# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

| | |
|---|---|
| **Test Report No.** | **: W164R-D022** |
| **AGR No.** | **: A161A-258** |
| **Applicant** | **: BLUEBIRD INC.** |
| **Address** | **: (Dogok-dong, SEI Tower13,14)39, Eonjuro30-gil, Gangnam-gu, Seoul, South Korea** |
| **Manufacturer** | **: BLUEBIRD INC.** |
| **Address** | **: (Dogok-dong, SEI Tower13,14)39, Eonjuro30-gil, Gangnam-gu, Seoul, South Korea** |
| **Type of Equipment** | **: Premium Tablet** |
| **FCC ID.** | **: SS4ST100** |
| **Model Name** | **: ST100** |
| **Serial number** | **: N/A** |
| **Total page of Report** | **: 122 pages (including this page)** |
| **Date of Incoming** | **: February 01, 2016** |
| **Date of issue** | **: April 06, 2016** |

## SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART E Section 15.407***

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by: Jae-Ho, Lee / Chief Engineer, ONETECH Corp.

Approved by: Sung-Ik, Han/ Managing Director, ONETECH Corp.

 

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**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

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# Revision History

| Issued Report No. | Issued Date | Revisions | Effect Section |
|---|---|---|---|
| W164R-D022 | April 06, 2016 | Initial Issue | All |
| | | | |
| | | | |
| | | | |



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# 1. VERIFICATION OF COMPLIANCE

| | |
|---|---|
| Applicant | : BLUEBIRD INC. |
| Address | : (Dogok-dong, SEI Tower13,14)39, Eonjuro30-gil, Gangnam-gu, Seoul, South Korea |
| Contact Person | : Jae-ho, Lee / Assistant Manager |
| Telephone No. | : +82-70-7730-8210 |
| FCC ID | : SS4ST100 |
| Model Name | : ST100 |
| Serial Number | : N/A |
| Date | : April 06, 2016 |

| | |
|---|---|
| EQUIPMENT CLASS | Unlicensed National Information infrastructure(UNII) |
| E.U.T. DESCRIPTION | Premium Tablet |
| THIS REPORT CONCERNS | Original Grant |
| MEASUREMENT PROCEDURES | ANSI C63.10: 2013 |
| TYPE OF EQUIPMENT TESTED | Pre-Production |
| KIND OF EQUIPMENT AUTHORIZATION REQUESTED | Certification |
| EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S) | FCC PART 15 SUBPART E Section 15.407 |
| Modifications on the Equipment to Achieve Compliance | None |
| Final Test was Conducted On | 3 m, Semi Anechoic Chamber |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

 

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# 2. TEST SUMMARY

## 2.1 Test items and results

| SECTION | TEST ITEMS | RESULTS |
|---|---|---|
| 15.407(a) | 26 dB Bandwidth | PASS |
| 15.407(a) | Maximum Conducted Output Power | Met the Limit / PASS |
| 15.407(a) | Peak Power Spectral Density | Met the Limit / PASS |
| 15.407(a) | Peak Excursion | Met the Limit / PASS |
| 15.407(g) | Frequency Stability | Met the Limit / PASS |
| 15.407(b) | Undesirable Emissions | Met the Limit / PASS |
| 15.205, 15.407(b) | General Field Strength Limits (Restricted Bandsand Radiated Emission Limits) | Met the Limit / PASS |
| 15.207 | AC Conducted Emissions 150 kHz-30 MHz | Met the Limit / PASS |
| 15.407(h) | Dynamic frequency Selection | Met the Limit / PASS |

## 2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

## 2.3 Related Submittal(s) / Grant(s)

Original submittal only

## 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART E Section 15.407

## 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

## 2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862 Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-666/ T-1842

IC (Industry Canada) – Registration No. Site# 3736A-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

 

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# 3. GENERAL INFORMATION

## 3.1 Product Description

The BLUEBIRD INC., Model ST100 (referred to as the EUT in this report) is a Premium Tablet. Product specification information described herein was obtained from product data sheet or user's manual.

| | | |
|---|---|---|
| DEVICE TYPE | Premium Tablet | |
| FREQUENCY RANGE | 5 150 MHz ~ 5 250 MHz Band | 802.11a/n(HT20): 5 180 MHz ~ 5 240 MHz |
| | 5 250 MHz ~ 5 350 MHz Band | 802.11a/n(HT20): 5 260 MHz ~ 5 320 MHz |
| | 5 470 MHz ~ 5 725 MHz Band | 802.11a/n(HT20): 5 500 MHz ~ 5 700 MHz |
| | 5 725 MHz ~ 5 850 MHz Band | 802.11a/n(HT20): 5 745 MHz ~ 5 825 MHz |
| MAX. RF OUTPUT POWER | 5 150 MHz ~ 5 250 MHz Band | Wi-Fi 802.11a (11.88 dBm)<br>Wi-Fi 802.11n_20 MHz (11.88 dBm) |
| | 5 250 MHz ~ 5 350 MHz Band | Wi-Fi 802.11a (11.50 dBm)<br>Wi-Fi 802.11n_20 MHz (11.50 dBm) |
| | 5 470 MHz ~ 5 725 MHz Band | Wi-Fi 802.11a (12.08 dBm)<br>Wi-Fi 802.11n_20 MHz (12.14 dBm) |
| | 5 725 MHz ~ 5 850 MHz Band | Wi-Fi 802.11a (11.55 dBm)<br>Wi-Fi 802.11n_20 MHz (11.60 dBm) |
| MODULATION TYPE | OFDM Modulation(BPSK/QPSK/16QAM/64QAM) | |
| Antenna Gain | 5 150 MHz ~ 5 250 MHz Band | 0.65 dBi |
| | 5 250 MHz ~ 5 350 MHz Band | 0.66 dBi |
| | 5 470 MHz ~ 5 725 MHz Band | 0.54 dBi |
| | 5 725 MHz ~ 5 850 MHz Band | -0.63 dBi |
| List of each Osc. or crystal Freq.(Freq. >= 1 MHz) | 26 MHz | |

 

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### 3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

## 4. EUT MODIFICATIONS

-. None

 

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# 5. SYSTEM TEST CONFIGURATION

## 5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE | MANUFACTURER | MODEL/PART NUMBER | FCC ID |
|---|---|---|---|
| Display Controller Board | Kingdisplay | KD101N37-40NA-A1-REVB | |
| Display Panel | N/A | N/A | |
| Main Board | N/A | N/A | |
| Battery | Guandong TeamGiant New Energy Tech.Limited Liability Co.,LTD | BAT-ST100 | |
| SUB Board | N/A | TVE1015IST-SUB-V1.1 | |
| Sensor | N/A | CMK-TVE1013-B-V5B1.0 | |
| Antenna | N/A | MICRO RF Rev 3.0 | |
| Camera module | N/A | CMK-TVE1010I-F-V2B2.0 | |
| Touch sensor controller Board | N/A | 101332C-Q-00 | |
| Wireless Module | HUAWEI TECHNOLOGIES CO.,LTD. | MU739 | QISMU739 |

## 5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

| Model | Manufacturer | Description | Connected to |
|---|---|---|---|
| N/A | N/A | N/A | N/A |



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### 5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting mode is programmed.

5 150 MHz ~ 5 250 MHz Band

| Modulation & Channel selected | DATA RATE | OUTPUT POWER |
|---|---|---|
| 802.11a (High Channel) | 6 Mbps | 11.88 |
| | 9 Mbps | 11.86 |
| | 12 Mbps | 11.82 |
| | 18 Mbps | 11.77 |
| | 24 Mbps | 11.72 |
| | 36 Mbps | 11.68 |
| | 48 Mbps | 11.64 |
| | 54 Mbps | 11.54 |
| 802.11n(HT20) (High Channel) | 6.5 Mbps | 11.88 |
| | 13 Mbps | 11.84 |
| | 19.5 Mbps | 11.81 |
| | 26 Mbps | 11.76 |
| | 39 Mbps | 11.69 |
| | 52 Mbps | 11.64 |
| | 58.5 Mbps | 11.64 |
| | 65 Mbps | 11.56 |

The worse case data rate for each modulation is determined 6 Mbps for IEEE 802.11a and 6.5 Mbps for IEEE 802.11n(HT20).

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

 

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5 250 MHz ~ 5 350 MHz Band

| Modulation & Channel selected | DATA RATE | OUTPUT POWER |
|---|---|---|
| 802.11a (Middle Channel) | 6 Mbps | 11.50 |
| | 9 Mbps | 11.41 |
| | 12 Mbps | 11.41 |
| | 18 Mbps | 11.40 |
| | 24 Mbps | 11.33 |
| | 36 Mbps | 11.28 |
| | 48 Mbps | 11.20 |
| | 54 Mbps | 11.14 |
| 802.11n(HT20) (Middle Channel) | 6.5 Mbps | 11.50 |
| | 13 Mbps | 11.43 |
| | 19.5 Mbps | 11.39 |
| | 26 Mbps | 11.34 |
| | 39 Mbps | 11.28 |
| | 52 Mbps | 11.26 |
| | 58.5 Mbps | 11.19 |
| | 65 Mbps | 11.15 |

The worse case data rate for each modulation is determined 6 Mbps for IEEE 802.11a and 6.5 Mbps for IEEE 802.11n(HT20).

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

 

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5 470 MHz ~ 5 725 MHz Band

| Modulation & Channel selected | DATA RATE | OUTPUT POWER |
|---|---|---|
| 802.11a (Low Channel) | 6 Mbps | 12.08 |
| | 9 Mbps | 12.02 |
| | 12 Mbps | 12.00 |
| | 18 Mbps | 11.94 |
| | 24 Mbps | 11.88 |
| | 36 Mbps | 11.84 |
| | 48 Mbps | 11.79 |
| | 54 Mbps | 11.76 |
| 802.11n(HT20) (Low Channel) | 6.5 Mbps | 12.14 |
| | 13 Mbps | 12.06 |
| | 19.5 Mbps | 12.05 |
| | 26 Mbps | 11.94 |
| | 39 Mbps | 11.90 |
| | 52 Mbps | 11.87 |
| | 58.5 Mbps | 11.80 |
| | 65 Mbps | 11.74 |

The worse case data rate for each modulation is determined 6 Mbps for IEEE 802.11a and 6.5 Mbps for IEEE 802.11n(HT20).

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

 

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5 725 MHz ~ 5 850 MHz Band

| Modulation & Channel selected | DATA RATE | OUTPUT POWER |
|---|---|---|
| 802.11a (Low Channel) | 6 Mbps | 11.55 |
| | 9 Mbps | 11.52 |
| | 12 Mbps | 11.49 |
| | 18 Mbps | 11.50 |
| | 24 Mbps | 11.47 |
| | 36 Mbps | 11.44 |
| | 48 Mbps | 11.43 |
| | 54 Mbps | 11.42 |
| 802.11n(HT20) (Low Channel) | 6.5 Mbps | 11.60 |
| | 13 Mbps | 11.57 |
| | 19.5 Mbps | 11.56 |
| | 26 Mbps | 11.53 |
| | 39 Mbps | 11.52 |
| | 52 Mbps | 11.50 |
| | 58.5 Mbps | 11.51 |
| | 65 Mbps | 11.48 |

The worse case data rate for each modulation is determined 6 Mbps for IEEE 802.11a and 6.5 Mbps for IEEE 802.11n(HT20).

- To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

 

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**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

## 5.4 Configuration of Test System

**Line Conducted Test**: The EUT was tested in a Transmitting mode. The EUT was connected to USB and the power of USB was connected to Adapter. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

**Radiated Emission Test**: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

## 5.5 Antenna Requirement

For intentional device, according to 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.

**Antenna Construction:**

The antenna of the EUT is a PIFA Antenna on the main board in the EUT, so no consideration of replacement by the user.



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# 6. PRELIMINARY TEST

## 6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

| Operation Mode | The Worse operating condition (Please check one only) |
|---|---|
| Transmitting Mode | X |

## 6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

| Operation Mode | The Worse operating condition (Please check one only) |
|---|---|
| Transmitting Mode | X |



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# 7. MIMIMUM 26 dB BANDWIDTH

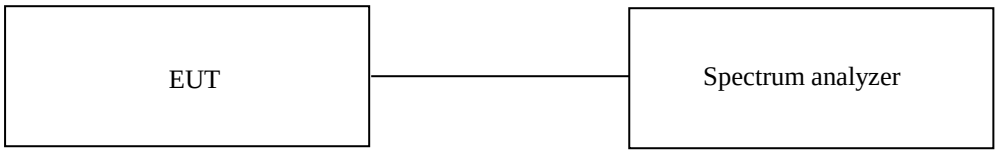
## 7.1 Operating environment

Temperature : 23 ℃

Relative humidity : 47 % R.H.

## 7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 26 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 26 dB.




## 7.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal. |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul. 22, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

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### 7.4.1 Test data for 802.11a RLAN Mode

-. Test Date : March 10, 2016

-. Test Result : Pass

| FREQUENCY RANGE (MHz) | CHANNEL | FREQUENCY (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|---|
| 5 150 ~ 5 250 | Low | 5 180 | 18.38 |
| | Middle | 5 200 | 18.38 |
| | High | 5 240 | 18.38 |
| 5 250 ~ 5 350 | Low | 5 260 | 18.38 |
| | Middle | 5 300 | 18.38 |
| | High | 5 320 | 18.38 |
| 5 470 ~ 5 725 | Low | 5 500 | 18.38 |
| | Middle | 5 600 | 18.38 |
| | High | 5 700 | 18.38 |
| 5 725 ~ 5 850 | Low | 5 745 | 18.38 |
| | Middle | 5 785 | 18.38 |
| | High | 5 825 | 18.38 |

**Tested by: Jun-Hui, Lee / Senior Engineer**



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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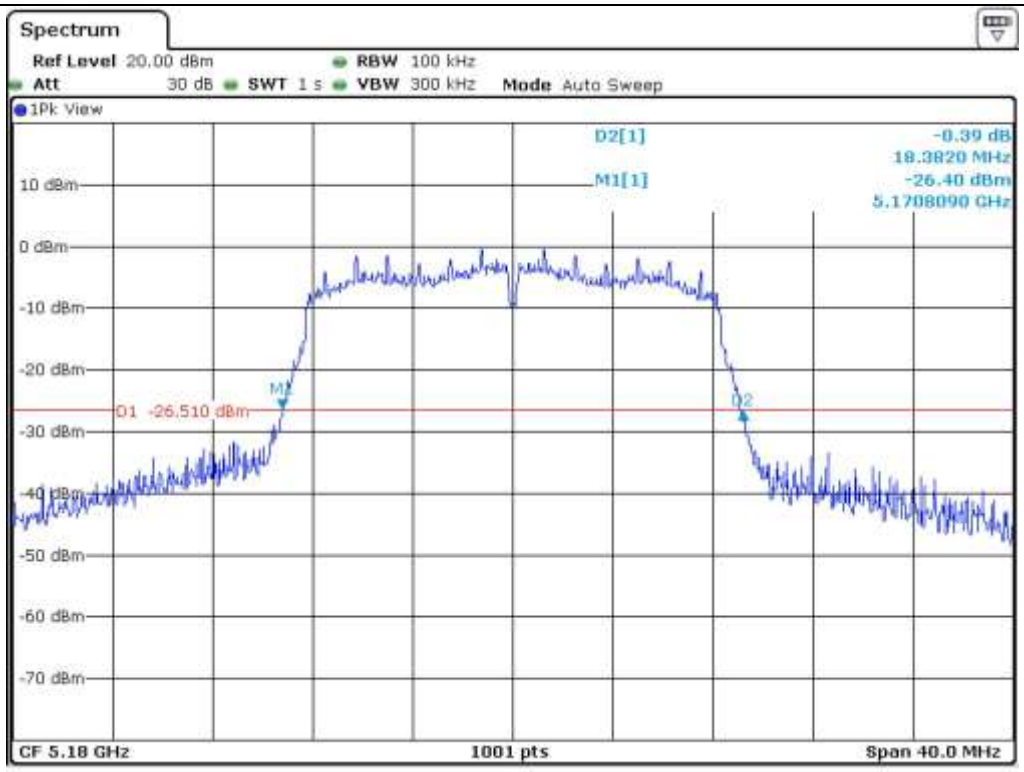
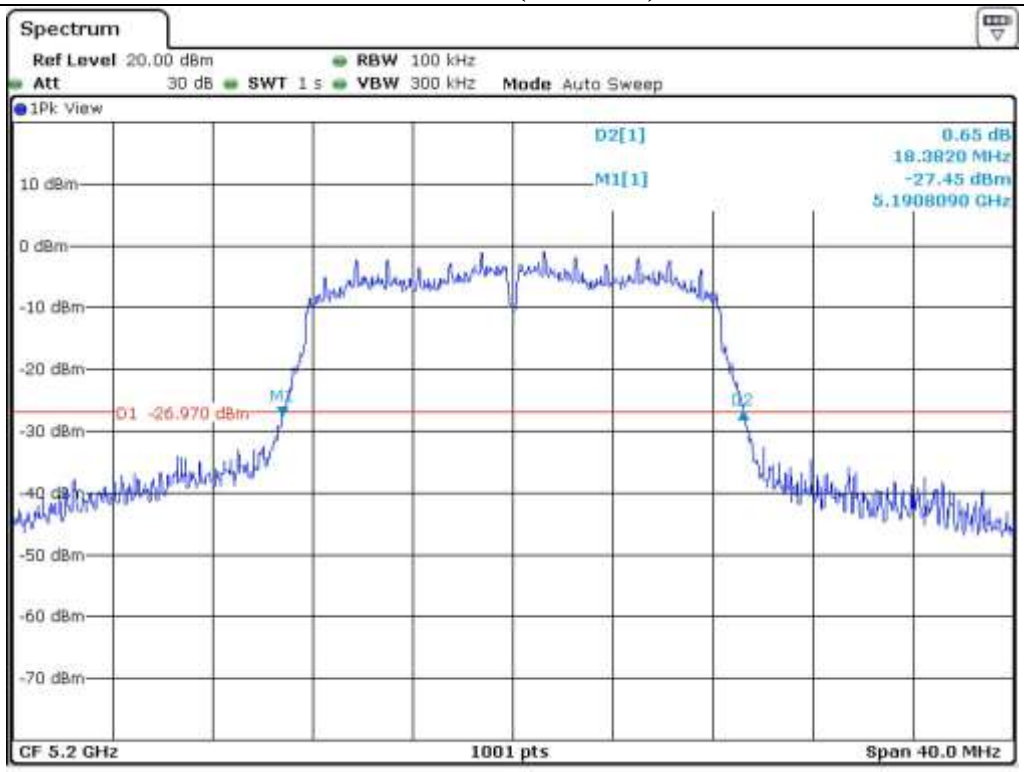



Low Channel (5 180 MHz)




Middle Channel (5 200 MHz)

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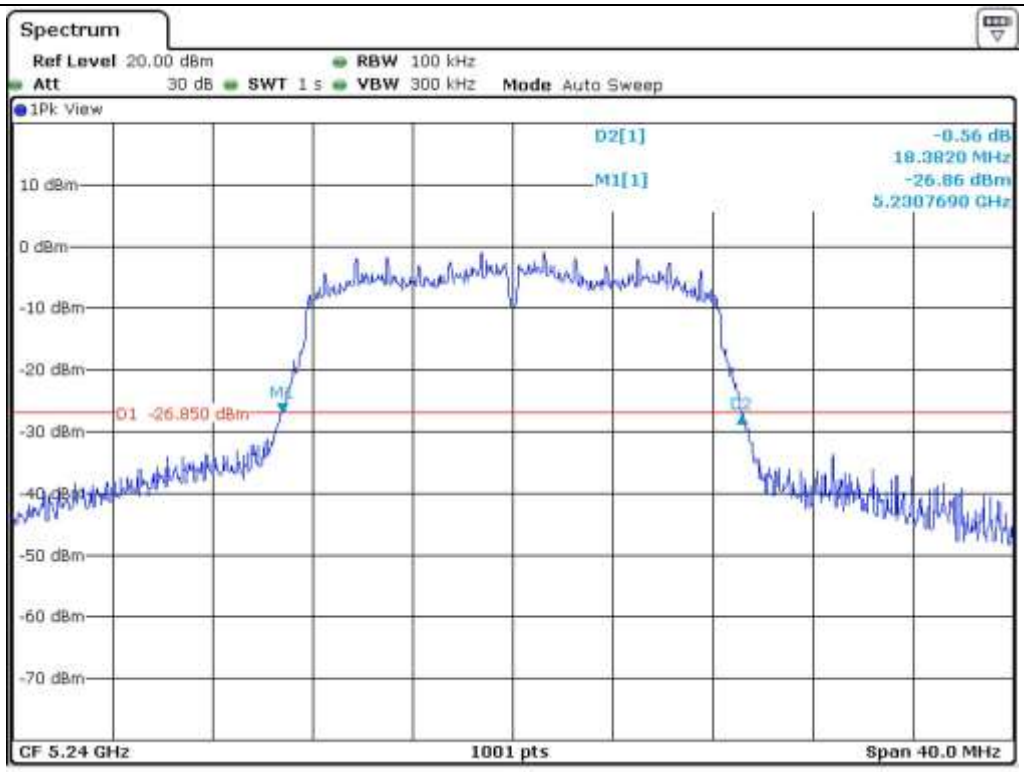
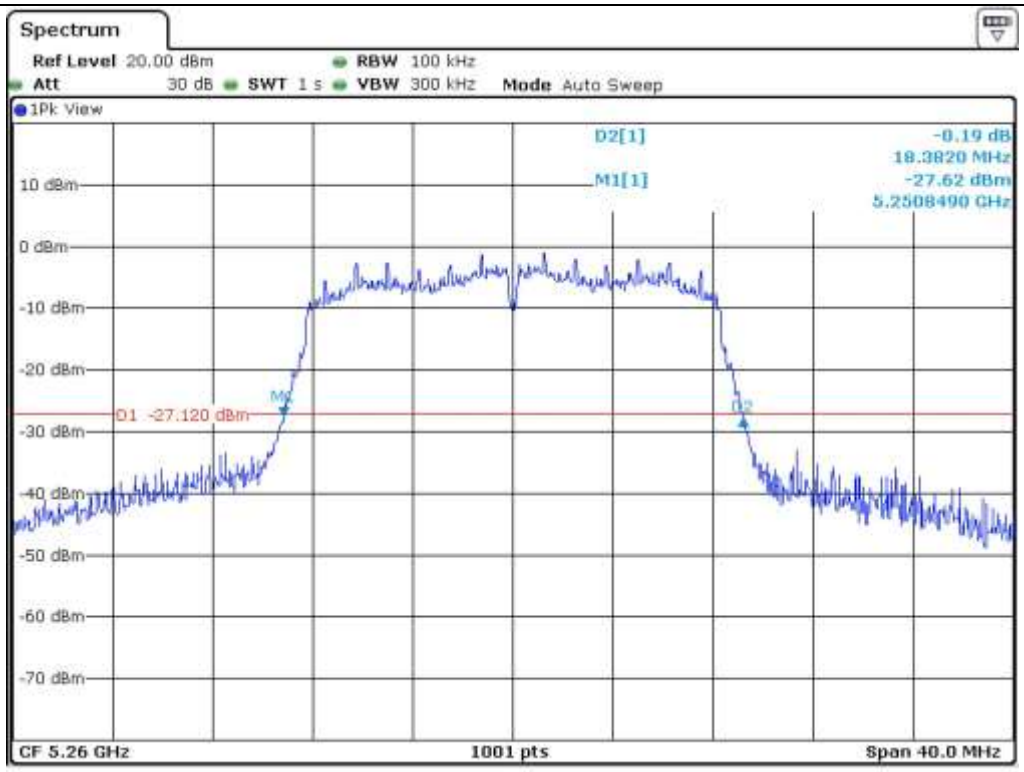


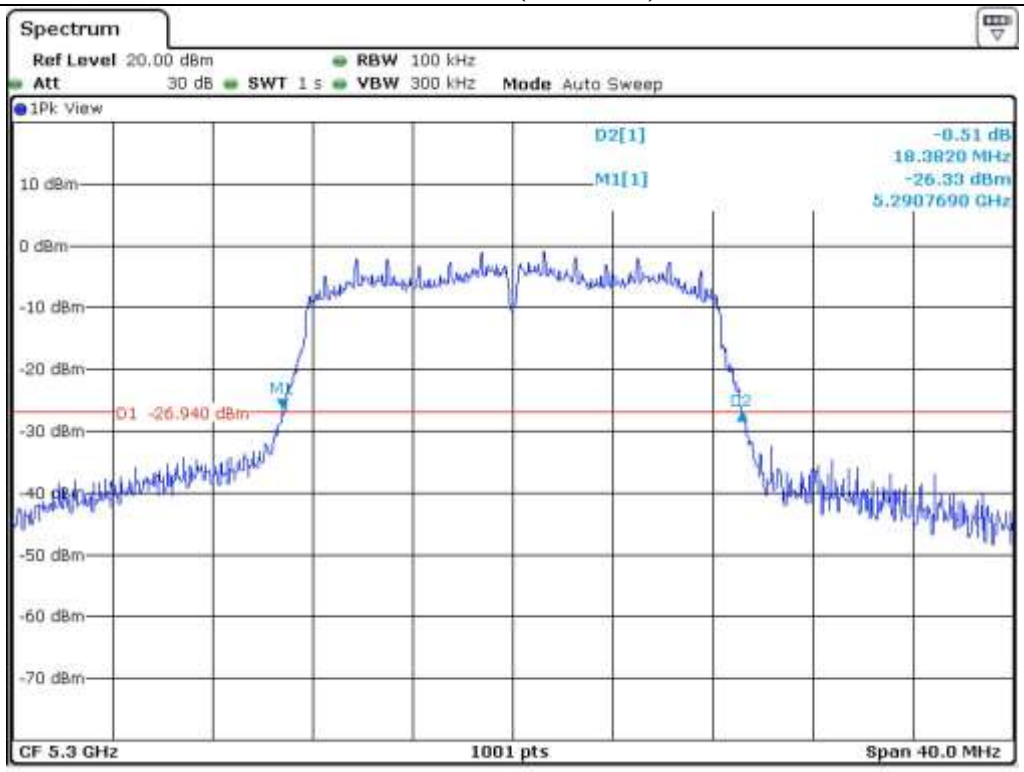

High Channel (5 240 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




Low Channel (5 260 MHz)




Middle Channel (5 300 MHz)

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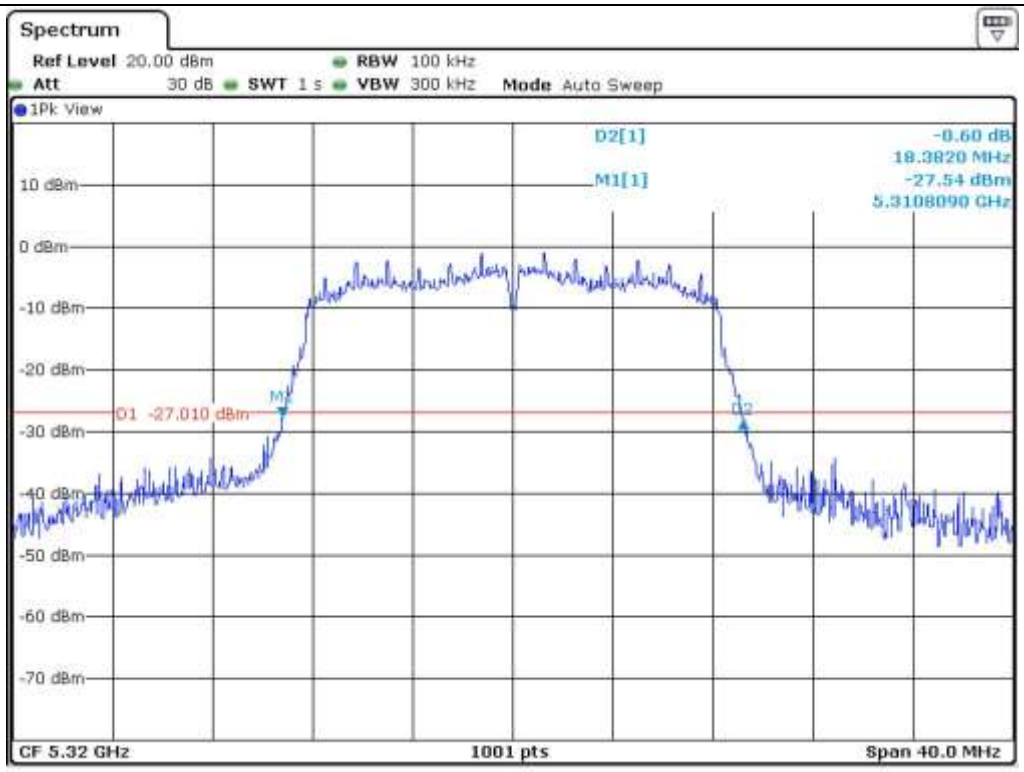


High Channel (5 320 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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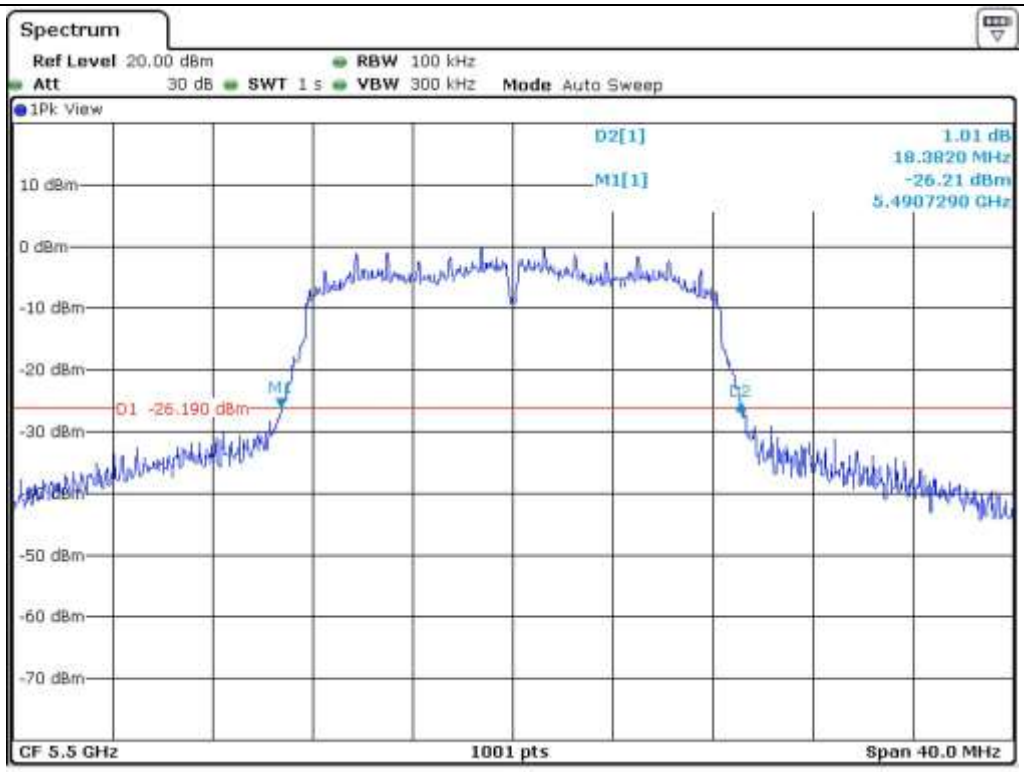
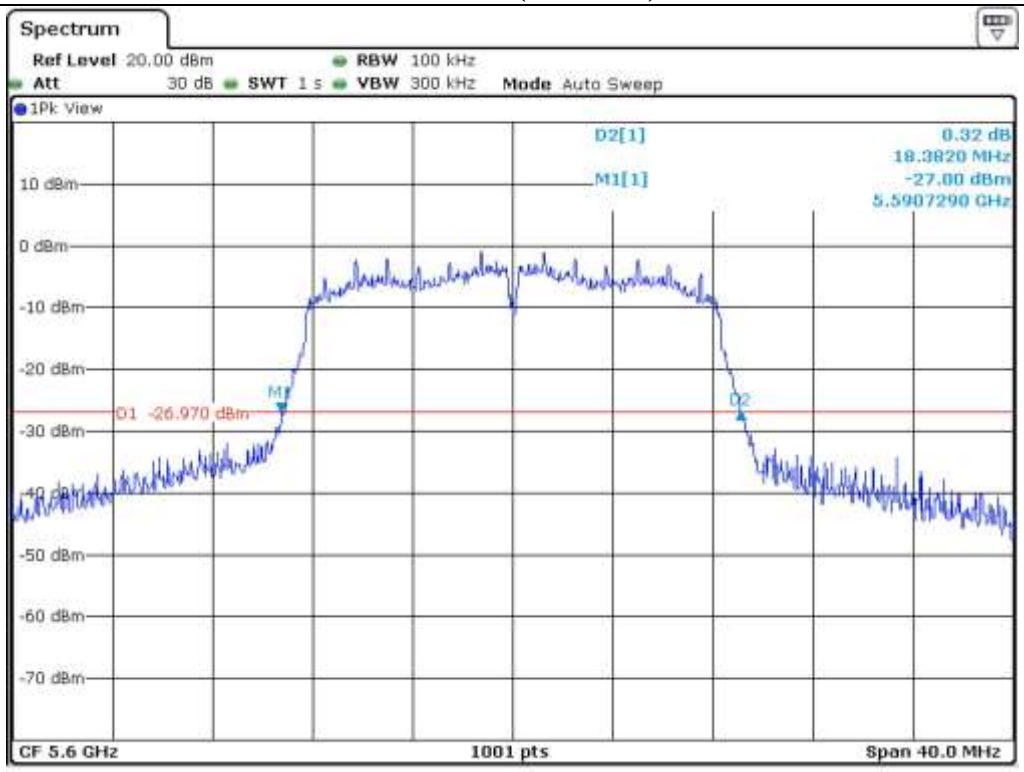



Low Channel (5 500 MHz)




Middle Channel (5 600 MHz)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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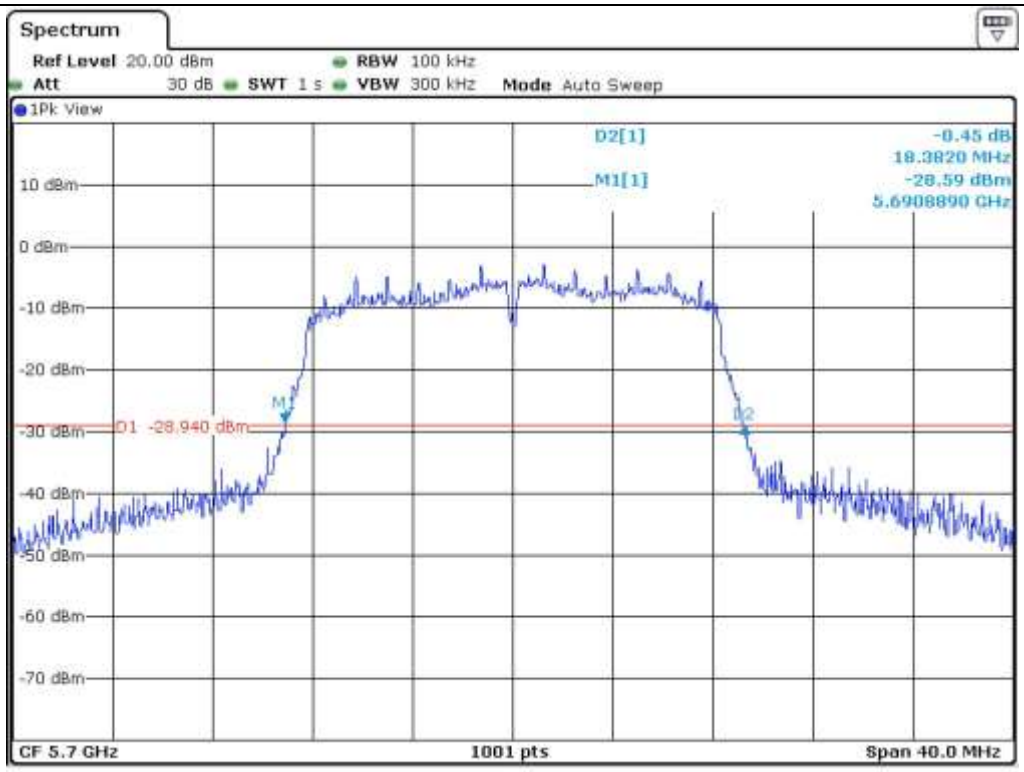


