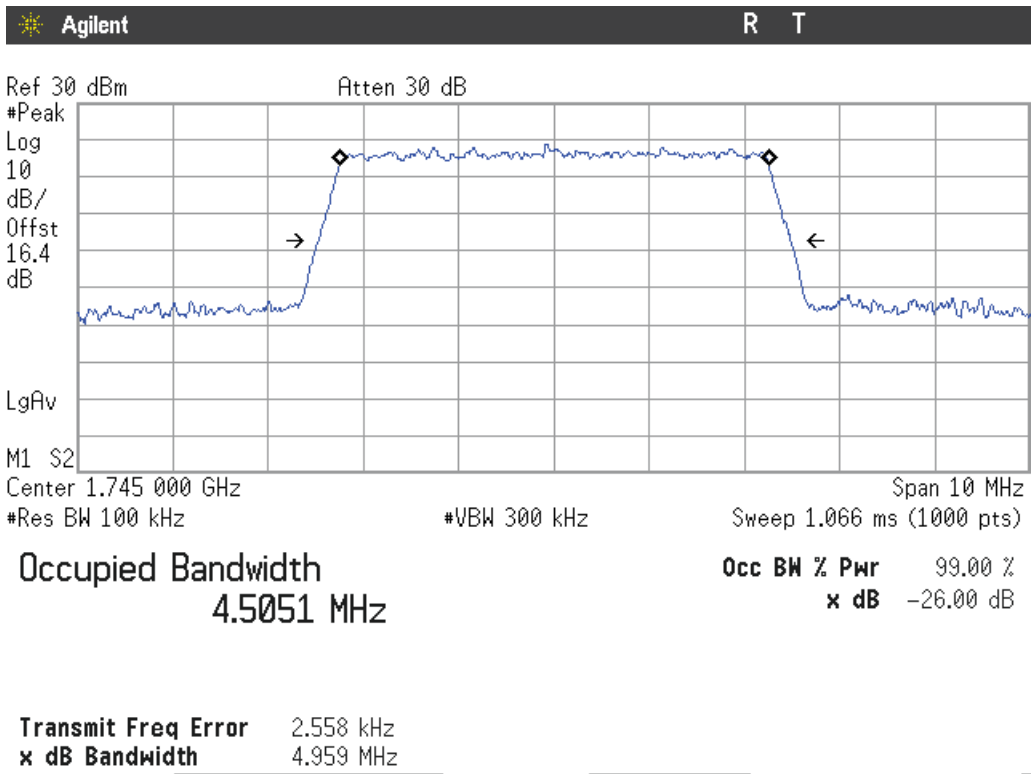
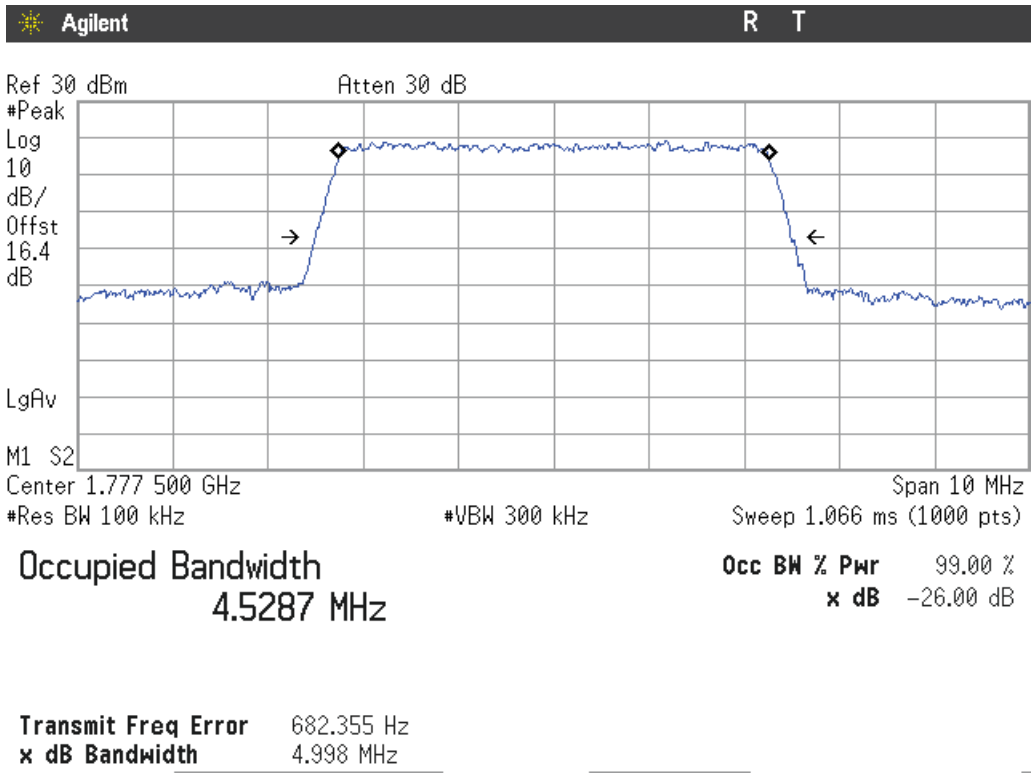


Middle Channel:

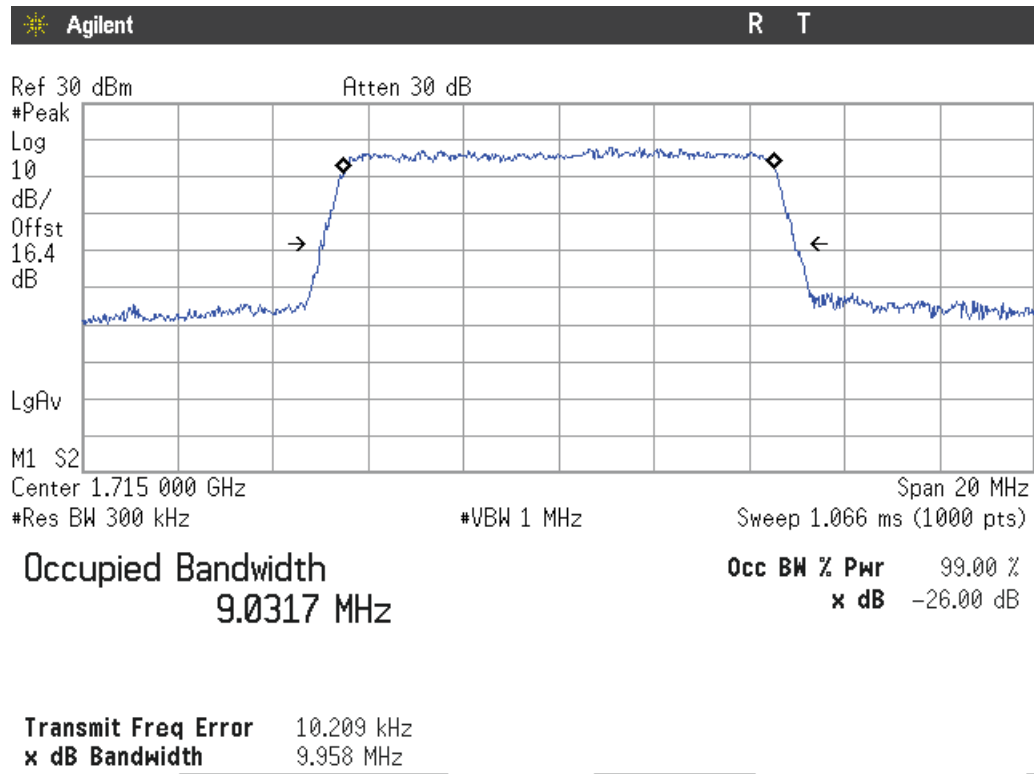


Highest Channel:

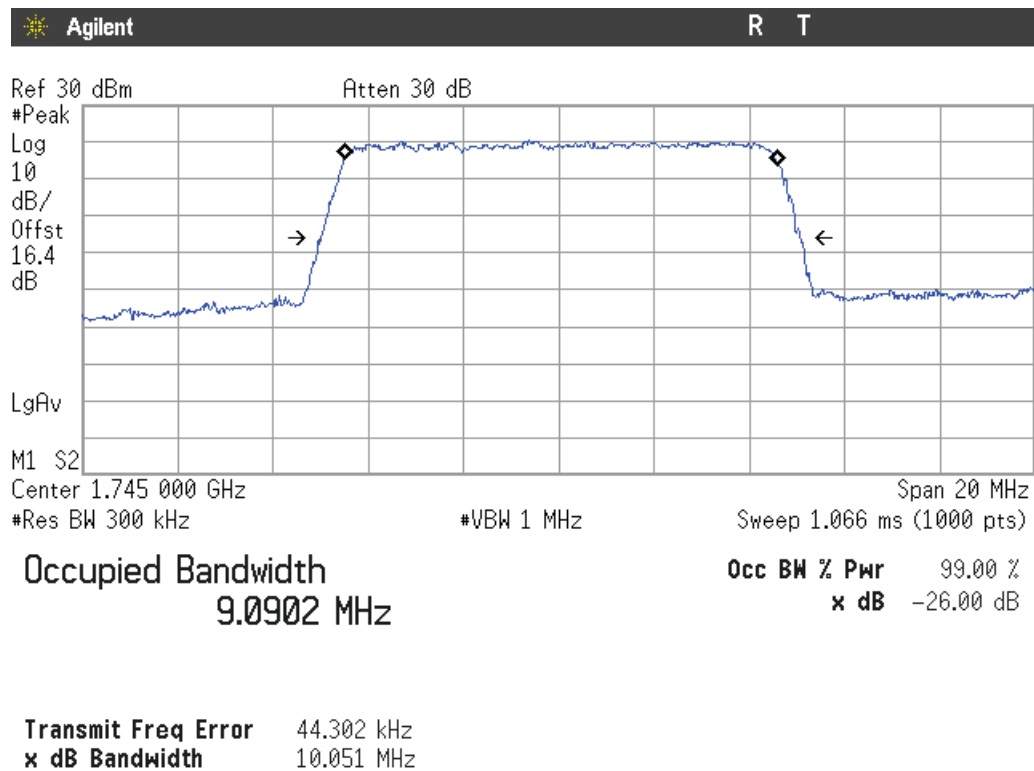


LTE Band 66. QPSK MODULATION. BW = 10 MHz.

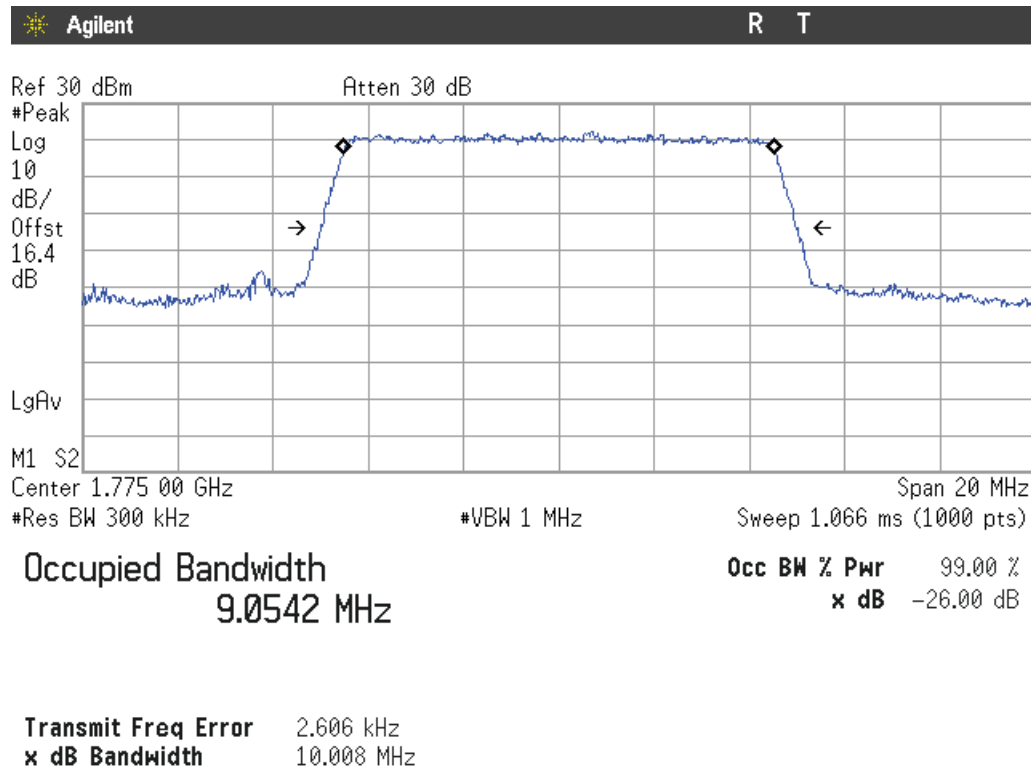
Lowest Channel:



Middle Channel:

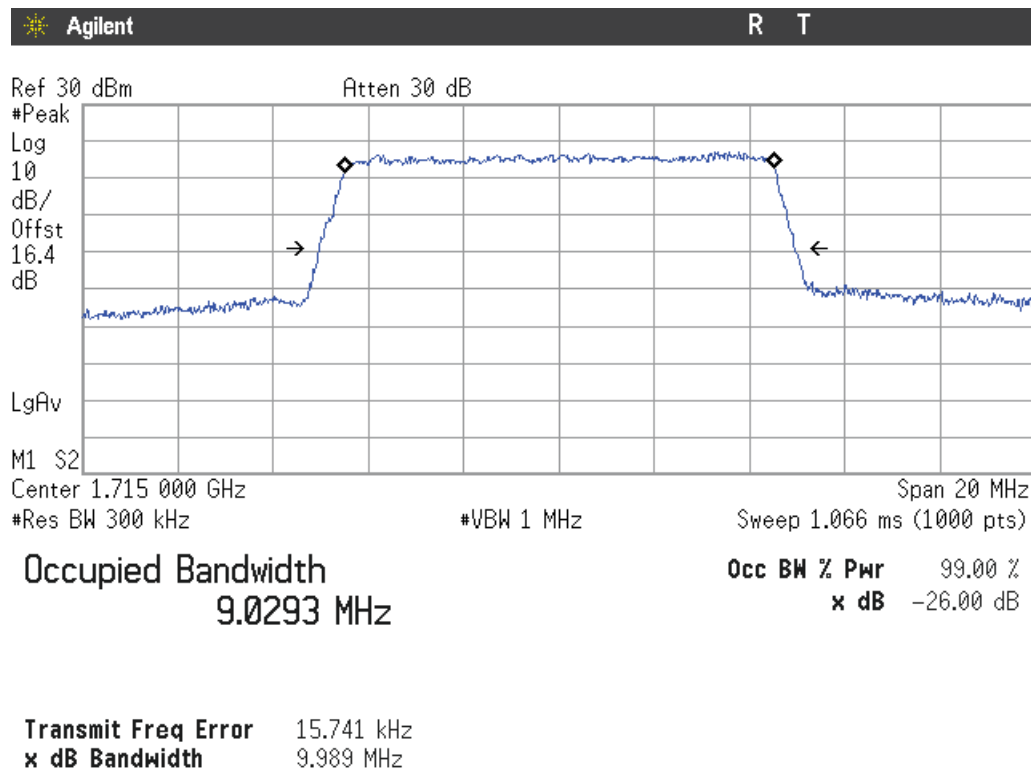


Highest Channel:

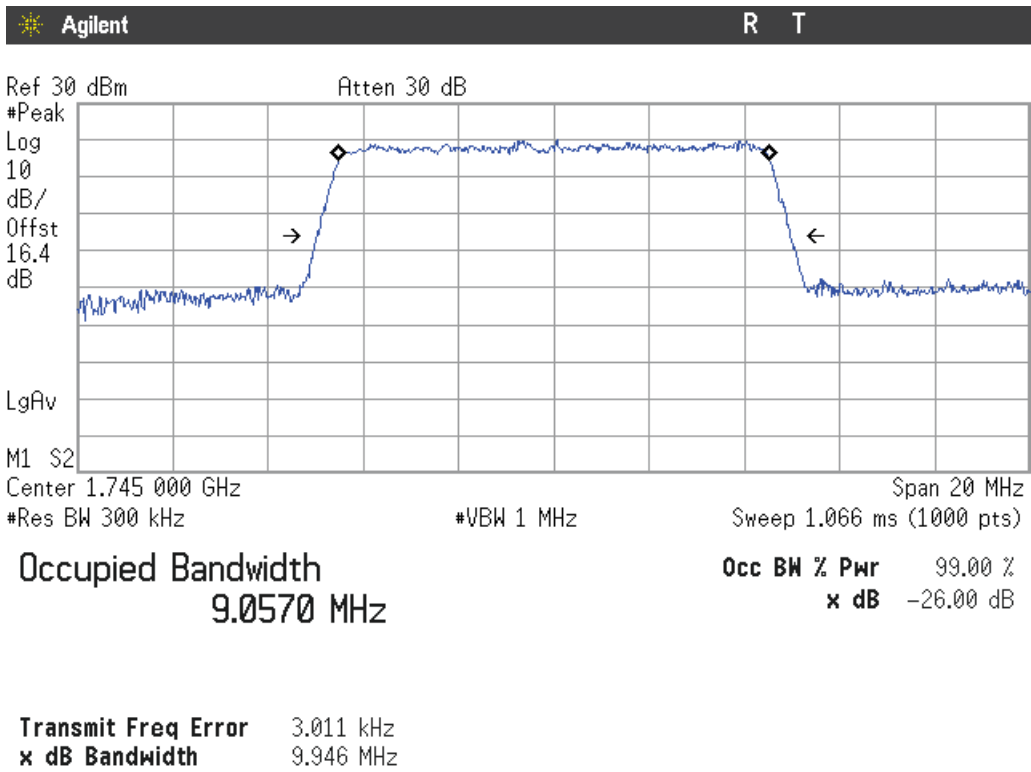


LTE Band 66. 16QAM MODULATION. BW = 10 MHz.

