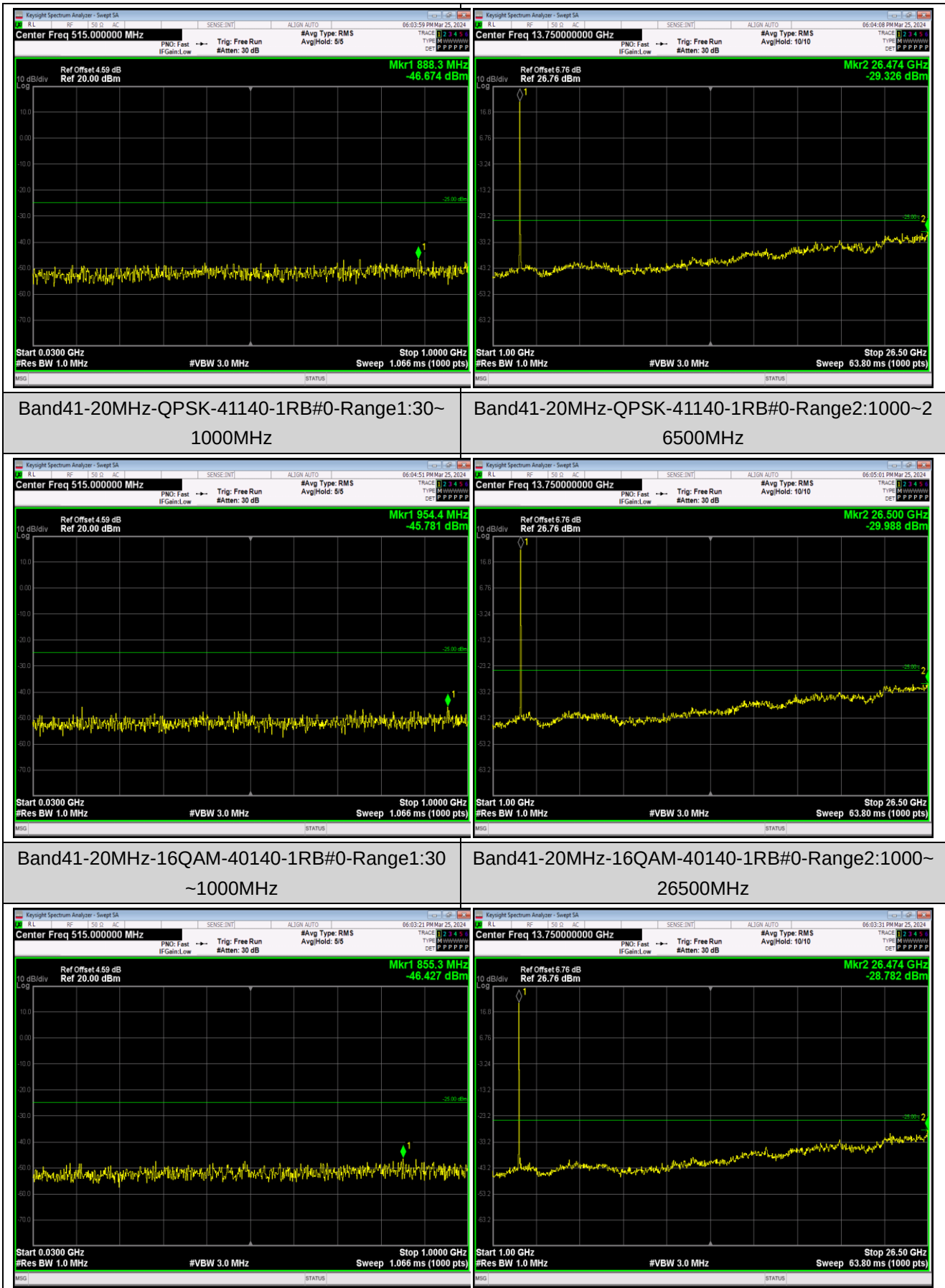
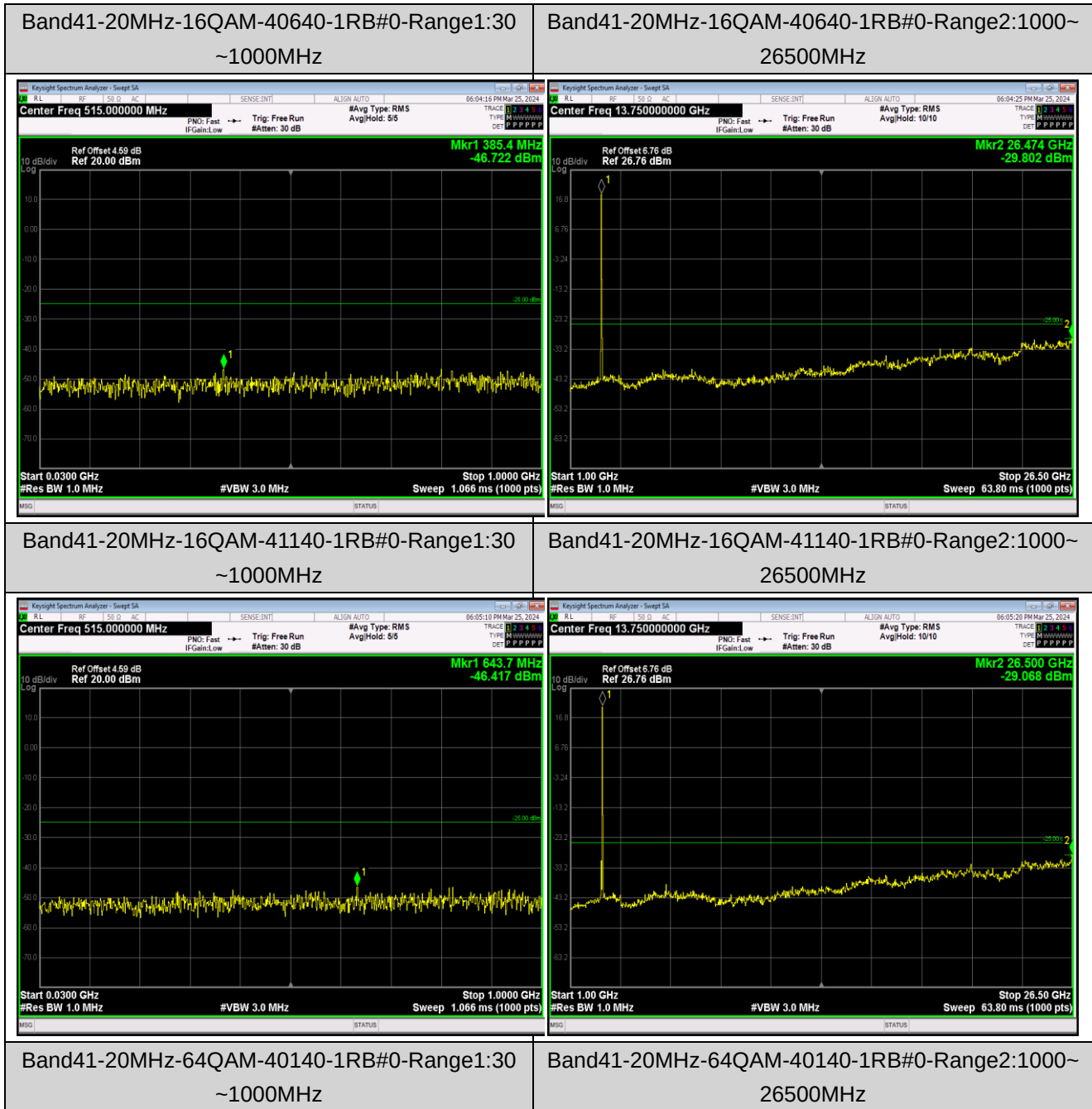
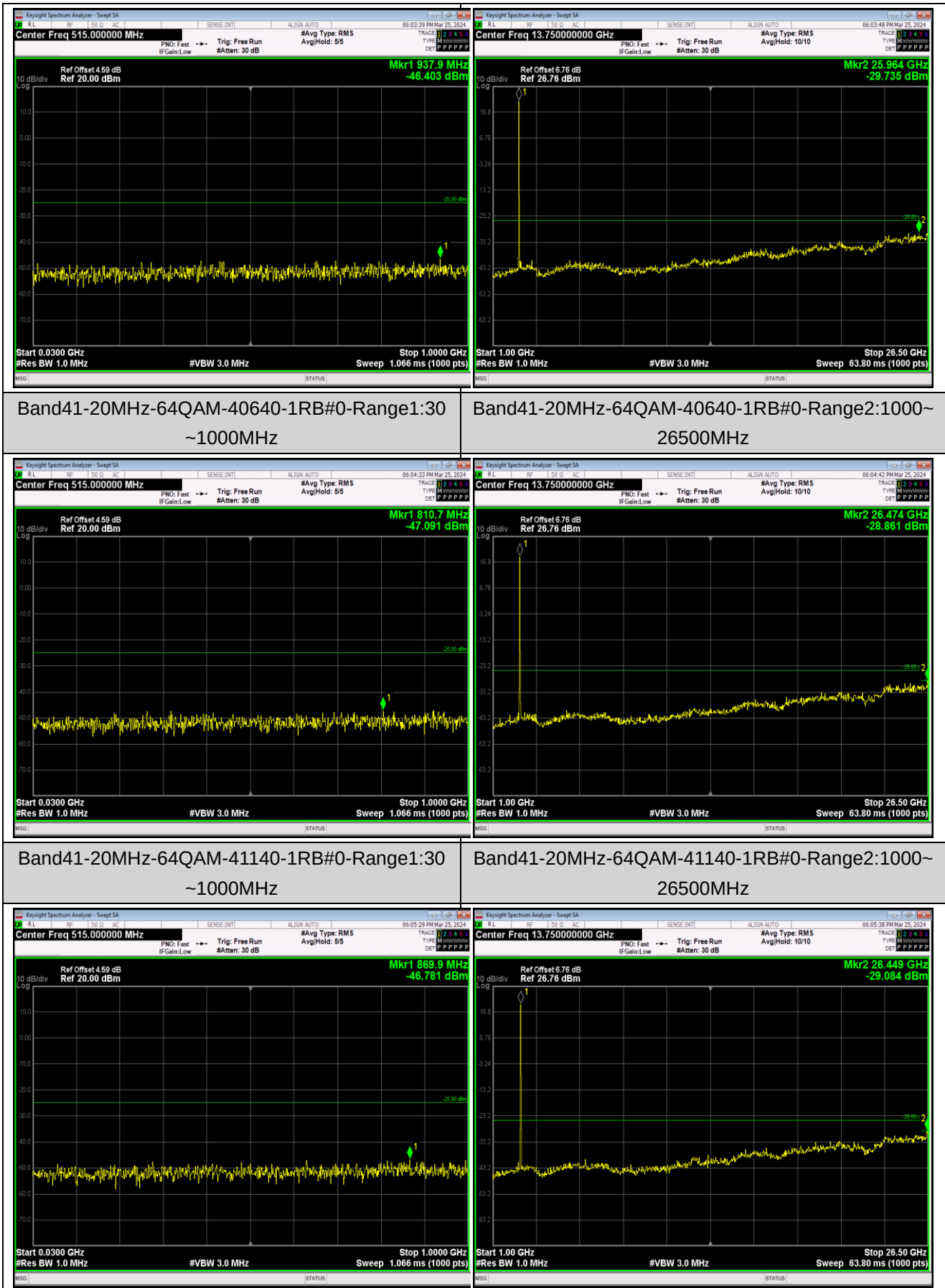








## Appendix F: Frequency Stability

LTE Band 2 part:

| Reference Frequency: LTE Band 2 (10MHz) Middle channel=18900 Frequency=1880.0MHz |                  |                 |           |                                   |        |
|----------------------------------------------------------------------------------|------------------|-----------------|-----------|-----------------------------------|--------|
| Temperature                                                                      |                  |                 |           |                                   |        |
| Power supplied (Vdc)                                                             | Temperature (°C) | Frequency error |           | Limit (ppm)                       | Result |
|                                                                                  |                  | Hz              | ppm       |                                   |        |
| QPSK                                                                             |                  |                 |           |                                   |        |
| 3.85                                                                             | -30              | -49.92          | -0.026553 | Within authorized band for Band 2 | Pass   |
|                                                                                  | -20              | -22.26          | -0.011840 |                                   |        |
|                                                                                  | -10              | -35.39          | -0.018824 |                                   |        |
|                                                                                  | 0                | -55.76          | -0.029660 |                                   |        |
|                                                                                  | 10               | -38.65          | -0.020559 |                                   |        |
|                                                                                  | 20               | -45.50          | -0.024202 |                                   |        |
|                                                                                  | 30               | -25.45          | -0.013537 |                                   |        |
|                                                                                  | 40               | -40.33          | -0.021452 |                                   |        |
|                                                                                  | 50               | -23.66          | -0.012585 |                                   |        |
| 16QAM                                                                            |                  |                 |           |                                   |        |
| 3.85                                                                             | -30              | 19.61           | 0.010431  | Within authorized band for Band 2 | Pass   |
|                                                                                  | -20              | 35.95           | 0.019122  |                                   |        |
|                                                                                  | -10              | 7.72            | 0.004106  |                                   |        |
|                                                                                  | 0                | 40.20           | 0.021383  |                                   |        |
|                                                                                  | 10               | 35.99           | 0.019144  |                                   |        |
|                                                                                  | 20               | 36.62           | 0.019479  |                                   |        |
|                                                                                  | 30               | 19.37           | 0.010303  |                                   |        |
|                                                                                  | 40               | 25.88           | 0.013766  |                                   |        |
|                                                                                  | 50               | 22.49           | 0.011963  |                                   |        |
| 64QAM                                                                            |                  |                 |           |                                   |        |
| 3.85                                                                             | -30              | 31.84           | 0.016936  | Within authorized band for Band 2 | Pass   |
|                                                                                  | -20              | 58.49           | 0.031112  |                                   |        |
|                                                                                  | -10              | 40.83           | 0.021718  |                                   |        |
|                                                                                  | 0                | -15.92          | -0.008468 |                                   |        |
|                                                                                  | 10               | 12.57           | 0.006686  |                                   |        |
