

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LICENSED TRANSMITTER

Test Report No. : W165R-D018

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 : 36 pages (including this page)

Date of Incoming : February 01, 2016

Date of issue : May 12, 2016

## SUMMARY

The equipment complies with the regulation; **FCC Part 24 Subpart E**

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.

Prepared by:



Jae-Ho, Lee / Chief Engineer  
ONETECH Corp.

Approved by:



Sung-Ik, Han / Managing Director  
ONETECH Corp.

## CONTENTS

|                                                                         | PAGE      |
|-------------------------------------------------------------------------|-----------|
| <b>1. VERIFICATION OF COMPLIANCE .....</b>                              | <b>5</b>  |
| <b>2. TEST SUMMARY .....</b>                                            | <b>6</b>  |
| 2.1 TEST ITEMS AND RESULTS .....                                        | 6         |
| 2.2 ADDITIONS, DEVIATIONS, EXCLUSIONS FROM STANDARDS.....               | 6         |
| 2.3 RELATED SUBMITTAL(S) / GRANT(S) .....                               | 6         |
| 2.4 PURPOSE OF THE TEST .....                                           | 6         |
| 2.5 TEST METHODOLOGY.....                                               | 6         |
| 2.6 TEST FACILITY.....                                                  | 7         |
| <b>3. GENERAL INFORMATION .....</b>                                     | <b>8</b>  |
| 3.1 PRODUCT DESCRIPTION.....                                            | 8         |
| 3.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT..... | 8         |
| 3.3 PERIPHERAL EQUIPMENT .....                                          | 8         |
| 3.4 MODE OF OPERATION DURING THE TEST .....                             | 9         |
| <b>4. EUT MODIFICATIONS.....</b>                                        | <b>9</b>  |
| <b>5. CONDUCTED POWER OF TRANSMITTER.....</b>                           | <b>10</b> |
| 5.1 OPERATING ENVIRONMENT .....                                         | 10        |
| 5.2 TEST SET-UP .....                                                   | 10        |
| 5.3 TEST EQUIPMENT USED .....                                           | 10        |
| 5.4 TEST DATA.....                                                      | 11        |
| <b>6. OCCUPIED BANDWIDTH.....</b>                                       | <b>12</b> |
| 6.1 OPERATING ENVIRONMENT .....                                         | 12        |
| 6.2 TEST SET-UP .....                                                   | 12        |
| 6.3 TEST EQUIPMENT USED .....                                           | 12        |
| 6.4 TEST DATA.....                                                      | 13        |
| <b>7. BAND EDGES COMPLIANCE.....</b>                                    | <b>17</b> |
| 7.1 OPERATING ENVIRONMENT .....                                         | 17        |
| 7.2 TEST SET-UP .....                                                   | 17        |
| 7.3 TEST EQUIPMENT USED .....                                           | 17        |
| 7.4 TEST DATA.....                                                      | 18        |

|                                                       |           |
|-------------------------------------------------------|-----------|
| <b>8. SPURIOUS EMISSION AT ANTENNA TERMINAL .....</b> | <b>22</b> |
| <b>8.1 OPERATING ENVIRONMENT .....</b>                | <b>22</b> |
| <b>8.2 TEST SET-UP .....</b>                          | <b>22</b> |
| <b>8.3 TEST EQUIPMENT USED .....</b>                  | <b>22</b> |
| <b>8.4 TEST DATA.....</b>                             | <b>23</b> |

### Revision History

| Issued Report No. | Issued Date  | Revisions     | Effect Section |
|-------------------|--------------|---------------|----------------|
| W165R-D018        | May 12, 2016 | Initial Issue | All            |
|                   |              |               |                |
|                   |              |               |                |

## 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  
 HOST MODEL NAME : ST100  
 HOST FCC ID : SS4ST100  
 MODULE MODEL NAME : MU739  
 MODULE FCC ID : QISMU739  
 SERIAL NUMBER : N/A  
 DATE : May 12, 2016

|                                                         |                              |
|---------------------------------------------------------|------------------------------|
| EQUIPMENT CLASS                                         | PCB-PCS Licensed Transmitter |
| EQUIPMENT DESCRIPTION                                   | Premium Tablet               |
| THIS REPORT CONCERNS                                    | Original Grant               |
| MEASUREMENT PROCEDURES                                  | ANSI C63.10: 2013            |
| TYPE OF EQUIPMENT TESTED                                | Pre-Production               |
| KIND OF EQUIPMENT<br>AUTHORIZATION REQUESTED            | Certification                |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | FCC Part 24 Subpart E        |
| MODIFICATIONS ON THE EQUIPMENT<br>TO ACHIEVE COMPLIANCE | No                           |
| 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.

## 2. TEST SUMMARY

### 2.1 Test items and results

| SECTION        | TEST ITEMS                            | RESULTS              |
|----------------|---------------------------------------|----------------------|
| 2.1046, 22.913 | Conducted Power of Transmitter        | Met the Limit / PASS |
| 2.1049         | Occupied Bandwidth                    | Met the Limit / PASS |
| 2.1051, 22.917 | Band Edges compliance                 | Met the Limit / PASS |
| 2.1051, 22.917 | Spurious Emission at Antenna Terminal | 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 Grant

### 2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

### 2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI/TIA-603-D 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

### 3. GENERAL INFORMATION

#### 3.1 Product Description

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

|                                                    |                                              |
|----------------------------------------------------|----------------------------------------------|
| DEVICE TYPE                                        | Premium Tablet                               |
| LIST OF EACH OSC. or CRY.<br>FREQ.(FREQ. >= 1 MHz) | 26 MHz                                       |
| EMISSION DESIGNATOR                                | GPRS, HSDPA, HSUPA                           |
| OPERATING<br>FREQUENCY                             | GPRS : 1 850.2 MHz ~ 1 909.8 MHz             |
|                                                    | HSDPA : 1 852.4 MHz ~ 1 907.6 MHz            |
|                                                    | HSUPA : 1 852.4 MHz ~ 1 907.6 MHz            |
| ANTENNA TYPE                                       | PIFA Antenna                                 |
| RATED SUPPLY VOLTAGE                               | DC 3.8 V                                     |
| EXTERNAL CONNECTOR                                 | Micro SD card slot, USIM card slot, USB, AUX |

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

-. None

#### 3.3 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          |

### 3.4 Mode of operation during the test

The EUT was received signal form signal generator and then each modulation was configured for maximum signal gain and bandwidth. The EUT was operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission. The applicant does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports on the EUT for radiated spurious emission testing.

For the above testing, following frequencies per channel were selected for each modulation.

- Mode

| Modulation | Channel | Frequency | Modulation | Channel | Frequency | Modulation | Channel | Frequency |
|------------|---------|-----------|------------|---------|-----------|------------|---------|-----------|
| GPRS       | Low     | 1 850.2   | HSDPA      | Low     | 1 852.4   | HSUPA      | Low     | 1 852.4   |
|            | Middle  | 1 880.0   |            | Middle  | 1 880.0   |            | Middle  | 1 880.0   |
|            | High    | 1 909.8   |            | High    | 1 907.6   |            | High    | 1 907.6   |

## 4. EUT MODIFICATIONS

-. None

## 5. Conducted Power of Transmitter

### 5.1 Operating environment

Temperature : 25 °C  
Relative humidity : 40 % R.H.

### 5.2 Test set-up



### 5.3 Test equipment used

|     | Model Number | Manufacturer | Description                  | Serial Number | Last Cal.          |
|-----|--------------|--------------|------------------------------|---------------|--------------------|
| ■ - | E5515C       | Agilent      | WIRELESS COMMUNICATIONS TEST | GB44350208    | Oct. 07, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

## 5.4 Test data

### 5.4.1 Test data for GSM1900

-. Test Date : May 12, 2016

-. Test Result : Pass

| CHANNEL | FREQUENCY<br>(MHz) | MEASURED VALUE<br>(dBm) | LIMIT<br>(dBm) | MARGIN<br>(dB) |
|---------|--------------------|-------------------------|----------------|----------------|
| LOW     | 1 850.2            | 29.64                   | 38.45          | 8.81           |
| MIDDLE  | 1 800.0            | 29.64                   | 38.45          | 8.81           |
| HIGH    | 1 909.8            | 29.60                   | 38.45          | 8.85           |

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

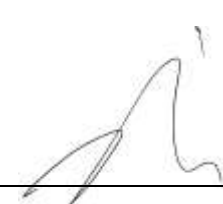
### 5.4.2 Test data for WCDMA(Band 2)

-. Test Date : May 12, 2016

-. Test Result : Pass

| CHANNEL | FREQUENCY<br>(MHz) | MEASURED<br>VALUE (dBm) | LIMIT<br>(dBm) | MARGIN<br>(dB) |
|---------|--------------------|-------------------------|----------------|----------------|
| LOW     | 1 852.4            | 23.15                   | 38.45          | 15.30          |
| MIDDLE  | 1 880.0            | 23.01                   | 38.45          | 15.44          |
| HIGH    | 1 907.6            | 23.07                   | 38.45          | 15.38          |

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

  
Tested by: Jun-Hui, Lee / Senior Engineer

## 6. Occupied Bandwidth

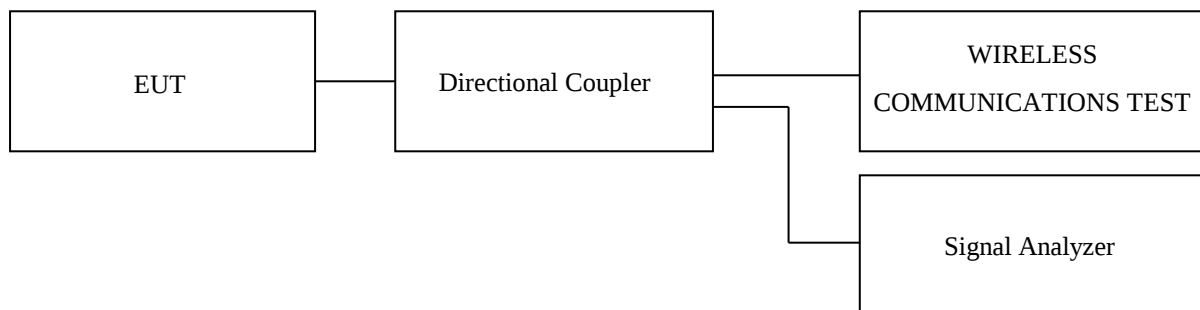
### 6.1 Operating environment

Temperature : 25 °C  
Relative humidity : 40 % R.H.

### 6.2 Test set-up

The emission bandwidth (×dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated × dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3× the resolution bandwidth. When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3×RBW.



