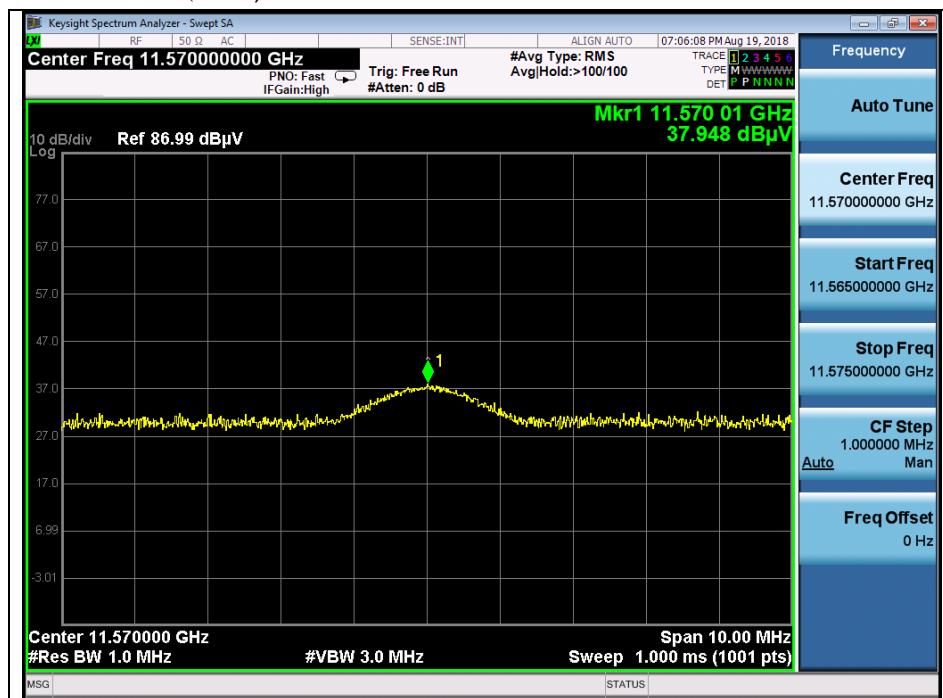
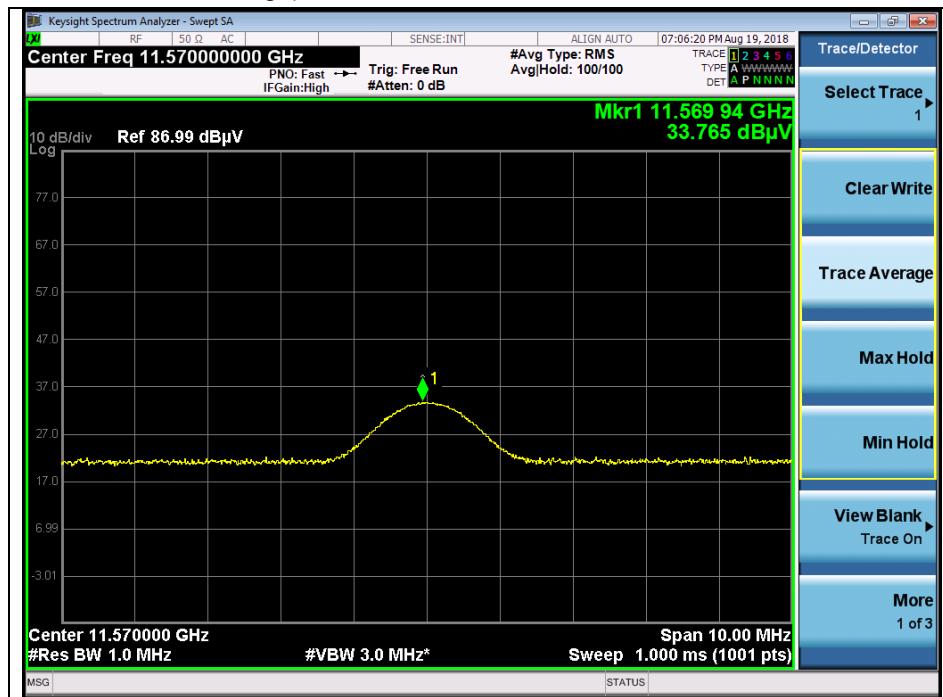


Middle channel 2nd harmonic (Peak) - Band 3Middle channel 2nd harmonic (Average) - Band 3

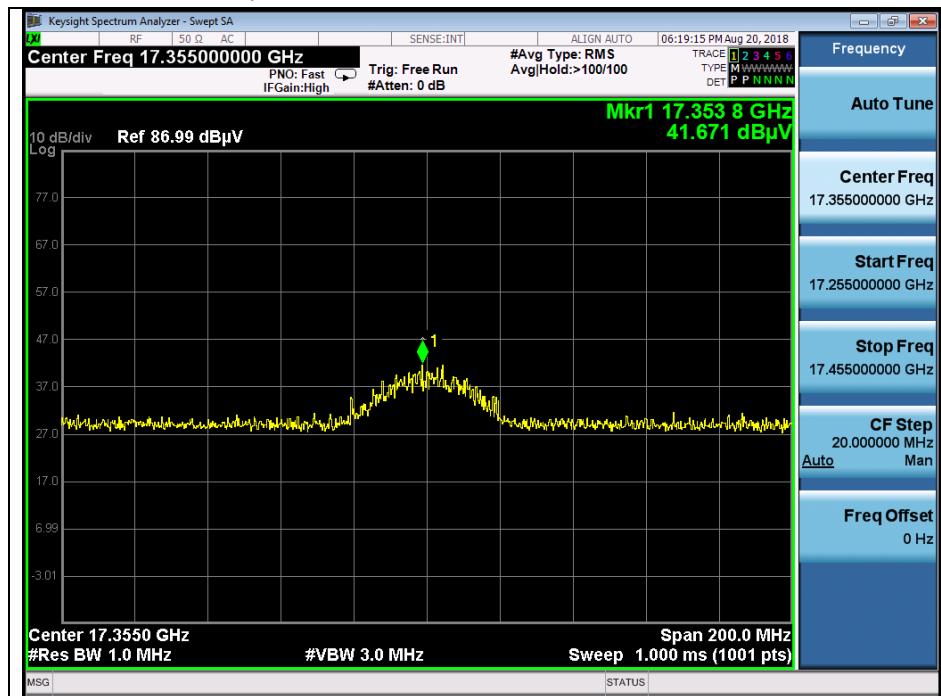
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A4(210 mm x 297 mm)

Middle channel 3rd harmonic (Peak) - Band 3High channel 2nd harmonic (Peak) - Band 3

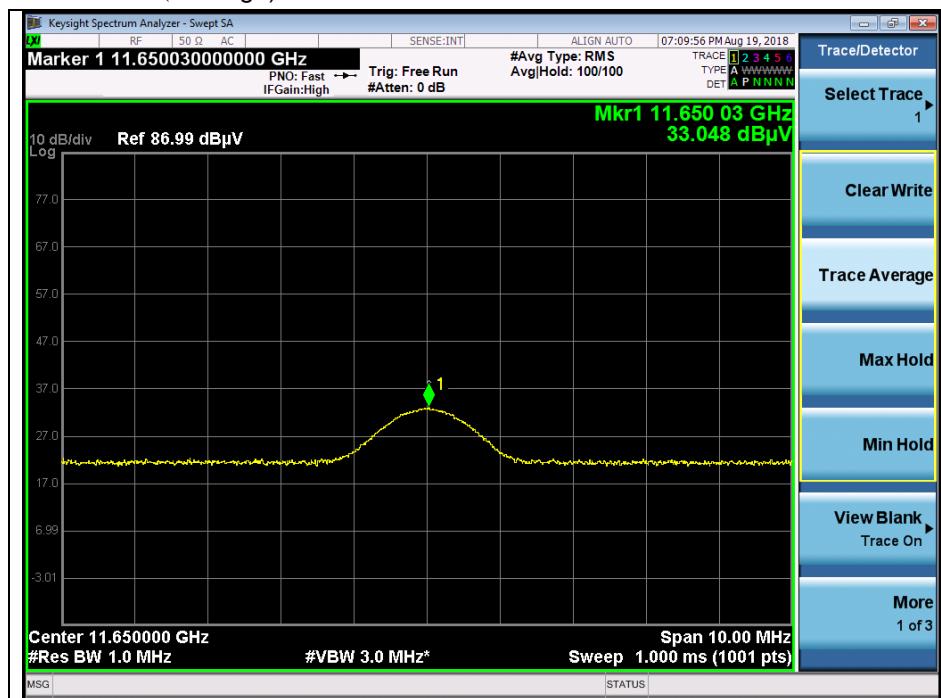
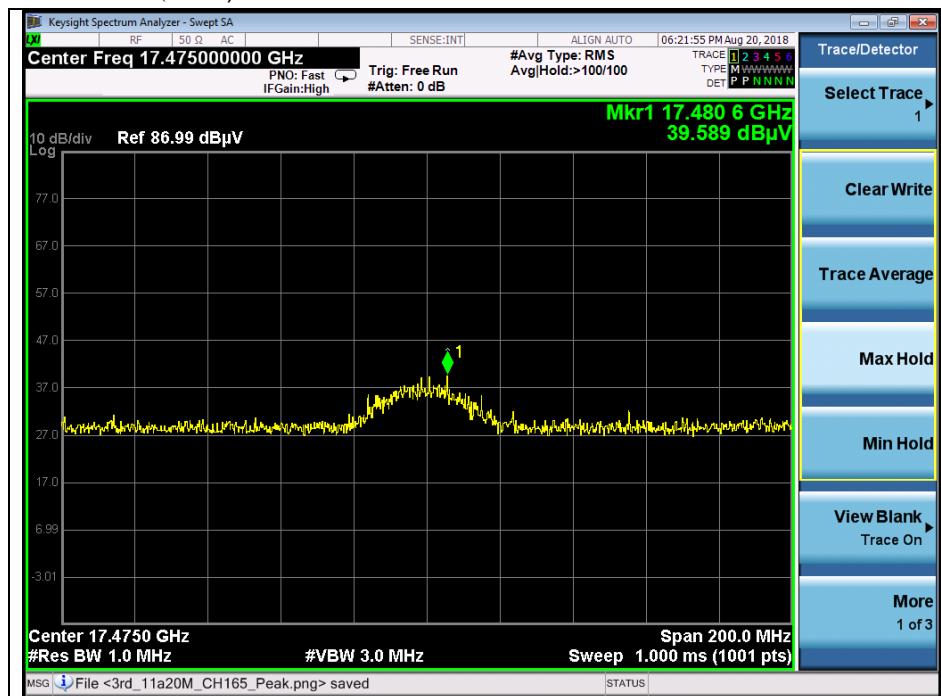
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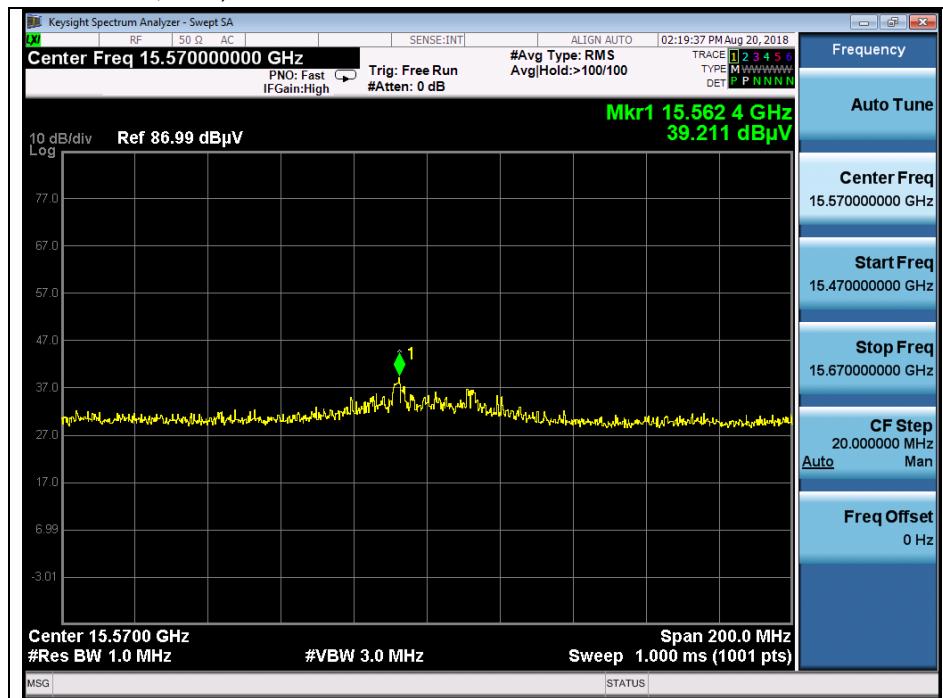
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A4(210 mm × 297 mm)

High channel 2nd harmonic (Average) - Band 3

High channel 3rd harmonic (Peak) - Band 3


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OFDM: 802.11n_HT40(MCS0)Low channel 2nd harmonic (Peak) - Band 1Low channel 3rd harmonic (Peak) - Band 1

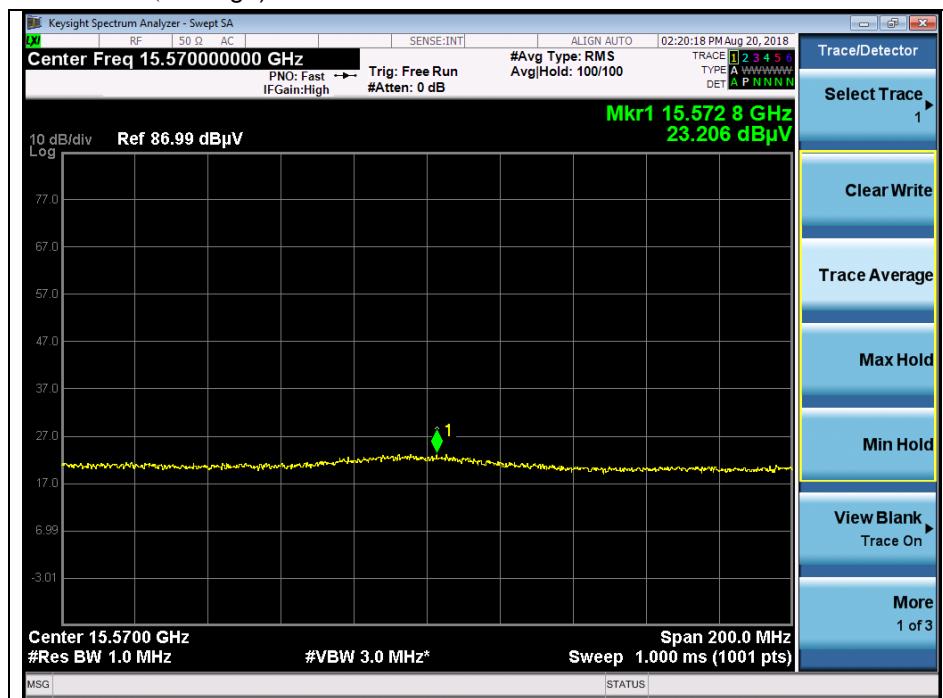
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A4(210 mm x 297 mm)

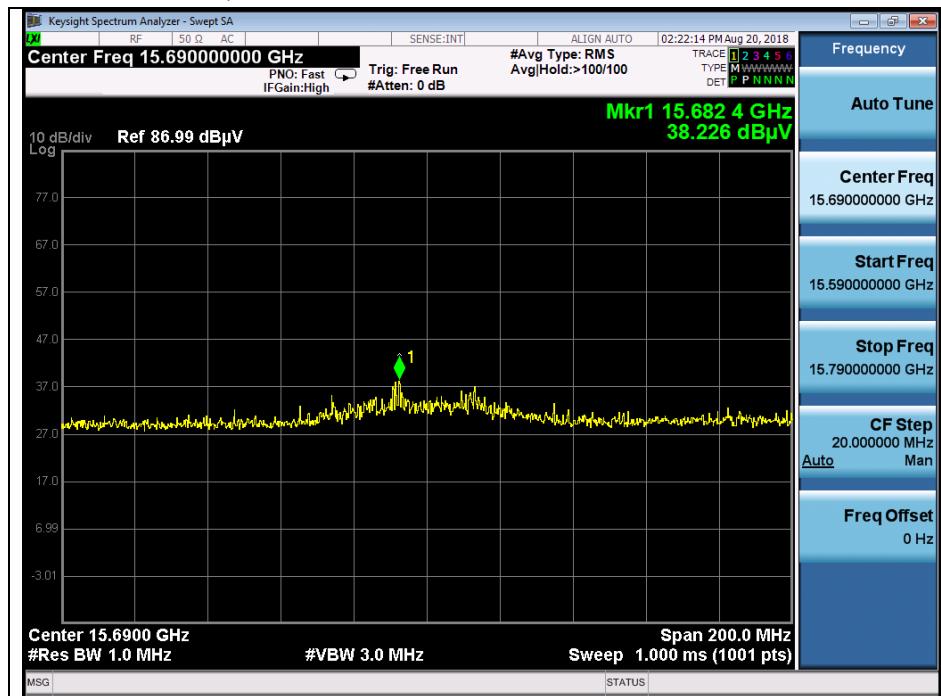
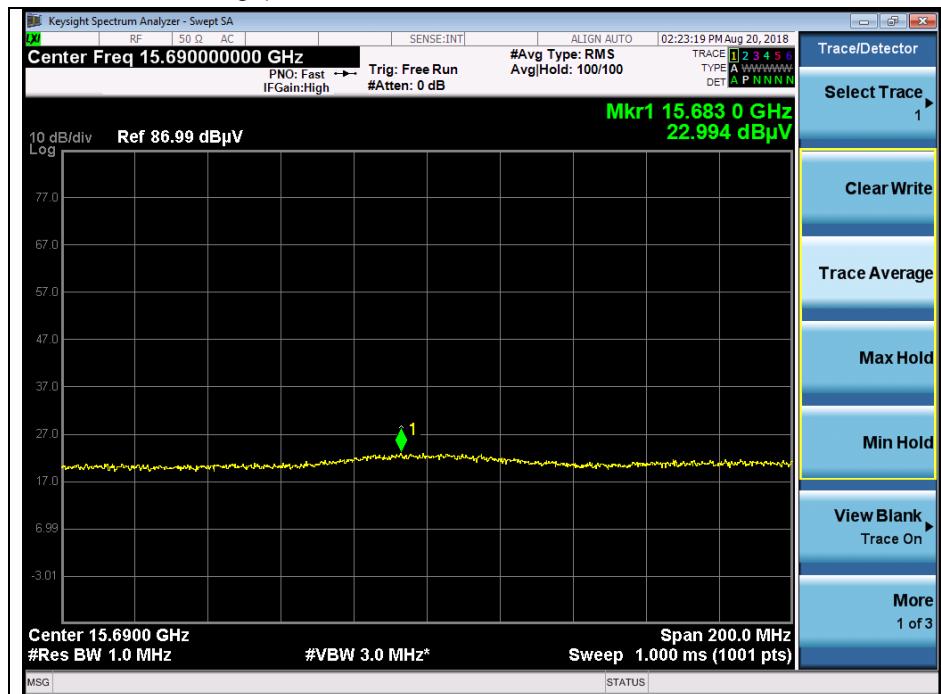
Low channel 3rd harmonic (Average) - Band 1High channel 2nd harmonic (Peak) - Band 1

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A4(210 mm x 297 mm)

High channel 3rd harmonic (Peak) - Band 1High channel 3rd harmonic (Average) - Band 1

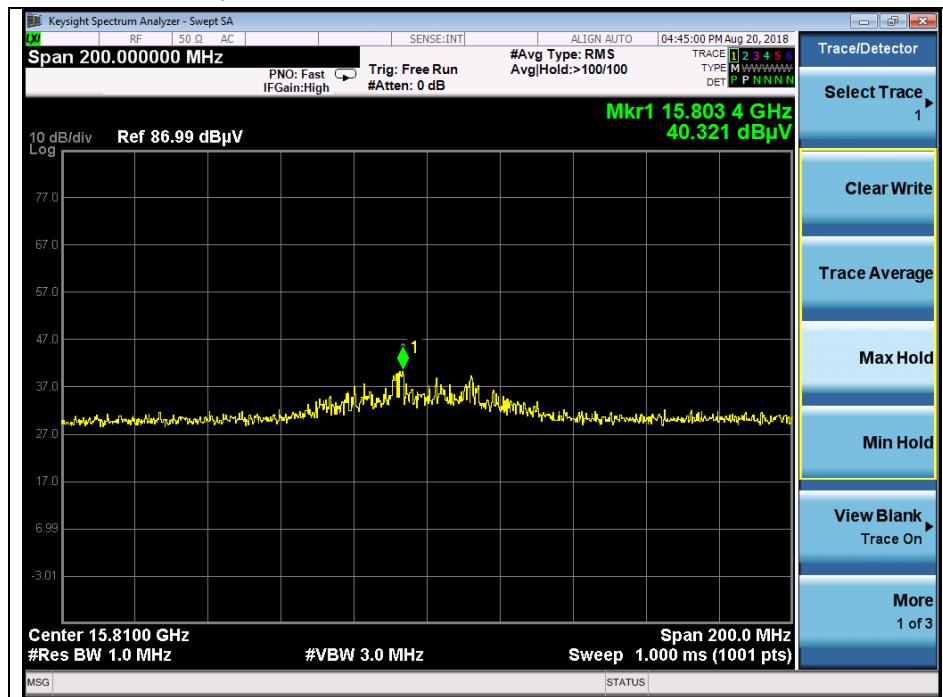
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A4(210 mm x 297 mm)

Low channel 2nd harmonic (Peak) - Band 2ALow channel 3rd harmonic (Peak) - Band 2A

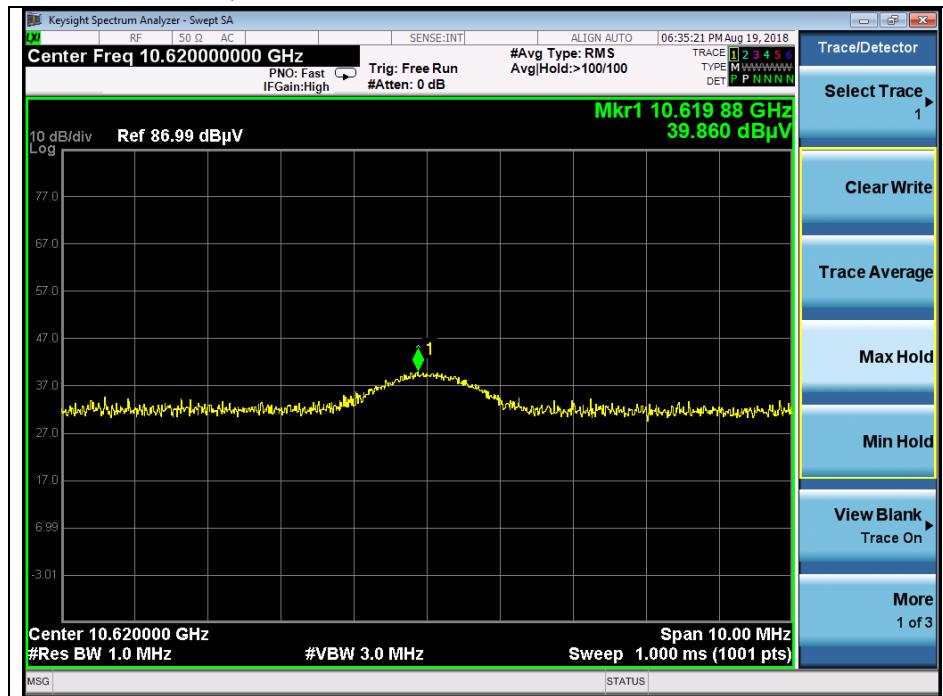
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A4(210 mm x 297 mm)

Low channel 3rd harmonic (Average) - Band 2AHigh channel 2nd harmonic (Peak) - Band 2A

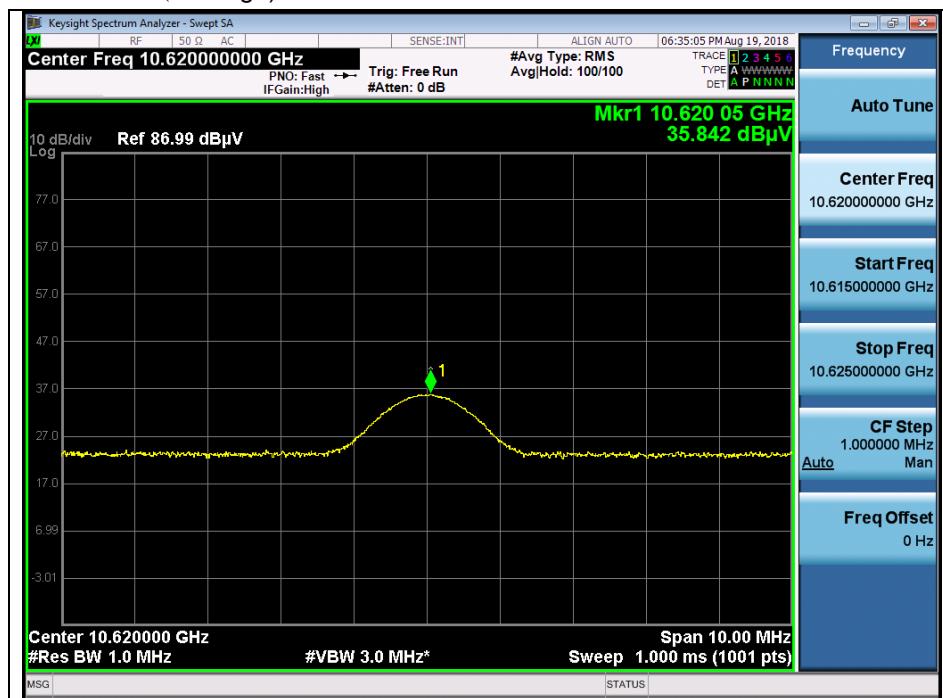
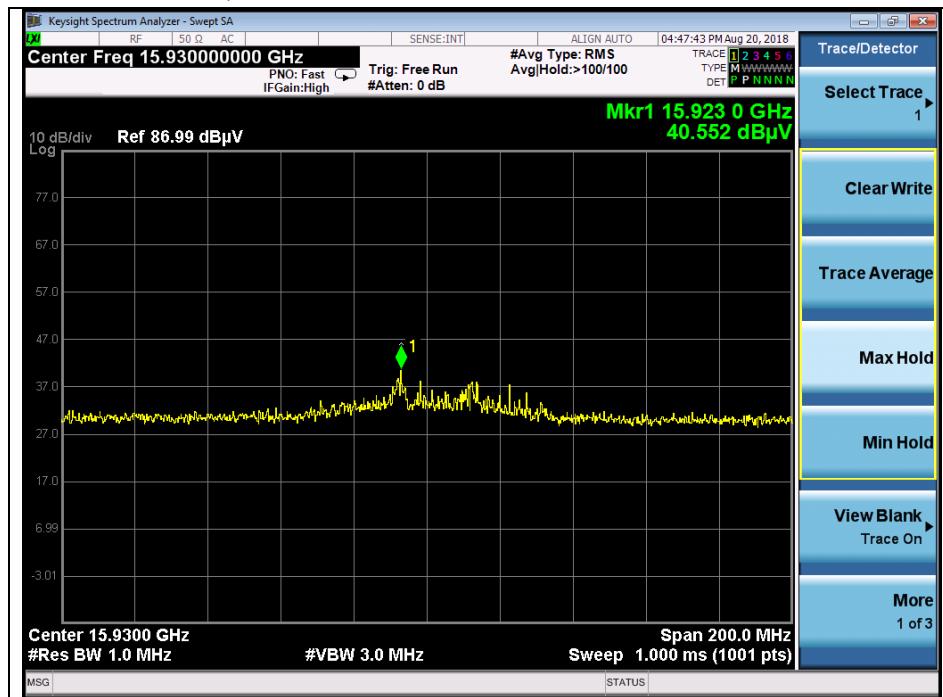
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A4(210 mm x 297 mm)

High channel 2nd harmonic (Average) - Band 2AHigh channel 3rd harmonic (Peak) - Band 2A

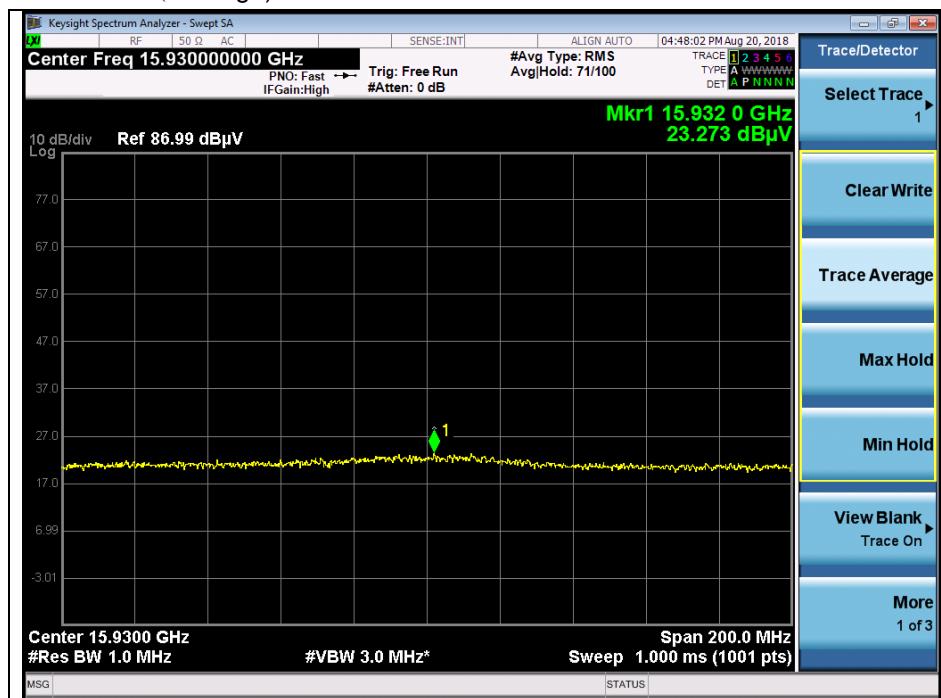
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A4(210 mm x 297 mm)

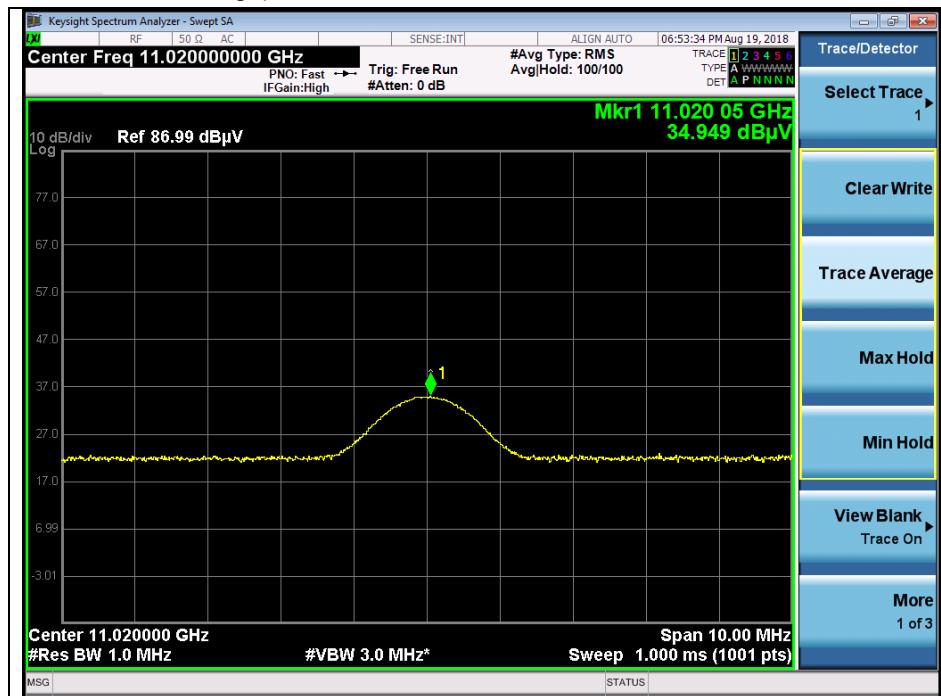
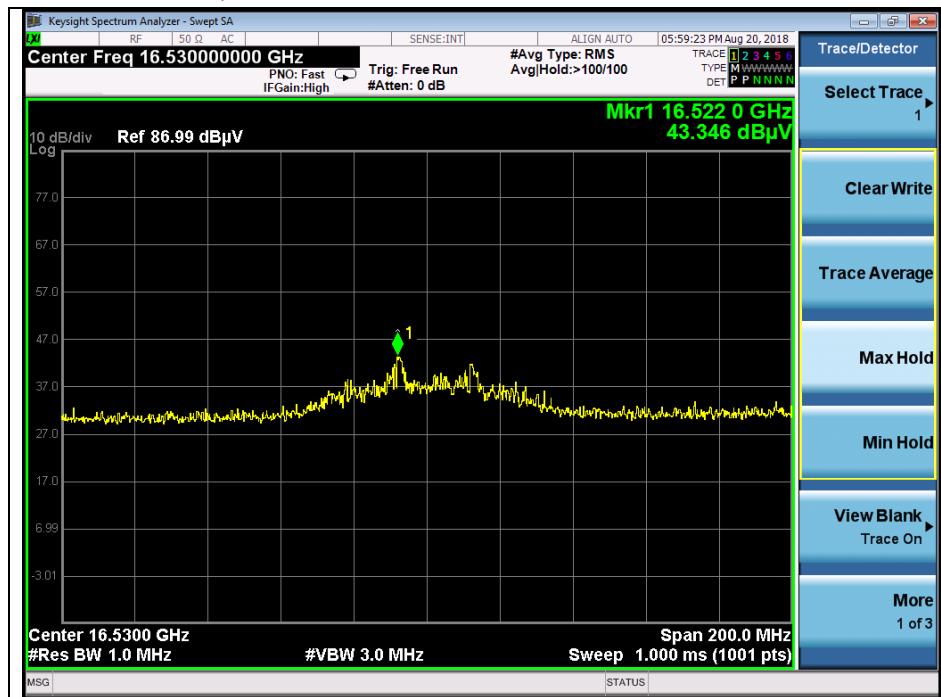
High channel 3rd harmonic (Average) - Band 2ALow channel 2nd harmonic (Peak) - Band 2C

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A4(210 mm x 297 mm)

Low channel 2nd harmonic (Average) - Band 2CLow channel 3rd harmonic (Peak) - Band 2C

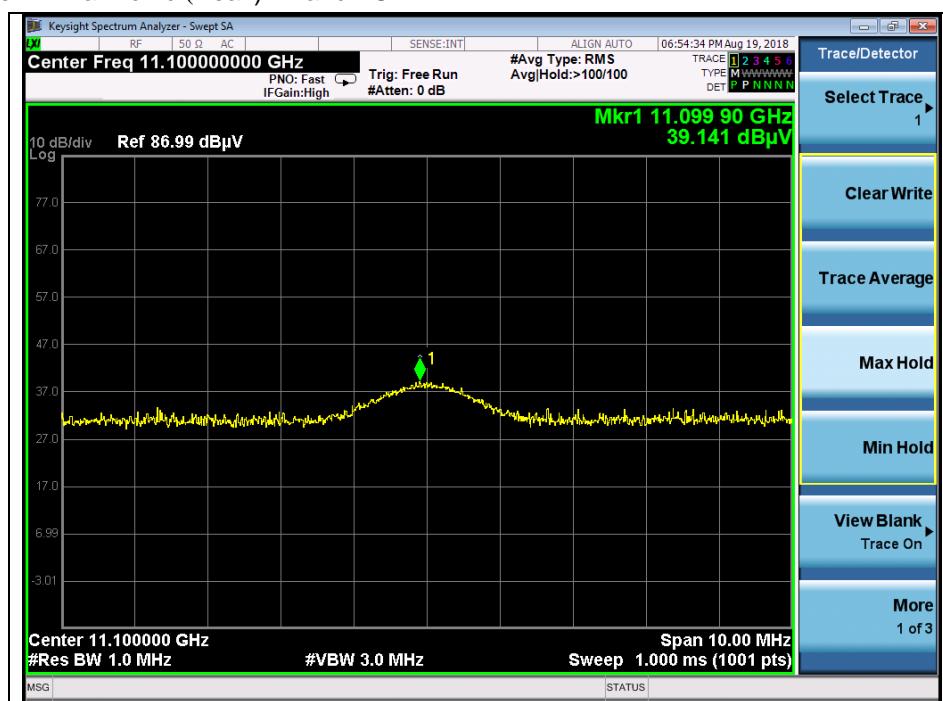
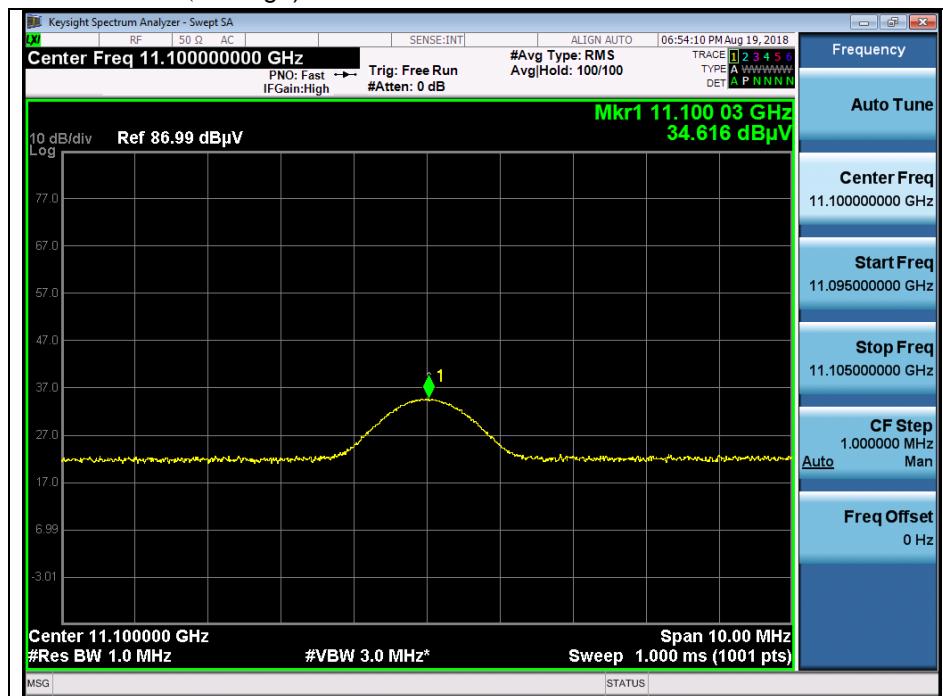
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A4(210 mm x 297 mm)

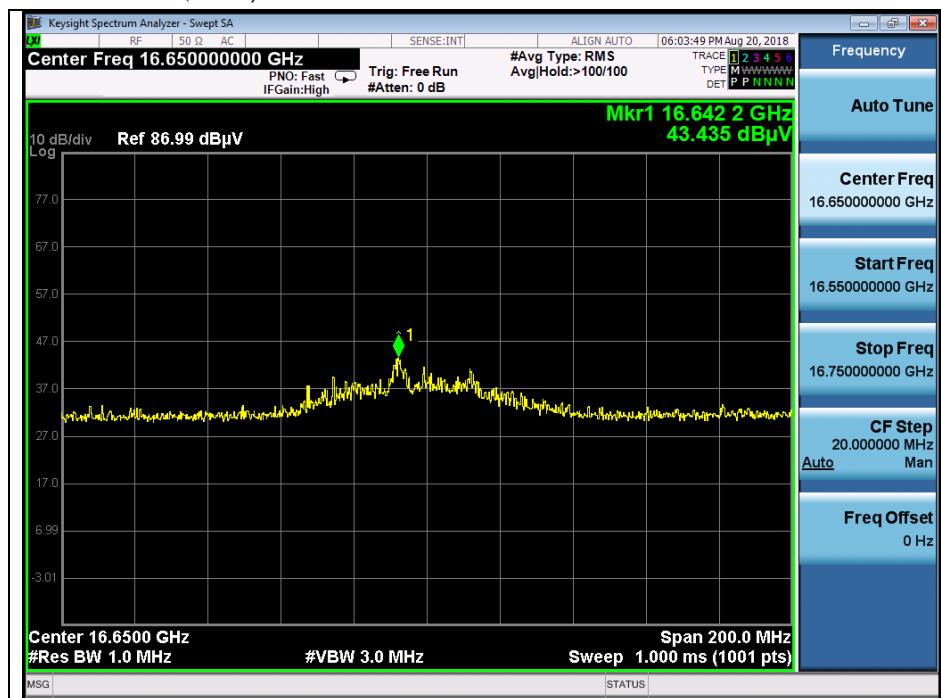
Middle channel 2nd harmonic (Peak) - Band 2CMiddle channel 2nd harmonic (Average) - Band 2C

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A4(210 mm x 297 mm)

Middle channel 3rd harmonic (Peak) - Band 2CHigh channel 2nd harmonic (Peak) - Band 2C

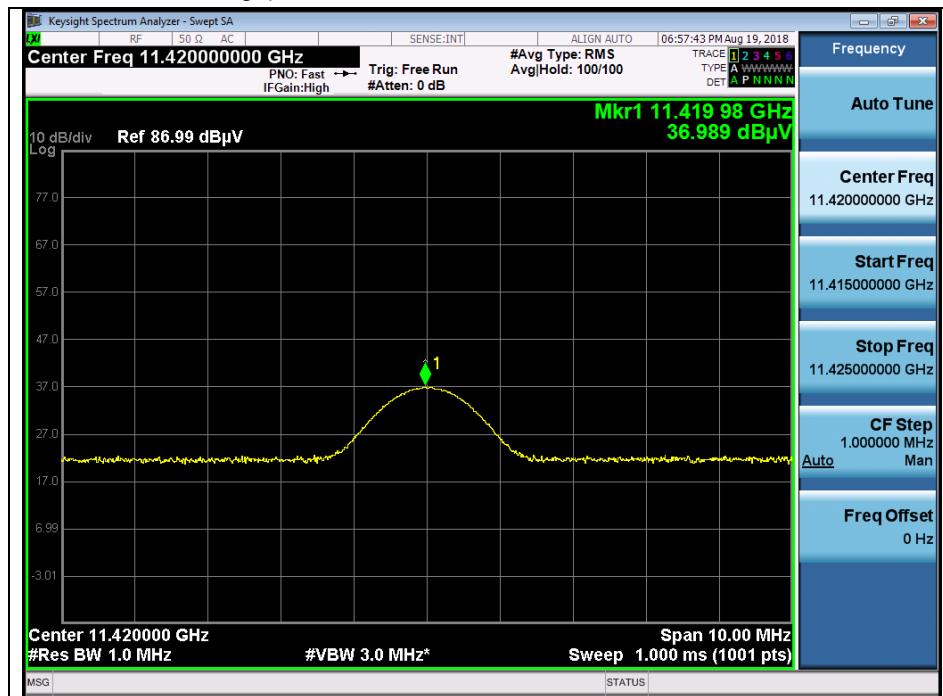
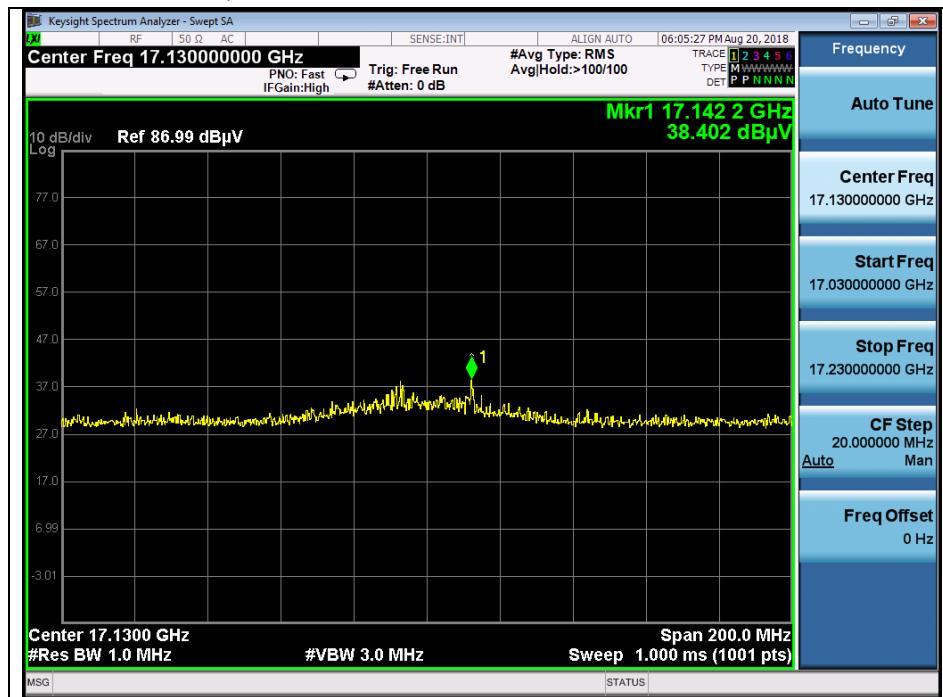
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A4(210 mm x 297 mm)

High channel 2nd harmonic (Average) - Band 2CHigh channel 3rd harmonic (Peak) - Band 2C

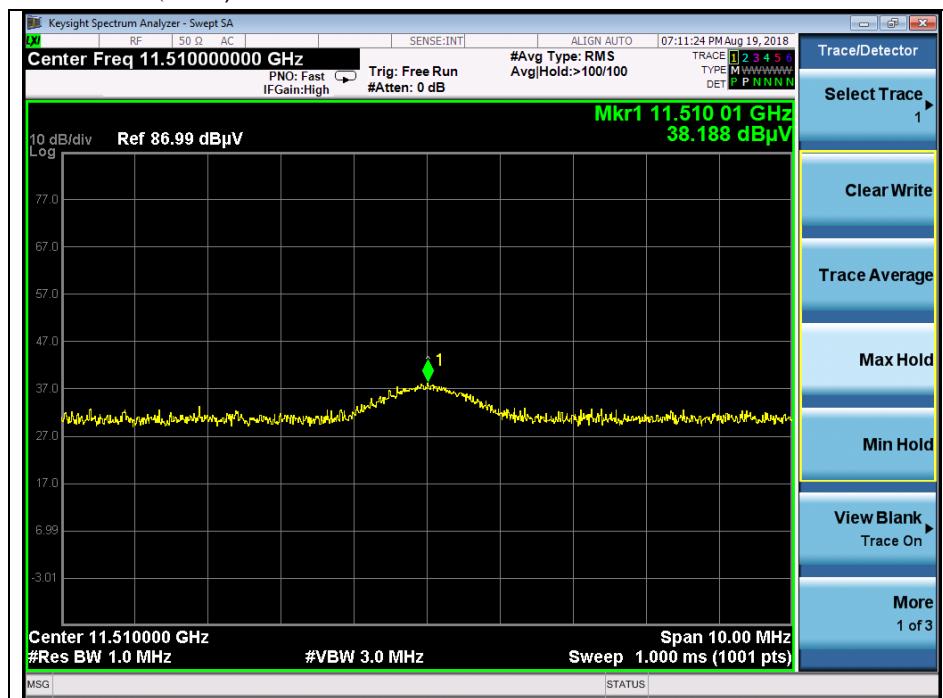
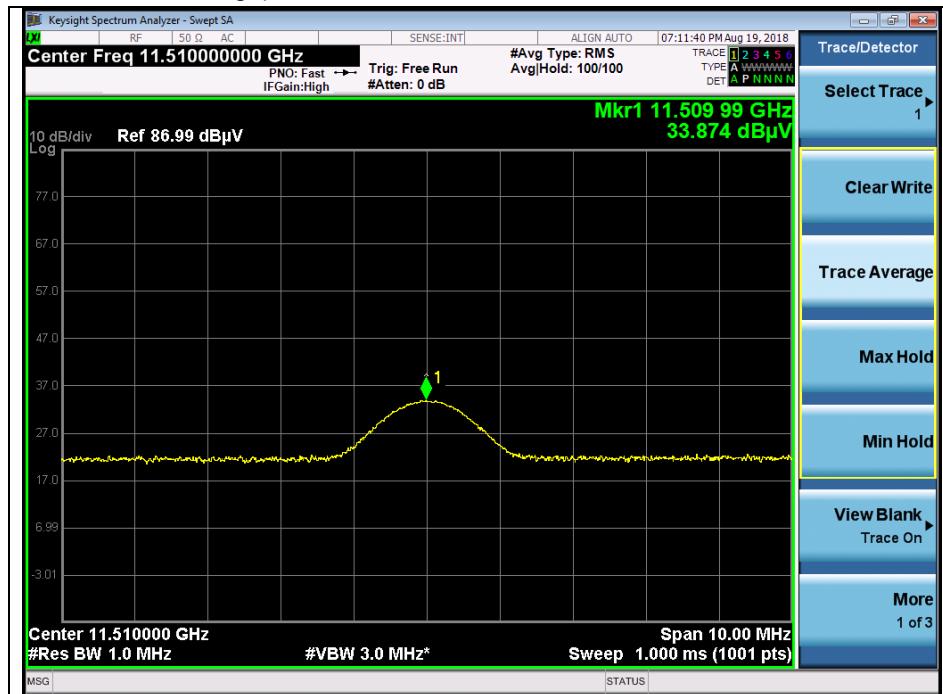
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A4(210 mm × 297 mm)

Low channel 2nd harmonic (Peak) - Band 3Low channel 2nd harmonic (Average) - Band 3

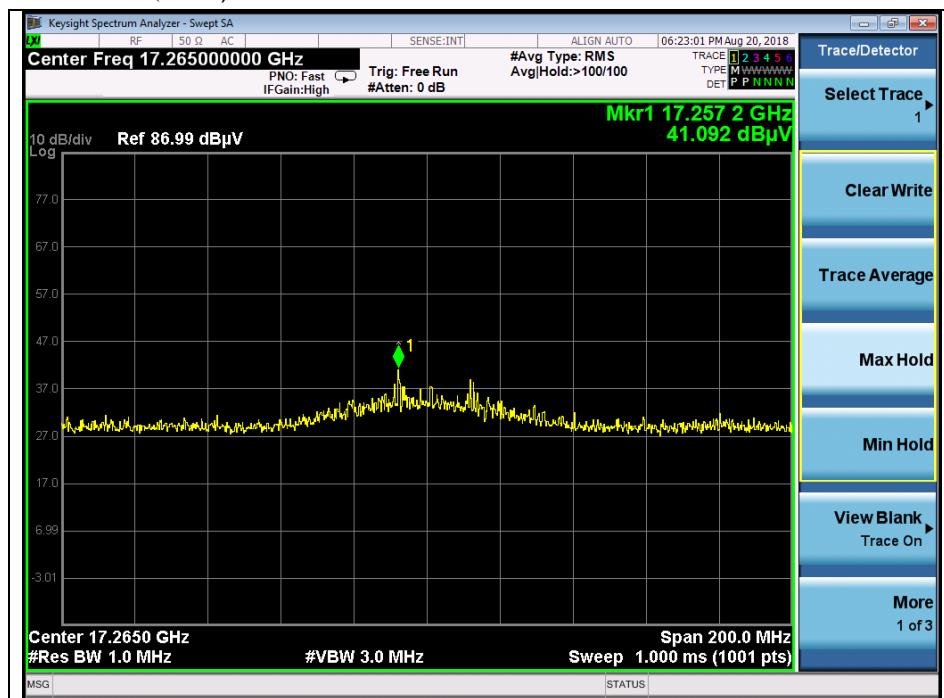
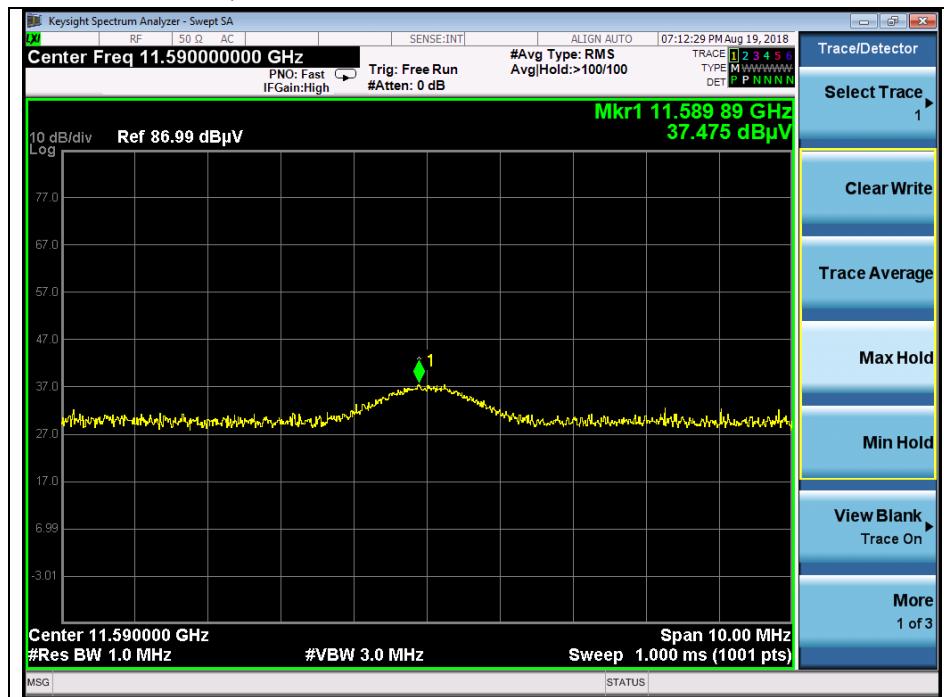
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A4(210 mm x 297 mm)

