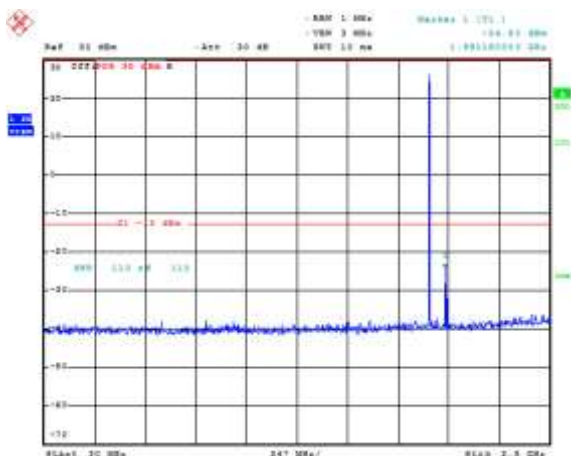


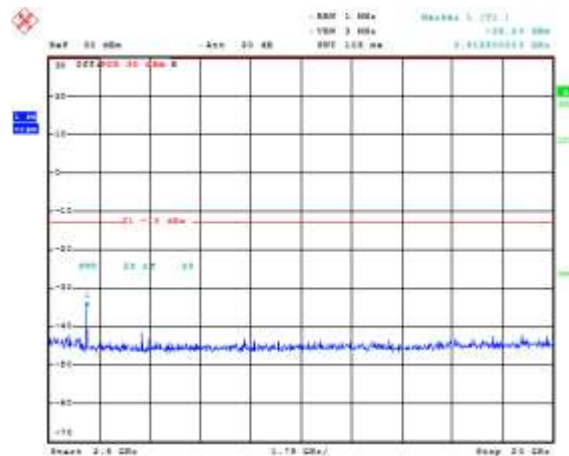
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 2 Conducted RF Emission Test Data cont'd

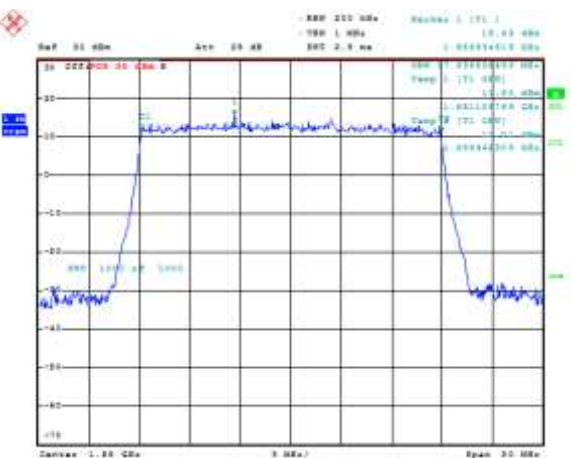
**Figure 3-17a: Band 2, Spurious Conducted Emissions, High Channel, 1.4MHz BW (RB= 6)**



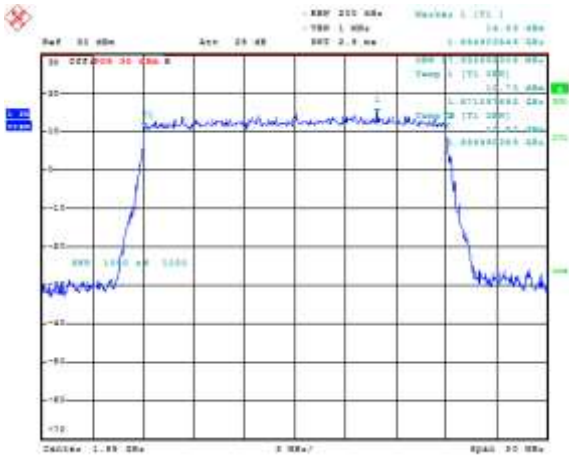
**Figure 3-18a: Band 2, Spurious Conducted Emissions, High Channel, 1.4MHz BW (RB= 6)**



**Figure 3-19a: Occupied Bandwidth, Band 2 Low Channel, 20MHz BW (RB= 100)**



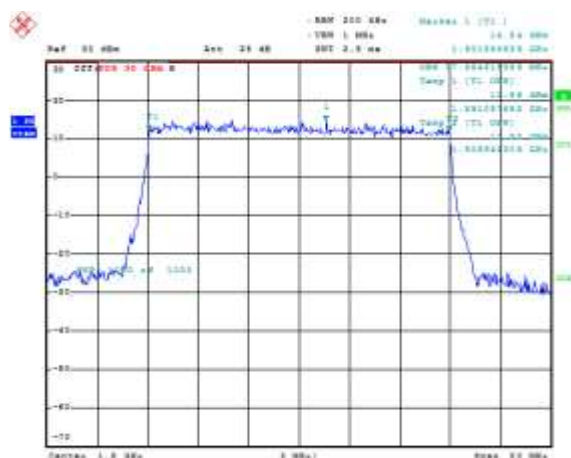
**Figure 3-20a: Occupied Bandwidth, Band 2 Middle Channel, 20MHz BW (RB= 100)**



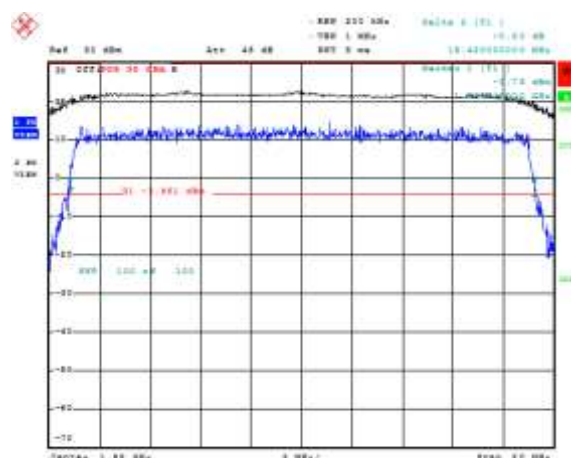
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 2 Conducted RF Emission Test Data cont'd

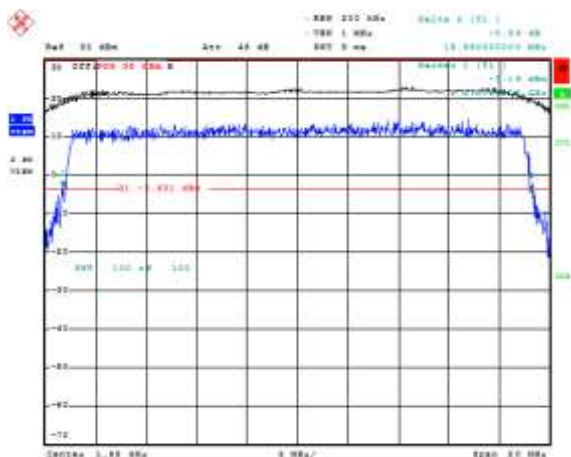
**Figure 3-21a: Occupied Bandwidth, Band 2 High Channel, 20MHz BW (RB= 100)**



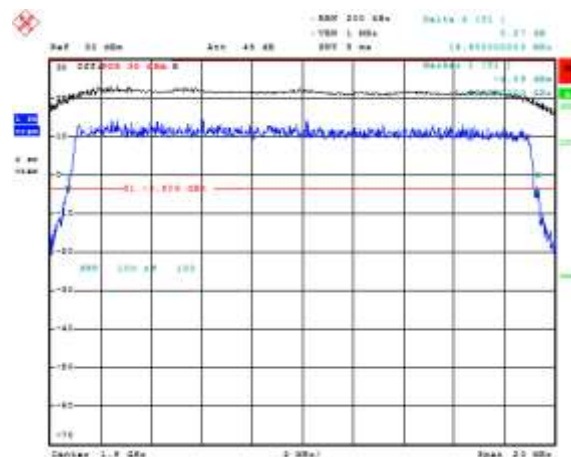
**Figure 3-22a: -26 dBc Bandwidth, Band 2 Low Channel, 20MHz BW (RB= 100)**



**Figure 3-23a: -26 dBc Bandwidth, Band 2 Middle Channel, 20MHz BW (RB= 100)**



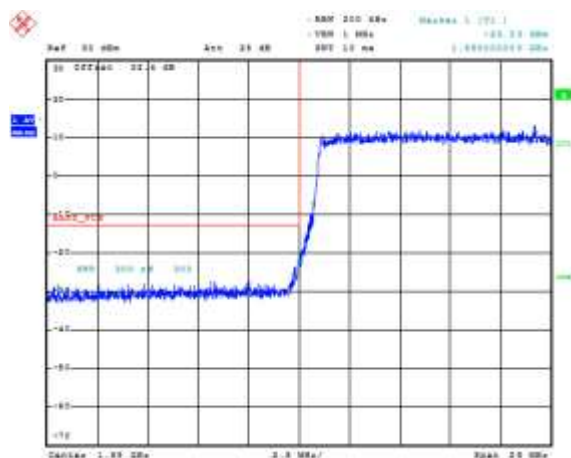
**Figure 3-24a: -26 dBc Bandwidth, Band 2 High Channel, 20MHz BW (RB= 100)**



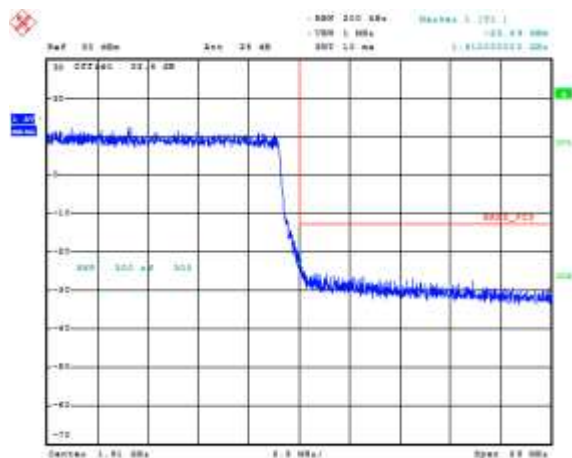
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|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 2 Conducted RF Emission Test Data cont'd

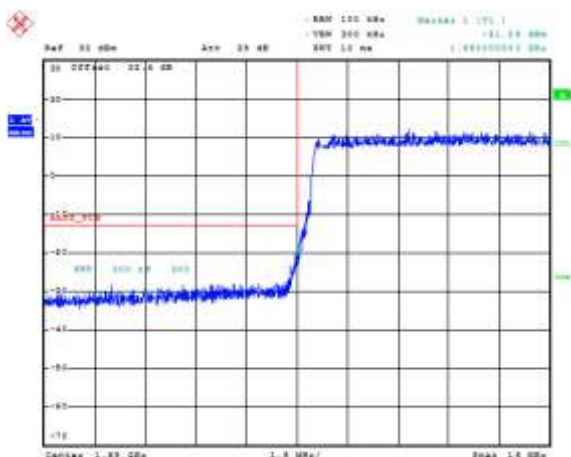
**Figure 3-25a: Band 2 Low Channel Mask, 20MHz  
BW, RB = 100**



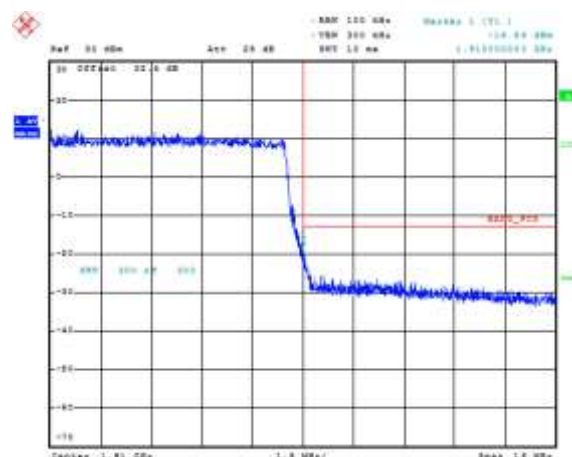
**Figure 3-26a: Band 2 High Channel Mask, 20MHz  
BW, RB = 100**



**Figure 3-27a: Band 2 Low Channel Mask, 10MHz  
BW, RB = 50**



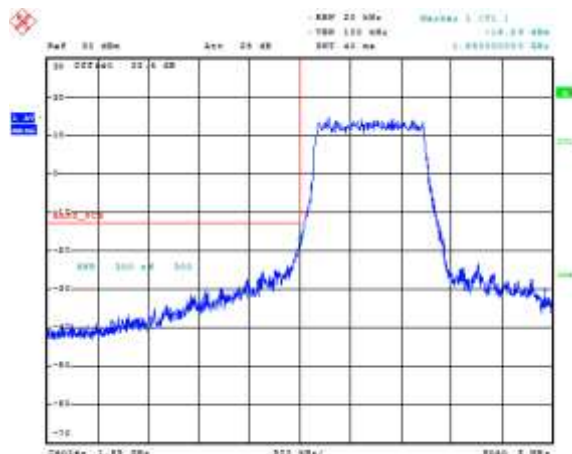
**Figure 3-28a: Band 2 High Channel Mask, 10MHz  
BW, RB = 50**



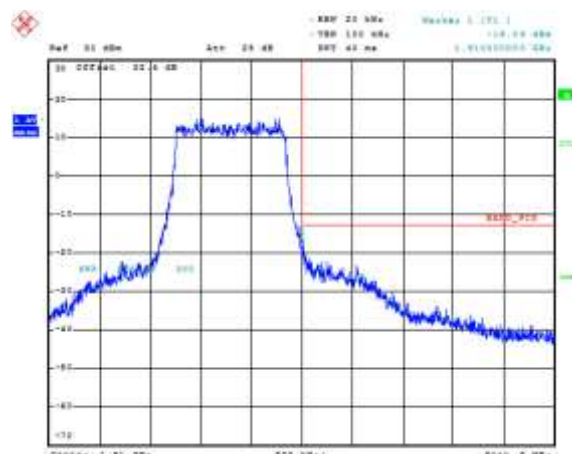
|                                                                                   |                                                                                                |                                                         |
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|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 2 Conducted RF Emission Test Data cont'd

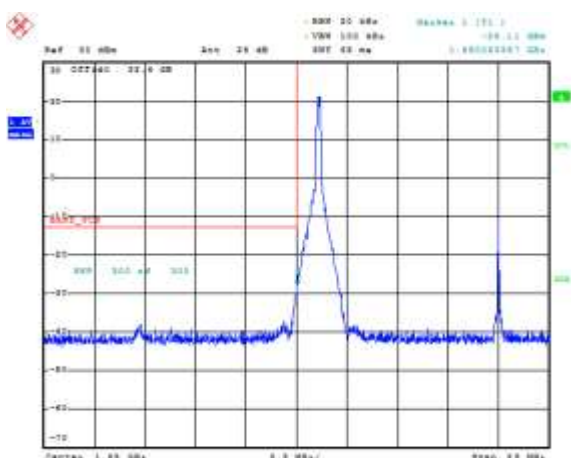
**Figure 3-29a: Band 2 Low Channel Mask, 1.4MHz BW, RB = 6**



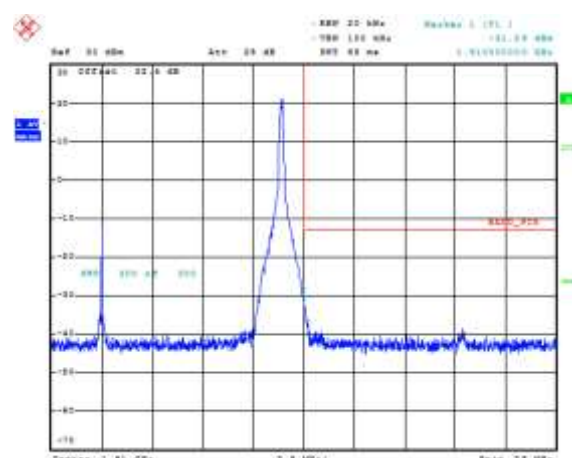
**Figure 3-30a: Band 2 High Channel Mask, 1.4MHz BW, RB = 6**



**Figure 3-31a: Band 2 Low Channel Mask, 20MHz BW, RB = 1**



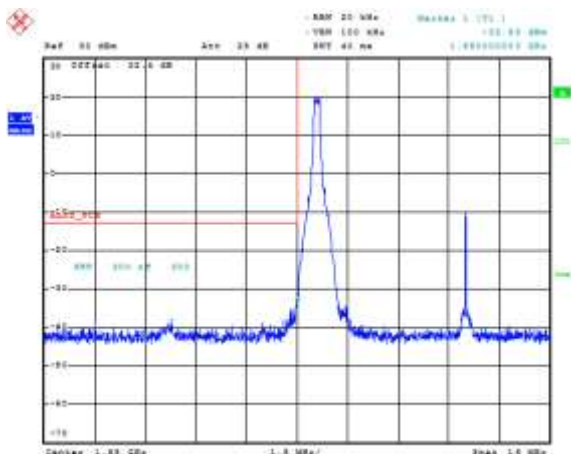
**Figure 3-32a: Band 2 High Channel Mask, 20MHz BW, RB = 1**



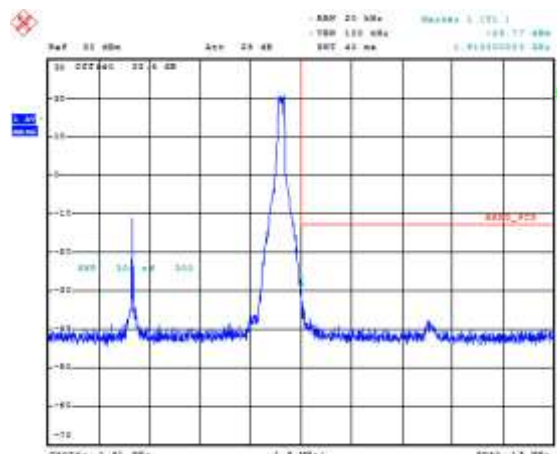
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|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 2 Conducted RF Emission Test Data cont'd

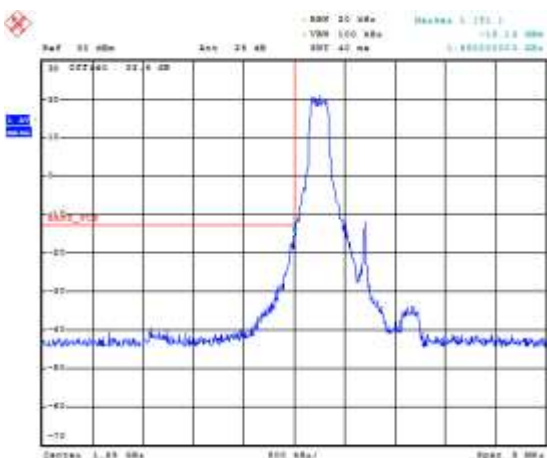
**Figure 3-33a: Band 2 Low Channel Mask, 10MHz  
BW, RB = 1**



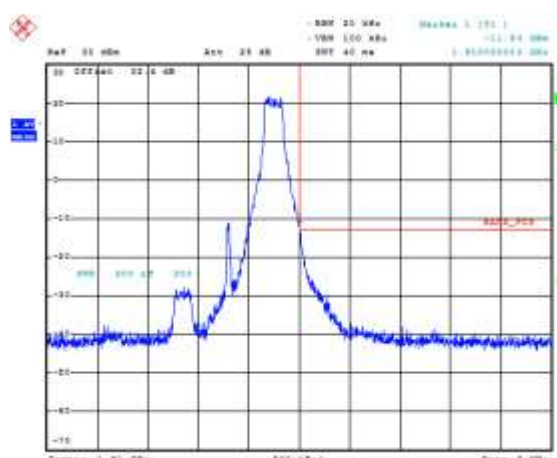
**Figure 3-34a: Band 2 High Channel Mask, 10MHz  
BW, RB = 1**



**Figure 3-35a: Band 2 Low Channel Mask, 1.4MHz  
BW, RB = 1**



**Figure 3-36a: Band 2 High Channel Mask, 1.4MHz  
BW, RB = 1**

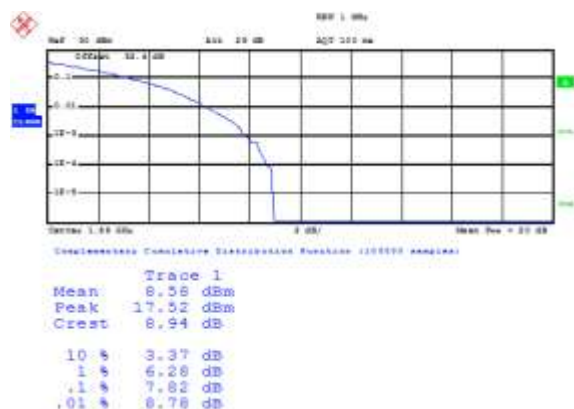




|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 2 Conducted RF Emission Test Data cont'd

**Figure 3-37a: Band 2, Mid Channel PAR, 20 MHz BW, RB = 50 QPSK**



**Figure 3-38a: Band 2, Mid Channel PAR, 20 MHz BW, RB = 100 16-QAM**



**Figure 3-39a: Band 2, Mid Channel PAR, 10 MHz BW, RB = 25 QPSK**



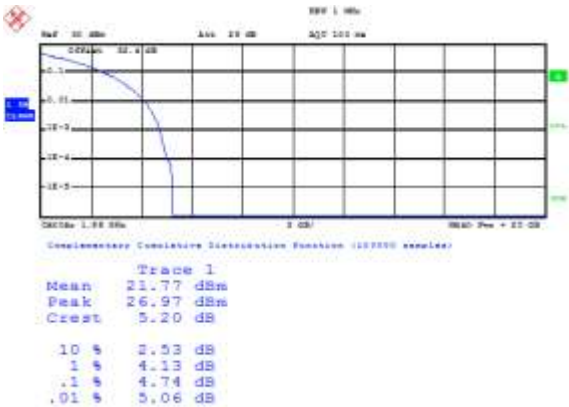
**Figure 3-40a: Band 2, Mid Channel PAR, 10 MHz BW, RB = 50 16-QAM**



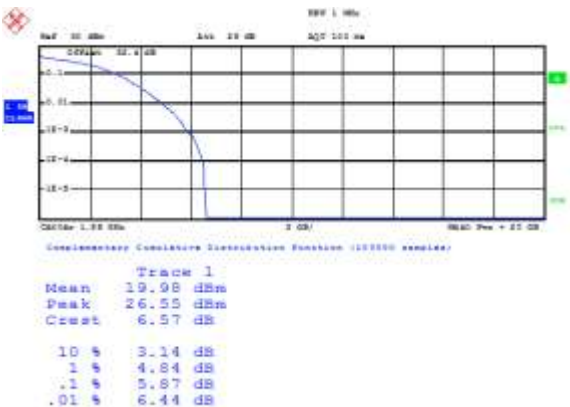
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

LTE Band 2 Conducted RF Emission Test Data cont'd

**Figure 3-41a: Band 2, Mid Channel PAR, 1.4 MHz  
BW, RB = 3 QPSK**



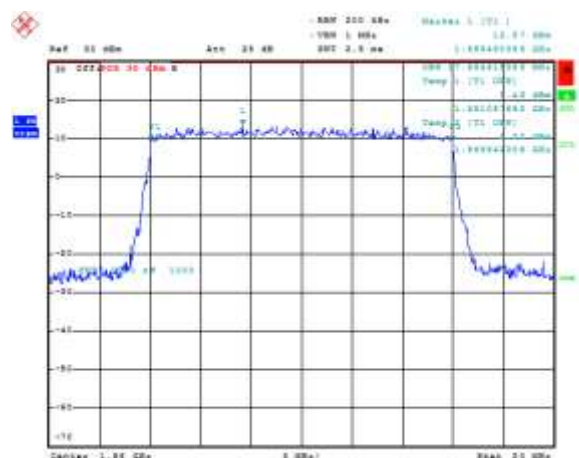
**Figure 3-42a: Band 2, Mid Channel PAR, 1.4 MHz  
BW, RB = 6 16-QAM**



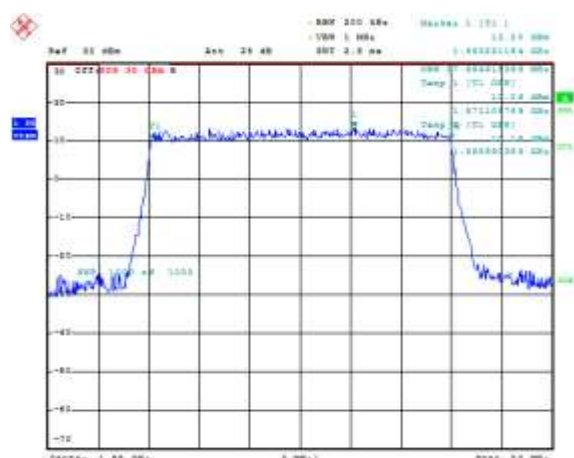
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|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 2 Conducted RF Emission Test Data cont'd

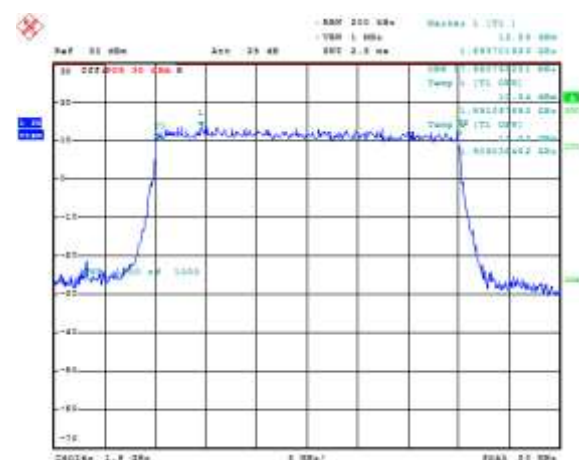
**Figure 3-43a: Occupied Bandwidth, Band 2 Low Channel, 20MHz BW (RB= 100) 16-QAM**



**Figure 3-44a: Occupied Bandwidth, Band 2 Mid Channel, 20MHz BW (RB= 100) 16-QAM**



**Figure 3-45a: Occupied Bandwidth, Band 2 High Channel, 20MHz BW (RB= 100) 16-QAM**

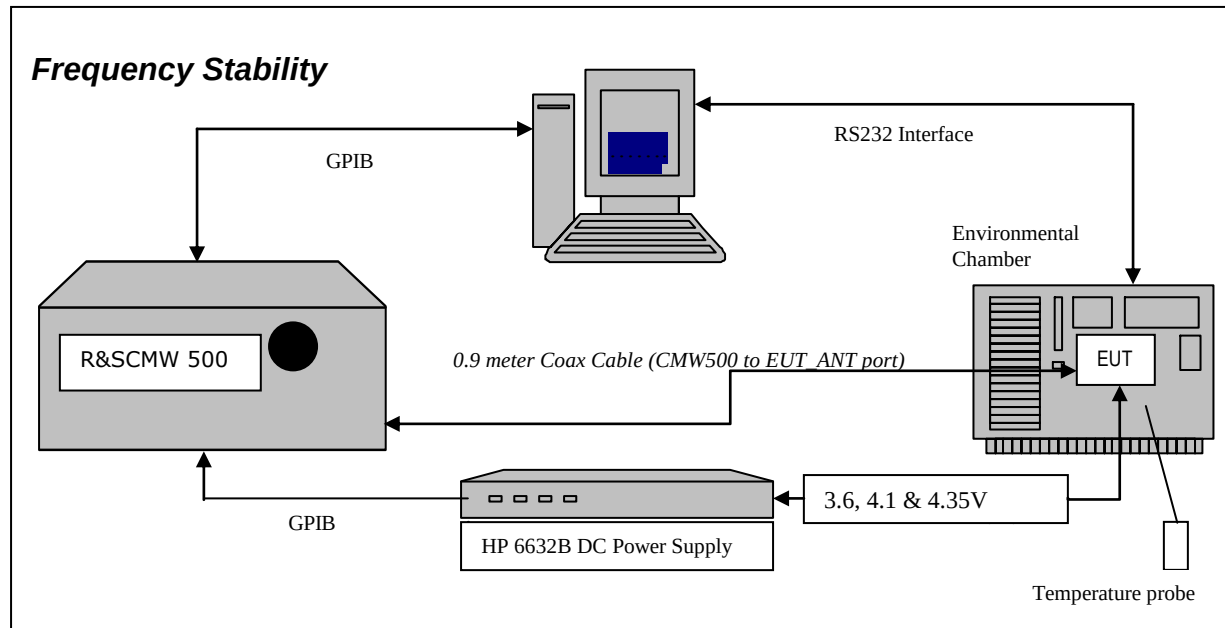




## APPENDIX 3B – LTE Band 2 FREQUENCY STABILITY TEST DATA

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Frequency Stability Test Data



The following measurements were performed by Sijia Li.

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements

**2.1055** Frequency Stability - Procedures

(a,b) Frequency Stability - Temperature Variation

(d) Frequency Stability - Voltage Variation

**24.235** *Frequency Stability.*

*The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.*

*The EUT meets the requirements as stated in CFR 47 chapter 1, Section 24.235, CFR 47 and RSS-133, 6.3 Frequency Stability.*

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMW 500 and the EUT antenna port.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## Test Setup:

The EUT was placed in the Temperature chamber and connected to CMW 500 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.

---

The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMW 500 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 1860.0, 1880.0 and 1900.0 MHz each was measured under bandwidth of 20 MHz with maximum (100) RBs. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.

After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

|                                                                                   |                                                                                                |                                                         |
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|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Procedure:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

1. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMW 500 Radio Communication Tester.
6. Command the CMW 500 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. The CMW 500 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 4.1 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

The maximum frequency error in the LTE band 2 measured was **-0.0126 PPM**.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Date of test: Feb 3, 2015

**LTE band 2 results: channels 18600, 18900, & 19199 @ 20°C maximum transmitted power**

| Traffic Channel Number | LTE Band 2 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|----------------------------|-----------------|-----------------------|----------------------|---------|
| 18600                  | 1860.0                     | 3.6             | 20                    | 8.05                 | 0.0043  |
| 18900                  | 1880.0                     | 3.6             | 20                    | -20.13               | -0.0107 |
| 19199                  | 1900.0                     | 3.6             | 20                    | -13.05               | -0.0069 |

| Traffic Channel Number | LTE Band 2 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|----------------------------|-----------------|-----------------------|----------------------|---------|
| 18600                  | 1860.0                     | 4.1             | 20                    | 10.40                | 0.0056  |
| 18900                  | 1880.0                     | 4.1             | 20                    | 5.79                 | 0.0031  |
| 19199                  | 1900.0                     | 4.1             | 20                    | -5.18                | -0.0027 |

| Traffic Channel Number | LTE Band 2 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|----------------------------|-----------------|-----------------------|----------------------|--------|
| 18600                  | 1860.0                     | 4.35            | 20                    | 15.52                | 0.0083 |
| 18900                  | 1880.0                     | 4.35            | 20                    | 9.67                 | 0.0051 |
| 19199                  | 1900.0                     | 4.35            | 20                    | 3.65                 | 0.0019 |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 2 Results: channel 18600 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 18600                  | 1860.0          | 3.6             | -30                   | -14.13               | -0.0076 |
| 18600                  | 1860.0          | 3.6             | -20                   | -14.62               | -0.0079 |
| 18600                  | 1860.0          | 3.6             | -10                   | -9.33                | -0.0050 |
| 18600                  | 1860.0          | 3.6             | 0                     | 5.01                 | 0.0027  |
| 18600                  | 1860.0          | 3.6             | 10                    | 9.33                 | 0.0050  |
| 18600                  | 1860.0          | 3.6             | 20                    | 8.05                 | 0.0043  |
| 18600                  | 1860.0          | 3.6             | 30                    | 13.30                | 0.0072  |
| 18600                  | 1860.0          | 3.6             | 40                    | 14.08                | 0.0076  |
| 18600                  | 1860.0          | 3.6             | 50                    | -6.92                | -0.0037 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 18600                  | 1860.0          | 4.1             | -30                   | 11.36                | 0.0061  |
| 18600                  | 1860.0          | 4.1             | -20                   | 9.11                 | 0.0049  |
| 18600                  | 1860.0          | 4.1             | -10                   | 11.83                | 0.0064  |
| 18600                  | 1860.0          | 4.1             | 0                     | -6.64                | -0.0036 |
| 18600                  | 1860.0          | 4.1             | 10                    | -12.82               | -0.0069 |
| 18600                  | 1860.0          | 4.1             | 20                    | 10.40                | 0.0056  |
| 18600                  | 1860.0          | 4.1             | 30                    | 13.22                | 0.0071  |
| 18600                  | 1860.0          | 4.1             | 40                    | 11.52                | 0.0062  |
| 18600                  | 1860.0          | 4.1             | 50                    | -12.73               | -0.0068 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 18600                  | 1860.0          | 4.35            | -30                   | 14.92                | 0.0080  |
| 18600                  | 1860.0          | 4.35            | -20                   | -13.65               | -0.0073 |
| 18600                  | 1860.0          | 4.35            | -10                   | -15.01               | -0.0081 |
| 18600                  | 1860.0          | 4.35            | 0                     | -12.60               | -0.0068 |
| 18600                  | 1860.0          | 4.35            | 10                    | -6.47                | -0.0035 |
| 18600                  | 1860.0          | 4.35            | 20                    | 15.52                | 0.0083  |
| 18600                  | 1860.0          | 4.35            | 30                    | -16.35               | -0.0088 |
| 18600                  | 1860.0          | 4.35            | 40                    | -15.16               | -0.0082 |
| 18600                  | 1860.0          | 4.35            | 50                    | 12.83                | 0.0069  |



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 2 Results: channel 18900 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM            |
|------------------------|-----------------|-----------------|-----------------------|----------------------|----------------|
| 18900                  | 1880.00         | 3.6             | -30                   | -20.66               | -0.0110        |
| 18900                  | 1880.00         | 3.6             | -20                   | -22.19               | -0.0118        |
| 18900                  | 1880.00         | 3.6             | -10                   | -15.64               | -0.0083        |
| 18900                  | 1880.00         | 3.6             | 0                     | 9.60                 | 0.0051         |
| 18900                  | 1880.00         | 3.6             | 10                    | -20.16               | -0.0107        |
| 18900                  | 1880.00         | 3.6             | 20                    | -20.13               | -0.0107        |
| 18900                  | 1880.00         | 3.6             | 30                    | 4.62                 | 0.0025         |
| 18900                  | 1880.00         | 3.6             | 40                    | -12.57               | -0.0067        |
| 18900                  | 1880.00         | 3.6             | 50                    | -23.07               | -0.0123        |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM            |
| 18900                  | 1880.00         | 4.1             | -30                   | -17.50               | -0.0093        |
| 18900                  | 1880.00         | 4.1             | -20                   | -18.32               | -0.0097        |
| 18900                  | 1880.00         | 4.1             | -10                   | -21.86               | -0.0116        |
| 18900                  | 1880.00         | 4.1             | 0                     | -3.86                | -0.0021        |
| 18900                  | 1880.00         | 4.1             | 10                    | 8.61                 | 0.0046         |
| 18900                  | 1880.00         | 4.1             | 20                    | 5.79                 | 0.0031         |
| 18900                  | 1880.00         | 4.1             | 30                    | -15.32               | -0.0081        |
| 18900                  | 1880.00         | 4.1             | 40                    | -23.65               | <b>-0.0126</b> |
| 18900                  | 1880.00         | 4.1             | 50                    | -7.17                | -0.0038        |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM            |
| 18900                  | 1880.00         | 4.35            | -30                   | -21.17               | -0.0113        |
| 18900                  | 1880.00         | 4.35            | -20                   | 6.84                 | 0.0036         |
| 18900                  | 1880.00         | 4.35            | -10                   | -13.23               | -0.0070        |
| 18900                  | 1880.00         | 4.35            | 0                     | -10.37               | -0.0055        |
| 18900                  | 1880.00         | 4.35            | 10                    | -21.89               | -0.0116        |
| 18900                  | 1880.00         | 4.35            | 20                    | 9.67                 | 0.0051         |
| 18900                  | 1880.00         | 4.35            | 30                    | -14.09               | -0.0075        |
| 18900                  | 1880.00         | 4.35            | 40                    | -20.61               | -0.0110        |
| 18900                  | 1880.00         | 4.35            | 50                    | -18.48               | -0.0098        |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 2 Results: channel 19199 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 19199                  | 1900.0          | 3.6             | -30                   | 9.84                 | 0.0052  |
| 19199                  | 1900.0          | 3.6             | -20                   | 8.37                 | 0.0044  |
| 19199                  | 1900.0          | 3.6             | -10                   | 6.90                 | 0.0036  |
| 19199                  | 1900.0          | 3.6             | 0                     | -5.81                | -0.0031 |
| 19199                  | 1900.0          | 3.6             | 10                    | 6.71                 | 0.0035  |
| 19199                  | 1900.0          | 3.6             | 20                    | 9.33                 | 0.0049  |
| 19199                  | 1900.0          | 3.6             | 30                    | 5.72                 | 0.0030  |
| 19199                  | 1900.0          | 3.6             | 40                    | -8.47                | -0.0045 |
| 19199                  | 1900.0          | 3.6             | 50                    | -7.42                | -0.0039 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 19199                  | 1900.0          | 4.1             | -30                   | -15.44               | -0.0081 |
| 19199                  | 1900.0          | 4.1             | -20                   | 5.97                 | 0.0031  |
| 19199                  | 1900.0          | 4.1             | -10                   | 12.93                | 0.0068  |
| 19199                  | 1900.0          | 4.1             | 0                     | -19.78               | -0.0104 |
| 19199                  | 1900.0          | 4.1             | 10                    | 12.25                | 0.0064  |
| 19199                  | 1900.0          | 4.1             | 20                    | -13.05               | -0.0069 |
| 19199                  | 1900.0          | 4.1             | 30                    | -12.95               | -0.0068 |
| 19199                  | 1900.0          | 4.1             | 40                    | -6.85                | -0.0036 |
| 19199                  | 1900.0          | 4.1             | 50                    | -13.49               | -0.0071 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 19199                  | 1900.0          | 4.35            | -30                   | -15.91               | -0.0084 |
| 19199                  | 1900.0          | 4.35            | -20                   | -5.66                | -0.0030 |
| 19199                  | 1900.0          | 4.35            | -10                   | 11.07                | 0.0058  |
| 19199                  | 1900.0          | 4.35            | 0                     | 5.48                 | 0.0029  |
| 19199                  | 1900.0          | 4.35            | 10                    | -12.16               | -0.0064 |
| 19199                  | 1900.0          | 4.35            | 20                    | -5.18                | -0.0027 |
| 19199                  | 1900.0          | 4.35            | 30                    | -7.67                | -0.0040 |
| 19199                  | 1900.0          | 4.35            | 40                    | 8.44                 | 0.0044  |
| 19199                  | 1900.0          | 4.35            | 50                    | 5.16                 | 0.0027  |

## APPENDIX 3C – LTE Band 2 RADIATED EMISSIONS TEST DATA

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 3C</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### Radiated Power Test Data Results

The following measurements were performed by Shiva Kumbham.

Date of Test: February 23, 2015

The environmental tests conditions were: Temperature: 26.4 °C  
Relative Humidity: 2.5 %

The BlackBerry® smartphone was standalone, horizontal down with top of device facing the RX antenna when the turntable is at 0 degree position.

Measurements were performed with QPSK and 16QAM modulations. The smallest test margins are reported below.

