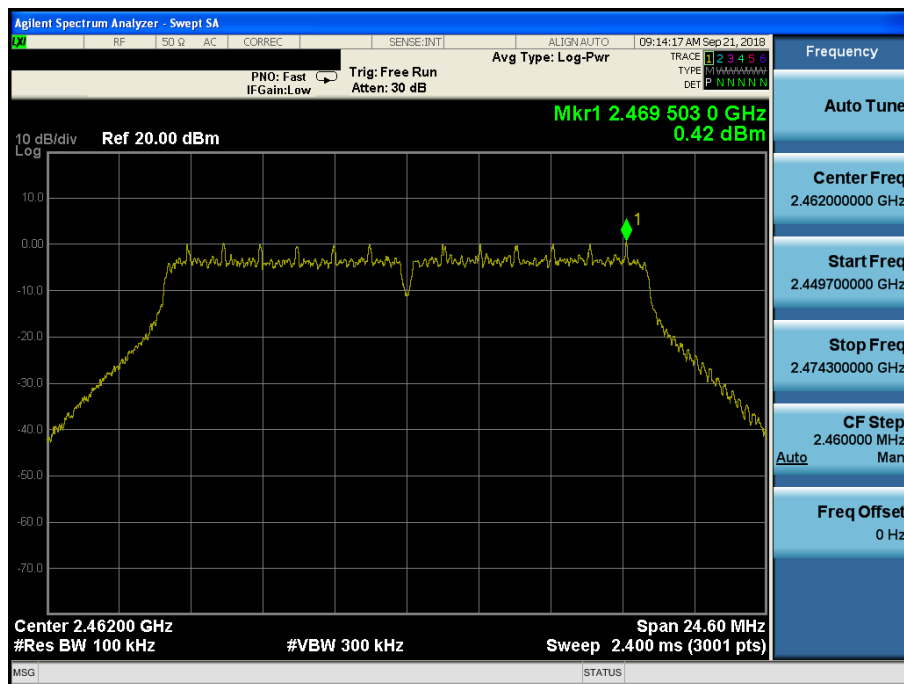


## TM 2 & Highest

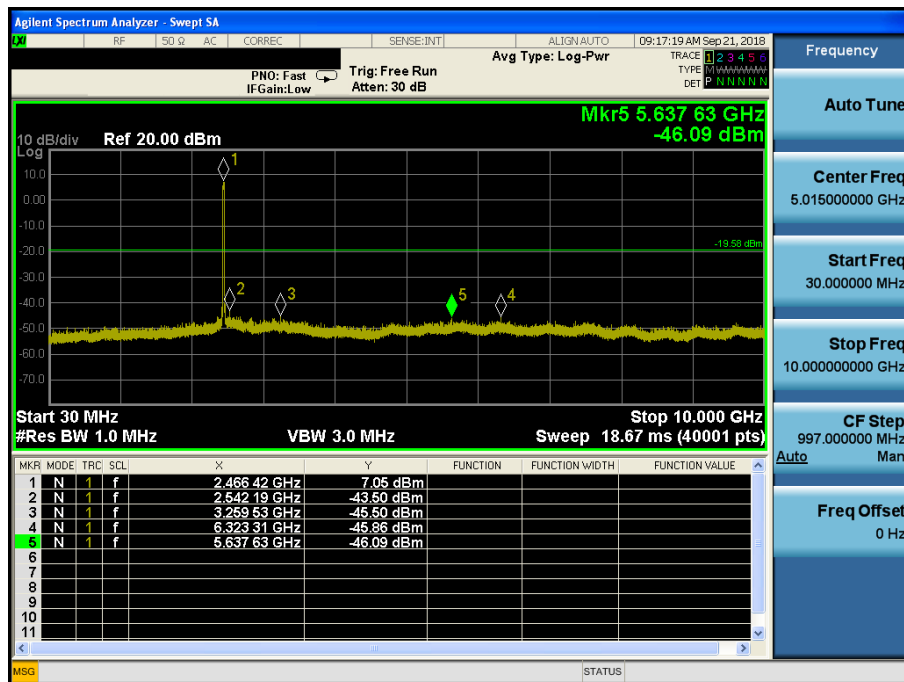
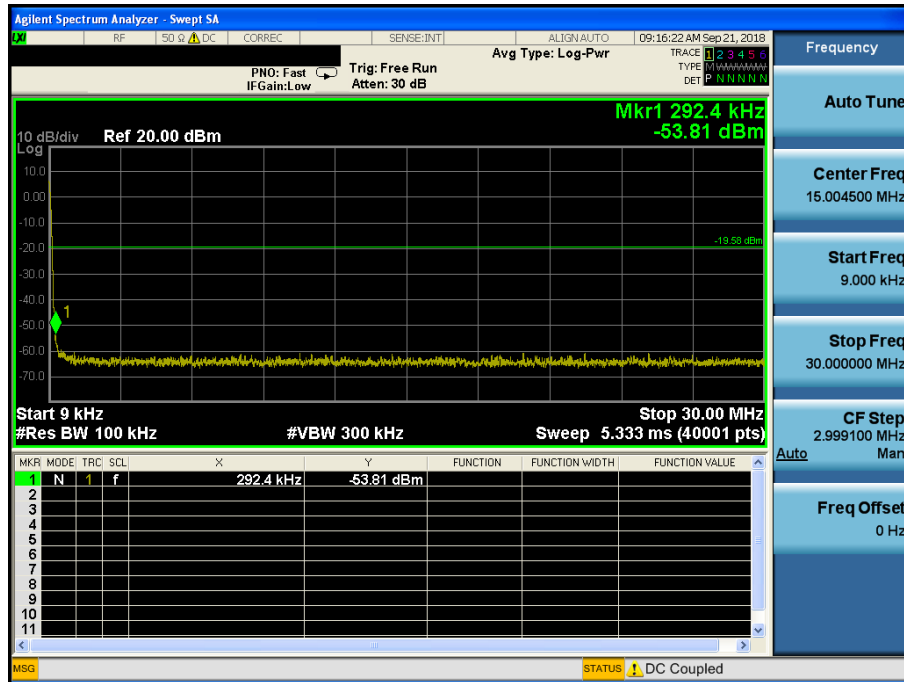
### Reference



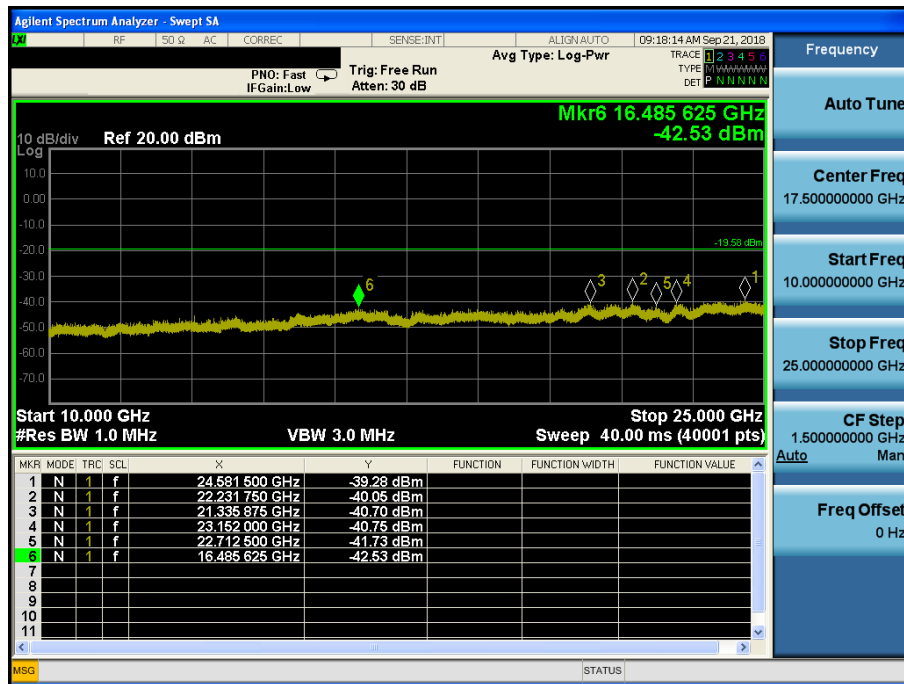
### High Band-edge



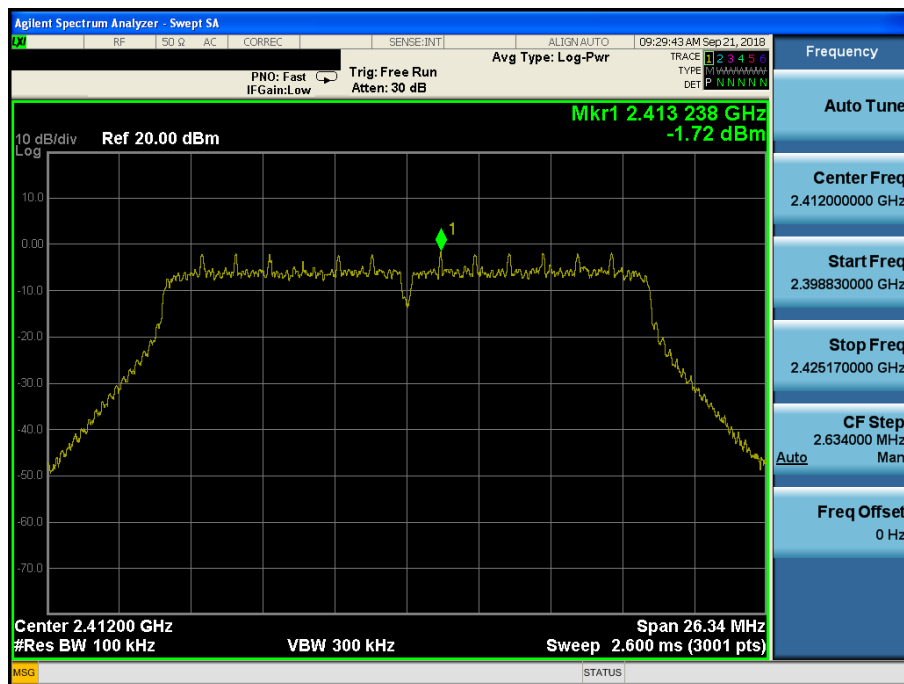
## Conducted Spurious Emissions



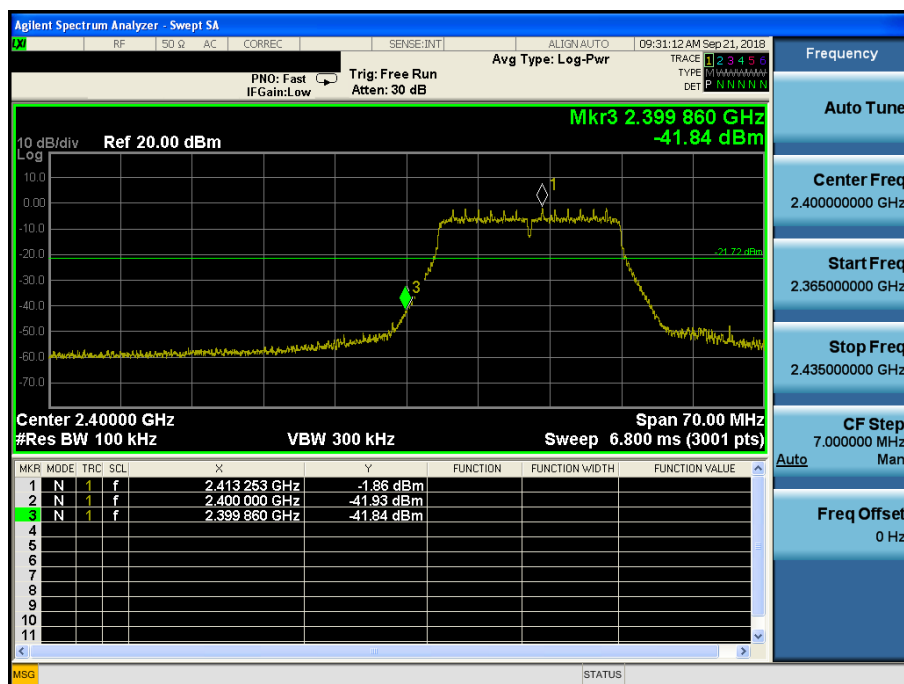
## Conducted Spurious Emissions



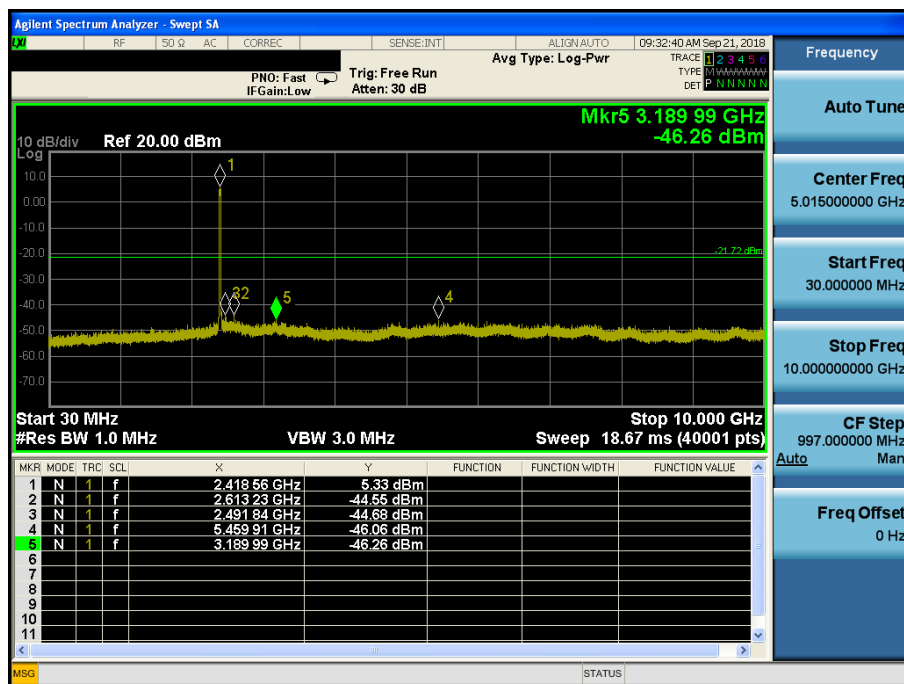
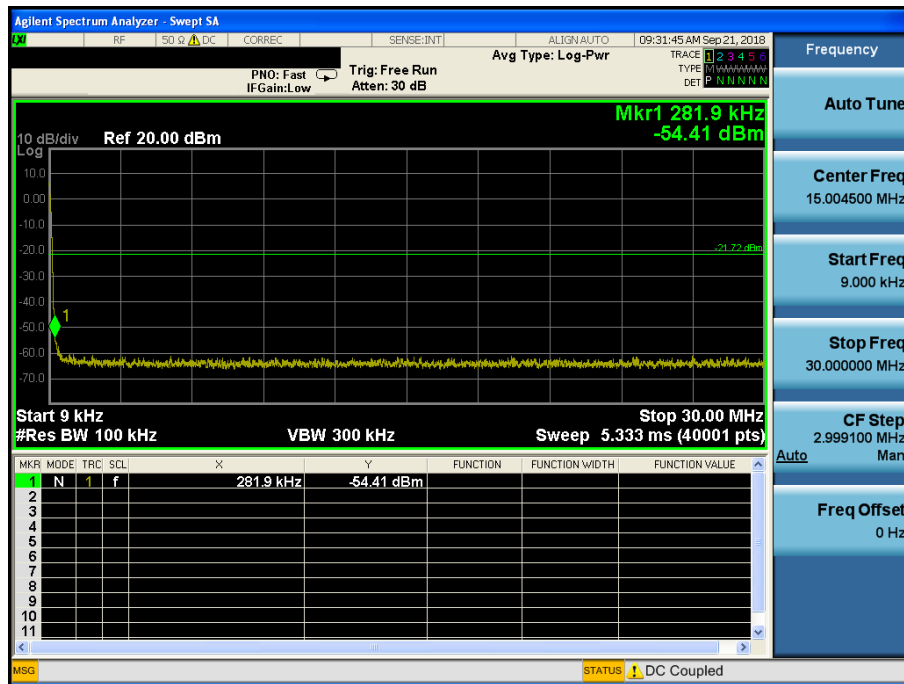
## Reference



