# 12. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

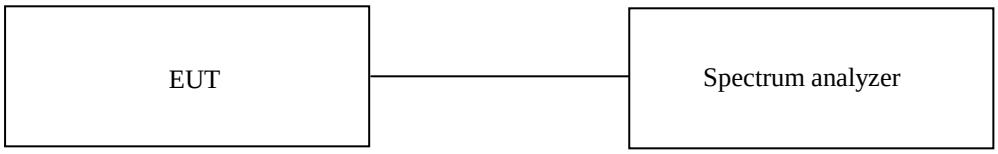
## 12.1 Operating environment

Temperature : 21 ℃

Relative humidity : 45 % 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 | Apr. 05, 2017 (1Y) |
| ■ - | ESU | Rohde & Schwarz | EMI Test Receiver | 100261 | Apr. 06, 2017 (1Y) |
| ■ - | 310N | Sonoma Instrument | Pre-Amplifier | 312544 | Apr. 05, 2017 (1Y) |
| ■ - | BBV9718 | Schwarzbeck | Amplifier | 310 | Sep. 01, 2017 (1Y) |
| ■ | SCU40A | Rohde & Schwarz | Signal Conditioning unit | 100436 | Apr. 04, 2017 (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 | 9163-421 | Apr. 15, 2016 (2Y) |
| ■ - | BBHA9120D | Schwarzbeck | Horn Antenna | BBHA9120D295 | May 26, 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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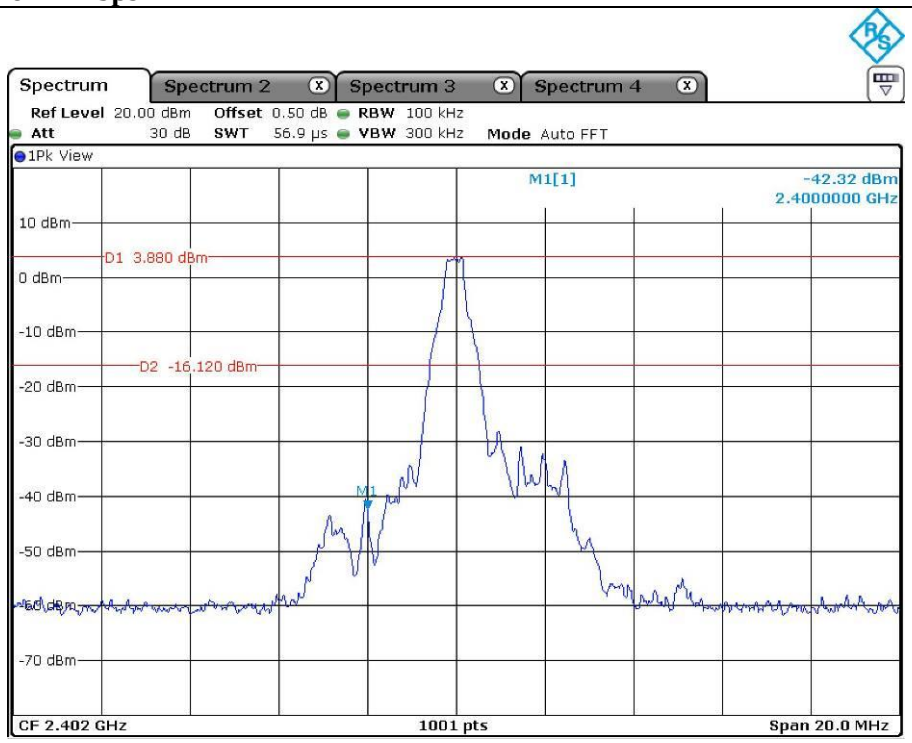
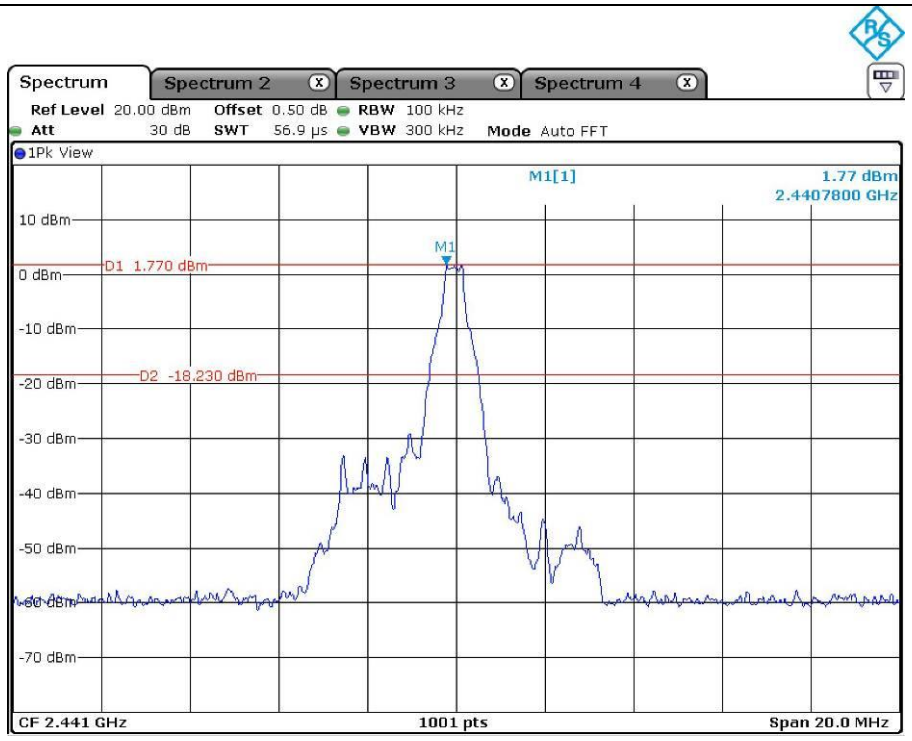
## 12.5 Test data for conducted emission