### 6.3 Test equipment used

| Model Number  | Manufacturer    | Description                     | Serial Number | Last Cal.          |
|---------------|-----------------|---------------------------------|---------------|--------------------|
| ■ - FSV40     | Rohde & Schwarz | Signal Analyzer                 | 101009        | Jul. 22, 2015 (1Y) |
| ■ - E5515C    | Agilent         | WIRELESS<br>COMMUNICATIONS TEST | GB44350208    | Oct. 07, 2015 (1Y) |
| ■ - AAMCS-UDC | AA-MCS          | Directional Coupler             | 400           | Nov. 10, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

## 6.4 Test data

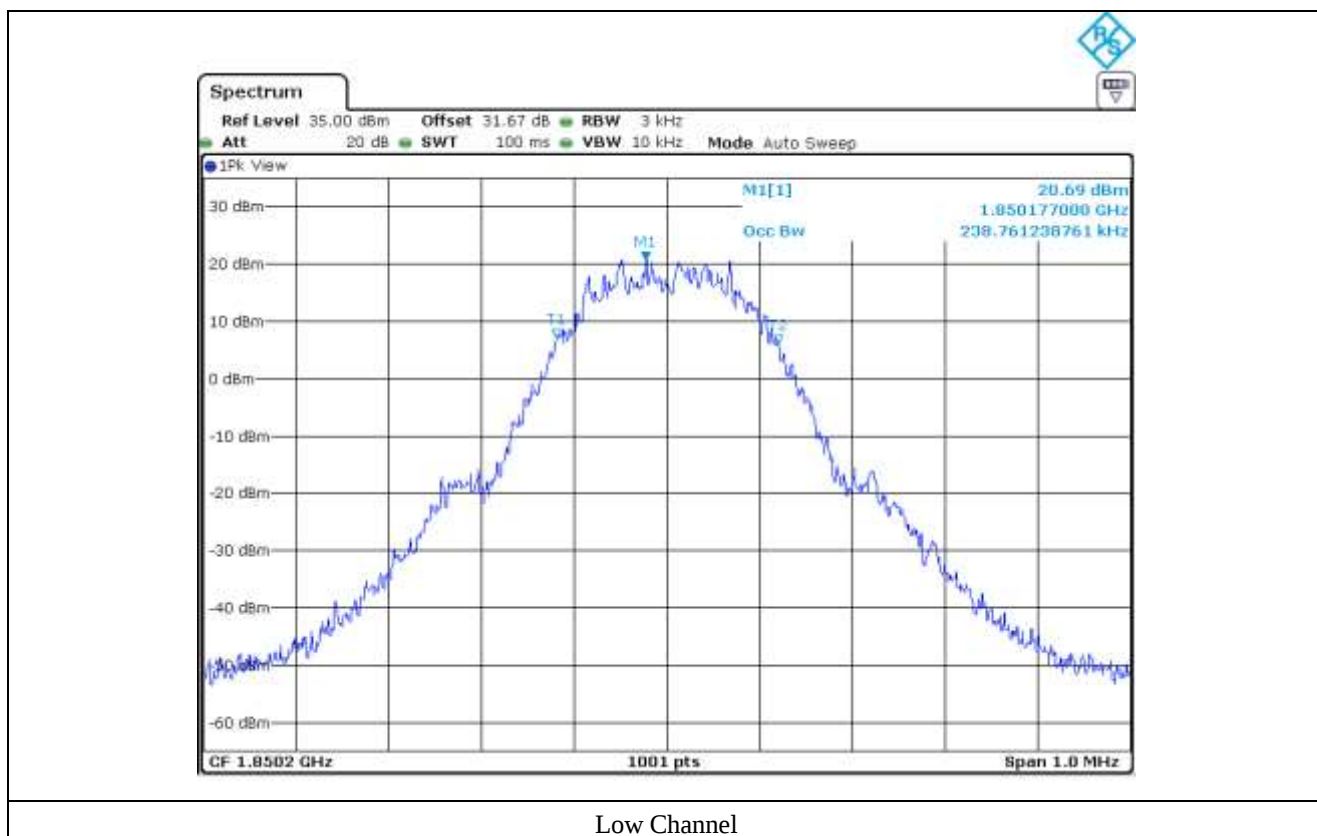
### 6.4.1 Test data for GSM1900

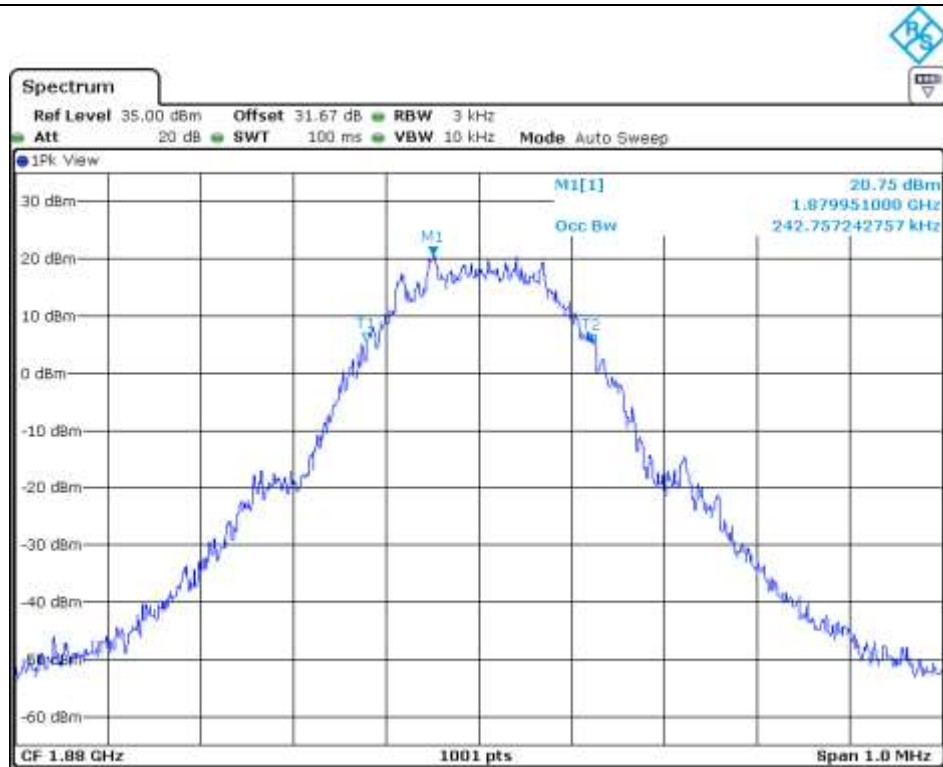
-. Test Date : May 12, 2016

-. Test Result : Pass

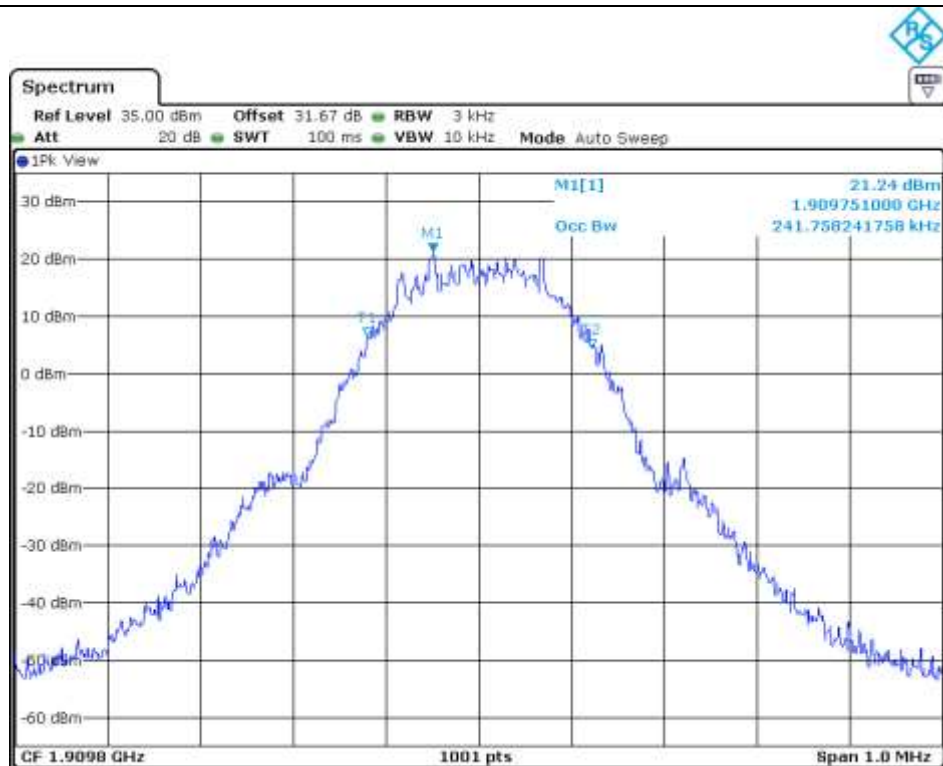
| CHANNEL | FREQUENCY(MHz) | 99% Occupied Bandwidth(kHz) |
|---------|----------------|-----------------------------|
| Low     | 1 850.2        | 238.76                      |
| Middle  | 1 880.0        | 242.76                      |
| High    | 1 909.8        | 241.76                      |

Tested by: Jun-Hui, Lee / Senior Engineer





Middle Channel



High Channel

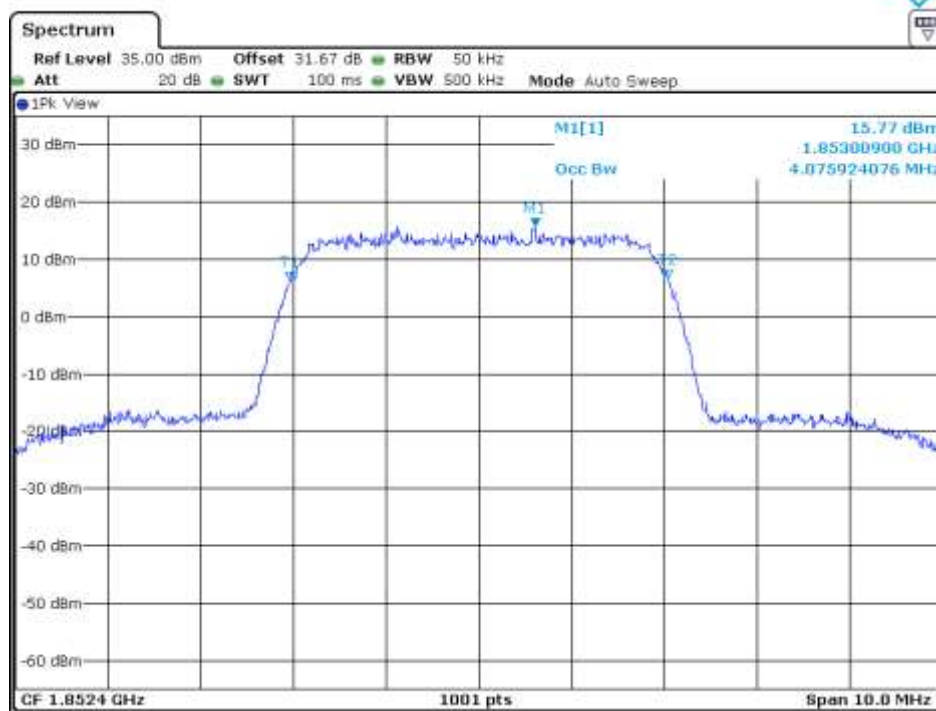
### 6.4.2 Test data for WCDMA(Band 2)

-. Test Date : May 12, 2016

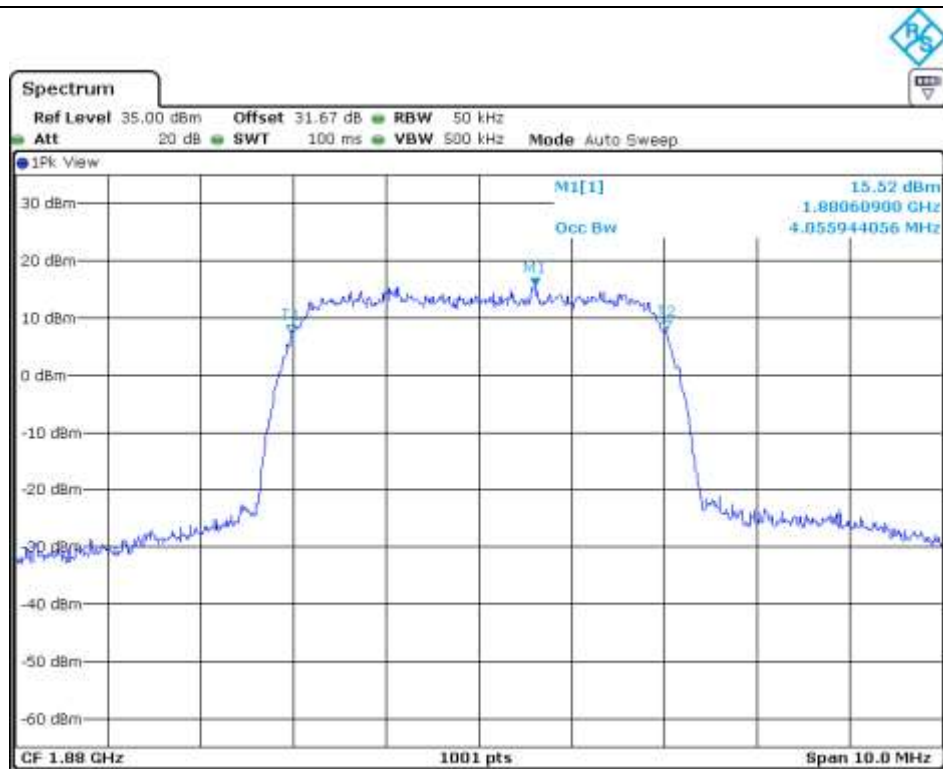
-. Test Result : Pass

| CHANNEL | FREQUENCY(MHz) | 99% Occupied Bandwidth(MHz) |
|---------|----------------|-----------------------------|
| Low     | 1 852.4        | 4.08                        |
| Middle  | 1 880.0        | 4.06                        |
| High    | 1 907.6        | 4.06                        |

