5.6 BAND EDGE AT ANTENNA TERMINALS

Test Requirement: FCC 47 CFR Part 2.1051,
GSM 850 & WCDMA Band V & LTE Band 5: FCC 47 CFR Part 22.917(a),
GSM 1900 & WCDMA Band II & LTE Band 2: FCC 47 CFR Part 24.238(a),
WCDMA Band IV & LTE Band 4: FCC 47 CFR Part 27.53(h)(1),
LTE Band 12 & Band 17: FCC 47 CFR Part 27.53(g)
LTE Band 7: FCC 47 CFR Part 27.53(m)(4)

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limit:

FCC 47 CFR Part 22 & FCC 47 CFR Part 24: The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13 dBm.

FCC 47 CFR Part 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 47 CFR Part 27.53(h)(1): Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB. The emission limit equal to –13 dBm.

FCC 47 CFR Part 27.53(m)(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 that 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.

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.
For each band edge measurement:

1) Set the spectrum analyzer span to include the block edge frequency.
2) Set a marker to point the corresponding band edge frequency in each test case.
3) Set display line at -13 dBm
4) Set resolution bandwidth to at least 1% of emission bandwidth.
5) Set spectrum analyzer with RMS detector.
6) Record the max trace plot into the test report

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

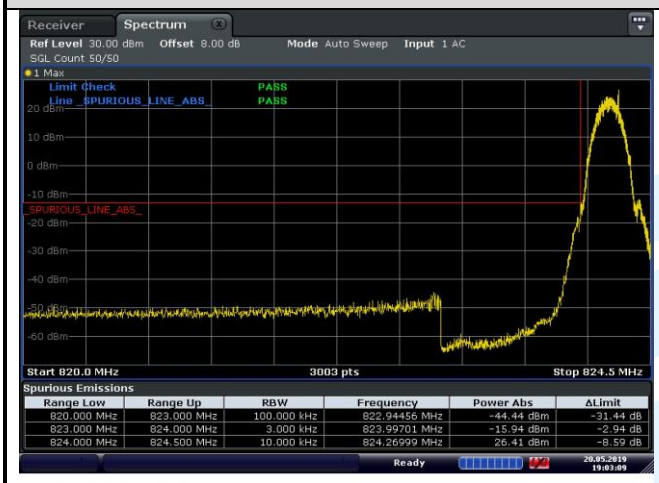
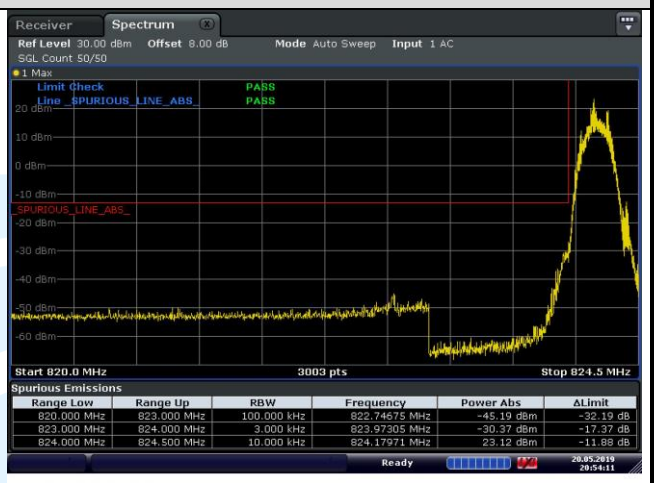
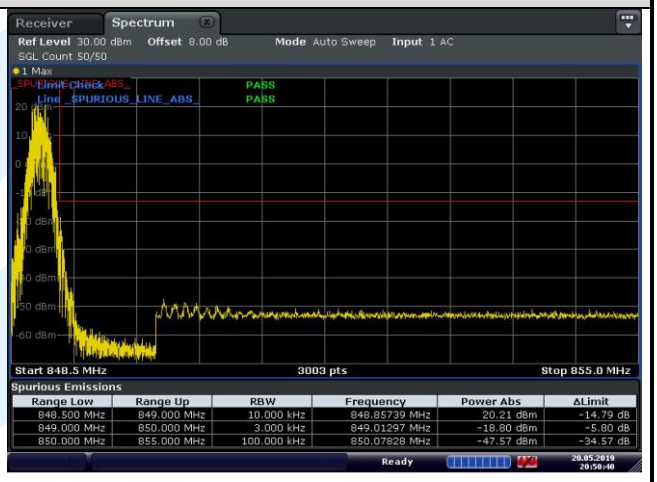
Test Setup: Refer to section 4.2.2 for details.

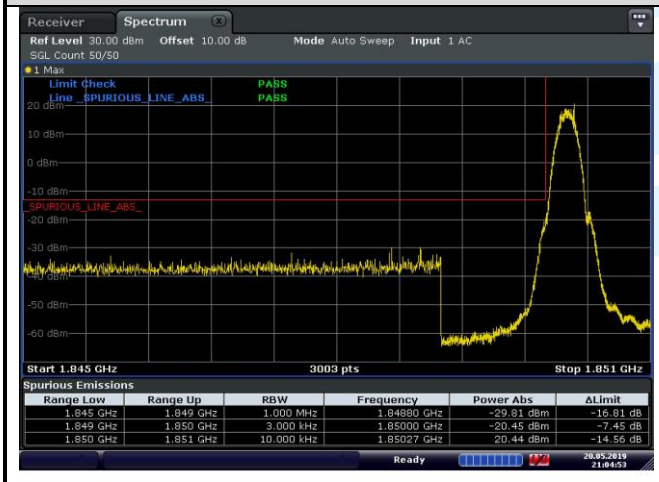
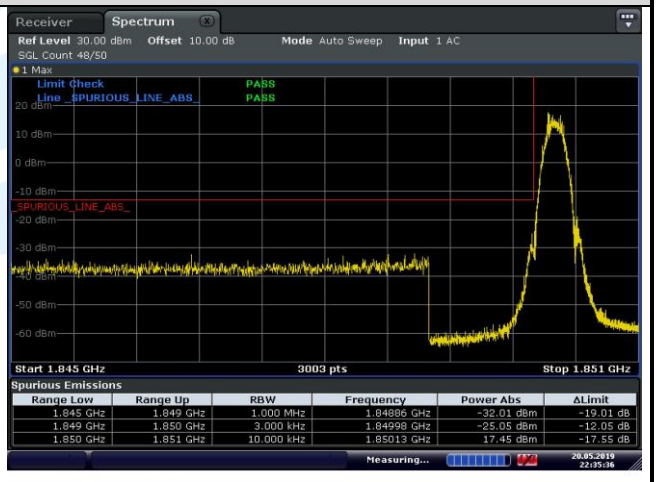
Instruments Used: Refer to section 3 for details

