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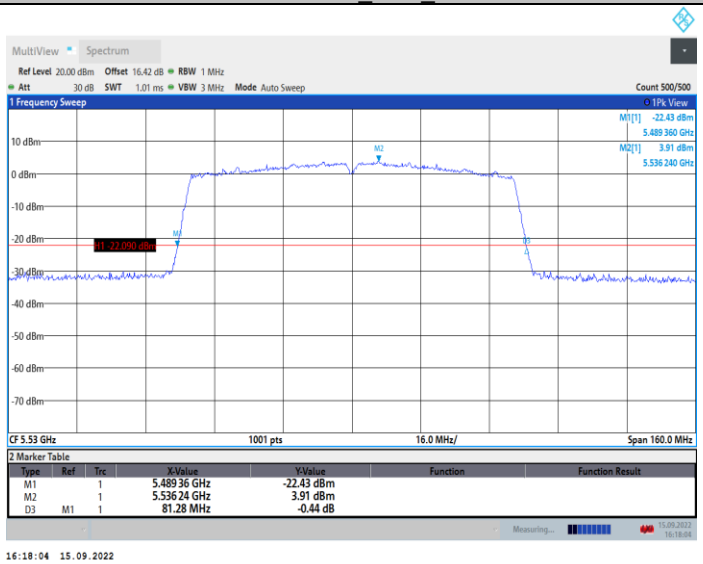
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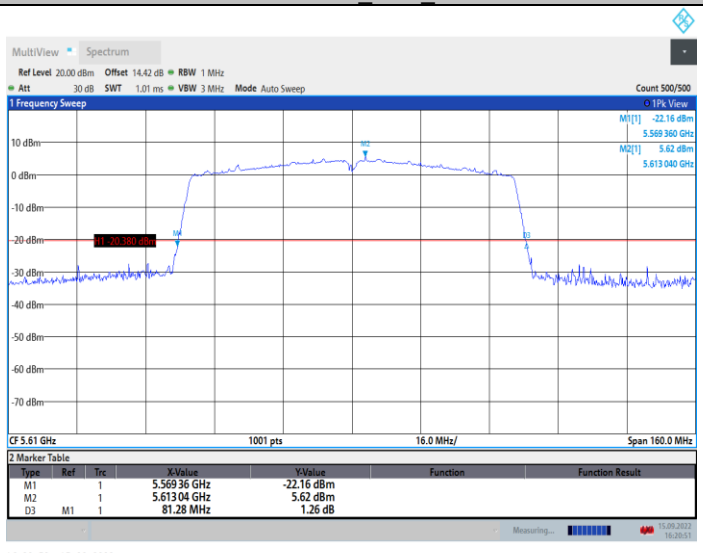
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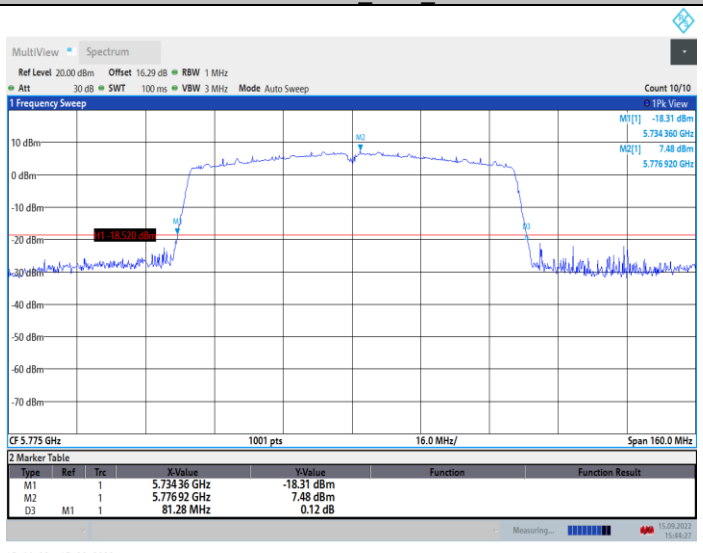

8. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

8.1. Limits of Maximum Conducted Output Power Measurement

CFR 47 (FCC) part 15.407 (a)
For the band 5.15–5.25 GHz.
For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the max-imum antenna gain does not exceed 6 dBi.
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz,the maximum antenna gain does not exceed 6 dBi.
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

8.2. Test Procedure

(i) Measurements may be performed using spectrum analyzer if all of the conditions listed below are satisfied.
The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B.
(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
(iv) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle (e.g.,10 log (1/0.25) if the duty cycle is 25%) the measurement result.

8.3. Test Setup

8.4. Test Data

Table 11 Maximum Conducted Output Power Test Data

Test Mode	Test Channel [MHz]	Power [dBm]	Limit [dBm]	Verdict
802.11a	5180	14.98	<=23.98	PASS

802.11a	5200	16.74	<=23.98	PASS
802.11a	5240	17.40	<=23.98	PASS
802.11a	5260	17.17	<=23.98	PASS
802.11a	5280	17.02	<=23.98	PASS
802.11a	5320	13.89	<=23.98	PASS
802.11a	5500	13.62	<=23.98	PASS
802.11a	5600	17.37	<=23.98	PASS
802.11a	5700	11.97	<=23.98	PASS
802.11a	5745	16.63	<=30	PASS
802.11a	5785	16.67	<=30	PASS
802.11a	5825	16.79	<=30	PASS
802.11n HT20	5180	14.92	<=23.98	PASS
802.11n HT20	5200	17.01	<=23.98	PASS
802.11n HT20	5240	17.38	<=23.98	PASS
802.11n HT20	5260	17.17	<=23.98	PASS
802.11n HT20	5280	17.11	<=23.8	PASS
802.11n HT20	5320	13.23	<=23.98	PASS
802.11n HT20	5500	13.31	<=23.98	PASS
802.11n HT20	5600	17.09	<=23.98	PASS
802.11n HT20	5700	12.01	<=23.98	PASS
802.11n HT20	5745	16.69	<=30	PASS
802.11n HT20	5785	16.62	<=30	PASS
802.11n HT20	5825	16.75	<=30	PASS
802.11n HT40	5190	11.66	<=23.98	PASS
802.11n HT40	5230	16.92	<=23.98	PASS
802.11n HT40	5270	15.91	<=23.98	PASS
802.11n HT40	5310	11.78	<=23.98	PASS
802.11n HT40	5510	11.62	<=23.98	PASS
802.11n HT40	5590	16.99	<=23.98	PASS
802.11n HT40	5670	14.04	<=23.98	PASS
802.11n HT40	5755	16.73	<=30	PASS
802.11n HT40	5795	16.69	<=30	PASS
802.11ac VHT20	5180	14.59	<=23.98	PASS
802.11ac VHT20	5200	16.14	<=23.98	PASS
802.11ac VHT20	5240	16.51	<=23.98	PASS
802.11ac VHT20	5260	16.27	<=23.98	PASS
802.11ac VHT20	5280	16.06	<=23.98	PASS
802.11ac VHT20	5320	13.14	<=23.98	PASS
802.11ac VHT20	5500	12.64	<=23.98	PASS
802.11ac VHT20	5600	16.06	<=23.98	PASS
802.11ac VHT20	5700	11.02	<=23.98	PASS
802.11ac VHT20	5745	16.68	<=30	PASS
802.11ac VHT20	5785	17.10	<=30	PASS
802.11ac VHT20	5825	17.41	<=30	PASS
802.11ac VHT40	5190	10.58	<=23.98	PASS
802.11ac VHT40	5230	15.62	<=23.98	PASS

802.11ac VHT40	5270	15.20	<=23.98	PASS
802.11ac VHT40	5310	11.16	<=23.98	PASS
802.11ac VHT40	5510	10.36	<=23.98	PASS
802.11ac VHT40	5590	16.07	<=23.98	PASS
802.11ac VHT40	5670	12.68	<=23.98	PASS
802.11ac VHT40	5755	16.71	<=30	PASS
802.11ac VHT40	5795	17.07	<=30	PASS
802.11ac VHT80	5210	10.97	<=23.98	PASS
802.11ac VHT80	5290	11.10	<=23.98	PASS
802.11ac VHT80	5530	10.75	<=23.98	PASS
802.11ac VHT80	5610	14.81	<=23.98	PASS
802.11ac VHT80	5775	13.98	<=30	PASS

Note：The Duty Cycle Factor is compensated in the graph.

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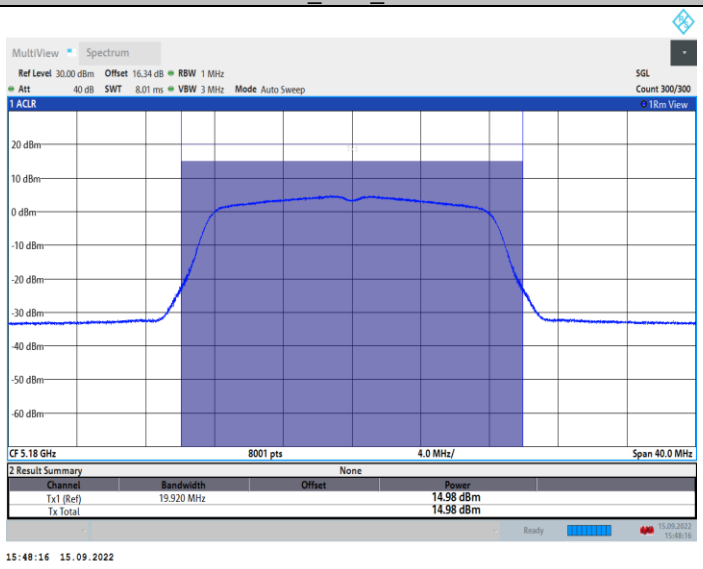
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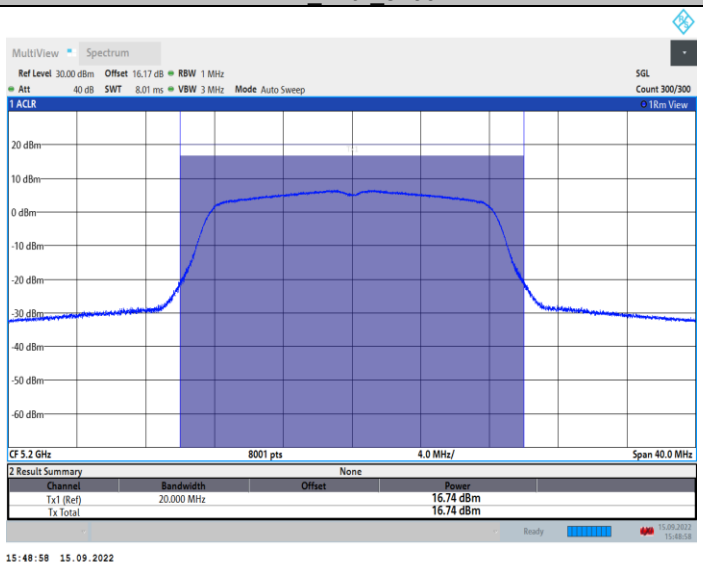

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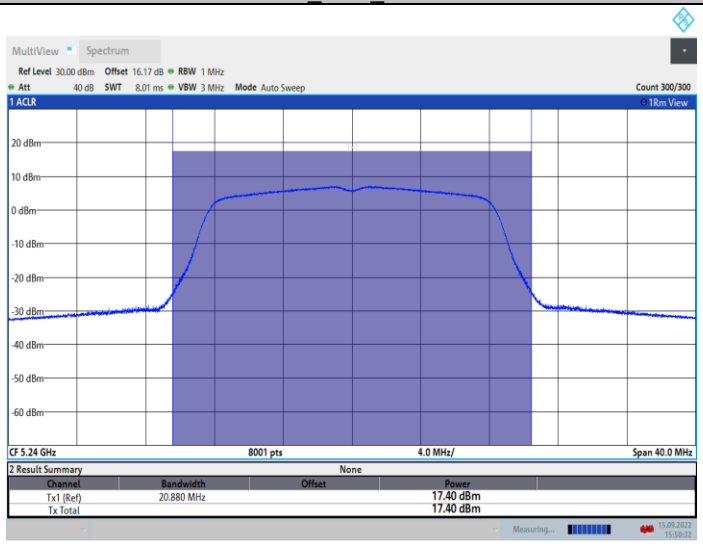 15:50:32 15.09.2022
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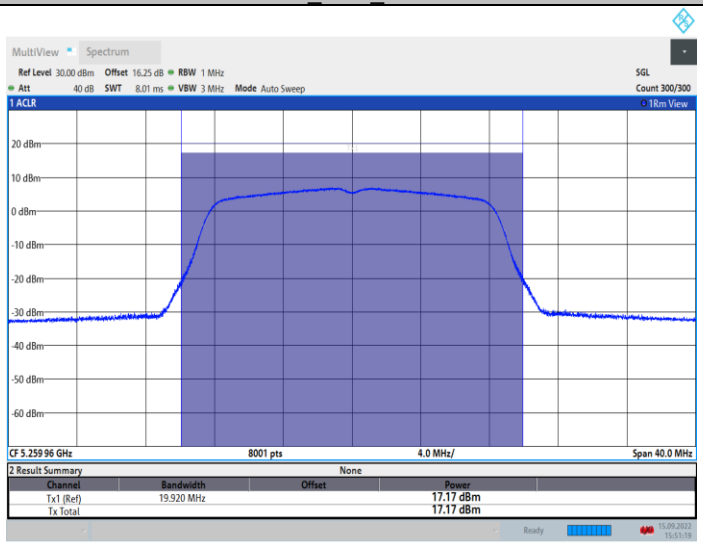 15:51:20 15.09.2022
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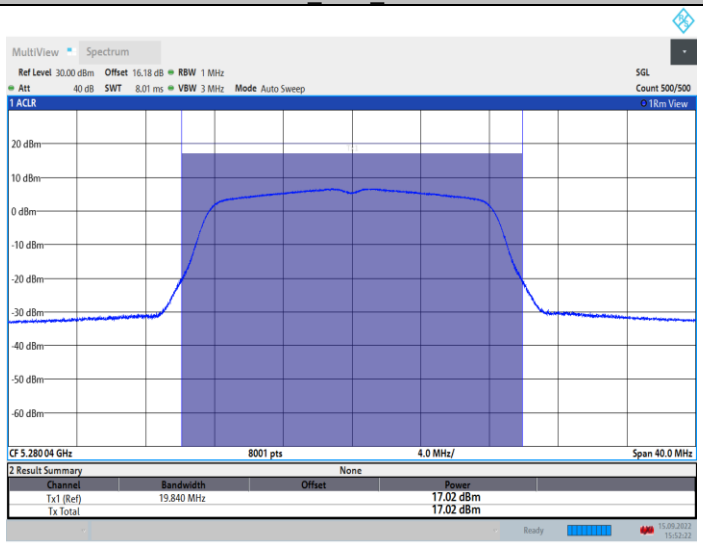 15:52:22 15.09.2022

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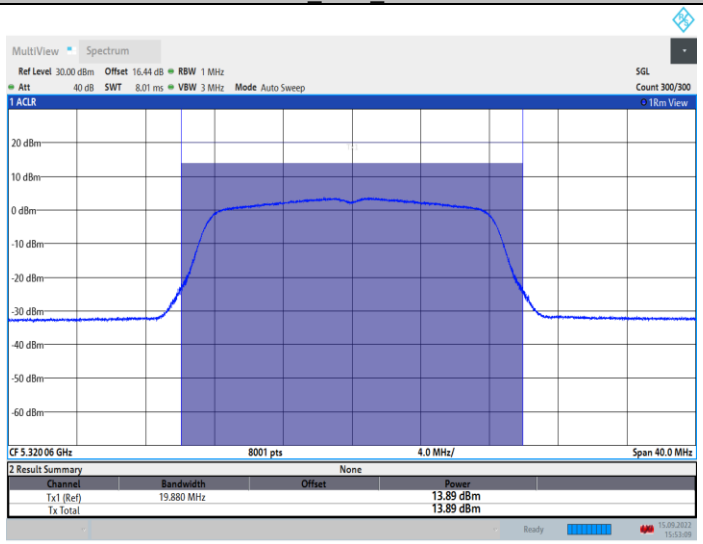
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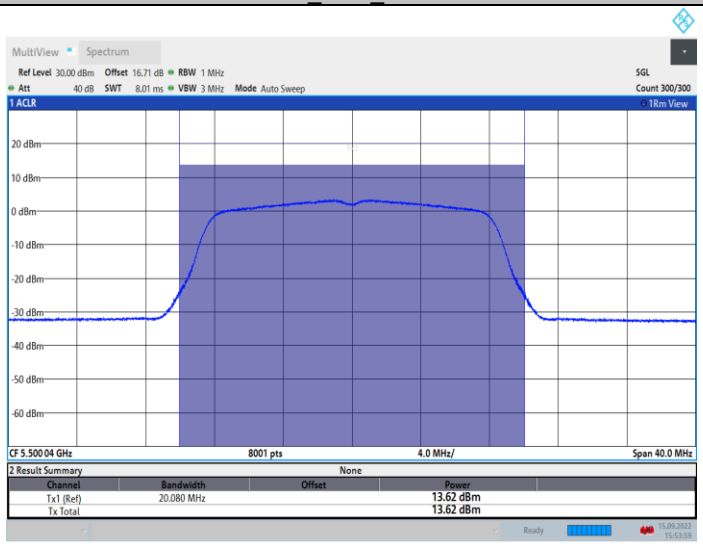
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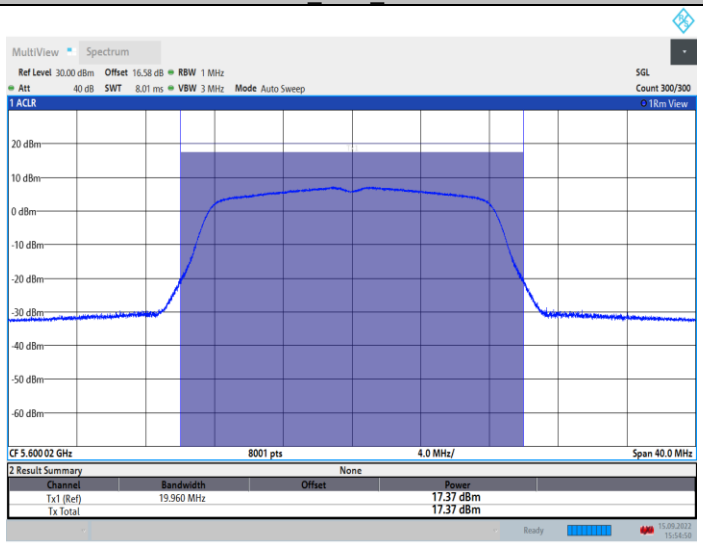