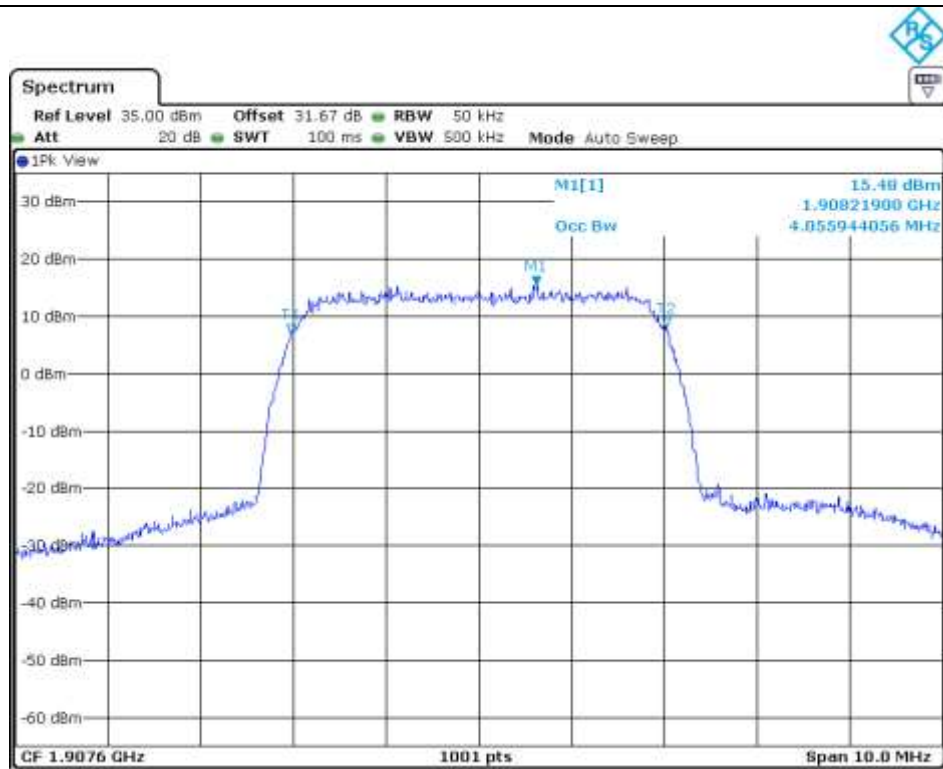
Tested by: Jun-Hui, Lee / Senior Engineer



Low Channel



Middle Channel



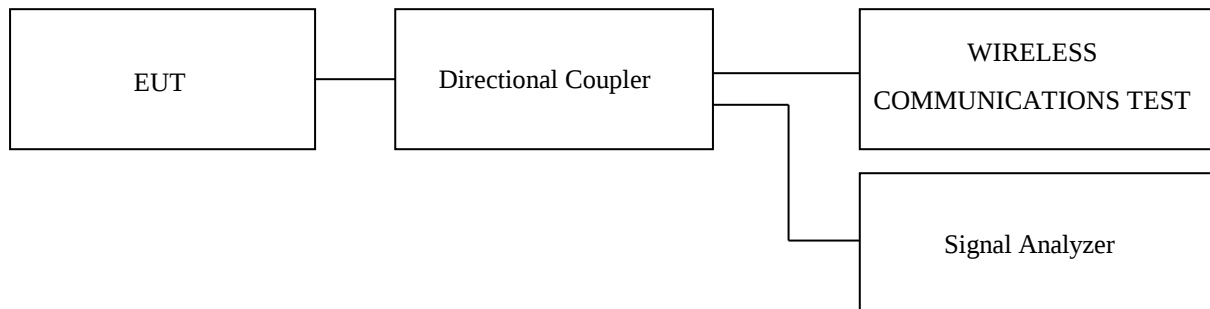
High Channel

## 7. Band Edges Compliance

### 7.1 Operating environment

Temperature : 25 °C  
Relative humidity : 40 % R.H.

### 7.2 Test set-up



### 7.3 Test equipment used

| Model Number  | Manufacturer    | Description                  | Serial Number | Last Cal.          |
|---------------|-----------------|------------------------------|---------------|--------------------|
| ■ - FSV40     | Rohde & Schwarz | Signal Analyzer              | 101009        | Jul. 22, 2015 (1Y) |
| ■ - E5515C    | Agilent         | WIRELESS COMMUNICATIONS TEST | GB44350208    | Oct. 07, 2015 (1Y) |
| ■ - AAMCS-UDC | AA-MCS          | Directional Coupler          | 400           | Nov. 10, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

## 7.4 Test data

### 7.4.1 Test data for GSM1900

-. Test Date : May 12, 2016

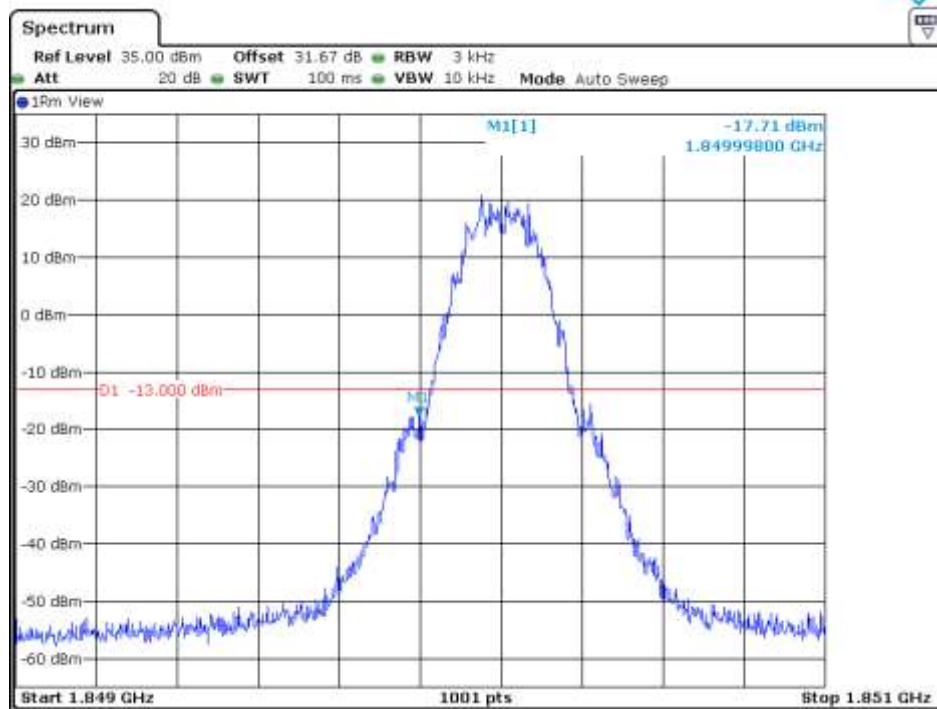
-. Test Result : Pass

| CHANNEL | FREQUENCY<br>(MHz) | Measured Value<br>(dBm) | LIMITS<br>(dBm) | MARGIN<br>(dB) |
|---------|--------------------|-------------------------|-----------------|----------------|
| LOW     | 1 850.00           | -17.71                  | -13.00          | 4.71           |
| HIGH    | 1 910.02           | -16.02                  | -13.00          | 3.02           |

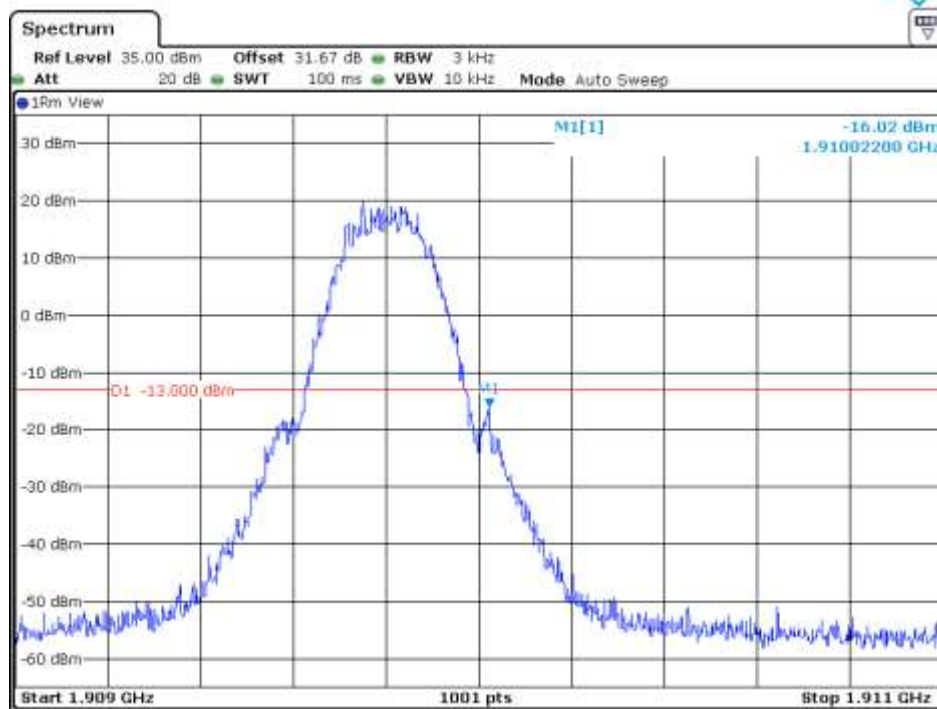
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)



Tested by: Jun-Hui, Lee / Senior Engineer



Low Channel



High Channel

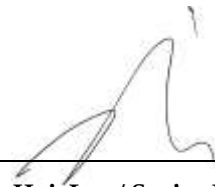
#### 7.4.2 Test data for WCDMA(Band 2)

