# 12. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

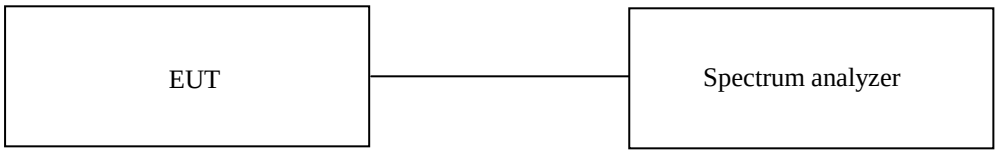
## 12.1 Operating environment

Temperature : 22.4 ℃

Relative humidity : 43.8 % R.H

## 12.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.




## 12.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 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.

## 12.4 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal. |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Mar. 14, 2018 (1Y) |
| ■ - | ESU | Rohde & Schwarz | EMI Test Receiver | 100261 | Mar. 29, 2018 (1Y) |
| ■ - | 310N | Sonoma Instrument | Pre-Amplifier | 312544 | Mar. 28, 2018 (1Y) |
| ■ - | BBV9718 | Schwarzbeck | Amplifier | 310 | Mar. 30, 2018 (1Y) |
| ■ | SCU40A | Rohde & Schwarz | Signal Conditioning unit | 100436 | Mar. 15, 2018 (1Y) |
| ■ - | DT3000-3t | Innco System | Turn Table | DT3000/093 | N/A |
| ■ - | MA-4000XPET | Innco System | Antenna Master | MA4000/509 | N/A |
| ■ - | VULB9163 | Schwarzbeck | TRILOG Broadband Antenna | 9163-419 | Aug. 05, 2016 (2Y) |
| ■ - | BBHA9120D | Schwarzbeck | Horn Antenna | BBHA9120D295 | Aug. 16, 2017 (2Y) |
| ■ - | BBHA9170 | Schwarzbeck | Horn Antenna | BBHA9170179 | Jul. 28, 2017 (2Y) |
| ■ - | TC-3000C | TESCOM | BLUETOOTH TESTER | 3000C000634 | Mar. 15, 2018 (1Y) |

All test equipment used is calibrated on a regular basis.

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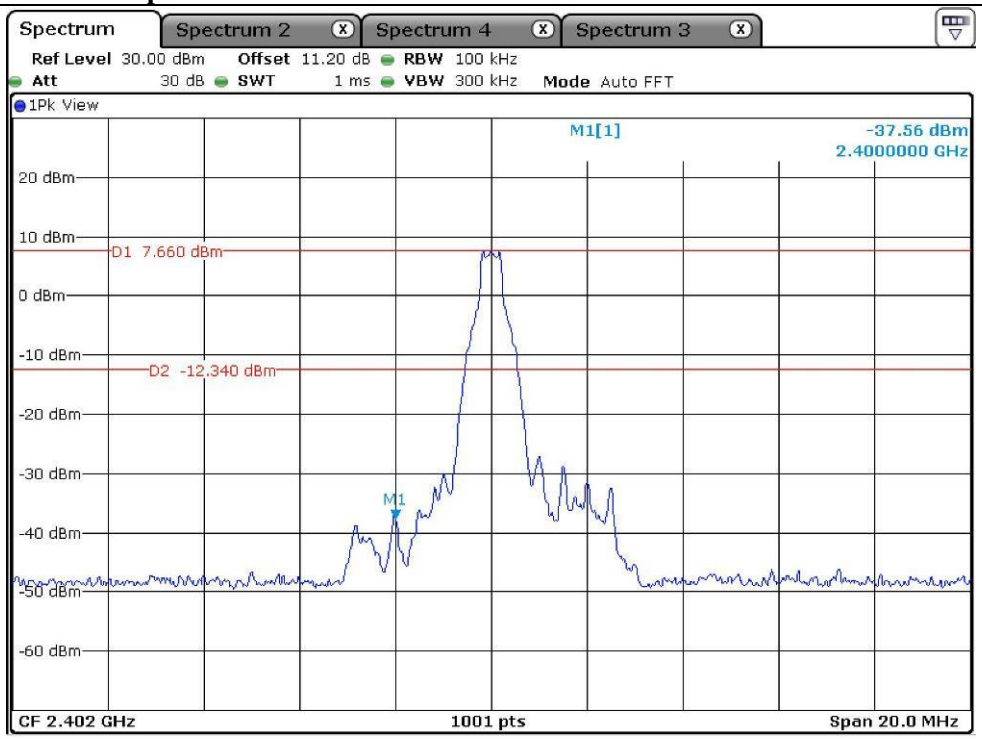
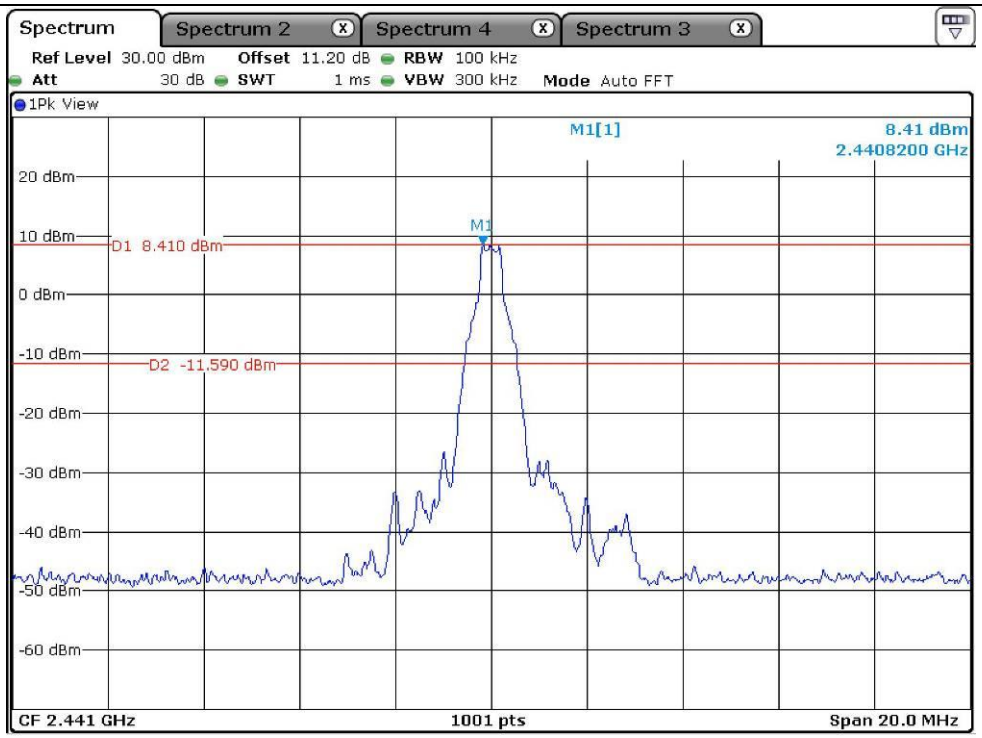
## 12.5 Test data for conducted emission

### 12.5.1 Test data for 1 Mbps




Low Channel




Middle Channel



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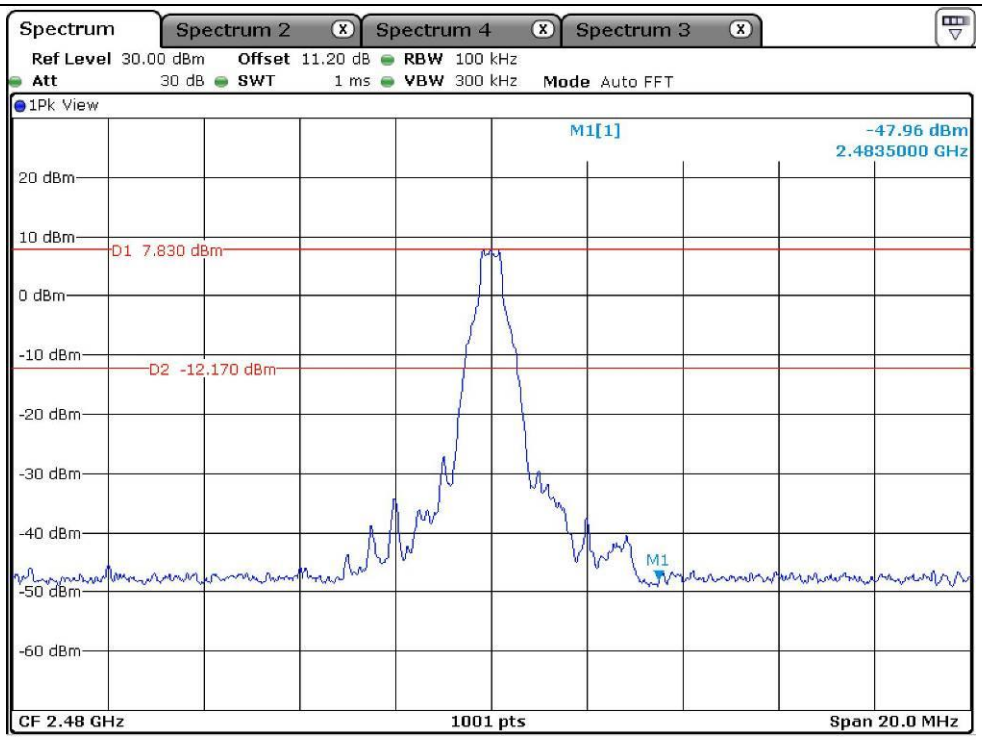
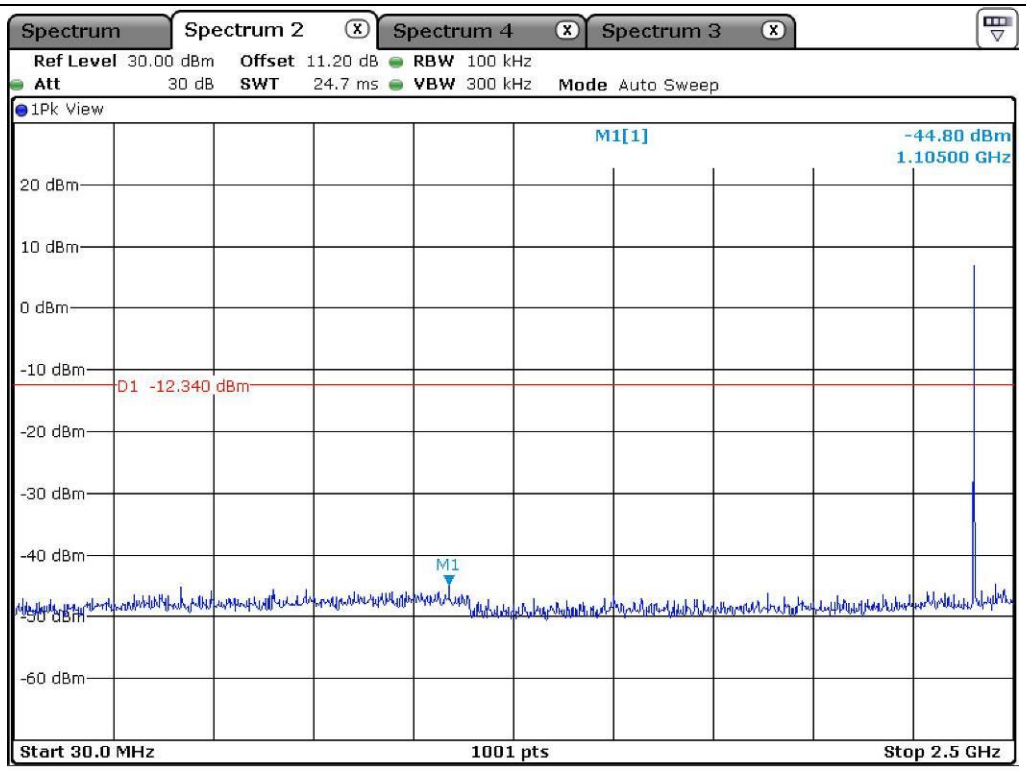
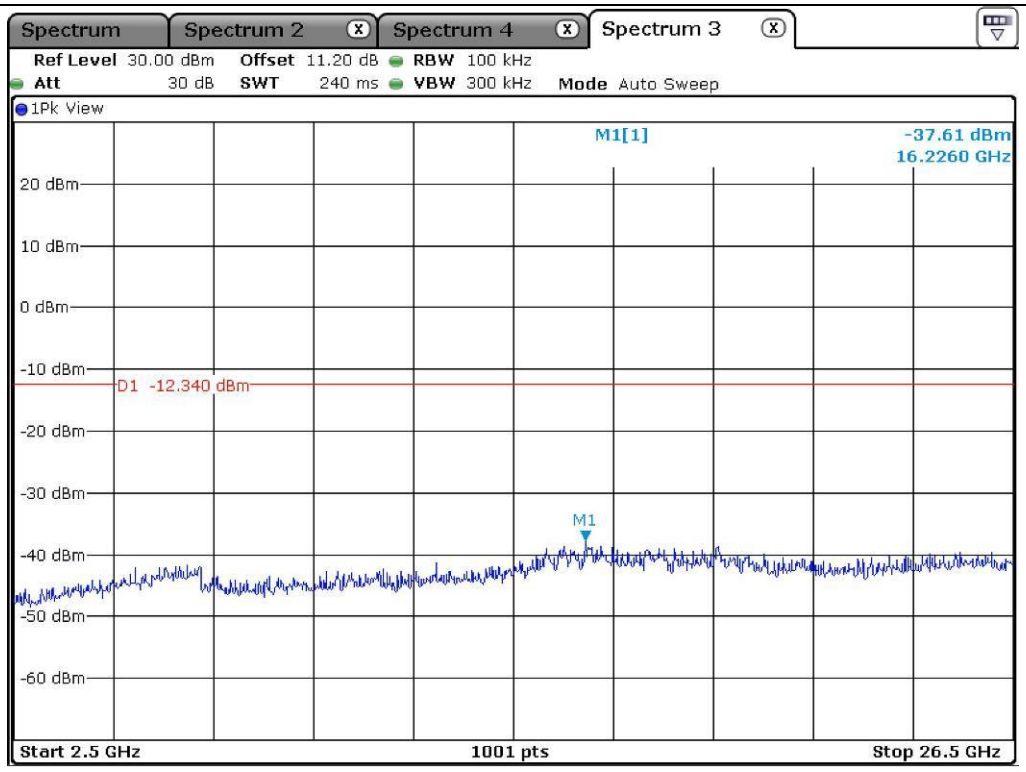