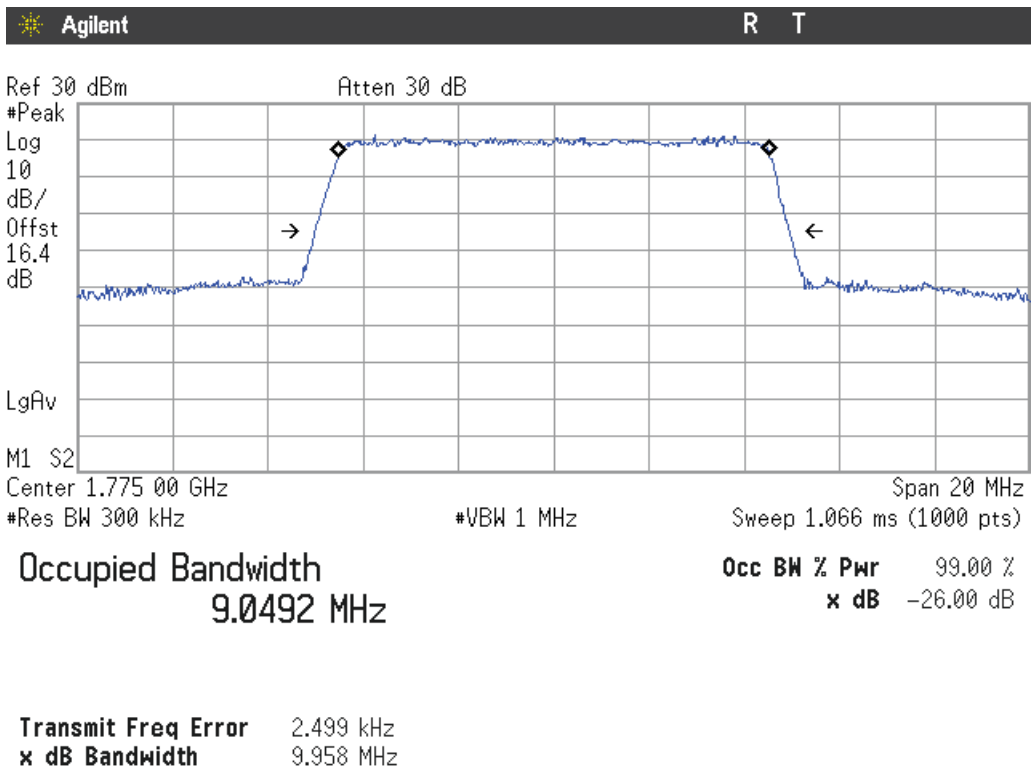
Lowest Channel:



Middle Channel:

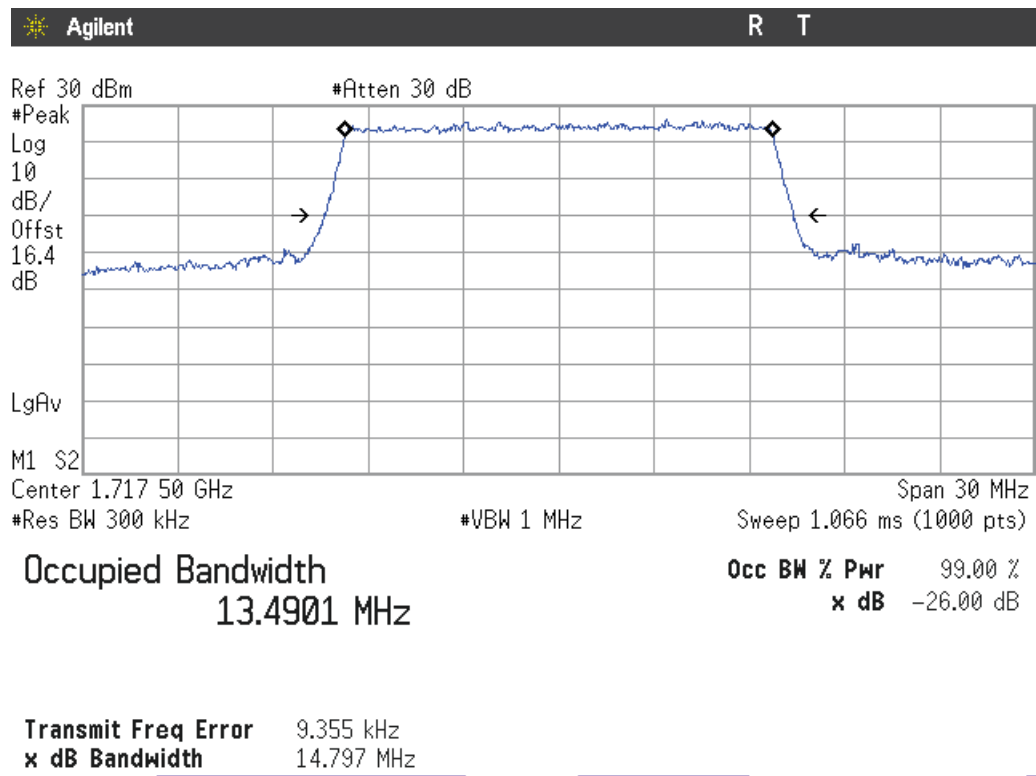


Highest Channel:

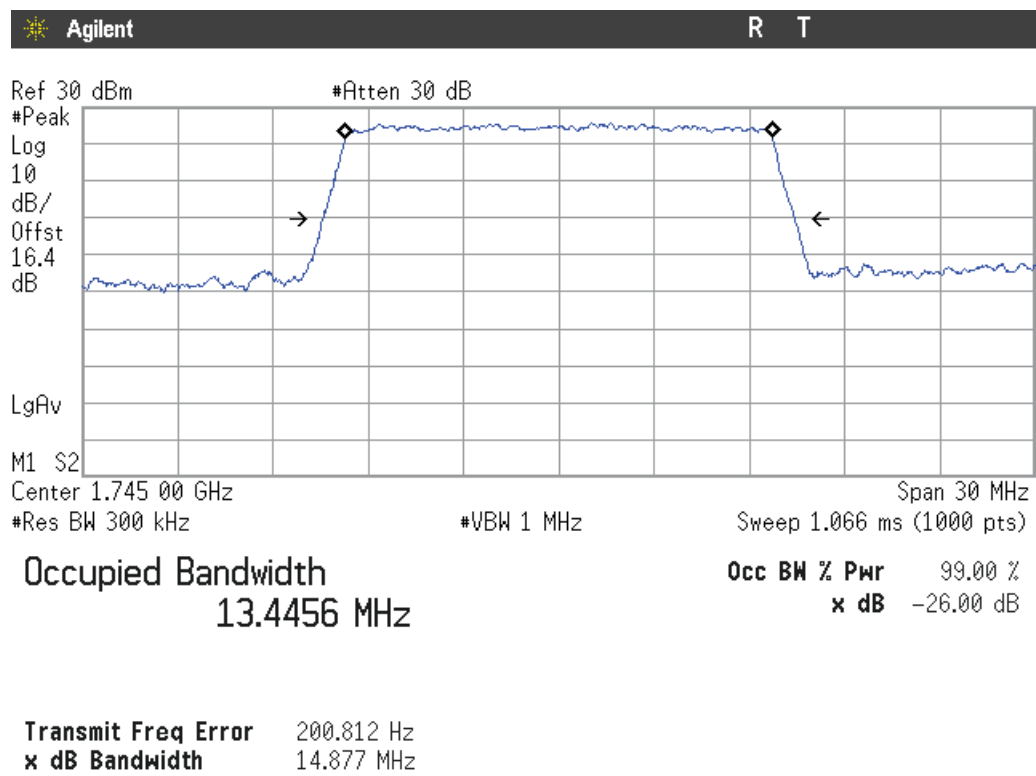


LTE Band 66. QPSK MODULATION. BW = 15 MHz.

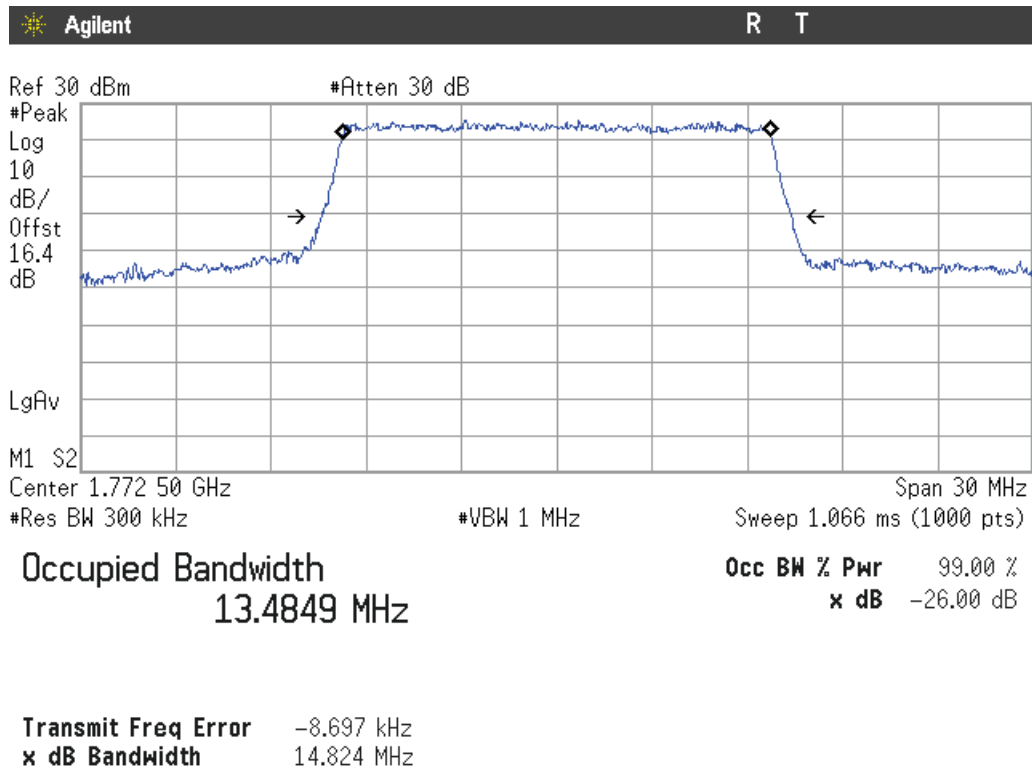
Lowest Channel:



Middle Channel:

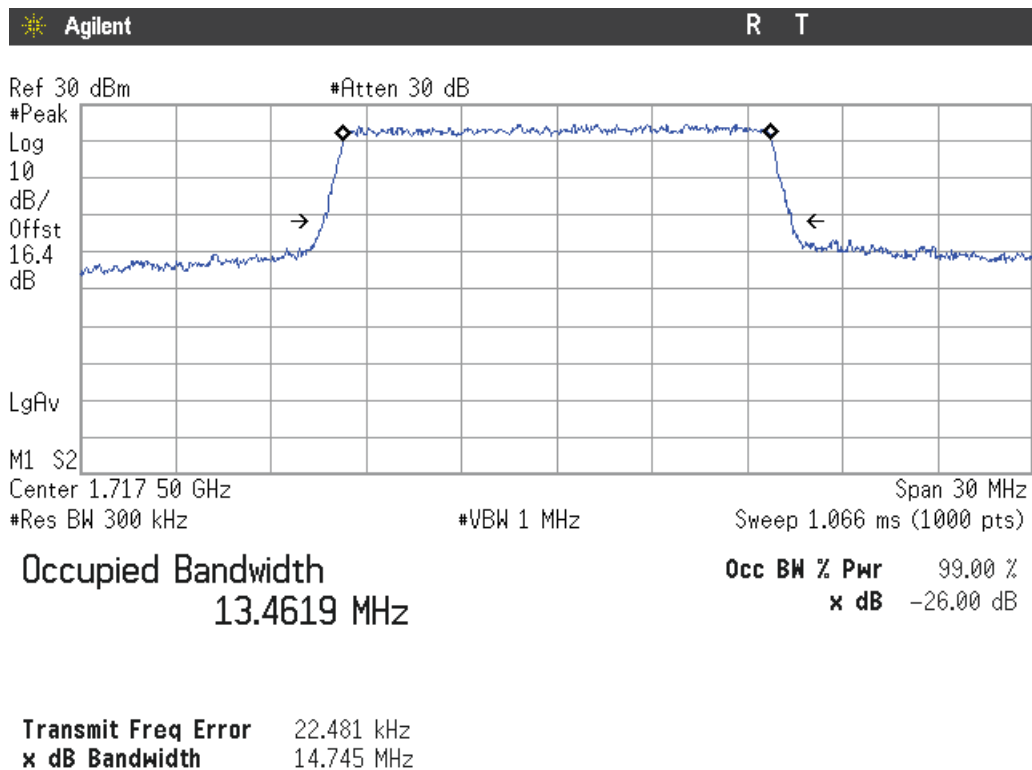


Highest Channel:

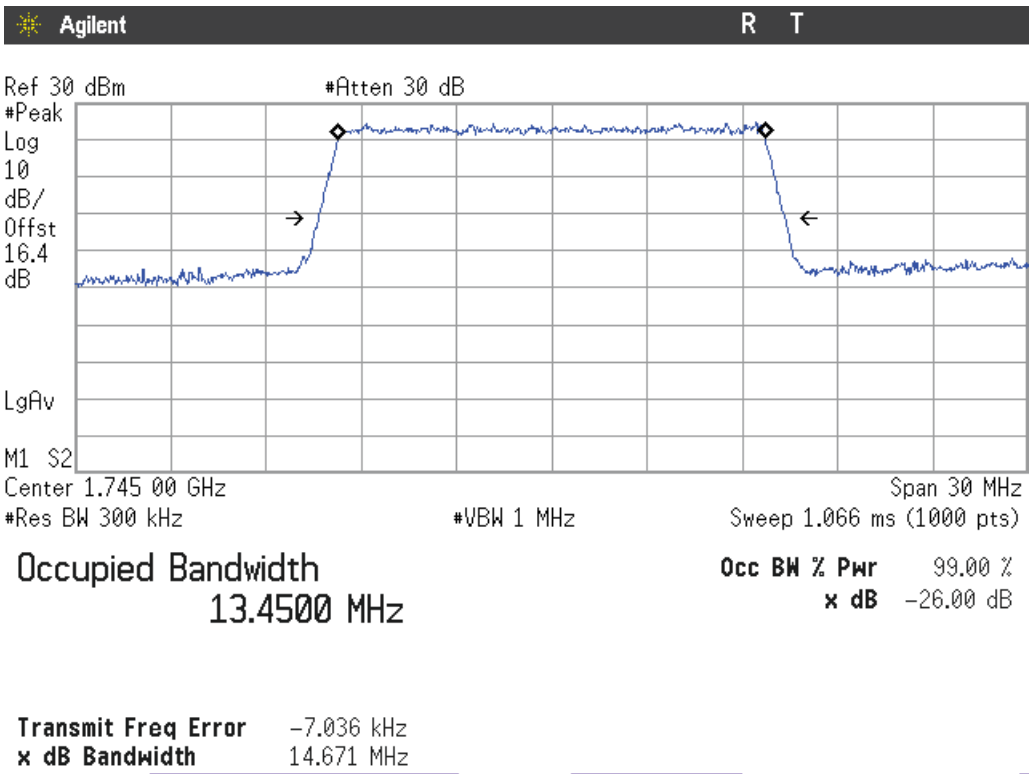


LTE Band 66. 16QAM MODULATION. BW = 15 MHz.

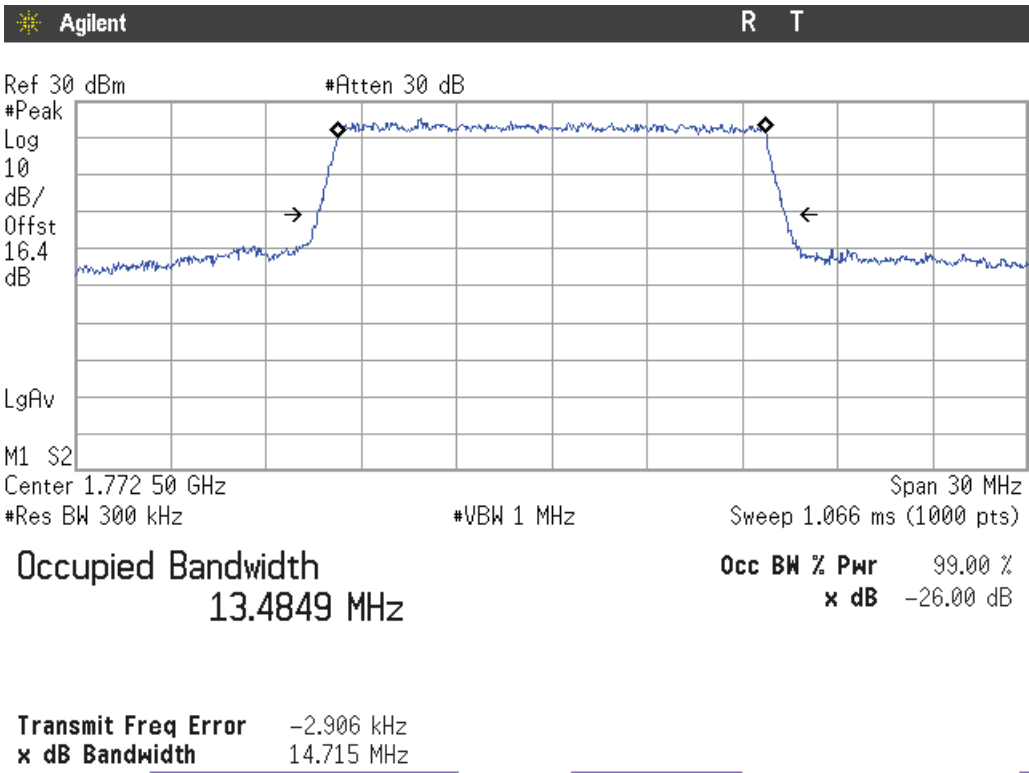
Lowest Channel:



Middle Channel:

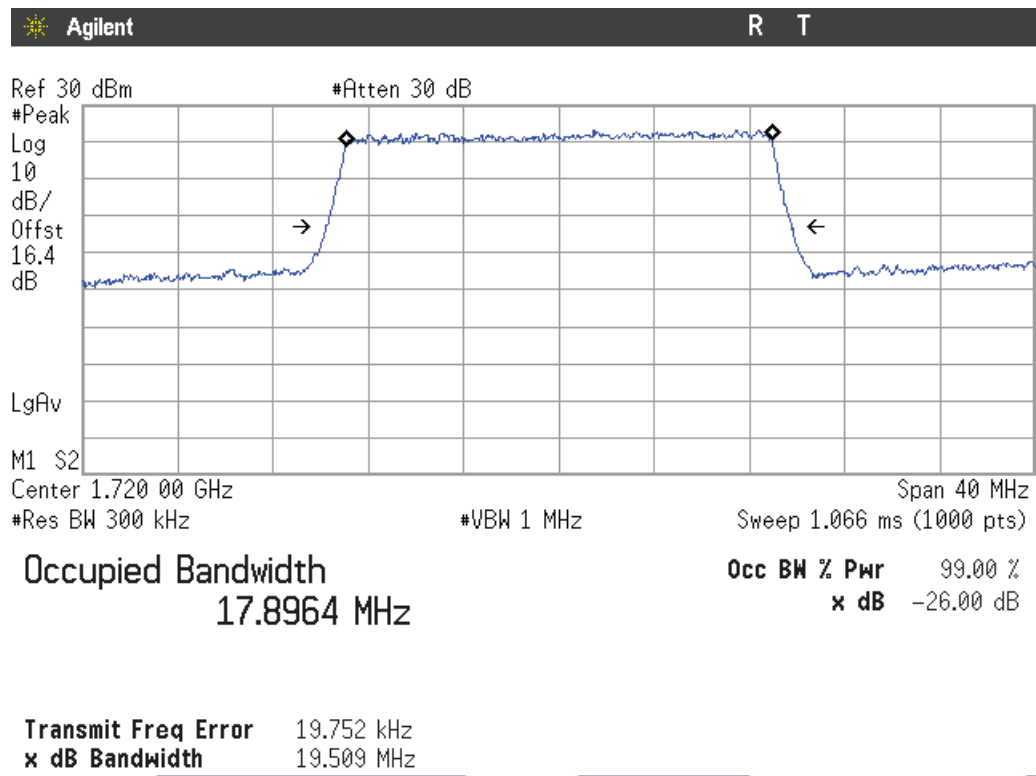


Highest Channel:

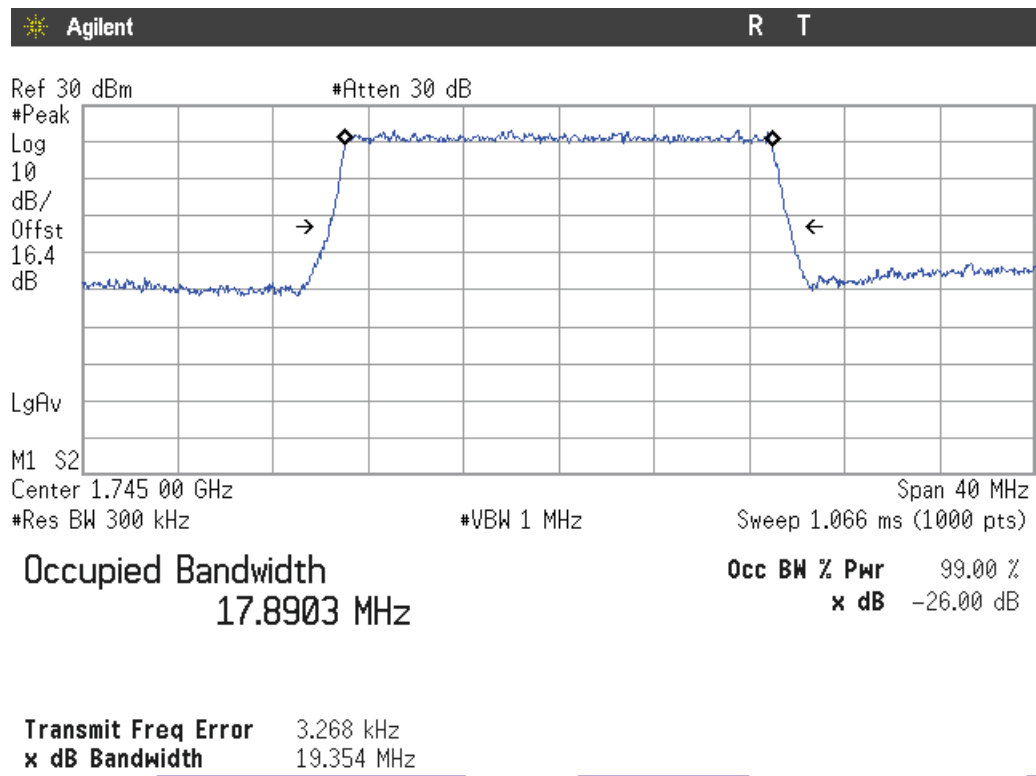


LTE Band 66. QPSK MODULATION. BW = 20 MHz.

