

### 3. 99 % Bandwidth & 26 dB 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. 99 % Bandwidth

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3 x RBW. Detector = sampling, Trace mode = max hold.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency).

This frequency is then recorded.

##### 3.3.2. 26 dB Bandwidth

1. This measurement settings are specified in section C.1 of KDB 789033\_D02 v01r03.
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 %.

#### Remark;

In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545\_D03 v01.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

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) | 99 % Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|------|----------|-----------------|-----|------------------|----------------------|-----------------------|
| 11a  | U-NII 1  | 5 180           | 36  | 6                | 17.771               | 21.360                |
|      |          | 5 200           | 40  | 6                | 17.829               | 20.927                |
|      |          | 5 240           | 48  | 6                | 17.887               | 21.013                |
|      | U-NII 2A | 5 260           | 52  | 6                | 18.119               | 21.157                |
|      |          | 5 280           | 56  | 6                | 18.003               | 21.302                |
|      |          | 5 320           | 64  | 6                | 17.887               | 21.129                |
|      | U-NII 2C | 5 500           | 100 | 6                | 17.829               | 21.418                |
|      |          | 5 580           | 116 | 6                | 17.887               | 21.129                |
|      |          | 5 700           | 140 | 6                | 17.887               | 21.129                |
|      | U-NII 3  | 5 745           | 149 | 6                | 18.003               | 21.302                |
|      |          | 5 785           | 157 | 6                | 17.945               | 21.245                |
|      |          | 5 825           | 165 | 6                | 18.003               | 21.418                |

| Mode     | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | 99 % Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|----------|----------|-----------------|-----|------------------|----------------------|-----------------------|
| 11n_HT20 | U-NII 1  | 5 180           | 36  | MCS0             | 18.871               | 21.302                |
|          |          | 5 200           | 40  | MCS0             | 18.640               | 21.534                |
|          |          | 5 240           | 48  | MCS0             | 18.698               | 21.360                |
|          | U-NII 2A | 5 260           | 52  | MCS0             | 18.813               | 21.447                |
|          |          | 5 280           | 56  | MCS0             | 18.698               | 21.534                |
|          |          | 5 320           | 64  | MCS0             | 18.698               | 21.592                |
|          | U-NII 2C | 5 500           | 100 | MCS0             | 18.755               | 21.708                |
|          |          | 5 580           | 116 | MCS0             | 18.929               | 21.592                |
|          |          | 5 700           | 140 | MCS0             | 18.755               | 21.476                |
|          | U-NII 3  | 5 745           | 149 | MCS0             | 18.813               | 21.592                |
|          |          | 5 785           | 157 | MCS0             | 18.755               | 21.650                |
|          |          | 5 825           | 165 | MCS0             | 18.755               | 21.592                |

| Mode     | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | 99 % Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|----------|----------|-----------------|-----|------------------|----------------------|-----------------------|
| 11n_HT40 | U-NII 1  | 5 190           | 38  | MCS0             | 36.585               | 40.900                |
|          |          | 5 230           | 46  | MCS0             | 36.353               | 39.940                |
|          | U-NII 2A | 5 270           | 54  | MCS0             | 36.353               | 42.030                |
|          |          | 5 310           | 62  | MCS0             | 36.237               | 40.170                |
|          | U-NII 2C | 5 510           | 102 | MCS0             | 36.353               | 40.640                |
|          |          | 5 550           | 110 | MCS0             | 36.353               | 44.050                |
|          |          | 5 670           | 134 | MCS0             | 36.353               | 40.520                |
|          | U-NII 3  | 5 755           | 151 | MCS0             | 36.469               | 40.750                |
|          |          | 5 795           | 159 | MCS0             | 36.469               | 40.460                |

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

| Mode       | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | 99 % Bandwidth (MHz) | 26 dB Bandwidth (MHz) |
|------------|----------|-----------------|-----|------------------|----------------------|-----------------------|
| 11ac_VHT80 | U-NII 1  | 5 210           | 42  | MCS0             | 75.253               | 81.510                |
|            | U-NII 2A | 5 290           | 58  | MCS0             | 75.253               | 82.430                |
|            | U-NII 2C | 5 530           | 106 | MCS0             | 75.485               | 81.740                |
|            |          | 5 690           | 138 | MCS0             | 75.485               | 82.210                |
|            | U-NII 3  | 5 775           | 155 | MCS0             | 75.485               | 82.400                |

| Band                                   | Mode       | Frequency (MHz) | Ch. | Data Rate (Mbps) | 26 dB Bandwidth (MHz) |
|----------------------------------------|------------|-----------------|-----|------------------|-----------------------|
| U-NII 2C<br>(Band-crossing<br>channel) | 11a        | 5 720           | 144 | 6                | 15.651                |
|                                        | 11n_HT20   | 5 720           | 144 | MCS0             | 15.709                |
|                                        | 11n_HT40   | 5 710           | 142 | MCS0             | 35.260                |
|                                        | 11ac_VHT80 | 5 690           | 138 | MCS0             | 75.980                |

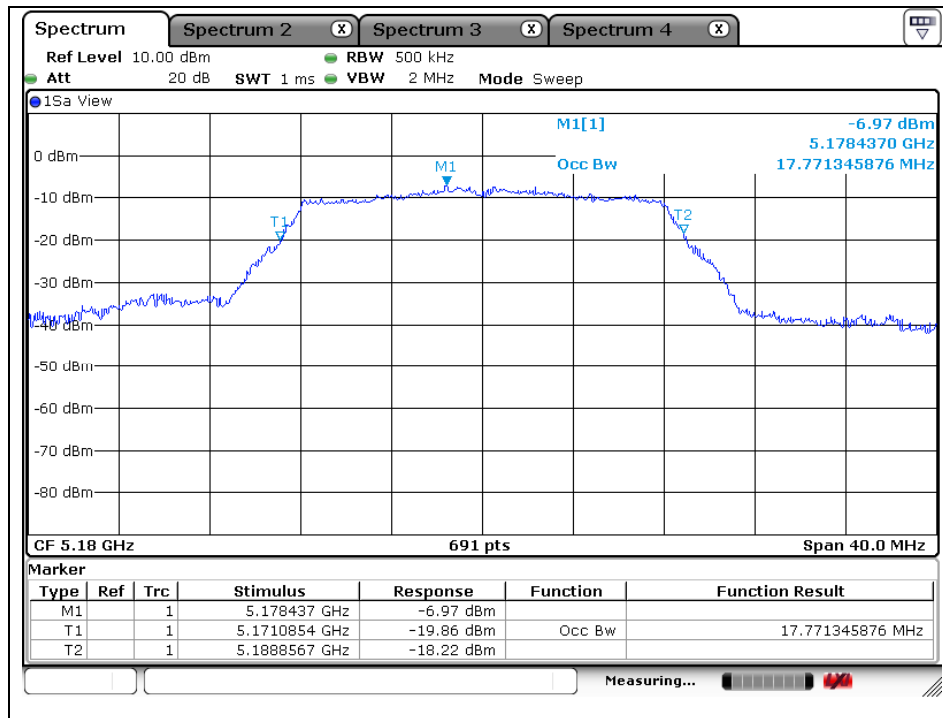
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

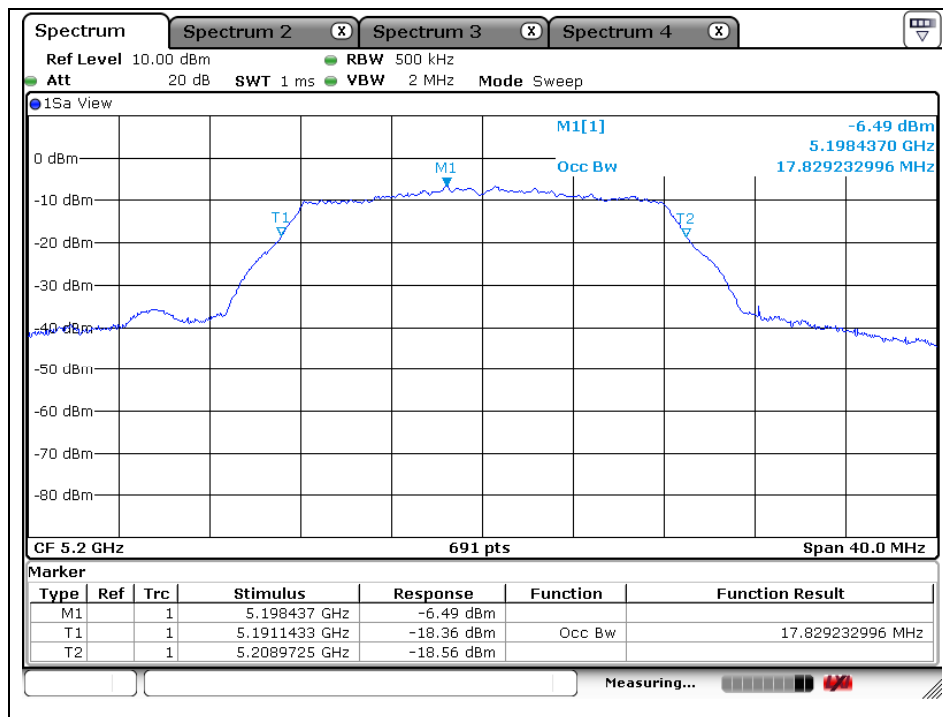
## 99 % Bandwidth

### 802.11a (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 200 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

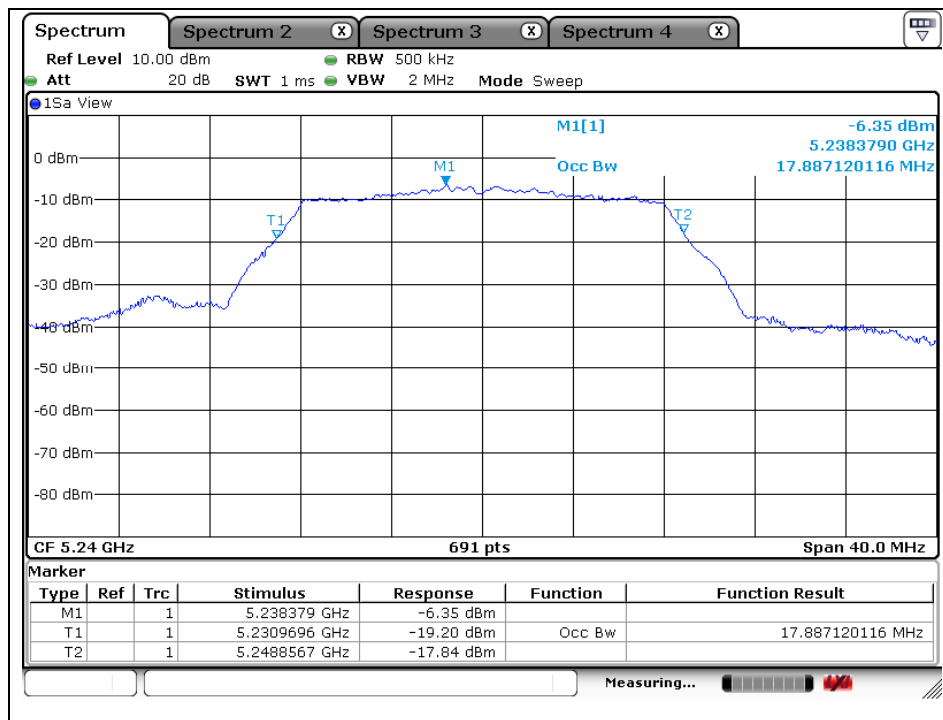
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

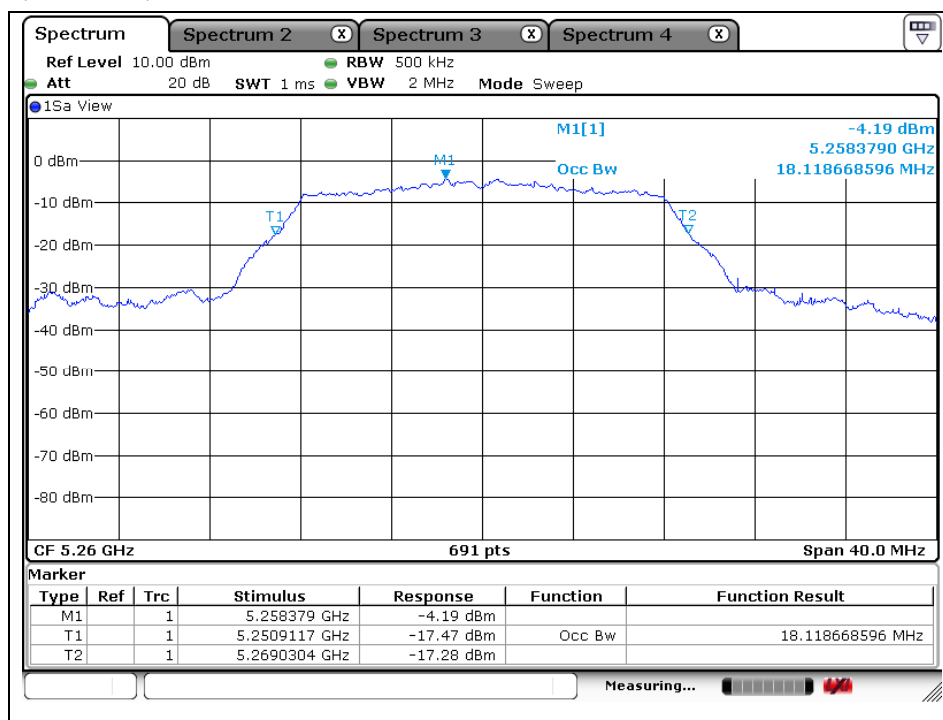
A4(210 mm x 297 mm)

## High Channel (5 240 MHz)



## 802.11a (Band 2A)

### Low Channel (5 260 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

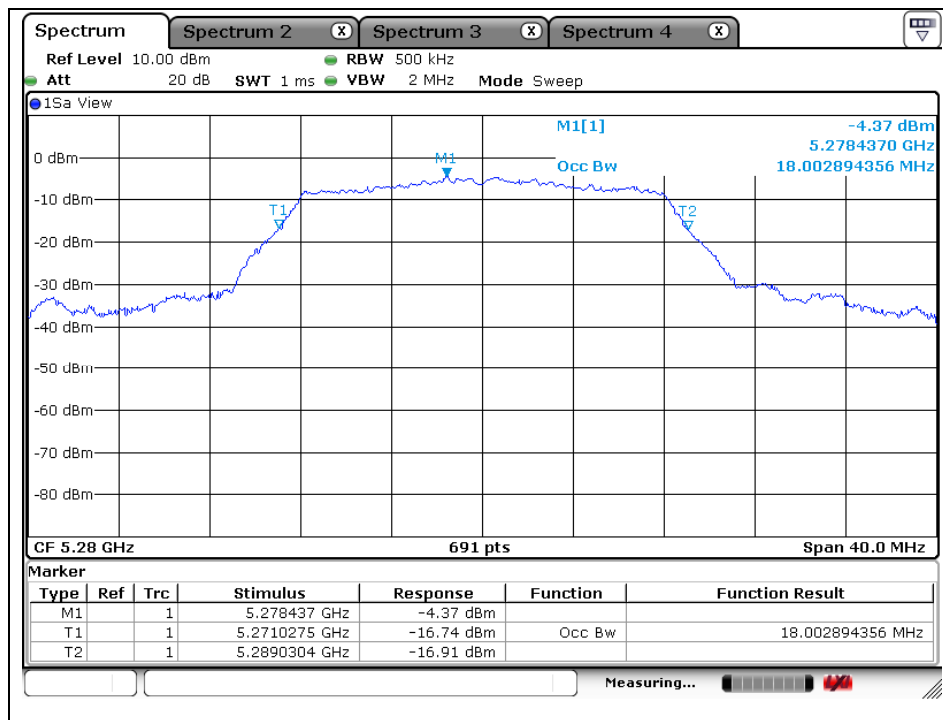
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

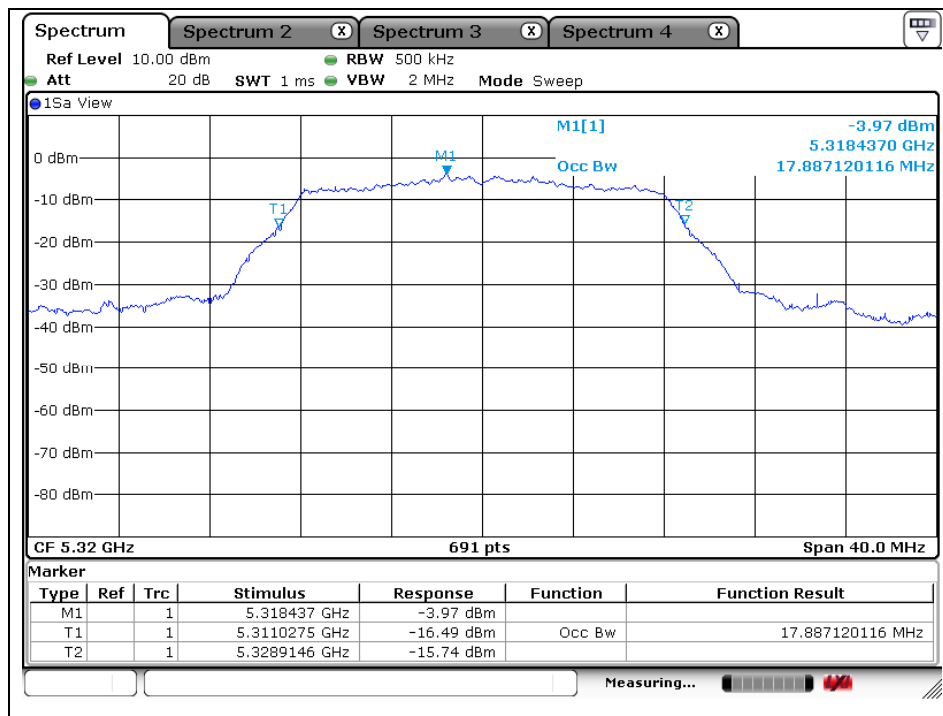
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 280 MHz)



## High Channel (5 320 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

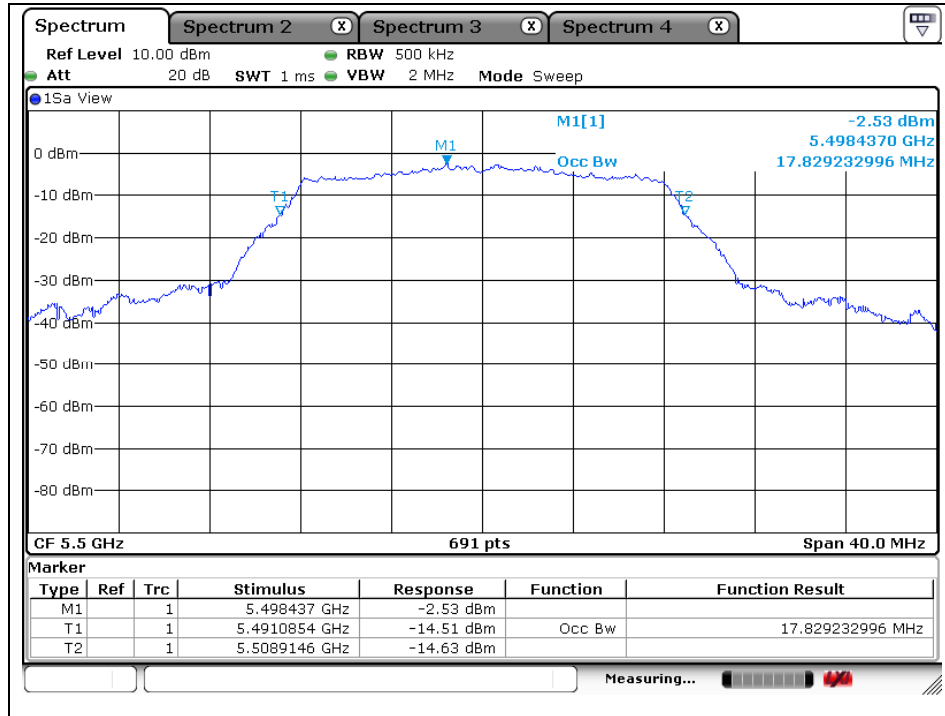
RTT5041-20(2015.10.01)(3)

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

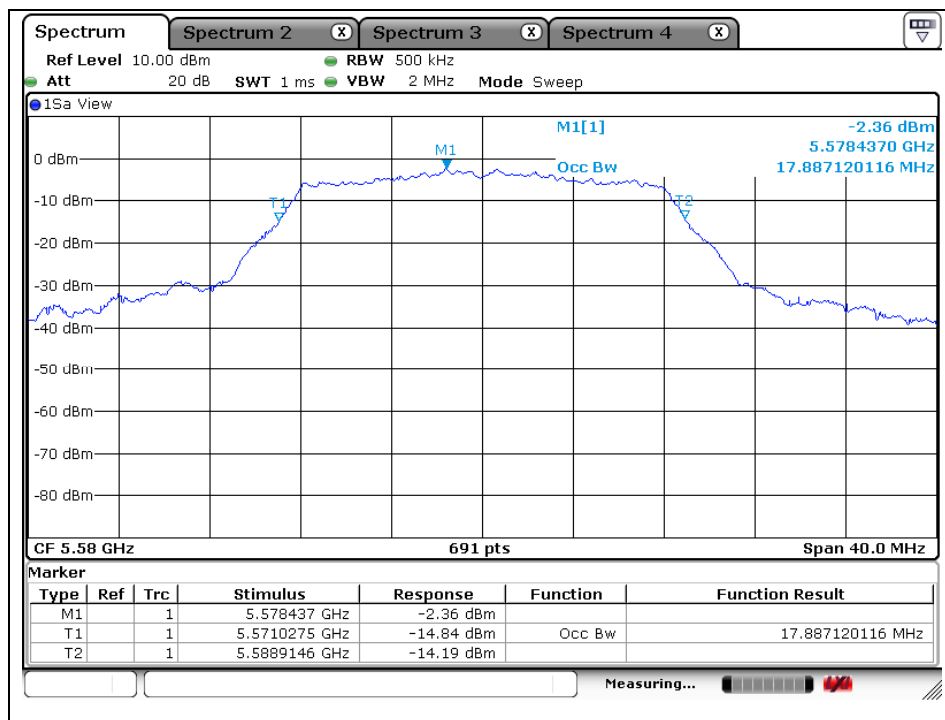
A4(210 mm x 297 mm)

## 802.11a (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

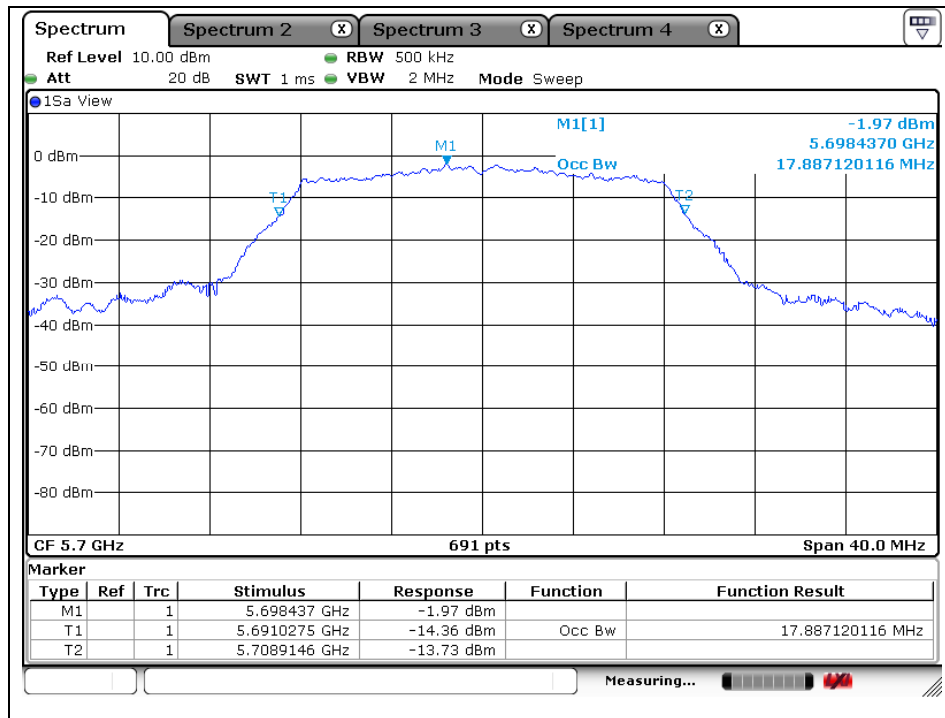
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

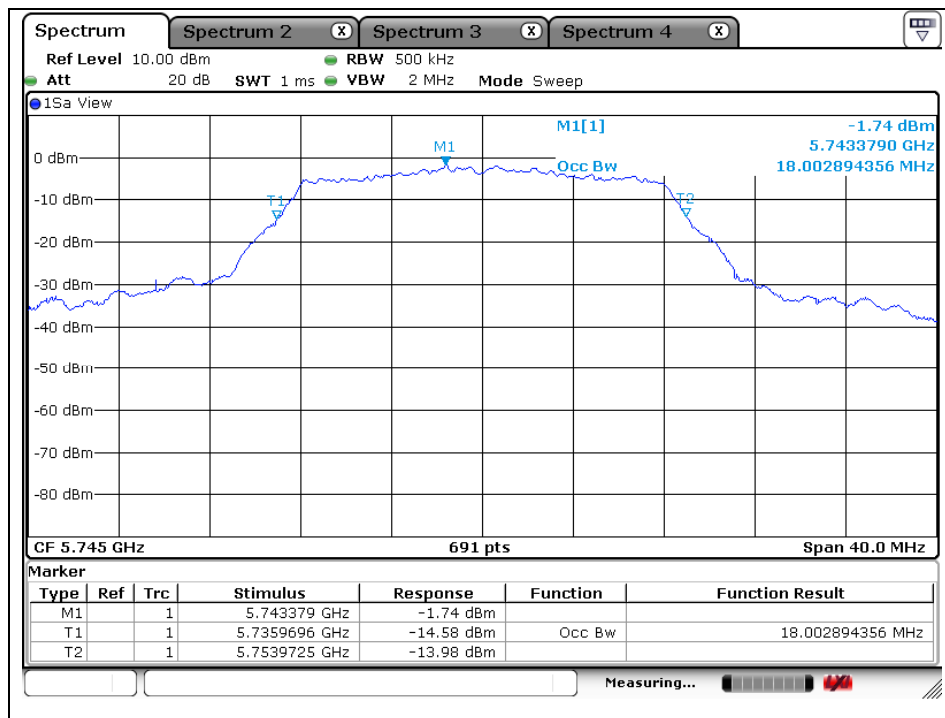
A4(210 mm x 297 mm)

## High Channel (5 700 MHz)



## 802.11a (Band 3)

### Low Channel (5 745 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

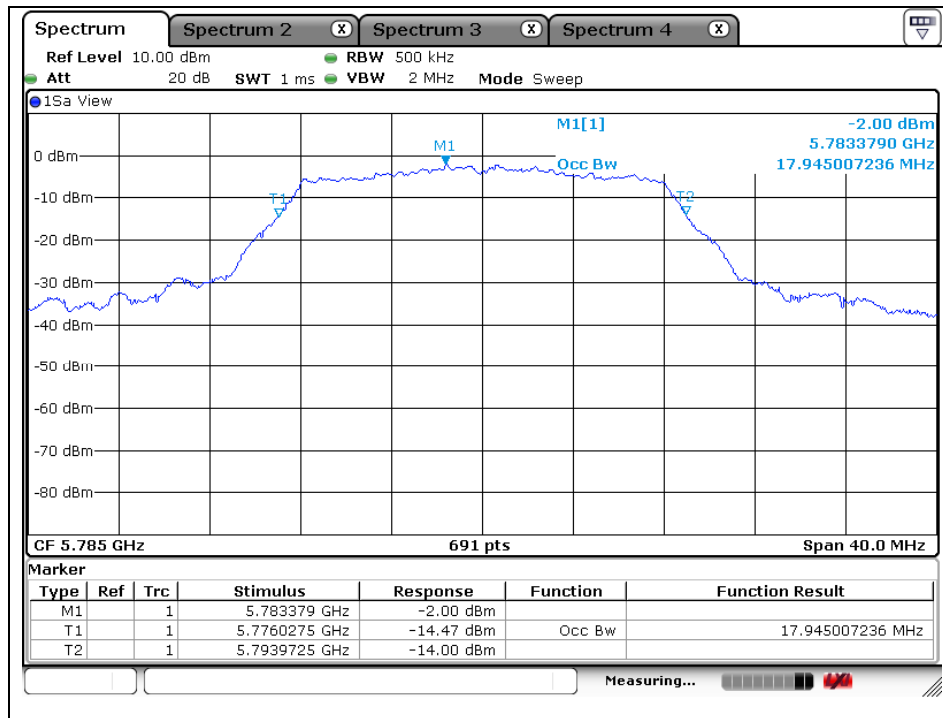
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

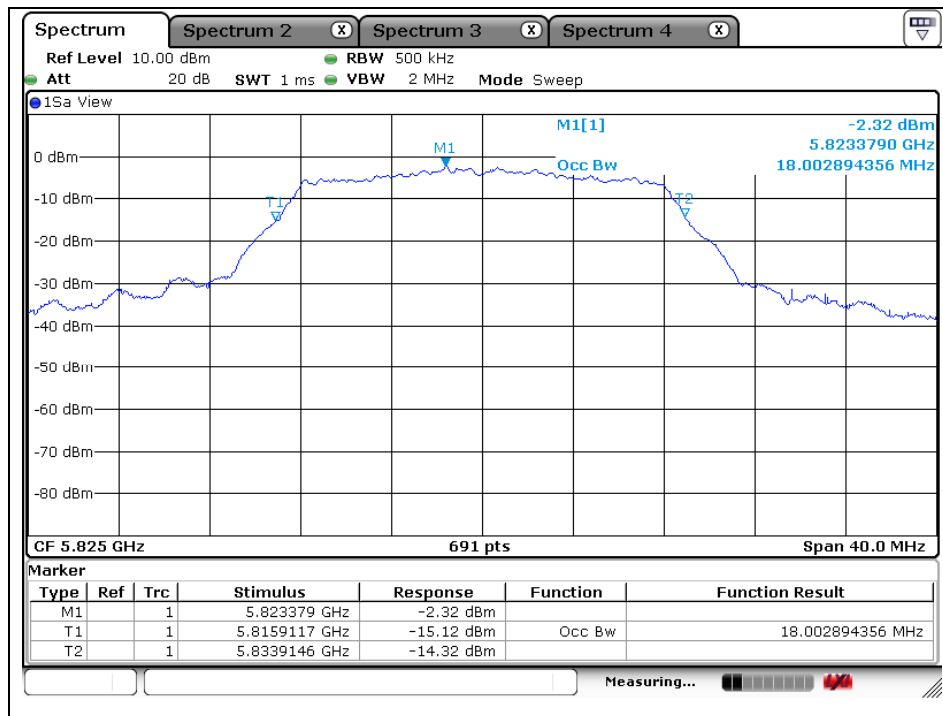
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 785 MHz)



## High Channel (5 825 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

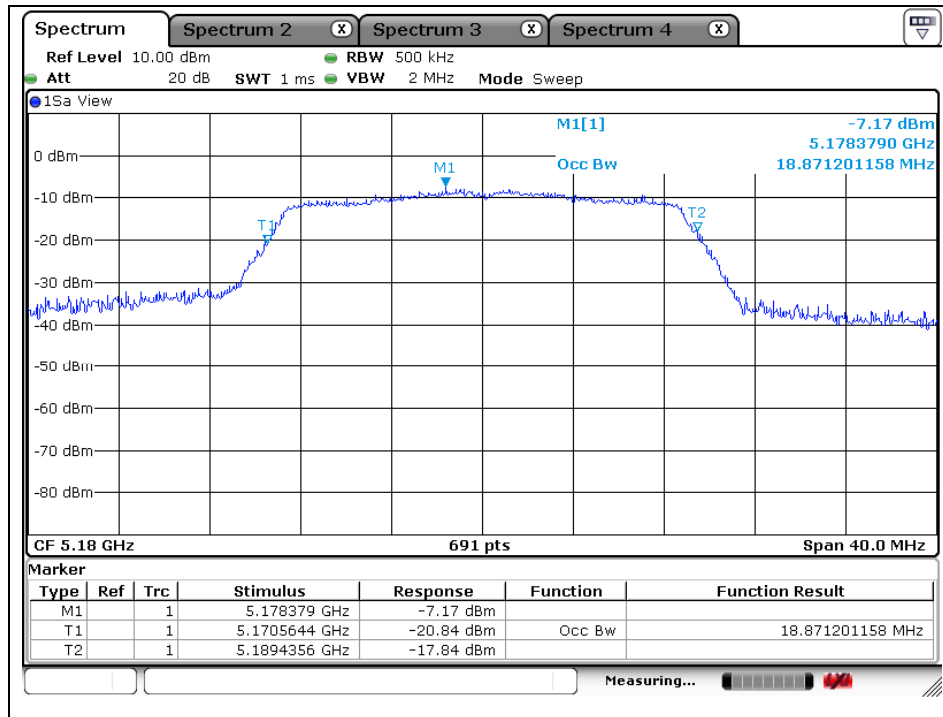
RTT5041-20(2015.10.01)(3)

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

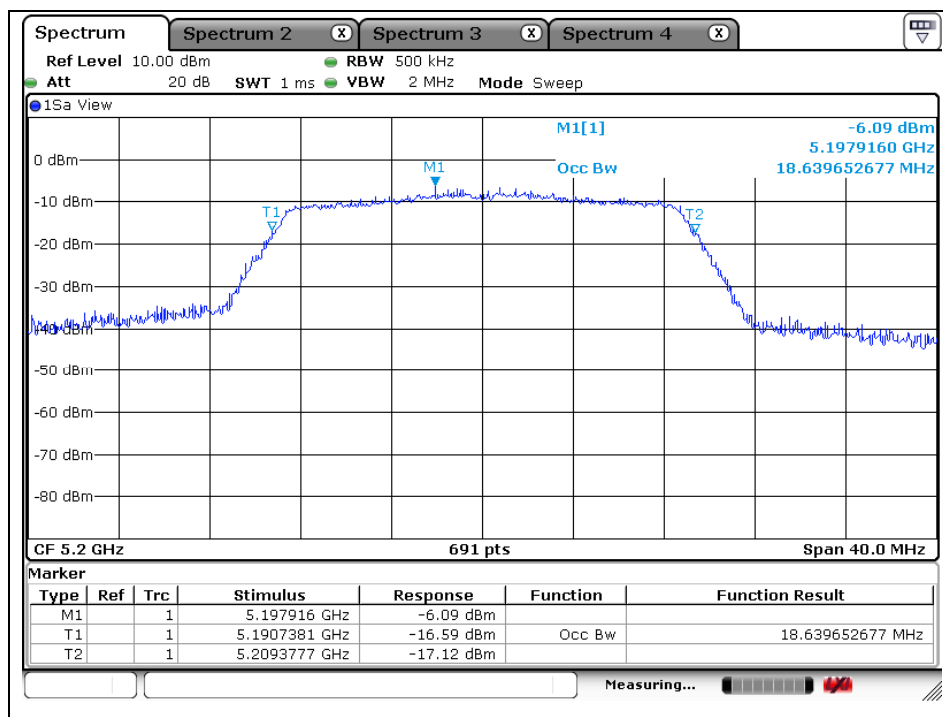
A4(210 mm x 297 mm)

## 802.11n\_HT20 (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 200 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

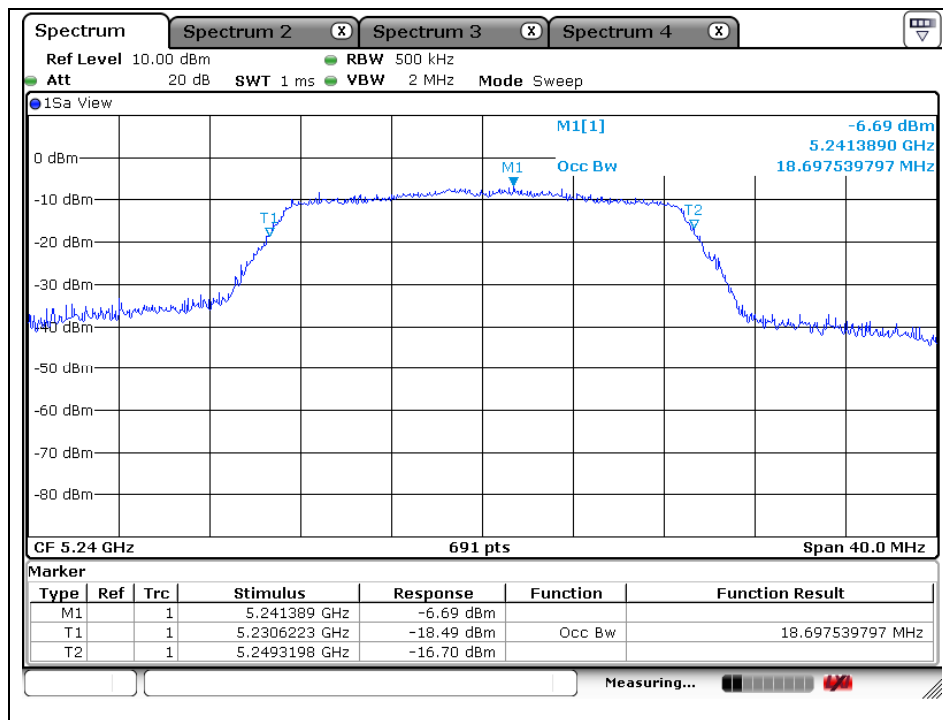
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

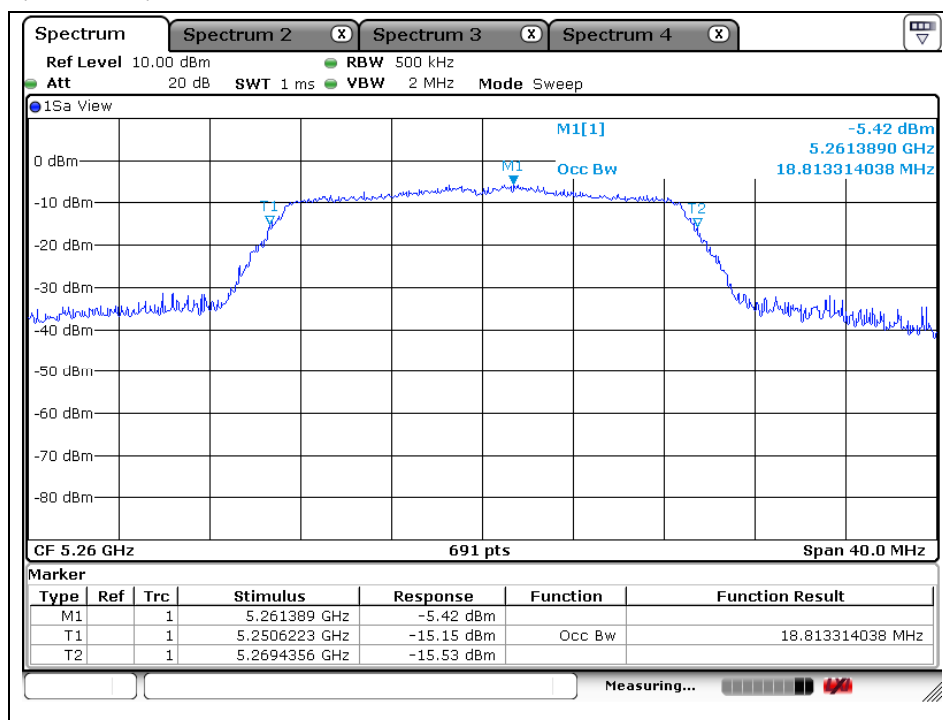
A4(210 mm x 297 mm)

## High Channel (5 240 MHz)



## 802.11n\_HT20 (Band 2A)

### Low Channel (5 260 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

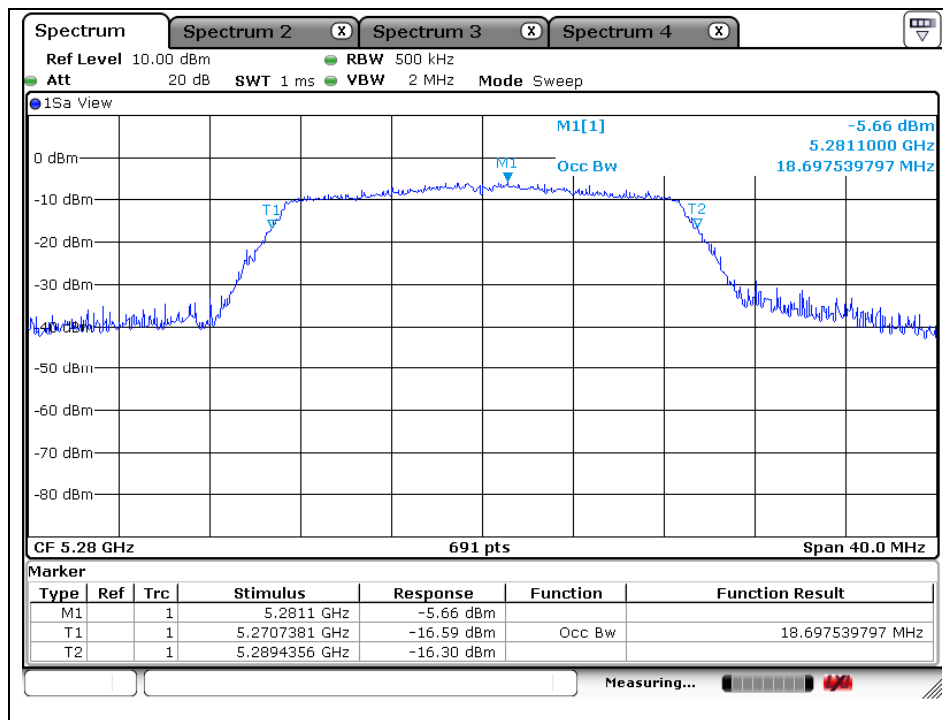
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

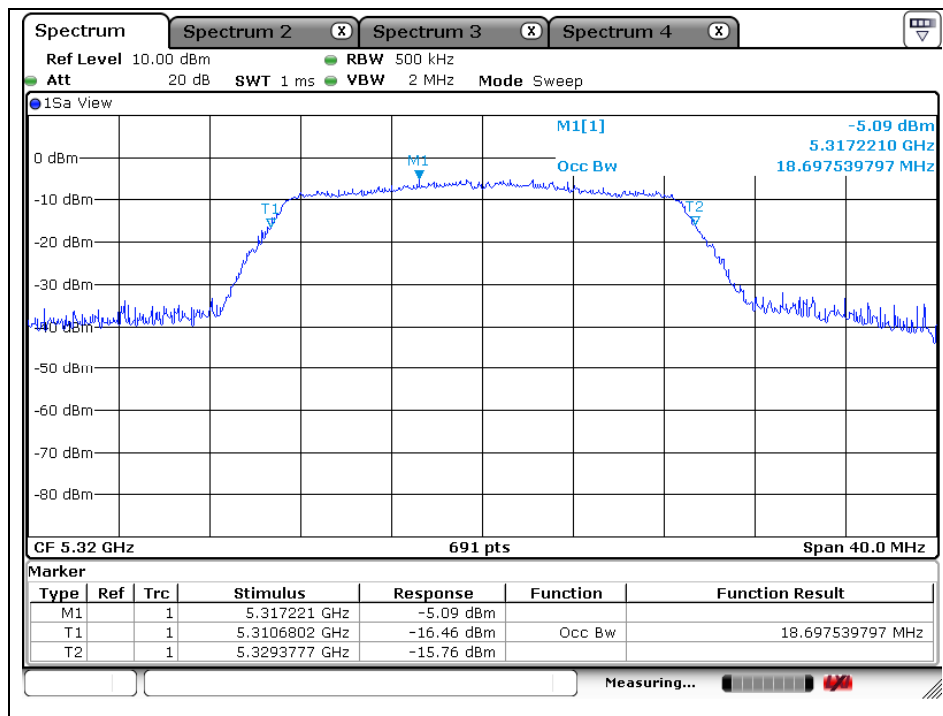
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 280 MHz)