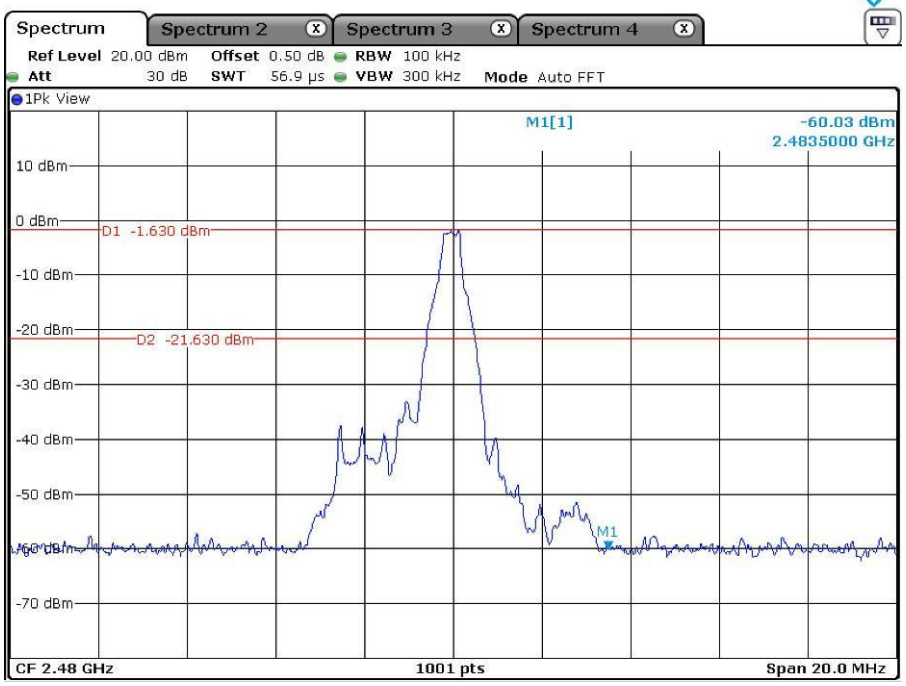
### 12.5.1 Test data for 1 Mbps



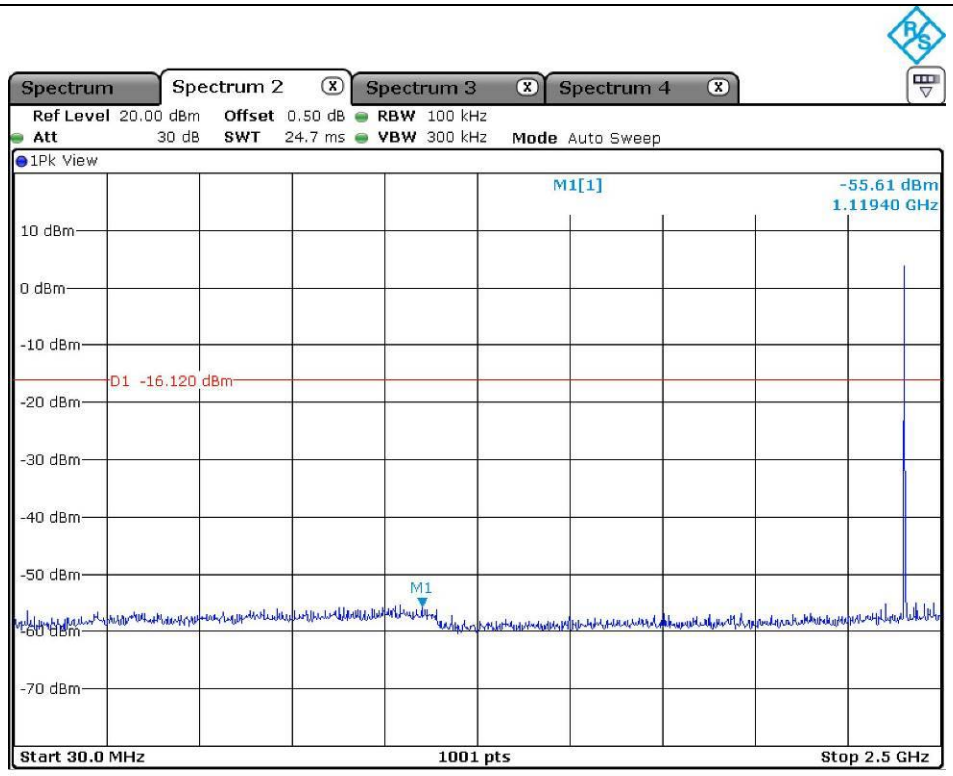

Low Channel



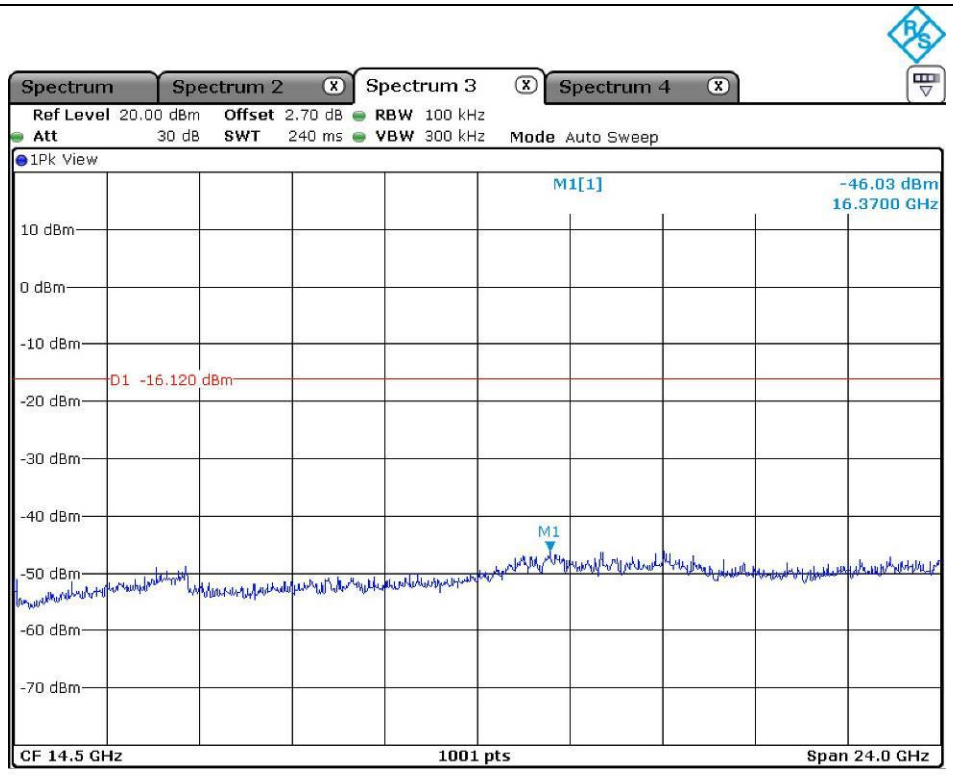

Middle Channel




High Channel




Low Channel




Low Channel



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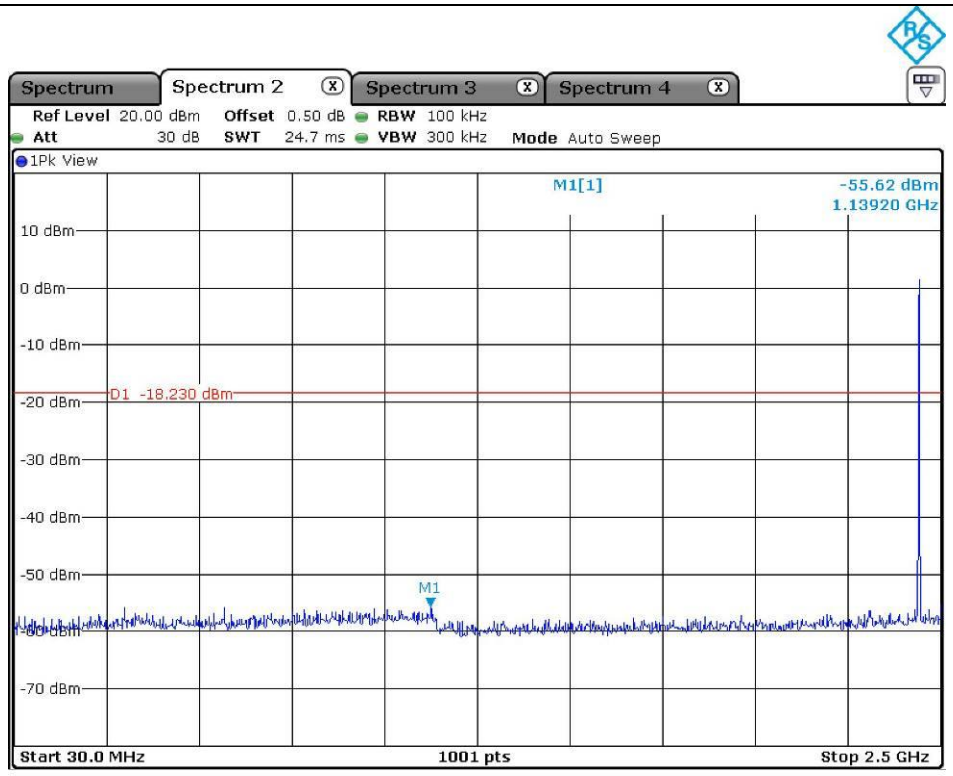
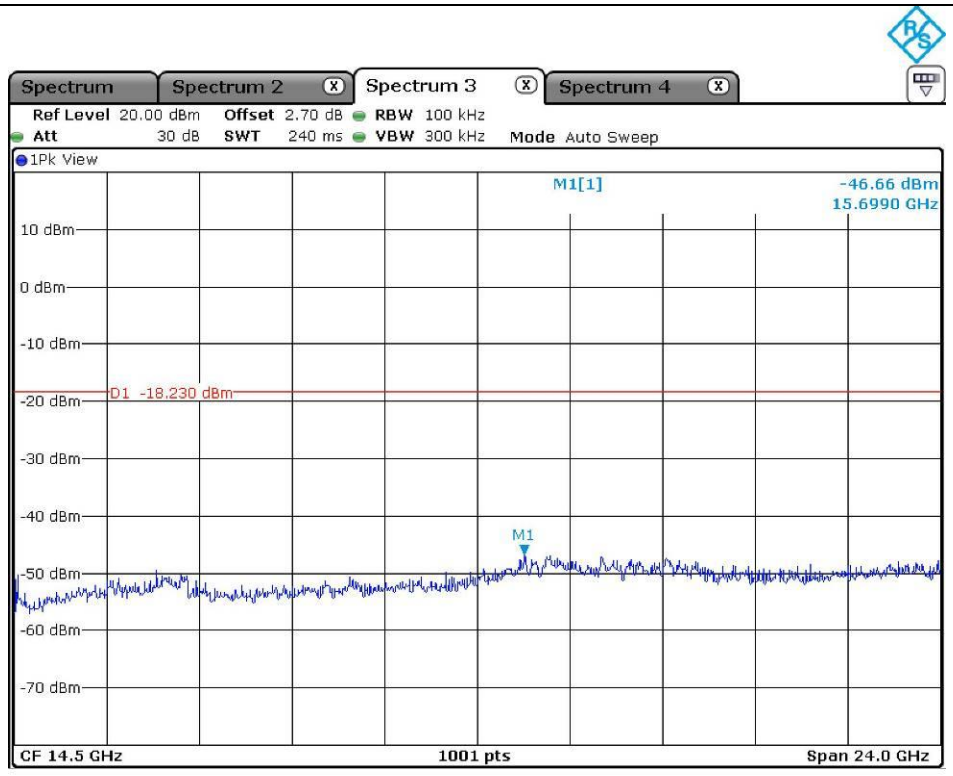



Middle Channel




Middle Channel



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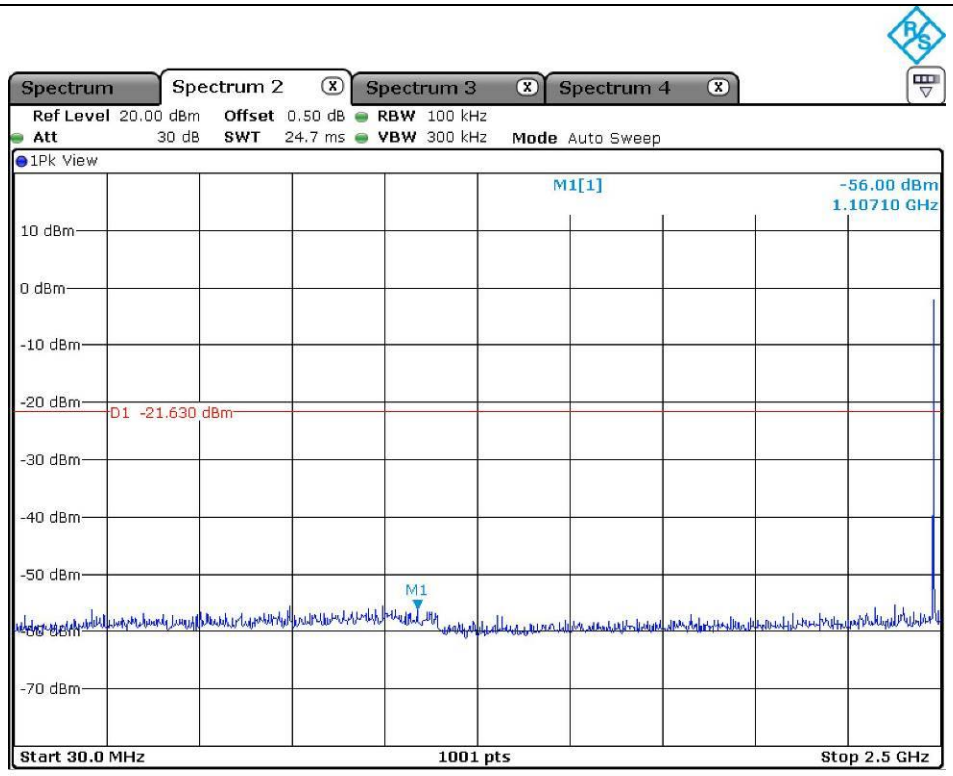
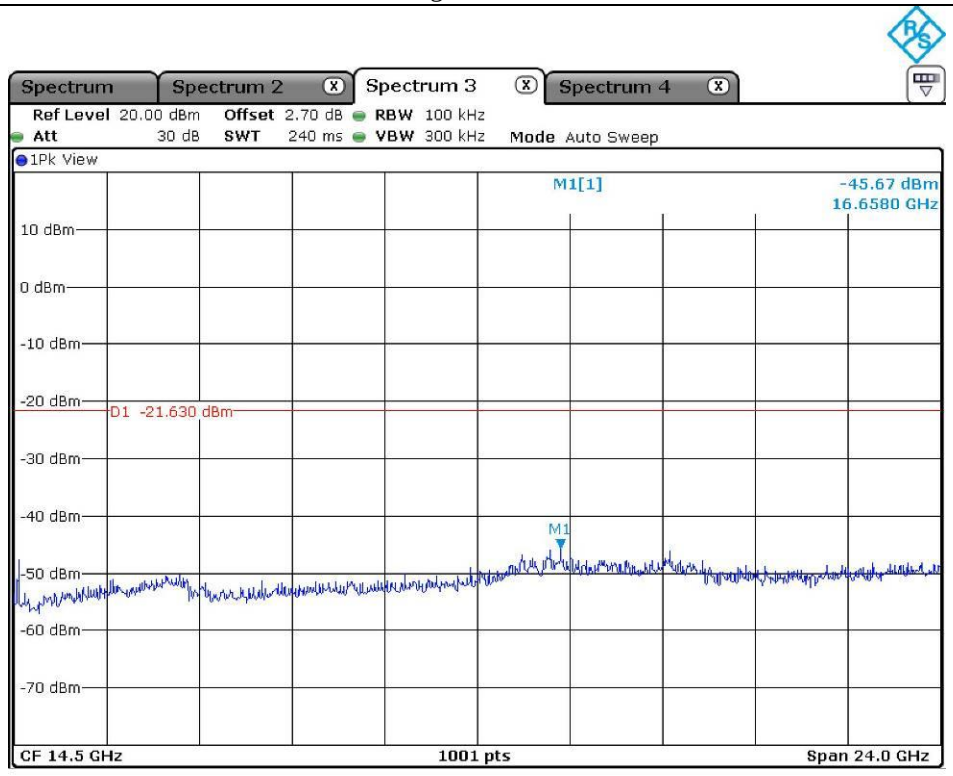
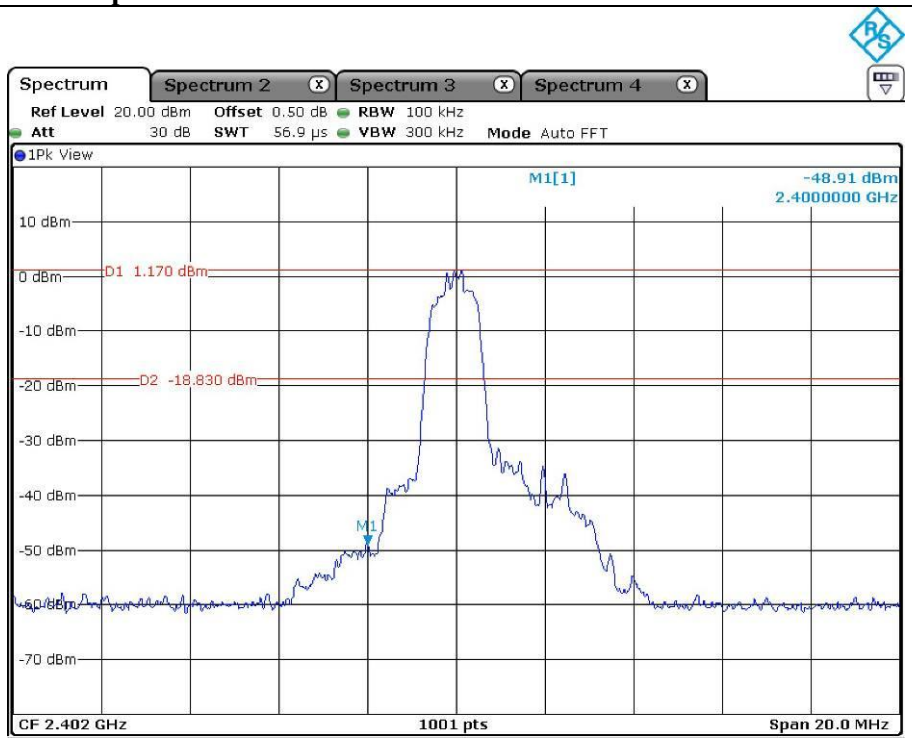



