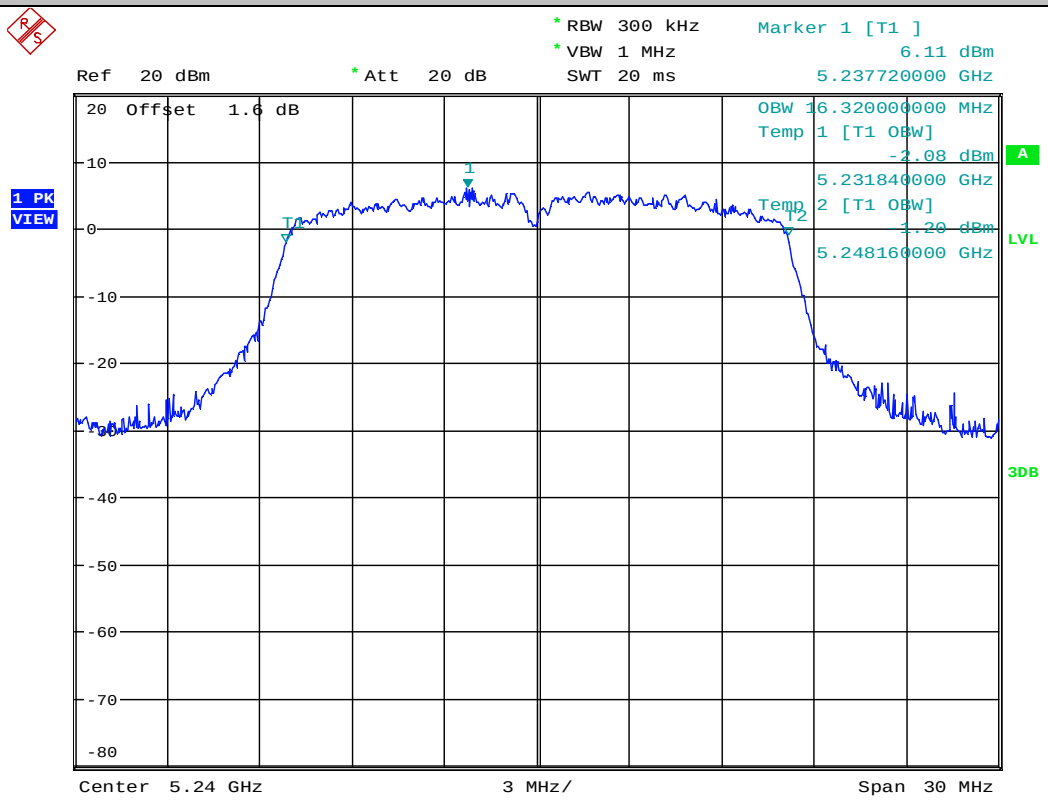
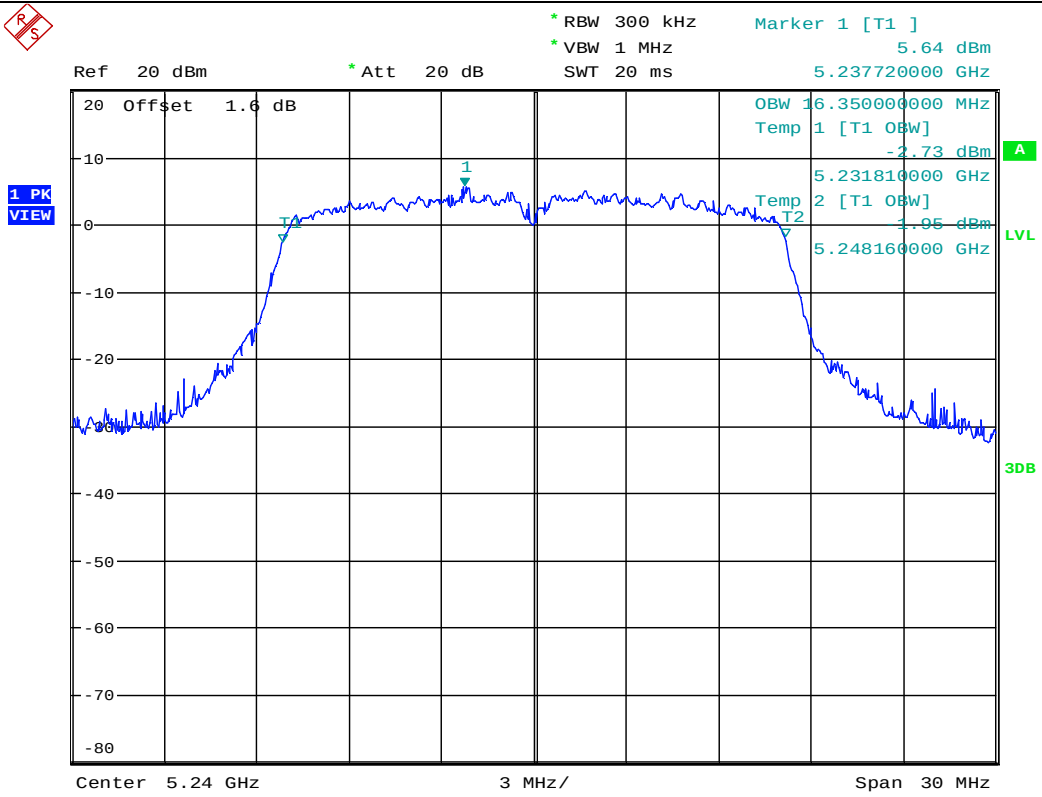
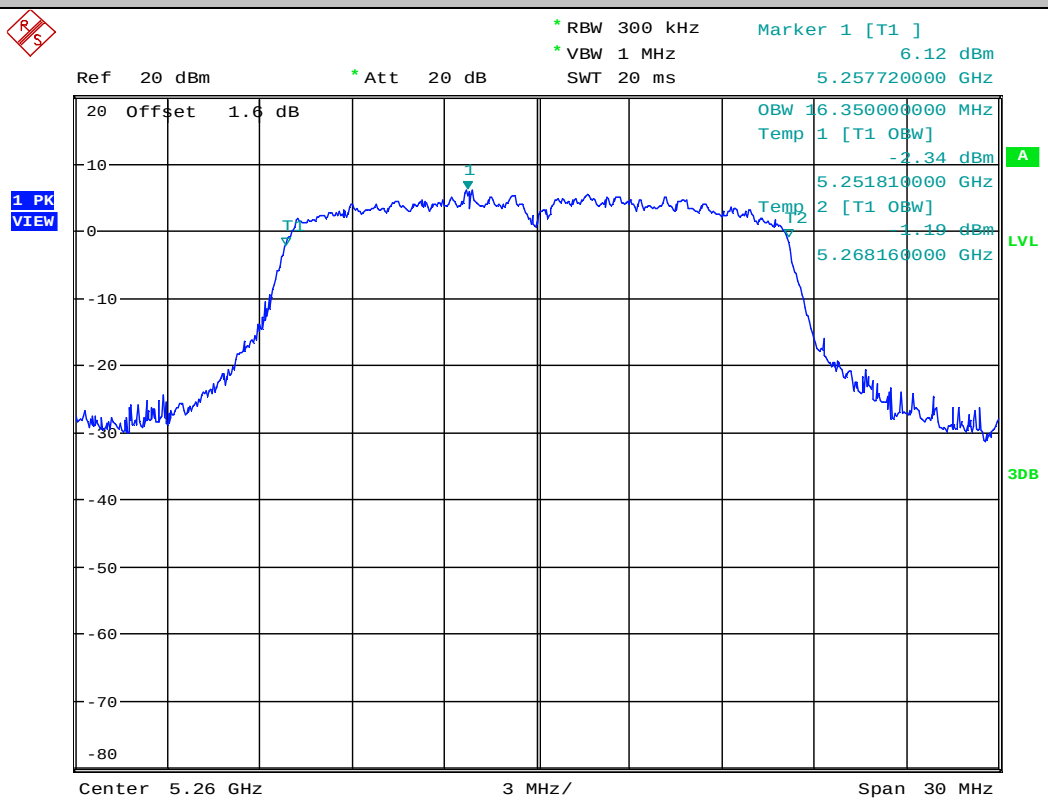
Occupied Bandwidth Measurement_11A_5240_Ant1



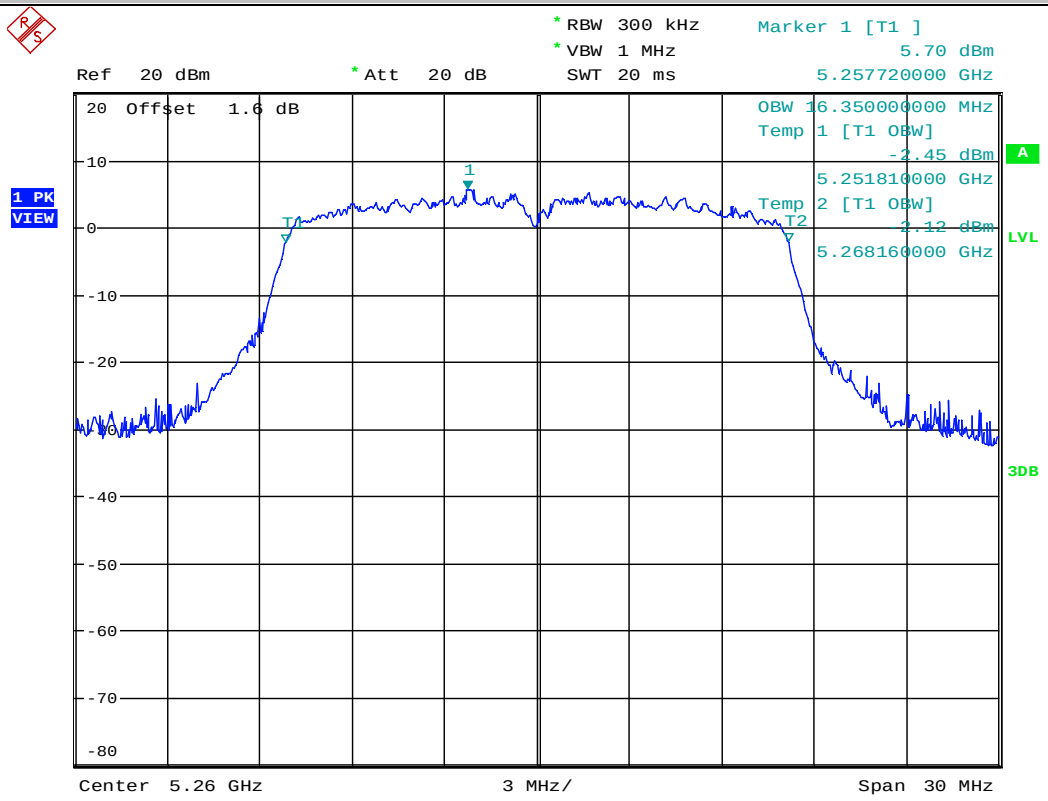
Occupied Bandwidth Measurement_11A_5240_Ant2



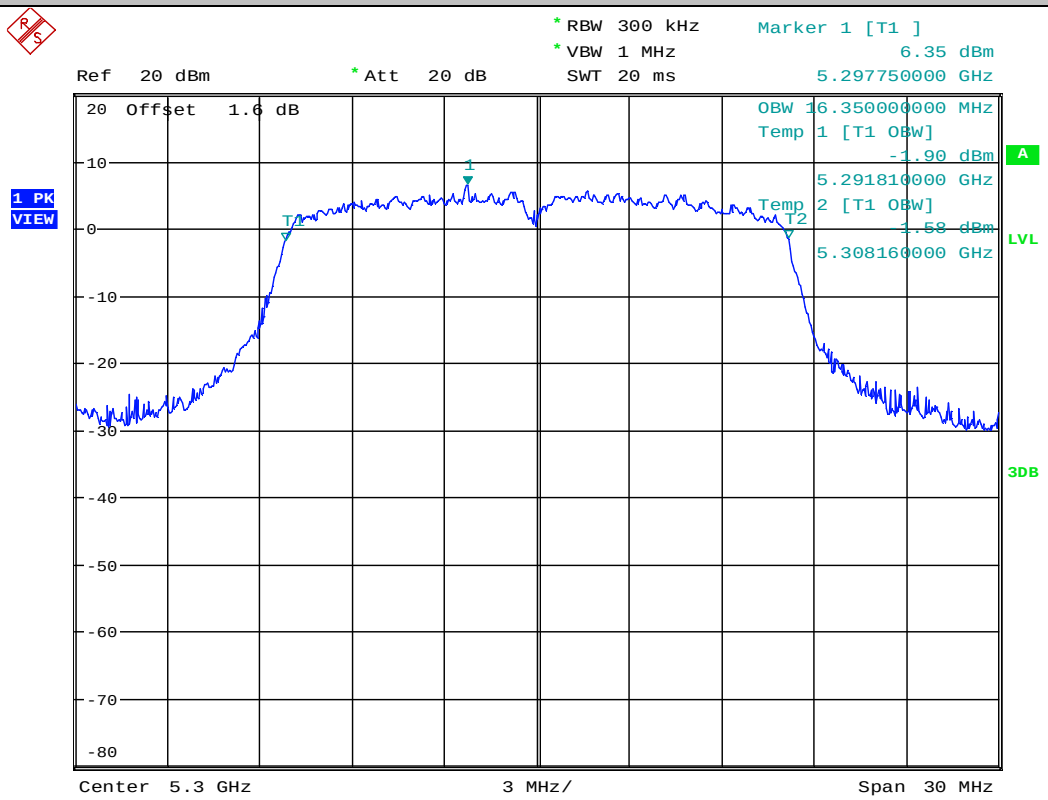
Occupied Bandwidth Measurement_11A_5260_Ant1



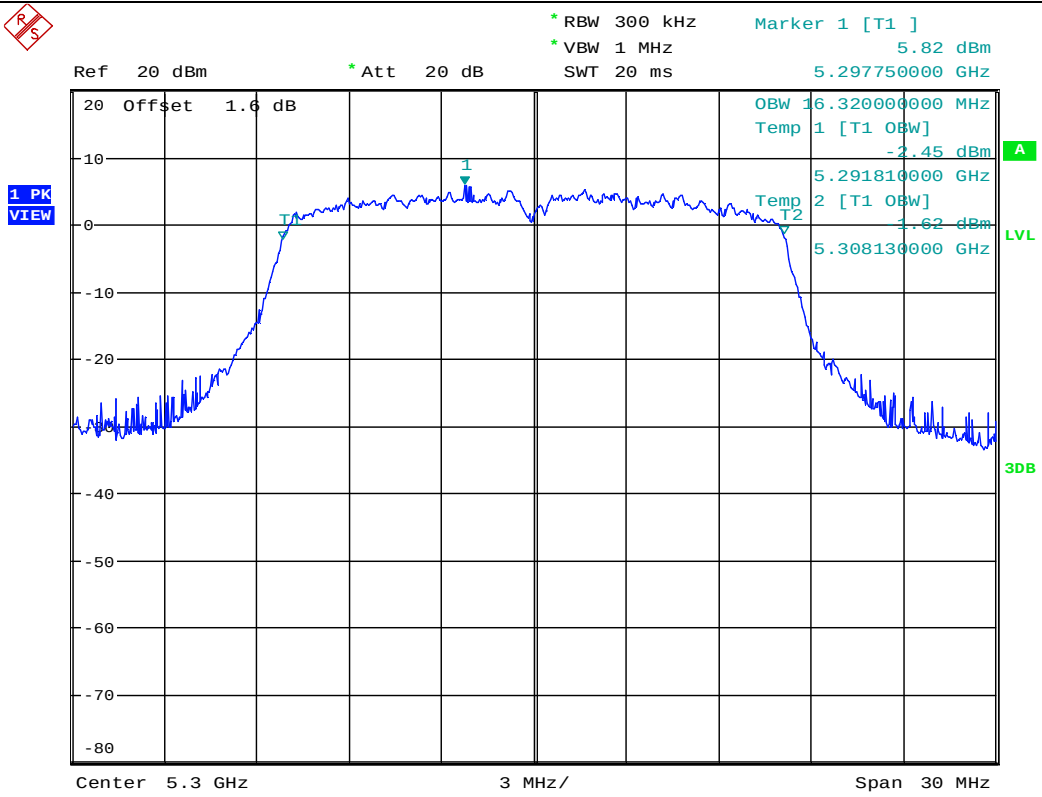
Occupied Bandwidth Measurement_11A_5260_Ant2



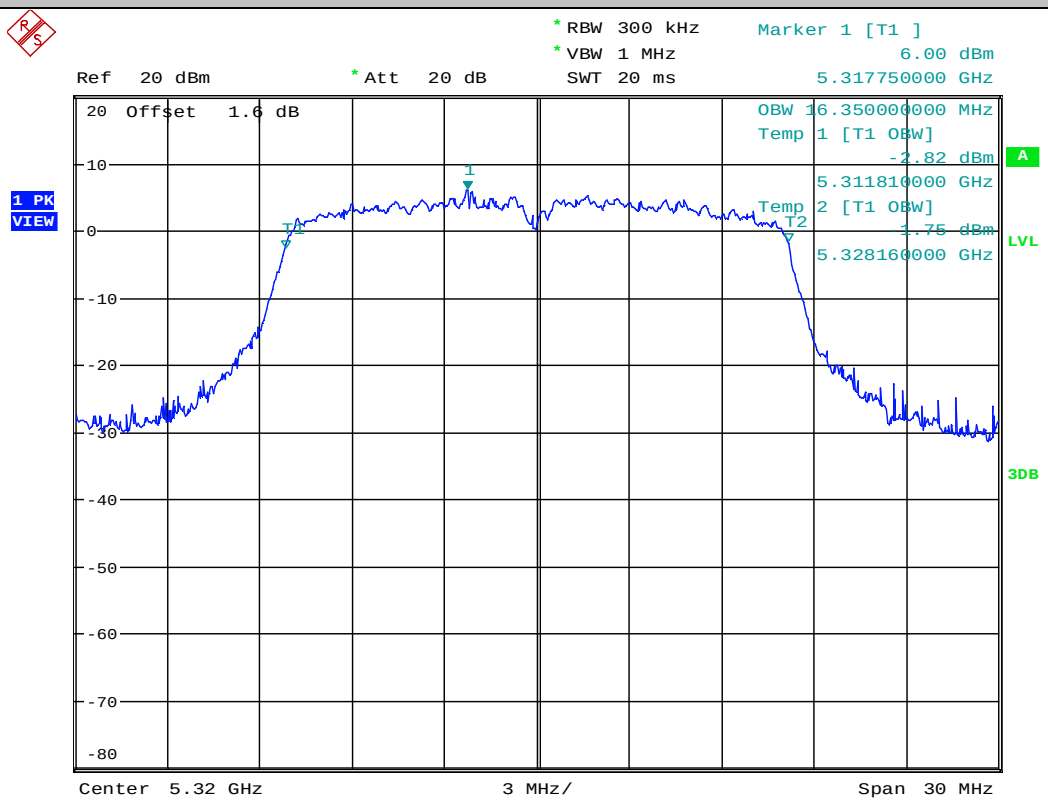
Occupied Bandwidth Measurement_11A_5300_Ant1



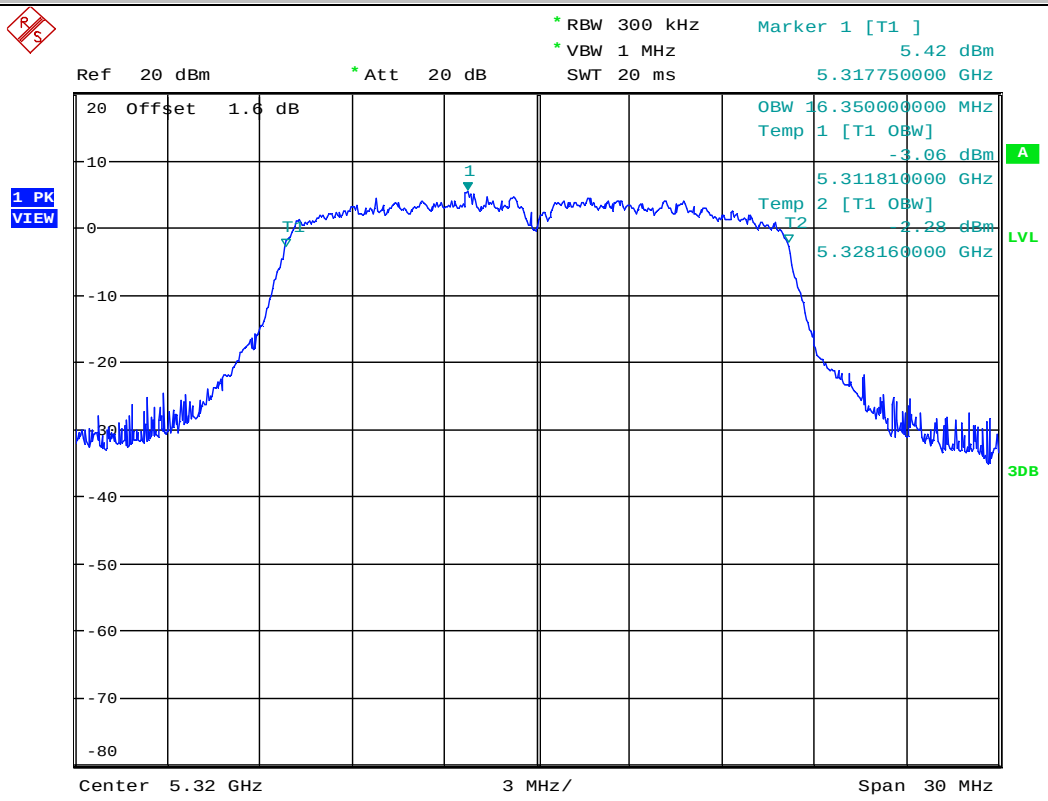
Occupied Bandwidth Measurement_11A_5300_Ant2



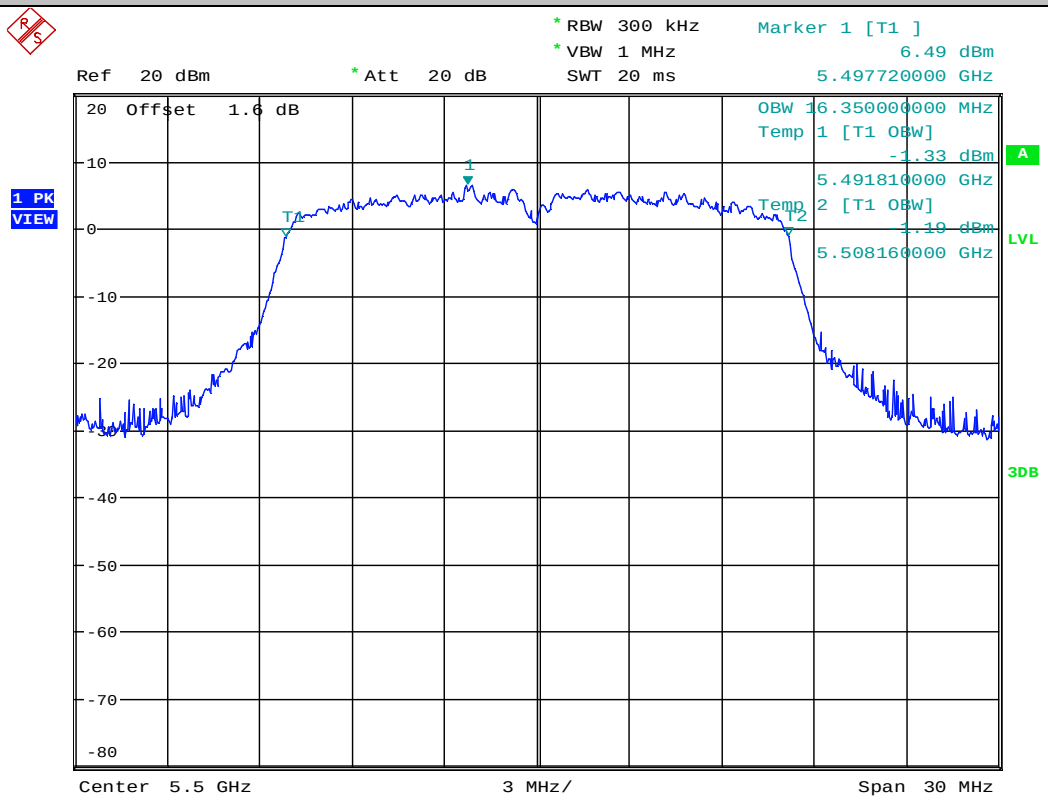
Occupied Bandwidth Measurement_11A_5320_Ant1



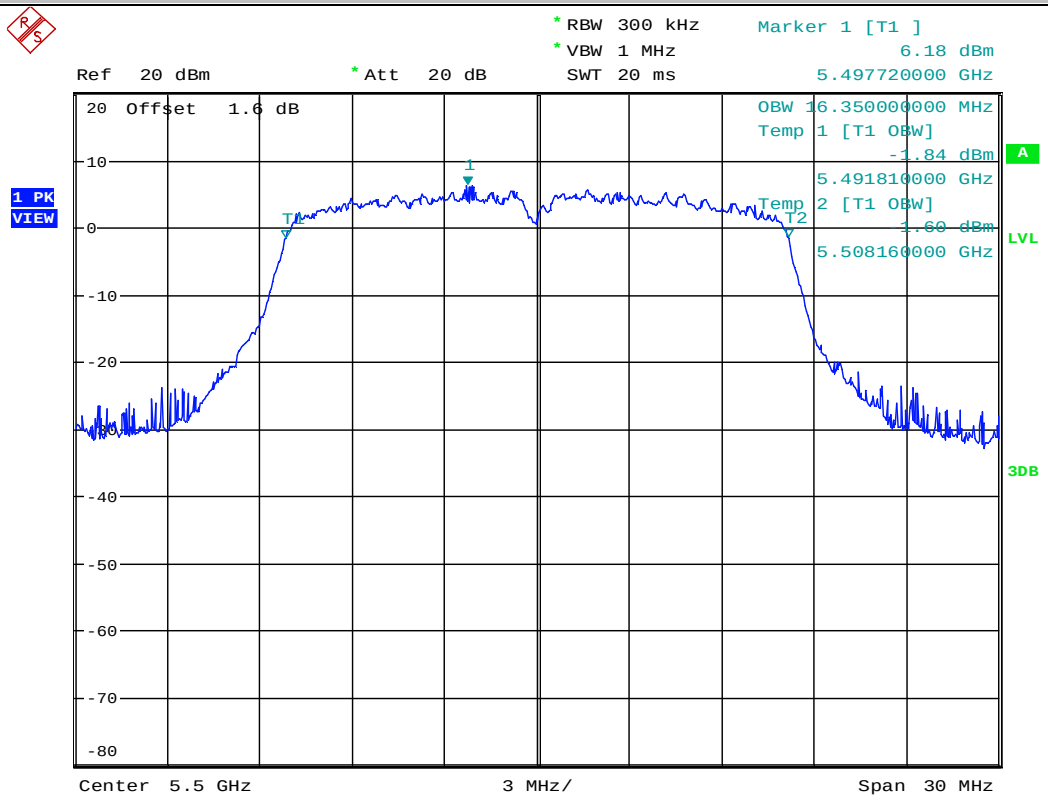
Occupied Bandwidth Measurement_11A_5320_Ant2



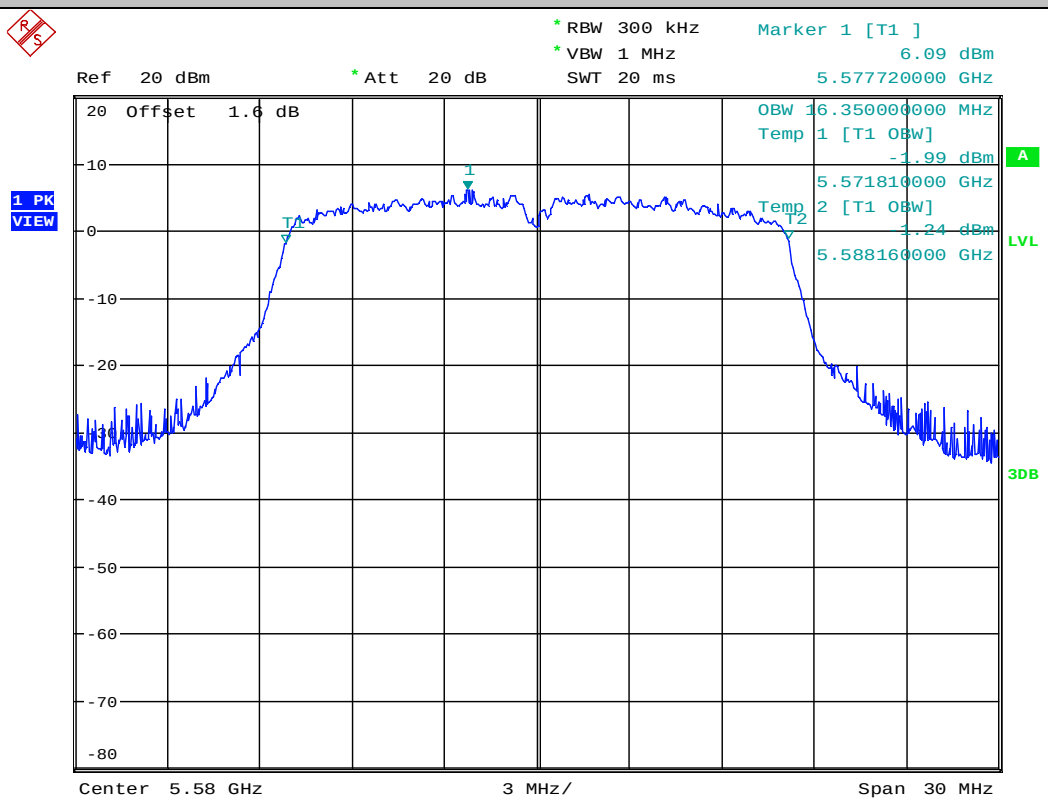
Occupied Bandwidth Measurement_11A_5500_Ant1



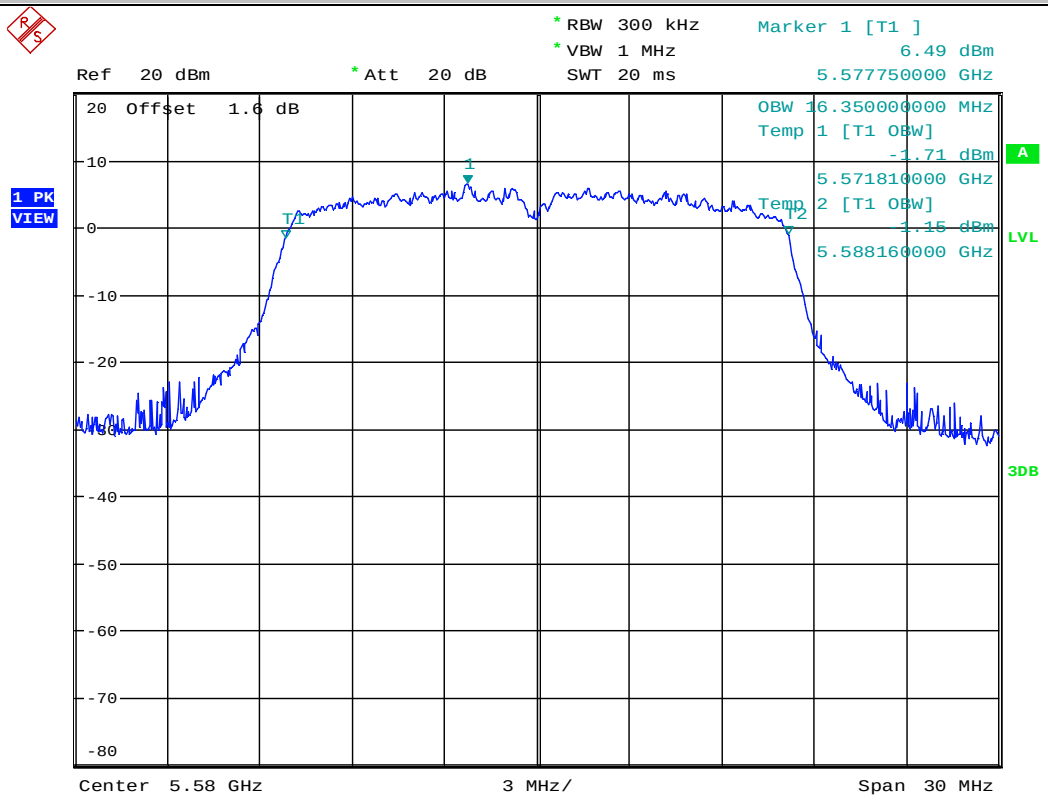
Occupied Bandwidth Measurement_11A_5500_Ant2



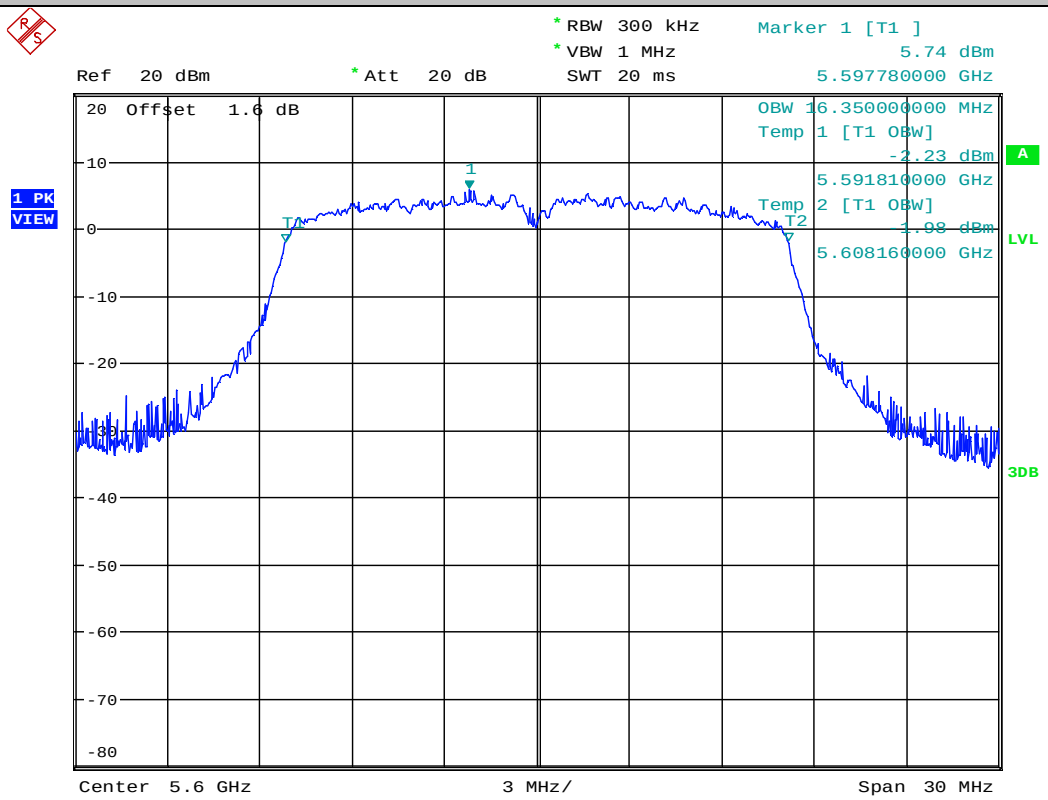
Occupied Bandwidth Measurement_11A_5580_Ant1



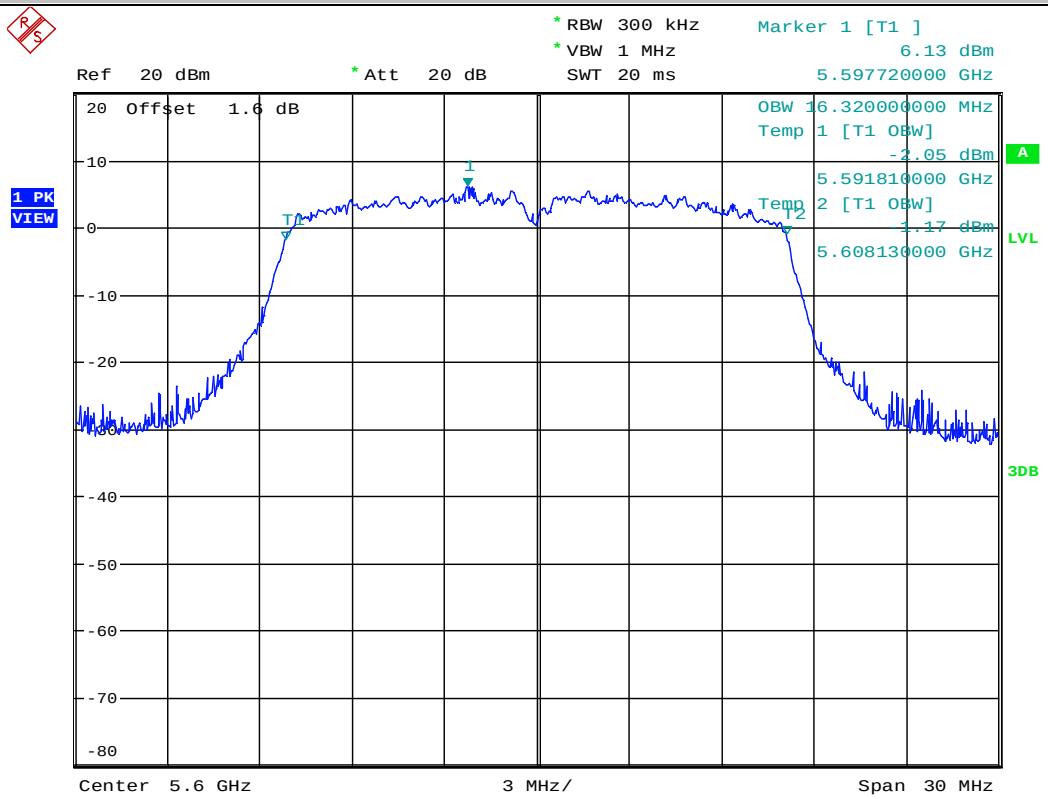
Occupied Bandwidth Measurement_11A_5580_Ant2



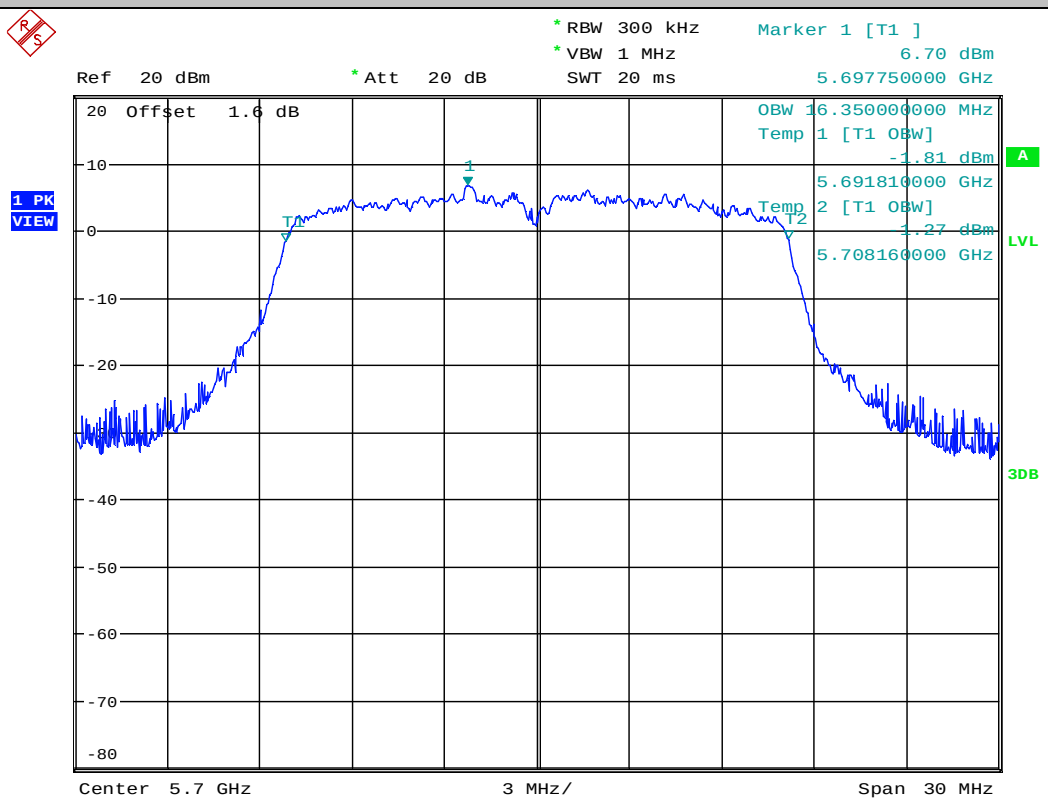
Occupied Bandwidth Measurement_11A_5600_Ant1



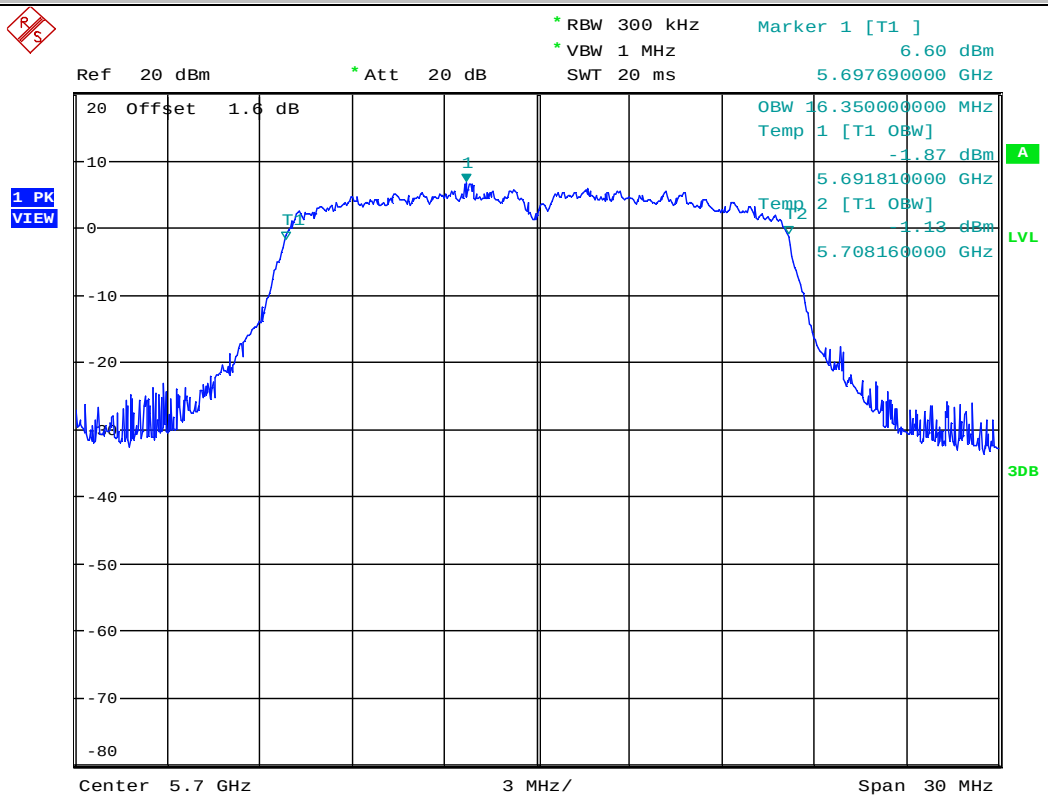
Occupied Bandwidth Measurement_11A_5600_Ant2



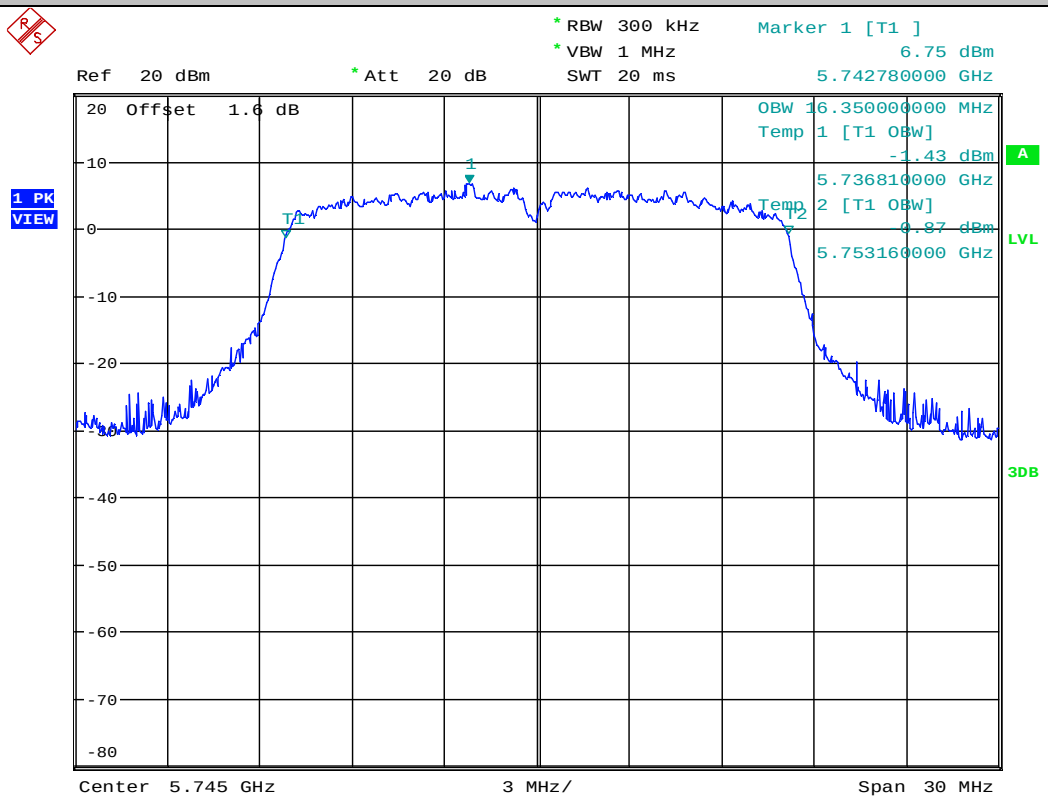
Occupied Bandwidth Measurement_11A_5700_Ant1



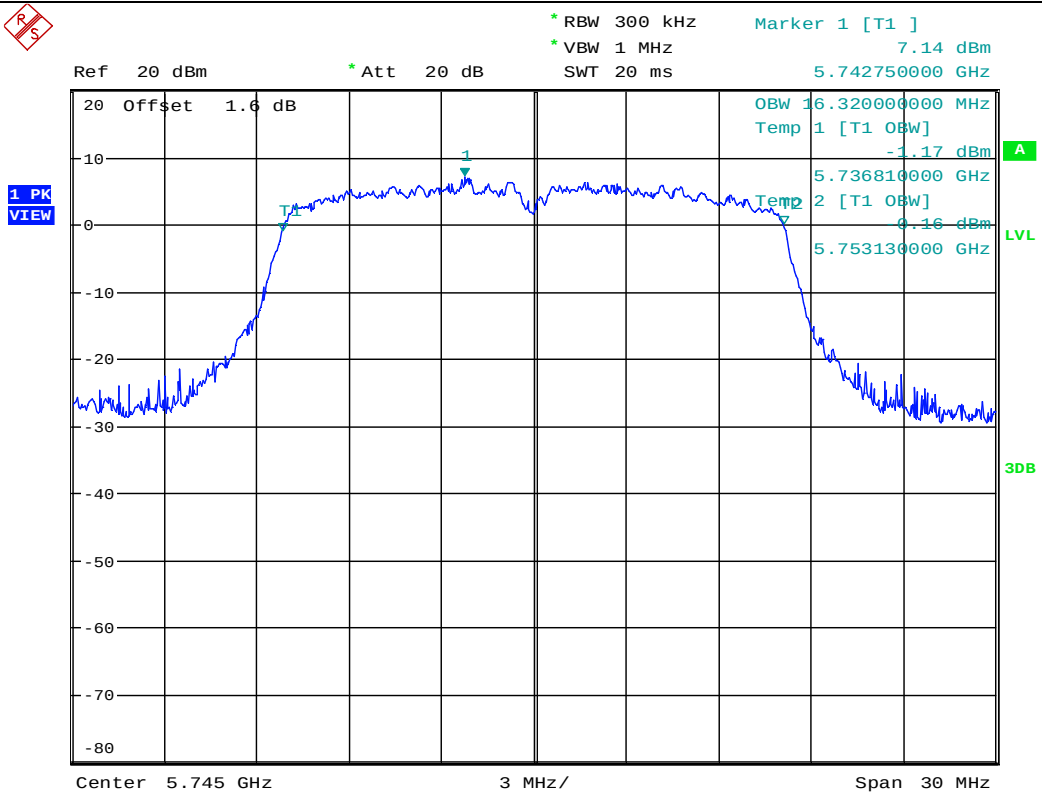
Occupied Bandwidth Measurement_11A_5700_Ant2



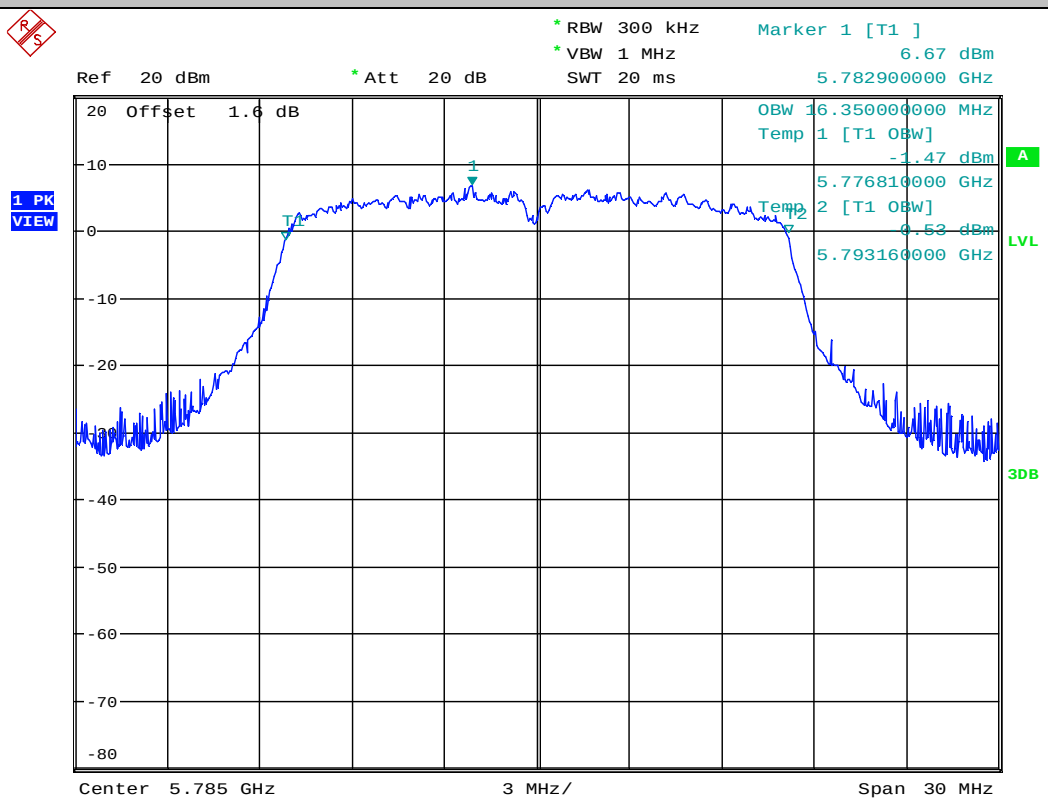
Occupied Bandwidth Measurement_11A_5745_Ant1



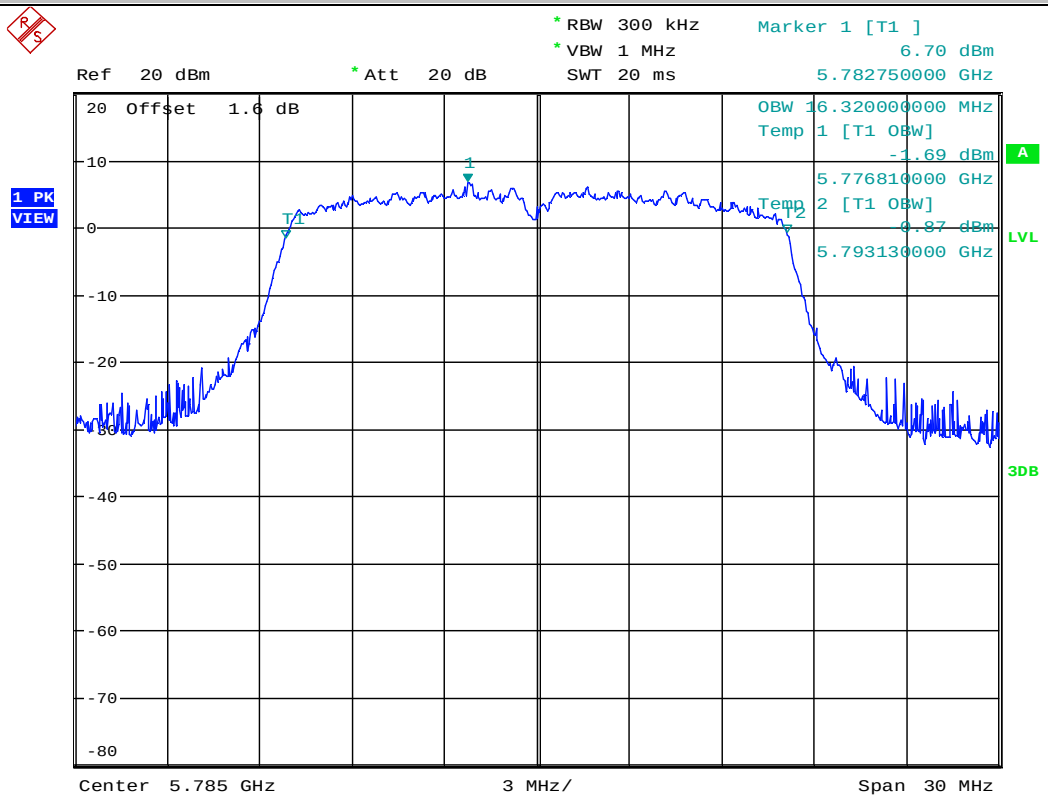
Occupied Bandwidth Measurement_11A_5745_Ant2



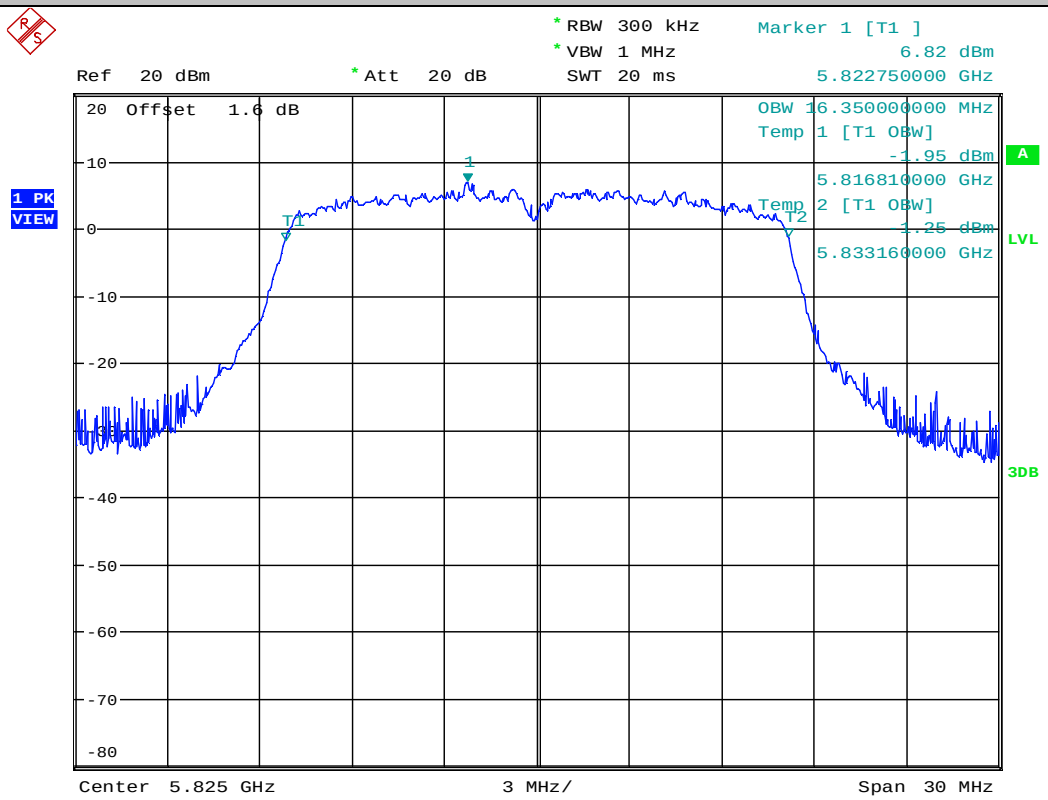
Occupied Bandwidth Measurement_11A_5785_Ant1



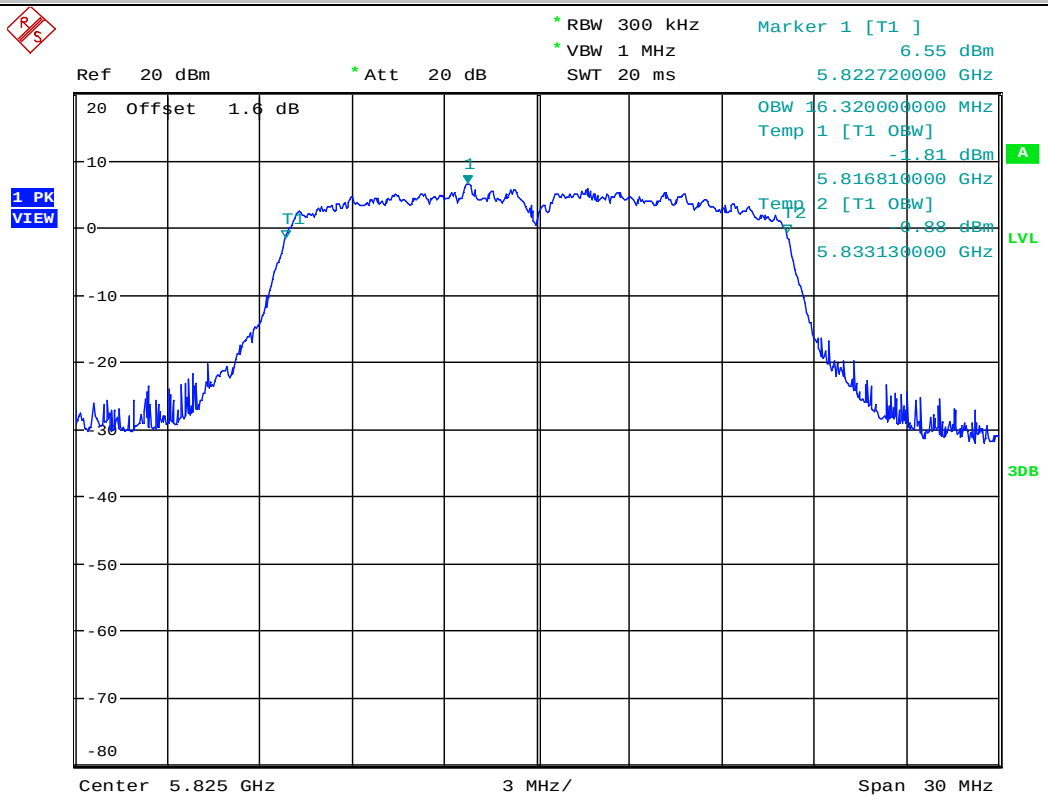
Occupied Bandwidth Measurement_11A_5785_Ant2



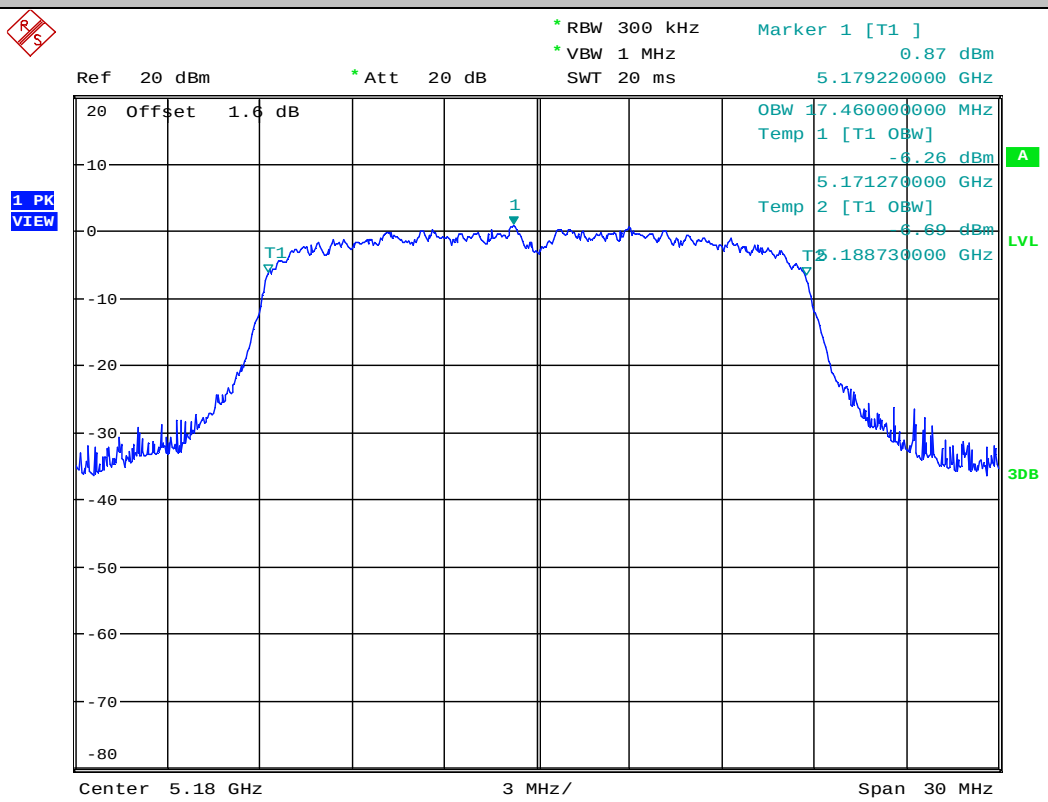
Occupied Bandwidth Measurement_11A_5825_Ant1



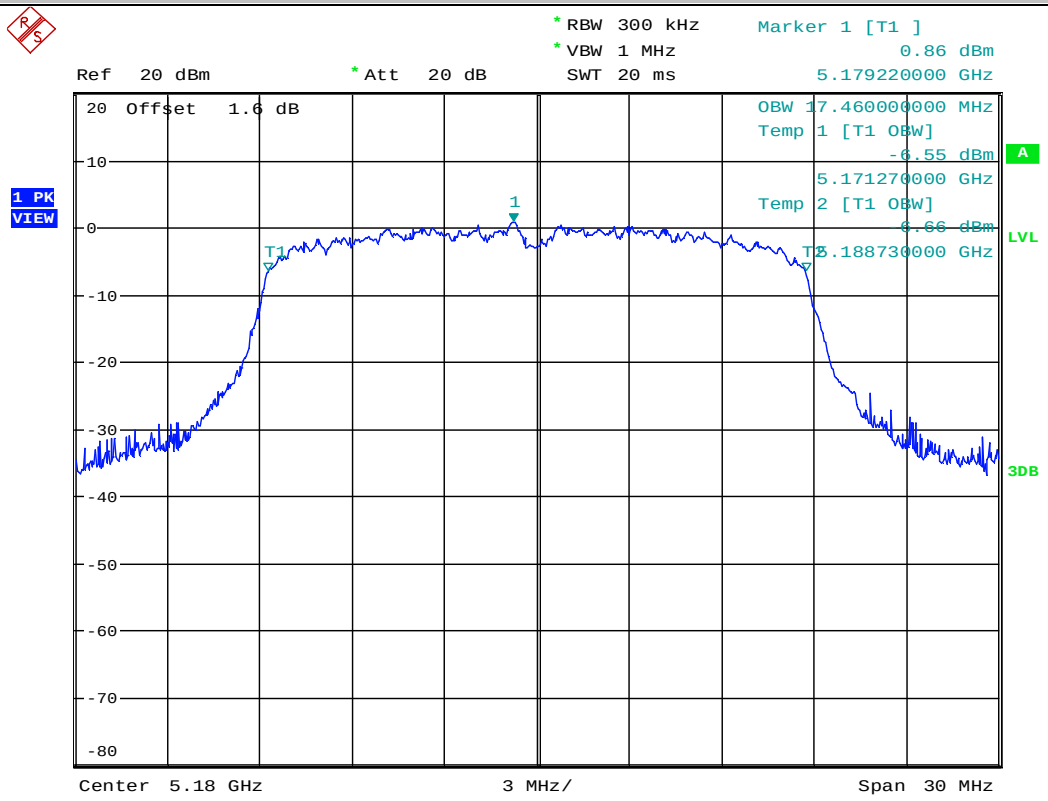
Occupied Bandwidth Measurement_11A_5825_Ant2



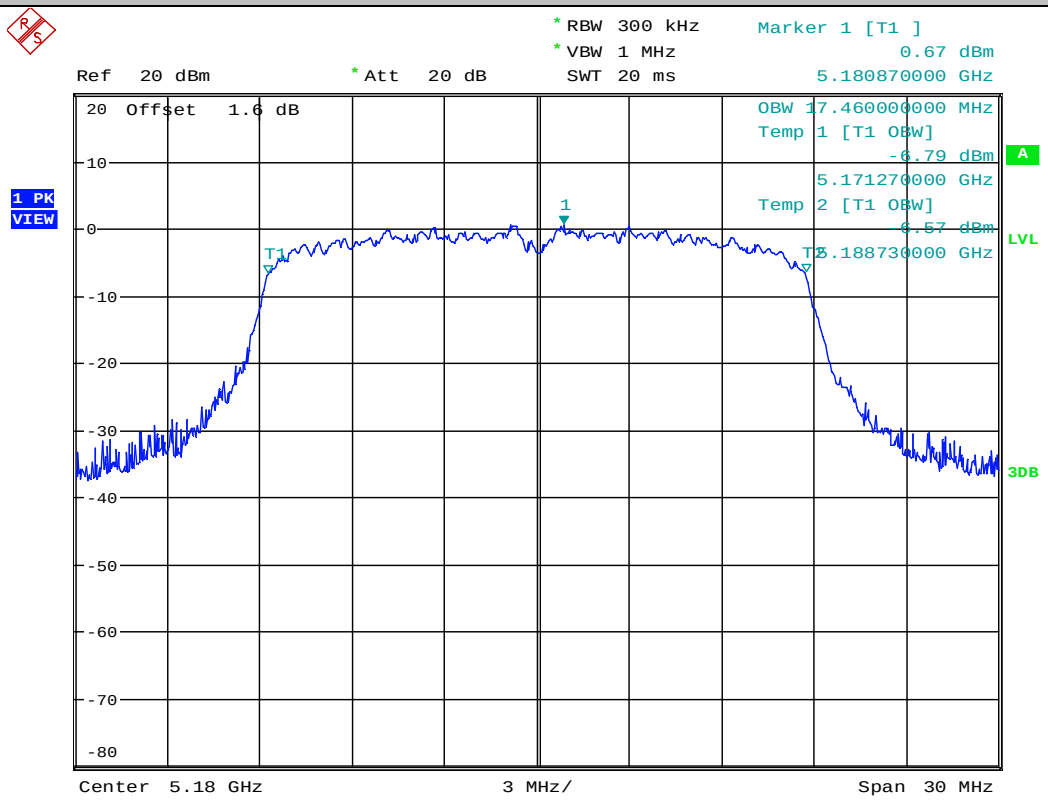
Occupied Bandwidth Measurement_11AC20_5180_Ant1



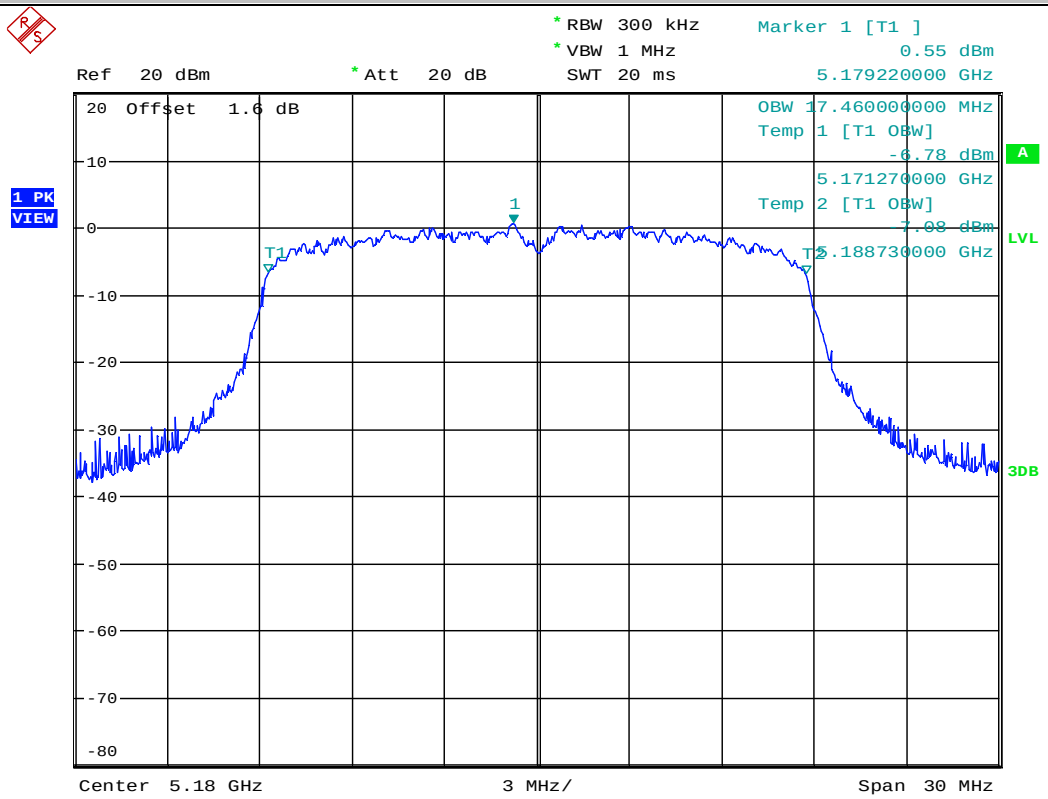
Occupied Bandwidth Measurement_11N20_5180_Ant1



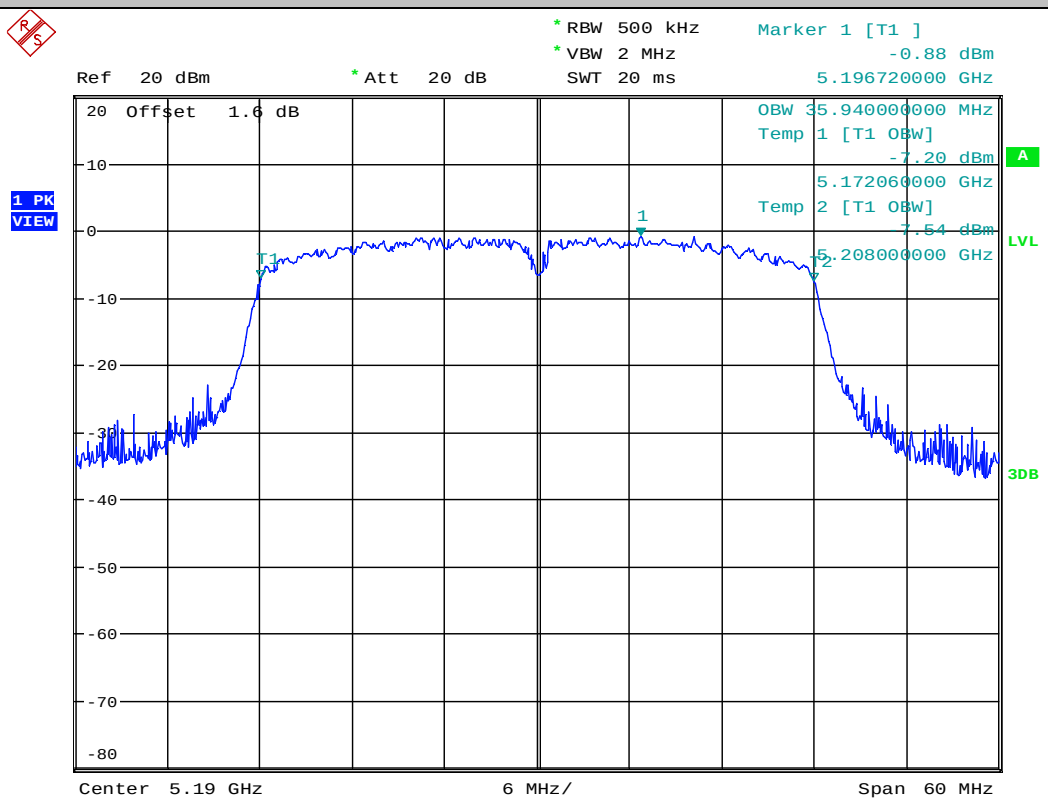
Occupied Bandwidth Measurement_11N20_5180_Ant2



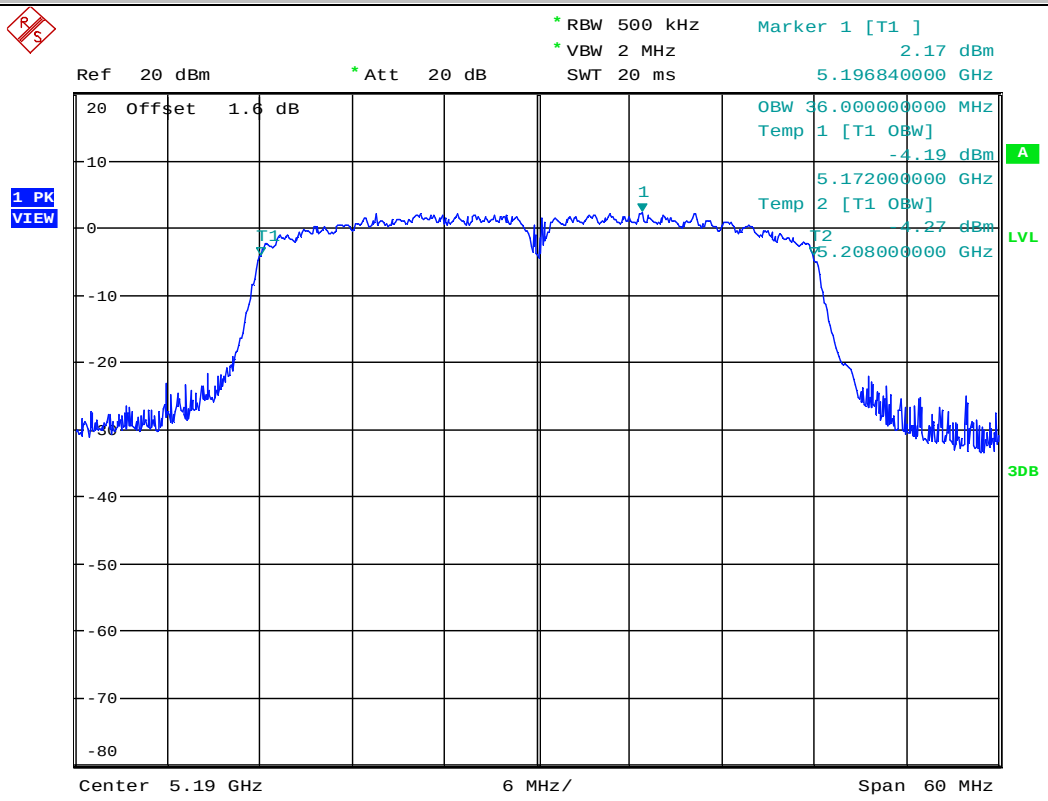
Occupied Bandwidth Measurement_11AC20_5180_Ant2



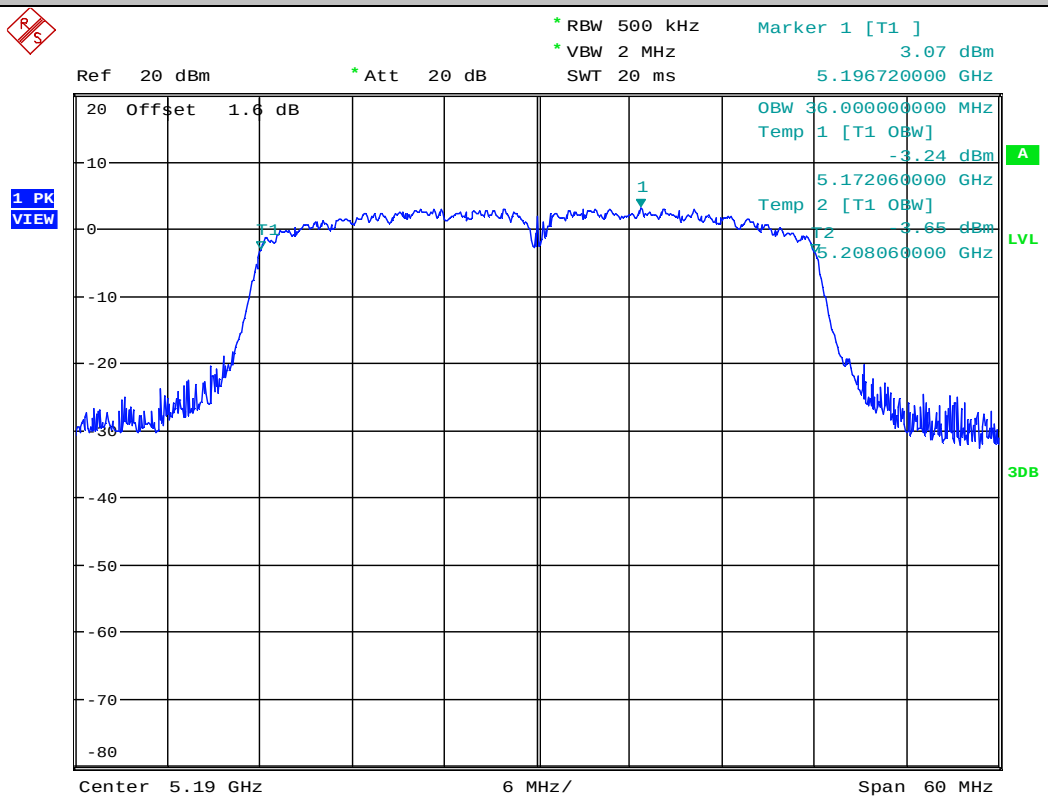
Occupied Bandwidth Measurement_11AC40_5190_Ant1



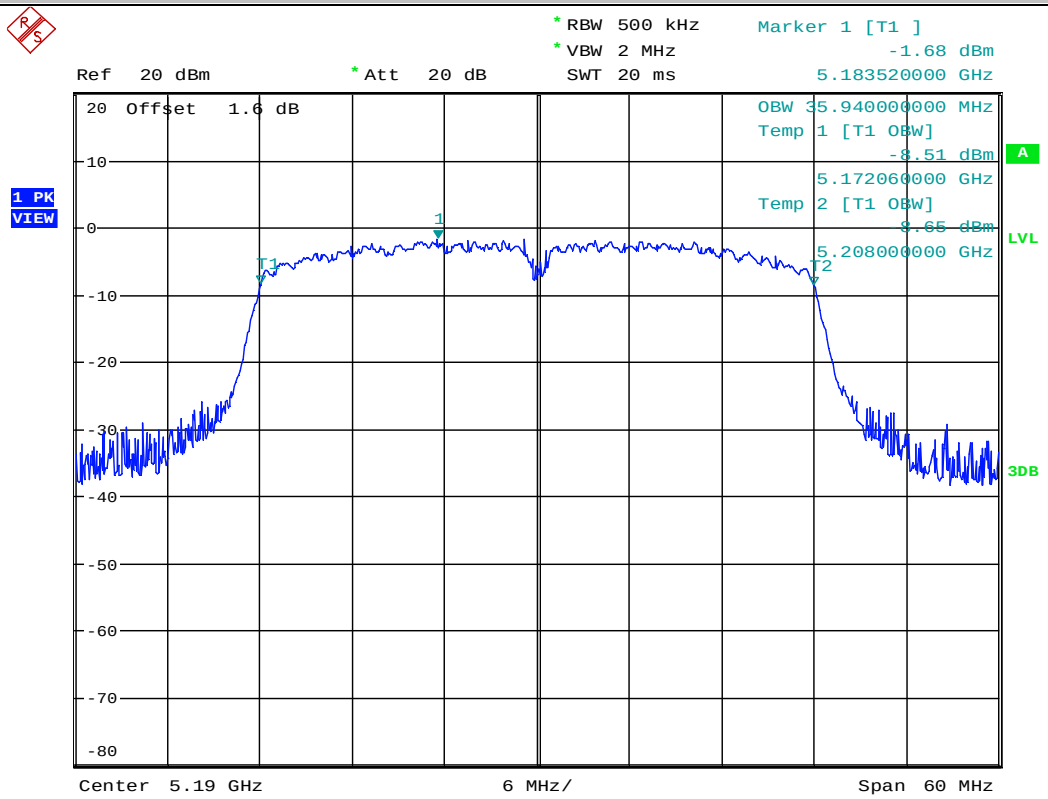
Occupied Bandwidth Measurement_11N40_5190_Ant1



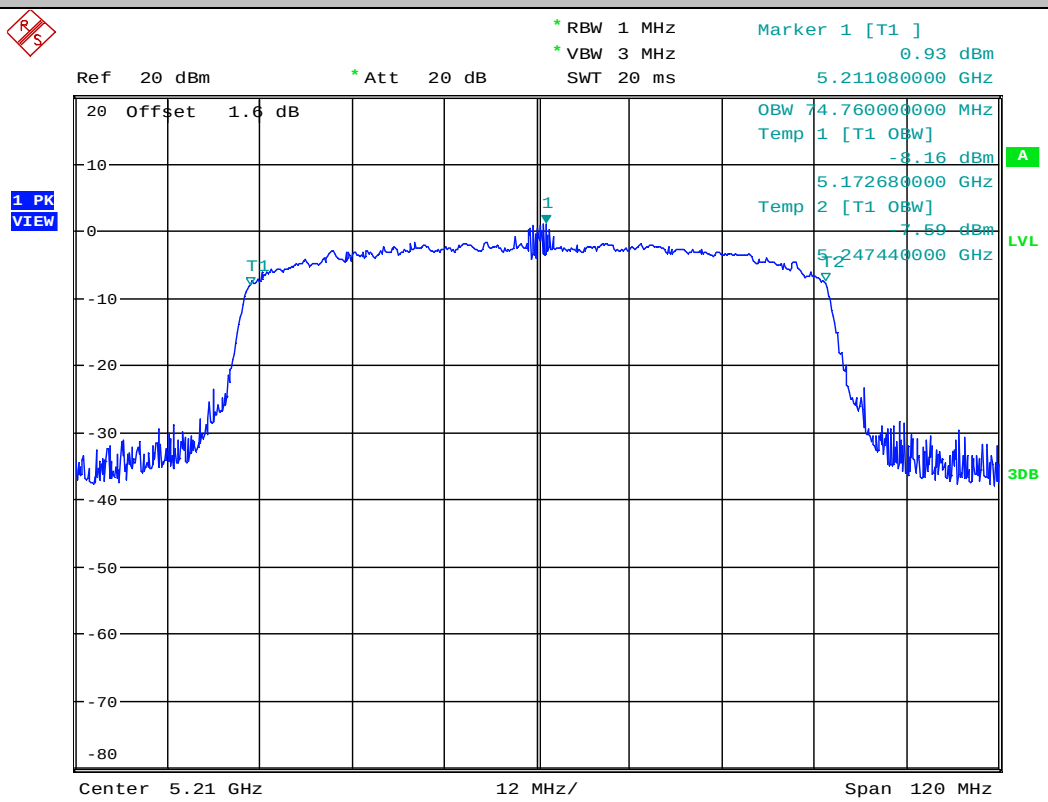
Occupied Bandwidth Measurement_11N40_5190_Ant2



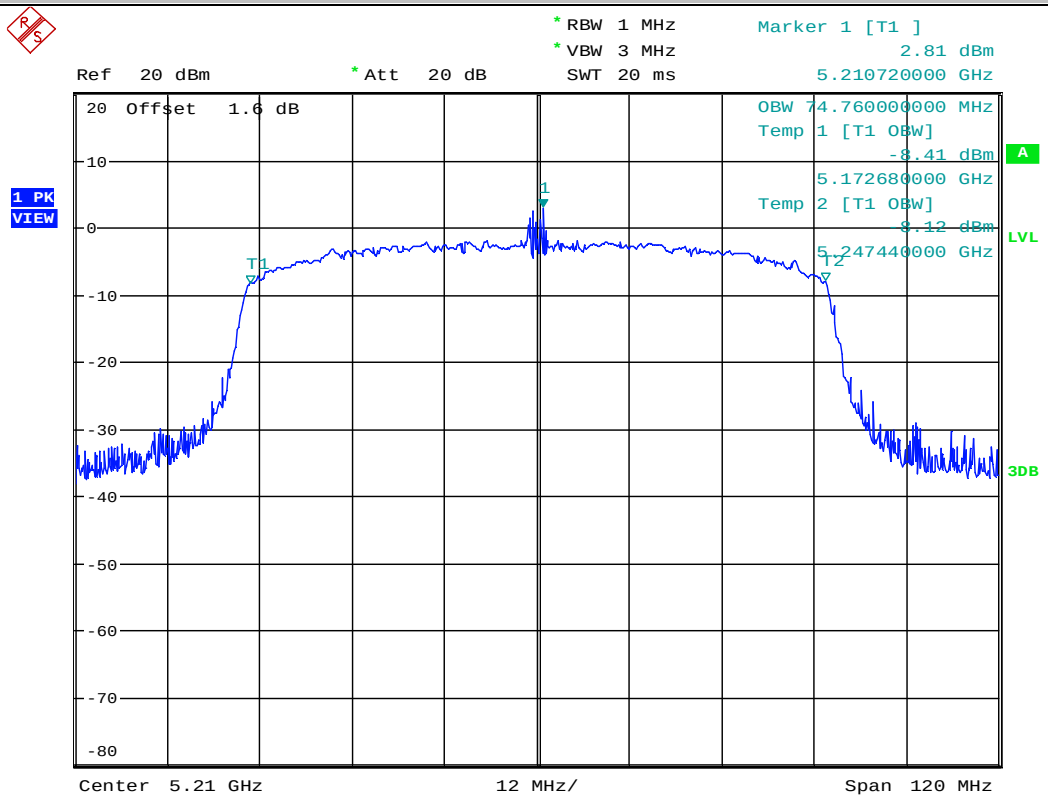
Occupied Bandwidth Measurement_11AC40_5190_Ant2



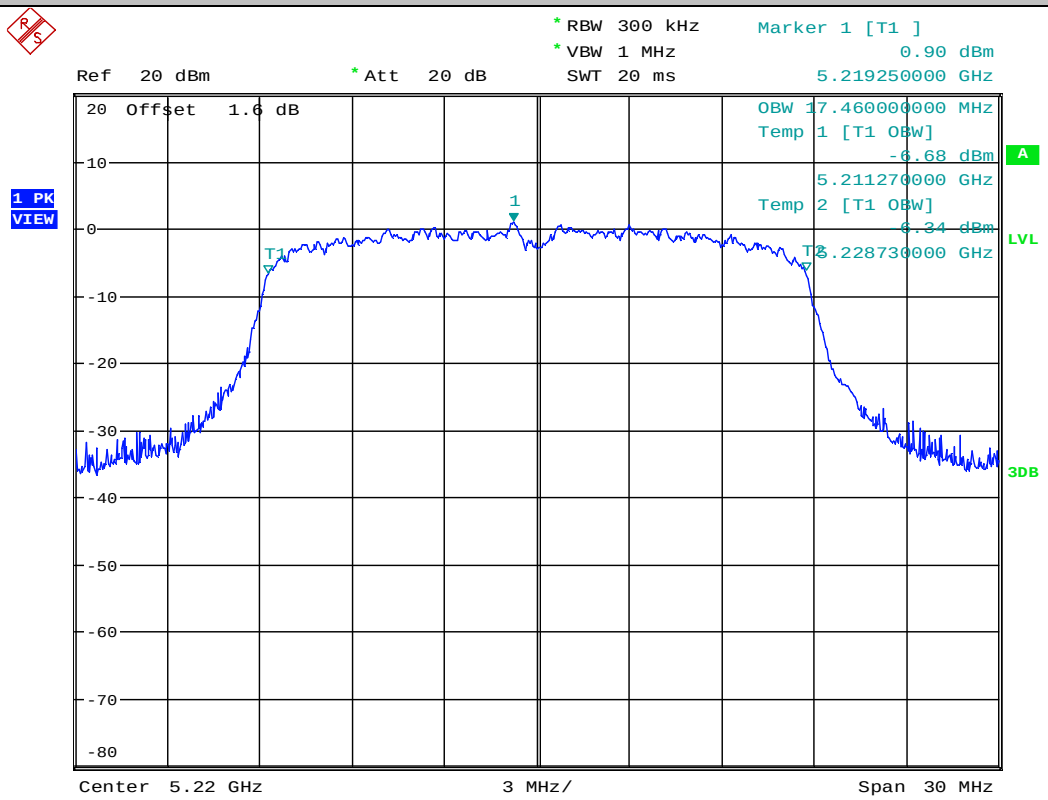
Occupied Bandwidth Measurement_11AC80_5210_Ant1



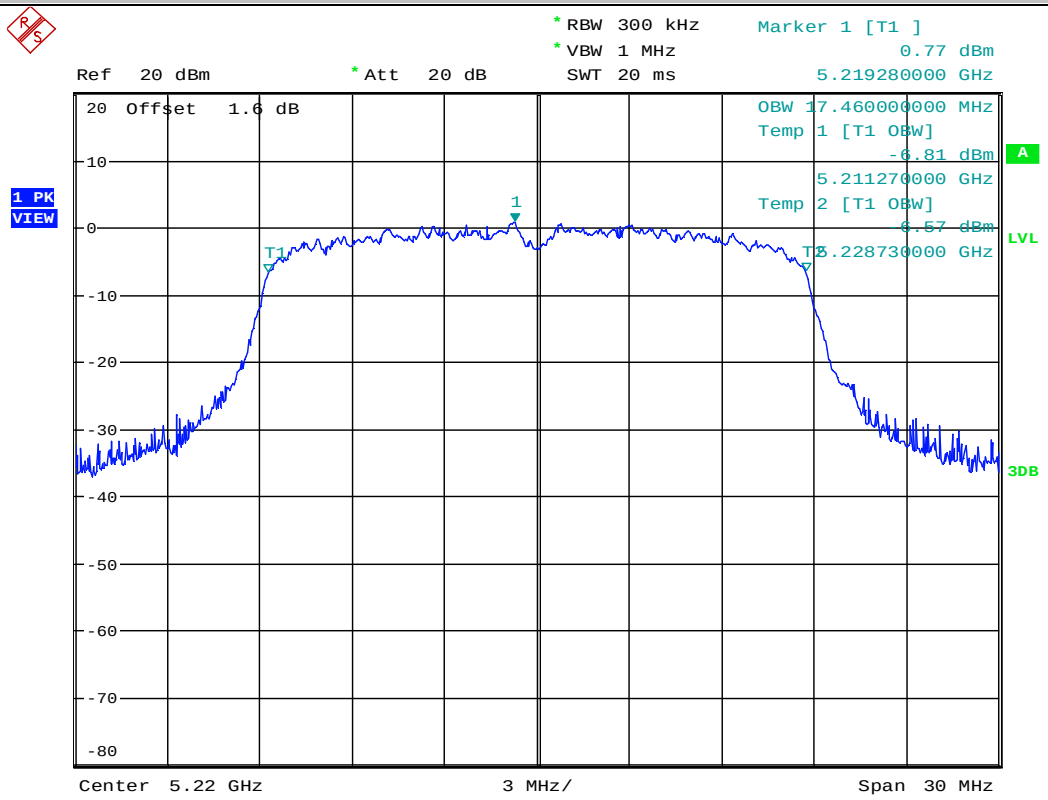
Occupied Bandwidth Measurement_11AC80_5210_Ant2