## High Channel (5 320 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

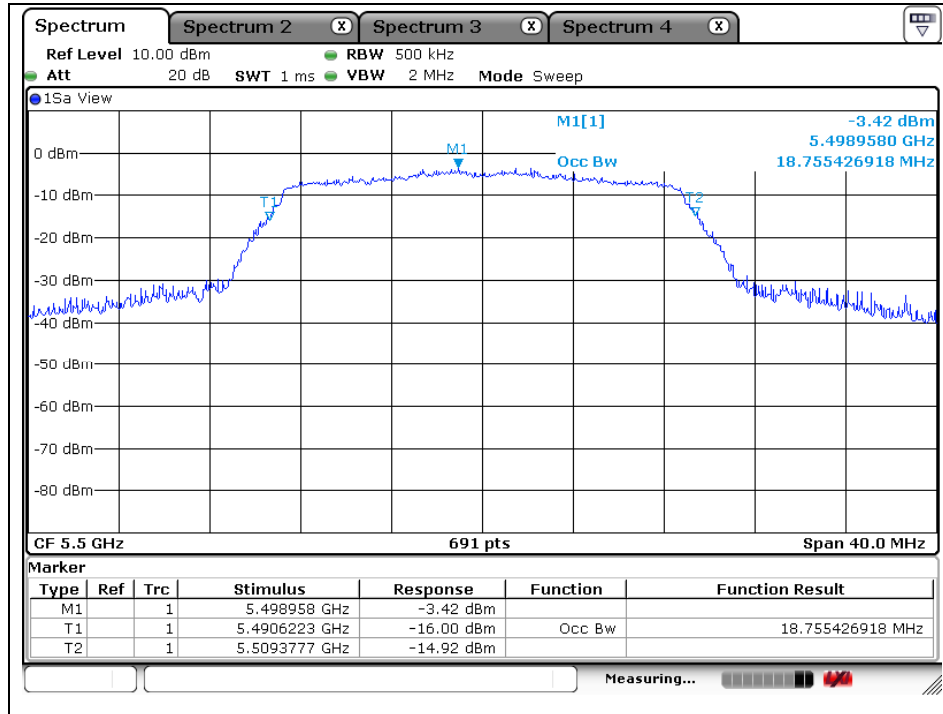
RTT5041-20(2015.10.01)(3)

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

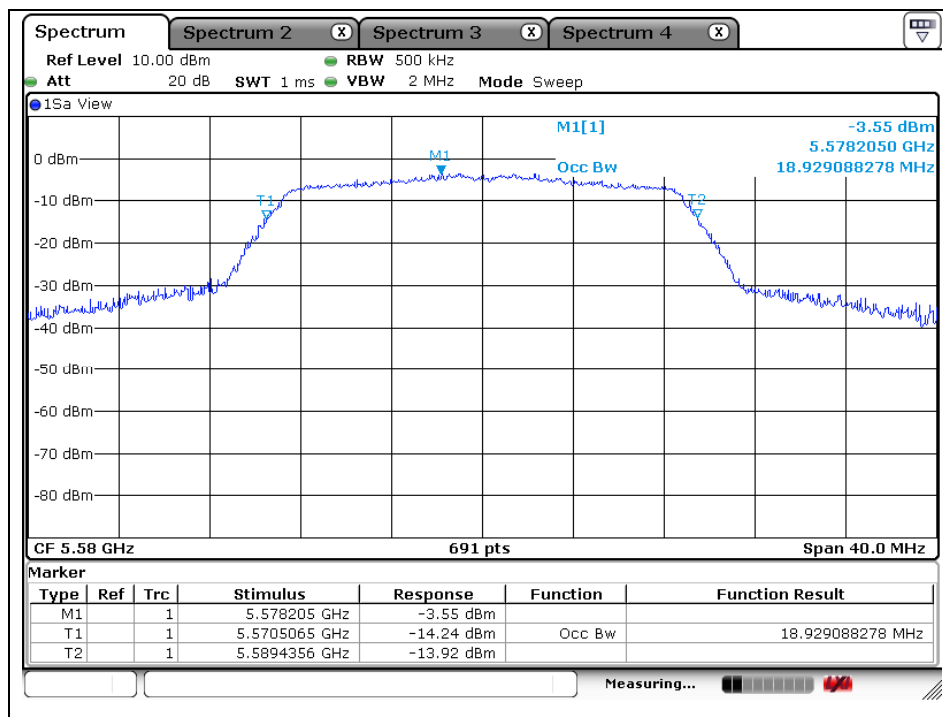
A4(210 mm x 297 mm)

## 802.11n\_HT20 (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

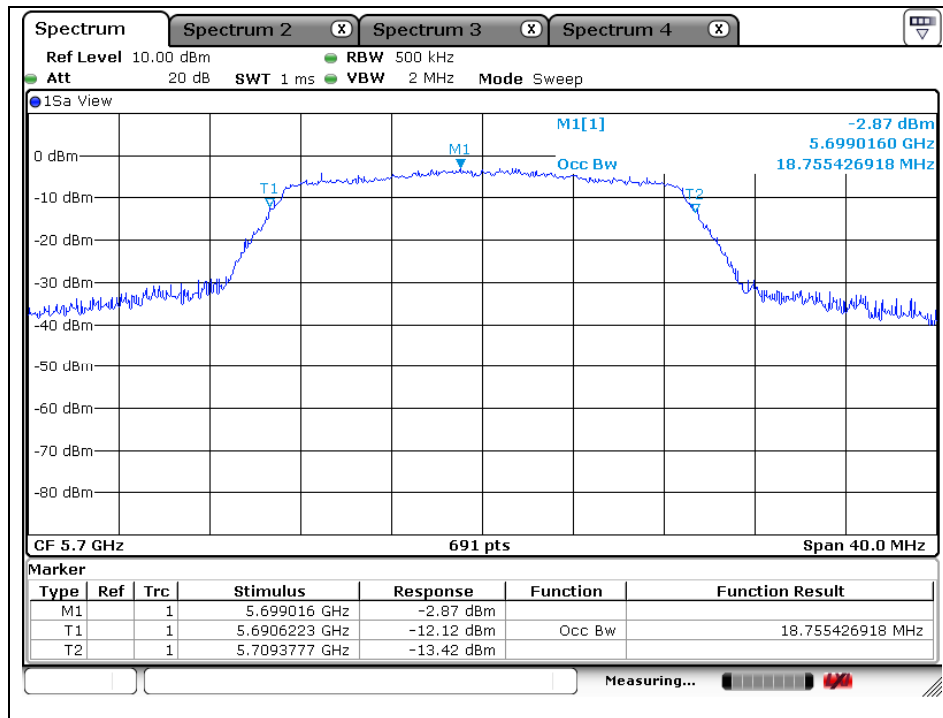
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

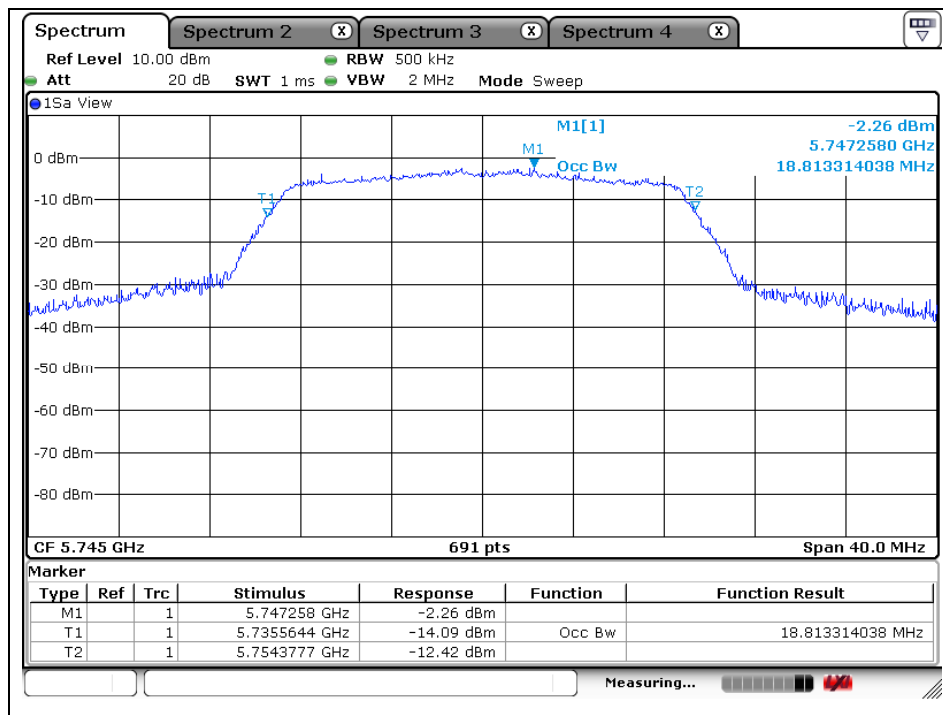
A4(210 mm x 297 mm)

## High Channel (5 700 MHz)



## 802.11n\_HT20 (Band 3)

## Low Channel (5 745 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

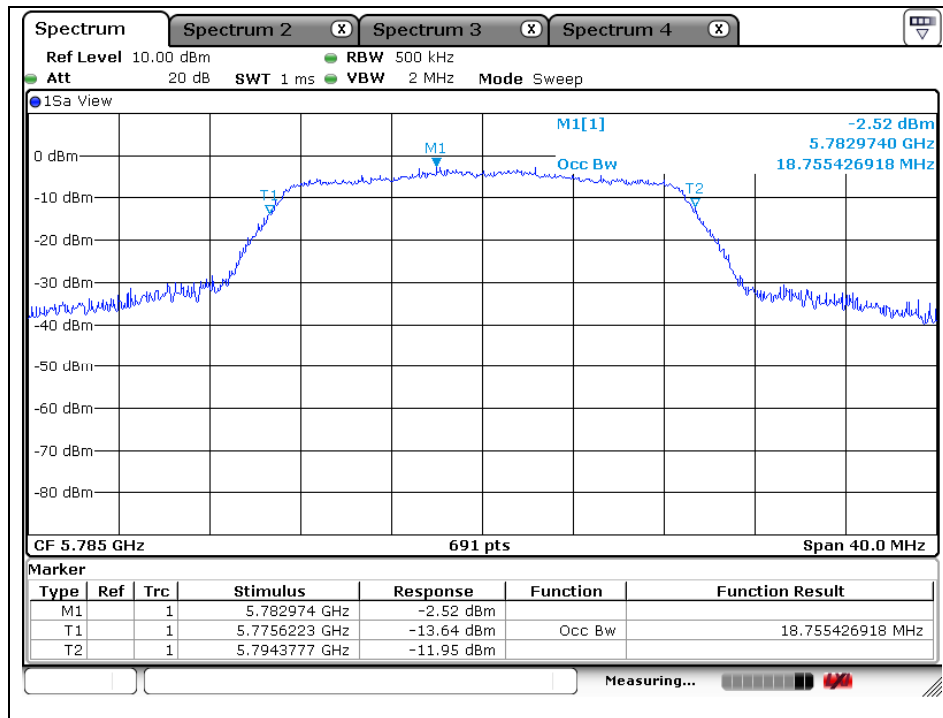
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

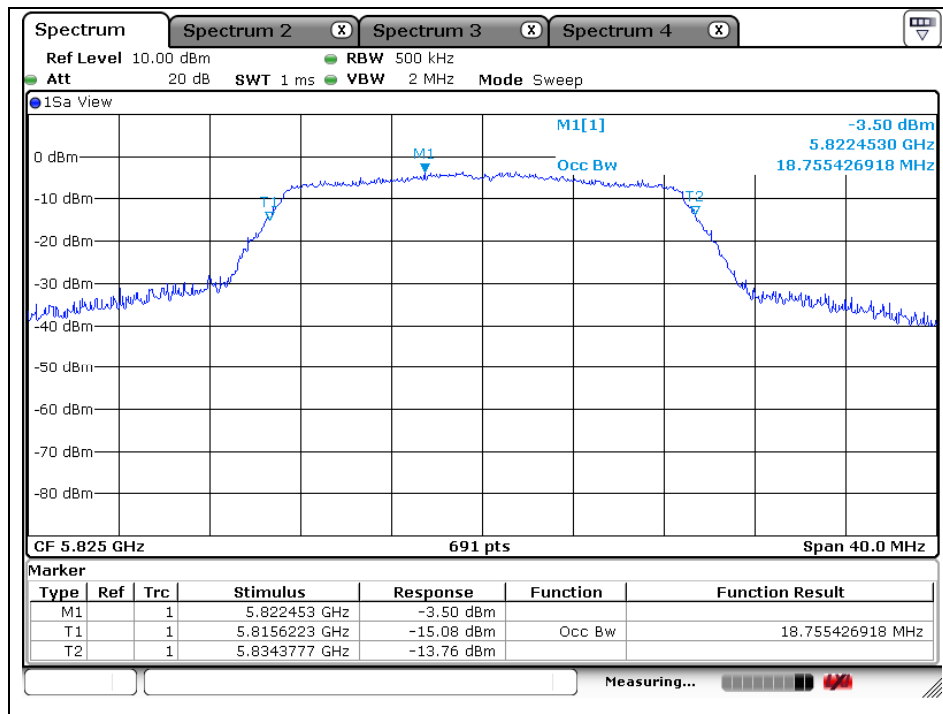
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 785 MHz)



## High Channel (5 825 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

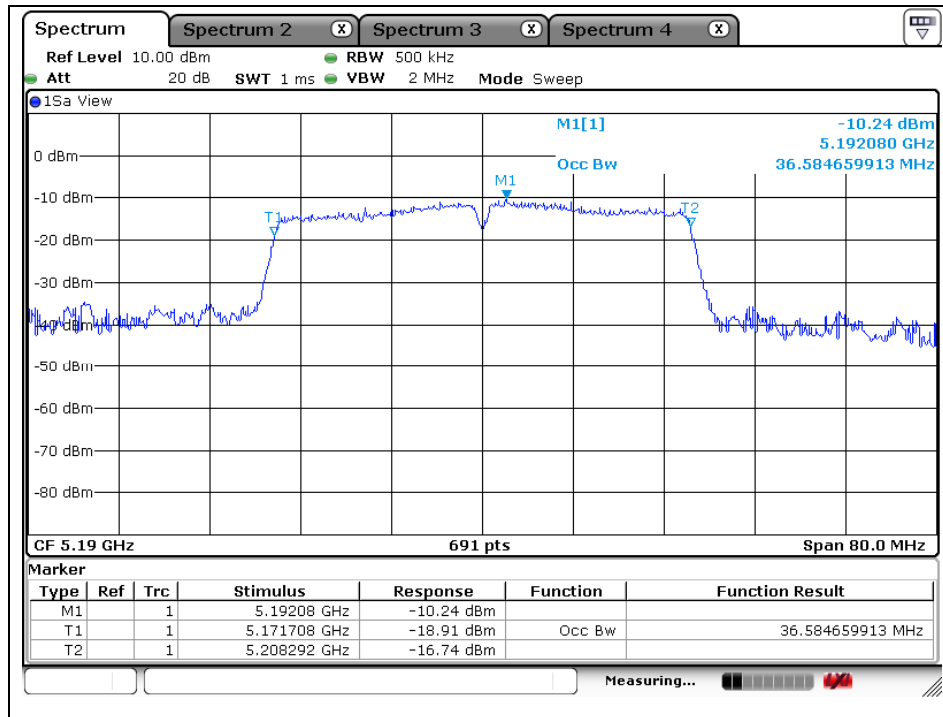
RTT5041-20(2015.10.01)(3)

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

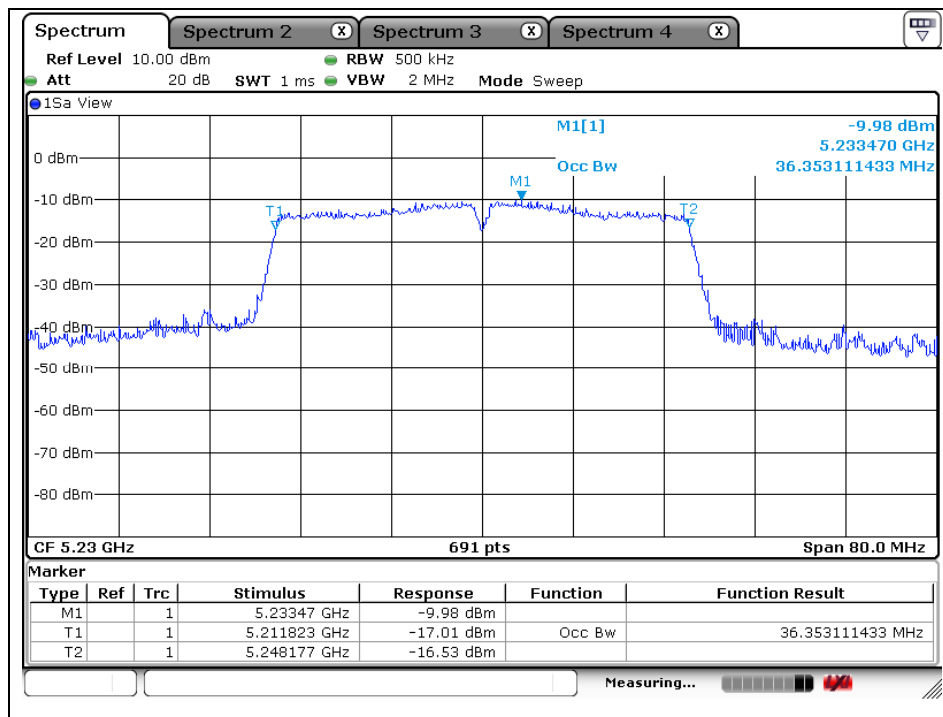
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 1)

Low Channel (5 190 MHz)



High Channel (5 230 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

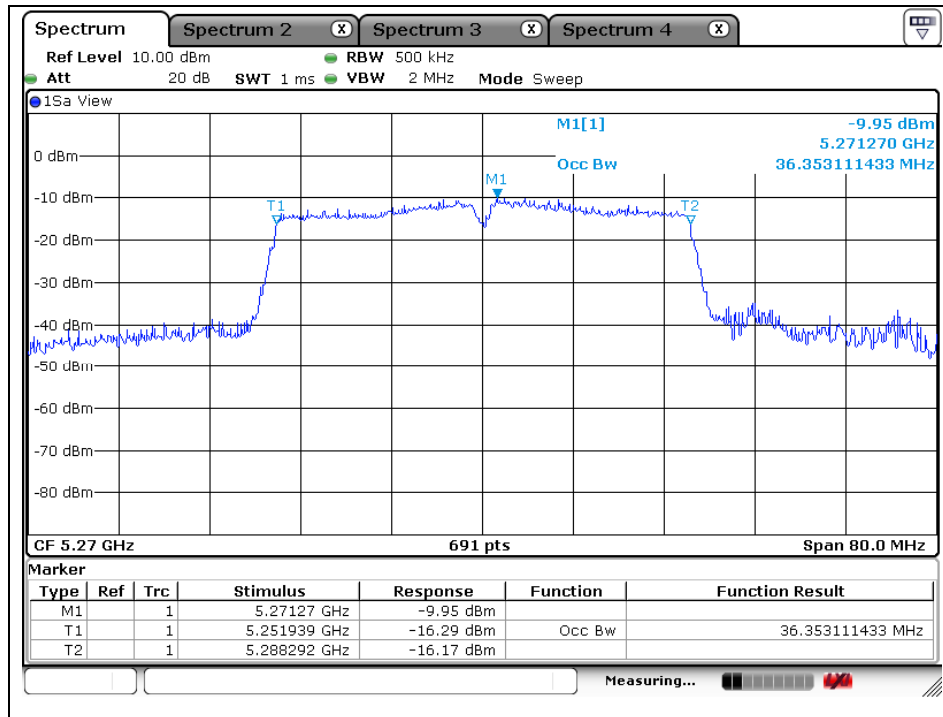
RTT5041-20(2015.10.01)(3)

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

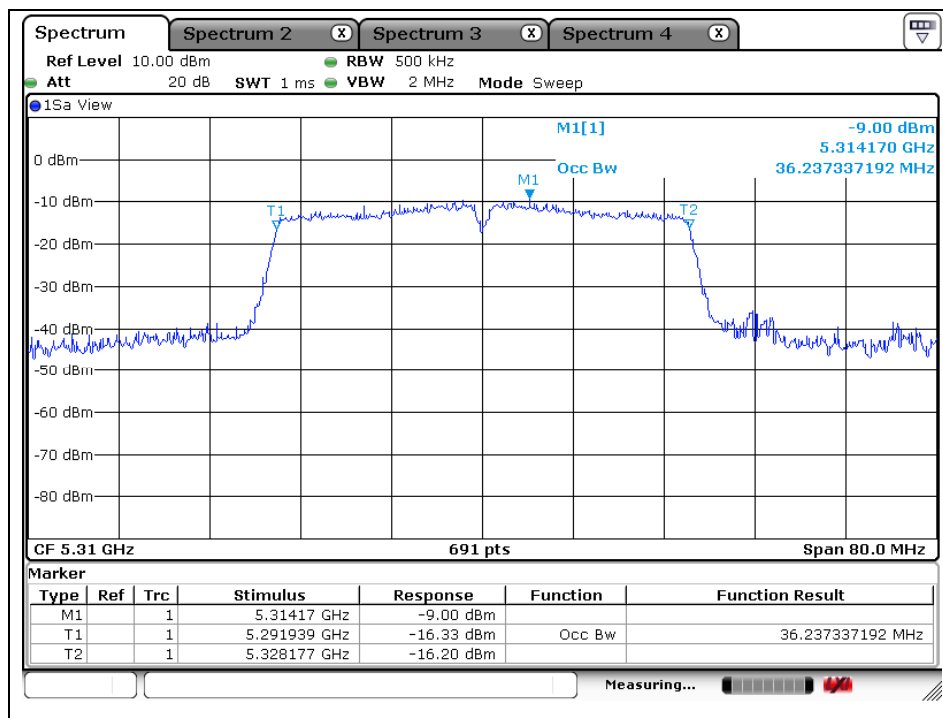
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 2A)

Low Channel (5 270 MHz)



High Channel (5 310 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

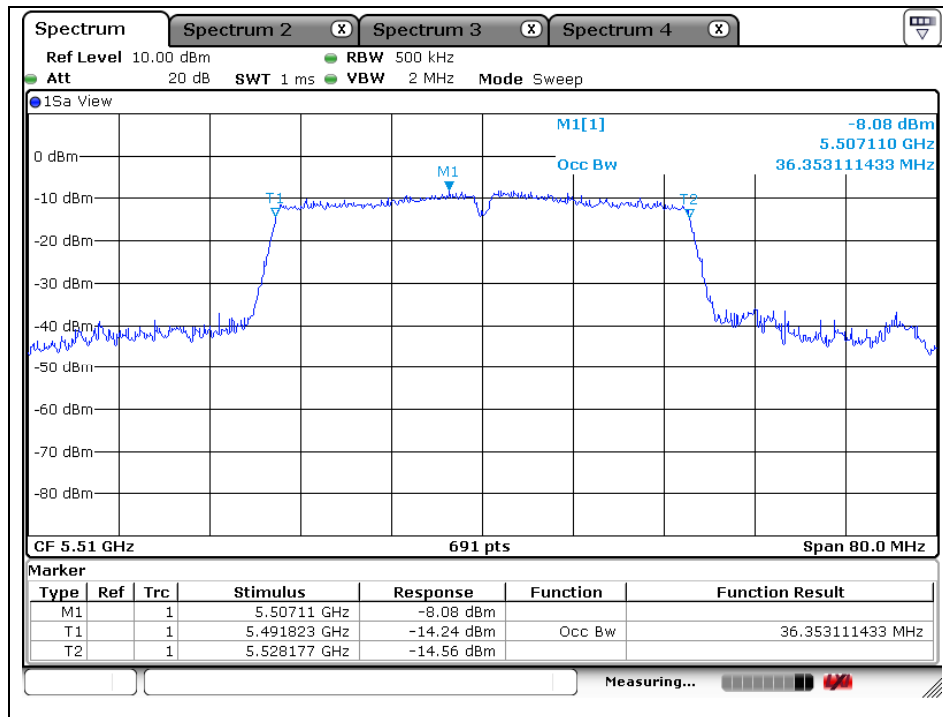
RTT5041-20(2015.10.01)(3)

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

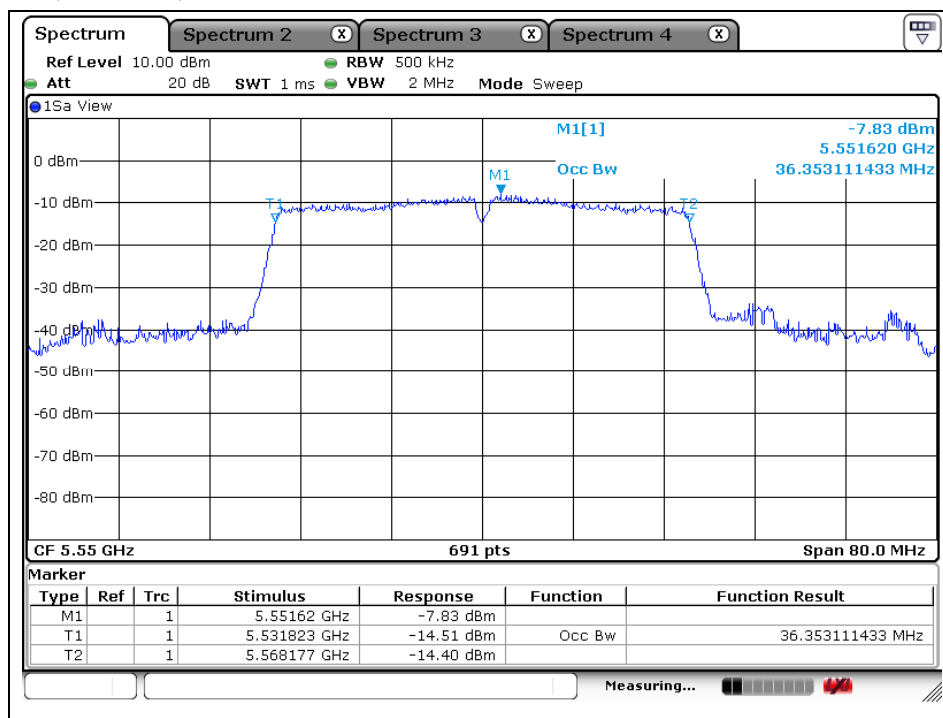
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 2C)

Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

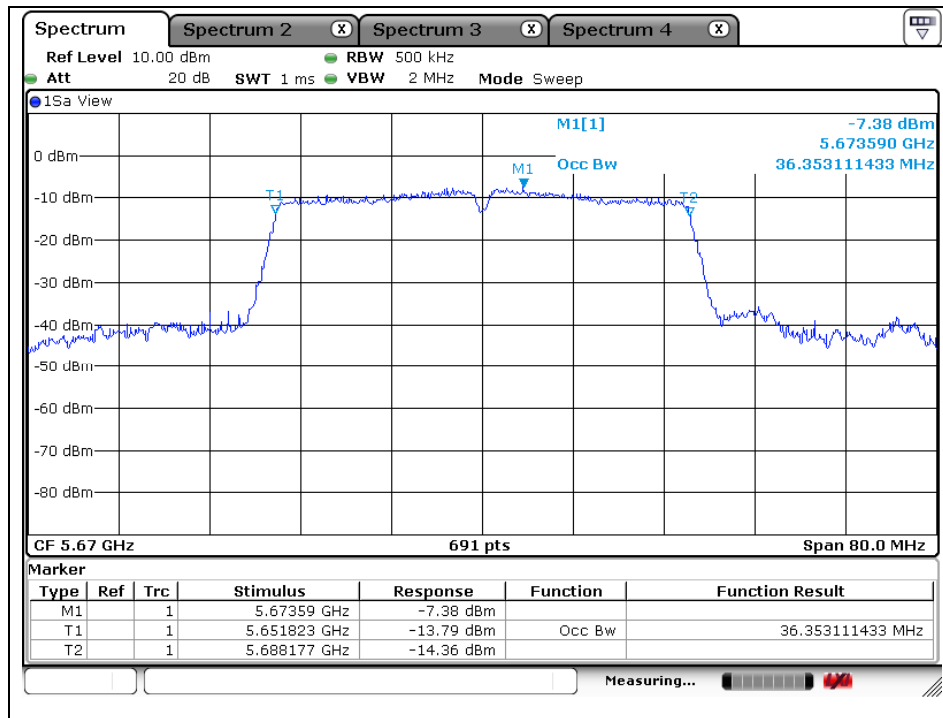
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

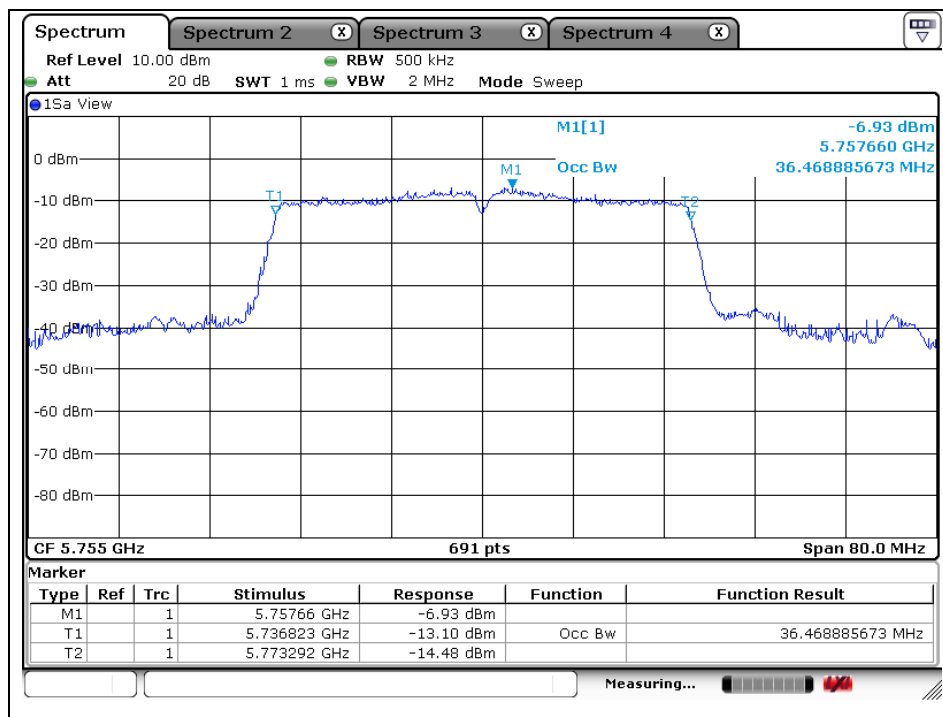
A4(210 mm x 297 mm)

## High Channel (5 670 MHz)



## 802.11n\_HT40 (Band 3)

### Low Channel (5 755 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

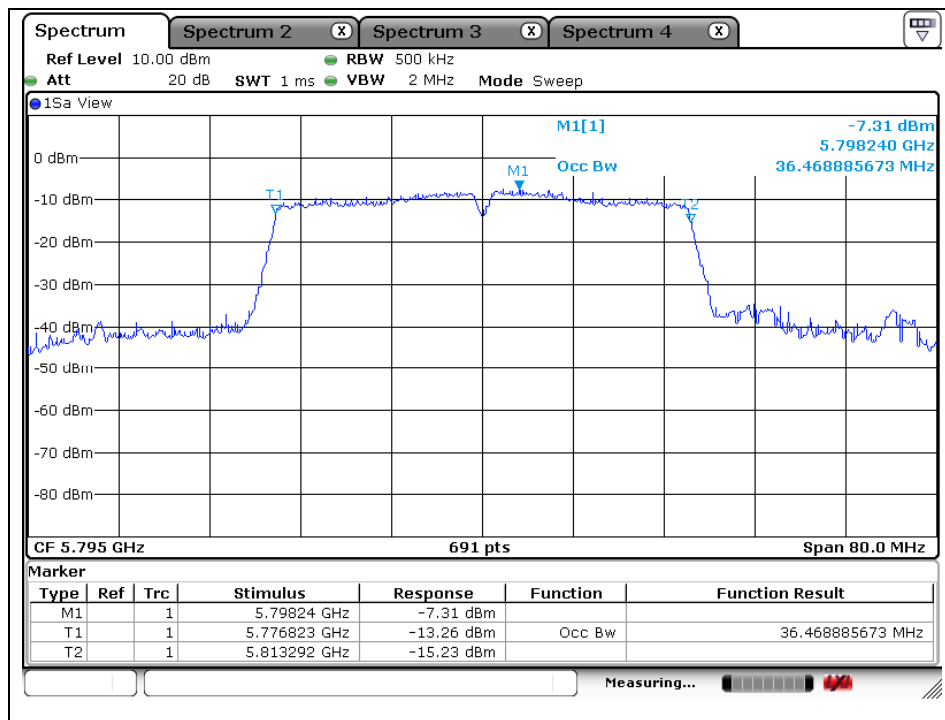
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

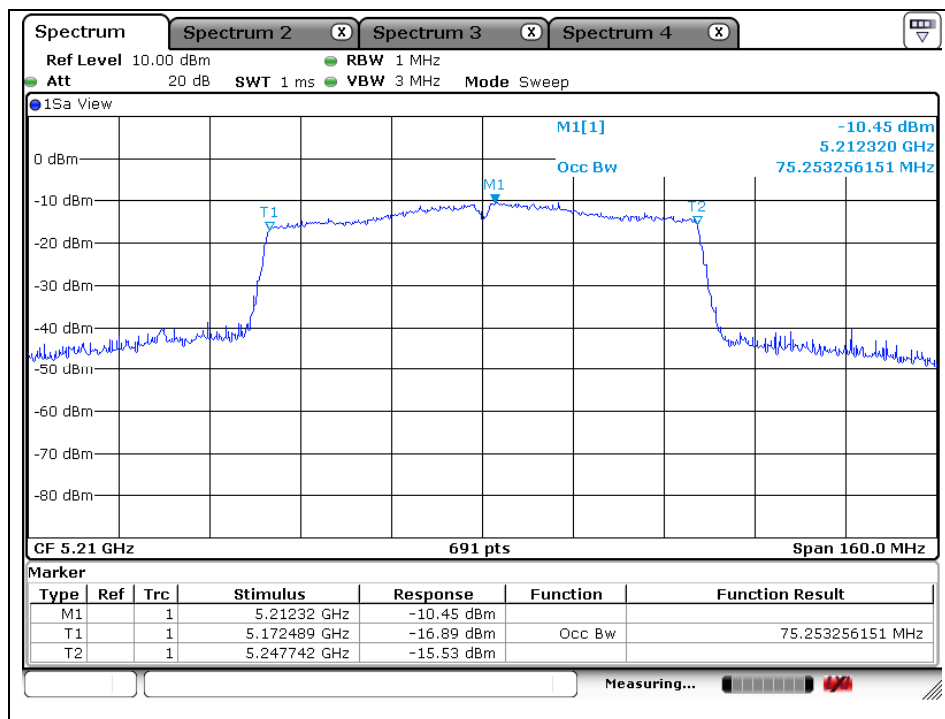
A4(210 mm x 297 mm)

## High Channel (5 795 MHz)



## 802.11ac\_VHT80 (Band 1)

### Middle Channel (5 210 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

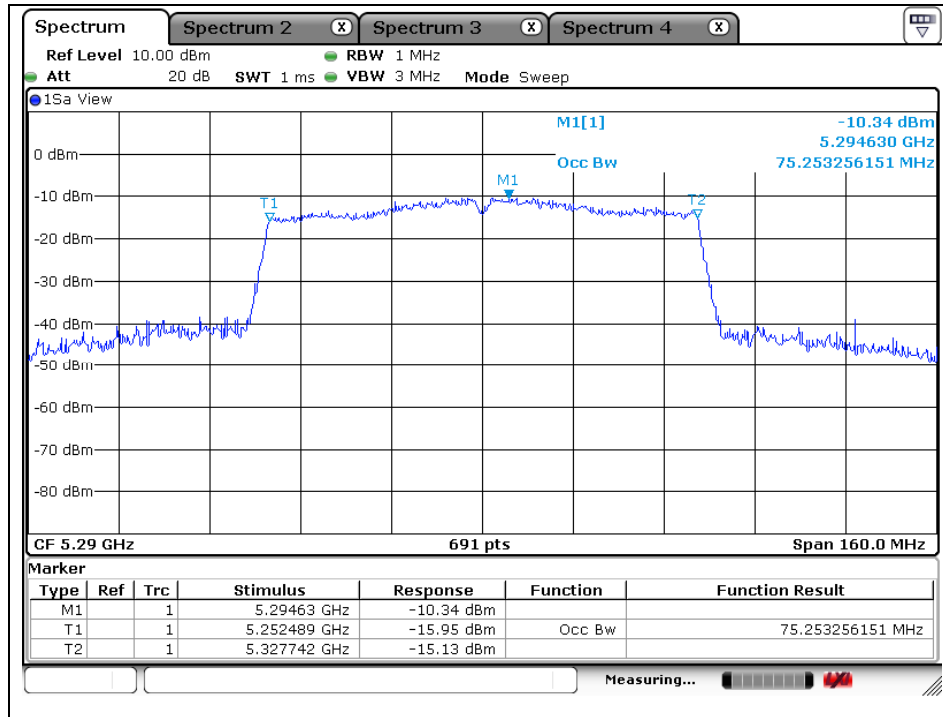
RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

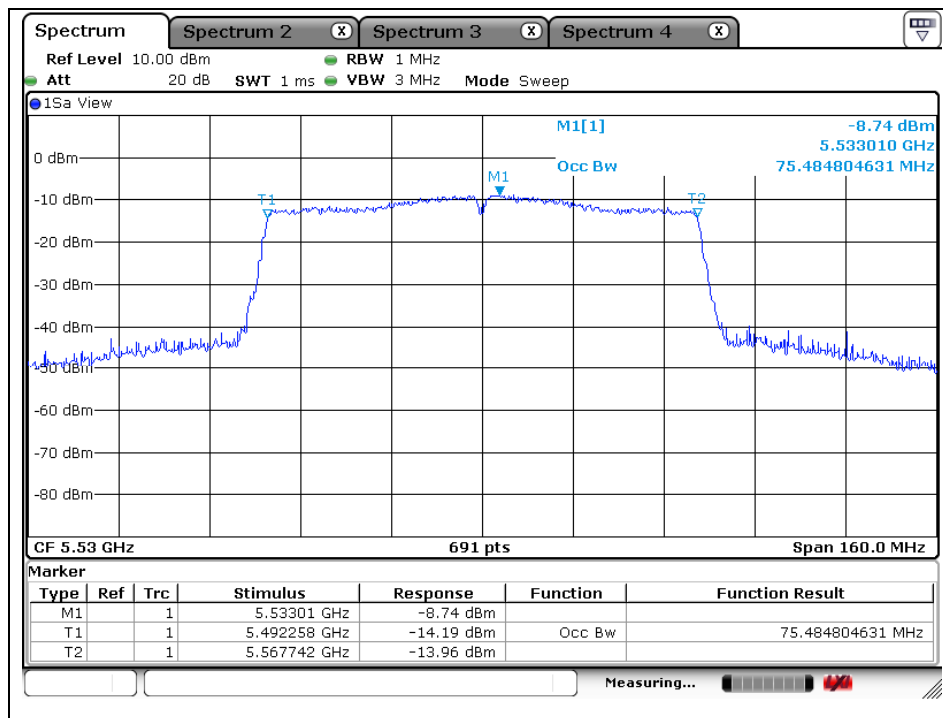
## 802. 11ac\_VHT80 (Band 2A)

Middle Channel (5 290 MHz)



## 802. 11ac\_VHT80 (Band 2C)

Low Channel (5 530 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

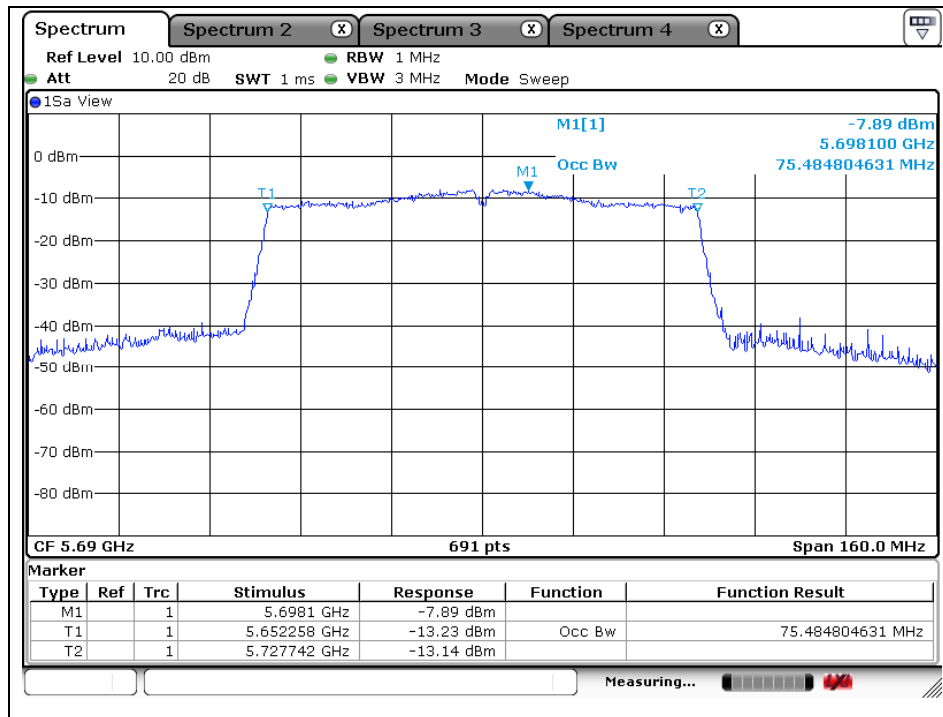
RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

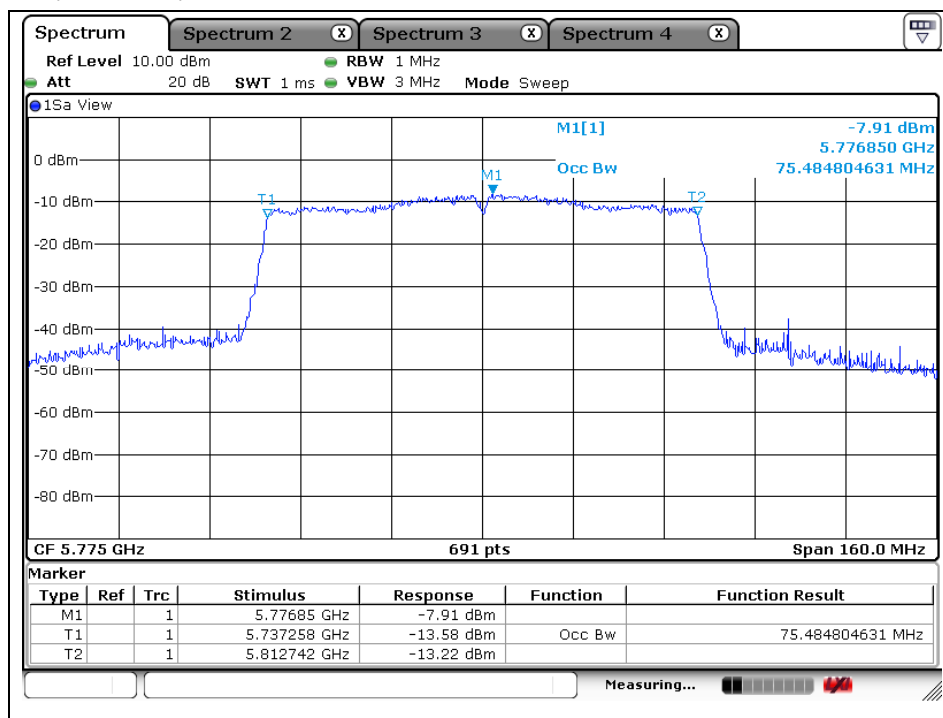
## 802.11ac\_VHT80 (Band 2C)

High Channel (5 690 MHz)



## 802.11ac\_VHT80 (Band 3)

Middle Channel (5 775 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

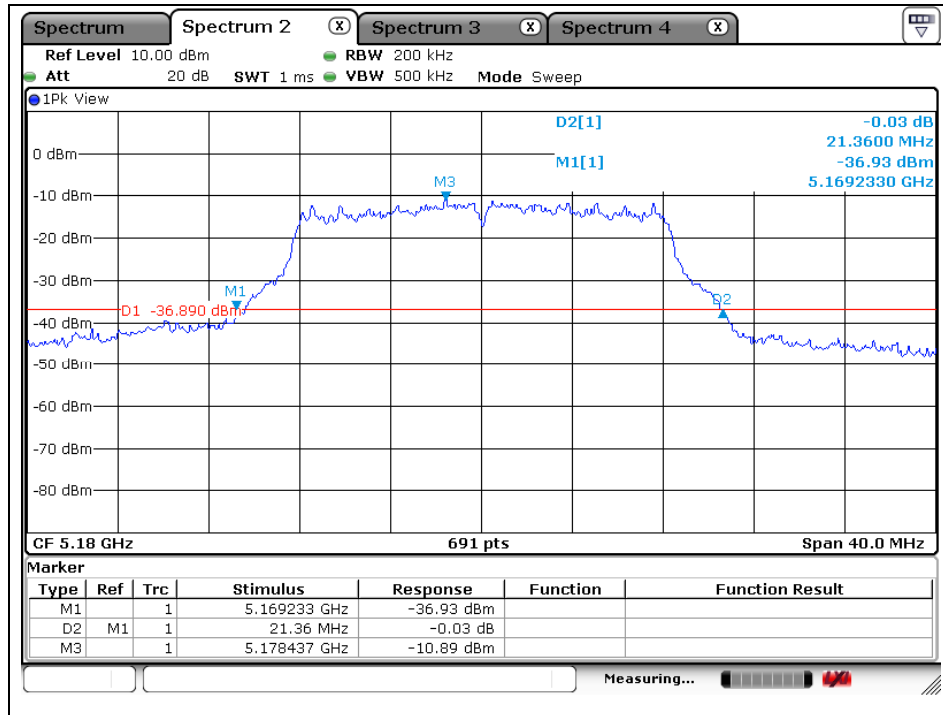
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

