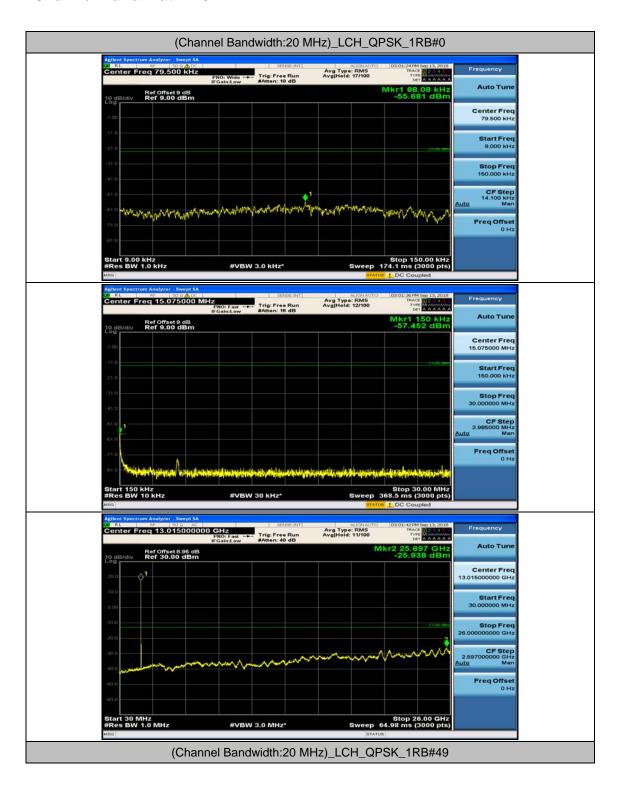




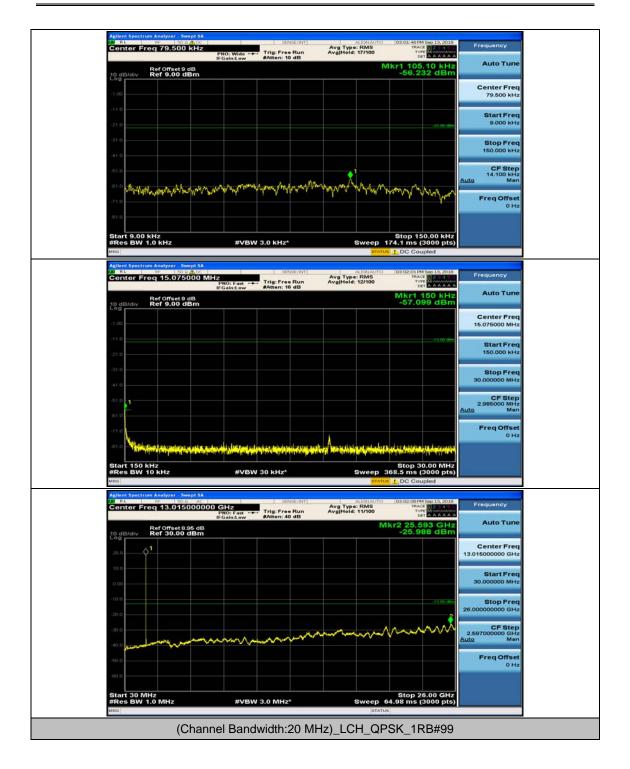


#### **Channel Bandwidth: 20 MHz**



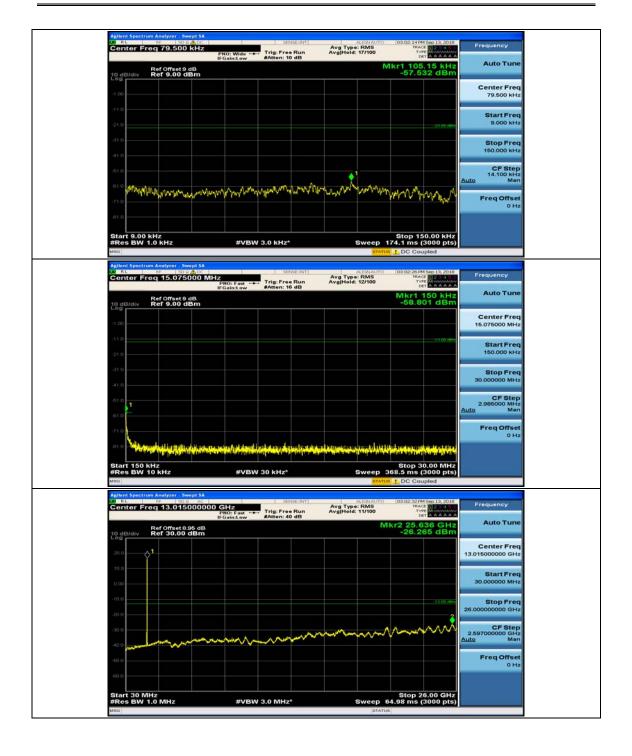




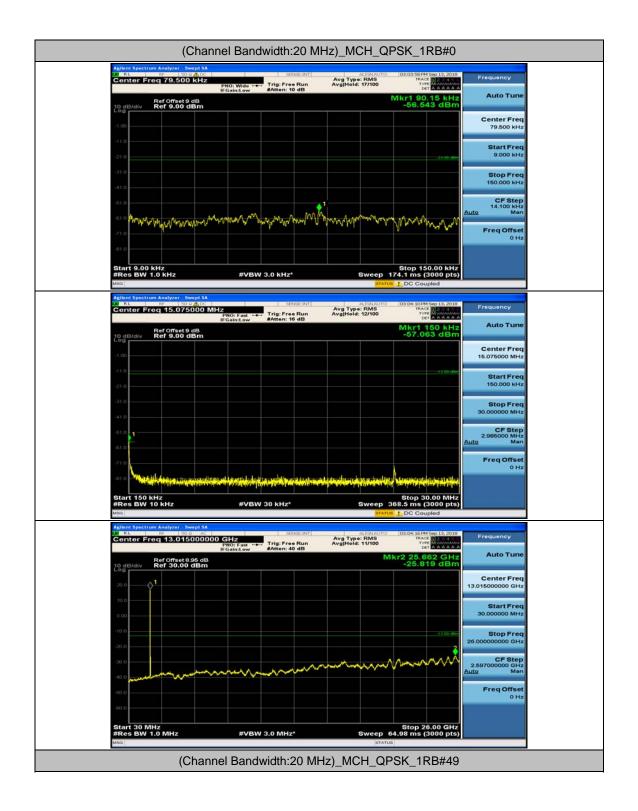






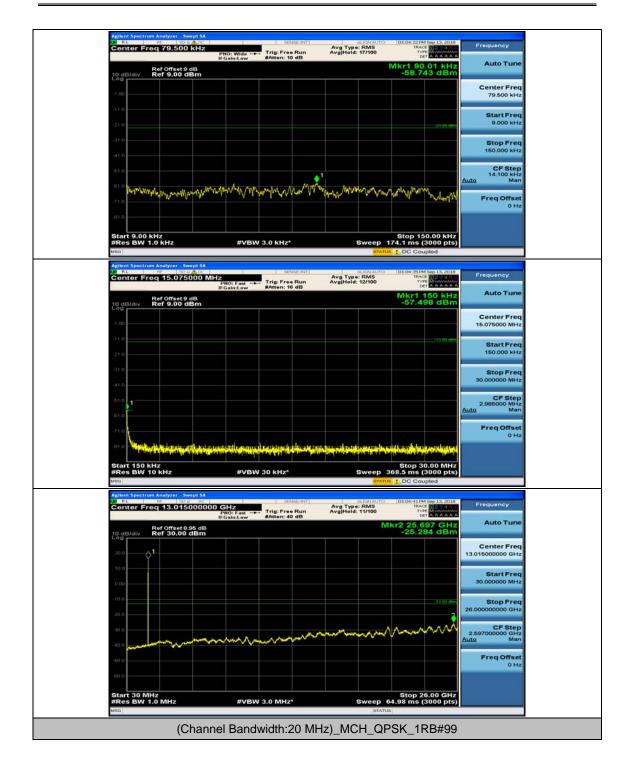






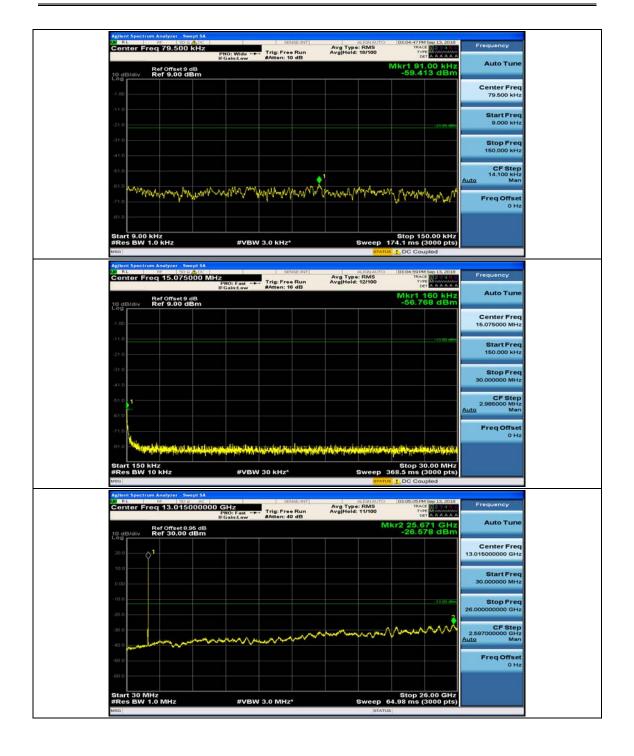




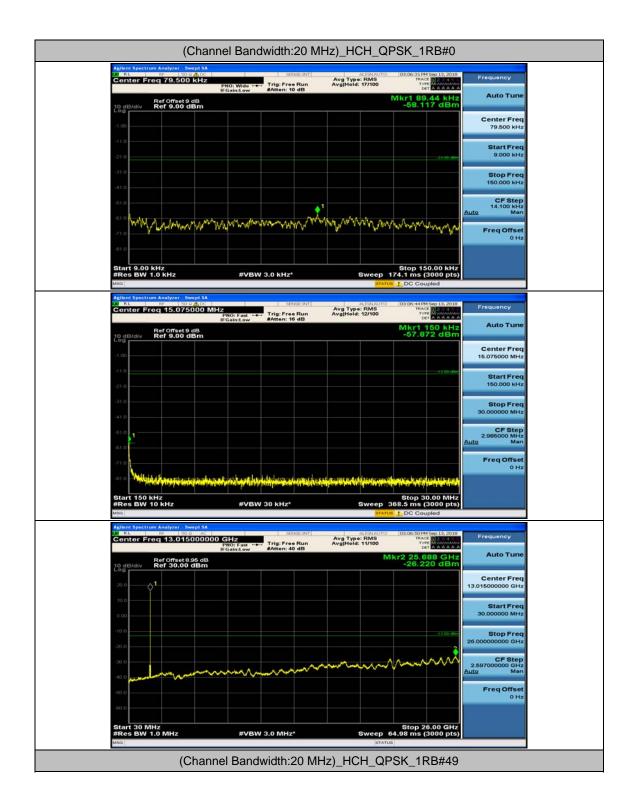






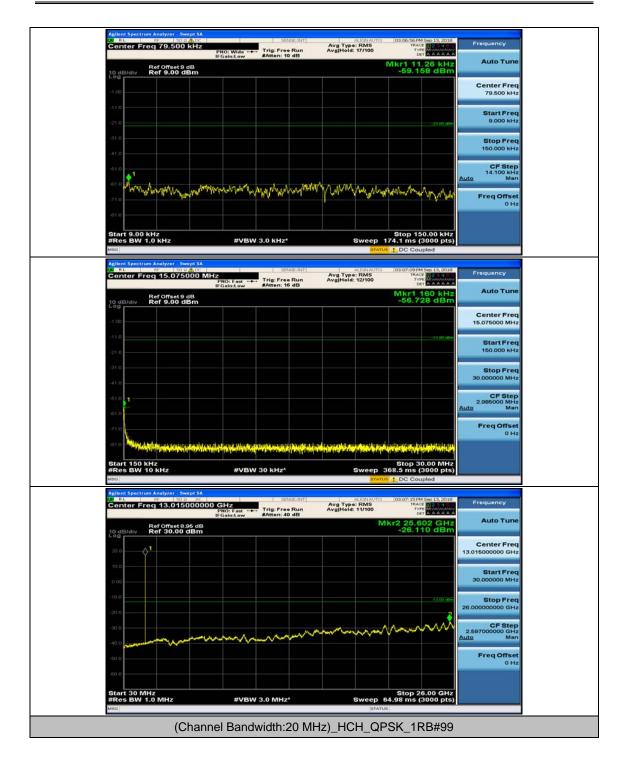






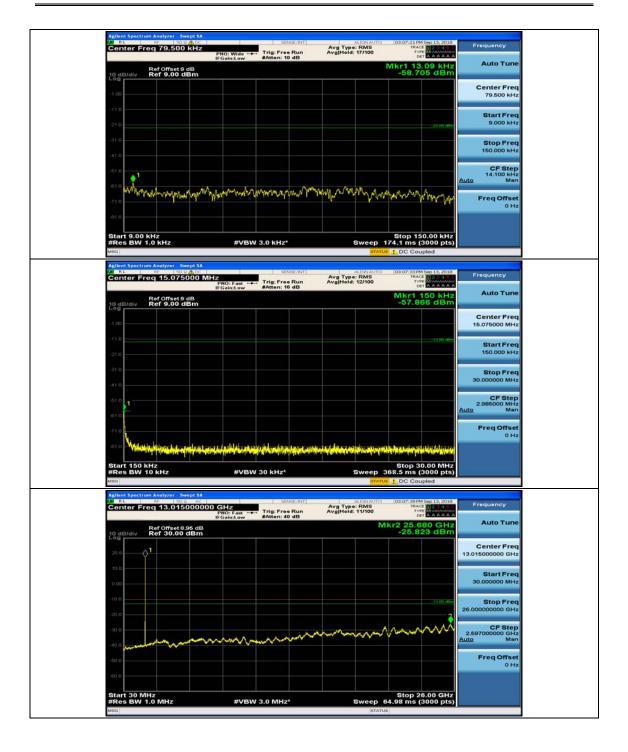




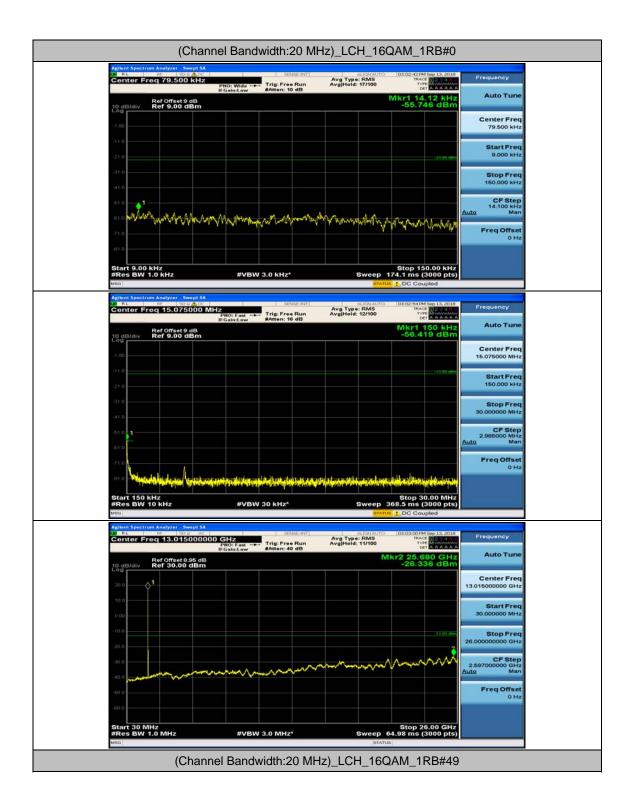






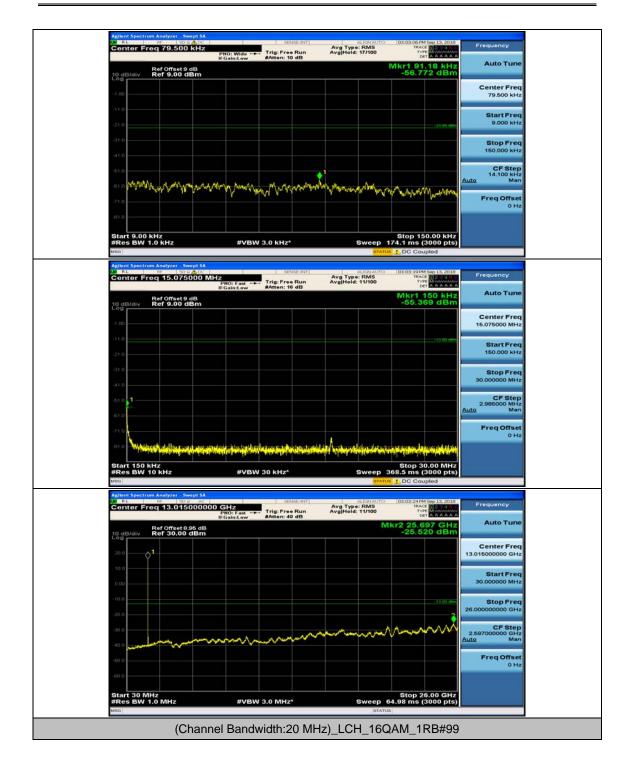






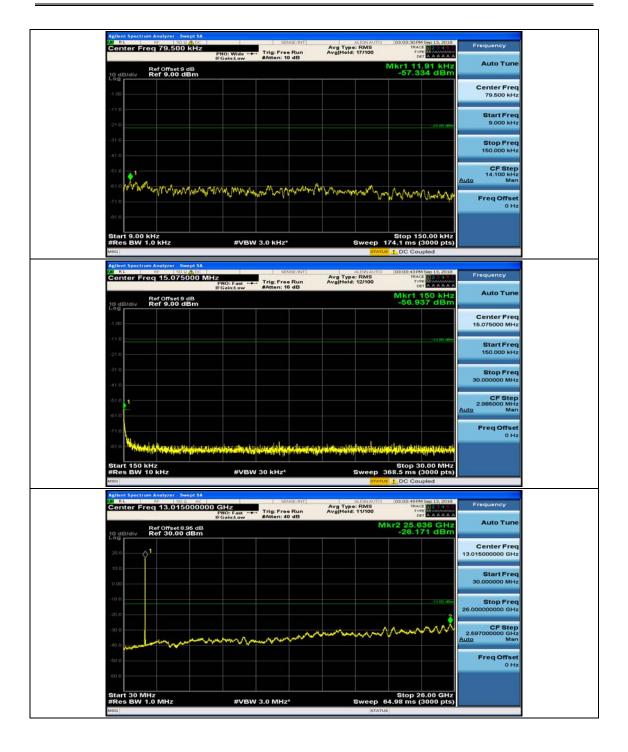




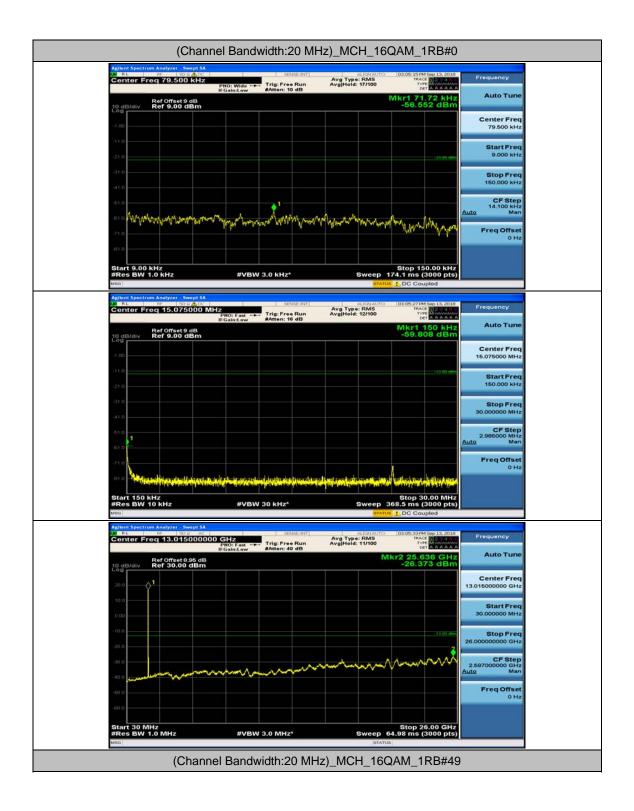






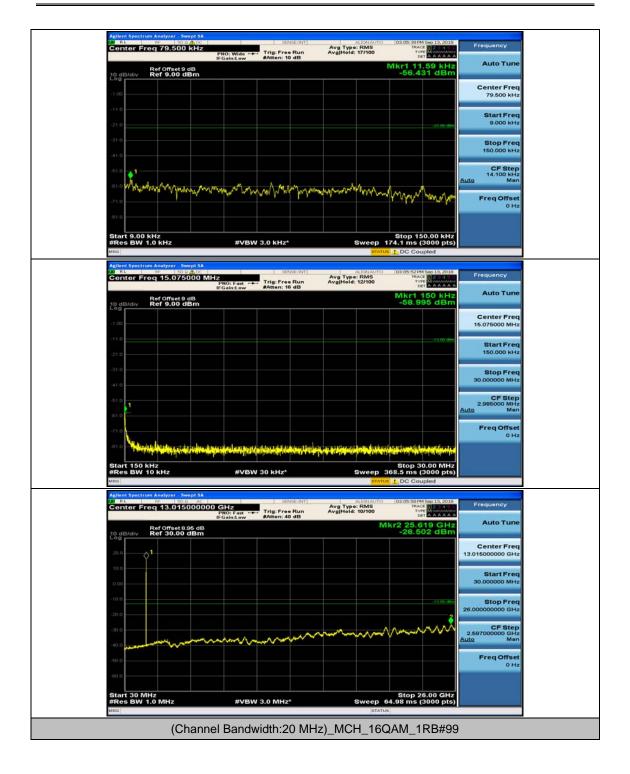






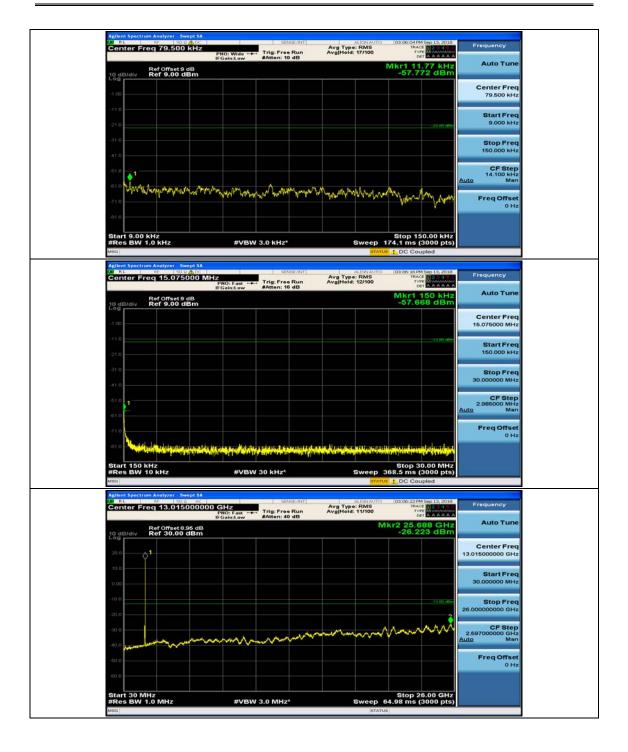




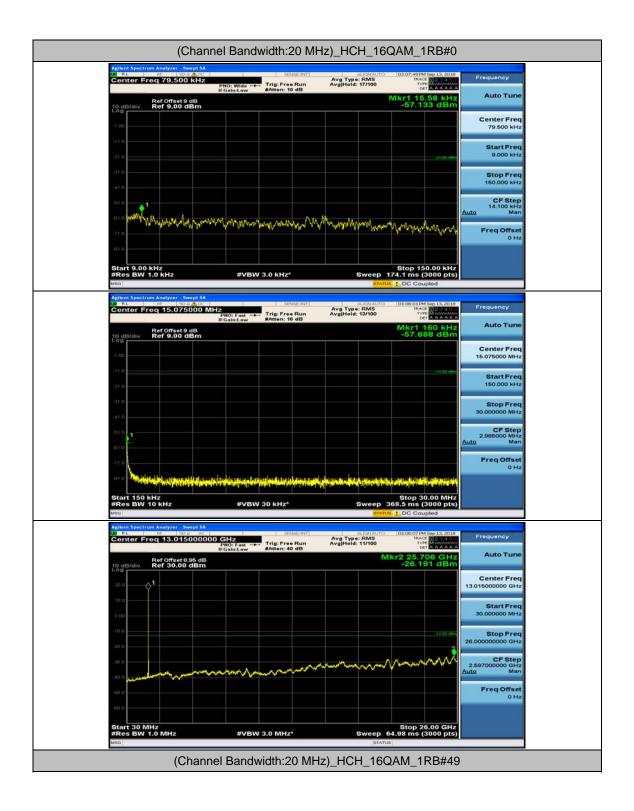






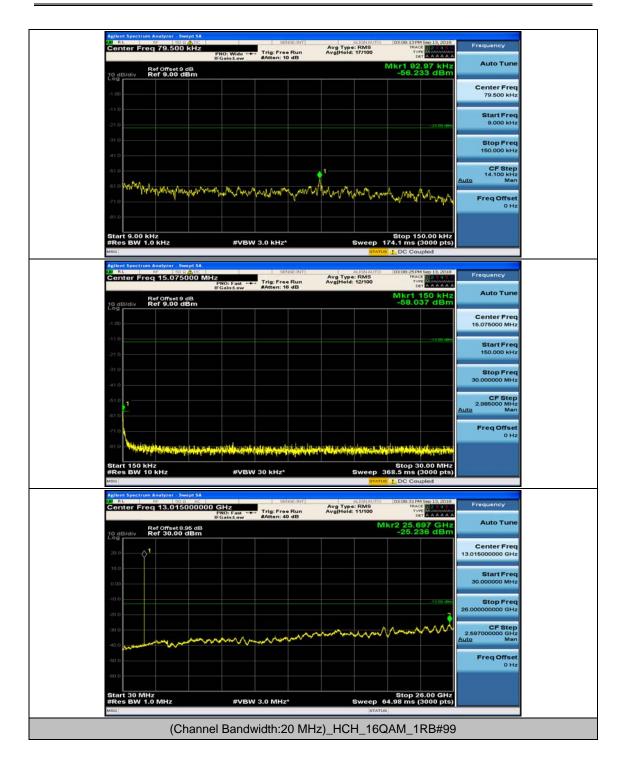






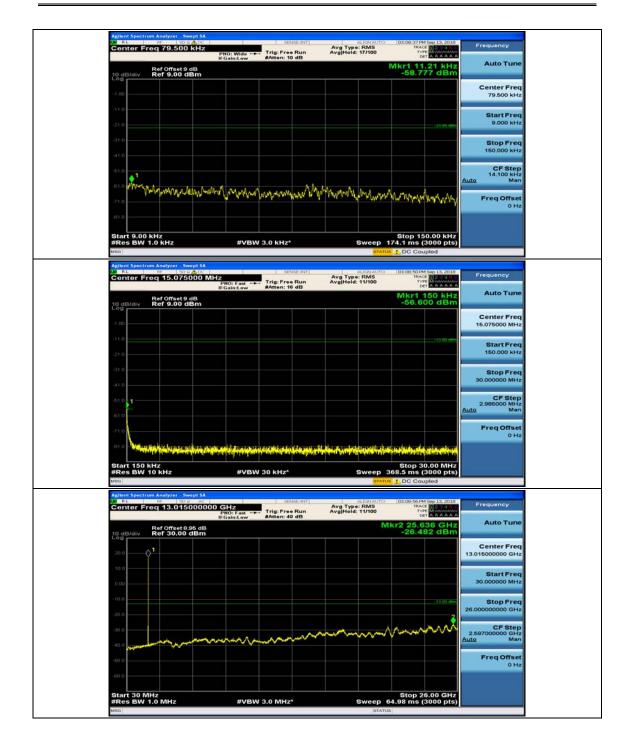
















# **Appendix F: Frequency Stability**

# **Test Result**

**Channel Bandwidth: 1.4 MHz** 

|            |             |                  | Channel Band        | width: 1.4 MHz    |                    |                |         |
|------------|-------------|------------------|---------------------|-------------------|--------------------|----------------|---------|
|            |             |                  |                     | tage              |                    |                |         |
| Modulation | Channel     | Voltage<br>[Vdc] | Temperature<br>(°ℂ) | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |             | VL               | TN                  | 4.43              | 0.002590           | ± 2.5          | PASS    |
|            | LCH         | VN               | TN                  | -0.36             | -0.000210          | ± 2.5          | PASS    |
|            |             | VH               | TN                  | 1.14              | 0.000666           | ± 2.5          | PASS    |
|            |             | VL               | TN                  | -0.4              | -0.000231          | ± 2.5          | PASS    |