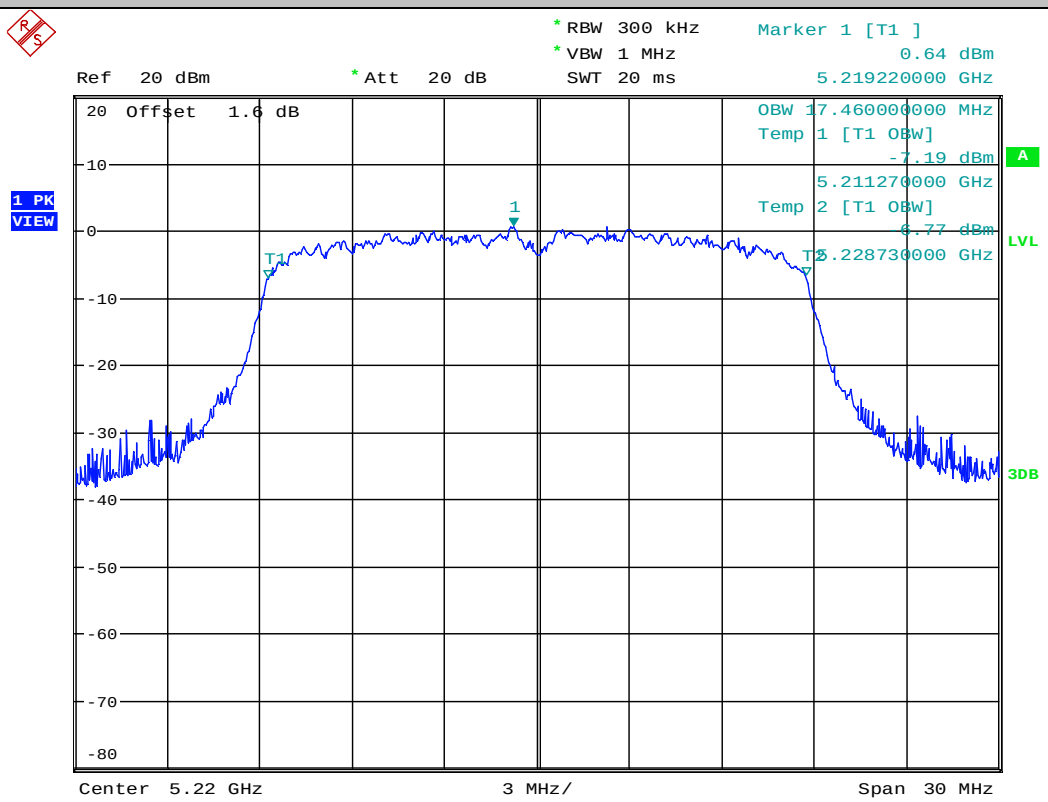
Occupied Bandwidth Measurement_11N20_5220_Ant1



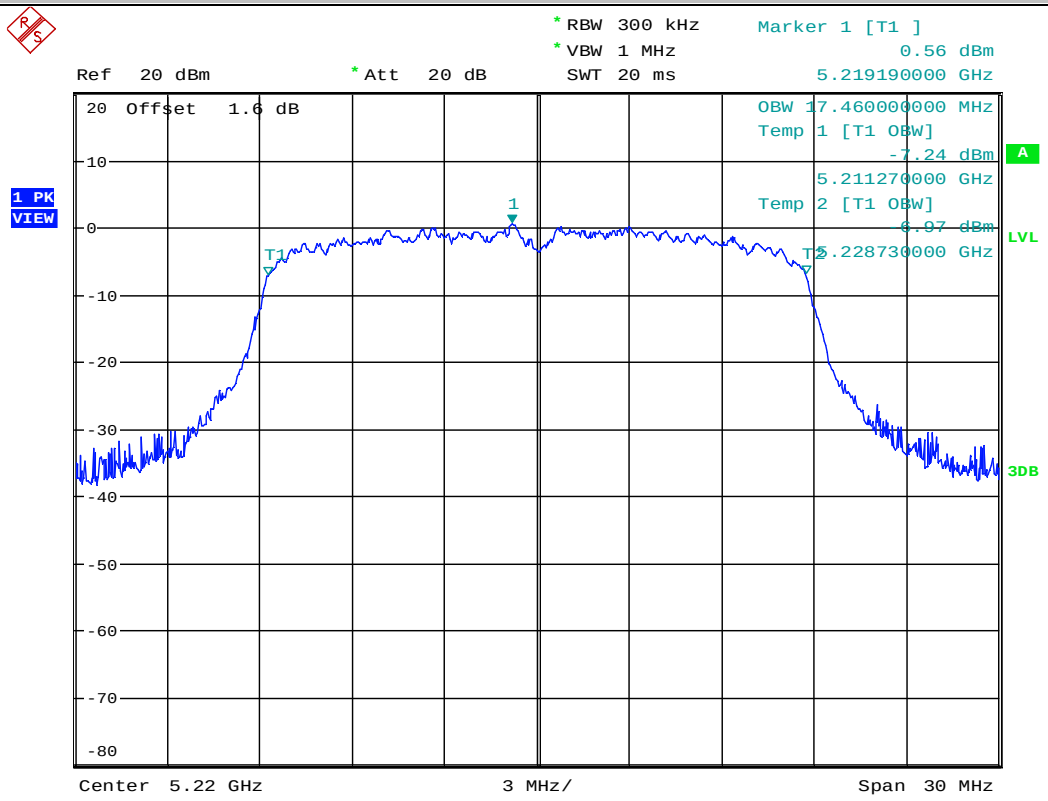
Occupied Bandwidth Measurement_11AC20_5220_Ant1



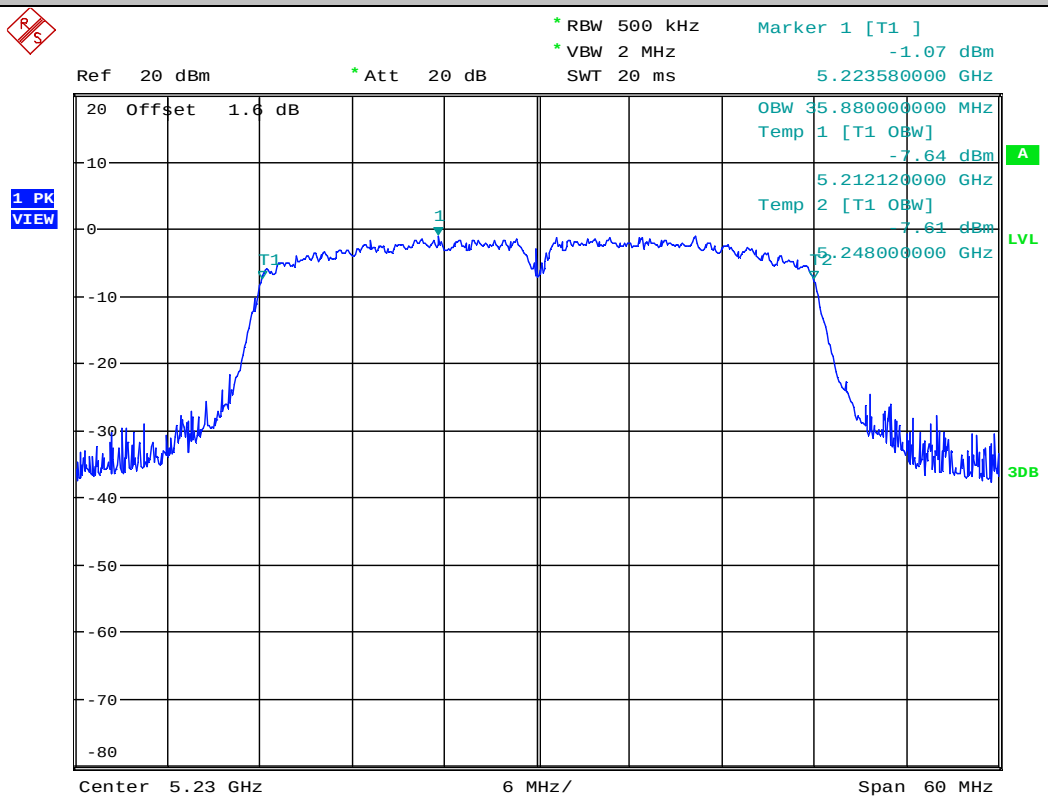
Occupied Bandwidth Measurement_11N20_5220_Ant2



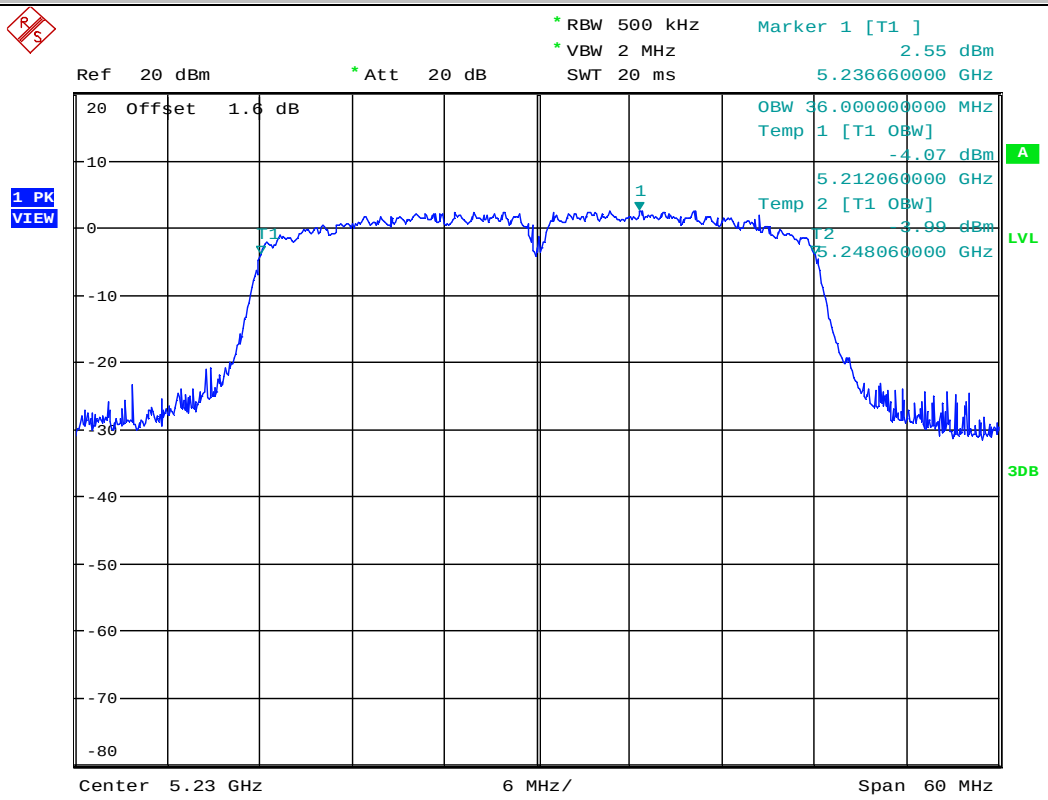
Occupied Bandwidth Measurement_11AC20_5220_Ant2



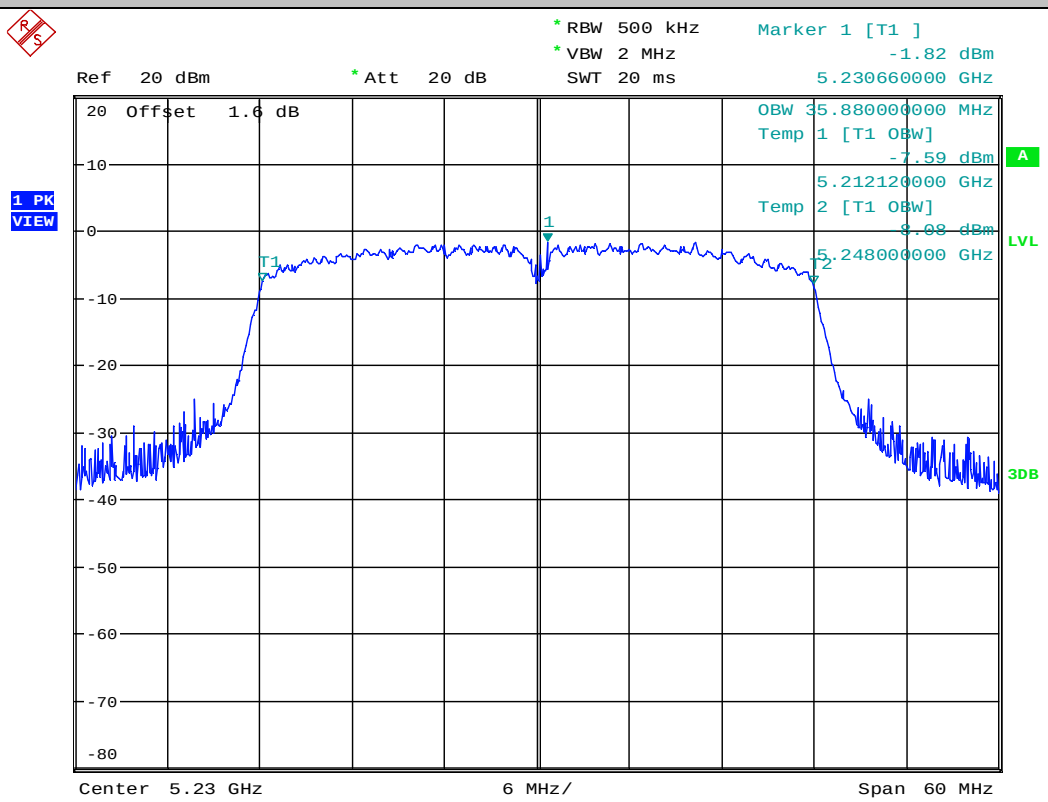
Occupied Bandwidth Measurement_11AC40_5230_Ant1



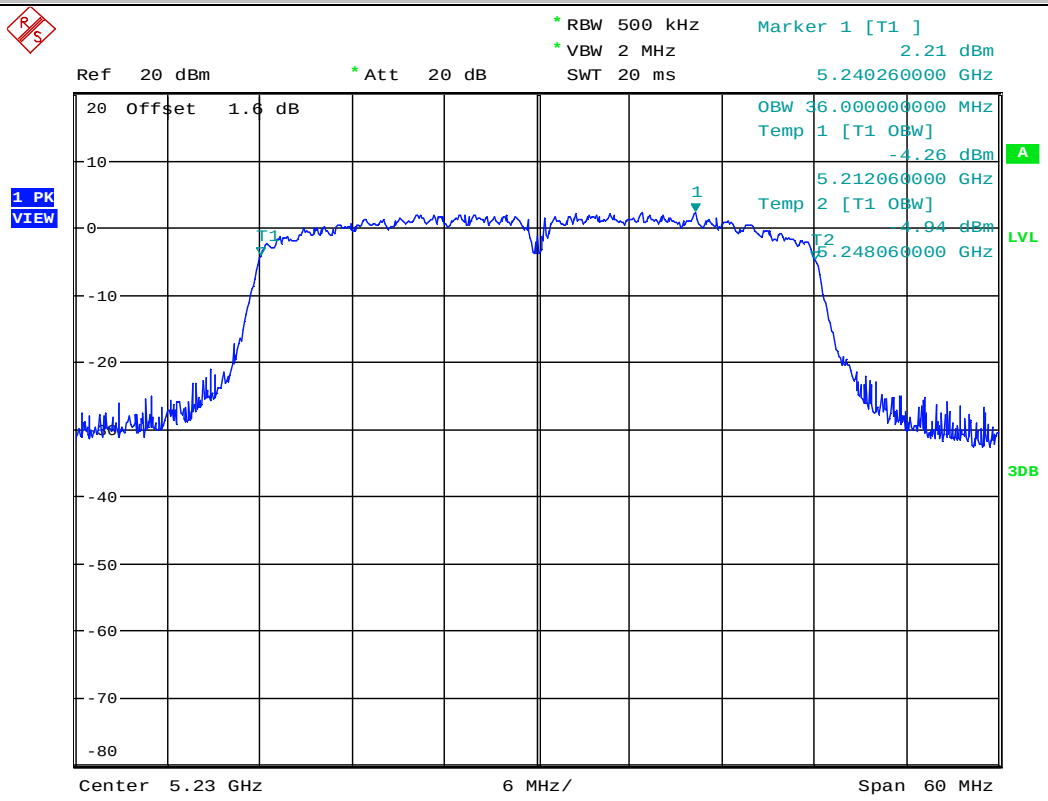
Occupied Bandwidth Measurement_11N40_5230_Ant1



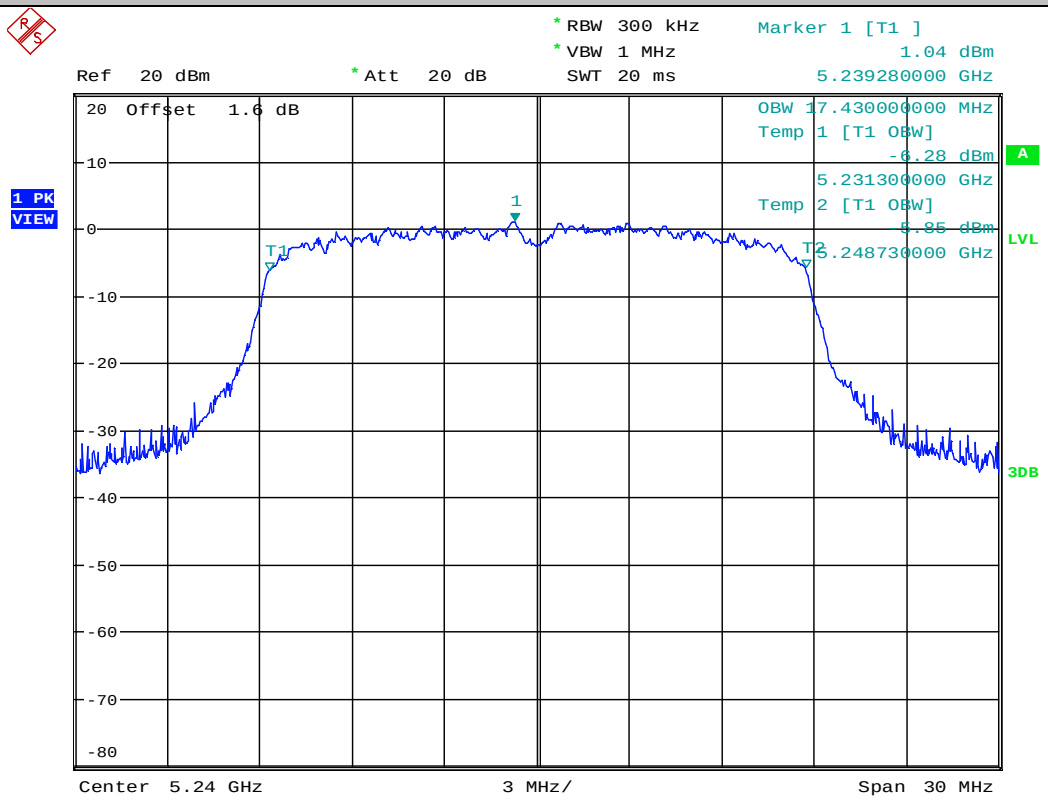
Occupied Bandwidth Measurement_11AC40_5230_Ant2



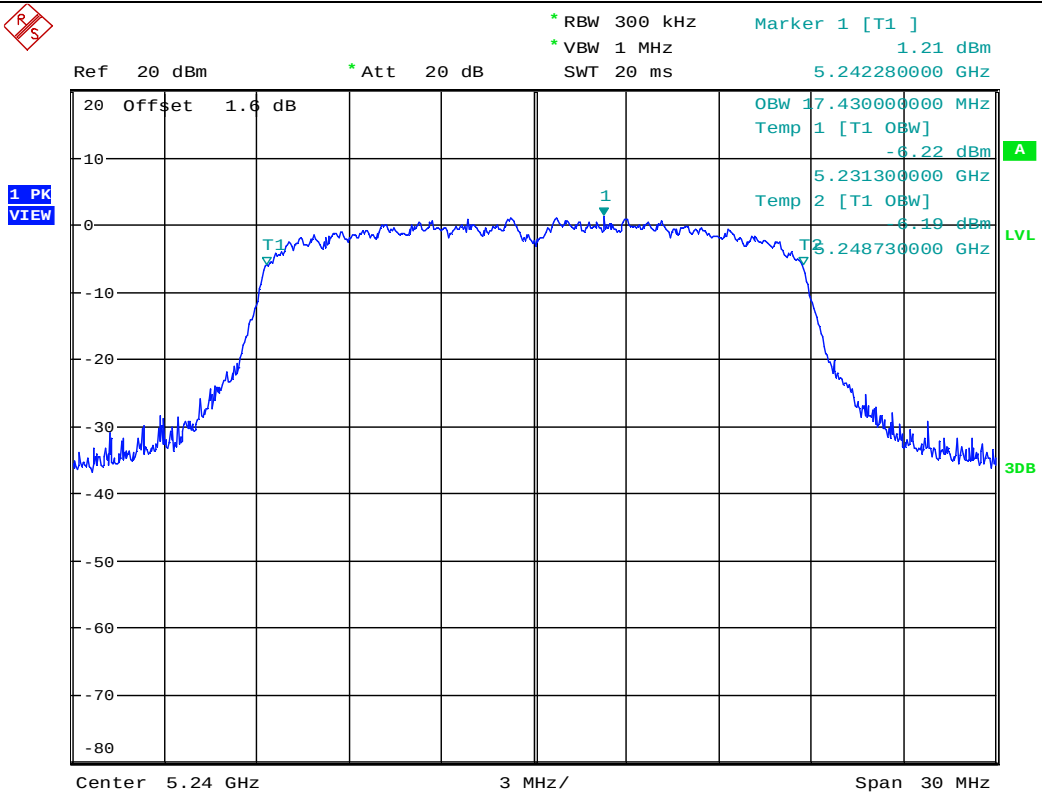
Occupied Bandwidth Measurement_11N40_5230_Ant2



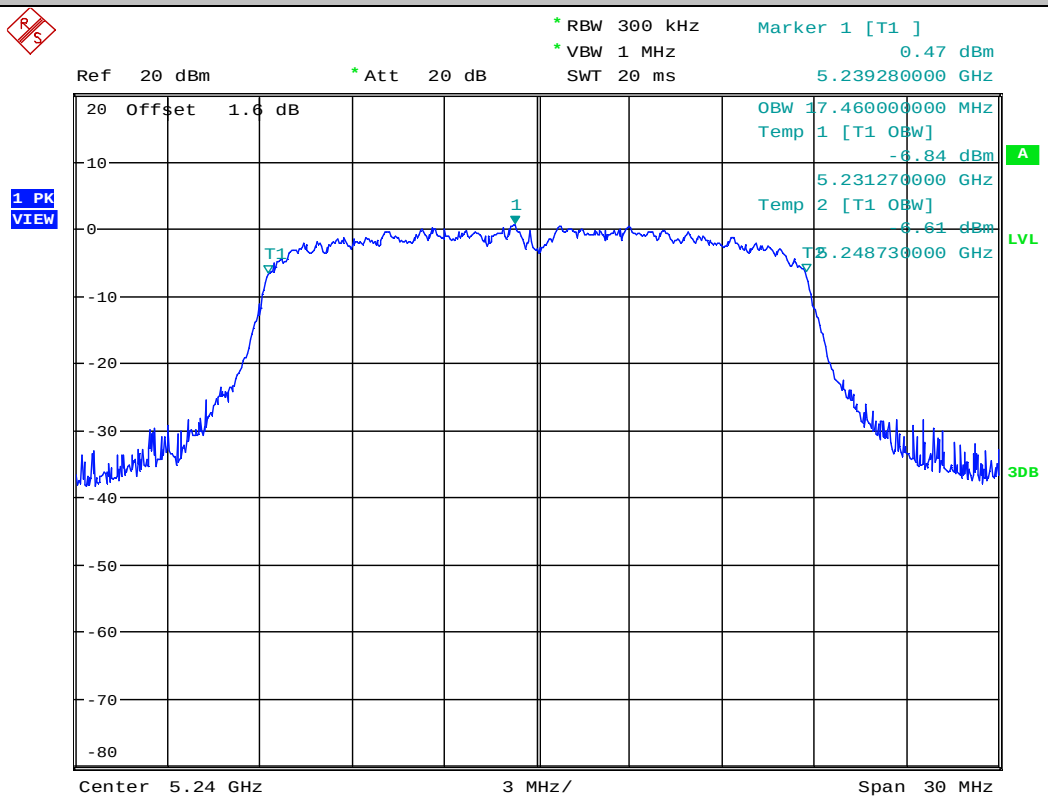
Occupied Bandwidth Measurement_11AC20_5240_Ant1



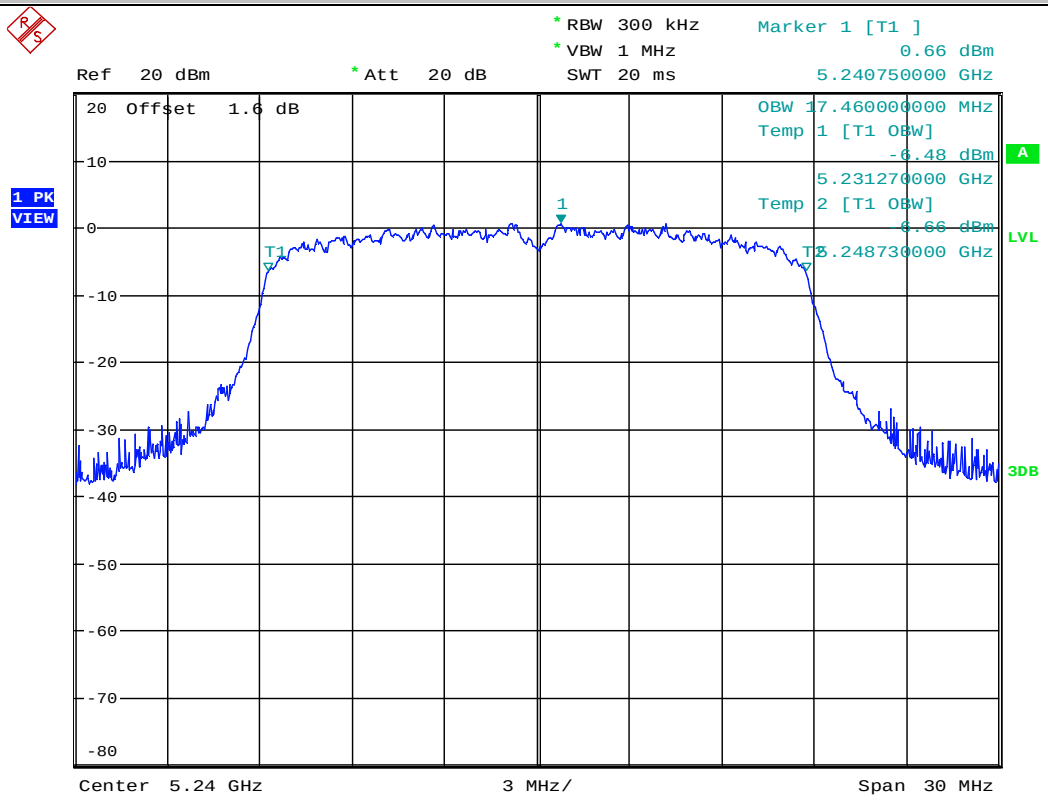
Occupied Bandwidth Measurement_11N20_5240_Ant1



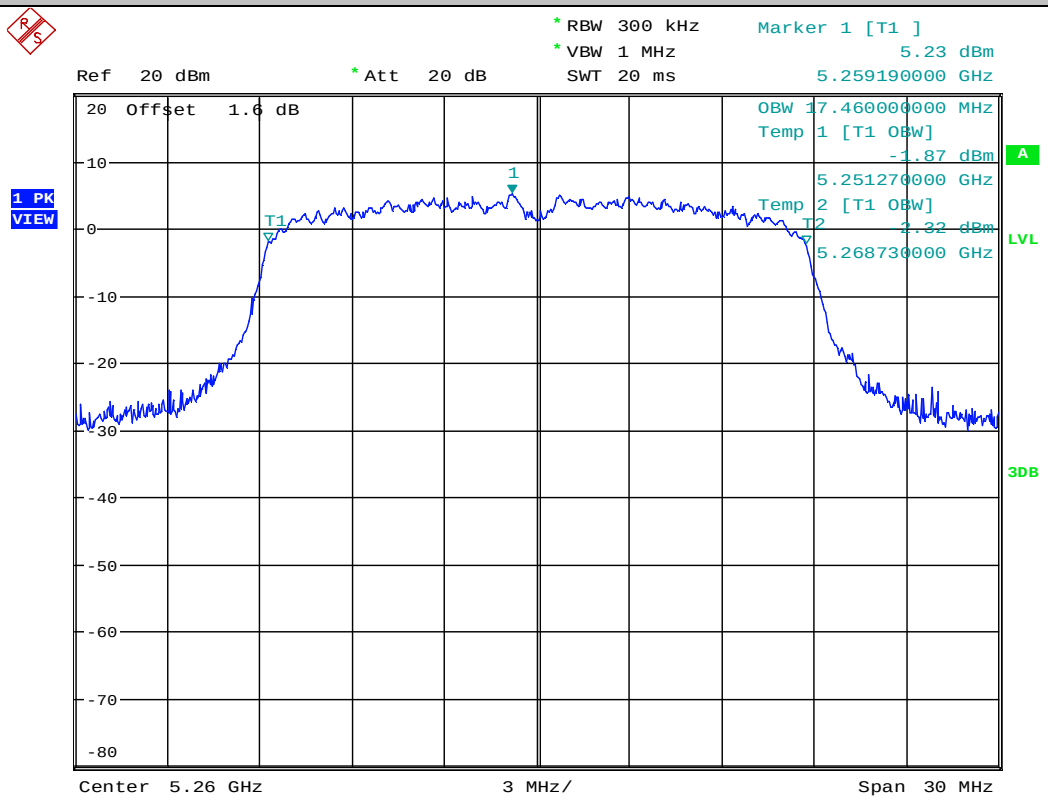
Occupied Bandwidth Measurement_11AC20_5240_Ant2



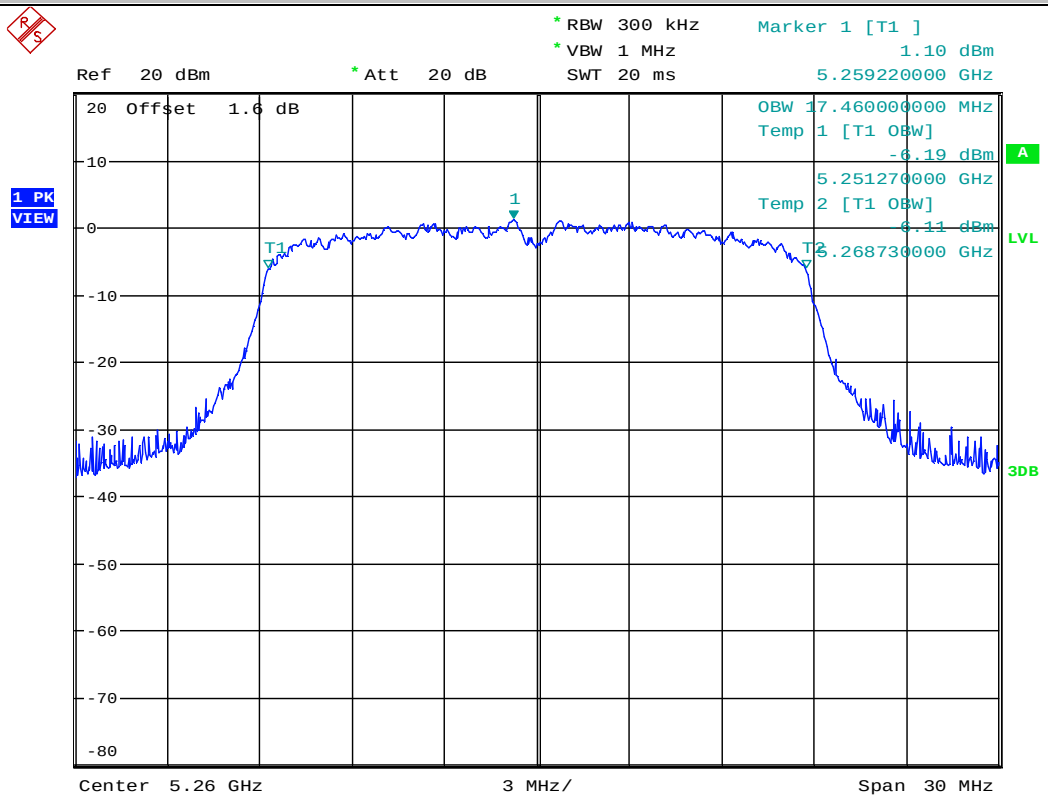
Occupied Bandwidth Measurement_11N20_5240_Ant2



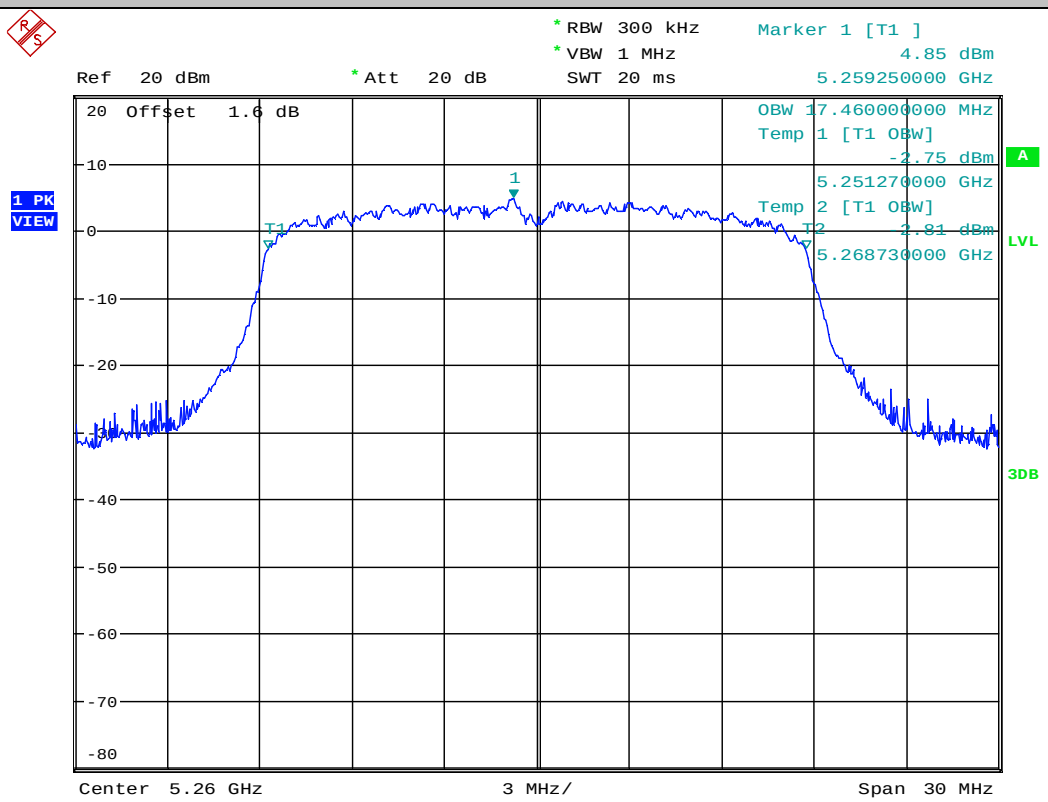
Occupied Bandwidth Measurement_11N20_5260_Ant1



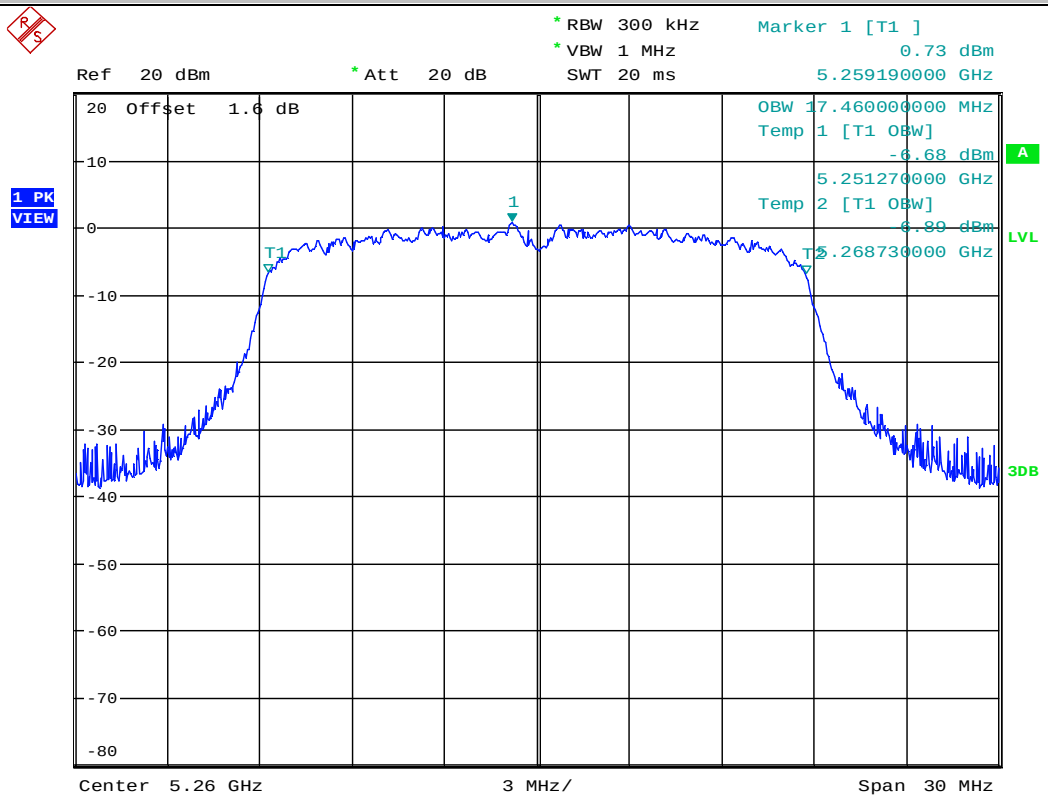
Occupied Bandwidth Measurement_11AC20_5260_Ant1



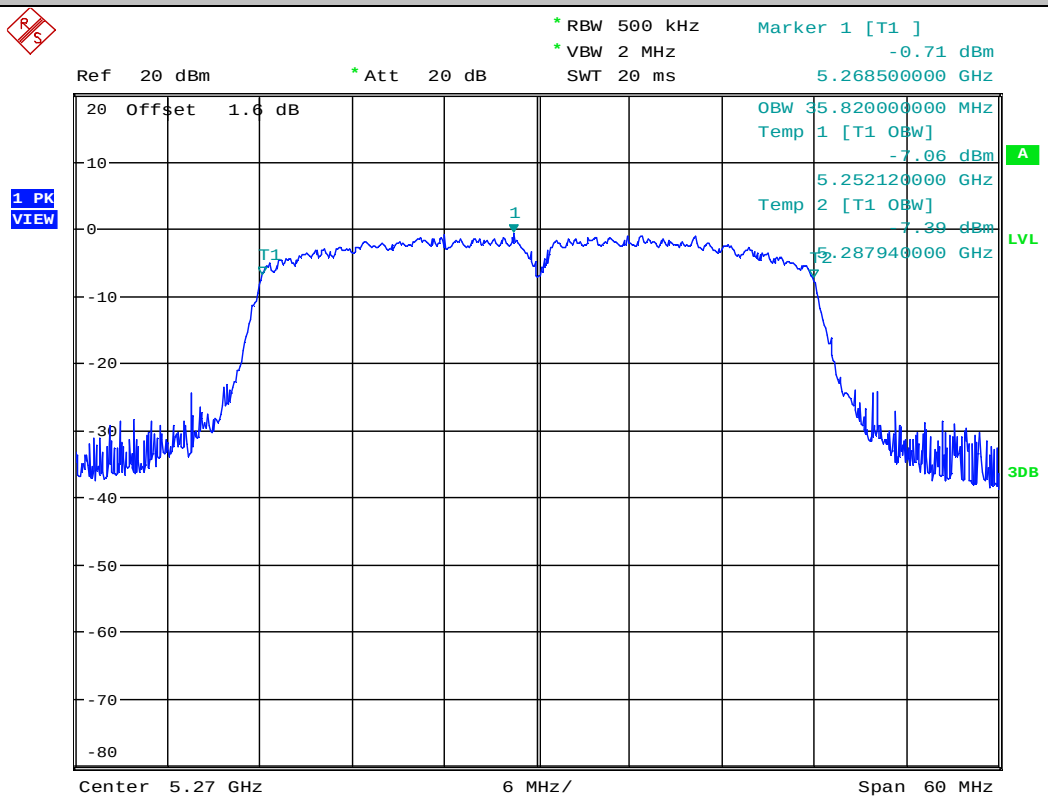
Occupied Bandwidth Measurement_11N20_5260_Ant2



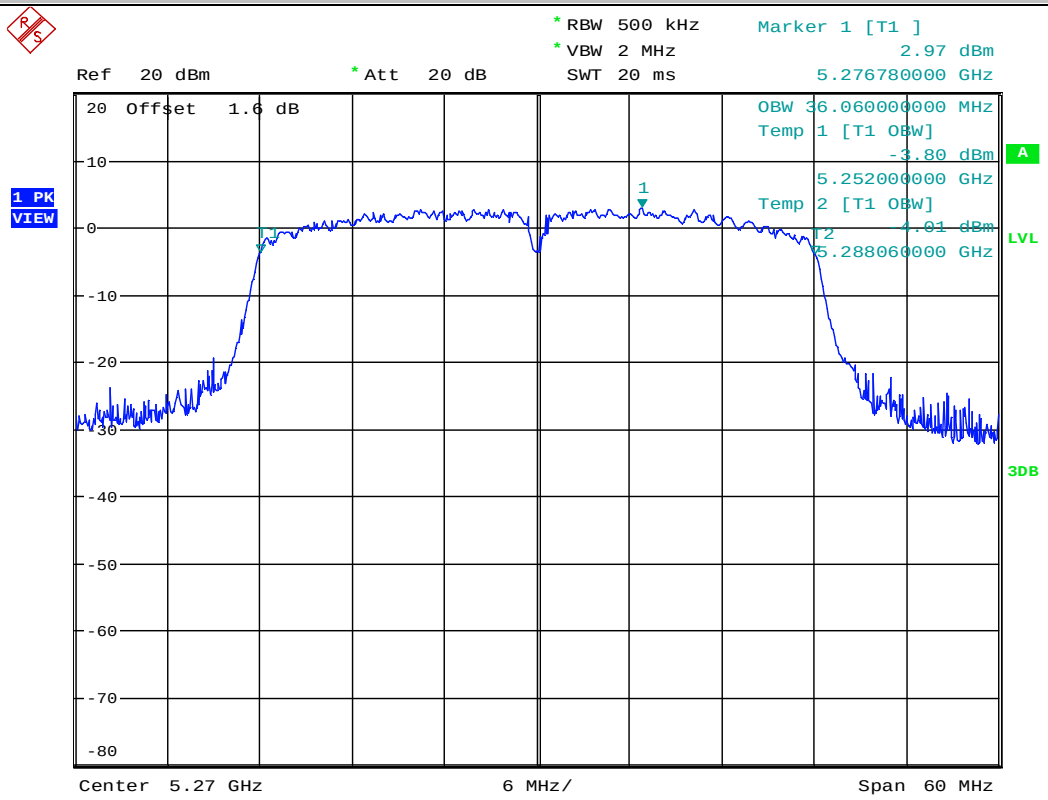
Occupied Bandwidth Measurement_11AC20_5260_Ant2



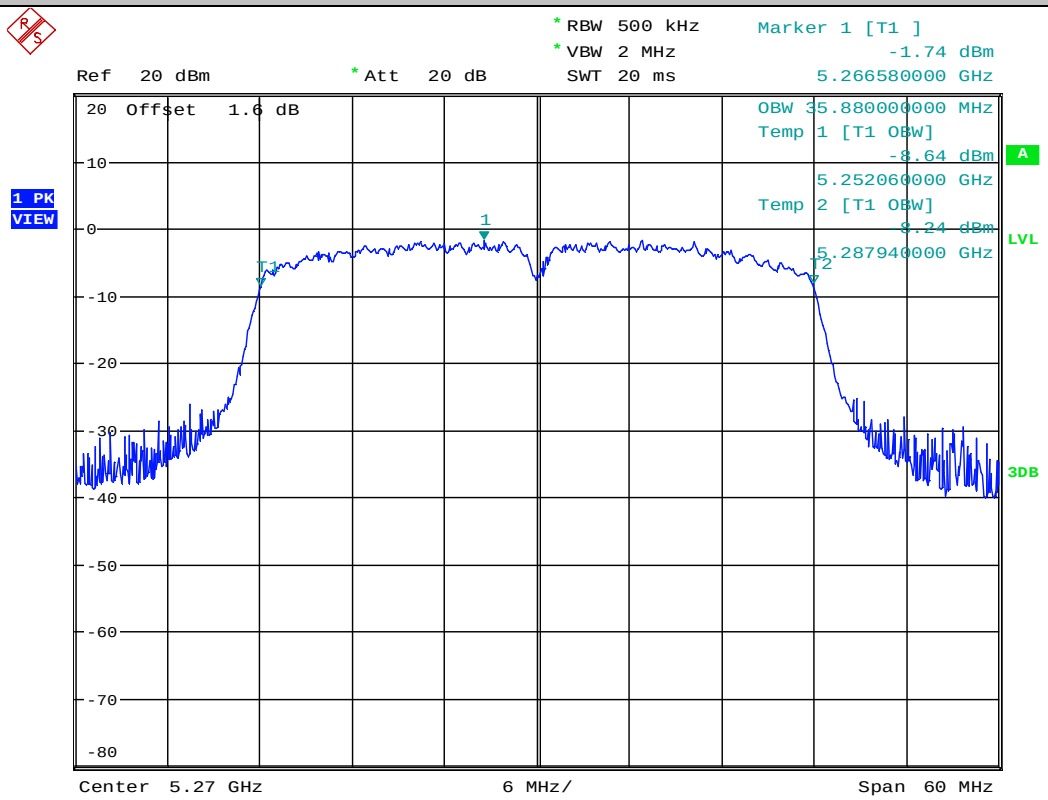
Occupied Bandwidth Measurement_11AC40_5270_Ant1



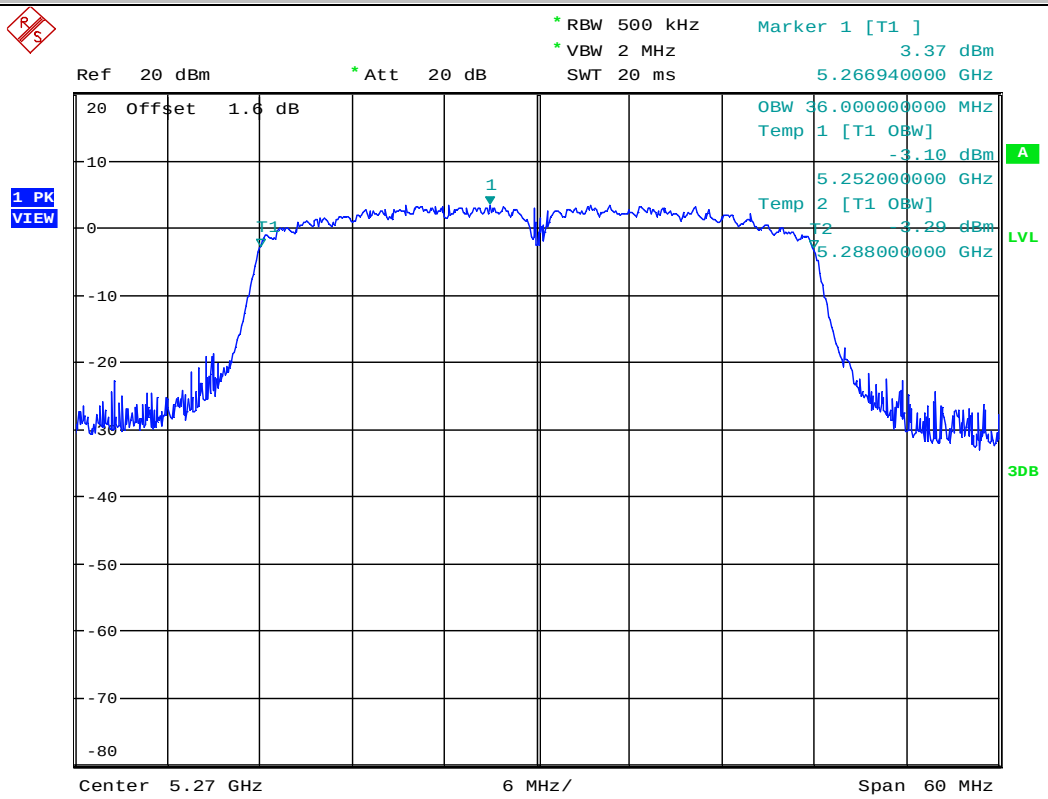
Occupied Bandwidth Measurement_11N40_5270_Ant1



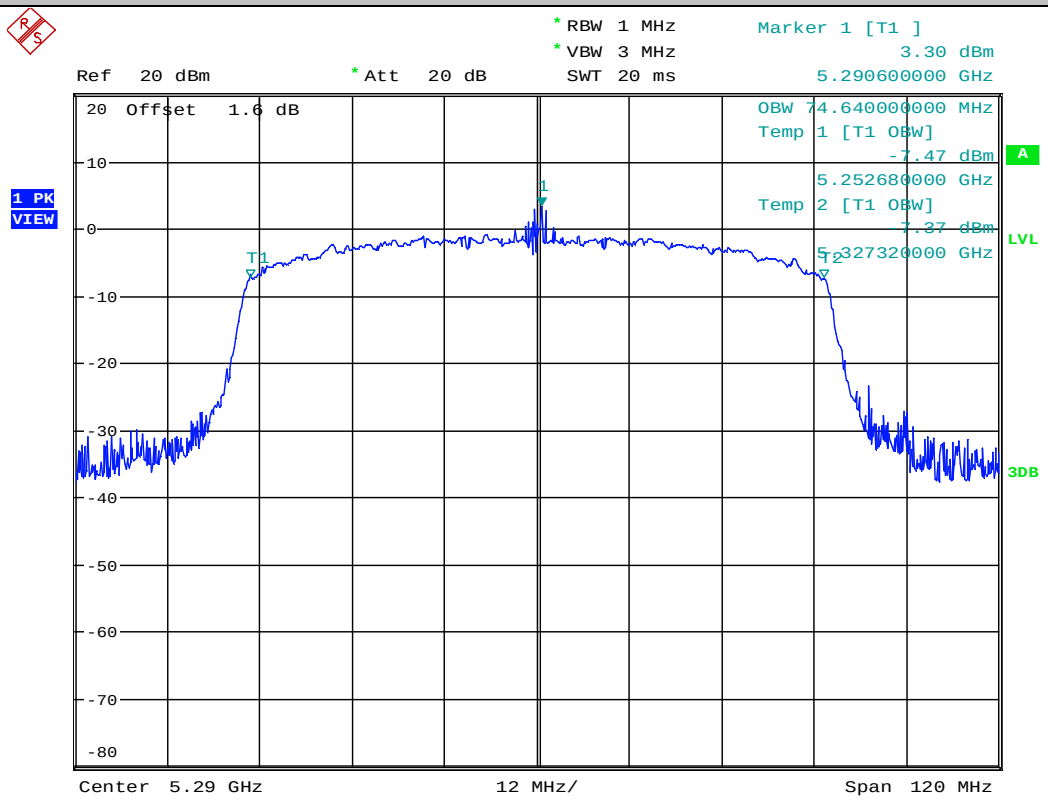
Occupied Bandwidth Measurement_11AC40_5270_Ant2



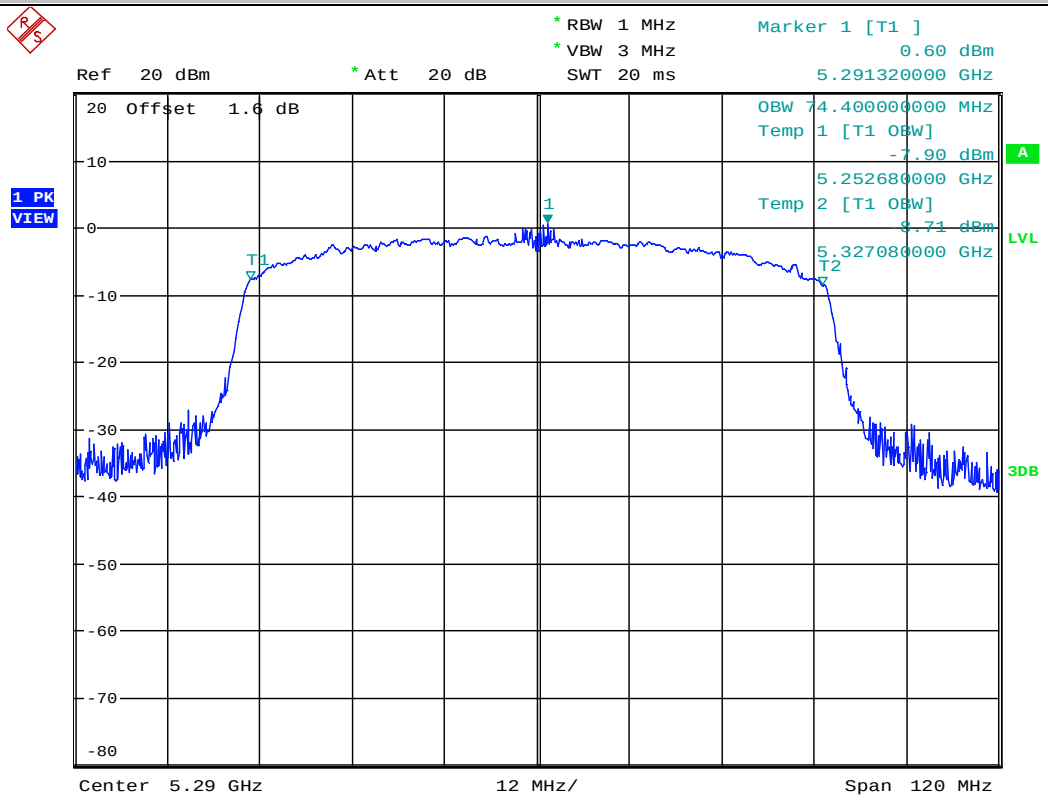
Occupied Bandwidth Measurement_11N40_5270_Ant2



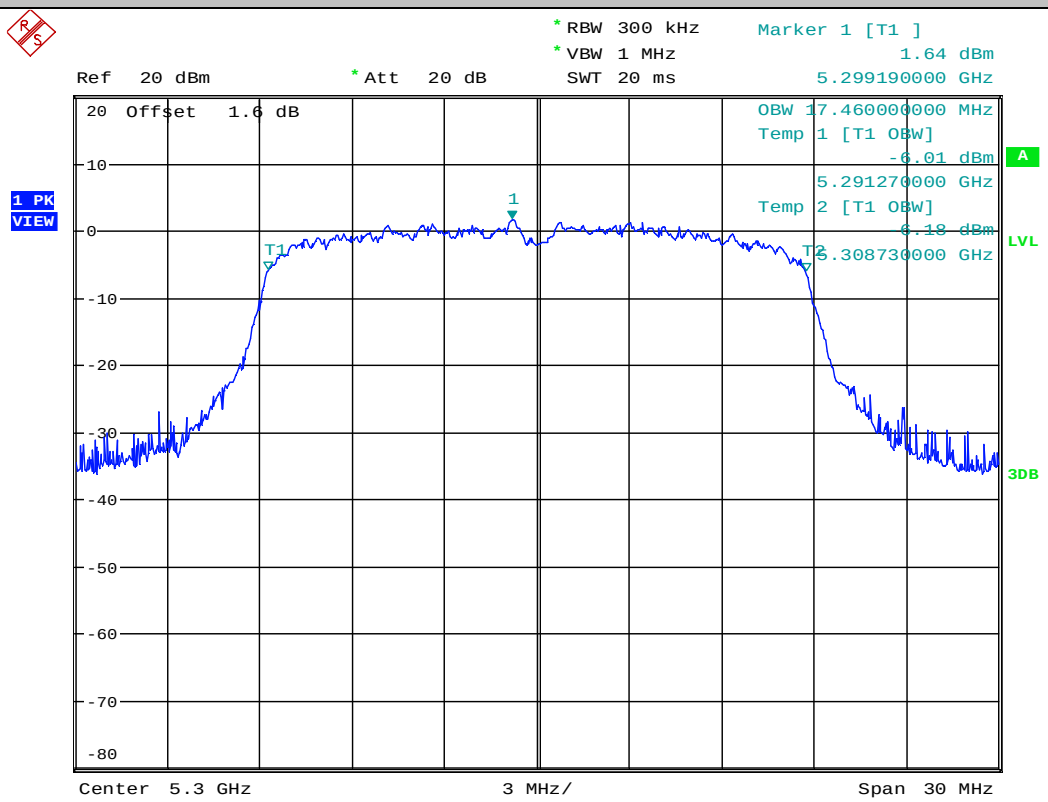
Occupied Bandwidth Measurement_11AC80_5290_Ant1



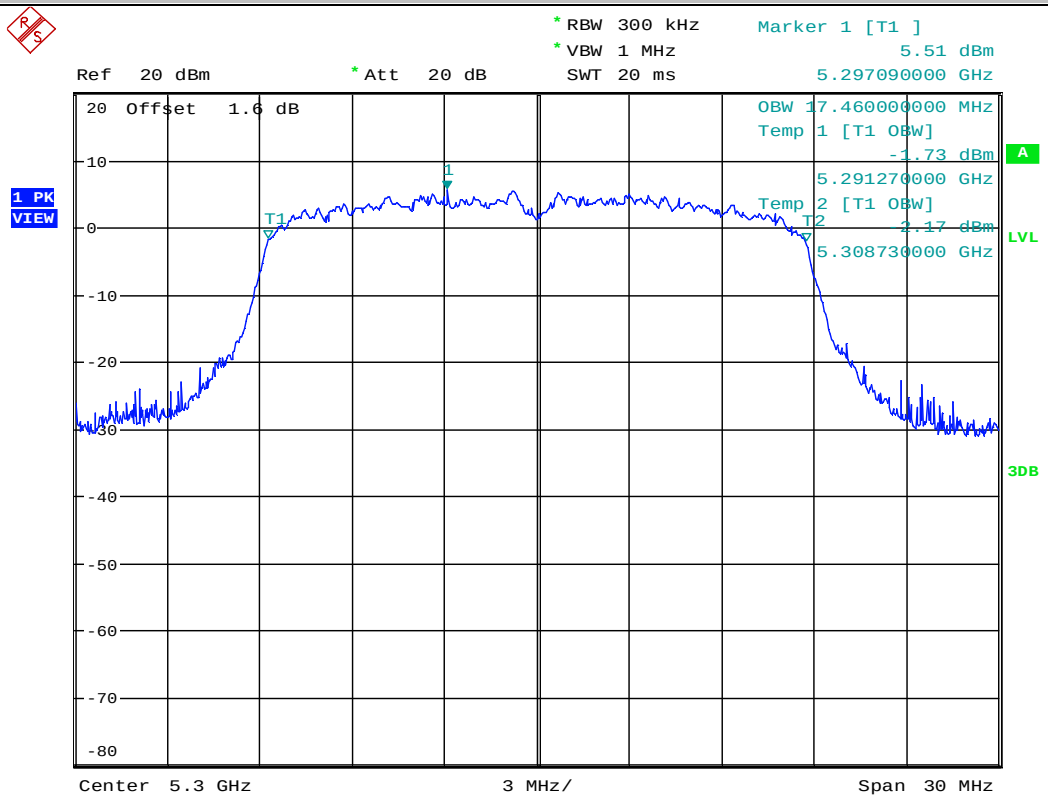
Occupied Bandwidth Measurement_11AC80_5290_Ant2



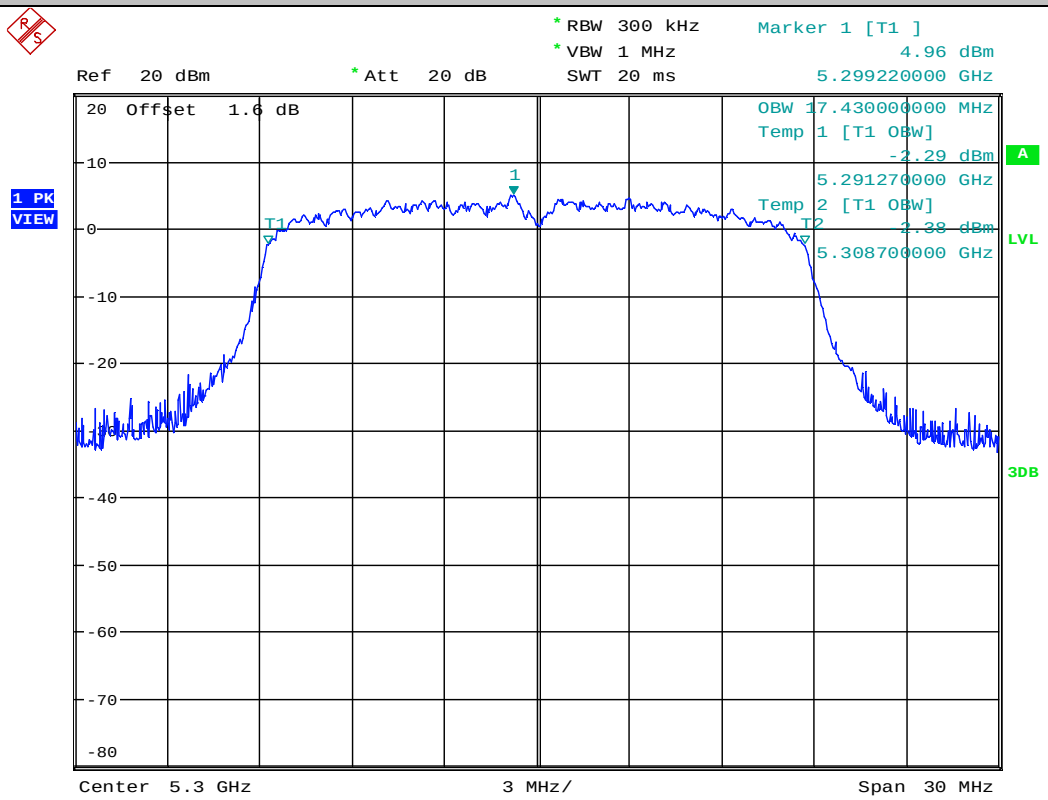
Occupied Bandwidth Measurement_11AC20_5300_Ant1



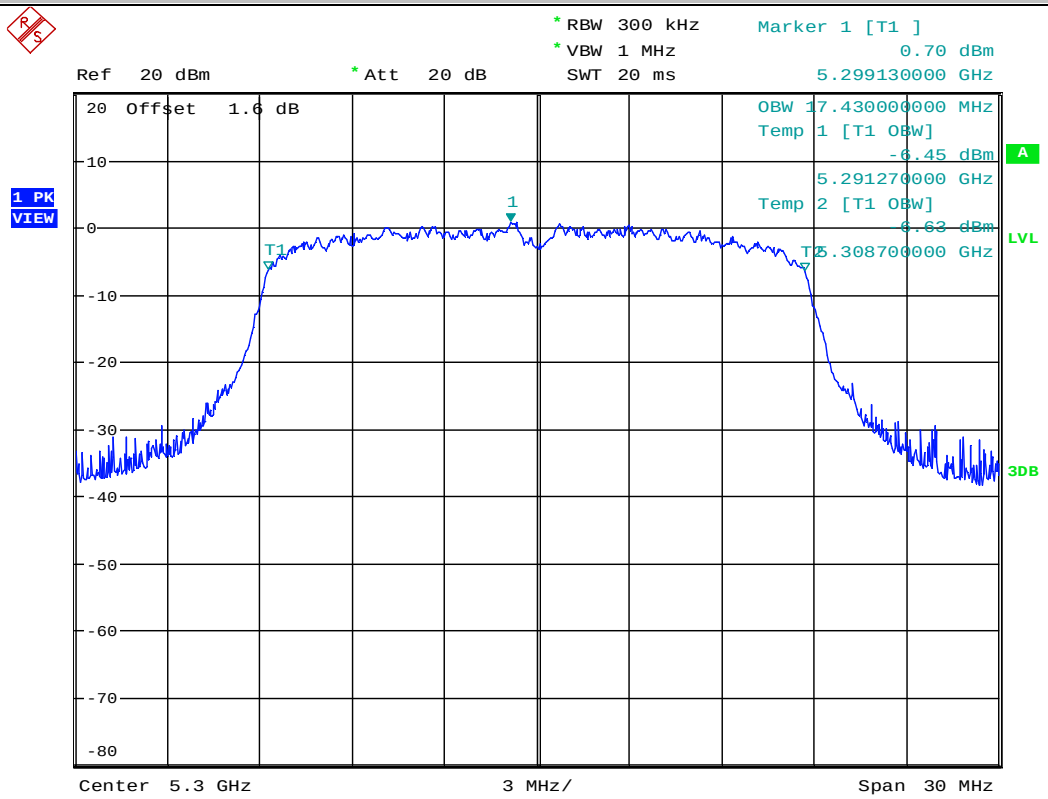
Occupied Bandwidth Measurement_11N20_5300_Ant1



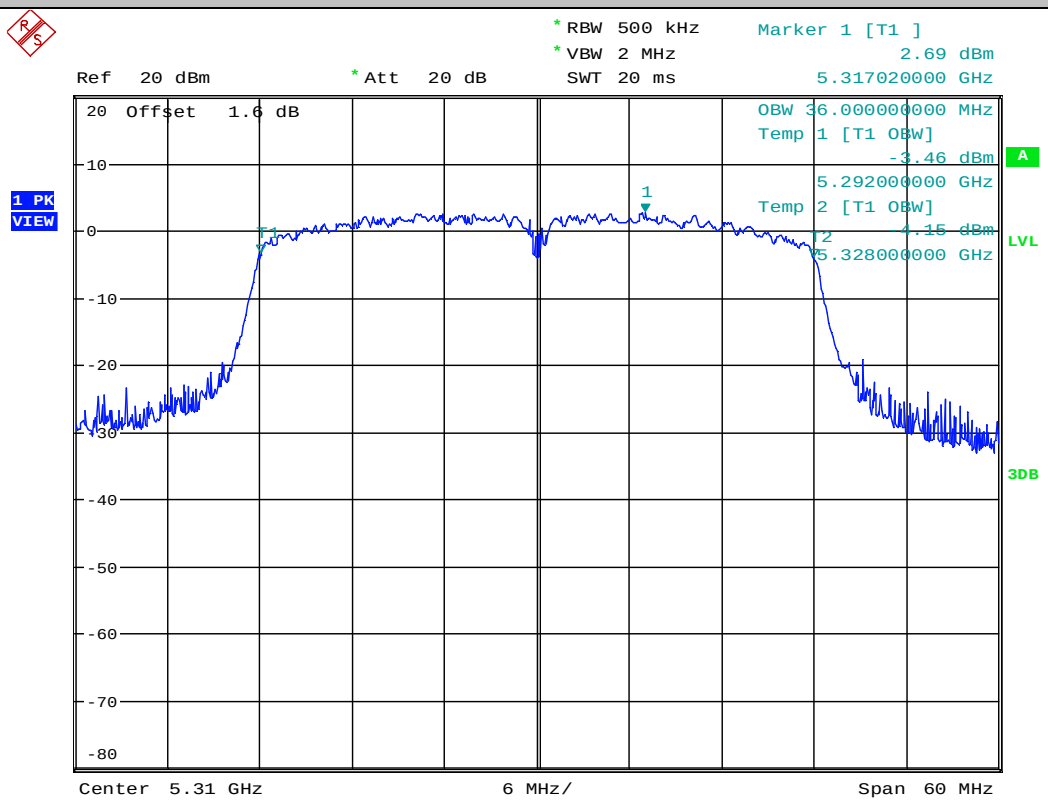
Occupied Bandwidth Measurement_11N20_5300_Ant2



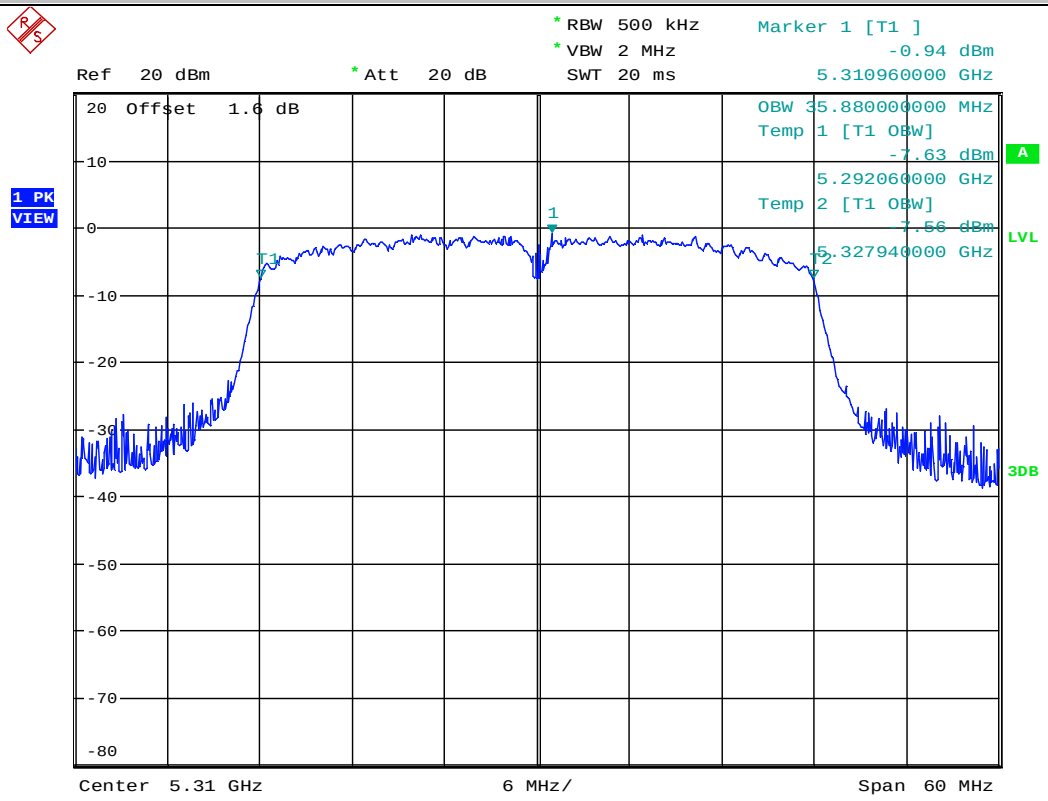
Occupied Bandwidth Measurement_11AC20_5300_Ant2



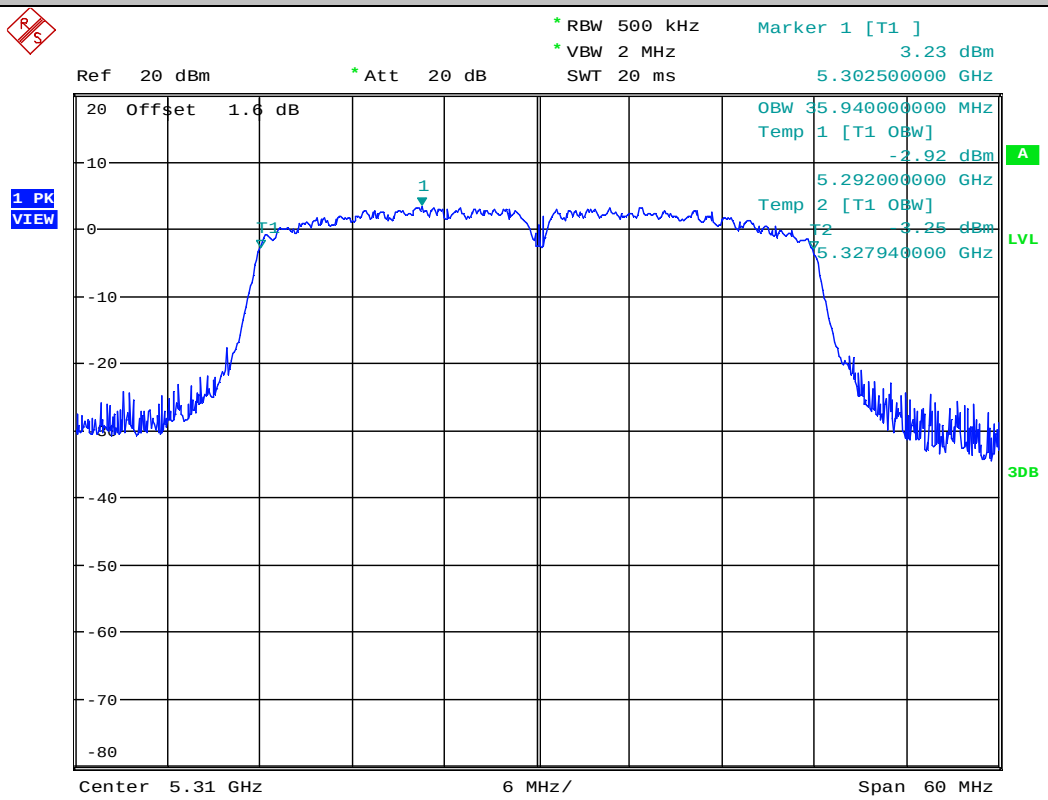
Occupied Bandwidth Measurement_11N40_5310_Ant1



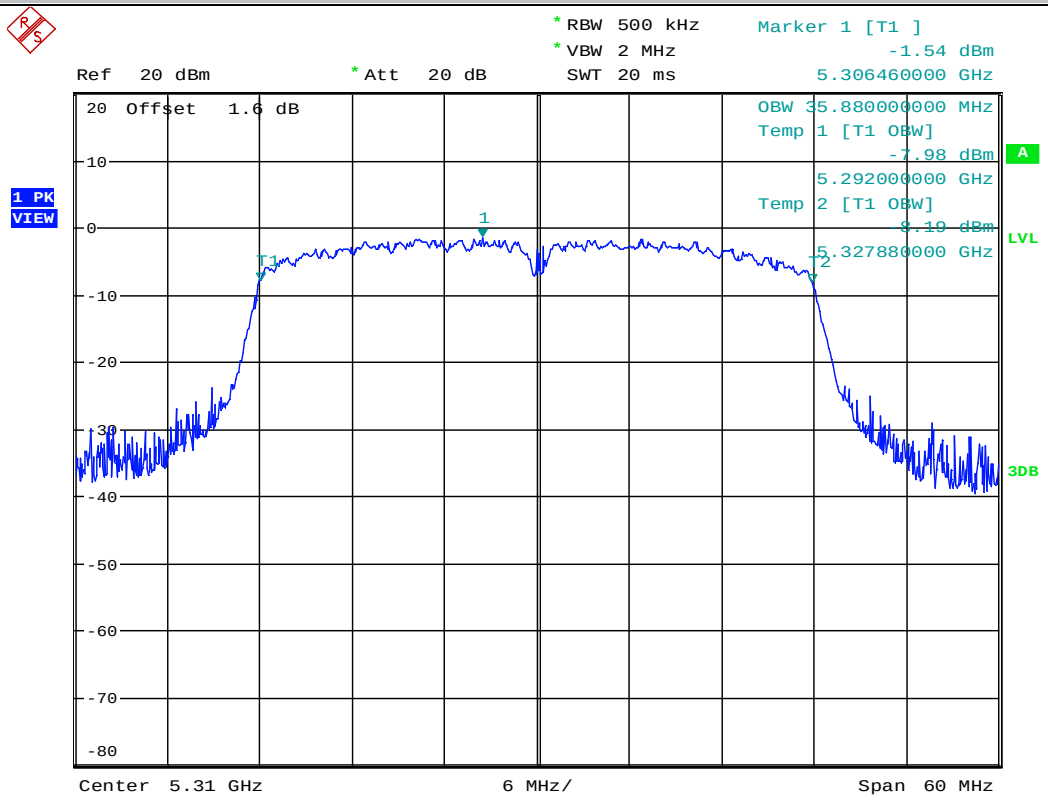
Occupied Bandwidth Measurement_11AC40_5310_Ant1



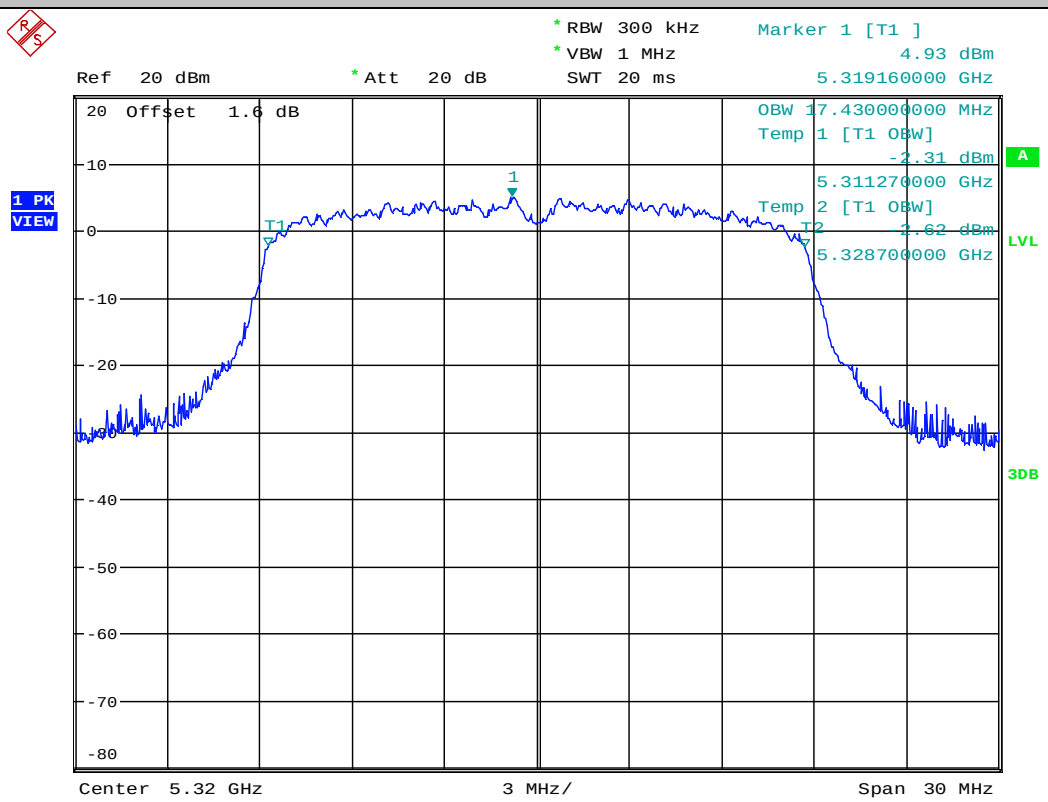
Occupied Bandwidth Measurement_11N40_5310_Ant2



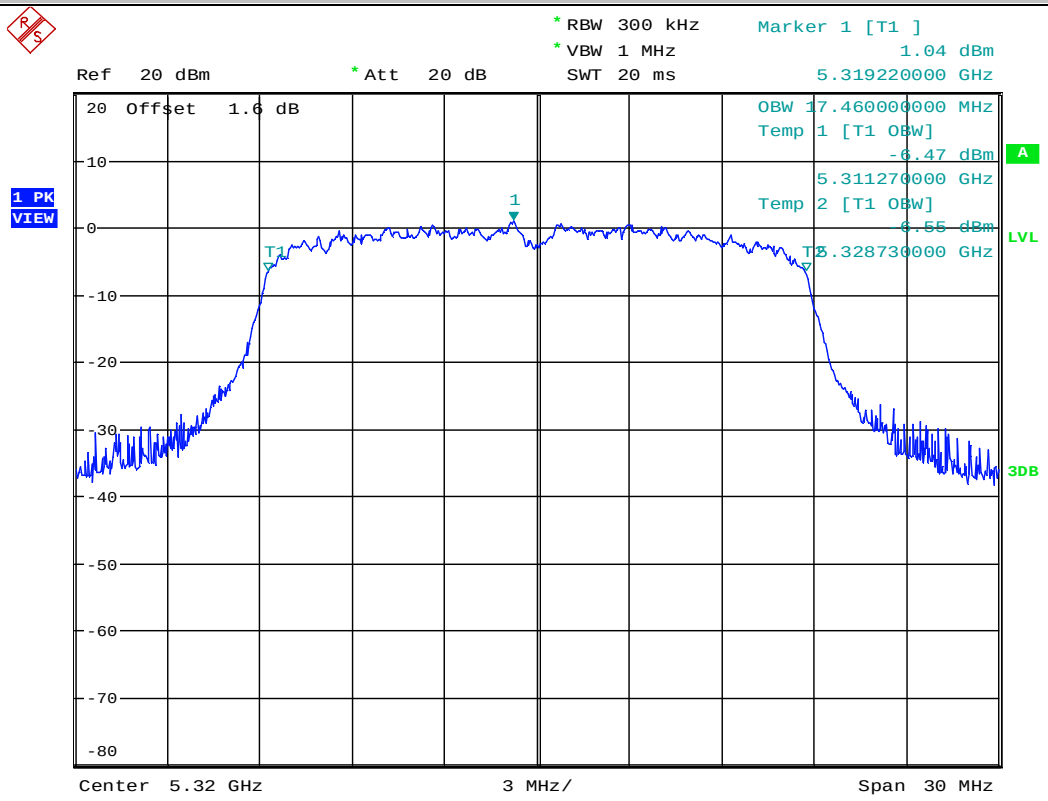
Occupied Bandwidth Measurement_11AC40_5310_Ant2



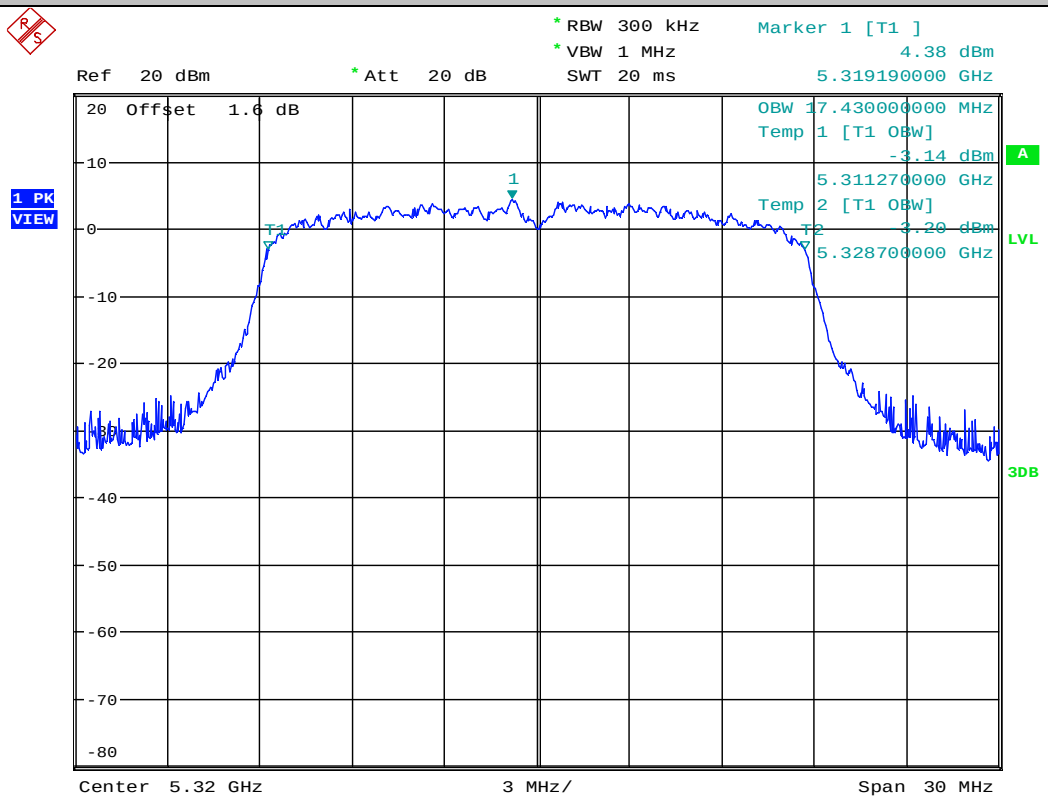
Occupied Bandwidth Measurement_11N20_5320_Ant1



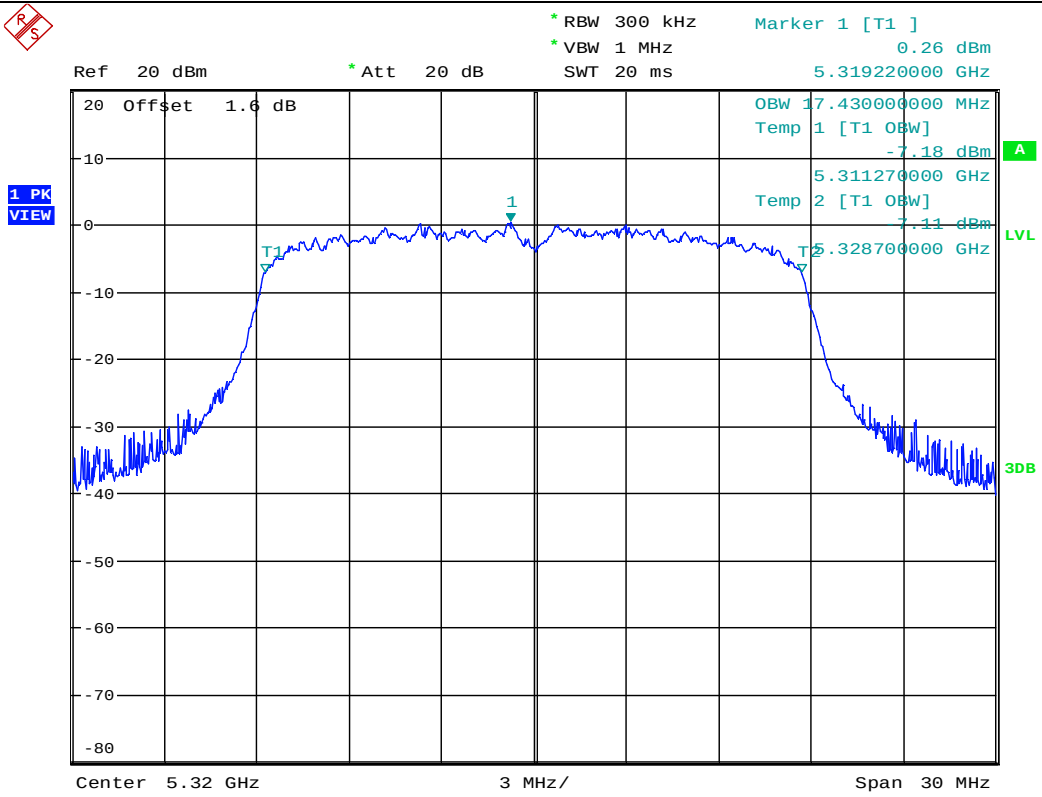
Occupied Bandwidth Measurement_11AC20_5320_Ant1



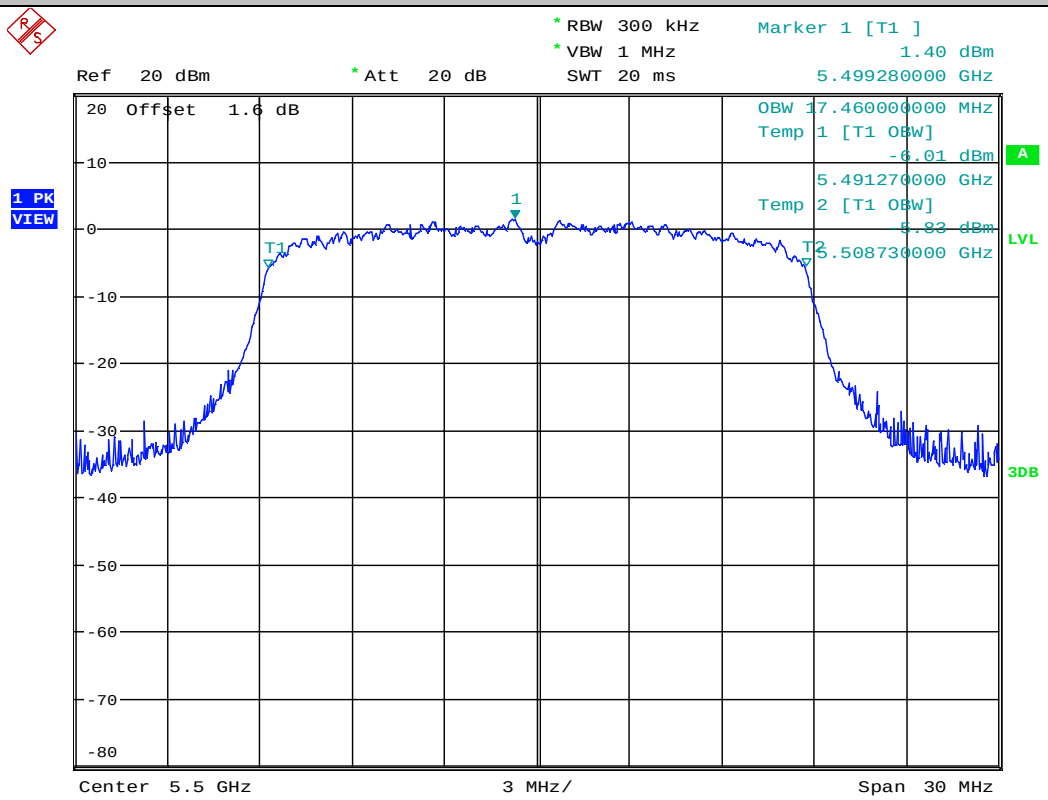
Occupied Bandwidth Measurement_11N20_5320_Ant2



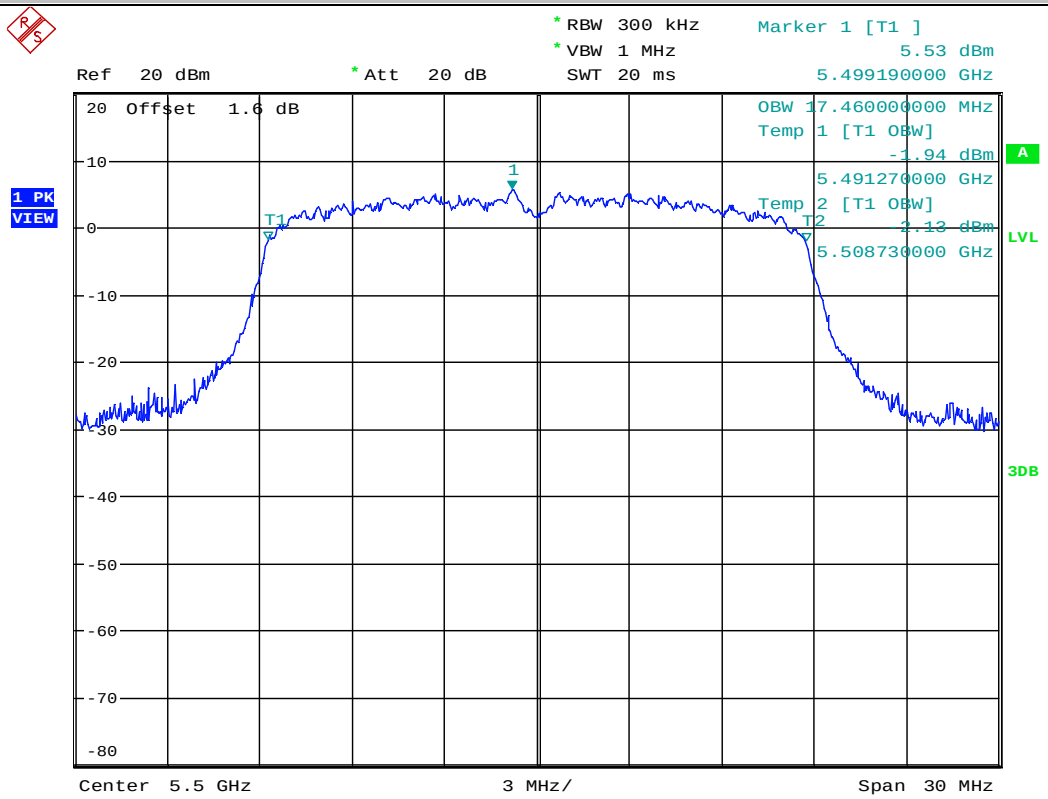
Occupied Bandwidth Measurement_11AC20_5320_Ant2