High Channel

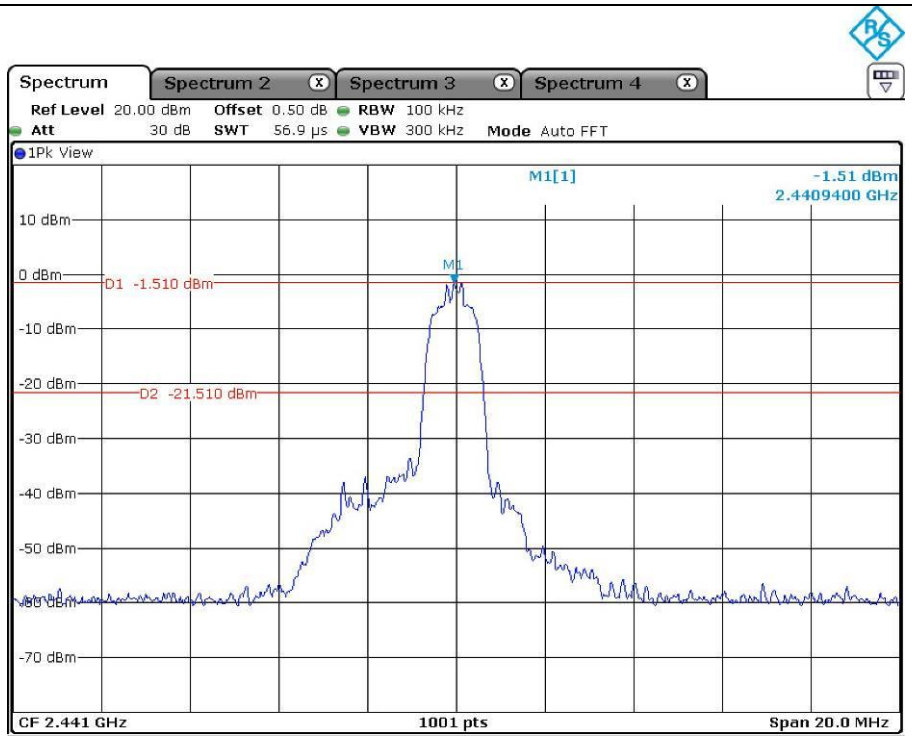



High Channel

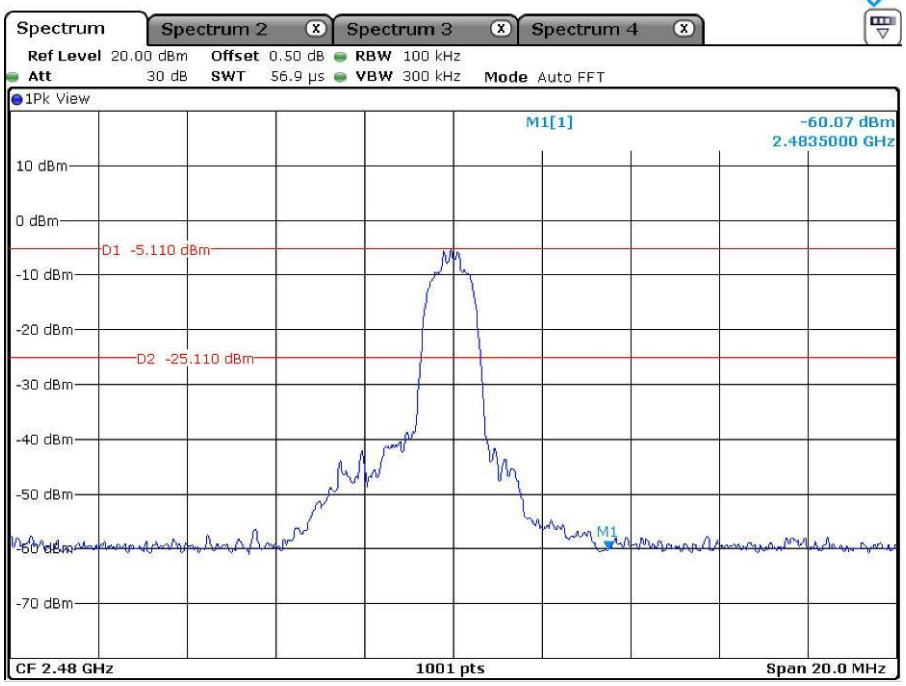
### 12.5.2 Test data for 2 Mbps



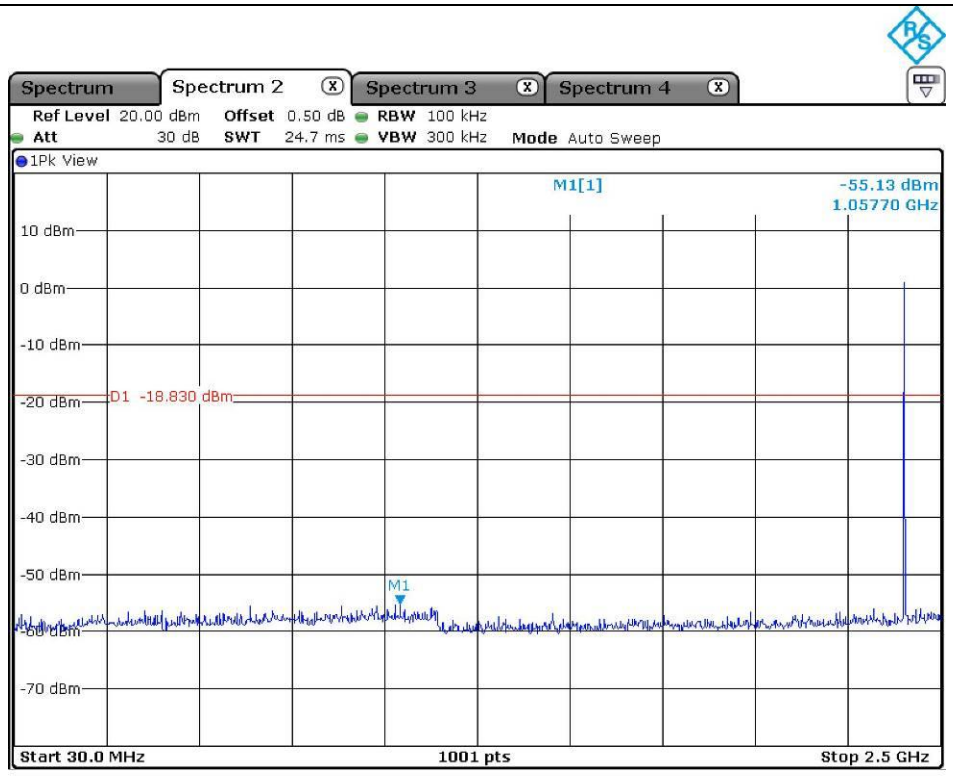

Low Channel



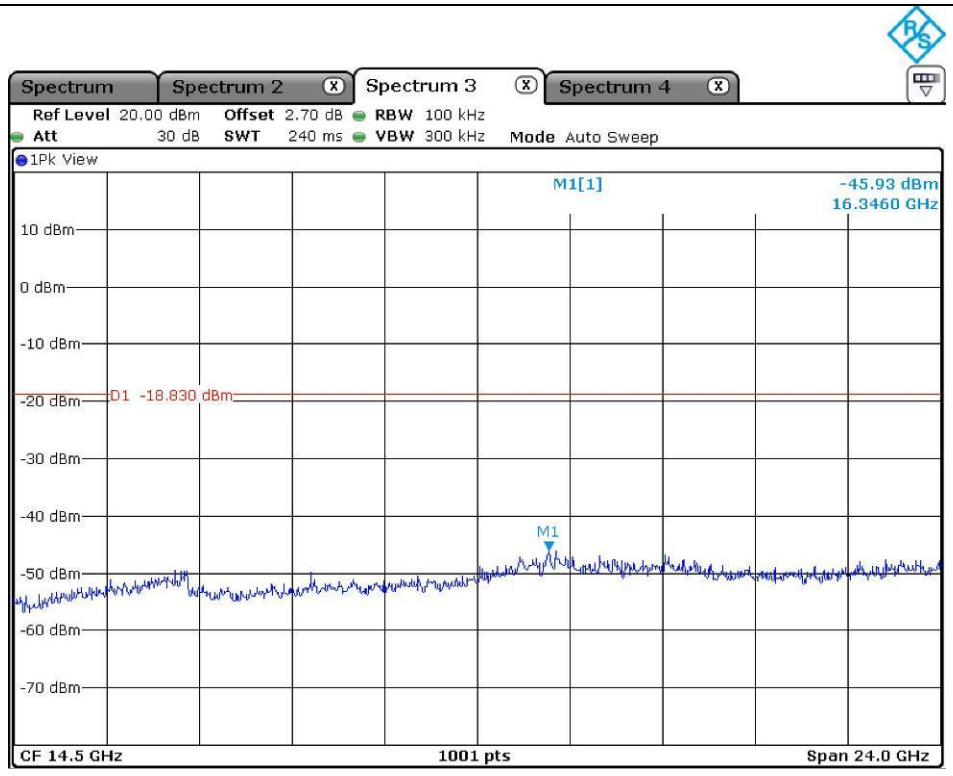

Middle Channel



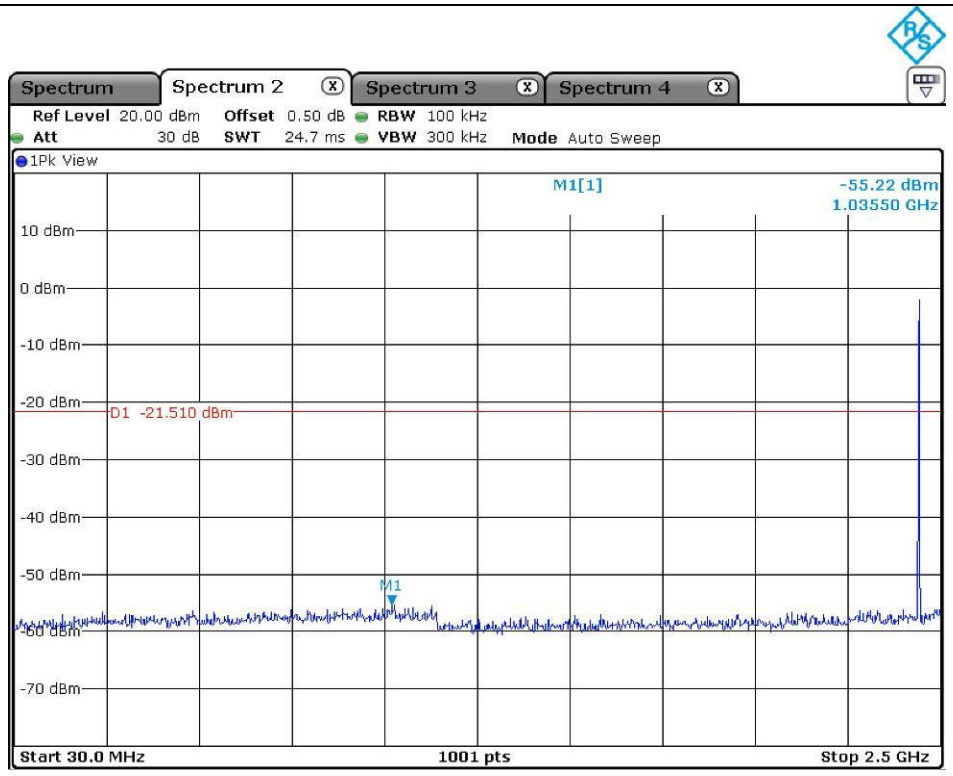

High Channel



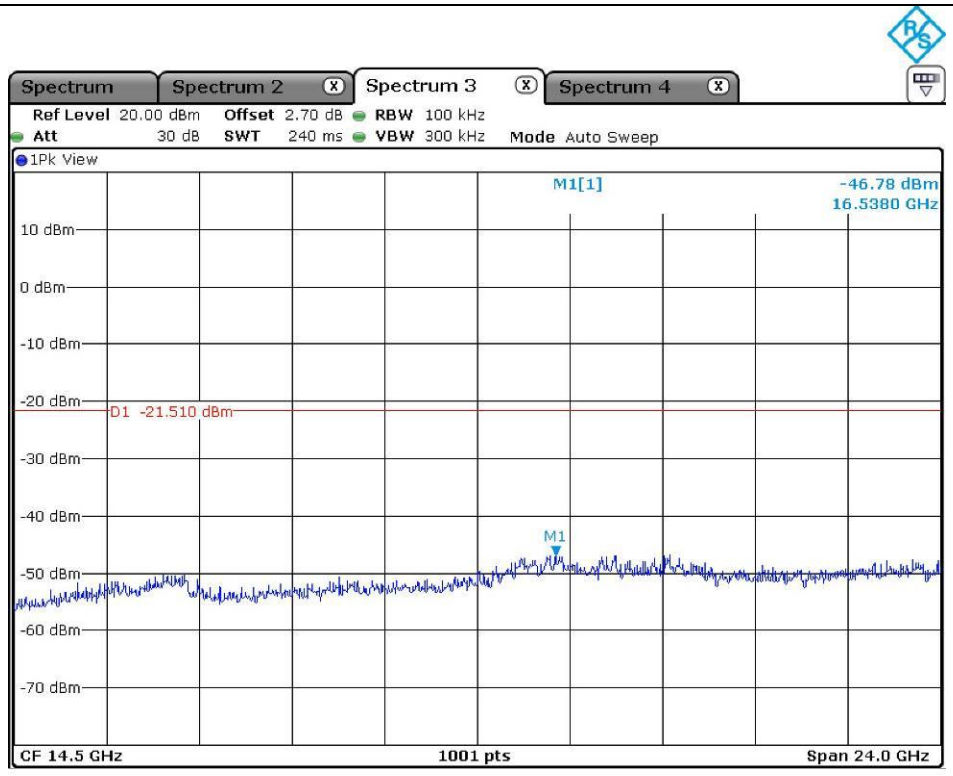

Low Channel



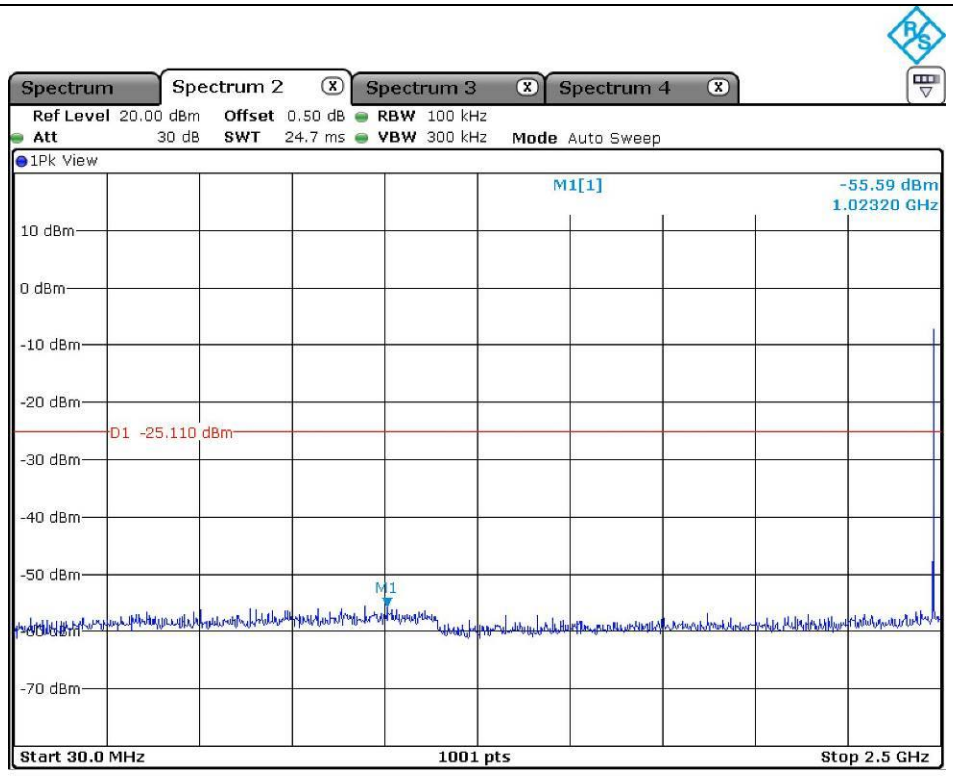

Low Channel