| QPSK       | MCH         | VN               | TN                  | -1.24             | -0.000716          | ± 2.5          | PASS    |
|            |             | VH               | TN                  | -1.48             | -0.000854          | ± 2.5          | PASS    |
|            |             | VL               | TN                  | 2.21              | 0.001260           | ± 2.5          | PASS    |
|            | HCH         | VN               | TN                  | 2.25              | 0.001283           | ± 2.5          | PASS    |
|            |             | VH               | TN                  | 4.98              | 0.002839           | ± 2.5          | PASS    |
|            |             | VL               | TN                  | 4.69              | 0.002742           | ± 2.5          | PASS    |
|            | LCH         | VN               | TN                  | 2.66              | 0.001555           | ± 2.5          | PASS    |
|            |             | VH               | TN                  | 4.09              | 0.002391           | ± 2.5          | PASS    |
|            |             | VL               | TN                  | 4.87              | 0.002811           | ± 2.5          | PASS    |
| 16QAM      | MCH         | VN               | TN                  | -1.52             | -0.000877          | ± 2.5          | PASS    |
|            |             | VH               | TN                  | 1.33              | 0.000768           | ± 2.5          | PASS    |
|            | НСН         | VL               | TN                  | 0.82              | 0.000467           | ± 2.5          | PASS    |
|            |             | VN               | TN                  | 3.92              | 0.002235           | ± 2.5          | PASS    |
|            |             | VH               | TN                  | 0.33              | 0.000188           | ± 2.5          | PASS    |
|            |             |                  | Tempe               | erature           |                    | •              |         |