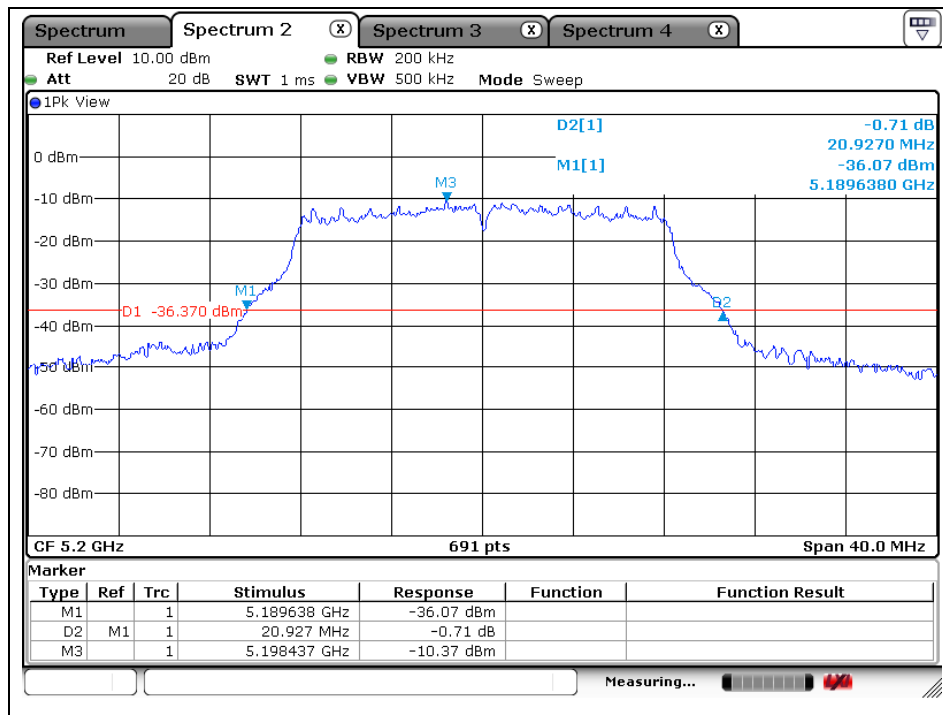
## 26 dB Bandwidth

### 802.11a (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 200 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

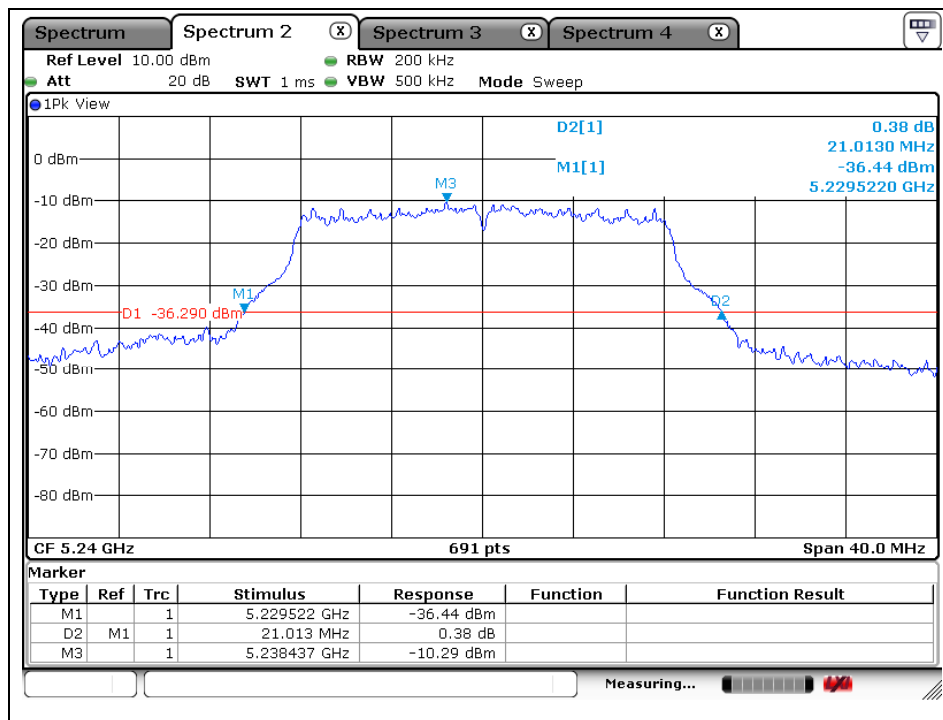
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

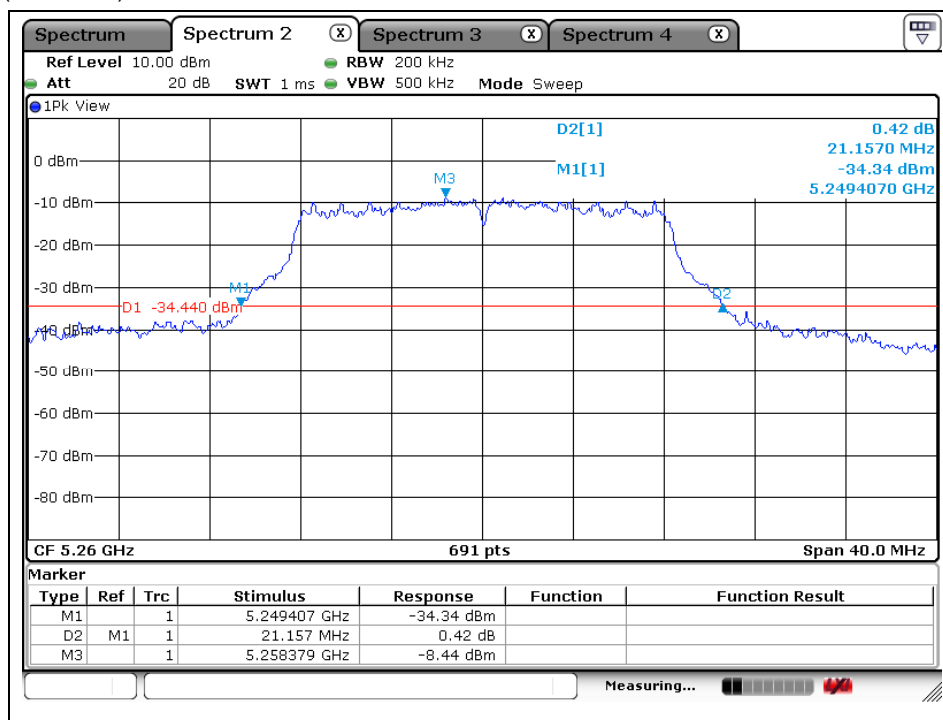
A4(210 mm x 297 mm)

## High Channel (5 240 MHz)



## 802.11a (Band 2A)

### Low Channel (5 260 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

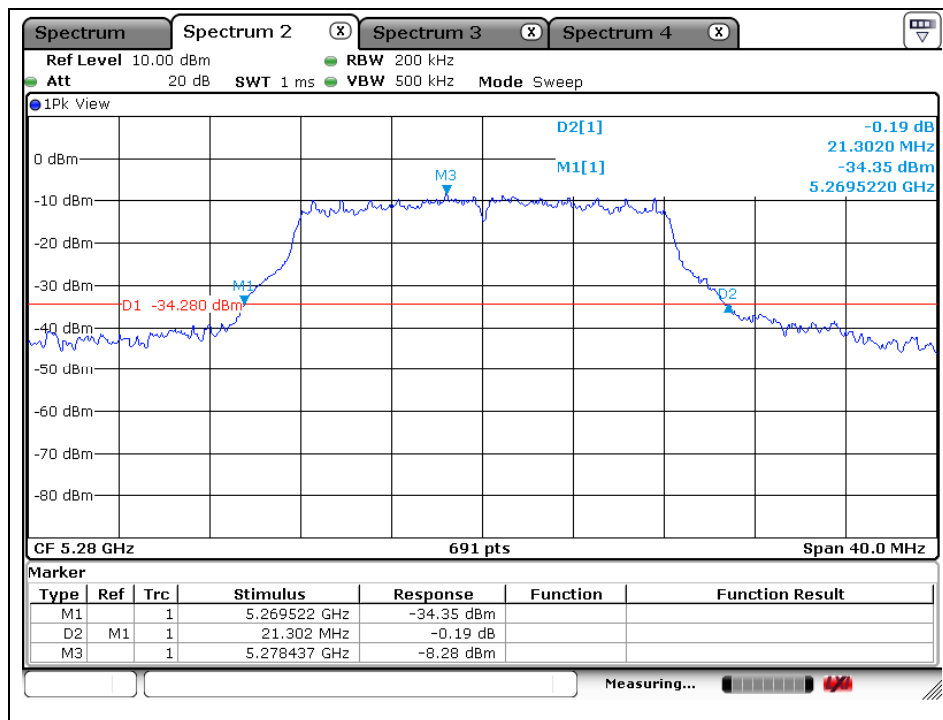
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

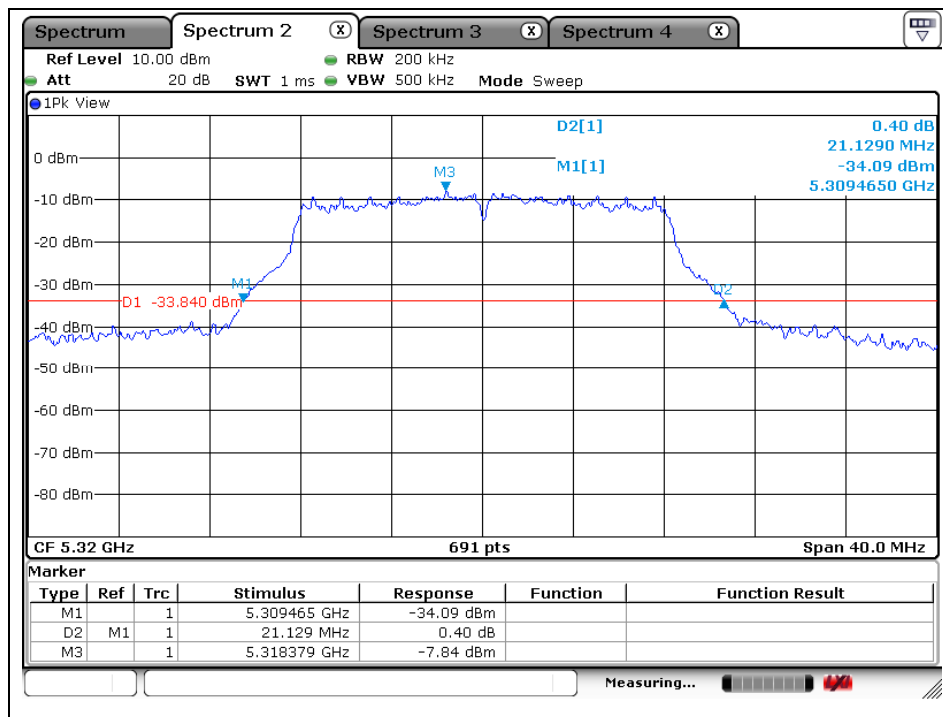
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 280 MHz)



## High Channel (5 320 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

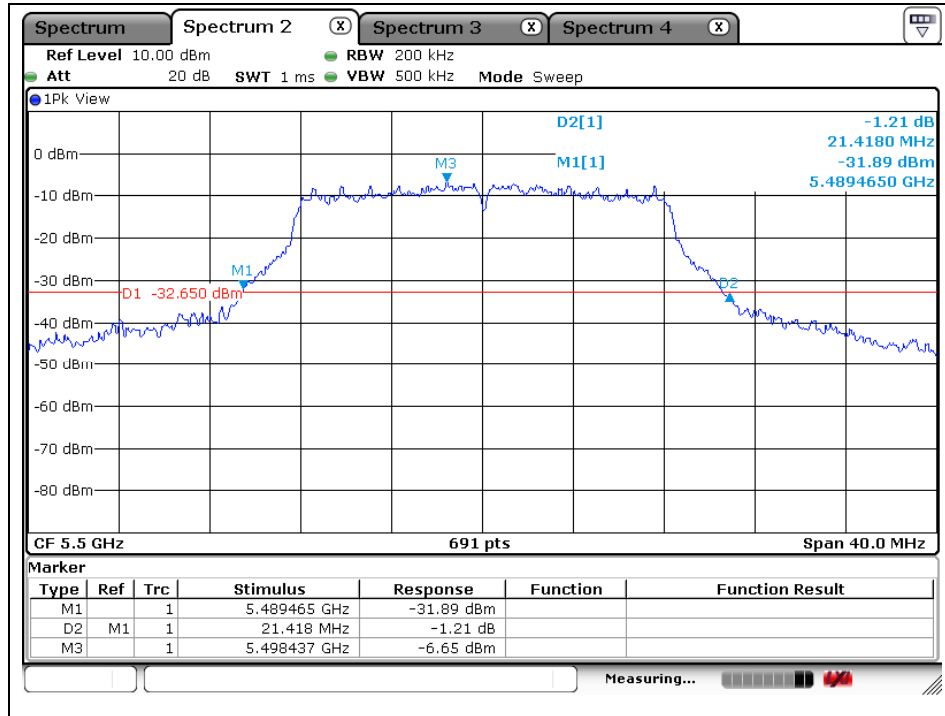
RTT5041-20(2015.10.01)(3)

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

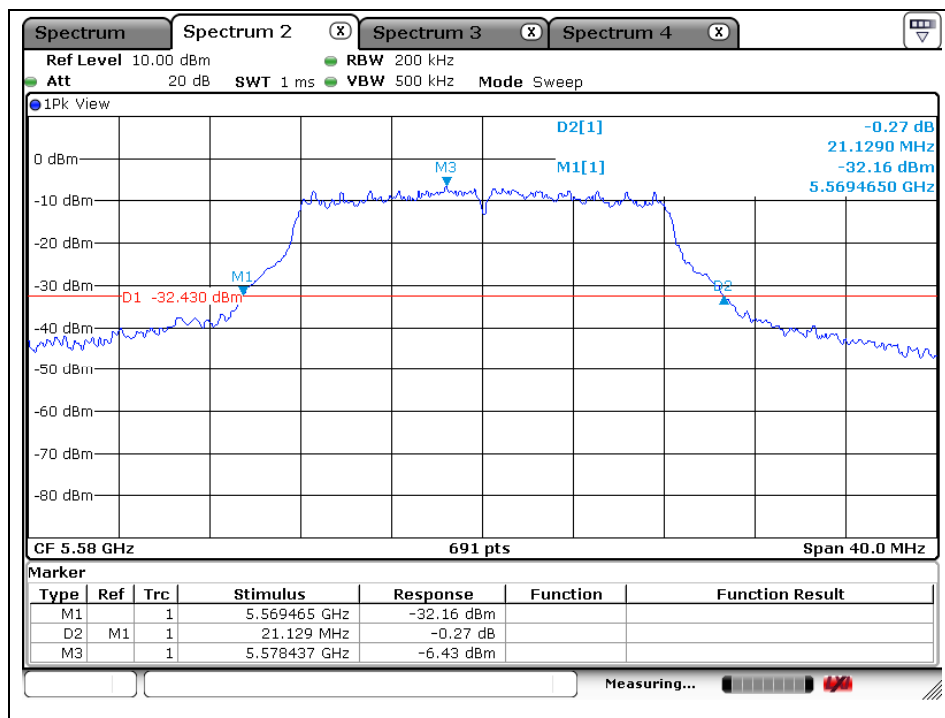
A4(210 mm x 297 mm)

## 802.11a (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

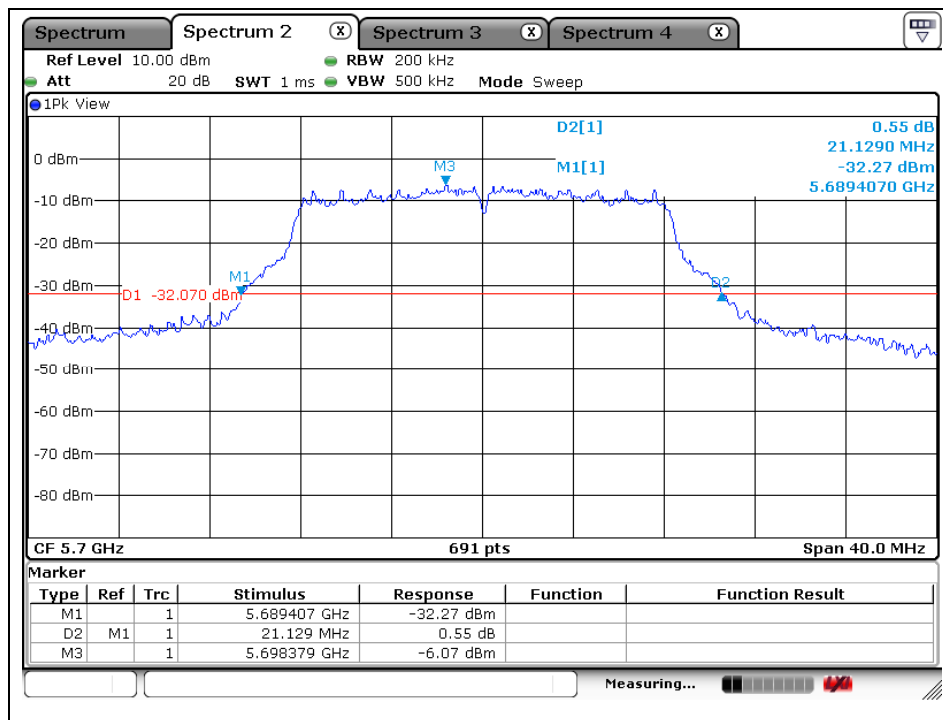
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

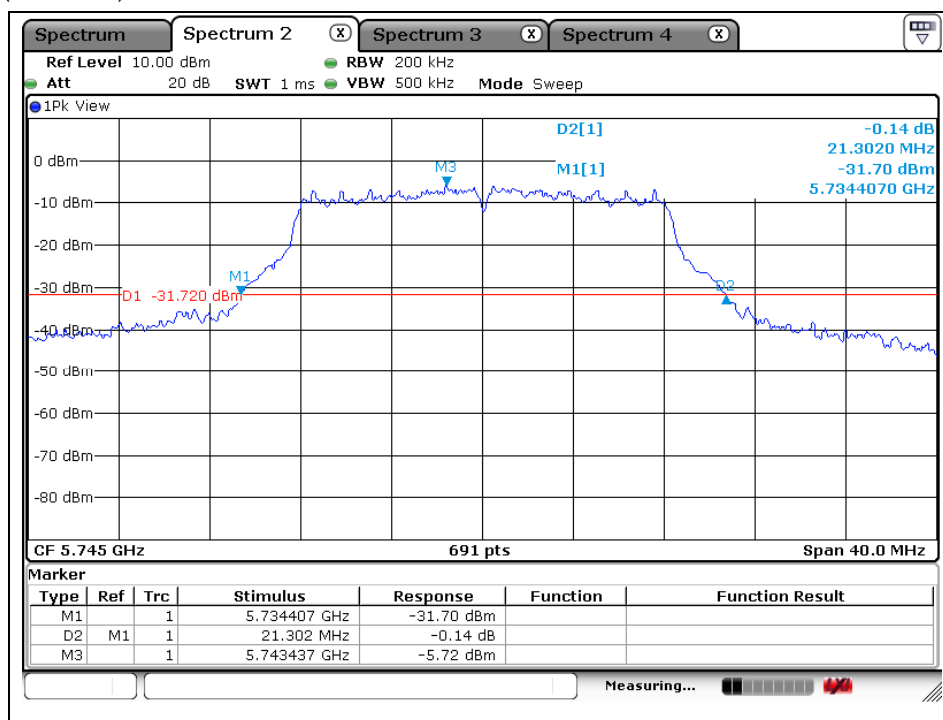
A4(210 mm x 297 mm)

## High Channel (5 700 MHz)



## 802.11a (Band 3)

### Low Channel (5 745 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

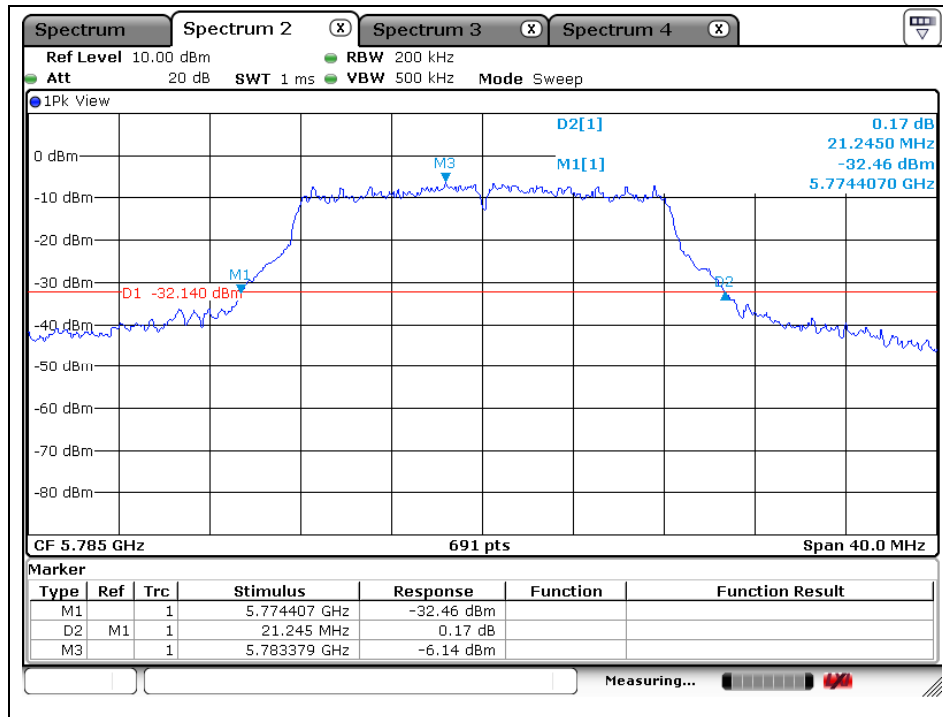
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

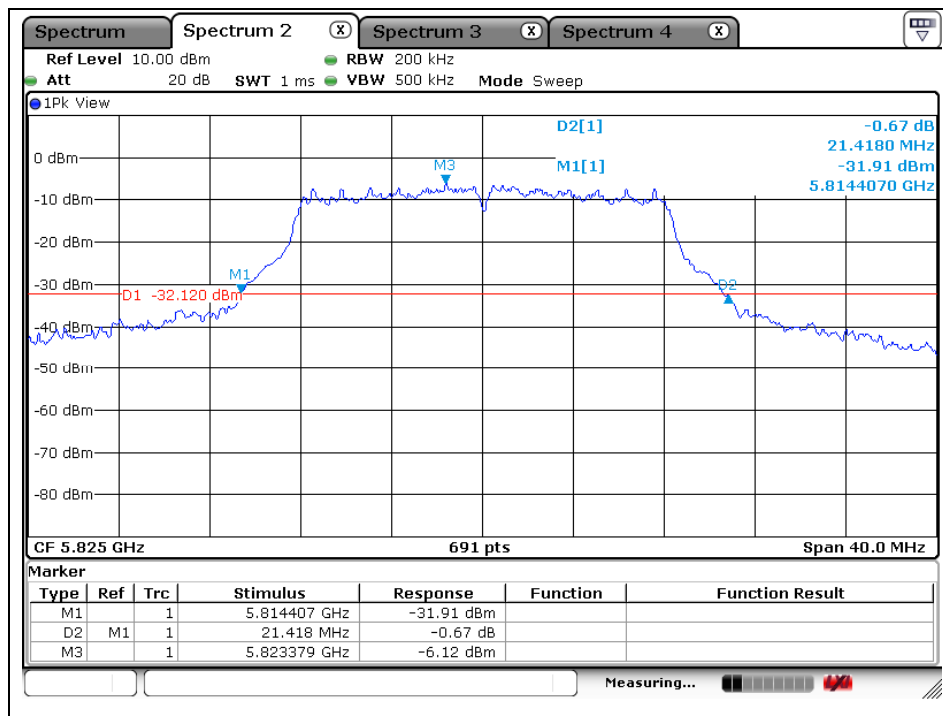
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 785 MHz)



## High Channel (5 825 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

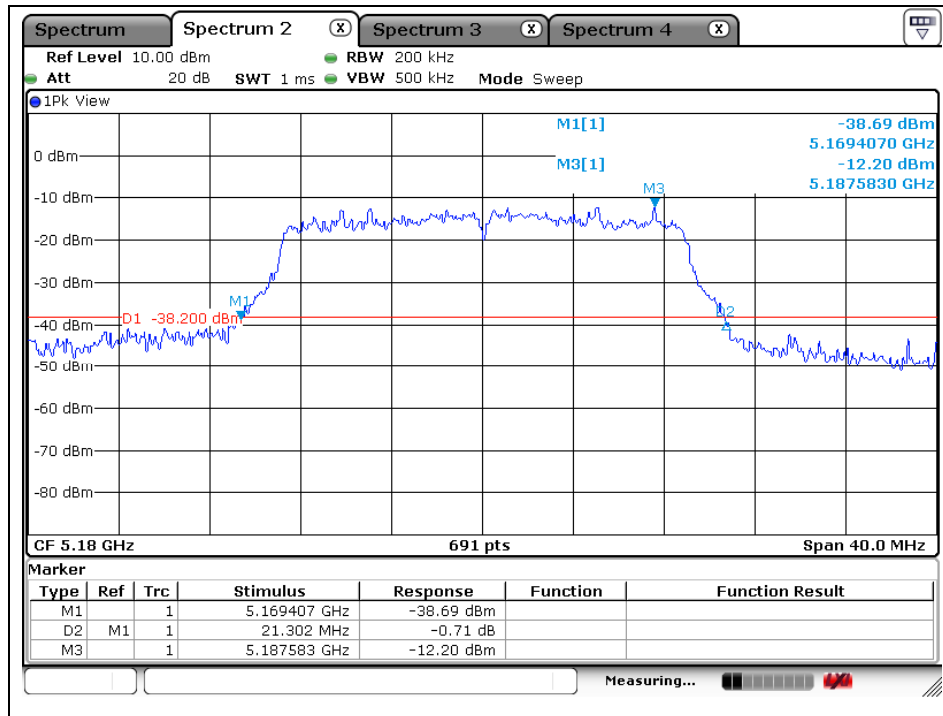
RTT5041-20(2015.10.01)(3)

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

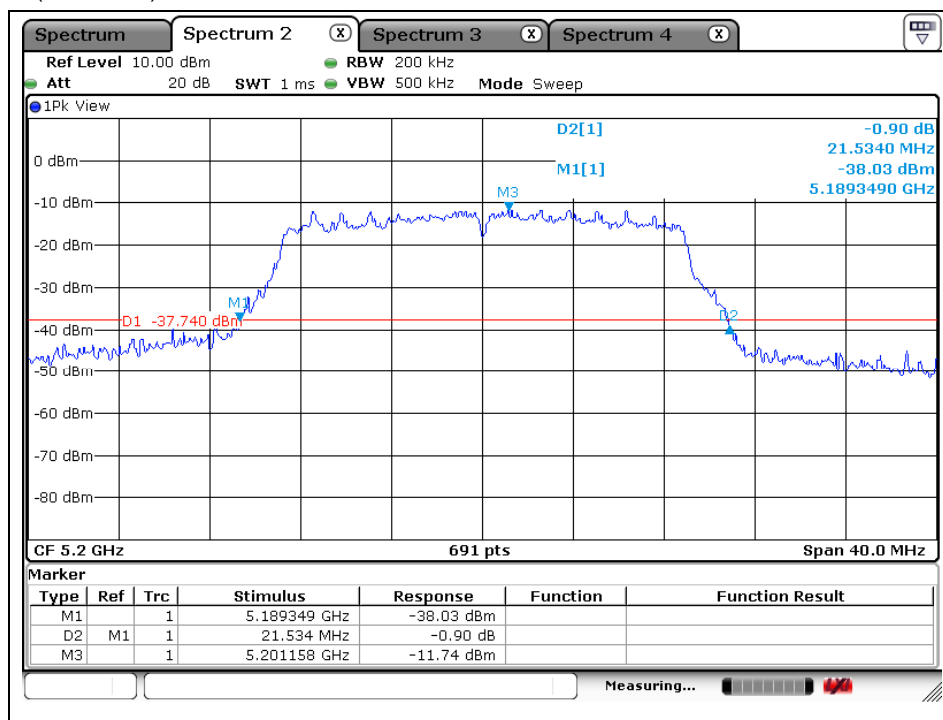
A4(210 mm x 297 mm)

## 802.11n\_HT20 (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 200 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

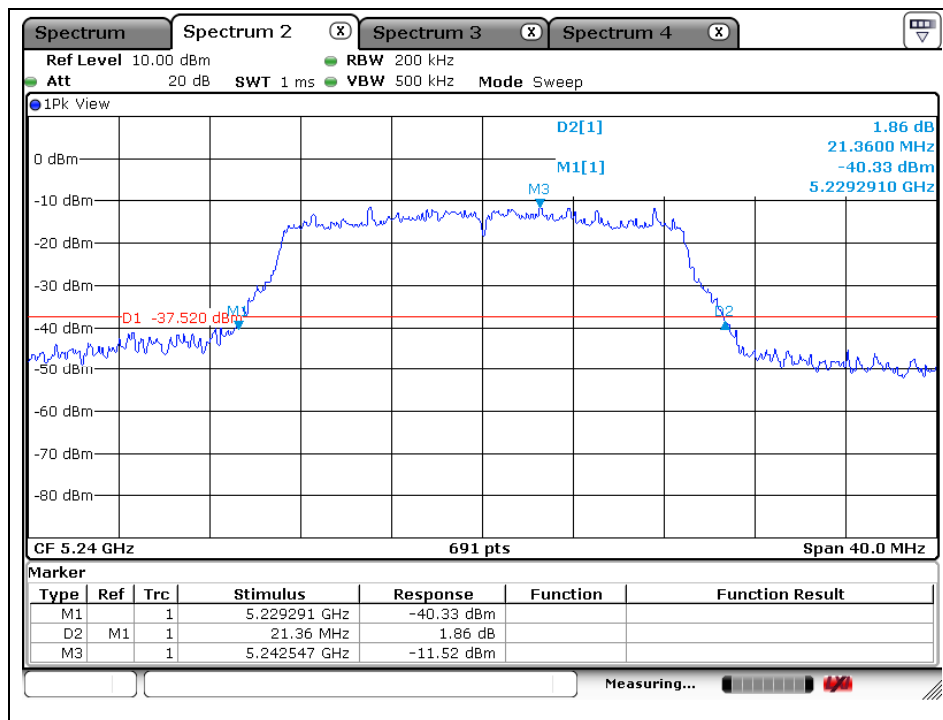
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

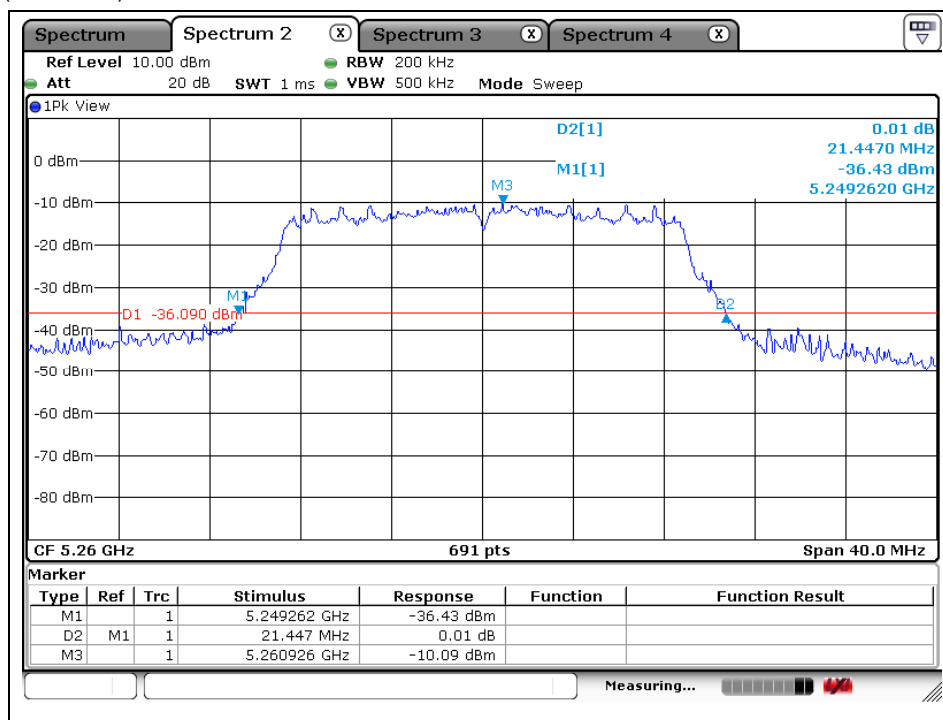
A4(210 mm x 297 mm)

## High Channel (5 240 MHz)



## 802.11n\_HT20 (Band 2A)

### Low Channel (5 260 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

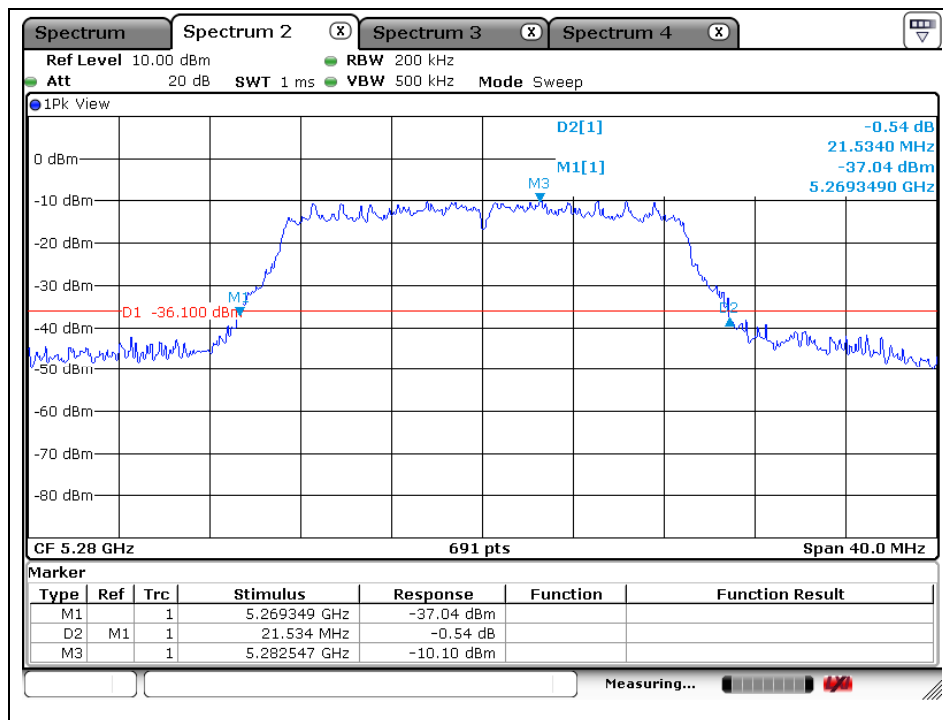
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

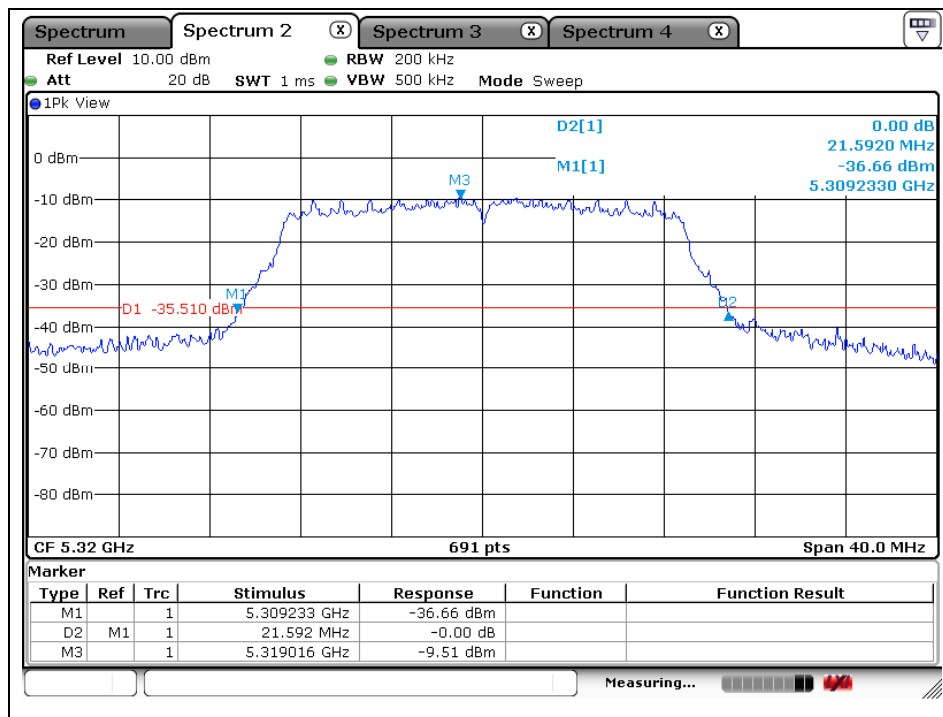
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 280 MHz)



## High Channel (5 320 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

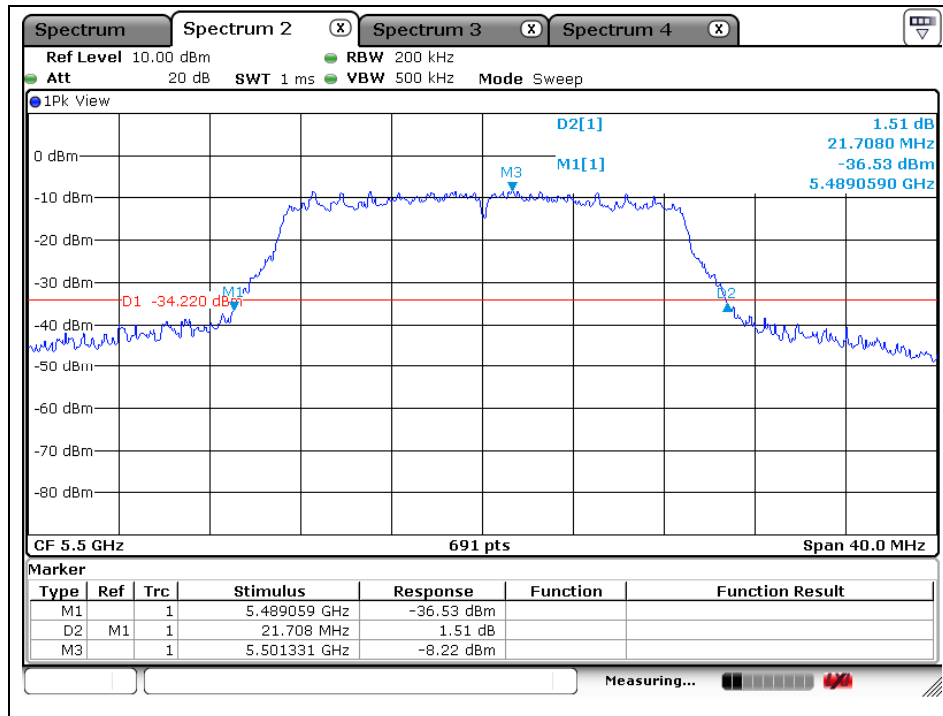
RTT5041-20(2015.10.01)(3)

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

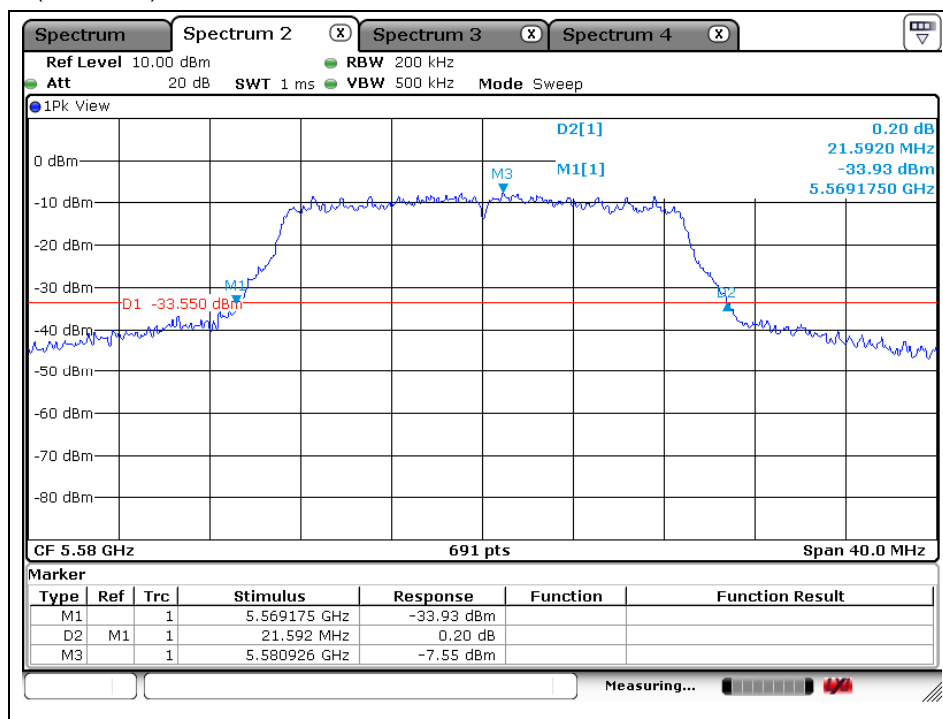
A4(210 mm x 297 mm)

## 802.11n\_HT20 (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

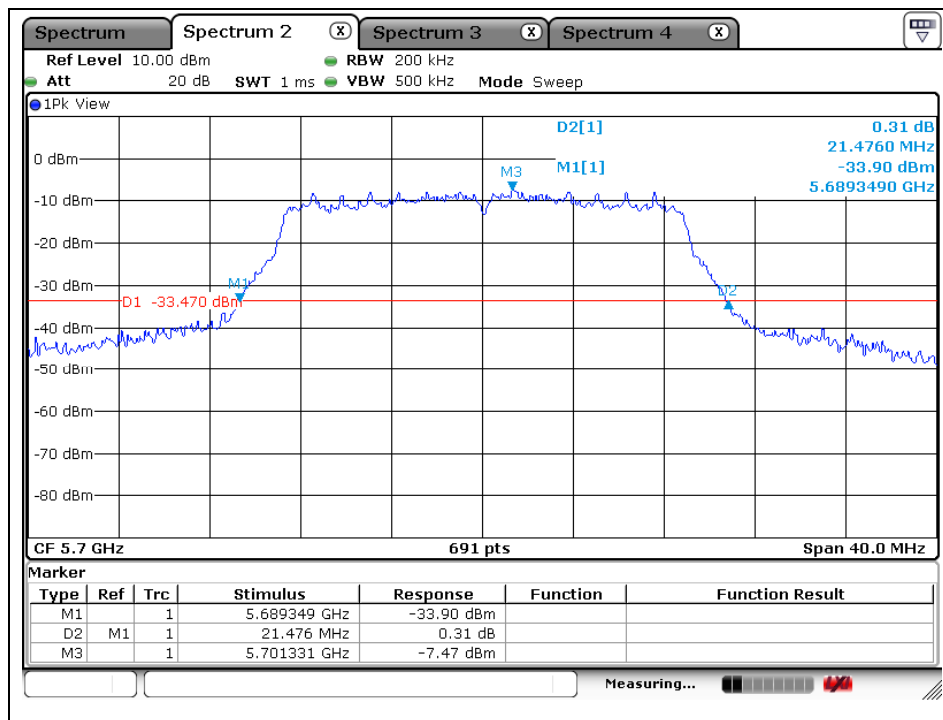
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