High Channel (5 700 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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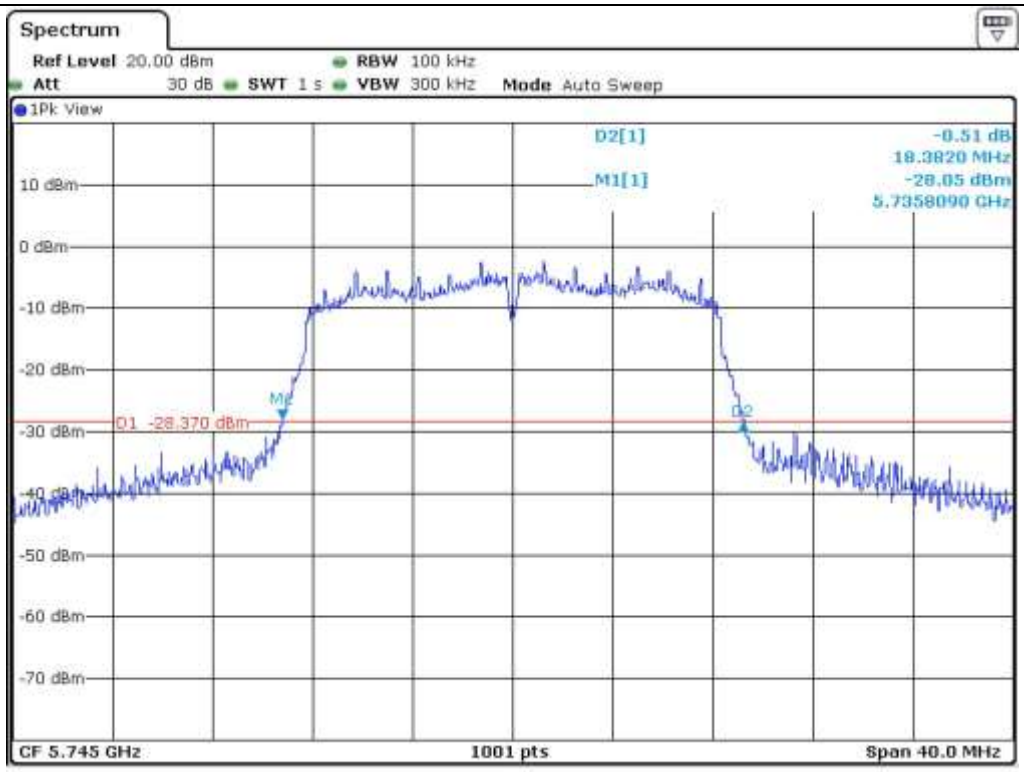
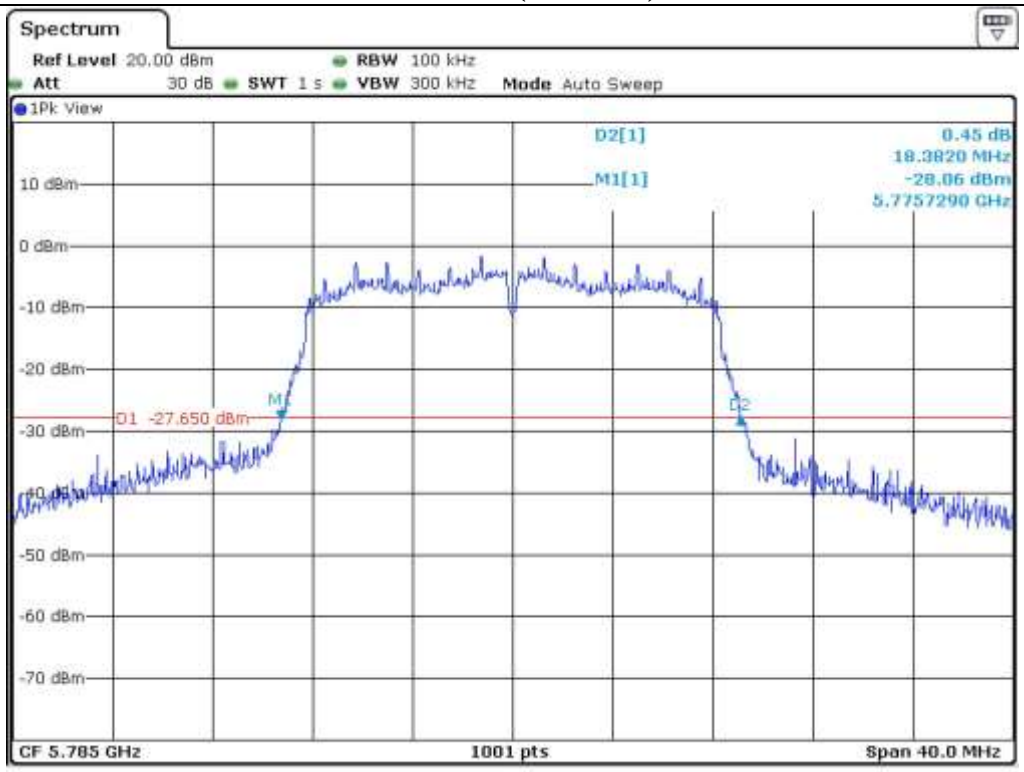



Low Channel (5 745 MHz)




Middle Channel (5 785 MHz)

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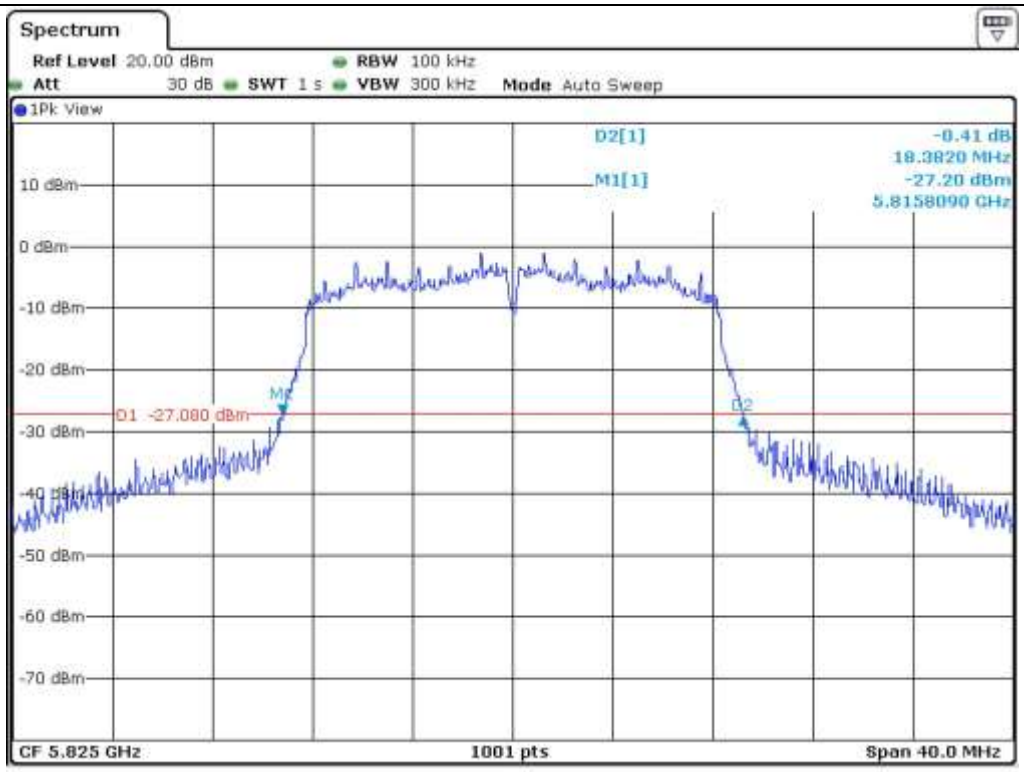


High Channel (5 825 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

### 7.4.2 Test data for 802.11n_HT20 RLAN Mode

-. Test Date : March 10, 2016

-. Test Result : Pass

| FREQUENCY RANGE (MHz) | CHANNEL | FREQUENCY (MHz) | 26 dB Bandwidth (MHz) |
|---|---|---|---|
| 5 150 ~ 5 250 | Low | 5 180 | 18.74 |
| | Middle | 5 200 | 18.74 |
| | High | 5 240 | 18.74 |
| 5 250 ~ 5 350 | Low | 5 260 | 18.74 |
| | Middle | 5 300 | 18.74 |
| | High | 5 320 | 18.74 |
| 5 470 ~ 5 725 | Low | 5 500 | 18.74 |
| | Middle | 5 600 | 18.74 |
| | High | 5 700 | 18.74 |
| 5 725 ~ 5 850 | Low | 5 745 | 18.74 |
| | Middle | 5 785 | 18.74 |
| | High | 5 825 | 18.74 |

**Tested by: Jun-Hui, Lee / Senior Engineer**




**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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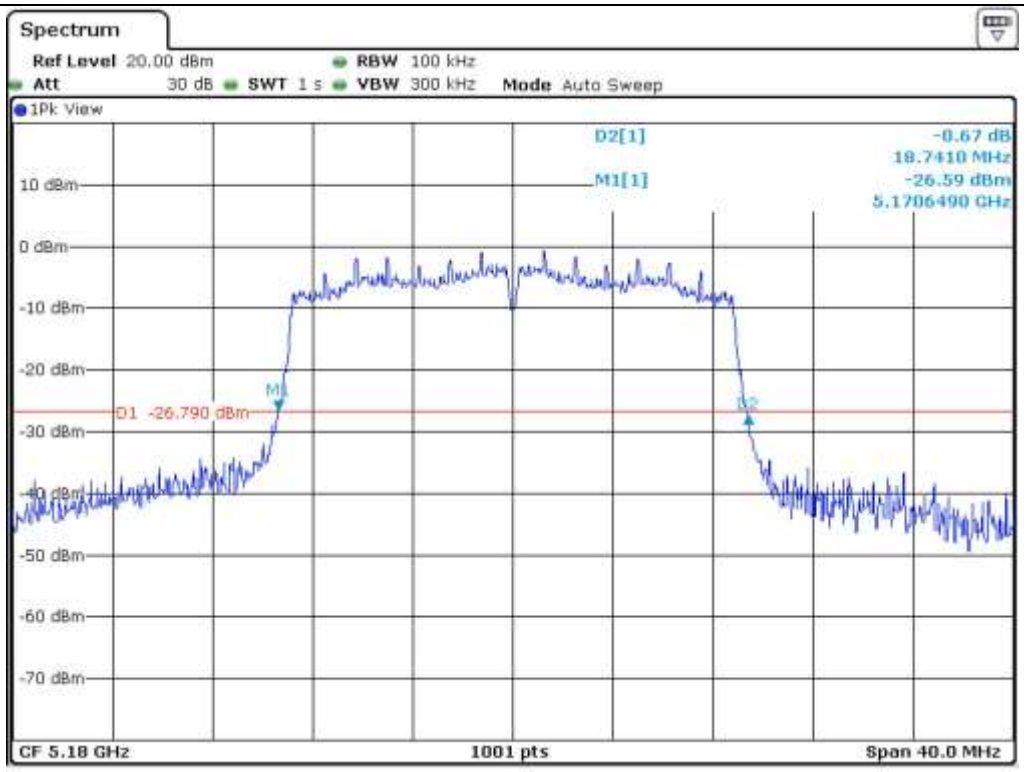
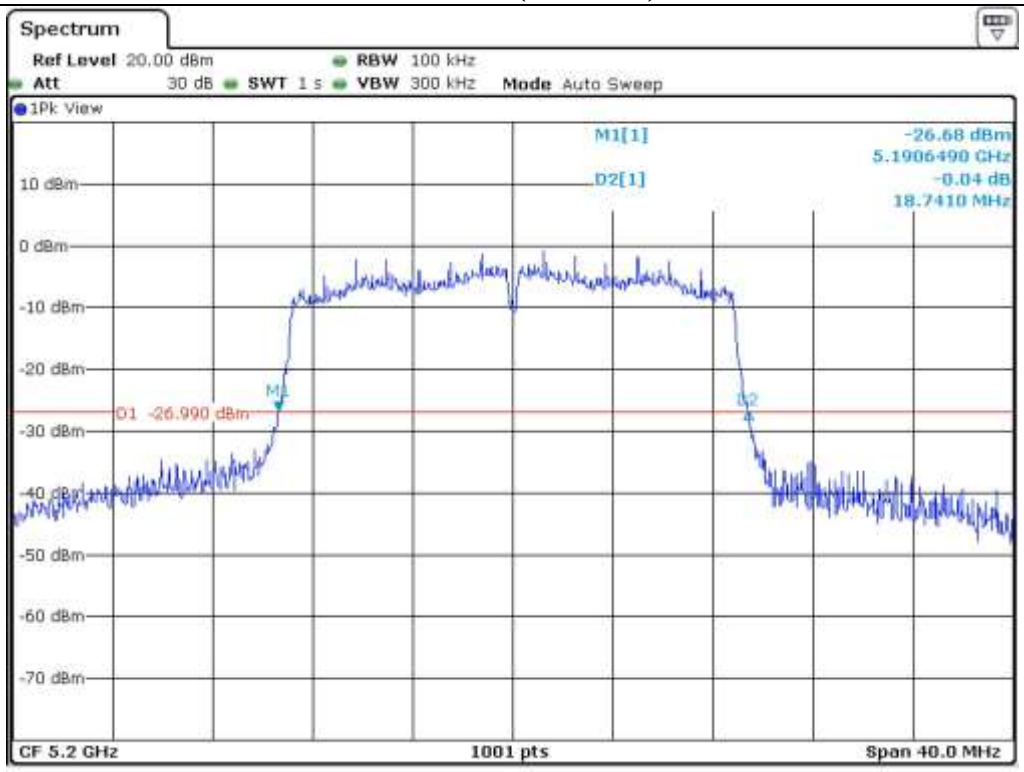



Low Channel (5 180 MHz)




Middle Channel (5 200 MHz)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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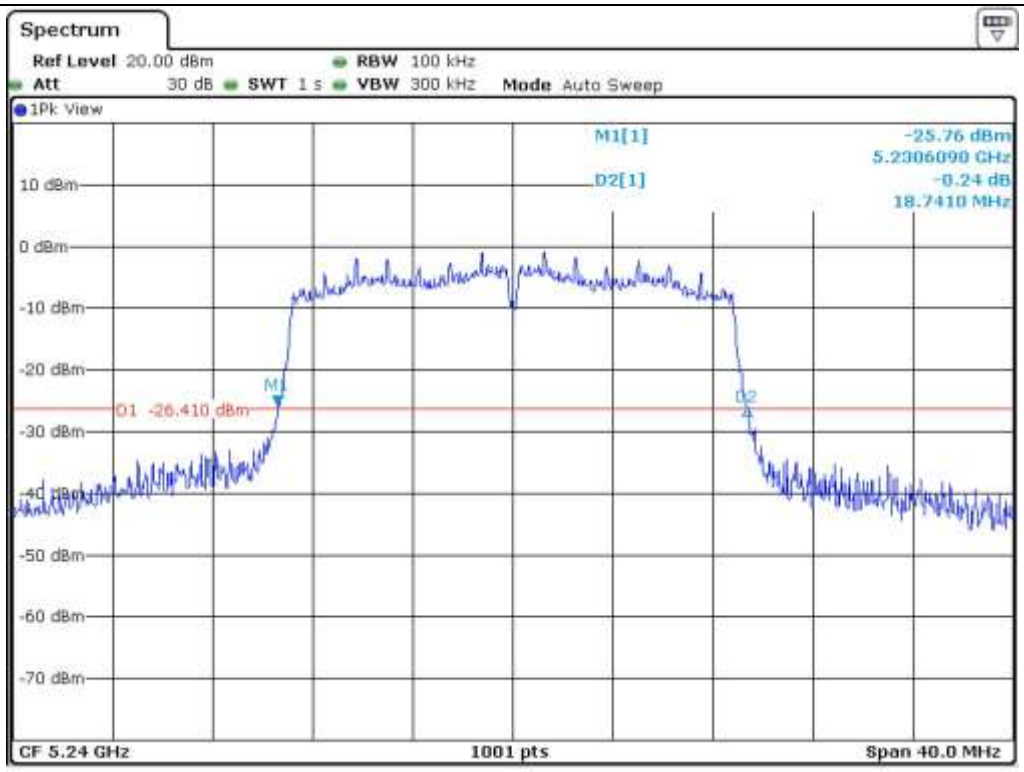


High Channel (5 240 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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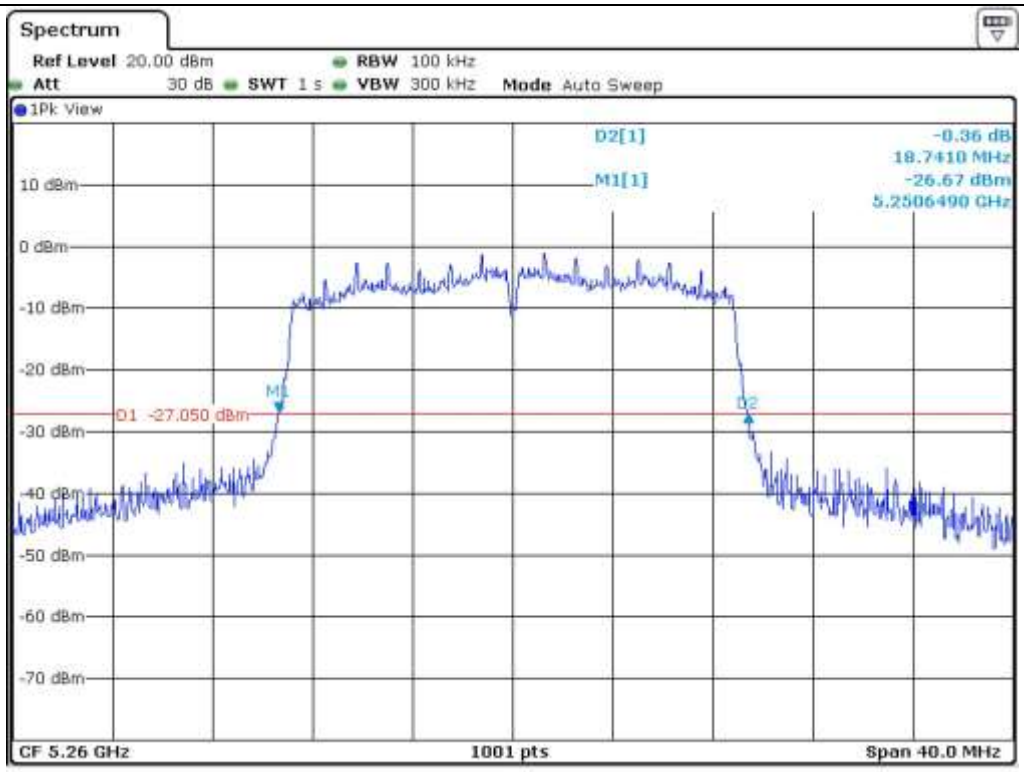
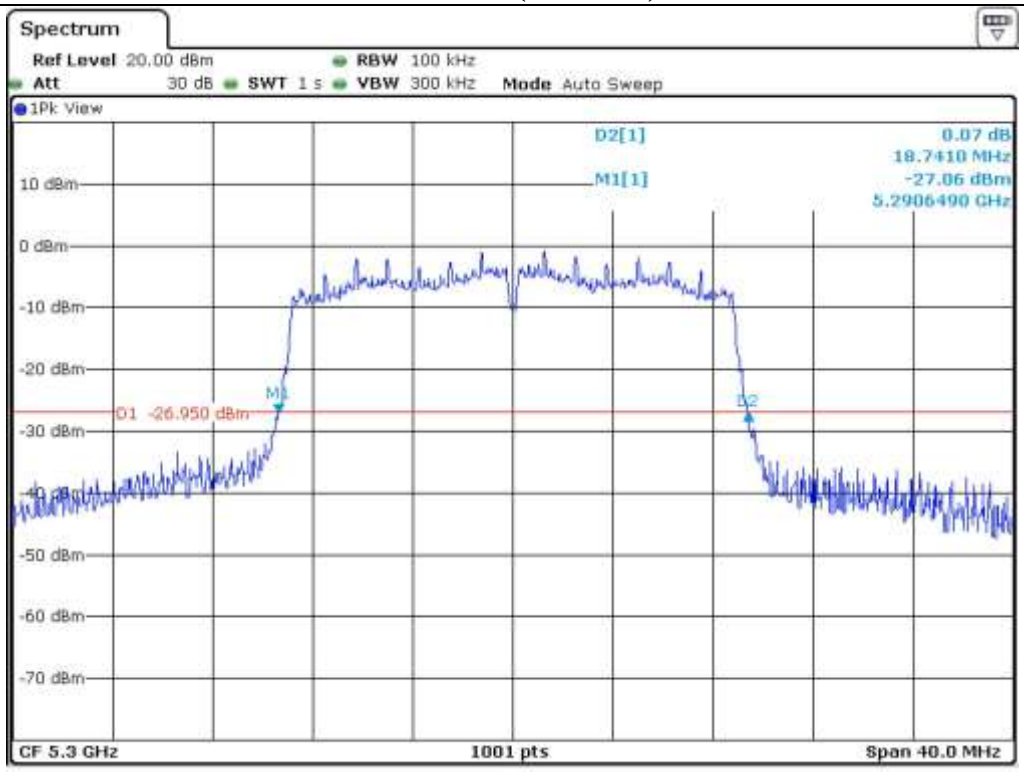



Low Channel (5 260 MHz)




Middle Channel (5 300 MHz)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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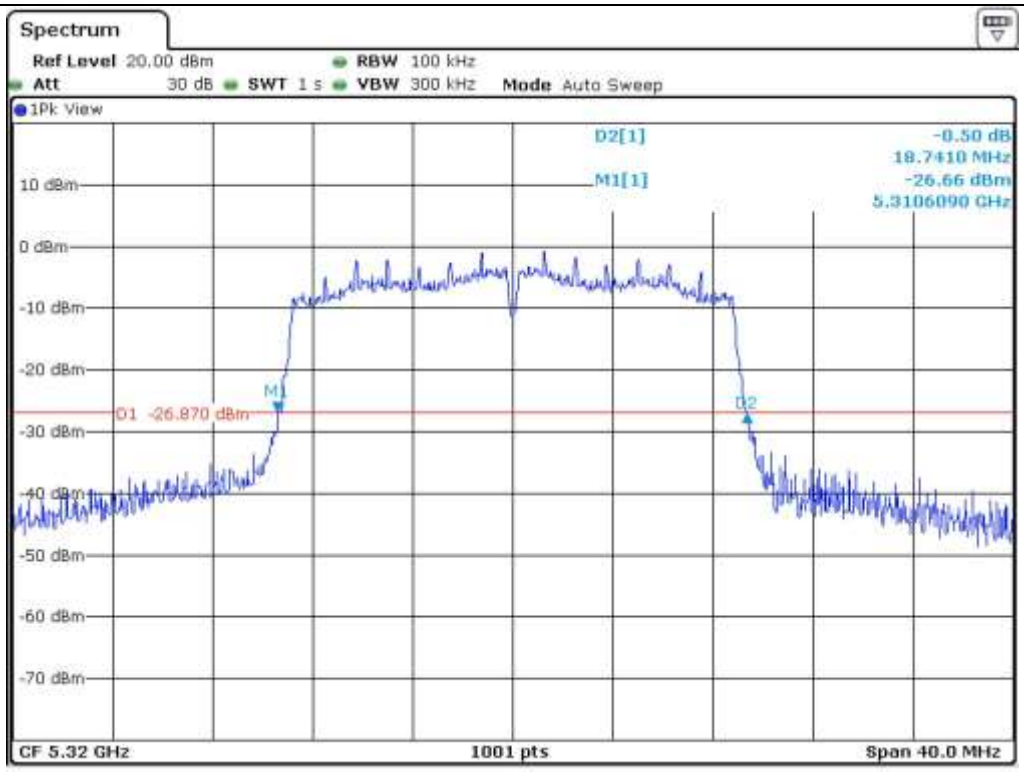


High Channel (5 320 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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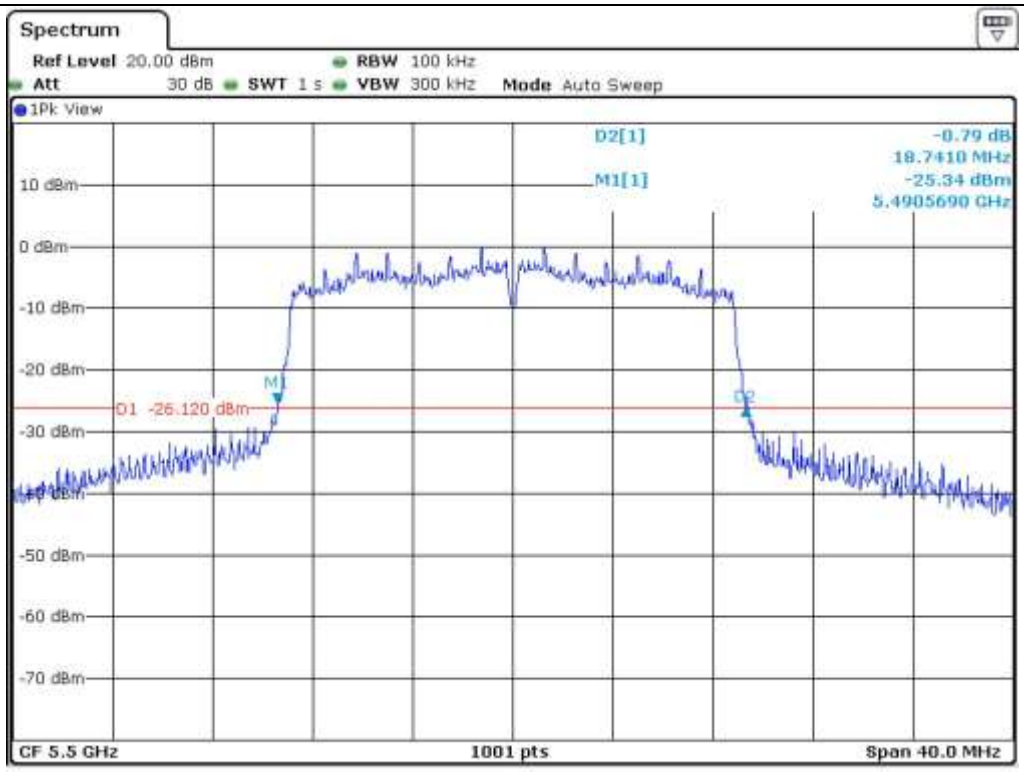
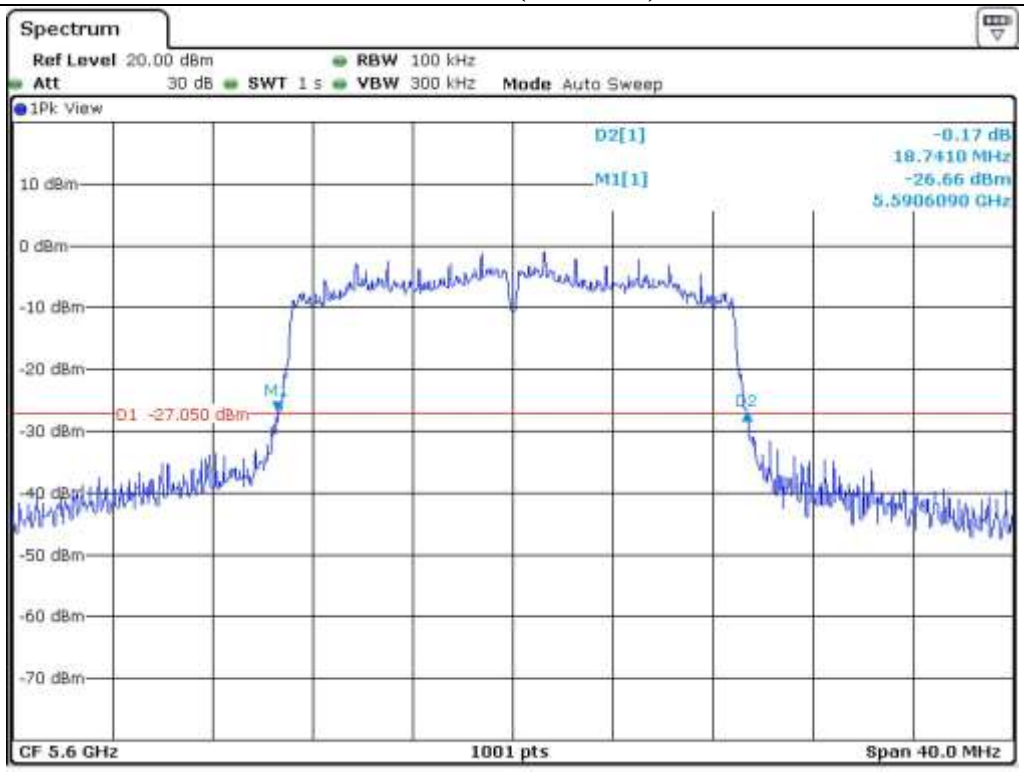


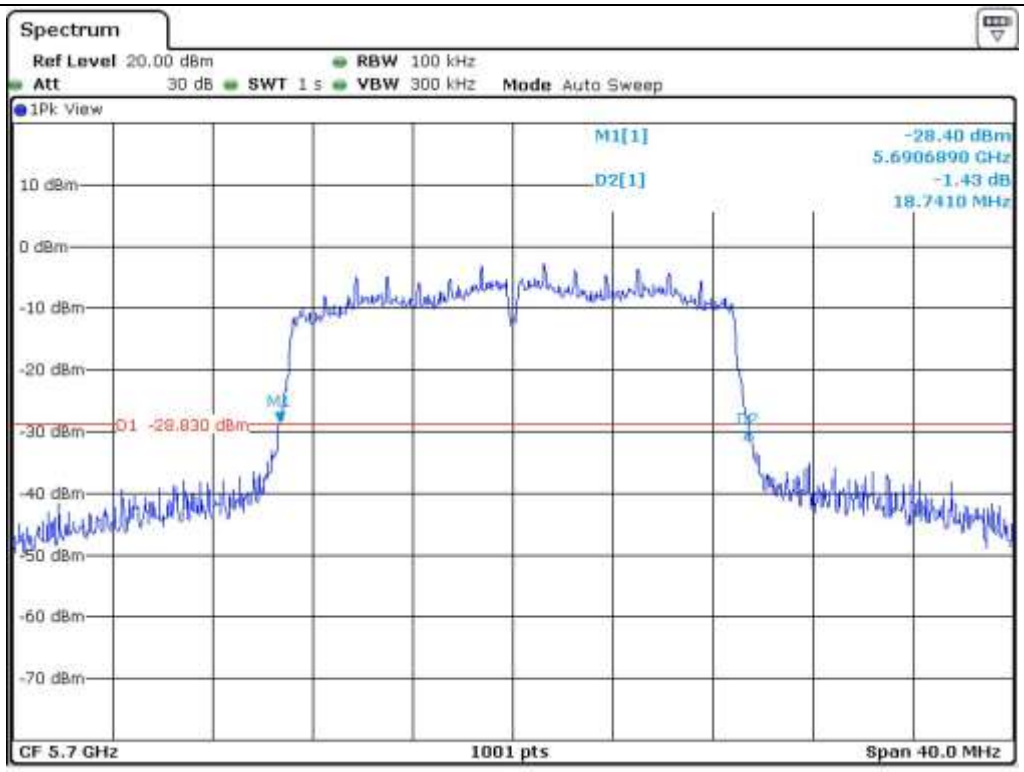

Low Channel (5 500 MHz)




Middle Channel (5 600 MHz)

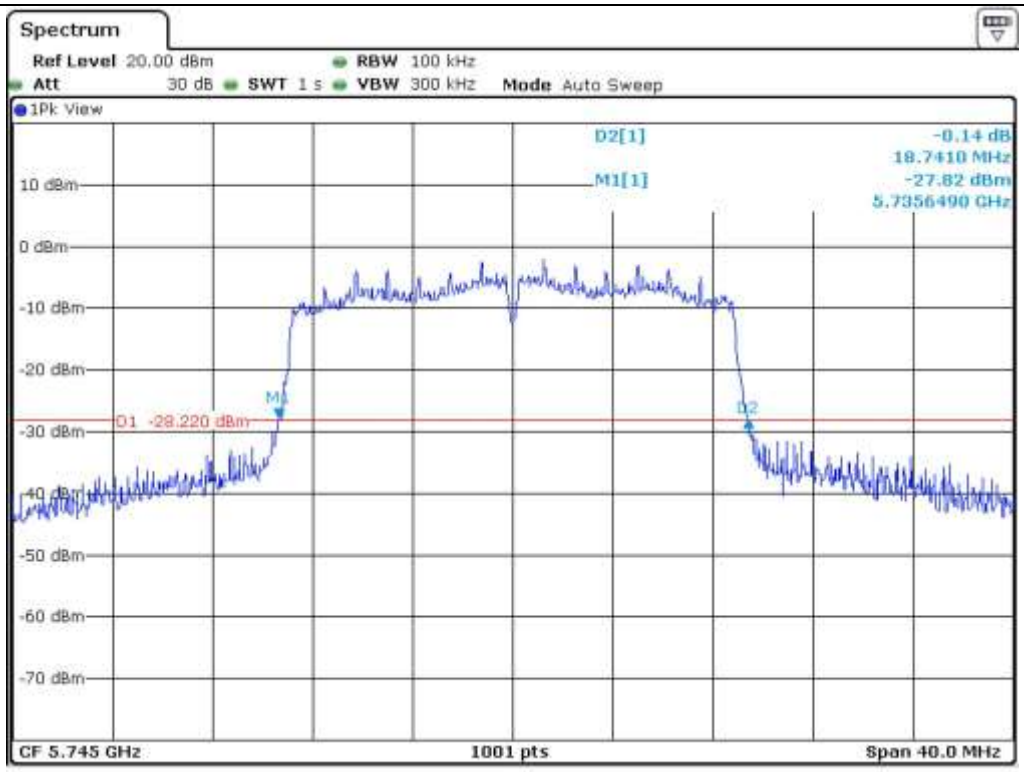
**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



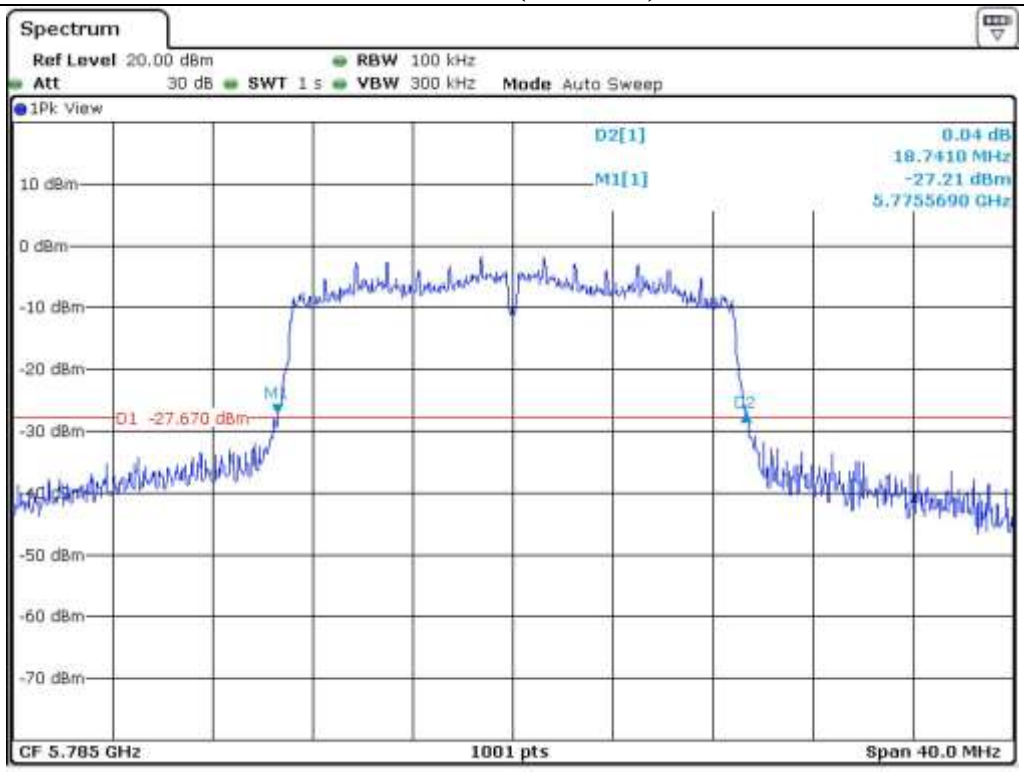

High Channel (5 700 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



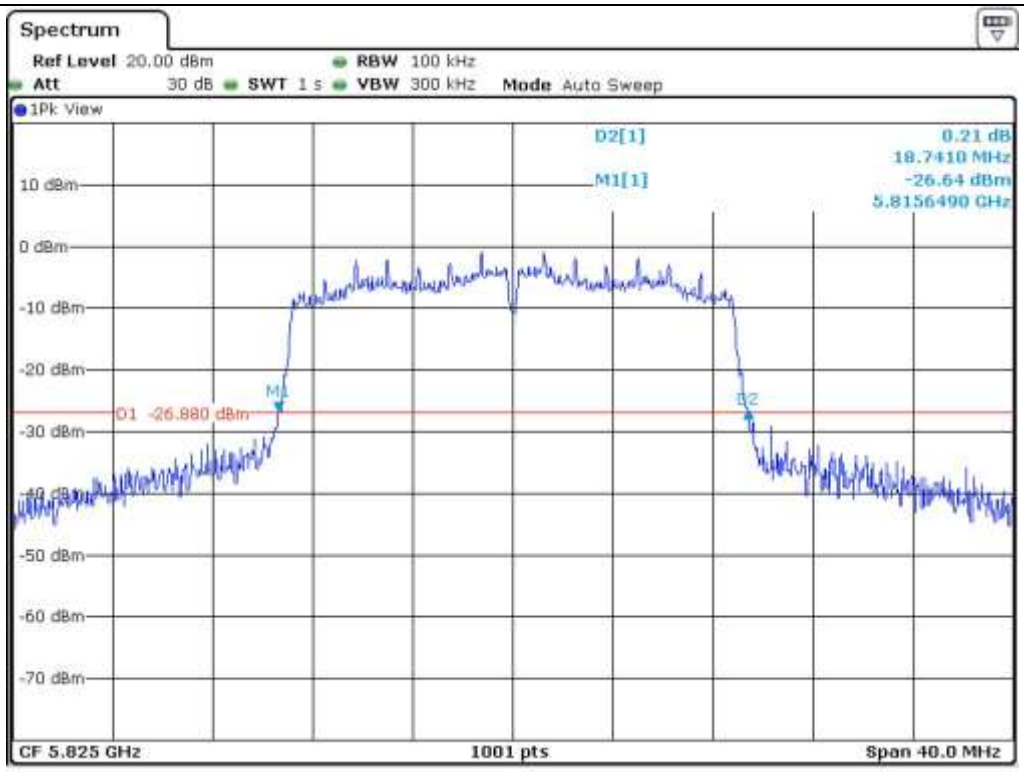

Low Channel (5 745 MHz)




Middle Channel (5 785 MHz)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




High Channel (5 825 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

# 8. MAXIMUM PEAK OUTPUT POWER

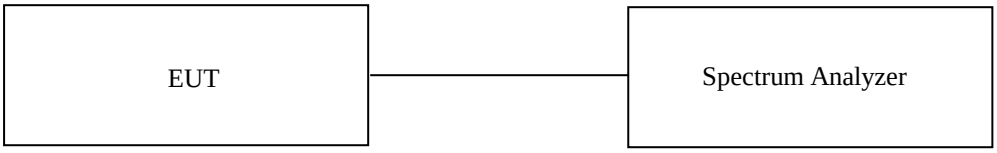
## 8.1 Operating environment

Temperature : 23 °C

Relative humidity : 47 % R.H.

