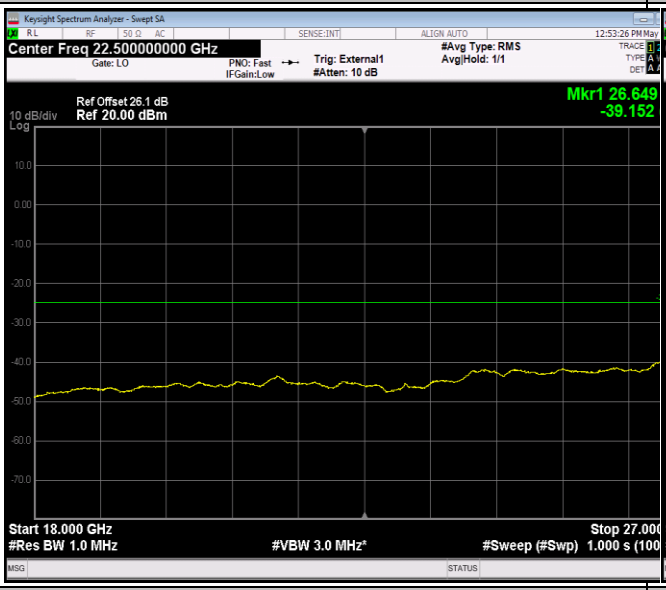
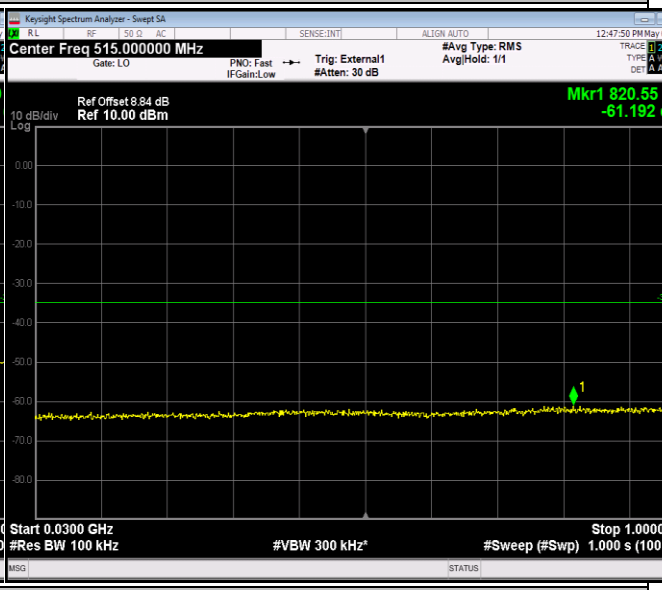
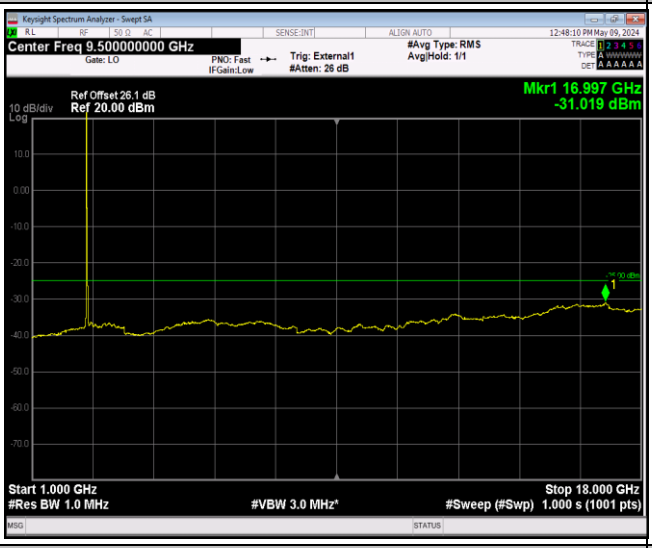
Band41_20MHz_16QAM_41140_1RB#0_30~1000_30~1000