| Modulation | Channe<br>I | Voltage<br>[Vdc] | Temperature<br>(℃)  | Deviation<br>(Hz) | Deviation (ppm)    | Limit<br>(ppm) | Verdict |
|            |             | VN               | -30                 | 0.83              | 0.000485           | ± 2.5          | PASS    |
|            |             | VN               | -20                 | 3.58              | 0.002093           | ± 2.5          | PASS    |
|            |             | VN               | -10                 | 0.12              | 0.000070           | ± 2.5          | PASS    |
|            |             | VN               | 0                   | -1.65             | -0.000965          | ± 2.5          | PASS    |
| QPSK       | LCH         | VN               | 10                  | -1.67             | -0.000976          | ± 2.5          | PASS    |
| WF3N       |             | VN               | 20                  | 1.57              | 0.000918           | ± 2.5          | PASS    |
|            |             | VN               | 30                  | 3.87              | 0.002262           | ± 2.5          | PASS    |
|            |             | VN               | 40                  | -1.45             | -0.000848          | ± 2.5          | PASS    |
|            |             | VN               | 50                  | -1.67             | -0.000976          | ± 2.5          | PASS    |
|            | MCH         | VN               | -30                 | 1.52              | 0.000877           | ± 2.5          | PASS    |



|       |      | VN | -20 | 3.93  | 0.002268  | ± 2.5 | PASS |
|-------|------|----|-----|-------|-----------|-------|------|
|       |      | VN | -10 | 0.59  | 0.000341  | ± 2.5 | PASS |
|       |      | VN | 0   | 3.07  | 0.001772  | ± 2.5 | PASS |
|       |      | VN | 10  | 2.92  | 0.001685  | ± 2.5 | PASS |
|       |      | VN | 20  | 0.95  | 0.000548  | ± 2.5 | PASS |
|       |      | VN | 30  | 0.87  | 0.000502  | ± 2.5 | PASS |
|       |      | VN | 40  | 1.79  | 0.001033  | ± 2.5 | PASS |
|       |      | VN | 50  | 1.81  | 0.001045  | ± 2.5 | PASS |