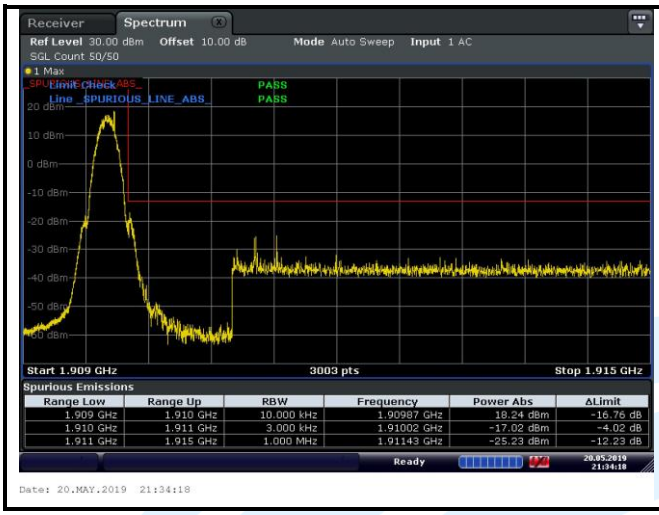
Test Mode: Link mode

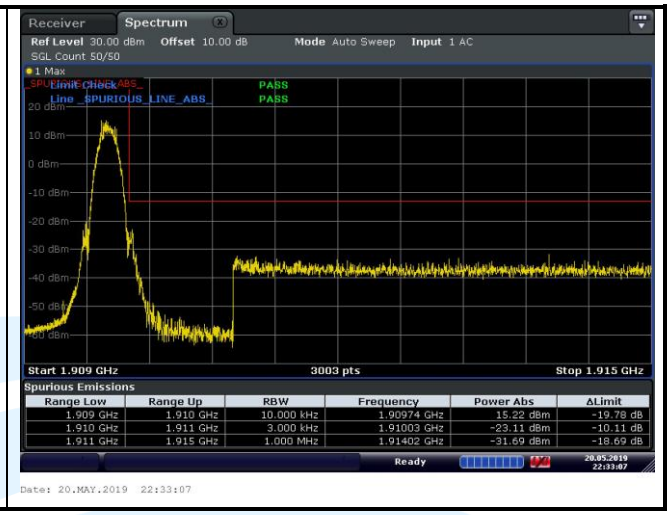
Test Results: Pass

The test plots as follows:

GSM 850 1Tx-slot	EDGE 850 1Tx-slot
Lowest Channel	
	
Highest Channel	
	

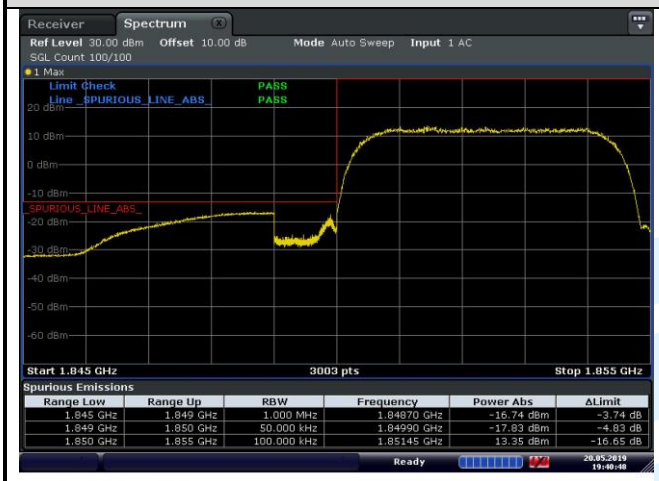
GSM 1900 1Tx-slot	EDGE 1900 1Tx-slot
Lowest Channel	
	
Highest Channel	


Receiver
Spectrum
Ref Level 30.00 dBm Offset 10.00 dB Mode Auto Sweep Input 1 AC
SGL Count 50/50
1 Max
Limit Check PASS
Line _SPURIOUS_LINE_ABS_ PASS
Start 1.909 GHz 3003 pts Stop 1.915 GHz
Spurious Emissions
Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit
1.909 GHz | 1.910 GHz | 10.000 kHz | 1.90987 GHz | 18.24 dBm | -16.76 dB
1.910 GHz | 1.911 GHz | 3.000 kHz | 1.91002 GHz | -17.02 dBm | -4.02 dB
1.911 GHz | 1.915 GHz | 1.000 MHz | 1.91143 GHz | -25.23 dBm | -12.23 dB
Ready
Date: 20.MAY.2019 21:34:18


Receiver
Spectrum
Ref Level 30.00 dBm Offset 10.00 dB Mode Auto Sweep Input 1 AC
SGL Count 50/50
1 Max
Limit Check PASS
Line _SPURIOUS_LINE_ABS_ PASS
Start 1.909 GHz 3003 pts Stop 1.915 GHz
Spurious Emissions
Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit
1.909 GHz | 1.910 GHz | 10.000 kHz | 1.90974 GHz | 15.22 dBm | -19.78 dB
1.910 GHz | 1.911 GHz | 3.000 kHz | 1.91003 GHz | -23.11 dBm | -10.11 dB
1.911 GHz | 1.915 GHz | 1.000 MHz | 1.91402 GHz | -31.69 dBm | -18.69 dB
Ready
Date: 20.MAY.2019 22:33:07