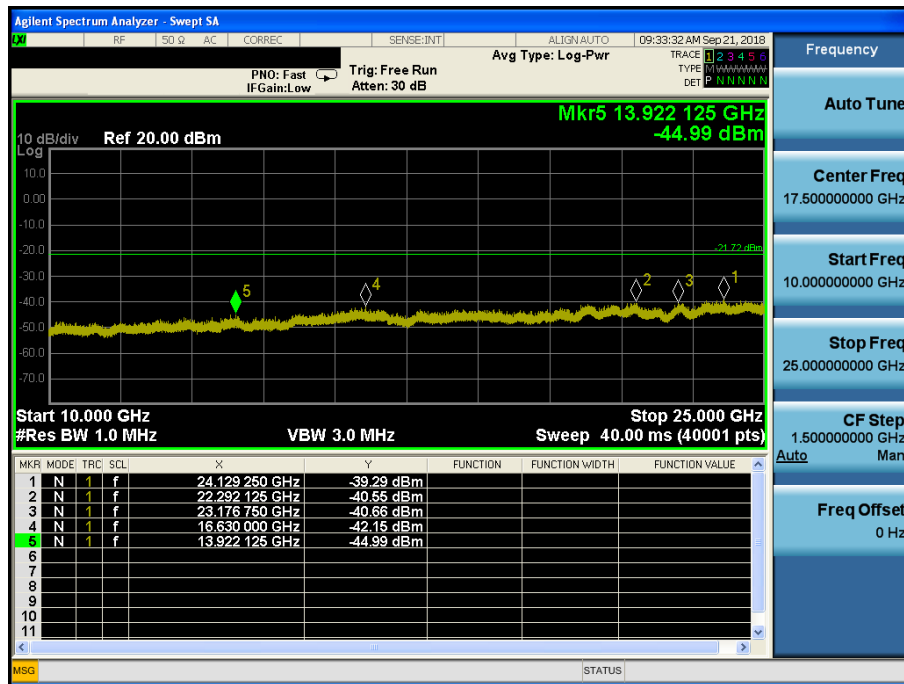
## Low Band-edge



## Conducted Spurious Emissions

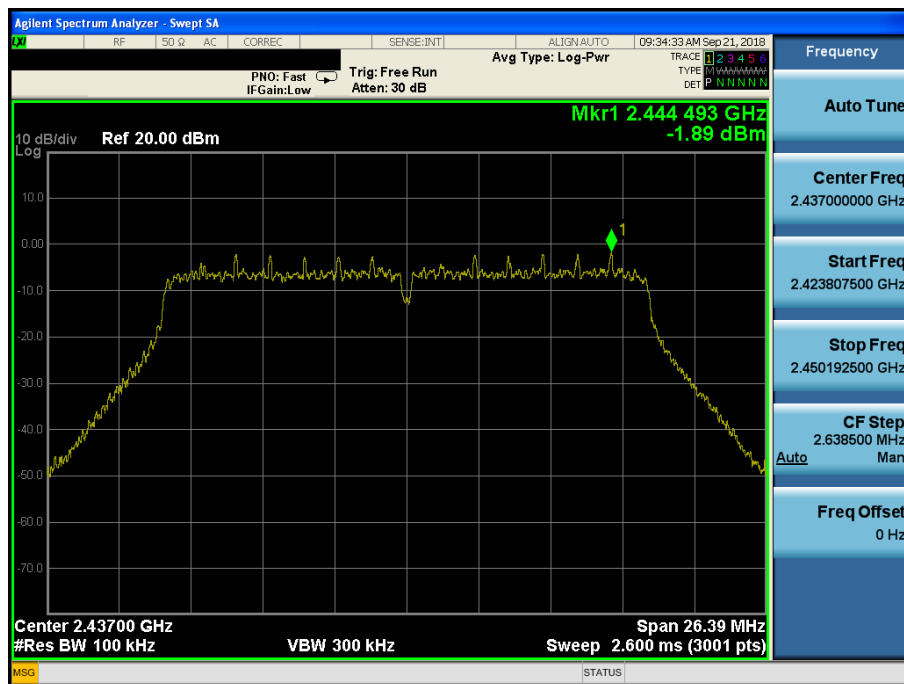


## Conducted Spurious Emissions

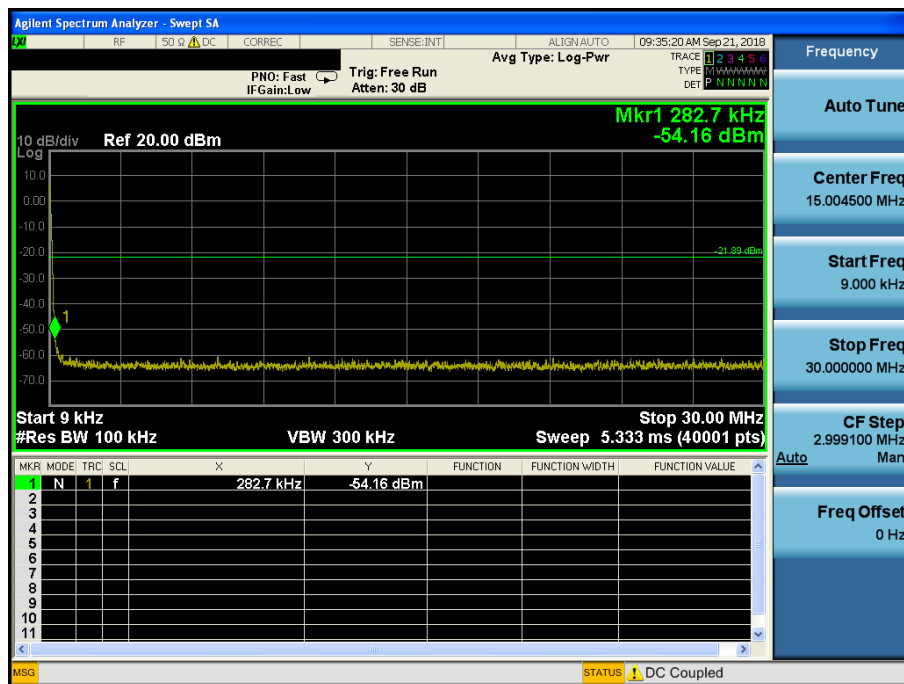


## TM 3 & Middle

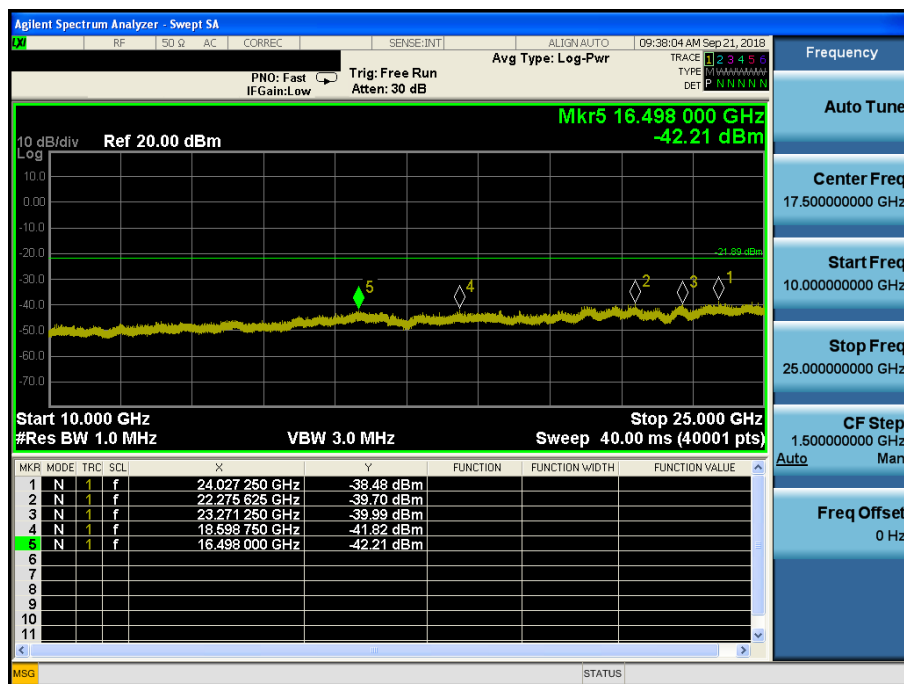
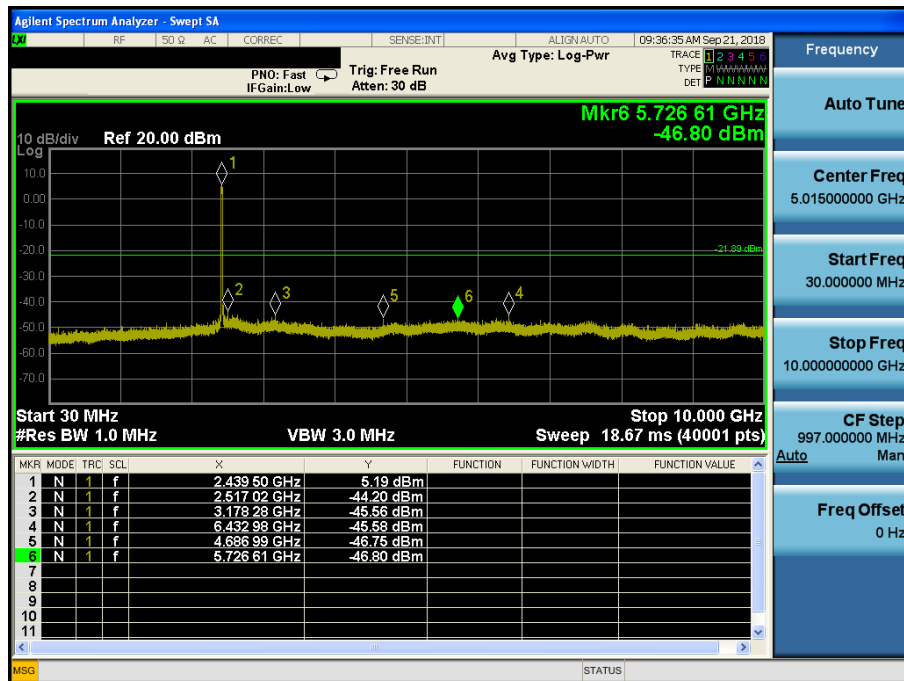
### Reference



### Conducted Spurious Emissions

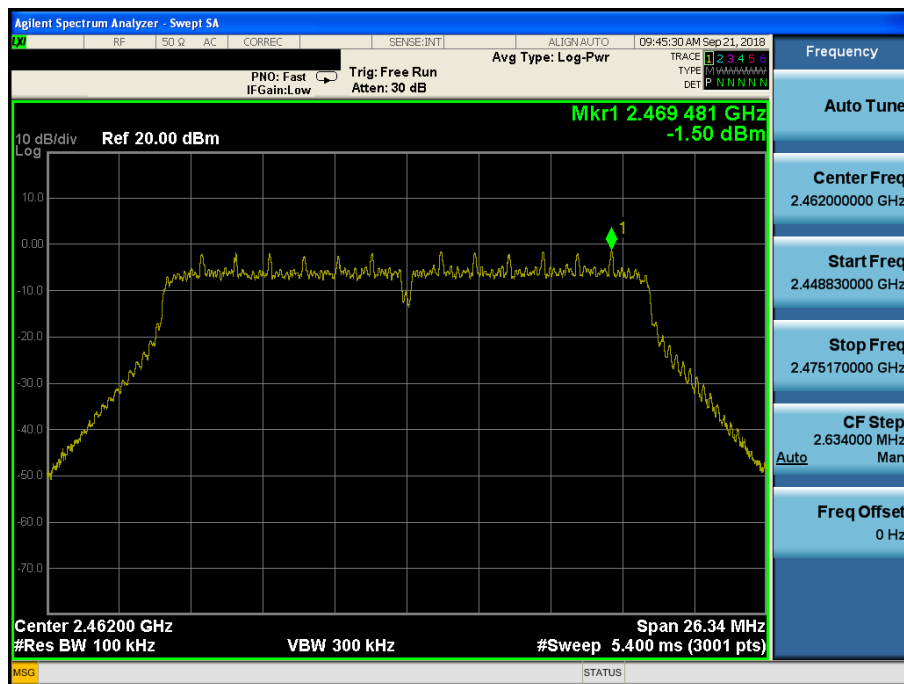


## Conducted Spurious Emissions

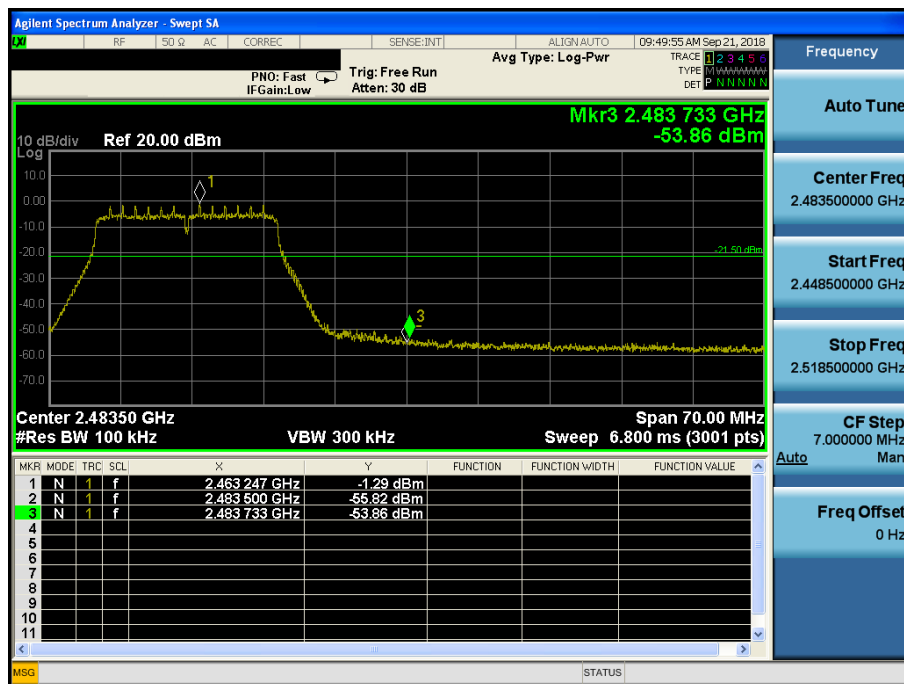


## TM 3 & Highest

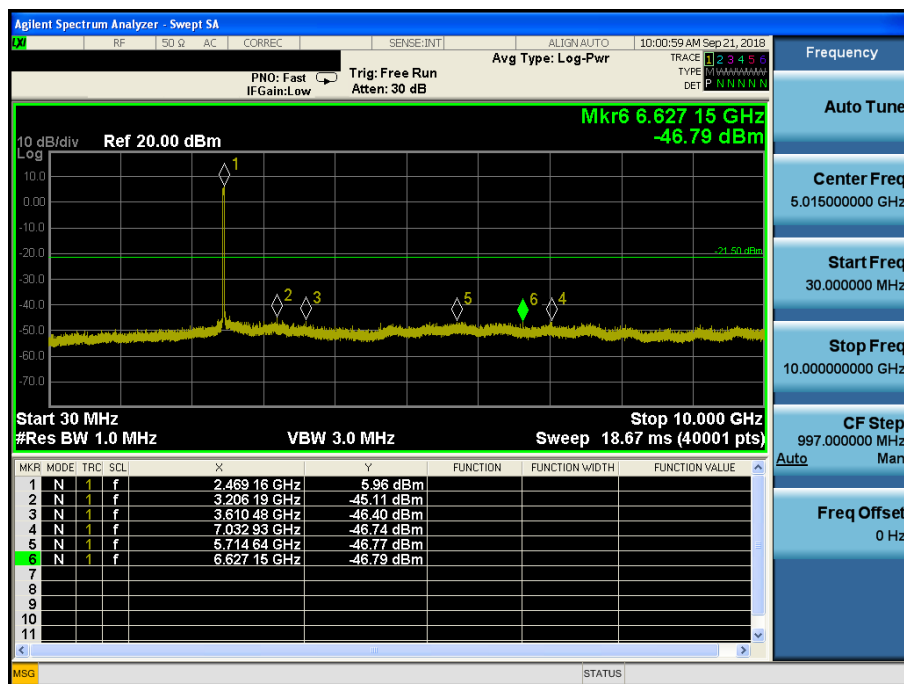
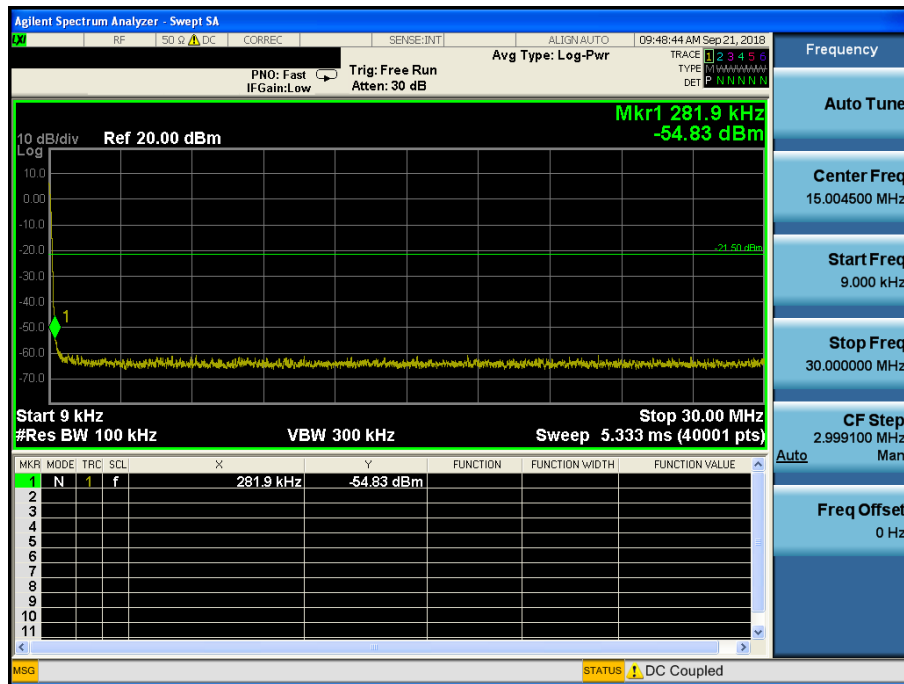
### Reference