|                                                                                  | 20               | 33.83           | 0.017995  |                                   |        |
|                                                                                  | 30               | 47.05           | 0.025027  |                                   |        |
|                                                                                  | 40               | 22.87           | 0.012165  |                                   |        |
|                                                                                  | 50               | 26.45           | 0.014069  |                                   |        |

| Voltage                                                                                                          |                         |                 |           |                                      |        |
|------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|-----------|--------------------------------------|--------|
| Temperature<br>(°C)                                                                                              | Power supplied<br>(Vdc) | Frequency error |           | Limit (ppm)                          | Result |
|                                                                                                                  |                         | Hz              | ppm       |                                      |        |
| QPSK                                                                                                             |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | -30.30          | -0.016117 | Within authorized<br>band for Band 2 | Pass   |
|                                                                                                                  | 3.85                    | 21.80           | 0.011596  |                                      |        |
|                                                                                                                  | 4.40                    | -37.77          | -0.020090 |                                      |        |
| 16QAM                                                                                                            |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | -11.89          | -0.006324 | Within authorized<br>band for Band 2 | Pass   |
|                                                                                                                  | 3.85                    | -49.68          | -0.026426 |                                      |        |
|                                                                                                                  | 4.40                    | 53.57           | 0.028495  |                                      |        |
| 64QAM                                                                                                            |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | 48.14           | 0.025606  | Within authorized<br>band for Band 2 | Pass   |
|                                                                                                                  | 3.85                    | 42.82           | 0.022777  |                                      |        |
|                                                                                                                  | 4.40                    | 42.80           | 0.022766  |                                      |        |
| 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<br>(Vdc)                                                         | Temperature<br>(℃) | Frequency error |           | Limit (ppm)                          | Result |
|                                                                                 |                    | Hz              | ppm       |                                      |        |
| QPSK                                                                            |                    |                 |           |                                      |        |
| 3.85                                                                            | -30                | -20.56          | -0.011867 | Within authorized<br>band for Band 4 | Pass   |
|                                                                                 | -20                | -10.59          | -0.006113 |                                      |        |
|                                                                                 | -10                | -7.30           | -0.004214 |                                      |        |
|                                                                                 | 0                  | -15.03          | -0.008675 |                                      |        |
|                                                                                 | 10                 | -46.66          | -0.026932 |                                      |        |
|                                                                                 | 20                 | -21.27          | -0.012277 |                                      |        |
|                                                                                 | 30                 | -13.33          | -0.007694 |                                      |        |
|                                                                                 | 40                 | -40.74          | -0.023515 |                                      |        |