WCDMA Band II

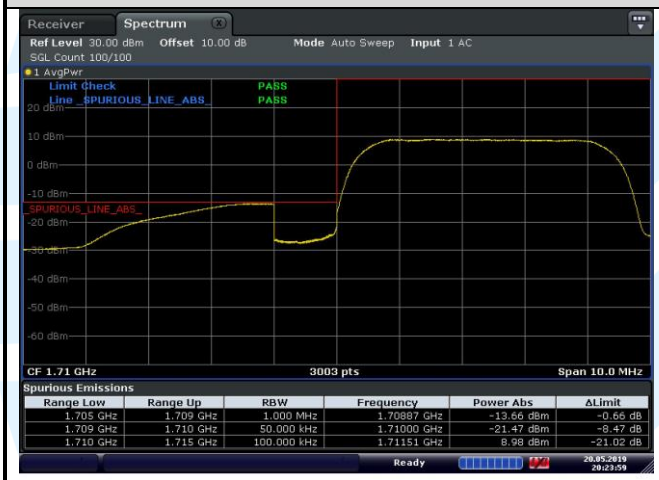
Lowest Channel



Highest Channel

WCDMA Band IV

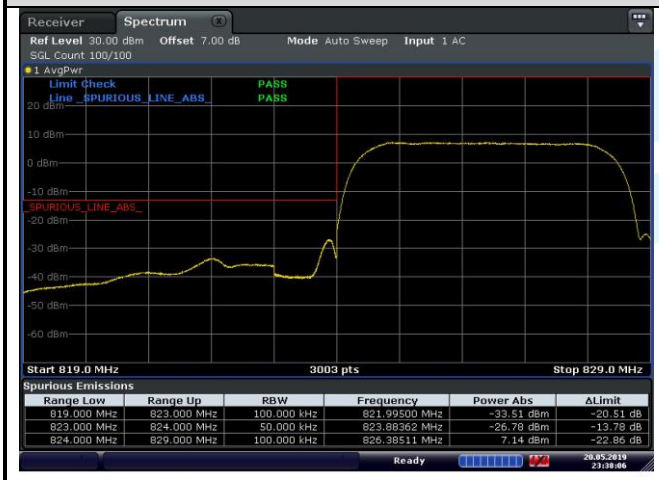
Lowest Channel



Highest Channel

WCDMA Band V

Lowest Channel



Highest Channel

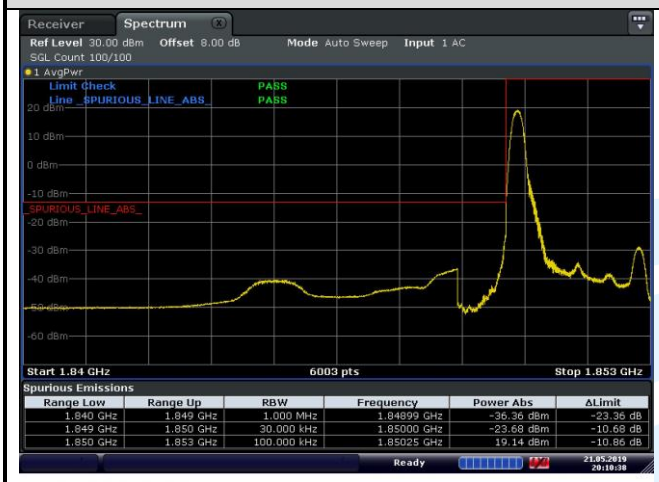
LTE Band 2

LTE Band 2 / 1.4 MHz / QPSK	
1 RB	Full RB
Lowest Channel	
Highest Channel	

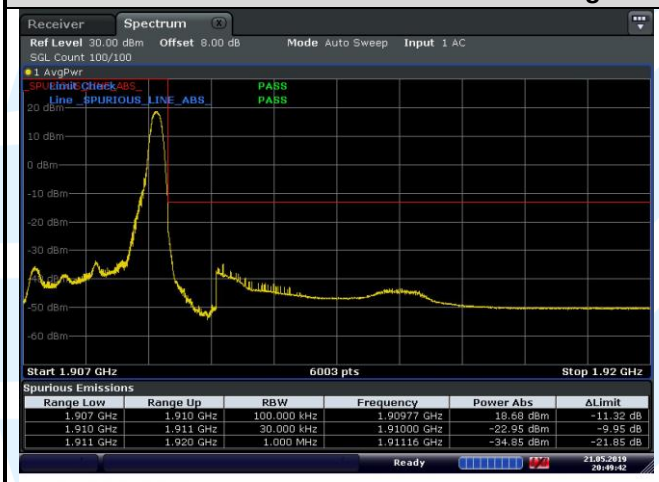
LTE Band 2 / 3 MHz / QPSK

1 RB	Full RB

Lowest Channel



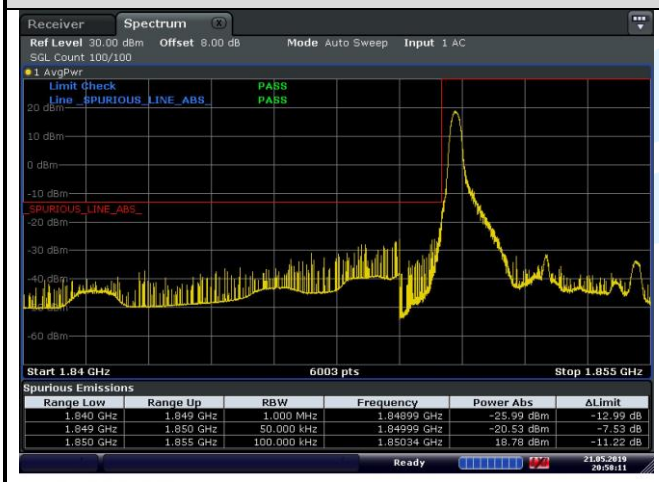
Highest Channel



LTE Band 2 / 5 MHz / QPSK

1 RB	Full RB

Lowest Channel

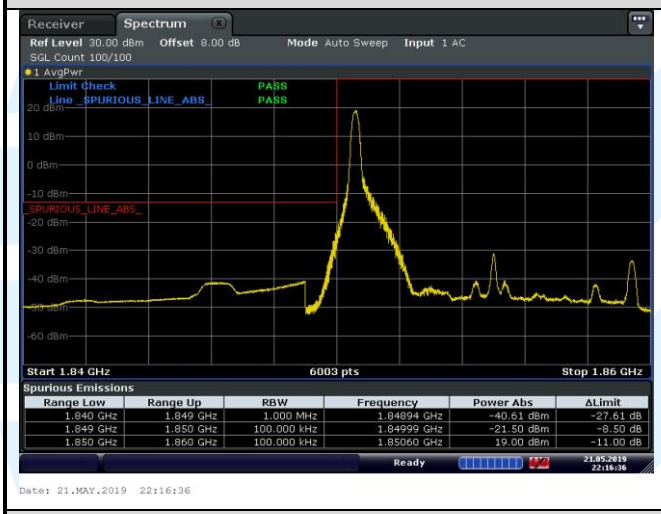


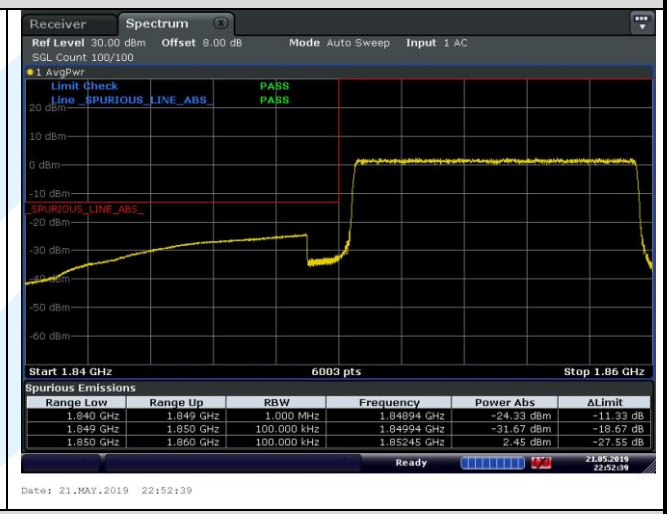
Highest Channel

LTE Band 2 / 10 MHz / QPSK