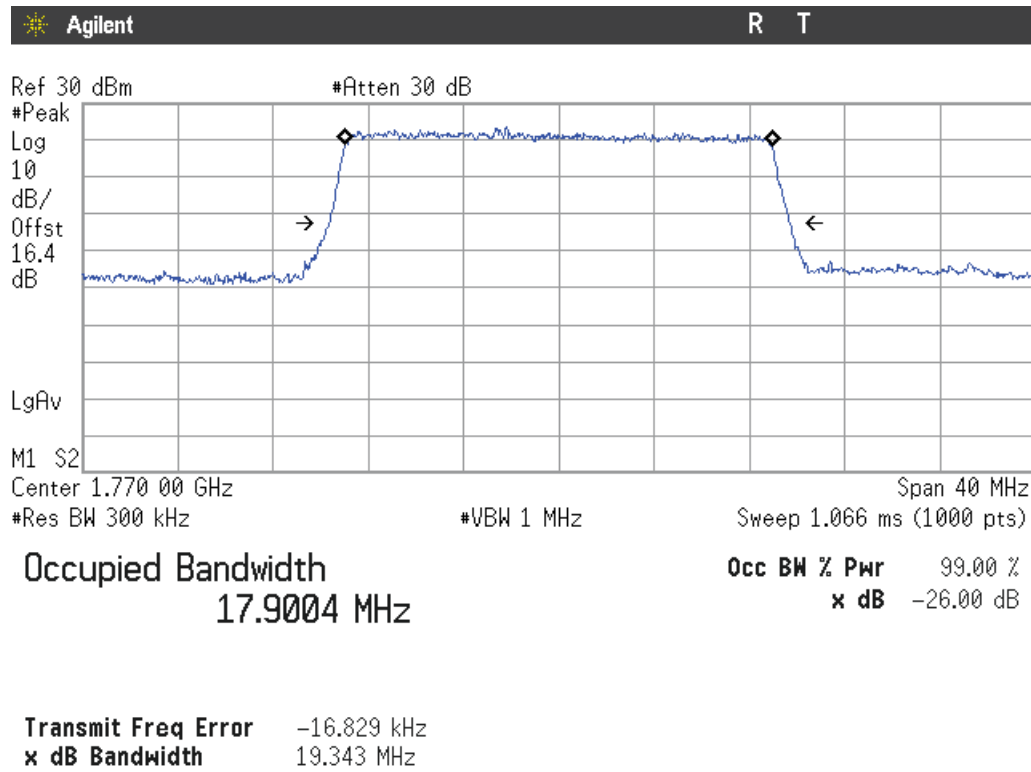
Lowest Channel:



Middle Channel:

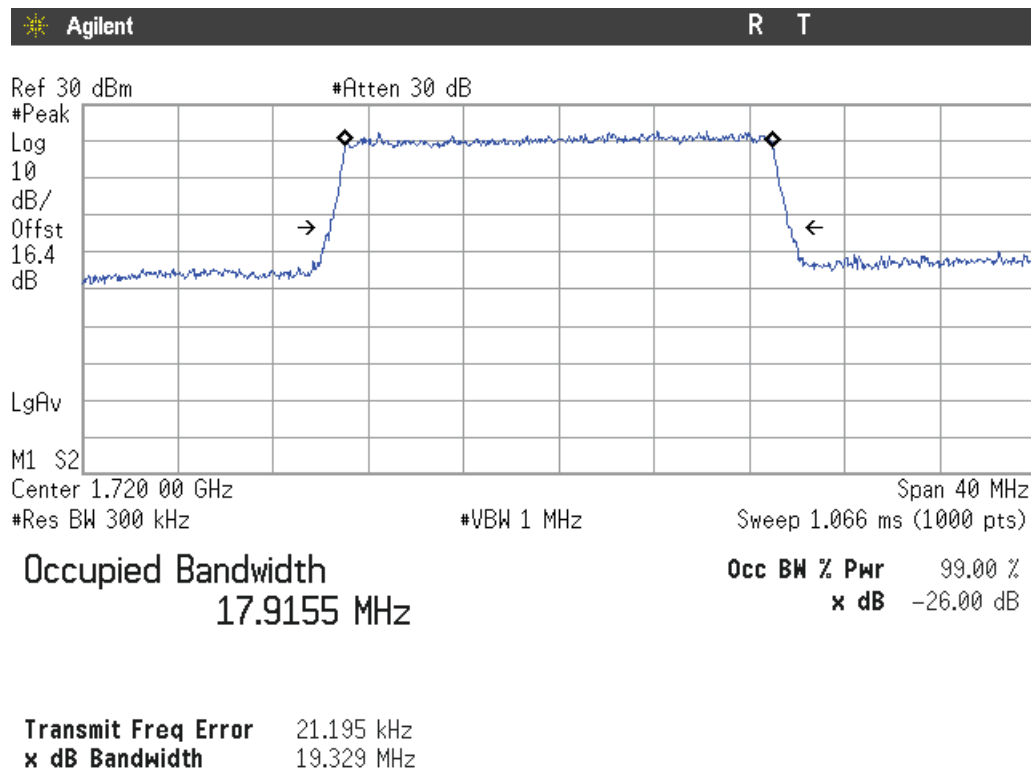


Highest Channel:

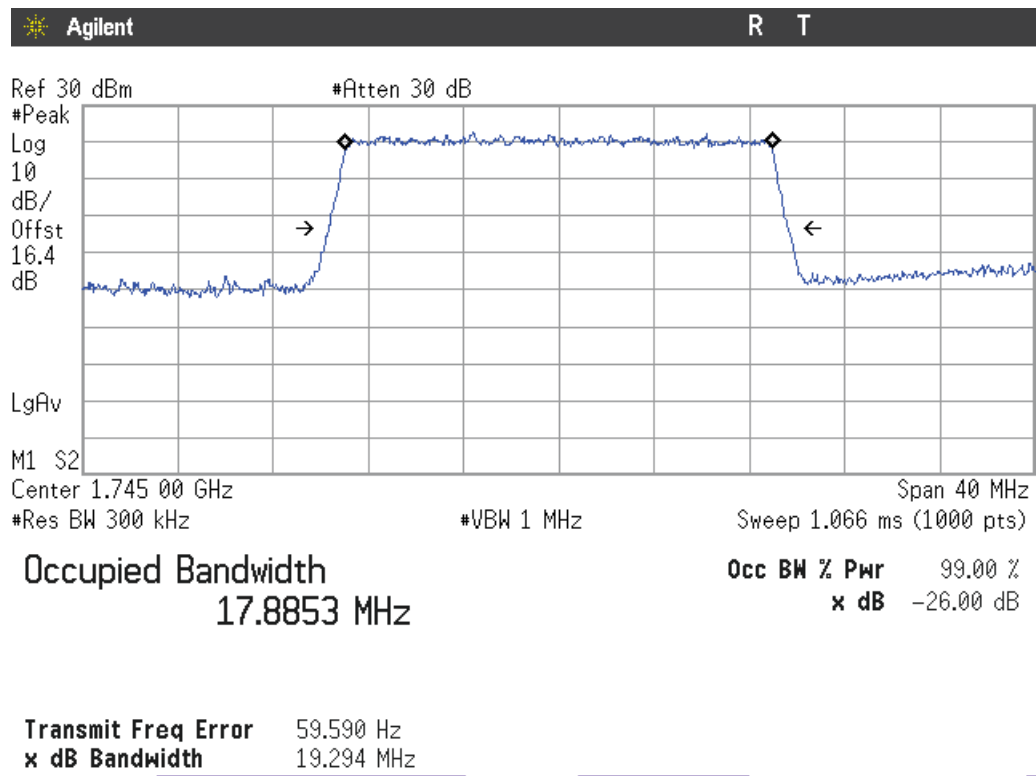


LTE Band 66. 16QAM MODULATION. BW = 20 MHz.

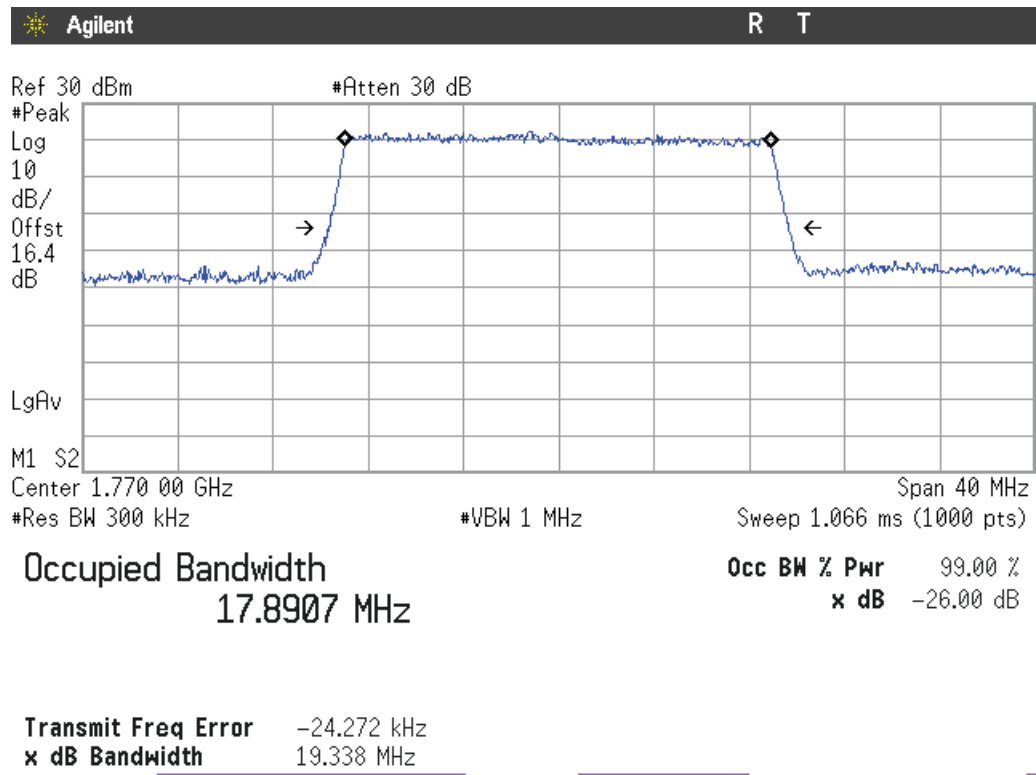
Lowest Channel:



Middle Channel:



Highest Channel:



Spurious emissions at antenna terminals

SPECIFICATION:

FCC §27.53 (h):

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.

FCC §27.53 (m) (4) & (6):

(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

FCC §27.53 (g):

(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.

FCC §27.53 (a) (4) & (5):

(4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than: $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log (P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log (P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than $67 + 10 \log (P)$ dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2300 and 2305 MHz, $55 + 10 \log (P)$ dB on all frequencies between 2296 and 2300 MHz, $61 + 10 \log (P)$ dB on all frequencies between 2292 and 2296 MHz, $67 + 10 \log (P)$ dB on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log (P)$ dB below 2288 MHz;

(iii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2360 and 2365 MHz, and not less than $70 + 10 \log (P)$ dB above 2365 MHz.

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.

RSS-199 Clause 4.5:

In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.

Equipment shall comply with the following unwanted emission limits:

a. for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$

b. for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

$40 + 10 \log_{10} p$ from the channel edges to 5 MHz away

$43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and

$55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges

In addition, the attenuation shall not be less than $43 + 10 \log_{10} p$ on all frequencies between 2490.5 MHz and 2496 MHz, and $55 + 10 \log_{10} p$ at or below 2490.5 MHz.

In (a) and (b), p is the transmitter power measured in watts and X is 6 MHz or the equipment occupied bandwidth, whichever is greater.

RSS-130 Clause 4.6.

The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB.

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 $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment.

At P_o transmitting power, the specified minimum attenuation becomes $43 + 10 \log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13 \text{ dBm.}$$

At P_o transmitting power, the specified minimum attenuation becomes $65 + 10 \log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [65 + 10 \log (P_o \text{ in mwatts}) - 30] = -35 \text{ dBm.}$$

METHOD:

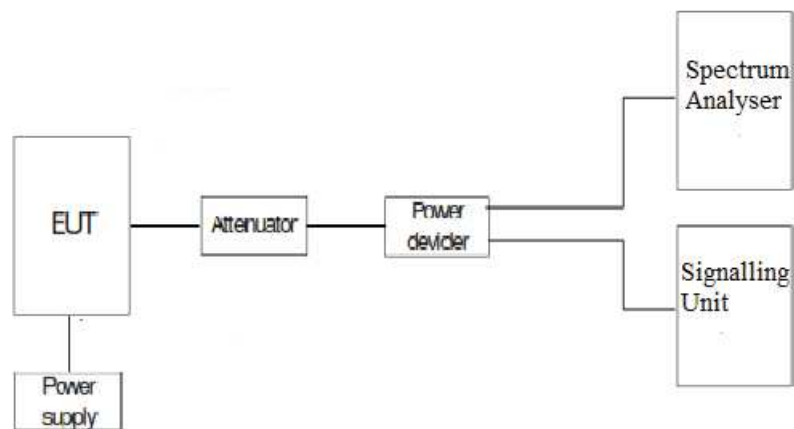
The EUT RF output connector was connected to a spectrum analyser and to the Universal Radio Communication tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50 Ohm attenuator and a power divider.

The spectrum was investigated from 9 kHz to 18 GHz for 3G Band IV and from 9 kHz to 8 GHz for LTE Band 12, 13 and from 9KHz to 26 GHz for LTE 7, 30

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 Resource Blocks and modulation which is the worst case for conducted power was used.

TEST SETUP:



RESULTS:

3G Band IV. WCDMA MODULATION.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

Verdict: PASS

3G Band IV. HSUPA MODULATION.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

Verdict: PASS

LTE BANDS: Test performed on the worst-case modulation and worst RB and worst Offset for all the nominal BW of each LTE band.

LTE Band 7. QPSK MODULATION. BW = 5 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 7. QPSK MODULATION. BW = 10 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 7. QPSK MODULATION. BW = 15 MHz.

- Lowest Channel:

No spurious frequencies found.

- Middle Channel:

Spurious frequencies detected at less than 20 dB below the limit:

Frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
5082	-41.63	< ± 2.03

- Highest Channel:

No spurious frequencies found.

LTE Band 7. 16QAM MODULATION. BW = 20 MHz.

- Lowest Channel:

No spurious frequencies found.

- Middle Channel:

Spurious frequencies detected at less than 20 dB below the limit:

Frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
5088	-44.94	< ± 2.03

- Highest Channel:

Spurious frequencies detected at less than 20 dB below the limit:

Frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
5139	-43.47	< ± 2.03

Verdict: PASS

LTE Band 12. QPSK MODULATION. BW = 1.4 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 12. QPSK MODULATION. BW = 3 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 12. QPSK MODULATION. BW = 5 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 12. QPSK MODULATION. BW = 10 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

Verdict: PASS

LTE Band 13. QPSK MODULATION. BW = 5 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 13. QPSK MODULATION. BW = 10 MHz.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

Verdict: PASS

LTE Band 30. QPSK MODULATION. BW = 5 MHz.

- Lowest Channel:

Spurious frequencies detected at less than 10 dB below the limit:

Frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
4617.8	-45.92	< ± 2.03

- Middle Channel:

Spurious frequencies detected at less than 10 dB below the limit:

Frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
4620.3	-45.75	< ± 2.03

- Highest Channel:

Spurious frequencies detected at less than 10 dB below the limit:

Frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
4620.3	-46.94	< ± 2.03

LTE Band 30. QPSK MODULATION. BW = 10 MHz

- Middle Channel:

Spurious frequencies detected at less than 10 dB below the limit:

Frequency (MHz)	Level (dBm)	Measurement uncertainty (dB)
4620.3	-47.76	< ± 2.03

Verdict: PASS

LTE Band 38. 16QAM MODULATION. BW = 5 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 38. QPSK MODULATION. BW = 10 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 38. QPSK MODULATION. BW = 15 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

LTE Band 38. QPSK MODULATION. BW = 20 MHz.

- Lowest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Middle Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

- Highest Channel:

No spurious frequencies detected at less than 20 dB below the limit in all the range.

Verdict: PASS

LTE Band 66. QPSK MODULATION. BW = 1.4 MHz.

- Lowest Channel:
No spurious frequencies found.
- Middle Channel:
No spurious frequencies found.
- Highest Channel:
No spurious frequencies found.

LTE Band 66. QPSK MODULATION. BW = 3 MHz.

- Lowest Channel:
No spurious frequencies found.
- Middle Channel:
No spurious frequencies found.
- Highest Channel:
No spurious frequencies found.

LTE Band 66. QPSK MODULATION. BW = 5 MHz.

- Lowest Channel:
No spurious frequencies found.
- Middle Channel:
No spurious frequencies found.
- Highest Channel:
No spurious frequencies found.

LTE Band 66. QPSK MODULATION. BW = 10 MHz.

- Lowest Channel:
No spurious frequencies found.
- Middle Channel:
No spurious frequencies found.
- Highest Channel:
No spurious frequencies found.

LTE Band 66. QPSK MODULATION. BW = 15 MHz.

- Lowest Channel:
No spurious frequencies found.
- Middle Channel:
No spurious frequencies found.
- Highest Channel:
No spurious frequencies found.

LTE Band 66. 16QAM MODULATION. BW = 20 MHz.

- Lowest Channel:

No spurious frequencies found.

- Middle Channel:

No spurious frequencies found.

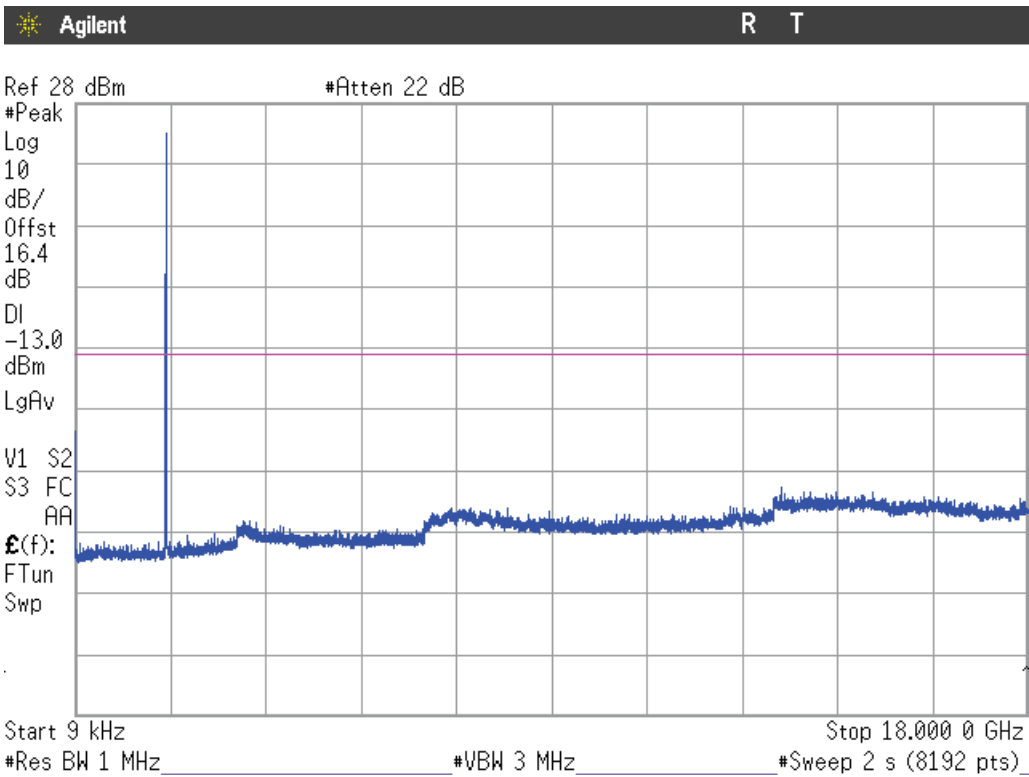
- Highest Channel:

No spurious frequencies found.

Verdict: PASS

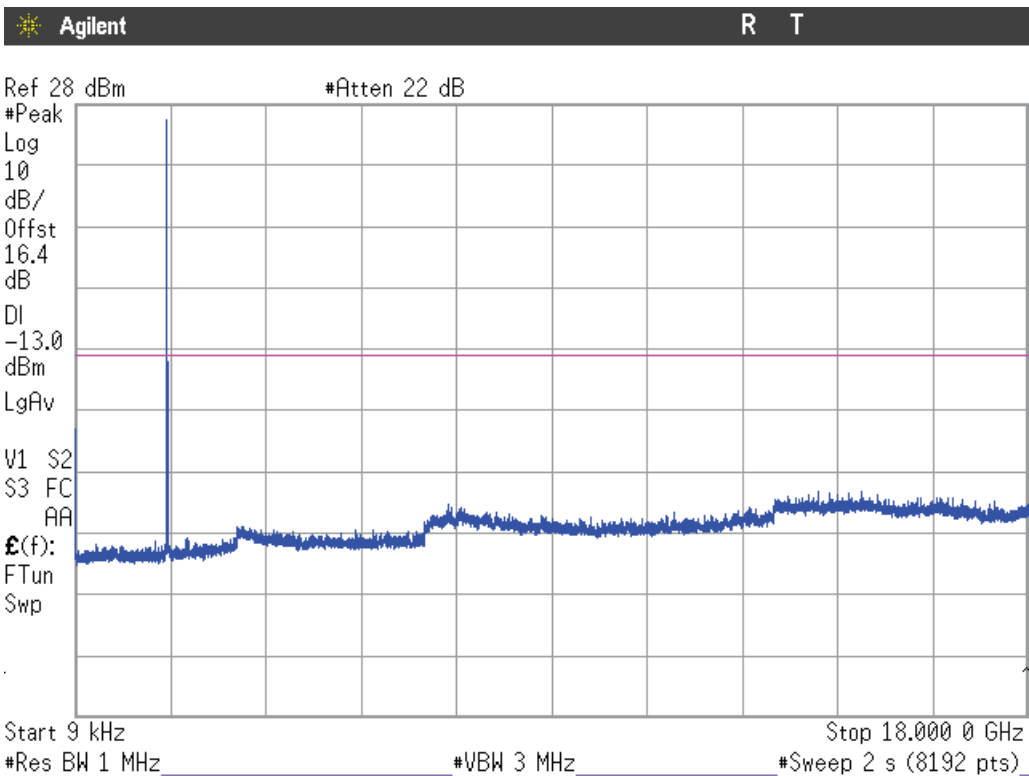
3G Band IV. WCDMA MODULATION.