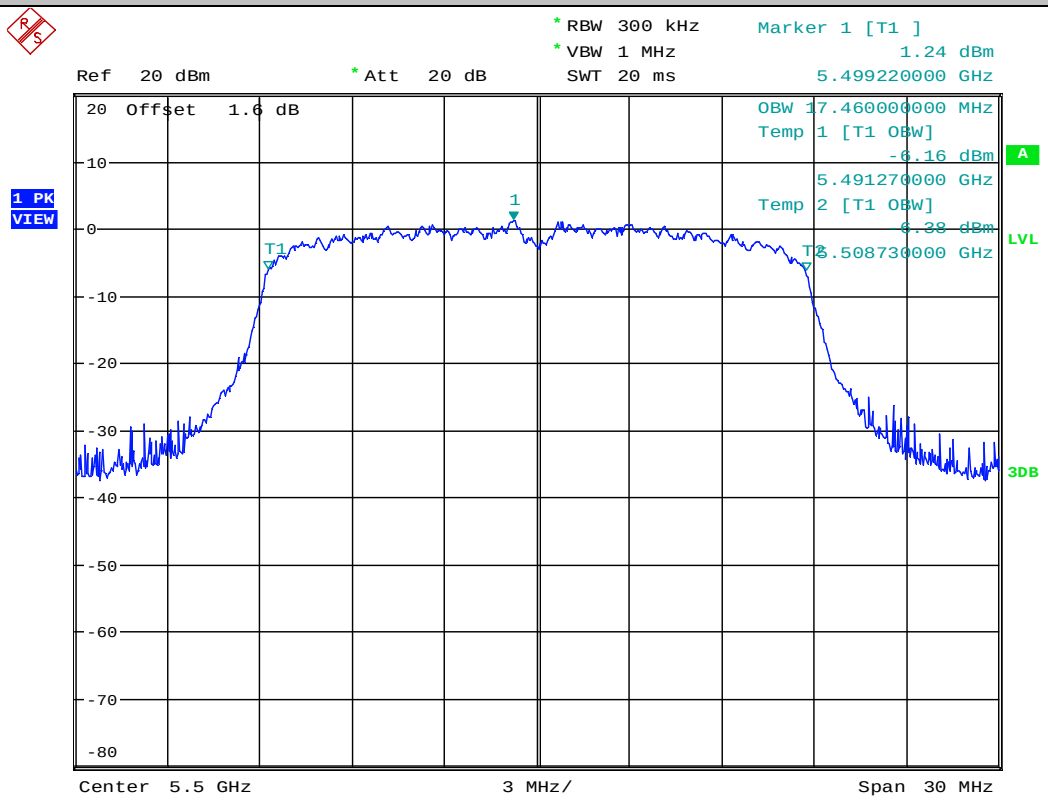
Occupied Bandwidth Measurement_11AC20_5500_Ant1



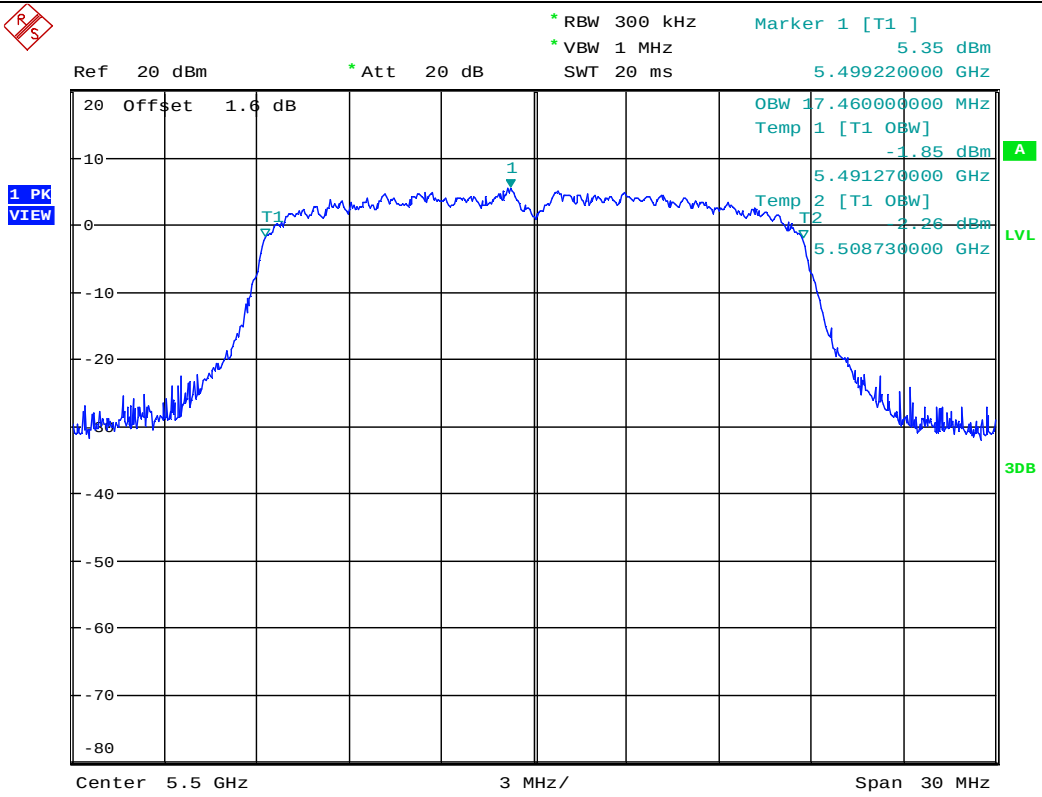
Occupied Bandwidth Measurement_11N20_5500_Ant1



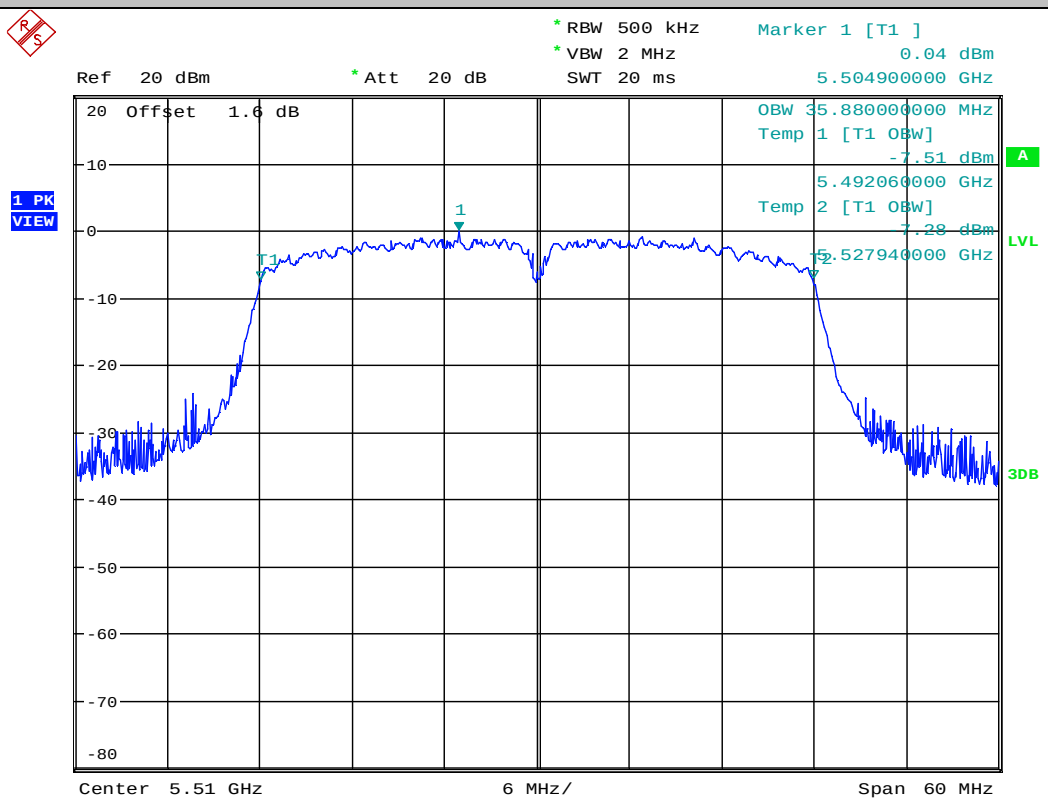
Occupied Bandwidth Measurement_11AC20_5500_Ant2



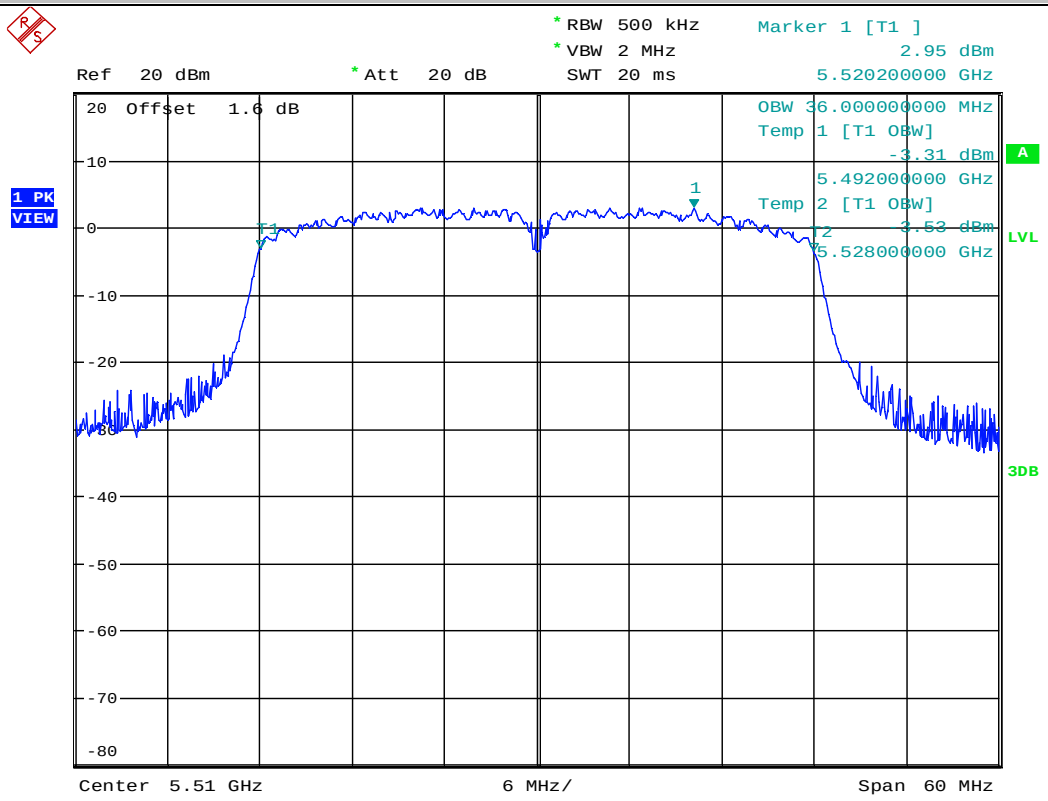
Occupied Bandwidth Measurement_11N20_5500_Ant2



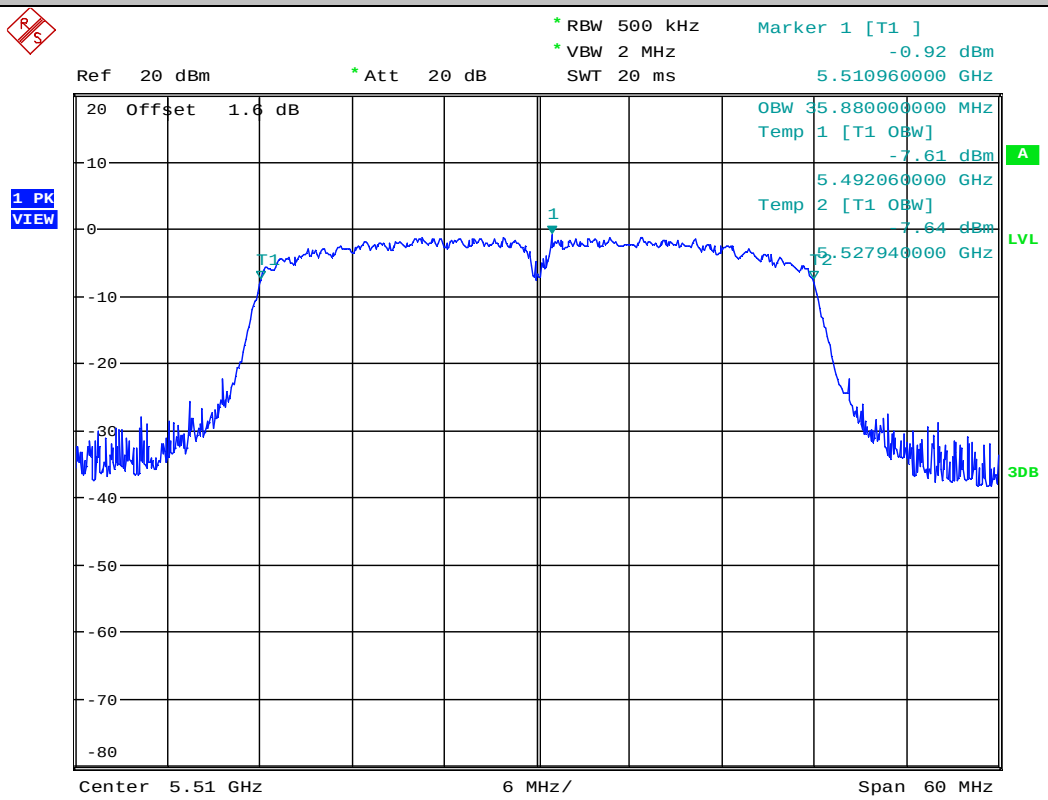
Occupied Bandwidth Measurement_11AC40_5510_Ant1



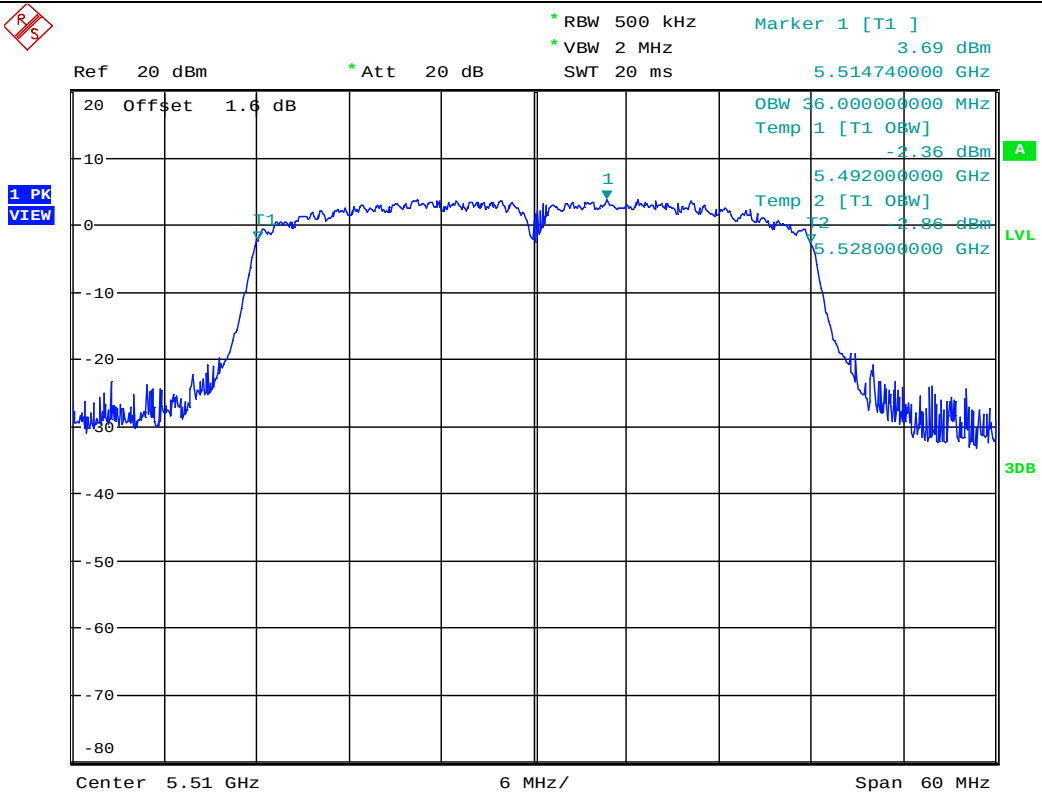
Occupied Bandwidth Measurement_11N40_5510_Ant1



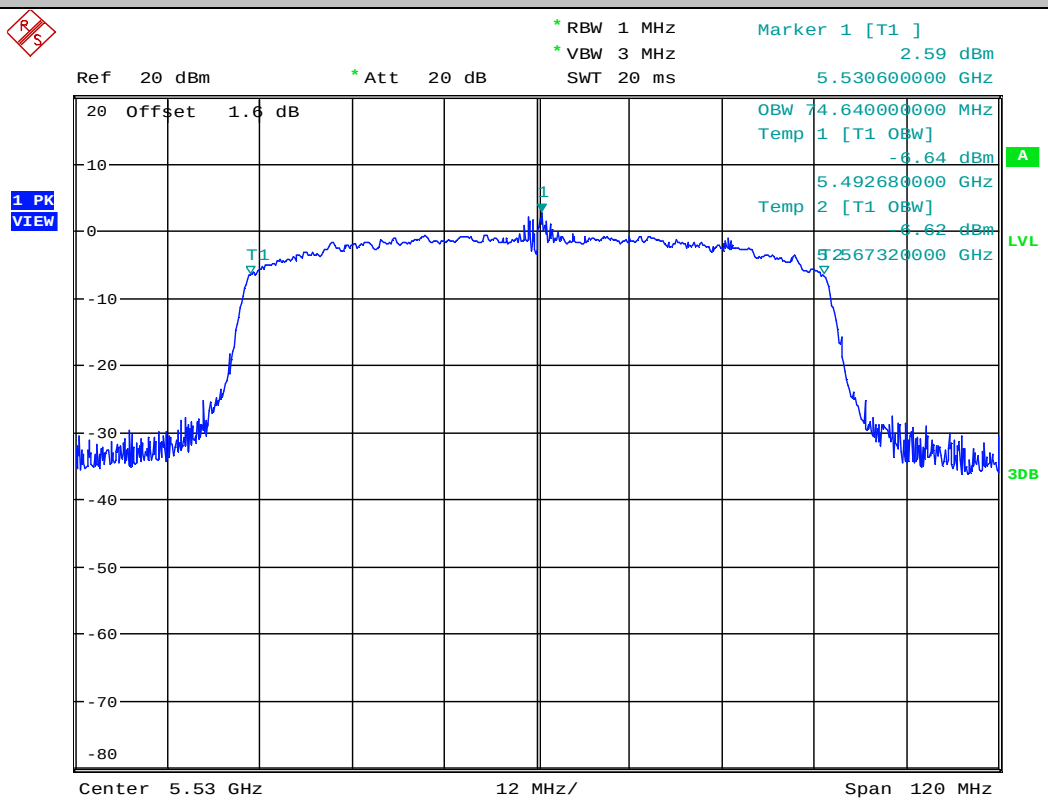
Occupied Bandwidth Measurement_11AC40_5510_Ant2



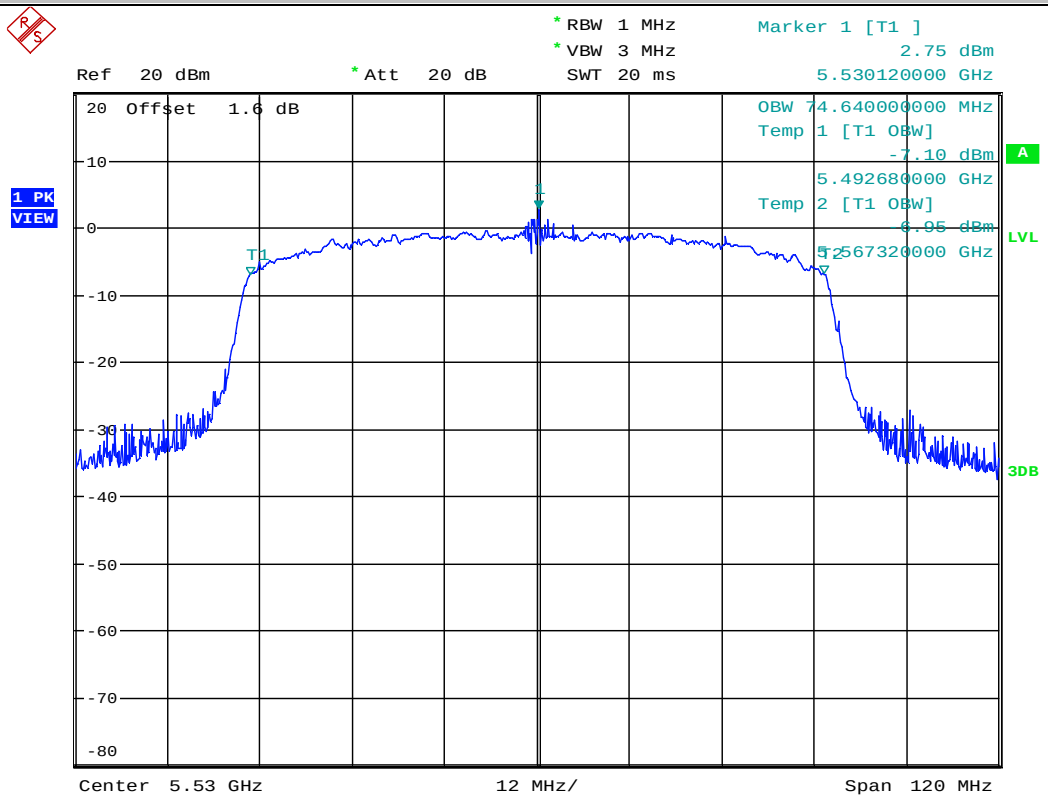
Occupied Bandwidth Measurement_11N40_5510_Ant2



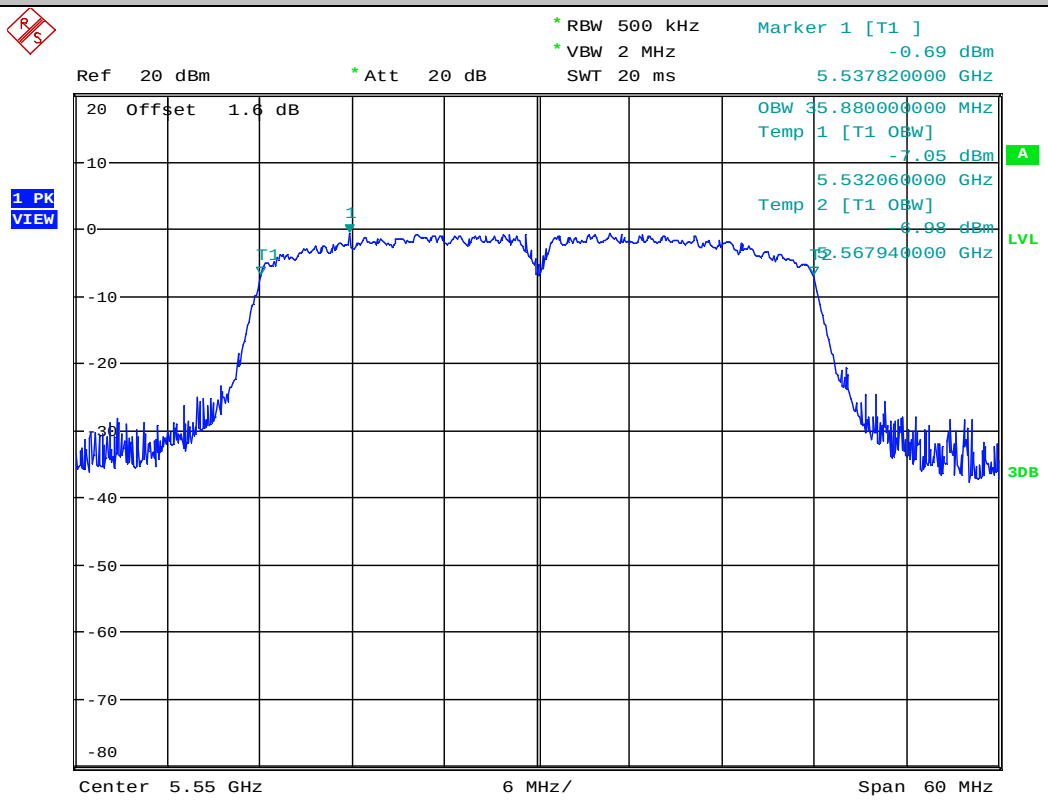
Occupied Bandwidth Measurement_11AC80_5530_Ant1



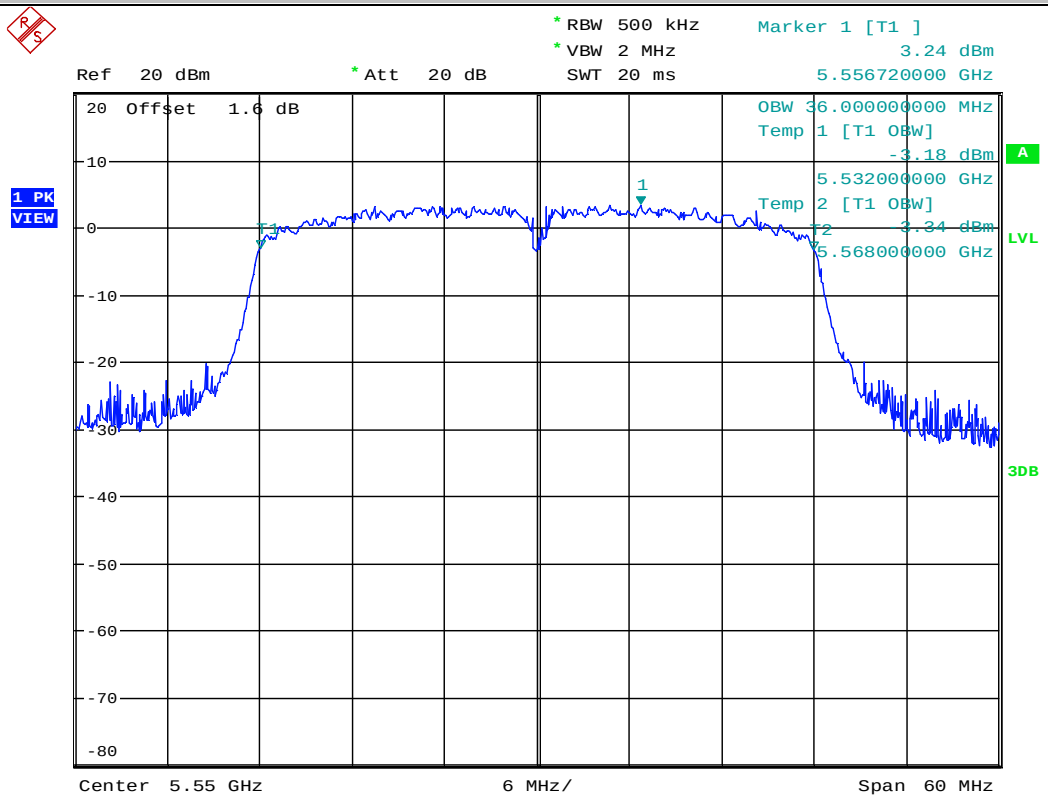
Occupied Bandwidth Measurement_11AC80_5530_Ant2



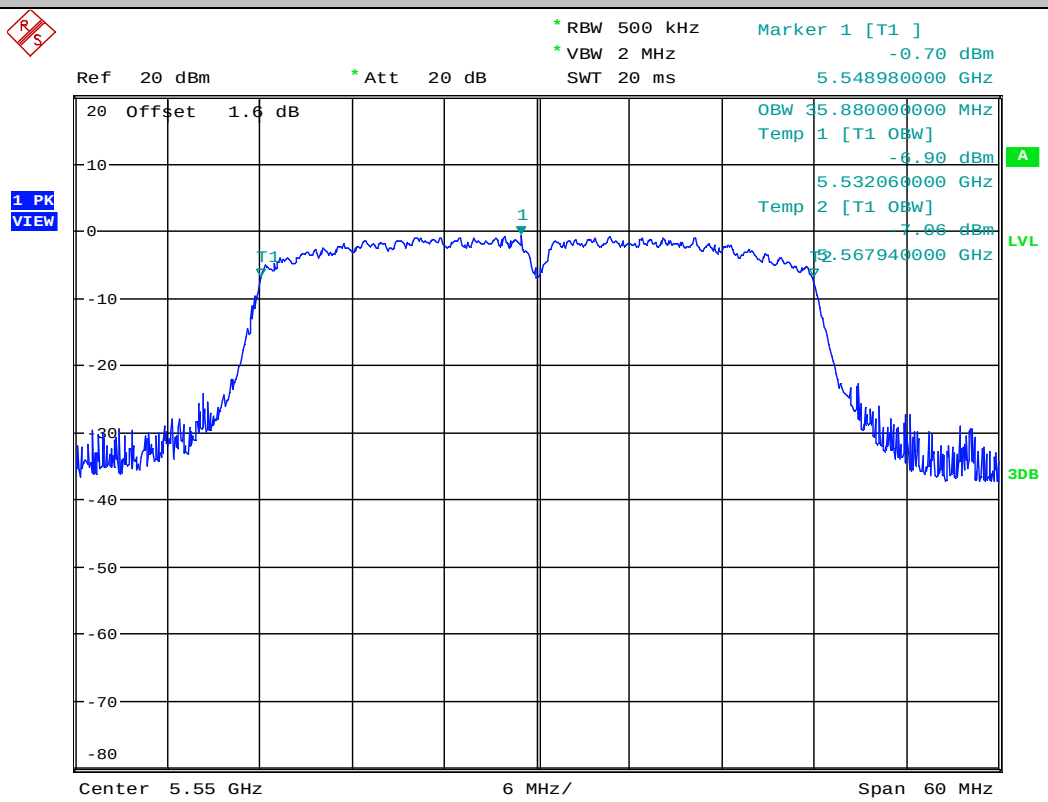
Occupied Bandwidth Measurement_11AC40_5550_Ant1



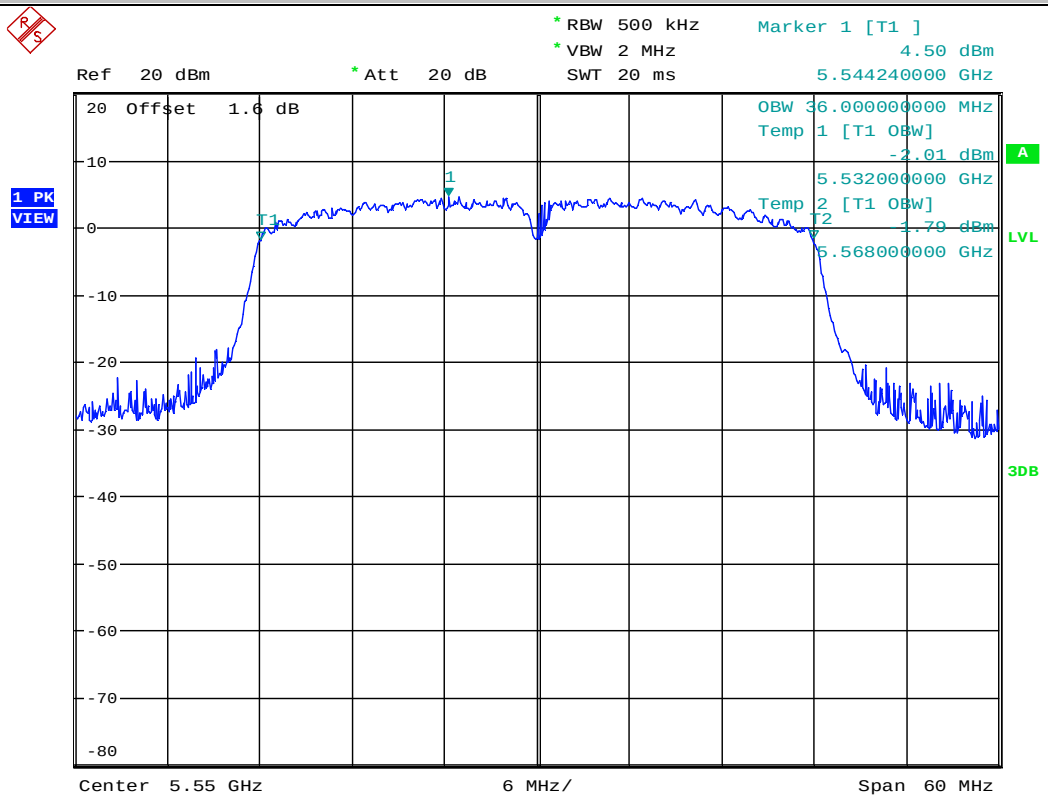
Occupied Bandwidth Measurement_11N40_5550_Ant1



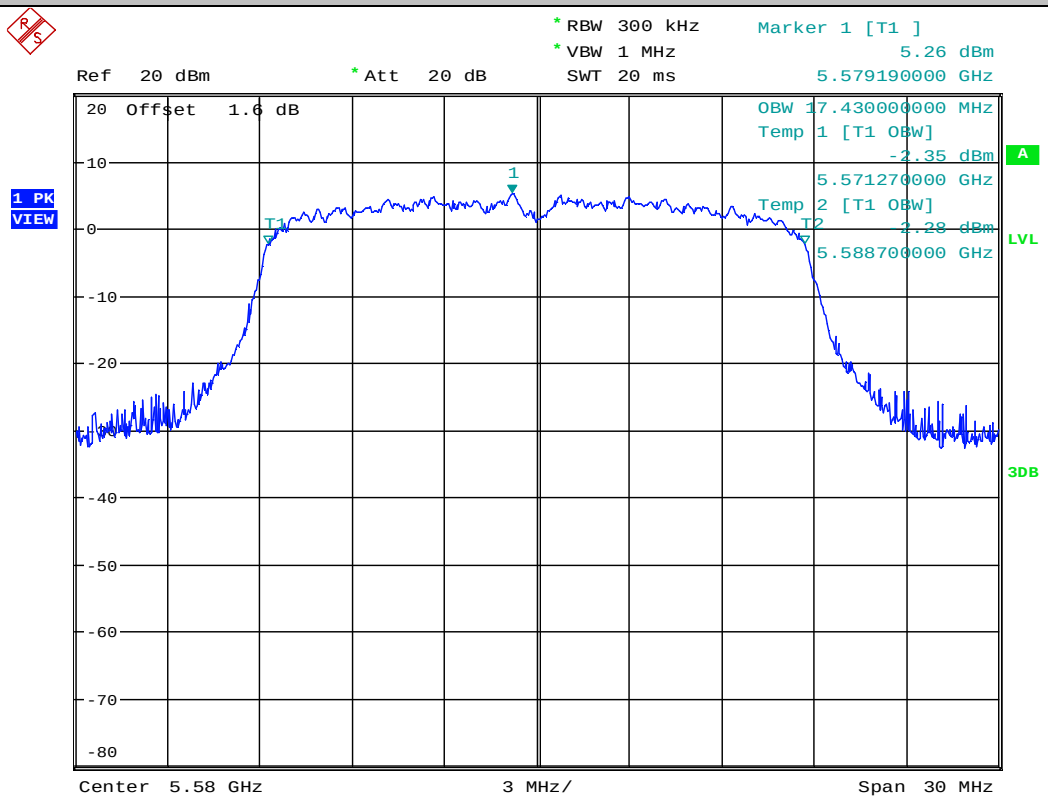
Occupied Bandwidth Measurement_11AC40_5550_Ant2



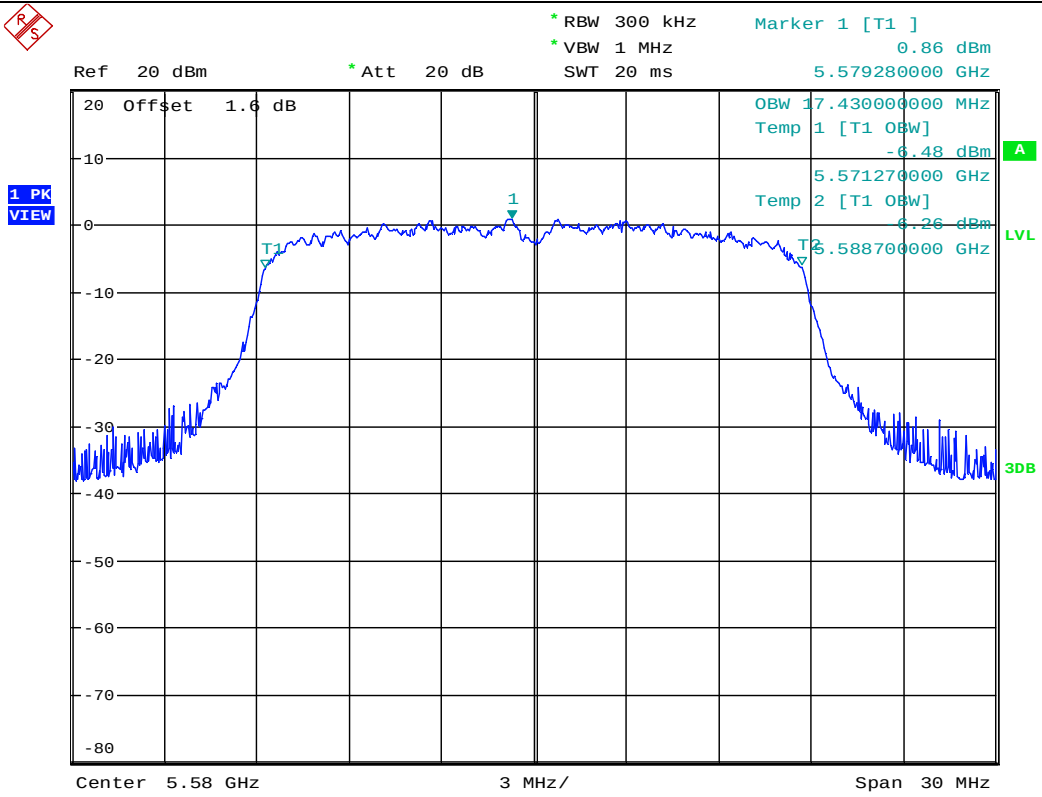
Occupied Bandwidth Measurement_11N40_5550_Ant2



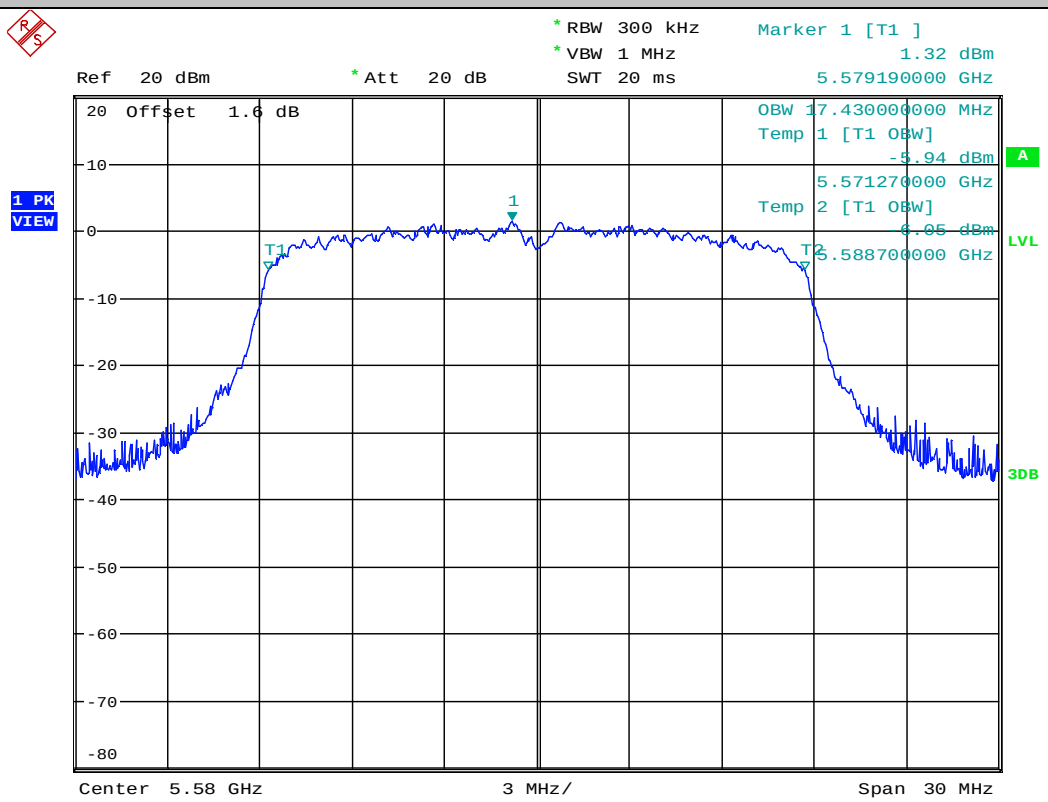
Occupied Bandwidth Measurement_11N20_5580_Ant1



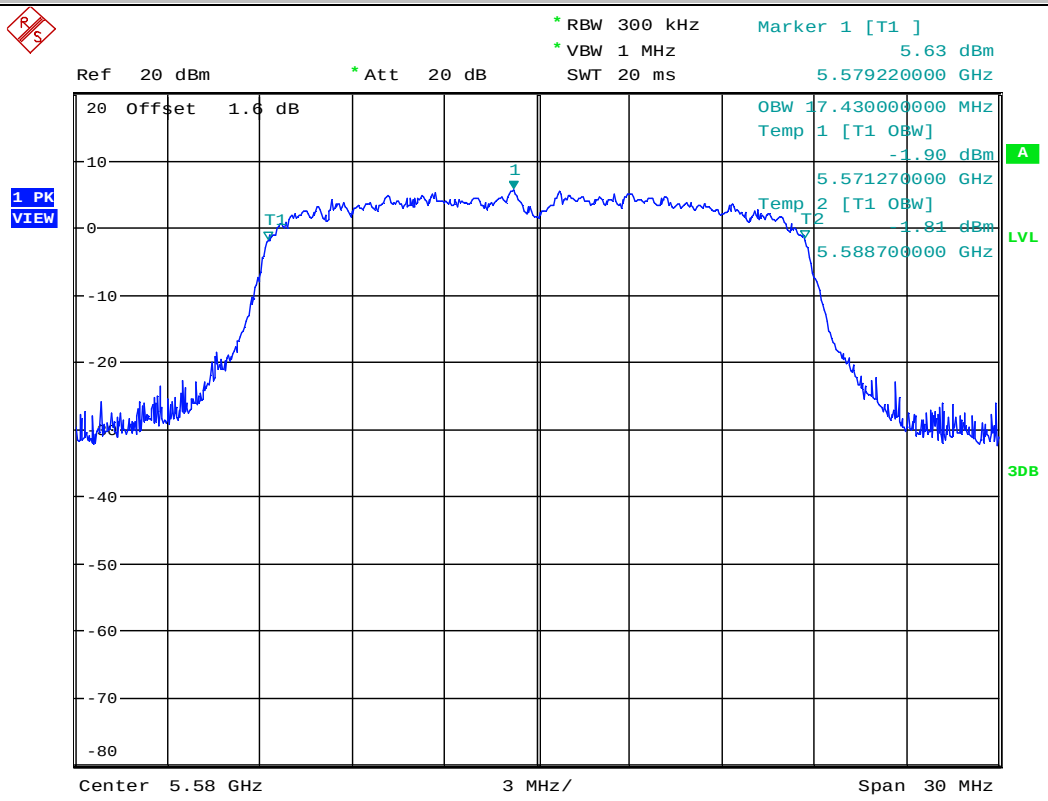
Occupied Bandwidth Measurement_11AC20_5580_Ant1



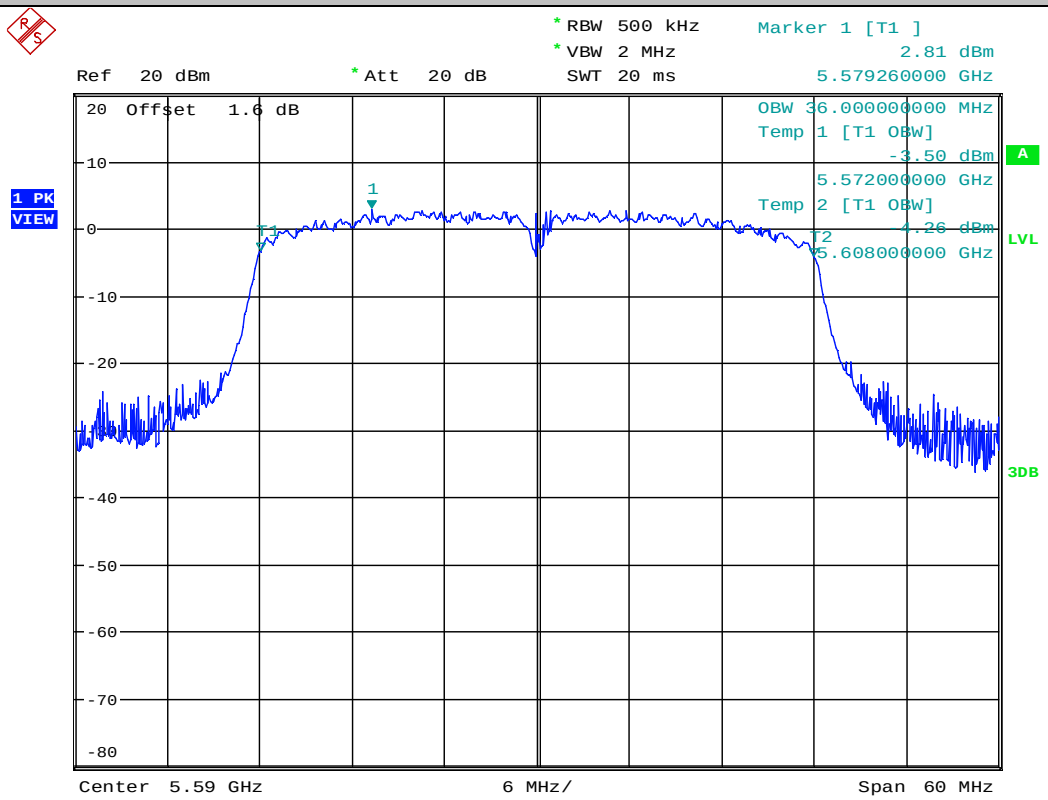
Occupied Bandwidth Measurement_11AC20_5580_Ant2



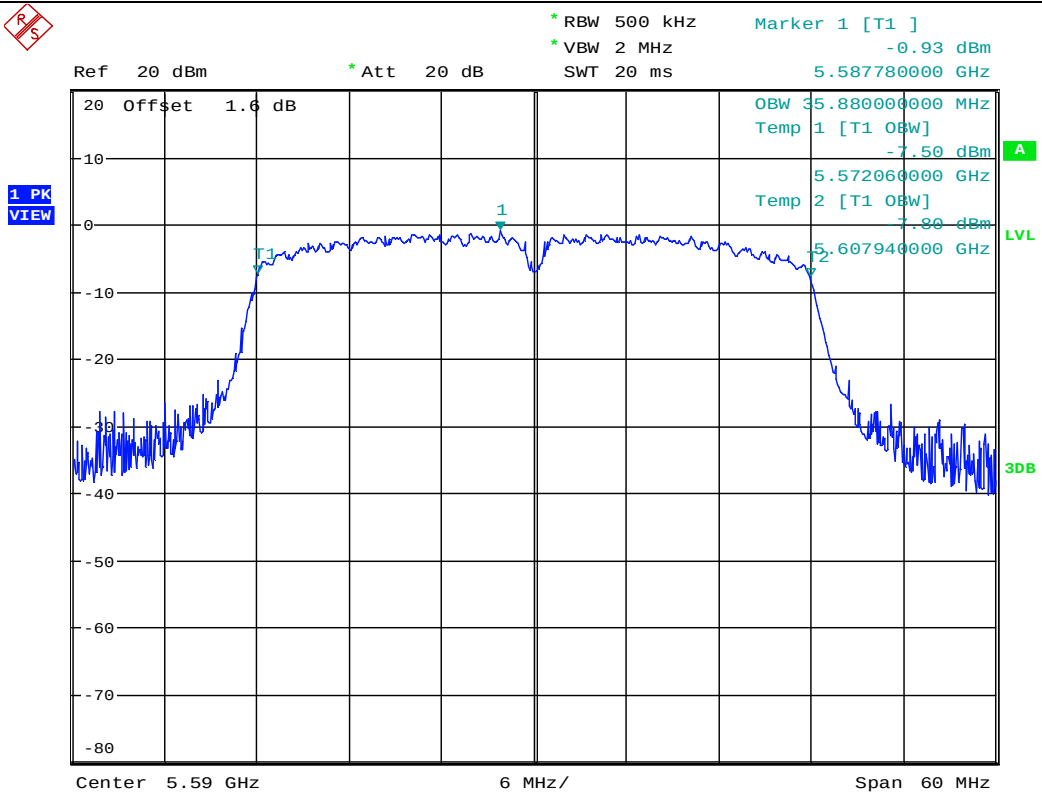
Occupied Bandwidth Measurement_11N20_5580_Ant2



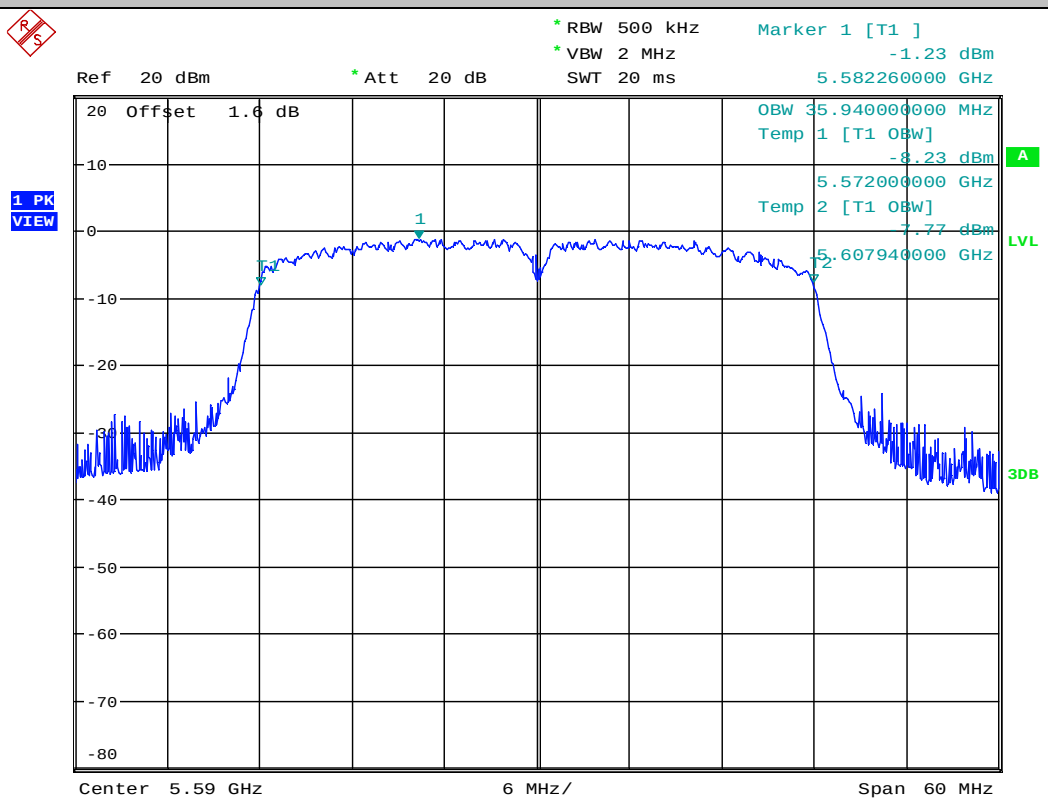
Occupied Bandwidth Measurement_11N40_5590_Ant1



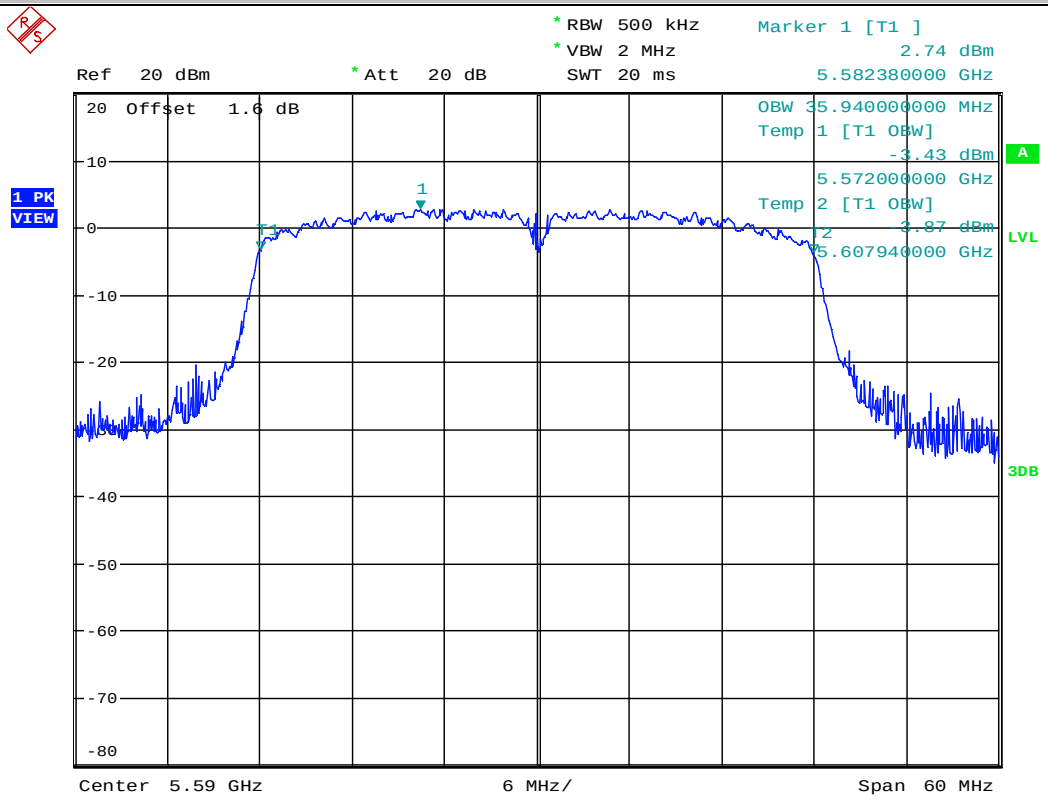
Occupied Bandwidth Measurement_11AC40_5590_Ant1



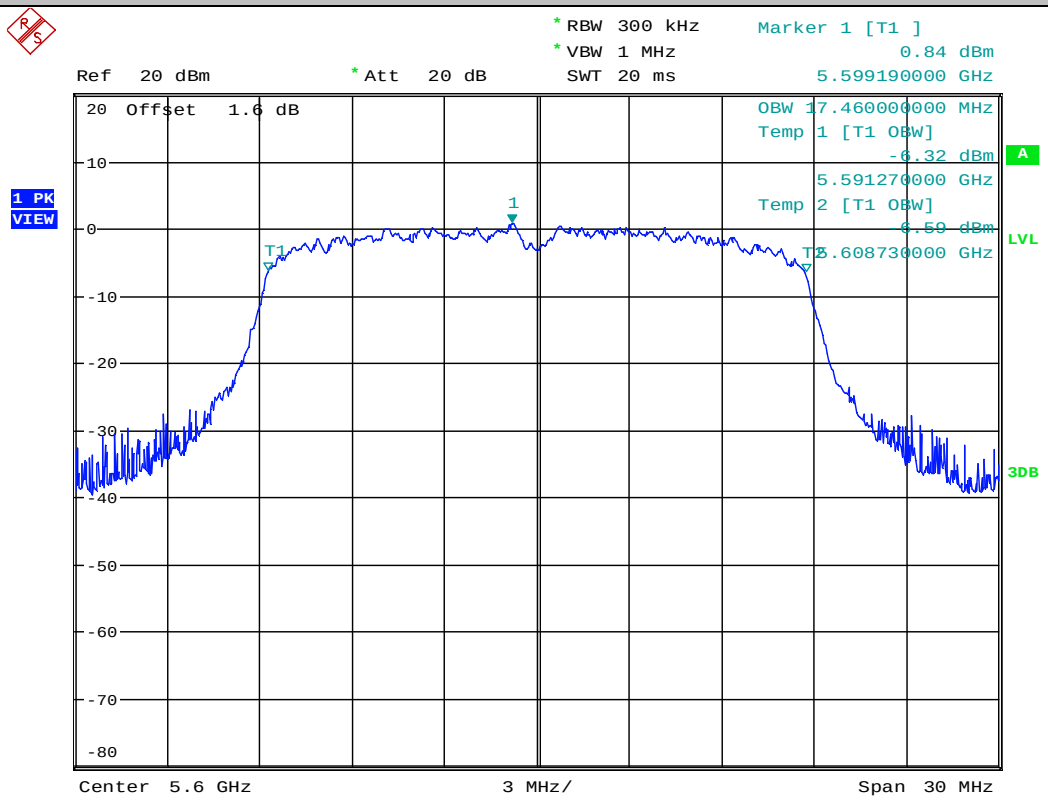
Occupied Bandwidth Measurement_11AC40_5590_Ant2



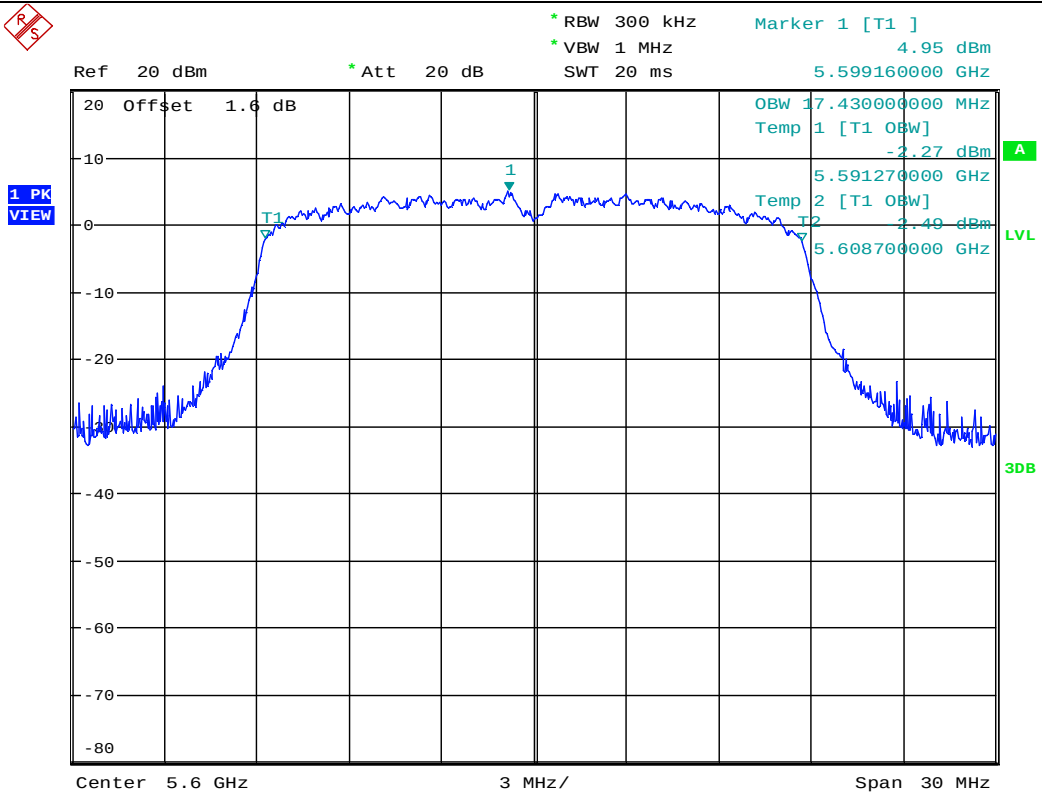
Occupied Bandwidth Measurement_11N40_5590_Ant2



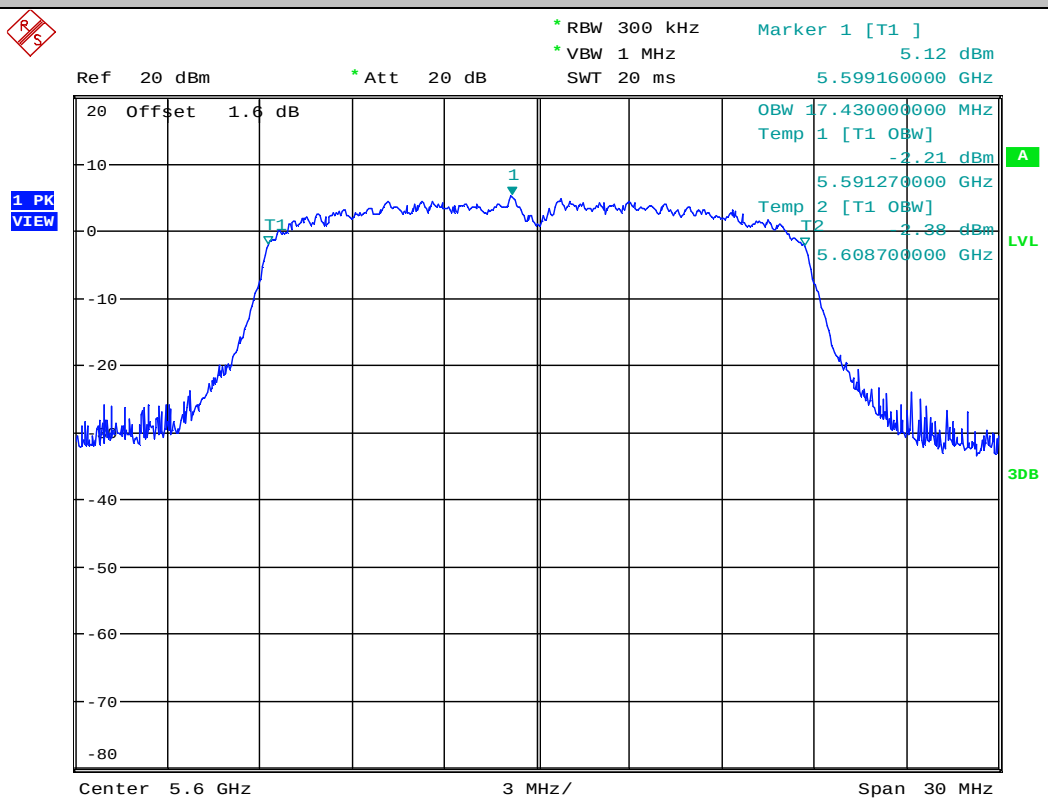
Occupied Bandwidth Measurement_11AC20_5600_Ant1



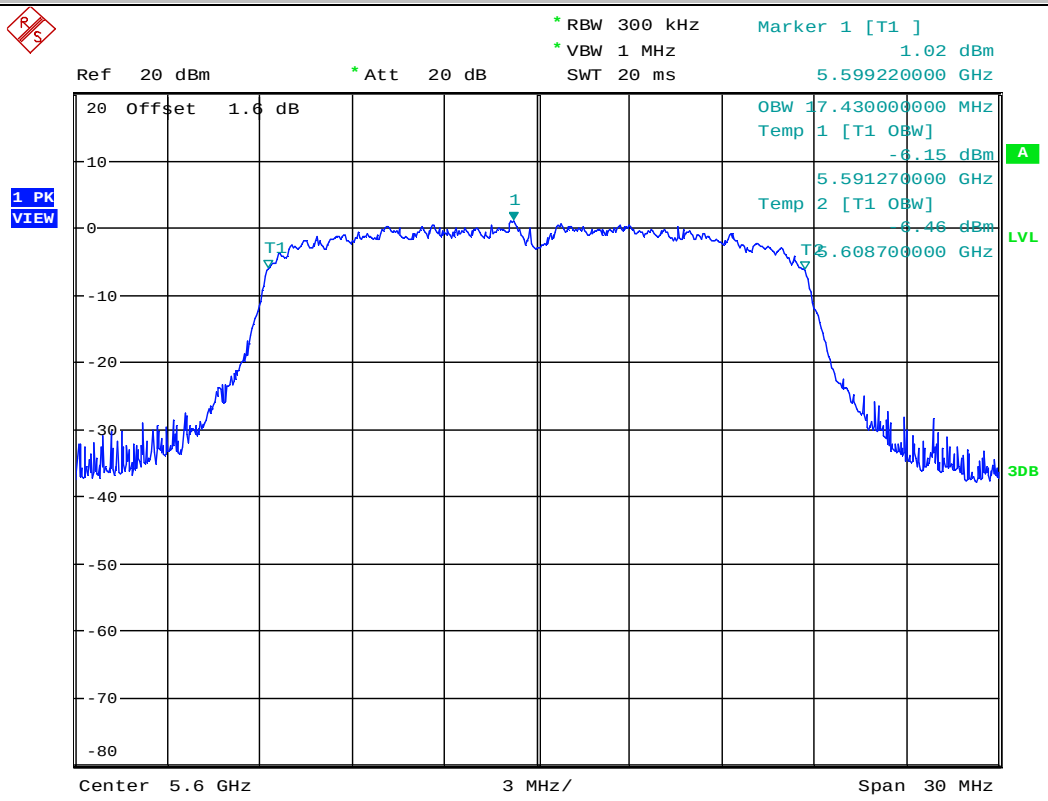
Occupied Bandwidth Measurement_11N20_5600_Ant1



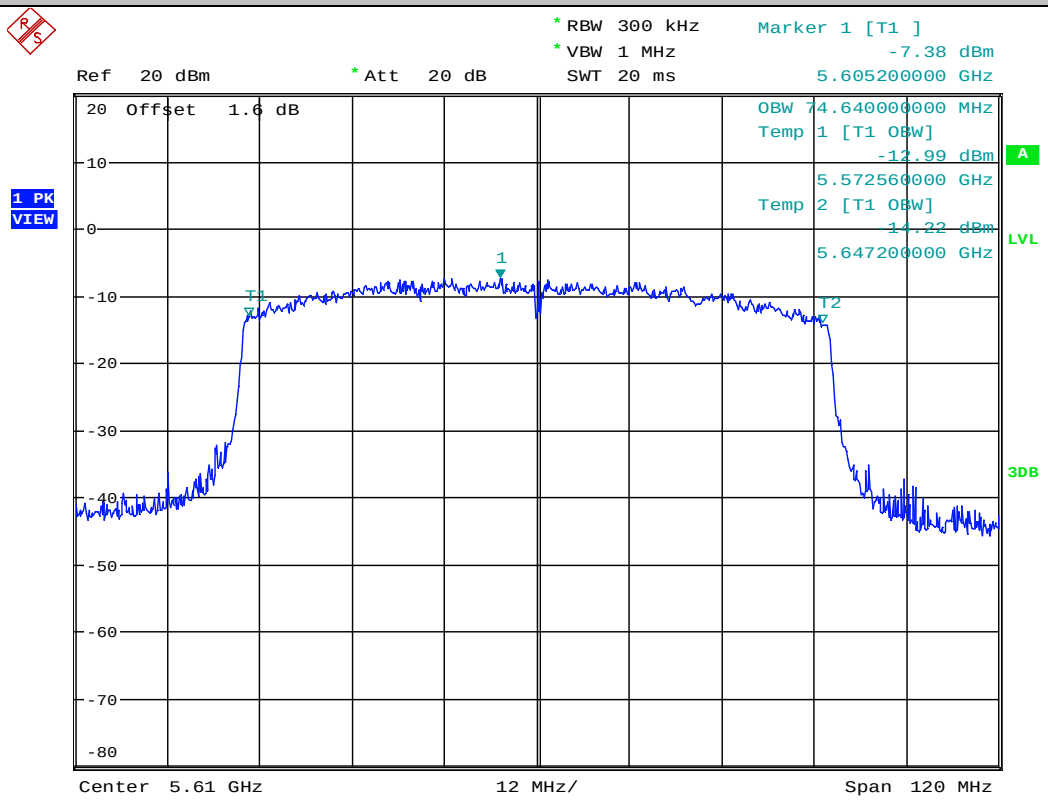
Occupied Bandwidth Measurement_11N20_5600_Ant2



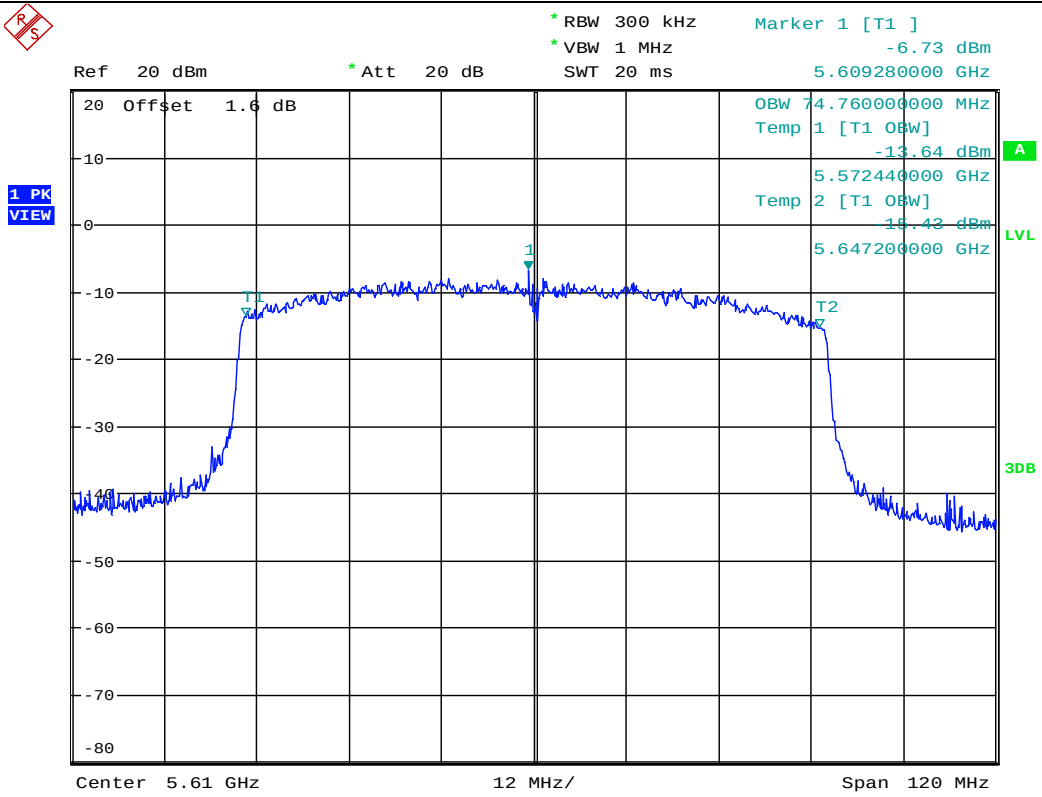
Occupied Bandwidth Measurement_11AC20_5600_Ant2



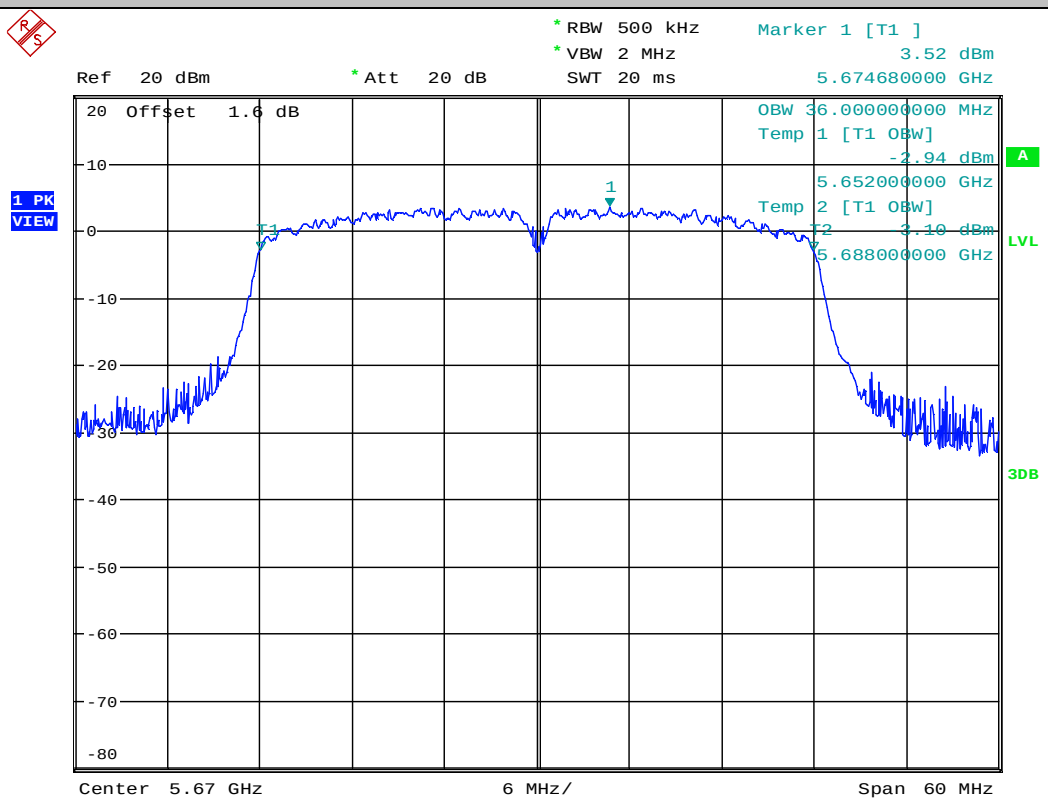
Occupied Bandwidth Measurement_11AC80_5610_Ant1



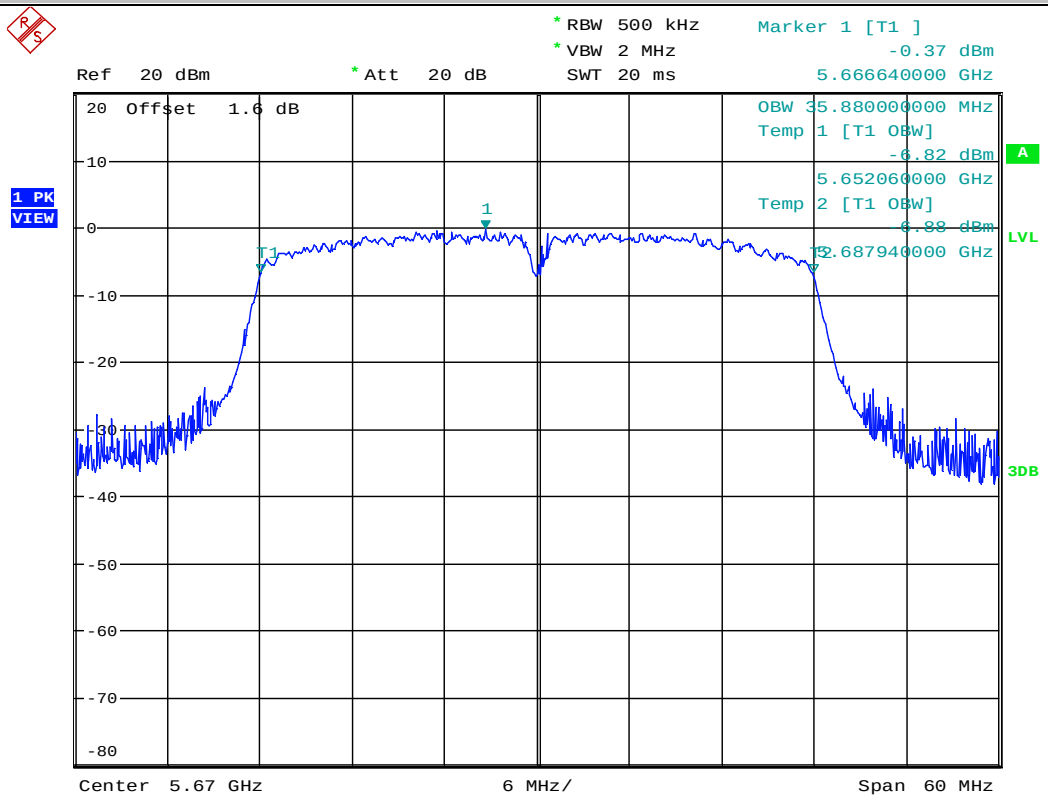
Occupied Bandwidth Measurement_11AC80_5610_Ant2



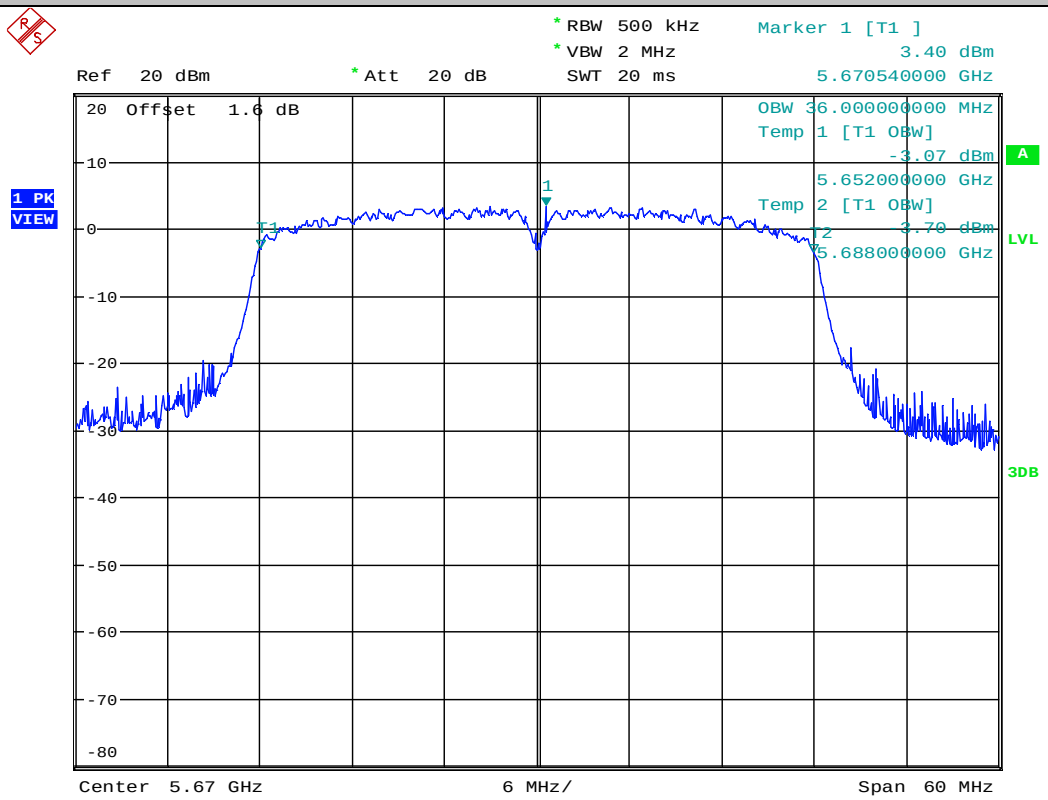
Occupied Bandwidth Measurement_11N40_5670_Ant1



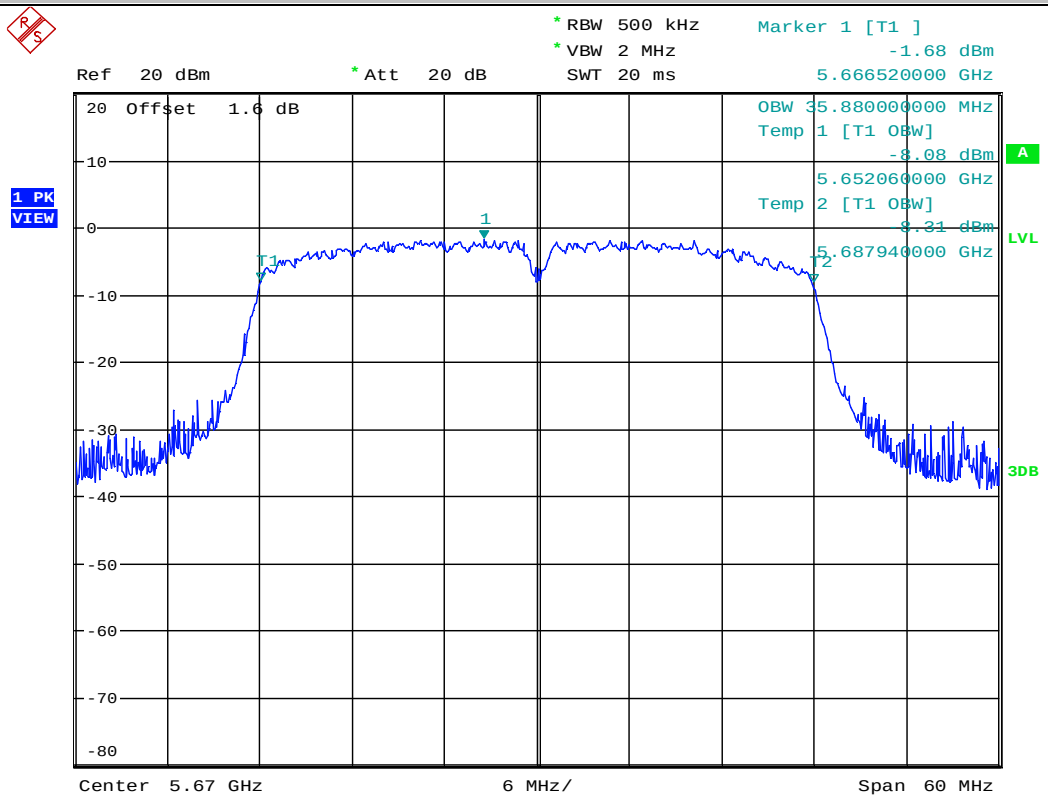
Occupied Bandwidth Measurement_11AC40_5670_Ant1



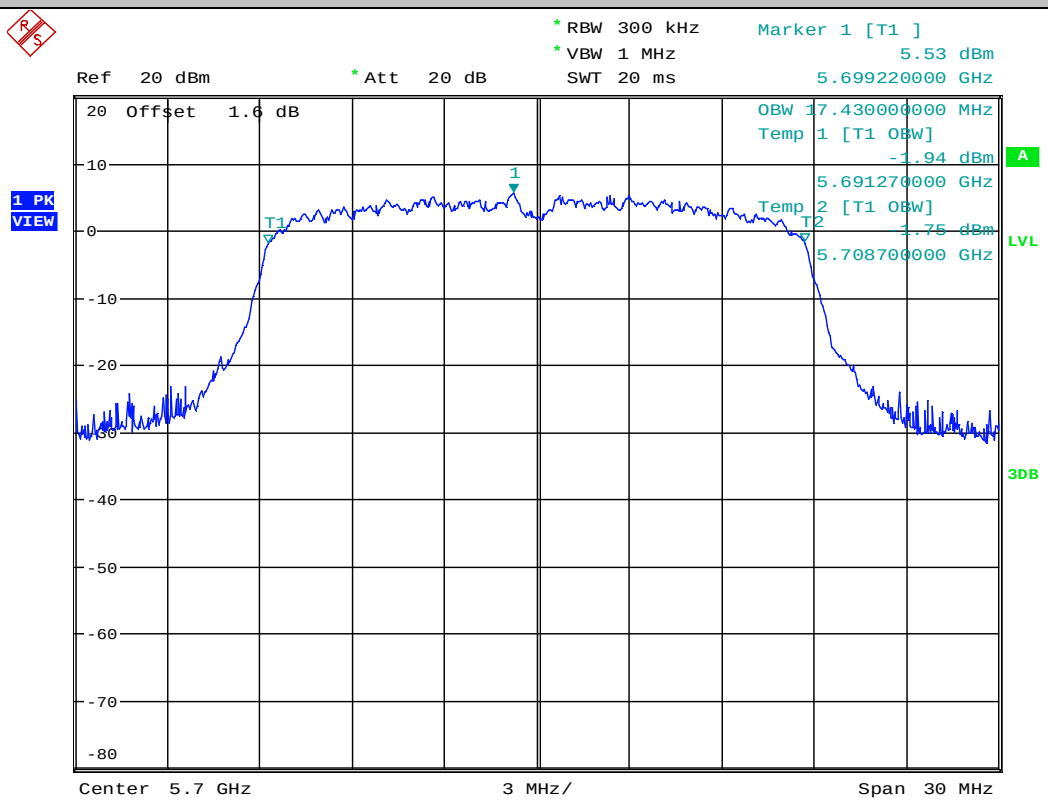
Occupied Bandwidth Measurement_11N40_5670_Ant2



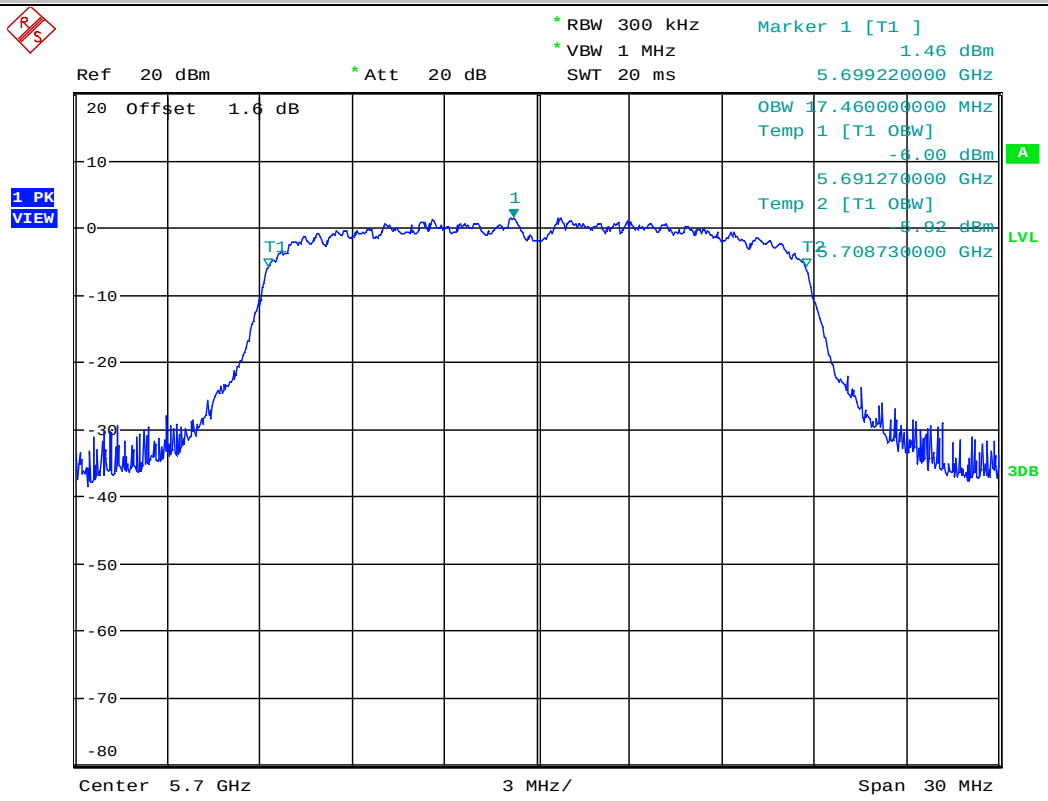
Occupied Bandwidth Measurement_11AC40_5670_Ant2



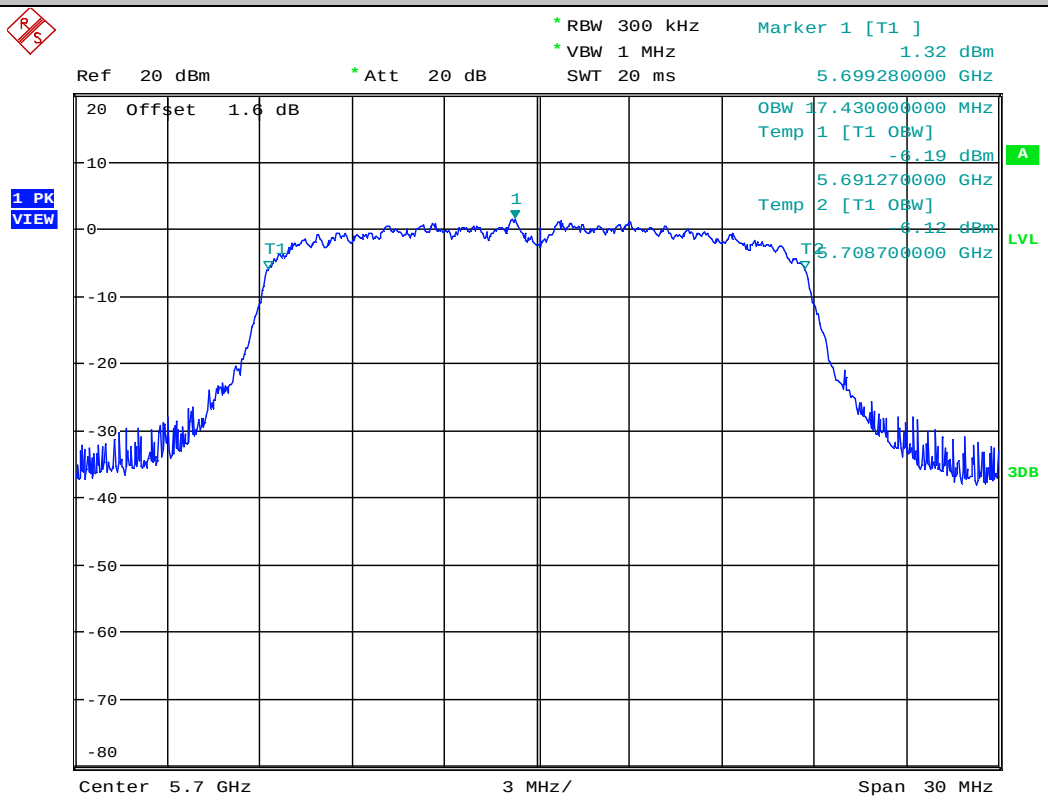
Occupied Bandwidth Measurement_11N20_5700_Ant1



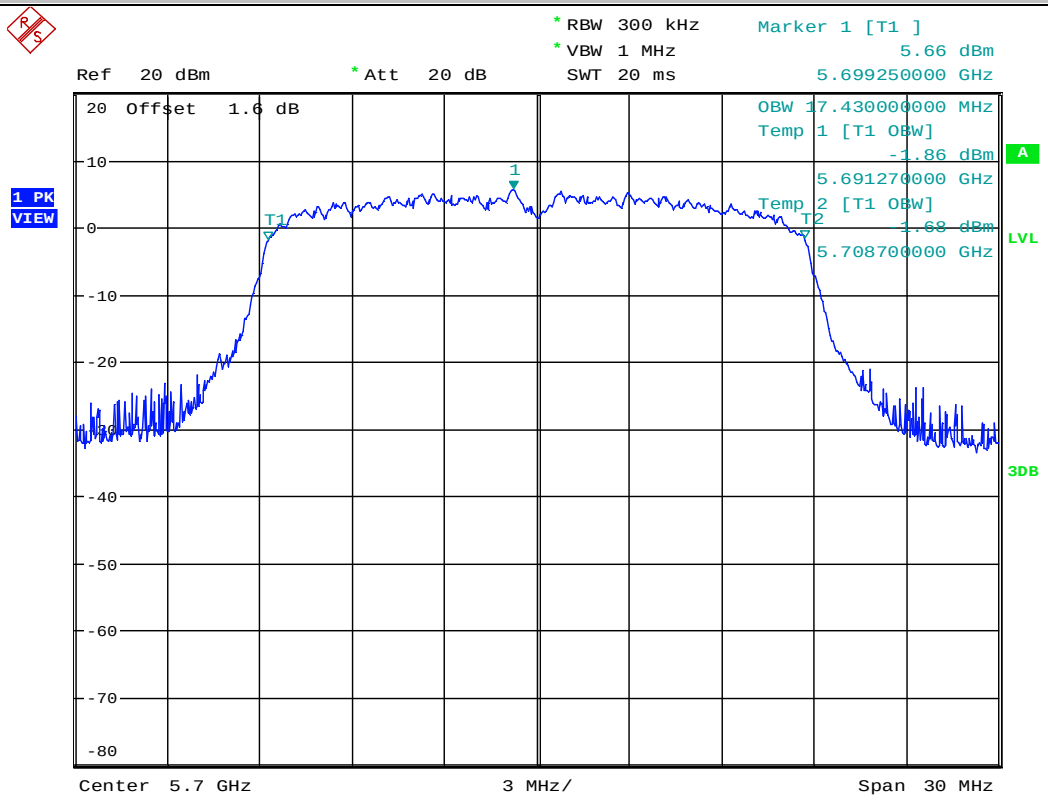
Occupied Bandwidth Measurement_11AC20_5700_Ant1