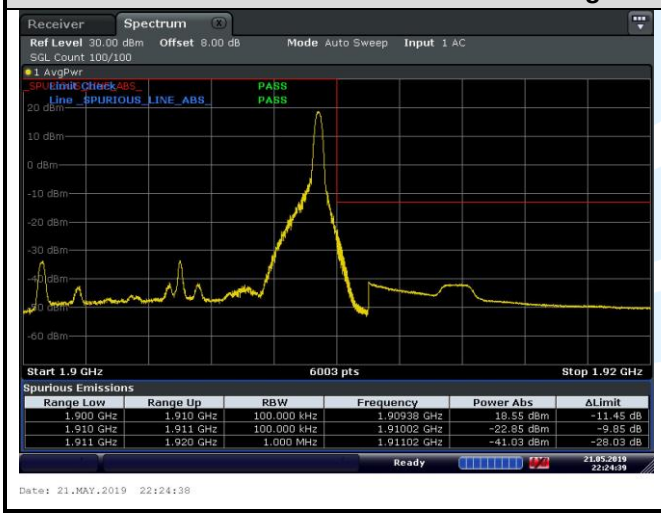
1 RB	Full RB

Lowest Channel





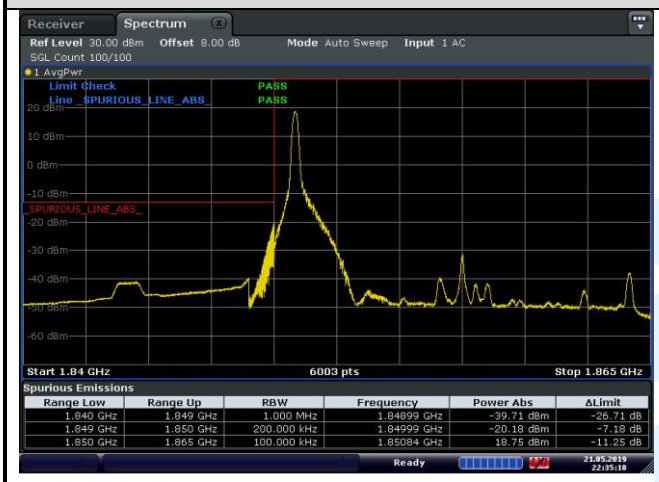
Highest Channel

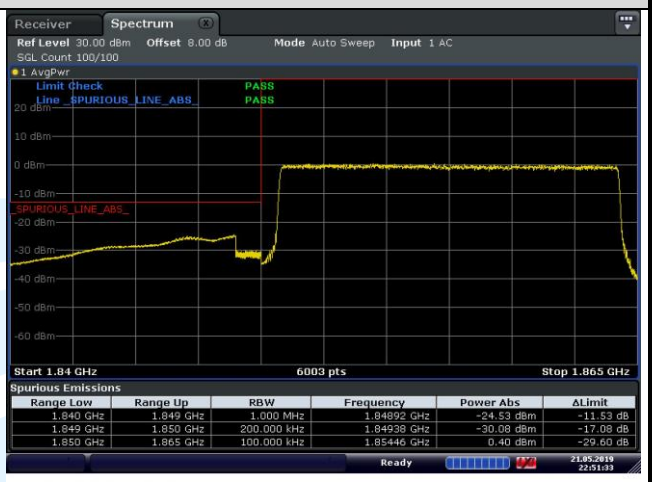


LTE Band 2 / 15 MHz / QPSK

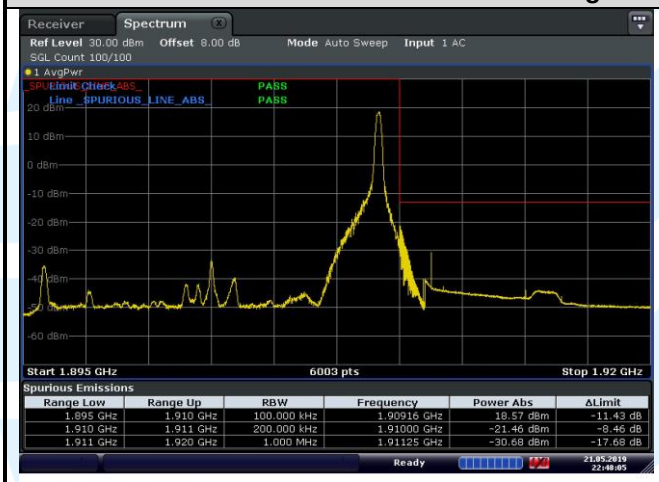
1 RB	Full RB

Lowest Channel





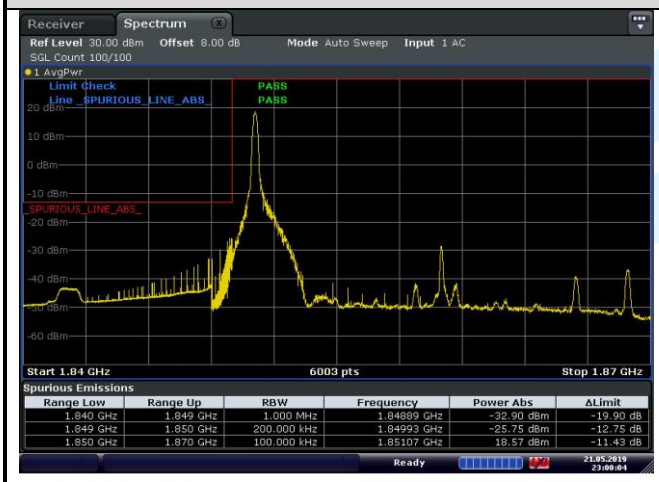
Highest Channel

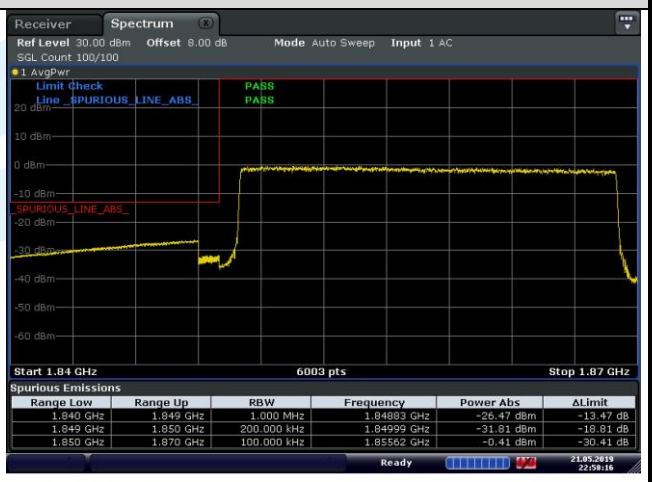


LTE Band 2 / 20 MHz / QPSK

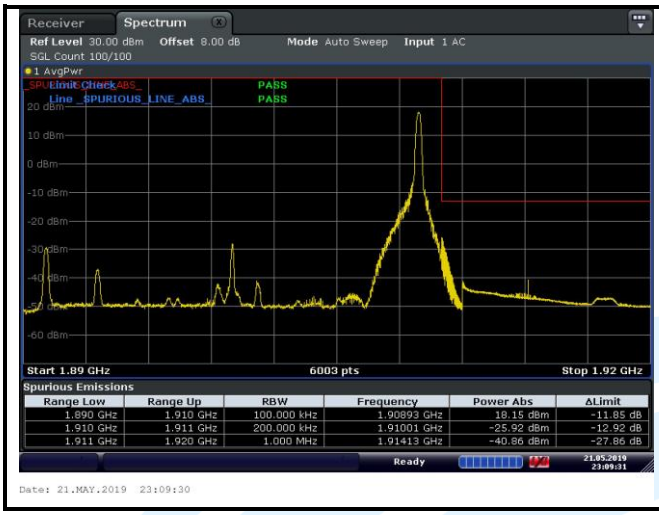
1 RB	Full RB

Lowest Channel





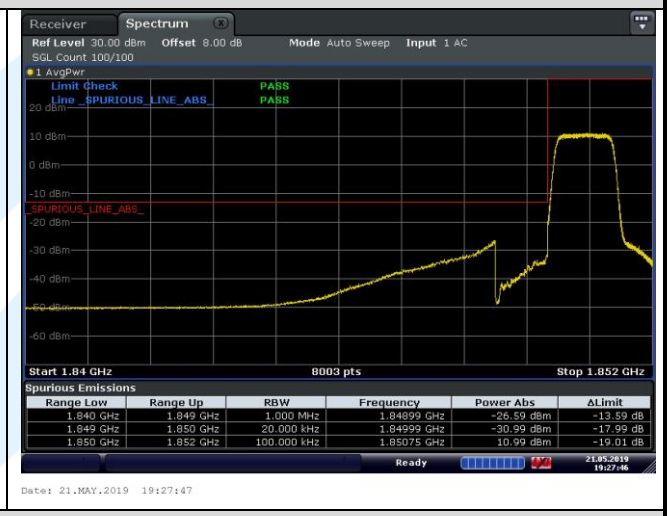
Highest Channel



LTE Band 2 / 1.4 MHz / 16QAM

1 RB	Full RB

Lowest Channel

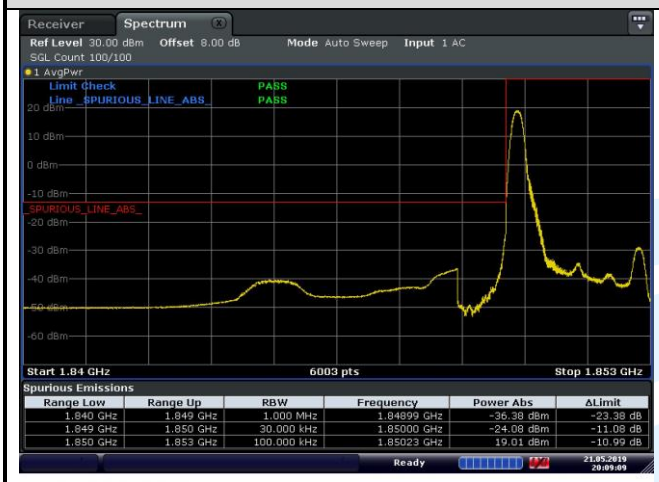


Highest Channel

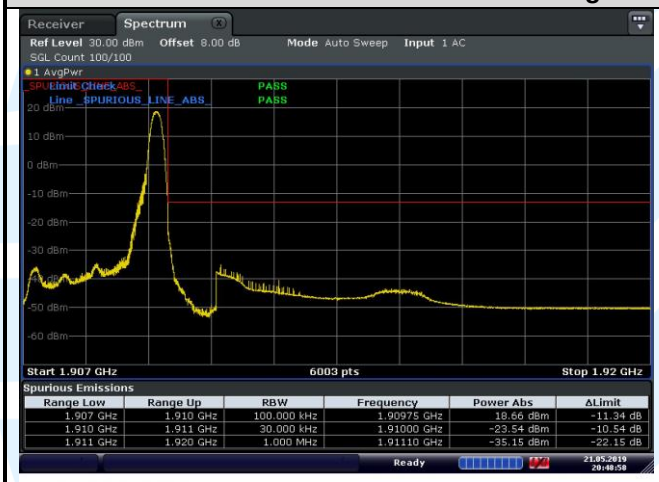