-. Test Date : May 12, 2016

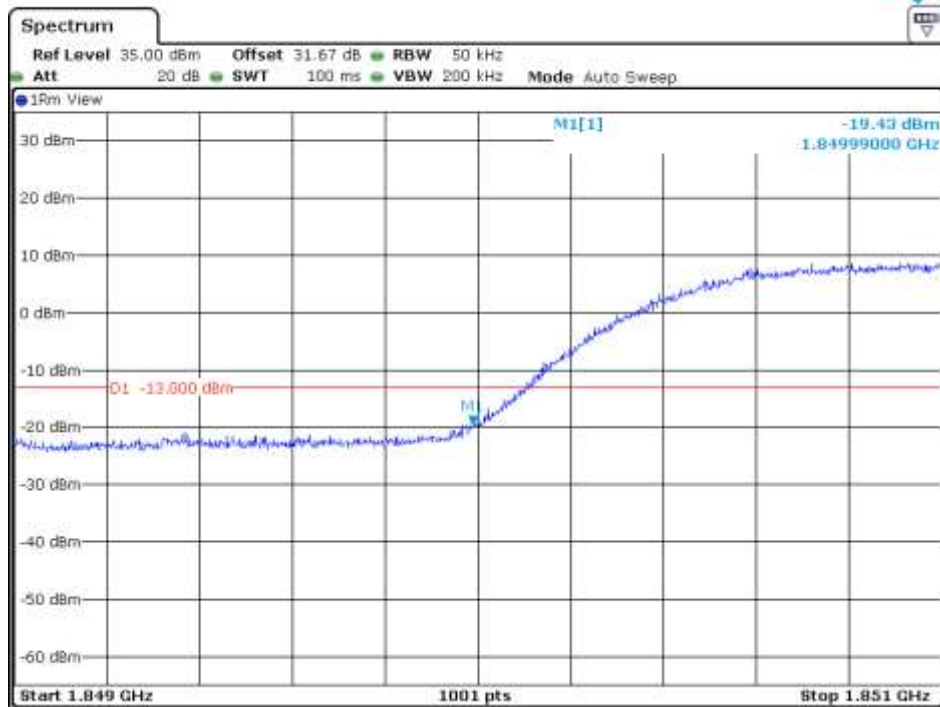
-. Test Result : Pass

| CHANNEL | FREQUENCY<br>(MHz) | Measured Value<br>(dBm) | LIMITS<br>(dBm) | MARGIN<br>(dB) |
|---------|--------------------|-------------------------|-----------------|----------------|
| LOW     | 1 849.99           | -19.43                  | -13.00          | 6.43           |
| HIGH    | 1 910.05           | -25.07                  | -13.00          | 12.07          |

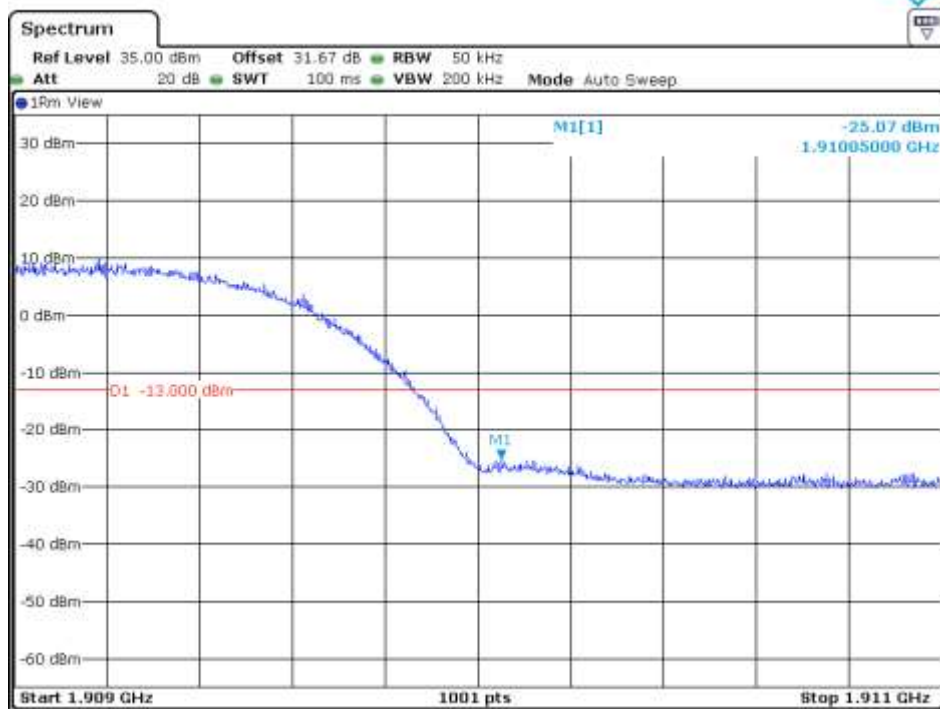
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)



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



Low Channel



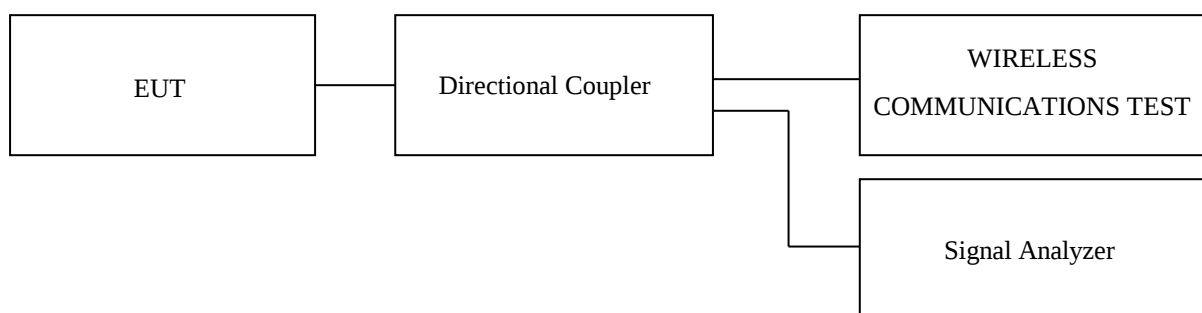
High Channel

## 8. Spurious Emission at Antenna Terminal

### 8.1 Operating environment

Temperature : 25 °C  
Relative humidity : 40 % R.H.

### 8.2 Test set-up



### 8.3 Test equipment used

| Model Number  | Manufacturer    | Description                  | Serial Number | Last Cal.          |
|---------------|-----------------|------------------------------|---------------|--------------------|
| ■ - FSV40     | Rohde & Schwarz | Signal Analyzer              | 101009        | Jul. 22, 2015 (1Y) |
| ■ - E5515C    | Agilent         | WIRELESS COMMUNICATIONS TEST | GB44350208    | Oct. 07, 2015 (1Y) |
| ■ - AAMCS-UDC | AA-MCS          | Directional Coupler          | 400           | Nov. 10, 2015 (1Y) |

All test equipment used is calibrated on a regular basis.

## 8.4 Test data

### 8.4.1 Test data for GSM1900

-. Test Date : May 12, 2016

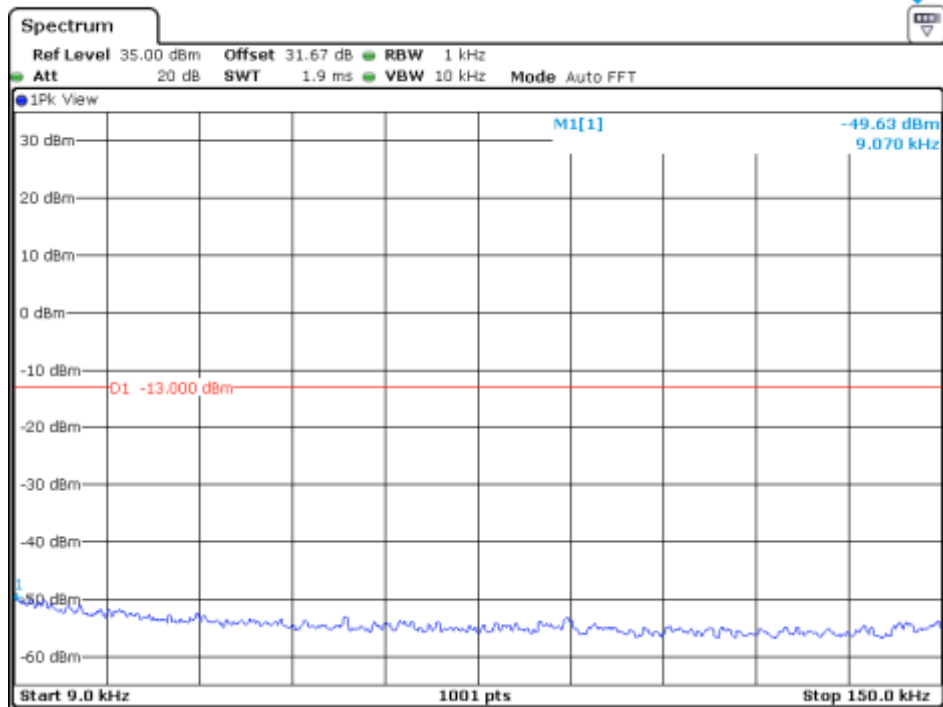
-. Test Result : Pass

| CHANNEL | FREQUENCY<br>(MHz) | Measured value<br>(dBm) | LIMITS<br>(dBm) | MARGIN<br>(dB) |
|---------|--------------------|-------------------------|-----------------|----------------|
| LOW     | 951.06             | -35.77                  | -13.00          | 22.77          |
| MIDDLE  | 863.85             | -36.45                  | -13.00          | 23.45          |
| HIGH    | 752.41             | -36.23                  | -13.00          | 23.23          |

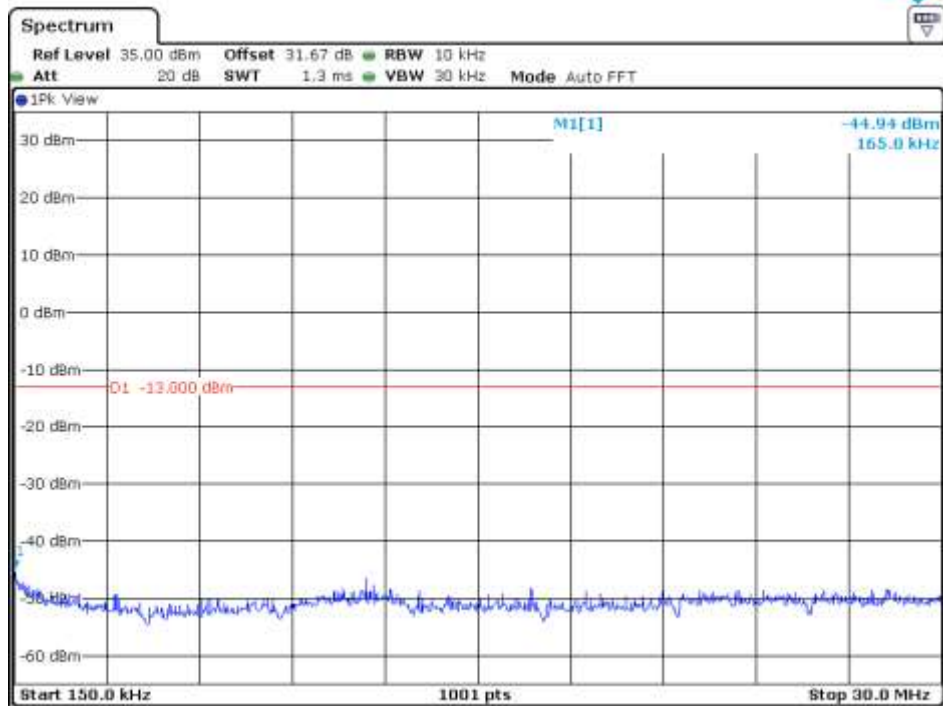
Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)



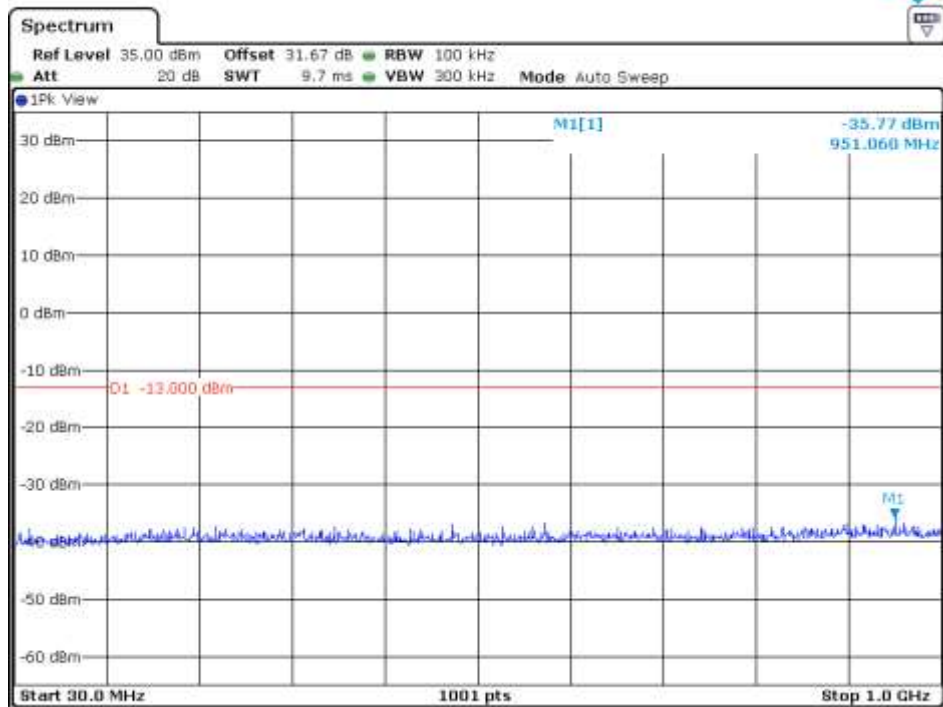
Tested by: Jun-Hui, Lee / Senior Engineer