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

#### **LTE band 2, 20MHz BW, RB=1, QPSK modulation**

|      |       |                 |      |            |      |                   |                  | Substitution Method |               |                             |      |             |                    |
|------|-------|-----------------|------|------------|------|-------------------|------------------|---------------------|---------------|-----------------------------|------|-------------|--------------------|
| EUT  |       |                 |      | Rx Antenna |      | Spectrum Analyzer |                  | Tracking Generator  |               |                             |      |             |                    |
| Type | Ch    | Frequency (MHz) | Band | Type       | Pol. | Reading (dBuV)    | Max (V,H) (dBuV) | Pol. Tx-Rx          | Reading (dBm) | Corrected Reading (dBm) (W) |      | Limit (dBm) | Diff to Limit (dB) |
| F0   | 18700 | 1860.00         | 2    | Horn       | V    | -27.77            | -26.83           | V-V                 | -15.59        | 24.69                       | 0.29 | 33.00       | 8.31               |
| F0   | 18700 | 1860.00         | 2    | Horn       | H    | -26.83            |                  | H-H                 | -14.81        |                             |      |             |                    |
| F0   | 18900 | 1880.00         | 2    | Horn       | V    | -27.03            | -26.63           | V-V                 | -14.96        | <b>25.52</b>                | 0.36 | 33.00       | 7.48               |
| F0   | 18900 | 1880.00         | 2    | Horn       | H    | -26.63            |                  | H-H                 | -13.88        |                             |      |             |                    |
| F0   | 19099 | 1899.90         | 2    | Horn       | V    | -28.10            | -27.36           | V-V                 | -15.34        | 24.66                       | 0.29 | 33.00       | 8.34               |
| F0   | 19099 | 1899.90         | 2    | Horn       | H    | -27.36            |                  | H-H                 | -14.88        |                             |      |             |                    |

#### **LTE band 2, 20MHz BW, RB=1, 16-QAM modulation**

|      |       |                 |      |            |      |                   |                  | Substitution Method |               |                             |      |             |                    |
|------|-------|-----------------|------|------------|------|-------------------|------------------|---------------------|---------------|-----------------------------|------|-------------|--------------------|
| EUT  |       |                 |      | Rx Antenna |      | Spectrum Analyzer |                  | Tracking Generator  |               |                             |      |             |                    |
| Type | Ch    | Frequency (MHz) | Band | Type       | Pol. | Reading (dBuV)    | Max (V,H) (dBuV) | Pol. Tx-Rx          | Reading (dBm) | Corrected Reading (dBm) (W) |      | Limit (dBm) | Diff to Limit (dB) |
| F0   | 18700 | 1860.00         | 2    | Horn       | V    | -28.65            | -27.64           | V-V                 | -16.38        | 23.85                       | 0.24 | 33.00       | 9.15               |
| F0   | 18700 | 1860.00         | 2    | Horn       | H    | -27.64            |                  | H-H                 | -15.65        |                             |      |             |                    |
| F0   | 18900 | 1880.00         | 2    | Horn       | V    | -28.11            | -27.12           | V-V                 | -15.44        | <b>25.01</b>                | 0.32 | 33.00       | 7.99               |
| F0   | 18900 | 1880.00         | 2    | Horn       | H    | -27.12            |                  | H-H                 | -14.39        |                             |      |             |                    |
| F0   | 19099 | 1899.90         | 2    | Horn       | V    | -29.11            | -28.33           | V-V                 | -16.33        | 23.65                       | 0.23 | 33.00       | 9.35               |
| F0   | 19099 | 1899.90         | 2    | Horn       | H    | -28.33            |                  | H-H                 | -15.89        |                             |      |             |                    |

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Page 141 of 255



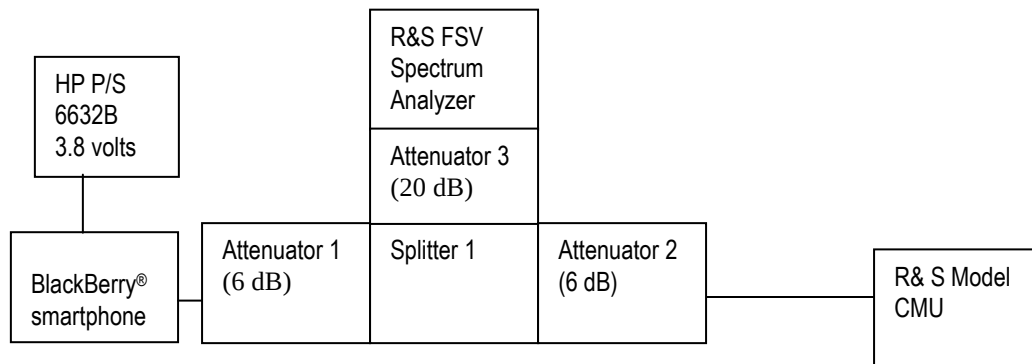
## APPENDIX 4A– LTE Band 4 CONDUCTED RF EMISSIONS TEST DATA/PLOTS

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 4 Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, 99% power bandwidth and the channel mask.

### Test Setup Diagram



A reference offset of 31.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

| <u>UNIT</u>  | <u>MANUFACTURER</u> | <u>MODEL</u>  | <u>SERIAL NUMBER</u> |
|--------------|---------------------|---------------|----------------------|
| Attenuator 1 | Mini-Circuits       | BW-S6W2+      | 0647                 |
| Attenuator 2 | Mini-Circuits       | BW-S6W2+      | 0648                 |
| Attenuator 3 | Mini-Circuits       | BW-S20-2W263+ | 1234                 |
| Splitter 1   | Weinschel           | 1515          | MES 92               |

Date of Test: Feb 17, 2015

The environmental test conditions were:    Temperature:        23.2°C  
                                                                          Relative Humidity:    21.1 %

The following measurements were performed by Sijia Li.



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 4 Conducted RF Emission Test Data cont'd

#### Emission Designator Table

| Frequency Range (MHz) | Conducted Output Power (dBm) | Emission Designator | Band   | Bandwidth (MHz) | Modulation |
|-----------------------|------------------------------|---------------------|--------|-----------------|------------|
| 1710.7-1754.3         | 21.80                        | 1M08G7D             | LTE B4 | 1.4             | QPSK       |
| 1710.7-1754.3         | 20.50                        | 1M08D7W             | LTE B4 | 1.4             | 16QAM      |
| 1711.5-1753.5         | 21.70                        | 2M69G7D             | LTE B4 | 3               | QPSK       |
| 1711.5-1753.5         | 21.30                        | 2M69D7W             | LTE B4 | 3               | 16QAM      |
| 1712.5-1752.5         | 21.90                        | 4M48G7D             | LTE B4 | 5               | QPSK       |
| 1712.5-1752.5         | 21.40                        | 4M47D7W             | LTE B4 | 5               | 16QAM      |
| 1715-1750             | 21.70                        | 8M95G7D             | LTE B4 | 10              | QPSK       |
| 1715-1750             | 21.30                        | 8M95D7W             | LTE B4 | 10              | 16QAM      |
| 1717.5-1747.5         | 21.70                        | 13M4G7D             | LTE B4 | 15              | QPSK       |
| 1717.5-1747.5         | 21.40                        | 13M4D7W             | LTE B4 | 15              | 16QAM      |
| 1720-1745             | 21.90                        | 17M9G7D             | LTE B4 | 20              | QPSK       |
| 1720-1745             | 21.50                        | 17M9D7W             | LTE B4 | 20              | 16QAM      |

**The conducted spurious emissions** – As per 47 CFR 2.1051, CFR 27.53, RSS-139, 6.5 were measured from 30 MHz to 20 GHz.

#### **–26 dBc Bandwidth and Occupied Bandwidth (99%)**

The modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth For each 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz and 20MHz with different number of RBs for LTE band 4,.

QPSK and 16-QAM modulations were applied to each of the bandwidths. Only the worst case measurements are documented in this report.

A minimum RB condition was also measured (RB = 1).

The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.

The worst case –26dBc bandwidth for LTE band 4 was measured to be 18.70 MHz. Results were derived in a 200 kHz resolution bandwidth.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

#### **Test Data for LTE Band 4 selected Frequencies in 20MHz BW (RB = 100)**

| LTE Band 4<br>Frequency (MHz) | 26dBc Occupied Bandwidth<br>(MHz) | 99% Occupied Bandwidth<br>(MHz) |              |
|-------------------------------|-----------------------------------|---------------------------------|--------------|
|                               | QPSK                              | QPSK                            | 16-QAM       |
| 1720.0                        | 18.60                             | 17.88                           | 17.88        |
| 1732.5                        | 18.70                             | <b>17.93</b>                    | <b>17.93</b> |
| 1745.0                        | 18.52                             | 17.84                           | 17.88        |

#### **Peak to Average Ratio (PAR)**

For each 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz and 20MHz with different number of RBs as per scalable bandwidths for LTE band 4, the peak to average ratio was measured on the low, middle and high channels with QPSK modulation.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

The worst case measured was 11.32 dB in 10MHz bandwidth with 50 RBs.

#### **Measurement Plots for LTE Band 4**

See Figures 4-1a to 4-18a for the plots of the conducted spurious emissions.

See Figures 4-19a to 4-34a and 4-51a to 4-53a for the plots of 99% Occupied Bandwidth and -26 dBc Bandwidth.

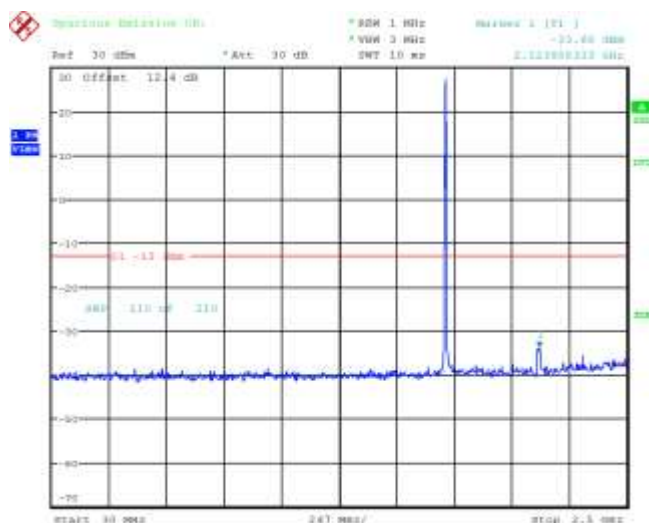
See Figures 4-35a to 4-44a for the plots of the Channel mask.

See Figures 4-45a to 4-50a for the plots of the Peak to Average Ratios.

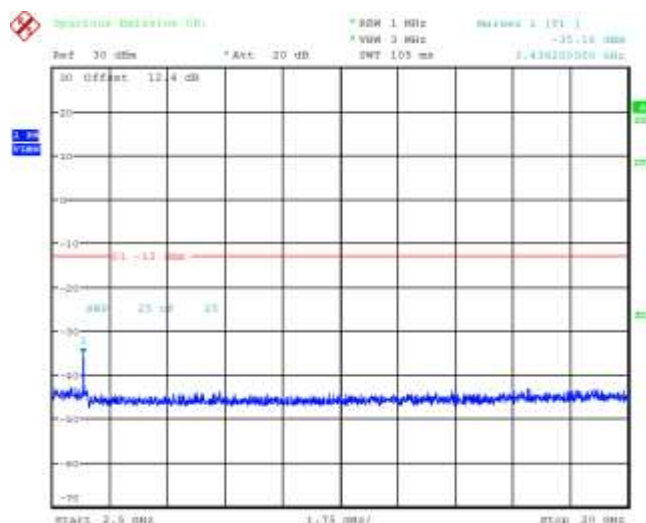
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

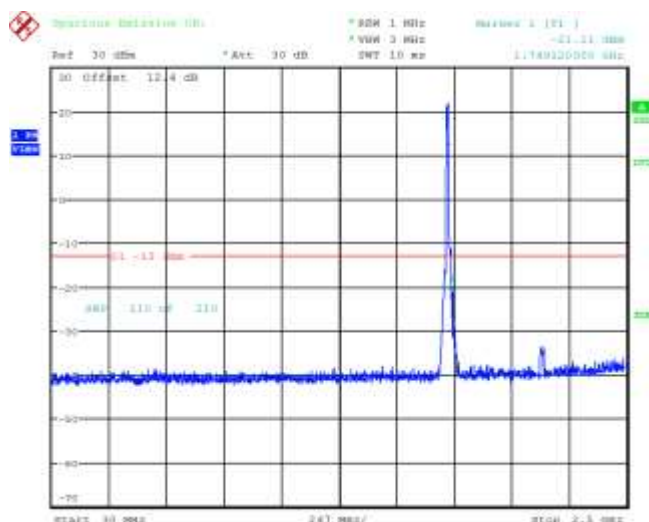
**Figure 4-1a: Band 4, Spurious Conducted Emissions, Low channel, 20MHz BW (RB= 1)**



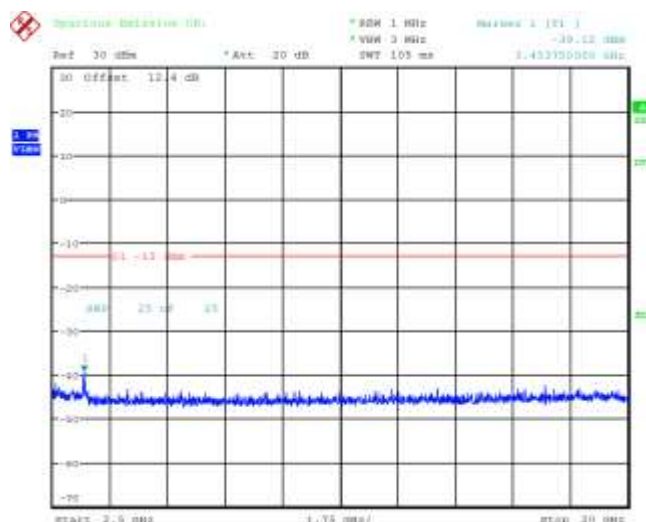
**Figure 4-2a: Band 4, Spurious Conducted Emissions, Low channel, 20MHz BW (RB= 1)**



**Figure 4-3a: Band 4, Spurious Conducted Emissions, Middle channel, 20MHz BW (RB= 50)**



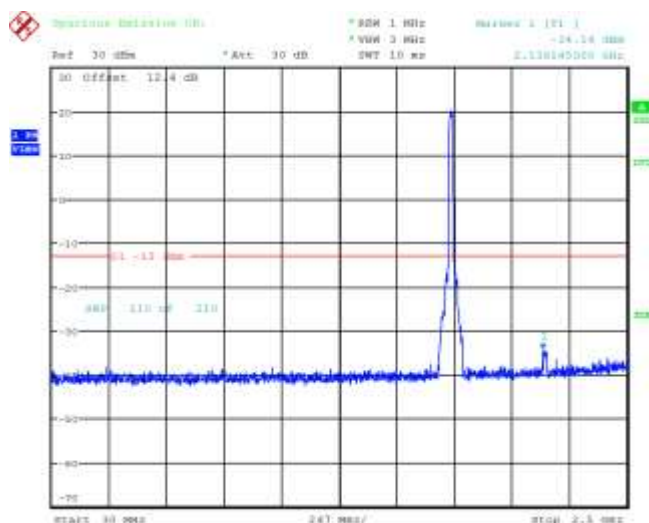
**Figure 4-4a: Band 4, Spurious Conducted Emissions, Middle channel, 20MHz BW (RB= 50)**



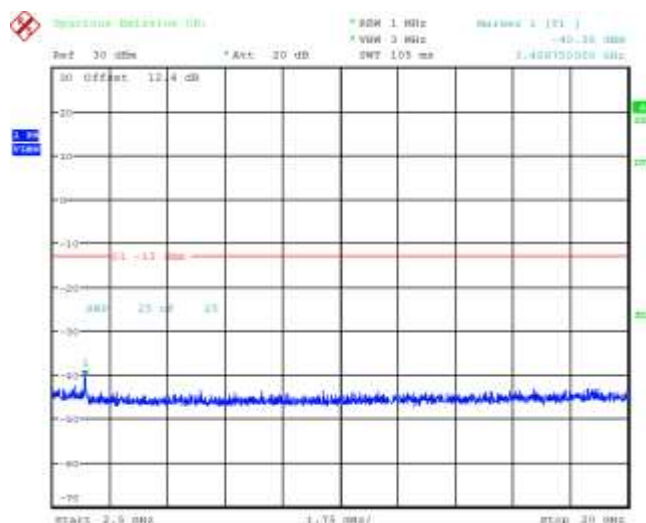
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

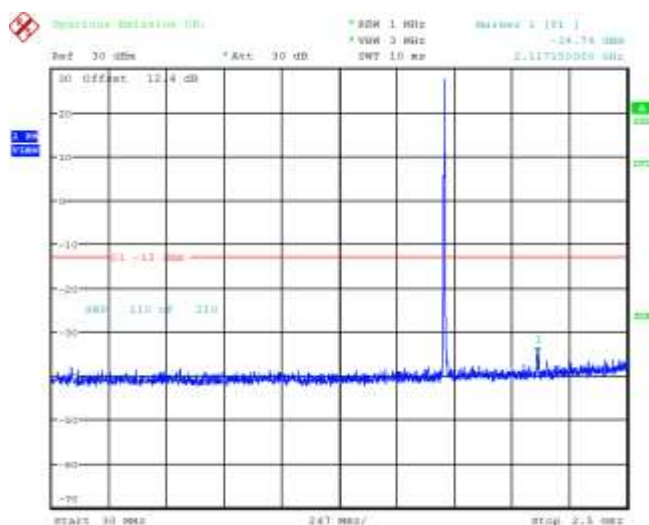
**Figure 4-5a: Band 4, Spurious Conducted Emissions, High Channel, 20MHz BW (RB= 100)**



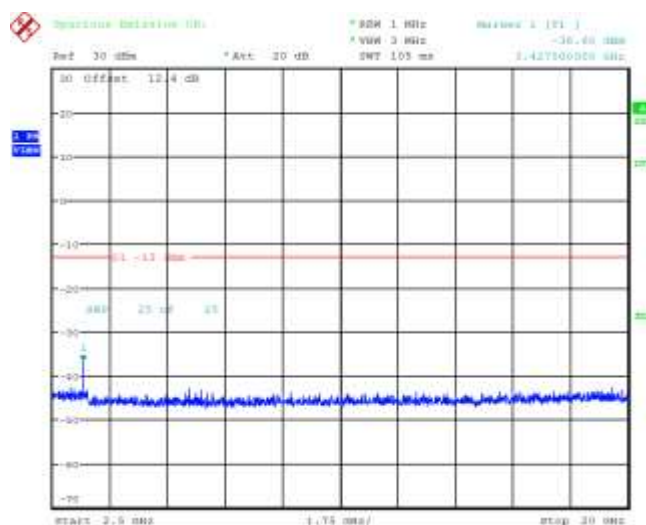
**Figure 4-6a: Band 4, Spurious Conducted Emissions, High Channel, 20MHz BW (RB= 100)**



**Figure 4-7a: Band 4, Spurious Conducted Emissions, Low channel, 10MHz BW (RB= 1)**



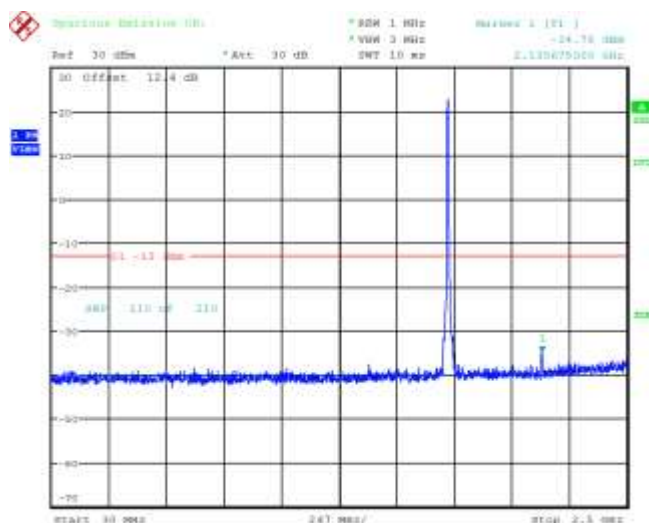
**Figure 4-8a: Band 4, Spurious Conducted Emissions, Low channel, 10MHz BW (RB= 1)**



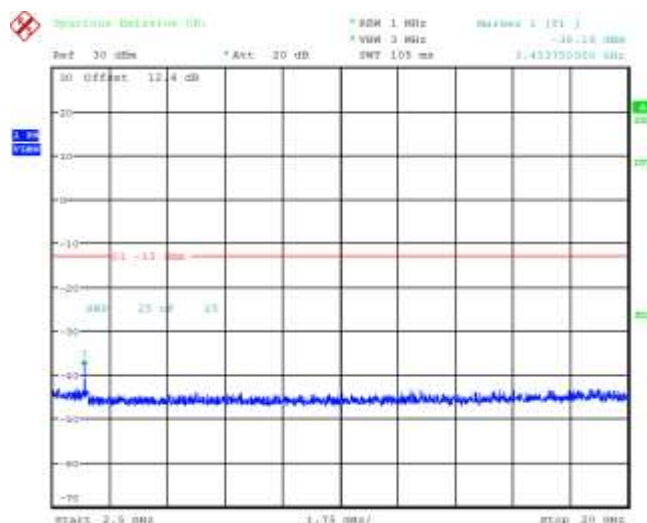
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

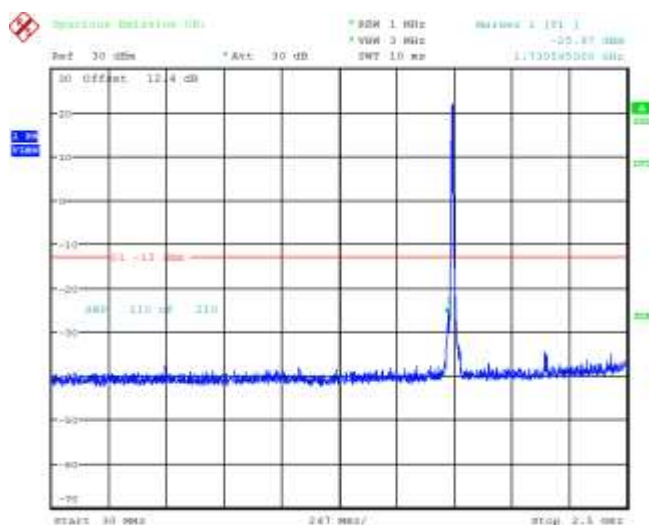
**Figure 4-9a: Band 4, Spurious Conducted Emissions, Middle Channel, 10MHz BW (RB= 25)**



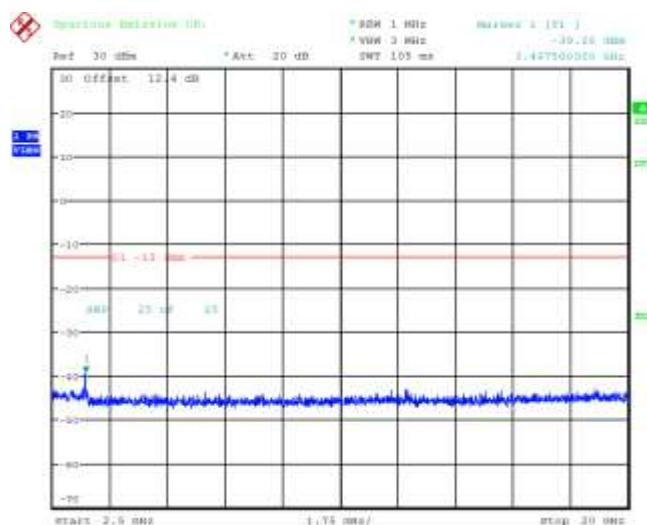
**Figure 4-10a: Band 4, Spurious Conducted Emissions, Middle Channel, 10MHz BW (RB= 25)**



**Figure 4-11a: Band 4, Spurious Conducted Emissions, High channel, 10MHz BW (RB= 50)**



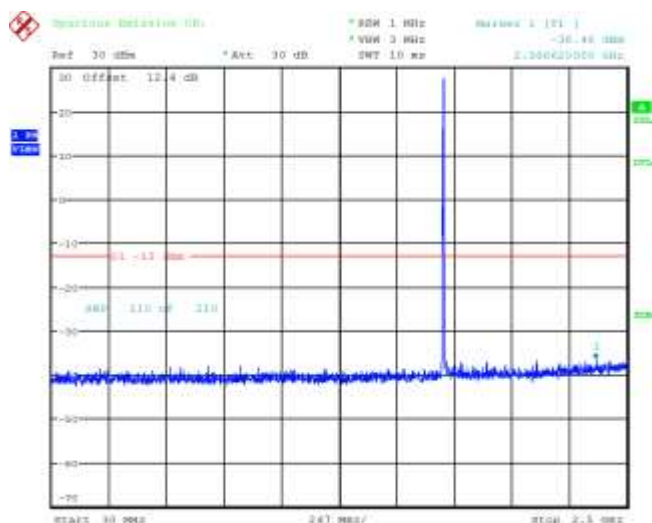
**Figure 4-12a: Band 4, Spurious Conducted Emissions, High channel, 10MHz BW (RB= 50)**



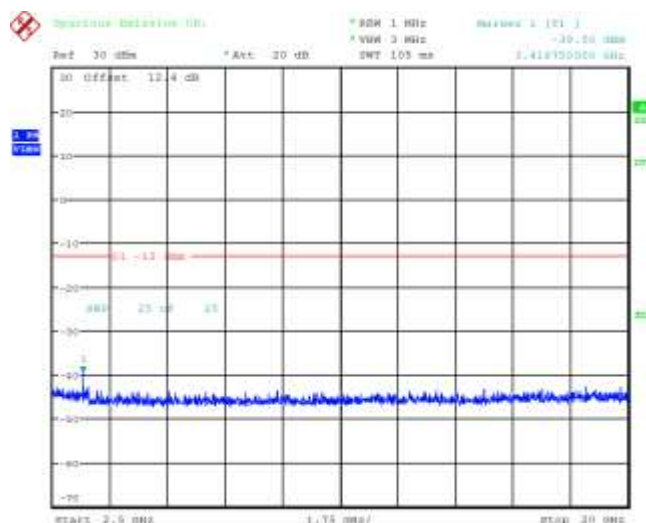
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

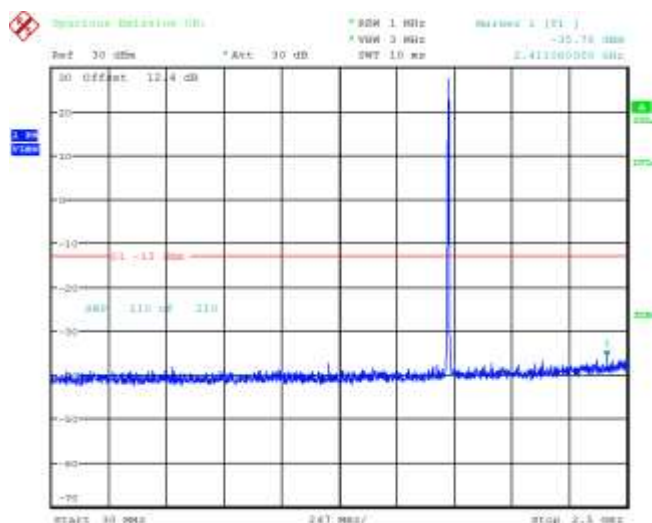
**Figure 4-13a: Band 4, Spurious Conducted Emissions, Low Channel, 1.4MHz BW (RB= 1)**



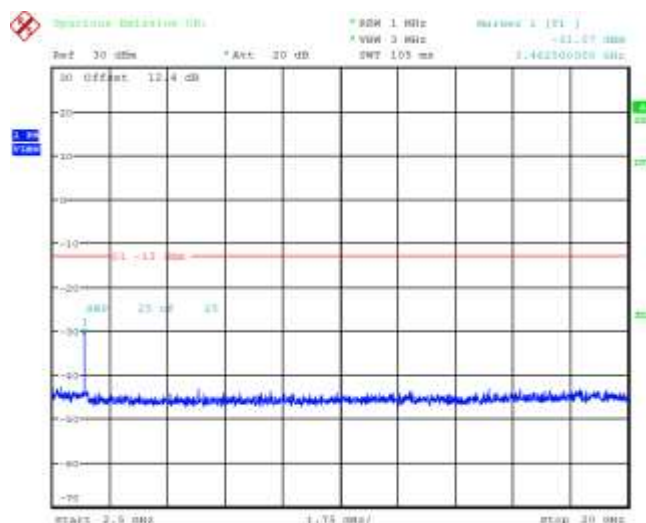
**Figure 4-14a: Band 4, Spurious Conducted Emissions, Low Channel, 1.4MHz BW (RB= 1)**



**Figure 4-15a: Band 4, Spurious Conducted Emissions, Middle channel, 1.4MHz BW (RB= 3)**



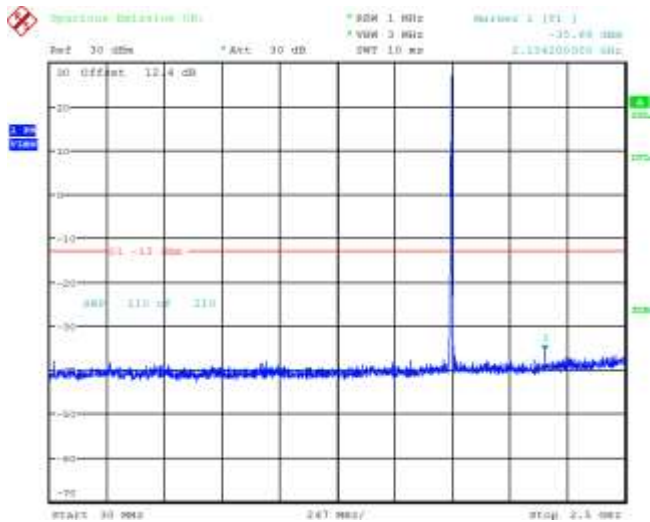
**Figure 4-16a: Band 4, Spurious Conducted Emissions, Middle channel, 1.4MHz BW (RB= 3)**



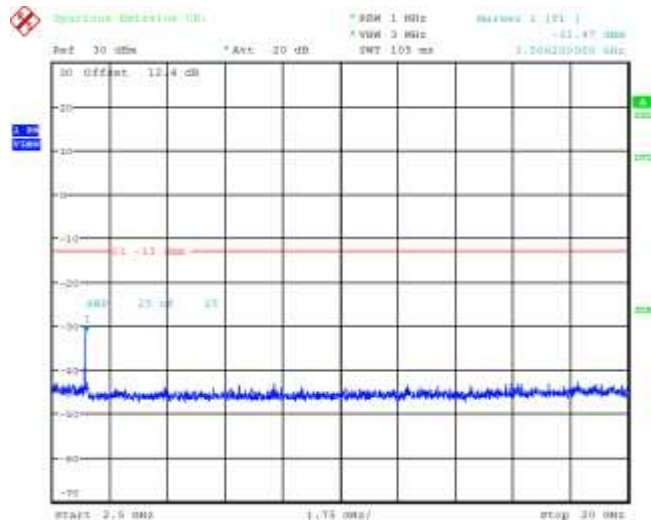
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

LTE Band 4 Conducted RF Emission Test Data cont'd

**Figure 4-17a: Band 4, Spurious Conducted Emissions, High channel, 1.4MHz BW (RB= 6)**



**Figure 4-18a: Band 4, Spurious Conducted Emissions, High channel, 1.4MHz BW (RB= 6)**

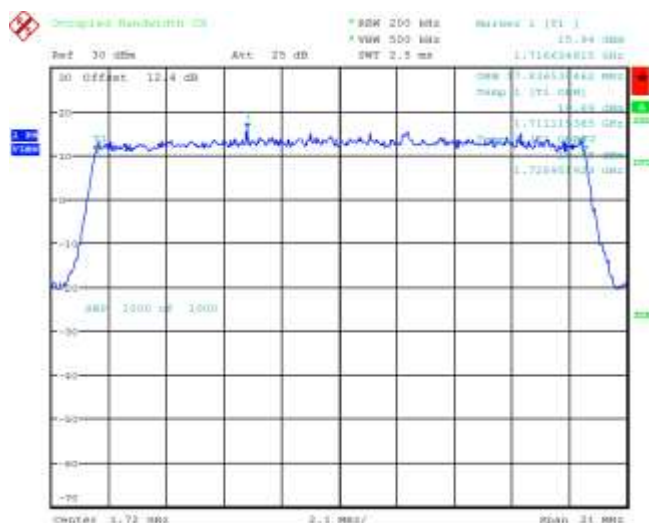




|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

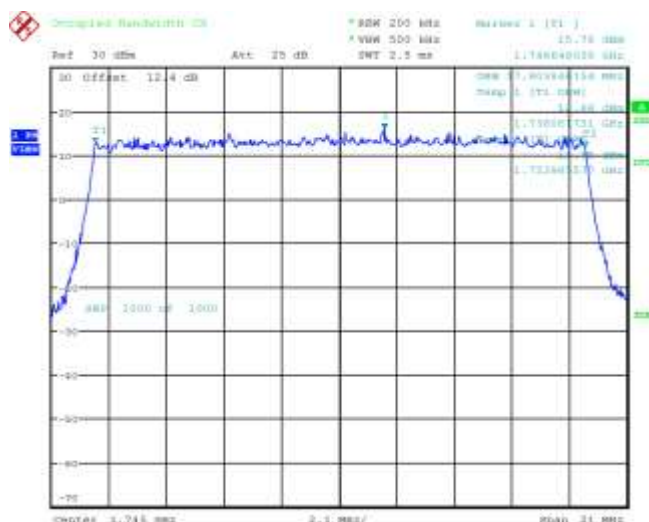
**Figure 4-19a: Occupied Bandwidth, Band 4 Low Channel, 20MHz BW, RB=100**



**Figure 4-20a: Occupied Bandwidth, Band 4 Middle Channel, 20MHz BW, RB=100**



**Figure 4-21a: Occupied Bandwidth, Band 4 High Channel, 20MHz BW, RB=100**

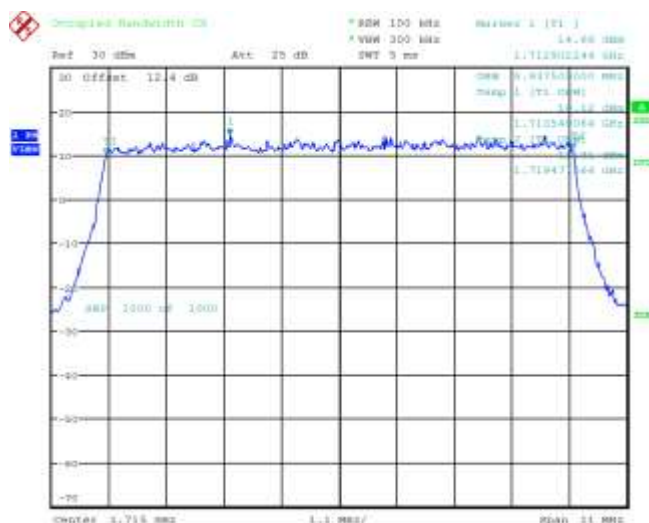




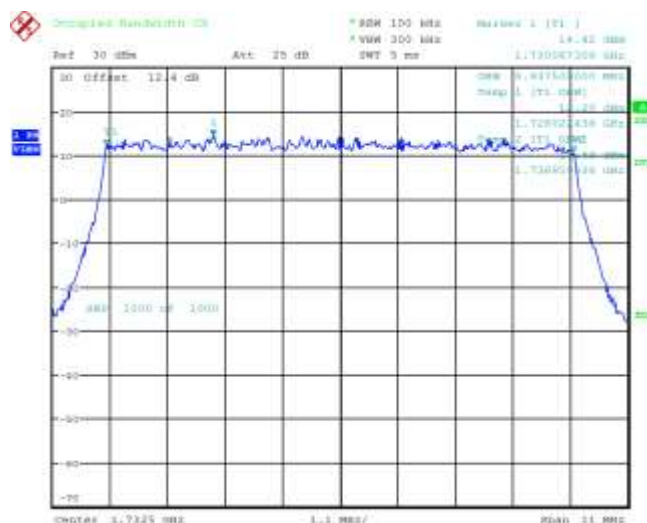
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

**Figure 4-22a: Occupied Bandwidth, Band 4 Low Channel, 10MHz BW, RB=50**



**Figure 4-23a: Occupied Bandwidth, Band Middle Channel, 10MHz BW, RB=50**



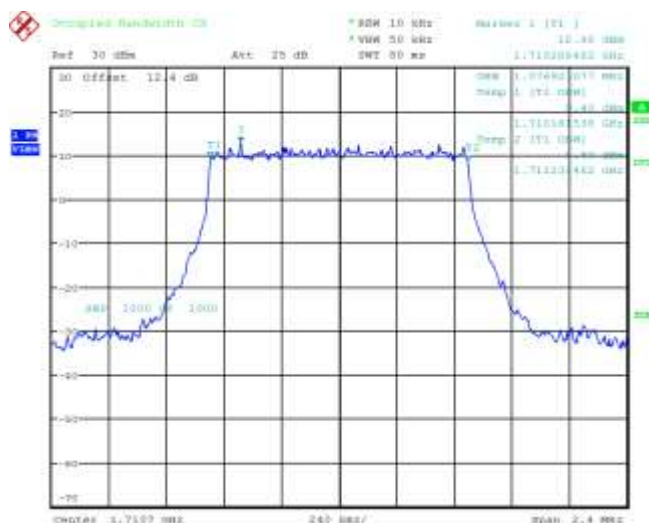
**Figure 4-24a: Occupied Bandwidth, Band 4 High Channel, 10MHz BW, RB=50**



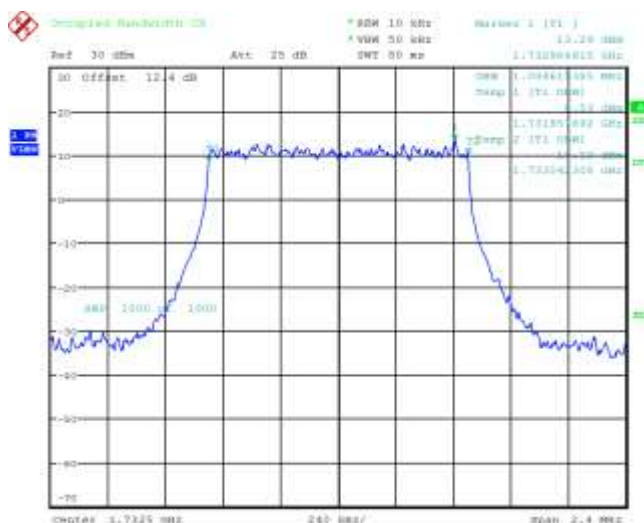
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

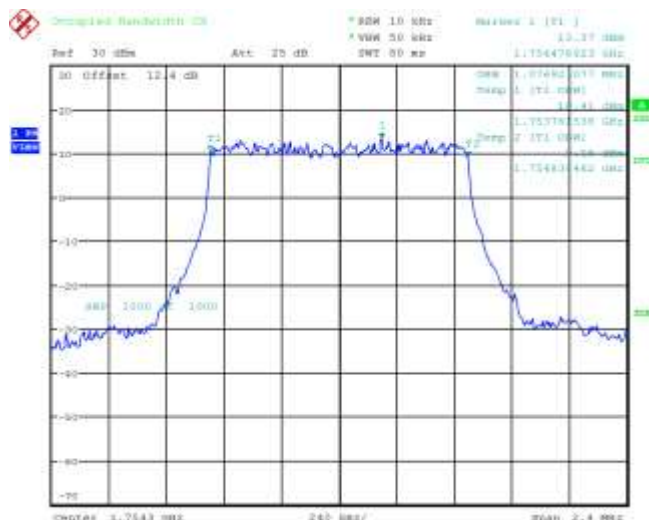
**Figure 4-25a: Occupied Bandwidth, Band 4 Low Channel, 1.4MHz BW, RB=6**