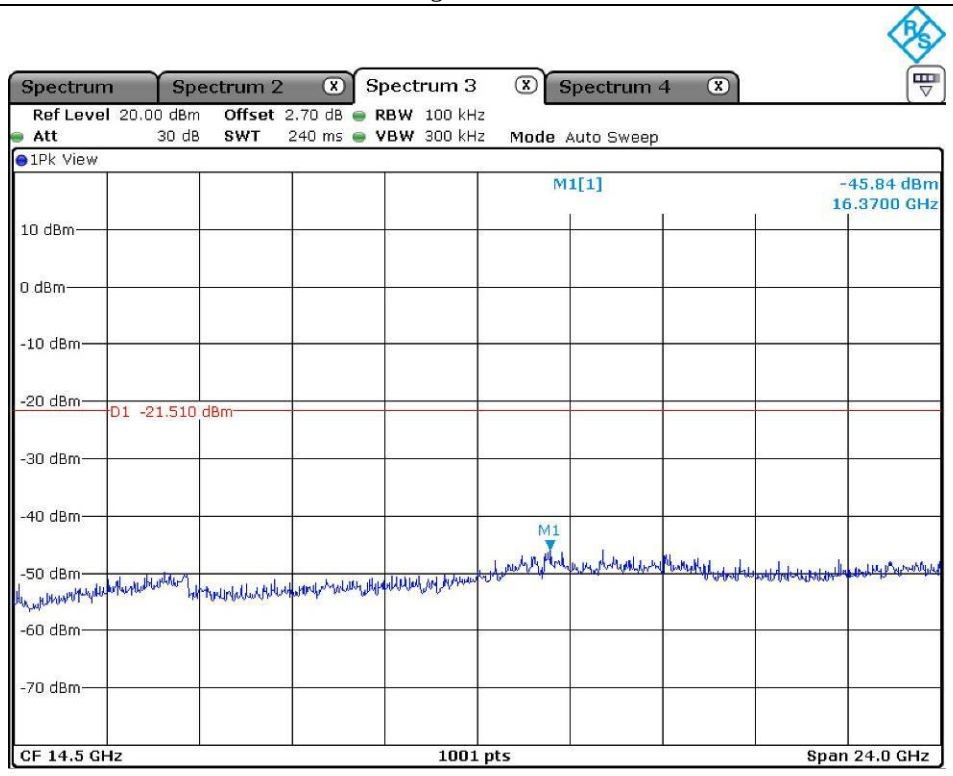

Middle Channel




Middle Channel

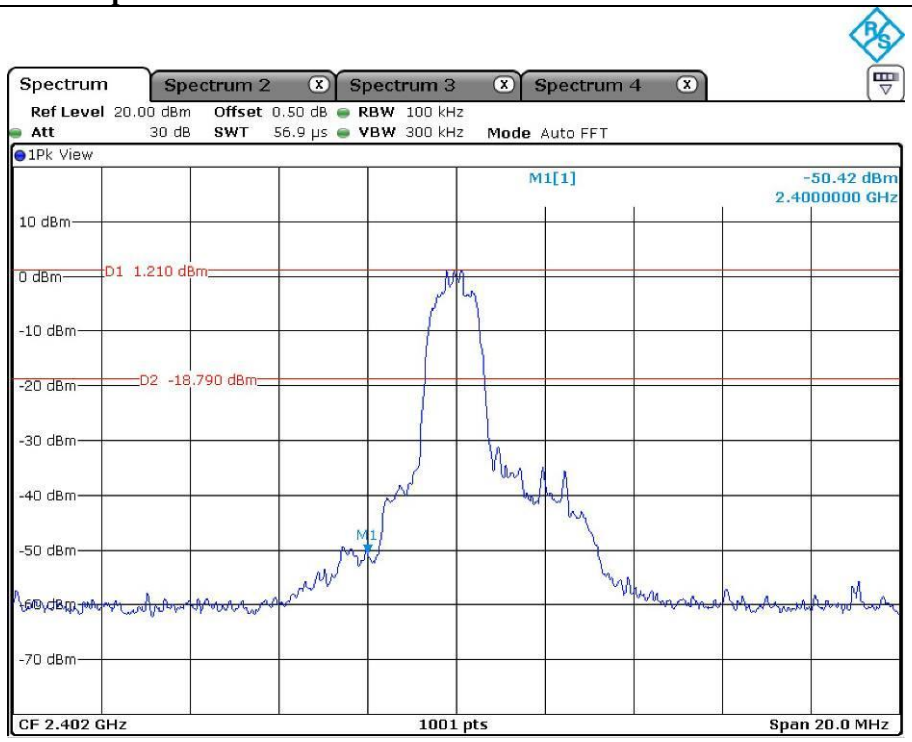



High Channel

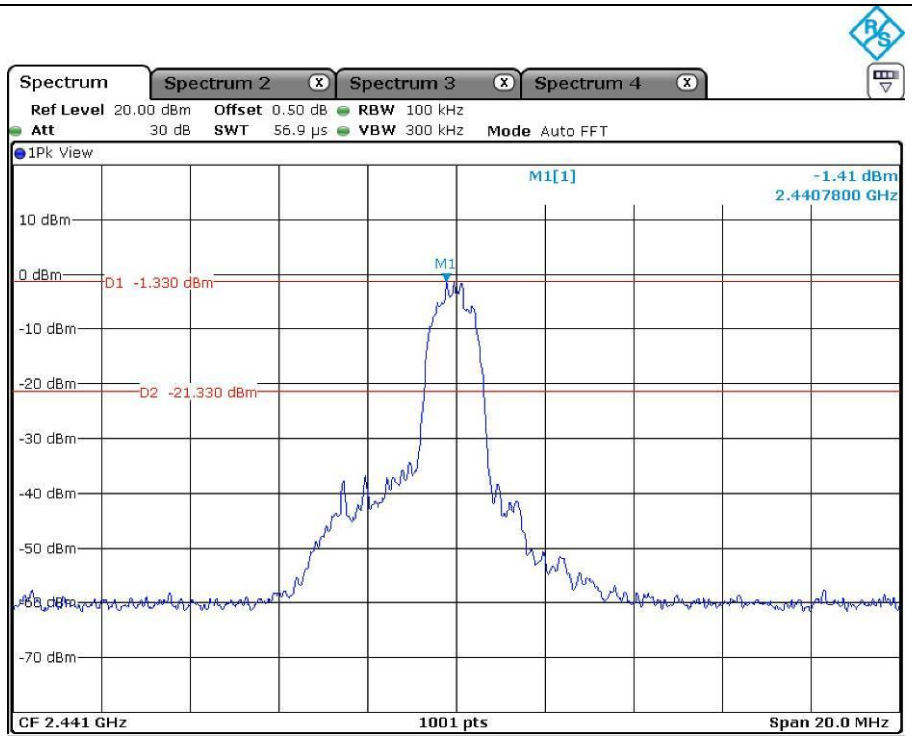



High Channel

### 12.5.3 Test data for 3 Mbps




Low Channel




Middle Channel



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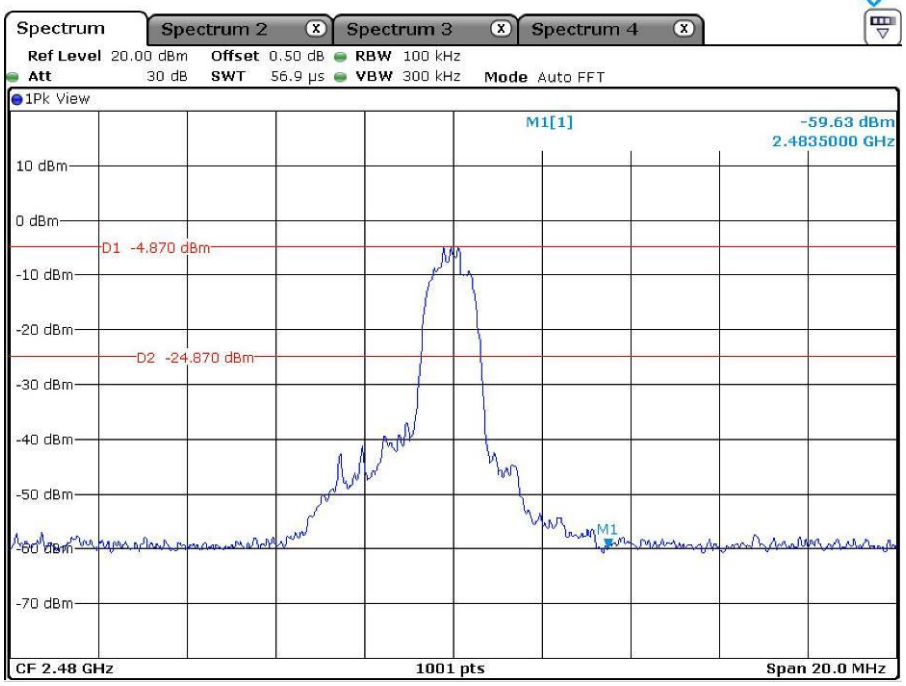
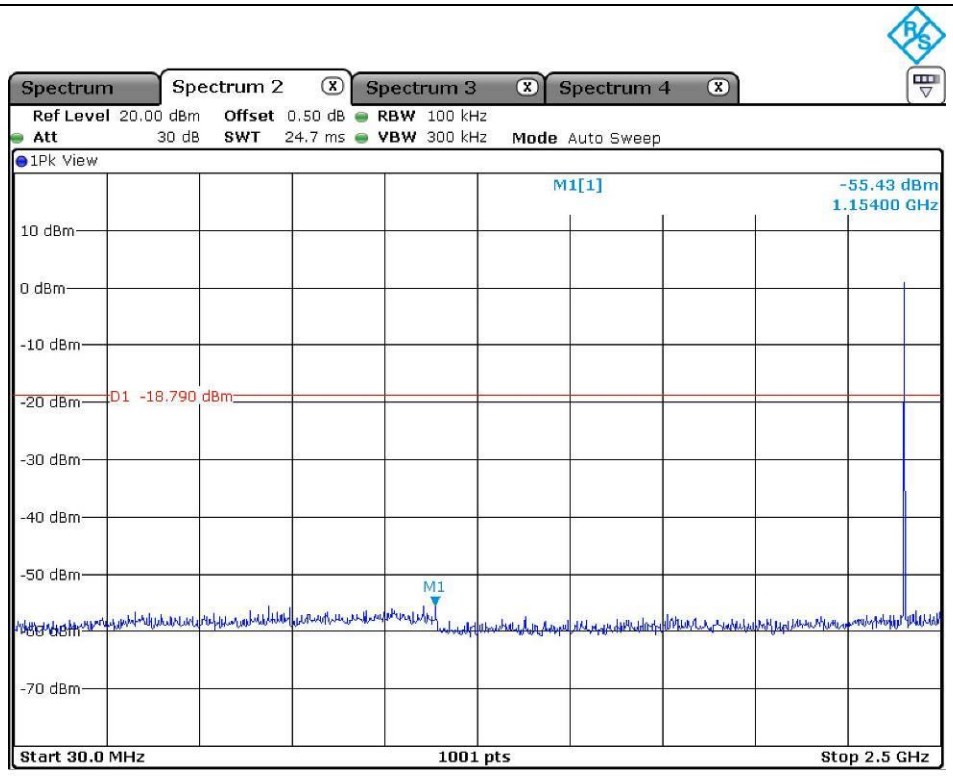
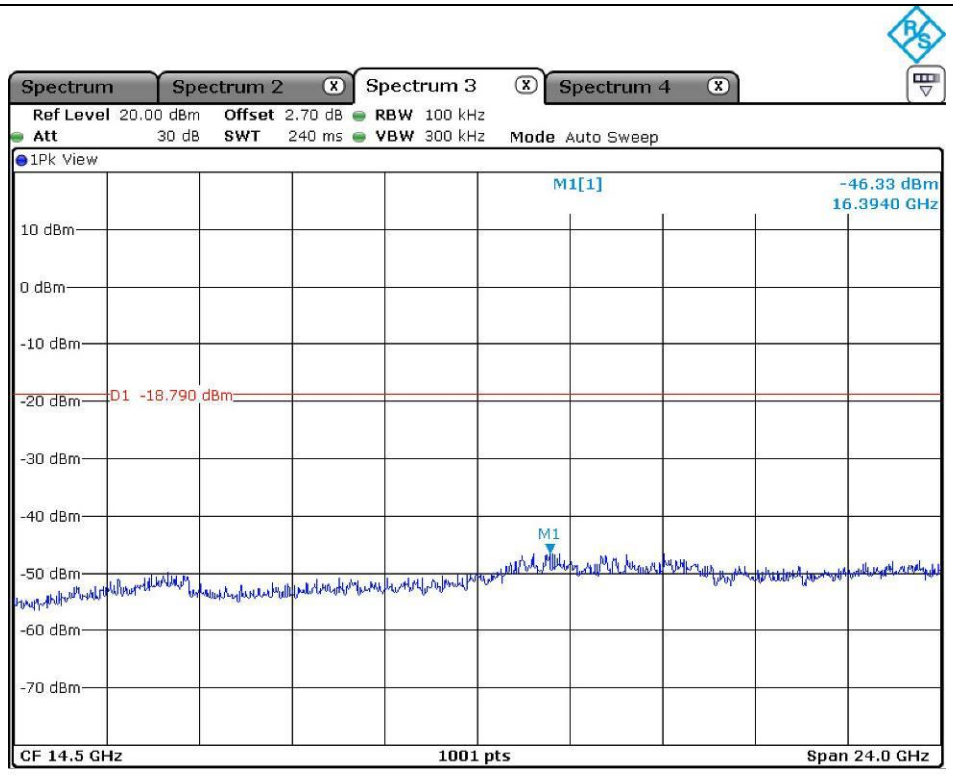