|                                                                                 | 50                 | -24.59          | -0.014193 |                                      |        |
| 16QAM                                                                           |                    |                 |           |                                      |        |
| 3.85                                                                            | -30                | 18.57           | 0.010719  | Within authorized<br>band for Band 4 | Pass   |
|                                                                                 | -20                | 42.16           | 0.024335  |                                      |        |
|                                                                                 | -10                | 21.90           | 0.012641  |                                      |        |
|                                                                                 | 0                  | 23.42           | 0.013518  |                                      |        |
|                                                                                 | 10                 | 29.04           | 0.016762  |                                      |        |
|                                                                                 | 20                 | 27.72           | 0.016000  |                                      |        |
|                                                                                 | 30                 | 48.19           | 0.027815  |                                      |        |
|                                                                                 | 40                 | 17.72           | 0.010228  |                                      |        |
|                                                                                 | 50                 | 37.36           | 0.021564  |                                      |        |
| 64QAM                                                                           |                    |                 |           |                                      |        |
| 3.85                                                                            | -30                | 48.74           | 0.028133  | Within authorized<br>band for Band 4 | Pass   |
|                                                                                 | -20                | 21.19           | 0.012231  |                                      |        |
|                                                                                 | -10                | 40.40           | 0.023319  |                                      |        |
|                                                                                 | 0                  | -19.31          | -0.011146 |                                      |        |
|                                                                                 | 10                 | 27.92           | 0.016115  |                                      |        |
|                                                                                 | 20                 | 37.22           | 0.021483  |                                      |        |
|                                                                                 | 30                 | 23.12           | 0.013345  |                                      |        |
|                                                                                 | 40                 | 38.45           | 0.022193  |                                      |        |
|                                                                                 | 50                 | 29.80           | 0.017201  |                                      |        |

| Voltage                                                                                                          |                         |                 |           |                                      |        |
|------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|-----------|--------------------------------------|--------|
| Temperature<br>(°C)                                                                                              | Power supplied<br>(Vdc) | Frequency error |           | Limit (ppm)                          | Result |
|                                                                                                                  |                         | Hz              | ppm       |                                      |        |
| QPSK                                                                                                             |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | -16.11          | -0.009299 | Within authorized<br>band for Band 4 | Pass   |
|                                                                                                                  | 3.85                    | 18.61           | 0.010742  |                                      |        |
|                                                                                                                  | 4.40                    | -33.47          | -0.019319 |                                      |        |
| 16QAM                                                                                                            |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | -12.73          | -0.007348 | Within authorized<br>band for Band 4 | Pass   |
|                                                                                                                  | 3.85                    | -44.98          | -0.025962 |                                      |        |
