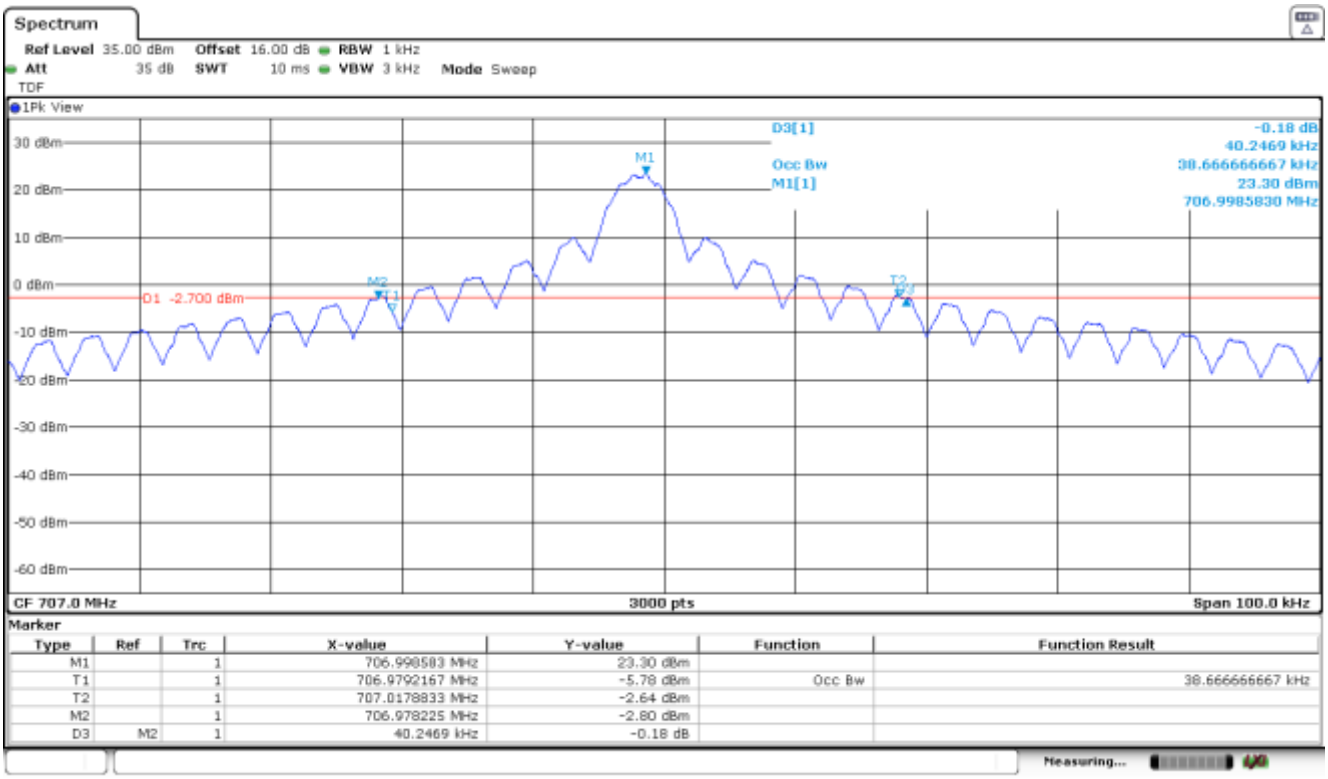
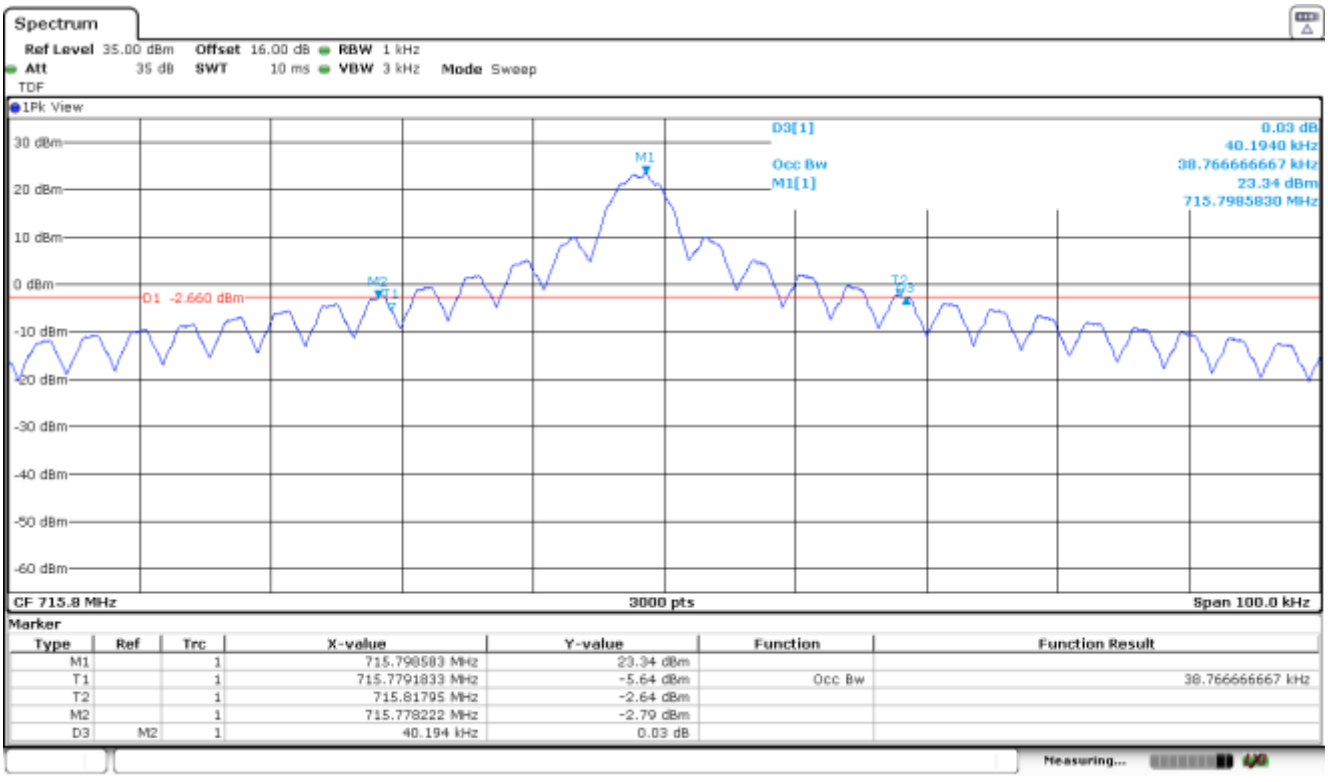
## Middle Channel

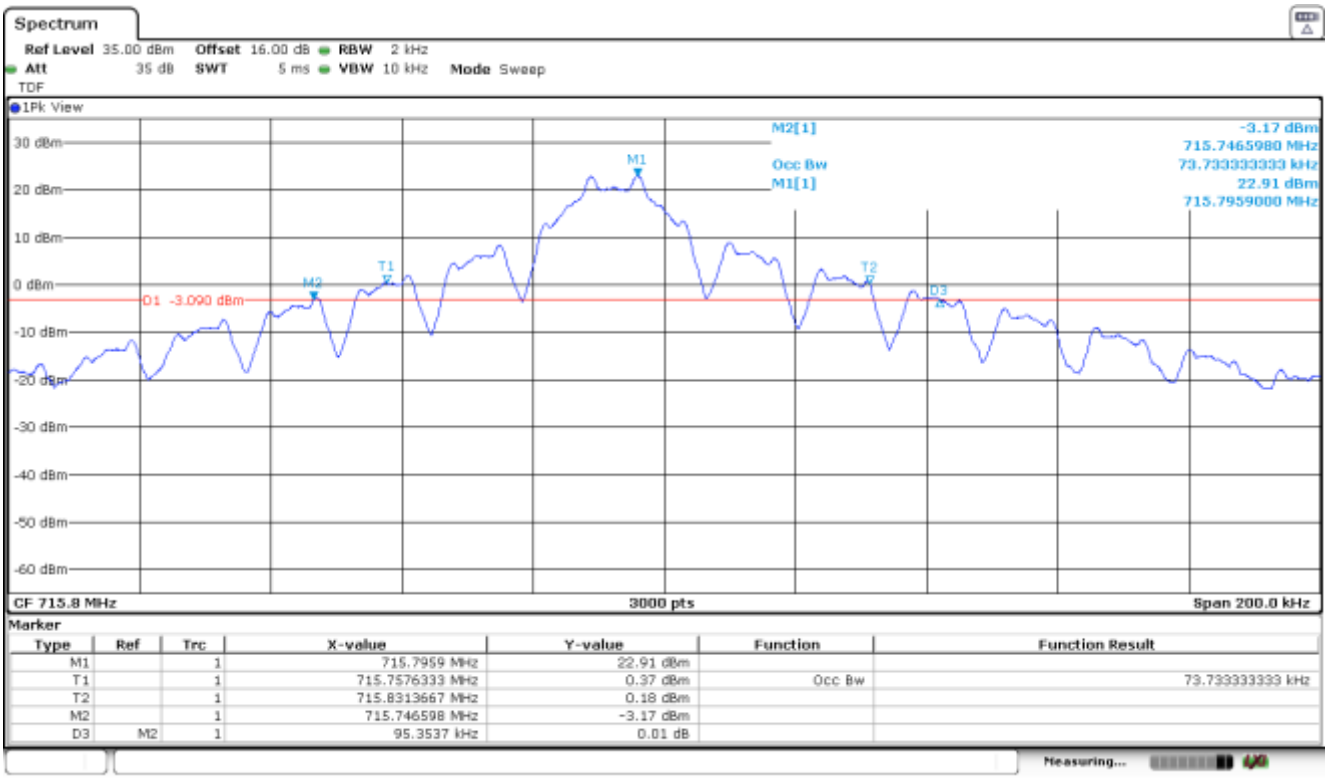



## Highest Channel

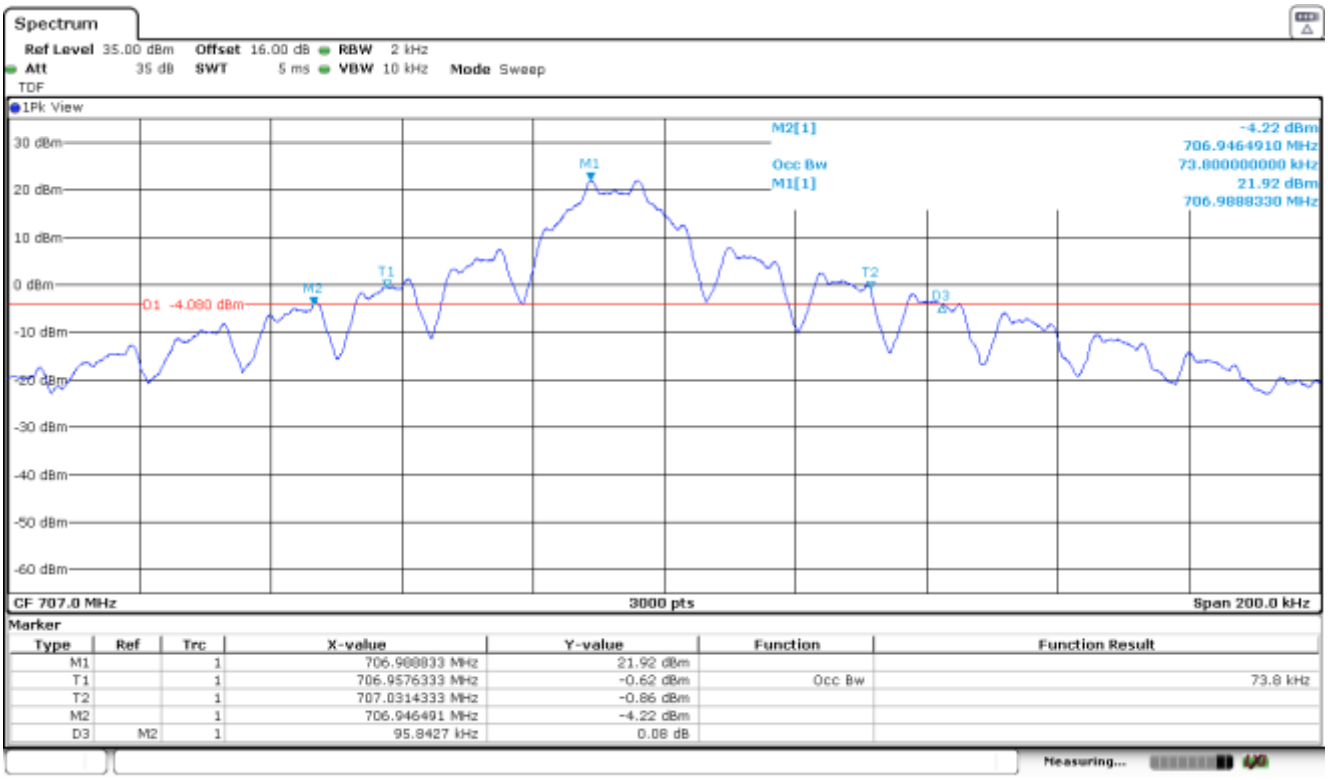


## Tone 15 kHz. π/2 - BPSK MODULATION

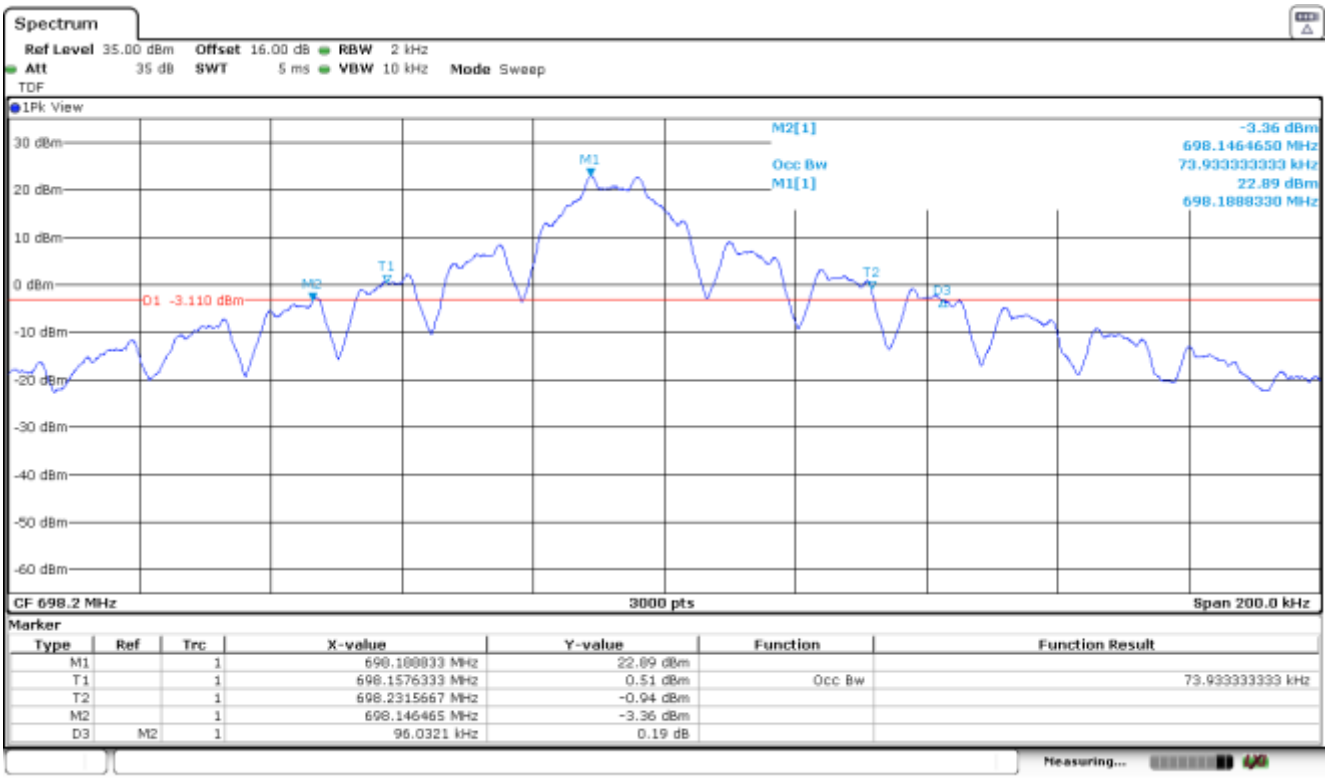
### Lowest Channel




### Middle Channel

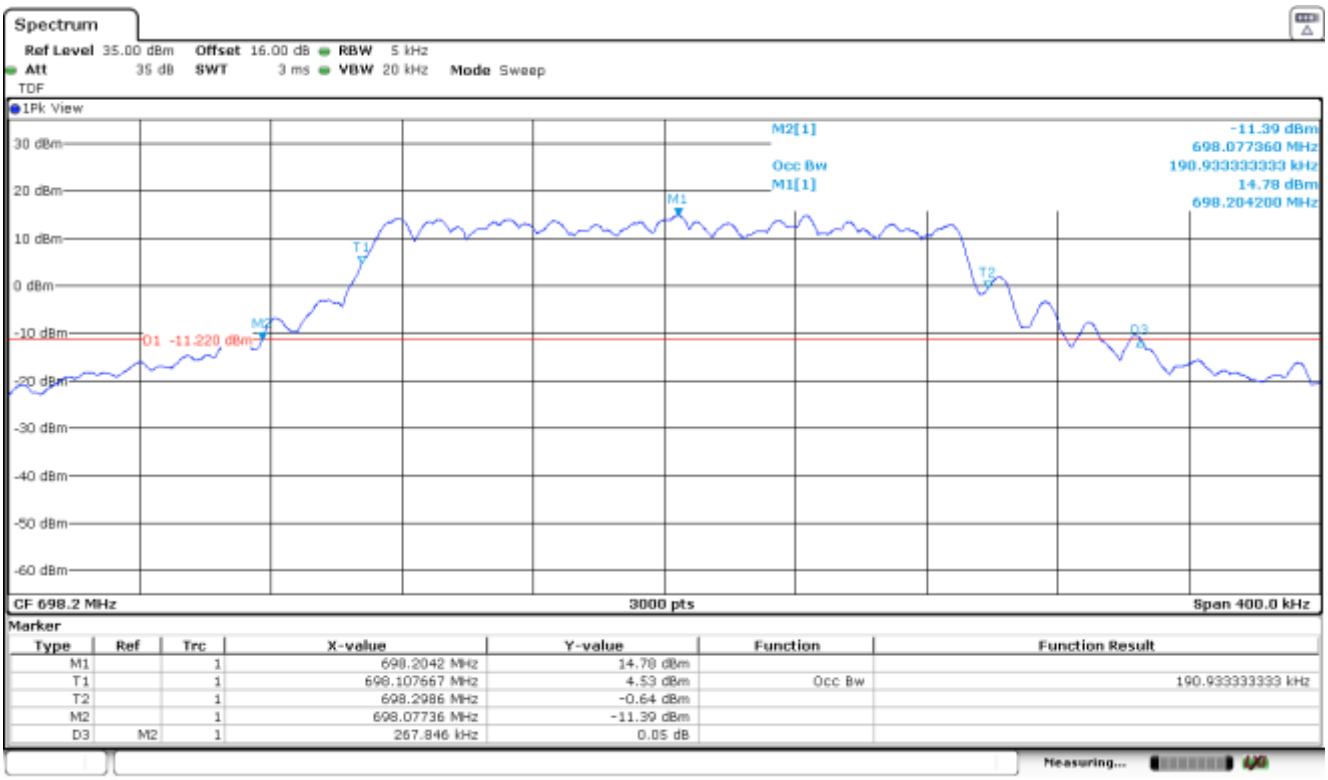


Highest Channel

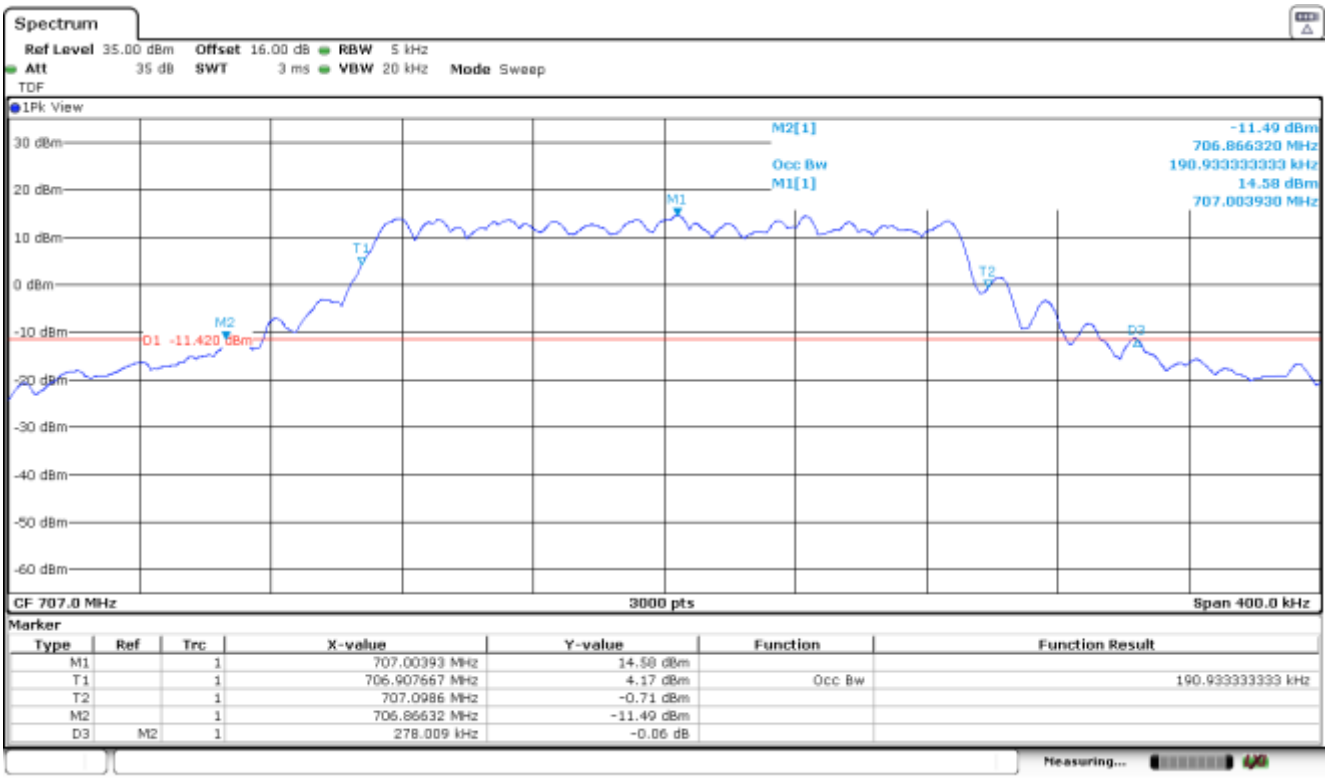



12 Tones 15 kHz. π/4 - QPSK MODULATION

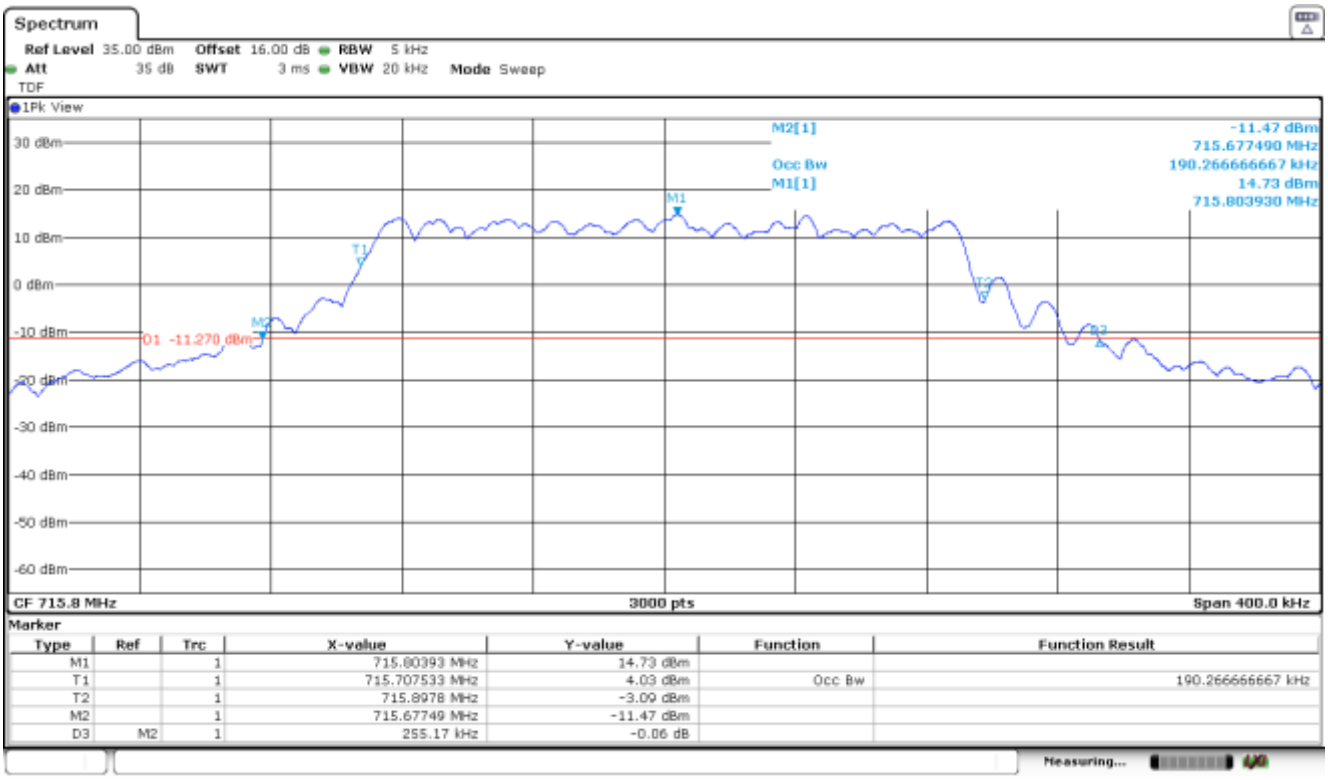
Lowest Channel



## Middle Channel




## Highest Channel



# Spurious emissions at antenna terminals

## SPECIFICATION

FCC §27.53 (g).

For operations in the 600 MHz band and the 698-746 MHz band. the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation. measured in watts. by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However. in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block. a resolution bandwidth of at least 30 kHz may be employed.

FCC §27.53 (c).
On any frequency outside the 776-788 MHz band. the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

On all frequencies between 763-775 MHz and 793-805 MHz. by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment. for mobile and portable stations.

RSS-130 Clause 4.7.
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power. P (dBW). by at least 65 + 10 log10 p(watts). dB. for mobile and portable equipment.

FCC §27.53 (h). RSS-139 Clause 6.6.

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

At Po transmitting power. the specified minimum attenuation becomes 43+10 log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm.
At Po transmitting power. the specified minimum attenuation becomes 65+10 log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [65 + 10 log (Po in mwatts) - 30] = -35 dBm.

## METHOD

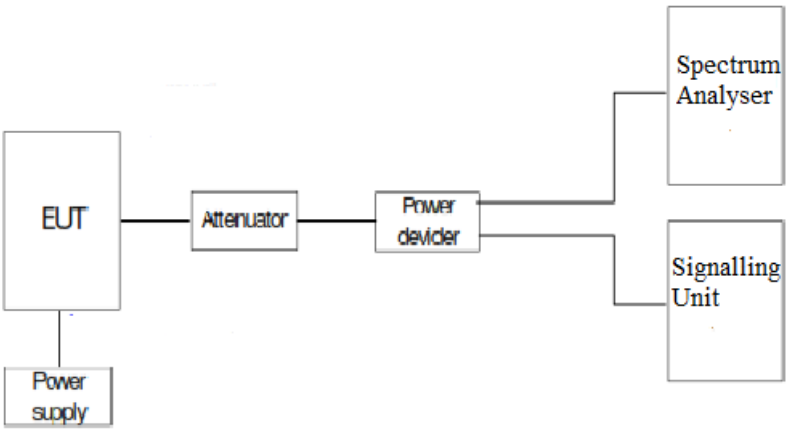
The EUT RF output connector was connected to a spectrum analyser and to the Universal Radio Communication tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50 ohm attenuator and a power divider.

The spectrum was investigated from 9 kHz to 18 GHz for NBIoT Band 66 and from 9 kHz to 8 GHz for NBIoT Band 12 and 13.

The reading of the spectrum analyser is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyser.

The configuration of tones and modulation which is the worst case for conducted power was used.

TEST SETUP




RESULTS (see plots in next pages)

NBIoT Band 12 (1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

1. CHANNEL: LOWEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE

No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

NBIoT Band 12 (3 Tone 15 kHz. π/4 - QPSK MODULATION)

1. CHANNEL: LOWEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE

No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

Measurement uncertainty (dB): < ± 2.76

Verdict: PASS

NBIoT Band 13 (1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

1. CHANNEL: LOWEST

| Frequency (MHz) | Level (dBm) | Limit (dBm) |
|---|---|---|
| 774.9898 | -53.21 | -35 |

2. CHANNEL: MIDDLE

No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST

No spurious signals were found at less than 20dB respect to the limit in all the range.

NBIoT Band 13 (Tone 15 kHz. π/4 - QPSK MODULATION)

1. CHANNEL: MIDDLE

Measurement uncertainty (dB): < ± 2.76

Verdict: PASS

NBIoT Band 66 (1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

1. CHANNEL: LOWEST
   No spurious signals were found in all the range.

2. CHANNEL: MIDDLE

   No spurious signals were found in all the range.

3. CHANNEL: HIGHEST
   No spurious signals were found in all the range.

NBIoT Band 66 (Tone 15 kHz. π/4 - QPSK MODULATION)

1. CHANNEL: LOWEST
   No spurious signals were found in all the range.

2. CHANNEL: MIDDLE

   No spurious signals were found in all the range.

3. CHANNEL: HIGHEST
   No spurious signals were found in all the range.

Measurement uncertainty (dB): < ± 2.76

Verdict: PASS

NBIoT Band 85 (1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

1. CHANNEL: LOWEST
   No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE

   No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
   No spurious signals were found at less than 20dB respect to the limit in all the range.

NBIoT Band 85 (Tone 15 kHz. π/4 - QPSK MODULATION)

1. CHANNEL: LOWEST
   No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE

   No spurious signals were found at less than 20dB respect to the limit in all the range.

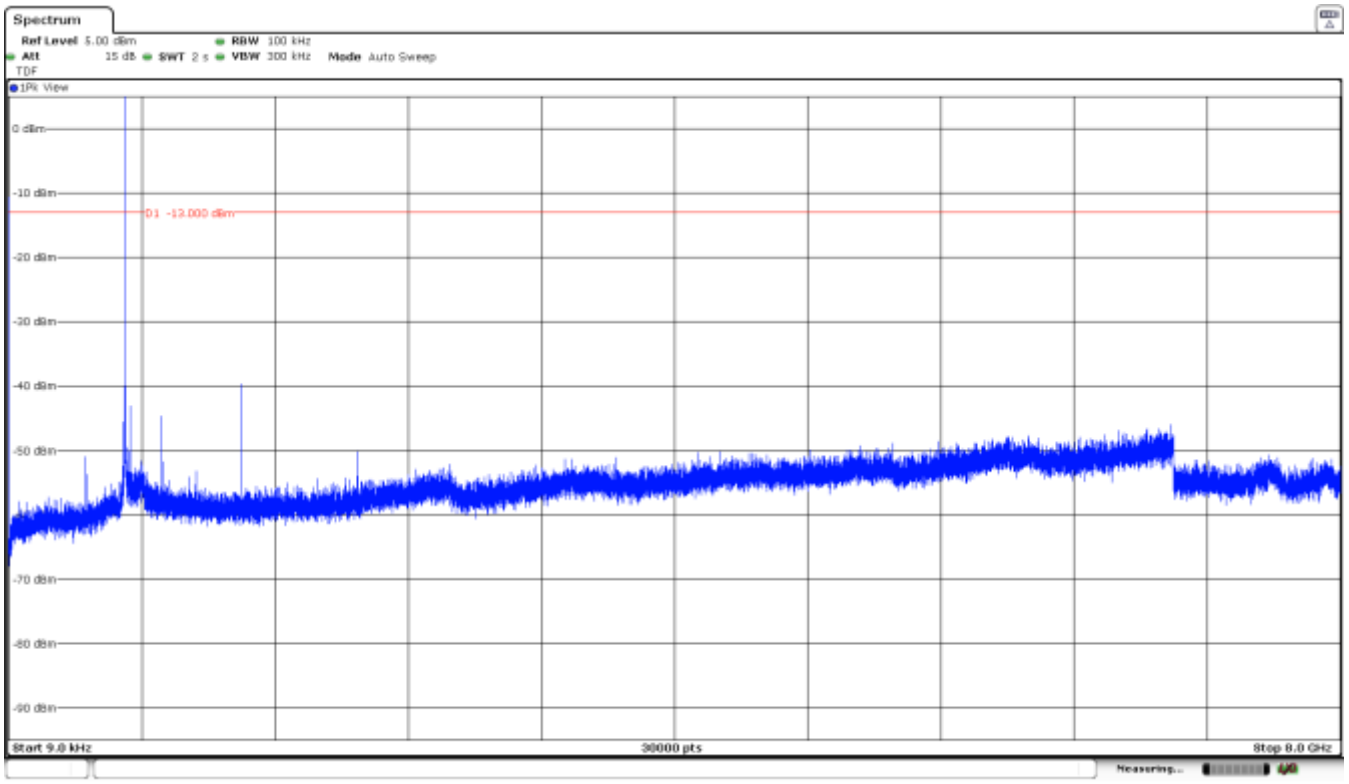
3. CHANNEL: HIGHEST
   No spurious signals were found at less than 20dB respect to the limit in all the range.

Measurement uncertainty (dB): < ± 2.76

Verdict: PASS

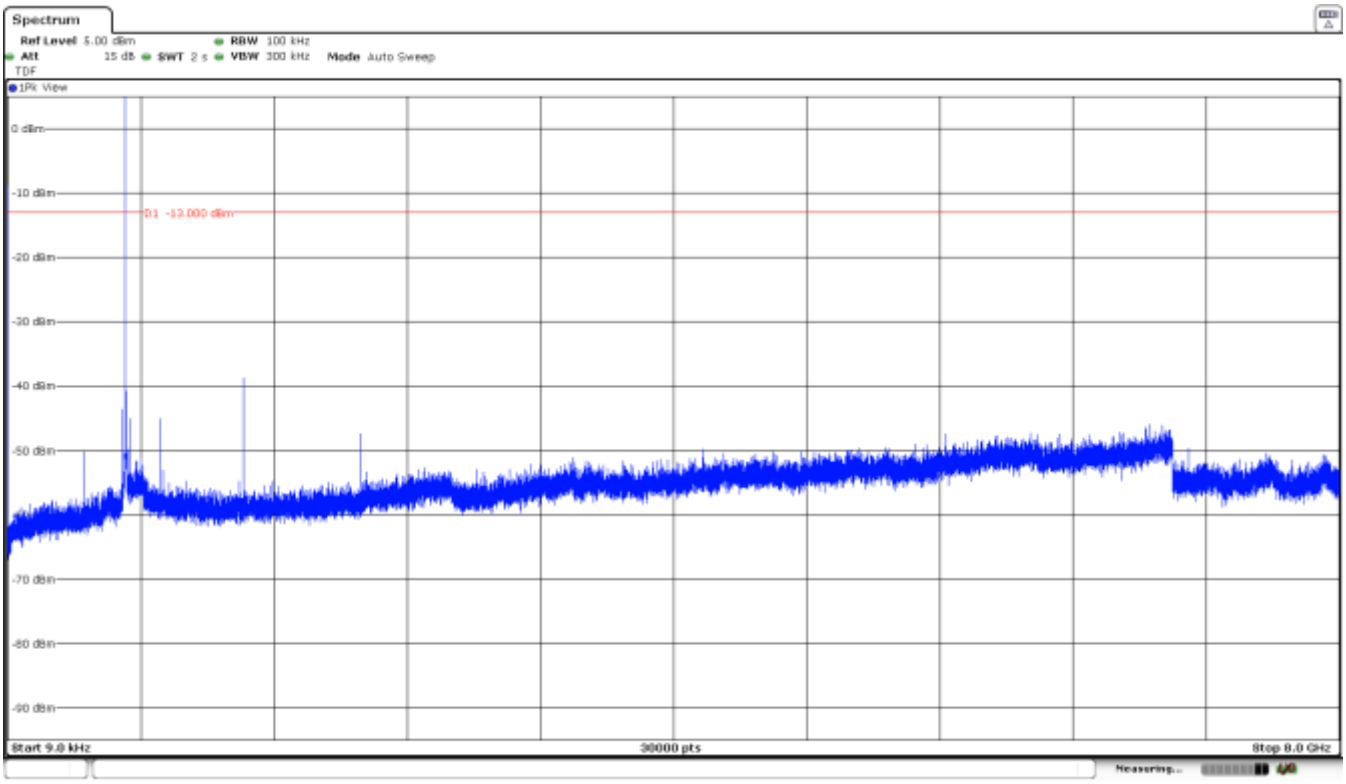
NBIoT Band 12 (1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

1. CHANNEL: LOWEST Frequency Range 9 kHz – 8 GHz



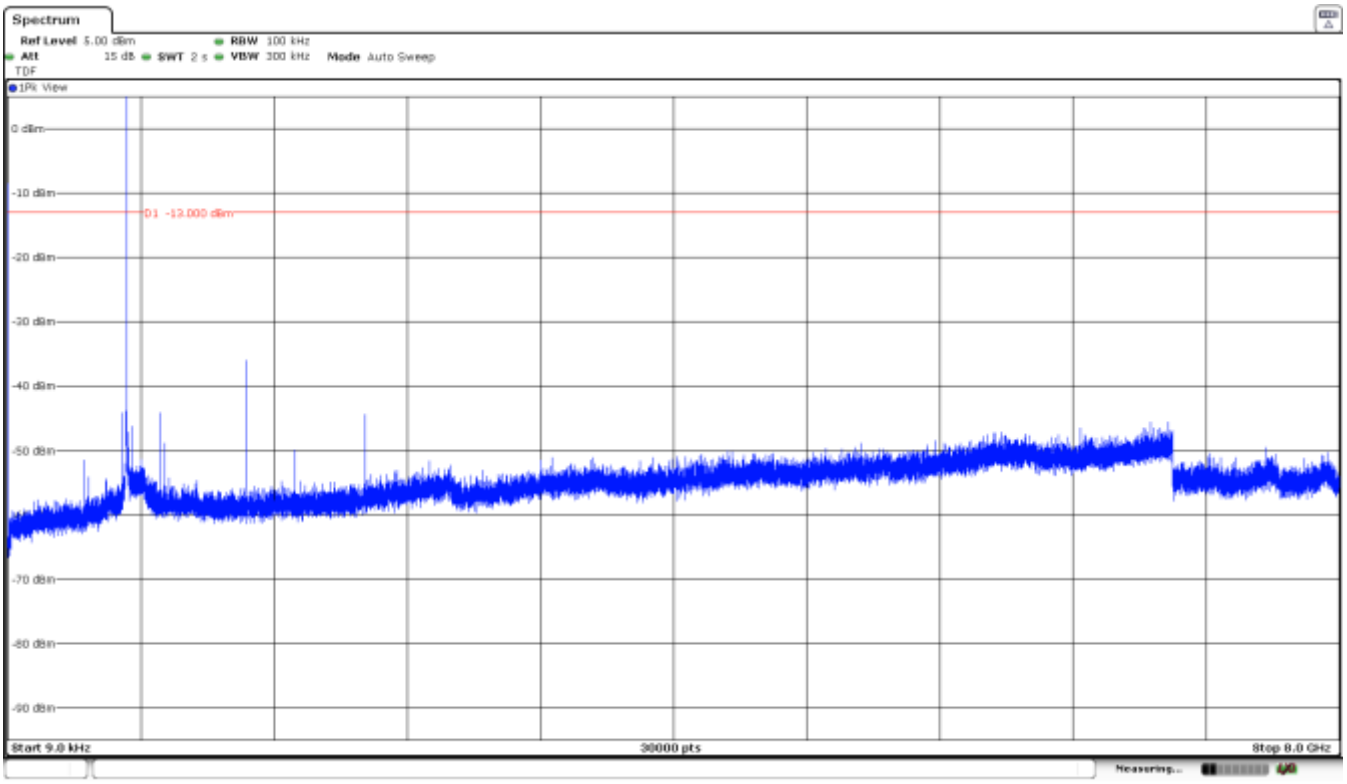

The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE Frequency Range 9 kHz – 8 GHz




The peak above the limit is the carrier frequency.