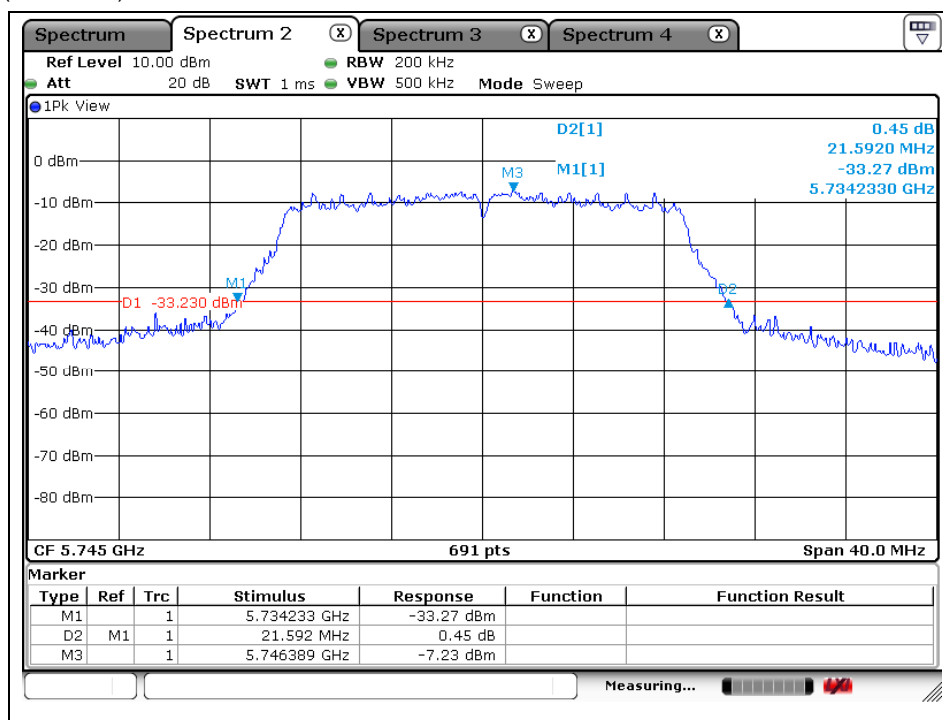
A4(210 mm x 297 mm)

## High Channel (5 700 MHz)



## 802.11n\_HT20 (Band 3)

### Low Channel (5 745 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

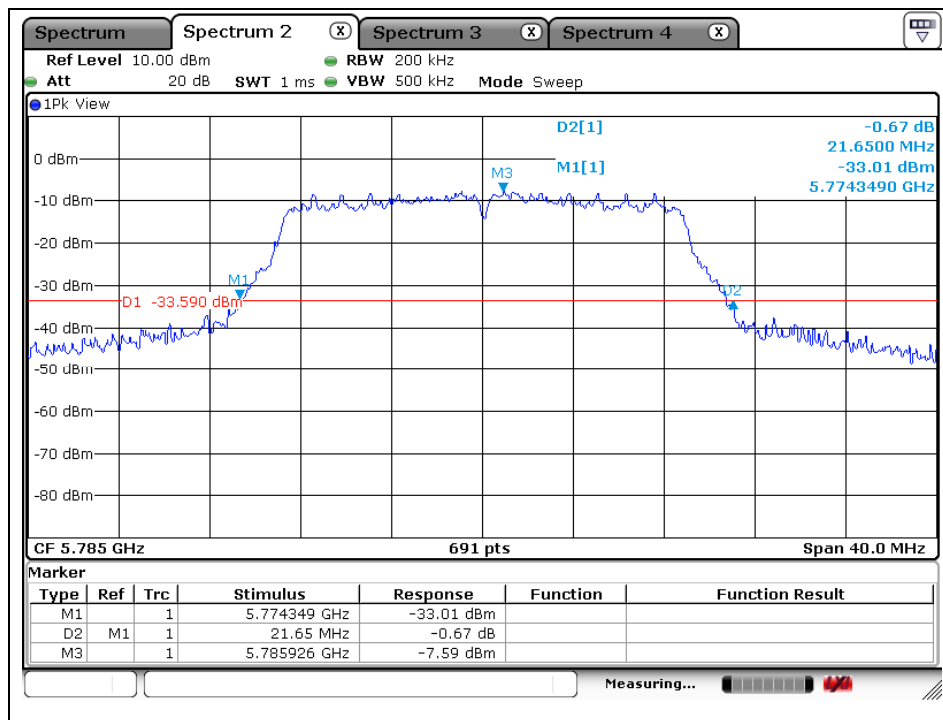
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

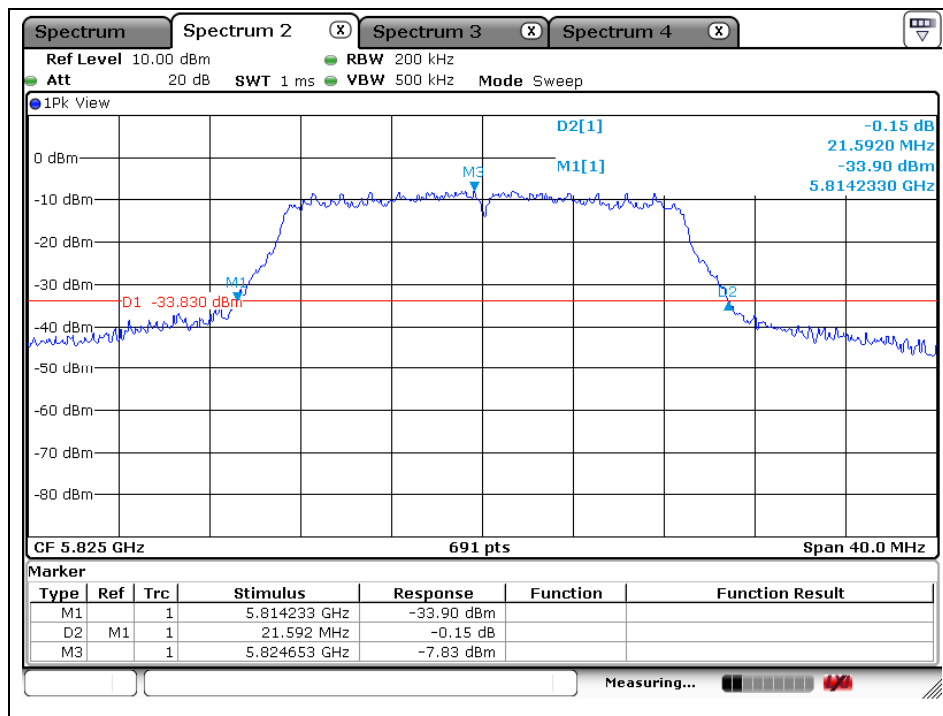
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 785 MHz)



## High Channel (5 825 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

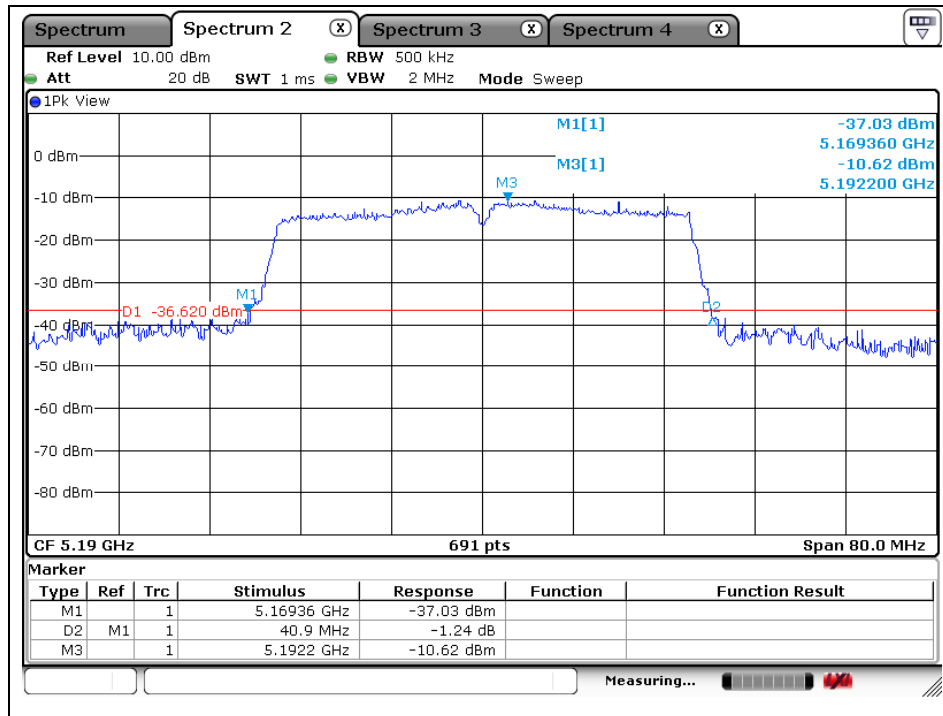
RTT5041-20(2015.10.01)(3)

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

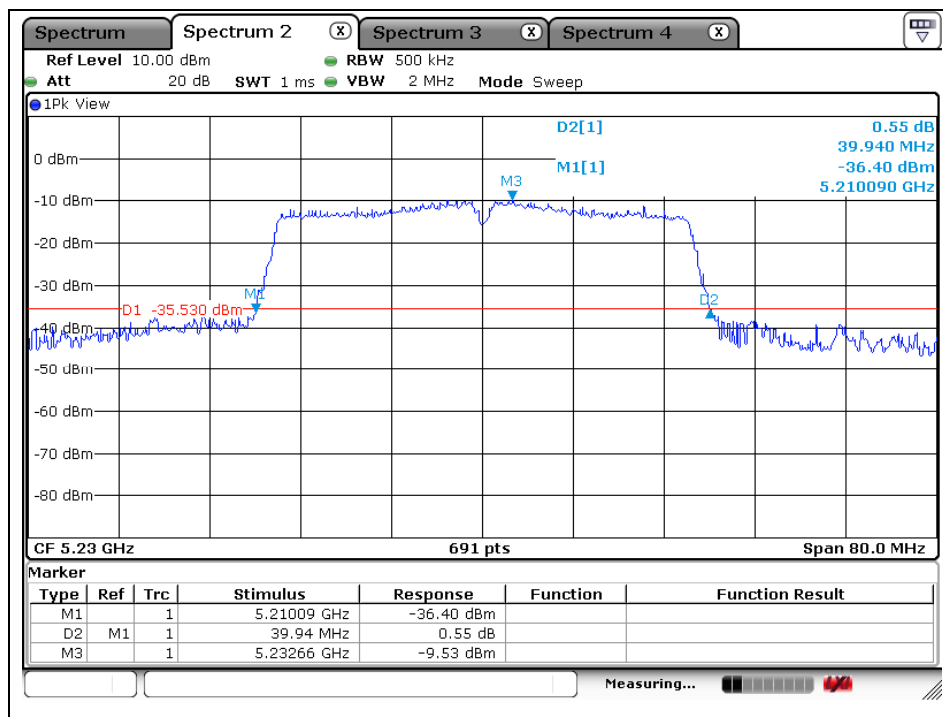
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 1)

Low Channel (5 190 MHz)



High Channel (5 230 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

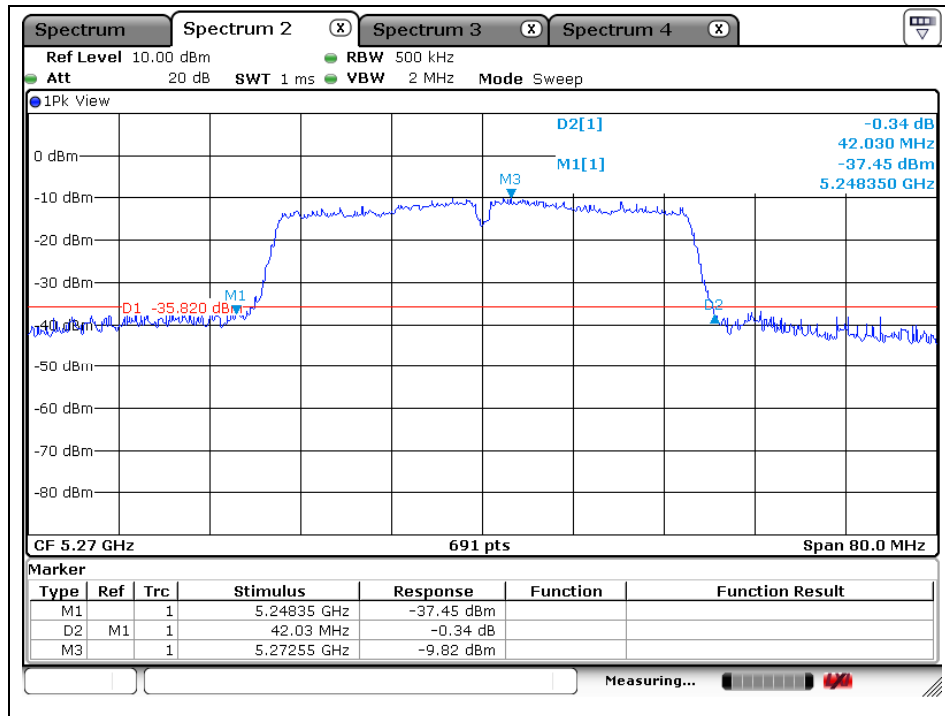
RTT5041-20(2015.10.01)(3)

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

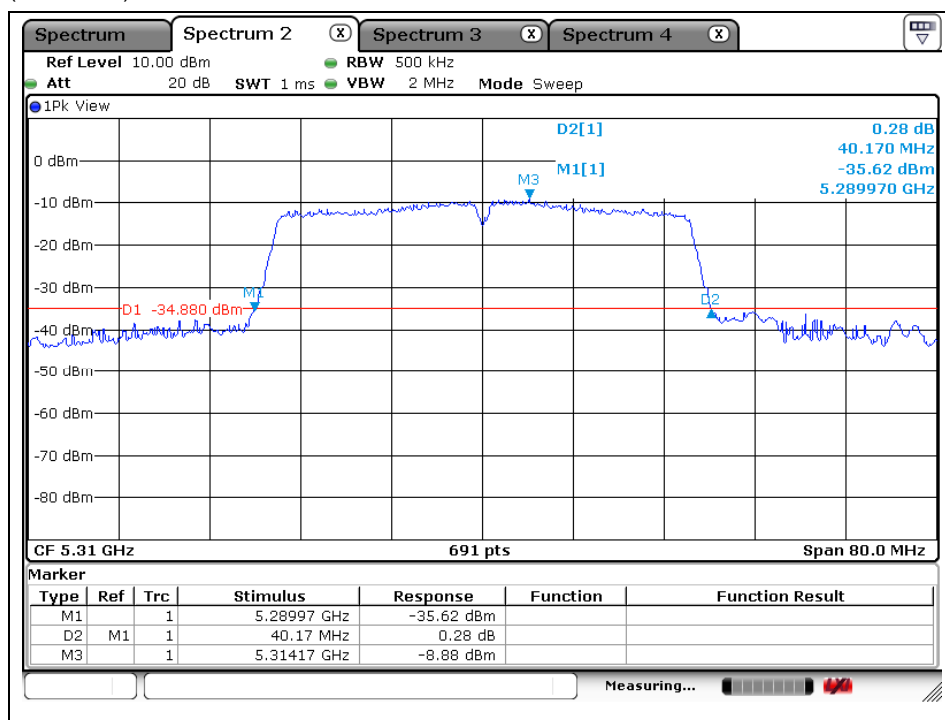
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 2A)

Low Channel (5 270 MHz)



High Channel (5 310 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

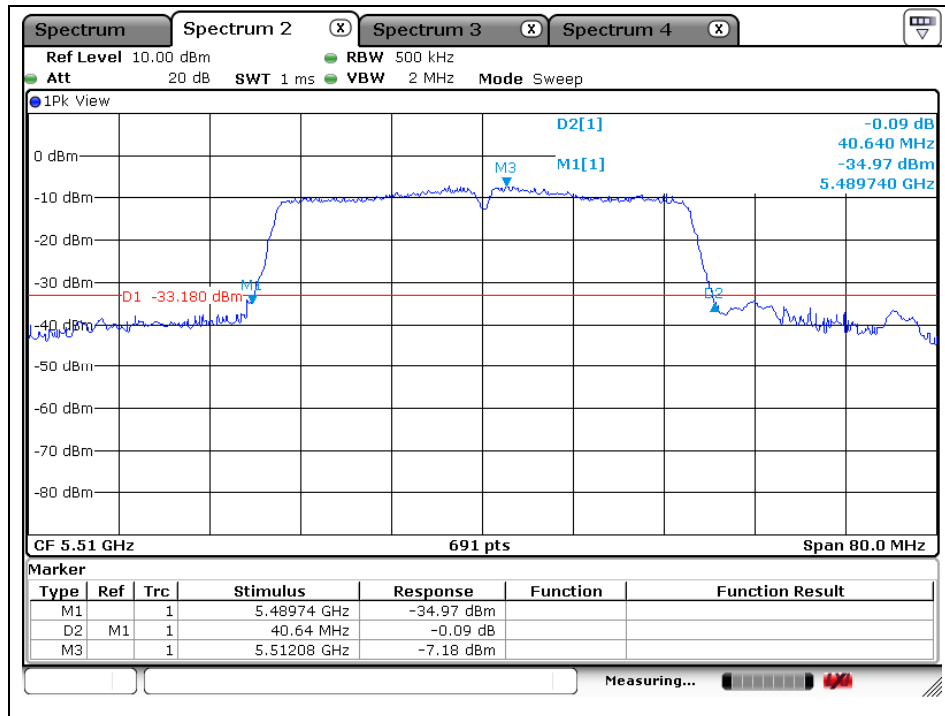
RTT5041-20(2015.10.01)(3)

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

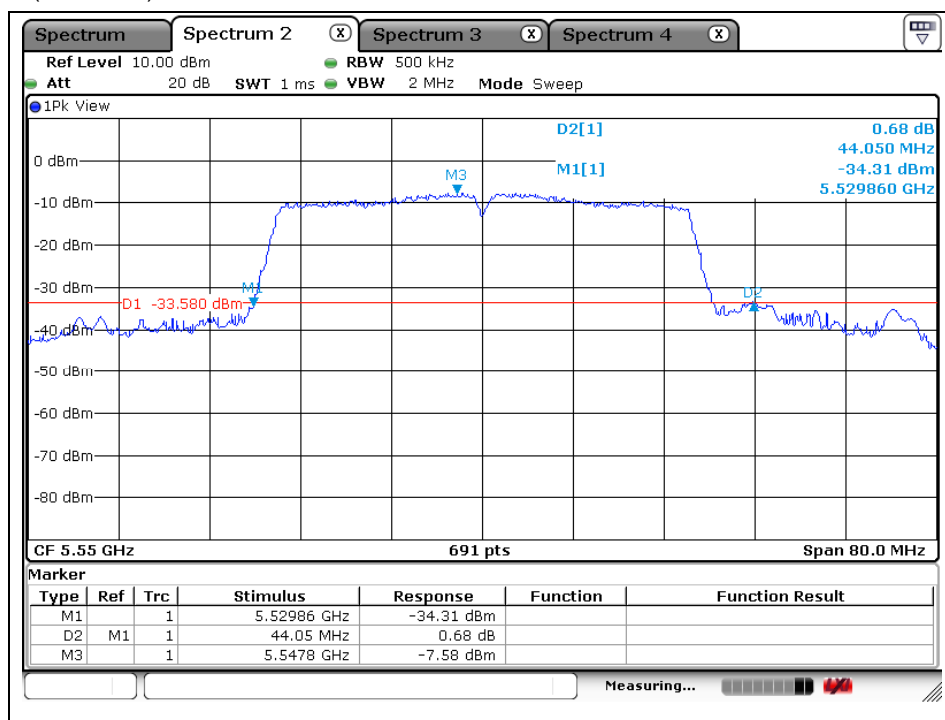
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 2C)

Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

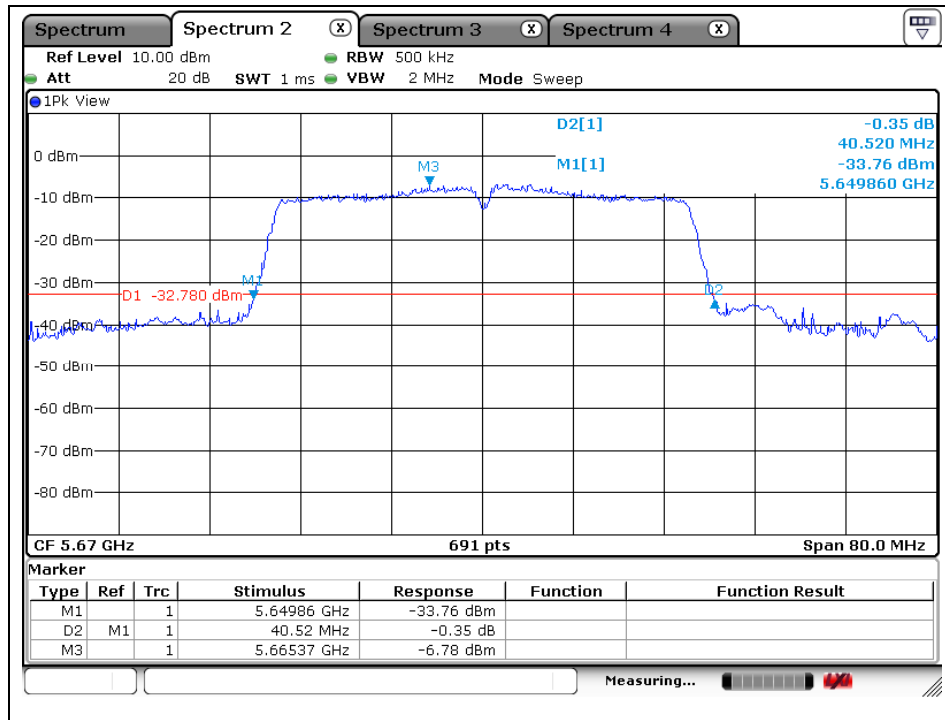
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

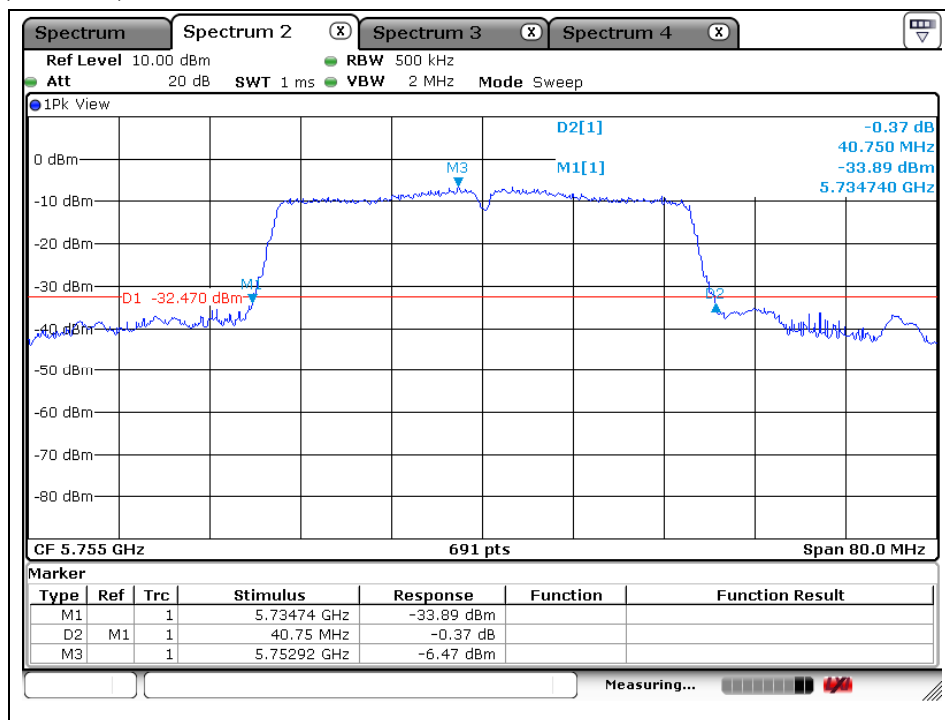
A4(210 mm x 297 mm)

High Channel (5 670 MHz)



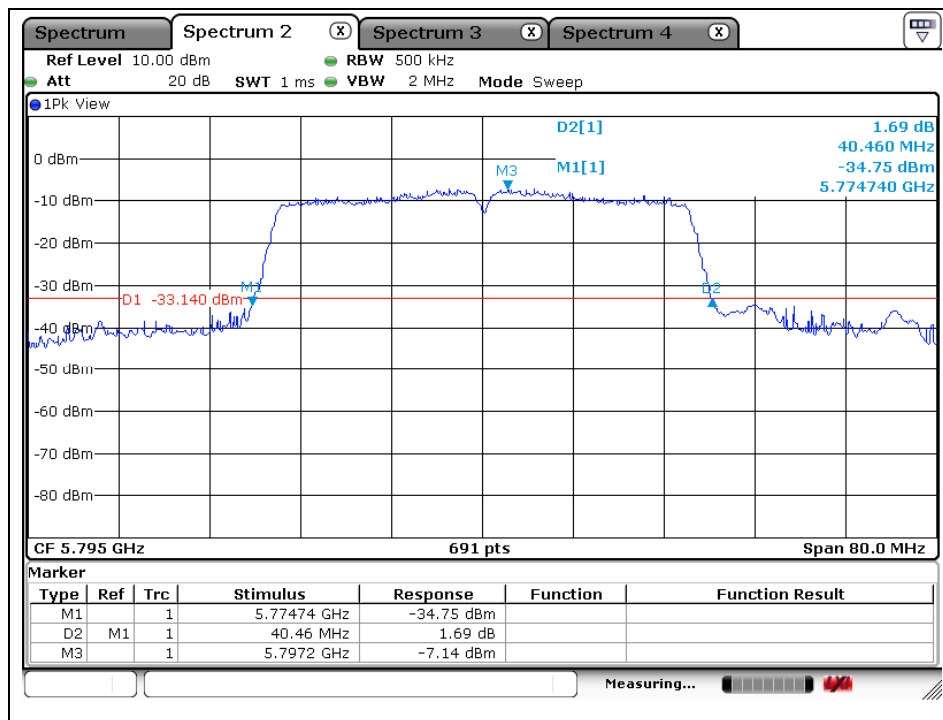
### 802.11n\_HT40 (Band 3)

Low Channel (5 755 MHz)



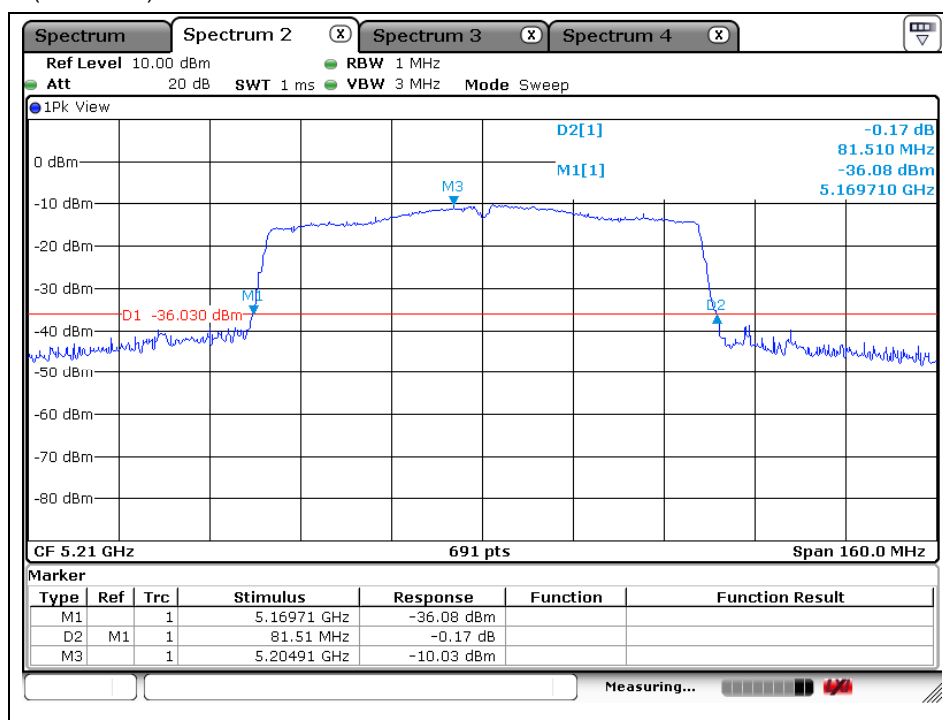
*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

## High Channel (5 795 MHz)



## 802.11ac\_VHT80 (Band 1)

### Middle Channel (5 210 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

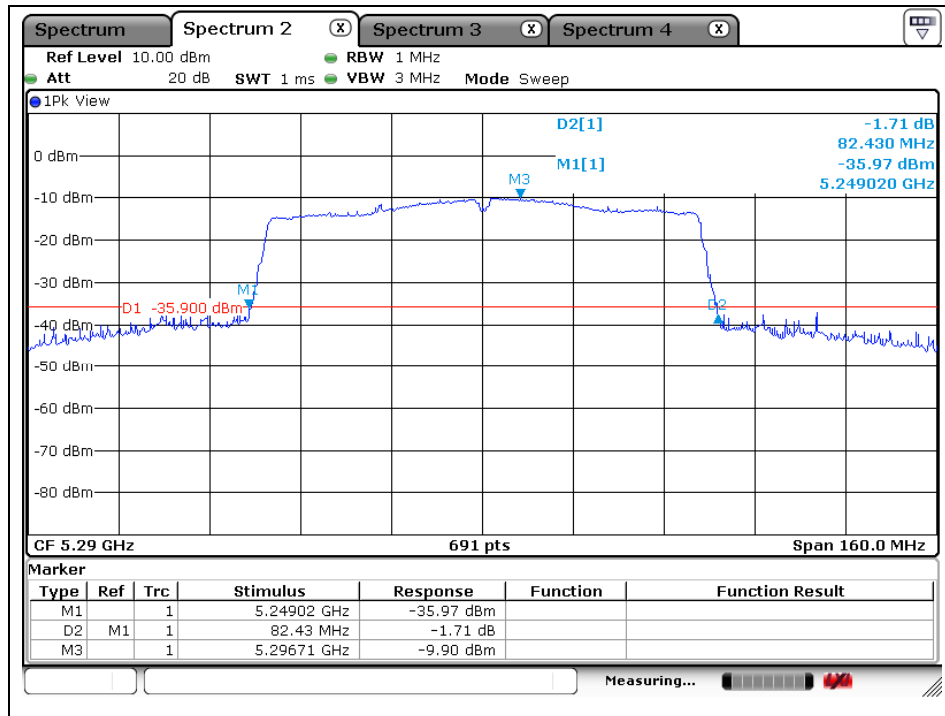
RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

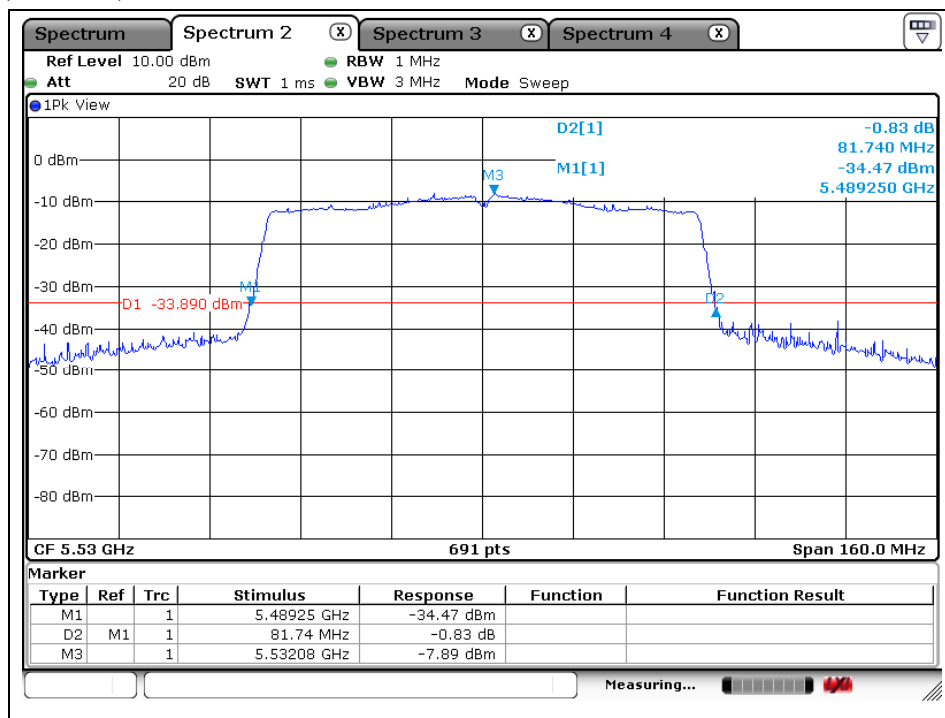
## 802.11ac\_VHT80 (Band 2A)

Middle Channel (5 290 MHz)



## 802.11ac\_VHT80 (Band 2C)

Low Channel (5 530 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

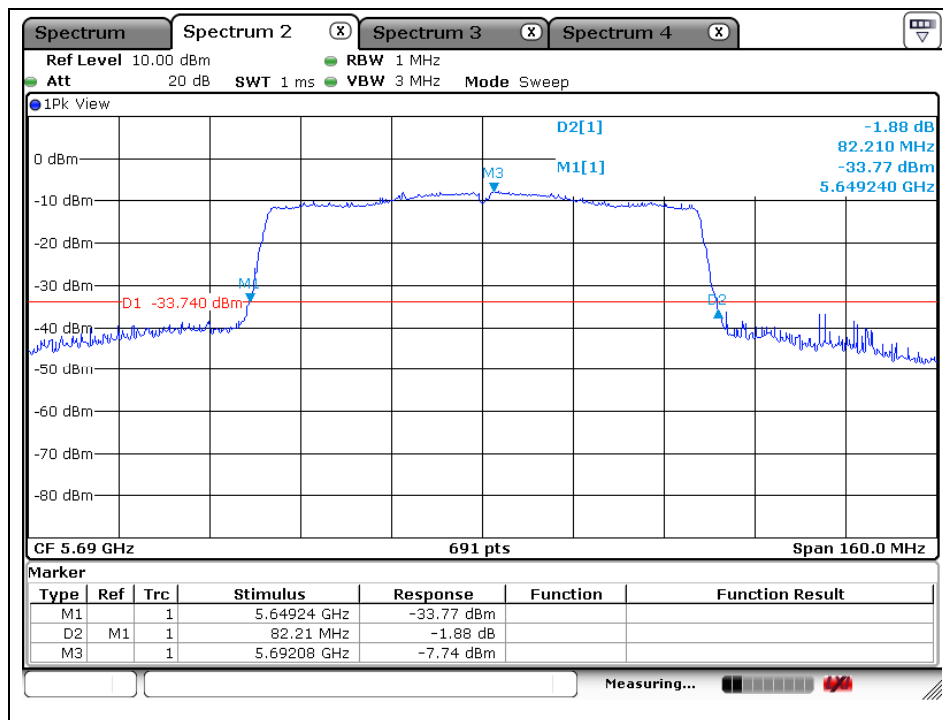
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

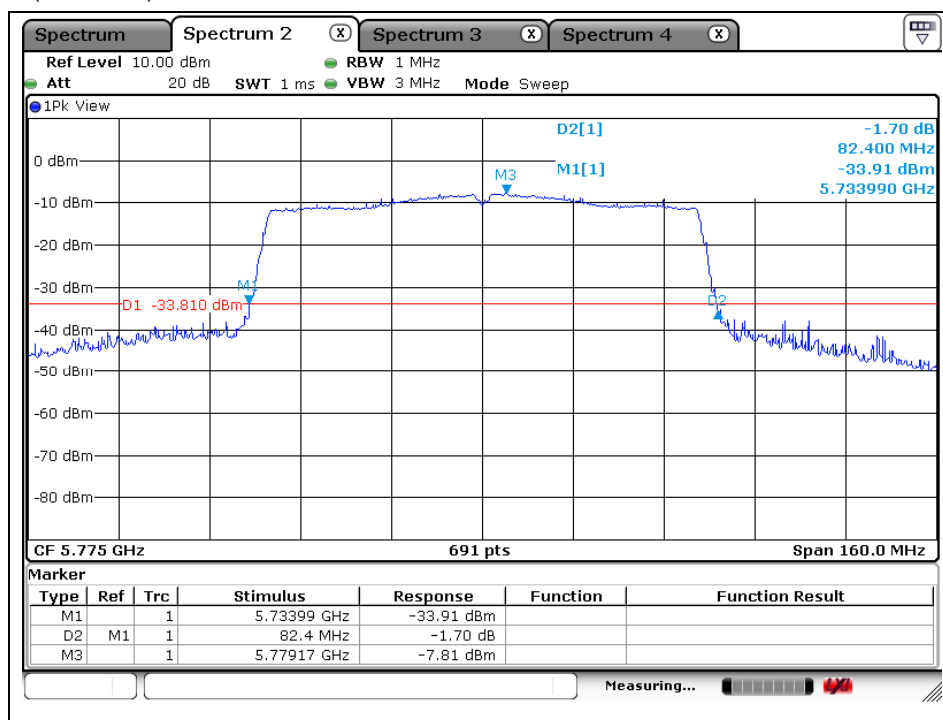
A4(210 mm x 297 mm)

## High Channel (5 690 MHz)



## 802.11ac\_VHT80 (Band 3)

### Middle Channel (5 775 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

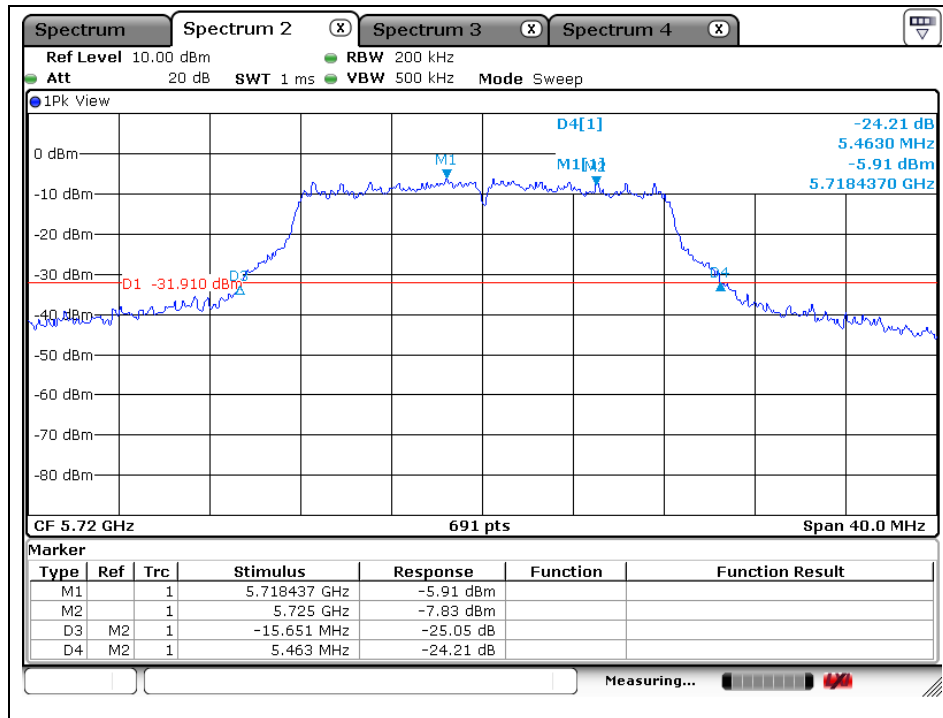
RTT5041-20(2015.10.01)(3)

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

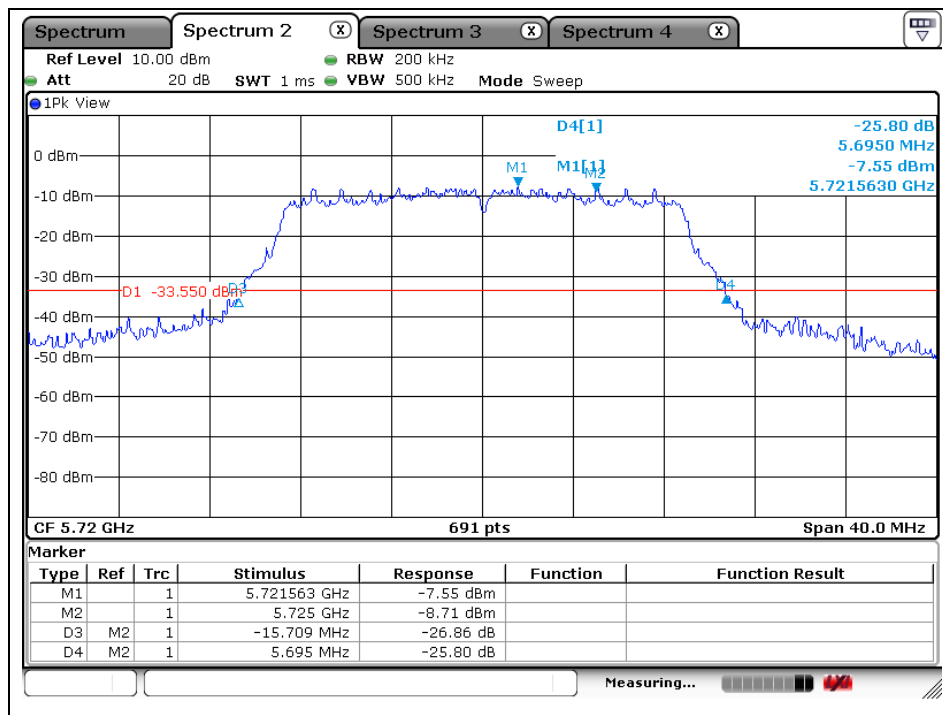
A4(210 mm x 297 mm)

## Band-crossing channels

### 802.11a (5 720 MHz)



### 802.11n\_HT20 (5 720 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

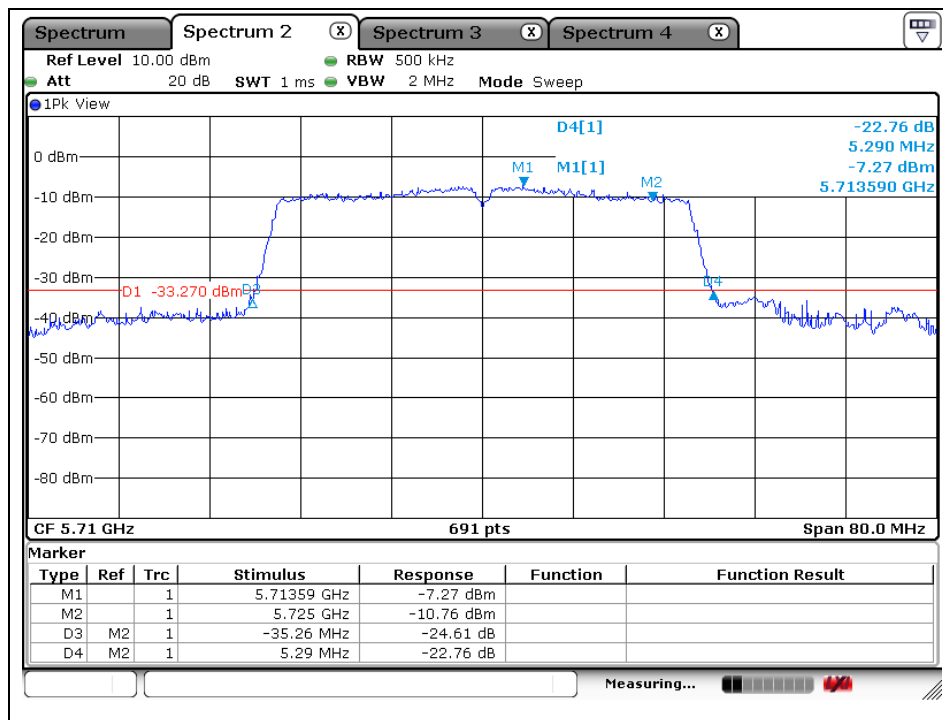
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

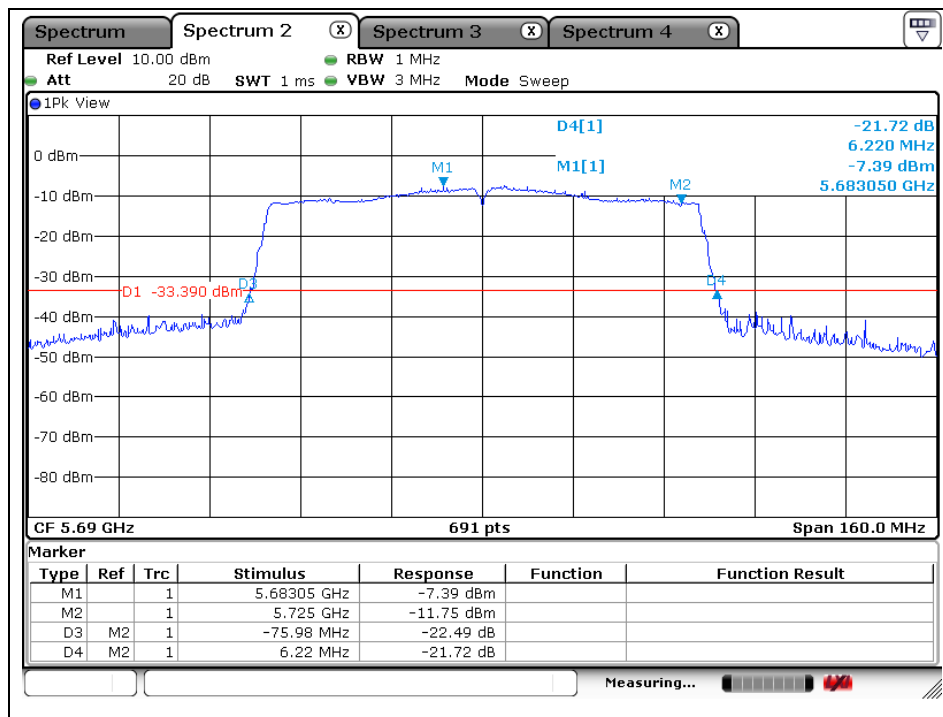
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## 802.11n\_HT40 (5 710 MHz)