Lowest Channel:



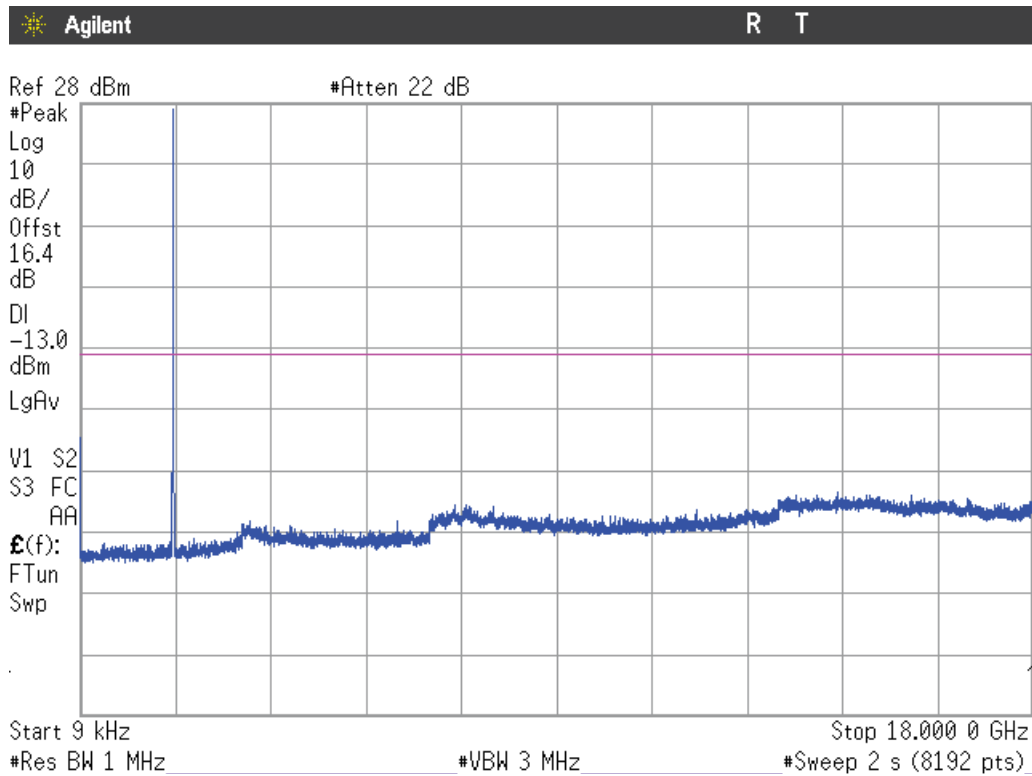
The peak above the limit is the carrier frequency.

Middle Channel:



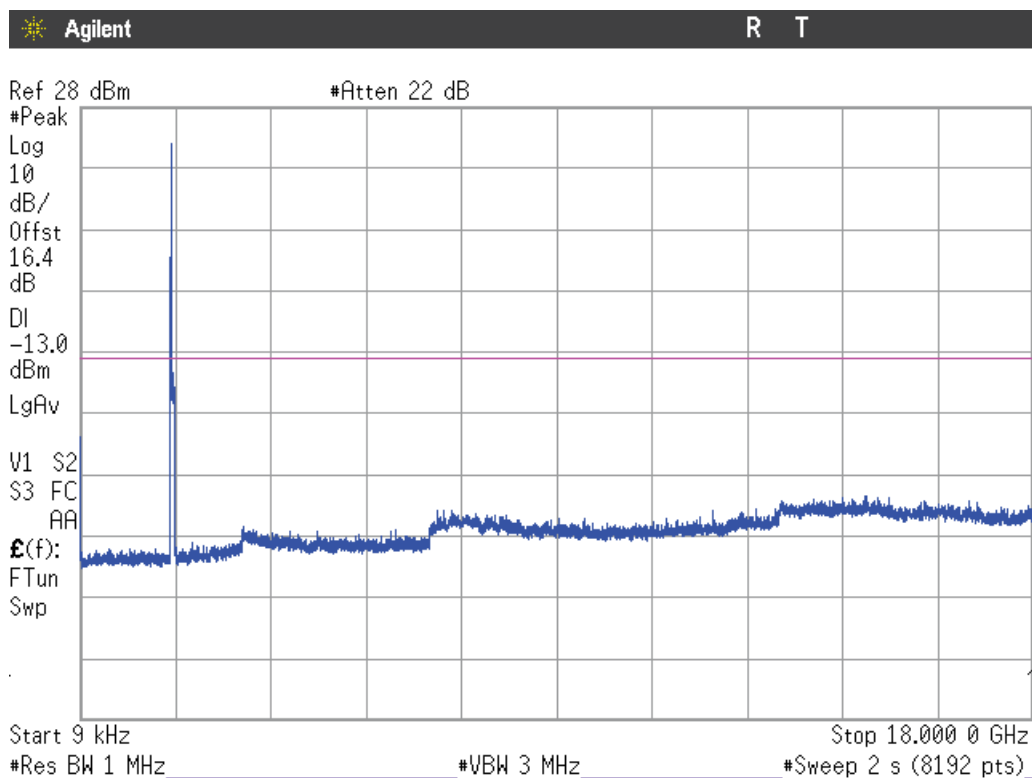
The peak above the limit is the carrier frequency.

Highest Channel:



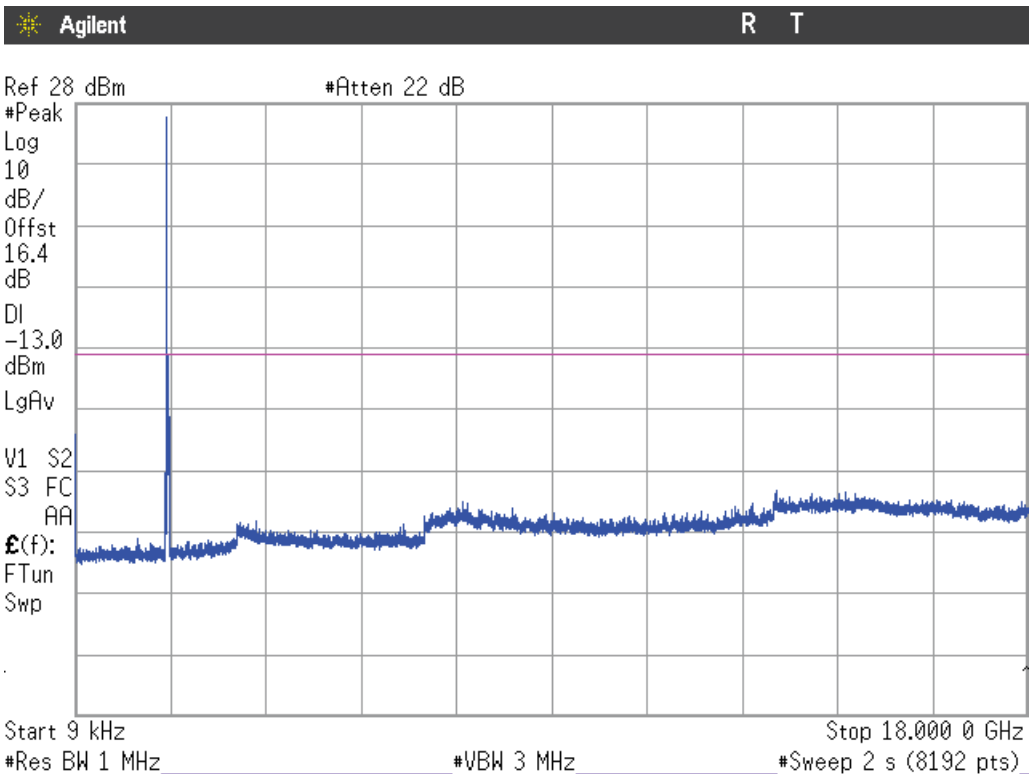
3G Band IV. HSUPA MODULATION.

Lowest Channel:



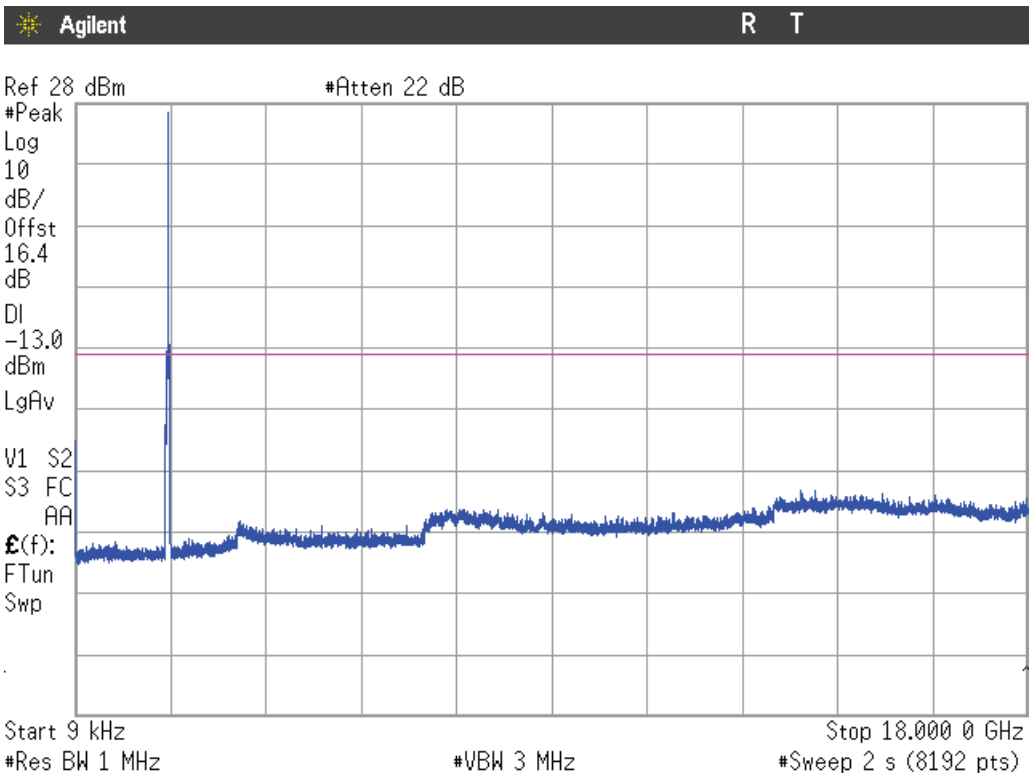
The peak above the limit is the carrier frequency.

Middle Channel:



The peak above the limit is the carrier frequency.

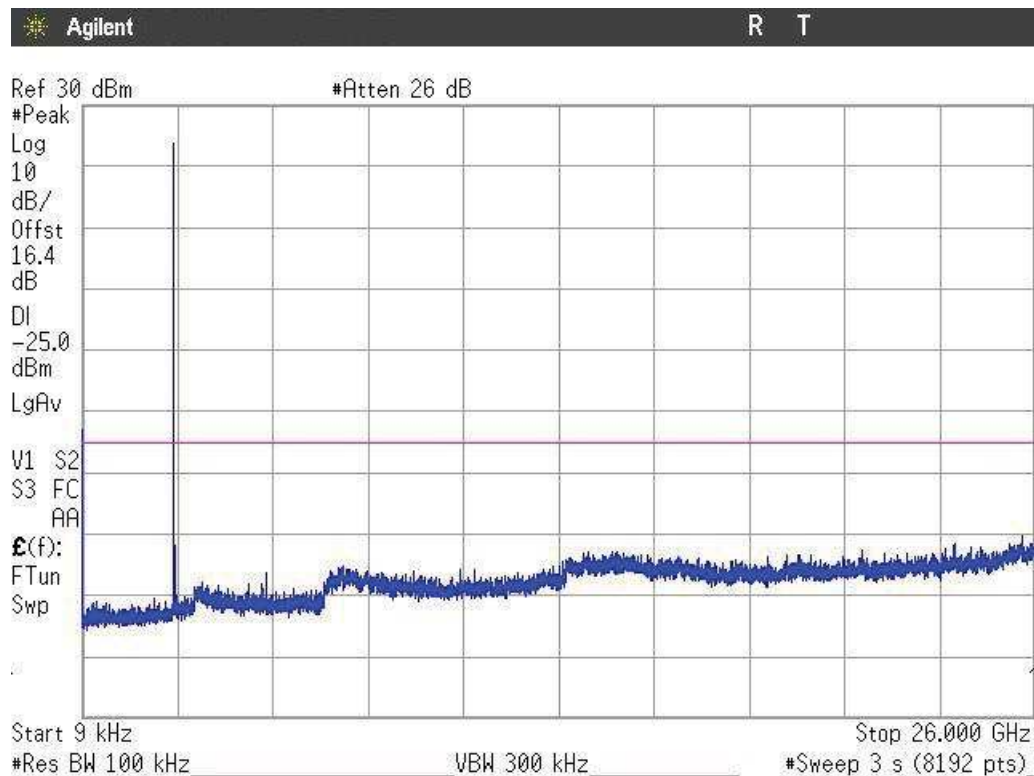
Highest Channel:



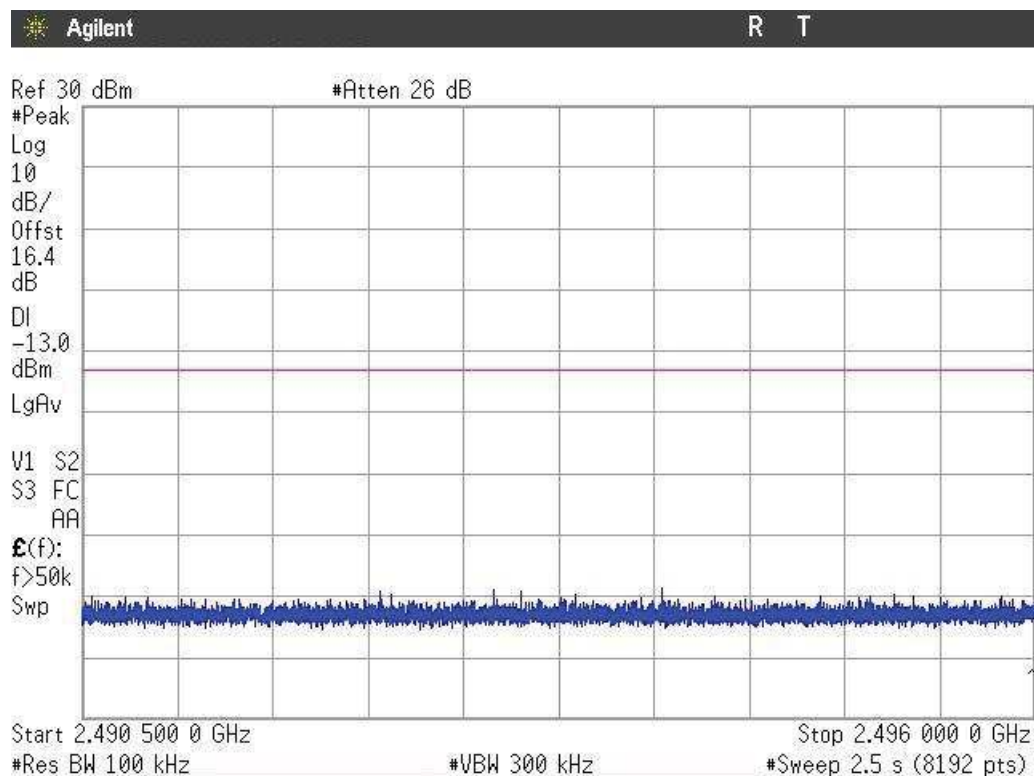
The peak above the limit is the carrier frequency.

LTE Band 7. QPSK MODULATION. BW = 5 MHz.

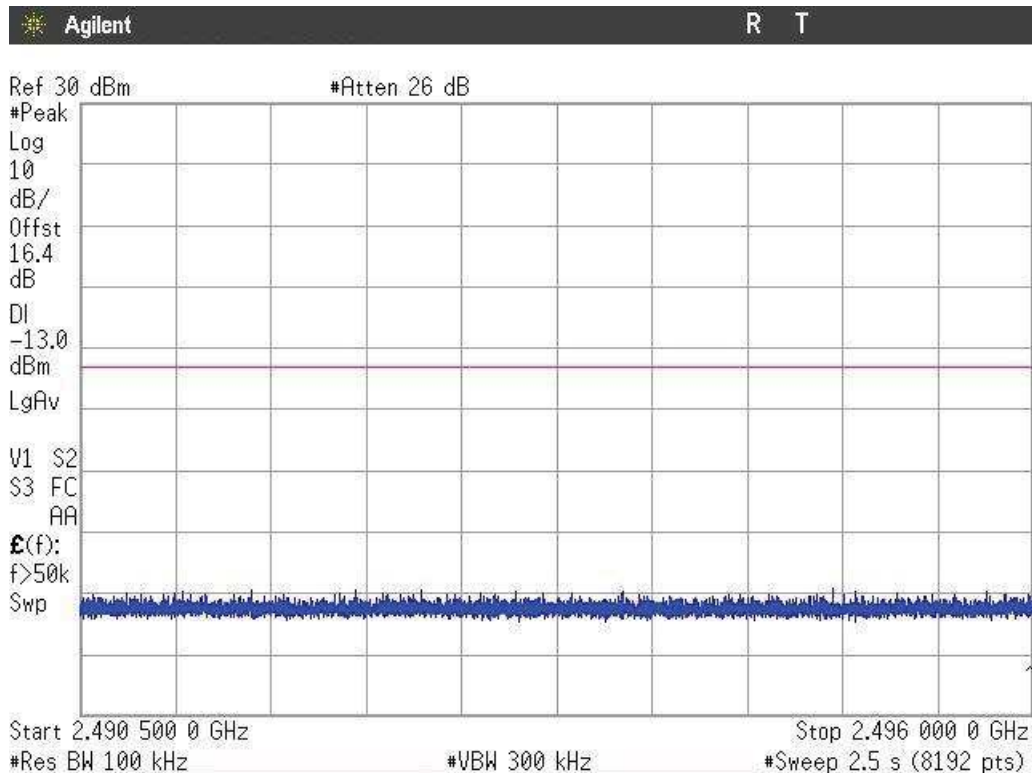
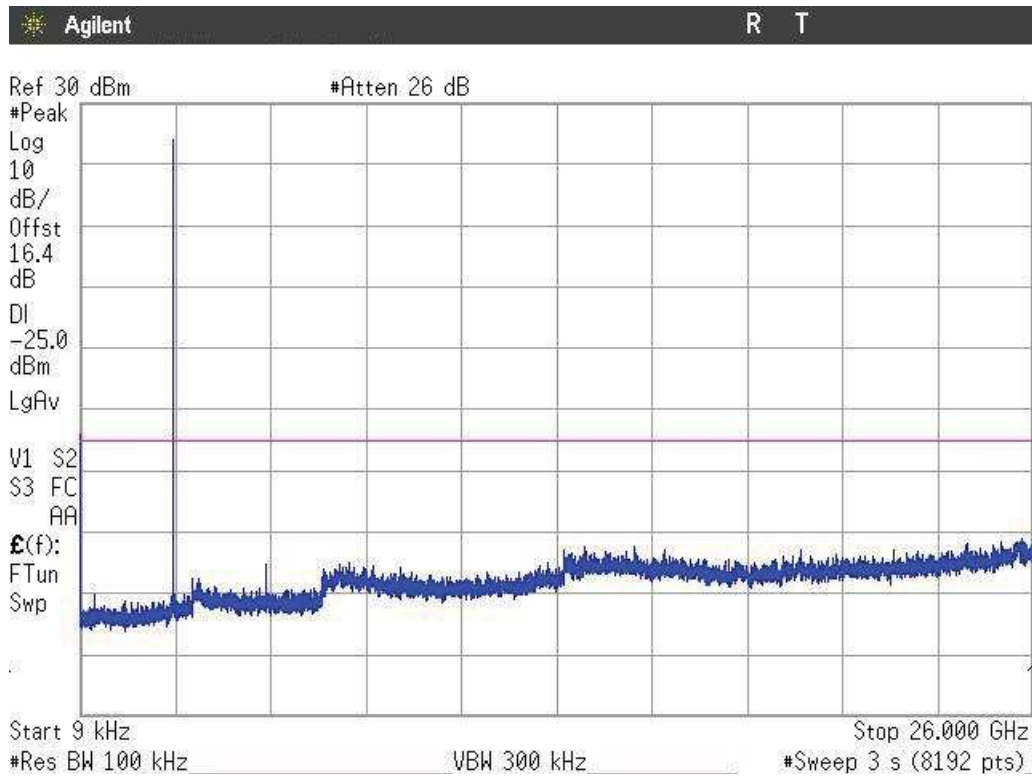
Lowest Channel:



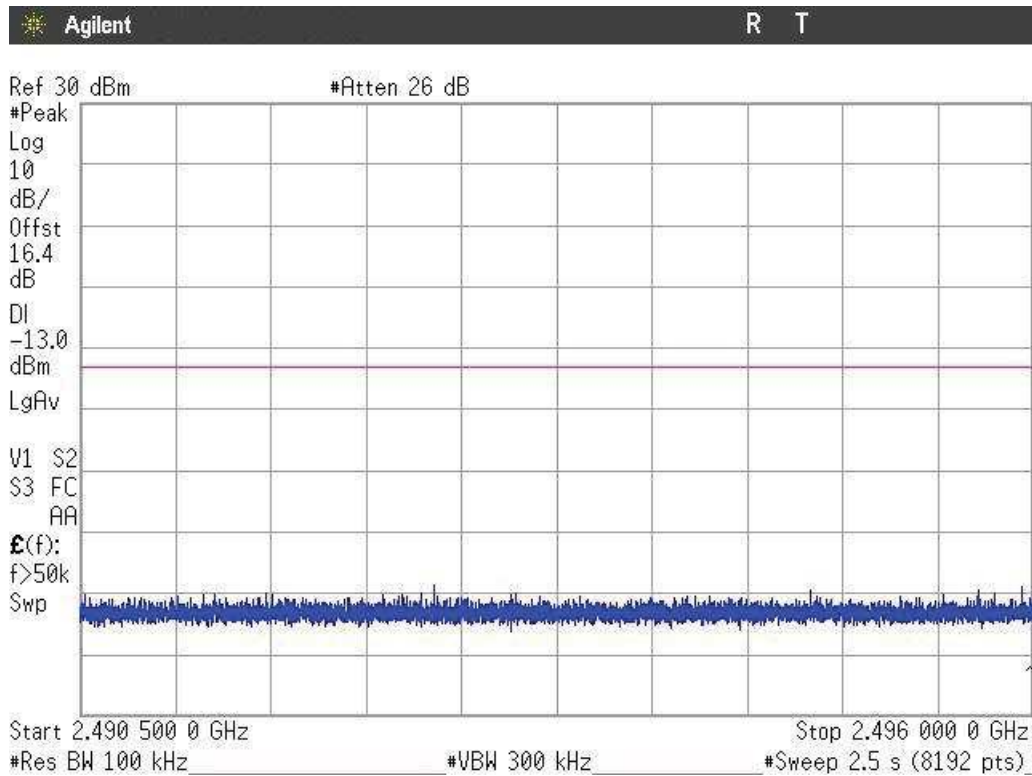
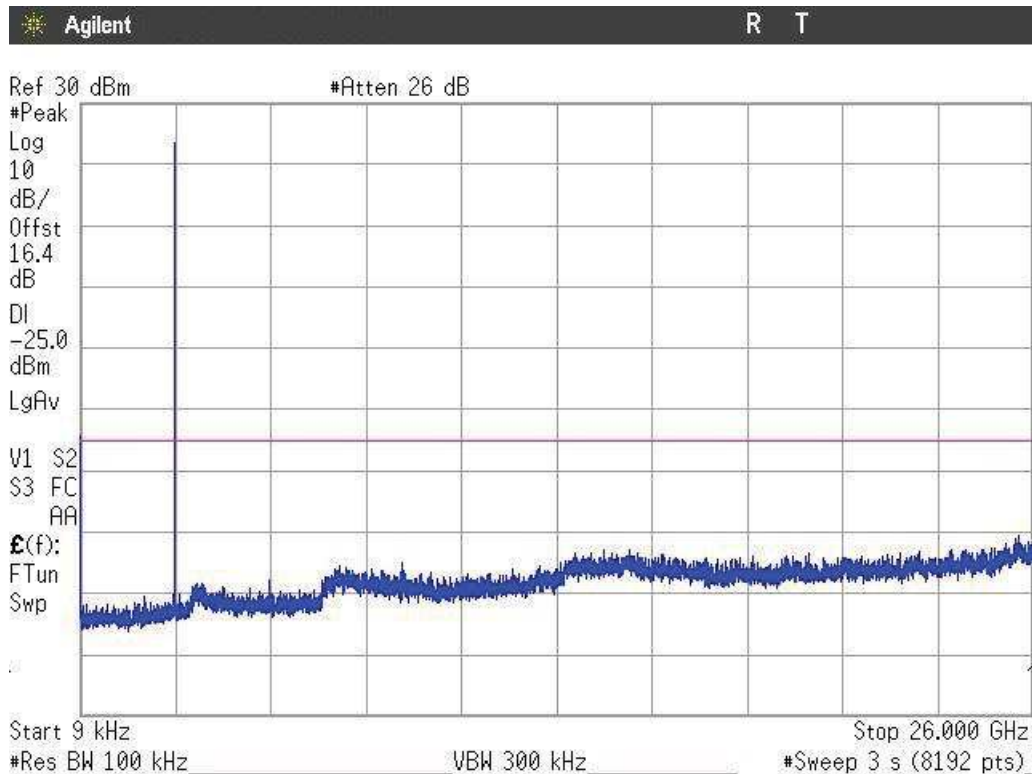
The peak above the limit is the carrier frequency.



Middle Channel:

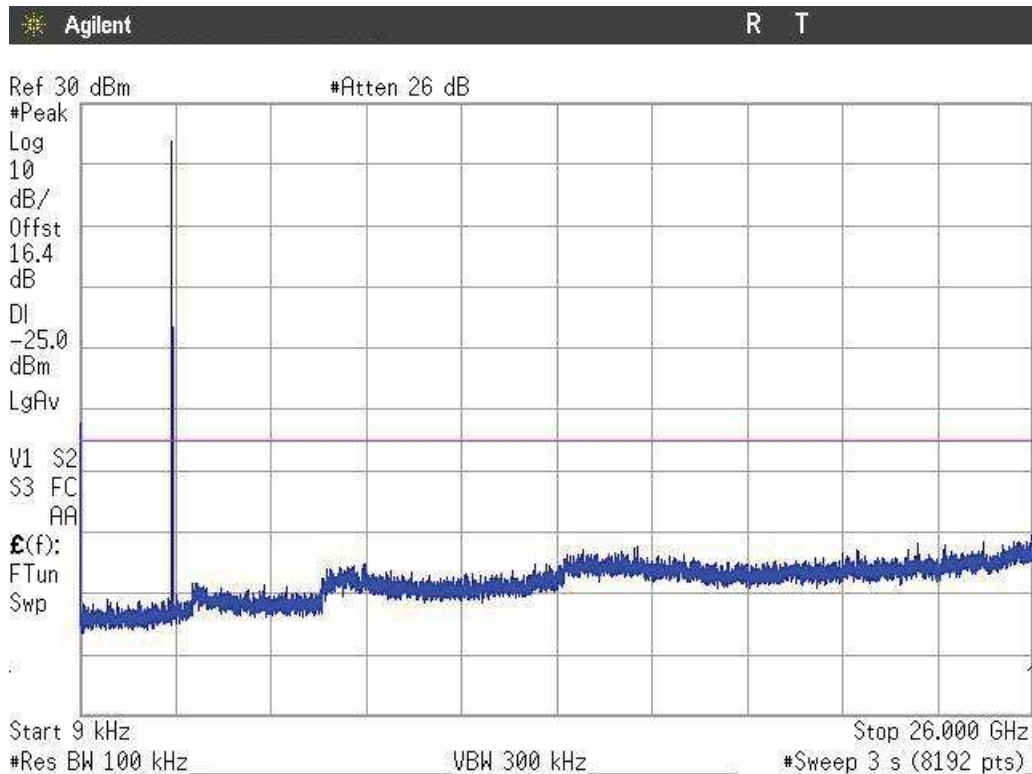


Highest Channel:

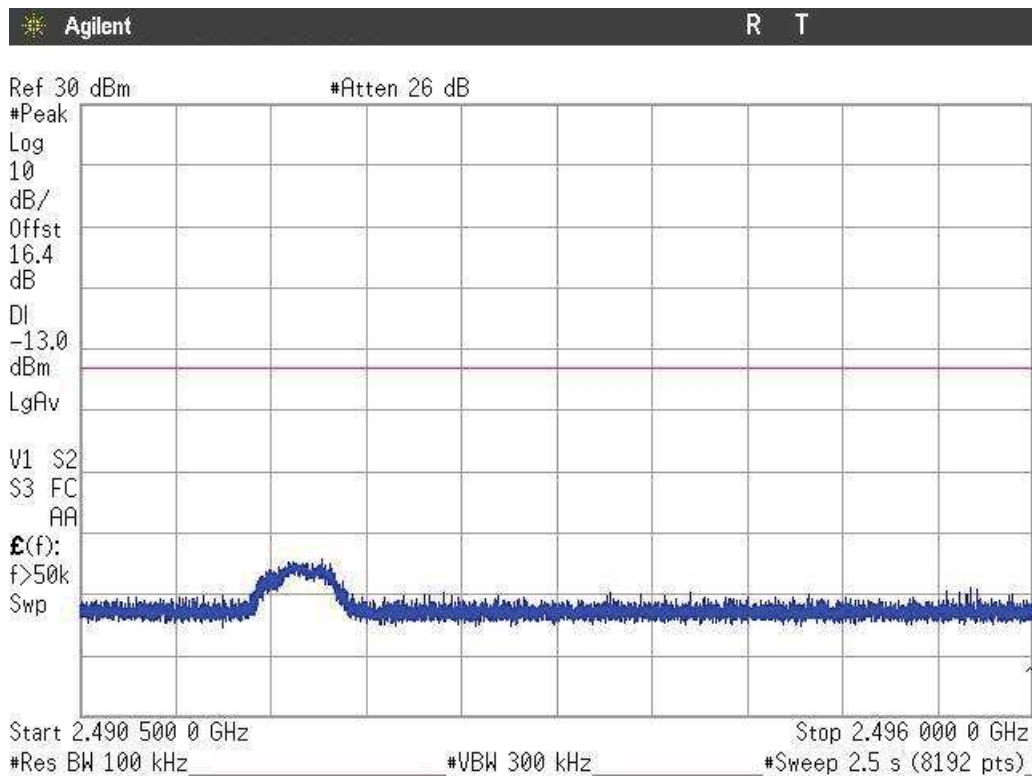


LTE Band 7. QPSK MODULATION. BW = 10 MHz.

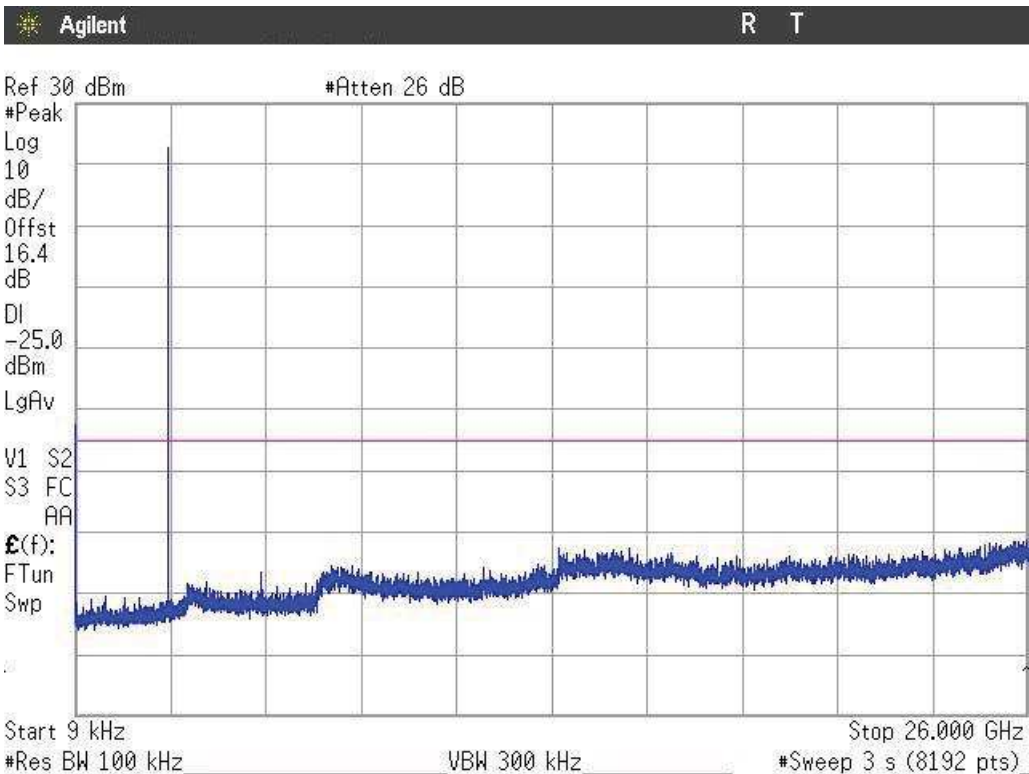
Lowest Channel:



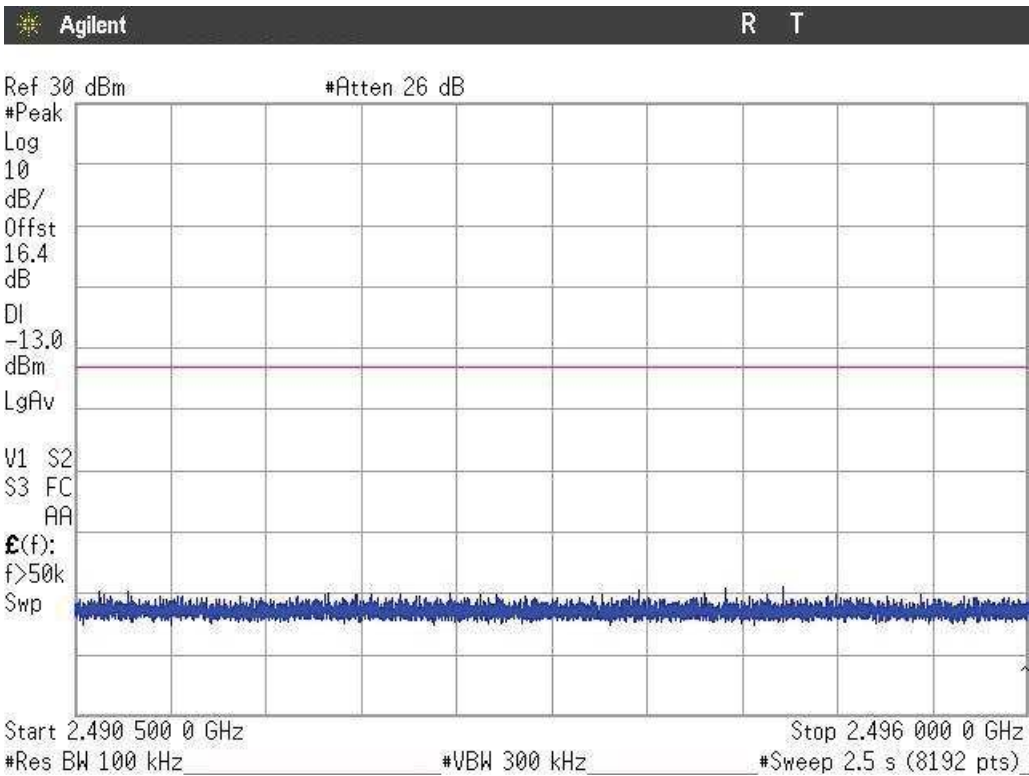
The peak above the limit is the carrier frequency.



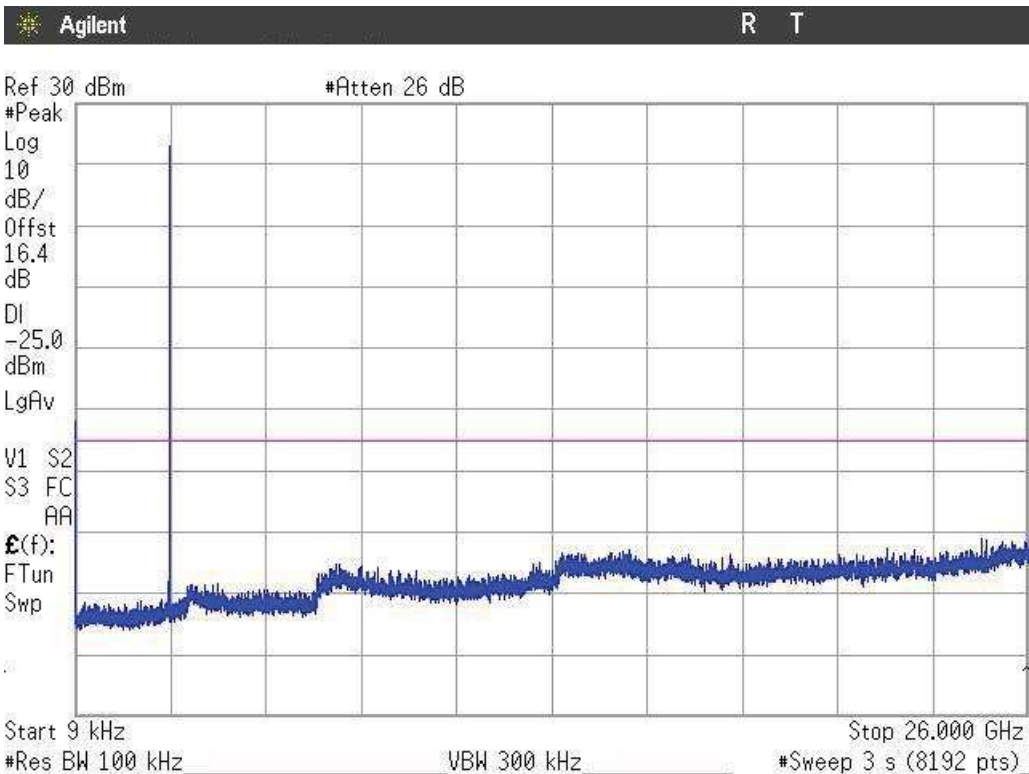
Middle Channel:



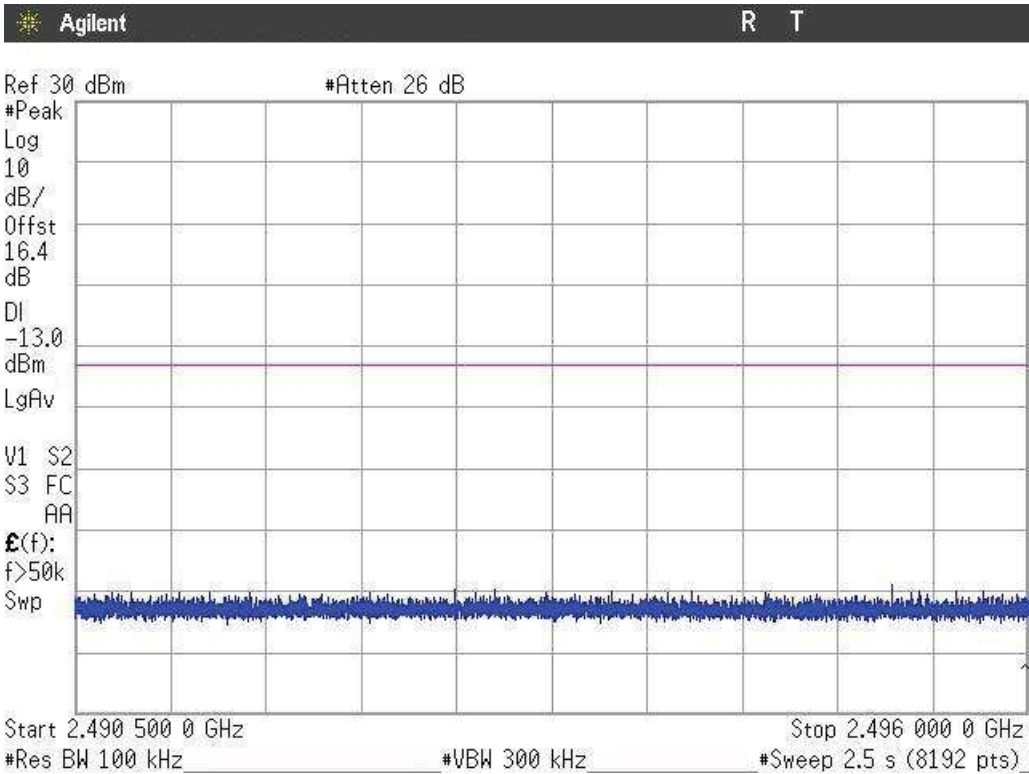
The peak above the limit is the carrier frequency.