|                                                                                                                  | 4.40                    | 31.89           | 0.018407  |                                      |        |
| 64QAM                                                                                                            |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | 37.89           | 0.021870  | Within authorized<br>band for Band 4 | Pass   |
|                                                                                                                  | 3.85                    | -18.35          | -0.010592 |                                      |        |
|                                                                                                                  | 4.40                    | 33.72           | 0.019463  |                                      |        |
| 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<br>(Vdc)                                                        | Temperature<br>(℃) | Frequency error |           | Limit (ppm) | Result |
|                                                                                |                    | Hz              | ppm       |             |        |
| QPSK                                                                           |                    |                 |           |             |        |
| 3.85                                                                           | -30                | -35.68          | -0.042654 | ±2.5        | Pass   |
|                                                                                | -20                | -49.92          | -0.059677 |             |        |
|                                                                                | -10                | -11.33          | -0.013545 |             |        |
|                                                                                | 0                  | -23.52          | -0.028117 |             |        |
|                                                                                | 10                 | -28.01          | -0.033485 |             |        |
|                                                                                | 20                 | -37.01          | -0.044244 |             |        |
|                                                                                | 30                 | -45.50          | -0.054393 |             |        |
|                                                                                | 40                 | -47.98          | -0.057358 |             |        |
|                                                                                | 50                 | 4.23            | 0.005057  |             |        |
| 16QAM                                                                          |                    |                 |           |             |        |
| 3.85                                                                           | -30                | 10.80           | 0.012911  | ±2.5        | Pass   |
|                                                                                | -20                | 22.85           | 0.027316  |             |        |
|                                                                                | -10                | 30.18           | 0.036079  |             |        |
|                                                                                | 0                  | 34.49           | 0.041231  |             |        |
|                                                                                | 10                 | 43.95           | 0.052540  |             |        |
|                                                                                | 20                 | 44.36           | 0.053030  |             |        |
|                                                                                | 30                 | 45.96           | 0.054943  |             |        |
|                                                                                | 40                 | 12.13           | 0.014501  |             |        |
|                                                                                | 50                 | 8.41            | 0.010054  |             |        |
| 64QAM                                                                          |                    |                 |           |             |        |
| 3.85                                                                           | -30                | 38.88           | 0.046479  | ±2.5        | Pass   |
|                                                                                | -20                | 4.15            | 0.004961  |             |        |
|                                                                                | -10                | 21.44           | 0.025631  |             |        |
|                                                                                | 0                  | 32.50           | 0.038852  |             |        |
|                                                                                | 10                 | 35.58           | 0.042534  |             |        |
|                                                                                | 20                 | 50.01           | 0.059785  |             |        |
|                                                                                | 30                 | 6.84            | 0.008177  |             |        |
|                                                                                | 40                 | 18.90           | 0.022594  |             |        |