## 802.11ac\_VHT80 (5 690 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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, for equipment operating in the band 5 725-5 850 MHz 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\_v01r03.
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.
9. In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545\_D03 v01.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

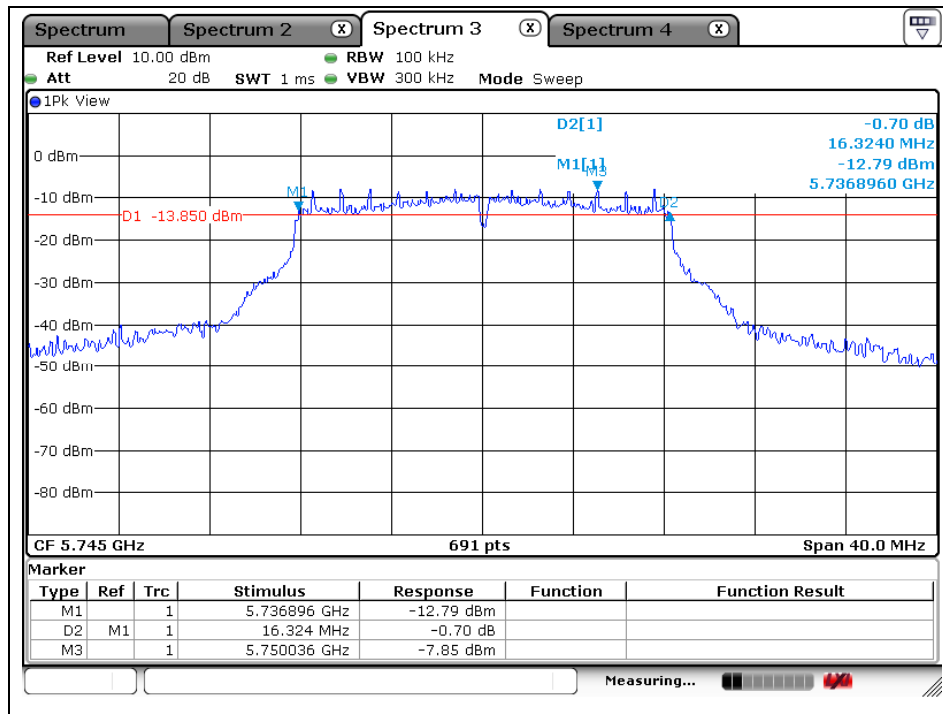
## 4.4. Test result

Ambient temperature : (23 ± 1) °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                | 16.32                | 500                     |
|                                     |            | 5 785           | 157 | 6                | 16.32                |                         |
|                                     |            | 5 825           | 165 | 6                | 16.32                |                         |
|                                     | 11n_HT20   | 5 745           | 149 | MCS0             | 17.60                |                         |
|                                     |            | 5 785           | 157 | MCS0             | 17.60                |                         |
|                                     |            | 5 825           | 165 | MCS0             | 17.54                |                         |
|                                     | 11n_HT40   | 5 755           | 151 | MCS0             | 36.32                |                         |
|                                     |            | 5 795           | 159 | MCS0             | 36.30                |                         |
|                                     | 11ac_VHT80 | 5 775           | 155 | MCS0             | 75.66                |                         |
| U-NII 3<br>(Band-Crossing channels) | 11a        | 5 720           | 144 | 6                | 3.26                 |                         |
|                                     | 11n_HT20   | 5 720           | 144 | MCS0             | 3.84                 |                         |
|                                     | 11n_HT40   | 5 710           | 142 | MCS0             | 3.09                 |                         |
|                                     | 11ac_VHT80 | 5 690           | 138 | MCS0             | 2.97                 |                         |

### 802.11a (Band 3)

Low Channel (5 745 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

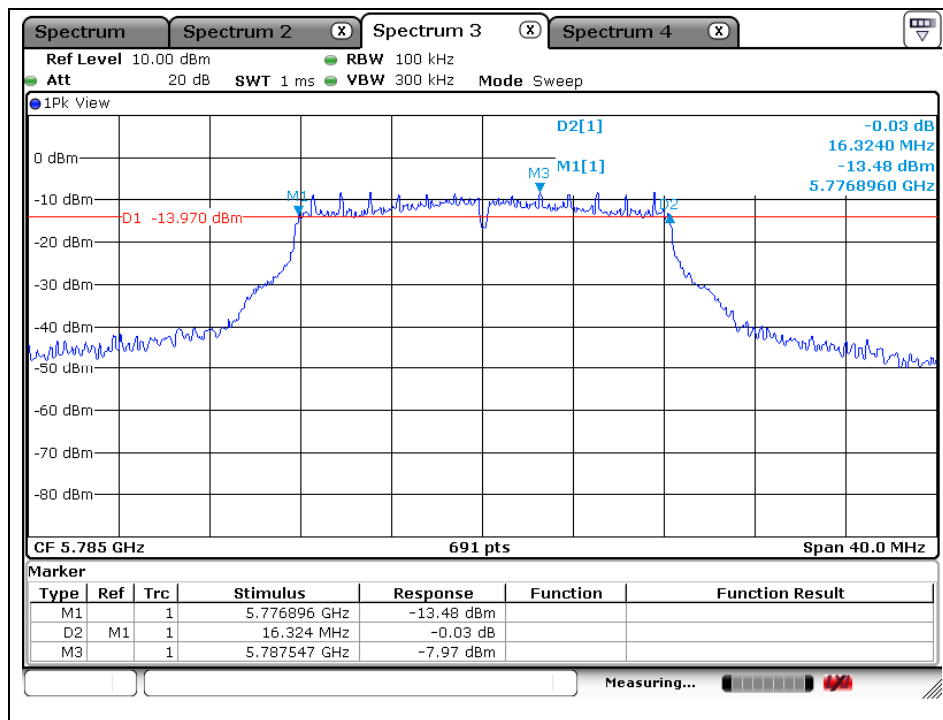
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

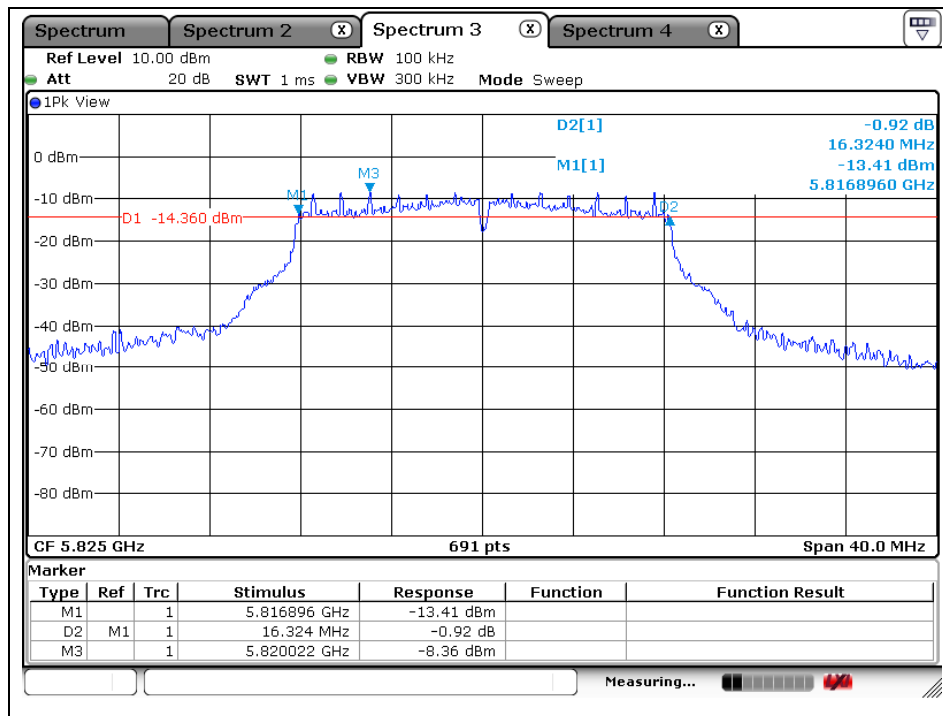
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 785 MHz)



## High Channel (5 825 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

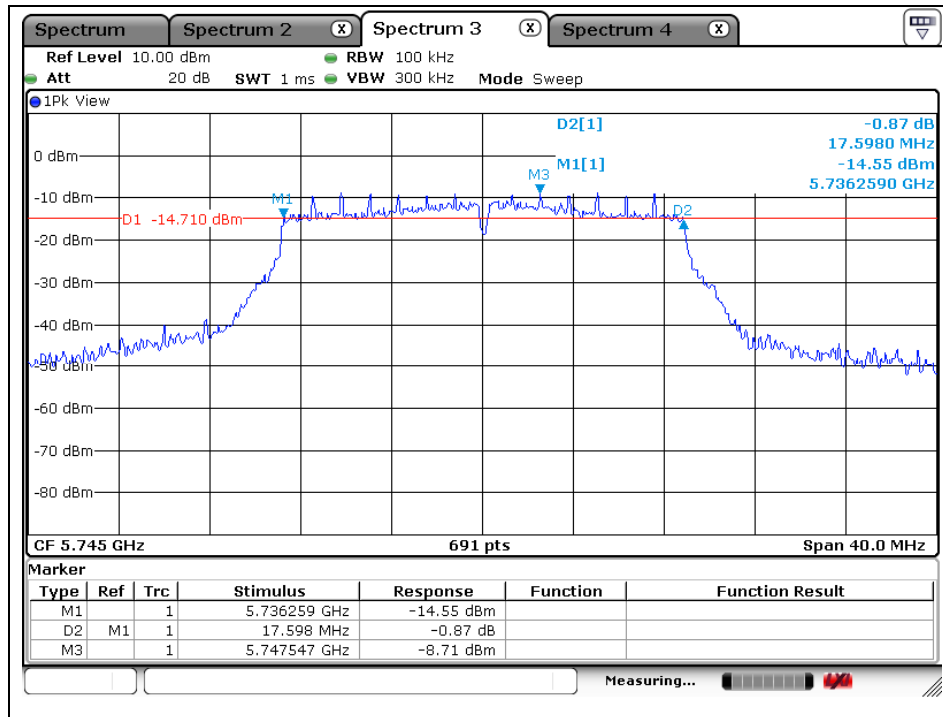
RTT5041-20(2015.10.01)(3)

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

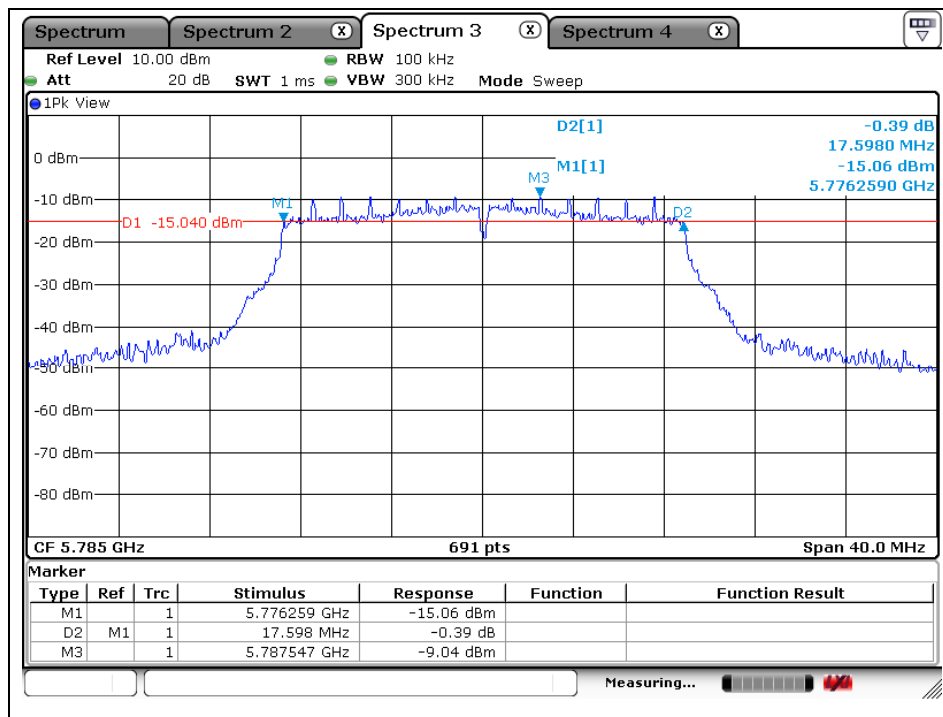
A4(210 mm x 297 mm)

## 802.11n\_HT20 (Band 3)

Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

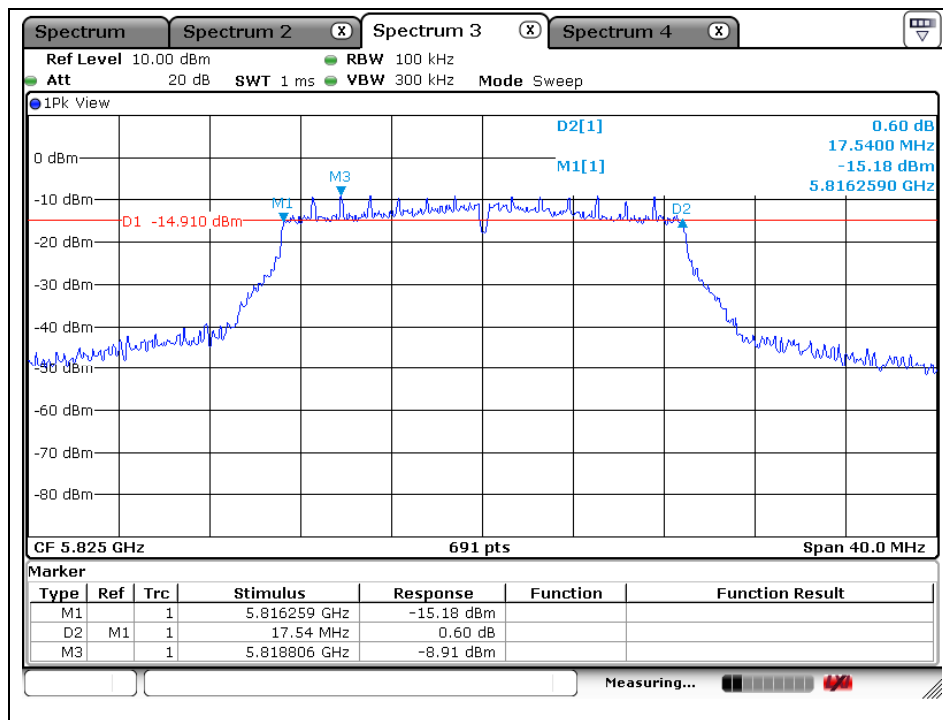
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

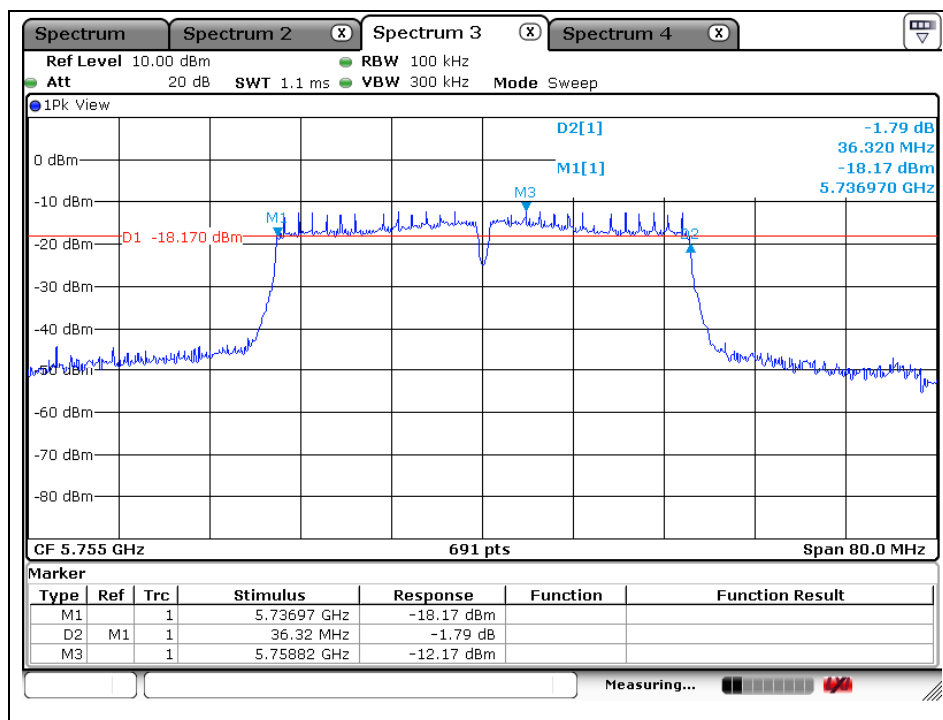
A4(210 mm x 297 mm)

## High Channel (5 825 MHz)



## 802.11n\_HT40 (Band 3)

### Low Channel (5 755 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

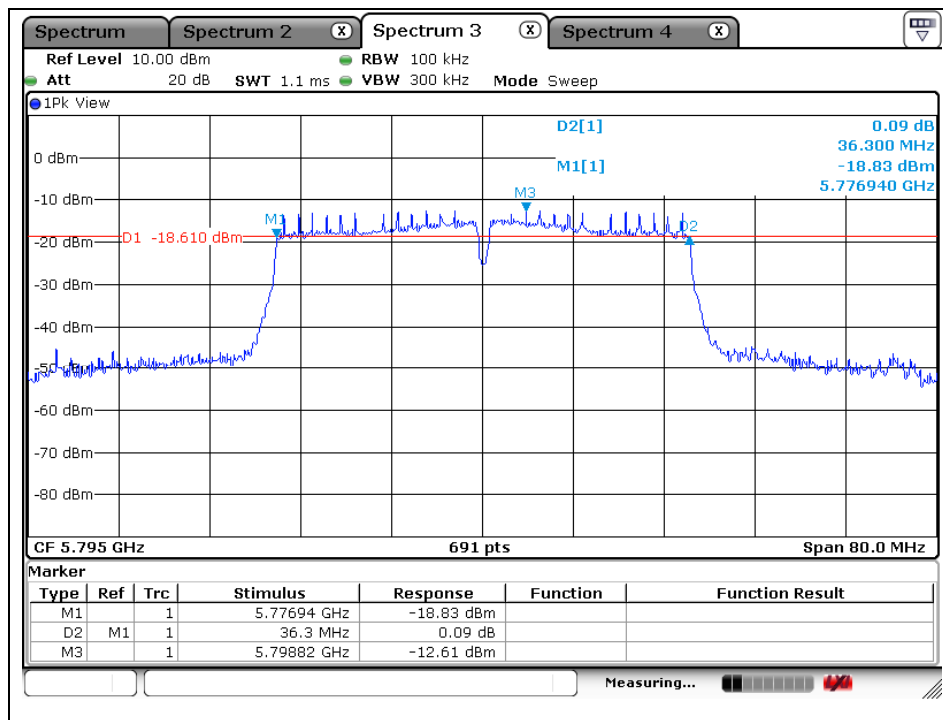
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

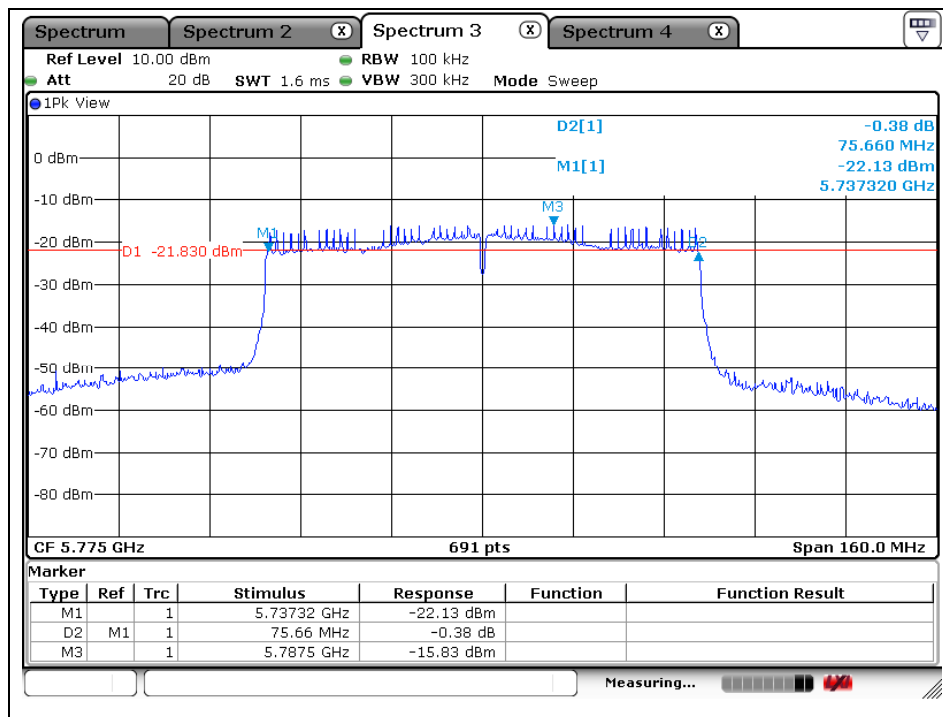
A4(210 mm x 297 mm)

## High Channel (5 795 MHz)



## 802.11ac\_VHT80 (Band 3)

### Middle Channel (5 775 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

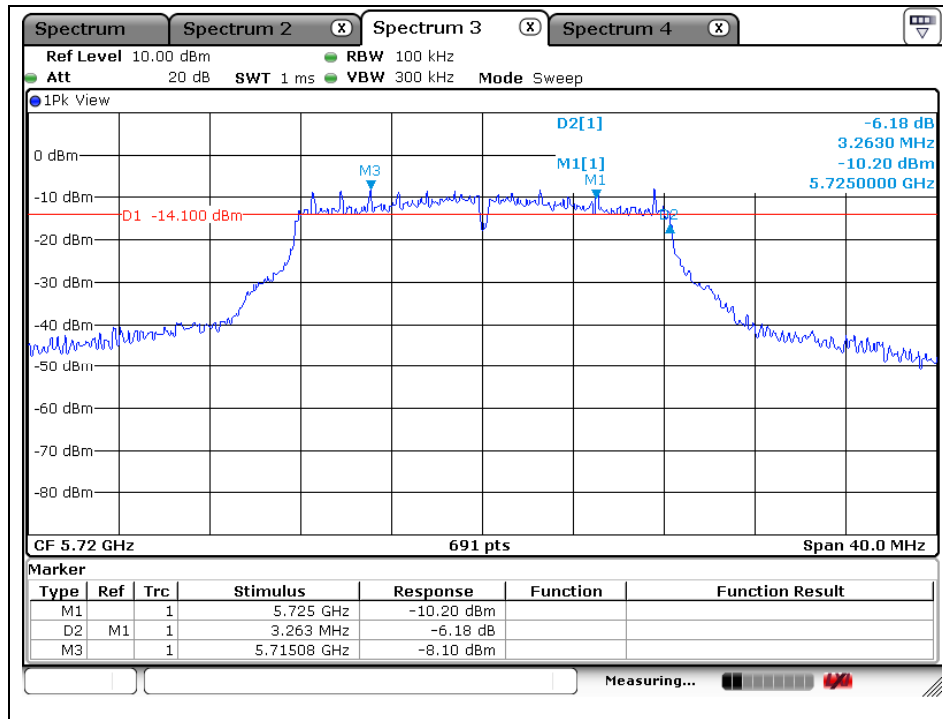
RTT5041-20(2015.10.01)(3)

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

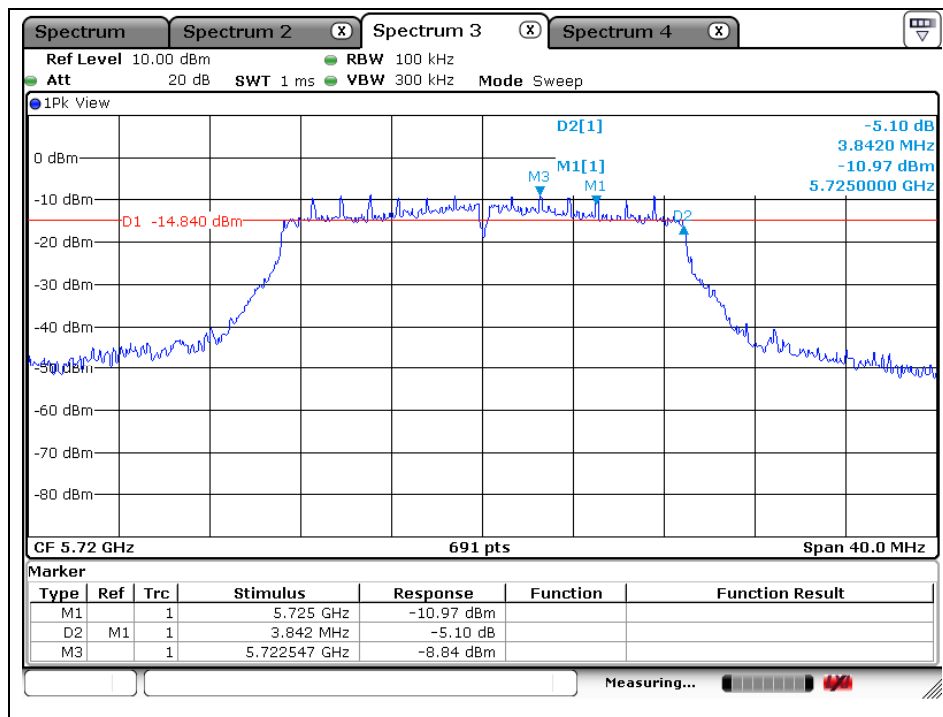
A4(210 mm x 297 mm)

## Band-crossing channels

802.11a (5 720 MHz)



802.11n\_HT20 (5 720 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

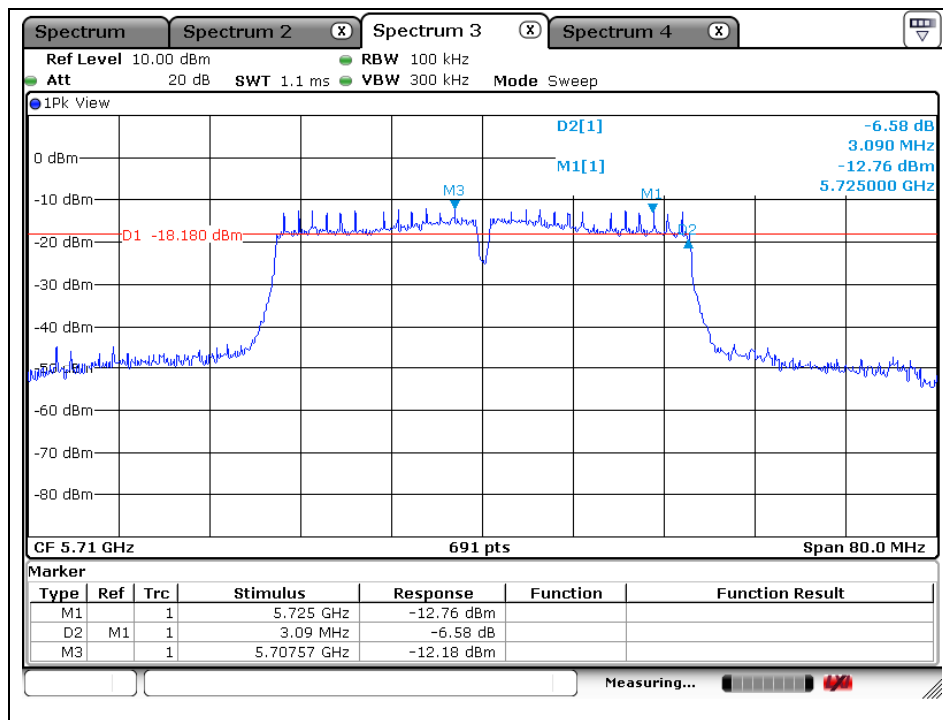
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

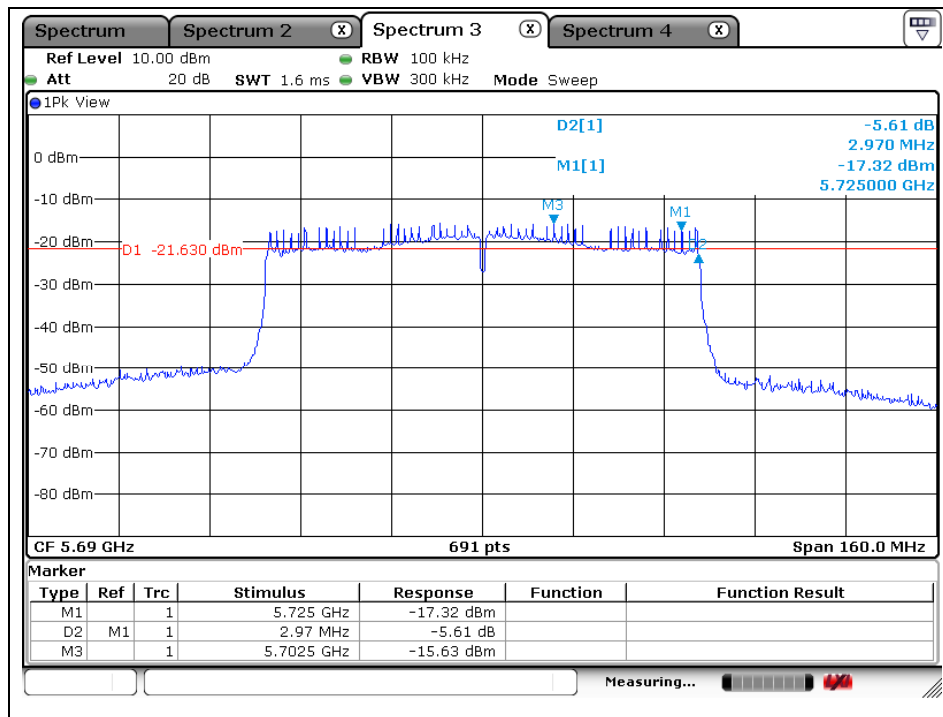
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## 802.11n\_HT40 (5 710 MHz)



## 802.11ac\_VHT80 (5 690 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

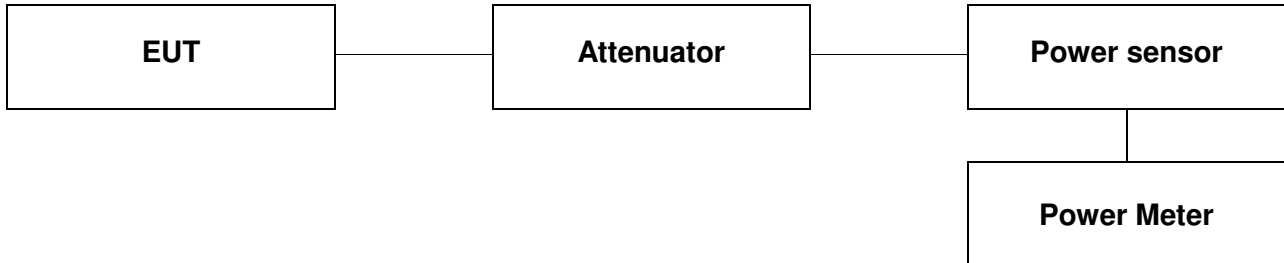
RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

## 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 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.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

### 5.2.2. IC

(1) According to RSS-247 Issue 2, 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  $1.76 + 10 \log_{10} B$ , dB m, whichever is less stringent. 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  $10 + 10 \log_{10} B$ , dB m, whichever power is less. B is the 99 % emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dB m in any 1.0 MHz band.

(2) According to RSS-247 Issue 2, 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  $1.76 + 10 \log_{10} B$ , dB m, whichever is less stringent. 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.

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

b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dB m, 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.

(3) According to RSS-247 Issue 2, 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  $11 + 10 \log_{10} B$ , dB m, whichever is less. The power spectral density shall not exceed 11 dB m in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dB m, 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.

(4) According to RSS-247 Issue 2, 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 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 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-multipoint<sup>3</sup> systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

### 5.3. Test procedure

1. This measurement settings are specified in section E.3.a of KDB 789033\_v01r03.
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 percent).
6. In case of band crossing channels 138, 142 and 144, the measurement is complied with section E.2.d of KDB 789033\_D02 v01r03 and section D of KDB 644545\_D03 v01.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

## 5.4. Test result

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

| Mode | Band     | Frequency (MHz) | Conducted Power (dB m) |                      |                             |                             |
|------|----------|-----------------|------------------------|----------------------|-----------------------------|-----------------------------|
|      |          |                 | Data Rate [Mbps]       | Average Power (dB m) | Duty Correction Factor (dB) | Average Power Result (dB m) |
| 11a  | U-NII 1  | 5 180           | 6                      | 13.54                | 0.32                        | <u>13.86</u>                |
|      |          | 5 200           | 6                      | 13.38                | 0.32                        | 13.70                       |
|      |          | 5 240           | 6                      | 13.08                | 0.32                        | 13.40                       |
|      | U-NII 2A | 5 260           | 6                      | 14.15                | 0.32                        | <u>14.47</u>                |
|      |          | 5 280           | 6                      | 14.12                | 0.32                        | 14.44                       |
|      |          | 5 320           | 6                      | 13.90                | 0.32                        | 14.22                       |
|      | U-NII 2C | 5 500           | 6                      | 12.91                | 0.32                        | 13.23                       |
|      |          | 5 580           | 6                      | 13.17                | 0.32                        | <u>13.49</u>                |
|      |          | 5 700           | 6                      | 13.02                | 0.32                        | 13.34                       |
|      | U-NII 3  | 5 745           | 6                      | 13.06                | 0.32                        | 13.38                       |
|      |          | 5 785           | 6                      | 13.05                | 0.32                        | 13.37                       |
|      |          | 5 825           | 6                      | 13.08                | 0.32                        | <u>13.40</u>                |

## FCC Limit

| Band     | Conducted Power Limit (dB m) |                    |                |                  |                     |              |
|----------|------------------------------|--------------------|----------------|------------------|---------------------|--------------|
|          | 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              |                |                  | -0.60               | 23.98        |
|          | 5 200                        |                    |                |                  |                     |              |
|          | 5 240                        |                    |                |                  |                     |              |
| U-NII 2A | 5 260                        | 23.98              | 21.157         | 24.25            | -0.60               | 23.98        |
|          | 5 280                        |                    | 21.302         | 24.28            |                     |              |
|          | 5 320                        |                    | 21.129         | 24.25            |                     |              |
| U-NII 2C | 5 500                        | 23.98              | 21.418         | 24.31            | -0.80               | 23.98        |
|          | 5 580                        |                    | 21.129         | 24.25            |                     |              |
|          | 5 700                        |                    | 21.129         | 24.25            |                     |              |
| U-NII 3  | 5 745                        | 30.00              |                |                  | -0.80               | 30.00        |
|          | 5 785                        |                    |                |                  |                     |              |
|          | 5 825                        |                    |                |                  |                     |              |

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

**IC Limit**

| Band     | Conducted Power Limit (dB m) |                    |               |                                 |                     |              |
|----------|------------------------------|--------------------|---------------|---------------------------------|---------------------|--------------|
|          | Frequency (MHz)              | Fixed Limit (dB m) | 99 % BW (MHz) | 10+10Log <sub>10</sub> B (dB m) | Antenna gain (dB i) | Limit (dB m) |
| U-NII 1  | 5 180                        | 23.01              | 17.771        | 22.50                           | -0.60               | 22.50        |
|          | 5 200                        |                    | 17.829        | 22.51                           |                     | 22.51        |
|          | 5 220                        |                    | 17.887        | 22.53                           |                     | 22.53        |
| Band     | Frequency (MHz)              | Fixed Limit (dB m) | 99 % BW (MHz) | 11+10Log <sub>10</sub> B (dB m) | Antenna gain (dB i) | Limit (dB m) |
| U-NII 2A | 5 260                        | 23.98              | 18.119        | 23.58                           | -0.60               | 23.58        |
|          | 5 280                        |                    | 18.003        | 23.55                           |                     | 23.55        |
|          | 5 320                        |                    | 17.887        | 23.53                           |                     | 23.53        |
| U-NII 2C | 5 500                        | 23.98              | 17.829        | 23.51                           | -0.80               | 23.51        |
|          | 5 580                        |                    | 17.887        | 23.53                           |                     | 23.53        |
|          | 5 700                        |                    | 17.887        | 23.53                           |                     | 23.53        |
| U-NII 3  | 5 745                        | 30.00              |               |                                 | -0.80               | 30.00        |
|          | 5 785                        |                    |               |                                 |                     |              |
|          | 5 825                        |                    |               |                                 |                     |              |

Remark:

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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

| Mode     | Band     | Frequency (MHz) | Conducted Power (dB m) |                      |                             |                             |
|----------|----------|-----------------|------------------------|----------------------|-----------------------------|-----------------------------|
|          |          |                 | Data Rate [Mbps]       | Average Power (dB m) | Duty Correction Factor (dB) | Average Power Result (dB m) |
| 11n_HT20 | U-NII 1  | 5 180           | MCS0                   | 12.26                | 0.32                        | <u>12.58</u>                |
|          |          | 5 200           | MCS0                   | 12.14                | 0.32                        | 12.46                       |
|          |          | 5 240           | MCS0                   | 11.92                | 0.32                        | 12.24                       |
|          | U-NII 2A | 5 260           | MCS0                   | 12.87                | 0.32                        | <u>13.19</u>                |
|          |          | 5 280           | MCS0                   | 12.62                | 0.32                        | 12.94                       |
|          |          | 5 320           | MCS0                   | 12.57                | 0.32                        | 12.89                       |
|          | U-NII 2C | 5 500           | MCS0                   | 11.61                | 0.32                        | 11.93                       |
|          |          | 5 580           | MCS0                   | 11.84                | 0.32                        | <u>12.16</u>                |
|          |          | 5 700           | MCS0                   | 11.61                | 0.32                        | 11.93                       |
|          | U-NII 3  | 5 745           | MCS0                   | 11.53                | 0.32                        | 11.85                       |
|          |          | 5 785           | MCS0                   | 11.60                | 0.32                        | 11.92                       |
|          |          | 5 825           | MCS0                   | 11.61                | 0.32                        | <u>11.93</u>                |

#### FCC Limit

| Band     | Conducted Power Limit (dB m) |                    |                |                  |                     |              |
|----------|------------------------------|--------------------|----------------|------------------|---------------------|--------------|
|          | 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              |                |                  | -0.60               | 23.98        |
|          | 5 200                        |                    |                |                  |                     |              |
|          | 5 240                        |                    |                |                  |                     |              |
| U-NII 2A | 5 260                        | 23.98              | 21.447         | 24.31            | -0.60               | 23.98        |
|          | 5 280                        |                    | 21.534         | 24.33            |                     |              |
|          | 5 320                        |                    | 21.592         | 24.34            |                     |              |
| U-NII 2C | 5 500                        | 23.98              | 21.708         | 24.37            | -0.80               | 23.98        |
|          | 5 580                        |                    | 21.592         | 24.34            |                     |              |
|          | 5 700                        |                    | 21.476         | 24.32            |                     |              |
| U-NII 3  | 5 745                        | 30.00              |                |                  | -0.80               | 30.00        |
|          | 5 785                        |                    |                |                  |                     |              |
|          | 5 825                        |                    |                |                  |                     |              |

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

**IC Limit**

| Band     | Conducted Power Limit (dB m) |                    |               |                                 |                     |              |
|----------|------------------------------|--------------------|---------------|---------------------------------|---------------------|--------------|
|          | Frequency (MHz)              | Fixed Limit (dB m) | 99 % BW (MHz) | 10+10Log <sub>10</sub> B (dB m) | Antenna gain (dB i) | Limit (dB m) |
| U-NII 1  | 5 180                        | 23.01              | 18.871        | 22.76                           | -0.60               | 22.76        |
|          | 5 200                        |                    | 18.640        | 22.70                           |                     | 22.70        |
|          | 5 240                        |                    | 18.698        | 22.72                           |                     | 22.72        |
| Band     | Frequency (MHz)              | Fixed Limit (dB m) | 99 % BW (MHz) | 11+10Log <sub>10</sub> B (dB m) | Antenna gain (dB i) | Limit (dB m) |
| U-NII 2A | 5 260                        | 23.98              | 18.813        | 23.74                           | -0.60               | 23.74        |
|          | 5 280                        |                    | 18.698        | 23.72                           |                     | 23.72        |
|          | 5 320                        |                    | 18.698        | 23.72                           |                     | 23.72        |
| U-NII 2C | 5 500                        | 23.98              | 18.755        | 23.73                           | -0.80               | 23.73        |
|          | 5 580                        |                    | 18.929        | 23.77                           |                     | 23.77        |
|          | 5 700                        |                    | 18.755        | 23.73                           |                     | 23.73        |
| U-NII 3  | 5 745                        | 30.00              |               |                                 | -0.80               | 30.00        |
|          | 5 785                        |                    |               |                                 |                     |              |
|          | 5 825                        |                    |               |                                 |                     |              |

Remark:

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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

| Mode     | Band     | Frequency (MHz) | Conducted Power (dB m) |                      |                             |                             |
|----------|----------|-----------------|------------------------|----------------------|-----------------------------|-----------------------------|
|          |          |                 | Data Rate [Mbps]       | Average Power (dB m) | Duty Correction Factor (dB) | Average Power Result (dB m) |
| 11n_HT40 | U-NII 1  | 5 190           | MCS0                   | 11.86                | 0.60                        | <u>12.46</u>                |
|          |          | 5 230           | MCS0                   | 11.61                | 0.60                        | 12.21                       |
|          | U-NII 2A | 5 270           | MCS0                   | 12.53                | 0.60                        | <u>13.13</u>                |
|          |          | 5 310           | MCS0                   | 12.33                | 0.60                        | 12.93                       |
|          | U-NII 2C | 5 510           | MCS0                   | 11.31                | 0.60                        | 11.91                       |
|          |          | 5 550           | MCS0                   | 11.41                | 0.60                        | 12.01                       |
|          |          | 5 670           | MCS0                   | 11.74                | 0.60                        | <u>12.34</u>                |
|          | U-NII 3  | 5 755           | MCS0                   | 11.65                | 0.60                        | 12.25                       |
|          |          | 5 795           | MCS0                   | 11.69                | 0.60                        | <u>12.29</u>                |

#### FCC Limit

| Band     | Conducted Power Limit (dB m) |                    |                |                  |                     |              |
|----------|------------------------------|--------------------|----------------|------------------|---------------------|--------------|
|          | 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              |                |                  | -0.60               | 23.98        |
|          | 5 230                        |                    |                |                  |                     |              |
| U-NII 2A | 5 270                        | 23.98              | 42.030         | 27.24            | -0.60               | 23.98        |
|          | 5 310                        |                    | 40.170         | 27.04            |                     |              |
| U-NII 2C | 5 510                        | 23.98              | 40.640         | 27.09            | -0.80               | 23.98        |
|          | 5 550                        |                    | 44.050         | 27.44            |                     |              |
|          | 5 670                        |                    | 40.520         | 27.08            |                     |              |
| U-NII 3  | 5 755                        | 30.00              |                |                  | -0.80               | 30.00        |
|          | 5 795                        |                    |                |                  |                     |              |

#### IC Limit

| Band     | Conducted Power Limit (dB m) |                    |               |                                 |                     |              |
|----------|------------------------------|--------------------|---------------|---------------------------------|---------------------|--------------|
|          | Frequency (MHz)              | Fixed Limit (dB m) | 99 % BW (MHz) | 10+10Log <sub>10</sub> B (dB m) | Antenna gain (dB i) | Limit (dB m) |
| U-NII 1  | 5 190                        | 23.01              | 36.585        | 25.63                           | -0.60               | 23.01        |
|          | 5 230                        |                    | 36.353        | 25.61                           |                     |              |
| U-NII 2A | 5 270                        | 23.98              | 36.353        | 26.61                           | -0.60               | 23.98        |
|          | 5 310                        |                    | 36.237        | 26.59                           |                     |              |
| U-NII 2C | 5 510                        | 23.98              | 36.353        | 26.61                           | -0.80               | 23.98        |
|          | 5 550                        |                    | 36.353        | 26.61                           |                     |              |
|          | 5 670                        |                    | 36.353        | 26.61                           |                     |              |
| U-NII 3  | 5 755                        | 30.00              |               |                                 | -0.80               | 30.00        |
|          | 5 795                        |                    |               |                                 |                     |              |

Remark:

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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

| Mode       | Band     | Frequency (MHz) | Conducted Power (dB m) |                      |                             |                             |
|------------|----------|-----------------|------------------------|----------------------|-----------------------------|-----------------------------|
|            |          |                 | Data Rate [Mbps]       | Average Power (dB m) | Duty Correction Factor (dB) | Average Power Result (dB m) |
| 11ac_VHT80 | U-NII 1  | 5 210           | MCS0                   | 9.98                 | 1.19                        | <u>11.17</u>                |
|            | U-NII 2A | 5 290           | MCS0                   | 10.71                | 1.19                        | <u>11.90</u>                |
|            | U-NII 2C | 5 530           | MCS0                   | 9.71                 | 1.19                        | 10.90                       |
|            |          | 5 690           | MCS0                   | 9.87                 | 1.19                        | <u>11.06</u>                |
|            | U-NII 3  | 5 775           | MCS0                   | 9.92                 | 1.19                        | <u>11.11</u>                |