|       |      | VN | -30 | 2.64  | 0.001505  | ± 2.5 | PASS |
|       |      | VN | -20 | 3.25  | 0.001853  | ± 2.5 | PASS |
|       |      | VN | -10 | 2.9   | 0.001653  | ± 2.5 | PASS |
|       |      | VN | 0   | 4.91  | 0.002799  | ± 2.5 | PASS |
|       | HCH  | VN | 10  | -0.48 | -0.000274 | ± 2.5 | PASS |
|       |      | VN | 20  | 4.64  | 0.002645  | ± 2.5 | PASS |
|       |      | VN | 30  | -1.93 | -0.001100 | ± 2.5 | PASS |
|       |      | VN | 40  | -1.85 | -0.001055 | ± 2.5 | PASS |
|       |      | VN | 50  | 4.49  | 0.002559  | ± 2.5 | PASS |
|       |      | VN | -30 | 4.67  | 0.002730  | ± 2.5 | PASS |
|       |      | VN | -20 | 4.61  | 0.002695  | ± 2.5 | PASS |
|       |      | VN | -10 | -0.13 | -0.000076 | ± 2.5 | PASS |
|       |      | VN | 0   | 1.08  | 0.000631  | ± 2.5 | PASS |
|       | LCH  | VN | 10  | 4.82  | 0.002818  | ± 2.5 | PASS |
|       |      | VN | 20  | 2.66  | 0.001555  | ± 2.5 | PASS |
|       |      | VN | 30  | 0.45  | 0.000263  | ± 2.5 | PASS |
|       |      | VN | 40  | 0.79  | 0.000462  | ± 2.5 | PASS |
|       |      | VN | 50  | -0.93 | -0.000544 | ± 2.5 | PASS |
|       |      | VN | -30 | 0.02  | 0.000011  | ± 2.5 | PASS |
|       |      | VN | -20 | 4.06  | 0.002314  | ± 2.5 | PASS |
| 16001 |      | VN | -10 | 4.16  | 0.002371  | ± 2.5 | PASS |
| 16QAM |      | VN | 0   | 3.38  | 0.001927  | ± 2.5 | PASS |
|       | мсн  | VN | 10  | -1.53 | -0.000872 | ± 2.5 | PASS |
|       |      | VN | 20  | -0.71 | -0.000405 | ± 2.5 | PASS |
|       |      | VN | 30  | -1.53 | -0.000872 | ± 2.5 | PASS |
|       |      | VN | 40  | 4.67  | 0.002662  | ± 2.5 | PASS |
|       |      | VN | 50  | -0.68 | -0.000388 | ± 2.5 | PASS |
|       |      | VN | -30 | -1.38 | -0.000787 | ± 2.5 | PASS |
|       |      | VN | -20 | 2.09  | 0.001191  | ± 2.5 | PASS |
|       | HOLL | VN | -10 | 4.24  | 0.002417  | ± 2.5 | PASS |
|       | HCH  | VN | 0   | 1.97  | 0.001123  | ± 2.5 | PASS |
|       |      | VN | 10  | 0.24  | 0.000137  | ± 2.5 | PASS |
|       |      | VN | 20  | -0.67 | -0.000382 | ± 2.5 | PASS |



