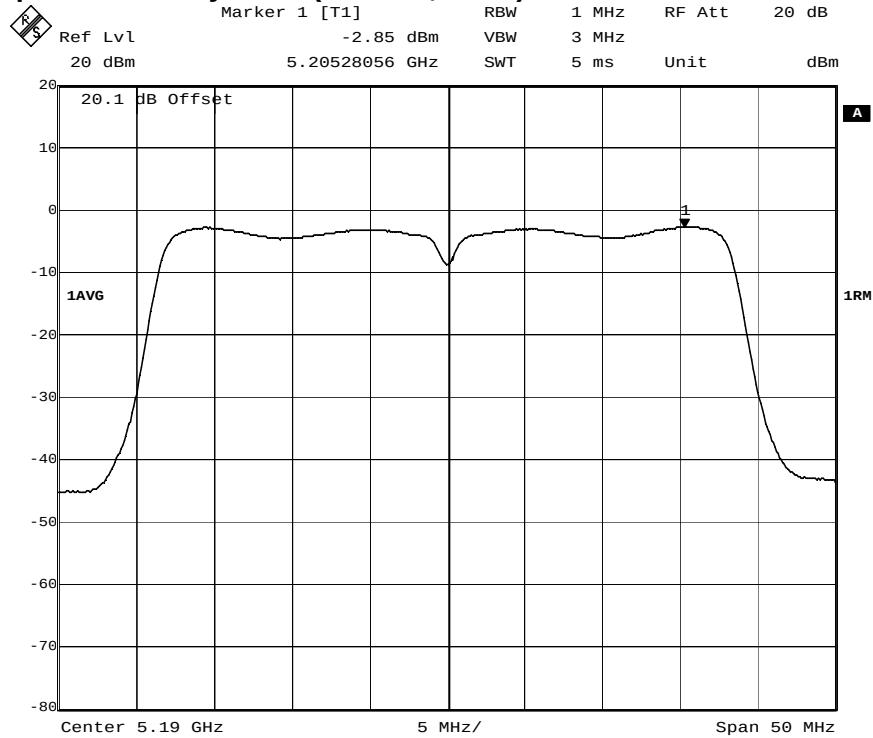
802.11n (HT20) Channel 157, Power Spectral Density, Chain A and Chain B



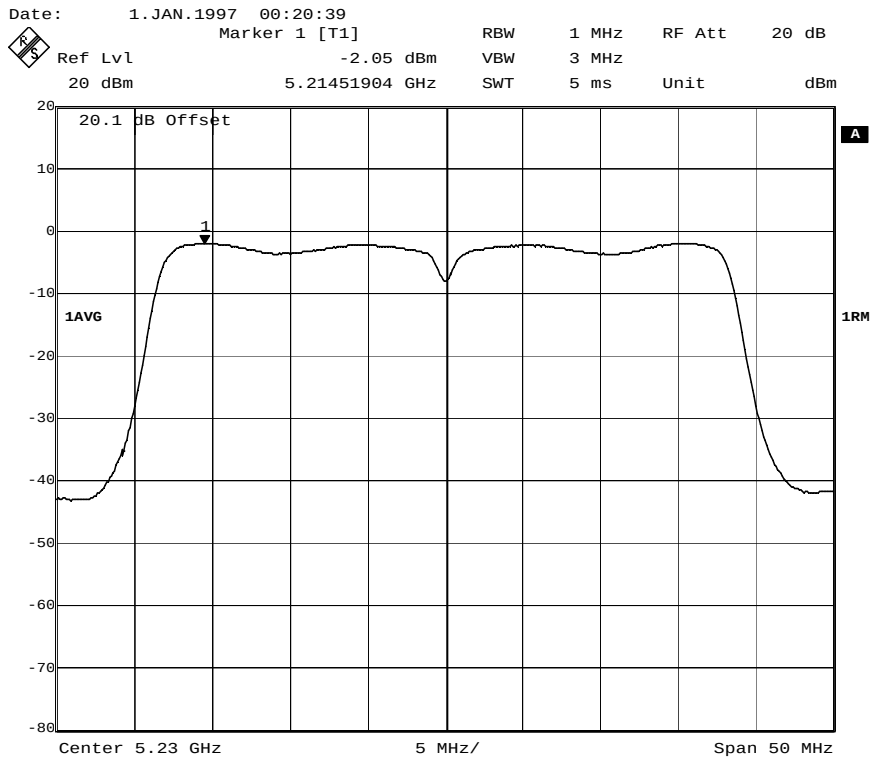
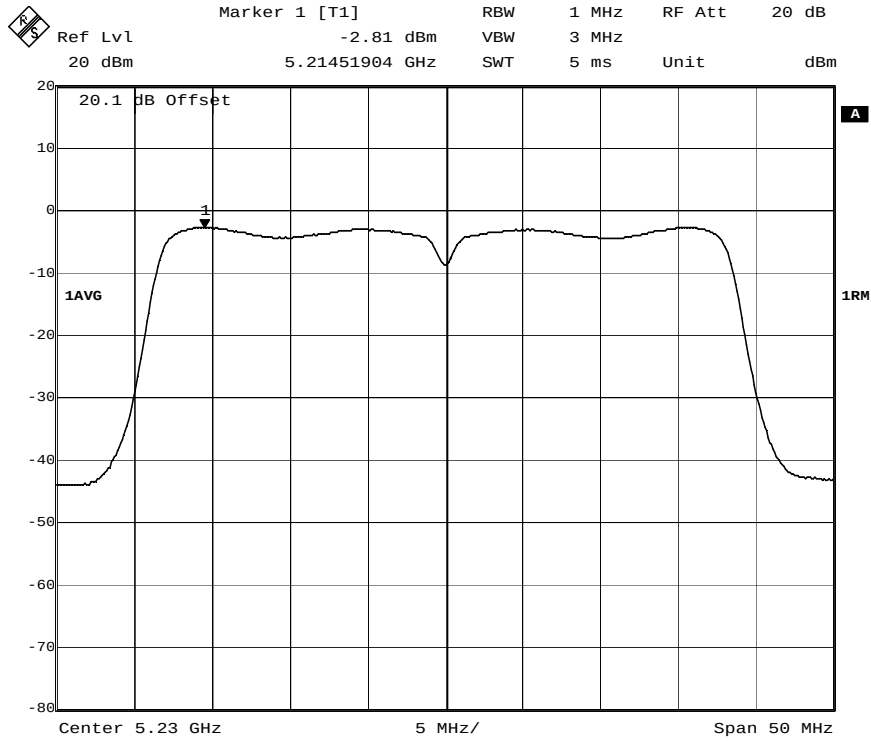
Date: 1.JAN.1997 07:45:30