|                                                                                | 50                 | 29.60           | 0.035386  |             |        |

| Voltage                                                                                                          |                         |                 |           |             |        |
|------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|-----------|-------------|--------|
| Temperature<br>(°C)                                                                                              | Power supplied<br>(Vdc) | Frequency error |           | Limit (ppm) | Result |
|                                                                                                                  |                         | Hz              | ppm       |             |        |
| QPSK                                                                                                             |                         |                 |           |             |        |
| 25                                                                                                               | 3.45                    | 7.85            | 0.009384  | ±2.5        | Pass   |
|                                                                                                                  | 3.85                    | 12.80           | 0.015302  |             |        |
|                                                                                                                  | 4.40                    | -13.28          | -0.015876 |             |        |
| 16QAM                                                                                                            |                         |                 |           |             |        |
| 25                                                                                                               | 3.45                    | 21.41           | 0.025595  | ±2.5        | Pass   |
|                                                                                                                  | 3.85                    | -8.45           | -0.010102 |             |        |
|                                                                                                                  | 4.40                    | 44.62           | 0.053341  |             |        |
| 64QAM                                                                                                            |                         |                 |           |             |        |
| 25                                                                                                               | 3.45                    | 39.18           | 0.046838  | ±2.5        | Pass   |
|                                                                                                                  | 3.85                    | 12.85           | 0.015362  |             |        |
|                                                                                                                  | 4.40                    | 16.29           | 0.019474  |             |        |
| 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<br>(Vdc)                                                         | Temperature<br>(℃) | Frequency error |           | Limit (ppm)                          | Result |
|                                                                                 |                    | Hz              | ppm       |                                      |        |
| QPSK                                                                            |                    |                 |           |                                      |        |
| 3.85                                                                            | -30                | -34.12          | -0.013460 | Within authorized<br>band for Band 7 | Pass   |
|                                                                                 | -20                | -59.82          | -0.023598 |                                      |        |
|                                                                                 | -10                | -67.25          | -0.026529 |                                      |        |
|                                                                                 | 0                  | -22.57          | -0.008903 |                                      |        |
|                                                                                 | 10                 | -58.99          | -0.023270 |                                      |        |
|                                                                                 | 20                 | -52.11          | -0.020556 |                                      |        |
|                                                                                 | 30                 | -18.50          | -0.007298 |                                      |        |
|                                                                                 | 40                 | -28.64          | -0.011298 |                                      |        |
|                                                                                 | 50                 | -45.82          | -0.018075 |                                      |        |
| 16QAM                                                                           |                    |                 |           |                                      |        |