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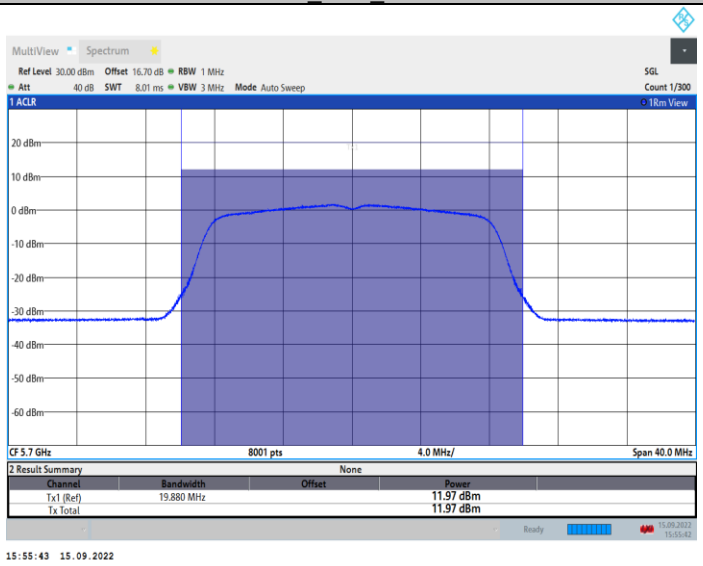
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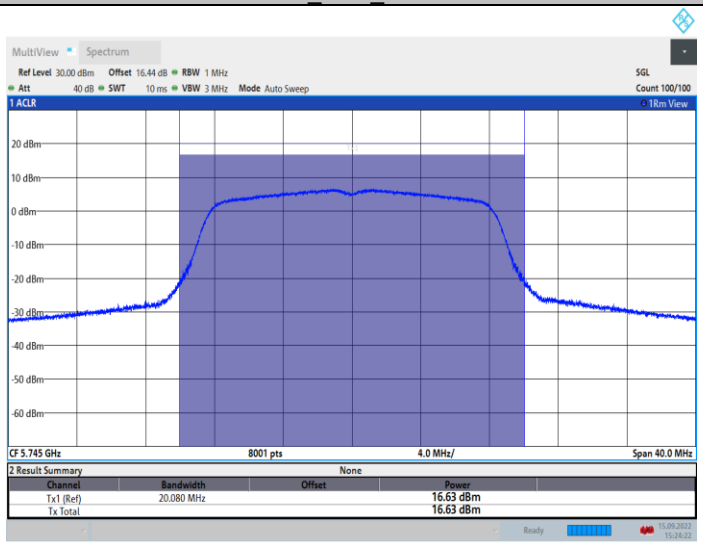
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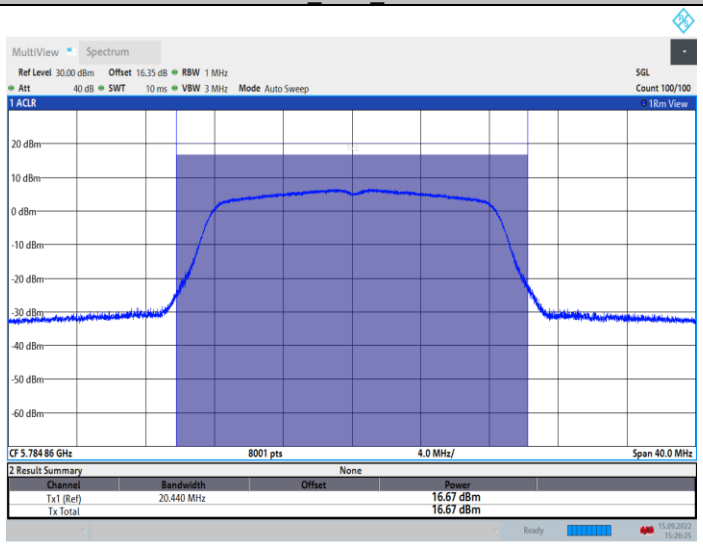

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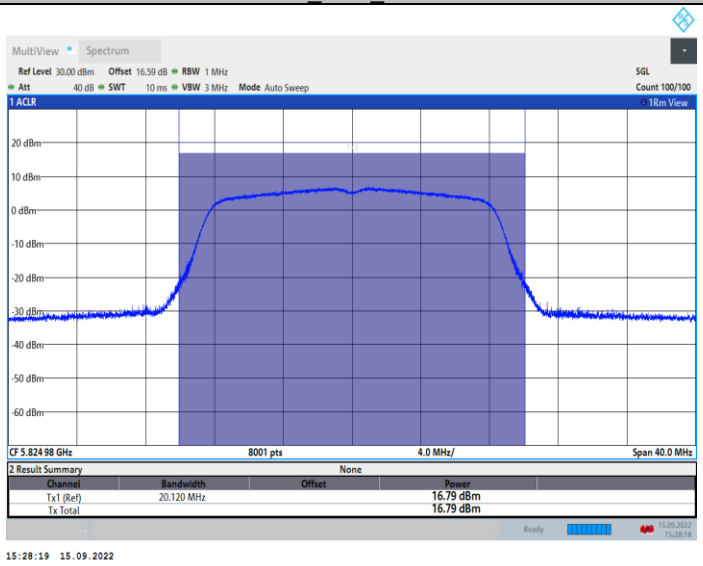
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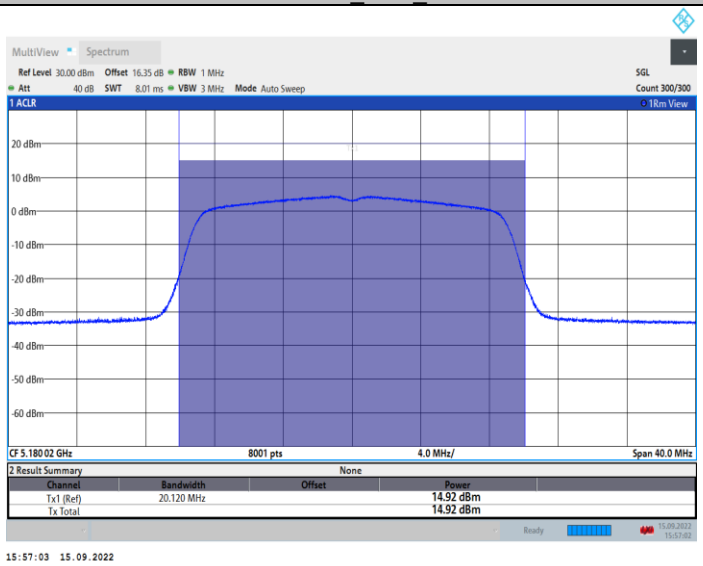
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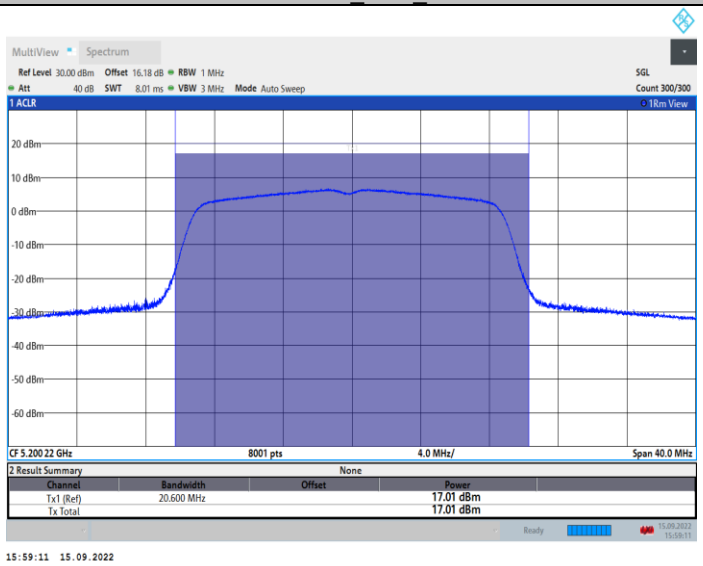

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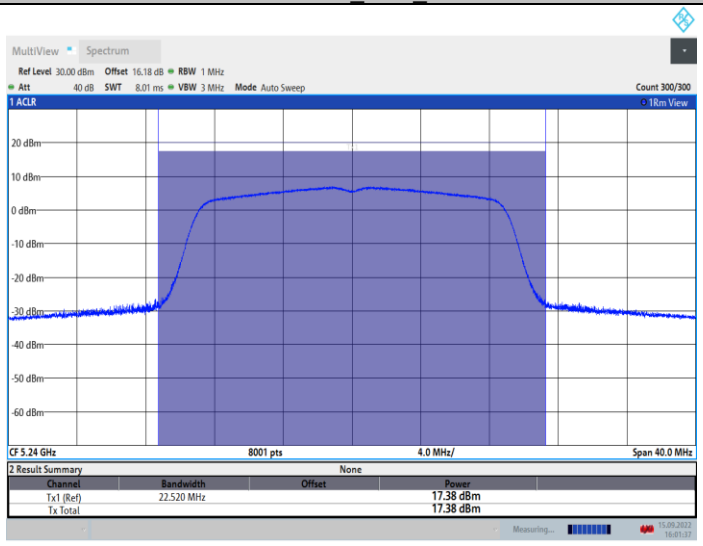 16:01:38 15.09.2022
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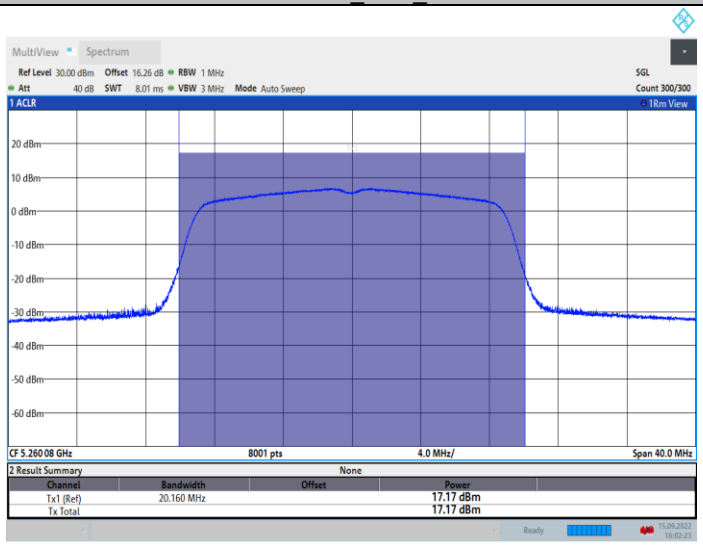 16:02:24 15.09.2022
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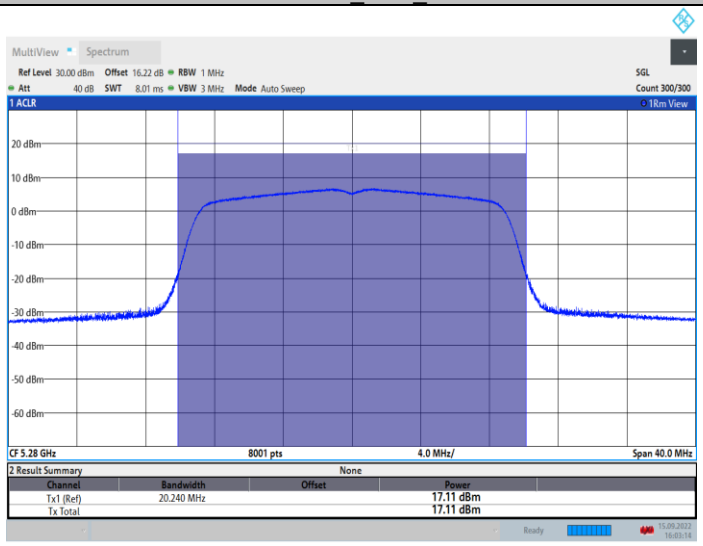 16:03:15 15.09.2022

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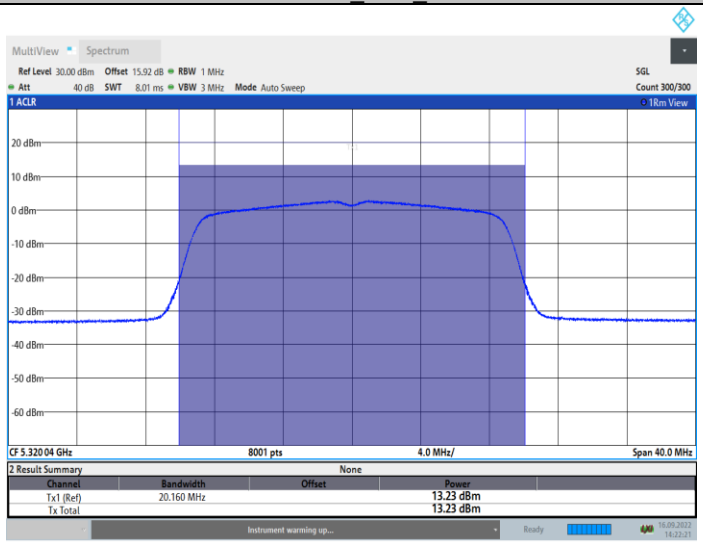
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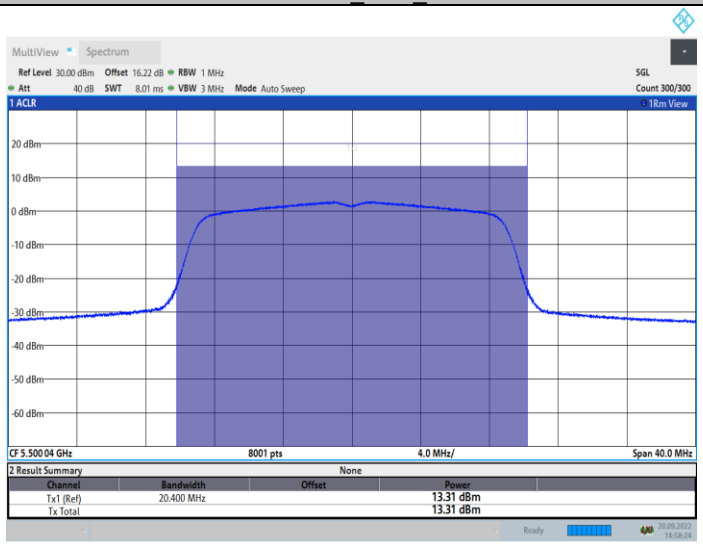
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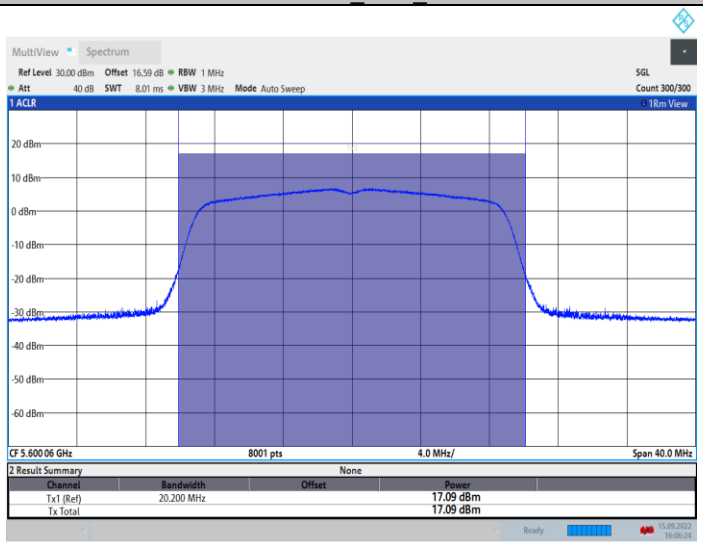