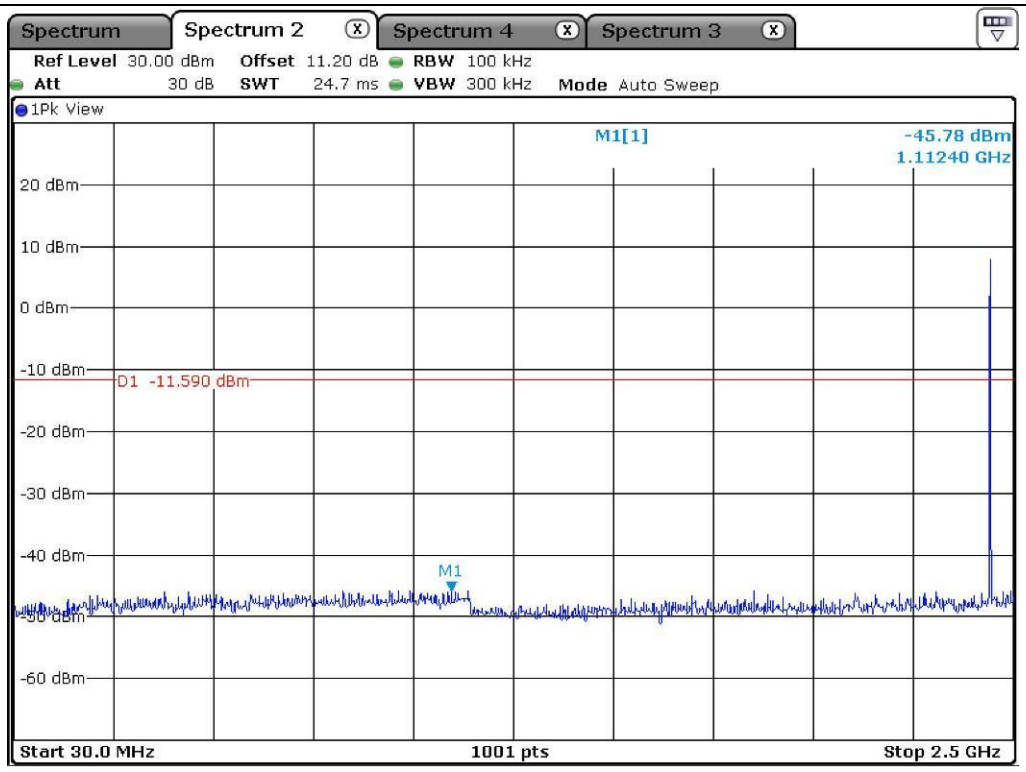

High Channel



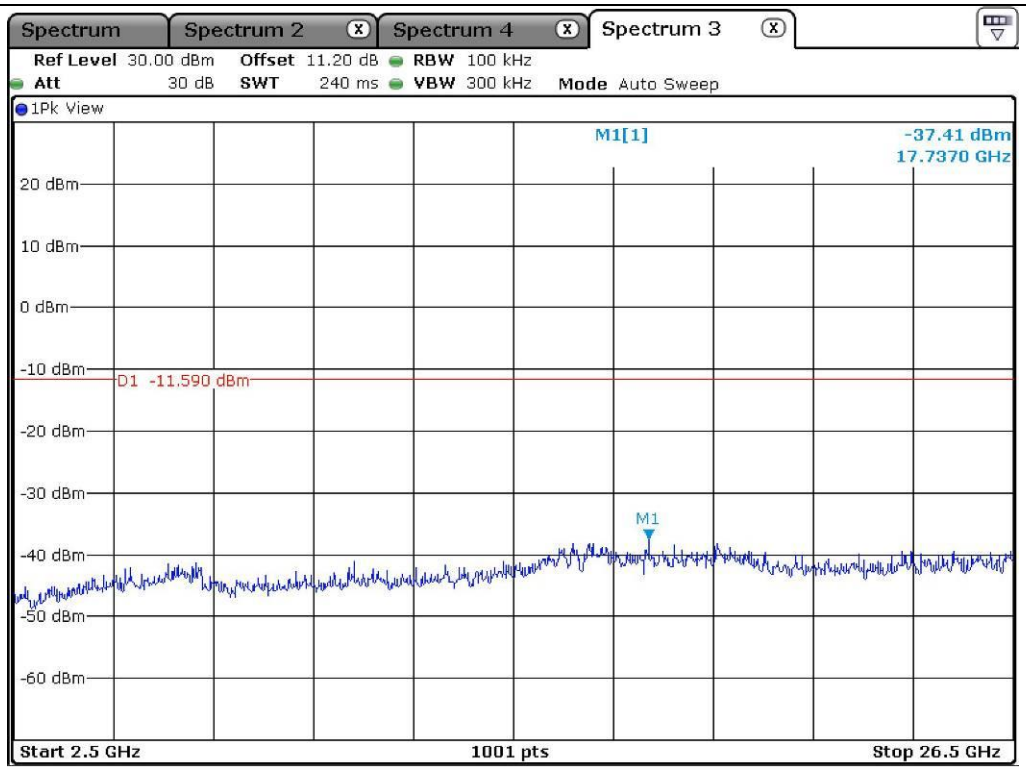

Low Channel




Low Channel




Middle Channel




Middle Channel



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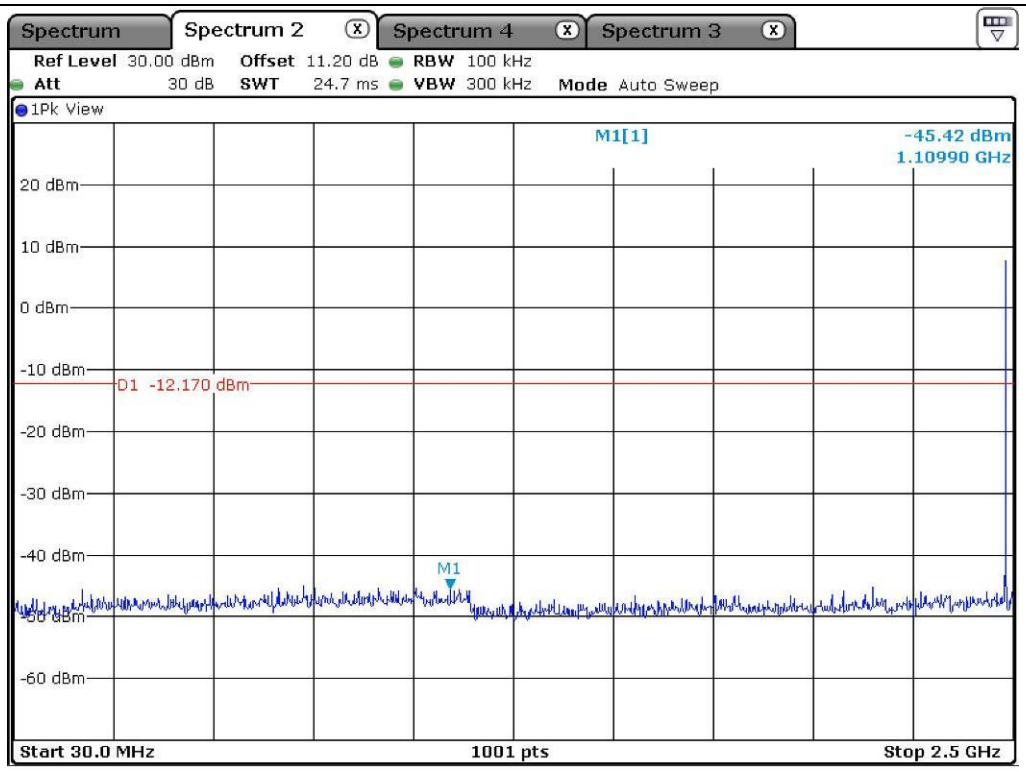
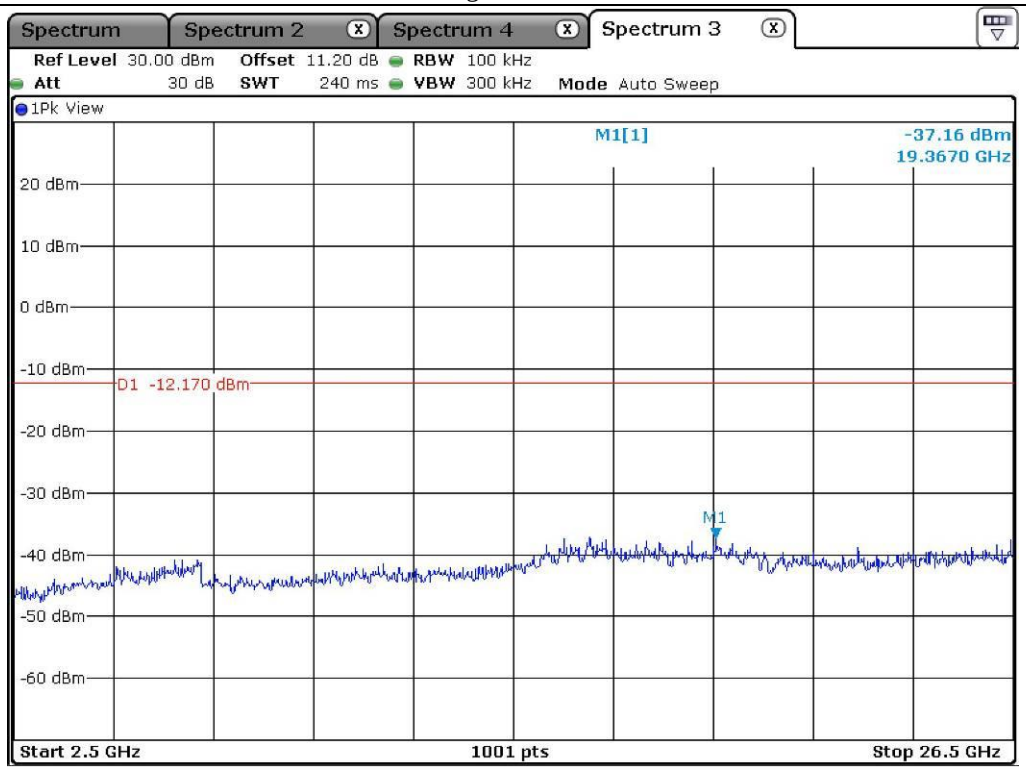



