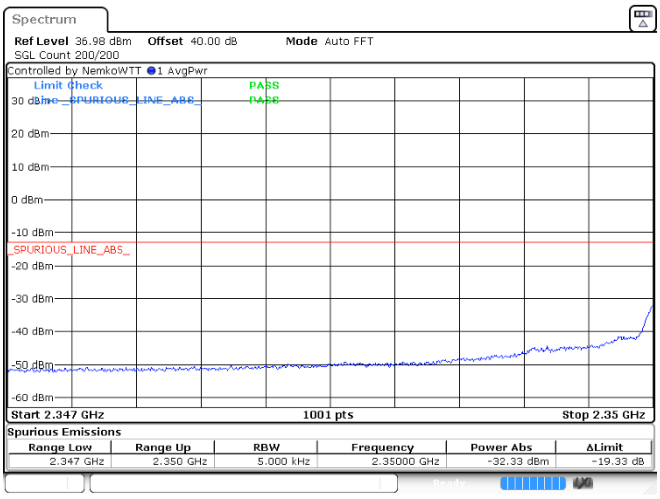
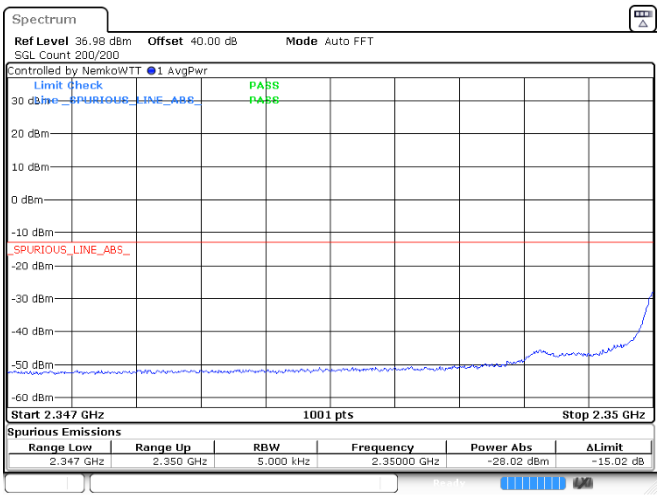
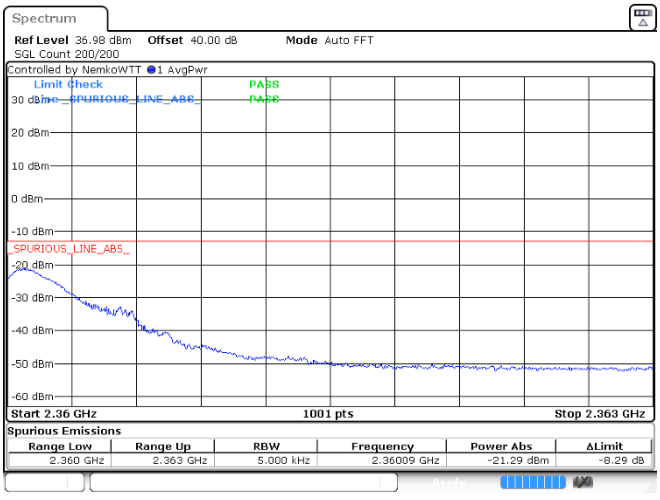


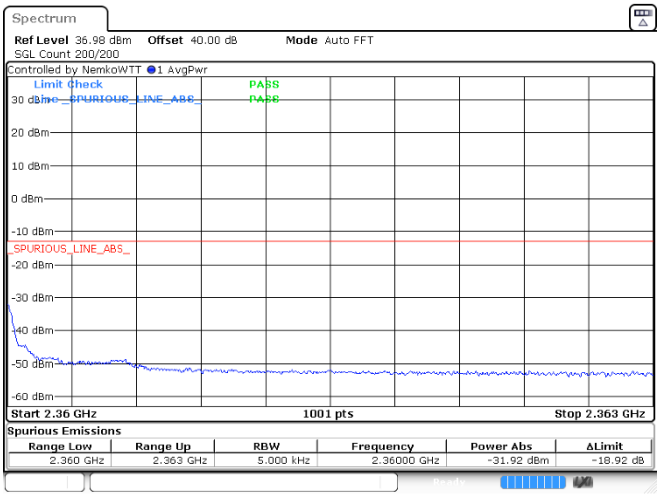
Low band edge, 2 signals, level = AGC Threshold + 3



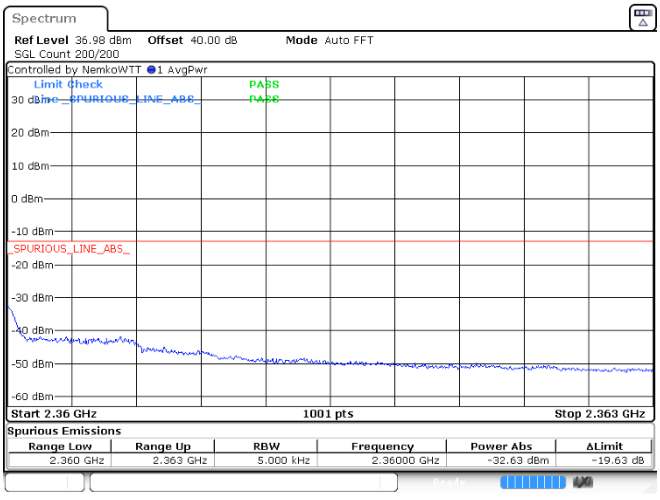
Low band edge, 1 signal, level = AGC Threshold + 3



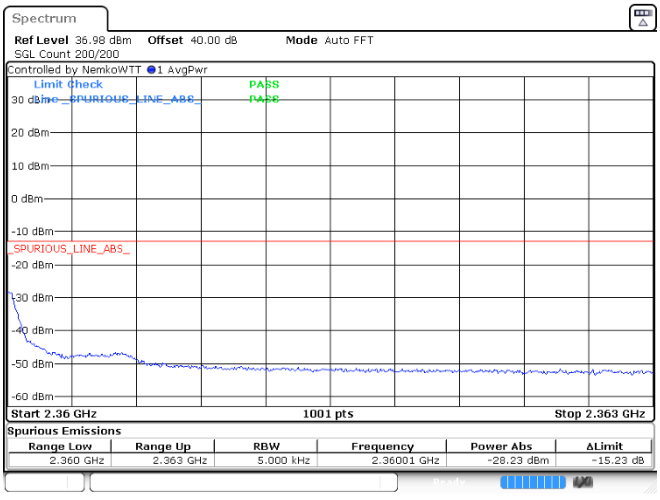
High band edge, 2 signals, level = AGC Threshold - 0.5



High band edge, 1 signal, level = AGC Threshold - 0.5



High band edge, 2 signals, level = AGC Threshold + 3

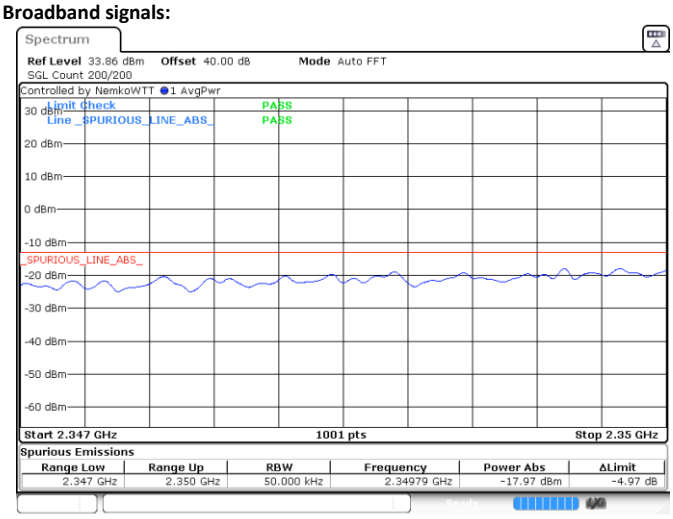


Low band edge, 1 signal, level = AGC Threshold + 3

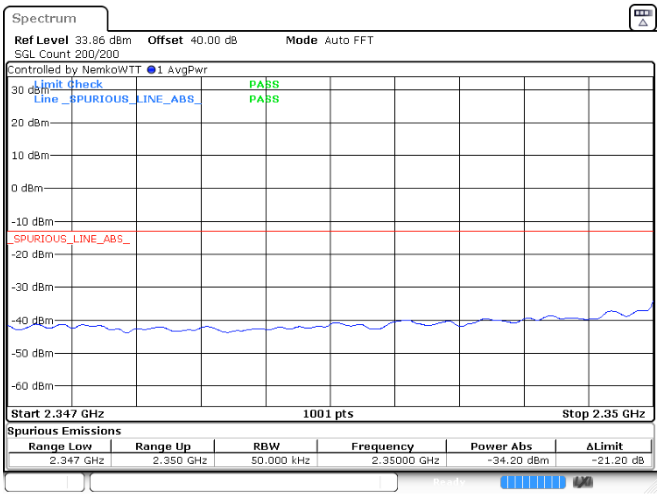
Table 8.5-6: *Spurious emissions at RF connector test data, broadband*

Condition	Frequency of highest emission (MHz)	Level (dBm)	Limit (dBm)
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **2** **Low** band edge	2349.785714	-17.97	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **1** **Low** band edge	2349.998501	-34.20	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **2** **Low** band edge	2349.998501	-30.61	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **1** **Low** band edge	2349.998501	-34.59	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **2** **High** band edge	2360.139361	-35.08	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **1** **High** band edge	2360.001499	-34.46	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **2** **High** band edge	2360.079421	-32.65	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **1** **High** band edge	2630.001499	-33.71	-13.00

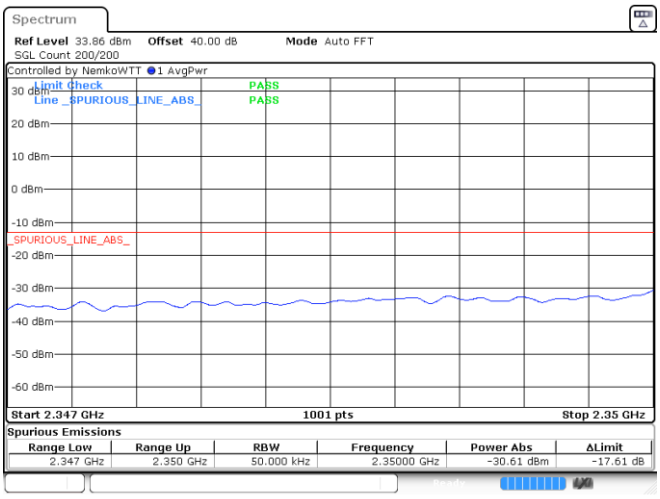
Broadband signals:



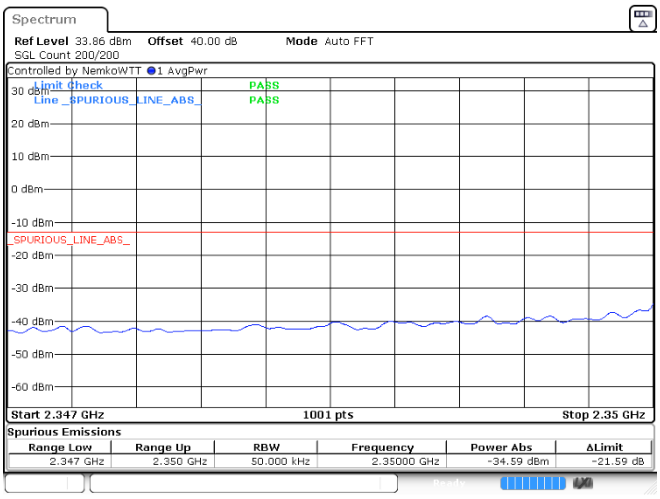
Low band edge, 2 signals, level = AGC Threshold - 0.5



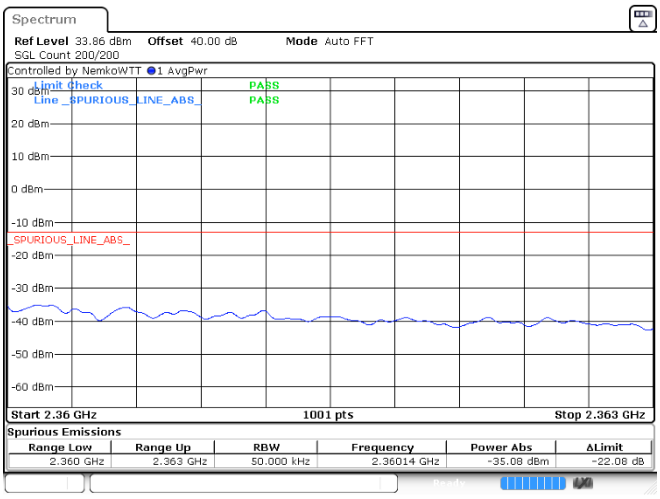
Low band edge, 1 signal, level = AGC Threshold - 0.5



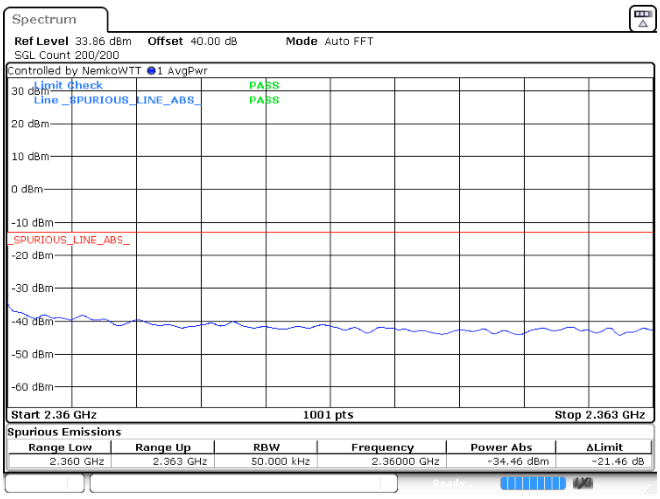
Low band edge, 2 signals, level = AGC Threshold + 3



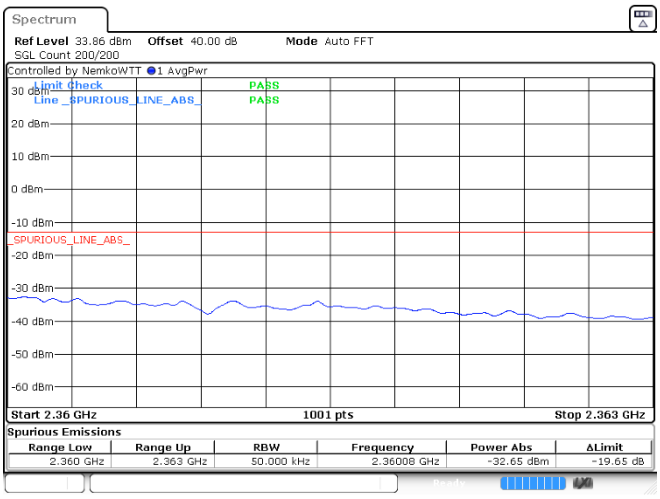
Low band edge, 1 signal, level = AGC Threshold + 3



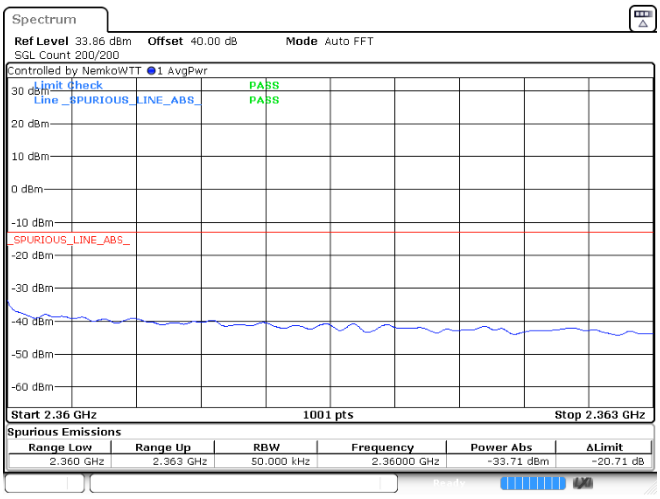
High band edge, 2 signals, level = AGC Threshold - 0.5



High band edge, 1 signal, level = AGC Threshold - 0.5



High band edge, 2 signals, level = AGC Threshold + 3



Low band edge, 1 signal, level = AGC Threshold + 3

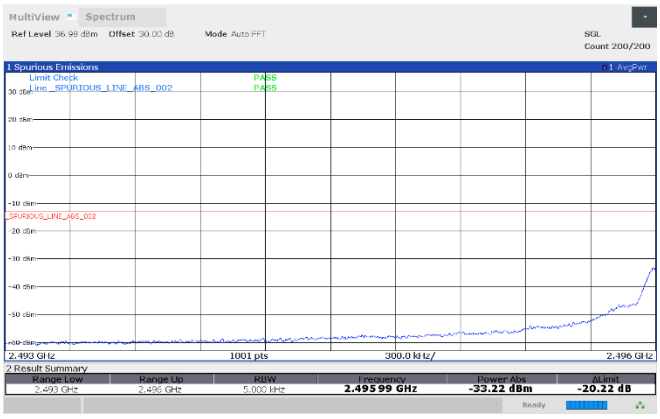
8.5.5.4 Operating frequency band: band 41: 2496 – 2690 MHz