**Figure 4-26a: Occupied Bandwidth, Band 4 Middle Channel, 1.4MHz BW, RB=6**



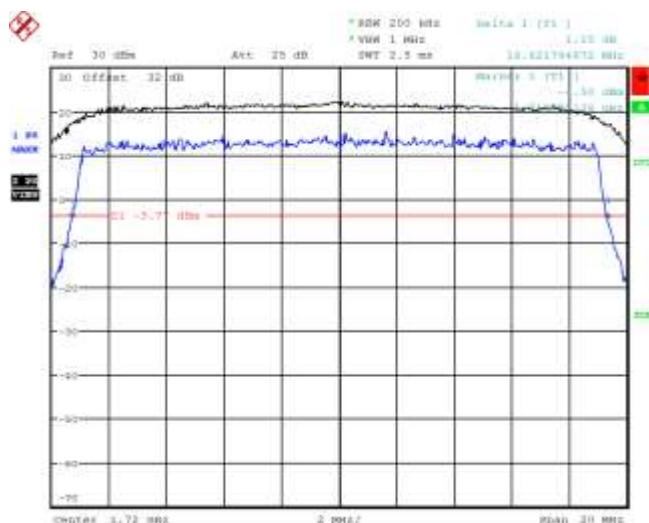
**Figure 4-27a: Occupied Bandwidth, Band 4 High Channel, 1.4MHz BW, RB=6**



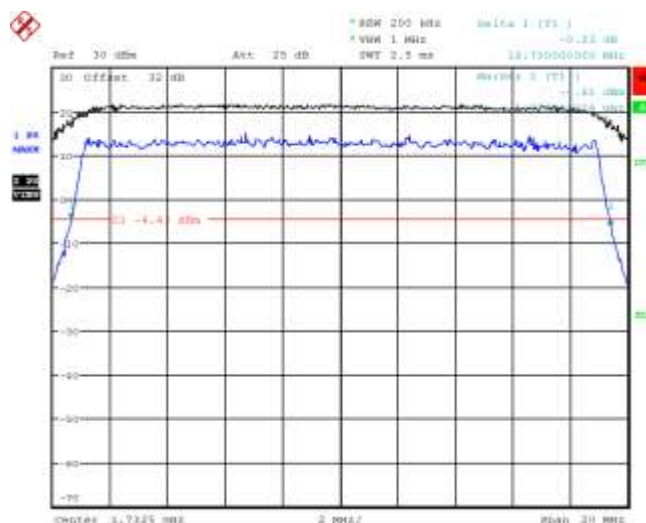
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

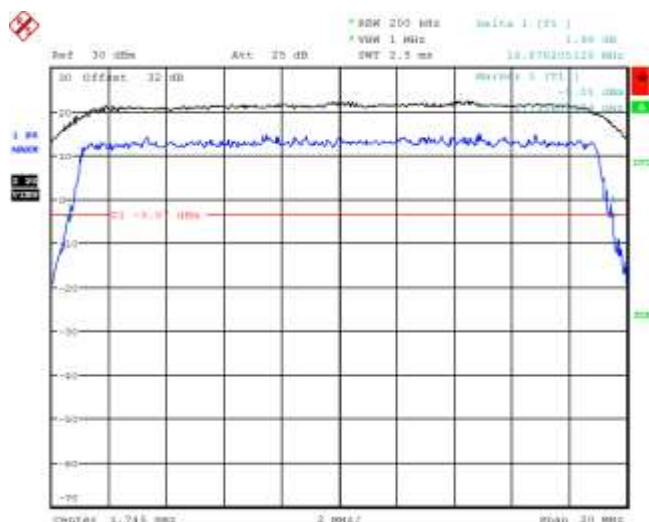
**Figure 4-28a: -26 dBc Bandwidth, Band 4 Low Channel, 20MHz BW, RB=100**



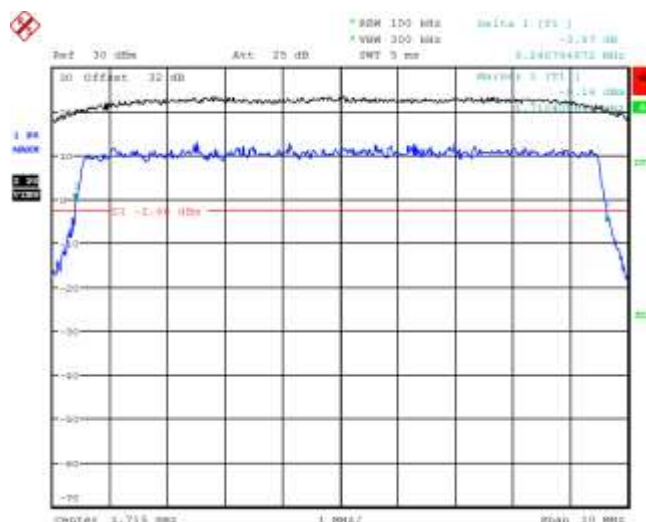
**Figure 4-29a: -26 dBc Bandwidth, Band 4 Middle Channel, 20MHz BW, RB=100**



**Figure 4-30a: -26 dBc Bandwidth, Band 4 High Channel, 20MHz BW, RB=100**



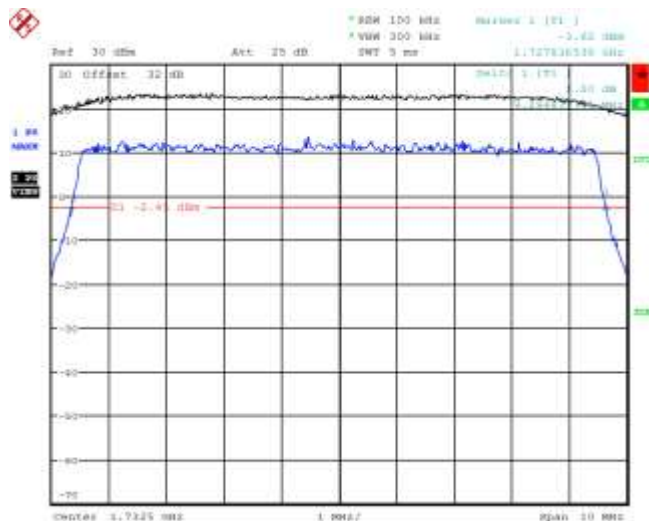
**Figure 4-31a: -26 dBc Bandwidth, Band 4 Low Channel, 10MHz BW, RB=50**



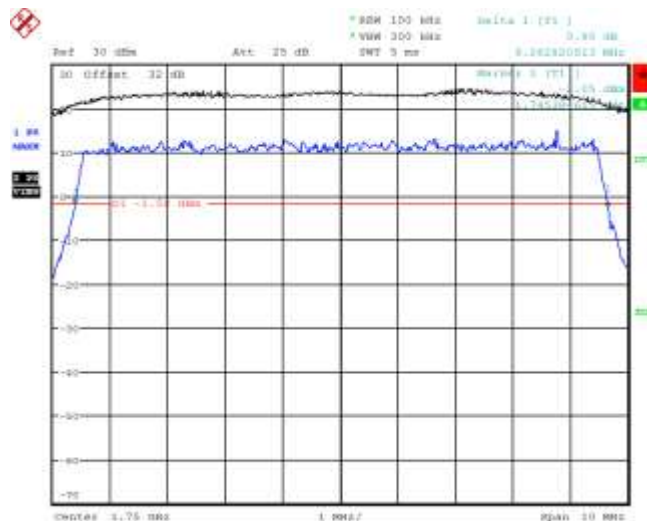
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

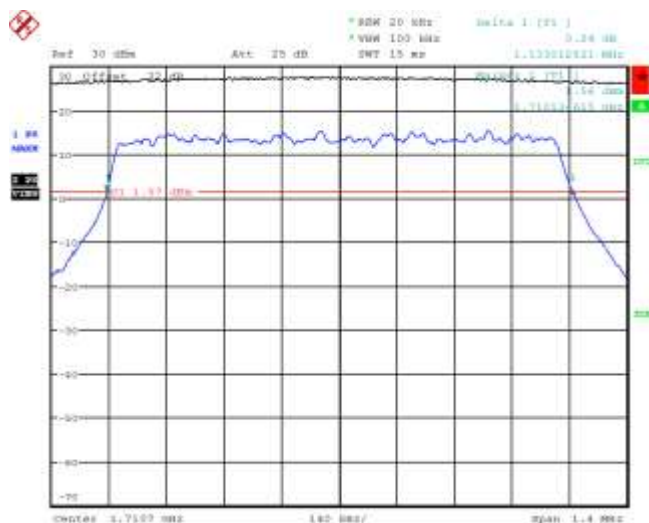
**Figure 4-32a: -26 dBc Bandwidth, Band 4 Middle Channel, 10MHz BW, RB=50**



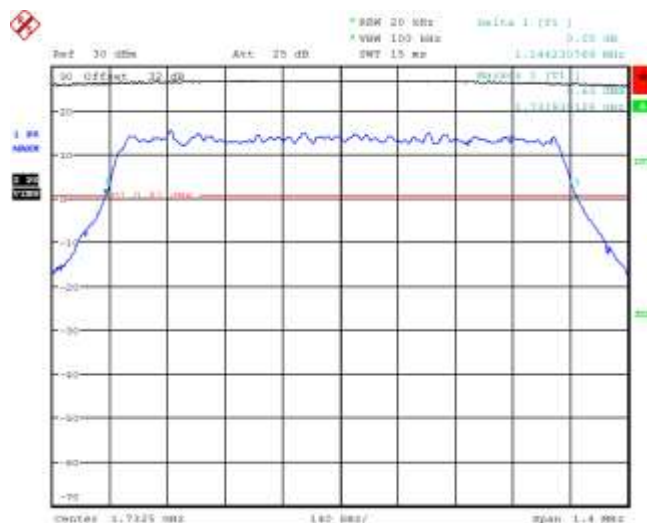
**Figure 4-33a: -26 dBc Bandwidth, Band 4 High Channel, 10MHz BW, RB=50**



**Figure 4-34a: -26 dBc Bandwidth, Band 4 Low Channel, 1.4MHz BW, RB=6**



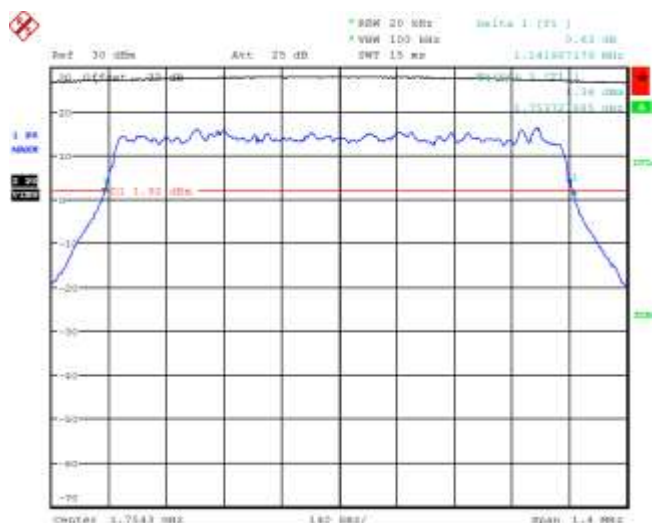
**Figure 4-35a: -26 dBc Bandwidth, Band 4 Middle Channel, 1.4MHz BW, RB=6**



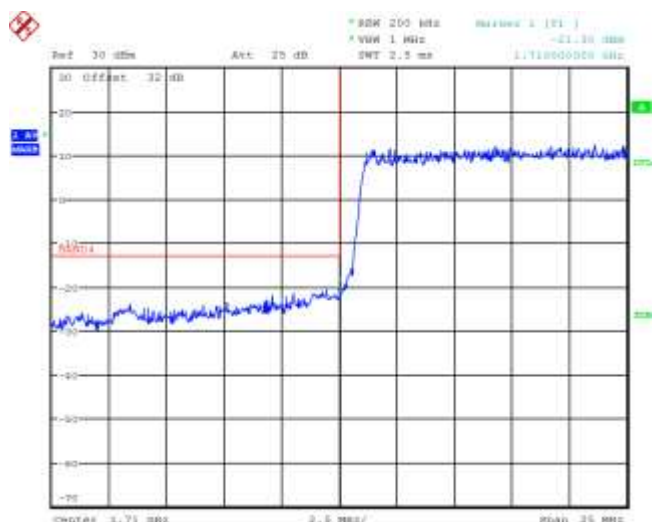
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

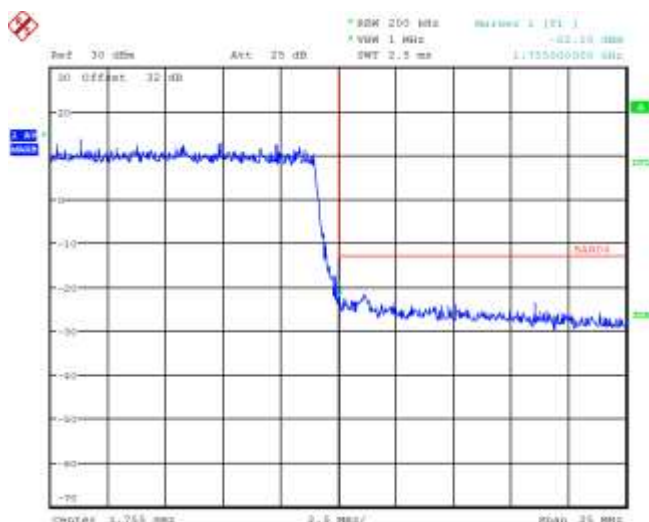
**Figure 4-36a: -26 dBc Bandwidth, Band 4 High Channel, 1.4MHz BW, RB=6**



**Figure 4-37a: Band 4 Low Channel Mask, 20MHz BW, RB=100**



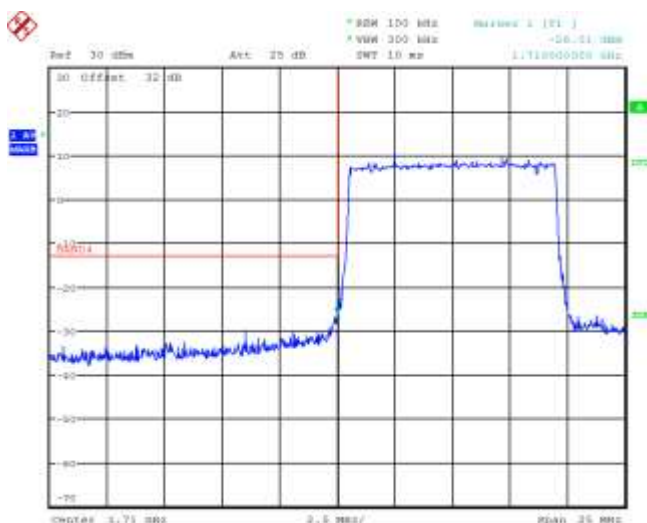
**Figure 4-38a: Band 4 High Channel Mask, 20MHz BW, RB=100**



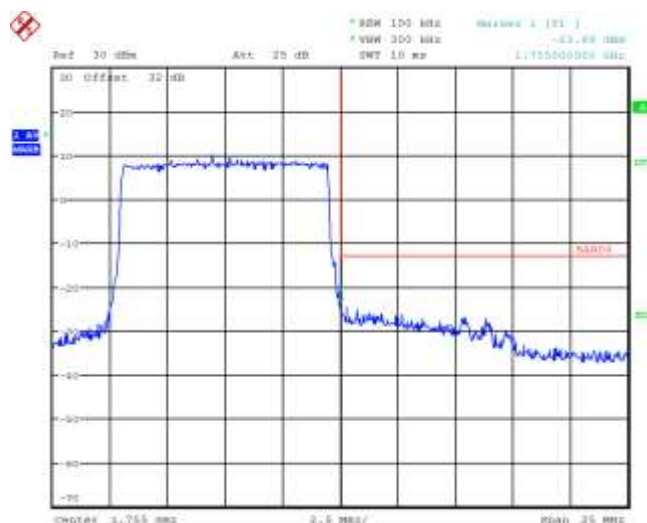
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

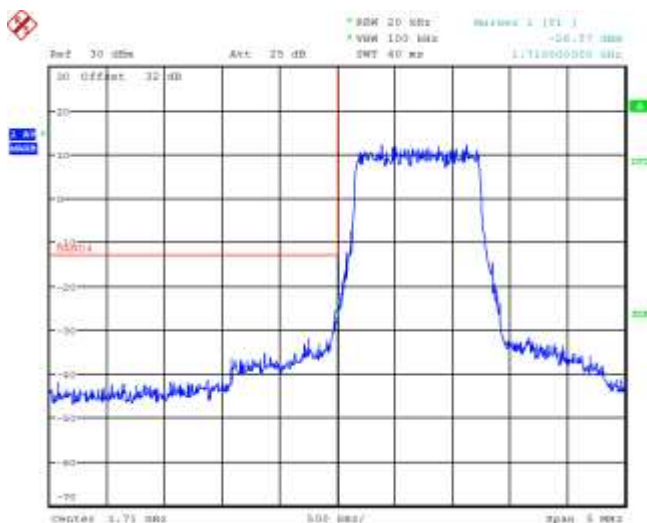
**Figure 4-39a: Band 4 Low Channel Mask, 10MHz BW, RB=50**



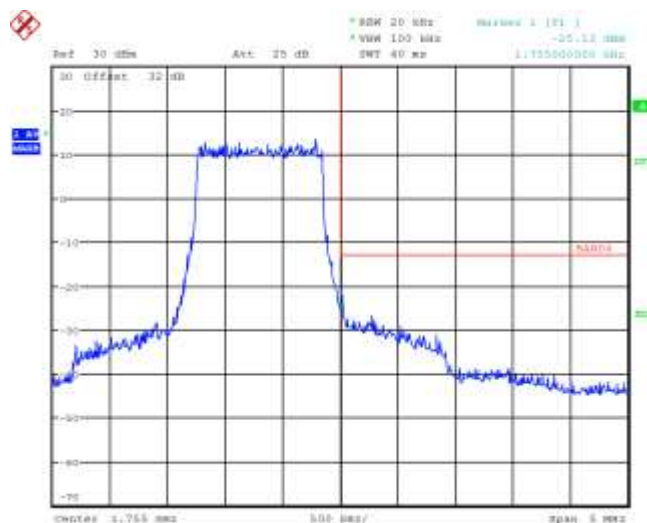
**Figure 4-40a: Band 4 High Channel Mask, 10MHz BW, RB=50**



**Figure 4-41a: Band 4 Low Channel Mask, 1.4MHz BW, RB=6**



**Figure 4-42a: Band 4 High Channel Mask, 1.4MHz BW, RB=6**

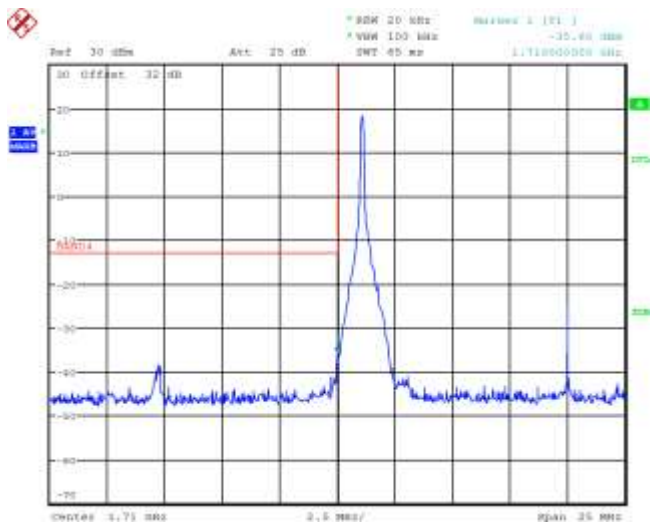




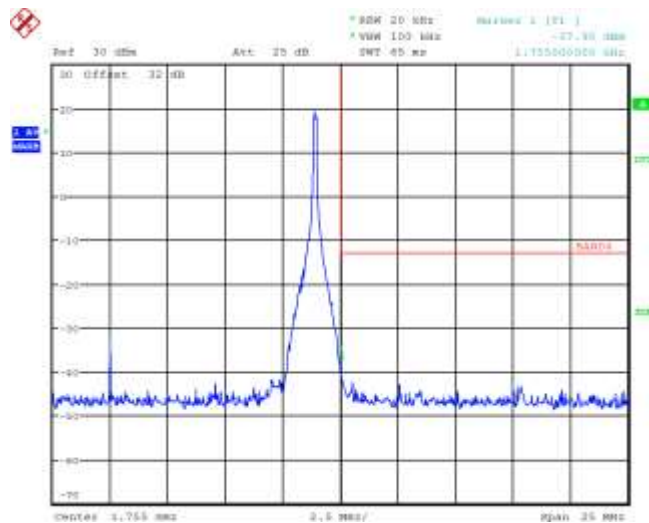
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

LTE Band 4 Conducted RF Emission Test Data cont'd

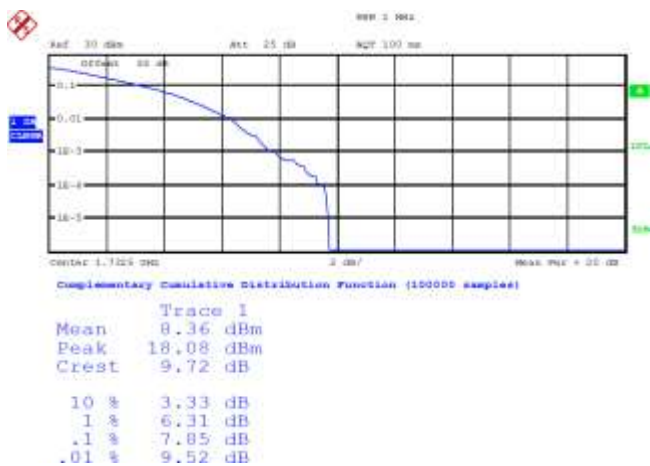
**Figure 4-43a: Band 4 Low Channel Mask, 20MHz BW, RB=1**



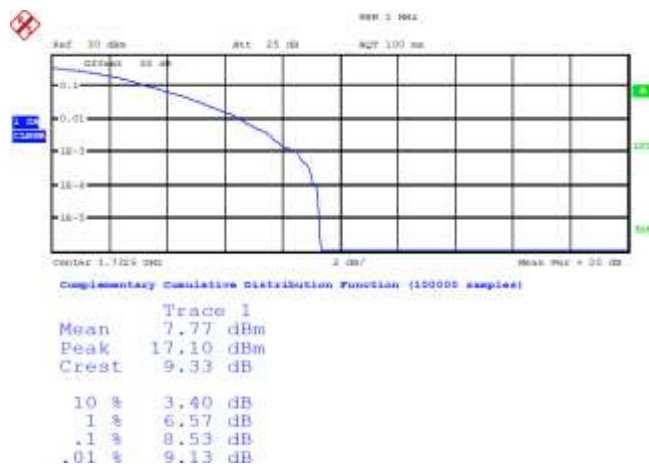
**Figure 4-44a: Band 4 High Channel Mask, 20MHz BW, RB=1**



**Figure 4-45a: Band 4 Mid Channel PAR, 20MHz BW, RB=50, QPSK**



**Figure 4-46a: Band 4 Middle Channel Mask, 20MHz BW, RB=100, 16-QAM**



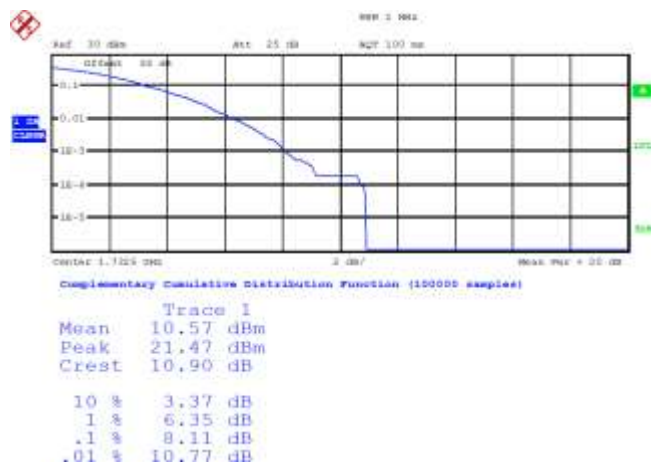
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

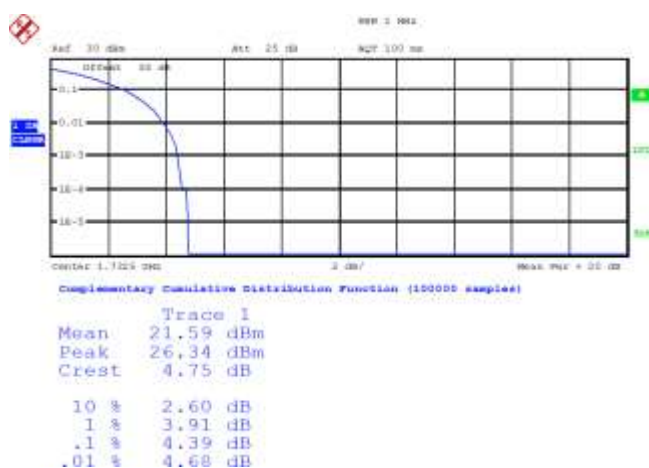
**Figure 4-47a: Band 4 Mid Channel PAR, 10MHz BW, RB=25, QPSK**



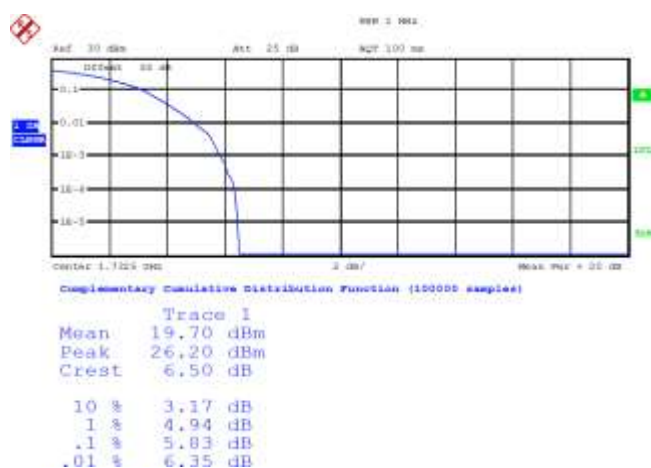
**Figure 4-48a: Band 4 Mid Channel PAR, 10MHz BW, RB=50, 16-QAM**



**Figure 4-49a: Band 4 Mid Channel PAR, 1.4MHz BW, RB=3, QPSK**



**Figure 4-50a: Band 4 Middle Channel Mask, 5MHz BW, RB=6, 16-QAM**

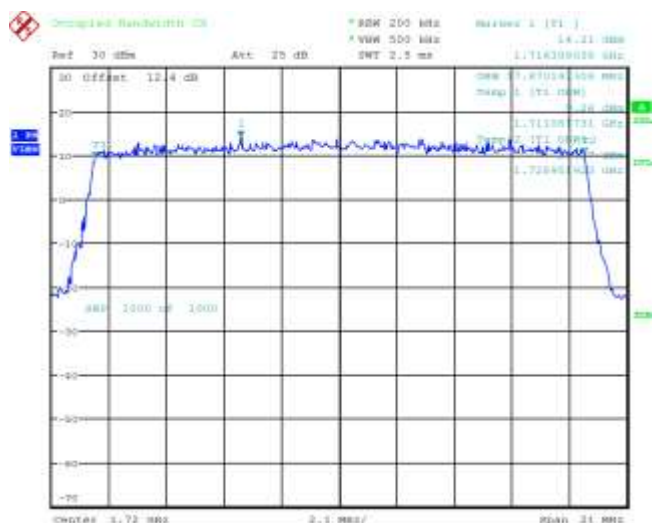




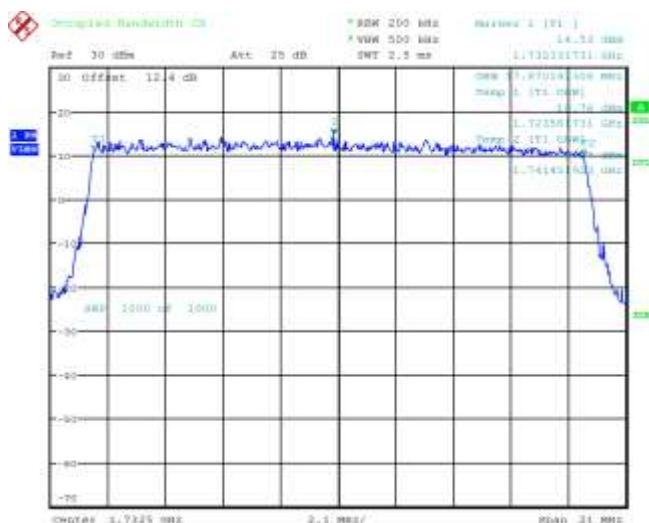
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 4 Conducted RF Emission Test Data cont'd

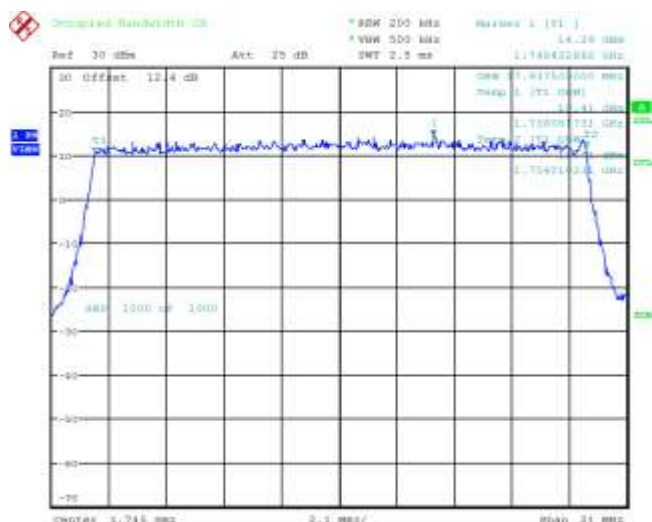
**Figure 4-51a: Occupied Bandwidth, Band 4 Low Channel, 20MHz BW (RB= 100) 16-QAM**



**Figure 4-52a: Occupied Bandwidth, Band 4 Mid Channel, 20MHz BW (RB= 100) 16-QAM**



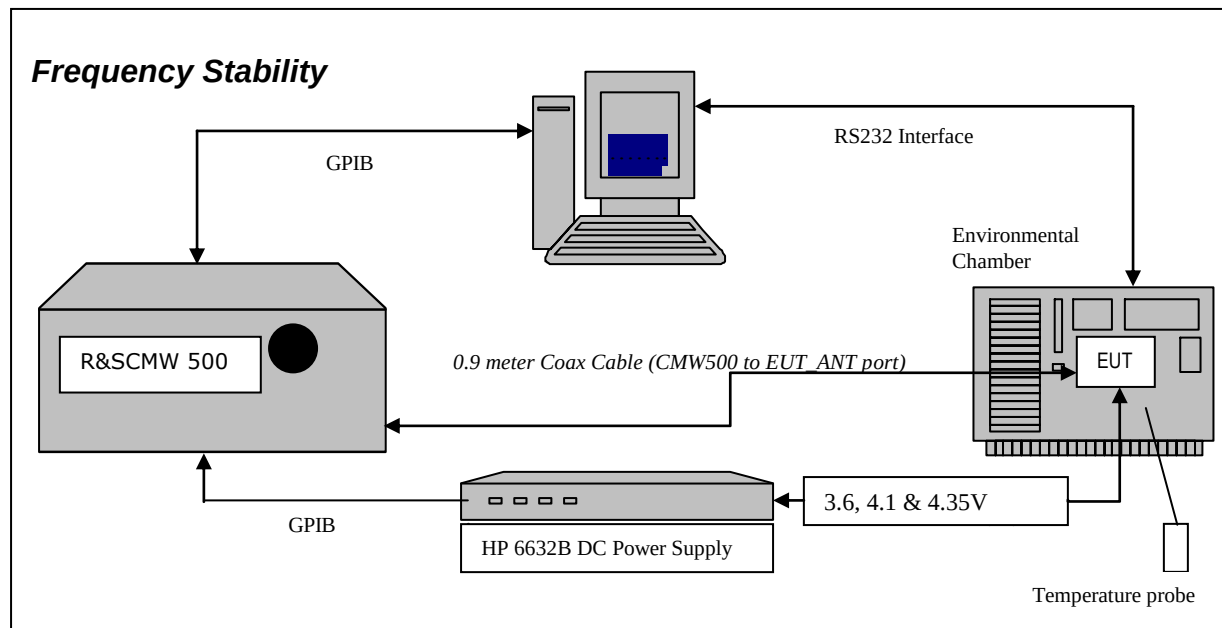
**Figure 4-53a: Occupied Bandwidth, Band 4 High Channel, 20MHz BW (RB= 100) 16-QAM**



## APPENDIX 4B – LTE Band 4 FREQUENCY STABILITY TEST DATA

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 4 Frequency Stability Test Data



The following measurements were performed by Sijia Li.

### **CFR 47 Chapter 1** - Federal Communications Commission Rules

#### **Part 2 Required Measurements**

##### **2.1055** Frequency Stability - Procedures

(a,b) Frequency Stability - Temperature Variation

(d) Frequency Stability - Voltage Variation

*The EUT meets the requirements as stated in CFR 47 chapter 1, Section 27.54, CFR 47 and RSS-139, 6.3 Frequency Stability.*

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMW 500 and the EUT antenna port.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## Test Setup:

The EUT was placed in the Temperature chamber and connected to CMW 500 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.

---

The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMW 500 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 1720.0 MHz, 1732.5 MHz and 1745.0 MHz each was measured under 20 MHz bandwidth with maximum (100) RBs. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.

After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**Procedure:**

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

15. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
16. Start test program
17. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
18. Set power supply voltage to 3.6 volts.
19. Set up CMW 500 Radio Communication Tester.
20. Command the CMW 500 to switch to the low channel.
21. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
22. EUT is commanded to Transmit 100 Bursts.
23. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
24. The CMW 500 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
25. Repeat steps 5 to 10 changing the supply voltage to 4.1 Volts
26. Increase temperature by 10°C and soak for 1/2 hour.
27. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
28. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

The maximum frequency error in the LTE band 4 measured was **0.0070PPM**.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Date of Test: Feb 17, 2015

LTE Band 4 results: channels 20050, 20175 and 20300 @ 20°C maximum transmitted power

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|---------------------|-----------------|-----------------------|----------------------|---------|
| 20050                  | 1720.0              | 3.6             | 20                    | -6.59                | -0.0038 |
| 20175                  | 1732.5              | 3.6             | 20                    | 10.17                | 0.0059  |
| 20300                  | 1745.0              | 3.6             | 20                    | 6.95                 | 0.0040  |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 20050                  | 1720.0              | 4.1             | 20                    | 4.94                 | 0.0029 |
| 20175                  | 1732.5              | 4.1             | 20                    | 8.74                 | 0.0050 |
| 20300                  | 1745.0              | 4.1             | 20                    | 6.95                 | 0.0040 |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 20050                  | 1720.0              | 4.35            | 20                    | 6.82                 | 0.0040 |
| 20175                  | 1732.5              | 4.35            | 20                    | 9.64                 | 0.0056 |
| 20300                  | 1745.0              | 4.35            | 20                    | 8.57                 | 0.0049 |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

LTE band 4 Results: channel 20050 @ maximum transmitted power

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 20050                  | 1720.0          | 3.6             | -30                   | -7.30                | -0.0042 |
| 20050                  | 1720.0          | 3.6             | -20                   | -6.22                | -0.0036 |
| 20050                  | 1720.0          | 3.6             | -10                   | -6.35                | -0.0037 |
| 20050                  | 1720.0          | 3.6             | 0                     | 9.44                 | 0.0055  |
| 20050                  | 1720.0          | 3.6             | 10                    | -5.71                | -0.0033 |
| 20050                  | 1720.0          | 3.6             | 20                    | -6.59                | -0.0038 |
| 20050                  | 1720.0          | 3.6             | 30                    | 7.34                 | 0.0043  |
| 20050                  | 1720.0          | 3.6             | 40                    | -7.12                | -0.0041 |
| 20050                  | 1720.0          | 3.6             | 50                    | -6.55                | -0.0038 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20050                  | 1720.0          | 4.1             | -30                   | -5.74                | -0.0033 |
| 20050                  | 1720.0          | 4.1             | -20                   | 5.85                 | 0.0034  |
| 20050                  | 1720.0          | 4.1             | -10                   | -7.97                | -0.0046 |
| 20050                  | 1720.0          | 4.1             | 0                     | 5.11                 | 0.0030  |
| 20050                  | 1720.0          | 4.1             | 10                    | 4.36                 | 0.0025  |
| 20050                  | 1720.0          | 4.1             | 20                    | 4.94                 | 0.0029  |
| 20050                  | 1720.0          | 4.1             | 30                    | -7.70                | -0.0045 |
| 20050                  | 1720.0          | 4.1             | 40                    | -6.67                | -0.0039 |
| 20050                  | 1720.0          | 4.1             | 50                    | -7.78                | -0.0045 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20050                  | 1720.0          | 4.35            | -30                   | -8.96                | -0.0052 |
| 20050                  | 1720.0          | 4.35            | -20                   | -6.35                | -0.0037 |
| 20050                  | 1720.0          | 4.35            | -10                   | 6.85                 | 0.0040  |
| 20050                  | 1720.0          | 4.35            | 0                     | -1.37                | -0.0008 |
| 20050                  | 1720.0          | 4.35            | 10                    | 1.11                 | 0.0006  |
| 20050                  | 1720.0          | 4.35            | 20                    | 6.82                 | 0.0040  |
| 20050                  | 1720.0          | 4.35            | 30                    | -6.49                | -0.0038 |
| 20050                  | 1720.0          | 4.35            | 40                    | -7.14                | -0.0042 |
| 20050                  | 1720.0          | 4.35            | 50                    | -6.39                | -0.0037 |



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 4 Results: channel 20175 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------------|
| 20175                  | 1732.5          | 3.6             | -30                   | -4.88                | -0.0028       |
| 20175                  | 1732.5          | 3.6             | -20                   | 6.88                 | 0.0040        |
| 20175                  | 1732.5          | 3.6             | -10                   | 9.17                 | 0.0053        |
| 20175                  | 1732.5          | 3.6             | 0                     | 3.55                 | 0.0020        |
| 20175                  | 1732.5          | 3.6             | 10                    | 3.69                 | 0.0021        |
| 20175                  | 1732.5          | 3.6             | 20                    | 10.17                | 0.0059        |
| 20175                  | 1732.5          | 3.6             | 30                    | 7.04                 | 0.0041        |
| 20175                  | 1732.5          | 3.6             | 40                    | 8.30                 | 0.0048        |
| 20175                  | 1732.5          | 3.6             | 50                    | 12.13                | <b>0.0070</b> |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
| 20175                  | 1732.5          | 4.1             | -30                   | 8.77                 | 0.0051        |
| 20175                  | 1732.5          | 4.1             | -20                   | 8.96                 | 0.0052        |
| 20175                  | 1732.5          | 4.1             | -10                   | 9.00                 | 0.0052        |
| 20175                  | 1732.5          | 4.1             | 0                     | -2.36                | -0.0014       |
| 20175                  | 1732.5          | 4.1             | 10                    | 6.45                 | 0.0037        |
| 20175                  | 1732.5          | 4.1             | 20                    | 8.74                 | 0.0050        |
| 20175                  | 1732.5          | 4.1             | 30                    | 8.00                 | 0.0046        |
| 20175                  | 1732.5          | 4.1             | 40                    | 7.70                 | 0.0044        |
| 20175                  | 1732.5          | 4.1             | 50                    | 7.37                 | 0.0043        |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
| 20175                  | 1732.5          | 4.35            | -30                   | -5.55                | -0.0032       |
| 20175                  | 1732.5          | 4.35            | -20                   | -6.87                | -0.0040       |
| 20175                  | 1732.5          | 4.35            | -10                   | 7.17                 | 0.0041        |
| 20175                  | 1732.5          | 4.35            | 0                     | 2.11                 | 0.0012        |
| 20175                  | 1732.5          | 4.35            | 10                    | -2.26                | -0.0013       |
| 20175                  | 1732.5          | 4.35            | 20                    | 9.64                 | 0.0056        |
| 20175                  | 1732.5          | 4.35            | 30                    | 5.41                 | 0.0031        |
| 20175                  | 1732.5          | 4.35            | 40                    | 7.34                 | 0.0042        |
| 20175                  | 1732.5          | 4.35            | 50                    | -7.14                | -0.0041       |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 4 Results: channel 20300 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 20300                  | 1745.0          | 3.6             | -30                   | -6.19                | -0.0035 |
| 20300                  | 1745.0          | 3.6             | -20                   | 8.61                 | 0.0049  |
| 20300                  | 1745.0          | 3.6             | -10                   | 6.67                 | 0.0038  |
| 20300                  | 1745.0          | 3.6             | 0                     | -5.95                | -0.0034 |
| 20300                  | 1745.0          | 3.6             | 10                    | 4.25                 | 0.0024  |
| 20300                  | 1745.0          | 3.6             | 20                    | 6.95                 | 0.0040  |
| 20300                  | 1745.0          | 3.6             | 30                    | -8.93                | -0.0051 |
| 20300                  | 1745.0          | 3.6             | 40                    | -4.85                | -0.0028 |
| 20300                  | 1745.0          | 3.6             | 50                    | -6.27                | -0.0036 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20300                  | 1745.0          | 4.1             | -30                   | 8.96                 | 0.0051  |
| 20300                  | 1745.0          | 4.1             | -20                   | -6.42                | -0.0037 |
| 20300                  | 1745.0          | 4.1             | -10                   | 7.50                 | 0.0043  |
| 20300                  | 1745.0          | 4.1             | 0                     | 6.55                 | 0.0038  |
| 20300                  | 1745.0          | 4.1             | 10                    | -4.36                | -0.0025 |
| 20300                  | 1745.0          | 4.1             | 20                    | 6.95                 | 0.0040  |
| 20300                  | 1745.0          | 4.1             | 30                    | -7.00                | -0.0040 |
| 20300                  | 1745.0          | 4.1             | 40                    | 6.25                 | 0.0036  |
| 20300                  | 1745.0          | 4.1             | 50                    | -6.49                | -0.0037 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20300                  | 1745.0          | 4.35            | -30                   | -7.82                | -0.0045 |
| 20300                  | 1745.0          | 4.35            | -20                   | 6.79                 | 0.0039  |
| 20300                  | 1745.0          | 4.35            | -10                   | 7.67                 | 0.0044  |
| 20300                  | 1745.0          | 4.35            | 0                     | 5.51                 | 0.0032  |
| 20300                  | 1745.0          | 4.35            | 10                    | -3.68                | -0.0021 |
| 20300                  | 1745.0          | 4.35            | 20                    | 8.57                 | 0.0049  |
| 20300                  | 1745.0          | 4.35            | 30                    | 8.27                 | 0.0047  |
| 20300                  | 1745.0          | 4.35            | 40                    | -5.11                | -0.0029 |
| 20300                  | 1745.0          | 4.35            | 50                    | 4.66                 | 0.0027  |

## APPENDIX 4C – LTE Band 4 RADIATED EMISSIONS TEST DATA

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 4C</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### Radiated Power Test Data Results

The following measurements were performed by Shiva Kumbham.