## 8.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99 % bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.




## 8.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal. |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul. 22, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

### 8.4 Test data for 802.11a RLAN Mode

-. Test Date : March 10, 2016

-. Test Result : Pass

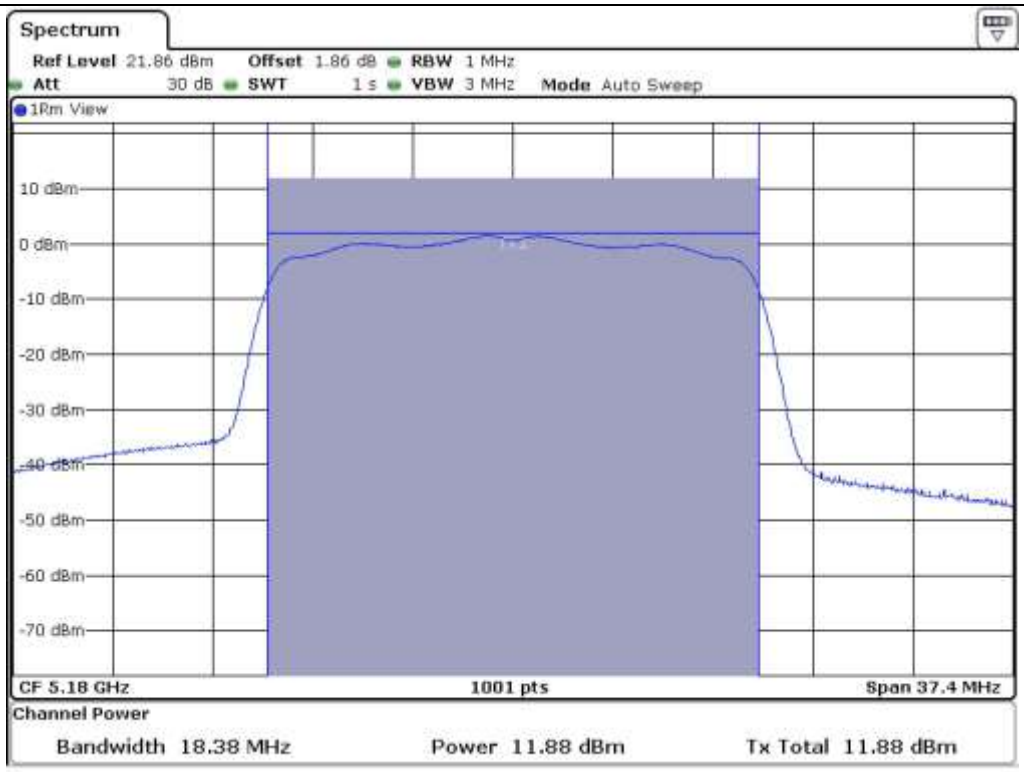
| FREQUENCY RANGE (MHz) | CHANNEL | FREQUENCY (MHz) | 26 dB Bandwidth (MHz) | MEASURED VLAUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---|---|---|---|---|---|---|
| 5 150 ~ 5 250 | Low | 5 180 | 18.38 | 11.88 | 23.98 | 12.10 |
| | Middle | 5 200 | 18.38 | 11.67 | 23.98 | 12.31 |
| | High | 5 240 | 18.38 | 11.82 | 23.98 | 12.16 |
| 5 250 ~ 5 350 | Low | 5 260 | 18.38 | 11.27 | 23.98 | 12.71 |
| | Middle | 5 300 | 18.38 | 11.50 | 23.98 | 12.48 |
| | High | 5 320 | 18.38 | 11.27 | 23.98 | 12.71 |
| 5 470 ~ 5 725 | Low | 5 500 | 18.38 | 12.08 | 23.98 | 11.90 |
| | Middle | 5 600 | 18.38 | 11.27 | 23.98 | 12.71 |
| | High | 5 700 | 18.38 | 9.15 | 23.98 | 14.83 |
| 5 725 ~ 5 850 | Low | 5 745 | 18.38 | 10.56 | 30.00 | 19.44 |
| | Middle | 5 785 | 18.38 | 11.03 | 30.00 | 18.97 |
| | High | 5 825 | 18.38 | 11.55 | 30.00 | 18.45 |

Remark: See next page for measurement data.

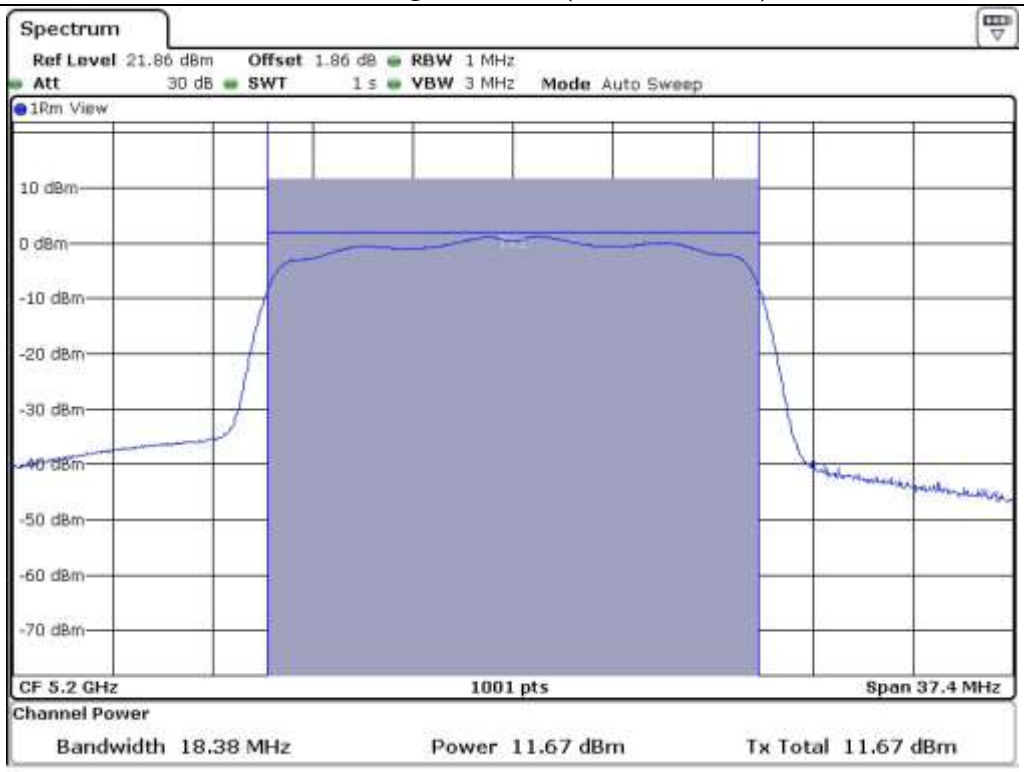
**Tested by: Jun-Hui, Lee / Senior Engineer**



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




Low Channel @ 5 180 MHz (26 dB Bandwidth)




Middle Channel @ 5 200 MHz (26 dB Bandwidth)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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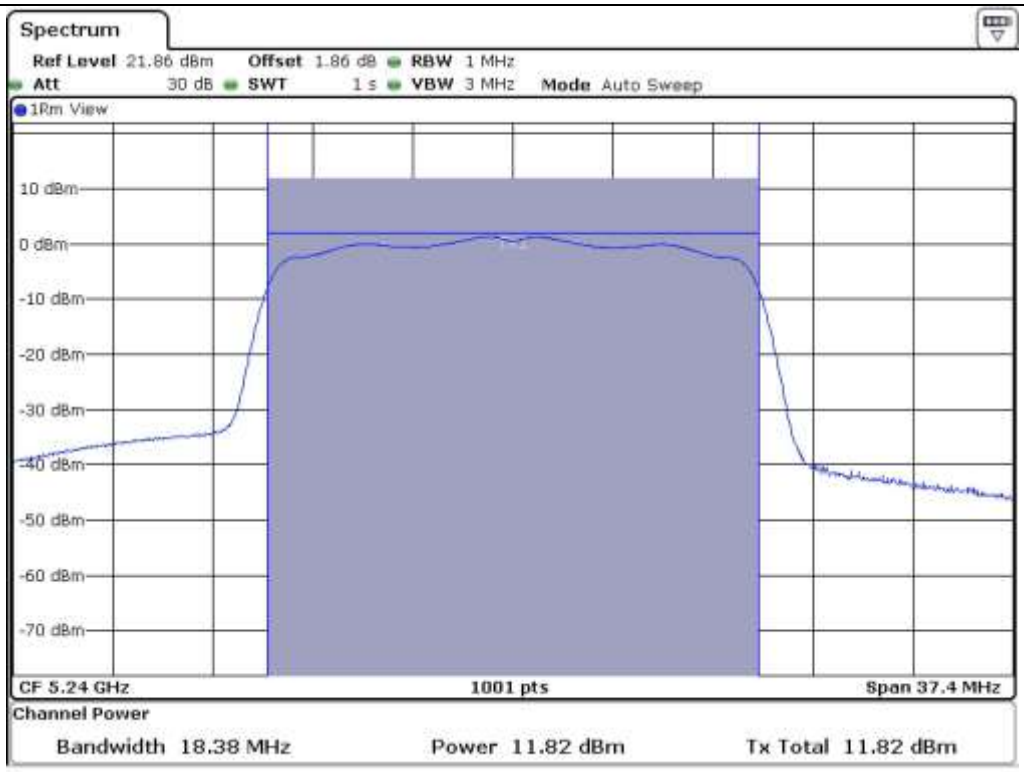


High Channel @ 5 240 MHz (26 dB Bandwidth)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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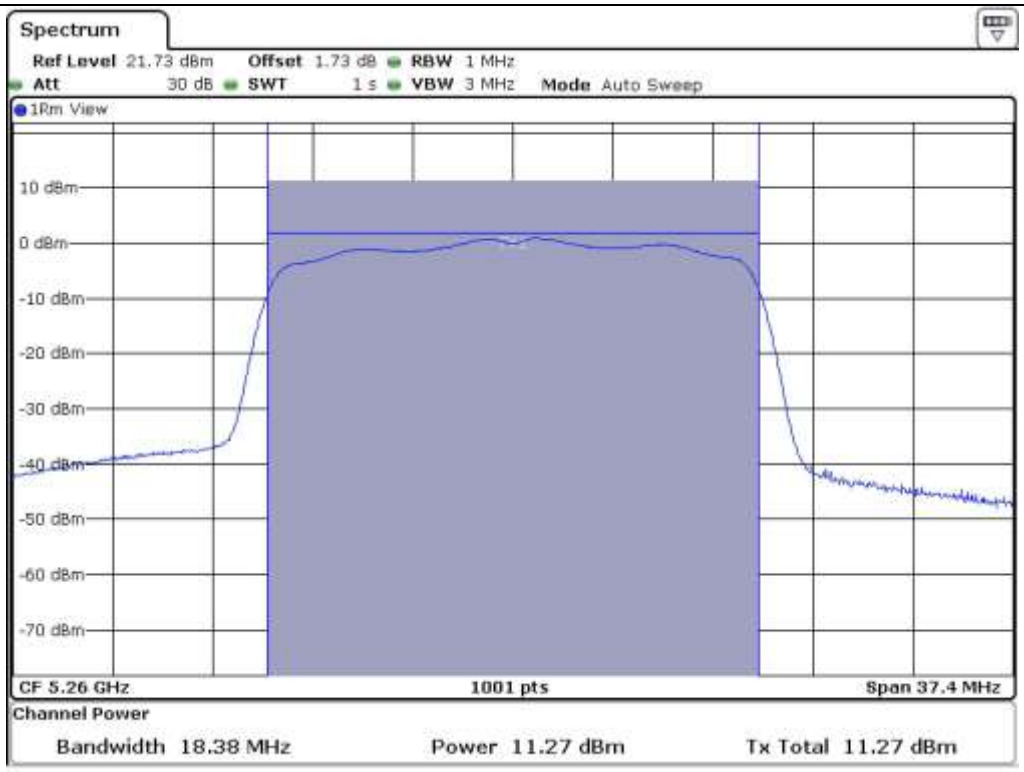
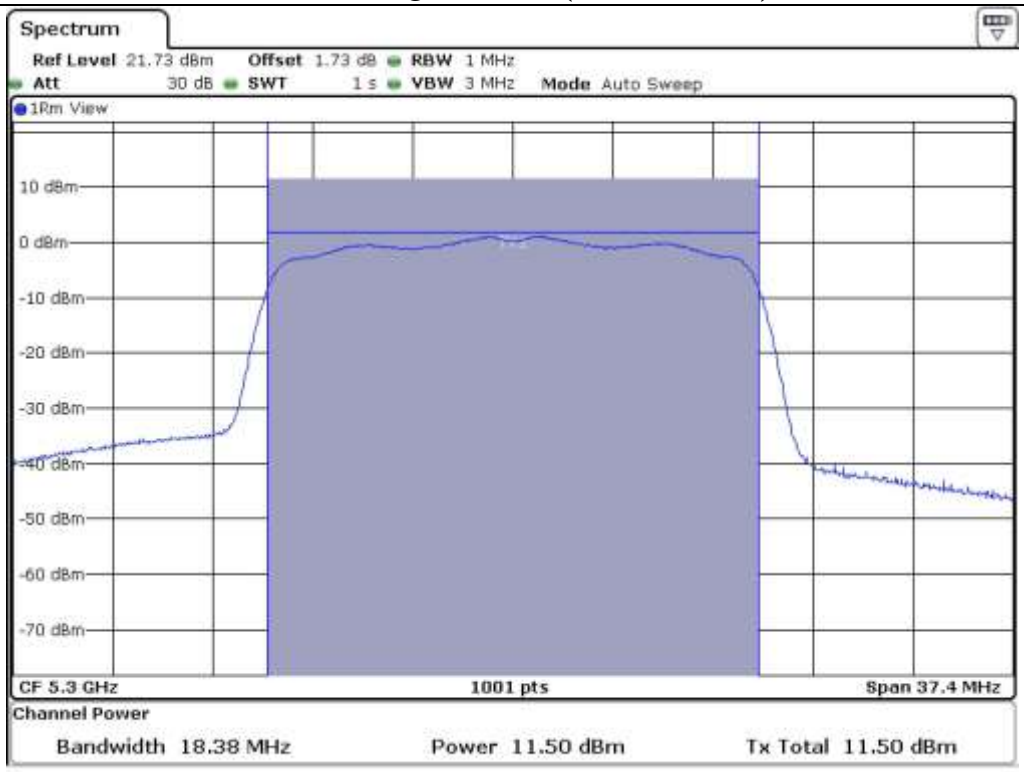


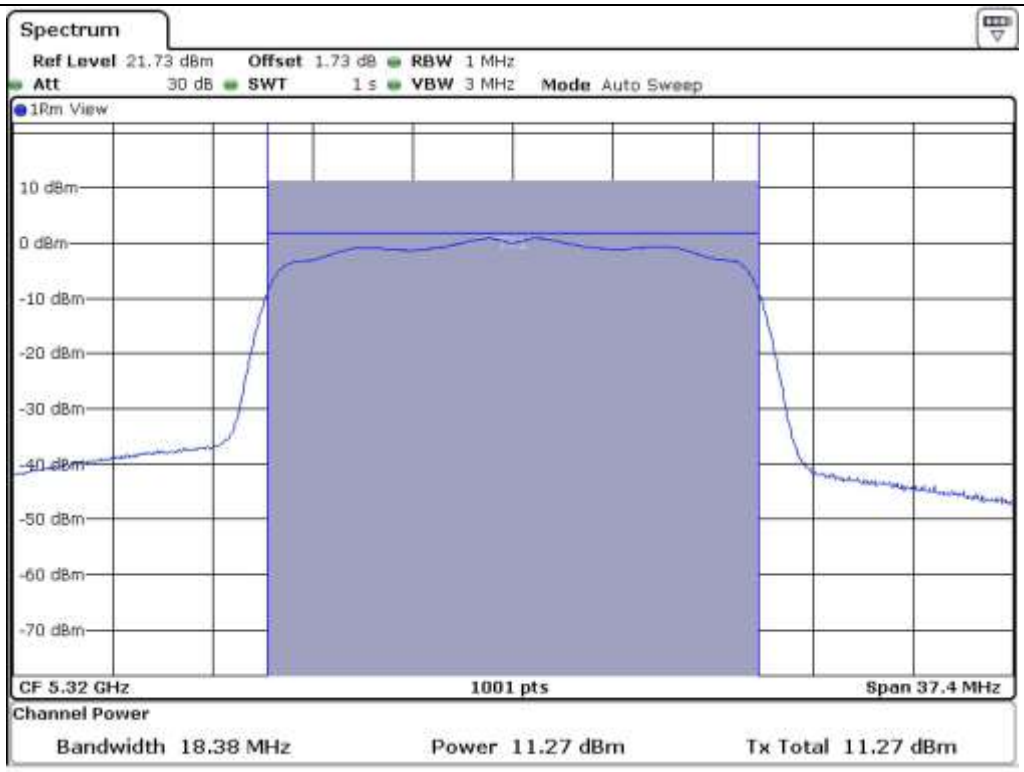

Low Channel @ 5 260 MHz (26 dB Bandwidth)




Middle Channel @ 5 300 MHz (26 dB Bandwidth)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




High Channel @ 5 320 MHz (26 dB Bandwidth)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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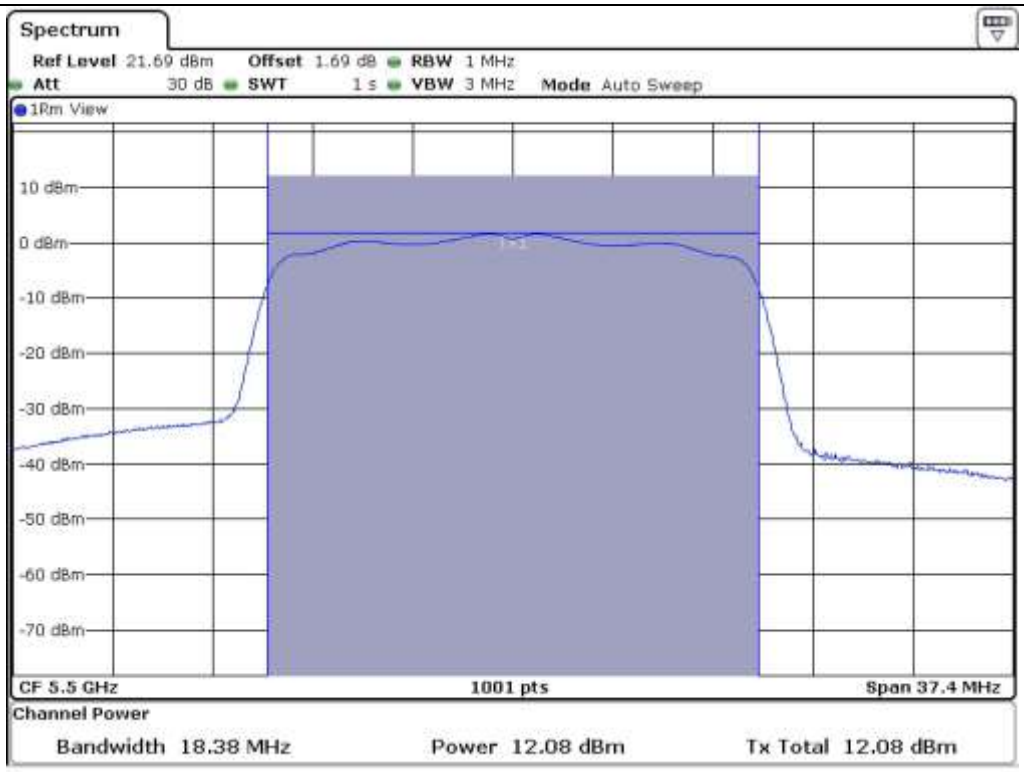
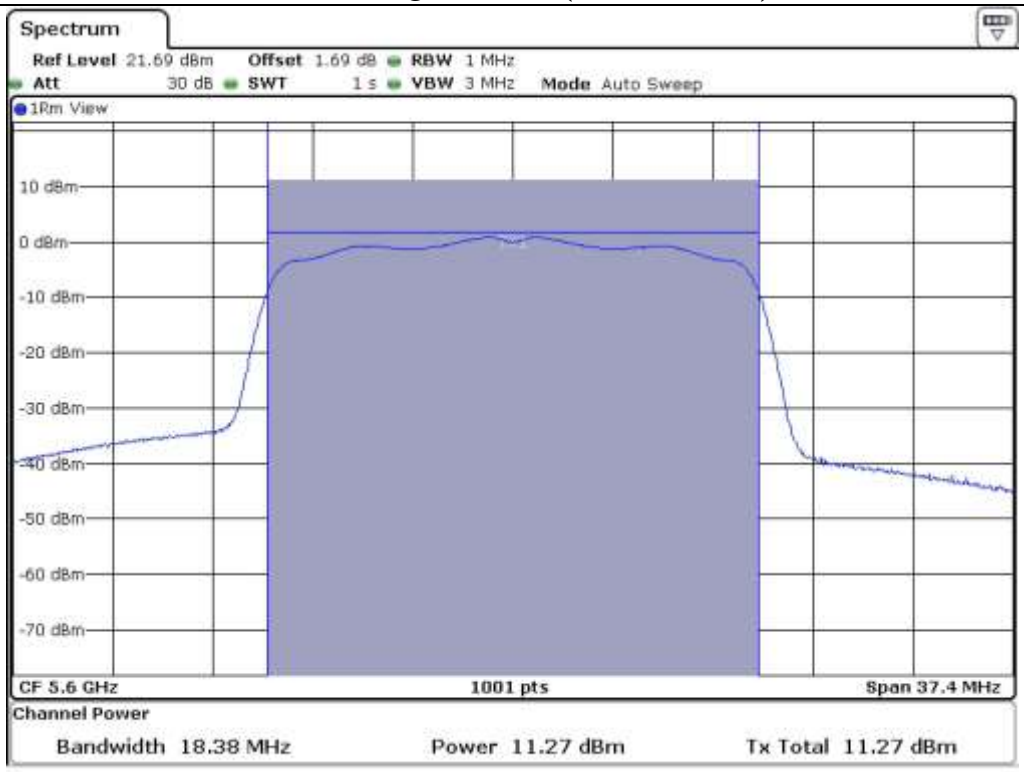



Low Channel @ 5 500 MHz (26 dB Bandwidth)




Middle Channel @ 5 600 MHz (26 dB Bandwidth)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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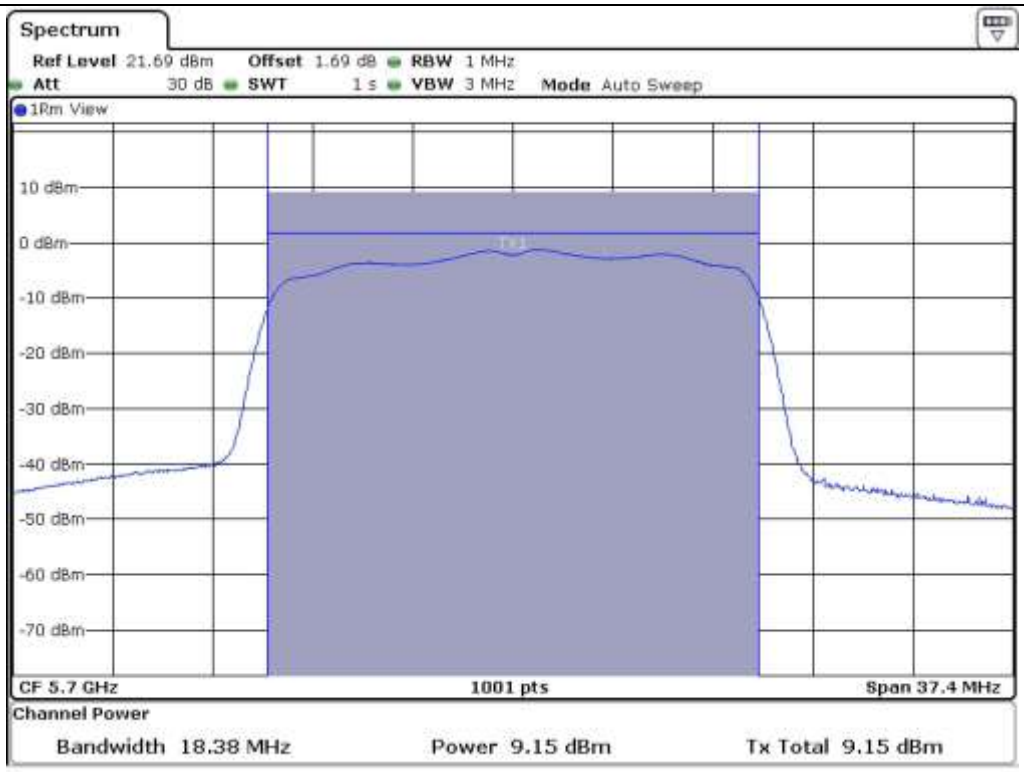
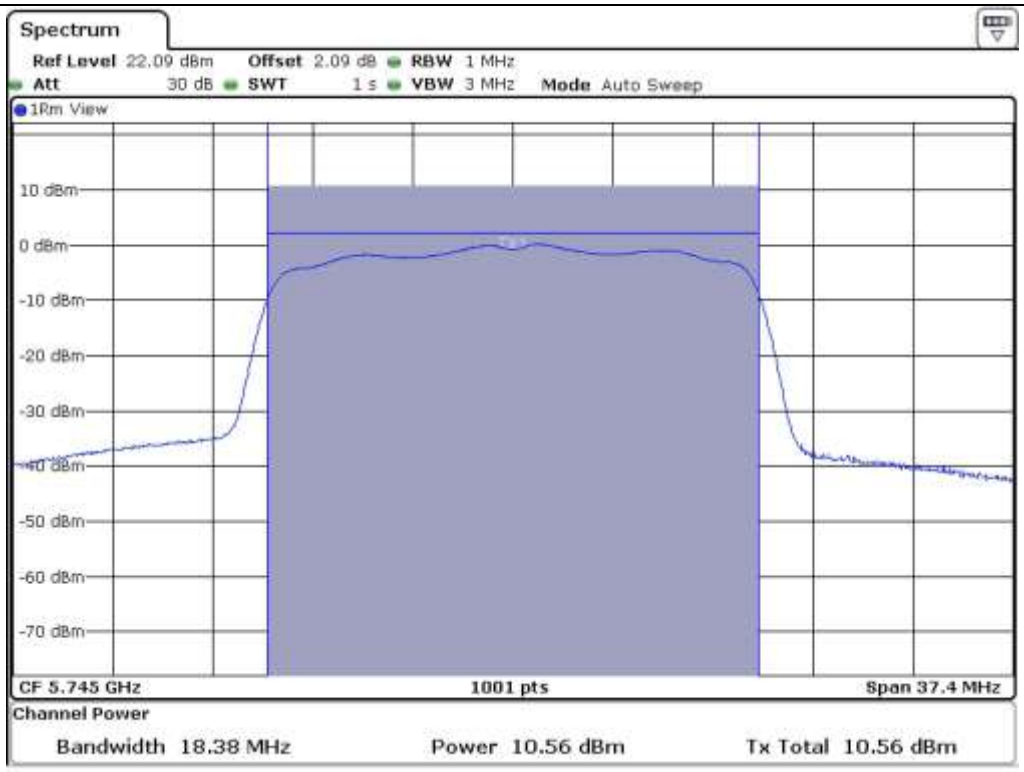


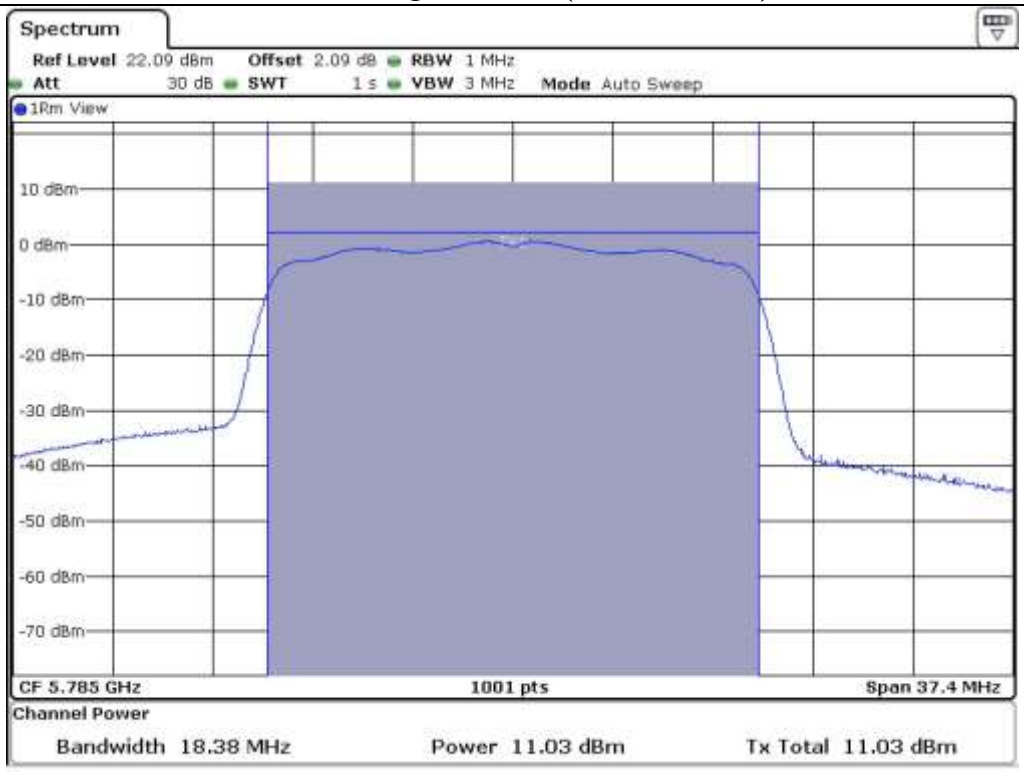

High Channel @ 5 700 MHz (26 dB Bandwidth)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




Low Channel @ 5 745 MHz (26 dB Bandwidth)