Low channel 3rd harmonic (Peak) - Band 3High channel 2nd harmonic (Peak) - Band 3

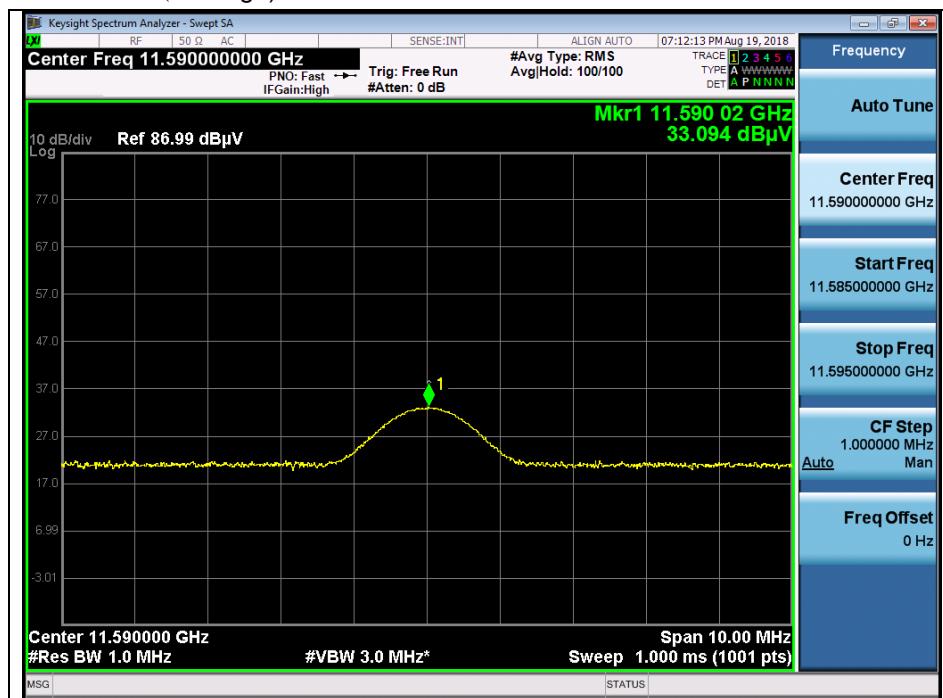
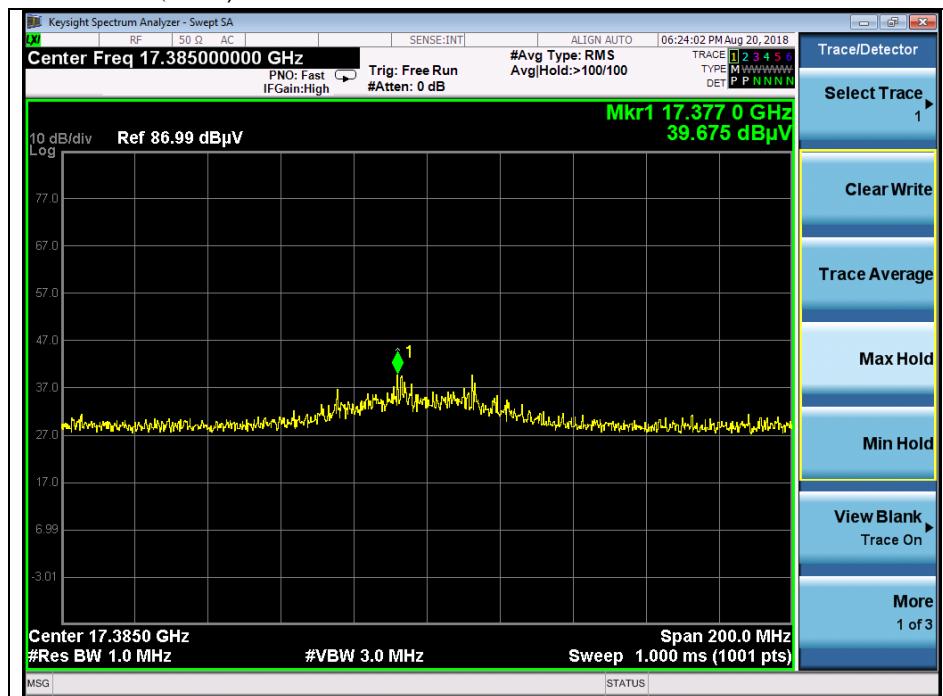
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A4(210 mm x 297 mm)

High channel 2nd harmonic (Average) - Band 3High channel 3rd harmonic (Peak) - Band 3

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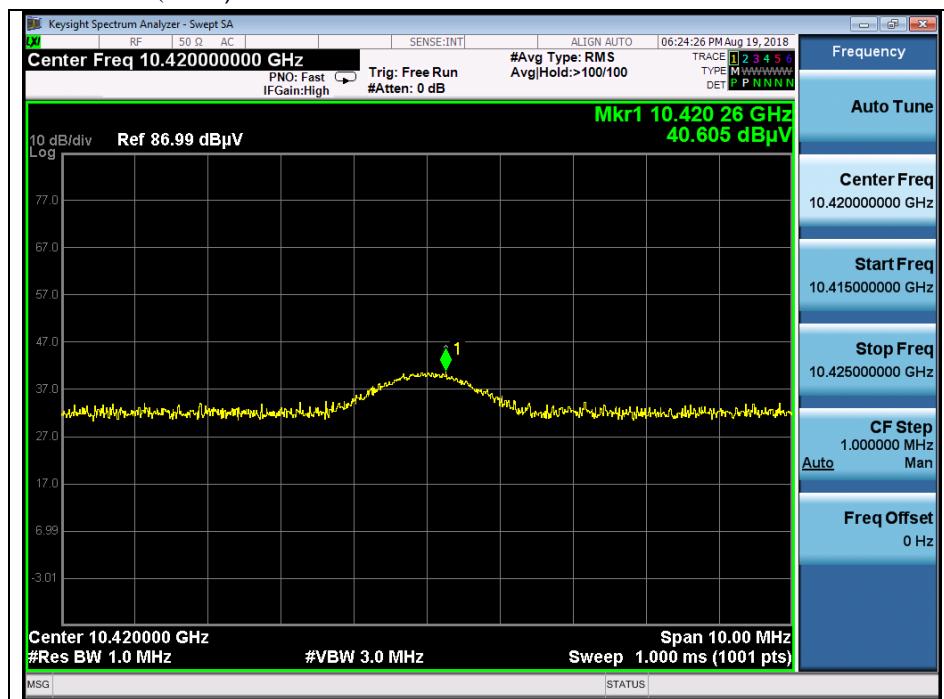
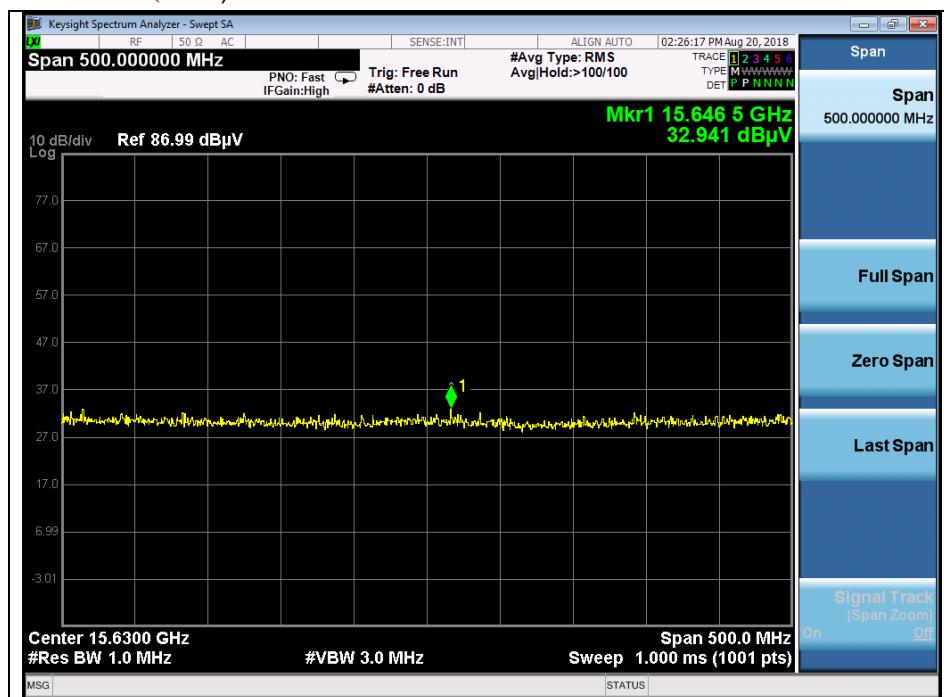
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A4(210 mm x 297 mm)

OFDM: 802.11ac_VHT80(MCS0)

Low channel 2nd harmonic (Peak) - Band 1

Low channel 3rd harmonic (Peak) - Band 1


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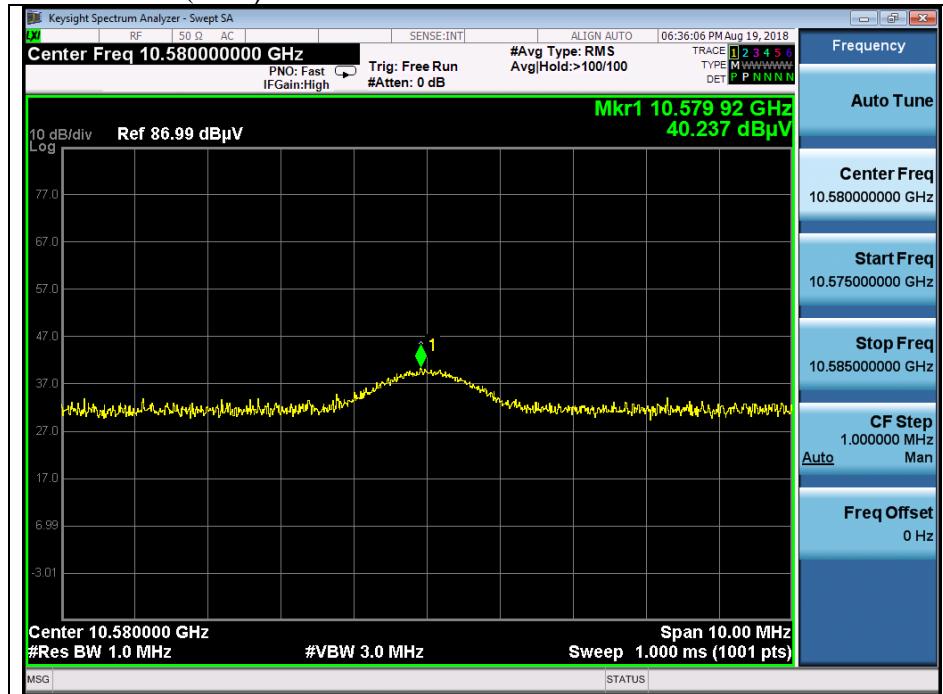
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A4(210 mm x 297 mm)

Low channel 3rd harmonic (Average) - Band 1

Middle channel 2nd harmonic (Peak) - Band 2A


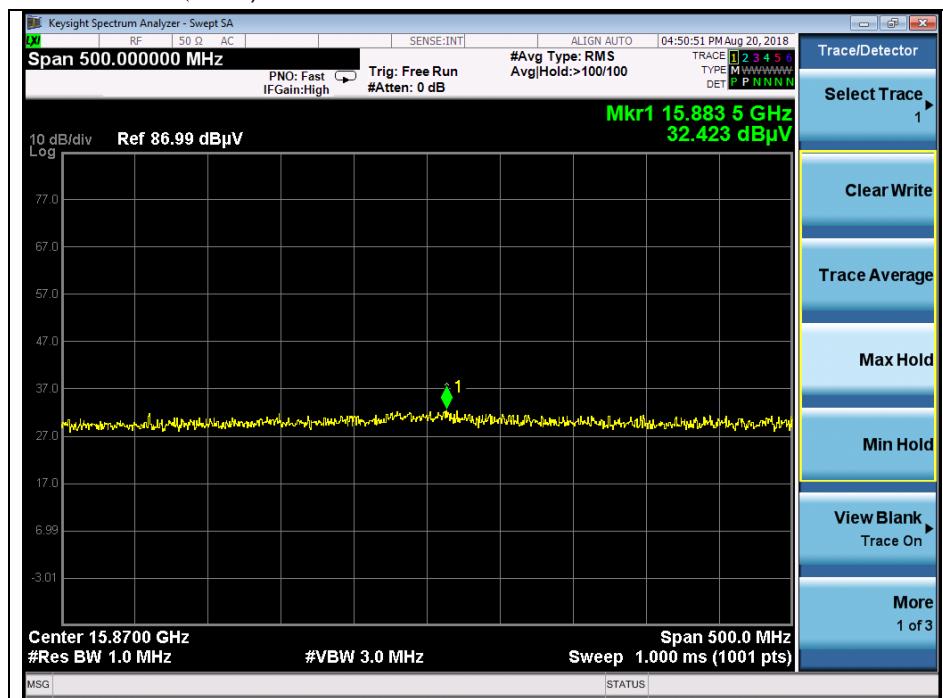
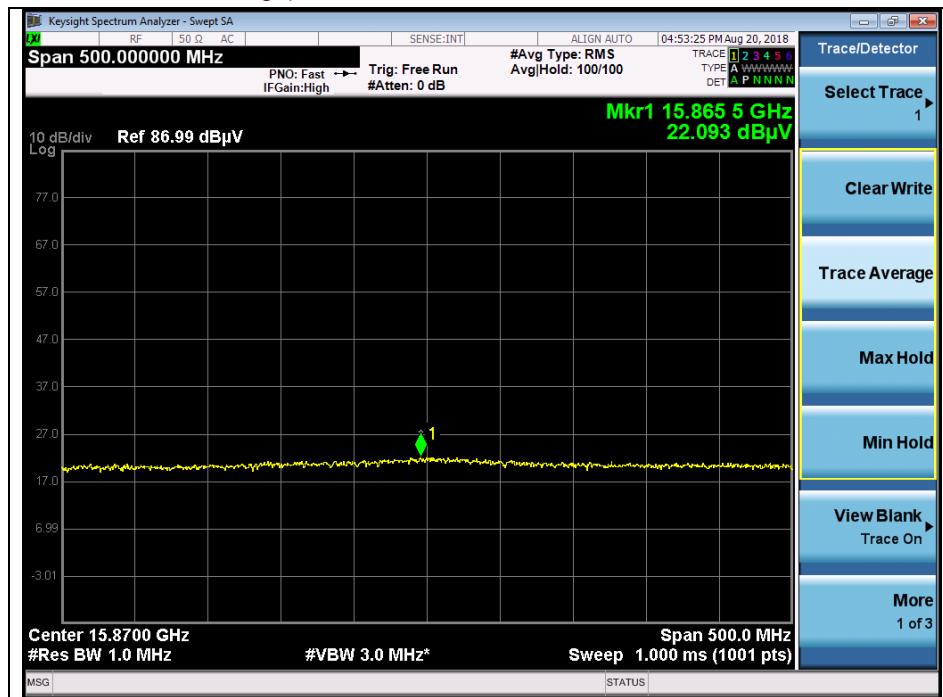
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A4(210 mm × 297 mm)

Middle channel 3rd harmonic (Peak) - Band 2AMiddle channel 3rd harmonic (Average) - Band 2A

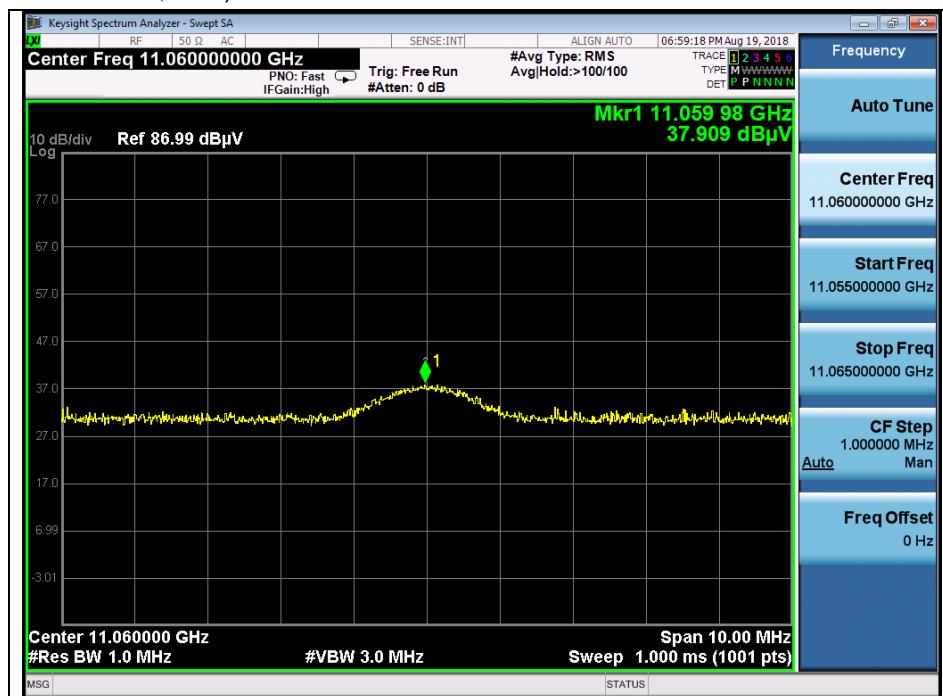
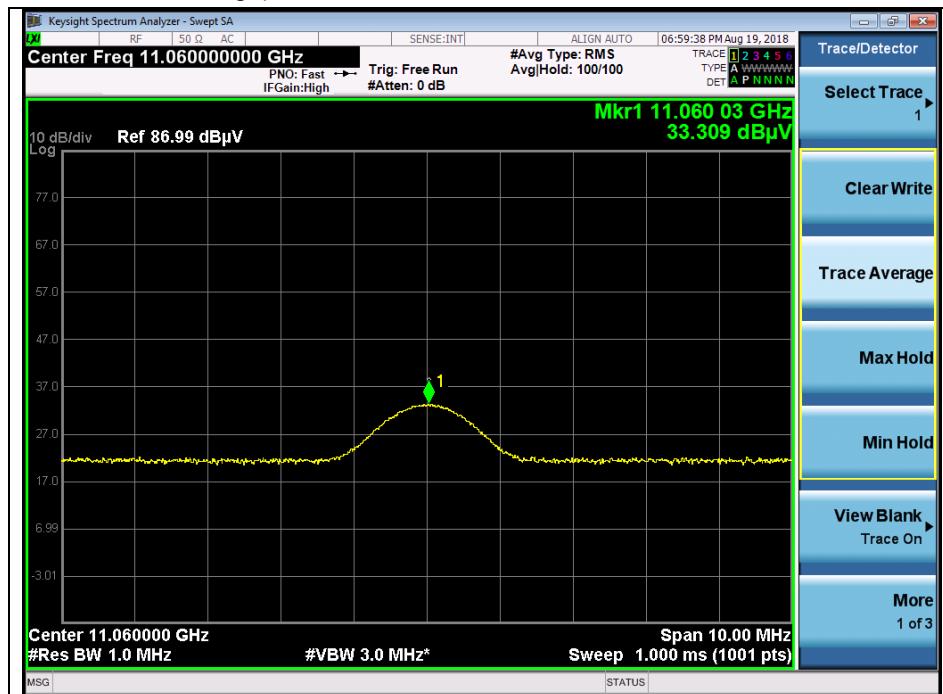
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A4(210 mm x 297 mm)

Low channel 2nd harmonic (Peak) - Band 2C

Low channel 2nd harmonic (Average) - Band 2C


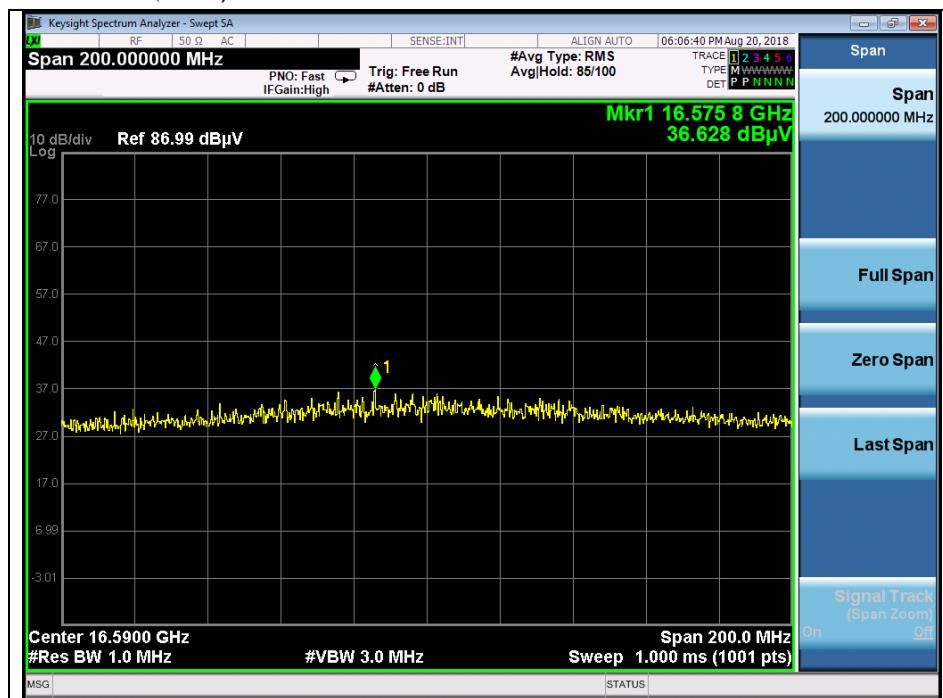
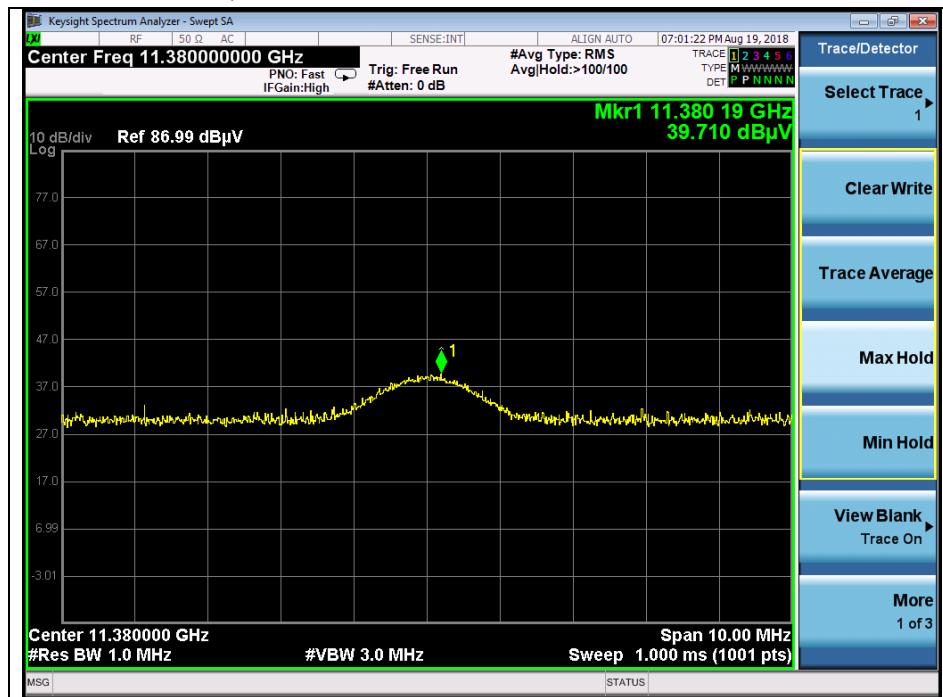
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A4(210 mm x 297 mm)

Low channel 3rd harmonic (Peak) - Band 2C

High channel 2nd harmonic (Peak) - Band 2C


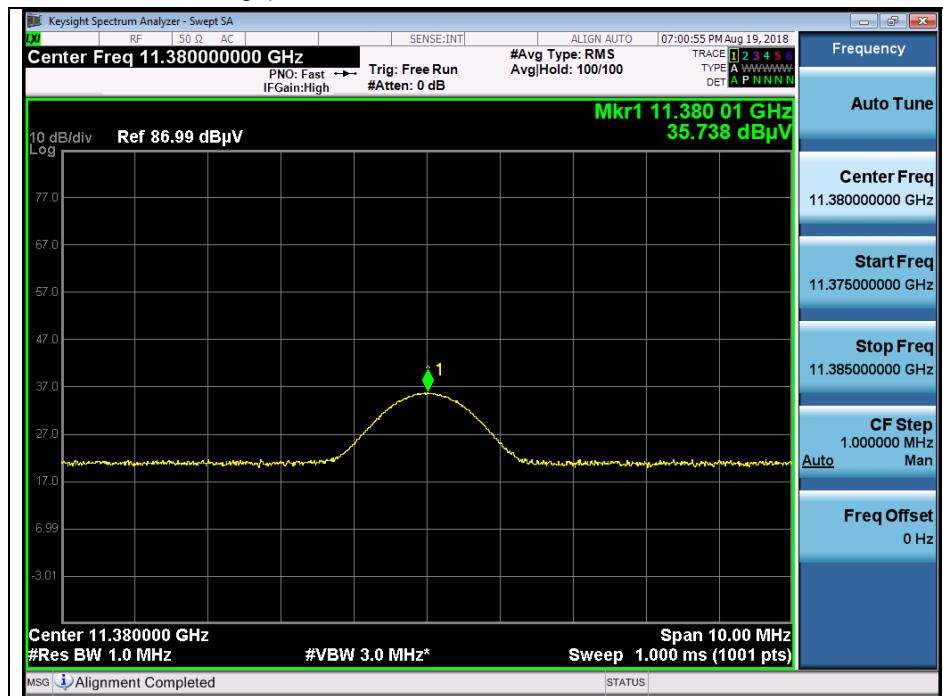
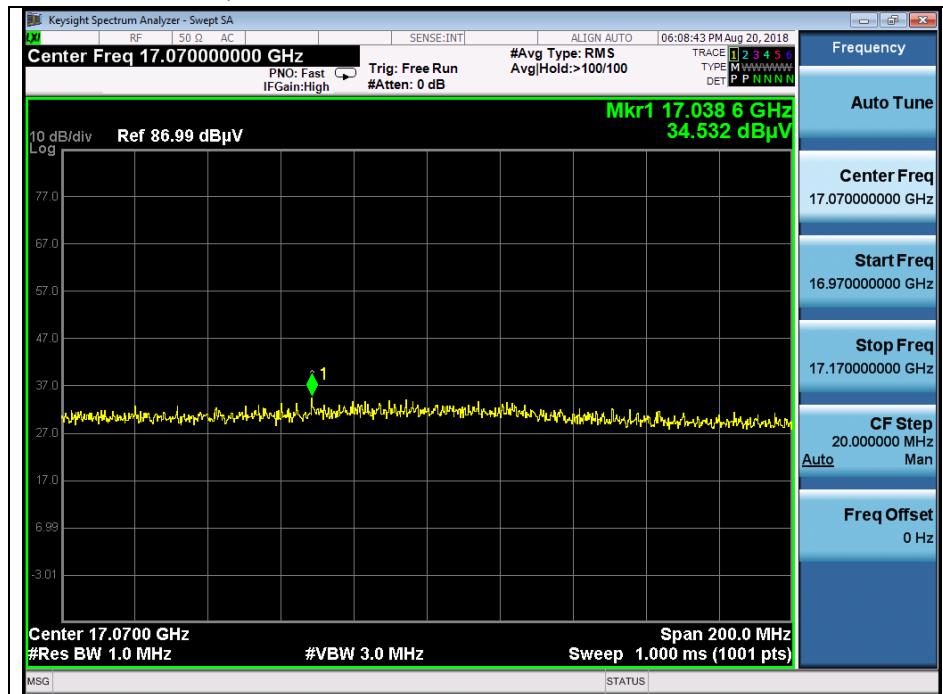
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A4(210 mm x 297 mm)

High channel 2nd harmonic (Average) - Band 2CHigh channel 3rd harmonic (Peak) - Band 2C

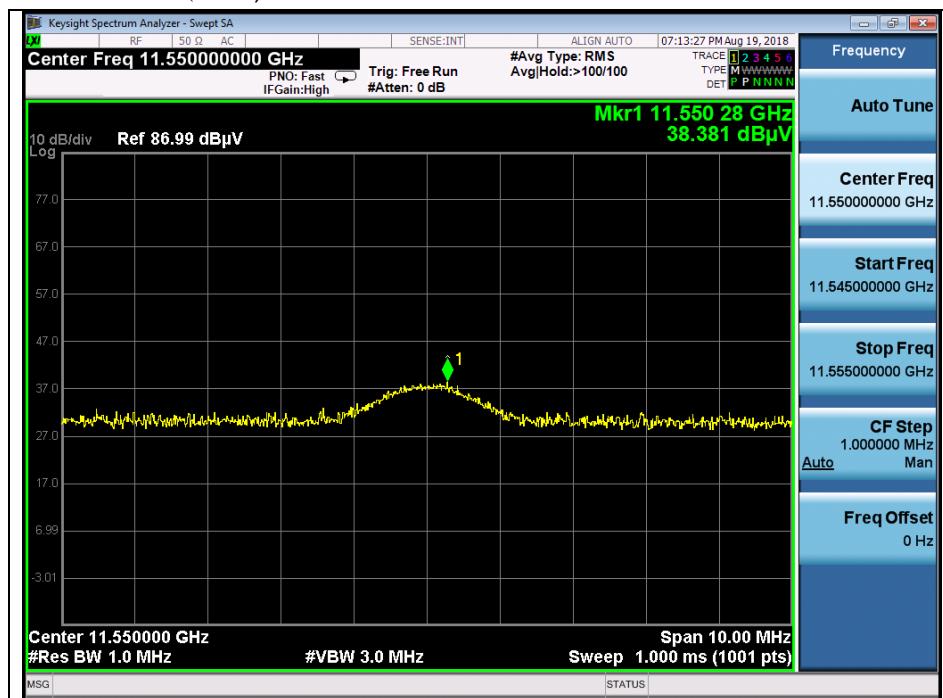
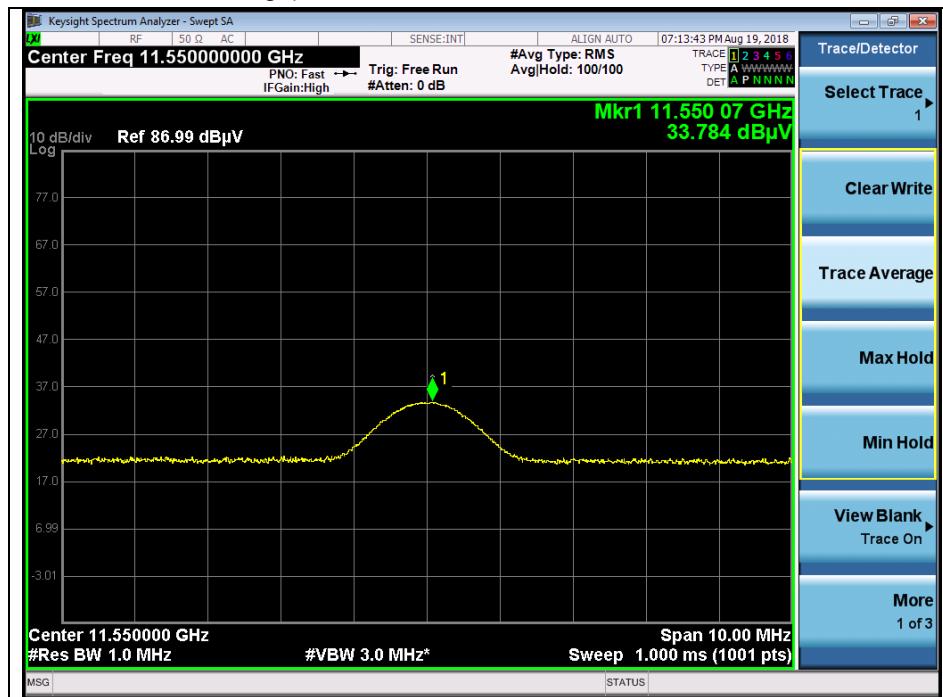
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A4(210 mm × 297 mm)

Middle channel 2nd harmonic (Peak) - Band 3Middle channel 2nd harmonic (Average) - Band 3

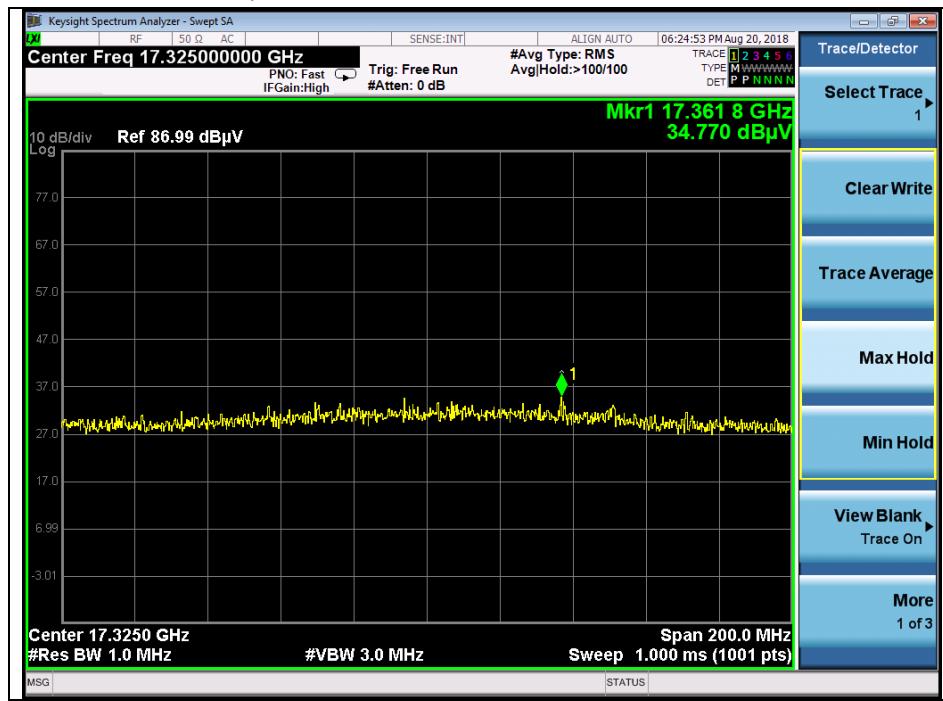
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A4(210 mm × 297 mm)

Middle channel 3rd harmonic (Peak) - Band 3

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A4(210 mm x 297 mm)

3.26 dB Bandwidth & 99 % Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purpose only.

3.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

3.3.1. 26 dB Bandwidth

1. This measurement settings are specified in section C.1 of KDB 789033 D02 v02r01.
2. Set RBW: approximately 1 % of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

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3.2.2. 99 % Bandwidth

3.2.2.1 FCC

1. This measurement settings are specified in section D of KDB 789033 D02 v02r01.
2. Set center frequency to the nominal EUT channel center frequency.
3. Set span = 1.5 times to 5.0 times the OBW.
4. Set RBW = 1 % to 5 % of the OBW.
5. Set VBW \geq 3 x RBW.
6. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
7. Use the 99 % power bandwidth function of the instrument (if available).
8. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % occupied bandwidth is the difference between these two frequencies.

In the result,

- DFS requirements are not applicable in the 5 150 MHz ~ 5 250 MHz.

Remark:

In case of band crossing channels 138, 142 and 144, the measurement is complied with section III.A of KDB 789033 D02 v02r01.

3.2.2.2 IC

- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

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A4(210 mm x 297 mm)

3.4. Test result

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	26 dB Bandwidth (MHz)	99 % Bandwidth (MHz)
11a	U-NII 1	5 180	36	6	21.129	16.961
		5 220	44		21.071	16.961
		5 240	48		21.099	17.019
	U-NII 2A	5 260	52		21.071	16.961
		5 300	60		21.129	16.961
		5 320	64		21.041	17.019
	U-NII 2C	5 500	100		21.071	17.019
		5 580	116		21.071	16.961
		5 700	140		21.013	16.961
	U-NII 3	5 745	149		20.933	16.961
		5 785	157		21.129	17.019
		5 825	165		21.187	17.019

Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	26 dB Bandwidth (MHz)	99 % Bandwidth (MHz)
11n_HT20	U-NII 1	5 180	36	MCS0	21.650	18.003
		5 220	44		21.592	18.061
		5 240	48		21.505	18.119
	U-NII 2A	5 260	52		21.418	18.061
		5 300	60		21.592	18.119
		5 320	64		21.678	18.119
	U-NII 2C	5 500	100		21.708	18.061
		5 580	116		21.650	18.177
		5 700	140		21.534	18.061
	U-NII 3	5 745	149		21.570	18.119
		5 785	157		21.534	18.119
		5 825	165		21.650	18.061

Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	26 dB Bandwidth (MHz)	99 % Bandwidth (MHz)
11n_HT40	U-NII 1	5 190	38	MCS0	40.410	36.469
		5 230	46		40.040	36.585
	U-NII 2A	5 270	54		40.330	36.469
		5 310	62		40.160	36.469
	U-NII 2C	5 510	102		40.290	36.585
		5 550	110		40.240	36.585
		5 670	134		40.290	36.585
	U-NII 3	5 755	151		40.150	36.585
		5 795	159		40.330	36.585

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Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	26 dB Bandwidth (MHz)	99 % Bandwidth (MHz)
11ac_VHT80	U-NII 1	5 210	42	MCS0	82.200	75.716
	U-NII 2A	5 290	58		82.030	75.485
	U-NII 2C	5 530	106		81.970	75.485
		5 690	138		82.200	75.716
	U-NII 3	5 775	155		82.180	75.716

Band	Mode	Frequency (MHz)	Ch.	Data Rate (Mbps)	26 dB Bandwidth (MHz)
U-NII 2C (Band-crossing channel)	11a	5 720	144	6	15.593
	11n_HT20	5 720	144	MCS0	15.767
	11n_HT40	5 710	142	MCS0	34.990
	11ac_VHT80	5 690	138	MCS0	75.780

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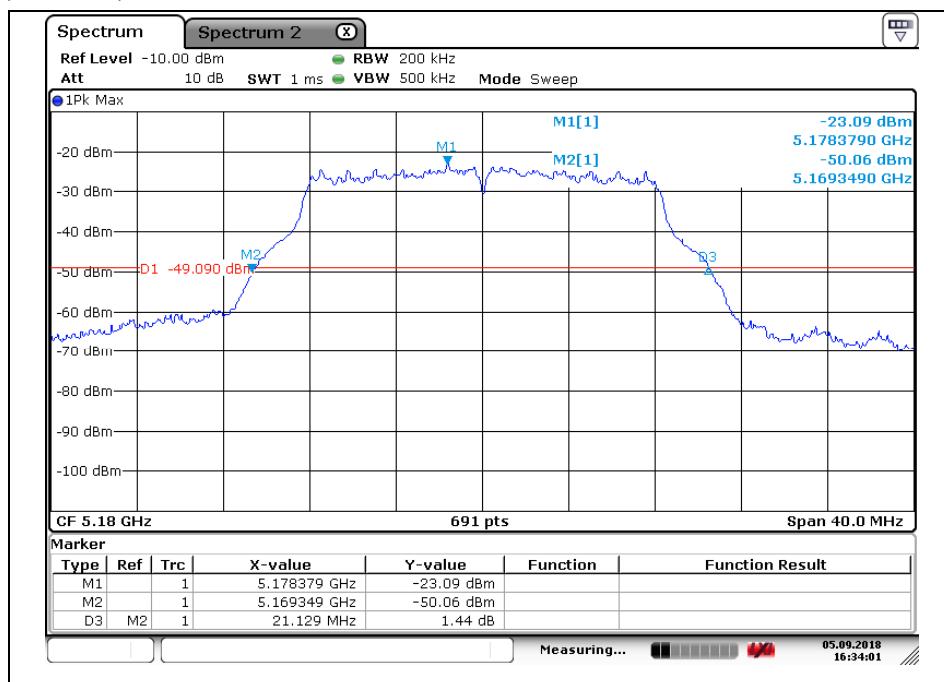
A4(210 mm x 297 mm)

- Test plots

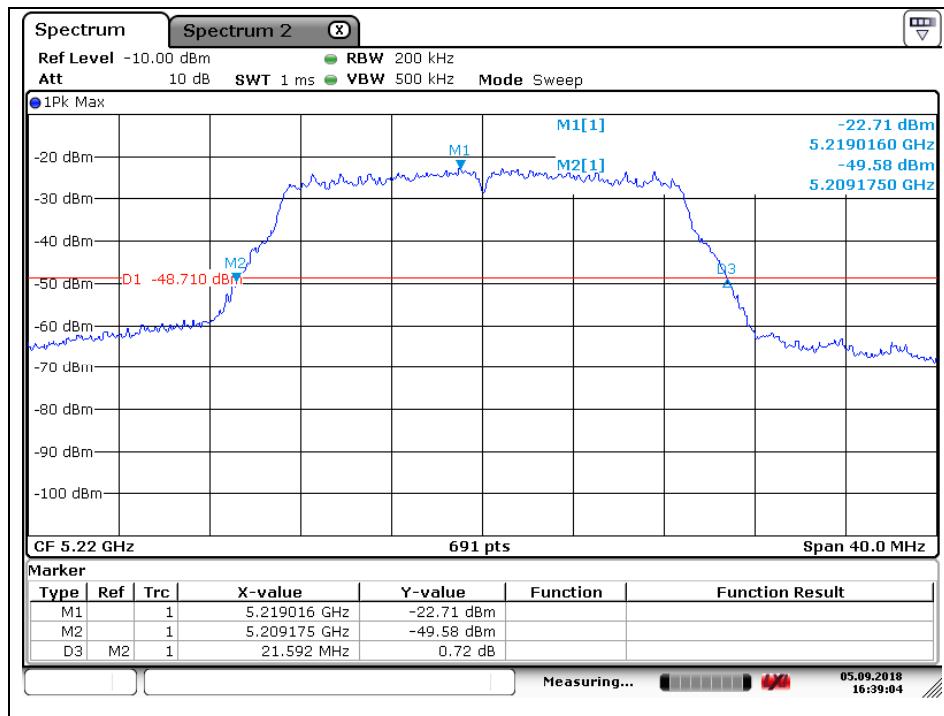
26 dB Bandwidth

802.11a (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 220 MHz)



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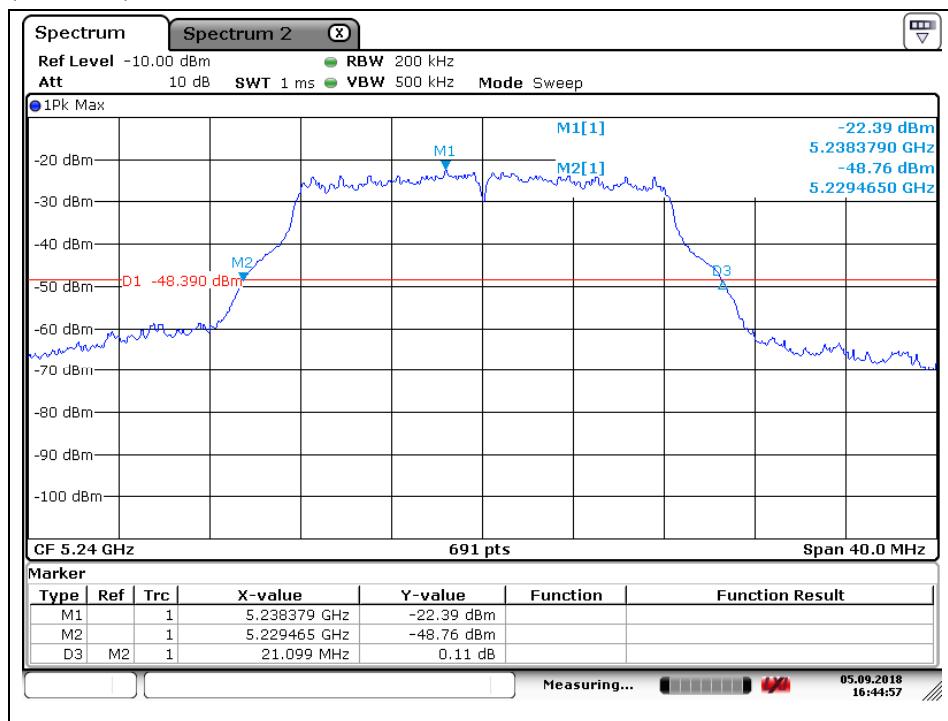
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

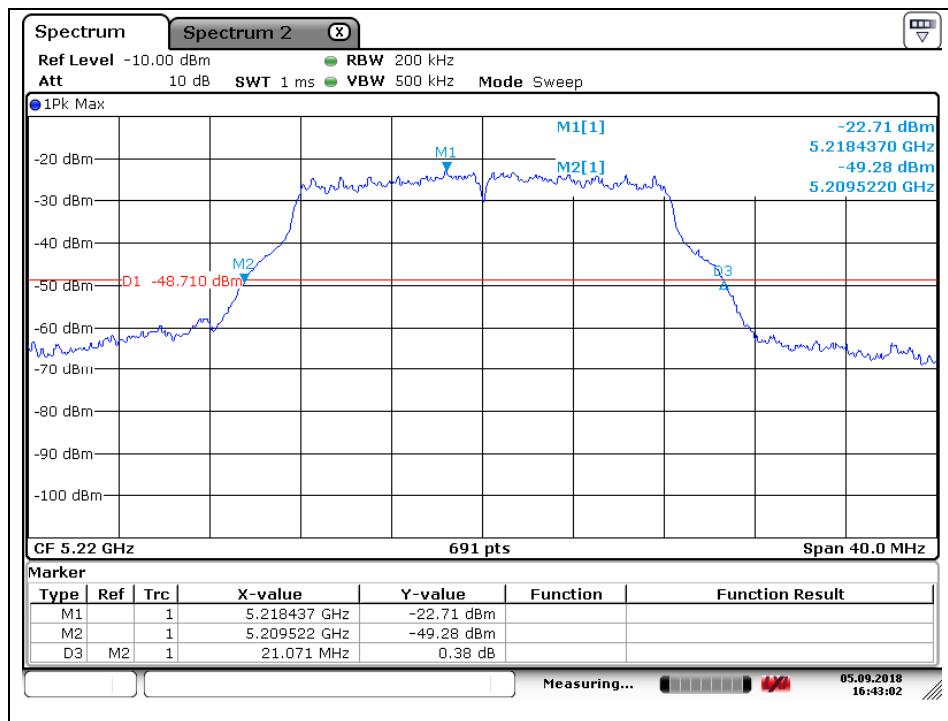
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A4(210 mm x 297 mm)

High Channel (5.240 MHz)


802.11a (Band 2A)

Low Channel (5.260 MHz)



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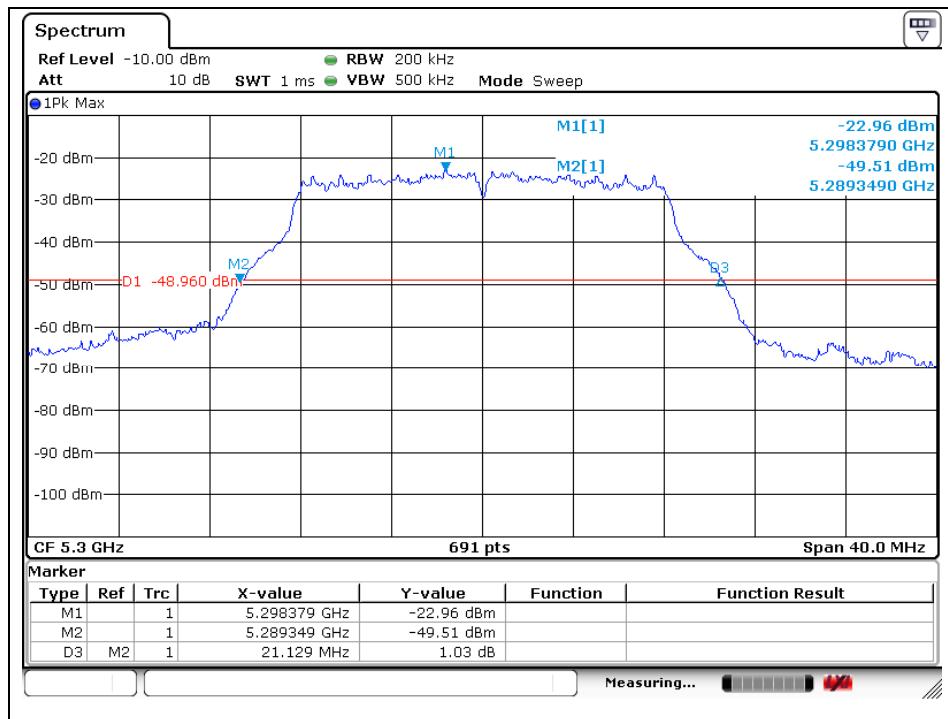
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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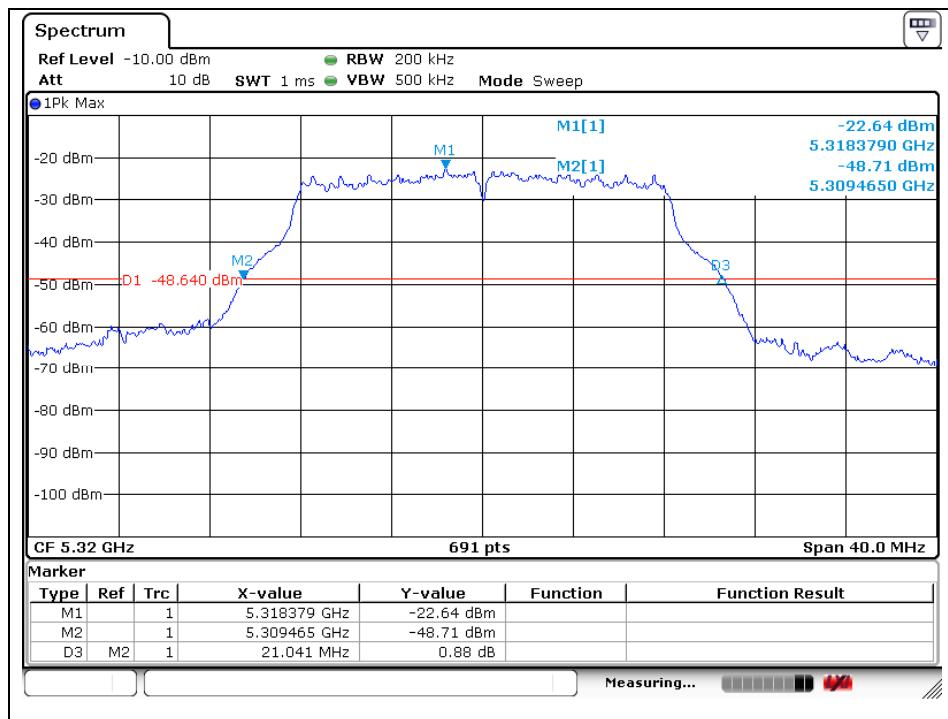
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A4(210 mm x 297 mm)

Middle Channel (5 300 MHz)



High Channel (5 320 MHz)