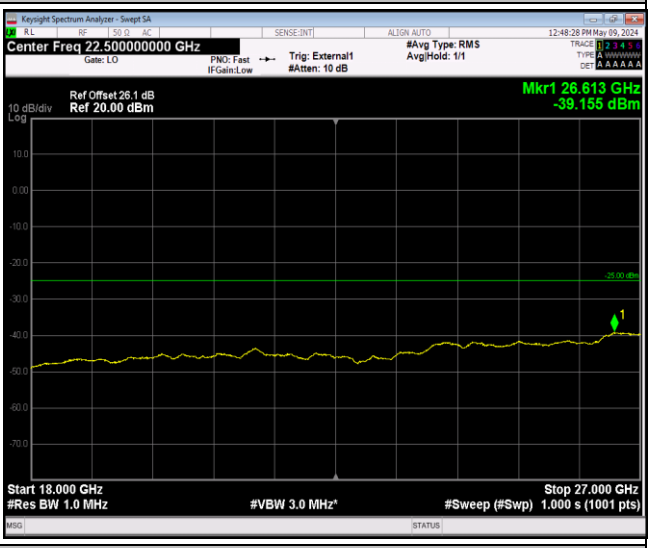

Band41_20MHz_16QAM_41140_1RB#0_1000~18000_1000~18000




Band41_20MHz_16QAM_41140_1RB#0_18000~27000_18000~27000

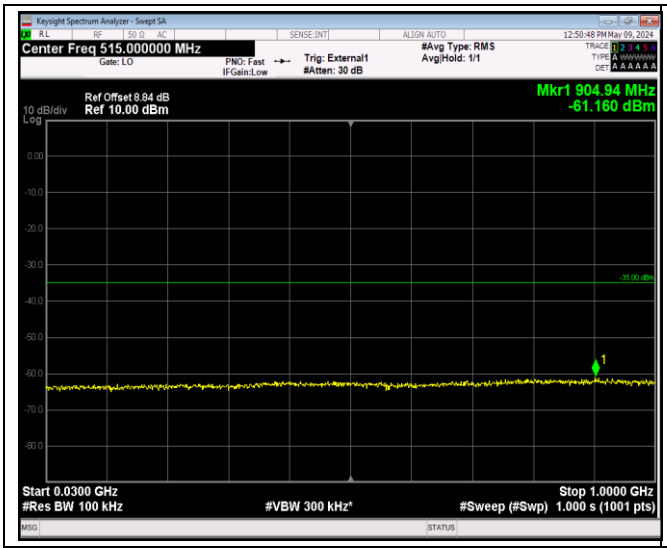



Band41_20MHz_64QAM_40140_1RB#0_30~1000_30~1000

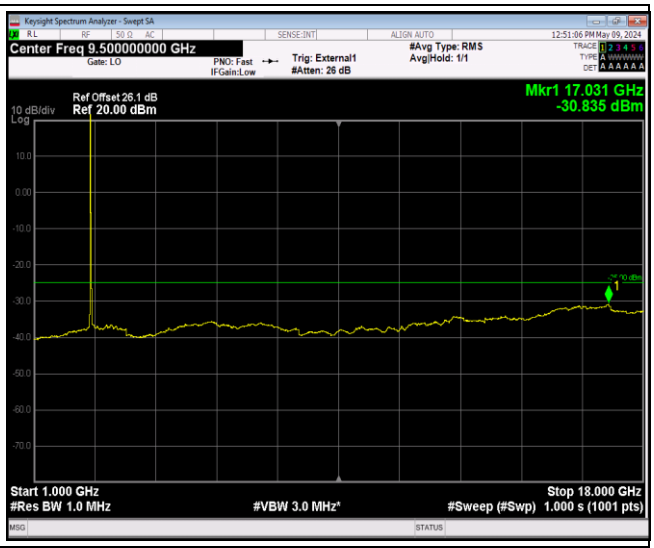



Band41_20MHz_64QAM_40140_1RB#0_1000~18000_1000~18000

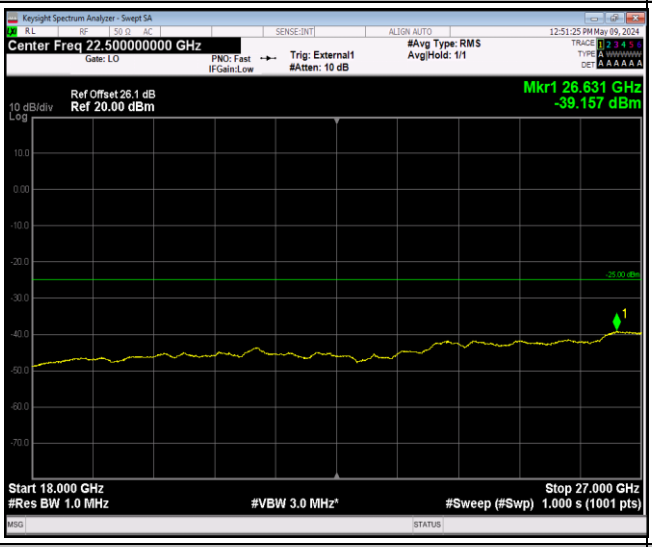
Band41_20MHz_64QAM_40140_1RB#0_18000~27000_18000~27000