Date of Test: February 23, 2015

The environmental tests conditions were: Temperature: 26.4 °C  
Relative Humidity: 2.5 %

The BlackBerry® smartphone was standalone, volume keys pointing up with the LCD facing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed with QPSK and 16QAM modulations. The smallest test margins are reported below.

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

#### **LTE band 4, 5MHz BW, RB=1, QPSK modulation**

|      |       |                 |      |            |      |                   |                  | Substitution Method |               |                                                    |      |             |                    |
|------|-------|-----------------|------|------------|------|-------------------|------------------|---------------------|---------------|----------------------------------------------------|------|-------------|--------------------|
| EUT  |       |                 |      | Rx Antenna |      | Spectrum Analyzer |                  | Tracking Generator  |               |                                                    |      |             |                    |
| Type | Ch    | Frequency (MHz) | Band | Type       | Pol. | Reading (dBuV)    | Max (V,H) (dBuV) | Pol. Tx-Rx          | Reading (dBm) | Corrected Reading (relative to Isotropic Radiator) |      | Limit (dBm) | Diff to Limit (dB) |
|      |       |                 |      |            |      |                   |                  |                     |               | (dBm)                                              | (W)  |             |                    |
| F0   | 19975 | 1712.50         | 4    | Horn       | V    | -21.07            | -21.07           | V-V                 | -11.38        | 28.13                                              | 0.65 | 30.00       | 1.87               |
| F0   | 19975 | 1712.50         | 4    | Horn       | H    | -24.71            |                  | H-H                 | -10.51        |                                                    |      |             |                    |
| F0   | 20175 | 1732.50         | 4    | Horn       | V    | -22.72            | -22.72           | V-V                 | -12.66        | 26.72                                              | 0.47 | 30.00       | 3.28               |
| F0   | 20175 | 1732.50         | 4    | Horn       | H    | -26.07            |                  | H-H                 | -12.07        |                                                    |      |             |                    |
| F0   | 20374 | 1752.40         | 4    | Horn       | V    | -21.73            | -21.73           | V-V                 | -11.55        | 27.94                                              | 0.62 | 30.00       | 2.06               |
| F0   | 20374 | 1752.40         | 4    | Horn       | H    | -25.18            |                  | H-H                 | -10.66        |                                                    |      |             |                    |

#### **LTE band 4, 20MHz BW, RB=1, 16-QAM modulation**

|      |       |                    |      |            |      |                   |                        | Substitution Method |                  |                                                       |      |                |                          |
|------|-------|--------------------|------|------------|------|-------------------|------------------------|---------------------|------------------|-------------------------------------------------------|------|----------------|--------------------------|
| EUT  |       |                    |      | Rx Antenna |      | Spectrum Analyzer |                        | Tracking Generator  |                  |                                                       |      |                |                          |
| Type | Ch    | Frequency<br>(MHz) | Band | Type       | Pol. | Reading<br>(dBuV) | Max<br>(V,H)<br>(dBuV) | Pol.<br><br>Tx-Rx   | Reading<br>(dBm) | Corrected Reading<br>(relative to Isotropic Radiator) |      | Limit<br>(dBm) | Diff to<br>Limit<br>(dB) |
|      |       |                    |      |            |      |                   |                        |                     |                  | (dBm)                                                 | (W)  |                |                          |
| F0   | 20050 | 1720.00            | 4    | Horn       | V    | -22.07            | -22.07                 | V-V                 | -12.19           | 26.77                                                 | 0.48 | 30.00          | 3.23                     |
| F0   | 20050 | 1720.00            | 4    | Horn       | H    | -25.64            |                        | H-H                 | -11.87           |                                                       |      |                |                          |
| F0   | 20175 | 1732.50            | 4    | Horn       | V    | -23.73            | -23.73                 | V-V                 | -13.73           | 25.68                                                 | 0.37 | 30.00          | 4.32                     |
| F0   | 20175 | 1732.50            | 4    | Horn       | H    | -26.99            |                        | H-H                 | -13.11           |                                                       |      |                |                          |
| F0   | 20299 | 1744.90            | 4    | Horn       | V    | -23.17            | -23.17                 | V-V                 | -12.44           | 27.20                                                 | 0.52 | 30.00          | 2.80                     |
| F0   | 20299 | 1744.90            | 4    | Horn       | H    | -26.65            |                        | H-H                 | -11.40           |                                                       |      |                |                          |

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Page 171 of 255



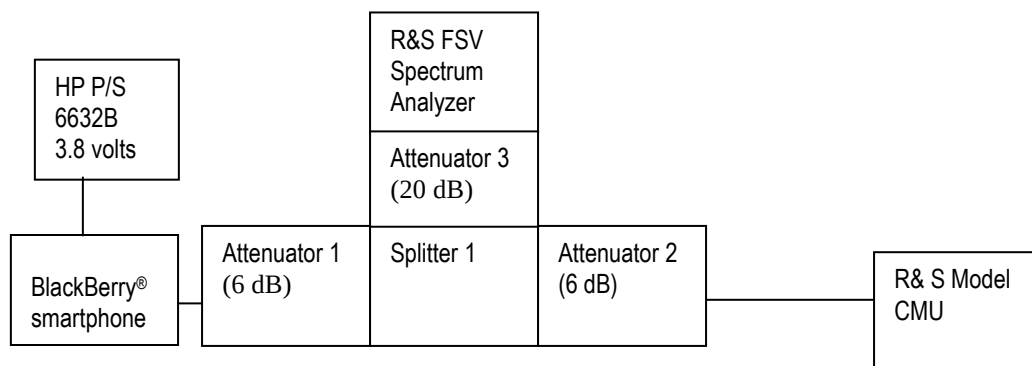
## APPENDIX 5A– LTE Band 5 CONDUCTED RF EMISSIONS TEST DATA/PLOTS

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 5 Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, 99% power bandwidth and the channel mask.

#### Test Setup Diagram



A reference offset of 31.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

| <u>UNIT</u>  | <u>MANUFACTURER</u> | <u>MODEL</u>  | <u>SERIAL<br/>NUMBER</u> |
|--------------|---------------------|---------------|--------------------------|
| Attenuator 1 | Mini-Circuits       | BW-S6W2+      | 0647                     |
| Attenuator 2 | Mini-Circuits       | BW-S6W2+      | 0648                     |
| Attenuator 3 | Mini-Circuits       | BW-S20-2W263+ | 1234                     |
| Splitter 1   | Weinschel           | 1515          | MES 92                   |

Date of Test: Feb 2-3, 2015

The environmental test conditions were:    Temperature:            22.5 °C  
                                                                          Relative Humidity:        19.2 %

The following measurements were performed by Sijia Li.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 5 Conducted RF Emission Test Data cont'd

### Emission Designator Table

| Frequency Range (MHz) | Conducted Output Power (dBm) | Emission Designator | Band   | Bandwidth (MHz) | Modulation |
|-----------------------|------------------------------|---------------------|--------|-----------------|------------|
| 824.7-848.2           | 23.00                        | 1M08G7D             | LTE B5 | 1.4             | QPSK       |
| 824.7-848.2           | 21.92                        | 1M08D7W             | LTE B5 | 1.4             | 16QAM      |
| 825.5-847.5           | 23.88                        | 2M69G7D             | LTE B5 | 3               | QPSK       |
| 825.5-847.5           | 22.59                        | 2M68D7W             | LTE B5 | 3               | 16QAM      |
| 826.5-846.4           | 23.14                        | 4M47G7D             | LTE B5 | 5               | QPSK       |
| 826.5-846.4           | 22.47                        | 4M47D7W             | LTE B5 | 5               | 16QAM      |
| 829-844               | 23.10                        | 8M93G7D             | LTE B5 | 10              | QPSK       |
| 829-844               | 22.74                        | 8M92D7W             | LTE B5 | 10              | 16QAM      |

**The conducted spurious emissions** – As per 47 CFR 2.1051, CFR 22.917 and RSS-132, 5.5 were measured from 30 MHz to 20 GHz.

### **–26 dBc Bandwidth and Occupied Bandwidth (99%)**

For each 1.4MHz, 3MHz, 5MHz, 10MHz with different number of RBs as per scalable bandwidths for LTE band 5, the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth.

QPSK and 16-QAM modulations were applied to each of the bandwidths. Only the worst case measurements are documented in this report.

A minimum RB condition was also measured (RB = 1).

The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.

The worst case –26dBc bandwidth for LTE band 5 was measured to be 9.22 MHz. Results were derived in a 100 kHz resolution bandwidth.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**Test Data for LTE Band 5 selected Frequencies in 10MHz BW (RB = 50)**

| LTE Band 5<br>Frequency (MHz) | 26dBc Occupied Bandwidth<br>(MHz) | 99% Occupied Bandwidth<br>(MHz) |             |
|-------------------------------|-----------------------------------|---------------------------------|-------------|
|                               | QPSK                              | QPSK                            | 16-QAM      |
| 829.0                         | 9.22                              | <b>8.94</b>                     | <b>8.94</b> |
| 836.5                         | 9.22                              | <b>8.94</b>                     | <b>8.94</b> |
| 843.9                         | 9.21                              | <b>8.94</b>                     | <b>8.94</b> |

**Measurement Plots for LTE Band 5**

See Figures 5-1a to 5-18a for the plots of the conducted spurious emissions.

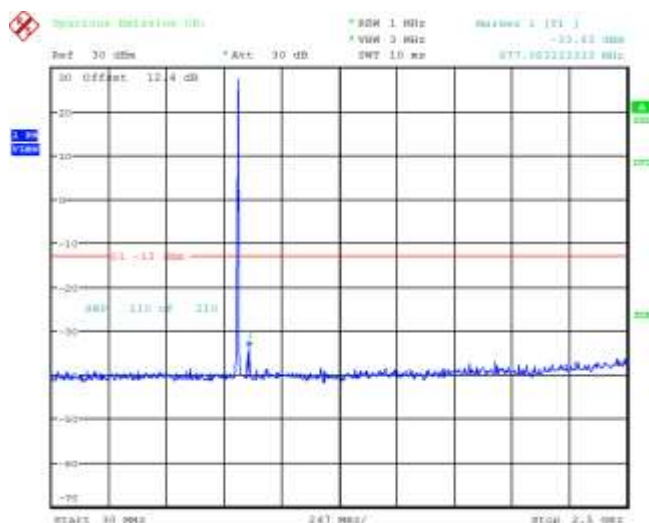
See Figures 5-19a to 5-36a and 5-45a to 5-47a for the plots of 99% Occupied Bandwidth and -26 dBc Bandwidth.

See Figures 5-37a to 5-44a for the plots of the Channel mask.

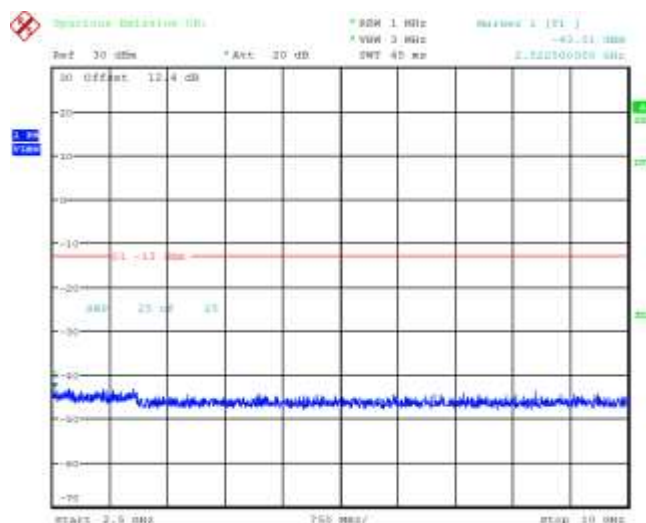
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 5 Conducted RF Emission Test Data cont'd

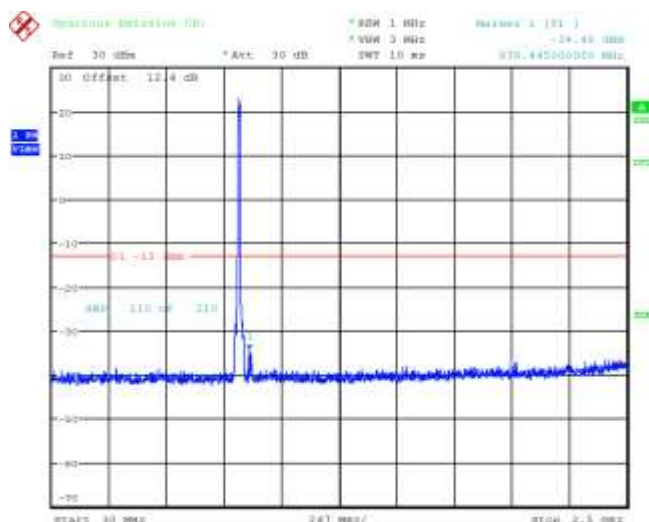
**Figure 5-1a: Band 5, Spurious Conducted Emissions, Low channel, 10MHz BW (RB= 1)**



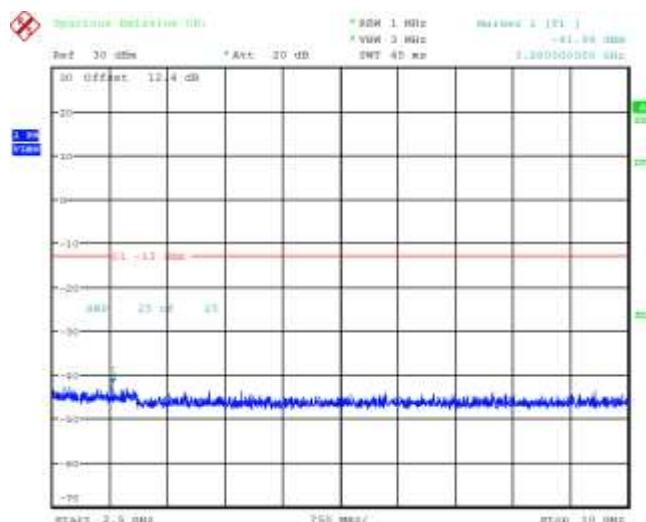
**Figure 5-2a: Band 5, Spurious Conducted Emissions, Low channel, 10MHz BW (RB= 1)**



**Figure 5-3a: Band 5, Spurious Conducted Emissions, Middle channel, 10MHz BW (RB= 25)**



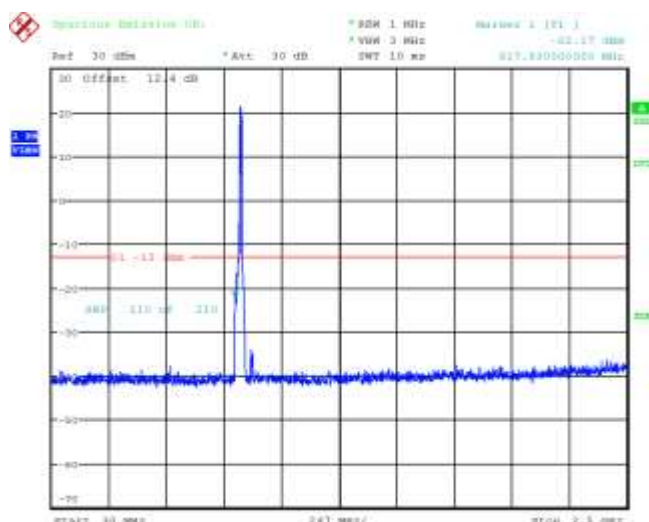
**Figure 5-4a: Band 5, Spurious Conducted Emissions, Middle channel, 10MHz BW (RB= 25)**



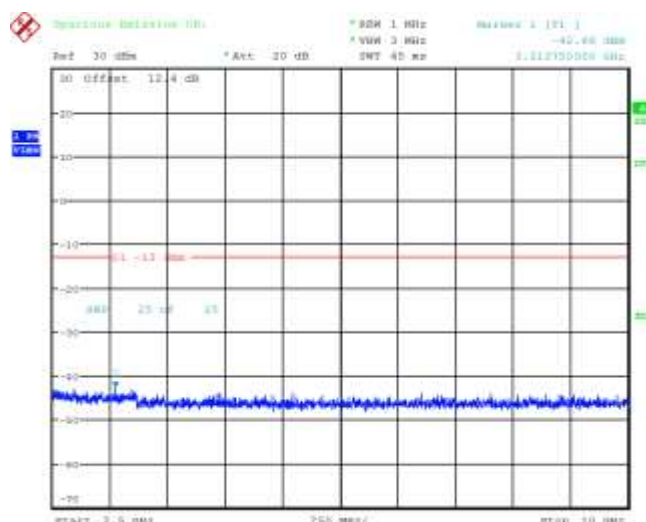
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 5 Conducted RF Emission Test Data cont'd

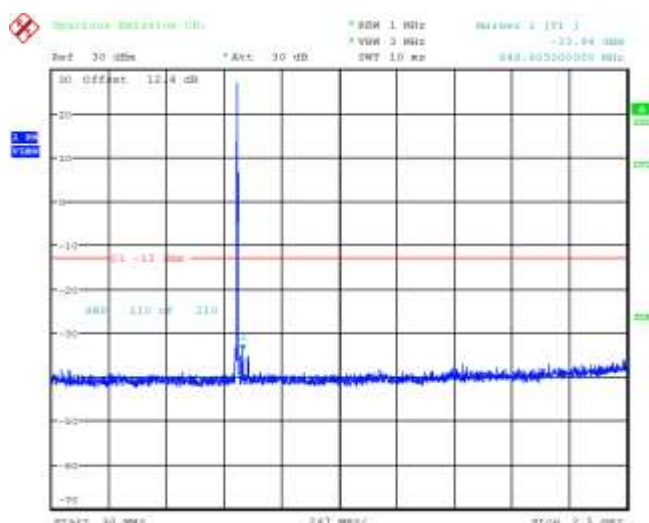
**Figure 5-5a: Band 5, Spurious Conducted Emissions, High Channel, 10MHz BW (RB= 50)**



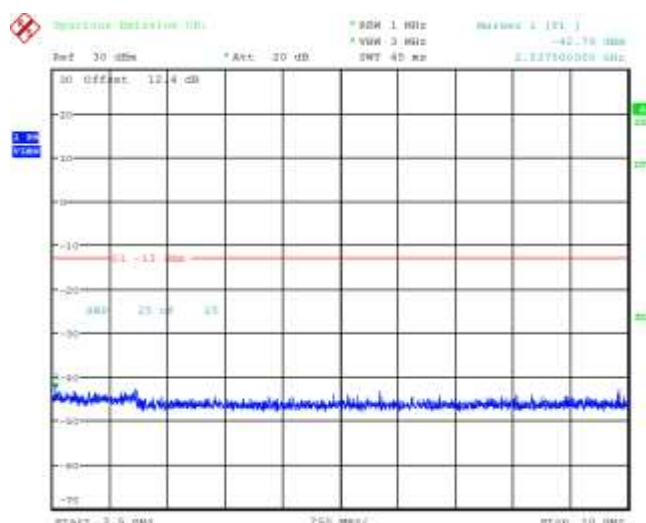
**Figure 5-6a: Band 5, Spurious Conducted Emissions, High Channel, 10MHz BW (RB= 50)**



**Figure 5-7a: Band 5, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 1)**



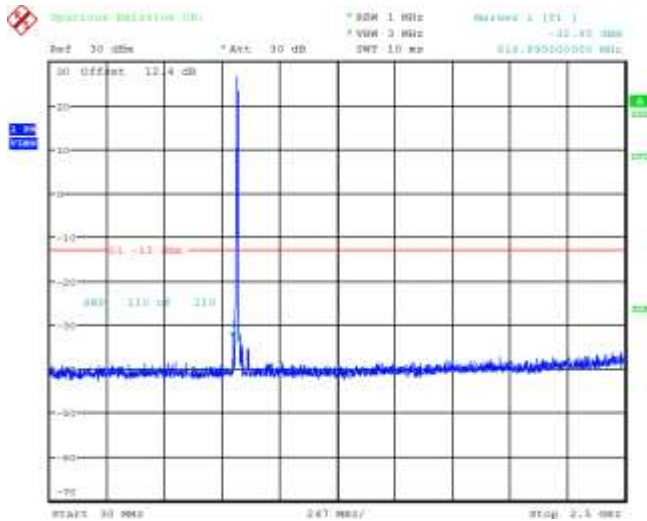
**Figure 5-8a: Band 5, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 1)**



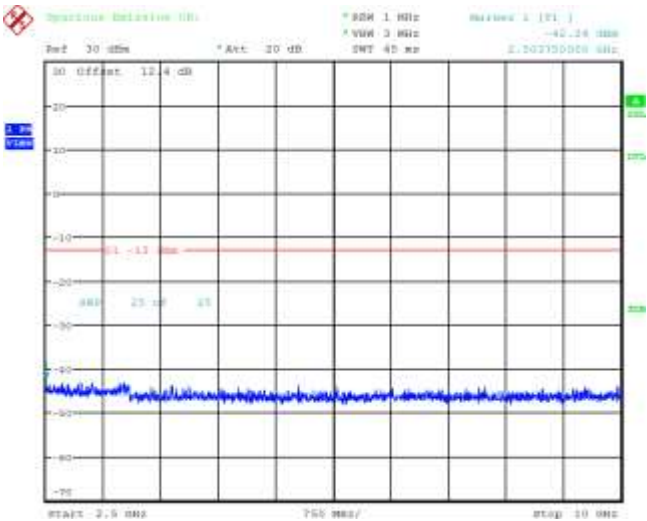
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

# LTE Band 5 Conducted RF Emission Test Data cont'd

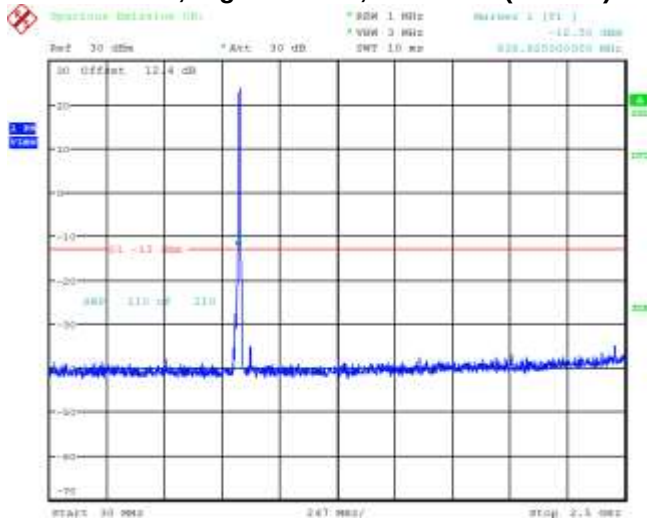
**Figure 5-9a: Band 5, Spurious Conducted Emissions, Middle Channel, 5MHz BW (RB= 15)**



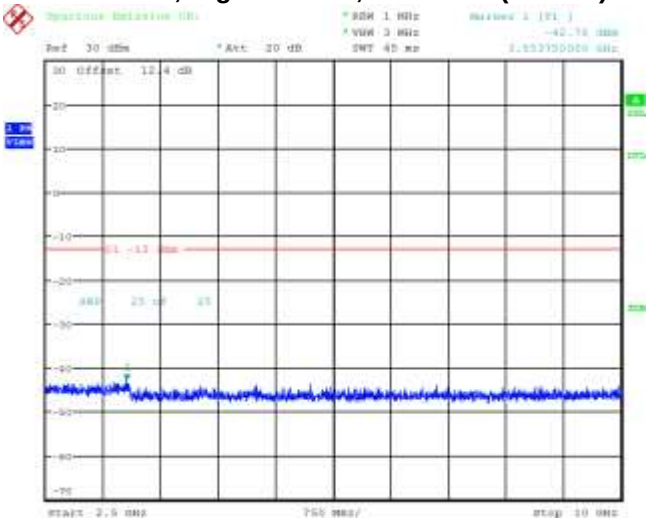
**Figure 5-10a: Band 5, Spurious Conducted Emissions, Middle Channel, 5MHz BW (RB= 15)**



**Figure 5-11a: Band 5, Spurious Conducted Emissions, High channel, 5MHz BW (RB= 25)**



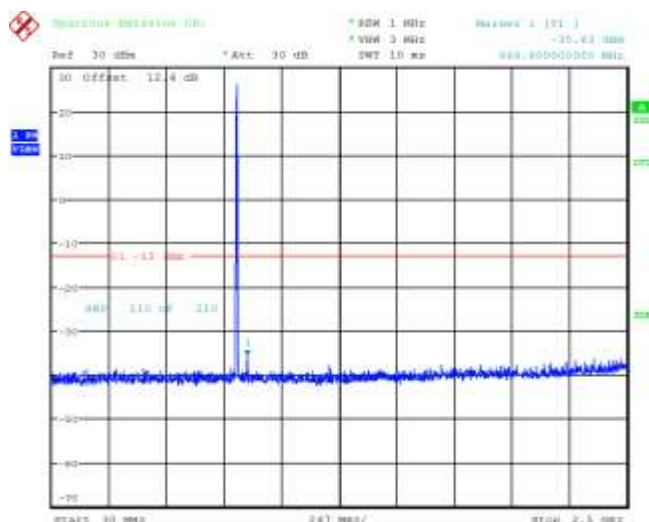
**Figure 5-12a: Band 5, Spurious Conducted Emissions, High channel, 5MHz BW (RB= 25)**



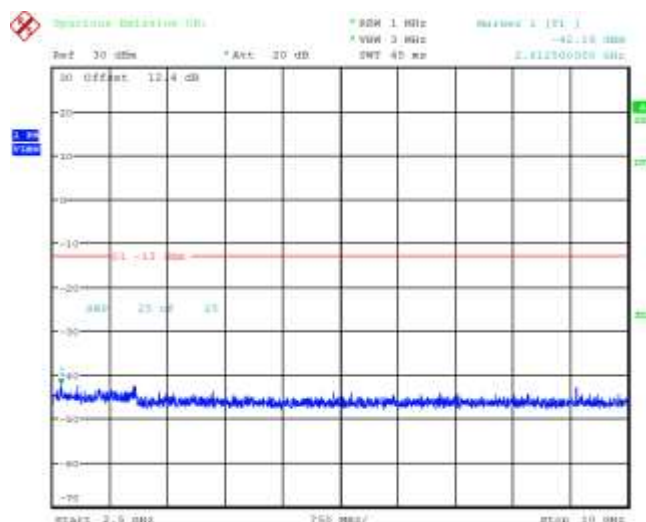
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 5 Conducted RF Emission Test Data cont'd

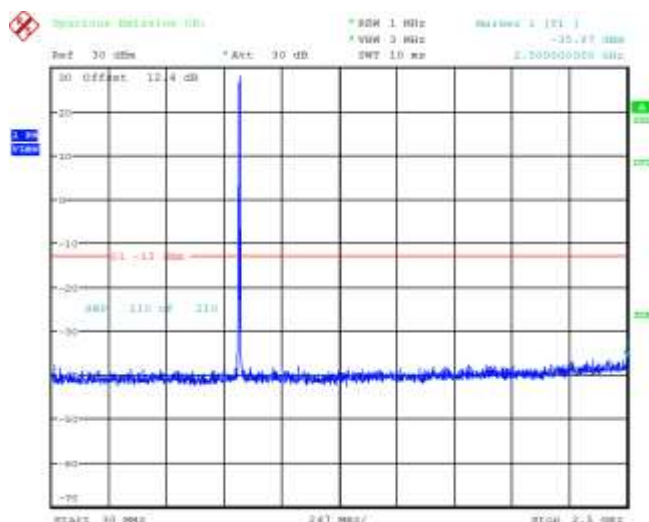
**Figure 5-13a: Band 5, Spurious Conducted Emissions, Low Channel, 1.4MHz BW (RB= 1)**



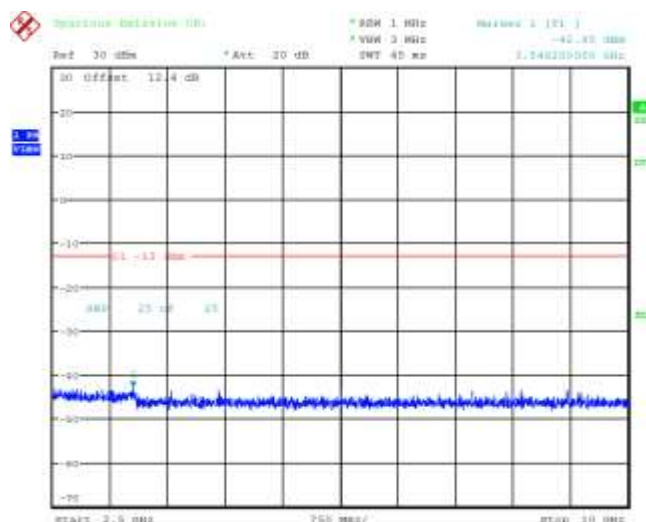
**Figure 5-14a: Band 5, Spurious Conducted Emissions, Low Channel, 1.4MHz BW (RB= 1)**



**Figure 5-15a: Band 5, Spurious Conducted Emissions, Middle channel, 1.4MHz BW (RB= 3)**



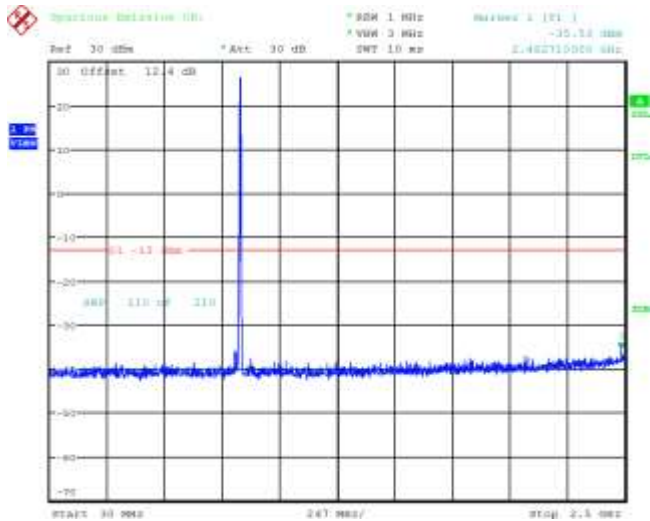
**Figure 5-16a: Band 5, Spurious Conducted Emissions, Middle channel, 1.4MHz BW (RB= 3)**



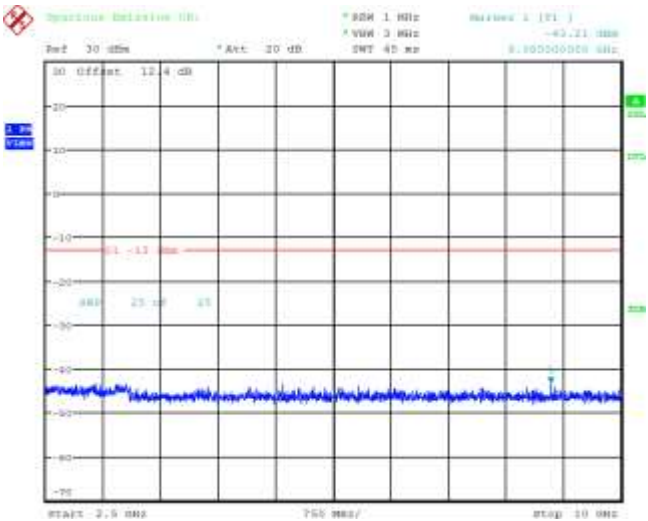
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

LTE Band 5 Conducted RF Emission Test Data cont'd

**Figure 5-17a: Band 5, Spurious Conducted Emissions, High channel, 1.4MHz BW (RB= 6)**



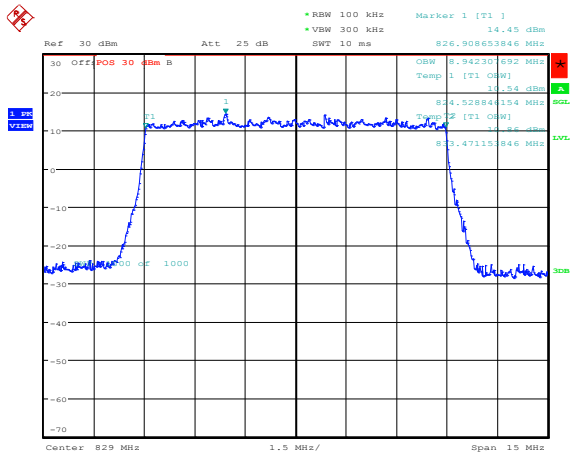
**Figure 5-18a: Band 5, Spurious Conducted Emissions, High channel, 1.4MHz BW (RB= 6)**



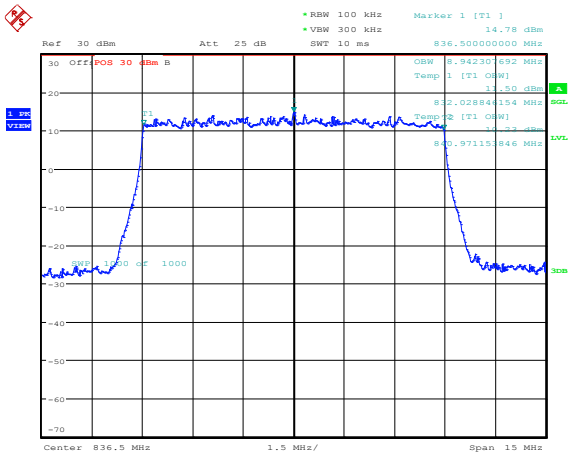
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

LTE Band 5 Conducted RF Emission Test Data cont'd

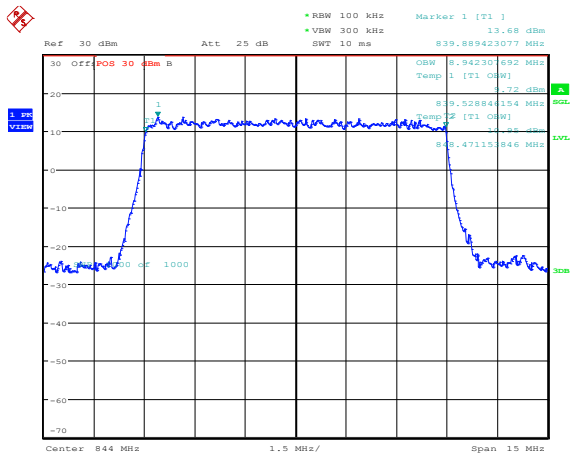
**Figure 5-19a: Occupied Bandwidth, Band 5 Low Channel, 10MHz BW, RB=50**



**Figure 5-20a: Occupied Bandwidth, Band 5 Middle Channel, 10MHz BW, RB=50**



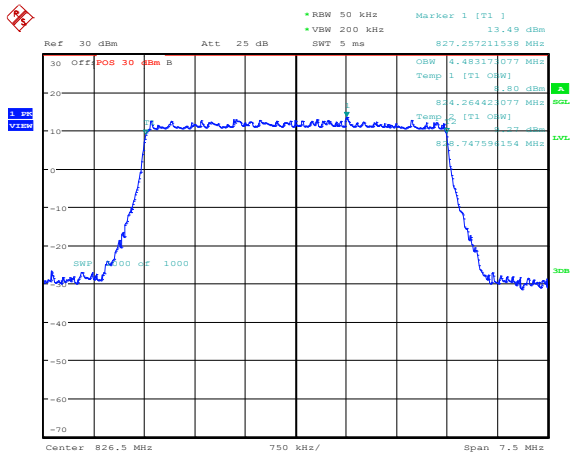
**Figure 5-21a: Occupied Bandwidth, Band 5 High Channel, 10MHz BW, RB=50**



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

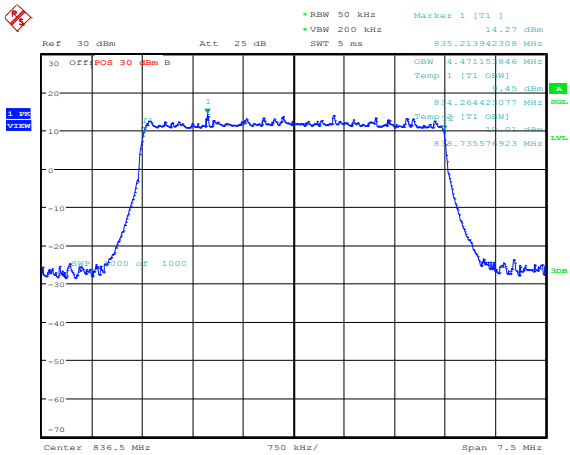
LTE Band 5 Conducted RF Emission Test Data cont'd