LTE Band 2 / 3 MHz / 16QAM

1 RB	Full RB

Lowest Channel



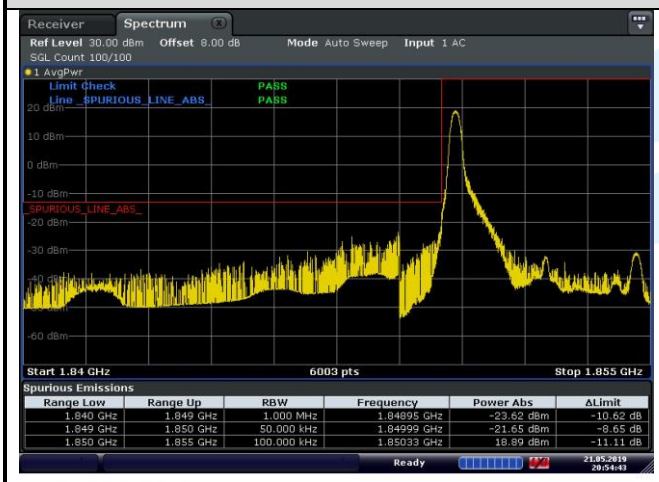
Highest Channel

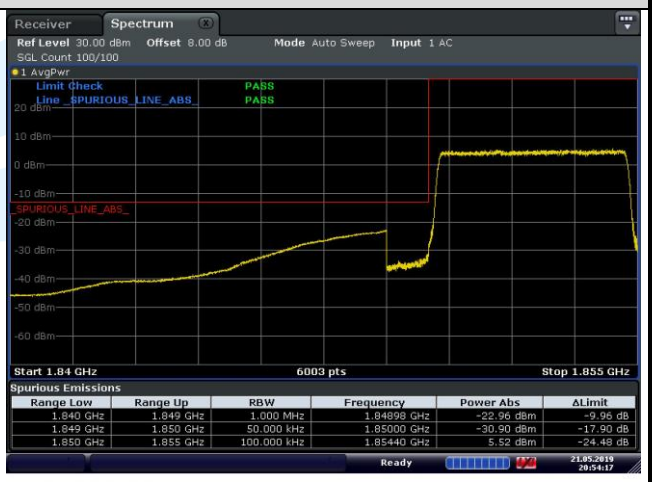


LTE Band 2 / 5 MHz / 16QAM

1 RB	Full RB

Lowest Channel



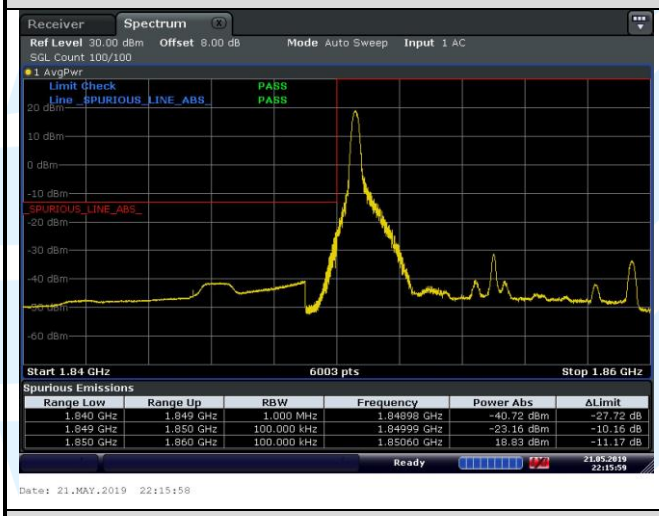


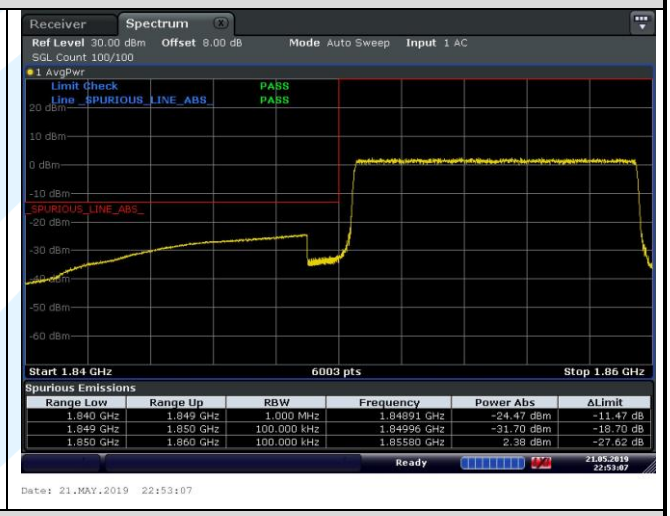
Highest Channel

LTE Band 2 / 10 MHz / 16QAM

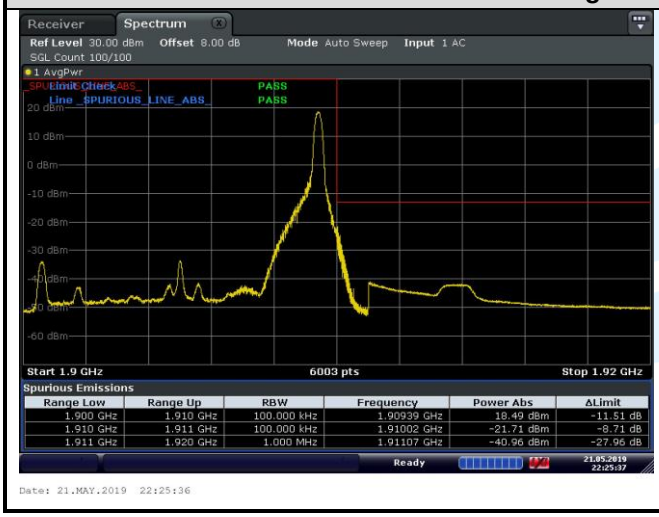
1 RB	Full RB

Lowest Channel





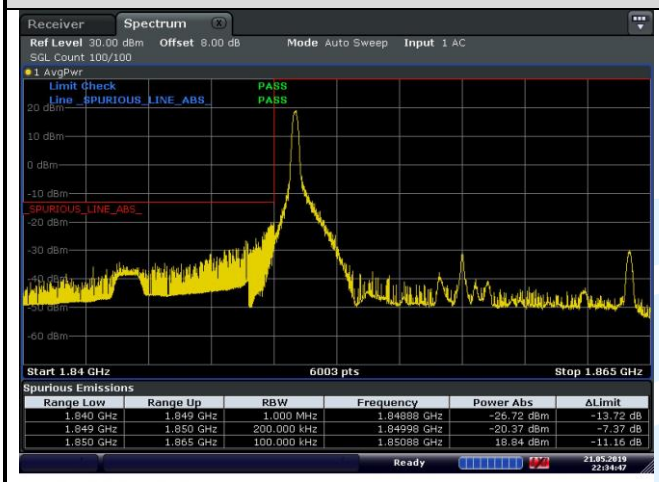
Highest Channel

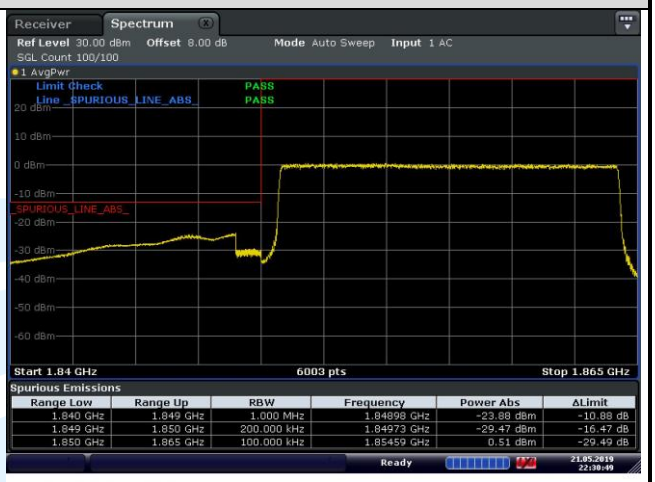


LTE Band 2 / 15 MHz / 16QAM

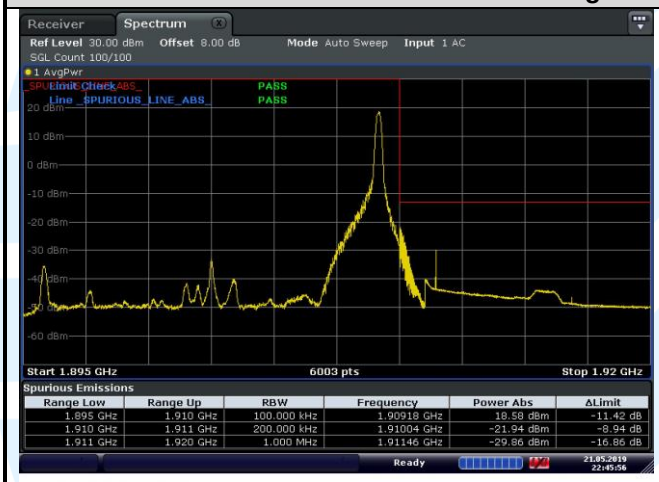
1 RB	Full RB

Lowest Channel





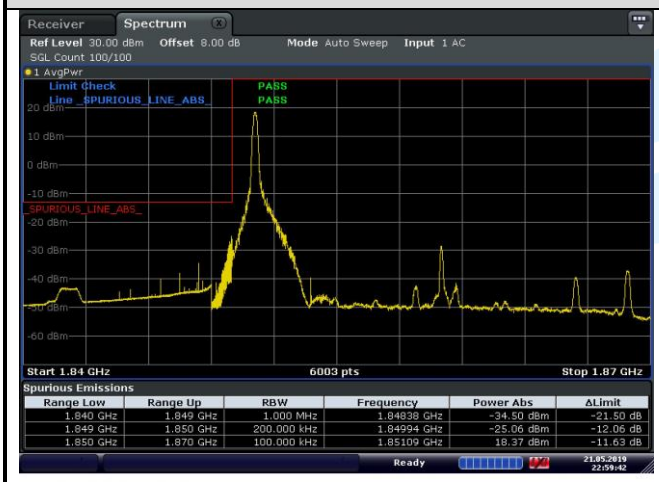
Highest Channel