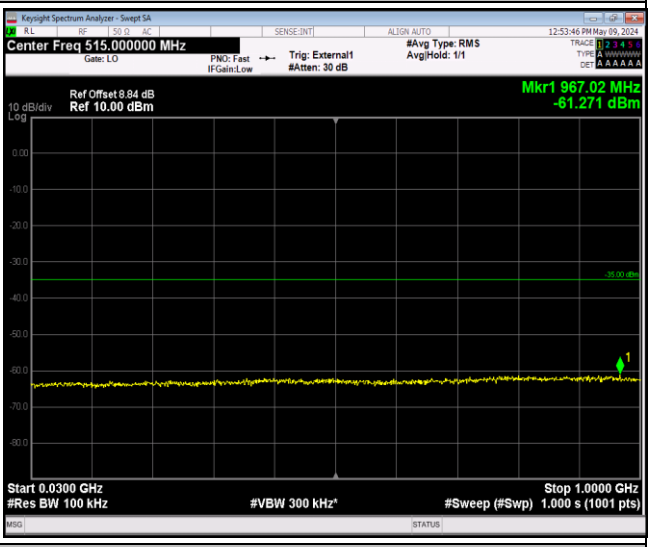

Band41_20MHz_64QAM_40640_1RB#0_30~1000_30~1000



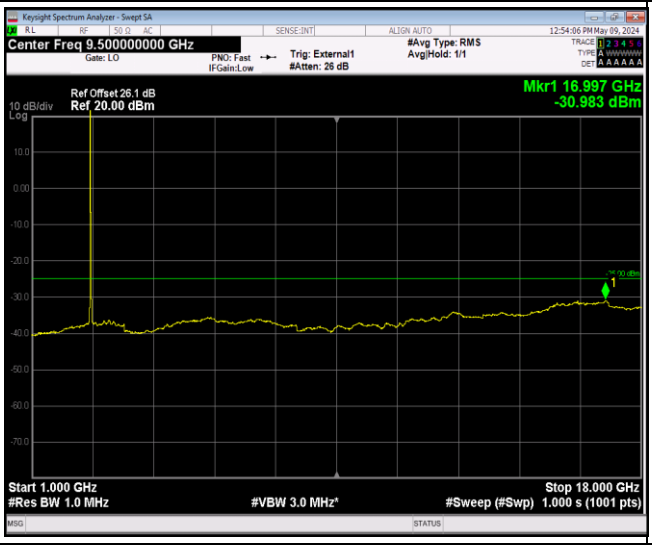

Band41_20MHz_64QAM_40640_1RB#0_1000~18000_1000~18000



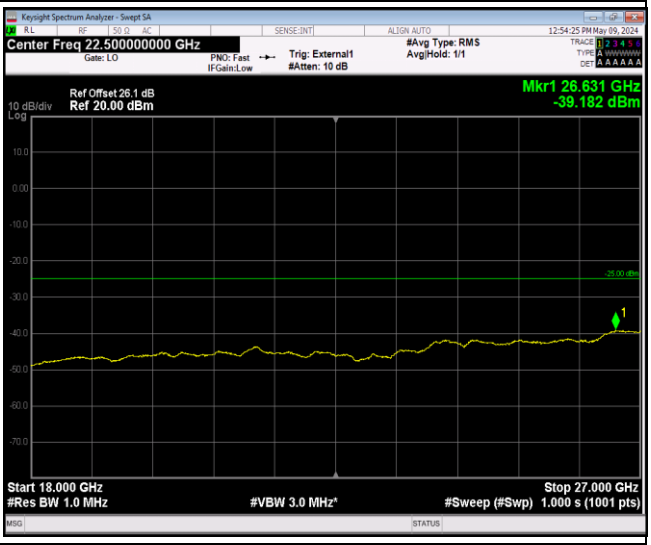

Band41_20MHz_64QAM_40640_1RB#0_18000~27000




Band41_20MHz_64QAM_41140_1RB#0_30~1000




Band41_20MHz_64QAM_41140_1RB#0_1000~18000




Band41_20MHz_64QAM_41140_1RB#0_18000~27000

# Appendix F: Frequency Stability

## Test Result

**LTE Band 2 part:**

| Reference Frequency: LTE Band 2 (10MHz) Middle channel=18900 Frequency=1880.0MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.91 | -30 | 4.16 | 0.002213 | Within authorized band for Band 2 | Pass |
| | -20 | 5.87 | 0.003122 | | |
| | -10 | -5.87 | -0.003122 | | |
| | 0 | -6.12 | -0.003255 | | |
| | 10 | -4.52 | -0.002404 | | |
| | 20 | -6.58 | -0.003500 | | |
| | 30 | 15.36 | 0.008170 | | |
| | 40 | -9.37 | -0.004984 | | |
| | 50 | -11.52 | -0.006128 | | |
| 16QAM | | | | | |
| 3.91 | -30 | -5.82 | -0.003096 | Within authorized band for Band 2 | Pass |
| | -20 | -10.00 | -0.005319 | | |
| | -10 | 7.17 | 0.003814 | | |
| | 0 | -9.10 | -0.004840 | | |
| | 10 | 8.77 | 0.004665 | | |
| | 20 | -8.04 | -0.004277 | | |
| | 30 | -10.01 | -0.005324 | | |
| | 40 | 8.00 | 0.004255 | | |
| | 50 | -9.57 | -0.005090 | | |
| 64QAM | | | | | |
| 3.91 | -30 | 5.39 | 0.002867 | Within authorized band for Band 2 | Pass |
| | -20 | 9.66 | 0.005138 | | |
| | -10 | 11.26 | 0.005989 | | |
| | 0 | -10.01 | -0.005324 | | |
| | 10 | -10.01 | -0.005324 | | |
| | 20 | 2.70 | 0.001436 | | |
| | 30 | -9.21 | -0.004899 | | |
| | 40 | 2.62 | 0.001394 | | |
| | 50 | -10.47 | -0.005569 | | |

| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.45 | -12.04 | -0.006404 | Within authorized band for Band 2 | Pass |
| | 3.91 | 9.37 | 0.004984 | | |
| | 4.50 | -7.50 | -0.003989 | | |
| 16QAM | | | | | |
| 25 | 3.45 | -3.86 | -0.002053 | Within authorized band for Band 2 | Pass |
| | 3.91 | 9.80 | 0.005213 | | |
| | 4.50 | -11.00 | -0.005851 | | |
| 64QAM | | | | | |
| 25 | 3.45 | -6.14 | -0.003266 | Within authorized band for Band 2 | Pass |
| | 3.91 | -9.94 | -0.005287 | | |
| | 4.50 | -10.69 | -0.005686 | | |
| *Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.* | | | | | |

**LTE Band 4 part:**

| Reference Frequency: LTE Band 4 (10MHz) Middle channel=20175 Frequency=1732.5MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.91 | -30 | 7.61 | 0.004392 | Within authorized band for Band 4 | Pass |
| | -20 | -8.97 | -0.005177 | | |
| | -10 | 5.15 | 0.002973 | | |
| | 0 | 9.74 | 0.005622 | | |
| | 10 | 4.06 | 0.002343 | | |
| | 20 | 8.64 | 0.004987 | | |
| | 30 | 3.42 | 0.001974 | | |
| | 40 | -8.80 | -0.005079 | | |
| | 50 | 10.30 | 0.005945 | | |
| 16QAM | | | | | |
| 3.91 | -30 | 7.80 | 0.004502 | Within authorized band for Band 4 | Pass |
| | -20 | 8.24 | 0.004756 | | |
| | -10 | 4.09 | 0.002361 | | |
| | 0 | 3.83 | 0.002211 | | |
| | 10 | -14.53 | -0.008387 | | |
| | 20 | -9.38 | -0.005414 | | |
| | 30 | -12.87 | -0.007429 | | |
| | 40 | -12.75 | -0.007359 | | |
| | 50 | 7.84 | 0.004525 | | |
| 64QAM | | | | | |
| 3.91 | -30 | -9.36 | -0.005403 | Within authorized band for Band 4 | Pass |
| | -20 | -5.22 | -0.003013 | | |
| | -10 | -14.69 | -0.008479 | | |
| | 0 | -3.30 | -0.001905 | | |
| | 10 | -9.17 | -0.005293 | | |
| | 20 | -12.12 | -0.006996 | | |
| | 30 | -9.63 | -0.005558 | | |
| | 40 | 6.02 | 0.003475 | | |
| | 50 | 10.01 | 0.005778 | | |

| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.45 | -7.44 | -0.004294 | Within authorized band for Band 4 | Pass |
| | 3.91 | -14.38 | -0.008300 | | |
| | 4.50 | 8.68 | 0.005010 | | |
| 16QAM | | | | | |
| 25 | 3.45 | -8.74 | -0.005045 | Within authorized band for Band 4 | Pass |
| | 3.91 | -12.50 | -0.007215 | | |
| | 4.50 | 2.73 | 0.001576 | | |
| 64QAM | | | | | |
| 25 | 3.45 | -4.99 | -0.002880 | Within authorized band for Band 4 | Pass |
| | 3.91 | 2.66 | 0.001535 | | |
| | 4.50 | -13.48 | -0.007781 | | |
| *Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.* | | | | | |

**LTE Band 5 part:**

| Reference Frequency: LTE Band 5(10MHz) Middle channel=20525 Frequency=836.5MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.91 | -30 | -6.27 | -0.007496 | ±2.5 | Pass |
| | -20 | -4.96 | -0.005929 | | |
| | -10 | -10.06 | -0.012026 | | |
| | 0 | -5.01 | -0.005989 | | |
| | 10 | -6.22 | -0.007436 | | |
| | 20 | -5.52 | -0.006599 | | |
| | 30 | -3.98 | -0.004758 | | |
| | 40 | -6.45 | -0.007711 | | |
| | 50 | -4.33 | -0.005176 | | |
| 16QAM | | | | | |
| 3.91 | -30 | -3.28 | -0.003921 | ±2.5 | Pass |
| | -20 | -5.81 | -0.006946 | | |
| | -10 | -8.43 | -0.010078 | | |
| | 0 | -7.97 | -0.009528 | | |
| | 10 | -8.20 | -0.009803 | | |
| | 20 | -4.66 | -0.005571 | | |
| | 30 | -6.09 | -0.007280 | | |
| | 40 | -6.02 | -0.007197 | | |
| | 50 | -2.17 | -0.002594 | | |
| 64QAM | | | | | |
| 3.91 | -30 | -9.67 | -0.011560 | ±2.5 | Pass |
| | -20 | -8.81 | -0.010532 | | |
| | -10 | -4.86 | -0.005810 | | |
| | 0 | -9.68 | -0.011572 | | |
| | 10 | -9.61 | -0.011488 | | |
| | 20 | -5.61 | -0.006707 | | |
| | 30 | -8.18 | -0.009779 | | |
| | 40 | -2.93 | -0.003503 | | |
| | 50 | -8.18 | -0.009779 | | |

| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.45 | -1.34 | -0.001602 | ±2.5 | Pass |
| | 3.91 | 2.46 | 0.002941 | | |
| | 4.50 | -3.66 | -0.004375 | | |
| 16QAM | | | | | |
| 25 | 3.45 | -3.19 | -0.003814 | ±2.5 | Pass |
| | 3.91 | -6.24 | -0.007460 | | |
| | 4.50 | -7.62 | -0.009109 | | |
| 64QAM | | | | | |
| 25 | 3.45 | 4.08 | 0.004877 | ±2.5 | Pass |
| | 3.91 | 4.48 | 0.005356 | | |
| | 4.50 | -9.67 | -0.011560 | | |
| *Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.* | | | | | |

**LTE Band 7 part:**

| Reference Frequency: LTE Band 7(10MHz) Middle channel=21100 Frequency=2535.0MHz | | | | | |
|---|---|---|---|---|---|
| Temperature | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.91 | -30 | -13.59 | -0.005361 | Within authorized band for Band 7 | Pass |
| | -20 | 7.77 | 0.003065 | | |
| | -10 | 6.71 | 0.002647 | | |
| | 0 | -16.74 | -0.006604 | | |
| | 10 | -17.07 | -0.006734 | | |
| | 20 | -11.09 | -0.004375 | | |
| | 30 | -16.32 | -0.006438 | | |
| | 40 | -4.09 | -0.001613 | | |
| | 50 | -12.26 | -0.004836 | | |
| 16QAM | | | | | |
| 3.91 | -30 | 3.25 | 0.001282 | Within authorized band for Band 7 | Pass |
| | -20 | -2.22 | -0.000876 | | |
| | -10 | -7.44 | -0.002935 | | |
| | 0 | -12.32 | -0.004860 | | |
| | 10 | 13.85 | 0.005464 | | |
| | 20 | 6.78 | 0.002675 | | |
| | 30 | 12.37 | 0.004880 | | |
| | 40 | -11.01 | -0.004343 | | |
| | 50 | 2.63 | 0.001037 | | |
| 64QAM | | | | | |
| 3.91 | -30 | -9.36 | -0.003692 | Within authorized band for Band 7 | Pass |
| | -20 | -3.56 | -0.001404 | | |
| | -10 | -15.61 | -0.006158 | | |
| | 0 | 11.13 | 0.004391 | | |
| | 10 | -9.50 | -0.003748 | | |
| | 20 | 6.49 | 0.002560 | | |
| | 30 | -14.05 | -0.005542 | | |
| | 40 | -9.60 | -0.003787 | | |
| | 50 | 13.62 | 0.005373 | | |

| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.45 | -13.33 | -0.005258 | Within authorized band for Band 7 | Pass |
| | 3.91 | -15.05 | -0.005937 | | |
| | 4.50 | -20.50 | -0.008087 | | |
| 16QAM | | | | | |
| 25 | 3.45 | 18.44 | 0.007274 | Within authorized band for Band 7 | Pass |
| | 3.91 | -14.29 | -0.005637 | | |
| | 4.50 | 7.02 | 0.002769 | | |
| 64QAM | | | | | |
| 25 | 3.45 | -11.76 | -0.004639 | Within authorized band for Band 7 | Pass |
| | 3.91 | -5.59 | -0.002205 | | |
| | 4.50 | 11.70 | 0.004615 | | |
| *Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.* | | | | | |