**Figure 5-22a: Occupied Bandwidth, Band 5 Low Channel, 5MHz BW, RB=25**



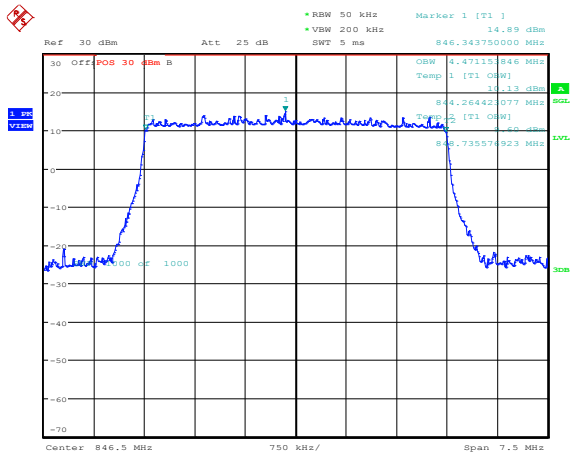
Date: 30.JAN.2015 10:53:39

**Figure 5-23a: Occupied Bandwidth, Band 5 Middle Channel, 5MHz BW, RB=25**



Date: 30.JAN.2015 10:54:41

**Figure 5-24a: Occupied Bandwidth, Band 5 High Channel, 5MHz BW, RB=25**



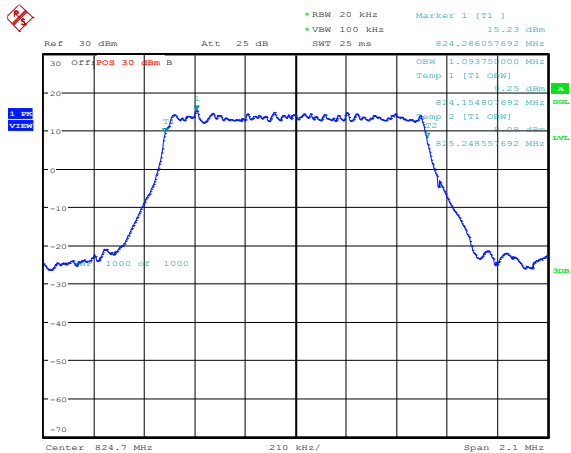
Date: 30.JAN.2015 10:55:07



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

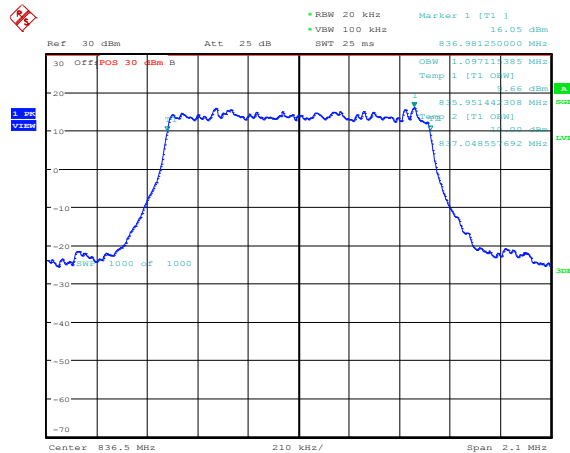
## LTE Band 5 Conducted RF Emission Test Data cont'd

Figure 5-25a: Occupied Bandwidth, Band 5 Low Channel, 1.4MHz BW, RB=6



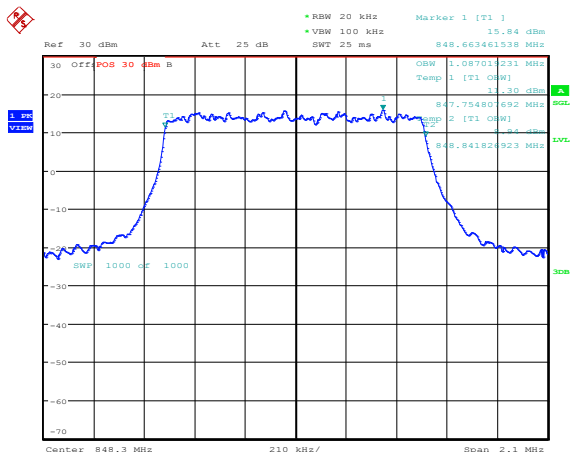
Date: 30.JAN.2015 11:02:01

Figure 5-26a: Occupied Bandwidth, Band 5 Middle Channel, 1.4MHz BW, RB=6



Date: 30.JAN.2015 11:02:57

Figure 5-27a: Occupied Bandwidth, Band 5 High Channel, 1.4MHz BW, RB=6

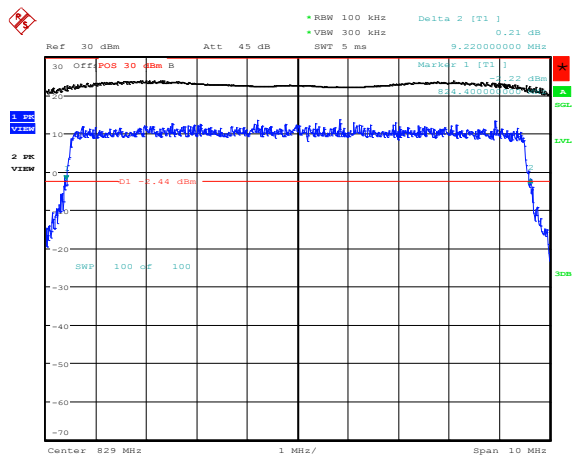


Date: 30.JAN.2015 11:03:35

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

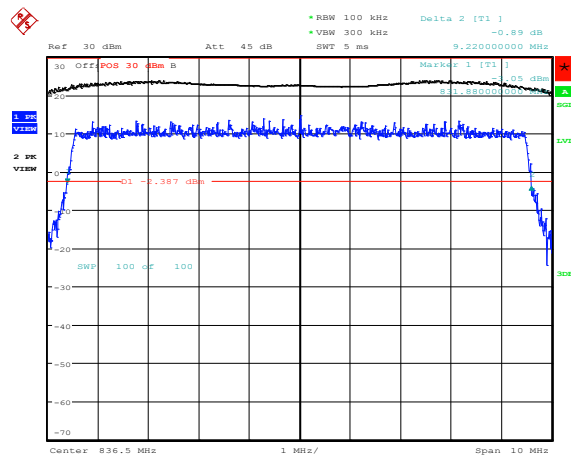
## LTE Band 5 Conducted RF Emission Test Data cont'd

**Figure 5-28a: -26 dBc Bandwidth, Band 5 Low Channel, 10MHz BW, RB=50**



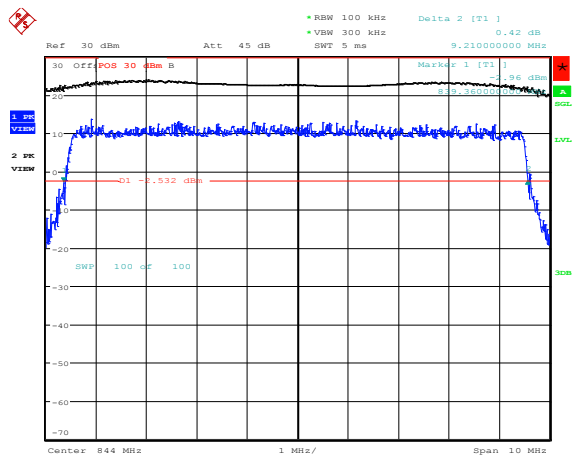
Date: 2.FEB.2015 11:47:33

**Figure 5-29a: -26 dBc Bandwidth, Band 5 Middle Channel, 10MHz BW, RB=50**



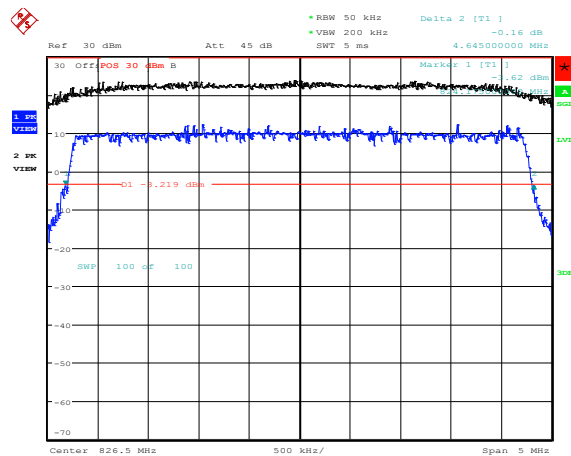
Date: 2.FEB.2015 11:47:50

**Figure 5-30a: -26 dBc Bandwidth, Band 5 High Channel, 10MHz BW, RB=50**



Date: 2.FEB.2015 11:48:06

**Figure 5-31a: -26 dBc Bandwidth, Band 5 Low Channel, 5MHz BW, RB=25**

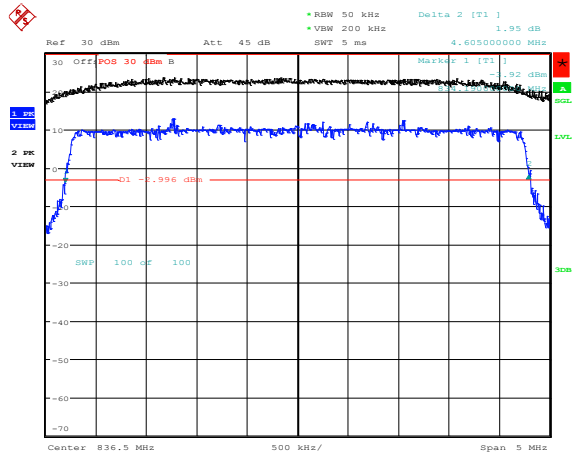


Date: 2.FEB.2015 11:48:27

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

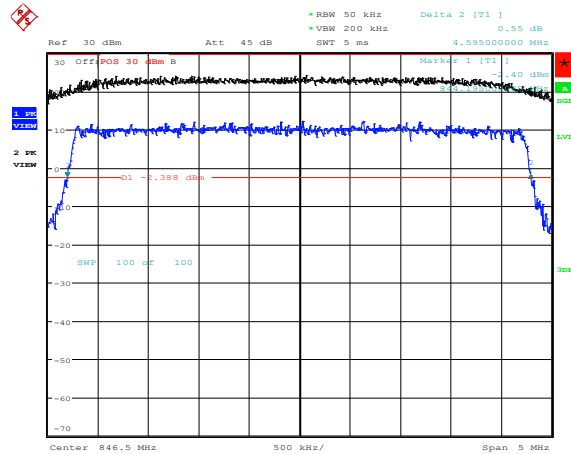
## LTE Band 5 Conducted RF Emission Test Data cont'd

**Figure 5-32a: -26 dBc Bandwidth, Band 5 Middle Channel, 5MHz BW, RB=25**



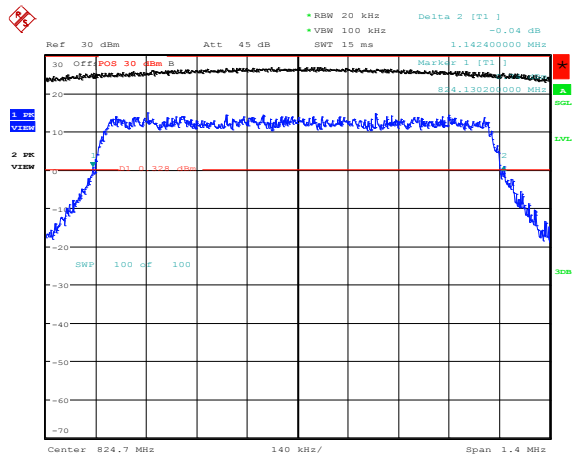
Date: 2.FEB.2015 11:48:43

**Figure 5-33a: -26 dBc Bandwidth, Band 5 High Channel, 5MHz BW, RB=25**



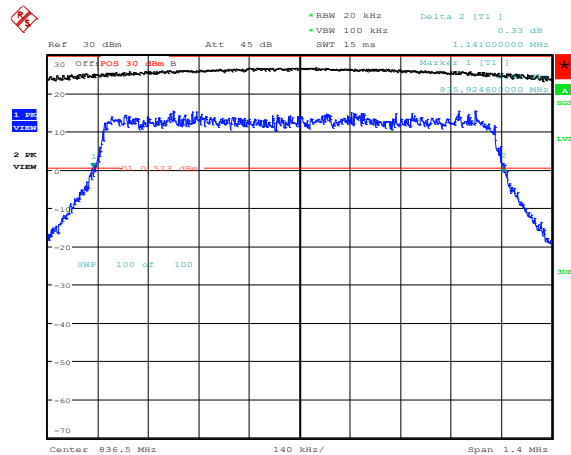
Date: 2.FEB.2015 11:48:56

**Figure 5-34a: -26 dBc Bandwidth, Band 5 Low Channel, 1.4MHz BW, RB=6**



Date: 2.FEB.2015 11:49:18

**Figure 5-35a: -26 dBc Bandwidth, Band 5 Middle Channel, 1.4MHz BW, RB=6**

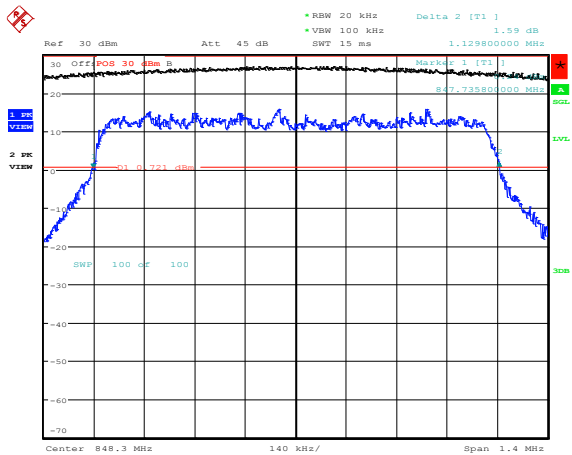


Date: 2.FEB.2015 11:49:34

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

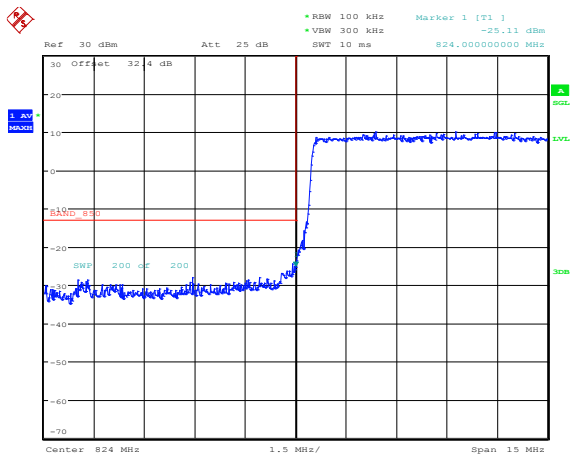
LTE Band 5 Conducted RF Emission Test Data cont'd

**Figure 5-36a: -26 dBc Bandwidth, Band 5 High Channel, 1.4MHz BW, RB=6**



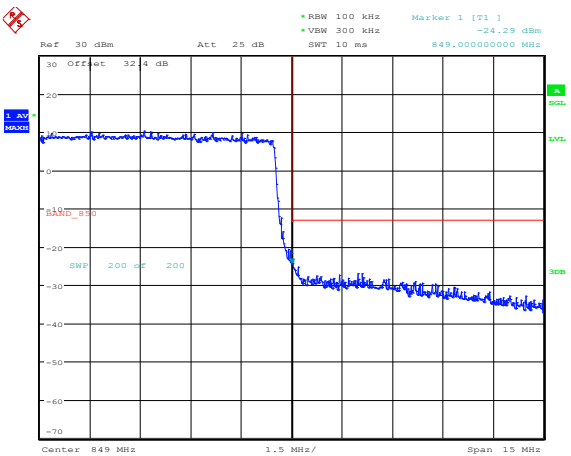
Date: 2.FEB.2015 11:49:48

**Figure 5-37a: Band 5 Low Channel Mask, 10MHz BW, RB=50**



Date: 3.FEB.2015 13:10:49

**Figure 5-38a: Band 5 High Channel Mask, 10MHz BW, RB=50**

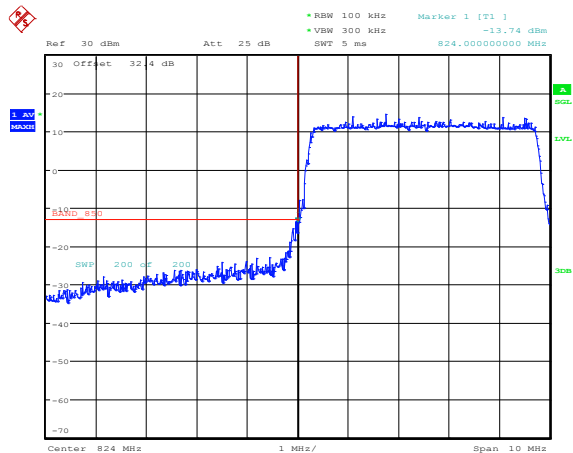


Date: 3.FEB.2015 13:13:36

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

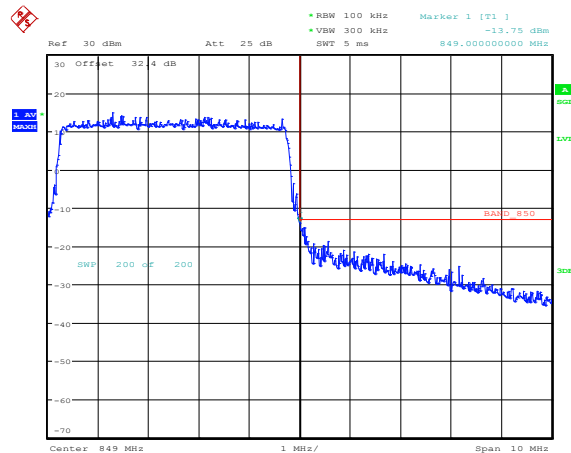
## LTE Band 5 Conducted RF Emission Test Data cont'd

**Figure 5-39a: Band 5 Low Channel Mask, 5MHz BW, RB=25**



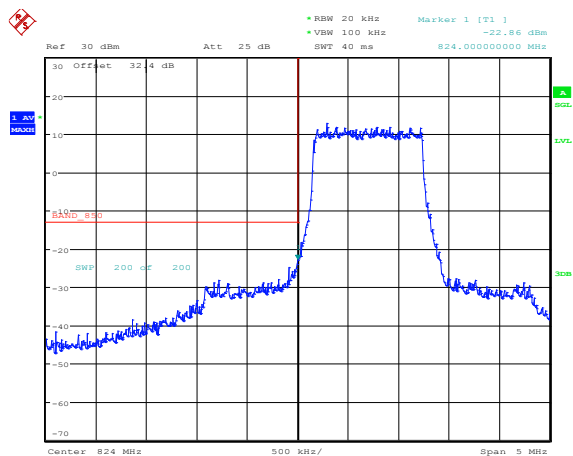
Date: 3.FEB.2015 13:20:04

**Figure 5-40a: Band 5 High Channel Mask, 5MHz BW, RB=25**



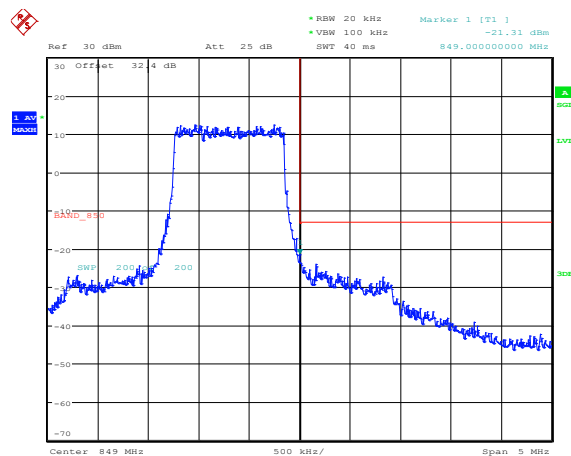
Date: 3.FEB.2015 13:23:10

**Figure 5-41a: Band 5 Low Channel Mask, 1.4MHz BW, RB=6**



Date: 3.FEB.2015 13:28:29

**Figure 5-42a: Band 5 High Channel Mask, 1.4MHz BW, RB=6**

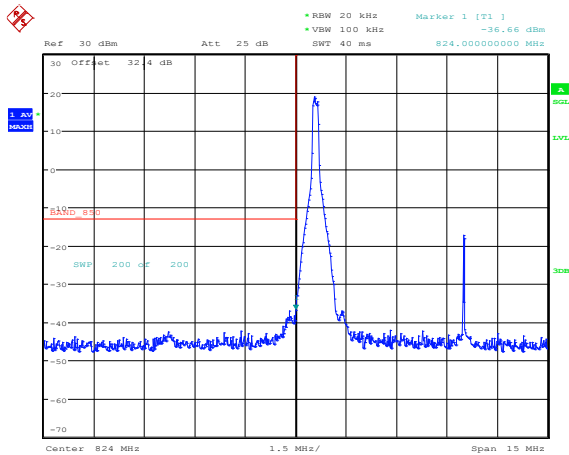


Date: 3.FEB.2015 13:30:59

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

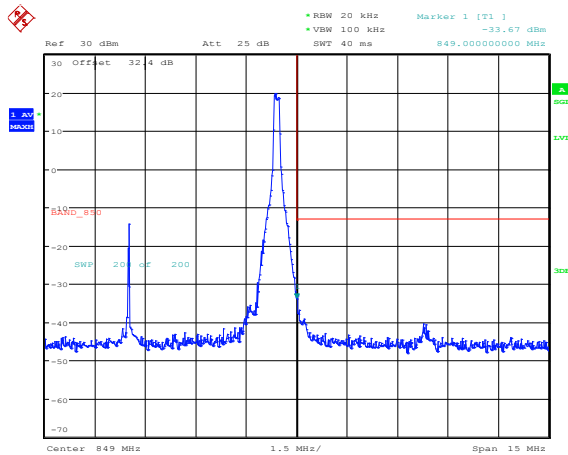
LTE Band 5 Conducted RF Emission Test Data cont'd

Figure 5-43d: Band 5 Low Channel Mask, 10MHz BW, RB=1



Date: 3.FEB.2015 13:09:35

Figure 5-44a: Band 5 High Channel Mask, 10MHz BW, RB=1

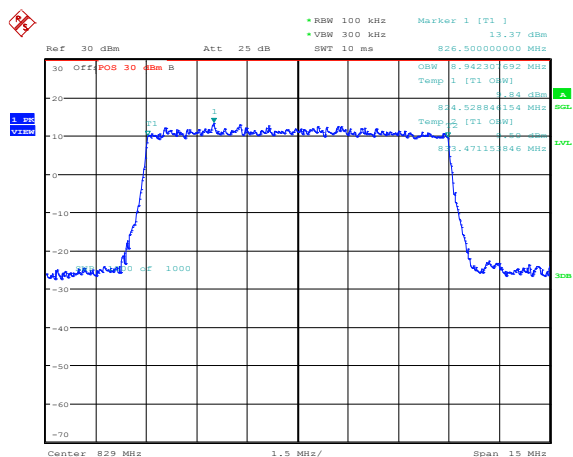


Date: 3.FEB.2015 13:11:46

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

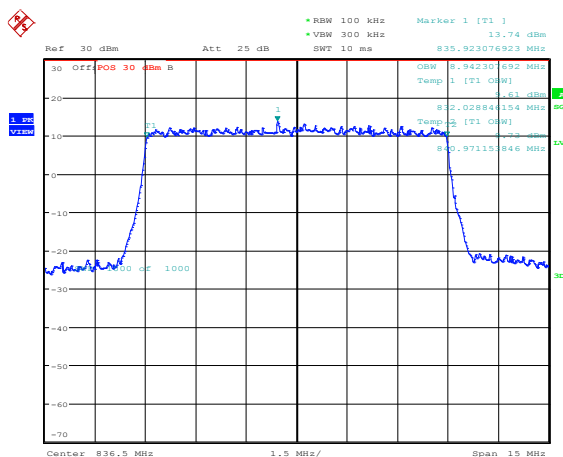
## LTE Band 5 Conducted RF Emission Test Data cont'd

**Figure 5-45a: Occupied Bandwidth, Band 5 Low Channel, 10MHz BW (RB= 50) 16-QAM**



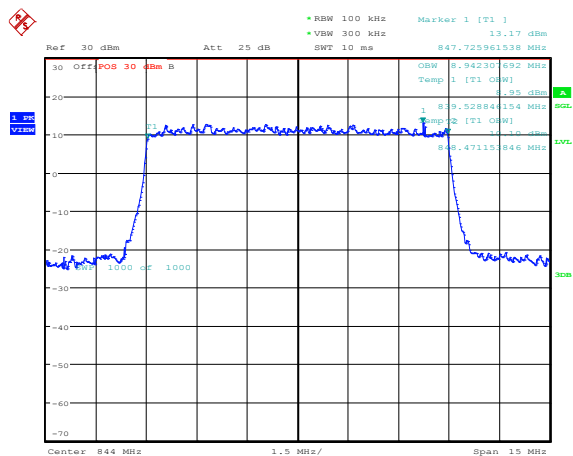
Date: 30.JAN.2015 10:50:49

**Figure 5-46a: Occupied Bandwidth, Band 5 Mid Channel, 20MHz BW (RB= 50) 16-QAM**



Date: 30.JAN.2015 10:52:04

**Figure 5-47a: Occupied Bandwidth, Band 5 High Channel, 10MHz BW (RB= 50) 16-QAM**



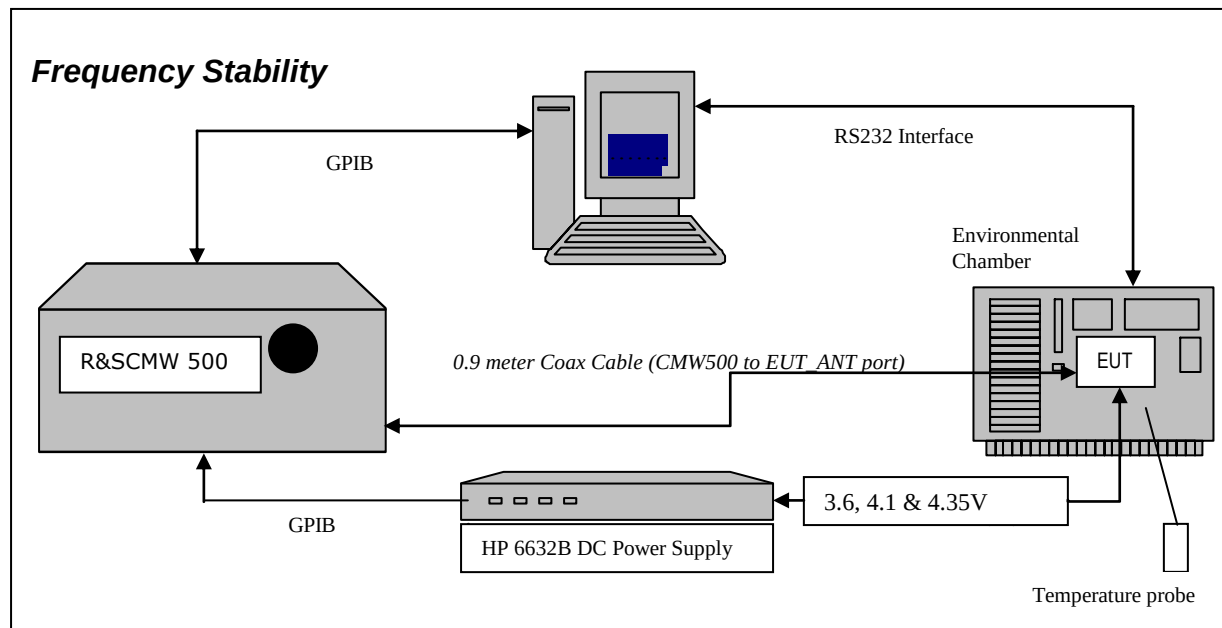
Date: 30.JAN.2015 10:53:06

## APPENDIX 5B – LTE Band 5 FREQUENCY STABILITY TEST DATA



|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 5 Frequency Stability Test Data



The following measurements were performed by Sijia Li.

CFR 47 Chapter 1 - Federal Communications Commission Rules

Part 2 Required Measurements

**2.1055** Frequency Stability - Procedures

(a,b) Frequency Stability - Temperature Variation

(d) Frequency Stability - Voltage Variation

**24.236** *Frequency Stability.*

*The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.*

*The EUT meets the requirements as stated in CFR 47 chapter 1, Section 27.54, CFR 47 and RSS-139, 6.3 Frequency Stability.*

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMW 500 and the EUT antenna port.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## Test Setup:

The EUT was placed in the Temperature chamber and connected to CMW 500 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.

---

The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMW 500 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 829.0 MHz, 836.5 MHz and 844.0 MHz each was measured under 10 MHz bandwidth with maximum (50) RBs. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.

After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

#### Procedure:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

29. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
30. Start test program
31. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
32. Set power supply voltage to 3.6 volts.
33. Set up CMW 500 Radio Communication Tester.
34. Command the CMW 500 to switch to the low channel.
35. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
36. EUT is commanded to Transmit 100 Bursts.
37. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
38. The CMW 500 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
39. Repeat steps 5 to 10 changing the supply voltage to 4.1 Volts
40. Increase temperature by 10°C and soak for 1/2 hour.
41. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
42. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

The maximum frequency error in the LTE Band 5 measured was **0.0075 PPM**.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Date of Test: Feb 17, 2015

LTE Band 5 results: channels 20400, 20525 and 20649 @ 20°C maximum transmitted power

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 20450                  | 829.0               | 3.6             | 20                    | 5.51                 | 0.0066 |
| 20525                  | 836.5               | 3.6             | 20                    | 4.86                 | 0.0058 |
| 20600                  | 844.0               | 3.6             | 20                    | 3.43                 | 0.0041 |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 20450                  | 829.0               | 4.1             | 20                    | 5.01                 | 0.0060 |
| 20525                  | 836.5               | 4.1             | 20                    | 2.42                 | 0.0029 |
| 20600                  | 844.0               | 4.1             | 20                    | 3.38                 | 0.0040 |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 20450                  | 829.0               | 4.35            | 20                    | 2.56                 | 0.0031 |
| 20525                  | 836.5               | 4.35            | 20                    | 4.86                 | 0.0058 |
| 20600                  | 844.0               | 4.35            | 20                    | 4.91                 | 0.0058 |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 5 Results: channel 20400 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 20450                  | 829.0           | 3.6             | -30                   | 2.98                 | 0.0036  |
| 20450                  | 829.0           | 3.6             | -20                   | 3.86                 | 0.0047  |
| 20450                  | 829.0           | 3.6             | -10                   | 4.48                 | 0.0054  |
| 20450                  | 829.0           | 3.6             | 0                     | 3.18                 | 0.0038  |
| 20450                  | 829.0           | 3.6             | 10                    | 4.35                 | 0.0052  |
| 20450                  | 829.0           | 3.6             | 20                    | 5.51                 | 0.0066  |
| 20450                  | 829.0           | 3.6             | 30                    | -2.88                | -0.0035 |
| 20450                  | 829.0           | 3.6             | 40                    | 3.12                 | 0.0038  |
| 20450                  | 829.0           | 3.6             | 50                    | 4.84                 | 0.0058  |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20450                  | 829.0           | 4.1             | -30                   | 4.31                 | 0.0052  |
| 20450                  | 829.0           | 4.1             | -20                   | 2.78                 | 0.0033  |
| 20450                  | 829.0           | 4.1             | -10                   | 4.21                 | 0.0051  |
| 20450                  | 829.0           | 4.1             | 0                     | -1.44                | -0.0017 |
| 20450                  | 829.0           | 4.1             | 10                    | -1.63                | -0.0020 |
| 20450                  | 829.0           | 4.1             | 20                    | 5.01                 | 0.0060  |
| 20450                  | 829.0           | 4.1             | 30                    | 4.52                 | 0.0055  |
| 20450                  | 829.0           | 4.1             | 40                    | 2.06                 | 0.0025  |
| 20450                  | 829.0           | 4.1             | 50                    | 2.49                 | 0.0030  |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20450                  | 829.0           | 4.35            | -30                   | 2.72                 | 0.0033  |
| 20450                  | 829.0           | 4.35            | -20                   | 2.36                 | 0.0028  |
| 20450                  | 829.0           | 4.35            | -10                   | 5.34                 | 0.0064  |
| 20450                  | 829.0           | 4.35            | 0                     | 3.78                 | 0.0046  |
| 20450                  | 829.0           | 4.35            | 10                    | 3.15                 | 0.0038  |
| 20450                  | 829.0           | 4.35            | 20                    | 2.56                 | 0.0031  |
| 20450                  | 829.0           | 4.35            | 30                    | 3.59                 | 0.0043  |
| 20450                  | 829.0           | 4.35            | 40                    | -2.33                | -0.0028 |
| 20450                  | 829.0           | 4.35            | 50                    | 3.26                 | 0.0039  |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 5 Results: channel 20525 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------------|
| 20525                  | 836.5           | 3.6             | -30                   | 6.15                 | 0.0074        |
| 20525                  | 836.5           | 3.6             | -20                   | 5.26                 | 0.0063        |
| 20525                  | 836.5           | 3.6             | -10                   | 2.99                 | 0.0036        |
| 20525                  | 836.5           | 3.6             | 0                     | 2.83                 | 0.0034        |
| 20525                  | 836.5           | 3.6             | 10                    | 3.43                 | 0.0041        |
| 20525                  | 836.5           | 3.6             | 20                    | 4.86                 | 0.0058        |
| 20525                  | 836.5           | 3.6             | 30                    | 1.92                 | 0.0023        |
| 20525                  | 836.5           | 3.6             | 40                    | 4.03                 | 0.0048        |
| 20525                  | 836.5           | 3.6             | 50                    | -2.23                | -0.0027       |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
| 20525                  | 836.5           | 4.1             | -30                   | 5.84                 | 0.0070        |
| 20525                  | 836.5           | 4.1             | -20                   | 2.49                 | 0.0030        |
| 20525                  | 836.5           | 4.1             | -10                   | 3.60                 | 0.0043        |
| 20525                  | 836.5           | 4.1             | 0                     | 4.79                 | 0.0057        |
| 20525                  | 836.5           | 4.1             | 10                    | 2.76                 | 0.0033        |
| 20525                  | 836.5           | 4.1             | 20                    | 2.42                 | 0.0029        |
| 20525                  | 836.5           | 4.1             | 30                    | 3.45                 | 0.0041        |
| 20525                  | 836.5           | 4.1             | 40                    | 5.16                 | 0.0062        |
| 20525                  | 836.5           | 4.1             | 50                    | 3.42                 | 0.0041        |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
| 20525                  | 836.5           | 4.35            | -30                   | 2.70                 | 0.0032        |
| 20525                  | 836.5           | 4.35            | -20                   | 3.91                 | 0.0047        |
| 20525                  | 836.5           | 4.35            | -10                   | 1.96                 | 0.0023        |
| 20525                  | 836.5           | 4.35            | 0                     | 3.39                 | 0.0041        |
| 20525                  | 836.5           | 4.35            | 10                    | 3.66                 | 0.0044        |
| 20525                  | 836.5           | 4.35            | 20                    | 4.86                 | 0.0058        |
| 20525                  | 836.5           | 4.35            | 30                    | 6.25                 | <b>0.0075</b> |
| 20525                  | 836.5           | 4.35            | 40                    | 4.06                 | 0.0049        |
| 20525                  | 836.5           | 4.35            | 50                    | -2.40                | -0.0029       |

|                                                                                                     |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  <b>BlackBerry</b> | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                                    | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 5 Results: channel 20649 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 20600                  | 844.0           | 3.6             | -30                   | -4.11                | -0.0049 |
| 20600                  | 844.0           | 3.6             | -20                   | 2.62                 | 0.0031  |
| 20600                  | 844.0           | 3.6             | -10                   | 2.56                 | 0.0030  |
| 20600                  | 844.0           | 3.6             | 0                     | 4.22                 | 0.0050  |
| 20600                  | 844.0           | 3.6             | 10                    | 4.21                 | 0.0050  |
| 20600                  | 844.0           | 3.6             | 20                    | 3.43                 | 0.0041  |
| 20600                  | 844.0           | 3.6             | 30                    | -2.96                | -0.0035 |
| 20600                  | 844.0           | 3.6             | 40                    | -2.06                | -0.0024 |
| 20600                  | 844.0           | 3.6             | 50                    | 2.78                 | 0.0033  |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20600                  | 844.0           | 4.1             | -30                   | 4.09                 | 0.0048  |
| 20600                  | 844.0           | 4.1             | -20                   | 5.15                 | 0.0061  |
| 20600                  | 844.0           | 4.1             | -10                   | 4.45                 | 0.0053  |
| 20600                  | 844.0           | 4.1             | 0                     | -2.85                | -0.0034 |
| 20600                  | 844.0           | 4.1             | 10                    | 2.30                 | 0.0027  |
| 20600                  | 844.0           | 4.1             | 20                    | 3.38                 | 0.0040  |
| 20600                  | 844.0           | 4.1             | 30                    | 3.28                 | 0.0039  |
| 20600                  | 844.0           | 4.1             | 40                    | -2.89                | -0.0034 |
| 20600                  | 844.0           | 4.1             | 50                    | -2.76                | -0.0033 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 20600                  | 844.0           | 4.35            | -30                   | -2.45                | -0.0029 |
| 20600                  | 844.0           | 4.35            | -20                   | 2.79                 | 0.0033  |
| 20600                  | 844.0           | 4.35            | -10                   | 4.42                 | 0.0052  |
| 20600                  | 844.0           | 4.35            | 0                     | 3.38                 | 0.0040  |
| 20600                  | 844.0           | 4.35            | 10                    | -2.60                | -0.0031 |
| 20600                  | 844.0           | 4.35            | 20                    | 4.91                 | 0.0058  |
| 20600                  | 844.0           | 4.35            | 30                    | 4.41                 | 0.0052  |
| 20600                  | 844.0           | 4.35            | 40                    | -5.32                | -0.0063 |
| 20600                  | 844.0           | 4.35            | 50                    | -2.39                | -0.0028 |

## APPENDIX 5C – LTE Band 5 RADIATED EMISSIONS TEST DATA



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 5C</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### Radiated Power Test Data Results

The following measurements were performed by Shiva Kumbham.

Date of Test: February 23, 2015

The environmental tests conditions were: Temperature: 26.4 °C  
Relative Humidity: 2.5 %

The BlackBerry® smartphone was standalone horizontal up and top of the device pointing to the RX antenna when the turntable is at 0 degree position.

Measurements were performed with QPSK and 16QAM modulations. The smallest test margins are reported below.