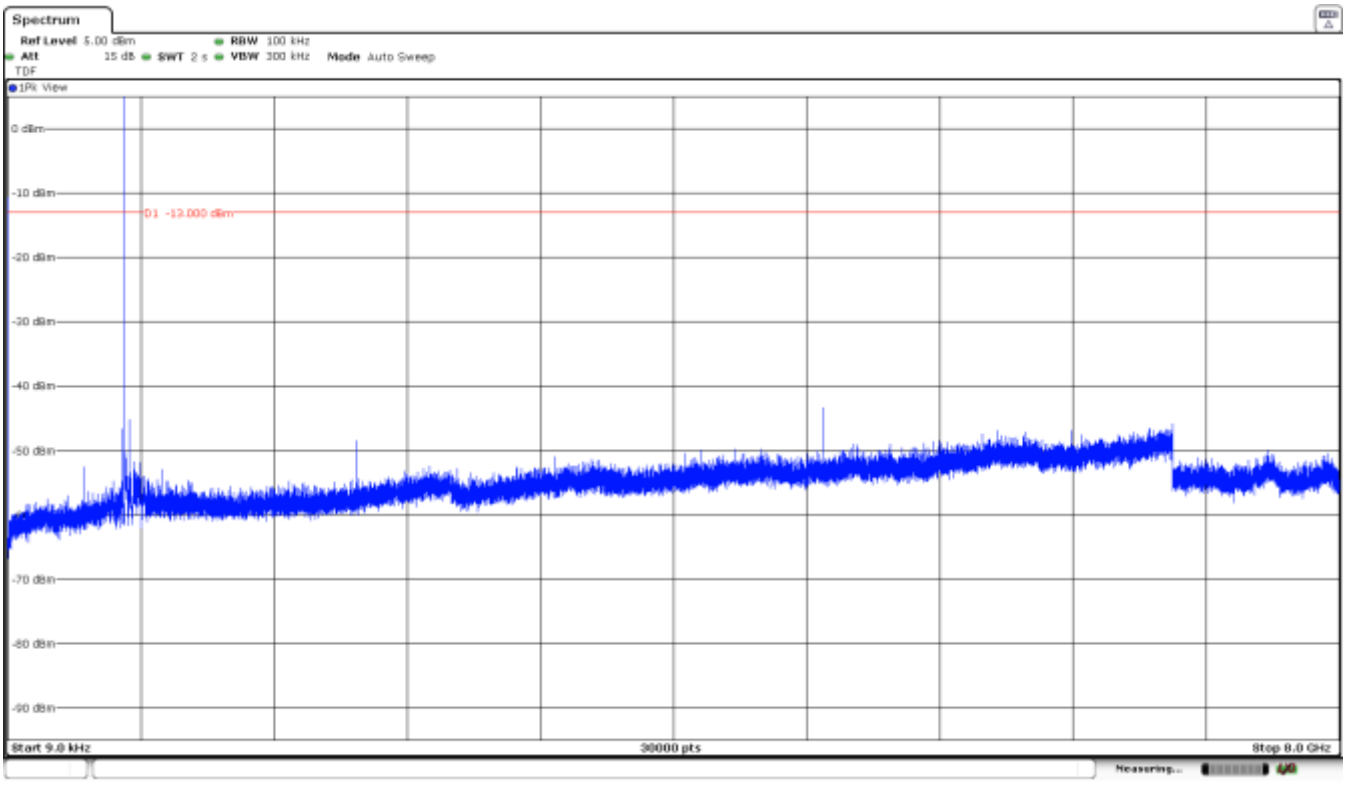
3. CHANNEL: HIGHEST Frequency Range 9 kHz – 8 GHz




The peak above the limit is the carrier frequency.

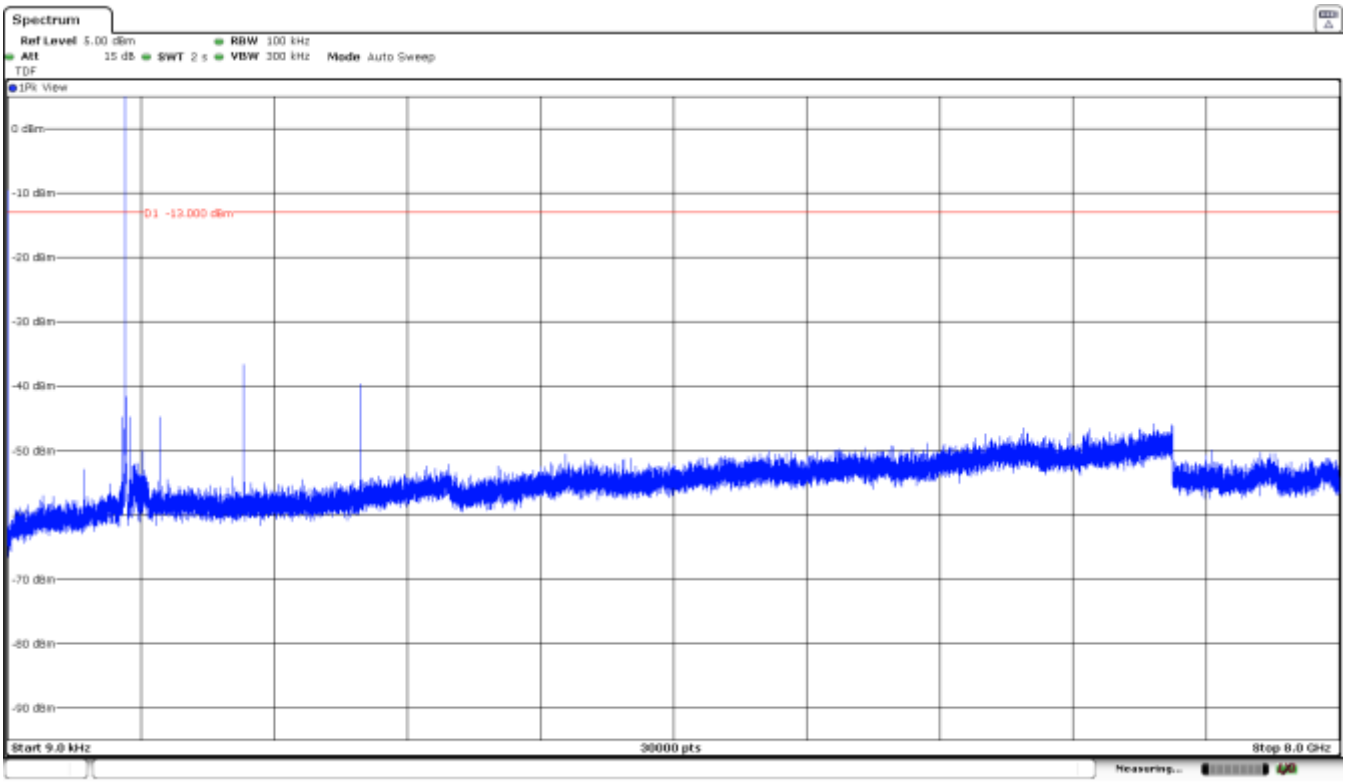
NBIoT Band 12 (3 Tones 15 kHz. π/4 - QPSK MODULATION)

1. CHANNEL: LOWEST Frequency Range 9 kHz – 8 GHz



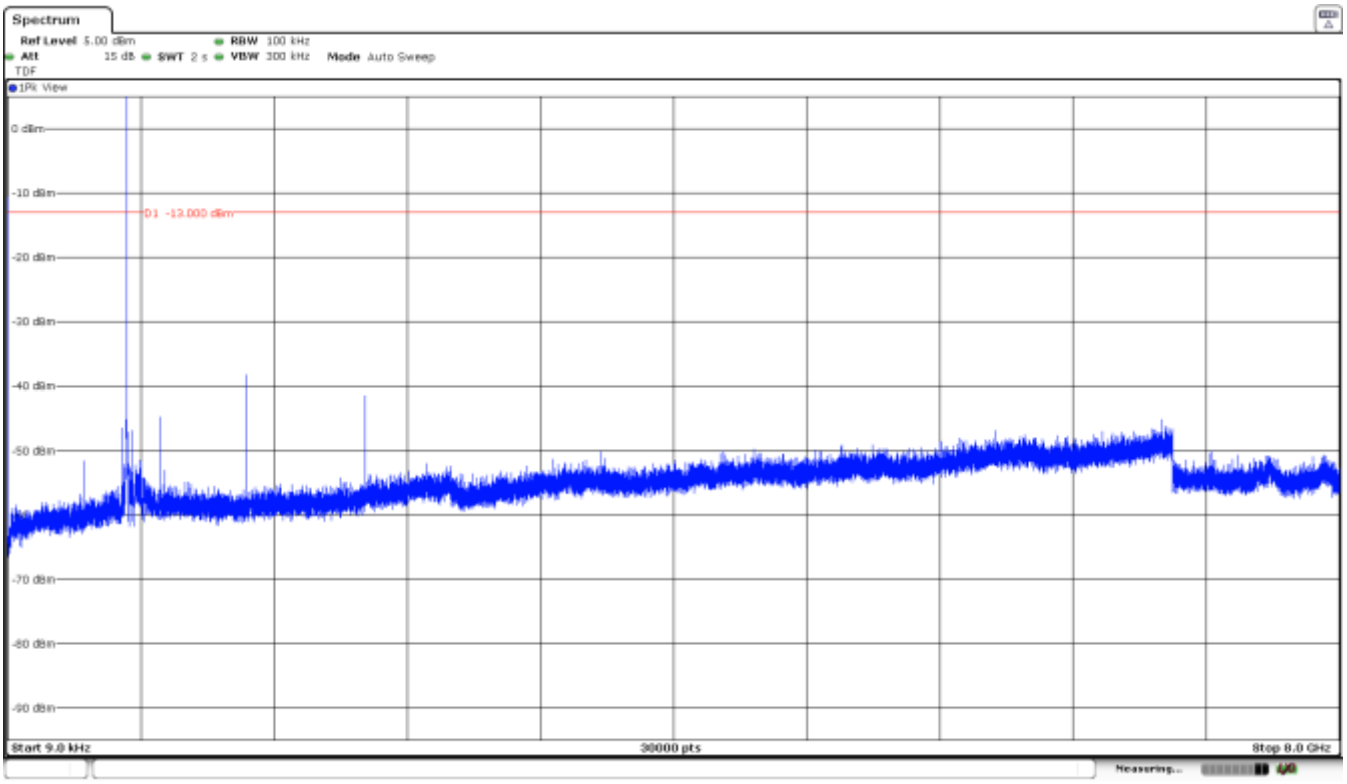

The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE Frequency Range 9 kHz – 8 GHz




The peak above the limit is the carrier frequency.

3. CHANNEL: HIGHEST Frequency Range 9 kHz – 8 GHz

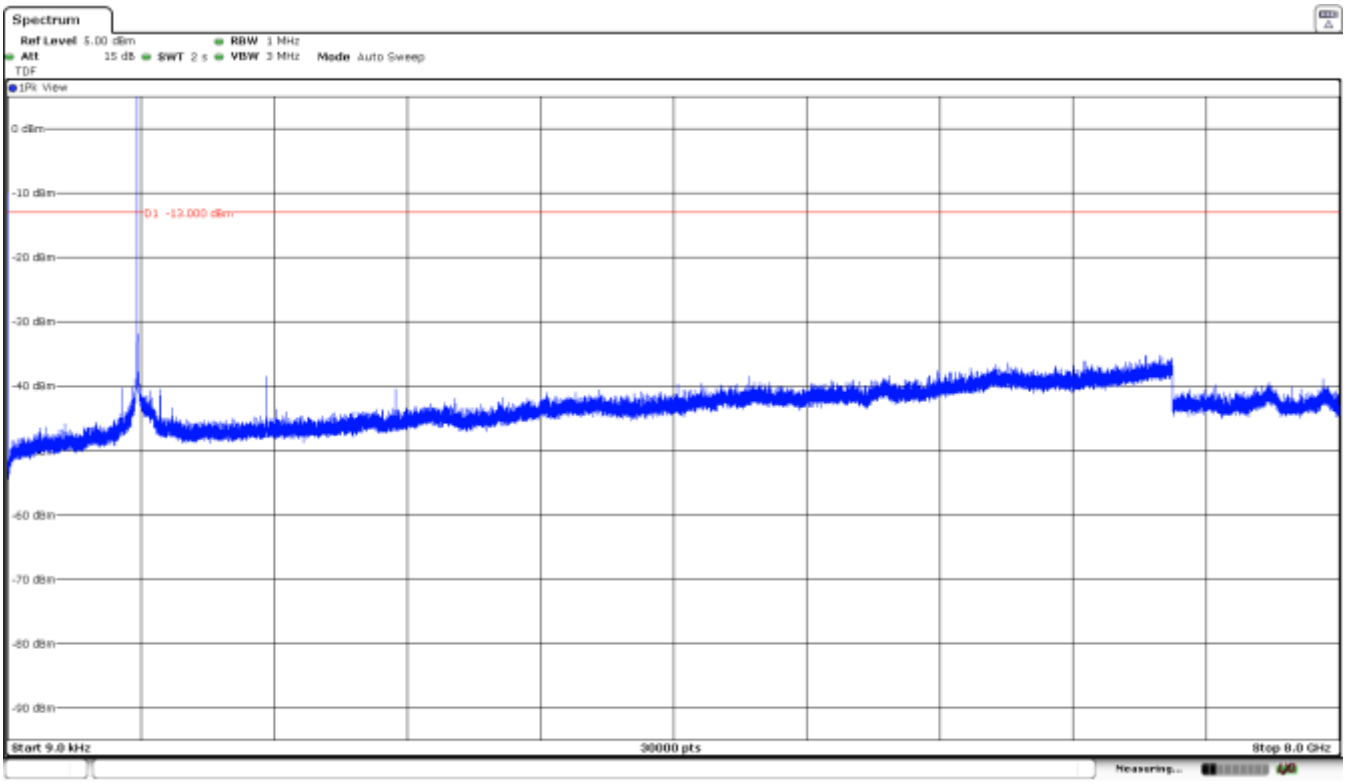



The peak above the limit is the carrier frequency.

NBIoT Band 13 (1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

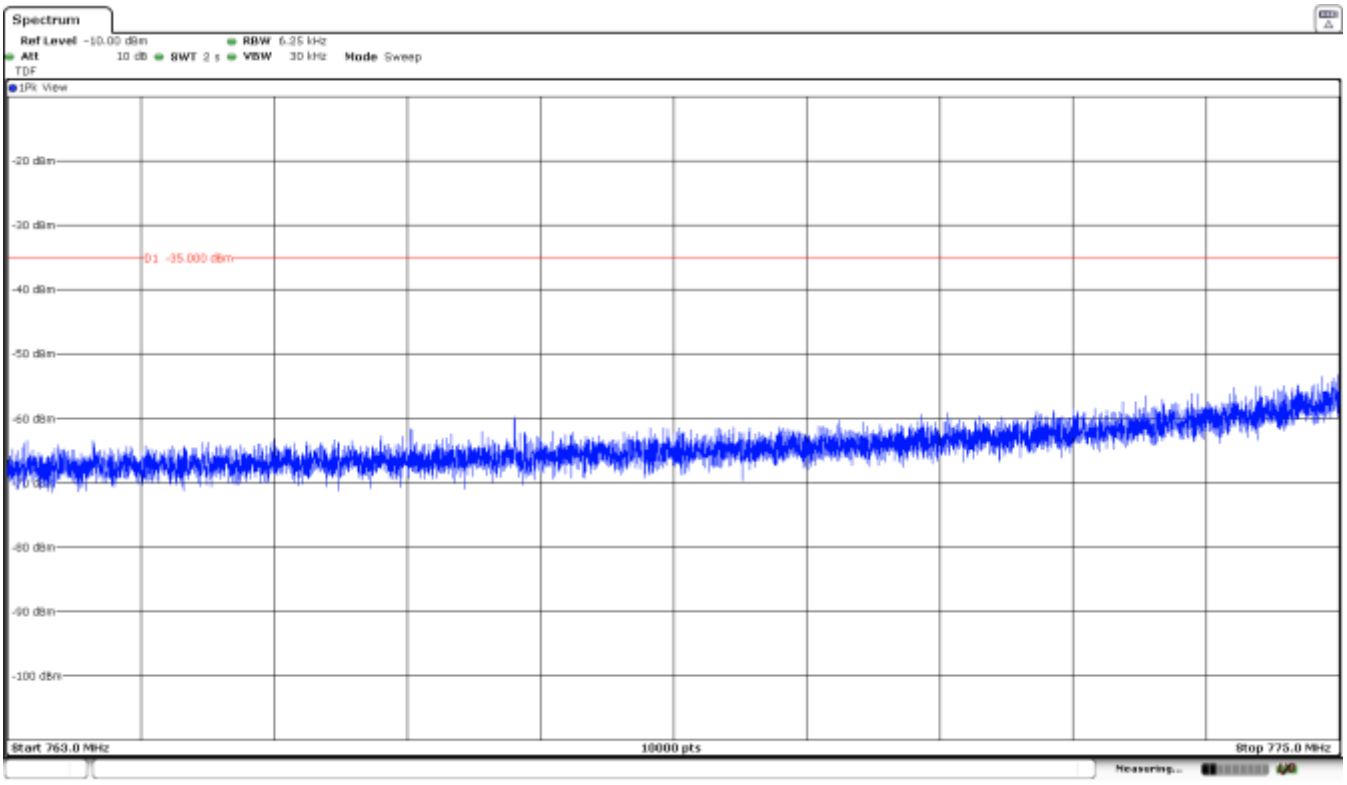
1. CHANNEL: LOWEST

Frequency Range 9 kHz – 8 GHz

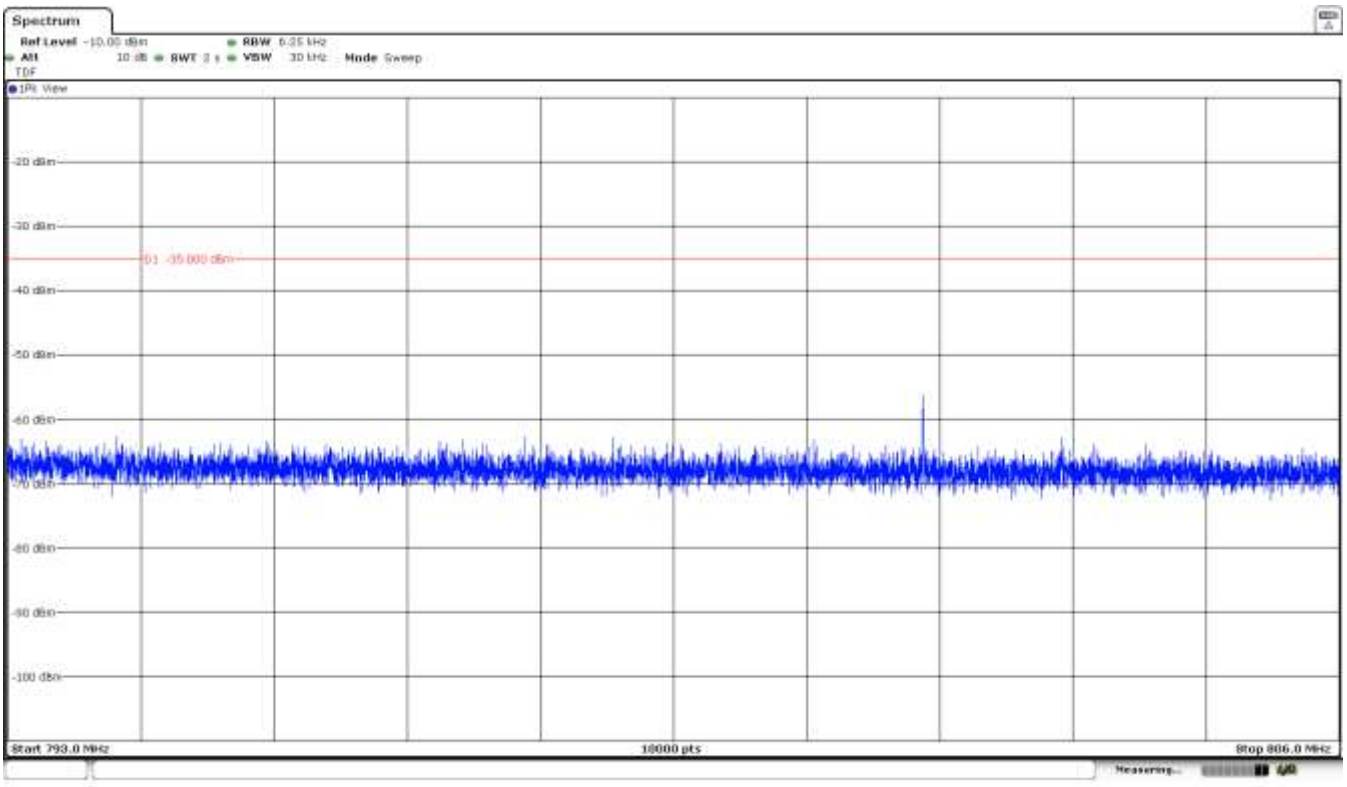



Note: The peak above the limit is the carrier frequency. The peak at 746MHz corresponds to the downlink signal.

Frequency Range 763 MHz - 775 MHz

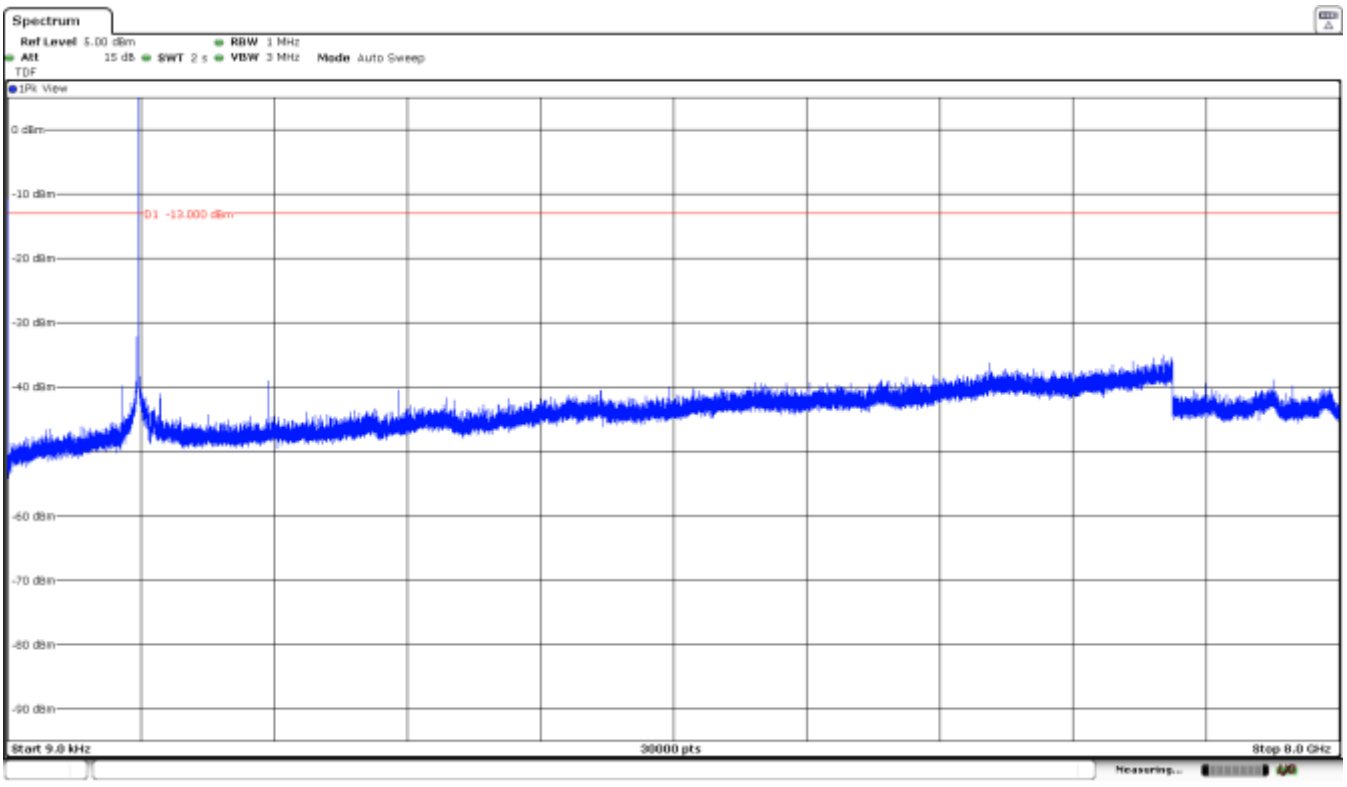


Frequency Range 793 MHz - 806 MHz



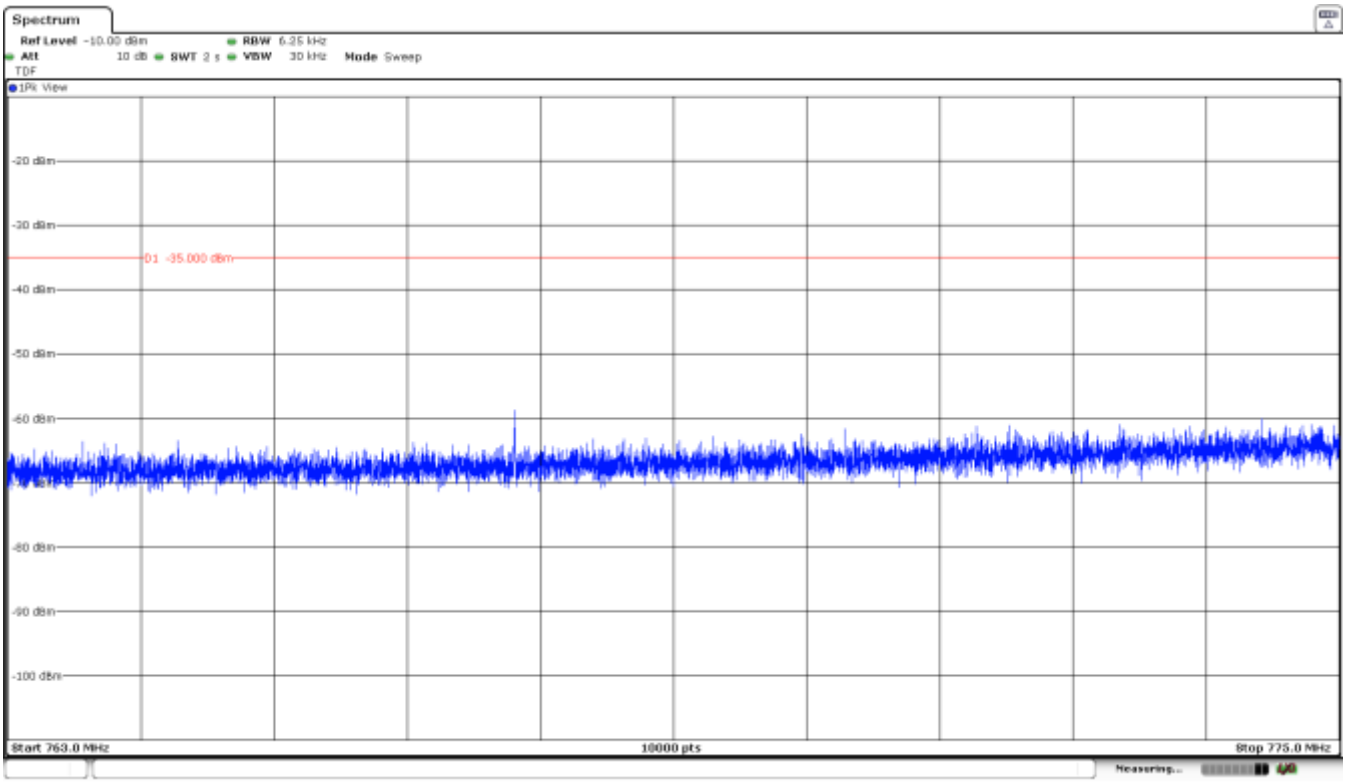

2. CHANNEL: MIDDLE

Frequency Range 9 kHz – 8 GHz

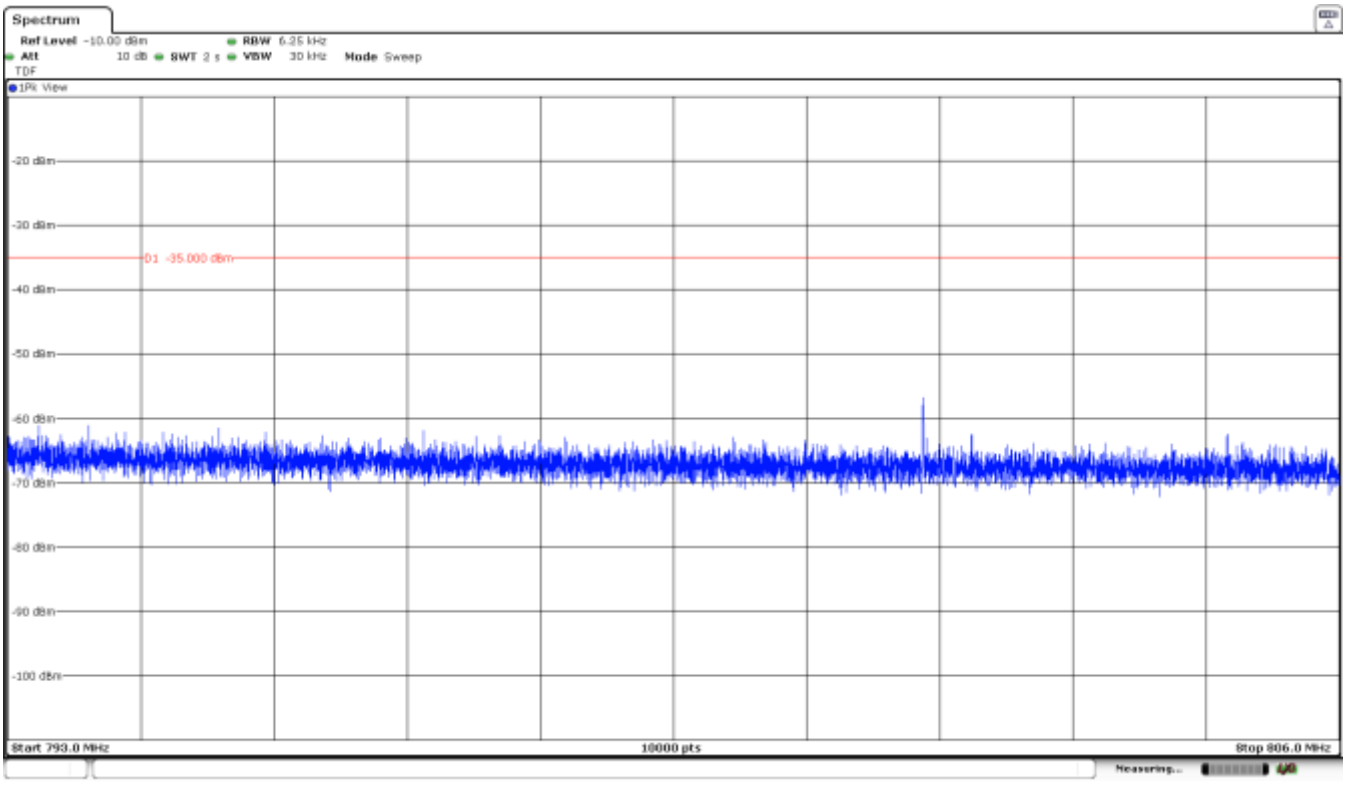



Note: The peak above the limit is the carrier frequency. The peak at 751MHz corresponds to the downlink signal.