High Channel




Low Channel




Low Channel



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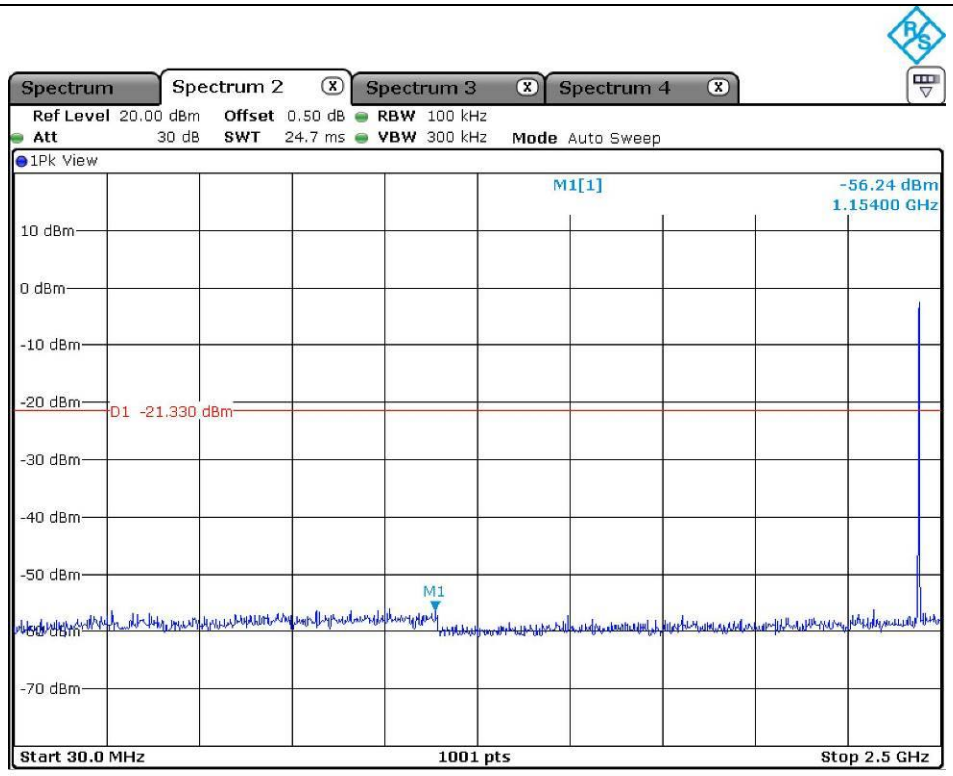
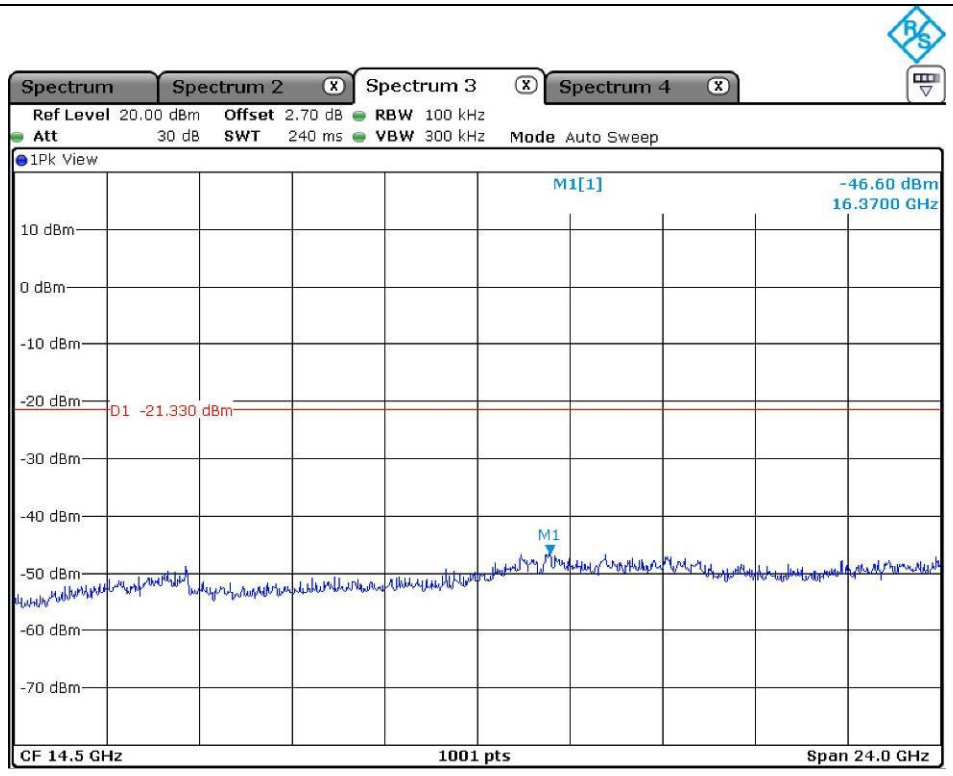
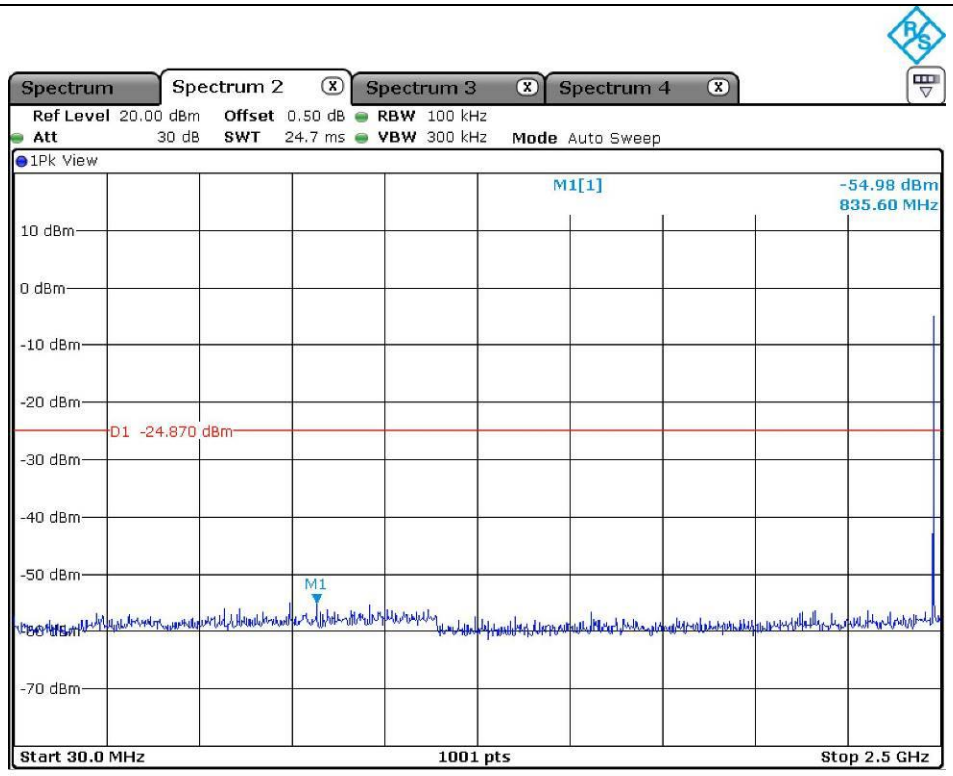


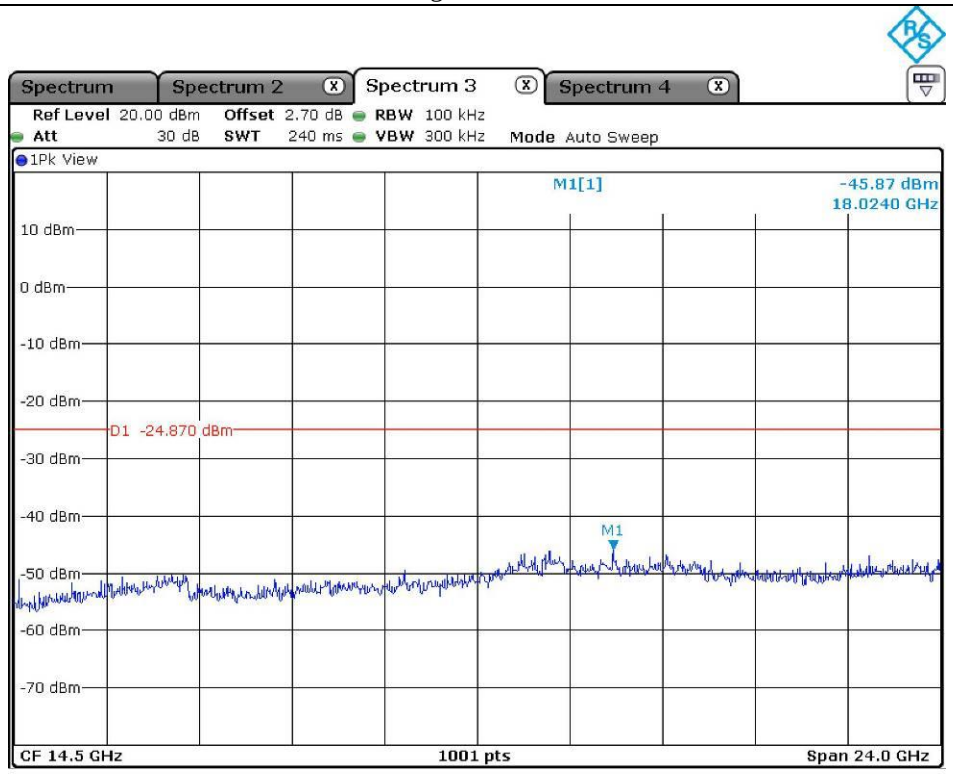

Middle Channel




Middle Channel




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 : October 24, 2017 ~ October 31, 2017

-. 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

-. Duty Cycle : 100 %

-. 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** | | | | | | | | | |
| 2.390 000 | 31.87 | Peak | H | 27.47 | 11.35 | 40.07 | 30.62 | 74.00 | 43.38 |
| | 20.53 | Average | H | | | | 19.28 | 54.00 | 34.72 |
| | 31.62 | Peak | V | | | | 30.37 | 74.00 | 43.63 |
| | 20.87 | Average | V | | | | 19.62 | 54.00 | 34.38 |
| **Test Data for High Channel** | | | | | | | | | |
| 2.483 500 | 34.06 | Peak | H | 27.47 | 11.38 | 40.10 | 32.81 | 74.00 | 41.19 |
| | 24.91 | Average | H | | | | 23.66 | 54.00 | 30.34 |
| | 32.52 | Peak | V | | | | 31.27 | 74.00 | 42.73 |
| | 22.55 | Average | V | | | | 21.30 | 54.00 | 32.70 |

Tabulated test data for Restricted Band

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

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

 

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**12.6.1.2 Test data for 2 Mbps**

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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

-. Duty Cycle : 100 %

-. 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** | | | | | | | | | |
| 2.390 000 | 30.17 | Peak | H | 27.47 | 11.35 | 40.07 | 28.92 | 74.00 | 45.08 |
| | 18.06 | Average | H | | | | 16.81 | 54.00 | 37.19 |
| | 29.01 | Peak | V | | | | 27.76 | 74.00 | 46.24 |
| | 18.36 | Average | V | | | | 17.11 | 54.00 | 36.89 |
| **Test Data for High Channel** | | | | | | | | | |
| 2.483 500 | 34.67 | Peak | H | 27.47 | 11.38 | 40.10 | 33.42 | 74.00 | 40.58 |
| | 23.13 | Average | H | | | | 21.88 | 54.00 | 32.12 |
| | 30.26 | Peak | V | | | | 29.01 | 74.00 | 44.99 |
| | 20.78 | Average | V | | | | 19.53 | 54.00 | 34.47 |

Tabulated test data for Restricted Band

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

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

 

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**12.6.1.3 Test data for 3 Mbps**

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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

-. Duty Cycle : 100 %

-. 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** | | | | | | | | | |
| 2.390 000 | 33.84 | Peak | H | 27.47 | 11.35 | 40.07 | 32.59 | 74.00 | 41.41 |
| | 18.09 | Average | H | | | | 16.84 | 54.00 | 37.16 |
| | 31.26 | Peak | V | | | | 30.01 | 74.00 | 43.99 |
| | 17.88 | Average | V | | | | 16.63 | 54.00 | 37.37 |
| **Test Data for High Channel** | | | | | | | | | |
| 2.483 500 | 33.46 | Peak | H | 27.47 | 11.38 | 40.10 | 32.21 | 74.00 | 41.79 |
| | 24.59 | Average | H | | | | 23.34 | 54.00 | 30.66 |
| | 32.96 | Peak | V | | | | 31.71 | 74.00 | 42.29 |
| | 24.00 | Average | V | | | | 22.75 | 54.00 | 31.25 |

Tabulated test data for Restricted Band

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

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

 

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## 12.6.2 Radiated Emission which fall in the Band Edge

### 12.6.2.1 Test data for 1 Mbps

-. Test Date : October 24, 2017 ~ October 31, 2017

-. Resolution bandwidth : 100 kHz and Peak Detector for Peak Mode

100 kHz and RMS Detector for Average Mode

-. Video bandwidth : 300 kHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : 100 %

-. 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** | | | | | | | | | |
| 2.400 000 | 54.84 | Peak | H | 27.47 | 11.36 | 40.08 | 53.59 | 74.00 | 20.41 |
| | 49.33 | Average | H | | | | 48.08 | 54.00 | 5.92 |
| | 52.12 | Peak | V | | | | 50.87 | 74.00 | 23.13 |
| | 46.17 | Average | V | | | | 44.92 | 54.00 | 9.08 |

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain

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

 

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**12.6.2.2 Test data for 2 Mbps**

-. Test Date : October 24, 2017 ~ October 31, 2017

-. Resolution bandwidth : 100 kHz and Peak Detector for Peak Mode

100 kHz and RMS Detector for Average Mode

-. Video bandwidth : 300 kHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : 100 %