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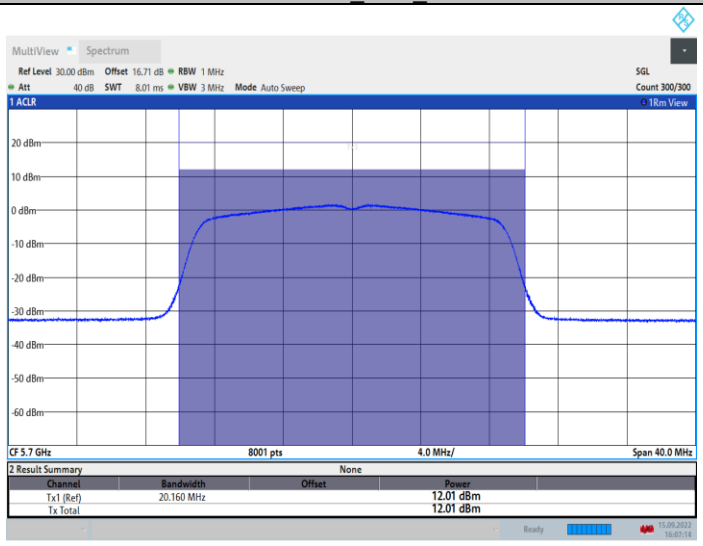
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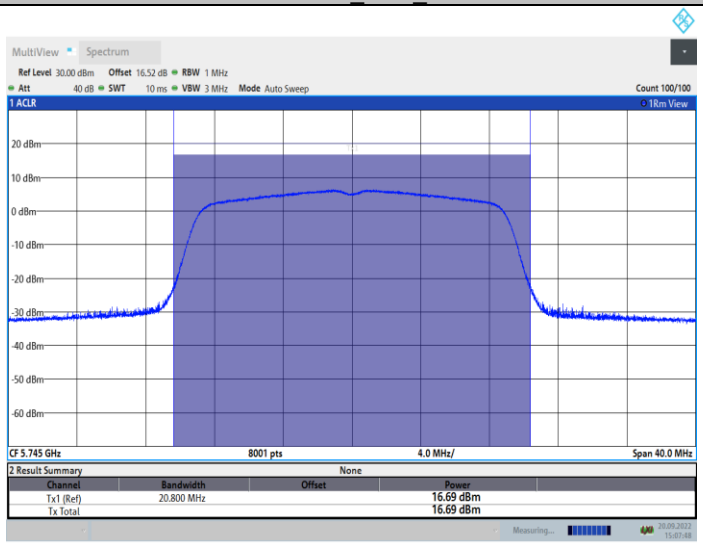
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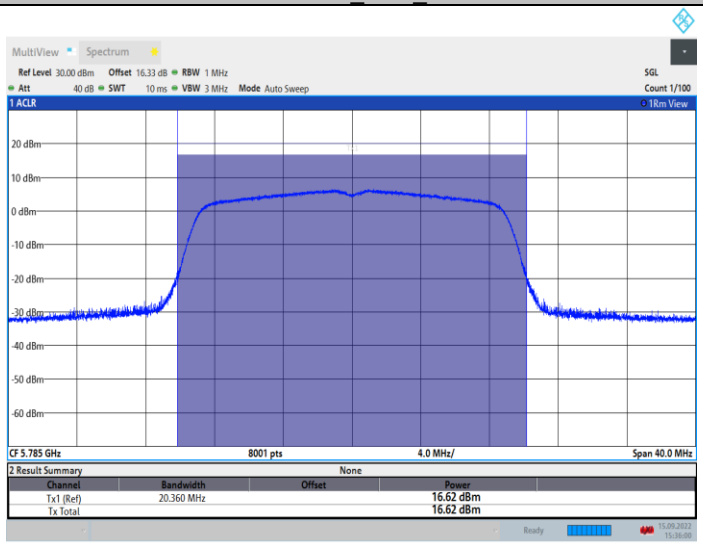

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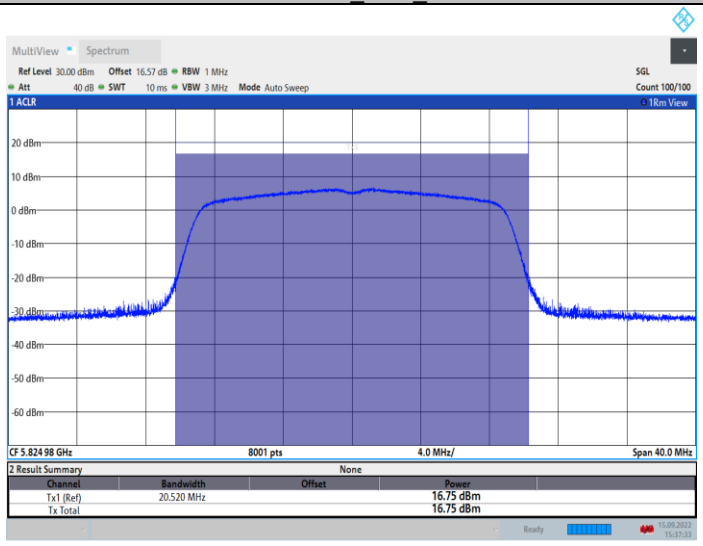
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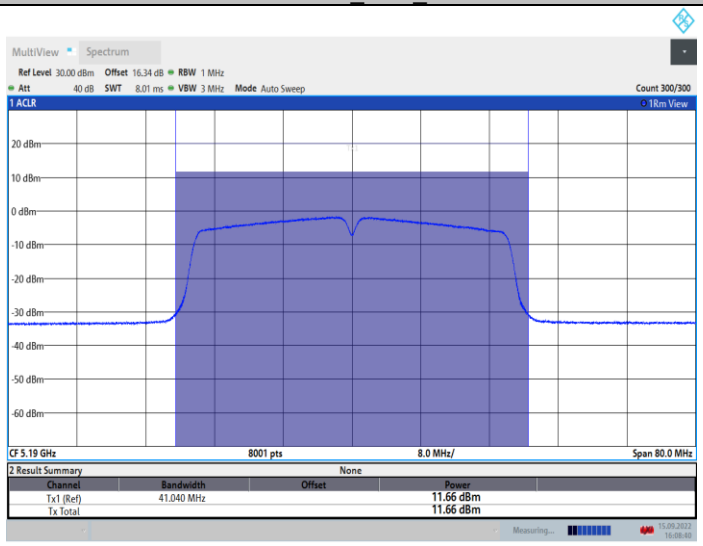
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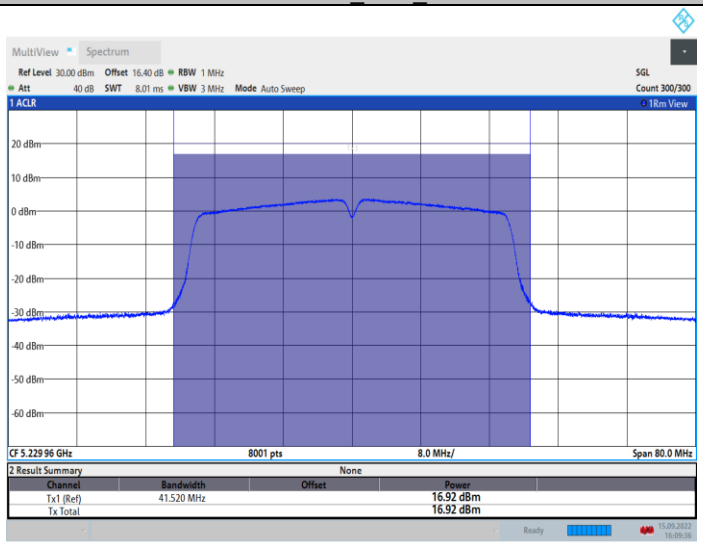

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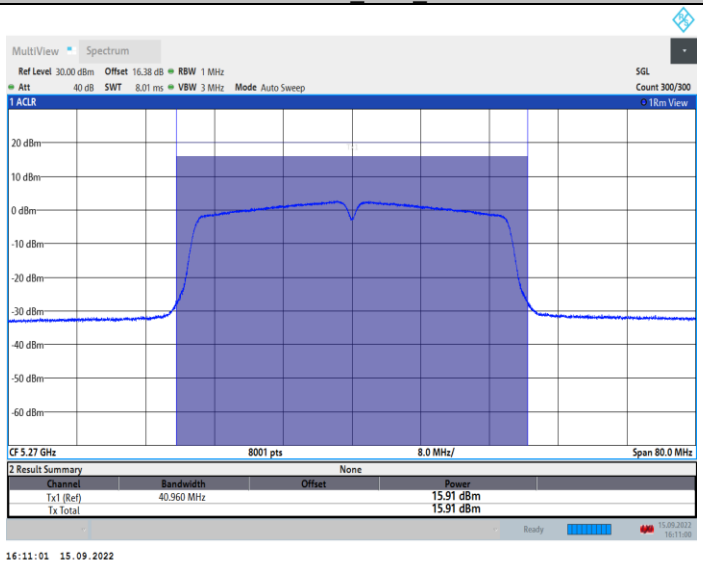
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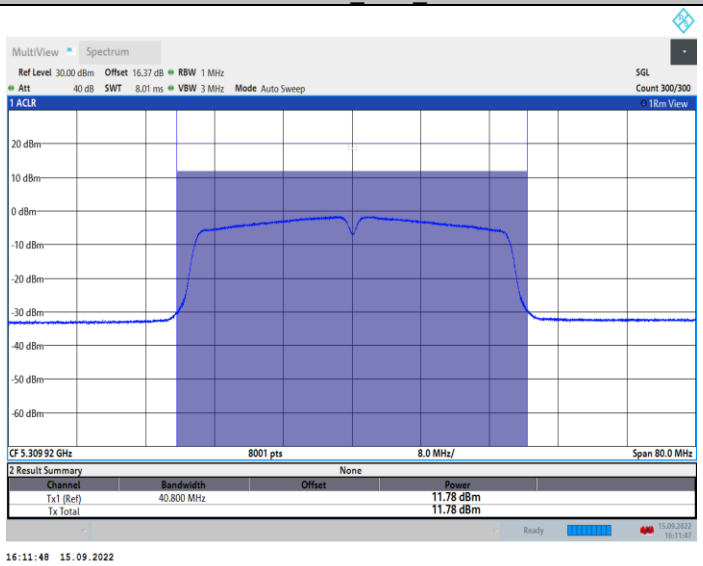
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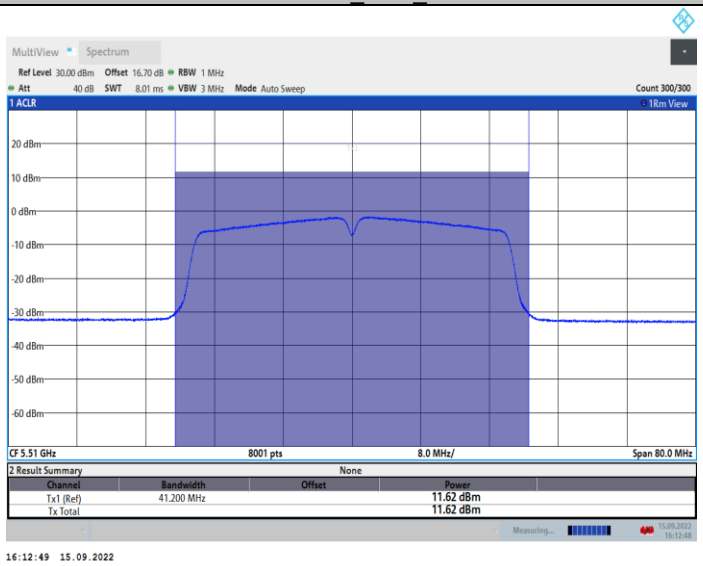

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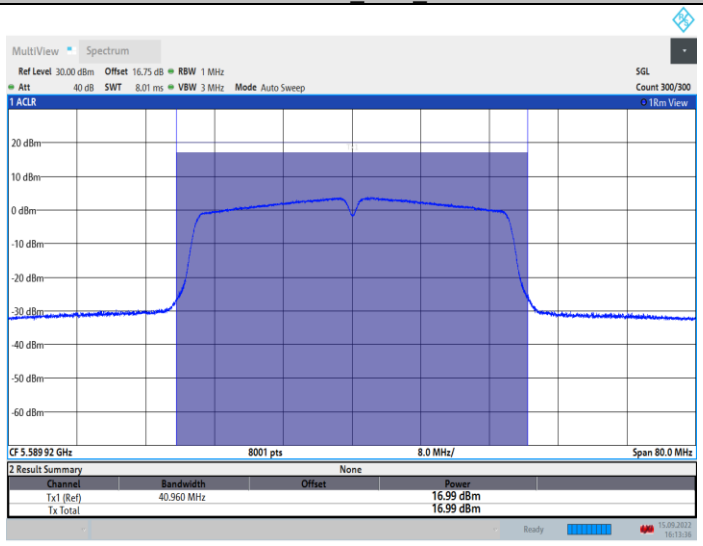
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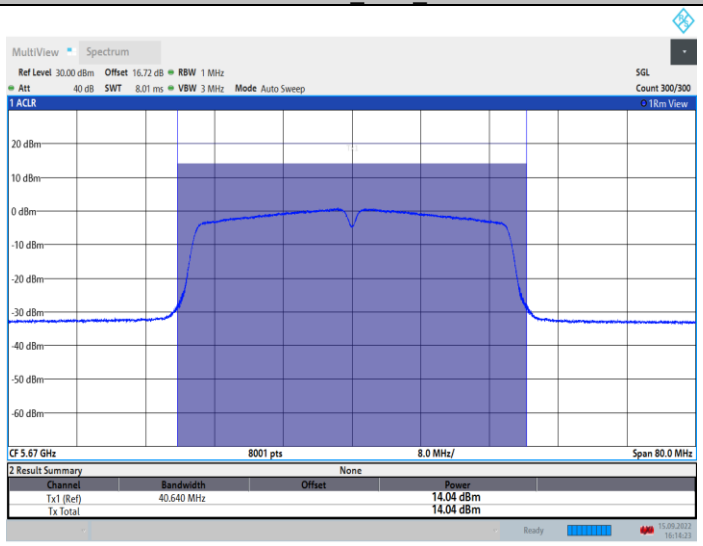
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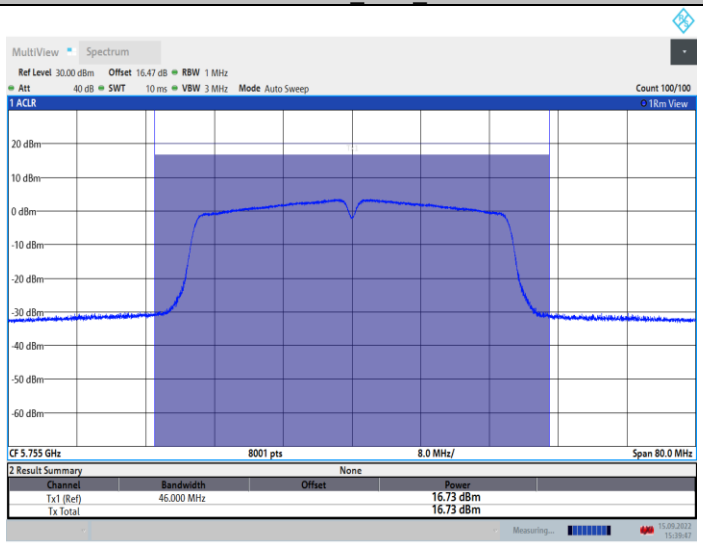