High Channel




High Channel



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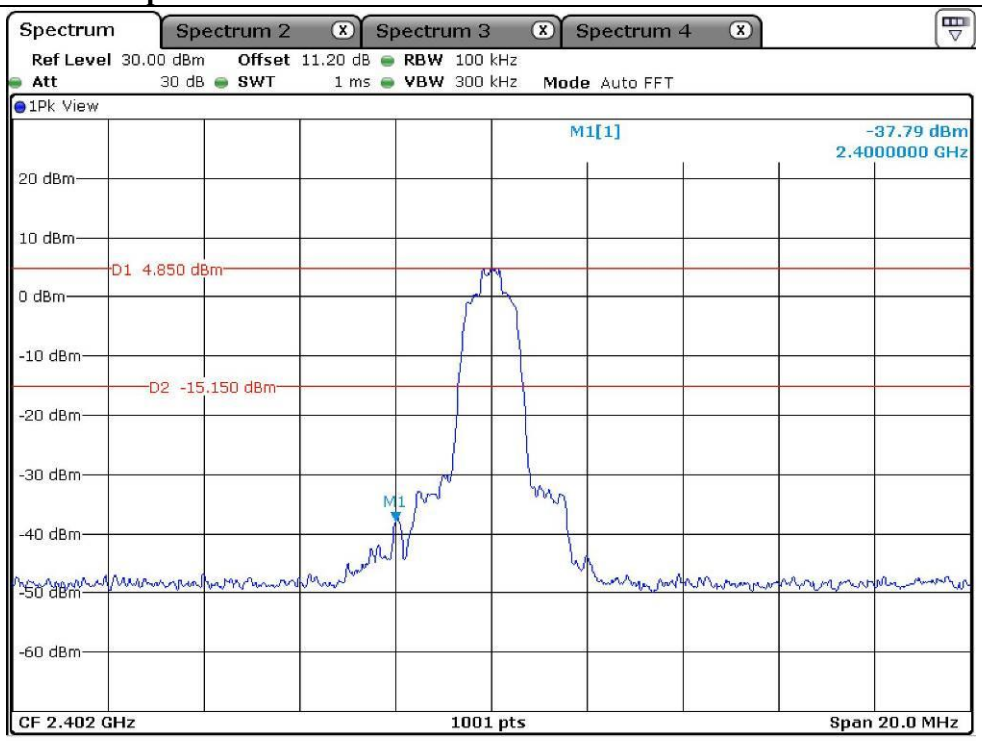
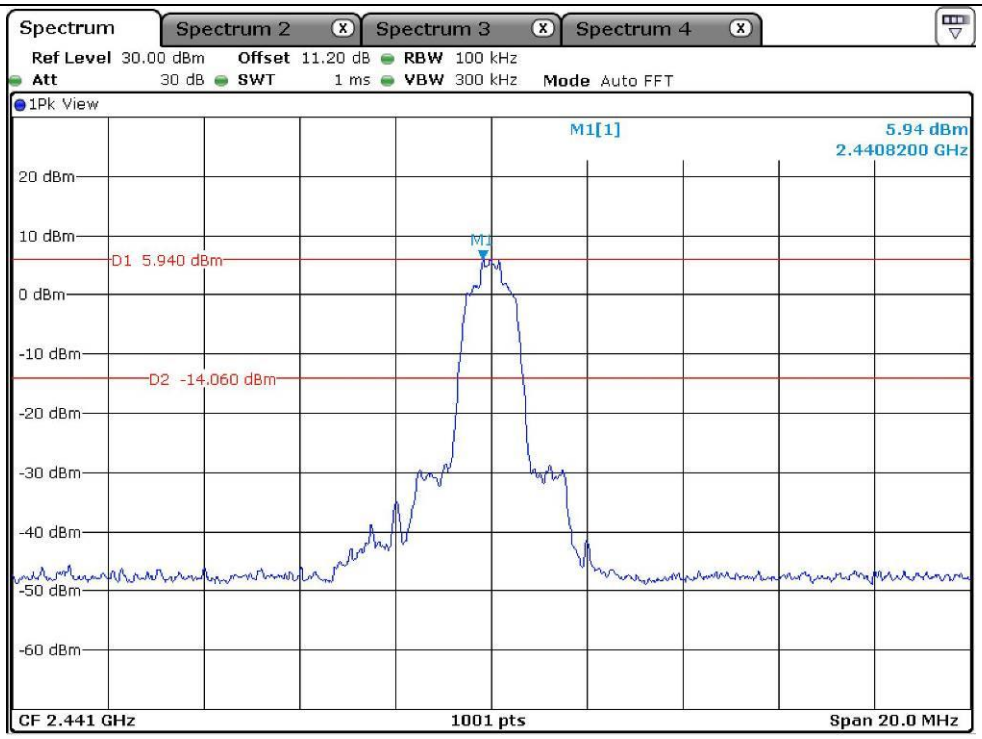
### 12.5.2 Test data for 2 Mbps




Low Channel




Middle Channel

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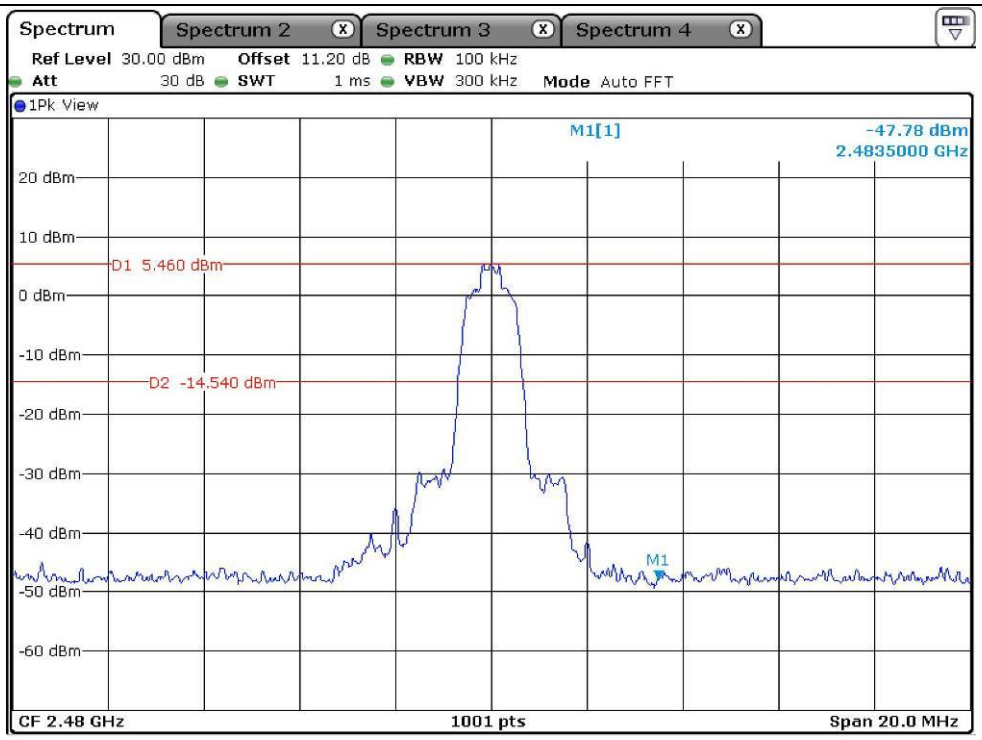
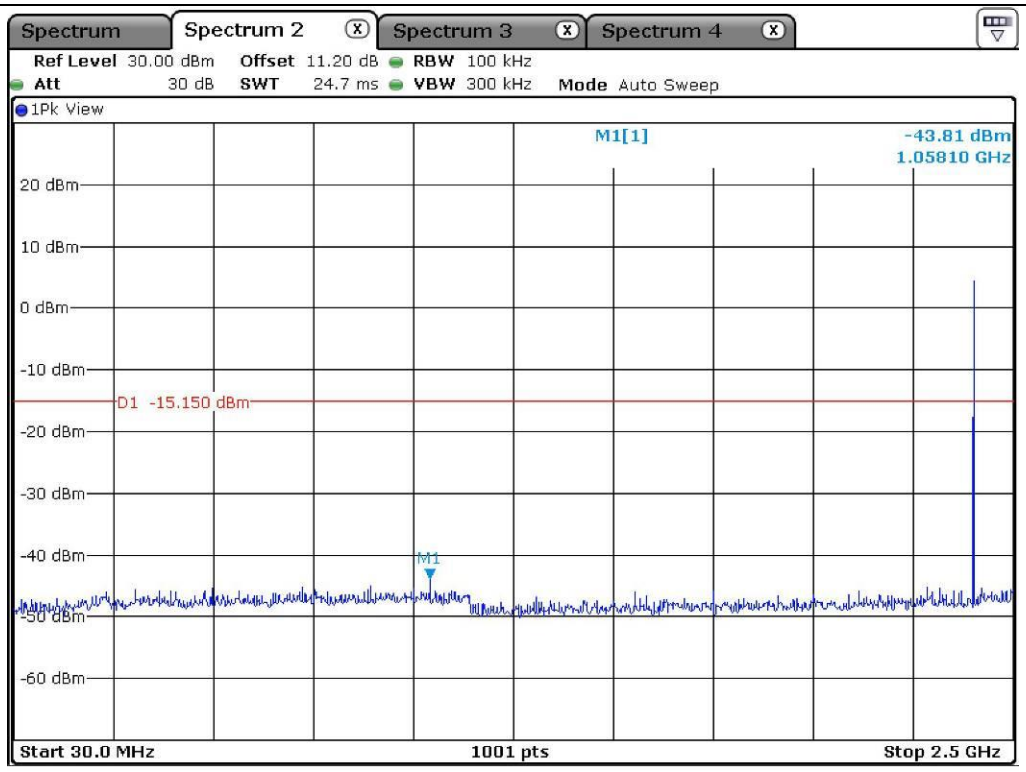
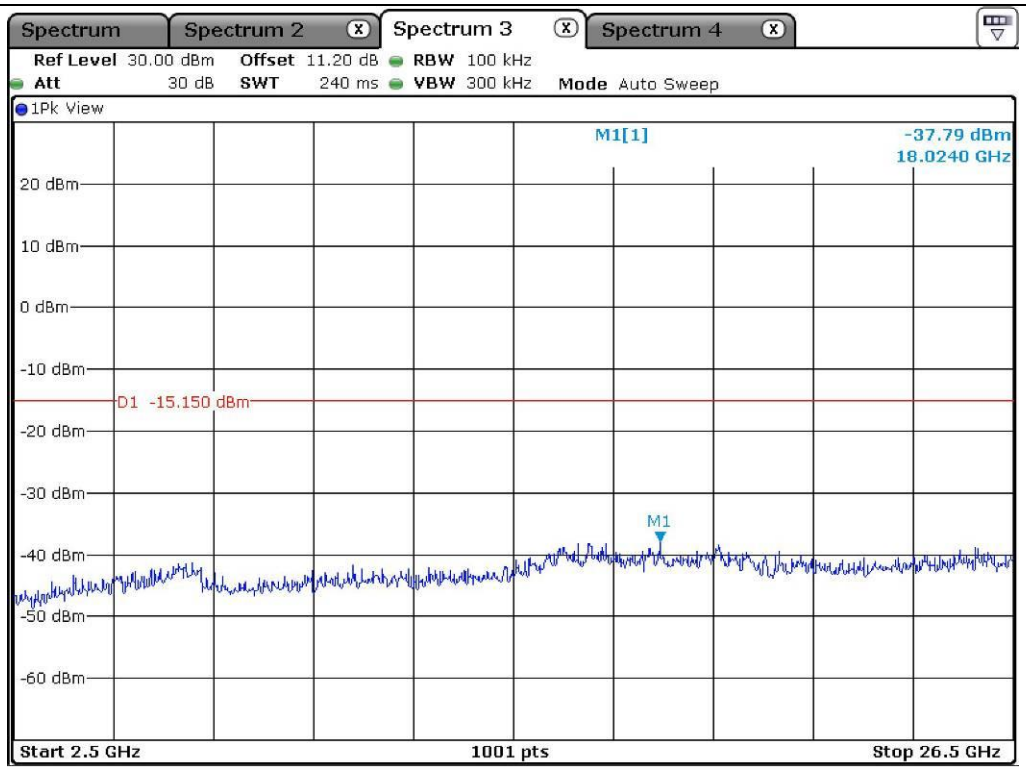