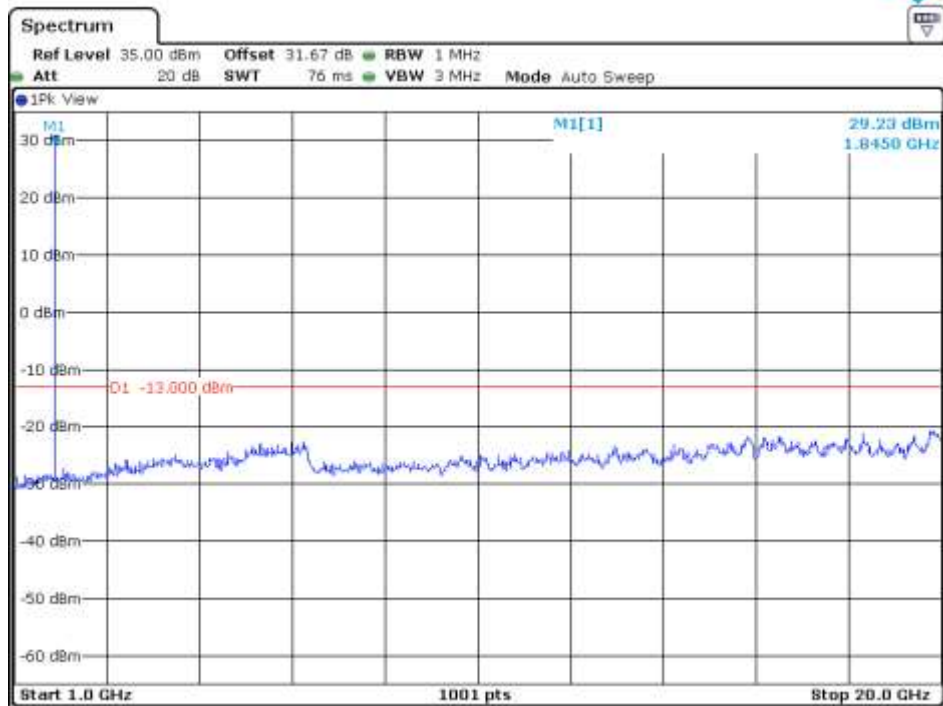
Low Channel



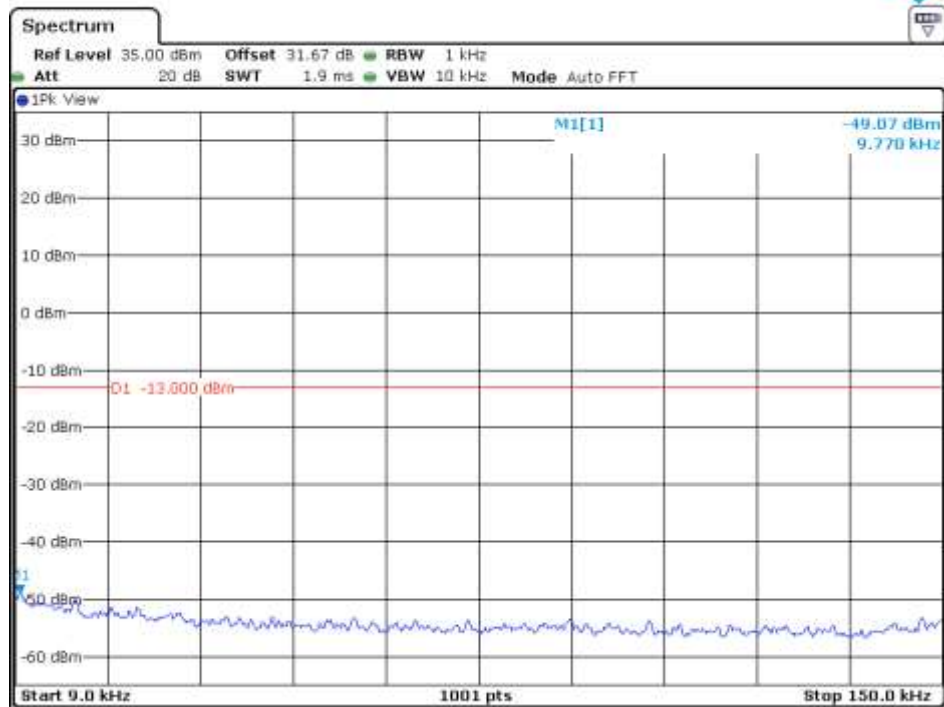
Low Channel



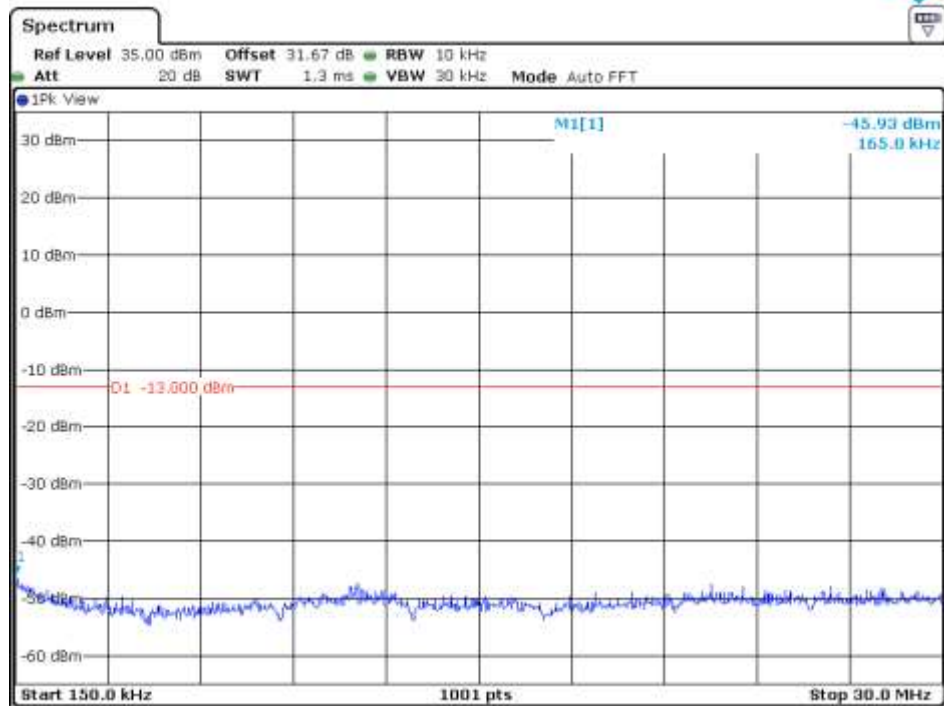
Low Channel



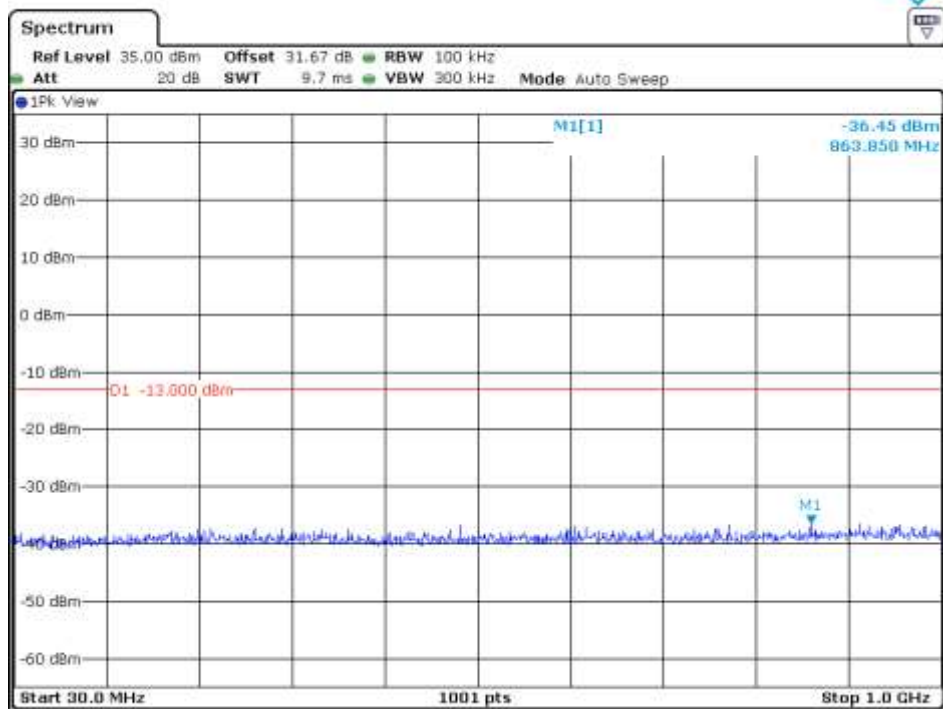
Low Channel



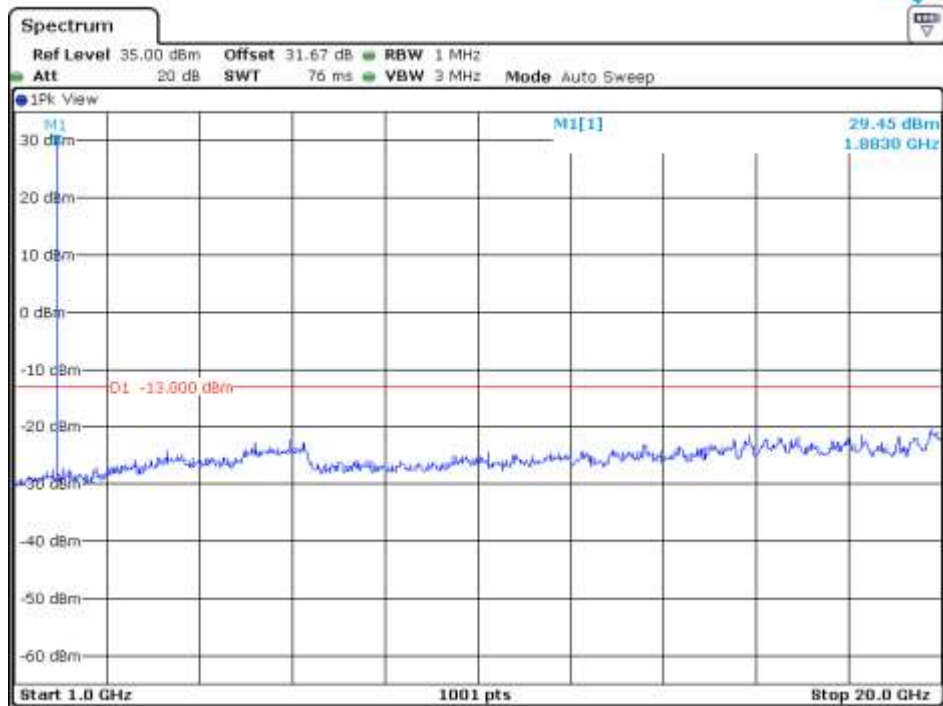
Middle Channel



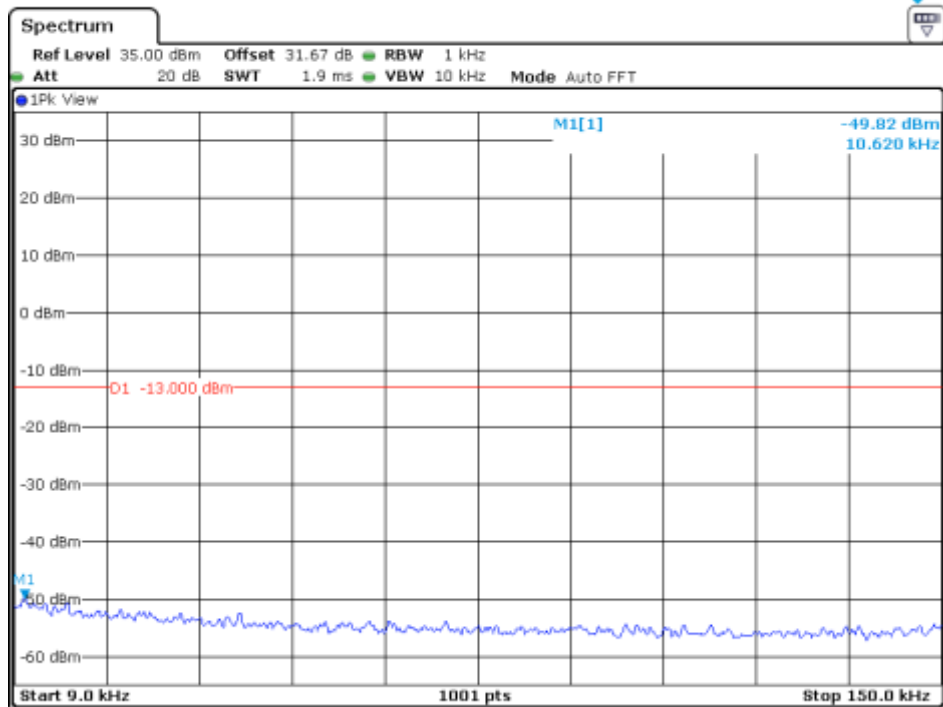
Middle Channel



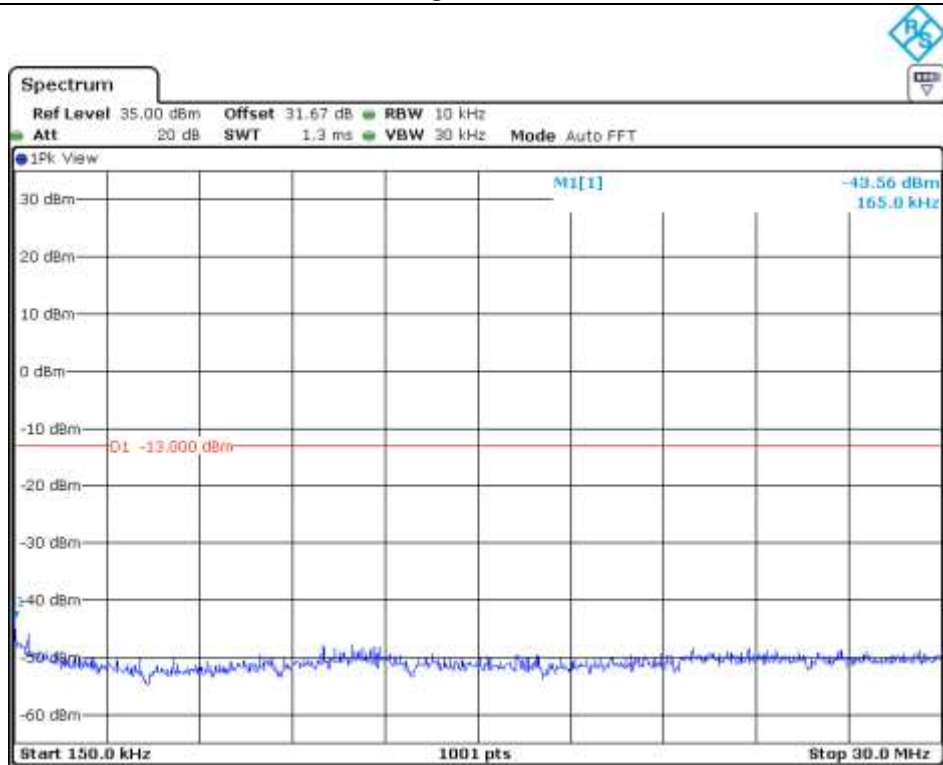
Middle Channel



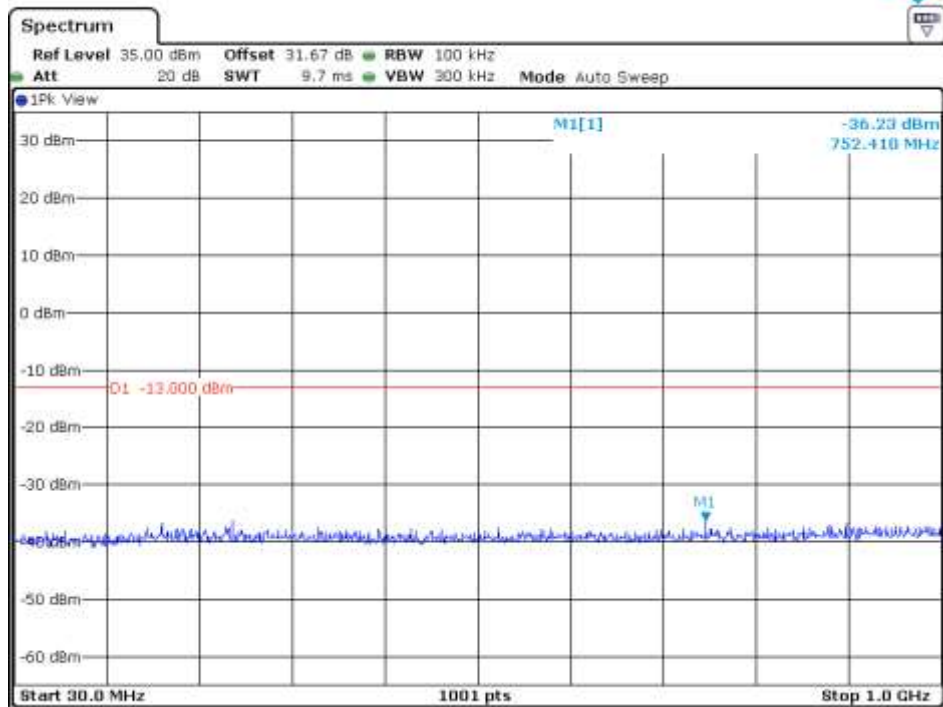
Middle Channel



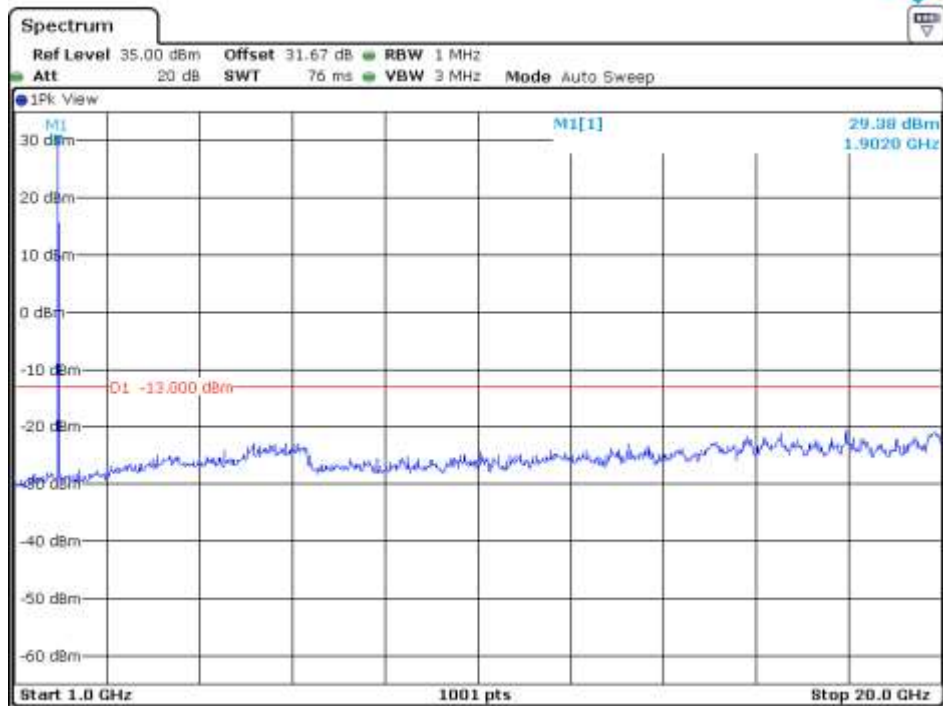
High Channel



High Channel



High Channel



High Channel

#### 8.4.2 Test data for WCDMA(Band 2)

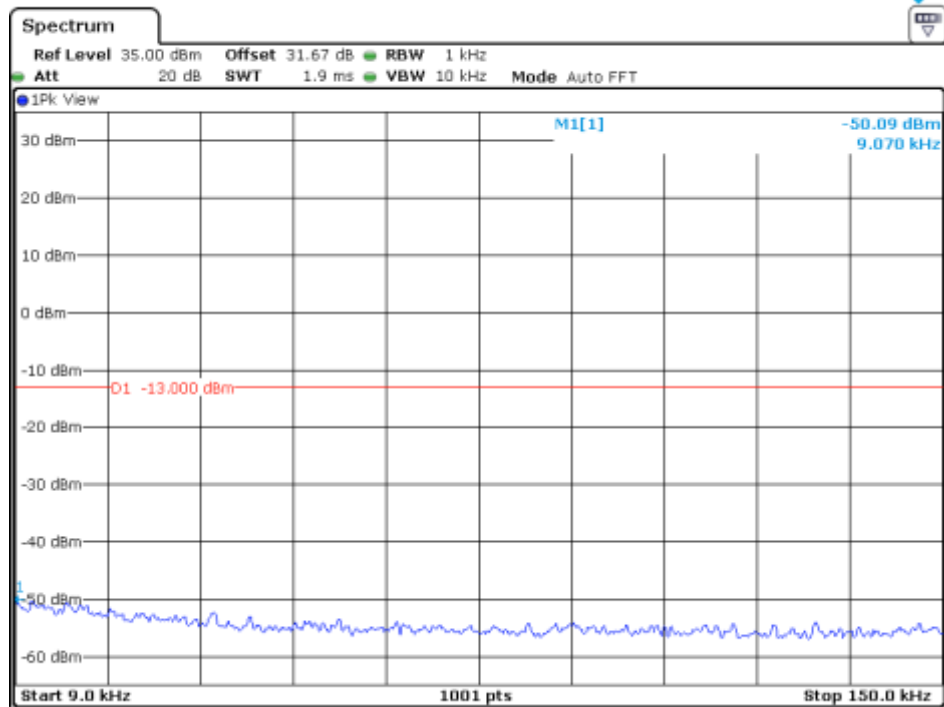