Highest Channel:

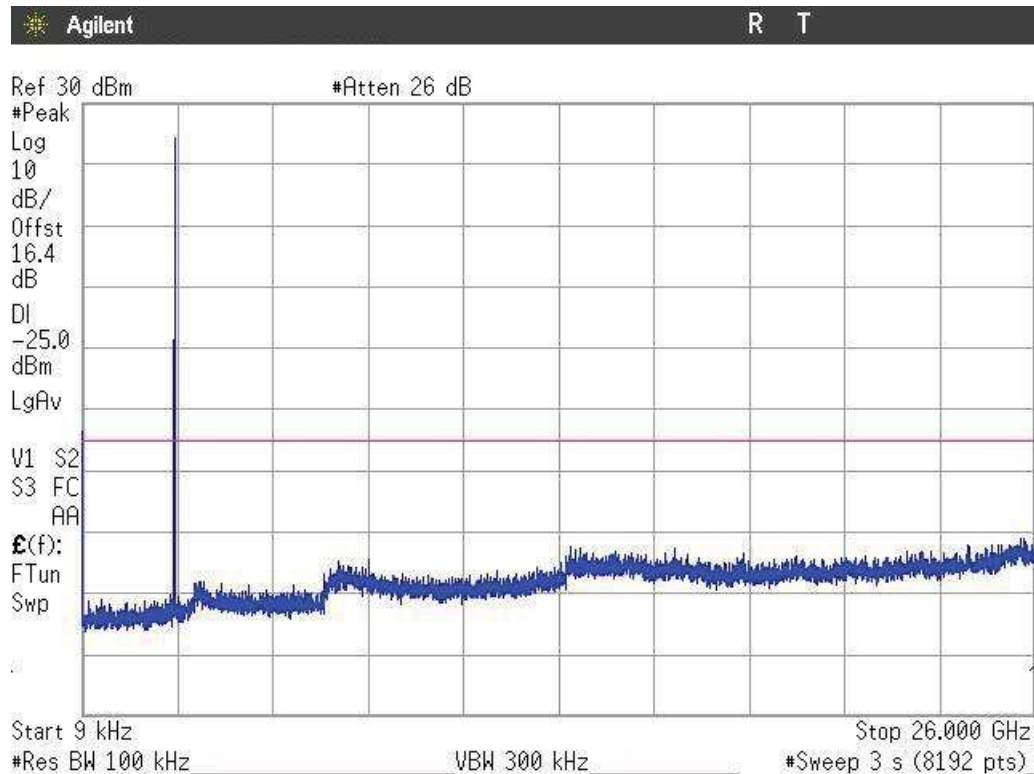


The peak above the limit is the carrier frequency.

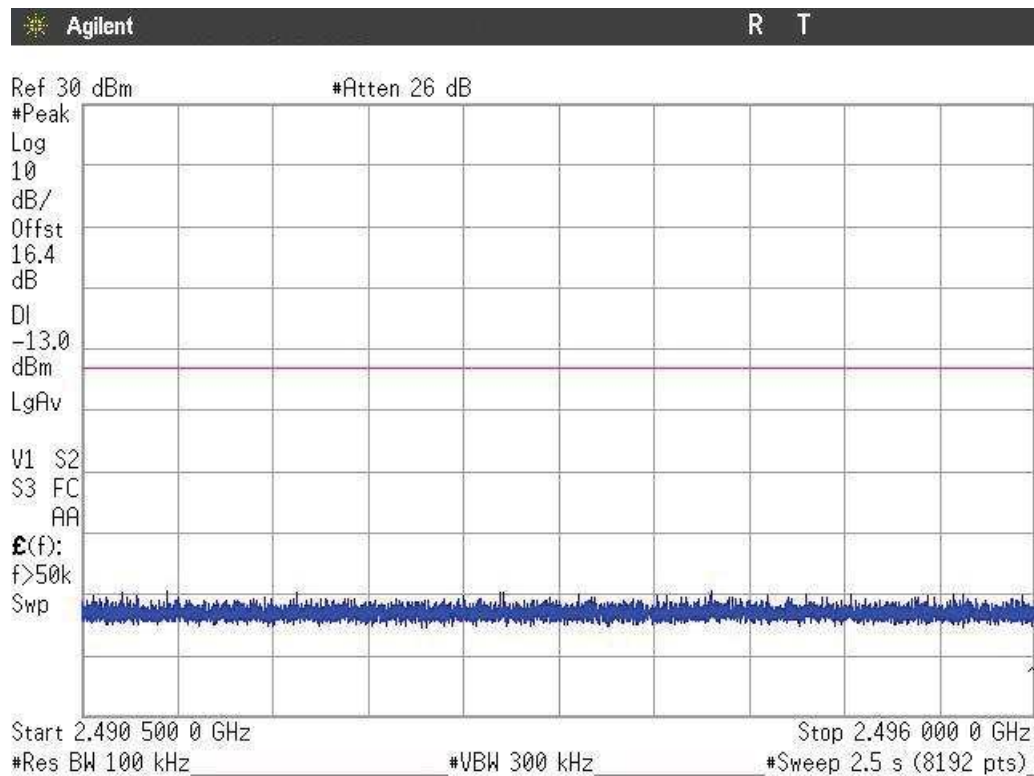


LTE Band 7. QPSK MODULATION. BW = 15 MHz.

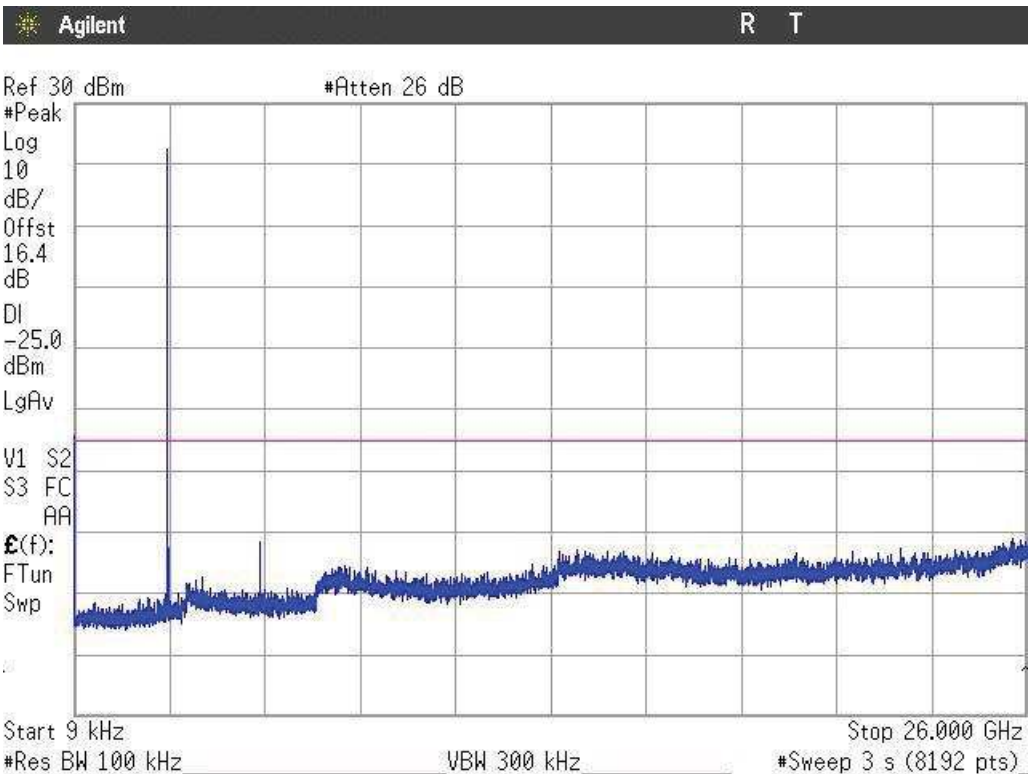
Lowest Channel:



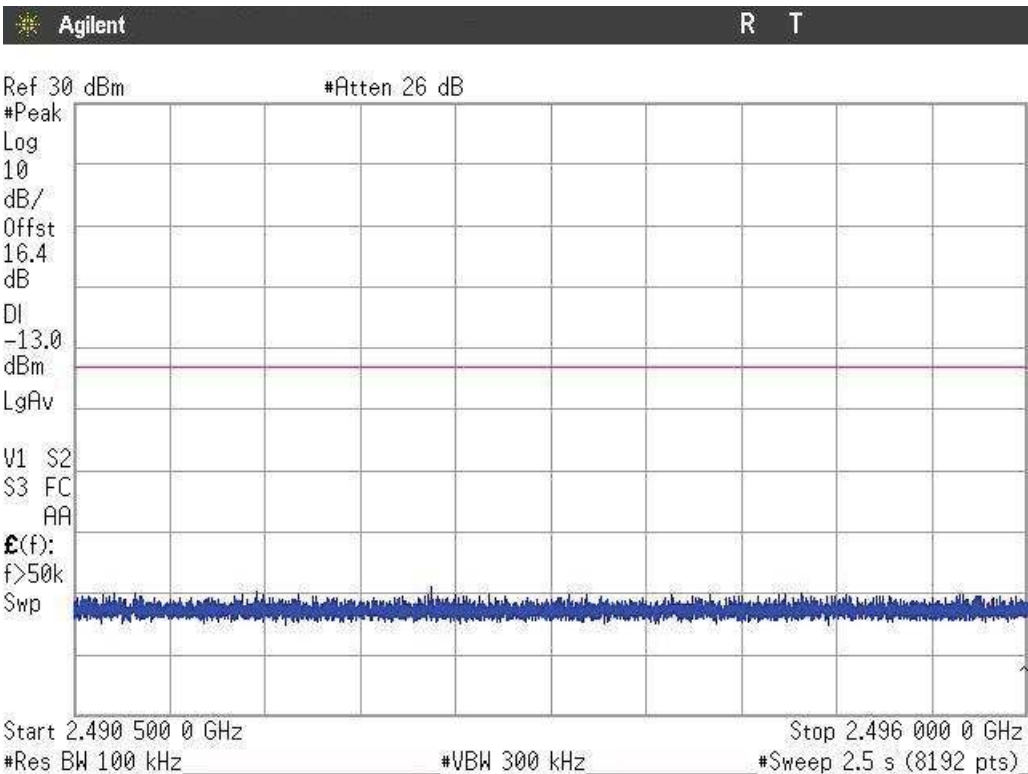
The peak above the limit is the carrier frequency.



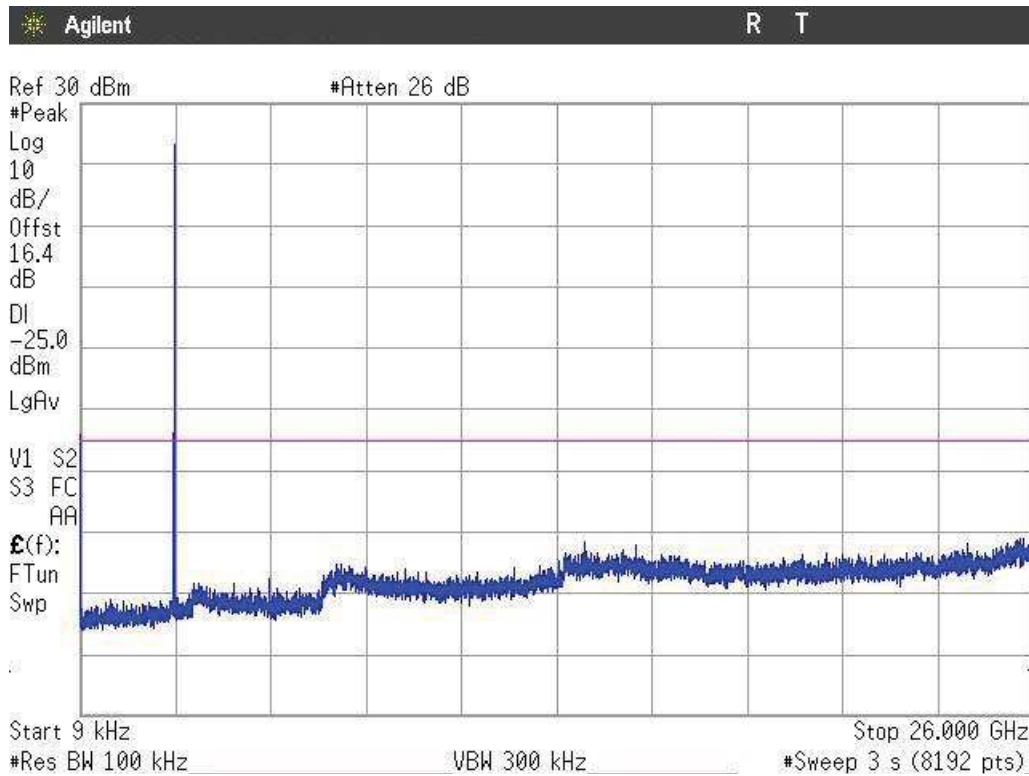
Middle Channel:



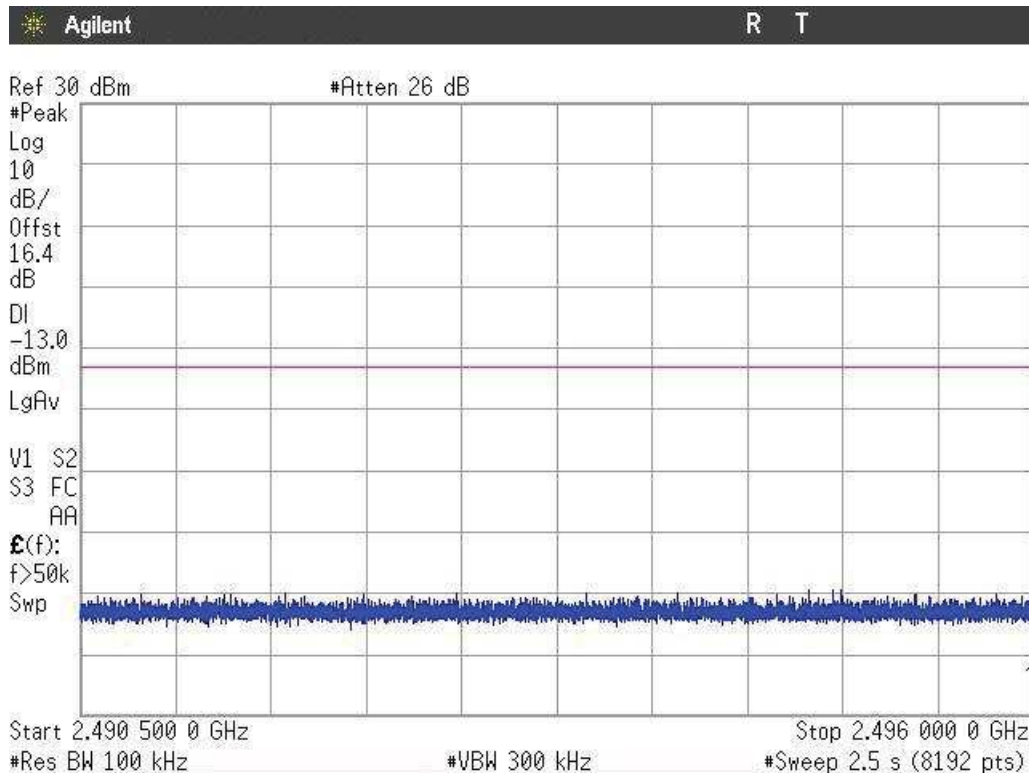
The peak above the limit is the carrier frequency.



Highest Channel:

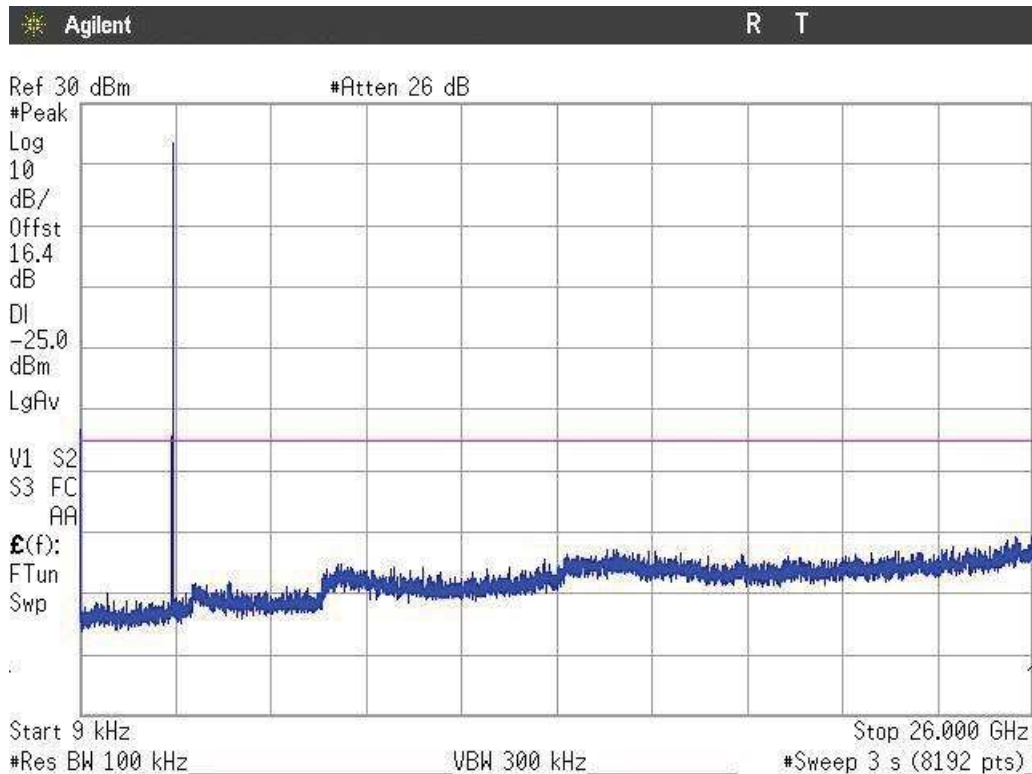


The peak above the limit is the carrier frequency.

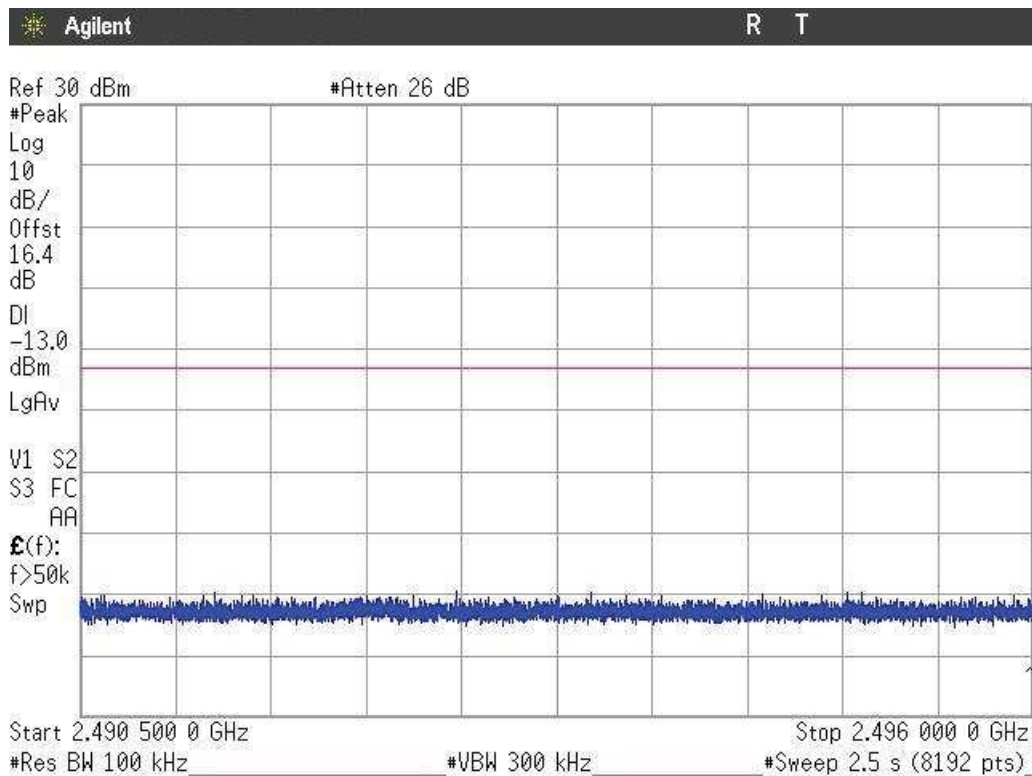


LTE Band 7. 16QAM MODULATION. BW = 20 MHz.