High Channel




Low Channel




Low Channel



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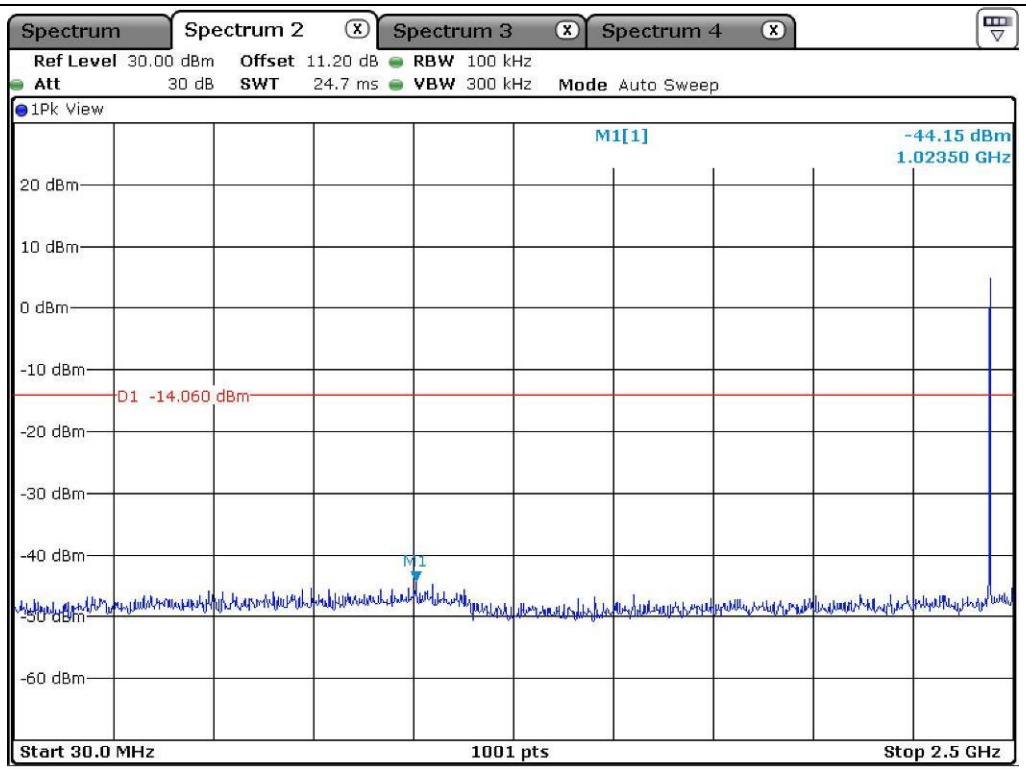
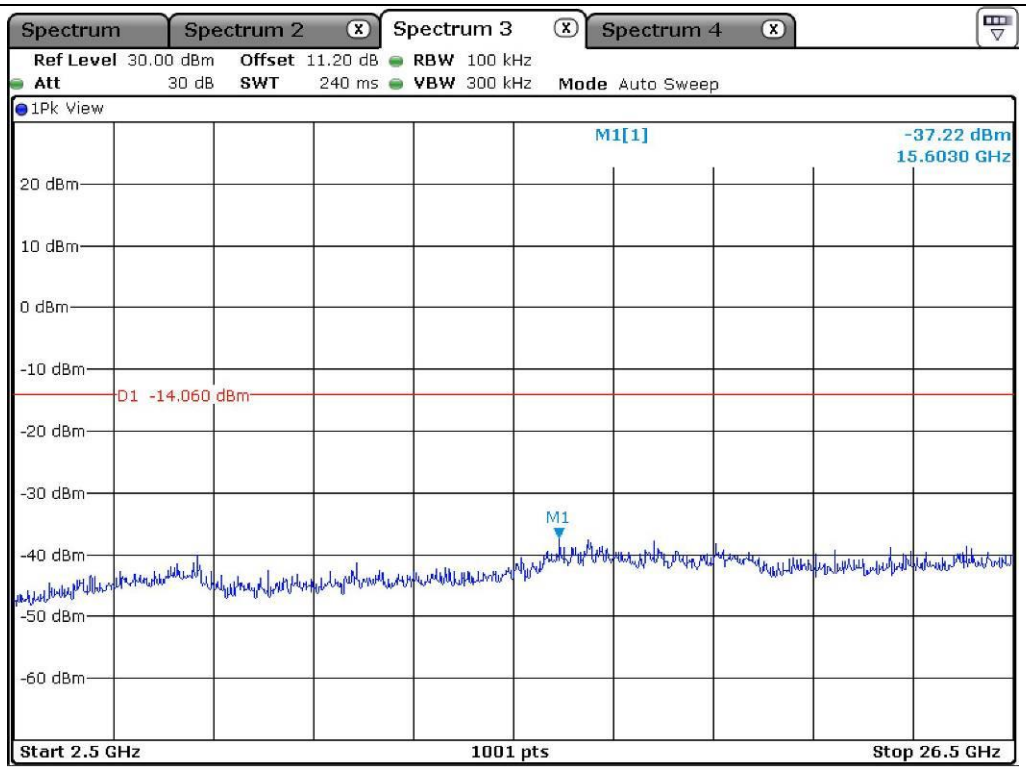



Middle Channel




Middle Channel



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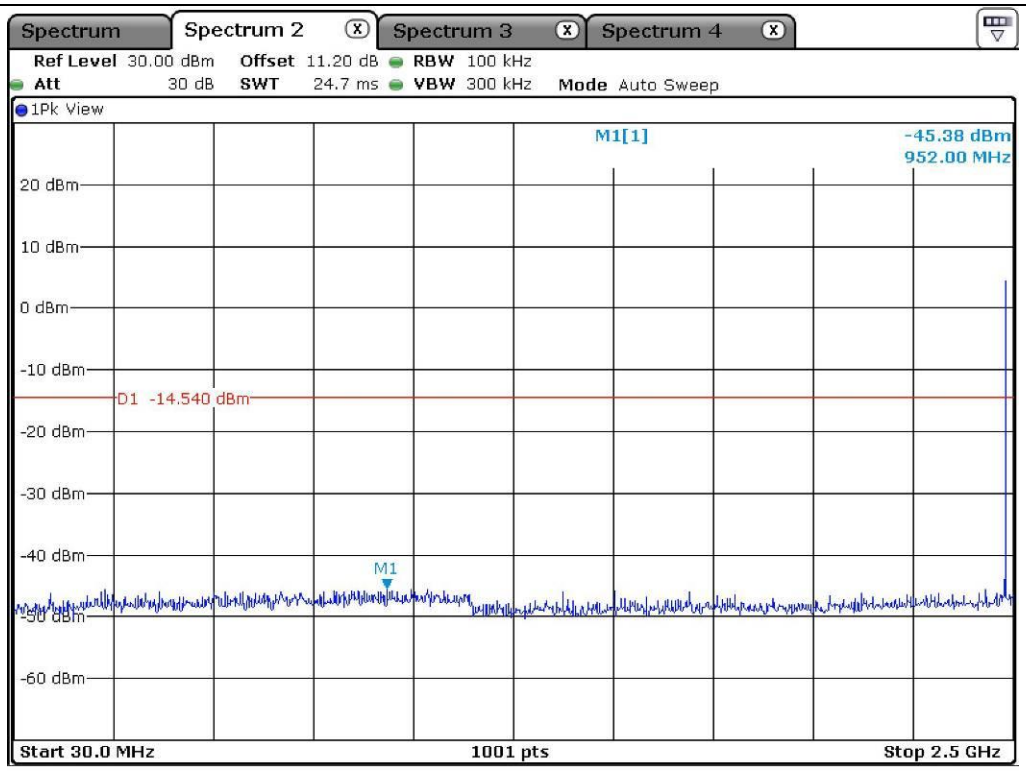
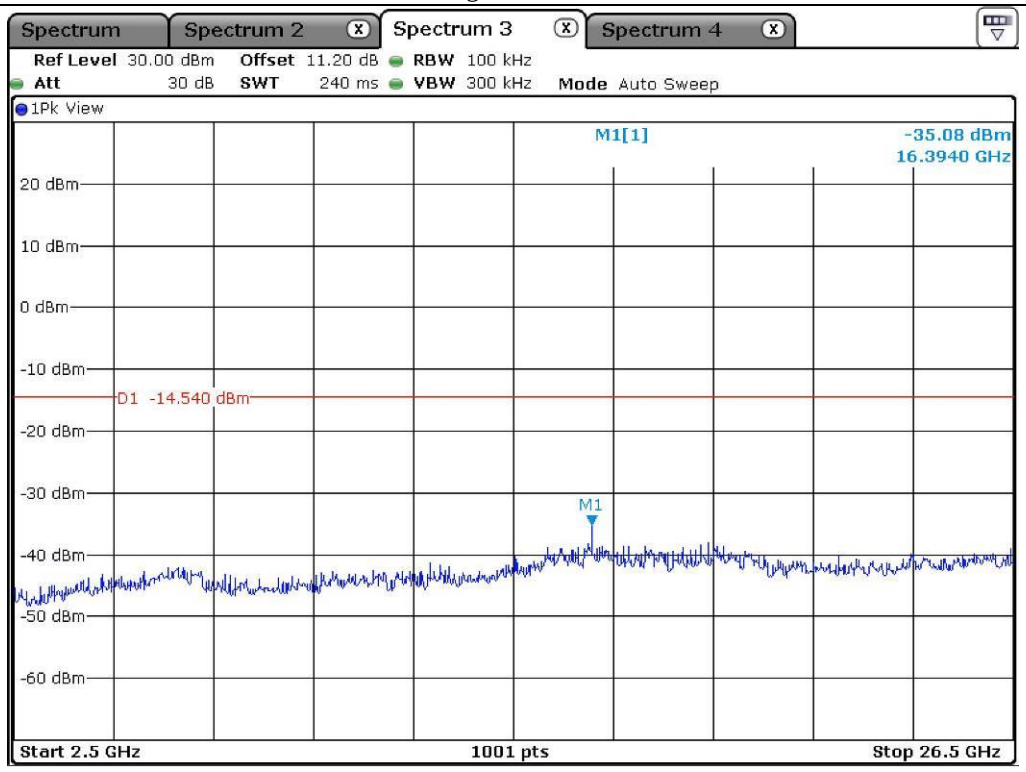



High Channel




High Channel



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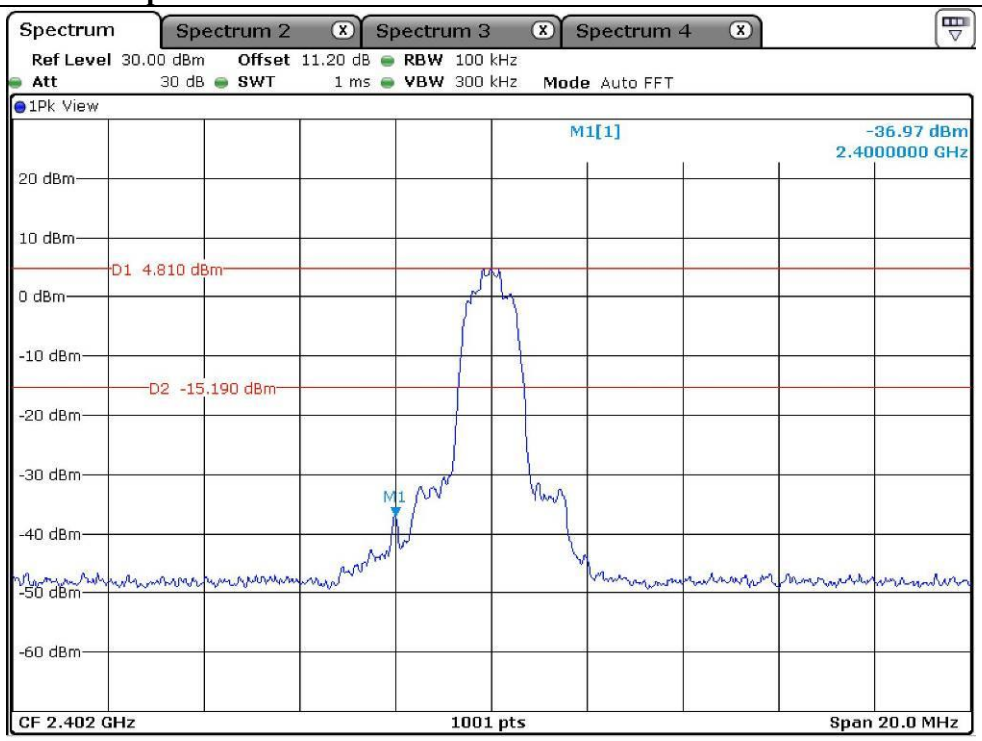
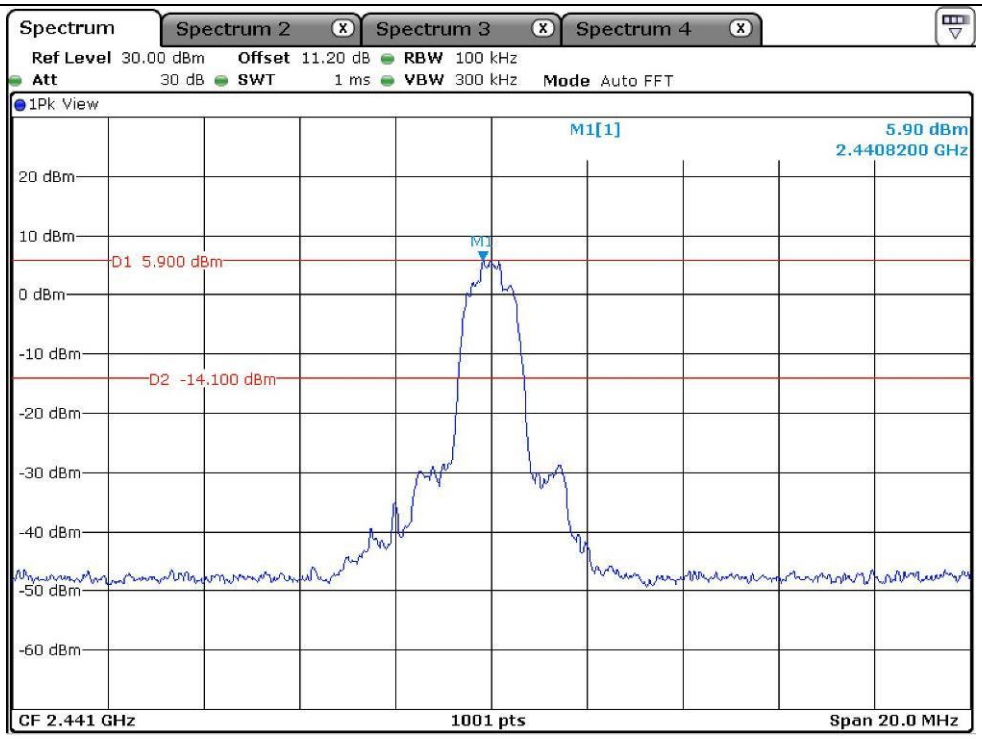
### 12.5.3 Test data for 3 Mbps