802.11n (HT20) Channel 165, Power Spectral Density, Chain A and Chain B

7.14 Power Spectral Density Plots (802.11n, HT40):

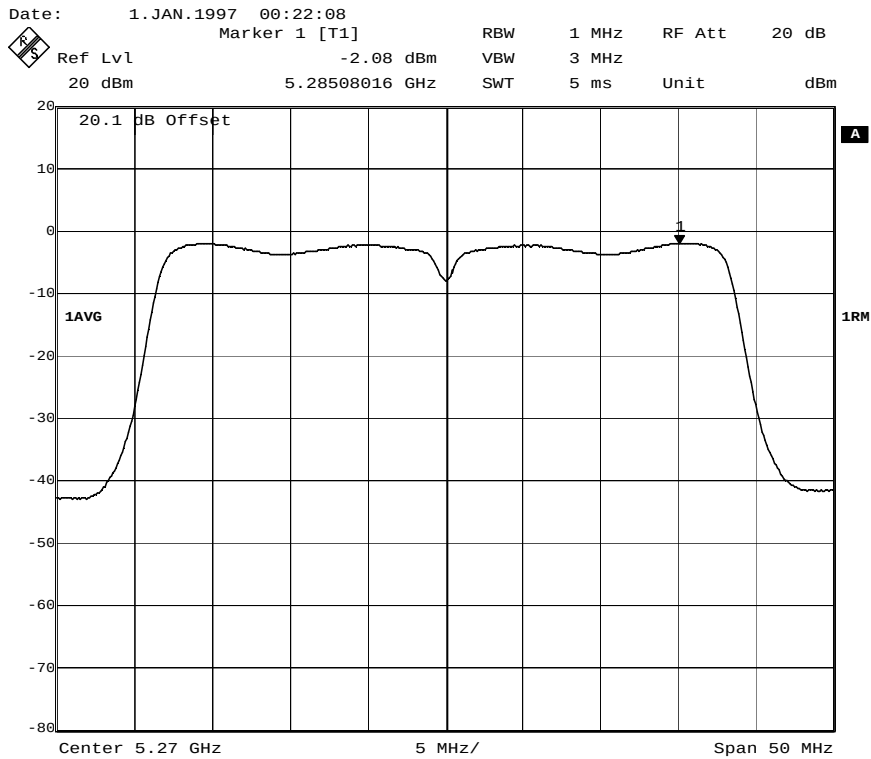
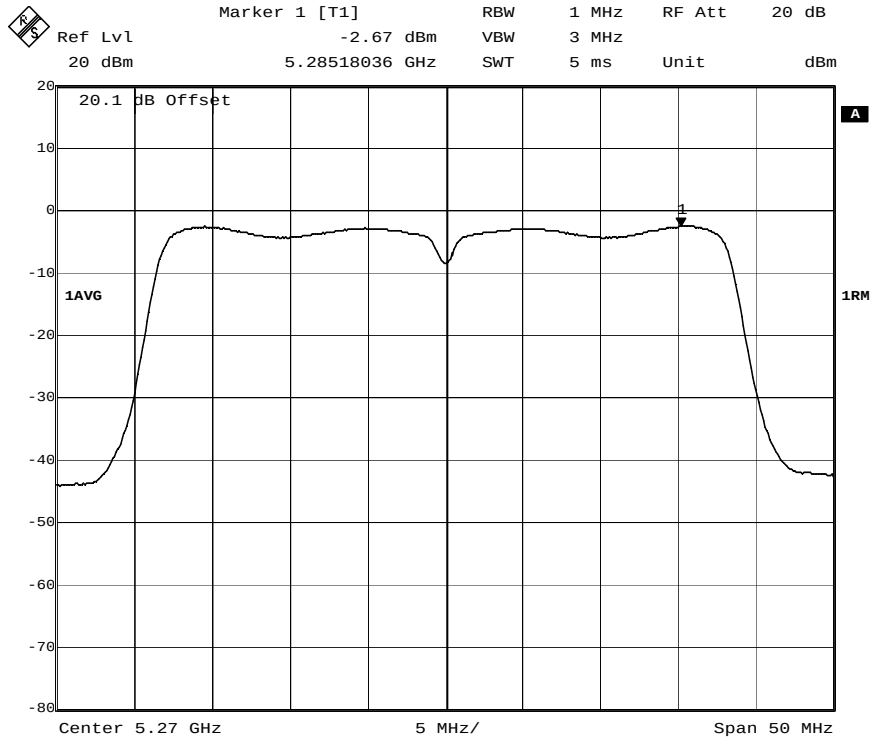


Date: 1.JAN.1997 00:07:14
 802.11n (HT40) Channel 38, Power Spectral Density, Chain A and Chain B



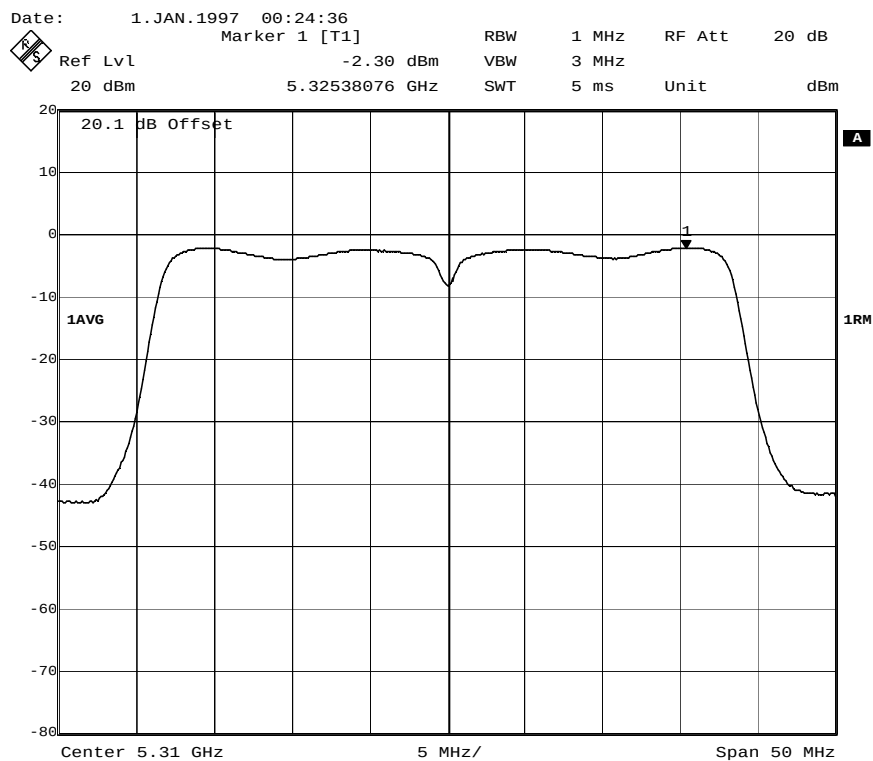
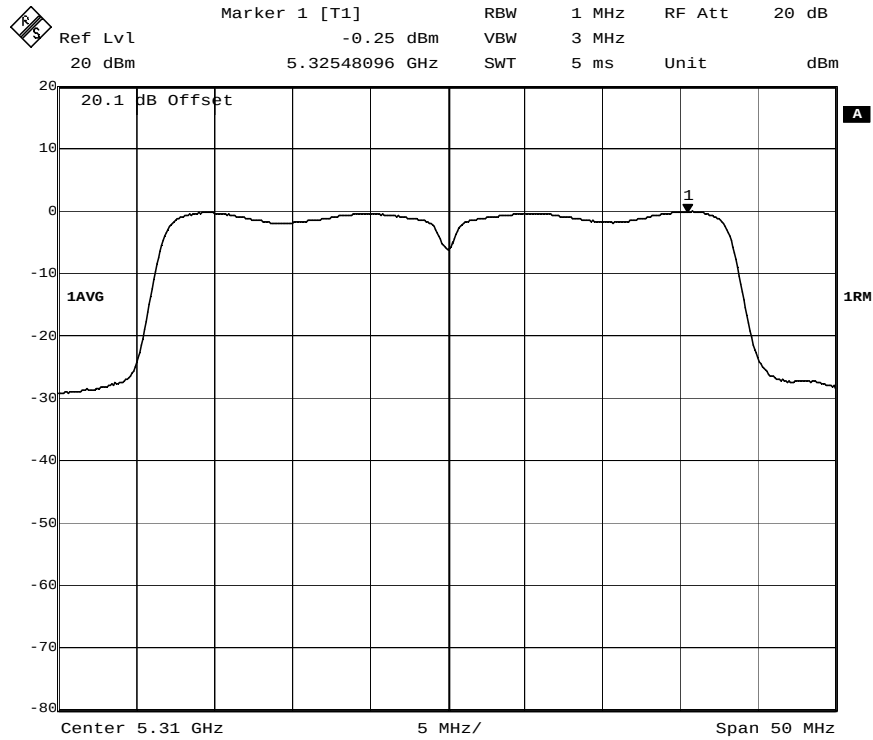
Date: 1.JAN.1997 00:10:38