-. 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** | | | | | | | | | |
| 2.400 000 | 55.29 | Peak | H | 27.47 | 11.36 | 40.08 | 54.04 | 74.00 | 19.96 |
| | 50.11 | Average | H | | | | 48.86 | 54.00 | 5.14 |
| | 49.96 | Peak | V | | | | 48.71 | 74.00 | 25.29 |
| | 48.19 | Average | V | | | | 46.94 | 54.00 | 7.06 |

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain

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

 

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**12.6.2.3 Test data for 3 Mbps**

-. Test Date : October 24, 2017 ~ October 31, 2017

-. Resolution bandwidth : 100 kHz and Peak Detector for Peak Mode
100 kHz and RMS Detector for Average Mode

-. Video bandwidth : 300 kHz for Peak and Average Mode

-. Measurement distance : 3 m

-. Duty Cycle : 100 %

-. 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** | | | | | | | | | |
| 2.400 000 | 56.38 | Peak | H | 27.47 | 11.36 | 40.08 | 55.13 | 74.00 | 18.87 |
| | 50.21 | Average | H | | | | 48.96 | 54.00 | 5.04 |
| | 52.77 | Peak | V | | | | 51.52 | 74.00 | 22.48 |
| | 46.22 | Average | V | | | | 44.97 | 54.00 | 9.03 |

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain

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

 

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### 12.6.3 Spurious & Harmonic Radiated Emission above 1 GHz

#### 12.6.3.1 Test data for 1 Mbps

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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

-. Duty Cycle : 100 %

-. 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 | 38.04 | Peak | H | 30.70 | 16.10 | 40.60 | 44.24 | 73.98 | 29.74 |
| | 31.92 | Average | H | | | | 38.12 | 53.98 | 15.86 |
| | 34.04 | Peak | V | | | | 40.24 | 73.98 | 33.74 |
| | 29.91 | Average | V | | | | 36.11 | 53.98 | 17.87 |
| **Test Data for Middle Channel** | | | | | | | | | |
| 4 882.00 | 40.72 | Peak | H | 30.90 | 16.30 | 40.60 | 47.32 | 73.98 | 26.66 |
| | 33.29 | Average | H | | | | 39.89 | 53.98 | 14.09 |
| | 38.08 | Peak | V | | | | 44.68 | 73.98 | 29.30 |
| | 30.67 | Average | V | | | | 37.27 | 53.98 | 16.71 |
| **Test Data for High Channel** | | | | | | | | | |
| 4 960.00 | 38.66 | Peak | H | 31.00 | 16.50 | 40.60 | 45.56 | 73.98 | 28.42 |
| | 30.99 | Average | H | | | | 37.89 | 53.98 | 16.09 |
| | 36.96 | Peak | V | | | | 43.86 | 73.98 | 30.12 |
| | 31.82 | Average | V | | | | 38.72 | 53.98 | 15.26 |

Tabulated test data for Restricted Band

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

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



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**12.6.3.2 Test data for 2 Mbps**

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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

-. Duty Cycle : 100 %

-. 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 | 38.47 | Peak | H | 30.70 | 16.10 | 40.60 | 44.67 | 73.98 | 29.31 |
| | 32.82 | Average | H | | | | 39.02 | 53.98 | 14.96 |
| | 33.20 | Peak | V | | | | 39.40 | 73.98 | 34.58 |
| | 32.89 | Average | V | | | | 39.09 | 53.98 | 14.89 |
| **Test Data for Middle Channel** | | | | | | | | | |
| 4 882.00 | 41.94 | Peak | H | 30.90 | 16.30 | 40.60 | 48.54 | 73.98 | 25.44 |
| | 30.50 | Average | H | | | | 37.10 | 53.98 | 16.88 |
| | 35.10 | Peak | V | | | | 41.70 | 73.98 | 32.28 |
| | 33.19 | Average | V | | | | 39.79 | 53.98 | 14.19 |
| **Test Data for High Channel** | | | | | | | | | |
| 4 960.00 | 40.08 | Peak | H | 31.00 | 16.50 | 40.60 | 46.98 | 73.98 | 27.00 |
| | 31.34 | Average | H | | | | 38.24 | 53.98 | 15.74 |
| | 39.47 | Peak | V | | | | 46.37 | 73.98 | 27.61 |
| | 32.69 | Average | V | | | | 39.59 | 53.98 | 14.39 |

Tabulated test data for Restricted Band

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

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

 

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**12.6.3.3 Test data for 3 Mbps**

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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

-. Duty Cycle : 100 %

-. 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 | 37.32 | Peak | H | 30.70 | 16.10 | 40.60 | 43.52 | 73.98 | 30.46 |
| | 33.03 | Average | H | | | | 39.23 | 53.98 | 14.75 |
| | 33.73 | Peak | V | | | | 39.93 | 73.98 | 34.05 |
| | 27.51 | Average | V | | | | 33.71 | 53.98 | 20.27 |
| **Test Data for Middle Channel** | | | | | | | | | |
| 4 882.00 | 38.97 | Peak | H | 30.90 | 16.30 | 40.60 | 45.57 | 73.98 | 28.41 |
| | 31.94 | Average | H | | | | 38.54 | 53.98 | 15.44 |
| | 36.45 | Peak | V | | | | 43.05 | 73.98 | 30.93 |
| | 28.28 | Average | V | | | | 34.88 | 53.98 | 19.10 |
| **Test Data for High Channel** | | | | | | | | | |
| 4 960.00 | 36.47 | Peak | H | 31.00 | 16.50 | 40.60 | 43.37 | 73.98 | 30.61 |
| | 32.49 | Average | H | | | | 39.39 | 53.98 | 14.59 |
| | 37.19 | Peak | V | | | | 44.09 | 73.98 | 29.89 |
| | 32.12 | Average | V | | | | 39.02 | 53.98 | 14.96 |

Tabulated test data for Restricted Band

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

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

 

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# 13. RADIATED EMISSION TEST

## 13.1 Operating environment

Temperature : 24.3 ℃

Relative humidity : 43.9 % 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 | Apr. 05, 2017 (1Y) |
| ■ - | ESU | Rohde & Schwarz | EMI Test Receiver | 100261 | Apr. 06, 2017 (1Y) |
| ■ - | 310N | Sonoma Instrument | Pre-Amplifier | 312544 | Apr. 05, 2017 (1Y) |
| ■ - | BBV9718 | Schwarzbeck | Amplifier | 310 | Sep. 01, 2017 (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 | 9163-421 | Apr. 15, 2016 (2Y) |
| ■ - | BBHA9120D | Schwarzbeck | Horn Antenna | BBHA9120D295 | May 26, 2017 (2Y) |
| ■ - | BBHA 9170 | 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 1 Mbps

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

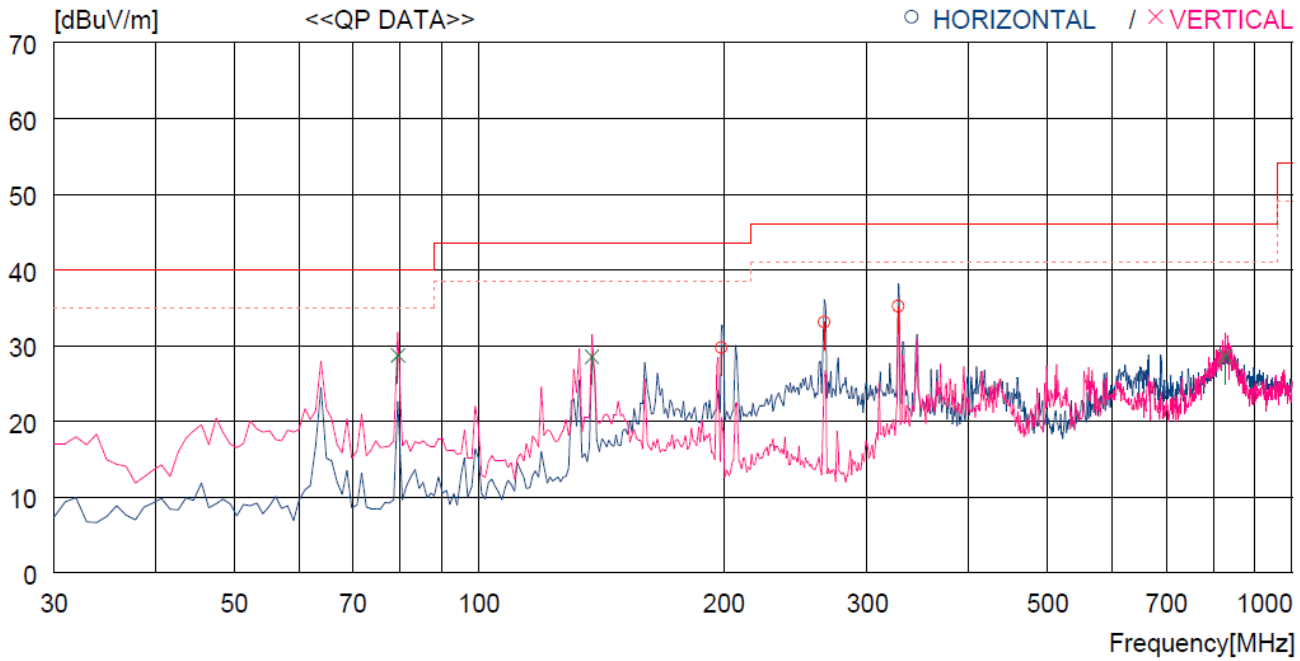
-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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 | 198.780 | 49.1 | 10.5 | 3.3 | 33.2 | 29.7 | 43.5 | 13.8 | 100 | 0 |
| 2 | 265.710 | 50.1 | 12.3 | 3.8 | 33.1 | 33.1 | 46.0 | 12.9 | 100 | 0 |
| 3 | 327.790 | 50.1 | 14.0 | 4.2 | 33.1 | 35.2 | 46.0 | 10.8 | 100 | 0 |
| ----- Vertical ------ | | | | | | | | | | |
| 4 | 79.470 | 52.0 | 7.6 | 2.2 | 33.1 | 28.7 | 40.0 | 11.3 | 100 | 14 |
| 5 | 137.670 | 50.4 | 8.2 | 2.8 | 32.9 | 28.5 | 43.5 | 15.0 | 100 | 58 |
| 6 | 827.331 | 34.2 | 20.9 | 6.6 | 33.1 | 28.6 | 46.0 | 17.4 | 100 | 7 |

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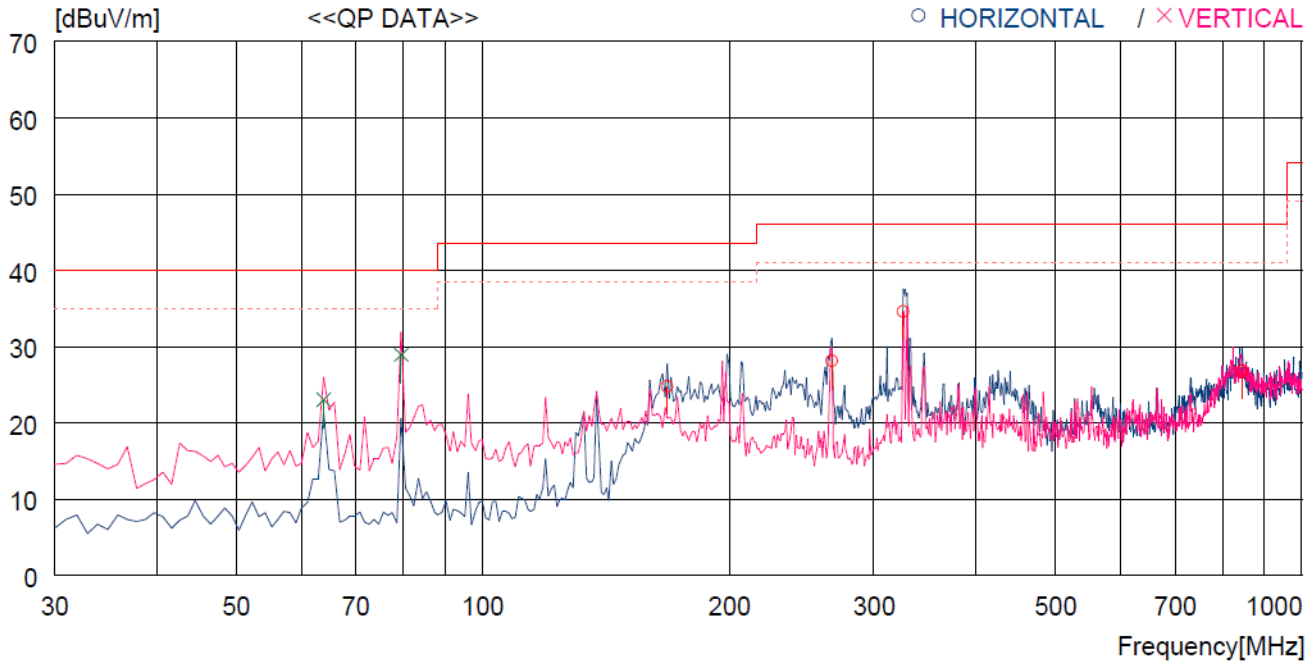
Operating condition : Middle Channel




| 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 | 167.740 | 45.9 | 8.8 | 3.1 | 33.0 | 24.8 | 43.5 | 18.7 | 100 | 133 |
| 2 | 266.680 | 45.1 | 12.3 | 3.8 | 33.1 | 28.1 | 46.0 | 17.9 | 100 | 133 |
| 3 | 325.850 | 49.6 | 13.9 | 4.2 | 33.1 | 34.6 | 46.0 | 11.4 | 100 | 106 |
| 4 | 845.761 | 32.0 | 21.1 | 6.7 | 33.0 | 26.8 | 46.0 | 19.2 | 100 | 133 |
| ----- Vertical ------ | | | | | | | | | | |
| 5 | 63.950 | 42.3 | 11.9 | 1.9 | 33.1 | 23.0 | 40.0 | 17.0 | 100 | 176 |
| 6 | 79.470 | 52.2 | 7.6 | 2.2 | 33.1 | 28.9 | 40.0 | 11.1 | 100 | 194 |