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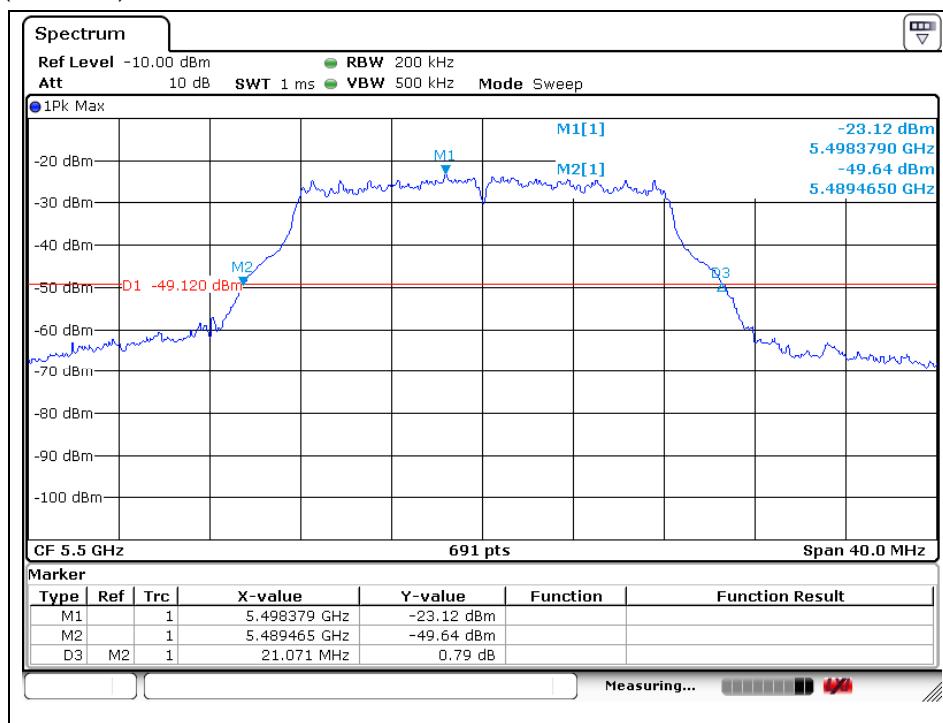
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

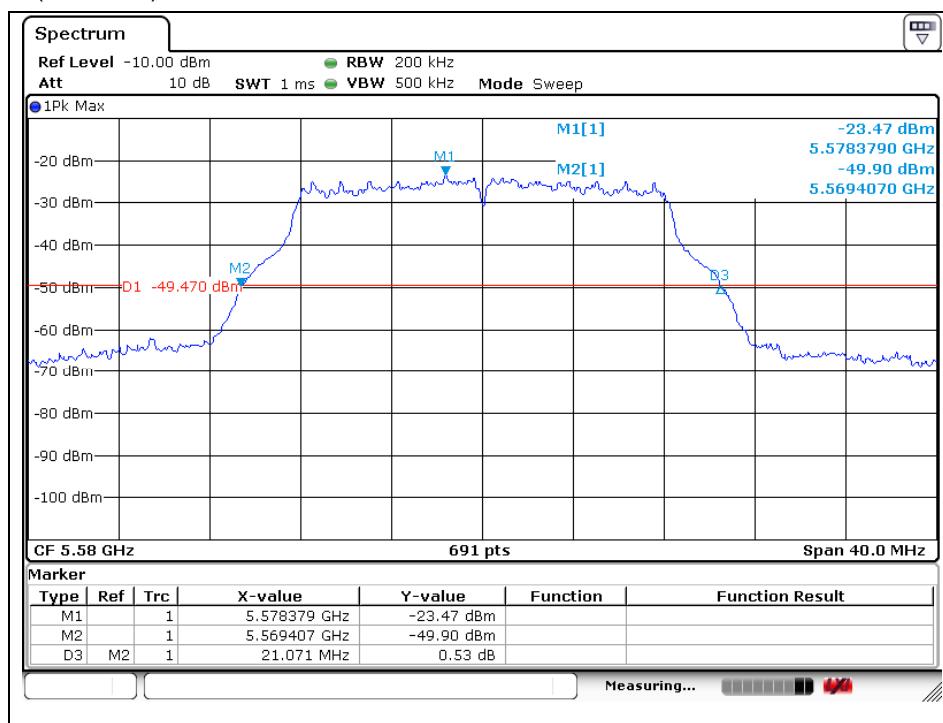
A4(210 mm x 297 mm)

802.11a (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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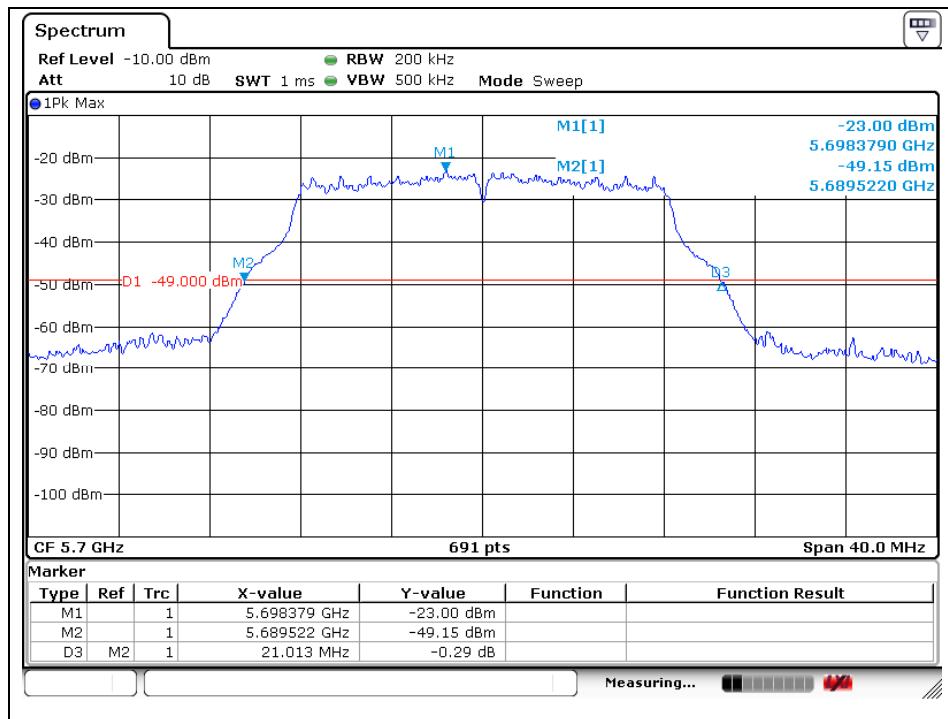
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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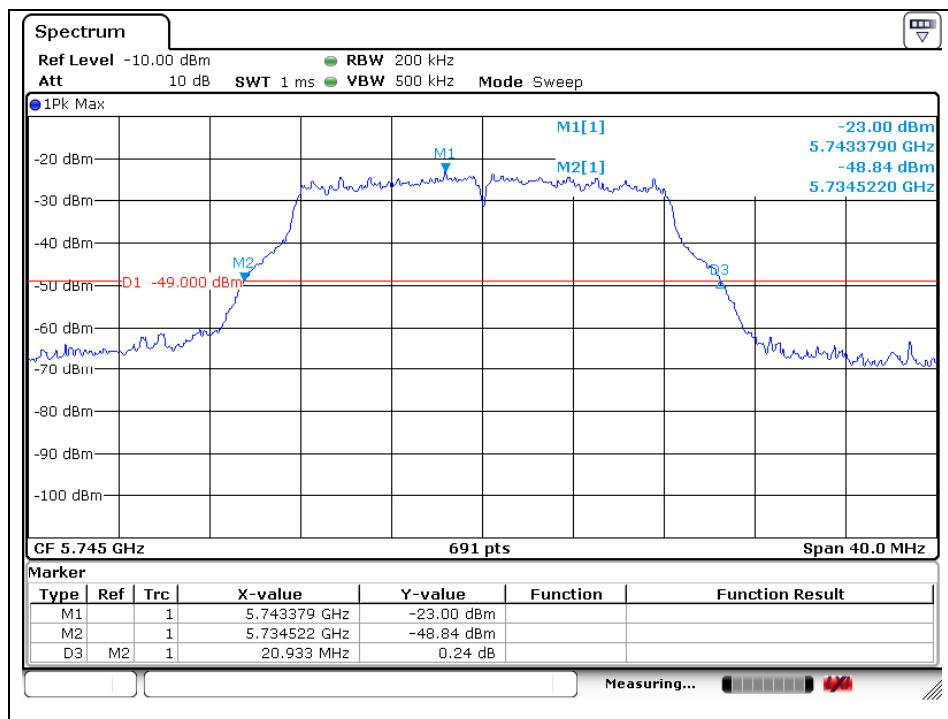
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A4(210 mm x 297 mm)

High Channel (5 700 MHz)


802.11a (Band 3)

Low Channel (5 745 MHz)



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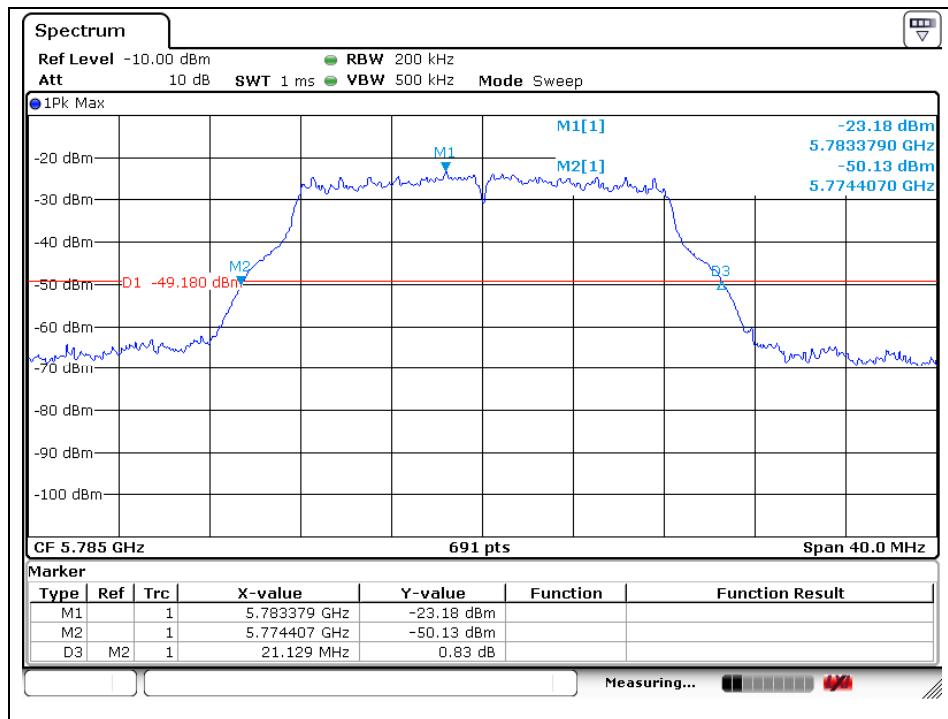
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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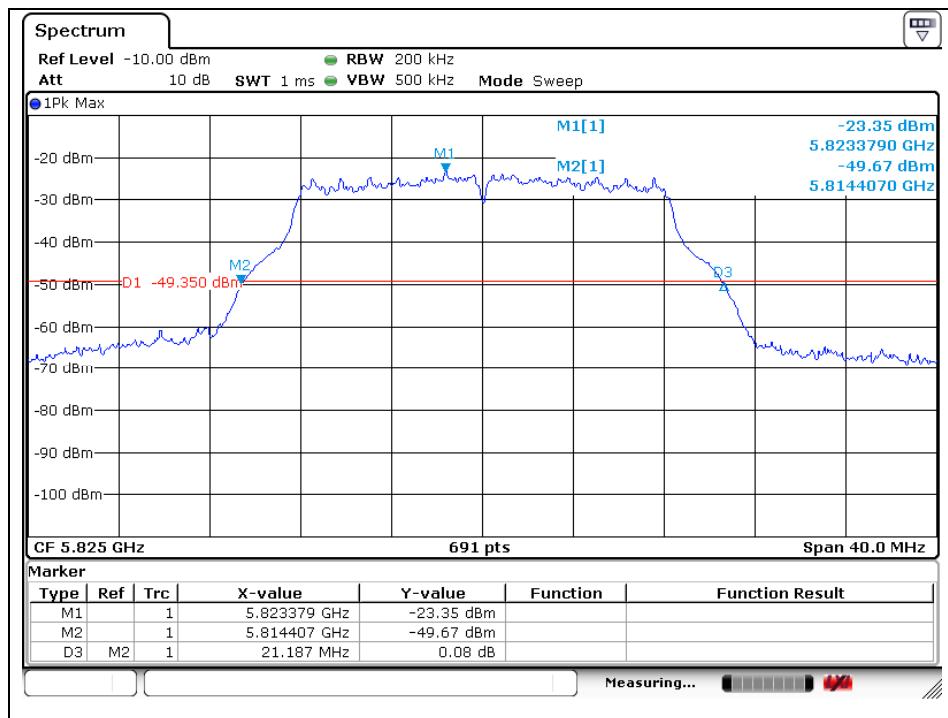
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A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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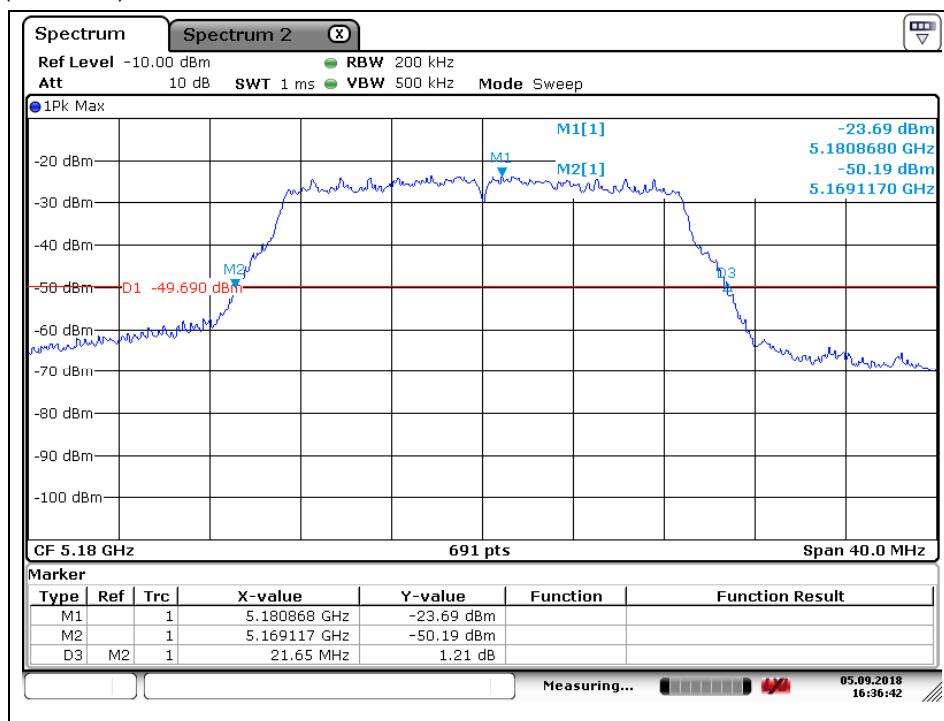
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

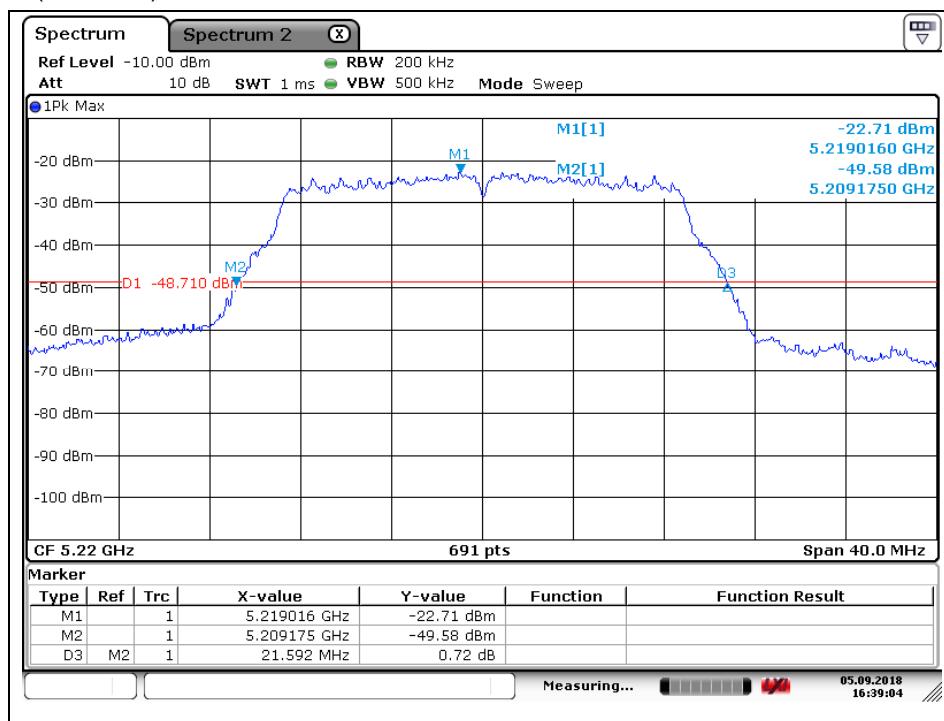
A4(210 mm x 297 mm)

802.11n_HT20 (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 220 MHz)



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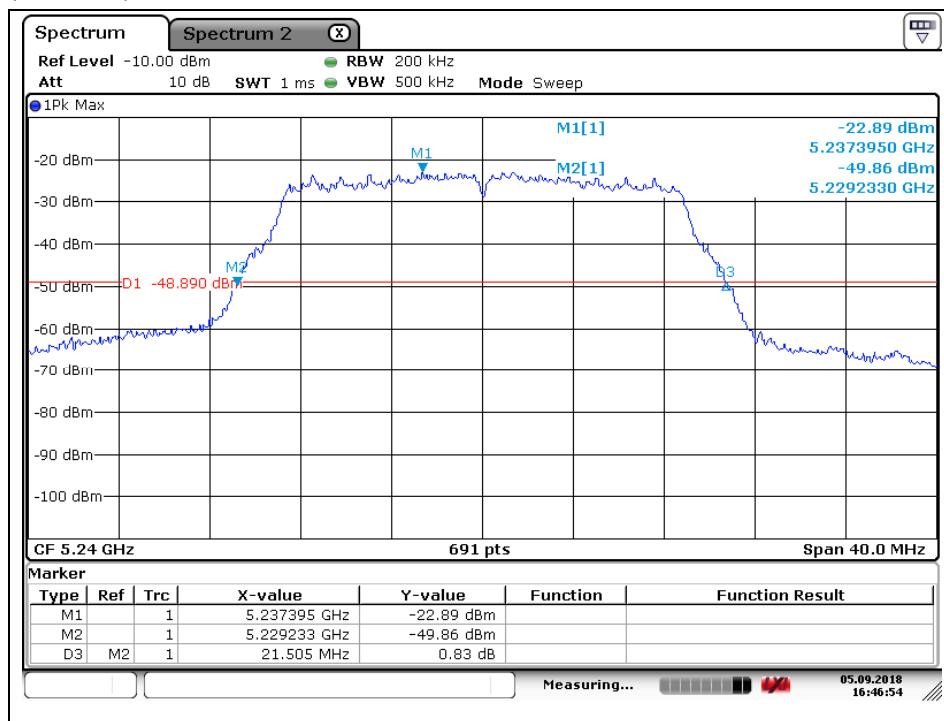
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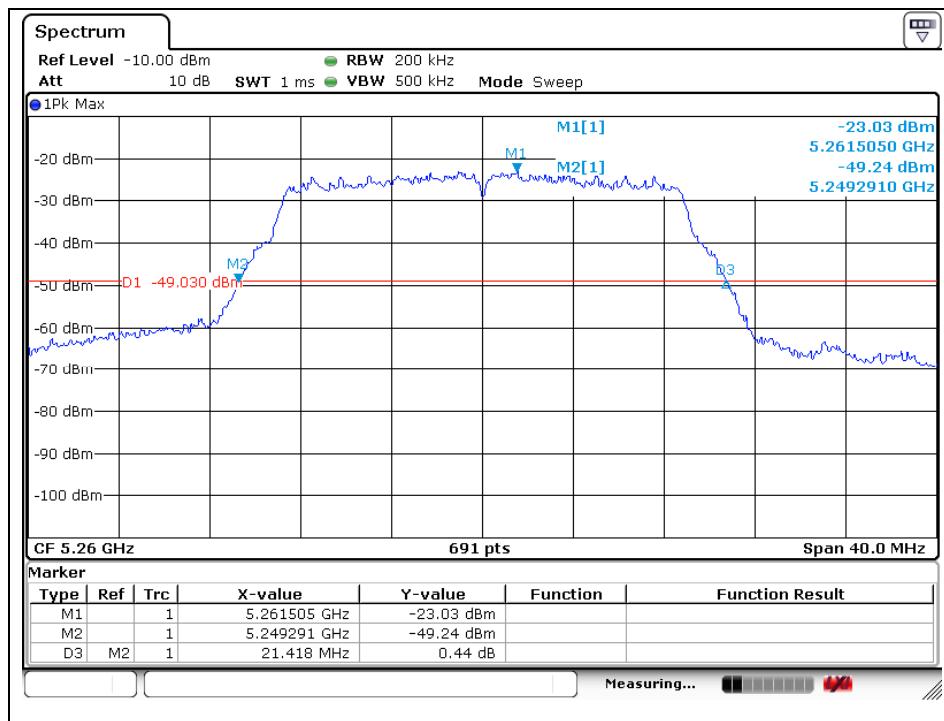
A4(210 mm x 297 mm)

High Channel (5.240 MHz)



802.11n_HT20 (Band 2A)

Low Channel (5.260 MHz)



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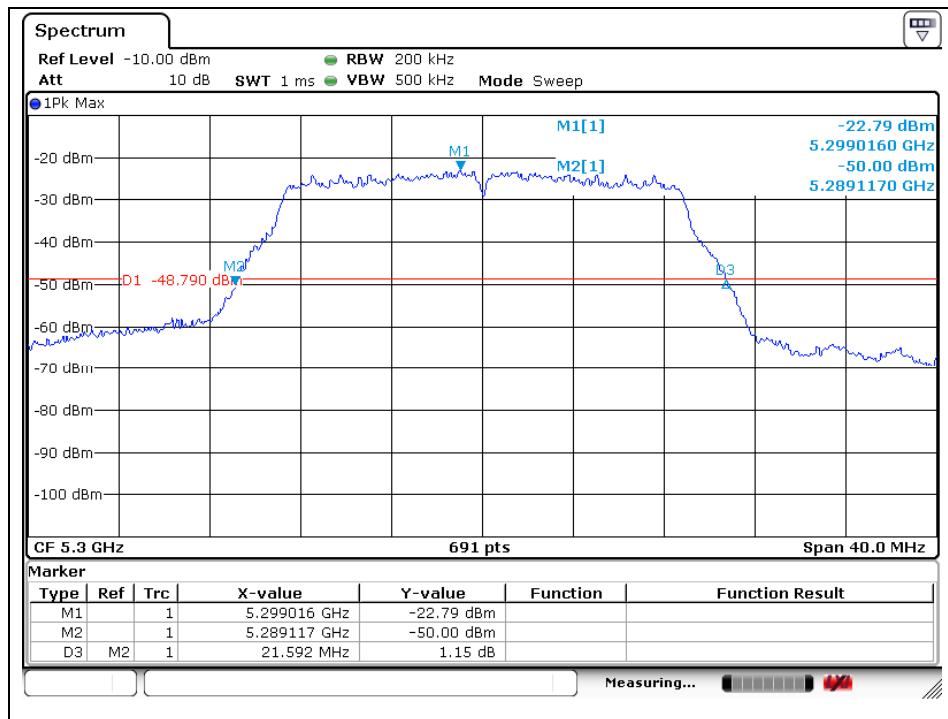
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RTT5041-19(2017.07.10)(0)

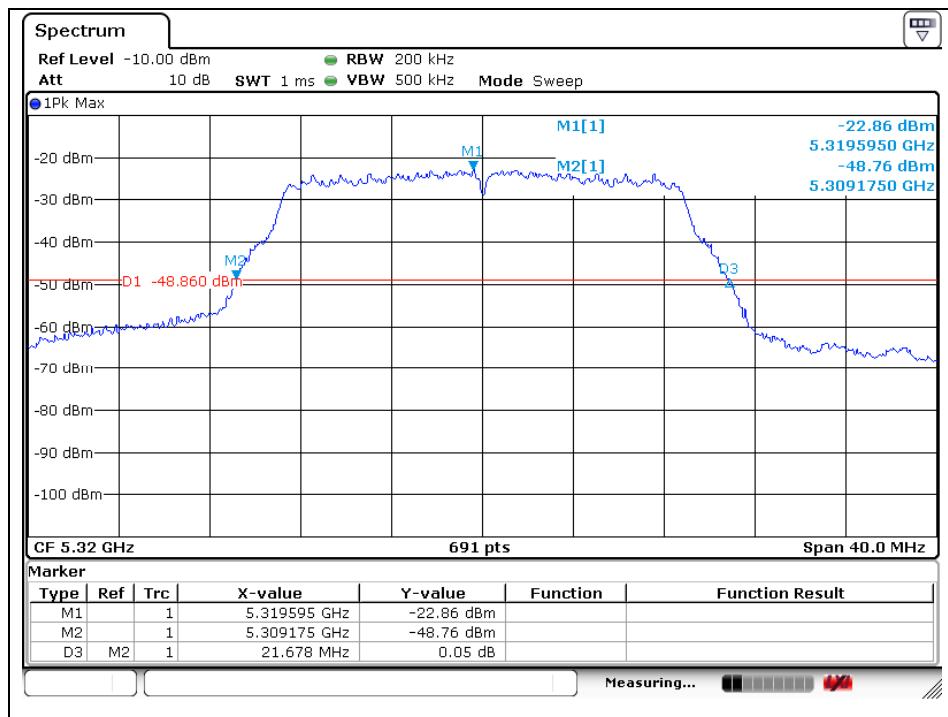
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A4(210 mm x 297 mm)

Middle Channel (5 300 MHz)



High Channel (5 320 MHz)



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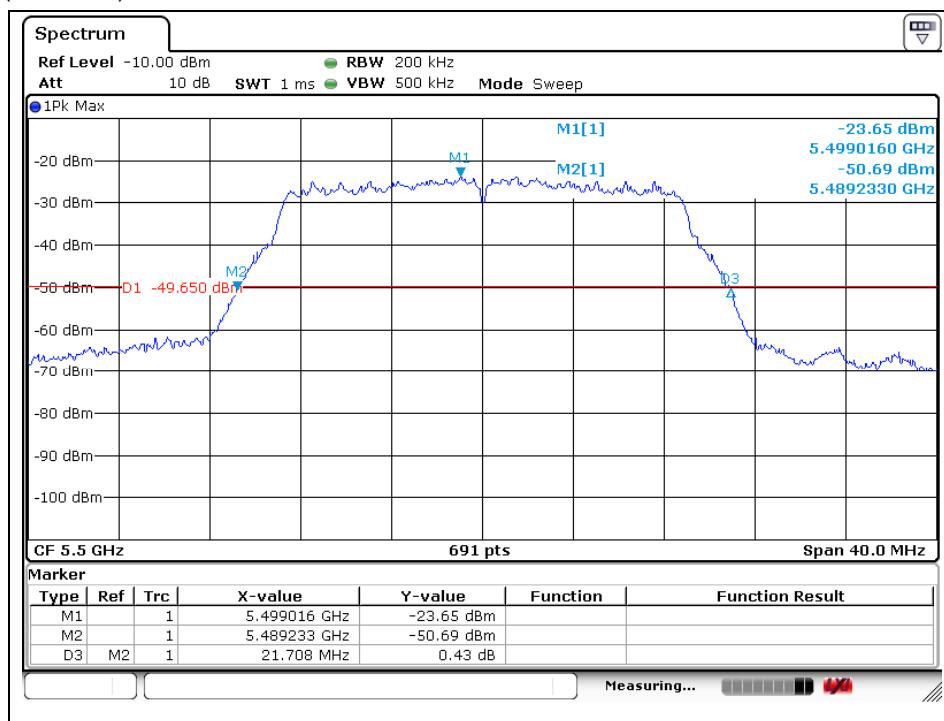
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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

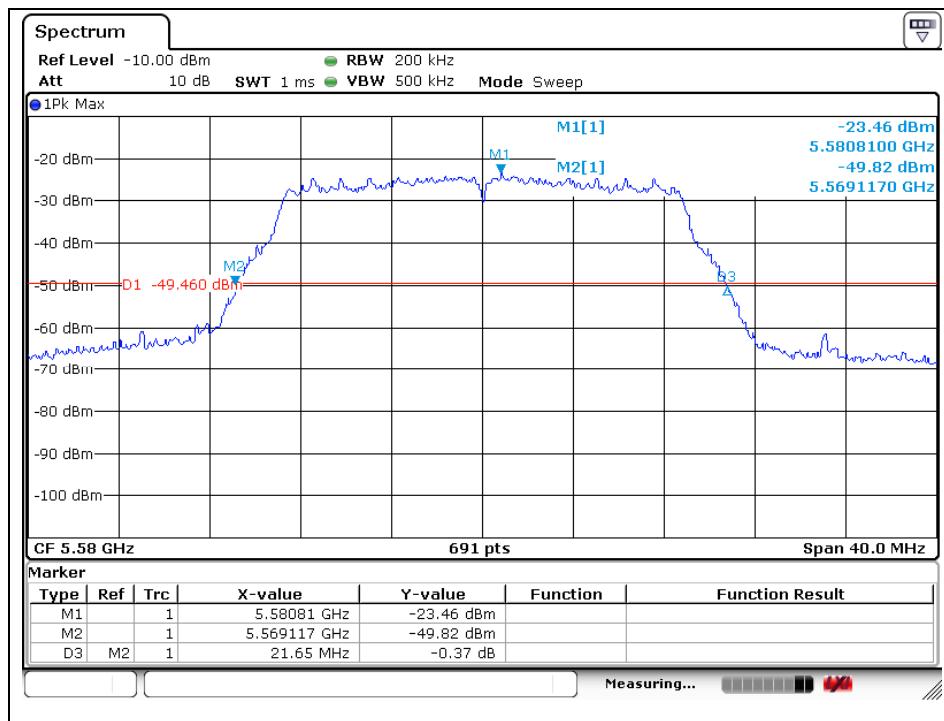
A4(210 mm x 297 mm)

802.11n_HT20 (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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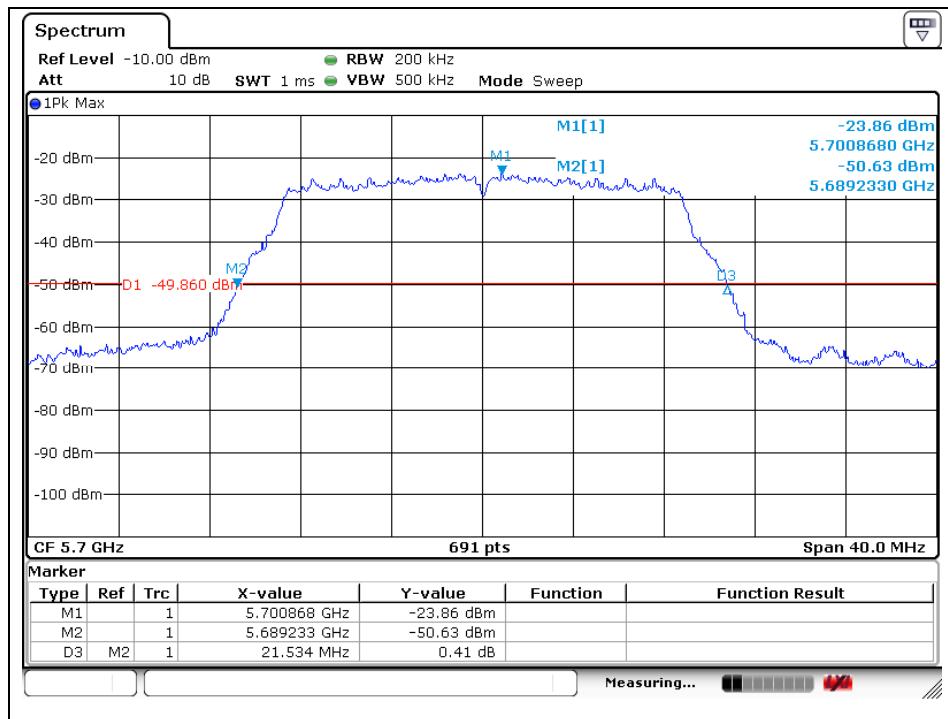
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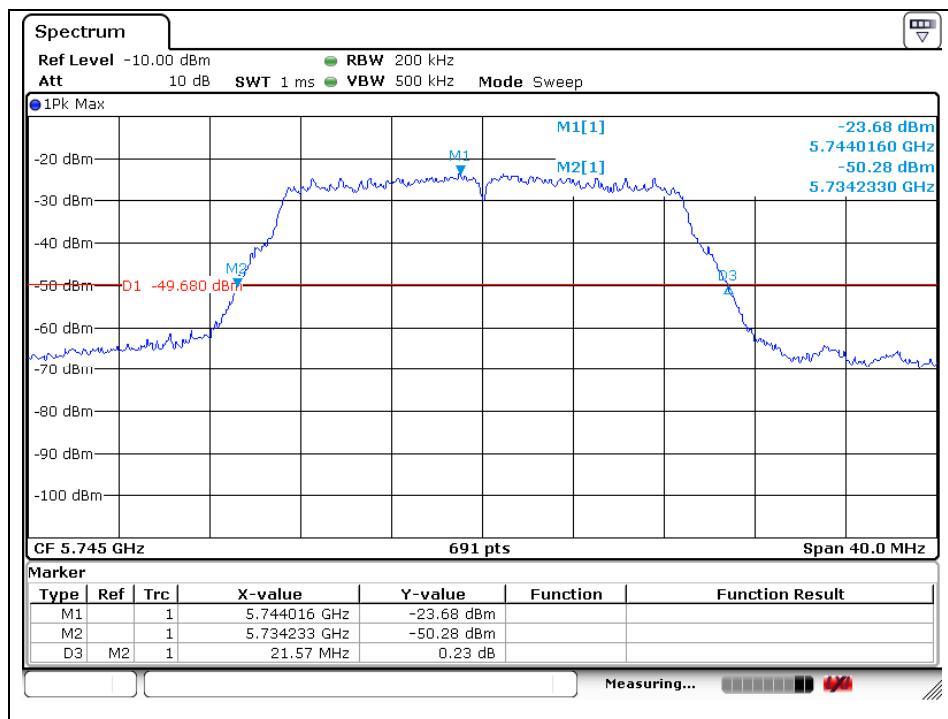
A4(210 mm x 297 mm)

High Channel (5 700 MHz)



802.11n_HT20 (Band 3)

Low Channel (5 745 MHz)



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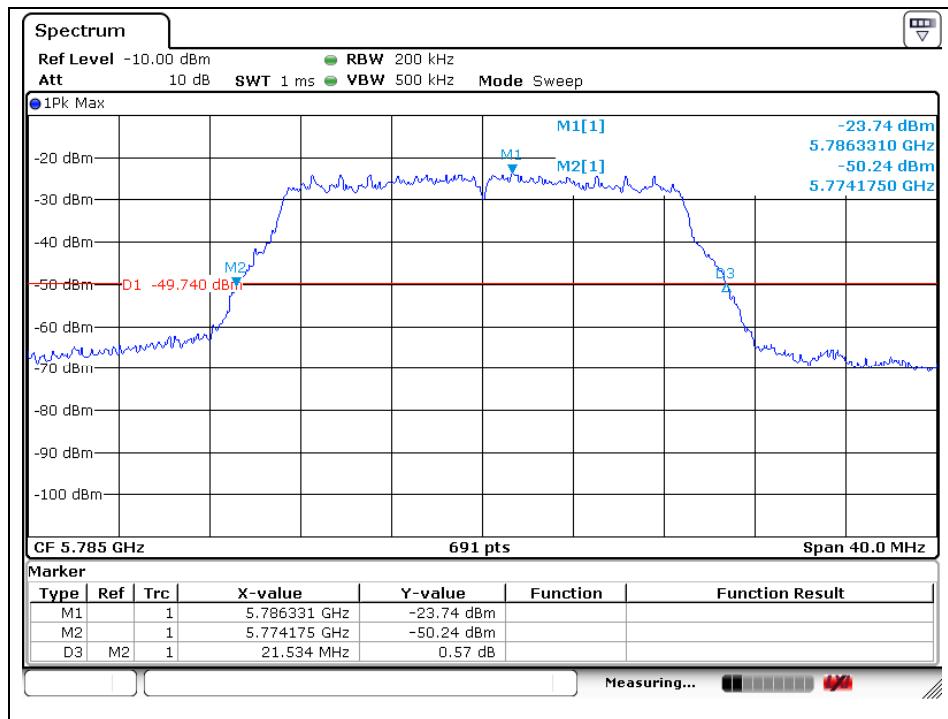
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

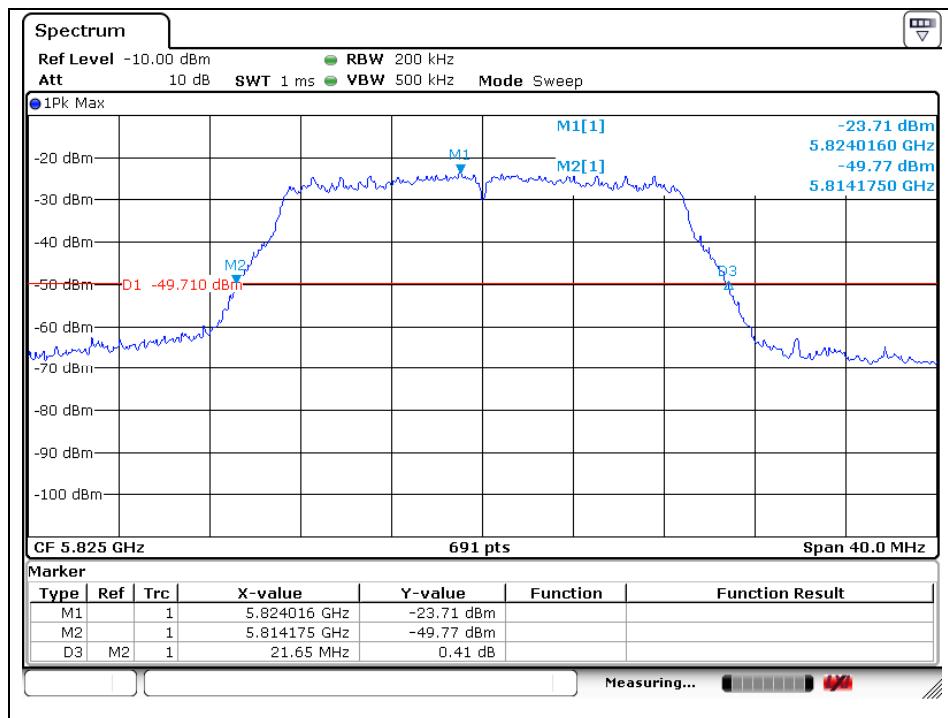
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A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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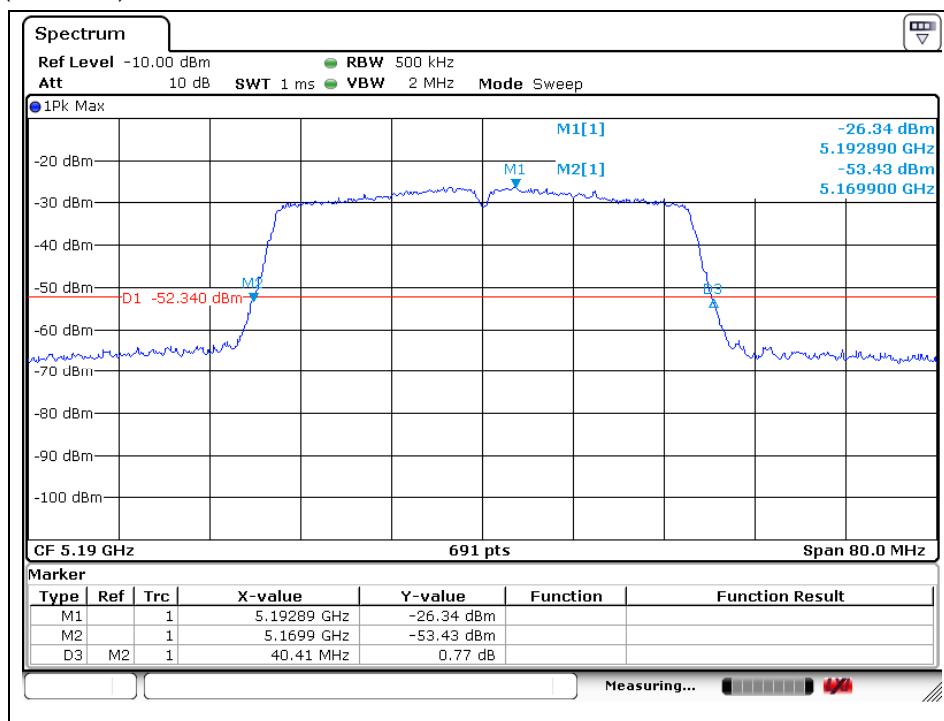
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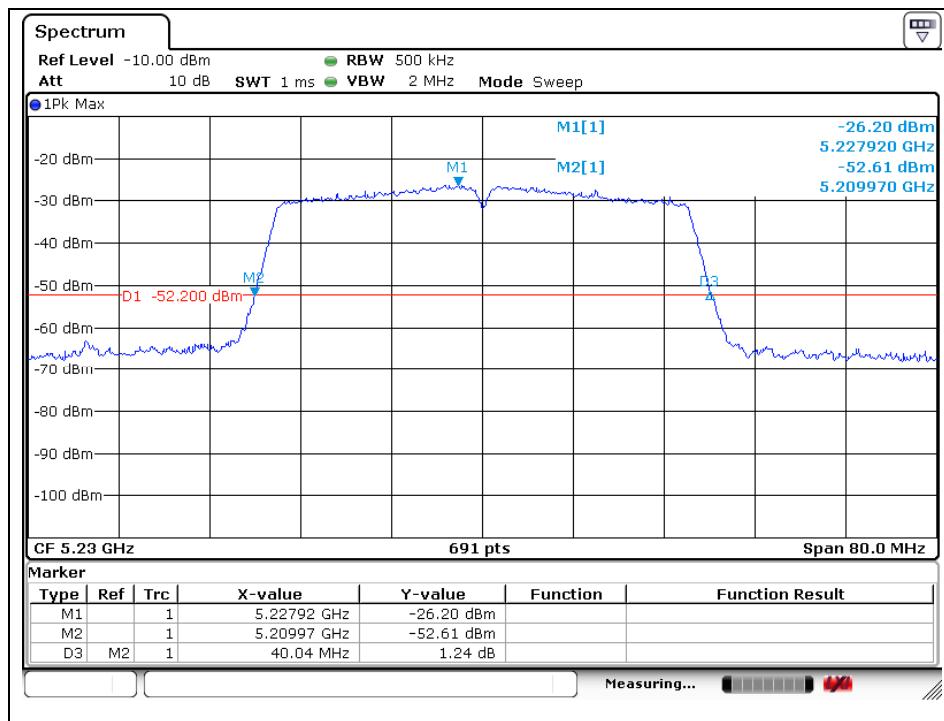
A4(210 mm x 297 mm)

802.11n_HT40 (Band 1)

Low Channel (5 190 MHz)



High Channel (5 230 MHz)



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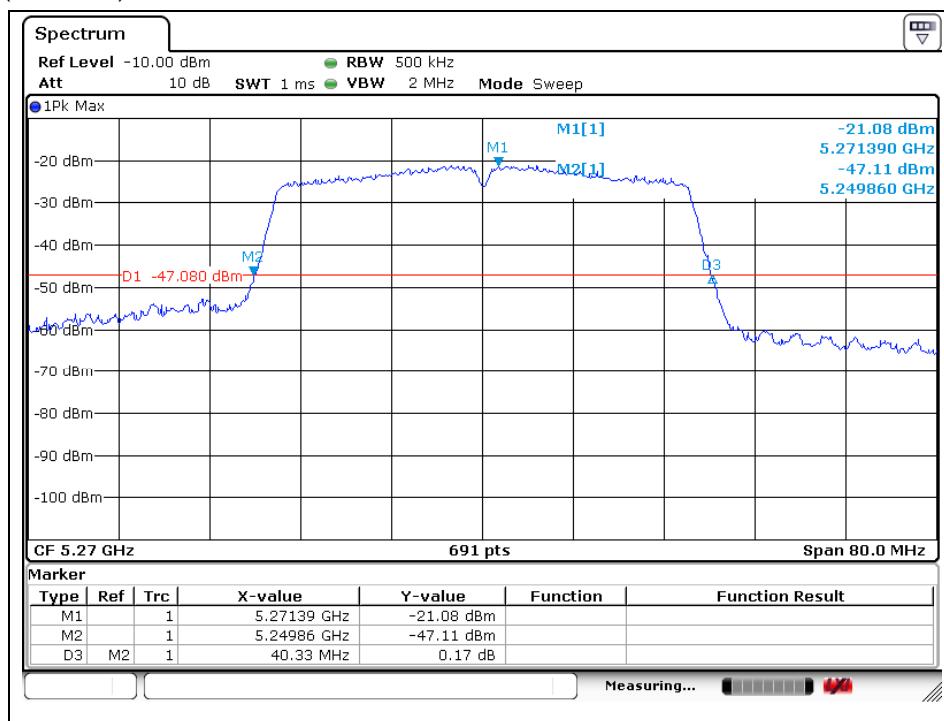
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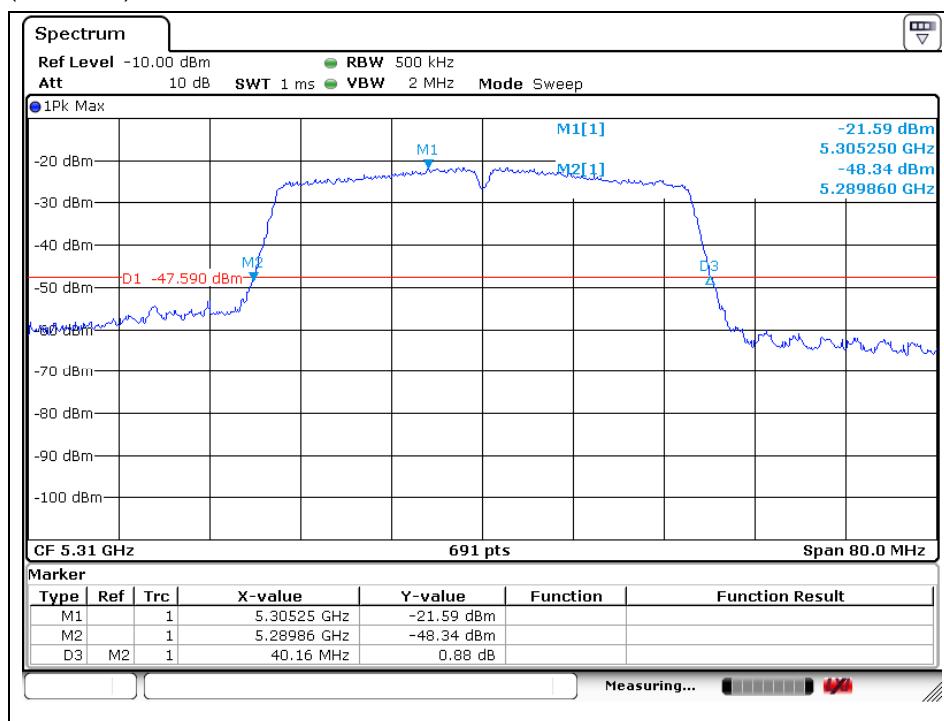
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2A)

Low Channel (5 270 MHz)



High Channel (5 310 MHz)



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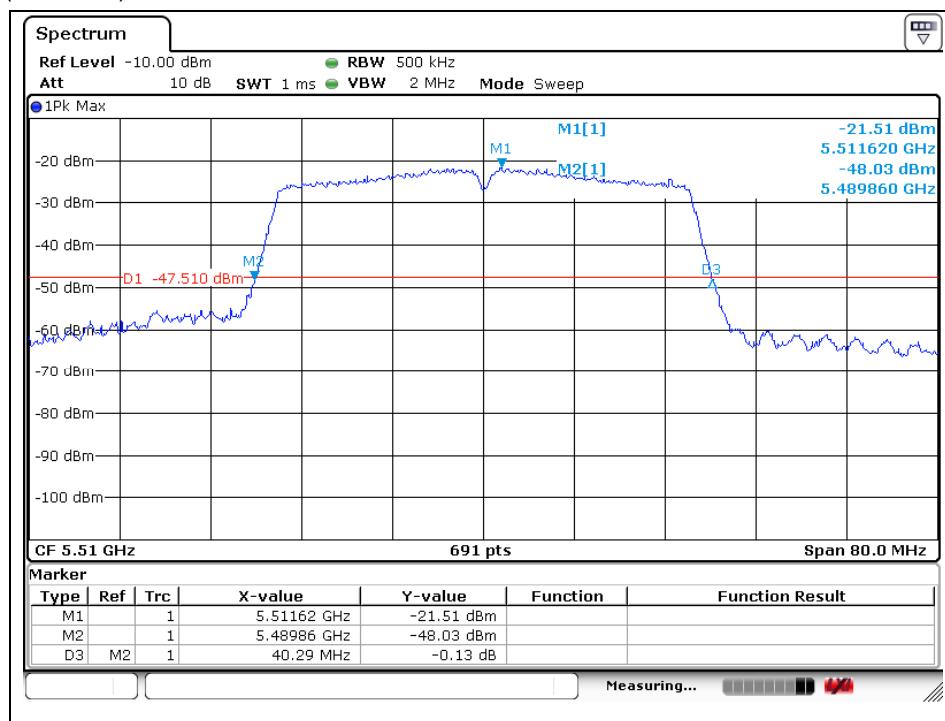
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

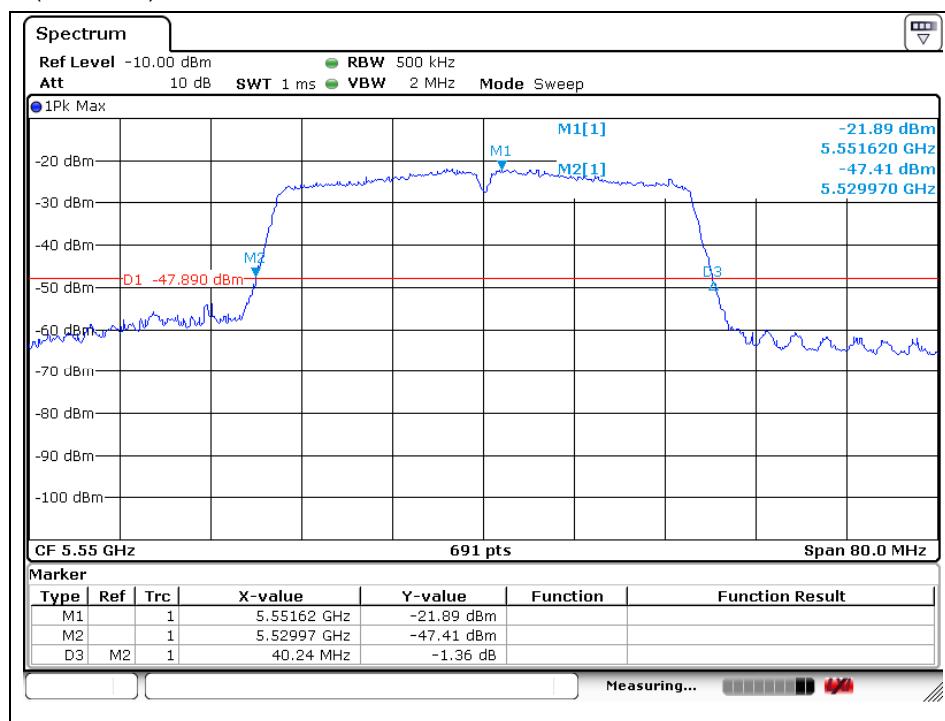
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2C)

Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)