|  | VN | 30 | 3.69 | 0.002103 | ± 2.5 | PASS |
|--|----|----|------|----------|-------|------|
|  | VN | 40 | 1.99 | 0.001134 | ± 2.5 | PASS |
|  | VN | 50 | 4.88 | 0.002782 | ± 2.5 | PASS |

#### **Channel Bandwidth: 3 MHz**

|            |         |                  | Channel Band        | lwidth: 3 MHz+    |                    |                |         |
|------------|---------|------------------|---------------------|-------------------|--------------------|----------------|---------|
|            |         |                  |                     | tage              |                    |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(°C) | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |         | VL               | TN                  | 4.73              | 0.002764           | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | 2.45              | 0.001431           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 4.04              | 0.002361           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | -1.92             | -0.001108          | ± 2.5          | PASS    |
| QPSK       | мсн     | VN               | TN                  | 4.51              | 0.002603           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 4.43              | 0.002557           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 3.91              | 0.002230           | ± 2.5          | PASS    |
|            | HCH     | VN               | TN                  | -0.46             | -0.000262          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | -1.62             | -0.000924          | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 4.58              | 0.002676           | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | 1.75              | 0.001022           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | -1.31             | -0.000765          | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 4.07              | 0.002349           | ± 2.5          | PASS    |
| 16QAM      | MCH     | VN               | TN                  | 3.07              | 0.001772           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 0.24              | 0.000139           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 1.25              | 0.000713           | ± 2.5          | PASS    |
|            | НСН     | VN               | TN                  | 0.37              | 0.000211           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 1                 | 0.000570           | ± 2.5          | PASS    |
|            |         |                  | Tempe               | erature           |                    |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(℃)  | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |         | VN               | -30                 | -1.87             | -0.001093          | ± 2.5          | PASS    |
|            |         | VN               | -20                 | 2.23              | 0.001303           | ± 2.5          | PASS    |
|            |         | VN               | -10                 | 1.74              | 0.001017           | ± 2.5          | PASS    |
|            |         | VN               | 0                   | -1.77             | -0.001034          | ± 2.5          | PASS    |
|            | LCH     | VN               | 10                  | 3.05              | 0.001782           | ± 2.5          | PASS    |
| QPSK       |         | VN               | 20                  | -0.25             | -0.000146          | ± 2.5          | PASS    |
|            |         | VN               | 30                  | 0.9               | 0.000526           | ± 2.5          | PASS    |
|            |         | VN               | 40                  | -1.58             | -0.000923          | ± 2.5          | PASS    |
|            |         | VN               | 50                  | -0.23             | -0.000134          | ± 2.5          | PASS    |
|            | MOLL    | VN               | -30                 | -0.78             | -0.000450          | ± 2.5          | PASS    |
|            | MCH     | VN               | -20                 | 2.84              | 0.001639           | ± 2.5          | PASS    |



|      |     |    | I   |       | 1         | 1     |      |
|------|-----|----|-----|-------|-----------|-------|------|
|      |     | VN | -10 | -0.56 | -0.000323 | ± 2.5 | PASS |
|      |     | VN | 0   | 4.64  | 0.002678  | ± 2.5 | PASS |
|      |     | VN | 10  | 4.44  | 0.002563  | ± 2.5 | PASS |
|      |     | VN | 20  | 3.63  | 0.002095  | ± 2.5 | PASS |
|      |     | VN | 30  | 3.26  | 0.001882  | ± 2.5 | PASS |
|      |     | VN | 40  | -1.35 | -0.000779 | ± 2.5 | PASS |
|      |     | VN | 50  | 2.32  | 0.001339  | ± 2.5 | PASS |
|      |     | VN | -30 | 3.75  | 0.002139  | ± 2.5 | PASS |
|      |     | VN | -20 | 0.95  | 0.000542  | ± 2.5 | PASS |
|      |     | VN | -10 | 1.27  | 0.000724  | ± 2.5 | PASS |
|      |     | VN | 0   | 2.68  | 0.001528  | ± 2.5 | PASS |
|      | HCH | VN | 10  | 2.3   | 0.001312  | ± 2.5 | PASS |
|      |     | VN | 20  | -1.54 | -0.000878 | ± 2.5 | PASS |
|      |     | VN | 30  | 1.48  | 0.000844  | ± 2.5 | PASS |
|      |     | VN | 40  | -1.8  | -0.001027 | ± 2.5 | PASS |
|      |     | VN | 50  | 2.56  | 0.001460  | ± 2.5 | PASS |
|      |     | VN | -30 | 2.62  | 0.001512  | ± 2.5 | PASS |
|      |     | VN | -20 | 2.97  | 0.001714  | ± 2.5 | PASS |
|      |     | VN | -10 | 0.31  | 0.000179  | ± 2.5 | PASS |
|      |     | VN | 0   | 2.39  | 0.001380  | ± 2.5 | PASS |
|      | LCH | VN | 10  | 4.09  | 0.002361  | ± 2.5 | PASS |
|      |     | VN | 20  | -0.62 | -0.000358 | ± 2.5 | PASS |
|      |     | VN | 30  | 2.62  | 0.001512  | ± 2.5 | PASS |
|      |     | VN | 40  | 1.05  | 0.000606  | ± 2.5 | PASS |
|      |     | VN | 50  | -1.54 | -0.000889 | ± 2.5 | PASS |
|      |     | VN | -30 | 0.56  | 0.000319  | ± 2.5 | PASS |
|      |     | VN | -20 | 2.88  | 0.001642  | ± 2.5 | PASS |
|      |     | VN | -10 | 0.24  | 0.000137  | ± 2.5 | PASS |
| QPSK |     | VN | 0   | 3.09  | 0.001762  | ± 2.5 | PASS |
|      | МСН | VN | 10  | 4.71  | 0.002686  | ± 2.5 | PASS |
|      |     | VN | 20  | 2.1   | 0.001198  | ± 2.5 | PASS |
|      |     | VN | 30  | 4.9   | 0.002794  | ± 2.5 | PASS |
|      |     | VN | 40  | 1.35  | 0.000770  | ± 2.5 | PASS |
|      |     | VN | 50  | 0.64  | 0.000365  | ± 2.5 | PASS |
|      |     | VN | -30 | -1.52 | -0.000867 | ± 2.5 | PASS |
|      |     | VN | -20 | 2.52  | 0.001437  | ± 2.5 | PASS |
|      |     | VN | -10 | 3.42  | 0.001950  | ± 2.5 | PASS |
|      | нсн | VN | 0   | 0.6   | 0.000342  | ± 2.5 | PASS |
|      |     | VN | 10  | 4.51  | 0.002572  | ± 2.5 | PASS |
|      |     | VN | 20  | 1.61  | 0.000918  | ± 2.5 | PASS |
|      |     | VN | 30  | 3.97  | 0.002264  | ± 2.5 | PASS |



| VN | 40 | 2.36 | 0.001346 | ± 2.5 | PASS |
|----|----|------|----------|-------|------|
| VN | 50 | 4.42 | 0.002521 | ± 2.5 | PASS |