**LTE Band 41 part:**

| Reference Frequency: LTE Band 41 (10MHz) Middle channel=40640 Frequency=2595.0MHz | | | | | |
|---|---|---|---|---|---|
| **Temperature** | | | | | |
| Power supplied (Vdc) | Temperature (℃) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 3.91 | -30 | 6.22 | 0.002397 | Within authorized band for Band 41 | Pass |
| | -20 | 6.14 | 0.002366 | | |
| | -10 | -5.99 | -0.002308 | | |
| | 0 | -12.10 | -0.004663 | | |
| | 10 | 6.09 | 0.002347 | | |
| | 20 | 4.33 | 0.001669 | | |
| | 30 | -14.31 | -0.005514 | | |
| | 40 | -11.24 | -0.004331 | | |
| | 50 | -8.84 | -0.003407 | | |
| 16QAM | | | | | |
| 3.91 | -30 | 4.86 | 0.001873 | Within authorized band for Band 41 | Pass |
| | -20 | -8.45 | -0.003256 | | |
| | -10 | -13.92 | -0.005364 | | |
| | 0 | -4.13 | -0.001592 | | |
| | 10 | 4.19 | 0.001615 | | |
| | 20 | -6.72 | -0.002590 | | |
| | 30 | -5.14 | -0.001981 | | |
| | 40 | -5.64 | -0.002173 | | |
| | 50 | -10.76 | -0.004146 | | |
| 64QAM | | | | | |
| 3.91 | -30 | -10.01 | -0.003857 | Within authorized band for Band 41 | Pass |
| | -20 | -3.50 | -0.001349 | | |
| | -10 | -8.87 | -0.003418 | | |
| | 0 | -5.91 | -0.002277 | | |
| | 10 | -5.34 | -0.002058 | | |
| | 20 | -10.71 | -0.004127 | | |
| | 30 | 5.42 | 0.002089 | | |
| | 40 | 6.04 | 0.002328 | | |
| | 50 | -5.35 | -0.002062 | | |

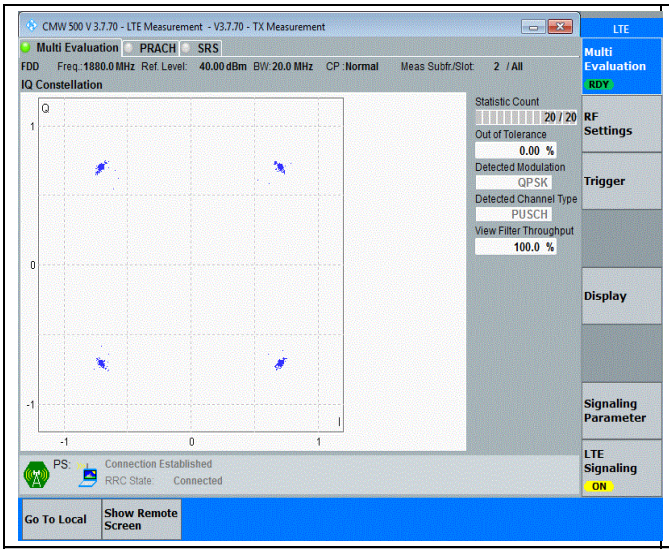
| Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature (℃) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| QPSK | | | | | |
| 25 | 3.45 | -9.81 | -0.003780 | Within authorized band for Band 41 | Pass |
| | 3.91 | -17.34 | -0.006682 | | |
| | 4.50 | -9.26 | -0.003568 | | |
| 16QAM | | | | | |
| 25 | 3.45 | -3.96 | -0.001526 | Within authorized band for Band41 | Pass |
| | 3.91 | -4.61 | -0.001776 | | |
| | 4.50 | -6.67 | -0.002570 | | |
| 64QAM | | | | | |
| 25 | 3.45 | -11.50 | -0.004432 | Within authorized band for Band41 | Pass |
| | 3.91 | -6.21 | -0.002393 | | |
| | 4.50 | -10.13 | -0.003904 | | |
| *Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.* | | | | | |