| 3.85                                                                            | -30                | -29.24          | -0.011535 | Within authorized<br>band for Band 7 | Pass   |
|                                                                                 | -20                | -36.79          | -0.014513 |                                      |        |
|                                                                                 | -10                | -49.21          | -0.019412 |                                      |        |
|                                                                                 | 0                  | -47.06          | -0.018564 |                                      |        |
|                                                                                 | 10                 | -58.61          | -0.023120 |                                      |        |
|                                                                                 | 20                 | -39.17          | -0.015452 |                                      |        |
|                                                                                 | 30                 | -41.33          | -0.016304 |                                      |        |
|                                                                                 | 40                 | -41.28          | -0.016284 |                                      |        |
|                                                                                 | 50                 | -15.88          | -0.006264 |                                      |        |
| 64QAM                                                                           |                    |                 |           |                                      |        |
| 3.85                                                                            | -30                | 58.95           | 0.023254  | Within authorized<br>band for Band 7 | Pass   |
|                                                                                 | -20                | 25.45           | 0.010039  |                                      |        |
|                                                                                 | -10                | 24.35           | 0.009606  |                                      |        |
|                                                                                 | 0                  | -20.24          | -0.007984 |                                      |        |
|                                                                                 | 10                 | -25.08          | -0.009893 |                                      |        |
|                                                                                 | 20                 | -56.42          | -0.022256 |                                      |        |
|                                                                                 | 30                 | -23.53          | -0.009282 |                                      |        |
|                                                                                 | 40                 | 13.43           | 0.005298  |                                      |        |
|                                                                                 | 50                 | -52.90          | -0.020868 |                                      |        |

| Voltage                                                                                                          |                         |                 |           |                                      |        |
|------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|-----------|--------------------------------------|--------|
| Temperature<br>(°C)                                                                                              | Power supplied<br>(Vdc) | Frequency error |           | Limit (ppm)                          | Result |
|                                                                                                                  |                         | Hz              | ppm       |                                      |        |
| QPSK                                                                                                             |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | -50.65          | -0.019980 | Within authorized<br>band for Band 7 | Pass   |
|                                                                                                                  | 3.85                    | -76.58          | -0.030209 |                                      |        |
|                                                                                                                  | 4.40                    | -26.25          | -0.010355 |                                      |        |
| 16QAM                                                                                                            |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | -42.29          | -0.016682 | Within authorized<br>band for Band 7 | Pass   |
|                                                                                                                  | 3.85                    | -21.04          | -0.008300 |                                      |        |
|                                                                                                                  | 4.40                    | -21.44          | -0.008458 |                                      |        |
| 64QAM                                                                                                            |                         |                 |           |                                      |        |