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

#### LTE band 5, 5MHz BW, RB=1, QPSK modulation

|      |       |                 |      |            |      |                   |                  | Substitution Method |               |                                        |      |             |                    |
|------|-------|-----------------|------|------------|------|-------------------|------------------|---------------------|---------------|----------------------------------------|------|-------------|--------------------|
| EUT  |       |                 |      | Rx Antenna |      | Spectrum Analyzer |                  | Tracking Generator  |               |                                        |      |             |                    |
| Type | Ch    | Frequency (MHz) | Band | Type       | Pol. | Reading (dBuV)    | Max (V,H) (dBuV) | Pol. Tx-Rx          | Reading (dBm) | Corrected Reading (relative to Dipole) |      | Limit (dBm) | Diff to Limit (dB) |
| F0   | 20425 | 826.50          | 5    | Dipole     | V    | -40.80            | -30.76           | V-V                 | 4.33          | 22.14                                  | 0.16 | 38.50       | 16.36              |
| F0   | 20425 | 826.50          | 5    | Dipole     | H    | -30.76            |                  | H-H                 | 2.73          |                                        |      |             |                    |
| F0   | 20525 | 836.50          | 5    | Dipole     | V    | -39.50            | -29.53           | V-V                 | 6.23          | <b>23.92</b>                           | 0.25 | 38.50       | 14.58              |
| F0   | 20525 | 836.50          | 5    | Dipole     | H    | -29.53            |                  | H-H                 | 4.16          |                                        |      |             |                    |
| F0   | 20624 | 846.40          | 5    | Dipole     | V    | -41.47            | -31.06           | V-V                 | 5.96          | 23.71                                  | 0.23 | 38.50       | 14.79              |
| F0   | 20624 | 846.40          | 5    | Dipole     | H    | -31.06            |                  | H-H                 | 2.70          |                                        |      |             |                    |

#### LTE band 5, 10MHz BW, RB=1, 16-QAM modulation

|      |       |                 |      |            |      |                   |                  | Substitution Method |               |                                        |      |             |                    |
|------|-------|-----------------|------|------------|------|-------------------|------------------|---------------------|---------------|----------------------------------------|------|-------------|--------------------|
| EUT  |       |                 |      | Rx Antenna |      | Spectrum Analyzer |                  | Tracking Generator  |               |                                        |      |             |                    |
| Type | Ch    | Frequency (MHz) | Band | Type       | Pol. | Reading (dBuV)    | Max (V,H) (dBuV) | Pol. Tx-Rx          | Reading (dBm) | Corrected Reading (relative to Dipole) |      | Limit (dBm) | Diff to Limit (dB) |
| F0   | 20500 | 834.00          | 5    | Dipole     | V    | -41.46            | -31.57           | V-V                 | 4.76          | <b>22.57</b>                           | 0.18 | 38.50       | 15.93              |
| F0   | 20500 | 834.00          | 5    | Dipole     | H    | -31.57            |                  | H-H                 | 2.22          |                                        |      |             |                    |
| F0   | 20525 | 836.50          | 5    | Dipole     | V    | -40.73            | -31.00           | V-V                 | 4.71          | 22.40                                  | 0.17 | 38.50       | 16.10              |
| F0   | 20525 | 836.50          | 5    | Dipole     | H    | -31.00            |                  | H-H                 | 2.59          |                                        |      |             |                    |
| F0   | 20549 | 838.90          | 5    | Dipole     | V    | -41.04            | -31.28           | V-V                 | 4.57          | 22.32                                  | 0.17 | 38.50       | 16.18              |
| F0   | 20549 | 838.90          | 5    | Dipole     | H    | -31.28            |                  | H-H                 | 2.16          |                                        |      |             |                    |

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Page 200 of 255



## APPENDIX 6A– LTE Band 13 CONDUCTED RF EMISSIONS TEST DATA/PLOTS



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 13 Conducted RF Emission Test Data cont'd

**The conducted spurious emissions** – As per 47 CFR 2.202, CFR 2.1046, CFR 27.53 CFR 27.54, CFR 27.50 were measured from 30 MHz to 20 GHz.

#### **–26 dBc Bandwidth and Occupied Bandwidth (99%)**

the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth for each 5MHz and 10MHz with different number of RBs for LTE Band 13.

QPSK and 16-QAM modulations were applied to each of the bandwidths. Only the worst case measurements are documented in this report.

A minimum RB condition was also measured (RB = 1).

The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.

The worst case –26dBc bandwidth for LTE Band 13 was measured to be 9.25 MHz. Results were derived in a 100 kHz resolution bandwidth.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

#### **Test Data for LTE Band 13 selected Frequencies in 10MHz BW (RB = 50)**

| <b>LTE Band 13<br/>Frequency (MHz)</b> | <b>26dBc Occupied Bandwidth<br/>(MHz)</b> | <b>99% Occupied Bandwidth<br/>(MHz)</b> |
|----------------------------------------|-------------------------------------------|-----------------------------------------|
| <b>782.0</b>                           | <b>9.25</b>                               | <b>8.942</b>                            |

#### **Test Data for LTE Band 13 selected Frequencies in 5MHz BW (RB = 25)**

| <b>LTE Band 13<br/>Frequency (MHz)</b> | <b>26dBc Occupied Bandwidth<br/>(MHz)</b> | <b>99% Occupied Bandwidth<br/>(MHz)</b> |
|----------------------------------------|-------------------------------------------|-----------------------------------------|
| <b>779.5</b>                           | <b>4.66</b>                               | <b>4.495</b>                            |
| <b>782.0</b>                           | <b>4.62</b>                               | <b>4.495</b>                            |
| <b>784.5</b>                           | <b>4.625</b>                              | <b>4.495</b>                            |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### **Peak to Average Ratio (PAR)**

For each 5MHz and 10MHz with different number of RBs as per scalable bandwidths for LTE band 13, the peak to average ratio was measured on the low, middle and high channels with QPSK modulation.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

The worst case measured was 9.51 dB on 10MHz bandwidth with 25 RBs while transmitting at 782MHz.

### **Measurement Plots for LTE Band 13**

See Figures 3-1a to 3-8a for the plots of the conducted spurious emissions.

See Figures 3-9a to 3-16a for the plots of 99% Occupied Bandwidth and -26 dBc Bandwidth.

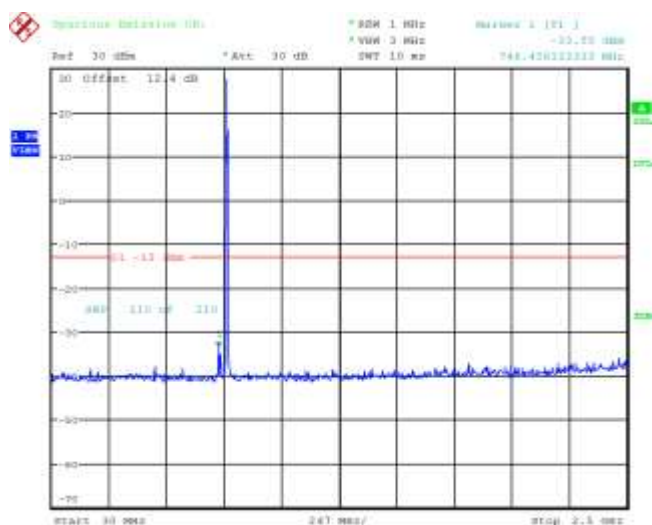
See Figures 3-17a to 3-21a for the plots of the Channel mask.

See Figures 3-22a for the plots of the Peak to Average Ratio.

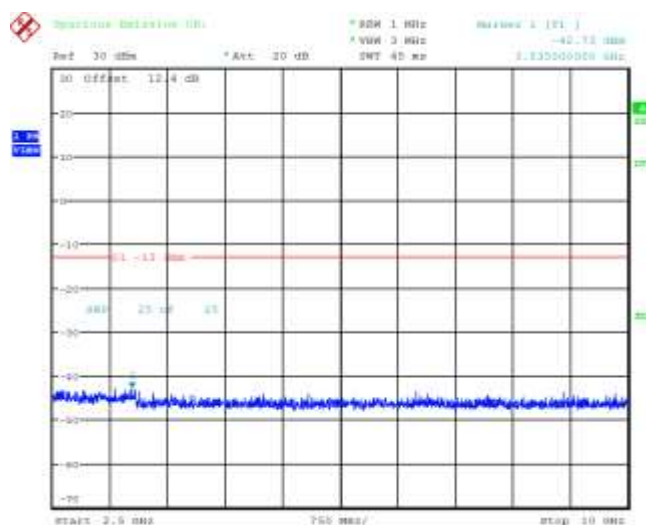
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 13 Conducted RF Emission Test Data cont'd

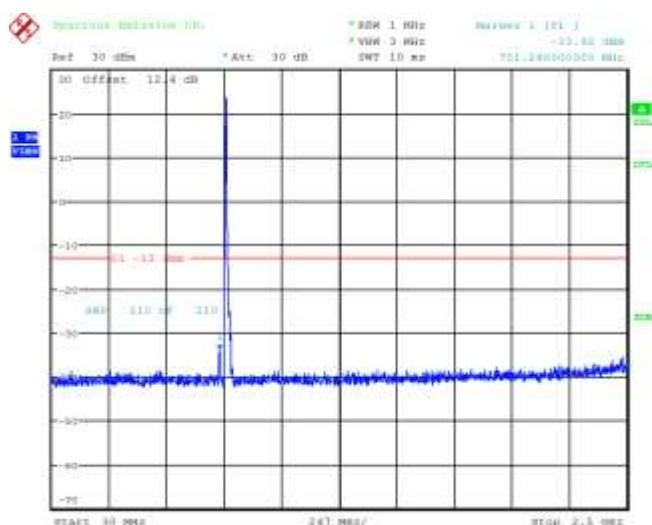
**Figure 3-1a: Band 13, Spurious Conducted Emissions, 10MHz BW (RB= 50)**



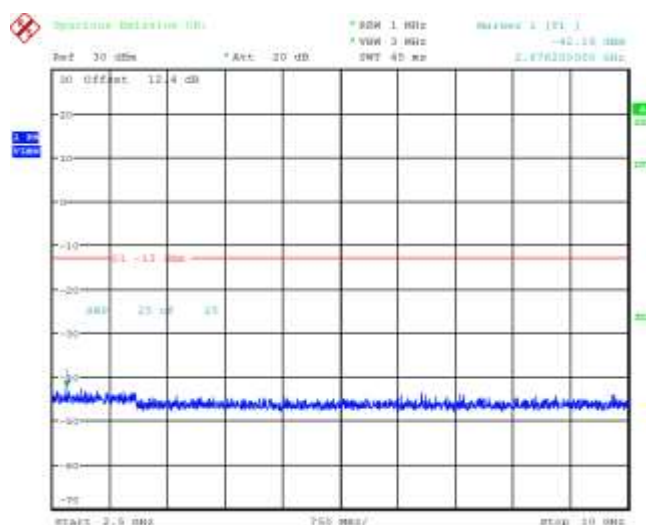
**Figure 3-2a: Band 13, Spurious Conducted Emissions, 10MHz BW (RB= 50)**



**Figure 3-3a: Band 13, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 25)**



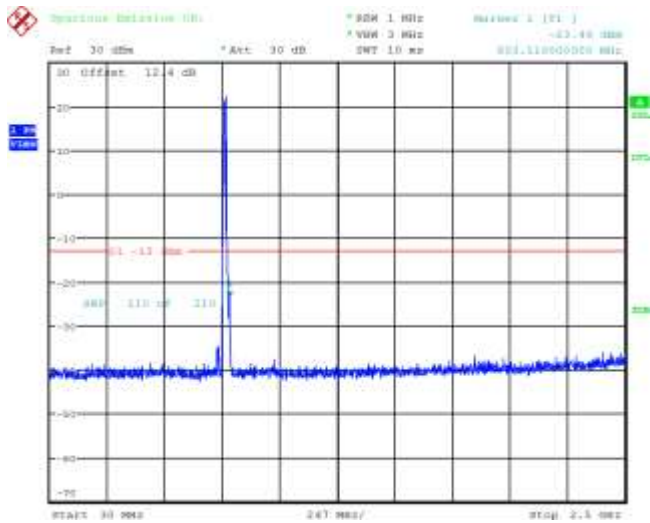
**Figure 3-4a: Band 13, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 25)**



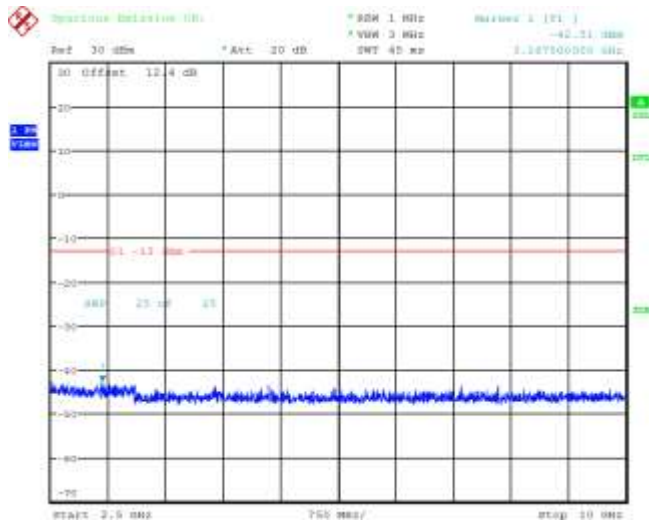
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

LTE Band 13 Conducted RF Emission Test Data cont'd

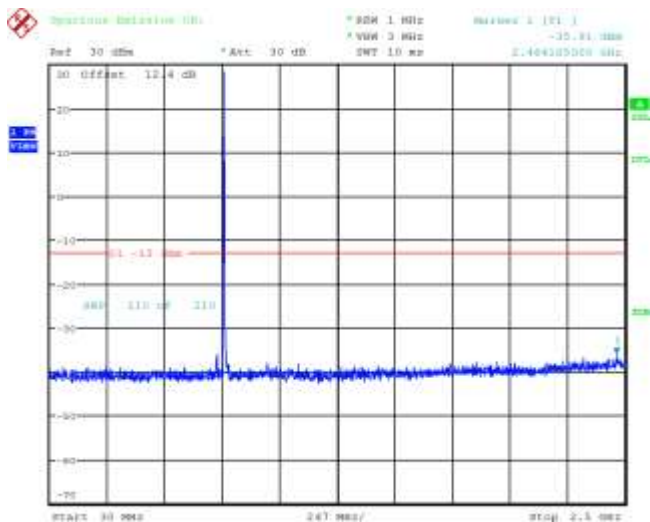
**Figure 3-5a: Band 13, Spurious Conducted Emissions, Middle Channel, 5MHz BW (RB= 25)**



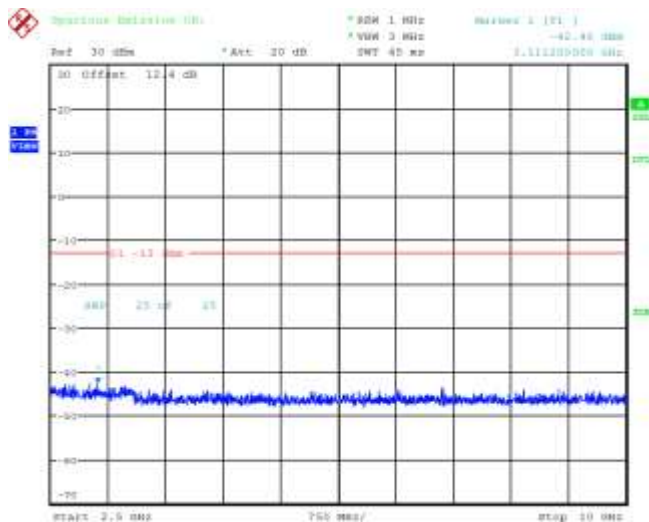
**Figure 3-6a: Band 13, Spurious Conducted Emissions, High Channel, 5MHz BW (RB= 25)**



**Figure 3-7a: Band 13, Spurious Conducted Emissions, High channel, 5MHz BW (RB= 25)**



**Figure 3-8a: Band 13, Spurious Conducted Emissions, High channel, 5MHz BW (RB= 25)**

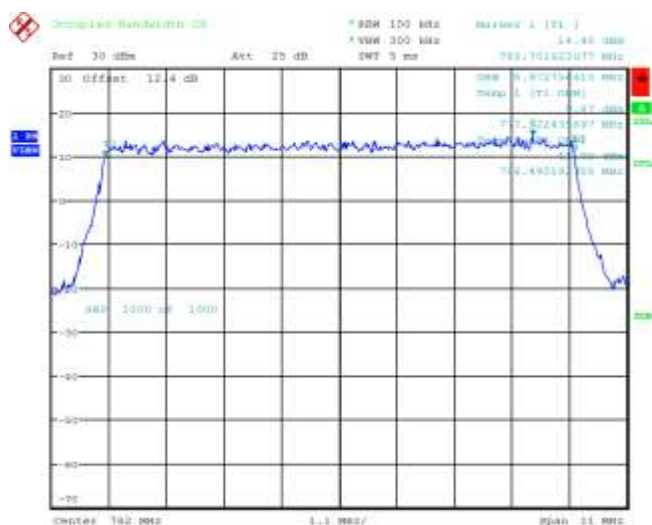




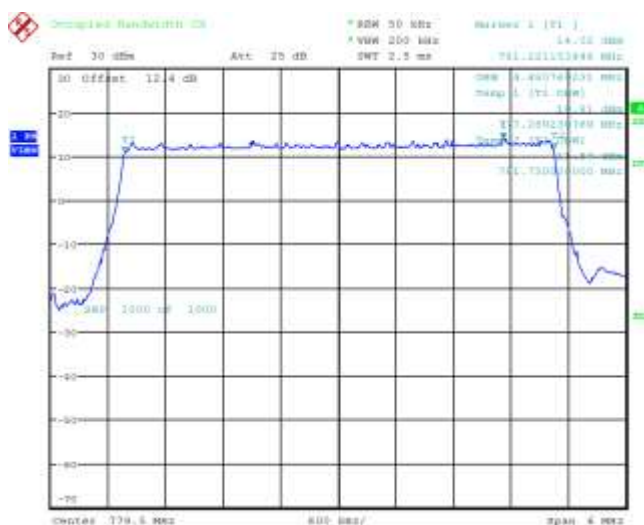
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 13 Conducted RF Emission Test Data cont'd

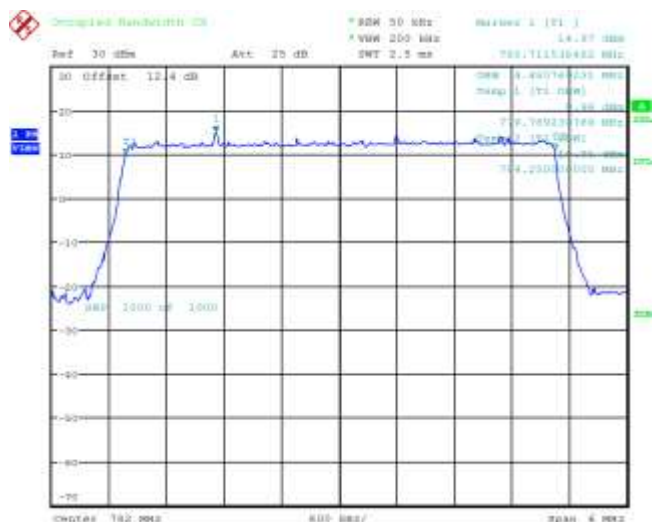
**Figure 3-9a: Occupied Bandwidth, Band 13  
10MHz BW, RB=50**



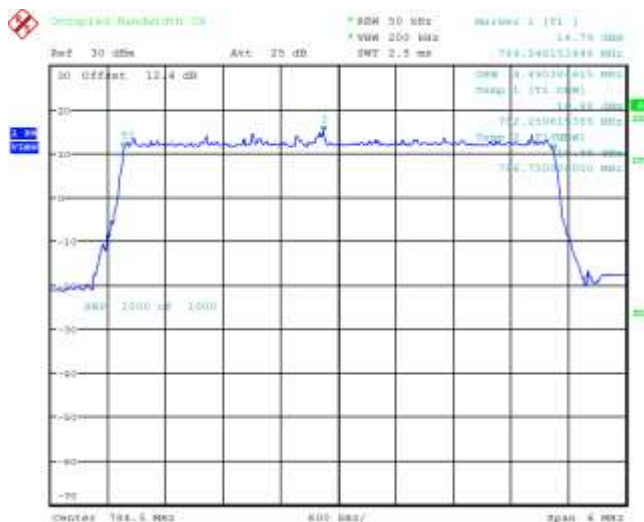
**Figure 3-10a: Occupied Bandwidth, Band 5 Low  
Channel, 5MHz BW, RB=25**



**Figure 3-11a: Occupied Bandwidth, Band 5 Middle  
Channel, 5MHz BW, RB=25**



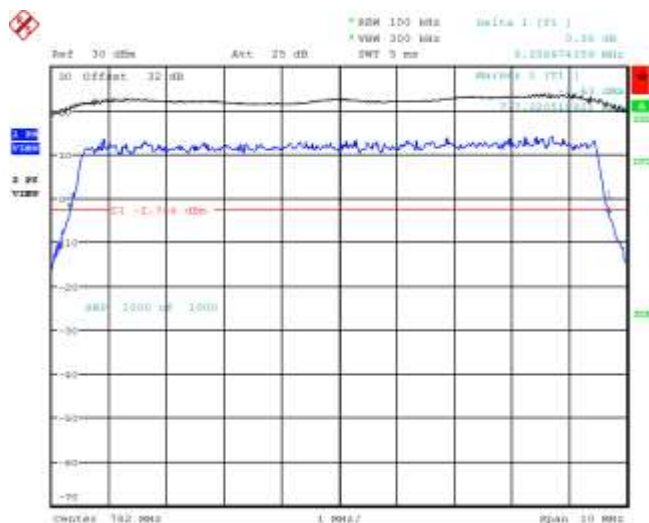
**Figure 3-12a: Occupied Bandwidth, Band 5 High  
Channel, 5MHz BW, RB=25**



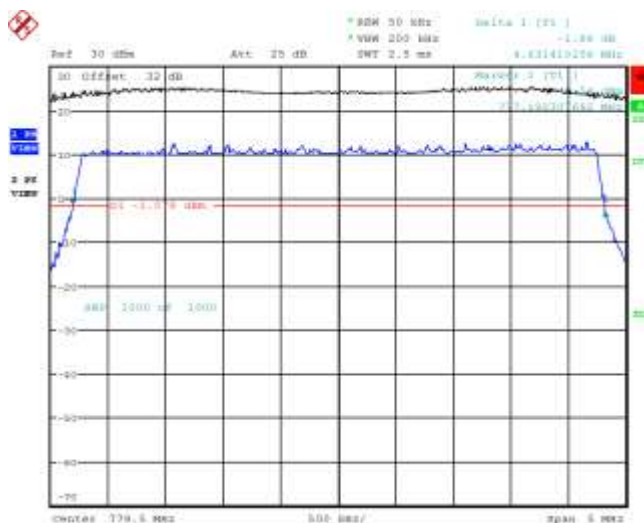
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 13 Conducted RF Emission Test Data cont'd

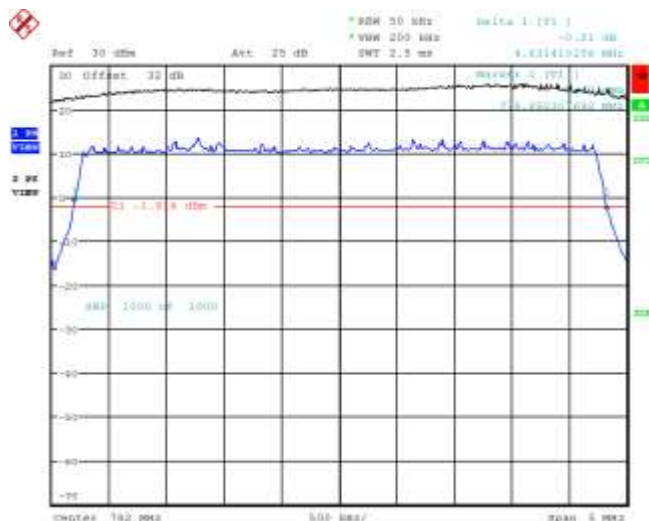
**Figure 3-13a: -26 dBc Bandwidth, Band 13 Middle Channel, 10MHz BW, RB=50**



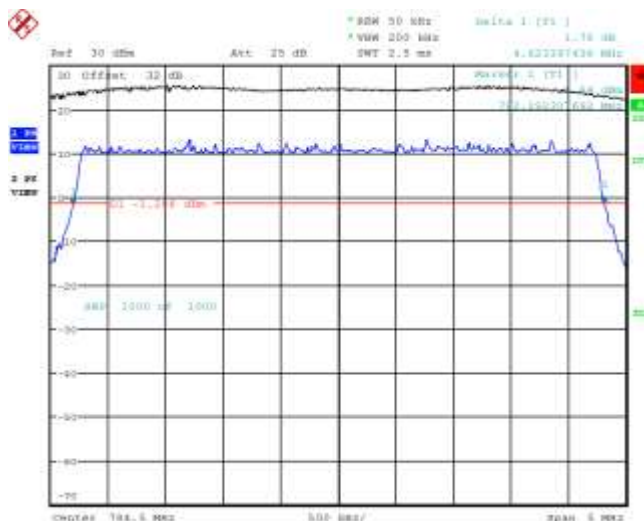
**Figure 3-14a: -26 dBc Bandwidth, Band 13 Low Channel, 5MHz BW, RB=25**



**Figure 3-15a: -26 dBc Bandwidth, Band 13 Middle Channel, 5MHz BW, RB=25**



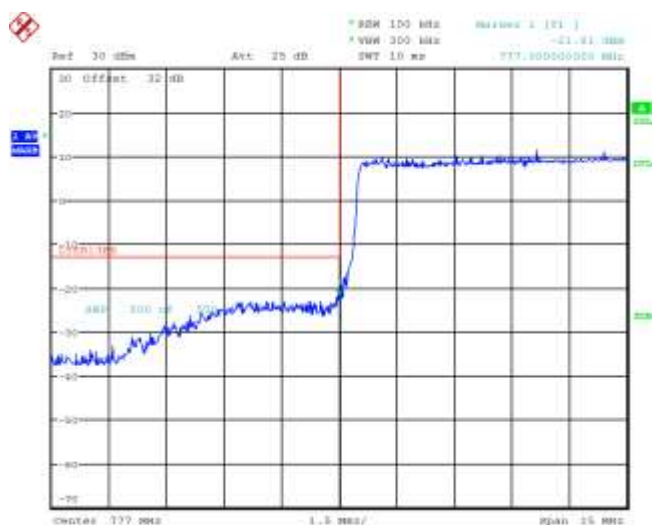
**Figure 3-16a: -26 dBc Bandwidth, Band 13 High Channel, 5MHz BW, RB=25**



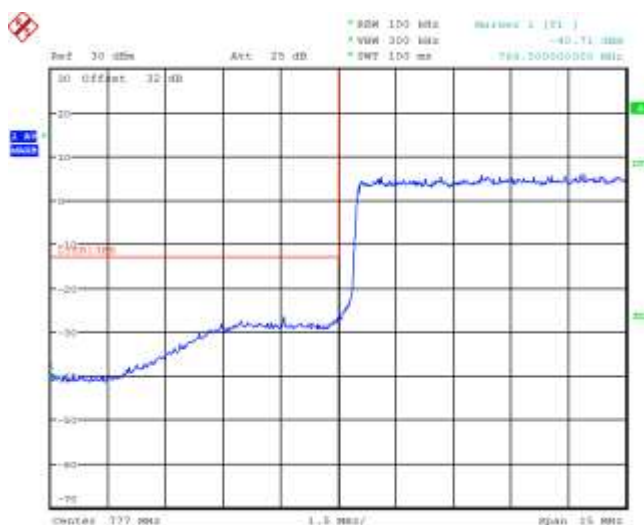
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 13 Conducted RF Emission Test Data cont'd

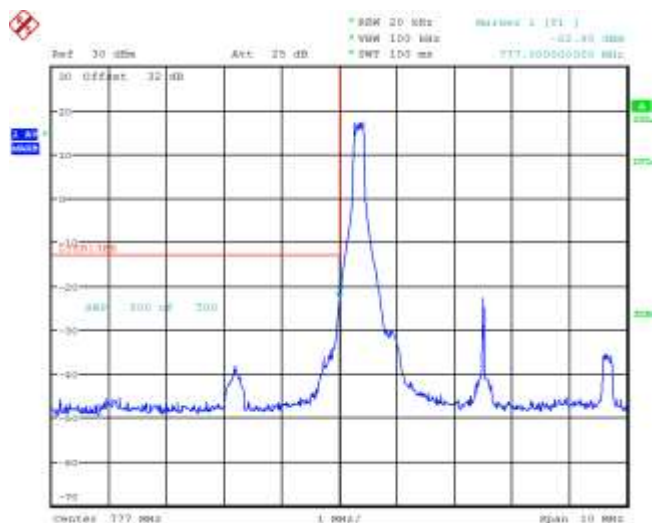
**Figure 3-17a: Band 13 Channel Mask, 10MHz BW, RB=50**



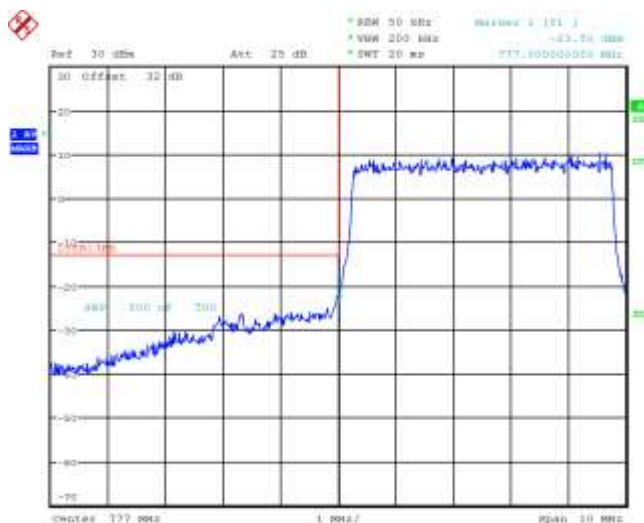
**Figure 3-17a: Band 13 Channel Mask, 10MHz BW, RB=50**



**Figure 3-18a: Band 13 Low Channel Mask, 5MHz BW, RB=1**



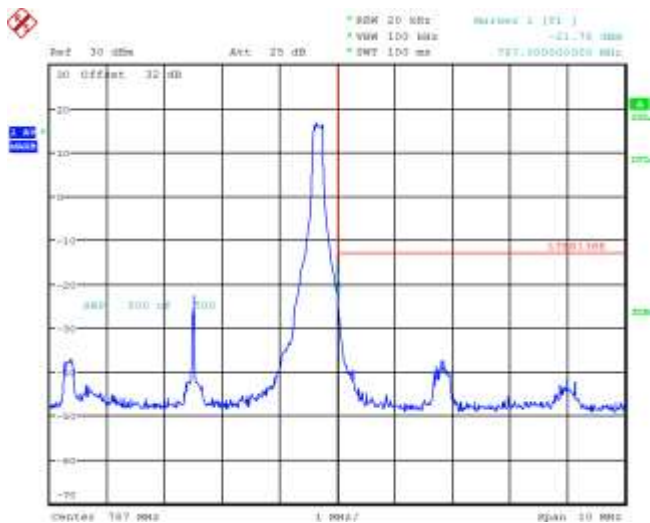
**Figure 3-19a: Band 13 Low Channel Mask, 5MHz BW, RB=25**



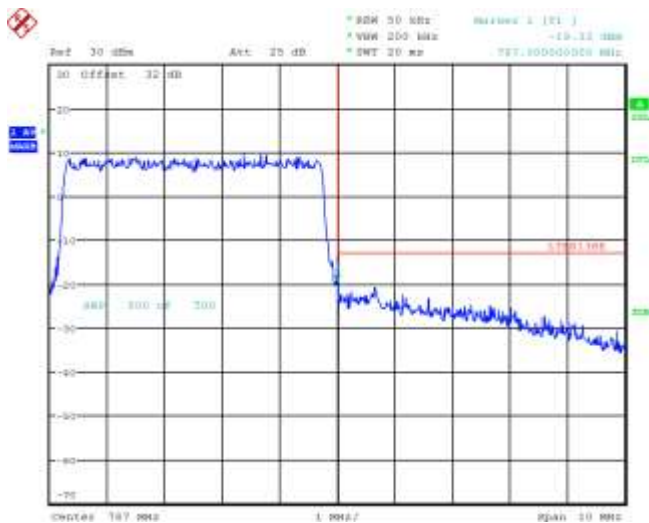
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

# LTE Band 13 Conducted RF Emission Test Data cont'd

**Figure 3-20a: Band 13 High Channel Mask, 5MHz BW, RB=1**



**Figure 3-21a: Band 13 High Channel Mask, 5MHz BW, RB=25**



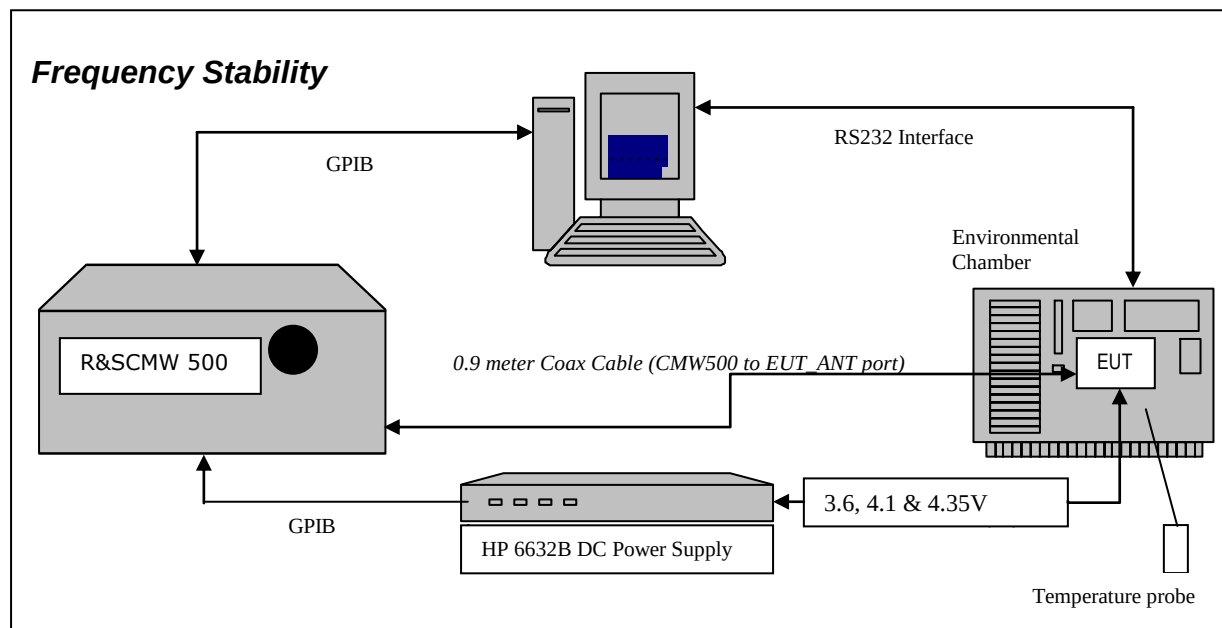
**Figure 3-22a: Band 13 PAR, 10MHz BW, RB=25**



## APPENDIX 6B – LTE Band 13 FREQUENCY STABILITY TEST DATA

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 13 Frequency Stability Test Data



The following measurements were performed by Sijia Li.

## **CFR 47 Chapter 1 - Federal Communications Commission Rules**

### **Part 2 Required Measurements**

#### **2.1055** Frequency Stability - Procedures

(a,b) Frequency Stability - Temperature Variation

(d) Frequency Stability - Voltage Variation

*The EUT meets the requirements as stated in CFR 47 chapter 1, Section 27.54, Frequency Stability.*

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMW 500 and the EUT antenna port.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## Test Setup:

The EUT was placed in the Temperature chamber and connected to CMW 500 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.

The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMW 500 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was measured on 782MHz for 10MHz bandwidth with maximum (50) RB. The transmit frequency was varied in 3 steps consisting of 779.5 MHz, 782.0 MHz and 784.5 MHz each was measured under 5 MHz bandwidth with maximum (25) RBs. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.

After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Procedure for FCC:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

1. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMW 500 Radio Communication Tester.
6. Command the CMW 500 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. The CMW 500 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
11. Repeat steps 5 to 10 changing the supply voltage to 4.1 Volts
12. Increase temperature by 10°C and soak for 1/2 hour.
13. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
14. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

The maximum frequency error in the LTE Band 13 measured was **0.0093 PPM**.