Middle Channel @ 5 785 MHz (26 dB Bandwidth)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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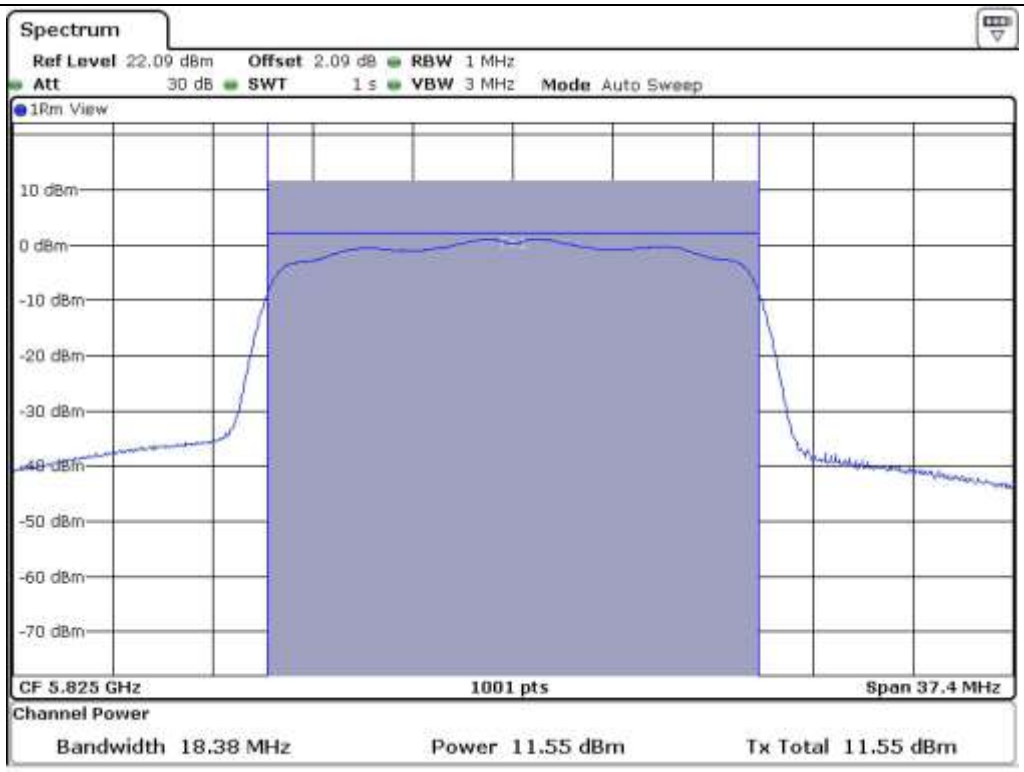



High Channel @ 5 825 MHz (26 dB Bandwidth)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

### 8.5 Test data for 802.11n_HT20 RLAN Mode

-. Test Date : March 10, 2016

-. Test Result : Pass

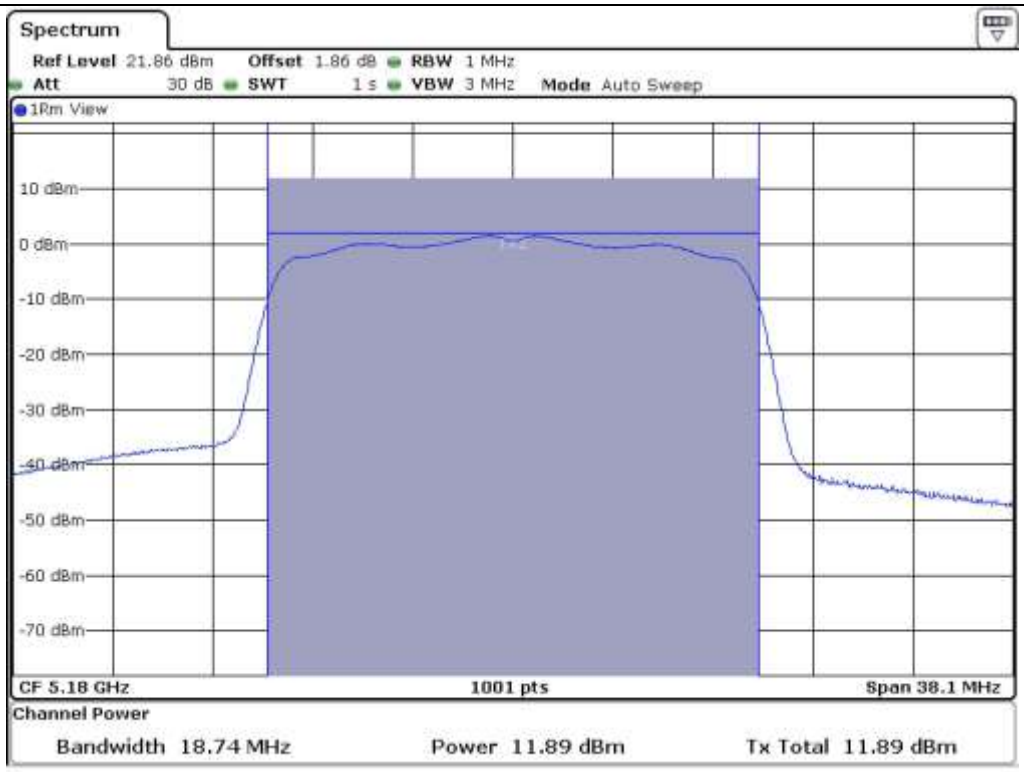
| FREQUENCY RANGE (MHz) | CHANNEL | FREQUENCY (MHz) | 26 dB Bandwidth (MHz) | MEASURED VLAUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---|---|---|---|---|---|---|
| 5 150 ~ 5 250 | Low | 5 180 | 18.74 | 11.88 | 23.98 | 12.10 |
| | Middle | 5 200 | 18.74 | 11.64 | 23.98 | 12.34 |
| | High | 5 240 | 18.74 | 11.69 | 23.98 | 12.29 |
| 5 250 ~ 5 350 | Low | 5 260 | 18.74 | 11.36 | 23.98 | 12.62 |
| | Middle | 5 300 | 18.74 | 11.50 | 23.98 | 12.48 |
| | High | 5 320 | 18.74 | 11.30 | 23.98 | 12.68 |
| 5 470 ~ 5 725 | Low | 5 500 | 18.74 | 12.14 | 23.98 | 11.84 |
| | Middle | 5 600 | 18.74 | 11.21 | 23.98 | 12.77 |
| | High | 5 700 | 18.74 | 9.21 | 23.98 | 14.77 |
| 5 725 ~ 5 850 | Low | 5 745 | 18.74 | 10.59 | 30.00 | 19.41 |
| | Middle | 5 785 | 18.74 | 11.31 | 30.00 | 18.69 |
| | High | 5 825 | 18.74 | 11.60 | 30.00 | 18.40 |

Remark: See next page for measurement data.

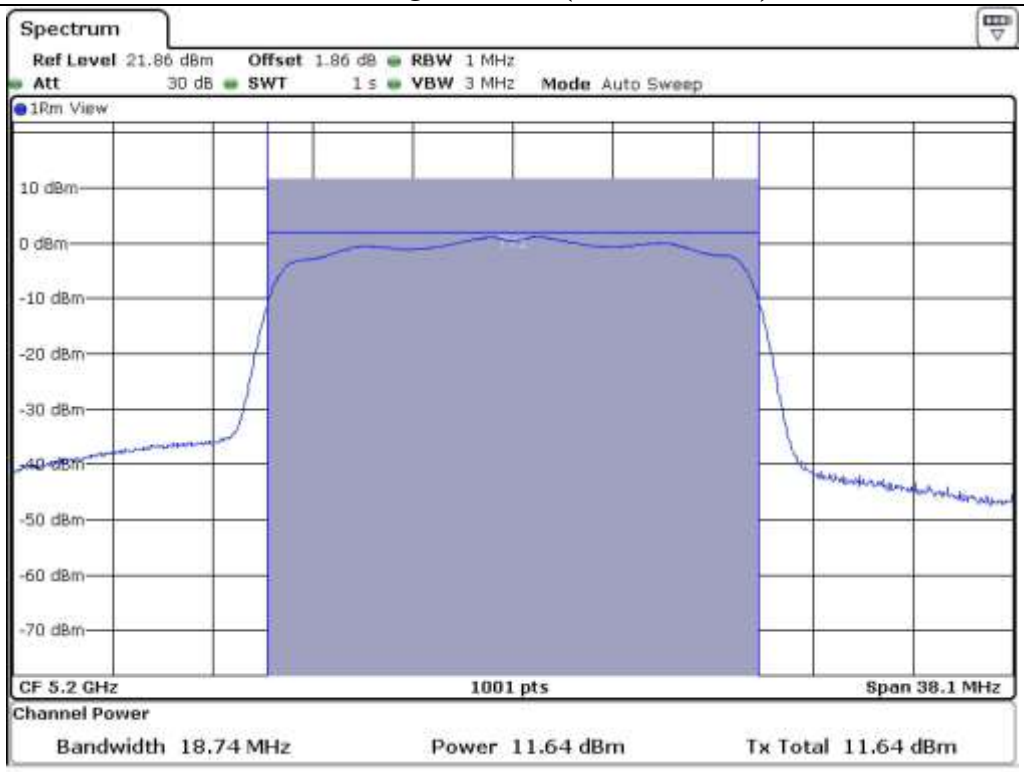
**Tested by: Jun-Hui, Lee / Senior Engineer**

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



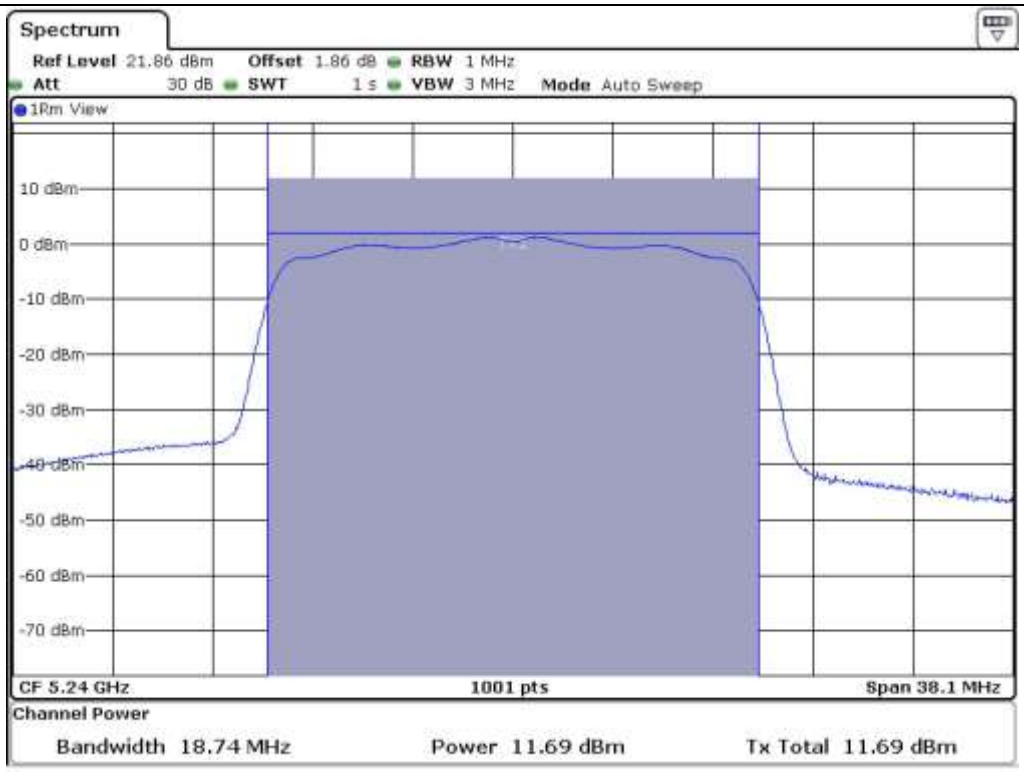

Low Channel @ 5 180 MHz (26 dB Bandwidth)




Middle Channel @ 5 200 MHz (26 dB Bandwidth)

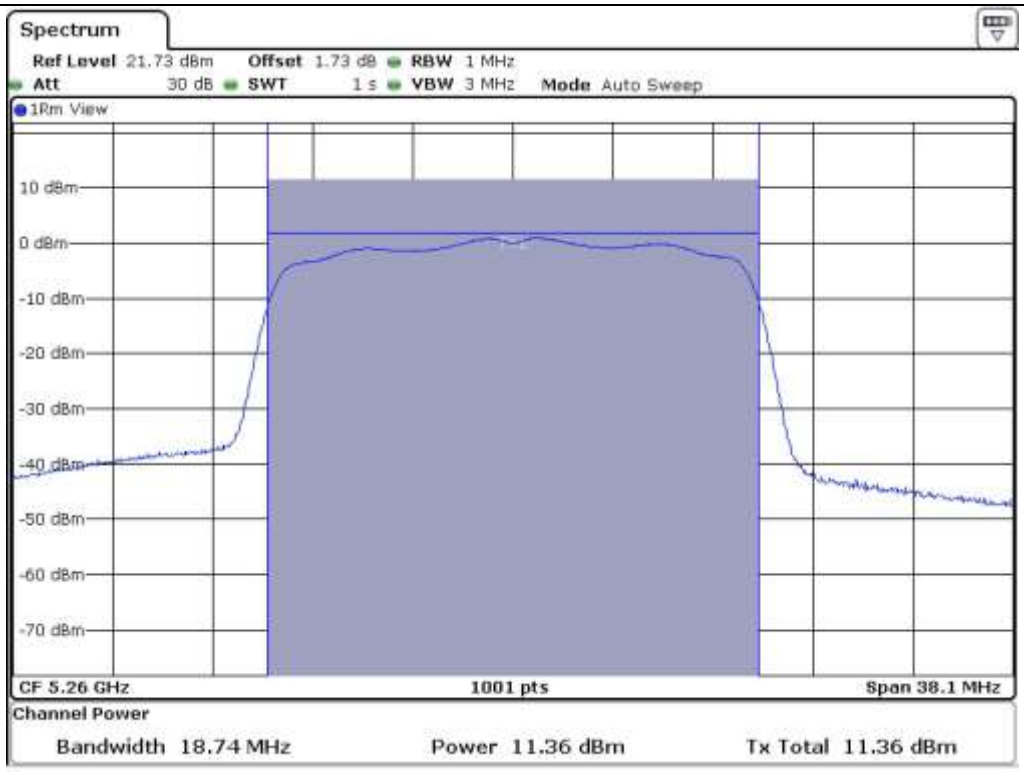
**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



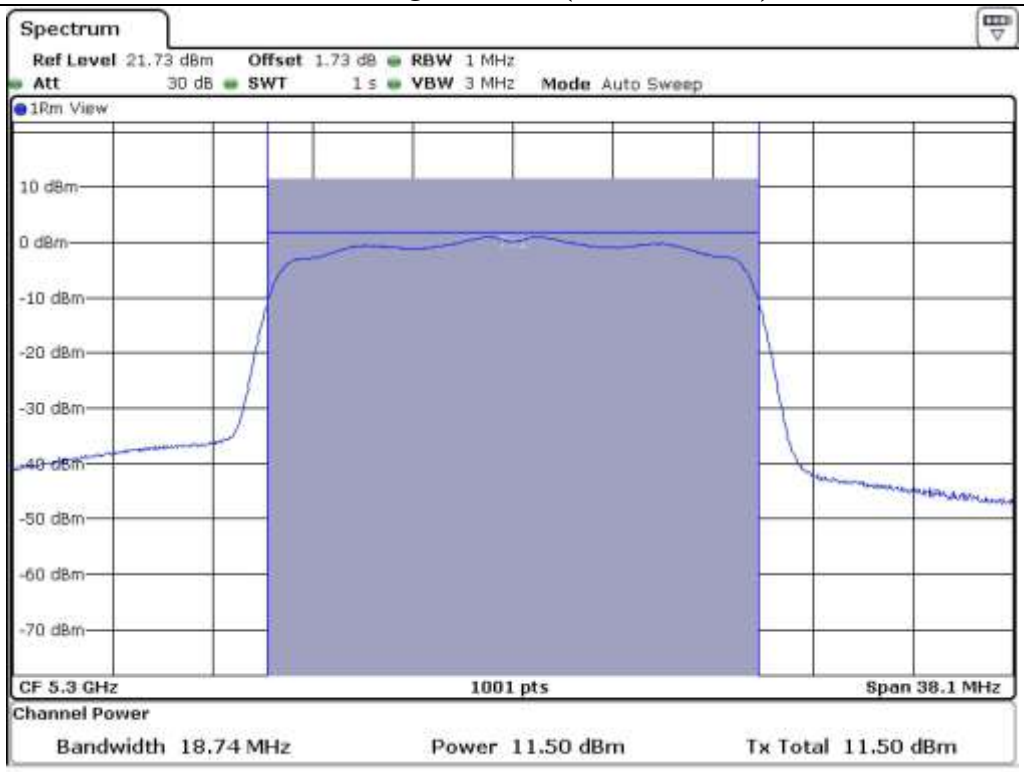

High Channel @ 5 240 MHz (26 dB Bandwidth)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



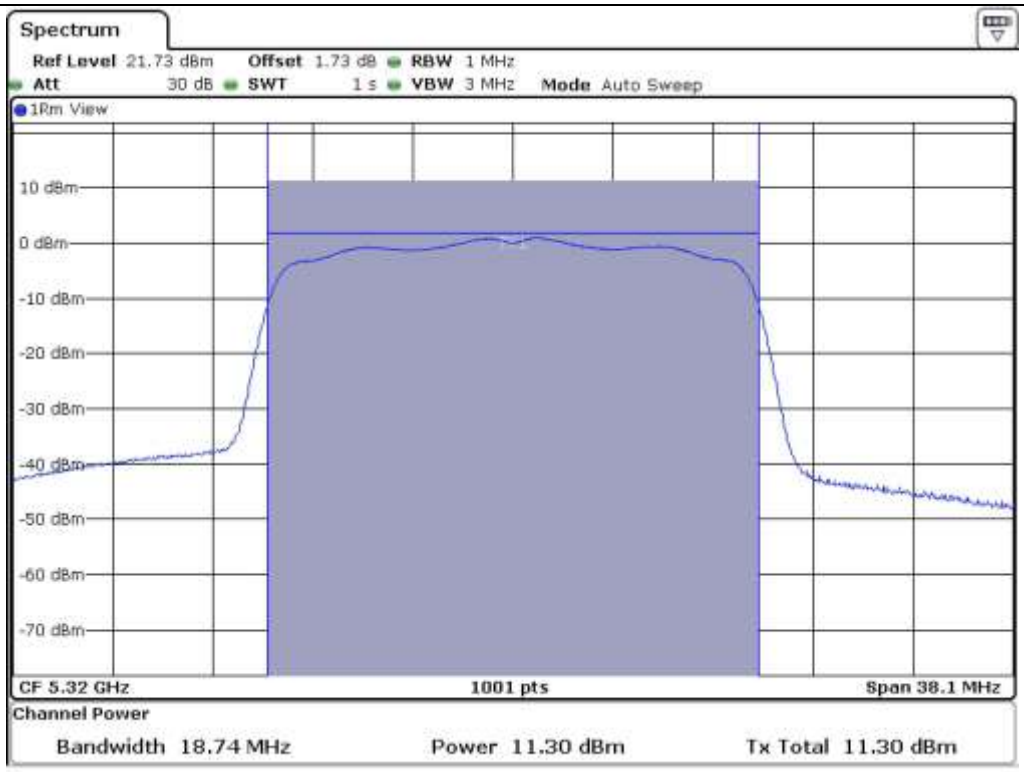

Low Channel @ 5 260 MHz (26 dB Bandwidth)




Middle Channel @ 5 300 MHz (26 dB Bandwidth)

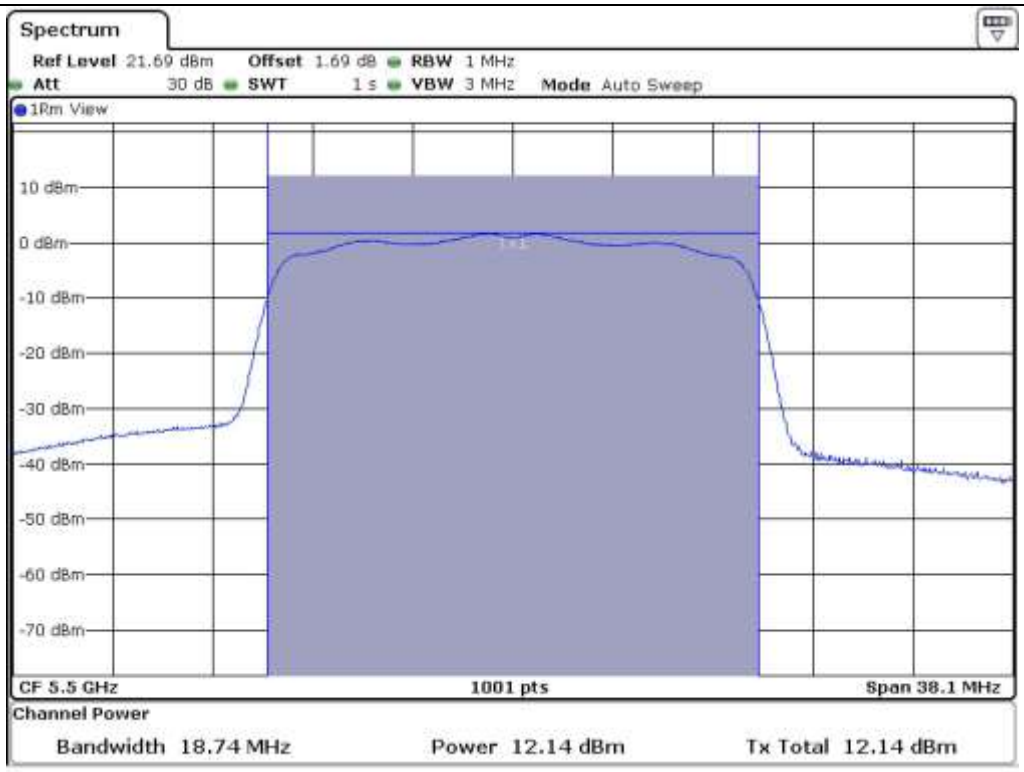
**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



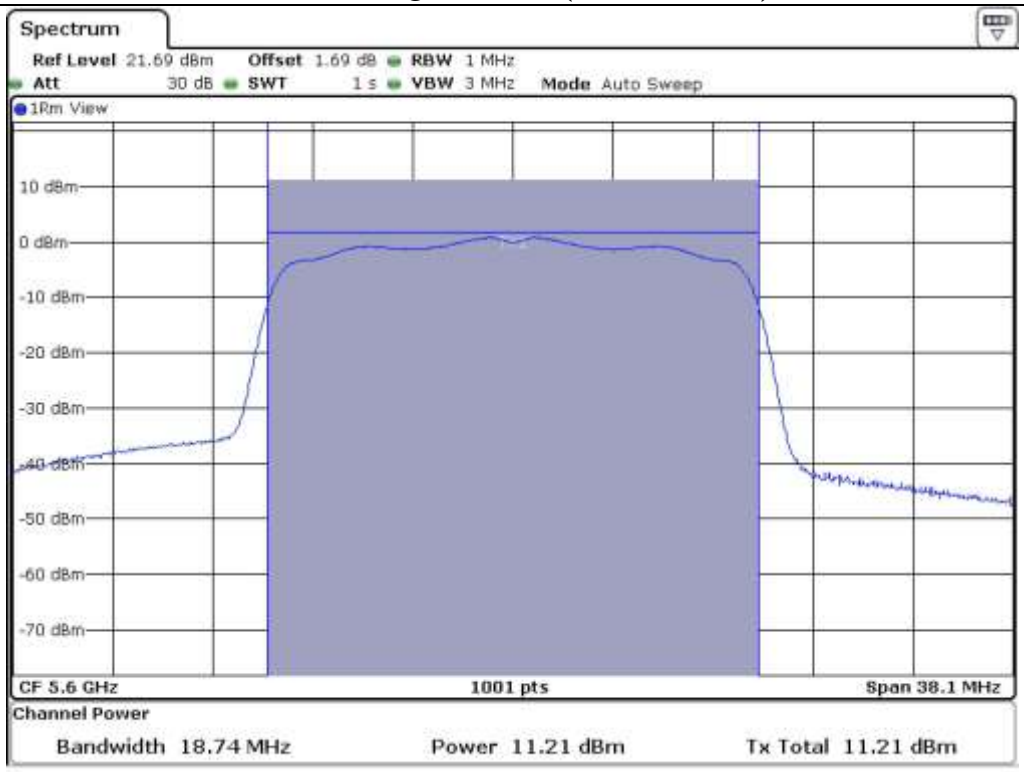

High Channel @ 5 320 MHz (26 dB Bandwidth)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



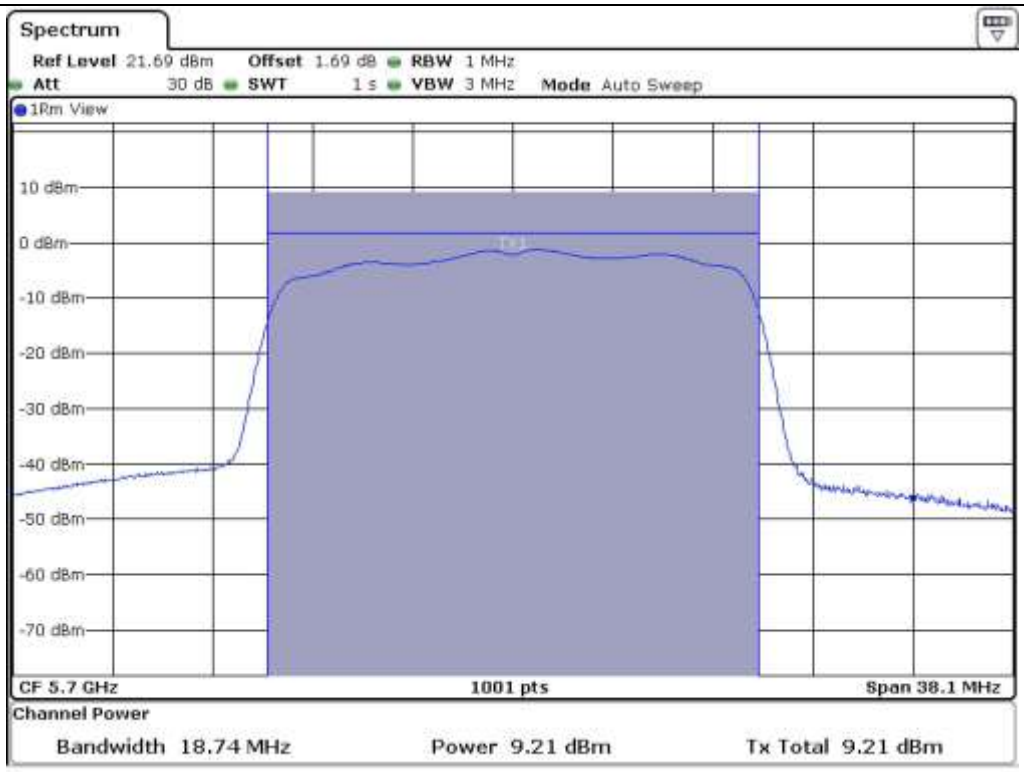

Low Channel @ 5 500 MHz (26 dB Bandwidth)




Middle Channel @ 5 600 MHz (26 dB Bandwidth)

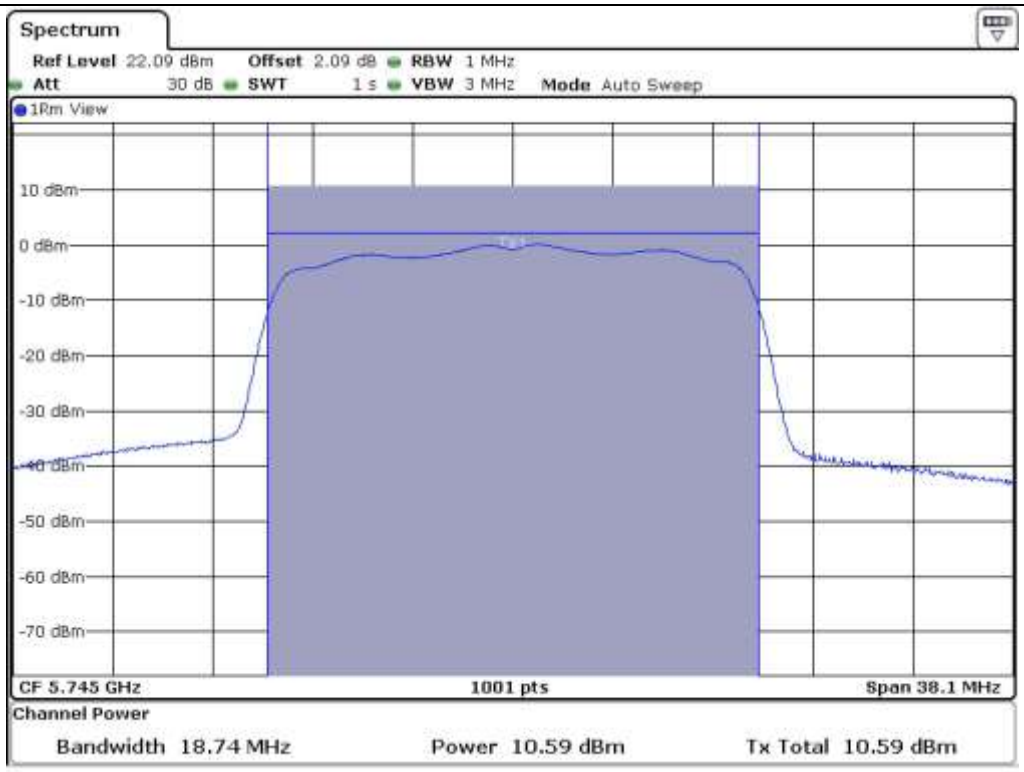
**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



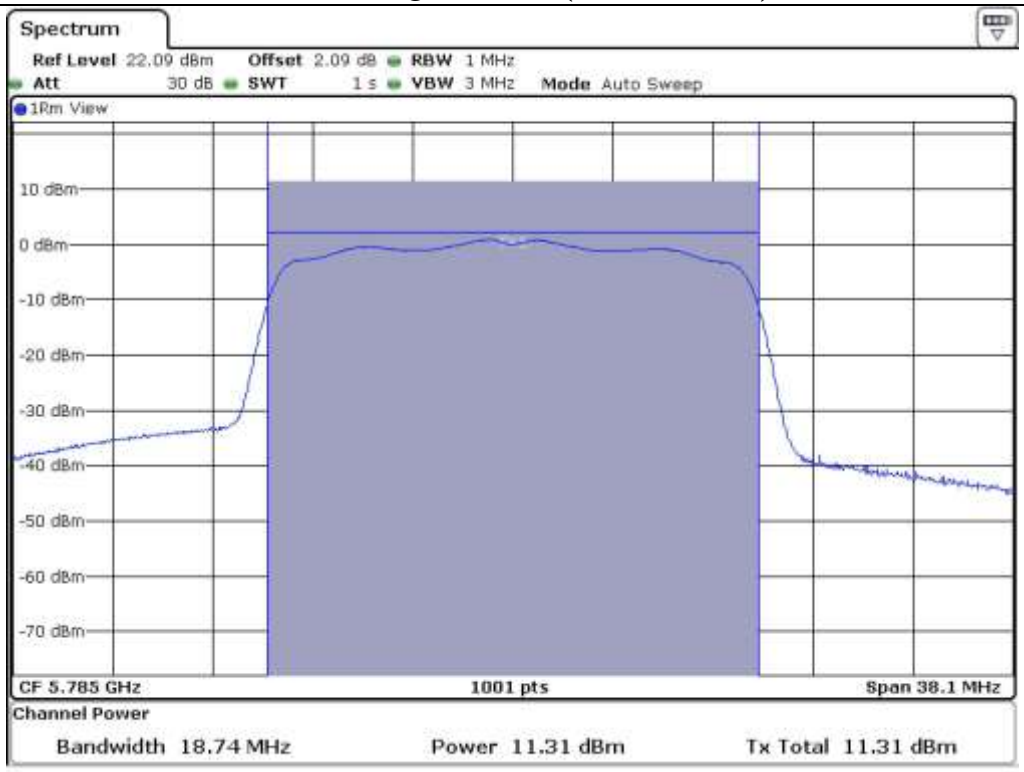

High Channel @ 5 700 MHz (26 dB Bandwidth)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



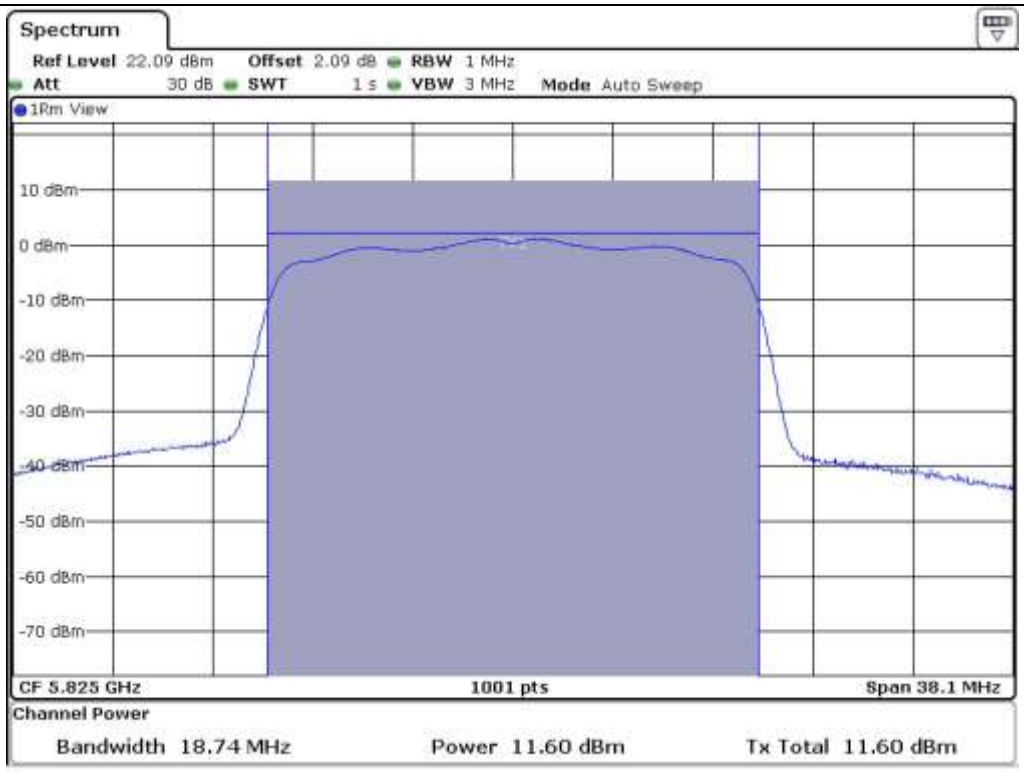

Low Channel @ 5 745 MHz (26 dB Bandwidth)




Middle Channel @ 5 785 MHz (26 dB Bandwidth)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




High Channel @ 5 825 MHz (26 dB Bandwidth)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

# 9. PEAK POWER SPECTRUL DENSITY

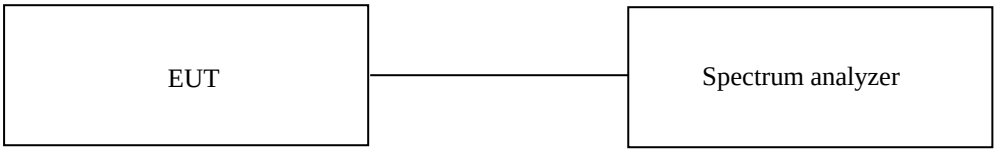
## 9.1 Operating environment

Temperature : 23 °C

Relative humidity : 47 % R.H.