Frequency Range 763 MHz - 775 MHz

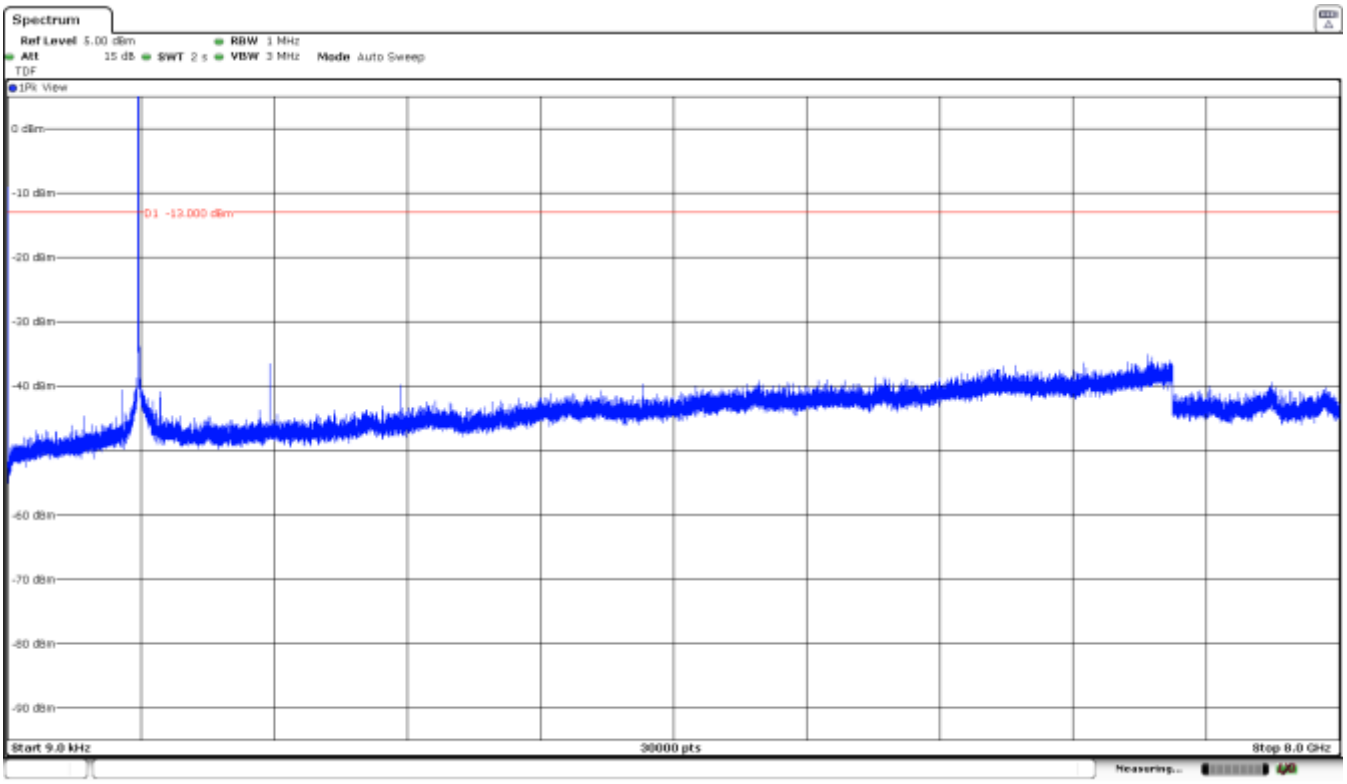



Frequency Range 793 MHz - 806 MHz



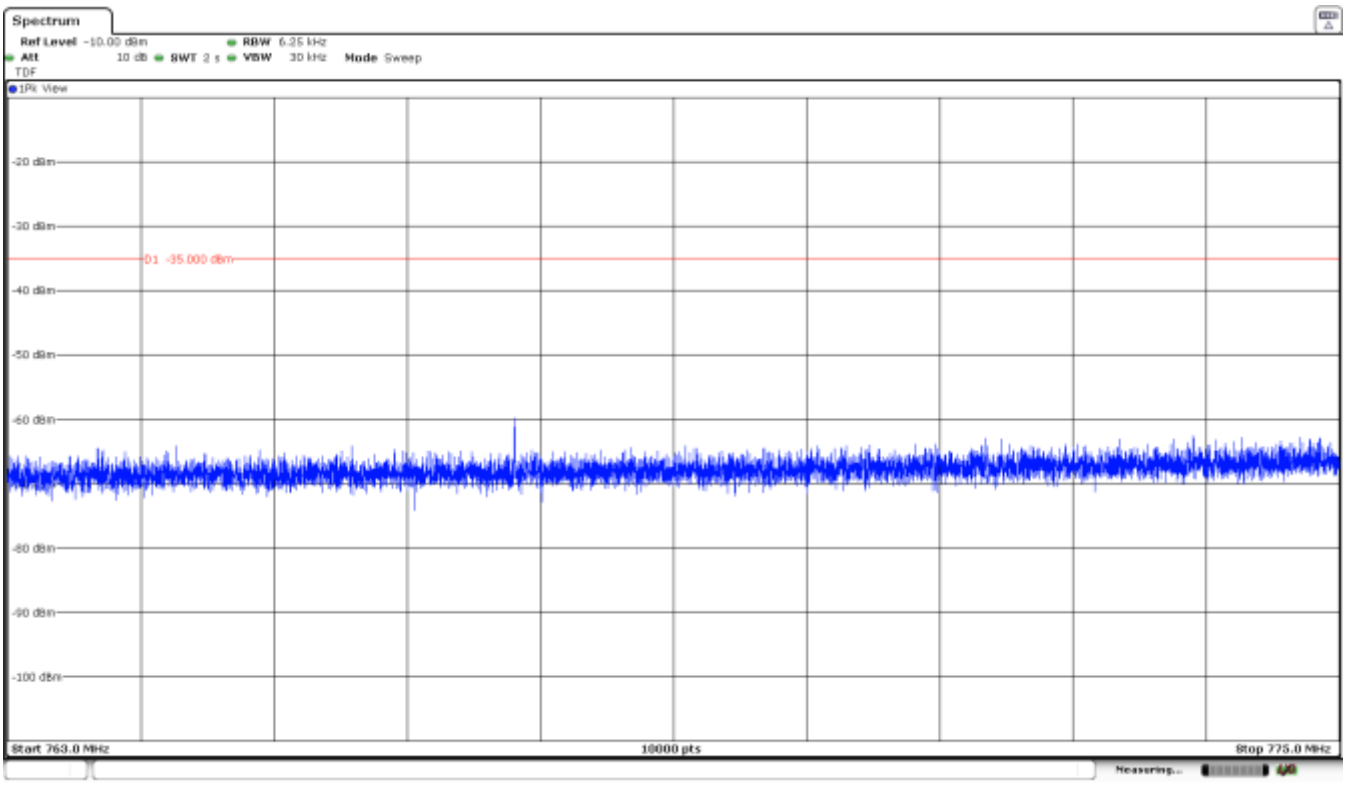
3. CHANNEL: HIGHEST

Frequency Range 9 kHz – 8 GHz

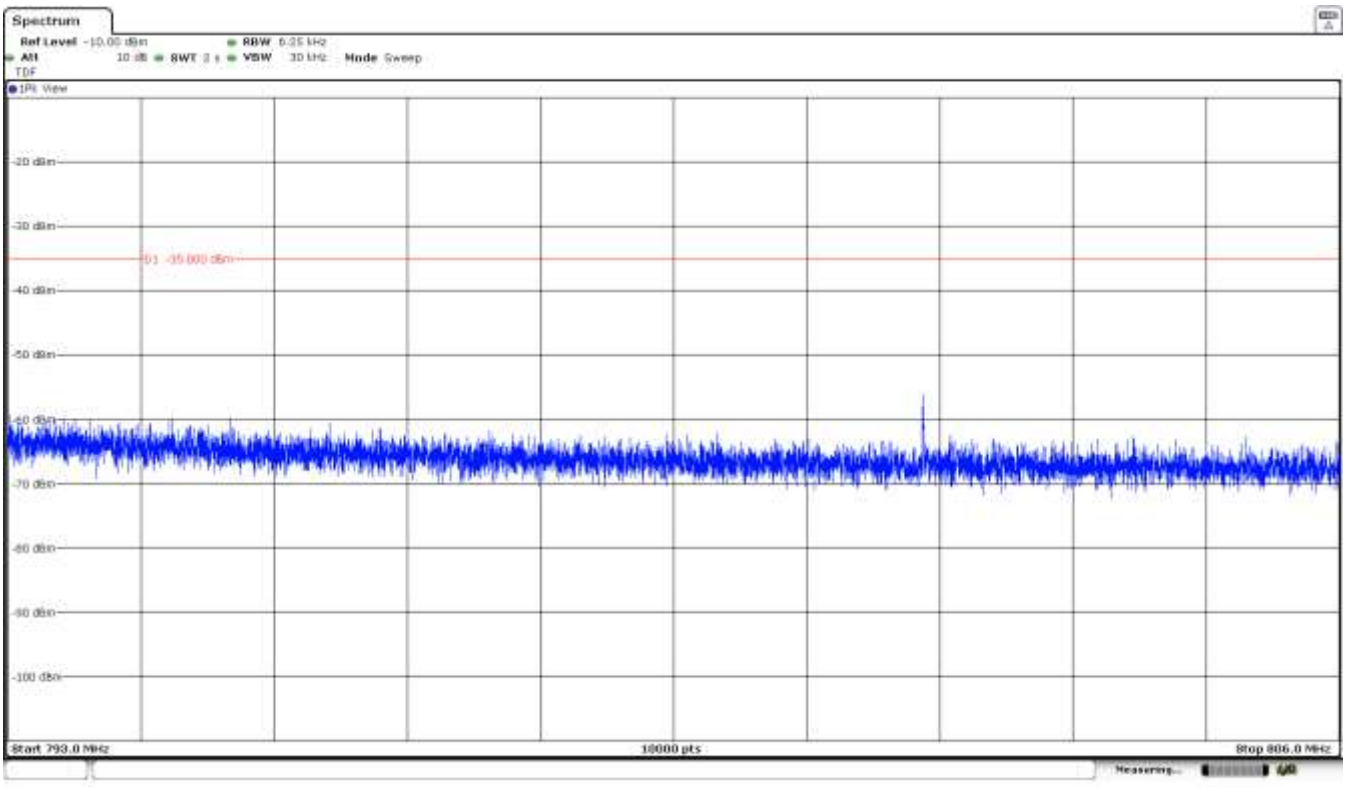



Note: The peak above the limit is the carrier frequency. The peak at 756MHz corresponds to the downlink signal.

Frequency Range 763 MHz - 775 MHz



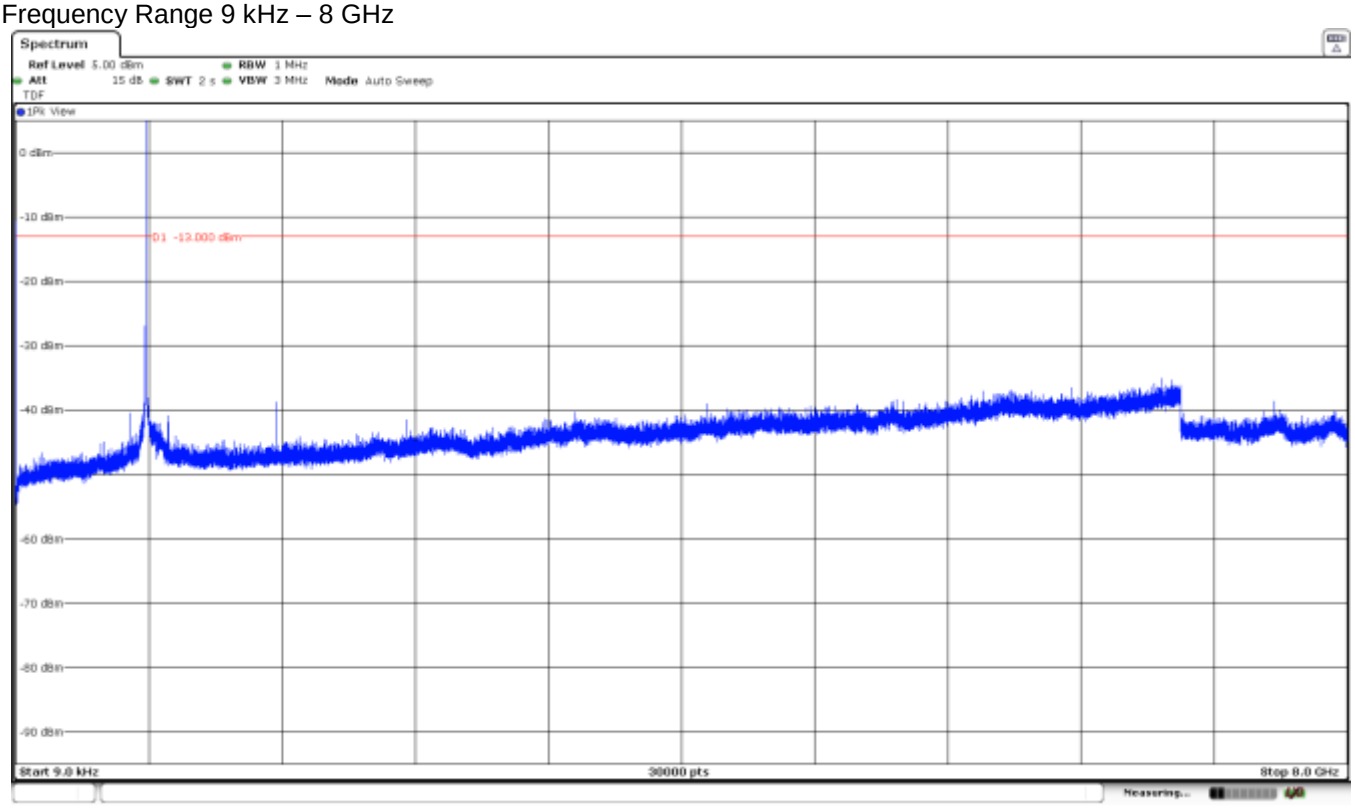
Frequency Range 793 MHz - 806 MHz




NBIoT Band 13 (1 Tone 15 kHz. π/4 - QPSK MODULATION)

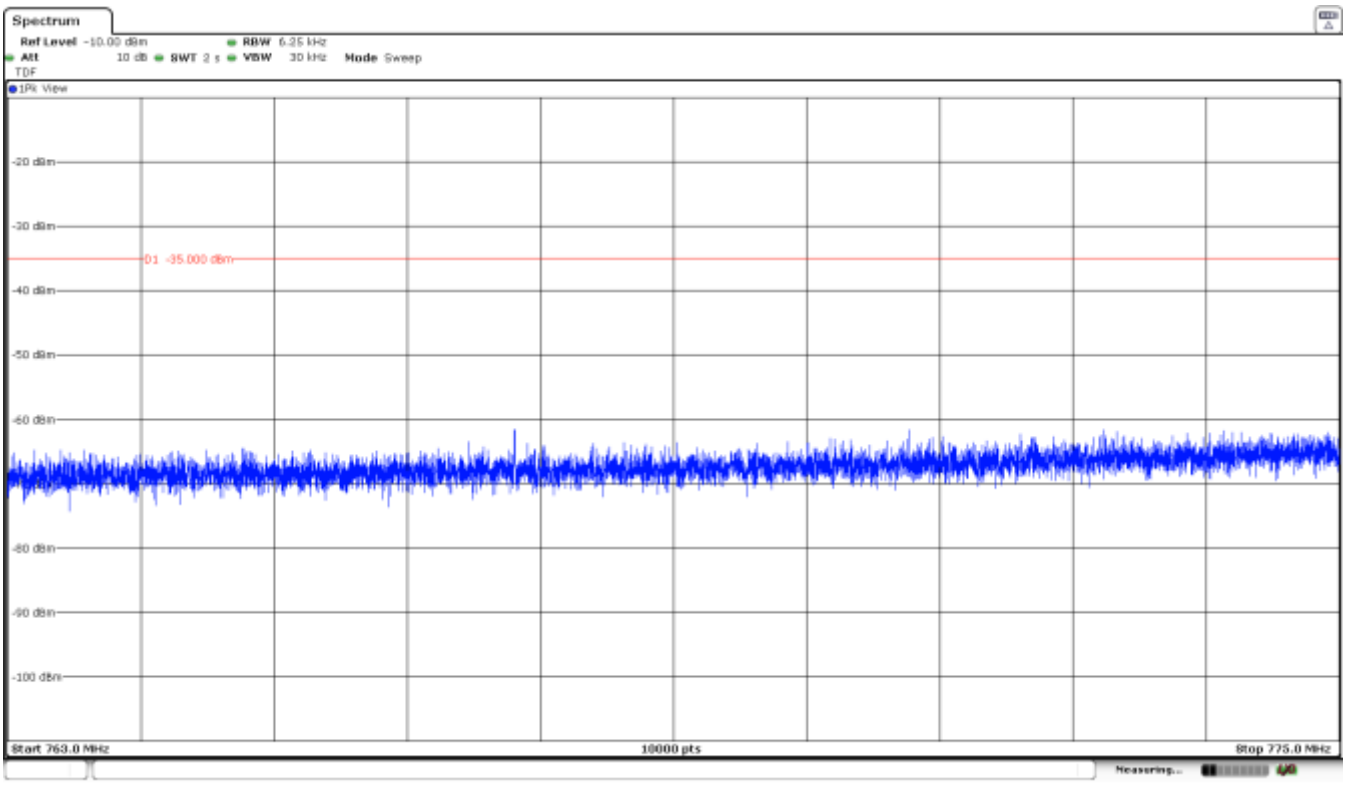
1. CHANNEL: MIDDLE

Frequency Range 9 kHz – 8 GHz

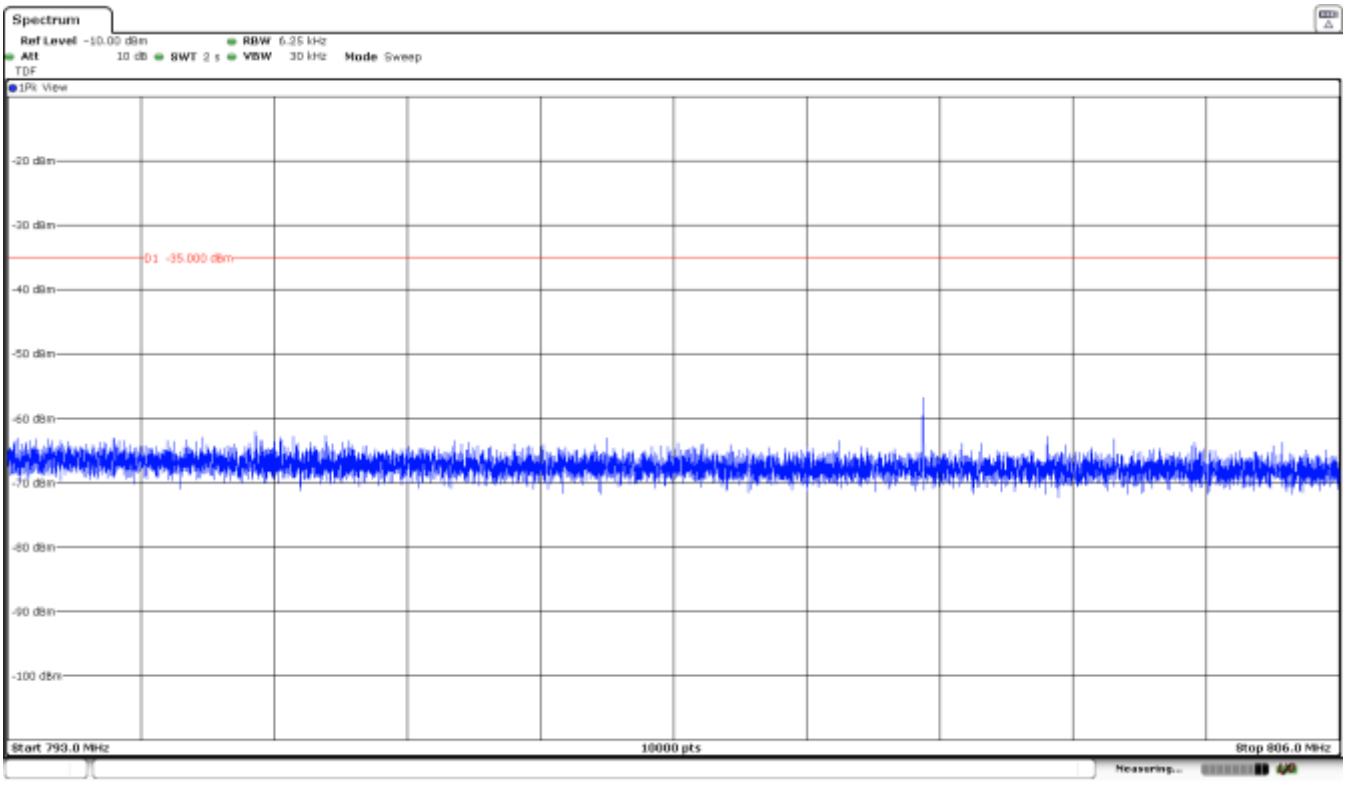



Note: The peak above the limit is the carrier frequency. The peak at 746MHz corresponds to the downlink signal.

Frequency Range 763 MHz - 775 MHz

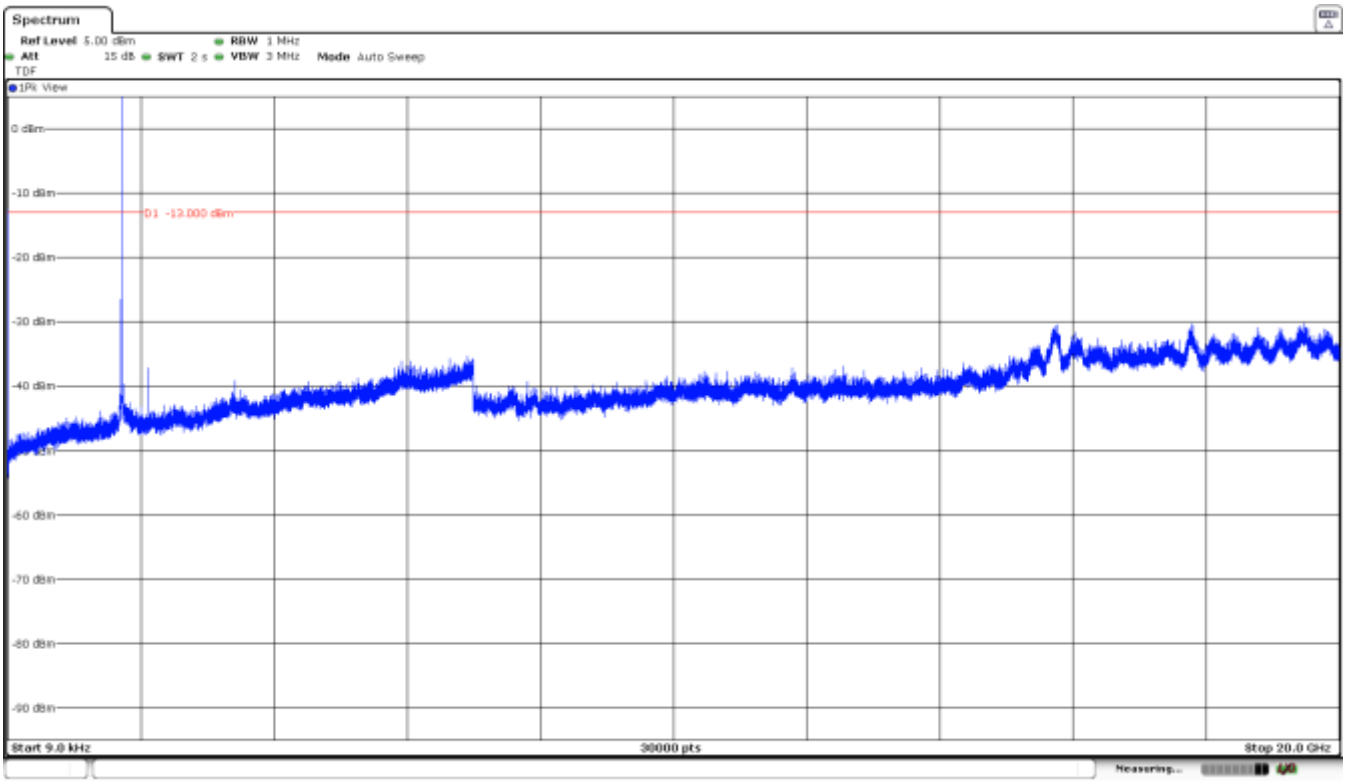



Frequency Range 793 MHz - 806 MHz



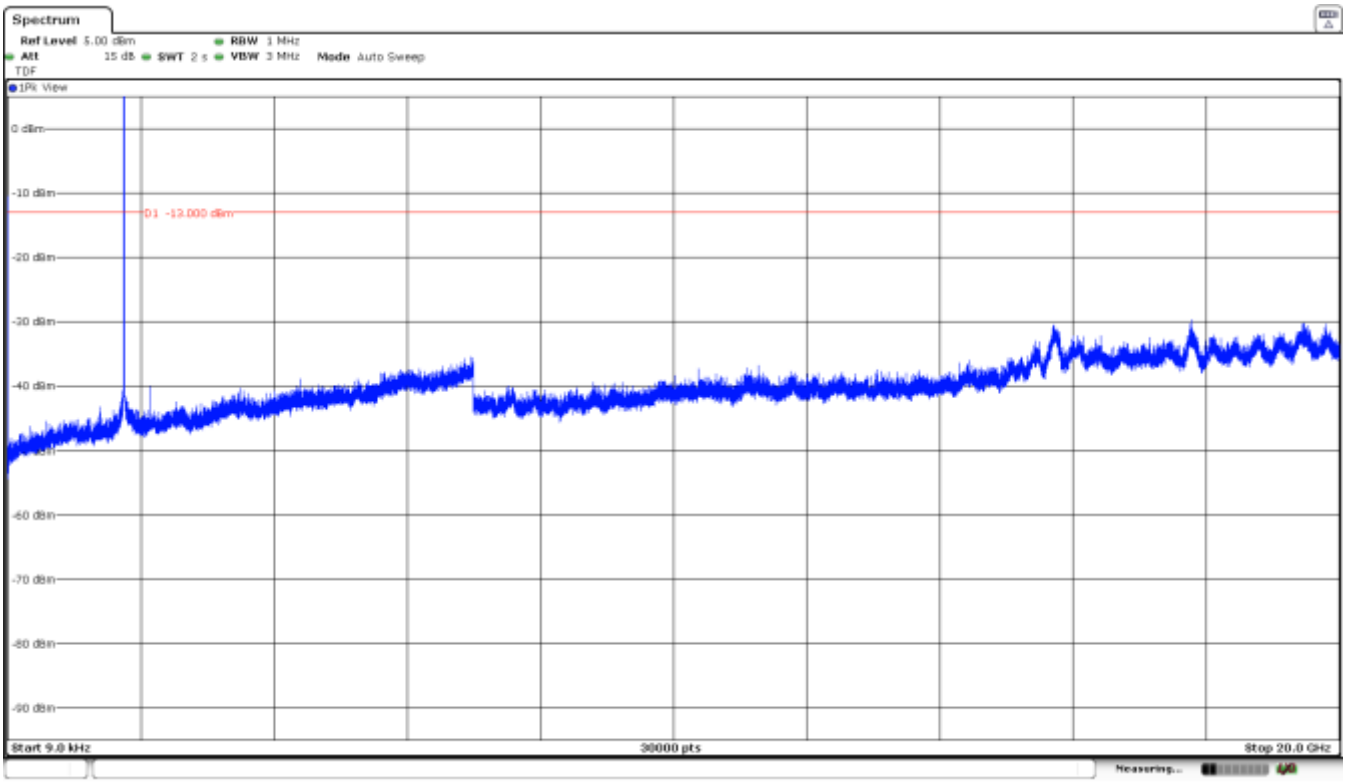
NBIoT Band 66(1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

1. CHANNEL: LOWEST



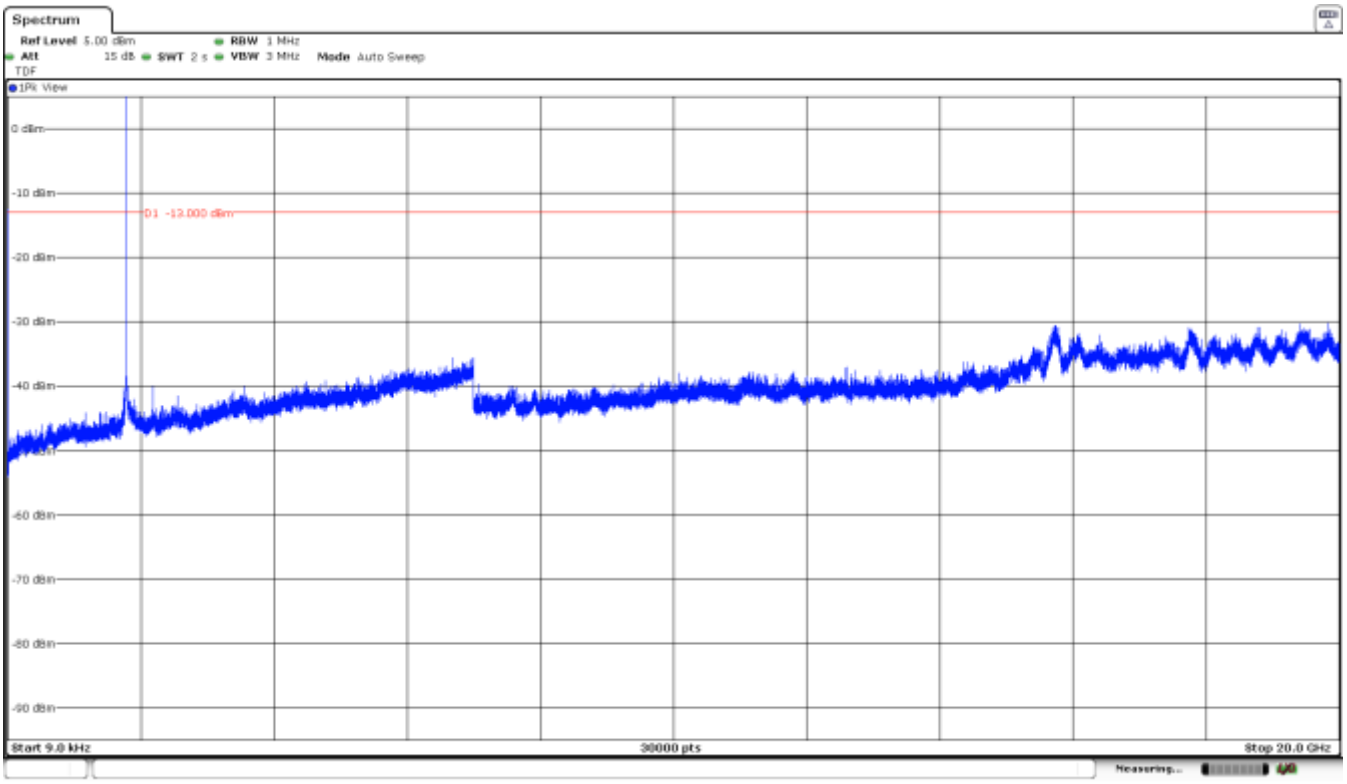

Note: The peak above the limit is the carrier frequency. The peak at 1805MHz corresponds to the downlink signal.

2. CHANNEL: MIDDLE




Note: The peak above the limit is the carrier frequency. The peak at 1840MHz corresponds to the downlink signal.

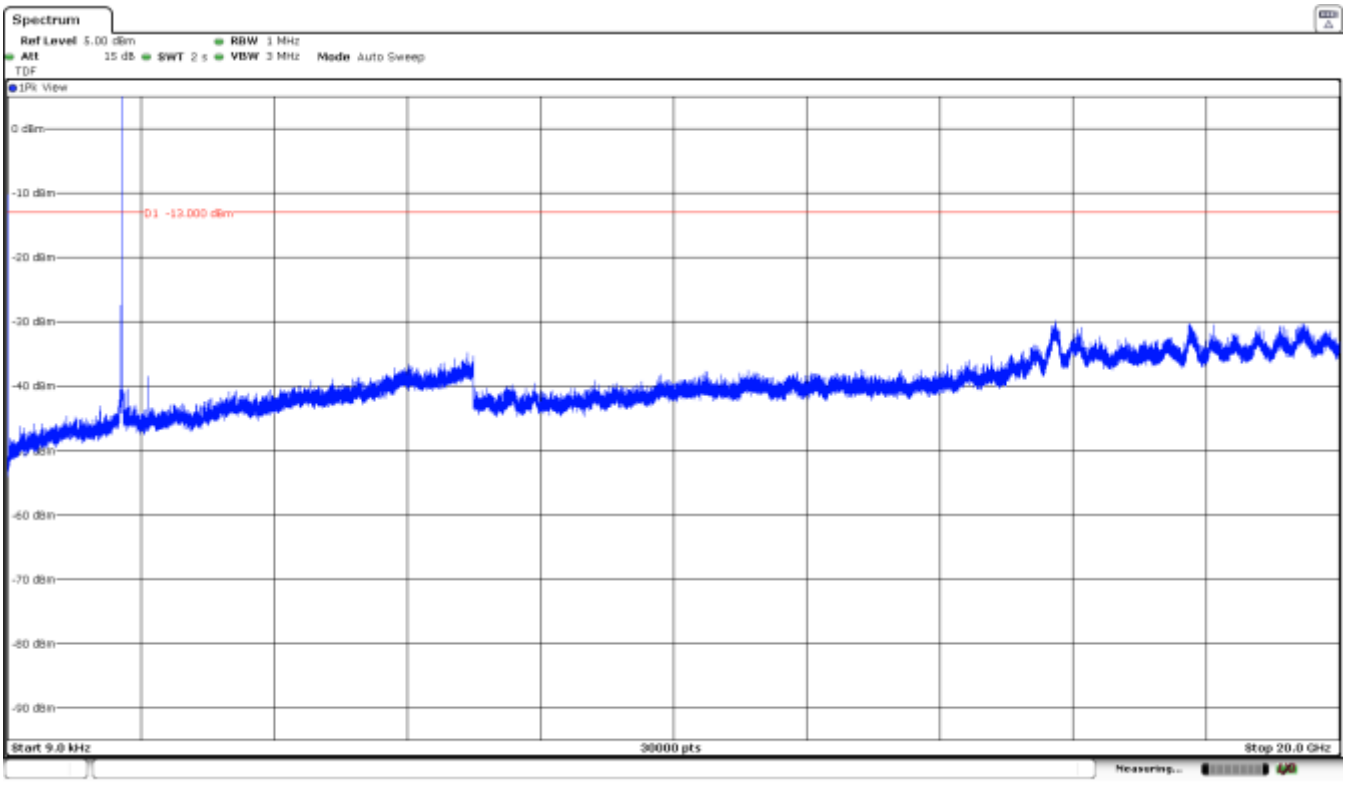
3. CHANNEL: HIGHEST




Note: The peak above the limit is the carrier frequency. The peak at 1875MHz corresponds to the downlink signal.

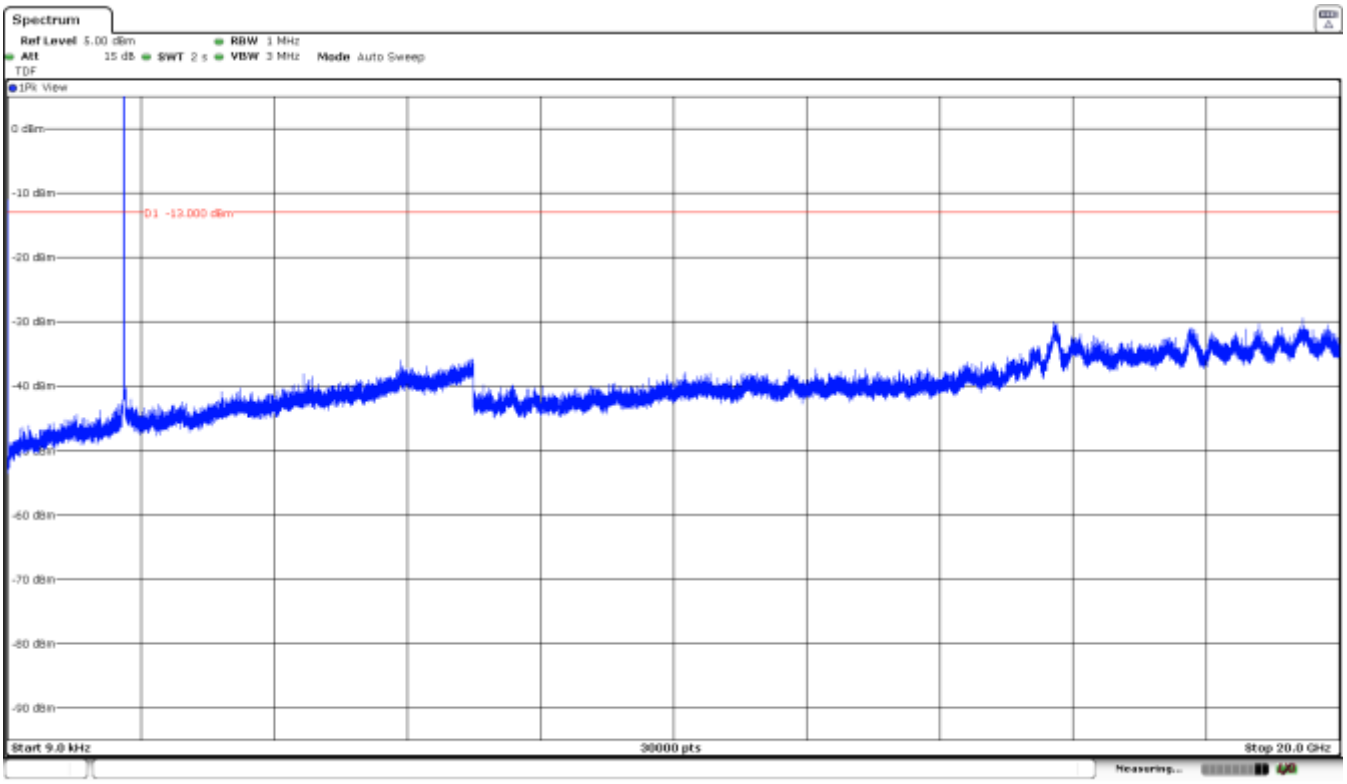
NBIoT Band 66(1 Tone 15 kHz. π/4 - QPSK MODULATION)

1. CHANNEL: LOWEST



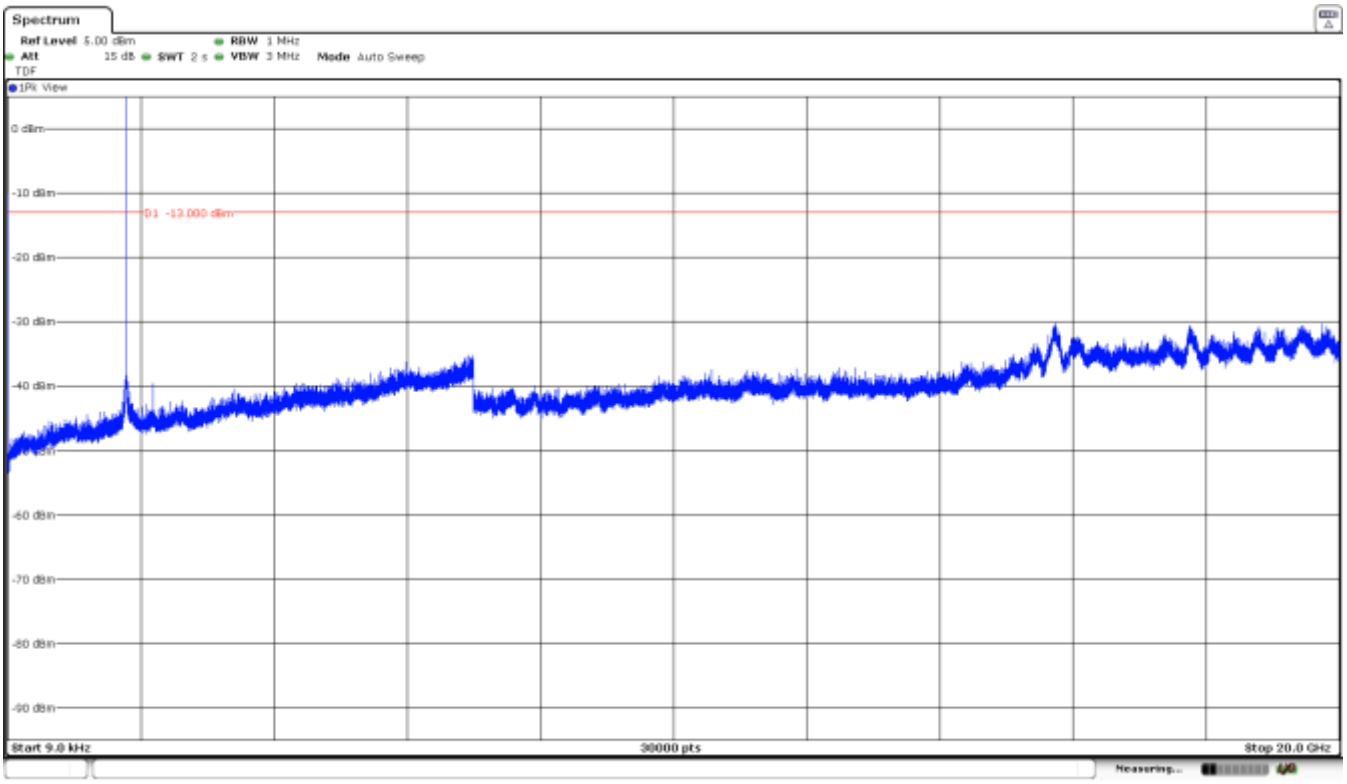

Note: The peak above the limit is the carrier frequency. The peak at 1805MHz corresponds to the downlink signal.