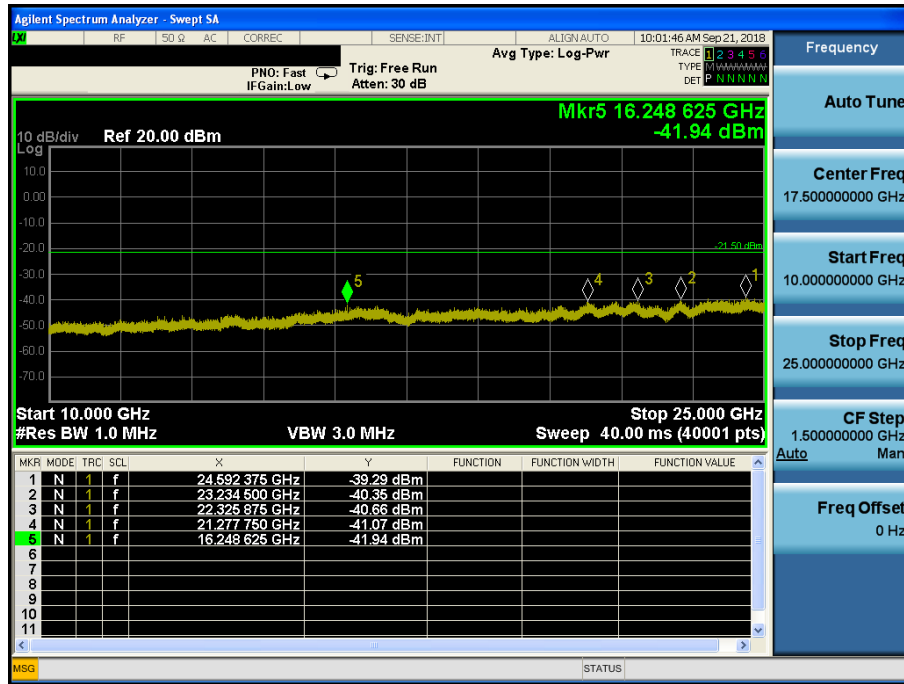
### High Band-edge



## Conducted Spurious Emissions

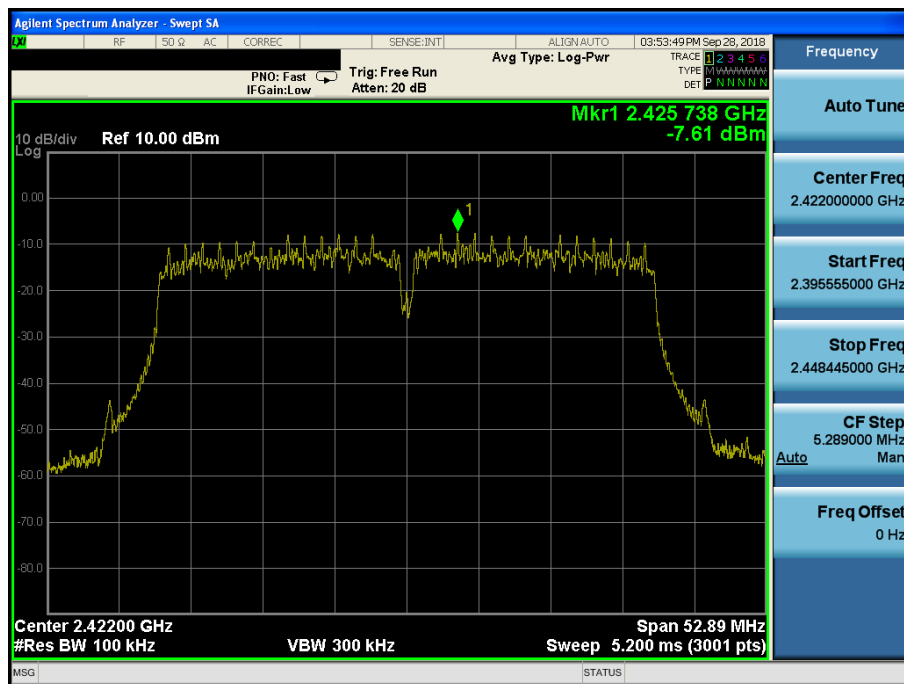


## Conducted Spurious Emissions

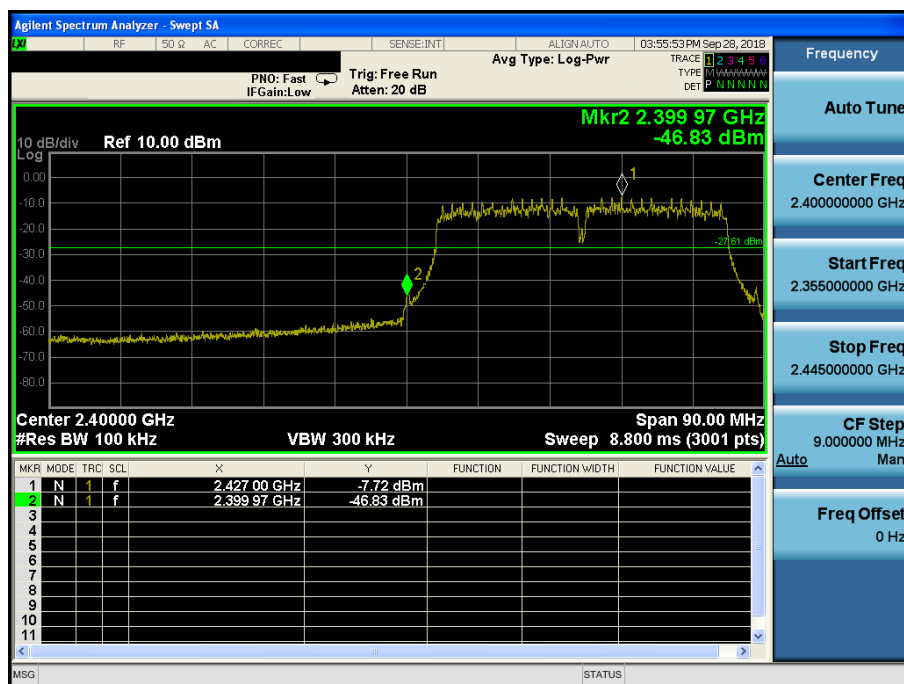


TM 4 & Lowest

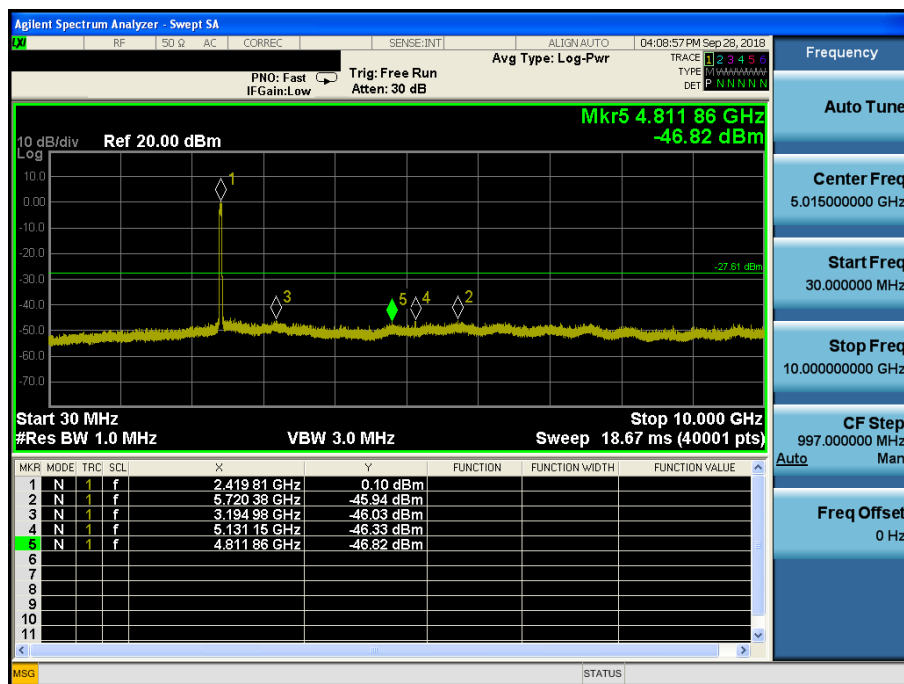
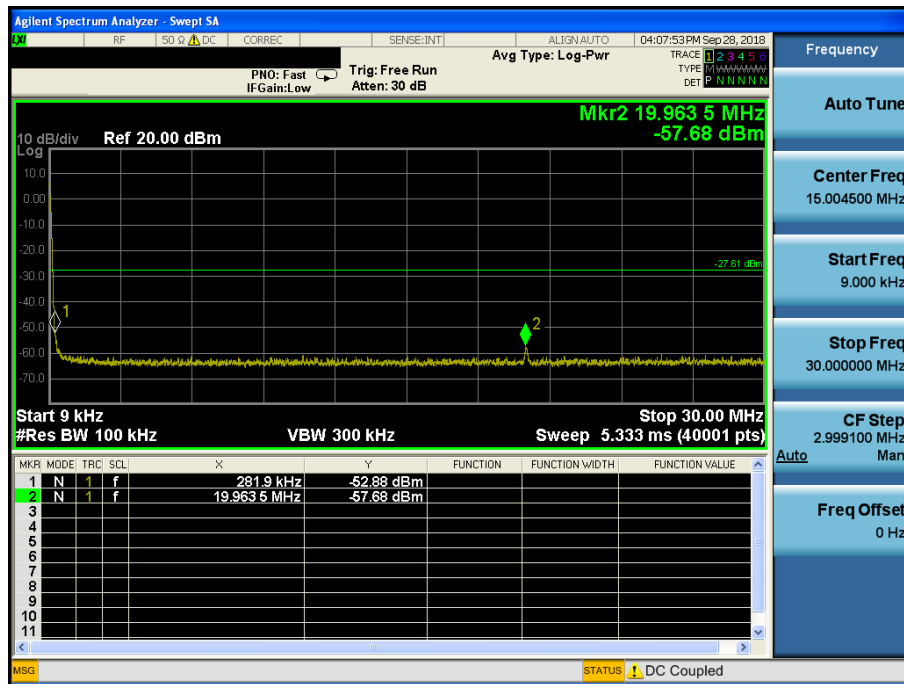
Reference



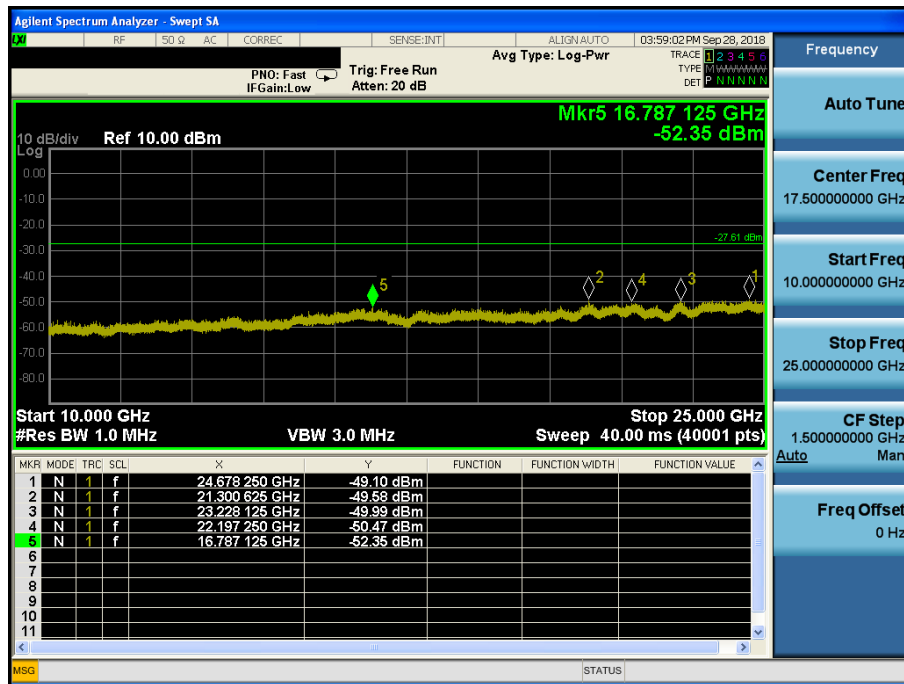
Low Band-edge



## Conducted Spurious Emissions

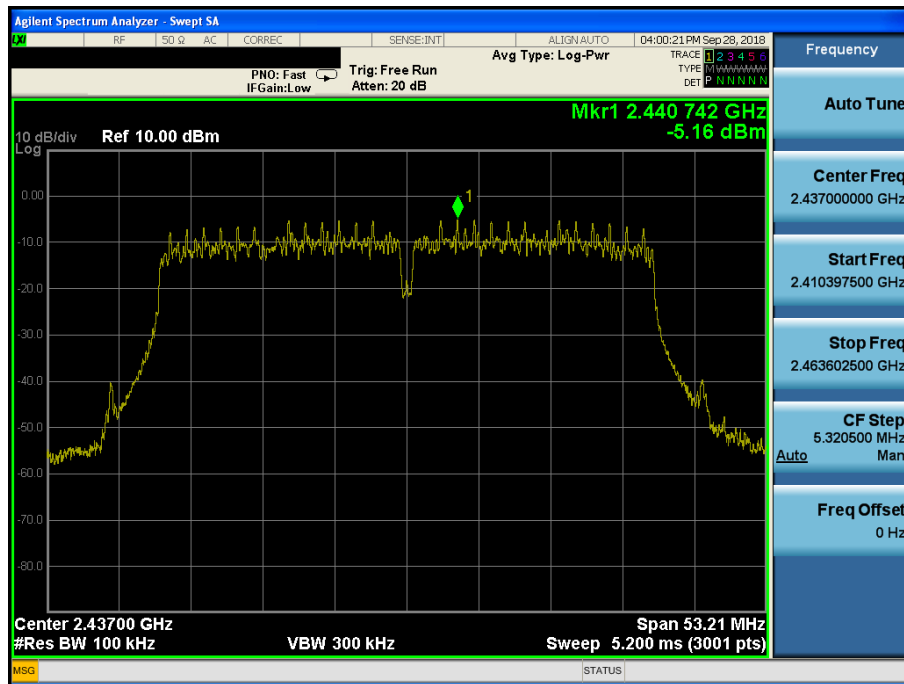


## Conducted Spurious Emissions

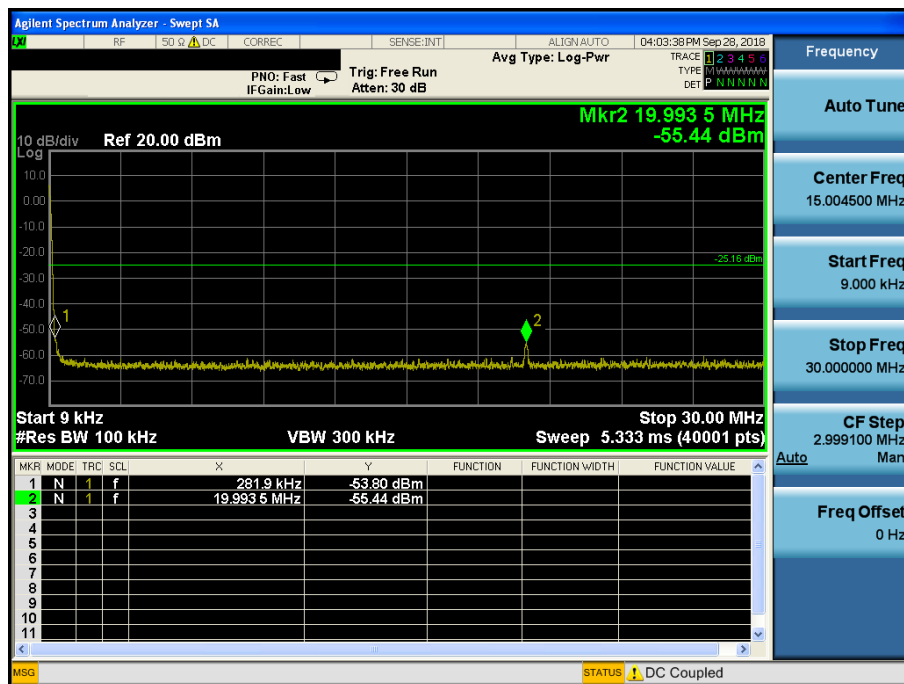


## TM 4 & Middle

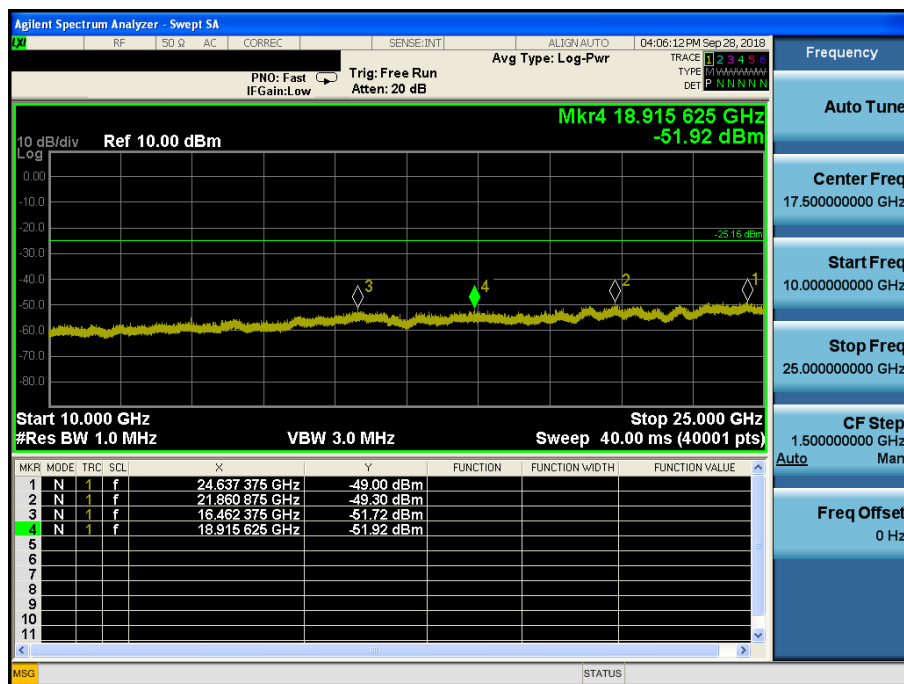
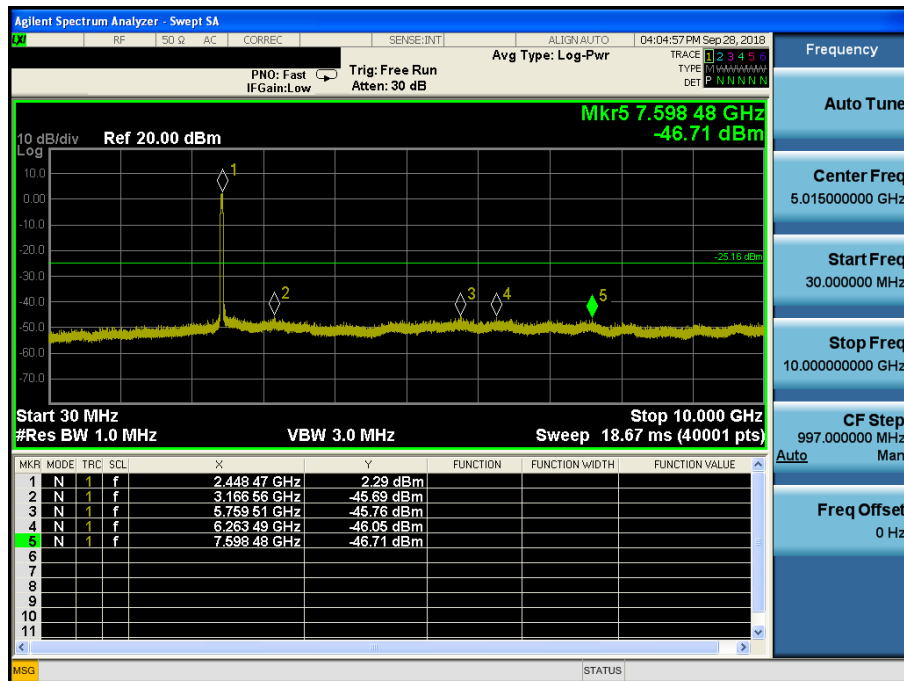
### Reference