## 9.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 times the resolution bandwidth. The maximum level form the EUT in 1 MHz bandwidth was measured with above condition.




## 9.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal. |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul. 22, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

### 9.4 Test data for 802.11a RLAN Mode

-. Test Date : March 10, 2016

-. Operating condition : Highest Output Power Transmitting Mode

-. Test Result : Pass

| FREQUENCY RANGE (MHz) | CHANNEL | FREQUENCY (MHz) | MEASURED VLAUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---|---|---|---|---|---|
| 5 150 ~ 5 250 | Low | 5 180 | 1.59 | 11.00 | 9.41 |
| | Middle | 5 200 | 1.38 | 11.00 | 9.62 |
| | High | 5 240 | 1.34 | 11.00 | 9.66 |
| 5 250 ~ 5 350 | Low | 5 260 | 0.93 | 11.00 | 10.07 |
| | Middle | 5 300 | 1.00 | 11.00 | 10.00 |
| | High | 5 320 | 0.90 | 11.00 | 10.10 |
| 5 470 ~ 5 725 | Low | 5 500 | 1.85 | 11.00 | 9.15 |
| | Middle | 5 600 | 1.01 | 11.00 | 9.99 |
| | High | 5 700 | -0.93 | 11.00 | 11.93 |
| 5 725 ~ 5 850 | Low | 5 745 | 0.05 | 30.00 | 29.95 |
| | Middle | 5 785 | 0.94 | 30.00 | 29.06 |
| | High | 5 825 | 1.24 | 30.00 | 28.76 |

Remark: See next page for measurement data.

**Tested by: Jun-Hui, Lee / Senior Engineer**

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

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Low Channel (5 180 MHz)


Middle Channel (5 200 MHz)

 

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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High Channel (5 240 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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Low Channel (5 260 MHz)


Middle Channel (5 300 MHz)

 

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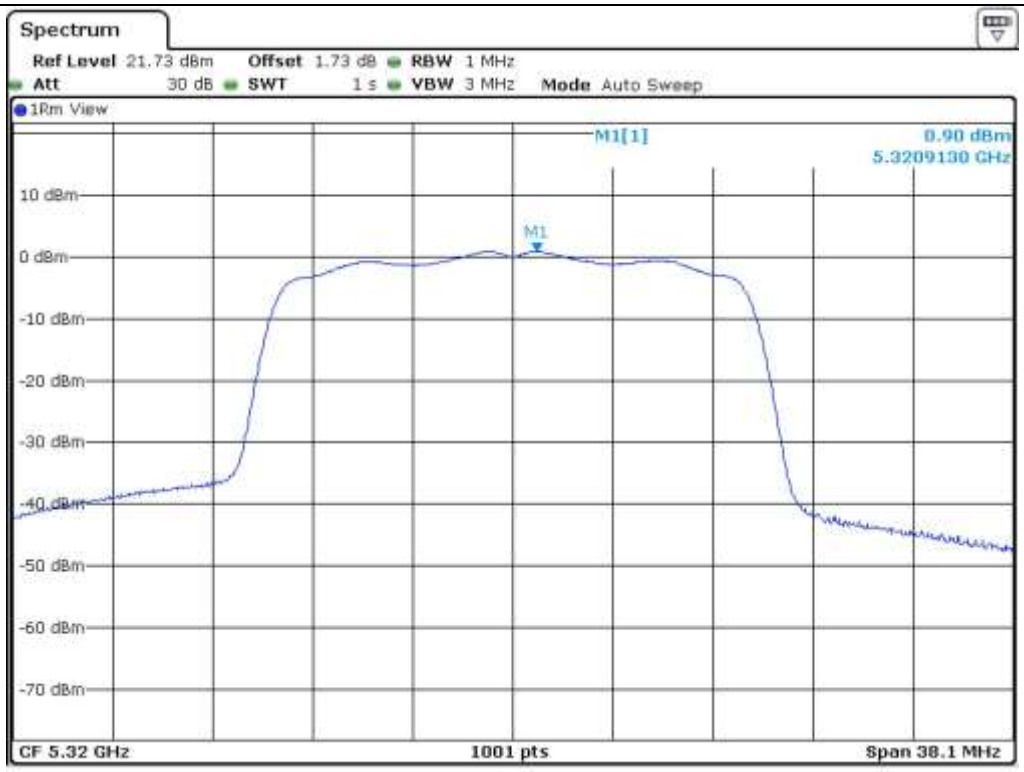


High Channel (5 320 MHz)



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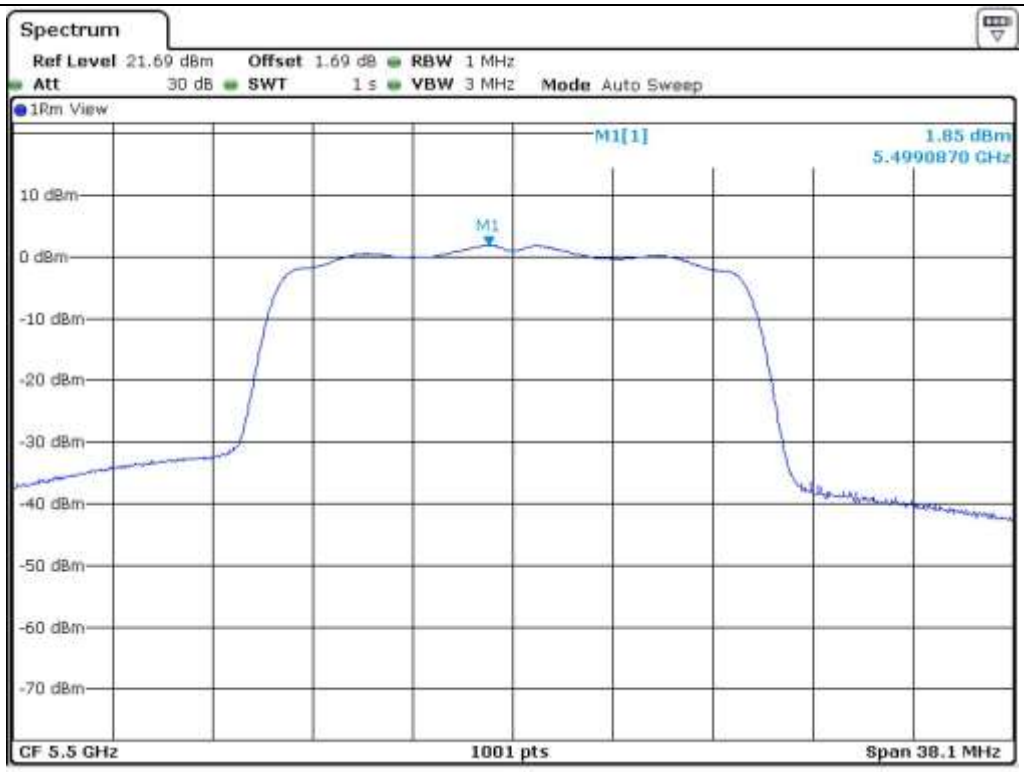


Low Channel (5 500 MHz)


Middle Channel (5 600 MHz)

 

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High Channel (5 700 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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Low Channel (5 745 MHz)


Middle Channel (5 785 MHz)

 

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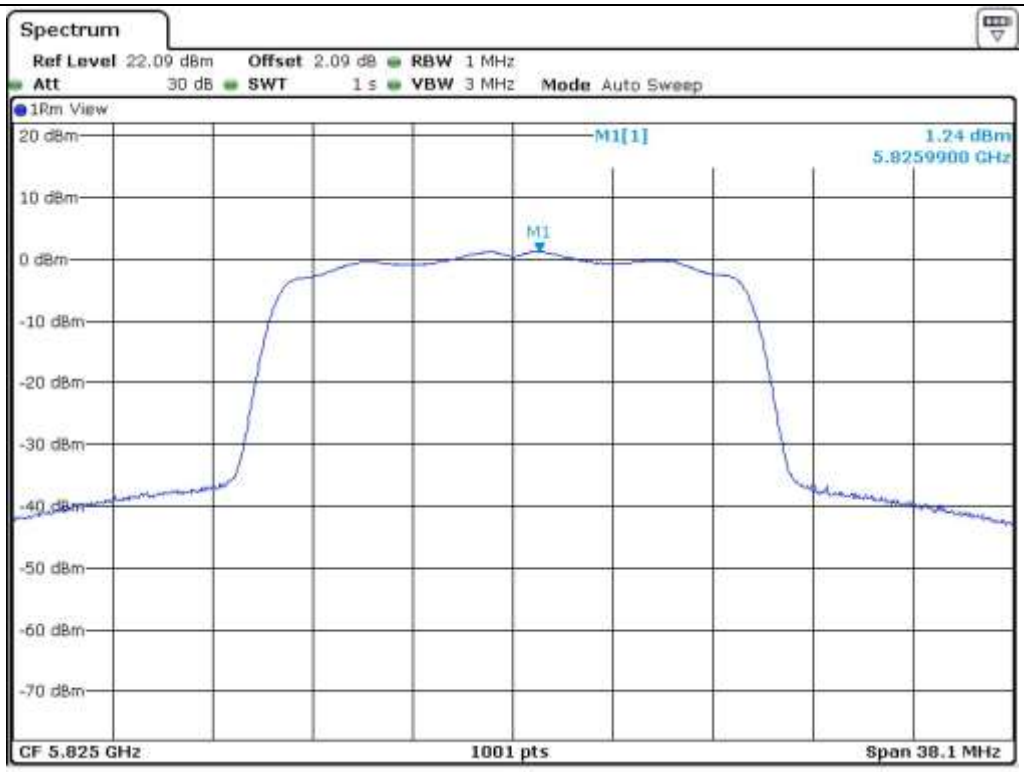


High Channel (5 825 MHz)



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### 9.5 Test data for 802.11n_HT20 RLAN Mode

-. Test Date : March 10, 2016

-. Operating condition : Highest Output Power Transmitting Mode

-. Test Result : Pass

| FREQUENCY RANGE (MHz) | CHANNEL | FREQUENCY (MHz) | MEASURED VLAUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---|---|---|---|---|---|
| 5 150 ~ 5 250 | Low | 5 180 | 1.42 | 11.00 | 9.58 |
| | Middle | 5 200 | 1.13 | 11.00 | 9.87 |
| | High | 5 240 | 1.24 | 11.00 | 9.76 |
| 5 250 ~ 5 350 | Low | 5 260 | 0.81 | 11.00 | 10.19 |
| | Middle | 5 300 | 0.98 | 11.00 | 10.02 |
| | High | 5 320 | 1.00 | 11.00 | 10.00 |
| 5 470 ~ 5 725 | Low | 5 500 | 1.70 | 11.00 | 9.30 |
| | Middle | 5 600 | 0.79 | 11.00 | 10.21 |
| | High | 5 700 | -1.16 | 11.00 | 12.16 |
| 5 725 ~ 5 850 | Low | 5 745 | 0.14 | 30.00 | 29.86 |
| | Middle | 5 785 | 0.60 | 30.00 | 29.40 |
| | High | 5 825 | 1.29 | 30.00 | 28.71 |

Remark: See next page for measurement data.

**Tested by: Jun-Hui, Lee / Senior Engineer**

 

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Low Channel (5 180 MHz)


Middle Channel (5 200 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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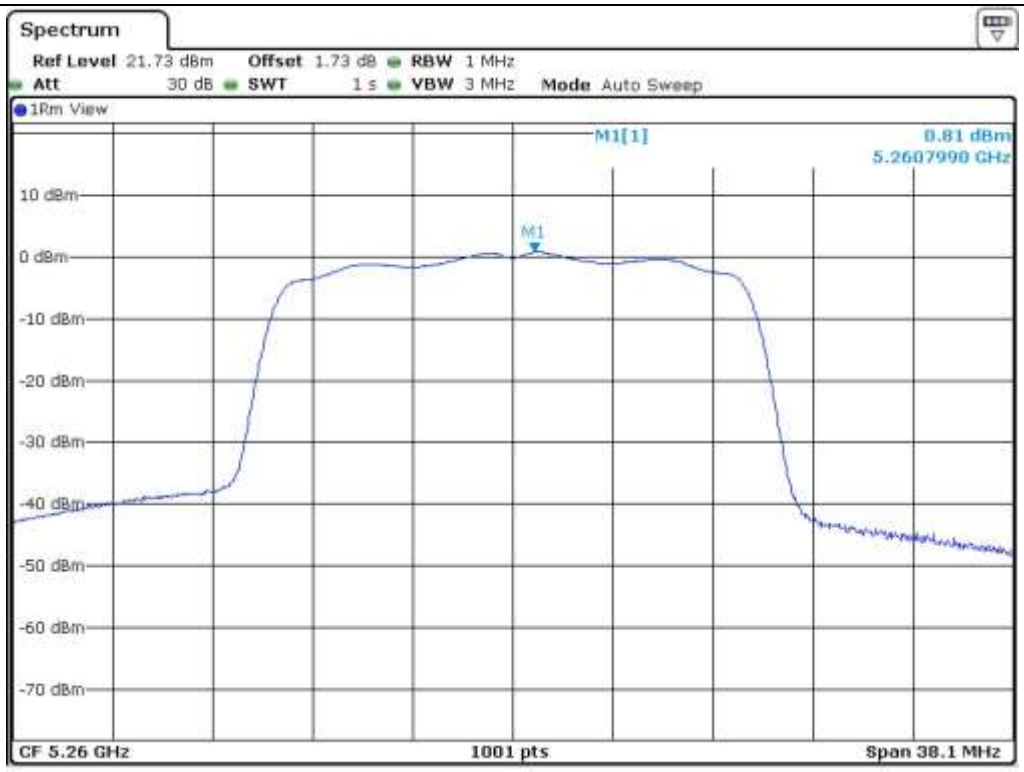
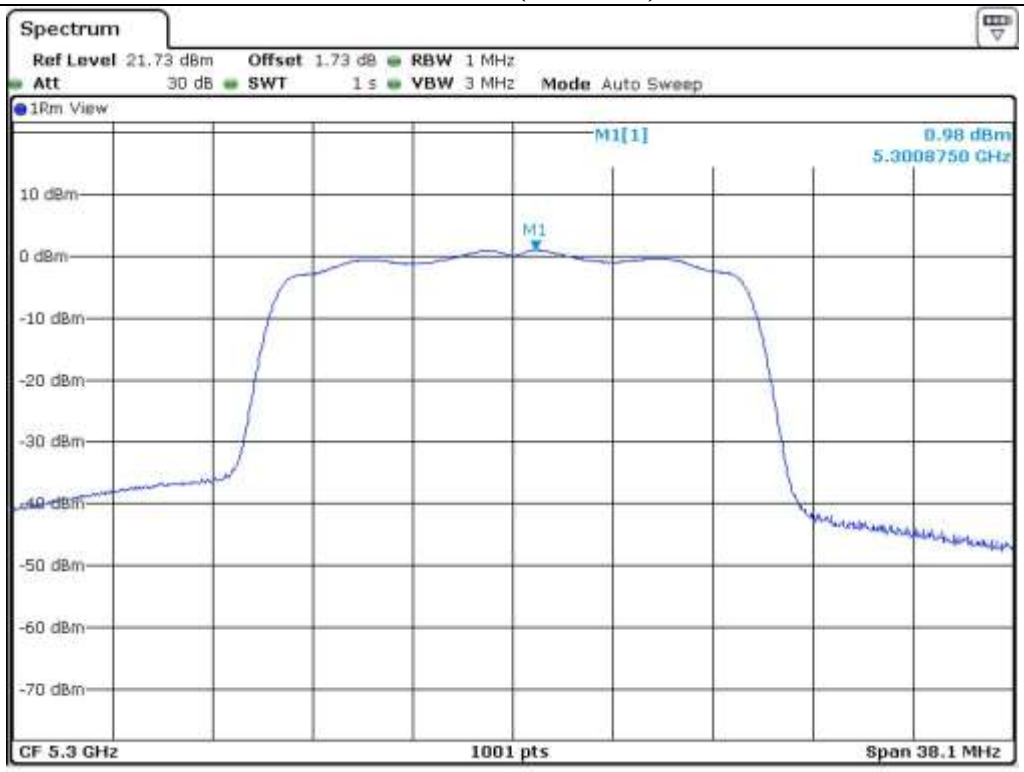
High Channel (5 240 MHz)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




Low Channel (5 260 MHz)




Middle Channel (5 300 MHz)

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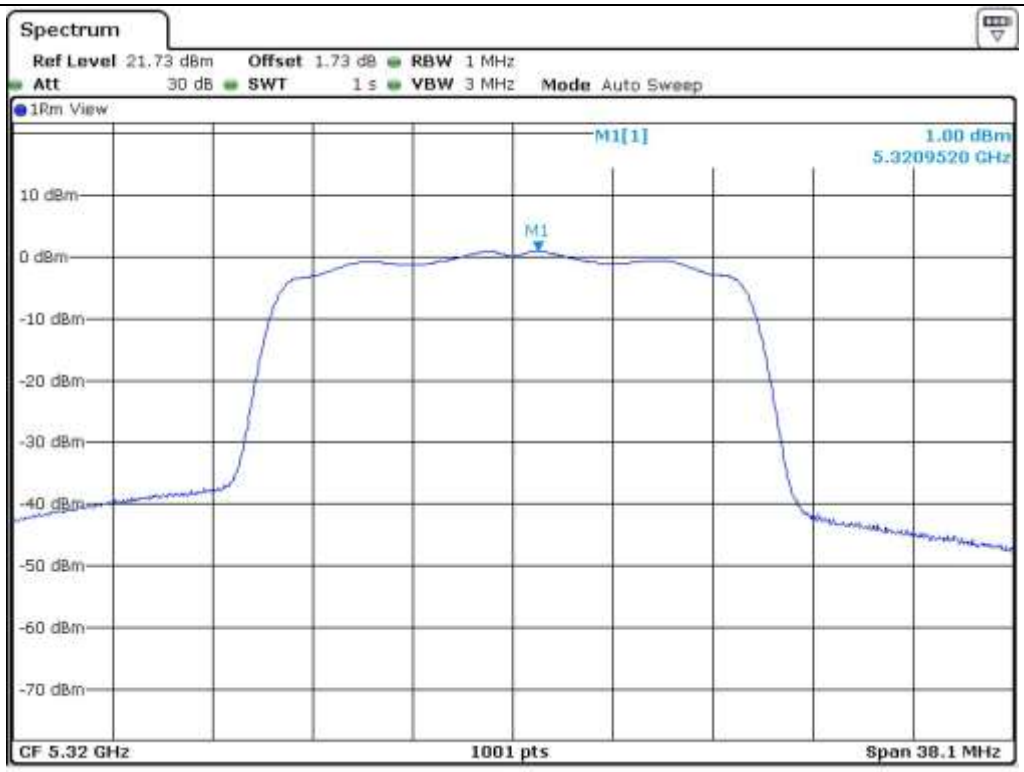
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)




High Channel (5 320 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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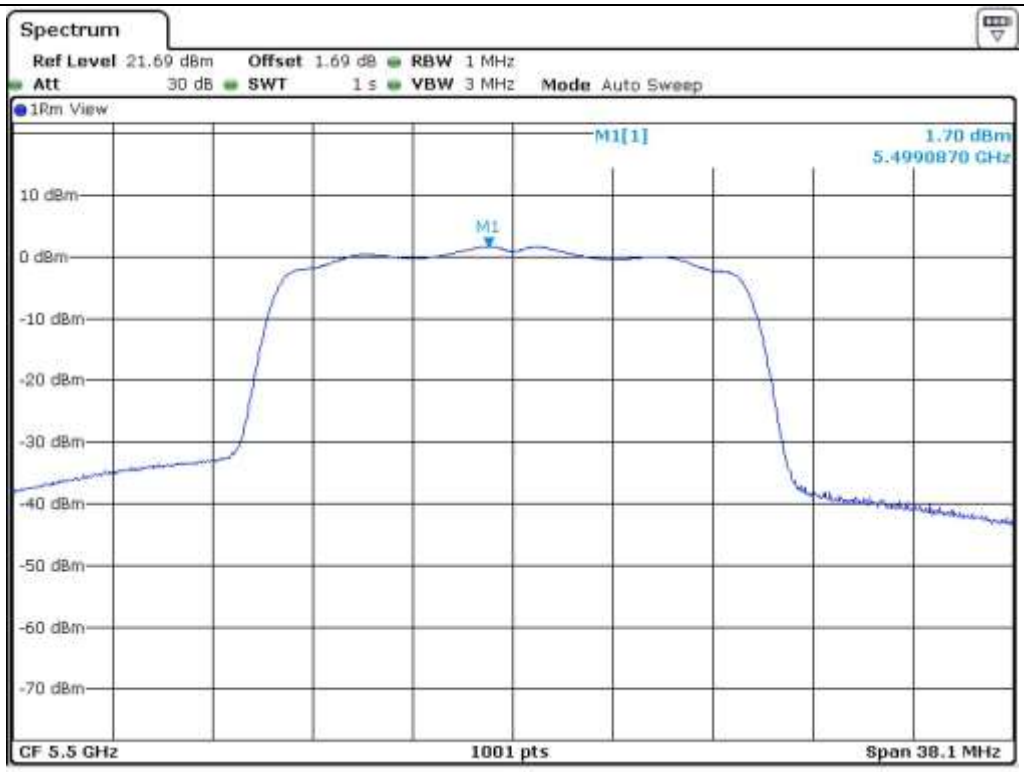


Low Channel (5 500 MHz)


Middle Channel (5 600 MHz)

 

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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High Channel (5 700 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)


Low Channel (5 745 MHz)


Middle Channel (5 785 MHz)

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)


High Channel (5 825 MHz)



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

# 10. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

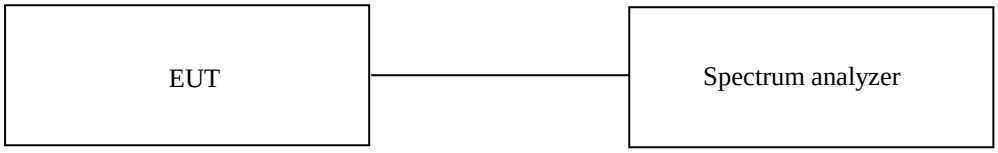
## 10.1 Operating environment

Temperature : 23 °C

Relative humidity : 47 % R.H.

## 10.2 Test set-up

Turn EUT off and set chamber temperature to -30 °C and then allow sufficient time (approximately 20 min to 30 min after chamber reach the assigned temperature) for EUT to stabilize. Turn on the EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10 °C step from 0 °C to +65 °C. Repeat above method for frequency measurements every 10 °C step and then record all measured frequencies on each temperature step.




## 10.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal.(Interval) |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul. 22, 2015 (1Y) |
| ■ - | SSE-43CI-A | Samkun Tech | Humidity Chamber | 060712 | May 15, 2015 (1Y) |
| ■ - | DRP-305DN | DIGITAL Elec. | DC Power supply | 4030195 | Sep. 03, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

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**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

### 10.4 Test Data for 5 150 MHz ~ 5 250 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Temperature (˚C) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 0 | 5 180 000 000 | 5 180 025 648 | 25.648 |
| 10 | | 5 180 024 098 | 24.098 |
| 20 | | 5 180 023 057 | 23.057 |
| 30 | | 5 180 022 100 | 22.100 |
| 40 | | 5 180 021 128 | 21.128 |
| 50 | | 5 180 020 530 | 20.530 |
| 60 | | 5 180 019 892 | 19.892 |
| 65 | | 5 200 027 251 | 27.251 |
| 0 | 5 200 000 000 | 5 200 025 816 | 25.816 |
| 10 | | 5 200 024 570 | 24.570 |
| 20 | | 5 200 023 902 | 23.902 |
| 30 | | 5 200 023 001 | 23.001 |
| 40 | | 5 200 022 119 | 22.119 |
| 50 | | 5 200 021 369 | 21.369 |
| 60 | | 5 200 020 678 | 20.678 |
| 65 | | 5 240 028 270 | 28.270 |
| 0 | 5 240 000 000 | 5 240 026 700 | 26.700 |
| 10 | | 5 240 025 312 | 25.312 |
| 20 | | 5 240 024 439 | 24.439 |
| 30 | | 5 240 023 378 | 23.378 |
| 40 | | 5 240 022 574 | 22.574 |
| 50 | | 5 240 022 053 | 22.053 |
| 60 | | 5 240 020 861 | 20.861 |
| 65 | | 5 180 025 648 | 25.648 |

**Tested by: Jun-Hui, Lee / Senior Engineer**



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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### 10.5 Test Data for 5 250 MHz ~ 5 350 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Temperature (˚C) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 0 | 5 260 000 000 | 5 260 028 657 | 28.657 |
| 10 | | 5 260 027 302 | 27.302 |
| 20 | | 5 260 025 813 | 25.813 |
| 30 | | 5 260 024 768 | 24.768 |
| 40 | | 5 260 023 818 | 23.818 |
| 50 | | 5 260 022 742 | 22.742 |
| 60 | | 5 260 021 817 | 21.817 |
| 65 | | 5 260 021 052 | 21.052 |
| 0 | 5 300 000 000 | 5 300 029 154 | 29.154 |
| 10 | | 5 300 027 772 | 27.772 |
| 20 | | 5 300 026 243 | 26.243 |
| 30 | | 5 300 025 328 | 25.328 |
| 40 | | 5 300 024 543 | 24.543 |
| 50 | | 5 300 023 444 | 23.444 |
| 60 | | 5 300 022 860 | 22.860 |
| 65 | | 5 300 021 604 | 21.604 |
| 0 | 5 320 000 000 | 5 320 029 600 | 29.600 |
| 10 | | 5 320 027 939 | 27.939 |
| 20 | | 5 320 026 764 | 26.764 |
| 30 | | 5 320 025 940 | 25.940 |
| 40 | | 5 320 025 059 | 25.059 |
| 50 | | 5 320 024 088 | 24.088 |
| 60 | | 5 320 023 307 | 23.307 |
| 65 | | 5 320 022 242 | 22.242 |

**Tested by: Jun-Hui, Lee / Senior Engineer**

 

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## 10.6 Test Data for 5 470 MHz ~ 5 725 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Temperature (˚C) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 0 | 5 500 000 000 | 5 500 036 153 | 36.153 |
| 10 | | 5 500 034 849 | 34.849 |
| 20 | | 5 500 033 250 | 33.250 |
| 30 | | 5 500 032 426 | 32.426 |
| 40 | | 5 500 031 337 | 31.337 |
| 50 | | 5 500 030 204 | 30.204 |
| 60 | | 5 500 029 441 | 29.441 |
| 65 | | 5 500 028 490 | 28.490 |
| 0 | 5 600 000 000 | 5 600 036 926 | 36.926 |
| 10 | | 5 600 035 451 | 35.451 |
| 20 | | 5 600 034 154 | 34.154 |
| 30 | | 5 600 033 219 | 33.219 |
| 40 | | 5 600 032 459 | 32.459 |
| 50 | | 5 600 031 316 | 31.316 |
| 60 | | 5 600 030 217 | 30.217 |
| 65 | | 5 600 029 461 | 29.461 |
| 0 | 5 700 000 000 | 5 700 038 115 | 38.115 |
| 10 | | 5 700 036 506 | 36.506 |
| 20 | | 5 700 035 031 | 35.031 |
| 30 | | 5 700 034 170 | 34.170 |
| 40 | | 5 700 033 178 | 33.178 |
| 50 | | 5 700 032 473 | 32.473 |
| 60 | | 5 700 031 104 | 31.104 |
| 65 | | 5 700 030 318 | 30.318 |

**Tested by: Jun-Hui, Lee / Senior Engineer**



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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## 10.7 Test Data for 5 725 MHz ~ 5 850 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Temperature (˚C) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 0 | 5 745 000 000 | 5 745 038 274 | 38.274 |
| 10 | | 5 745 036 853 | 36.853 |
| 20 | | 5 745 035 418 | 35.418 |
| 30 | | 5 745 034 190 | 34.190 |
| 40 | | 5 745 033 502 | 33.502 |
| 50 | | 5 745 032 360 | 32.360 |
| 60 | | 5 745 031 419 | 31.419 |
| 65 | | 5 745 030 459 | 30.459 |
| 0 | 5 785 000 000 | 5 785 038 714 | 38.714 |
| 10 | | 5 785 037 185 | 37.185 |
| 20 | | 5 785 035 916 | 35.916 |
| 30 | | 5 785 035 093 | 35.093 |
| 40 | | 5 785 034 103 | 34.103 |
| 50 | | 5 785 033 307 | 33.307 |
| 60 | | 5 785 032 275 | 32.275 |
| 65 | | 5 785 031 715 | 31.715 |
| 0 | 5 825 000 000 | 5 825 039 206 | 39.206 |
| 10 | | 5 825 038 072 | 38.072 |
| 20 | | 5 825 036 365 | 36.365 |
| 30 | | 5 825 035 236 | 35.236 |
| 40 | | 5 825 034 278 | 34.278 |
| 50 | | 5 825 033 491 | 33.491 |
| 60 | | 5 825 032 274 | 32.274 |
| 65 | | 5 825 031 414 | 31.414 |

**Tested by: Jun-Hui, Lee / Senior Engineer**



**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

# 11. FREQUENCY STABILITY WITH VOLTAGE VARIATION

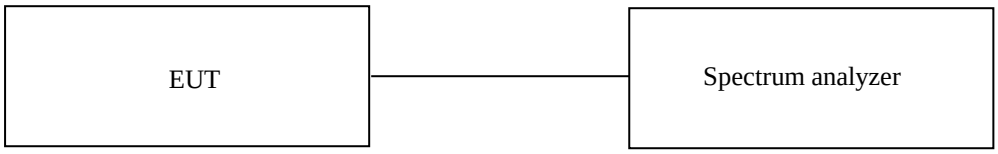
## 11.1 Operating environment

Temperature : 23 °C

Relative humidity : 47 % R.H.

## 11.2 Test set-up

An external DC power supply was connected to the input of the EUT. The voltage of EUT set to 115 % of the nominal value and then was reduced to 85 % of nominal voltage. The output frequency was recorded at each step.




## 11.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal.(Interval) |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul 22, 2015 (1Y) |
| ■ - | DRP-305DN | DIGITAL Elec. | DC Power supply | 4030195 | Sep. 03, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

**HEAD OFFICE** : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

**EMC Testing Div.** : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

### 11.4 Test Data for 5 150 MHz ~ 5 250 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Voltage (Vdc) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 4.37 | 5 180 000 000 | 5 180 024 280 | 24.280 |
| 3.80 | | 5 180 024 236 | 24.236 |
| 3.23 | | 5 180 024 214 | 24.214 |
| 4.37 | 5 200 000 000 | 5 200 024 730 | 24.730 |
| 3.80 | | 5 200 024 692 | 24.692 |
| 3.23 | | 5 200 024 651 | 24.651 |
| 4.37 | 5 240 000 000 | 5 240 025 541 | 25.541 |
| 3.80 | | 5 240 025 495 | 25.495 |
| 3.23 | | 5 240 025 460 | 25.460 |

### 11.5 Test Data for 5 250 MHz ~ 5 350 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Voltage (Vdc) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 4.37 | 5 260 000 000 | 5 260 025 987 | 25.987 |
| 3.80 | | 5 260 025 954 | 25.954 |
| 3.23 | | 5 260 025 920 | 25.92 |
| 4.37 | 5 300 000 000 | 5 300 026 474 | 26.474 |
| 3.80 | | 5 300 026 429 | 26.429 |
| 3.23 | | 5 300 026 383 | 26.383 |
| 4.37 | 5 320 000 000 | 5 320 026 944 | 26.944 |
| 3.80 | | 5 320 026 896 | 26.896 |
| 3.23 | | 5 320 026 865 | 26.865 |



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### 11.6 Test Data for 5 470 MHz ~ 5 725 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Voltage (Vdc) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 4.37 | 5 500 000 000 | 5 500 033 426 | 33.426 |
| 3.80 | | 5 500 033 391 | 33.391 |
| 3.23 | | 5 500 033 349 | 33.349 |
| 4.37 | 5 600 000 000 | 5 600 034 352 | 34.352 |
| 3.80 | | 5 600 034 312 | 34.312 |
| 3.23 | | 5 600 034 286 | 34.286 |
| 4.37 | 5 700 000 000 | 5 700 035 176 | 35.176 |
| 3.80 | | 5 700 035 152 | 35.152 |
| 3.23 | | 5 700 035 128 | 35.128 |

### 11.7 Test Data for 5 725 MHz ~ 5 850 MHz Band

-. Test Date : March 10, 2016

-. Result : Pass

| Voltage (Vdc) | Carrier Freq. (Hz) | Measured Freq. (Hz) | Freequency Error (kHz) |
|---|---|---|---|
| 4.37 | 5 745 000 000 | 5 745 035 608 | 35.608 |
| 3.80 | | 5 745 035 567 | 35.567 |
| 3.23 | | 5 745 035 523 | 35.523 |
| 4.37 | 5 785 000 000 | 5 785 036 068 | 36.068 |
| 3.80 | | 5 785 036 031 | 36.031 |
| 3.23 | | 5 785 035 996 | 35.996 |
| 4.37 | 5 825 000 000 | 5 825 036 519 | 36.519 |
| 3.80 | | 5 825 036 470 | 36.470 |
| 3.23 | | 5 825 036 450 | 36.450 |

**Tested by: Jun-Hui, Lee / Senior Engineer**



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# 12. RADIATED SPURIOUS EMISSIONS

## 12.1 Operating environment

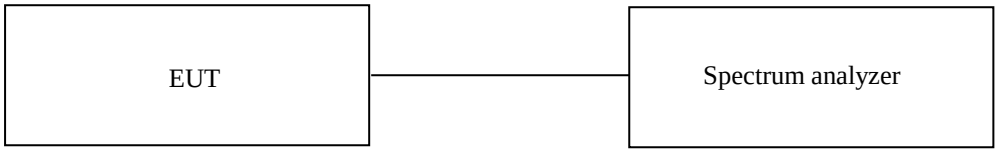
Temperature : (23 ~ 24) °C

Relative humidity : (43 ~ 44) % R.H.

## 12.2 Test set-up for conducted measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable above the ground plane.

The frequency spectrum from 30 MHz to 40 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.




## 12.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal.(Interval) |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul. 22, 2015 (1Y) |
| ■ - | ESCI | Rohde & Schwarz | Test Receiver | 101012 | Nov. 02, 2015 (1Y) |
| ■ - | 310N | Sonoma Instrument | Pre-Amplifier | 312544 | Apr. 29, 2015 (1Y) |
| ■ - | SCU-18 | Rohde & Schwarz | Pre-Amplifier | 10041 | Nov. 23, 2015 (1Y) |
| ■ - | SCU40A | Rohde & Schwarz | Pre-Amplifier | 100436 | Jun. 04, 2015 (1Y) |
| ■ - | DT3000 | Innco System | Turn Table | 930611 | N/A |
| ■ - | MA4000-EP | Innco System | Antenna Master | 3320611 | N/A |
| ■ - | VULB9163 | Schwarzbeck | TRILOG Broadband Antenna | 9163-421 | Jul. 10, 2014 (2Y) |
| ■ - | BBHA9120D | Schwarzbeck | Horn Antenna | BBHA9120D295 | Aug. 31, 2015 (2Y) |
| ■ - | BBHA9170 | Schwarzbeck | Horn Antenna | BBHA9170178 | Apr. 30, 2015 (2Y) |

All test equipment used is calibrated on a regular basis.