2. CHANNEL: MIDDLE




Note: The peak above the limit is the carrier frequency. The peak at 1840MHz corresponds to the downlink signal.

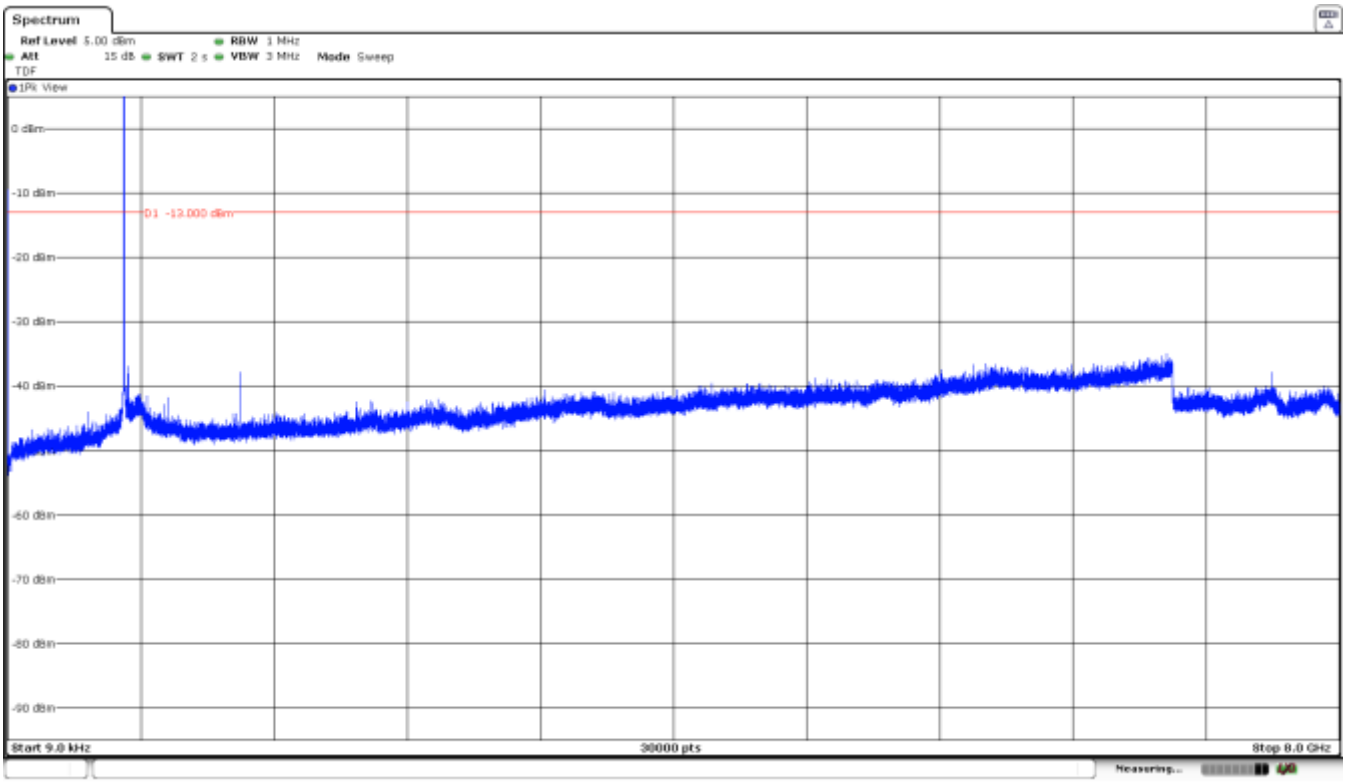
3. CHANNEL: HIGHEST




Note: The peak above the limit is the carrier frequency. The peak at 1875MHz corresponds to the downlink signal.

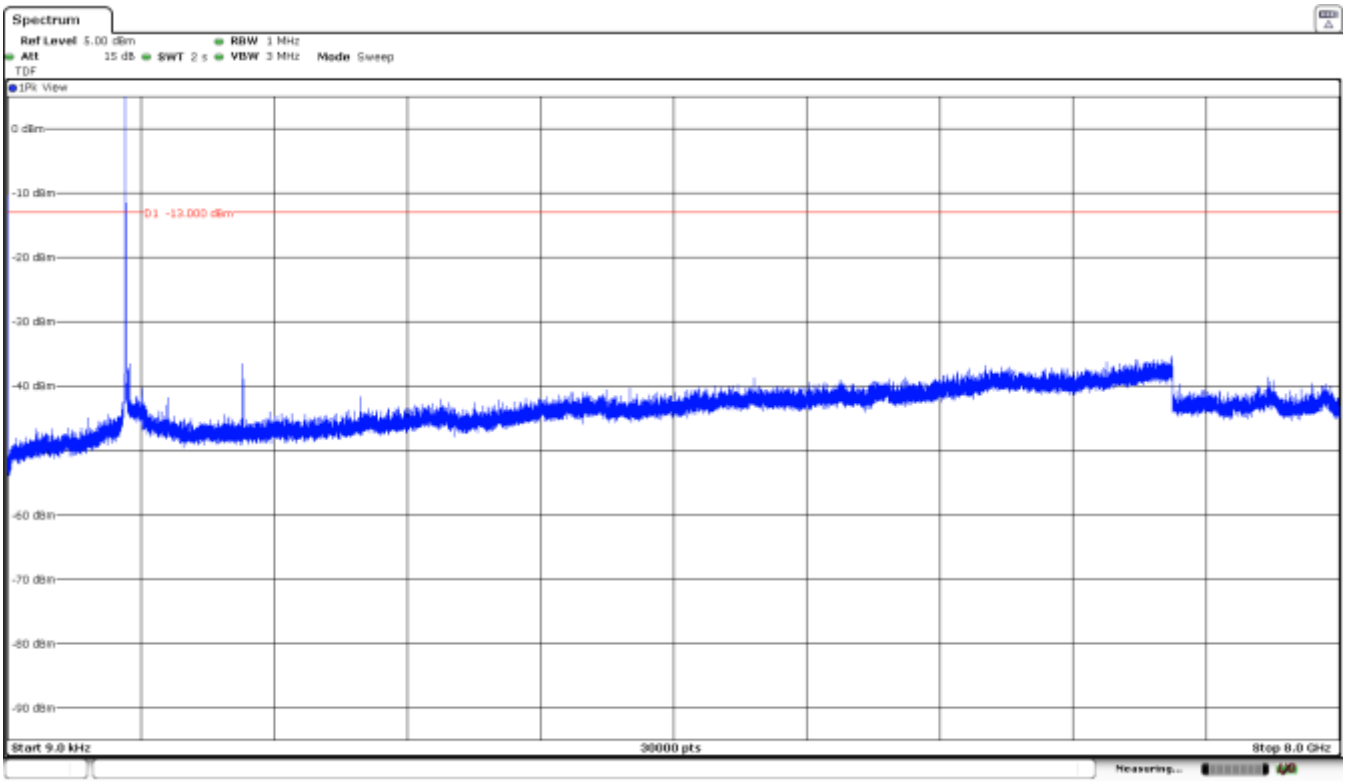
NBIoT Band 85 (1 Tone 3.75 kHz. π/2 - BPSK MODULATION)

1. CHANNEL: LOWEST Frequency Range 9 kHz – 10 GHz



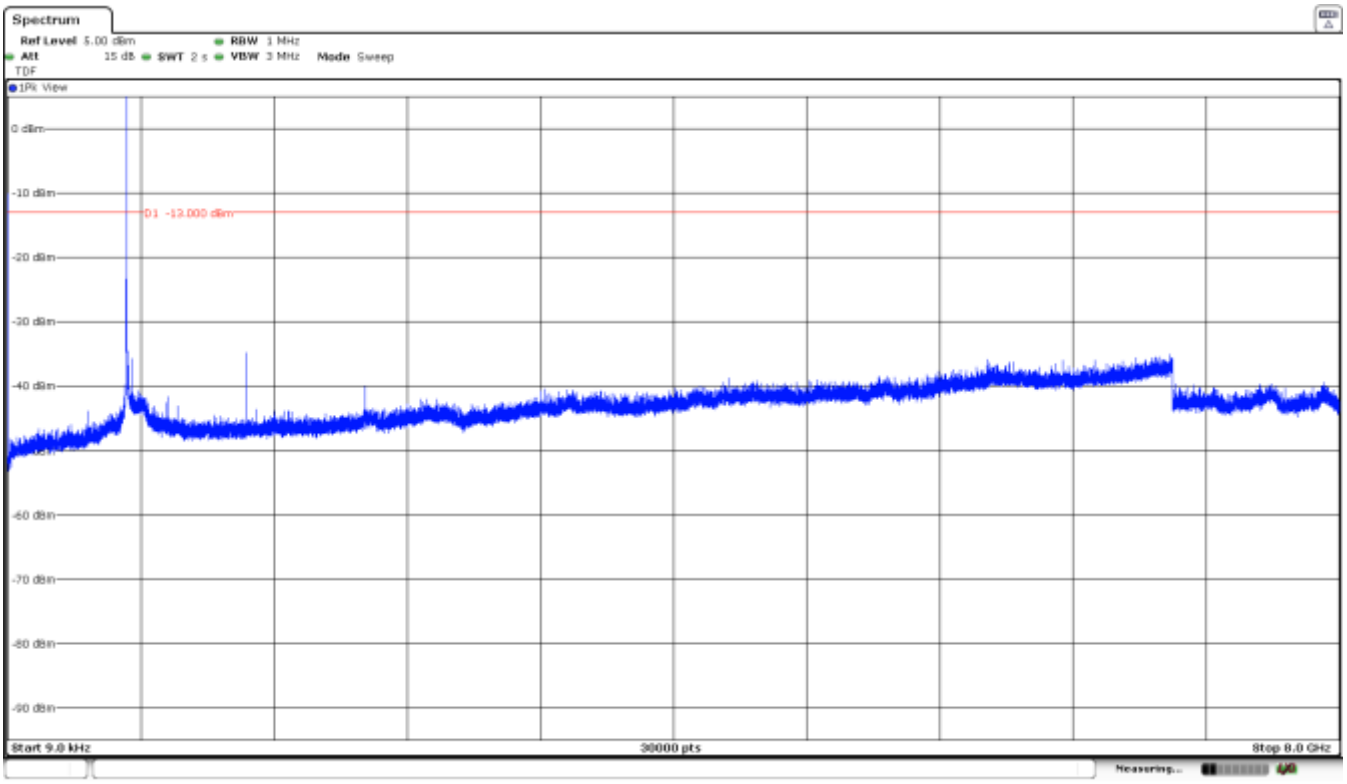

Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE Frequency Range 9 kHz – 10 GHz




Note: The peak above the limit is the carrier frequency.

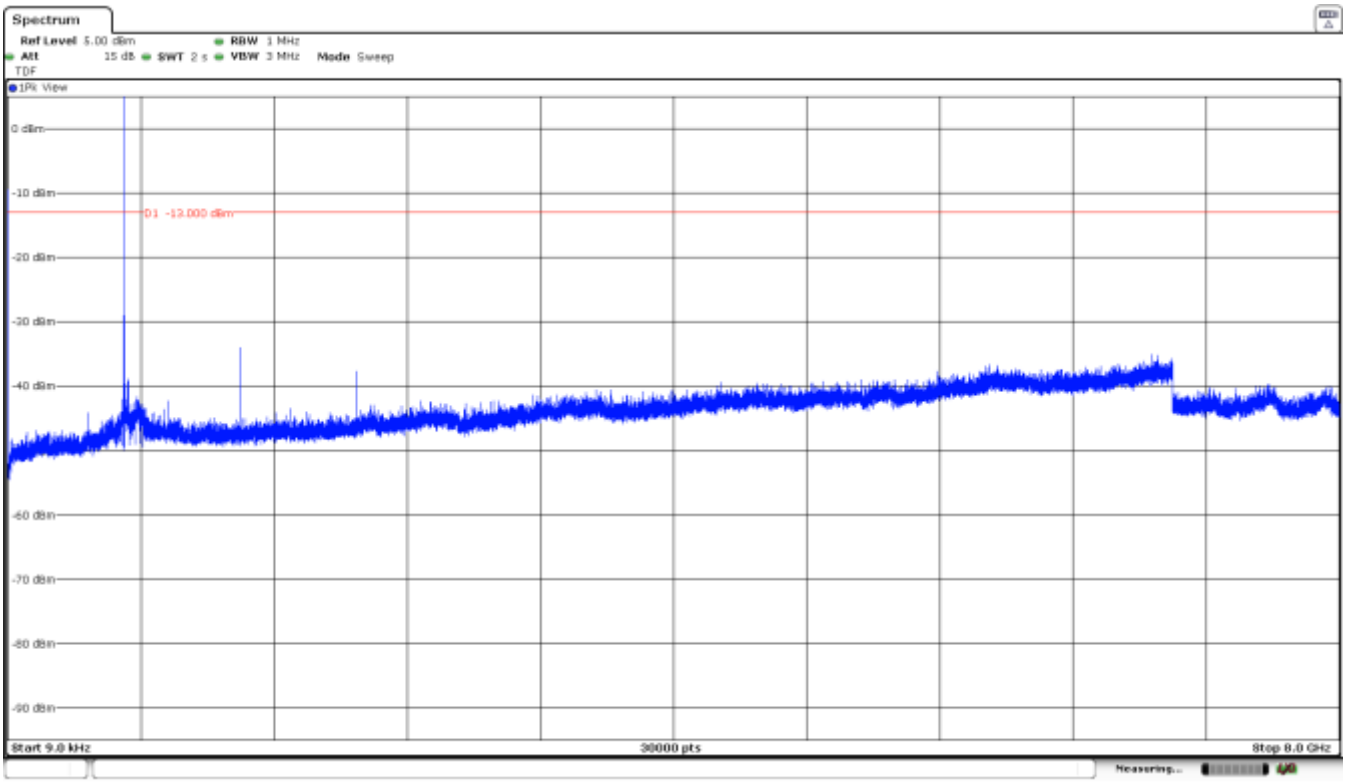
3. CHANNEL: HIGHEST Frequency Range 9 kHz – 10 GHz




Note: The peak above the limit is the carrier frequency.

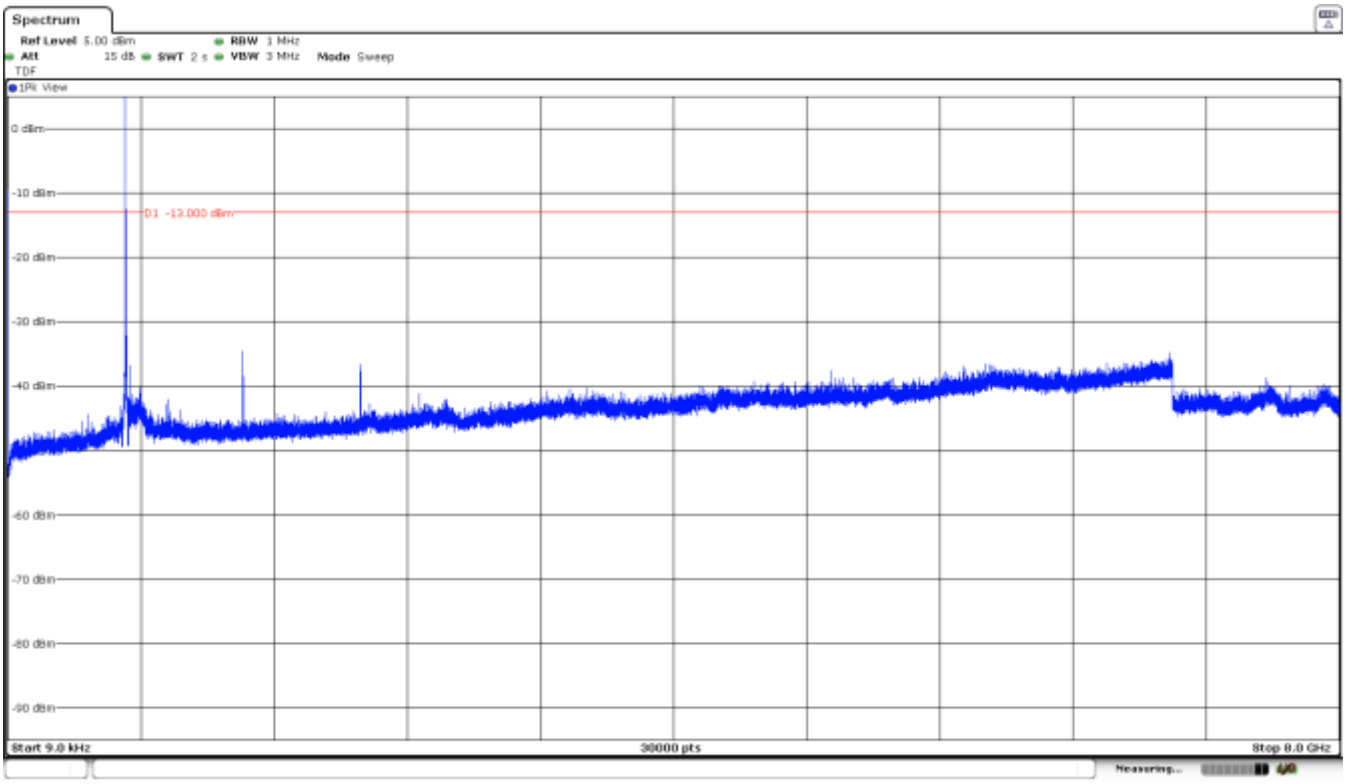
NBIoT Band 85 (3 Tones 15 kHz. π/4 - QPSK MODULATION)

1. CHANNEL: LOWEST Frequency Range 9 kHz – 8 GHz



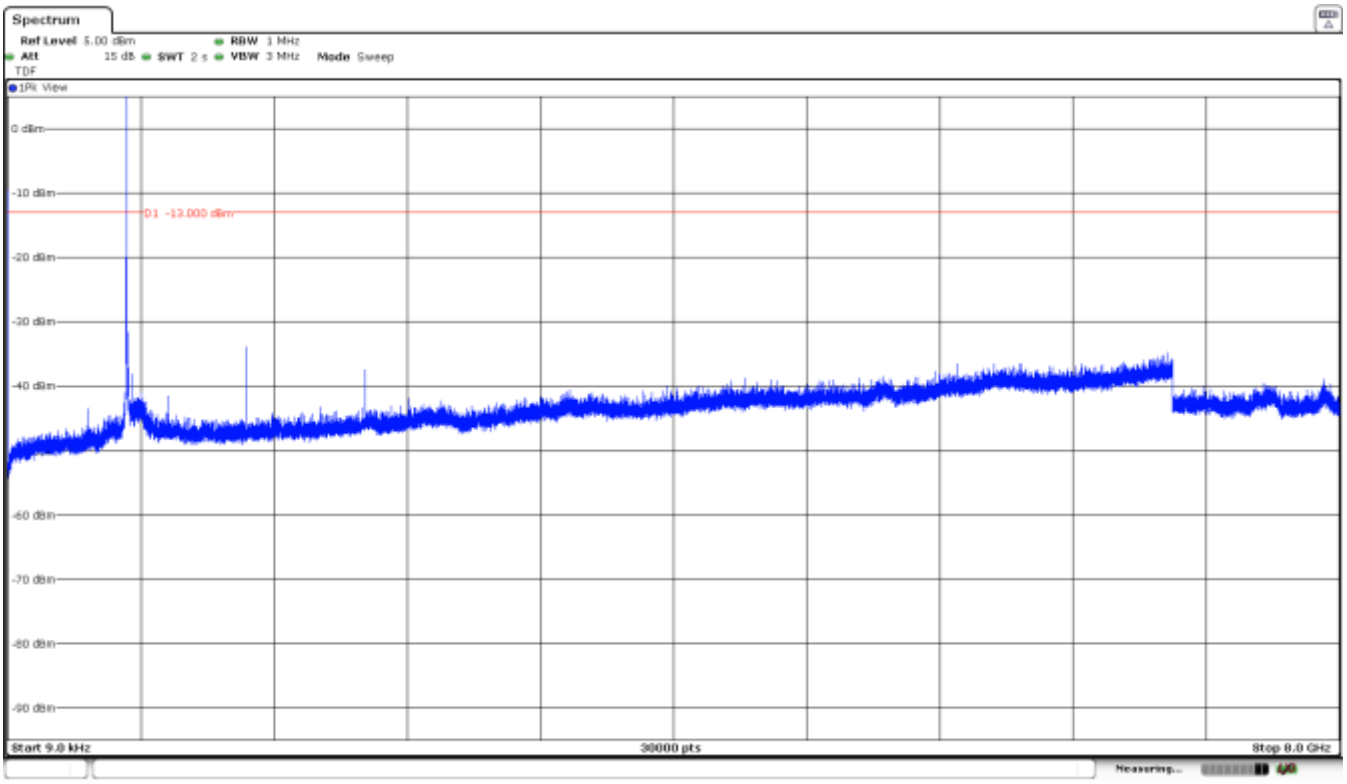

Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE Frequency Range 9 kHz – 8 GHz




Note: The peak above the limit is the carrier frequency.

3. CHANNEL: HIGHEST Frequency Range 9 kHz – 8 GHz




Note: The peak above the limit is the carrier frequency.

# Spurious emissions at antenna terminals at Block Edges

## SPECIFICATION

FCC §27.53 (c) & (g) & (h). RSS-130 Clause 4.7. . RSS-139 Clause 6.6.

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

At Po transmitting power. the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm

## METHOD

The EUT RF output connector was connected to a spectrum analyser and to the Universal Radio Communication tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50 ohm attenuator and a power splitter.

The reading of the spectrum analyser is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyser.

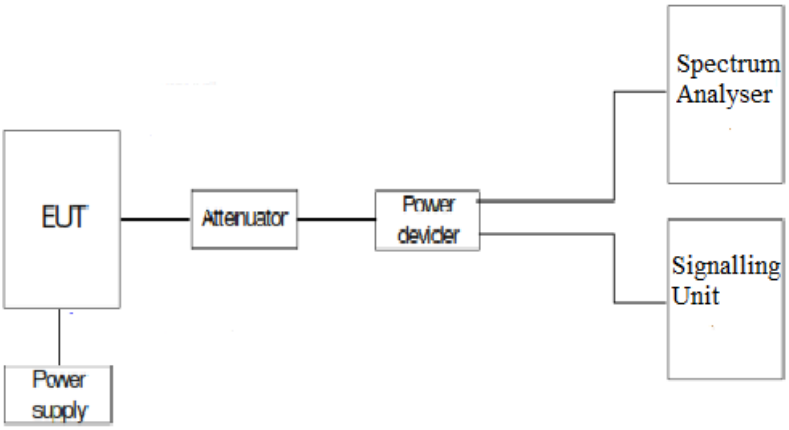
The configuration of modulation which is the worst case for conducted power was used.

For NBIoT Band12 and NBIoT85. as indicated in FCC part 27.53 (g) /RSS-130 Clause 4.6., in the 100 kHz bands immediately outside and adjacent to the licensee's frequency block or band. a resolution bandwidth of 30 kHz may be employed.

For NBIoT Band 13. as indicated in FCC part 27.53 (c) (5) /RSS-130 Clause 4.6., in the 100 kHz bands immediately outside and adjacent to the licensee's frequency block or band. a resolution bandwidth of 30 kHz may be employed.

For NBIoT Band 66. as indicated in FCC part 27.53 (h) (3) /RSS-139 Clause 6.6.. in the 1 MHz bands immediately outside and adjacent to the licensee's frequency block. a resolution bandwidth of at least one percent of the emission bandwidth/occupied bandwidth of the fundamental emission of the transmitter may be employed.

## TEST SETUP



RESULTS (see plots in next pages)

NBIoT BAND 12.

| (Channels in Band 12): | Tone= 3.75 kHz.<br>Offset=0.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=0.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at lowest Block Edge at antenna port (dBm) | -29.51 | -28.22 | -24.84 |

| (Channels in Band 12): | Tone= 3.75 kHz.<br>Offset=47.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=11.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at highest Block Edge at antenna port (dBm) | -26.88 | -28.18 | -25.41 |

NBIoT. BAND 13.

| (Channels in Band 13): | Tone= 3.75 kHz.<br>Offset=0.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=0.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at lowest Block Edge at antenna port (dBm) | -25.09 | -32.89 | -27.16 |

| (Channels in Band 13): | Tone= 3.75 kHz.<br>Offset=47.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=11.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at highest Block Edge at antenna port (dBm) | -25.91 | -32.60 | -26.00 |

NBIoT. BAND 66.

| (Channels in Band 66): | Tone= 3.75 kHz.<br>Offset=0.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=0.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at lowest Block Edge at antenna port (dBm) | -35.08 | -25.77 | -27.28 |

| (Channels in Band 66): | Tone= 3.75 kHz.<br>Offset=47.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=11.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at highest Block Edge at antenna port (dBm) | -34.88 | -28.31 | -34.40 |

NBIoT. BAND 85.

| (Channels in Band 85): | Tone= 3.75 kHz.<br>Offset=0.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=0.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at lowest Block Edge at antenna port (dBm) | -26.88 | -21.94 | -22.45 |

| (Channels in Band 85): | Tone= 3.75 kHz.<br>Offset=47.<br>π/4 - QPSK | Tone= 15 kHz.<br>Offset=11.<br>π/4 - QPSK | 12 Tones= 15 kHz.<br>Offset=0.<br>π/4 - QPSK |
|---|---|---|---|
| Maximum measured level at highest Block Edge at antenna port (dBm) | -26.72 | -25.64 | -26.04 |

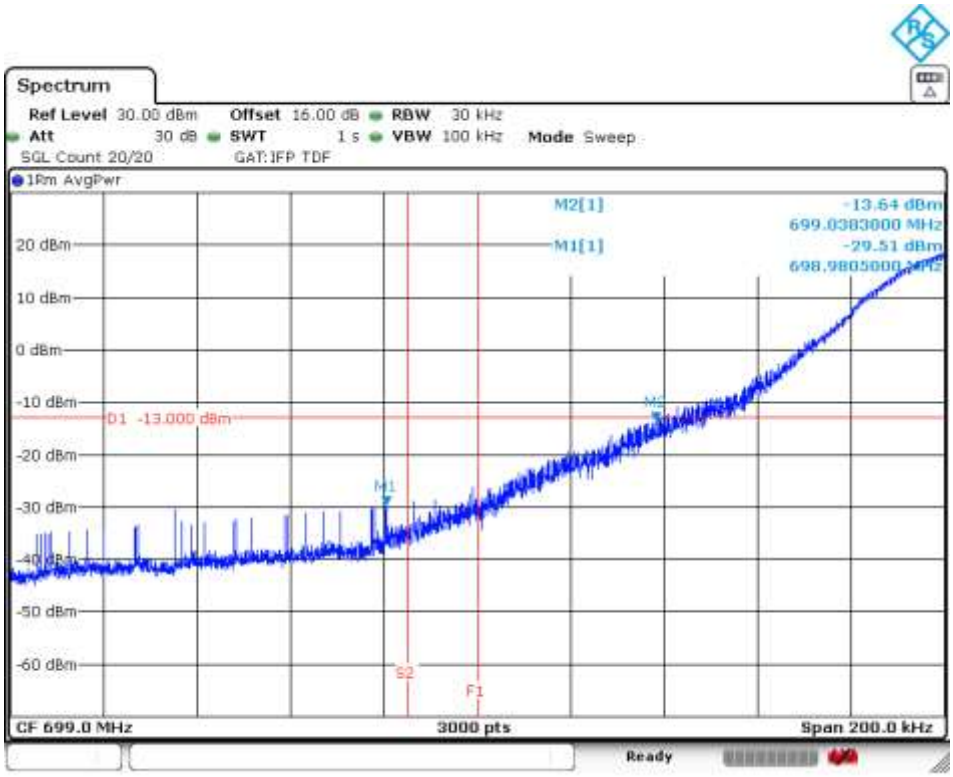
Measurement uncertainty = <±1.20 dB.

Verdict: PASS

NBIoT. BAND 12.

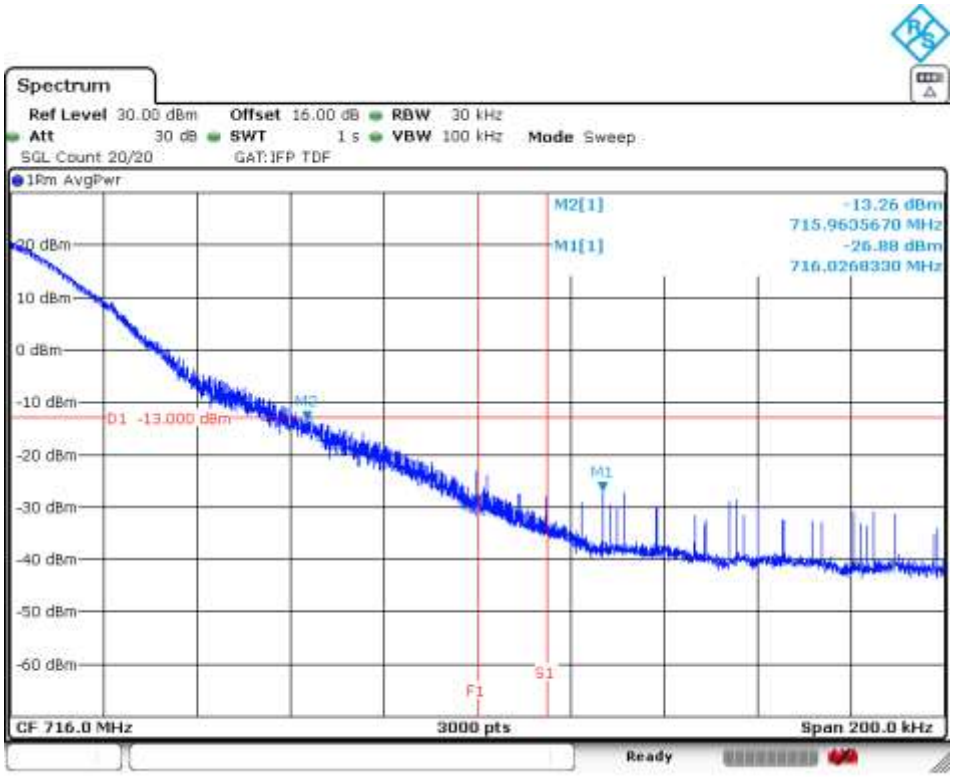
1 tone π/2 – BPSK. BW=3.75 kHz Offset = 0

CHANNEL LOWEST




1 tone π/2 – BPSK. BW=3.75 kHz Offset = 47

CHANNEL HIGHEST

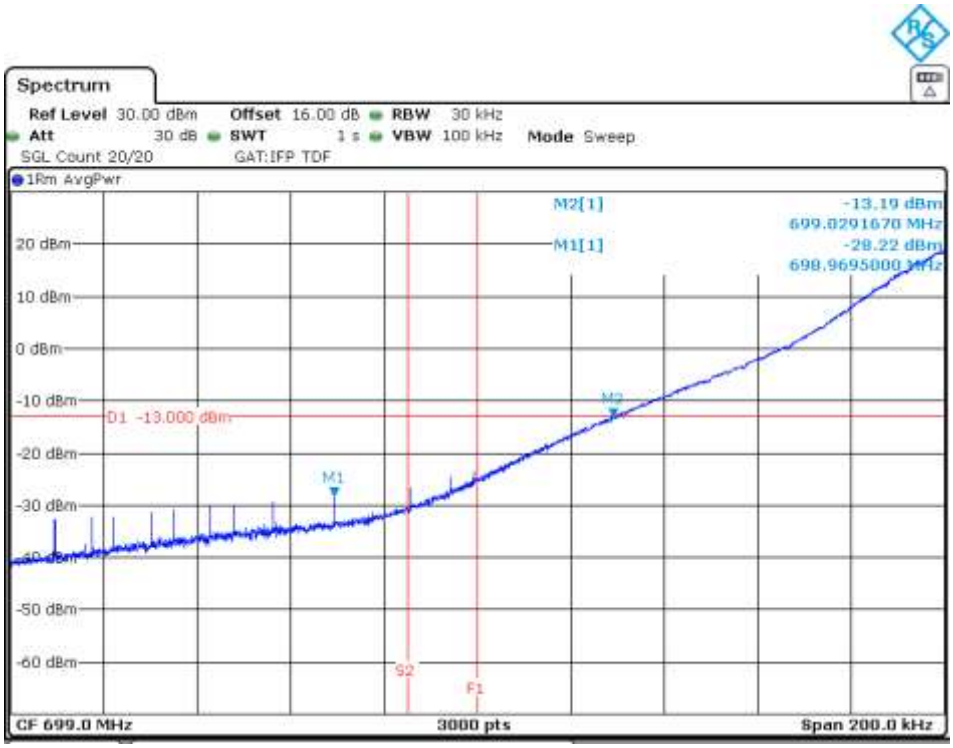



NOTE: Zoom (100KHz) with RBW=30KHz.

NBIoT. BAND 12.

1 tone π/4 – QPSK. BW=15 kHz Offset = 0

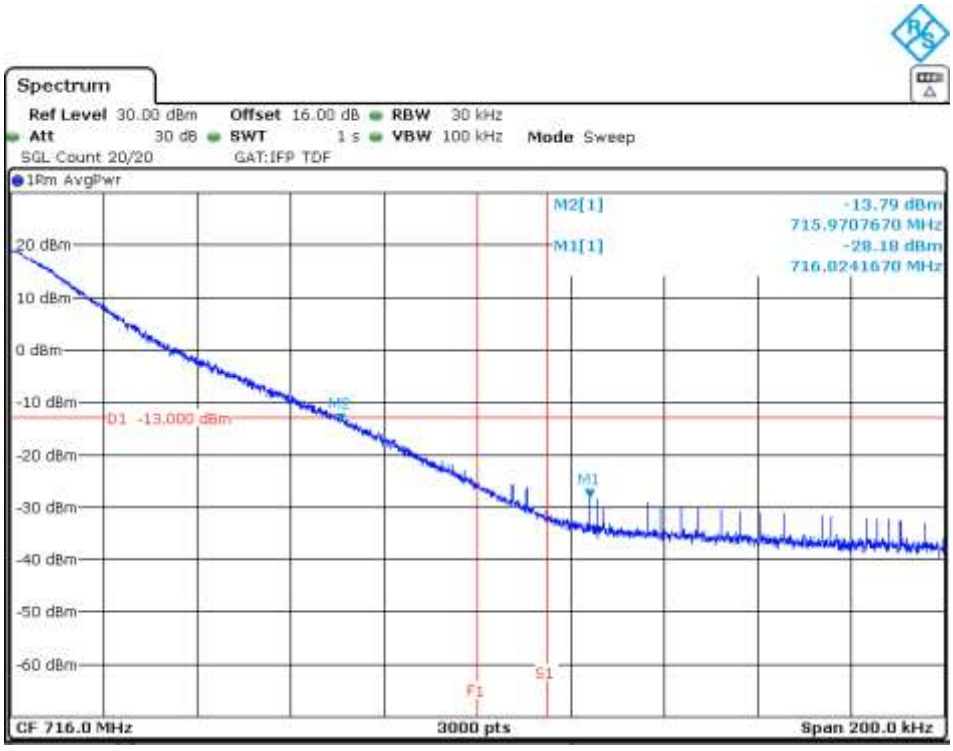
CHANNEL LOWEST




NOTE: Zoom (100KHz) with RBW=30KHz

1 tone π/4 – QPSK. BW=15 kHz Offset = 11

CHANNEL HIGHEST

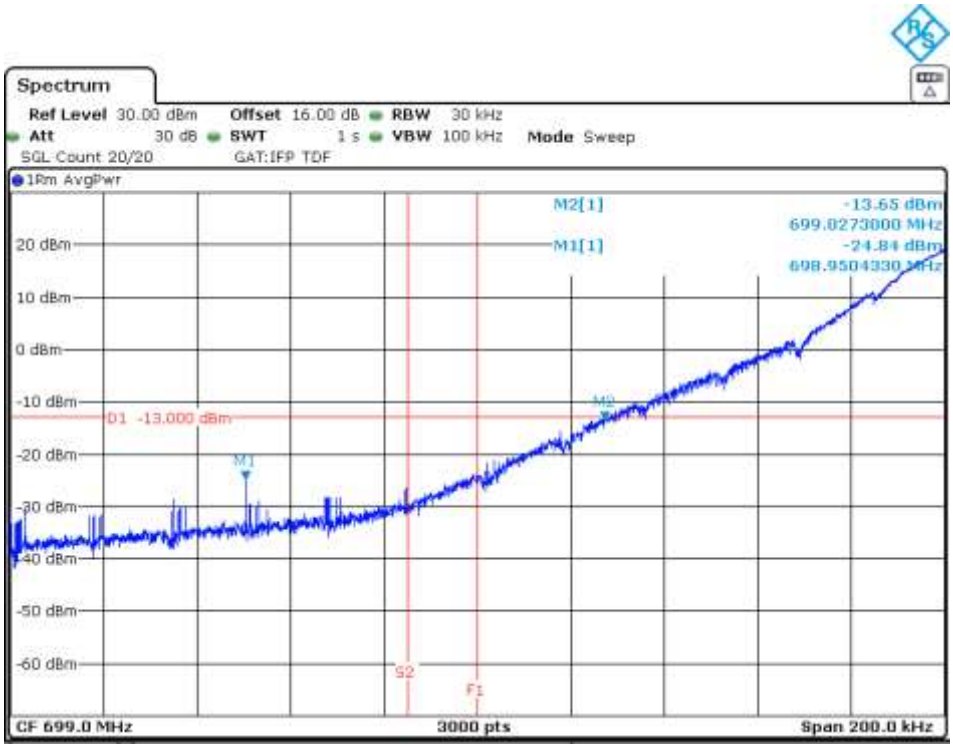



NOTE: Zoom (100KHz) with RBW=30KHz

NBIoT. BAND 12.