802.11n (HT40) Channel 46, Power Spectral Density, Chain A and Chain B



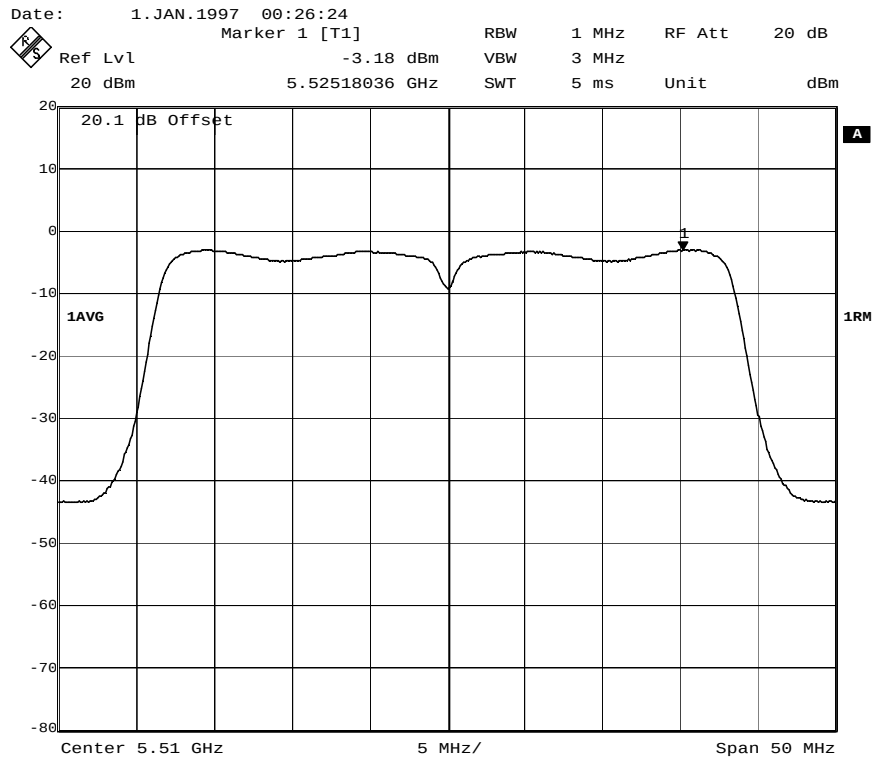
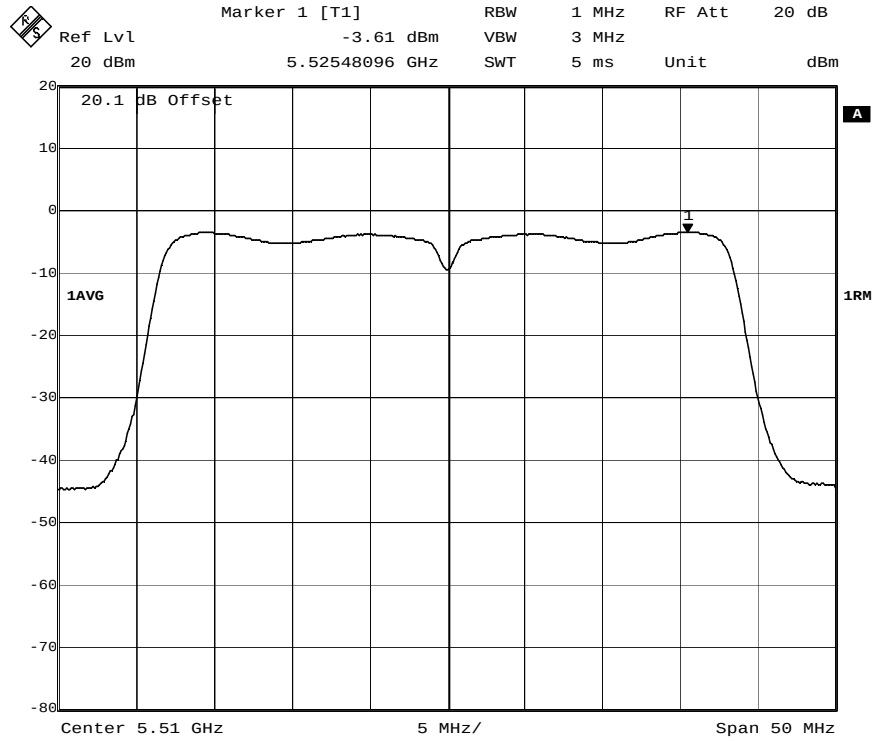
Date: 1.JAN.1997 00:12:17

802.11n (HT40) Channel 54, Power Spectral Density, Chain A and Chain B



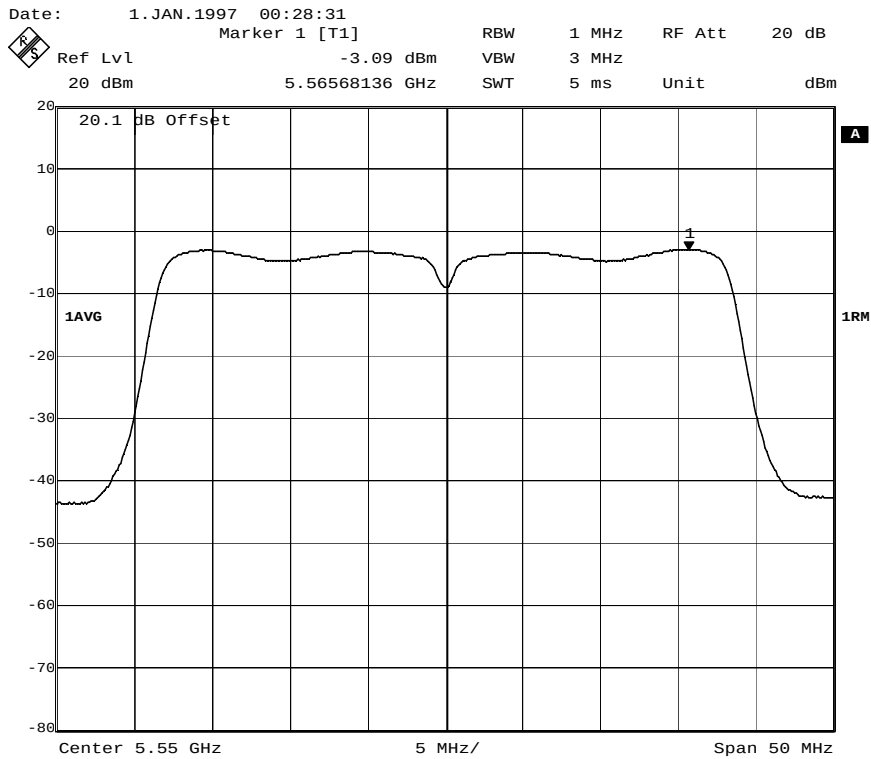
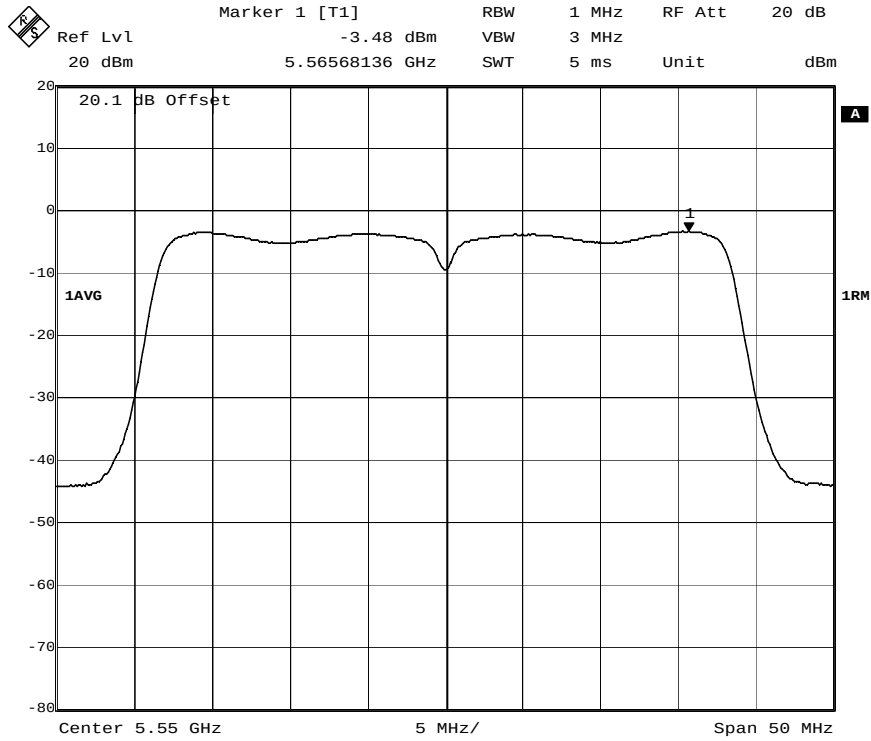
Date: 1.JAN.1997 00:14:34