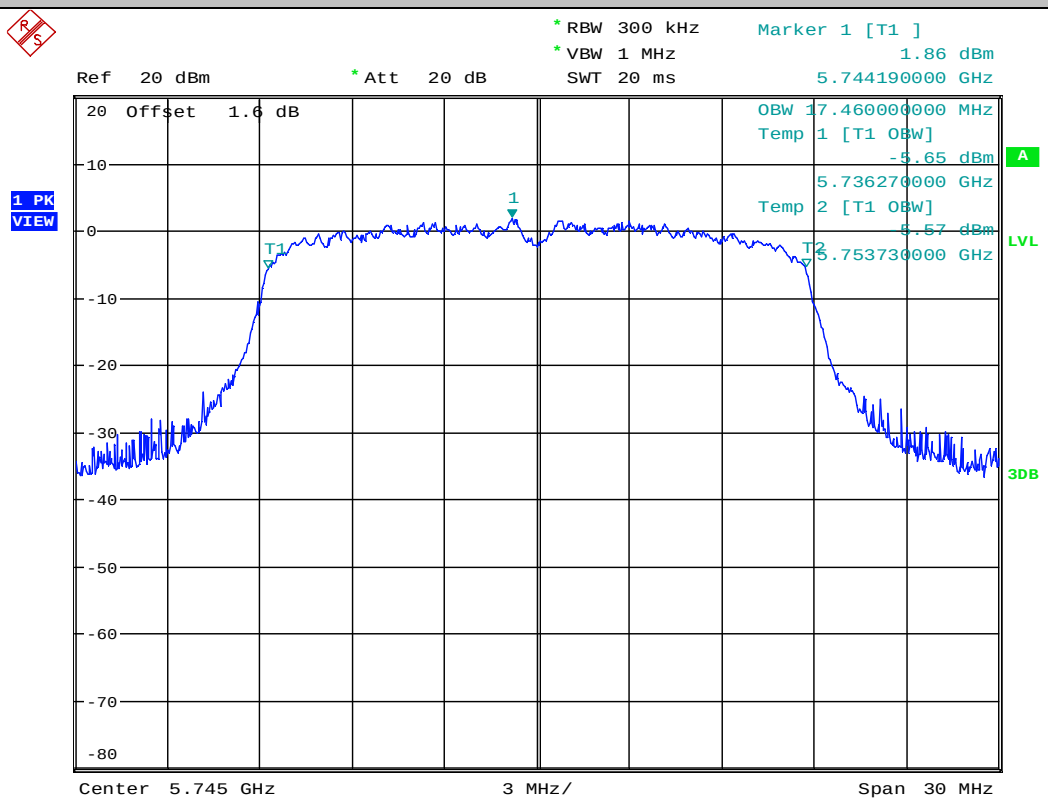
Occupied Bandwidth Measurement_11AC20_5700_Ant2



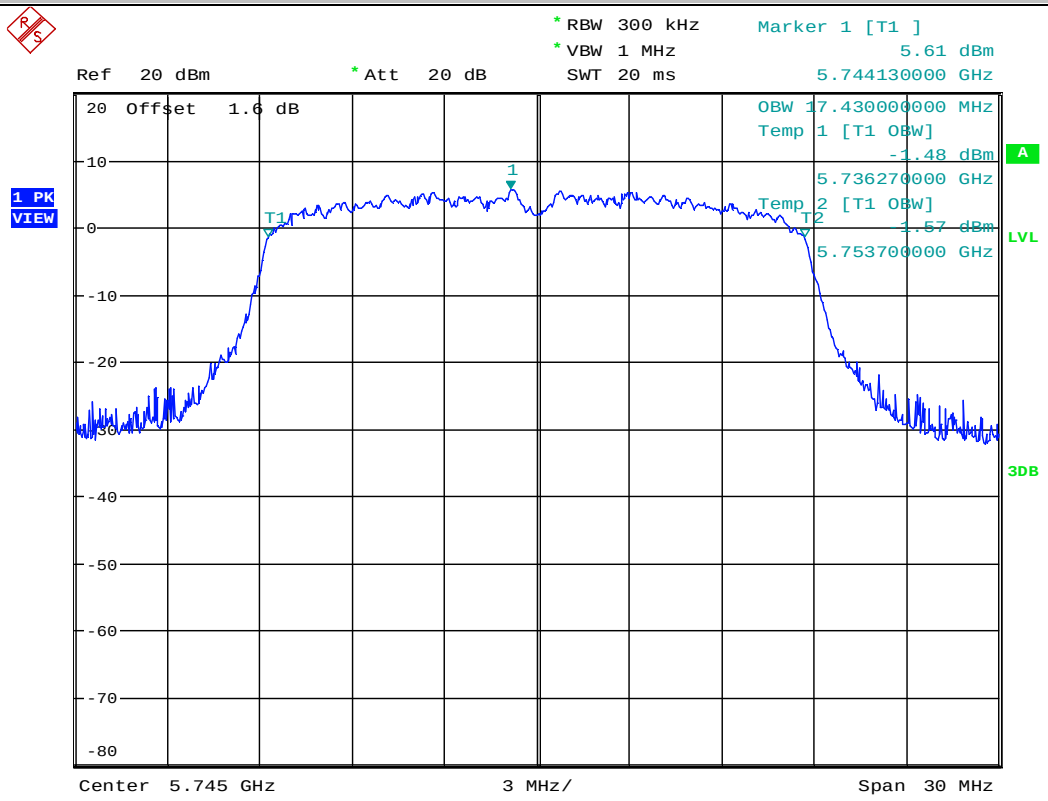
Occupied Bandwidth Measurement_11N20_5700_Ant2



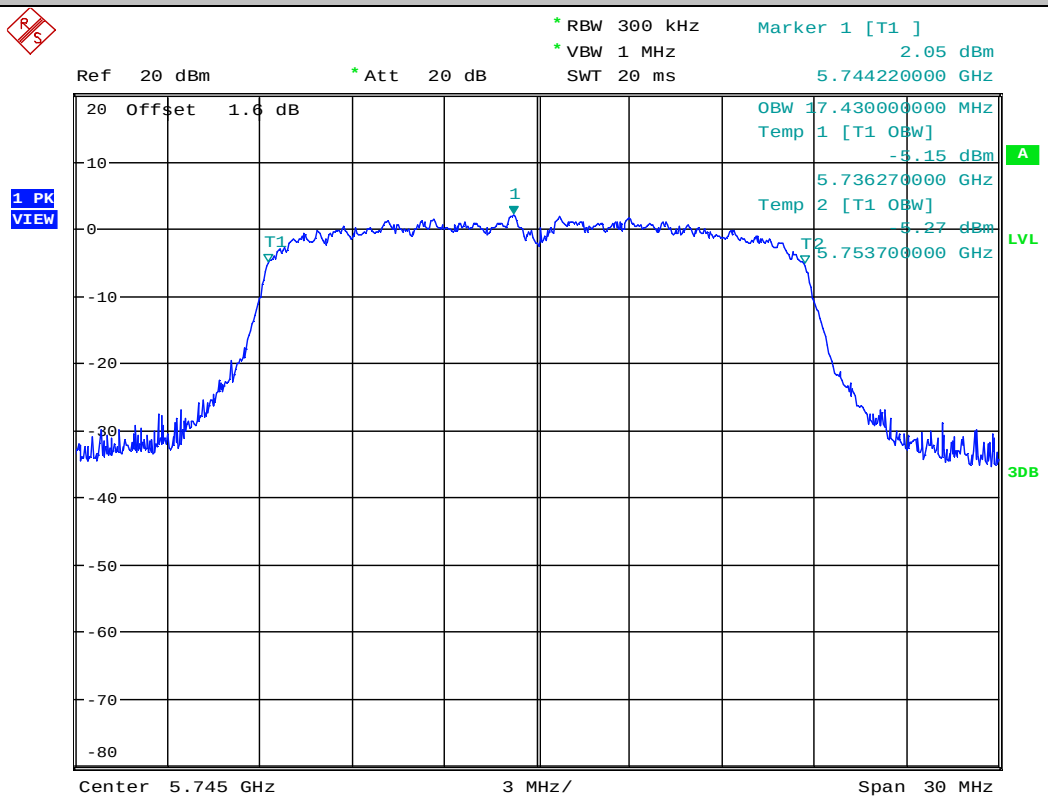
Occupied Bandwidth Measurement_11AC20_5745_Ant1



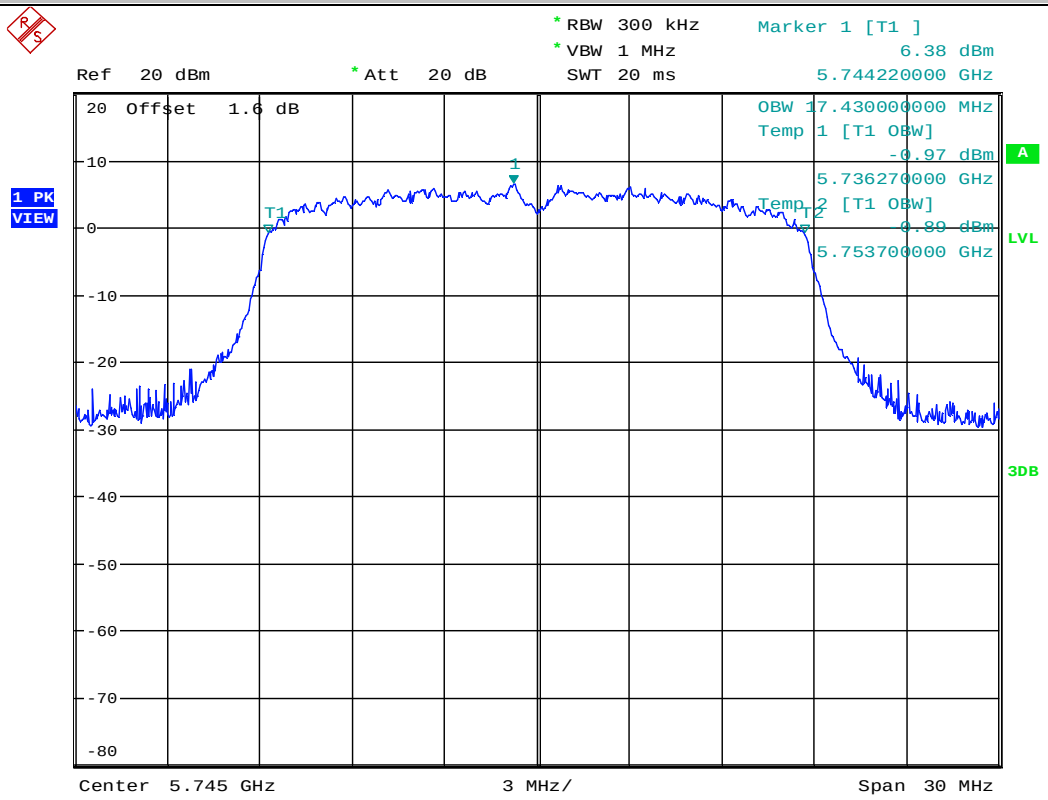
Occupied Bandwidth Measurement_11N20_5745_Ant1



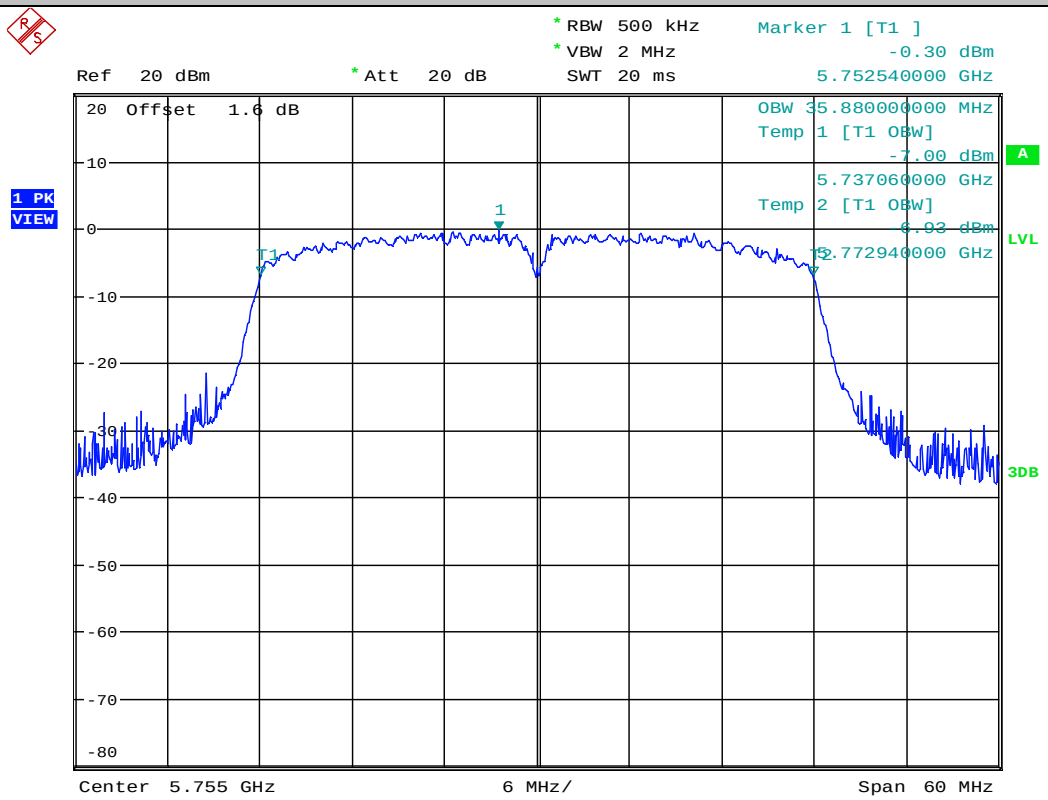
Occupied Bandwidth Measurement_11AC20_5745_Ant2



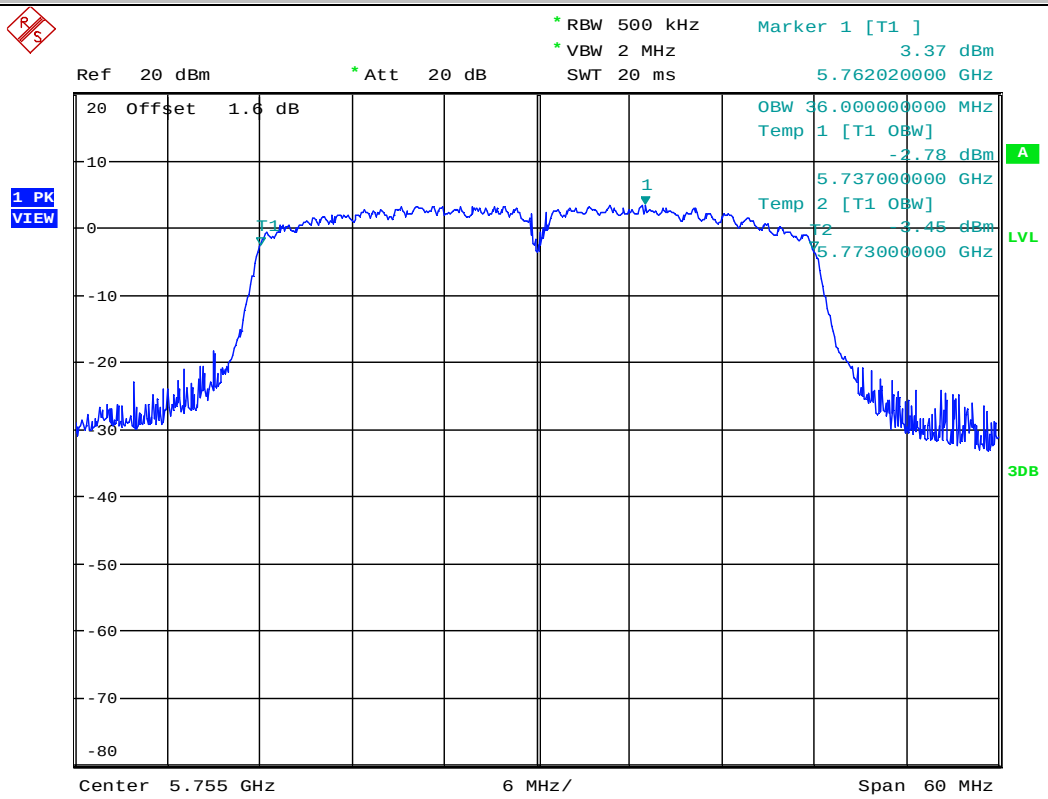
Occupied Bandwidth Measurement_11N20_5745_Ant2



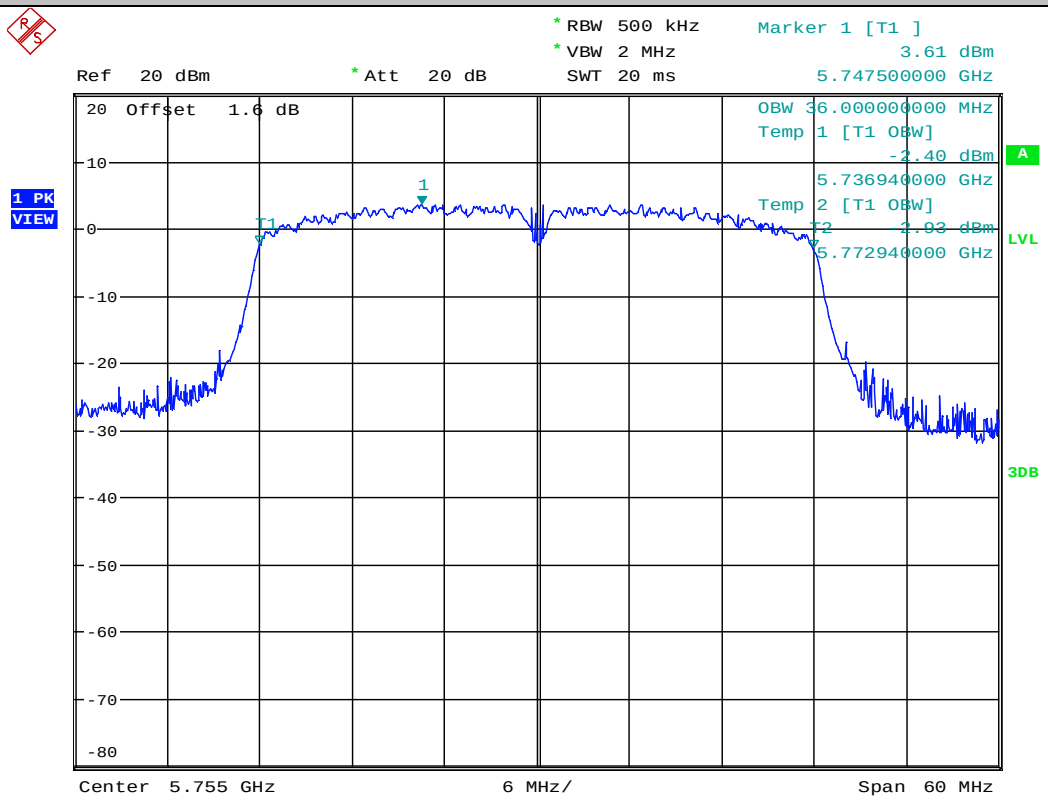
Occupied Bandwidth Measurement_11AC40_5755_Ant1



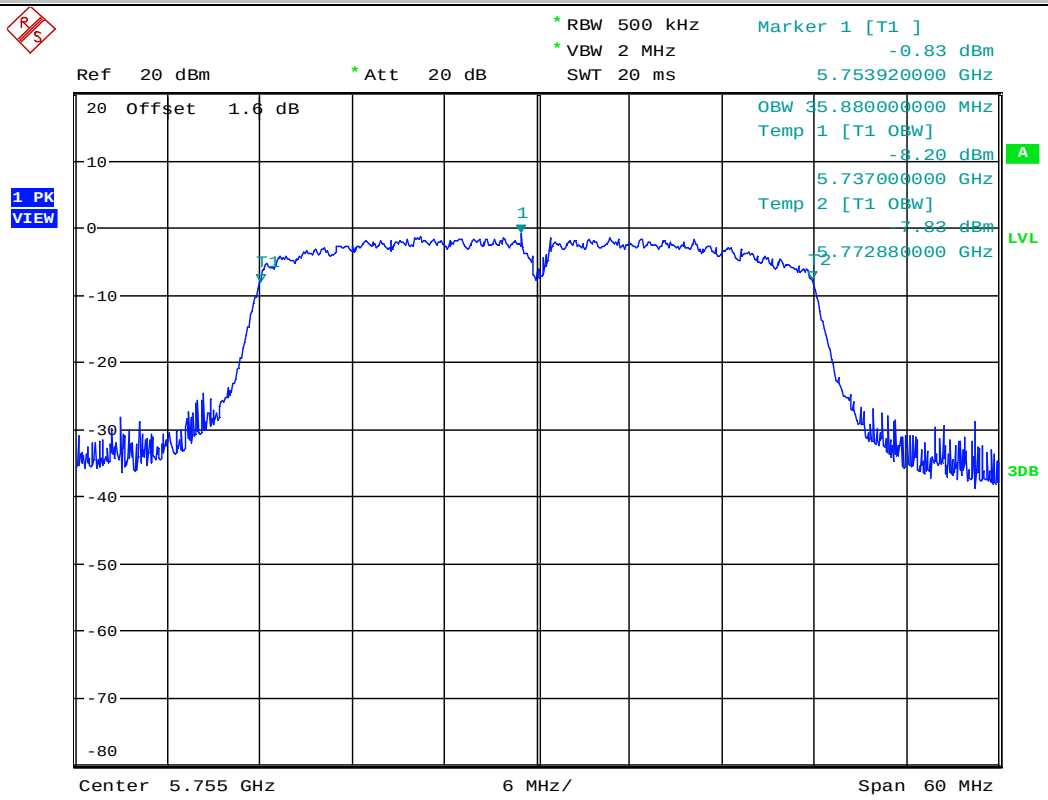
Occupied Bandwidth Measurement_11N40_5755_Ant1



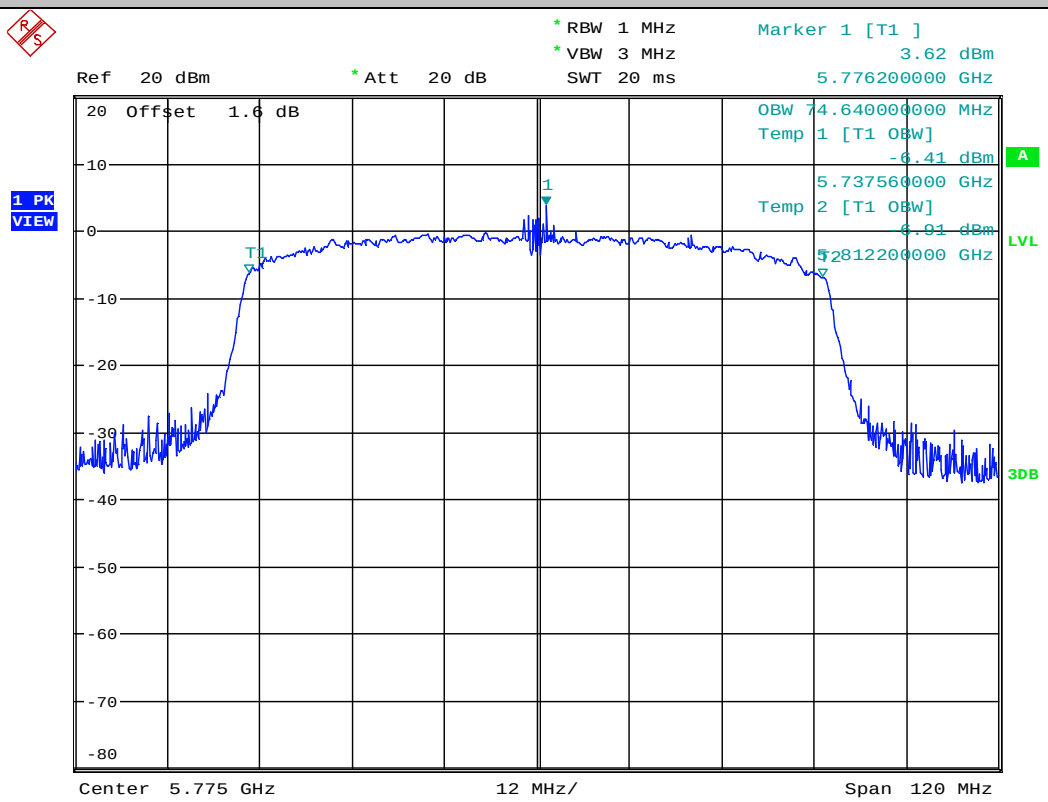
Occupied Bandwidth Measurement_11N40_5755_Ant2



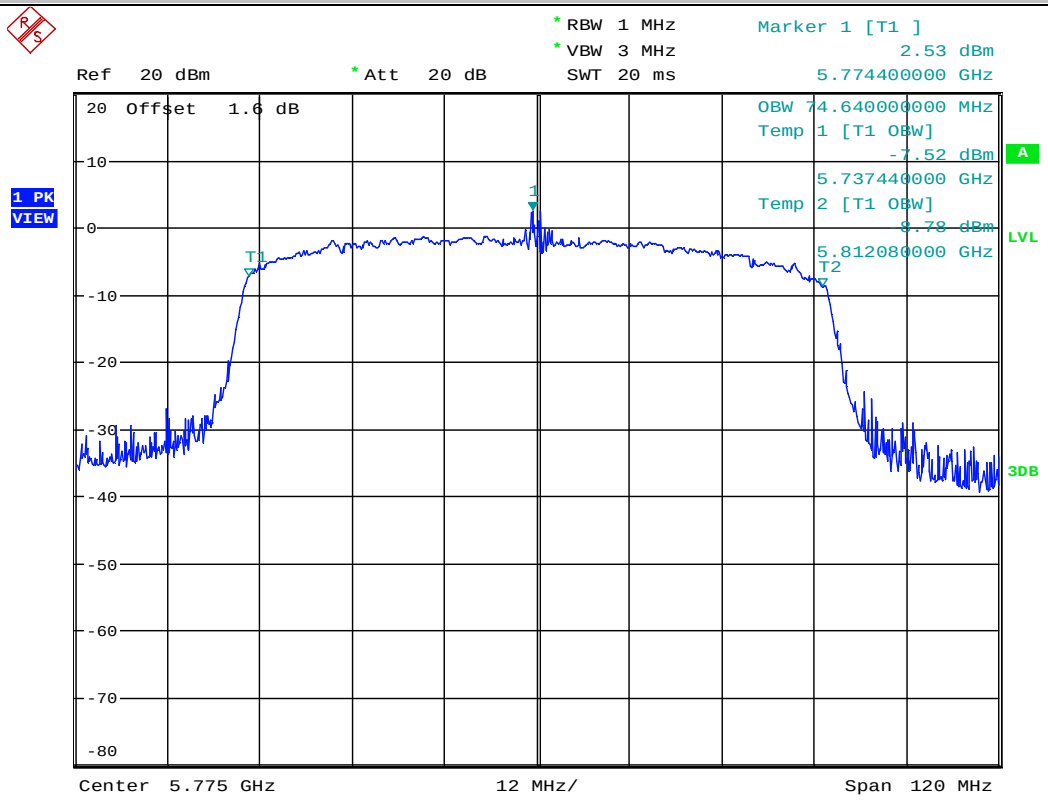
Occupied Bandwidth Measurement_11AC40_5755_Ant2



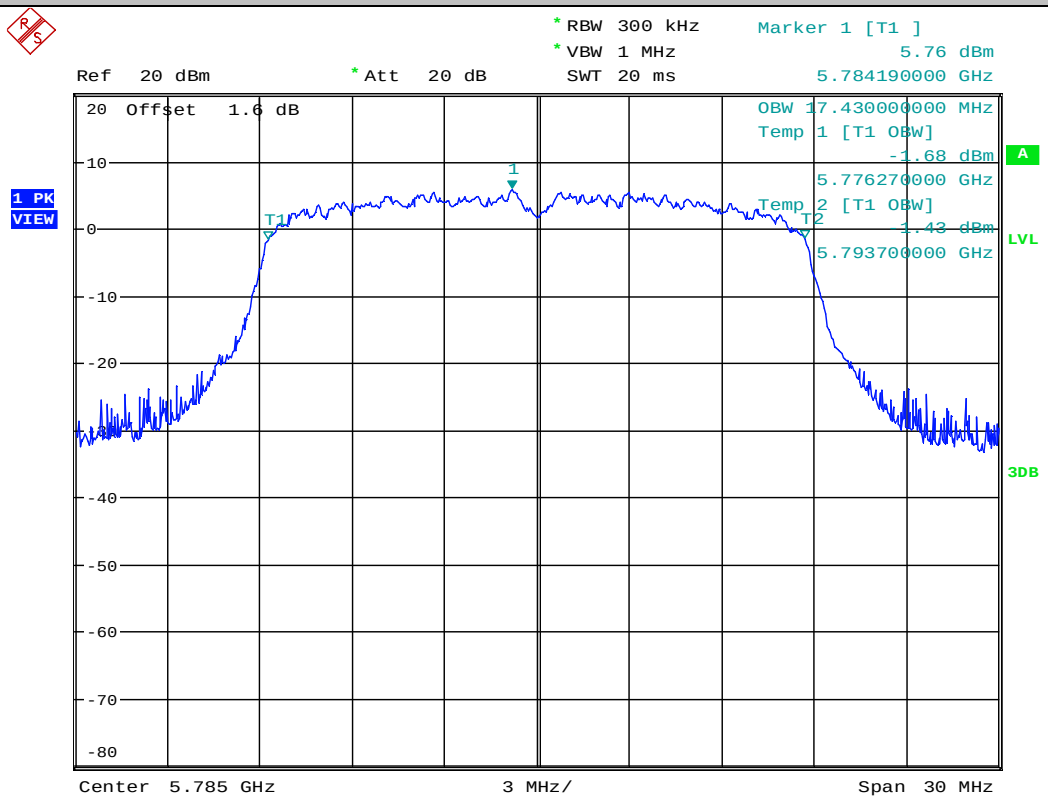
Occupied Bandwidth Measurement_11AC80_5775_Ant1



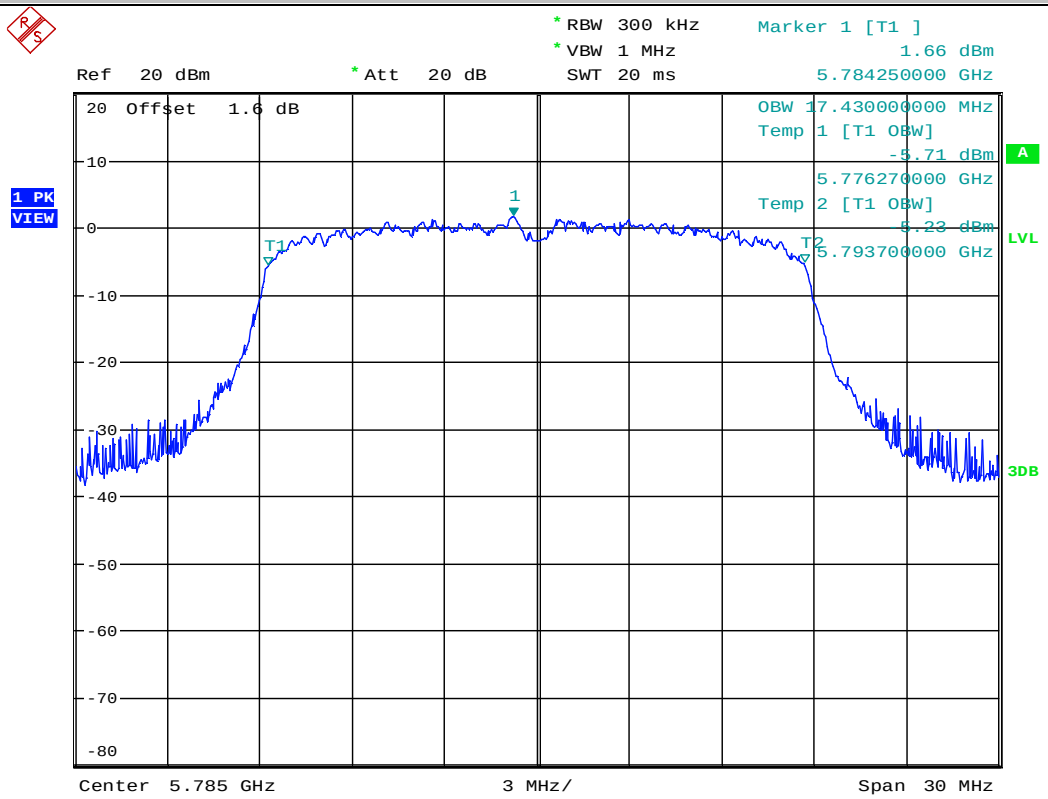
Occupied Bandwidth Measurement_11AC80_5775_Ant2



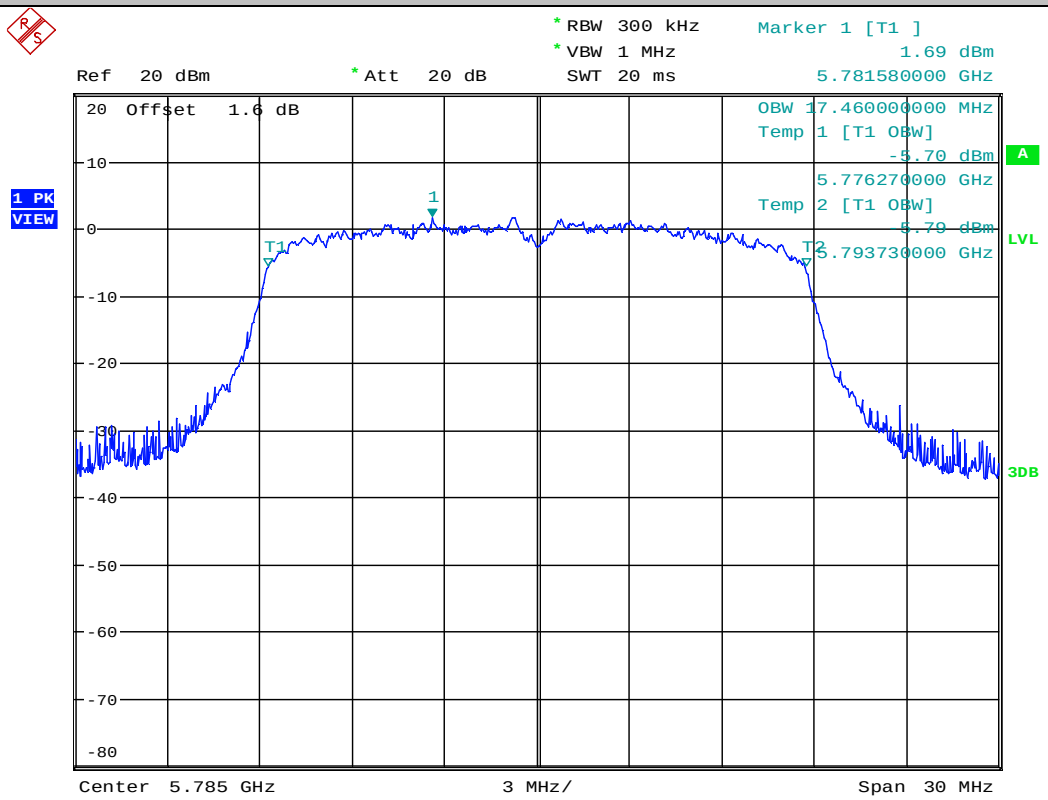
Occupied Bandwidth Measurement_11N20_5785_Ant1



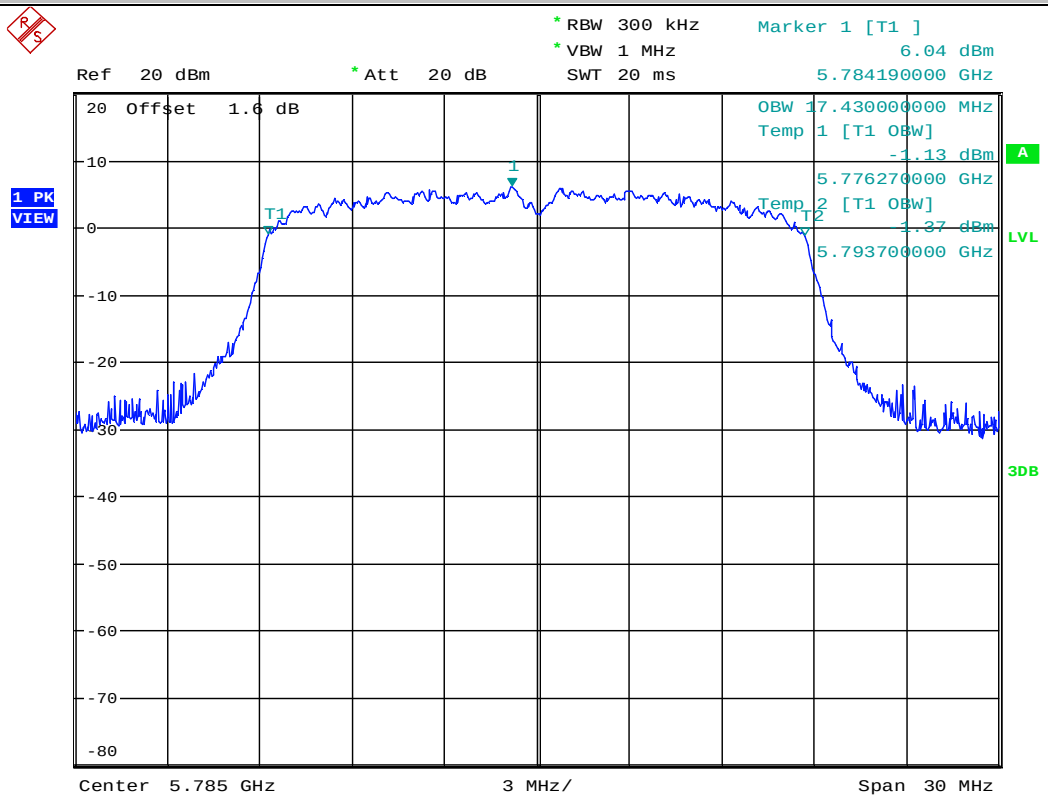
Occupied Bandwidth Measurement_11AC20_5785_Ant1



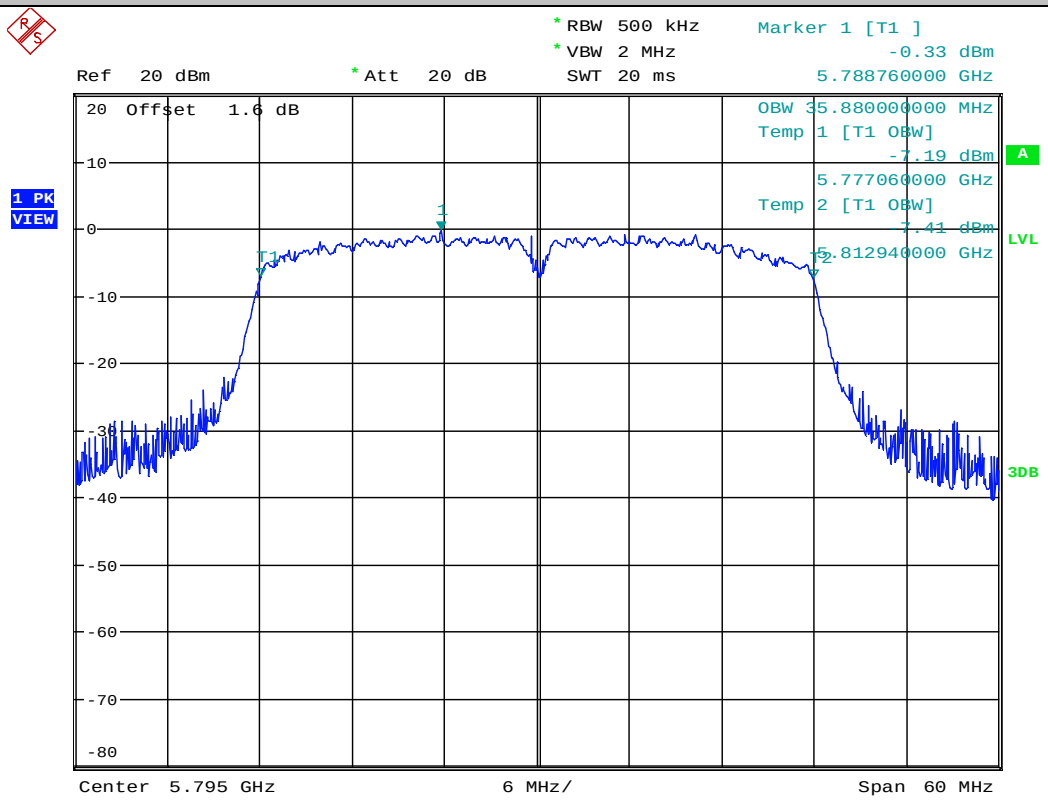
Occupied Bandwidth Measurement_11AC20_5785_Ant2



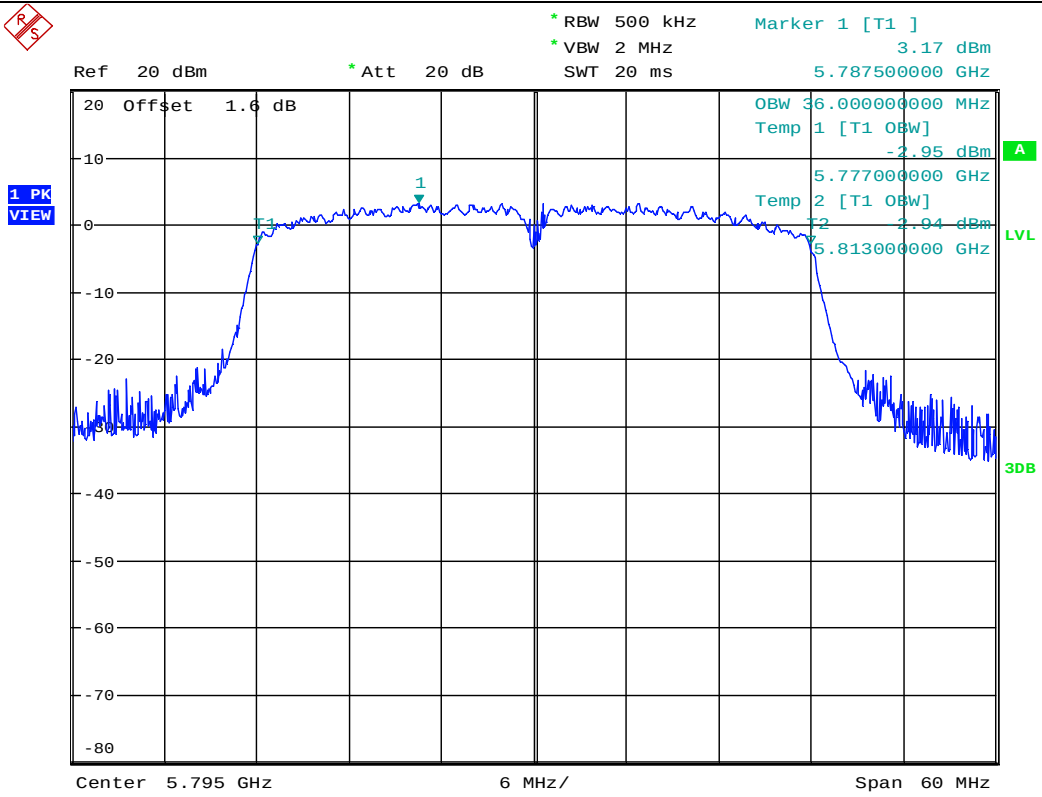
Occupied Bandwidth Measurement_11N20_5785_Ant2



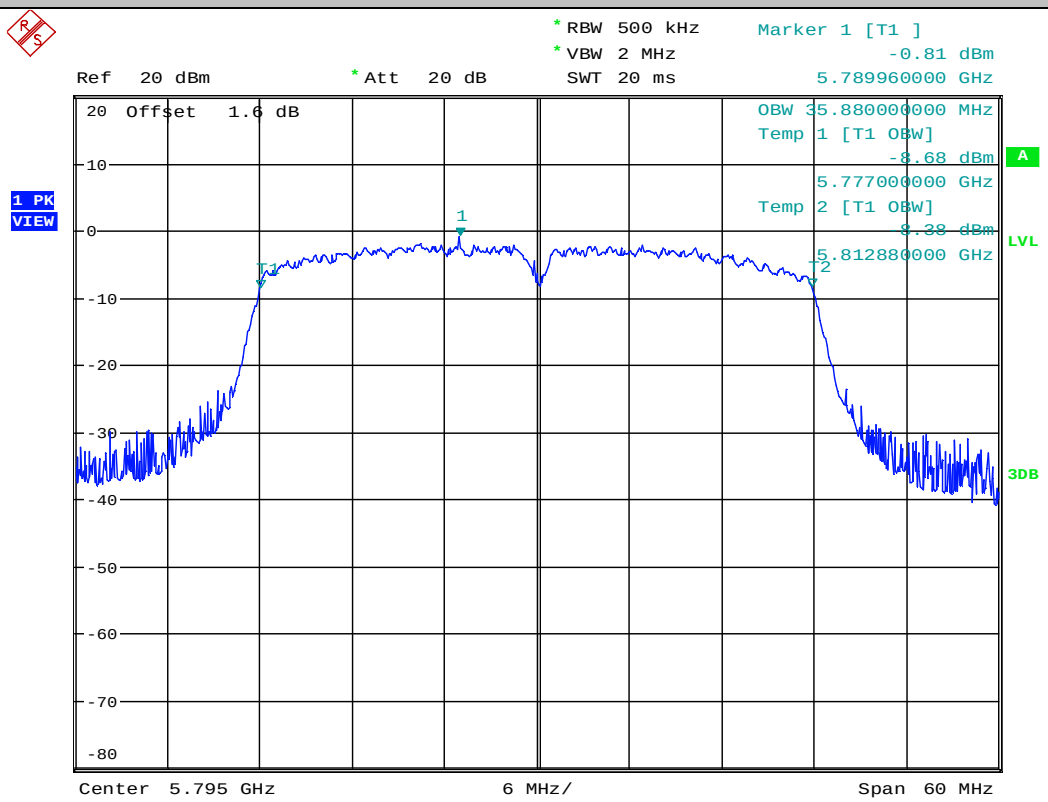
Occupied Bandwidth Measurement_11AC40_5795_Ant1



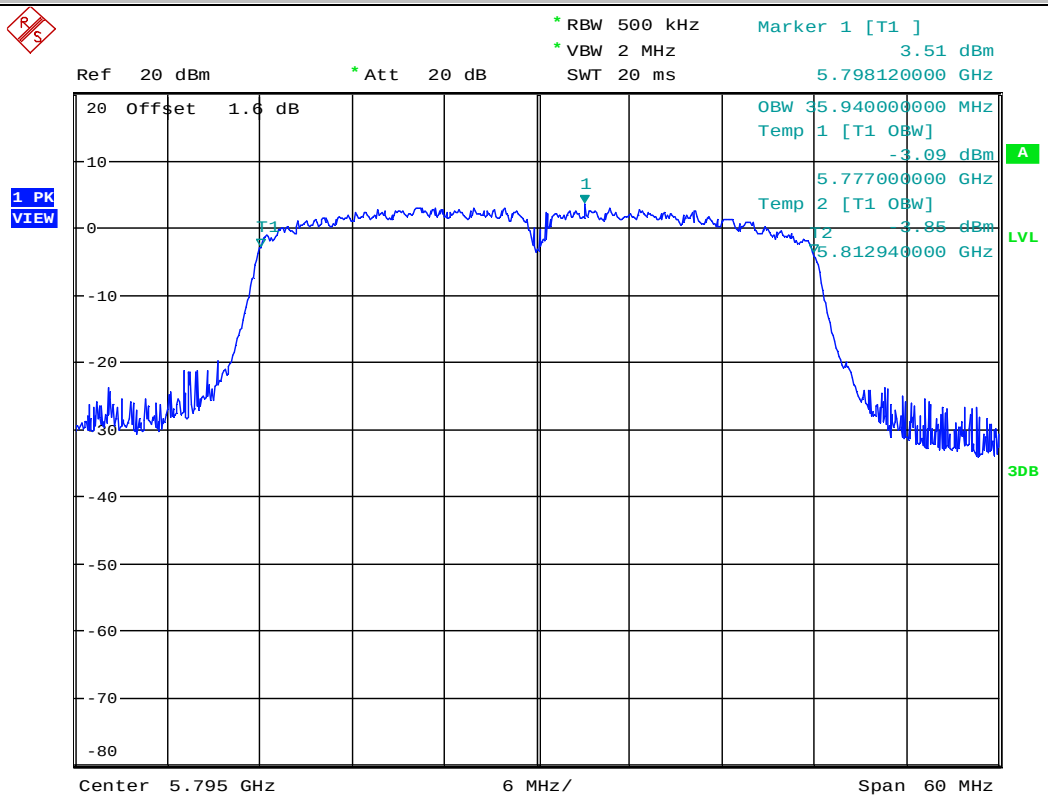
Occupied Bandwidth Measurement_11N40_5795_Ant1



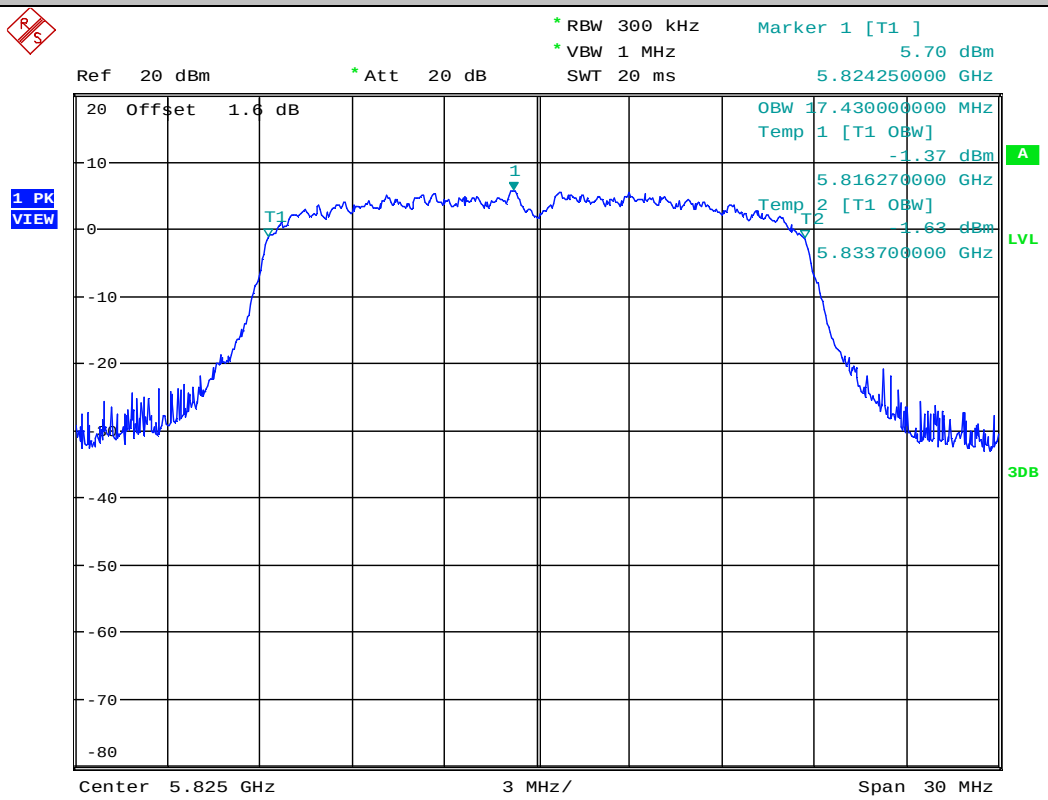
Occupied Bandwidth Measurement_11AC40_5795_Ant2



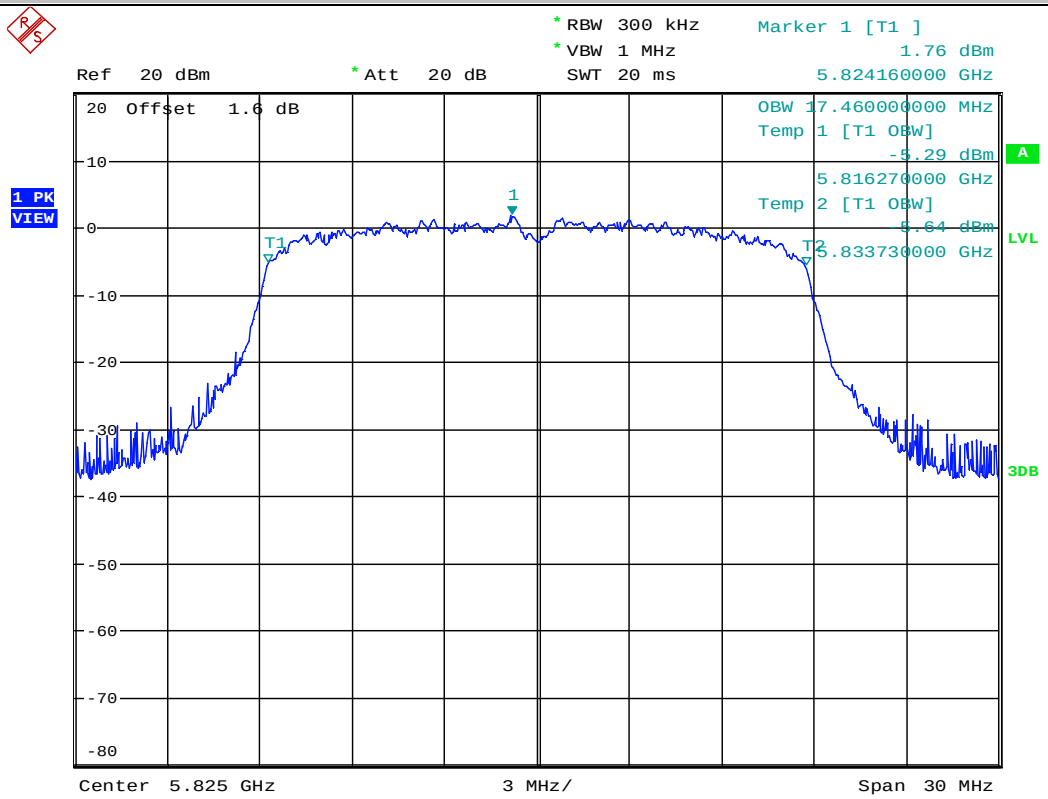
Occupied Bandwidth Measurement_11N40_5795_Ant2



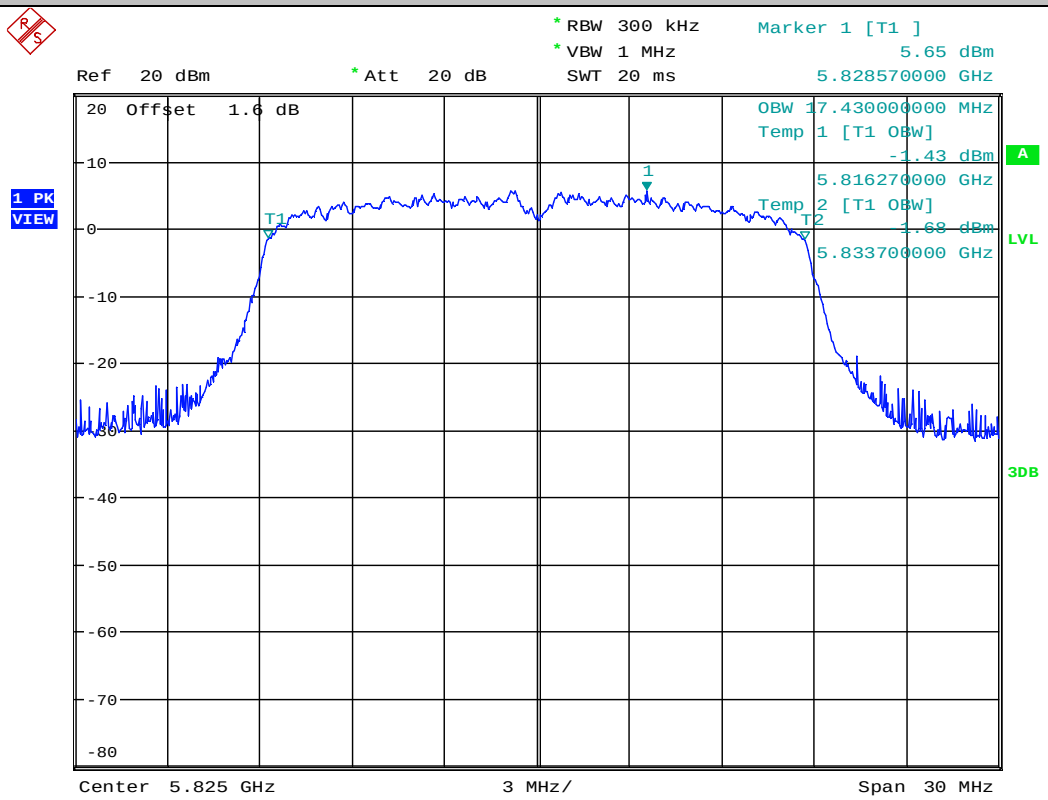
Occupied Bandwidth Measurement_11N20_5825_Ant1



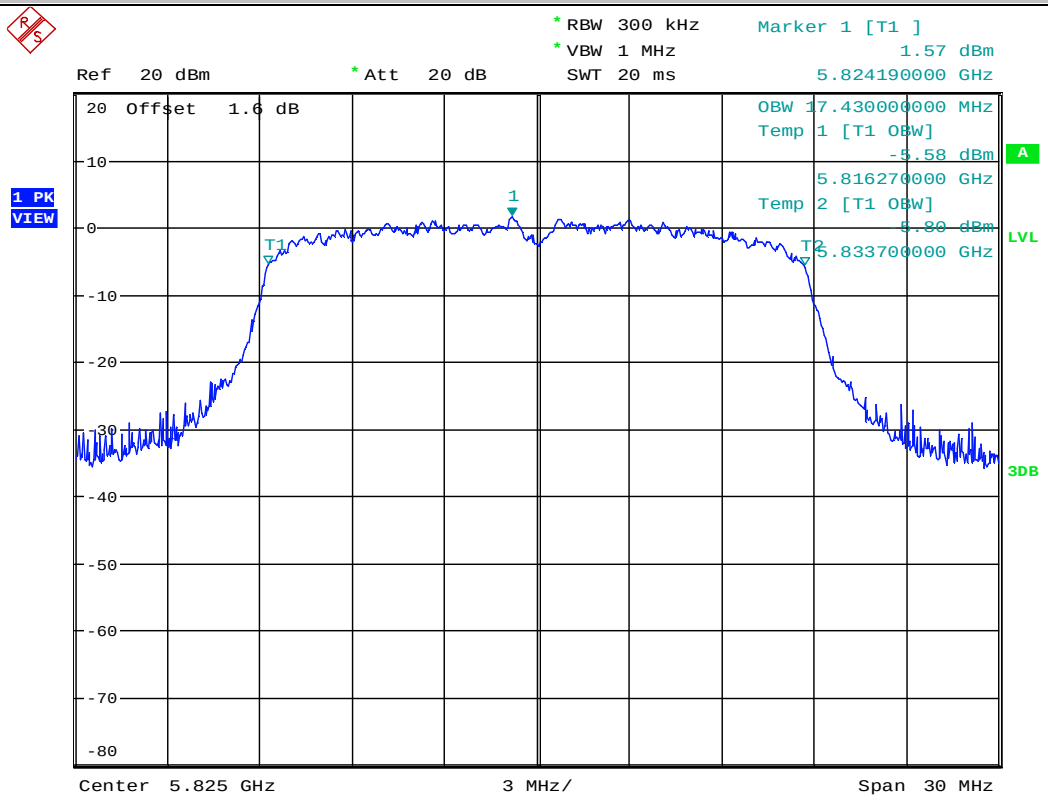
Occupied Bandwidth Measurement_11AC20_5825_Ant1



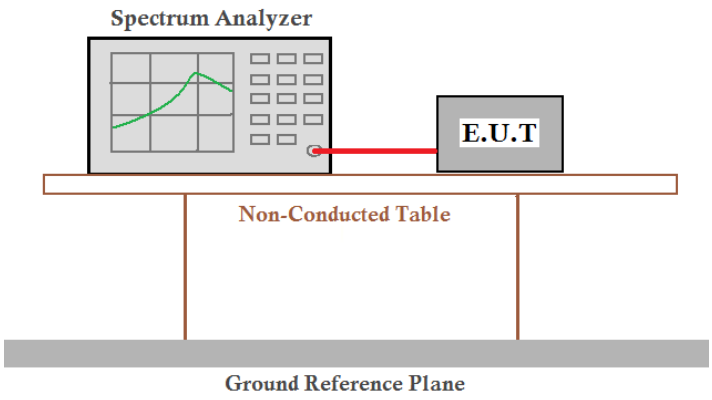
Occupied Bandwidth Measurement_11N20_5825_Ant2



Occupied Bandwidth Measurement_11AC20_5825_Ant2



5.5 Power Spectral Density

Test Requirement:	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	
Test Method:	KDB 789033 D02 v01r04 Section F	
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss in the spectrum analyzer.*	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40); 6.5Mbps of rate is the worst case of 802.11ac(VHT20) ; 13.5Mbps of rate is the worst case of 802.11ac(VHT40); 29.3Mbps of rate is the worst case of 802.11ac(VHT80).	
Limit:	U-NII-1	11dBm/MHz
	U-NII-2A	11dBm/MHz
	U-NII-2C	11dBm/MHz
	U-NII-3	30dBm/500KHz
Test Results:	Pass	

Maximum Power Spectral Density

Test Mode	Test Channel	Ant	Level [dBm/MHz]	10log(1/x) Factor [dB]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	5180	Ant1	2.16	0.27	2.43	<11.00	PASS
11A	5180	Ant2	1.64	0.31	1.95	<11.00	PASS
11A	5220	Ant1	2.25	0.23	2.48	<11.00	PASS
11A	5220	Ant2	1.75	0.31	2.06	<11.00	PASS
11A	5240	Ant1	2.75	0.25	3	<11.00	PASS
11A	5240	Ant2	1.94	0.21	2.15	<11.00	PASS
11A	5260	Ant1	2.58	0.23	2.81	<11.00	PASS
11A	5260	Ant2	1.9	0.31	2.21	<11.00	PASS
11A	5300	Ant1	2.6	0.21	2.81	<11.00	PASS
11A	5300	Ant2	2.05	0.25	2.3	<11.00	PASS
11A	5320	Ant1	2.13	0.31	2.44	<11.00	PASS
11A	5320	Ant2	1.58	0.29	1.87	<11.00	PASS
11A	5500	Ant1	2.96	0.31	3.27	<11.00	PASS
11A	5500	Ant2	2.59	0.23	2.82	<11.00	PASS
11A	5580	Ant1	2.35	0.25	2.6	<11.00	PASS
11A	5580	Ant2	2.73	0.25	2.98	<11.00	PASS
11A	5600	Ant1	2.02	0.23	2.25	<11.00	PASS
11A	5600	Ant2	2.28	0.25	2.53	<11.00	PASS
11A	5700	Ant1	3	0.21	3.21	<11.00	PASS
11A	5700	Ant2	2.85	0.21	3.06	<11.00	PASS
11N20	5180	Ant1	-0.99	0.4	-0.59	<11.00	PASS
11AC20	5180	Ant1	-0.82	0.31	-0.51	<11.00	PASS
11AC20	5180	Ant2	-0.94	0.35	-0.59	<11.00	PASS
11N20	5180	Ant2	-1.11	0.31	-0.8	<11.00	PASS
11AC40	5190	Ant1	-5.49	0.56	-4.93	<11.00	PASS
11N40	5190	Ant1	-4.75	0.73	-4.02	<11.00	PASS
11AC40	5190	Ant2	-5.63	0.52	-5.11	<11.00	PASS
11N40	5190	Ant2	-4.95	0.53	-4.42	<11.00	PASS
11AC80	5210	Ant1	-9.15	1.12	-8.03	<11.00	PASS
11AC80	5210	Ant2	-9.37	1.08	-8.29	<11.00	PASS
11AC20	5220	Ant1	-0.83	0.35	-0.48	<11.00	PASS
11N20	5220	Ant1	-0.84	0.48	-0.36	<11.00	PASS
11AC20	5220	Ant2	-1.15	0.35	-0.8	<11.00	PASS
11N20	5220	Ant2	-1.14	0.31	-0.83	<11.00	PASS

11N40	5230	Ant1	-4.26	0.53	-3.73	<11.00	PASS
11AC40	5230	Ant1	-5.03	0.77	-4.26	<11.00	PASS
11N40	5230	Ant2	-4.71	0.57	-4.14	<11.00	PASS
11AC40	5230	Ant2	-5.58	0.52	-5.06	<11.00	PASS
11N20	5240	Ant1	-0.45	0.35	-0.1	<11.00	PASS
11AC20	5240	Ant1	-0.56	0.43	-0.13	<11.00	PASS
11N20	5240	Ant2	-0.81	0.35	-0.46	<11.00	PASS
11AC20	5240	Ant2	-0.96	0.31	-0.65	<11.00	PASS
11AC20	5260	Ant1	-0.5	0.35	-0.15	<11.00	PASS
11N20	5260	Ant1	3.58	0.35	3.93	<11.00	PASS
11AC20	5260	Ant2	-0.95	0.31	-0.64	<11.00	PASS
11N20	5260	Ant2	3.21	0.31	3.52	<11.00	PASS
11N40	5270	Ant1	-3.94	0.53	-3.41	<11.00	PASS
11AC40	5270	Ant1	-4.91	0.69	-4.22	<11.00	PASS
11AC40	5270	Ant2	-5.57	0.53	-5.04	<11.00	PASS
11N40	5270	Ant2	-4.76	0.57	-4.19	<11.00	PASS
11AC80	5290	Ant1	-8.38	0.89	-7.49	<11.00	PASS
11AC80	5290	Ant2	-8.7	1.12	-7.58	<11.00	PASS
11AC20	5300	Ant1	-0.17	0.43	0.26	<11.00	PASS
11N20	5300	Ant1	3.83	0.4	4.23	<11.00	PASS
11N20	5300	Ant2	3.24	0.39	3.63	<11.00	PASS
11AC20	5300	Ant2	-0.84	0.35	-0.49	<11.00	PASS
11AC40	5310	Ant1	-4.87	0.73	-4.14	<11.00	PASS
11N40	5310	Ant1	-3.97	0.69	-3.28	<11.00	PASS
11N40	5310	Ant2	-4.66	0.57	-4.09	<11.00	PASS
11AC40	5310	Ant2	-5.26	0.48	-4.78	<11.00	PASS
11AC20	5320	Ant1	-0.75	0.48	-0.27	<11.00	PASS
11N20	5320	Ant1	3.31	0.31	3.62	<11.00	PASS
11N20	5320	Ant2	2.61	0.31	2.92	<11.00	PASS
11AC20	5320	Ant2	-1.42	0.39	-1.03	<11.00	PASS
11AC20	5500	Ant1	-0.25	0.48	0.23	<11.00	PASS
11N20	5500	Ant1	2.67	0.31	2.98	<11.00	PASS
11N20	5500	Ant2	2.55	0.48	3.03	<11.00	PASS
11AC20	5500	Ant2	-0.44	0.31	-0.13	<11.00	PASS
11N40	5510	Ant1	-3.91	0.57	-3.34	<11.00	PASS
11AC40	5510	Ant1	-4.73	0.56	-4.17	<11.00	PASS
11N40	5510	Ant2	-4.2	0.57	-3.63	<11.00	PASS
11AC40	5510	Ant2	-5.92	0.52	-5.4	<11.00	PASS

11AC80	5530	Ant1	-7.82	0.97	-6.85	<11.00	PASS
11AC80	5530	Ant2	-8.7	0.89	-7.81	<11.00	PASS
11AC40	5550	Ant1	-4.43	0.52	-3.91	<11.00	PASS
11N40	5550	Ant1	-3.45	0.49	-2.96	<11.00	PASS
11N40	5550	Ant2	-3.66	0.53	-3.13	<11.00	PASS
11AC40	5550	Ant2	-5.26	0.56	-4.7	<11.00	PASS
11N20	5580	Ant1	2.38	0.35	2.73	<11.00	PASS
11AC20	5580	Ant1	-0.76	0.31	-0.45	<11.00	PASS
11N20	5580	Ant2	2.55	0.48	3.03	<11.00	PASS
11AC20	5580	Ant2	-0.33	0.35	0.02	<11.00	PASS
11AC40	5590	Ant1	-5.08	0.57	-4.51	<11.00	PASS
11N40	5590	Ant1	-4.13	0.53	-3.6	<11.00	PASS
11N40	5590	Ant2	-3.95	0.49	-3.46	<11.00	PASS
11AC40	5590	Ant2	-5.53	0.64	-4.89	<11.00	PASS
11N20	5600	Ant1	2.16	0.31	2.47	<11.00	PASS
11AC20	5600	Ant1	-0.7	0.4	-0.3	<11.00	PASS
11AC20	5600	Ant2	-0.55	0.43	-0.12	<11.00	PASS
11N20	5600	Ant2	2.4	0.31	2.71	<11.00	PASS
11AC80	5610	Ant1	-8.73	0.89	-7.84	<11.00	PASS
11AC80	5610	Ant2	-9.53	1.31	-8.22	<11.00	PASS
11N40	5670	Ant1	-3.25	0.53	-2.72	<11.00	PASS
11AC40	5670	Ant1	-4.35	0.48	-3.87	<11.00	PASS
11N40	5670	Ant2	-3.68	0.57	-3.11	<11.00	PASS
11AC40	5670	Ant2	-5.39	0.53	-4.86	<11.00	PASS
11AC20	5700	Ant1	-0.08	0.31	0.23	<11.00	PASS
11N20	5700	Ant1	2.74	0.31	3.05	<11.00	PASS
11AC20	5700	Ant2	-0.24	0.31	0.07	<11.00	PASS
11N20	5700	Ant2	2.52	0.31	2.83	<11.00	PASS

Test Mode	Test Channel	Ant	Level [dBm/500kHz]	10log(1/x) Factor[dB]	10log(500kHz/RBW) Factor [dB]	PSD [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
11A	5745	Ant1	2.68	0.38	0	3.06	<30.00	PASS
11A	5745	Ant2	1.95	0.21	0	2.16	<30.00	PASS
11A	5785	Ant1	2.69	0.38	0	3.07	<30.00	PASS
11A	5785	Ant2	2.41	0.24	0	2.65	<30.00	PASS
11A	5825	Ant1	2.59	0.23	0	2.82	<30.00	PASS
11A	5825	Ant2	2.26	0.25	0	2.51	<30.00	PASS
11N20	5745	Ant1	2.27	0.35	0	2.62	<30.00	PASS

11AC20	5745	Ant1	-1.53	0.31	0	-1.22	<30.00	PASS
11N20	5745	Ant2	2.86	0.31	0	3.17	<30.00	PASS
11AC20	5745	Ant2	-1.38	0.35	0	-1.03	<30.00	PASS
11N40	5755	Ant1	-1.76	0.53	0	-1.23	<30.00	PASS
11AC40	5755	Ant1	-5.86	0.53	0	-5.33	<30.00	PASS
11N40	5755	Ant2	-1.35	0.61	0	-0.74	<30.00	PASS
11AC40	5755	Ant2	-6.52	0.64	0	-5.88	<30.00	PASS
11AC80	5775	Ant1	-9.32	0.89	0	-8.43	<30.00	PASS
11AC80	5775	Ant2	-10.25	0.94	0	-9.31	<30.00	PASS
11AC20	5785	Ant1	-1.74	0.43	0	-1.31	<30.00	PASS
11N20	5785	Ant1	2.55	0.27	0	2.82	<30.00	PASS
11N20	5785	Ant2	2.74	0.35	0	3.09	<30.00	PASS
11AC20	5785	Ant2	-1.52	0.31	0	-1.21	<30.00	PASS
11AC40	5795	Ant1	-6.07	0.56	0	-5.51	<30.00	PASS
11N40	5795	Ant1	-1.94	0.53	0	-1.41	<30.00	PASS
11AC40	5795	Ant2	-7.03	0.53	0	-6.5	<30.00	PASS
11N40	5795	Ant2	-2	0.53	0	-1.47	<30.00	PASS
11AC20	5825	Ant1	-1.65	0.35	0	-1.3	<30.00	PASS
11N20	5825	Ant1	2.39	0.31	0	2.7	<30.00	PASS
11N20	5825	Ant2	2.48	0.31	0	2.79	<30.00	PASS
11AC20	5825	Ant2	-1.47	0.31	0	-1.16	<30.00	PASS

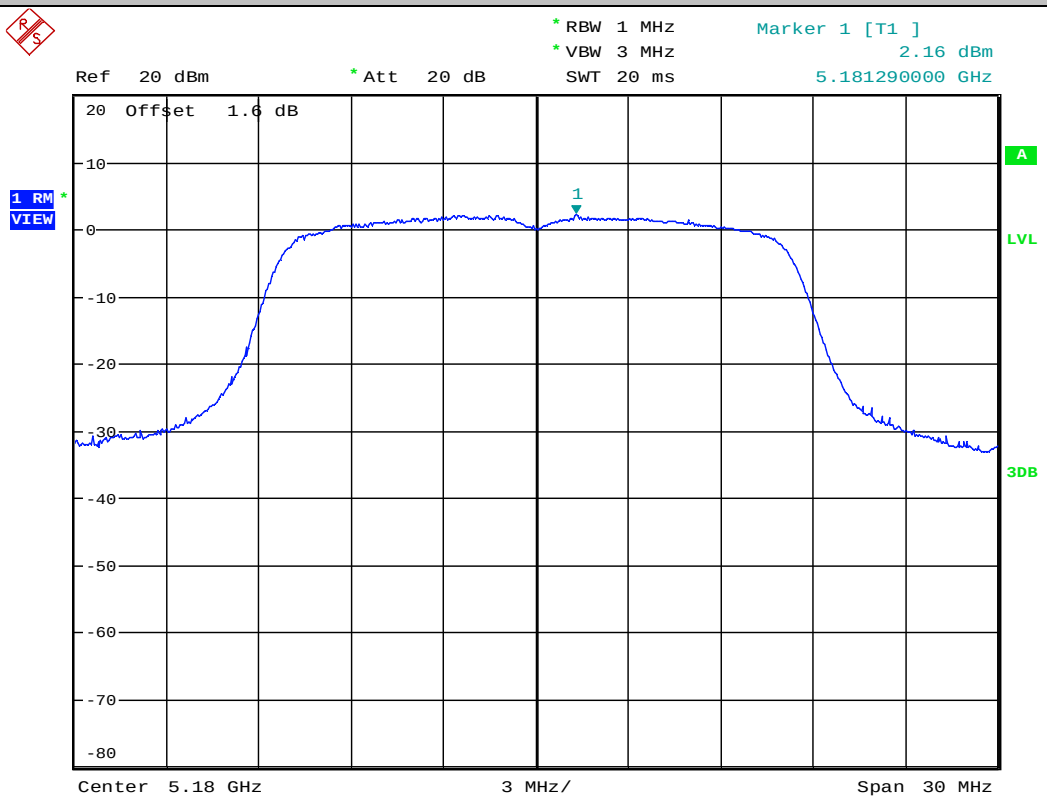
MIMO:

Test Mode	Test Channel	Ant	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11AC20	5180	Ant+Ant2	2.46	<9.67	PASS
11N20	5180	Ant+Ant2	2.32	<9.67	PASS
11AC40	5190	Ant+Ant2	-2.01	<9.67	PASS
11N40	5190	Ant+Ant2	-1.21	<9.67	PASS
11AC80	5210	Ant+Ant2	-5.15	<9.67	PASS
11AC20	5220	Ant+Ant2	2.37	<9.67	PASS
11N20	5220	Ant+Ant2	2.42	<9.67	PASS
11N40	5230	Ant+Ant2	-0.92	<9.67	PASS
11AC40	5230	Ant+Ant2	-1.63	<9.67	PASS
11N20	5240	Ant+Ant2	2.73	<9.67	PASS
11AC20	5240	Ant+Ant2	2.63	<9.67	PASS
11AC20	5260	Ant+Ant2	2.62	<9.67	PASS
11N20	5260	Ant+Ant2	6.74	<9.67	PASS
11AC40	5270	Ant+Ant2	-1.60	<9.67	PASS
11N40	5270	Ant+Ant2	-0.77	<9.67	PASS
11AC80	5290	Ant+Ant2	-4.52	<9.67	PASS
11N20	5300	Ant+Ant2	6.95	<9.67	PASS
11AC20	5300	Ant+Ant2	2.91	<9.67	PASS
11N40	5310	Ant+Ant2	-0.66	<9.67	PASS
11AC40	5310	Ant+Ant2	-1.44	<9.67	PASS
11N20	5320	Ant+Ant2	6.29	<9.67	PASS
11AC20	5320	Ant+Ant2	2.38	<9.67	PASS
11N20	5500	Ant+Ant2	6.02	<9.67	PASS
11AC20	5500	Ant+Ant2	3.06	<9.67	PASS
11N40	5510	Ant+Ant2	-0.47	<9.67	PASS
11AC40	5510	Ant+Ant2	-1.73	<9.67	PASS
11AC80	5530	Ant+Ant2	-4.29	<9.67	PASS
11N40	5550	Ant+Ant2	-0.03	<9.67	PASS
11AC40	5550	Ant+Ant2	-1.28	<9.67	PASS
11N20	5580	Ant+Ant2	5.89	<9.67	PASS
11AC20	5580	Ant+Ant2	2.80	<9.67	PASS
11N40	5590	Ant+Ant2	-0.52	<9.67	PASS
11AC40	5590	Ant+Ant2	-1.69	<9.67	PASS
11AC20	5600	Ant+Ant2	2.80	<9.67	PASS
11N20	5600	Ant+Ant2	5.60	<9.67	PASS

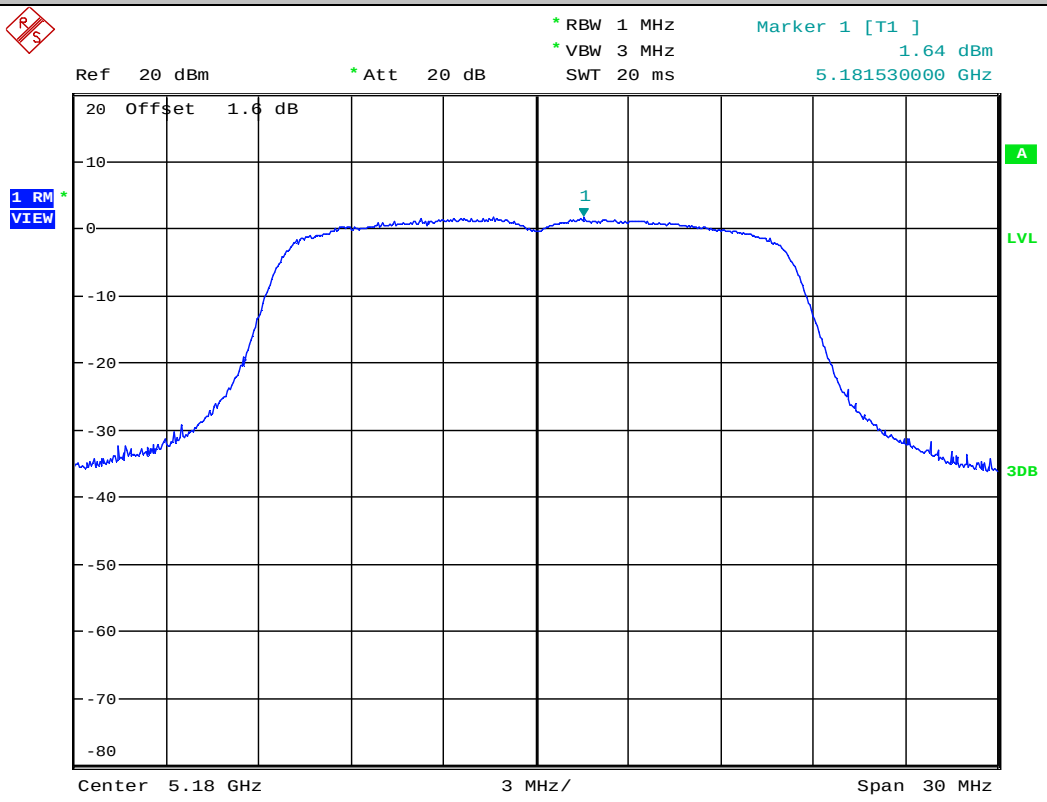
11AC80	5610	Ant+Ant2	-5.02	<9.67	PASS
11N40	5670	Ant+Ant2	0.10	<9.67	PASS
11AC40	5670	Ant+Ant2	-1.33	<9.67	PASS
11AC20	5700	Ant+Ant2	3.16	<9.67	PASS
11N20	5700	Ant+Ant2	5.95	<9.67	PASS

Test Mode	Test Channel	Ant	PSD [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
11N20	5745	Ant+Ant2	5.91	<28.67	PASS
11AC20	5745	Ant+Ant2	1.89	<28.67	PASS
11N40	5755	Ant+Ant2	2.03	<28.67	PASS
11AC40	5755	Ant+Ant2	-2.59	<28.67	PASS
11AC80	5775	Ant+Ant2	-5.84	<28.67	PASS
11N20	5785	Ant+Ant2	5.97	<28.67	PASS
11AC20	5785	Ant+Ant2	1.75	<28.67	PASS
11AC40	5795	Ant+Ant2	-2.97	<28.67	PASS
11N40	5795	Ant+Ant2	1.57	<28.67	PASS
11N20	5825	Ant+Ant2	5.76	<28.67	PASS
11AC20	5825	Ant+Ant2	1.78	<28.67	PASS

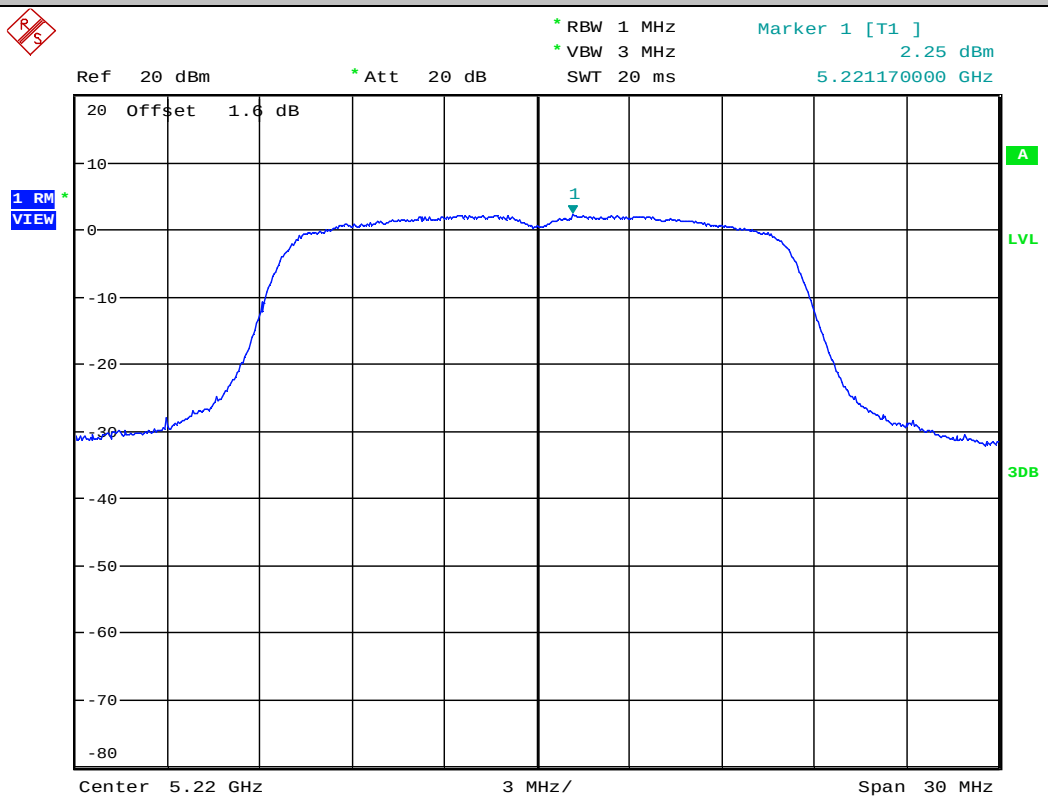
Maximum Power Spectral Density_TNVN_11A_5180_Ant1



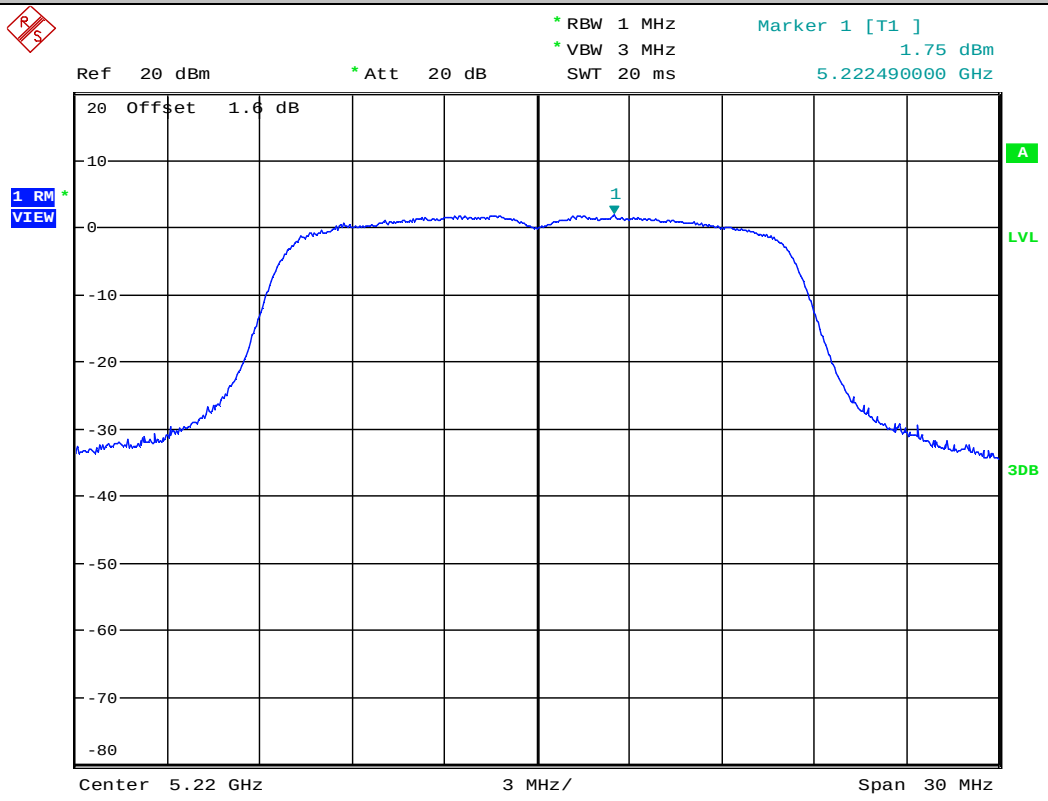
Maximum Power Spectral Density_TNVN_11A_5180_Ant2



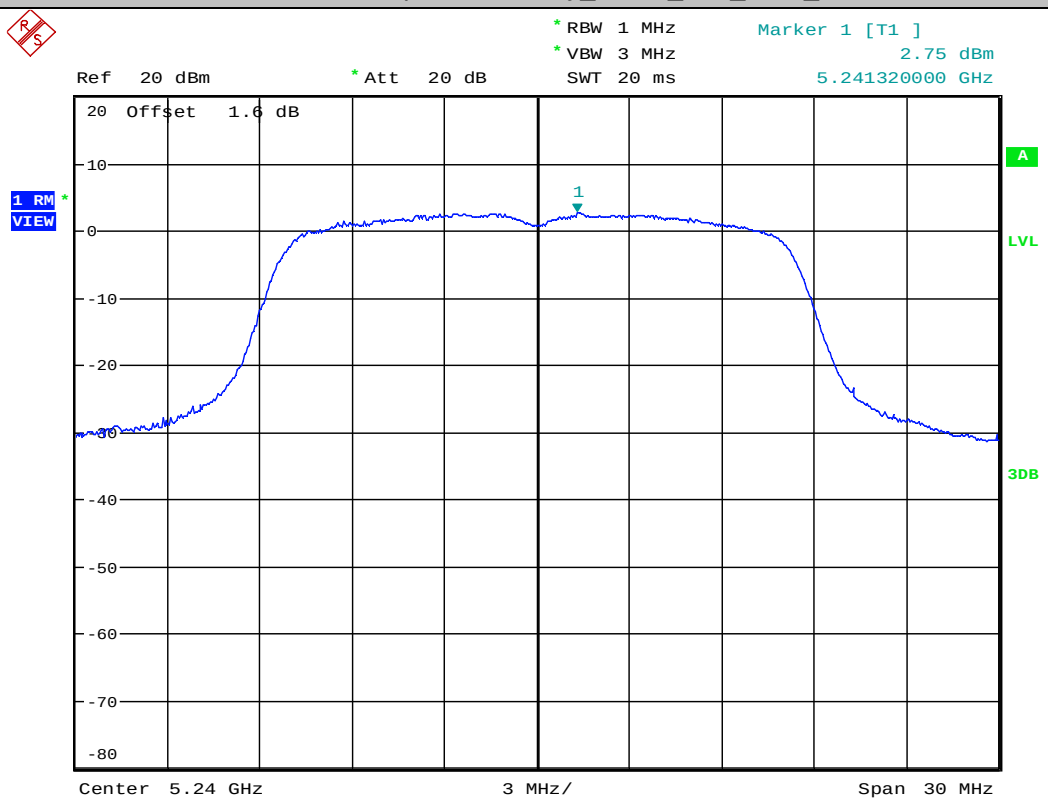
Maximum Power Spectral Density_TNVN_11A_5220_Ant1



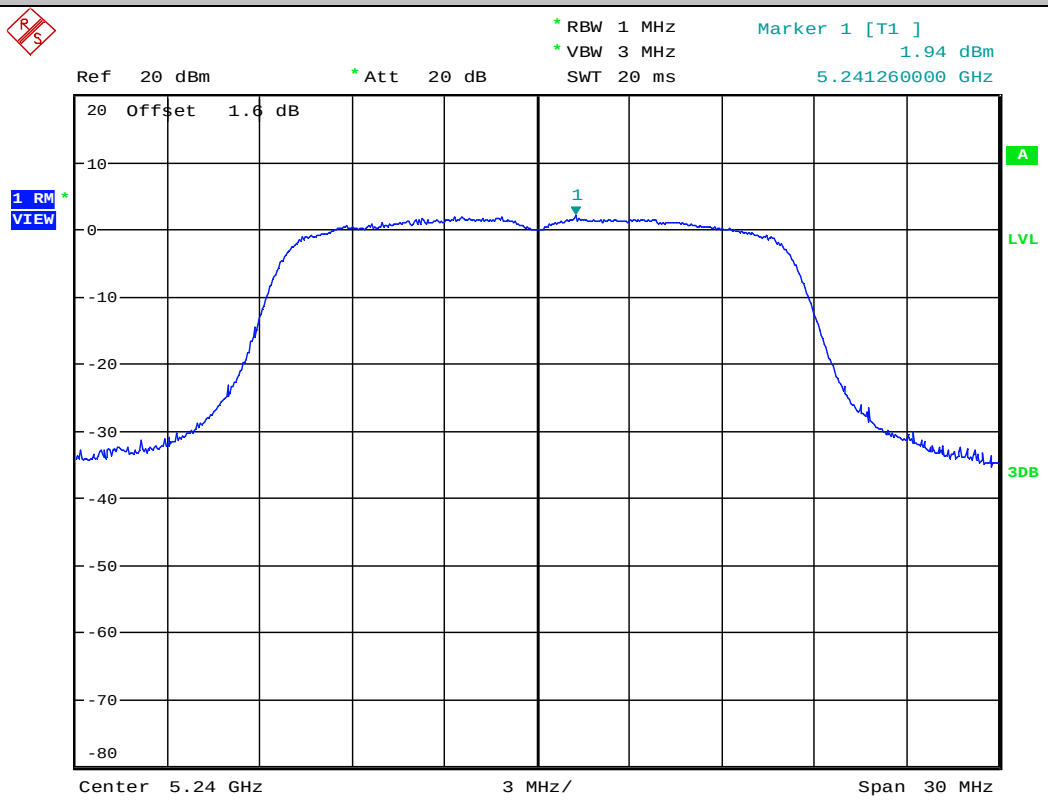
Maximum Power Spectral Density_TNVN_11A_5220_Ant2