### Conducted Spurious Emissions

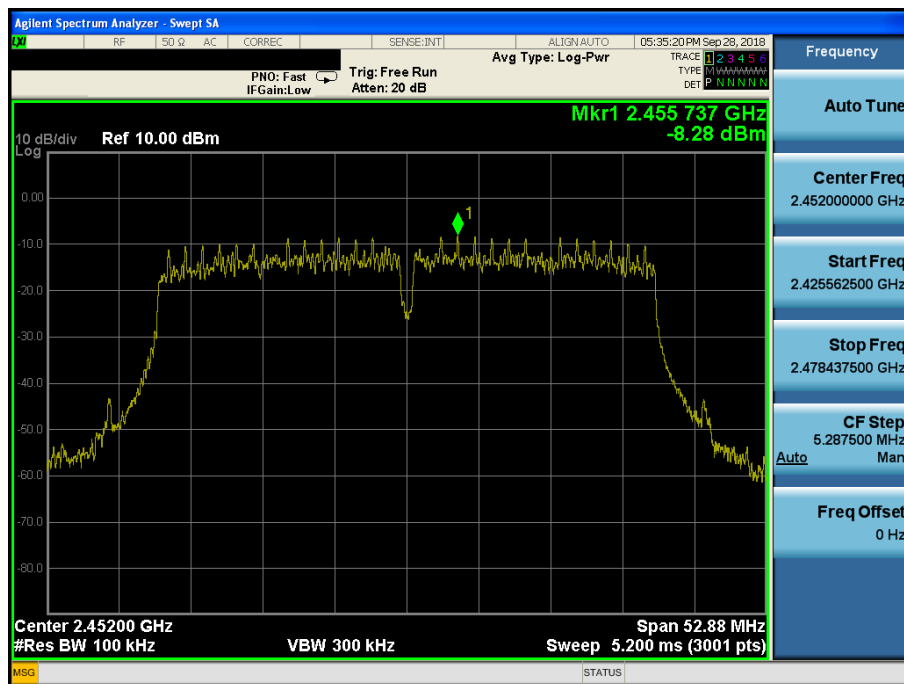


## Conducted Spurious Emissions

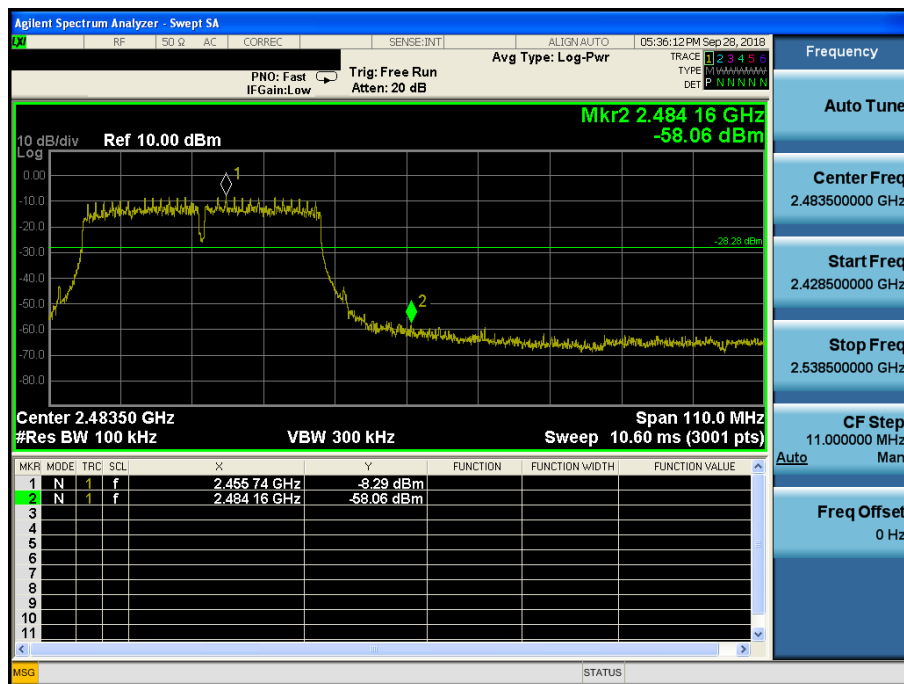


## TM 4 & Highest

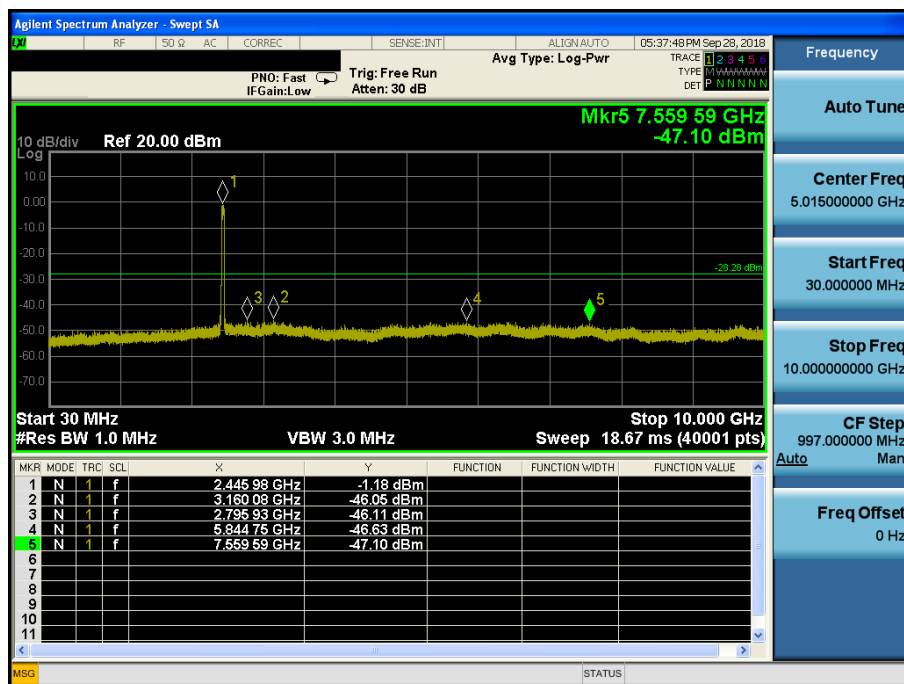
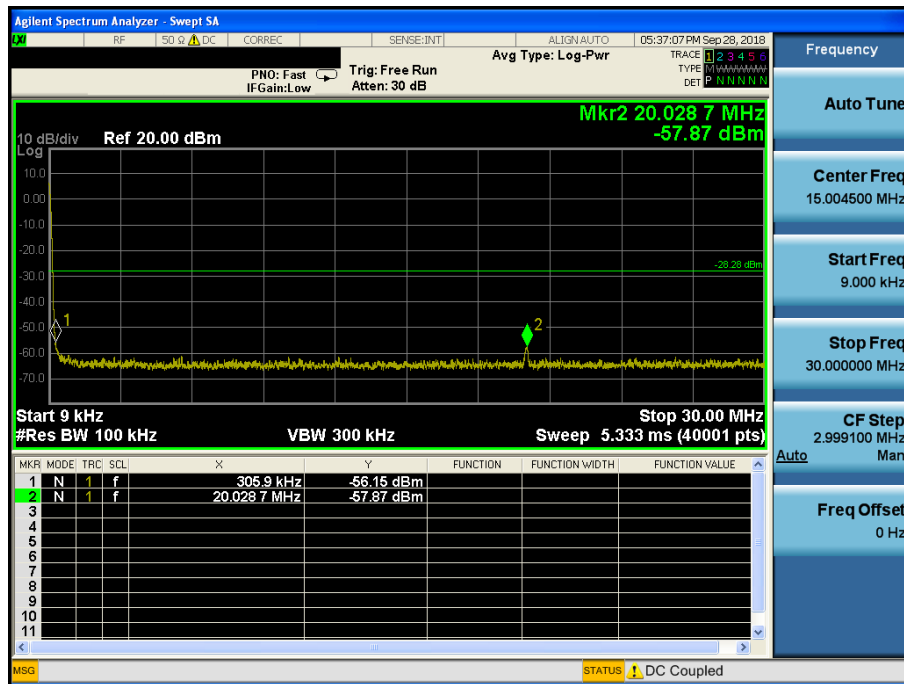
### Reference



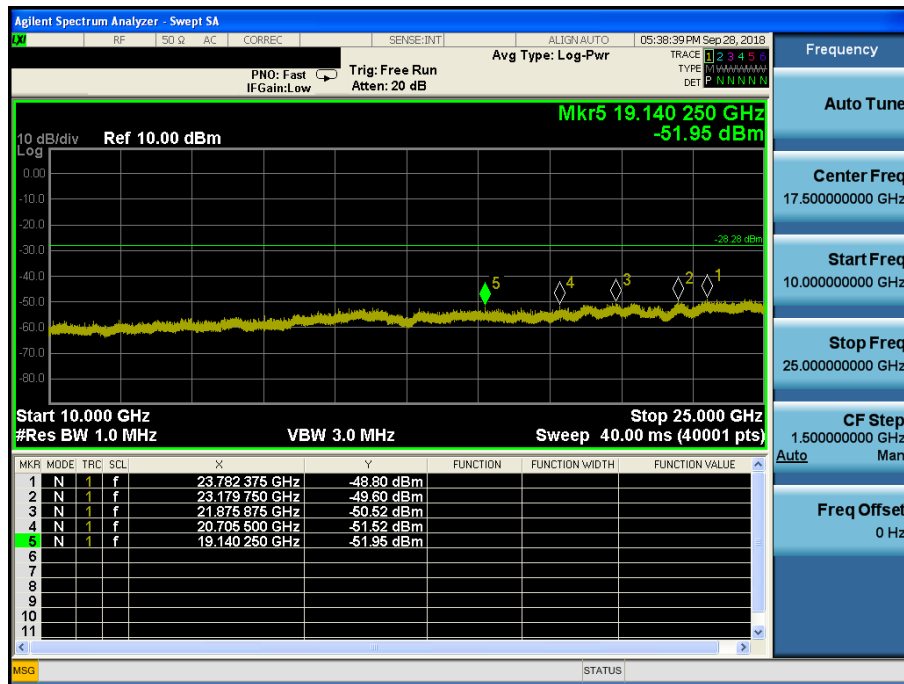
### High Band-edge



## Conducted Spurious Emissions



## Conducted Spurious Emissions



## 8.5 Radiated spurious emissions

### ■ Test Requirements and limit, §15.247(d), §15.205, §15.209

In any 100 kHz bandwidth outside the operating frequency band, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 KHz bandwidth within the band. In case the emission fall within the restricted band specified on 15.205(a) and (b), then the 15.209(a) limit in the table below has to be followed.

#### ■ FCC Part 15.209(a) and (b)

| Frequency (MHz) | Limit (uV/m)  | Measurement Distance (meter) |
|-----------------|---------------|------------------------------|
| 0.009 – 0.490   | 2400/F (kHz)  | 300                          |
| 0.490 – 1.705   | 24000/F (kHz) | 30                           |
| 1.705 – 30.0    | 30            | 30                           |
| 30 ~ 88         | 100 **        | 3                            |
| 88 ~ 216        | 150 **        | 3                            |
| 216 ~ 960       | 200 **        | 3                            |
| Above 960       | 500           | 3                            |

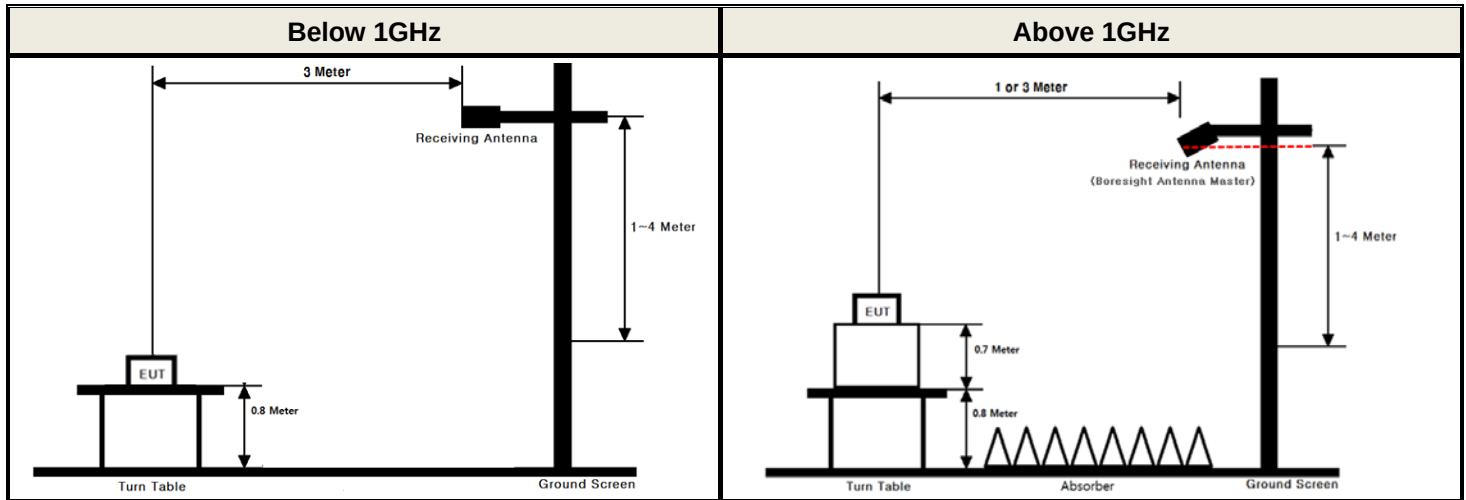
\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

#### ■ FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz               | MHz                 | MHz               | MHz             | GHz          | GHz           |
|-------------------|---------------------|-------------------|-----------------|--------------|---------------|
| 0.009 ~ 0.110     | 8.41425 ~ 8.41475   | 108 ~ 121.94      | 1300 ~ 1427     | 4.5 ~ 5.15   | 14.47 ~ 14.5  |
| 0.495 ~ 0.505     | 12.29 ~ 12.293      | 123 ~ 138         | 1435 ~ 1626.5   | 5.35 ~ 5.46  | 15.35 ~ 16.2  |
| 2.1735 ~ 2.1905   | 12.51975 ~ 12.52025 | 149.9 ~ 150.05    | 1645.5 ~ 1646.5 | 7.25 ~ 7.75  | 17.7 ~ 21.4   |
| 4.125 ~ 4.128     | 12.57675 ~ 12.57725 | 156.52475 ~       | 1660 ~ 1710     | 8.025 ~ 8.5  | 22.01 ~ 23.12 |
| 4.17725 ~ 4.17775 | 13.36 ~ 13.41       | 156.52525         | 1718.8 ~ 1722.2 | 9.0 ~ 9.2    | 23.6 ~ 24.0   |
| 4.20725 ~ 4.20775 | 16.42 ~ 16.423      | 156.7 ~ 156.9     | 2200 ~ 2300     | 9.3 ~ 9.5    | 31.2 ~ 31.8   |
| 6.215 ~ 6.218     | 16.69475 ~ 16.69525 | 162.0125 ~ 167.17 | 2310 ~ 2390     | 10.6 ~ 12.7  | 36.43 ~ 36.5  |
| 6.26775 ~ 6.26825 | 16.80425 ~ 16.80475 | 167.72 ~ 173.2    | 2483.5 ~ 2500   | 13.25 ~ 13.4 | Above 38.6    |
| 6.31175 ~ 6.31225 | 25.5 ~ 25.67        | 240 ~ 285         | 2655 ~ 2900     |              |               |
| 8.291 ~ 8.294     | 37.5 ~ 38.25        | 322 ~ 335.4       | 3260 ~ 3267     |              |               |
| 8.362 ~ 8.366     | 73 ~ 74.6           | 399.90 ~ 410      | 3332 ~ 3339     |              |               |
| 8.37625 ~ 8.38675 | 74.8 ~ 75.2         | 608 ~ 614         | 3345.8 ~ 3358   |              |               |
|                   |                     | 960 ~ 1240        | 3600 ~ 4400     |              |               |

■ **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

## ■ Test Configuration



## ■ Test Procedure

1. The EUT is placed on a non-conductive table, emission measurements at below 1 GHz, the table height is 80 cm and above 1 GHz, the table height is 1.5 m.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 1 or 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

- KDB558074 D01v05 - Section 8.6
- ANSI C63.10-2013 – Section 11.12

### Peak Measurement

RBW = As specified in below table, VBW  $\geq 3 \times$  RBW, Sweep = Auto, Detector = Peak, Trace mode = Max Hold until the trace stabilizes.

| Frequency   | RBW         |
|-------------|-------------|
| 9-150 kHz   | 200-300 Hz  |
| 0.15-30 MHz | 9-10 kHz    |
| 30-1000 MHz | 100-120 kHz |
| > 1000 MHz  | 1 MHz       |

### Average Measurement

1. RBW = 1 MHz
2. VBW  $\geq 1/T$
3. Video bandwidth mode or display mode
  - 1) The instrument shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to RMS and setting the Average-VBW Type to Power (RMS).
  - 2) As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode.
3. Detector = Peak (Number of points  $\geq 2 \times$  Span / RBW)
4. Sweep time = auto.
5. Trace mode = Max Hold
6. Allow max hold to run for at least  $50 \times (1/\text{duty cycle})$  traces.

**Note: Duty cycle is not constant. Refer to the APPENDIX II.**

■ Test Results: **Comply**

**Radiated Spurious Emissions data(9 kHz ~ 1 GHz) : Test Mode 1(TM 1)**

| Tested Frequency | Frequency (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|------------------|-----------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| Lowest           | 30.73           | V       | X                   | PK            | 36.80          | -10.96     | N/A       | N/A      | 25.84           | 40.00          | 14.16       |
|                  | 79.96           | V       | X                   | PK            | 36.30          | -13.96     | N/A       | N/A      | 22.34           | 40.00          | 17.66       |
|                  | 84.08           | V       | X                   | PK            | 37.20          | -14.24     | N/A       | N/A      | 22.96           | 40.00          | 17.04       |
|                  | 122.88          | H       | X                   | PK            | 36.70          | -9.22      | N/A       | N/A      | 27.48           | 43.50          | 16.02       |
|                  | 160.71          | H       | X                   | PK            | 43.00          | -7.76      | N/A       | N/A      | 35.24           | 43.50          | 8.26        |
|                  | 167.62          | H       | X                   | PK            | 43.30          | -7.93      | N/A       | N/A      | 35.37           | 43.50          | 8.13        |
|                  | 239.52          | H       | X                   | PK            | 40.90          | -8.57      | N/A       | N/A      | 32.33           | 46.00          | 13.67       |
|                  | 399.92          | H       | X                   | PK            | 36.80          | -3.30      | N/A       | N/A      | 33.50           | 46.00          | 12.50       |
|                  | 479.95          | H       | X                   | PK            | 44.10          | -1.11      | N/A       | N/A      | 42.99           | 46.00          | 3.01        |
|                  | 479.95          | H       | X                   | QP            | 41.62          | -1.11      | N/A       | N/A      | 40.51           | 46.00          | 5.49        |
|                  | 799.99          | H       | X                   | PK            | 23.70          | 6.75       | N/A       | N/A      | 30.45           | 46.00          | 15.55       |
|                  | -               | -       | -                   | -             | -              | -          | -         | -        | -               | -              | -           |
|                  | -               | -       | -                   | -             | -              | -          | -         | -        | -               | -              | -           |

**Note.**

- Exploratory testing has been performed to determine the emissions characteristic of this EUT. And middle channel of 802.11b(TM1) was selected for final testing and reported.
- No other unwanted emissions were found above listed frequencies.
- All data were recorded using a spectrum analyzer employing a peak detector. If PK results were meet Quasi-peak limit, Quasi-peak measurements were omitted.
- Information of Distance Factor  
For finding emissions, the test distance might be reduced from 3 m to 1 m. In this case, the distance factor (-9.54 dB) is applied to the result.  
- Calculation of distance factor =  $20 \log(\text{applied distance} / \text{required distance}) = 20 \log(1 \text{ m} / 3 \text{ m}) = -9.54 \text{ dB}$   
When distance factor is "N/A", the distance is 3 m and distance factor is not applied.
- Sample Calculation.  
Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG  
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,  
DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

**Radiated Spurious Emissions data(1 ~ 25 GHz) : Test Mode 1(TM 1)**

| Tested Frequency | Frequency (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|------------------|-----------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| Lowest           | 2386.90         | H       | X                   | PK            | 54.20          | 2.68       | N/A       | N/A      | 56.88           | 74.00          | 17.12       |
|                  | 2388.53         | H       | X                   | AV            | 43.24          | 2.69       | N/A       | N/A      | 45.93           | 54.00          | 8.07        |
|                  | 4823.78         | H       | Z                   | PK            | 50.87          | 1.49       | N/A       | N/A      | 52.36           | 74.00          | 21.64       |
|                  | 4823.80         | H       | Z                   | AV            | 40.53          | 1.49       | N/A       | N/A      | 42.02           | 54.00          | 11.98       |
| Middle           | 4874.04         | H       | Z                   | PK            | 50.36          | 1.62       | N/A       | N/A      | 51.98           | 74.00          | 22.02       |
|                  | 4874.08         | H       | Z                   | AV            | 41.18          | 1.62       | N/A       | N/A      | 42.80           | 54.00          | 11.20       |
| Highest          | 2484.71         | H       | X                   | PK            | 55.45          | 3.10       | N/A       | N/A      | 58.55           | 74.00          | 15.45       |
|                  | 2485.09         | H       | X                   | AV            | 44.09          | 3.10       | N/A       | N/A      | 47.19           | 54.00          | 6.81        |
|                  | 4923.84         | H       | Z                   | PK            | 51.19          | 1.78       | N/A       | N/A      | 52.97           | 74.00          | 21.03       |
|                  | 4923.93         | H       | Z                   | AV            | 41.42          | 1.78       | N/A       | N/A      | 43.20           | 54.00          | 10.80       |

**Note.**

1. The radiated emissions were investigated up to 25GHz. And no other spurious and harmonic emissions were found above listed frequencies.

2. Information of Distance Factor

For finding emissions, the test distance might be reduced from 3 m to 1 m. In this case, the distance factor (-9.54 dB) is applied to the result.

- Calculation of distance factor =  $20 \log(\text{applied distance} / \text{required distance}) = 20 \log(1 \text{ m} / 3 \text{ m}) = -9.54 \text{ dB}$

When distance factor is "N/A", the distance is 3 m and distance factor is not applied.

3. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

**Radiated Spurious Emissions data(1 ~ 25 GHz) : Test Mode 2(TM 2)**

| Tested Frequency | Frequency (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|------------------|-----------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| Lowest           | 2389.93         | H       | X                   | PK            | 54.46          | 2.70       | N/A       | N/A      | 57.16           | 74.00          | 16.84       |
|                  | 2389.63         | H       | X                   | AV            | 43.10          | 2.70       | N/A       | N/A      | 45.80           | 54.00          | 8.20        |
|                  | 4823.69         | H       | Z                   | PK            | 50.90          | 1.49       | N/A       | N/A      | 52.39           | 74.00          | 21.61       |
|                  | 4823.96         | H       | Z                   | AV            | 40.28          | 1.49       | N/A       | N/A      | 41.77           | 54.00          | 12.23       |
| Middle           | 4873.95         | H       | Z                   | PK            | 50.89          | 1.62       | N/A       | N/A      | 52.51           | 74.00          | 21.49       |
|                  | 4874.06         | H       | Z                   | AV            | 40.56          | 1.62       | N/A       | N/A      | 42.18           | 54.00          | 11.82       |
| Highest          | 2483.59         | H       | X                   | PK            | 56.18          | 3.10       | N/A       | N/A      | 59.28           | 74.00          | 14.72       |
|                  | 2483.59         | H       | X                   | AV            | 44.03          | 3.10       | N/A       | N/A      | 47.13           | 54.00          | 6.87        |
|                  | 4923.87         | H       | Z                   | PK            | 50.75          | 1.78       | N/A       | N/A      | 52.53           | 74.00          | 21.47       |
|                  | 4923.99         | H       | Z                   | AV            | 40.25          | 1.78       | N/A       | N/A      | 42.03           | 54.00          | 11.97       |

**Note.**

1. The radiated emissions were investigated up to 25GHz. And no other spurious and harmonic emissions were found above listed frequencies.

2. Information of Distance Factor

For finding emissions, the test distance might be reduced from 3 m to 1 m. In this case, the distance factor (-9.54 dB) is applied to the result.

- Calculation of distance factor =  $20 \log(\text{applied distance} / \text{required distance}) = 20 \log(1 \text{ m} / 3 \text{ m}) = -9.54 \text{ dB}$

When distance factor is "N/A", the distance is 3 m and distance factor is not applied.

3. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

**Radiated Spurious Emissions data(1 ~ 25 GHz) : Test Mode 3(TM 3)**

| Tested Frequency | Frequency (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|------------------|-----------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| Lowest           | 2388.67         | H       | X                   | PK            | 54.83          | 2.69       | N/A       | N/A      | 57.52           | 74.00          | 16.48       |
|                  | 2389.98         | H       | X                   | AV            | 43.10          | 2.70       | N/A       | N/A      | 45.80           | 54.00          | 8.20        |
|                  | 4824.20         | H       | Z                   | PK            | 50.79          | 1.49       | N/A       | N/A      | 52.28           | 74.00          | 21.72       |
|                  | 4823.87         | H       | Z                   | AV            | 40.28          | 1.49       | N/A       | N/A      | 41.77           | 54.00          | 12.23       |
| Middle           | 4873.84         | H       | Z                   | PK            | 50.78          | 1.62       | N/A       | N/A      | 52.40           | 74.00          | 21.60       |
|                  | 4874.01         | H       | Z                   | AV            | 40.04          | 1.62       | N/A       | N/A      | 41.66           | 54.00          | 12.34       |
| Highest          | 2483.87         | H       | X                   | PK            | 55.58          | 3.10       | N/A       | N/A      | 58.68           | 74.00          | 15.32       |
|                  | 2484.06         | H       | X                   | AV            | 43.99          | 3.10       | N/A       | N/A      | 47.09           | 54.00          | 6.91        |
|                  | 4924.26         | H       | Z                   | PK            | 50.19          | 1.78       | N/A       | N/A      | 51.97           | 74.00          | 22.03       |
|                  | 4924.01         | H       | Z                   | AV            | 39.88          | 1.78       | N/A       | N/A      | 41.66           | 54.00          | 12.34       |

**Note.**

1. The radiated emissions were investigated up to 25GHz. And no other spurious and harmonic emissions were found above listed frequencies.

2. Information of Distance Factor

For finding emissions, the test distance might be reduced from 3 m to 1 m. In this case, the distance factor (-9.54 dB) is applied to the result.

- Calculation of distance factor =  $20 \log(\text{applied distance} / \text{required distance}) = 20 \log(1 \text{ m} / 3 \text{ m}) = -9.54 \text{ dB}$

When distance factor is "N/A", the distance is 3 m and distance factor is not applied.

3. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

**Radiated Spurious Emissions data(1 ~ 25 GHz) : Test Mode 4(TM 4)**

| Tested Frequency | Frequency (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|------------------|-----------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| Lowest           | 2386.85         | H       | X                   | PK            | 53.77          | 2.68       | N/A       | N/A      | 56.45           | 74.00          | 17.55       |
|                  | 2388.42         | H       | X                   | AV            | 44.26          | 2.69       | N/A       | N/A      | 46.95           | 54.00          | 7.05        |
|                  | 4843.73         | H       | Z                   | PK            | 50.62          | 1.54       | N/A       | N/A      | 52.16           | 74.00          | 21.84       |
|                  | 4844.15         | H       | Z                   | AV            | 41.91          | 1.54       | N/A       | N/A      | 43.45           | 54.00          | 10.55       |
| Middle           | 4873.81         | H       | Z                   | PK            | 51.92          | 1.62       | N/A       | N/A      | 53.54           | 74.00          | 20.46       |
|                  | 4873.84         | H       | Z                   | AV            | 42.10          | 1.62       | N/A       | N/A      | 43.72           | 54.00          | 10.28       |
| Highest          | 2486.90         | H       | X                   | PK            | 52.35          | 3.10       | N/A       | N/A      | 55.45           | 74.00          | 18.55       |
|                  | 2486.03         | H       | X                   | AV            | 43.72          | 3.10       | N/A       | N/A      | 46.82           | 54.00          | 7.18        |
|                  | 4903.85         | H       | Z                   | PK            | 51.71          | 1.73       | N/A       | N/A      | 53.44           | 74.00          | 20.56       |
|                  | 4903.84         | H       | Z                   | AV            | 41.48          | 1.73       | N/A       | N/A      | 43.21           | 54.00          | 10.79       |

**Note.**

1. The radiated emissions were investigated up to 25GHz. And no other spurious and harmonic emissions were found above listed frequencies.

2. Information of Distance Factor

For finding emissions, the test distance might be reduced from 3 m to 1 m. In this case, the distance factor (-9.54 dB) is applied to the result.

- Calculation of distance factor =  $20 \log(\text{applied distance} / \text{required distance}) = 20 \log(1 \text{ m} / 3 \text{ m}) = -9.54 \text{ dB}$

When distance factor is "N/A", the distance is 3 m and distance factor is not applied.

3. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

## 8.6 Power-line conducted emissions

### ■ Test Requirements and limit, §15.207

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

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

| Frequency Range<br>(MHz) | Conducted Limit (dBuV) |            |
|--------------------------|------------------------|------------|
|                          | Quasi-Peak             | Average    |
| 0.15 ~ 0.5               | 66 to 56 *             | 56 to 46 * |
| 0.5 ~ 5                  | 56                     | 46         |
| 5 ~ 30                   | 60                     | 50         |

\* Decreases with the logarithm of the frequency

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### ■ Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to the test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

### ■ Test Results: **Comply**(Refer to next page.)

The worst data was reported.

## ■ Result Plots

## AC Line Conducted Emissions (Graph)

Results of Conducted Emission

DTNC

Date 2018-09-21

Order No.  
Model No.  
Serial No.  
Test Condition

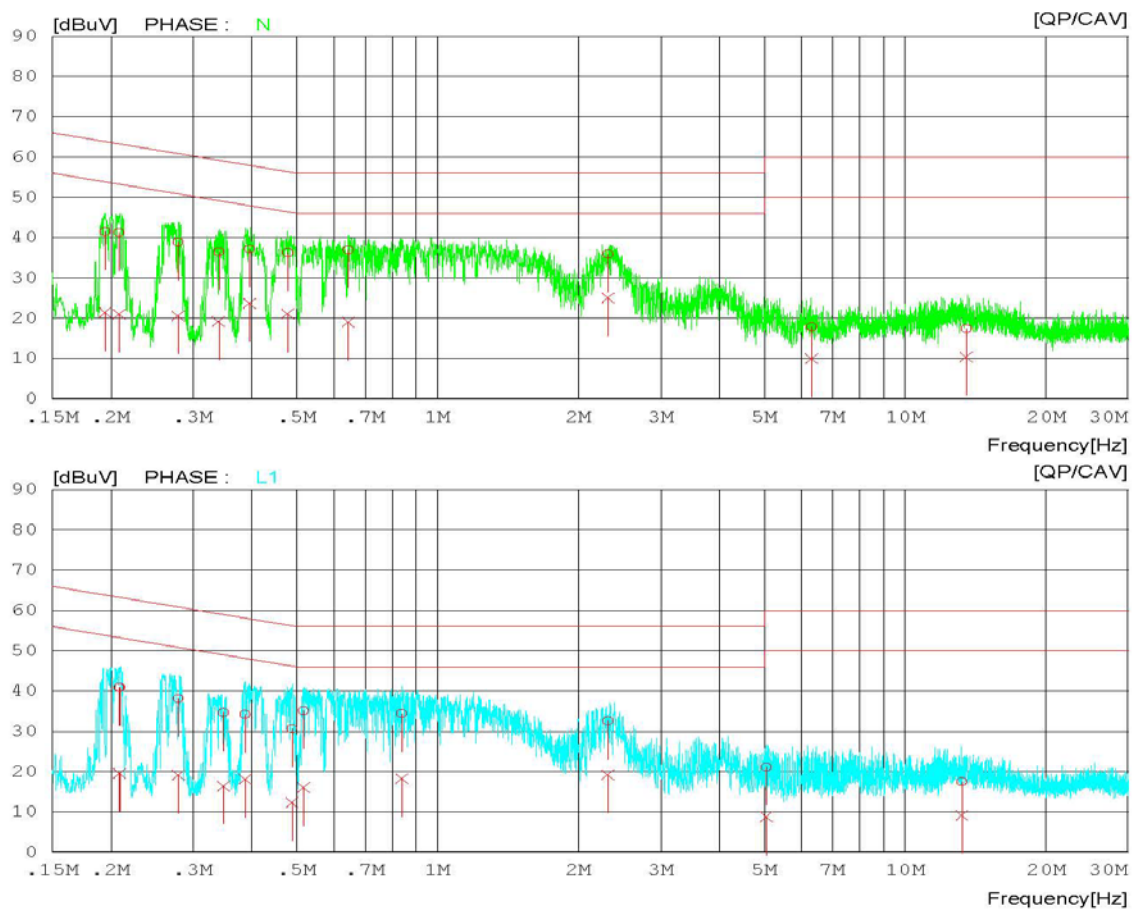
W8188511K  
2.4G WLAN

Reference No.  
Power Supply  
Temp/Humi.  
Operator

120 V / 60Hz  
25 °C / 45 %  
M.H.LEE

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV



## AC Line Conducted Emissions (List)

### Results of Conducted Emission

DTNC

Date 2018-09-21

Order No.  
Model No. W8188511K  
Serial No.  
Test Condition 2.4G WLAN

Reference No.  
Power Supply 120 V / 60Hz  
Temp/Humi. 25 °C / 45 %  
Operator M.H.LEE

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV

| NO | FREQ<br>[MHz] | READING      |               | C.FACTOR<br>[dB] | RESULT       |               | LIMIT        |               | MARGIN       |               | PHASE |
|----|---------------|--------------|---------------|------------------|--------------|---------------|--------------|---------------|--------------|---------------|-------|
|    |               | QP<br>[dBuV] | CAV<br>[dBuV] |                  | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] |       |
| 1  | 0.19452       | 31.42        | 11.42         | 10.02            | 41.44        | 21.44         | 63.84        | 53.84         | 22.40        | 32.40         | N     |
| 2  | 0.20859       | 31.27        | 10.98         | 9.99             | 41.26        | 20.97         | 63.26        | 53.26         | 22.00        | 32.29         | N     |
| 3  | 0.27854       | 28.90        | 10.54         | 10.01            | 38.91        | 20.55         | 60.86        | 50.86         | 21.95        | 30.31         | N     |
| 4  | 0.34042       | 26.52        | 9.16          | 10.01            | 36.53        | 19.17         | 59.19        | 49.19         | 22.66        | 30.02         | N     |
| 5  | 0.39625       | 27.16        | 13.73         | 10.01            | 37.17        | 23.74         | 57.93        | 47.93         | 20.76        | 24.19         | N     |
| 6  | 0.47770       | 26.28        | 11.10         | 10.01            | 36.29        | 21.11         | 56.38        | 46.38         | 20.09        | 25.27         | N     |
| 7  | 0.64371       | 26.93        | 8.96          | 10.03            | 36.96        | 18.99         | 56.00        | 46.00         | 19.04        | 27.01         | N     |
| 8  | 2.31440       | 25.84        | 14.96         | 10.12            | 35.96        | 25.08         | 56.00        | 46.00         | 20.04        | 20.92         | N     |
| 9  | 6.30560       | 7.56         | -0.30         | 10.24            | 17.80        | 9.94          | 60.00        | 50.00         | 42.20        | 40.06         | N     |
| 10 | 13.51580      | 6.97         | -0.07         | 10.44            | 17.41        | 10.37         | 60.00        | 50.00         | 42.59        | 39.63         | N     |
| 11 | 0.20865       | 30.94        | 9.61          | 9.97             | 40.91        | 19.58         | 63.26        | 53.26         | 22.35        | 33.68         | L1    |
| 12 | 0.20860       | 30.95        | 9.61          | 9.97             | 40.92        | 19.58         | 63.26        | 53.26         | 22.34        | 33.68         | L1    |
| 13 | 0.27891       | 28.17        | 9.13          | 9.97             | 38.14        | 19.10         | 60.85        | 50.85         | 22.71        | 31.75         | L1    |
| 14 | 0.34832       | 24.61        | 6.45          | 9.97             | 34.58        | 16.42         | 59.00        | 49.00         | 24.42        | 32.58         | L1    |
| 15 | 0.38729       | 24.17        | 8.09          | 9.98             | 34.15        | 18.07         | 58.12        | 48.12         | 23.97        | 30.05         | L1    |
| 16 | 0.48777       | 20.62        | 2.29          | 9.99             | 30.61        | 12.28         | 56.21        | 46.21         | 25.60        | 33.93         | L1    |
| 17 | 0.51642       | 25.08        | 6.03          | 9.99             | 35.07        | 16.02         | 56.00        | 46.00         | 20.93        | 29.98         | L1    |
| 18 | 0.83789       | 24.44        | 8.17          | 9.99             | 34.43        | 18.16         | 56.00        | 46.00         | 21.57        | 27.84         | L1    |
| 19 | 2.31120       | 22.52        | 9.17          | 10.08            | 32.60        | 19.25         | 56.00        | 46.00         | 23.40        | 26.75         | L1    |
| 20 | 5.04700       | 10.97        | -1.43         | 10.16            | 21.13        | 8.73          | 60.00        | 50.00         | 38.87        | 41.27         | L1    |
| 21 | 13.21480      | 7.11         | -1.26         | 10.39            | 17.50        | 9.13          | 60.00        | 50.00         | 42.50        | 40.87         | L1    |

## 9. LIST OF TEST EQUIPMENT

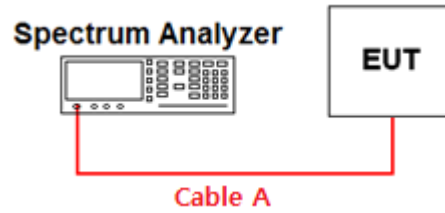
| Type                                   | Manufacturer                           | Model                       | Cal.Date<br>(yy/mm/dd) | Next.Cal.Date<br>(yy/mm/dd) | S/N                |
|----------------------------------------|----------------------------------------|-----------------------------|------------------------|-----------------------------|--------------------|
| Spectrum Analyzer                      | Agilent Technologies                   | N9020A                      | 18/07/09               | 19/07/09                    | MY50200834         |
| Spectrum Analyzer                      | Agilent Technologies                   | N9020A                      | 18/01/03               | 19/01/03                    | MY48011700         |
| Multimeter                             | FLUKE                                  | 17B                         | 17/12/26               | 18/12/26                    | 26030065WS         |
| Signal Generator                       | Rohde Schwarz                          | SMBV100A                    | 17/12/27               | 18/12/27                    | 255571             |
| Signal Generator                       | ANRITSU                                | MG3695C                     | 18/02/12               | 19/02/12                    | 173501             |
| Thermohygrometer                       | BODYCOM                                | BJ5478                      | 1801/03                | 19/01/03                    | 120612-1           |
| Thermohygrometer                       | BODYCOM                                | BJ5478                      | 18/07/09               | 19/07/09                    | N/A                |
| IN/OUT<br>Thermohygrometer             | SATO                                   | PC-5000TRH-II               | 18/07/18               | 19/07/18                    | N/A                |
| HYGROMETER                             | TESTO                                  | 608-H1                      | 18/02/10               | 19/02/10                    | 34862883           |
| Loop Antenna                           | Schwarzbeck                            | FMZB1513                    | 18/01/30               | 20/01/30                    | 1513-128           |
| BILOG ANTENNA                          | Schwarzbeck                            | VULB 9160                   | 18/07/13               | 20/07/13                    | 3359               |
| Horn Antenna                           | ETS-Lindgren                           | 3115                        | 17/01/13               | 19/01/13                    | 9202-3820          |
| Horn Antenna                           | Schwarzbeck                            | BBHA 9120C                  | 17/12/04               | 19/12/04                    | 9120C-561          |
| Horn Antenna                           | A.H.Systems Inc.                       | SAS-574                     | 17/07/31               | 19/07/31                    | 155                |
| PreAmplifier                           | tsj                                    | MLA-10K01-B01-27            | 18/01/11               | 19/01/11                    | 2005354            |
| PreAmplifier                           | tsj                                    | MLA-0118-J01-45             | 18/02/08               | 19/02/08                    | 17138              |
| PreAmplifier                           | tsj                                    | MLA-1840-J02-45             | 18/07/06               | 19/07/06                    | 16966-10728        |
| Attenuator                             | SMAJK                                  | SMAJK-2-3                   | 18/07/02               | 19/07/02                    | 3                  |
| Attenuator                             | Aeroflex/Weinschel                     | 56-3                        | 18/07/02               | 19/07/02                    | Y2370              |
| Attenuator                             | SRTechnology                           | F01-B0606-01                | 18/07/02               | 19/07/02                    | 13092403           |
| Attenuator<br>High Pass Filter         | Hefei Shunze<br>Wainwright Instruments | SS5T2.92-10-40              | 18/07/03               | 19/07/03                    | 16012202           |
|                                        |                                        | WHNX8.0/26.5-6SS            | 18/07/02               | 19/07/02                    | 3                  |
| High Pass Filter                       | Wainwright Instruments                 | WHKX12-935-1000-15000-40SS  | 18/07/02               | 19/07/02                    | 8                  |
| High Pass Filter                       | Wainwright Instruments                 | WHKX10-2838-3300-18000-60SS | 18/07/02               | 19/07/02                    | 1                  |
| Power Meter &<br>Wide Bandwidth Sensor | Anritsu                                | ML2496A<br>MA2411B          | 17/12/27               | 18/12/27                    | 1338004<br>1249303 |
| Attenuator                             | SMAJK                                  | SMAJK-50-10                 | 18/07/04               | 19/07/04                    | 2-50-10            |
| EMI Test Receiver                      | Rohde Schwarz                          | ESR7                        | 18/02/13               | 19/02/13                    | 101061             |
| EMI Test Receiver                      | Rohde Schwarz                          | ESCI7                       | 18/02/12               | 19/02/12                    | 100910             |
| PULSE LIMITER                          | Rohde Schwarz                          | ESH3-Z2                     | 17/09/29               | 18/09/29                    | 101333             |
|                                        |                                        |                             | 18/09/27               | 19/09/27                    |                    |
| Cable                                  | DT&C                                   | CABLE                       | 18/07/06               | 19/07/06                    | G-13               |
| Cable                                  | DT&C                                   | CABLE                       | 18/07/06               | 19/07/06                    | G-14               |
| Cable                                  | Junkosha                               | MWX241                      | 18/06/25               | 19/06/25                    | G-04               |
| Cable                                  | Junkosha                               | MWX241                      | 18/06/25               | 19/06/25                    | G-07               |
| Cable                                  | DT&C                                   | CABLE                       | 18/07/05               | 19/07/05                    | RF-82              |
| Cable                                  | HUBER+SUHNER                           | SUCOFLEX                    | 17/12/22               | 18/12/22                    | C-1                |
| Cable                                  | HUBER+SUHNER                           | SUCOFLEX                    | 17/12/22               | 18/12/22                    | C-2                |
| Cable                                  | HUBER+SUHNER                           | SUCOFLEX                    | 17/12/22               | 18/12/22                    | C-3                |
| Cable                                  | HUBER+SUHNER                           | SUCOFLEX                    | 17/12/22               | 18/12/22                    | C-4                |

Note: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017

Note: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

## APPENDIX I

### ▪ Conducted Measurement



Path loss information

| Frequency (GHz)                        | Path Loss (dB) | Frequency (GHz) | Path Loss (dB) |
|----------------------------------------|----------------|-----------------|----------------|
| 0.03                                   | 0.21           | 15              | 0.94           |
| 1                                      | 0.43           | 20              | 1.12           |
| 2.412 & 2.437 & 2.462<br>2.422 & 2.452 | 0.50           | 25              | 1.25           |
| 5                                      | 0.67           | -               | -              |
| 10                                     | 0.80           | -               | -              |

Note 1: The path loss from EUT to Spectrum analyzer was measured and used for test.