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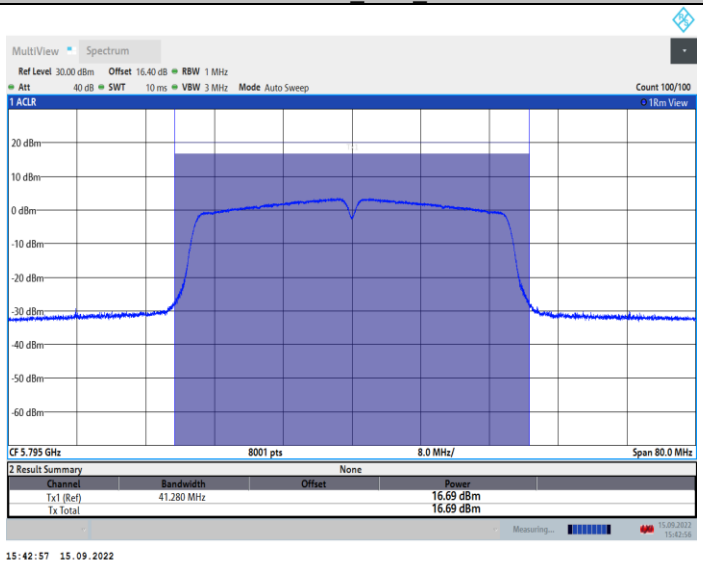
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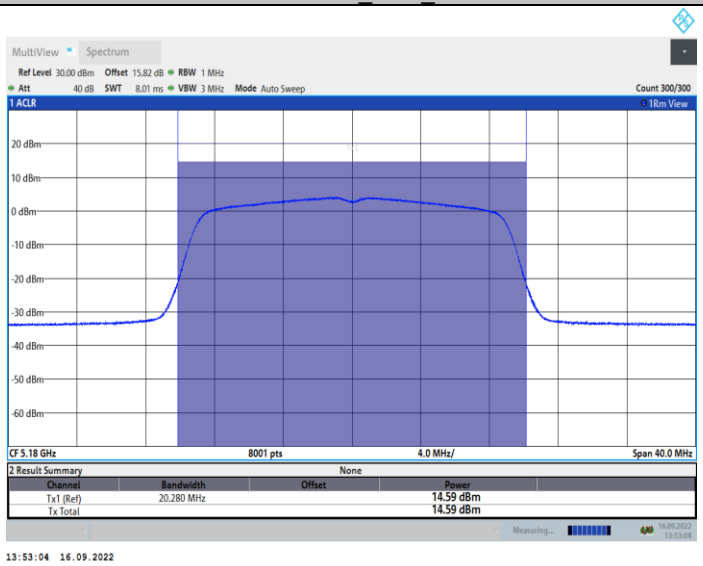
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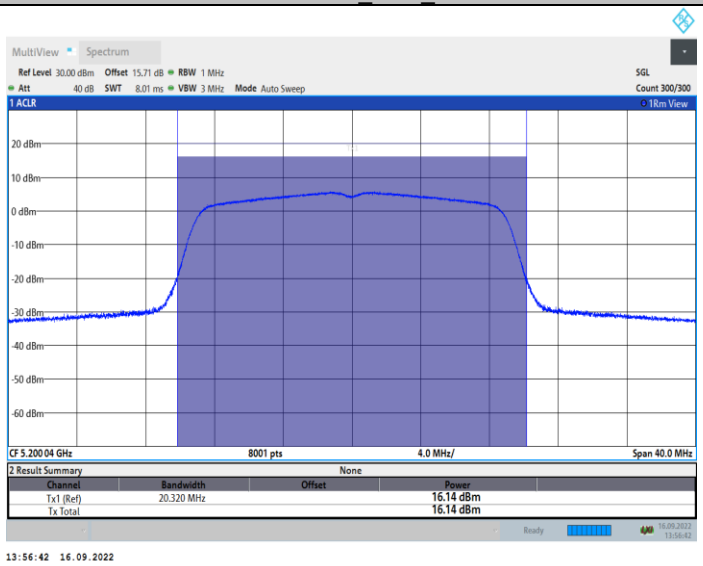

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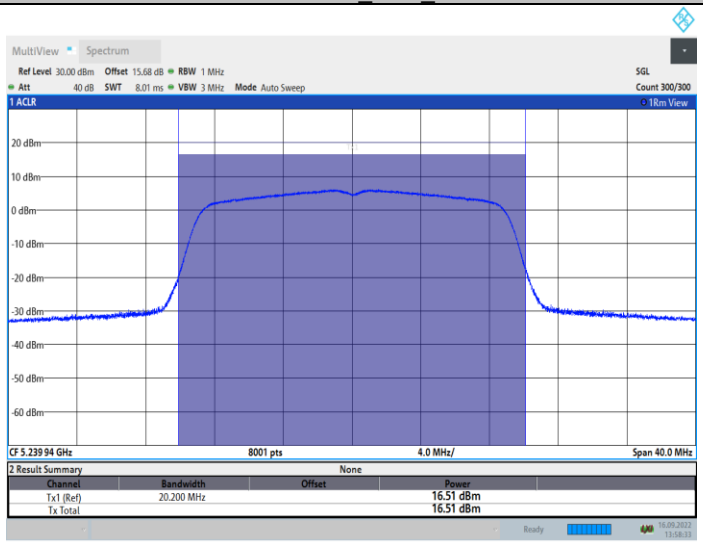
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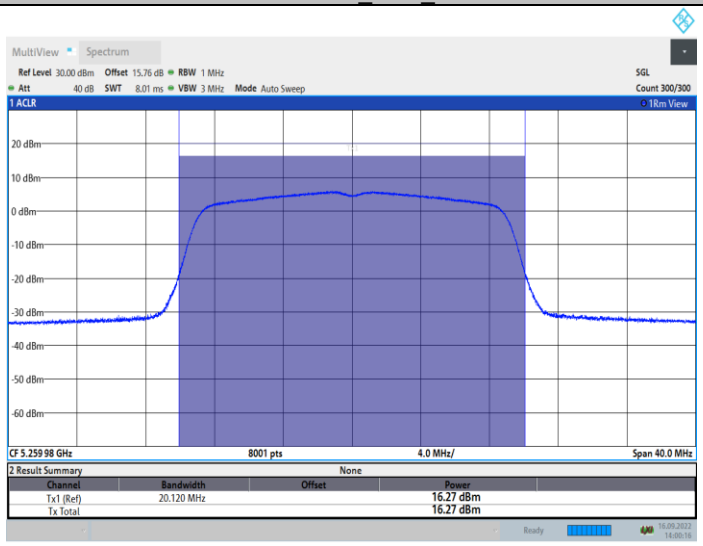
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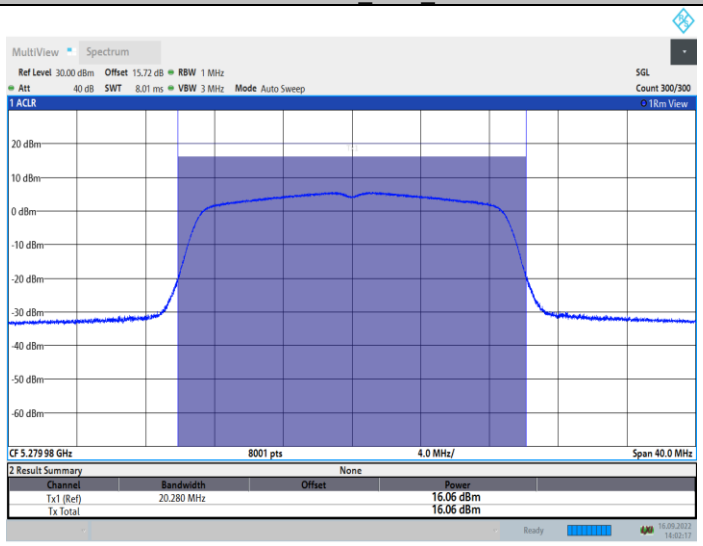

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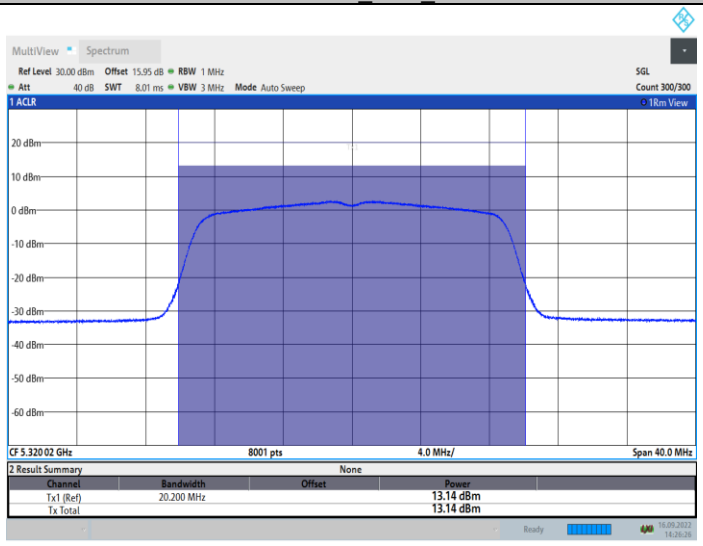
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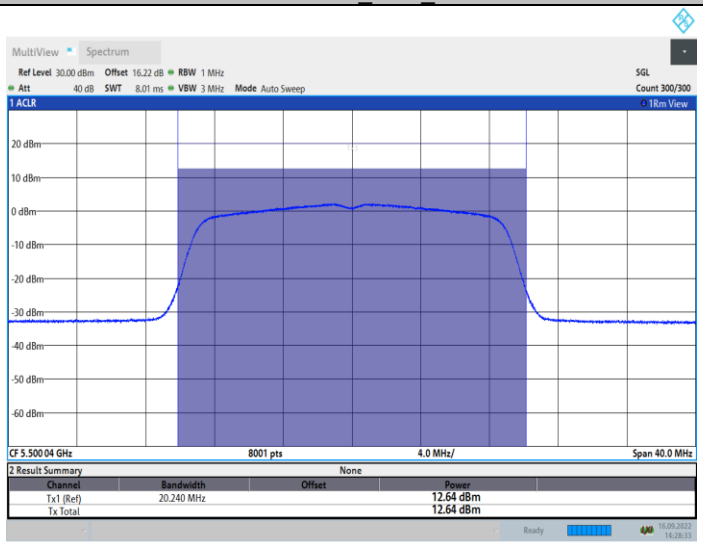
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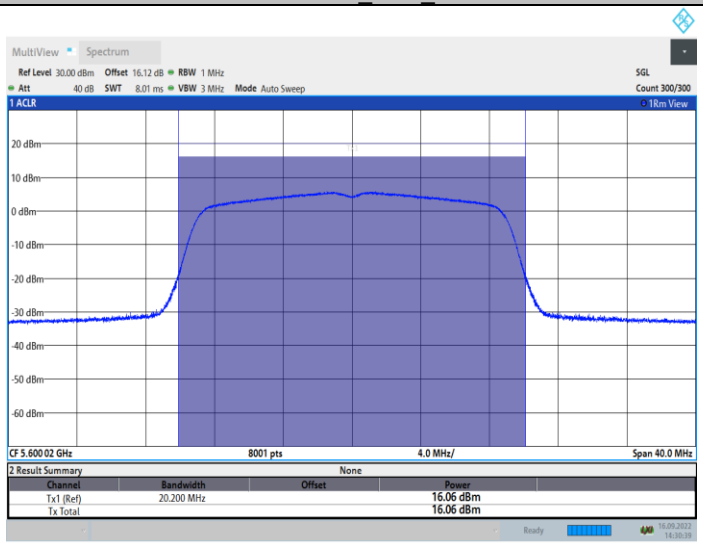

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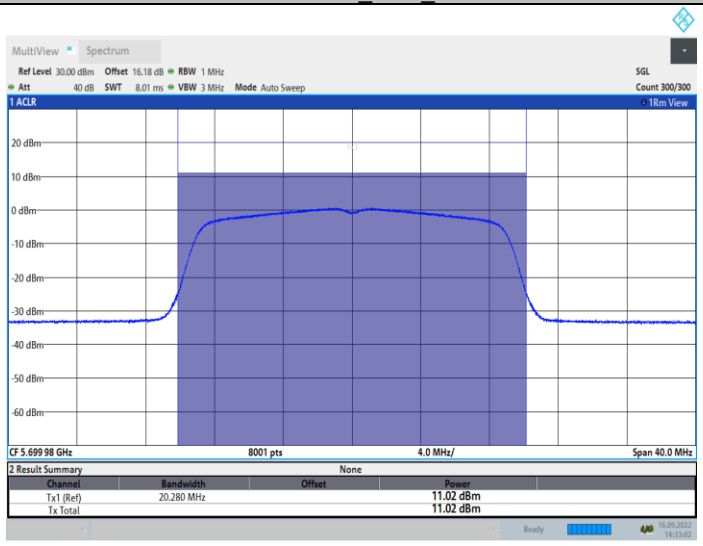
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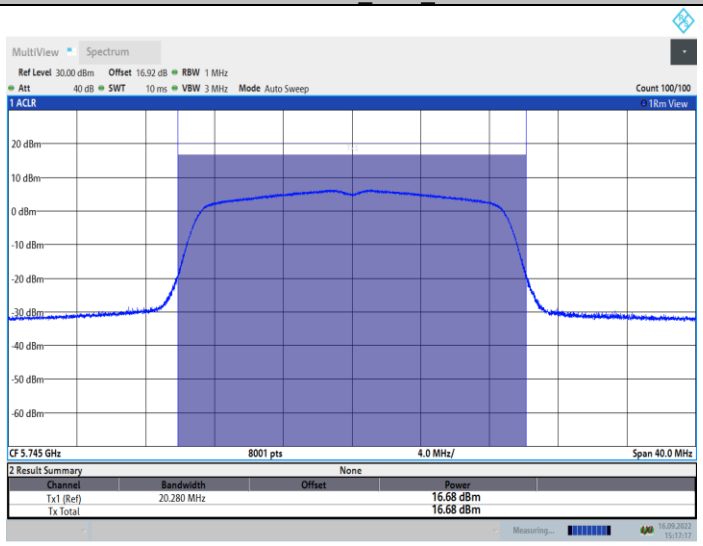
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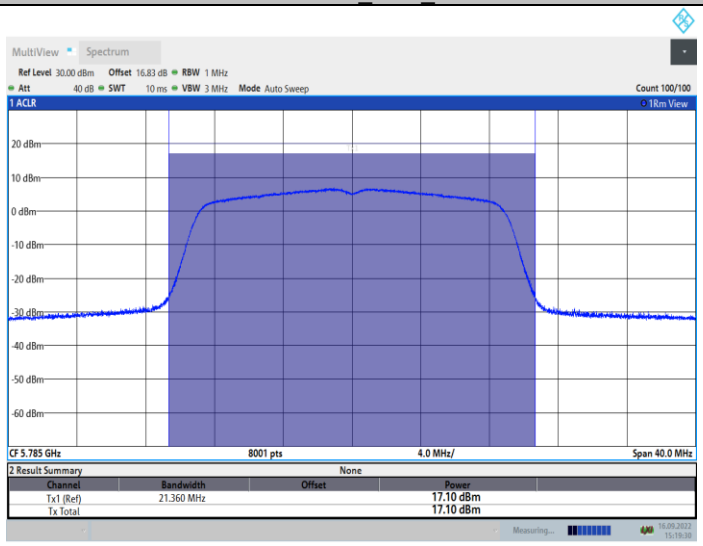

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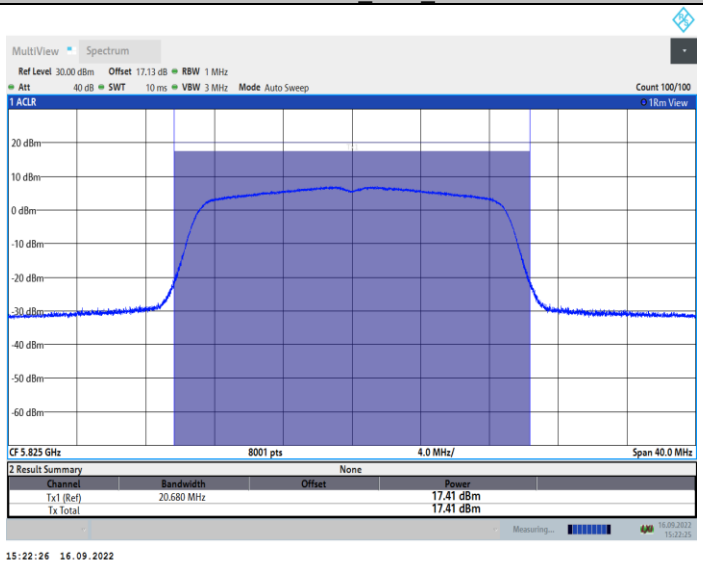
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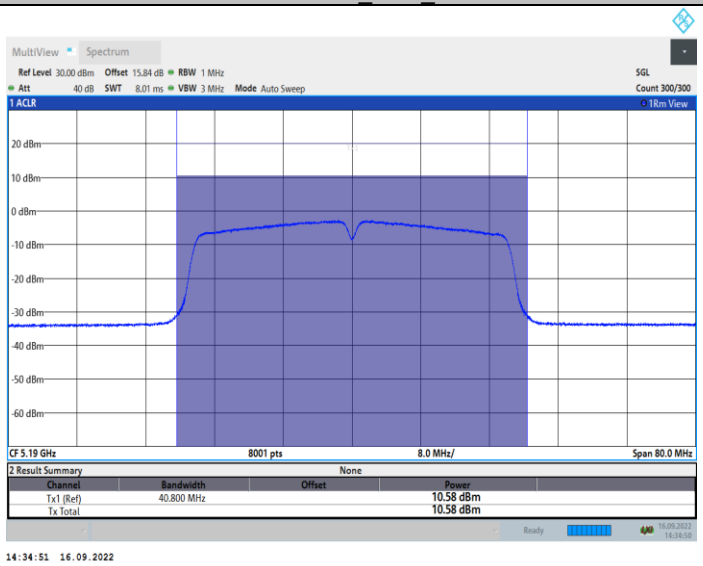
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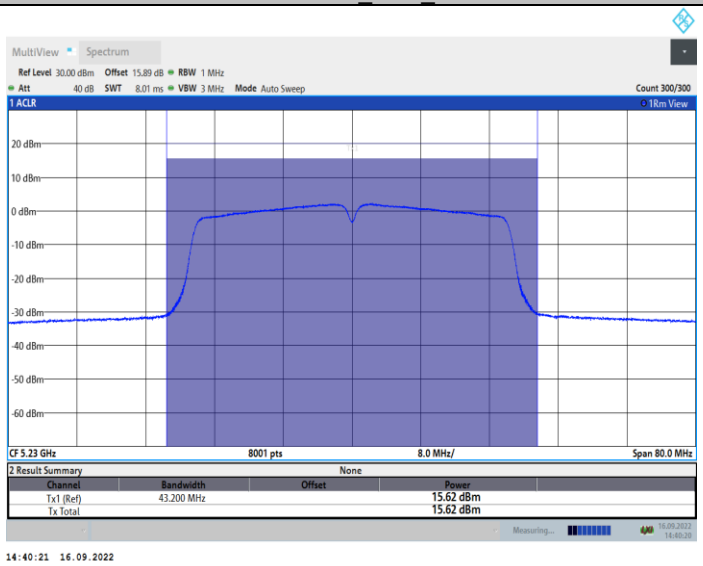