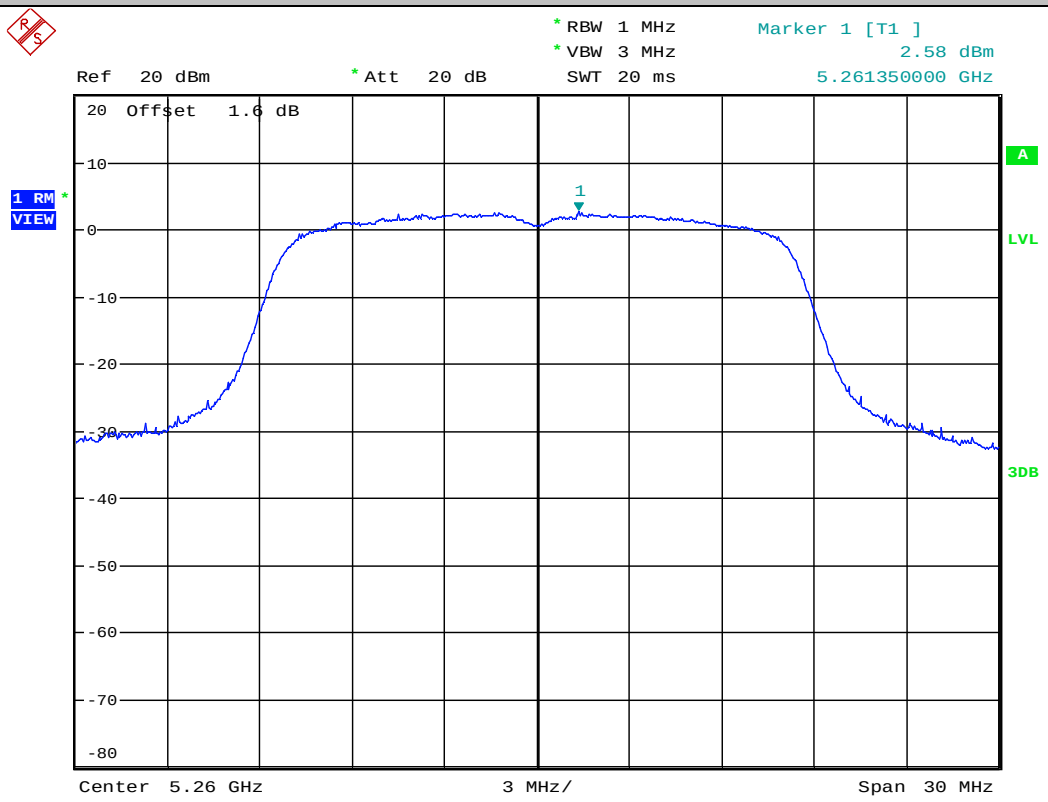
Maximum Power Spectral Density_TNVN_11A_5240_Ant1



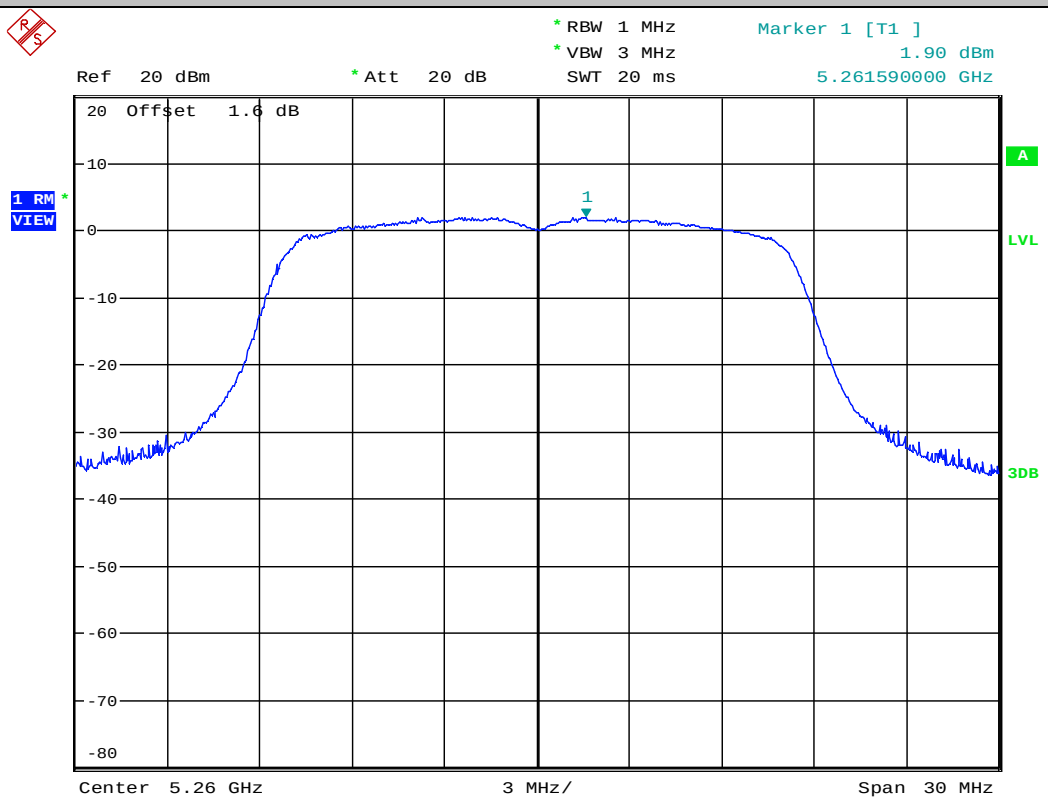
Maximum Power Spectral Density_TNVN_11A_5240_Ant2



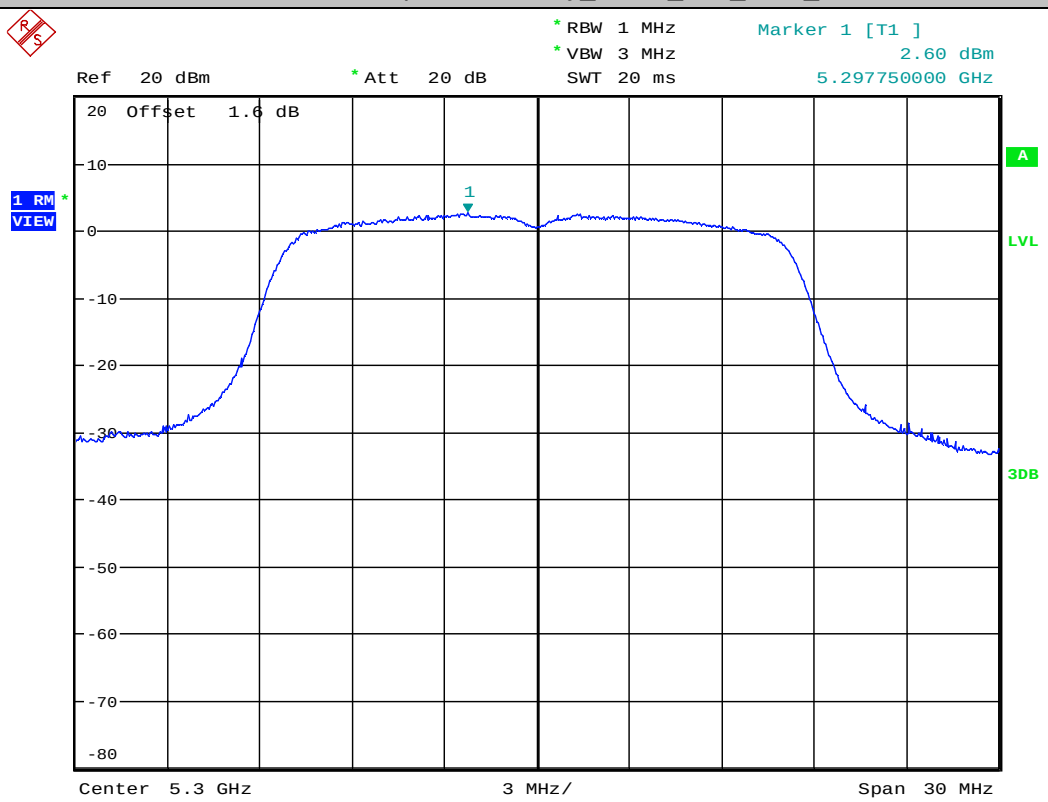
Maximum Power Spectral Density_TNVN_11A_5260_Ant1



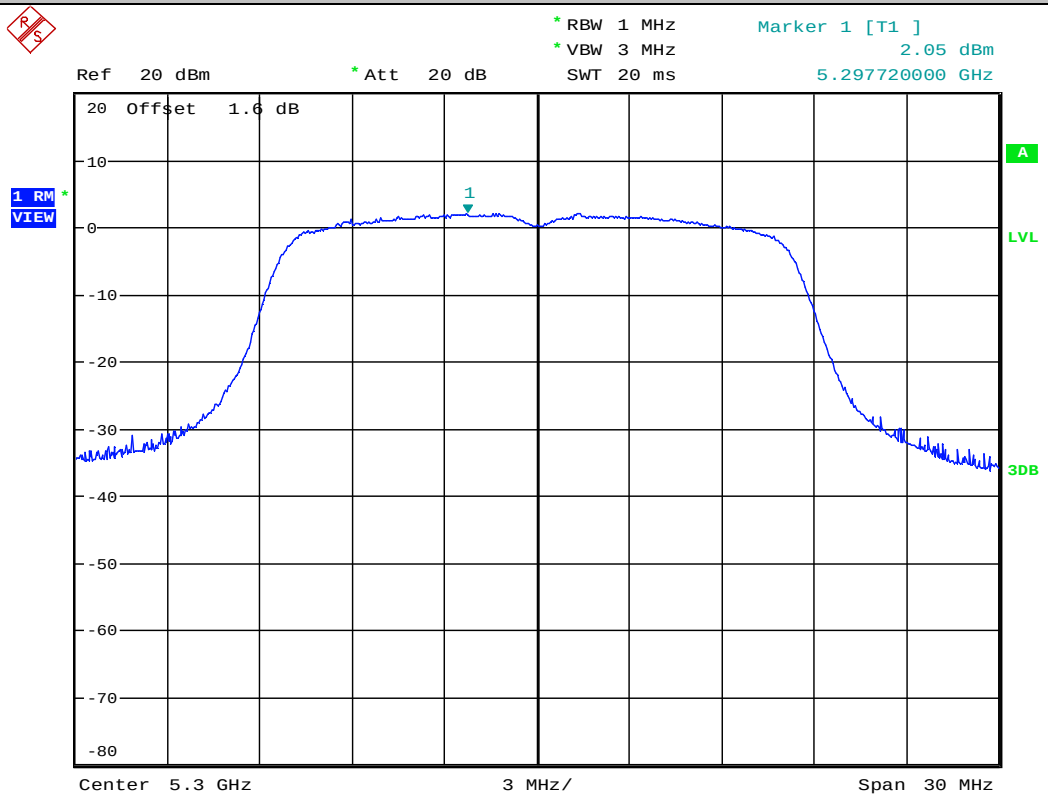
Maximum Power Spectral Density_TNVN_11A_5260_Ant2



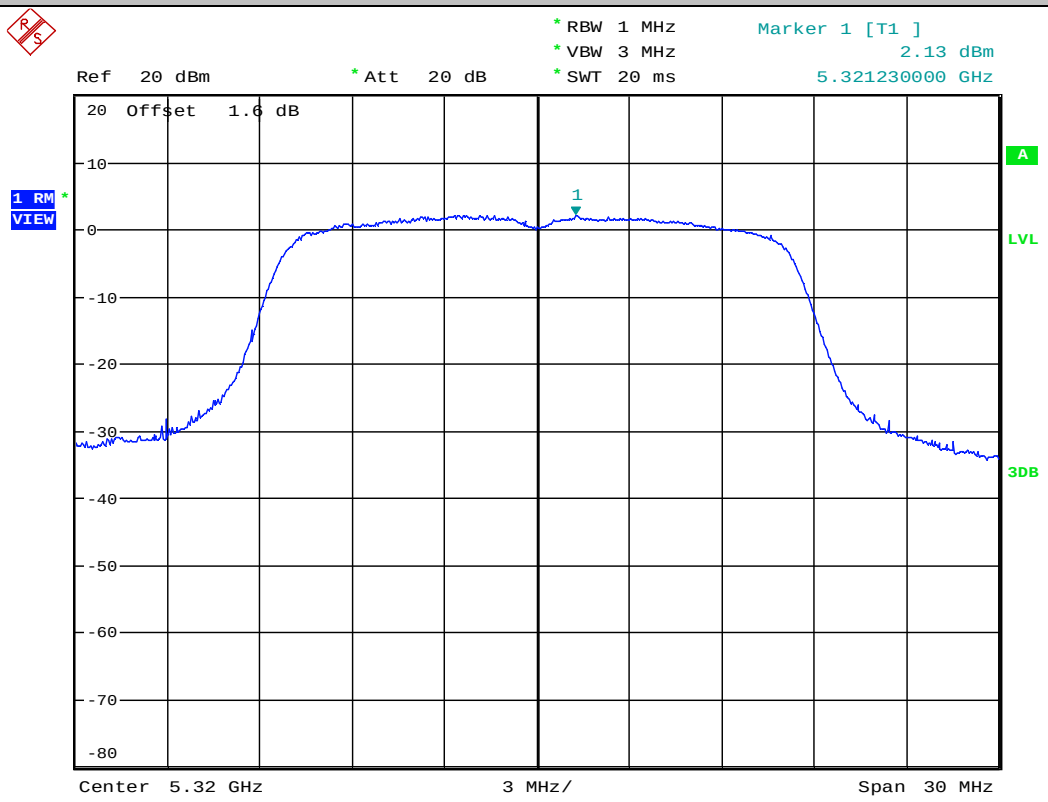
Maximum Power Spectral Density_TNVN_11A_5300_Ant1



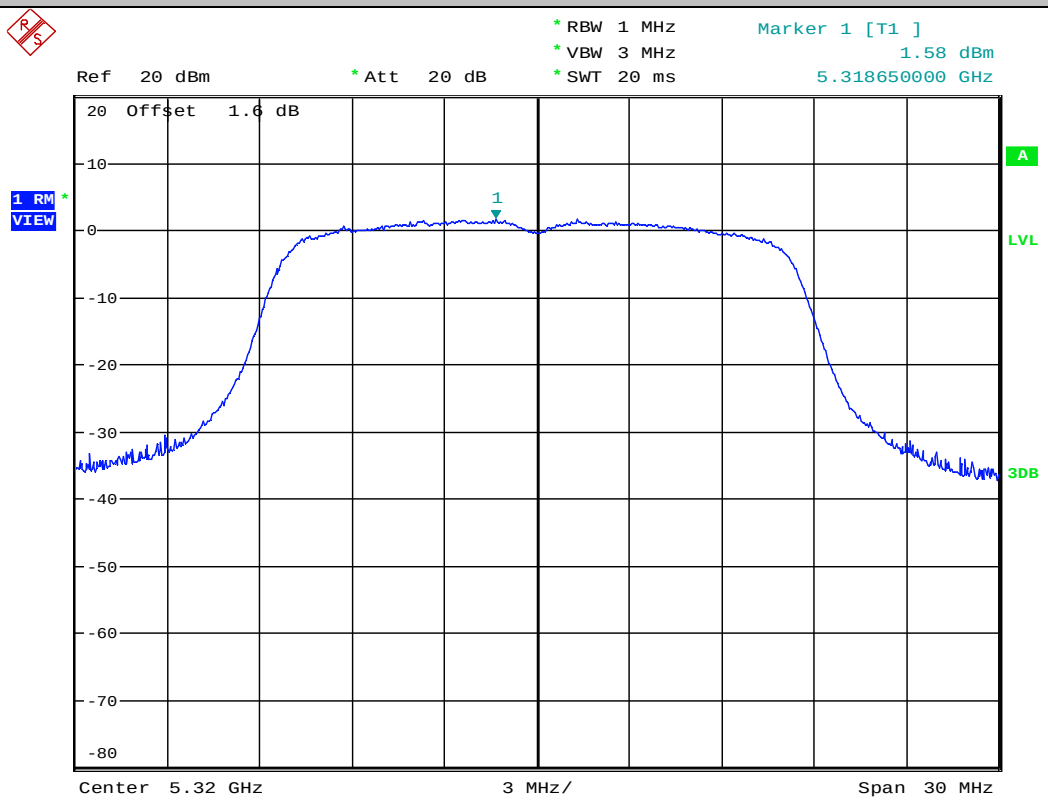
Maximum Power Spectral Density_TNVN_11A_5300_Ant2



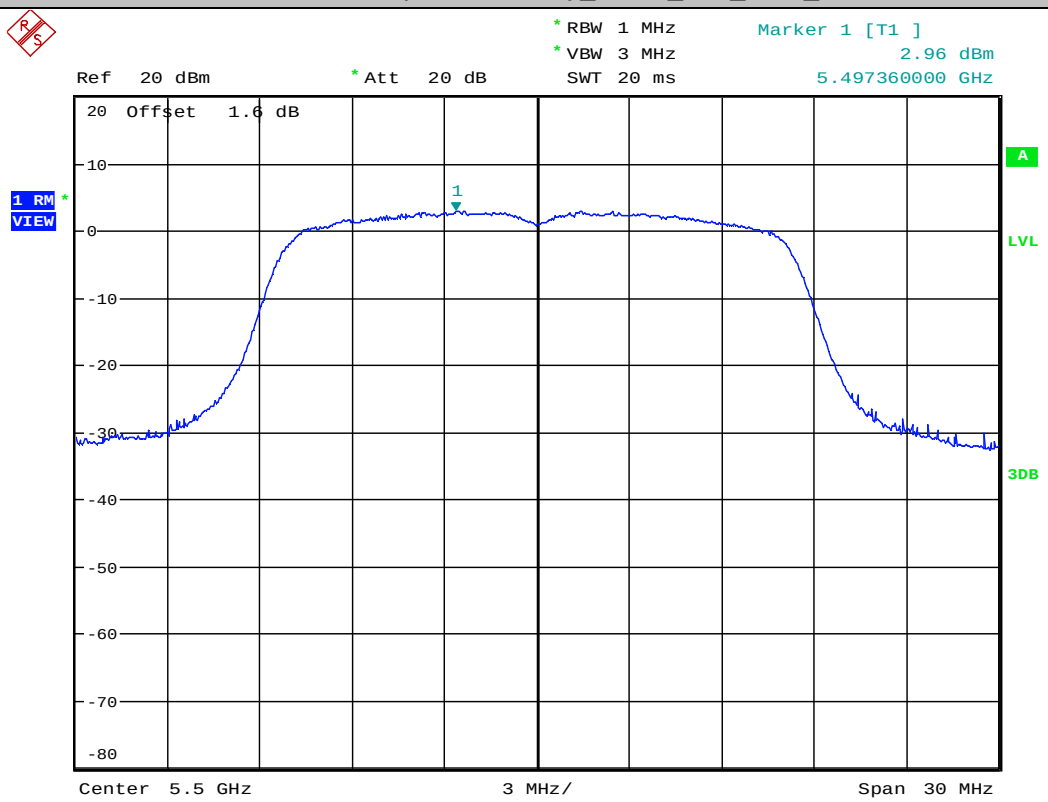
Maximum Power Spectral Density_TNVN_11A_5320_Ant1



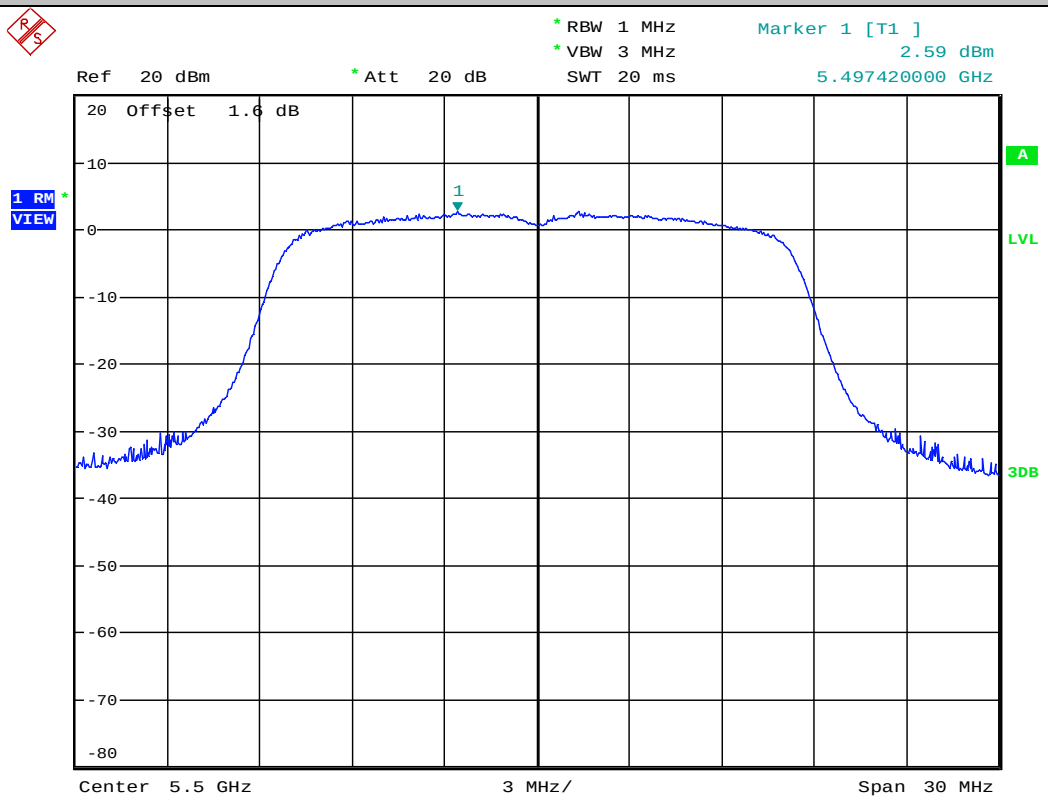
Maximum Power Spectral Density_TNVN_11A_5320_Ant2



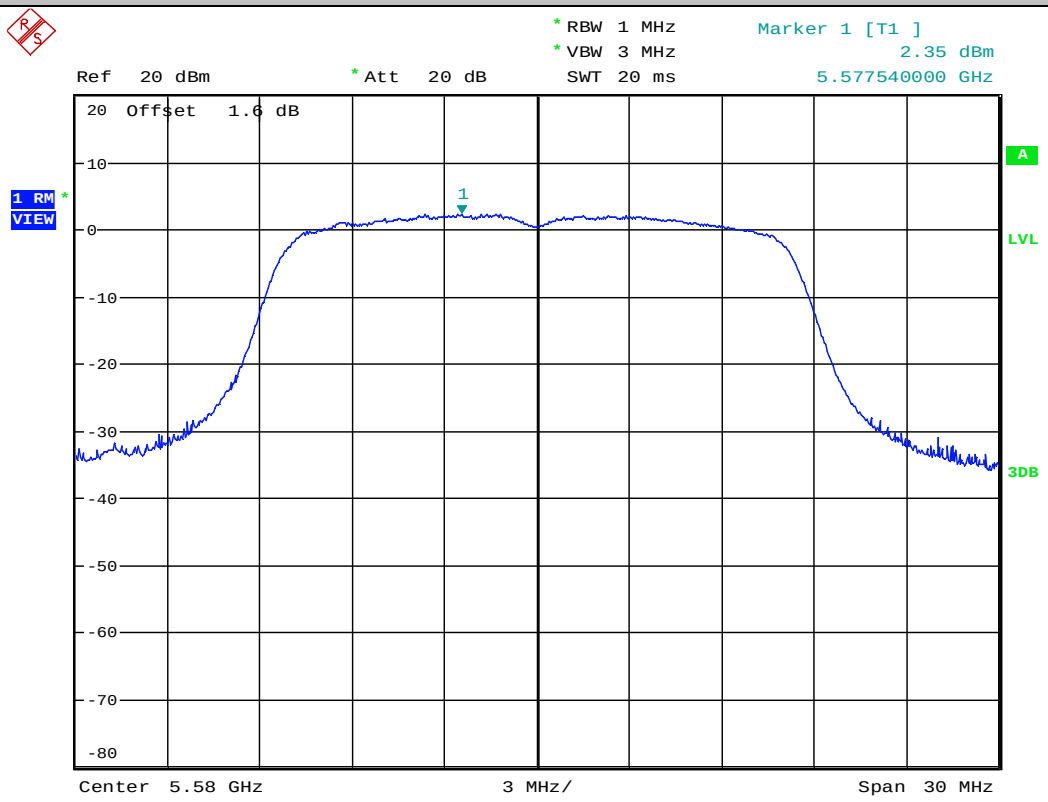
Maximum Power Spectral Density_TNVN_11A_5500_Ant1



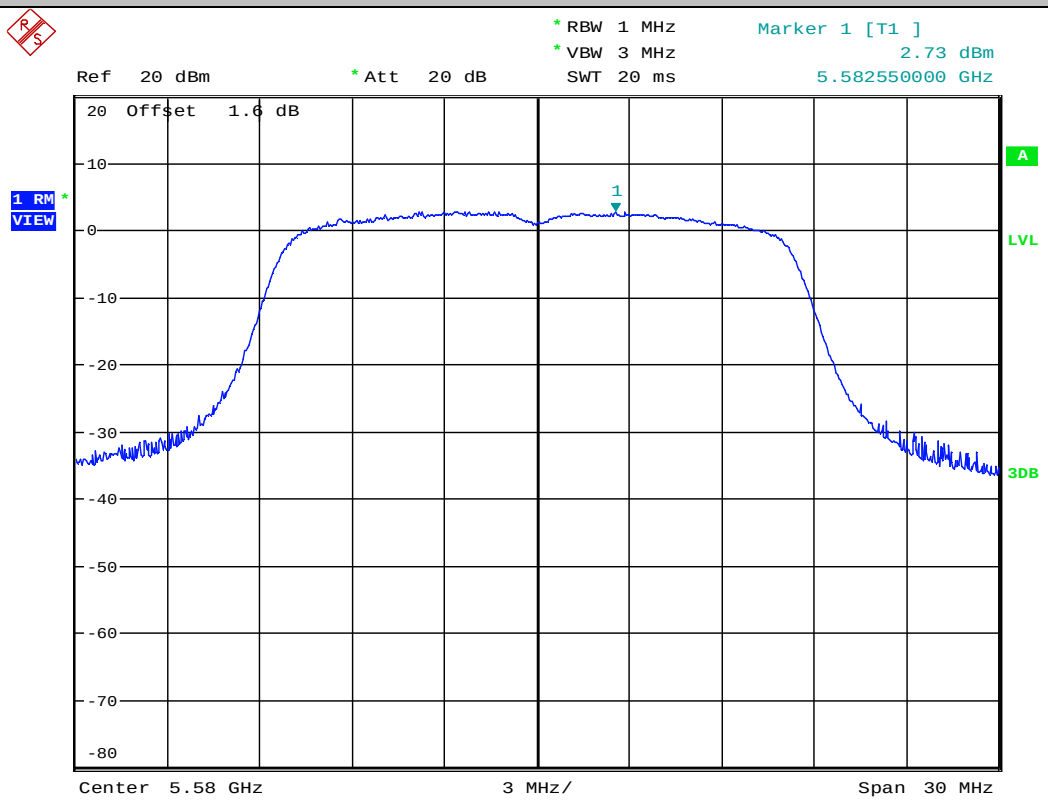
Maximum Power Spectral Density_TNVN_11A_5500_Ant2



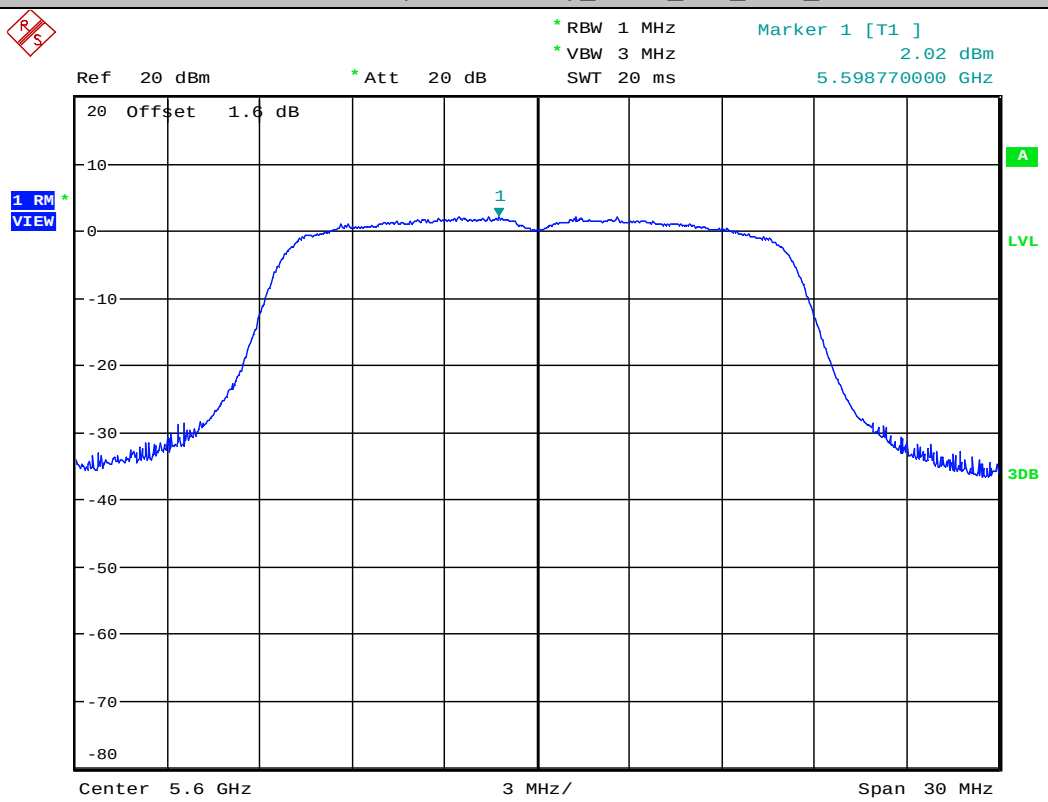
Maximum Power Spectral Density_TNVN_11A_5580_Ant1



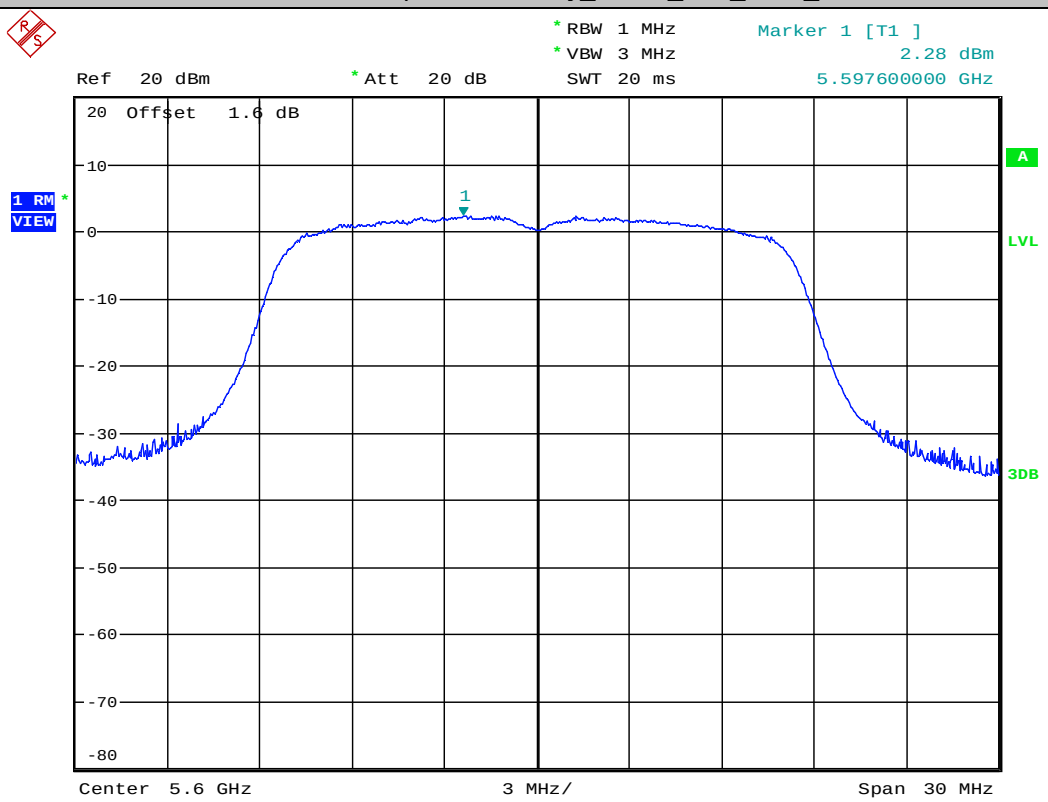
Maximum Power Spectral Density_TNVN_11A_5580_Ant2



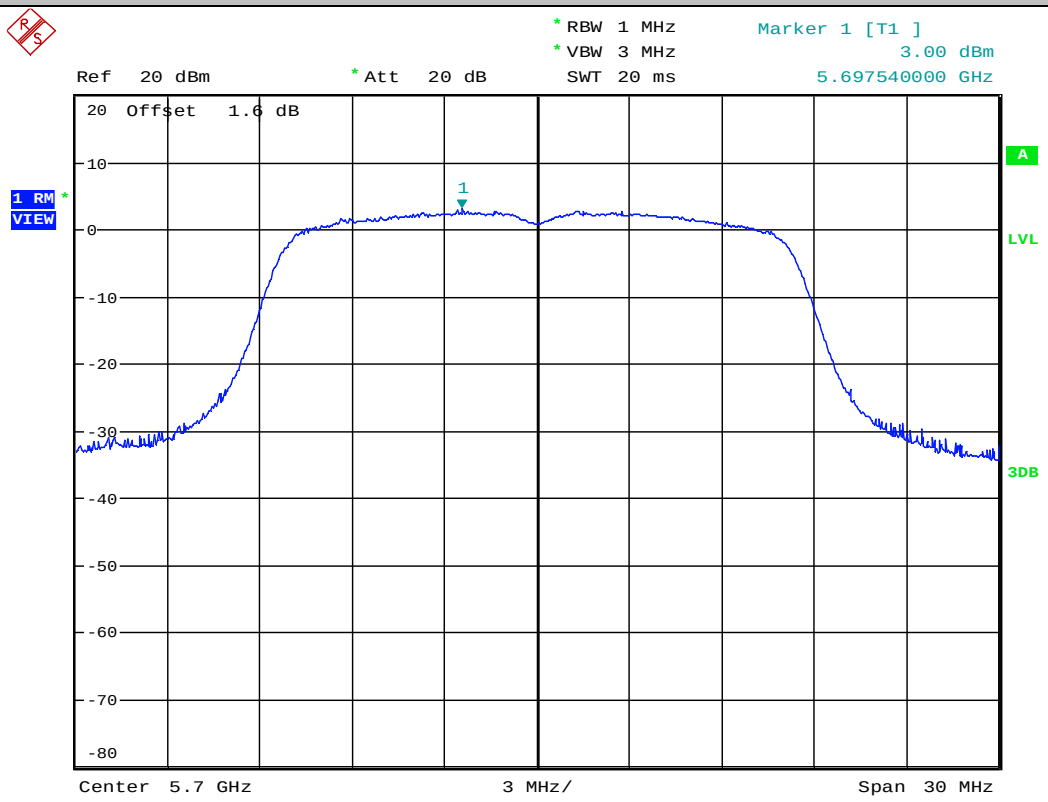
Maximum Power Spectral Density_TNVN_11A_5600_Ant1



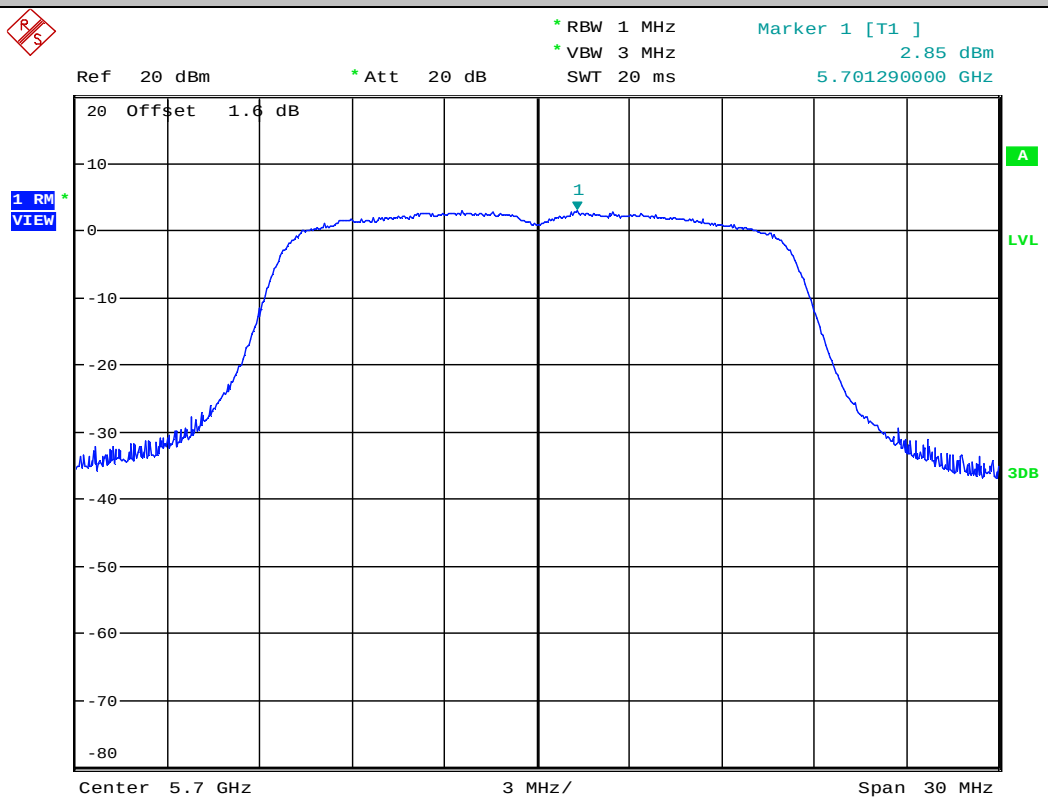
Maximum Power Spectral Density_TNVN_11A_5600_Ant2



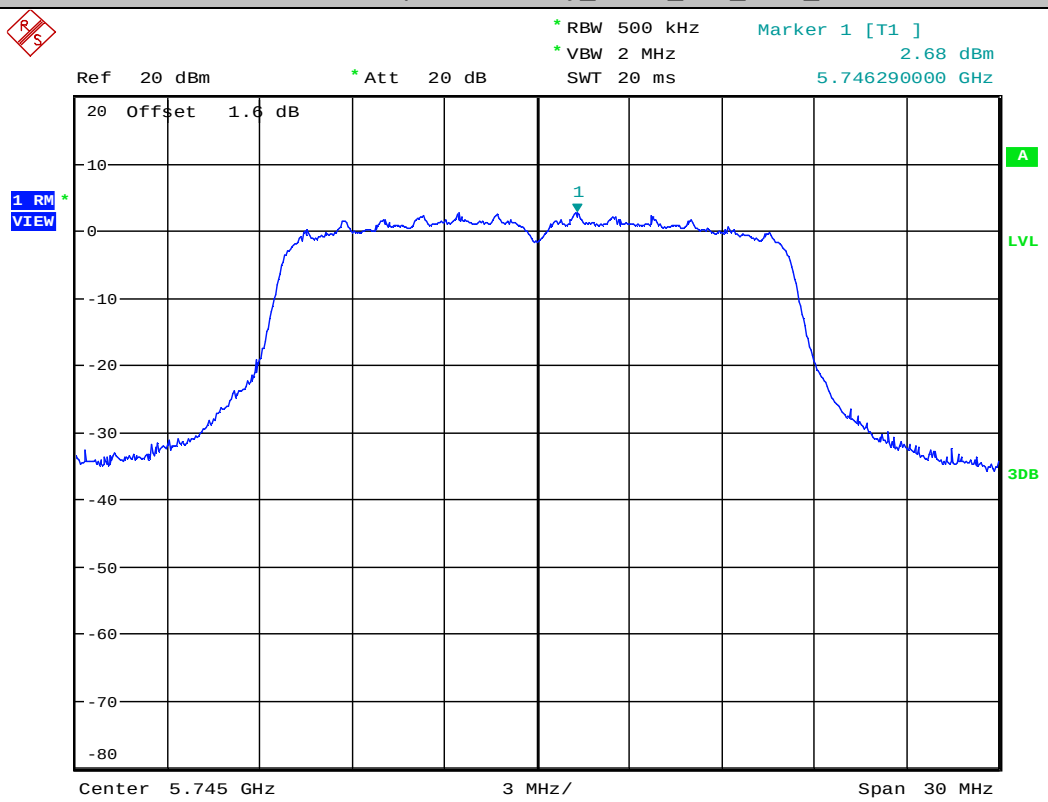
Maximum Power Spectral Density_TNVN_11A_5700_Ant1



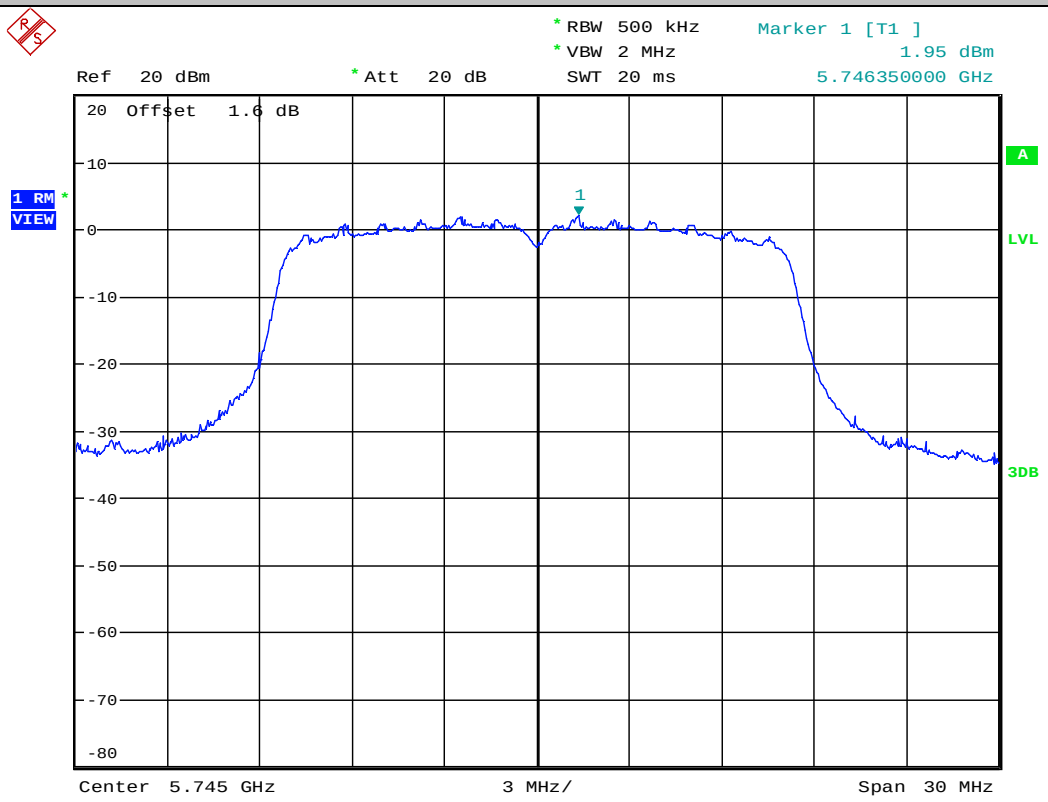
Maximum Power Spectral Density_TNVN_11A_5700_Ant2



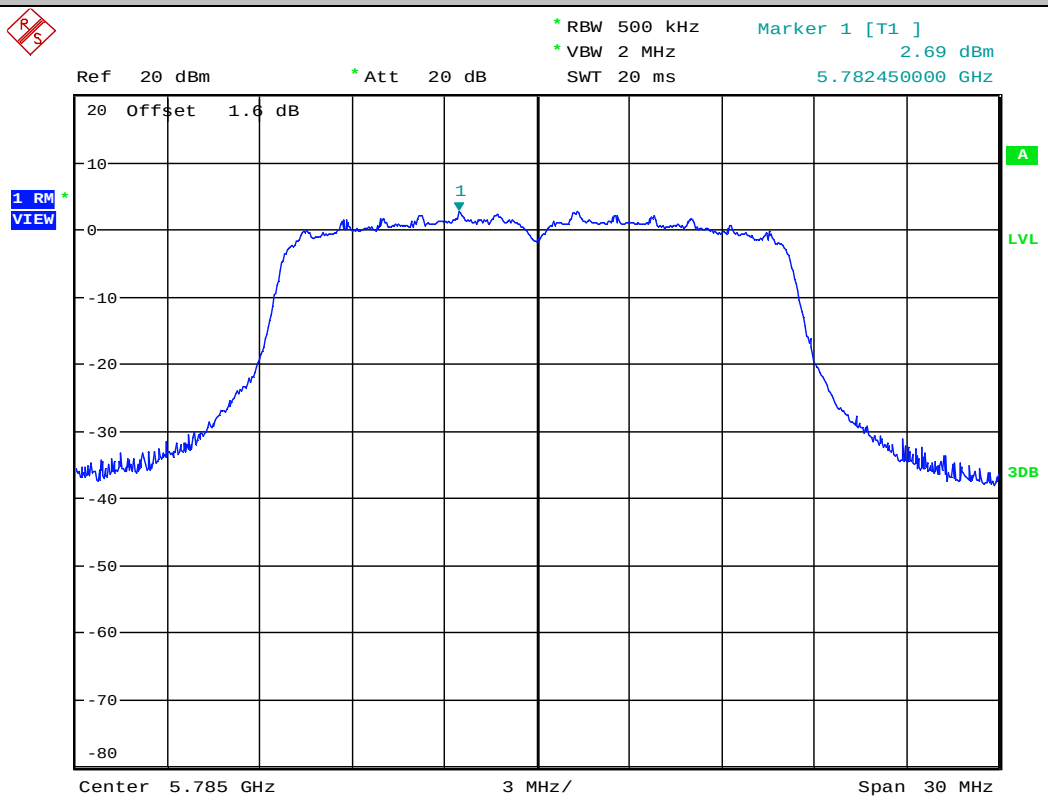
Maximum Power Spectral Density_TNVN_11A_5745_Ant1



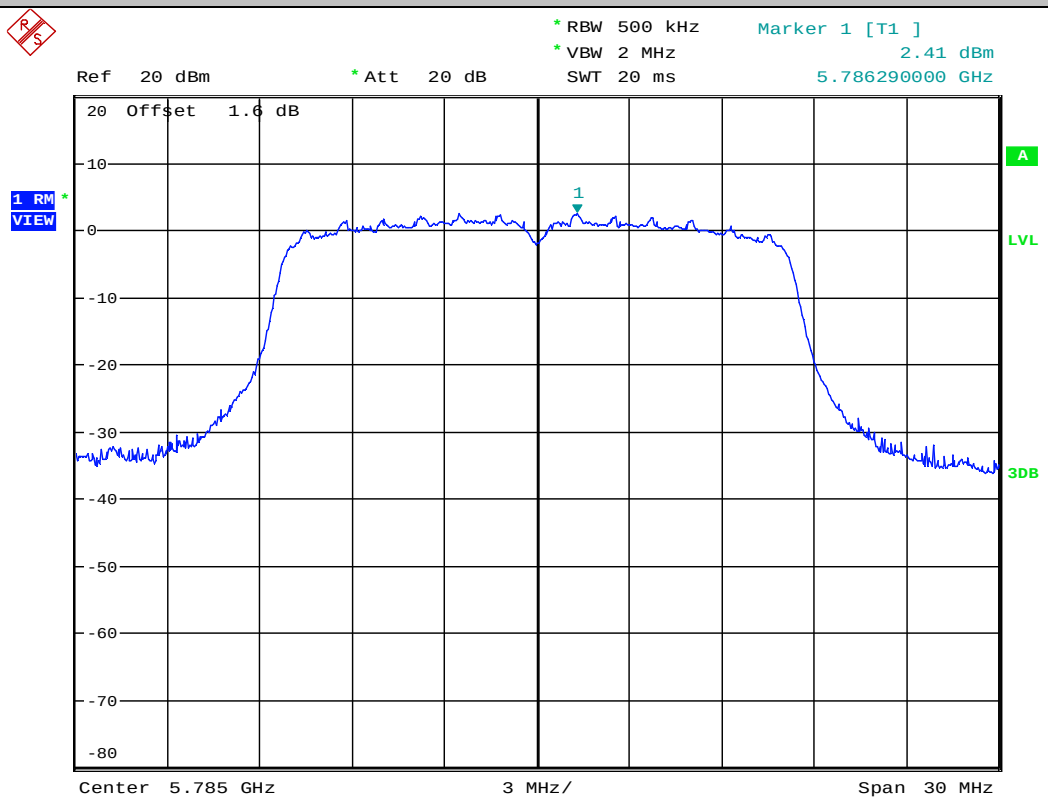
Maximum Power Spectral Density_TNVN_11A_5745_Ant2



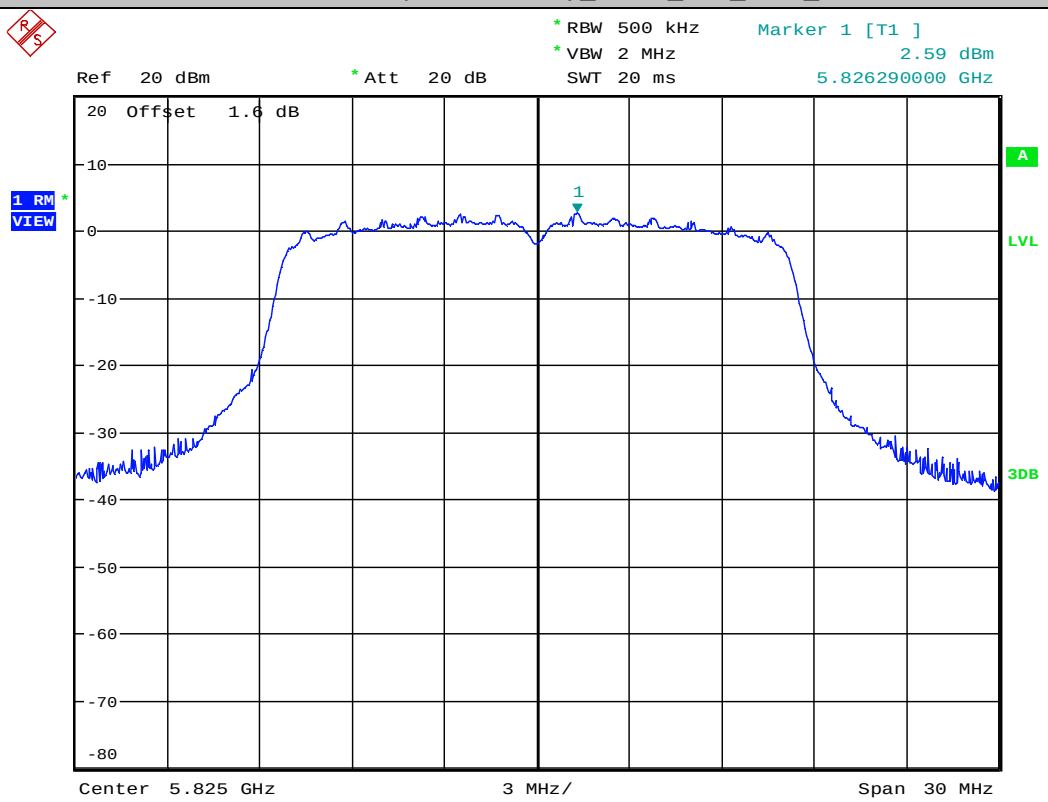
Maximum Power Spectral Density_TNVN_11A_5785_Ant1



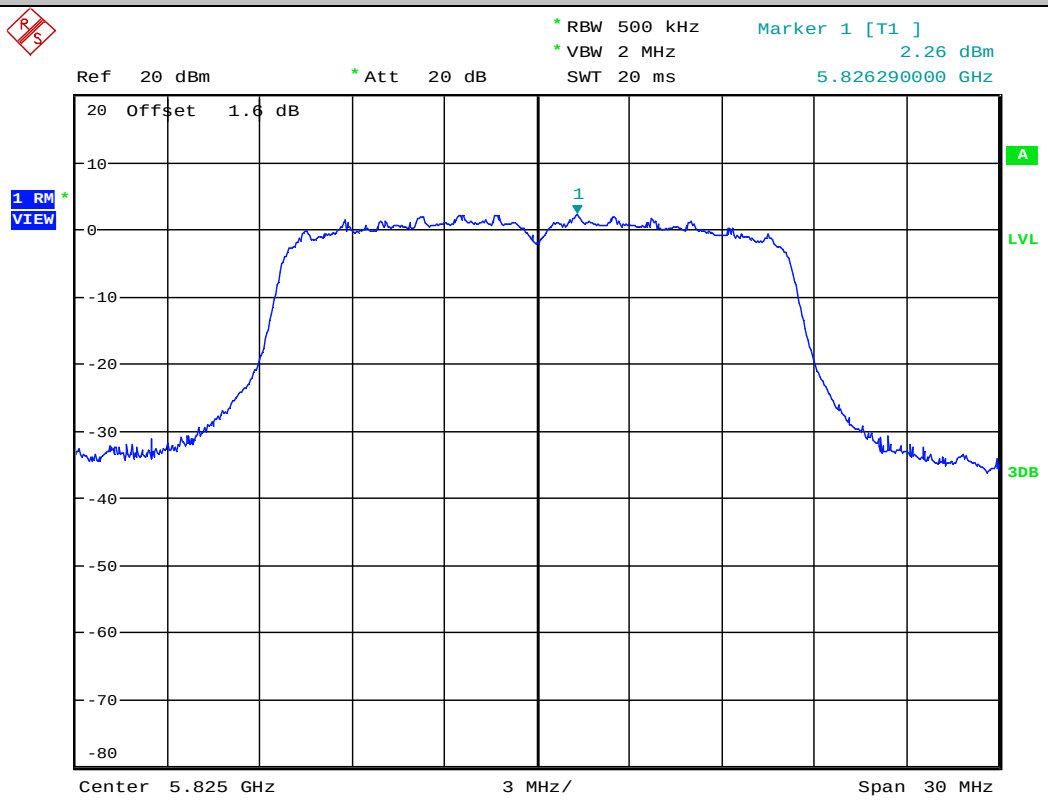
Maximum Power Spectral Density_TNVN_11A_5785_Ant2



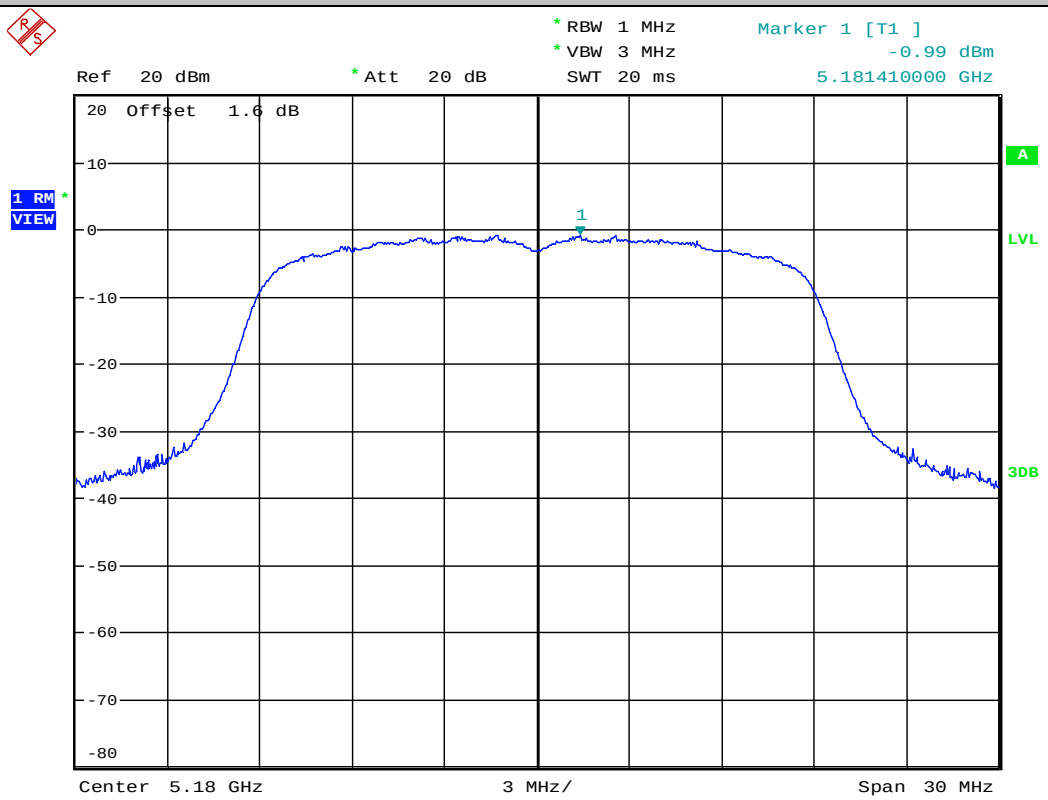
Maximum Power Spectral Density_TNVN_11A_5825_Ant1



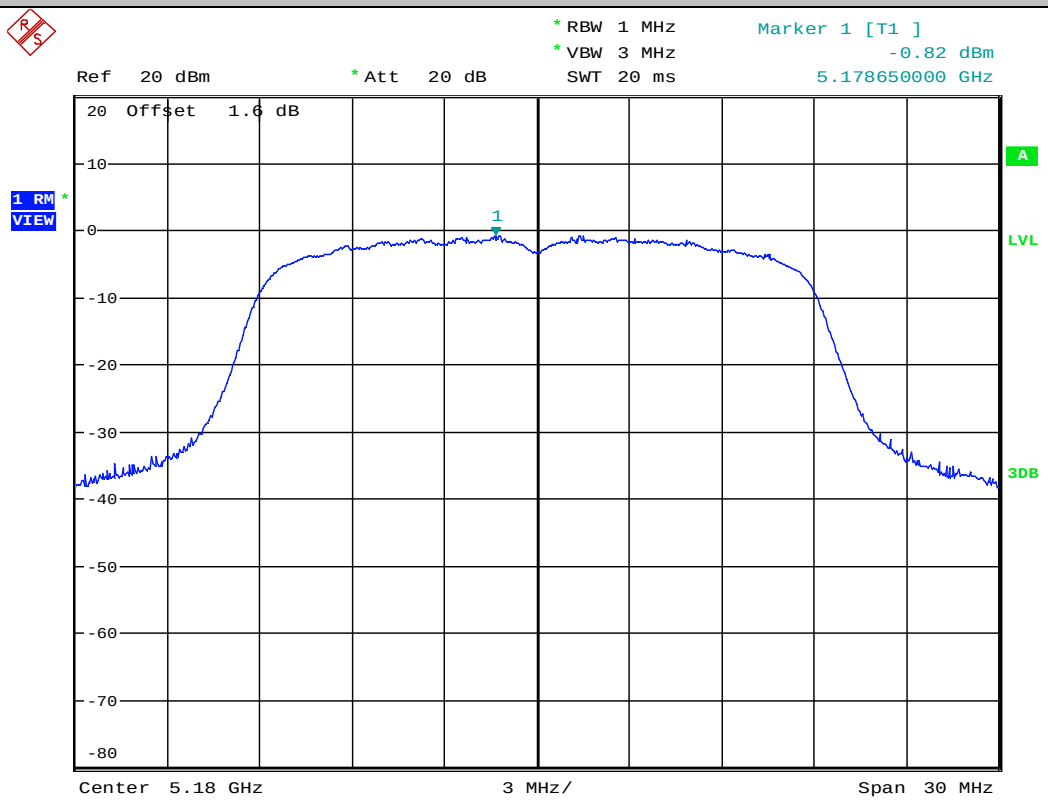
Maximum Power Spectral Density_TNVN_11A_5825_Ant2



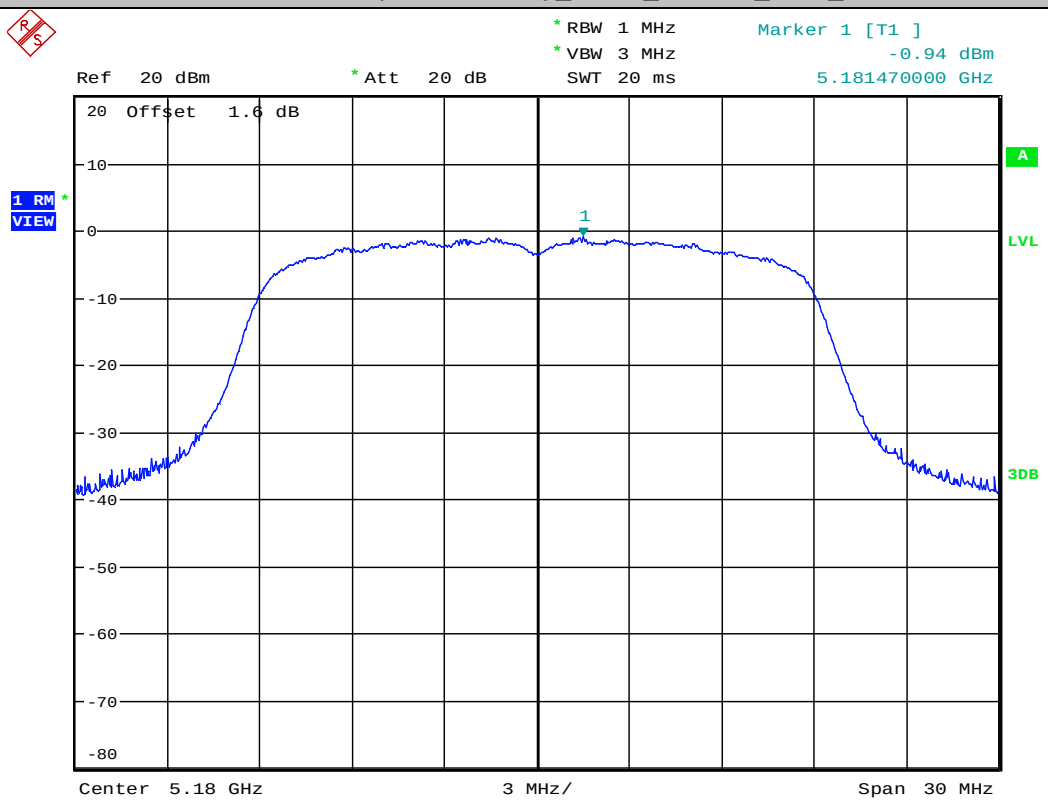
Maximum Power Spectral Density_TNVN_11N20_5180_Ant1



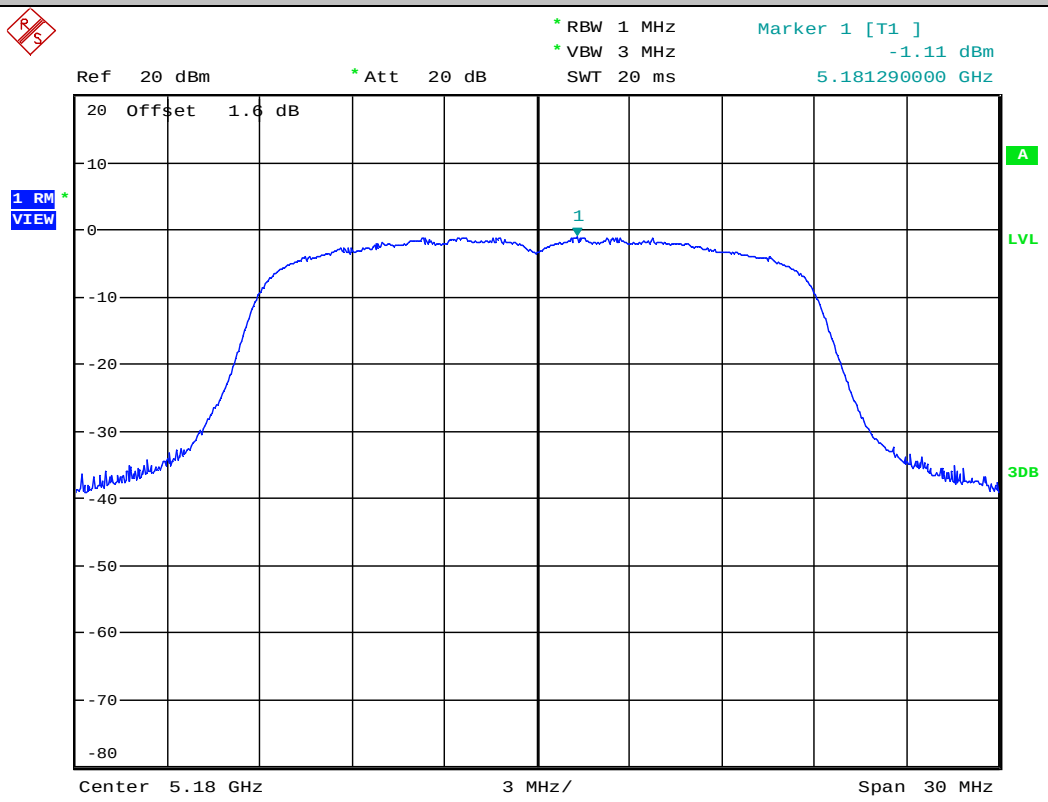
Maximum Power Spectral Density_TNVN_11AC20_5180_Ant1



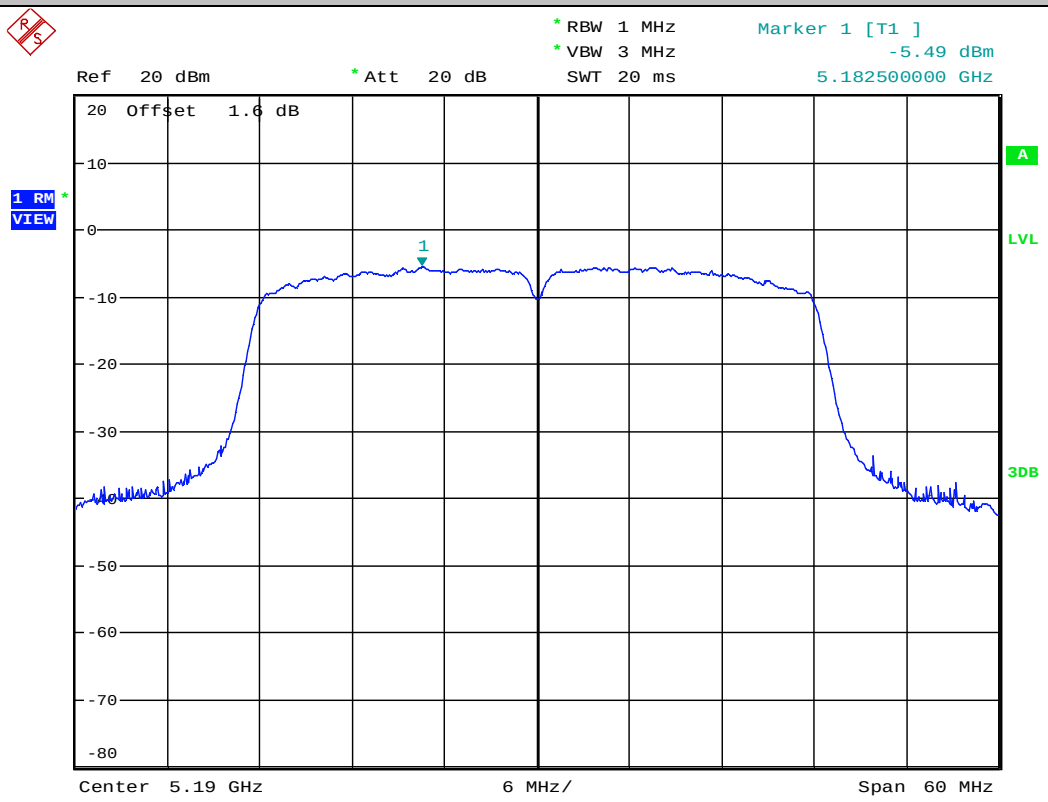
Maximum Power Spectral Density_TNVN_11AC20_5180_Ant2



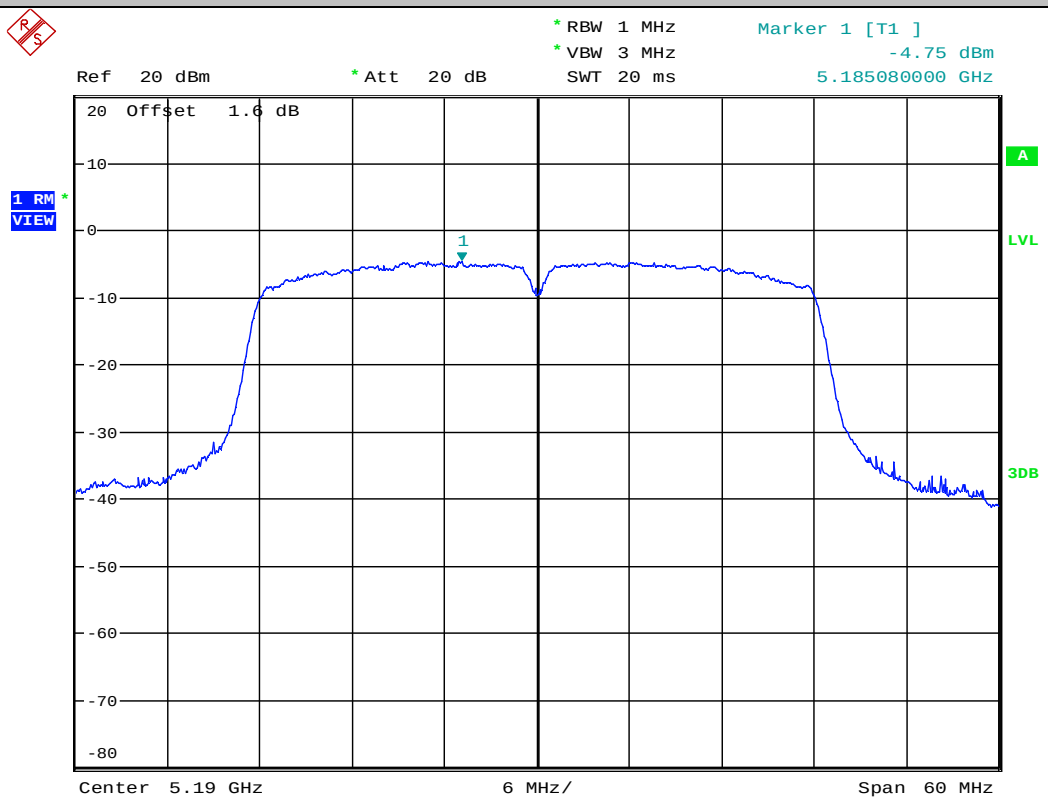
Maximum Power Spectral Density_TNVN_11N20_5180_Ant2



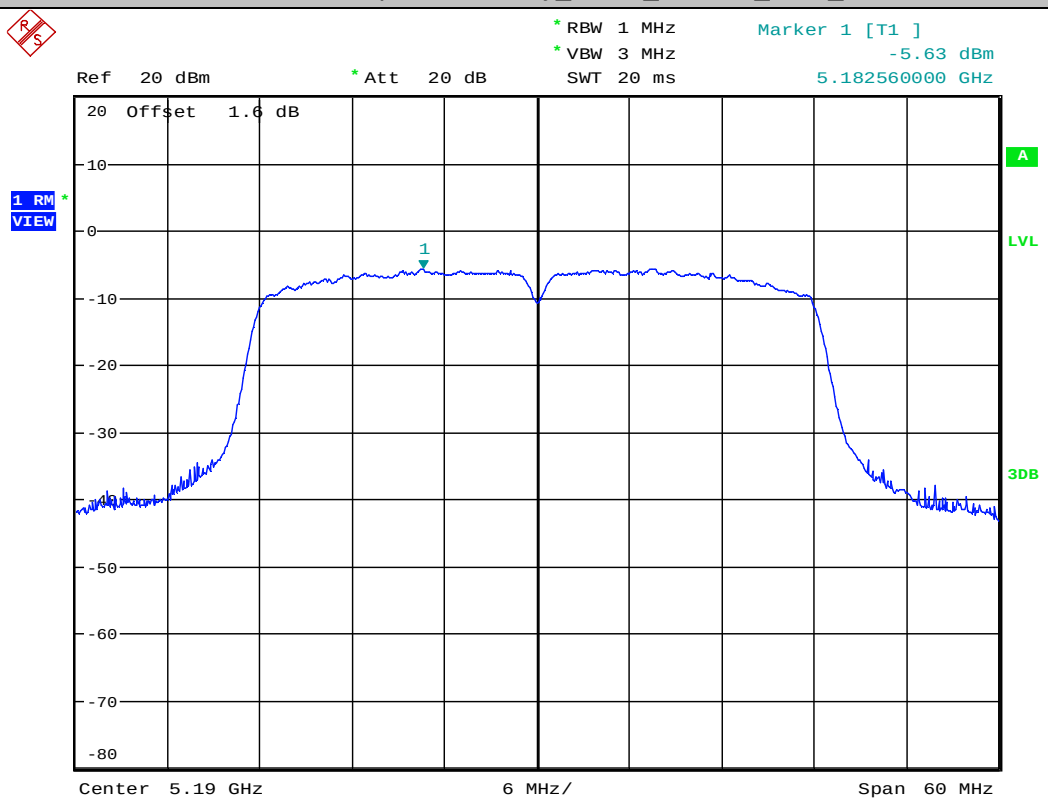
Maximum Power Spectral Density_TNVN_11AC40_5190_Ant1



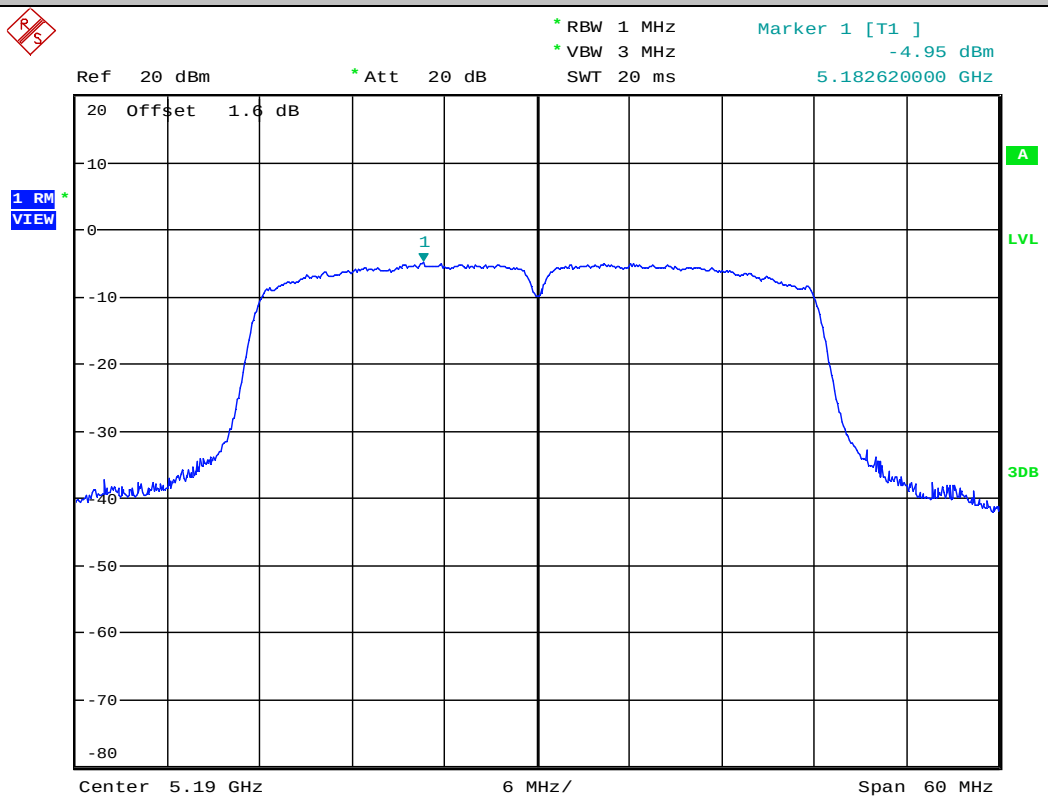
Maximum Power Spectral Density_TNVN_11N40_5190_Ant1



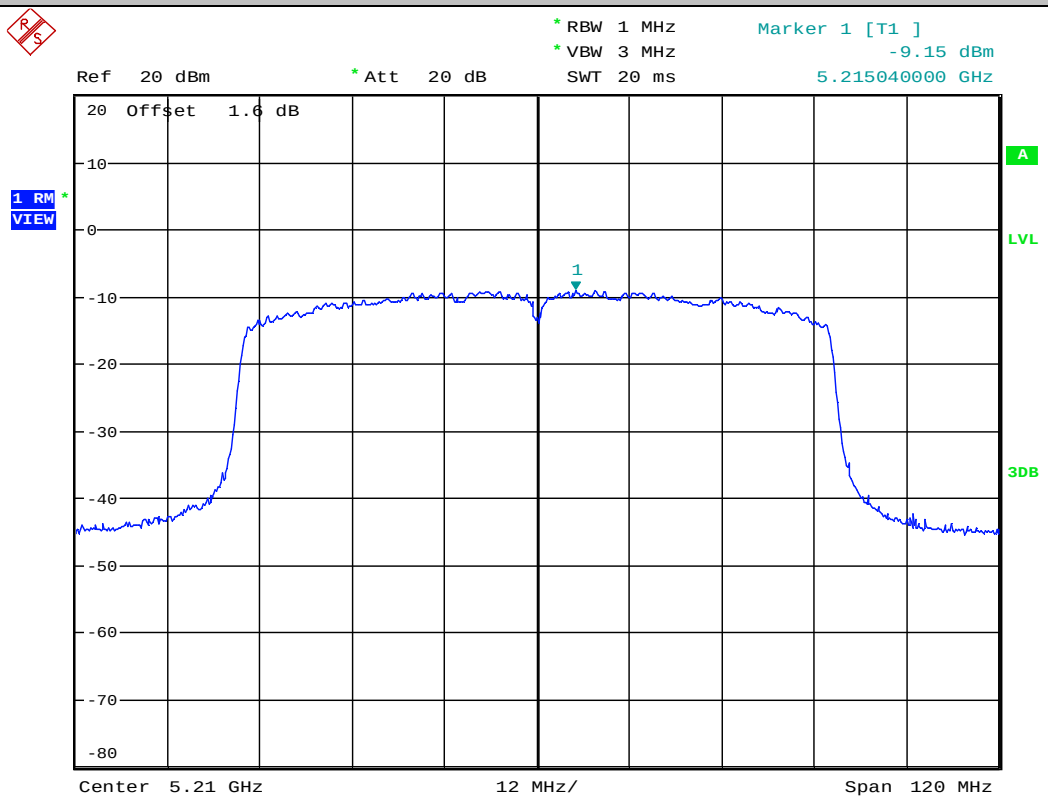
Maximum Power Spectral Density_TNVN_11AC40_5190_Ant2



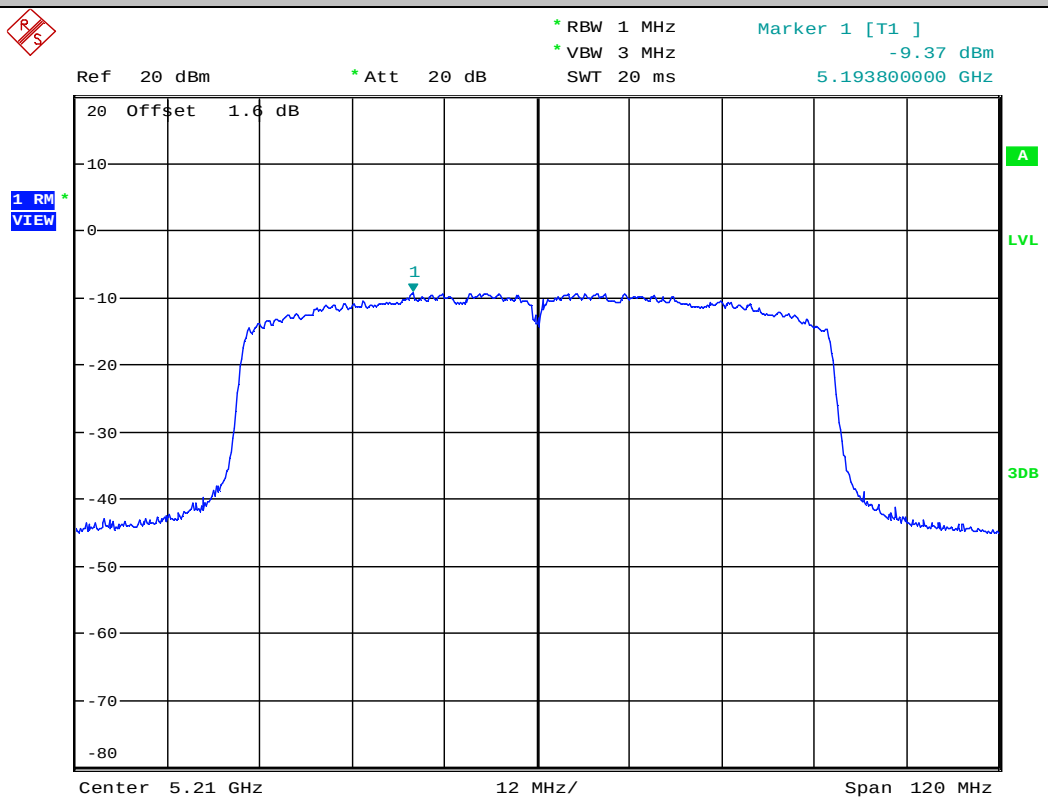
Maximum Power Spectral Density_TNVN_11N40_5190_Ant2



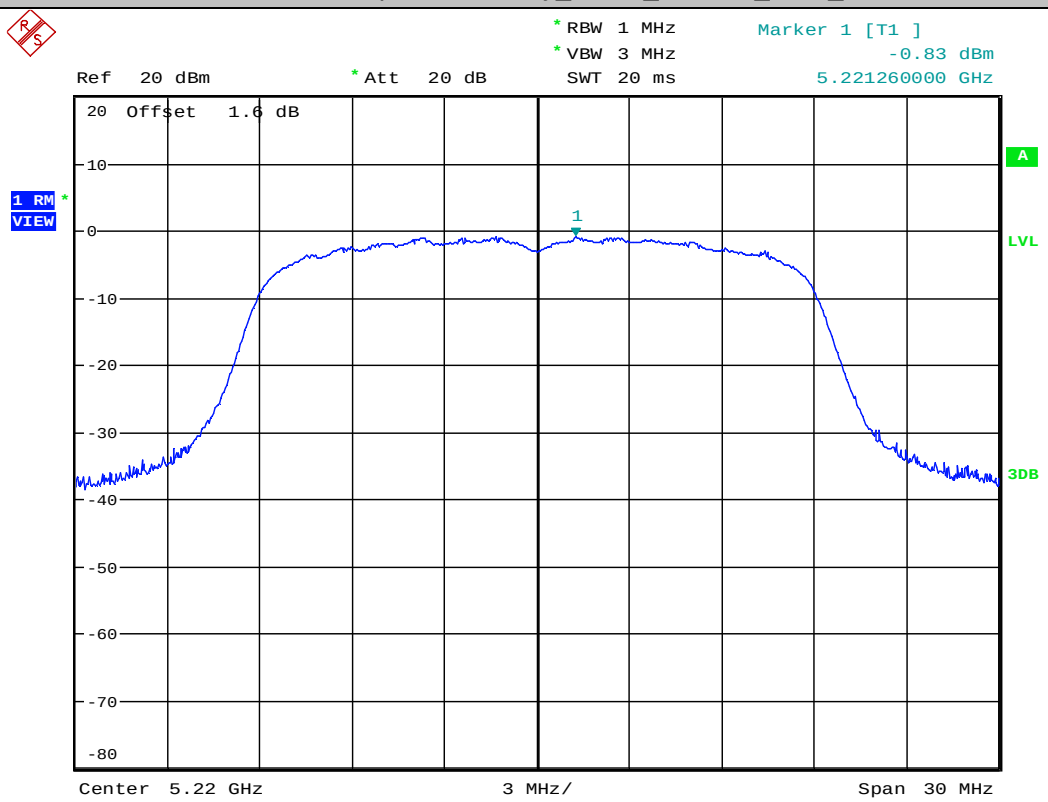
Maximum Power Spectral Density_TNVN_11AC80_5210_Ant1



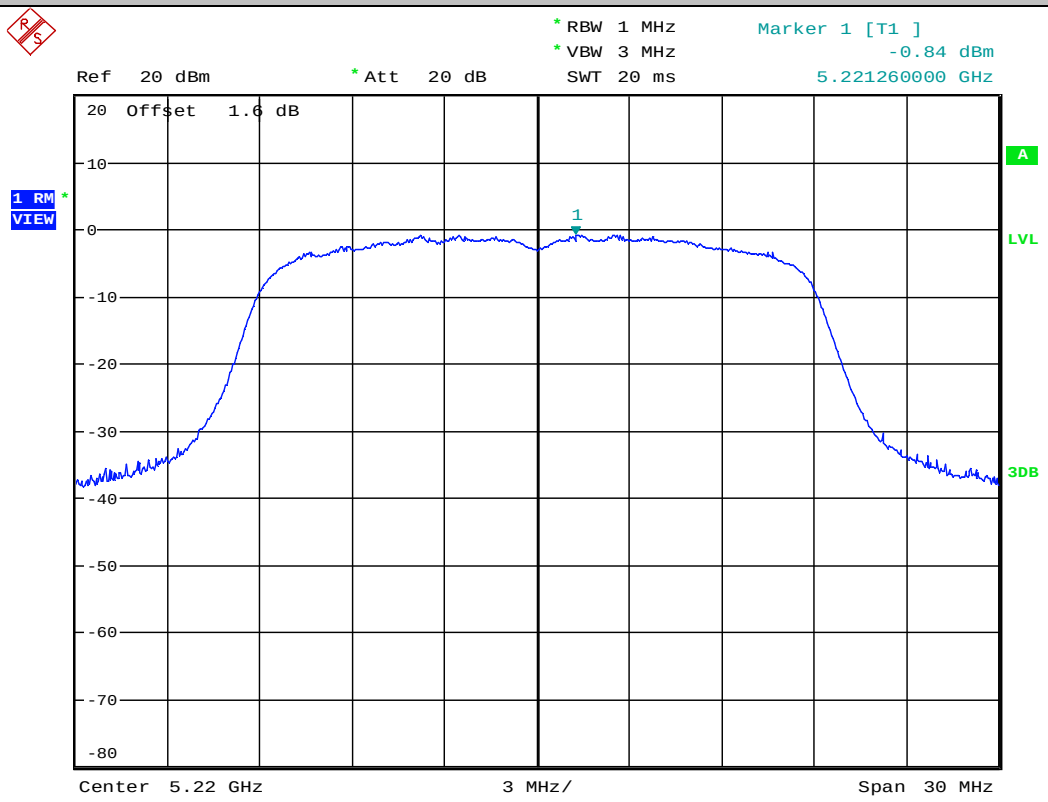
Maximum Power Spectral Density_TNVN_11AC80_5210_Ant2



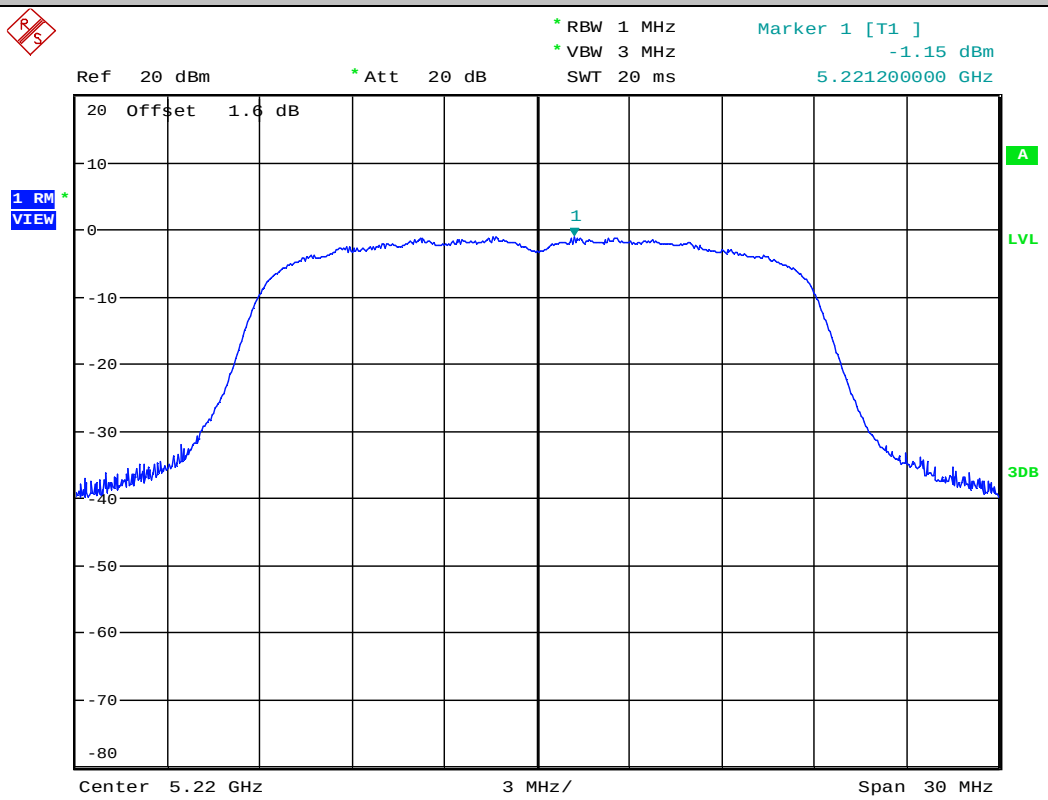
Maximum Power Spectral Density_TNVN_11AC20_5220_Ant1