Low Channel




Middle Channel



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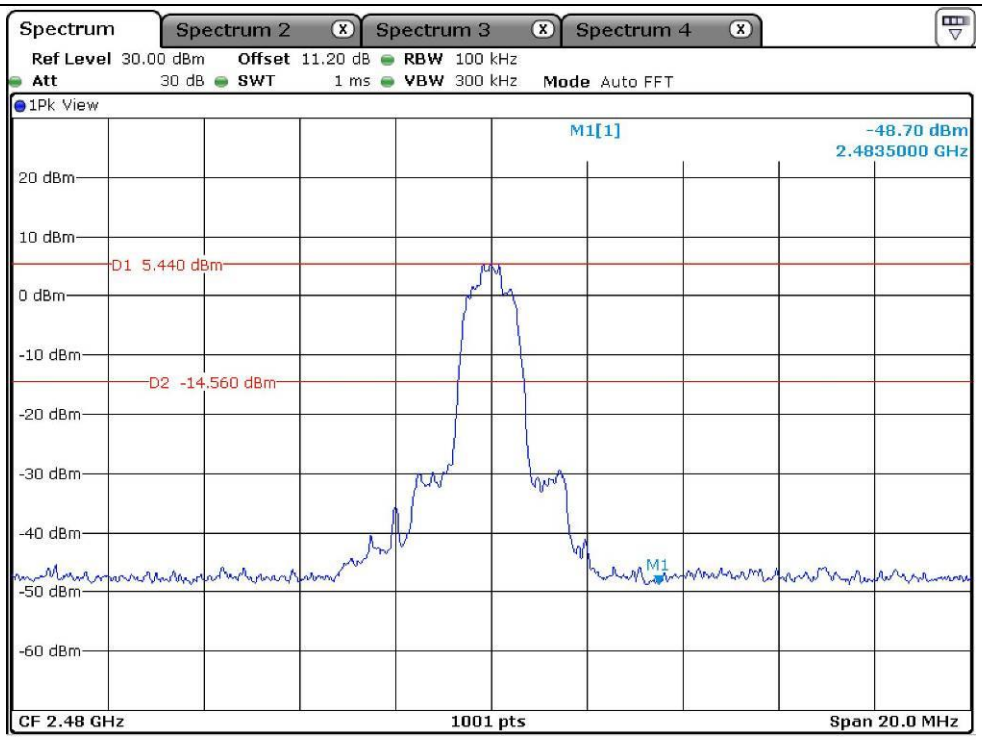
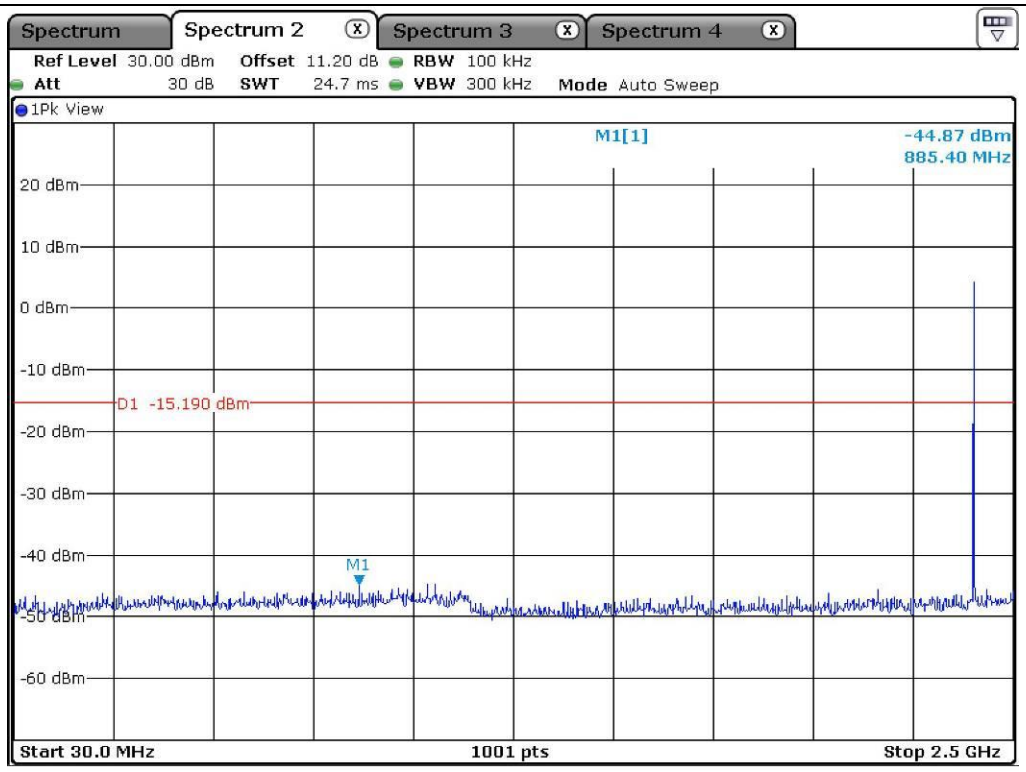
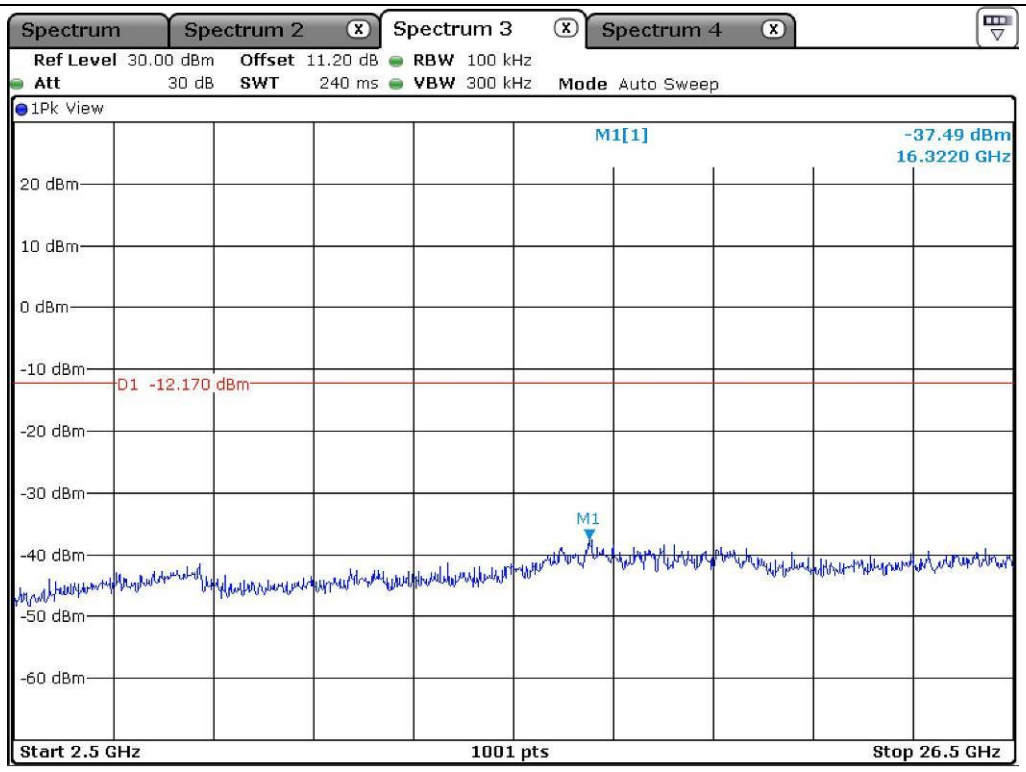



High Channel




Low Channel




Low Channel

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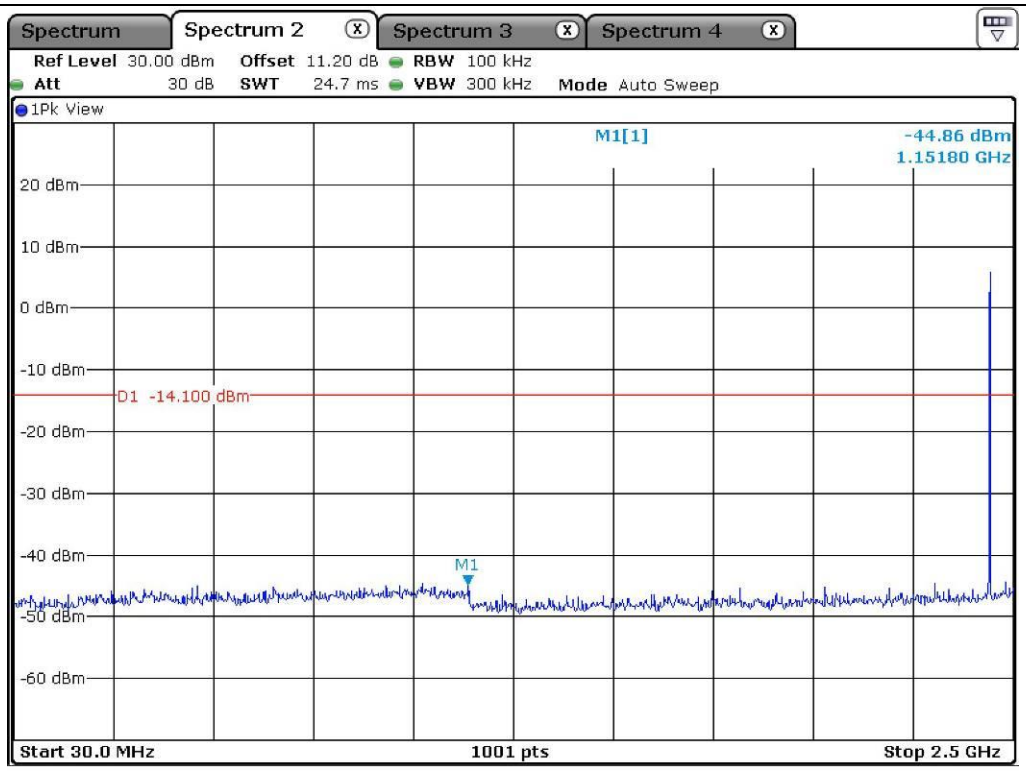
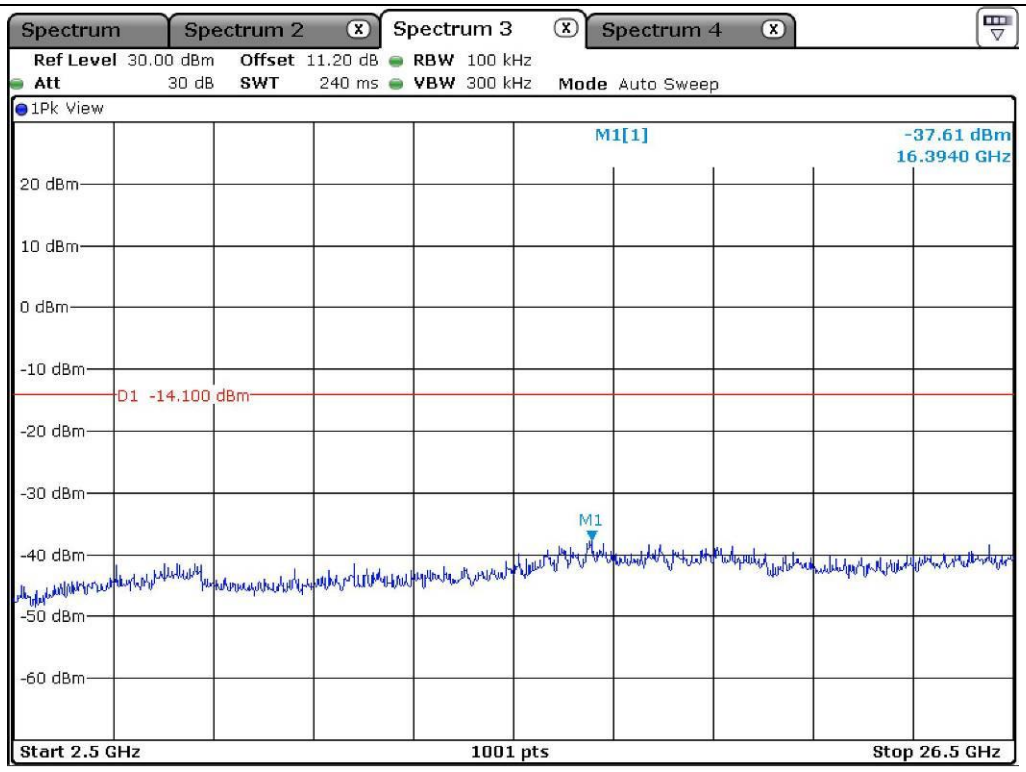