802.11n (HT40) Channel 62, Power Spectral Density, Chain A and Chain B



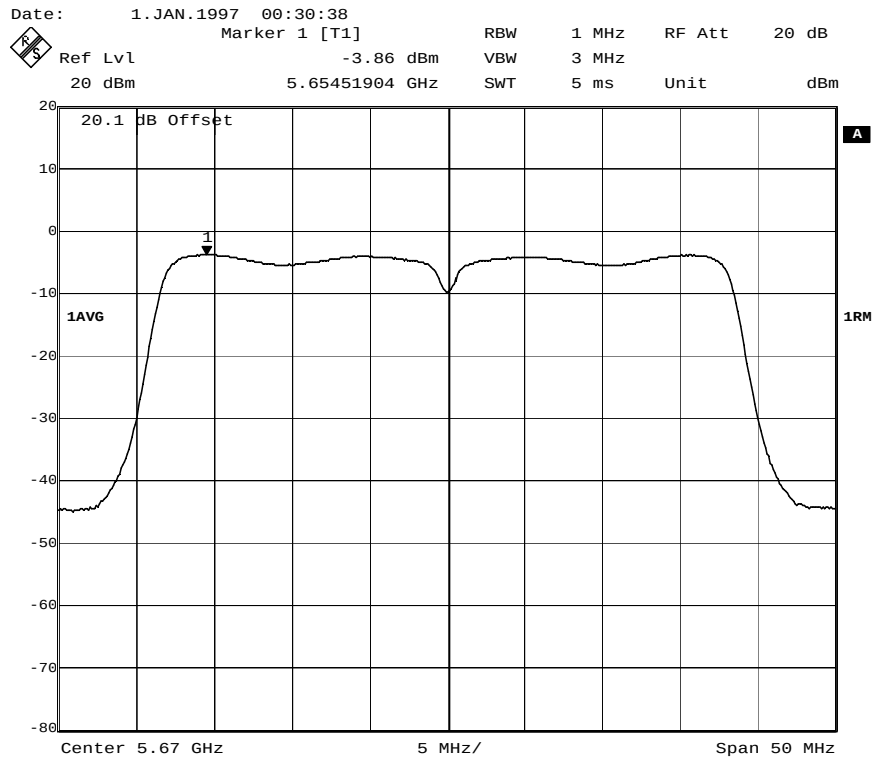
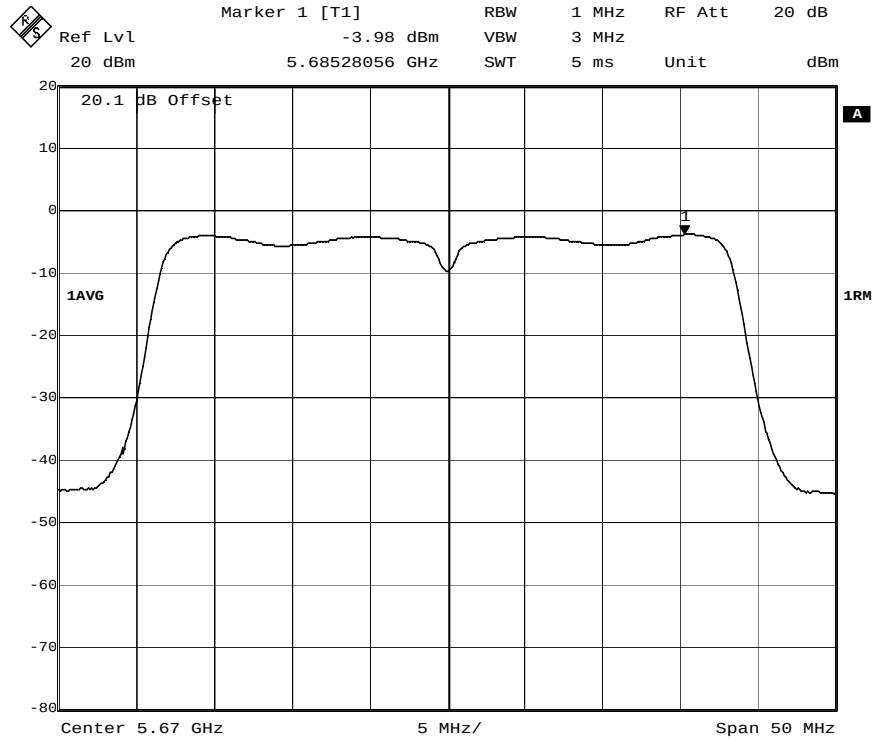
Date: 1.JAN.1997 00:15:59