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Date of test: Feb 17, 2015

**LTE Band 13 results (10MHz Bandwidth): channels 23205, 23230 and 23255 @ 20°C  
maximum transmitted power**

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|---------------------|-----------------|-----------------------|----------------------|---------|
| 23205                  | 779.50              | 3.6             | 20                    | 4.75                 | 0.0061  |
| 23230                  | 782.00              | 3.6             | 20                    | -3.33                | -0.0043 |
| 23255                  | 784.50              | 3.6             | 20                    | 5.55                 | 0.0071  |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 23205                  | 779.50              | 4.1             | 20                    | 3.88                 | 0.0050 |
| 23230                  | 782.00              | 4.1             | 20                    | 4.52                 | 0.0058 |
| 23255                  | 784.50              | 4.1             | 20                    | 3.69                 | 0.0047 |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 23205                  | 779.50              | 4.35            | 20                    | 4.39                 | 0.0056 |
| 23230                  | 782.00              | 4.35            | 20                    | 4.39                 | 0.0056 |
| 23255                  | 784.50              | 4.35            | 20                    | 5.38                 | 0.0069 |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE Band 13 Results (10MHz Bandwidth): channel 23205 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23205                  | 779.50          | 3.6             | -30                   | -3.65                | -0.0047 |
| 23205                  | 779.50          | 3.6             | -20                   | 4.73                 | 0.0061  |
| 23205                  | 779.50          | 3.6             | -10                   | 4.84                 | 0.0062  |
| 23205                  | 779.50          | 3.6             | 0                     | 3.26                 | 0.0042  |
| 23205                  | 779.50          | 3.6             | 10                    | 4.48                 | 0.0057  |
| 23205                  | 779.50          | 3.6             | 20                    | 4.75                 | 0.0061  |
| 23205                  | 779.50          | 3.6             | 30                    | 4.51                 | 0.0058  |
| 23205                  | 779.50          | 3.6             | 40                    | -5.55                | -0.0071 |
| 23205                  | 779.50          | 3.6             | 50                    | 4.88                 | 0.0063  |
| 23205                  | 779.50          | 3.6             | 60                    | -4.53                | -0.0058 |

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23205                  | 779.50          | 4.1             | -30                   | 5.08                 | 0.0065  |
| 23205                  | 779.50          | 4.1             | -20                   | 4.59                 | 0.0059  |
| 23205                  | 779.50          | 4.1             | -10                   | 4.55                 | 0.0058  |
| 23205                  | 779.50          | 4.1             | 0                     | 3.66                 | 0.0047  |
| 23205                  | 779.50          | 4.1             | 10                    | 5.36                 | 0.0069  |
| 23205                  | 779.50          | 4.1             | 20                    | 3.88                 | 0.0050  |
| 23205                  | 779.50          | 4.1             | 30                    | 4.51                 | 0.0058  |
| 23205                  | 779.50          | 4.1             | 40                    | -5.64                | -0.0072 |
| 23205                  | 779.50          | 4.1             | 50                    | -4.95                | -0.0064 |
| 23205                  | 779.50          | 4.1             | 60                    | -3.65                | -0.0047 |

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23205                  | 779.50          | 4.35            | -30                   | 4.11                 | 0.0053  |
| 23205                  | 779.50          | 4.35            | -20                   | -4.06                | -0.0052 |
| 23205                  | 779.50          | 4.35            | -10                   | 5.72                 | 0.0073  |
| 23205                  | 779.50          | 4.35            | 0                     | 4.99                 | 0.0064  |
| 23205                  | 779.50          | 4.35            | 10                    | 3.60                 | 0.0046  |
| 23205                  | 779.50          | 4.35            | 20                    | 4.39                 | 0.0056  |
| 23205                  | 779.50          | 4.35            | 30                    | 4.65                 | 0.0060  |
| 23205                  | 779.50          | 4.35            | 40                    | -5.34                | -0.0069 |
| 23205                  | 779.50          | 4.35            | 50                    | -3.56                | -0.0046 |
| 23205                  | 779.50          | 4.35            | 60                    | -4.11                | -0.0053 |

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE Band 13 Results(5MHz Bandwidth): channel 23230 @ maximum transmitted power  
(cont'd)**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23230                  | 782.00          | 3.6             | -30                   | -5.09                | -0.0065 |
| 23230                  | 782.00          | 3.6             | -20                   | -3.92                | -0.0050 |
| 23230                  | 782.00          | 3.6             | -10                   | 4.29                 | 0.0055  |
| 23230                  | 782.00          | 3.6             | 0                     | 3.76                 | 0.0048  |
| 23230                  | 782.00          | 3.6             | 10                    | -4.41                | -0.0056 |
| 23230                  | 782.00          | 3.6             | 20                    | -3.33                | -0.0043 |
| 23230                  | 782.00          | 3.6             | 30                    | 3.93                 | 0.0050  |
| 23230                  | 782.00          | 3.6             | 40                    | -4.42                | -0.0057 |
| 23230                  | 782.00          | 3.6             | 50                    | -5.99                | -0.0077 |
| 23230                  | 782.00          | 3.6             | 60                    | -3.16                | -0.0040 |

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23230                  | 782.00          | 4.1             | -30                   | -4.84                | -0.0062 |
| 23230                  | 782.00          | 4.1             | -20                   | -5.78                | -0.0074 |
| 23230                  | 782.00          | 4.1             | -10                   | -5.35                | -0.0068 |
| 23230                  | 782.00          | 4.1             | 0                     | 3.33                 | 0.0043  |
| 23230                  | 782.00          | 4.1             | 10                    | 5.71                 | 0.0073  |
| 23230                  | 782.00          | 4.1             | 20                    | 4.52                 | 0.0058  |
| 23230                  | 782.00          | 4.1             | 30                    | -4.51                | -0.0058 |
| 23230                  | 782.00          | 4.1             | 40                    | -4.66                | -0.0060 |
| 23230                  | 782.00          | 4.1             | 50                    | 5.69                 | 0.0073  |
| 23230                  | 782.00          | 4.1             | 60                    | -3.30                | -0.0042 |

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23230                  | 782.00          | 4.35            | -30                   | -4.33                | -0.0055 |
| 23230                  | 782.00          | 4.35            | -20                   | -3.92                | -0.0050 |
| 23230                  | 782.00          | 4.35            | -10                   | -4.22                | -0.0054 |
| 23230                  | 782.00          | 4.35            | 0                     | -3.53                | -0.0045 |
| 23230                  | 782.00          | 4.35            | 10                    | -3.62                | -0.0046 |
| 23230                  | 782.00          | 4.35            | 20                    | 4.39                 | 0.0056  |
| 23230                  | 782.00          | 4.35            | 30                    | 5.92                 | 0.0076  |
| 23230                  | 782.00          | 4.35            | 40                    | -3.69                | -0.0047 |
| 23230                  | 782.00          | 4.35            | 50                    | 5.19                 | 0.0066  |
| 23230                  | 782.00          | 4.35            | 60                    | -3.29                | -0.0042 |

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|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE Band 13 Results(5MHz Bandwidth): channel 23255 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23255                  | 784.50          | 3.6             | -30                   | -3.82                | -0.0049 |
| 23255                  | 784.50          | 3.6             | -20                   | 3.68                 | 0.0047  |
| 23255                  | 784.50          | 3.6             | -10                   | 5.38                 | 0.0069  |
| 23255                  | 784.50          | 3.6             | 0                     | 3.96                 | 0.0050  |
| 23255                  | 784.50          | 3.6             | 10                    | 4.99                 | 0.0064  |
| 23255                  | 784.50          | 3.6             | 20                    | 5.55                 | 0.0071  |
| 23255                  | 784.50          | 3.6             | 30                    | 4.42                 | 0.0056  |
| 23255                  | 784.50          | 3.6             | 40                    | -4.63                | -0.0059 |
| 23255                  | 784.50          | 3.6             | 50                    | -4.28                | -0.0055 |
| 23255                  | 784.50          | 3.6             | 60                    | 4.12                 | 0.0053  |

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------------|
| 23255                  | 784.50          | 4.1             | -30                   | 4.94                 | 0.0063        |
| 23255                  | 784.50          | 4.1             | -20                   | -4.91                | -0.0063       |
| 23255                  | 784.50          | 4.1             | -10                   | 4.72                 | 0.0060        |
| 23255                  | 784.50          | 4.1             | 0                     | 7.28                 | <b>0.0093</b> |
| 23255                  | 784.50          | 4.1             | 10                    | 4.01                 | 0.0051        |
| 23255                  | 784.50          | 4.1             | 20                    | 3.69                 | 0.0047        |
| 23255                  | 784.50          | 4.1             | 30                    | 5.35                 | 0.0068        |
| 23255                  | 784.50          | 4.1             | 40                    | 3.95                 | 0.0050        |
| 23255                  | 784.50          | 4.1             | 50                    | 4.26                 | 0.0054        |
| 23255                  | 784.50          | 4.1             | 60                    | -2.92                | -0.0037       |

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23255                  | 784.50          | 4.35            | -30                   | 3.91                 | 0.0050  |
| 23255                  | 784.50          | 4.35            | -20                   | 6.79                 | 0.0087  |
| 23255                  | 784.50          | 4.35            | -10                   | 6.64                 | 0.0085  |
| 23255                  | 784.50          | 4.35            | 0                     | 3.85                 | 0.0049  |
| 23255                  | 784.50          | 4.35            | 10                    | 3.93                 | 0.0050  |
| 23255                  | 784.50          | 4.35            | 20                    | 5.38                 | 0.0069  |
| 23255                  | 784.50          | 4.35            | 30                    | 3.48                 | 0.0044  |
| 23255                  | 784.50          | 4.35            | 40                    | -2.99                | -0.0038 |
| 23255                  | 784.50          | 4.35            | 50                    | 3.85                 | 0.0049  |
| 23255                  | 784.50          | 4.35            | 60                    | -4.01                | -0.0051 |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

#### Procedure for IC:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

1. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –20°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMW 500 Radio Communication Tester.
6. Command the CMW 500 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. Using a resolution bandwidth equal to that permitted within the 1MHz band immediately outside the channel edge, reference points will be selected at the unwanted emission levels which comply with the attenuation  $40 + 10 \log_{10} p$ , for the type of device under test, on the emission mask of the lowest and highest channels, and the frequency at these points shall be recorded as fL and fH respectively.
11. The frequency stability is calculated by fL minus the frequency offset (frequency error measured in step 9) and fH plus the frequency offset shall be within the frequency range that the equipment is designed to operate (2.5 to 2.57 GHz).
12. The CMW 500 commands the EUT to change frequency to the high channel and repeats steps 7 to 11.
13. Repeat steps 5 to 12 changing the supply voltage to 4.1 Volts
14. Increase temperature to 20 and 50°C and soak for 1/2 hour.
15. Repeat steps 4 - 14 for temperatures –20°C to 50°C.
16. Repeat steps 5 to 15 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Date of test: March 18, 2015.

IC RSS – 130, 4.3 LTE Band 13 Frequency Stability.

**LTE Band 13 10MHz Bandwidth results: channels 23205, & 23255 @ 20°C maximum transmitted power**

| Traffic Channel Number | LTE Band 13 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23205                  | 779.5                       | 3.6             | 20                    | -3.104               | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 3.6             | 20                    | 2.761                | N/A      | 786.688  | N/A                  | 786.688              |

| Traffic Channel Number | LTE Band 13 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23205                  | 779.5                       | 4.1             | 20                    | -3.033               | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 4.1             | 20                    | 3.777                | N/A      | 786.688  | N/A                  | 786.688              |

| Traffic Channel Number | LTE Band 13 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23205                  | 779.5                       | 4.35            | 20                    | -2.460               | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 4.35            | 20                    | 3.247                | N/A      | 786.688  | N/A                  | 786.688              |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE Band 13 10MHz Bandwidth results: channels 20850, & 21350 @ -20 and +50°C maximum transmitted power**

| Traffic Channel Number | LTE Band 13 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23205                  | 779.5                       | 3.6             | -20                   | -3.848               | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 3.6             | -20                   | -4.320               | N/A      | 786.688  | N/A                  | 786.687              |
| 23205                  | 779.5                       | 4.1             | -20                   | 4.148                | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 4.1             | -20                   | -2.890               | N/A      | 786.688  | N/A                  | 786.687              |
| 23205                  | 779.5                       | 4.35            | -20                   | -3.705               | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 4.35            | -20                   | 3.619                | N/A      | 786.688  | N/A                  | 786.688              |
| 23205                  | 779.5                       | 3.6             | 50                    | -2.847               | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 3.6             | 50                    | 2.160                | N/A      | 786.688  | N/A                  | 786.688              |
| 23205                  | 779.5                       | 4.1             | 50                    | 2.561                | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 4.1             | 50                    | -4.563               | N/A      | 786.688  | N/A                  | 786.687              |
| 23205                  | 779.5                       | 4.35            | 50                    | -3.333               | 777.264  | N/A      | 777.264              | N/A                  |
| 23255                  | 784.50                      | 4.35            | 50                    | -3.448               | N/A      | 786.688  | N/A                  | 786.687              |

## APPENDIX 6C – LTE Band 13 RADIATED EMISSIONS TEST DATA





|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6C</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### Radiated Emissions Test Data Results cont'd

The following measurements were performed by Shiva Kumbham.

Date of Test: February 20, 2015

The environmental test conditions were:    Temperature:            25.6 °C  
                                                                                  Relative Humidity:        2.8 %

The BlackBerry® smartphone was standalone, with horizontal pointing up and top facing the RX antenna when the turntable is at 0 degree position.

Test Distance was 3.0 meters with the RX antenna height scans between 3-4 meters height, and the frequency range scanned was 30MHz – 1GHz.

Measurements were performed in LTE band 13 with QPSK modulations for 5MHz BW (channel 23205, 23230 and 23254 with RB = 1).

Measurements were performed in LTE band 13 with QPSK modulations for 5MHz BW (channel 23205, 23230 and 23254 with RB = 25).

All emissions had test margins greater than 25.0 dB.

The following measurements were performed by Winston Vernon

Date of Test: February 12 and 20, 2015

The environmental test conditions were:    Temperature:            24.3 - 24.7 °C  
                                                                                  Relative Humidity:        13.7 - 14.5 %

Test Distance was 3.0 meters with the RX antenna height scans between 3-4 meters height, and a frequency range of 1 GHz to 10 GHz.

The BlackBerry® smartphone was standalone, horizontal up with top facing to the RX antenna when the turntable is at 0 degree position

Measurements were performed in LTE band 13 with QPSK modulations for 5MHz BW (channel 23205, 23230 and 23254 with RB = 1).

Measurements were performed in LTE band 13 with QPSK modulations for 5MHz BW (channel 23205, 23230 and 23254 with RB = 25).

All emissions had test margins greater than 25.0 dB.

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|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 6C</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

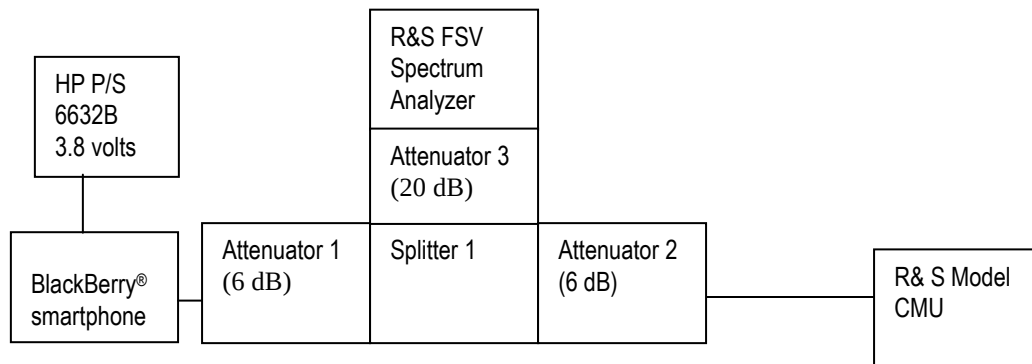
## APPENDIX 7A– LTE Band 17 CONDUCTED RF EMISSIONS TEST DATA/PLOTS

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 17 Conducted RF Emission Test Data

This appendix contains measurement data pertaining to conducted spurious emissions, 99% power bandwidth and the channel mask.

### Test Setup Diagram



A reference offset of 31.4 dB was applied to the spectrum analyzer reference level for the attenuators and coaxial cable loss in the test circuit.

| <u>UNIT</u>  | <u>MANUFACTURER</u> | <u>MODEL</u>  | <u>SERIAL NUMBER</u> |
|--------------|---------------------|---------------|----------------------|
| Attenuator 1 | Mini-Circuits       | BW-S6W2+      | 0647                 |
| Attenuator 2 | Mini-Circuits       | BW-S6W2+      | 0648                 |
| Attenuator 3 | Mini-Circuits       | BW-S20-2W263+ | 1234                 |
| Splitter 1   | Weinschel           | 1515          | MES 92               |

Date of Test: Feb 18, 2015.

The environmental test conditions were:    Temperature:        21.8 – 22.5°C  
                                                                                  Relative Humidity:    19 – 19.2 %

The following measurements were performed by Sijia Li.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 17 Conducted RF Emission Test Data cont'd

#### Emission Designator Table

| Frequency Range (MHz) | Conducted Output Power (dBm) | Emission Designator | Band    | Bandwidth (MHz) | Modulation |
|-----------------------|------------------------------|---------------------|---------|-----------------|------------|
| 706.5-713.5           | 23.22                        | 4M48G7D             | LTE B17 | 5               | QPSK       |
| 706.5-713.5           | 22.47                        | 4M47D7W             | LTE B17 | 5               | 16QAM      |
| 709-711               | 23.34                        | 8M95G7D             | LTE B17 | 10              | QPSK       |
| 709-711               | 22.80                        | 8M93D7W             | LTE B17 | 10              | 16QAM      |

**The conducted spurious emissions** – As per 47 CFR 2.202, CFR 2.1046, CFR 27.53 CFR 27.54, CFR 27.50, RSS-139 were measured from 30 MHz to 20 GHz.

#### **–26 dBc Bandwidth and Occupied Bandwidth (99%)**

the modulation spectrum was measured by both methods of 99% power bandwidth and –26 dBc bandwidth for each 5MHz and 10MHz with different number of RBs for LTE band 17. QPSK and 16-QAM modulations were applied to each of the bandwidths. Only the worst case measurements are documented in this report.

A minimum RB condition was also measured (RB = 1).

The resolution bandwidth required for out-of-band emissions in the 1 MHz bands immediately outside and adjacent to the frequency block, was determined to be at least 1% of the emission bandwidth.

The worst case –26dBc bandwidth for LTE band 17 was measured to be 9.28MHz. Results were derived in a 100 kHz resolution bandwidth.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### **Test Data for LTE Band 17 selected Frequencies in 10MHz BW (RB = 50)**

| LTE Band 17<br>Frequency (MHz) | 26dBc Occupied Bandwidth<br>(MHz) | 99% Occupied Bandwidth<br>(MHz) |              |
|--------------------------------|-----------------------------------|---------------------------------|--------------|
|                                | QPSK                              | QPSK                            | 16-QAM       |
| 709.0                          | 9.21                              | <b>8.966</b>                    | 8.942        |
| 710.0                          | 9.20                              | 8.942                           | 8.942        |
| 711.0                          | <b>9.28</b>                       | <b>8.966</b>                    | <b>8.966</b> |

#### **Peak to Average Ratio (PAR)**

For each 5MHz and 10MHz with different number of RBs as per scalable bandwidths for LTE band 17, the peak to average ratio was measured on the low, middle and high channels with QPSK modulation.

On any frequency outside the frequency block and outside the adjacent 1 MHz bands, a resolution bandwidth of at least 1 MHz was applied.

The worst case measured was 10.48 dB on in 10MHz bandwidth with 50 RBs.

#### **Measurement Plots for LTE Band 17**

See Figures 6-1a to 6-12a for the plots of the conducted spurious emissions.

See Figures 6-19a to 6-24a and 6-37a to 6-39a for the plots of 99% Occupied Bandwidth and -26 dBc Bandwidth.

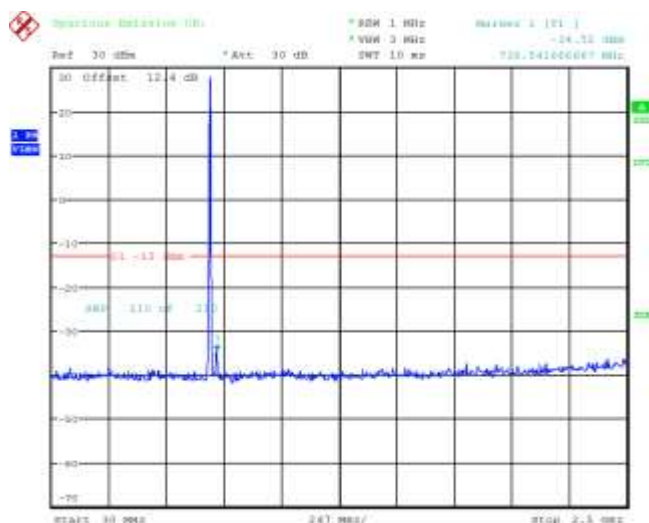
See Figures 6-25a to 6-32a for the plots of the Channel mask.

See Figures 6-33a to 6-36a for the plots of the Peak to Average Ratio.

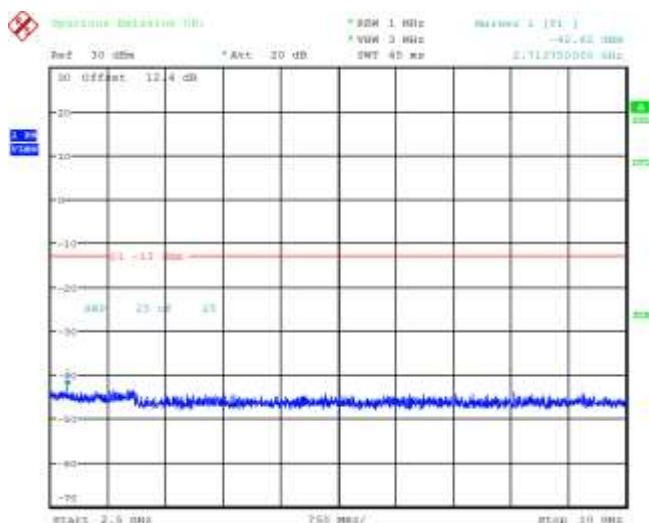
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

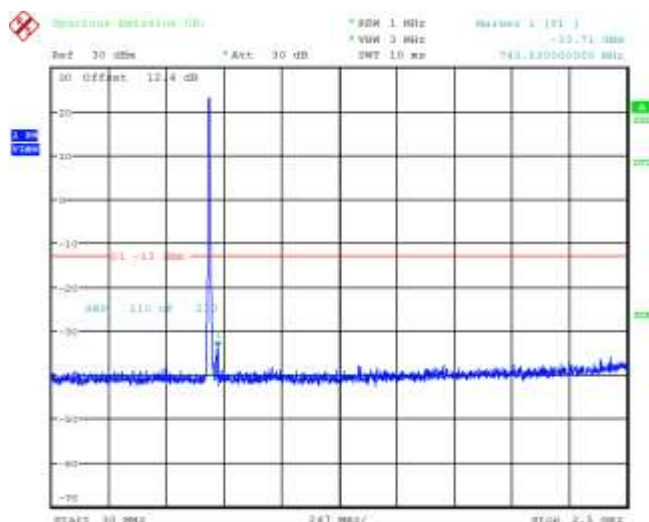
**Figure 6-1a: Band 17, Spurious Conducted Emissions, Low channel, 10MHz BW (RB= 1)**



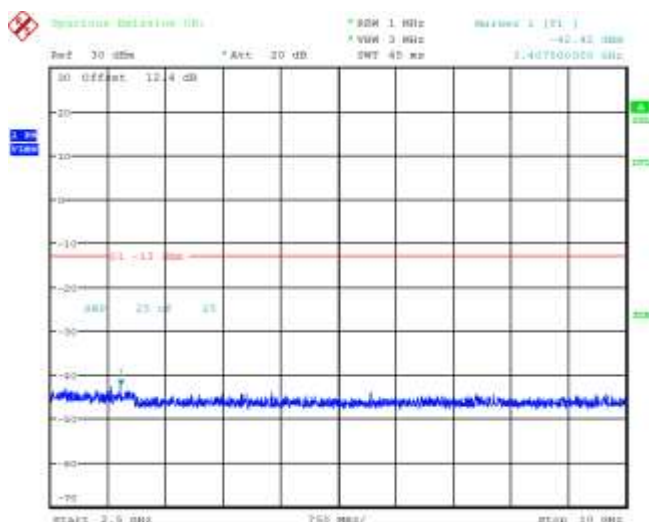
**Figure 6-2a: Band 17, Spurious Conducted Emissions, Low channel, 10MHz BW (RB= 1)**



**Figure 6-3a: Band 17, Spurious Conducted Emissions, Middle channel, 10MHz BW (RB= 25)**



**Figure 6-4a: Band 17, Spurious Conducted Emissions, Middle channel, 10MHz BW (RB= 25)**

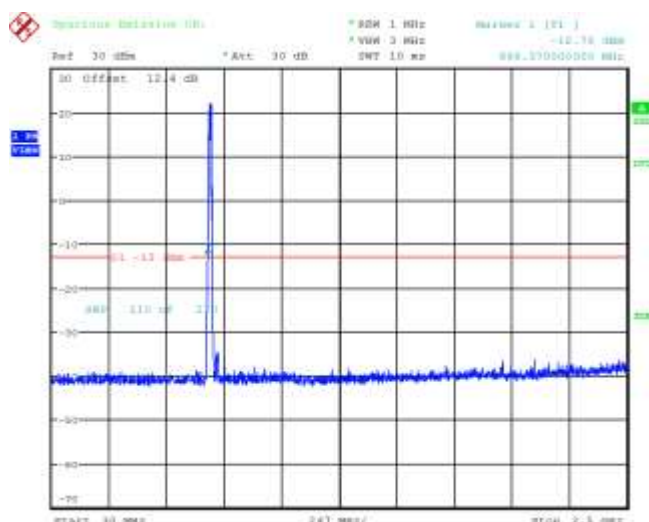




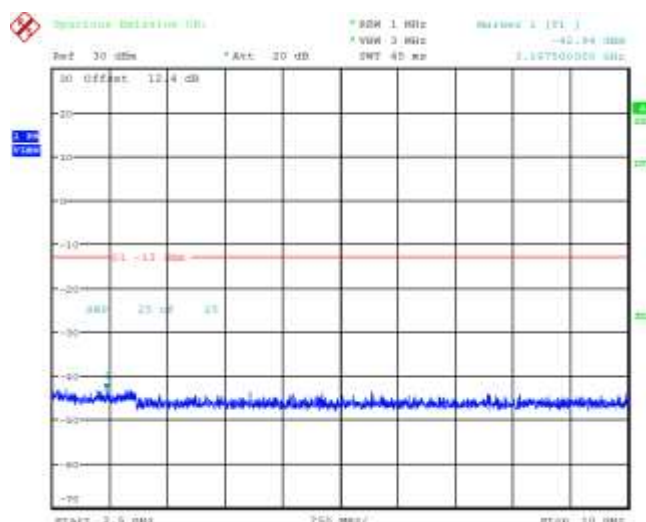
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

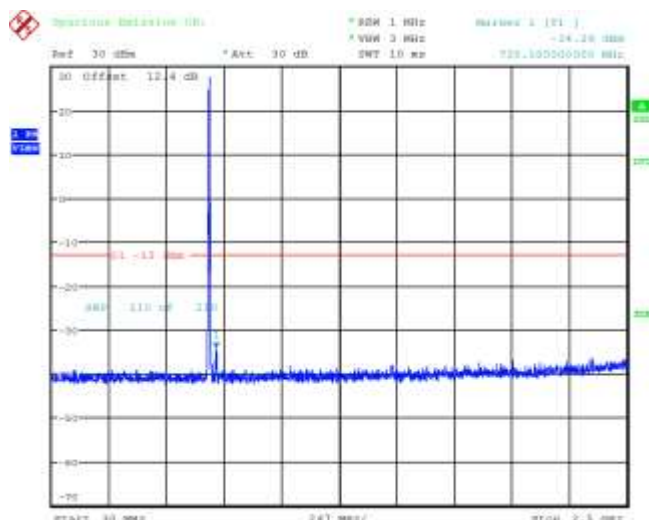
**Figure 6-5a: Band 17, Spurious Conducted Emissions, High Channel, 10MHz BW (RB= 50)**



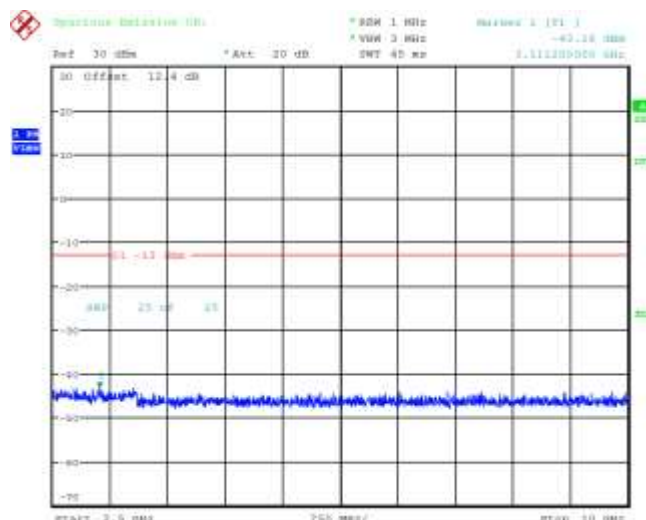
**Figure 6-6a: Band 17, Spurious Conducted Emissions, High Channel, 10MHz BW (RB= 50)**



**Figure 6-7a: Band 17, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 1)**



**Figure 6-8a: Band 17, Spurious Conducted Emissions, Low channel, 5MHz BW (RB= 1)**

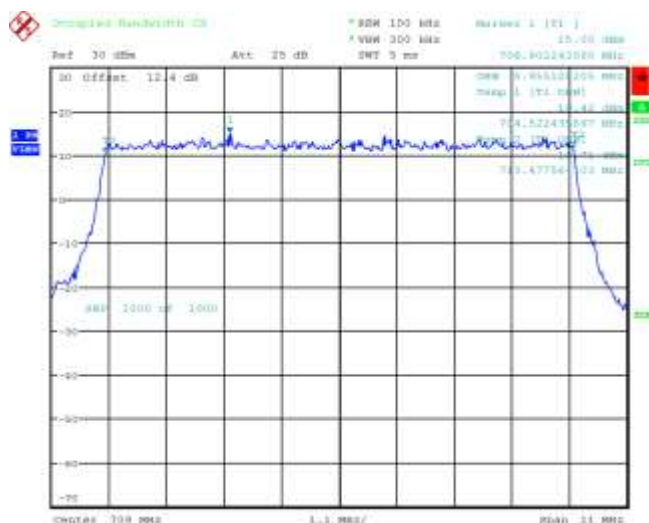




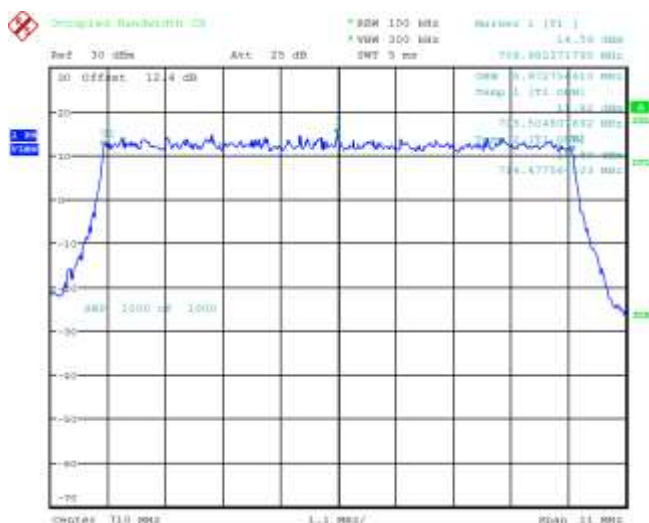
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

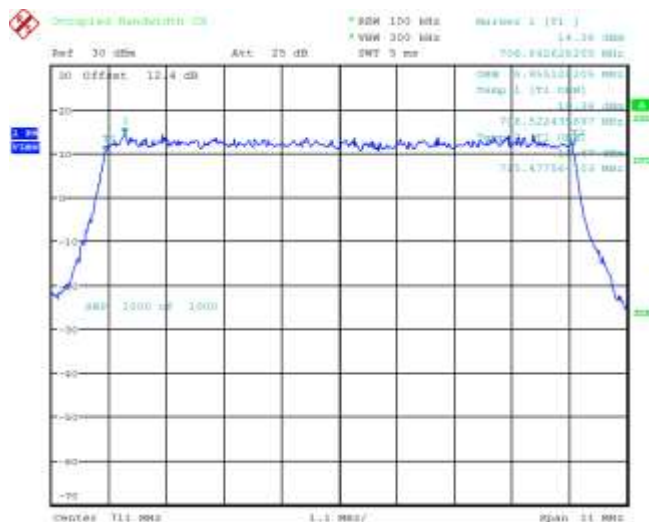
**Figure 6-13a: Occupied Bandwidth, Band 17 Low Channel, 10MHz BW, RB=50**



**Figure 6-14a: Occupied Bandwidth, Band 17 Middle Channel, 10MHz BW, RB=50**



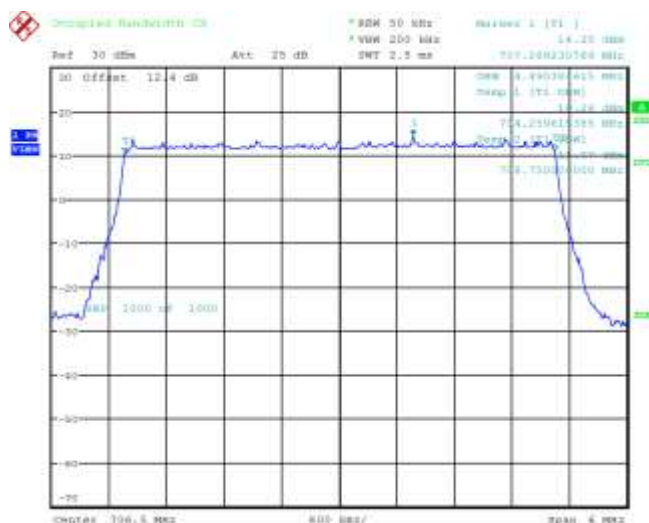
**Figure 6-15a: Occupied Bandwidth, Band 17 High Channel, 10MHz BW, RB=50**



|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

**Figure 6-16a: Occupied Bandwidth, Band 5 Low Channel, 5MHz BW, RB=25**



**Figure 6-17a: Occupied Bandwidth, Band 5 Middle Channel, 5MHz BW, RB=25**



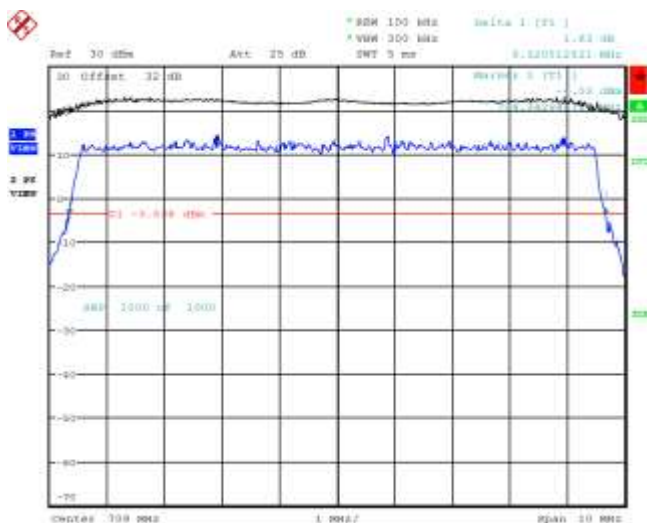
**Figure 6-18a: Occupied Bandwidth, Band 5 High Channel, 5MHz BW, RB=25**



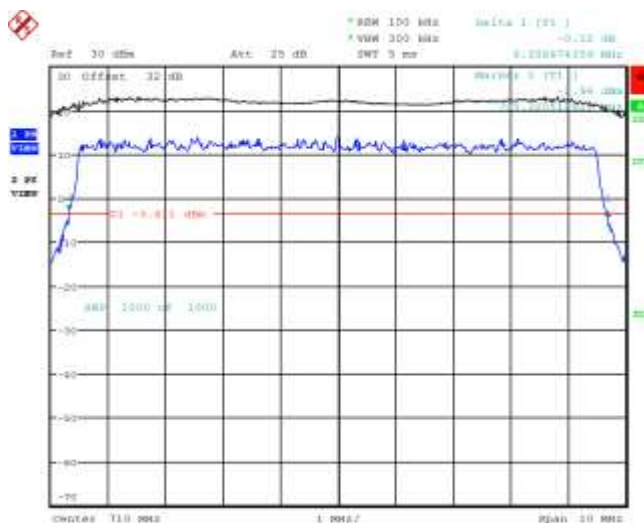
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

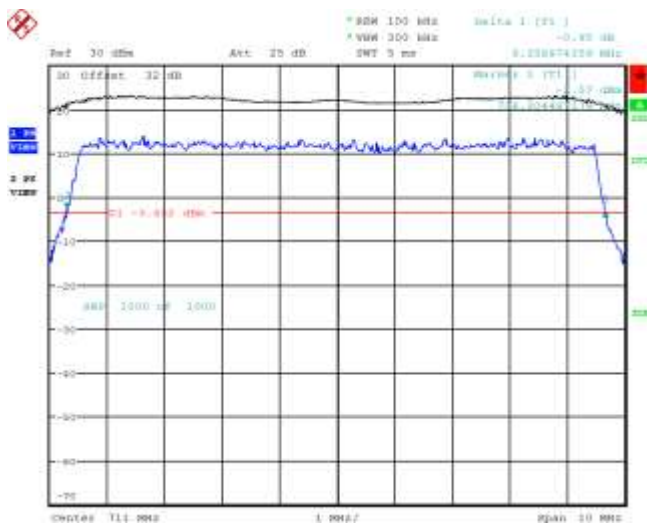
**Figure 6-19a: -26 dBc Bandwidth, Band 17 Low Channel, 10MHz BW, RB=50**



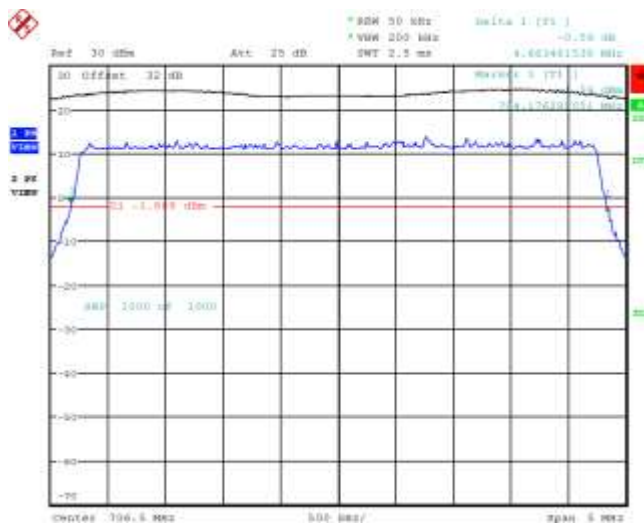
**Figure 6-20a: -26 dBc Bandwidth, Band 17 Middle Channel, 10MHz BW, RB=50**



**Figure 6-21a: -26 dBc Bandwidth, Band 17 High Channel, 10MHz BW, RB=50**



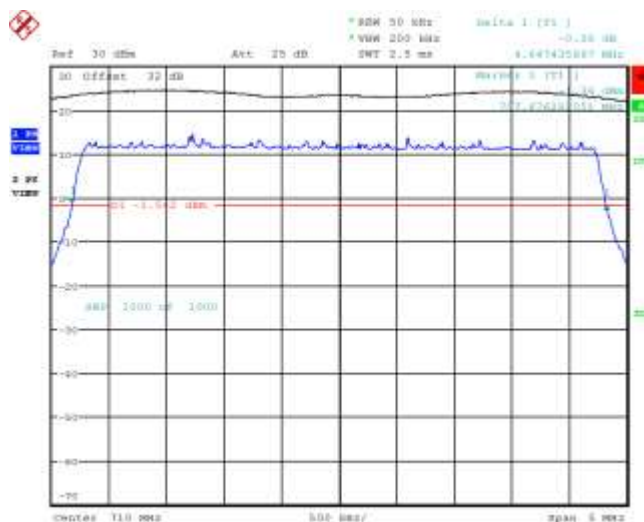
**Figure 6-22a: -26 dBc Bandwidth, Band 17 Low Channel, 5MHz BW, RB=25**



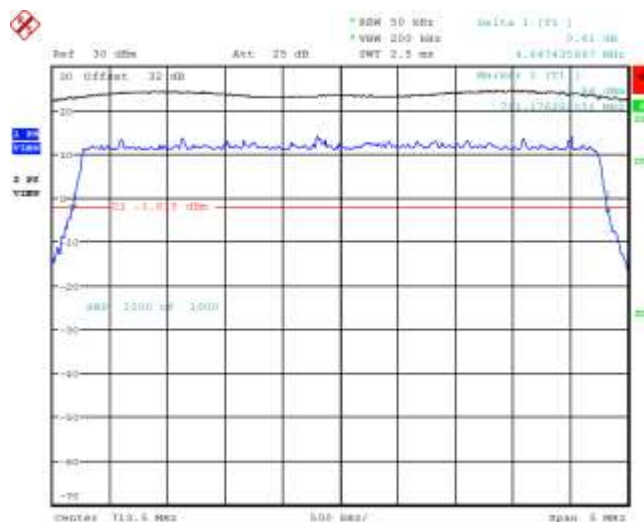
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

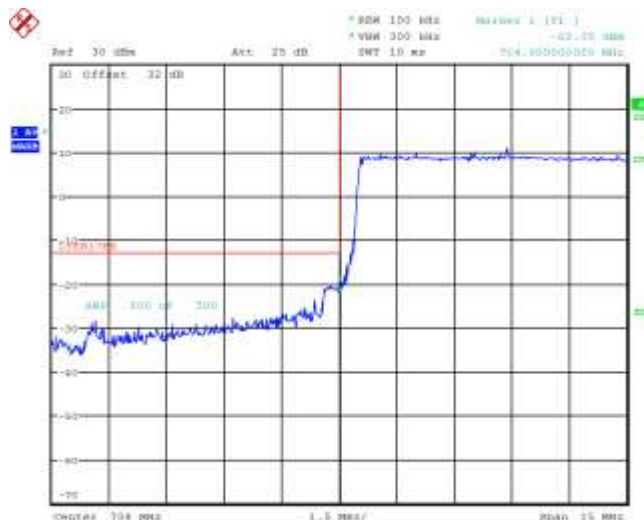
**Figure 6-23a: -26 dBc Bandwidth, Band 17 Middle Channel, 5MHz BW, RB=25**



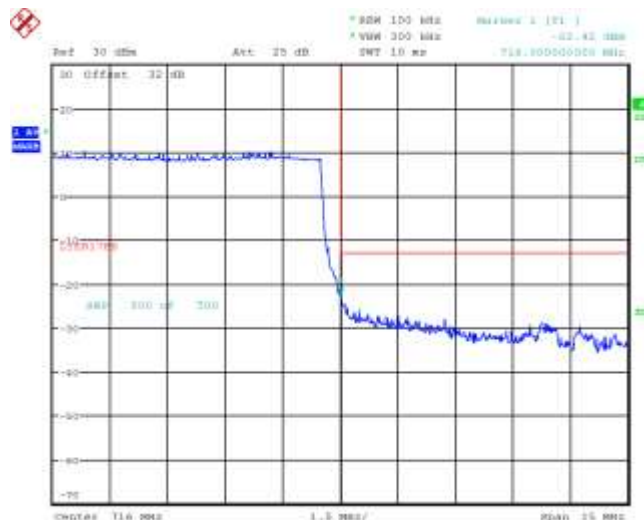
**Figure 6-24a: -26 dBc Bandwidth, Band 17 High Channel, 5MHz BW, RB=25**