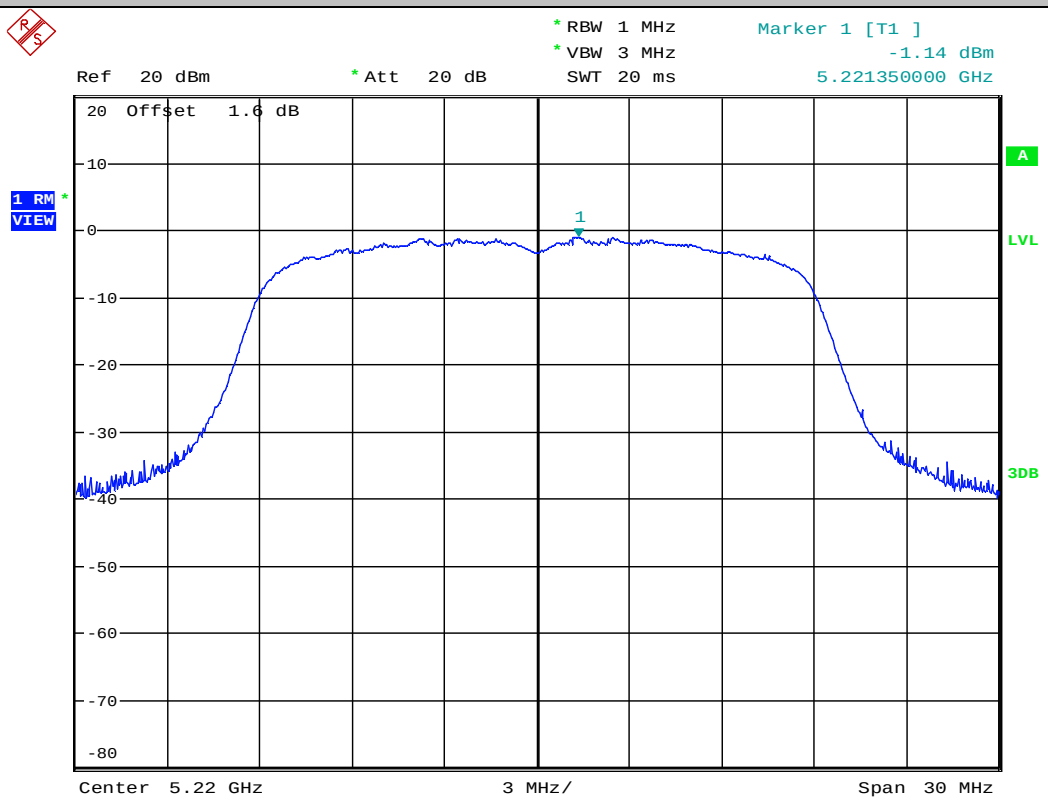
Maximum Power Spectral Density_TNVN_11N20_5220_Ant1



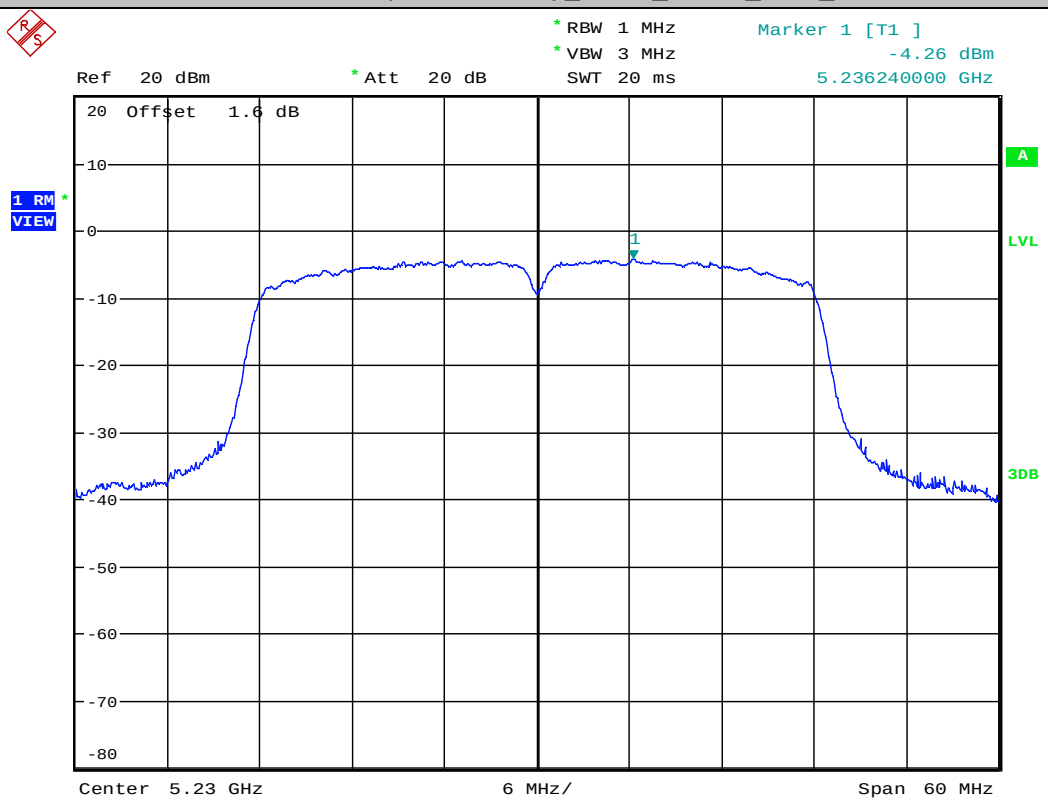
Maximum Power Spectral Density_TNVN_11AC20_5220_Ant2



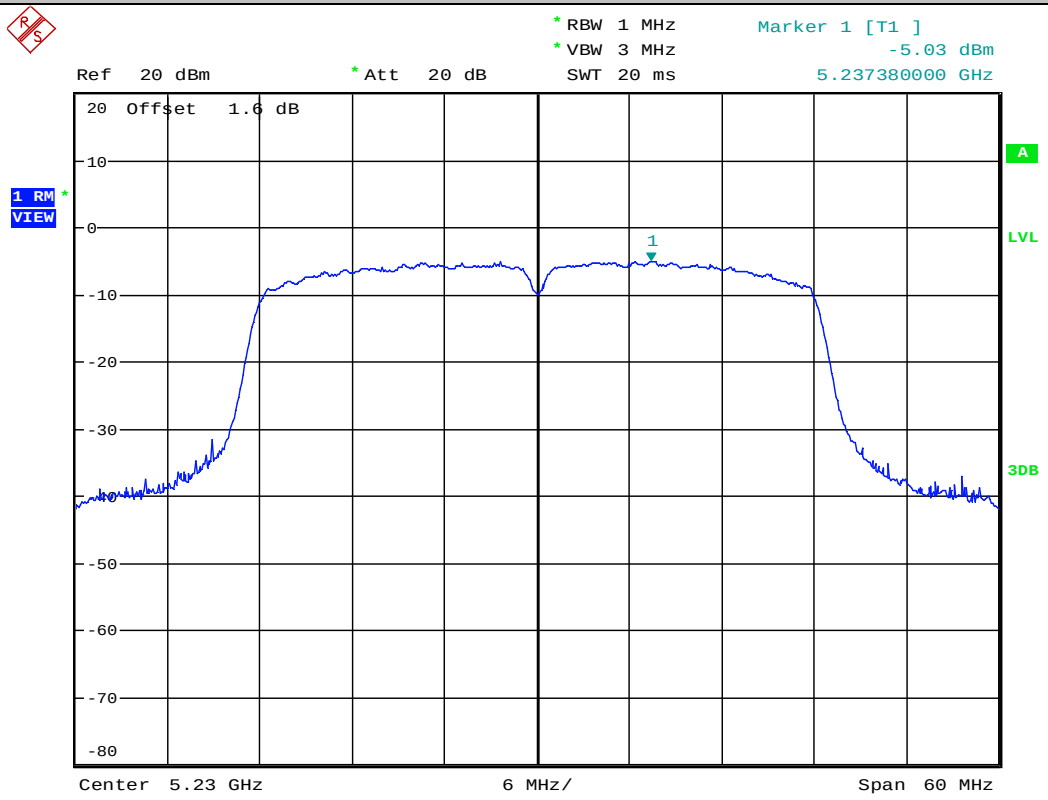
Maximum Power Spectral Density_TNVN_11N20_5220_Ant2



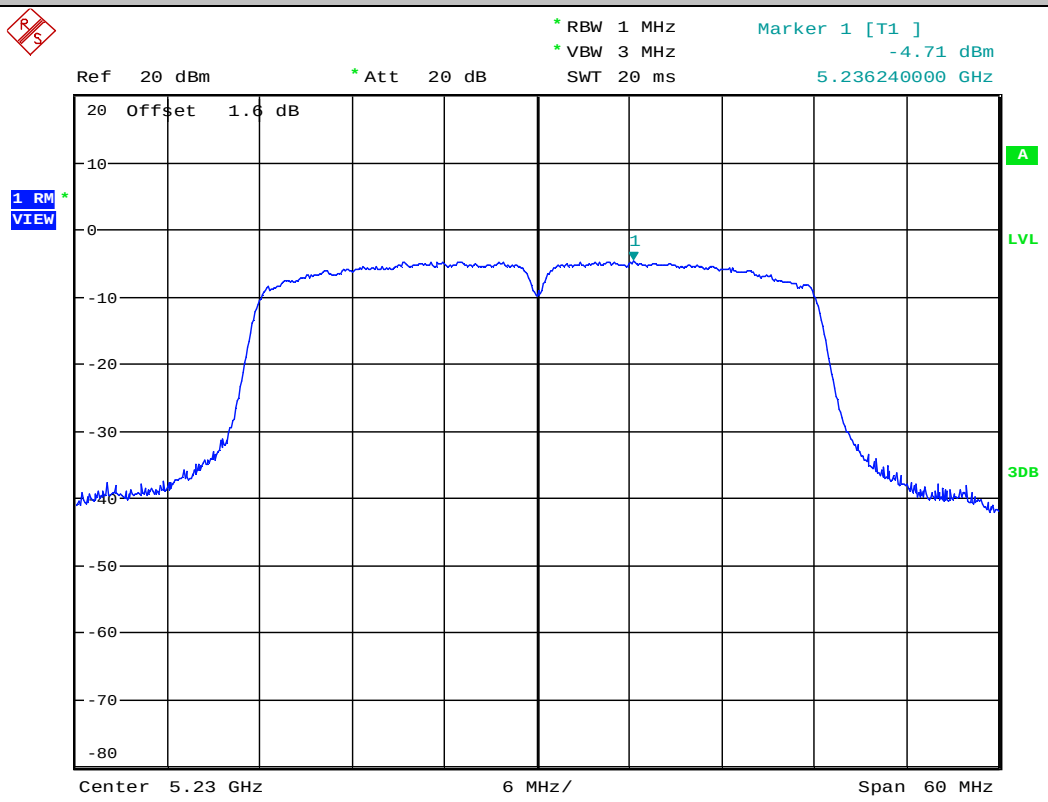
Maximum Power Spectral Density_TNVN_11N40_5230_Ant1



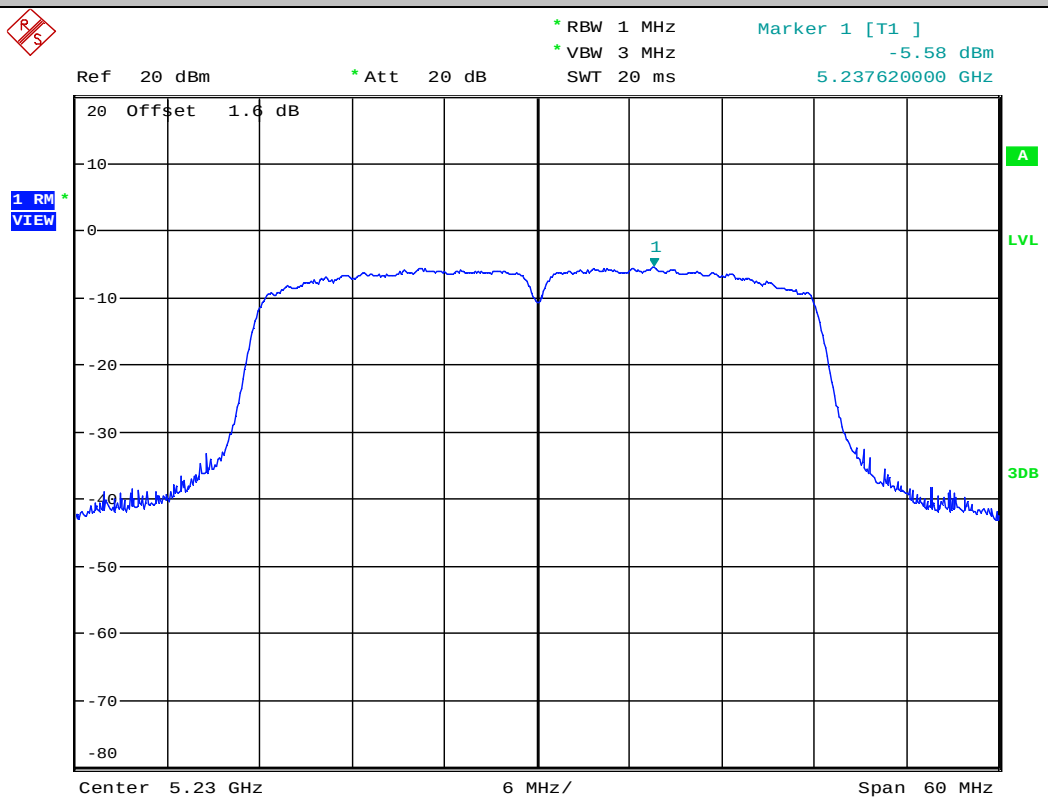
Maximum Power Spectral Density_TNVN_11AC40_5230_Ant1



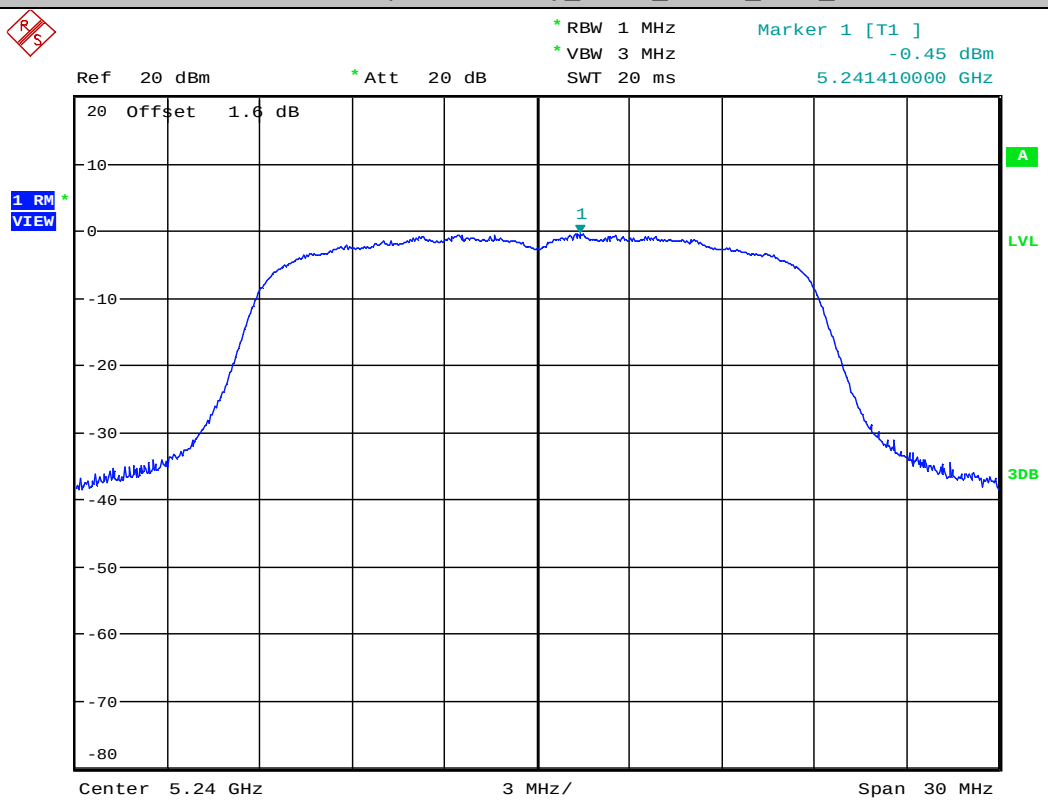
Maximum Power Spectral Density_TNVN_11N40_5230_Ant2



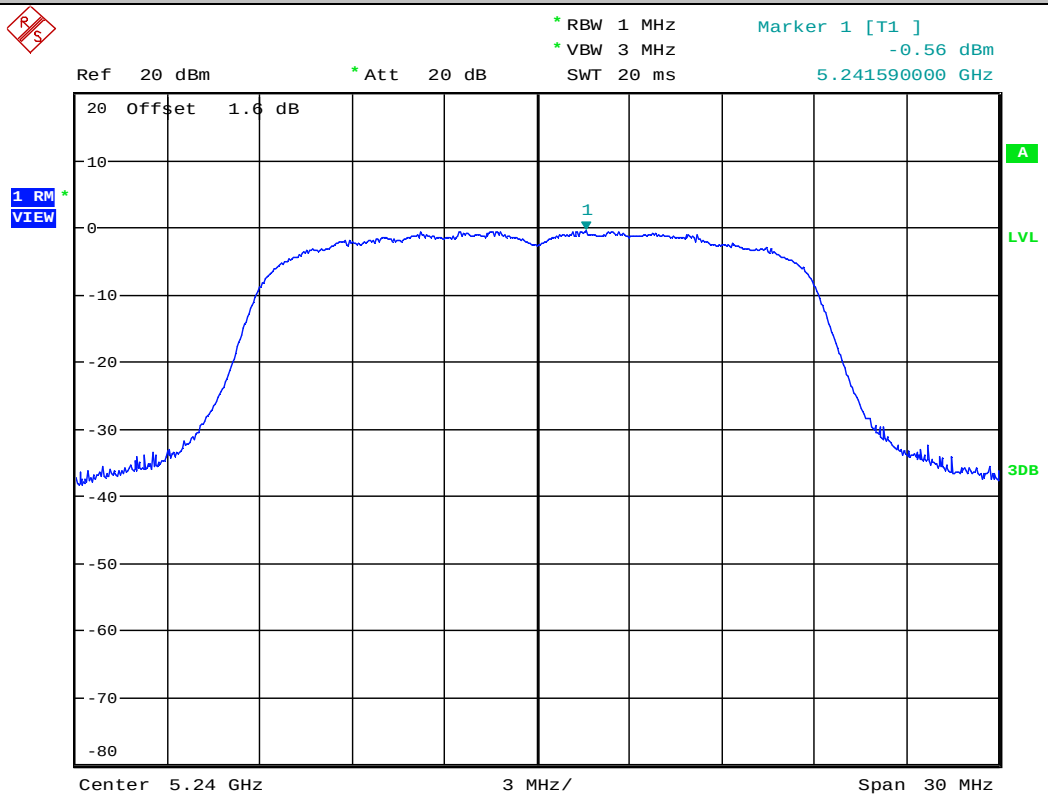
Maximum Power Spectral Density_TNVN_11AC40_5230_Ant2



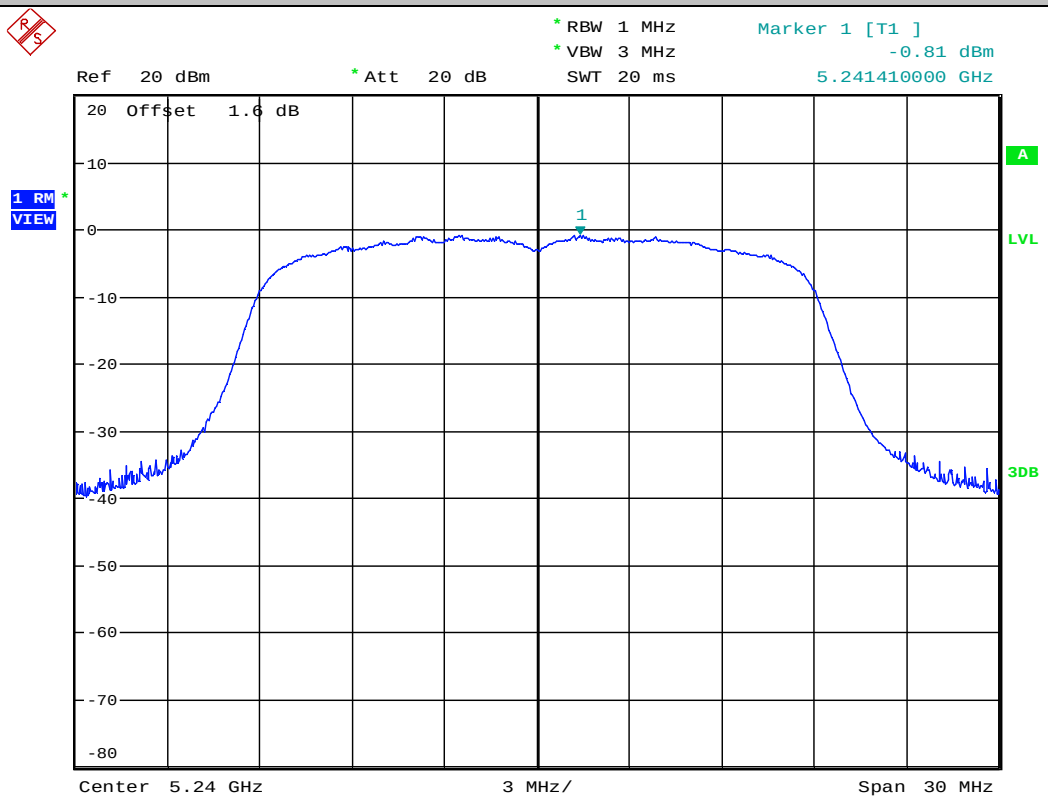
Maximum Power Spectral Density_TNVN_11N20_5240_Ant1



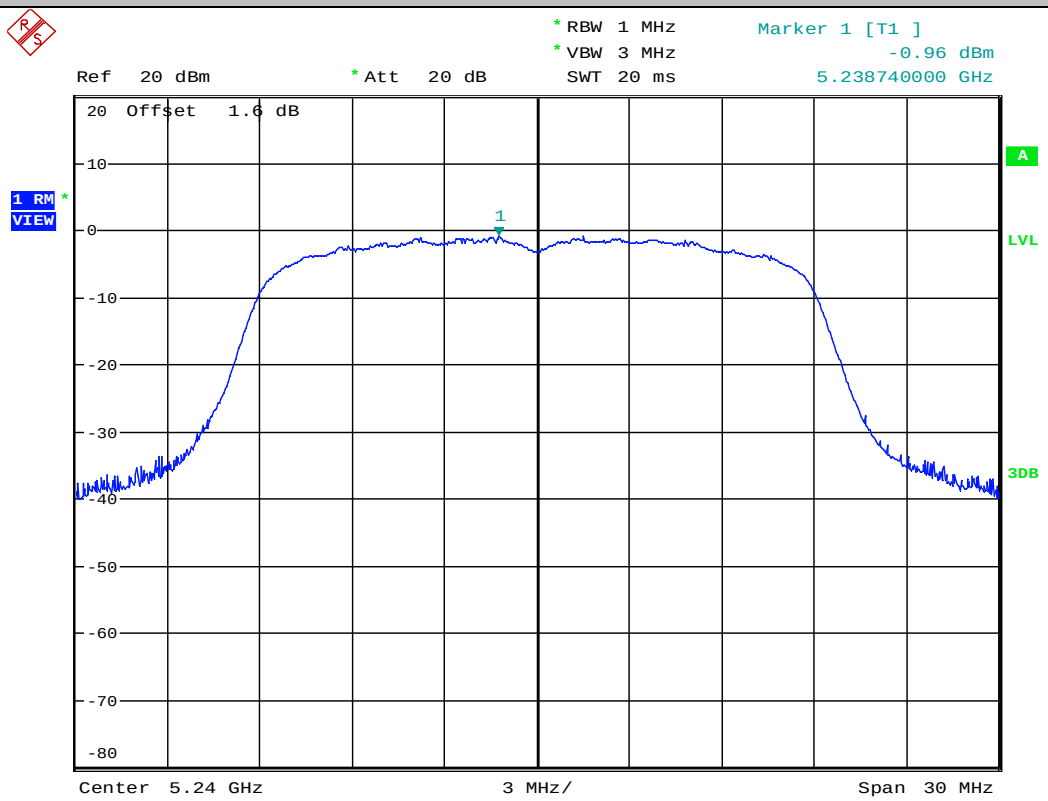
Maximum Power Spectral Density_TNVN_11AC20_5240_Ant1



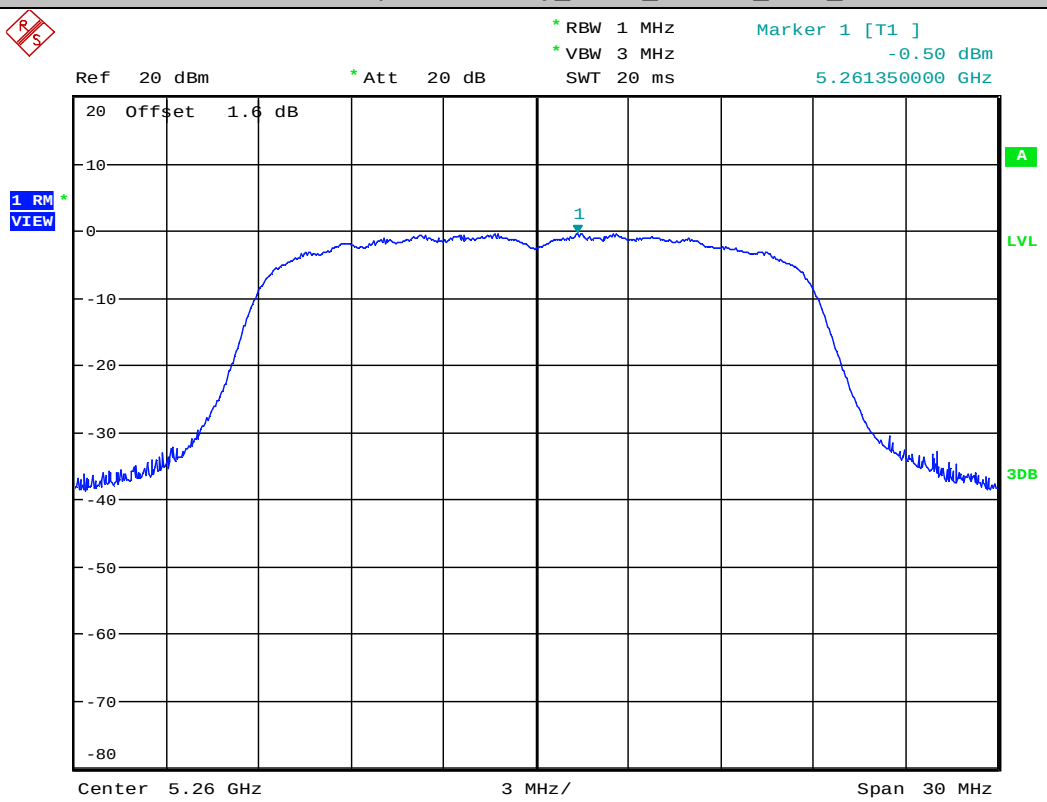
Maximum Power Spectral Density_TNVN_11N20_5240_Ant2



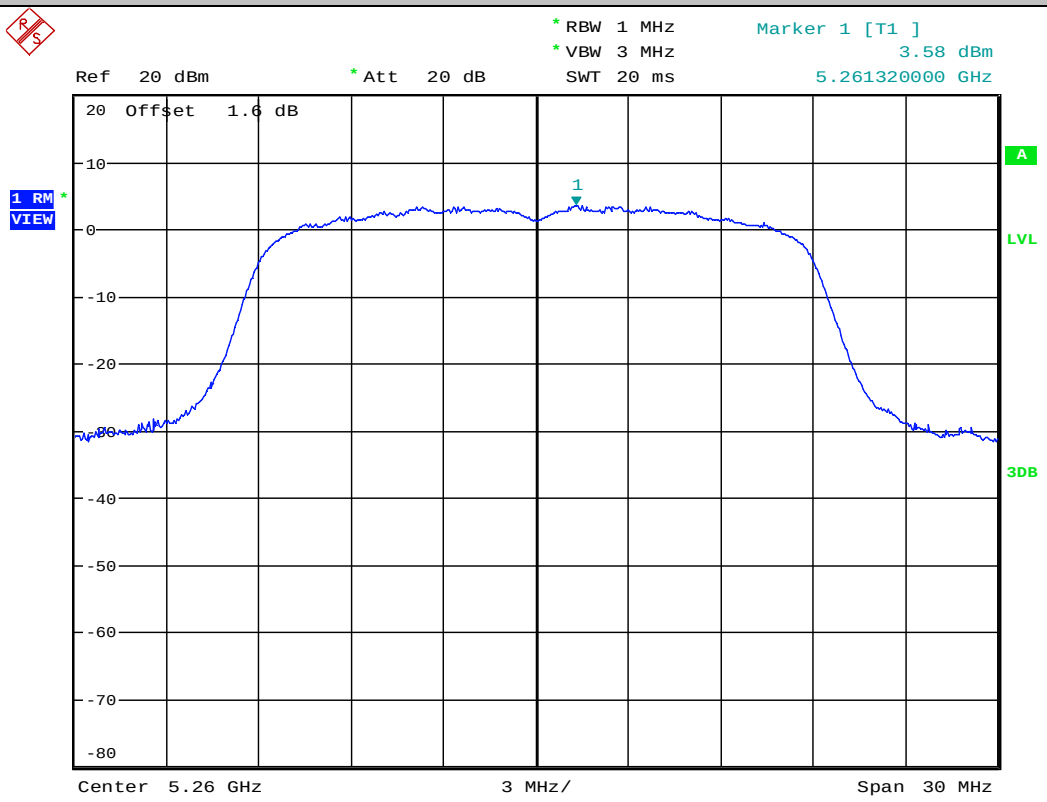
Maximum Power Spectral Density_TNVN_11AC20_5240_Ant2



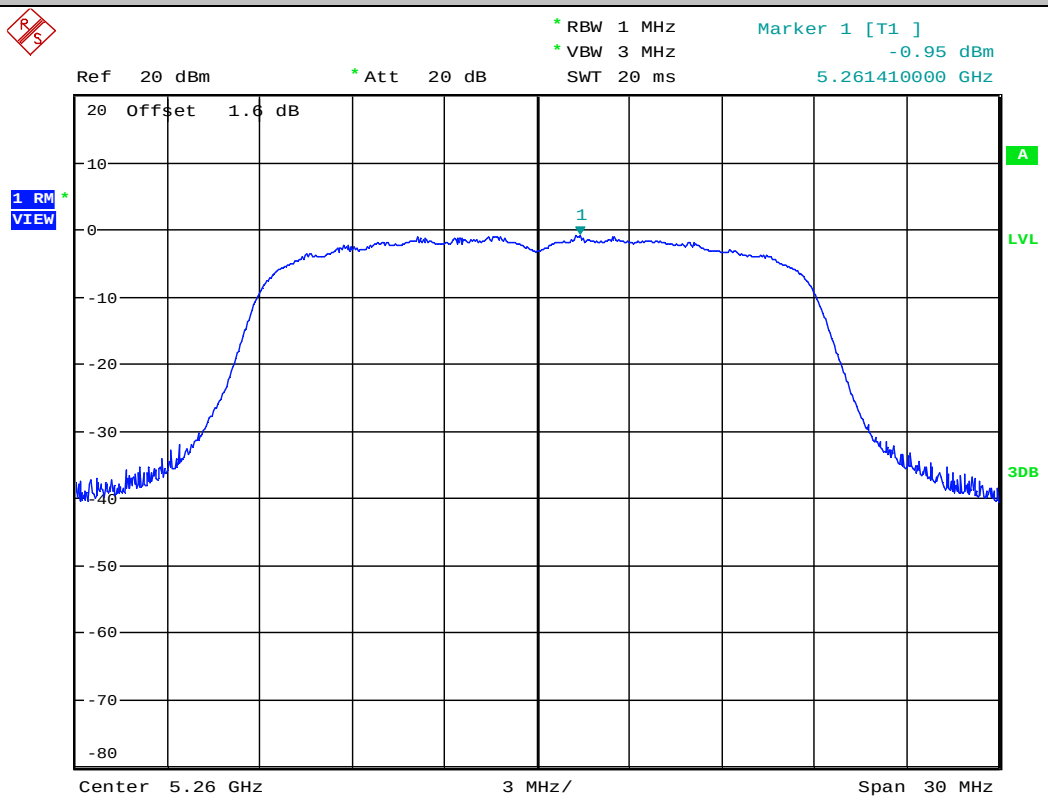
Maximum Power Spectral Density_TNVN_11AC20_5260_Ant1



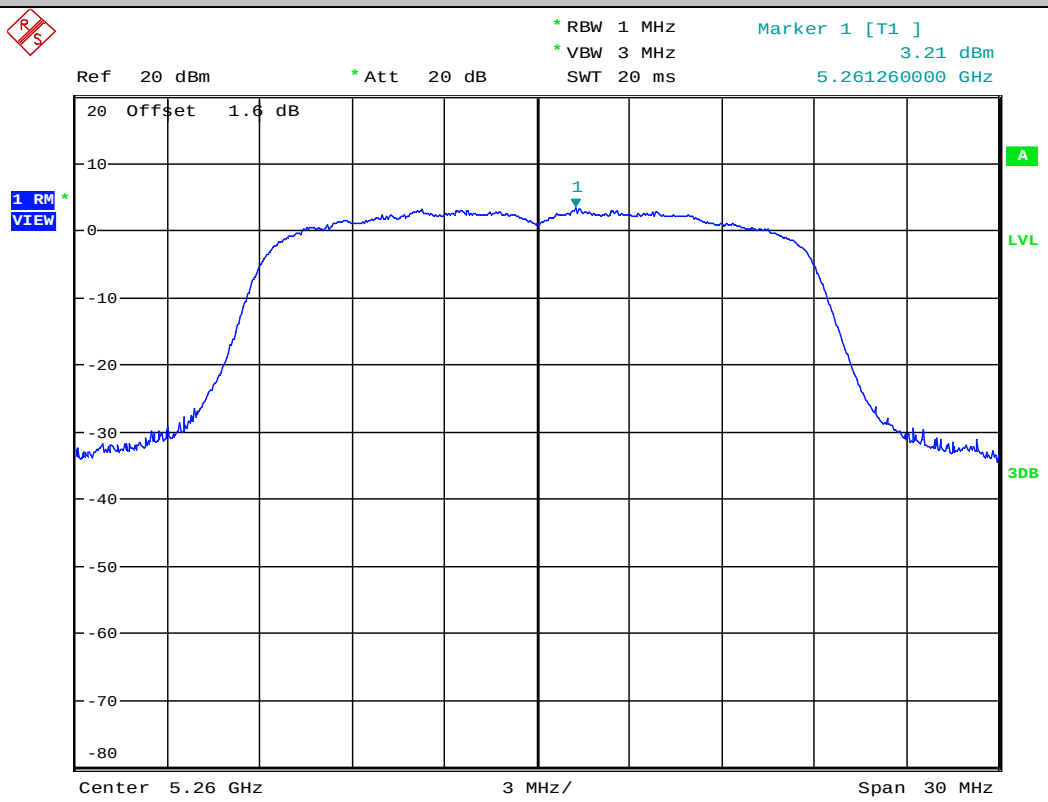
Maximum Power Spectral Density_TNVN_11N20_5260_Ant1



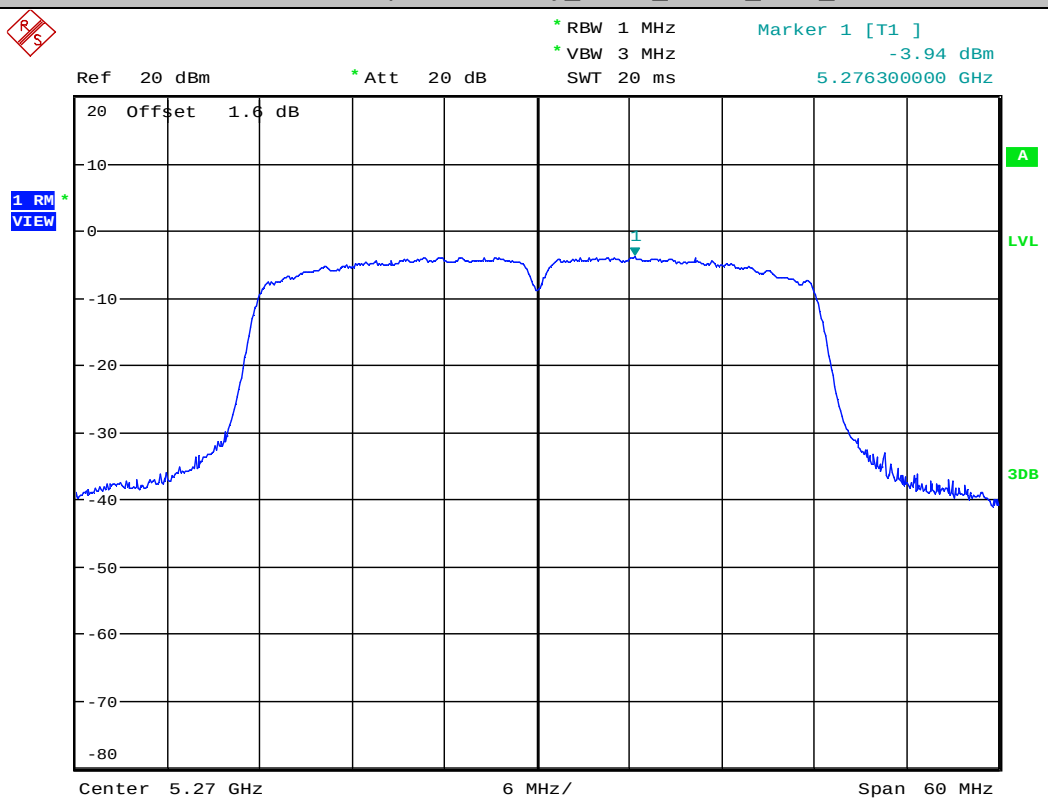
Maximum Power Spectral Density_TNVN_11AC20_5260_Ant2



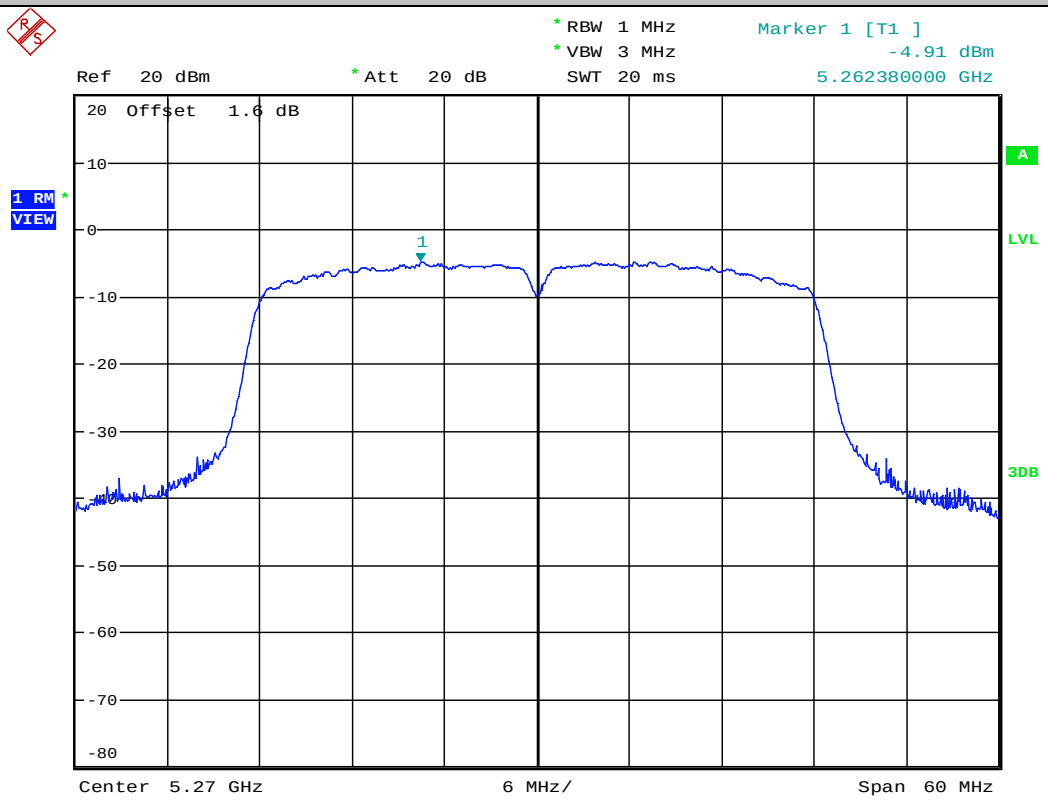
Maximum Power Spectral Density_TNVN_11N20_5260_Ant2



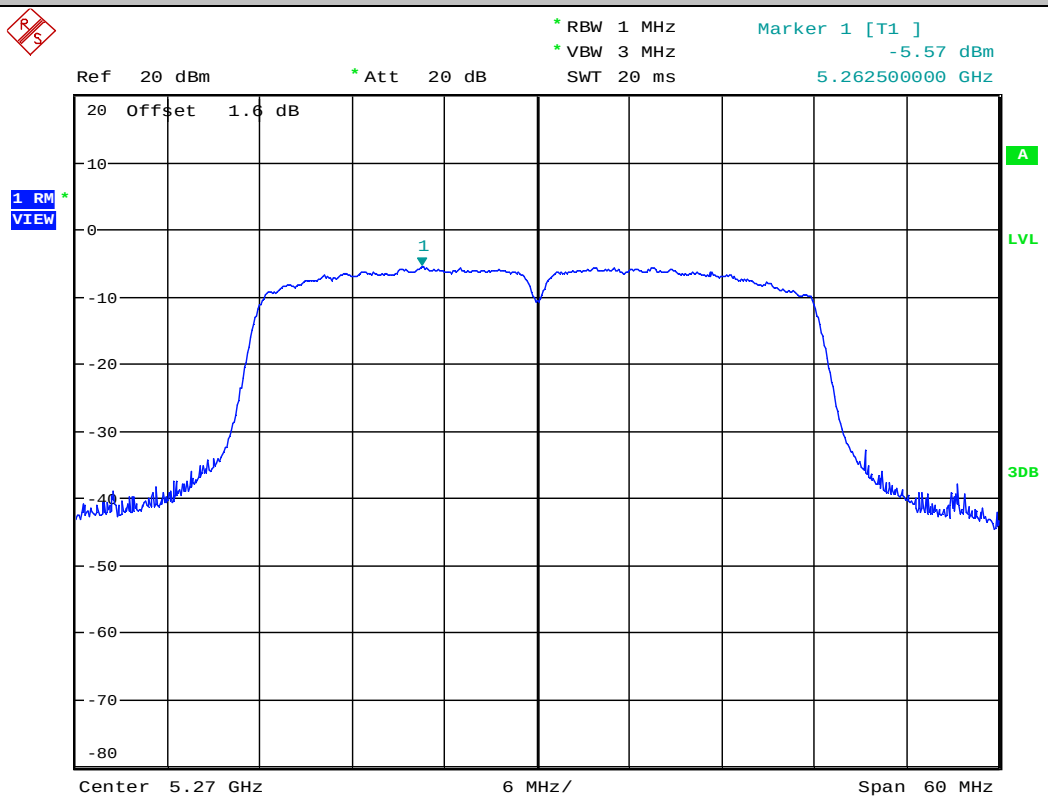
Maximum Power Spectral Density_TNVN_11N40_5270_Ant1



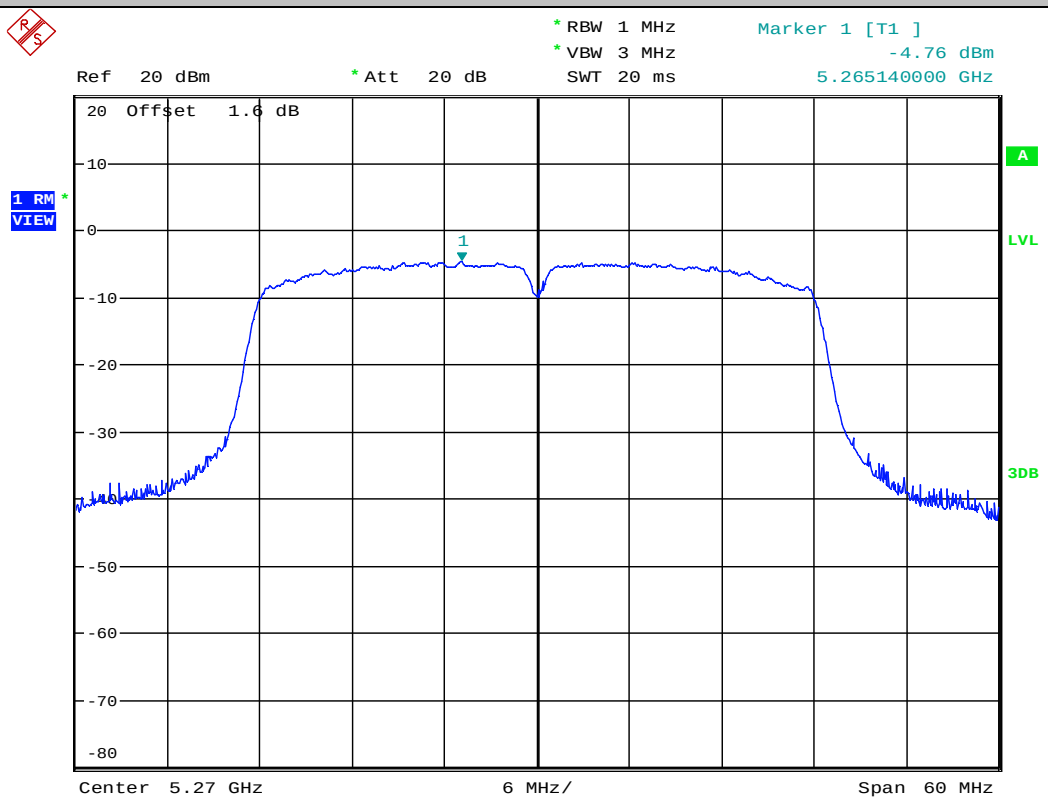
Maximum Power Spectral Density_TNVN_11AC40_5270_Ant1



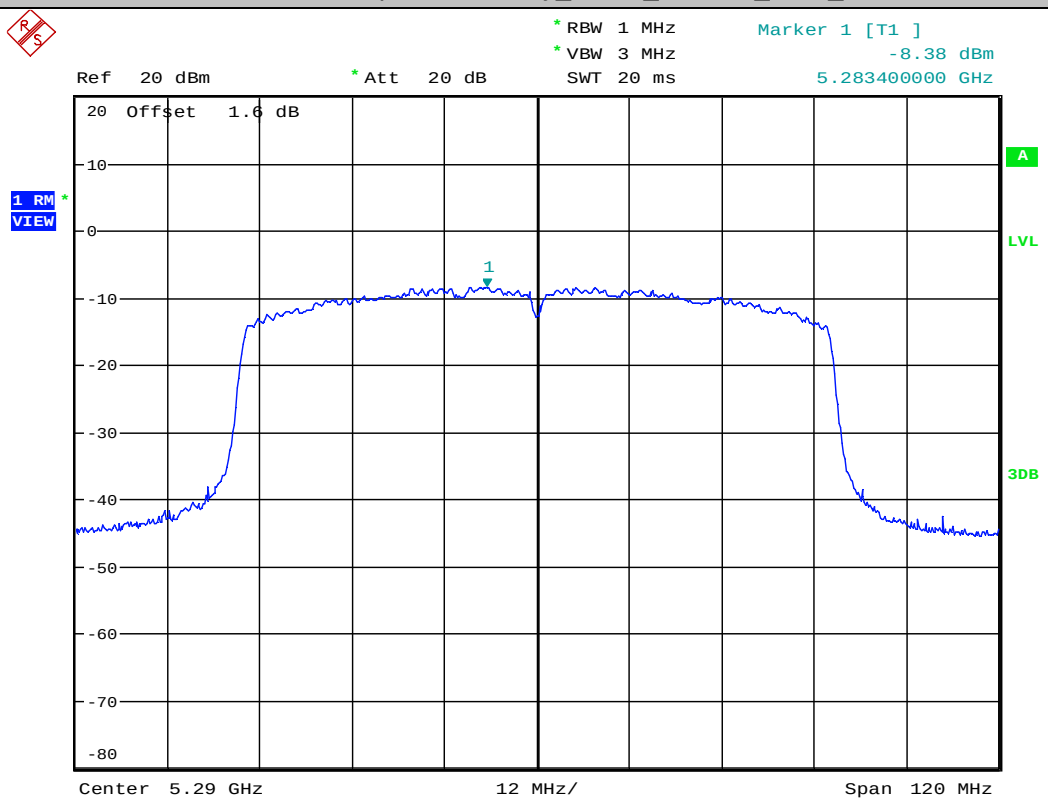
Maximum Power Spectral Density_TNVN_11AC40_5270_Ant2



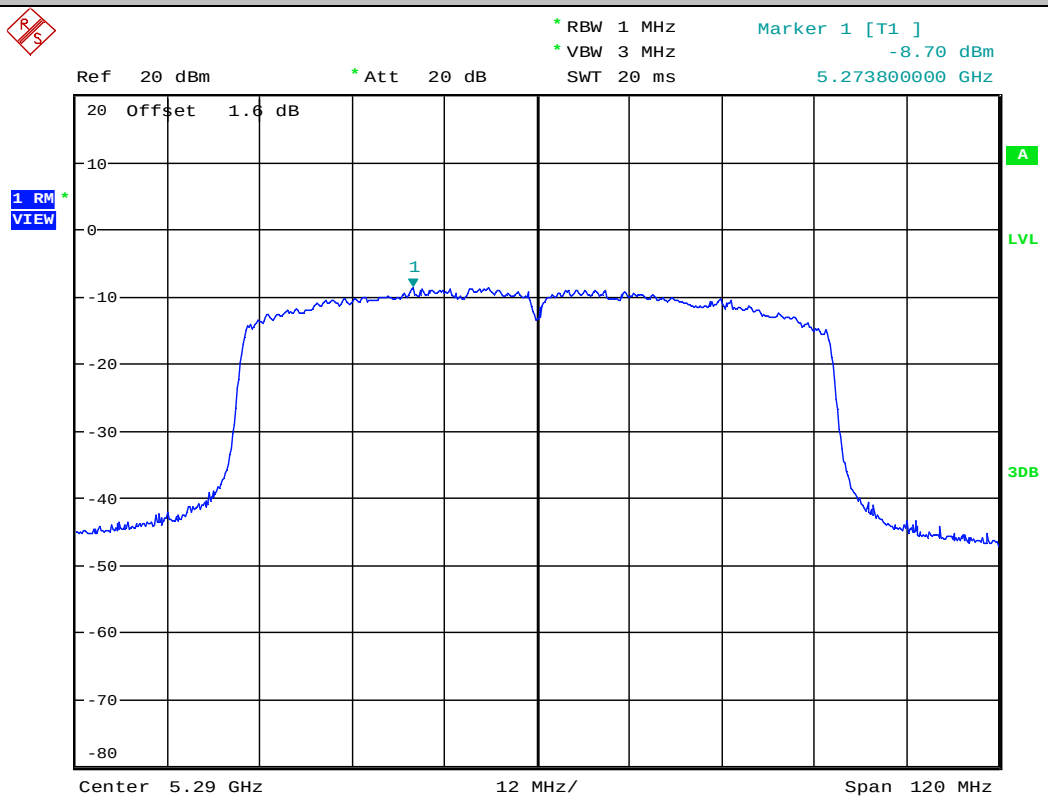
Maximum Power Spectral Density_TNVN_11N40_5270_Ant2



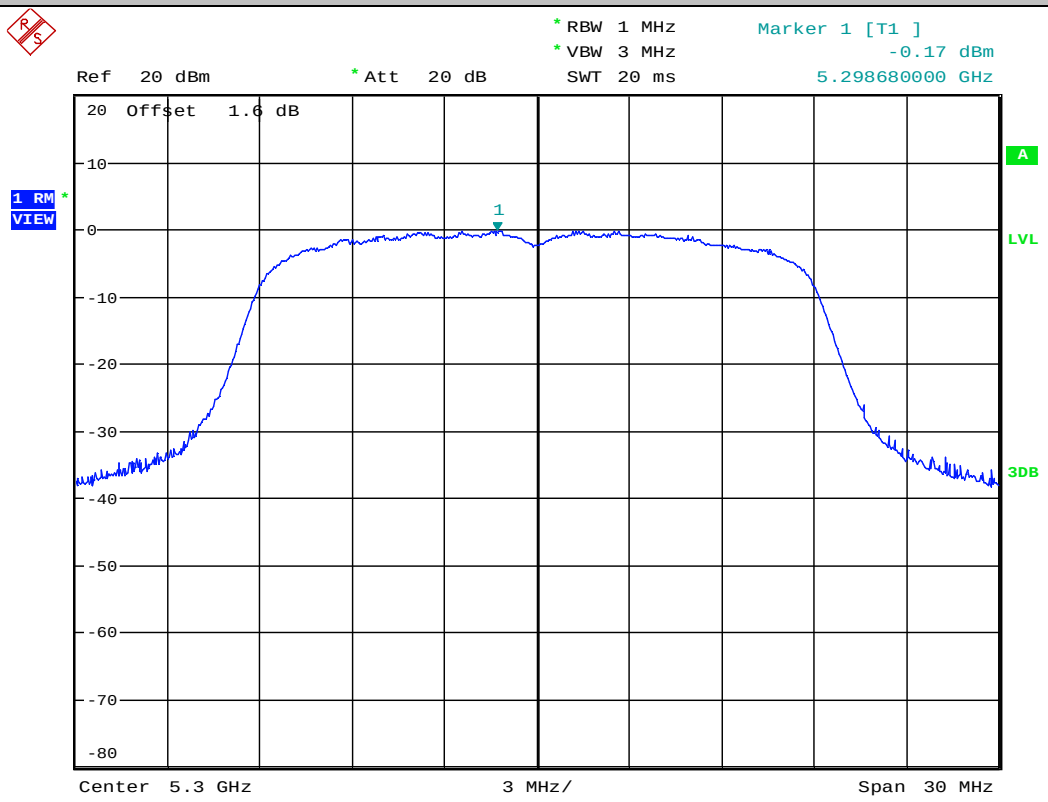
Maximum Power Spectral Density_TNVN_11AC80_5290_Ant1



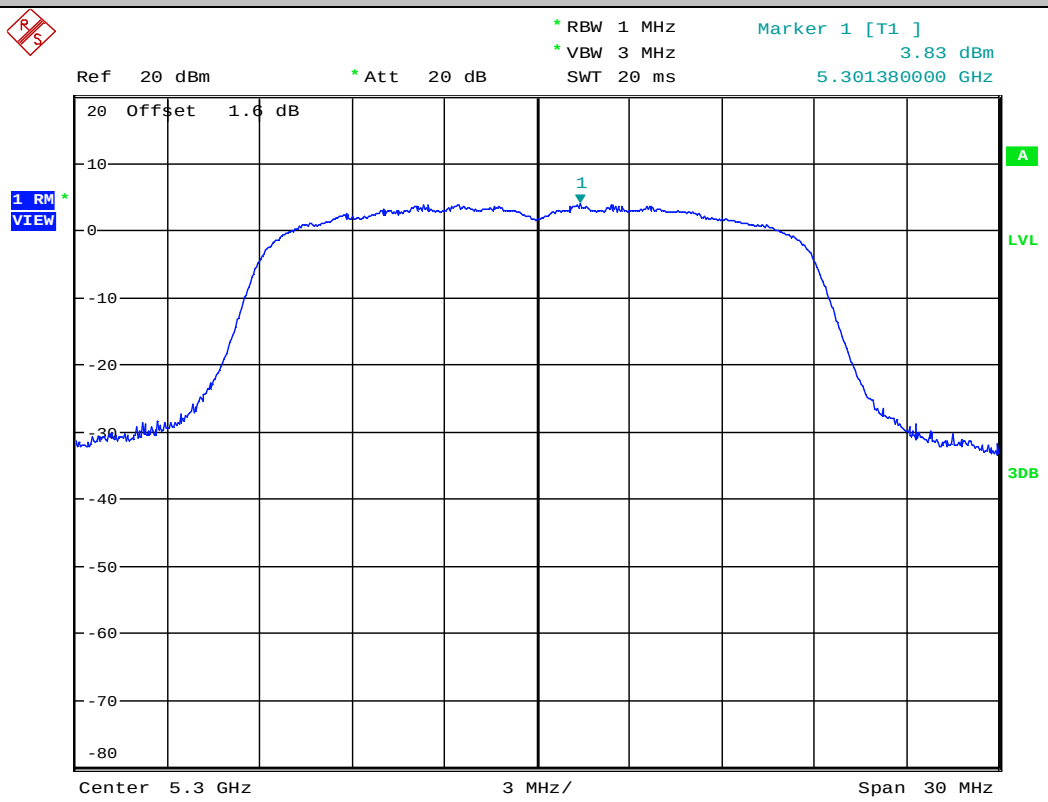
Maximum Power Spectral Density_TNVN_11AC80_5290_Ant2



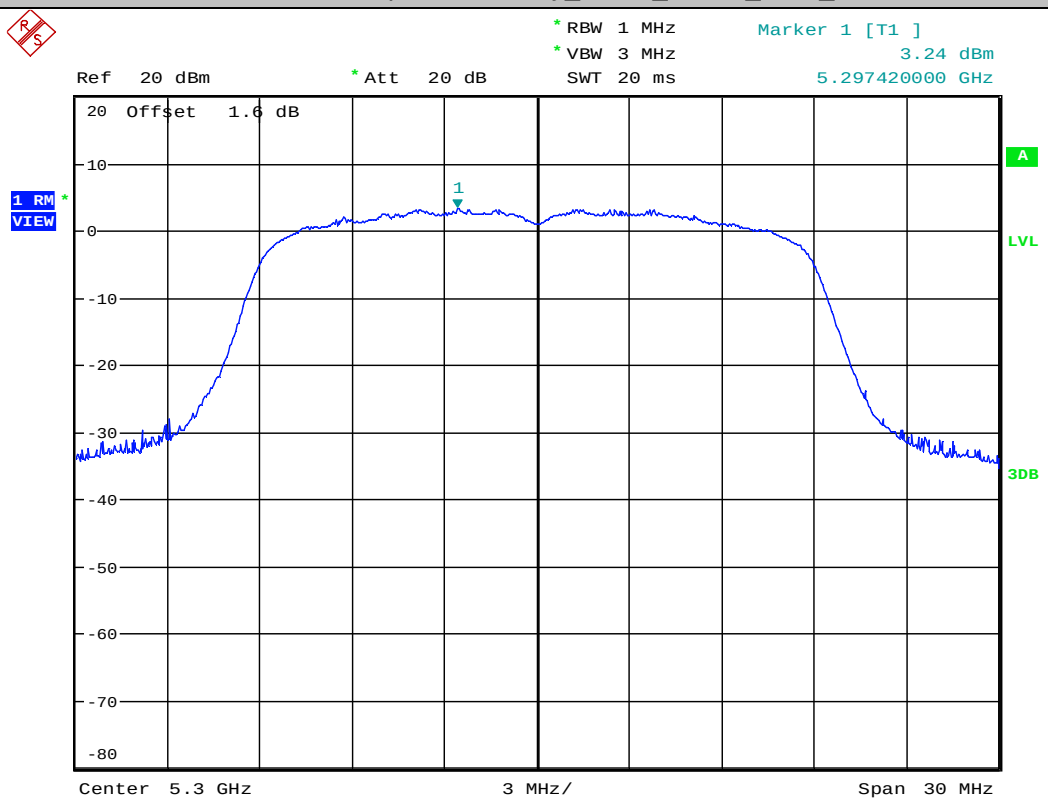
Maximum Power Spectral Density_TNVN_11AC20_5300_Ant1



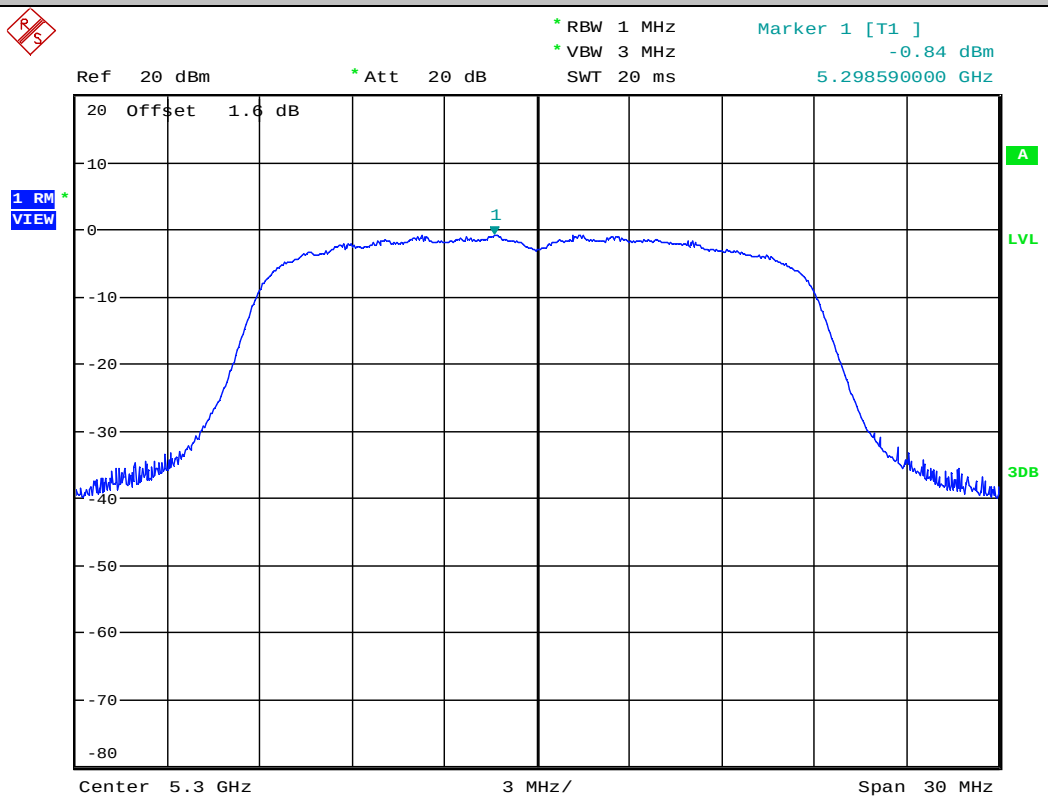
Maximum Power Spectral Density_TNVN_11N20_5300_Ant1



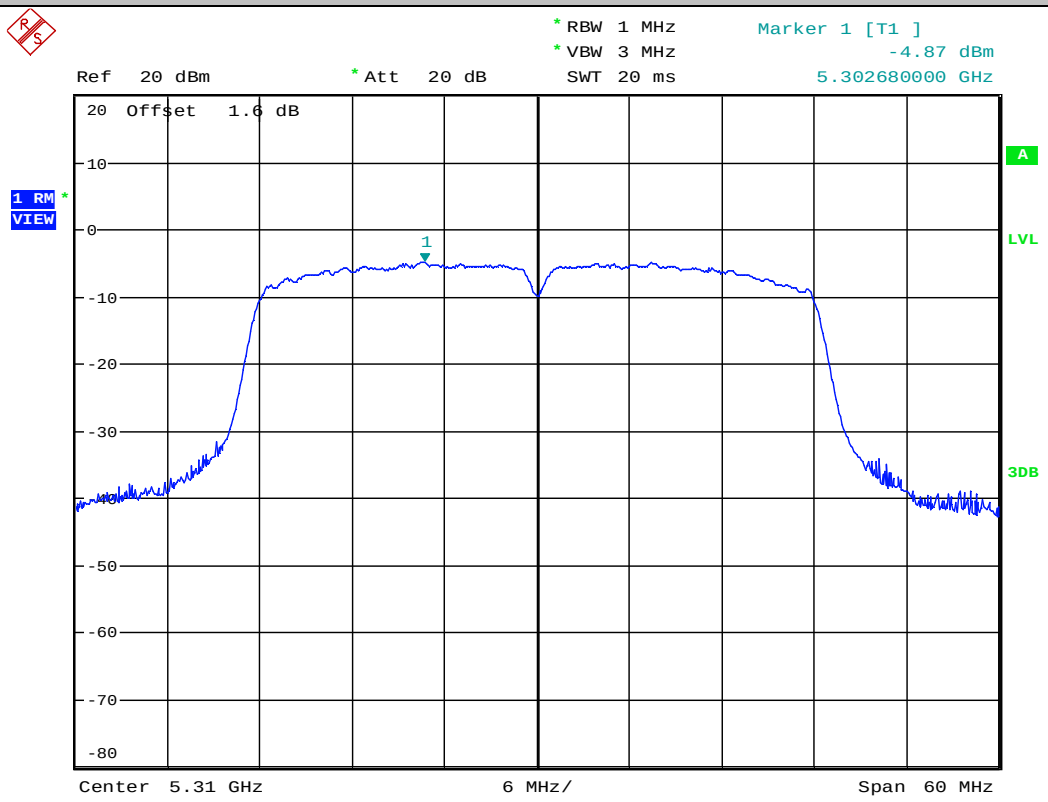
Maximum Power Spectral Density_TNVN_11N20_5300_Ant2



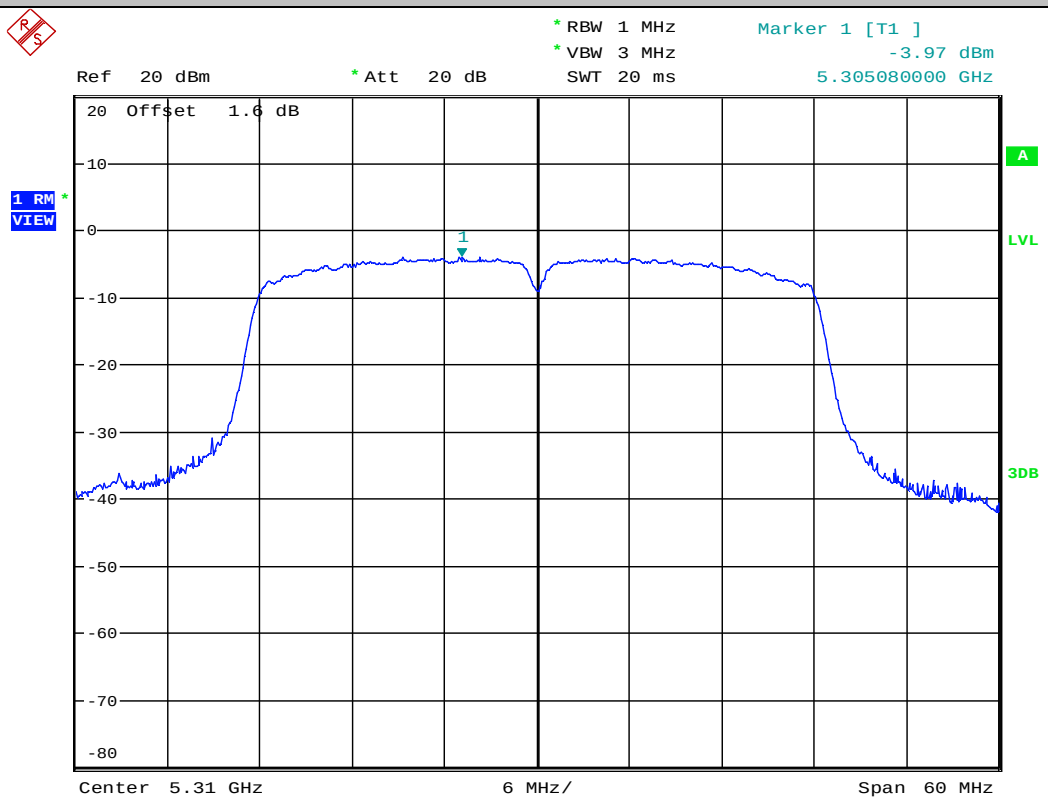
Maximum Power Spectral Density_TNVN_11AC20_5300_Ant2



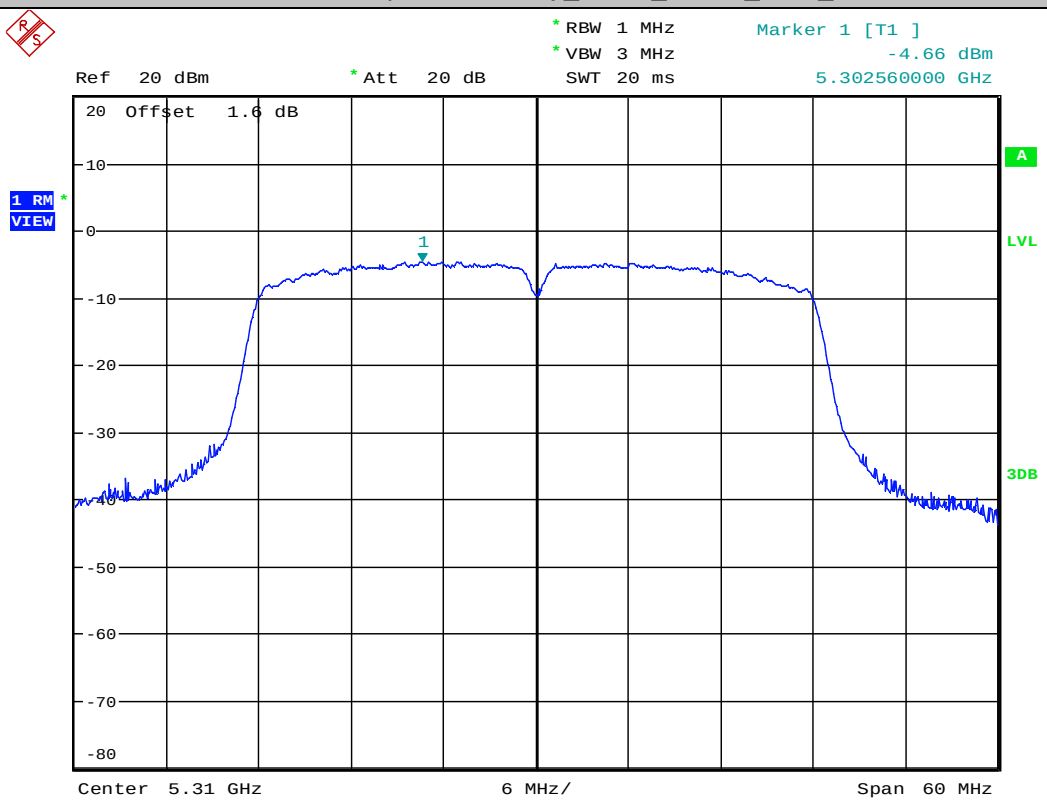
Maximum Power Spectral Density_TNVN_11AC40_5310_Ant1



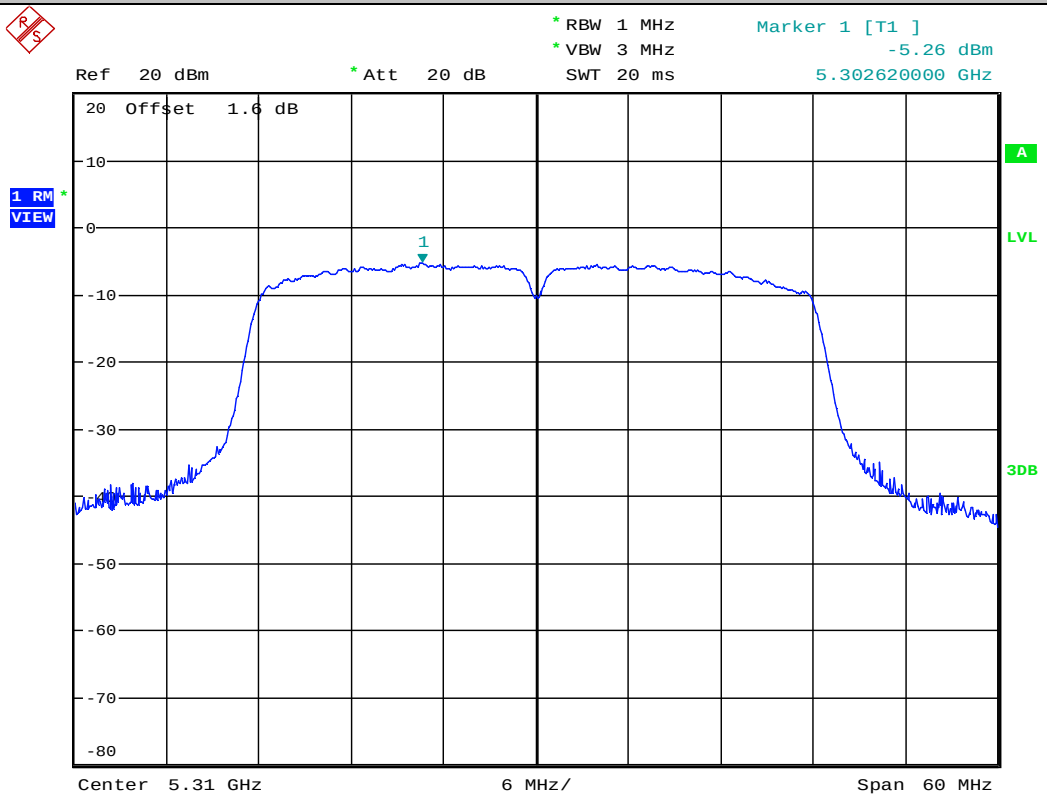
Maximum Power Spectral Density_TNVN_11N40_5310_Ant1



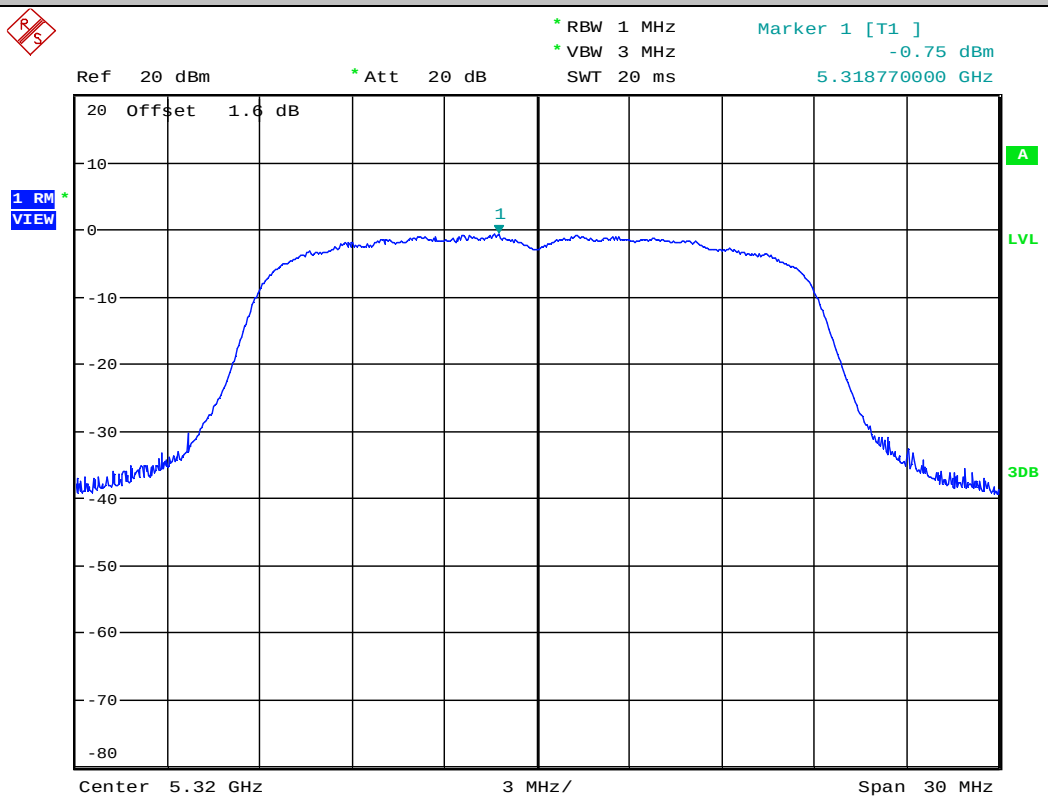
Maximum Power Spectral Density_TNVN_11N40_5310_Ant2



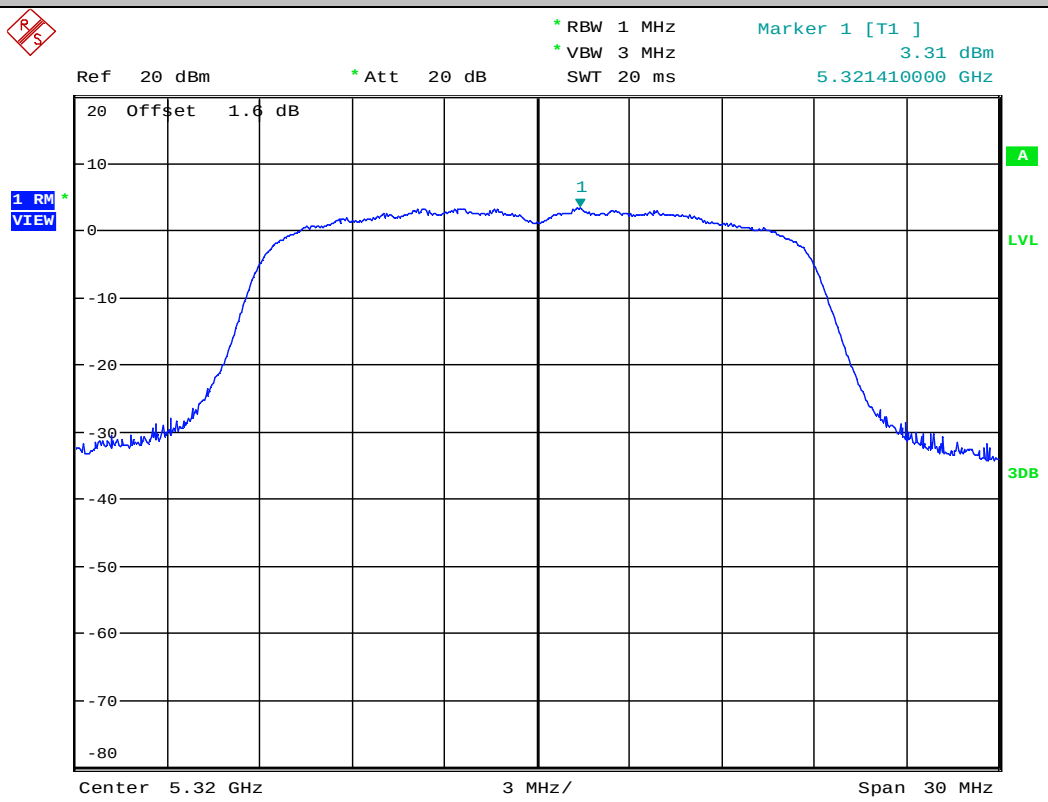
Maximum Power Spectral Density_TNVN_11AC40_5310_Ant2



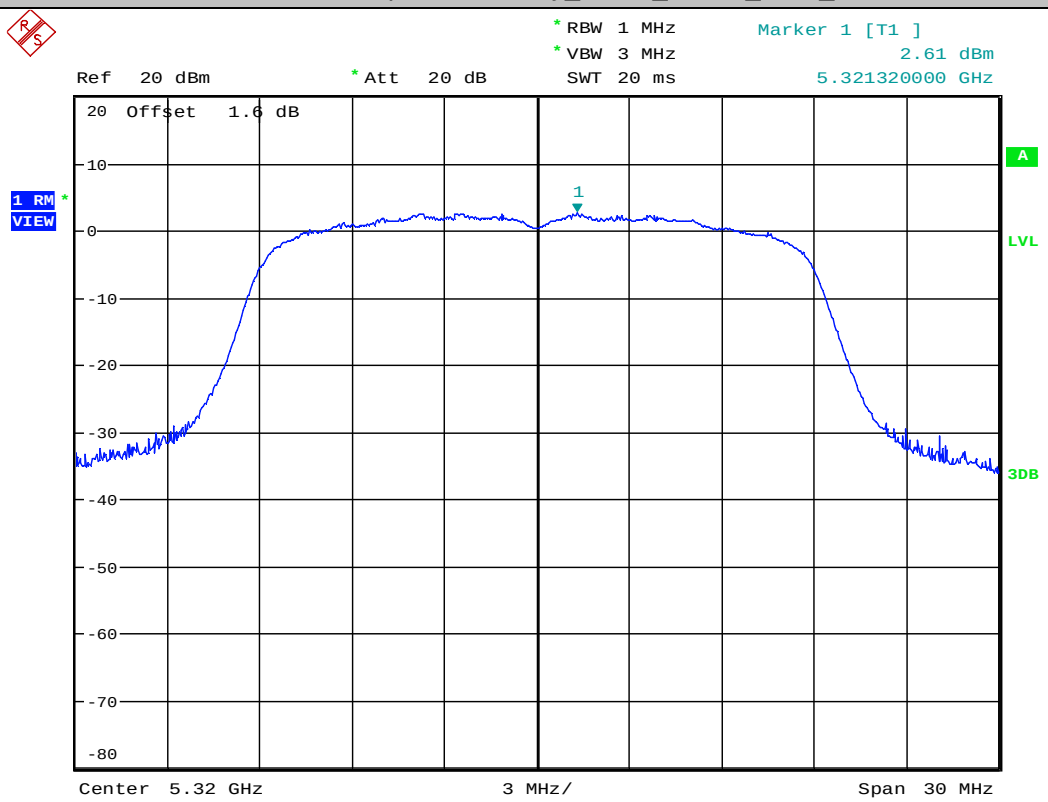
Maximum Power Spectral Density_TNVN_11AC20_5320_Ant1



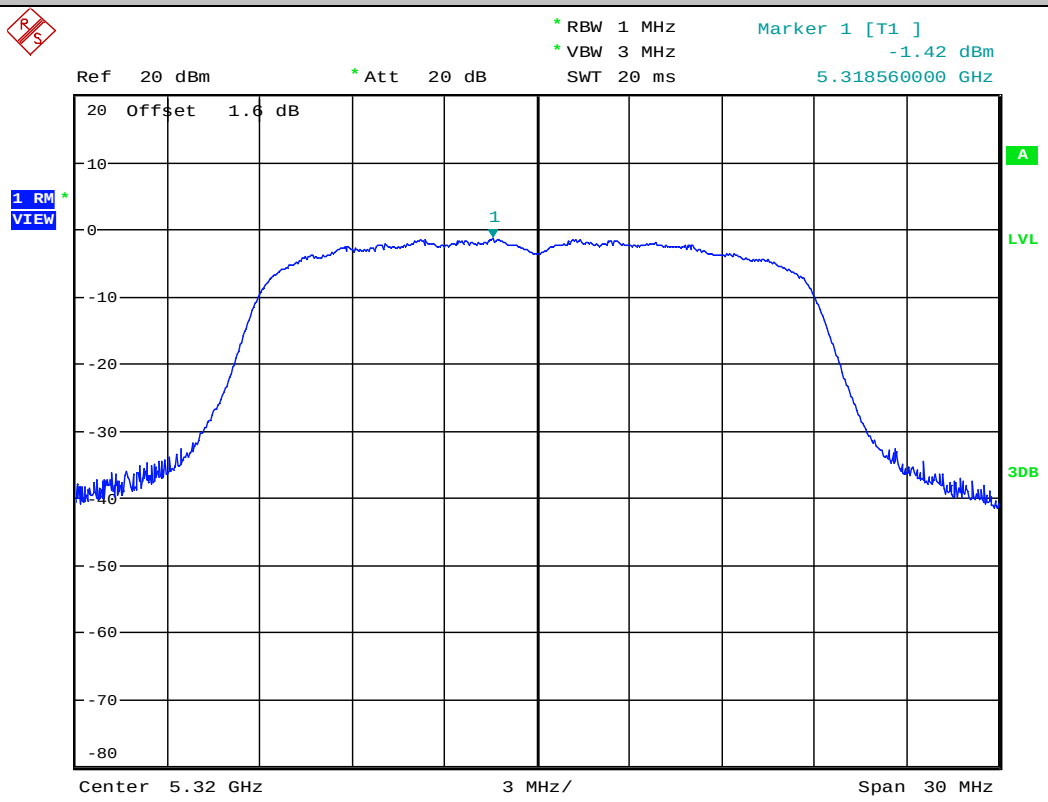
Maximum Power Spectral Density_TNVN_11N20_5320_Ant1



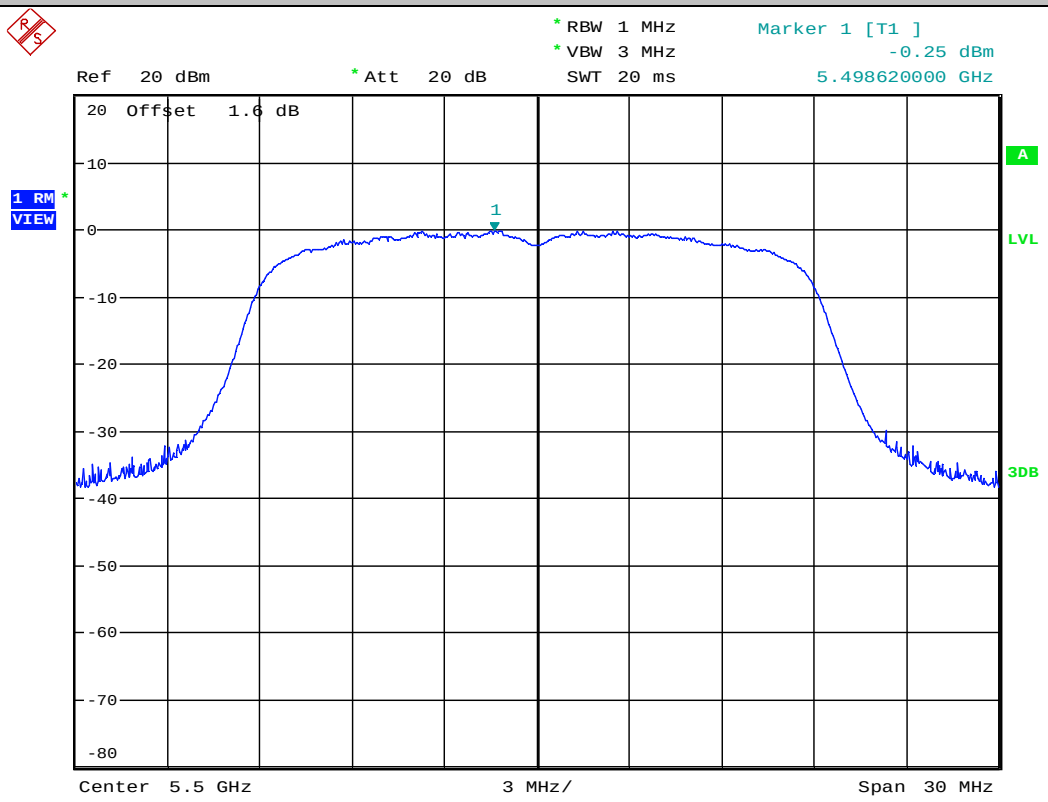
Maximum Power Spectral Density_TNVN_11N20_5320_Ant2



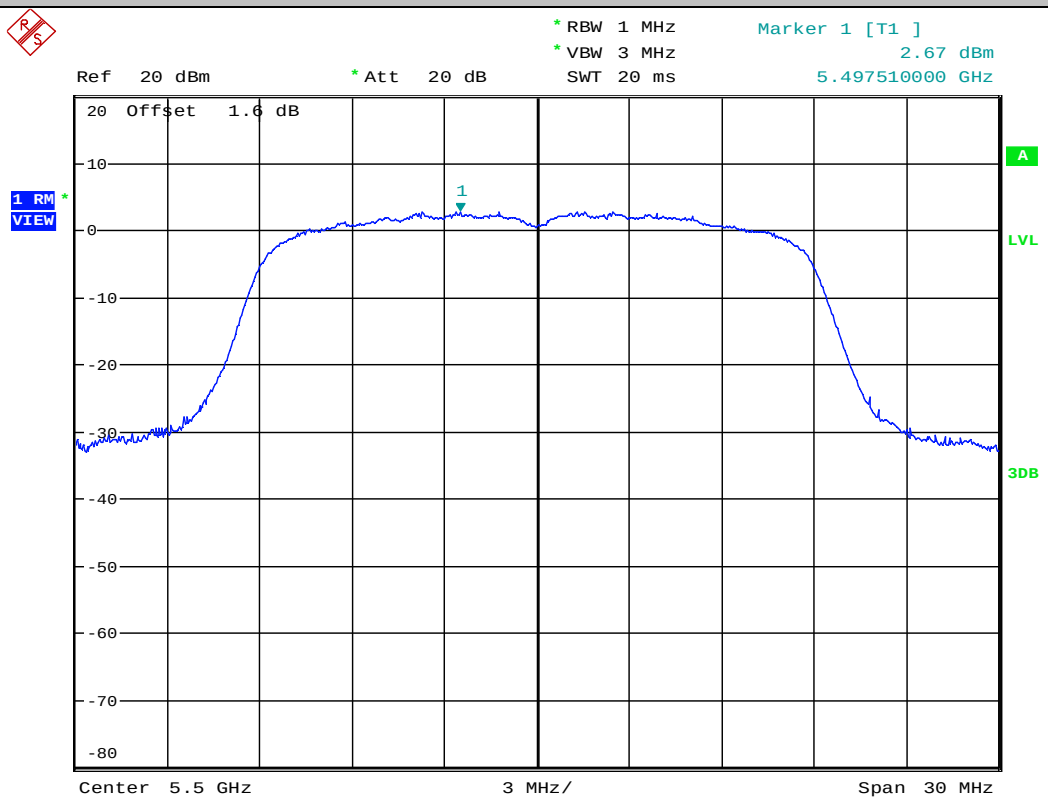
Maximum Power Spectral Density_TNVN_11AC20_5320_Ant2



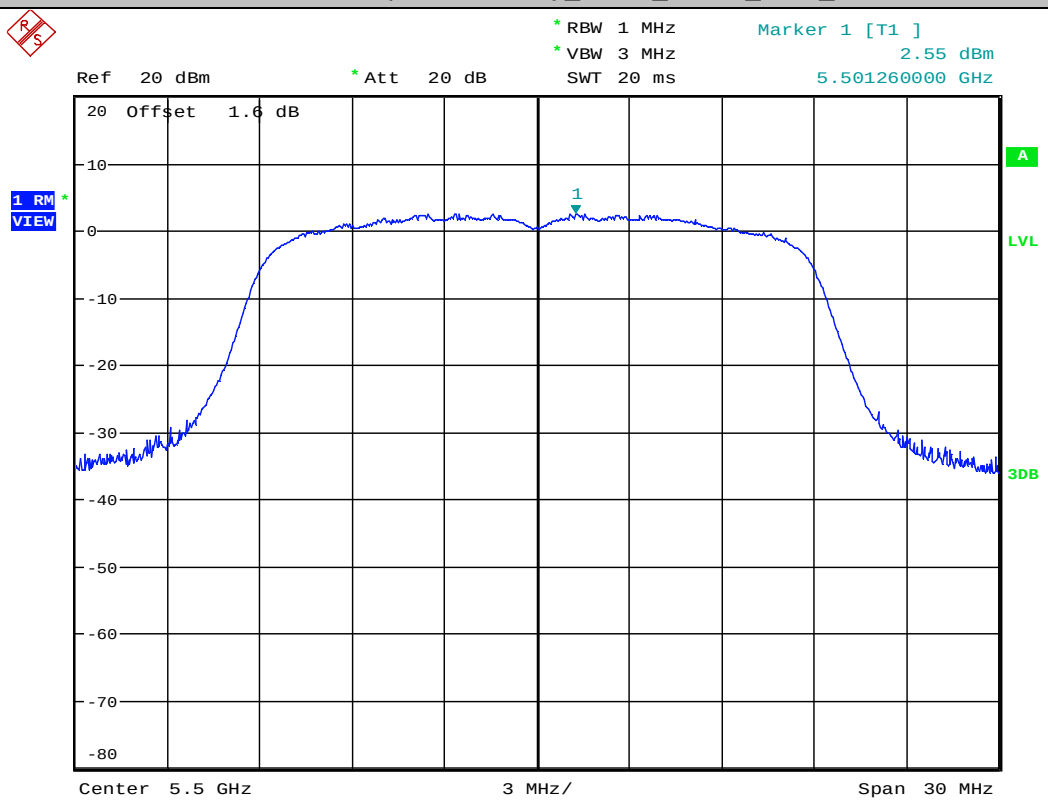
Maximum Power Spectral Density_TNVN_11AC20_5500_Ant1