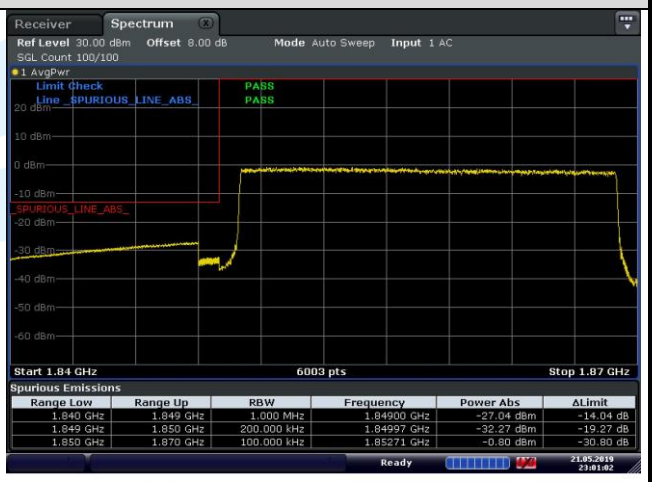


LTE Band 2 / 20 MHz / 16QAM

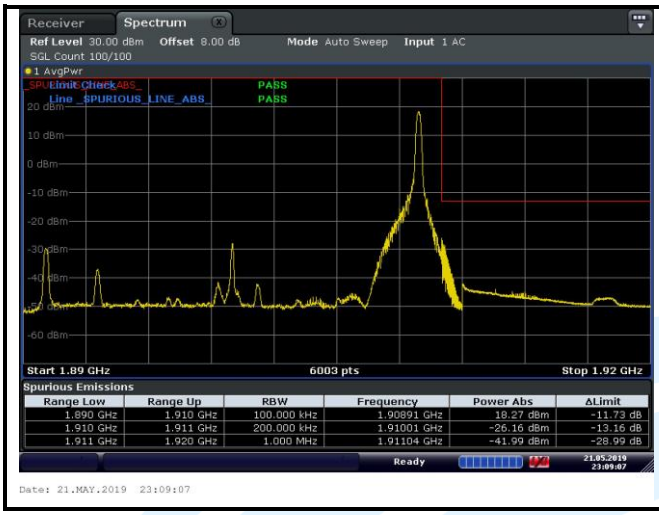
1 RB	Full RB

Lowest Channel



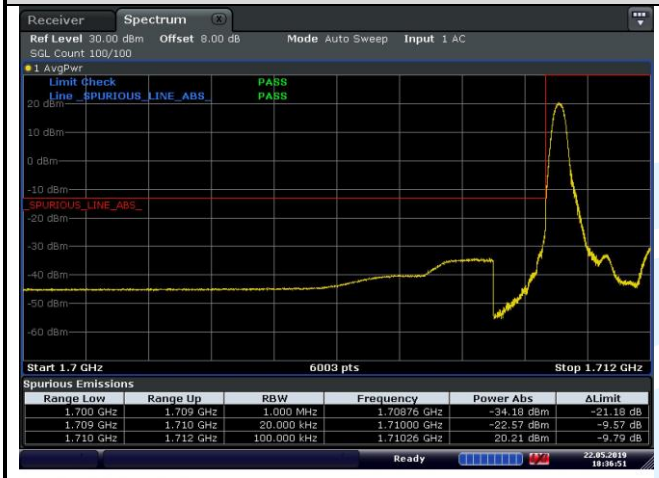


Highest Channel


Receiver
Spectrum
Ref Level 30.00 dBm Offset 8.00 dB Mode Auto Sweep Input 1 AC
SGL Count 100/100
1 AvgPwr
Limit Check PASS
Line SPURIOUS_LINE_ABS PASS
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
Start 1.89 GHz
6003 pts
Stop 1.92 GHz
Spurious Emissions
Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit
1.890 GHz | 1.910 GHz | 100.000 kHz | 1.90891 GHz | 18.27 dBm | -11.73 dB
1.910 GHz | 1.911 GHz | 200.000 kHz | 1.91001 GHz | -26.16 dBm | -13.16 dB
1.911 GHz | 1.920 GHz | 1.000 MHz | 1.91104 GHz | -41.99 dBm | -28.99 dB
Ready
21.05.2019 23:09:07
Date: 21.MAY.2019 23:09:07

Receiver
Spectrum
Ref Level 30.00 dBm Offset 8.00 dB Mode Auto Sweep Input 1 AC
SGL Count 100/100
1 AvgPwr
Limit Check PASS
Line SPURIOUS_LINE_ABS PASS
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
Start 1.89 GHz
6003 pts
Stop 1.92 GHz
Spurious Emissions
Range Low | Range Up | RBW | Frequency | Power Abs | ΔLimit
1.890 GHz | 1.910 GHz | 100.000 kHz | 1.89192 GHz | 0.05 dBm | -29.95 dB
1.910 GHz | 1.911 GHz | 200.000 kHz | 1.91000 GHz | -33.39 dBm | -20.39 dB
1.911 GHz | 1.920 GHz | 1.000 MHz | 1.91151 GHz | -31.12 dBm | -18.12 dB
Ready
21.05.2019 23:07:50
Date: 21.MAY.2019 23:07:57