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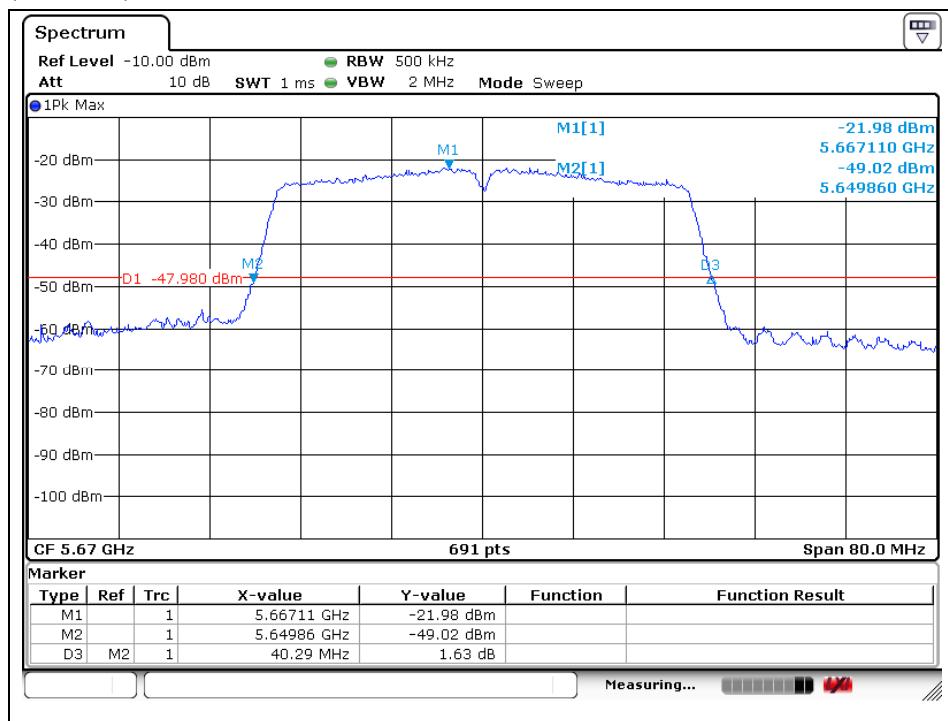
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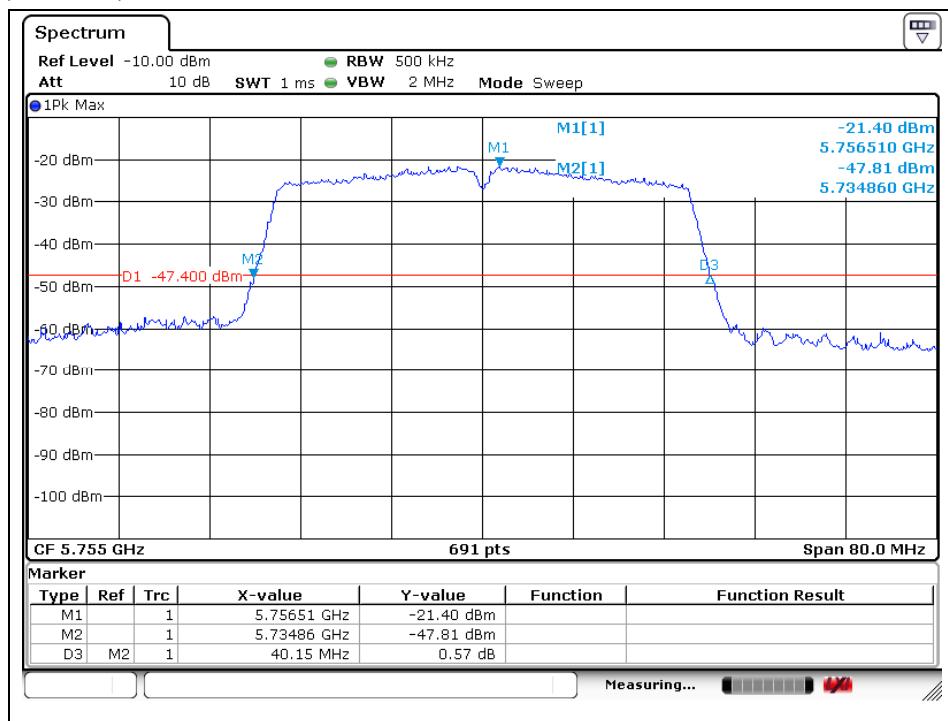
A4(210 mm x 297 mm)

High Channel (5 670 MHz)



802.11n_HT40 (Band 3)

Low Channel (5 755 MHz)



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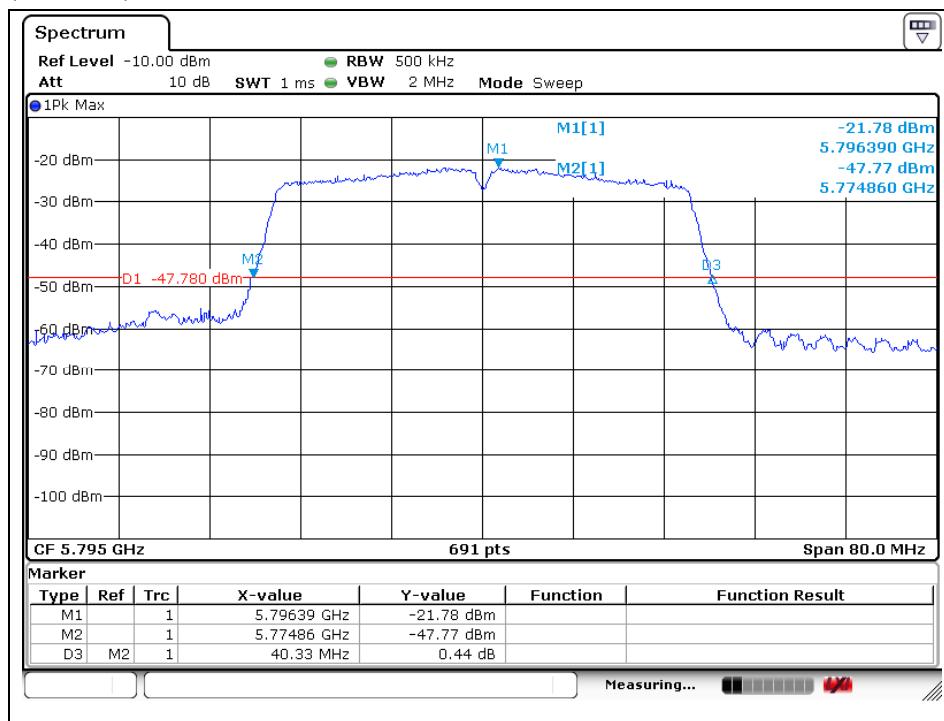
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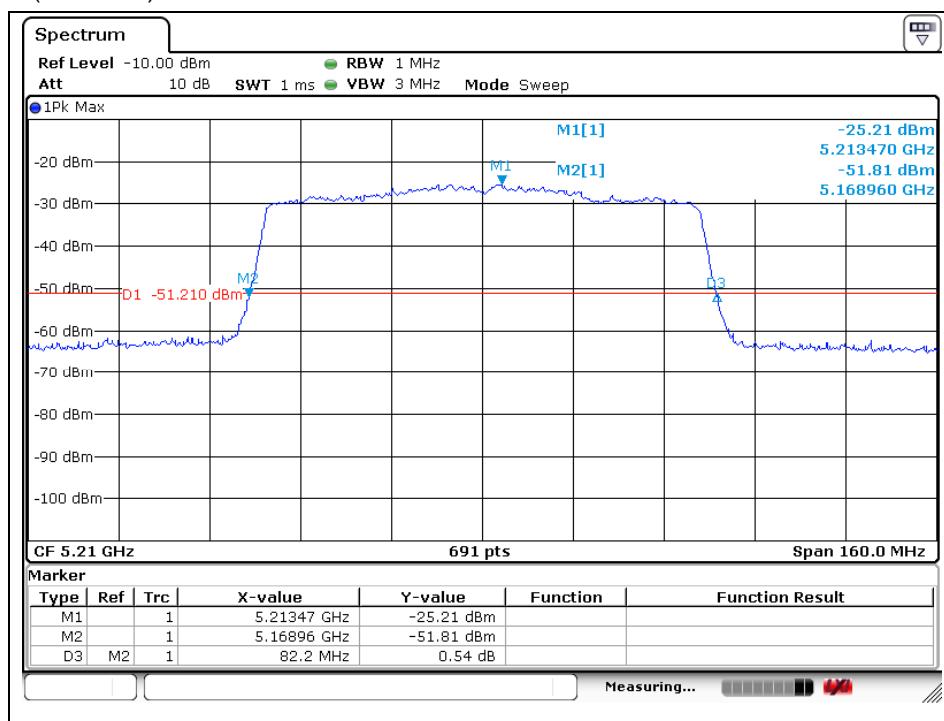
A4(210 mm x 297 mm)

High Channel (5 795 MHz)



802.11ac_VHT80 (Band 1)

Middle Channel (5 210 MHz)



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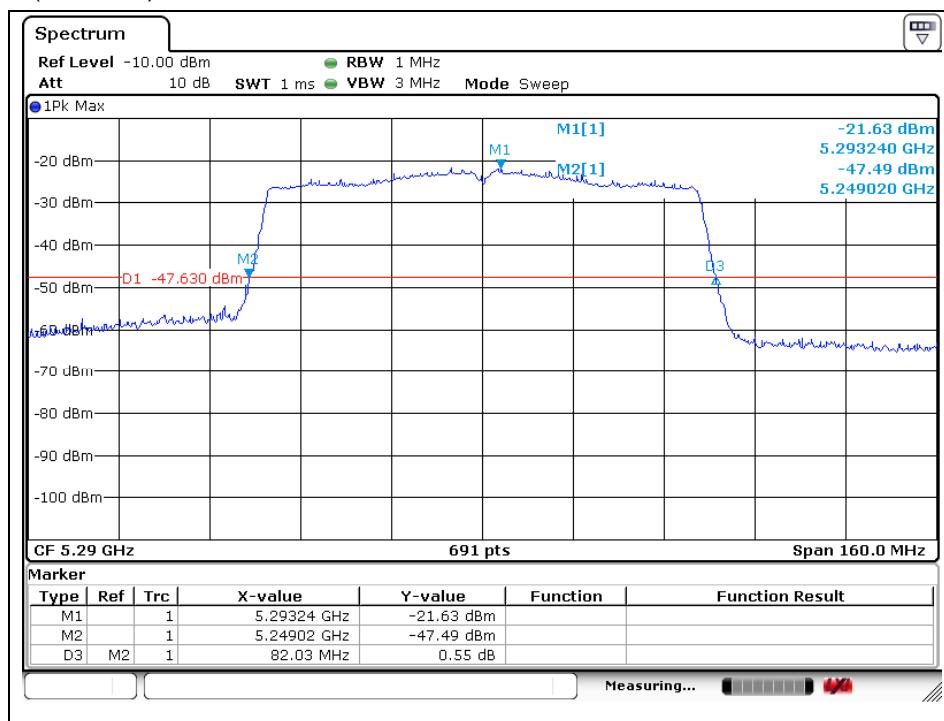
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

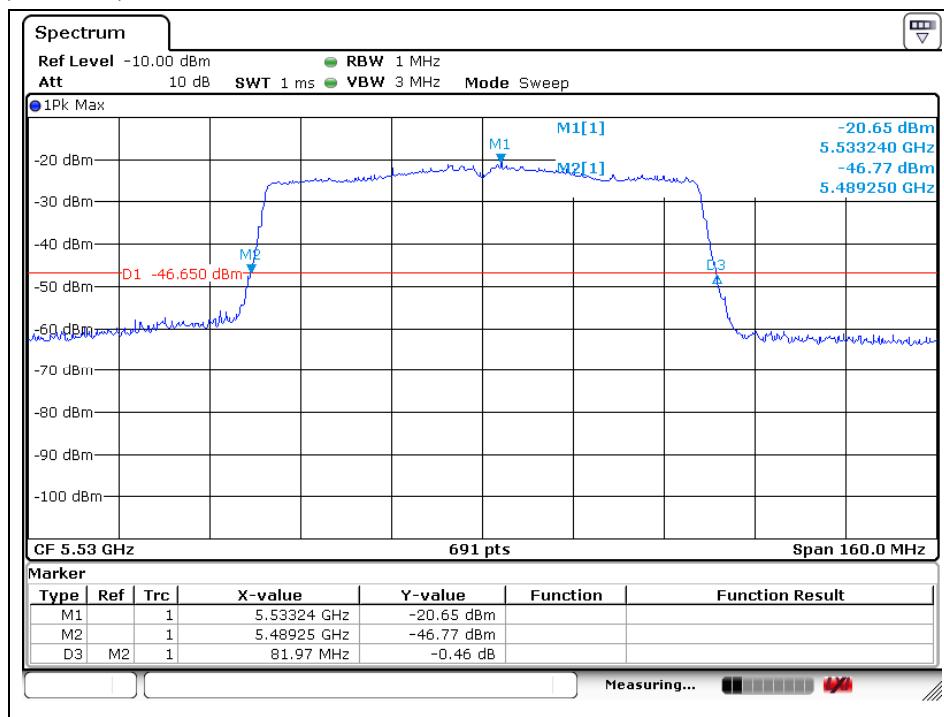
A4(210 mm x 297 mm)

802.11ac_VHT80 (Band 2A)

Middle Channel (5 290 MHz)

**802.11ac_VHT80 (Band 2C)**

Low Channel (5 530 MHz)



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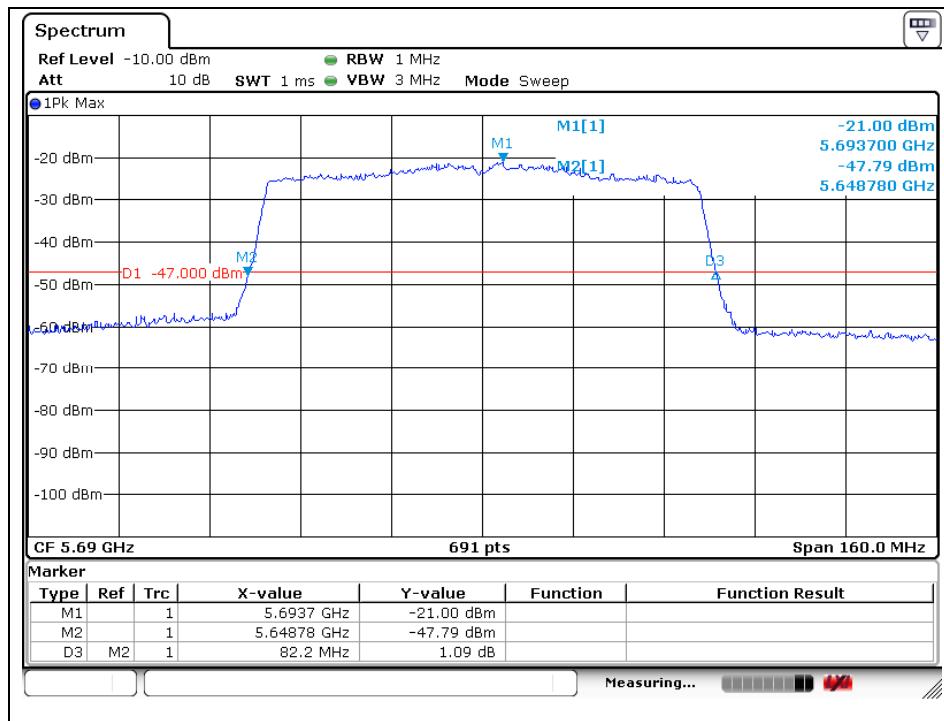
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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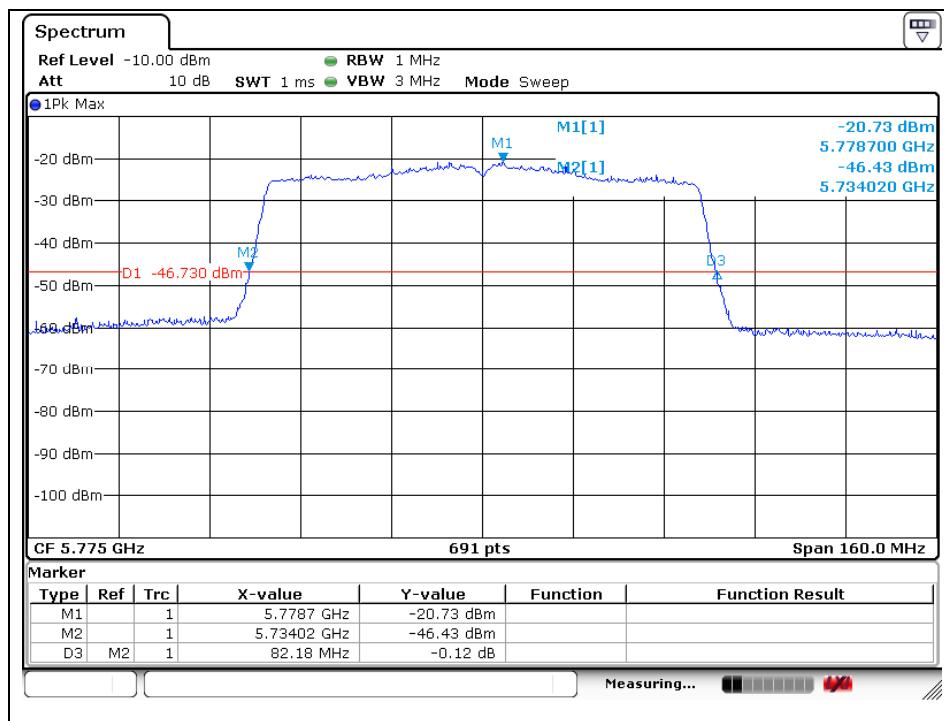
A4(210 mm x 297 mm)

High Channel (5 690 MHz)



802.11ac_VHT80 (Band 3)

Middle Channel (5 775 MHz)



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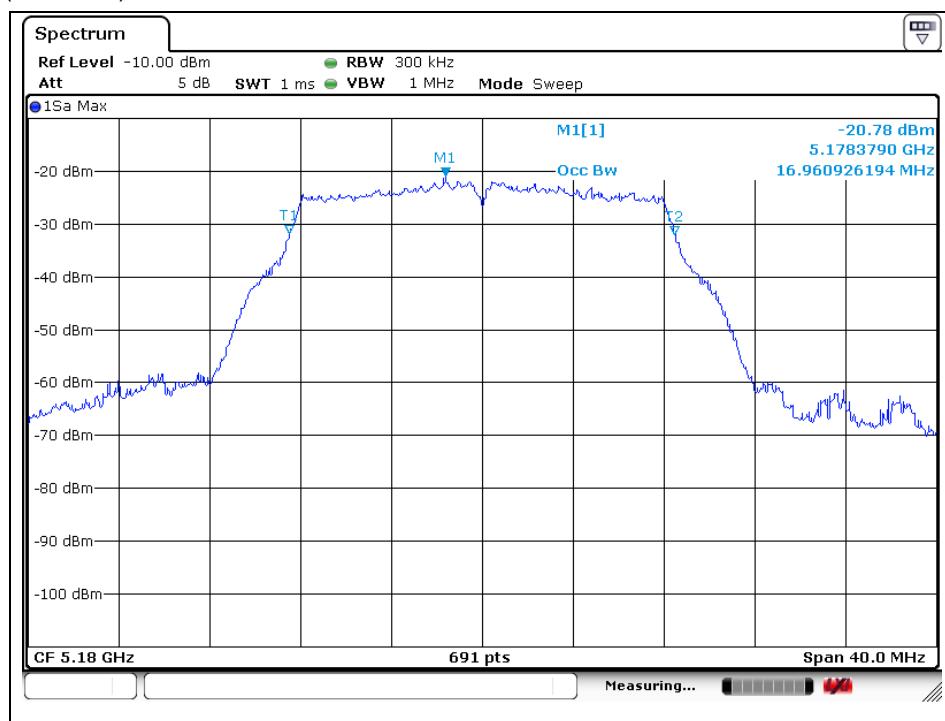
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

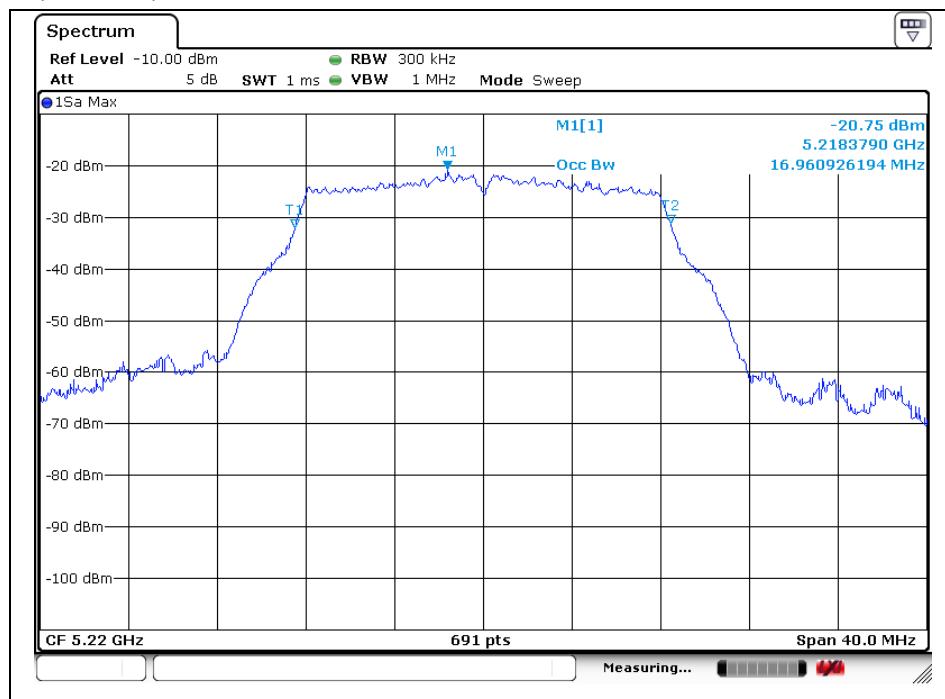
A4(210 mm x 297 mm)

99 % Bandwidth**802.11a (Band 1)**

Low Channel (5 180 MHz)



Middle Channel (5 220 MHz)



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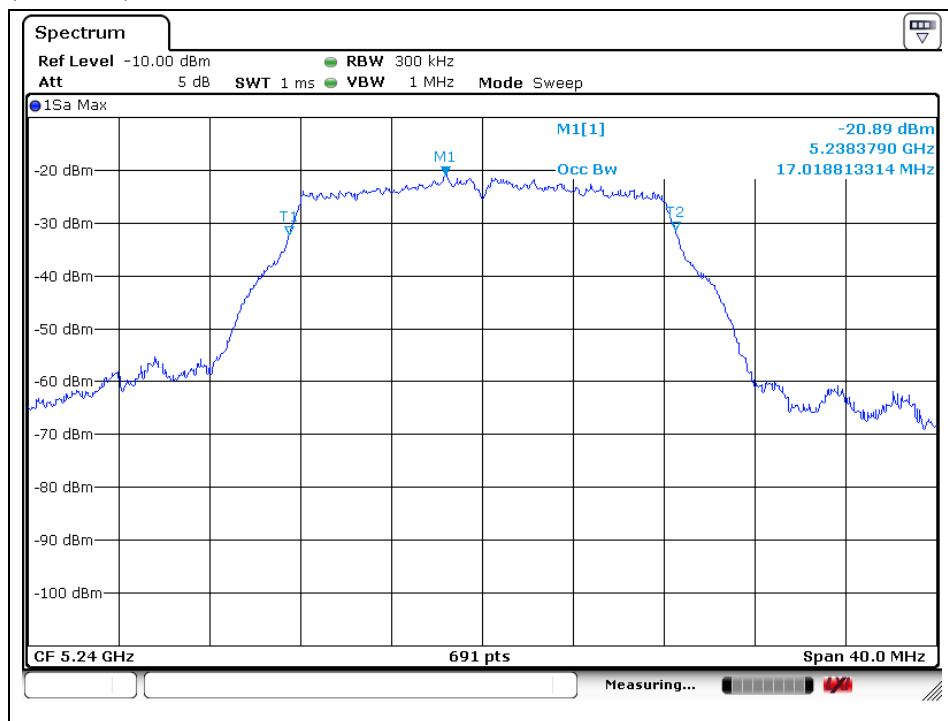
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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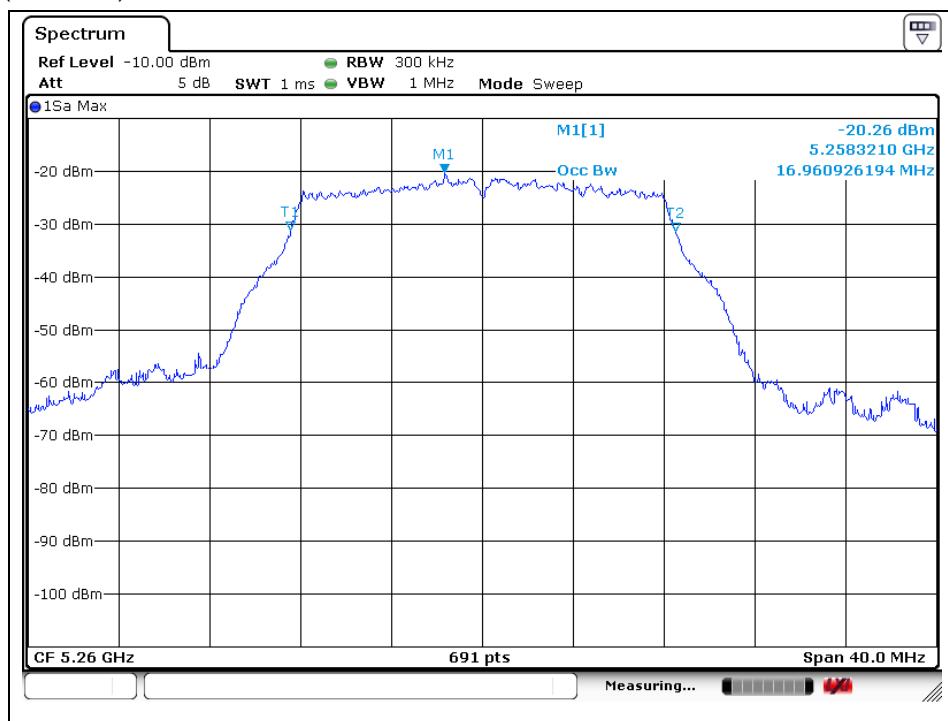
A4(210 mm x 297 mm)

High Channel (5.240 GHz)



802.11a (Band 2A)

Low Channel (5.260 GHz)



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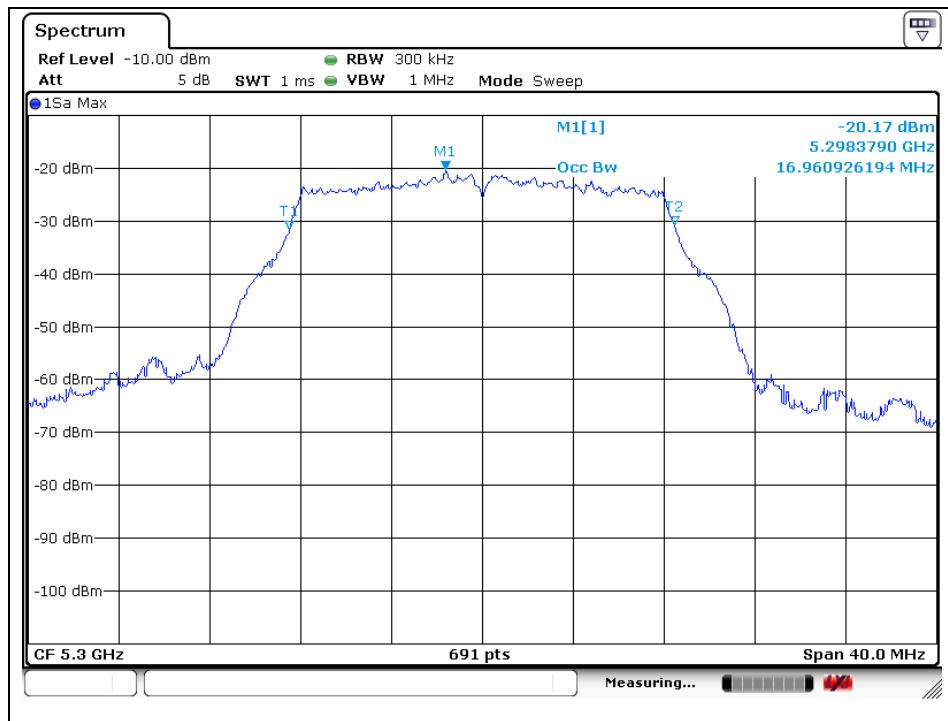
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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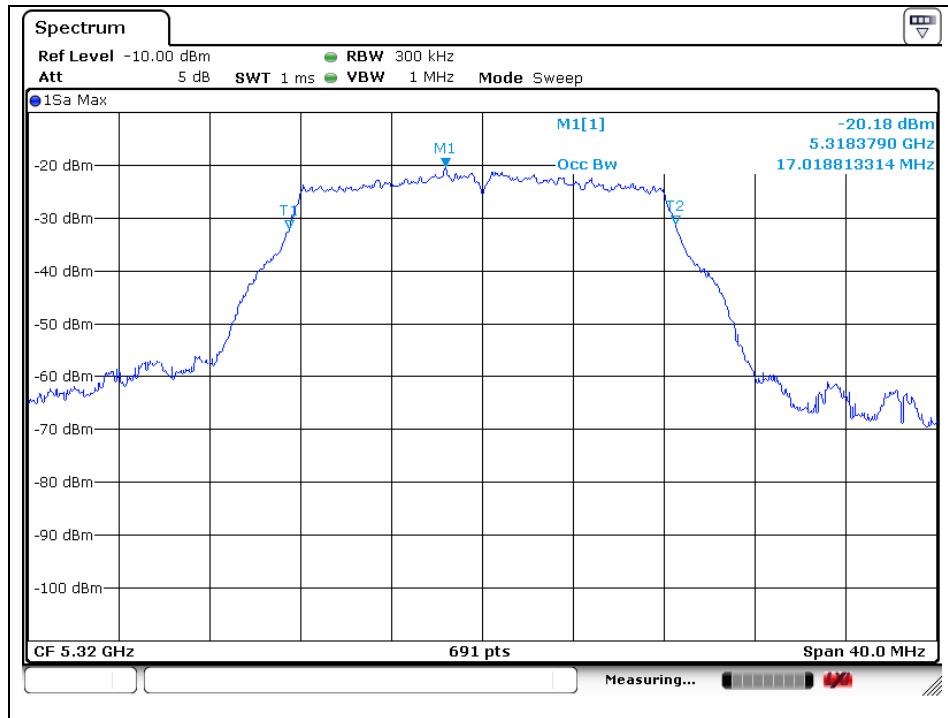
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A4(210 mm x 297 mm)

Middle Channel (5 300 MHz)



High Channel (5 320 MHz)



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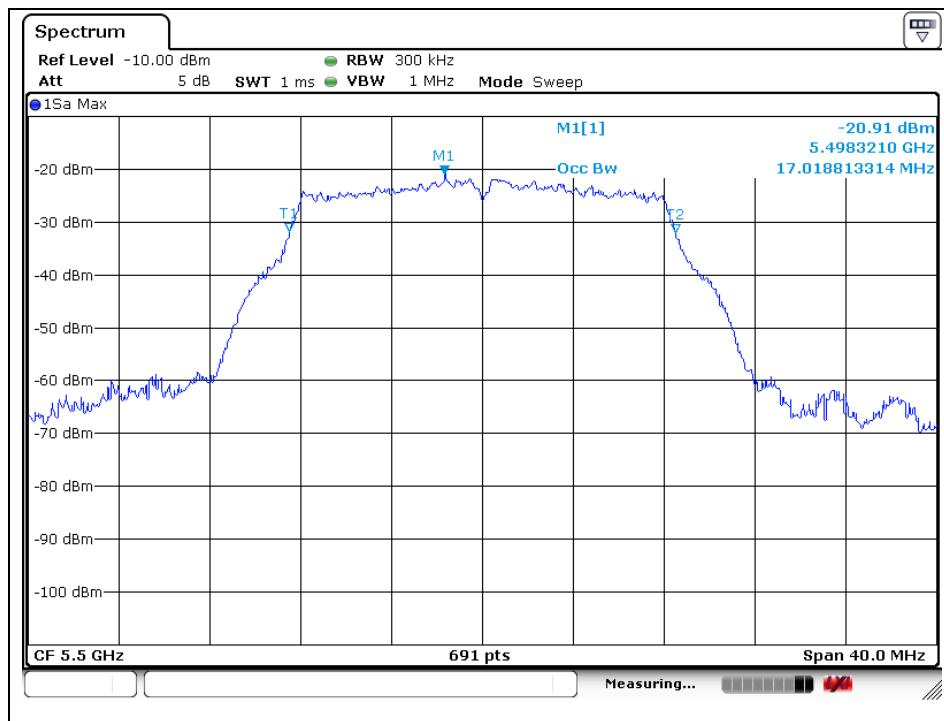
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

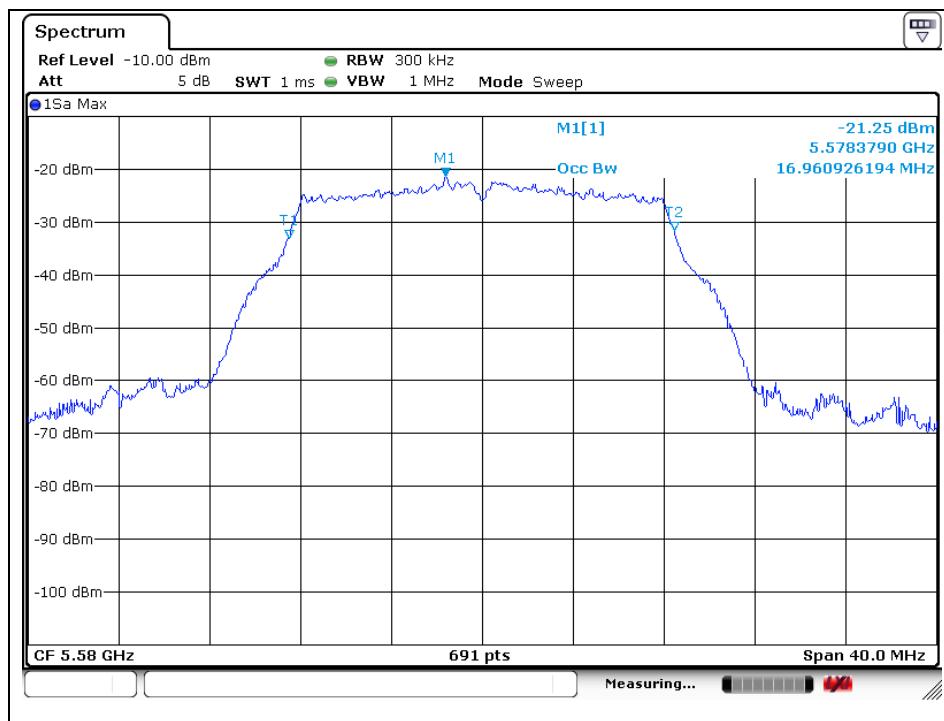
A4(210 mm x 297 mm)

802.11a (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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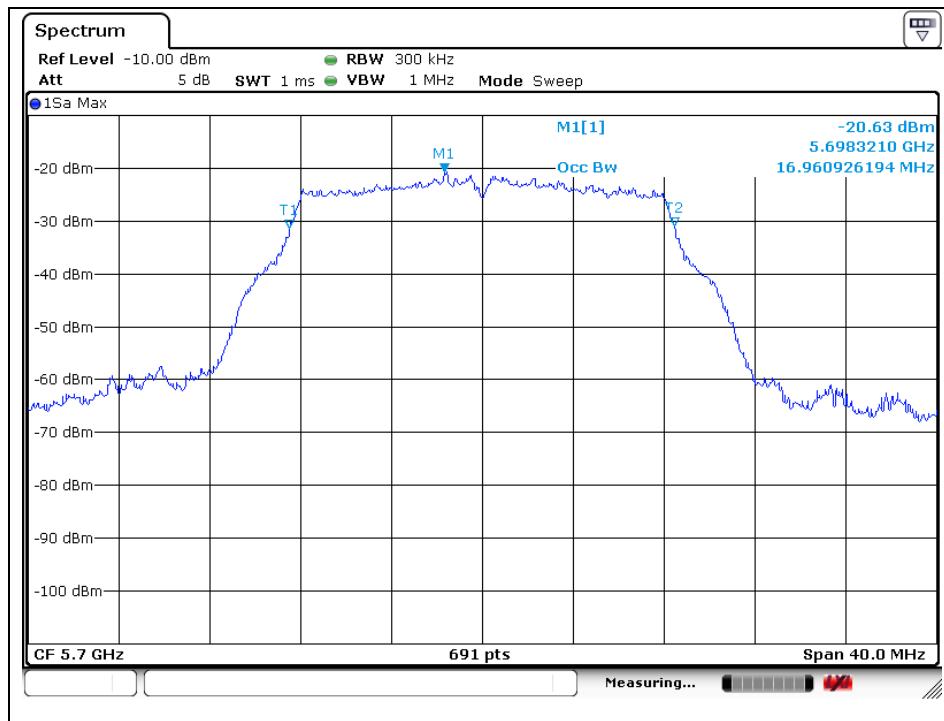
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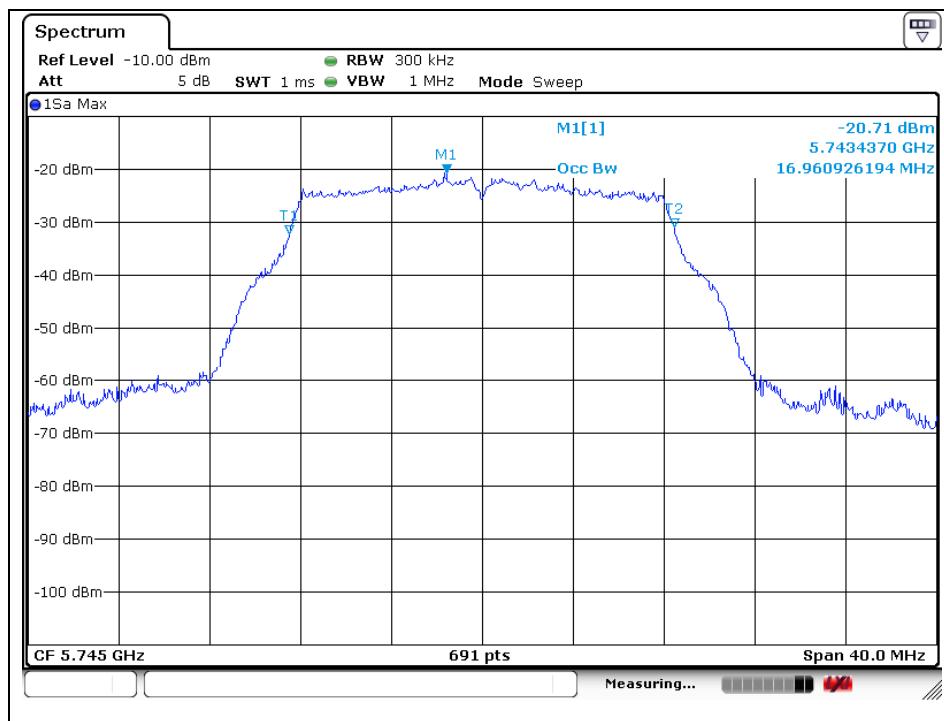
A4(210 mm x 297 mm)

High Channel (5 700 MHz)



802.11a (Band 3)

Low Channel (5 745 MHz)



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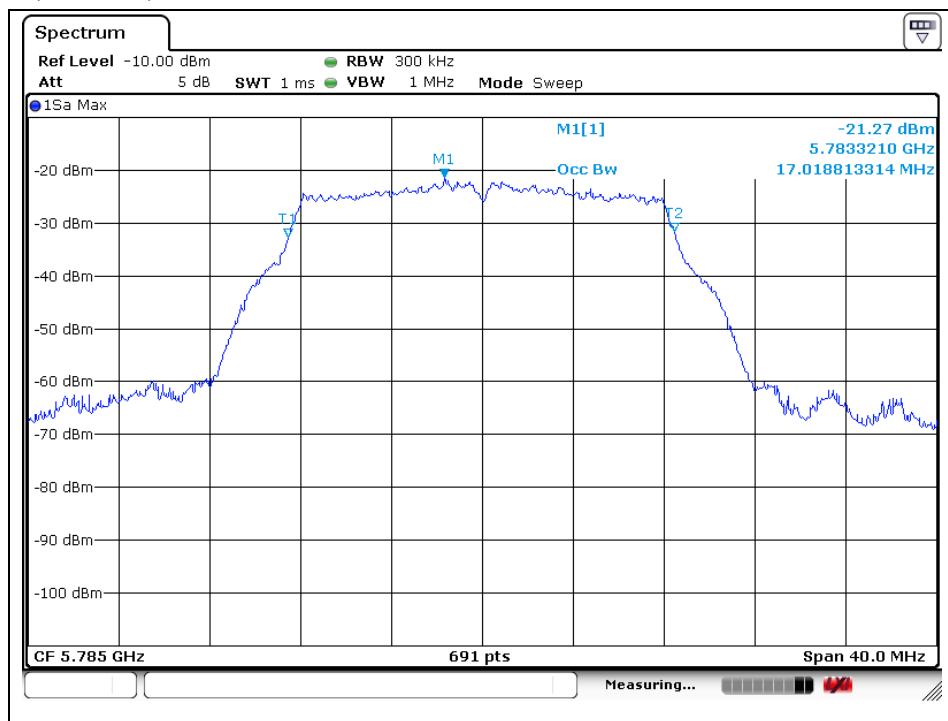
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

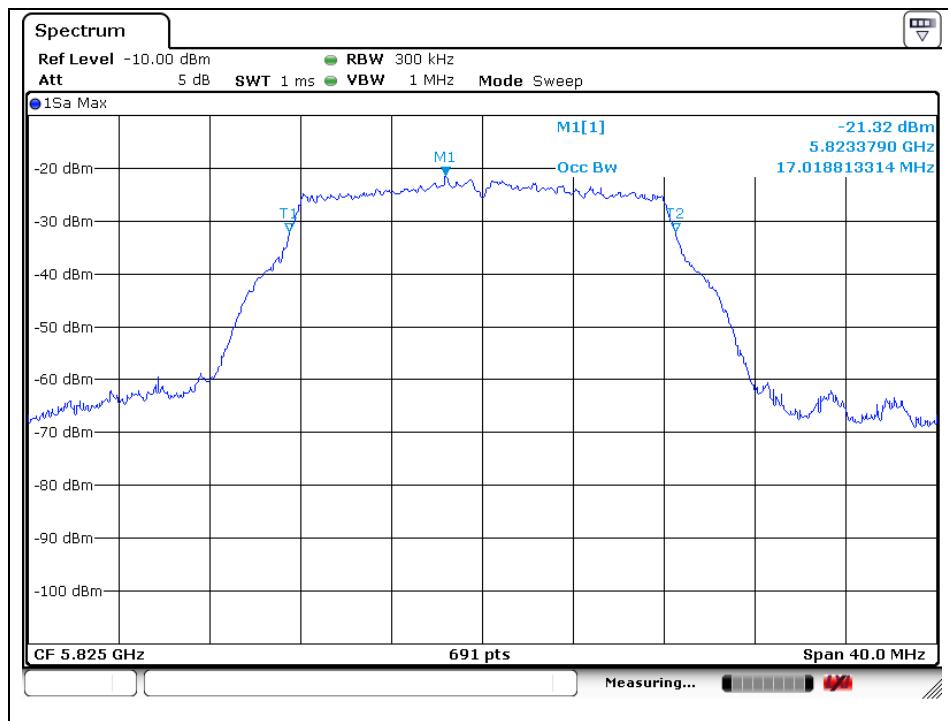
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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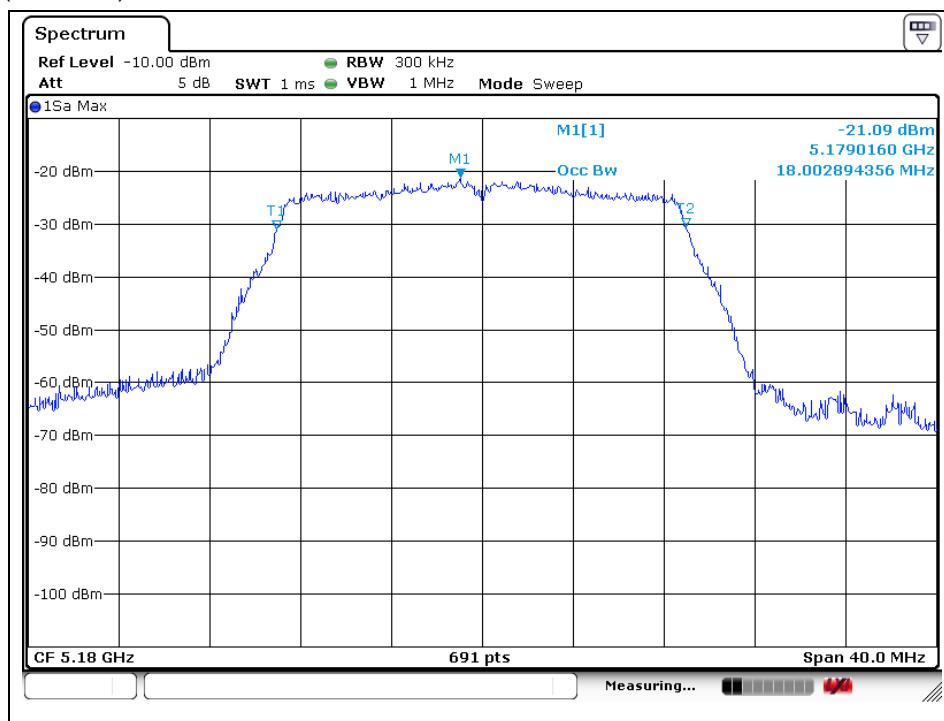
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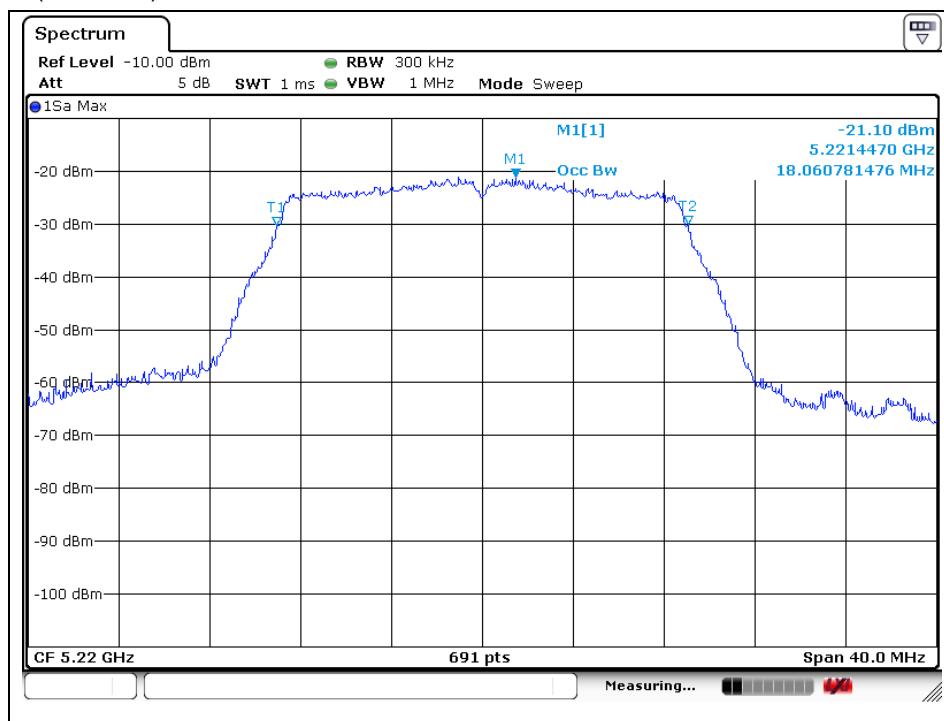
A4(210 mm x 297 mm)

802.11n_HT20 (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 220 MHz)



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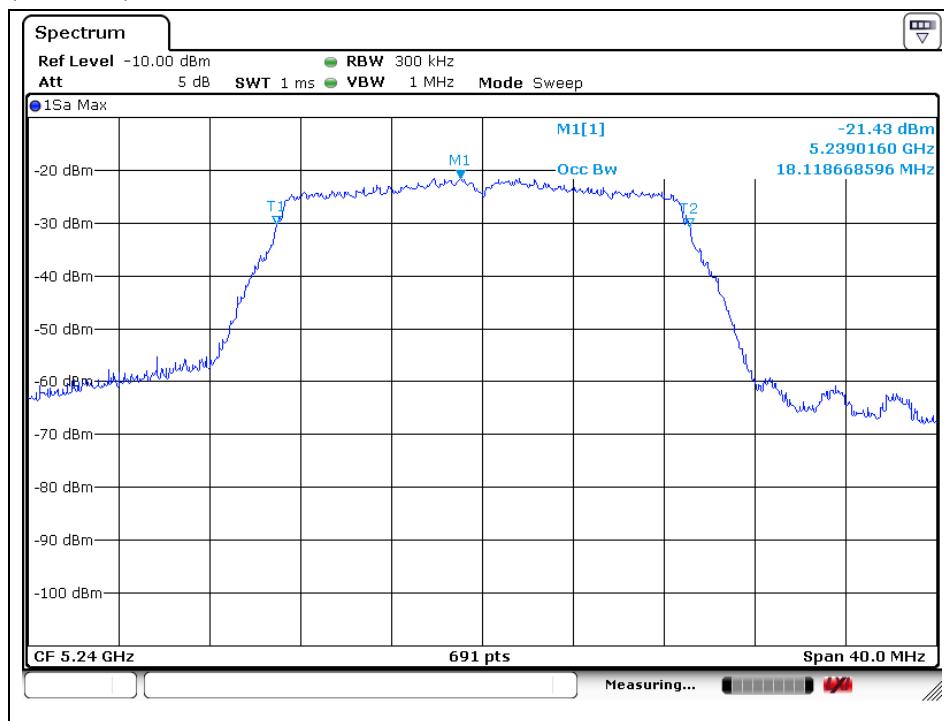
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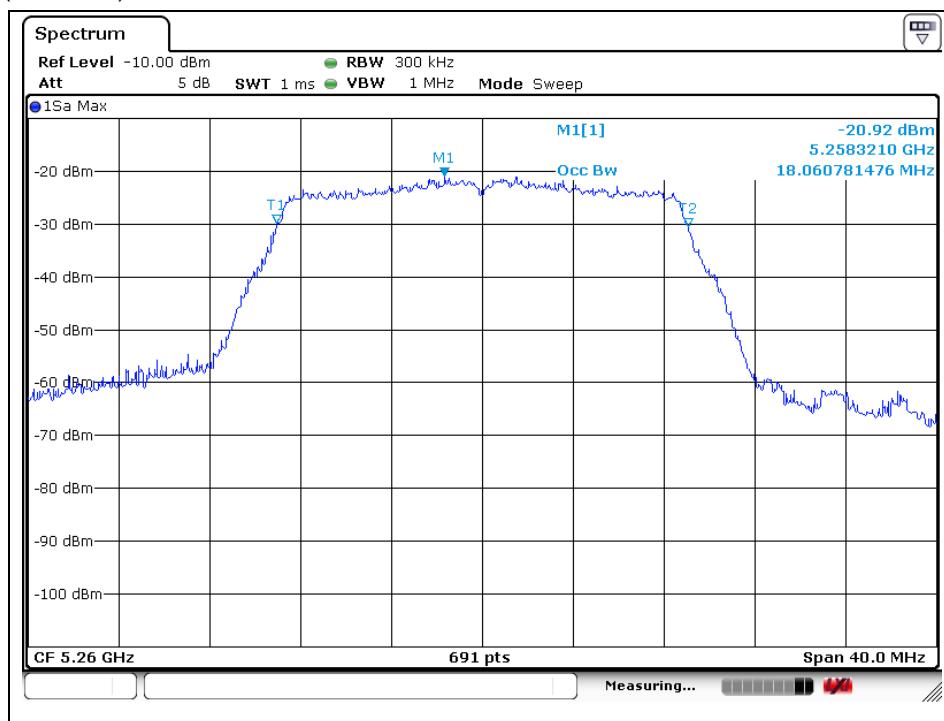
A4(210 mm x 297 mm)

High Channel (5.240 GHz)



802.11n_HT20 (Band 2A)

Low Channel (5.260 GHz)



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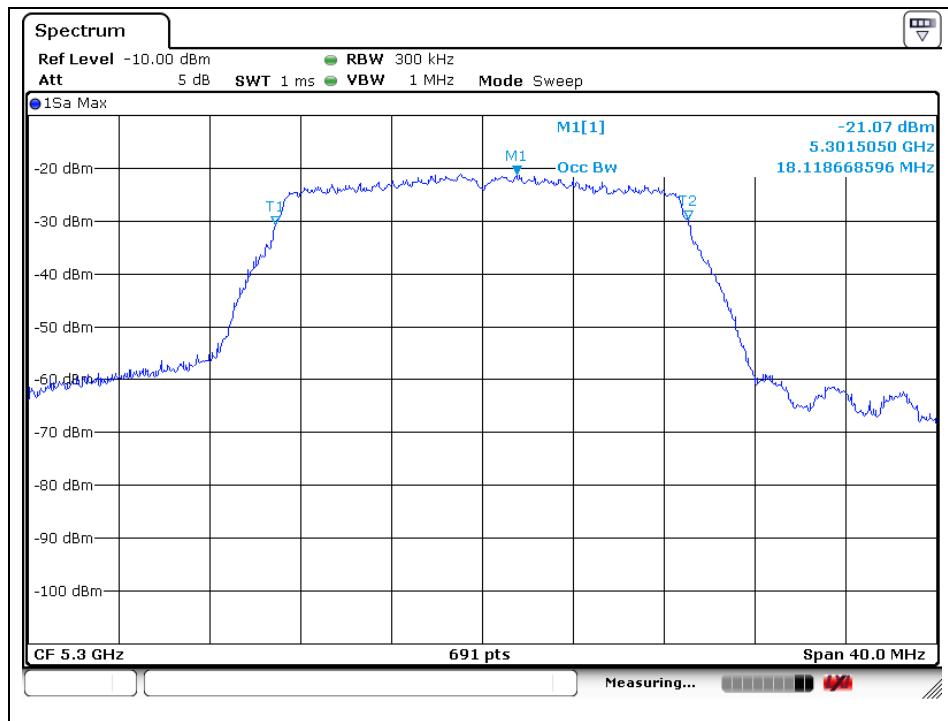
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