802.11n (HT40) Channel 102, Power Spectral Density, Chain A and Chain B

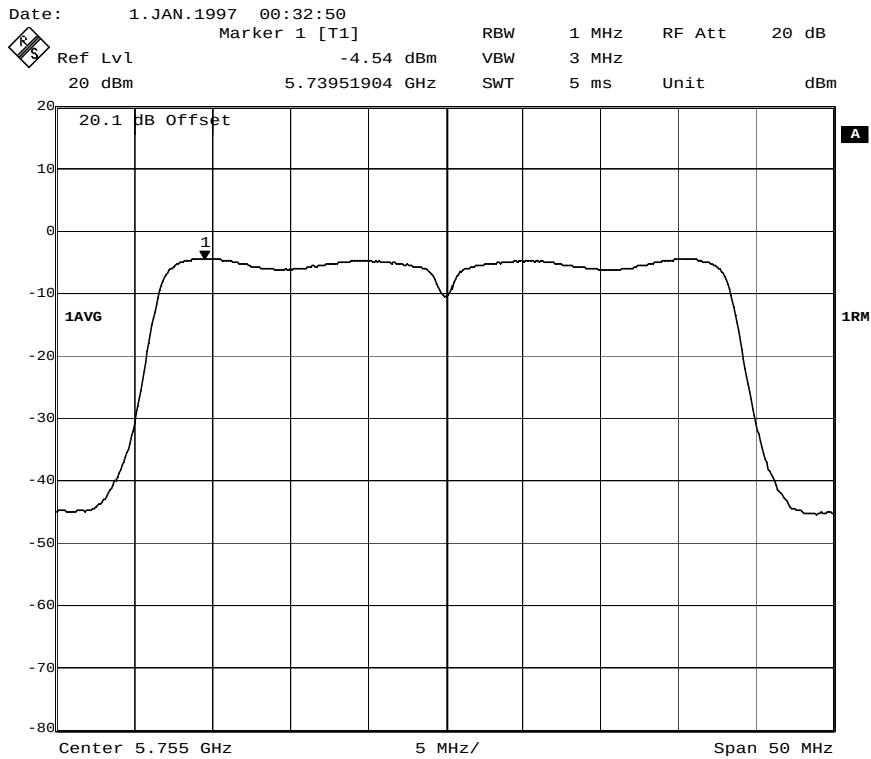
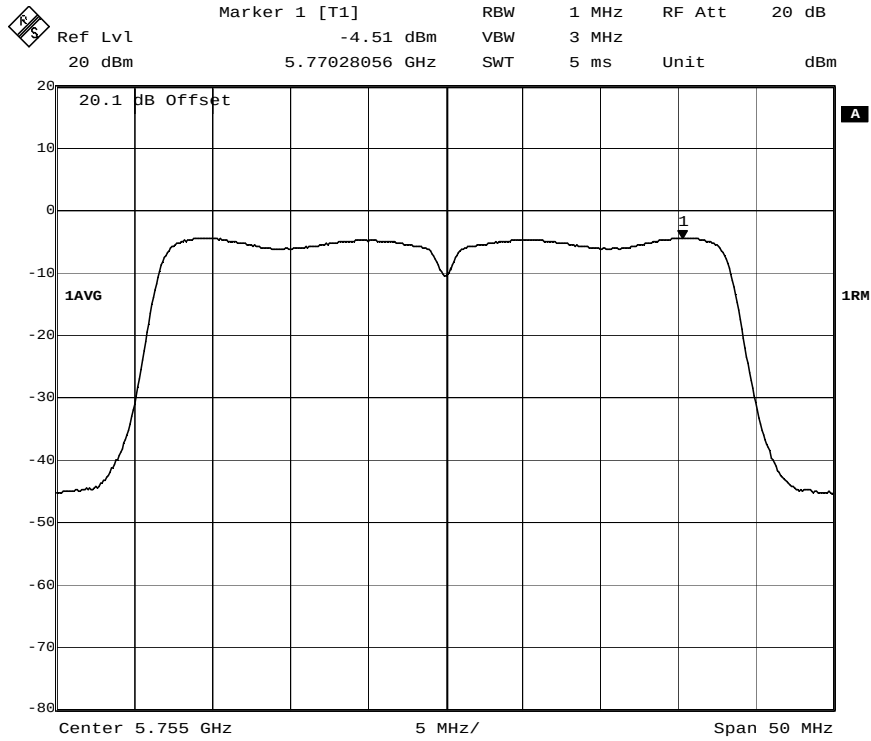


Date: 1.JAN.1997 00:17:39

802.11n (HT40) Channel 110, Power Spectral Density, Chain A and Chain B

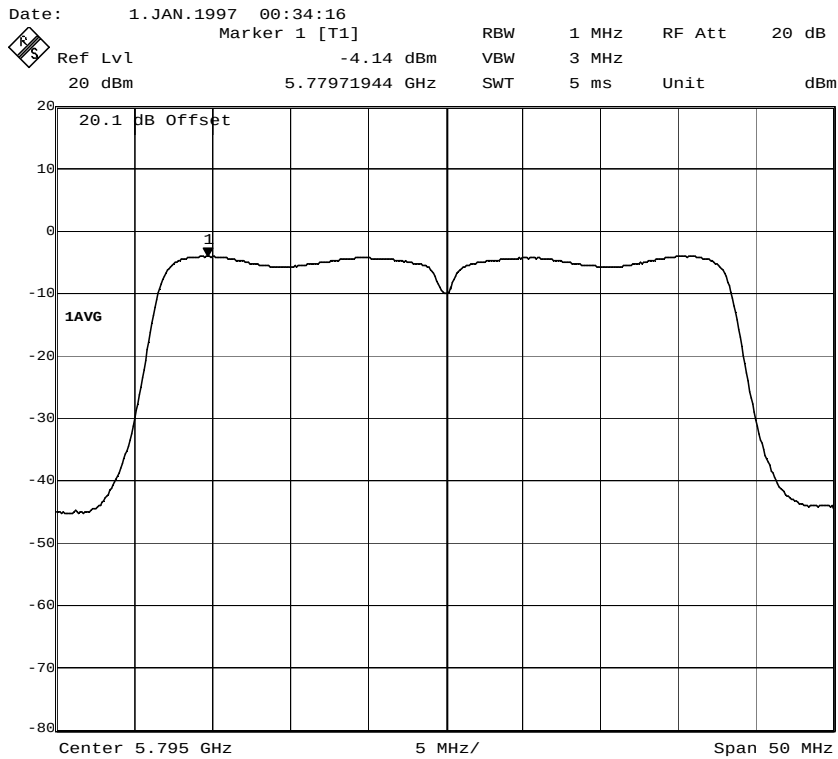
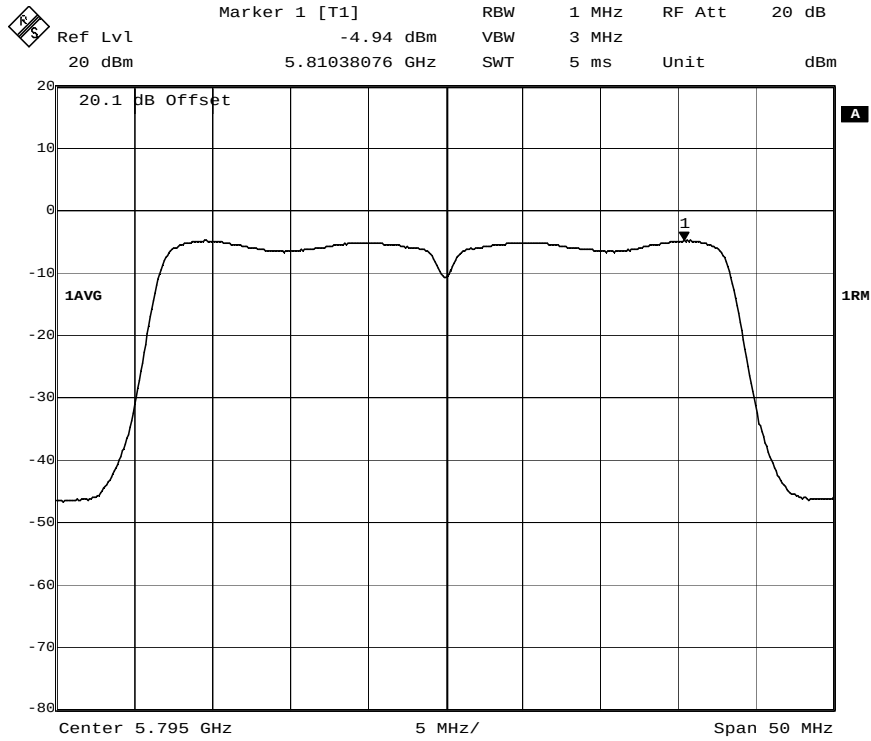