# **Channel Bandwidth: 5 MHz**

|            |         |                  | Channel Ban         | dwidth: 5 MHz     |                    |                |         |
|------------|---------|------------------|---------------------|-------------------|--------------------|----------------|---------|
|            |         |                  |                     | tage              |                    |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(°C) | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |         | VL               | TN                  | -1.49             | -0.000870          | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | -1.22             | -0.000712          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 2.18              | 0.001273           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | -0.26             | -0.000150          | ± 2.5          | PASS    |
| QPSK       | MCH     | VN               | TN                  | 2.95              | 0.001703           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 2.15              | 0.001241           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 4.98              | 0.002842           | ± 2.5          | PASS    |
|            | HCH     | VN               | TN                  | 0.29              | 0.000165           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | -0.26             | -0.000148          | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 0.66              | 0.000385           | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | 0.97              | 0.000566           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | -1.9              | -0.001109          | ± 2.5          | PASS    |
|            | MCH     | VL               | TN                  | 2.21              | 0.001276           | ± 2.5          | PASS    |
| 16QAM      |         | VN               | TN                  | 4.17              | 0.002407           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | -0.08             | -0.000046          | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 1.95              | 0.001113           | ± 2.5          | PASS    |
|            | HCH     | VN               | TN                  | 3.57              | 0.002037           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 3.44              | 0.001963           | ± 2.5          | PASS    |
|            |         |                  | Tempe               | erature           | •                  |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(℃)  | Deviation<br>(Hz) | Deviation (ppm)    | Limit<br>(ppm) | Verdict |
|            |         | VN               | -30                 | 3                 | 0.001752           | ± 2.5          | PASS    |
|            |         | VN               | -20                 | 4.01              | 0.002342           | ± 2.5          | PASS    |
|            |         | VN               | -10                 | 2.22              | 0.001296           | ± 2.5          | PASS    |
|            |         | VN               | 0                   | -0.85             | -0.000496          | ± 2.5          | PASS    |
|            | LCH     | VN               | 10                  | -1.04             | -0.000607          | ± 2.5          | PASS    |
| QPSK       |         | VN               | 20                  | -1.29             | -0.000753          | ± 2.5          | PASS    |
| QI'ON      |         | VN               | 30                  | 0.54              | 0.000315           | ± 2.5          | PASS    |
|            |         | VN               | 40                  | 3.93              | 0.002295           | ± 2.5          | PASS    |
|            |         | VN               | 50                  | 2.7               | 0.001577           | ± 2.5          | PASS    |
|            |         | VN               | -30                 | -1.6              | -0.000924          | ± 2.5          | PASS    |
|            | MCH     | VN               | -20                 | 0.09              | 0.000052           | ± 2.5          | PASS    |
|            |         | VN               | -10                 | -0.44             | -0.000254          | ± 2.5          | PASS    |



|       |       | VN | 0   | -1.41 | -0.000814 | ± 2.5          | PASS |
|-------|-------|----|-----|-------|-----------|----------------|------|
|       |       | VN | 10  |       | 0.002724  |                | PASS |
|       |       | VN | 20  | -0.76 | -0.002724 | ± 2.5<br>± 2.5 | PASS |
|       |       | VN | 30  | 4.63  | 0.002672  | ± 2.5          | PASS |
|       |       | VN | 40  | -1.18 | -0.002672 | ± 2.5          | PASS |
|       |       | VN | 50  | 2.79  | 0.001610  | ± 2.5          | PASS |
|       |       | VN | -30 | 3.2   | 0.001810  | ± 2.5          | PASS |
|       |       | VN | -20 | 0.88  | 0.001828  | ± 2.5          | PASS |
|       |       | VN | -10 | 0.66  | 0.000461  | ± 2.5          | PASS |
|       |       | VN | 0   | 1.93  | 0.000246  | ± 2.5          | PASS |
|       | HCH   | VN | 10  | 0.61  | 0.001012  | ± 2.5          | PASS |
|       | 11011 | VN | 20  | 4.43  | 0.000320  | ± 2.5          | PASS |
|       |       | VN | 30  | -1.02 | -0.002322 | ± 2.5          | PASS |
|       |       | VN | 40  | -1.02 | -0.000535 | ± 2.5          | PASS |
|       |       | VN | 50  | 4.97  | 0.002606  | ± 2.5          | PASS |
|       |       | VN | -30 | 2.47  | 0.001426  | ± 2.5          | PASS |
|       |       | VN | -20 | 0.51  | 0.000294  | ± 2.5          | PASS |
|       |       | VN | -10 | -1.43 | -0.000825 | ± 2.5          | PASS |
|       |       | VN | 0   | 0.61  | 0.000352  | ± 2.5          | PASS |
|       | LCH   | VN | 10  | -0.5  | -0.000289 | ± 2.5          | PASS |
|       |       | VN | 20  | 3.03  | 0.001749  | ± 2.5          | PASS |
|       |       | VN | 30  | 3.26  | 0.001882  | ± 2.5          | PASS |
|       |       | VN | 40  | -0.87 | -0.000502 | ± 2.5          | PASS |
|       |       | VN | 50  | -1.97 | -0.001137 | ± 2.5          | PASS |
|       |       | VN | -30 | -1.69 | -0.000964 | ± 2.5          | PASS |
|       |       | VN | -20 | 1.74  | 0.000993  | ± 2.5          | PASS |
|       |       | VN | -10 | -0.23 | -0.000131 | ± 2.5          | PASS |
| 16QAM |       | VN | 0   | -1.34 | -0.000765 | ± 2.5          | PASS |
| IOQAW | MCH   | VN | 10  | 3.88  | 0.002214  | ± 2.5          | PASS |
|       |       | VN | 20  | 4.55  | 0.002596  | ± 2.5          | PASS |
|       |       | VN | 30  | -0.53 | -0.000302 | ± 2.5          | PASS |
|       |       | VN | 40  | 3.14  | 0.001792  | ± 2.5          | PASS |
|       |       | VN | 50  | 4.17  | 0.002379  | ± 2.5          | PASS |
|       |       | VN | -30 | 3.46  | 0.001814  | ± 2.5          | PASS |
|       |       | VN | -20 | 1.61  | 0.000844  | ± 2.5          | PASS |
|       |       | VN | -10 | -1.91 | -0.001001 | ± 2.5          | PASS |
|       | HCH   | VN | 0   | -1.72 | -0.000902 | ± 2.5          | PASS |
|       | 11011 | VN | 10  | 0.79  | 0.000414  | ± 2.5          | PASS |
|       |       | VN | 20  | 1.01  | 0.000529  | ± 2.5          | PASS |
|       |       | VN | 30  | -1.52 | -0.000797 | ± 2.5          | PASS |
|       |       | VN | 40  | 4.56  | 0.002391  | ± 2.5          | PASS |



# **Channel Bandwidth: 10 MHz**

|            |         |                  | Channel Band        | lwidth: 10 MHz    |                    |                |         |
|------------|---------|------------------|---------------------|-------------------|--------------------|----------------|---------|
|            |         |                  |                     | tage              |                    |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(°C) | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |         | VL               | TN                  | 1.44              | 0.000840           | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | 0.22              | 0.000128           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | -0.72             | -0.000420          | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 3.48              | 0.002009           | ± 2.5          | PASS    |
| QPSK       | MCH     | VN               | TN                  | 0.74              | 0.000427           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 0.79              | 0.000456           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 2.05              | 0.001171           | ± 2.5          | PASS    |
|            | HCH     | VN               | TN                  | -1.33             | -0.000760          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 0.05              | 0.000029           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | -0.57             | -0.000332          | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | -1.14             | -0.000665          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 4.52              | 0.002636           | ± 2.5          | PASS    |
|            | MCH     | VL               | TN                  | -0.61             | -0.000352          | ± 2.5          | PASS    |
| 16QAM      |         | VN               | TN                  | -0.09             | -0.000052          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 4.54              | 0.002620           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 0.18              | 0.000103           | ± 2.5          | PASS    |
|            | НСН     | VN               | TN                  | 2.74              | 0.001566           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | -0.85             | -0.000486          | ± 2.5          | PASS    |
|            |         |                  | Tempe               | erature           |                    |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(℃)  | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |         | VN               | -30                 | -1.65             | -0.000962          | ± 2.5          | PASS    |
|            |         | VN               | -20                 | 3.39              | 0.001977           | ± 2.5          | PASS    |
|            |         | VN               | -10                 | -0.44             | -0.000257          | ± 2.5          | PASS    |
|            |         | VN               | 0                   | -1.51             | -0.000880          | ± 2.5          | PASS    |
|            | LCH     | VN               | 10                  | -1.04             | -0.000606          | ± 2.5          | PASS    |
|            |         | VN               | 20                  | 1.22              | 0.000711           | ± 2.5          | PASS    |
| 16QAM      |         | VN               | 30                  | -1                | -0.000583          | ± 2.5          | PASS    |
|            |         | VN               | 40                  | 1.43              | 0.000834           | ± 2.5          | PASS    |
|            |         | VN               | 50                  | 4.91              | 0.002863           | ± 2.5          | PASS    |
|            |         | VN               | -30                 | 2.09              | 0.001206           | ± 2.5          | PASS    |
|            | MCH     | VN               | -20                 | 0.29              | 0.000167           | ± 2.5          | PASS    |
|            | IVICH   | VN               | -10                 | -1.98             | -0.001143          | ± 2.5          | PASS    |
|            |         | VN               | 0                   | 3.59              | 0.002072           | ± 2.5          | PASS    |