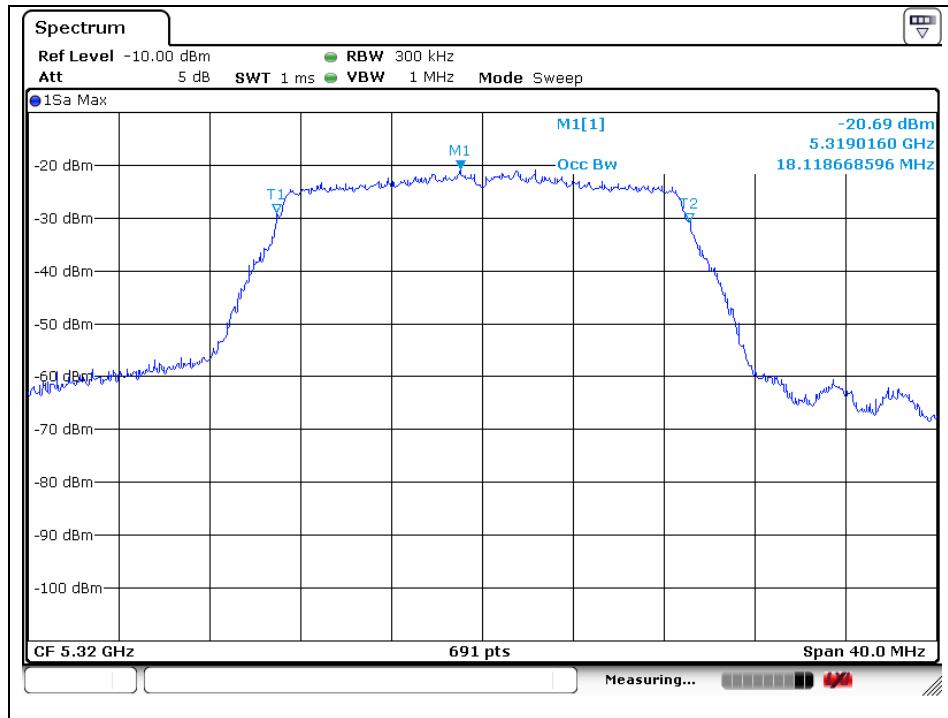
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A4(210 mm x 297 mm)

Middle Channel (5 300 MHz)



High Channel (5 320 MHz)



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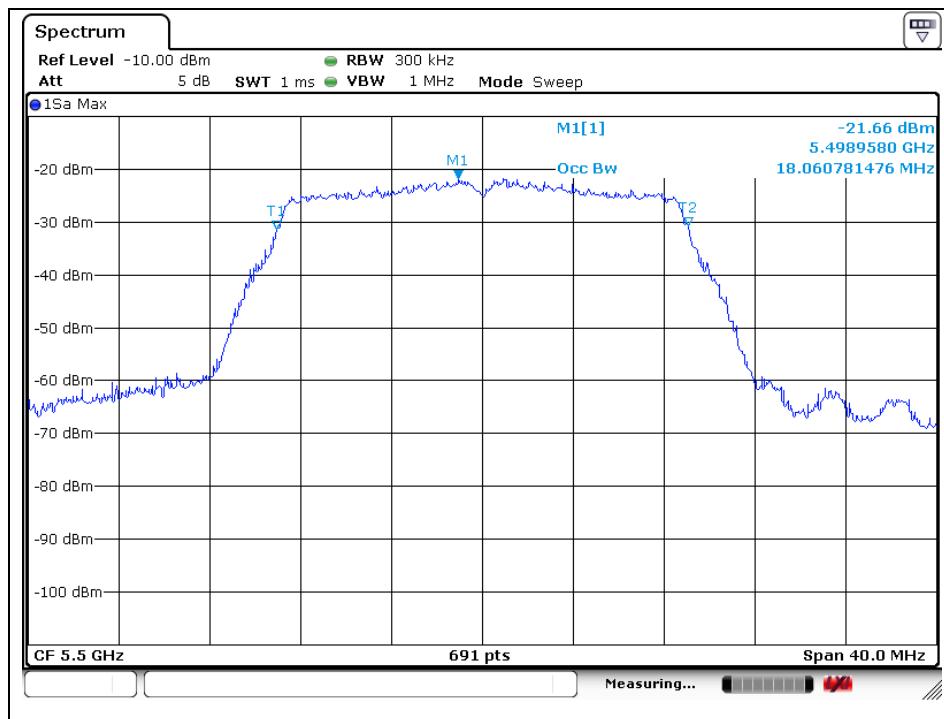
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

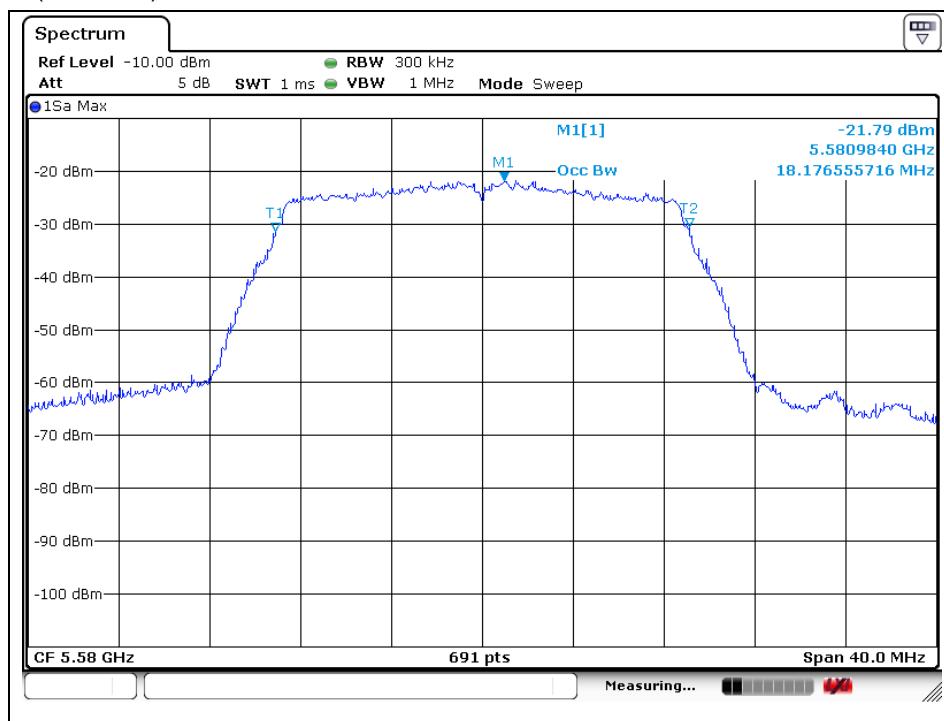
A4(210 mm x 297 mm)

802.11n_HT20 (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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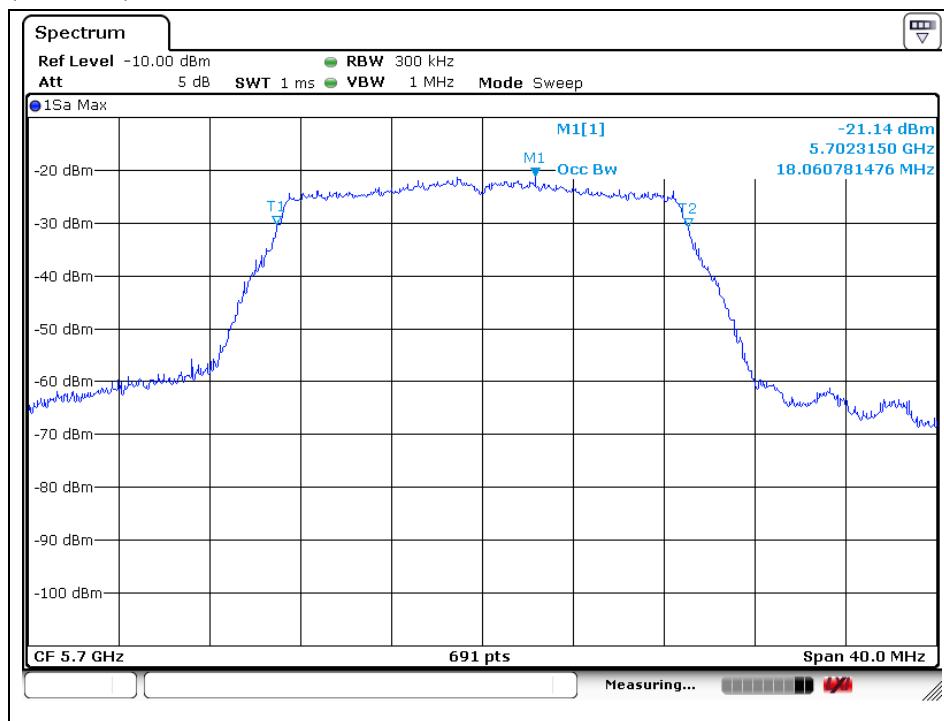
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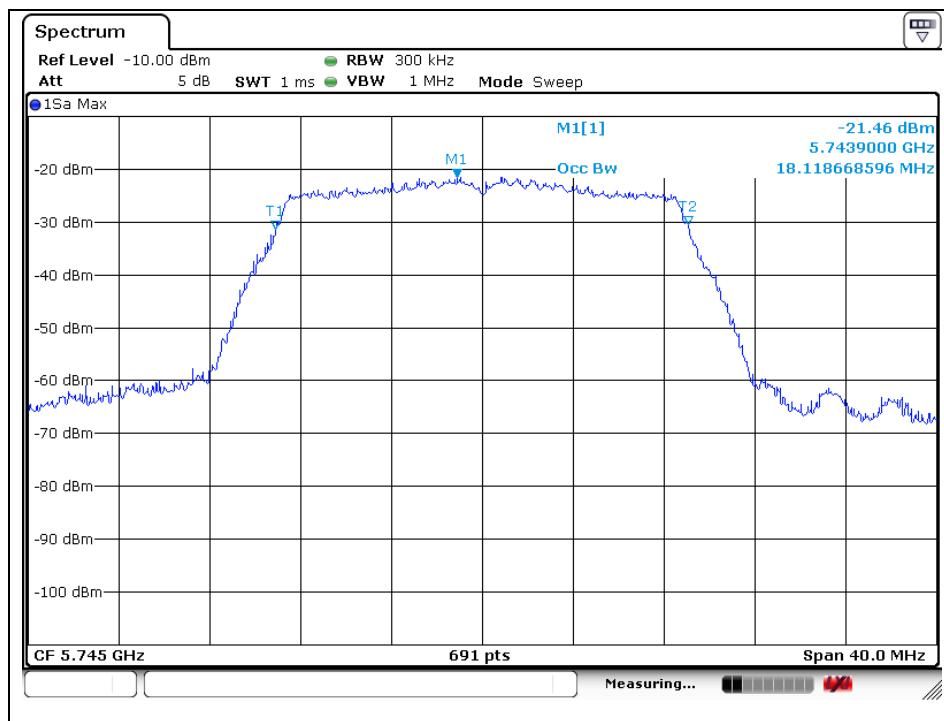
A4(210 mm x 297 mm)

High Channel (5 700 MHz)



802.11n_HT20 (Band 3)

Low Channel (5 745 MHz)



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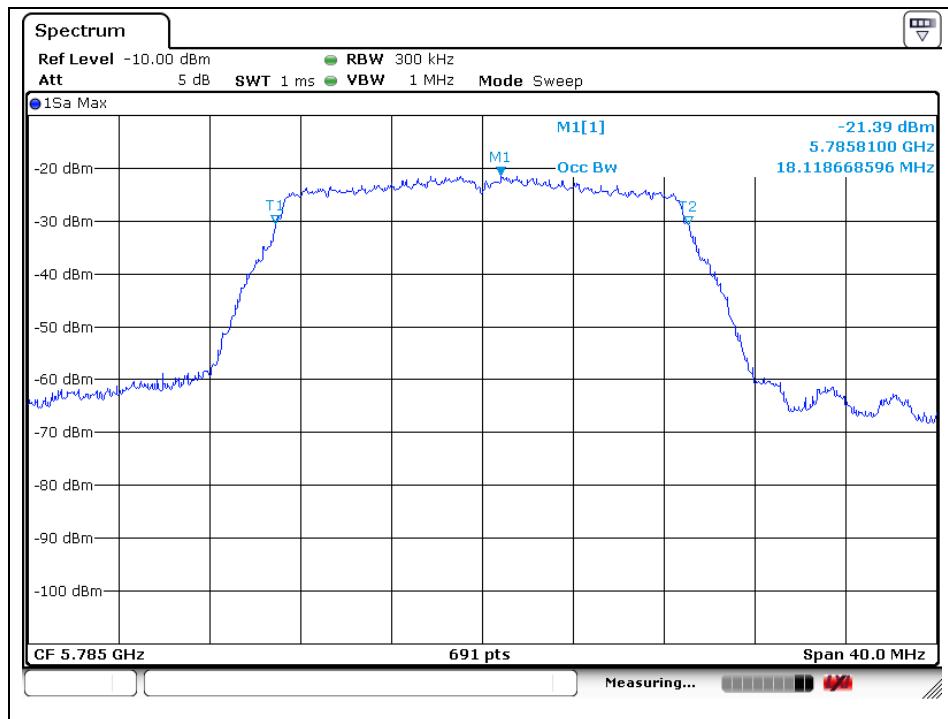
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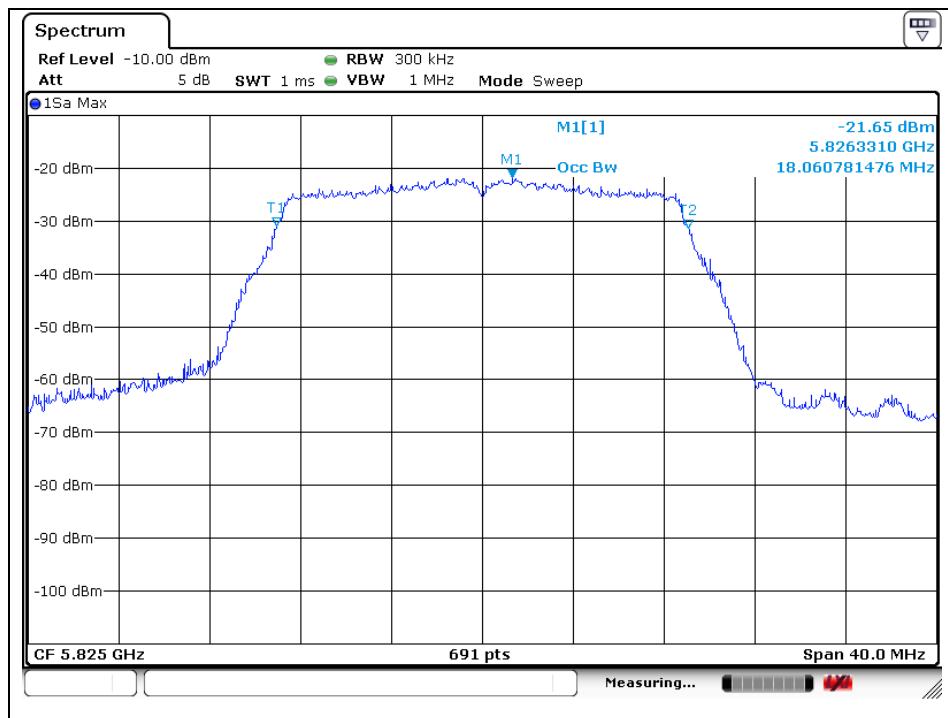
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A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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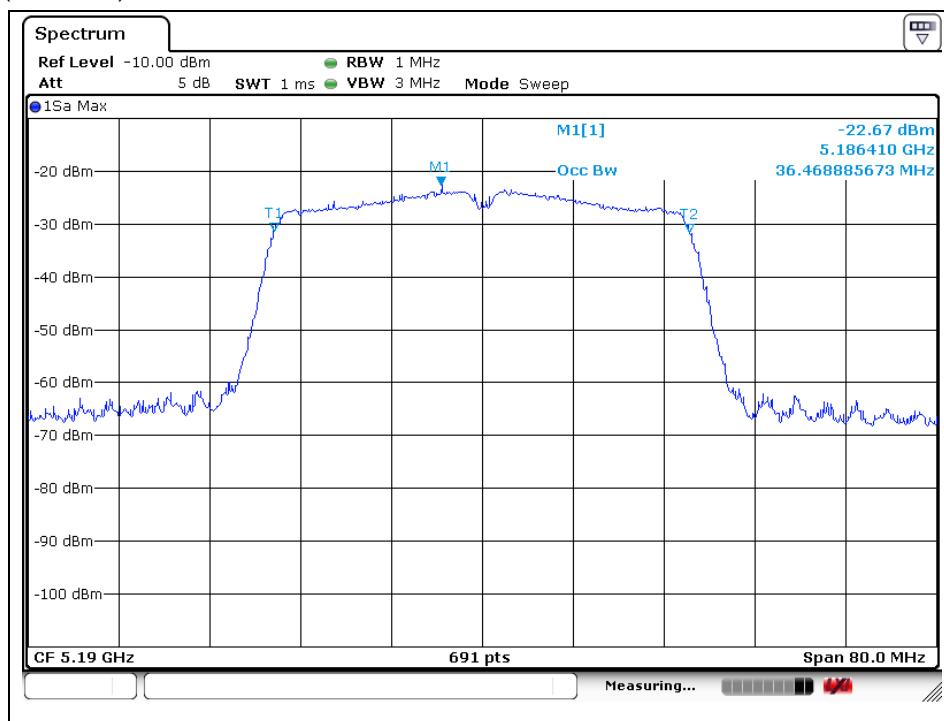
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

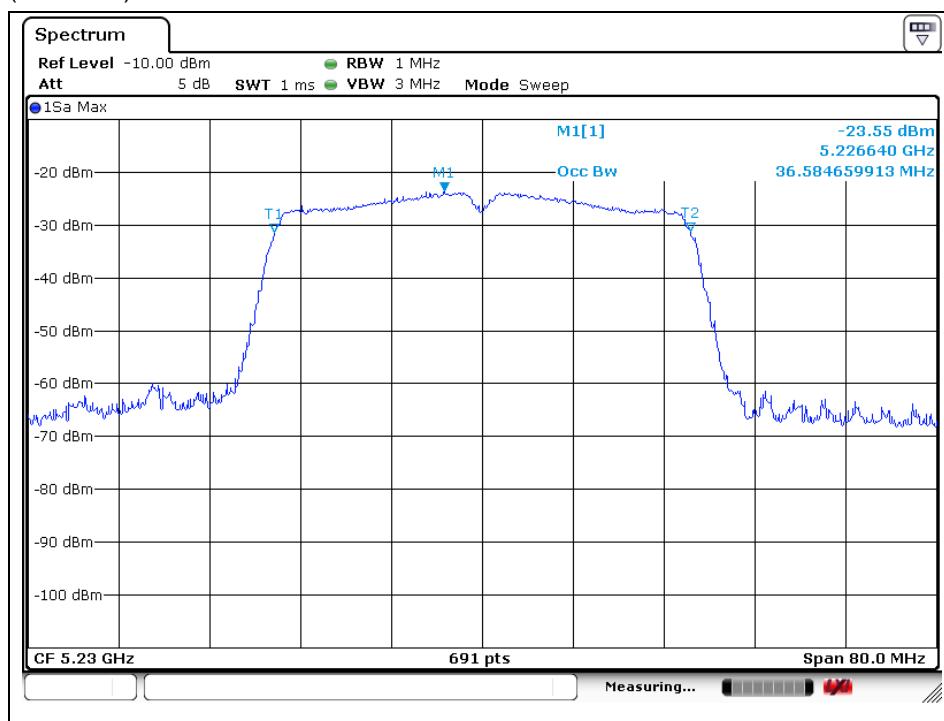
A4(210 mm x 297 mm)

802.11n_HT40 (Band 1)

Low Channel (5 190 MHz)



High Channel (5 230 MHz)



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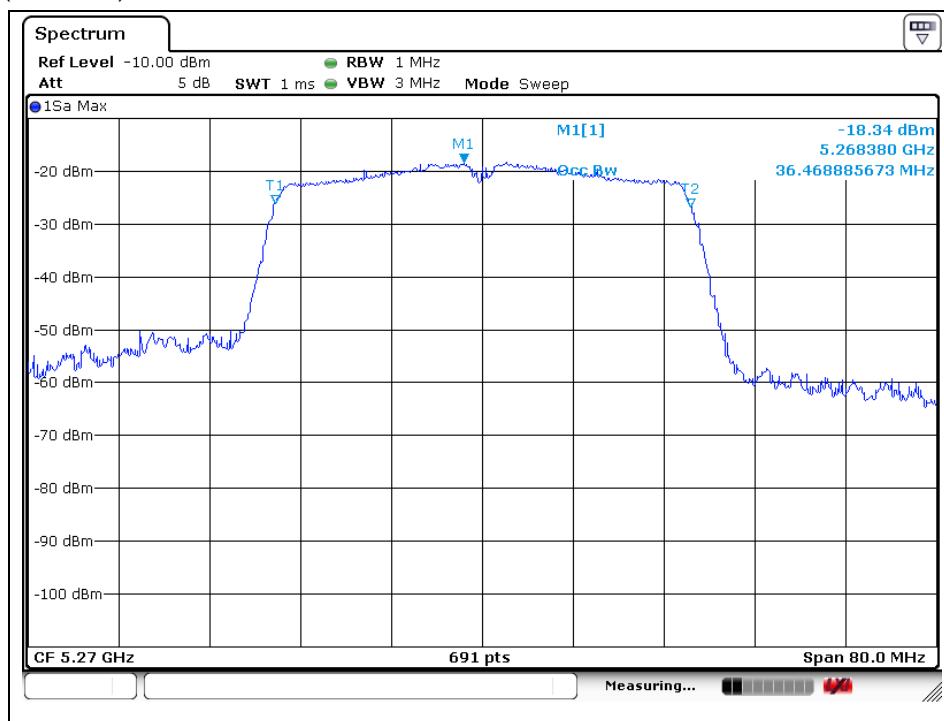
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

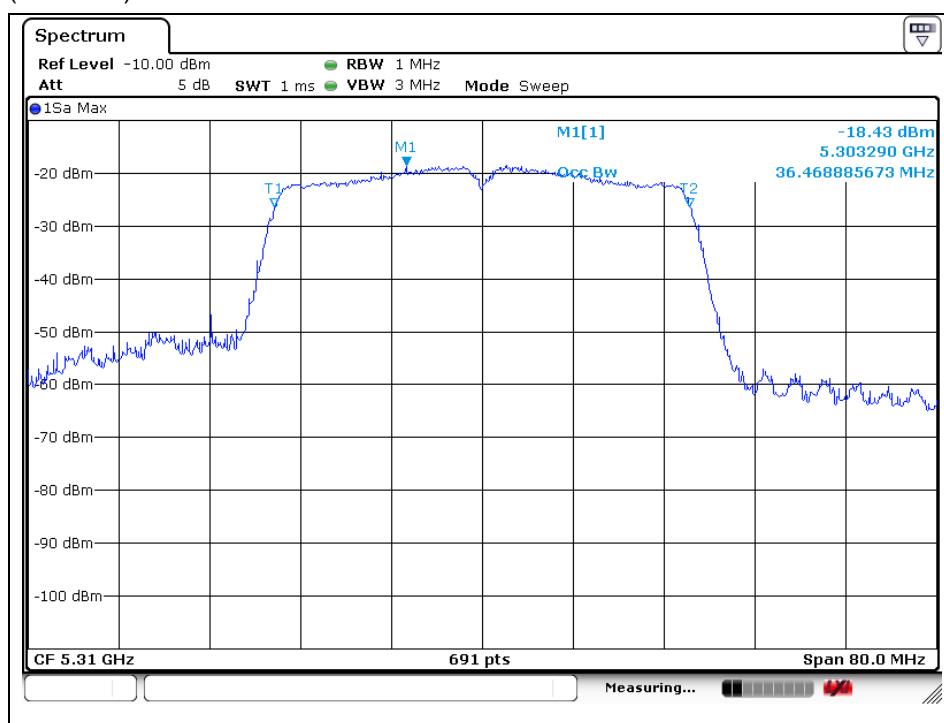
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2A)

Low Channel (5 270 MHz)



High Channel (5 310 MHz)



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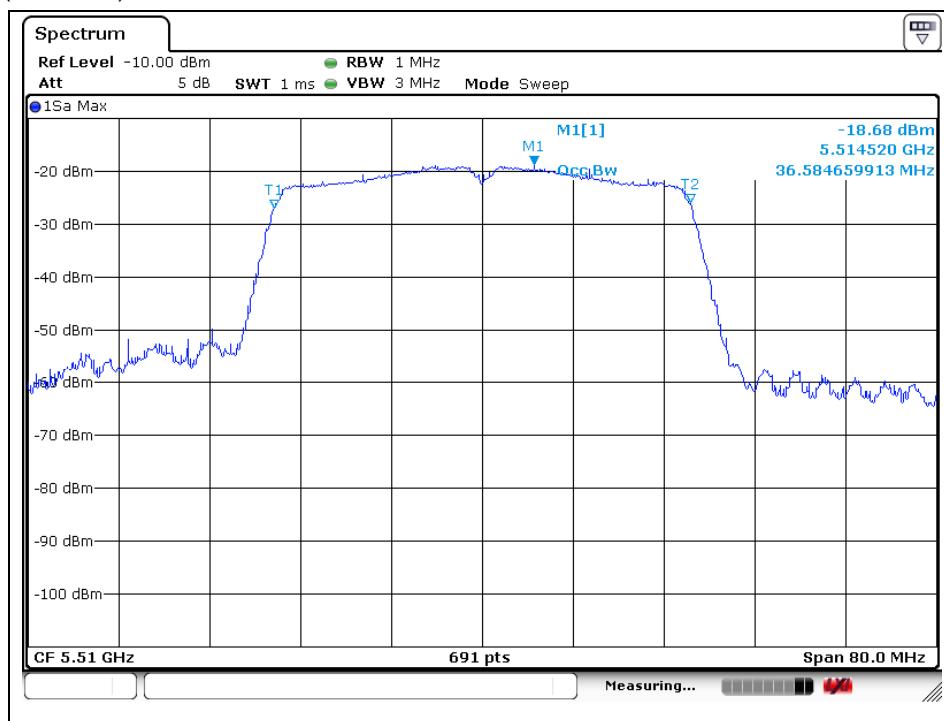
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

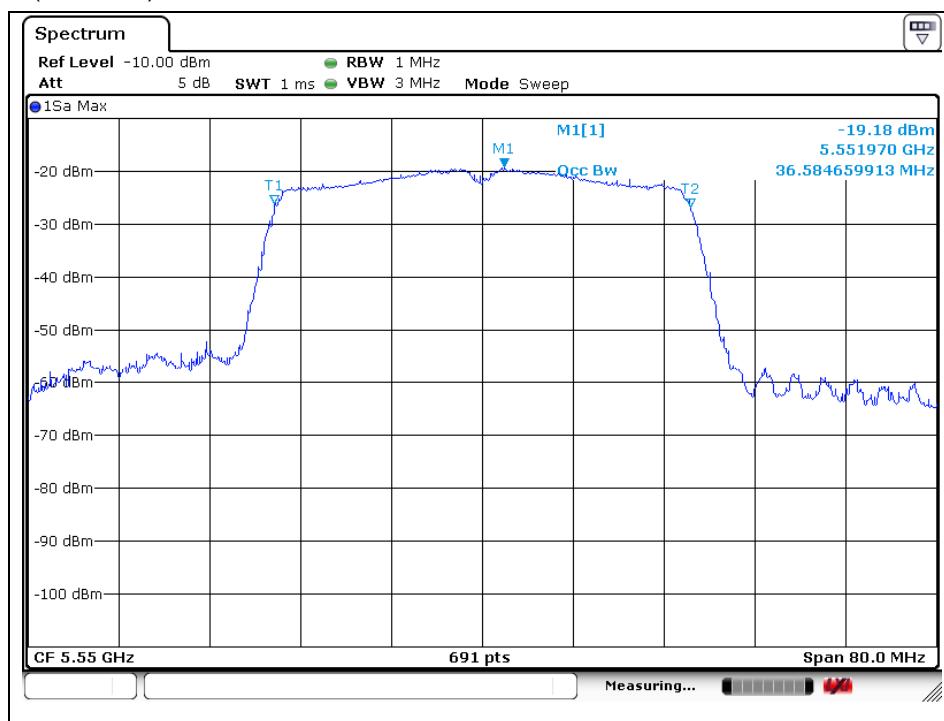
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2C)

Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)



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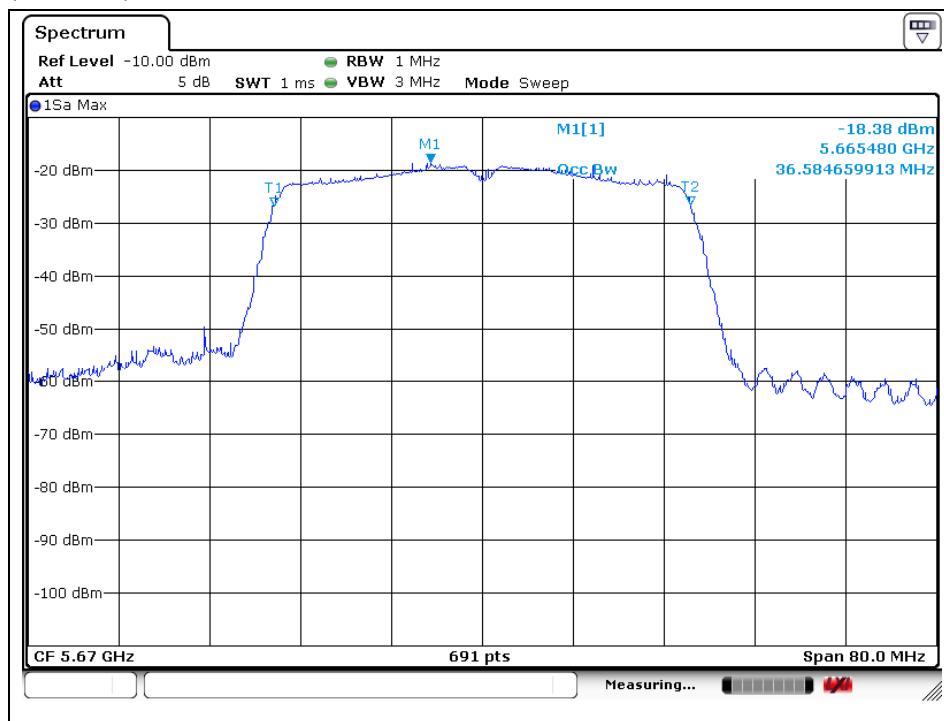
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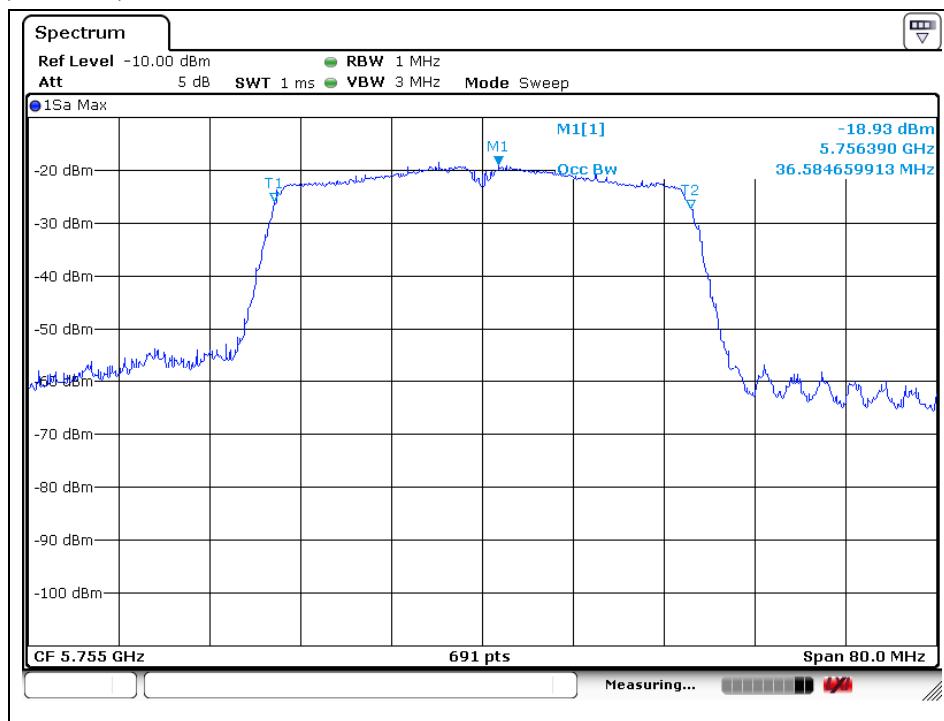
A4(210 mm x 297 mm)

High Channel (5 670 MHz)



802.11n_HT40 (Band 3)

Low Channel (5 755 MHz)



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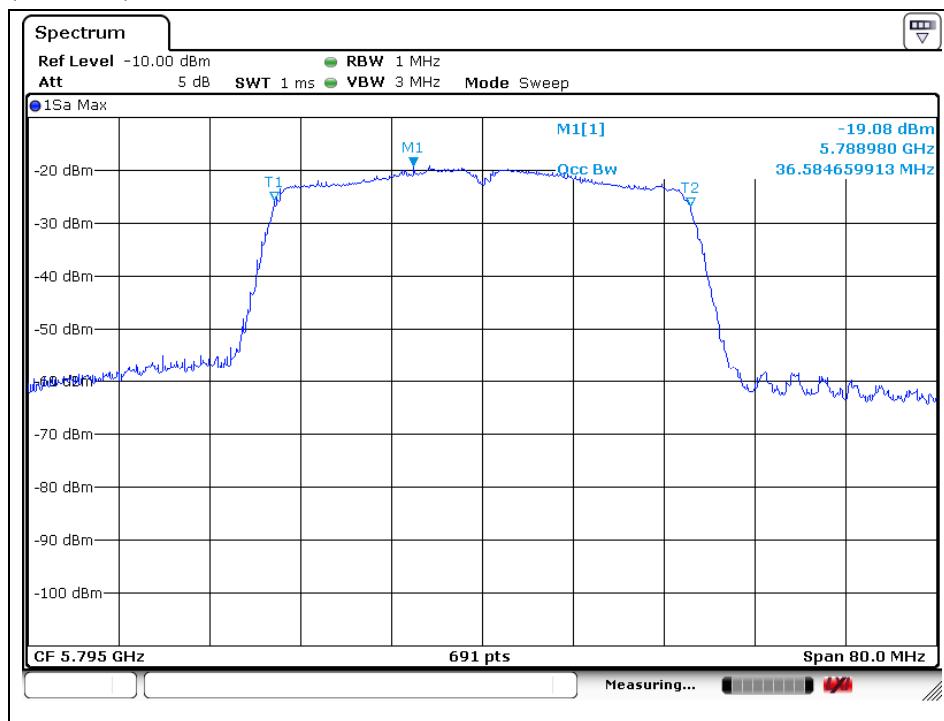
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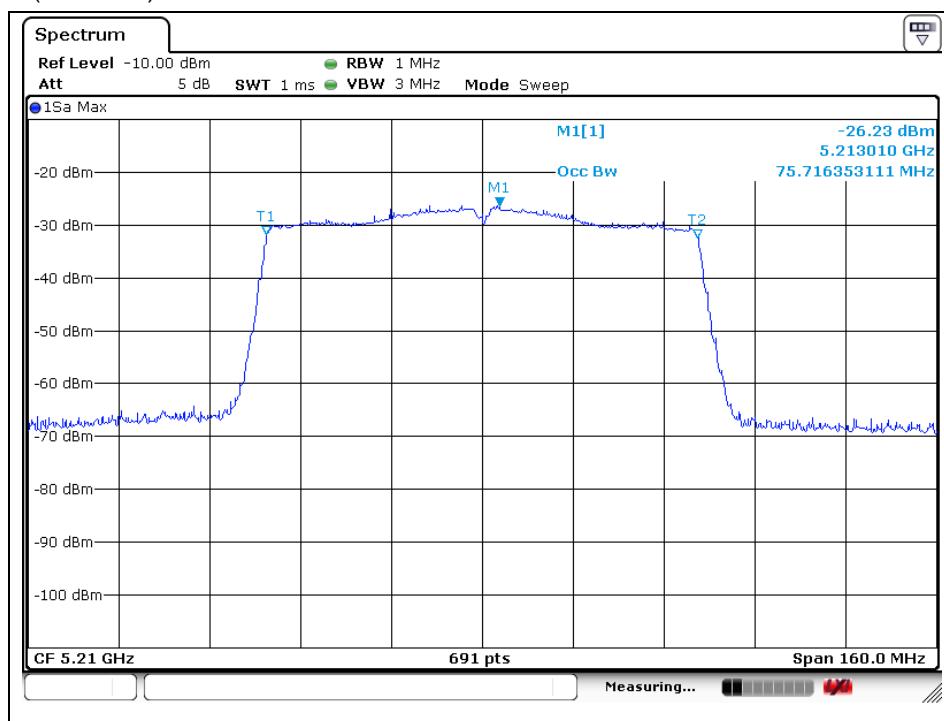
A4(210 mm x 297 mm)

High Channel (5 795 MHz)



802.11ac_VHT80 (Band 1)

Middle Channel (5 210 MHz)



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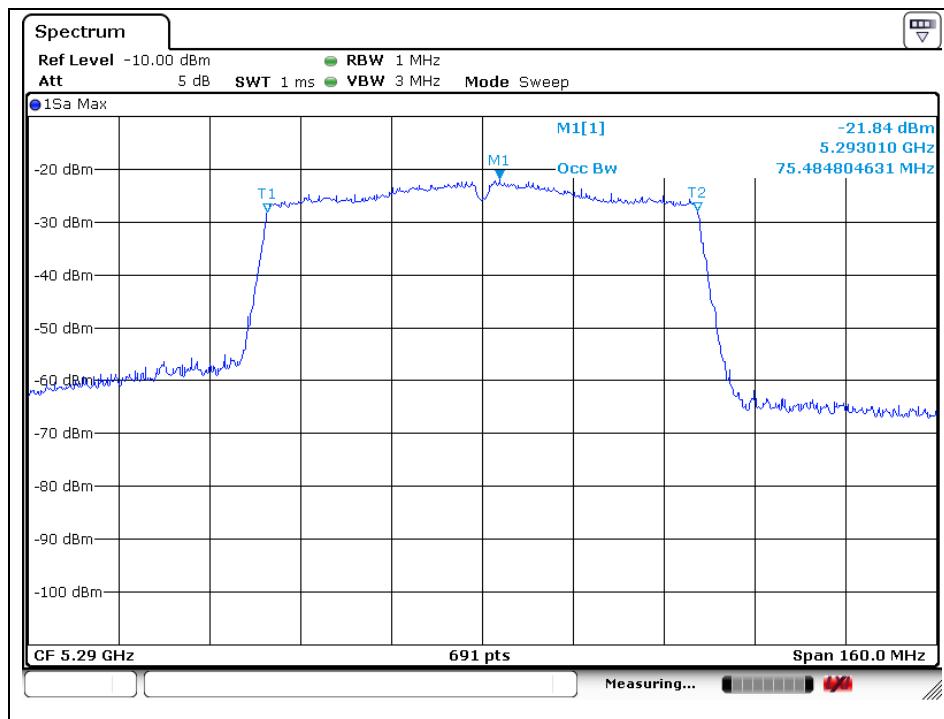
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

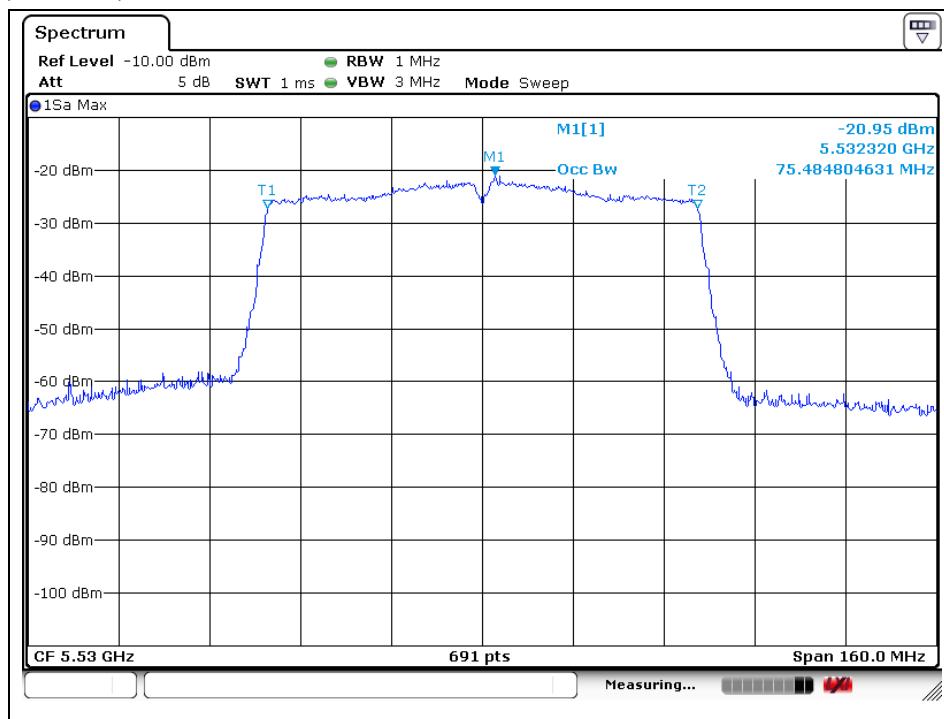
A4(210 mm x 297 mm)

802.11ac_VHT80 (Band 2A)

Middle Channel (5 290 MHz)

**802.11ac_VHT80 (Band 2C)**

Low Channel (5 530 MHz)



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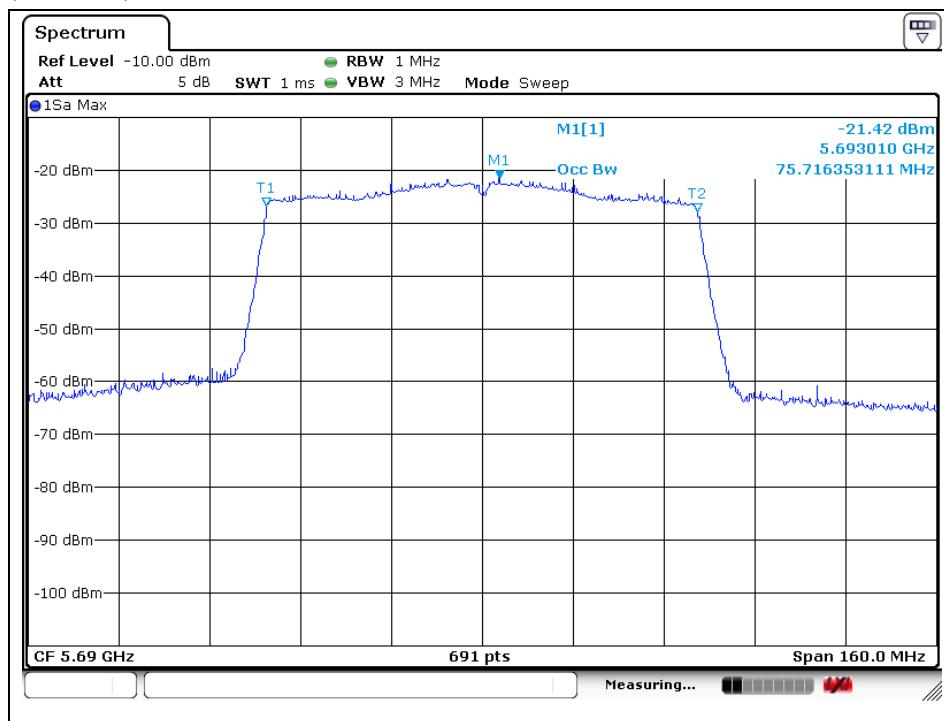
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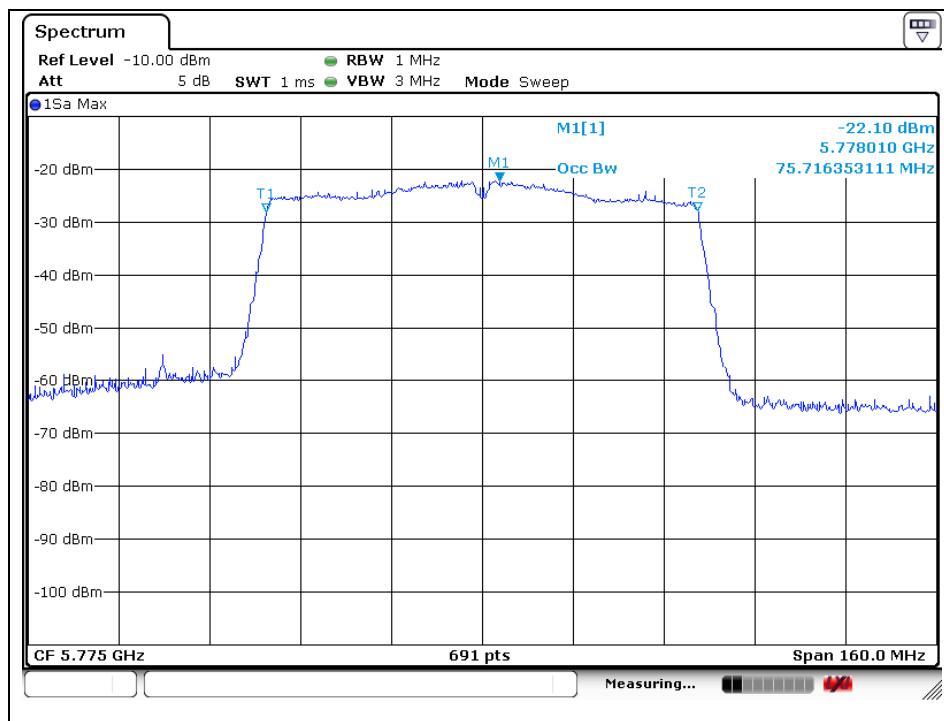
A4(210 mm x 297 mm)

High Channel (5 690 MHz)



802.11ac_VHT80 (Band 3)

Middle Channel (5 775 MHz)



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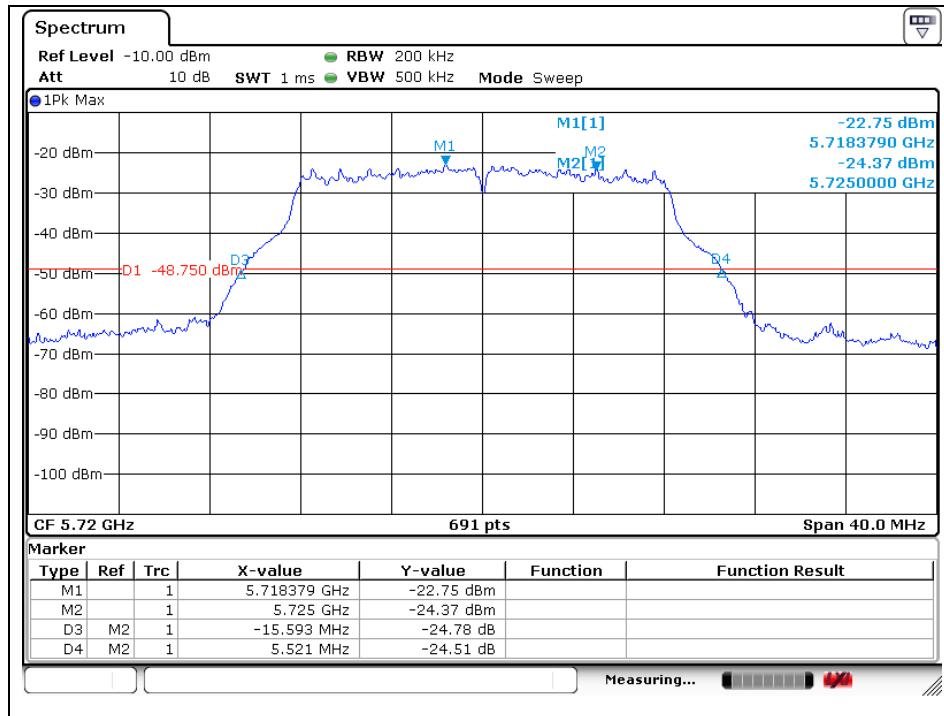
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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

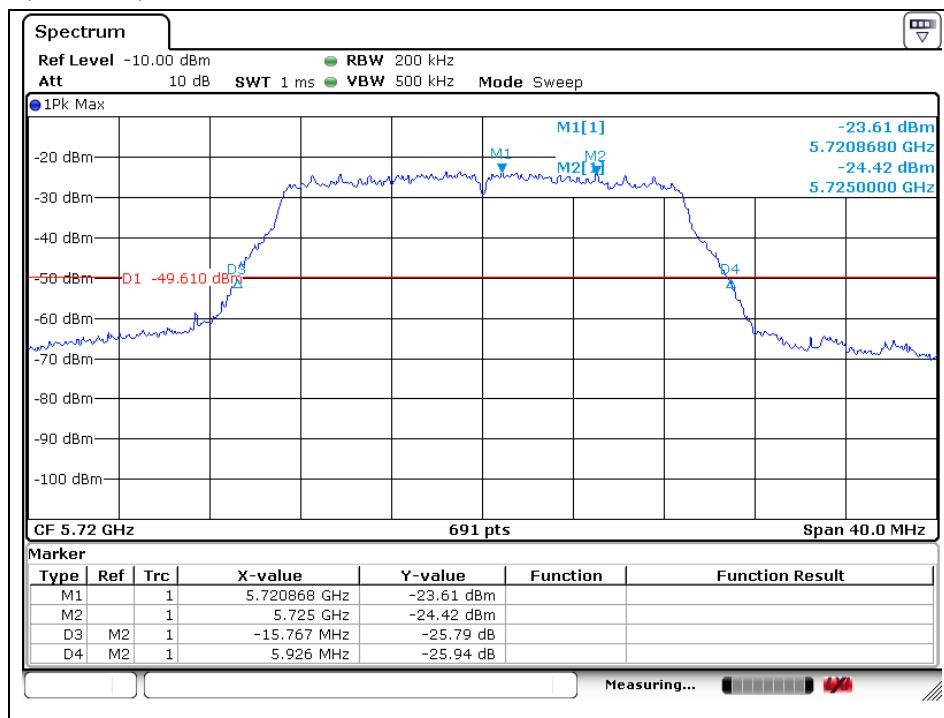
A4(210 mm x 297 mm)

Band-crossing channels

802.11a (5 720 MHz)



802.11n_HT20 (5 720 MHz)



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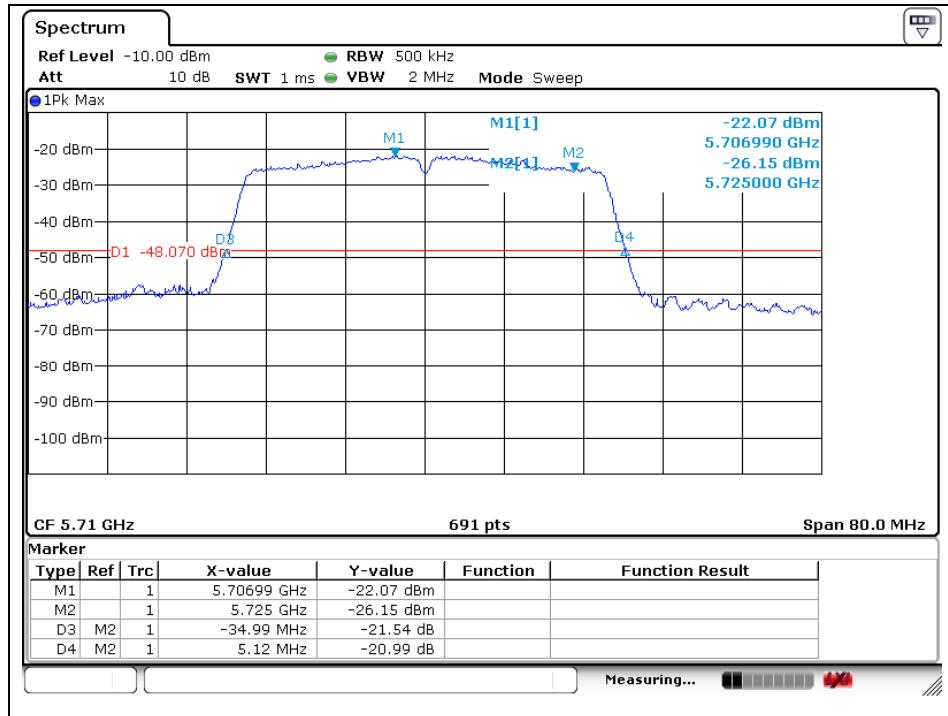
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

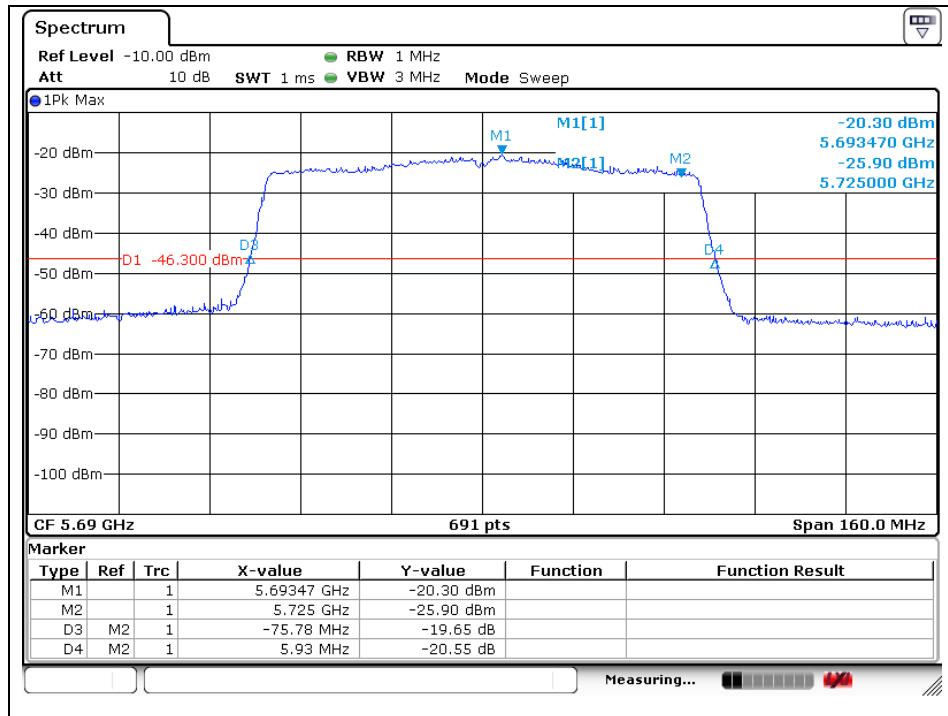
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A4(210 mm x 297 mm)

802.11n_HT40 (5 710 MHz)



802.11ac_VHT80 (5 690 MHz)



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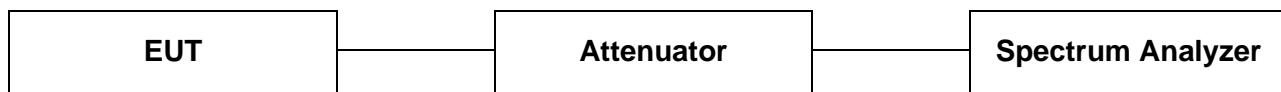
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

4. 6 dB Bandwidth

4.1. Test Setup



4.2. Limit

4.2.1. FCC

According to §15.407(e), within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

4.2.2. IC

According to RSS-247 Issue 2, 6.2.4.1, the minimum -6 dB Bandwidth shall be at least 500 kHz.