Middle Channel




Middle Channel



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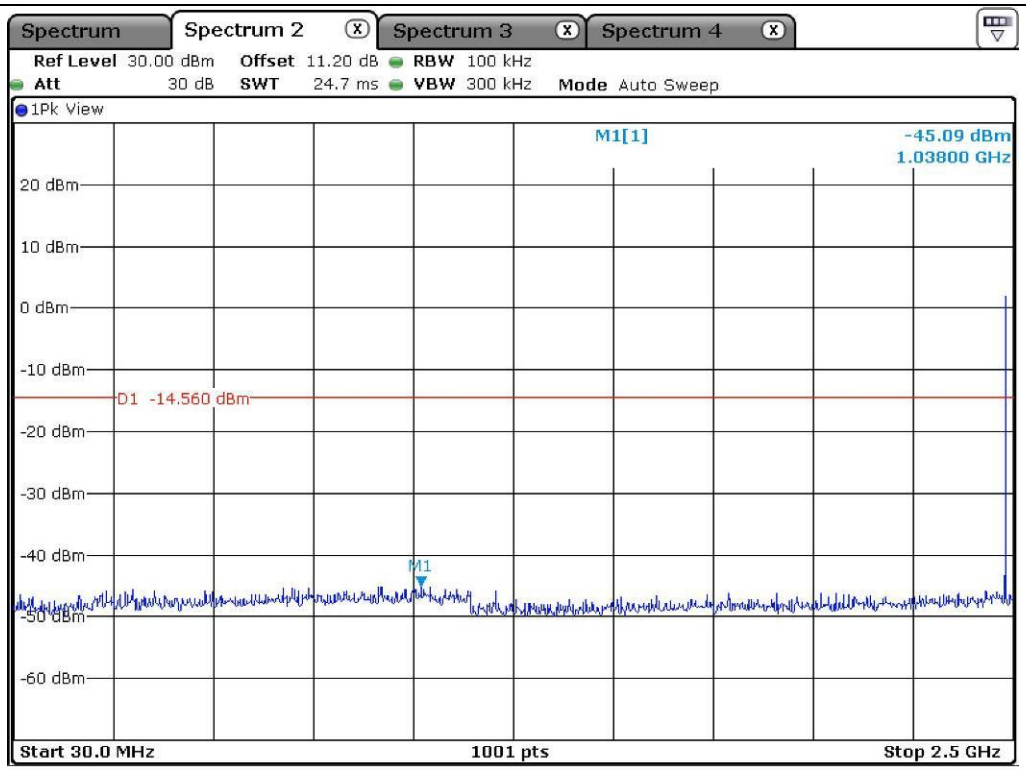
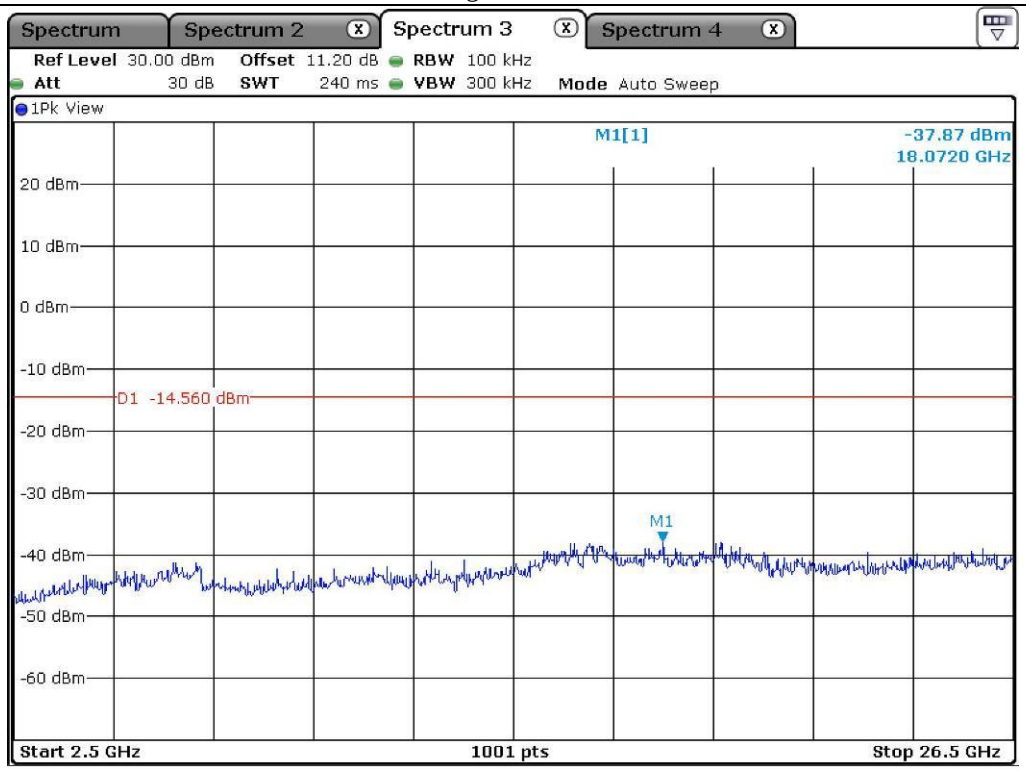



High Channel




High Channel



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## 12.6 Test data for Transmitting mode radiated emission

### 12.6.1 Radiated Emission which fall in the Restricted Band

#### 12.6.1.1 Test data for 1 Mbps

-. Test Date : June 12, 2018 ~ June 15, 2018

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

-. Video bandwidth : 3 MHz for Peak and Average Mode

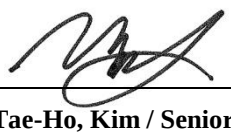
-. Measurement distance : 3 m

-. Result : PASSED

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Test Data for Low Channel** | | | | | | | | | |
| 2 384.76 | 55.20 | Peak | H | 26.94 | 9.20 | 34.76 | 56.58 | 74.00 | 17.42 |
| 2 389.00 | 36.05 | Average | H | | | | 37.43 | 54.00 | 16.57 |
| 2 388.14 | 56.38 | Peak | V | | | | 57.76 | 74.00 | 16.24 |
| 2 388.12 | 37.51 | Average | V | | | | 38.89 | 54.00 | 15.11 |
| **Test Data for High Channel** | | | | | | | | | |
| 2 499.18 | 47.18 | Peak | H | 27.47 | 9.49 | 35.51 | 48.63 | 74.00 | 25.37 |
| 2 499.50 | 36.95 | Average | H | | | | 38.40 | 54.00 | 15.60 |
| 2 499.89 | 47.36 | Peak | V | | | | 48.81 | 74.00 | 25.19 |
| 2 499.99 | 37.49 | Average | V | | | | 38.94 | 54.00 | 15.06 |

Tabulated test data for Restricted Band

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



**Tested by: Tae-Ho, Kim / Senior Manager**

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**12.6.1.2 Test data for 2 Mbps**

-. Test Date : June 12, 2018 ~ June 15, 2018

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

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Result : PASSED

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Test Data for Low Channel** | | | | | | | | | |
| 2 384.45 | 53.14 | Peak | H | 26.94 | 9.20 | 34.76 | 54.52 | 74.00 | 19.48 |
| 2 384.15 | 36.58 | Average | H | | | | 37.96 | 54.00 | 16.04 |
| 2 388.36 | 55.80 | Peak | V | | | | 57.18 | 74.00 | 16.82 |
| 2 487.24 | 37.33 | Average | V | | | | 38.71 | 54.00 | 15.29 |
| **Test Data for High Channel** | | | | | | | | | |
| 2 498.15 | 46.22 | Peak | H | 27.47 | 9.49 | 35.51 | 47.67 | 74.00 | 26.33 |
| 2 498.33 | 35.57 | Average | H | | | | 37.02 | 54.00 | 16.98 |
| 2 498.68 | 46.95 | Peak | V | | | | 48.40 | 74.00 | 25.60 |
| 2 498.07 | 36.04 | Average | V | | | | 37.49 | 54.00 | 16.51 |

Tabulated test data for Restricted Band

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

**Tested by: Tae-Ho, Kim / Senior Manager**

 

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**12.6.1.3 Test data for 3 Mbps**

-. Test Date : June 12, 2018 ~ June 15, 2018

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

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Result : PASSED

| Frequency (MHz) | Reading (dBµV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Test Data for Low Channel** | | | | | | | | | |
| 2 388.54 | 52.15 | Peak | H | 26.94 | 9.20 | 34.76 | 53.53 | 74.00 | 20.47 |
| 2 388.10 | 35.85 | Average | H | | | | 37.23 | 54.00 | 16.77 |
| 2 387.45 | 54.17 | Peak | V | | | | 55.55 | 74.00 | 18.45 |
| 2 387.68 | 36.41 | Average | V | | | | 37.79 | 54.00 | 16.21 |
| **Test Data for High Channel** | | | | | | | | | |
| 2 497.54 | 51.52 | Peak | H | 27.47 | 9.49 | 35.51 | 52.97 | 74.00 | 21.03 |
| 2 497.98 | 34.84 | Average | H | | | | 36.29 | 54.00 | 17.71 |
| 2 496.84 | 53.14 | Peak | V | | | | 54.59 | 74.00 | 19.41 |
| 2 496.13 | 35.98 | Average | V | | | | 37.43 | 54.00 | 16.57 |

Tabulated test data for Restricted Band

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

**Tested by: Tae-Ho, Kim / Manager**

 

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## 12.6.2 Spurious & Harmonic Radiated Emission above 1 GHz

### 12.6.2.1 Test data for 1 Mbps

-. Test Date : June 12, 2018 ~ June 15, 2018

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

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

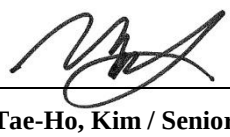
-. Measurement distance : 3 m

-. Result : PASSED

| Frequency (GHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Test Data for Low Channel** | | | | | | | | | |
| 4 804.00 | 43.41 | Peak | H | 30.84 | 12.31 | 35.74 | 50.82 | 74.00 | 23.18 |
| | 34.82 | Average | H | | | | 42.23 | 54.00 | 11.77 |
| | 45.72 | Peak | V | | | | 53.13 | 74.00 | 20.87 |
| | 36.09 | Average | V | | | | 43.50 | 54.00 | 10.50 |
| **Test Data for Middle Channel** | | | | | | | | | |
| 4 882.00 | 43.96 | Peak | H | 30.01 | 12.43 | 35.80 | 50.60 | 74.00 | 23.40 |
| | 34.54 | Average | H | | | | 41.18 | 54.00 | 12.82 |
| | 46.14 | Peak | V | | | | 52.78 | 74.00 | 21.22 |
| | 36.85 | Average | V | | | | 43.49 | 54.00 | 10.51 |
| **Test Data for High Channel** | | | | | | | | | |
| 4 960.00 | 42.15 | Peak | H | 31.15 | 12.81 | 35.96 | 50.15 | 74.00 | 23.85 |
| | 33.86 | Average | H | | | | 41.86 | 54.00 | 12.14 |
| | 44.56 | Peak | V | | | | 52.56 | 74.00 | 21.44 |
| | 34.51 | Average | V | | | | 42.51 | 54.00 | 11.49 |

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical, “*” Frequency fall in restricted band



**Tested by: Tae-Ho, Kim / Senior Manager**

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**12.6.2.2 Test data for 2 Mbps**

-. Test Date : June 12, 2018 ~ June 15, 2018

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

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

| Frequency (GHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Test Data for Low Channel** | | | | | | | | | |
| 4 804.00 | 42.15 | Peak | H | 30.84 | 12.31 | 35.74 | 49.56 | 74.00 | 24.44 |
| | 33.54 | Average | H | | | | 40.95 | 54.00 | 13.05 |
| | 44.54 | Peak | V | | | | 51.95 | 74.00 | 22.05 |
| | 34.98 | Average | V | | | | 42.39 | 54.00 | 11.61 |
| **Test Data for Middle Channel** | | | | | | | | | |
| 4 882.00 | 41.54 | Peak | H | 30.01 | 12.43 | 35.80 | 48.18 | 74.00 | 25.82 |
| | 33.86 | Average | H | | | | 40.50 | 54.00 | 13.50 |
| | 44.68 | Peak | V | | | | 51.32 | 74.00 | 22.68 |
| | 33.41 | Average | V | | | | 40.05 | 54.00 | 13.95 |
| **Test Data for High Channel** | | | | | | | | | |
| 4 960.00 | 41.85 | Peak | H | 31.15 | 12.81 | 35.96 | 49.85 | 74.00 | 24.15 |
| | 33.96 | Average | H | | | | 41.96 | 54.00 | 12.04 |
| | 43.85 | Peak | V | | | | 51.85 | 74.00 | 22.15 |
| | 34.95 | Average | V | | | | 42.95 | 54.00 | 11.05 |

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical, “*” Frequency fall in restricted band

**Tested by: Tae-Ho, Kim / Senior Manager**

 

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**12.6.2.3 Test data for 3 Mbps**