Table 8.5-7: *Spurious emissions at RF connector test data, narrowband*

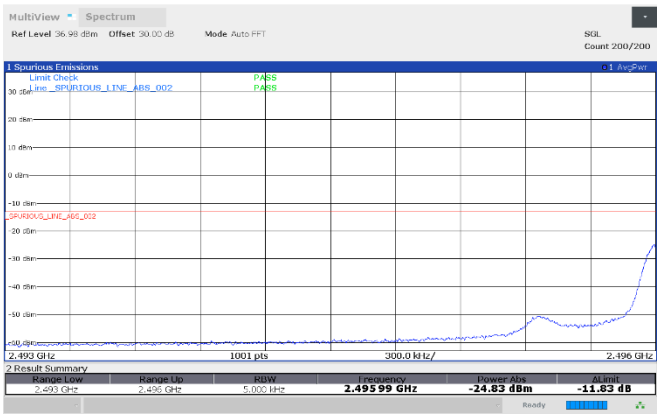
Condition	Frequency of highest emission (MHz)	Level (dBm)	Limit (dBm)
Input Level = **AGC Threshold - -0.5 dB** Input signal = **narrowband** Number of signals: **2** **Low** band edge	2495.986513	-33.22	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **narrowband** Number of signals: **1** **Low** band edge	2495.959510	-24.83	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **narrowband** Number of signals: **2** **Low** band edge	2495.995504	-32.88	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **narrowband** Number of signals: **1** **Low** band edge	2495.995504	-21.50	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **narrowband** Number of signals: **2** **High** band edge	2690.010490	-30.58	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **narrowband** Number of signals: **1** **High** band edge	2690.004496	-26.91	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **narrowband** Number of signals: **2** **High** band edge	2690.004496	-30.76	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **narrowband** Number of signals: **1** **High** band edge	2690.004496	-24.36	-13.00

Narrowband signal(s):

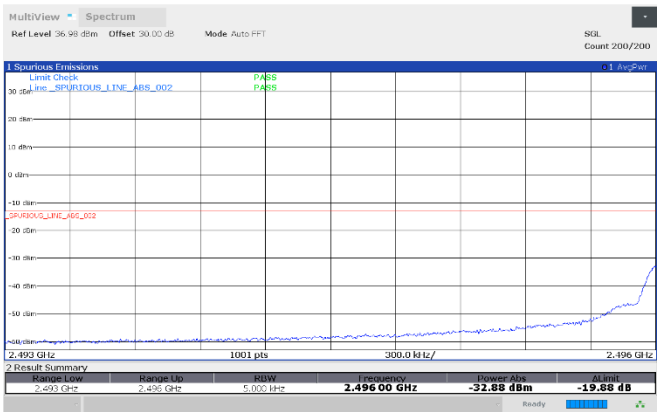
Low band edge, 2 signals, level = AGC Threshold - 0.5



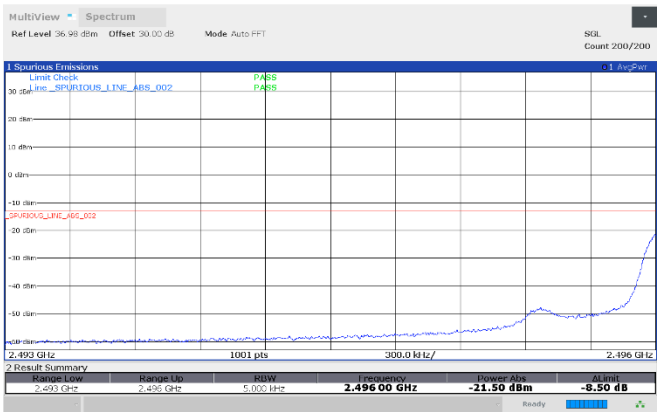
Low band edge, 1 signal, level = AGC Threshold - 0.5



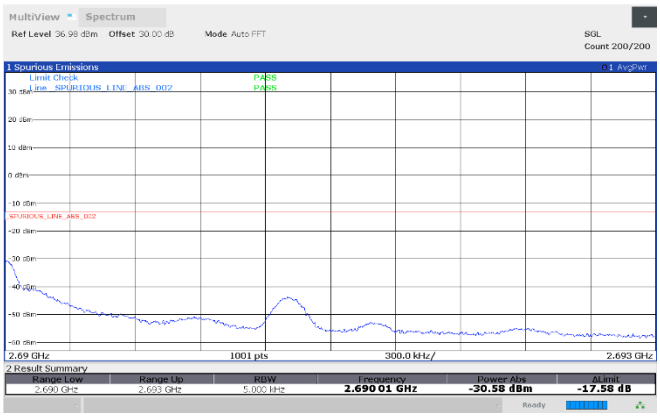
Low band edge, 2 signals, level = AGC Threshold + 3



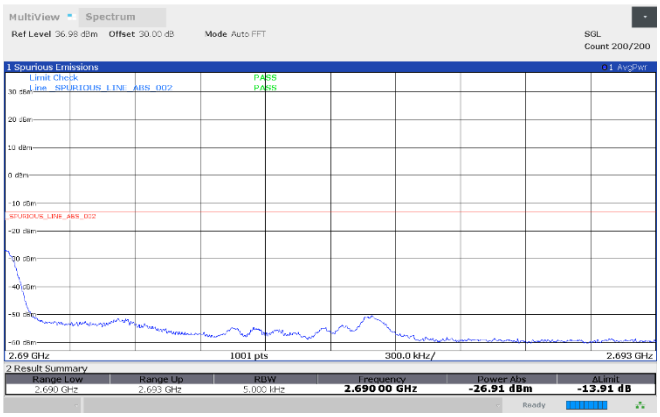
Low band edge, 1 signal, level = AGC Threshold + 3



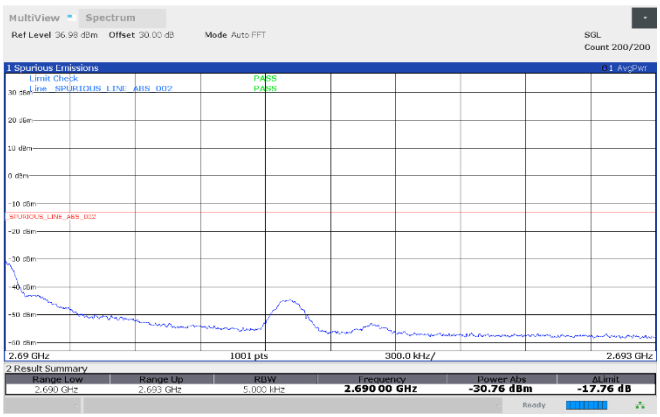
High band edge, 2 signals, level = AGC Threshold - 0.5



High band edge, 1 signal, level = AGC Threshold - 0.5



High band edge, 2 signals, level = AGC Threshold + 3



Low band edge, 1 signal, level = AGC Threshold + 3

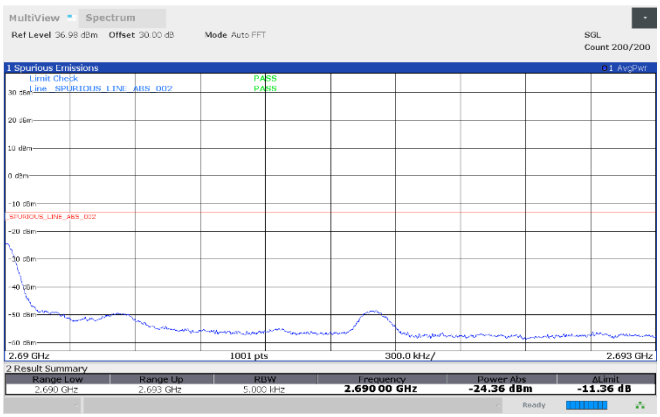


Table 8.5-8: *Spurious emissions at RF connector test data, broadband*

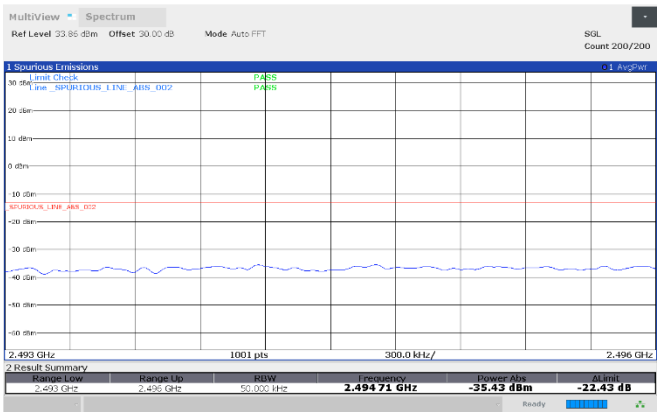
Condition	Frequency of highest emission (MHz)	Level (dBm)	Limit (dBm)
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **2** **Low** band edge	2495.216284	-32.13	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **1** **Low** band edge	2495.998501	-37.53	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **2** **Low** band edge	2494.706793	-35.43	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **1** **Low** band edge	2495.998501	-35.58	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **2** **High** band edge	2690.358142	-27.95	-13.00
Input Level = **AGC Threshold - -0.5 dB** Input signal = **broadband** Number of signals: **1** **High** band edge	2690.199301	-32.04	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **2** **High** band edge	2690.487013	-30.23	-13.00
Input Level = **AGC Threshold + 3 dB** Input signal = **broadband** Number of signals: **1** **High** band edge	2690.001499	-31.93	-13.00

Broadband signals:

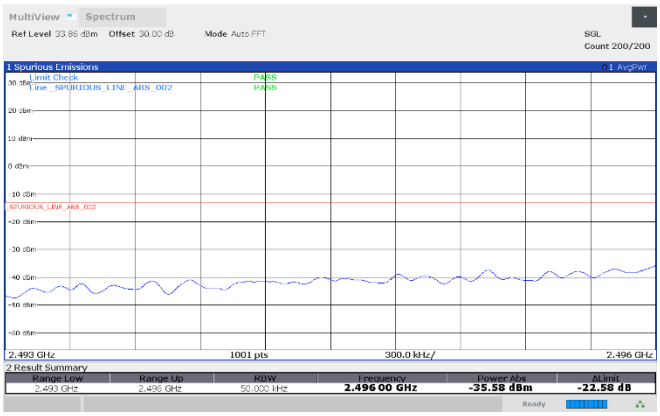
Low band edge, 2 signals, level = AGC Threshold - 0.5

Low band edge, 1 signal, level = AGC Threshold - 0.5

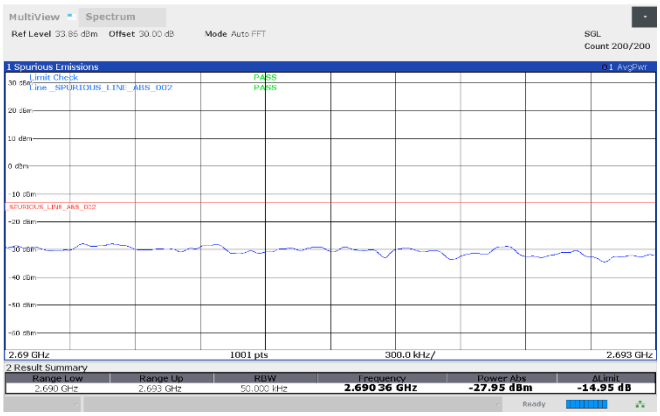
Low band edge, 2 signals, level = AGC Threshold + 3



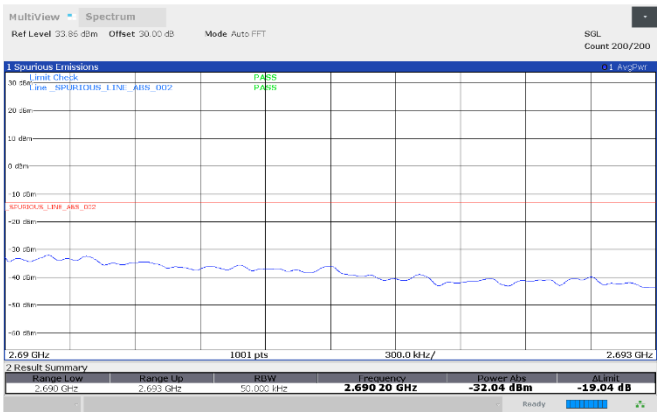
Low band edge, 1 signal, level = AGC Threshold + 3



High band edge, 2 signals, level = AGC Threshold - 0.5

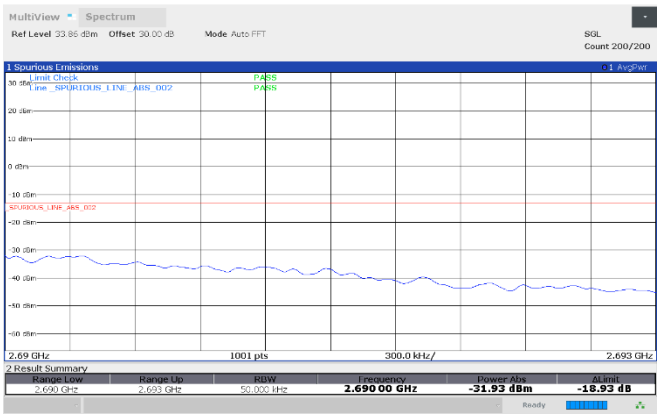


High band edge, 1 signal, level = AGC Threshold - 0.5



High band edge, 2 signals, level = AGC Threshold + 3

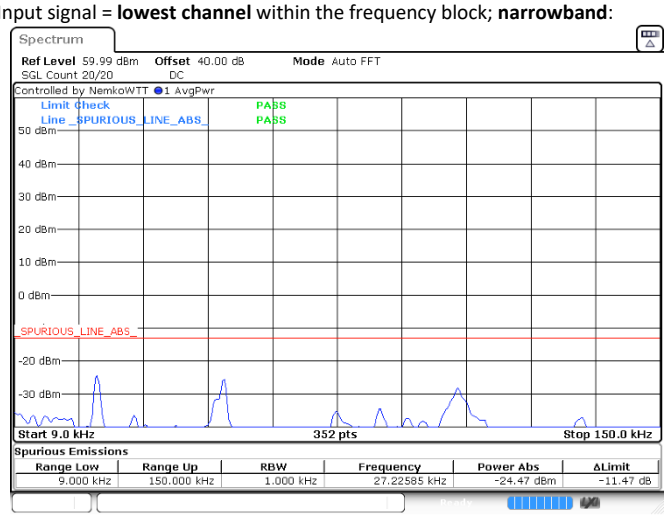
Low band edge, 1 signal, level = AGC Threshold + 3



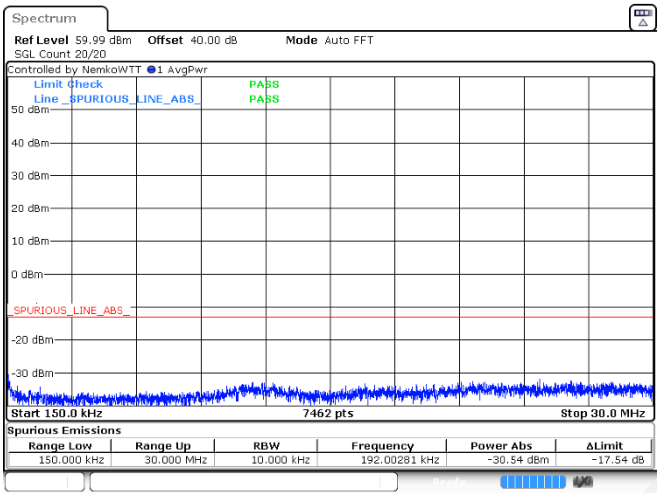
8.5.6 Test data - conducted spurious emissions:

8.5.6.1 Operating frequency band: band 25: 1930 – 1995 MHz

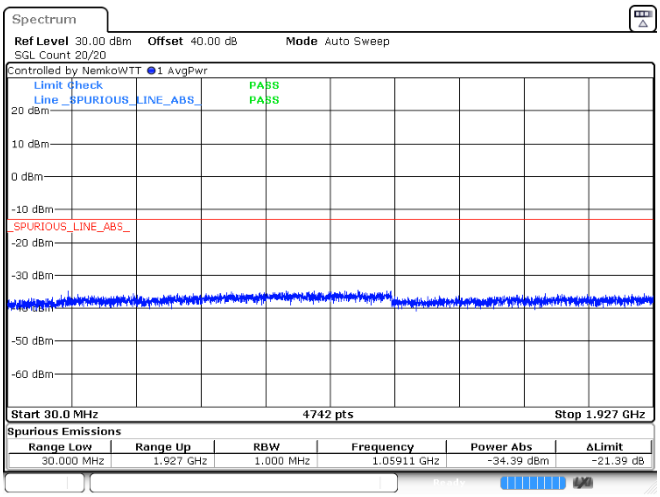
Input signal = **lowest channel** within the frequency block; **narrowband**:



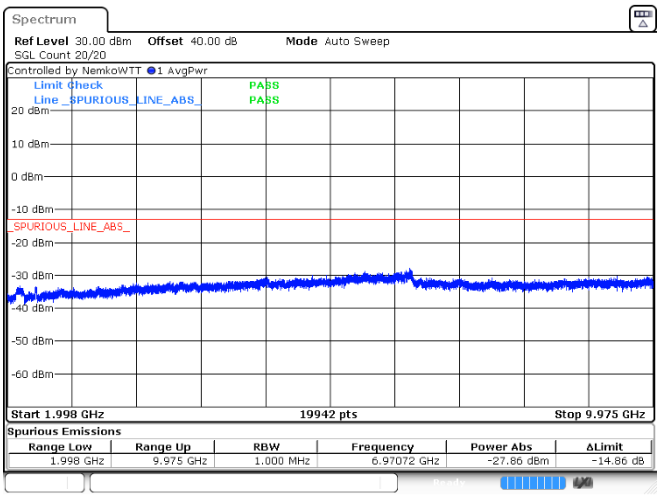
Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB



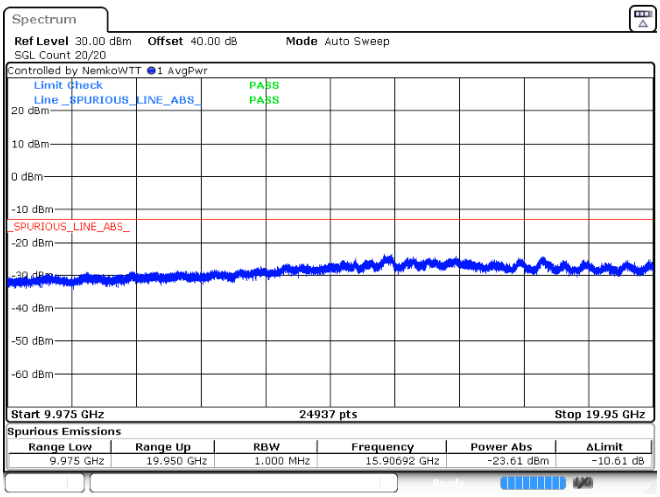
Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB



Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB

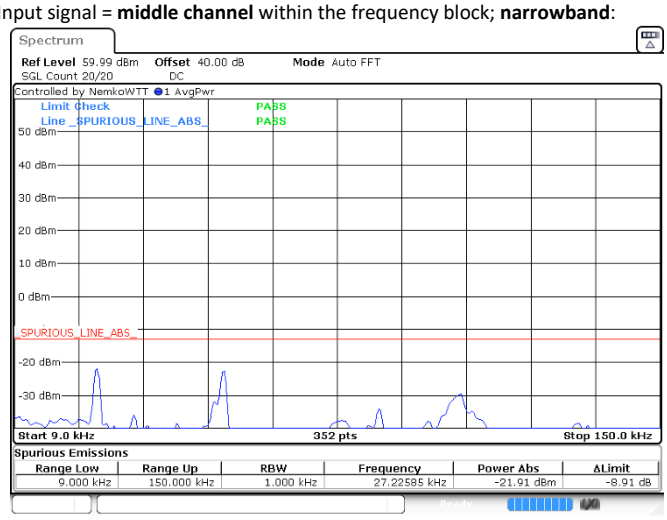


Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB

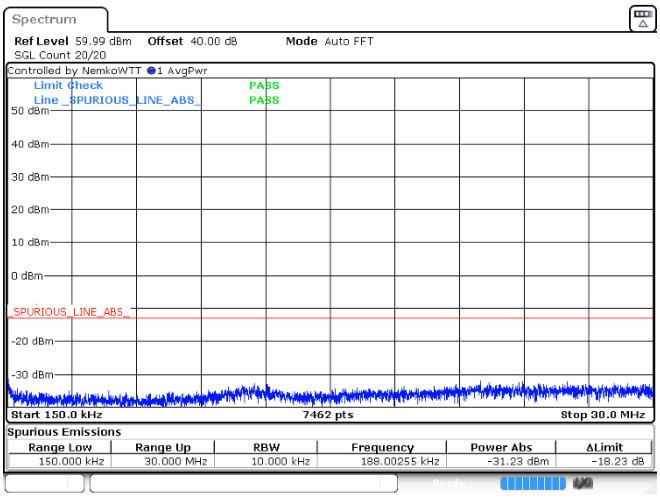


Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB

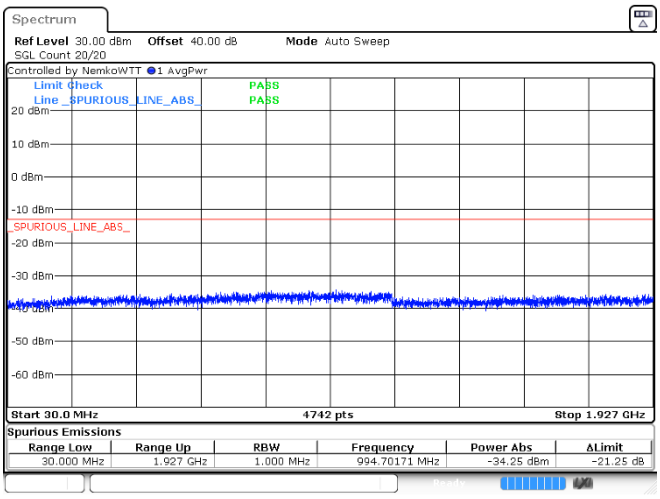
Input signal = **middle channel** within the frequency block; **narrowband**:



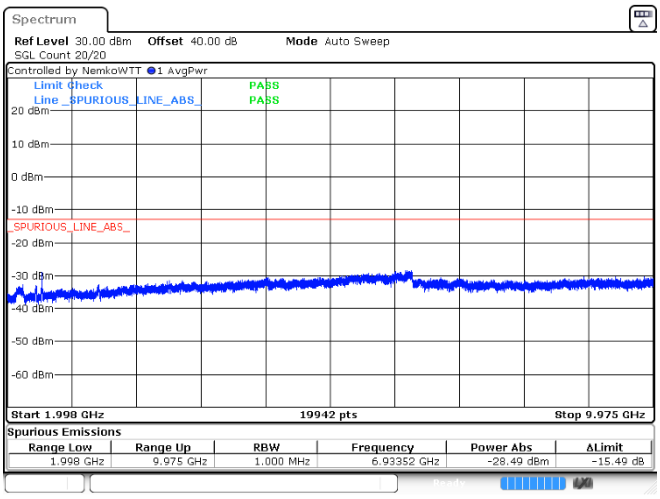
Conducted Spurious Emissions, Middle channel, NB



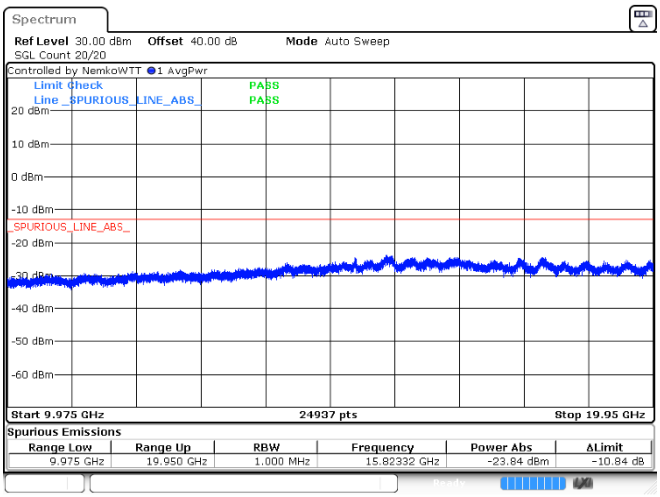
Conducted Spurious Emissions, Middle channel, NB



Conducted Spurious Emissions, Middle channel, NB

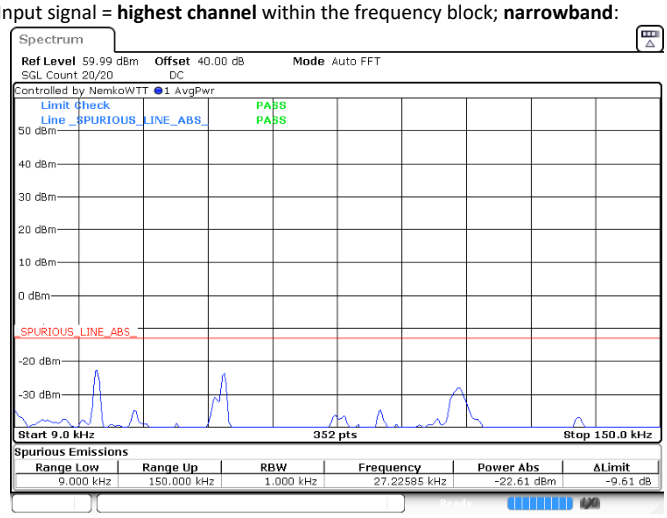


Conducted Spurious Emissions, Middle channel, NB

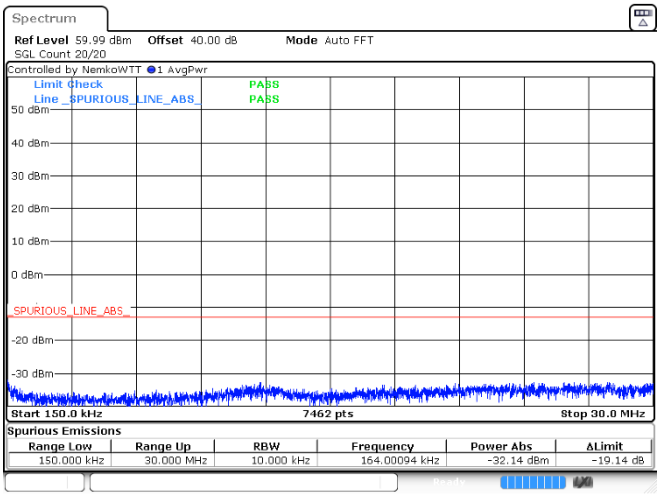


Conducted Spurious Emissions, Middle channel, NB

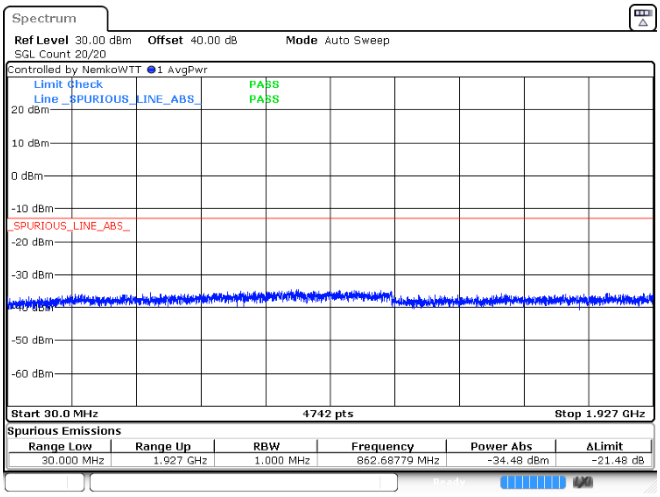
Input signal = **highest channel** within the frequency block; **narrowband**:



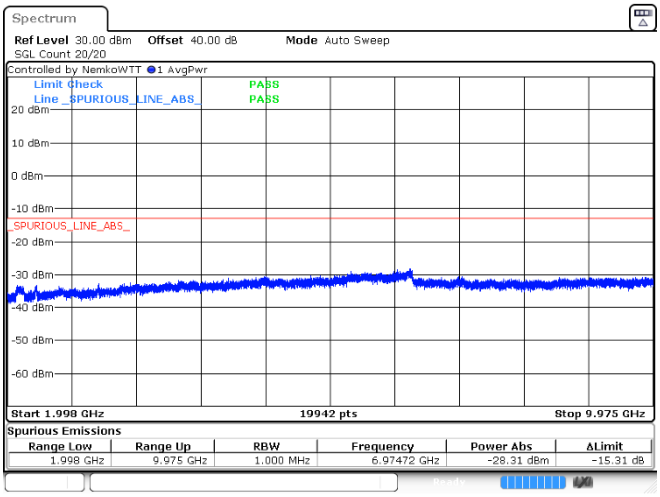
Conducted Spurious Emissions, High channel, NB



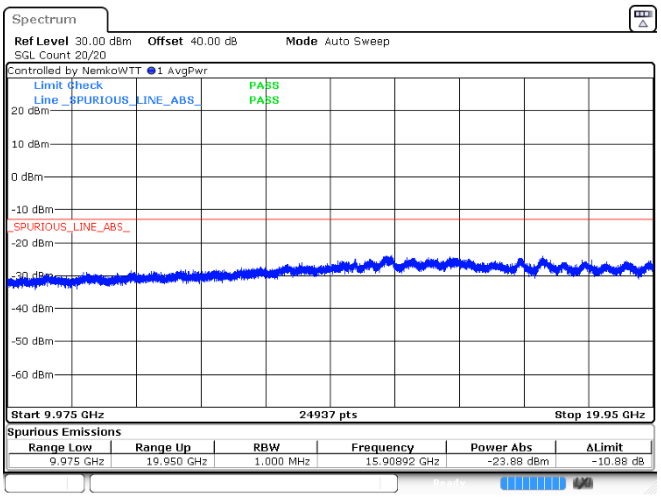
Conducted Spurious Emissions, High channel, NB



Conducted Spurious Emissions, High channel, NB

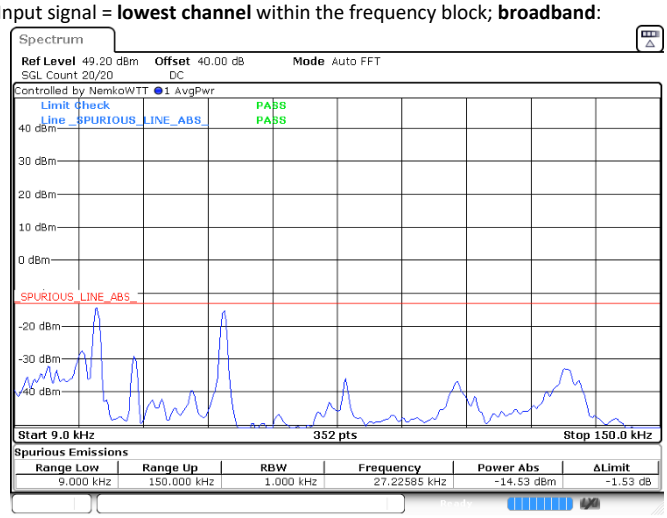


Conducted Spurious Emissions, High channel, NB

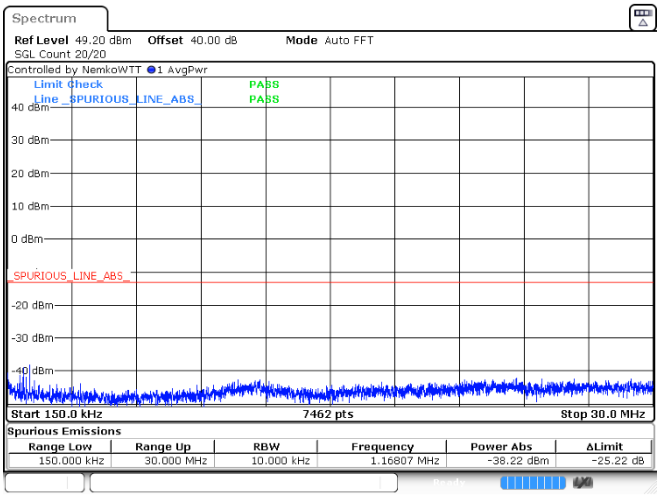


Conducted Spurious Emissions, High channel, NB

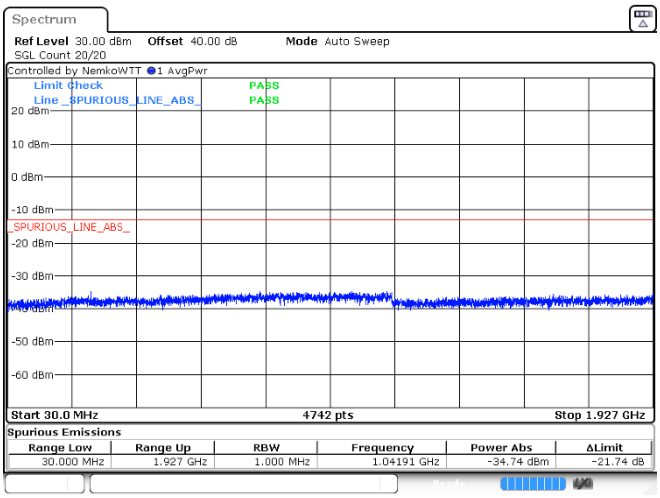
Input signal = **lowest channel** within the frequency block; **broadband**:



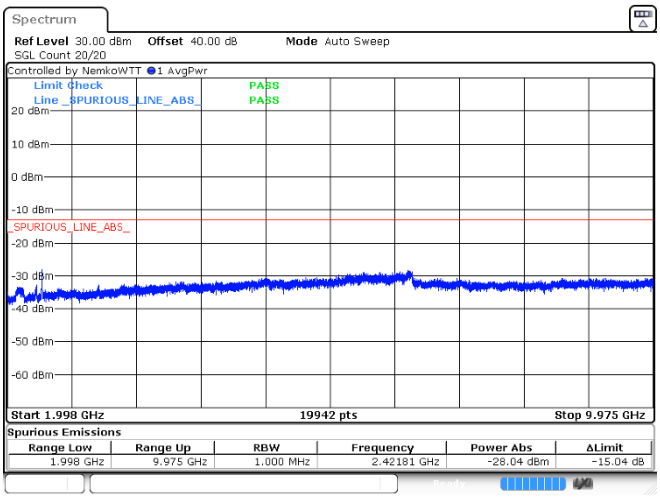
Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB



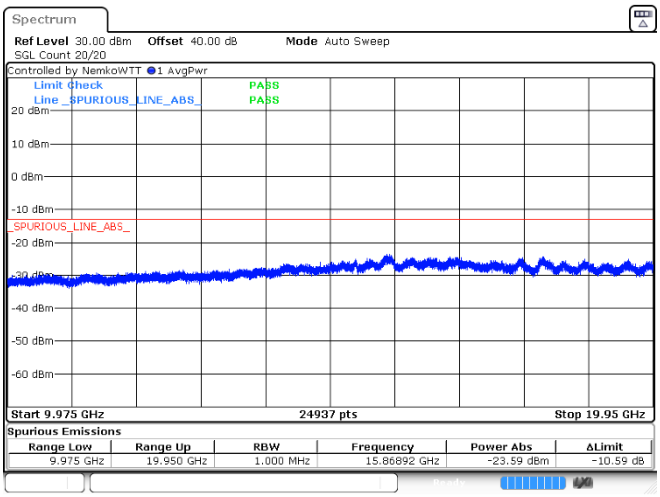
Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB



Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB

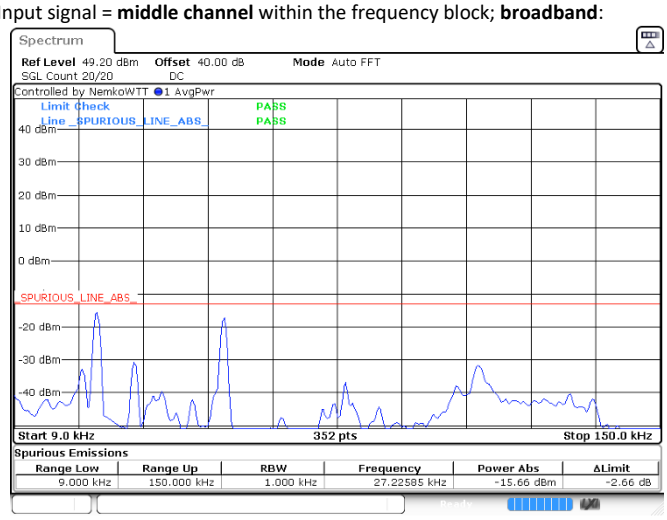


Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB

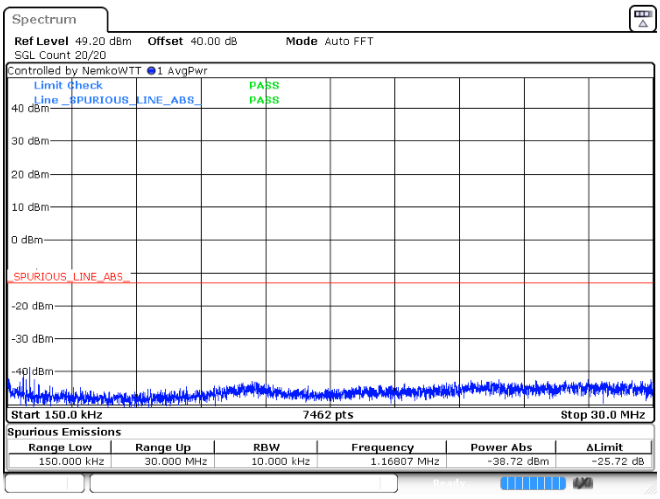


Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB

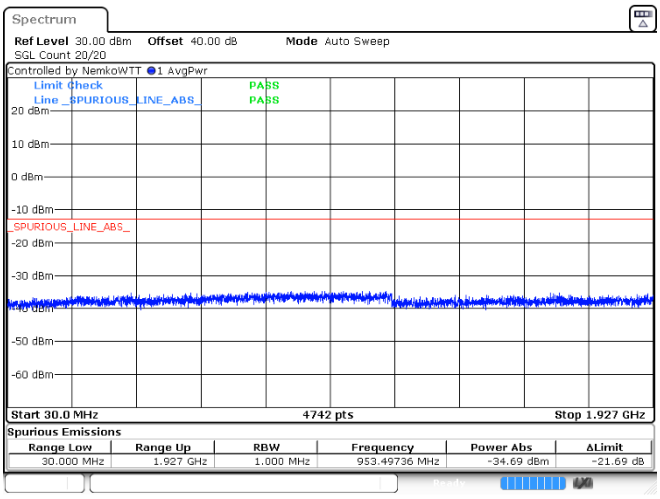
Input signal = **middle channel** within the frequency block; **broadband**:



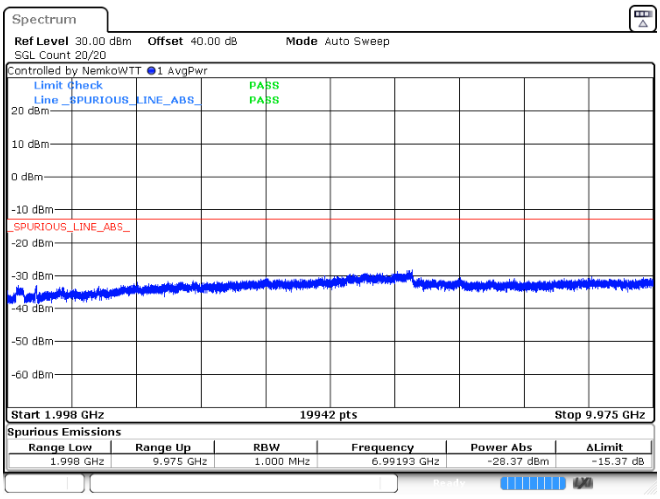
Conducted Spurious Emissions, Middle channel, BB



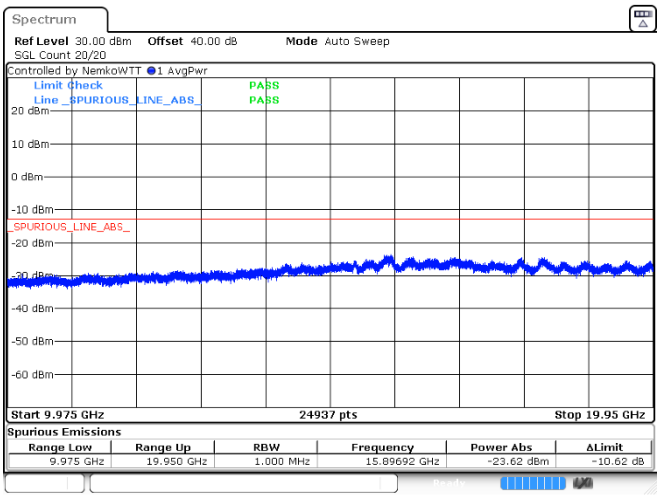
Conducted Spurious Emissions, Middle channel, BB



Conducted Spurious Emissions, Middle channel, BB

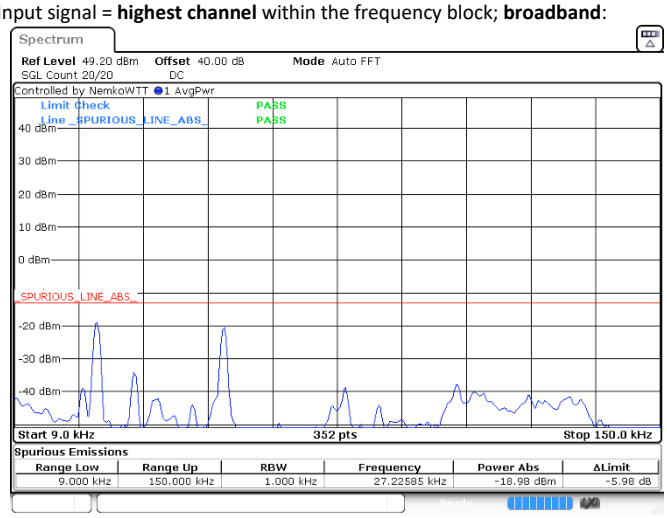


Conducted Spurious Emissions, Middle channel, BB

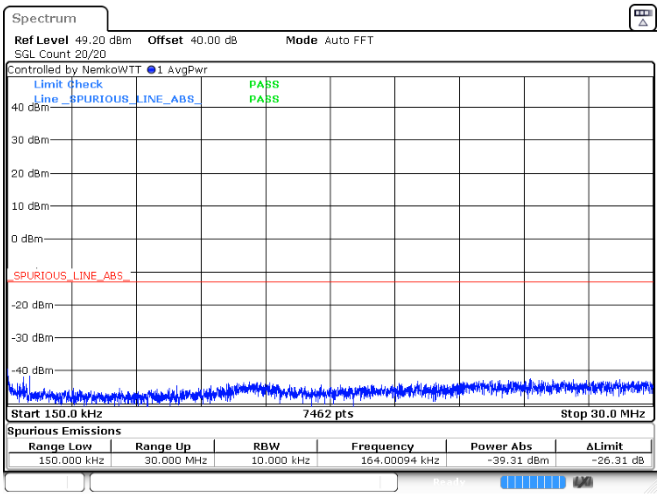


Conducted Spurious Emissions, Middle channel, BB

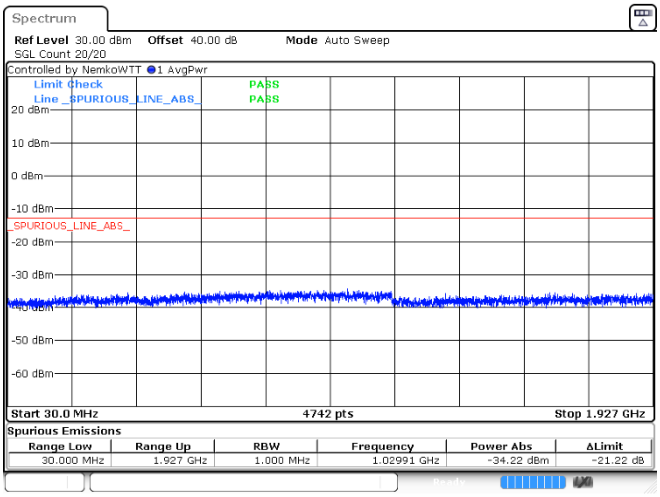
Input signal = **highest channel** within the frequency block; **broadband**:



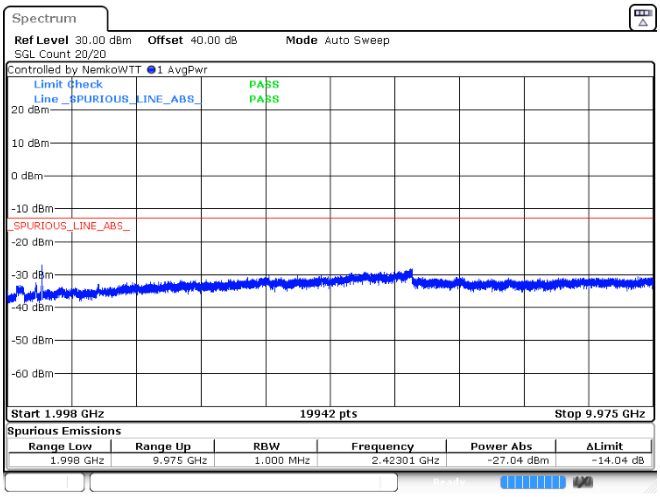
Conducted Spurious Emissions, High channel, BB



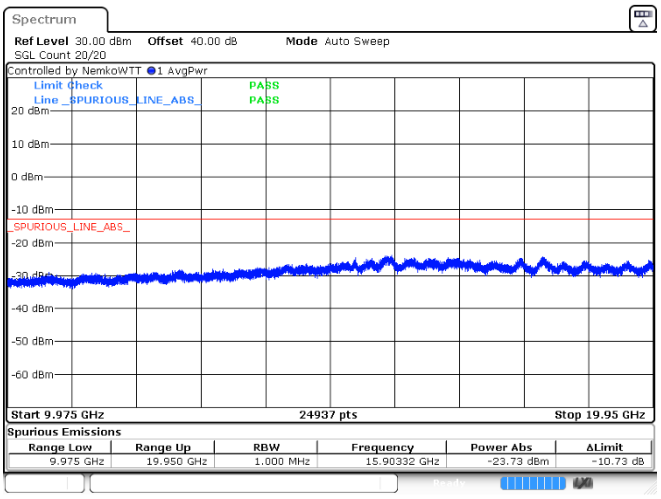
Conducted Spurious Emissions, High channel, BB



Conducted Spurious Emissions, High channel, BB



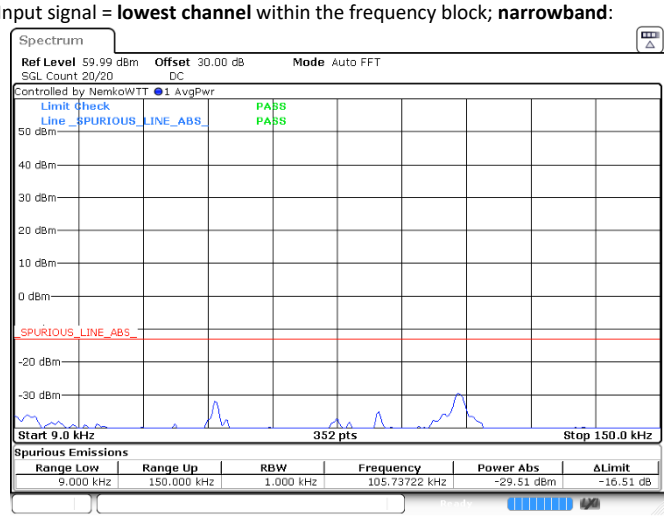
Conducted Spurious Emissions, High channel, BB



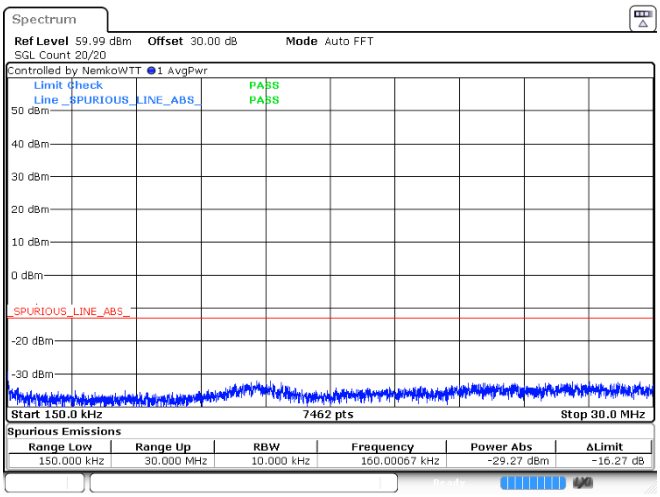
Conducted Spurious Emissions, High channel, BB

8.5.6.2 Operating frequency band: band 66: 2100 – 2180 MHz

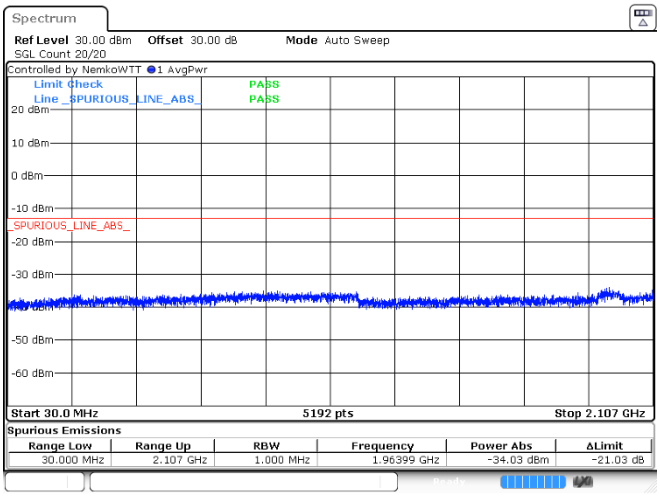
Input signal = **lowest channel** within the frequency block; **narrowband**:



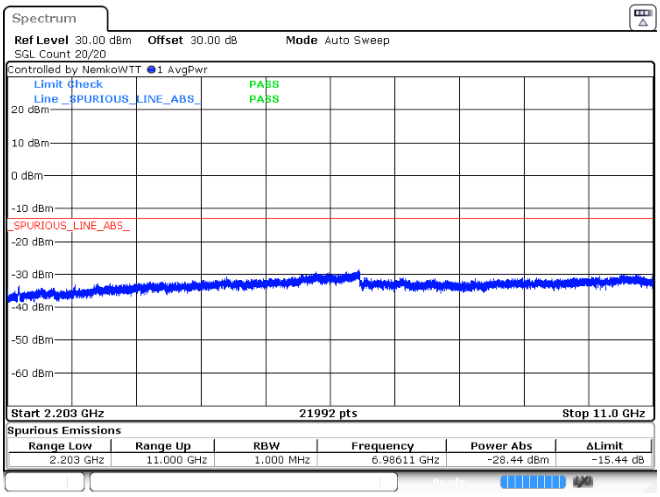
Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB



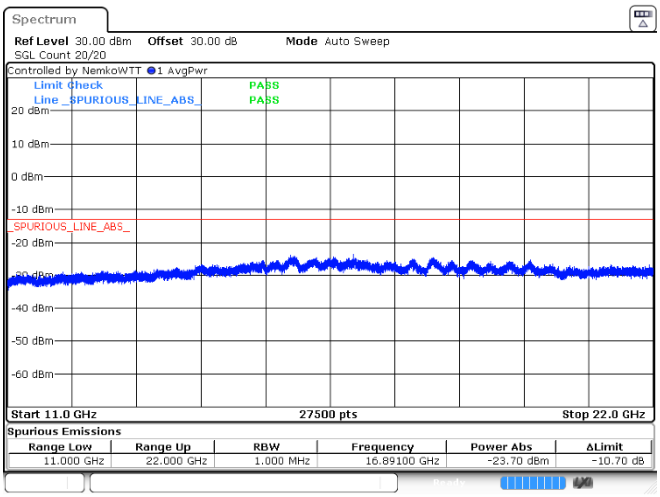
Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB



Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB

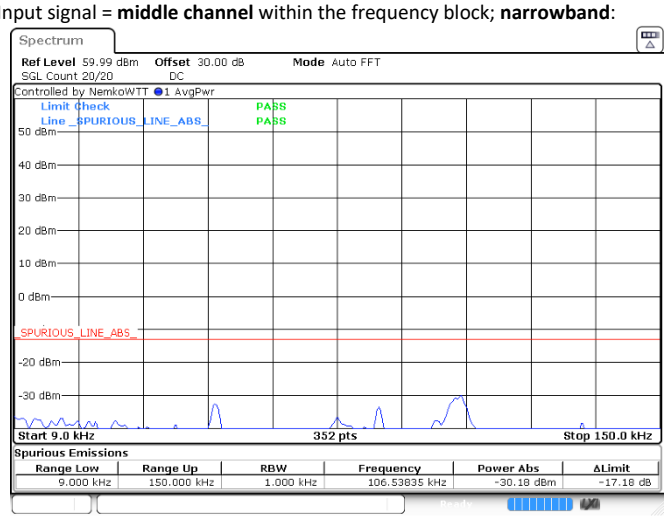


Conducted Spurious Emissions, Low channel, low frequency ran
ge, NB

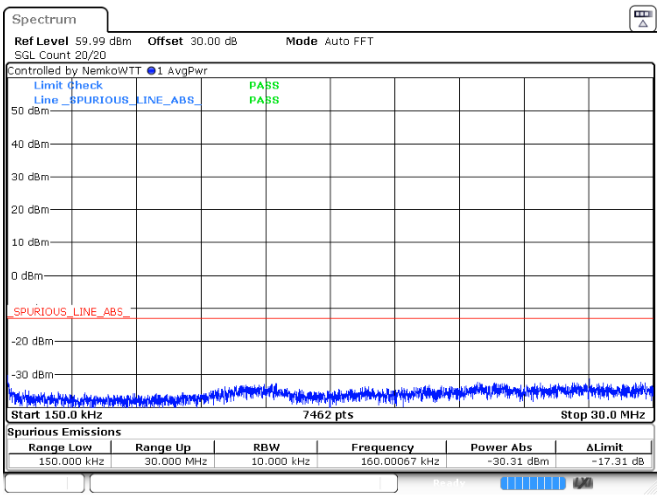


Conducted Spurious Emissions, Low channel, low frequency range, NB

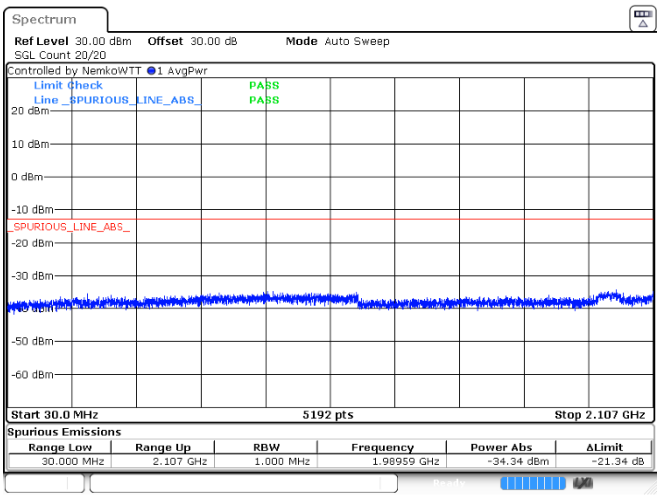
Input signal = **middle channel** within the frequency block; **narrowband**:



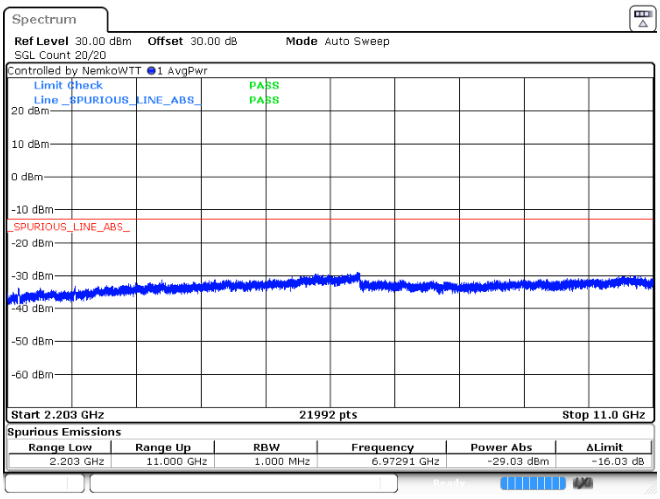
Conducted Spurious Emissions, Middle channel, NB



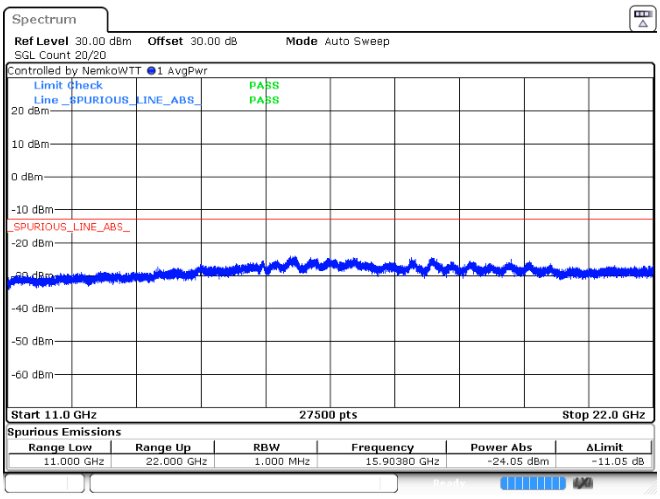
Conducted Spurious Emissions, Middle channel, NB



Conducted Spurious Emissions, Middle channel, NB

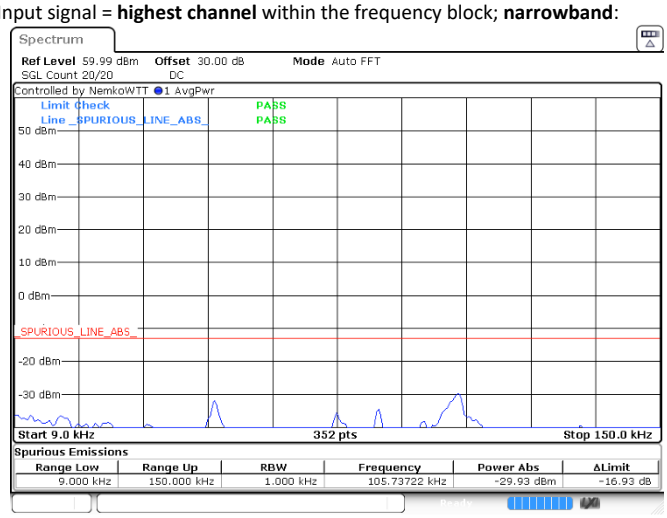


Conducted Spurious Emissions, Middle channel, NB

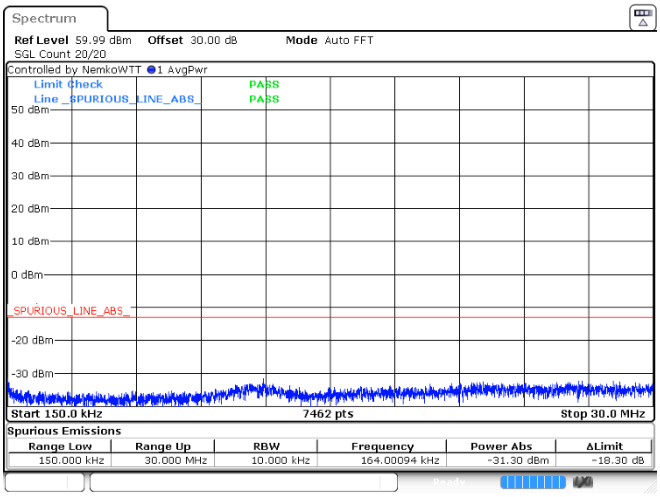


Conducted Spurious Emissions, Middle channel, NB

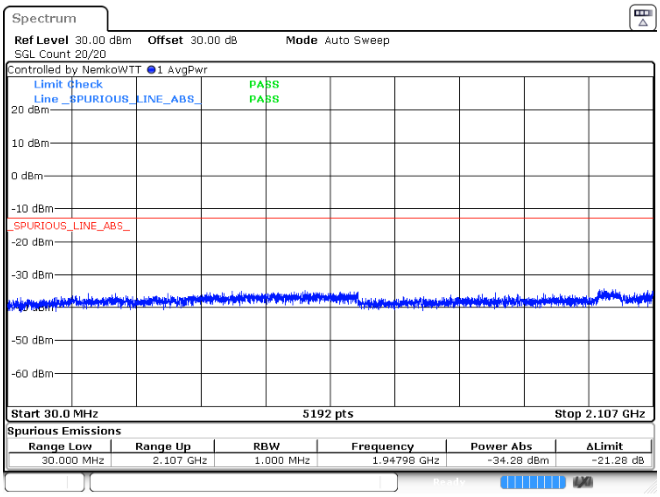
Input signal = **highest channel** within the frequency block; **narrowband**:



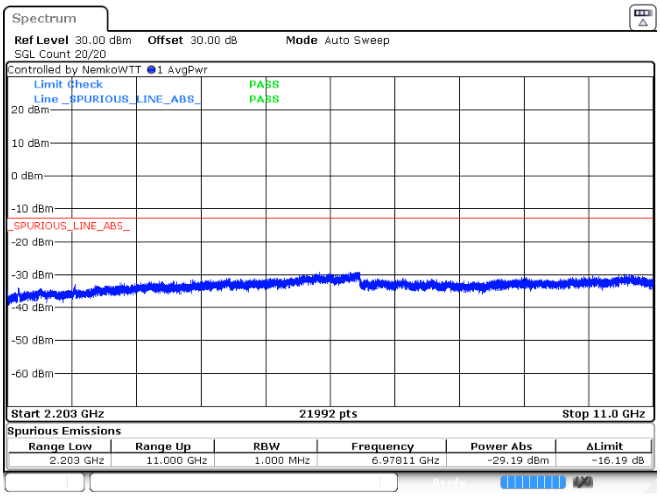
Conducted Spurious Emissions, High channel, NB



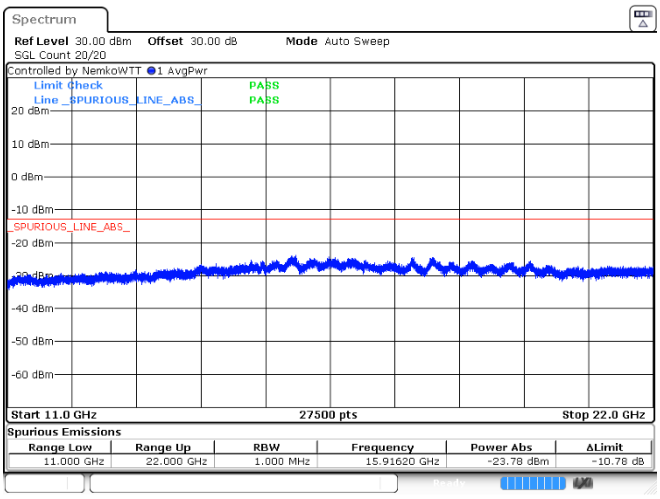
Conducted Spurious Emissions, High channel, NB



Conducted Spurious Emissions, High channel, NB

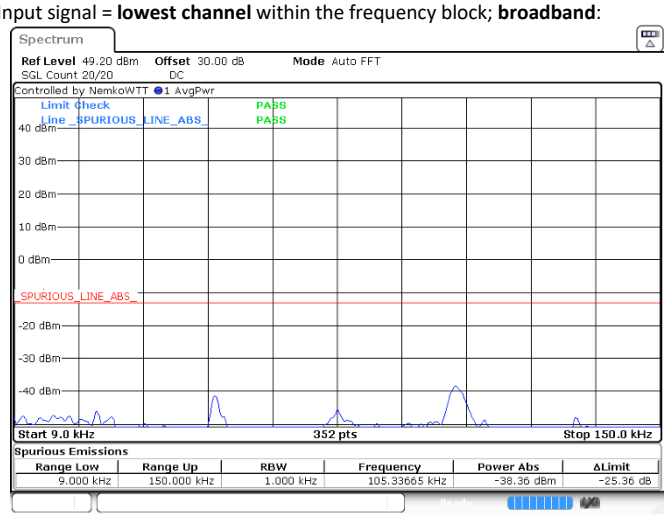


Conducted Spurious Emissions, High channel, NB

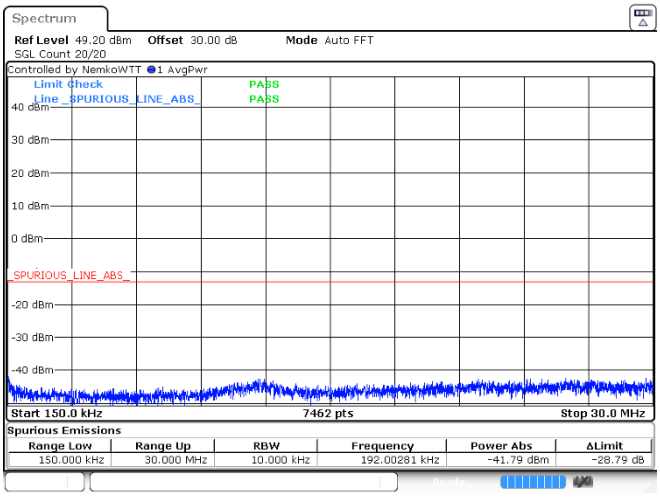


Conducted Spurious Emissions, High channel, NB

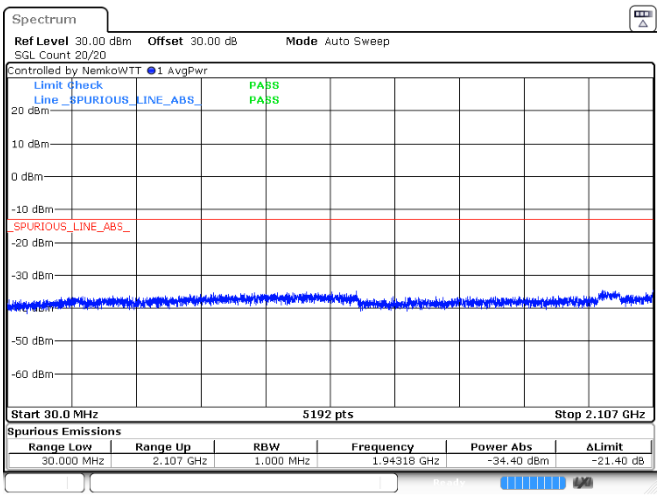
Input signal = **lowest channel** within the frequency block; **broadband**:



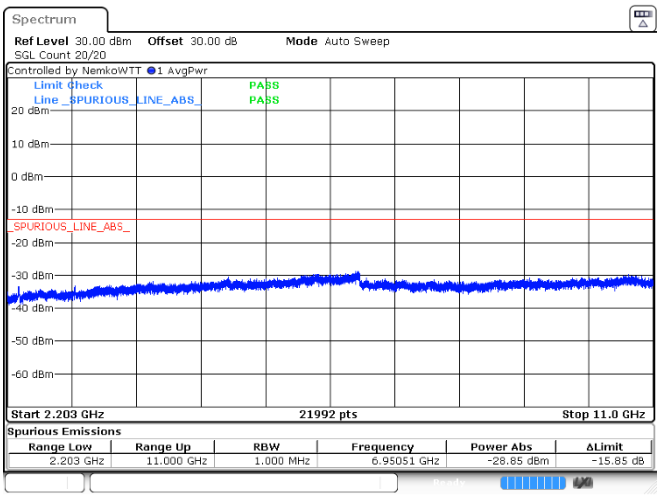
Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB



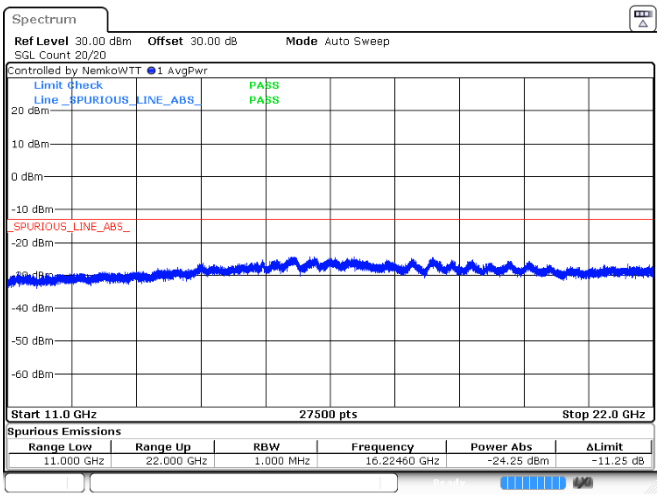
Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB



Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB

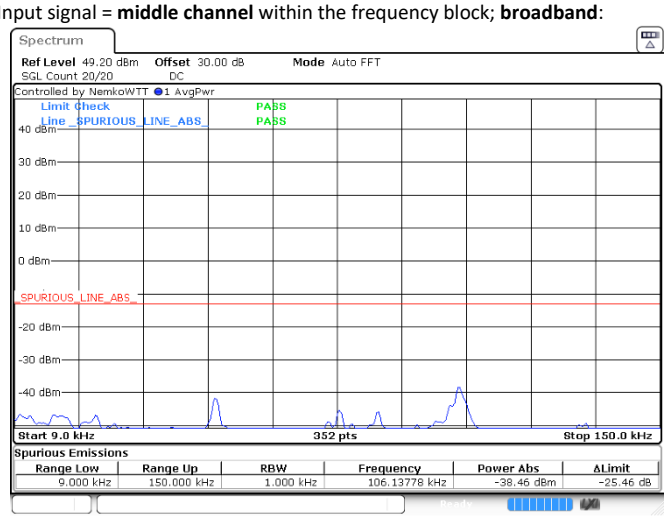


Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB

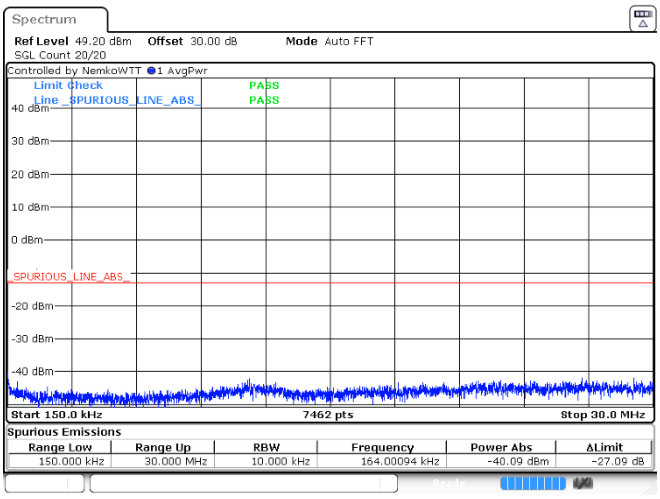


Conducted Spurious Emissions, Low channel, low frequency ran
ge, BB

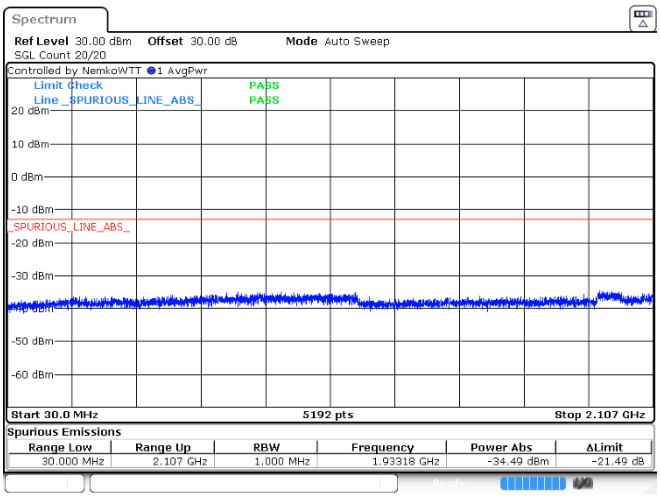
Input signal = **middle channel** within the frequency block; **broadband**:



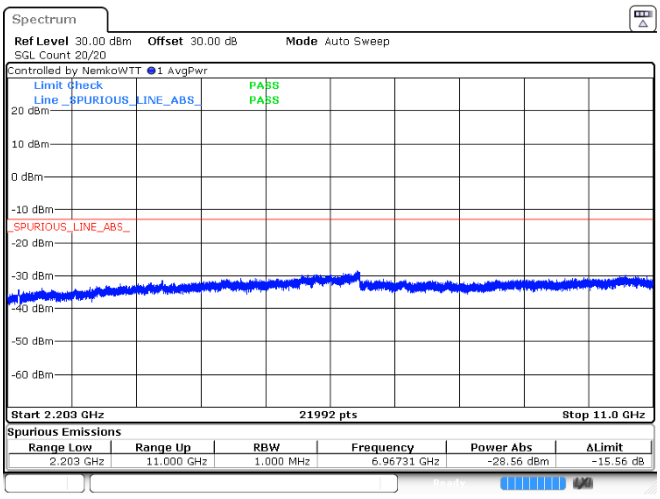
Conducted Spurious Emissions, Middle channel, BB



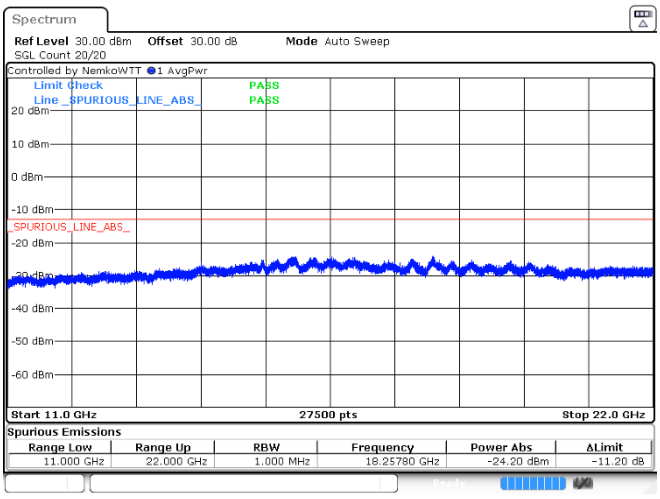
Conducted Spurious Emissions, Middle channel, BB



Conducted Spurious Emissions, Middle channel, BB

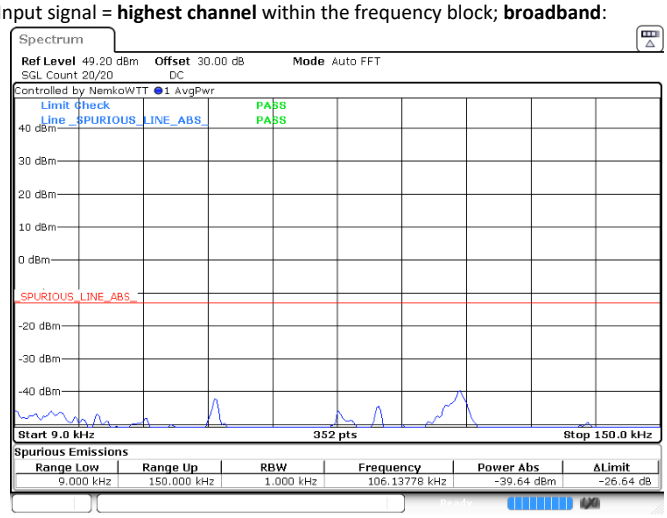


Conducted Spurious Emissions, Middle channel, BB

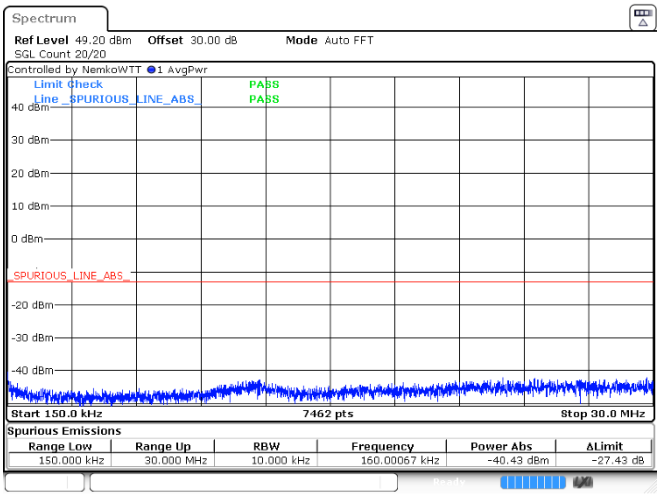


Conducted Spurious Emissions, Middle channel, BB

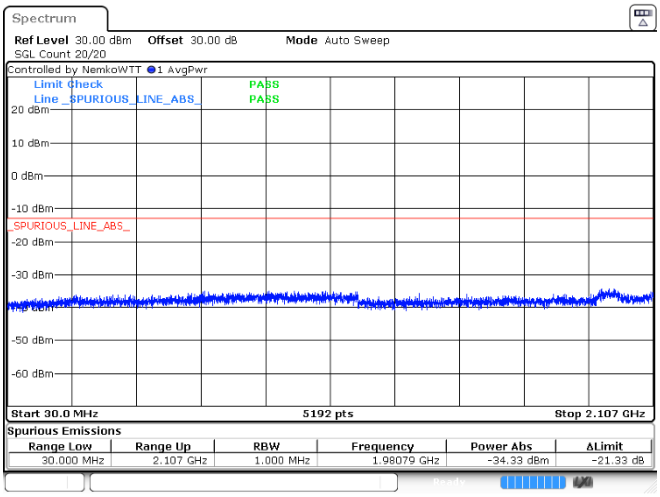
Input signal = **highest channel** within the frequency block; **broadband**:



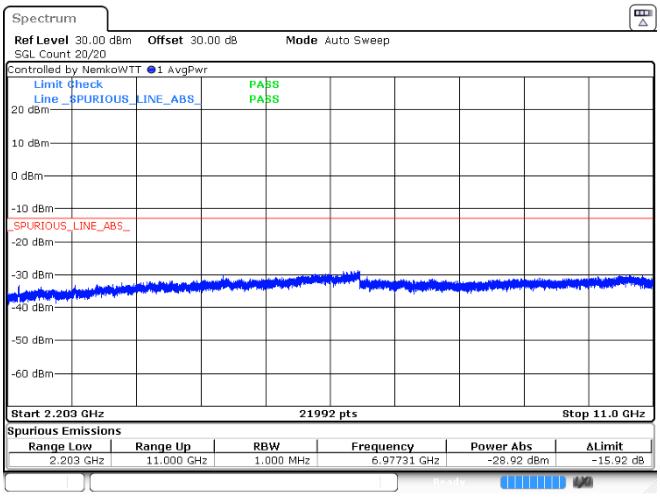
Conducted Spurious Emissions, High channel, BB



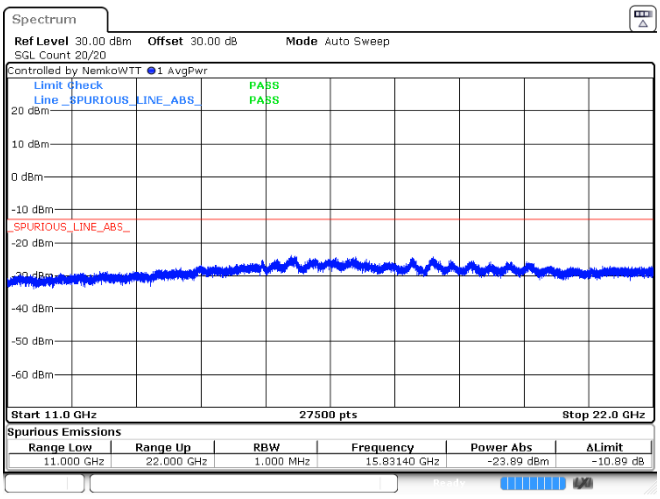
Conducted Spurious Emissions, High channel, BB



Conducted Spurious Emissions, High channel, BB



Conducted Spurious Emissions, High channel, BB

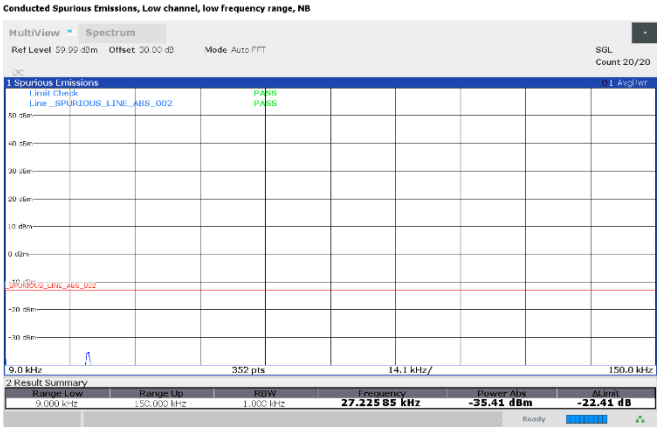


Conducted Spurious Emissions, High channel, BB

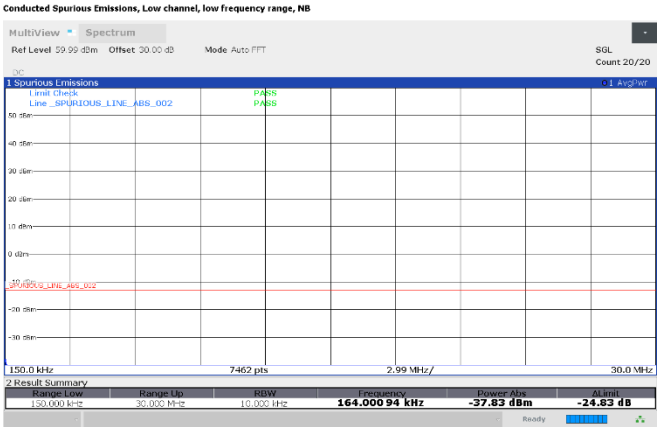
8.5.6.3 Operating frequency band: band 30: 2350 – 2360 MHz

Input signal = **lowest channel** within the frequency block; **narrowband**:

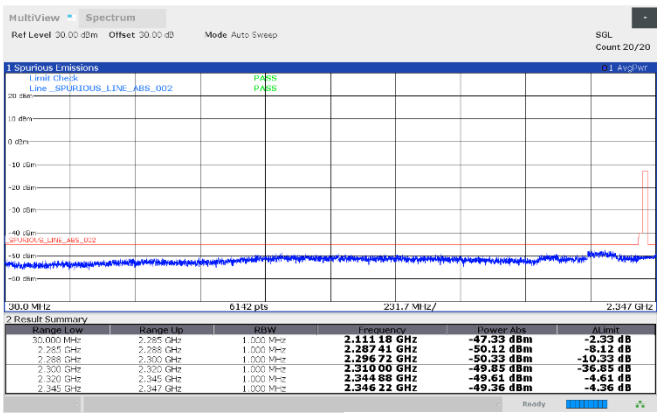
Conducted Spurious Emissions, Low channel, low frequency range, NB