Date: 1.JAN.1997 00:28:53
802.11n (HT40) Channel 134, Power Spectral Density, Chain A and Chain B



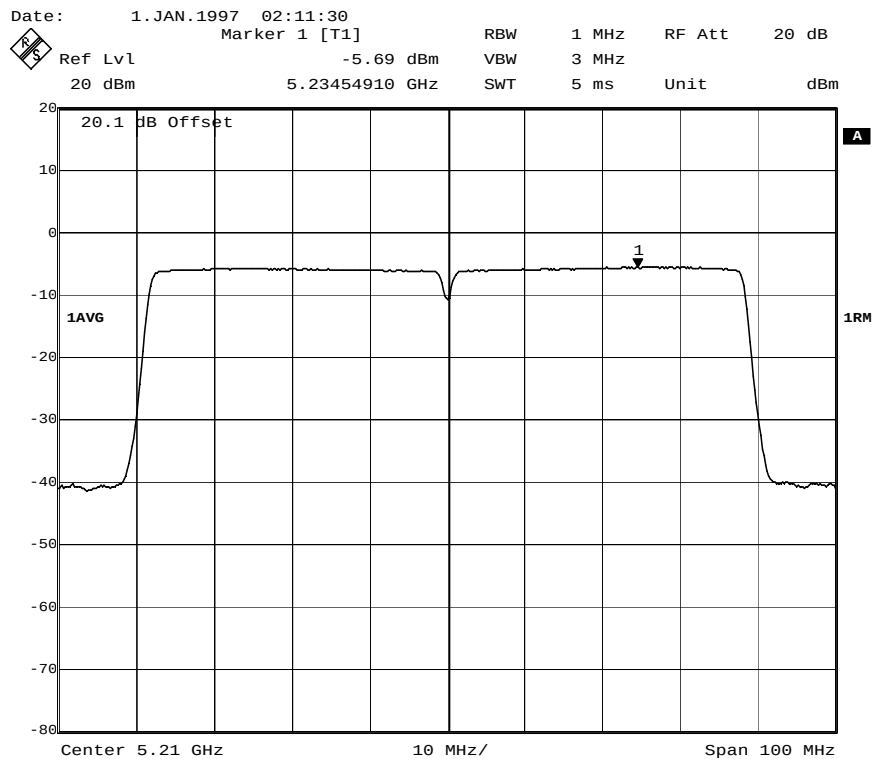
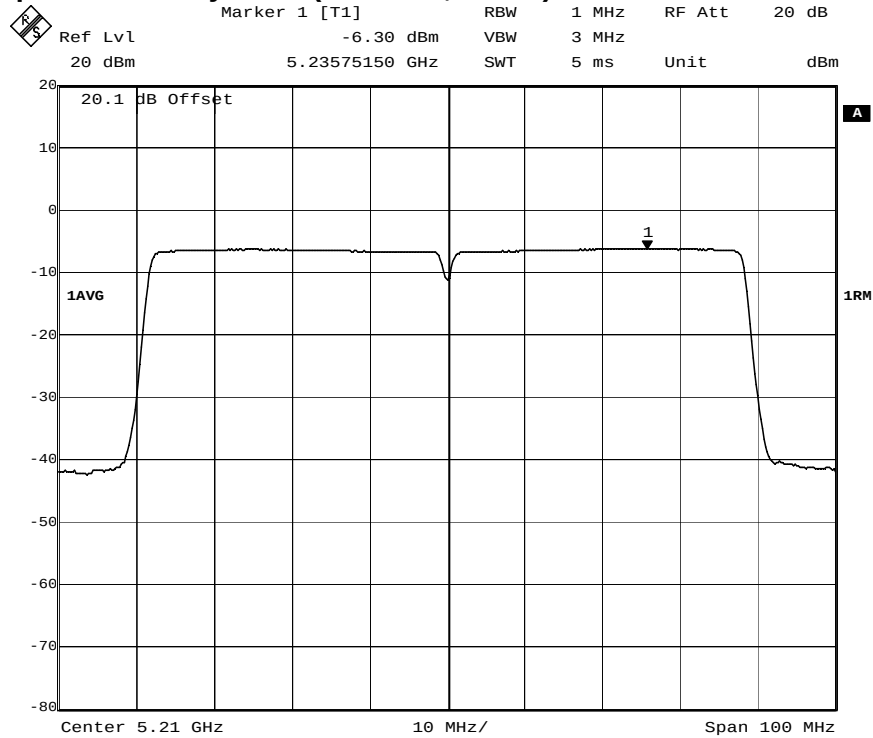
Date: 1.JAN.1997 00:23:04

802.11n (HT40) Channel 151, Power Spectral Density, Chain A and Chain B

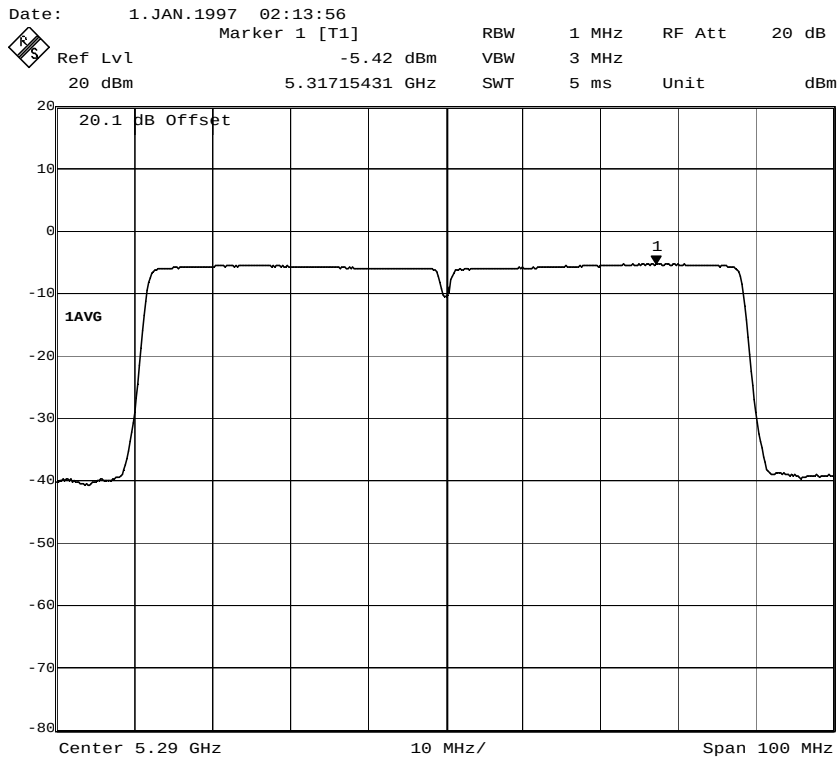
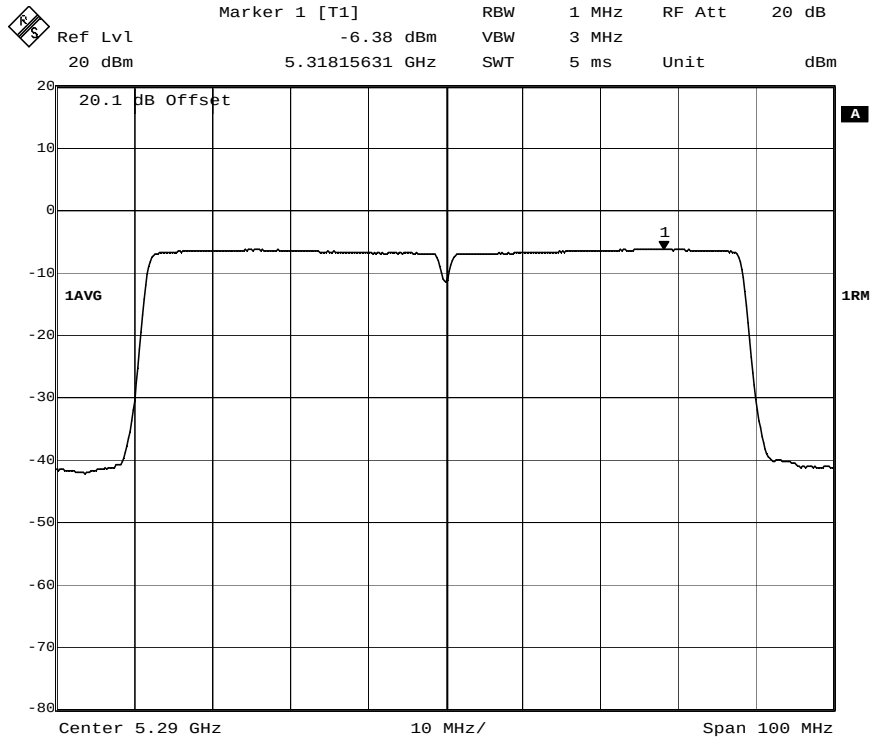