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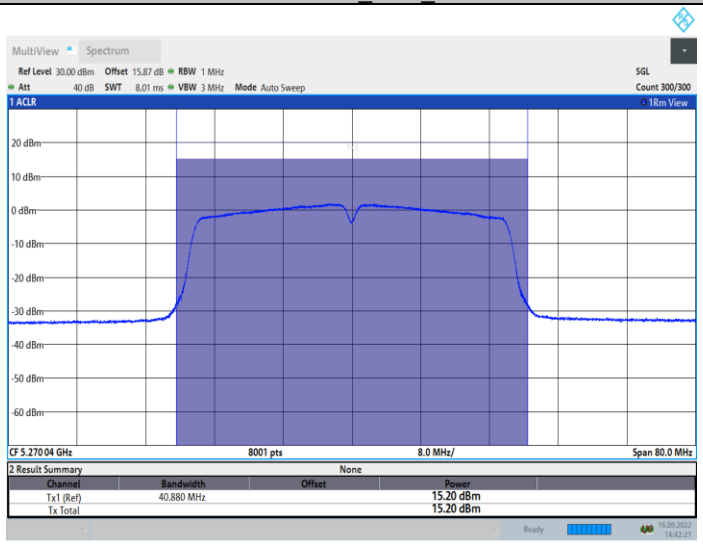
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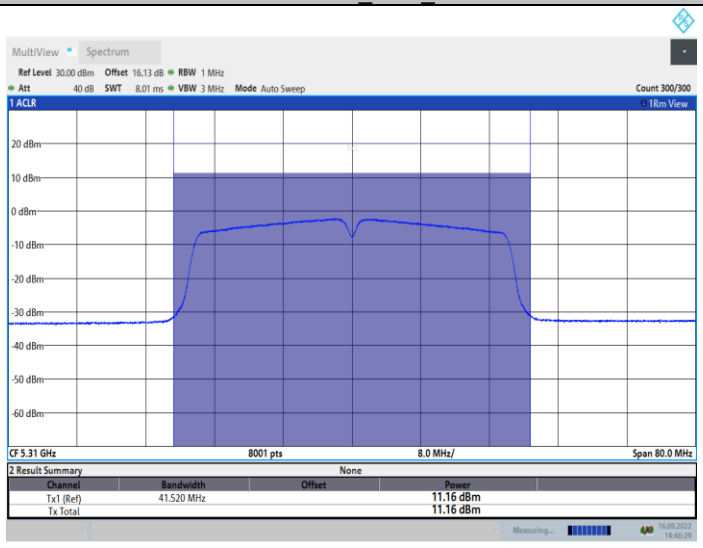
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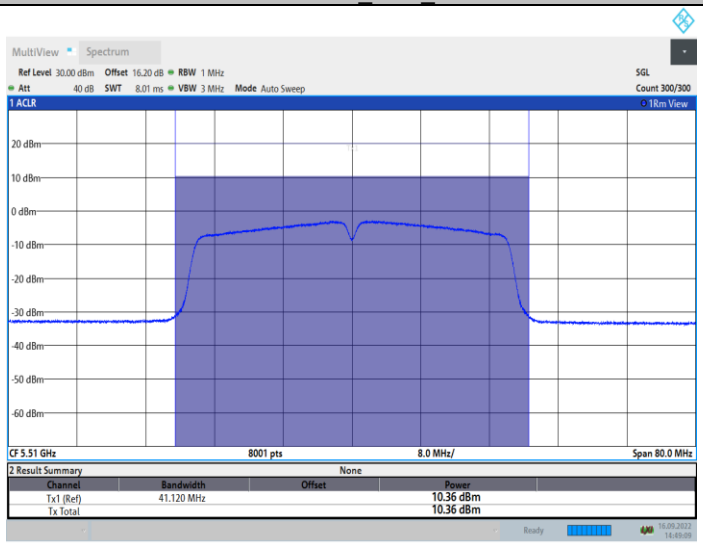

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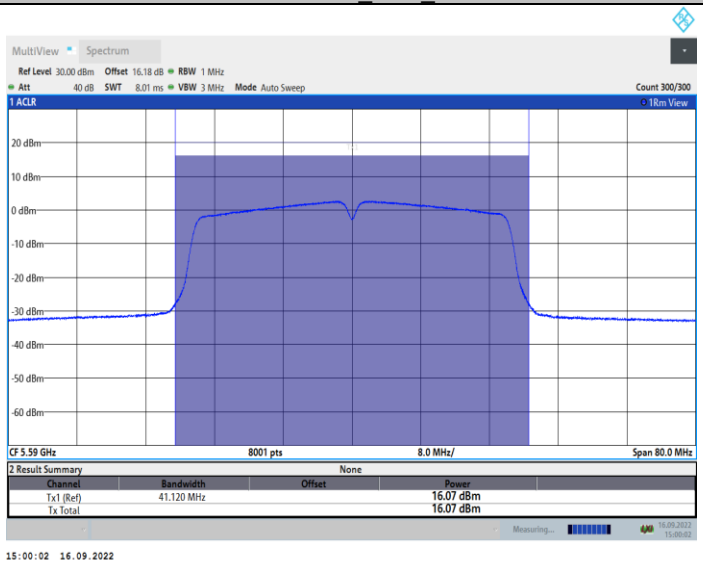
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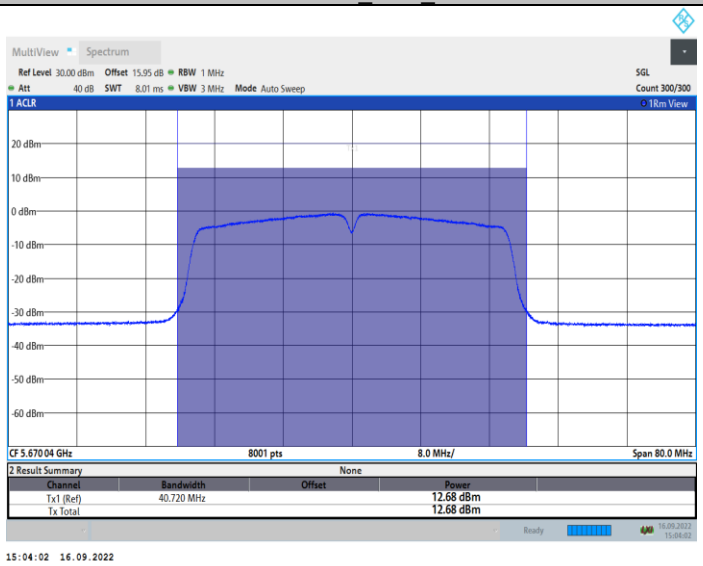
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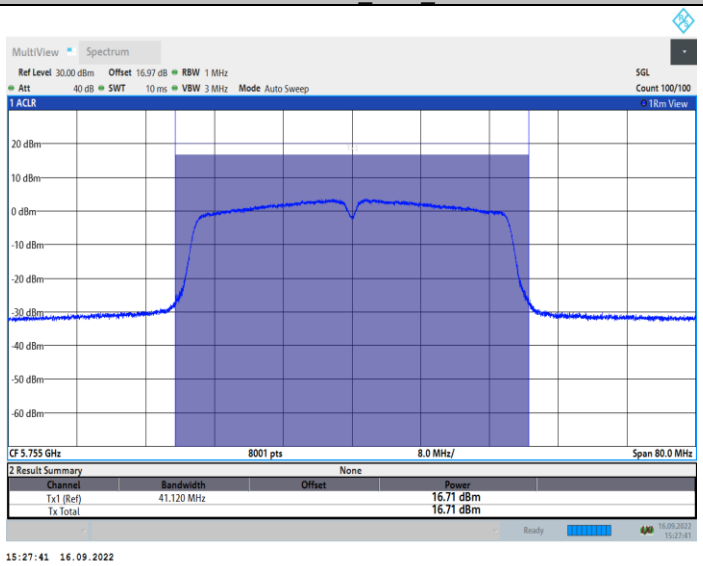

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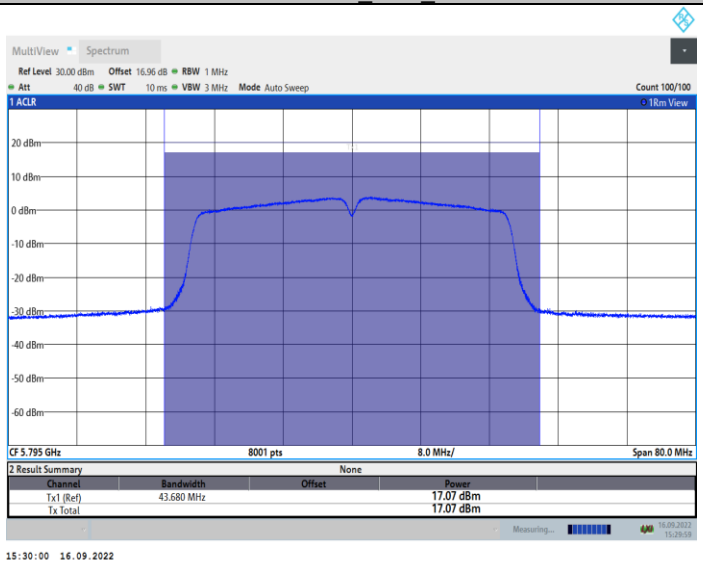
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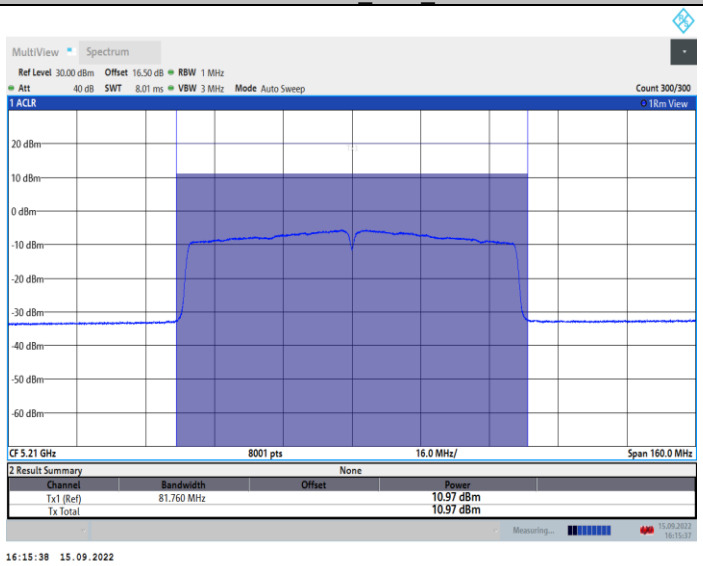
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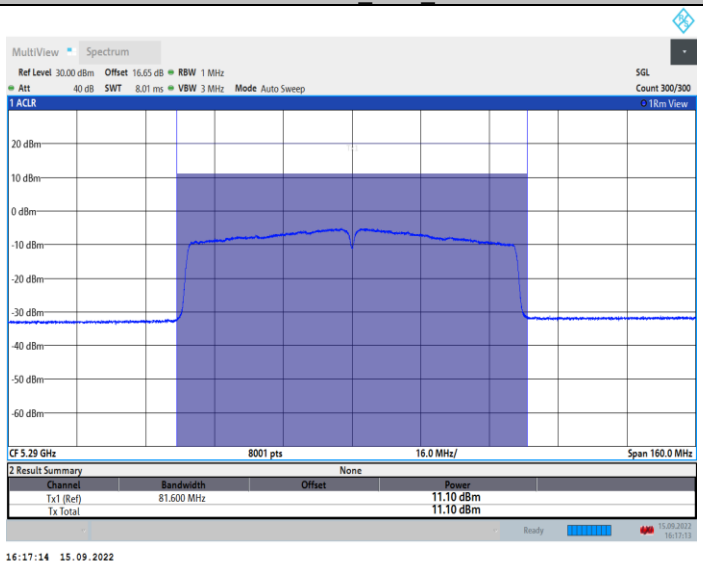

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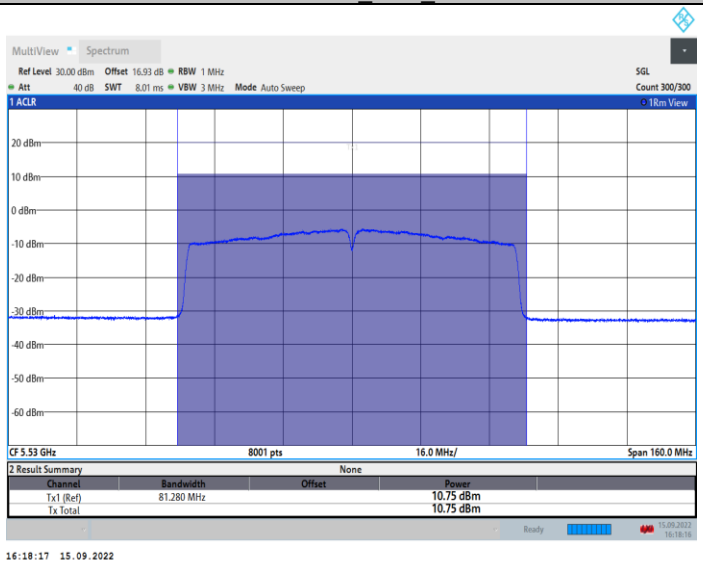
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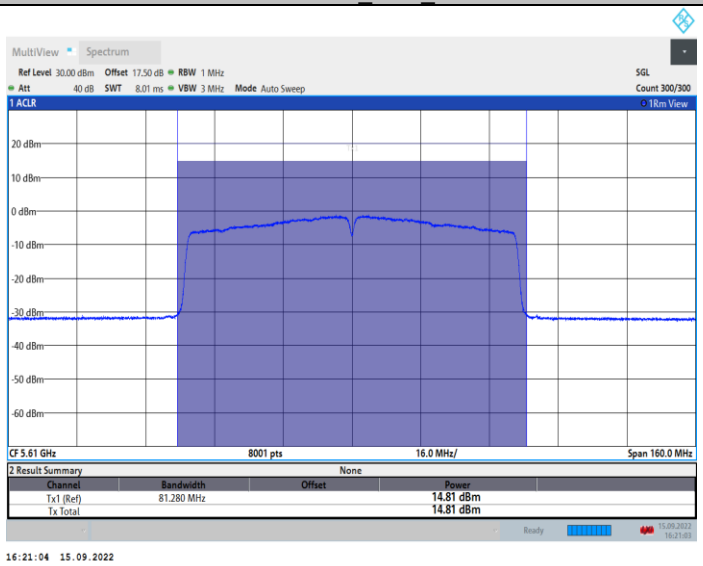
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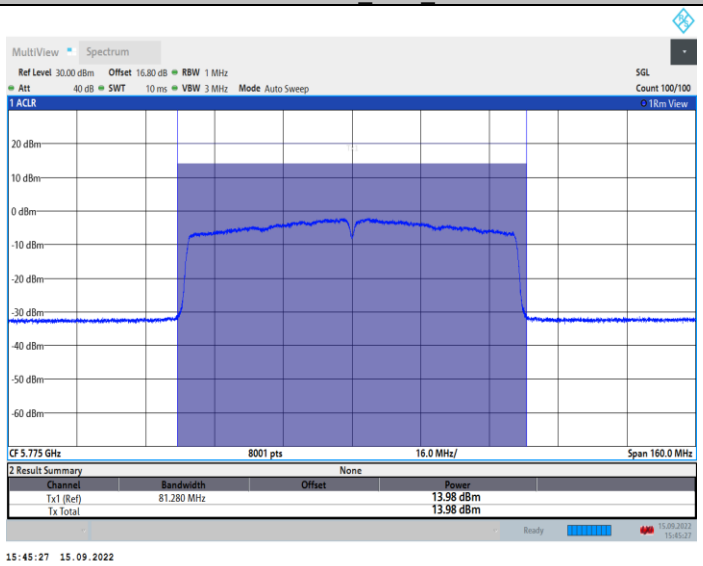