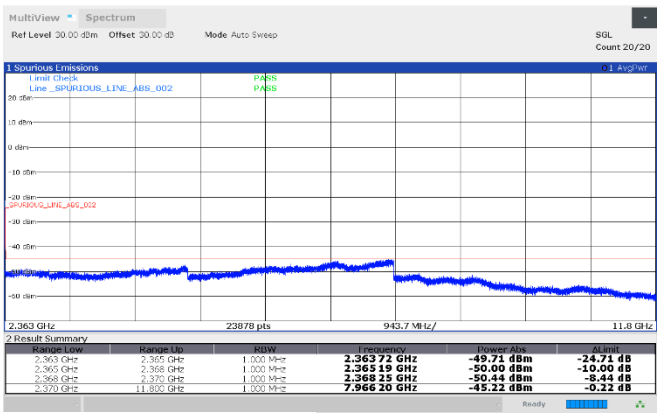
Conducted Spurious Emissions, Low channel, low frequency range, NB



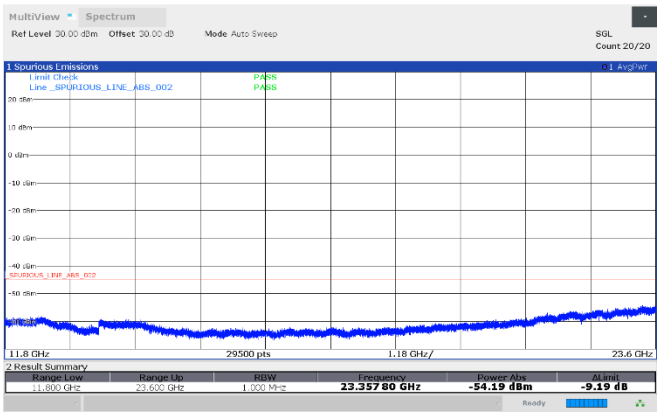
Conducted Spurious Emissions, Low channel, low frequency range, NB



Conducted Spurious Emissions, Low channel, low frequency range, NB



Conducted Spurious Emissions, Low channel, low frequency range, NB

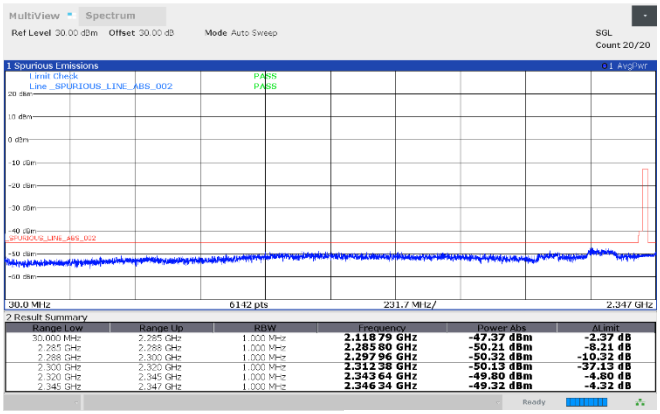


Input signal = **middle channel** within the frequency block; **narrowband**:

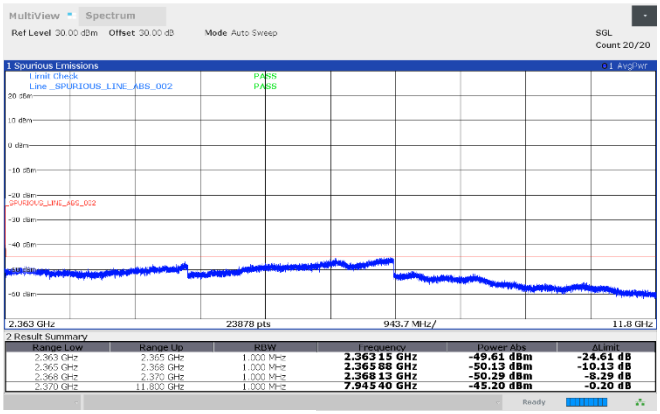
Conducted Spurious Emissions, Middle channel, NB

Conducted Spurious Emissions, Middle channel, NB

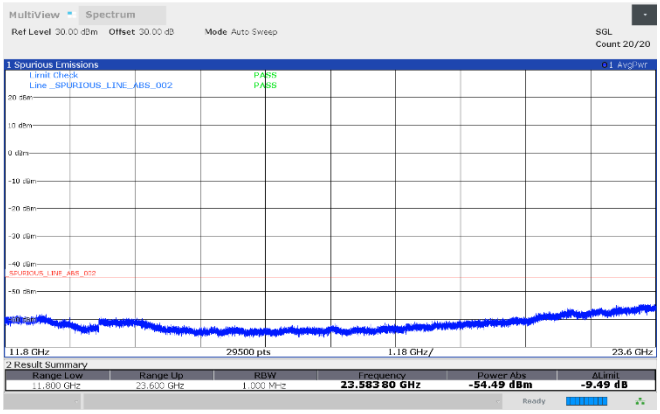
Conducted Spurious Emissions, Middle channel, NB



Conducted Spurious Emissions, Middle channel, NB



Conducted Spurious Emissions, Middle channel, NB

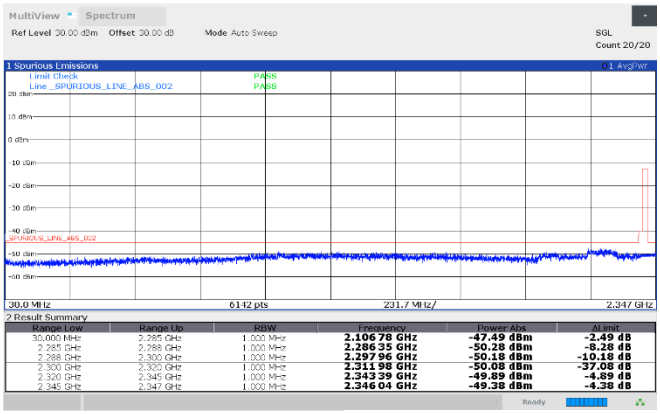


Input signal = **highest channel** within the frequency block; **narrowband**:

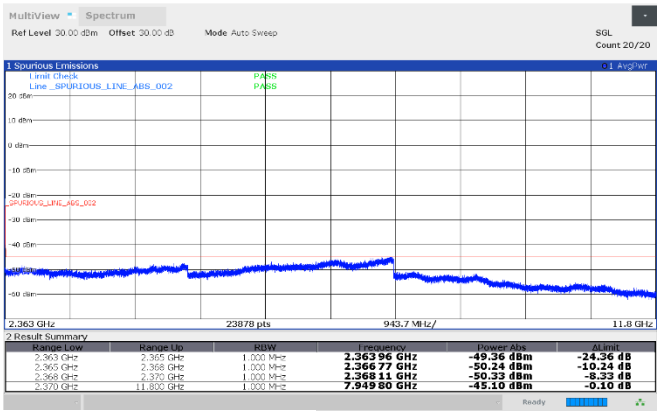
Conducted Spurious Emissions, High channel, NB

Conducted Spurious Emissions, High channel, NB

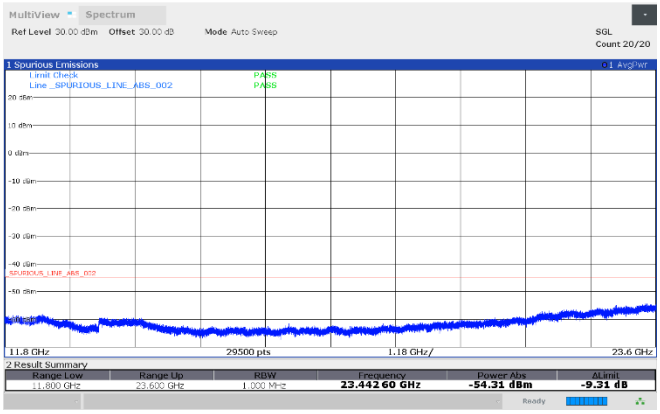
Conducted Spurious Emissions, High channel, NB



Conducted Spurious Emissions, High channel, NB

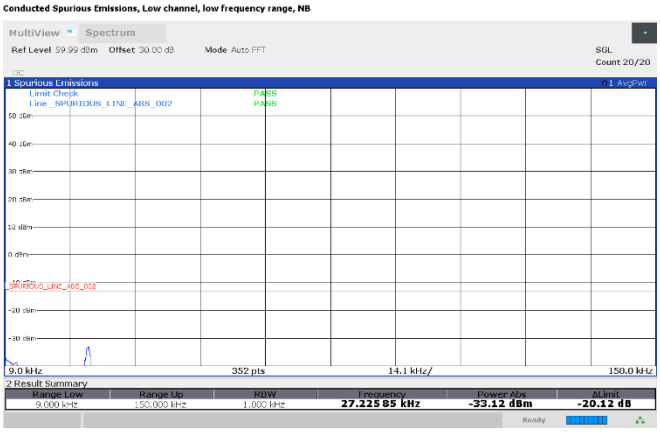


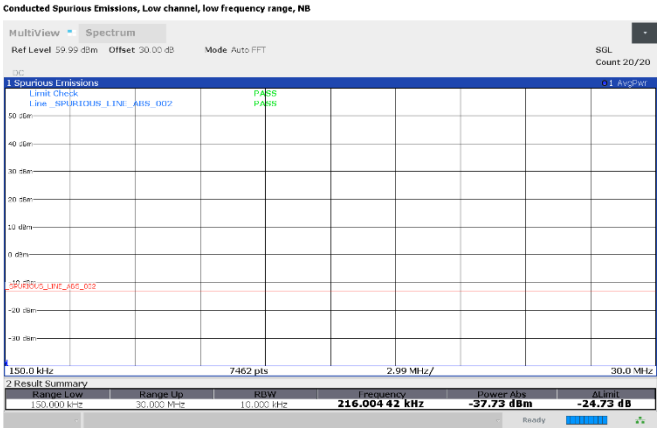
Conducted Spurious Emissions, High channel, NB

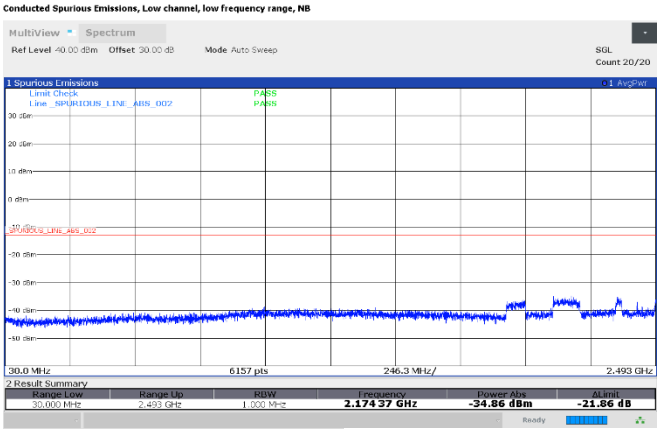


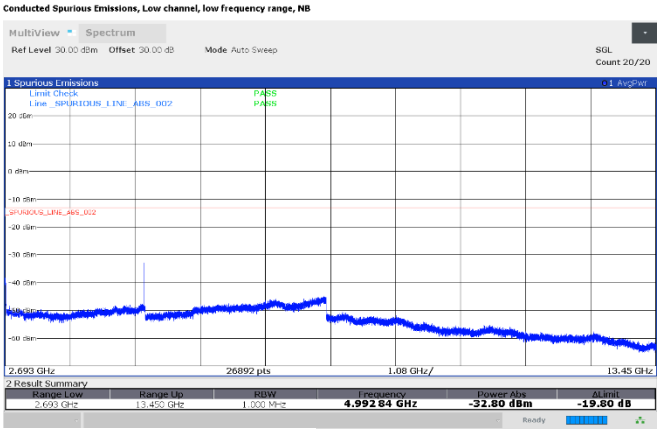
8.5.6.4 Operating frequency band: band 41: 2496 – 2690 MHz

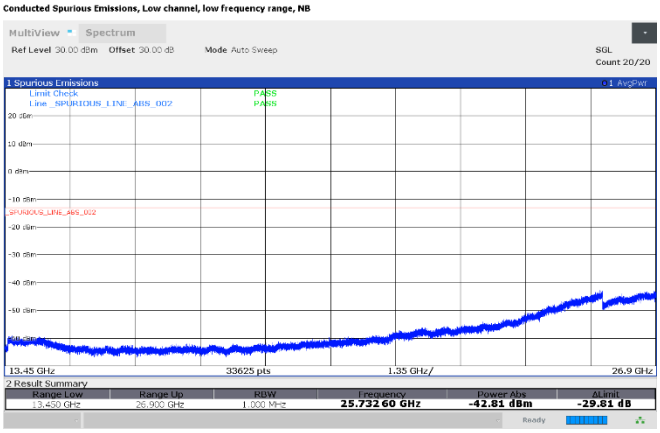
Input signal = **lowest channel** within the frequency block; **narrowband**:









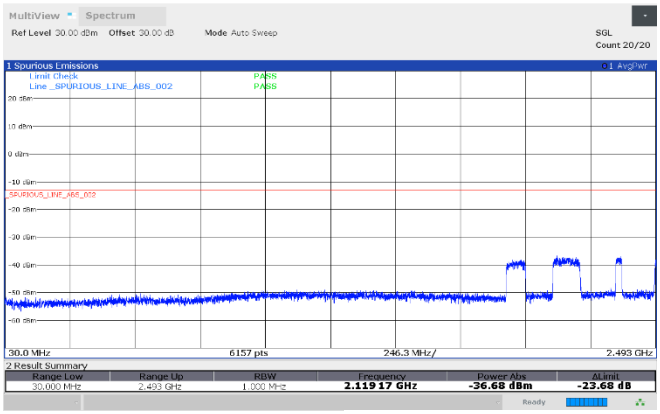


Input signal = **middle channel** within the frequency block; **narrowband**:

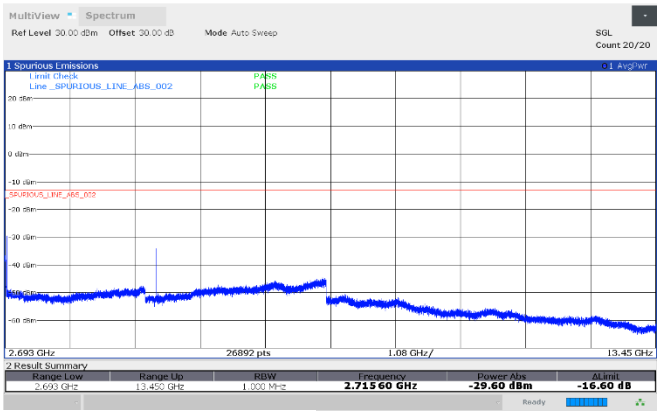
Conducted Spurious Emissions, Middle channel, NB

Conducted Spurious Emissions, Middle channel, NB

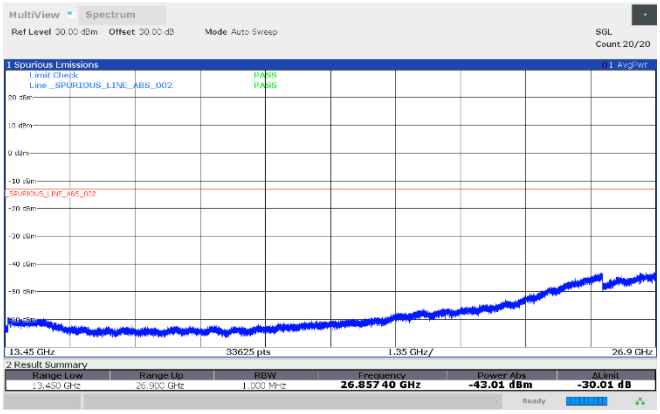
Conducted Spurious Emissions, Middle channel, NB



Conducted Spurious Emissions, Middle channel, NB



Conducted Spurious Emissions, Middle channel, NB

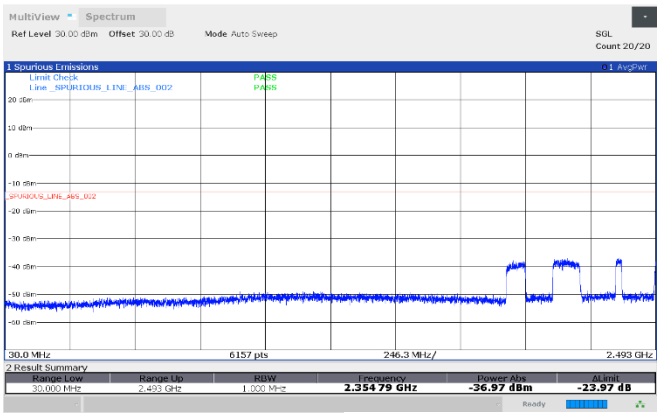


Input signal = **highest channel** within the frequency block; **narrowband**:

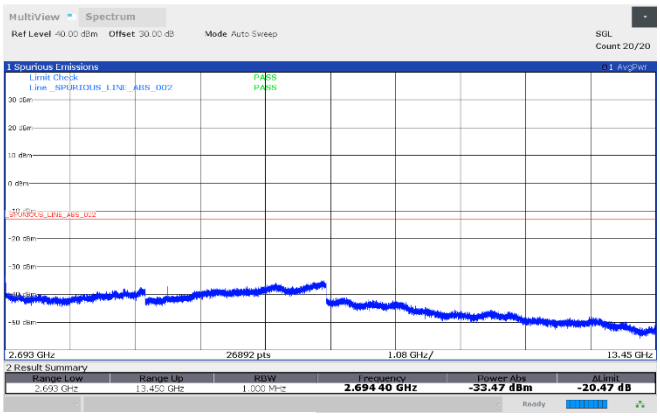
Conducted Spurious Emissions, High channel, NB

Conducted Spurious Emissions, High channel, NB

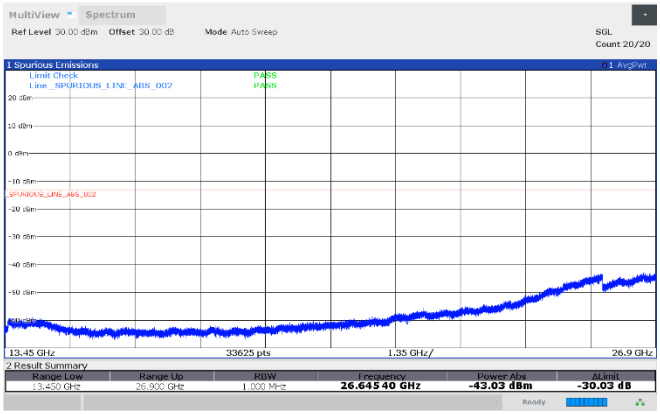
Conducted Spurious Emissions, High channel, NB



Conducted Spurious Emissions, High channel, NB



Conducted Spurious Emissions, High channel, NB

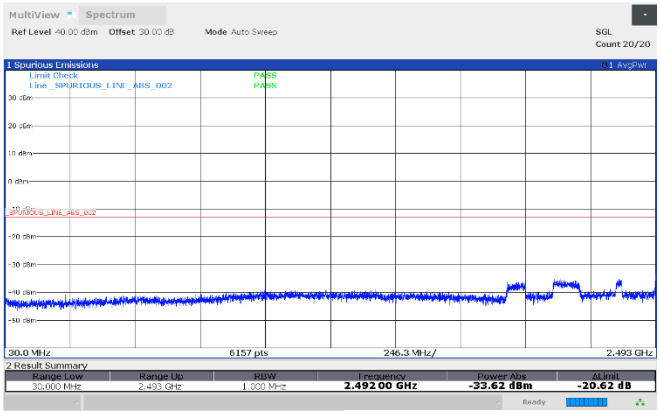


Input signal = **lowest channel** within the frequency block; **broadband**:

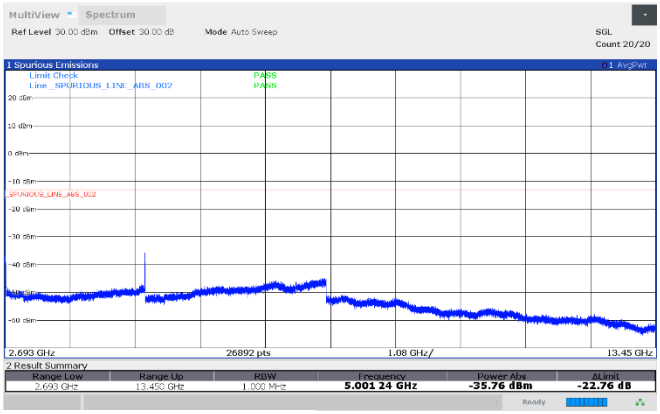
Conducted Spurious Emissions, Low channel, low frequency range, BB

Conducted Spurious Emissions, Low channel, low frequency range, BB

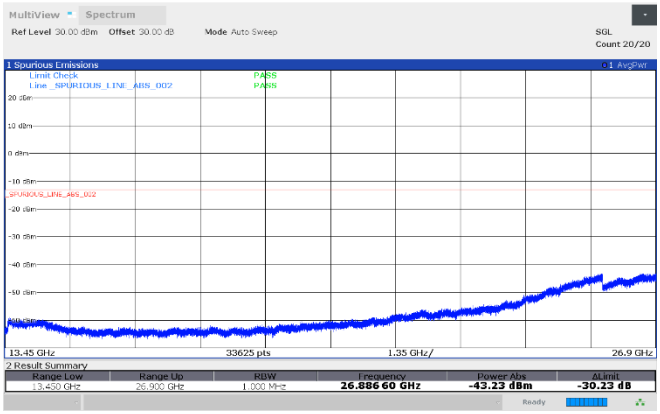
Conducted Spurious Emissions, Low channel, low frequency range, BB



Conducted Spurious Emissions, Low channel, low frequency range, BB



Conducted Spurious Emissions, Low channel, low frequency range, BB

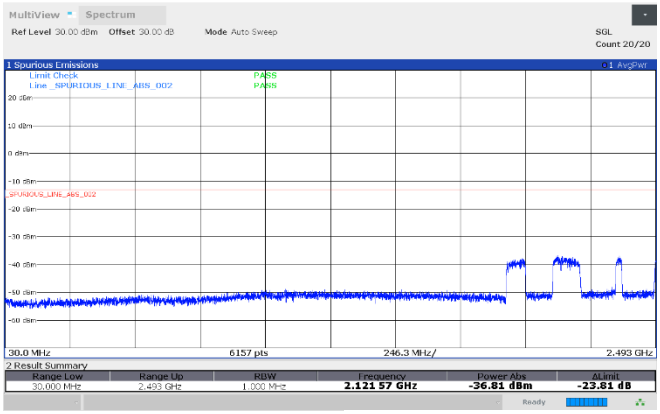


Input signal = **middle channel** within the frequency block; **broadband**:

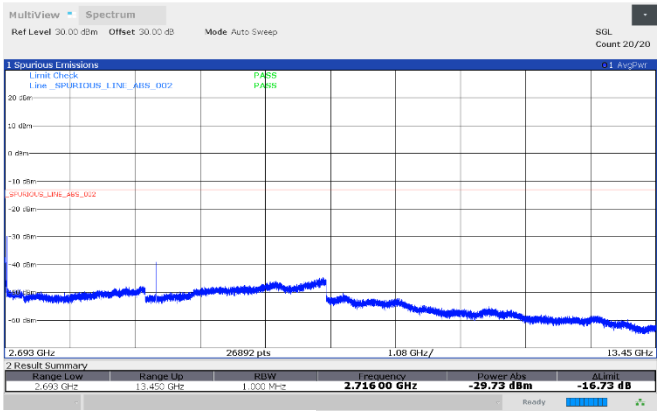
Conducted Spurious Emissions, Middle channel, BB

Conducted Spurious Emissions, Middle channel, BB

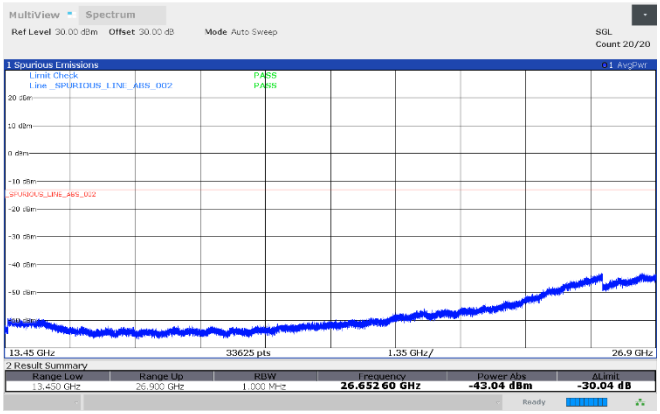
Conducted Spurious Emissions, Middle channel, BB



Conducted Spurious Emissions, Middle channel, BB



Conducted Spurious Emissions, Middle channel, BB

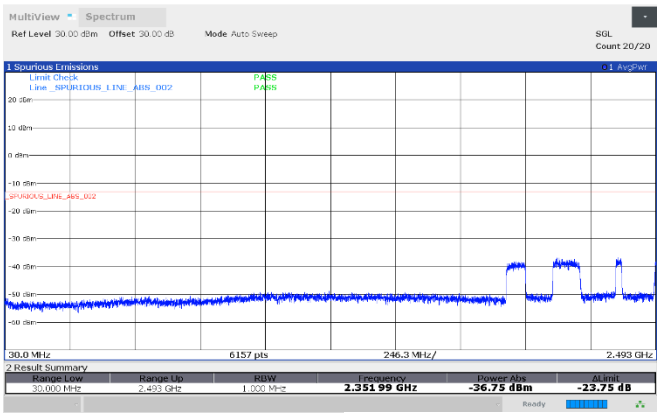


Input signal = **highest channel** within the frequency block; **broadband**:

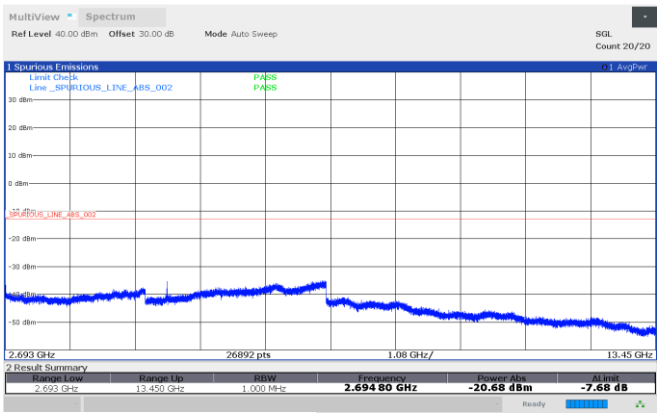
Conducted Spurious Emissions, High channel, BB

Conducted Spurious Emissions, High channel, BB

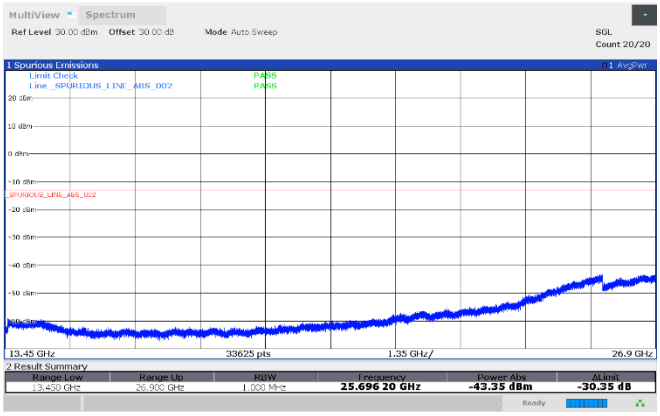
Conducted Spurious Emissions, High channel, BB



Conducted Spurious Emissions, High channel, BB



Conducted Spurious Emissions, High channel, BB



8.6 Radiated spurious emissions

8.6.1 References and limits

- FCC Part 24.238 & RSS-133 (band 25 operation)
- FCC Part 27.53(a) & RSS-195 (band 30 operation)
- FCC Part 27.53(h) & RSS-139 (band 66) and RSS-199 (band 41) (band 66, and 41 operation)
- ANSI C63.26 Clause 7.2.2.5
- KDB 935210 D05v01r05 Clause 3.8

8.6.2 Test summary

Verdict	Pass		
Test date	February 13, 2024	Temperature	20 °C
Test engineer	Lan Sayasane, EMC Test Engineer	Air pressure	1008 mbar
Test location	☐ 10m semi anechoic chamber ☒ 3m semi anechoic chamber ☐ Other:	Relative humidity	51 %

8.6.3 Notes

Testing was performed with a narrowband test signal (MSK modulated, gaussian filter of 0.3 and data rate 270 kbps) and a broadband signal (AWGN, 4.1 MHz 99% occupied bandwidth) on lowest, middle, and highest channels of each supported frequency band. Only the worst-case data (broadband signal) are presented here.

In the range 30 – 1000 MHz, radiated emissions were essentially identical for all operational modes. Thus, data in this range is only presented for one representative operational mode (band 30 operation chosen since the emissions limit is the most stringent).

8.6.4 Setup details

EUT power input during test	120 VAC / 60 Hz
EUT setup configuration	☒ Table-top ☐ Floor standing ☐ Other:
Measurement details	Receiver/spectrum analyzer settings for frequencies below 1 GHz:

Resolution bandwidth	100 kHz
Detector mode	– Peak (Preview measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak preview measurement) – 5000 ms (Peak final measurement)

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

Resolution bandwidth	1 MHz
Detector mode	Peak (Preview measurement) Peak (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak preview measurement) – 5000 ms (Peak final measurement)

8.6.5 Test data

8.6.5.1 Representative data: 30 – 1000 MHz

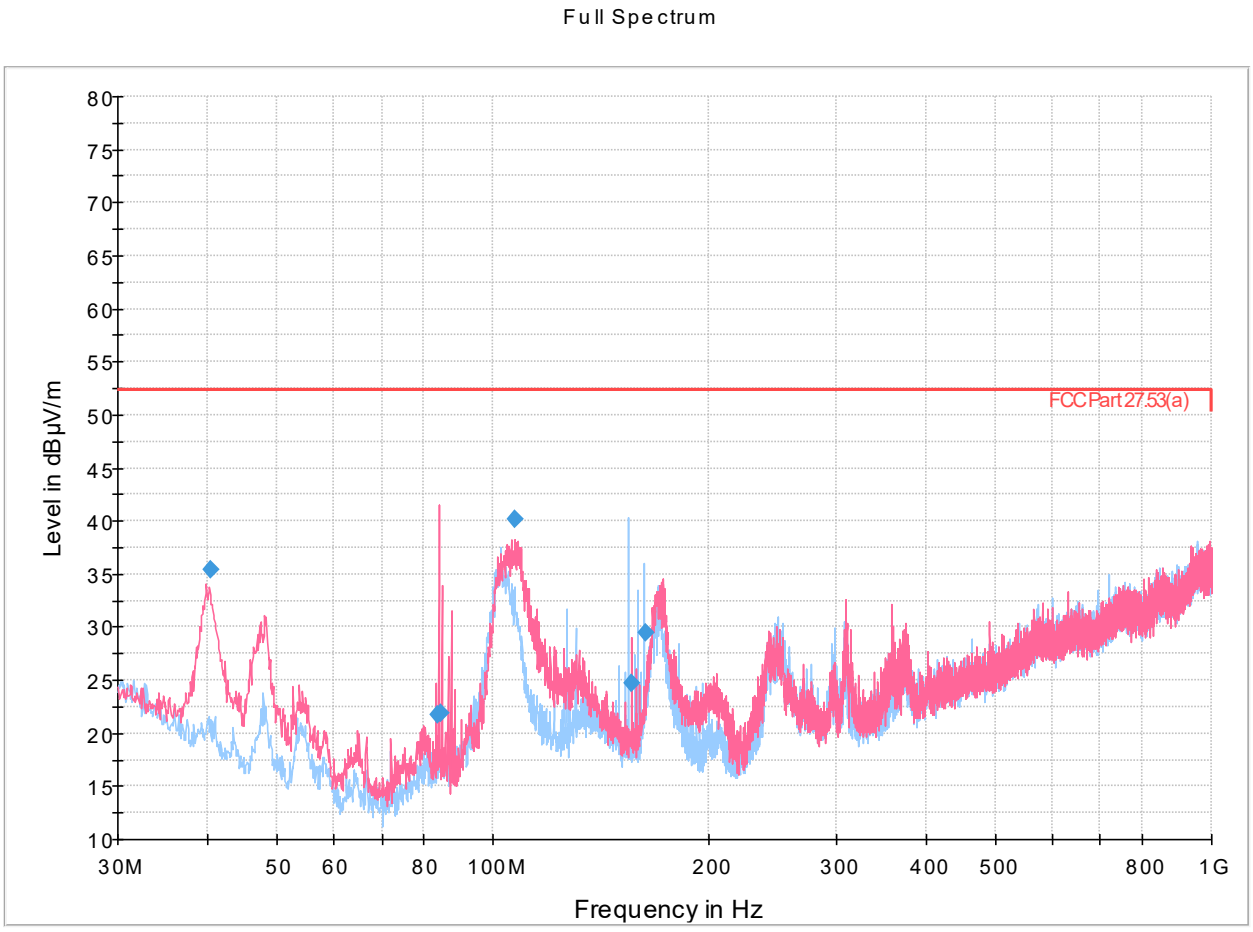


Figure 8.6-1: *Radiated emissions spectral plot (30 MHz - 1 GHz)*

Table 8.6-1*: Radiated emissions results*

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
40.374000	35.38	52.38	17.00	5000.0	100.000	100.0	V	263.0	18.9
83.629000	21.79	52.38	30.59	5000.0	100.000	263.0	V	0.0	14.3
84.622000	21.87	52.38	30.51	5000.0	100.000	364.0	V	20.0	14.4
107.054000	40.22	52.38	12.16	5000.0	100.000	100.0	V	135.0	17.9
155.457000	24.70	52.38	27.68	5000.0	100.000	201.0	H	100.0	17.7
163.274000	29.46	52.38	22.92	5000.0	100.000	183.0	H	212.0	17.1

Notes:
[1] Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.