# Appendix G: Modulation Characteristics

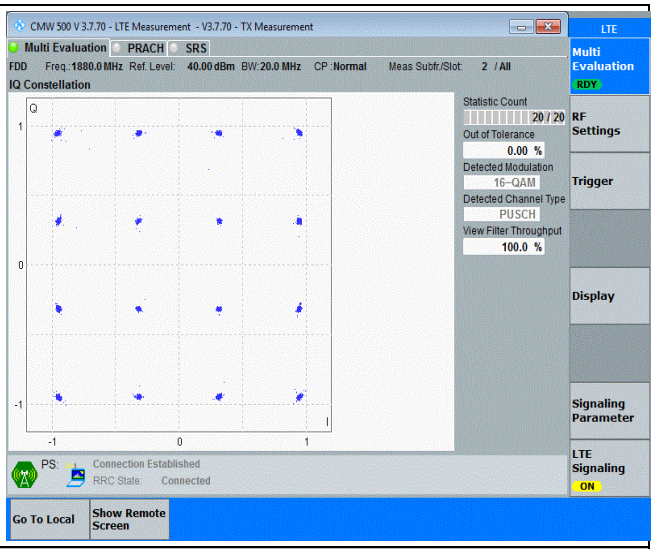
## Test Result

| Band | Bandwidth | Modulation | Channel | RB Configuration | Verdict |
|---|---|---|---|---|---|
| Band2 | 20MHz | QPSK | 18900 | 100RB#0 | PASS |
| Band2 | 20MHz | 16QAM | 18900 | 100RB#0 | PASS |
| Band2 | 20MHz | 64QAM | 18900 | 100RB#0 | PASS |
| Band4 | 20MHz | QPSK | 20175 | 100RB#0 | PASS |
| Band4 | 20MHz | 16QAM | 20175 | 100RB#0 | PASS |
| Band4 | 20MHz | 64QAM | 20175 | 100RB#0 | PASS |
| Band5 | 10MHz | QPSK | 20525 | 50RB#0 | PASS |
| Band5 | 10MHz | 16QAM | 20525 | 50RB#0 | PASS |
| Band5 | 10MHz | 64QAM | 20525 | 50RB#0 | PASS |
| Band7 | 20MHz | QPSK | 21100 | 100RB#0 | PASS |
| Band7 | 20MHz | 16QAM | 21100 | 100RB#0 | PASS |
| Band7 | 20MHz | 64QAM | 21100 | 100RB#0 | PASS |
| 41(2535-2655) | 20MHz | QPSK | 40640 | 100RB#0 | PASS |
| 41(2535-2655) | 20MHz | 16QAM | 40640 | 100RB#0 | PASS |
| 41(2535-2655) | 20MHz | 64QAM | 40640 | 100RB#0 | PASS |