|      |     | VN | 10  | 4.93  | 0.002846  | ± 2.5 | PASS |
|------|-----|----|-----|-------|-----------|-------|------|
|      |     | VN | 20  | 1.93  | 0.001114  | ± 2.5 | PASS |
|      |     | VN | 30  | 2.24  | 0.001293  | ± 2.5 | PASS |
|      |     | VN | 40  | 4.93  | 0.002846  | ± 2.5 | PASS |
|      |     | VN | 50  | 4.57  | 0.002638  | ± 2.5 | PASS |
|      |     | VN | -30 | 4.34  | 0.002480  | ± 2.5 | PASS |
|      |     | VN | -20 | 0.22  | 0.000126  | ± 2.5 | PASS |
|      |     | VN | -10 | 2     | 0.001143  | ± 2.5 | PASS |
|      |     | VN | 0   | -1.98 | -0.001131 | ± 2.5 | PASS |
|      | HCH | VN | 10  | 4.1   | 0.002343  | ± 2.5 | PASS |
|      |     | VN | 20  | 0.66  | 0.000377  | ± 2.5 | PASS |
|      |     | VN | 30  | 3.06  | 0.001749  | ± 2.5 | PASS |
|      |     | VN | 40  | -1.09 | -0.000623 | ± 2.5 | PASS |
|      |     | VN | 50  | -0.03 | -0.000017 | ± 2.5 | PASS |
|      |     | VN | -30 | 1.39  | 0.000802  | ± 2.5 | PASS |
|      |     | VN | -20 | 4.53  | 0.002615  | ± 2.5 | PASS |
|      | LCH | VN | -10 | 2.36  | 0.001362  | ± 2.5 | PASS |
|      |     | VN | 0   | -1.18 | -0.000681 | ± 2.5 | PASS |
|      |     | VN | 10  | -1.45 | -0.000837 | ± 2.5 | PASS |
|      |     | VN | 20  | 4.99  | 0.002880  | ± 2.5 | PASS |
|      |     | VN | 30  | 2.15  | 0.001241  | ± 2.5 | PASS |
|      |     | VN | 40  | 4.21  | 0.002430  | ± 2.5 | PASS |
|      |     | VN | 50  | -0.96 | -0.000554 | ± 2.5 | PASS |
|      |     | VN | -30 | 1.9   | 0.001086  | ± 2.5 | PASS |
|      |     | VN | -20 | -1.76 | -0.001006 | ± 2.5 | PASS |
|      |     | VN | -10 | 1.01  | 0.000577  | ± 2.5 | PASS |
|      |     | VN | 0   | -1.17 | -0.000669 | ± 2.5 | PASS |
| QPSK | MCH | VN | 10  | -0.8  | -0.000457 | ± 2.5 | PASS |
|      |     | VN | 20  | 2.85  | 0.001629  | ± 2.5 | PASS |
|      |     | VN | 30  | -1.17 | -0.000669 | ± 2.5 | PASS |
|      |     | VN | 40  | 0.3   | 0.000171  | ± 2.5 | PASS |
|      |     | VN | 50  | 1.3   | 0.000743  | ± 2.5 | PASS |
|      |     | VN | -30 | 2.25  | 0.001286  | ± 2.5 | PASS |
|      |     | VN | -20 | 4.92  | 0.002811  | ± 2.5 | PASS |
|      |     | VN | -10 | -1.85 | -0.001057 | ± 2.5 | PASS |
|      |     | VN | 0   | 1.41  | 0.000806  | ± 2.5 | PASS |
|      | HCH | VN | 10  | 3.3   | 0.001886  | ± 2.5 | PASS |
|      |     | VN | 20  | 4.96  | 0.002834  | ± 2.5 | PASS |
|      |     | VN | 30  | 3.31  | 0.001891  | ± 2.5 | PASS |
|      |     | VN | 40  | 3.94  | 0.002251  | ± 2.5 | PASS |
|      |     | VN | 50  | 0.28  | 0.000160  | ± 2.5 | PASS |



#### **Channel Bandwidth: 15 MHz**

|            |         |                  | Channel Band        | lwidth: 15 MHz    |                    |                |         |
|------------|---------|------------------|---------------------|-------------------|--------------------|----------------|---------|
|            |         |                  |                     | tage              |                    |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(°C) | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |         | VL               | TN                  | 1.12              | 0.000652           | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | 1.46              | 0.000850           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 0.34              | 0.000198           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | -1.46             | -0.000843          | ± 2.5          | PASS    |
| QPSK       | MCH     | VN               | TN                  | -1.83             | -0.001056          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 0.51              | 0.000294           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | 0.07              | 0.000040           | ± 2.5          | PASS    |
|            | HCH     | VN               | TN                  | 3.41              | 0.001951           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 0.9               | 0.000515           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | -0.79             | -0.000460          | ± 2.5          | PASS    |
|            | LCH     | VN               | TN                  | -0.51             | -0.000297          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 2.44              | 0.001421           | ± 2.5          | PASS    |
|            | MCH     | VL               | TN                  | 4.74              | 0.002736           | ± 2.5          | PASS    |
| 16QAM      |         | VN               | TN                  | 3.88              | 0.002240           | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 4.47              | 0.002580           | ± 2.5          | PASS    |
|            |         | VL               | TN                  | -0.76             | -0.000435          | ± 2.5          | PASS    |
|            | HCH     | VN               | TN                  | -0.41             | -0.000235          | ± 2.5          | PASS    |
|            |         | VH               | TN                  | 3.59              | 0.002054           | ± 2.5          | PASS    |
|            |         |                  | Tempe               | erature           |                    |                |         |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(℃)  | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm) | Verdict |
|            |         | VN               | -30                 | -1.3              | -0.000757          | ± 2.5          | PASS    |
|            |         | VN               | -20                 | -0.35             | -0.000204          | ± 2.5          | PASS    |
|            |         | VN               | -10                 | 2.09              | 0.001217           | ± 2.5          | PASS    |
|            |         | VN               | 0                   | 2.23              | 0.001298           | ± 2.5          | PASS    |
|            | LCH     | VN               | 10                  | 0.77              | 0.000448           | ± 2.5          | PASS    |
|            |         | VN               | 20                  | 4.18              | 0.002434           | ± 2.5          | PASS    |
| QPSK       |         | VN               | 30                  | 3.48              | 0.002026           | ± 2.5          | PASS    |
| QFSK       |         | VN               | 40                  | -0.06             | -0.000035          | ± 2.5          | PASS    |
|            |         | VN               | 50                  | 2.29              | 0.001333           | ± 2.5          | PASS    |
|            |         | VN               | -30                 | 0.51              | 0.000294           | ± 2.5          | PASS    |
|            |         | VN               | -20                 | -1.42             | -0.000820          | ± 2.5          | PASS    |
|            | MCH     | VN               | -10                 | 1.13              | 0.000652           | ± 2.5          | PASS    |
|            |         | VN               | 0                   | 1.94              | 0.001120           | ± 2.5          | PASS    |
|            |         | VN               | 10                  | 4.47              | 0.002580           | ± 2.5          | PASS    |