9. MAXIMUM POWER SPECTRAL DENSITY LEVEL MEASUREMENT

9.1. Limits of Maximum Power Spectral Density Level Measurement

CFR 47 (FCC) part 15.407 (a)
For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both
the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both
the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.2. Test Procedure

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

Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or
500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and 789033 D02 General UNII Test Procedures New Rules v01r02 Page 10 integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add
10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections
5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

9.3. Test Data

Table 12 Maximum Power Spectral Density Level Test Data

Test Mode	Test Channel [MHz]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
802.11a	5180	5.42	<=11	PASS
802.11a	5200	7.03	<=11	PASS
802.11a	5240	7.51	<=11	PASS
802.11a	5260	7.36	<=11	PASS
802.11a	5280	7.33	<=11	PASS
802.11a	5320	4.19	<=11	PASS
802.11a	5500	4.14	<=11	PASS
802.11a	5600	7.49	<=11	PASS
802.11a	5700	2.25	<=11	PASS
802.11a	5745	3.84	<=30	PASS
802.11a	5785	3.91	<=30	PASS
802.11a	5825	3.97	<=30	PASS
802.11n HT20	5180	4.9	<=11	PASS
802.11n HT20	5200	6.8	<=11	PASS
802.11n HT20	5240	7.24	<=11	PASS
802.11n HT20	5260	7.17	<=11	PASS
802.11n HT20	5280	7.08	<=11	PASS
802.11n HT20	5320	3.14	<=11	PASS

802.11n HT20	5500	3.42	<=11	PASS
802.11n HT20	5600	7.18	<=11	PASS
802.11n HT20	5700	2.05	<=11	PASS
802.11n HT20	5745	3.59	<=30	PASS
802.11n HT20	5785	3.54	<=30	PASS
802.11n HT20	5825	3.58	<=30	PASS
802.11n HT40	5190	-0.64	<=11	PASS
802.11n HT40	5230	4.2	<=11	PASS
802.11n HT40	5270	3.22	<=11	PASS
802.11n HT40	5310	-1.09	<=11	PASS
802.11n HT40	5510	-1.2	<=11	PASS
802.11n HT40	5590	4.2	<=11	PASS
802.11n HT40	5670	1.42	<=11	PASS
802.11n HT40	5755	0.65	<=30	PASS
802.11n HT40	5795	0.52	<=30	PASS
802.11ac VHT20	5180	4.72	<=11	PASS
802.11ac VHT20	5200	6.19	<=11	PASS
802.11ac VHT20	5240	6.76	<=11	PASS
802.11ac VHT20	5260	6.34	<=11	PASS
802.11ac VHT20	5280	6.25	<=11	PASS
802.11ac VHT20	5320	3.18	<=11	PASS
802.11ac VHT20	5500	2.9	<=11	PASS
802.11ac VHT20	5600	6.2	<=11	PASS
802.11ac VHT20	5700	1.19	<=11	PASS
802.11ac VHT20	5745	3.62	<=30	PASS
802.11ac VHT20	5785	3.96	<=30	PASS
802.11ac VHT20	5825	4.3	<=30	PASS
802.11ac VHT40	5190	-1.7	<=11	PASS
802.11ac VHT40	5230	3.26	<=11	PASS
802.11ac VHT40	5270	2.37	<=11	PASS
802.11ac VHT40	5310	-1.57	<=11	PASS
802.11ac VHT40	5510	-2.29	<=11	PASS
802.11ac VHT40	5590	3.22	<=11	PASS
802.11ac VHT40	5670	-0.04	<=11	PASS
802.11ac VHT40	5755	0.76	<=30	PASS
802.11ac VHT40	5795	1.02	<=30	PASS
802.11ac VHT80	5210	-4.91	<=11	PASS
802.11ac VHT80	5290	-4.76	<=11	PASS
802.11ac VHT80	5530	-5.03	<=11	PASS

802.11ac VHT80	5610	-1	<=11	PASS
802.11ac VHT80	5775	-5.05	<=30	PASS

Note：1. The Result and Limit Unit is dBm/500 kHz in the band 5.725-5.85 GHz.
2. The Duty Cycle Factor and RBW Factor is compensated in the graph.

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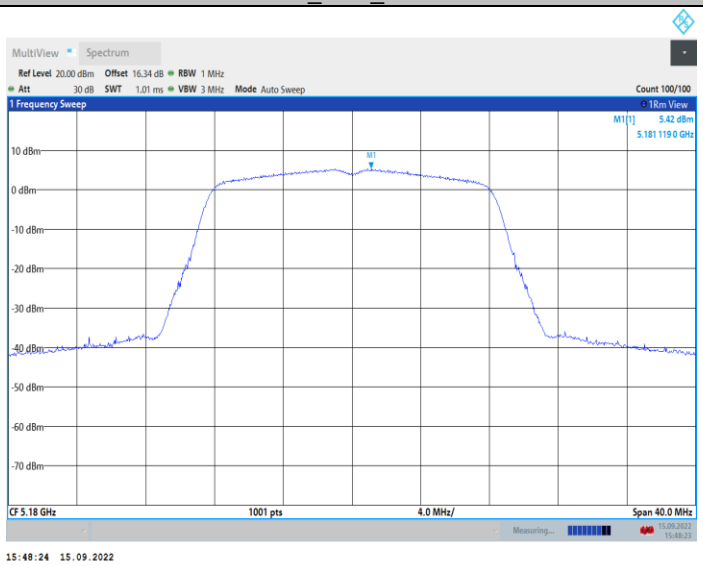

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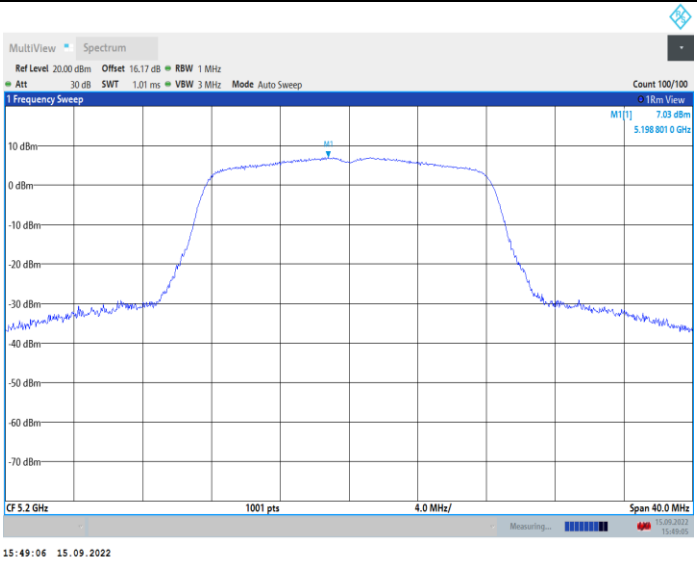

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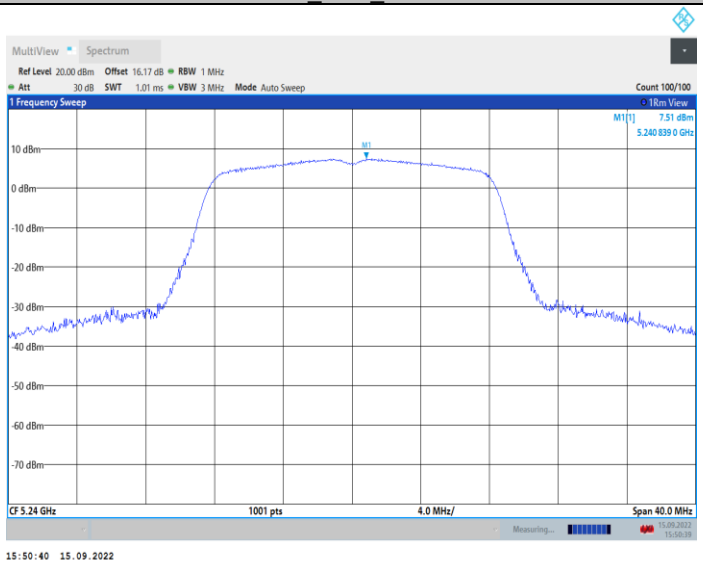 15:50:40 15.09.2022
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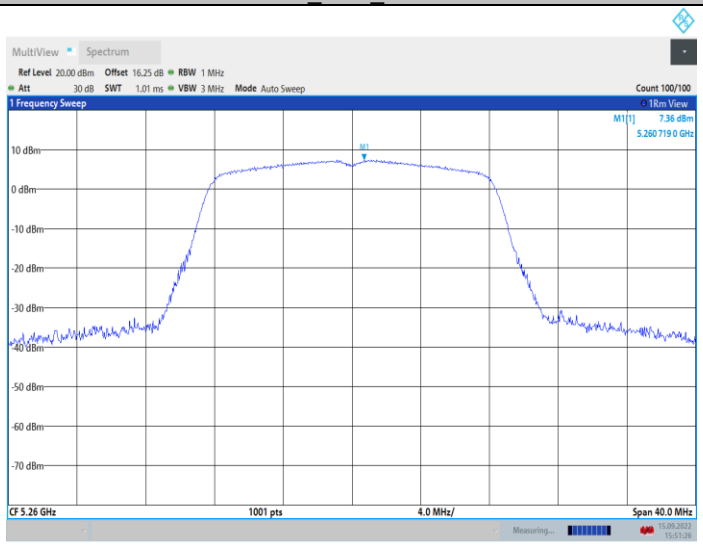 15:51:27 15.09.2022
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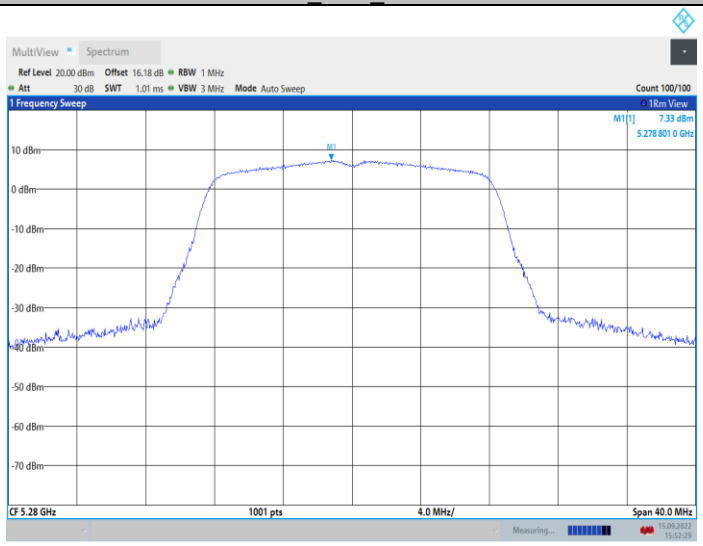 15:52:29 15.09.2022

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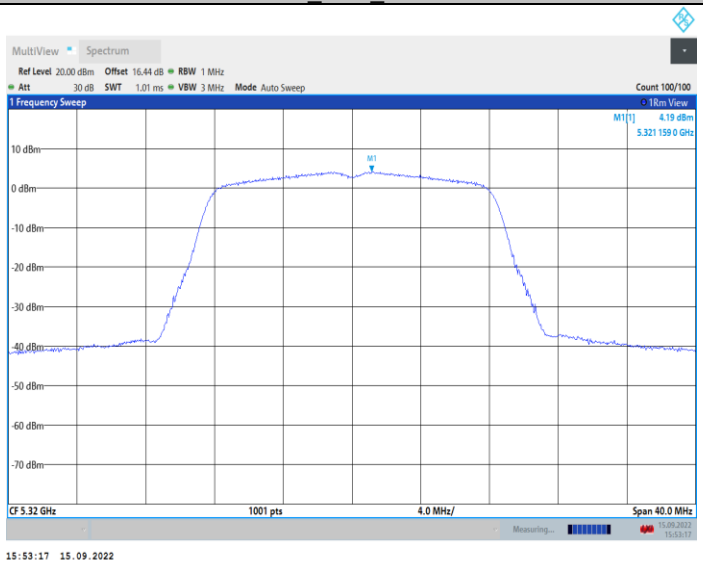
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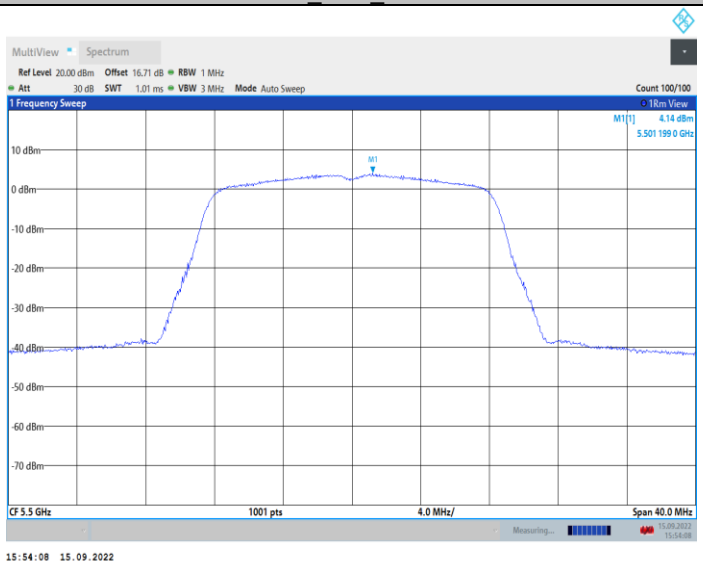
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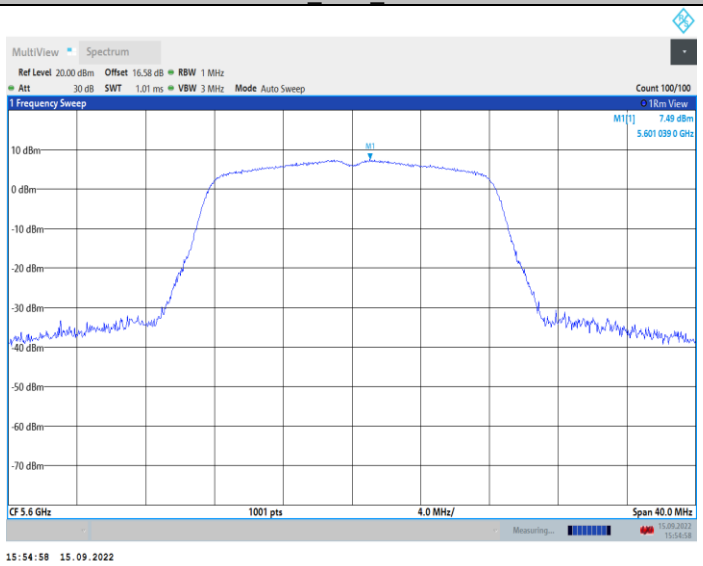