#### FCC Limit

| Band     | Conducted Power Limit (dB m) |                    |                |                  |                     |              |
|----------|------------------------------|--------------------|----------------|------------------|---------------------|--------------|
|          | 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              |                |                  | -0.60               | 23.98        |
| U-NII 2A | 5 290                        | 23.98              | 82.430         | 30.16            | -0.60               | 23.98        |
| U-NII 2C | 5 530                        | 23.98              | 81.740         | 30.12            | -0.80               | 23.98        |
|          | 5 690                        |                    | 82.210         | 30.15            |                     |              |
| U-NII 3  | 5 775                        | 30.00              |                |                  | -0.80               | 30.00        |

#### IC Limit

| Band     | Conducted Power Limit (dB m) |                    |               |                                 |                     |              |
|----------|------------------------------|--------------------|---------------|---------------------------------|---------------------|--------------|
|          | Frequency (MHz)              | Fixed Limit (dB m) | 99 % BW (MHz) | 10+10Log <sub>10</sub> B (dB m) | Antenna gain (dB i) | Limit (dB m) |
| U-NII 1  | 5 210                        | 23.01              | 75.253        | 28.77                           | -0.60               | 23.01        |
| Band     | Frequency (MHz)              | Fixed Limit (dB m) | 99 % BW (MHz) | 11+10Log <sub>10</sub> B (dB m) | Antenna gain (dB i) | Limit (dB m) |
| U-NII 2A | 5 290                        | 23.98              | 75.253        | 29.77                           | -0.60               | 23.98        |
| U-NII 2C | 5 530                        | 23.98              | 75.485        | 29.78                           | -0.80               | 23.98        |
|          | 5 690                        |                    | 75.485        | 29.78                           |                     |              |
| U-NII 3  | 5 775                        | 30.00              |               |                                 | -0.80               | 30.00        |

Remark:

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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

### -Band-crossing channels

| Band     | Mode       | Frequency (MHz) | Conducted Power (dB m) |                      |                             |                             |
|----------|------------|-----------------|------------------------|----------------------|-----------------------------|-----------------------------|
|          |            |                 | Data Rate [Mbps]       | Average Power (dB m) | Duty Correction Factor (dB) | Average Power Result (dB m) |
| U-NII 2C | 11a        | 5 720           | 6                      | 11.65                | 0.32                        | 11.97                       |
| U-NII 3  |            |                 | 6                      | 4.25                 | 0.32                        | 4.57                        |
| U-NII 2C | 11n_HT20   | 5 720           | MCS0                   | 10.47                | 0.32                        | 10.79                       |
| U-NII 3  |            |                 | MCS0                   | 3.50                 | 0.32                        | 3.82                        |
| U-NII 2C | 11n_HT40   | 5 710           | MCS0                   | 11.00                | 0.60                        | 11.60                       |
| U-NII 3  |            |                 | MCS0                   | 0                    | 0.60                        | 0.60                        |
| U-NII 2C | 11ac_VHT80 | 5 690           | MCS0                   | 9.61                 | 1.19                        | 10.80                       |
| U-NII 3  |            |                 | MCS0                   | -5.26                | 1.19                        | -4.07                       |

| Band     | Mode       | Conducted Power Limit (dB m) |                    |                |                  |                     |              |
|----------|------------|------------------------------|--------------------|----------------|------------------|---------------------|--------------|
|          |            | 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              | 15.651         | 22.95            | -0.80               | 22.95        |
| U-NII 3  |            |                              |                    |                |                  |                     | 30.00        |
| U-NII 2C | 11n_HT20   | 5 720                        | 23.98              | 15.709         | 22.96            | -0.80               | 22.96        |
| U-NII 3  |            |                              |                    |                |                  |                     | 30.00        |
| U-NII 2C | 11n_HT40   | 5 710                        | 23.98              | 35.260         | 26.47            | -0.80               | 23.98        |
| U-NII 3  |            |                              |                    |                |                  |                     | 30.00        |
| U-NII 2C | 11ac_VHT80 | 5 690                        | 23.98              | 75.980         | 29.81            | -0.80               | 23.98        |
| U-NII 3  |            |                              |                    |                |                  |                     | 30.00        |

Remark:

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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

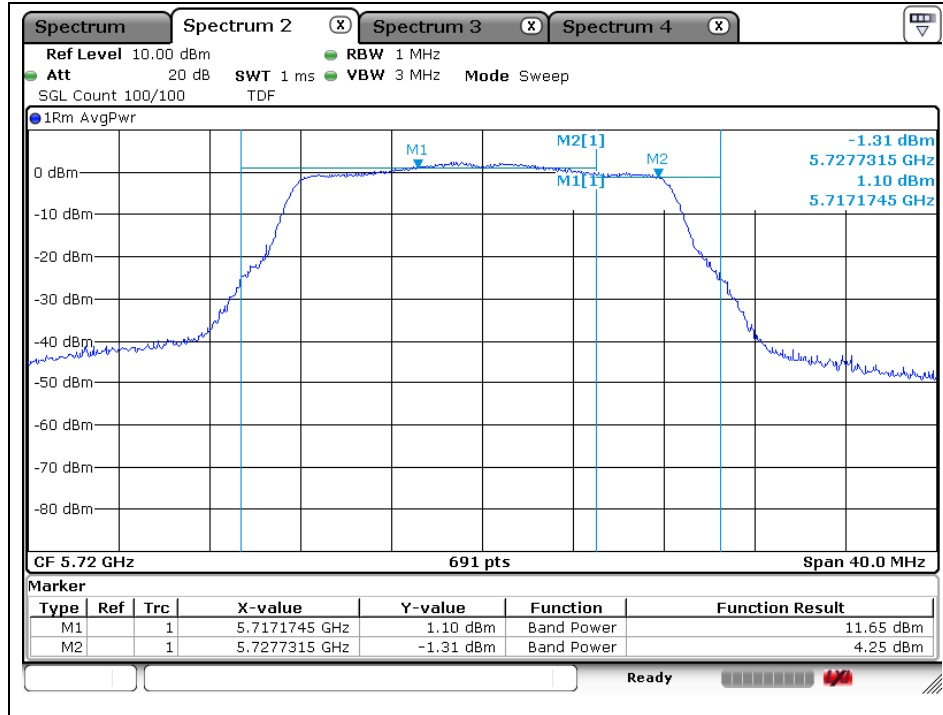
RTT5041-20(2015.10.01)(3)

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

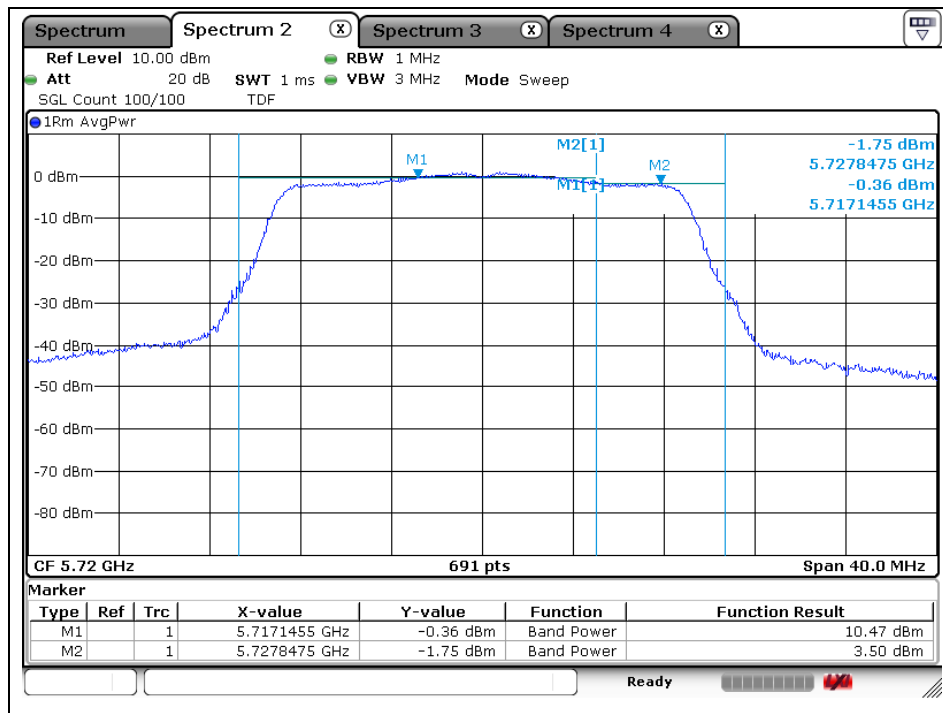
A4(210 mm x 297 mm)

## Band-crossing channels

### 802.11a (5 720 MHz)



### 802.11n\_HT20 (5 720 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

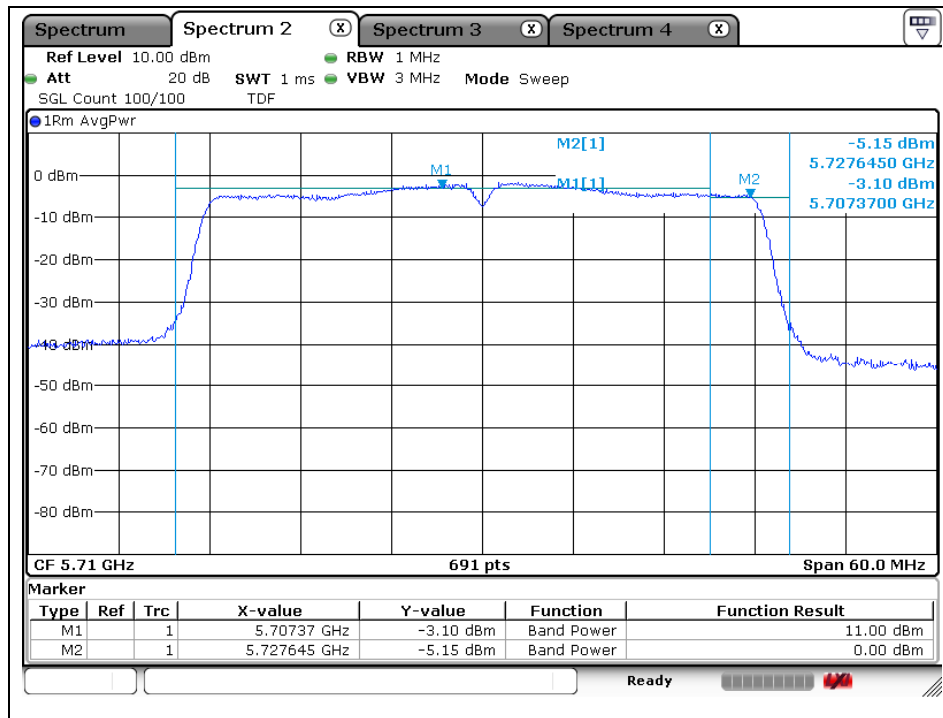
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

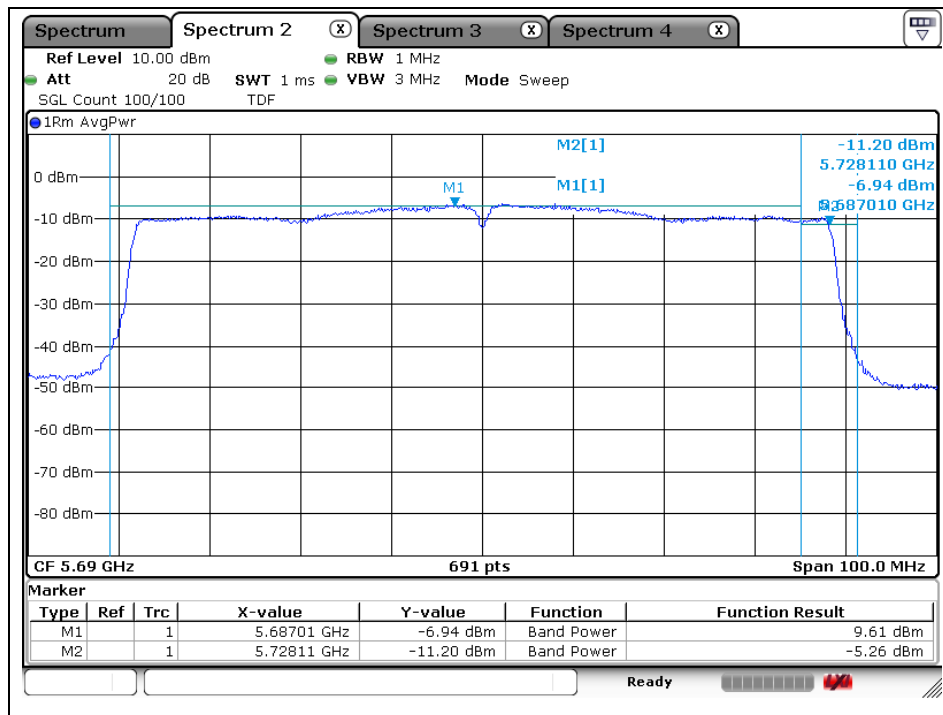
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## 802.11n\_HT40 (5 710 MHz)



## 802.11ac\_VHT80 (5 690 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

## 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 colocated 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.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

### 6.2.2. IC

(1) According to RSS-247 Issue 2, 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  $1.76 + 10 \log_{10} B$ , dB m, whichever is less stringent. 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  $10 + 10 \log_{10} B$ , dB m, whichever power is less. B is the 99 % emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dB m in any 1.0 MHz band.

(2) According to RSS-247 Issue 2, 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  $1.76 + 10 \log_{10} B$ , dB m, whichever is less stringent. 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.

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

b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dB m, 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.

(3) According to RSS-247 Issue 2, 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  $11 + 10 \log_{10} B$ , dB m, whichever is less. The power spectral density shall not exceed 11 dB m in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dB m, 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.

(4) According to RSS-247 Issue 2, 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 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 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-multipoint<sup>3</sup> systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

### 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\_v01r03.
  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 peak of the spectrum.**
    - b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
  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.I.a).
    - b) Set  $VBW \geq 3$  RBW.
    - c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10\log(500 \text{ kHz}/RBW)$  to the measured result, whereas RBW ( $< 500$  kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
    - d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10\log(1 \text{ MHz}/RBW)$  to the measured result, whereas RBW ( $< 1$  MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
    - e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
- Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since RBW = 100 kHz is available on nearly all spectrum analyzers.
7. In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545\_D03 v01.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

## 6.4. Test result

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

| Mode | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSD (dB m) | Duty Factor (dB) | Final PPSD (dB m) | Limit (dB m/1 MHz)   |
|------|----------|-----------------|-----|------------------|----------------------|------------------|-------------------|----------------------|
| 11a  | U-NII 1  | 5 180           | 36  | 6                | 2.51                 | 0.32             | 2.83              | 10                   |
|      |          | 5 200           | 40  | 6                | 2.38                 | 0.32             | 2.70              |                      |
|      |          | 5 240           | 48  | 6                | 2.86                 | 0.32             | 3.18              |                      |
|      | U-NII 2A | 5 260           | 52  | 6                | 3.28                 | 0.32             | 3.60              | 11                   |
|      |          | 5 280           | 56  | 6                | 3.14                 | 0.32             | 3.46              |                      |
|      |          | 5 320           | 64  | 6                | 3.41                 | 0.32             | 3.73              |                      |
|      | U-NII 2C | 5 500           | 100 | 6                | 3.43                 | 0.32             | 3.75              |                      |
|      |          | 5 580           | 116 | 6                | 2.33                 | 0.32             | 2.65              |                      |
|      |          | 5 700           | 140 | 6                | 2.30                 | 0.32             | 2.62              |                      |
|      | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSD (dB m) | Duty Factor (dB) | Final PPSD (dB m) | Limit (dB m/500 kHz) |
|      | U-NII 3  | 5 745           | 149 | 6                | -0.37                | 0.32             | -0.05             | 30                   |
|      |          | 5 785           | 157 | 6                | -0.50                | 0.32             | -0.18             |                      |
|      |          | 5 825           | 165 | 6                | -0.07                | 0.32             | 0.25              |                      |

| Mode     | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSD (dB m) | Duty Factor (dB) | Final PPSD (dB m) | Limit (dB m/1 MHz)   |
|----------|----------|-----------------|-----|------------------|----------------------|------------------|-------------------|----------------------|
| 11n_HT20 | U-NII 1  | 5 180           | 36  | MCS0             | 0.82                 | 0.32             | 1.14              | 10                   |
|          |          | 5 200           | 40  | MCS0             | 1.31                 | 0.32             | 1.63              |                      |
|          |          | 5 240           | 48  | MCS0             | 1.24                 | 0.32             | 1.56              |                      |
|          | U-NII 2A | 5 260           | 52  | MCS0             | 1.70                 | 0.32             | 2.02              | 11                   |
|          |          | 5 280           | 56  | MCS0             | 1.46                 | 0.32             | 1.78              |                      |
|          |          | 5 320           | 64  | MCS0             | 1.65                 | 0.32             | 1.97              |                      |
|          | U-NII 2C | 5 500           | 100 | MCS0             | 1.48                 | 0.32             | 1.80              |                      |
|          |          | 5 580           | 116 | MCS0             | 0.85                 | 0.32             | 1.17              |                      |
|          |          | 5 700           | 140 | MCS0             | 1.07                 | 0.32             | 1.39              |                      |
|          | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSD (dB m) | Duty Factor (dB) | Final PPSD (dB m) | Limit (dB m/500 kHz) |
|          | U-NII 3  | 5 745           | 149 | MCS0             | -2.21                | 0.32             | -1.89             | 30                   |
|          |          | 5 785           | 157 | MCS0             | -1.99                | 0.32             | -1.67             |                      |
|          |          | 5 825           | 165 | MCS0             | -2.19                | 0.32             | -1.87             |                      |

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

| Mode     | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSP (dB m) | Duty Factor (dB) | Final PPSP (dB m) | Limit (dB m/1 MHz)   |
|----------|----------|-----------------|-----|------------------|----------------------|------------------|-------------------|----------------------|
| 11n_HT40 | U-NII 1  | 5 190           | 38  | MCS0             | -2.03                | 0.60             | -1.43             | 10                   |
|          |          | 5 230           | 40  | MCS0             | -1.86                | 0.60             | -1.26             |                      |
|          | U-NII 2A | 5 270           | 54  | MCS0             | -1.72                | 0.60             | -1.12             | 11                   |
|          |          | 5 310           | 62  | MCS0             | -1.69                | 0.60             | -1.09             |                      |
|          | U-NII 2C | 5 510           | 102 | MCS0             | -1.63                | 0.60             | -1.03             |                      |
|          |          | 5 550           | 110 | MCS0             | -2.05                | 0.60             | -1.45             |                      |
|          |          | 5 670           | 134 | MCS0             | -1.71                | 0.60             | -1.11             |                      |
|          | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSP (dB m) | Duty Factor (dB) | Final PPSP (dB m) | Limit (dB m/500 kHz) |
|          | U-NII 3  | 5 755           | 151 | MCS0             | -4.95                | 0.60             | -4.35             | 30                   |
|          |          | 5 795           | 159 | MCS0             | -4.99                | 0.60             | -4.39             |                      |

| Mode       | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSP (dB m) | Duty Factor (dB) | Final PPSP (dB m) | Limit (dB m/1 MHz)   |
|------------|----------|-----------------|-----|------------------|----------------------|------------------|-------------------|----------------------|
| 11ac_VHT80 | U-NII 1  | 5 210           | 42  | MCS0             | -6.32                | 1.19             | -5.13             | 10                   |
|            | U-NII 2A | 5 290           | 58  | MCS0             | -5.88                | 1.19             | -4.69             | 11                   |
|            | U-NII 2C | 5 530           | 106 | MCS0             | -6.25                | 1.19             | -5.06             |                      |
|            |          | 5 690           | 138 | MCS0             | -6.17                | 1.19             | -4.98             |                      |
|            | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSP (dB m) | Duty Factor (dB) | Final PPSP (dB m) | Limit (dB m/500 kHz) |
|            | U-NII 3  | 5 775           | 155 | MCS0             | -9.55                | 1.19             | -8.36             | 30                   |

### Band-crossing channels

| Mode       | Band     | Frequency (MHz) | Ch. | Data Rate (Mbps) | Measured PPSP (dB m) | Duty Factor (dB) | Final PPSP (dB m) | Limit (dB m/1 MHz or dB m/500 kHz) |
|------------|----------|-----------------|-----|------------------|----------------------|------------------|-------------------|------------------------------------|
| 11a        | U-NII 2C | 5 720           | 144 | 6                | 2.61                 | 0.32             | 2.93              | 11                                 |
|            | U-NII 3  | 5 720           | 144 | 6                | -2.83                | 0.32             | -2.51             | 30                                 |
| 11n_HT20   | U-NII 2C | 5 720           | 144 | MCS0             | 1.07                 | 0.32             | 1.39              | 11                                 |
|            | U-NII 3  | 5 720           | 144 | MCS0             | -4.26                | 0.32             | -3.94             | 30                                 |
| 11n_HT40   | U-NII 2C | 5 710           | 142 | MCS0             | -1.99                | 0.60             | -1.39             | 11                                 |
|            | U-NII 3  | 5 710           | 142 | MCS0             | -7.51                | 0.60             | -6.91             | 30                                 |
| 11ac_VHT80 | U-NII 2C | 5 690           | 138 | MCS0             | -6.66                | 1.19             | -5.47             | 11                                 |
|            | U-NII 3  | 5 690           | 138 | MCS0             | -12.76               | 1.19             | -11.57            | 30                                 |

Note ;

Final PPSP = Measured PPSP + Duty Factor

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

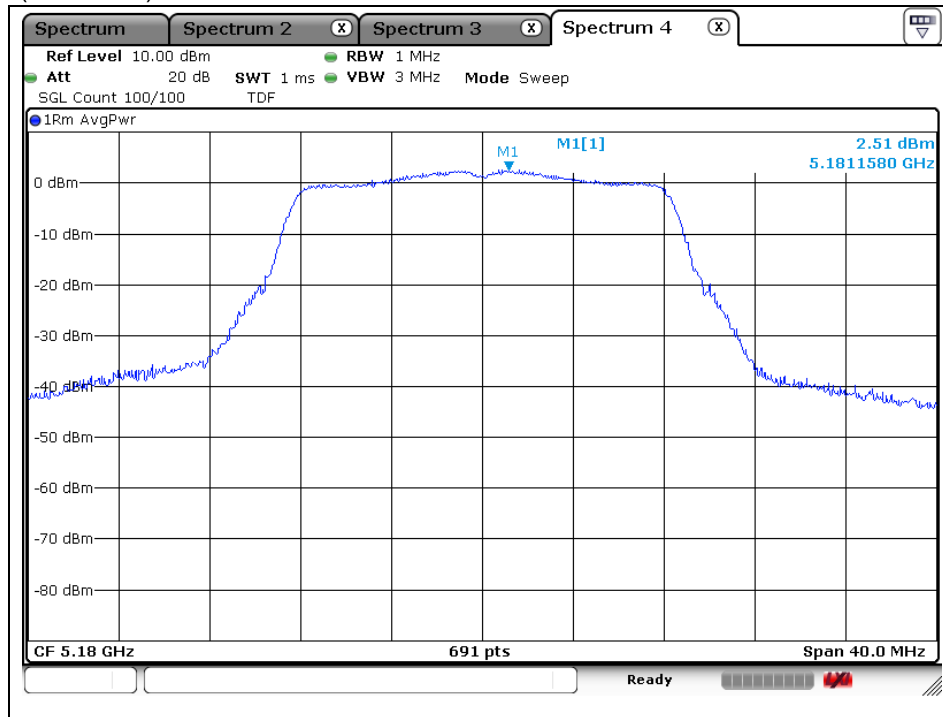
RTT5041-20(2015.10.01)(3)

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

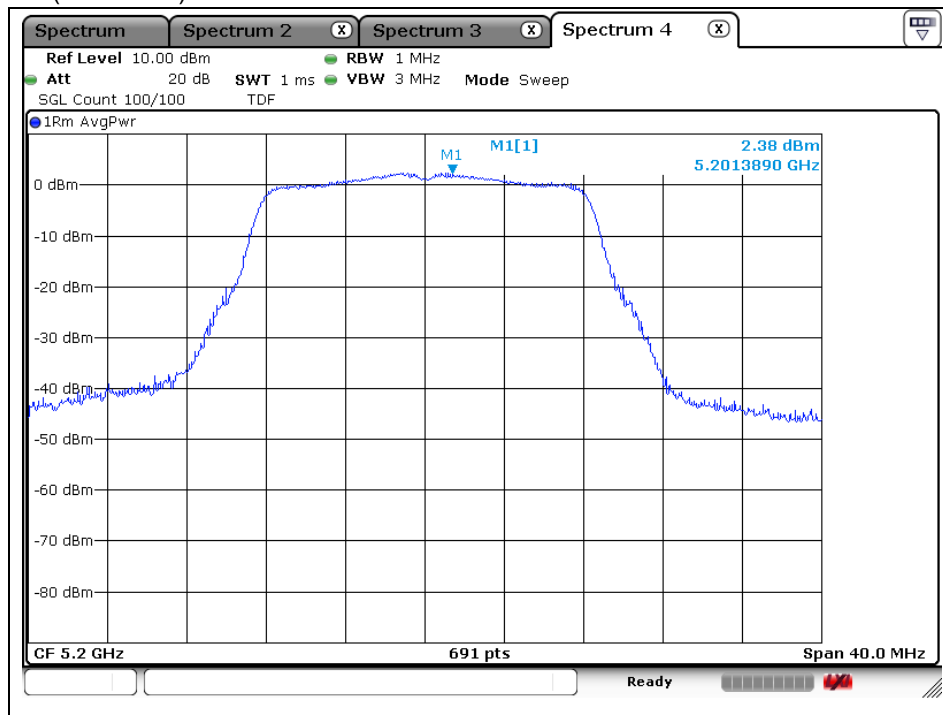
A4(210 mm x 297 mm)

## 802.11a (Band 1)

### Low Channel (5 180 MHz)



### Middle Channel (5 200 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

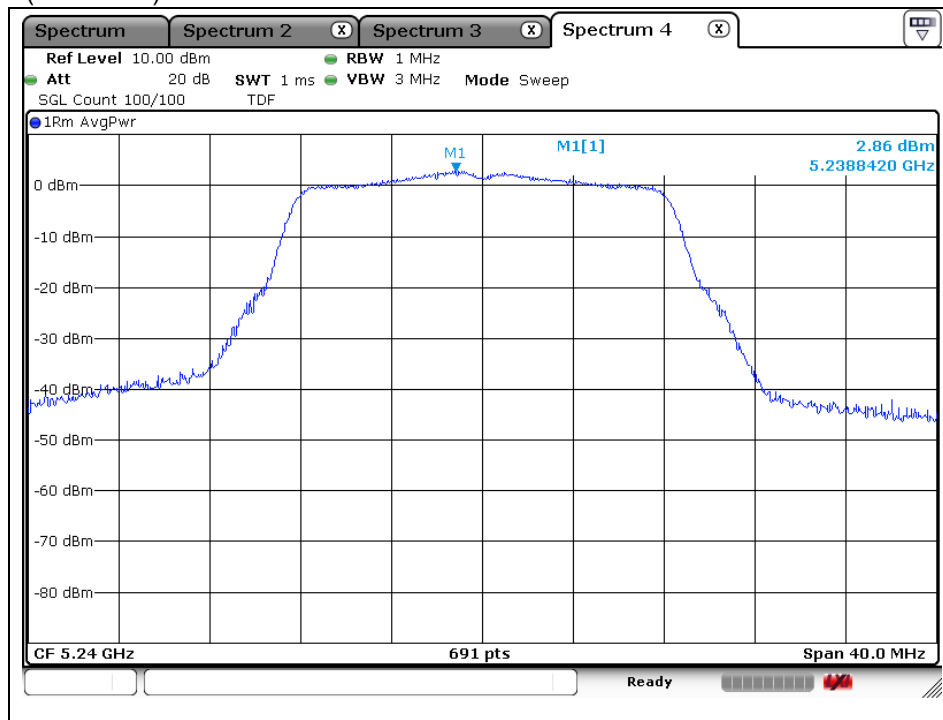
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

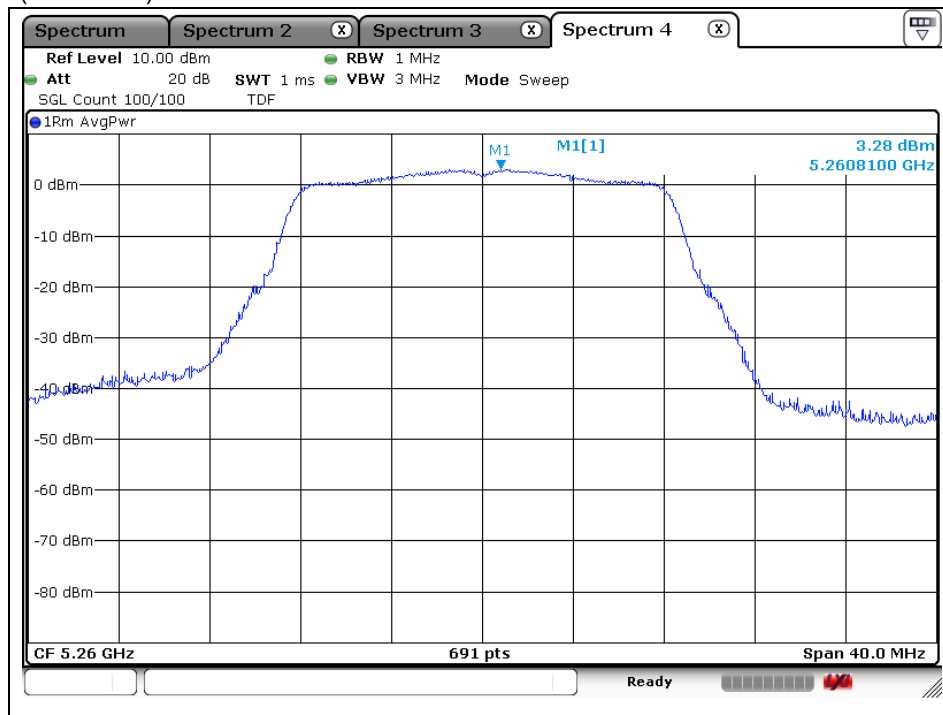
A4(210 mm x 297 mm)

## High Channel (5 240 MHz)



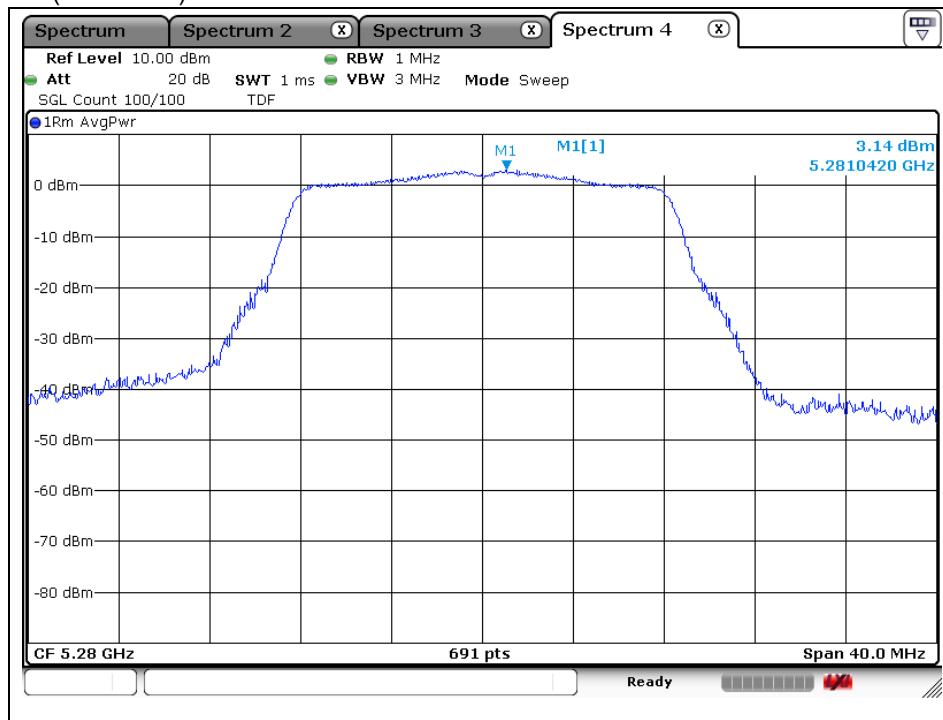
## 802.11a (Band 2A)

Low Channel (5 260 MHz)

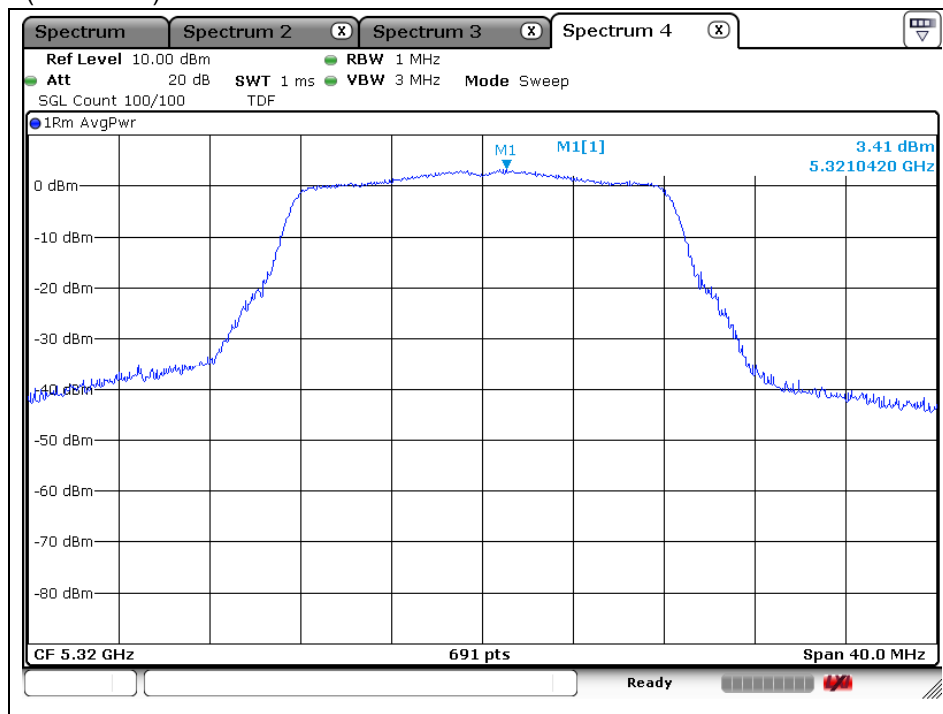


*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

Middle Channel (5 280 MHz)



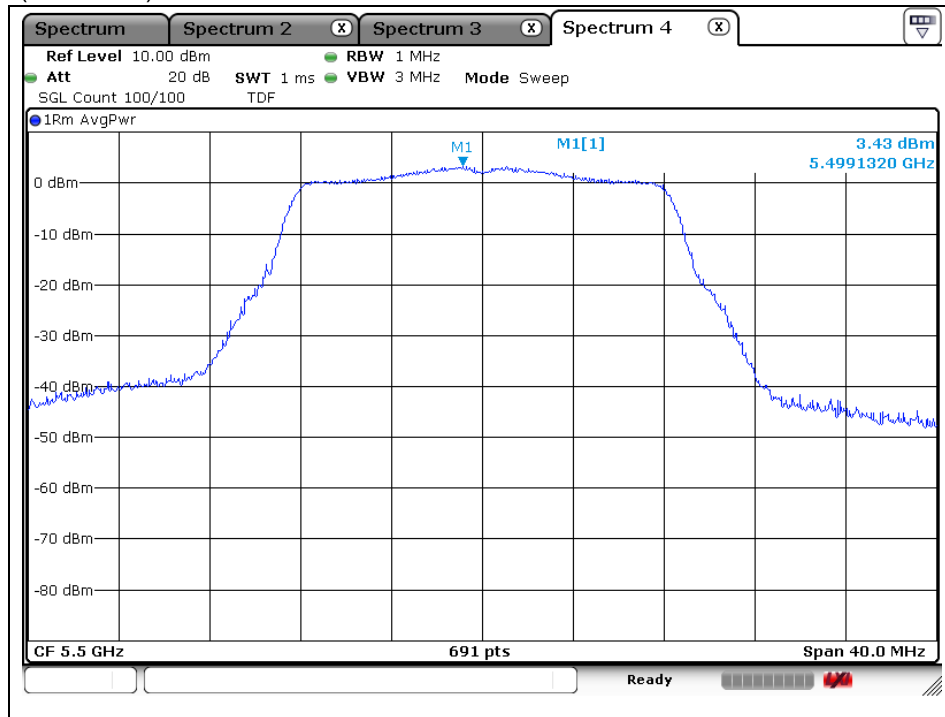
## High Channel (5 320 MHz)



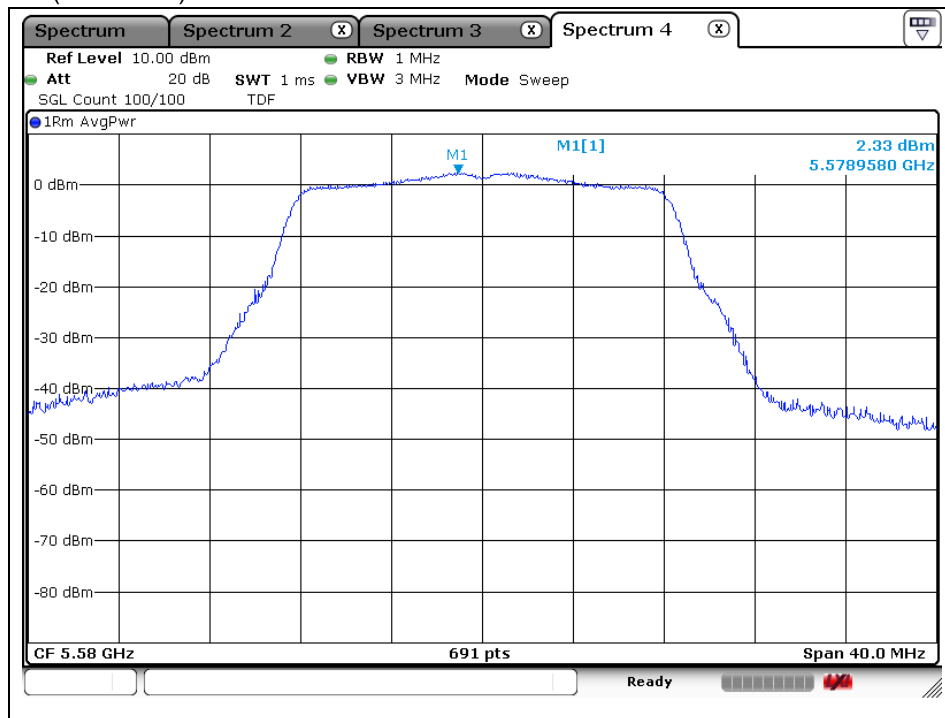
*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

## 802.11a (Band 2C)

### Low Channel (5 500 MHz)



### Middle Channel (5 580 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

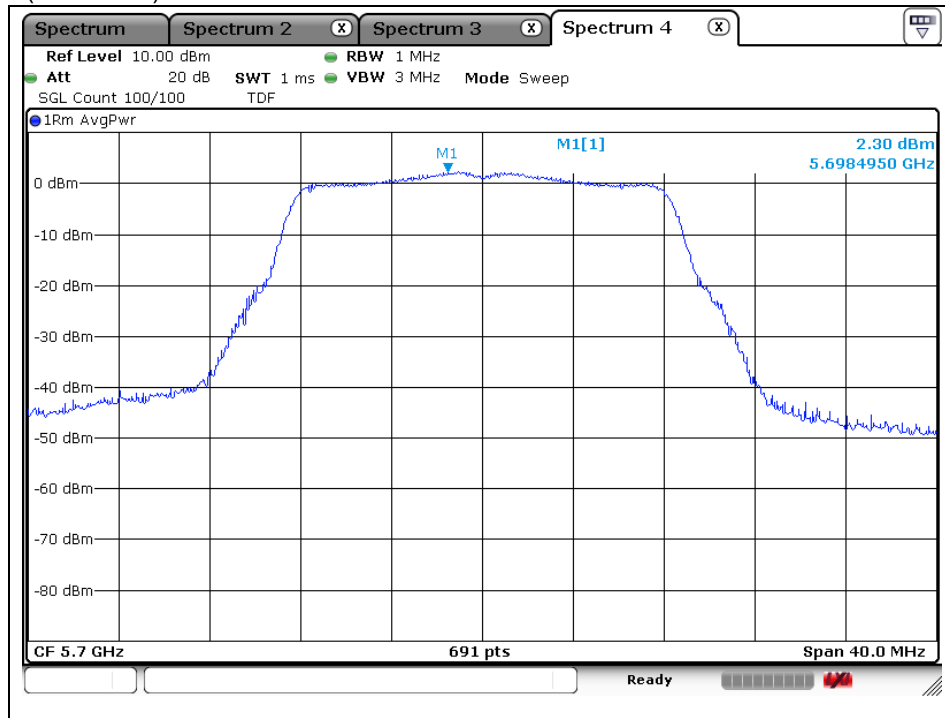
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

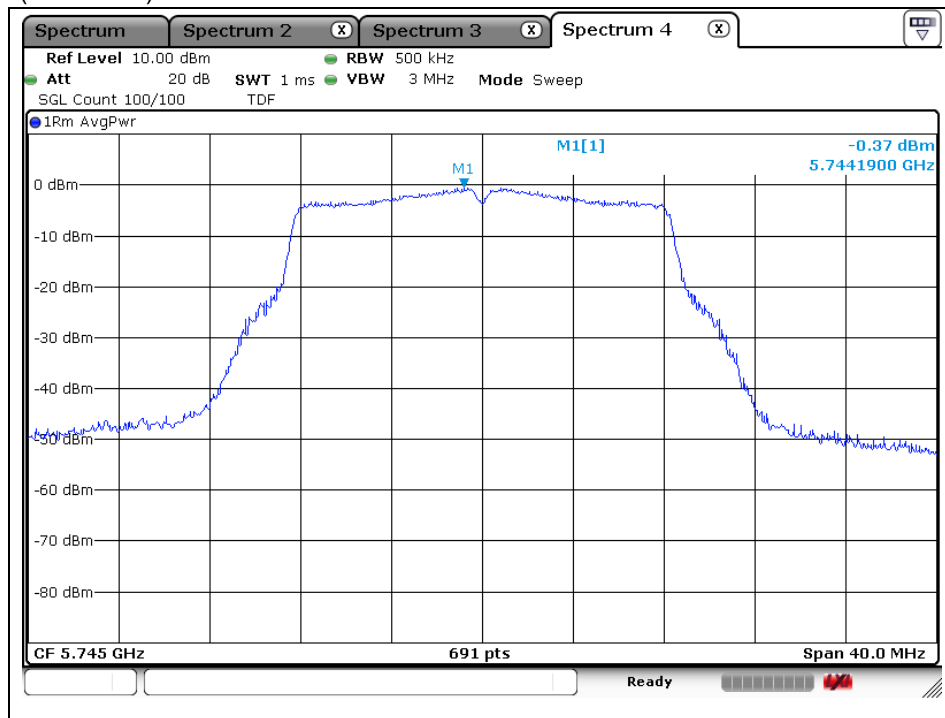
A4(210 mm x 297 mm)

## High Channel (5 700 MHz)



## 802.11a (Band 3)

## Low Channel (5 745 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

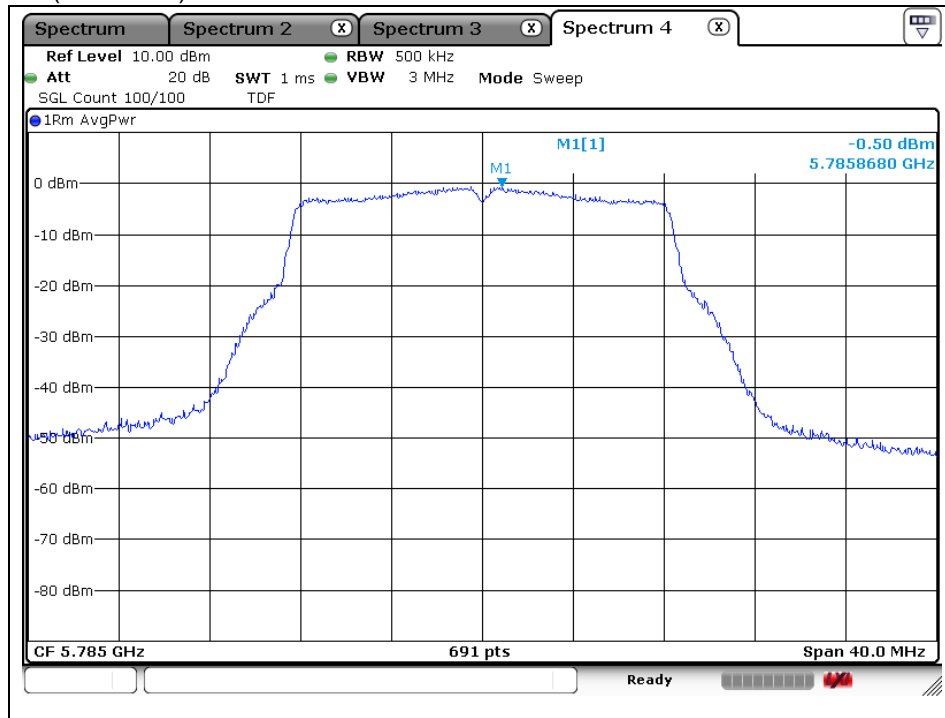
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