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## 12.4 Test data for 5 150 MHz ~ 5 250 MHz Band

### 12.4.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (23 ~ 24) °C

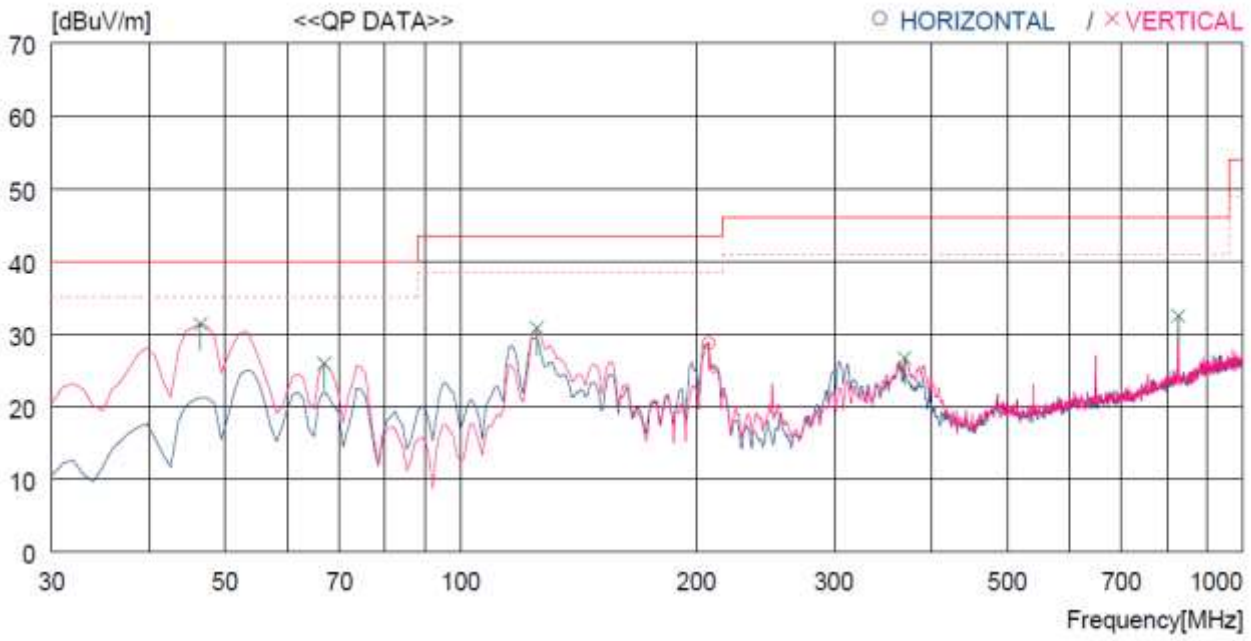
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Premium Tablet Date: March 09, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

-. Low, Middle and High Channels were tested, but the worst data were recorded.




| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|---|---|---|---|---|---|---|---|---|---|---|
| ----- Horizontal ------ | | | | | | | | | | |
| 1 | 207.510 | 46.8 | 11.0 | 3.8 | 32.8 | 28.8 | 43.5 | 14.7 | 100 | 19 |
| ----- Vertical ------ | | | | | | | | | | |
| 2 | 46.490 | 48.5 | 13.9 | 1.9 | 32.9 | 31.4 | 40.0 | 8.6 | 100 | 270 |
| 3 | 66.860 | 45.9 | 10.9 | 2.3 | 33.1 | 26.0 | 40.0 | 14.0 | 100 | 0 |
| 4 | 125.060 | 51.0 | 9.7 | 3.3 | 33.2 | 30.8 | 43.5 | 12.7 | 100 | 0 |
| 5 | 369.500 | 39.0 | 15.2 | 5.1 | 32.6 | 26.7 | 46.0 | 19.3 | 100 | 102 |
| 6 | 827.331 | 36.7 | 21.2 | 8.0 | 33.4 | 32.5 | 46.0 | 13.5 | 100 | 75 |



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### 12.4.2 Test data for Below 30 MHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

-. Frequency range : 9 kHz ~ 30 MHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBµV) | Ant. Pol. (H/V) | Ant. Height (m) | Angle (°) | Ant. Factor (dB/m) | Cable Loss | Emission Level(dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Any emissions were not observed from the EUT. | | | | | | | | | |

 

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### 12.4.3 Test data for above 1 GHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 40 GHz

-. Measurement distance : 3 m

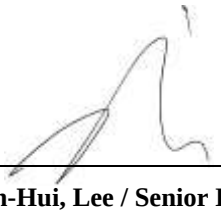
-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Low Channel** | | | | | | | | | |
| 10 360.00 | 54.96 | Peak | H | 38.60 | 16.30 | 42.50 | 67.36 | 73.98 | 6.62 |
| | 37.32 | Average | H | | | | 49.72 | 53.98 | 4.26 |
| | 54.53 | Peak | V | | | | 66.93 | 73.98 | 7.05 |
| | 36.65 | Average | V | | | | 49.05 | 53.98 | 4.93 |
| **Middle Channel** | | | | | | | | | |
| 10 400.00 | 54.11 | Peak | H | 38.60 | 16.30 | 42.50 | 66.51 | 73.98 | 7.47 |
| | 37.00 | Average | H | | | | 49.40 | 53.98 | 4.58 |
| | 54.24 | Peak | V | | | | 66.64 | 73.98 | 7.34 |
| | 36.26 | Average | V | | | | 48.66 | 53.98 | 5.32 |
| **High Channel** | | | | | | | | | |
| 10 480.00 | 55.08 | Peak | H | 38.60 | 16.30 | 42.50 | 67.48 | 73.98 | 6.50 |
| | 36.87 | Average | H | | | | 49.27 | 53.98 | 4.71 |
| | 54.74 | Peak | V | | | | 67.14 | 73.98 | 6.84 |
| | 36.29 | Average | V | | | | 48.69 | 53.98 | 5.29 |

Tabulated test data for Restricted Band

Remark - “H”: Horizontal, “V”: Vertical

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



**Tested by: Jun-Hui, Lee / Senior Engineer**

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## 12.5 Test data for 5 250 MHz ~ 5 350 MHz Band

### 12.5.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (23 ~ 24) °C

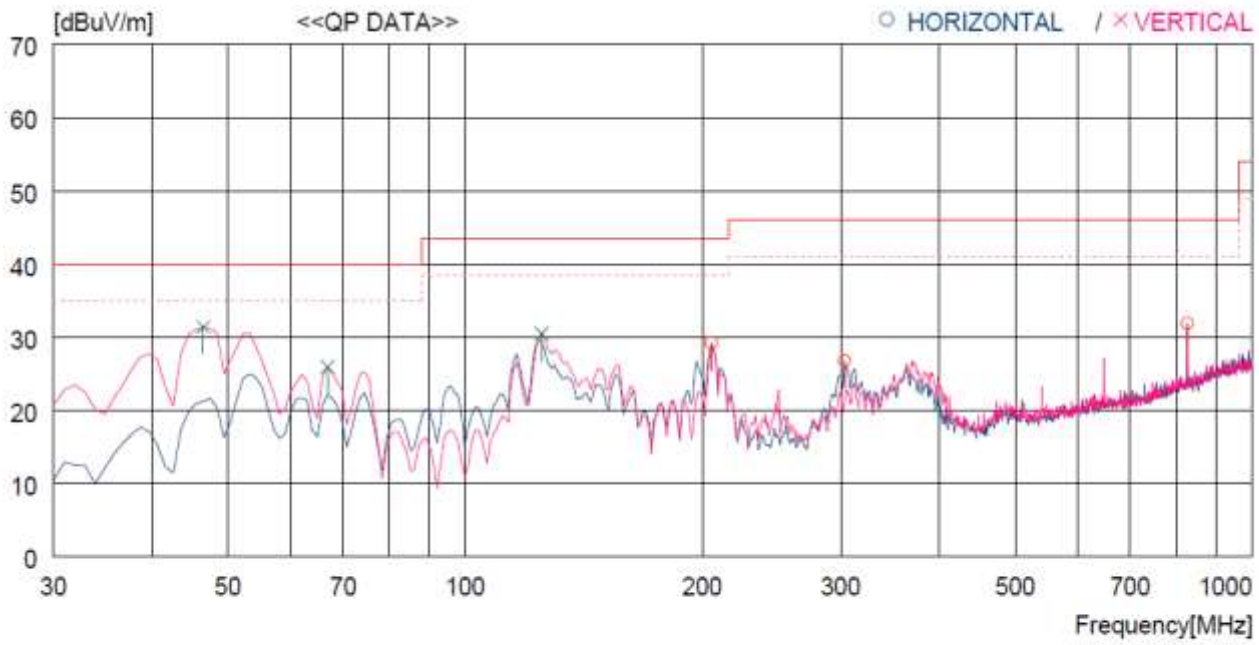
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Premium Tablet Date: March 09, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

-. Low, Middle and High Channels were tested, but the worst data were recorded.




| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|---|---|---|---|---|---|---|---|---|---|---|
| ----- Horizontal ------ | | | | | | | | | | |
| 1 | 205.570 | 47.3 | 10.9 | 3.8 | 32.8 | 29.2 | 43.5 | 14.3 | 100 | 19 |
| 2 | 303.540 | 41.2 | 13.7 | 4.6 | 32.7 | 26.8 | 46.0 | 19.2 | 100 | 359 |
| 3 | 827.331 | 36.1 | 21.2 | 8.0 | 33.4 | 31.9 | 46.0 | 14.1 | 100 | 359 |
| ----- Vertical ------ | | | | | | | | | | |
| 4 | 46.490 | 48.5 | 13.9 | 1.9 | 32.9 | 31.4 | 40.0 | 8.6 | 100 | 0 |
| 5 | 66.860 | 45.9 | 10.9 | 2.3 | 33.1 | 26.0 | 40.0 | 14.0 | 100 | 0 |
| 6 | 125.060 | 50.7 | 9.7 | 3.3 | 33.2 | 30.5 | 43.5 | 13.0 | 100 | 0 |



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### 12.5.2 Test data for Below 30 MHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

-. Frequency range : 9 kHz ~ 30 MHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBµV) | Ant. Pol. (H/V) | Ant. Height (m) | Angle (°) | Ant. Factor (dB/m) | Cable Loss | Emission Level(dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Any emissions were not observed from the EUT. | | | | | | | | | |

 

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### 12.5.3 Test data for above 1 GHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 40 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Low Channel** | | | | | | | | | |
| 10 520.00 | 54.58 | Peak | H | 38.80 | 16.50 | 42.50 | 67.38 | 73.98 | 6.60 |
| | 36.15 | Average | H | | | | 48.95 | 53.98 | 5.03 |
| | 54.86 | Peak | V | | | | 67.66 | 73.98 | 6.32 |
| | 36.59 | Average | V | | | | 49.39 | 53.98 | 4.59 |
| **Middle Channel** | | | | | | | | | |
| 10 600.00 | 55.12 | Peak | H | 38.80 | 16.50 | 42.50 | 67.92 | 73.98 | 6.06 |
| | 37.01 | Average | H | | | | 49.81 | 53.98 | 4.17 |
| | 54.87 | Peak | V | | | | 67.67 | 73.98 | 6.31 |
| | 36.64 | Average | V | | | | 49.44 | 53.98 | 4.54 |
| **High Channel** | | | | | | | | | |
| 10 640.00 | 54.77 | Peak | H | 38.80 | 16.50 | 42.50 | 67.57 | 73.98 | 6.41 |
| | 36.81 | Average | H | | | | 49.61 | 53.98 | 4.37 |
| | 54.85 | Peak | V | | | | 67.65 | 73.98 | 6.33 |
| | 36.47 | Average | V | | | | 49.27 | 53.98 | 4.71 |

Tabulated test data for Restricted Band

Remark - "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBµV/m) - Emission Level (dBµV/m)

**Tested by: Jun-Hui, Lee / Senior Engineer**



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## 12.6 Test data for 5 470 MHz ~ 5 725 MHz Band

### 12.6.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (23 ~ 24) °C

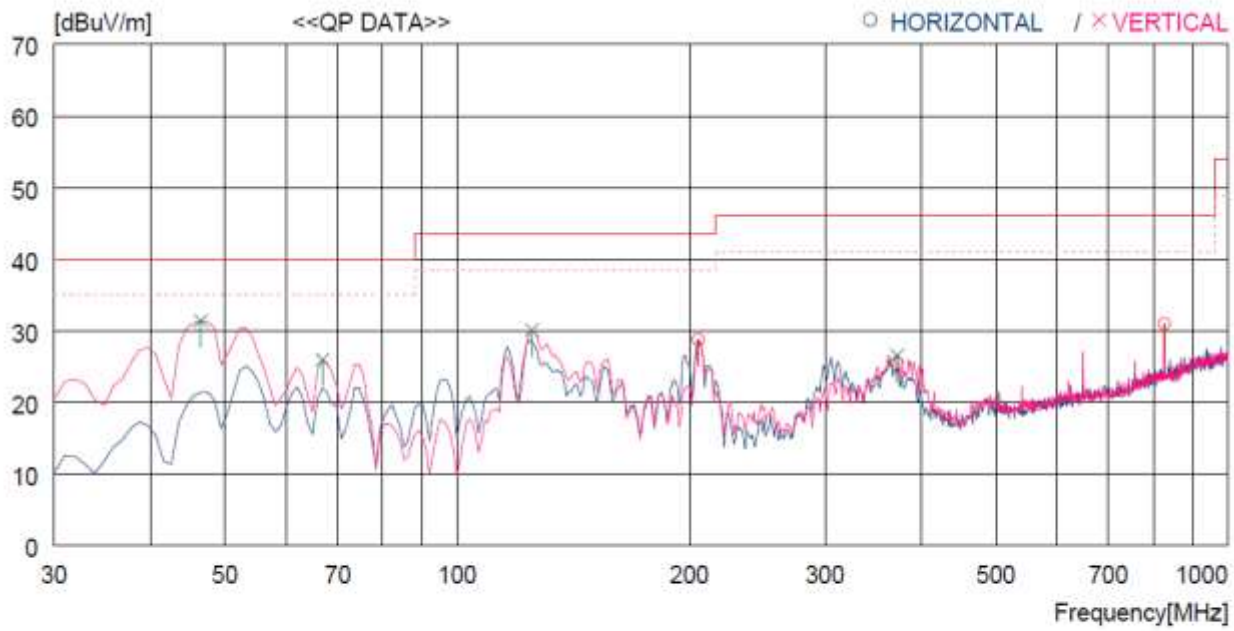
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Premium Tablet Date: March 09, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

-. Low, Middle and High Channels were tested, but the worst data were recorded.




| No. | FREQ | READING QP | ANT FACTOR | LOSS | GAIN | RESULT | LIMIT | MARGIN | ANTENNA | TABLE |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | [dBuV] | [dB] | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB] | [cm] | [DEG] |
| ----- Horizontal ------ | | | | | | | | | | |
| 1 | 205.570 | 46.7 | 10.9 | 4.1 | 32.9 | 28.8 | 43.5 | 14.7 | 200 | 0 |
| 2 | 827.331 | 33.8 | 21.2 | 8.8 | 32.8 | 31.0 | 46.0 | 15.0 | 100 | 359 |
| ----- Vertical ------ | | | | | | | | | | |
| 3 | 46.490 | 48.5 | 13.9 | 2.0 | 33.0 | 31.4 | 40.0 | 8.6 | 100 | 0 |
| 4 | 66.860 | 45.7 | 10.9 | 2.4 | 33.0 | 26.0 | 40.0 | 14.0 | 100 | 130 |
| 5 | 125.060 | 50.2 | 9.7 | 3.2 | 33.0 | 30.1 | 43.5 | 13.4 | 100 | 0 |
| 6 | 372.410 | 38.6 | 15.3 | 5.7 | 33.0 | 26.6 | 46.0 | 19.4 | 100 | 102 |

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### 12.6.2 Test data for Below 30 MHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

-. Frequency range : 9 kHz ~ 30 MHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBµV) | Ant. Pol. (H/V) | Ant. Height (m) | Angle (°) | Ant. Factor (dB/m) | Cable Loss | Emission Level(dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Any emissions were not observed from the EUT. | | | | | | | | | |



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### 12.6.3 Test data for above 1 GHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 40 GHz

-. Measurement distance : 3 m

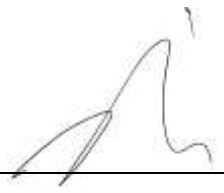
-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Low Channel** | | | | | | | | | |
| 11 000.00 | 55.18 | Peak | H | 39.40 | 17.30 | 42.60 | 69.28 | 73.98 | 4.70 |
| | 36.84 | Average | H | | | | 50.94 | 53.98 | 3.04 |
| | 54.26 | Peak | V | | | | 68.36 | 73.98 | 5.62 |
| | 36.34 | Average | V | | | | 50.44 | 53.98 | 3.54 |
| **Middle Channel** | | | | | | | | | |
| 11 200.00 | 54.62 | Peak | H | 39.40 | 17.30 | 42.60 | 68.72 | 73.98 | 5.26 |
| | 36.75 | Average | H | | | | 50.85 | 53.98 | 3.13 |
| | 54.79 | Peak | V | | | | 68.89 | 73.98 | 5.09 |
| | 37.04 | Average | V | | | | 51.14 | 53.98 | 2.84 |
| **High Channel** | | | | | | | | | |
| 11 400.00 | 54.81 | Peak | H | 39.40 | 17.30 | 42.60 | 68.91 | 73.98 | 5.07 |
| | 36.32 | Average | H | | | | 50.42 | 53.98 | 3.56 |
| | 55.17 | Peak | V | | | | 69.27 | 73.98 | 4.71 |
| | 54.81 | Peak | H | | | | 50.58 | 53.98 | 3.40 |

Tabulated test data for Restricted Band

Remark - "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBµV/m) - Emission Level (dBµV/m)



**Tested by: Jun-Hui, Lee / Senior Engineer**

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## 12.7 Test data for 5 725 MHz ~ 5 850 MHz Band

### 12.7.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (23 ~ 24) °C

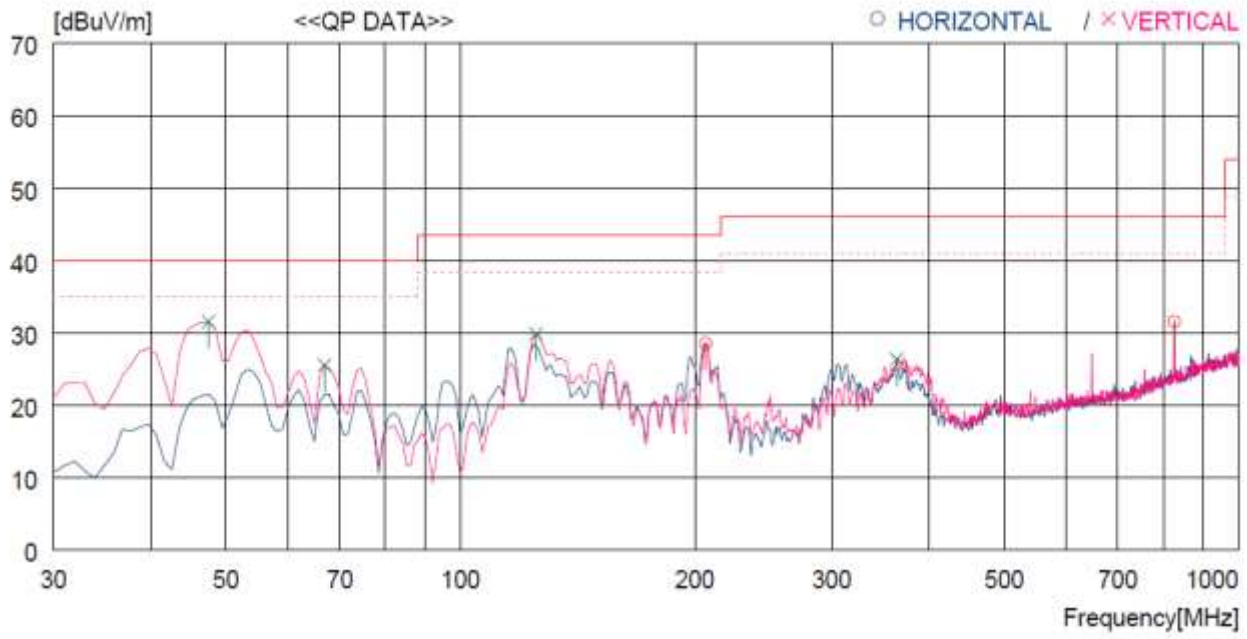
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Premium Tablet Date: March 09, 2016

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

-. Low, Middle and High Channels were tested, but the worst data were recorded.




| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|---|---|---|---|---|---|---|---|---|---|---|
| ----- Horizontal ------ | | | | | | | | | | |
| 1 | 206.540 | 46.6 | 11.0 | 3.8 | 32.8 | 28.6 | 43.5 | 14.9 | 100 | 359 |
| 2 | 827.331 | 35.8 | 21.2 | 8.0 | 33.4 | 31.6 | 46.0 | 14.4 | 100 | 359 |
| ----- Vertical ------ | | | | | | | | | | |
| 3 | 47.460 | 48.7 | 13.8 | 2.0 | 32.9 | 31.6 | 40.0 | 8.4 | 100 | 292 |
| 4 | 66.860 | 45.5 | 10.9 | 2.3 | 33.1 | 25.6 | 40.0 | 14.4 | 100 | 130 |
| 5 | 125.060 | 50.1 | 9.7 | 3.3 | 33.2 | 29.9 | 43.5 | 13.6 | 100 | 0 |
| 6 | 363.680 | 38.8 | 15.1 | 5.1 | 32.6 | 26.4 | 46.0 | 19.6 | 100 | 123 |



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### 12.7.2 Test data for Below 30 MHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

-. Frequency range : 9 kHz ~ 30 MHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBµV) | Ant. Pol. (H/V) | Ant. Height (m) | Angle (°) | Ant. Factor (dB/m) | Cable Loss | Emission Level(dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Any emissions were not observed from the EUT. | | | | | | | | | |



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### 12.7.3 Test data for above 1 GHz

-. Test Date : March 09, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 40 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Low Channel** | | | | | | | | | |
| 11 490.00 | 48.65 | Peak | H | 39.50 | 17.50 | 42.70 | 62.95 | 73.98 | 11.03 |
| | 32.89 | Average | H | | | | 47.19 | 53.98 | 6.79 |
| | 45.53 | Peak | V | | | | 59.83 | 73.98 | 14.15 |
| | 30.72 | Average | V | | | | 45.02 | 53.98 | 8.96 |
| **Middle Channel** | | | | | | | | | |
| 11 570.00 | 48.88 | Peak | H | 39.50 | 17.50 | 42.70 | 63.18 | 73.98 | 10.80 |
| | 33.10 | Average | H | | | | 47.40 | 53.98 | 6.58 |
| | 45.42 | Peak | V | | | | 59.72 | 73.98 | 14.26 |
| | 32.19 | Average | V | | | | 46.49 | 53.98 | 7.49 |
| **High Channel** | | | | | | | | | |
| 11 650.00 | 48.40 | Peak | H | 39.50 | 17.50 | 42.70 | 62.70 | 73.98 | 11.28 |
| | 33.03 | Average | H | | | | 47.33 | 53.98 | 6.65 |
| | 45.37 | Peak | V | | | | 59.67 | 73.98 | 14.31 |
| | 31.77 | Average | V | | | | 46.07 | 53.98 | 7.91 |

Tabulated test data for Restricted Band

Remark - “H”: Horizontal, “V”: Vertical

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)

**Tested by: Jun-Hui, Lee / Senior Engineer**



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# 13. RADIATED RESTRICTED BAND EDGE MEASUREMENTS

## 13.1 Operating environment

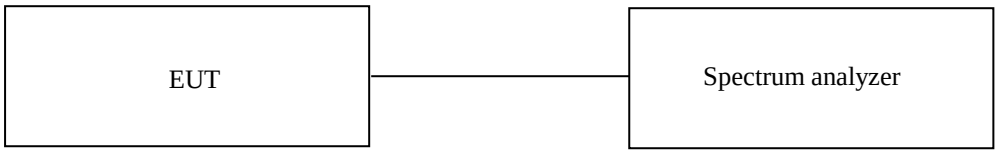
Temperature : 23 °C

Relative humidity : 50 % R.H.

## 13.2 Test set-up for conducted measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable above the ground plane.

The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.




## 13.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal.(Interval) |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul. 22, 2015 (1Y) |
| ■ - | ESCI | Rohde & Schwarz | Test Receiver | 101012 | Nov. 02, 2015 (1Y) |
| ■ - | 310N | Sonoma Instrument | Pre-Amplifier | 312544 | Apr. 29, 2015 (1Y) |
| ■ - | SCU-18 | Rohde & Schwarz | Pre-Amplifier | 10041 | Nov. 23, 2015 (1Y) |
| ■ - | DT3000 | Innco System | Turn Table | 930611 | N/A |
| ■ - | MA4000-EP | Innco System | Antenna Master | 3320611 | N/A |
| ■ - | VULB9163 | Schwarzbeck | TRILOG Broadband Antenna | 9163-421 | Jul. 10, 2014 (2Y) |
| ■ - | BBHA9120D | Schwarzbeck | Horn Antenna | BBHA9120D295 | Aug. 31, 2015 (2Y) |
| ■ - | BBHA9170 | Schwarzbeck | Horn Antenna | BBHA9170178 | Apr. 30, 2015 (2Y) |

All test equipment used is calibrated on a regular basis.

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## 13.4 Test data for 5 150 MHz ~ 5 250 MHz Band

### 13.4.1 Test data for 802.11a RLAN Mode

-. Test Date : March 06, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

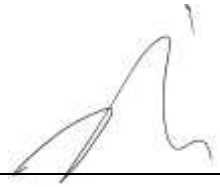
-. Result : Pass

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 5 150.00 | 67.68 | Peak | H | 31.00 | 11.50 | 42.20 | 67.98 | 74.00 | 6.02 |
| | 42.66 | Average | H | | | | 42.96 | 54.00 | 11.04 |
| | 67.23 | Peak | V | | | | 67.53 | 74.00 | 6.47 |
| | 42.40 | Average | V | | | | 42.70 | 54.00 | 11.30 |

Tabulated test data for Restricted Band

Remark - "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBµV/m) - Emission Level (dBµV/m)



**Tested by: Jun-Hui, Lee / Senior Engineer**

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### 13.4.2 Test data for 802.11n_HT20 RLAN Mode

-. Test Date : March 06, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

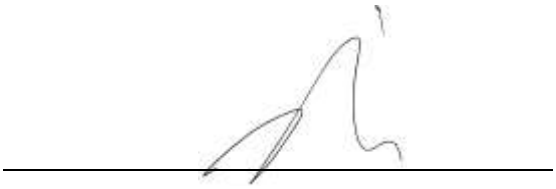
-. Result : Pass

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 5 150.00 | 54.55 | Peak | H | 31.00 | 11.50 | 42.20 | 54.85 | 74.00 | 19.15 |
| | 32.72 | Average | H | | | | 33.02 | 54.00 | 20.98 |
| | 52.91 | Peak | V | | | | 53.21 | 74.00 | 20.79 |
| | 32.37 | Average | V | | | | 32.67 | 54.00 | 21.33 |

Tabulated test data for Restricted Band

Remark - “H”: Horizontal, “V”: Vertical

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



**Tested by: Jun-Hui, Lee / Senior Engineer**

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## 13.5 Test data for 5 250 MHz ~ 5 350 MHz Band

### 13.5.1 Test data for 802.11a RLAN Mode

-. Test Date : March 06, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

-. Result : Pass

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 5 350.00 | 49.58 | Peak | H | 31.30 | 11.70 | 42.20 | 50.38 | 74.00 | 23.62 |
| | 32.04 | Average | H | | | | 32.84 | 54.00 | 21.16 |
| | 50.00 | Peak | V | | | | 50.80 | 74.00 | 23.20 |
| | 31.57 | Average | V | | | | 32.37 | 54.00 | 21.63 |

Tabulated test data for Restricted Band

Remark - "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBµV/m) - Emission Level (dBµV/m)

**Tested by: Jun-Hui, Lee / Senior Engineer**

 

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### 13.5.2 Test data for 802.11n_HT20 RLAN Mode

-. Test Date : March 06, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

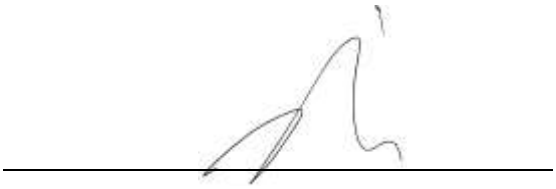
-. Result : Pass

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 5 350.00 | 52.51 | Peak | H | 31.30 | 11.70 | 42.20 | 53.31 | 74.00 | 20.69 |
| | 33.38 | Average | H | | | | 34.18 | 54.00 | 19.82 |
| | 51.72 | Peak | V | | | | 52.52 | 74.00 | 21.48 |
| | 33.36 | Average | V | | | | 34.16 | 54.00 | 19.84 |

Tabulated test data for Restricted Band

Remark - "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



**Tested by: Jun-Hui, Lee / Senior Engineer**

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## 13.6 Test data for 5 725 MHz ~ 5 850 MHz Band

### 13.6.1 Test data for 802.11a RLAN Mode

-. Test Date : March 06, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

-. Result : Pass

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Low Channel** | | | | | | | | | |
| 5 725.00 | 63.20 | Peak | H | 31.90 | 12.10 | 42.20 | 65.00 | 74.00 | 9.00 |
| | 43.29 | Average | H | | | | 45.09 | 54.00 | 8.91 |
| | 60.54 | Peak | V | | | | 62.34 | 74.00 | 11.66 |
| | 41.42 | Average | V | | | | 43.22 | 54.00 | 10.78 |
| **High Channel** | | | | | | | | | |
| 5 850.00 | 51.15 | Peak | H | 32.10 | 12.20 | 42.20 | 53.25 | 74.00 | 20.75 |
| | 33.48 | Average | H | | | | 35.58 | 54.00 | 18.42 |
| | 47.81 | Peak | V | | | | 49.91 | 74.00 | 24.09 |
| | 31.96 | Average | V | | | | 34.06 | 54.00 | 19.94 |

Tabulated test data for Restricted Band

Remark - “H”: Horizontal, “V”: Vertical

Margin (dB) = Limits (dBµV/m) - Emission Level (dBµV/m)

**Tested by: Jun-Hui, Lee / Senior Engineer**

 

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### 15.6.2 Test data for 802.11n_HT20 RLAN Mode

-. Test Date : March 06, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

-. Result : Pass

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Low Channel** | | | | | | | | | |
| 5 725.00 | 64.22 | Peak | H | 31.90 | 12.10 | 42.20 | 66.02 | 74.00 | 7.98 |
| | 43.06 | Average | H | | | | 44.86 | 54.00 | 9.14 |
| | 60.22 | Peak | V | | | | 62.02 | 74.00 | 11.98 |
| | 40.20 | Average | V | | | | 42.00 | 54.00 | 12.00 |
| **High Channel** | | | | | | | | | |
| 5 850.00 | 50.54 | Peak | H | 32.10 | 12.20 | 42.20 | 52.64 | 74.00 | 21.36 |
| | 33.64 | Average | H | | | | 35.74 | 54.00 | 18.26 |
| | 47.04 | Peak | V | | | | 49.14 | 74.00 | 24.86 |
| | 32.06 | Average | V | | | | 34.16 | 54.00 | 19.84 |

Tabulated test data for Restricted Band

Remark - "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)

**Tested by: Jun-Hui, Lee / Senior Engineer**



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# 14. CONDUCTED EMISSION TEST

## 14.1 Operating environment

Temperature : (23 ~ 24) °C

Relative humidity : (46 ~ 49) % R.H.

## 14.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μH + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

## 14.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal. (Interval) |
|---|---|---|---|---|---|
| ■ - | ESPI | Rohde & Schwarz | Test Receiver | 101012 | Nov. 02, 2015 (1Y) |
| □ - | ESHS10 | Rohde & Schwarz | Test Receiver | 834467/007 | Apr. 29, 2015 (1Y) |
| □ - | NSLK8128 | Schwarzbeck | AMN | 8128-216 | Apr. 06, 2015 (1Y) |
| ■ - | NSLK8126 | Schwarzbeck | AMN | 8126-404 | Apr. 29, 2015 (1Y) |
| □ - | 3825/2 | EMCO | AMN | 9109-1869 | Apr. 29, 2015 (1Y) |
| ■ - | 3825/2 | EMCO | AMN | 9109-1867 | Apr. 29, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.