4.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section C.2 of KDB 789033 D02 v02r01.
2. Set RBW = 100 kHz.
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Remark;

In case of band crossing channels 138, 142 and 144, the measurement is complied with section III.A of KDB 789033 D02 v02r01.

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A4(210 mm x 297 mm)

4.4. Test result

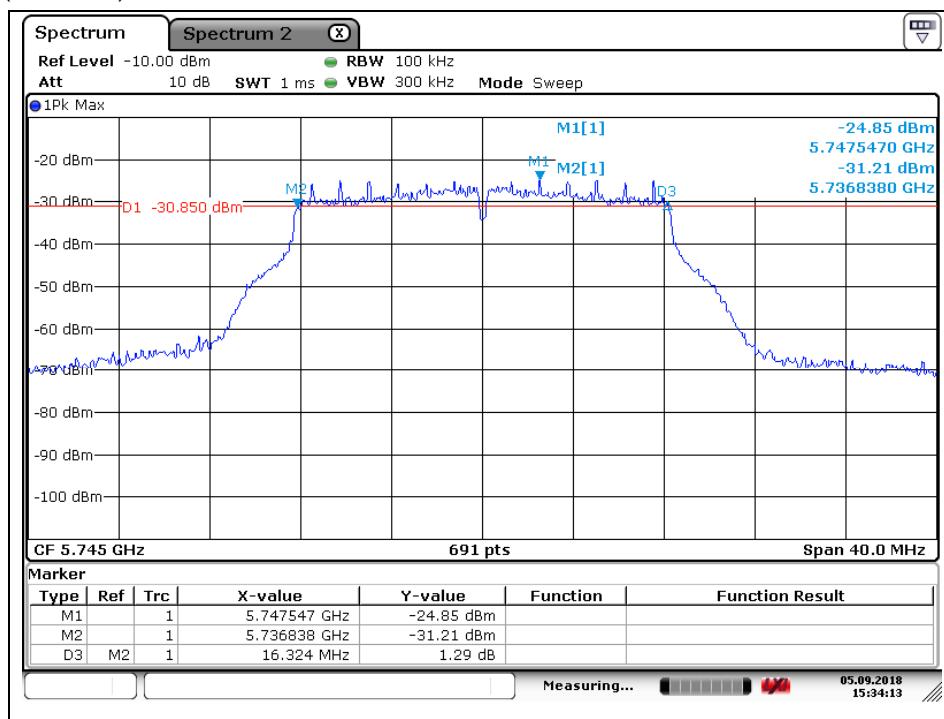
Ambient temperature : $(23 \pm 1)^\circ\text{C}$
 Relative humidity : 47 % R.H.

Band	Mode	Frequency (MHz)	Ch.	Data Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Bandwidth (kHz)
U-NII 3	11a	5 745	149	6	16.324	500
		5 785	157		16.324	
		5 825	165		16.324	
	11n_HT20	5 745	149	MCS0	17.598	
		5 785	157		17.598	
		5 825	165		17.598	
	11n_HT40	5 755	151	MCS0	35.770	
		5 795	159		36.030	
	11ac_VHT80	5 775	155	MCS0	75.400	
U-NII 3 (Band-crossing channels)	11a	5 720	144	6	3.220	
	11n_HT20	5 720	144	MCS0	3.799	
	11n_HT40	5 710	142	MCS0	2.990	
	11ac_VHT80	5 690	138	MCS0	2.990	

- Test plots

802.11a (Band 3)

Low Channel (5 745 MHz)



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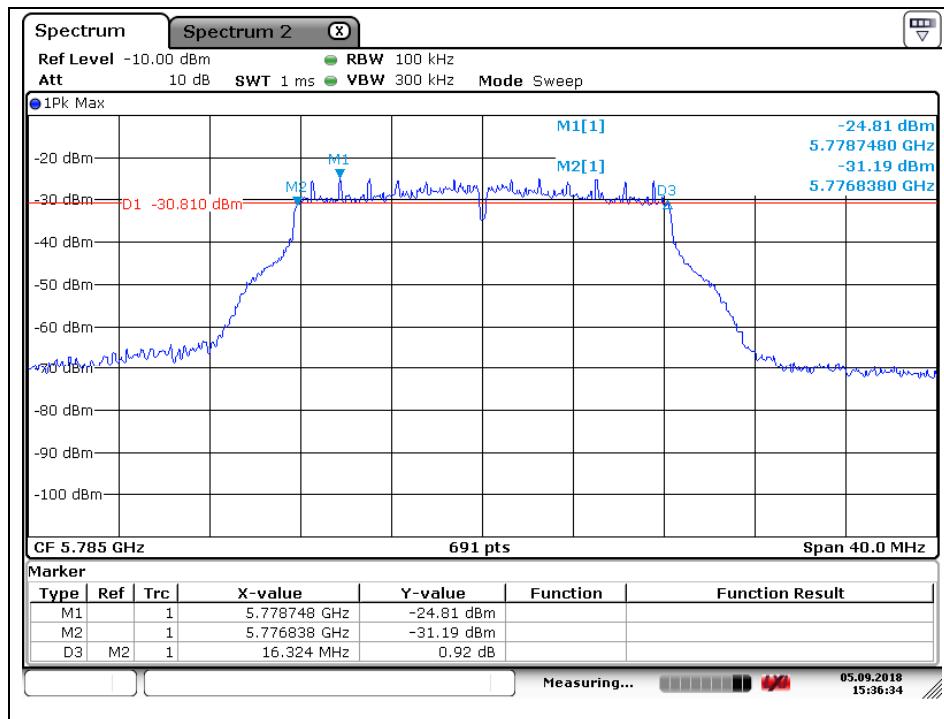
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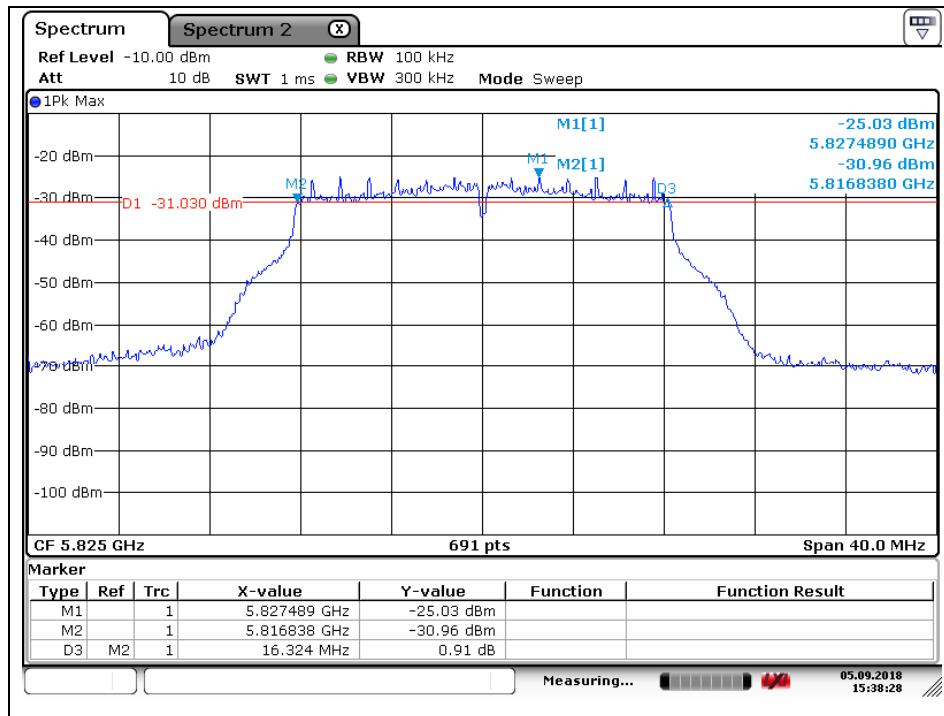
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Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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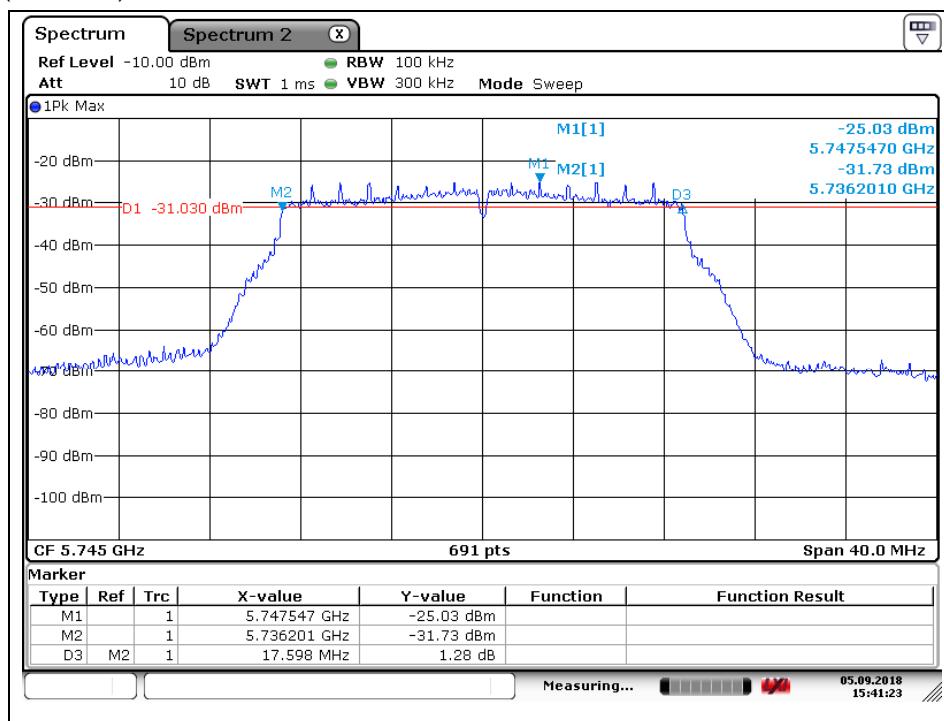
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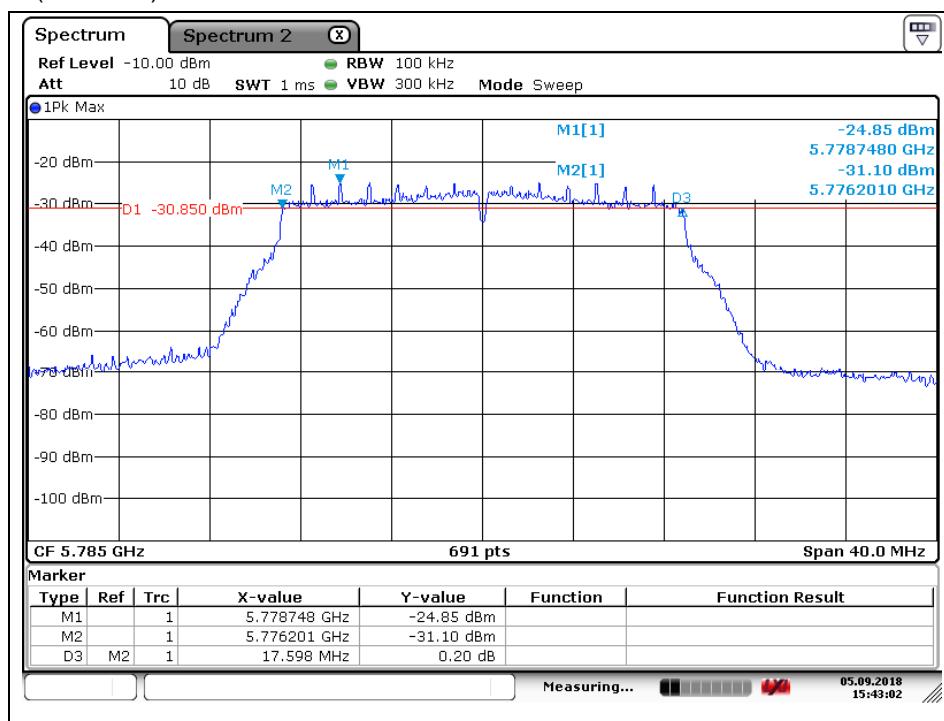
A4(210 mm x 297 mm)

802.11n_HT20 (Band 3)

Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



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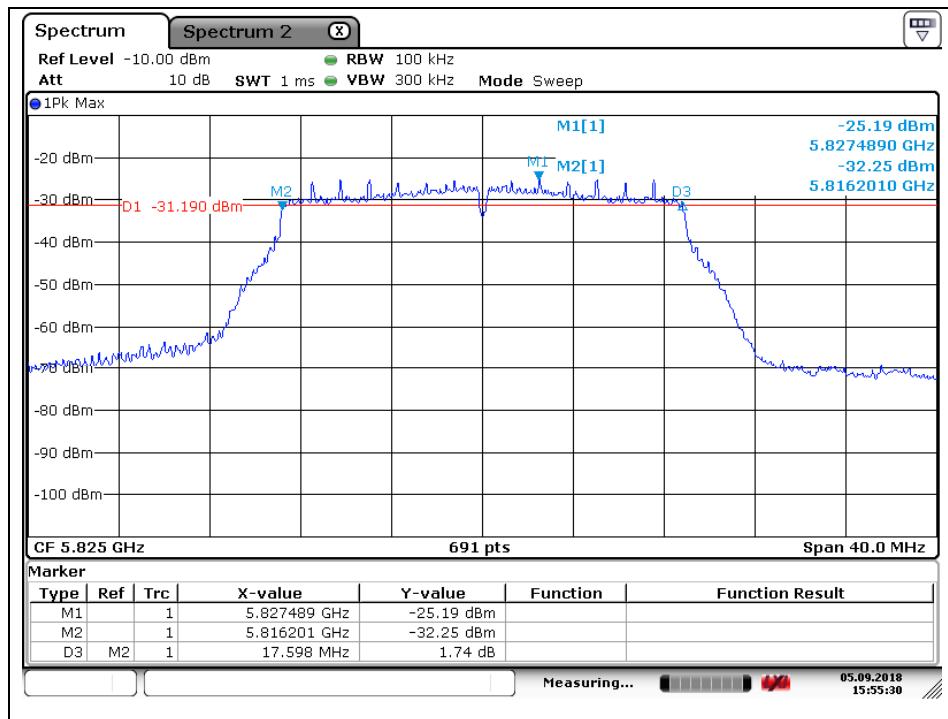
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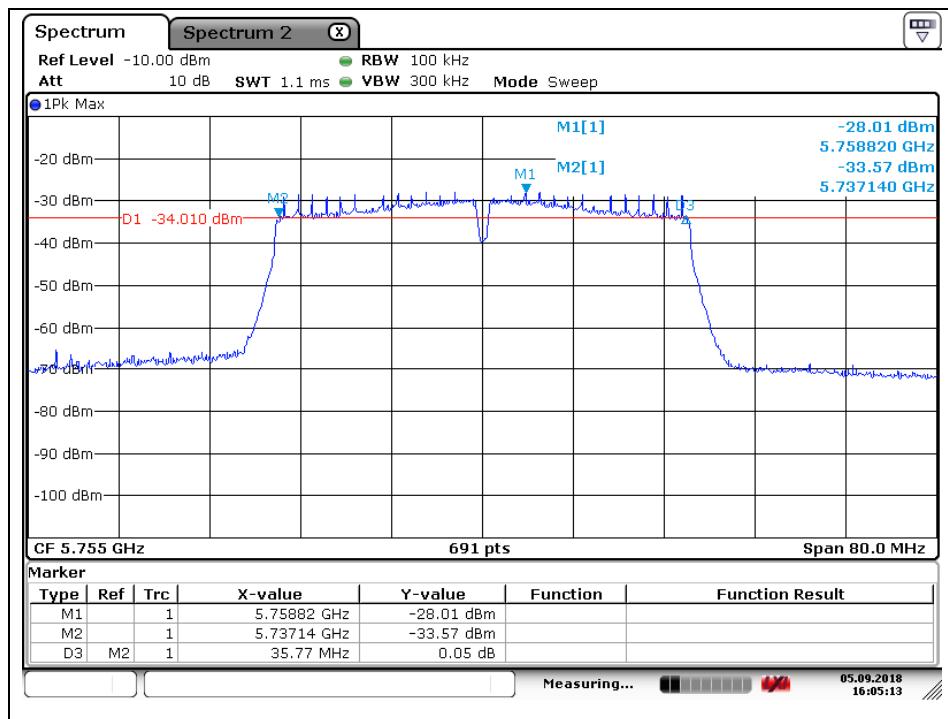
A4(210 mm x 297 mm)

High Channel (5 825 MHz)



802.11n_HT40 (Band 3)

Low Channel (5 755 MHz)



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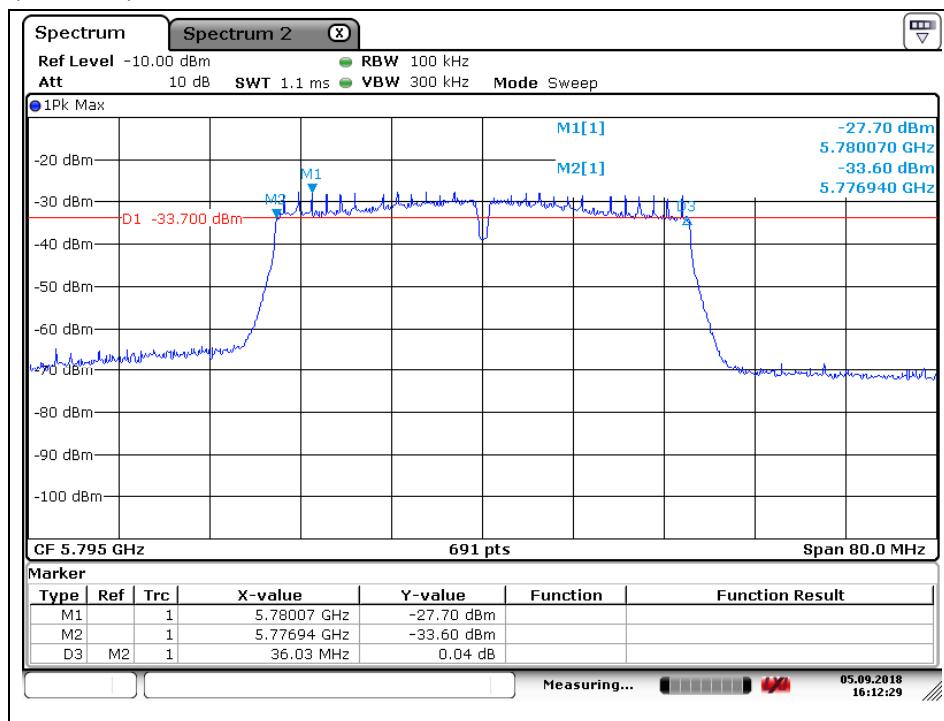
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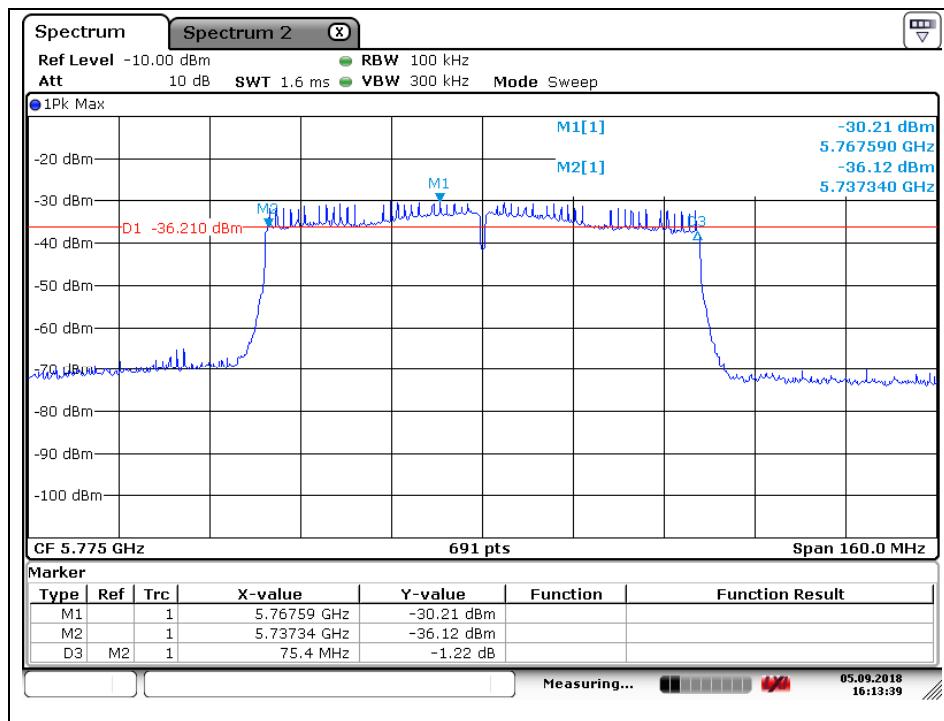
A4(210 mm x 297 mm)

High Channel (5 795 MHz)



802.11ac_VHT80 (Band 3)

Middle Channel (5 775 MHz)



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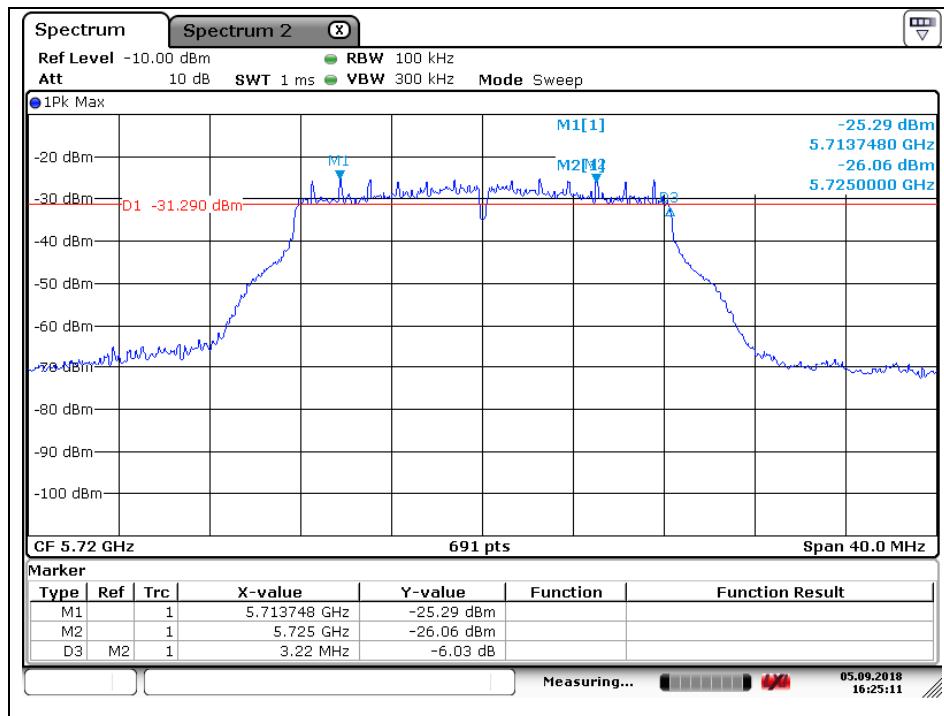
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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

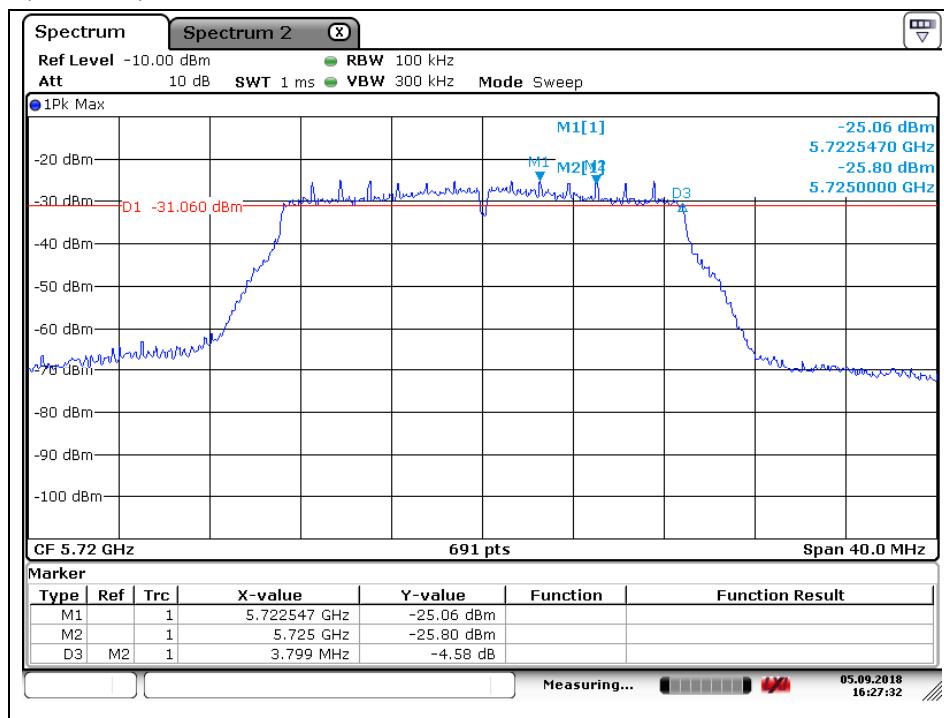
A4(210 mm x 297 mm)

Band-crossing channels

802.11a (5 720 MHz)



802.11n_HT20 (5 720 MHz)



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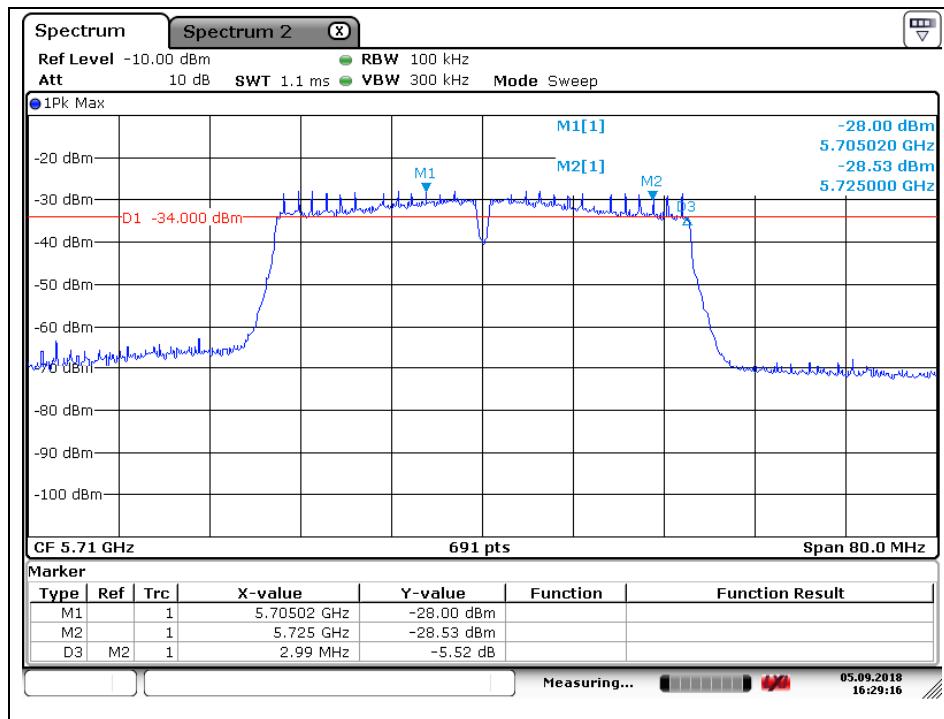
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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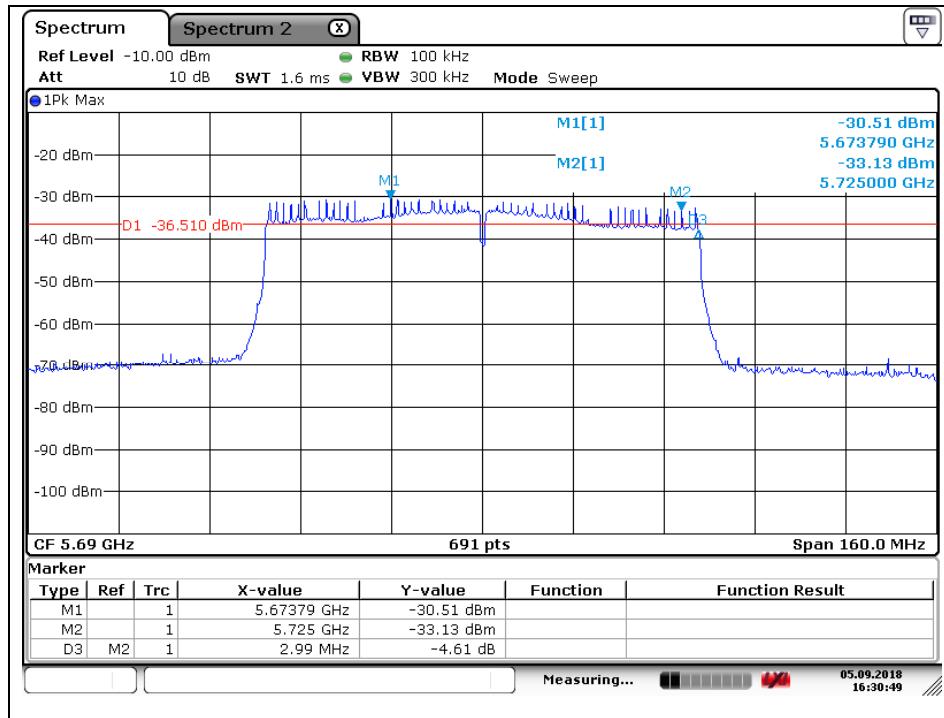
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802.11n_HT40 (5 710 MHz)



802.11ac_VHT80 (5 690 MHz)



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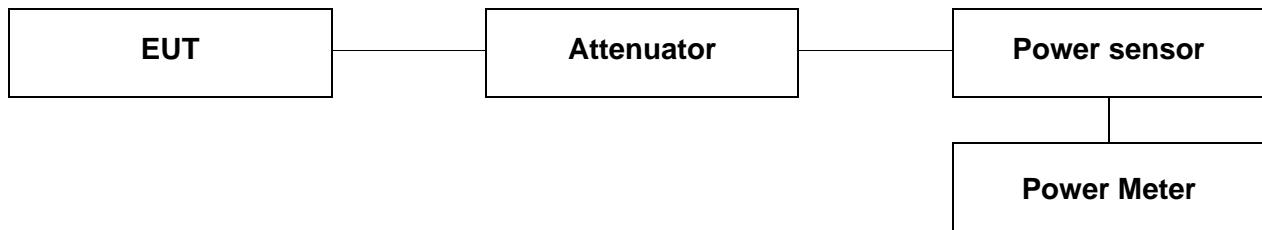
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5. Maximum Conducted Output Power

5.1. Test Setup



5.2. Limit

5.2.1. FCC

According to 15.407 (a)(1)(iv)

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dB i. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i.

According to 15.407 (a)(2)

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dB m} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i.

According to 15.407 (a)(3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dB m in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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5.2.2. IC

According to RSS-247 issue2,

6.2.1.1 Frequency band 5 150-5 250 MHz

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

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

6.2.2.1 Frequency band 5 250-5 350 MHz

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

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

- a) The maximum conducted output power shall not exceed 250 mW or $11 + 10\log_{10}B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10\log_{10}B$, dBm, whichever is less. B is the 99 % emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.3.1 Frequency band 5 470-5 600 MHz and 5 650-5 725 MHz

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

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

6.2.4.1 Frequency band 5 725-5 850 MHz

For equipment operating in the band 5 725-5 850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz. The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint³ systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

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A4(210 mm x 297 mm)

5.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section E.3.a of KDB 789033 D02 v02r01.
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:
 - The EUT is configured to transmit continuously or to transmit with a consistent 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.
3. If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B.
4. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
5. Adjust the measurement in dB m 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 %).
6. In case of band crossing channels 138, 142 and 144, the measurement is complied with section III.A of KDB 789033 D02 v02r01.

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5.4. Test result

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

Mode	Band	Frequency (MHz)	Conducted Power				
			Data Rate (Mbps)	Average Power (dB m)	Duty Correction Factor (dB)	Average Power Result (dB m)	EIRP (dB m)
11a	U-NII 1	5 180	6	8.25	0.36	8.61	12.12
		5 220		8.52	0.36	8.88	12.39
		5 240		8.70	0.36	9.06	12.57
	U-NII 2A	5 260		8.74	0.36	9.10	12.22
		5 300		8.65	0.36	9.01	12.13
		5 320		8.76	0.36	9.12	12.24
	U-NII 2C	5 500		8.28	0.36	8.64	10.92
		5 580		7.95	0.36	8.31	10.59
		5 700		8.41	0.36	8.77	11.05
	U-NII 3	5 745		8.35	0.36	8.71	
		5 785		8.10	0.36	8.46	
		5 825		8.17	0.36	8.53	

Band	FCC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 180	23.98			3.51	23.98
	5 220					
	5 240					
U-NII 2A	5 260	23.98	21.071	24.24	3.12	23.98
	5 300		21.129	24.25		
	5 320		21.041	24.23		
U-NII 2C	5 500	23.98	21.071	24.24	2.28	23.98
	5 580		21.071	24.24		
	5 700		21.013	24.22		
U-NII 3	5 745	30			-0.84	30
	5 785					
	5 825					

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A4(210 mm × 297 mm)

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	1.76+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	16.961	14.05	3.51	14.05
	5 220		16.961	14.05		14.05
	5 240		17.019	14.07		14.07
U-NII 2A	5 260	14.77	16.961	14.05	3.12	14.05
	5 300		16.961	14.05		14.05
	5 320		17.019	14.07		14.07

Band	IC Limit							
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	11+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)		
U-NII 2C	5 500	23.98	17.019	23.31	2.28	23.31		
	5 580		16.961	23.29		23.29		
	5 700		16.961	23.29		23.29		
U-NII 3	5 745	30				-0.84		
	5 785							
	5 825							

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Correction Factor (dB)

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A4(210 mm x 297 mm)

Mode	Band	Frequency (MHz)	Conducted Power				
			Data Rate (Mbps)	Average Power (dB m)	Duty Correction Factor (dB)	Average Power Result (dB m)	EIRP (dB m)
11n_HT20	U-NII 1	5 180	MCS0	7.95	0.32	8.27	11.78
		5 220		8.06	0.32	8.38	11.89
		5 240		7.95	0.32	8.27	11.78
	U-NII 2A	5 260		8.48	0.32	8.80	11.92
		5 300		8.40	0.32	8.72	11.84
		5 320		8.29	0.32	8.61	11.73
	U-NII 2C	5 500		7.79	0.32	8.11	10.39
		5 580		7.73	0.32	8.05	10.33
		5 700		7.88	0.32	8.20	10.48
	U-NII 3	5 745		7.99	0.32	8.31	/
		5 785		8.24	0.32	8.56	
		5 825		7.98	0.32	8.30	

Band	FCC Limit						
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)	
U-NII 1	5 180	23.98	/			3.51	
	5 220						
	5 240						
U-NII 2A	5 260	23.98	21.418	24.31	3.12	23.98	
	5 300		21.592	24.34			
	5 320		21.678	24.36			
U-NII 2C	5 500	23.98	21.708	24.37	2.28	23.98	
	5 580		21.650	24.35			
	5 700		21.534	24.33			
U-NII 3	5 745	30	/			-0.84	
	5 785						
	5 825						

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A4(210 mm x 297 mm)

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	1.76+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 180	14.77	18.003	14.31	3.51	14.31
	5 220		18.061	14.33		14.33
	5 240		18.119	14.34		14.34
U-NII 2A	5 260	14.77	18.061	14.33	3.12	14.33
	5 300		18.119	14.34		14.34
	5 320		18.119	14.34		14.34

Band	IC Limit							
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	11+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)		
U-NII 2C	5 500	23.98	18.061	23.57	2.28	23.57		
	5 580		18.177	23.60		23.60		
	5 700		18.061	23.57		23.57		
U-NII 3	5 745	30				-0.84		
	5 785							
	5 825							

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Correction Factor (dB)
- 2 EIRP (dB m) = Average Power Result (dB m) + Antenna gain(dB i)

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A4(210 mm x 297 mm)

Mode	Band	Frequency (MHz)	Conducted Power				
			Data Rate (Mbps)	Average Power (dB m)	Duty Correction Factor (dB)	Average Power Result (dB m)	EIRP (dB m)
11n_HT40	U-NII 1	5 190	MCS0	3.29	0.60	3.89	7.40
		5 230		3.23	0.60	3.83	7.34
	U-NII 2A	5 270		8.18	0.60	8.78	11.90
		5 310		7.97	0.60	8.57	11.69
	U-NII 2C	5 510		7.99	0.60	8.59	10.87
		5 550		7.76	0.60	8.36	10.64
		5 670		7.94	0.60	8.54	10.82
	U-NII 3	5 755		8.06	0.60	8.66	
		5 795		8.16	0.60	8.76	

Band	FCC Limit						
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)	
U-NII 1	5 190	23.98	40.330		3.51	23.98	
	5 230		27.06				
U-NII 2A	5 270	23.98	40.160	27.04	3.12	23.98	
	5 310						
U-NII 2C	5 510	23.98	40.290	27.05	2.28	23.98	
	5 550						
	5 670						
U-NII 3	5 755	30	40.240		-0.84	30	
	5 795						

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	1.76+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 190	14.77	36.469	17.38	3.51	14.77
	5 230		36.585	17.39		
U-NII 2A	5 270	14.77	36.469	17.38	3.12	14.77
	5 310		36.469	17.38		

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	1.76+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 2C	5 510	23.98	36.585	26.63	2.28	23.98
	5 550		36.585	26.63		
	5 670		36.585	26.63		
U-NII 3	5 755	30	40.240		-0.84	30
	5 795					

Remark:

1. Average Power Result (dB m) = Average Power (dB m) + Duty Correction Factor (dB)

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A4(210 mm x 297 mm)

Mode	Band	Frequency (MHz)	Conducted Power				
			Data Rate (Mbps)	Average Power (dB m)	Duty Correction Factor (dB)	Average Power Result (dB m)	EIRP (dB m)
11ac_VHT80	U-NII 1	5 210	MCS0	3.17	1.14	4.31	7.82
	U-NII 2A	5 290		6.83	1.14	7.97	11.09
	U-NII 2C	5 530		7.66	1.14	8.80	11.08
		5 690		7.78	1.14	8.92	11.20
	U-NII 3	5 775		8.03	1.14	9.17	

Band	FCC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 210	23.98			3.51	23.98
U-NII 2A	5 290	23.98	82.030	30.14	3.12	23.98
U-NII 2C	5 530	23.98	81.970	30.14	2.28	23.98
	5 690		82.200	30.15		
U-NII 3	5 775	30			-0.84	30

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	1.76+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 210	14.77	75.716	20.55	3.51	14.77
U-NII 2A	5 290	14.77	75.485	20.54	3.12	14.77

Band	IC Limit					
	Frequency (MHz)	Fixed Limit (dB m)	99 % BW (MHz)	11+10Log ₁₀ B (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 2C	5 530	23.98	75.485	29.78	2.28	23.98
	5 690		75.716	29.79		
U-NII 3	5 775	30			-0.84	30

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Correction Factor (dB)

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A4(210 mm x 297 mm)

- Band-crossing channels

Band	Mode	Frequency (MHz)	Conducted Power			
			Data Rate (Mbps)	Average Power (dB m)	Duty Correction Factor (dB)	Average Power Result (dB m)
U-NII 2C	11a	5 720	6	6.36	0.36	6.72
U-NII 3				-0.90	0.36	-0.54
U-NII 2C	11n_HT20	5 720	MCS0	6.15	0.32	6.47
U-NII 3				-0.77	0.32	-0.45
U-NII 2C	11n_HT40	5 710	MCS0	6.02	0.60	6.62
U-NII 3				-6.00	0.60	-5.40
U-NII 2C	11ac_VHT80	5 690	MCS0	6.04	1.14	7.18
U-NII 3				-9.40	1.14	-8.26

Band	Mode	Limit					
		Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 2C	11a	5 720	23.98	15.593	22.93	2.28	22.93
U-NII 3						-0.84	30
U-NII 2C	11n_HT20	5 720	23.98	15.883	23.01	2.28	23.01
U-NII 3						-0.84	30
U-NII 2C	11n_HT40	5 710	23.98	35.100	26.45	2.28	23.98
U-NII 3						-0.84	30
U-NII 2C	11ac_VHT80	5 690	23.98	76.090	28.81	2.28	23.98
U-NII 3						-0.84	30

Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Correction Factor (dB)

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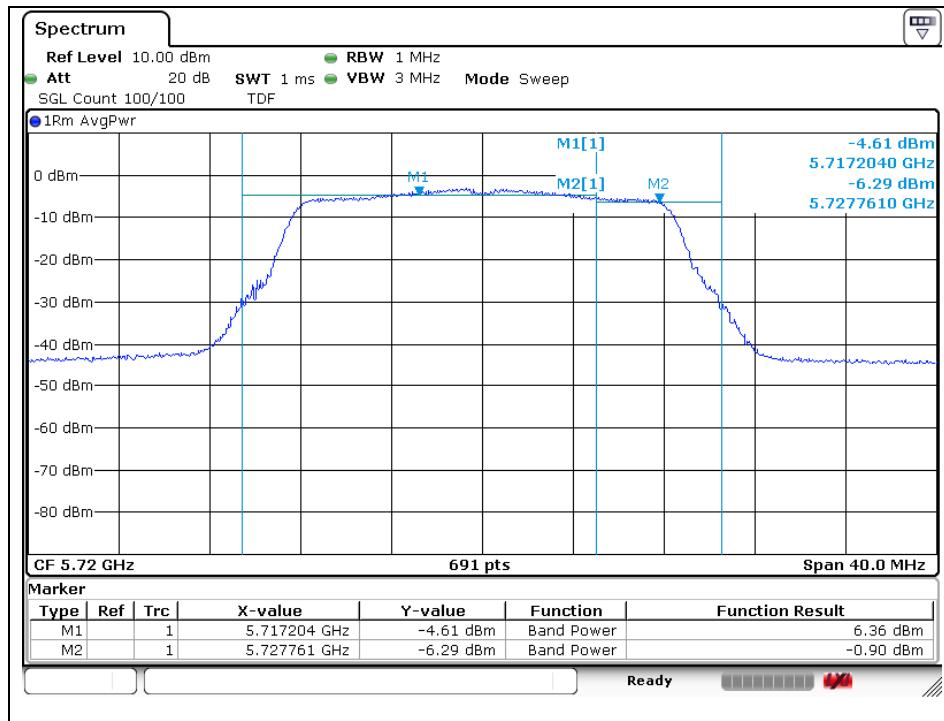
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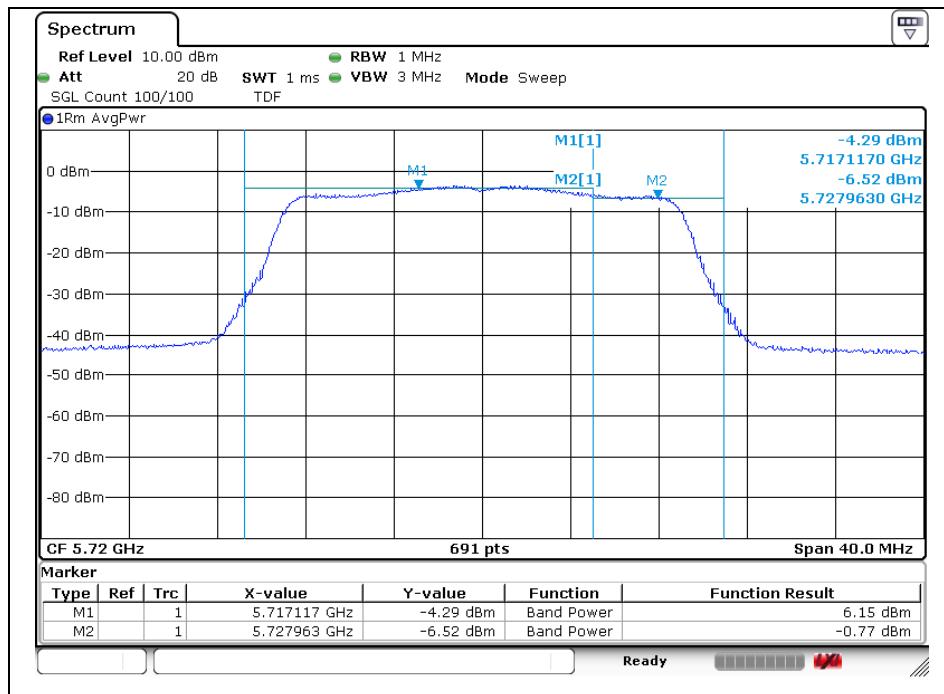
A4(210 mm x 297 mm)

- Test plots

802.11a (5 720 MHz)



802.11n_HT20 (5 720 MHz)



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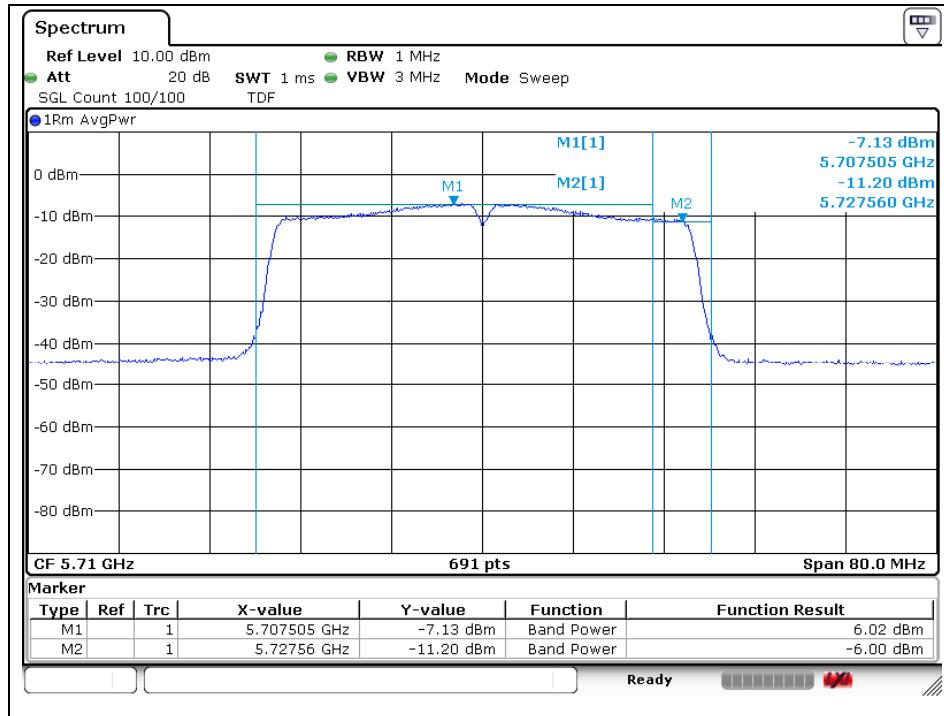
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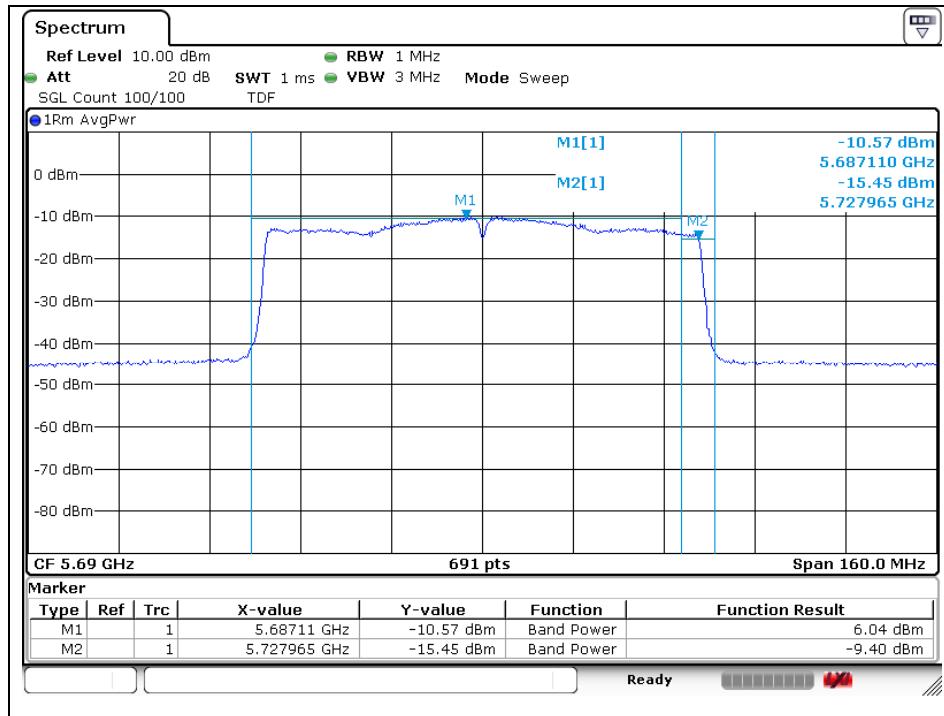
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802.11n_HT40 (5 710 MHz)



802.11ac_VHT80 (5 690 MHz)



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6. Peak Power Spectral Density

6.1. Test Setup



6.2. Limit

6.2.1 FCC

According to 15.407 (a)(1)(iv)

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dB i. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i.