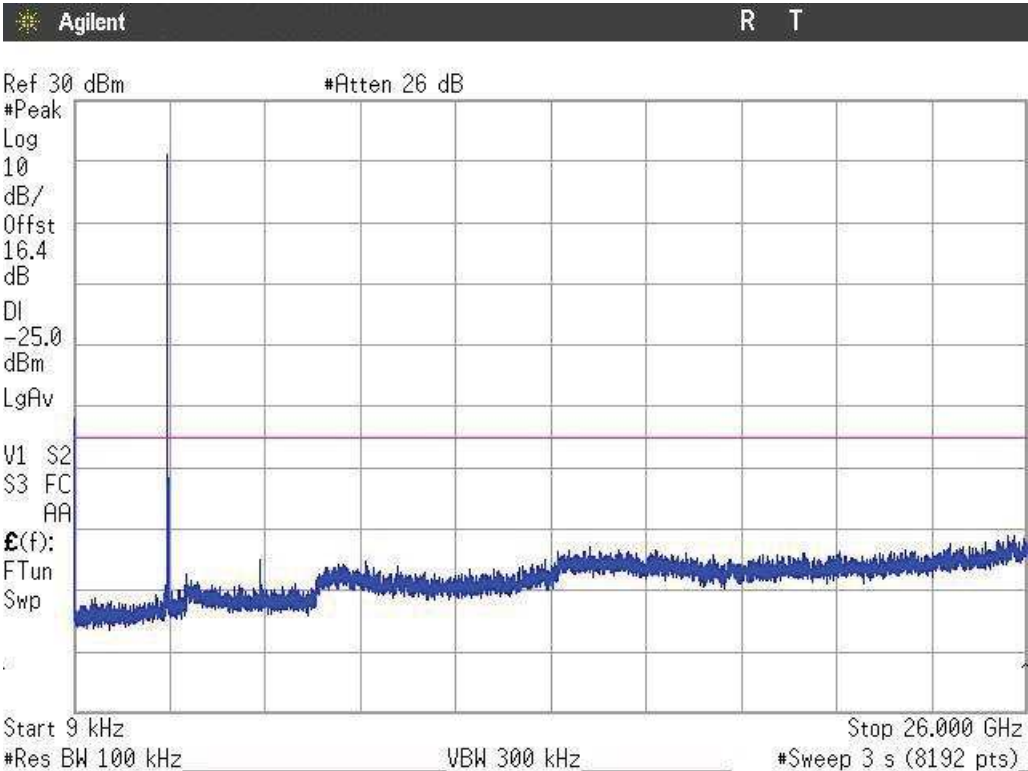
Lowest Channel:



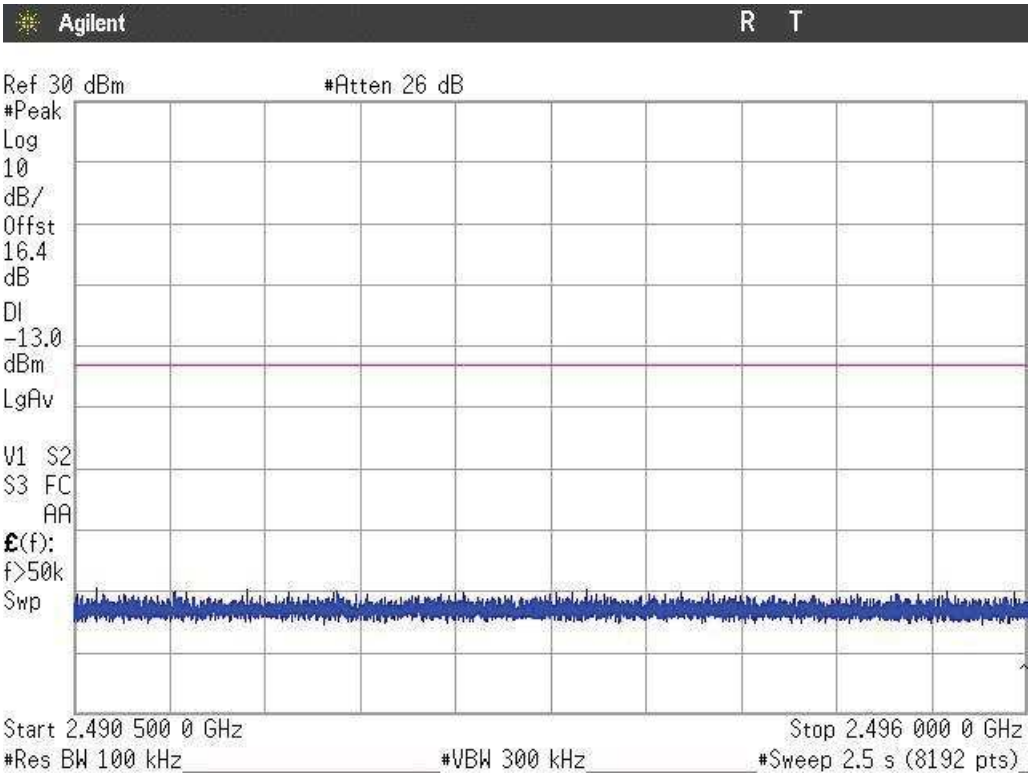
The peak above the limit is the carrier frequency.



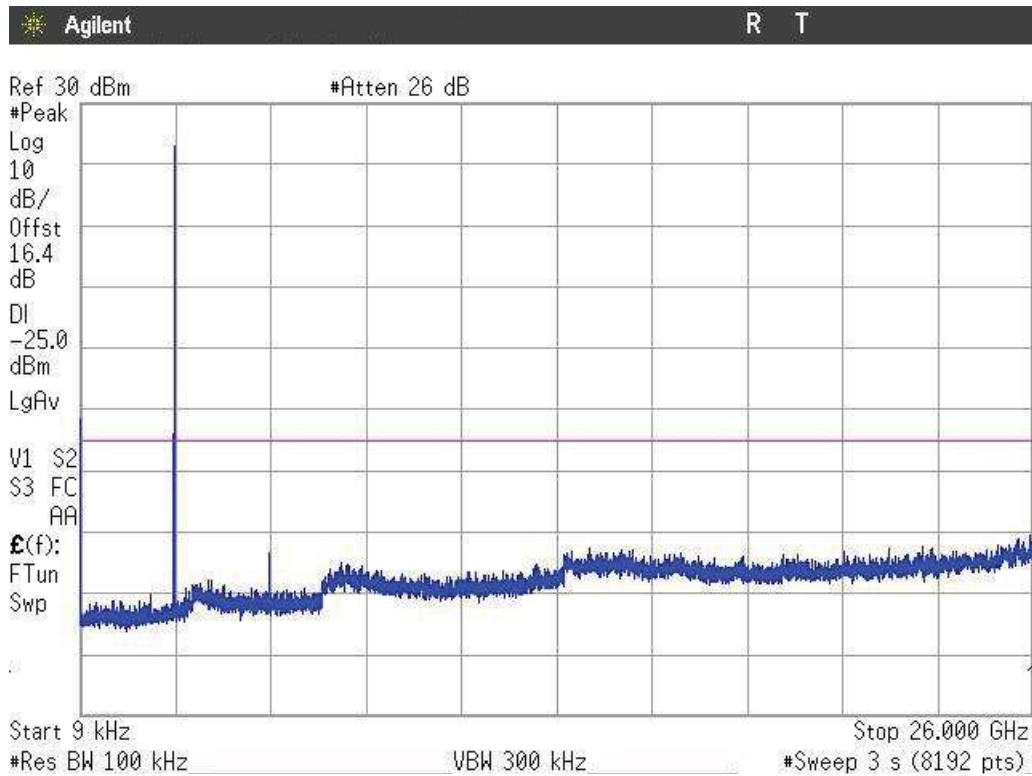
Middle Channel:



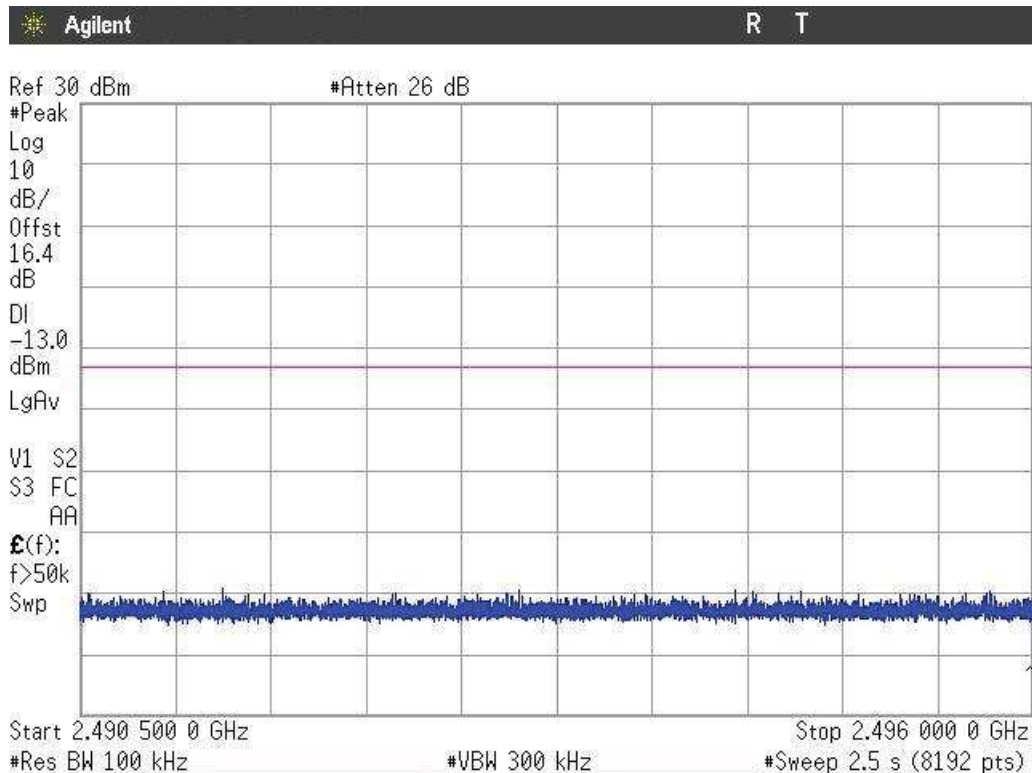
The peak above the limit is the carrier frequency.



Highest Channel:

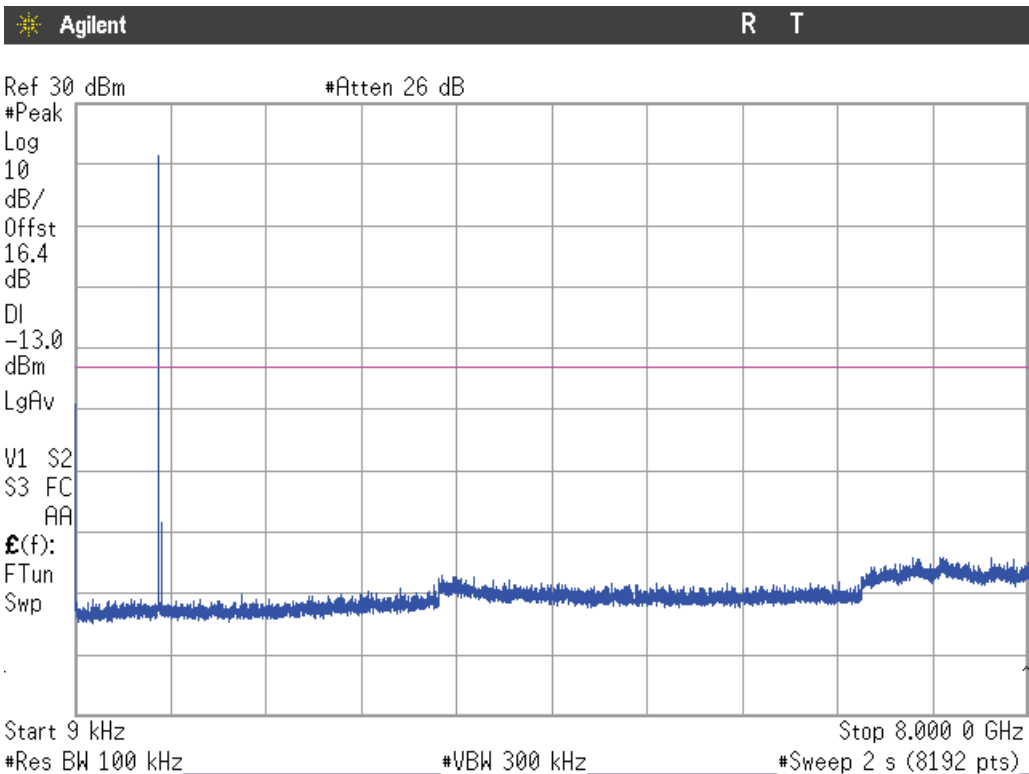


The peak above the limit is the carrier frequency.



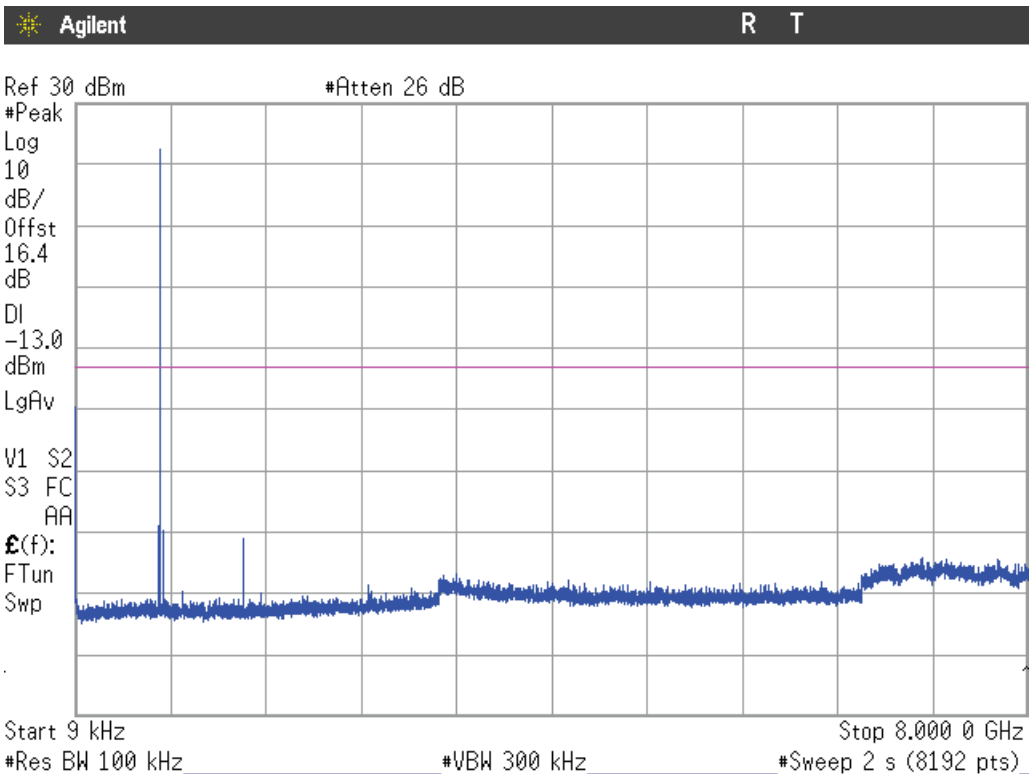
LTE Band 12. QPSK MODULATION. BW = 1.4 MHz.

Lowest Channel:



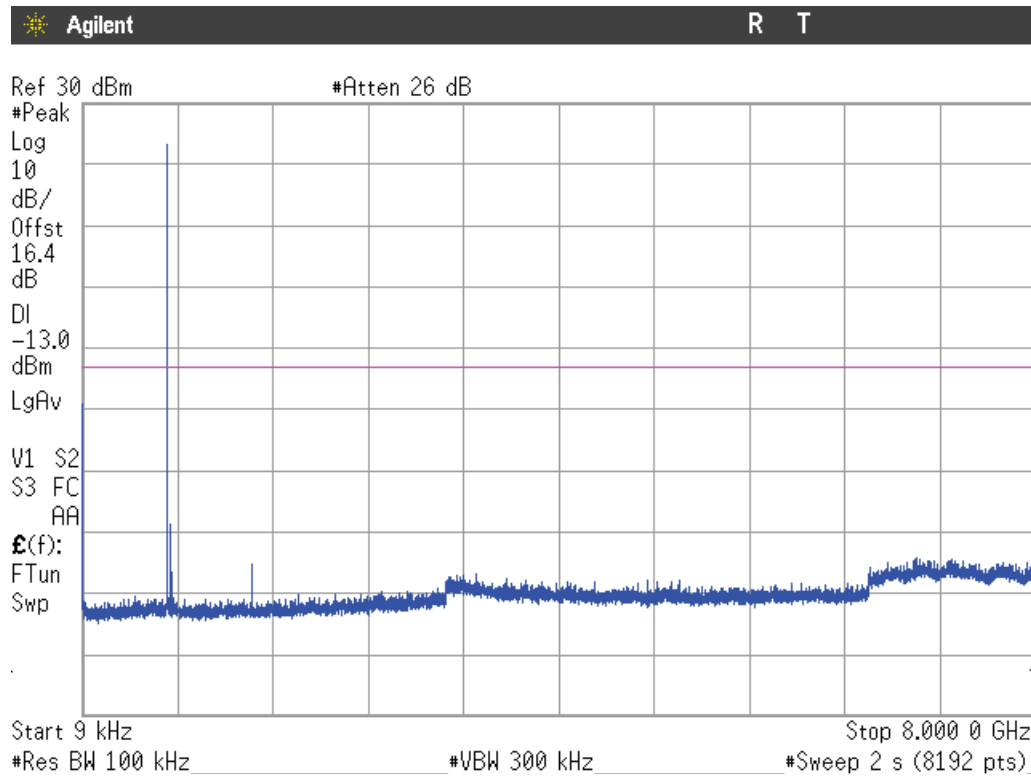
The peak above the limit is the carrier frequency.

Middle Channel:



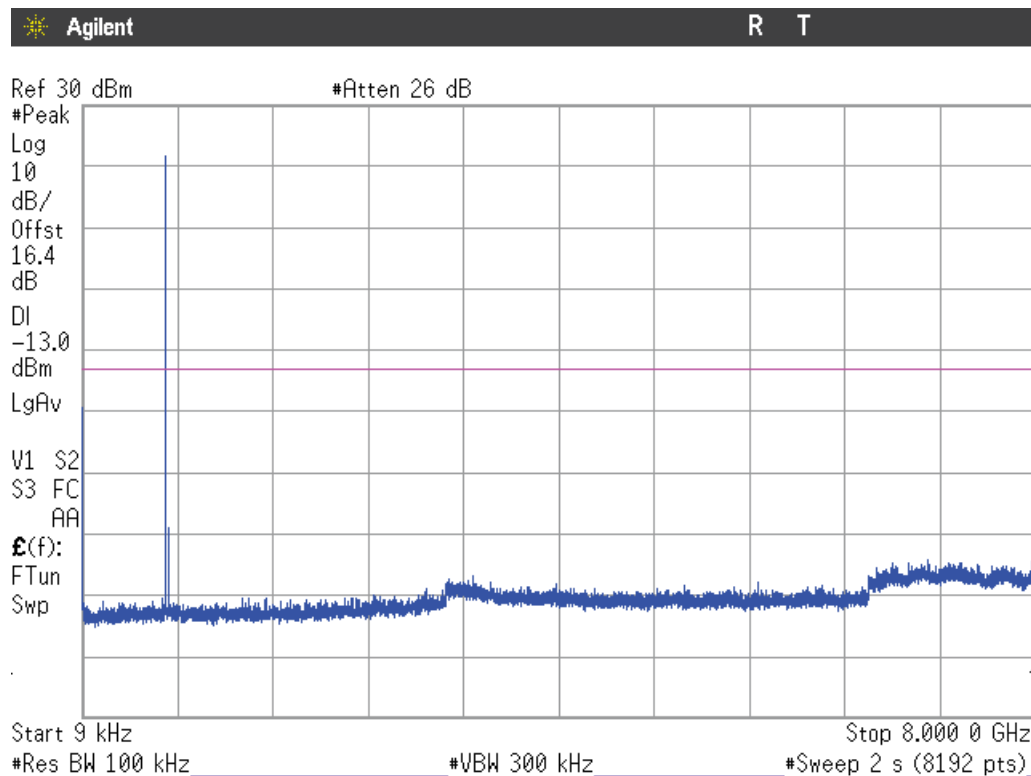
The peak above the limit is the carrier frequency.