Path loss (S/A's correction factor) = Cable A

(Attenuator, Applied only when it was used externally)

## APPENDIX II

### Duty cycle plots

#### ▪ Test Procedure

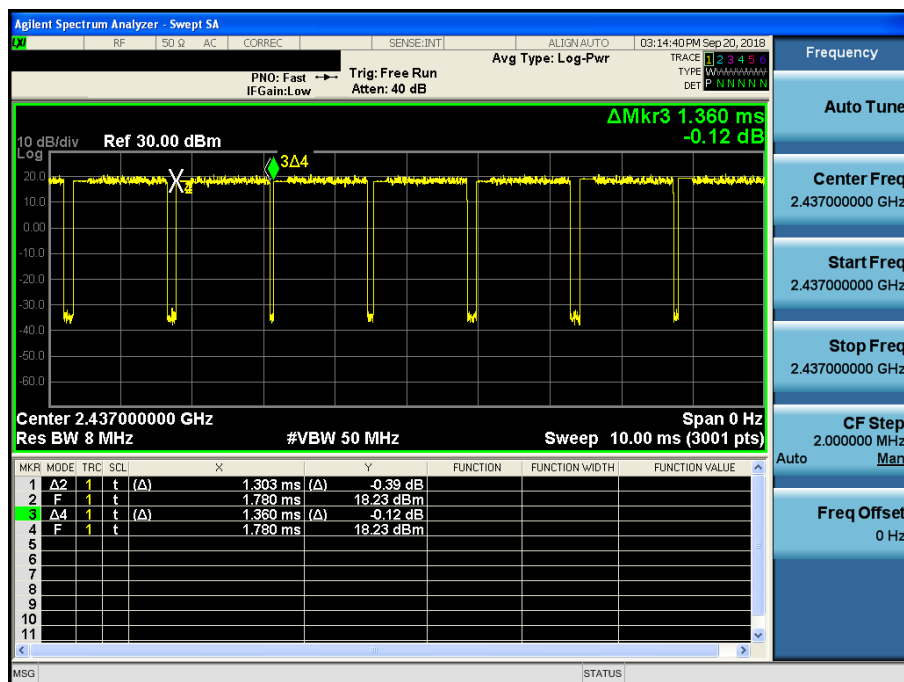
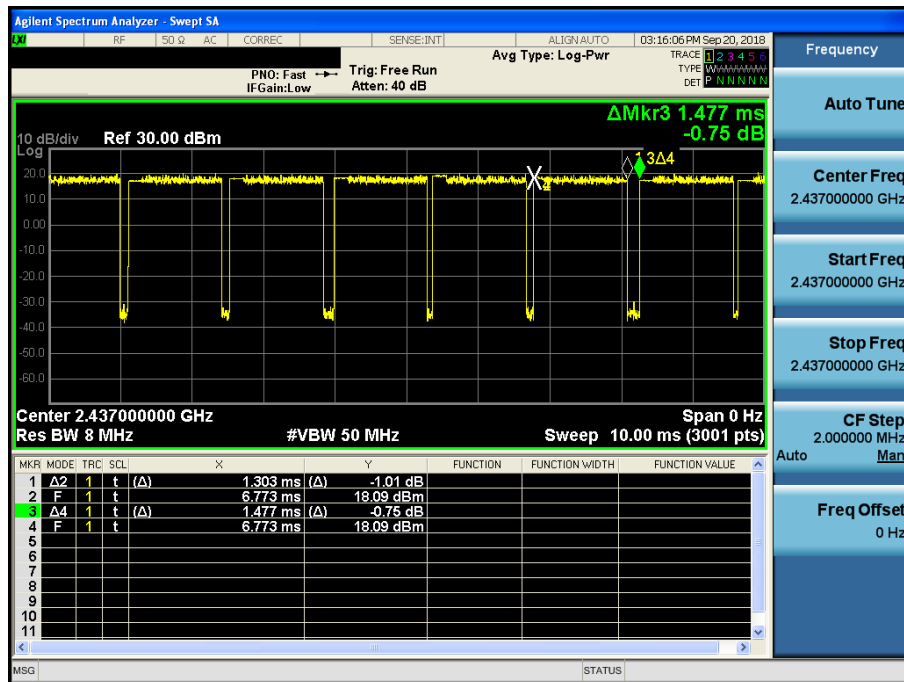
**Duty Cycle** was measured using **section 6.0 b) of KDB558074 D01V04** :

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set  $RBW \geq OBW$  if possible; otherwise, set RBW to the largest available value. Set  $VBW \geq RBW$ . Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$  and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

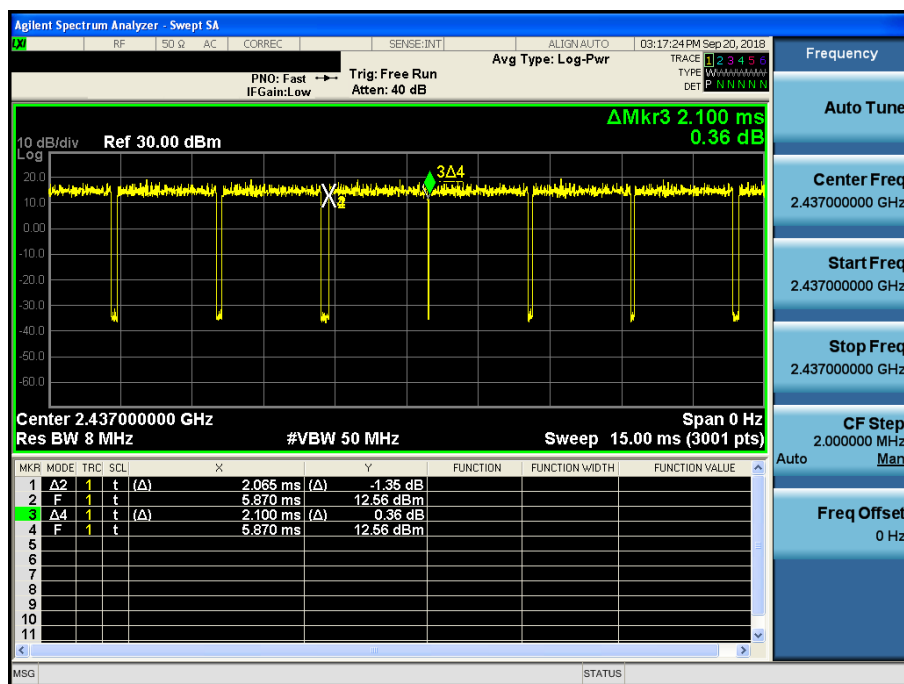
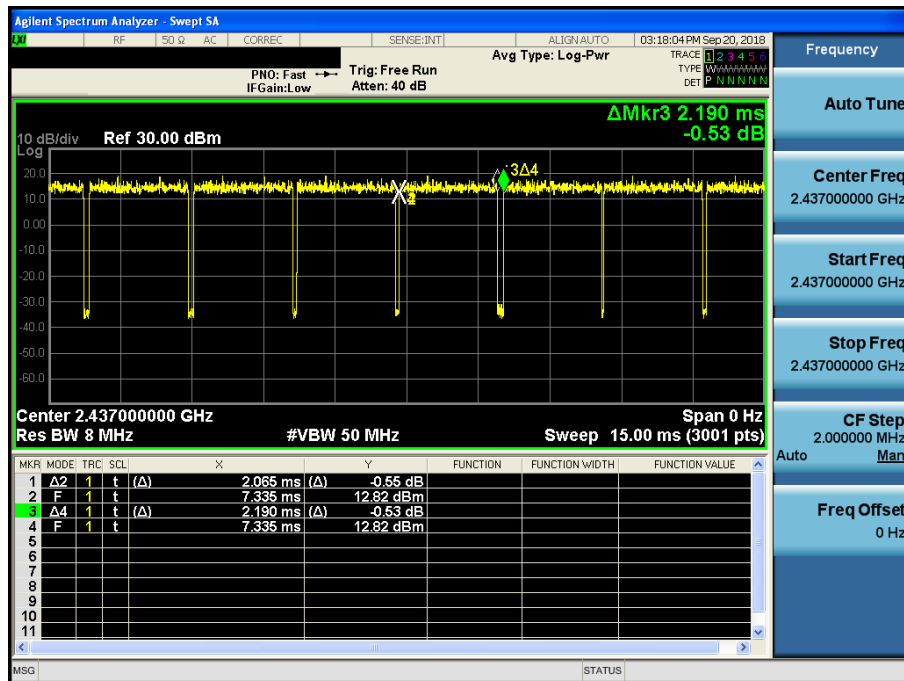
# Duty Cycle

TM 1 & Middle



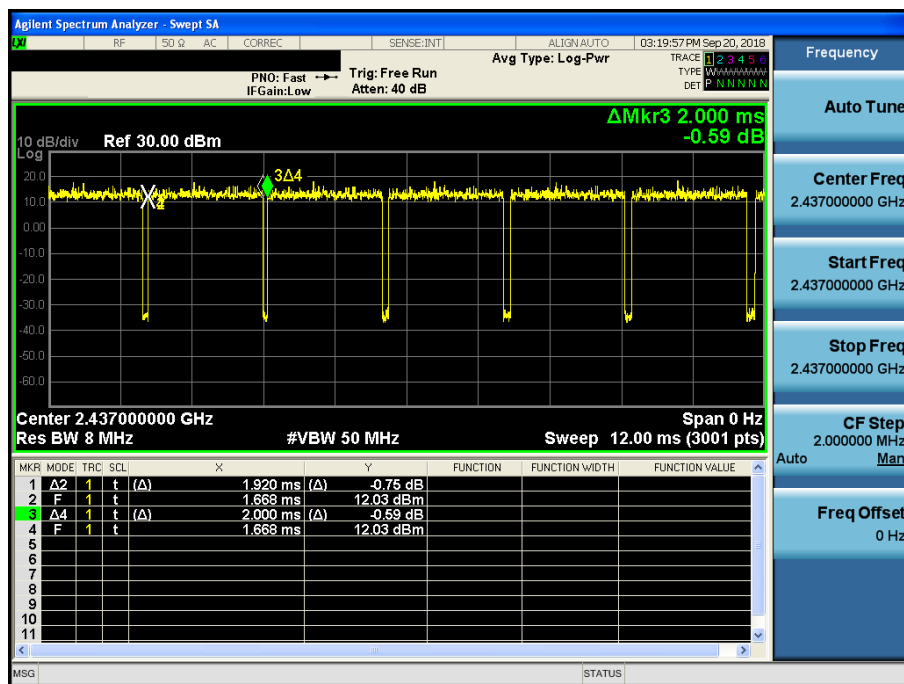
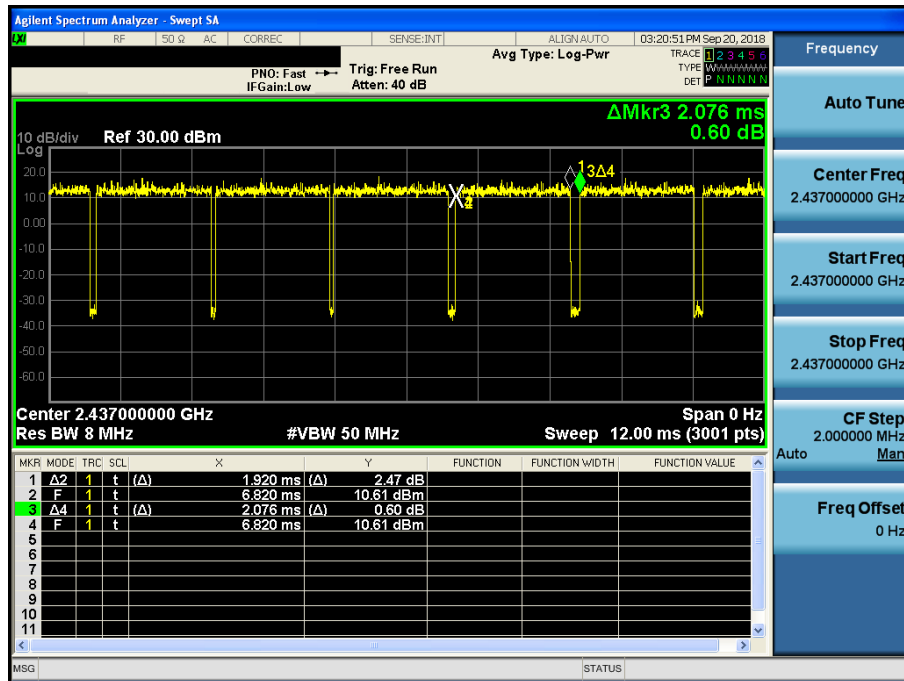
## Duty Cycle

TM 2 &amp; Middle



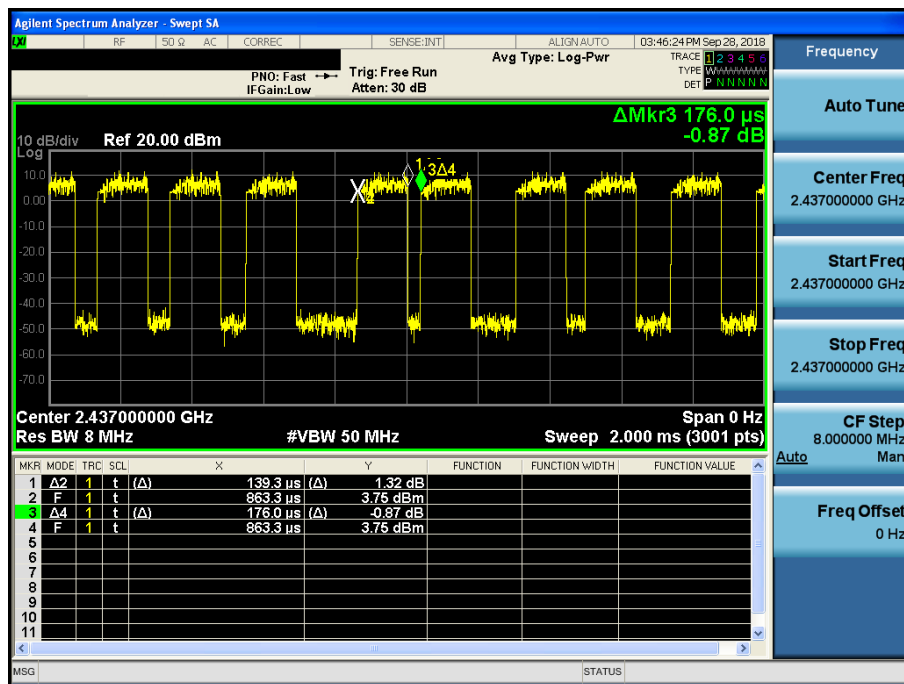
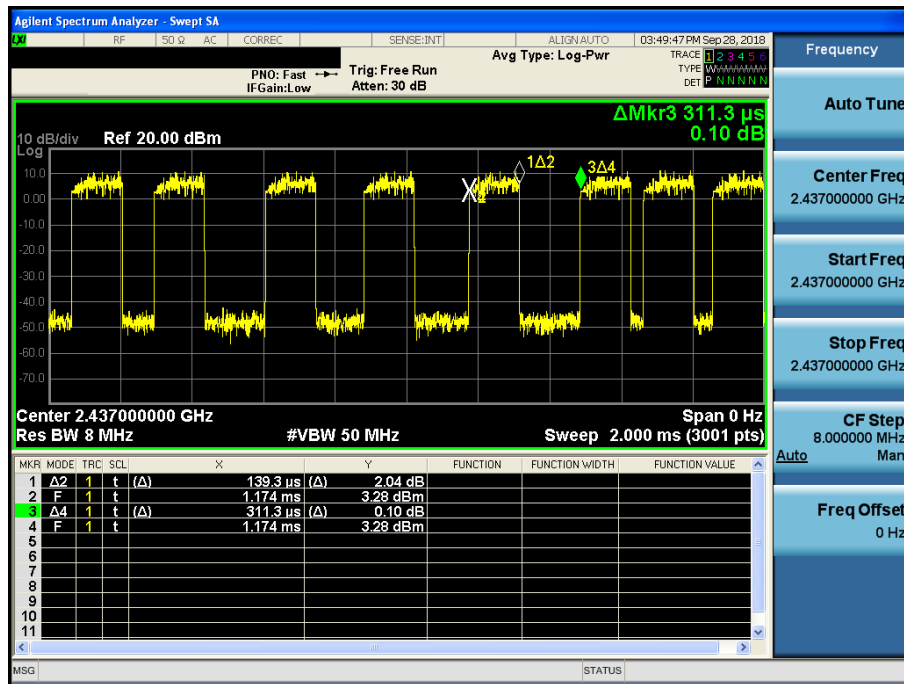
# Duty Cycle