12 tone π/4 – QPSK. BW=15 kHz Offset = 0

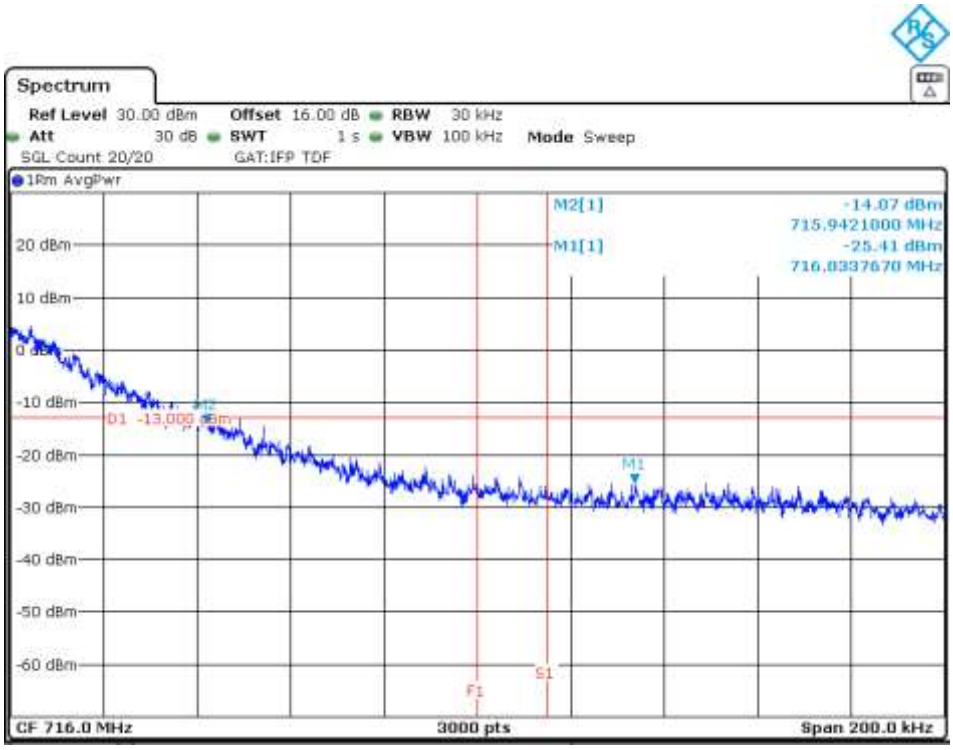
CHANNEL LOWEST




NOTE: Zoom (100KHz) with RBW=30KHz

1 tone π/4 – QPSK. BW=15 kHz Offset = 0

CHANNEL HIGHEST

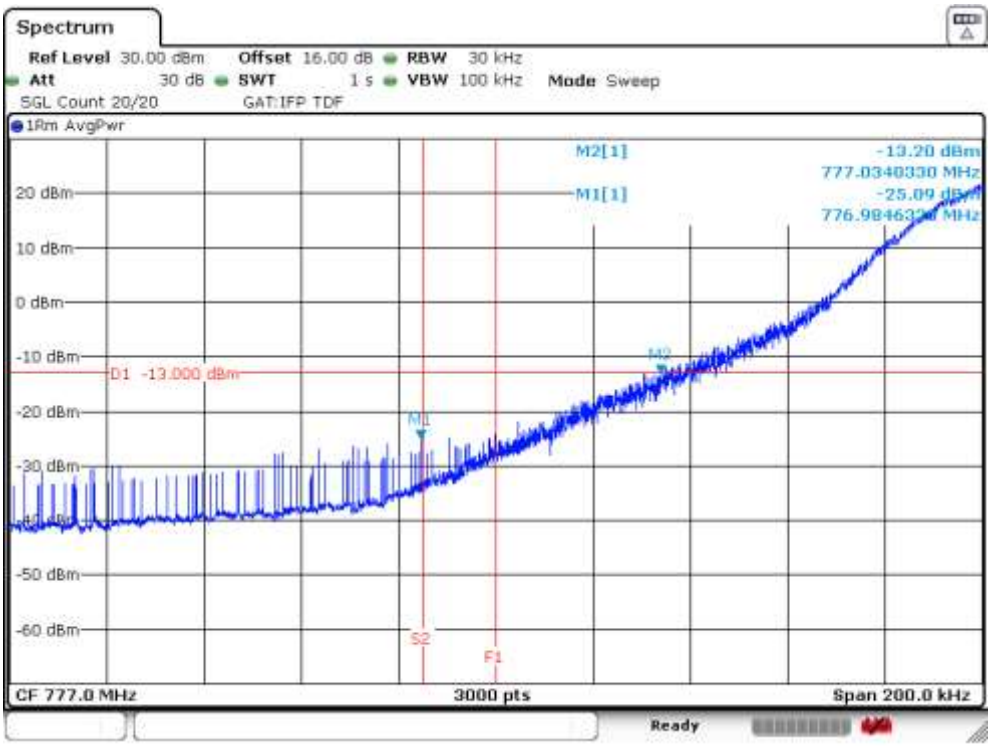



NOTE: Zoom (100KHz) with RBW=30KHz

NBIoT. BAND 13.

1 tone π/2 – BPSK. BW=3.75 kHz Offset = 0

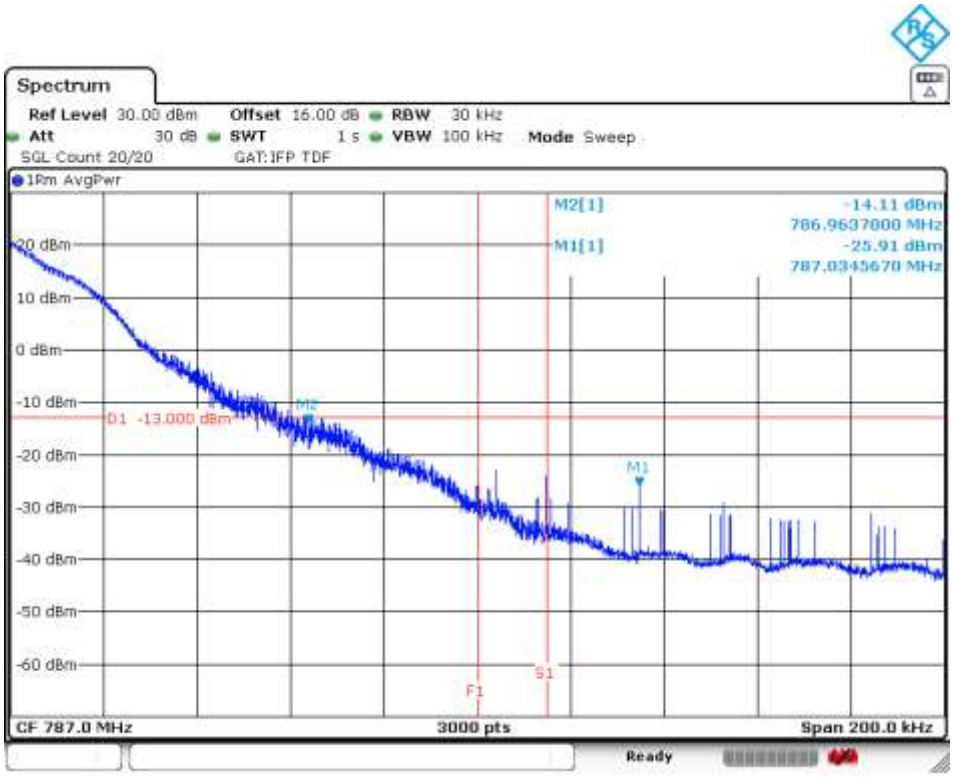
CHANNEL LOWEST




NOTE: Zoom (100KHz) with RBW=30KHz

1 tone π/2 – BPSK. BW=3.75 kHz Offset = 47

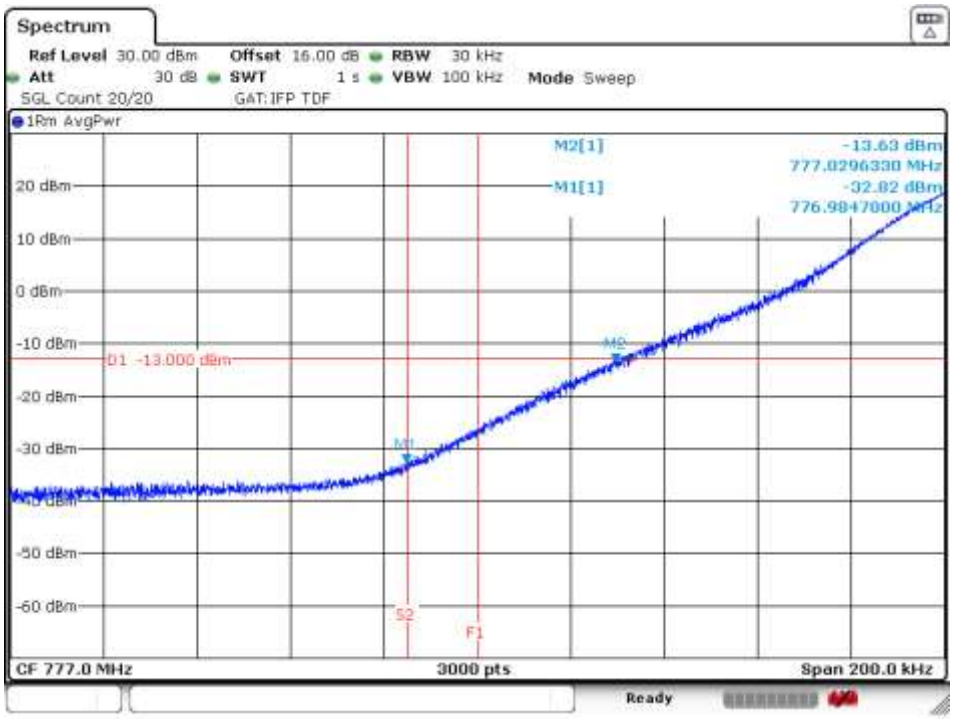
CHANNEL HIGHEST




NOTE: Zoom (100KHz) with RBW=30KHz.

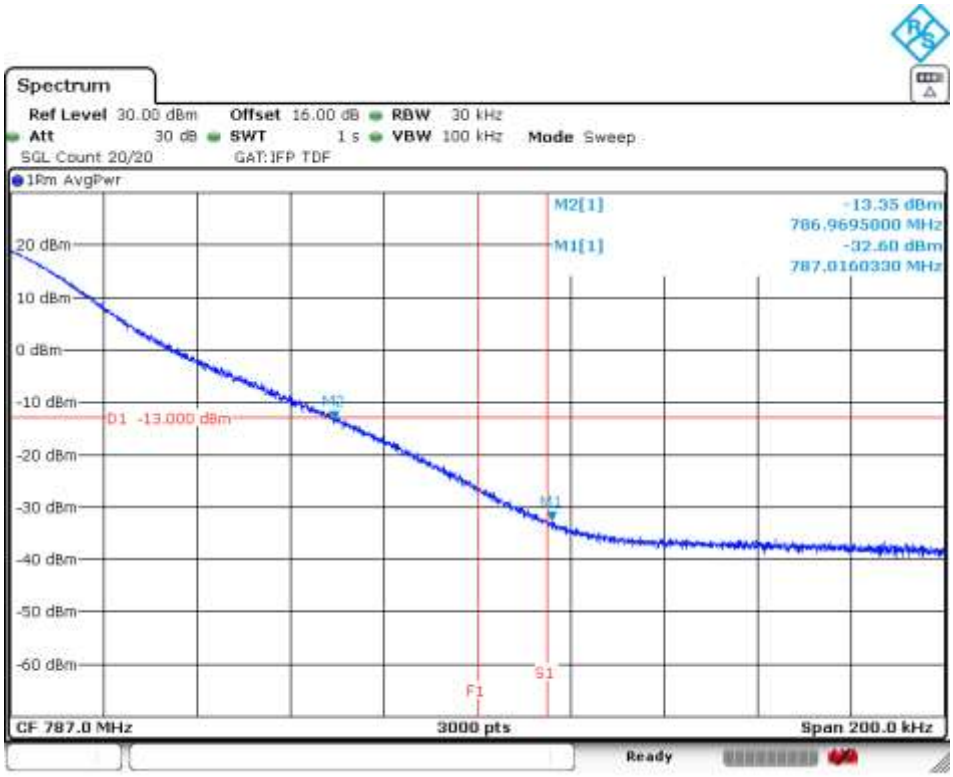
NBIoT. BAND 13.

1 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL LOWEST




NOTE: Zoom (100KHz) with RBW=30KHz.

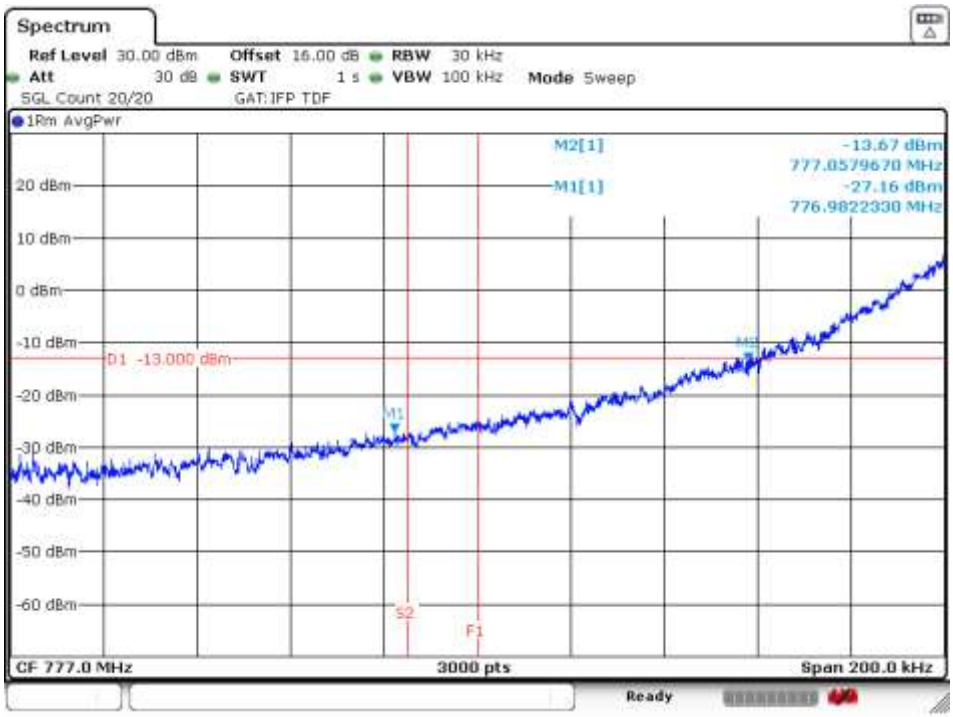
1 tone π/4 – QPSK. BW=15 kHz Offset = 11 CHANNEL HIGHEST




NOTE: Zoom (100KHz) with RBW=30KHz.

NBIoT. BAND 13.

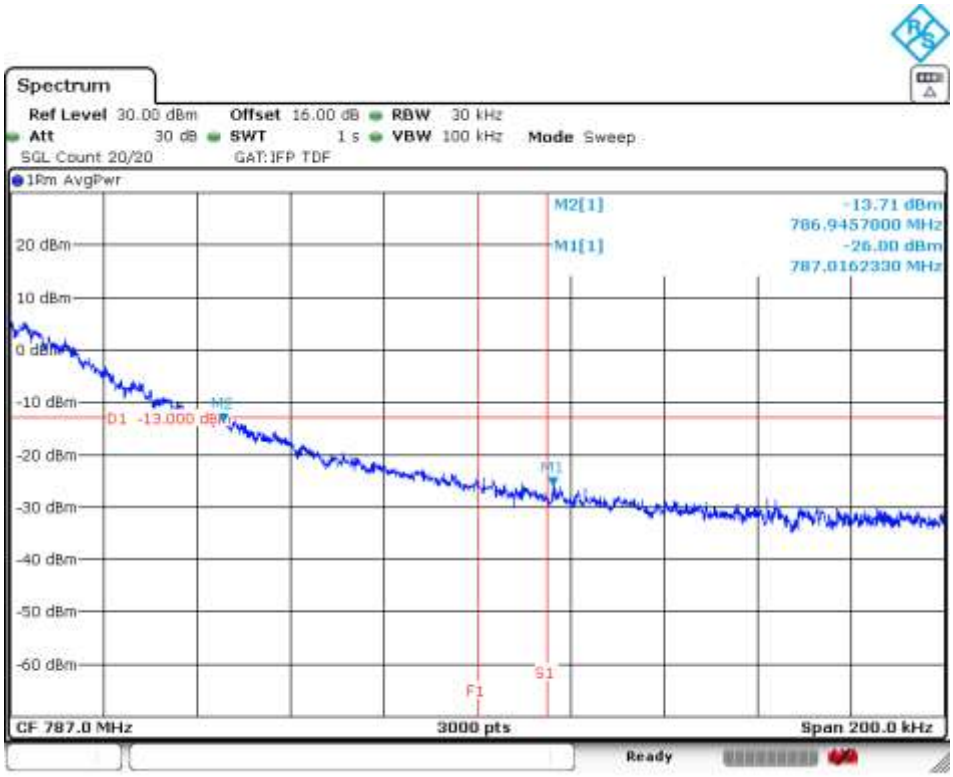
12 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL LOWEST




NOTE: Zoom (100KHz) with RBW=30KHz.

NBIoT. BAND 13.

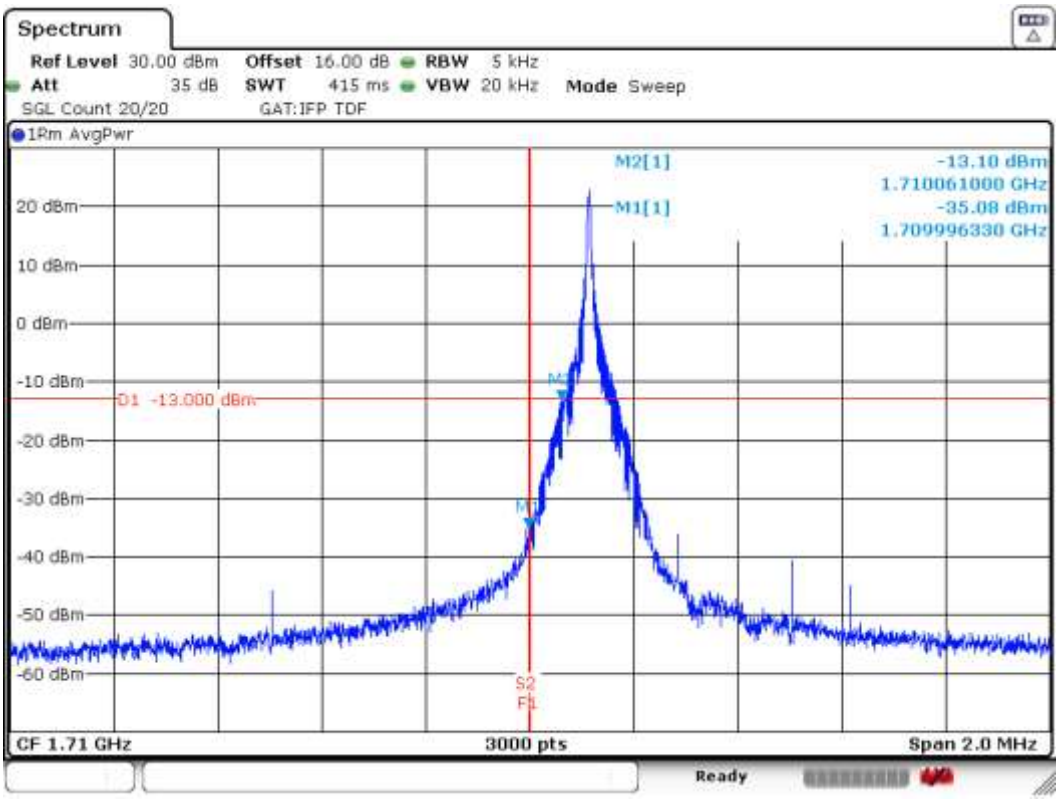
12 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL HIGHEST



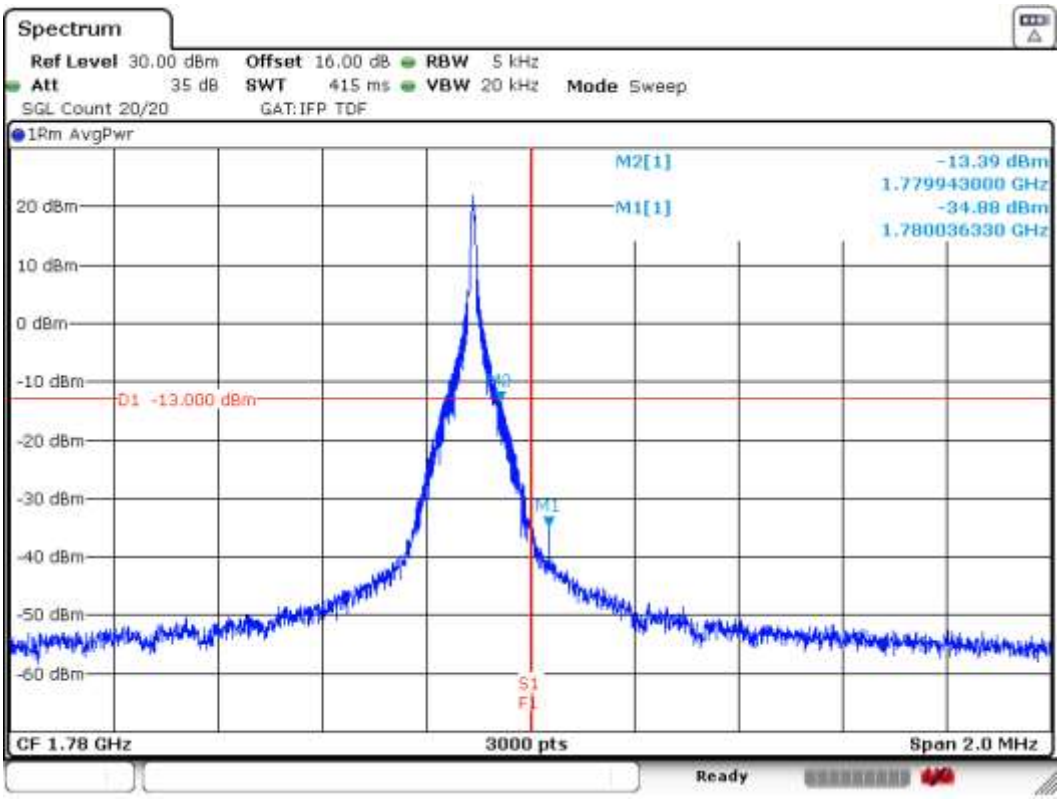

NOTE: Zoom (100KHz) with RBW=30KHz.

NBIoT. BAND 66.

1 tone π/2 – BPSK. BW=3.75 kHz Offset = 0 CHANNEL LOWEST

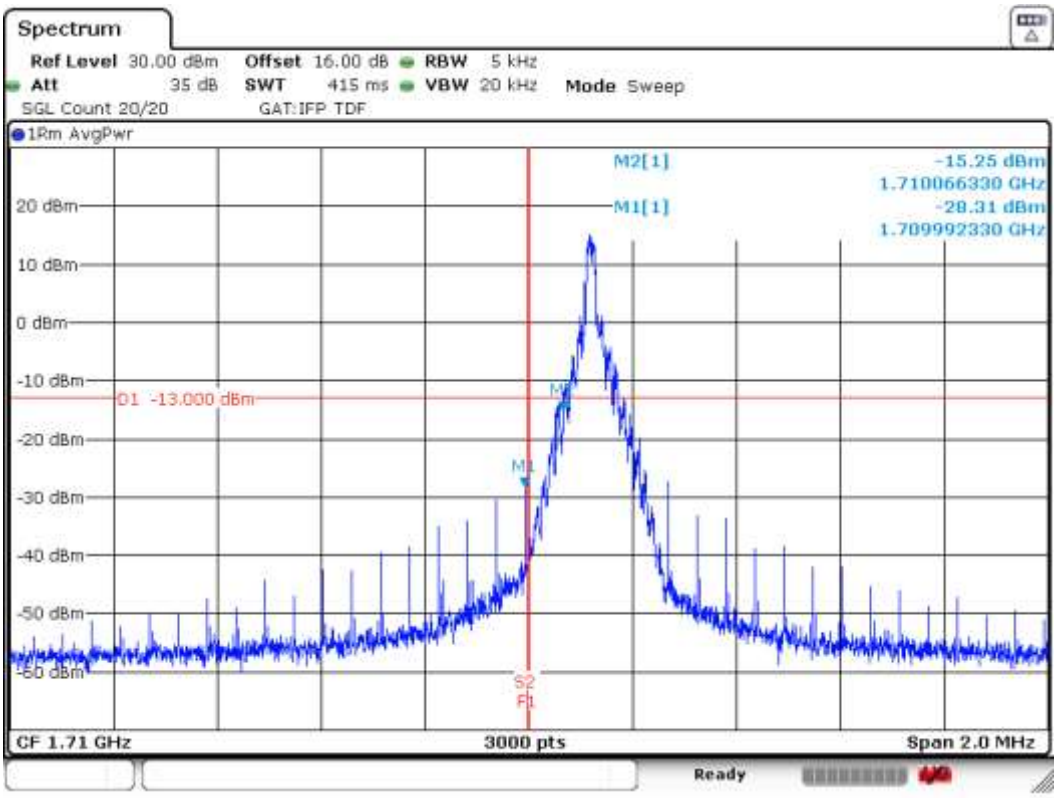



1 tone π/2 – BPSK. BW=3.75 kHz Offset = 47 CHANNEL HIGHEST

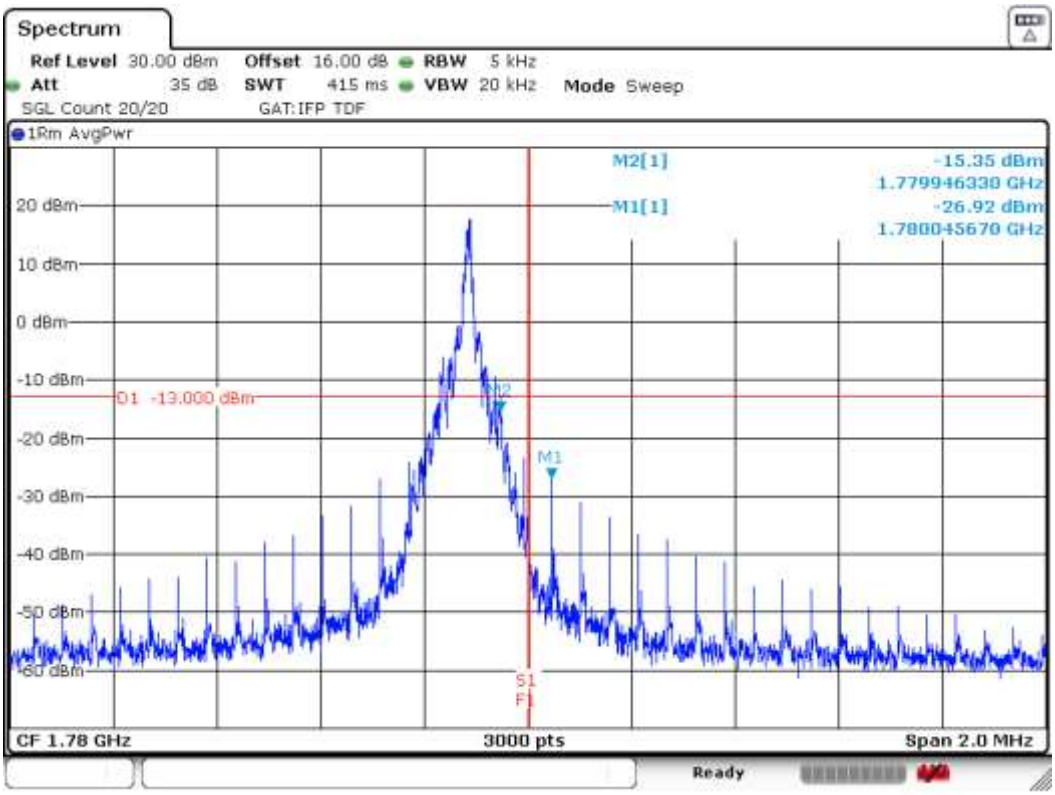


NBIoT. BAND 66.

1 tone π/2 – BPSK. BW=15 kHz Offset = 0 CHANNEL LOWEST

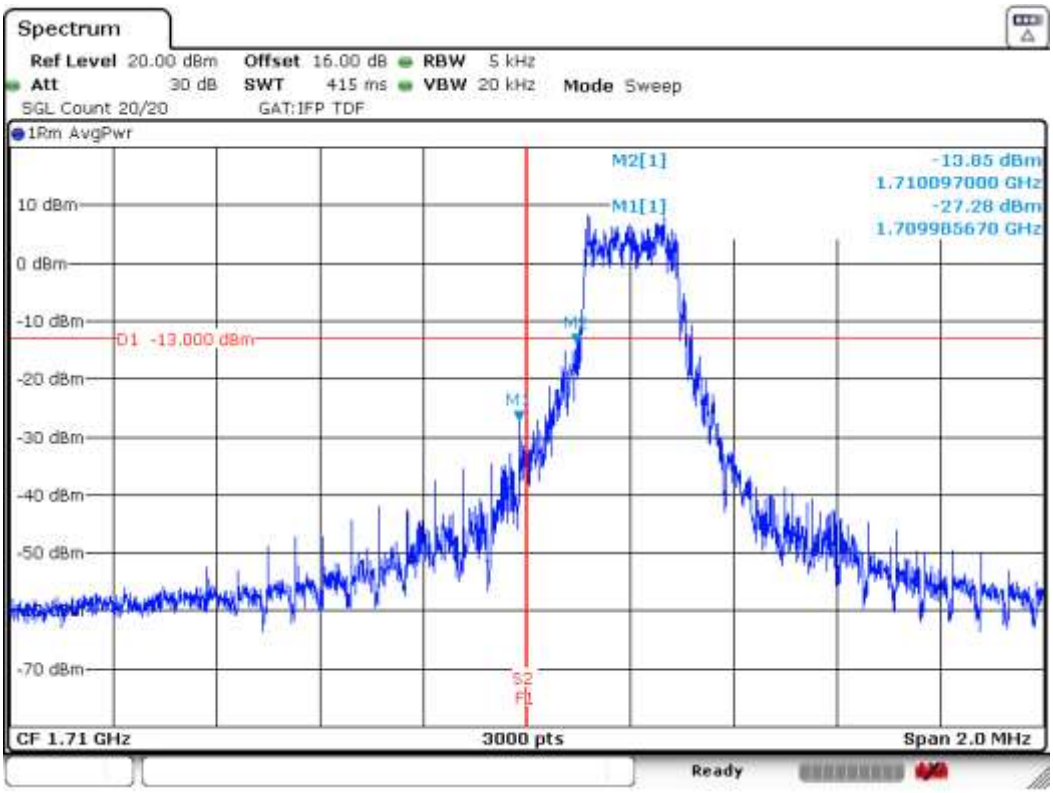



1 tone π/2 – BPSK. BW=15 kHz Offset = 11 CHANNEL HIGHEST

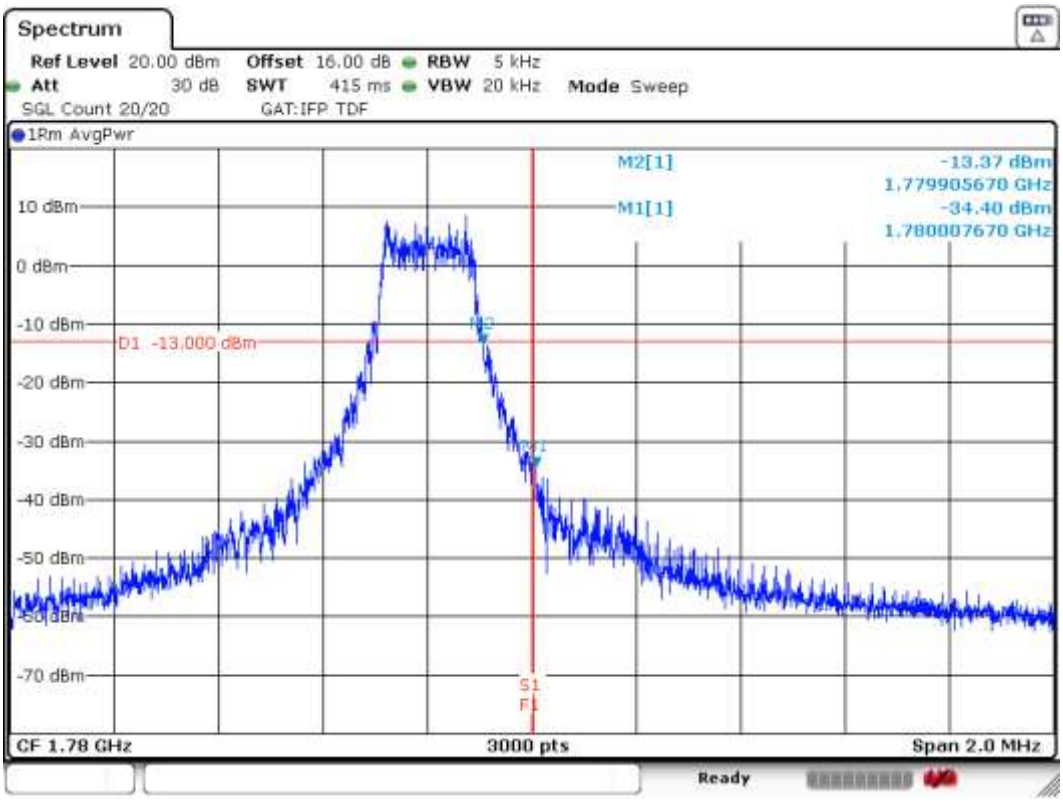


NBIoT. BAND 66.

15 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL LOWEST

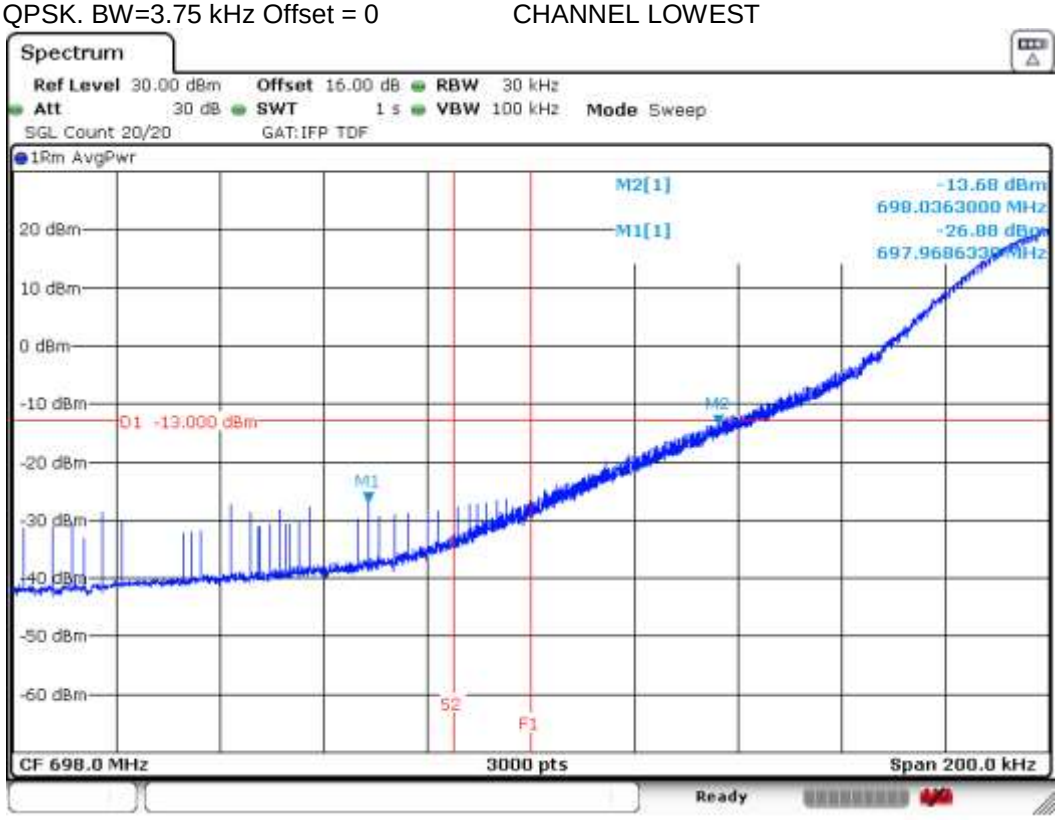



15 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL HIGHEST



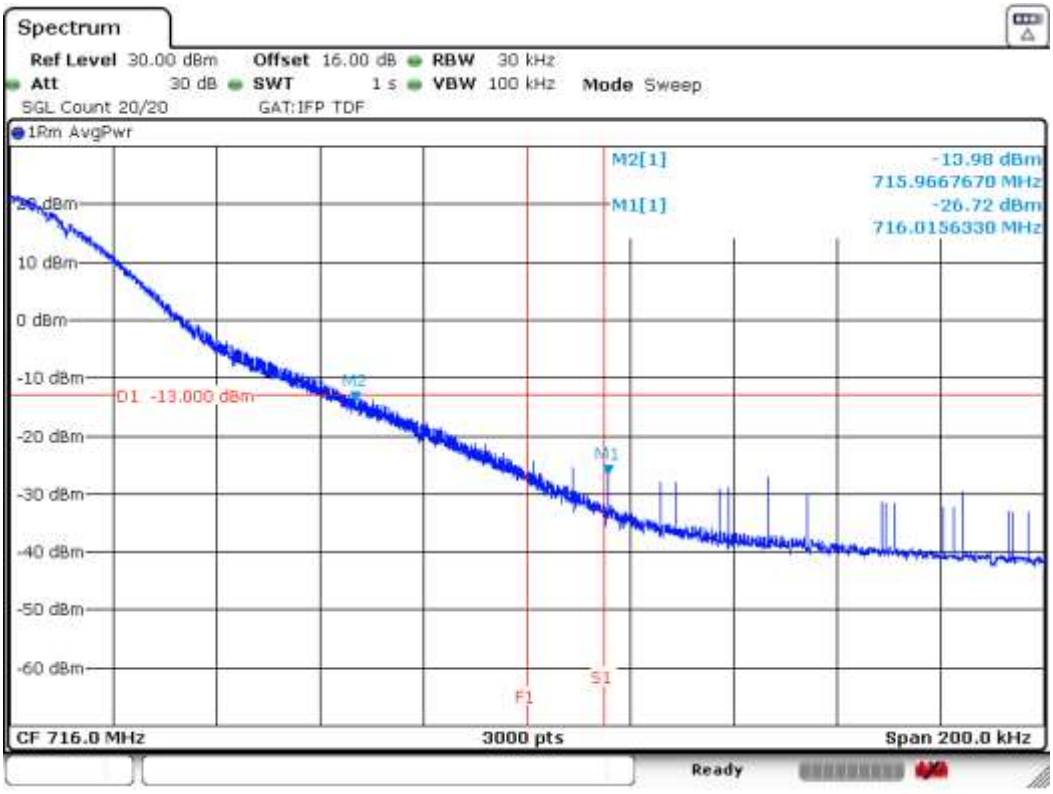
NBIoT. BAND 85.