| 25                                                                                                               | 3.45                    | 26.79           | 0.010568  | Within authorized<br>band for Band 7 | Pass   |
|                                                                                                                  | 3.85                    | -18.87          | -0.007444 |                                      |        |
|                                                                                                                  | 4.40                    | 32.70           | 0.012899  |                                      |        |
| 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 (°C) | Frequency error |           | Limit (ppm)                        | Result |
|                                                                                   |                  | Hz              | ppm       |                                    |        |
| QPSK                                                                              |                  |                 |           |                                    |        |
| 3.85                                                                              | -30              | -17.27          | -0.006655 | Within authorized band for Band 41 | Pass   |
|                                                                                   | -20              | 22.77           | 0.008775  |                                    |        |
|                                                                                   | -10              | -27.85          | -0.010732 |                                    |        |
|                                                                                   | 0                | -47.86          | -0.018443 |                                    |        |
|                                                                                   | 10               | -65.79          | -0.025353 |                                    |        |
|                                                                                   | 20               | -38.44          | -0.014813 |                                    |        |
|                                                                                   | 30               | -44.16          | -0.017017 |                                    |        |
|                                                                                   | 40               | -56.83          | -0.021900 |                                    |        |
|                                                                                   | 50               | -62.18          | -0.023961 |                                    |        |
| 16QAM                                                                             |                  |                 |           |                                    |        |
| 3.85                                                                              | -30              | 26.65           | 0.010270  | Within authorized band for Band 41 | Pass   |
|                                                                                   | -20              | 46.22           | 0.017811  |                                    |        |
|                                                                                   | -10              | -17.22          | -0.006636 |                                    |        |
|                                                                                   | 0                | -42.20          | -0.016262 |                                    |        |
|                                                                                   | 10               | -40.11          | -0.015457 |                                    |        |
|                                                                                   | 20               | -33.19          | -0.012790 |                                    |        |
|                                                                                   | 30               | -53.50          | -0.020617 |                                    |        |
|                                                                                   | 40               | -30.54          | -0.011769 |                                    |        |
|                                                                                   | 50               | -34.48          | -0.013287 |                                    |        |
| 64QAM                                                                             |                  |                 |           |                                    |        |
| 3.85                                                                              | -30              | 55.96           | 0.021565  | Within authorized band for Band 41 | Pass   |
|                                                                                   | -20              | 43.17           | 0.016636  |                                    |        |
|                                                                                   | -10              | -55.49          | -0.021383 |                                    |        |
|                                                                                   | 0                | 19.64           | 0.007568  |                                    |        |
|                                                                                   | 10               | 25.71           | 0.009908  |                                    |        |