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## 14.4 Test data

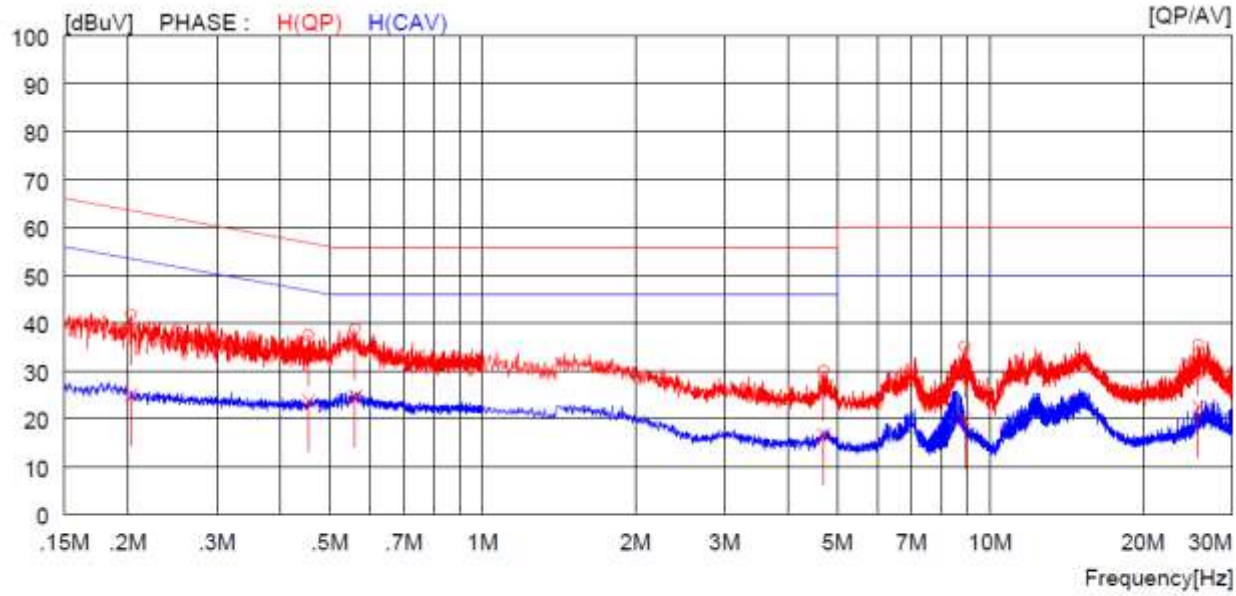
### 14.4.1 Test data for 5 150 MHz ~ 5 250 MHz Band

-. Test Date : March 08, 2016

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE




| NO | FREQ | READING QP | READING AV | C.FACTOR QP | C.FACTOR AV | RESULT QP | RESULT AV | LIMIT QP | LIMIT AV | MARGIN QP | MARGIN AV | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | [dBuV] | [dBuV] | [dB] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | |
| 1 | 0.20300 | 31.9 | ---- | 9.9 | | 41.8 | ---- | 63.5 | ---- | 21.7 | ---- | H(QP) |
| 2 | 0.45400 | 27.6 | ---- | 9.9 | | 37.5 | ---- | 56.8 | ---- | 19.3 | ---- | H(QP) |
| 3 | 0.56100 | 28.7 | ---- | 10.0 | | 38.7 | ---- | 56.0 | ---- | 17.3 | ---- | H(QP) |
| 4 | 4.69600 | 20.0 | ---- | 10.1 | | 30.1 | ---- | 56.0 | ---- | 25.9 | ---- | H(QP) |
| 5 | 8.90000 | 24.8 | ---- | 10.3 | | 35.1 | ---- | 60.0 | ---- | 24.9 | ---- | H(QP) |
| 6 | 25.72000 | 25.0 | ---- | 10.5 | | 35.5 | ---- | 60.0 | ---- | 24.5 | ---- | H(QP) |
| 7 | 0.20300 | ---- | 15.2 | 9.9 | | ---- | 25.1 | ---- | 53.5 | ---- | 28.4 | H(CAV) |
| 8 | 0.45400 | ---- | 13.8 | 9.9 | | ---- | 23.7 | ---- | 46.8 | ---- | 23.1 | H(CAV) |
| 9 | 0.56100 | ---- | 14.7 | 10.0 | | ---- | 24.7 | ---- | 46.0 | ---- | 21.3 | H(CAV) |
| 10 | 4.69600 | ---- | 6.6 | 10.1 | | ---- | 16.7 | ---- | 46.0 | ---- | 29.3 | H(CAV) |
| 11 | 8.90000 | ---- | 9.7 | 10.3 | | ---- | 20.0 | ---- | 50.0 | ---- | 30.0 | H(CAV) |
| 12 | 25.72000 | ---- | 12.0 | 10.5 | | ---- | 22.5 | ---- | 50.0 | ---- | 27.5 | H(CAV) |



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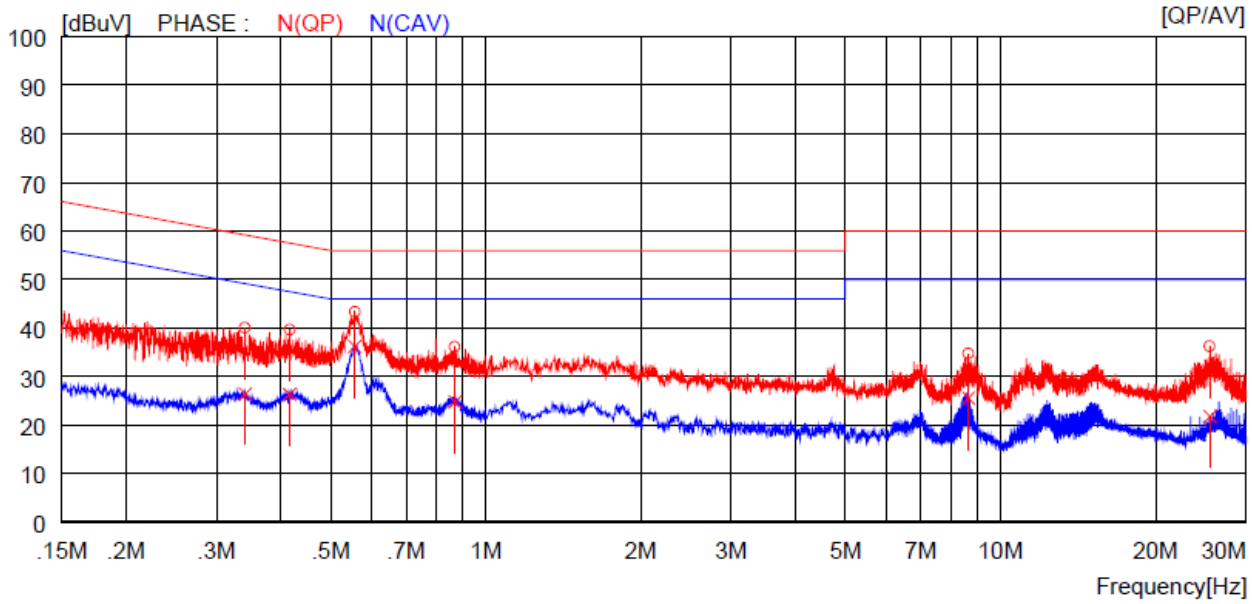
-. Tested Line : NEUTRAL LINE




| NO | FREQ | READING QP [dBuV] | READING AV [dBuV] | C.FACTOR QP [dB] | C.FACTOR AV [dB] | RESULT QP [dBuV] | RESULT AV [dBuV] | LIMIT QP [dBuV] | LIMIT AV [dBuV] | MARGIN QP [dB] | MARGIN AV [dB] | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.34100 | 30.1 | ---- | 9.9 | | 40.0 | ---- | 59.2 | ---- | 19.2 | ---- | N(QP) |
| 2 | 0.41600 | 29.8 | ---- | 9.9 | | 39.7 | ---- | 57.5 | ---- | 17.8 | ---- | N(QP) |
| 3 | 0.55700 | 33.3 | ---- | 10.0 | | 43.3 | ---- | 56.0 | ---- | 12.7 | ---- | N(QP) |
| 4 | 0.87100 | 26.1 | ---- | 10.0 | | 36.1 | ---- | 56.0 | ---- | 19.9 | ---- | N(QP) |
| 5 | 8.67000 | 24.5 | ---- | 10.3 | | 34.8 | ---- | 60.0 | ---- | 25.2 | ---- | N(QP) |
| 6 | 25.53000 | 25.8 | ---- | 10.5 | | 36.3 | ---- | 60.0 | ---- | 23.7 | ---- | N(QP) |
| 7 | 0.34100 | ---- | 16.6 | | 9.9 | ---- | 26.5 | ---- | 49.2 | ---- | 22.7 | N(CAV) |
| 8 | 0.41600 | ---- | 16.5 | | 9.9 | ---- | 26.4 | ---- | 47.5 | ---- | 21.1 | N(CAV) |
| 9 | 0.55700 | ---- | 26.2 | | 10.0 | ---- | 36.2 | ---- | 46.0 | ---- | 9.8 | N(CAV) |
| 10 | 0.87100 | ---- | 14.8 | | 10.0 | ---- | 24.8 | ---- | 46.0 | ---- | 21.2 | N(CAV) |
| 11 | 8.67000 | ---- | 15.3 | | 10.3 | ---- | 25.6 | ---- | 50.0 | ---- | 24.4 | N(CAV) |
| 12 | 25.53000 | ---- | 11.3 | | 10.5 | ---- | 21.8 | ---- | 50.0 | ---- | 28.2 | N(CAV) |

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

**Tested by: Jun-Hui, Lee / Senior Engineer**



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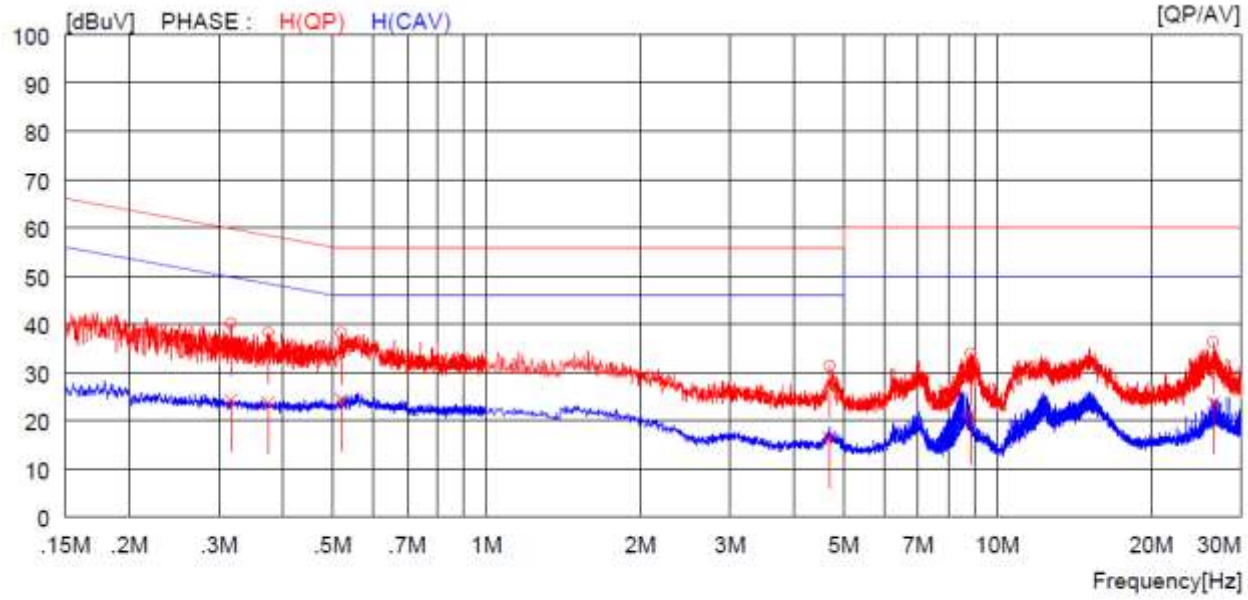
### 14.4.2 Test data for 5 250 MHz ~ 5 350 MHz Band

-. Test Date : March 08, 2016

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE




| NO | FREQ | READING | | C.FACTOR | | RESULT | | LIMIT | | MARGIN | | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | QP | AV | QP | AV | QP | AV | QP | AV | | | |
| | [MHz] | [dBuV] | [dBuV] | [dB] | | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | |
| 1 | 0.31600 | 30.2 | ---- | 9.9 | | 40.1 | ---- | 59.8 | ---- | 19.7 | ---- | H(QP) |
| 2 | 0.37400 | 28.3 | ---- | 9.9 | | 38.2 | ---- | 58.4 | ---- | 20.2 | ---- | H(QP) |
| 3 | 0.52000 | 28.1 | ---- | 10.0 | | 38.1 | ---- | 56.0 | ---- | 17.9 | ---- | H(QP) |
| 4 | 4.69200 | 21.2 | ---- | 10.1 | | 31.3 | ---- | 56.0 | ---- | 24.7 | ---- | H(QP) |
| 5 | 8.85500 | 23.5 | ---- | 10.3 | | 33.8 | ---- | 60.0 | ---- | 26.2 | ---- | H(QP) |
| 6 | 26.44000 | 25.8 | ---- | 10.5 | | 36.3 | ---- | 60.0 | ---- | 23.7 | ---- | H(QP) |
| 7 | 0.31600 | ---- | 14.3 | 9.9 | | ---- | 24.2 | ---- | 49.8 | ---- | 25.6 | H(CAV) |
| 8 | 0.37400 | ---- | 13.8 | 9.9 | | ---- | 23.7 | ---- | 48.4 | ---- | 24.7 | H(CAV) |
| 9 | 0.52000 | ---- | 14.3 | 10.0 | | ---- | 24.3 | ---- | 46.0 | ---- | 21.7 | H(CAV) |
| 10 | 4.69200 | ---- | 6.4 | 10.1 | | ---- | 16.5 | ---- | 46.0 | ---- | 29.5 | H(CAV) |
| 11 | 8.85500 | ---- | 11.1 | 10.3 | | ---- | 21.4 | ---- | 50.0 | ---- | 28.6 | H(CAV) |
| 12 | 26.44000 | ---- | 13.1 | 10.5 | | ---- | 23.6 | ---- | 50.0 | ---- | 26.4 | H(CAV) |



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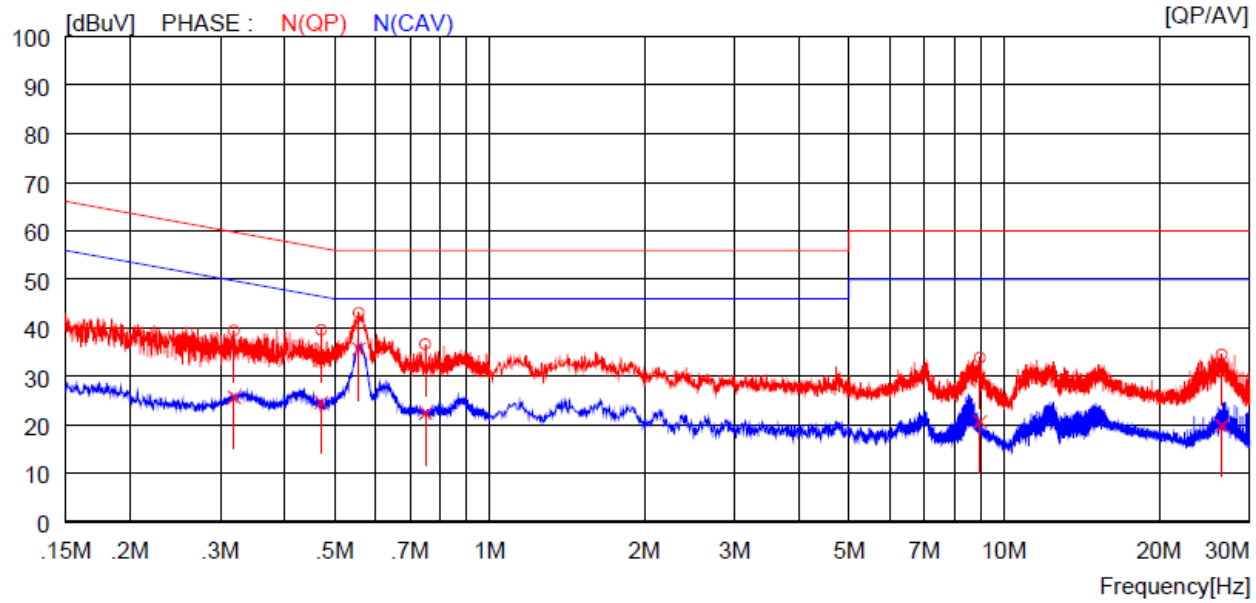
-. Tested Line : NEUTRAL LINE




| NO | FREQ | READING QP [dBuV] | READING AV [dBuV] | C.FACTOR QP [dB] | C.FACTOR AV [dB] | RESULT QP [dBuV] | RESULT AV [dBuV] | LIMIT QP [dBuV] | LIMIT AV [dBuV] | MARGIN QP [dB] | MARGIN AV [dB] | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.31900 | 29.5 | ---- | 9.9 | | 39.4 | ---- | 59.7 | ---- | 20.3 | ---- | N(QP) |
| 2 | 0.47100 | 29.6 | ---- | 9.9 | | 39.5 | ---- | 56.5 | ---- | 17.0 | ---- | N(QP) |
| 3 | 0.55700 | 33.1 | ---- | 10.0 | | 43.1 | ---- | 56.0 | ---- | 12.9 | ---- | N(QP) |
| 4 | 0.75100 | 26.6 | ---- | 10.0 | | 36.6 | ---- | 56.0 | ---- | 19.4 | ---- | N(QP) |
| 5 | 8.99500 | 23.6 | ---- | 10.3 | | 33.9 | ---- | 60.0 | ---- | 26.1 | ---- | N(QP) |
| 6 | 26.54000 | 24.0 | ---- | 10.5 | | 34.5 | ---- | 60.0 | ---- | 25.5 | ---- | N(QP) |
| 7 | 0.31900 | ---- | 15.8 | 9.9 | | ---- | 25.7 | ---- | 49.7 | ---- | 24.0 | N(CAV) |
| 8 | 0.47100 | ---- | 14.7 | 9.9 | | ---- | 24.6 | ---- | 46.5 | ---- | 21.9 | N(CAV) |
| 9 | 0.55700 | ---- | 25.7 | 10.0 | | ---- | 35.7 | ---- | 46.0 | ---- | 10.3 | N(CAV) |
| 10 | 0.75100 | ---- | 12.4 | 10.0 | | ---- | 22.4 | ---- | 46.0 | ---- | 23.6 | N(CAV) |
| 11 | 8.99500 | ---- | 10.4 | 10.3 | | ---- | 20.7 | ---- | 50.0 | ---- | 29.3 | N(CAV) |
| 12 | 26.54000 | ---- | 9.4 | 10.5 | | ---- | 19.9 | ---- | 50.0 | ---- | 30.1 | N(CAV) |

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

**Tested by: Jun-Hui, Lee / Senior Engineer**

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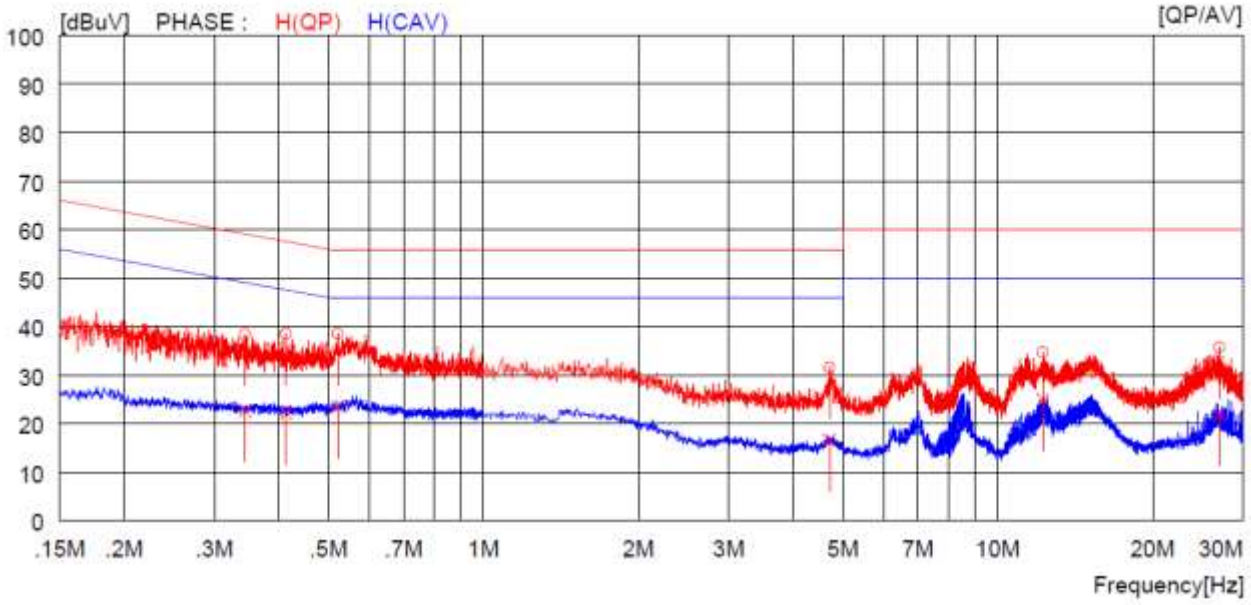
### 14.4.3 Test data for 5 470 MHz ~ 5 725 MHz Band

-. Test Date : March 08, 2016

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE




| NO | FREQ | READING QP | READING AV | C.FACTOR QP | C.FACTOR AV | RESULT QP | RESULT AV | LIMIT QP | LIMIT AV | MARGIN QP | MARGIN AV | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | [dBuV] | [dBuV] | [dB] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | |
| 1 | 0.34400 | 28.5 | ---- | 9.9 | | 38.4 | ---- | 59.1 | ---- | 20.7 | ---- | H(QP) |
| 2 | 0.41300 | 28.6 | ---- | 9.9 | | 38.5 | ---- | 57.6 | ---- | 19.1 | ---- | H(QP) |
| 3 | 0.52000 | 28.5 | ---- | 10.0 | | 38.5 | ---- | 56.0 | ---- | 17.5 | ---- | H(QP) |
| 4 | 4.70400 | 21.5 | ---- | 10.1 | | 31.6 | ---- | 56.0 | ---- | 24.4 | ---- | H(QP) |
| 5 | 12.23000 | 24.3 | ---- | 10.4 | | 34.7 | ---- | 60.0 | ---- | 25.3 | ---- | H(QP) |
| 6 | 26.99000 | 25.2 | ---- | 10.5 | | 35.7 | ---- | 60.0 | ---- | 24.3 | ---- | H(QP) |
| 7 | 0.34400 | ---- | 12.7 | 9.9 | | ---- | 22.6 | ---- | 49.1 | ---- | 26.5 | H(CAV) |
| 8 | 0.41300 | ---- | 12.3 | 9.9 | | ---- | 22.2 | ---- | 47.6 | ---- | 25.4 | H(CAV) |
| 9 | 0.52000 | ---- | 13.4 | 10.0 | | ---- | 23.4 | ---- | 46.0 | ---- | 22.6 | H(CAV) |
| 10 | 4.70400 | ---- | 6.5 | 10.1 | | ---- | 16.6 | ---- | 46.0 | ---- | 29.4 | H(CAV) |
| 11 | 12.23000 | ---- | 14.6 | 10.4 | | ---- | 25.0 | ---- | 50.0 | ---- | 25.0 | H(CAV) |
| 12 | 26.99000 | ---- | 11.4 | 10.5 | | ---- | 21.9 | ---- | 50.0 | ---- | 28.1 | H(CAV) |



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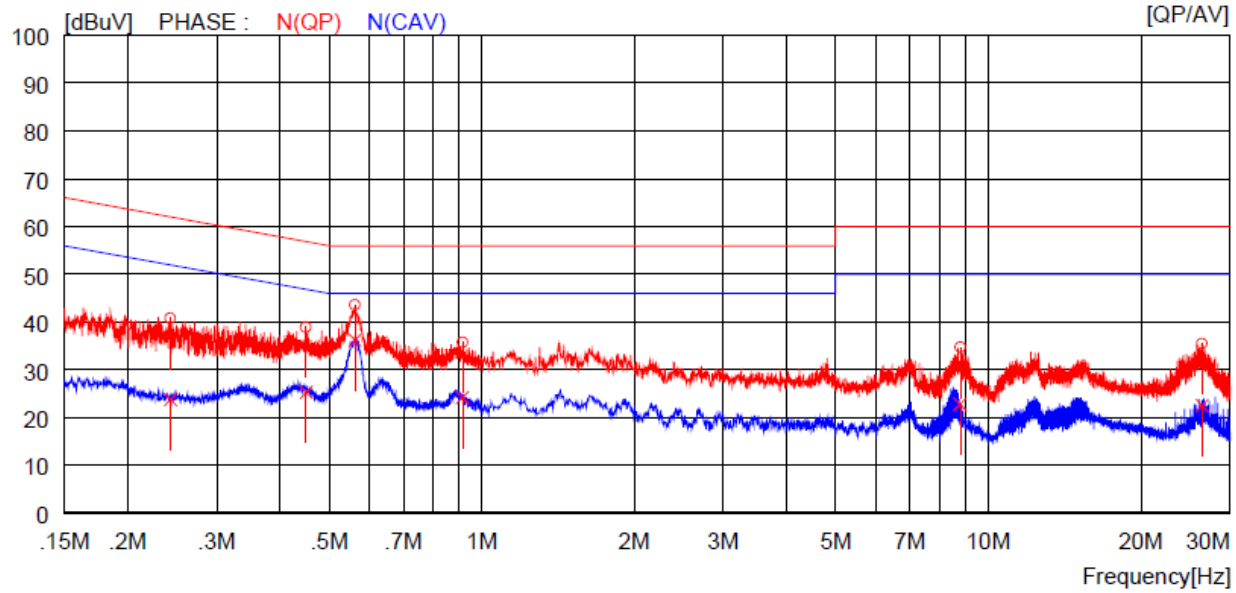
-. Tested Line : NEUTRAL LINE




| NO | FREQ | READING QP [dBuV] | READING AV [dBuV] | C.FACTOR QP [dB] | C.FACTOR AV [dB] | RESULT QP [dBuV] | RESULT AV [dBuV] | LIMIT QP [dBuV] | LIMIT AV [dBuV] | MARGIN QP [dB] | MARGIN AV [dB] | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.24300 | 30.9 | ---- | 9.9 | | 40.8 | ---- | 62.0 | ---- | 21.2 | ---- | N(QP) |
| 2 | 0.45000 | 29.0 | ---- | 9.9 | | 38.9 | ---- | 56.9 | ---- | 18.0 | ---- | N(QP) |
| 3 | 0.56200 | 33.6 | ---- | 10.0 | | 43.6 | ---- | 56.0 | ---- | 12.4 | ---- | N(QP) |
| 4 | 0.91700 | 25.8 | ---- | 10.0 | | 35.8 | ---- | 56.0 | ---- | 20.2 | ---- | N(QP) |
| 5 | 8.81000 | 24.4 | ---- | 10.3 | | 34.7 | ---- | 60.0 | ---- | 25.3 | ---- | N(QP) |
| 6 | 26.43000 | 25.0 | ---- | 10.5 | | 35.5 | ---- | 60.0 | ---- | 24.5 | ---- | N(QP) |
| 7 | 0.24300 | ---- | 13.9 | | 9.9 | ---- | 23.8 | ---- | 52.0 | ---- | 28.2 | N(CAV) |
| 8 | 0.45000 | ---- | 15.4 | | 9.9 | ---- | 25.3 | ---- | 46.9 | ---- | 21.6 | N(CAV) |
| 9 | 0.56200 | ---- | 26.2 | | 10.0 | ---- | 36.2 | ---- | 46.0 | ---- | 9.8 | N(CAV) |
| 10 | 0.91700 | ---- | 14.2 | | 10.0 | ---- | 24.2 | ---- | 46.0 | ---- | 21.8 | N(CAV) |
| 11 | 8.81000 | ---- | 12.5 | | 10.3 | ---- | 22.8 | ---- | 50.0 | ---- | 27.2 | N(CAV) |
| 12 | 26.43000 | ---- | 12.0 | | 10.5 | ---- | 22.5 | ---- | 50.0 | ---- | 27.5 | N(CAV) |

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

**Tested by: Jun-Hui, Lee / Senior Engineer**



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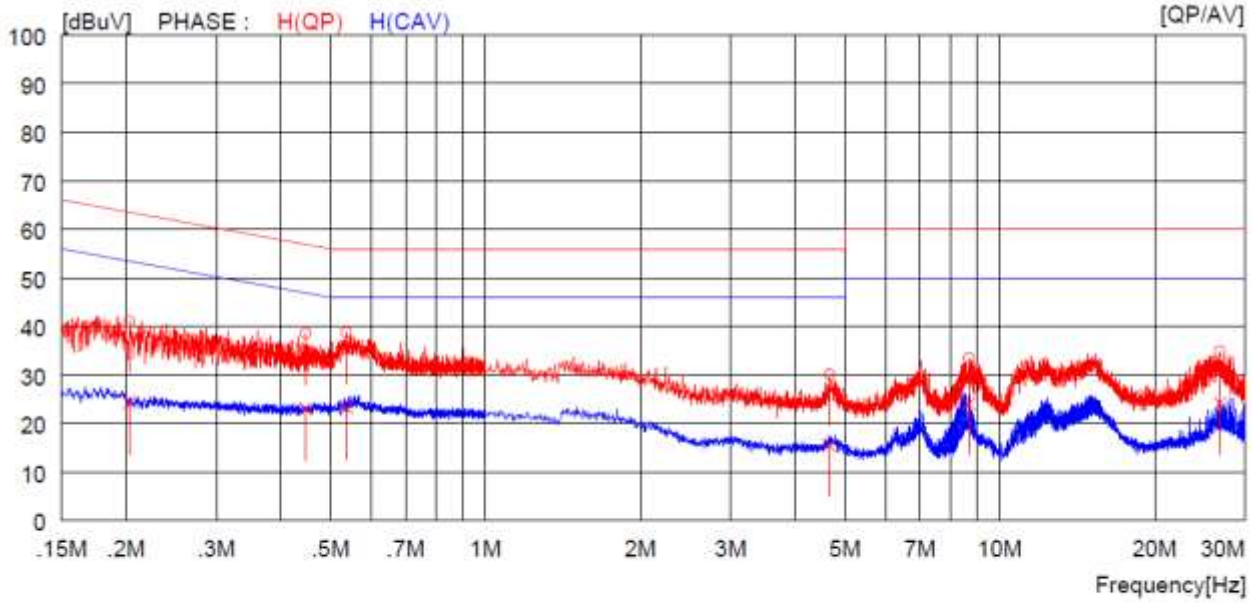
### 14.4.4 Test data for 5 725 MHz ~ 5 850 MHz Band

-. Test Date : March 08, 2016

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE




| NO | FREQ | READING QP [dBuV] | READING AV [dBuV] | C.FACTOR QP [dB] | C.FACTOR AV [dB] | RESULT QP [dBuV] | RESULT AV [dBuV] | LIMIT QP [dBuV] | LIMIT AV [dBuV] | MARGIN QP [dB] | MARGIN AV [dB] | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | | | | | | | | | | | |
| 1 | 0.20300 | 31.2 | ---- | 9.9 | | 41.1 | ---- | 63.5 | ---- | 22.4 | ---- | H(QP) |
| 2 | 0.44700 | 28.6 | ---- | 9.9 | | 38.5 | ---- | 56.9 | ---- | 18.4 | ---- | H(QP) |
| 3 | 0.53700 | 28.8 | ---- | 10.0 | | 38.8 | ---- | 56.0 | ---- | 17.2 | ---- | H(QP) |
| 4 | 4.66400 | 20.0 | ---- | 10.1 | | 30.1 | ---- | 56.0 | ---- | 25.9 | ---- | H(QP) |
| 5 | 8.71500 | 23.2 | ---- | 10.3 | | 33.5 | ---- | 60.0 | ---- | 26.5 | ---- | H(QP) |
| 6 | 26.81000 | 24.4 | ---- | 10.5 | | 34.9 | ---- | 60.0 | ---- | 25.1 | ---- | H(QP) |
| 7 | 0.20300 | ---- | 14.4 | 9.9 | | ---- | 24.3 | ---- | 53.5 | ---- | 29.2 | H(CAV) |
| 8 | 0.44700 | ---- | 13.1 | 9.9 | | ---- | 23.0 | ---- | 46.9 | ---- | 23.9 | H(CAV) |
| 9 | 0.53700 | ---- | 13.2 | 10.0 | | ---- | 23.2 | ---- | 46.0 | ---- | 22.8 | H(CAV) |
| 10 | 4.66400 | ---- | 5.4 | 10.1 | | ---- | 15.5 | ---- | 46.0 | ---- | 30.5 | H(CAV) |
| 11 | 8.71500 | ---- | 13.8 | 10.3 | | ---- | 24.1 | ---- | 50.0 | ---- | 25.9 | H(CAV) |
| 12 | 26.81000 | ---- | 13.7 | 10.5 | | ---- | 24.2 | ---- | 50.0 | ---- | 25.8 | H(CAV) |

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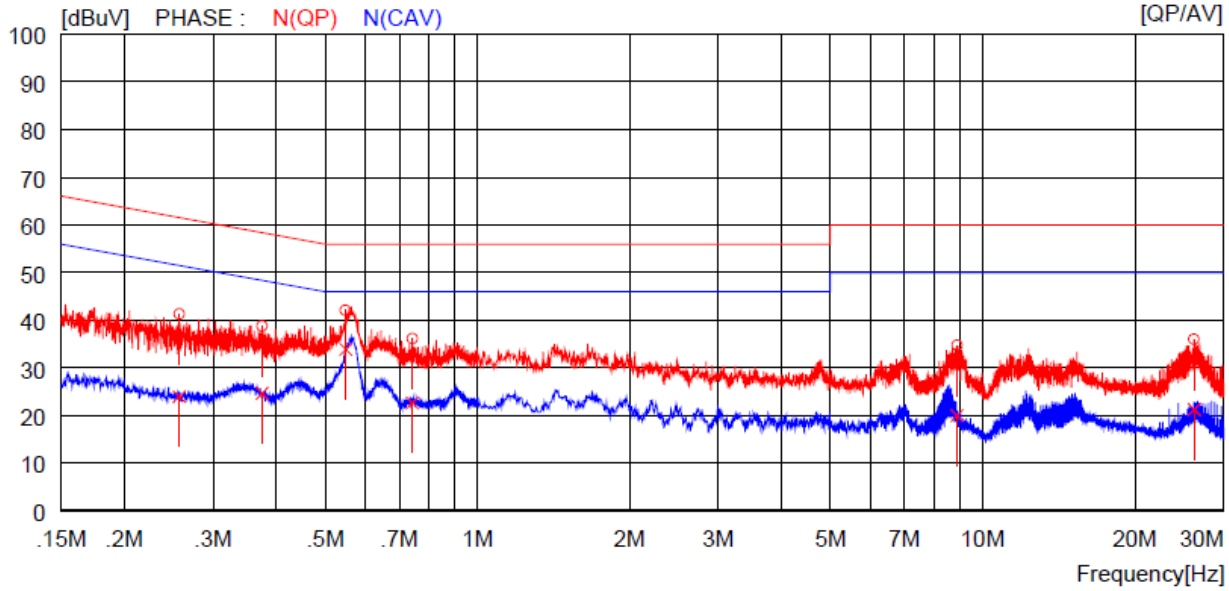
-. Tested Line : NEUTRAL LINE




| NO | FREQ | READING QP [dBuV] | READING AV [dBuV] | C.FACTOR QP [dB] | C.FACTOR AV [dBuV] | RESULT QP [dBuV] | RESULT AV [dBuV] | LIMIT QP [dBuV] | LIMIT AV [dBuV] | MARGIN QP | MARGIN AV | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.25700 | 31.4 | ---- | 9.9 | | 41.3 | ---- | 61.5 | ---- | 20.2 | ---- | N(QP) |
| 2 | 0.37500 | 28.9 | ---- | 9.9 | | 38.8 | ---- | 58.4 | ---- | 19.6 | ---- | N(QP) |
| 3 | 0.54900 | 32.0 | ---- | 10.0 | | 42.0 | ---- | 56.0 | ---- | 14.0 | ---- | N(QP) |
| 4 | 0.74400 | 26.1 | ---- | 10.0 | | 36.1 | ---- | 56.0 | ---- | 19.9 | ---- | N(QP) |
| 5 | 8.90500 | 24.4 | ---- | 10.3 | | 34.7 | ---- | 60.0 | ---- | 25.3 | ---- | N(QP) |
| 6 | 26.24000 | 25.5 | ---- | 10.5 | | 36.0 | ---- | 60.0 | ---- | 24.0 | ---- | N(QP) |
| 7 | 0.25700 | ---- | 14.1 | 9.9 | | ---- | 24.0 | ---- | 51.5 | ---- | 27.5 | N(CAV) |
| 8 | 0.37500 | ---- | 14.8 | 9.9 | | ---- | 24.7 | ---- | 48.4 | ---- | 23.7 | N(CAV) |
| 9 | 0.54900 | ---- | 23.9 | 10.0 | | ---- | 33.9 | ---- | 46.0 | ---- | 12.1 | N(CAV) |
| 10 | 0.74400 | ---- | 12.7 | 10.0 | | ---- | 22.7 | ---- | 46.0 | ---- | 23.3 | N(CAV) |
| 11 | 8.90500 | ---- | 9.7 | 10.3 | | ---- | 20.0 | ---- | 50.0 | ---- | 30.0 | N(CAV) |
| 12 | 26.24000 | ---- | 10.8 | 10.5 | | ---- | 21.3 | ---- | 50.0 | ---- | 28.7 | N(CAV) |

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

**Tested by: Jun-Hui, Lee / Senior Engineer**



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# 15 DYNAMIC FREQUENCY SELECTION (DFS)

## 15.1 Operating environment

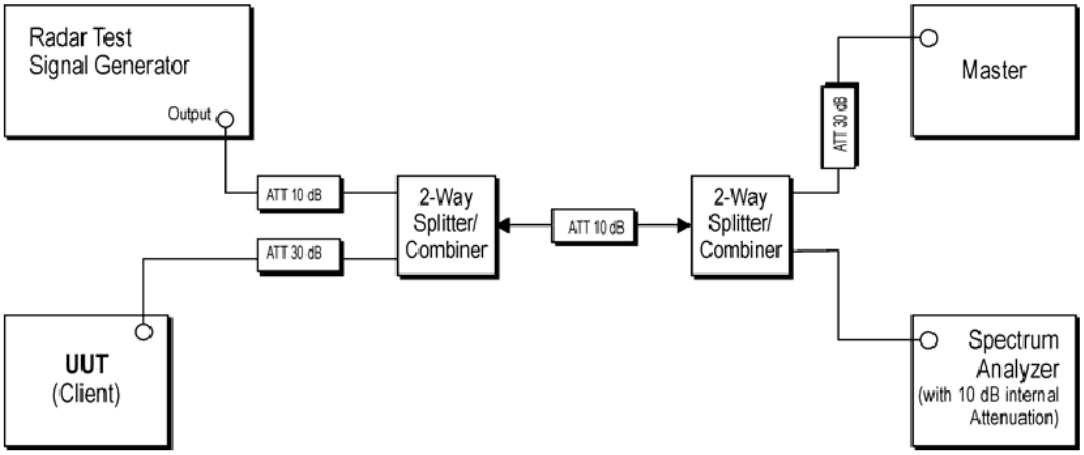
Temperature : 23 °C

Relative humidity : 47 % R.H.