Date: 1.JAN.1997 00:24:58
802.11n (HT40) Channel 159, Power Spectral Density, Chain A and Chain B

7.15 Power Spectral Density Plots (802.11ac,VHT80):

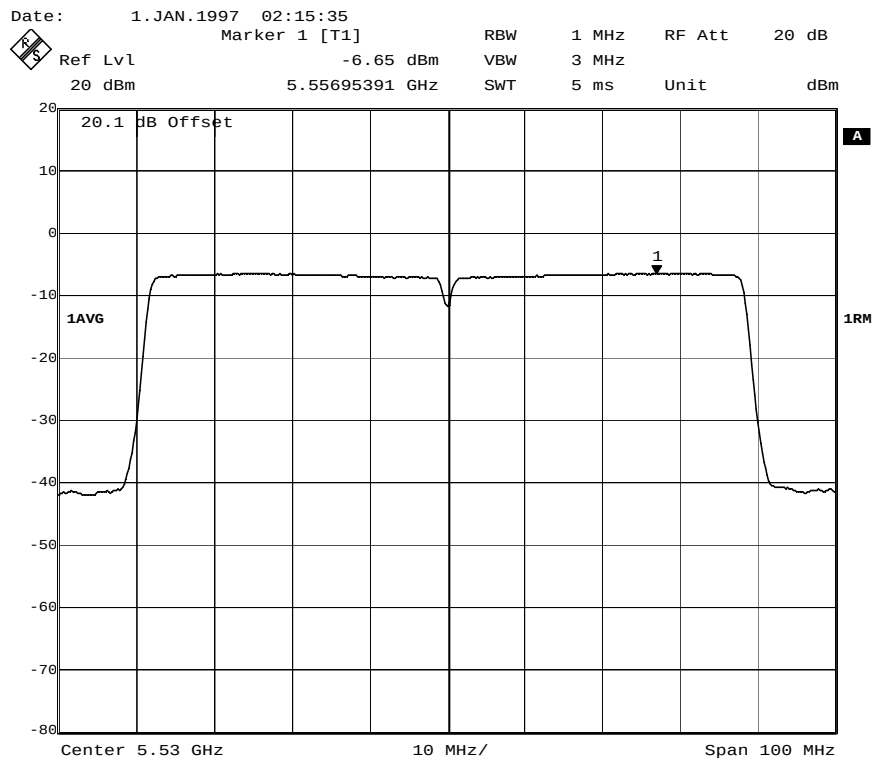
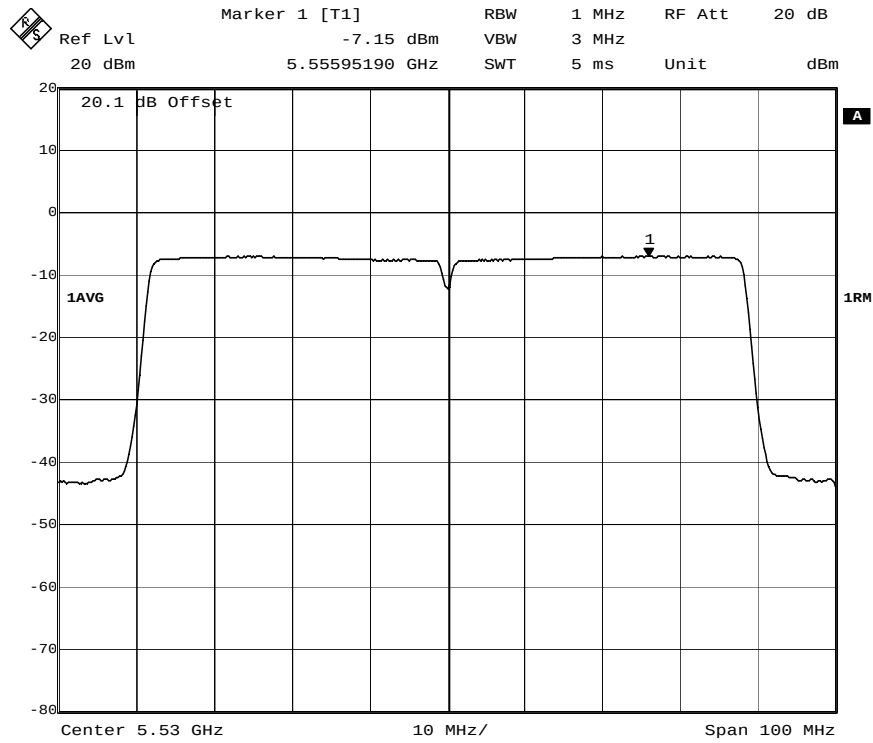


Date: 1.JAN.1997 01:43:12
 802.11ac (VHT80) Channel 42, Power Spectral Density, Chain A and Chain B