TM 3 & Middle



# Duty Cycle

TM 4 & Middle

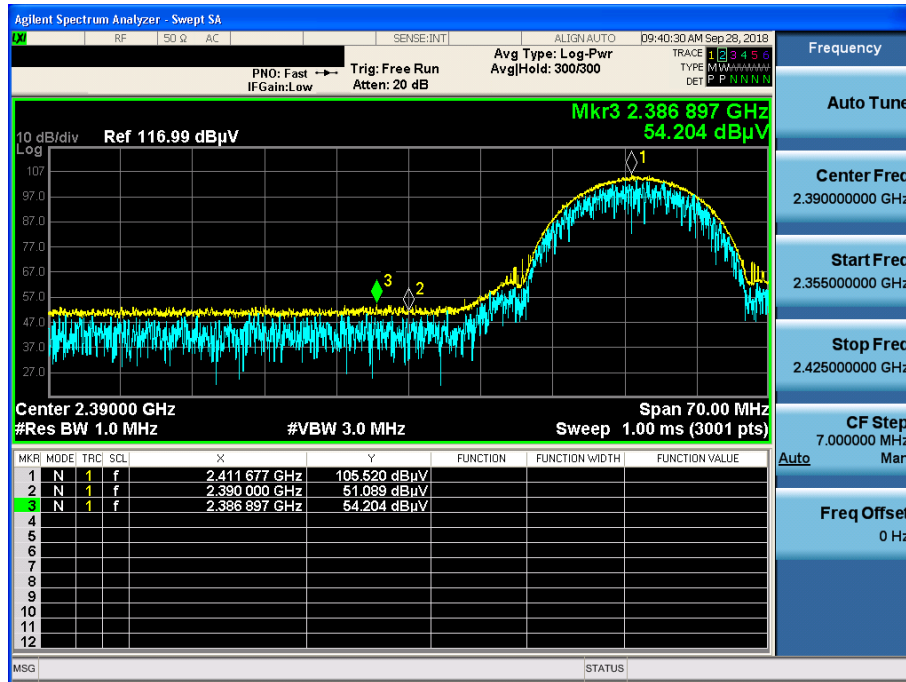


## APPENDIX III

## Unwanted Emissions (Radiated) Test Plot

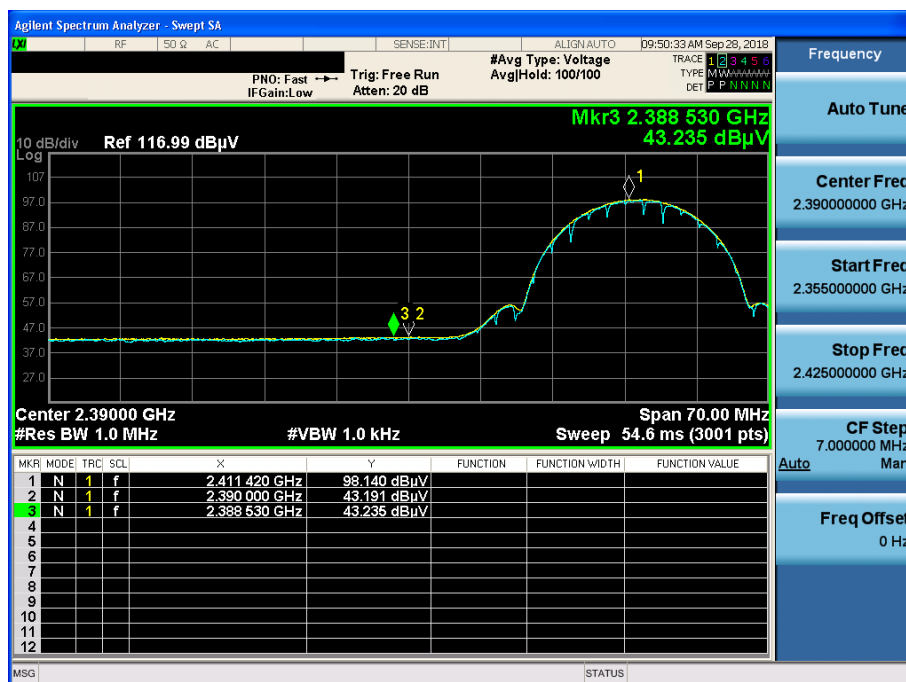
TM 1 &amp; Lowest &amp; X axis &amp; Hor

Detector Mode : PK



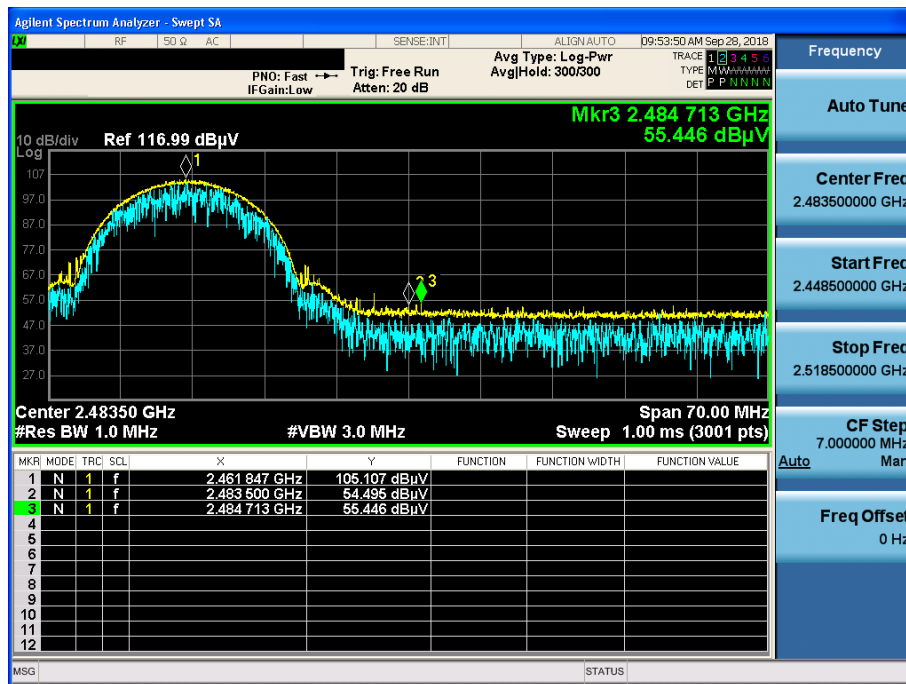
TM 1 &amp; Lowest &amp; X axis &amp; Hor

Detector Mode : AV



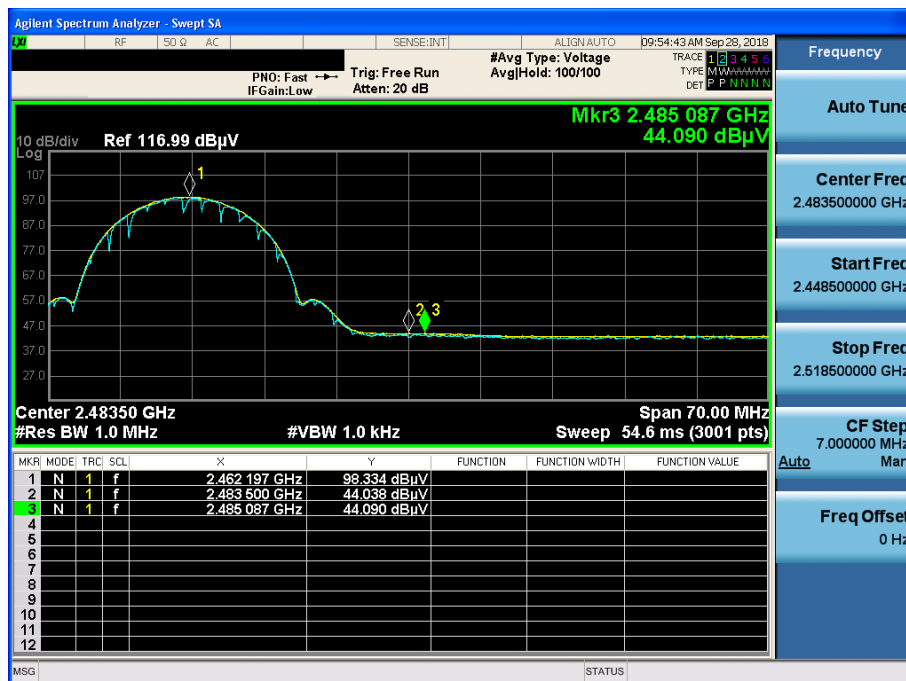
TM 1 & Highest & X axis & Hor

Detector Mode : PK



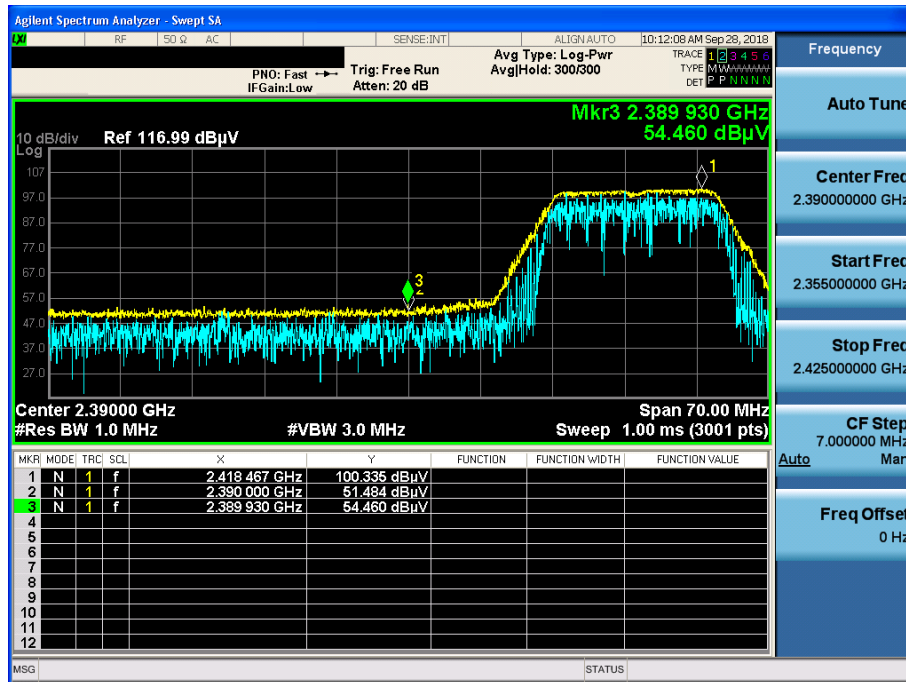
TM 1 & Highest & X axis & Hor

Detector Mode : AV



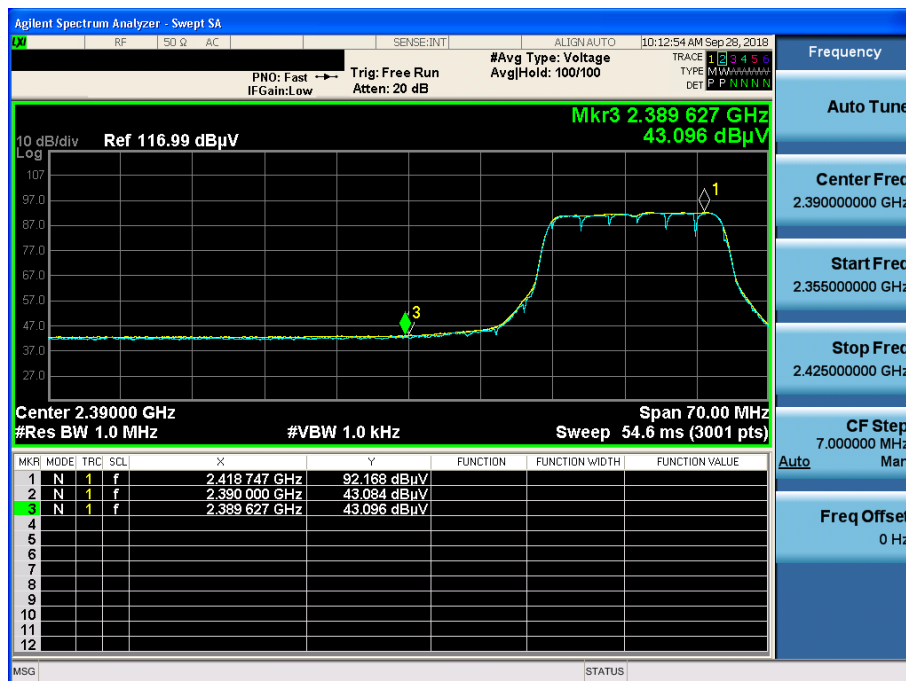
TM 2 &amp; Lowest &amp; X axis &amp; Hor

Detector Mode : PK



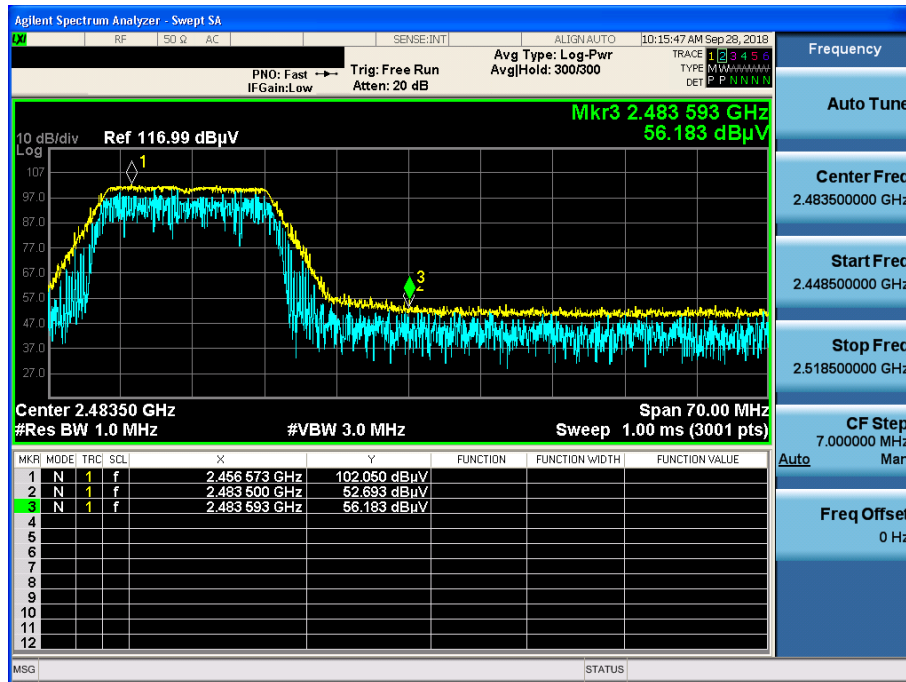
TM 2 &amp; Lowest &amp; X axis &amp; Hor