## 15.2 Test set-ups

The FCC 06-96 and RSS-210 A9.3 describes a conducted test setup. A conducted test setup was user this testing. Figure 1 shows the typical test setup. Each one channel selected between 5 250 MHz and 5 350 MHz, 5 470 MHz and 5 725 MHz is chosen for the testing.

Figure 1. Setup for Client with injection at the Master



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### 15.3 DFS Test Signals

**Table 5 – Short Pulse Radar Test Waveforms**

| Radar Type | Pulse Width (µsec) | PRI (µsec) | Number of Pulses | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|---|---|---|---|---|---|
| 0 | 1 | 1428 | 18 | See Note 1 | See Note 1 |
| 1 | 1 | Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a | Roundup $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{PRI_{\mu sec}}\right)\right\}$ | 60% | 30 |
| | | Test B: 15 unique PRI values randomly selected within the range of 518-3066 µ sec, with a minimum increment of 1 µ sec, excluding PRI values selected in Test A | | | |
| 2 | 1-5 | 150-230 | 23-29 | 60% | 30 |
| 3 | 6-10 | 200-500 | 16-18 | 60% | 30 |
| 4 | 11-20 | 200-500 | 12-16 | 60% | 30 |
| Aggregate (Radar Types 1-4) | | | | 80% | 120 |

**Table 6 – Long Pulse Radar Test Waveform**

| Radar Type | Pulse Width (µsec) | Chirp Width (MHz) | PRI (µsec) | Number of Pulses per *Burst* | Number of *Bursts* | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|---|---|---|---|---|---|---|---|
| 5 | 50-100 | 5-20 | 1000-2000 | 1-3 | 8-20 | 80% | 30 |



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## 15.4 Technical Requirement Specification

**Table 1: Applicability of DFS Requirements Prior to Use of a Channel**

| Requirement | Operational Mode | | |
|---|---|---|---|
| | Master | Client (without DFS ) | Client (with DFS ) |
| *Non-Occupancy Period* | Yes | Not required | Yes |
| *DFS Detection Threshold* | Yes | Not required | Yes |
| *Channel Availability Check Time* | Yes | Not required | Not required |
| *Uniform Spreading* | Yes | Not required | Not required |
| *U-NII Detection Bandwidth* | Yes | Not required | Yes |

**Table 2: Applicability of DFS requirements during normal operation**

| Requirement | Operational Mode | | |
|---|---|---|---|
| | Master | Client (without DFS) | Client (with DFS) |
| *DFS Detection Threshold* | Yes | Not required | Yes |
| *Channel Closing Transmission Time* | Yes | Yes | Yes |
| *Channel Move Time* | Yes | Yes | Yes |
| *U-NII Detection Bandwidth* | Yes | Not required | Yes |

## 15.5 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal. (Interval) |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Jul. 30, 2014 (1Y) |
| ■ - | D-05180-2 | RLC Electronis Inc. | Combiner | 0813 | Apr. 29, 2014 (1Y) |
| ■ - | 11636B | Hewlett Packard | Combiner | 12268 | Nov. 08, 2014 (1Y) |
| ■ - | SMJ100A | R/S | Signal Generator | 101038 | Nov. 08, 2014 (1Y) |
| ■ - | DRP-305DN | DIGITAL Elec. | DC Power supply | 4030195 | Sep. 03, 2014 (1Y) |
| ■ | AIR-AP1252AG-K-K9 | CISCO | AP | FGL1439Z0KE | N/A |

All test equipment used is calibrated on a regular basis.


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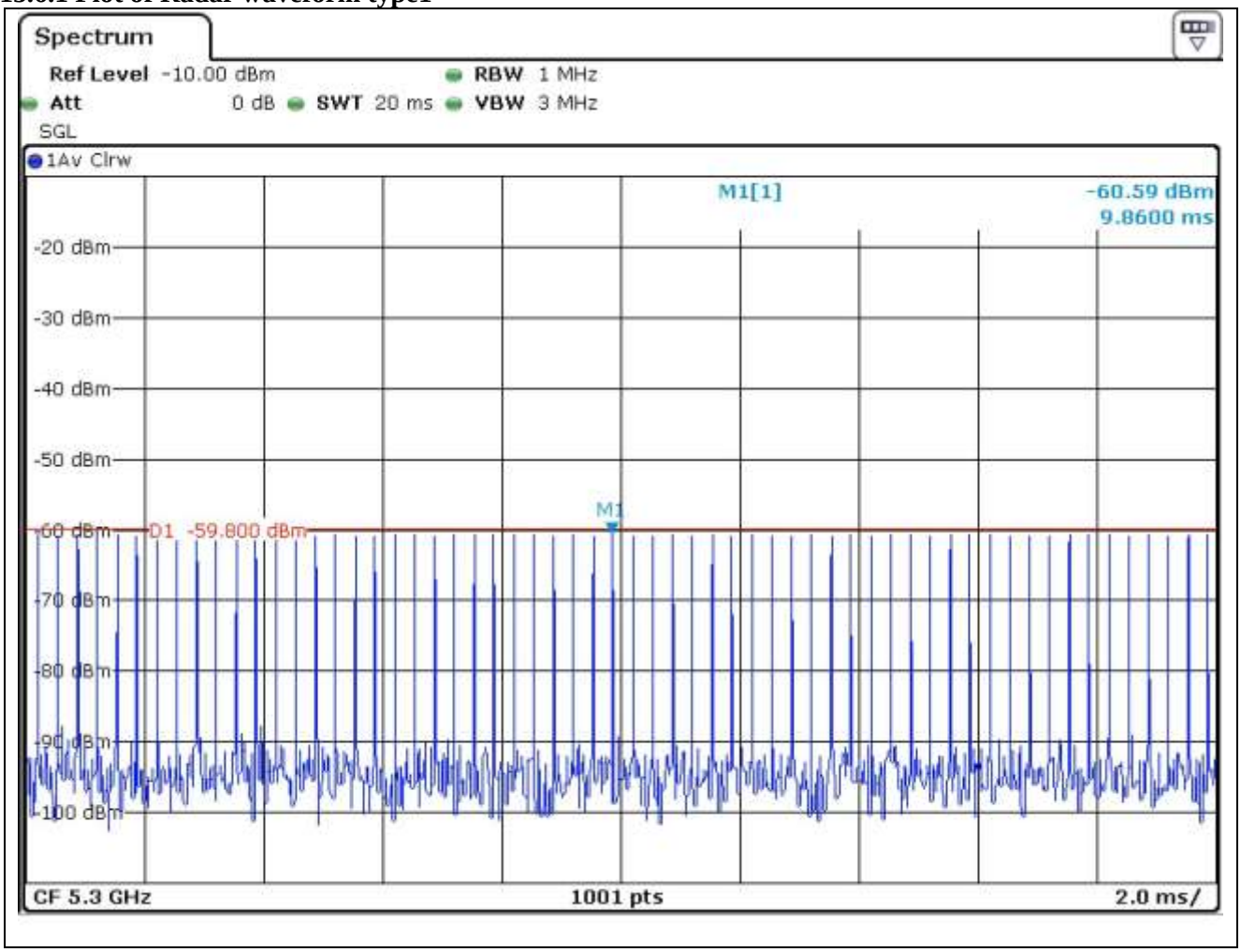
## 15.6 Test data for 5 250 MHz ~ 5 350 MHz Band

-. Test Date : March 10, 2015

| Frequency (MHz) | Channel move time(s) | | Channel closing transmission time(ms) | |
|---|---|---|---|---|
| | Measured | Limit | Measured | Limit |
| 5 300 | 0.152 | 10 | 0 | 60 |

### 15.6.1 Plot of Radar waveform type1




**Note: The calibrated conducted DFS detection threshold level is set to -59.5 dBm (-62+1+1.00=-60.00)**

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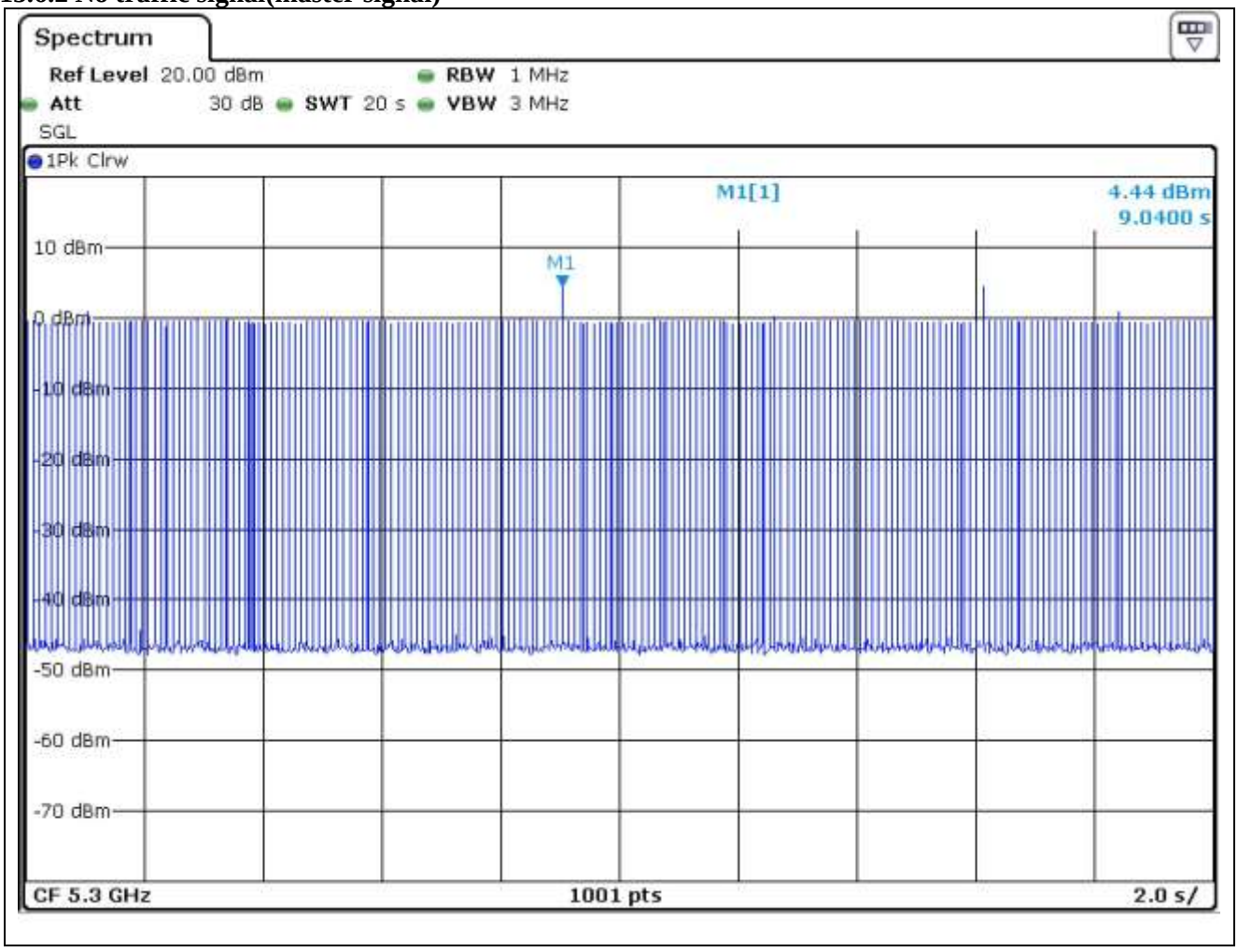
### 15.6.2 No traffic signal(master signal)



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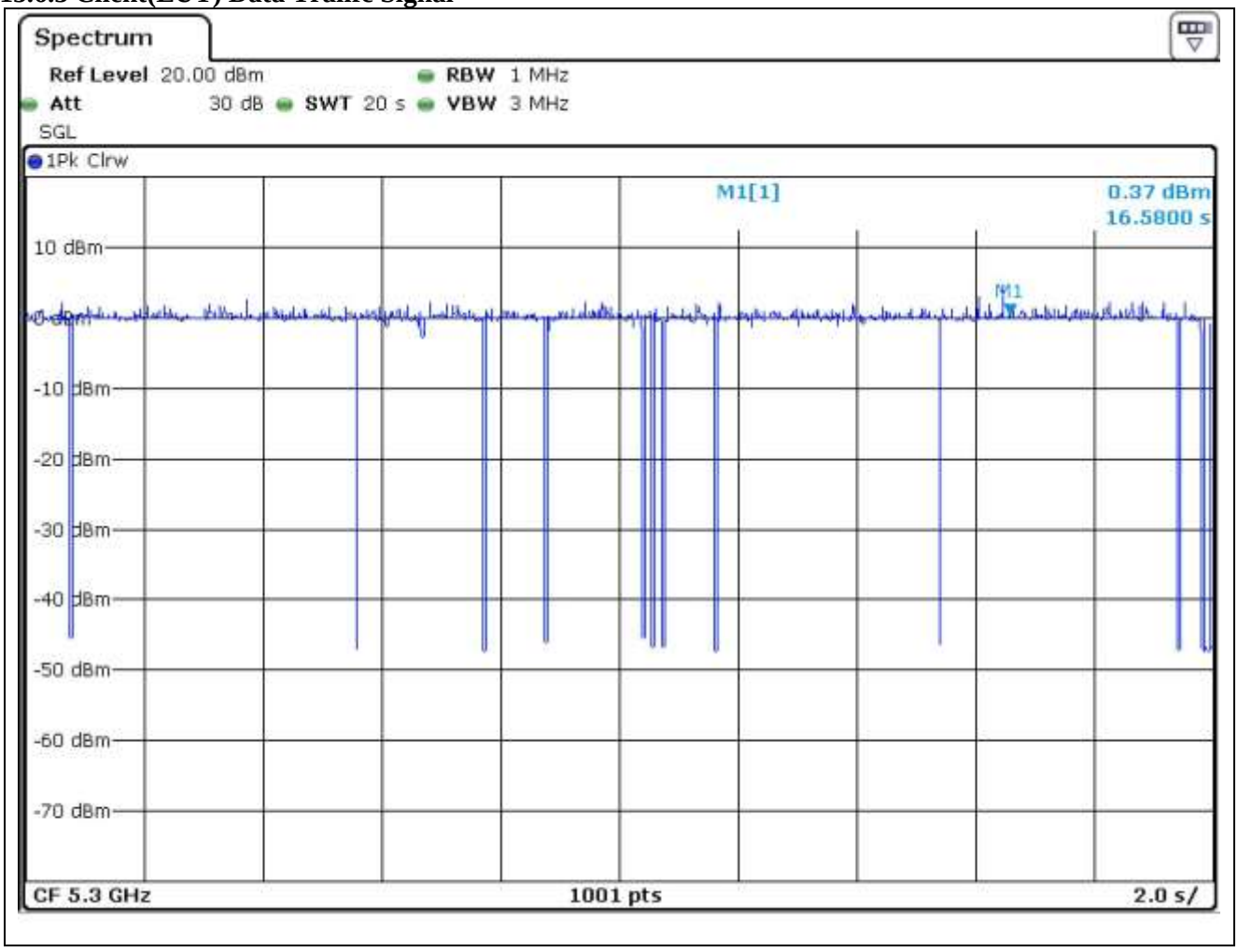
### 15.6.3 Client(EUT) Data Traiifc Signal



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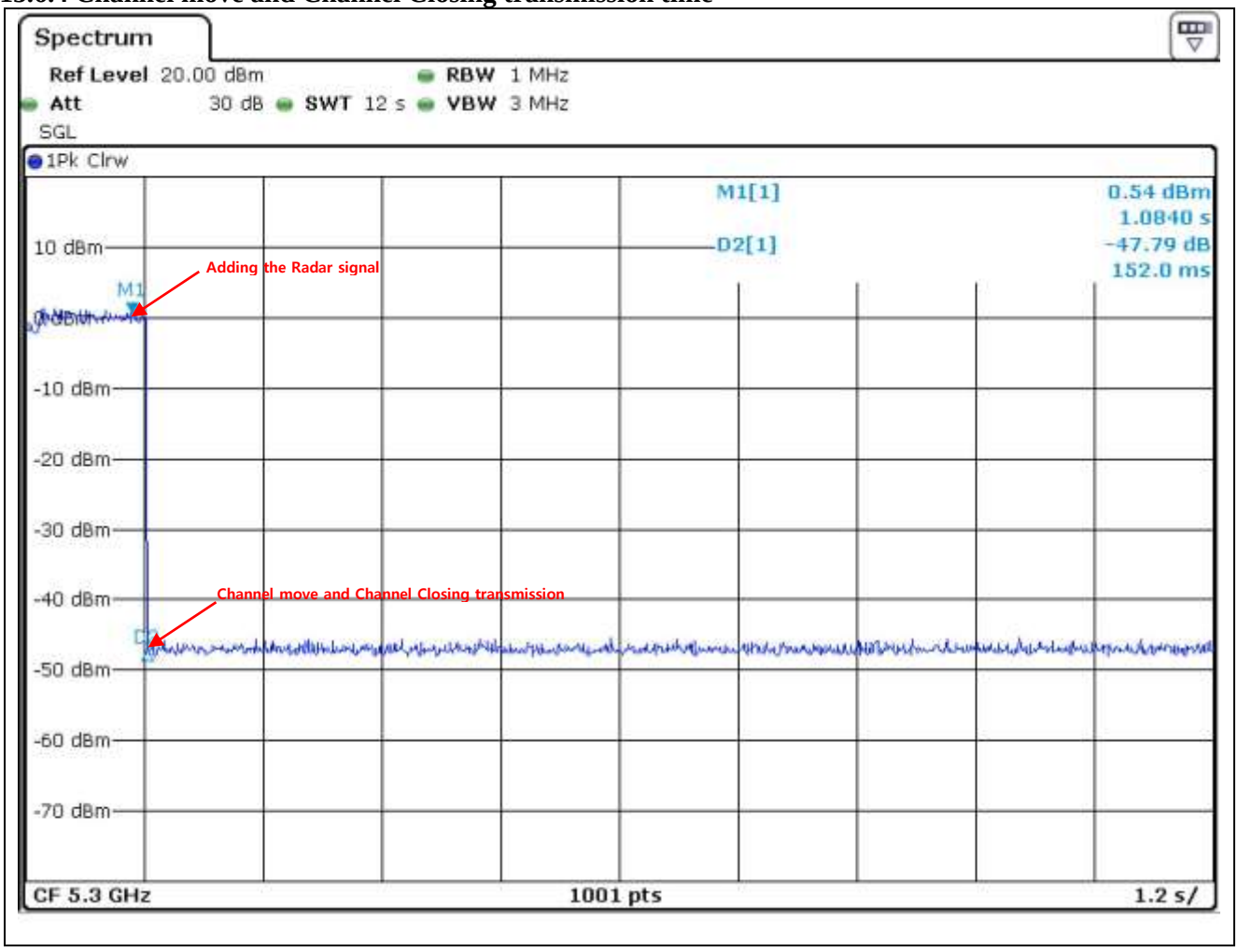
### 15.6.4 Channel move and Channel Closing transmission time



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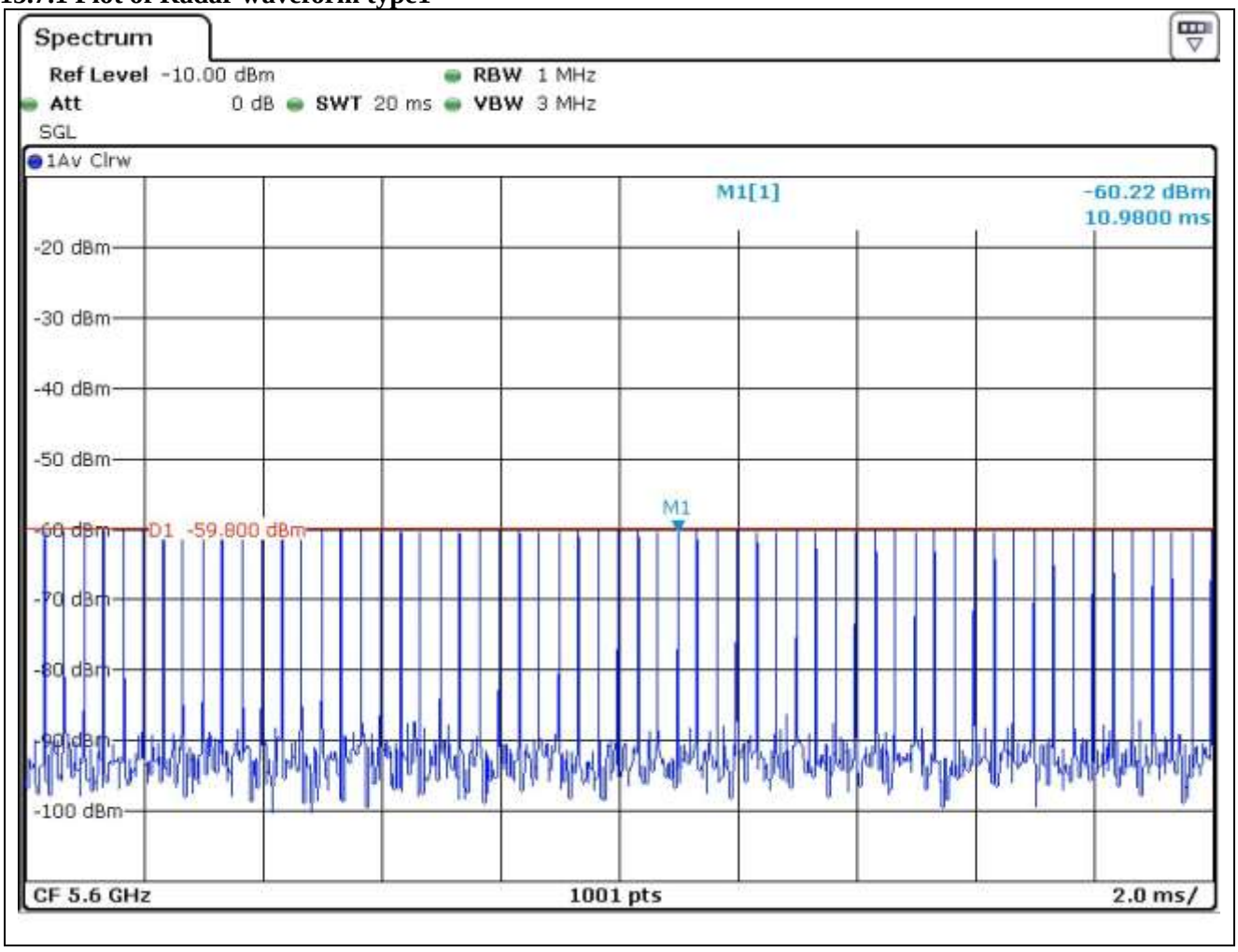
## 15.7 Test data for 5 470 MHz ~ 5 725 MHz Band

-. Test Date : March 11, 2015

| Frequency (MHz) | Channel move time(s) | | Channel closing transmission time(ms) | |
|---|---|---|---|---|
| | Measured | Limit | Measured | Limit |
| 5 600 | 0.152 | 10 | 0 | 60 |

### 15.7.1 Plot of Radar waveform type1




**Note: The calibrated conducted DFS detection threshold level is set to -59.5 dBm (-62+1+1.01=-59.99)**



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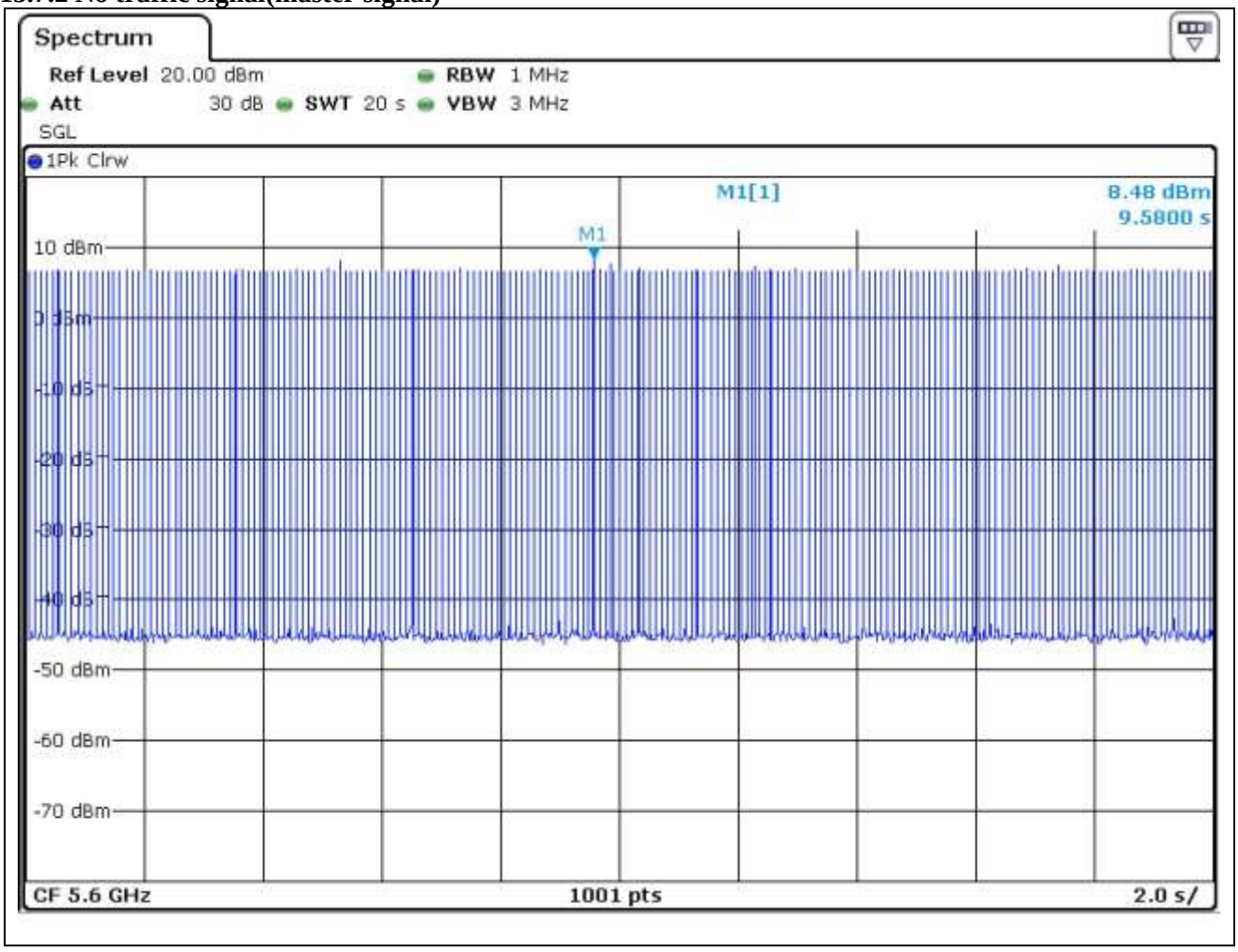
### 15.7.2 No traffic signal(master signal)



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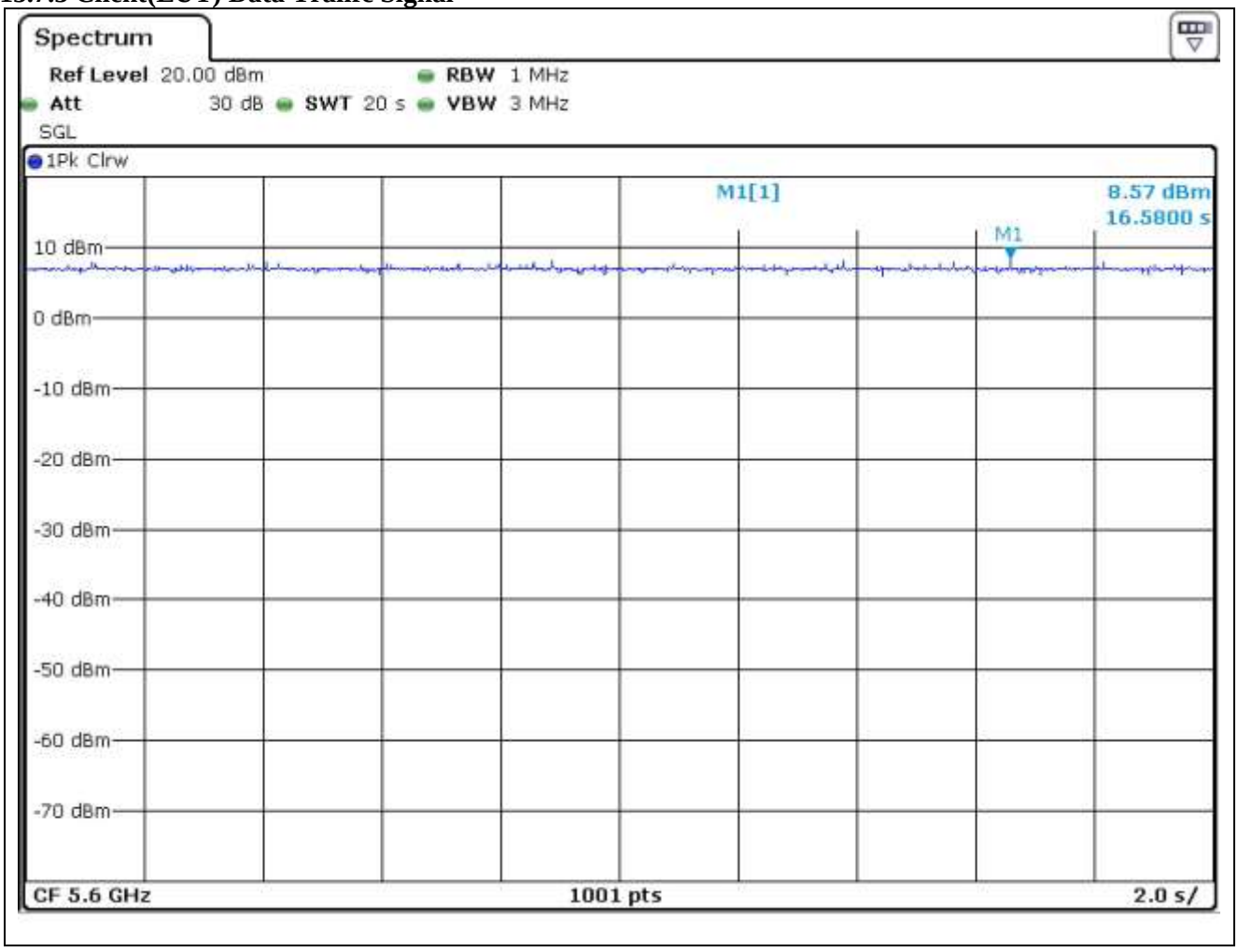
### 15.7.3 Client(EUT) Data Traiifc Signal



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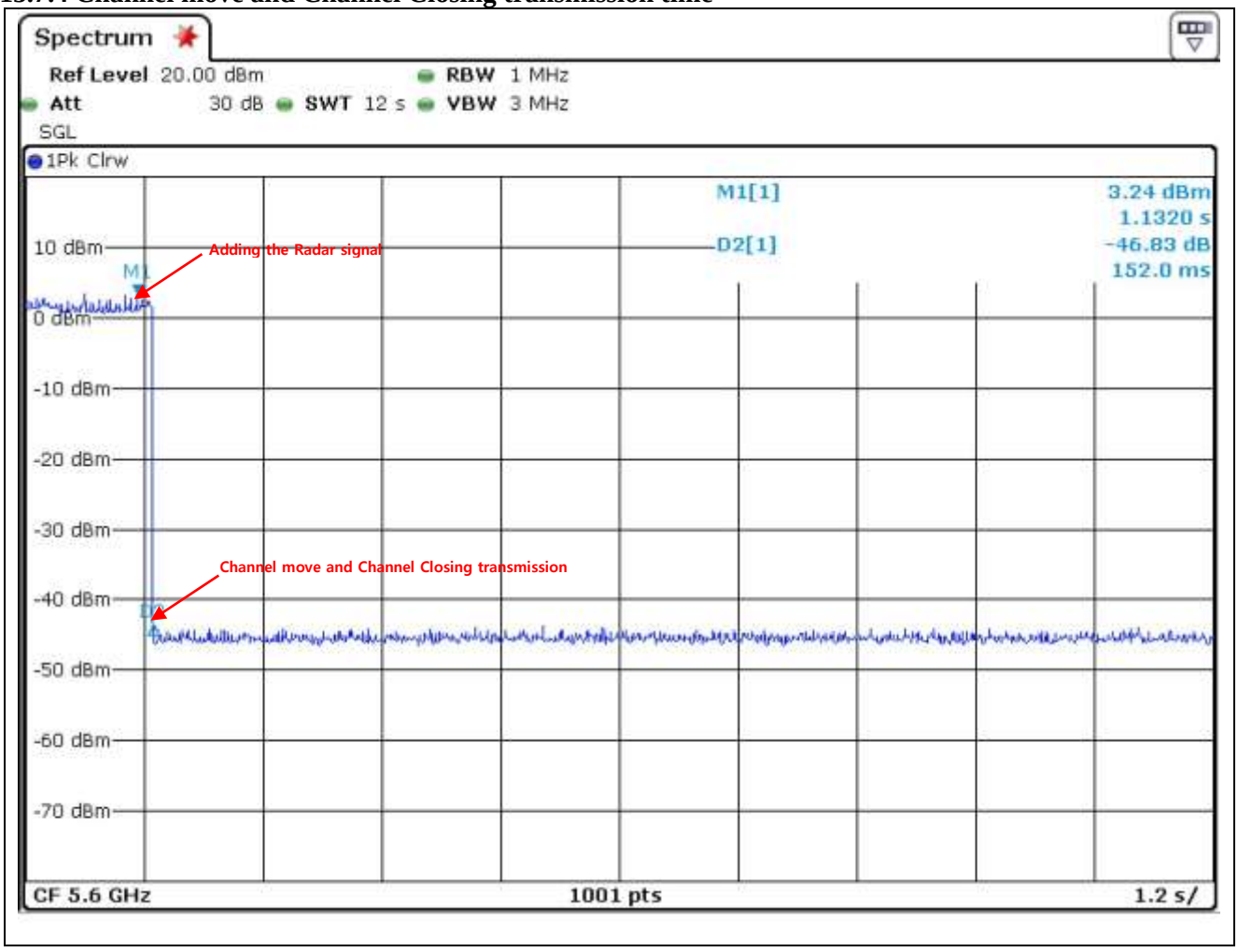
### 15.7.4 Channel move and Channel Closing transmission time



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