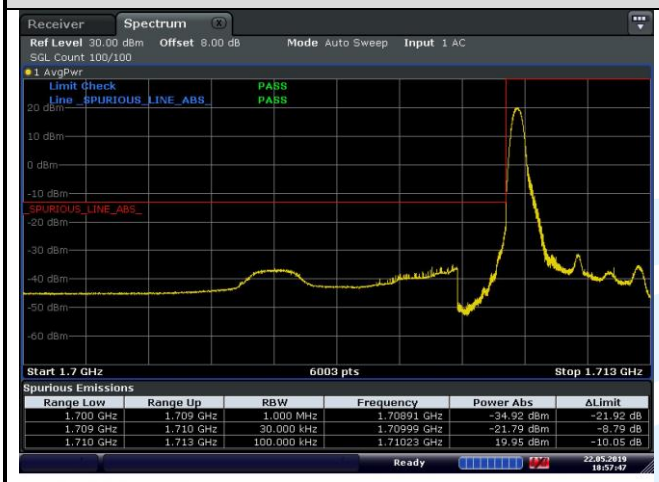
LTE Band 4

LTE Band 4 / 1.4 MHz / QPSK	
1 RB	**Full RB**
Lowest Channel	
	
Highest Channel	

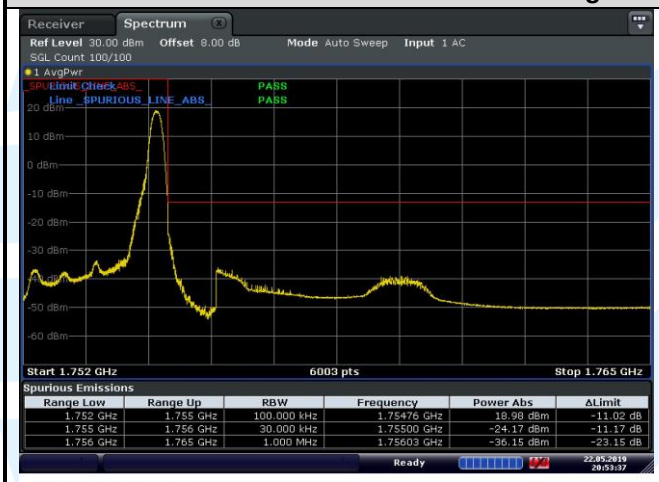
LTE Band 4 / 3 MHz / QPSK

1 RB	Full RB

Lowest Channel



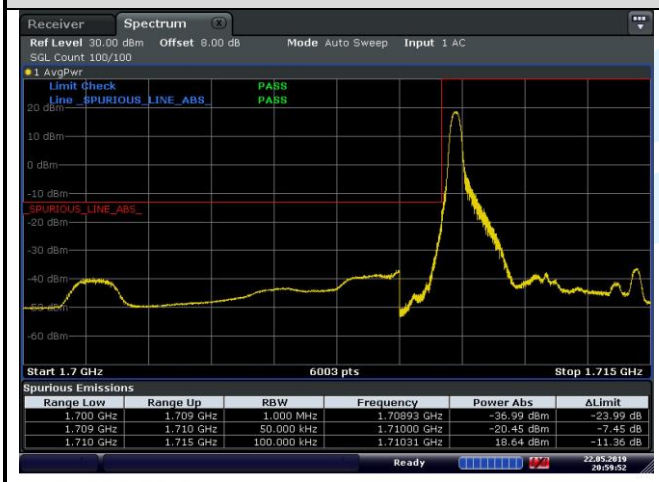
Highest Channel



LTE Band 4 / 5 MHz / QPSK

1 RB	Full RB

Lowest Channel

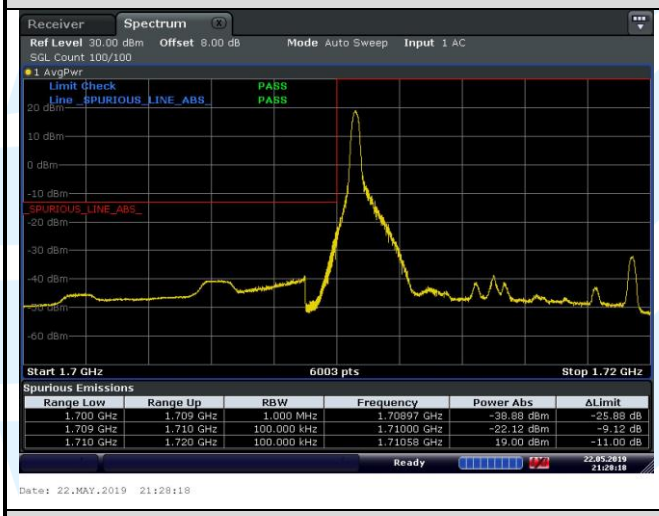


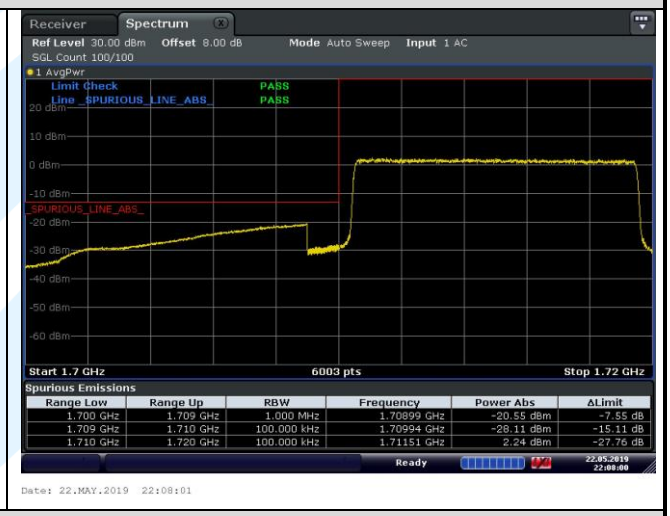
Highest Channel

LTE Band 4 / 10 MHz / QPSK

1 RB	Full RB

Lowest Channel



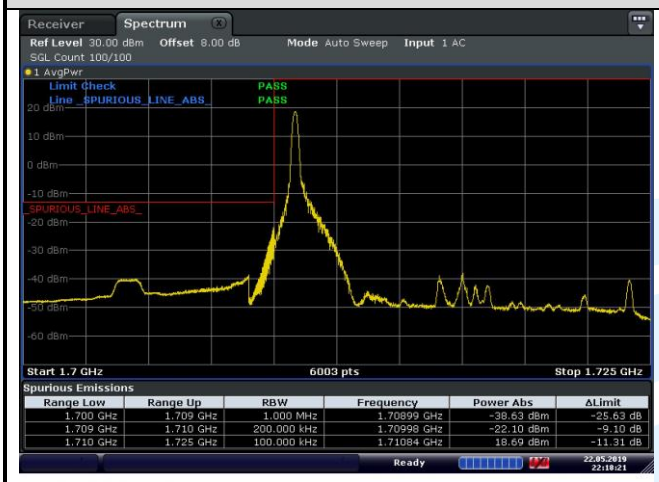


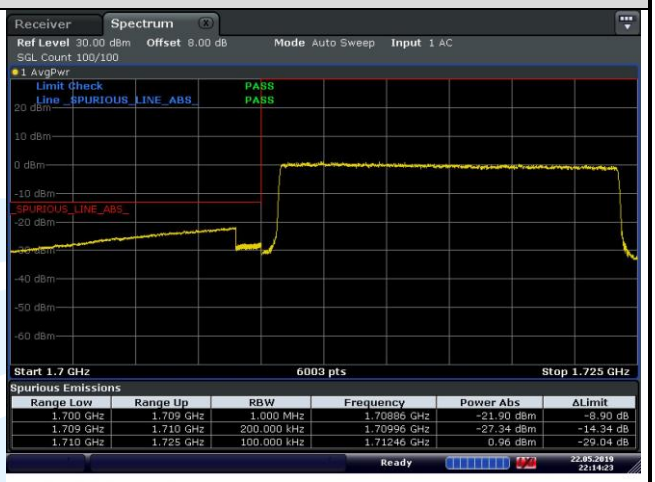
Highest Channel

LTE Band 4 / 15 MHz / QPSK

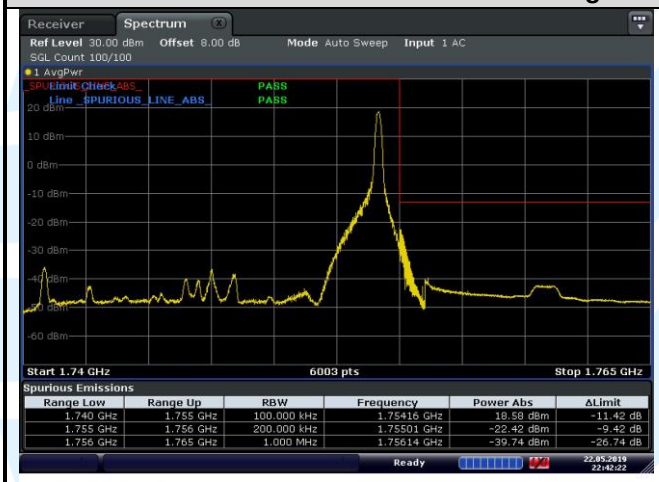
1 RB	Full RB

Lowest Channel





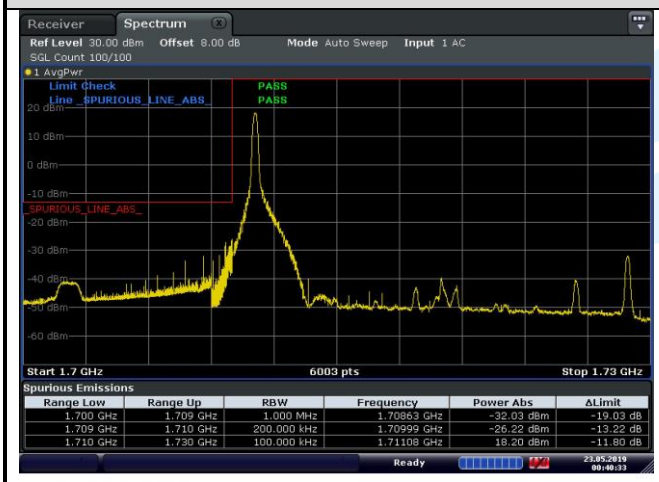
Highest Channel

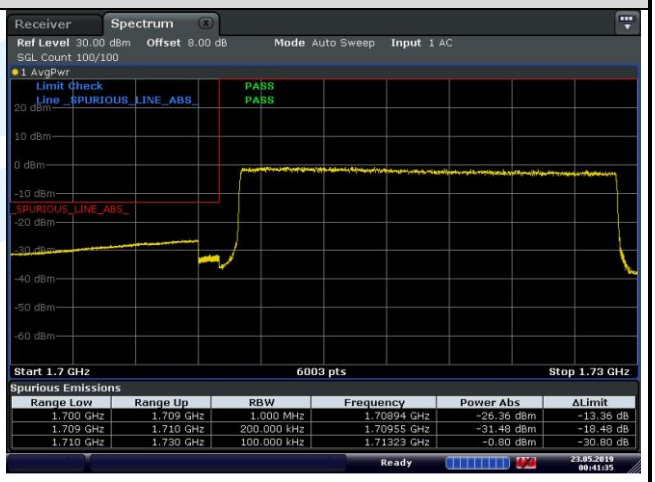


LTE Band 4 / 20 MHz / QPSK

1 RB	Full RB

Lowest Channel





Highest Channel