1 tone π/4 – QPSK. BW=3.75 kHz Offset = 0 CHANNEL LOWEST




NOTE: Zoom (100KHz) with RBW=30KHz.

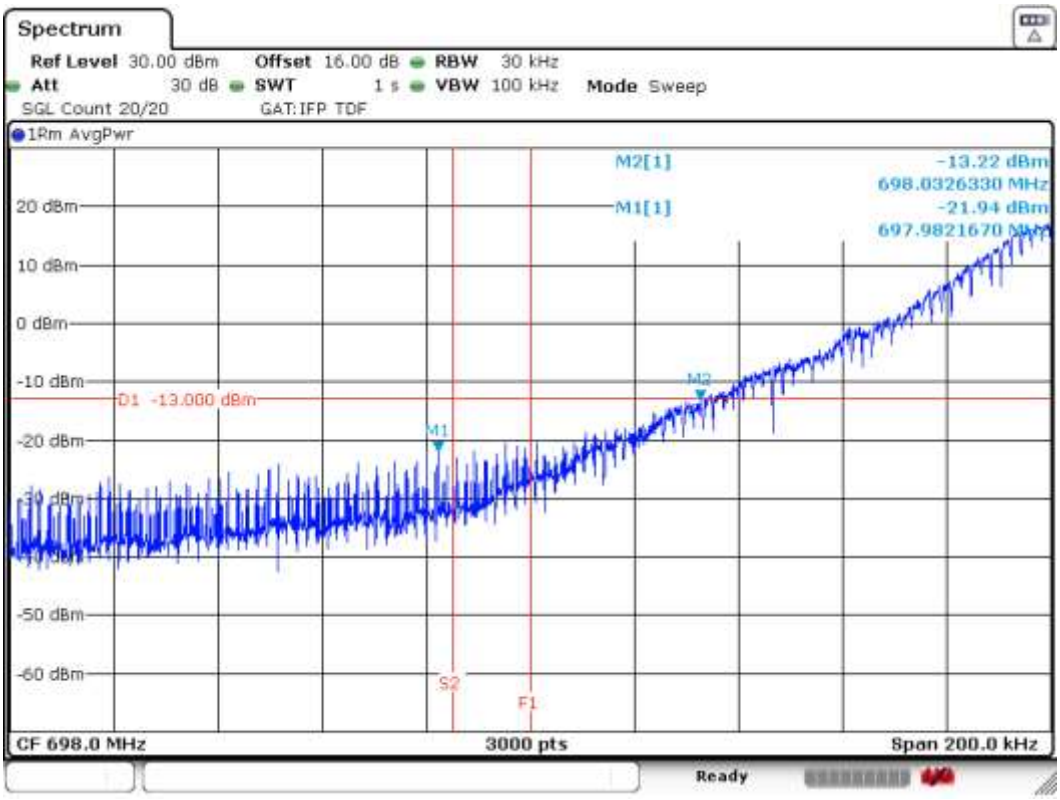
1 tone π/4 – QPSK. BW=3.75 kHz Offset = 47 CHANNEL HIGHEST




NOTE: Zoom (100KHz) with RBW=30KHz.

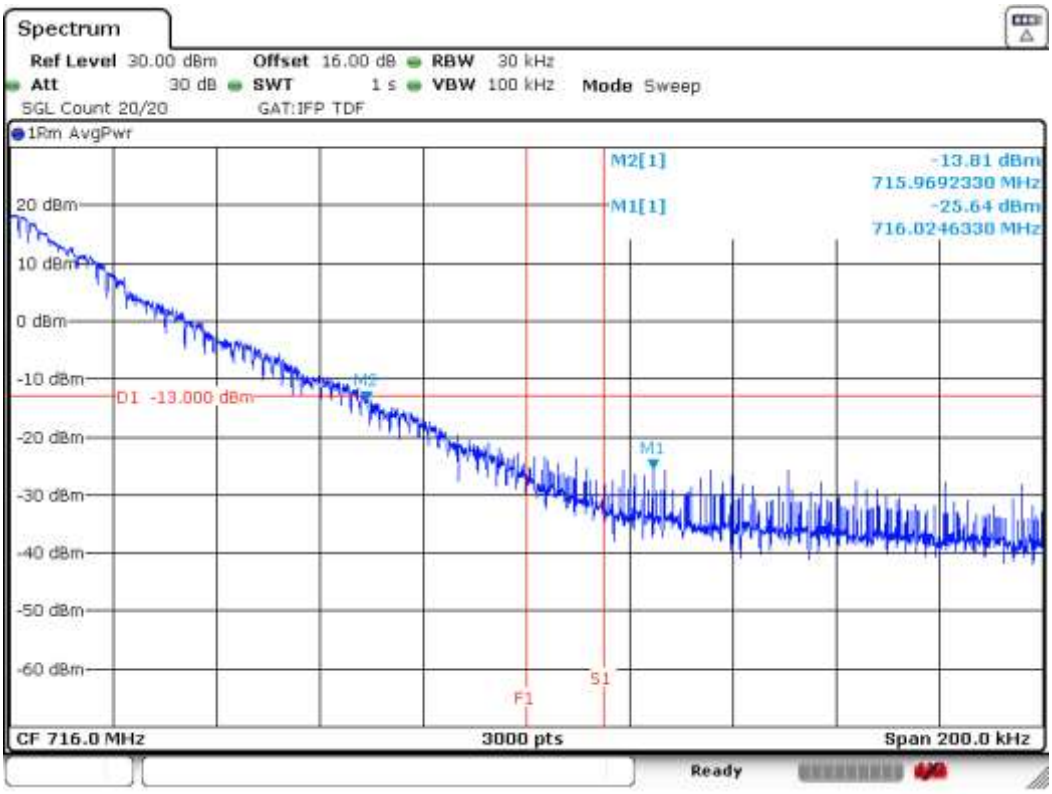
NBIoT. BAND 85.

1 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL LOWEST




NOTE: Zoom (100KHz) with RBW=30KHz.

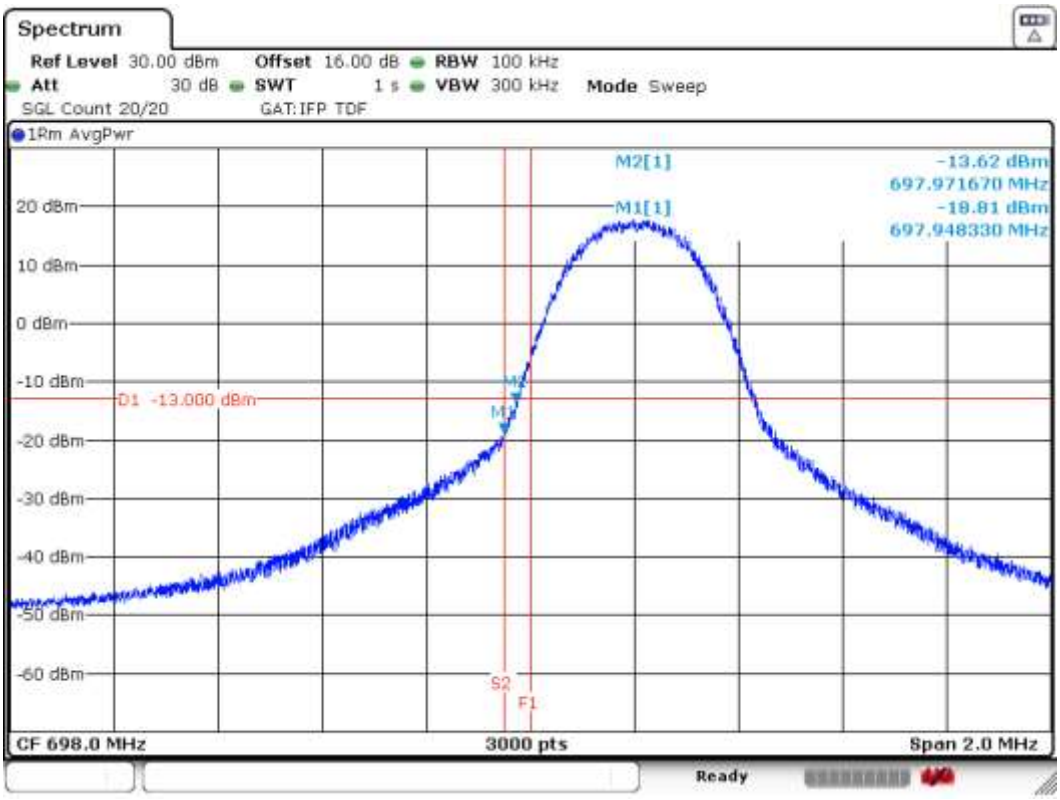
1 tone π/4 – QPSK. BW=15 kHz Offset = 11 CHANNEL HIGHEST



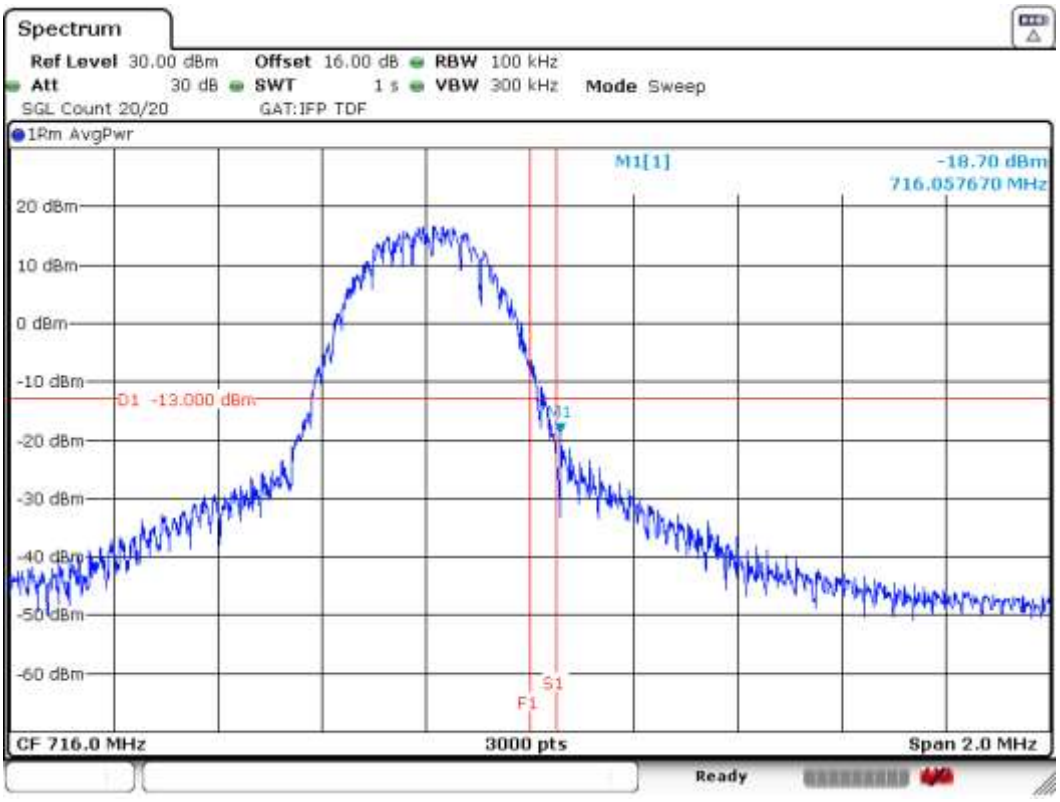

NOTE: Zoom (100KHz) with RBW=30KHz.

NBIoT. BAND 85.

12 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL LOWEST




12 tone π/4 – QPSK. BW=15 kHz Offset = 0 CHANNEL HIGHEST



# Radiated emissions

## SPECIFICATION

FCC §27.53 (g).

For operations in the 600 MHz band and the 698-746 MHz band. the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation. measured in watts. by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However. in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block. a resolution bandwidth of at least 30 kHz may be employed

FCC §27.53 (c) & (f).
On any frequency outside the 776-788 MHz band. the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

On all frequencies between 763-775 MHz and 793-805 MHz. by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment. for mobile and portable stations.

For operations in the 746-758 MHz. 775-788 MHz. and 805-806 MHz bands. emissions in the band 1559-1610 MHz shall be limited to −70 dBW (-40 dBm)/MHz equivalent isotropically radiated power (EIRP) for wideband signals. and −80 dBW (-50 dBm) EIRP for discrete emissions of less than 700 Hz bandwidth.

RSS-130 Clause 4.7.
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power. P (dBW). by at least 65 + 10 log10 p(watts). dB. for mobile and portable equipment.

The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW (-40 dBm) /MHz for wideband signal and -80 dBW (-50 dBm) for discrete emission with bandwidth less than 700 Hz.

FCC §27.53 (h). RSS-139 Clause 6.6.
According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

At Po transmitting power. the specified minimum attenuation becomes 43+10 log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm.

## METHOD

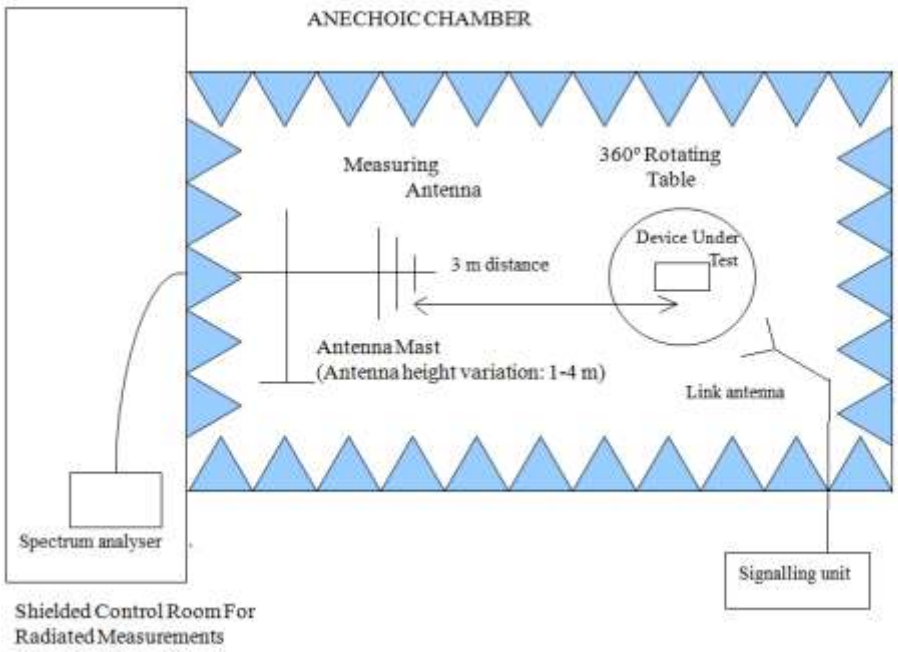
The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.
The EUT was placed on a non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum field strength (dBµV/m) is measured and recorded.

The maximum field strength (dBµV/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

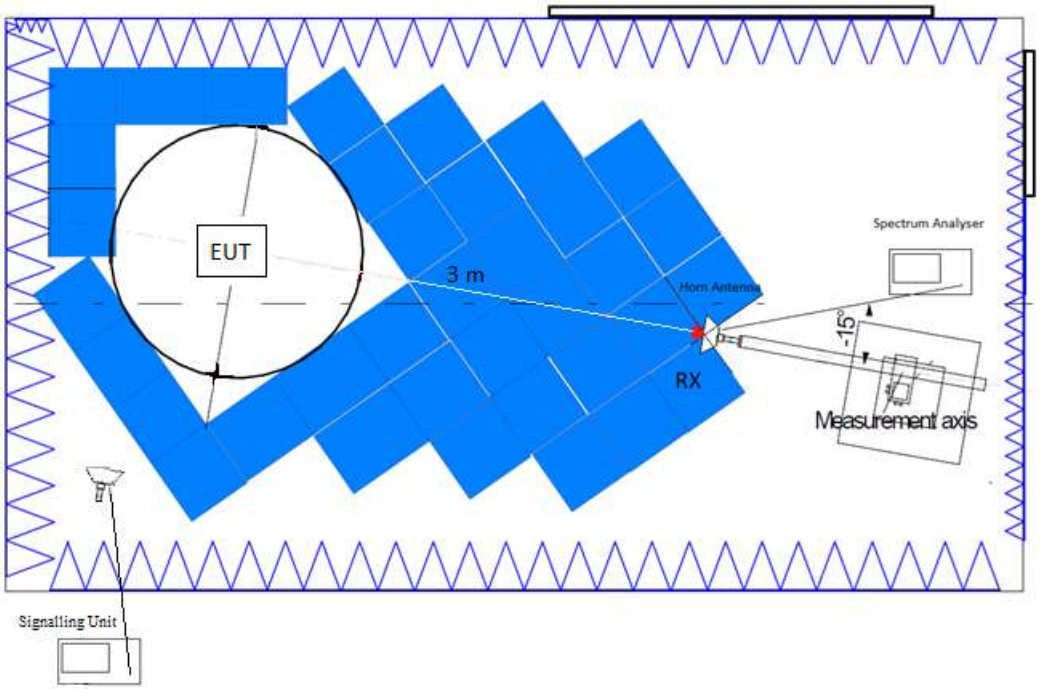
EIRP (dBm) = E (dBµV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m. D = 3 m

TEST SETUP

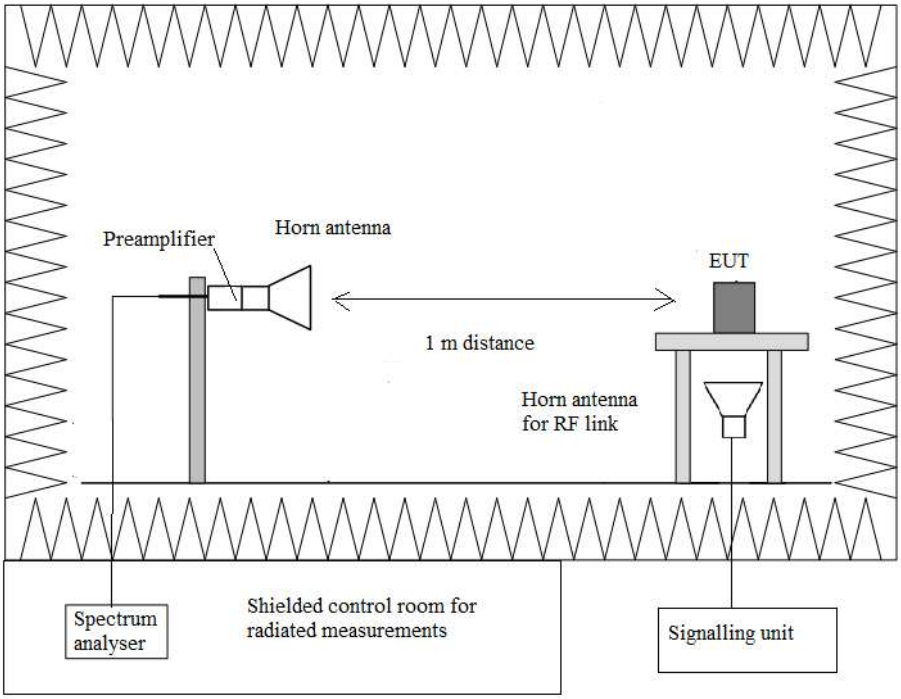
Radiated measurements below 1 GHz.




Radiated measurements above 1 GHz.



Radiated measurements above 18 GHz.



RESULTS

NBIoT. BAND 13.

Preliminary measurements determined that 1 tone of 15kHz (π/4 – QPSK) as the worst case. The results in the next tables shows the results for this configuration.

1. CHANNEL: LOWEST

**Frequency range 30 MHz-1000 MHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

**Frequency range 1 GHz-8 GHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

**Frequency range 1559 MHz-1610 MHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE

**Frequency range 30 MHz-1000 MHz**.

No radiated spurious signals were detected.

**Frequency range 1 GHz-8 GHz**.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

**Frequency range 1559 MHz-1610 MHz**.

| Spurious frequency (MHz) | Detector | E.I.R.P. (dBm) | Polarization |
|---|---|---|---|
| 1563.88357 | RMS | -50.97 | V |

3. CHANNEL: HIGHEST

**Frequency range 30 MHz-1000 MHz**.

No radiated spurious signals were detected.

**Frequency range 1 GHz-8 GHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

**Frequency range 1559 MHz-1610 MHz**.

| Spurious frequency (MHz) | Detector | E.I.R.P. (dBm) | Polarization |
|---|---|---|---|
| 1573.4288 | RMS | -51.15 | V |

| | |
|---|---|
| Measurement uncertainty (dB) | <±4.65 for f < 1GHz<br><±4.98 for f ≥ 1 GHz up to 8 GHz |

Verdict: PASS

NBIoT. BAND 66.

Preliminary measurements determined that 1 tone of 3.75kHz as the worst case. The results in the next tables shows the results for this configuration.

1. CHANNEL: LOWEST
**Frequency range 30 MHz-1000 MHz.**

No radiated spurious signals were detected at less than 20 dB respect to the limit.

**Frequency range 1 GHz-18 GHz.**

No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE
**Frequency range 30 MHz-1000 MHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

**Frequency range 1 GHz-18 GHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

3. CHANNEL: HIGHEST
**Frequency range 30 MHz-1000 MHz.**

No radiated spurious signals were detected at less than 20 dB respect to the limit.

**Frequency range 1 GHz-18 GHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

| | |
|---|---|
| Measurement uncertainty (dB) | <±4.65 for f < 1GHz<br><±3.98 for f ≥ 1 GHz up to 3 GHz<br><±4.98 for f ≥ 3 GHz up to 18 GHz |

Verdict: PASS

NBIoT. BAND 85.

Preliminary measurements determined that 1 tone of 15kHz (π/4 – QPSK) as the worst case. The results in the next tables shows the results for this configuration.

1. CHANNEL: LOWEST

**Frequency range 30 MHz-1000 MHz**.

No radiated spurious signals were detected.

**Frequency range 1 GHz-8 GHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE

**Frequency range 30 MHz-1000 MHz**.

No radiated spurious signals were detected.

**Frequency range 1 GHz-8 GHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

3. CHANNEL: HIGHEST

**Frequency range 30 MHz-1000 MHz**.

No radiated spurious signals were detected.

**Frequency range 1 GHz-8 GHz**.

No radiated spurious signals were detected at less than 20 dB respect to the limit.

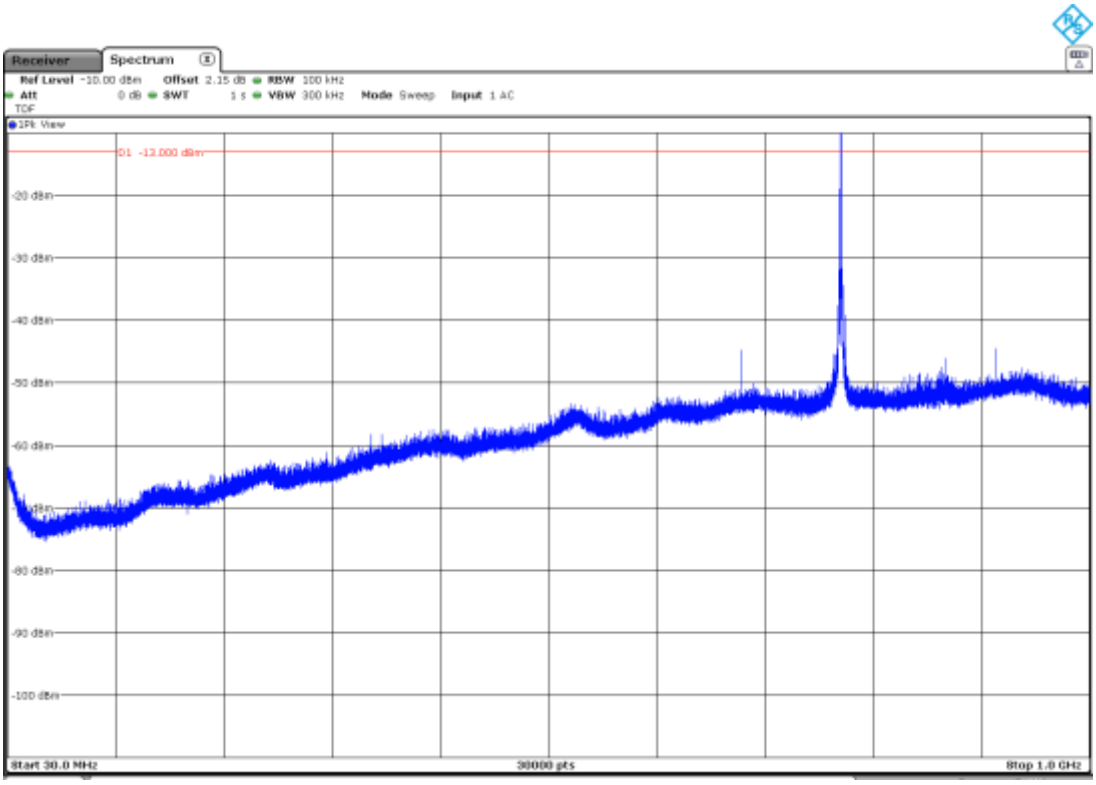
| | |
|---|---|
| Measurement uncertainty (dB) | <±4.65 for f < 1GHz<br><±4.98 for f ≥ 1 GHz up to 8 GHz |

Verdict: PASS

## NBIoT Band 13

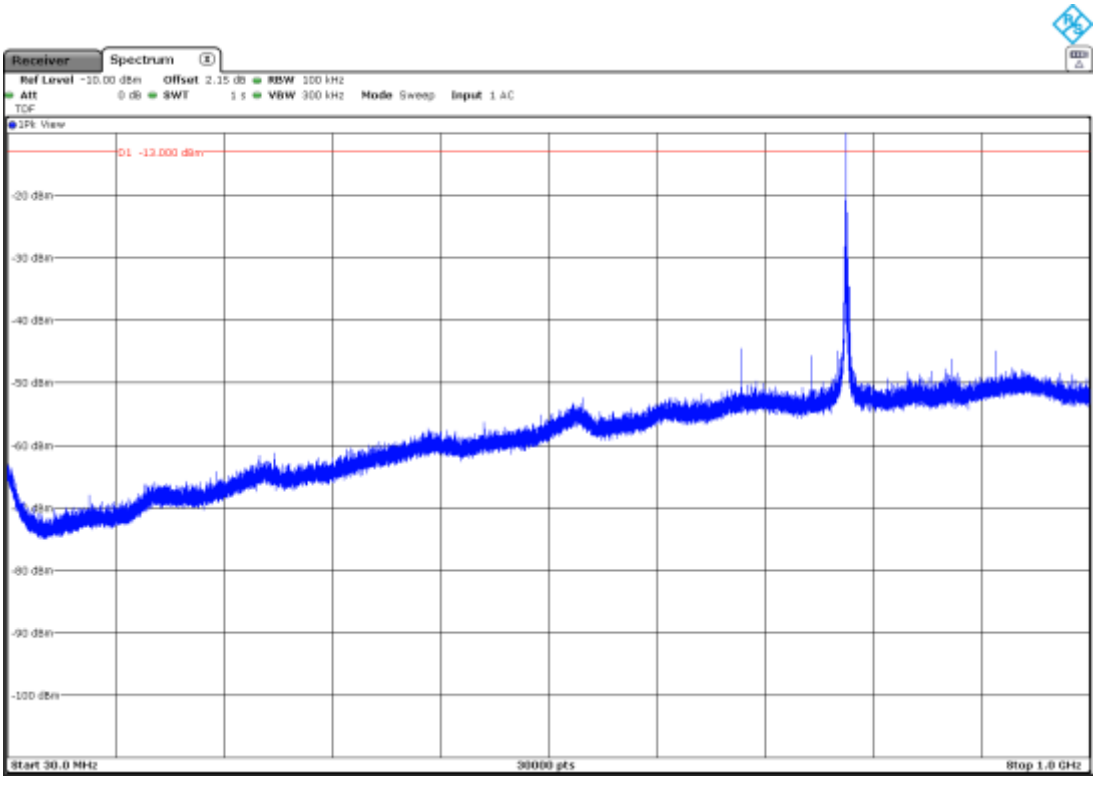
Frequency range 30 MHz to 1 GHz

CHANNEL: LOWEST



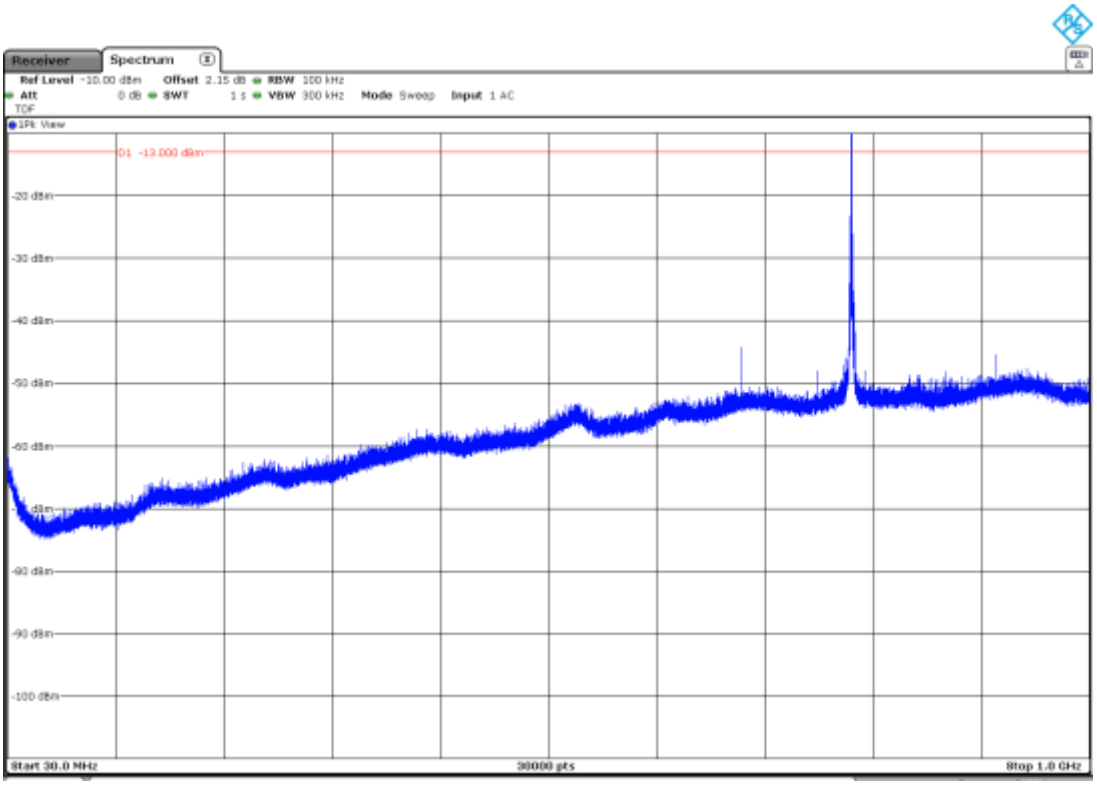

Note: The peak above the limit is the carrier frequency.

CHANNEL: MIDDLE




Note: The peak above the limit is the carrier frequency.

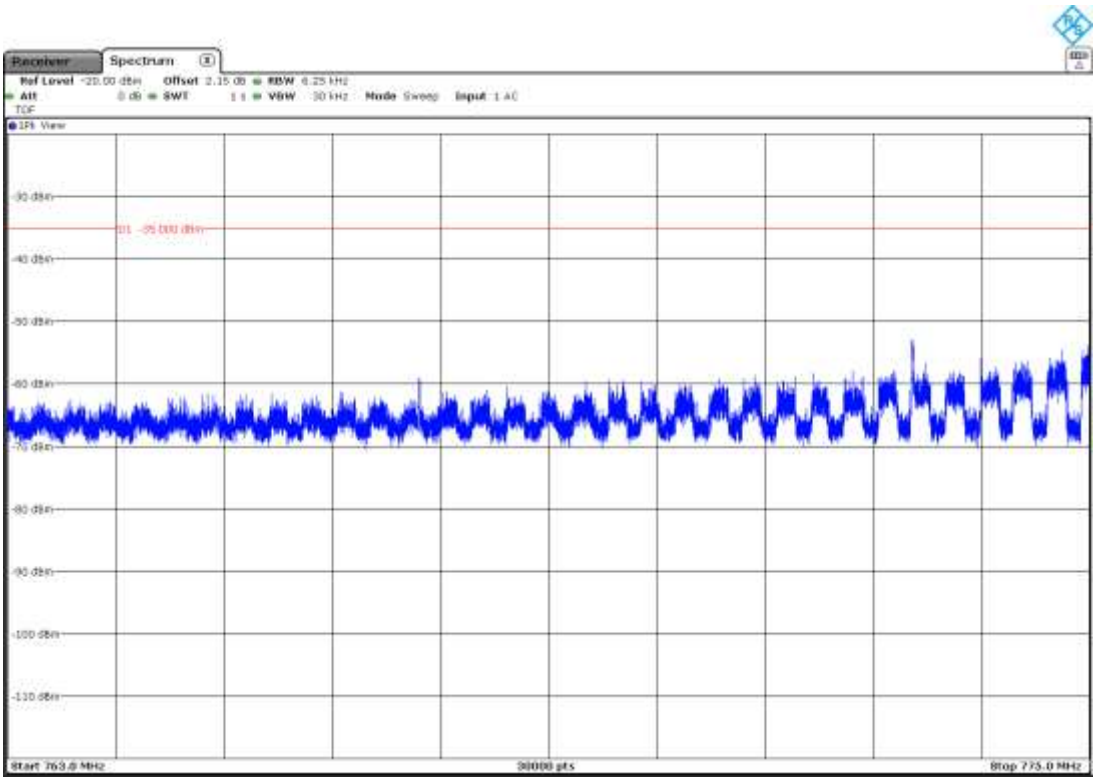
CHANNEL: HIGHEST



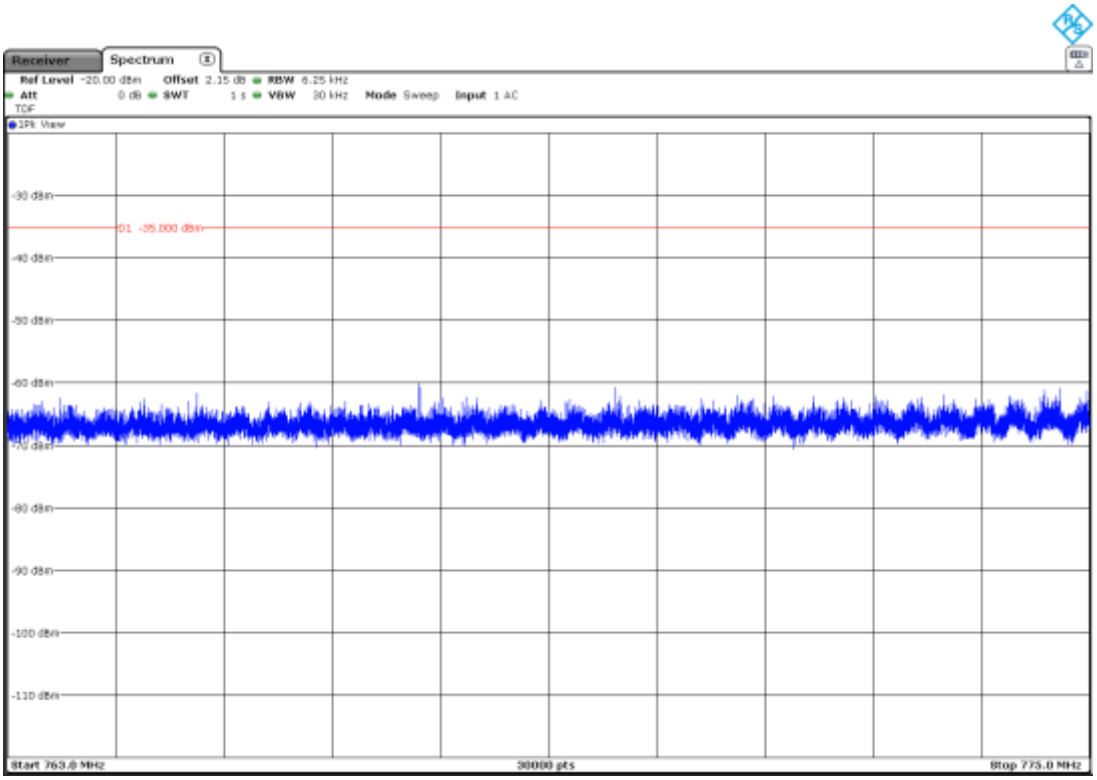

Note: The peak above the limit is the carrier frequency. The peak at 756MHz corresponds to the downlink signal.