**Figure 6-25a: Band 17 Low Channel Mask, 10MHz BW, RB=50**



**Figure 6-26a: Band 17 High Channel Mask, 10MHz BW, RB=50**

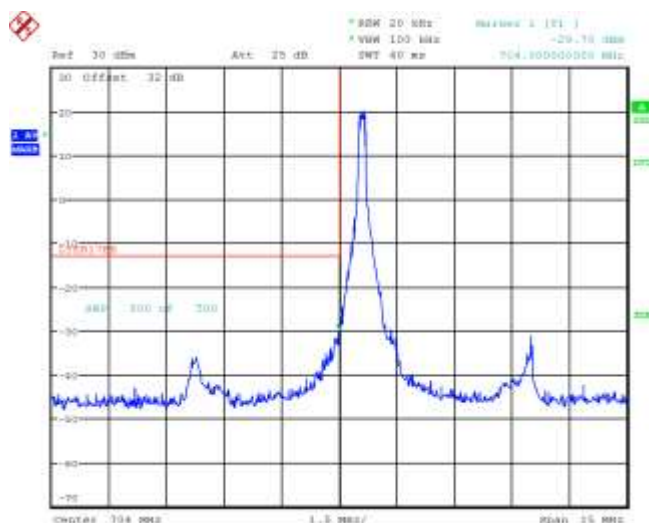




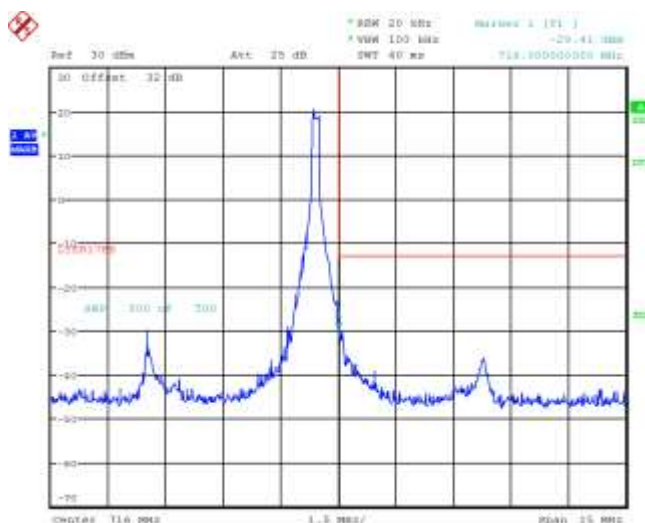
|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

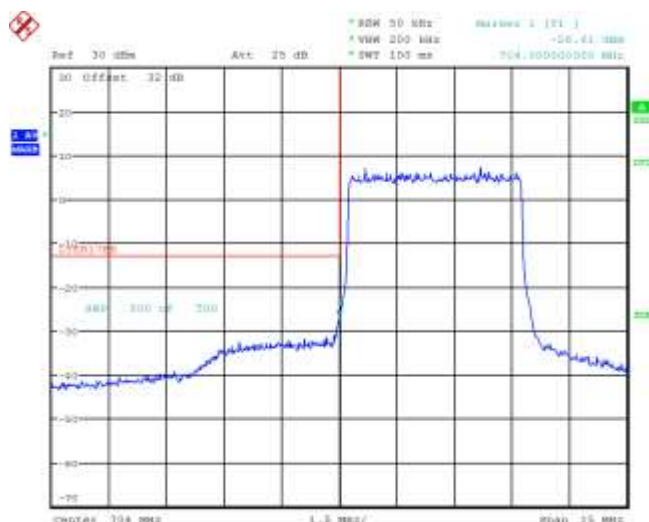
**Figure 6-27a: Band 17 Low Channel Mask, 10MHz  
BW, RB=1**



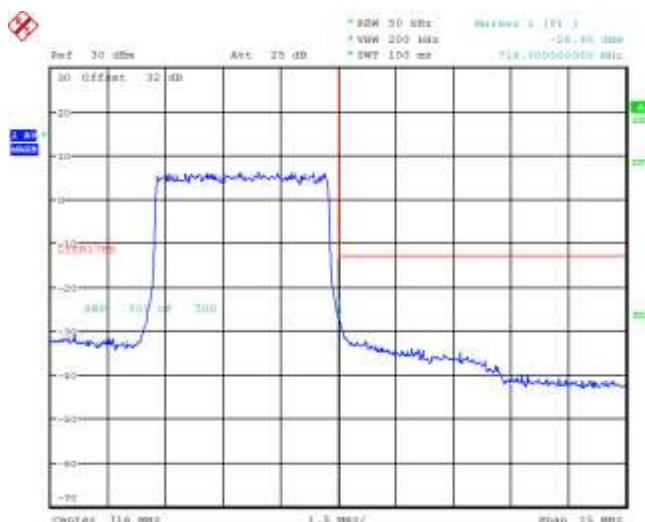
**Figure 6-28a: Band 17 High Channel Mask, 10MHz  
BW, RB=1**



**Figure 6-29a: Band 17 Low Channel Mask, 5MHz  
BW, RB=25**



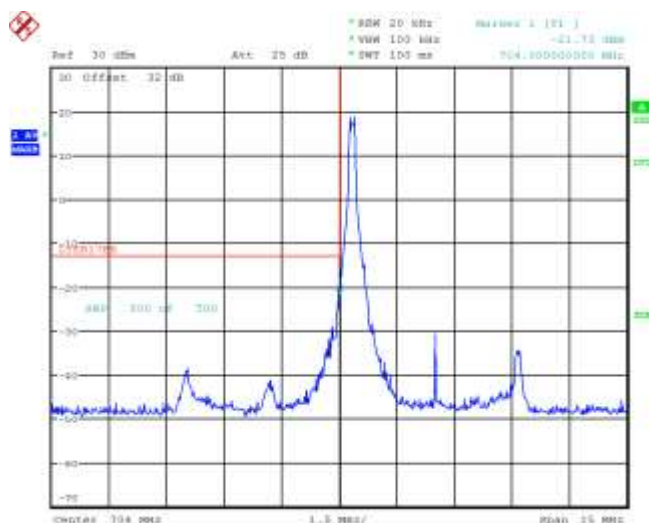
**Figure 6-30a: Band 17 High Channel Mask, 5MHz  
BW, RB=25**



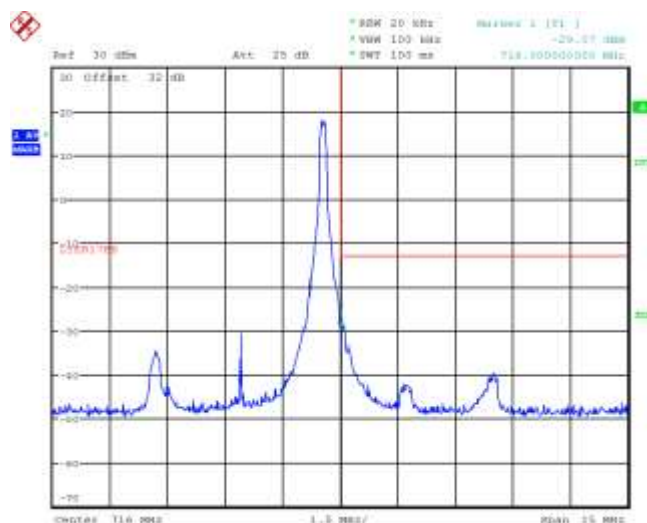
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|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

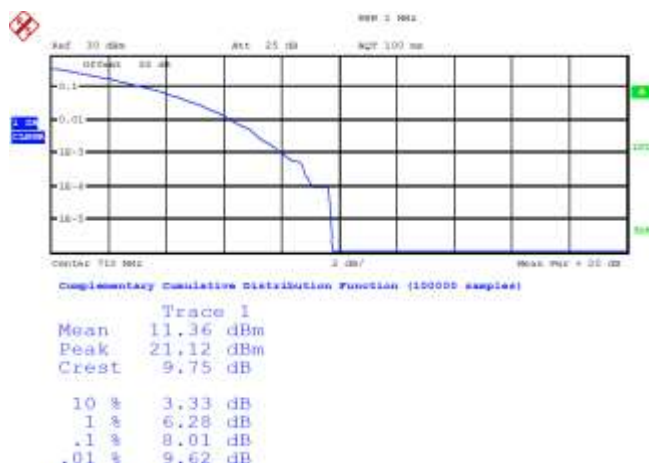
**Figure 6-31a: Band 17 Low Channel Mask, 5MHz BW, RB=1**



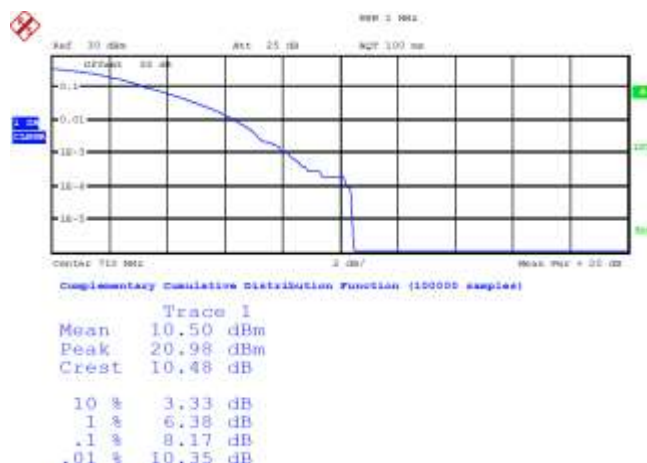
**Figure 6-32a: Band 17 High Channel Mask, 5MHz BW, RB=1**



**Figure 6-33a: Band 17 Mid Channel PAR, 10MHz BW, RB=25**



**Figure 6-34a: Band 17 Middle Channel PAR, 10MHz BW, RB=50**

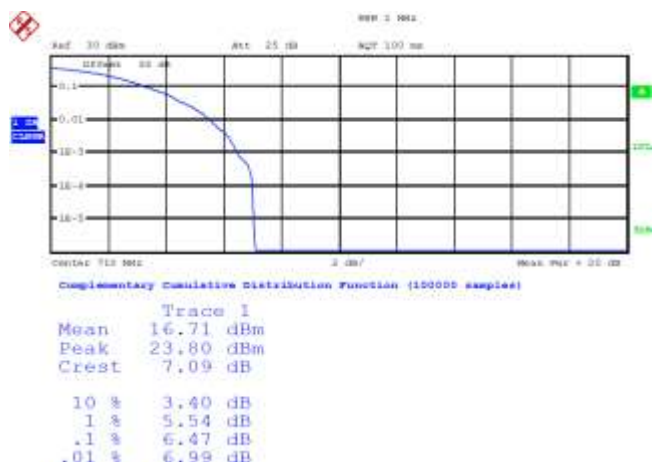




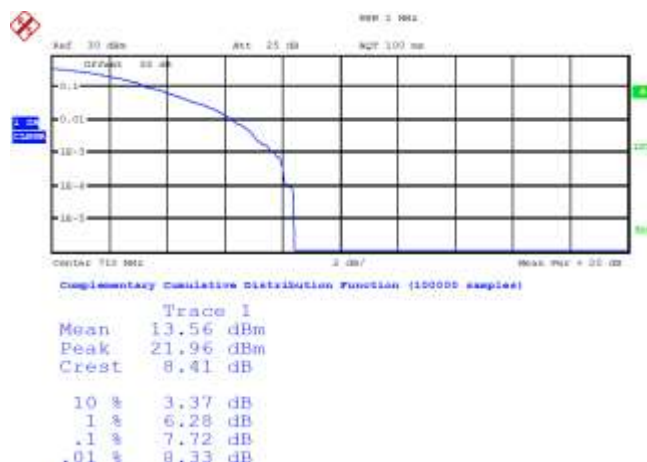
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|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

**Figure 6-35a: Band 17 Mid Channel PAR, 5MHz BW, RB=15**



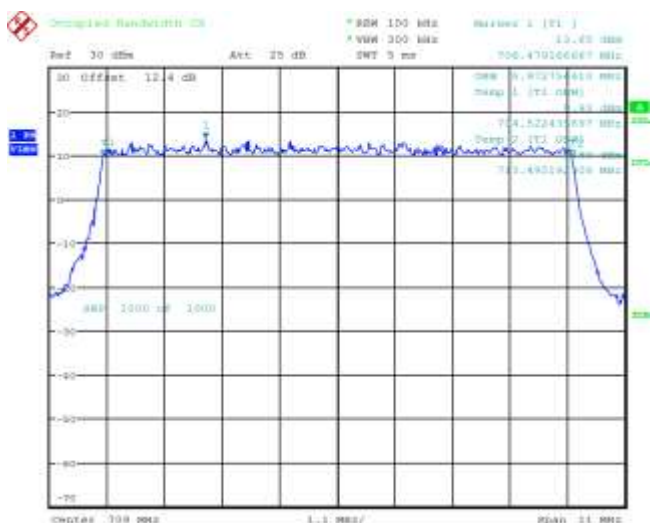
**Figure 6-36a: Band 17 Mid Channel PAR, 5MHz BW, RB=25**



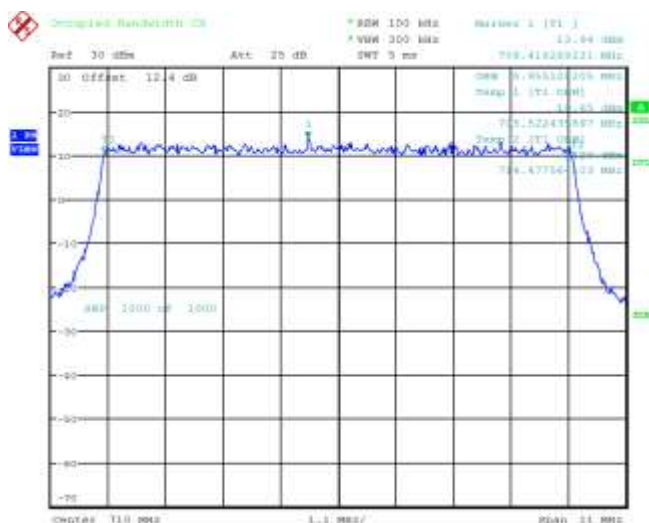
|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7A</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## LTE Band 17 Conducted RF Emission Test Data cont'd

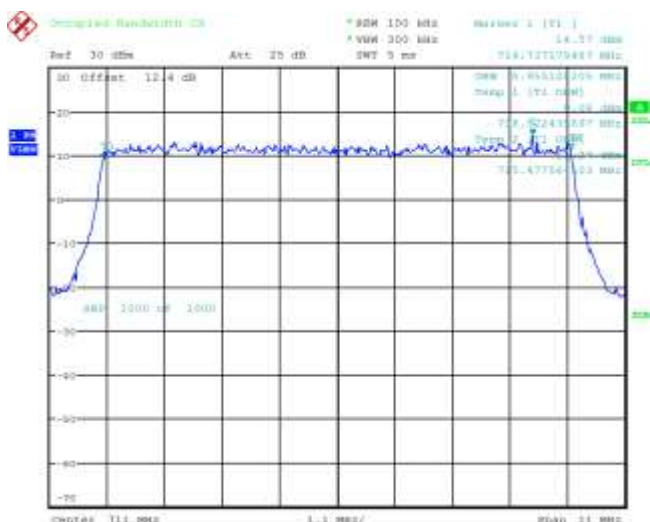
**Figure 6-37a: Occupied Bandwidth, Band 17 Low Channel, 20MHz BW (RB= 100) 16-QAM**



**Figure 6-38a: Occupied Bandwidth, Band 17 Mid Channel, 20MHz BW (RB= 100) 16-QAM**



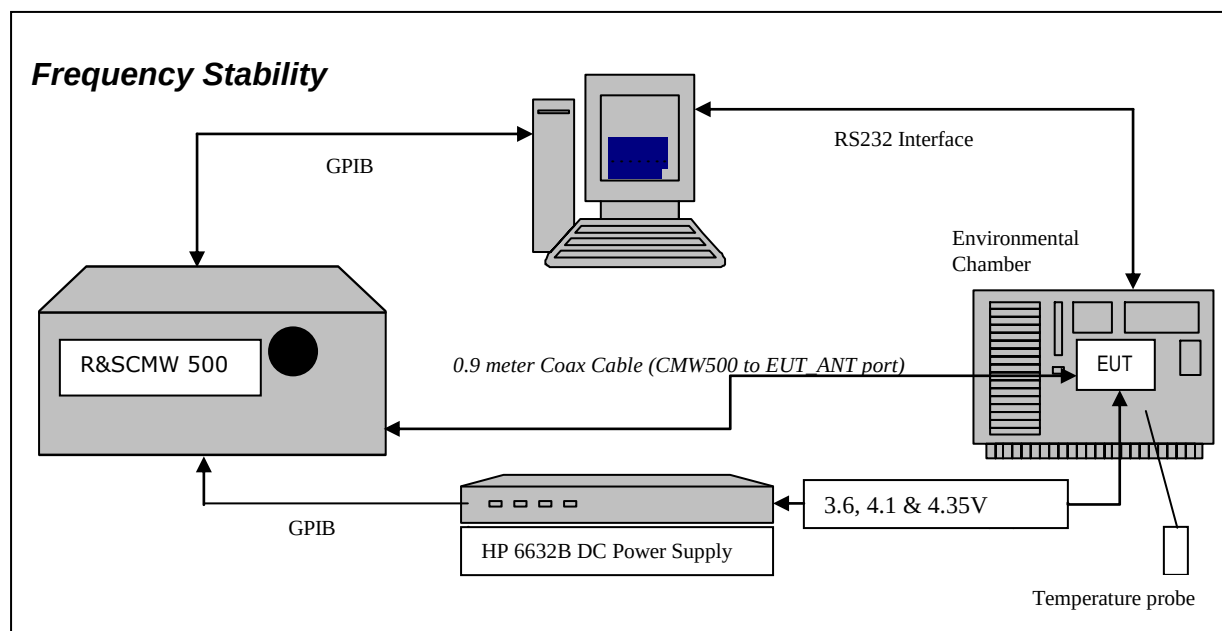
**Figure 6-39a: Occupied Bandwidth, Band 17 High Channel, 20MHz BW (RB= 100) 16-QAM**



## APPENDIX 7B – LTE Band 17 FREQUENCY STABILITY TEST DATA

|                                                  |                                                                                                |                                                         |
|--------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>BlackBerry</b>                                | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1 | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

### LTE Band 17 Frequency Stability Test Data



The following measurements were performed by Sijia Li.

## **CFR 47 Chapter 1 - Federal Communications Commission Rules**

### **Part 2 Required Measurements**

#### **2.1055** Frequency Stability - Procedures

(a,b) Frequency Stability - Temperature Variation

(d) Frequency Stability - Voltage Variation

*The EUT meets the requirements as stated in CFR 47 chapter 1, Section 27.54, CFR 47 and RSS-139, 6.3 Frequency Stability.*

Frequency Stability measurement devices were configured as presented in the block diagram recording frequency, power, data, temperatures, and stepped voltages controlled via a GPIB interface linked to the Environmental chamber, a DC power supply, and the Communications Test Set. A 0.9-metre coax cable was calibrated to characterize the insertion loss for the transmitted frequencies between the RF input/output of the CMW 500 and the EUT antenna port.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

## Test Setup:

The EUT was placed in the Temperature chamber and connected to CMW 500 outside as shown in the figure above. Dry air was pumped inside the temperature chamber to maintain a backpressure during the test. The EUT was kept in the off condition at all times except when the following measurements were to be made.

---

The chamber was switched on and the temperature was set to -30°C. After the chamber stabilized at -30 °C there was a soak period of one hour to alleviate moisture in the chamber, the EUT voltage was enabled. The system software recorded the frequency, power, and associated measurements.

A Computer system controlled the automated software. This application was given the command of activating all machines intrinsic to the temperature and voltage tests controlling the CMW 500 via the GPIB Bus. The Environmental Chamber was instructed through an RS-232 serial line. The EUT dialogue was passed through a serial connection.

The EUT repetitively transmitted 100 bursts for each set of programmed parameters recording temperature, voltage settings, and systematically selected frequencies. The power supply was cycled from minimum voltage 3.6 volts, to 4.1 volts and to 4.35 volts maximum voltage. The frequency error was measured at a maximum output power and recorded by the automated system test software.

The EUT output power and frequency was measured at 3.6 volts, 4.1 volts and 4.35 volts. The transmit frequency was varied in 3 steps consisting of 709.0 MHz, 710.0 MHz and 711.0 MHz each was measured under 10 MHz bandwidth with maximum (50) RBs. This frequency was recorded in MHz and deviation from nominal, in Parts Per Million.

After the initial one-hour soak at the beginning of the tests, a period of thirty minutes soak was initialized between each ascending temperature step, before proceeding to the next measurement test cycle.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Procedure for FCC:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

15. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
16. Start test program
17. Set the Temperature to –30°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
18. Set power supply voltage to 3.6 volts.
19. Set up CMW 500 Radio Communication Tester.
20. Command the CMW 500 to switch to the low channel.
21. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
22. EUT is commanded to Transmit 100 Bursts.
23. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
24. The CMW 500 commands the EUT to change frequency to the middle channel and high channel and repeats steps 7 to 9.
25. Repeat steps 5 to 10 changing the supply voltage to 4.1 Volts
26. Increase temperature by 10°C and soak for 1/2 hour.
27. Repeat steps 4 - 12 for temperatures –30°C to 60°C.
28. Repeat steps 5 to 10 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

The maximum frequency error in the LTE band 17 measured was **0.0106 PPM**.

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Date of Test: Feb 17, 2015

LTE Band 17 results: channels 23780, 23790 and 23800 @ 20°C maximum transmitted power

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|---------------------|-----------------|-----------------------|----------------------|---------|
| 23780                  | 709.0               | 3.6             | 20                    | -3.59                | -0.0051 |
| 23790                  | 710.0               | 3.6             | 20                    | 3.85                 | 0.0054  |
| 23800                  | 711.0               | 3.6             | 20                    | 3.10                 | 0.0044  |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 23780                  | 709.0               | 4.1             | 20                    | 3.89                 | 0.0055 |
| 23790                  | 710.0               | 4.1             | 20                    | 4.86                 | 0.0068 |
| 23800                  | 711.0               | 4.1             | 20                    | 2.70                 | 0.0038 |

| Traffic Channel Number | LTE Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM    |
|------------------------|---------------------|-----------------|-----------------------|----------------------|--------|
| 23780                  | 709.0               | 4.35            | 20                    | 2.98                 | 0.0042 |
| 23790                  | 710.0               | 4.35            | 20                    | 3.25                 | 0.0046 |
| 23800                  | 711.0               | 4.35            | 20                    | 2.65                 | 0.0037 |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 17 Results: channel 23780 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23780                  | 709.0           | 3.6             | -30                   | -4.28                | -0.0060 |
| 23780                  | 709.0           | 3.6             | -20                   | -3.81                | -0.0054 |
| 23780                  | 709.0           | 3.6             | -10                   | -3.75                | -0.0053 |
| 23780                  | 709.0           | 3.6             | 0                     | -3.19                | -0.0045 |
| 23780                  | 709.0           | 3.6             | 10                    | -3.29                | -0.0046 |
| 23780                  | 709.0           | 3.6             | 20                    | -3.59                | -0.0051 |
| 23780                  | 709.0           | 3.6             | 30                    | -3.68                | -0.0052 |
| 23780                  | 709.0           | 3.6             | 40                    | -5.29                | -0.0075 |
| 23780                  | 709.0           | 3.6             | 50                    | -4.68                | -0.0066 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 23780                  | 709.0           | 4.1             | -30                   | -4.56                | -0.0064 |
| 23780                  | 709.0           | 4.1             | -20                   | -2.96                | -0.0042 |
| 23780                  | 709.0           | 4.1             | -10                   | 3.46                 | 0.0049  |
| 23780                  | 709.0           | 4.1             | 0                     | -4.58                | -0.0065 |
| 23780                  | 709.0           | 4.1             | 10                    | -4.23                | -0.0060 |
| 23780                  | 709.0           | 4.1             | 20                    | 3.89                 | 0.0055  |
| 23780                  | 709.0           | 4.1             | 30                    | -3.69                | -0.0052 |
| 23780                  | 709.0           | 4.1             | 40                    | -5.59                | -0.0079 |
| 23780                  | 709.0           | 4.1             | 50                    | -3.79                | -0.0053 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 23780                  | 709.0           | 4.35            | -30                   | -5.58                | -0.0079 |
| 23780                  | 709.0           | 4.35            | -20                   | -2.85                | -0.0040 |
| 23780                  | 709.0           | 4.35            | -10                   | -3.63                | -0.0051 |
| 23780                  | 709.0           | 4.35            | 0                     | -3.88                | -0.0055 |
| 23780                  | 709.0           | 4.35            | 10                    | -3.85                | -0.0054 |
| 23780                  | 709.0           | 4.35            | 20                    | 2.98                 | 0.0042  |
| 23780                  | 709.0           | 4.35            | 30                    | -3.12                | -0.0044 |
| 23780                  | 709.0           | 4.35            | 40                    | -5.35                | -0.0075 |
| 23780                  | 709.0           | 4.35            | 50                    | -4.32                | -0.0061 |



|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 5 Results: channel 23790 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------------|
| 23790                  | 710.0           | 3.6             | -30                   | 5.48                 | 0.0077        |
| 23790                  | 710.0           | 3.6             | -20                   | 4.12                 | 0.0058        |
| 23790                  | 710.0           | 3.6             | -10                   | 4.95                 | 0.0070        |
| 23790                  | 710.0           | 3.6             | 0                     | 3.26                 | 0.0046        |
| 23790                  | 710.0           | 3.6             | 10                    | 3.75                 | 0.0053        |
| 23790                  | 710.0           | 3.6             | 20                    | 3.85                 | 0.0054        |
| 23790                  | 710.0           | 3.6             | 30                    | -5.02                | -0.0071       |
| 23790                  | 710.0           | 3.6             | 40                    | -6.21                | -0.0087       |
| 23790                  | 710.0           | 3.6             | 50                    | 5.35                 | 0.0075        |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
| 23790                  | 710.0           | 4.1             | -30                   | 5.06                 | 0.0071        |
| 23790                  | 710.0           | 4.1             | -20                   | 5.15                 | 0.0073        |
| 23790                  | 710.0           | 4.1             | -10                   | 6.08                 | 0.0086        |
| 23790                  | 710.0           | 4.1             | 0                     | 4.86                 | 0.0068        |
| 23790                  | 710.0           | 4.1             | 10                    | 3.83                 | 0.0054        |
| 23790                  | 710.0           | 4.1             | 20                    | 4.86                 | 0.0068        |
| 23790                  | 710.0           | 4.1             | 30                    | -4.08                | -0.0057       |
| 23790                  | 710.0           | 4.1             | 40                    | -3.33                | -0.0047       |
| 23790                  | 710.0           | 4.1             | 50                    | 4.22                 | 0.0059        |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM           |
| 23790                  | 710.0           | 4.35            | -30                   | 5.87                 | 0.0083        |
| 23790                  | 710.0           | 4.35            | -20                   | 6.35                 | 0.0089        |
| 23790                  | 710.0           | 4.35            | -10                   | 7.54                 | <b>0.0106</b> |
| 23790                  | 710.0           | 4.35            | 0                     | 2.40                 | 0.0034        |
| 23790                  | 710.0           | 4.35            | 10                    | 4.26                 | 0.0060        |
| 23790                  | 710.0           | 4.35            | 20                    | 3.25                 | 0.0046        |
| 23790                  | 710.0           | 4.35            | 30                    | -5.26                | -0.0074       |
| 23790                  | 710.0           | 4.35            | 40                    | -5.08                | -0.0072       |
| 23790                  | 710.0           | 4.35            | 50                    | 2.43                 | 0.0034        |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE band 17 Results: channel 23800 @ maximum transmitted power**

| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
|------------------------|-----------------|-----------------|-----------------------|----------------------|---------|
| 23800                  | 711.0           | 3.6             | -30                   | 3.39                 | 0.0048  |
| 23800                  | 711.0           | 3.6             | -20                   | 3.52                 | 0.0050  |
| 23800                  | 711.0           | 3.6             | -10                   | 6.52                 | 0.0092  |
| 23800                  | 711.0           | 3.6             | 0                     | 4.28                 | 0.0060  |
| 23800                  | 711.0           | 3.6             | 10                    | 4.05                 | 0.0057  |
| 23800                  | 711.0           | 3.6             | 20                    | 3.10                 | 0.0044  |
| 23800                  | 711.0           | 3.6             | 30                    | -2.78                | -0.0039 |
| 23800                  | 711.0           | 3.6             | 40                    | -4.69                | -0.0066 |
| 23800                  | 711.0           | 3.6             | 50                    | -7.23                | -0.0102 |
| 23800                  | 711.0           | 3.6             | 60                    | 3.39                 | 0.0048  |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 23800                  | 711.0           | 4.1             | -30                   | -3.16                | -0.0044 |
| 23800                  | 711.0           | 4.1             | -20                   | 4.51                 | 0.0063  |
| 23800                  | 711.0           | 4.1             | -10                   | 3.63                 | 0.0051  |
| 23800                  | 711.0           | 4.1             | 0                     | -2.96                | -0.0042 |
| 23800                  | 711.0           | 4.1             | 10                    | 4.05                 | 0.0057  |
| 23800                  | 711.0           | 4.1             | 20                    | 2.70                 | 0.0038  |
| 23800                  | 711.0           | 4.1             | 30                    | -4.49                | -0.0063 |
| 23800                  | 711.0           | 4.1             | 40                    | -3.78                | -0.0053 |
| 23800                  | 711.0           | 4.1             | 50                    | -4.29                | -0.0060 |
| 23800                  | 711.0           | 4.1             | 60                    | -3.16                | -0.0044 |
| Traffic Channel Number | Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | PPM     |
| 23800                  | 711.0           | 4.35            | -30                   | -2.82                | -0.0040 |
| 23800                  | 711.0           | 4.35            | -20                   | -3.55                | -0.0050 |
| 23800                  | 711.0           | 4.35            | -10                   | 2.59                 | 0.0036  |
| 23800                  | 711.0           | 4.35            | 0                     | -3.23                | -0.0045 |
| 23800                  | 711.0           | 4.35            | 10                    | 3.73                 | 0.0052  |
| 23800                  | 711.0           | 4.35            | 20                    | 2.65                 | 0.0037  |
| 23800                  | 711.0           | 4.35            | 30                    | -4.01                | -0.0056 |
| 23800                  | 711.0           | 4.35            | 40                    | -4.08                | -0.0057 |
| 23800                  | 711.0           | 4.35            | 50                    | -2.68                | -0.0038 |
| 23800                  | 711.0           | 4.35            | 60                    | -2.82                | -0.0040 |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

#### Procedure for IC:

The test system software for commencing the Frequency Stability Tests carried through the following cycle.

1. Switch on the HP 6632B power supply; CMW 500 Communications test Set, and Environmental Chamber.
2. Start test program
3. Set the Temperature to –20°C and maintain a period of one- hour soak time, with the EUT supply voltage disabled.
4. Set power supply voltage to 3.6 volts.
5. Set up CMW 500 Radio Communication Tester.
6. Command the CMW 500 to switch to the low channel.
7. Enable the voltage to the EUT, and connect a link to the CMW 500 test set.
8. EUT is commanded to Transmit 100 Bursts.
9. Software logs the following data from the CMW 500, power supply and temperature chamber: Traffic Channel Number, Traffic Channel Frequency, Power Level, Chamber Temperature, Supply Voltage, Power and Frequency Error.
10. Using a resolution bandwidth equal to that permitted within the 1MHz band immediately outside the channel edge, reference points will be selected at the unwanted emission levels which comply with the attenuation  $40 + 10 \log_{10} p$ , for the type of device under test, on the emission mask of the lowest and highest channels, and the frequency at these points shall be recorded as fL and fH respectively.
11. The frequency stability is calculated by fL minus the frequency offset (frequency error measured in step 9) and fH plus the frequency offset shall be within the frequency range that the equipment is designed to operate (2.5 to 2.57 GHz).
12. The CMW 500 commands the EUT to change frequency to the high channel and repeats steps 7 to 11.
13. Repeat steps 5 to 12 changing the supply voltage to 4.1 Volts
14. Increase temperature to 20 and 50°C and soak for 1/2 hour.
15. Repeat steps 4 - 14 for temperatures –20°C to 50°C.
16. Repeat steps 5 to 15 changing the supply voltage to 4.35 volts

Procedure 5 to 10 was repeated at room temperature (20°C) with the power supply voltage set to 3.6, 4.1 and 4.35 volts

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

Date of test: March 18, 2015.

IC RSS – 130, 4.3 LTE Band 17 Frequency Stability.

**LTE Band 17 20MHz Bandwidth results: channels 23780, & 23800 @ 20°C maximum transmitted power**

| Traffic Channel Number | LTE Band 17 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23780                  | 709.0                       | 3.6             | 20                    | -4.01                | 704.285  | N/A      | 704.285              | N/A                  |
| 23800                  | 711.0                       | 3.6             | 20                    | -2.49                | N/A      | 715.7    | N/A                  | 715.7                |

| Traffic Channel Number | LTE Band 17 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23780                  | 709.0                       | 4.1             | 20                    | 3.42                 | 704.345  | N/A      | 704.345              | N/A                  |
| 23800                  | 711.0                       | 4.1             | 20                    | -3.20                | N/A      | 715.64   | N/A                  | 715.64               |

| Traffic Channel Number | LTE Band 17 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23780                  | 709.0                       | 4.35            | 20                    | -2.57                | 704.33   | N/A      | 704.33               | N/A                  |
| 23800                  | 711.0                       | 4.35            | 20                    | 4.58                 | N/A      | 715.715  | N/A                  | 715.715              |

|                                                                                   |                                                                                                |                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7B</b> |                                                         |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |

**LTE Band 17 20MHz Bandwidth results: channels 23780, & 23800 @ -20 and +50°C maximum transmitted power**

| Traffic Channel Number | LTE Band 17 Frequency (MHz) | Voltage (Volts) | Temperature (Celsius) | Frequency Error (Hz) | fL (MHz) | fH (MHz) | fL-Freq Offset (MHz) | fH-Freq Offset (MHz) |
|------------------------|-----------------------------|-----------------|-----------------------|----------------------|----------|----------|----------------------|----------------------|
| 23780                  | 709.0                       | 3.6             | -20                   | -1.67                | 704.36   | N/A      | 704.36               | N/A                  |
| 23800                  | 711.0                       | 3.6             | -20                   | -2.49                | N/A      | 715.64   | N/A                  | 715.64               |
| 23780                  | 709.0                       | 4.1             | -20                   | -2.37                | 704.36   | N/A      | 704.36               | N/A                  |
| 23800                  | 711.0                       | 4.1             | -20                   | 4.08                 | N/A      | 715.73   | N/A                  | 715.73               |
| 23780                  | 709.0                       | 4.35            | -20                   | -1.90                | 704.315  | N/A      | 704.315              | N/A                  |
| 23800                  | 711.0                       | 4.35            | -20                   | 4.01                 | N/A      | 715.64   | N/A                  | 715.64               |
| 23780                  | 709.0                       | 3.6             | 50                    | -3.19                | 704.27   | N/A      | 704.27               | N/A                  |
| 23800                  | 711.0                       | 3.6             | 50                    | 1.46                 | N/A      | 715.64   | N/A                  | 715.64               |
| 23780                  | 709.0                       | 4.1             | 50                    | 1.83                 | 704.36   | N/A      | 704.36               | N/A                  |
| 23800                  | 711.0                       | 4.1             | 50                    | -4.46                | N/A      | 715.655  | N/A                  | 715.655              |
| 23780                  | 709.0                       | 4.35            | 50                    | -2.30                | 704.375  | N/A      | 704.375              | N/A                  |
| 23800                  | 711.0                       | 4.35            | 50                    | 2.26                 | N/A      | 715.655  | N/A                  | 715.655              |

## APPENDIX 7C – LTE Band 17 RADIATED EMISSIONS TEST DATA

|                                                                                   |                                                                                                |                                                         |  |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------|--|
|  | EMC Test Report for the BlackBerry® smartphone Model RHC161LW (STR100-2)<br><b>APPENDIX 7C</b> |                                                         |  |
| <b>Test Report No.:</b><br>RTS-6063-1503-19_Rev1                                  | <b>Dates of Test:</b><br>February 2 to March 3 and 18, 2015                                    | <b>FCC ID:</b> L6ARHC160LW<br><b>IC:</b> 2503A-RHC160LW |  |

### Radiated Power Test Data Results

Date of Test: February 23, 2015

The following measurements were performed by Shiva Kumbham.

The environmental tests conditions were: Temperature: 26.4 °C  
Relative Humidity: 2.4 %

The BlackBerry® smartphone was standalone, volume keys up with the screen facing the RX antenna when the turntable is at 0 degree position.

Measurements were performed with QPSK and 16QAM modulations. The smallest test margins are reported below.

Test Distance was 3.0 meters with the RX antenna height scans between 1-4 meters height.

#### **LTE band 17, 5MHz BW, RB=1, QPSK modulation**

| EUT  |       |                 |      | Rx Antenna |      | Spectrum Analyzer |                 | Substitution Method |               |                                        |      |             |                     |
|------|-------|-----------------|------|------------|------|-------------------|-----------------|---------------------|---------------|----------------------------------------|------|-------------|---------------------|
| Type | Ch    | Frequency (MHz) | Band | Type       | Pol. | Reading (dBm)     | Max (V,H) (dBm) | Pol. Tx-Rx          | Reading (dBm) | Corrected Reading (relative to Dipole) |      | Limit (dBm) | Diff. To Limit (dB) |
|      |       |                 |      |            |      |                   |                 |                     |               | (dBm)                                  | (W)  |             |                     |
| F0   | 23755 | 706.50          | 17   | Dipole     | V    | -43.57            | -32.26          | V-V                 | -0.29         | 18.00                                  | 0.06 | 35.00       | 17.00               |
| F0   | 23755 | 706.50          | 17   | Dipole     | H    | -32.26            |                 | H-H                 | -2.50         |                                        |      |             |                     |
| F0   | 23790 | 710.00          | 17   | Dipole     | V    | -42.70            | -30.99          | V-V                 | 1.31          | <b>19.63</b>                           | 0.09 | 35.00       | 15.37               |
| F0   | 23790 | 710.00          | 17   | Dipole     | H    | -30.99            |                 | H-H                 | -1.08         |                                        |      |             |                     |
| F0   | 23824 | 713.40          | 17   | Dipole     | V    | -42.45            | -30.86          | V-V                 | 1.25          | 19.51                                  | 0.09 | 35.00       | 15.49               |
| F0   | 23824 | 713.40          | 17   | Dipole     | H    | -30.86            |                 | H-H                 | -1.24         |                                        |      |             |                     |

#### **LTE band 17, 10MHz BW, RB=1, 16-QAM modulation**

| EUT  |       |                 |      | Rx Antenna |      | Spectrum Analyzer |                 | Substitution Method |               |                                        |      |             |                     |
|------|-------|-----------------|------|------------|------|-------------------|-----------------|---------------------|---------------|----------------------------------------|------|-------------|---------------------|
| Type | Ch    | Frequency (MHz) | Band | Type       | Pol. | Reading (dBm)     | Max (V,H) (dBm) | Pol. Tx-Rx          | Reading (dBm) | Corrected Reading (relative to Dipole) |      | Limit (dBm) | Diff. To Limit (dB) |
|      |       |                 |      |            |      |                   |                 |                     |               | (dBm)                                  | (W)  |             |                     |
| F0   | 23780 | 709.00          | 17   | Dipole     | V    | -44.15            | -32.18          | V-V                 | -0.09         | 18.20                                  | 0.07 | 35.00       | 16.80               |
| F0   | 23780 | 709.00          | 17   | Dipole     | H    | -32.18            |                 | H-H                 | -2.35         |                                        |      |             |                     |
| F0   | 23790 | 710.00          | 17   | Dipole     | V    | -44.16            | -32.25          | V-V                 | -0.02         | 18.30                                  | 0.07 | 35.00       | 16.70               |
| F0   | 23790 | 710.00          | 17   | Dipole     | H    | -32.25            |                 | H-H                 | -2.41         |                                        |      |             |                     |
| F0   | 23799 | 710.90          | 17   | Dipole     | V    | -43.74            | -31.93          | V-V                 | 0.39          | <b>18.65</b>                           | 0.07 | 35.00       | 16.35               |
| F0   | 23799 | 710.90          | 17   | Dipole     | H    | -31.93            |                 | H-H                 | -2.08         |                                        |      |             |                     |

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Page 254 of 255