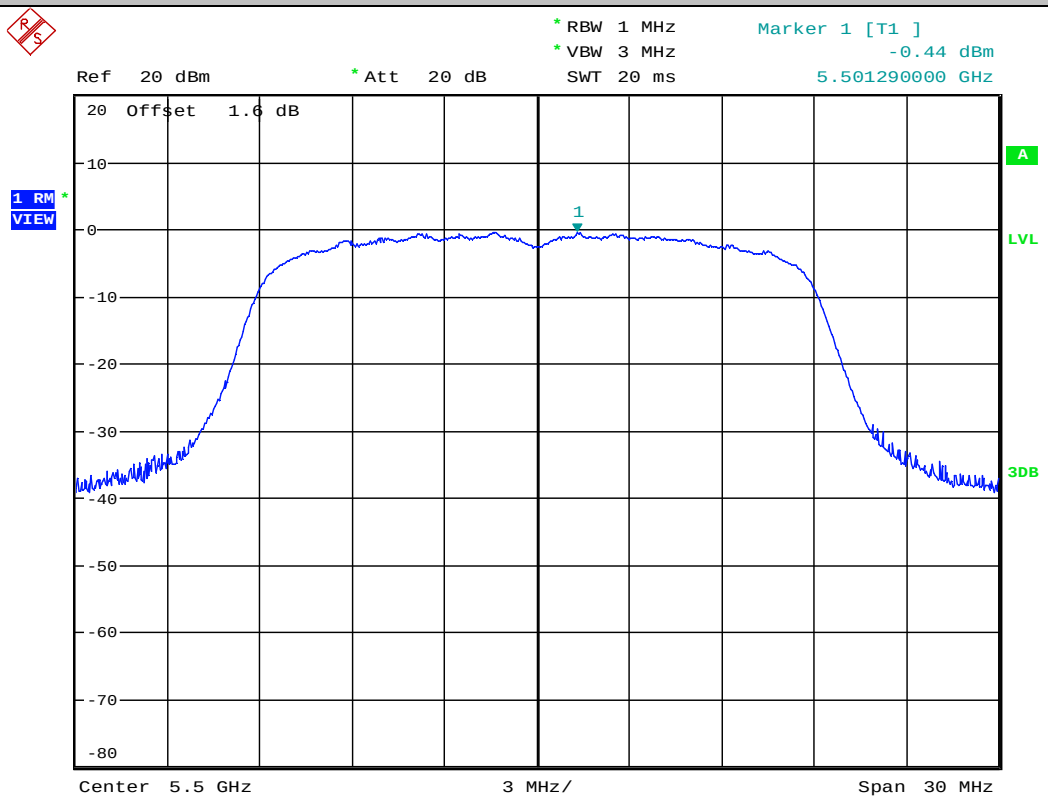
Maximum Power Spectral Density_TNVN_11N20_5500_Ant1



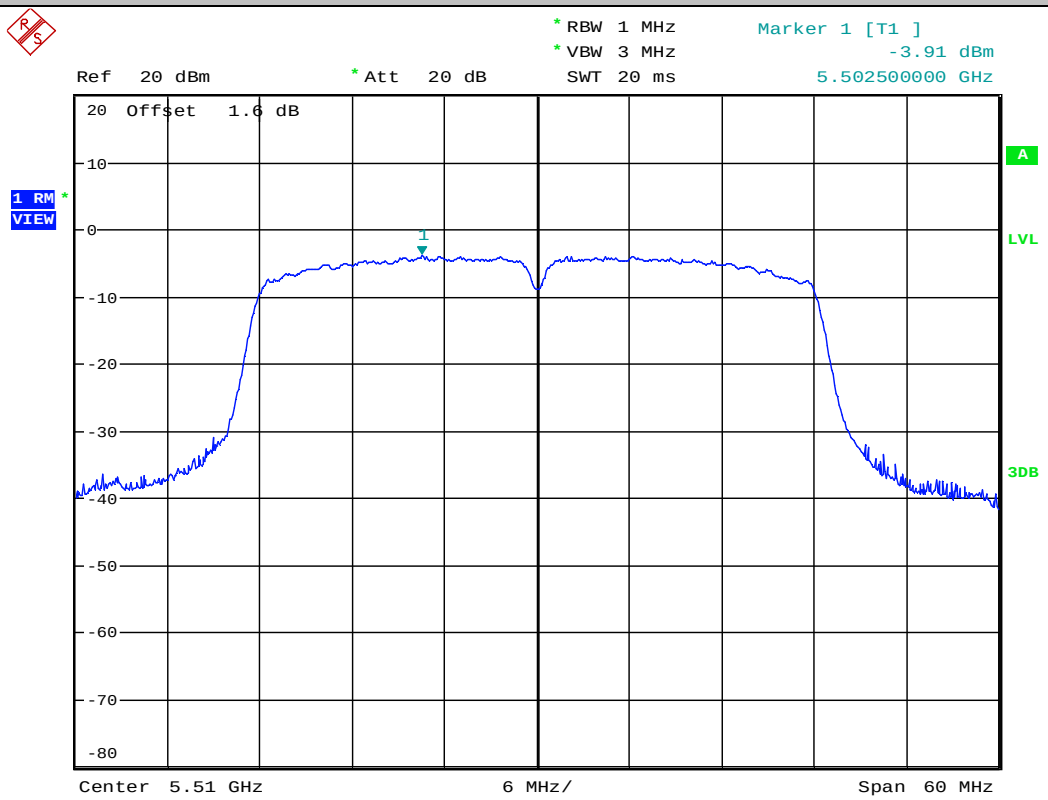
Maximum Power Spectral Density_TNVN_11N20_5500_Ant2



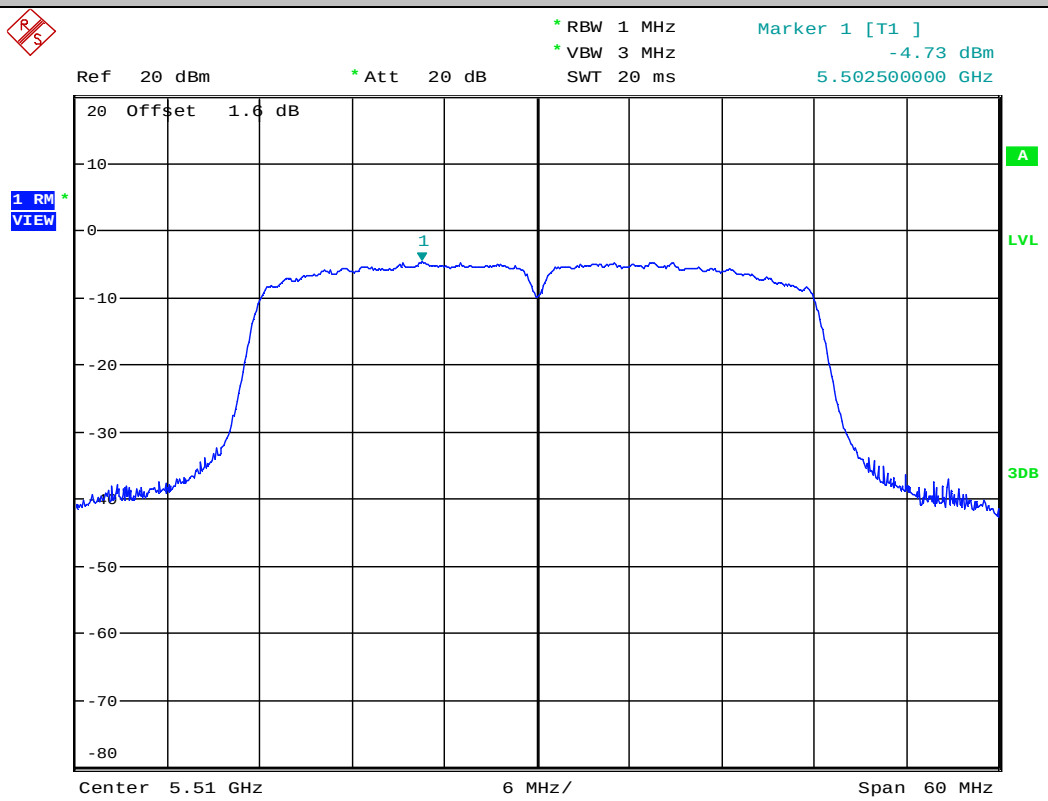
Maximum Power Spectral Density_TNVN_11AC20_5500_Ant2



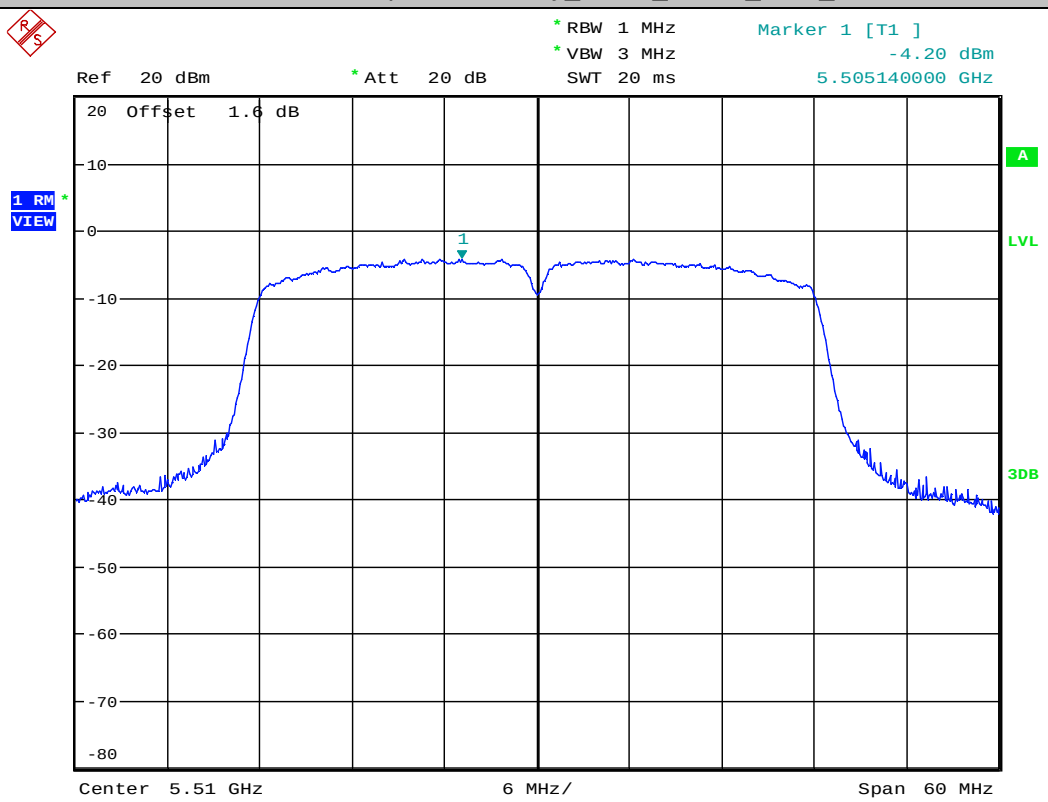
Maximum Power Spectral Density_TNVN_11N40_5510_Ant1



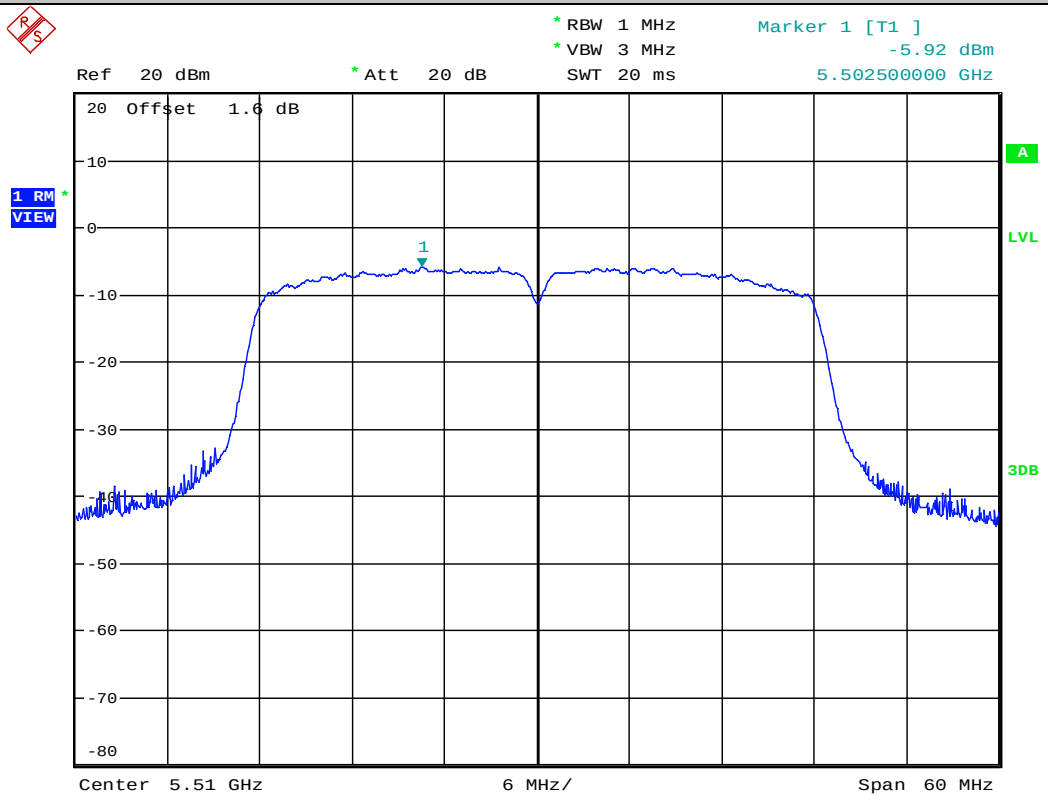
Maximum Power Spectral Density_TNVN_11AC40_5510_Ant1



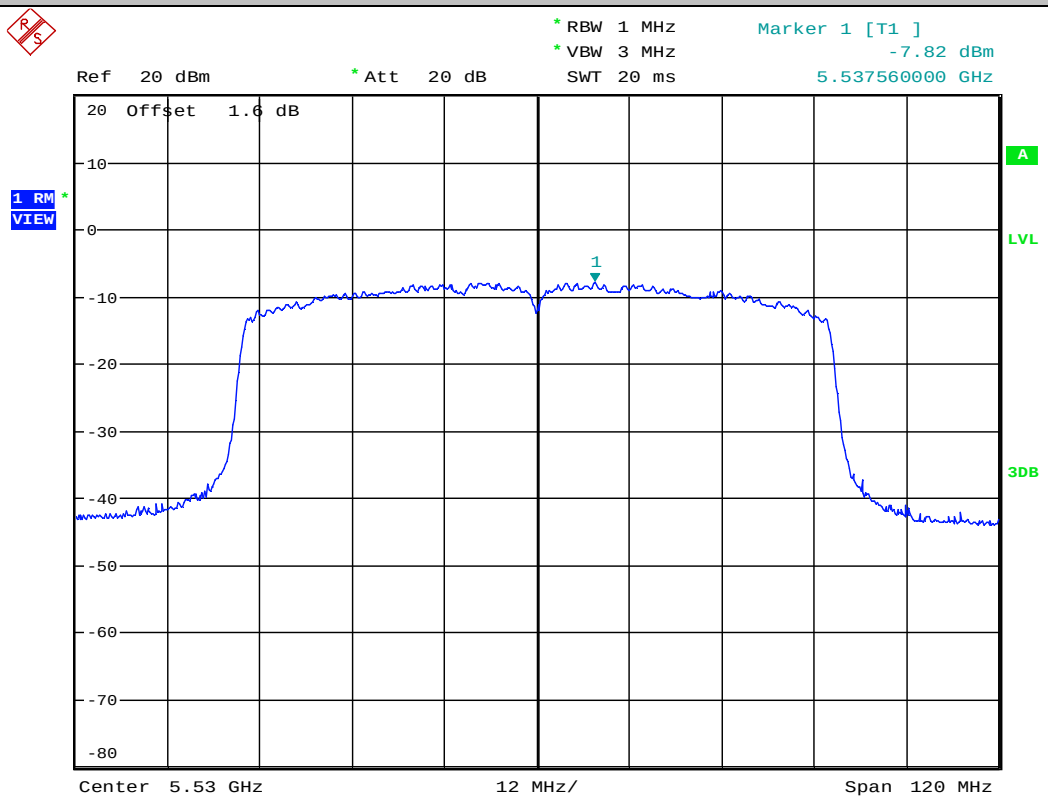
Maximum Power Spectral Density_TNVN_11N40_5510_Ant2



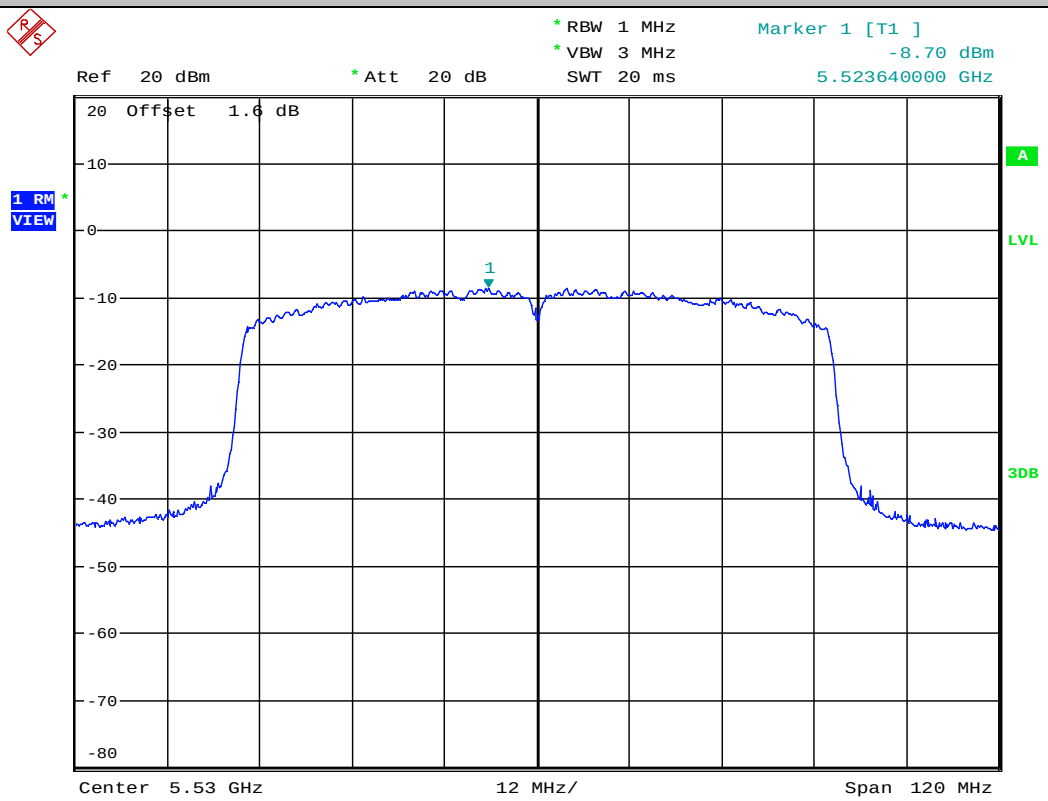
Maximum Power Spectral Density_TNVN_11AC40_5510_Ant2



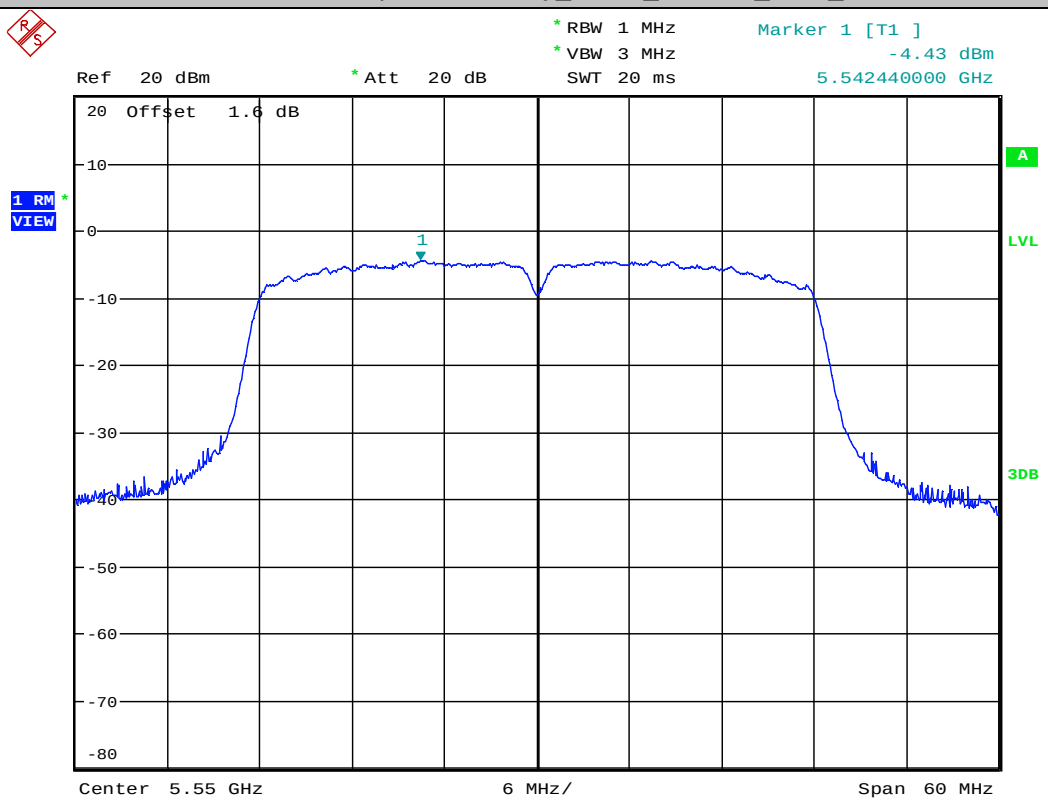
Maximum Power Spectral Density_TNVN_11AC80_5530_Ant1



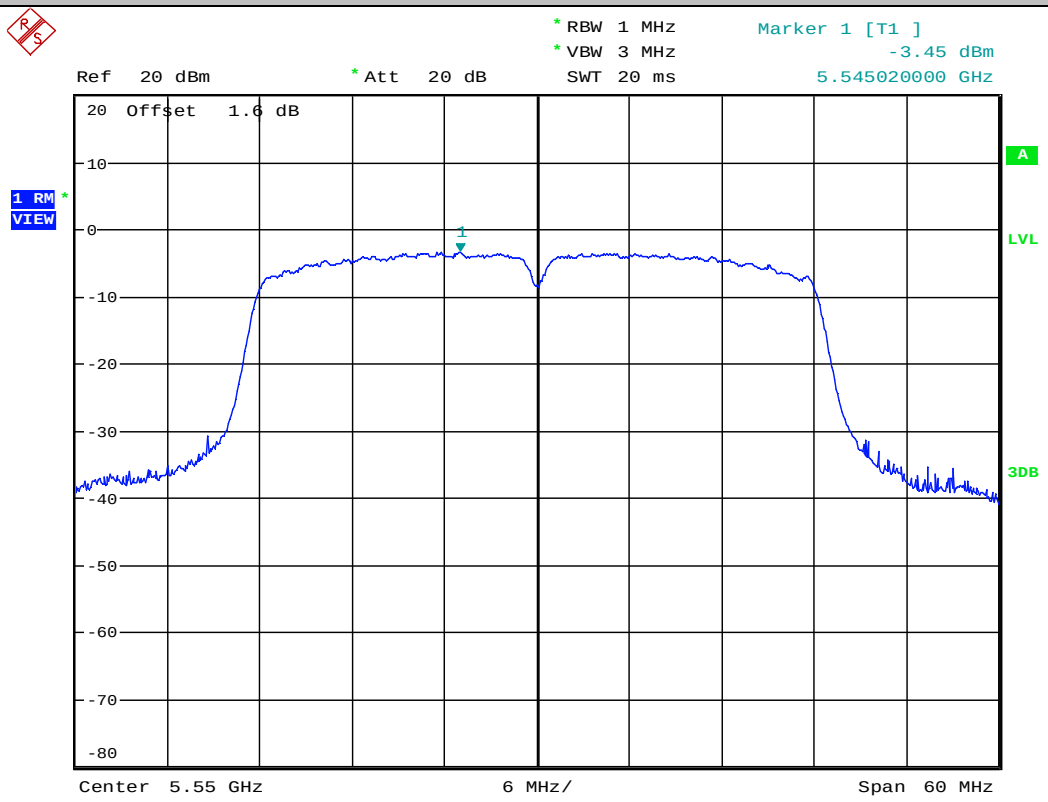
Maximum Power Spectral Density_TNVN_11AC80_5530_Ant2



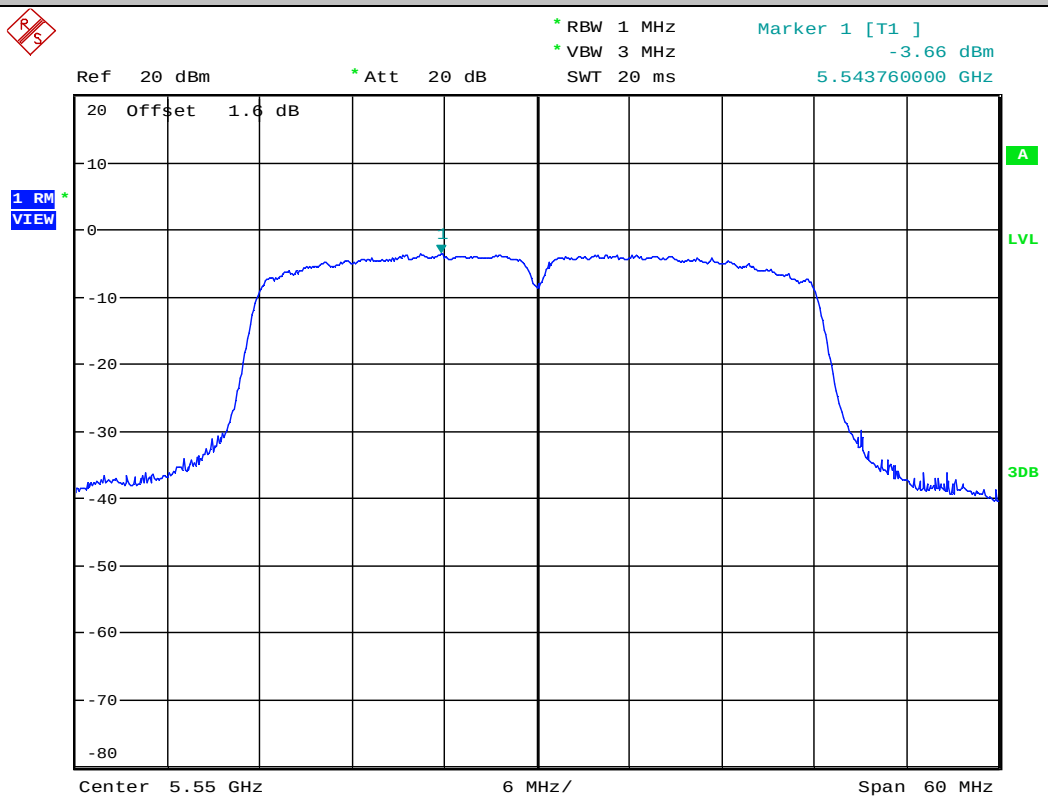
Maximum Power Spectral Density_TNVN_11AC40_5550_Ant1



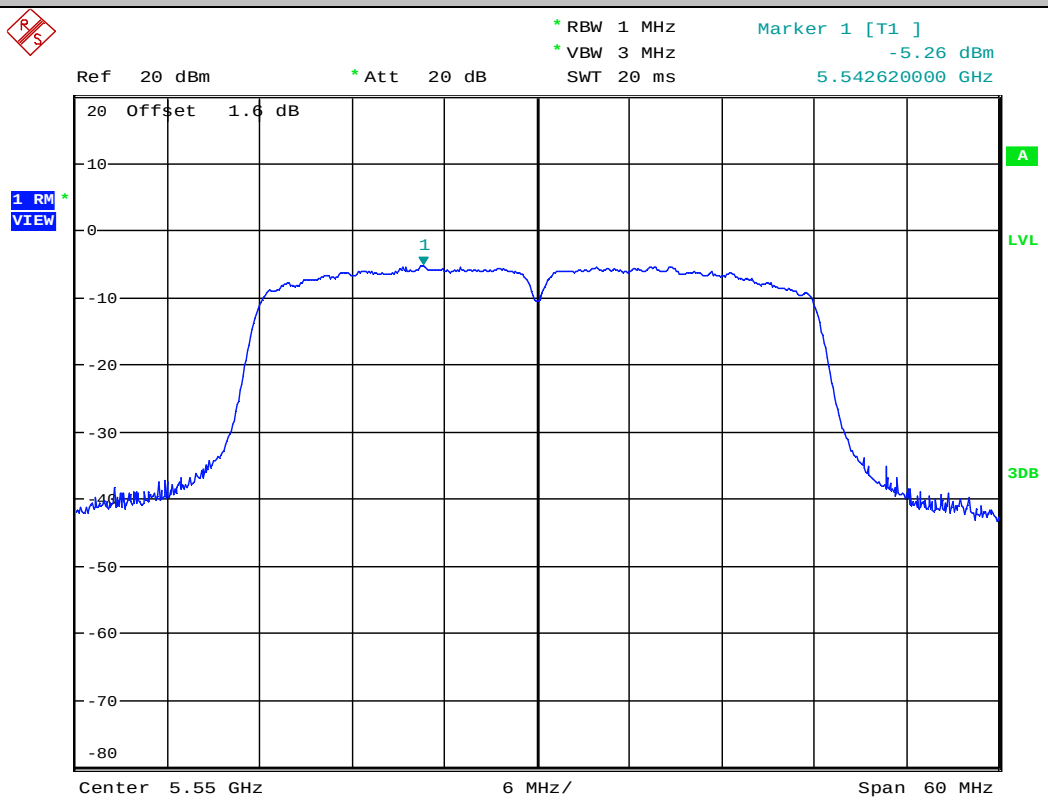
Maximum Power Spectral Density_TNVN_11N40_5550_Ant1



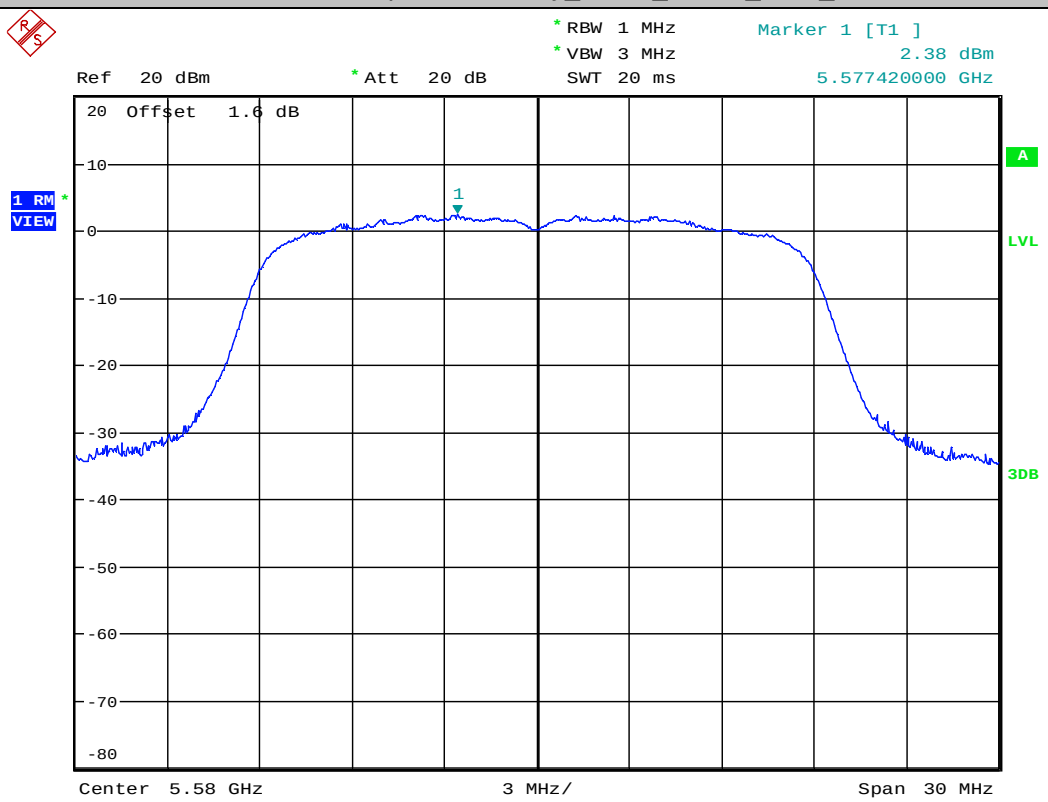
Maximum Power Spectral Density_TNVN_11N40_5550_Ant2



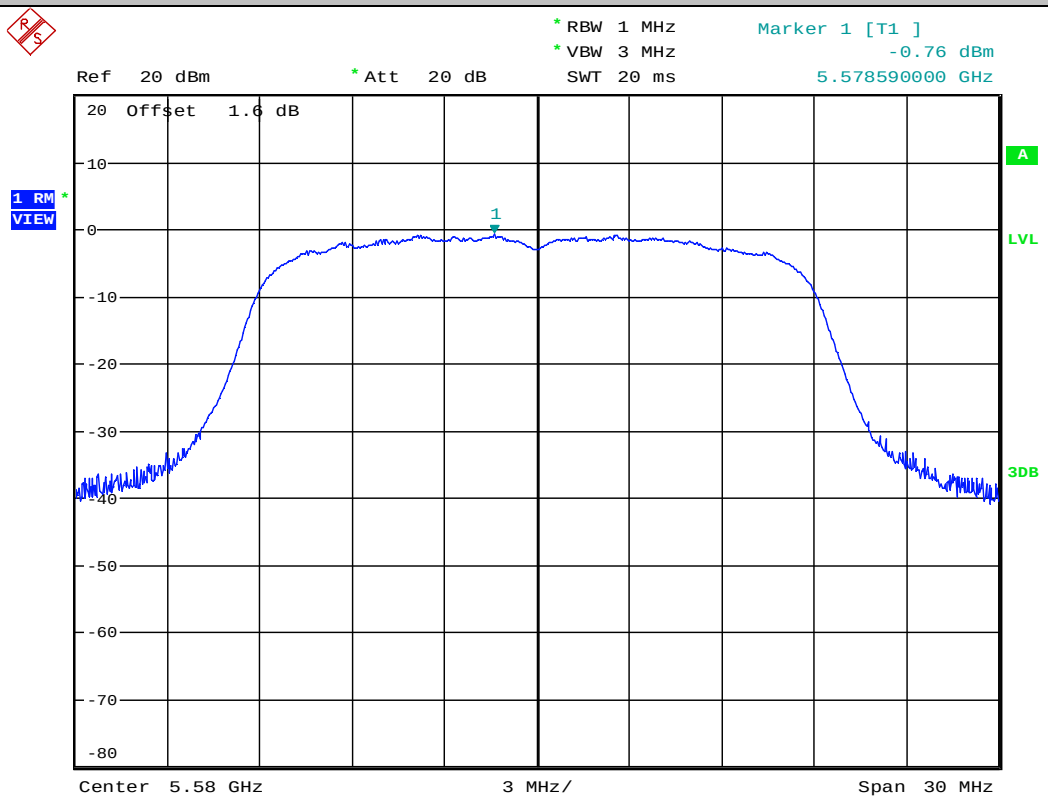
Maximum Power Spectral Density_TNVN_11AC40_5550_Ant2



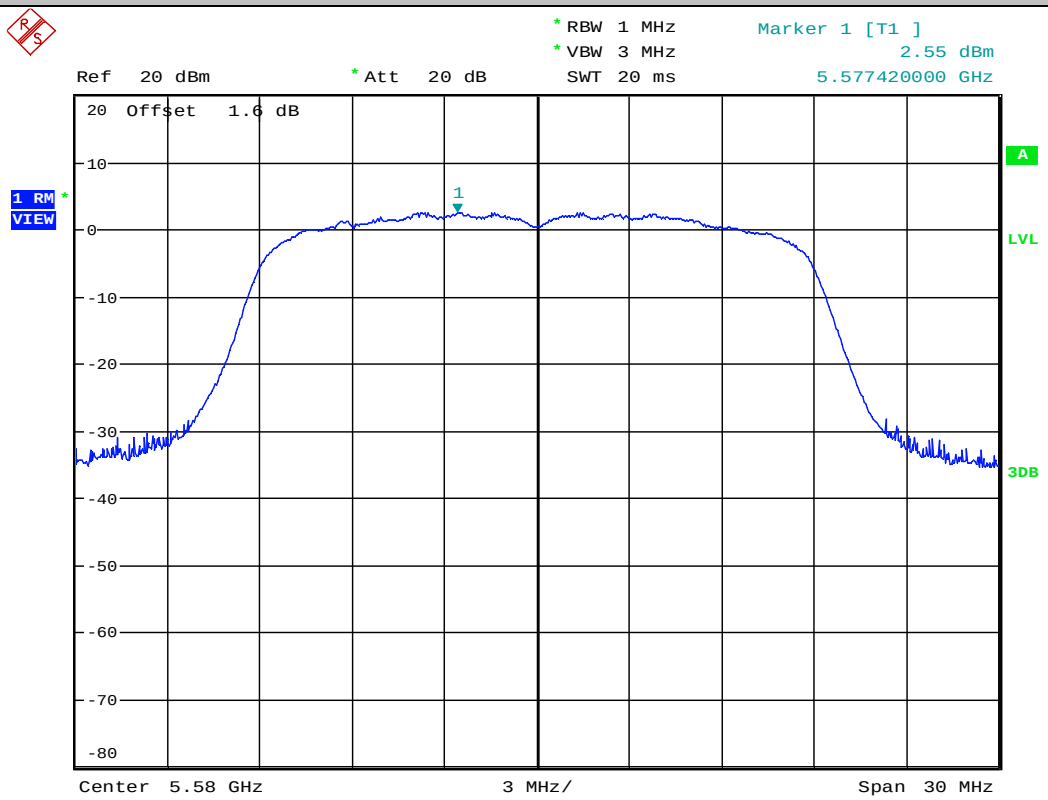
Maximum Power Spectral Density_TNVN_11N20_5580_Ant1



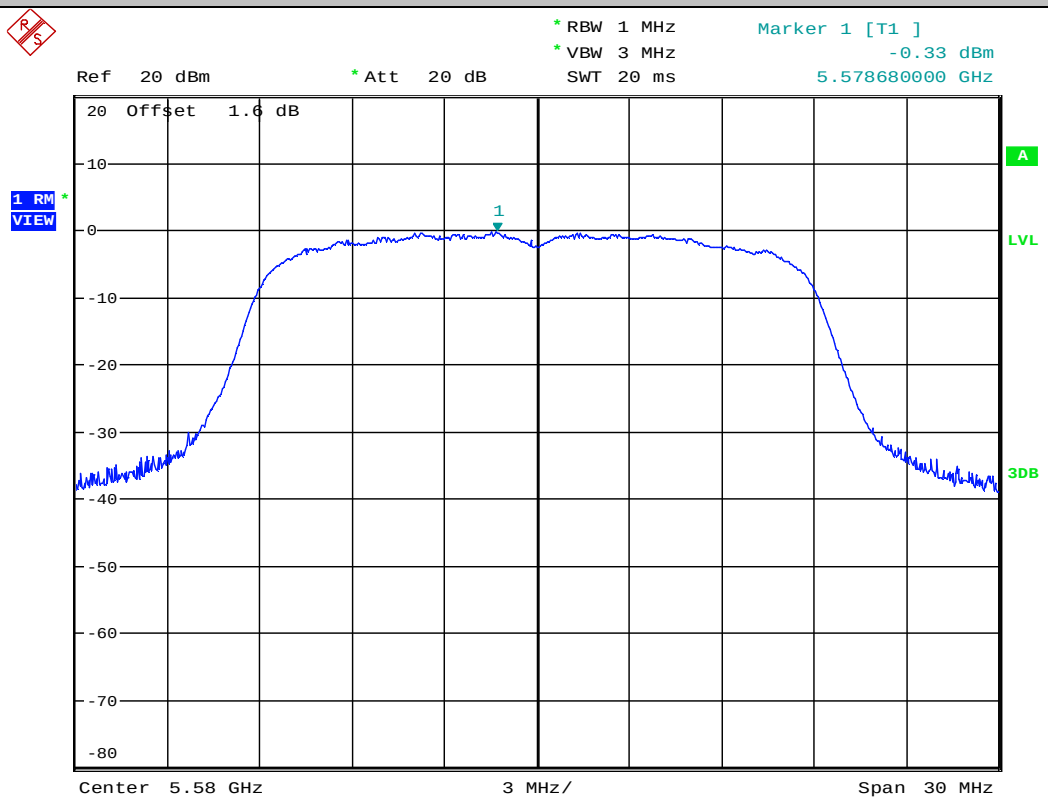
Maximum Power Spectral Density_TNVN_11AC20_5580_Ant1



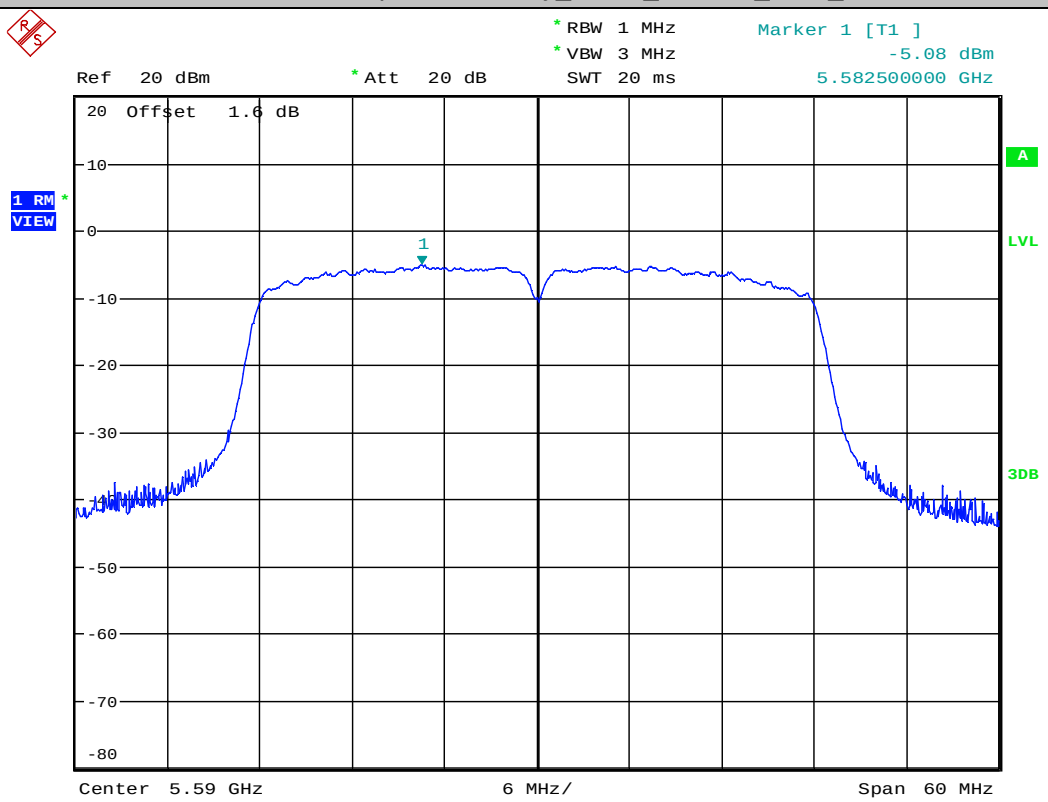
Maximum Power Spectral Density_TNVN_11N20_5580_Ant2



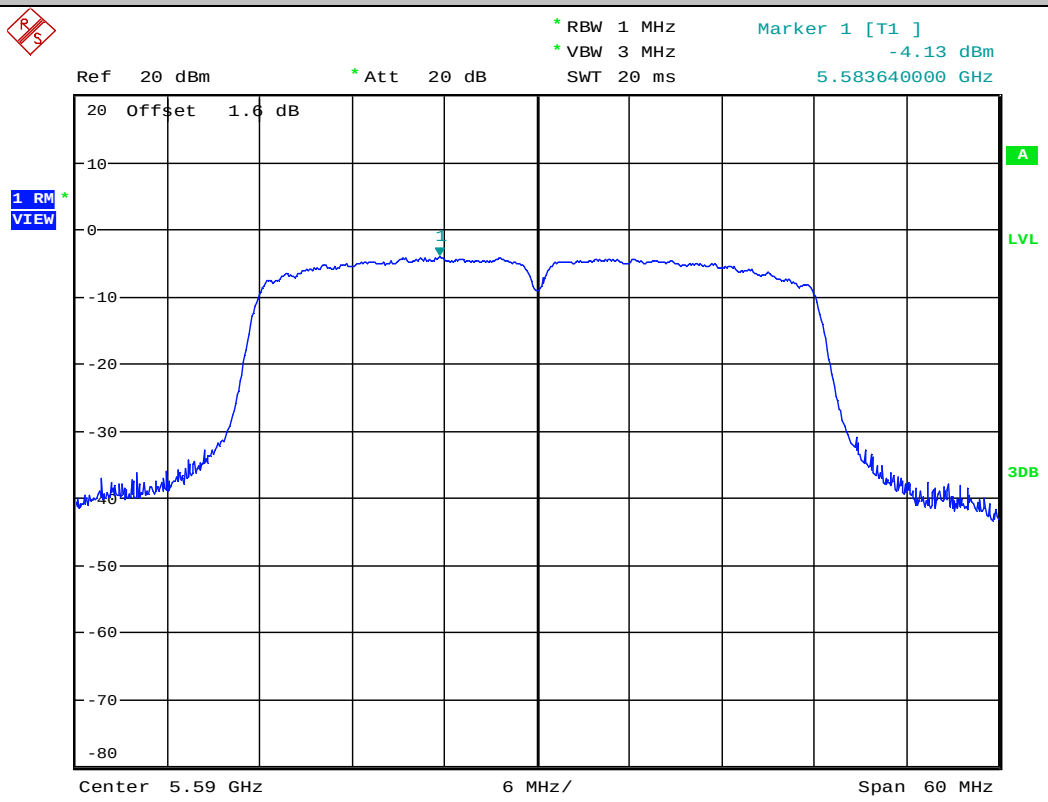
Maximum Power Spectral Density_TNVN_11AC20_5580_Ant2



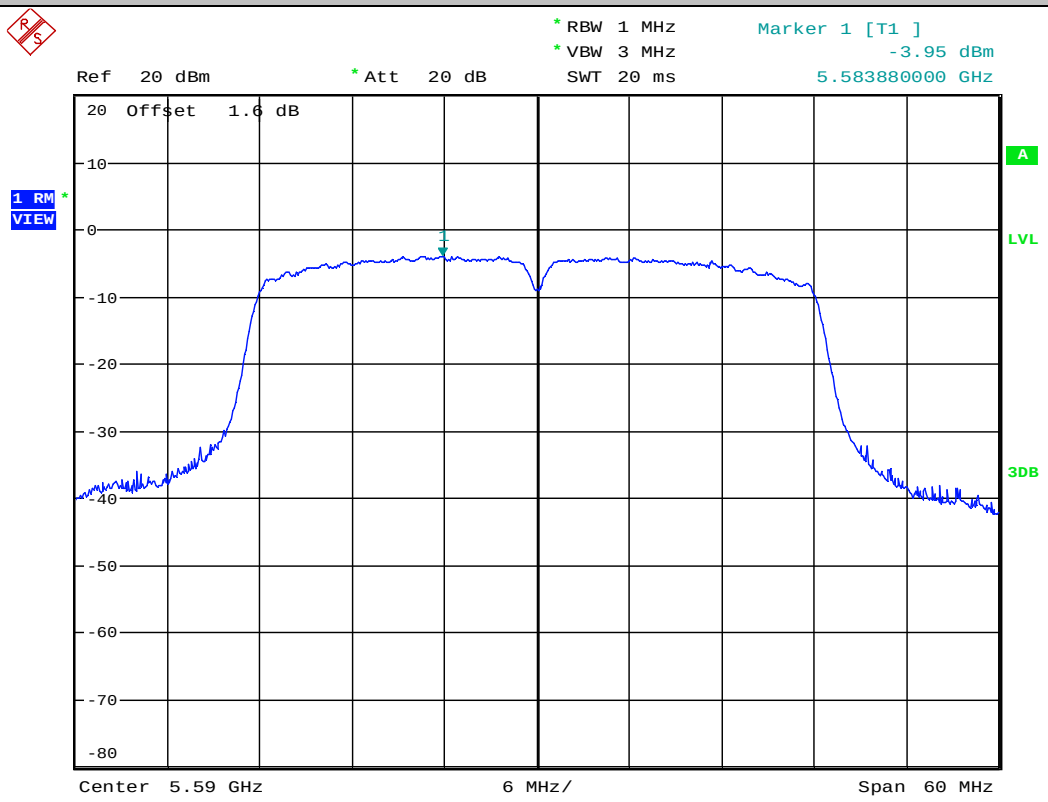
Maximum Power Spectral Density_TNVN_11AC40_5590_Ant1



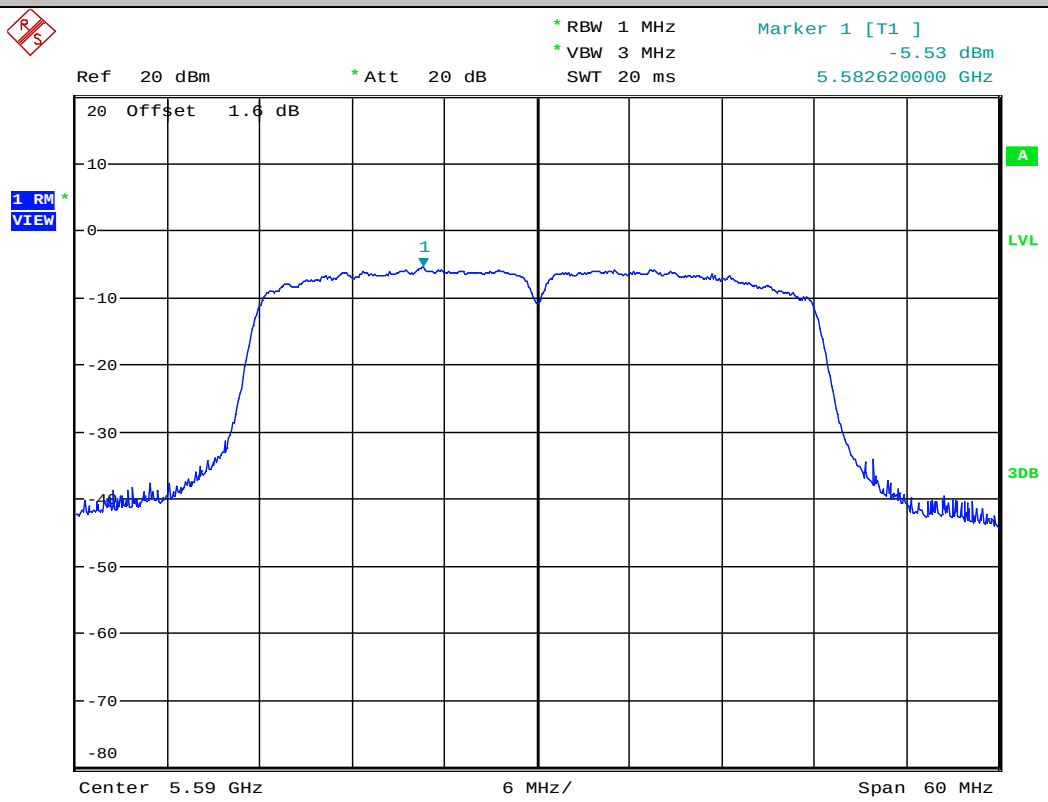
Maximum Power Spectral Density_TNVN_11N40_5590_Ant1



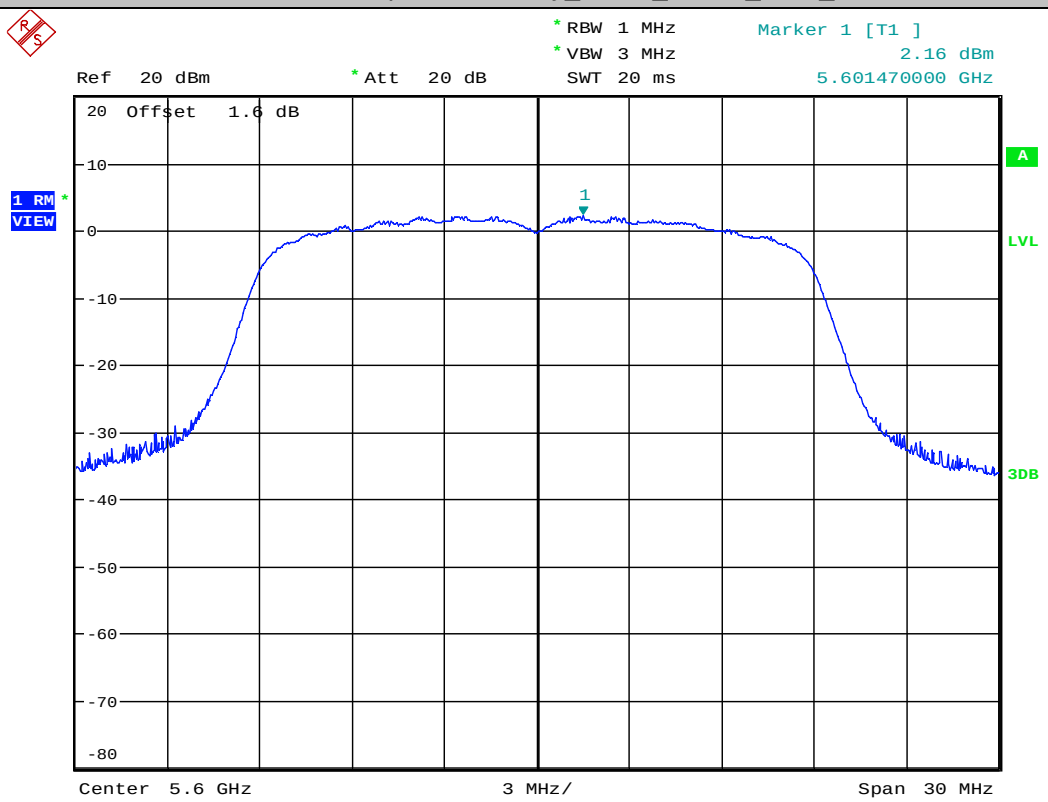
Maximum Power Spectral Density_TNVN_11N40_5590_Ant2



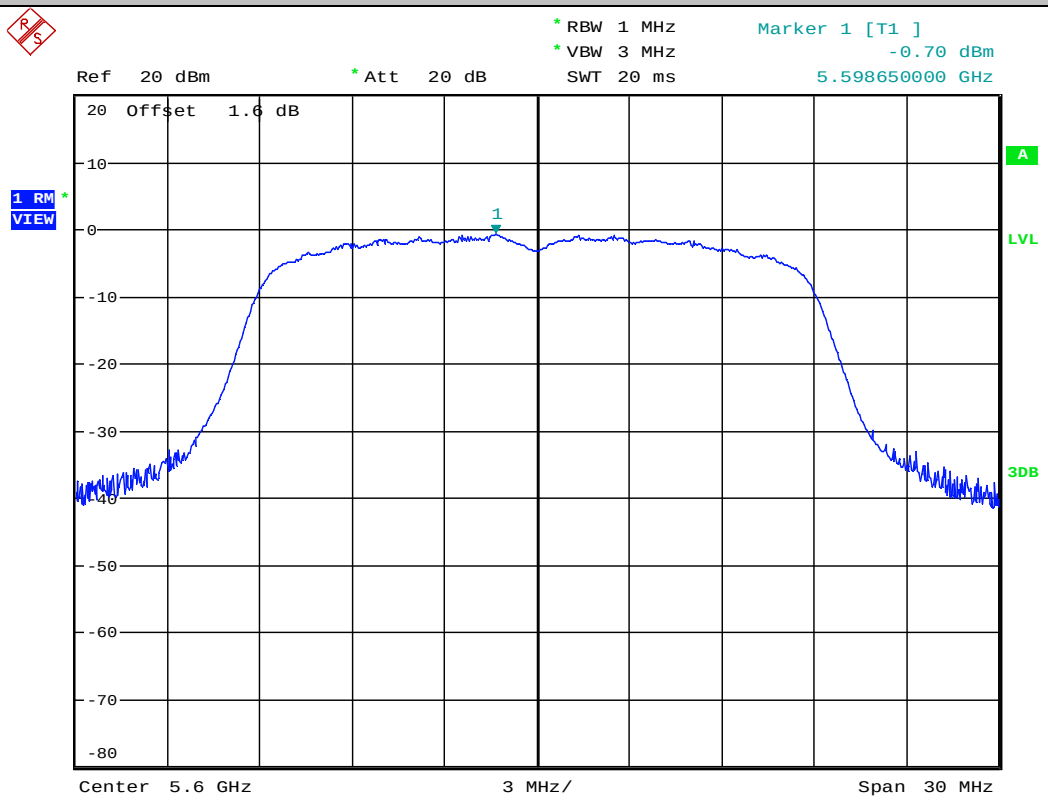
Maximum Power Spectral Density_TNVN_11AC40_5590_Ant2



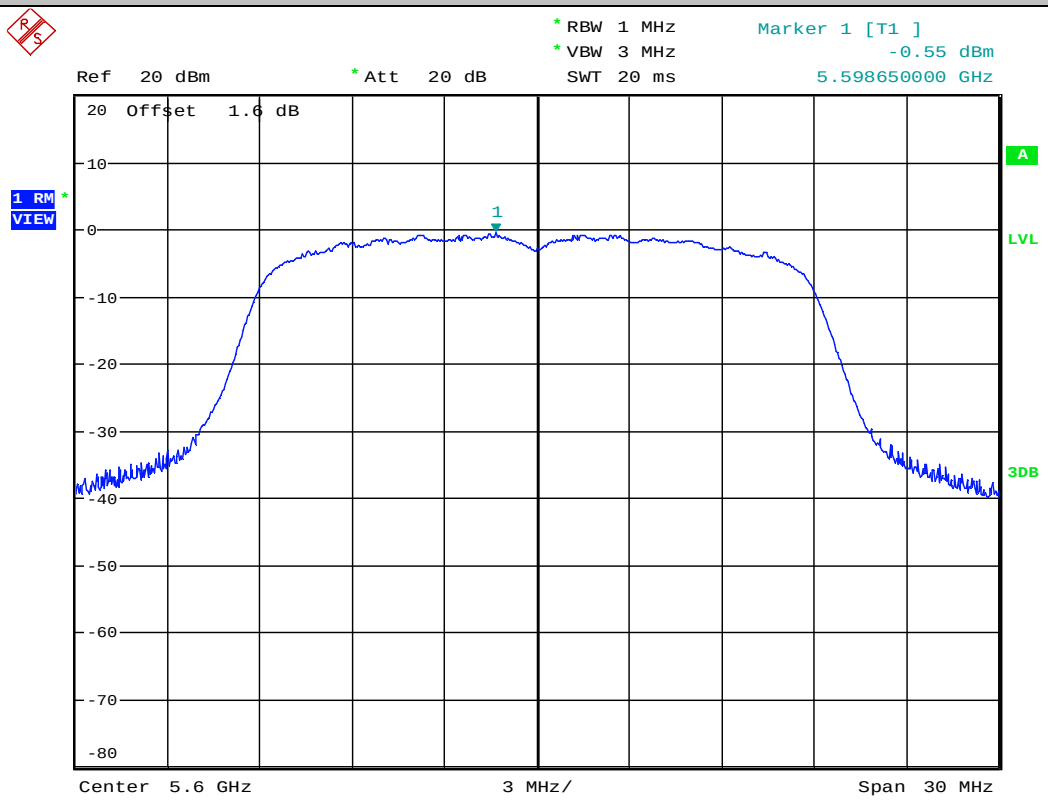
Maximum Power Spectral Density_TNVN_11N20_5600_Ant1



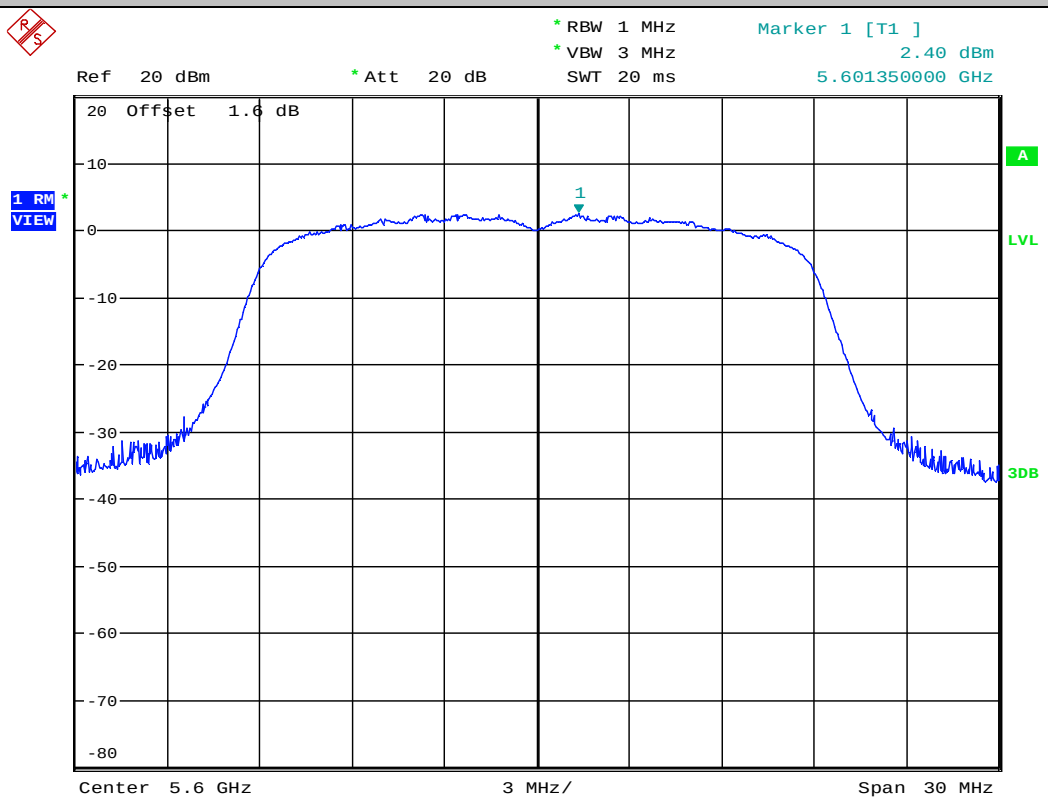
Maximum Power Spectral Density_TNVN_11AC20_5600_Ant1



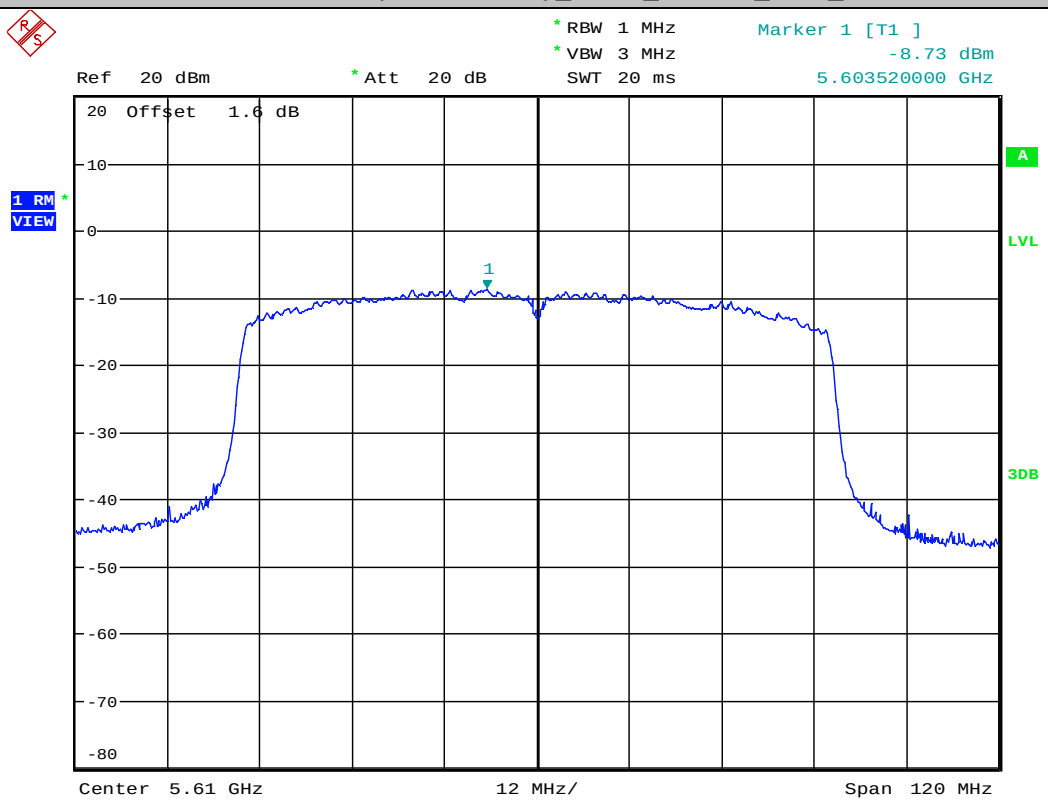
Maximum Power Spectral Density_TNVN_11AC20_5600_Ant2



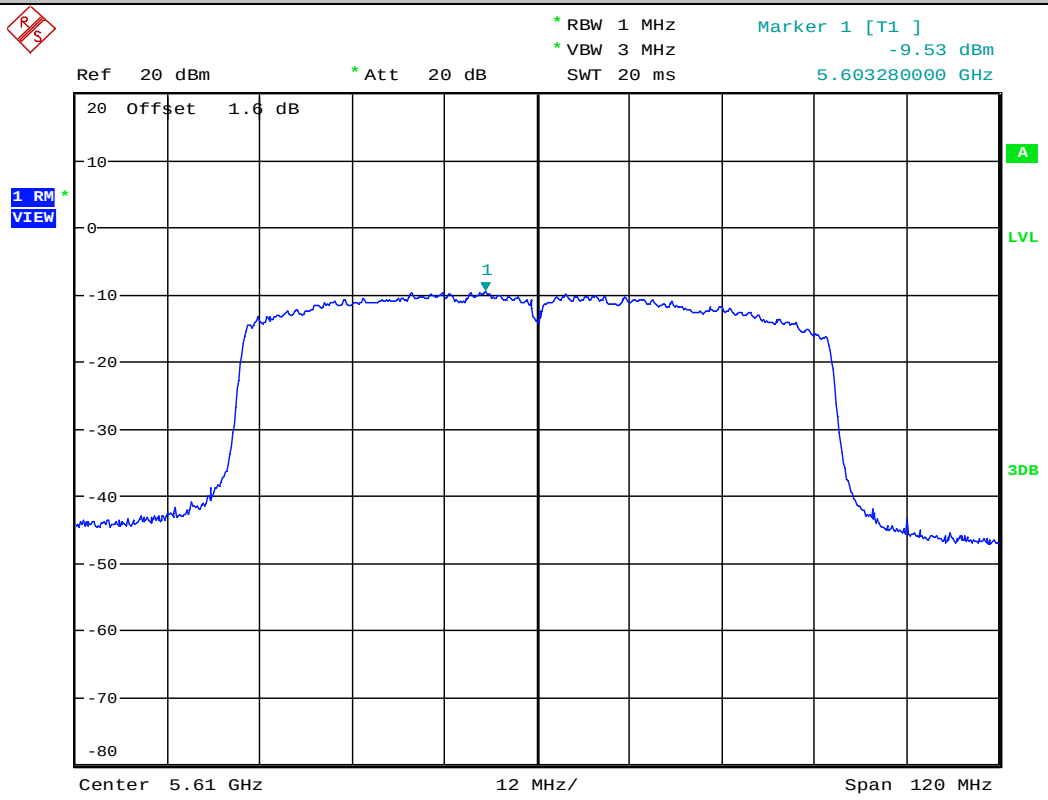
Maximum Power Spectral Density_TNVN_11N20_5600_Ant2



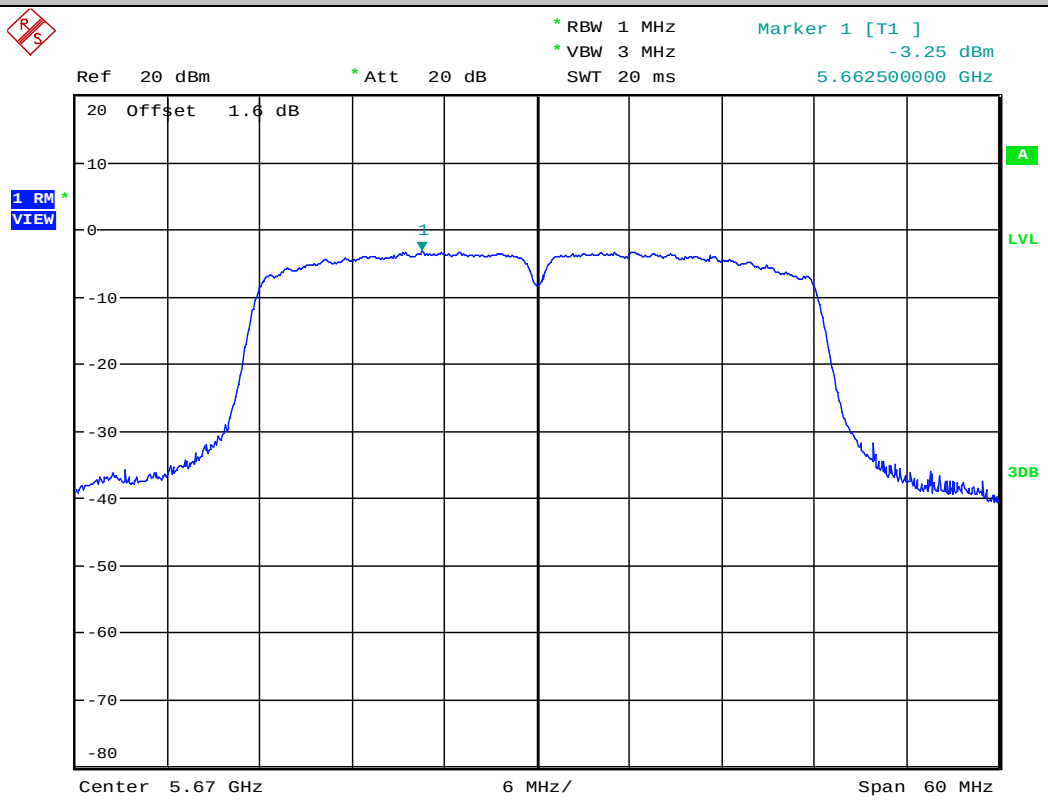
Maximum Power Spectral Density_TNVN_11AC80_5610_Ant1



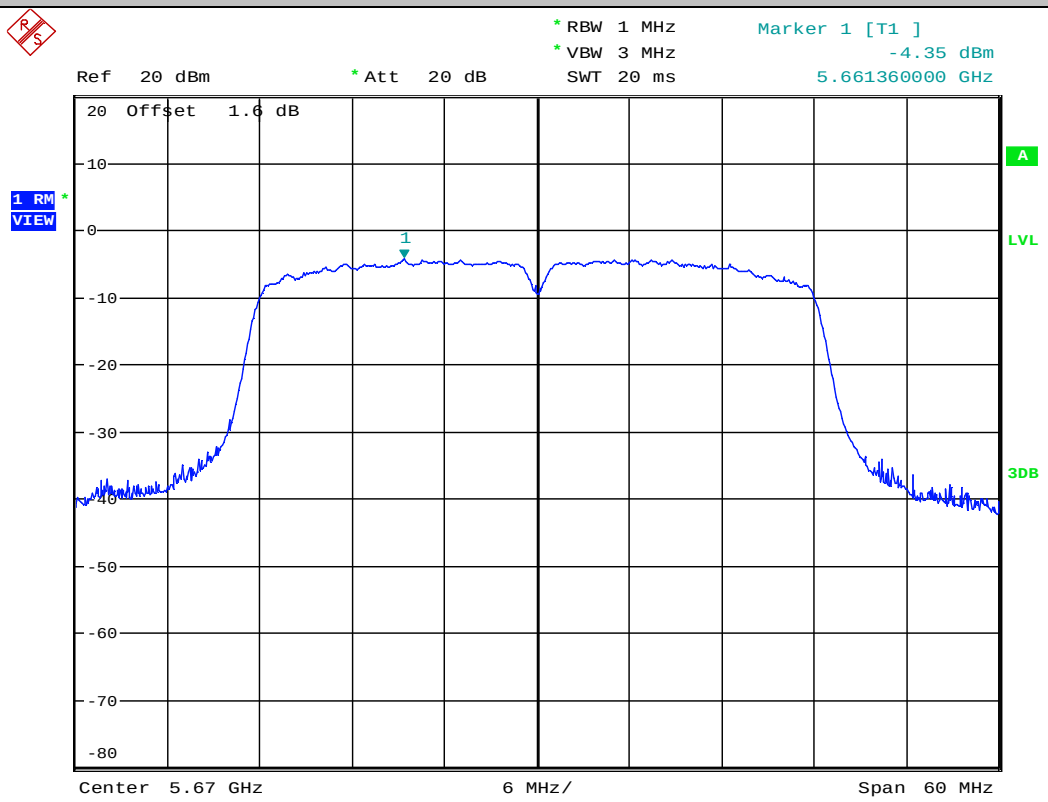
Maximum Power Spectral Density_TNVN_11AC80_5610_Ant2



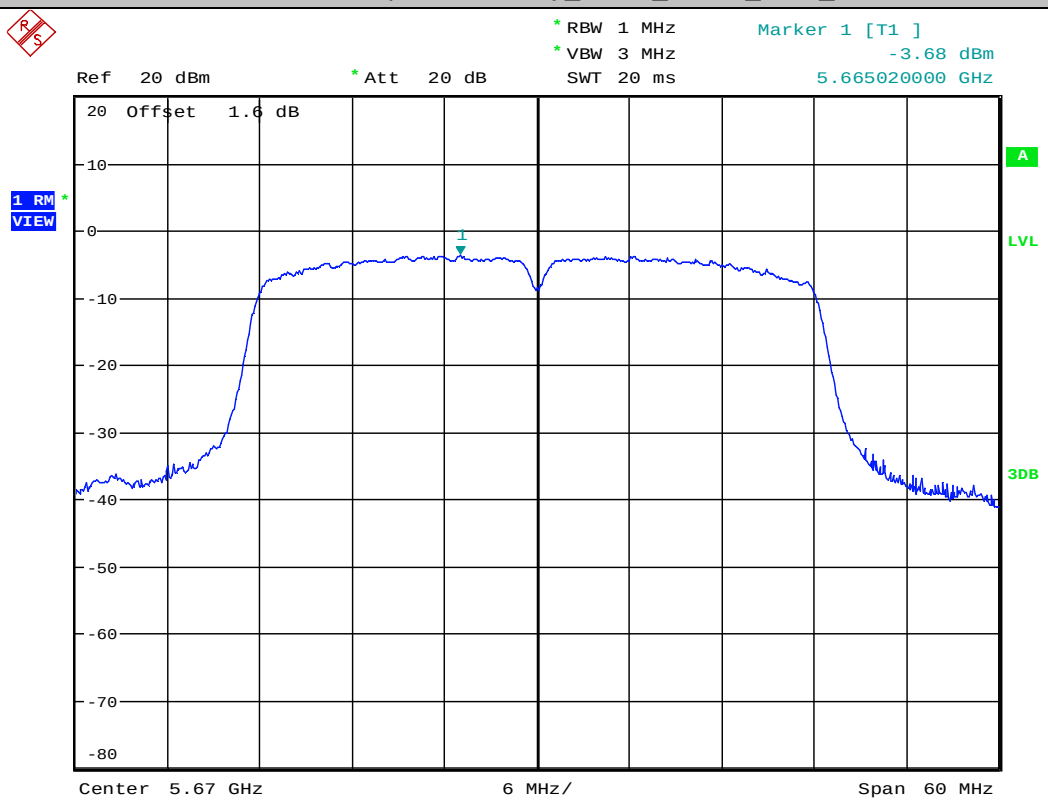
Maximum Power Spectral Density_TNVN_11N40_5670_Ant1



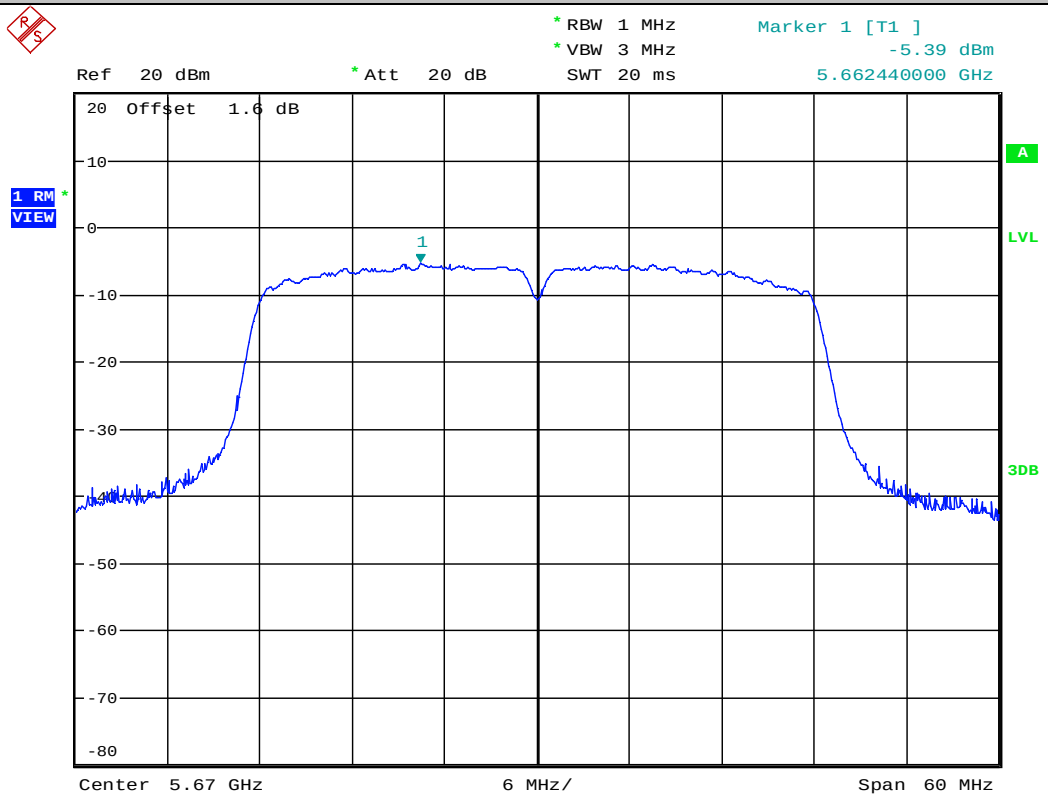
Maximum Power Spectral Density_TNVN_11AC40_5670_Ant1



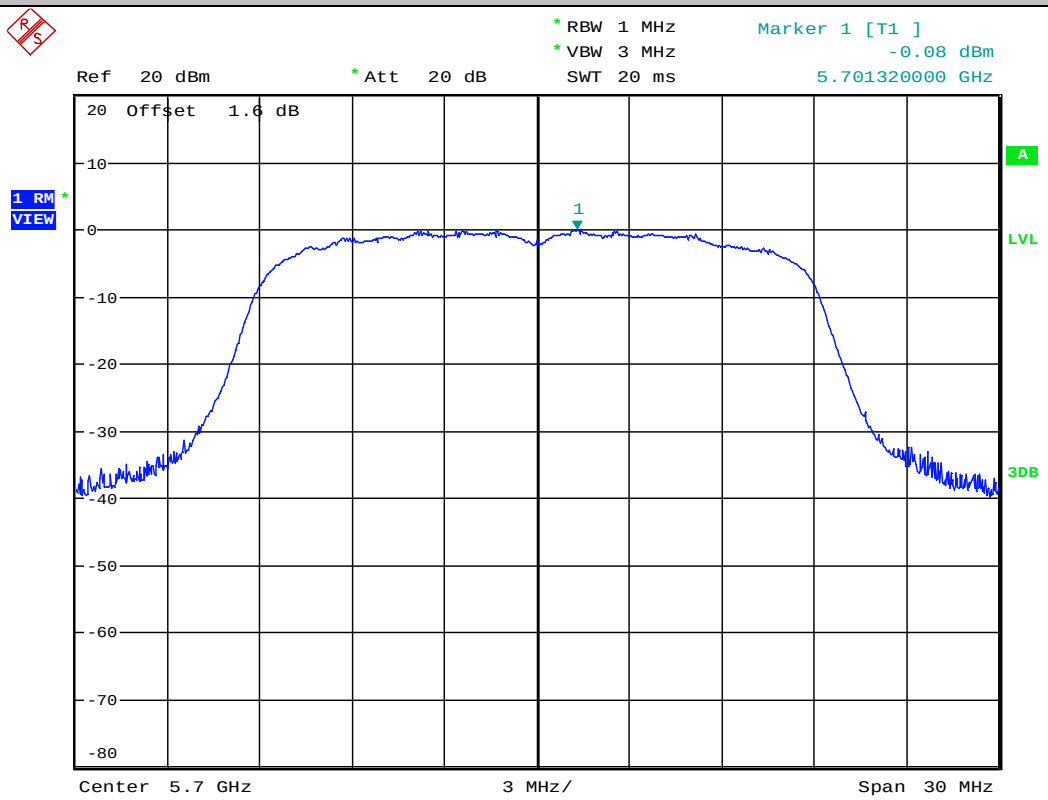
Maximum Power Spectral Density_TNVN_11N40_5670_Ant2



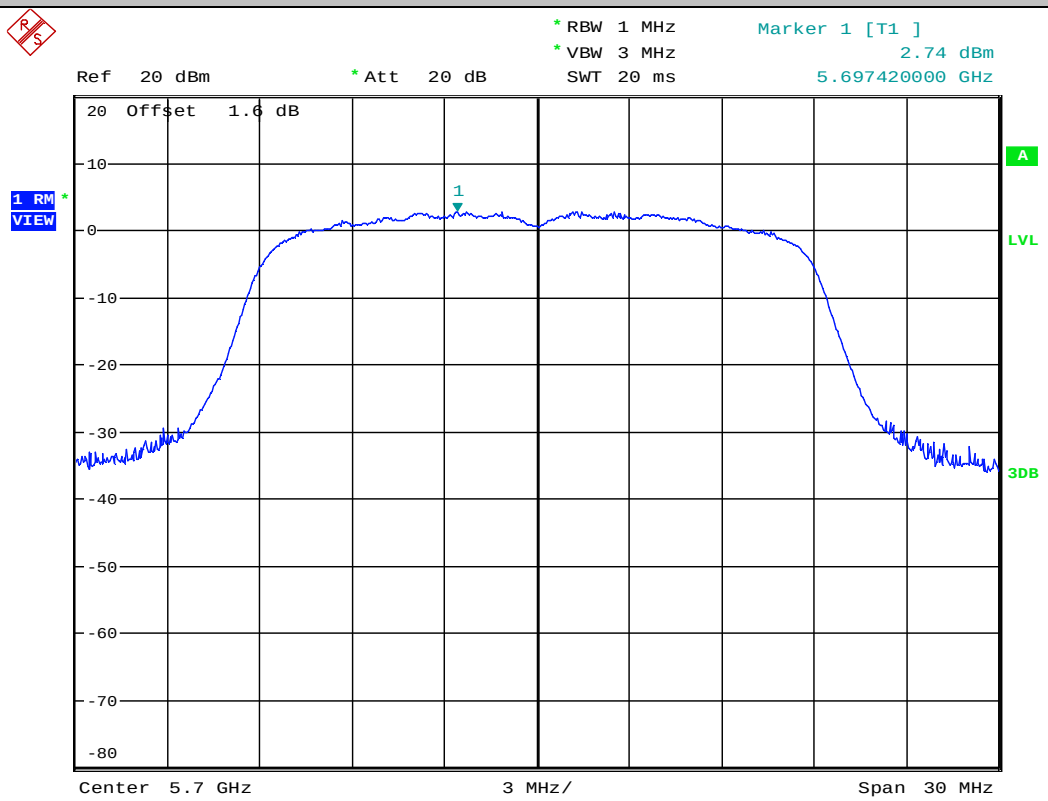
Maximum Power Spectral Density_TNVN_11AC40_5670_Ant2



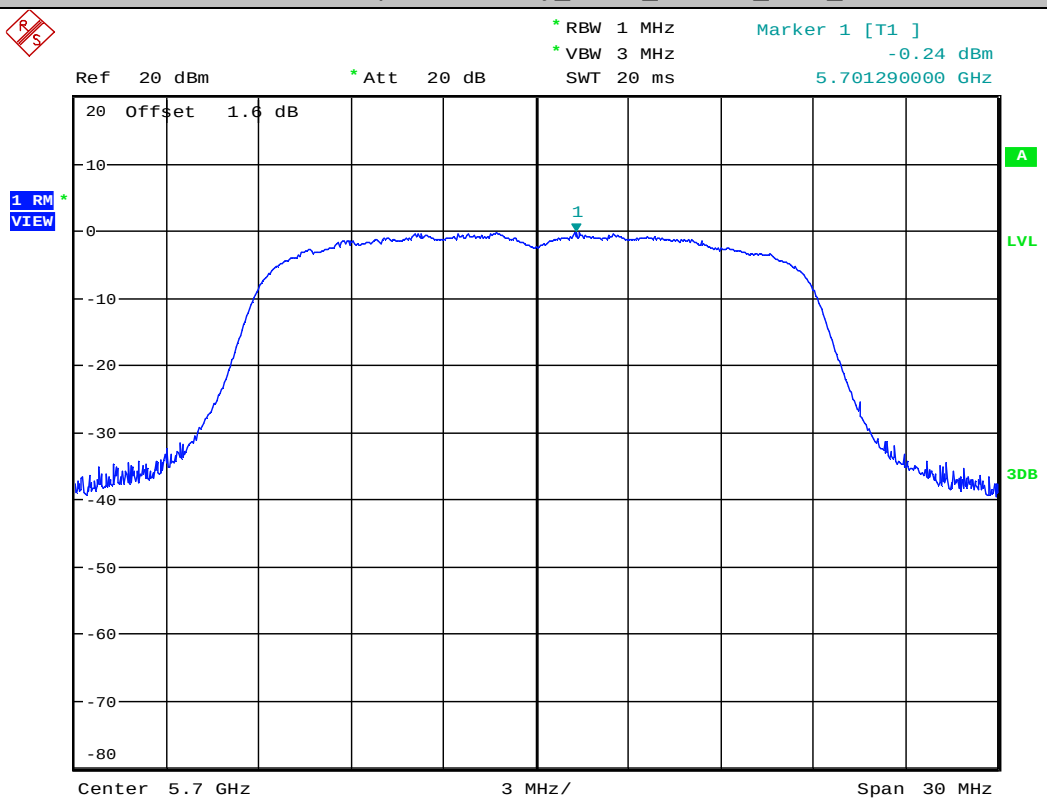
Maximum Power Spectral Density_TNVN_11AC20_5700_Ant1



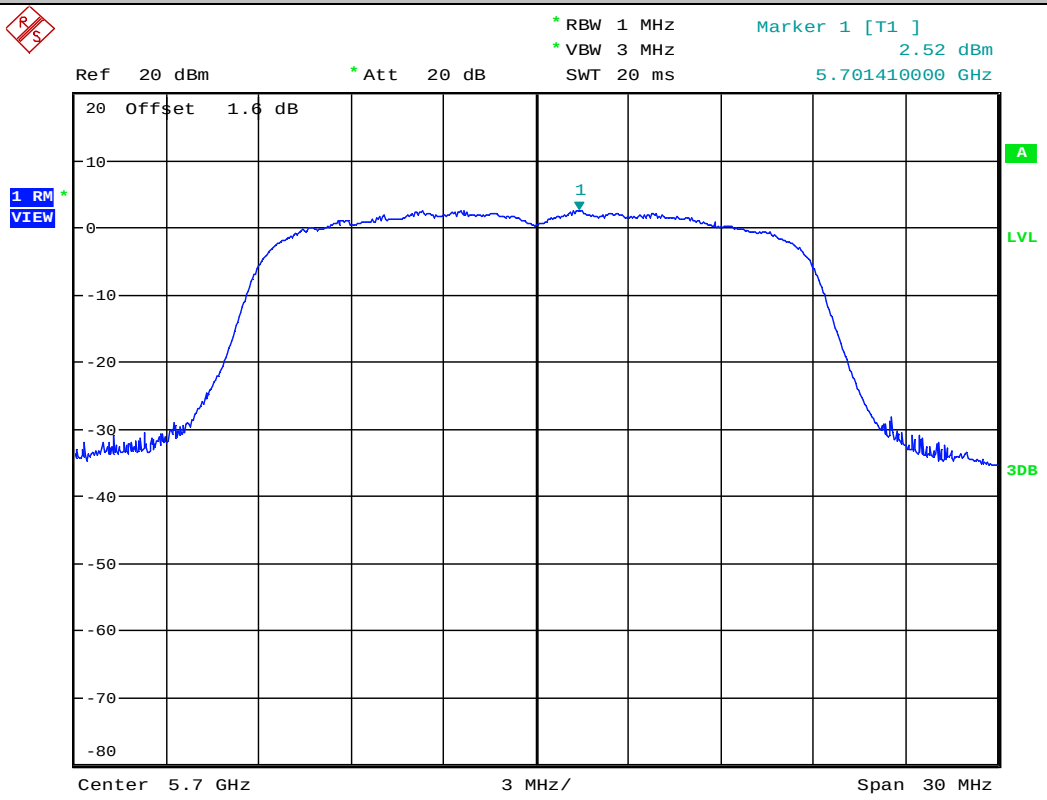
Maximum Power Spectral Density_TNVN_11N20_5700_Ant1



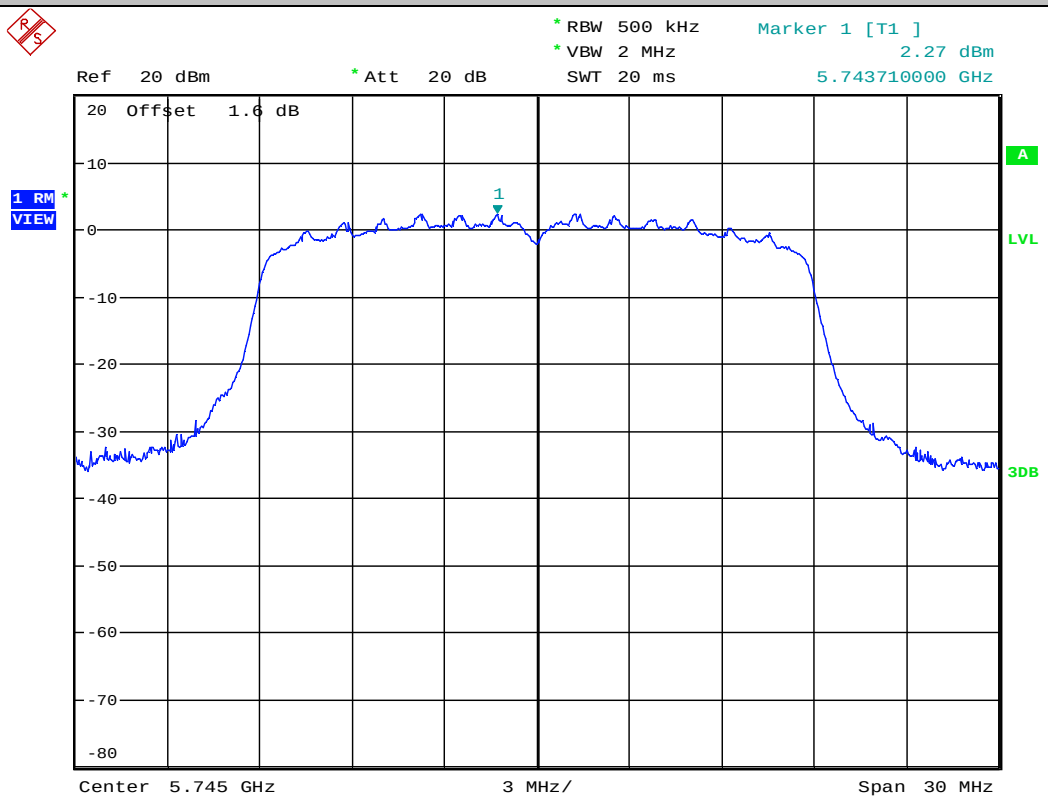
Maximum Power Spectral Density_TNVN_11AC20_5700_Ant2