FREQUENCY RANGE 763 - 775 MHz

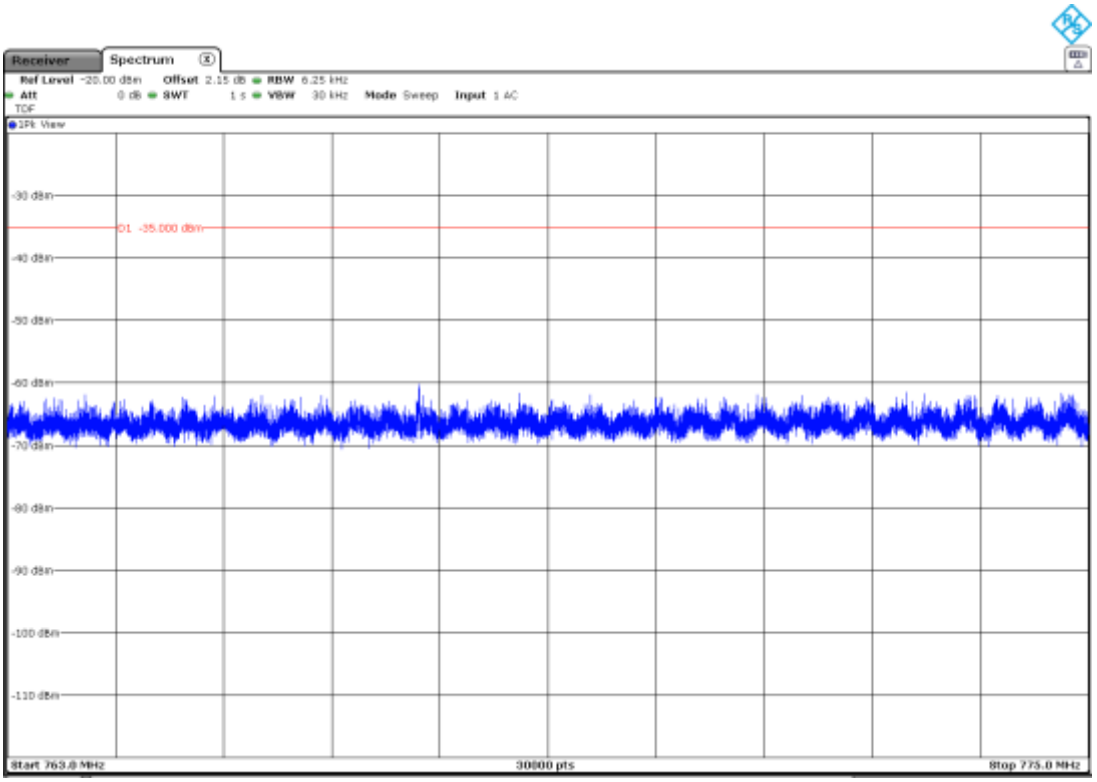
CHANNEL: LOWEST



CHANNEL: MIDDLE

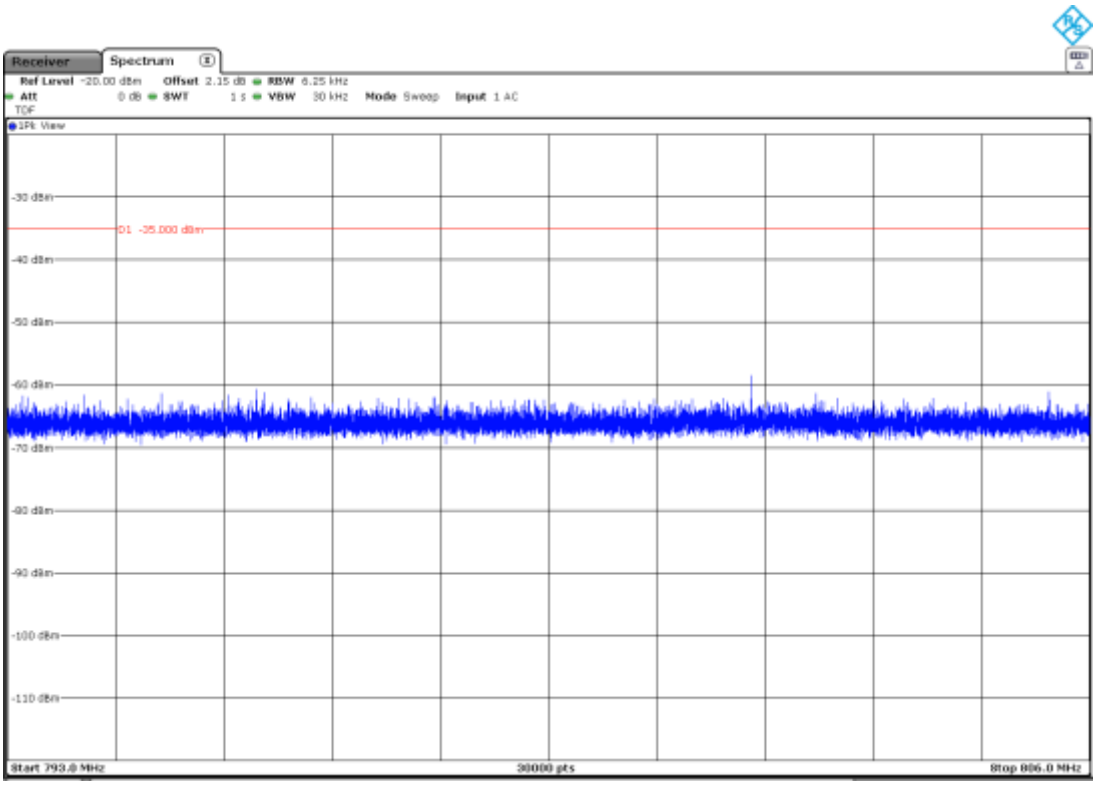



CHANNEL: HIGHEST

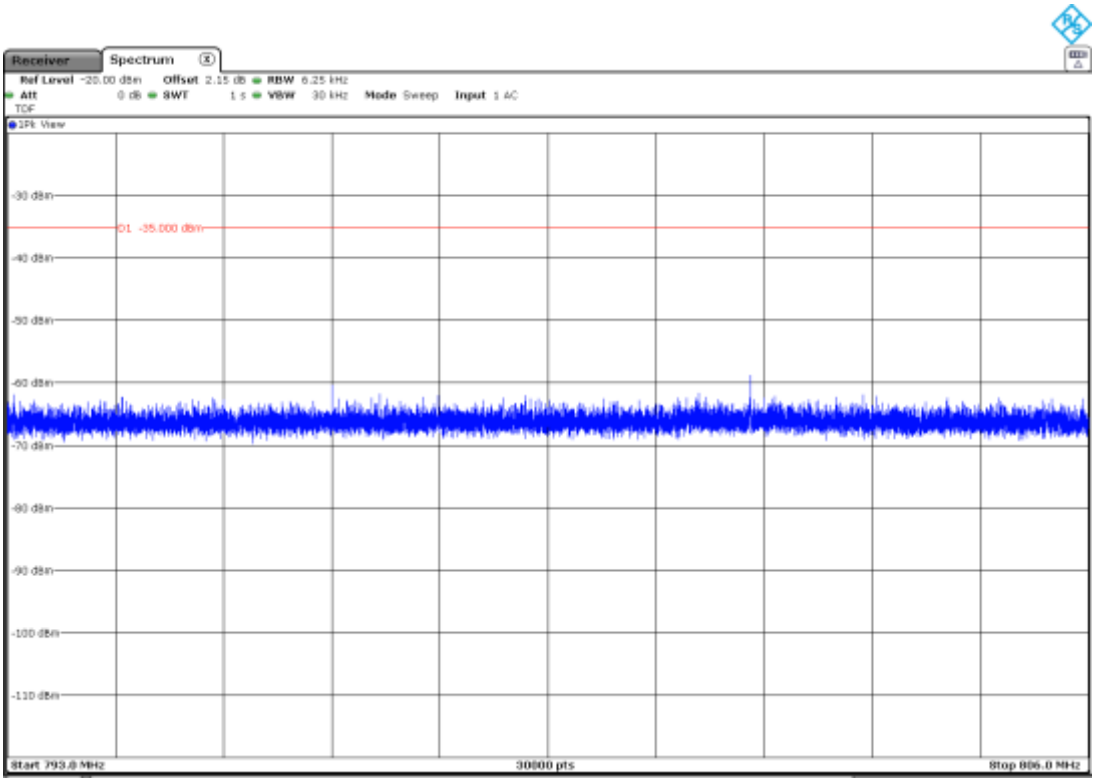


FREQUENCY RANGE 793 - 805 MHz

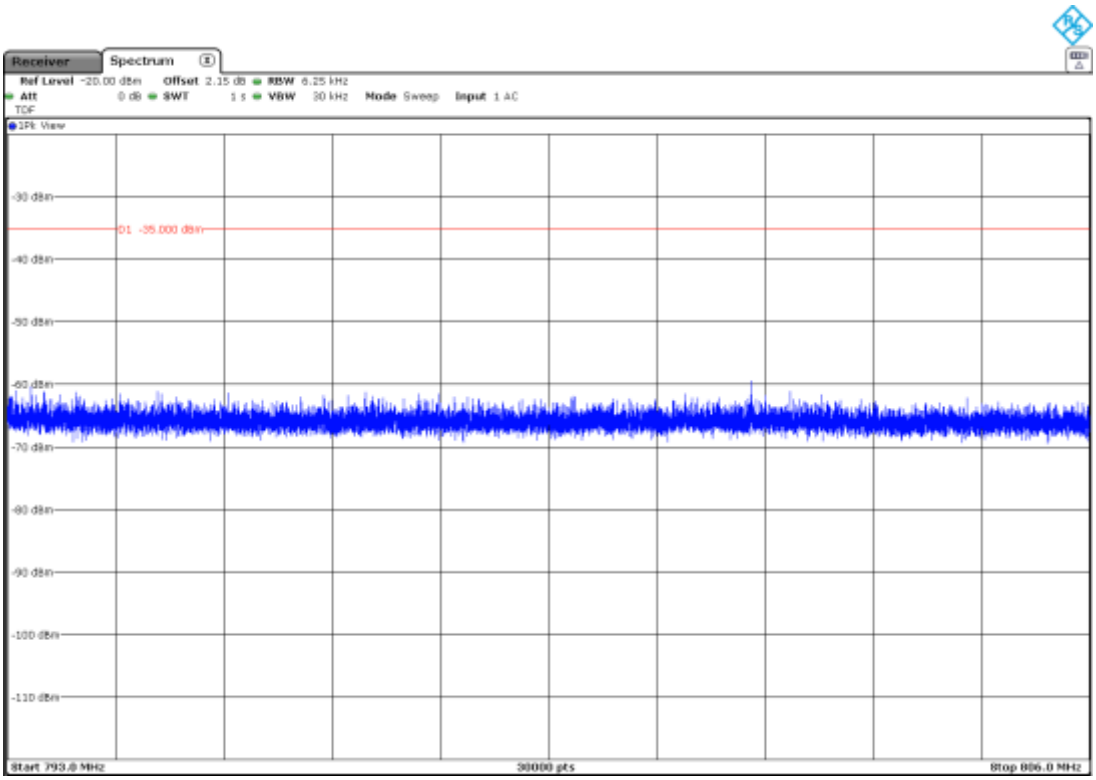
CHANNEL: LOWEST




CHANNEL: MIDDLE

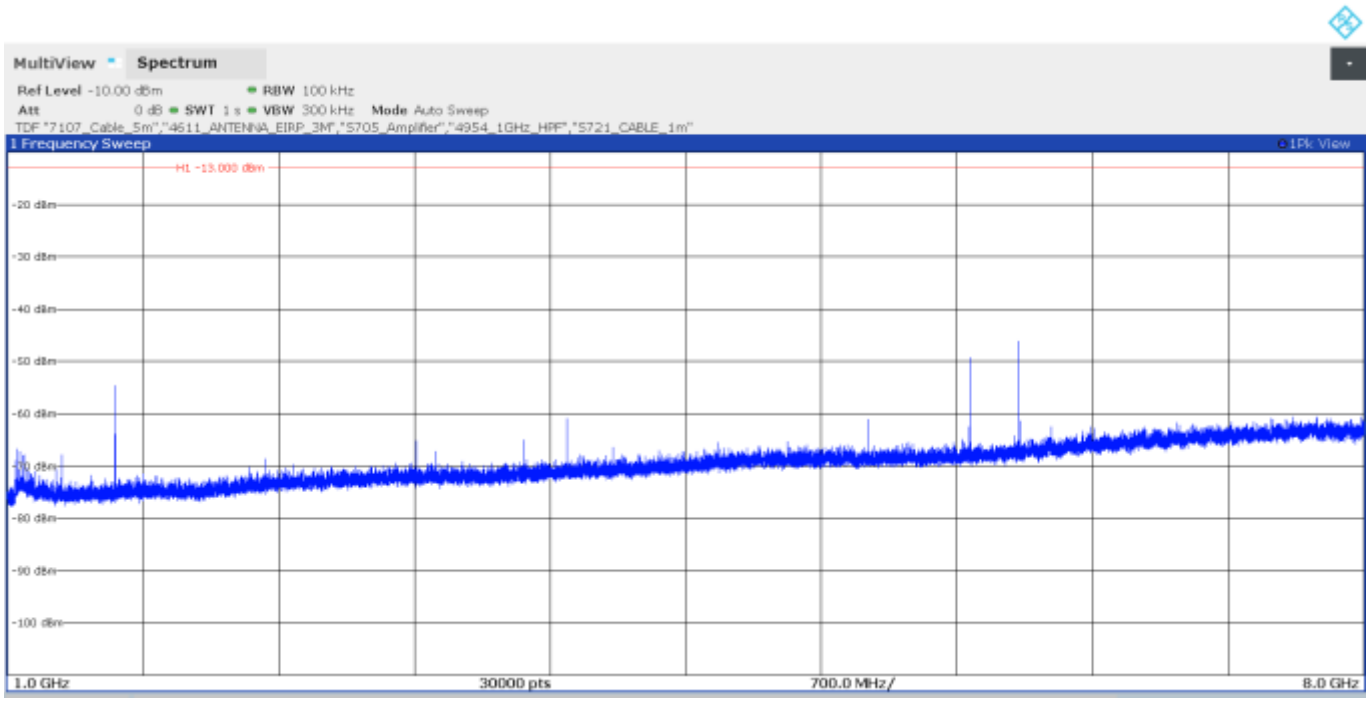


CHANNEL: HIGHEST

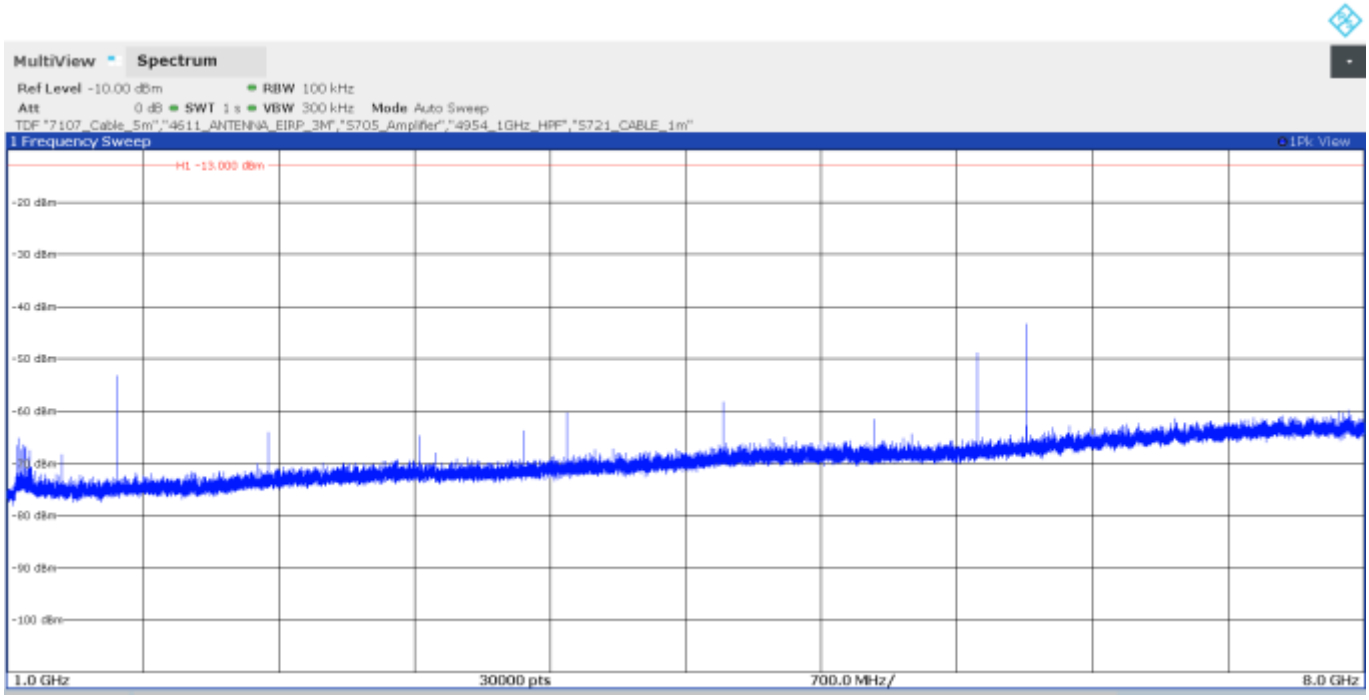



Frequency range 1 GHz to 8 GHz

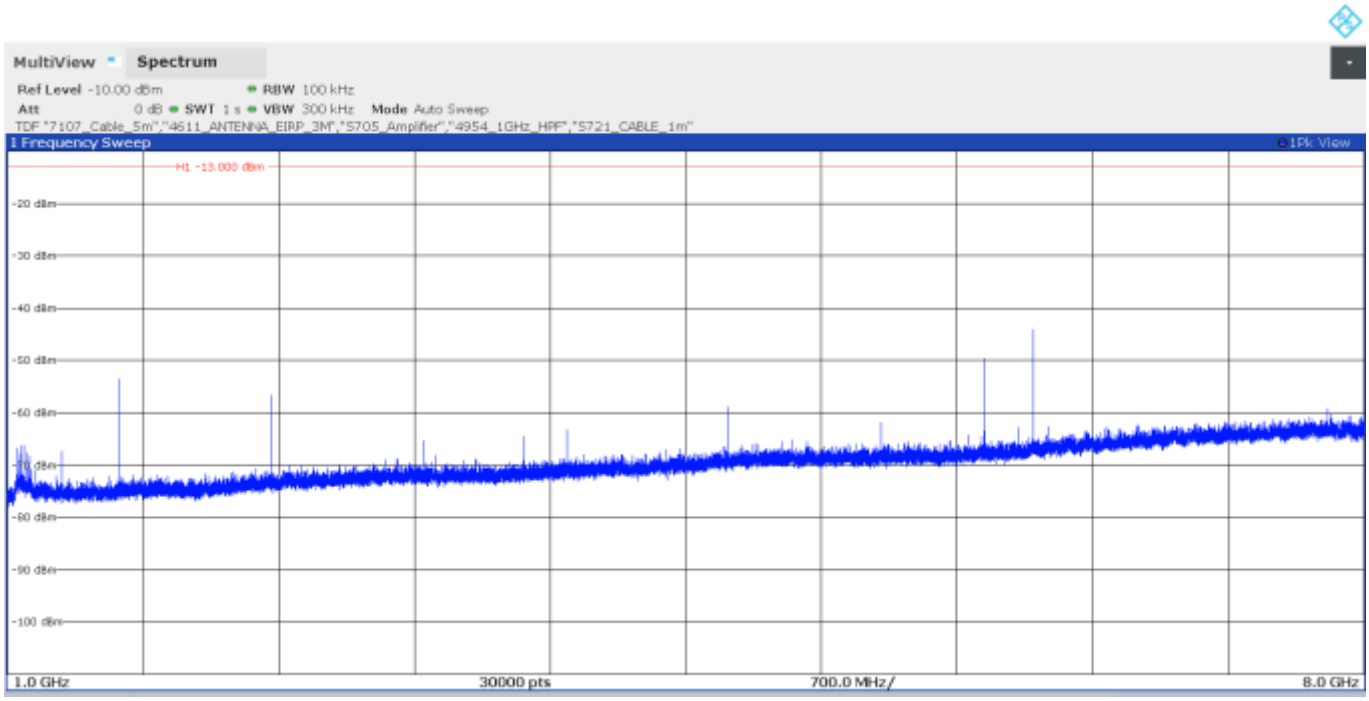
CHANNEL: LOWEST



## CHANNEL: MIDDLE

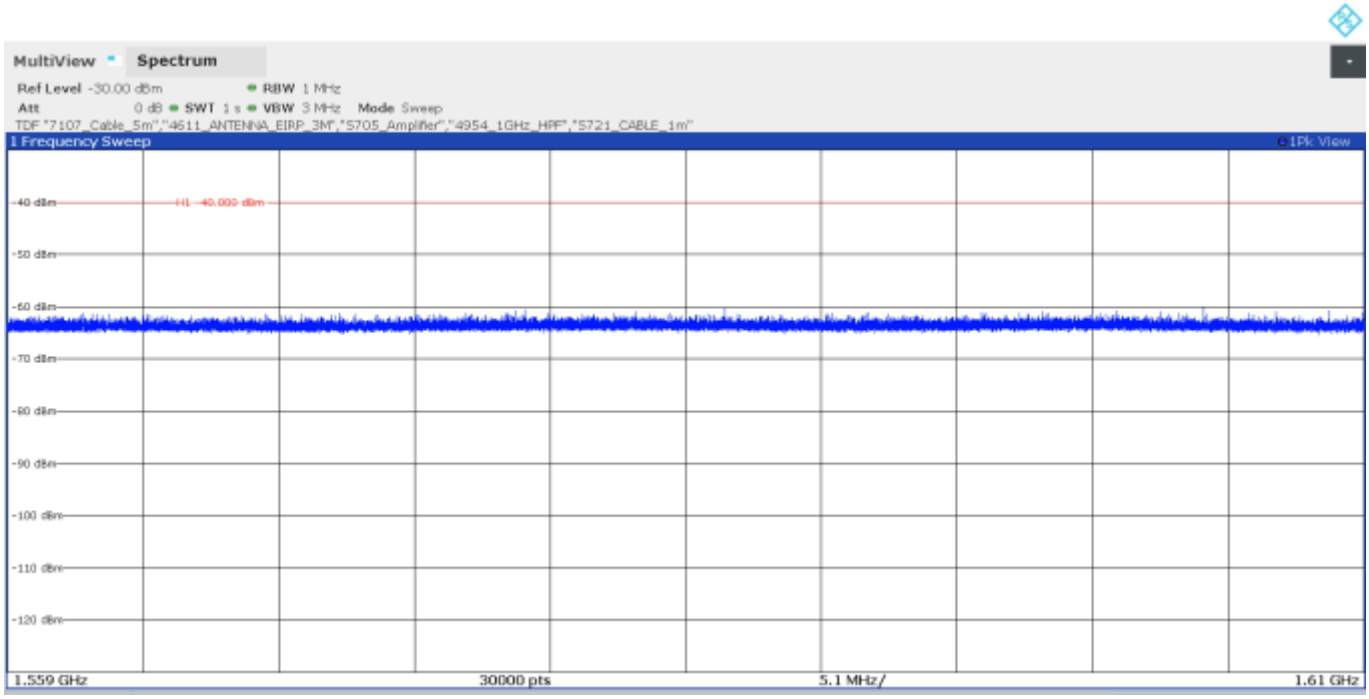



## CHANNEL: HIGHEST

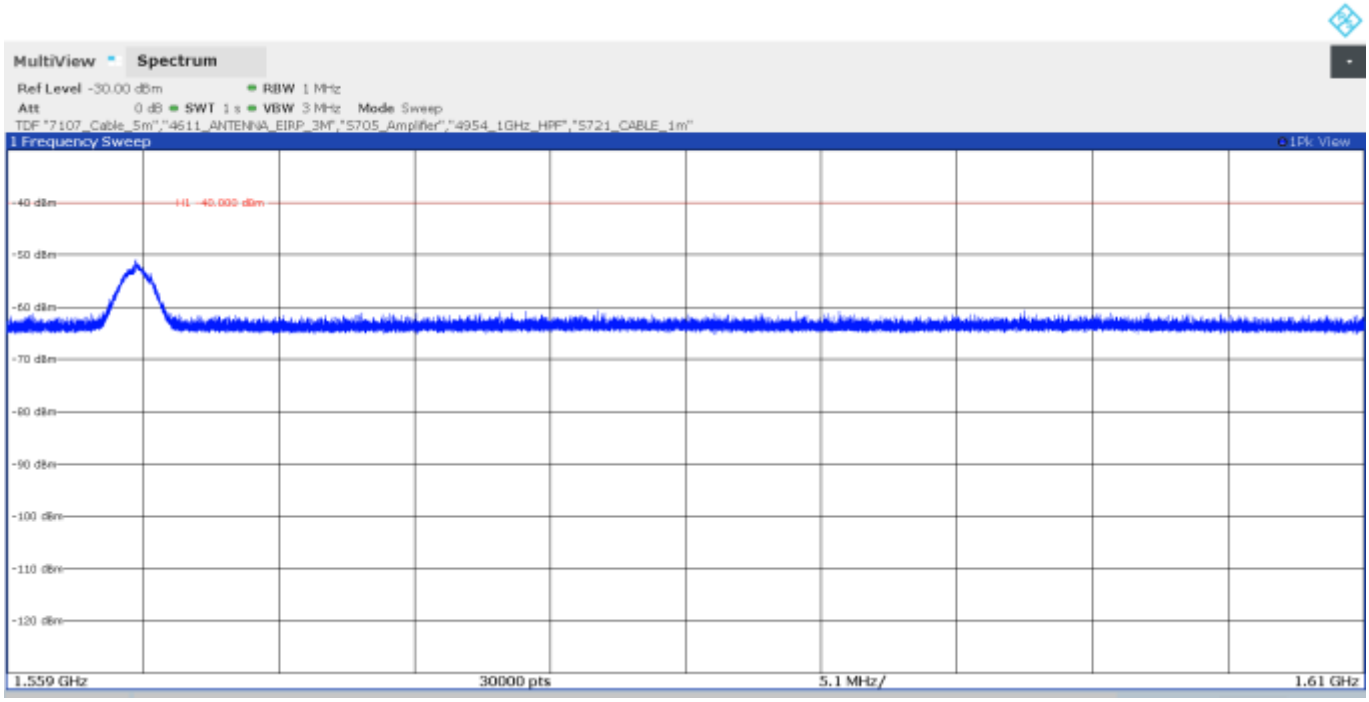


Frequency range 1559 MHz to 1610 MHz.