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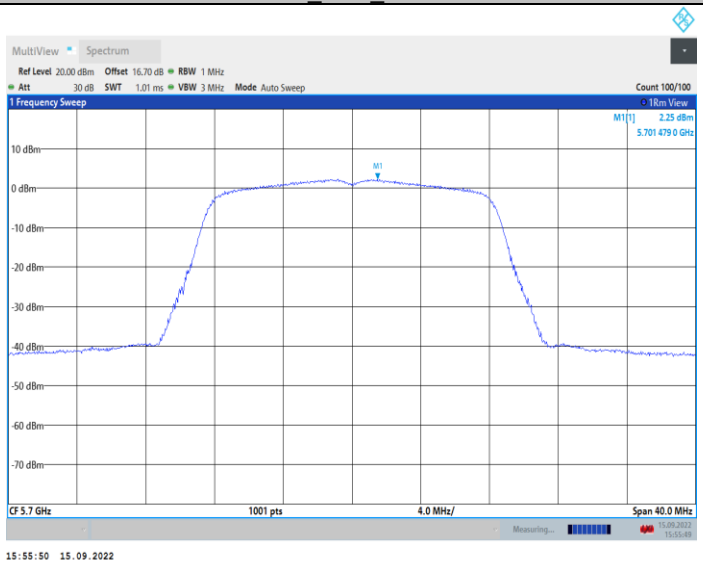 15:55:50 15.09.2022
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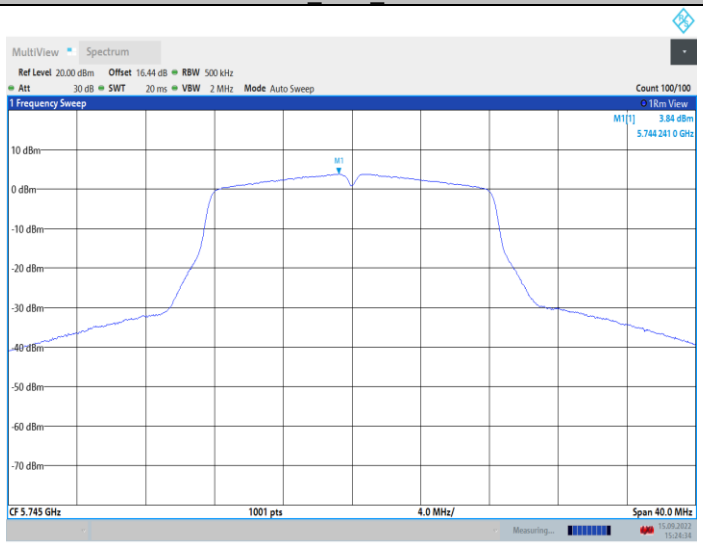 15:24:34 15.09.2022
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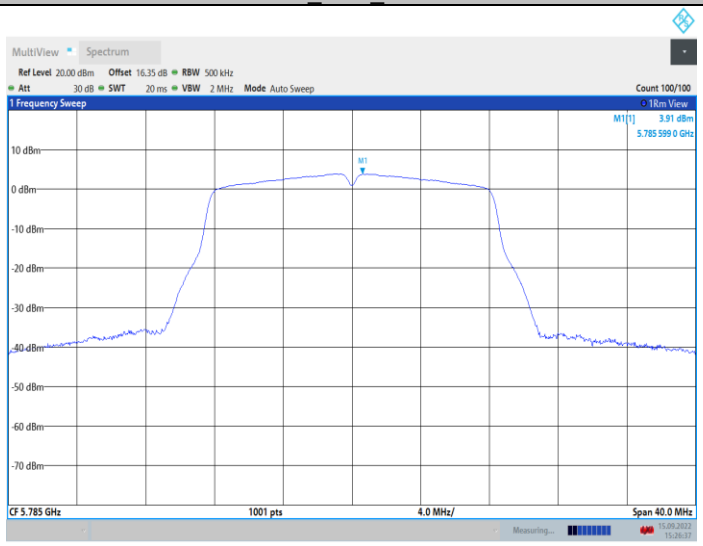 15:26:38 15.09.2022

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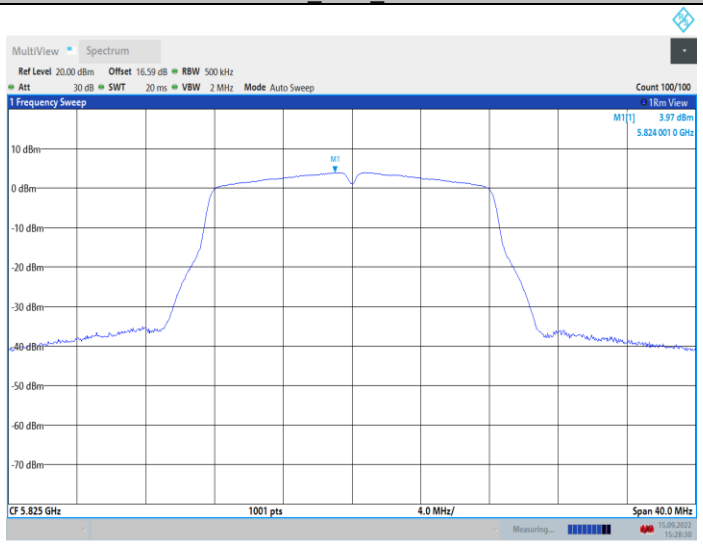 15:28:31 15.09.2022
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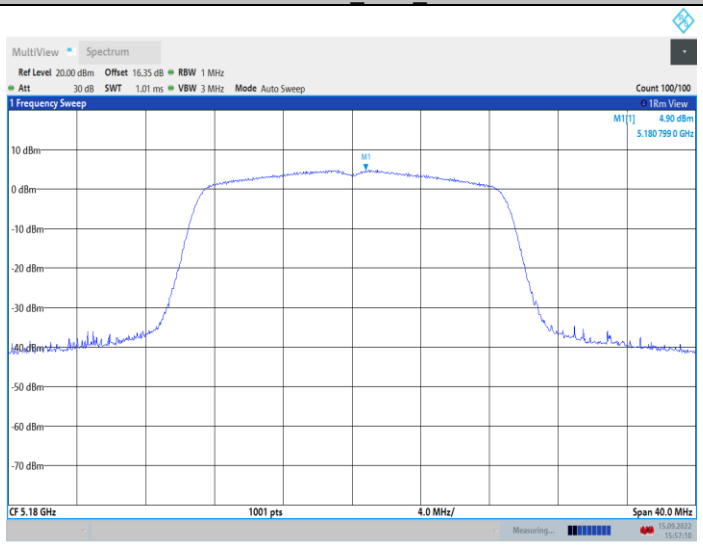 15:57:10 15.09.2022
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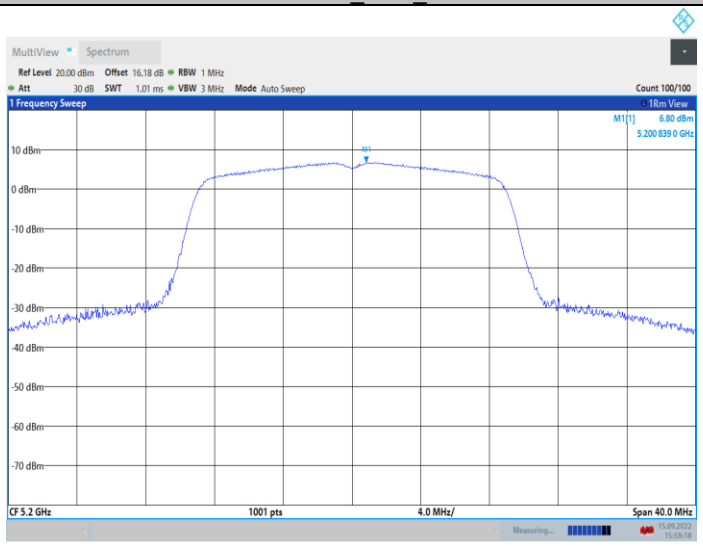 15:59:18 15.09.2022

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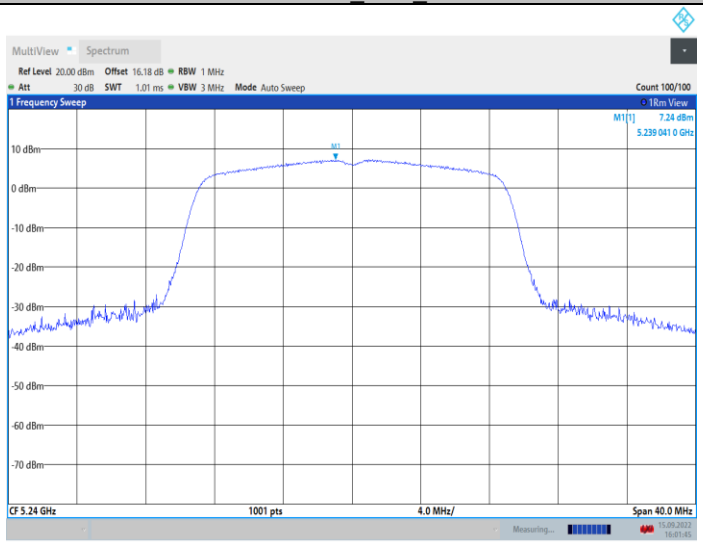 16:01:46 15.09.2022
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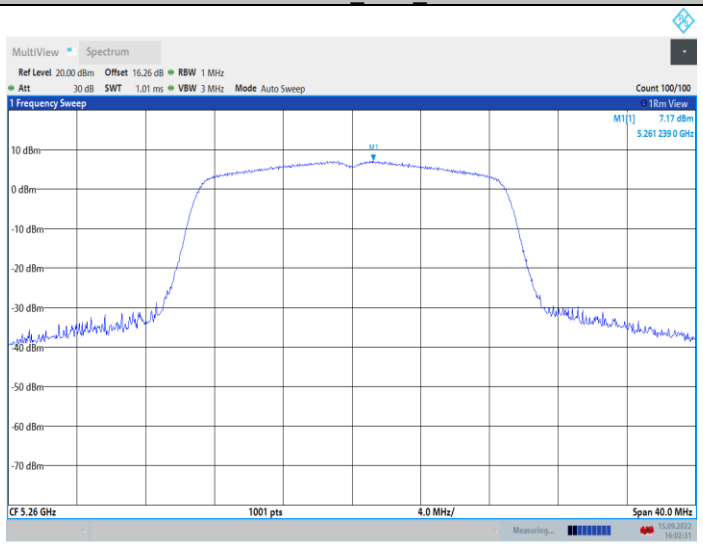 16:02:32 15.09.2022
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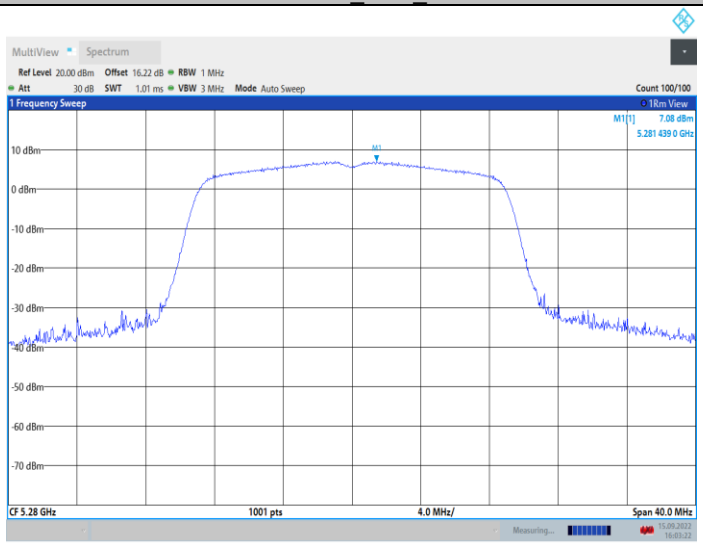 16:03:22 15.09.2022

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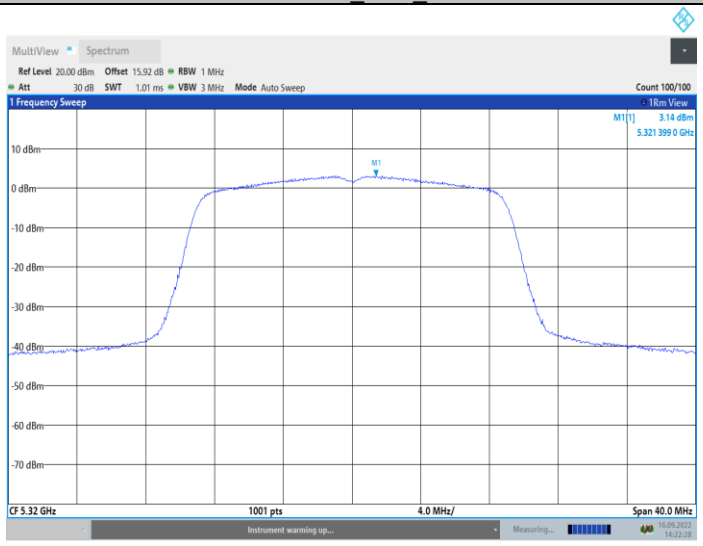 14:22:28 16.09.2022
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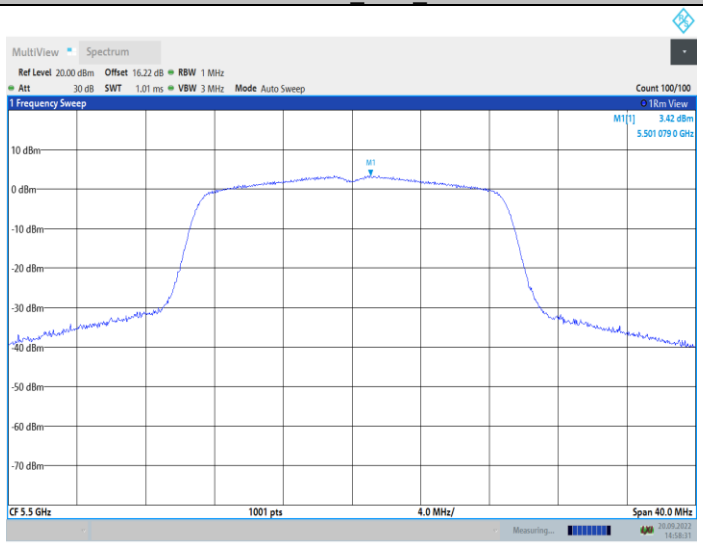 14:58:32 20.09.2022
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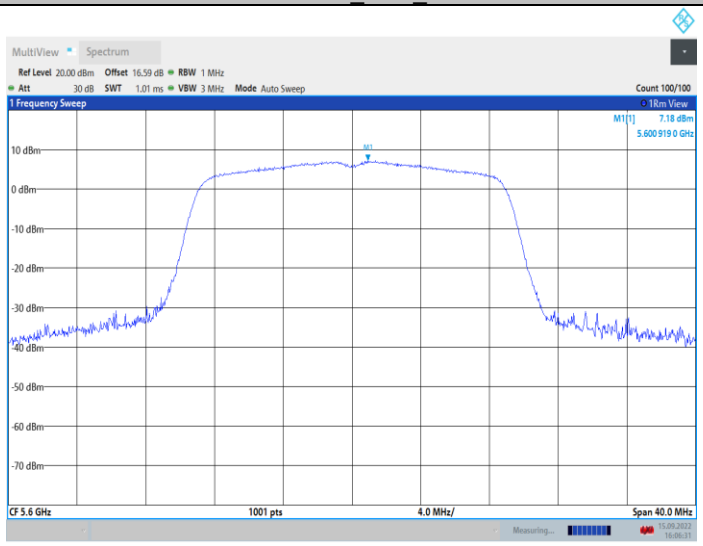 16:06:32 15.09.2022

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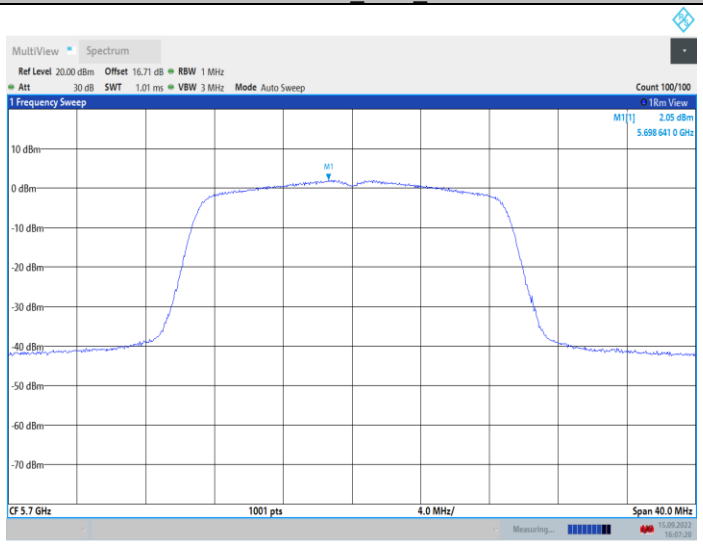 16:07:21 15.09.2022
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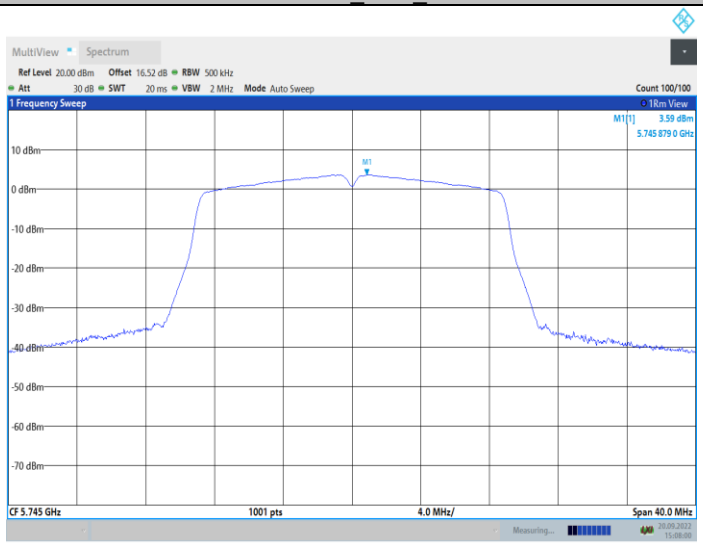 15:08:00 20.09.2022
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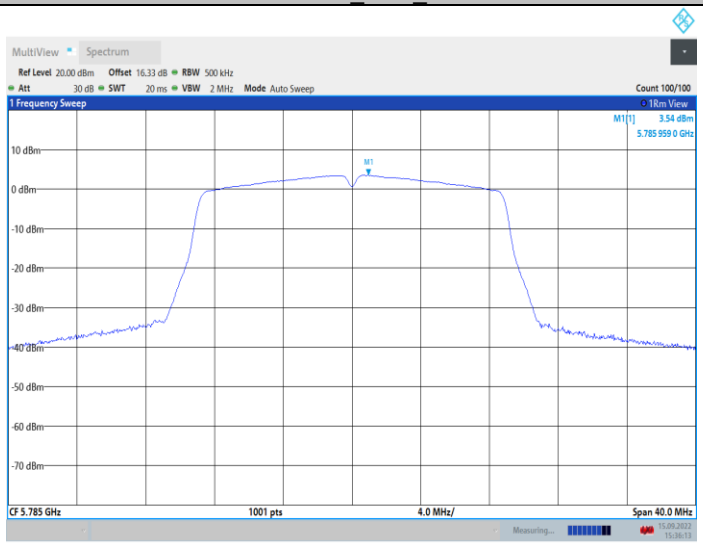 15:36:13 15.09.2022