According to 15.407 (a)(2)

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dB m + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i.

According to 15.407 (a)(3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dB m in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dB i 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 dB i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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6.2.2 IC

According to RSS-247 issue2,

6.2.1.1 Frequency band 5 150-5 250 MHz

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

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

6.2.2.1 Frequency band 5 250-5 350 MHz

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

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

- a) The maximum conducted output power shall not exceed 250 mW or $11 + 10\log_{10}B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10\log_{10}B$, dBm, whichever is less. B is the 99 % emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.3.1 Frequency band 5 470-5 600 MHz and 5 650-5 725 MHz

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

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

6.2.4.1 Frequency band 5 725-5 850 MHz

For equipment operating in the band 5 725-5 850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz. The maximum conducted output power shall not exceed 1 W. The output 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 output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint³ systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

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6.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section F of KDB 789033 D02 v02r01.
2. 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.)
3. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
4. 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 measured power in order to compute the average power during the actual transmission times.**
 - 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.
5. The result is the Maximum PSD over 1 MHz reference bandwidth.
6. 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 integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
 - a) Set RBW $\geq 1/T$, where T is defined in section II.B.1.a).
 - b) Set VBW ≥ 3 RBW.
 - c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500 \text{ kHz}/\text{RBW})$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
 - d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1 \text{ MHz}/\text{RBW})$ 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.
7. In case of band crossing channels 138, 142 and 144, the measurement is complied with section III.A of KDB 789033 D02 v02r01.

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6.4. Test result

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSSD (dB m)	Duty Correction Factor (dB)	Final PPSSD (dB m)	Limit (dB m/1 MHz)
11a	U-NII 1	5 180	36	6	-3.27	0.36	-2.91	10
		5 220	44		-2.38	0.36	-2.02	
		5 240	48		-2.60	0.36	-2.24	
	U-NII 2A	5 260	52		-2.35	0.36	-1.99	11
		5 300	60		-2.45	0.36	-2.09	
		5 320	64		-2.37	0.36	-2.01	
	U-NII 2C	5 500	100		-3.02	0.36	-2.66	
		5 580	116		-3.05	0.36	-2.69	
		5 700	140		-2.71	0.36	-2.35	
	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSSD (dB m)	Duty Factor (dB)	Final PPSSD (dB m)	Limit (dB m/500 kHz)
	U-NII 3	5 745	149	6	-5.57	0.36	-5.21	30
		5 785	157		-5.69	0.36	-5.33	
		5 825	165		-5.49	0.36	-5.13	

Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSSD (dB m)	Duty Correction Factor (dB)	Final PPSSD (dB m)	Limit (dB m/1 MHz)
11n_HT20	U-NII 1	5 180	36	MCS0	-3.46	0.32	-3.14	10
		5 220	44		-3.29	0.32	-2.97	
		5 240	48		-3.15	0.32	-2.83	
	U-NII 2A	5 260	52		-3.03	0.32	-2.71	11
		5 300	60		-2.63	0.32	-2.31	
		5 320	64		-2.73	0.32	-2.41	
	U-NII 2C	5 500	100		-3.32	0.32	-3.00	
		5 580	116		-3.34	0.32	-3.02	
		5 700	140		-3.13	0.32	-2.81	
	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSSD (dB m)	Duty Correction Factor (dB)	Final PPSSD (dB m)	Limit (dB m/500 kHz)
	U-NII 3	5 745	149	MCS0	-5.90	0.32	-5.58	30
		5 785	157		-5.99	0.32	-5.67	
		5 825	165		-5.77	0.32	-5.45	

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Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSD (dB m)	Duty Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/1 MHz)
11n_HT40	U-NII 1	5 190	38	MCS0	-10.96	0.60	-10.36	10
		5 230	46		-10.63	0.60	-10.03	
	U-NII 2A	5 270	54		-6.17	0.60	-5.57	11
		5 310	62		-5.99	0.60	-5.39	
	U-NII 2C	5 510	102		-6.59	0.60	-5.99	
		5 550	110		-6.86	0.60	-6.26	
		5 670	134		-6.77	0.60	-6.17	
	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSD (dB m)	Duty Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/500 kHz)
	U-NII 3	5 755	151	-9.27	0.60	-8.67	30	
		5 795	159	-9.28	0.60	-8.68		

Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSD (dB m)	Duty Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/1 MHz)
11ac_VHT80	U-NII 1	5 210	42	MCS0	-14.66	1.14	-13.52	10
	U-NII 2A	5 290	58		-10.44	1.14	-9.30	11
	U-NII 2C	5 530	106		-10.34	1.14	-9.20	
		5 690	138		-10.36	1.14	-9.22	
	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSD (dB m)	Duty Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/500 kHz)
	U-NII 3	5 775	155	MCS0	-13.04	1.14	-11.90	30

Band-crossing channels

Mode	Band	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSD (dB m)	Duty Correction Factor (dB)	Final PPSD (dB m)	Limit (dB m/1 MHz or dB m/500 kHz)
11a	U-NII 2C	5 720	144	6	-2.87	0.36	-2.51	11
	U-NII 3	5 720	144		-8.32	0.36	-7.96	30
11n_HT20	U-NII 2C	5 720	144	MCS0	-3.54	0.32	-3.22	11
	U-NII 3	5 720	144		-8.56	0.32	-8.24	30
11n_HT40	U-NII 2C	5 710	142	MCS0	-6.78	0.60	-6.18	11
	U-NII 3	5 710	142		-13.16	0.60	-12.56	30
11ac_VHT80	U-NII 2C	5 690	138	MCS0	-10.33	1.14	-9.19	11
	U-NII 3	5 690	138		-17.08	1.14	-15.94	30

Remark;

1. Final PPSD (dB m) = Measured PPSD (dB m) + Duty Correction Factor (dB)

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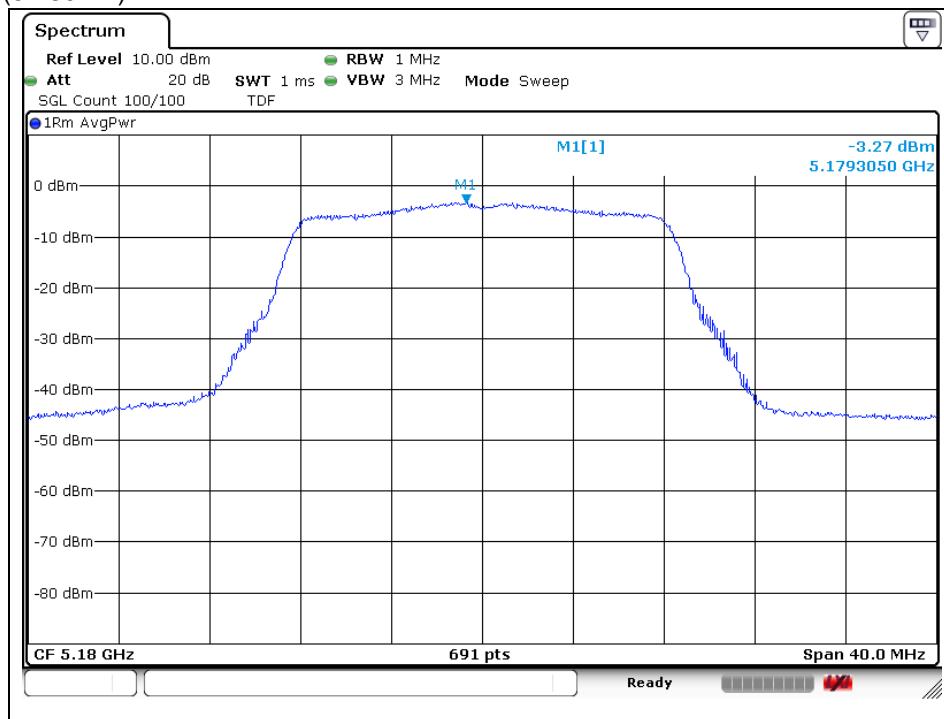
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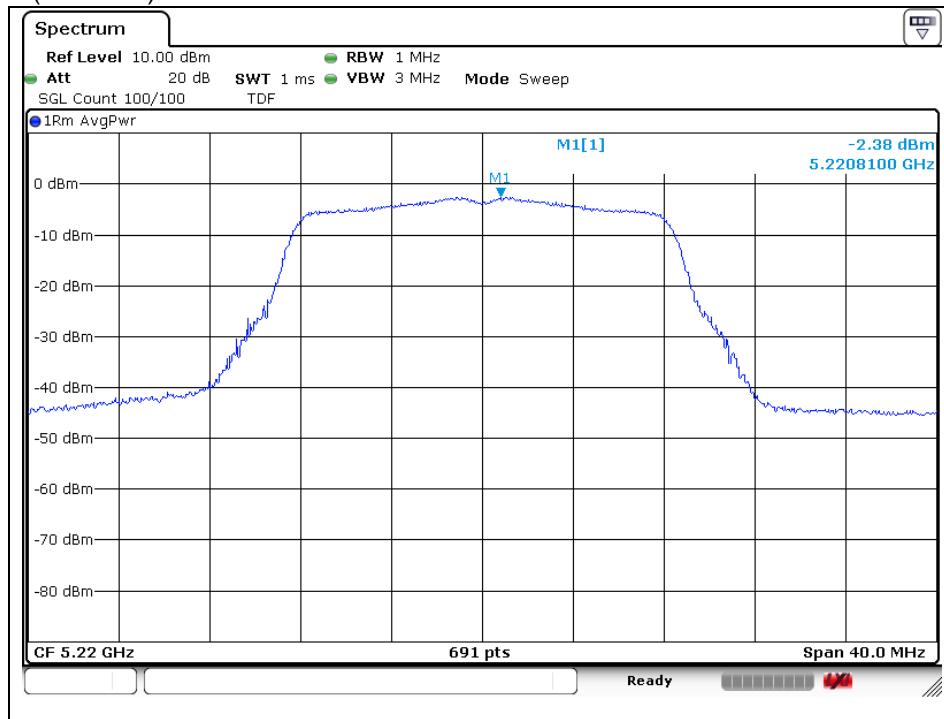
A4(210 mm x 297 mm)

- Test plots**802.11a (Band 1)**

Low Channel (5 180 MHz)



Middle Channel (5 220 MHz)



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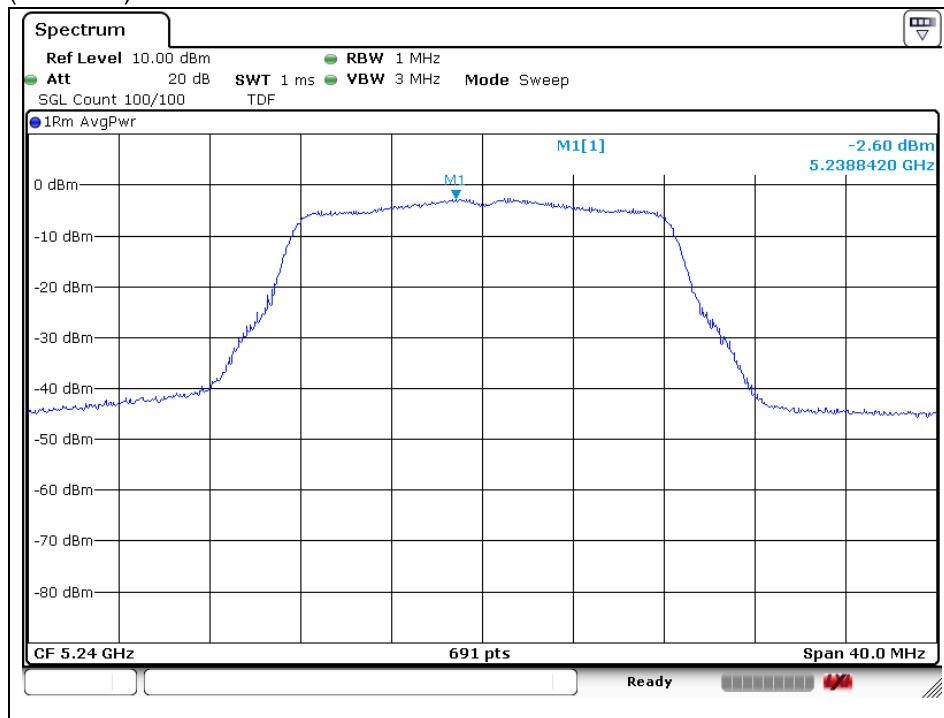
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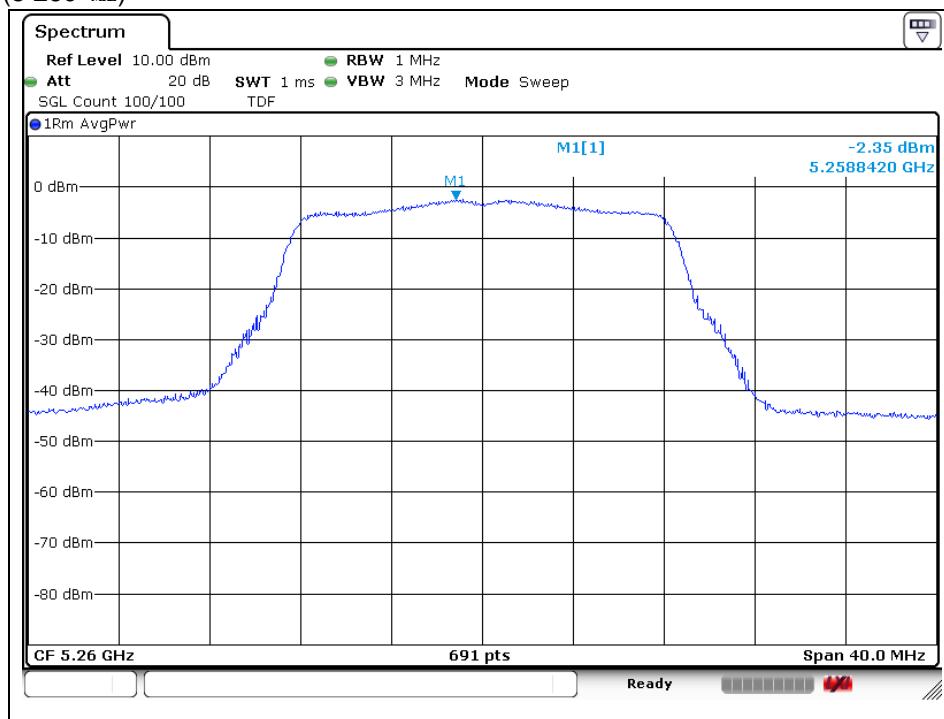
A4(210 mm x 297 mm)

High Channel (5.240 MHz)



802.11a (Band 2A)

Low Channel (5.260 MHz)



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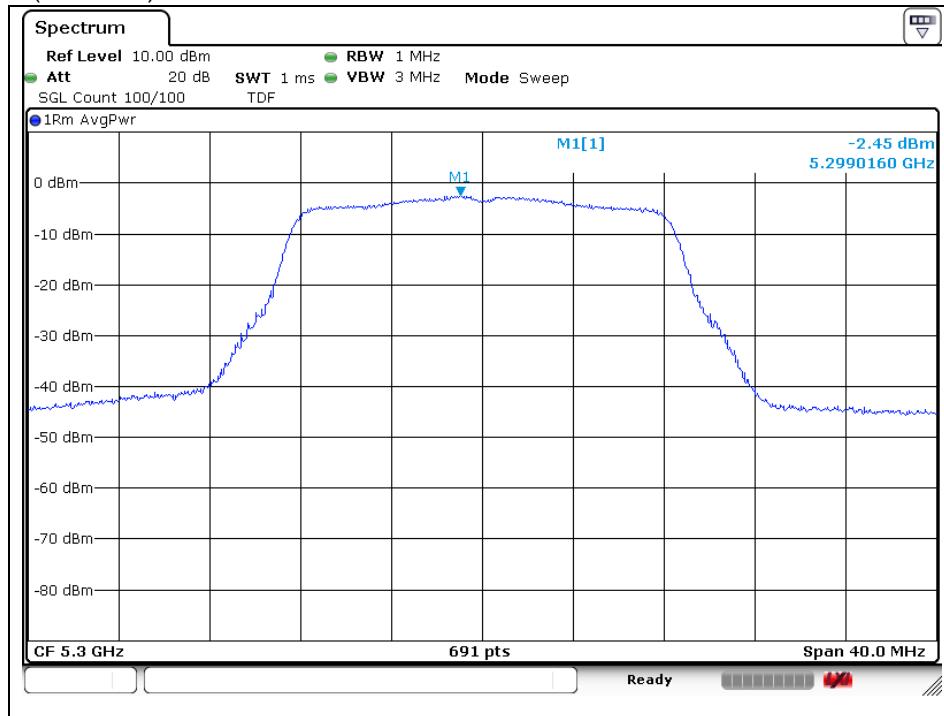
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

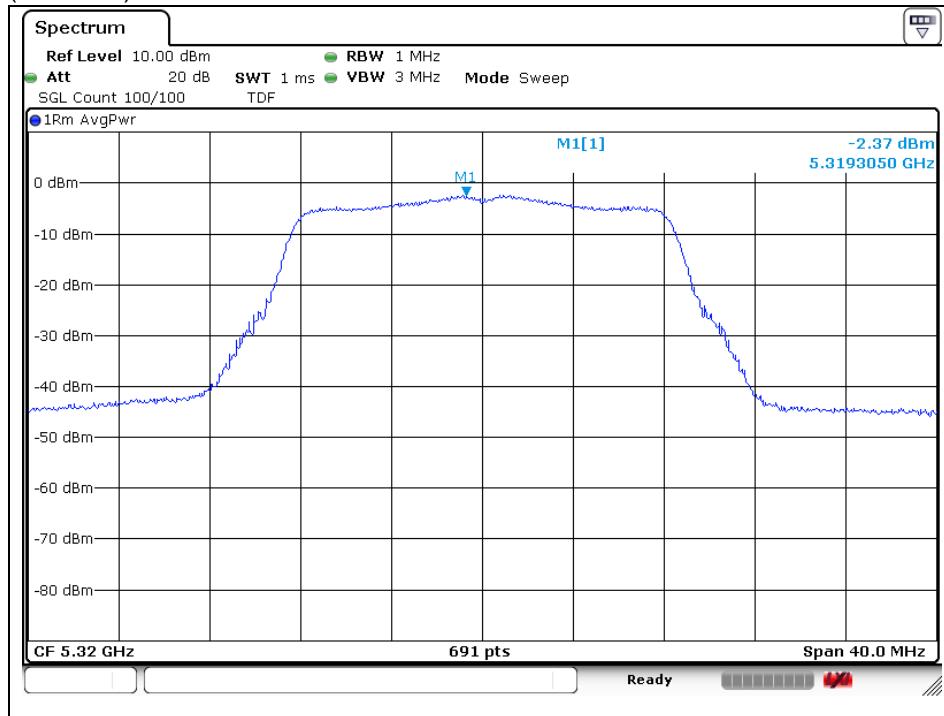
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A4(210 mm x 297 mm)

Middle Channel (5 300 MHz)



High Channel (5 320 MHz)



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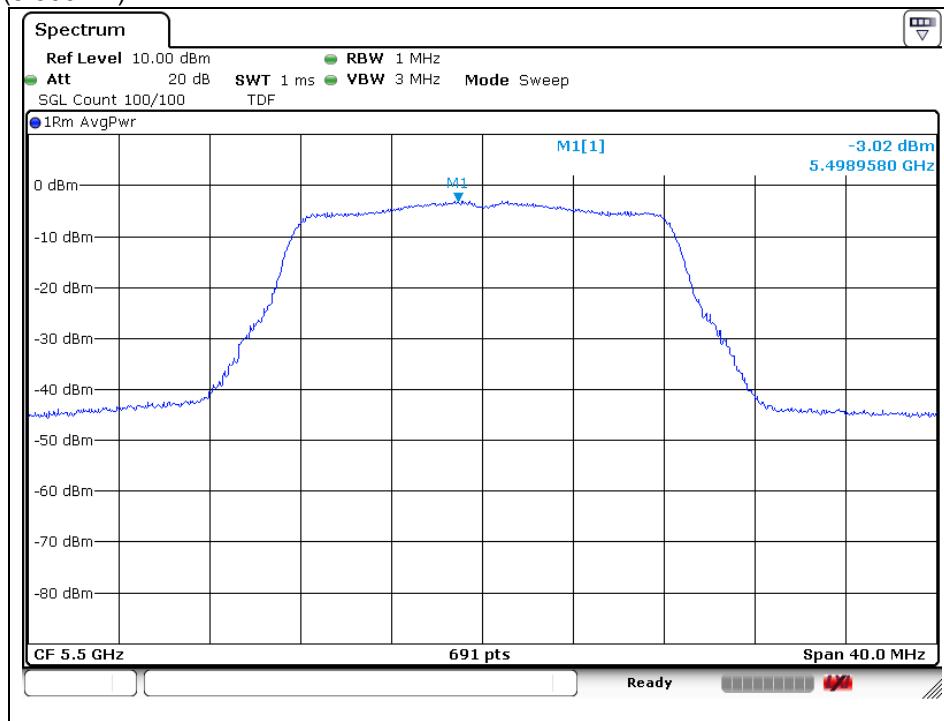
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

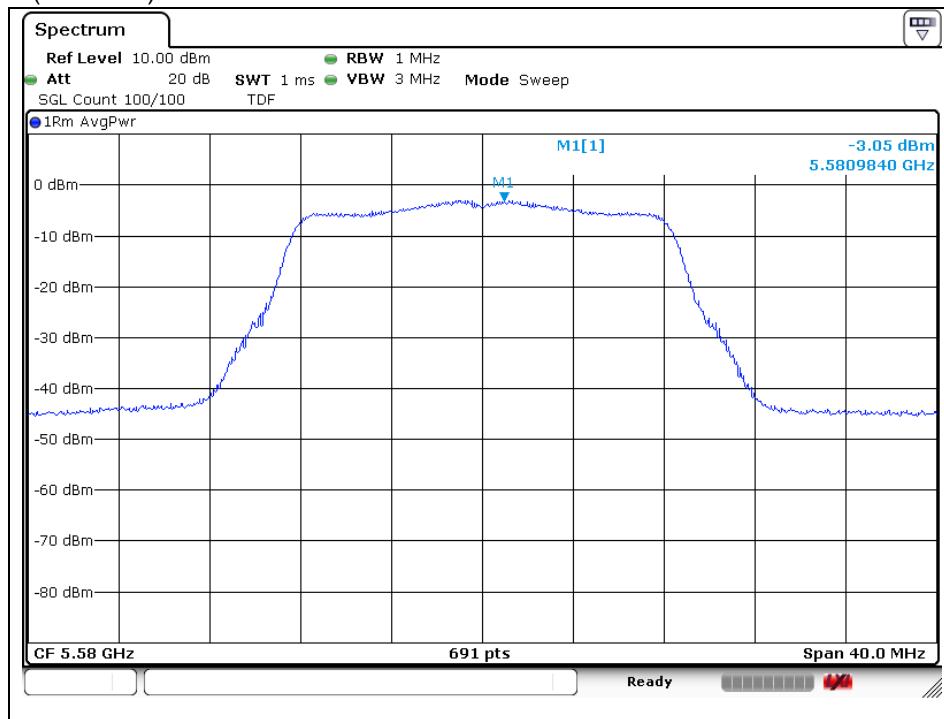
A4(210 mm x 297 mm)

802.11a (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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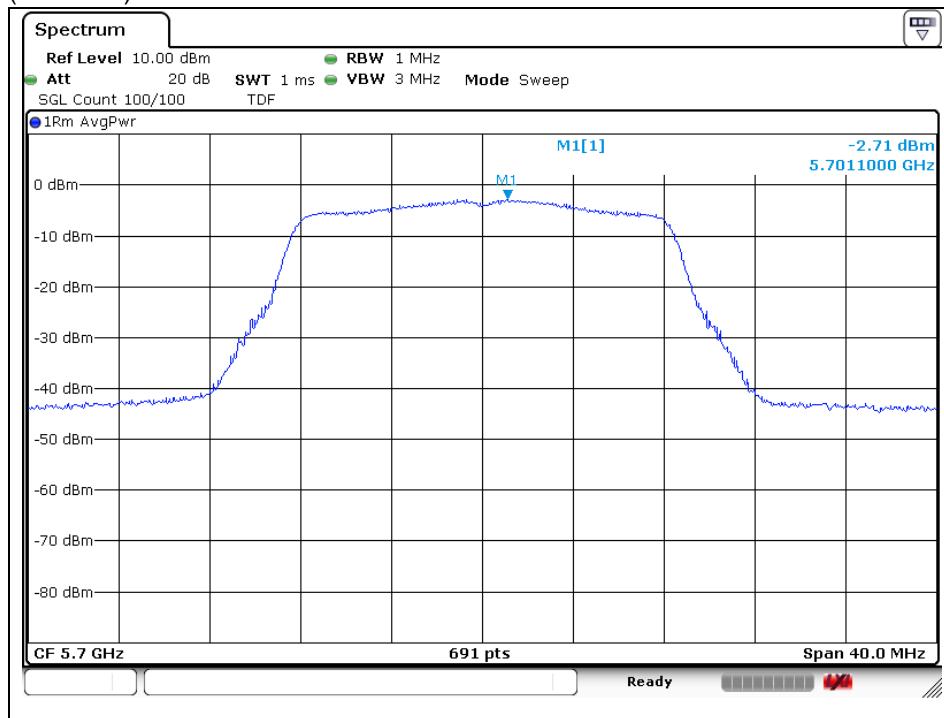
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

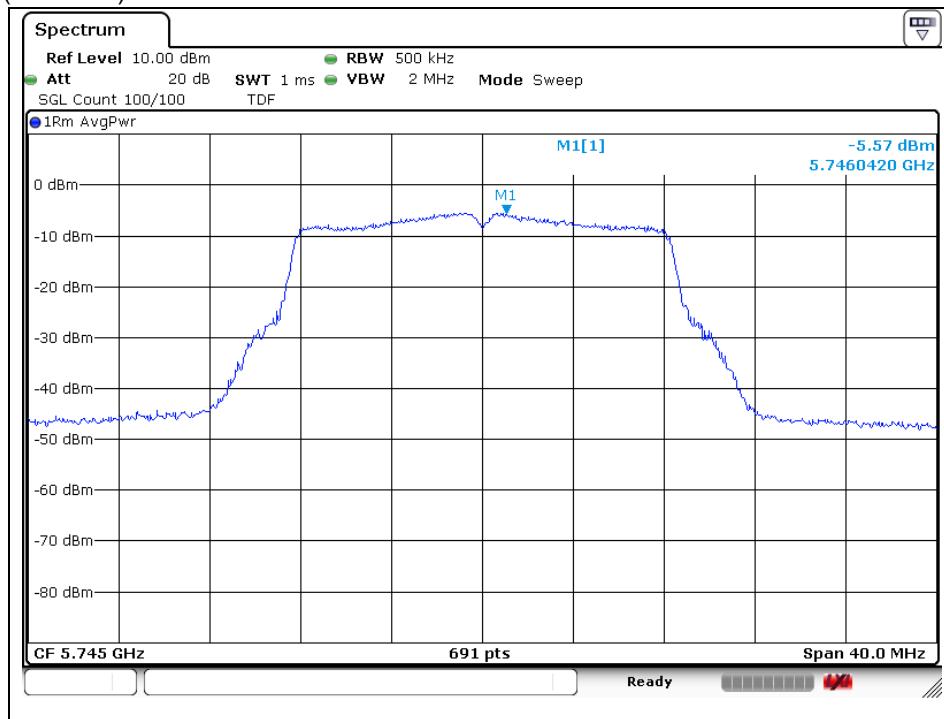
A4(210 mm x 297 mm)

High Channel (5 700 MHz)



802.11a (Band 3)

Low Channel (5 745 MHz)



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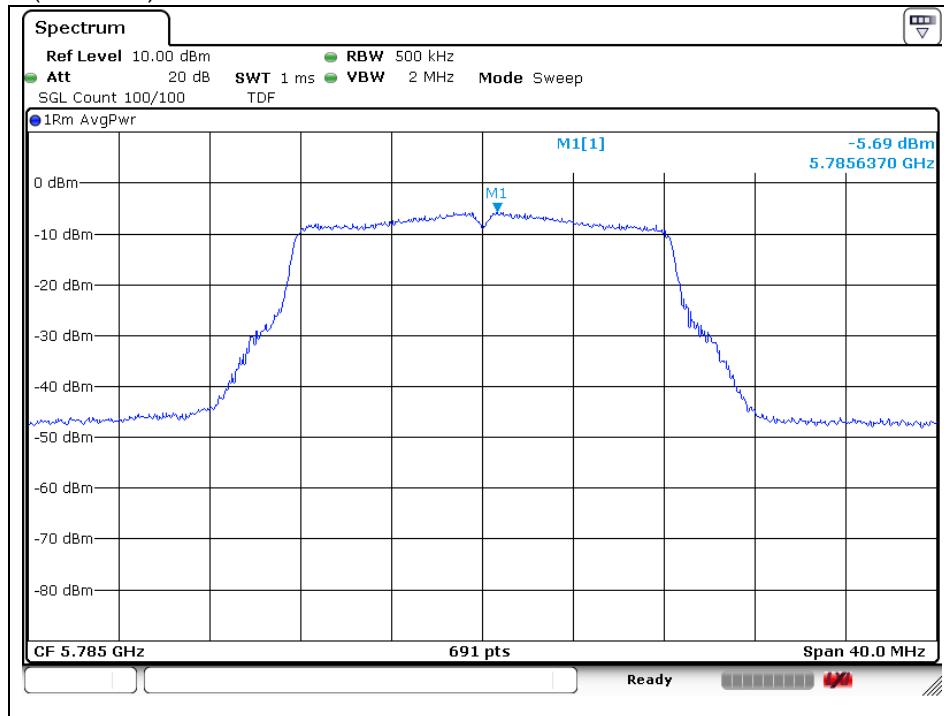
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

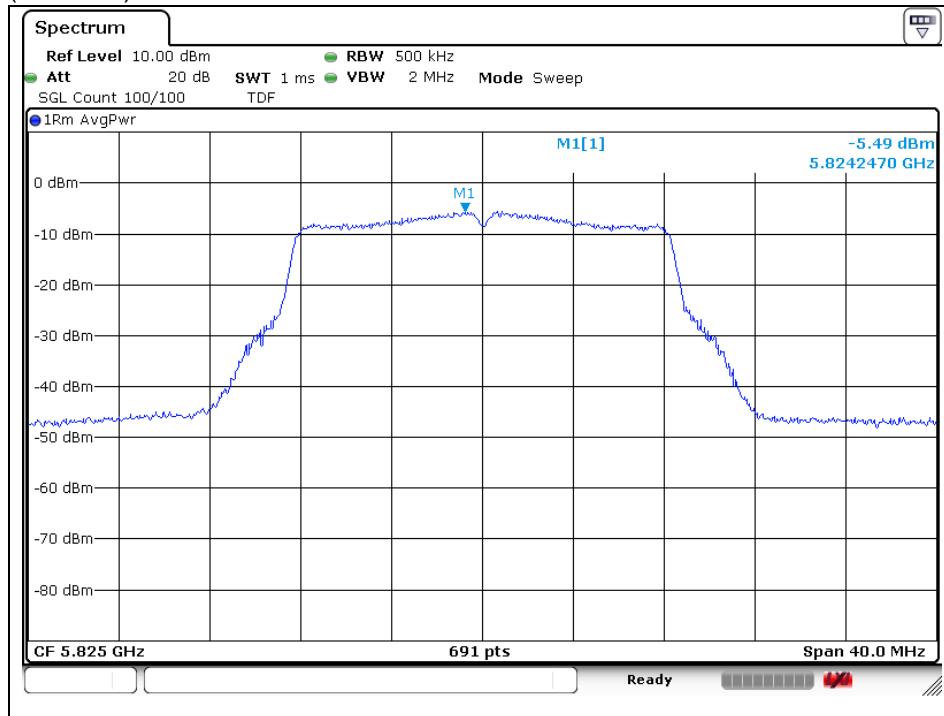
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A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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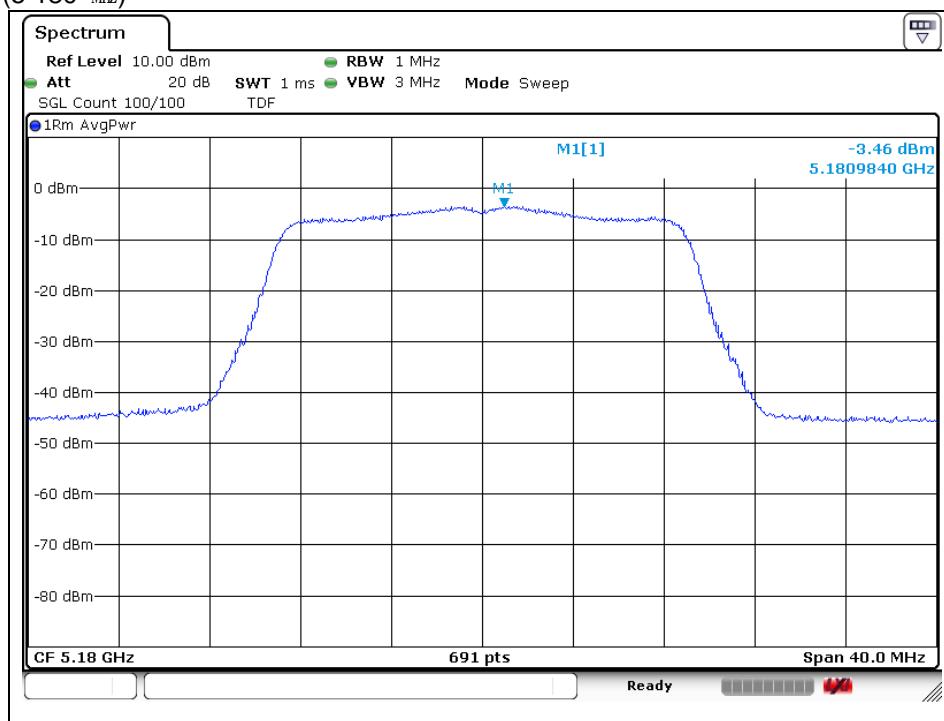
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

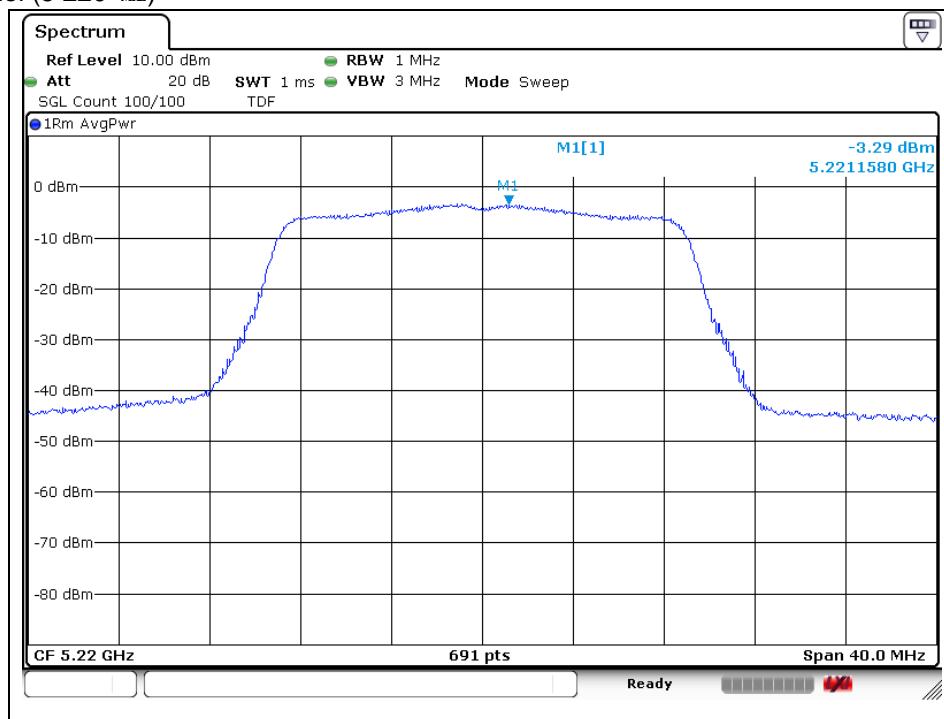
A4(210 mm x 297 mm)

802.11n_HT20 (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 220 MHz)



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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

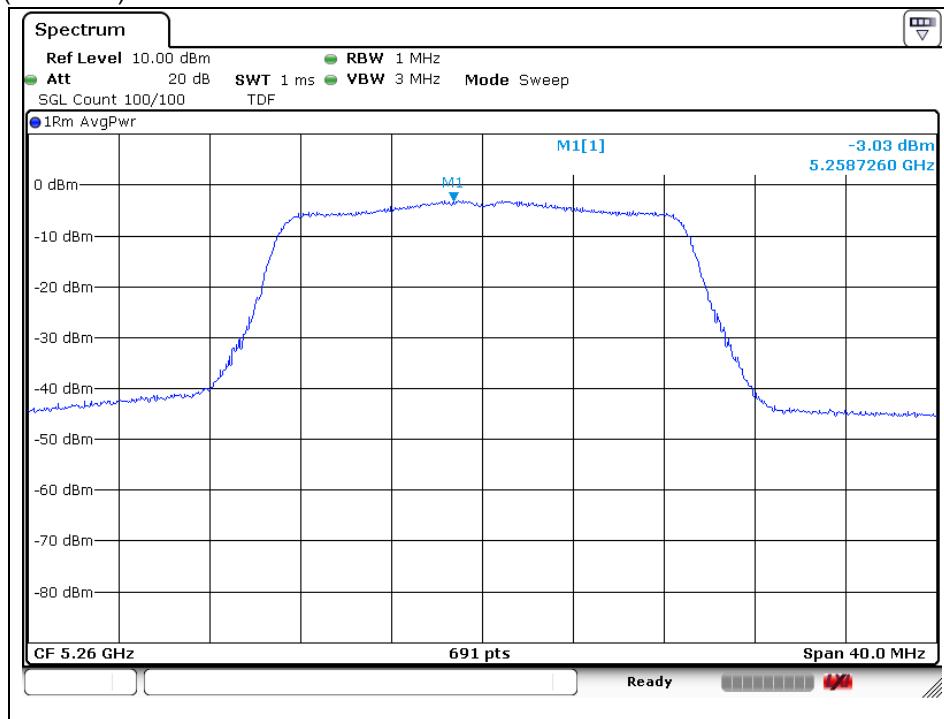
A4(210 mm x 297 mm)

High Channel (5.240 GHz)



802.11n_HT20 (Band 2A)

Low Channel (5.260 GHz)



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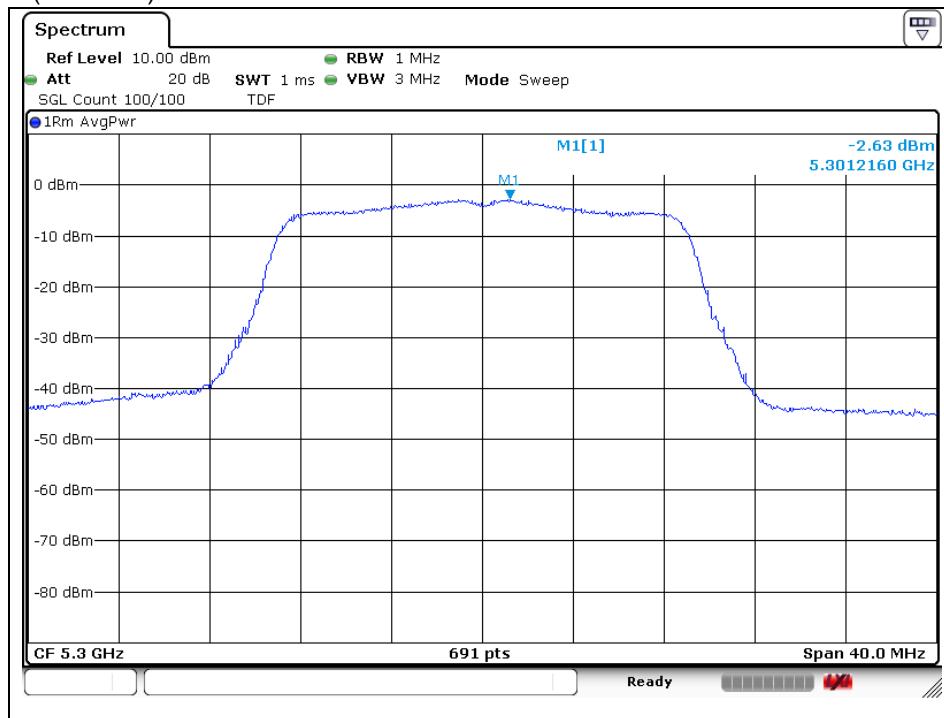
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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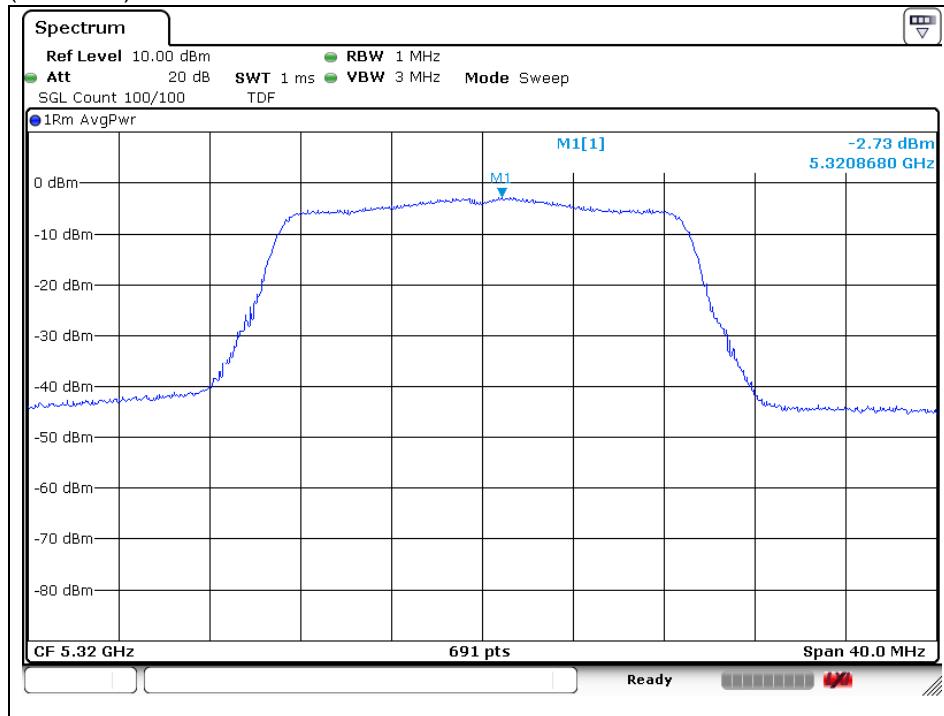
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A4(210 mm x 297 mm)

Middle Channel (5 300 MHz)



High Channel (5 320 MHz)



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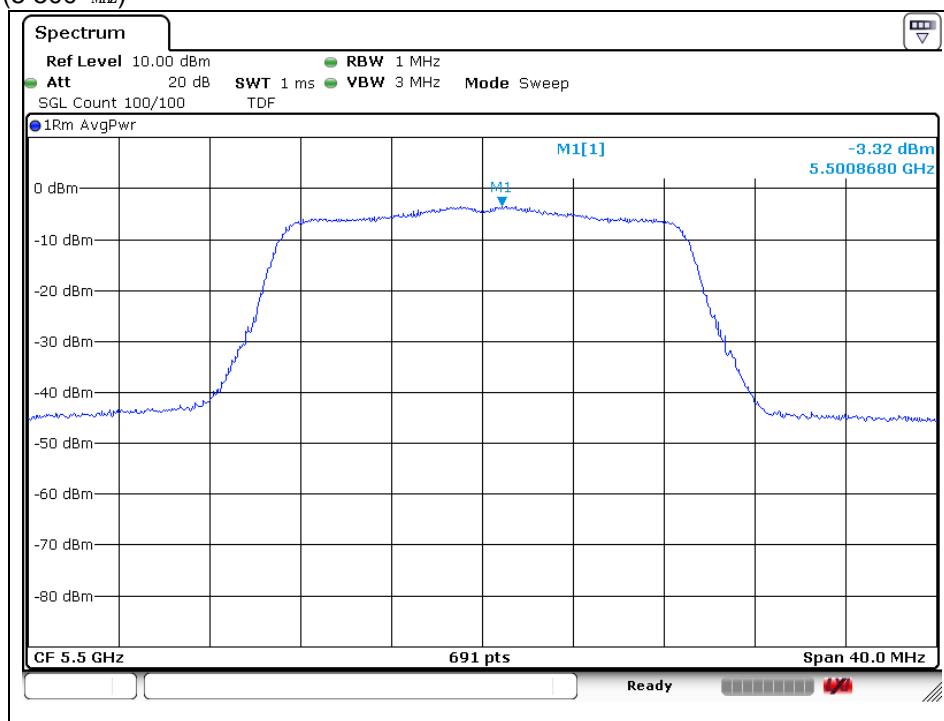
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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

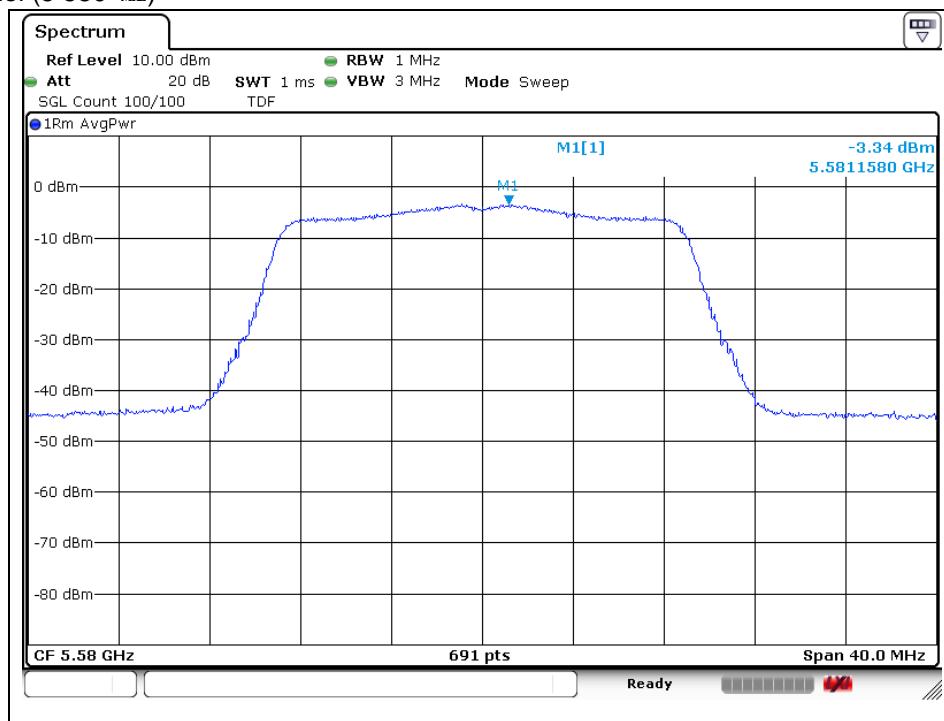
A4(210 mm x 297 mm)

802.11n_HT20 (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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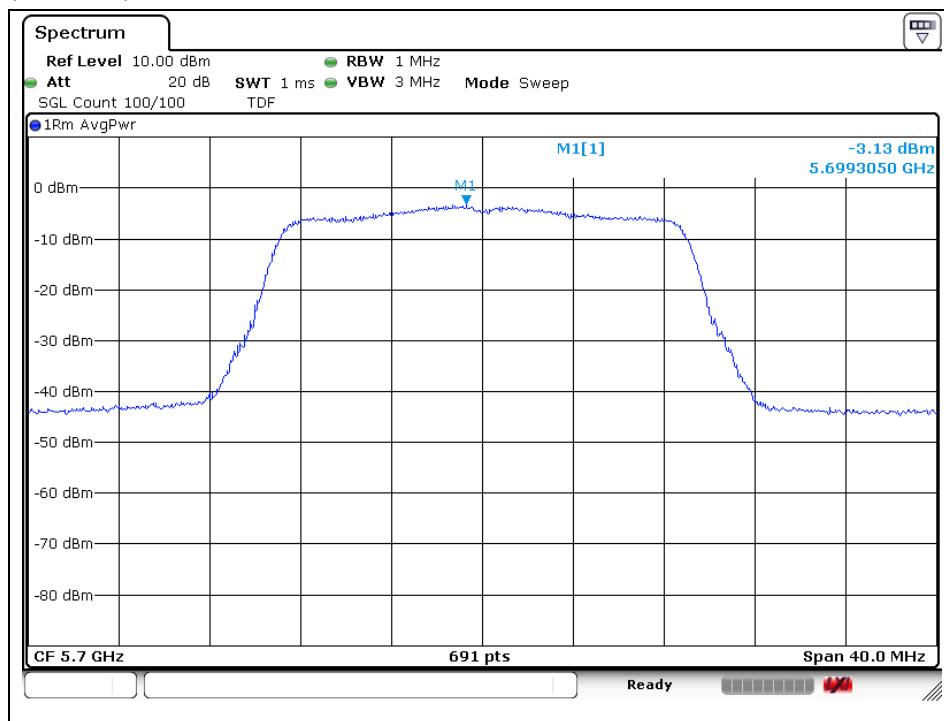
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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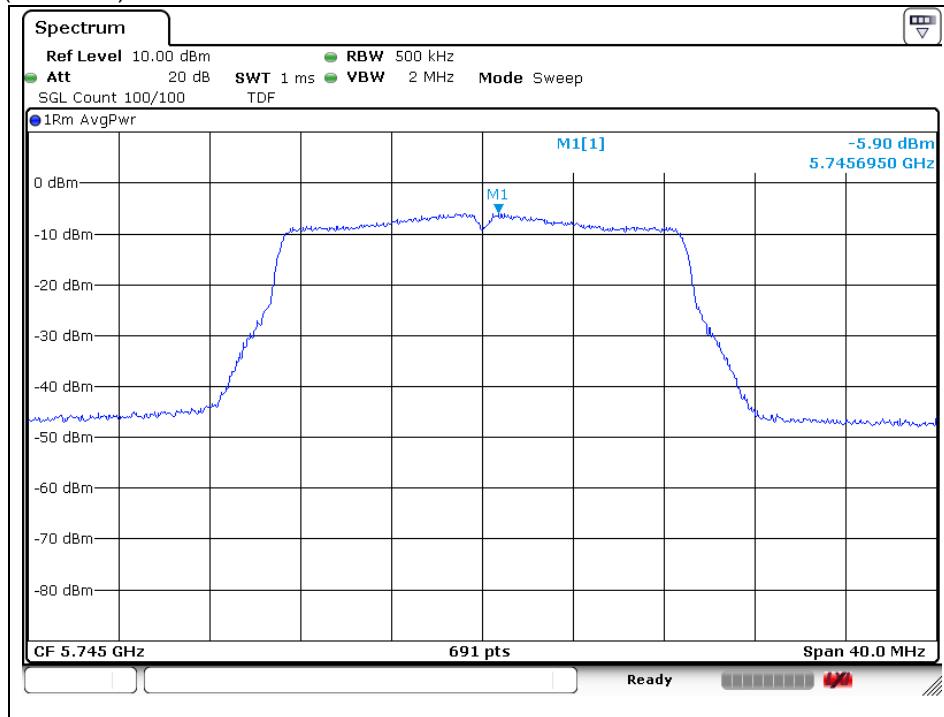
A4(210 mm x 297 mm)

High Channel (5 700 MHz)



802.11n_HT20 (Band 3)

Low Channel (5 745 MHz)