|                                                                                   | 20               | 28.90           | 0.011137  |                                    |        |
|                                                                                   | 30               | 39.02           | 0.015037  |                                    |        |
|                                                                                   | 40               | 44.12           | 0.017002  |                                    |        |
|                                                                                   | 50               | 51.91           | 0.020004  |                                    |        |

| Voltage                                                                                                          |                         |                 |           |                                       |        |
|------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|-----------|---------------------------------------|--------|
| Temperature<br>(°C)                                                                                              | Power supplied<br>(Vdc) | Frequency error |           | Limit (ppm)                           | Result |
|                                                                                                                  |                         | Hz              | ppm       |                                       |        |
| QPSK                                                                                                             |                         |                 |           |                                       |        |
| 25                                                                                                               | 3.45                    | -33.87          | -0.013052 | Within authorized<br>band for Band 41 | Pass   |
|                                                                                                                  | 3.85                    | 38.50           | 0.014836  |                                       |        |
|                                                                                                                  | 4.40                    | -45.53          | -0.017545 |                                       |        |
| 16QAM                                                                                                            |                         |                 |           |                                       |        |
| 25                                                                                                               | 3.45                    | -17.31          | -0.006671 | Within authorized<br>band for Band41  | Pass   |
|                                                                                                                  | 3.85                    | -15.36          | -0.005919 |                                       |        |
|                                                                                                                  | 4.40                    | 11.83           | 0.004559  |                                       |        |
| 64QAM                                                                                                            |                         |                 |           |                                       |        |
| 25                                                                                                               | 3.45                    | 38.88           | 0.014983  | Within authorized<br>band for Band41  | Pass   |
|                                                                                                                  | 3.85                    | -33.29          | -0.012829 |                                       |        |
|                                                                                                                  | 4.40                    | 23.15           | 0.008921  |                                       |        |
| 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 | Result | Verdict |
|--------|-----------|------------|---------|------------------|--------|---------|
| Band2  | 20MHz     | QPSK       | 18900   | 100RB#0          | PASS   | PASS    |
| Band2  | 20MHz     | 16QAM      | 18900   | 100RB#0          | PASS   | PASS    |
| Band2  | 20MHz     | 64QAM      | 18900   | 100RB#0          | PASS   | PASS    |
| Band4  | 20MHz     | QPSK       | 20175   | 100RB#0          | PASS   | PASS    |
| Band4  | 20MHz     | 16QAM      | 20175   | 100RB#0          | PASS   | PASS    |
| Band4  | 20MHz     | 64QAM      | 20175   | 100RB#0          | PASS   | PASS    |
| Band5  | 10MHz     | QPSK       | 20525   | 50RB#0           | PASS   | PASS    |
| Band5  | 10MHz     | 16QAM      | 20525   | 50RB#0           | PASS   | PASS    |
| Band5  | 10MHz     | 64QAM      | 20525   | 50RB#0           | PASS   | PASS    |
| Band7  | 20MHz     | QPSK       | 21100   | 100RB#0          | PASS   | PASS    |
| Band7  | 20MHz     | 16QAM      | 21100   | 100RB#0          | PASS   | PASS    |
| Band7  | 20MHz     | 64QAM      | 21100   | 100RB#0          | PASS   | PASS    |
| Band41 | 20MHz     | QPSK       | 40640   | 100RB#0          | PASS   | PASS    |
| Band41 | 20MHz     | 16QAM      | 40640   | 100RB#0          | PASS   | PASS    |
| Band41 | 20MHz     | 64QAM      | 40640   | 100RB#0          | PASS   | PASS    |

Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.

## Test Graphs