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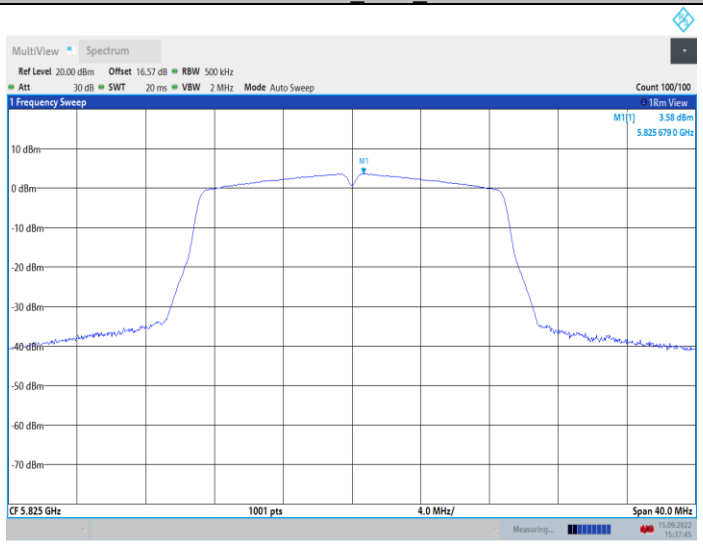
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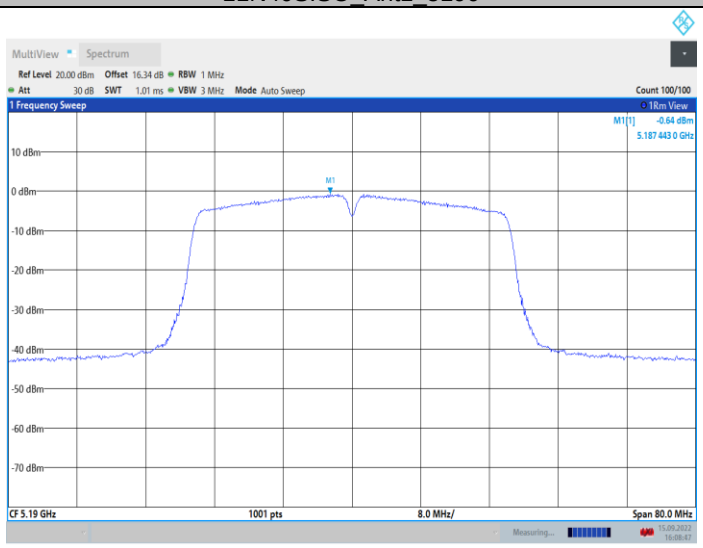
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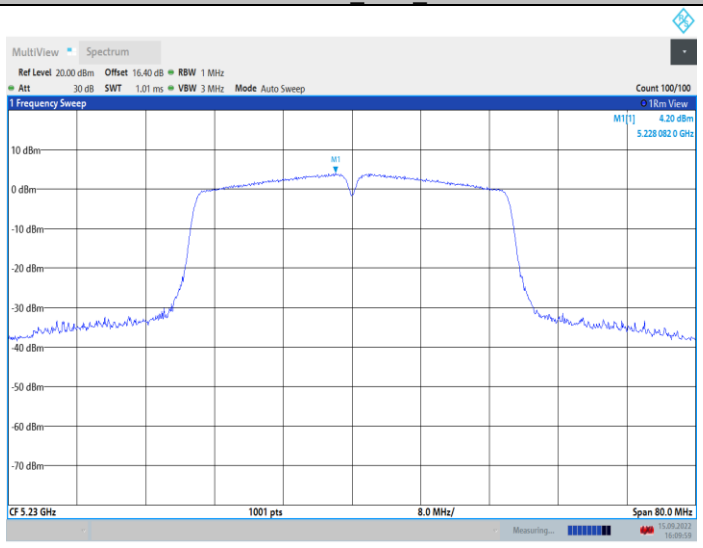

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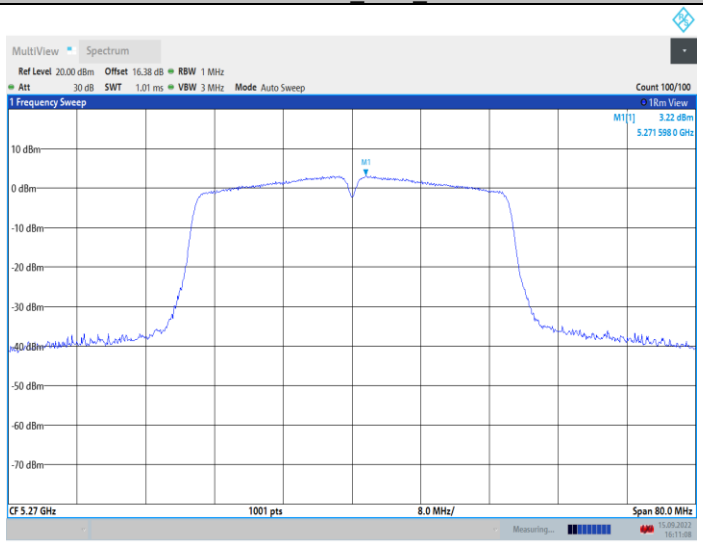
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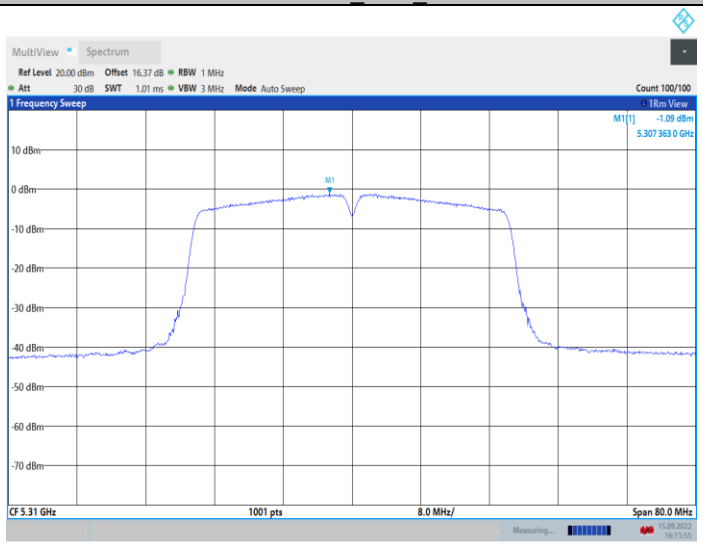
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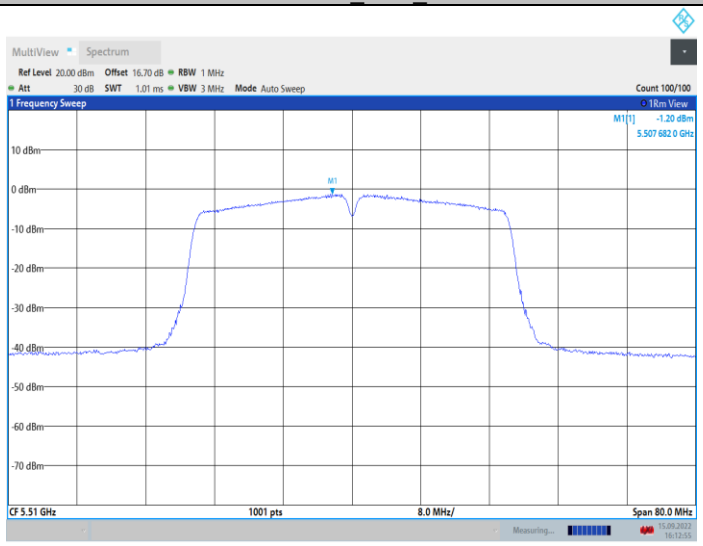

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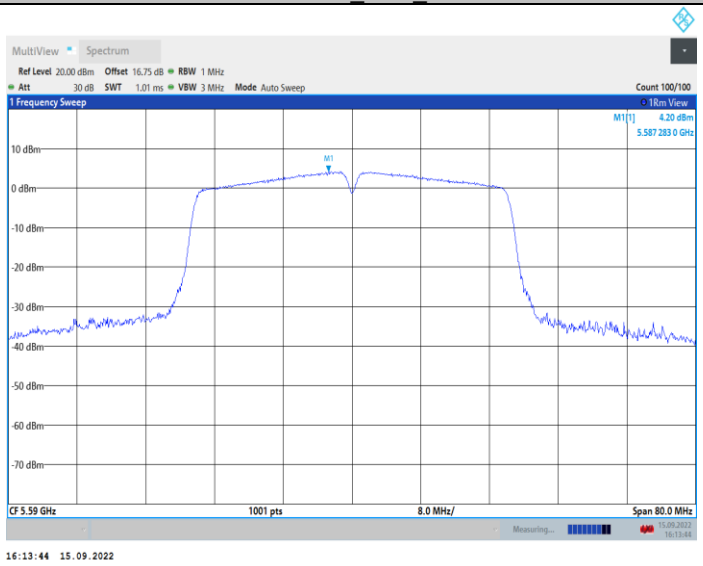
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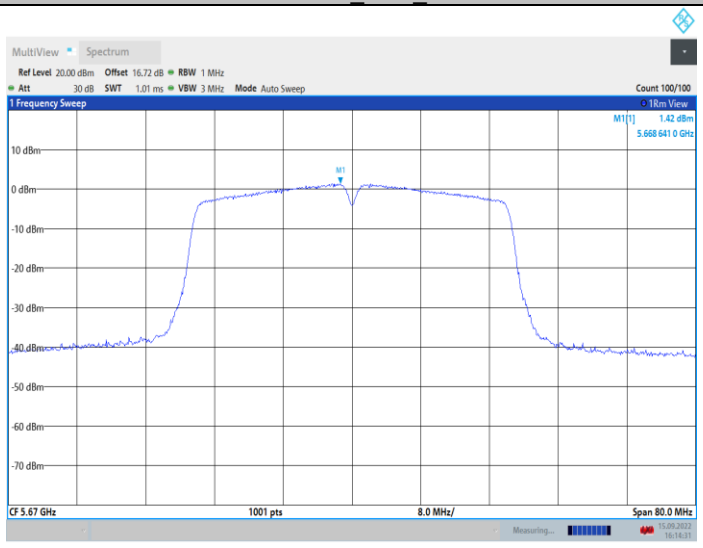
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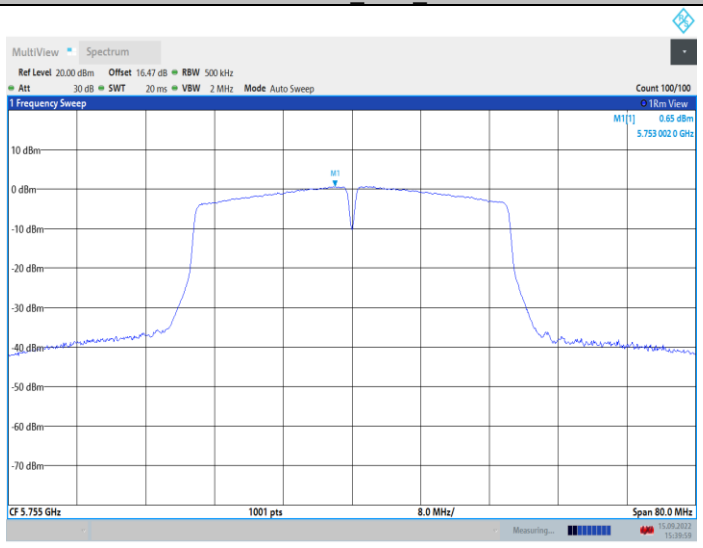

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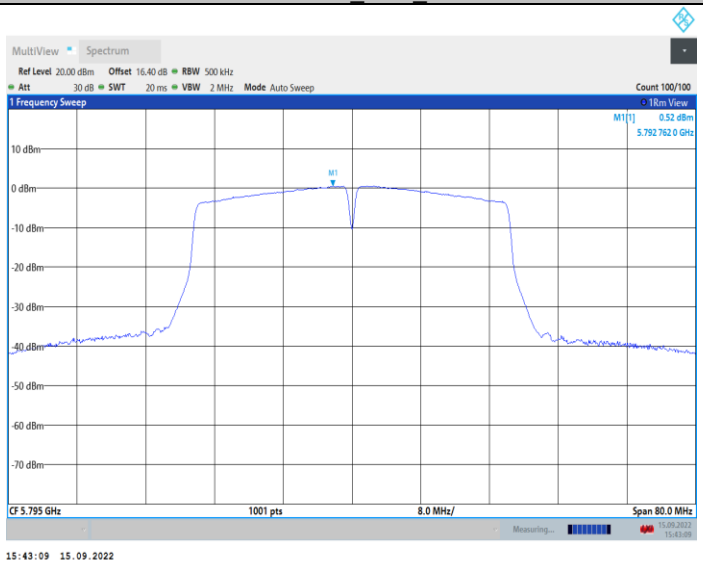 15:43:09 15.09.2022
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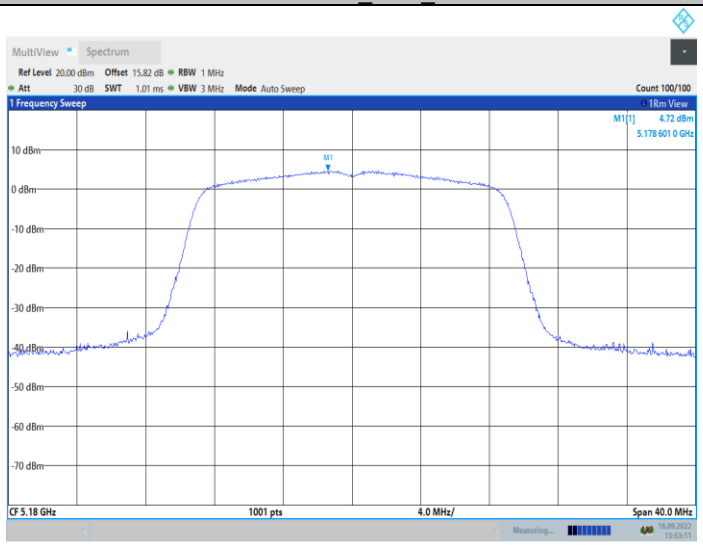 13:53:11 16.09.2022
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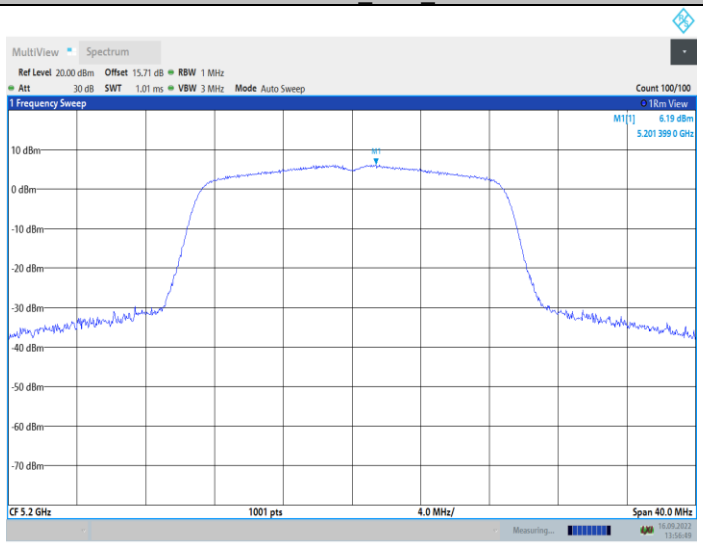 13:56:50 16.09.2022