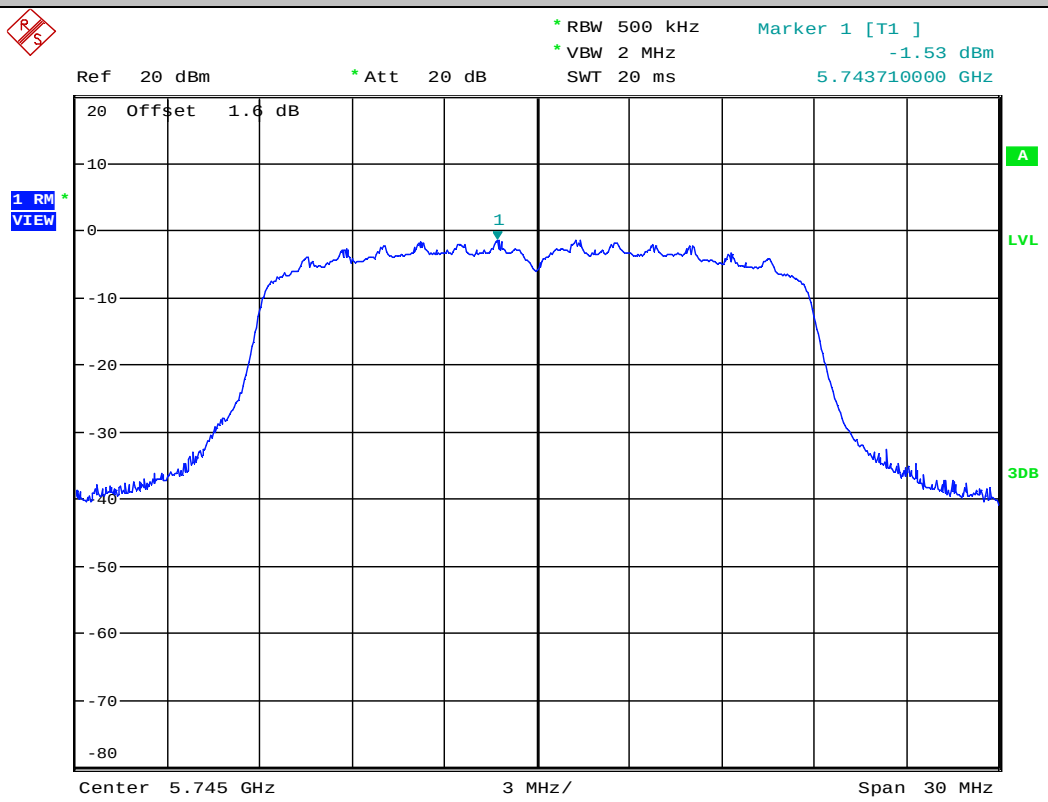
Maximum Power Spectral Density_TNVN_11N20_5700_Ant2



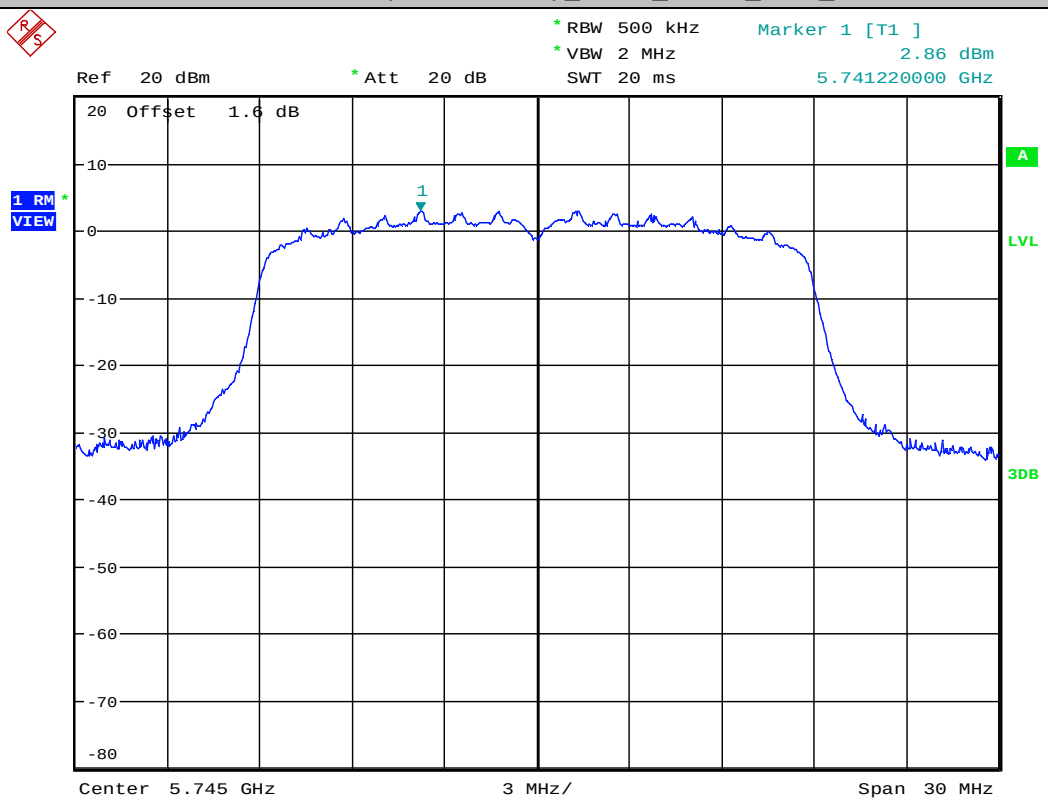
Maximum Power Spectral Density_TNVN_11N20_5745_Ant1



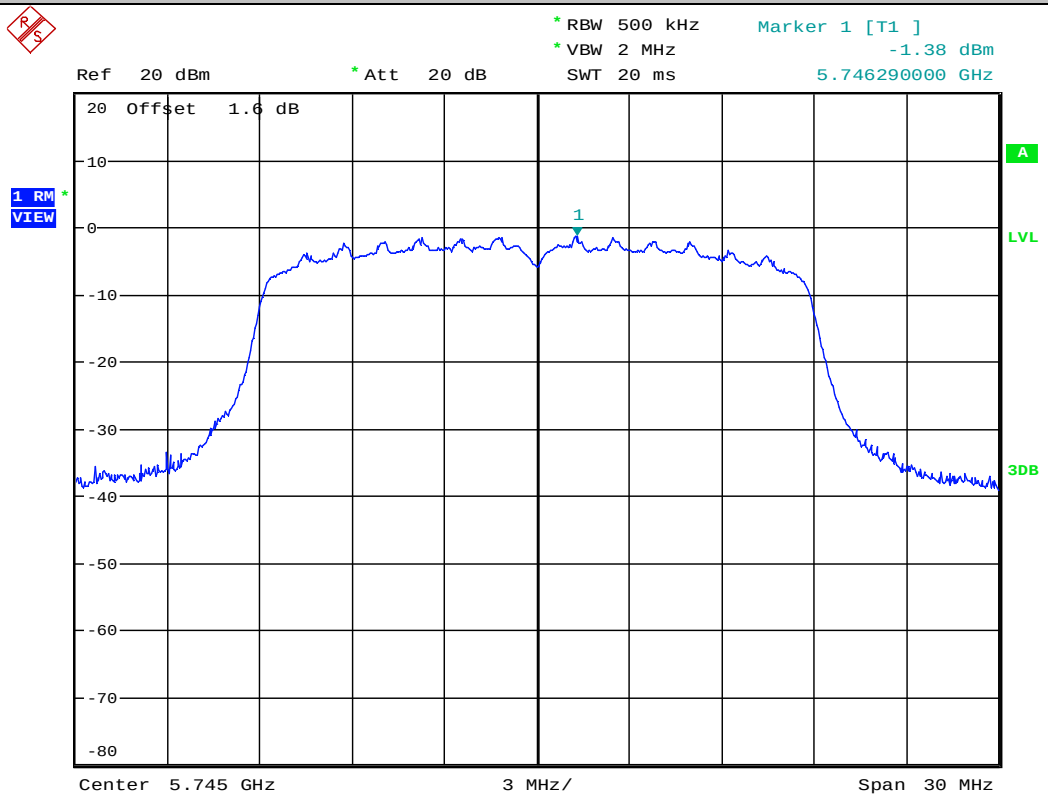
Maximum Power Spectral Density_TNVN_11AC20_5745_Ant1



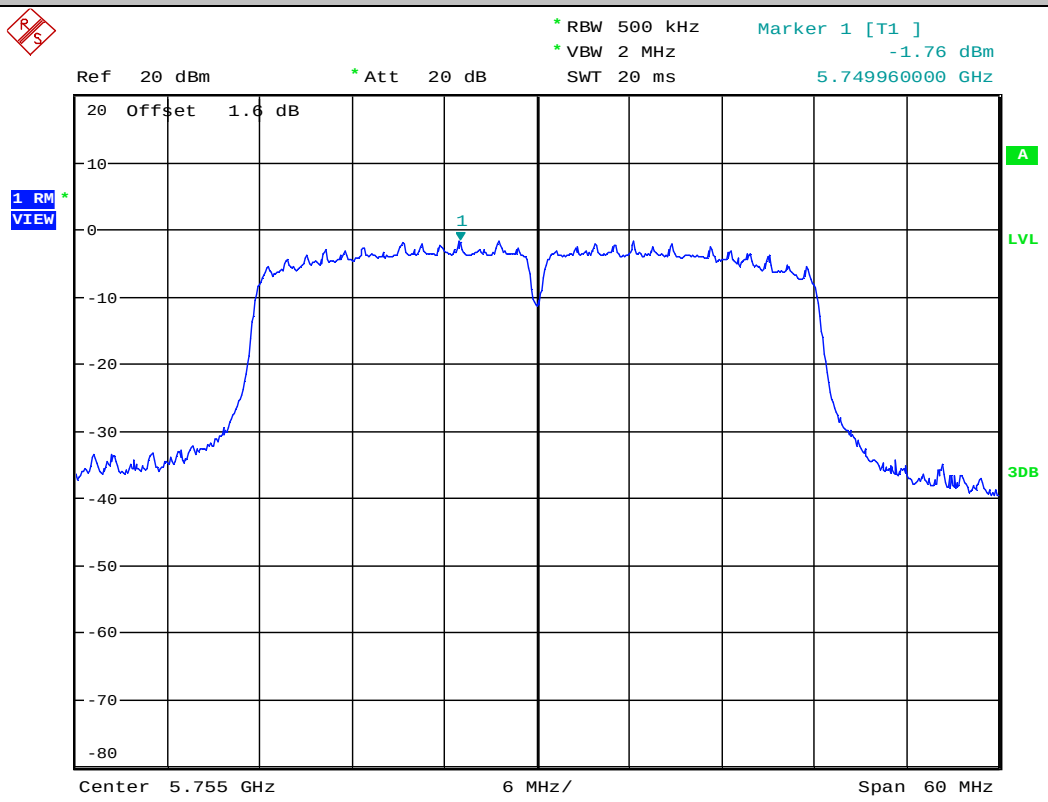
Maximum Power Spectral Density_TNVN_11N20_5745_Ant2



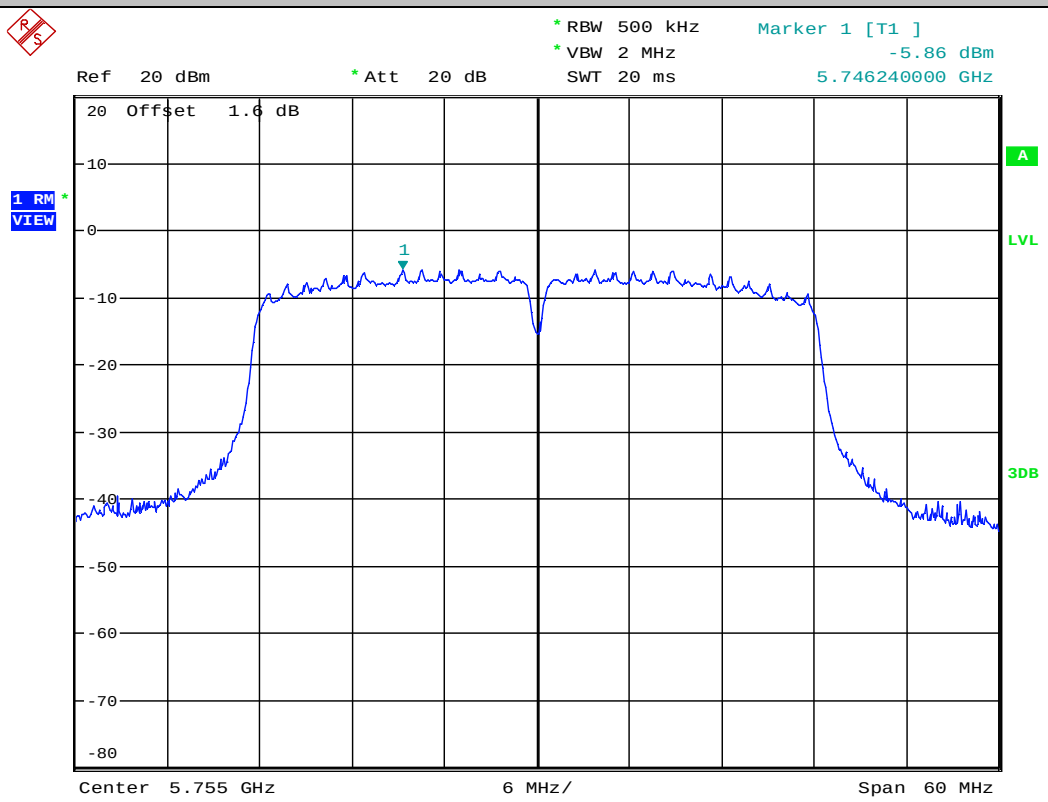
Maximum Power Spectral Density_TNVN_11AC20_5745_Ant2



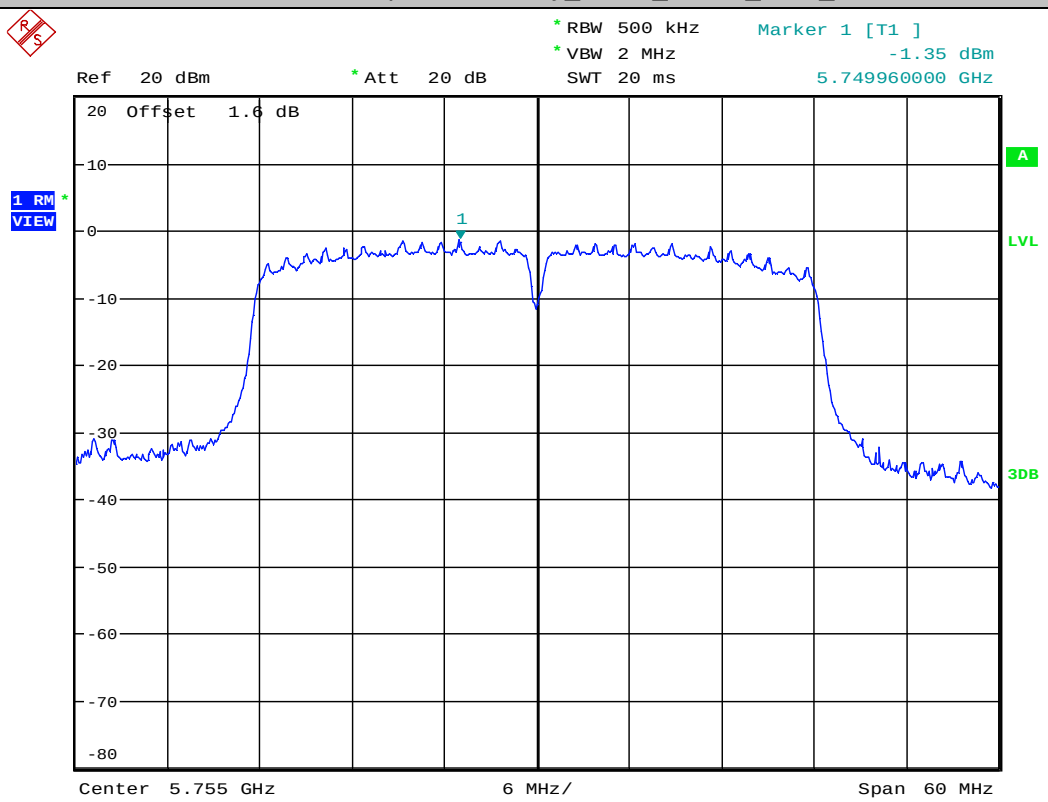
Maximum Power Spectral Density_TNVN_11N40_5755_Ant1



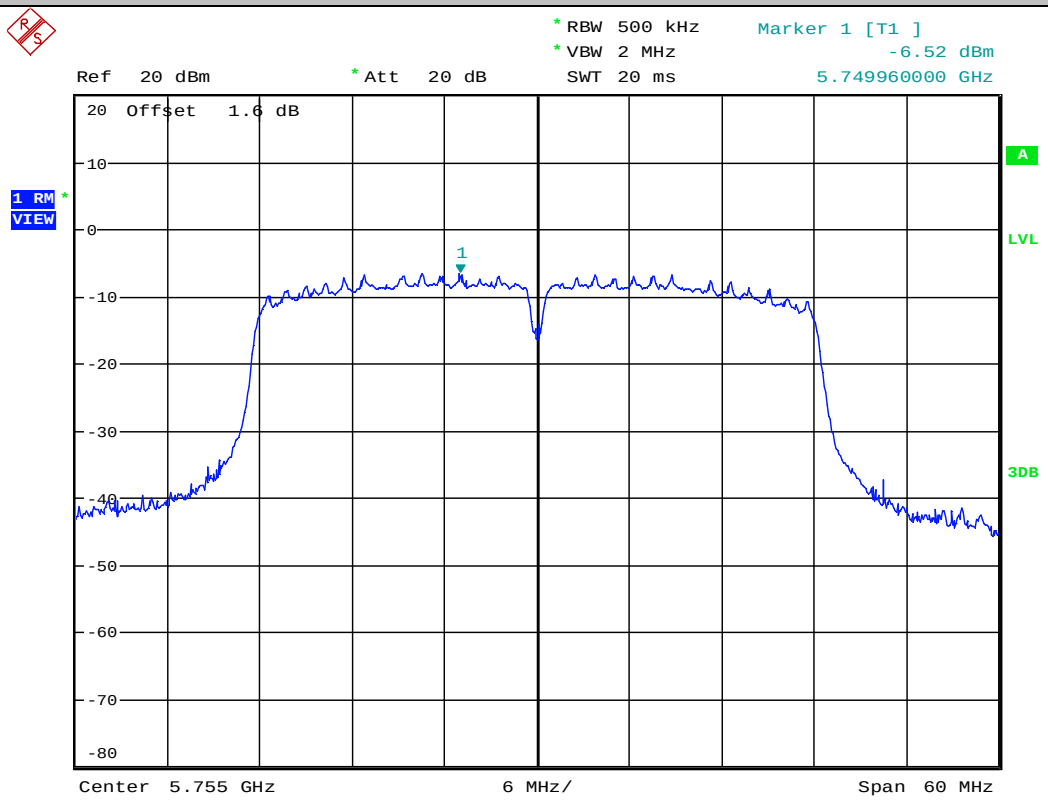
Maximum Power Spectral Density_TNVN_11AC40_5755_Ant1



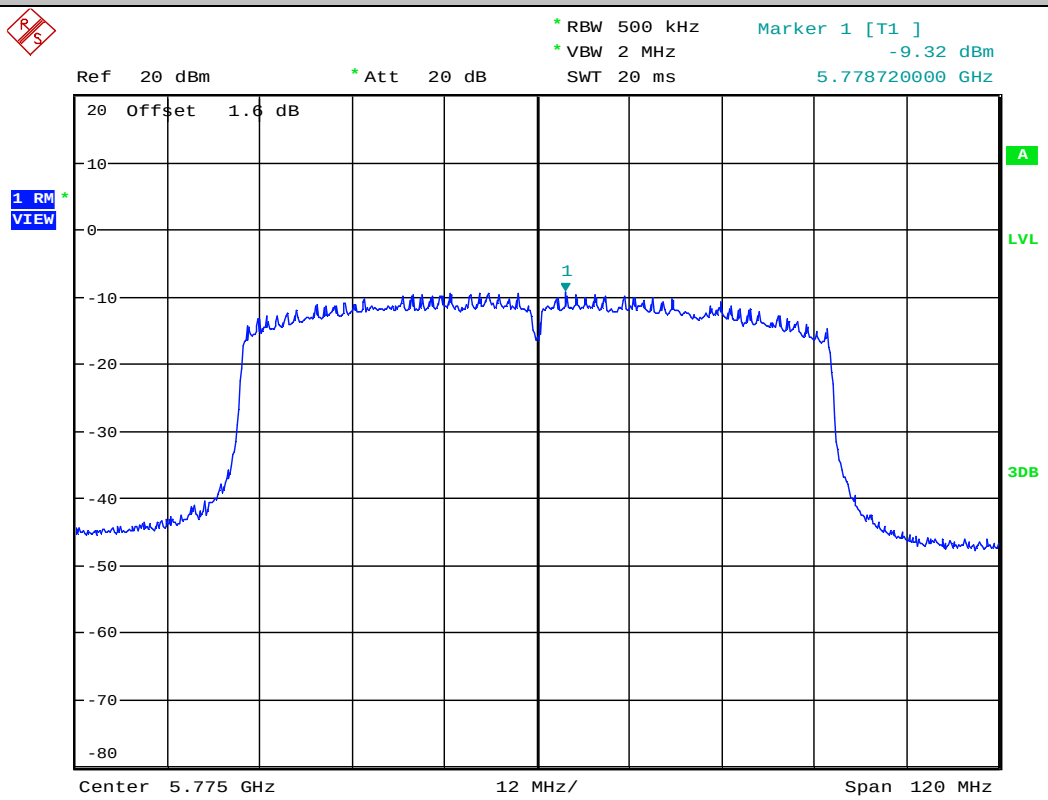
Maximum Power Spectral Density_TNVN_11N40_5755_Ant2



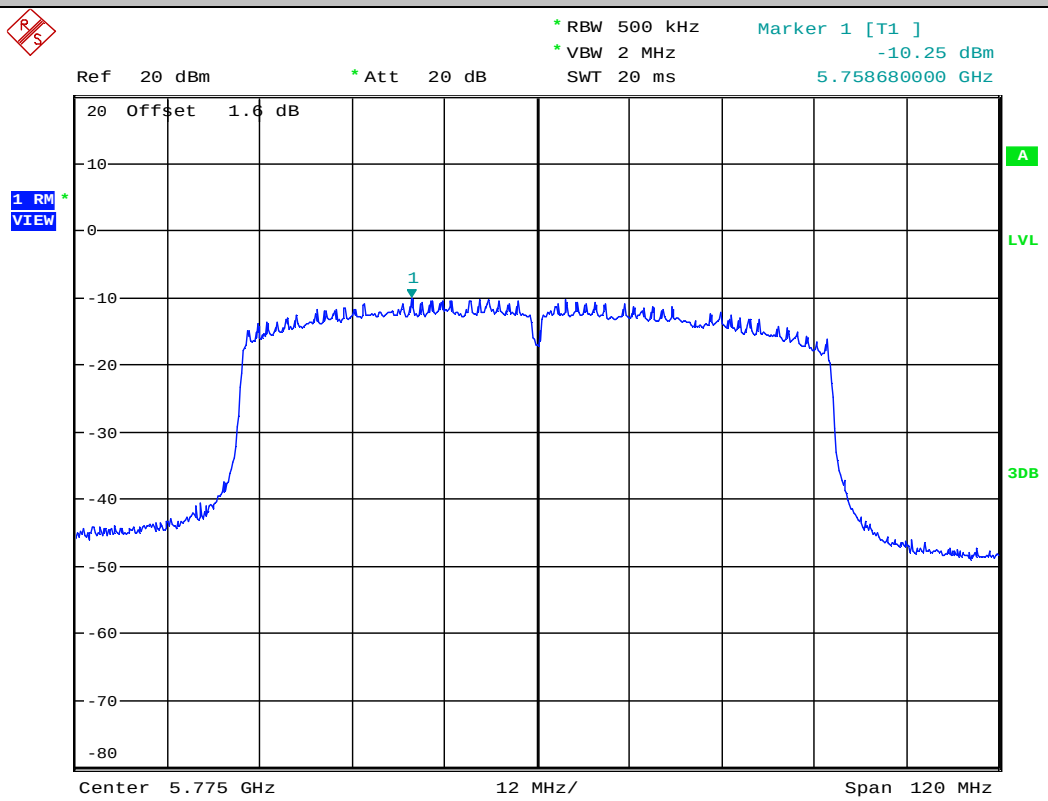
Maximum Power Spectral Density_TNVN_11AC40_5755_Ant2



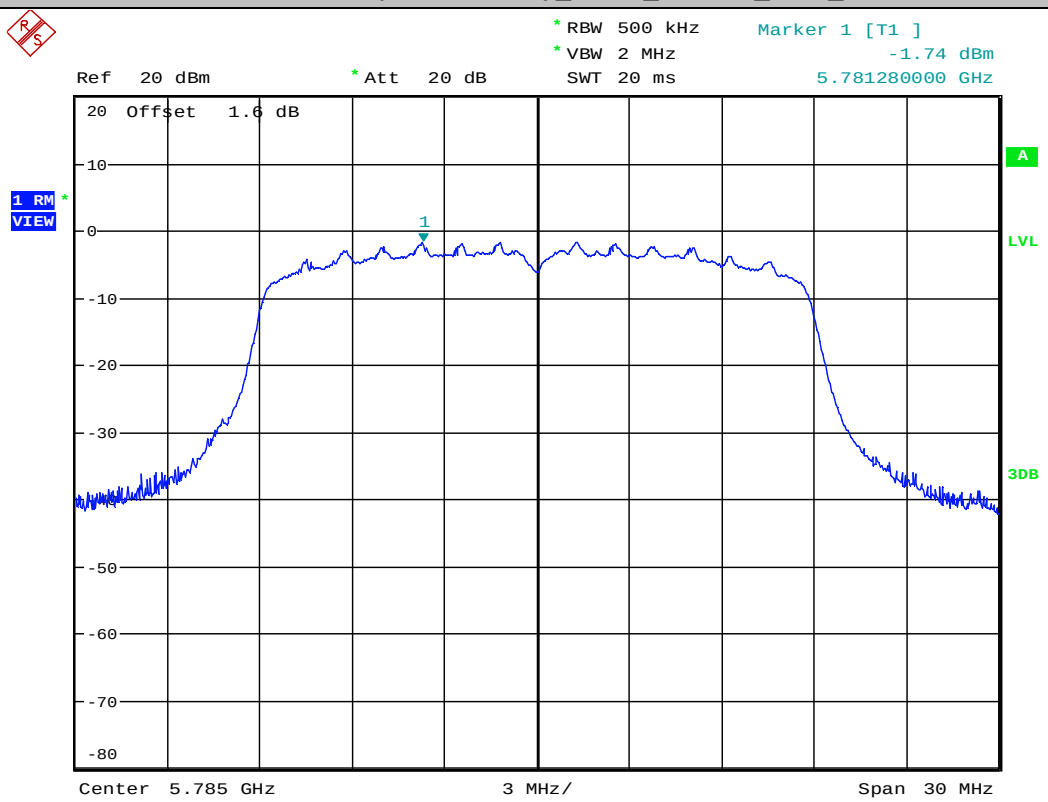
Maximum Power Spectral Density_TNVN_11AC80_5775_Ant1



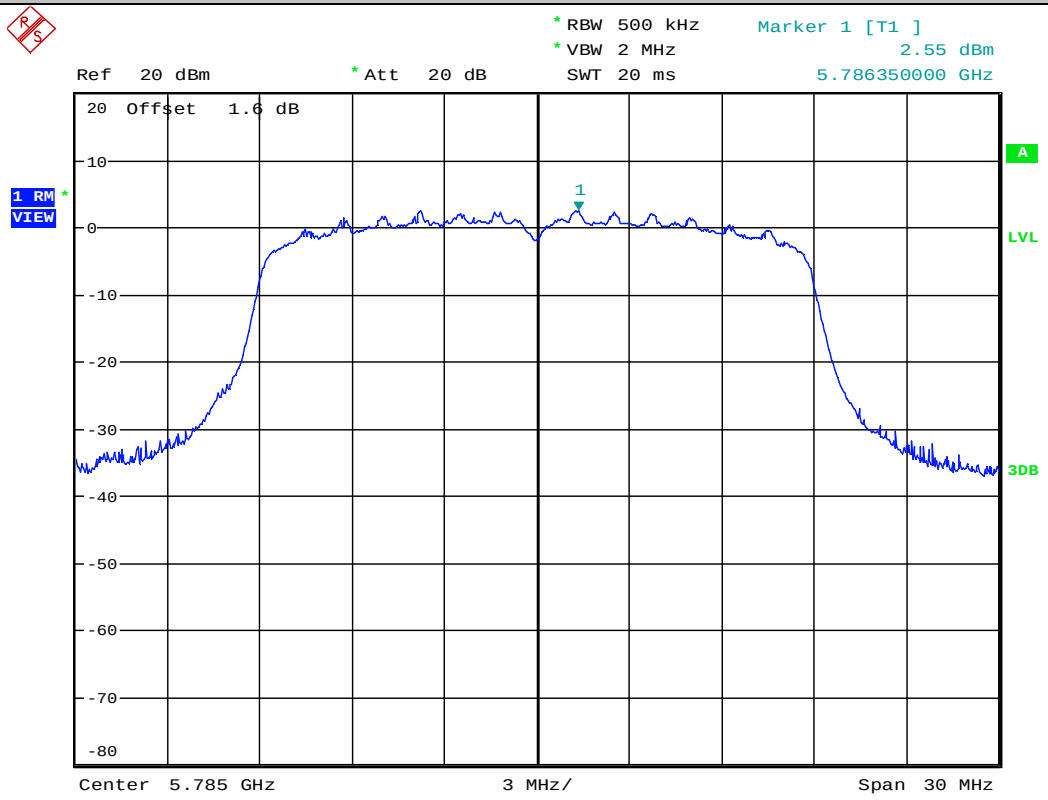
Maximum Power Spectral Density_TNVN_11AC80_5775_Ant2



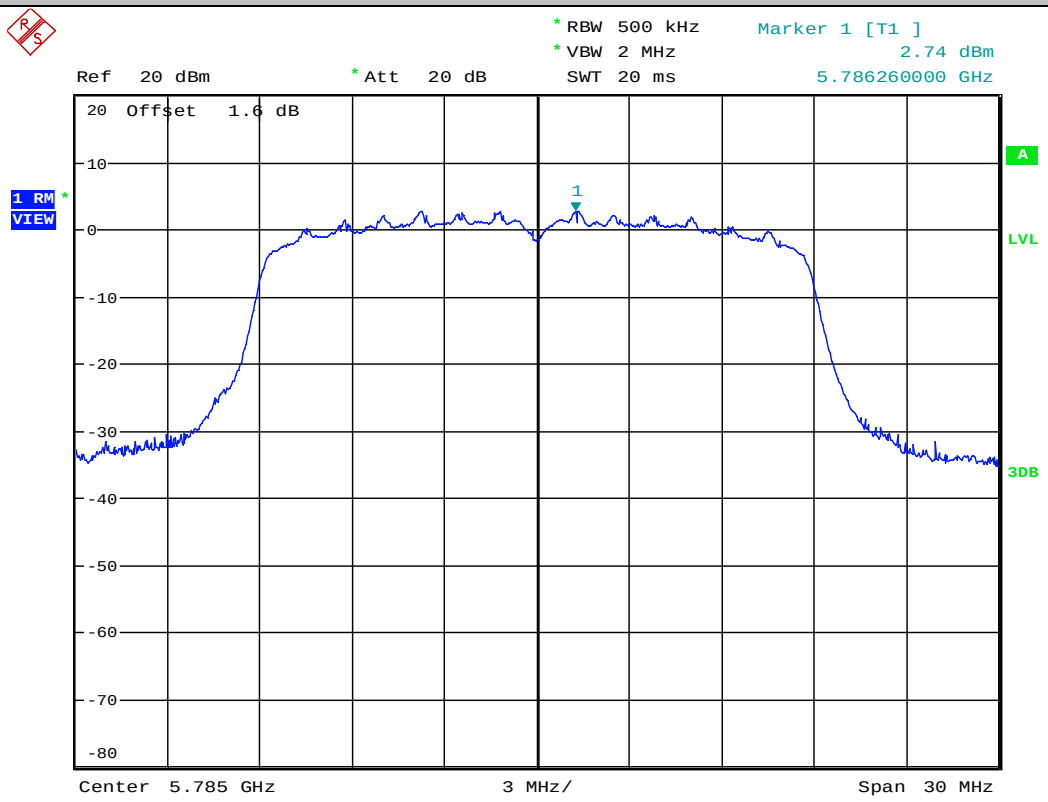
Maximum Power Spectral Density_TNVN_11AC20_5785_Ant1



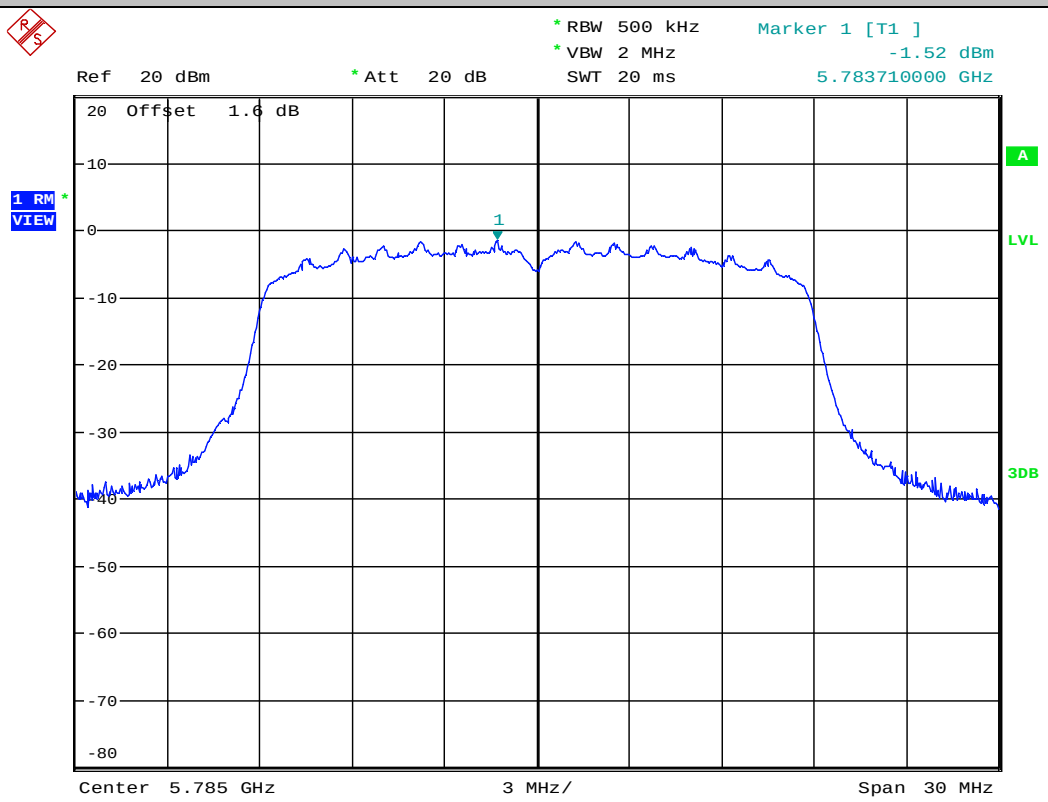
Maximum Power Spectral Density_TNVN_11N20_5785_Ant1



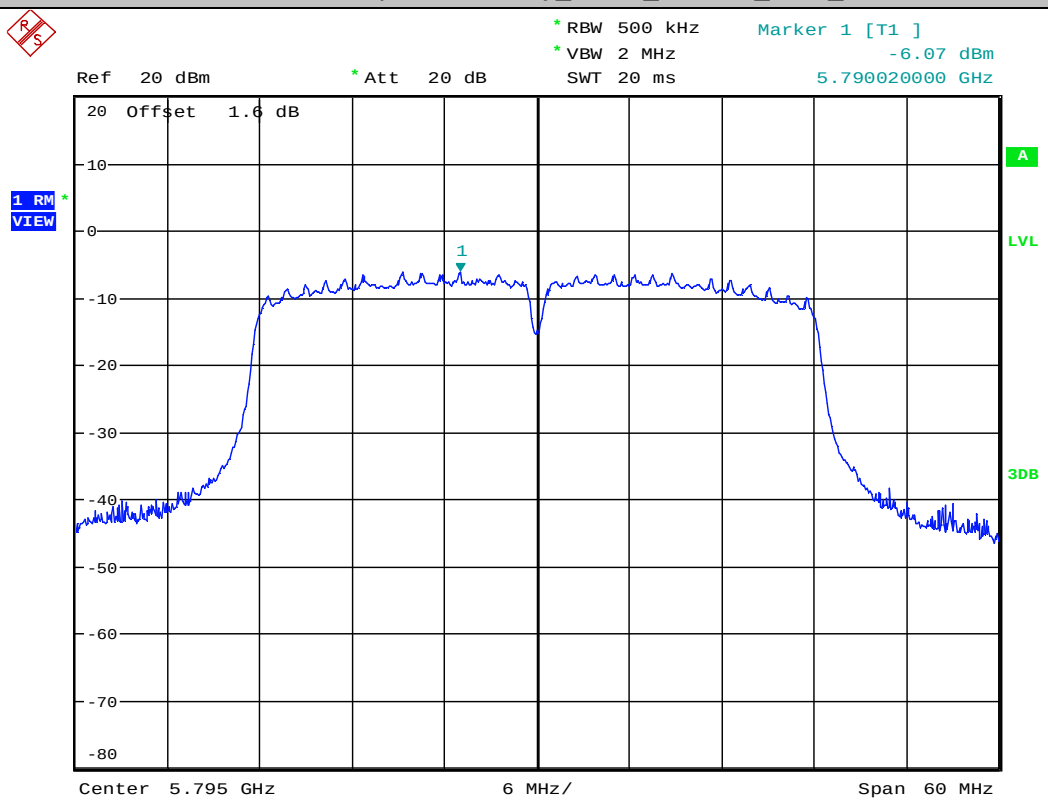
Maximum Power Spectral Density_TNVN_11N20_5785_Ant2



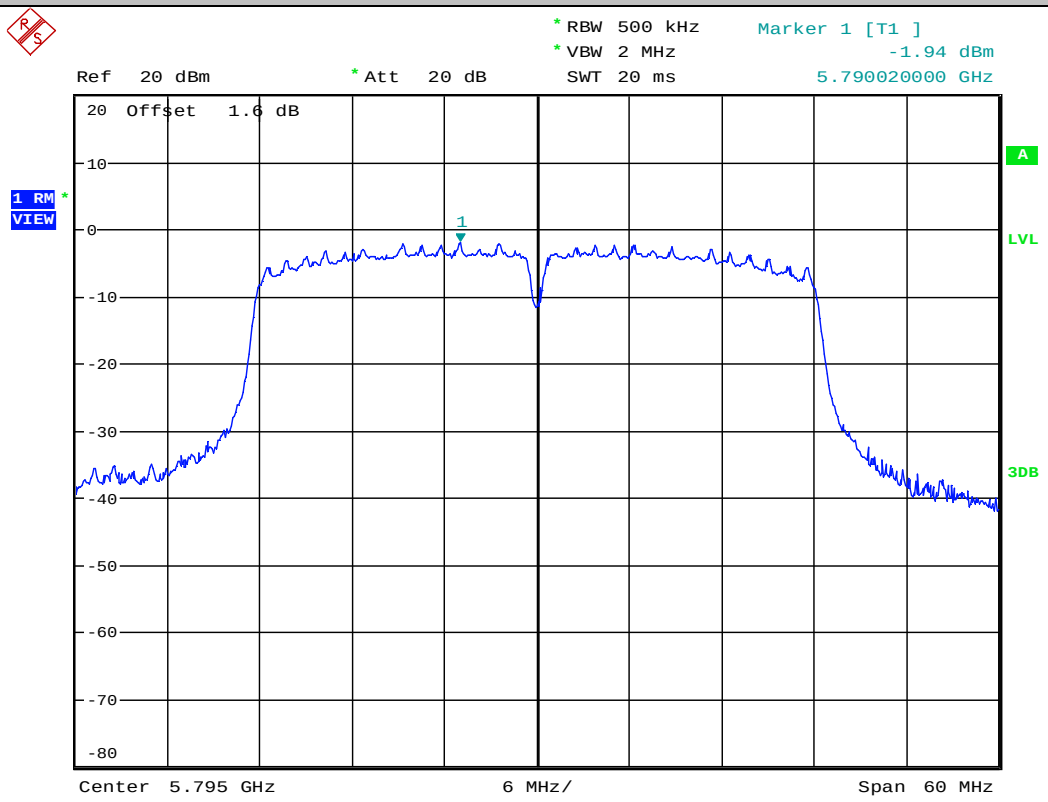
Maximum Power Spectral Density_TNVN_11AC20_5785_Ant2



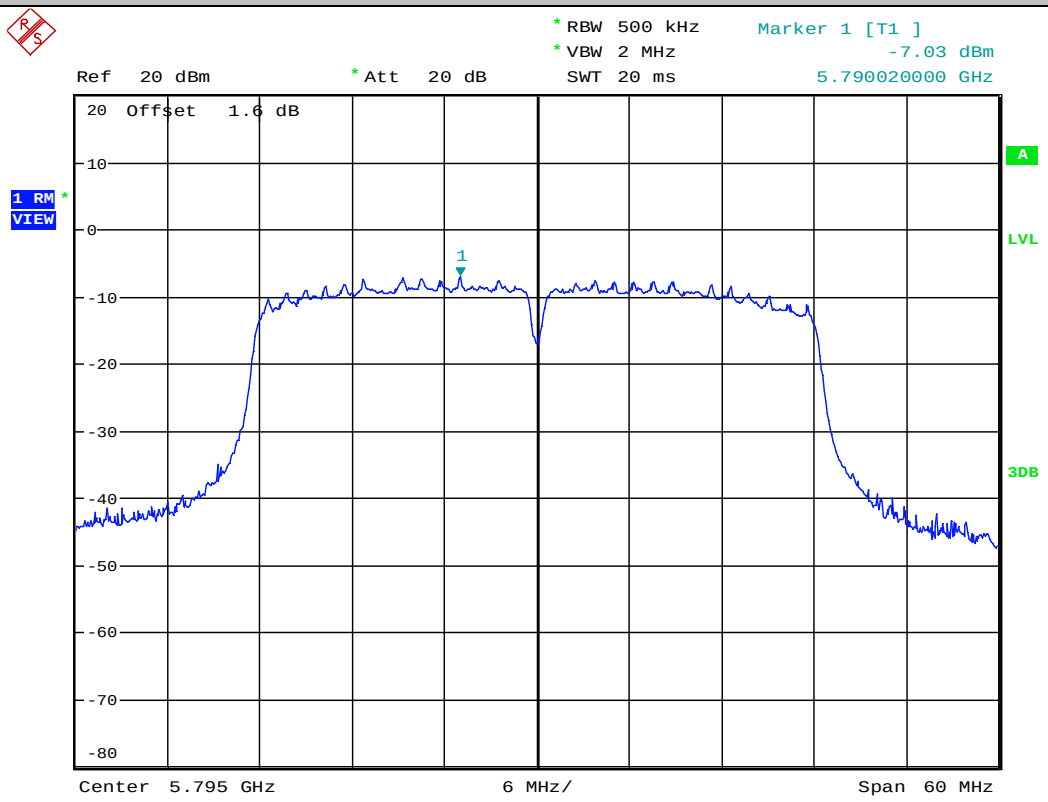
Maximum Power Spectral Density_TNVN_11AC40_5795_Ant1



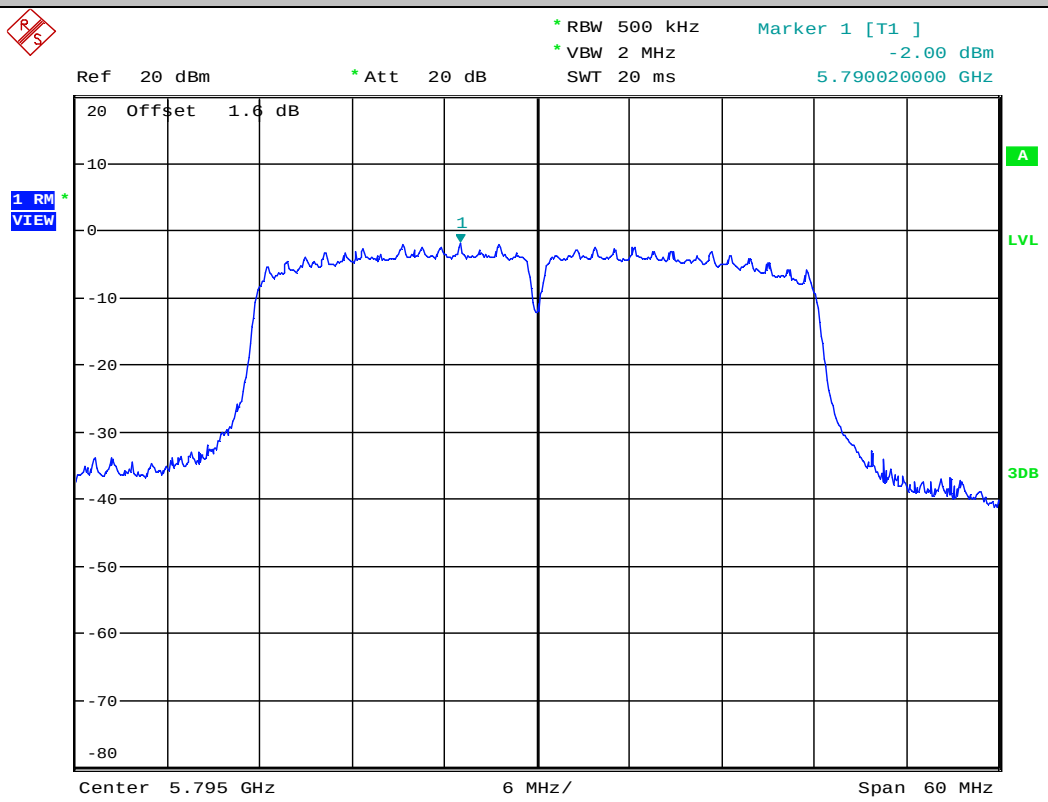
Maximum Power Spectral Density_TNVN_11N40_5795_Ant1



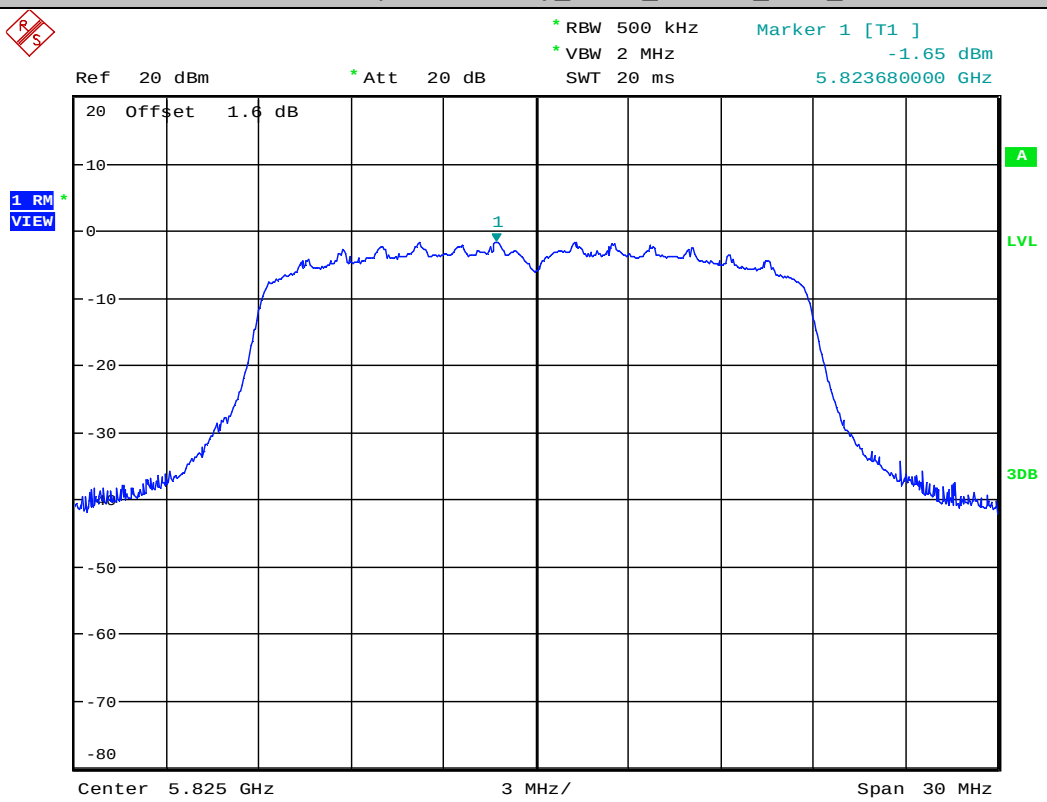
Maximum Power Spectral Density_TNVN_11AC40_5795_Ant2



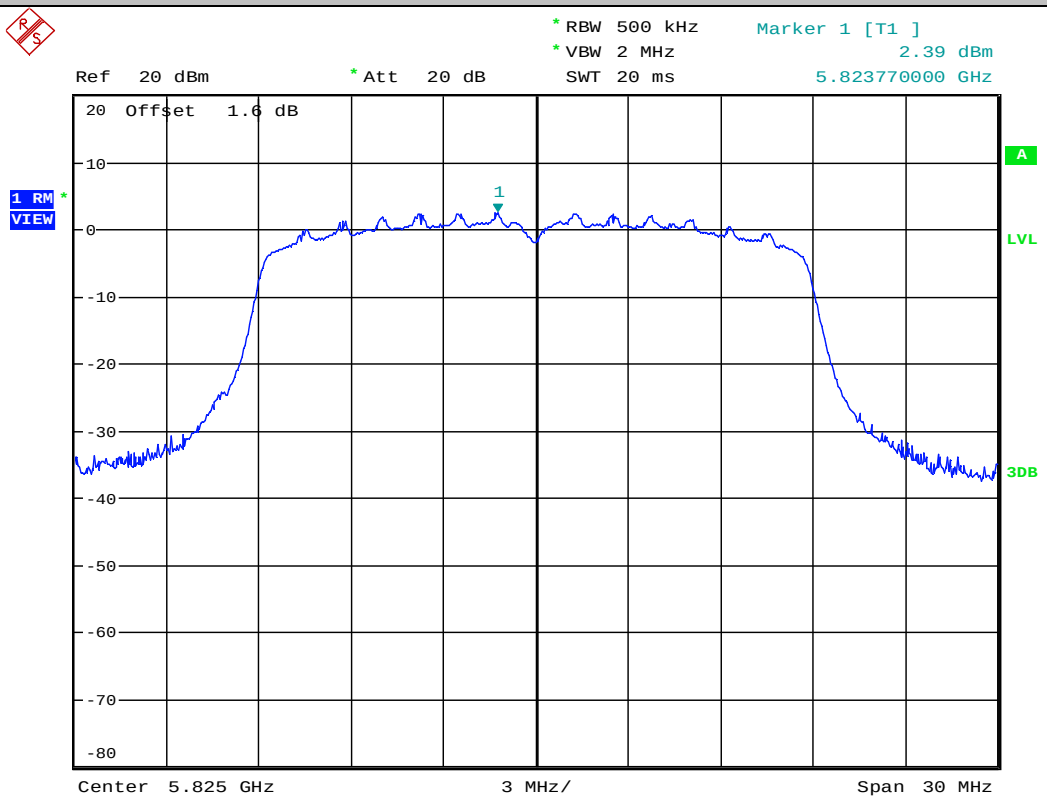
Maximum Power Spectral Density_TNVN_11N40_5795_Ant2



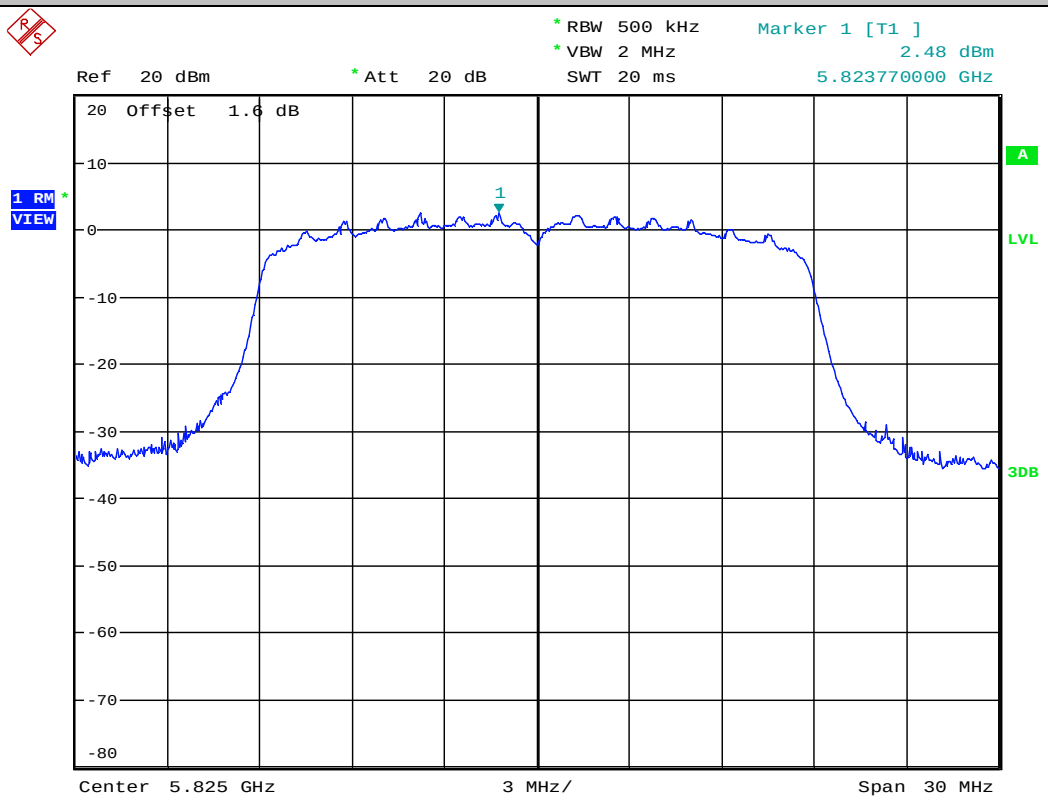
Maximum Power Spectral Density_TNVN_11AC20_5825_Ant1



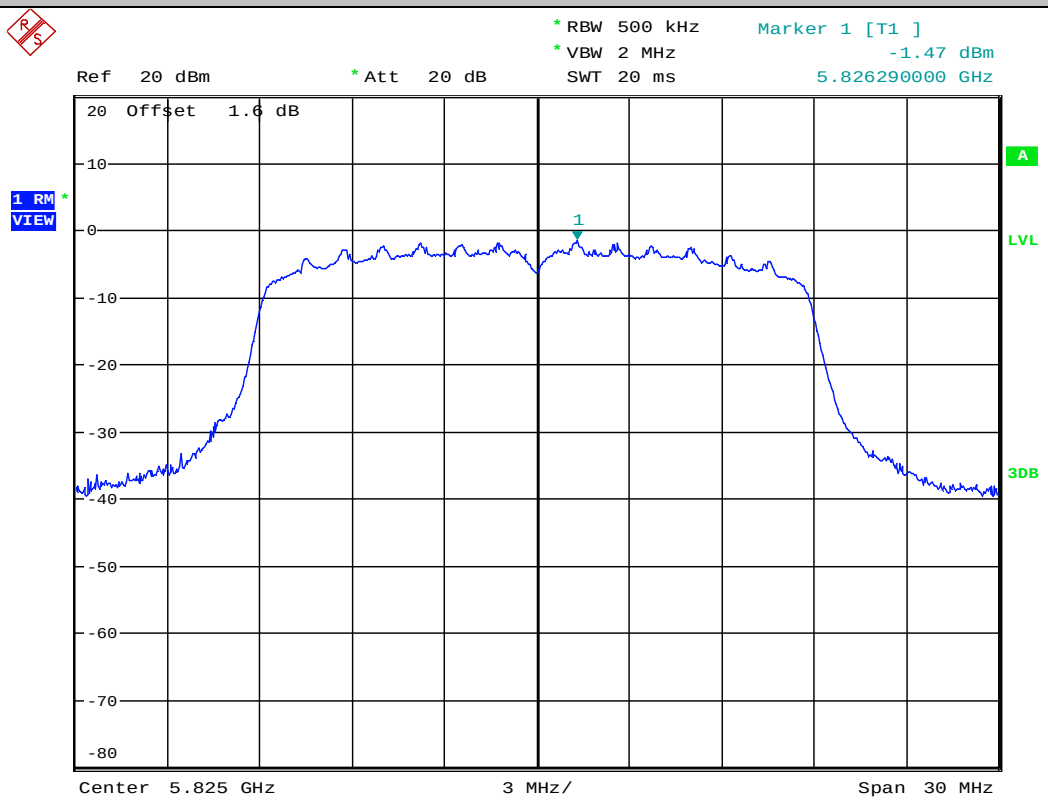
Maximum Power Spectral Density_TNVN_11N20_5825_Ant1



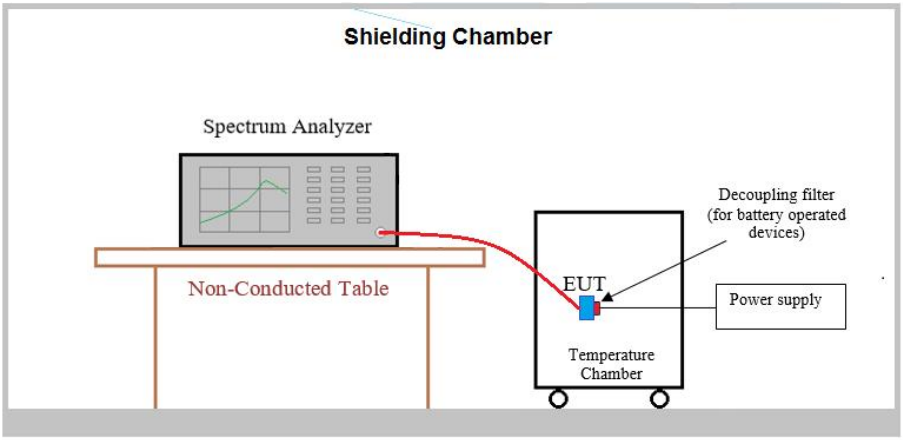
Maximum Power Spectral Density_TNVN_11N20_5825_Ant2



Maximum Power Spectral Density_TNVN_11AC20_5825_Ant2



5.6 Frequency Stability

Test Requirement:	FCC 47 CFR Part 15 Subpart E Section 15.407 (g)
Test Method:	ANSI C63.10-2013
Test Setup:	 *Remark:* *Offset the High-Frequency cable loss in the spectrum analyzer.*
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.
Limit:	The frequency of the carrier signal shall be maintained within band of operation.
Test Results:	Pass

Measurement Data

Frequency Stability Versus Temp.			
Operating Frequency: 5180 MHz is the worst case in 5180-5240MHz band range			
Temp (℃)	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5180.00	0.00000
40		5180.00	0.00000
30		5180.00	0.00000
20		5179.99	-1.93051
10		5180.00	0.00000
0		5179.96	-7.72207
-10		5179.96	-7.72207
-20		5179.99	-1.93051

Frequency Stability Versus Temp.			
Operating Frequency: 5180 MHz is the worst case in 5180-5240MHz band range			
Temp.	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
TN	VL	5180.00	0.00000
	VN	5179.97	-5.79154
	VH	5179.96	-7.72207

Frequency Stability Versus Temp.			
Operating Frequency: 5260 MHz is the worst case in 5260-5320MHz band range			
Temp (℃)	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5259.96	-7.60462
40		5260.00	0.00000
30		5260.00	0.00000
20		5259.98	-3.80230
10		5259.99	-1.90114
0		5260.00	0.00000
-10		5260.00	0.00000
-20		5259.97	-5.70345

Frequency Stability Versus Temp.			
Operating Frequency: 5260 MHz is the worst case in 5260-5320MHz band range			
Temp.	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
TN	VL	5260.00	0.00000
	VN	5259.99	-1.90114
	VH	5259.98	-3.80230

Frequency Stability Versus Temp.			
Operating Frequency: 5500 MHz is the worst case in 5500-5700MHz band range			
Temp (℃)	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5499.99	-1.818185
40		5499.97	-5.454575
30		5500.00	0.000000
20		5499.98	-3.636377
10		5499.98	-3.636377
0		5499.99	-1.818185
-10		5500.00	0.000000
-20		5500.00	0.000000

Frequency Stability Versus Temp.			
Operating Frequency: 5500 MHz is the worst case in 5500-5700MHz band range			
Temp.	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
TN	VL	5500.00	0.000000
	VN	5499.99	-1.818185
	VH	5499.99	-1.818185

Frequency Stability Versus Temp.			
Operating Frequency: 5745 MHz is the worst case in 5745-5825MHz band range			
Temp (℃)	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5745.00	0.000000
40		5744.99	-0.174064
30		5744.98	-0.348129
20		5745.00	0.000000
10		5744.98	-0.348129
0		5744.99	-0.174064
-10		5744.98	-0.348129
-20		5745.00	0.000000

Frequency Stability Versus Temp.			
Operating Frequency: 5745 MHz is the worst case in 5745-5825MHz band range			
Temp.	Volta ge	Measured Frequency (MHz)	Frequency Drift (ppm)
TN	VL	5744.99	-0.174064
	VN	5744.98	-0.348129
	VH	5745.00	0.000000

5.7 Radiated Spurious Emissions

Test Requirement:	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6) FCC 47 CFR Part 15 Subpart C Section 15.209/205
Test Method:	KDB 789033 D02 v01r04 Section G.3, G.4, G.5, and G.6
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Receiver Setup:	

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak
emission level radiated by the device.

Test Setup:	

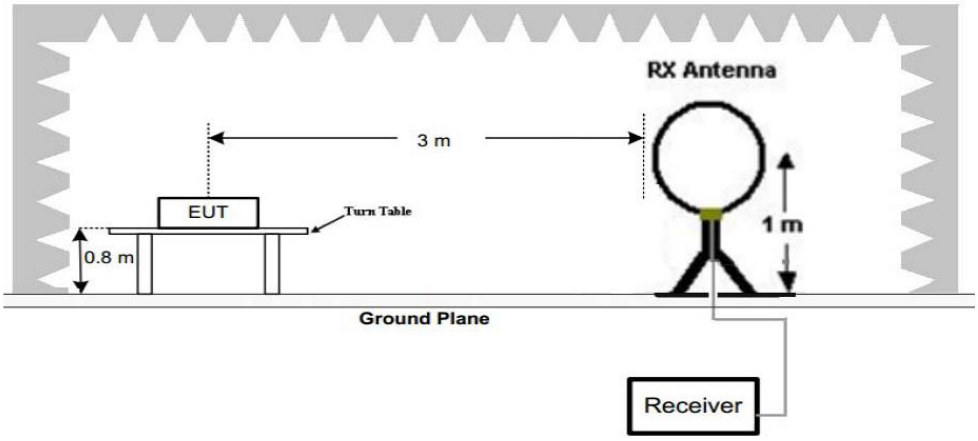


Figure 1. Below 30MHz

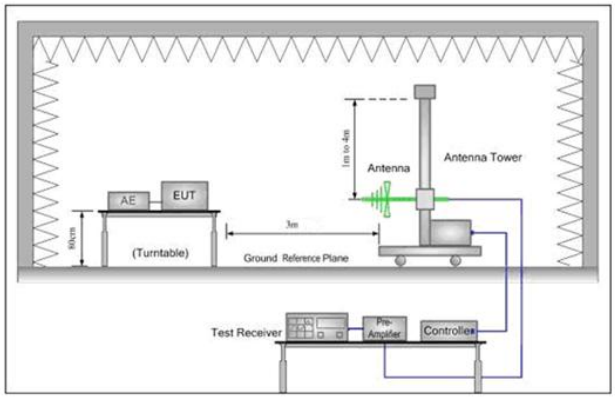


Figure 2. 30MHz to 1GHz

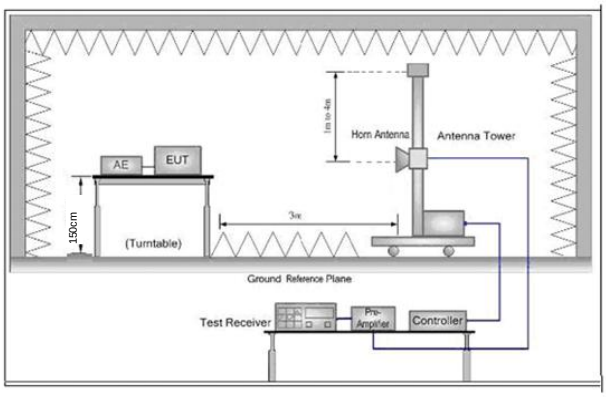


Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel ,the middle channel ,the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40); 6.5Mbps of rate is the worst case of 802.11ac(VHT20) ; 13.5Mbps of rate is the worst case of 802.11ac(VHT40); 29.3Mbps of rate is the worst case of 802.11ac(VHT80). For below 1GHz, through Pre-scan, find the 6Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.
Test Results:	Pass

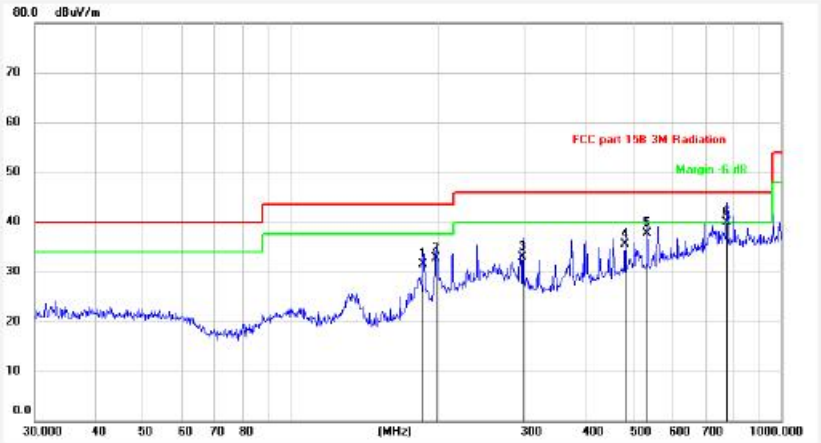
5.7.1 Radiated emission below 1GHz

30MHz~1GHz		
Test mode:	Transmitting	Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Antenna (dB/m)	Cable (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	33.3279	21.34	11.13	0.93	33.40	40.00	-6.60	QP
2	39.1616	16.67	12.02	1.01	29.70	40.00	-10.30	QP
3	133.1511	18.05	7.85	1.7	27.60	43.50	-15.90	QP
4	197.8928	22.06	10.19	1.95	34.20	43.50	-9.30	QP
5	280.0237	16.06	12.86	2.38	31.30	46.00	-14.70	QP
6	774.1584	10.15	20.89	3.76	34.80	46.00	-11.20	QP

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP Limit, QP Result is deemed to comply with QP Limit.

Test mode:	Transmitting	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Antenna (dB/m)	Cable (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	186.4406	20.16	9.44	1.9	31.50	43.50	-12.00	QP
2	197.8928	20.56	10.19	1.95	32.70	43.50	-10.80	QP
3	297.2241	17.15	13.41	2.44	33.00	46.00	-13.00	QP
4	480.5276	15.52	17.11	2.97	35.60	46.00	-10.40	QP
5	533.8321	16.58	18.11	3.11	37.80	46.00	-8.20	QP
6	774.1584	15.25	20.89	3.76	39.90	46.00	-6.10	QP

Remarks:1. Result=Reading+Antenna+Cable
2. If Peak Result complies with QP Limit, QP Result is deemed to comply with QP Limit.

5.7.2 Transmitter emission above 1GHz

Test mode:		802.11a(6Mbps)		Test channel:		36	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10360.000	50.18	2.13	52.31	74	-21.69	peak	H
10360.000	34.56	2.13	36.69	54	-17.31	AVG	H
15540.000	47.21	3.62	50.83	74	-23.17	peak	H
15540.000	36.56	3.62	40.18	54	-13.82	AVG	H
10360.000	47.87	2.13	50.00	74	-24.00	peak	V
10360.000	38.67	2.13	40.80	54	-13.20	AVG	V
15540.000	48.95	3.62	52.57	74	-21.43	peak	V
15540.000	35.68	3.62	39.30	54	-14.70	AVG	V

Test mode:		802.11a(6Mbps)		Test channel:		40	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10440.000	48.25	2.23	50.48	74	-23.52	peak	H
10440.000	38.56	2.23	40.79	54	-13.21	AVG	H
15660.000	48.96	3.75	52.71	74	-21.29	peak	H
15660.000	35.68	3.75	39.43	54	-14.57	AVG	H
10440.000	47.98	2.23	50.21	74	-23.79	peak	V
10440.000	38.12	2.23	40.35	54	-13.65	AVG	V
15660.000	48.65	3.75	52.40	74	-21.60	peak	V
15660.000	35.89	3.75	39.64	54	-14.36	AVG	V

Test mode:		802.11a(6Mbps)		Test channel:		48	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10480.000	48.76	2.31	51.07	74	-22.93	peak	H
10480.000	35.38	2.31	37.69	54	-16.31	AVG	H
15720.000	48.65	3.82	52.47	74	-21.53	peak	H
15720.000	38.56	3.82	42.38	54	-11.62	AVG	H
10480.000	46.87	2.31	49.18	74	-24.82	peak	V
10480.000	36.45	2.31	38.76	54	-15.24	AVG	V
15720.000	47.64	3.82	51.46	74	-22.54	peak	V
15720.000	37.65	3.82	41.47	54	-12.53	AVG	V

Test mode:		802.11a(6Mbps)		Test channel:		149	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11490.000	49.85	2.42	52.27	74	-21.73	peak	H
11490.000	38.43	2.42	40.85	54	-13.15	AVG	H
17235.000	48.78	3.92	52.70	74	-21.30	peak	H
17235.000	37.87	3.92	41.79	54	-12.21	AVG	H
11490.000	49.21	2.42	51.63	74	-22.37	peak	V
11490.000	38.12	2.42	40.54	54	-13.46	AVG	V
17235.000	47.28	3.92	51.20	74	-22.80	peak	V
17235.000	37.21	3.92	41.13	54	-12.87	AVG	V

Test mode:		802.11a(6Mbps)		Test channel:		157	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11570.000	48.26	2.47	50.73	74	-23.27	peak	H
11570.000	39.83	2.47	42.30	54	-11.70	AVG	H
17355.000	47.89	3.96	51.85	74	-22.15	peak	H
17355.000	37.83	3.96	41.79	54	-12.21	AVG	H
11570.000	49.23	2.47	51.70	74	-22.30	peak	V
11570.000	39.12	2.47	41.59	54	-12.41	AVG	V
17355.000	49.26	3.96	53.22	74	-20.78	peak	V
17355.000	36.87	3.96	40.83	54	-13.17	AVG	V

Test mode:		802.11a(6Mbps)		Test channel:		165	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
11650.000	49.13	2.55	51.68	74	-22.32	peak	H
11650.000	37.82	2.55	40.37	54	-13.63	AVG	H
17475.000	47.58	4.01	51.59	74	-22.41	peak	H
17475.000	36.48	4.01	40.49	54	-13.51	AVG	H
11650.000	48.34	2.55	50.89	74	-23.11	peak	V
11650.000	37.43	2.55	39.98	54	-14.02	AVG	V
17475.000	48.82	4.01	52.83	74	-21.17	peak	V
17475.000	36.29	4.01	40.30	54	-13.70	AVG	V

Remark:

1) The 6Mbps of rate of 802.11a is the worst case.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 40GHz,The disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

5.8 Restricted bands around fundamental frequency

Test Requirement:	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6) FCC 47 CFR Part 15 Subpart C Section 15.209/205
Test Method:	KDB 789033 D02 v01r04 Section G.3, G.4, G.5, and G.6
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	

Applicable To	**Limit**	
789033 D02 General U-NII Test Procedures New Rules v01r04	**Field Strength at 3 m**	
	PK: 74 (dBμV/m)	**AV: 54 (dBμV/m)**
Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
FCC 47 CFR Part 15 Subpart E Section 6.2.1.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.2.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.3.2	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.4.2	27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;	PK: 68.2 (dBμV/m)
	15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;	
	10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges;	
	-27 dBm/MHz at	

		frequencies more than 75 MHz above or below the band edges.	

Test Setup:

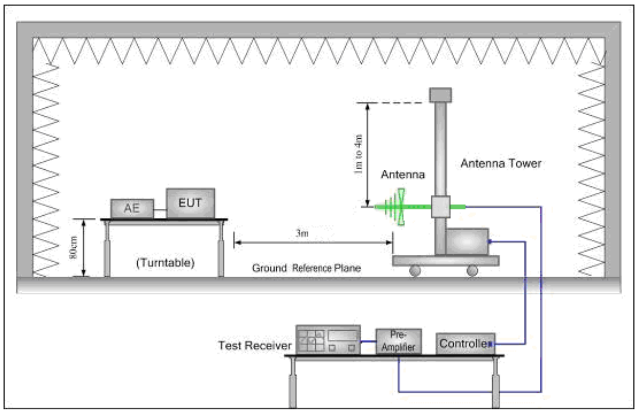


Figure 1. 30MHz to 1GHz

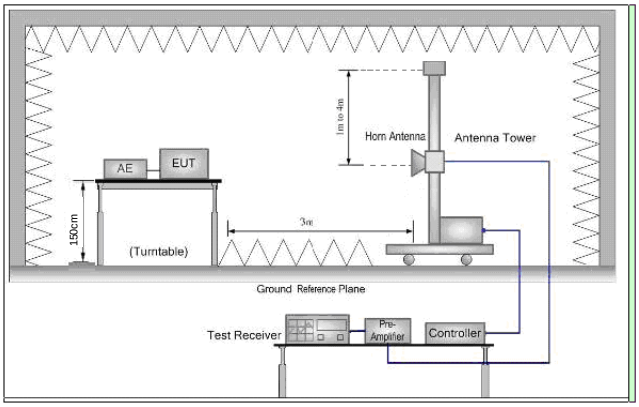


Figure 2. Above 1 GHz

Test Procedure:

a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
Note: For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power

	and modulation for lowest and highest channel g. Test the EUT in the lowest channel , the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40); 6.5Mbps of rate is the worst case of 802.11ac(VHT20) ; 13.5Mbps of rate is the worst case of 802.11ac(VHT40); 29.3Mbps of rate is the worst case of 802.11ac(VHT80). Only the worst case is recorded in the report.
Test Results:	Pass

Test data:

Worse case mode:		802.11a(6Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	56.87	-3.63	53.24	74	-20.76	peak	H
5150.00	45.87	-3.63	42.24	54	-11.76	AVG	H
5150.00	58.90	-3.63	55.27	74	-18.73	peak	V
5150.00	45.98	-3.63	42.35	54	-11.65	AVG	V

Worse case mode:		802.11a(6Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	57.65	-3.59	54.06	74	-19.94	peak	H
5350.00	45.76	-3.59	42.17	54	-11.83	AVG	H
5350.00	59.54	-3.59	55.95	74	-18.05	peak	V
5350.00	46.59	-3.59	43.00	54	-11.00	AVG	V

Worse case mode:		802.11a(6Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	59.65	-3.46	56.19	68.2	-12.01	peak	H
5742.15	96.63	-3.44	93.19	122.2	-24.95	peak	H
5650.00	59.43	-3.46	55.97	68.2	-12.23	peak	V
5742.37	89.52	-3.44	86.08	122.2	-36.12	peak	V

Worse case mode:		802.11a(6Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5824.77	90.59	-3.42	87.17	122.2	-35.03	peak	H
5925.00	57.89	-3.41	54.48	68.2	-13.72	peak	H
5818.71	87.89	-3.42	84.47	122.2	-37.73	peak	V
5925.00	48.54	-3.41	45.13	68.2	-23.07	peak	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	57.98	-3.63	54.35	74	-19.65	peak	H

5150.00	45.87	-3.63	42.24	54	-11.76	AVG	H
5150.00	58.56	-3.63	54.93	74	-19.07	peak	V
5150.00	46.84	-3.63	43.21	54	-10.97	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	58.63	-3.59	55.04	74	-18.96	peak	H
5350.00	45.64	-3.59	42.05	54	-11.95	AVG	H
5350.00	58.06	-3.59	54.47	74	-19.53	peak	V
5350.00	46.69	-3.59	43.01	54	-10.90	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	58.44	-3.46	54.98	68.2	-13.22	peak	H
5751.09	98.11	-3.44	94.67	122.2	-27.53	peak	H
5650.00	59.48	-3.46	56.02	68.2	-12.18	peak	V
5744.27	88.96	-3.44	85.52	122.2	-36.68	peak	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5823.41	98.21	-3.42	94.79	122.2	-27.41	peak	H
5925.00	60.11	-3.41	56.70	68.2	-11.50	peak	H
5824.65	88.53	-3.42	85.11	122.2	-37.09	peak	V
5925.00	45.80	-3.41	42.39	68.2	-25.81	peak	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		38	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	54.79	-3.63	51.16	74	-22.84	peak	H
5150.00	45.94	-3.63	42.31	54	-11.69	AVG	H
5150.00	55.89	-3.63	52.26	74	-21.74	peak	V
5150.00	46.92	-3.63	43.29	54	-10.71	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		46	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	57.72	-3.59	54.13	74	-19.87	peak	H

5350.00	44.34	-3.59	40.75	54	-13.25	AVG	H
5350.00	58.30	-3.59	54.71	74	-19.29	peak	V
5350.00	45.91	-3.59	42.32	54	-11.68	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		151	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	57.86	-3.46	54.40	68.2	-13.80	peak	H
5762.61	94.78	-3.44	91.34	122.2	-30.86	peak	H
5650.00	58.56	-3.46	55.10	68.2	-13.10	peak	V
5741.70	86.56	-3.44	83.12	122.2	-39.08	peak	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		159	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5743.60	94.54	-3.42	91.12	122.2	-31.08	peak	H
5925.00	58.78	-3.41	55.36	68.2	-12.84	peak	H
5779.52	85.49	-3.42	82.07	122.2	-40.13	peak	V
5925.00	49.69	-3.41	46.27	68.2	-21.93	peak	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	57.83	-3.63	54.20	74	-19.80	peak	H
5150.00	44.85	-3.63	41.22	54	-12.78	AVG	H
5150.00	58.49	-3.63	54.86	74	-19.14	peak	V
5150.00	45.54	-3.63	41.91	54	-12.09	AVG	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	58.33	-3.59	54.74	74	-19.26	peak	H
5350.00	48.56	-3.59	44.97	54	-9.03	AVG	H
5350.00	58.49	-3.59	54.90	74	-19.10	peak	V
5350.00	46.07	-3.59	42.48	54	-11.52	AVG	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.

(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	58.38	-3.46	54.92	68.2	-13.28	peak	H
5743.54	98.54	-3.44	95.10	122.2	-27.10	peak	H
5650.00	58.89	-3.46	55.43	68.2	-12.77	peak	V
5739.28	90.63	-3.44	87.19	122.2	-35.01	peak	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5831.03	95.85	-3.42	92.43	122.2	-29.77	peak	H
5925.00	58.73	-3.41	55.32	68.2	-12.88	peak	H
5825.11	89.59	-3.42	86.17	122.2	-36.03	peak	V
5925.00	47.54	-3.41	44.13	68.2	-24.07	peak	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		38	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	58.76	-3.63	55.13	74	-18.87	peak	H
5150.00	45.67	-3.63	42.04	54	-11.96	AVG	H
5150.00	59.56	-3.63	55.93	74	-18.07	peak	V
5150.00	46.07	-3.63	42.44	54	-11.56	AVG	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		46	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350.00	59.14	-3.59	55.55	74	-18.45	peak	H
5350.00	45.89	-3.59	42.30	54	-11.70	AVG	H
5350.00	58.76	-3.59	55.17	74	-18.83	peak	V
5350.00	46.85	-3.59	43.26	54	-10.74	AVG	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		151	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	58.89	-3.46	55.43	68.2	-12.77	peak	H
5751.19	90.76	-3.44	87.32	122.2	-34.88	peak	H
5650.00	58.34	-3.46	54.88	68.2	-13.32	peak	V
5741.72	87.65	-3.44	84.21	122.2	-37.99	peak	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		159	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5771.12	89.53	-3.42	86.11	122.2	-36.09	peak	H
5925.00	60.56	-3.41	57.15	68.2	-11.05	peak	H
5806.53	87.76	-3.42	84.34	122.2	-37.86	peak	V
5925.00	48.89	-3.41	45.48	68.2	-22.72	peak	V

Worse case mode:		802.11ac(VHT80)(29.3Mbps)		Test channel:		42	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150.00	59.51	-3.63	55.88	74	-18.12	peak	H
5150.00	44.48	-3.63	40.85	54	-13.15	AVG	H
5150.00	59.59	-3.63	55.96	74	-18.04	peak	V
5150.00	46.09	-3.63	42.46	54	-11.54	AVG	V
5350.00	58.64	-3.59	55.05	74	-18.95	peak	H
5350.00	43.67	-3.59	40.08	54	-13.92	AVG	H
5350.00	58.46	-3.59	54.87	74	-19.13	peak	V
5350.00	45.69	-3.59	42.10	54	-11.90	AVG	V

Worse case mode:		802.11ac(VHT80)(29.3Mbps)		Test channel:		155	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650.00	59.59	-3.46	56.13	68.2	-12.07	peak	H
5766.32	87.97	-3.44	84.53	122.2	-37.67	peak	H
5925.00	59.78	-3.46	56.32	68.2	-11.88	peak	H
5650.00	59.87	-3.41	56.46	68.2	-11.74	peak	V
5754.64	80.54	-3.42	77.12	122.2	-45.08	peak	V
5925.00	46.69	-3.41	43.28	68.2	-24.92	peak	V

Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

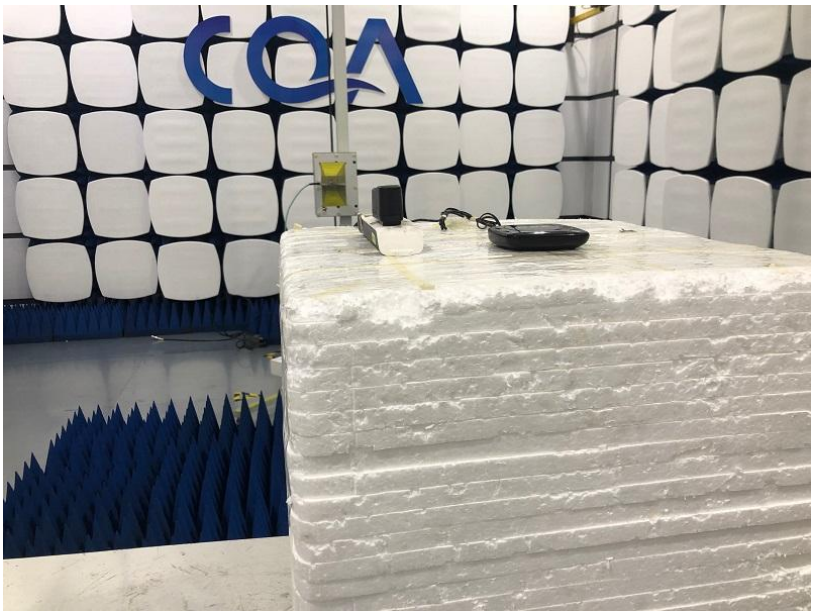
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

6 Photographs - EUT Test Setup

6.1 Radiated Spurious Emission

30MHz~1GHz:

Above 1GHz:

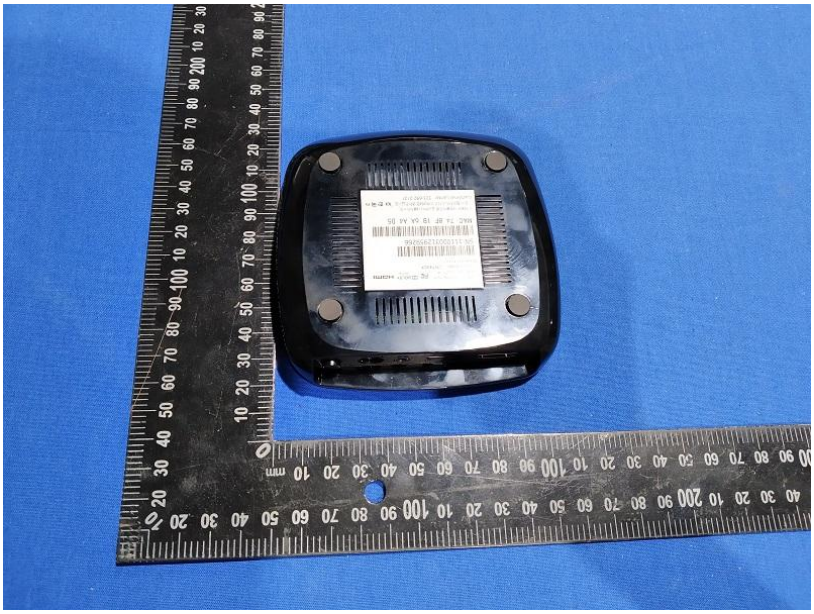


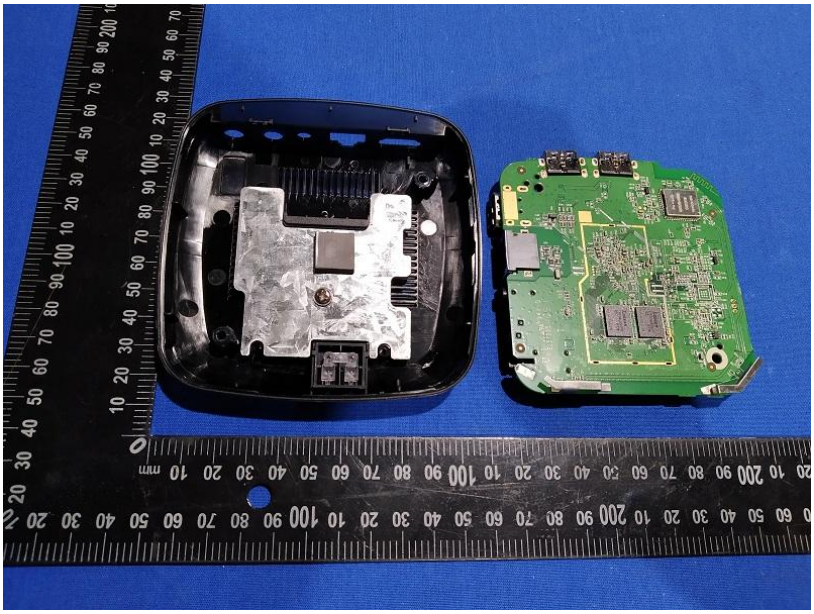
6.2 Conducted Emission

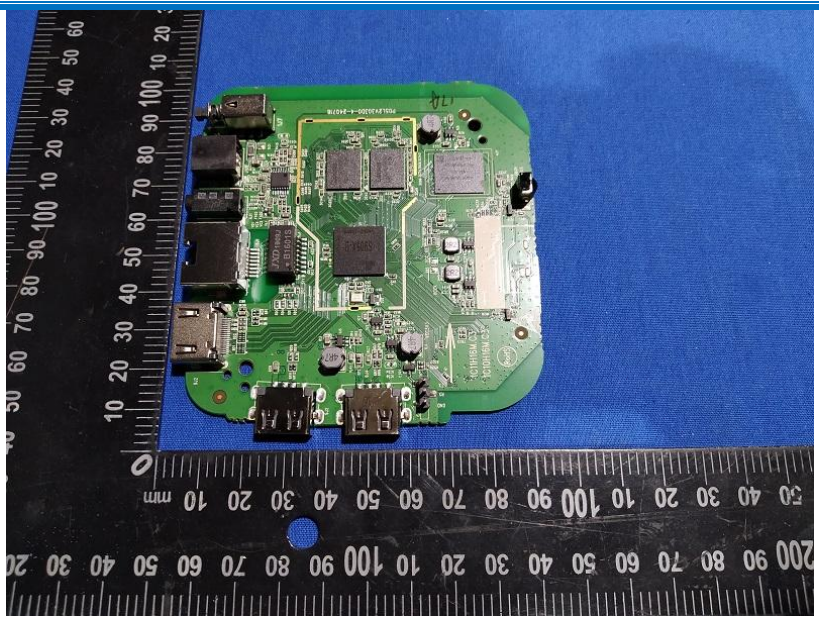
7 Photographs - EUT Constructional Details

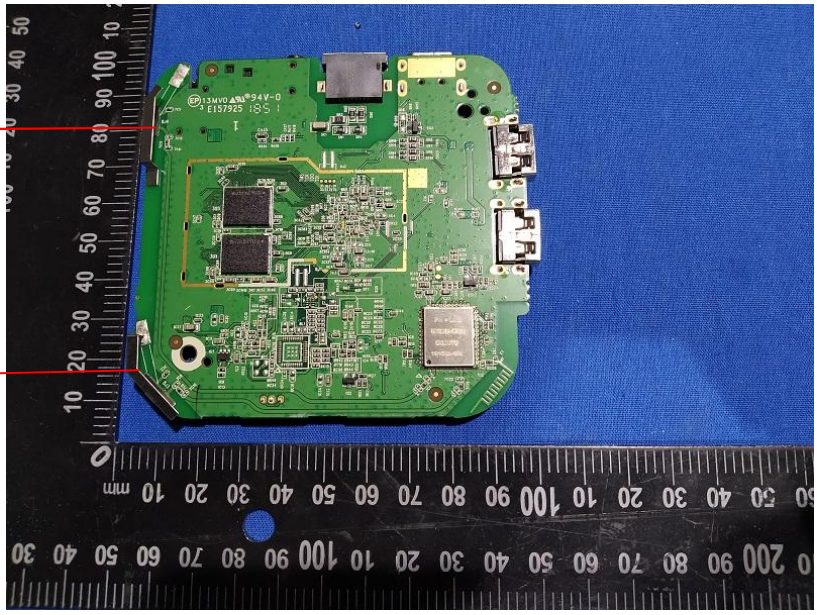
Test model No.:

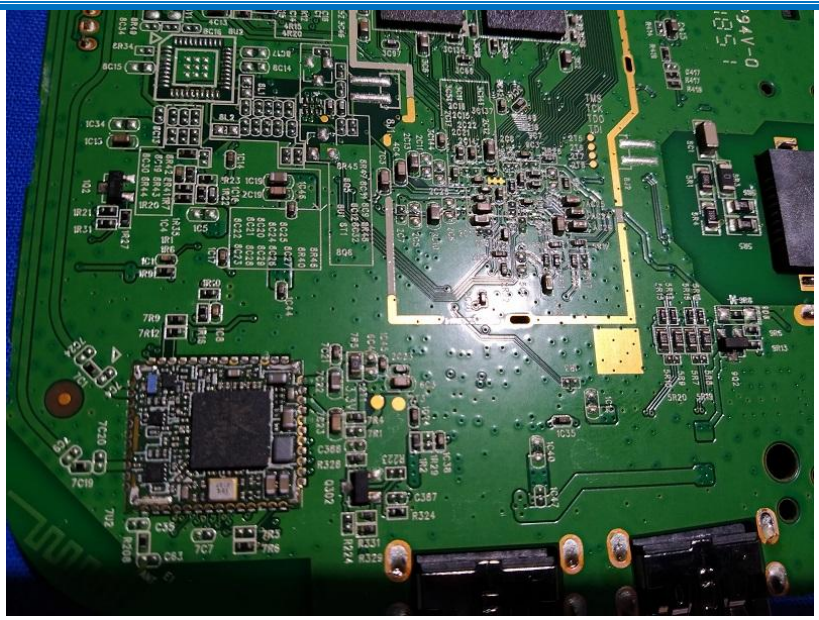
한국TV








2.4G/5G
Antenna 2
2.4G/5G
Antenna 1



THE END