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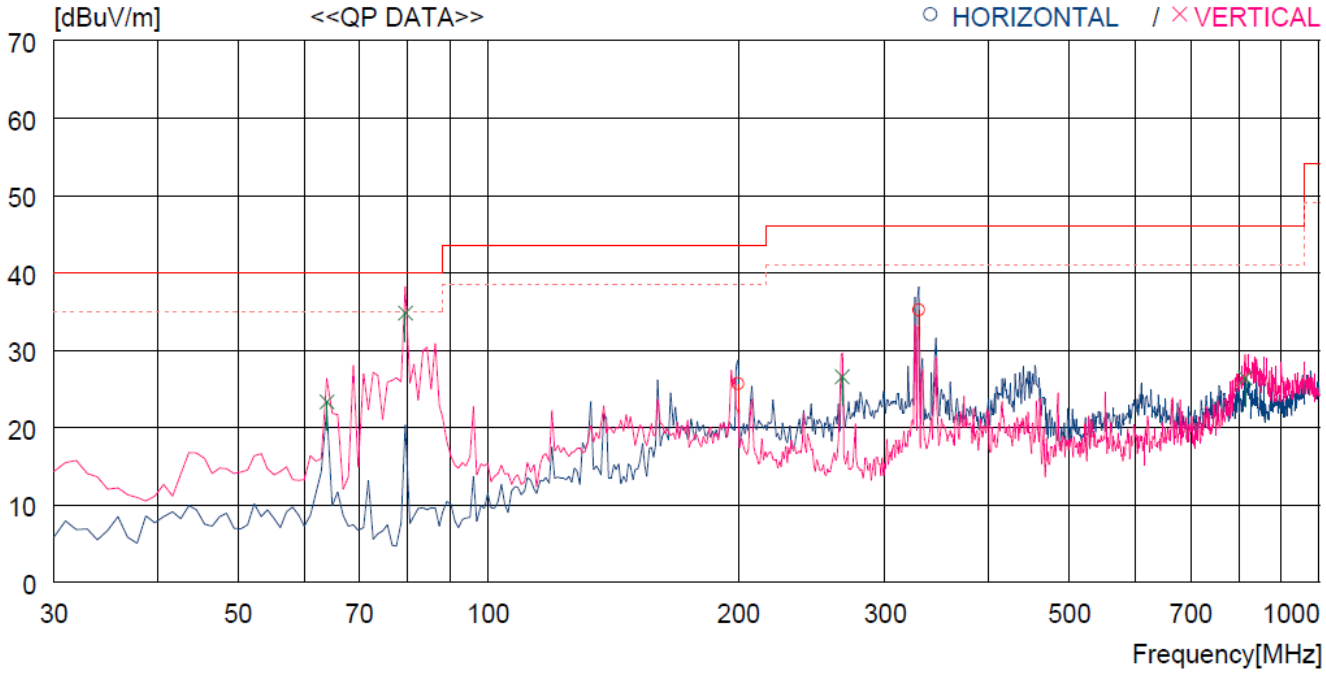
Operating condition : High Channel




| 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 | 199.750 | 45.0 | 10.5 | 3.3 | 33.2 | 25.6 | 43.5 | 17.9 | 100 | 188 |
| 2 | 329.730 | 50.0 | 14.1 | 4.2 | 33.1 | 35.2 | 46.0 | 10.8 | 100 | 219 |
| ----- Vertical ------ | | | | | | | | | | |
| 3 | 63.950 | 42.6 | 11.9 | 1.9 | 33.1 | 23.3 | 40.0 | 16.7 | 100 | 180 |
| 4 | 79.470 | 58.1 | 7.6 | 2.2 | 33.1 | 34.8 | 40.0 | 5.2 | 100 | 180 |
| 5 | 266.680 | 43.6 | 12.3 | 3.8 | 33.1 | 26.6 | 46.0 | 19.4 | 100 | 174 |
| 6 | 813.752 | 32.3 | 20.7 | 6.6 | 33.2 | 26.4 | 46.0 | 19.6 | 100 | 162 |

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



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### 13.4.2 Test data for Below 30 MHz

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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. | | | | | | | | |

### 13.4.3 Test data for above 1 GHz

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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 / Manager**

 

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## 13.5 Test data for 2 Mbps

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

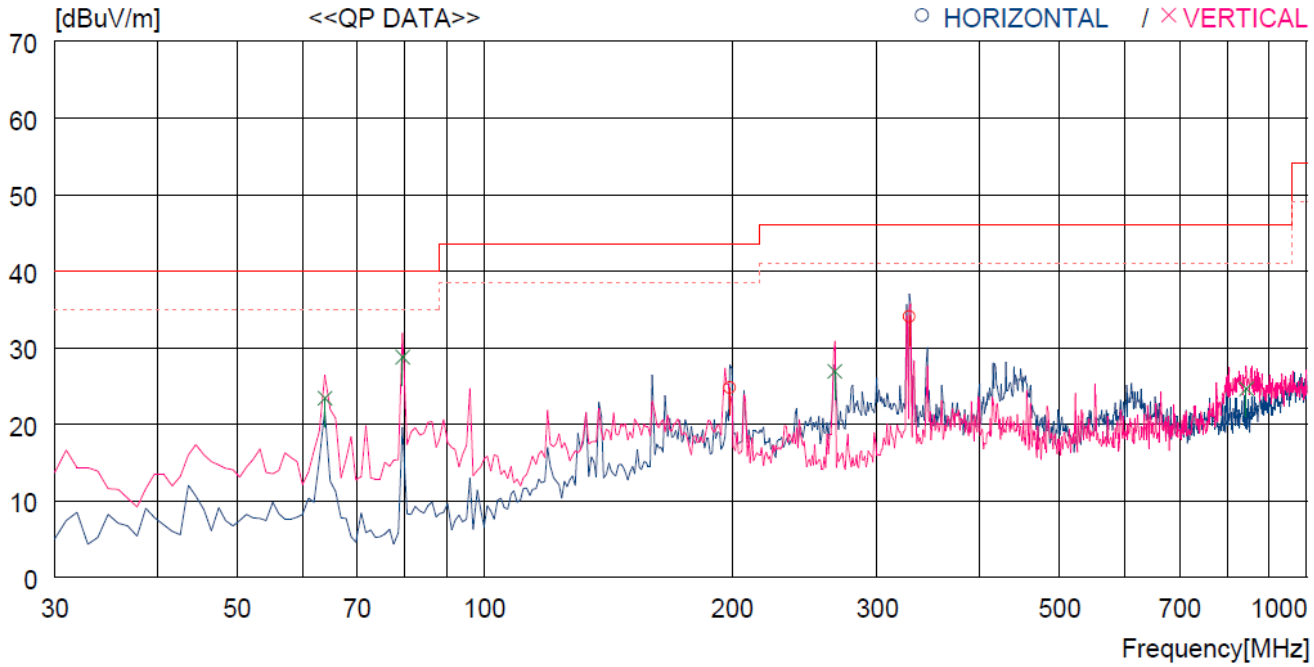
-. Test Date : October 24, 2017 ~ October 31, 2017

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 3 m

-. Operating condition : Low 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 | 198.780 | 44.2 | 10.5 | 3.3 | 33.2 | 24.8 | 43.5 | 18.7 | 100 | 198 |
| 2 | 328.760 | 48.9 | 14.0 | 4.2 | 33.1 | 34.0 | 46.0 | 12.0 | 100 | 198 |
| ----- Vertical ------ | | | | | | | | | | |
| 3 | 63.950 | 42.7 | 11.9 | 1.9 | 33.1 | 23.4 | 40.0 | 16.6 | 100 | 174 |
| 4 | 79.470 | 52.1 | 7.6 | 2.2 | 33.1 | 28.8 | 40.0 | 11.2 | 100 | 188 |
| 5 | 266.680 | 43.9 | 12.3 | 3.8 | 33.1 | 26.9 | 46.0 | 19.1 | 100 | 188 |
| 6 | 843.821 | 29.9 | 21.0 | 6.7 | 33.0 | 24.6 | 46.0 | 21.4 | 100 | 188 |



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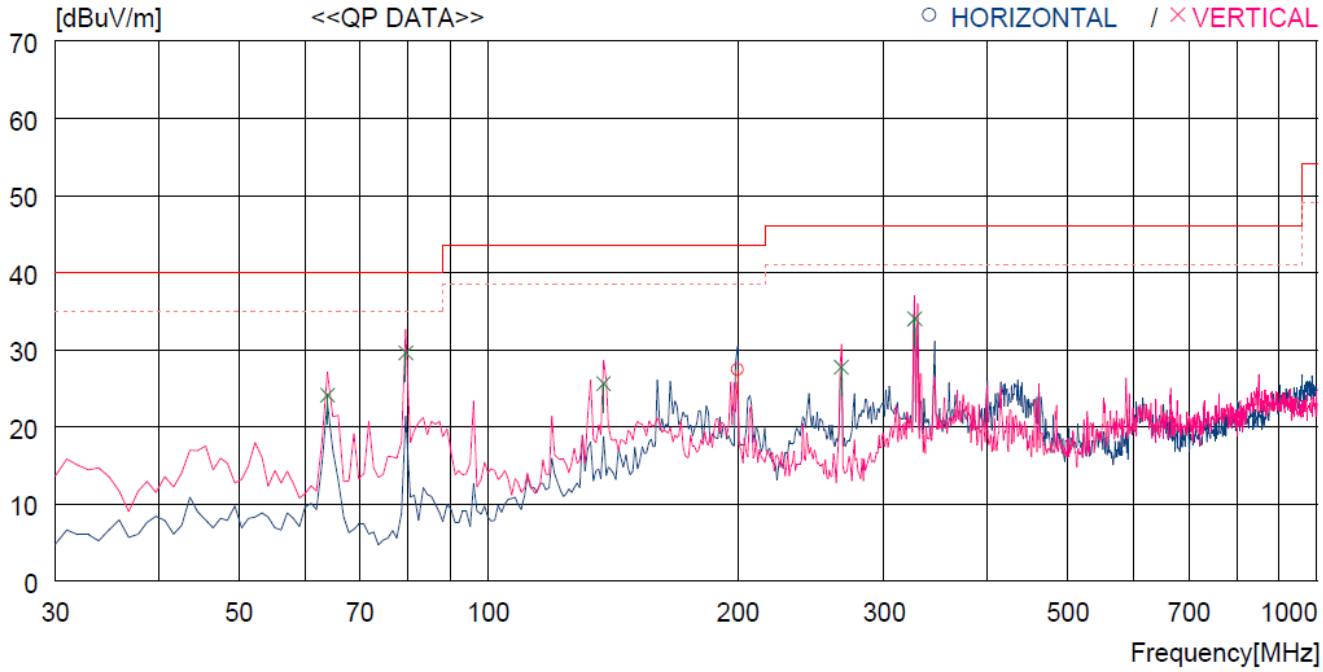
Operating condition : Middle Channel




| 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 | 199.750 | 46.8 | 10.5 | 3.3 | 33.2 | 27.4 | 43.5 | 16.1 | 100 | 181 |
| ----- Vertical ------ | | | | | | | | | | |
| 2 | 63.950 | 43.4 | 11.9 | 1.9 | 33.1 | 24.1 | 40.0 | 15.9 | 100 | 215 |
| 3 | 79.470 | 52.9 | 7.6 | 2.2 | 33.1 | 29.6 | 40.0 | 10.4 | 100 | 208 |
| 4 | 137.670 | 47.5 | 8.2 | 2.8 | 32.9 | 25.6 | 43.5 | 17.9 | 100 | 220 |
| 5 | 266.680 | 44.7 | 12.3 | 3.8 | 33.1 | 27.7 | 46.0 | 18.3 | 100 | 220 |
| 6 | 326.820 | 49.0 | 13.9 | 4.2 | 33.1 | 34.0 | 46.0 | 12.0 | 100 | 215 |