-. Test Date : June 12, 2018 ~ June 15, 2018

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

-. Video bandwidth : 3 MHz for Peak and Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

| Frequency (GHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | Amp Gain | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **Test Data for Low Channel** | | | | | | | | | |
| 4 804.00 | 41.37 | Peak | H | 30.84 | 12.31 | 35.74 | 48.78 | 74.00 | 25.22 |
| | 34.22 | Average | H | | | | 41.63 | 54.00 | 12.37 |
| | 43.37 | Peak | V | | | | 50.78 | 74.00 | 23.22 |
| | 34.68 | Average | V | | | | 42.09 | 54.00 | 11.91 |
| **Test Data for Middle Channel** | | | | | | | | | |
| 4 882.00 | 41.52 | Peak | H | 30.01 | 12.43 | 35.80 | 48.16 | 74.00 | 25.84 |
| | 33.89 | Average | H | | | | 40.53 | 54.00 | 13.47 |
| | 43.50 | Peak | V | | | | 50.14 | 74.00 | 23.86 |
| | 34.17 | Average | V | | | | 40.81 | 54.00 | 13.19 |
| **Test Data for High Channel** | | | | | | | | | |
| 4 960.00 | 41.54 | Peak | H | 31.15 | 12.81 | 35.96 | 49.54 | 74.00 | 24.46 |
| | 33.11 | Average | H | | | | 41.11 | 54.00 | 12.89 |
| | 43.12 | Peak | V | | | | 51.12 | 74.00 | 22.88 |
| | 34.24 | Average | V | | | | 42.24 | 54.00 | 11.76 |

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical, “*” Frequency fall in restricted band

**Tested by: Tae-Ho, Kim / Senior Manager**

 

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# 13. RADIATED EMISSION TEST

## 13.1 Operating environment

Temperature : 22.4 ℃

Relative humidity : 43.8 % R.H

## 13.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

## 13.3 Test equipment used

| | Model Number | Manufacturer | Description | Serial Number | Last Cal. |
|---|---|---|---|---|---|
| ■ - | FSV40 | Rohde & Schwarz | Signal Analyzer | 101009 | Mar. 14, 2018 (1Y) |
| ■ - | ESU | Rohde & Schwarz | EMI Test Receiver | 100261 | Mar. 29, 2018 (1Y) |
| ■ - | 310N | Sonoma Instrument | Pre-Amplifier | 312544 | Mar. 28, 2018 (1Y) |
| ■ - | BBV9718 | Schwarzbeck | Amplifier | 310 | Mar. 30, 2018 (1Y) |
| ■ | DT3000-3t | Innco System | Turn Table | DT3000/093 | N/A |
| ■ - | MA-4000XPET | Innco System | Antenna Master | MA4000/509 | N/A |
| ■ - | VULB9163 | Schwarzbeck | TRILOG Broadband Antenna | 9163-419 | Aug. 05, 2016 (2Y) |
| ■ - | BBHA9120D | Schwarzbeck | Horn Antenna | BBHA9120D295 | Aug. 16, 2017 (2Y) |
| ■ - | BBHA9170 | Schwarzbeck | Horn Antenna | BBHA9170179 | Jul. 28, 2017 (2Y) |

All test equipment used is calibrated on a regular basis.

 

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

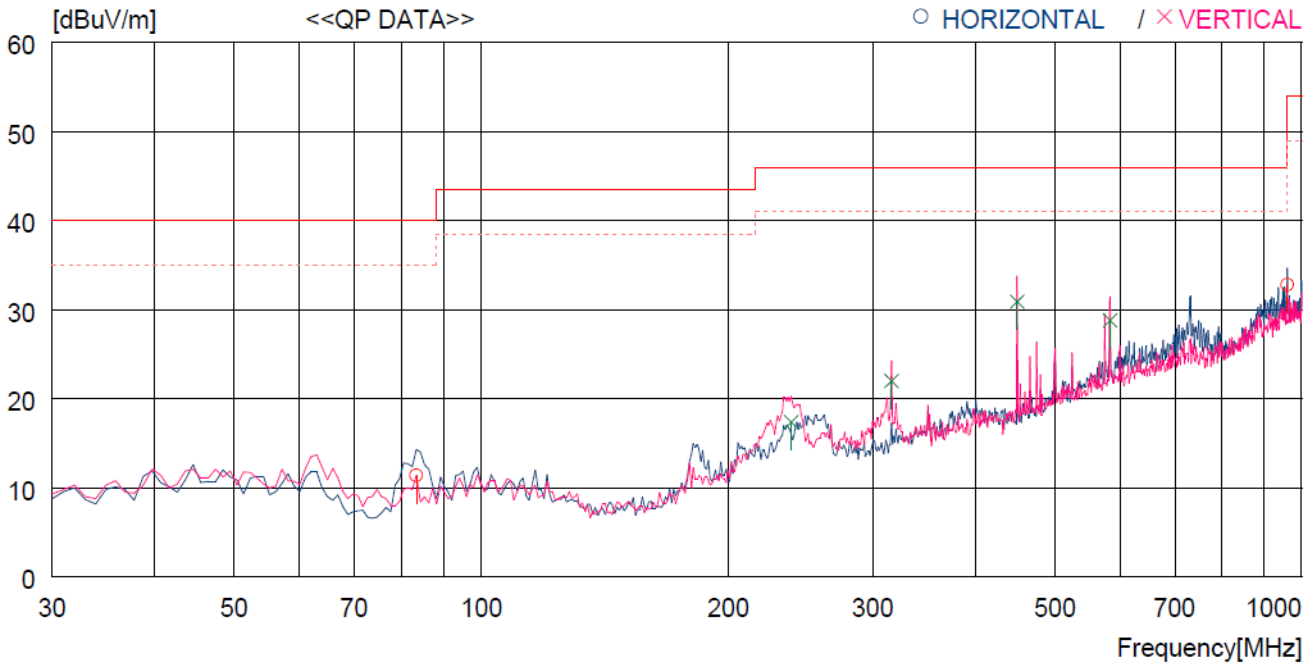
-. Test Date : June 12, 2018 ~ June 15, 2018

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 3 m

-. Operating condition : Low Channel




| 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 | 83.350 | 33.3 | 8.6 | 2.6 | 33.1 | 11.4 | 40.0 | 28.6 | 100 | 54 |
| 2 | 960.217 | 33.1 | 22.4 | 9.4 | 32.1 | 32.8 | 54.0 | 21.2 | 100 | 134 |
| ----- Vertical ------ | | | | | | | | | | |
| 3 | 238.550 | 33.9 | 12.0 | 4.5 | 33.0 | 17.4 | 46.0 | 28.6 | 100 | 0 |
| 4 | 316.150 | 35.8 | 13.9 | 5.3 | 33.0 | 22.0 | 46.0 | 24.0 | 100 | 321 |
| 5 | 450.011 | 41.6 | 16.1 | 6.4 | 33.2 | 30.9 | 46.0 | 15.1 | 100 | 0 |
| 6 | 583.868 | 36.1 | 18.9 | 7.3 | 33.5 | 28.8 | 46.0 | 17.2 | 100 | 0 |

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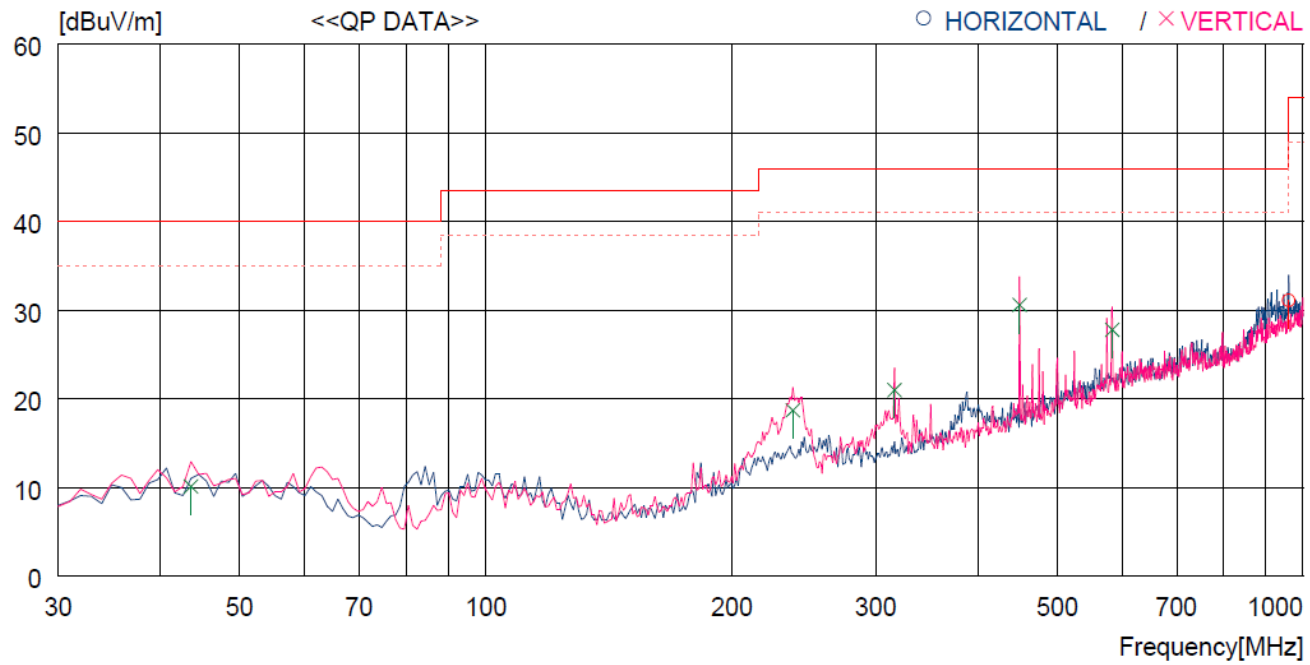
Operating condition : Middle Channel




| 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 | 960.217 | 31.4 | 22.4 | 9.4 | 32.1 | 31.1 | 54.0 | 22.9 | 100 | 111 |
| ----- Vertical ------ | | | | | | | | | | |
| 2 | 43.580 | 26.8 | 14.4 | 1.9 | 33.0 | 10.1 | 40.0 | 29.9 | 100 | 249 |
| 3 | 237.580 | 35.2 | 12.0 | 4.5 | 33.0 | 18.7 | 46.0 | 27.3 | 100 | 266 |
| 4 | 316.150 | 34.8 | 13.9 | 5.3 | 33.0 | 21.0 | 46.0 | 25.0 | 100 | 0 |
| 5 | 450.011 | 41.3 | 16.1 | 6.4 | 33.2 | 30.6 | 46.0 | 15.4 | 100 | 0 |
| 6 | 583.868 | 35.1 | 18.9 | 7.3 | 33.5 | 27.8 | 46.0 | 18.2 | 100 | 0 |



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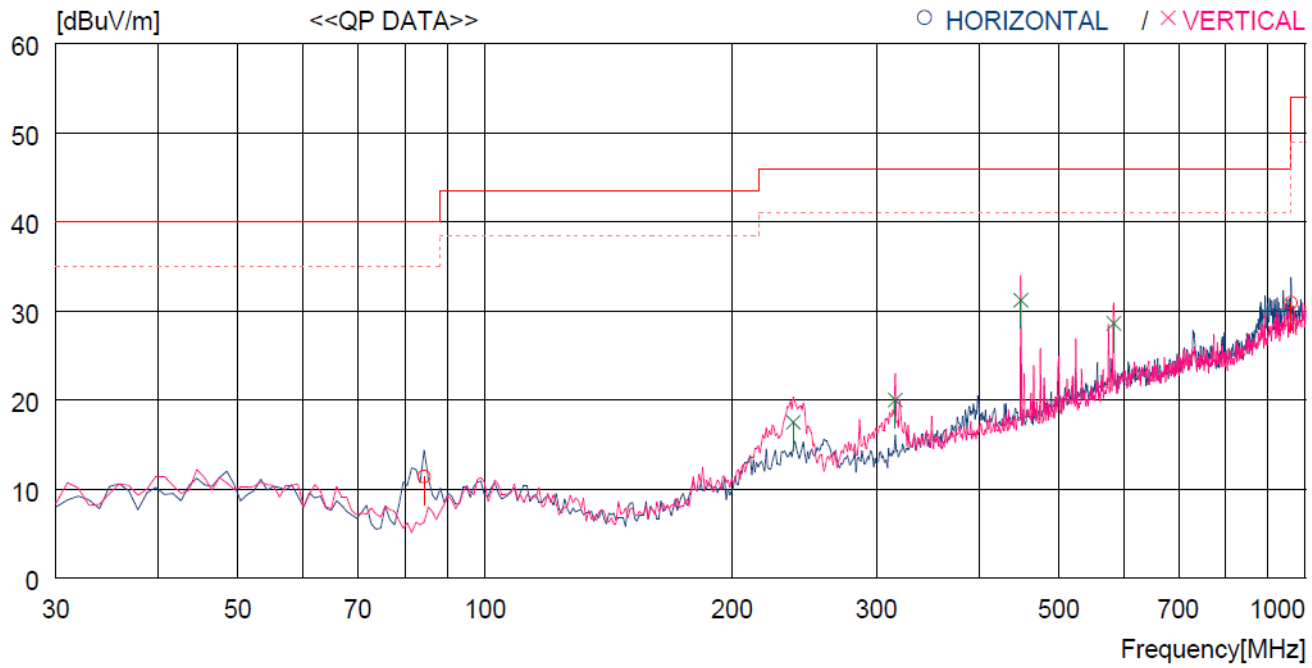
Operating condition : High Channel




| 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 | 84.320 | 33.0 | 8.9 | 2.6 | 33.1 | 11.4 | 40.0 | 28.6 | 100 | 245 |
| 2 | 960.217 | 31.2 | 22.4 | 9.4 | 32.1 | 30.9 | 54.0 | 23.1 | 100 | 117 |
| ----- Vertical ------ | | | | | | | | | | |
| 3 | 237.580 | 34.0 | 12.0 | 4.5 | 33.0 | 17.5 | 46.0 | 28.5 | 100 | 359 |
| 4 | 316.150 | 33.8 | 13.9 | 5.3 | 33.0 | 20.0 | 46.0 | 26.0 | 100 | 161 |
| 5 | 450.011 | 41.9 | 16.1 | 6.4 | 33.2 | 31.2 | 46.0 | 14.8 | 100 | 359 |
| 6 | 583.868 | 35.9 | 18.9 | 7.3 | 33.5 | 28.6 | 46.0 | 17.4 | 100 | 359 |