-. Test Date : May 12, 2016

-. Test Result : Pass

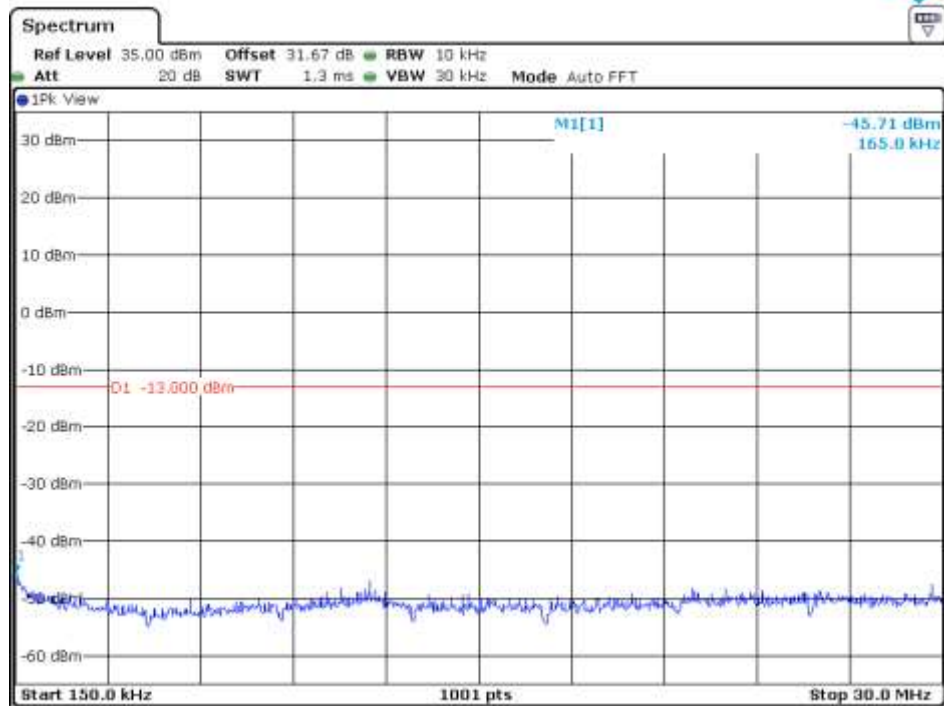
| CHANNEL | FREQUENCY<br>(MHz) | Measured value<br>(dBm) | LIMITS<br>(dBm) | MARGIN<br>(dB) |
|---------|--------------------|-------------------------|-----------------|----------------|
| LOW     | 907.46             | -36.48                  | -13.00          | 23.48          |
| MIDDLE  | 896.80             | -36.17                  | -13.00          | 23.17          |
| HIGH    | 197.16             | -35.82                  | -13.00          | 22.82          |