|      |     | VN | 20  | 1.24  | 0.000716  | ± 2.5 | PASS |
|------|-----|----|-----|-------|-----------|-------|------|
|      |     | VN | 30  | -0.12 | -0.000069 | ± 2.5 | PASS |
|      |     | VN | 40  | 2.12  | 0.001224  | ± 2.5 | PASS |
|      |     | VN | 50  | 3.27  | 0.001887  | ± 2.5 | PASS |
|      |     | VN | -30 | 0.39  | 0.000223  | ± 2.5 | PASS |
|      |     | VN | -20 | 2.8   | 0.001602  | ± 2.5 | PASS |
|      |     | VN | -10 | 0.3   | 0.000172  | ± 2.5 | PASS |
|      |     | VN | 0   | -1.87 | -0.001070 | ± 2.5 | PASS |
|      | HCH | VN | 10  | -0.3  | -0.000172 | ± 2.5 | PASS |
|      |     | VN | 20  | 1.92  | 0.001099  | ± 2.5 | PASS |
|      |     | VN | 30  | 4.72  | 0.002701  | ± 2.5 | PASS |
|      |     | VN | 40  | 3.5   | 0.002003  | ± 2.5 | PASS |
|      |     | VN | 50  | -1.1  | -0.000629 | ± 2.5 | PASS |
|      |     | VN | -30 | 0.3   | 0.000173  | ± 2.5 | PASS |
|      |     | VN | -20 | 4.69  | 0.002707  | ± 2.5 | PASS |
|      |     | VN | -10 | -0.3  | -0.000173 | ± 2.5 | PASS |
|      |     | VN | 0   | -2    | -0.001154 | ± 2.5 | PASS |
|      | LCH | VN | 10  | -1.6  | -0.000924 | ± 2.5 | PASS |
|      |     | VN | 20  | 0.35  | 0.000202  | ± 2.5 | PASS |
|      |     | VN | 30  | 4.28  | 0.002470  | ± 2.5 | PASS |
|      |     | VN | 40  | 1.35  | 0.000779  | ± 2.5 | PASS |
|      |     | VN | 50  | -0.81 | -0.000468 | ± 2.5 | PASS |
|      | MCH | VN | -30 | 1.74  | 0.000996  | ± 2.5 | PASS |
|      |     | VN | -20 | 4.73  | 0.002707  | ± 2.5 | PASS |
|      |     | VN | -10 | -1.59 | -0.000910 | ± 2.5 | PASS |
| QPSK |     | VN | 0   | -0.09 | -0.000052 | ± 2.5 | PASS |
|      |     | VN | 10  | 2.41  | 0.001379  | ± 2.5 | PASS |
|      |     | VN | 20  | -0.7  | -0.000401 | ± 2.5 | PASS |
|      |     | VN | 30  | 2.68  | 0.001534  | ± 2.5 | PASS |
|      |     | VN | 40  | 4.46  | 0.002552  | ± 2.5 | PASS |
|      |     | VN | 50  | 3.61  | 0.002066  | ± 2.5 | PASS |
|      | нсн | VN | -30 | 3.42  | 0.001957  | ± 2.5 | PASS |
|      |     | VN | -20 | 1.68  | 0.000961  | ± 2.5 | PASS |
|      |     | VN | -10 | 4.55  | 0.002604  | ± 2.5 | PASS |
|      |     | VN | 0   | 4.77  | 0.002730  | ± 2.5 | PASS |
|      |     | VN | 10  | 3.13  | 0.001791  | ± 2.5 | PASS |
|      |     | VN | 20  | 1.12  | 0.000641  | ± 2.5 | PASS |
|      |     | VN | 30  | -1.23 | -0.000704 | ± 2.5 | PASS |
|      |     | VN | 40  | -1.01 | -0.000578 | ± 2.5 | PASS |
|      |     | VN | 50  | 4.94  | 0.002827  | ± 2.5 | PASS |



# **Channel Bandwidth: 20 MHz**

| Modulation |         |                  |                     |                   |                    |                                    |         |  |  |  |  |  |  |  |
|------------|---------|------------------|---------------------|-------------------|--------------------|------------------------------------|---------|--|--|--|--|--|--|--|
| Modulation | 1       |                  | Vol                 | tage              |                    | Channel Bandwidth: 20 MHz  Voltage |         |  |  |  |  |  |  |  |
|            | Channel | Voltage<br>[Vdc] | Temperature<br>(°C) | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm)                     | Verdict |  |  |  |  |  |  |  |
|            |         | VL               | TN                  | 0.88              | 0.000512           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            | LCH     | VN               | TN                  | 2.69              | 0.001564           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VH               | TN                  | 0.13              | 0.000076           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            | MCH     | VL               | TN                  | 1.48              | 0.000854           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
| QPSK       |         | VN               | TN                  | 0.65              | 0.000375           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VH               | TN                  | -0.02             | -0.000012          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VL               | TN                  | 2.38              | 0.001364           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            | НСН     | VN               | TN                  | -0.33             | -0.000189          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VH               | TN                  | 4.25              | 0.002436           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VL               | TN                  | 4.7               | 0.002733           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            | LCH     | VN               | TN                  | 2.37              | 0.001378           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VH               | TN                  | -1.55             | -0.000901          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VL               | TN                  | 1.12              | 0.000646           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
| 16QAM      | MCH     | VN               | TN                  | 3.67              | 0.002118           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VH               | TN                  | 1.23              | 0.000710           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            | НСН     | VL               | TN                  | 3.77              | 0.002160           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | TN                  | 1.37              | 0.000785           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VH               | TN                  | -1.11             | -0.000636          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         |                  | Tempe               | erature           |                    |                                    |         |  |  |  |  |  |  |  |
| Modulation | Channel | Voltage<br>[Vdc] | Temperature<br>(℃)  | Deviation<br>(Hz) | Deviation<br>(ppm) | Limit<br>(ppm)                     | Verdict |  |  |  |  |  |  |  |
|            | LCH     | VN               | -30                 | 2.56              | 0.001488           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | -20                 | -1.08             | -0.000628          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | -10                 | 3.77              | 0.002192           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 0                   | -1.25             | -0.000727          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 10                  | 1.29              | 0.000750           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 20                  | 4.8               | 0.002791           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 30                  | 2.79              | 0.001622           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
| QPSK       |         | VN               | 40                  | 4.58              | 0.002663           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 50                  | 0.01              | 0.000006           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
| Γ          | мсн     | VN               | -30                 | 3.23              | 0.001864           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | -20                 | 1.72              | 0.000993           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | -10                 | -1.91             | -0.001102          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 0                   | -1.19             | -0.000687          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 10                  | -0.05             | -0.000029          | ± 2.5                              | PASS    |  |  |  |  |  |  |  |
|            |         | VN               | 20                  | 3.99              | 0.002303           | ± 2.5                              | PASS    |  |  |  |  |  |  |  |



|      |         | VN | 30  | 0.27  | 0.000156  | ± 2.5 | PASS |
|------|---------|----|-----|-------|-----------|-------|------|
|      |         | VN | 40  | 0.97  | 0.000560  | ± 2.5 | PASS |
|      | <u></u> | VN | 50  | 3.79  | 0.002188  | ± 2.5 | PASS |
|      | нсн     | VN | -30 | 3.85  | 0.002206  | ± 2.5 | PASS |
|      |         | VN | -20 | 3.42  | 0.001960  | ± 2.5 | PASS |
|      |         | VN | -10 | 3.1   | 0.001777  | ± 2.5 | PASS |
|      |         | VN | 0   | 0.74  | 0.000424  | ± 2.5 | PASS |
|      |         | VN | 10  | 1.24  | 0.000711  | ± 2.5 | PASS |
|      |         | VN | 20  | 1.85  | 0.001060  | ± 2.5 | PASS |
|      |         | VN | 30  | 1.93  | 0.001106  | ± 2.5 | PASS |
|      |         | VN | 40  | 0.34  | 0.000195  | ± 2.5 | PASS |
|      |         | VN | 50  | 2.7   | 0.001547  | ± 2.5 | PASS |
|      |         | VN | -30 | 0.02  | 0.000012  | ± 2.5 | PASS |
|      |         | VN | -20 | 3.42  | 0.001974  | ± 2.5 | PASS |
|      |         | VN | -10 | 2.24  | 0.001293  | ± 2.5 | PASS |
|      |         | VN | 0   | -0.43 | -0.000248 | ± 2.5 | PASS |
|      | LCH     | VN | 10  | 3.77  | 0.002176  | ± 2.5 | PASS |
|      |         | VN | 20  | 0.69  | 0.000398  | ± 2.5 | PASS |
|      |         | VN | 30  | 1.7   | 0.000981  | ± 2.5 | PASS |
|      |         | VN | 40  | 0.73  | 0.000421  | ± 2.5 | PASS |
|      |         | VN | 50  | 1.62  | 0.000935  | ± 2.5 | PASS |
|      |         | VN | -30 | 4.8   | 0.002751  | ± 2.5 | PASS |
|      | МСН     | VN | -20 | 3.52  | 0.002017  | ± 2.5 | PASS |
|      |         | VN | -10 | 2     | 0.001146  | ± 2.5 | PASS |
| QPSK |         | VN | 0   | 3.1   | 0.001777  | ± 2.5 | PASS |
|      |         | VN | 10  | 3.54  | 0.002029  | ± 2.5 | PASS |
|      |         | VN | 20  | -0.36 | -0.000206 | ± 2.5 | PASS |
|      |         | VN | 30  | -1.57 | -0.000900 | ± 2.5 | PASS |
|      |         | VN | 40  | -0.14 | -0.000080 | ± 2.5 | PASS |
|      |         | VN | 50  | -0.44 | -0.000252 | ± 2.5 | PASS |
|      | НСН     | VN | -30 | 0.28  | 0.000160  | ± 2.5 | PASS |
|      |         | VN | -20 | 4.26  | 0.002441  | ± 2.5 | PASS |
|      |         | VN | -10 | 2.99  | 0.001713  | ± 2.5 | PASS |
|      |         | VN | 0   | 4.05  | 0.002321  | ± 2.5 | PASS |
|      |         | VN | 10  | 3.83  | 0.002195  | ± 2.5 | PASS |
|      |         | VN | 20  | -1.15 | -0.000659 | ± 2.5 | PASS |
|      |         | VN | 30  | -1.06 | -0.000607 | ± 2.5 | PASS |
|      |         | VN | 40  | 4.53  | 0.002596  | ± 2.5 | PASS |
|      |         | VN | 50  | -0.92 | -0.000527 | ± 2.5 | PASS |
|      |         |    |     |       |           |       |      |