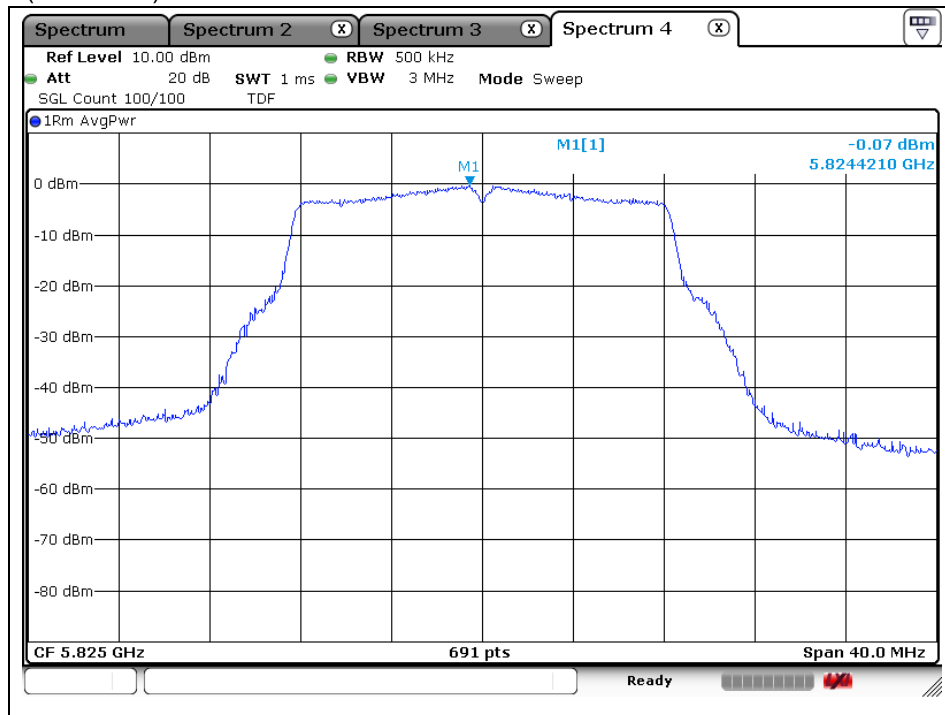
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 785 MHz)



## High Channel (5 825 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

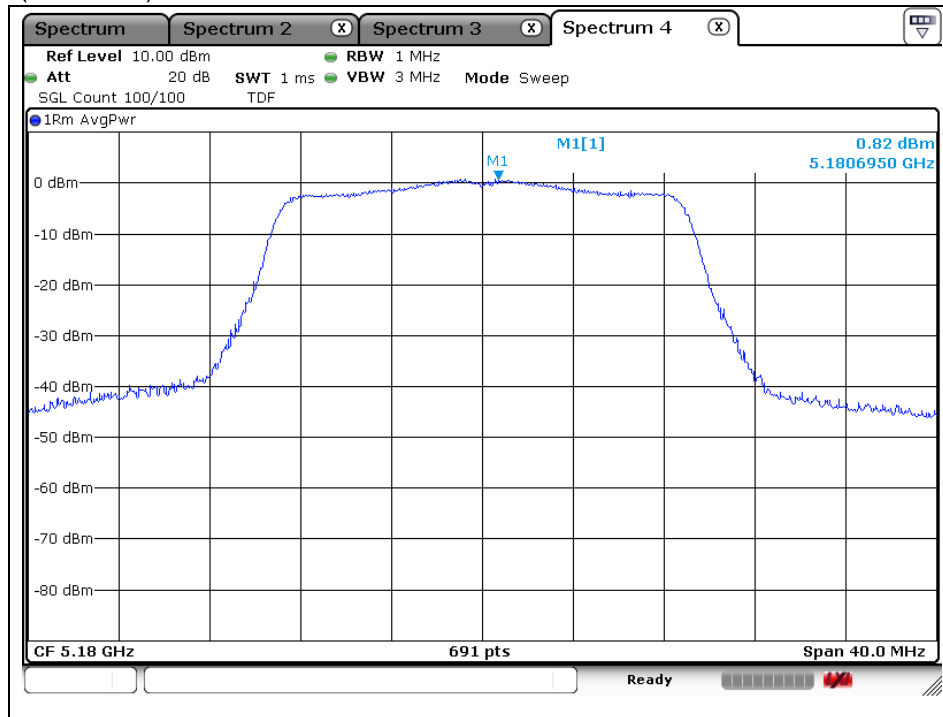
RTT5041-20(2015.10.01)(3)

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

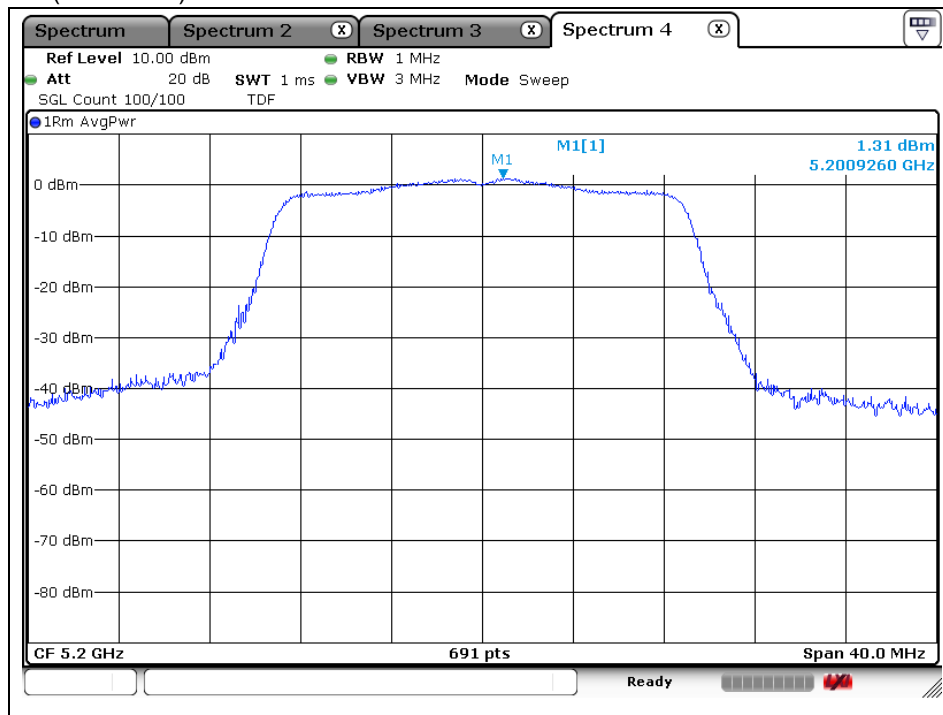
A4(210 mm x 297 mm)

## 802.11n\_HT20 (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 200 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

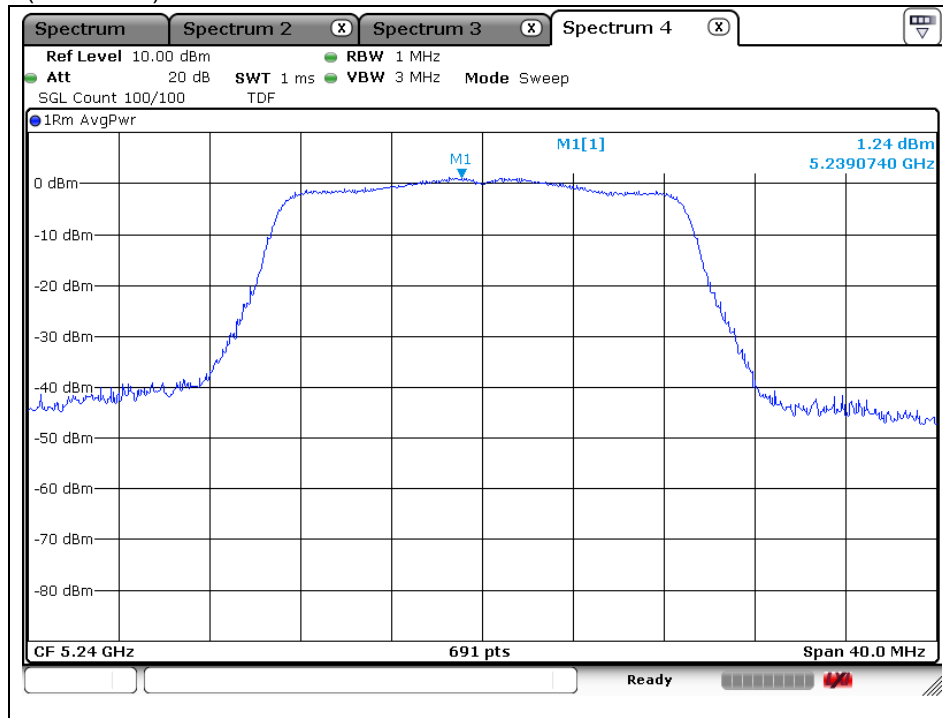
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

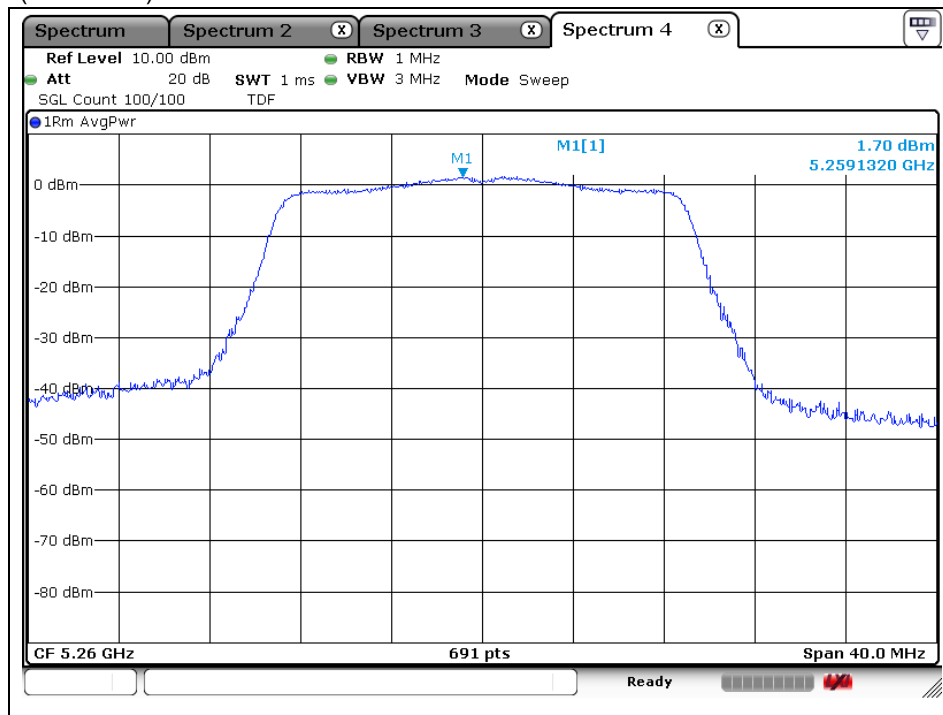
A4(210 mm x 297 mm)

## High Channel (5 240 MHz)



## 802.11n\_HT20 (Band 2A)

### Low Channel (5 260 MHz)



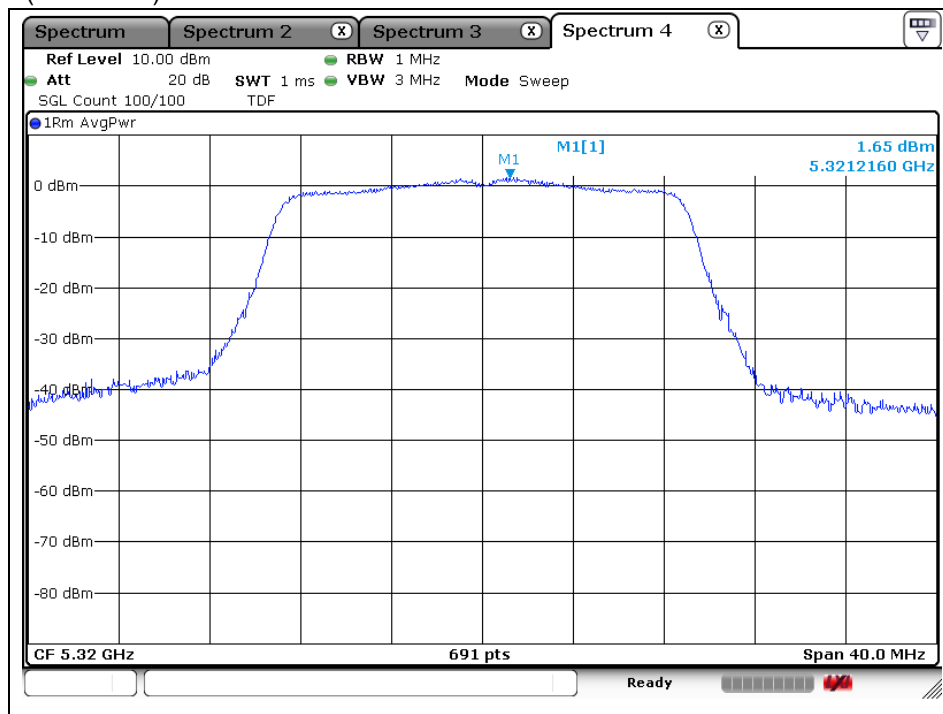
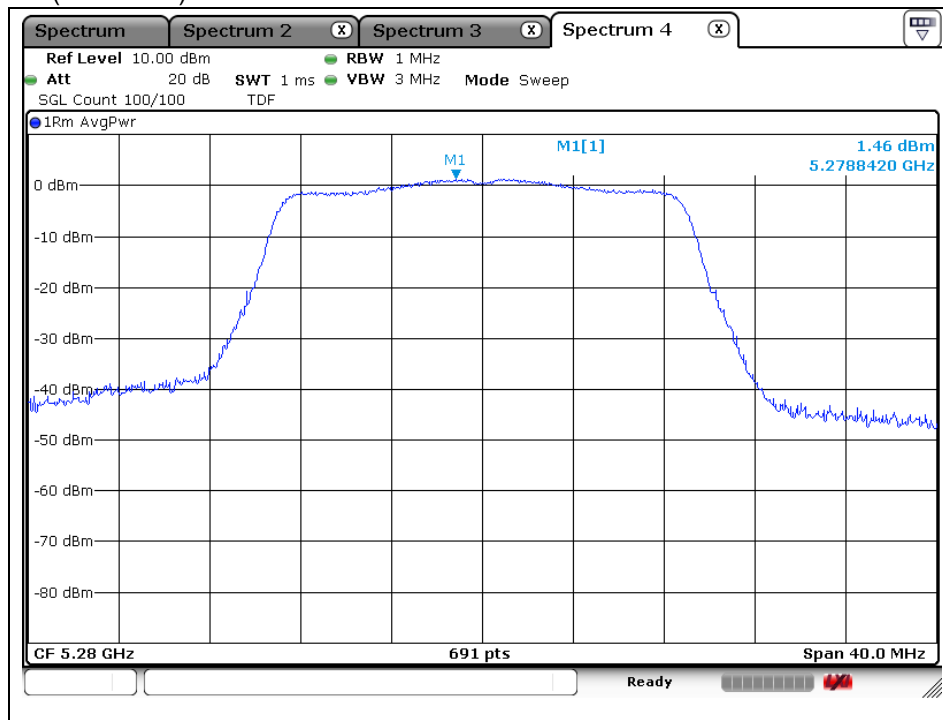
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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

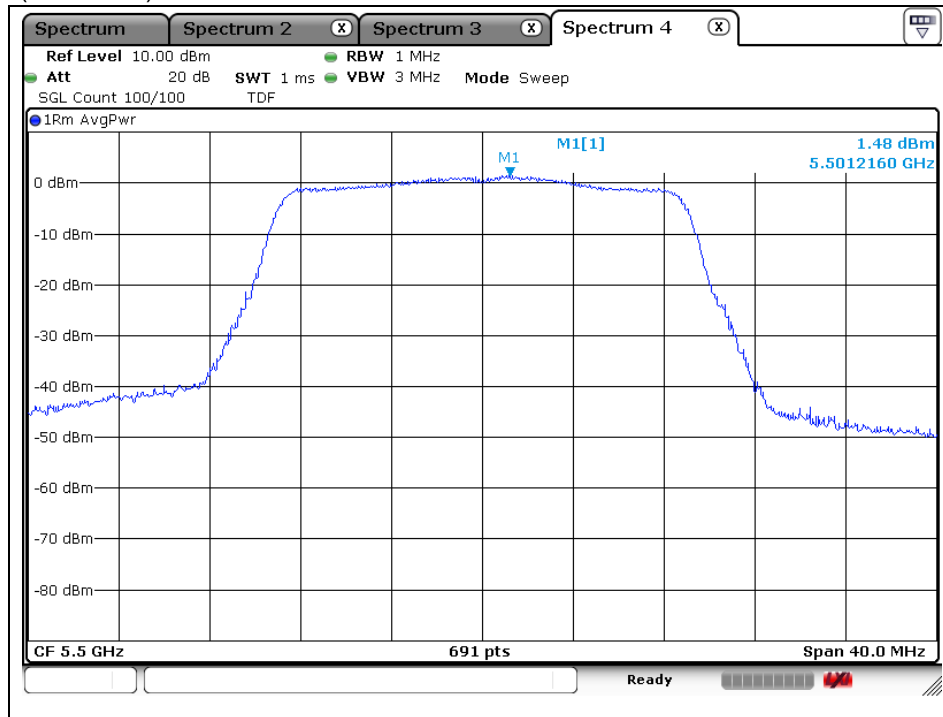
A4(210 mm x 297 mm)



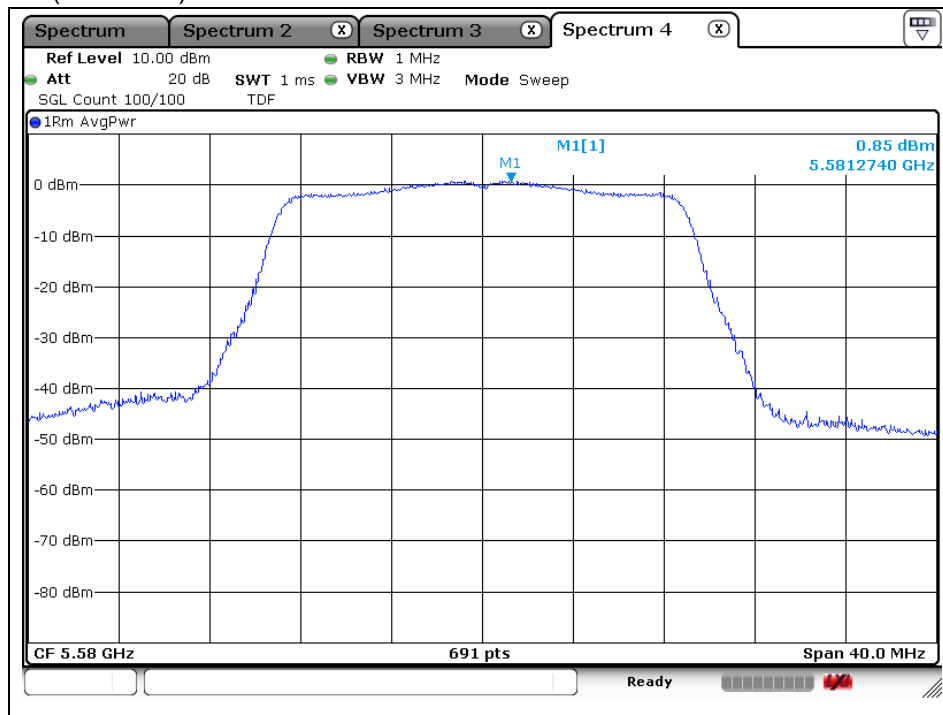
A4(210 mm x 297 mm)

## 802.11n\_HT20 (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

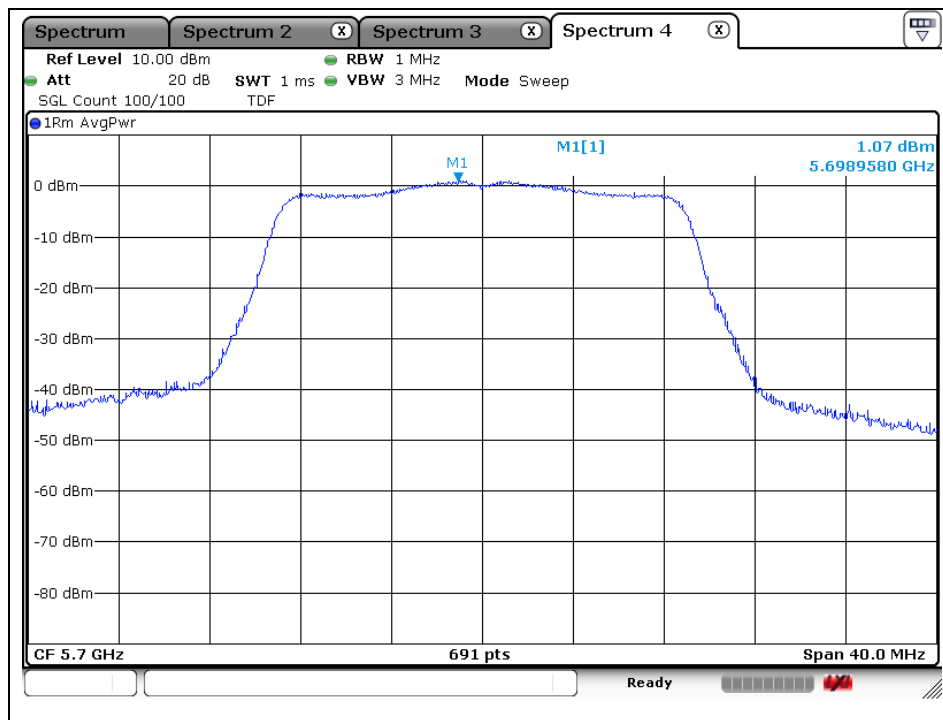
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

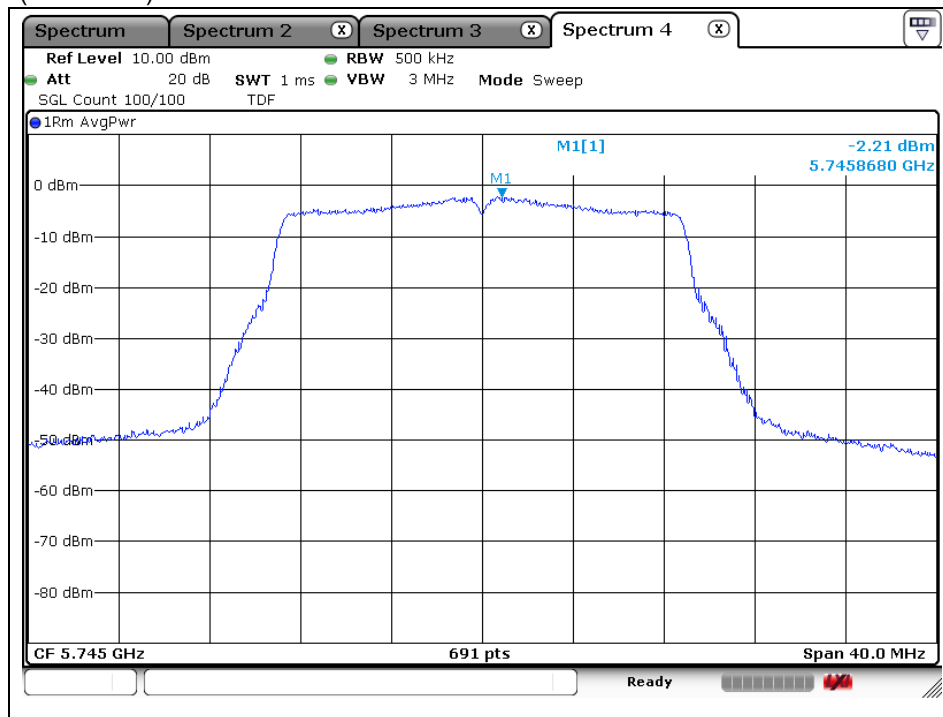
A4(210 mm x 297 mm)

## High Channel (5 700 MHz)



## 802.11n\_HT20 (Band 3)

### Low Channel (5 745 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

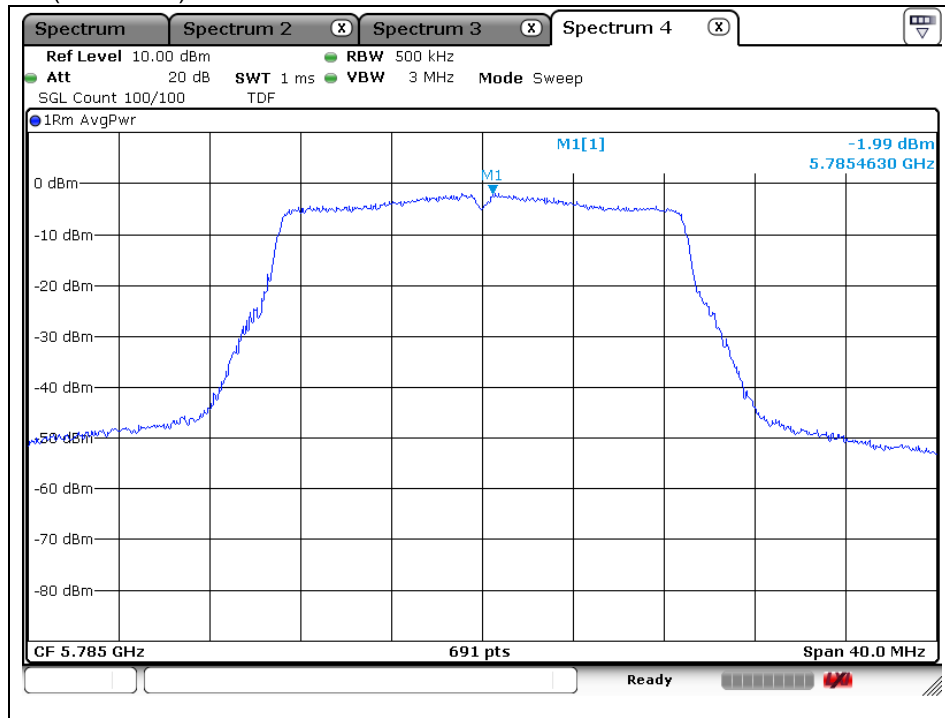
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

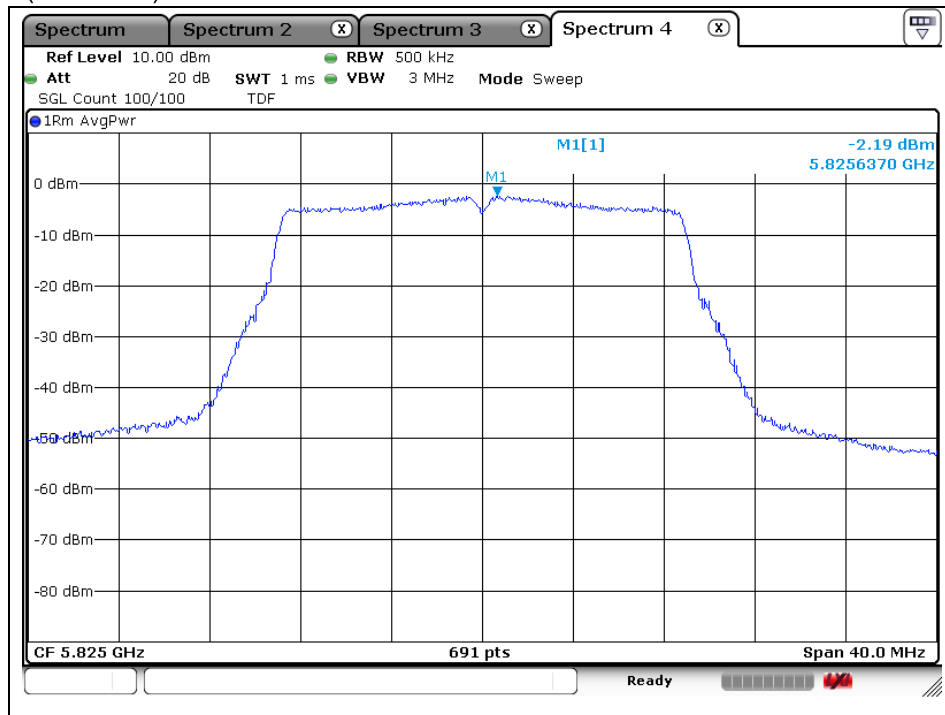
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## Middle Channel (5 785 MHz)



## High Channel (5 825 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

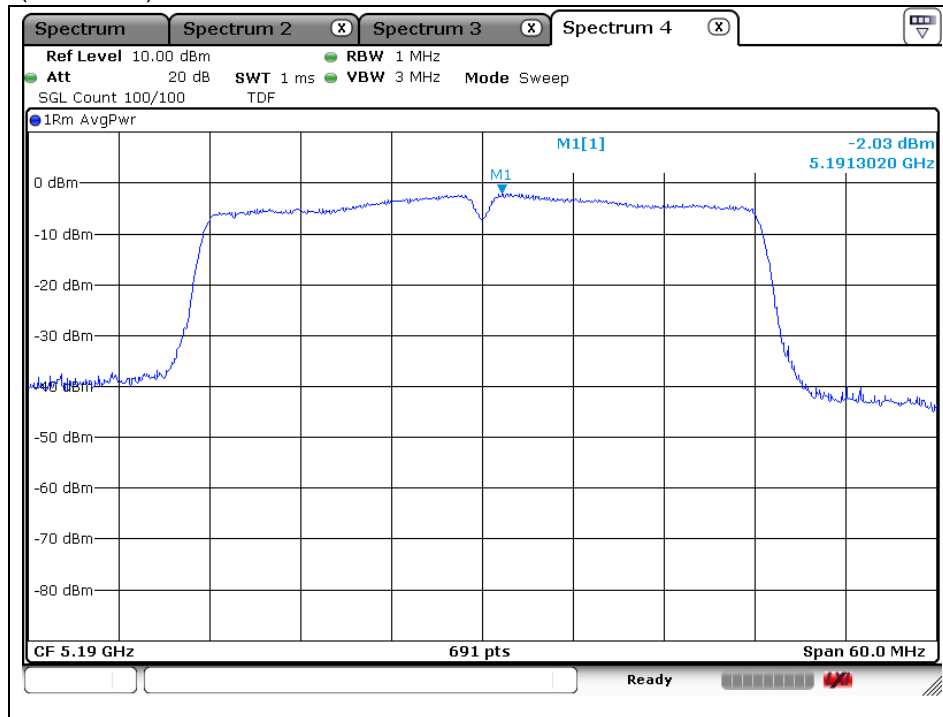
RTT5041-20(2015.10.01)(3)

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

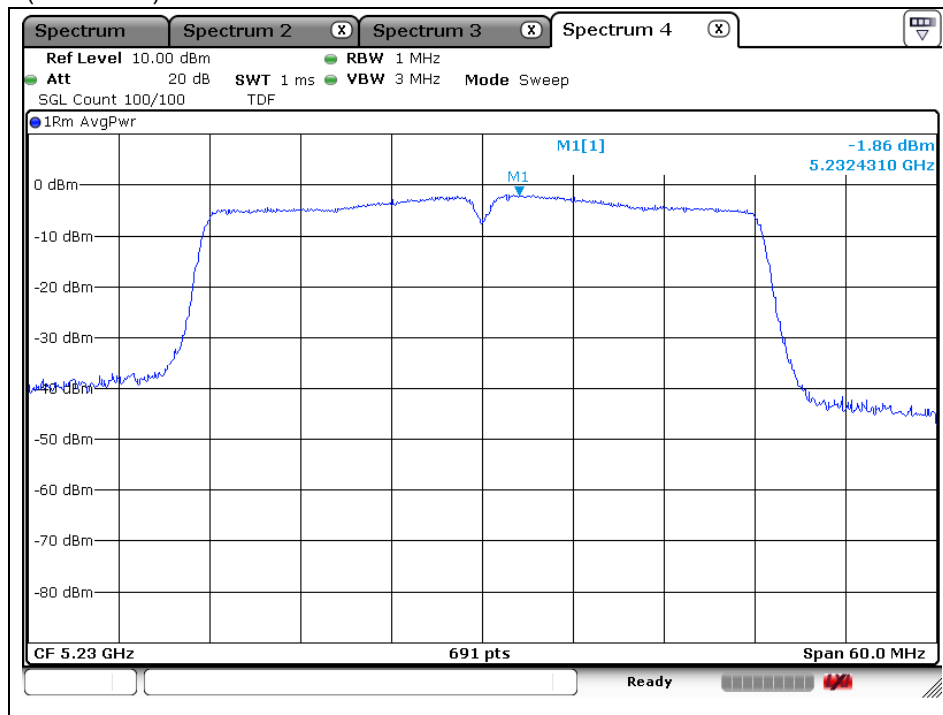
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 1)

Low Channel (5 190 MHz)



High Channel (5 230 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

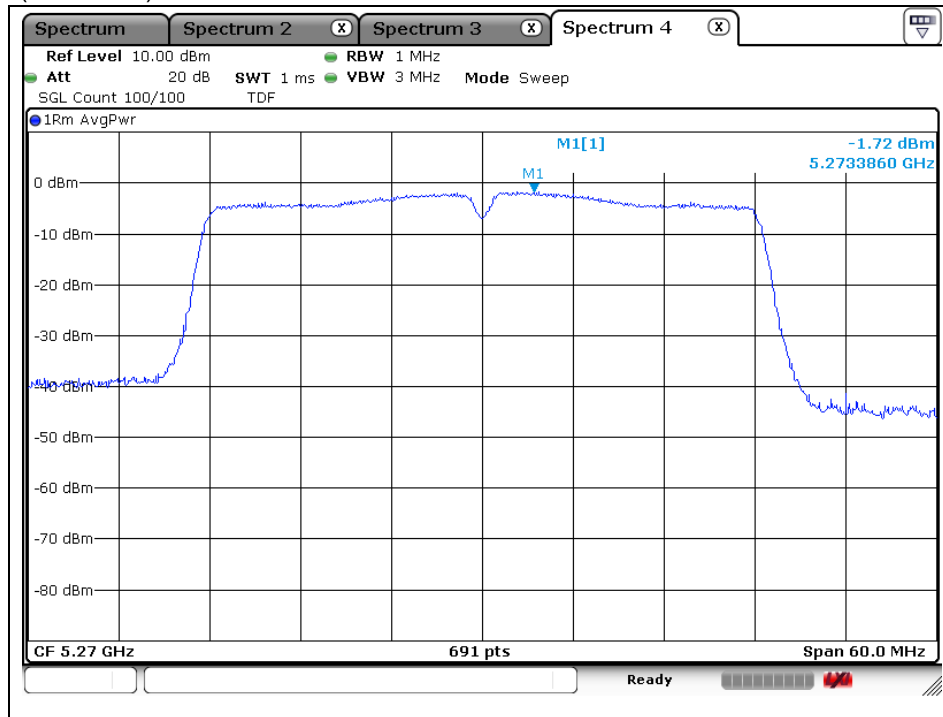
RTT5041-20(2015.10.01)(3)

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

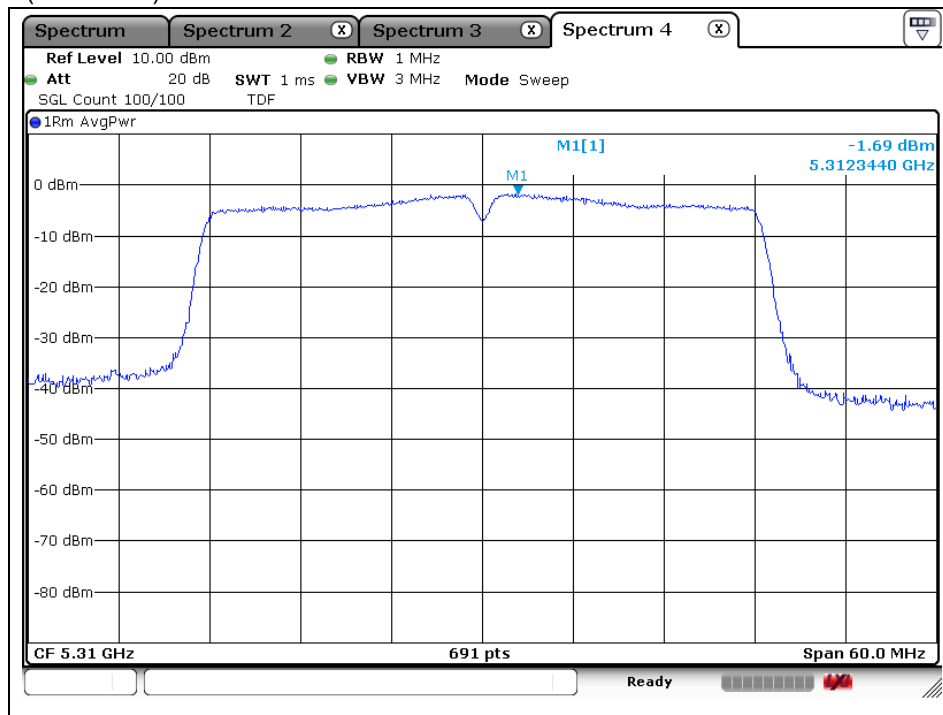
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 2A)

Low Channel (5 270 MHz)



High Channel (5 310 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

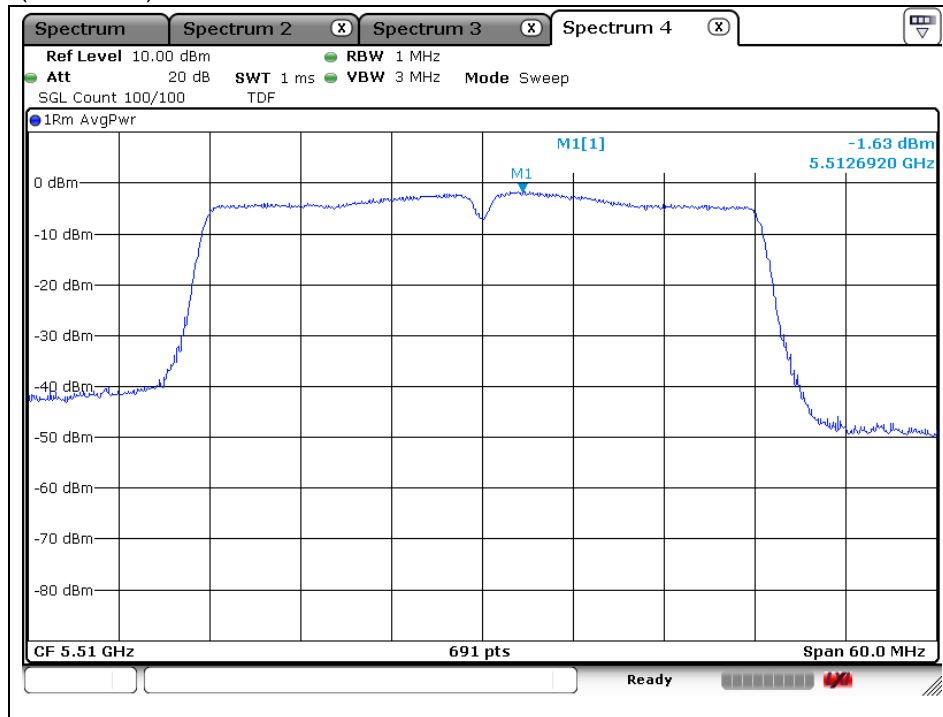
RTT5041-20(2015.10.01)(3)

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

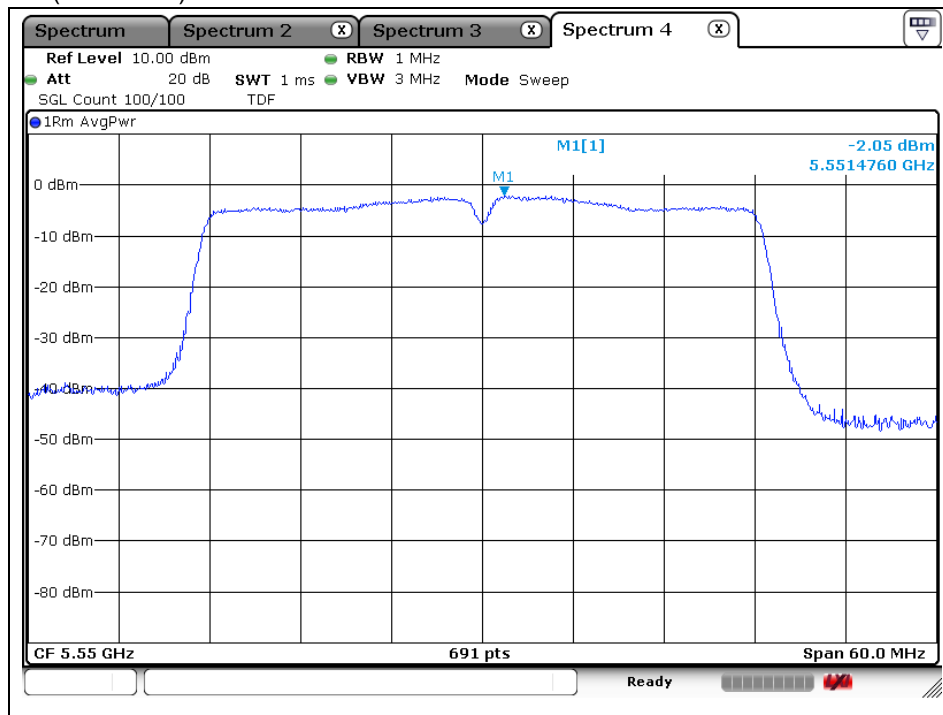
A4(210 mm x 297 mm)

## 802.11n\_HT40 (Band 2C)

Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

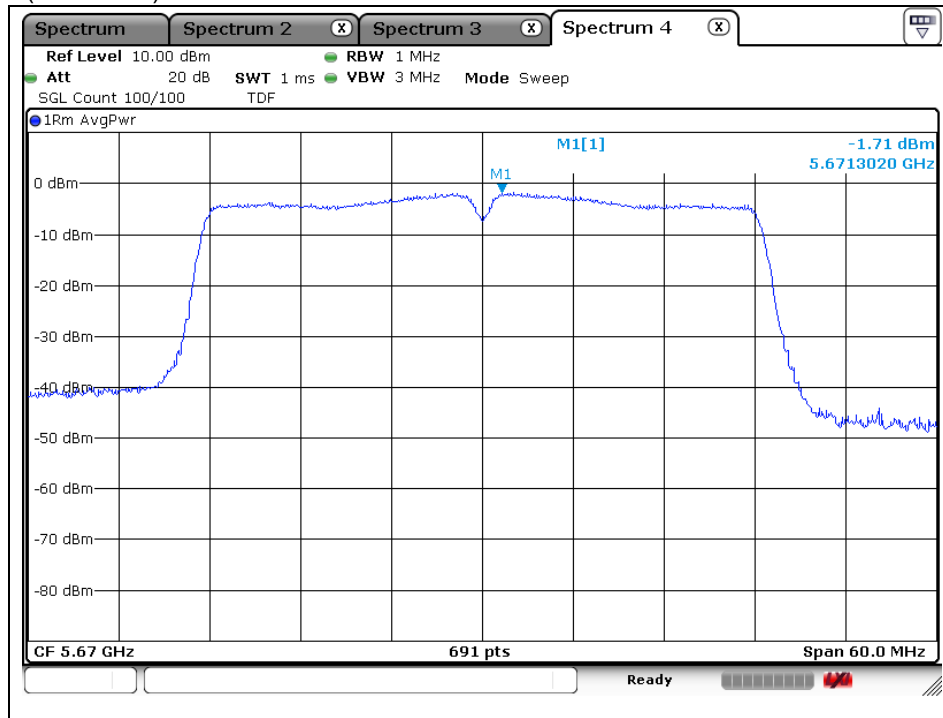
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