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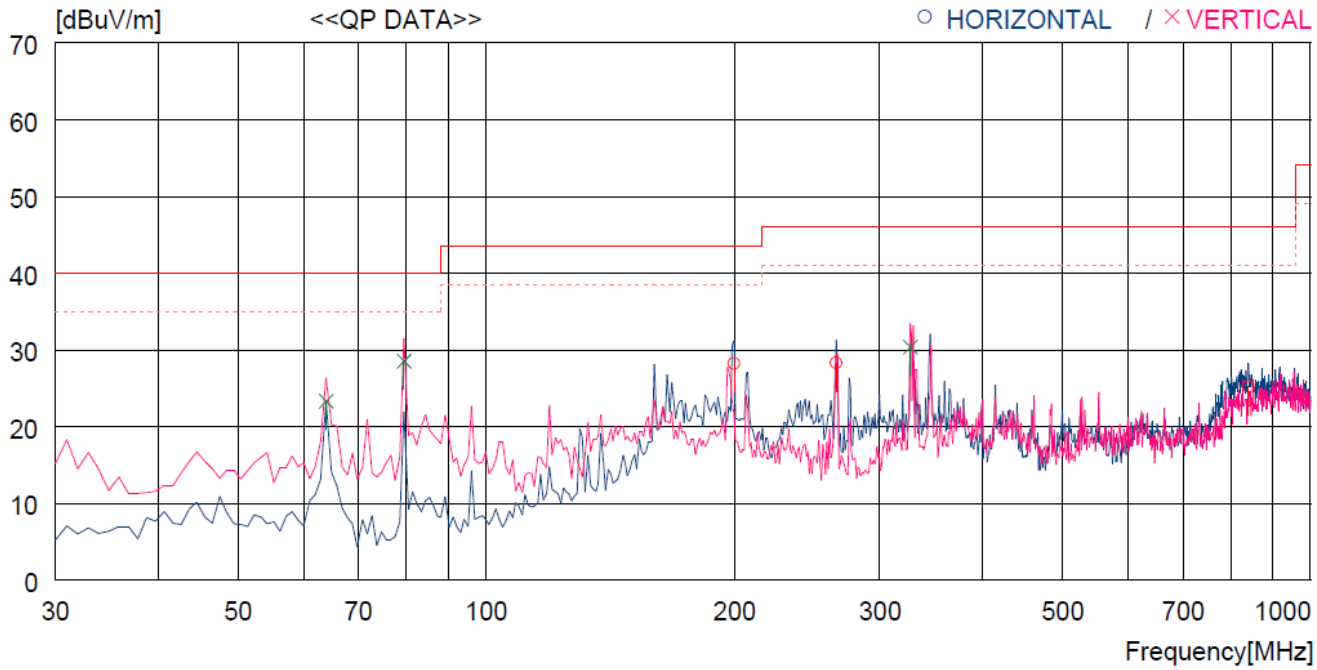
Operating condition : High Channel




| 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 | 199.750 | 47.6 | 10.5 | 3.3 | 33.2 | 28.2 | 43.5 | 15.3 | 100 | 165 |
| 2 | 265.710 | 45.3 | 12.3 | 3.8 | 33.1 | 28.3 | 46.0 | 17.7 | 100 | 165 |
| 3 | 840.911 | 30.5 | 21.0 | 6.7 | 33.0 | 25.2 | 46.0 | 20.8 | 100 | 159 |
| ----- Vertical ------ | | | | | | | | | | |
| 4 | 63.950 | 42.6 | 11.9 | 1.9 | 33.1 | 23.3 | 40.0 | 16.7 | 100 | 176 |
| 5 | 79.470 | 51.8 | 7.6 | 2.2 | 33.1 | 28.5 | 40.0 | 11.5 | 100 | 176 |
| 6 | 326.820 | 45.4 | 13.9 | 4.2 | 33.1 | 30.4 | 46.0 | 15.6 | 100 | 176 |

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

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### 13.5.2 Test data for Below 30 MHz

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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. | | | | | | | | |

### 13.5.3 Test data for above 1 GHz

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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 / Manager**

 

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## 13.6 Test data for 3 Mbps

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

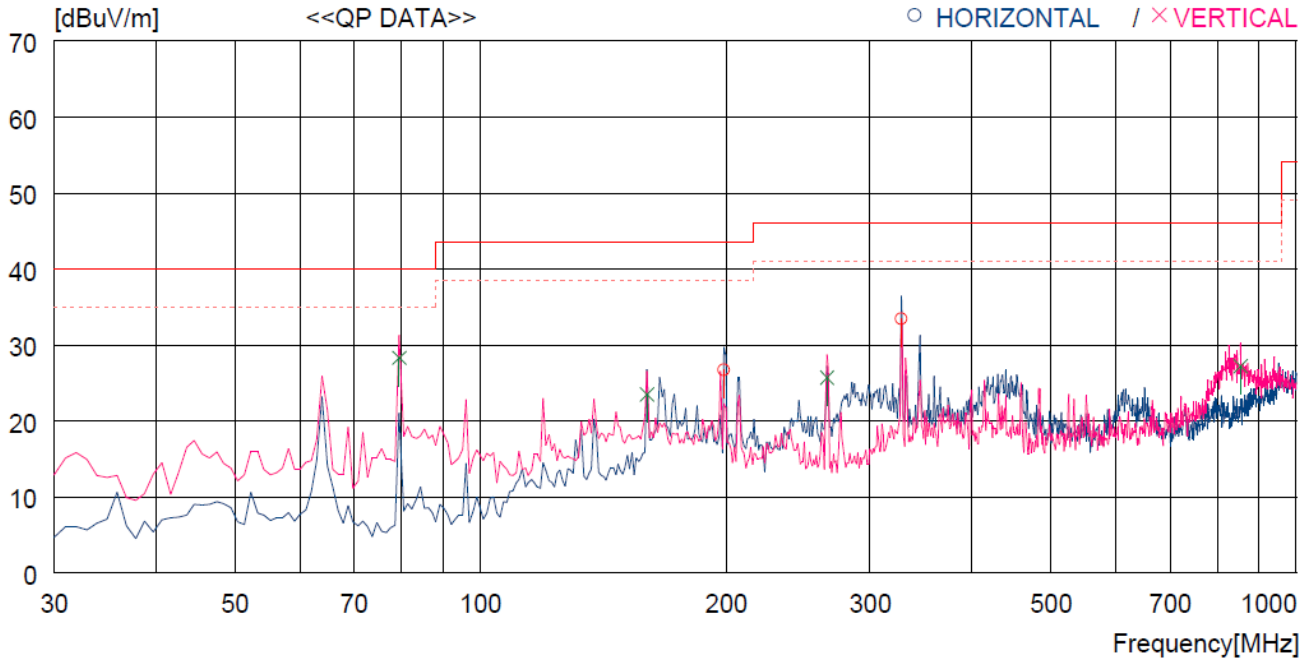
-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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 | 198.780 | 46.1 | 10.5 | 3.3 | 33.2 | 26.7 | 43.5 | 16.8 | 100 | 187 |
| 2 | 327.790 | 48.3 | 14.0 | 4.2 | 33.1 | 33.4 | 46.0 | 12.6 | 100 | 201 |
| ----- Vertical ------ | | | | | | | | | | |
| 3 | 79.470 | 51.6 | 7.6 | 2.2 | 33.1 | 28.3 | 40.0 | 11.7 | 100 | 172 |
| 4 | 159.980 | 45.1 | 8.4 | 3.0 | 33.0 | 23.5 | 43.5 | 20.0 | 100 | 159 |
| 5 | 265.710 | 42.7 | 12.3 | 3.8 | 33.1 | 25.7 | 46.0 | 20.3 | 100 | 178 |
| 6 | 853.520 | 32.2 | 21.2 | 6.8 | 33.0 | 27.2 | 46.0 | 18.8 | 100 | 178 |



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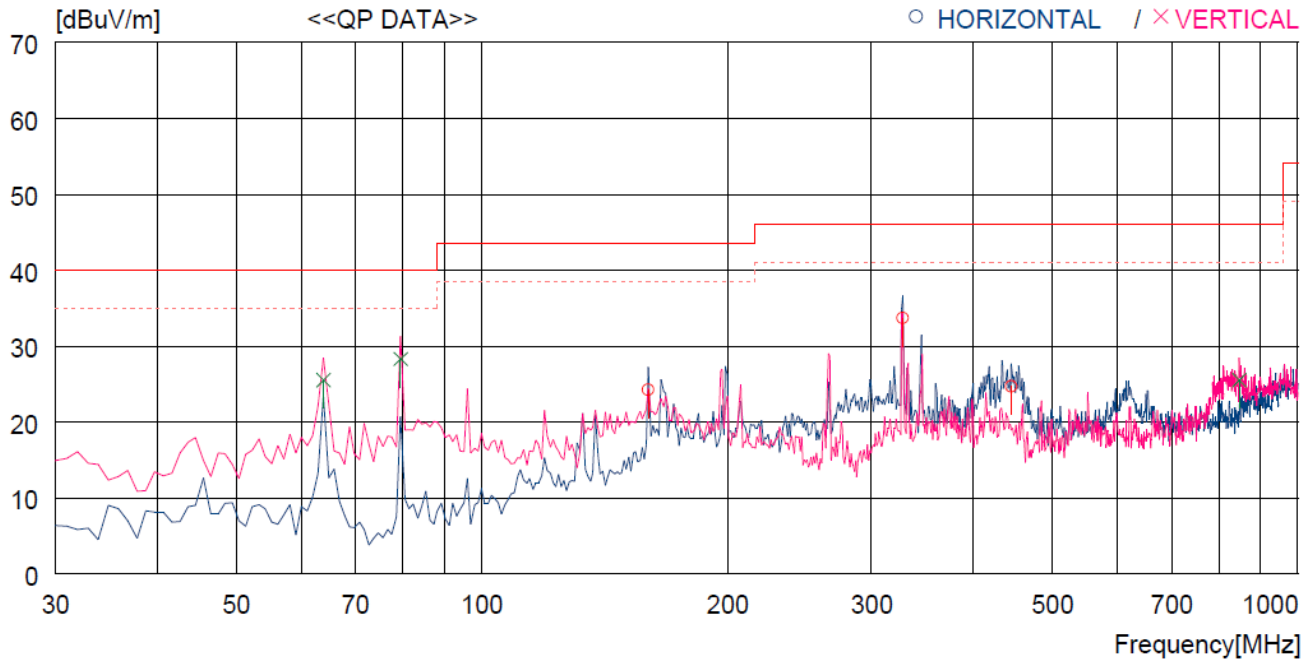
Operating condition : Middle Channel




| 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 | 159.980 | 45.8 | 8.4 | 3.0 | 33.0 | 24.2 | 43.5 | 19.3 | 100 | 208 |
| 2 | 327.790 | 48.6 | 14.0 | 4.2 | 33.1 | 33.7 | 46.0 | 12.3 | 100 | 195 |
| 3 | 445.161 | 36.6 | 16.5 | 4.8 | 33.2 | 24.7 | 46.0 | 21.3 | 100 | 208 |
| ----- Vertical ------ | | | | | | | | | | |
| 4 | 63.950 | 44.8 | 11.9 | 1.9 | 33.1 | 25.5 | 40.0 | 14.5 | 100 | 183 |
| 5 | 79.470 | 51.6 | 7.6 | 2.2 | 33.1 | 28.3 | 40.0 | 11.7 | 100 | 175 |
| 6 | 846.731 | 30.7 | 21.1 | 6.7 | 33.0 | 25.5 | 46.0 | 20.5 | 100 | 168 |



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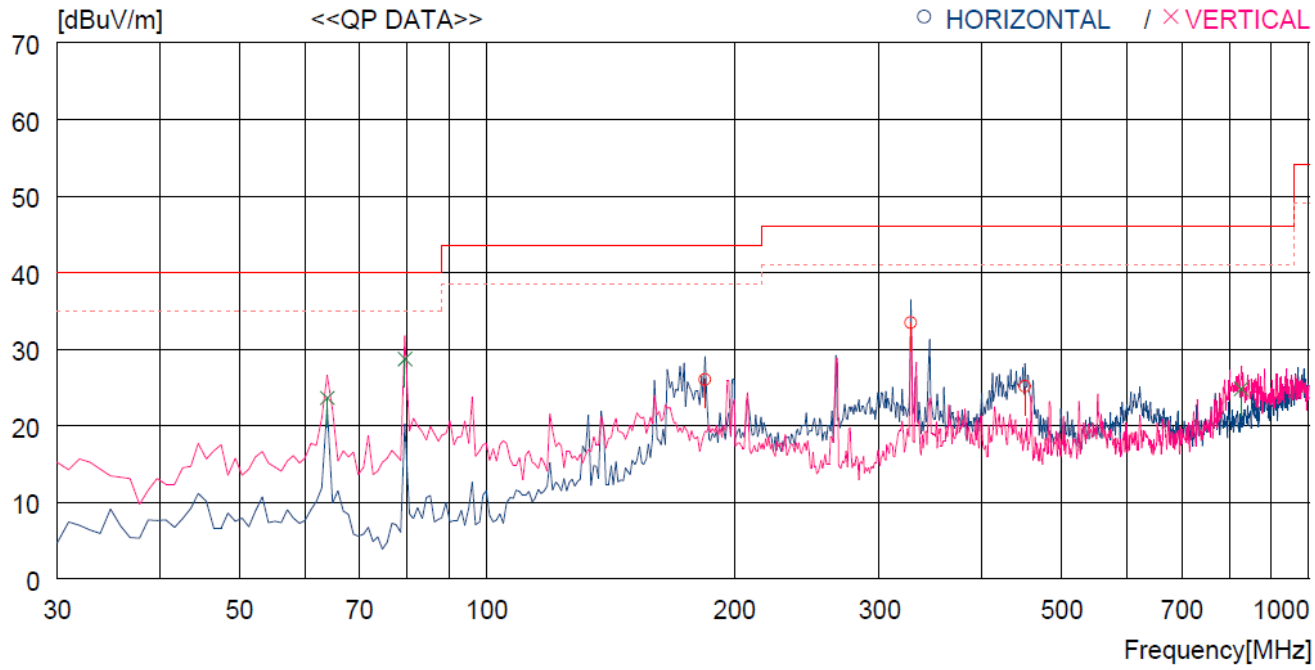
Operating condition : High Channel




| 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 | 184.230 | 46.0 | 9.9 | 3.2 | 33.1 | 26.0 | 43.5 | 17.5 | 100 | 209 |
| 2 | 327.790 | 48.3 | 14.0 | 4.2 | 33.1 | 33.4 | 46.0 | 12.6 | 100 | 196 |
| 3 | 450.981 | 37.0 | 16.4 | 4.9 | 33.2 | 25.1 | 46.0 | 20.9 | 100 | 196 |
| ----- Vertical ------ | | | | | | | | | | |
| 4 | 63.950 | 42.9 | 11.9 | 1.9 | 33.1 | 23.6 | 40.0 | 16.4 | 100 | 173 |
| 5 | 79.470 | 52.0 | 7.6 | 2.2 | 33.1 | 28.7 | 40.0 | 11.3 | 100 | 173 |
| 6 | 827.331 | 30.4 | 20.9 | 6.6 | 33.1 | 24.8 | 46.0 | 21.2 | 100 | 173 |

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

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### 13.6.2 Test data for Below 30 MHz

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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. | | | | | | | | |

### 13.6.3 Test data for above 1 GHz

-. Test Date : October 24, 2017 ~ October 31, 2017

-. 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 / Manager**

 

**ONETECH Corp.**: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)