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

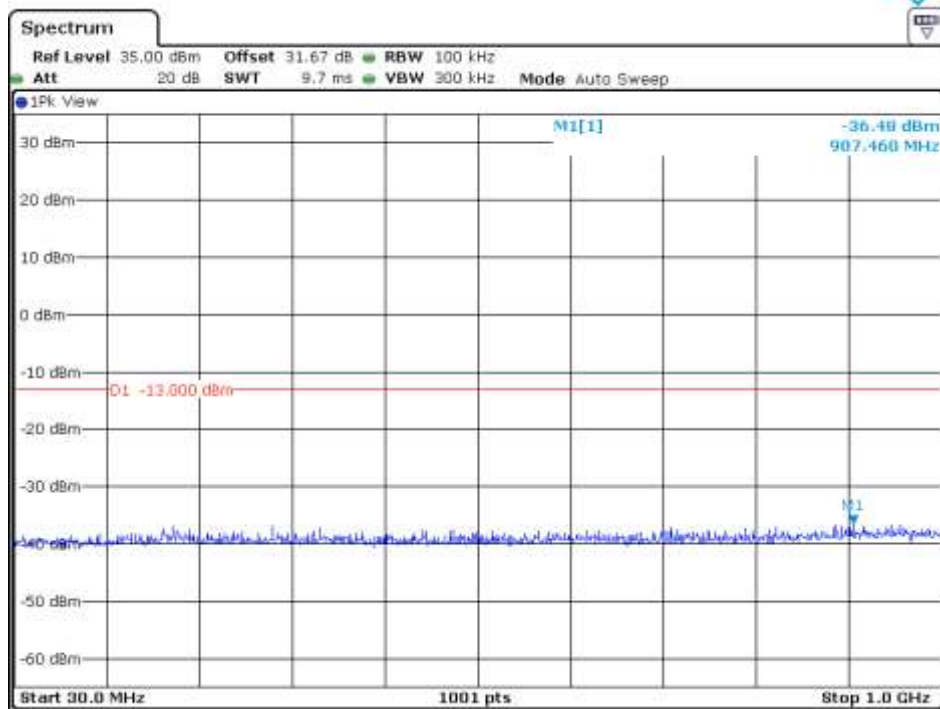
  
 Tested by: Jun-Hui, Lee / Senior Engineer



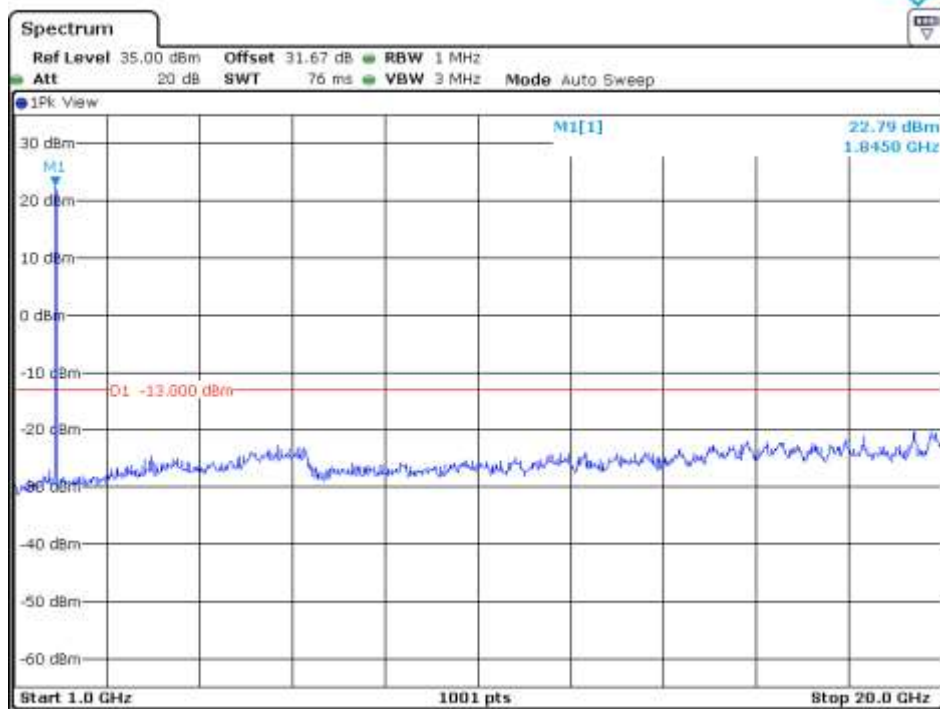
Low Channel



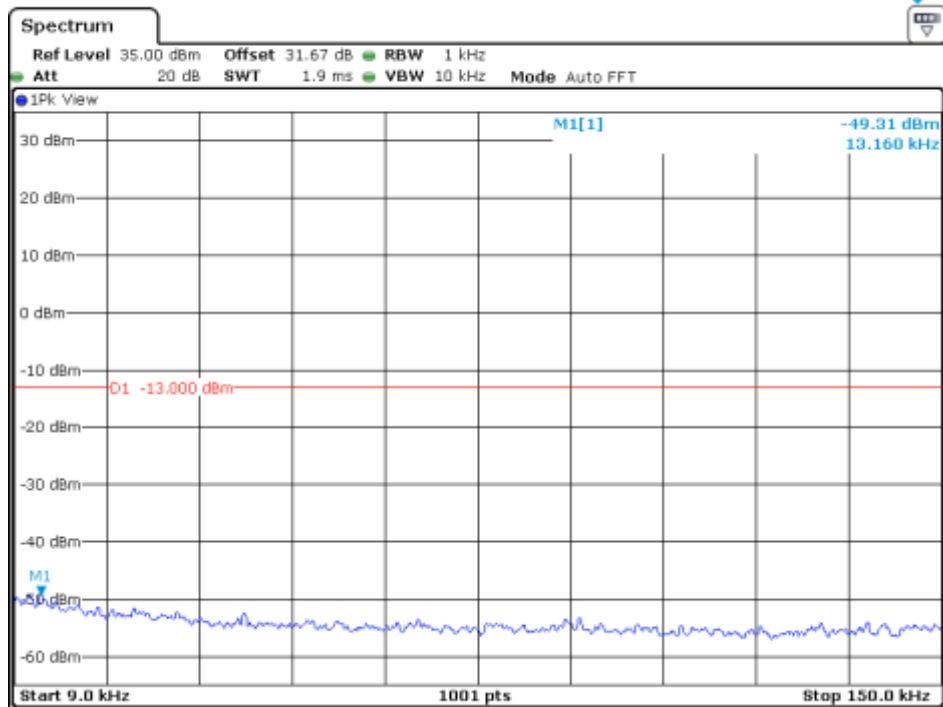
Low Channel



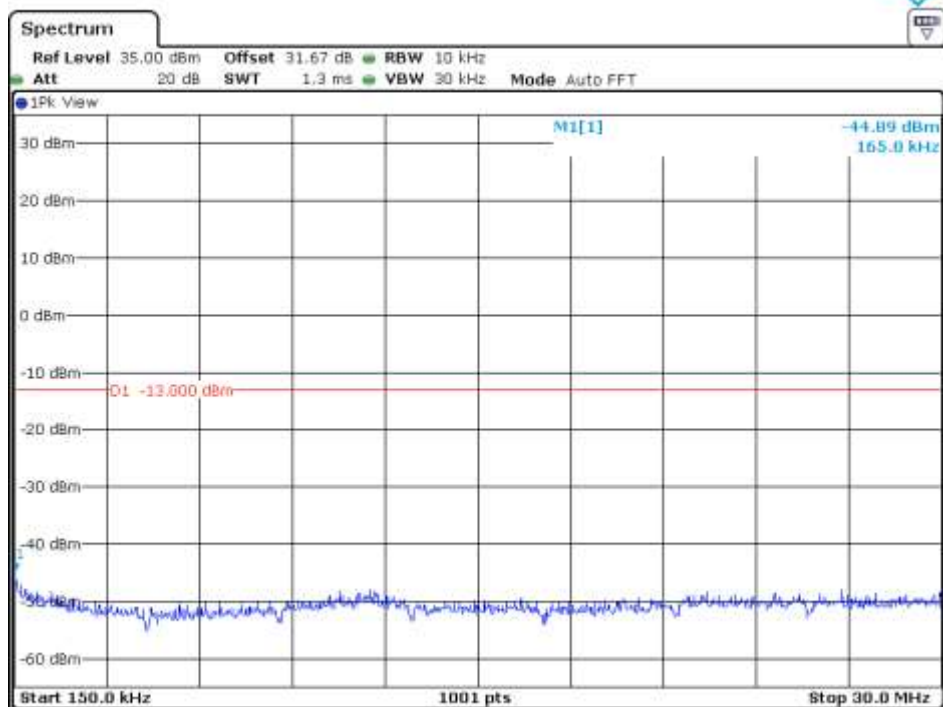
Low Channel



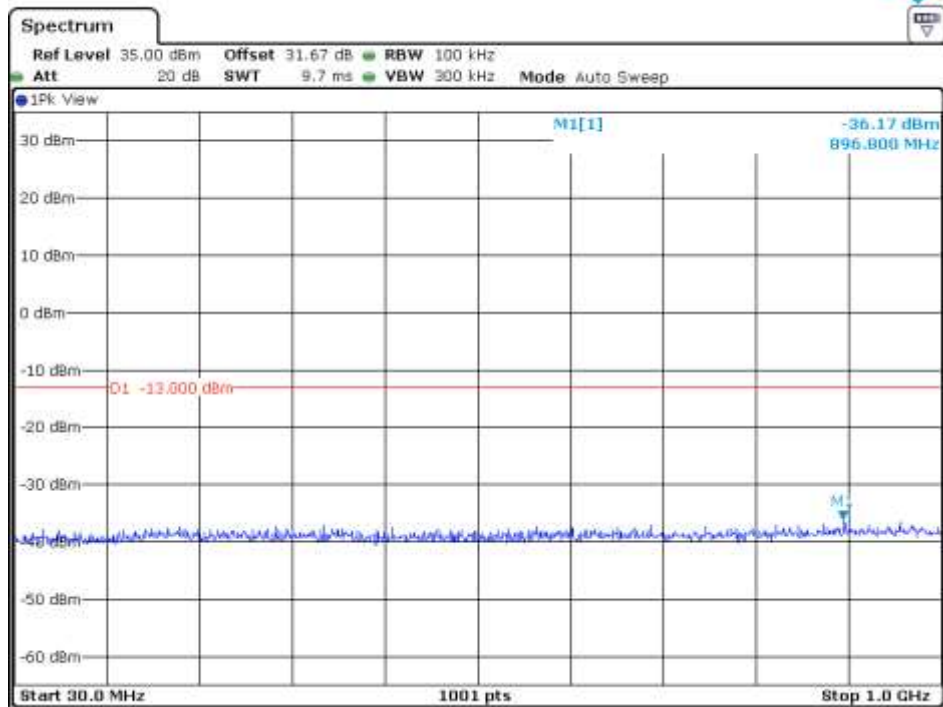