Highest Channel:

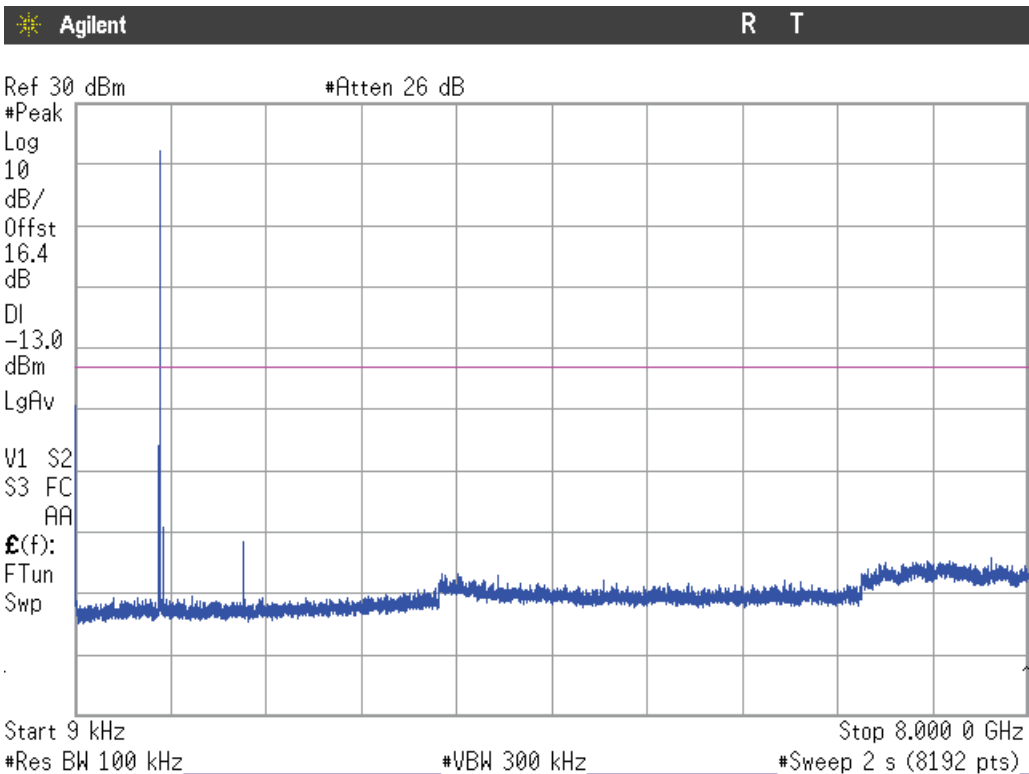


LTE Band 12. QPSK MODULATION. BW = 3 MHz.

Lowest Channel:

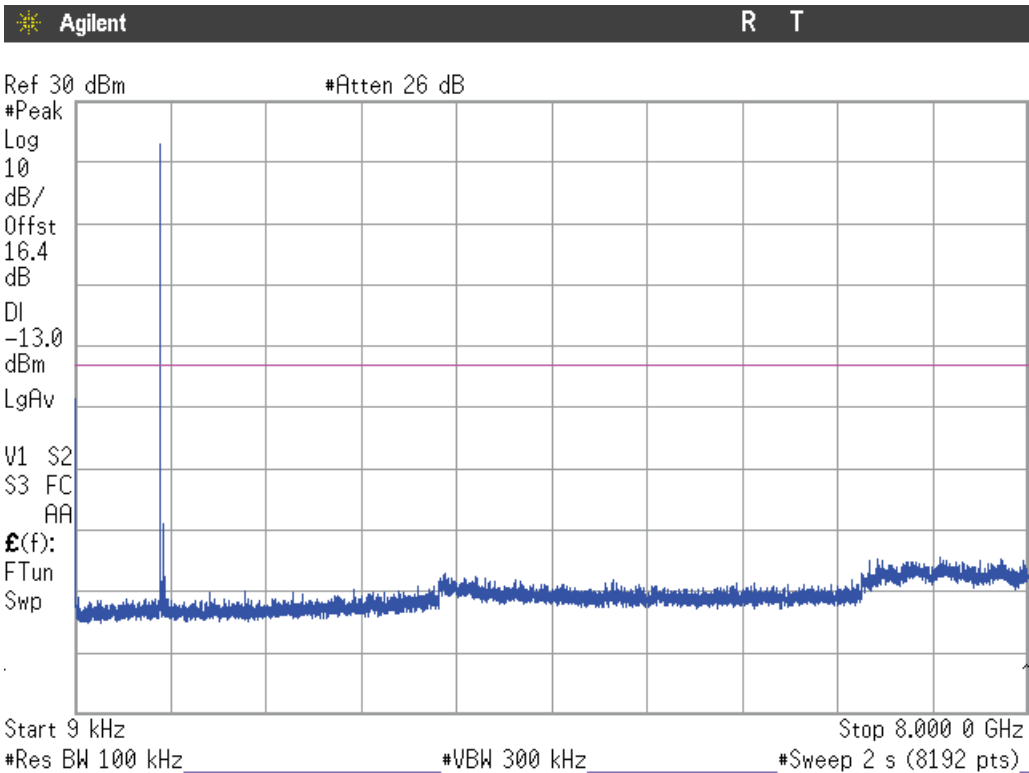


Middle Channel:



The peak above the limit is the carrier frequency.

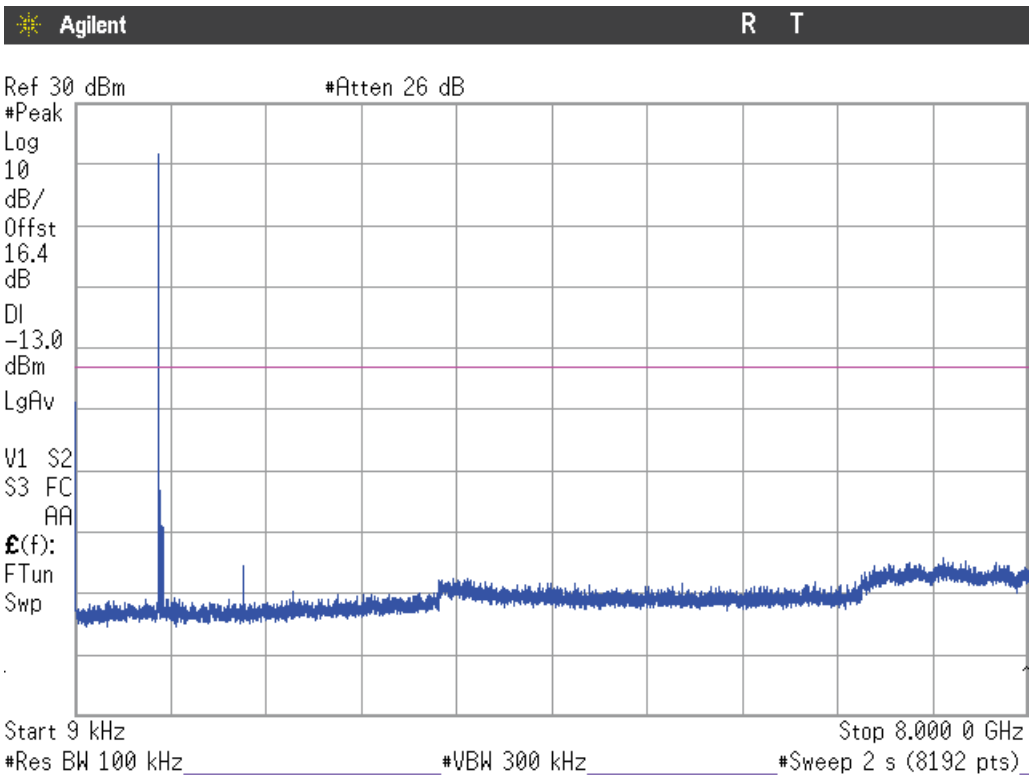
Highest Channel:



The peak above the limit is the carrier frequency.

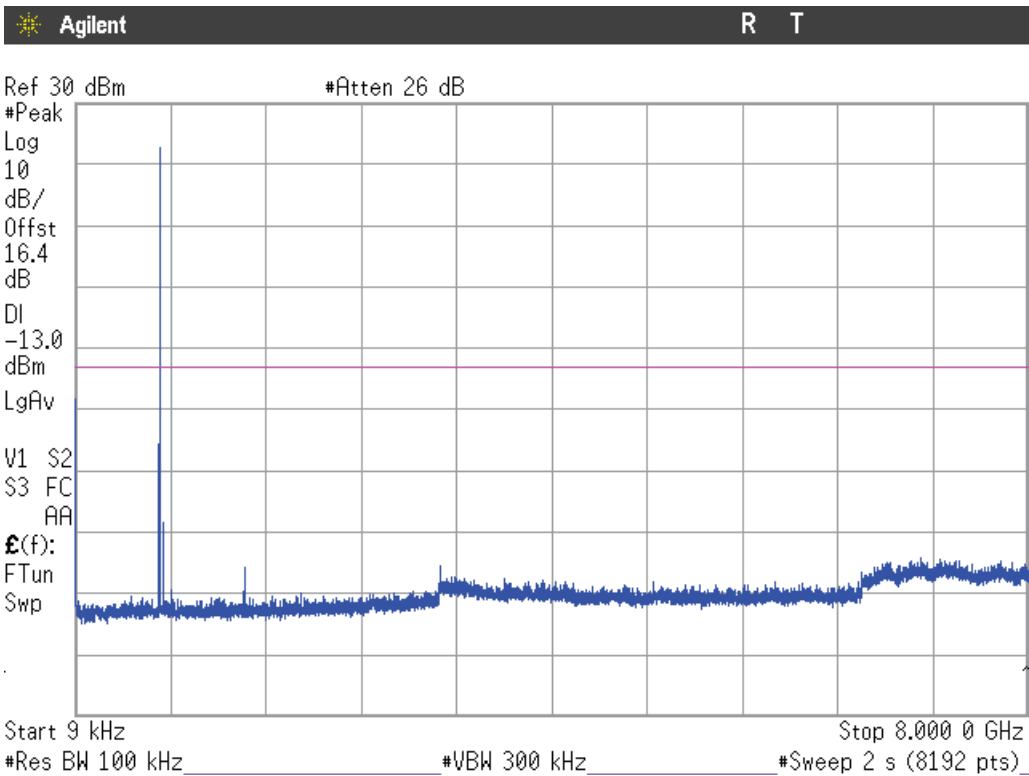
LTE Band 12. QPSK MODULATION. BW = 5 MHz.

Lowest Channel:



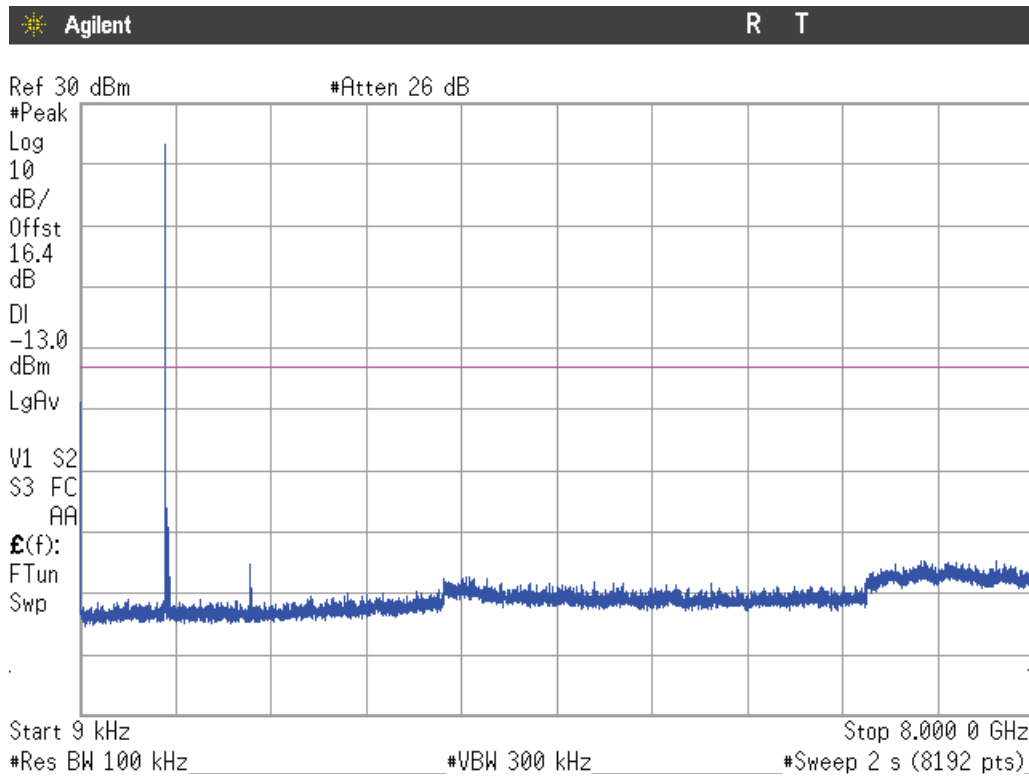
The peak above the limit is the carrier frequency.

Middle Channel:



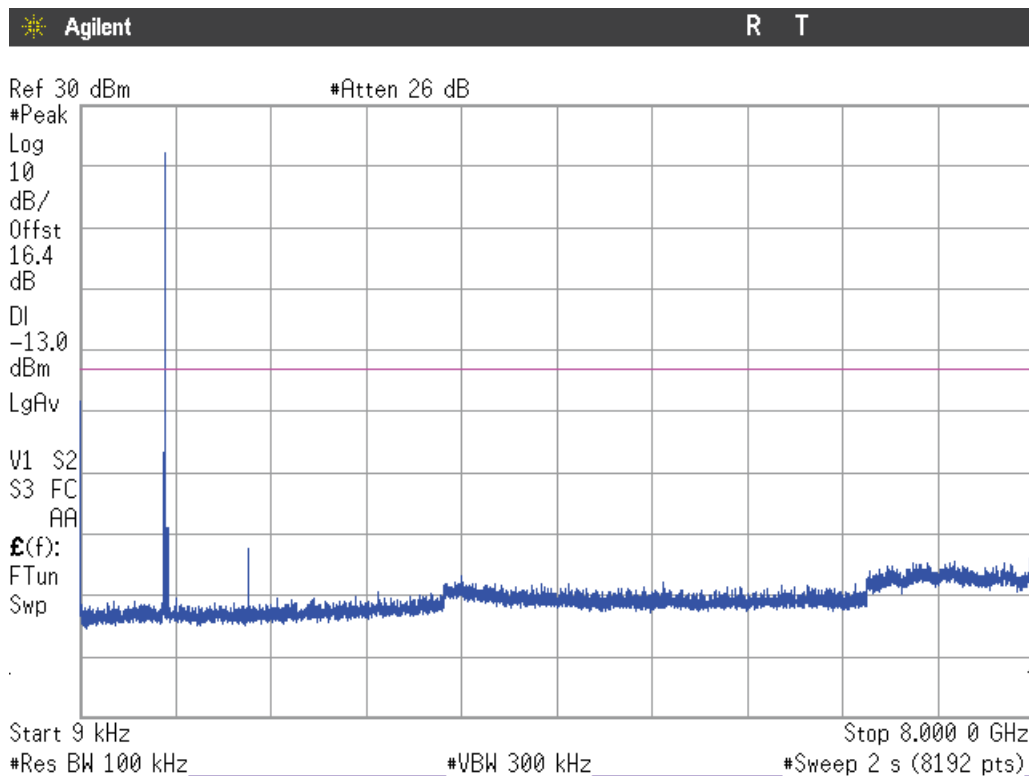
The peak above the limit is the carrier frequency.

Highest Channel:

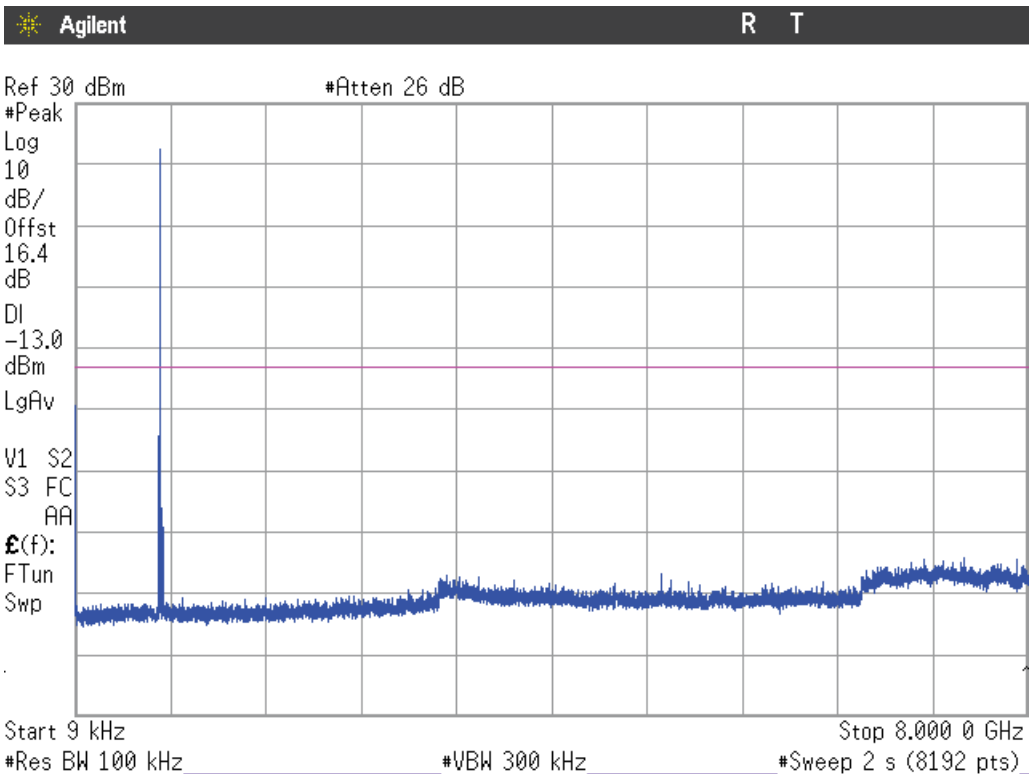


LTE Band 12. QPSK MODULATION. BW = 10 MHz.

Lowest Channel:

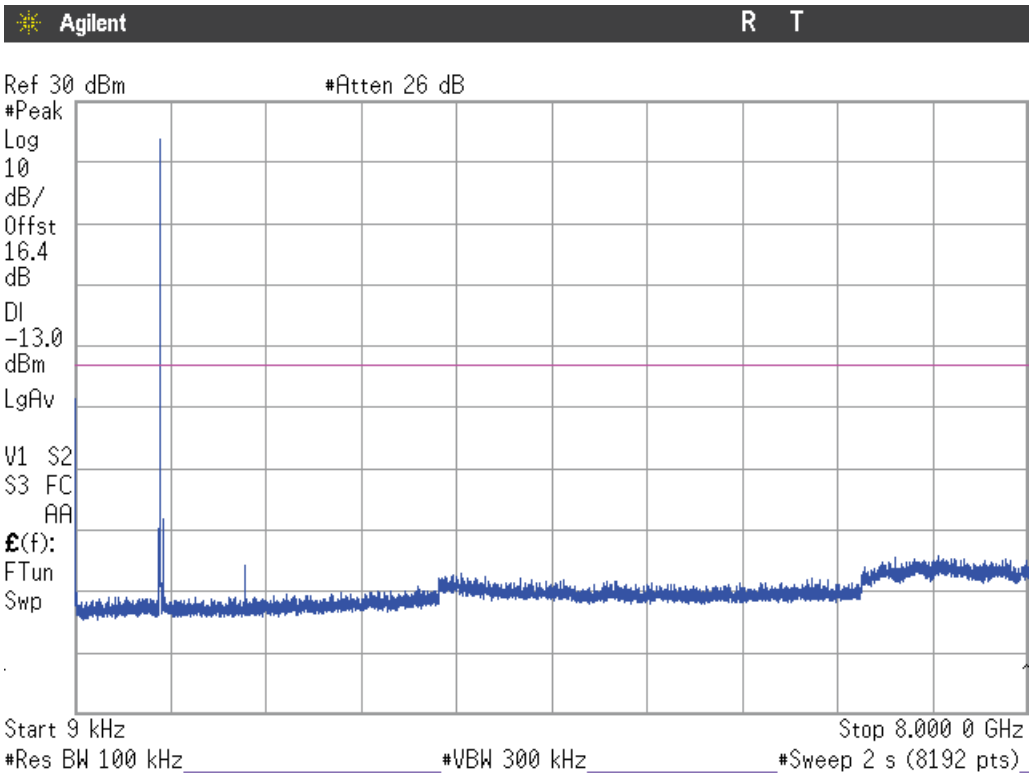


Middle Channel:



The peak above the limit is the carrier frequency.

Highest Channel:



The peak above the limit is the carrier frequency.