**Tested by: Tae-Ho, Kim / Senior Manager**

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### 13.5 Test data for Below 30 MHz

-. Test Date : June 12, 2018 ~ June 15, 2018

-. 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

| Frequency (MHz) | Reading (dBµV) | Ant. Pol. (H/V) | Ant. Factor (dB/m) | Cable Loss | Amp Gain | Emission Level(dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| It was not observed any emissions from the EUT. | | | | | | | | |

### 13.6 Test data for above 1 GHz

-. Test Date : June 12, 2018 ~ June 15, 2018

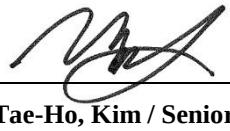
-. Resolution bandwidth : 1 MHz for Peak and Average Mode

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

| Frequency (MHz) | Reading (dBµV) | Ant. Pol. (H/V) | Ant. Factor (dB/m) | Cable Loss | Amp Gain | Emission Level(dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| It was not observed any emissions from the EUT. | | | | | | | | |



**Tested by: Tae-Ho, Kim / Senior Manager**

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# 14. CONDUCTED EMISSION TEST

## 14.1 Operating environment

Temperature : 22.4 ℃

Relative humidity : 43.8 % 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 | EMI Test Receiver | 101278 | Oct. 27, 2017 (1Y) |
| ☐ - | ESHS10 | Rohde & Schwarz | EMI Test Receiver | 834467/007 | Mar. 29, 2018 (1Y) |
| ☐ - | NSLK8128 | Schwarzbeck | AMN | 8128-216 | Mar. 29, 2018 (1Y) |
| ■ - | NSLK8126 | Schwarzbeck | AMN | 8126-404 | Apr. 04, 2018 (1Y) |
| ☐ - | 3825/2 | EMCO | AMN | 9109-1869 | Apr. 11, 2018 (1Y) |
| ■ - | 3825/2 | EMCO | AMN | 9109-1867 | Mar. 28, 2018 (1Y) |
| ■ - | TC-3000C | TESCOM | BLUETOOTH TESTER | 3000C000634 | Mar. 15, 2018 (1Y) |

All test equipment used is calibrated on a regular basis.

 

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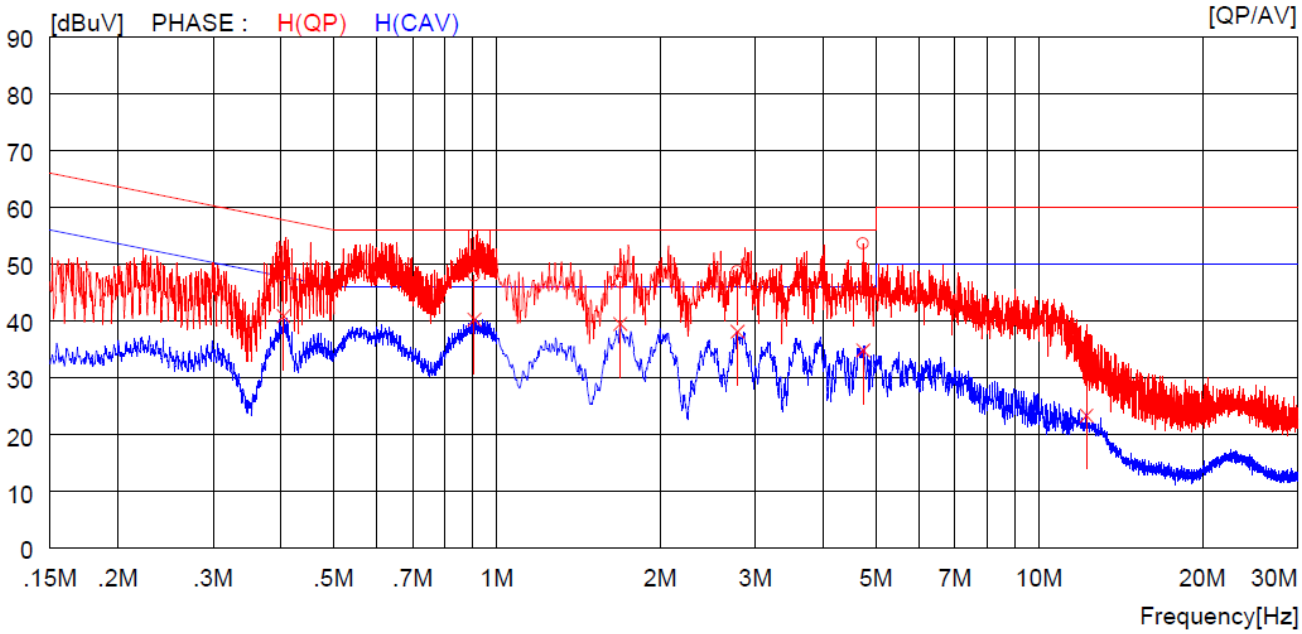
### 14.4 Test data

-. Test Date : June 12, 2018 ~ June 15, 2018

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE




| NO | FREQ [MHz] | READING QP [dBuV] | READING AV [dBuV] | C.FACTOR [dB] | RESULT QP [dBuV] | RESULT AV [dBuV] | LIMIT QP [dBuV] | LIMIT AV [dBuV] | MARGIN QP [dBuV] | MARGIN AV [dBuV] | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.40400 | 38.3 | ---- | 9.8 | 48.1 | ---- | 57.8 | ---- | 9.7 | ---- | H(QP) |
| 2 | 0.90800 | 38.1 | ---- | 9.9 | 48.0 | ---- | 56.0 | ---- | 8.0 | ---- | H(QP) |
| 3 | 1.68800 | 36.9 | ---- | 9.9 | 46.8 | ---- | 56.0 | ---- | 9.2 | ---- | H(QP) |
| 4 | 2.77600 | 38.8 | ---- | 10.0 | 48.8 | ---- | 56.0 | ---- | 7.2 | ---- | H(QP) |
| 5 | 4.73600 | 43.5 | ---- | 10.1 | 53.6 | ---- | 56.0 | ---- | 2.4 | ---- | H(QP) |
| 6 | 12.23000 | 23.1 | ---- | 10.2 | 33.3 | ---- | 60.0 | ---- | 26.7 | ---- | H(QP) |
| 7 | 0.40400 | ---- | 31.1 | 9.8 | ---- | 40.9 | ---- | 47.8 | ---- | 6.9 | H(CAV) |
| 8 | 0.90800 | ---- | 30.4 | 9.9 | ---- | 40.3 | ---- | 46.0 | ---- | 5.7 | H(CAV) |
| 9 | 1.68800 | ---- | 29.6 | 9.9 | ---- | 39.5 | ---- | 46.0 | ---- | 6.5 | H(CAV) |
| 10 | 2.77600 | ---- | 28.1 | 10.0 | ---- | 38.1 | ---- | 46.0 | ---- | 7.9 | H(CAV) |
| 11 | 4.73600 | ---- | 24.7 | 10.1 | ---- | 34.8 | ---- | 46.0 | ---- | 11.2 | H(CAV) |
| 12 | 12.23000 | ---- | 13.2 | 10.2 | ---- | 23.4 | ---- | 50.0 | ---- | 26.6 | H(CAV) |



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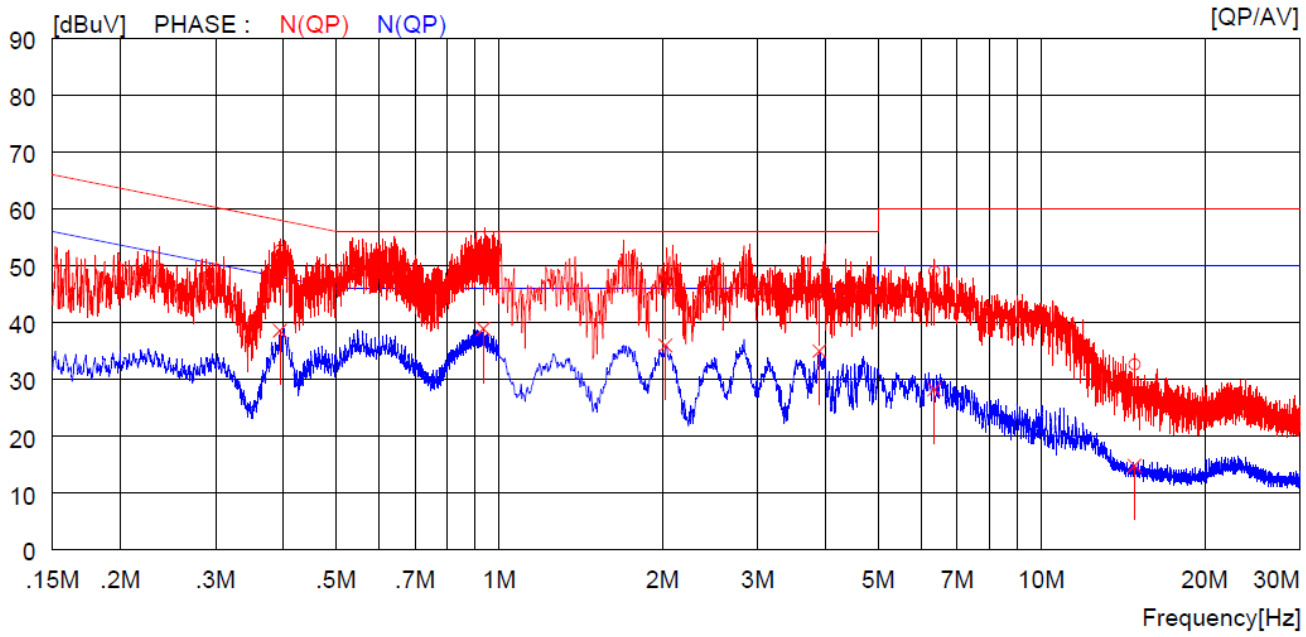
-. Tested Line : NEUTRAL LINE




| NO | FREQ [MHz] | READING QP [dBuV] | READING AV [dBuV] | C.FACTOR [dB] | RESULT QP [dBuV] | RESULT AV [dBuV] | LIMIT QP [dBuV] | LIMIT AV [dBuV] | MARGIN QP [dBuV] | MARGIN AV [dBuV] | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.39400 | 42.8 | ---- | 9.8 | 52.6 | ---- | 58.0 | ---- | 5.4 | ---- | N(QP) |
| 2 | 0.93500 | 42.8 | ---- | 9.9 | 52.7 | ---- | 56.0 | ---- | 3.3 | ---- | N(QP) |
| 3 | 2.02400 | 36.6 | ---- | 9.9 | 46.5 | ---- | 56.0 | ---- | 9.5 | ---- | N(QP) |
| 4 | 3.89200 | 35.5 | ---- | 10.1 | 45.6 | ---- | 56.0 | ---- | 10.4 | ---- | N(QP) |
| 5 | 6.34500 | 38.8 | ---- | 10.2 | 49.0 | ---- | 60.0 | ---- | 11.0 | ---- | N(QP) |
| 6 | 14.86000 | 22.2 | ---- | 10.4 | 32.6 | ---- | 60.0 | ---- | 27.4 | ---- | N(QP) |
| 7 | 0.39400 | ---- | 28.8 | 9.8 | ---- | 38.6 | ---- | 48.0 | ---- | 9.4 | N(CAV) |
| 8 | 0.93500 | ---- | 29.0 | 9.9 | ---- | 38.9 | ---- | 46.0 | ---- | 7.1 | N(CAV) |
| 9 | 2.02400 | ---- | 26.1 | 9.9 | ---- | 36.0 | ---- | 46.0 | ---- | 10.0 | N(CAV) |
| 10 | 3.89200 | ---- | 24.9 | 10.1 | ---- | 35.0 | ---- | 46.0 | ---- | 11.0 | N(CAV) |
| 11 | 6.34500 | ---- | 18.0 | 10.2 | ---- | 28.2 | ---- | 50.0 | ---- | 21.8 | N(CAV) |
| 12 | 14.86000 | ---- | 4.4 | 10.4 | ---- | 14.8 | ---- | 50.0 | ---- | 35.2 | 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: Tae-Ho, Kim / Senior Manager**



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