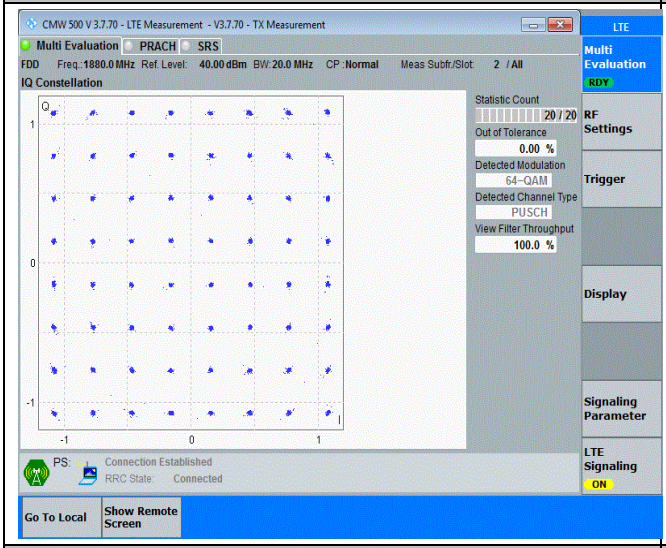
## Test Graphs



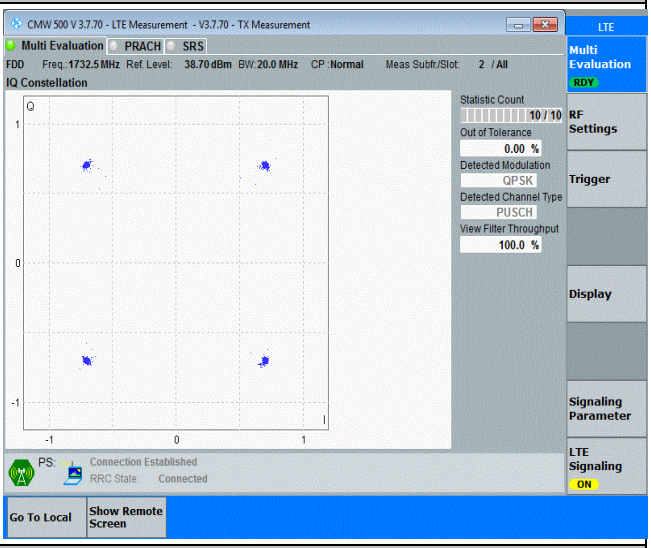

Band2-20MHz-QPSK-18900-100RB#0-PASS



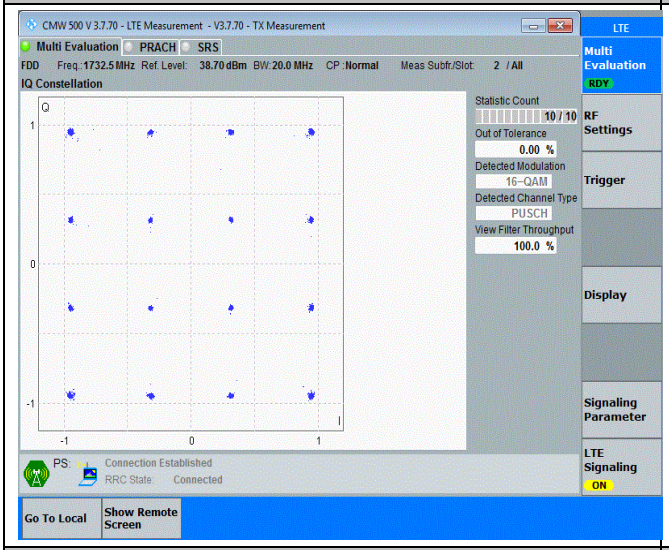

Band2-20MHz-16QAM-18900-100RB#0-PASS



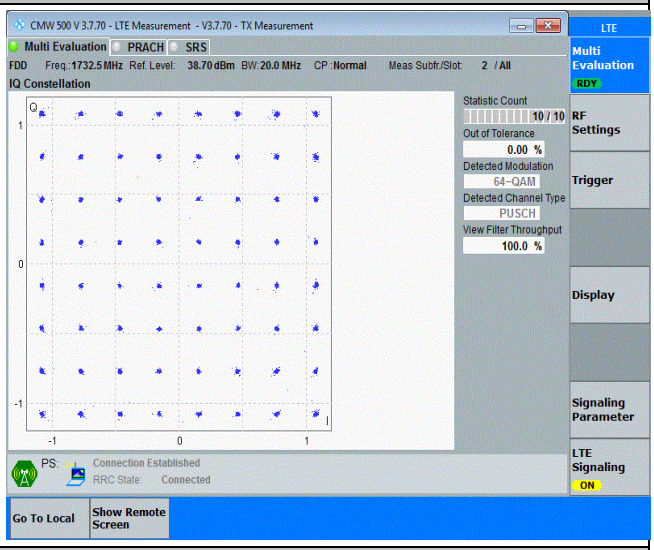

Band2-20MHz-64QAM-18900-100RB#0-PASS



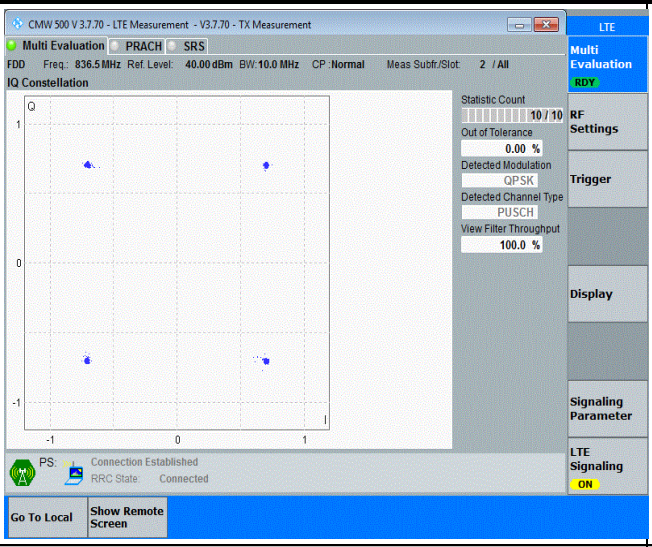

Band4-20MHz-QPSK-20175-100RB#0-PASS



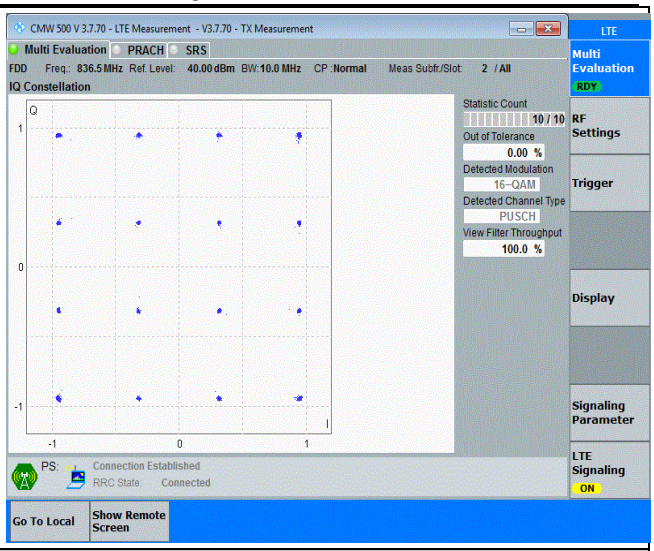

Band4-20MHz-16QAM-20175-100RB#0-PASS




Band4-20MHz-64QAM-20175-100RB#0-PASS




Band5-10MHz-QPSK-20525-50RB#0-PASS

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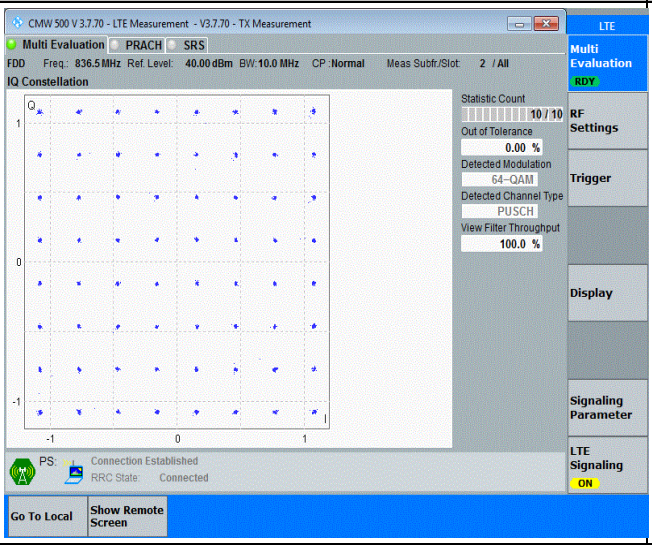


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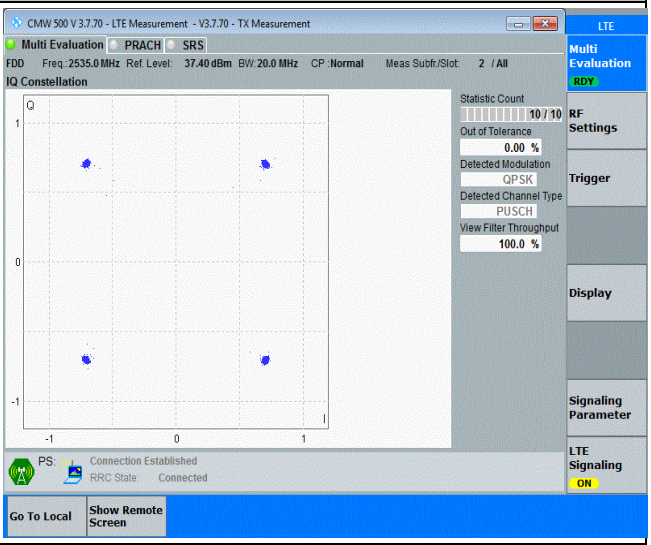
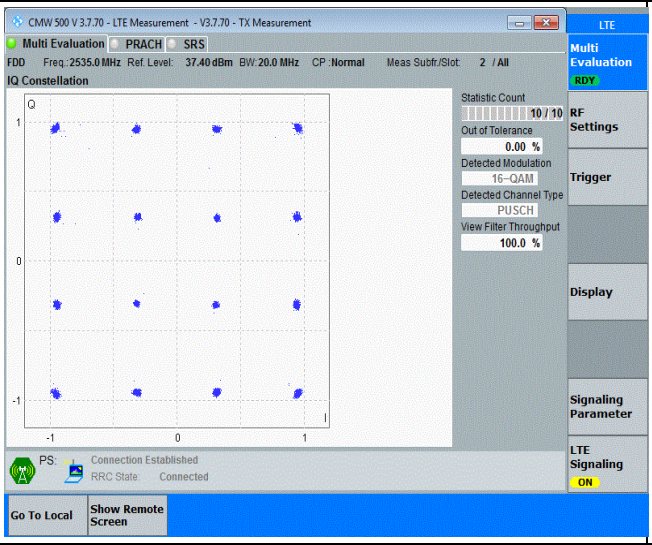