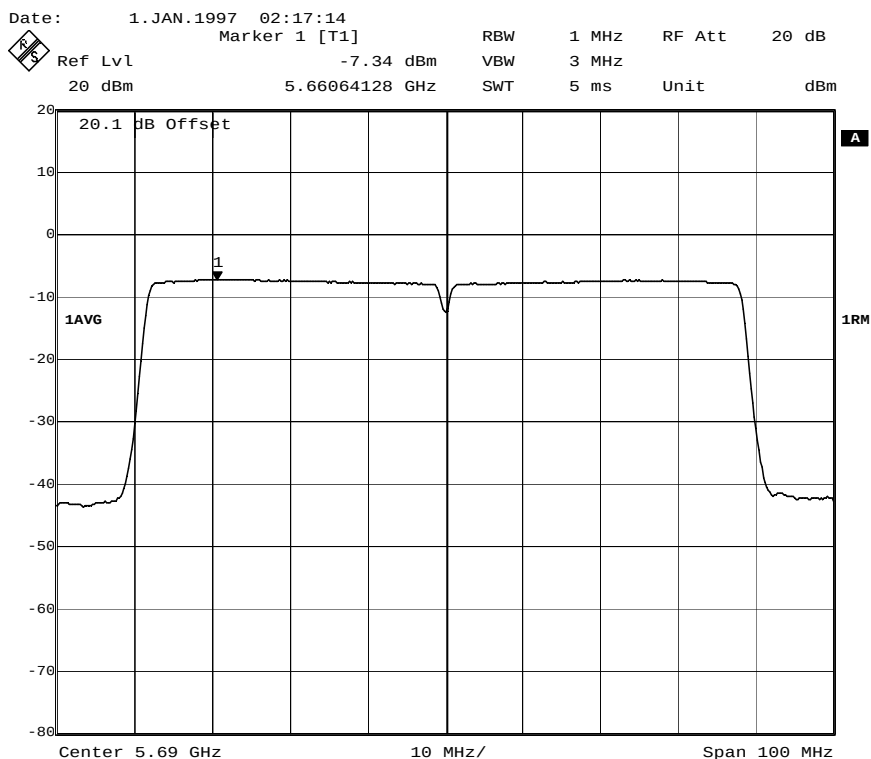
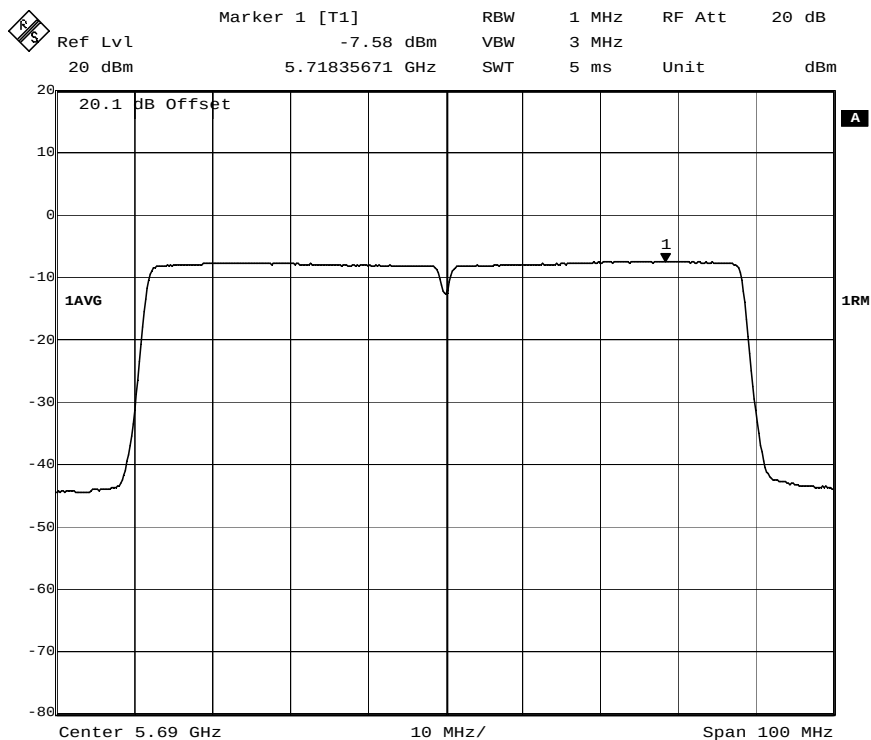
Date: 1.JAN.1997 01:44:22

802.11ac (VHT80) Channel 58, Power Spectral Density, Chain A and Chain B



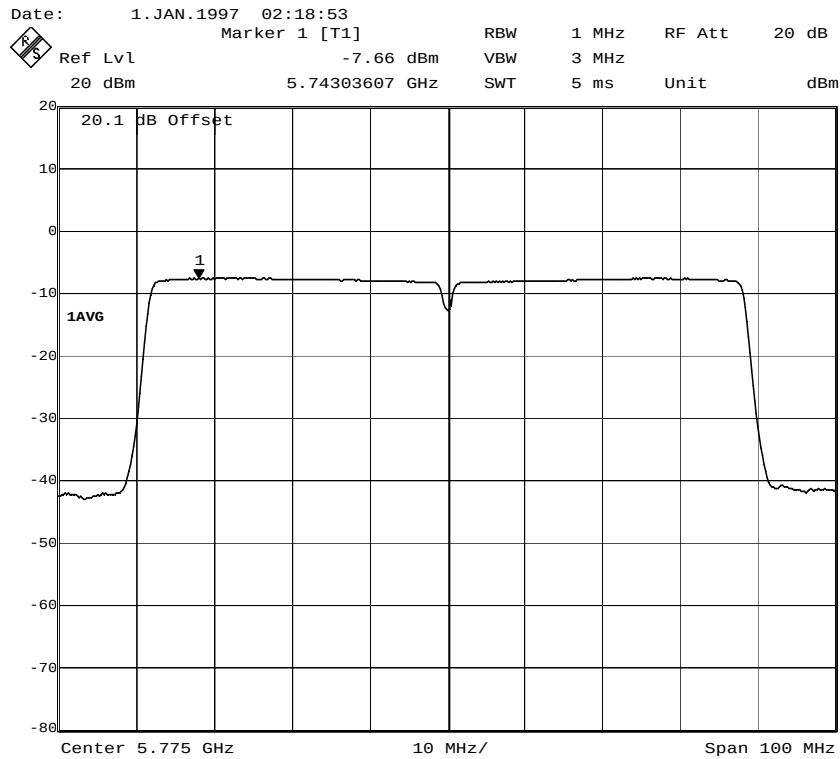
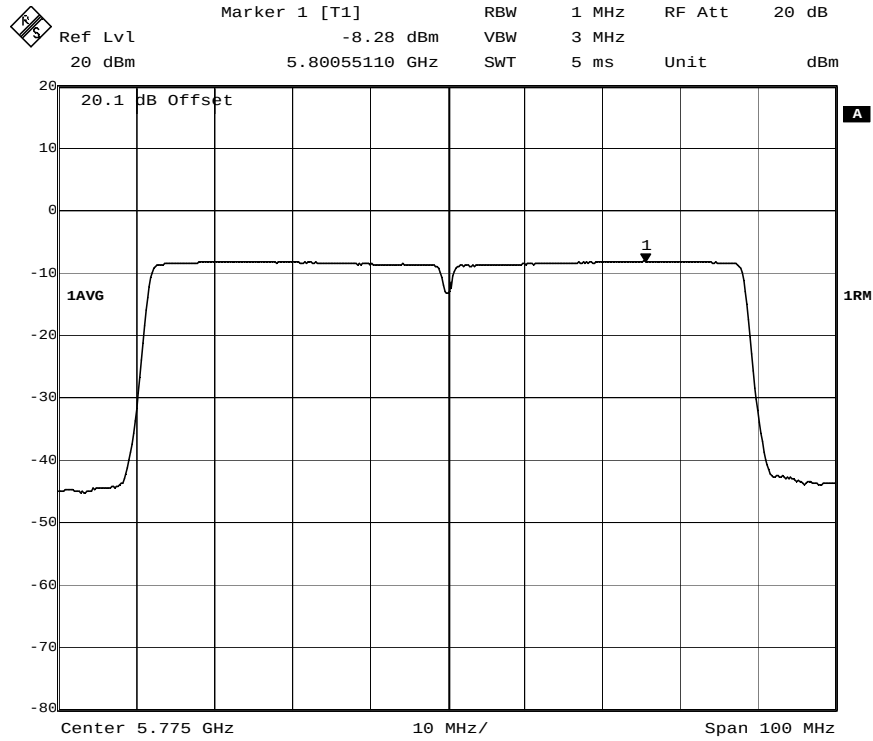
Date: 1.JAN.1997 01:45:36

802.11ac (VHT80) Channel 106, Power Spectral Density, Chain A and Chain B



Date: 1.JAN.1997 01:47:27

802.11ac (VHT80) Channel 138, Power Spectral Density, Chain A and Chain B



Date: 1.JAN.1997 01:48:59

802.11ac (VHT80) Channel 155, Power Spectral Density, Chain A and Chain B