Detector Mode : AV



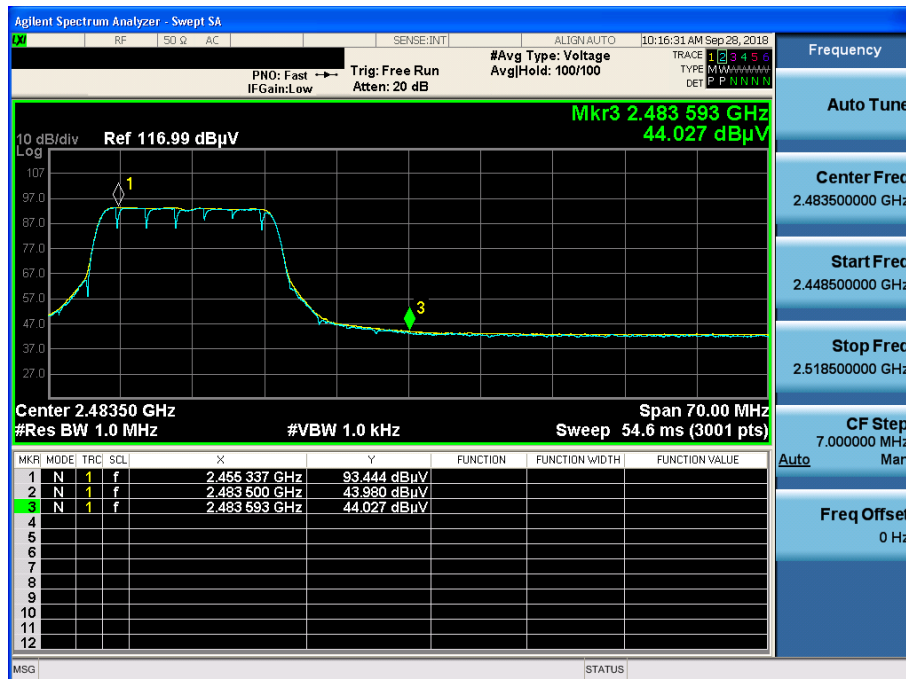
TM 2 & Highest & X axis & Hor

Detector Mode : PK



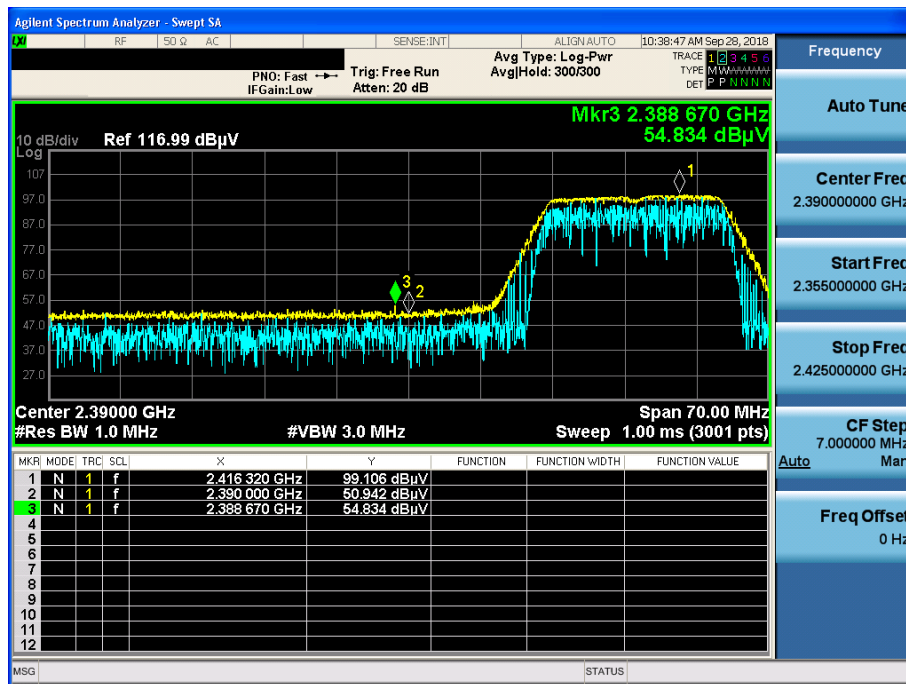
TM 2 & Highest & X axis & Hor

Detector Mode : AV



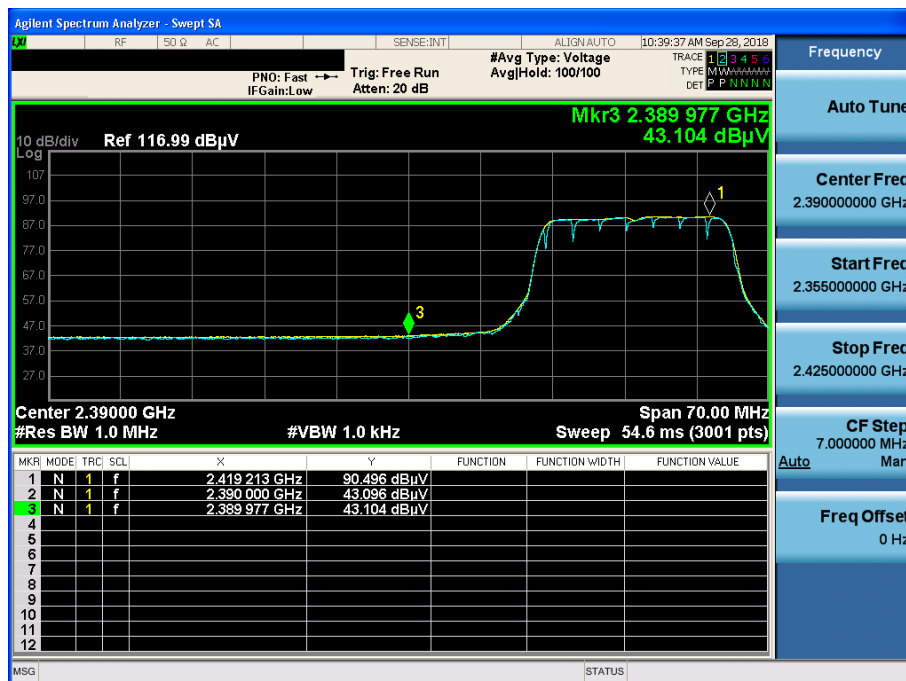
TM 3 & Lowest & X axis & Hor

Detector Mode : PK



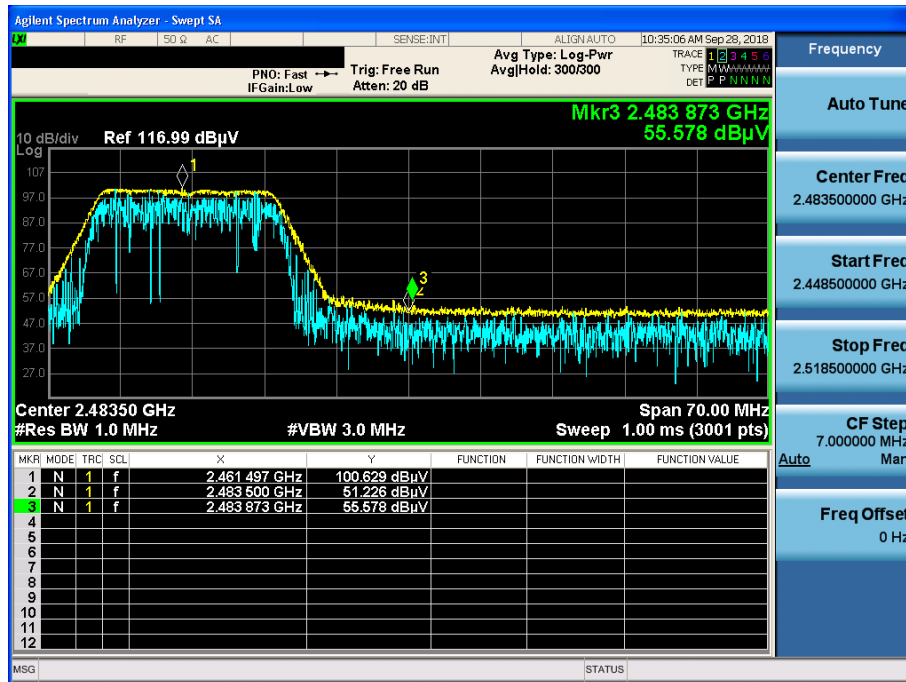
TM 3 & Lowest & X axis & Hor

Detector Mode : AV



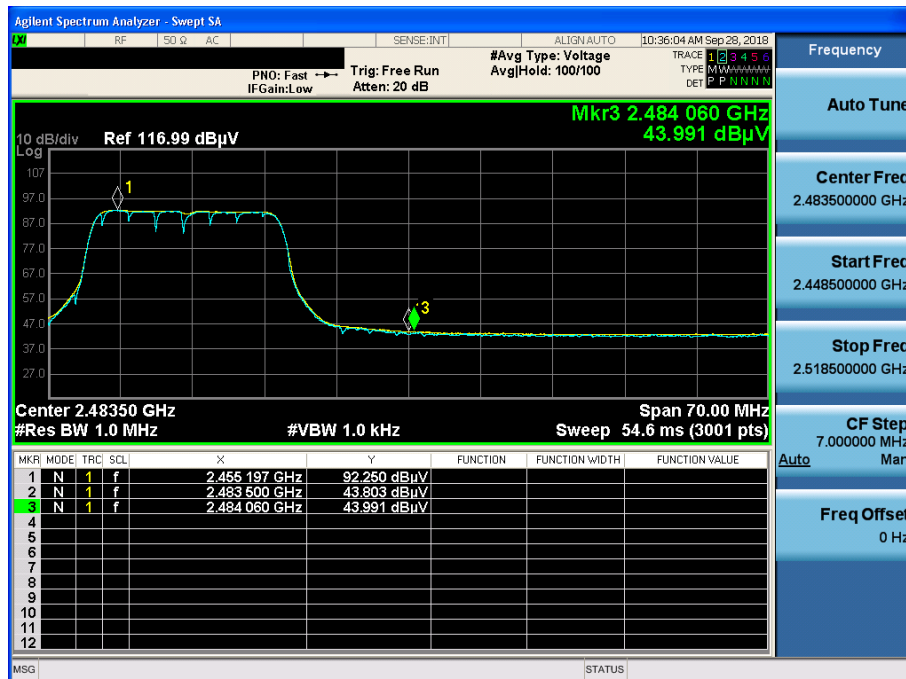
TM 3 & Highest & X axis & Hor

Detector Mode : PK



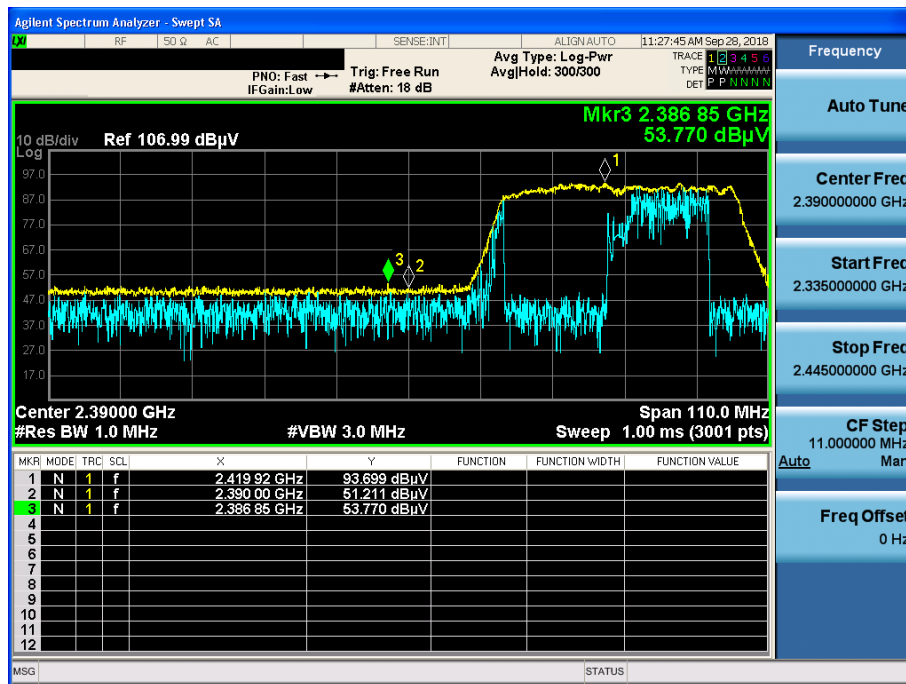
TM 3 & Highest & X axis & Hor

Detector Mode : AV



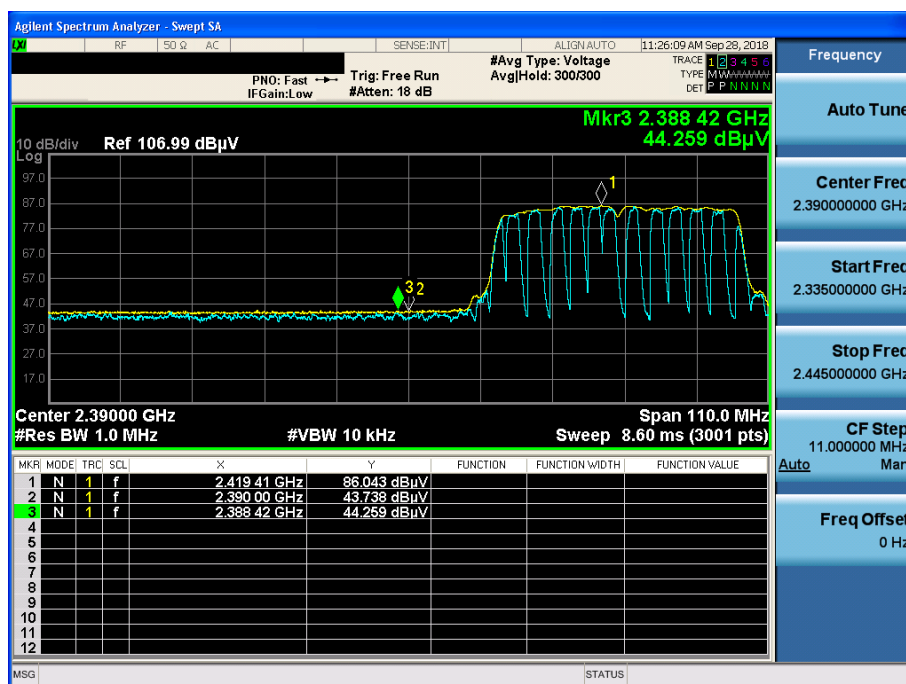
TM 4 & Lowest & X axis & Hor

Detector Mode : PK



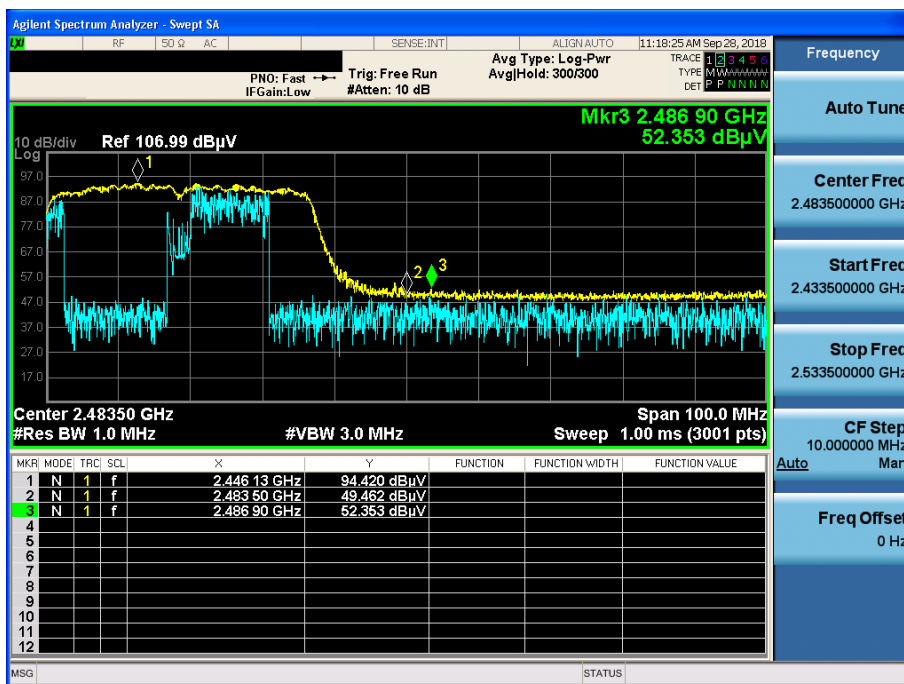
TM 4 & Lowest & X axis & Hor

Detector Mode : AV



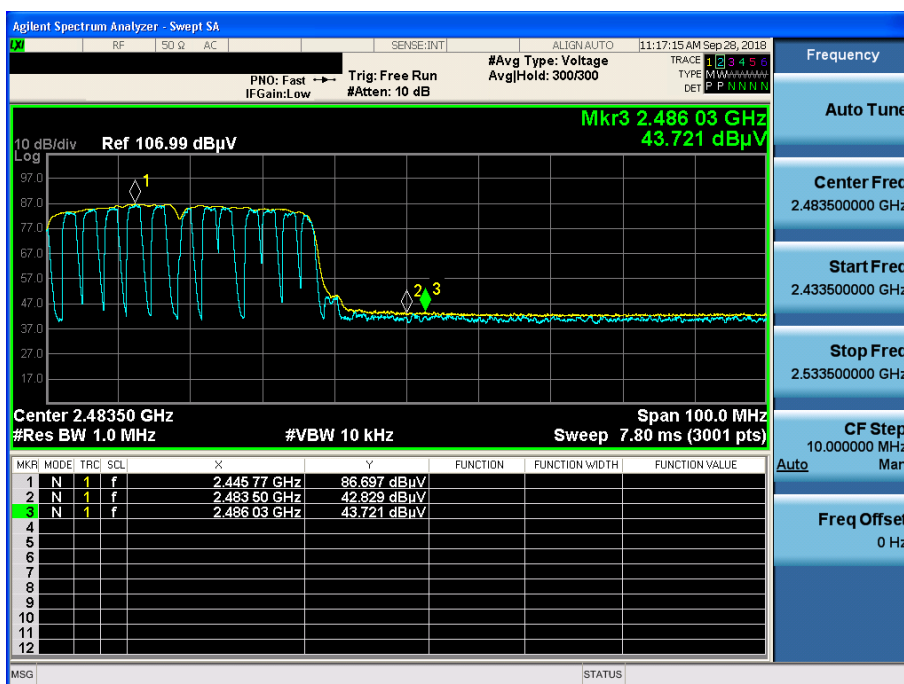
TM 4 & Highest & X axis & Hor

Detector Mode : PK



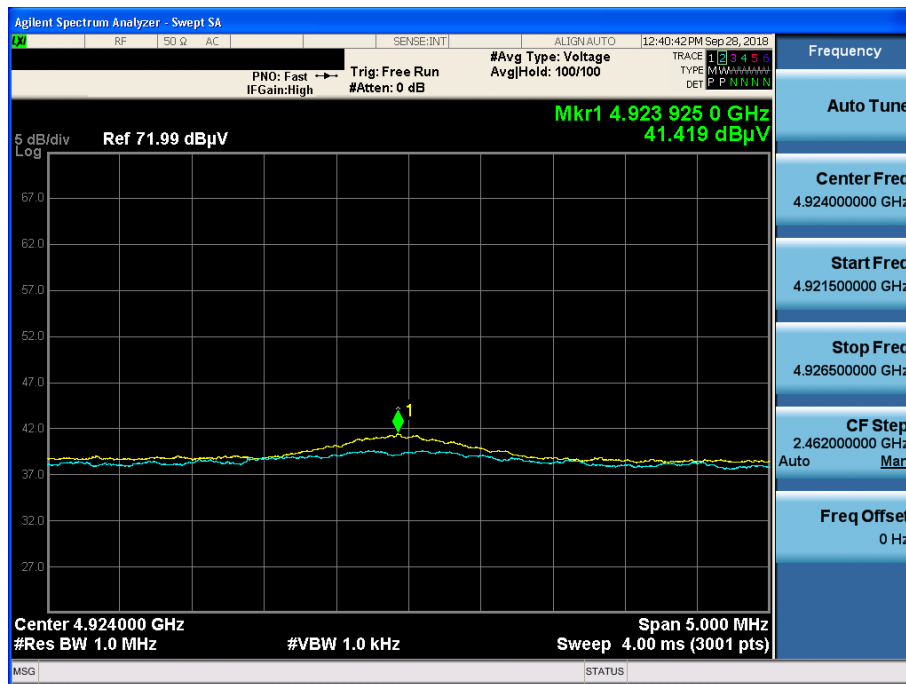
TM 4 & Highest & X axis & Hor

Detector Mode : AV



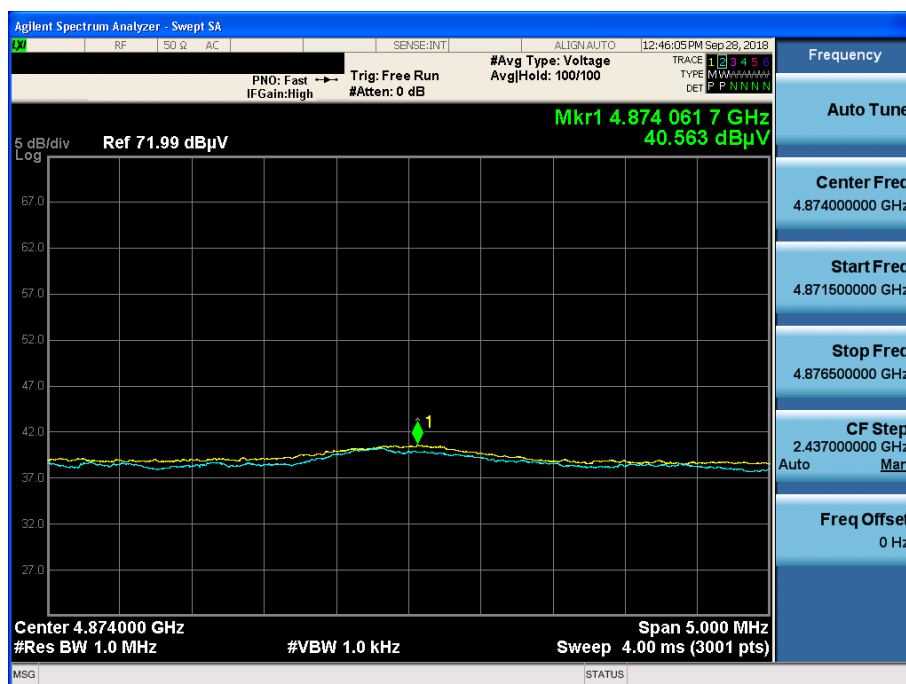
TM 1 & Highest & Z axis & Hor

Detector Mode : AV



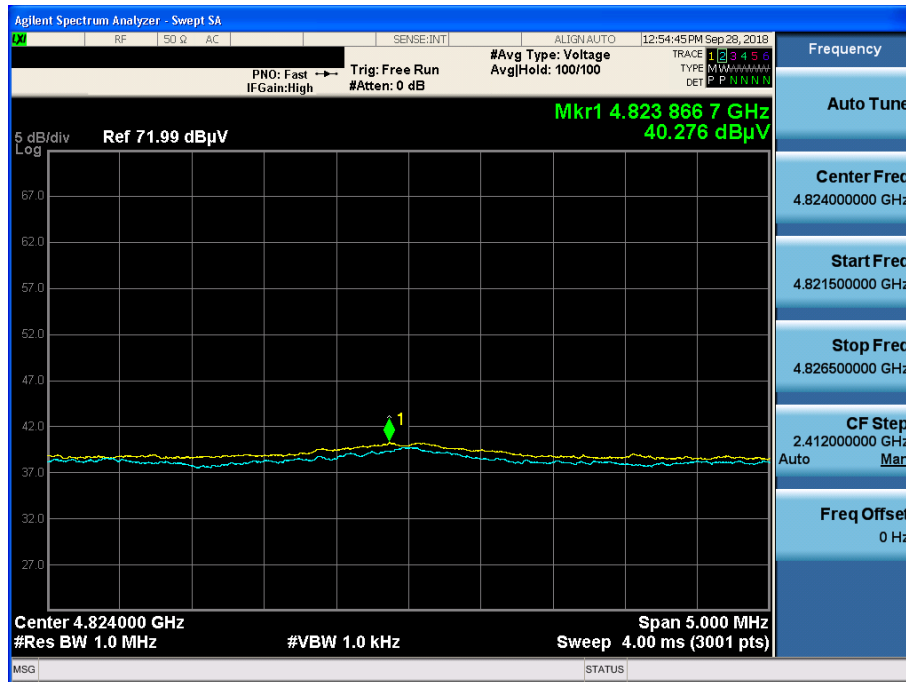
TM 2 & Middle & Z axis & Hor

Detector Mode : AV



TM 3 & Lowest & Z axis & Hor

Detector Mode : AV



TM 4 & Middle & Z axis & Hor

Detector Mode : AV