Low Channel



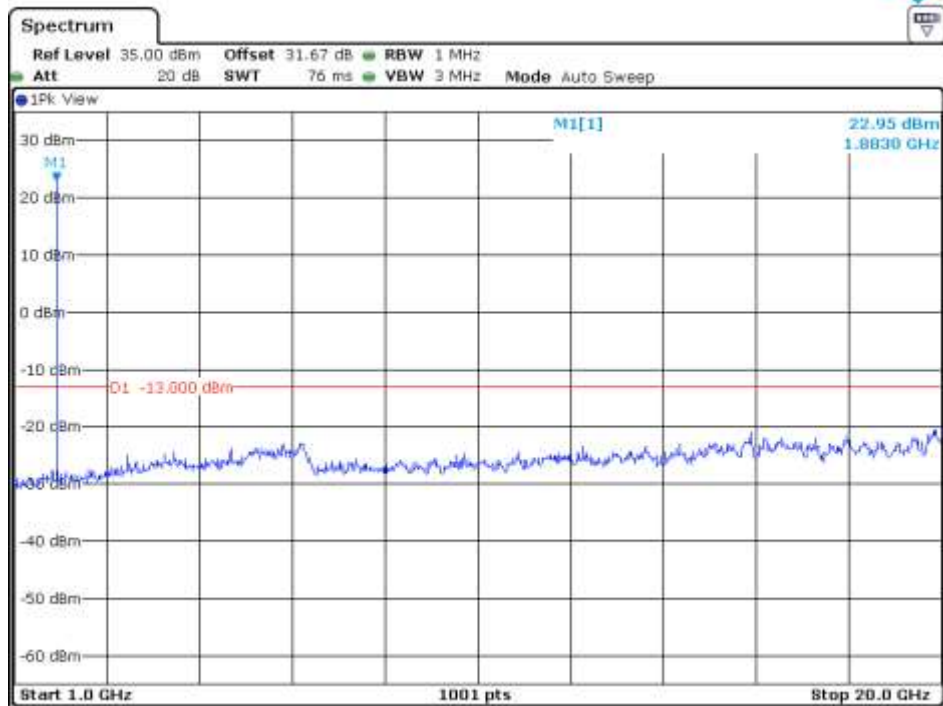
Middle Channel



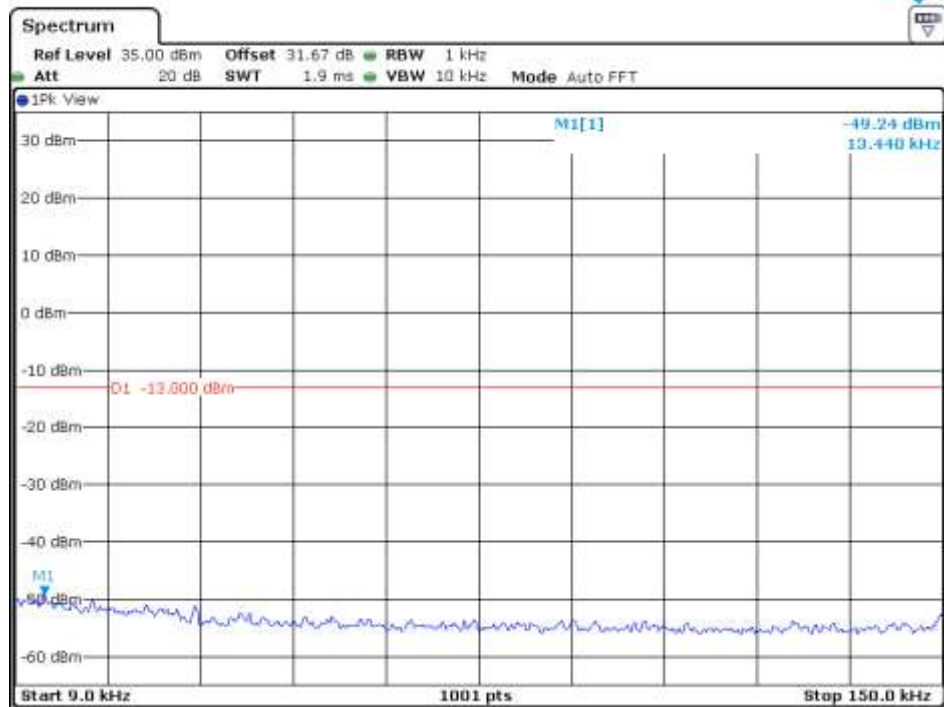
Middle Channel



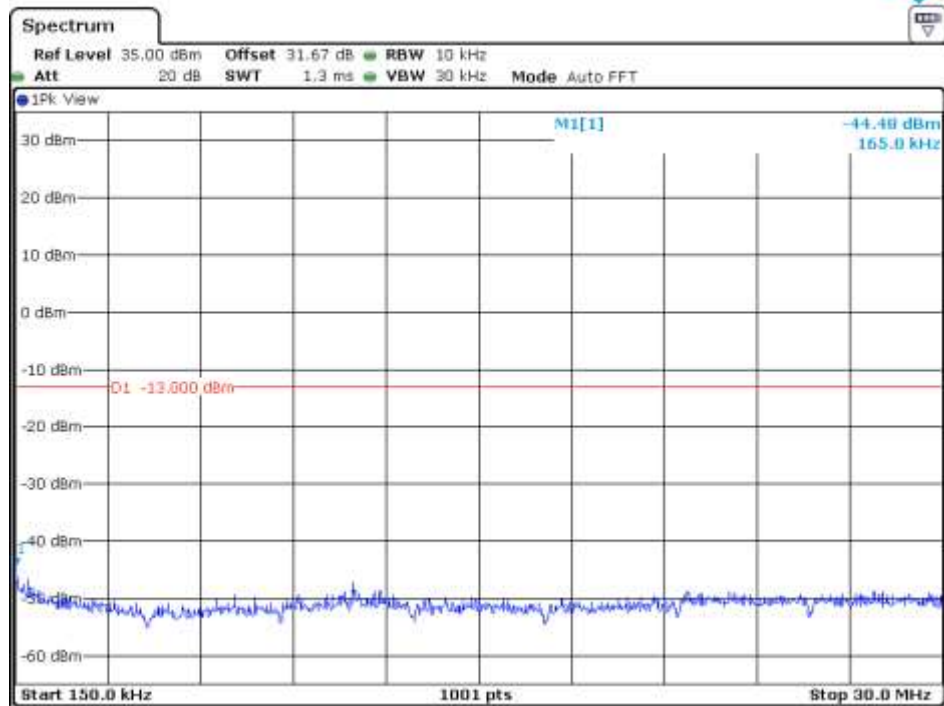
Middle Channel



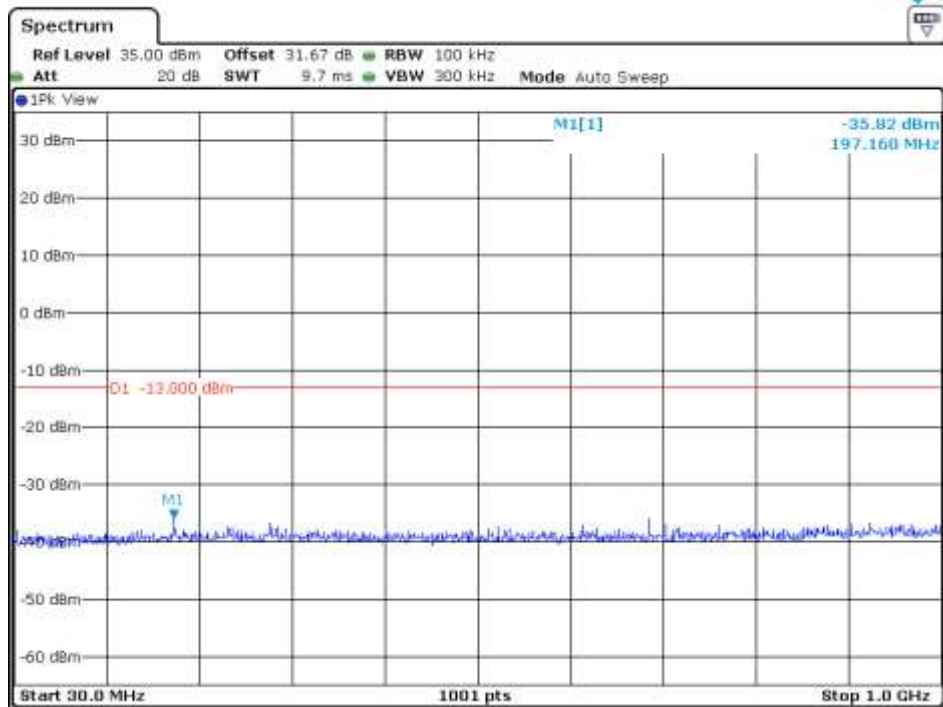
Middle Channel



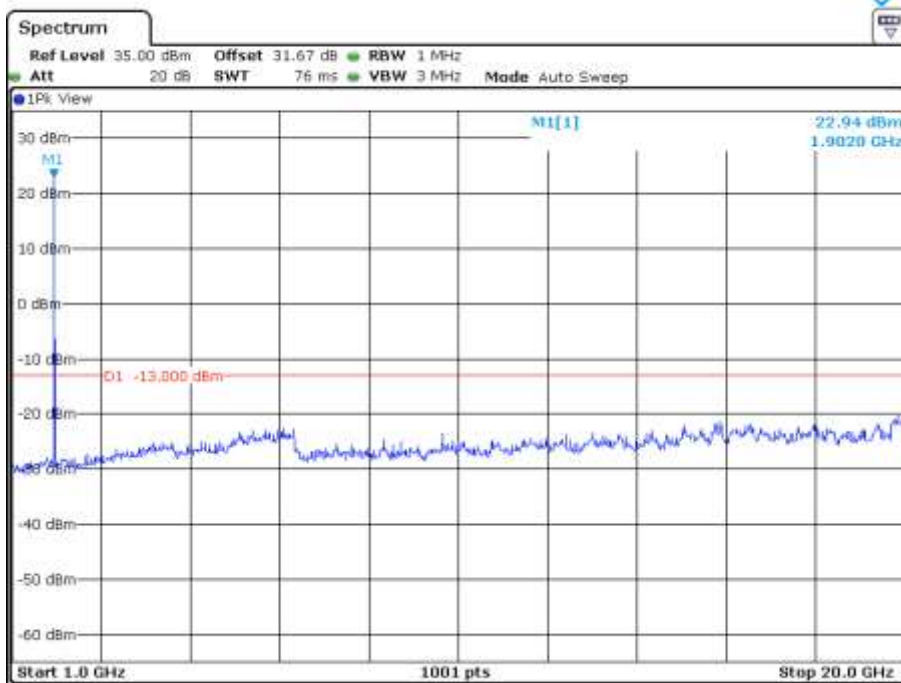
High Channel



High Channel



High Channel



High Channel