Band7-20MHz-QPSK-21100-100RB#0-PASS

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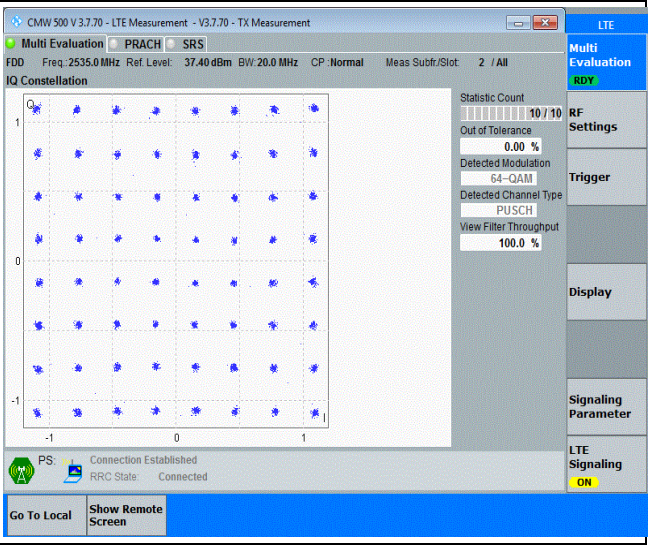


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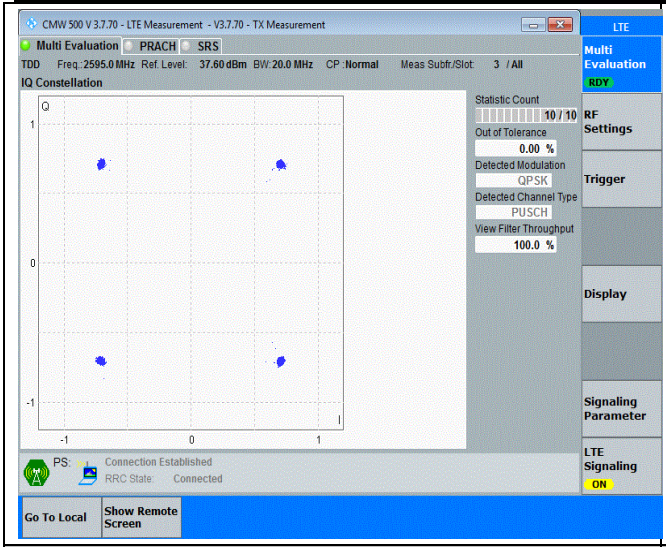
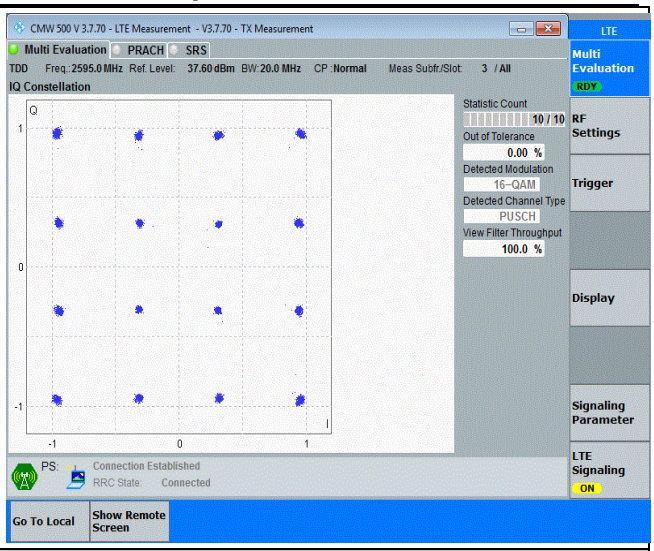



41(2535-2655)-20MHz-QPSK-40640-100RB#0-PASS

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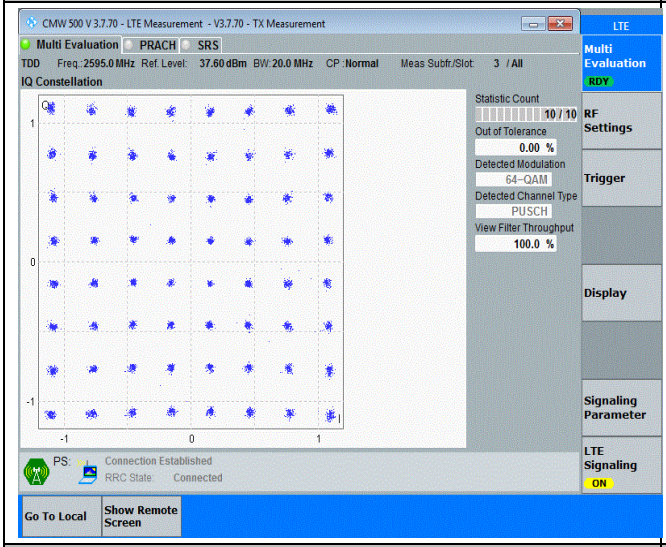


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