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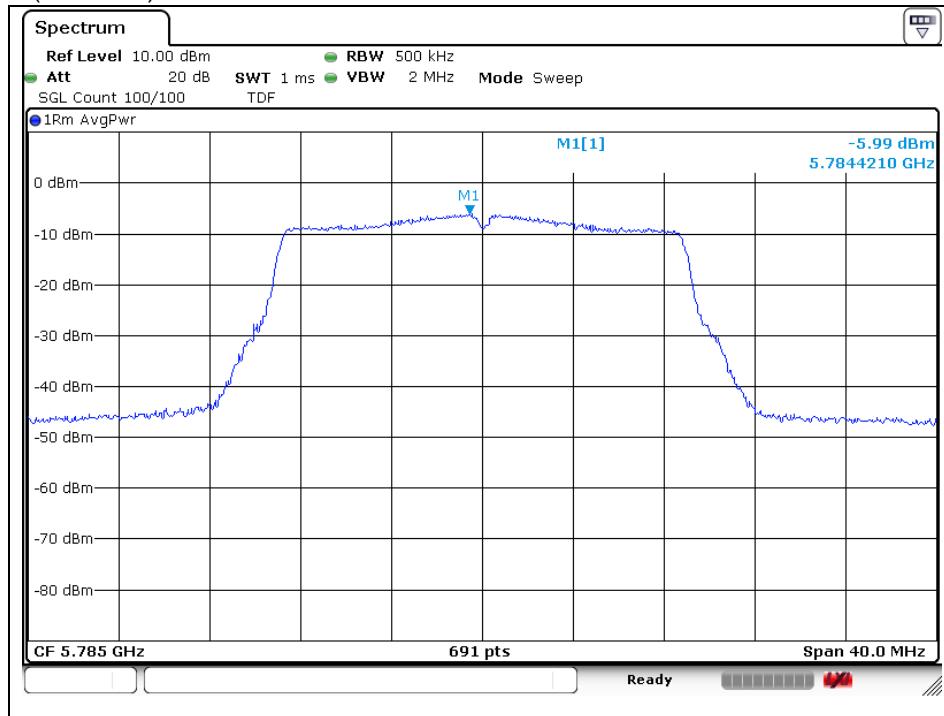
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

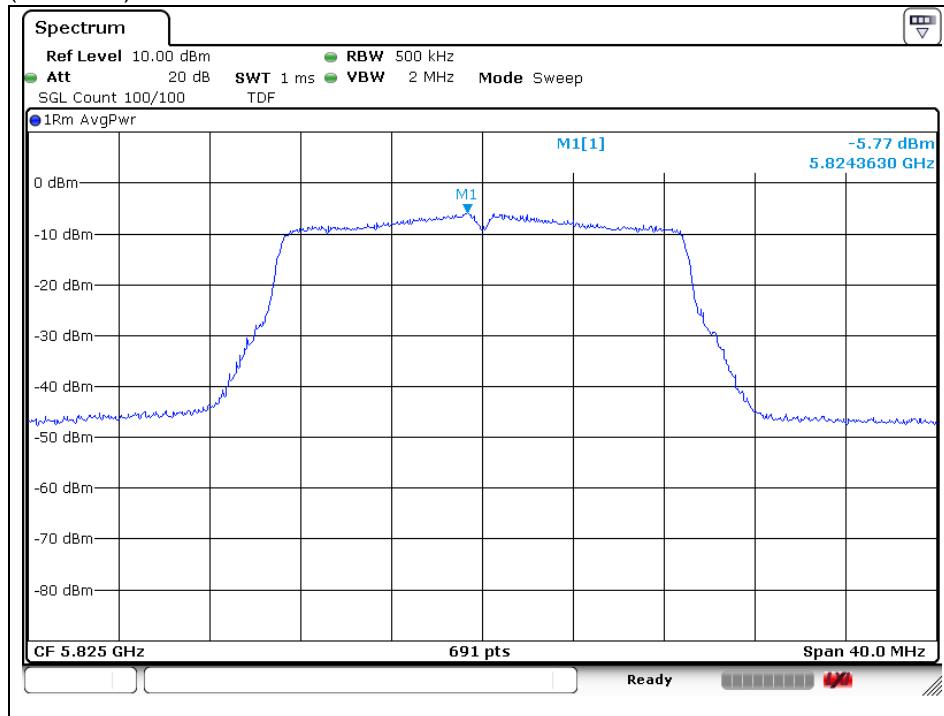
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A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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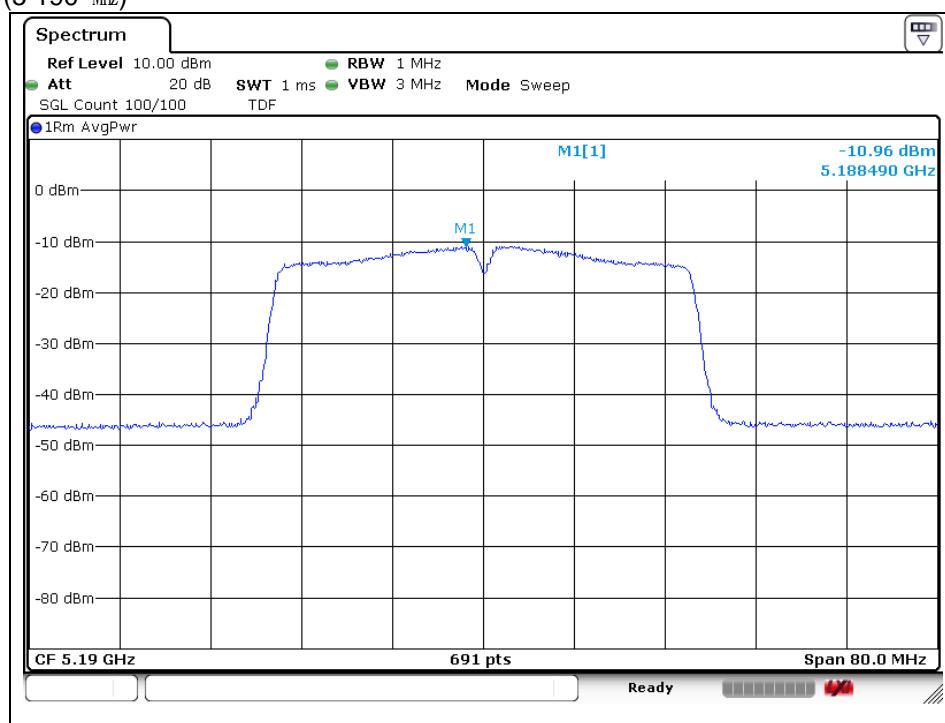
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

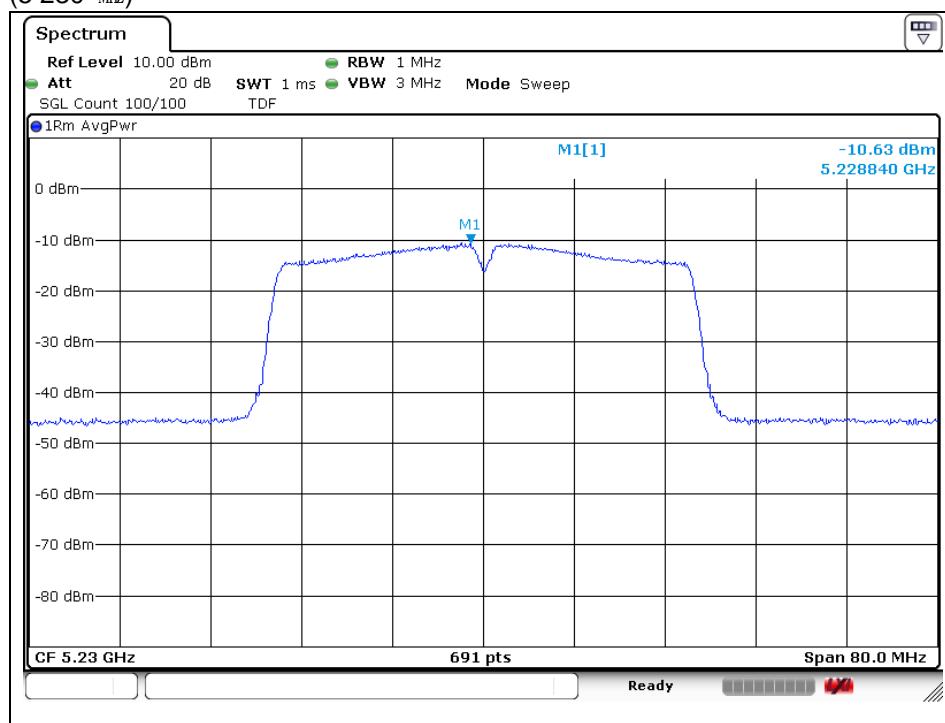
A4(210 mm x 297 mm)

802.11n_HT40 (Band 1)

Low Channel (5 190 MHz)



High Channel (5 230 MHz)



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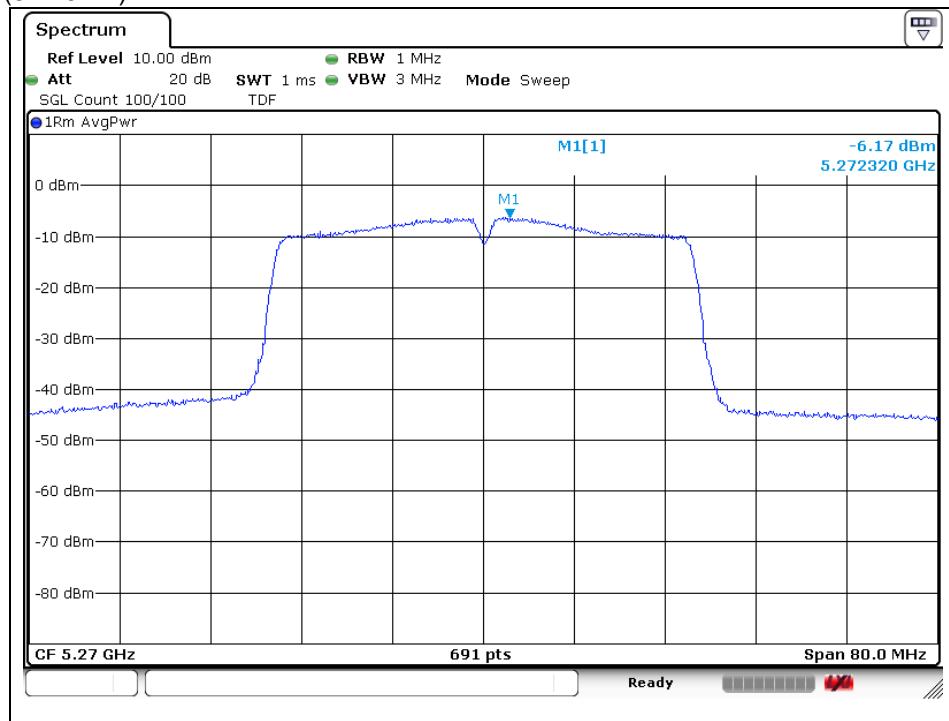
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

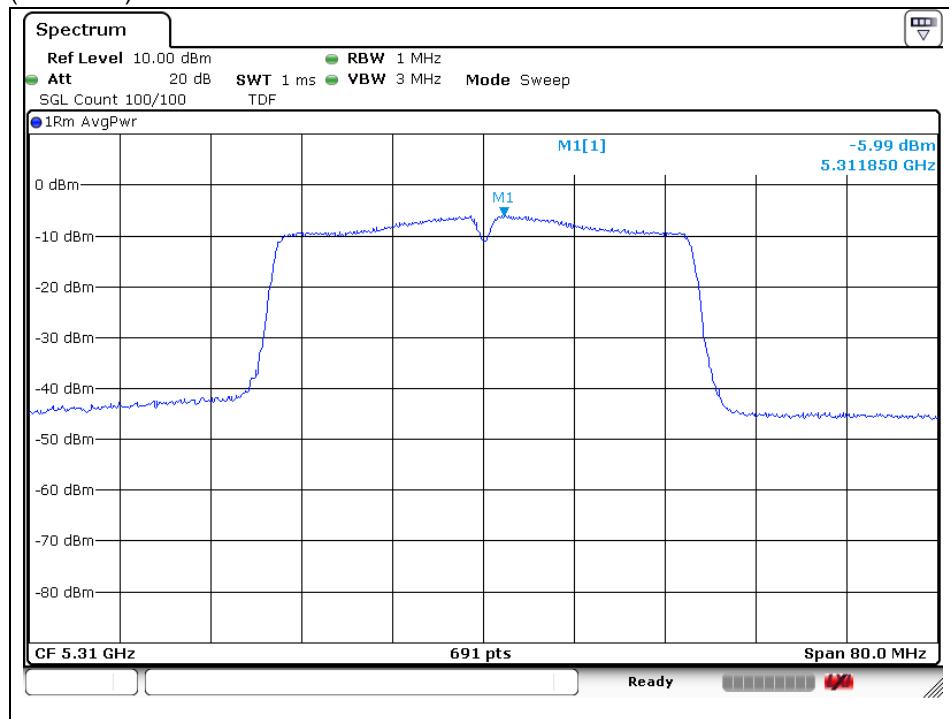
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2A)

Low Channel (5 270 MHz)



High Channel (5 310 MHz)



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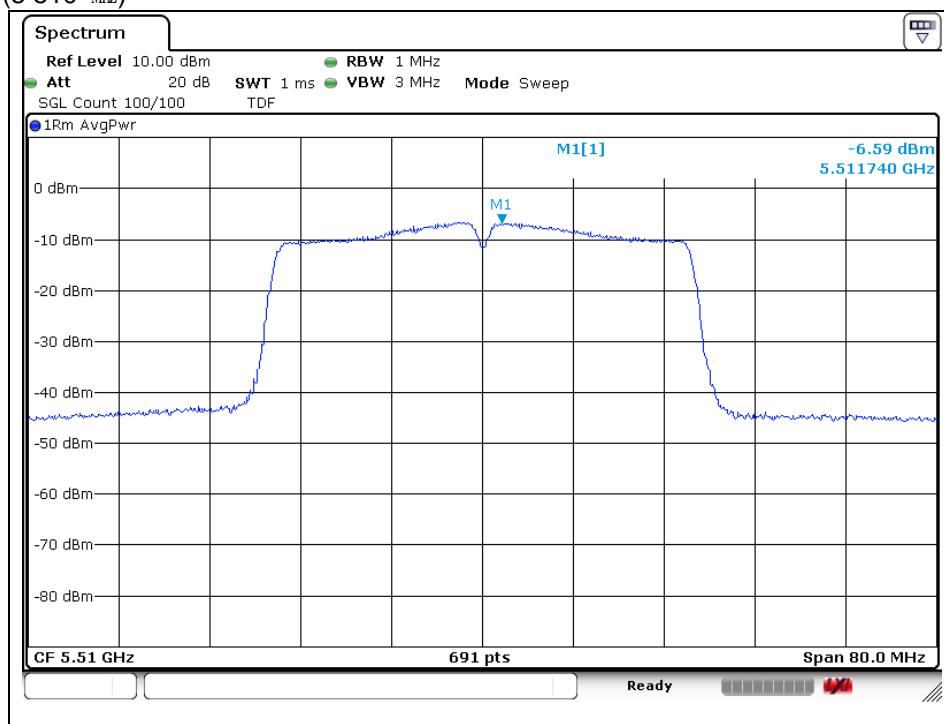
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

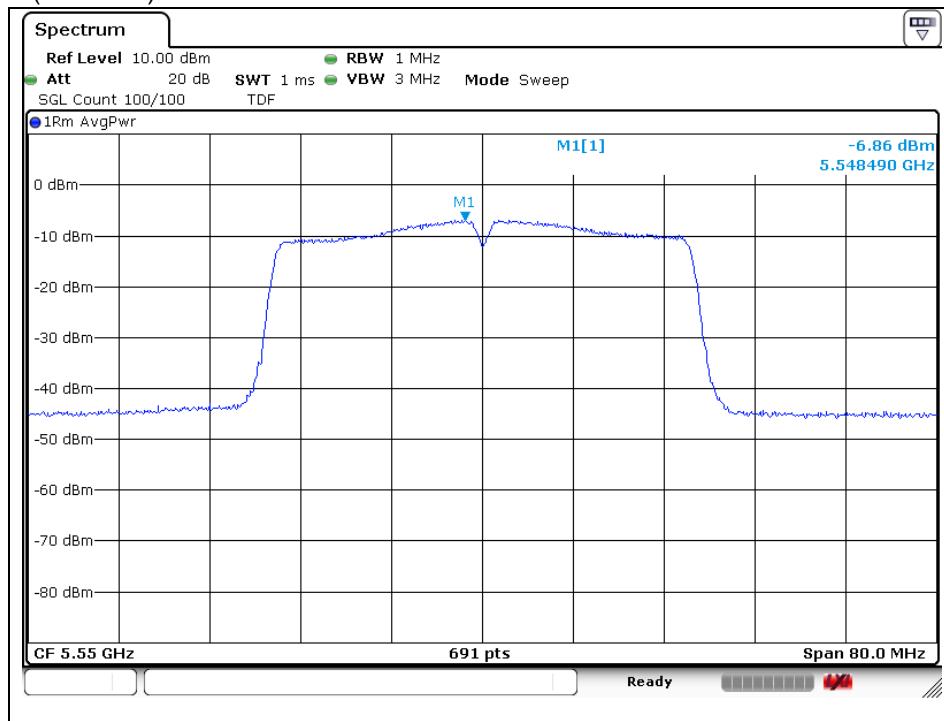
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2C)

Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)



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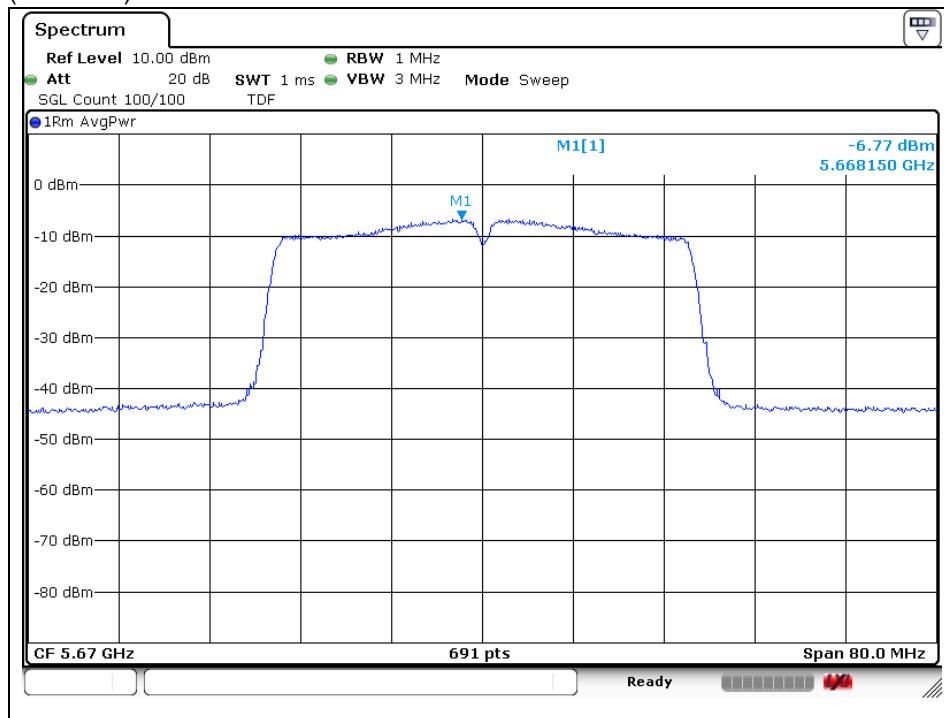
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

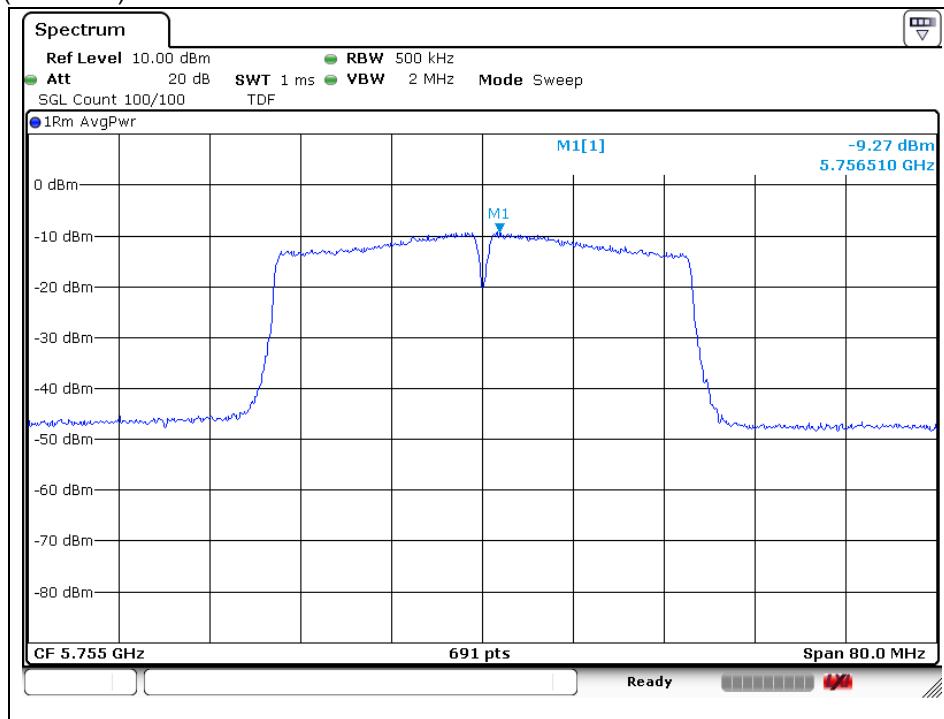
A4(210 mm x 297 mm)

High Channel (5 670 MHz)



802.11n_HT40 (Band 3)

Low Channel (5 755 MHz)



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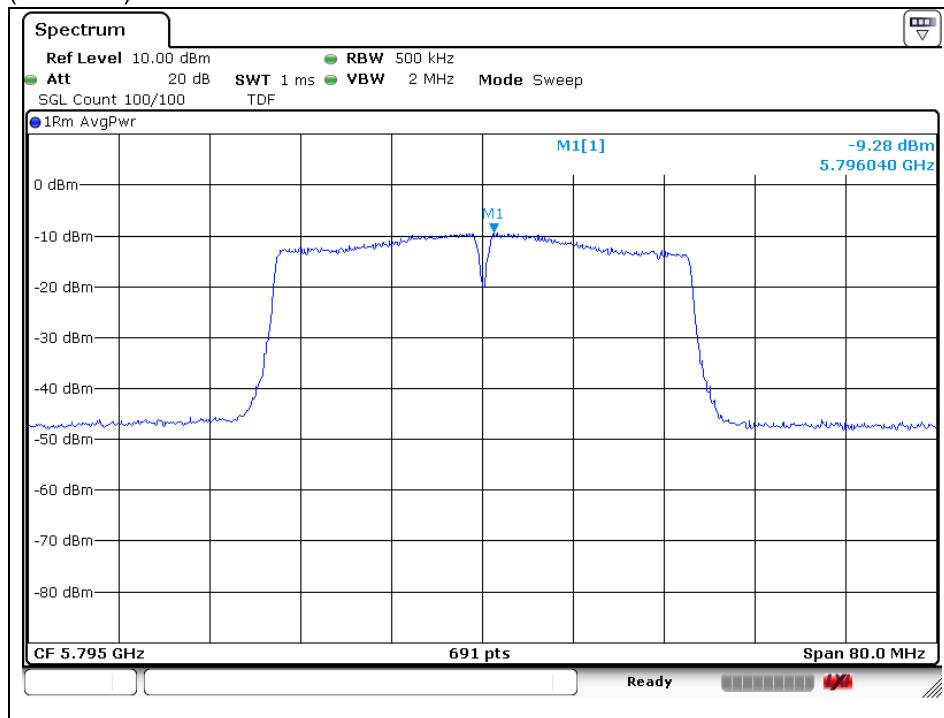
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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

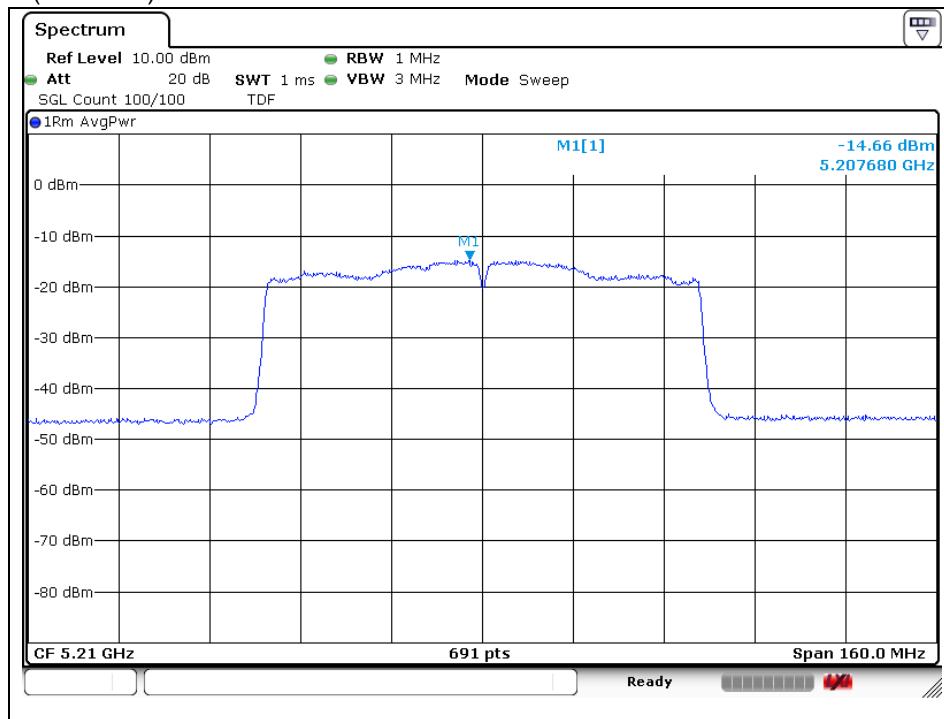
A4(210 mm x 297 mm)

High Channel (5 795 MHz)



802.11ac_VHT80 (Band 1)

Middle Channel (5 210 MHz)



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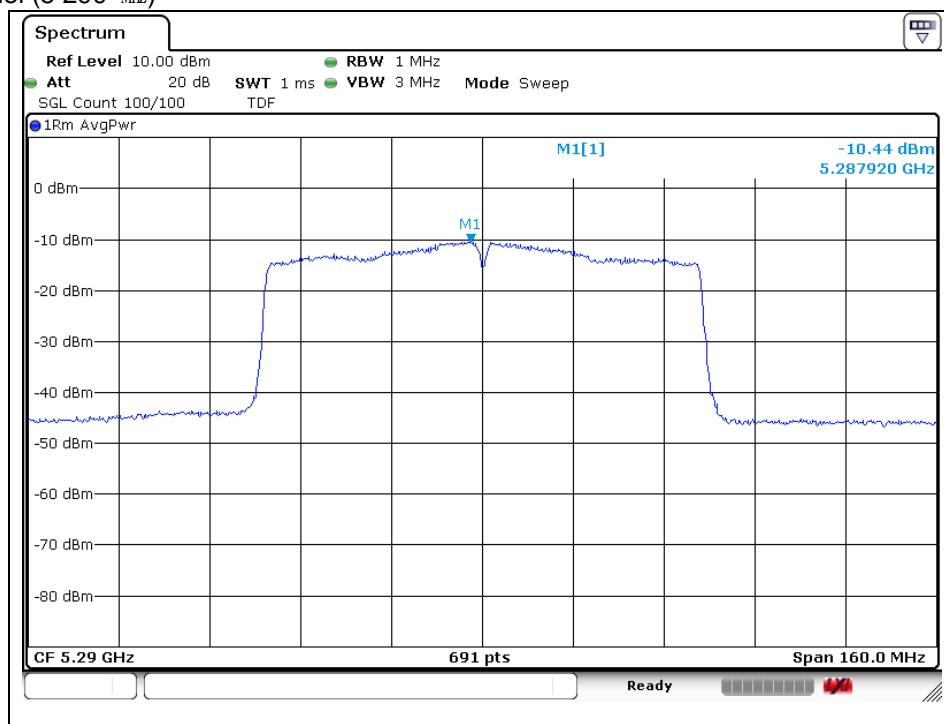
RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

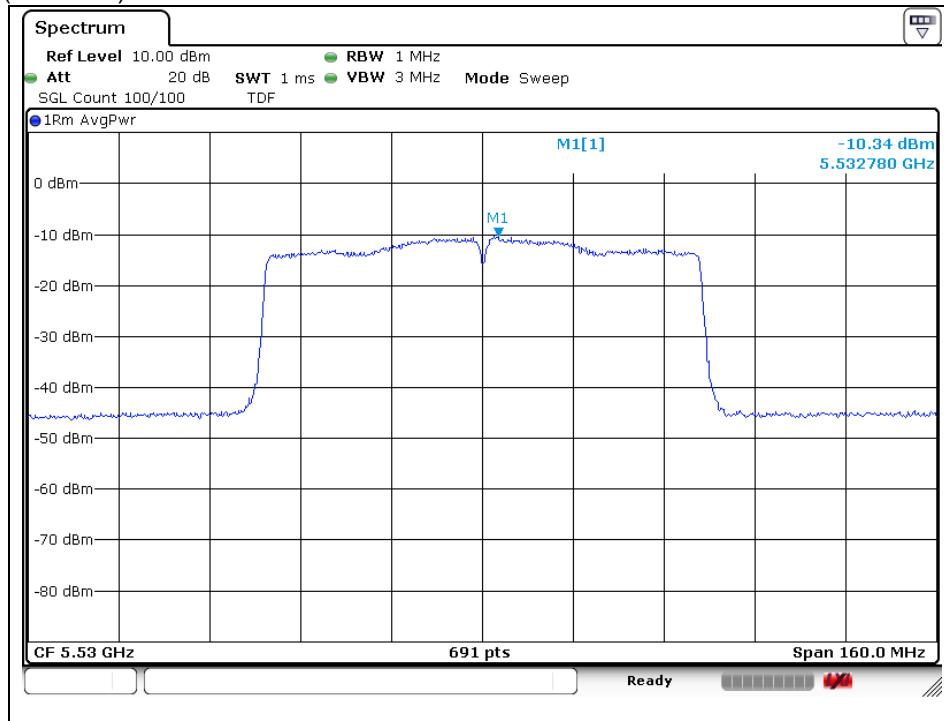
A4(210 mm x 297 mm)

802.11ac_VHT80 (Band 2A)

Middle Channel (5 290 MHz)

**802.11ac_VHT80 (Band 2C)**

Low Channel (5 530 MHz)



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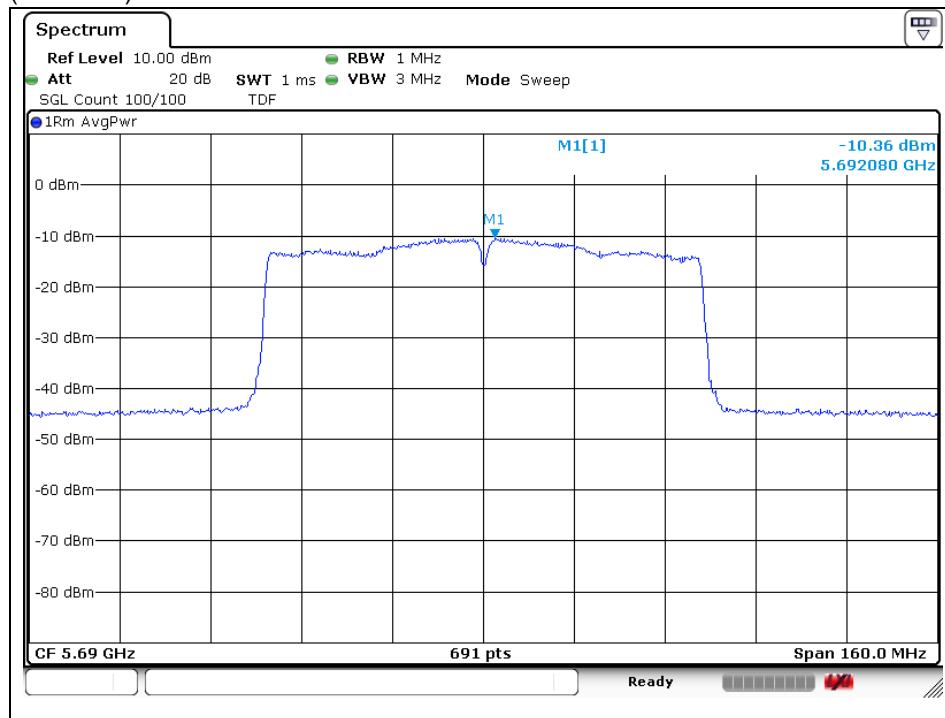
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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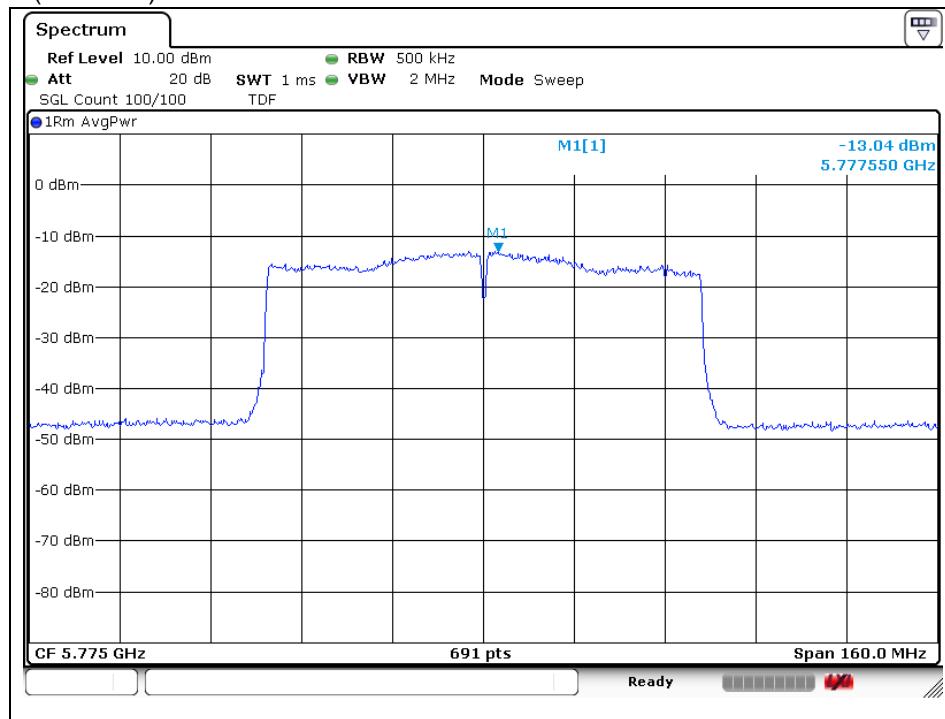
A4(210 mm x 297 mm)

High Channel (5 690 MHz)



802.11ac_VHT80 (Band 3)

Middle Channel (5 775 MHz)



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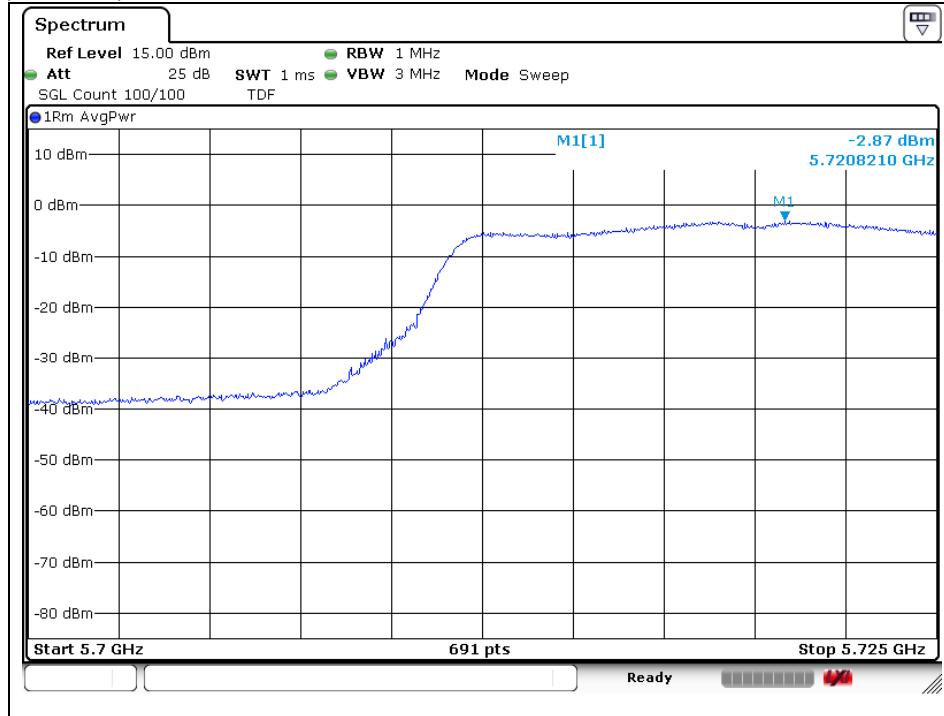
RTT5041-19(2017.07.10)(0)

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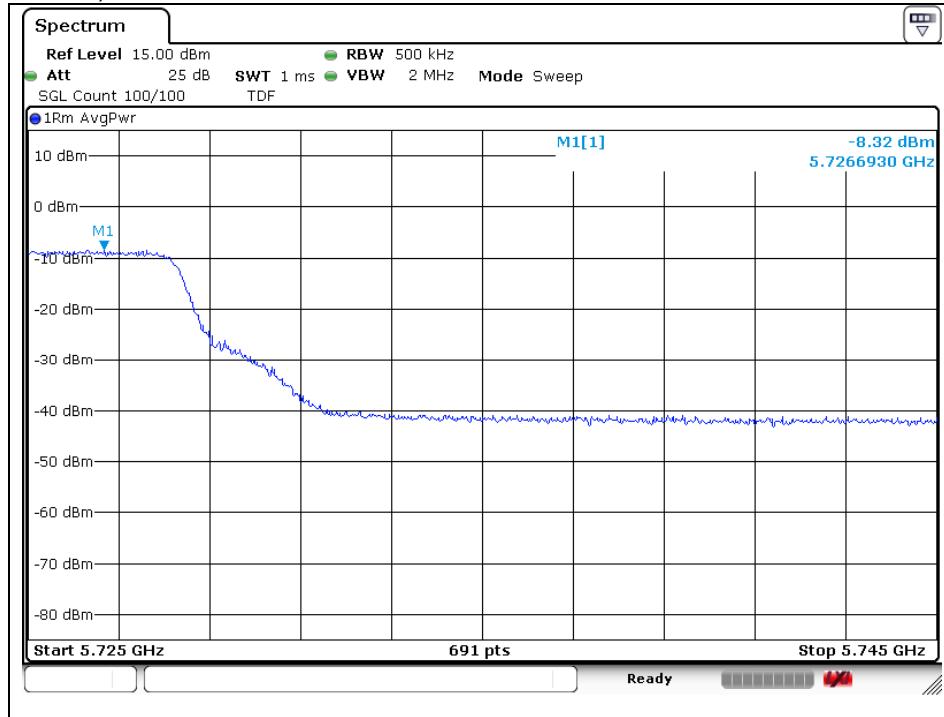
A4(210 mm x 297 mm)

Band-crossing channels

U-NII 2C 11a (5.720 MHz)



U-NII 3 11a (5.720 MHz)



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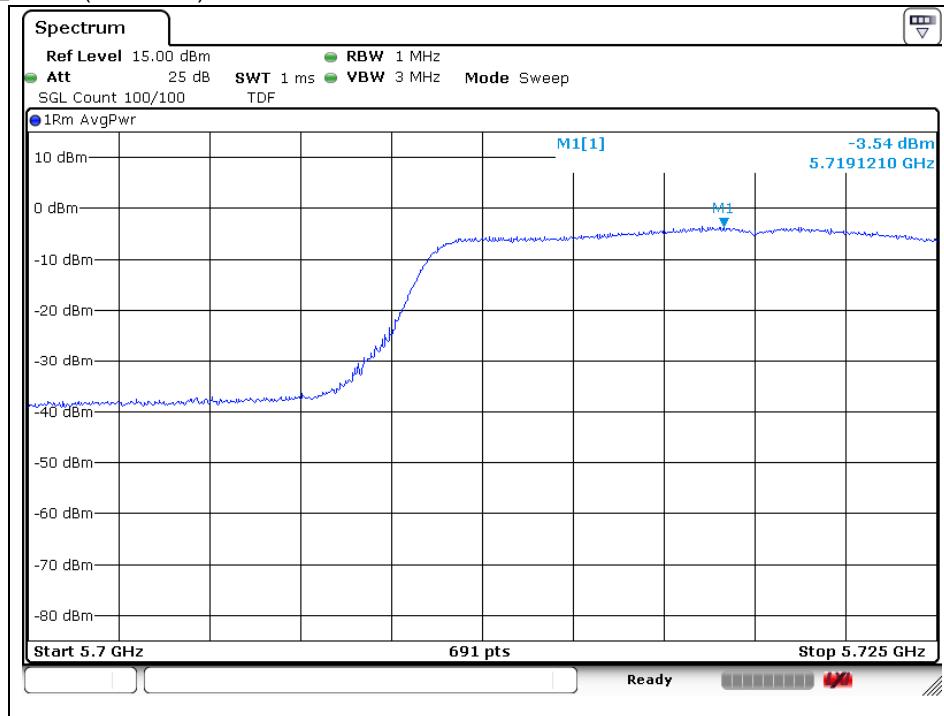
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

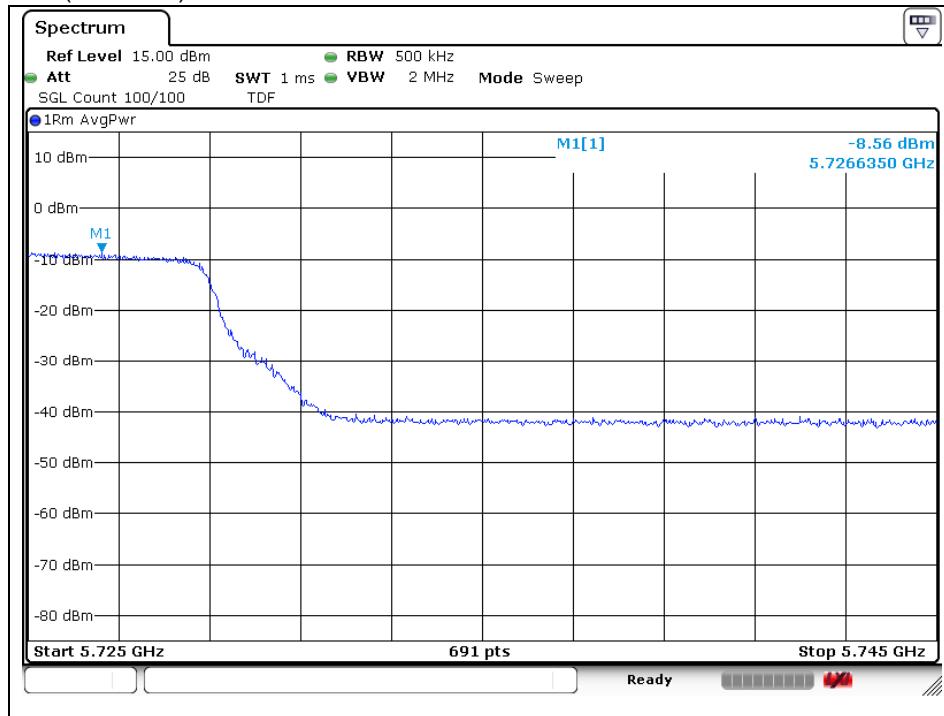
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A4(210 mm x 297 mm)

U-NII 2C 11n_HT20 (5 720 MHz)



U-NII 3 11n_HT20 (5 720 MHz)



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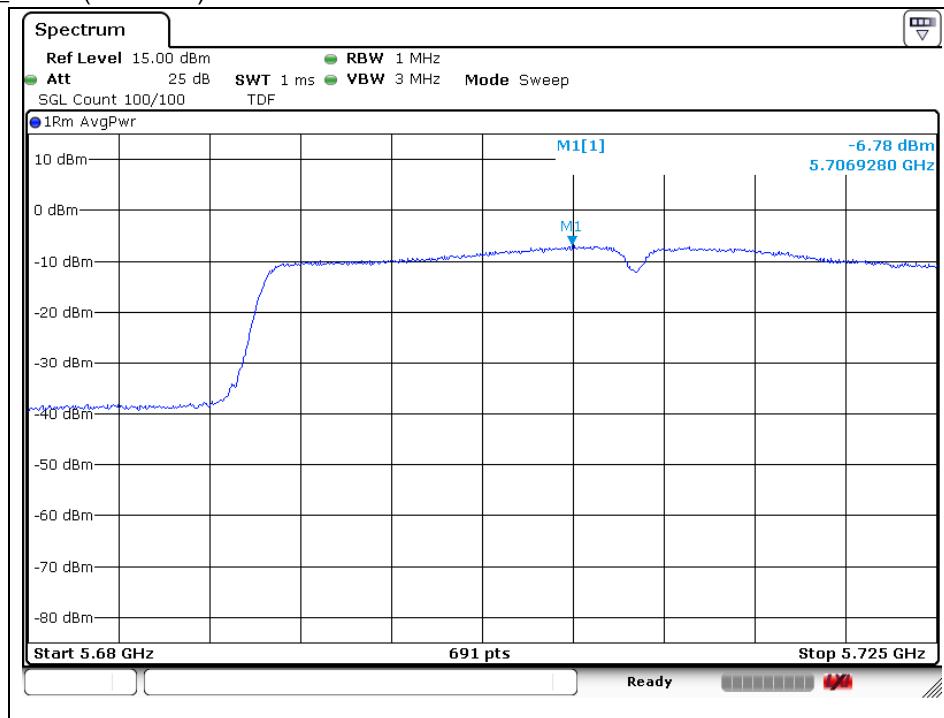
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

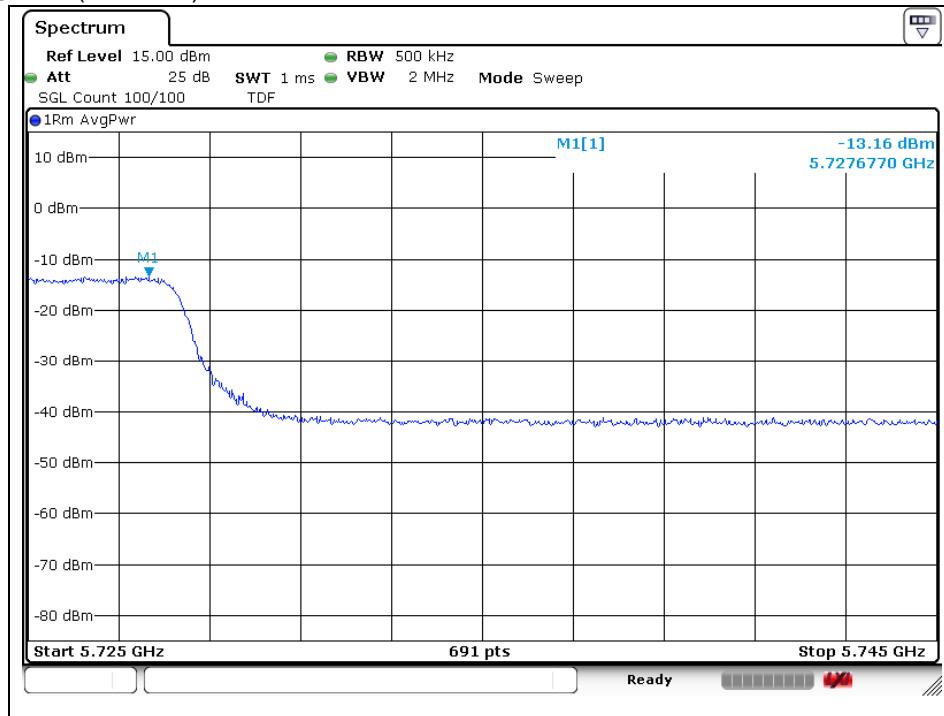
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A4(210 mm x 297 mm)

U-NII 2C 11n_HT40 (5.710 MHz)



U-NII 3 11n_HT40 (5.710 MHz)



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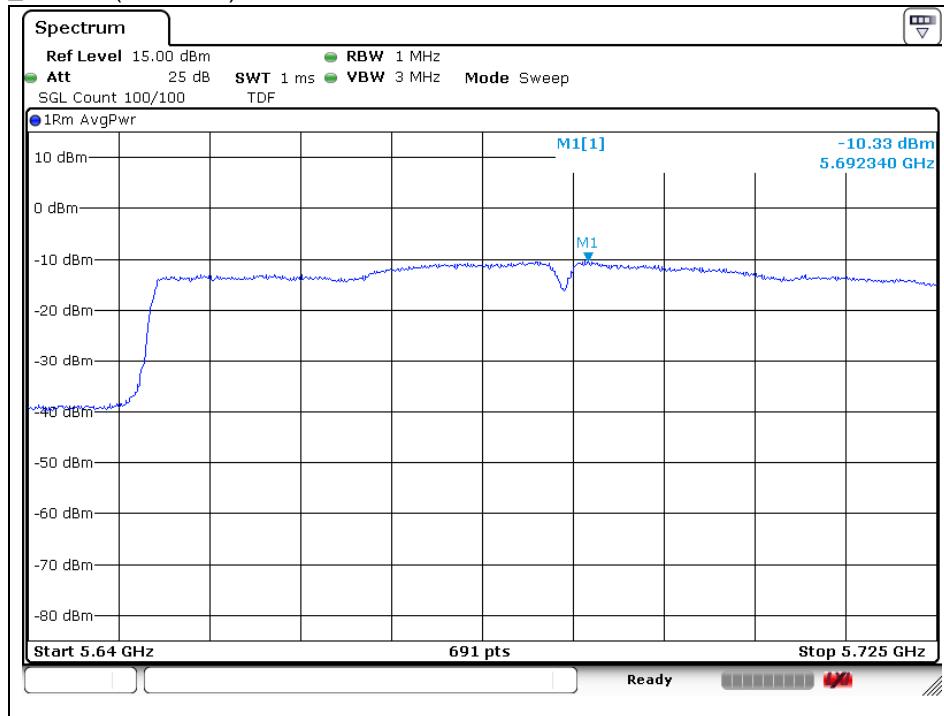
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

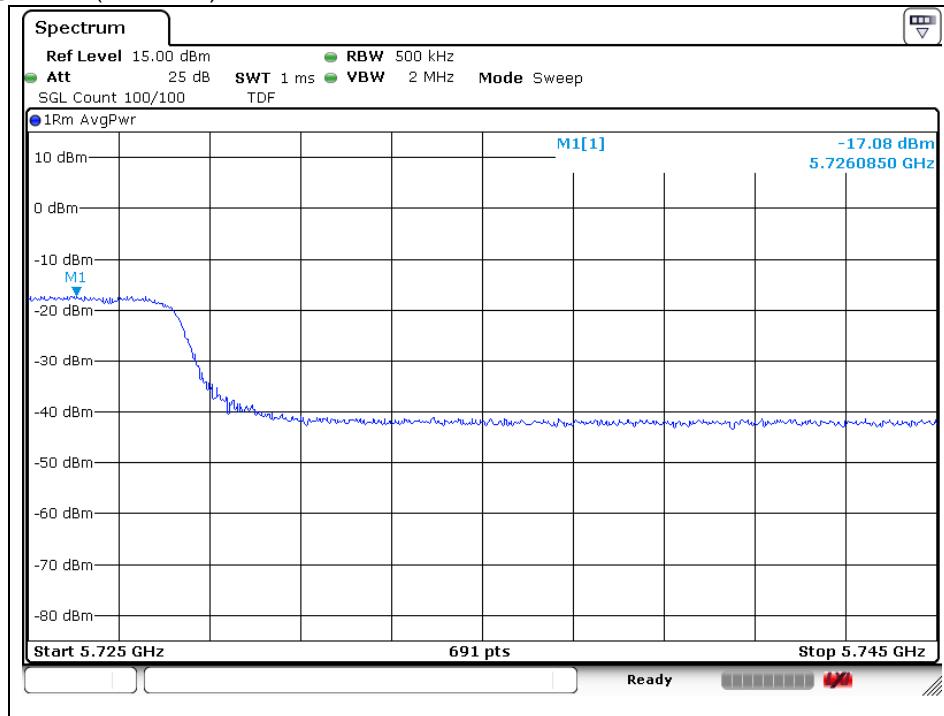
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

U-NII 2C 11ac VHT80 (5.690 MHz)



U-NII 3 11ac_VHT80 (5.690 MHz)



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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

7. Antenna Requirement

7.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section §15.407 (a) if transmitting antennas of directional gain greater than 6 dB i are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dB i.

7.2. Antenna Connected Construction

Antenna used in this product is PCB pattern antenna and peak max gain of antenna as below.

Band	5 150 MHz ~ 5 250 MHz	5 250 MHz ~ 5 350 MHz	5 470 MHz ~ 5 725 MHz	5 725 MHz ~ 5 850 MHz
Mode	11a/n_HT20, HT40, 11ac_VHT20, VHT40, VHT80			
Gain	3.51 dB i	3.12 dB i	2.28 dB i	-0.84 dB i

- End of the Test Report -

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A4(210 mm x 297 mm)