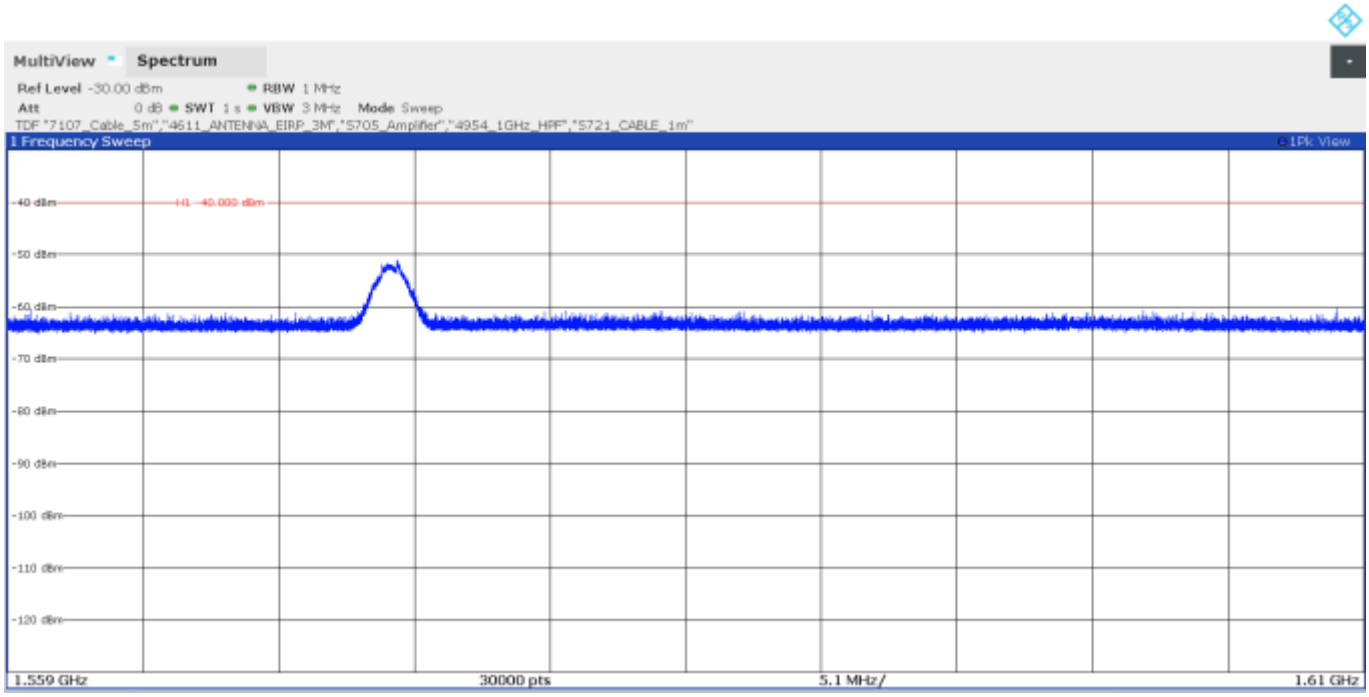
CHANNEL: LOWEST




CHANNEL: MIDDLE



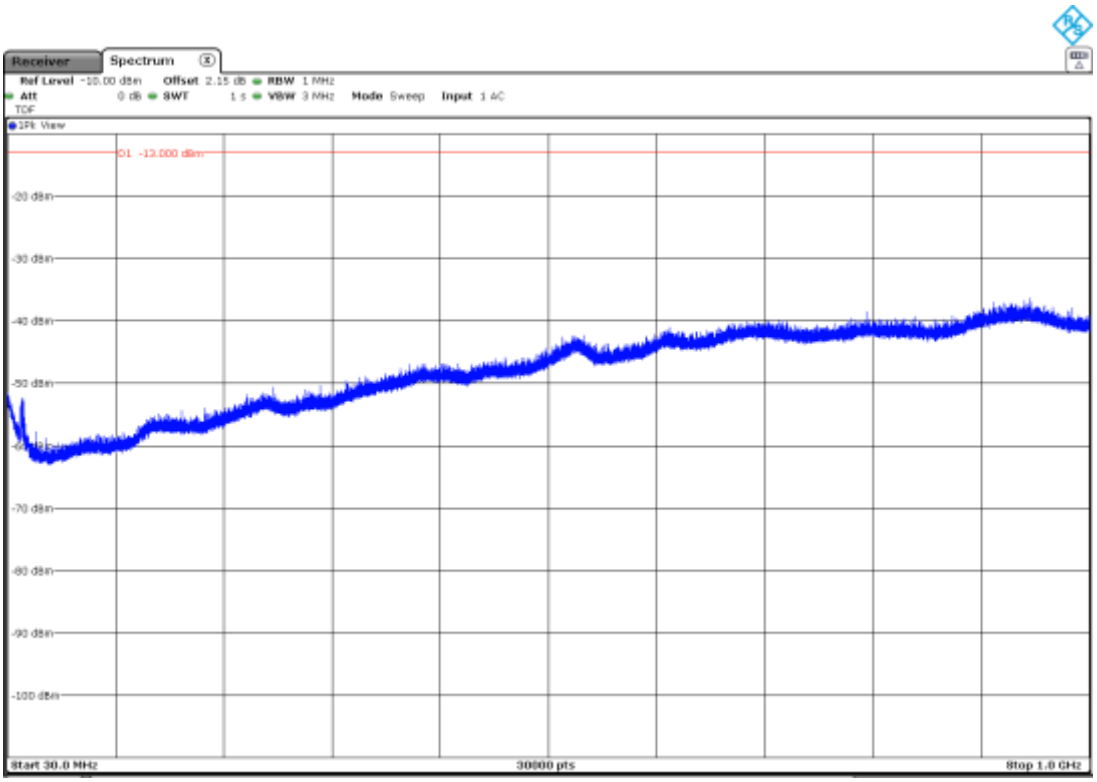
## CHANNEL: HIGHEST



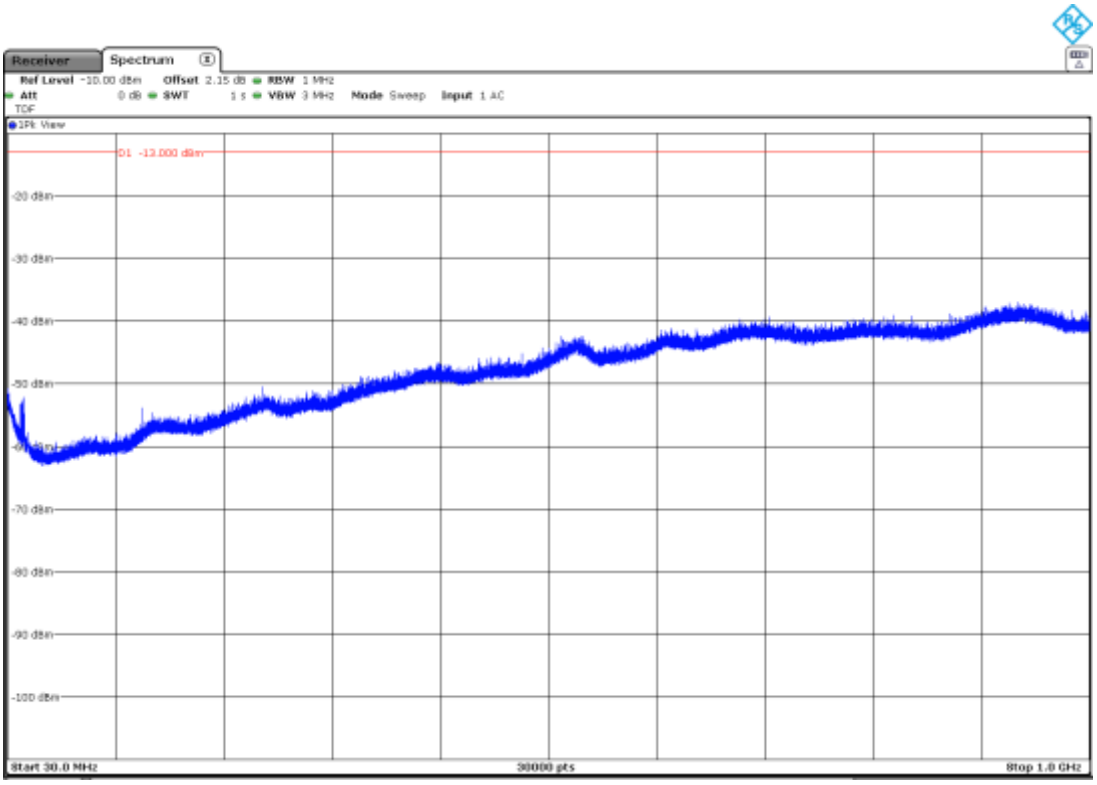
## NBIoT Band 66

Frequency range 30 MHz to 1 GHz

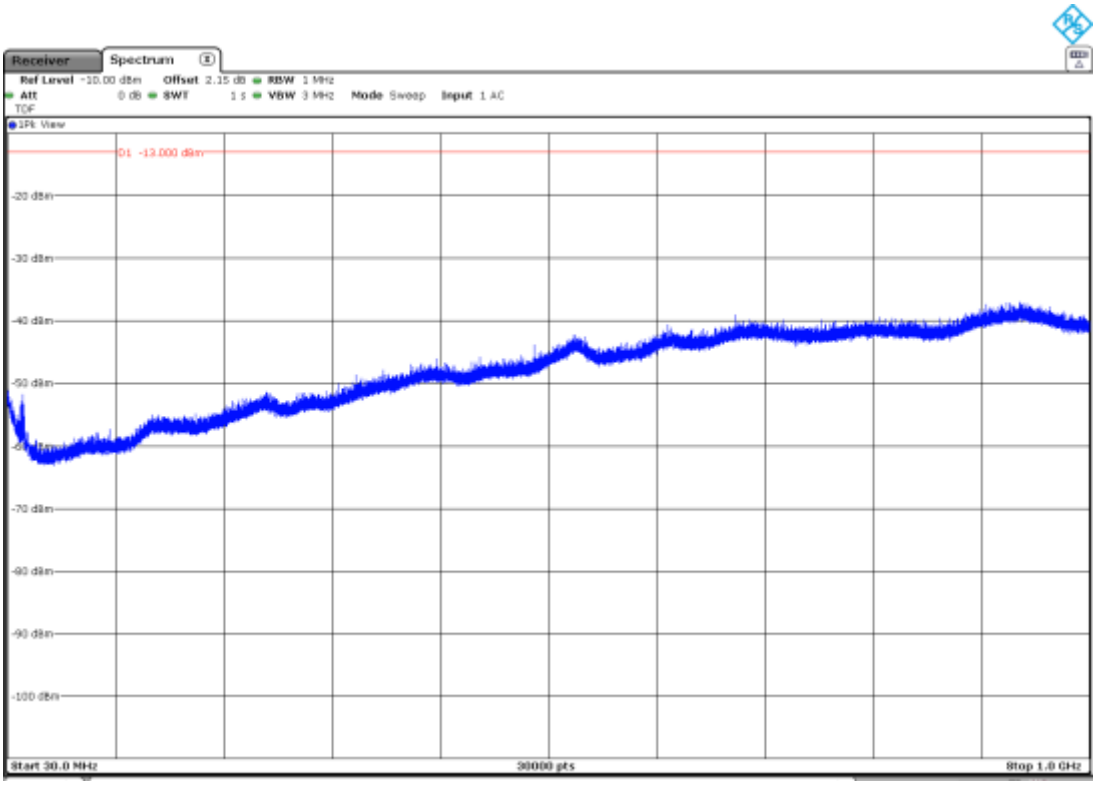
CHANNEL: LOWEST




CHANNEL: MIDDLE

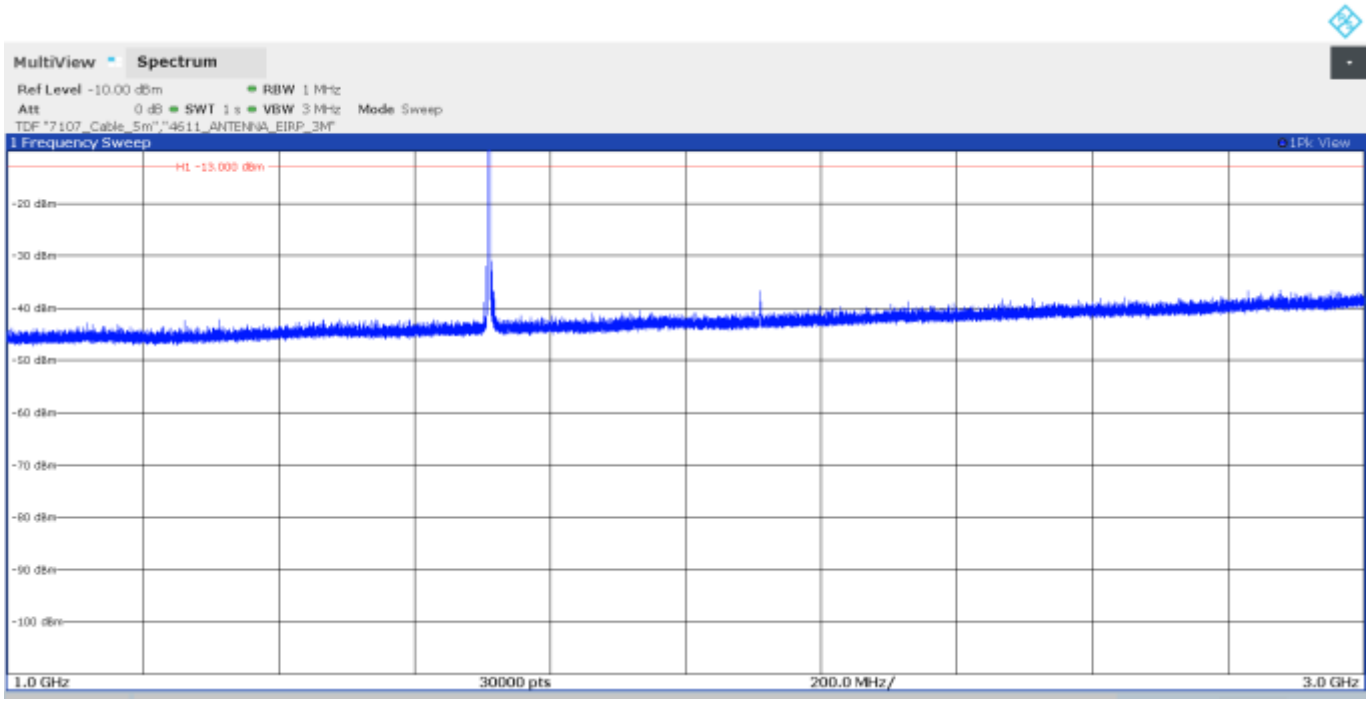


CHANNEL: HIGHEST



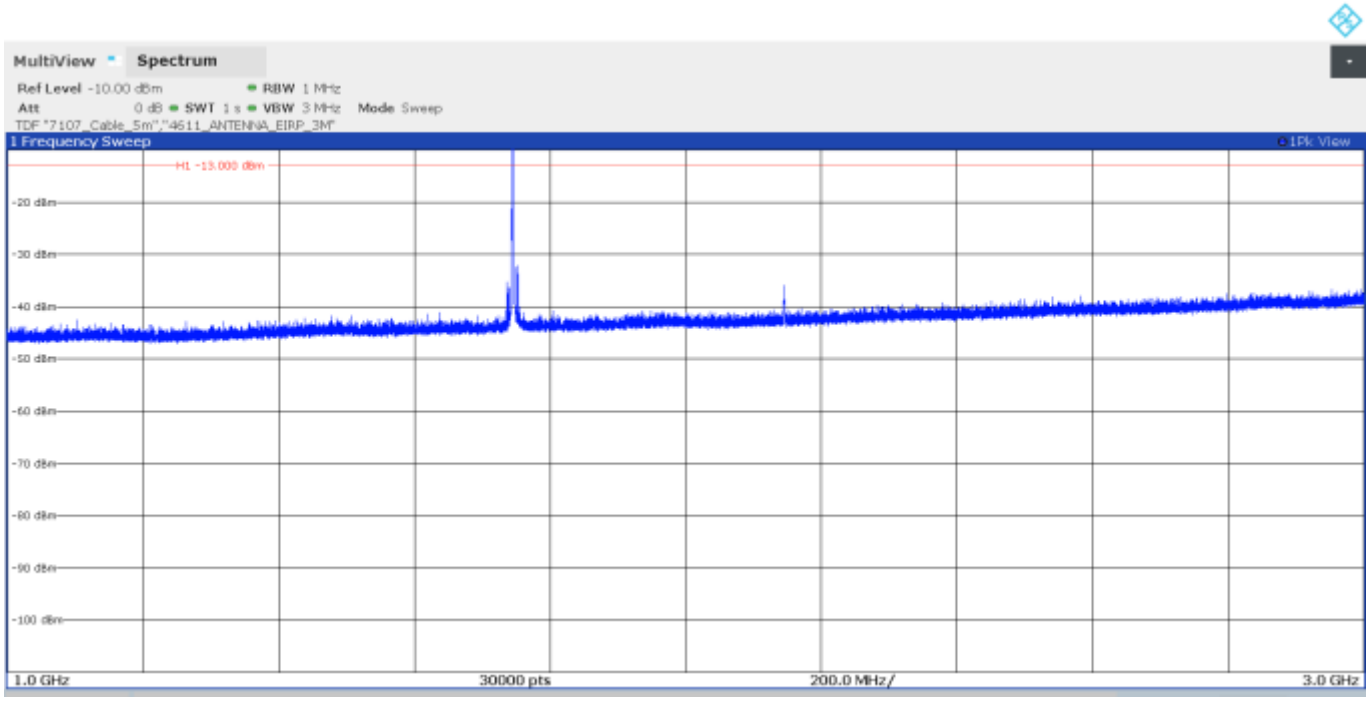

Frequency range 1 GHz to 3 GHz

CHANNEL: LOWEST



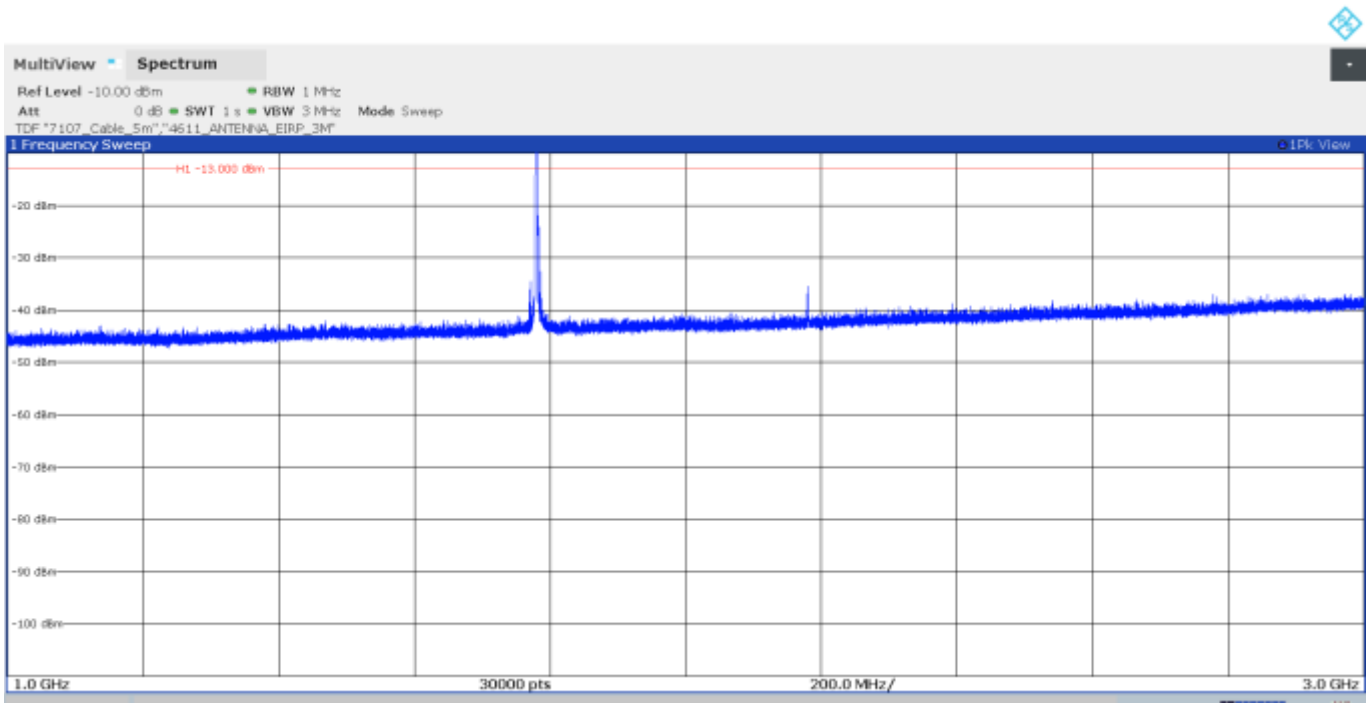

Note: The peak above the limit is the carrier frequency. The peak at 2110.2MHz corresponds to the downlink signal.

CHANNEL: MIDDLE




Note: The peak above the limit is the carrier frequency. The peak at 2145MHz corresponds to the downlink signal.

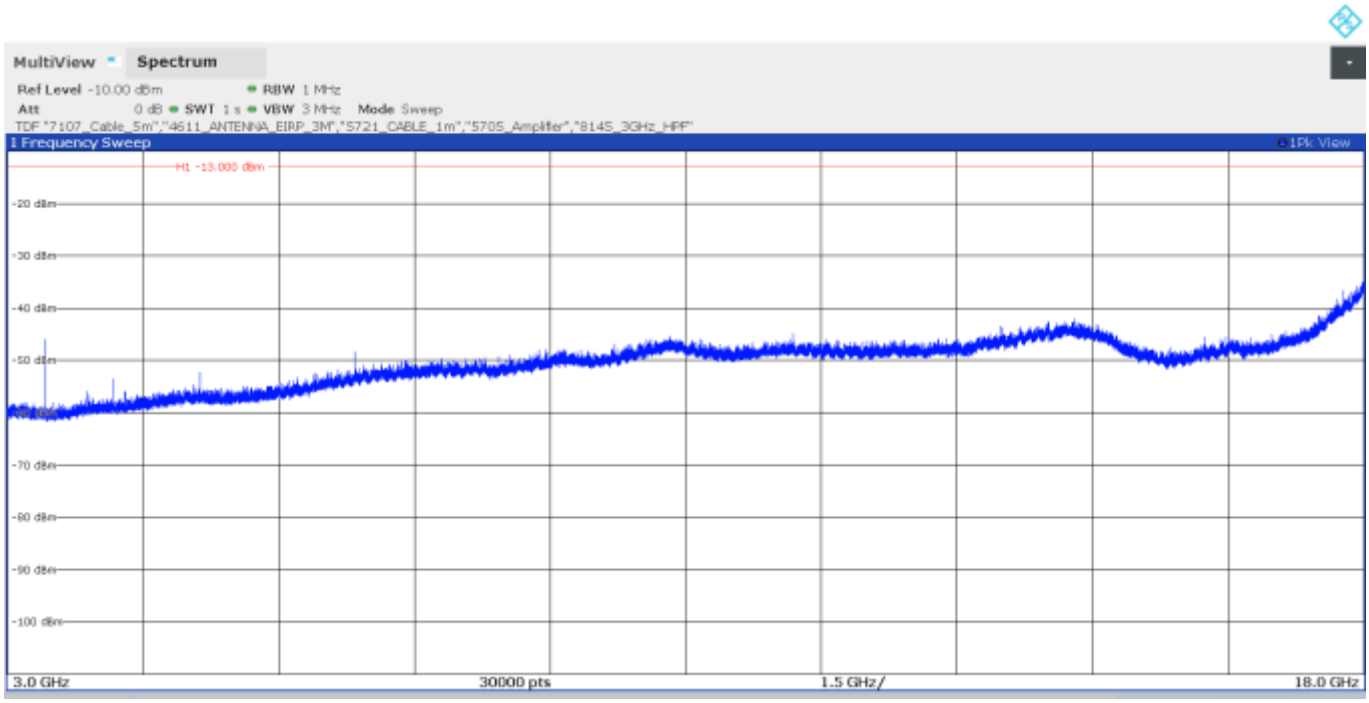
CHANNEL: HIGHEST



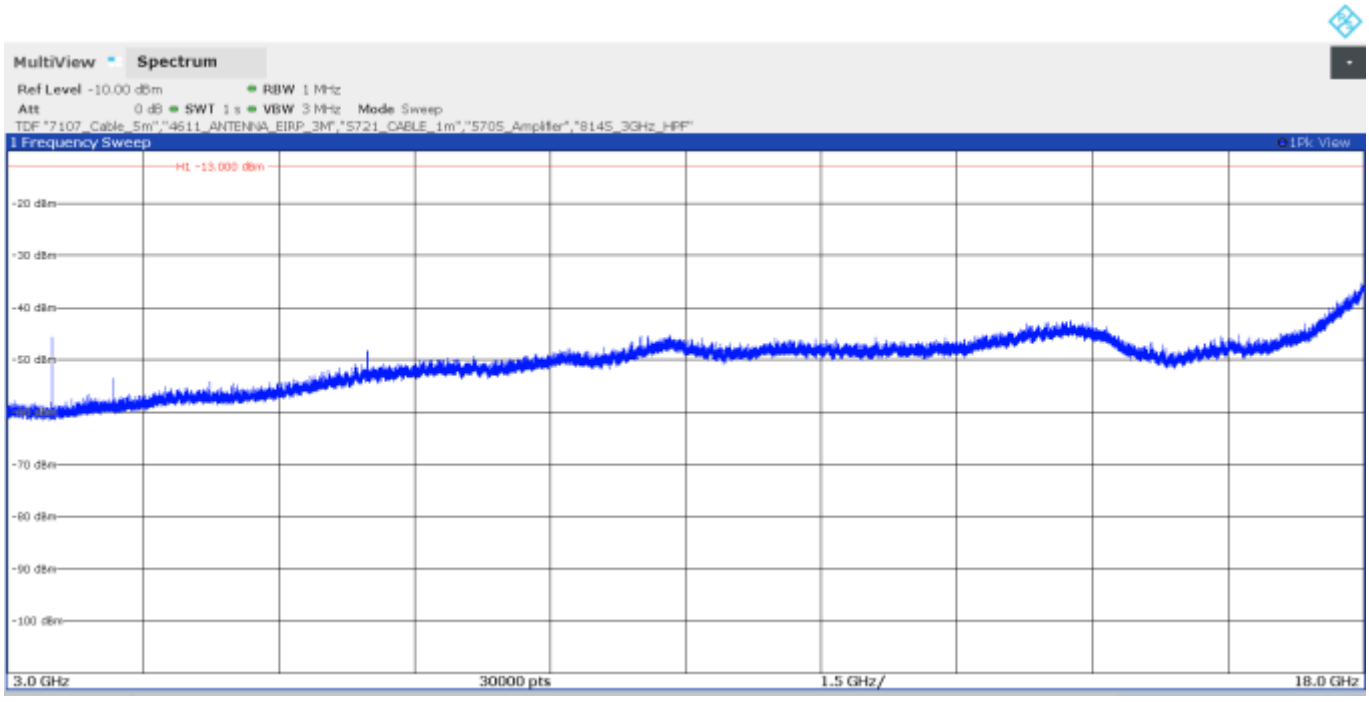

Note: The peak above the limit is the carrier frequency. The peak at 2179.8MHz corresponds to the downlink signal.

Frequency range 3 GHz to 18 GHz

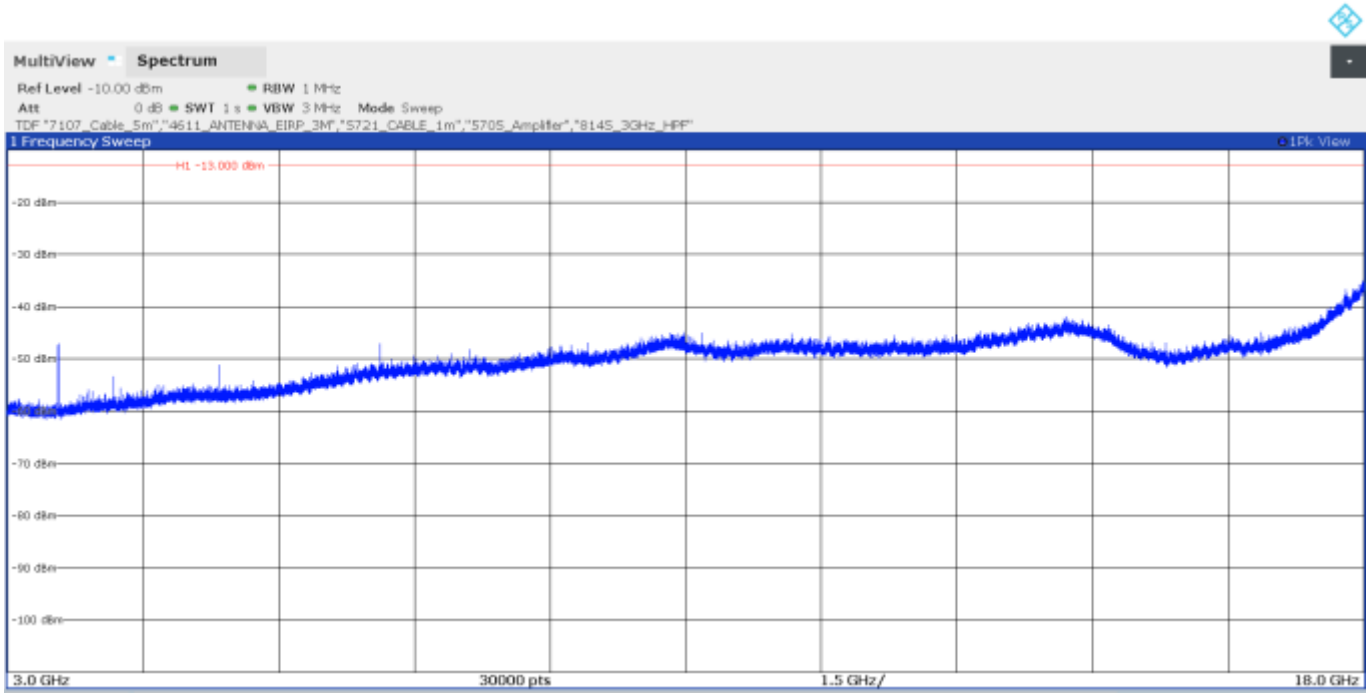
CHANNEL: LOWEST




CHANNEL: MIDDLE



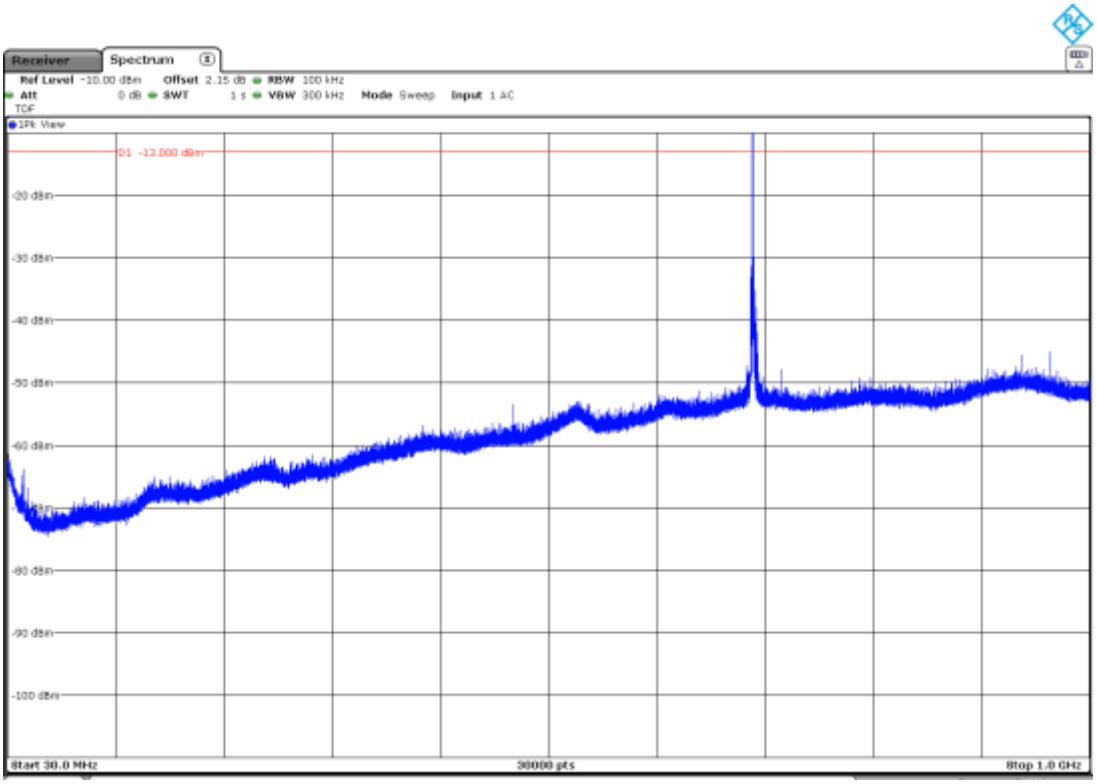
## CHANNEL: HIGHEST



## NBIoT Band 85

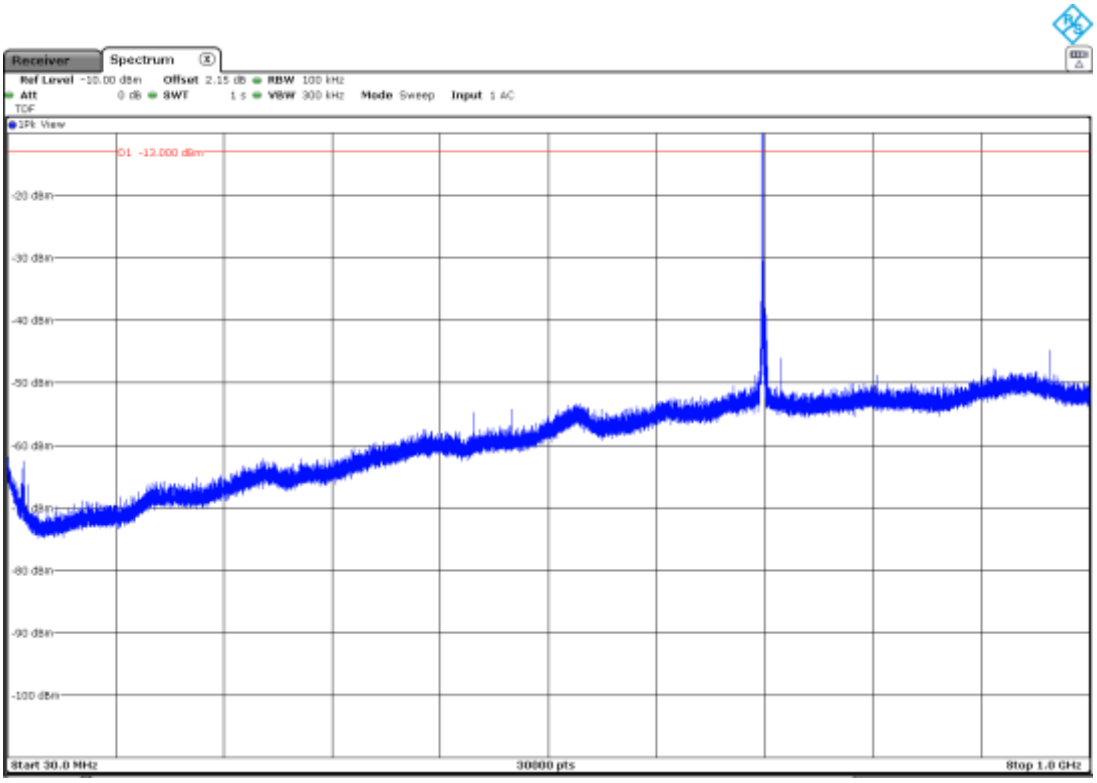
Frequency range 30 MHz to 1 GHz

CHANNEL: LOWEST



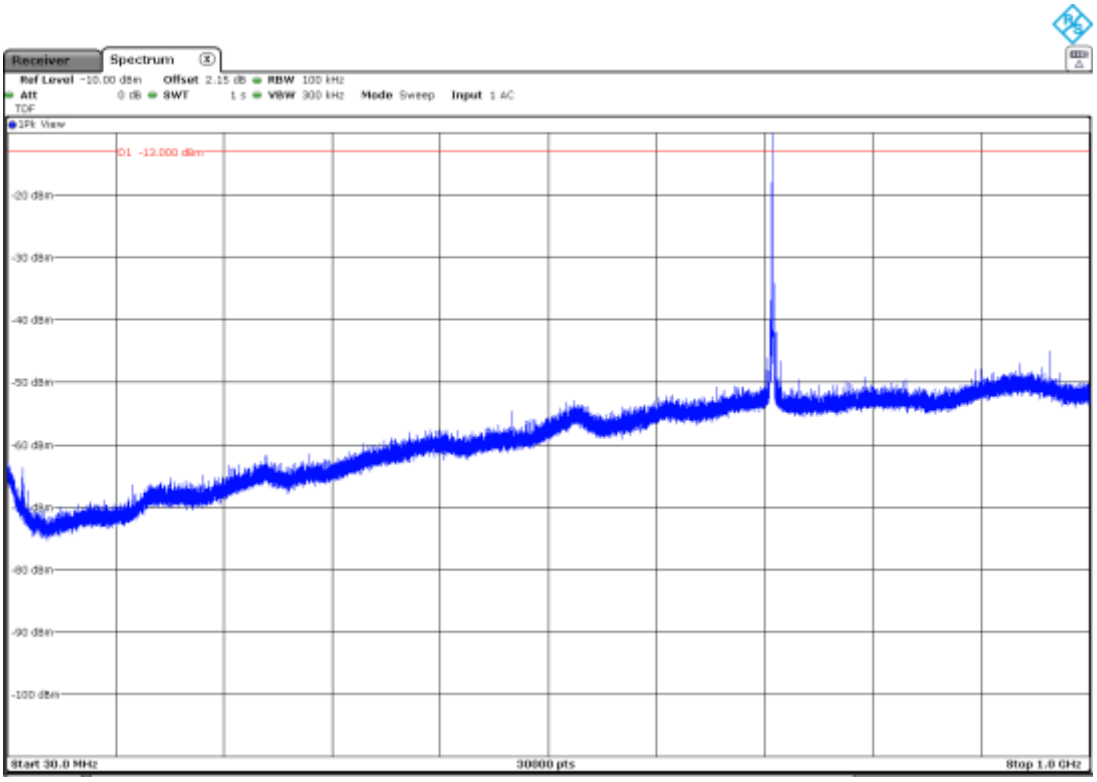

Note: The peak above the limit is the carrier frequency.

CHANNEL: MIDDLE




Note: The peak above the limit is the carrier frequency.

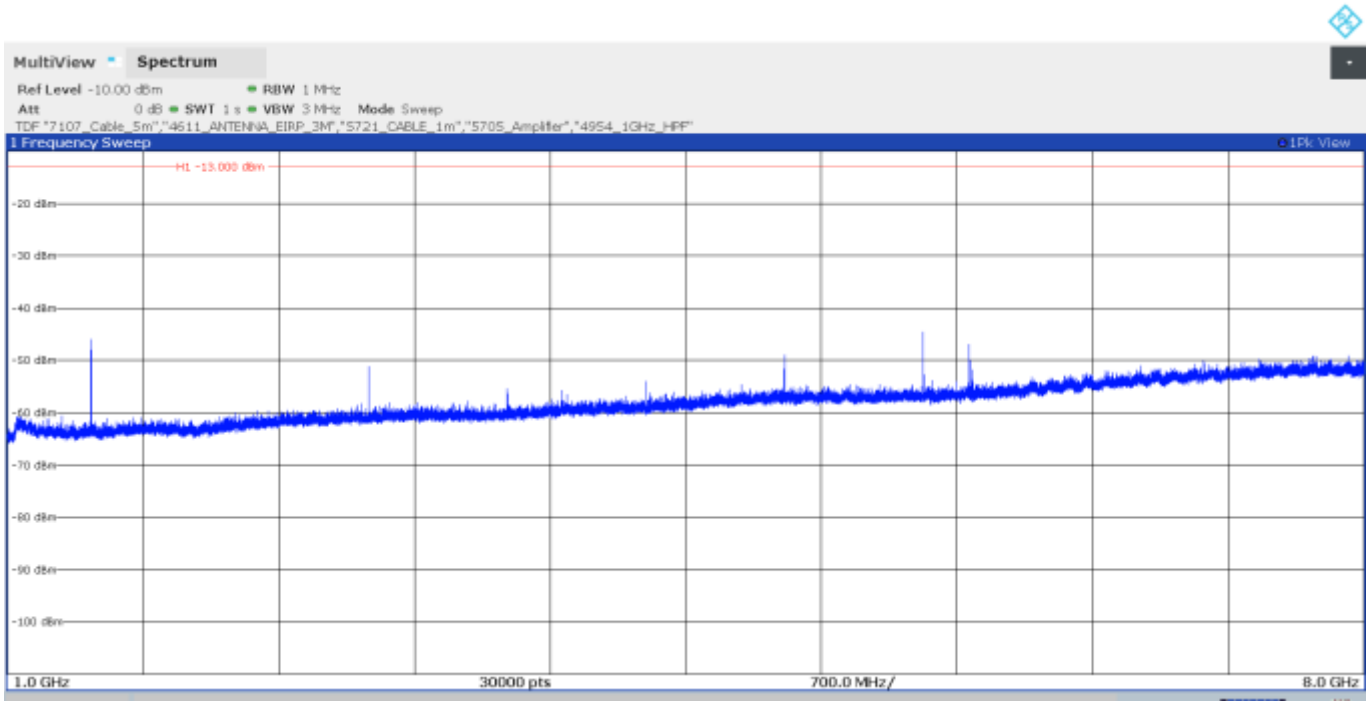
CHANNEL: HIGHEST



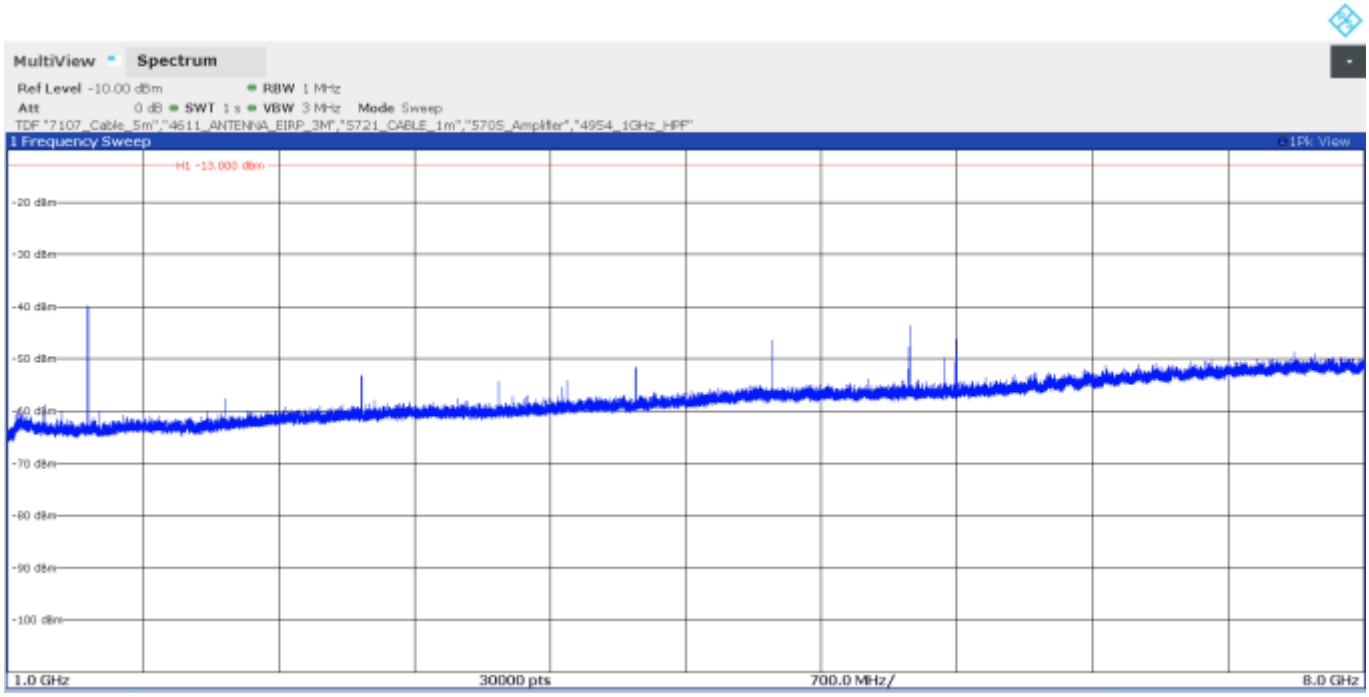

Note: The peak above the limit is the carrier frequency.

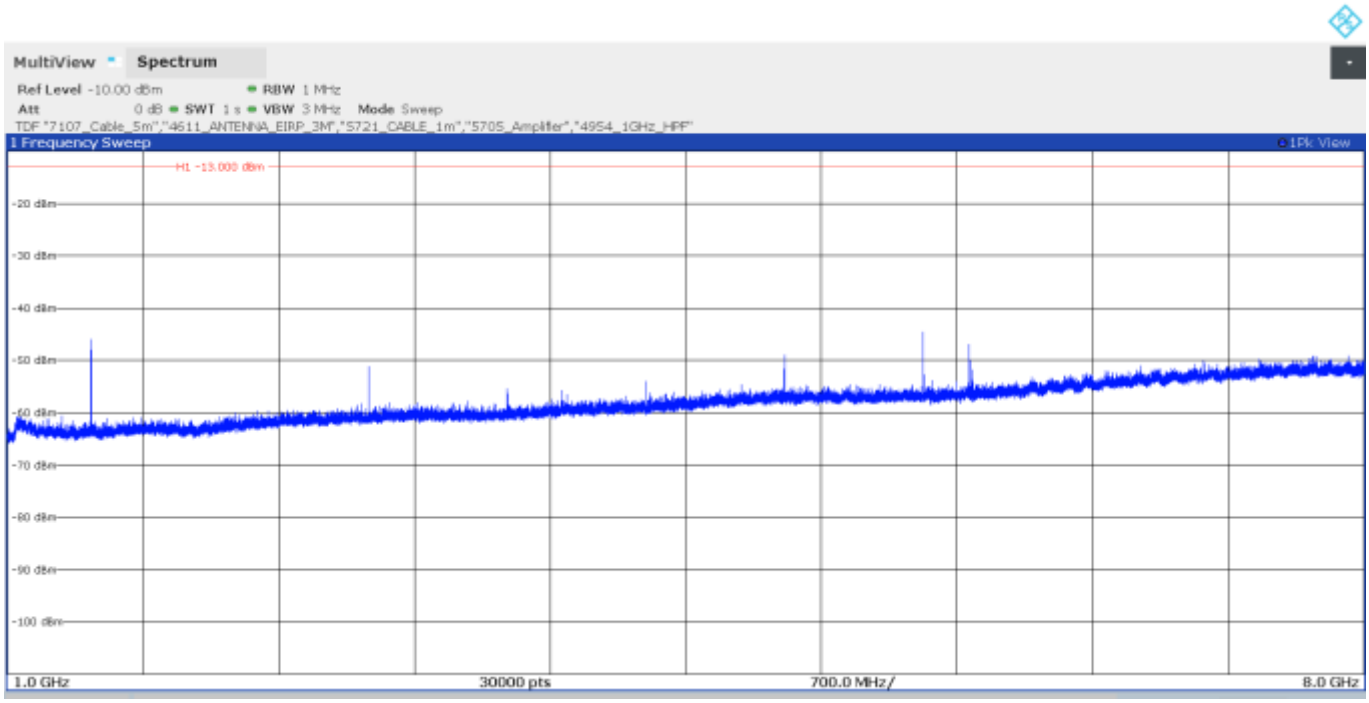
Frequency range 1 GHz to 8 GHz

CHANNEL: LOWEST



## CHANNEL: MIDDLE




## CHANNEL: HIGHEST