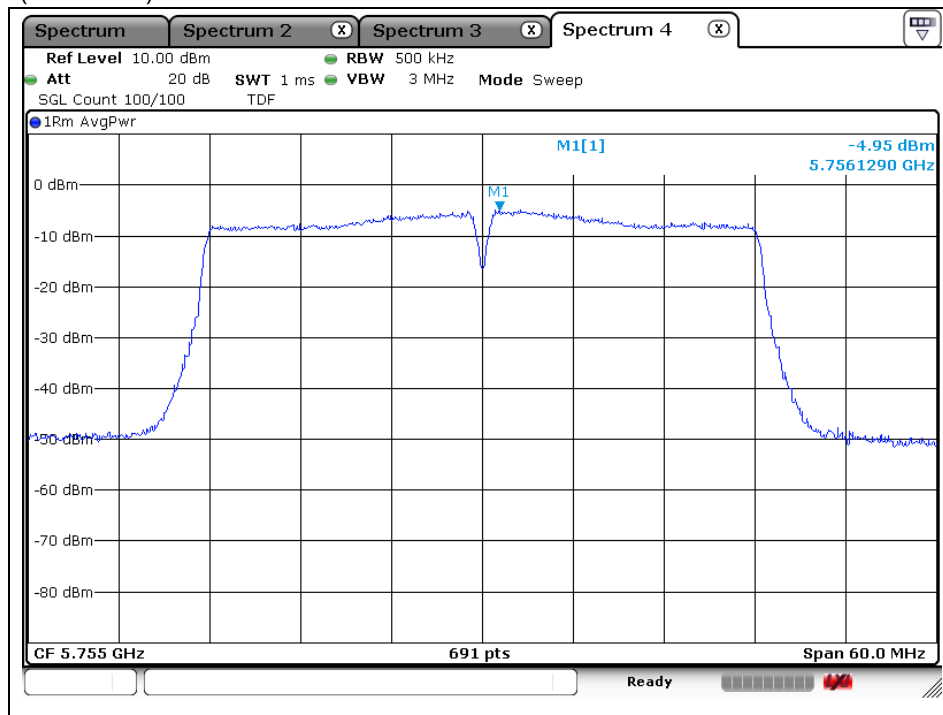
A4(210 mm x 297 mm)

## High Channel (5 670 MHz)



## 802.11n\_HT40 (Band 3)

### Low Channel (5 755 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

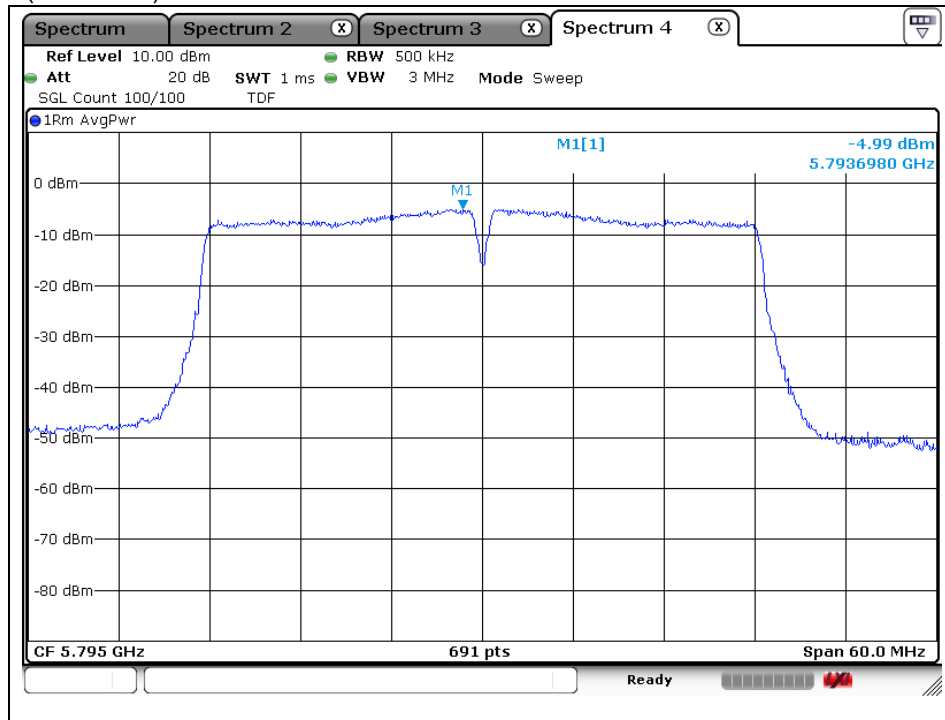
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

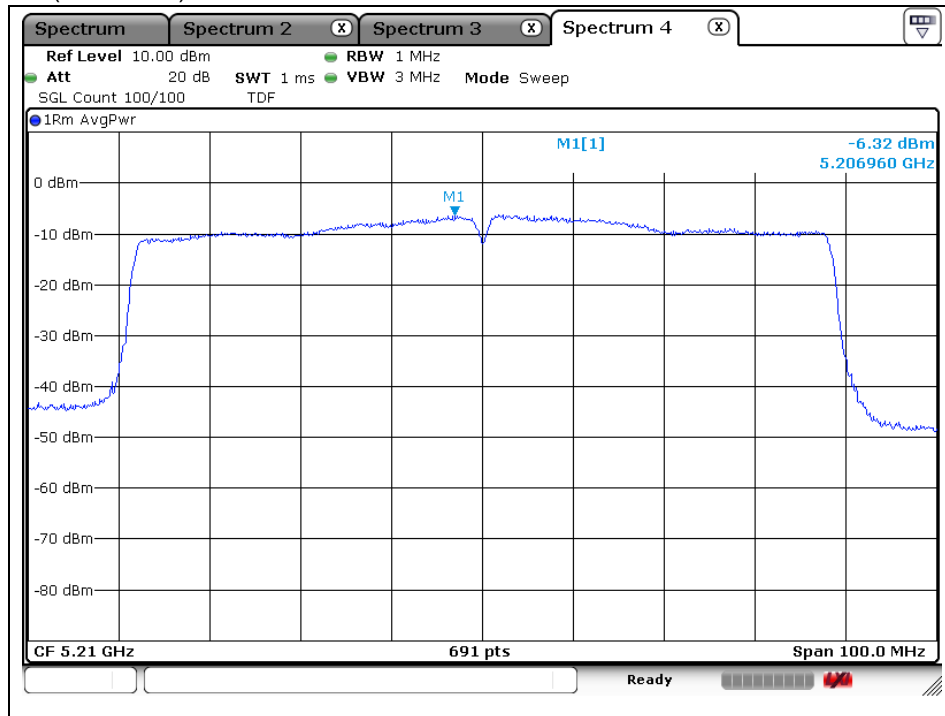
A4(210 mm x 297 mm)

## High Channel (5 795 MHz)



## 802.11ac\_VHT80 (Band 1)

### Middle Channel (5 210 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

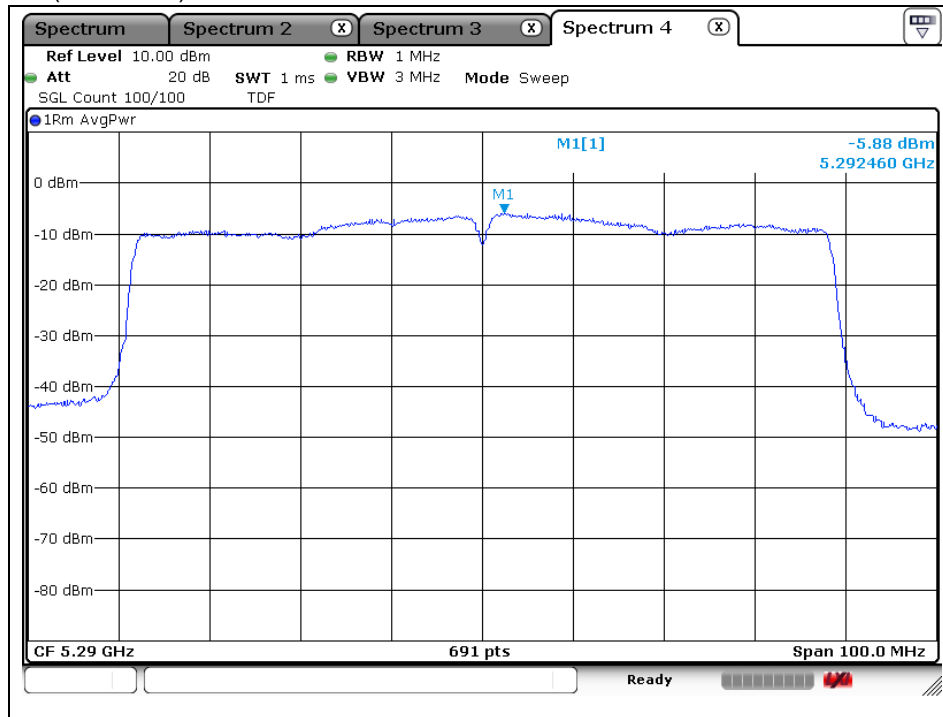
RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

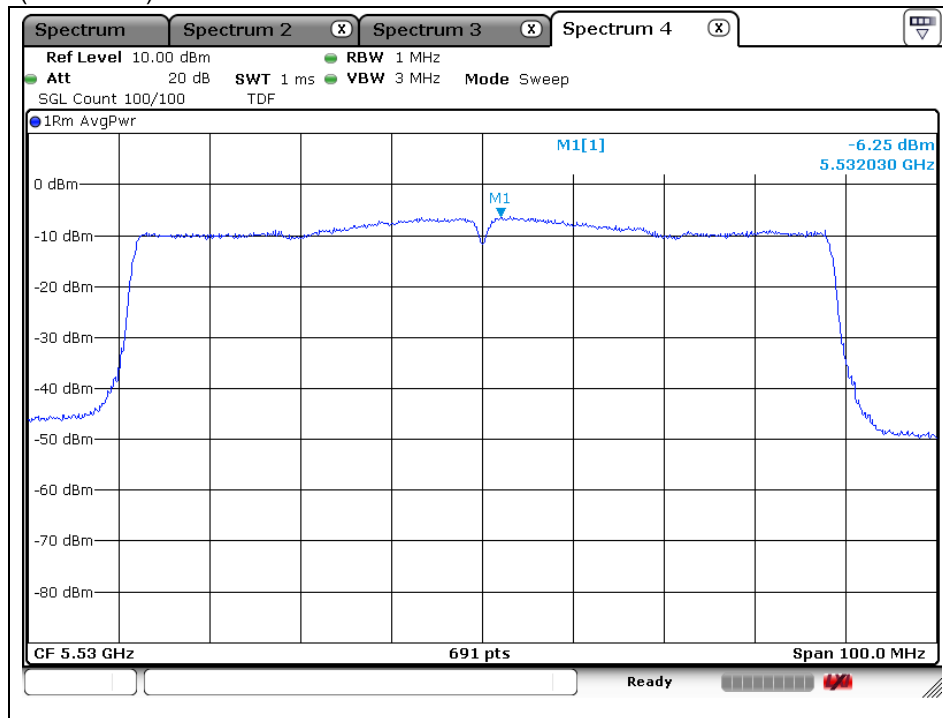
## 802.11ac\_VHT80 (Band 2A)

Middle Channel (5 290 MHz)



## 802.11ac\_VHT80 (Band 2C)

Low Channel (5 530 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

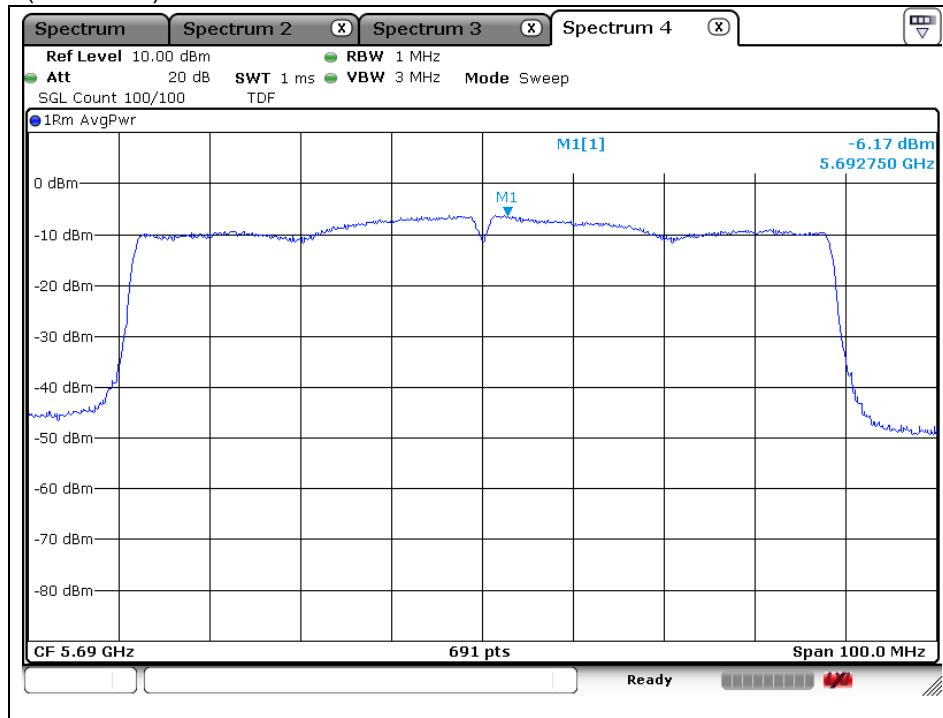
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

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

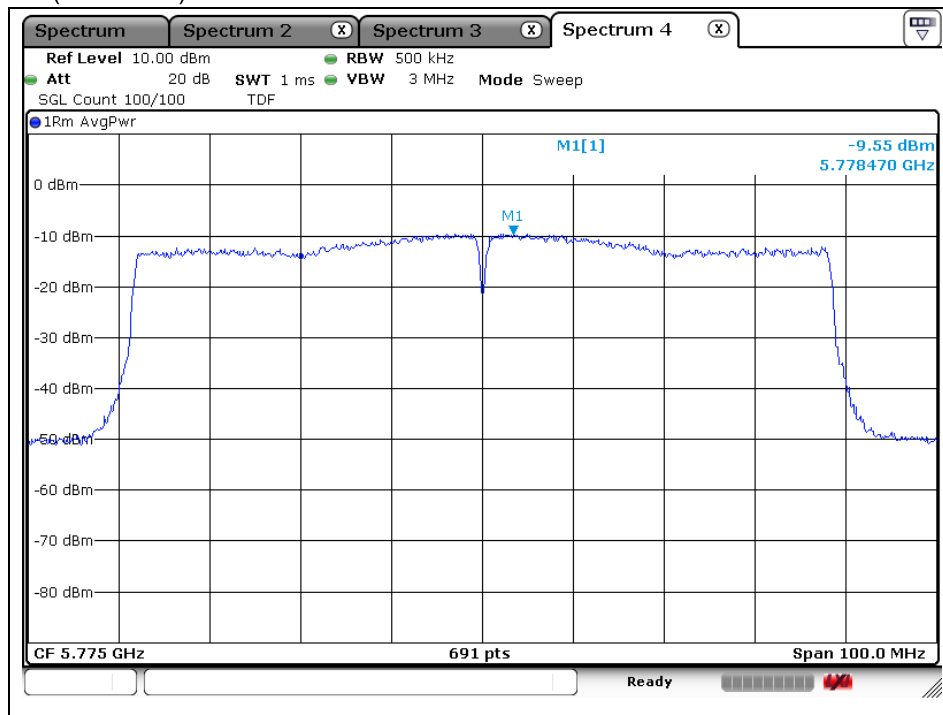
A4(210 mm x 297 mm)

## High Channel (5 690 MHz)



## 802.11ac\_VHT80 (Band 3)

### Middle Channel (5 775 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

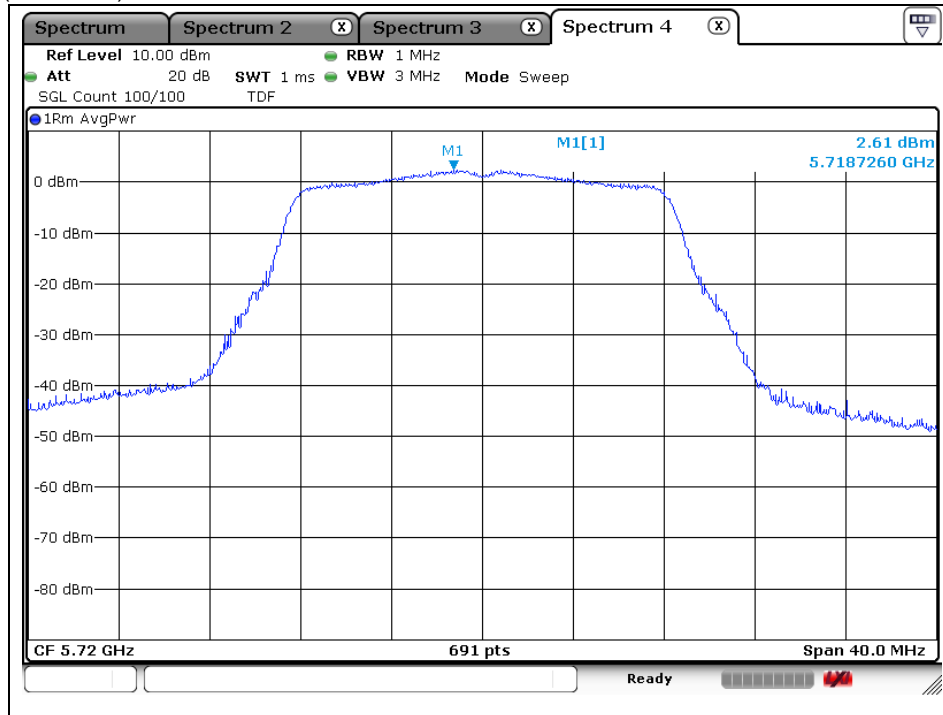
RTT5041-20(2015.10.01)(3)

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

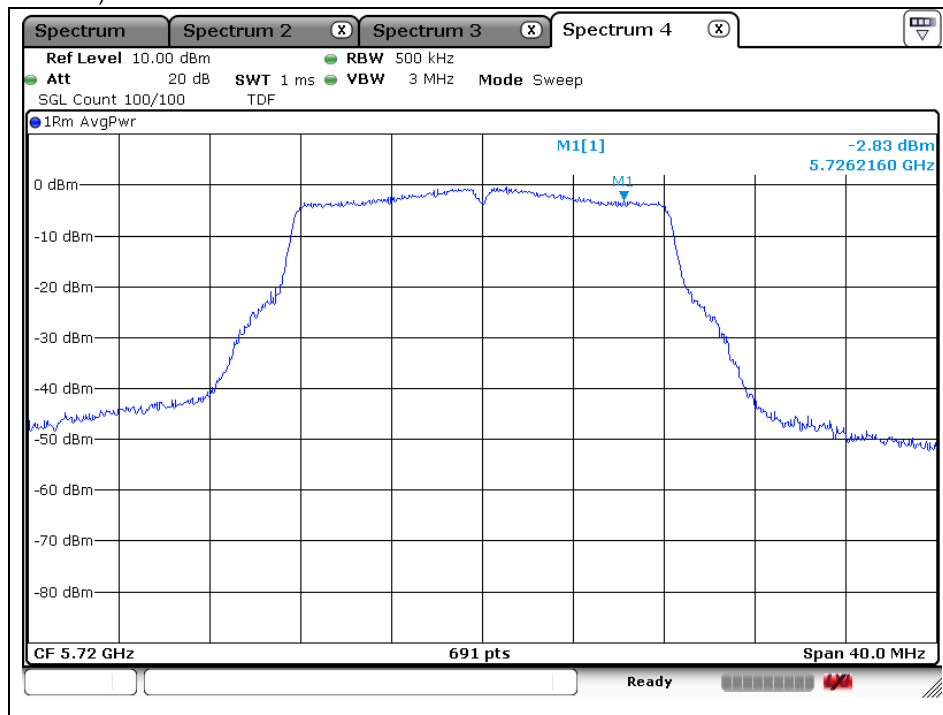
A4(210 mm x 297 mm)

## Band-crossing channels

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



U-NII 3 11a (5 720 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

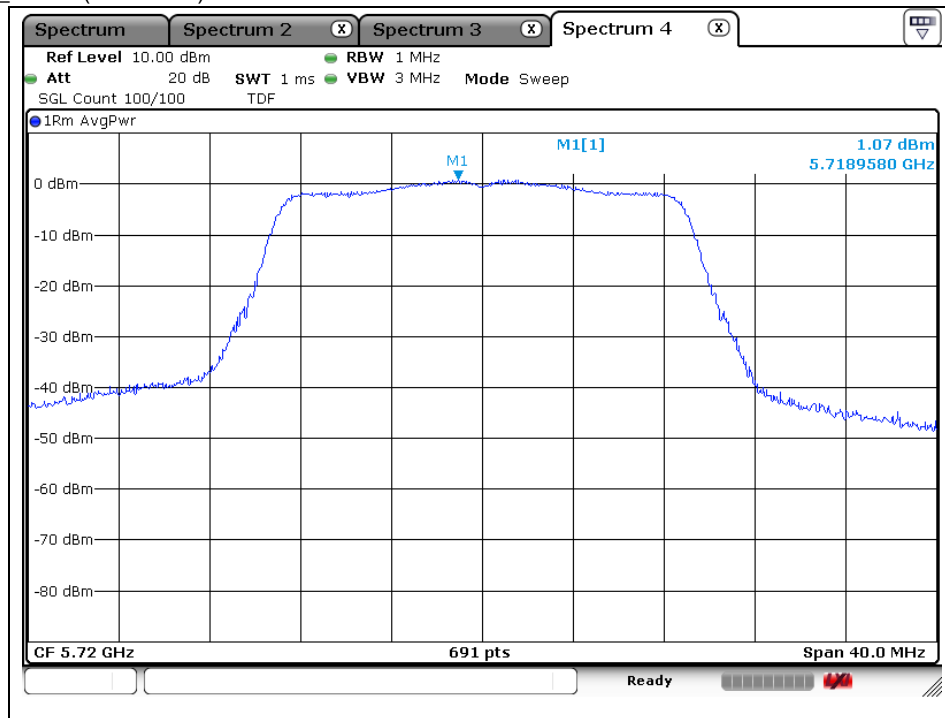
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

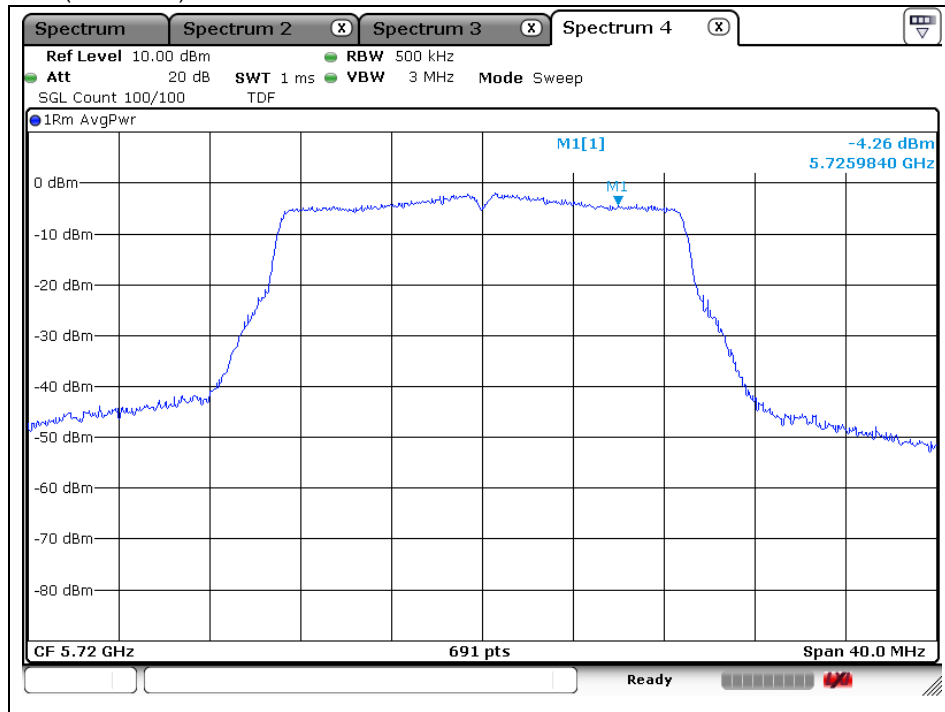
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## U-NII 2C 11n\_HT20 (5 720 MHz)



## U-NII 3 11n\_HT20 (5 720 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

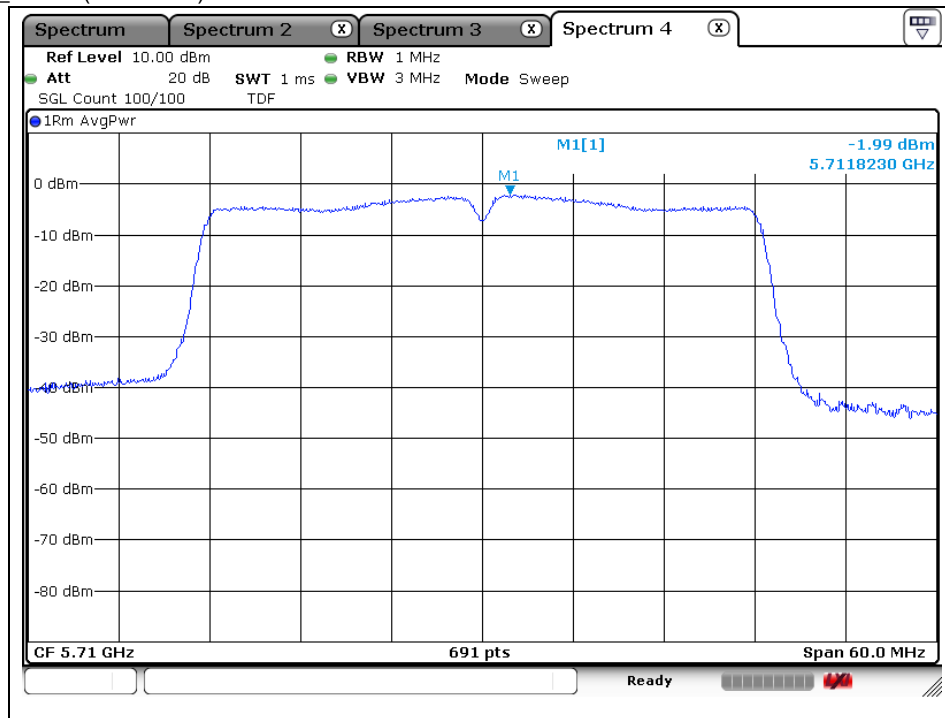
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

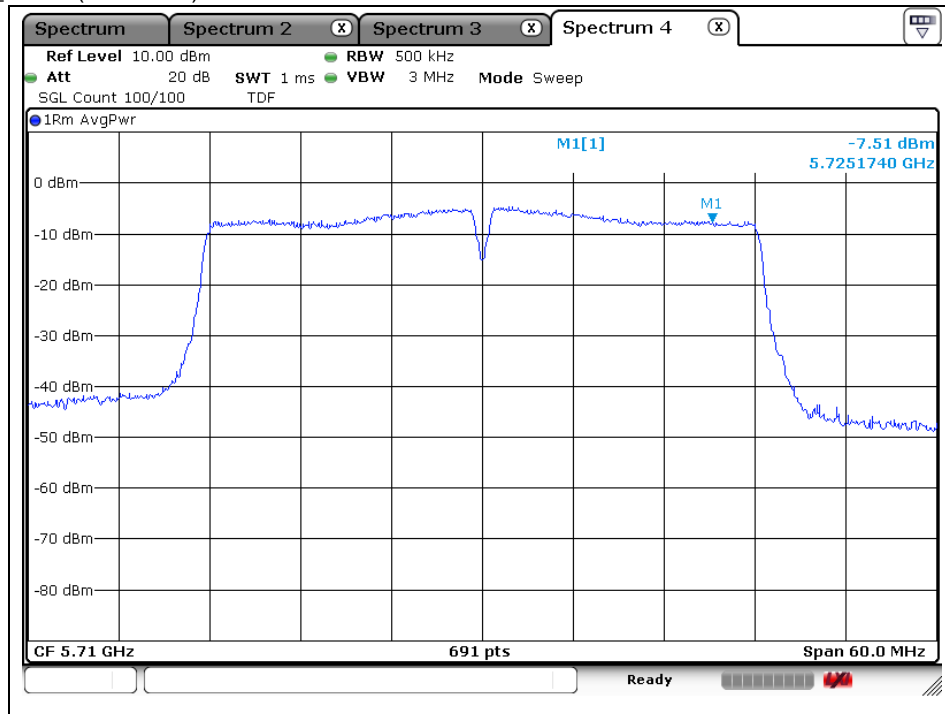
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## U-NII 2C 11n\_HT40 (5 710 MHz)



## U-NII 3 11n\_HT40 (5 710 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

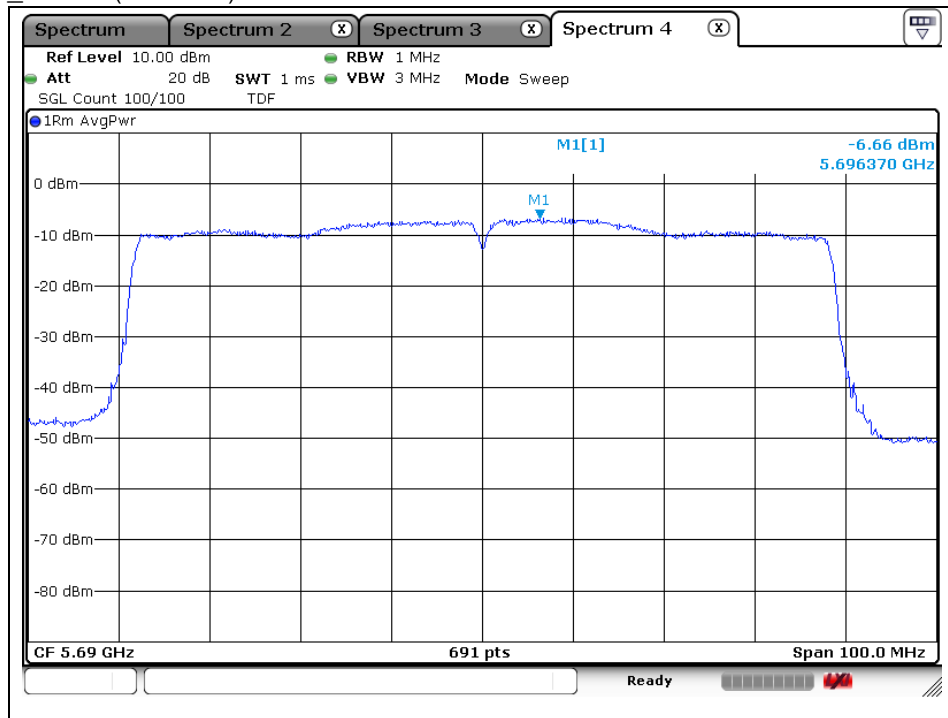
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

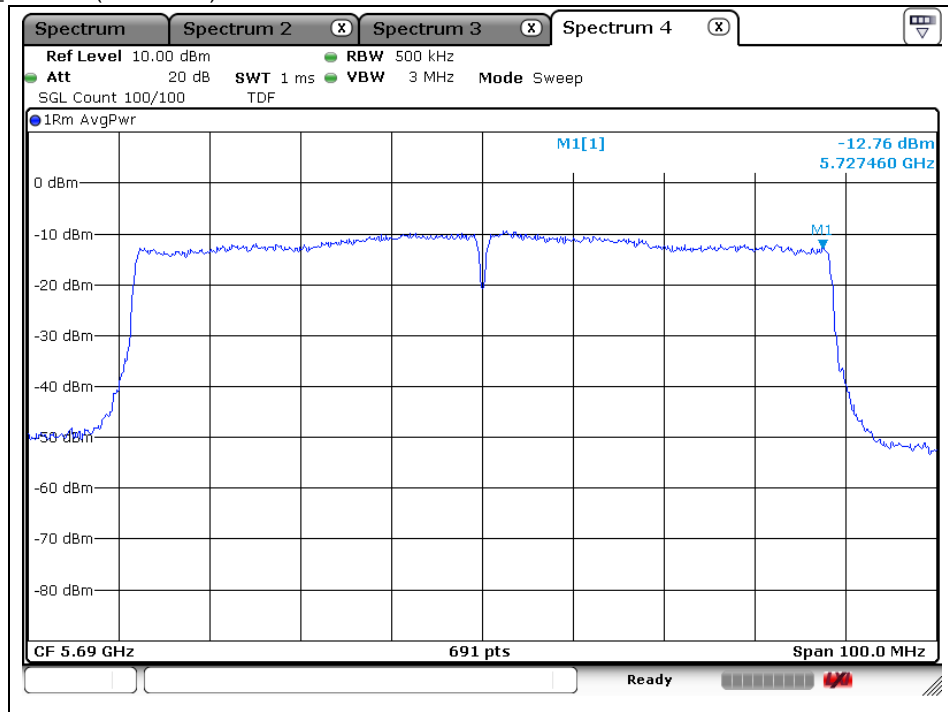
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

## U-NII 2C 11ac\_VHT80 (5 690 MHz)



## U-NII 3 11ac\_VHT80 (5 690 MHz)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

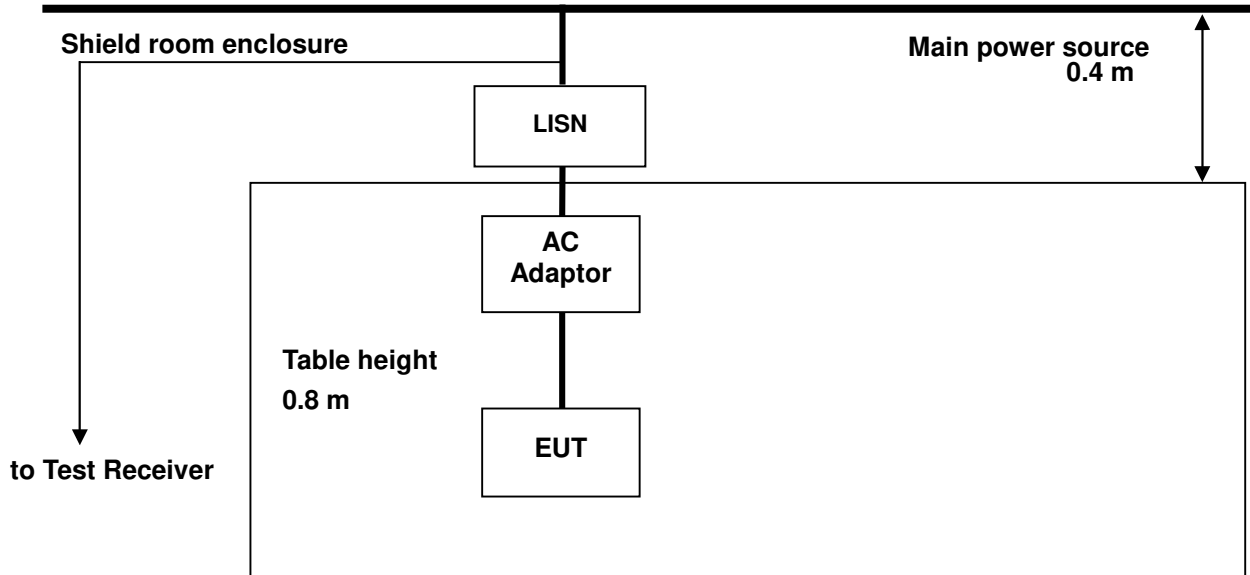
RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

## 7. AC Power Line Conducted Emission

### 7.1. Test Setup



### 7.2. Limit

#### 7.2.1. FCC

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H / 50 ohm line impedance stabilization network(LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

| Frequency of emission (MHz) | Conducted limit (dB $\mu$ V) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi-peak                   | Average  |
| 0.15 - 0.5                  | 66 - 56*                     | 56 - 46* |
| 0.5 - 5                     | 56                           | 46       |
| 5 - 30                      | 60                           | 50       |

\* Decreases with the logarithm of the frequency.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

### 7.2.2. IC

According to RSS-Gen Issue 4, 8.8, A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in Table 3.

Unless the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 3 below. The more stringent limit applies at the frequency range boundaries.

The conducted emissions shall be measured in accordance with the reference publication mentioned in Section 3.

**Table 3 – AC Power Line Conducted Emissions Limits**

| Frequency (MHz) | Conducted limit (dBμV) |           |
|-----------------|------------------------|-----------|
|                 | Quasi-Peak             | Average** |
| 0.15 - 0.5      | 66 - 56*               | 56 - 46*  |
| 0.5 - 5         | 56                     | 46        |
| 5 - 30          | 60                     | 50        |

\*The level decreases with the logarithm of the frequency.

\*\* A linear average detector is required.

### 7.3. Test Procedures

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

AC line conducted emissions from the EUT were measured according to the dictates of ANSI C63.10-2013

1. The test procedure is performed in a 6.5 m × 3.6 m × 3.6 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. The excess power cable between the EUT and the LISN was bundled. All connecting cables of EUT were moved to find the maximum emission.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm × 297 mm)

## 7.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line

Ambient temperature : (23 ± 1) °C  
Relative humidity : 47 % R.H.  
  
Frequency range : 0.15 MHz - 30 MHz  
Measured Bandwidth : 9 kHz

| FREQ.<br>(MHz) | LEVEL(dB $\mu$ V) |         | LINE | LIMIT(dB $\mu$ V) |         | MARGIN(dB) |         |
|----------------|-------------------|---------|------|-------------------|---------|------------|---------|
|                | Q-Peak            | Average |      | Q-Peak            | Average | Q-Peak     | Average |
| 0.20           | 39.60             | 25.60   | N    | 63.61             | 53.61   | 24.01      | 28.01   |
| 0.69           | 31.80             | 20.30   | N    | 56.00             | 46.00   | 24.20      | 25.70   |
| 0.73           | 31.90             | 20.20   | N    | 56.00             | 46.00   | 24.10      | 25.80   |
| 3.38           | 18.90             | 12.30   | N    | 56.00             | 46.00   | 37.10      | 33.70   |
| 4.60           | 18.50             | 12.50   | N    | 56.00             | 46.00   | 37.50      | 33.50   |
| 18.96          | 29.40             | 19.50   | N    | 60.00             | 50.00   | 30.60      | 30.50   |
| 0.16           | 37.30             | 24.50   | H    | 65.46             | 55.46   | 28.16      | 30.96   |
| 0.71           | 35.00             | 23.80   | H    | 56.00             | 46.00   | 21.00      | 22.20   |
| 0.81           | 28.70             | 19.60   | H    | 56.00             | 46.00   | 27.30      | 26.40   |
| 3.73           | 25.80             | 17.60   | H    | 56.00             | 46.00   | 30.20      | 28.40   |
| 4.63           | 24.90             | 17.20   | H    | 56.00             | 46.00   | 31.10      | 28.80   |
| 18.63          | 29.30             | 21.20   | H    | 60.00             | 50.00   | 30.70      | 28.80   |

### Remark;

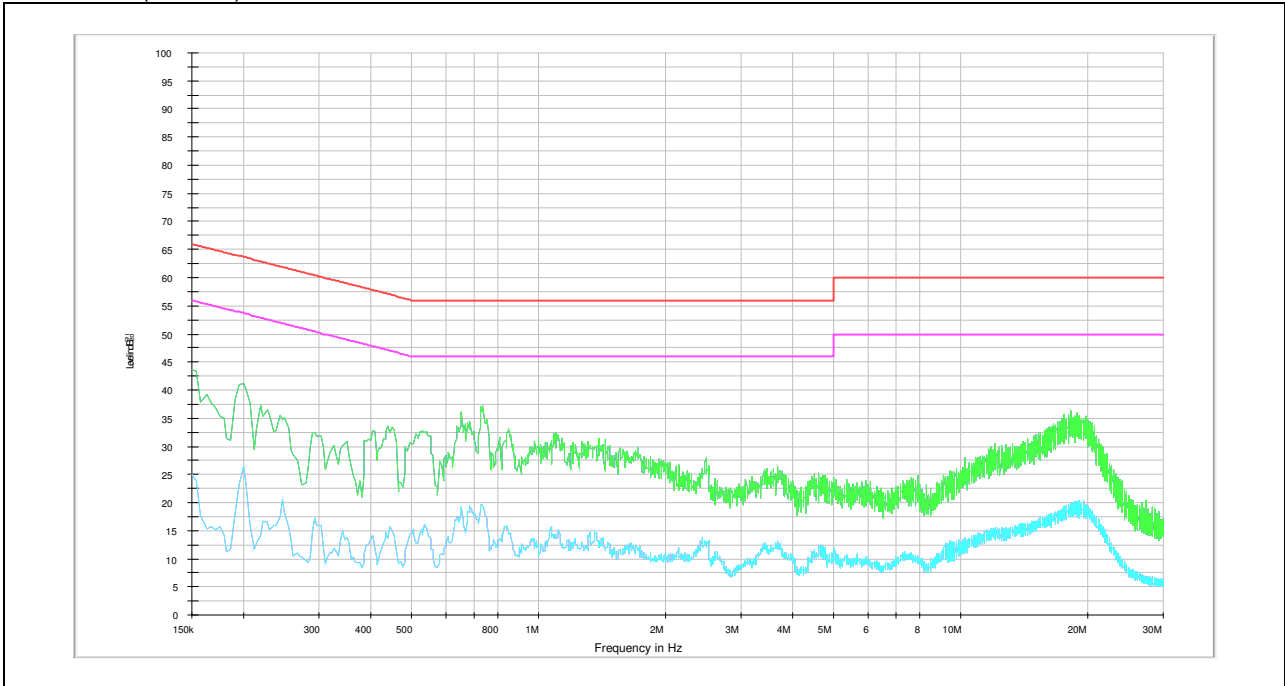
- Line ( H ): Hot, Line ( N ): Neutral.
- All modes of operation were investigated and the worst-case emissions were reported using 11a (Band 3) Mode, 6Mbps, Low channel.
- Traces shown in plot mad using a peak detector and average detector.
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Deviations to the Specifications: None.

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

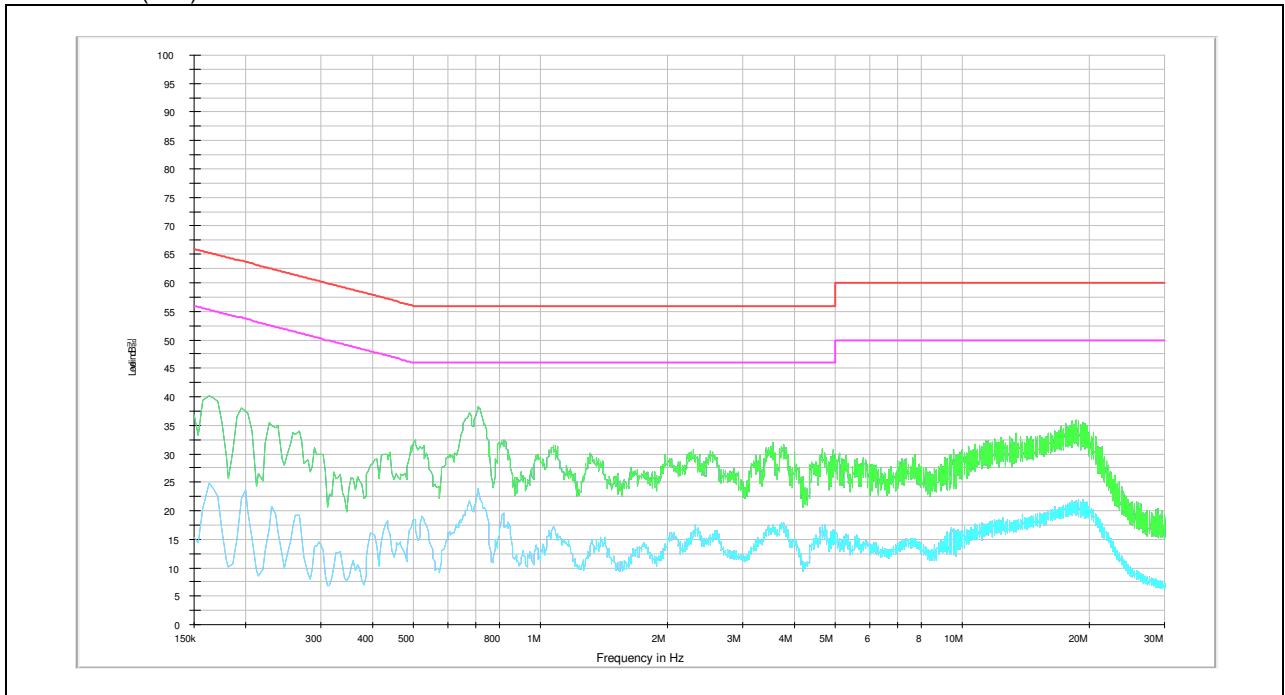
**SGS Korea Co., Ltd. (Gunpo Laboratory)** 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

## Plots of Conducted Power line

Test mode: (Neutral)



Test mode: (Hot)



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)

## 8. Antenna Requirement

### 8.1. 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.

### 8.2. Antenna Connected Construction

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

| Band | 5 150 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 | -0.60 dBi                                  | -0.80 dBi             | -0.80 dBi             |

**- End of the Test Report -**

*The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.*

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

RTT5041-20(2015.10.01)(3)

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

A4(210 mm x 297 mm)