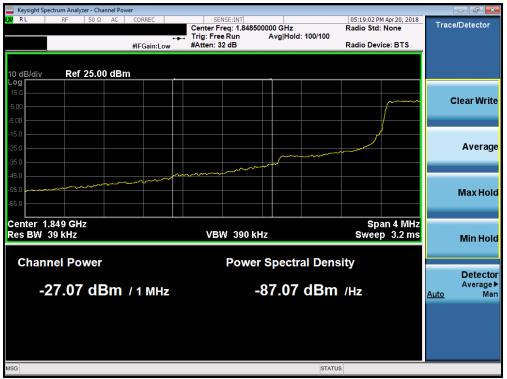




Plot 7-169. Lower Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



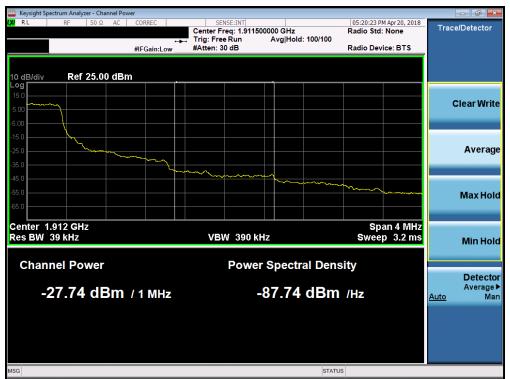
Plot 7-170. Lower Extended Band Edge Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 109 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 108 of 197                 |
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Plot 7-171. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-172. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 100 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 109 of 197                 |
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|              | Spectrum Analyz | er - Swept SA   | 4              |                      |           |            |                      |  |                    |   |             |                                 |
|--------------|-----------------|---|----------------|----------------------|-----------|------------|----------------------|--|--------------------|---|-------------|---------------------------------|
| XU RL        | RF              | 50 Ω A  | PNO:           | C<br>Wide ⊂<br>n:Low |           |            | #Avg Typ             | e: RMS   | TRA                | PM Apr 20, 2018<br>CE 1 2 3 4 5 6<br>(PE A WWWWW<br>DET A NNNNN | Fr          | requency                        |
| 10 dB/div    | Ref 25          | .00 dBn   |                | n:Low                | Atten: or |            |                      | Mkr1   | 1.915<br>-20       | 044 GHz<br>.69 dBm  |             | Auto Tun                        |
| 15.0         |                 |   |                |                      |           |            |                      |  |                    |   |             | <b>Center Fre</b><br>5000000 GH |
| 5.00         |                 |   | -reno-unit the | - Auronyunil         | man       |            |                      |  |                    | DL1 -13.00 dBm  | 1.91        | <b>Start Fre</b><br>3000000 GH  |
| 15.0<br>25.0 | Anna            | por de la companya de |                |                      | - t       | 1<br>Umura | Amanana.             |  |                    |   | 1.91        | <b>Stop Fre</b><br>7000000 GH   |
| 35.0         |                 |   |                |                      |           |            | - Andrew Constraints | and and a second s | A . 19 A           |   | <u>Auto</u> | CF Ste<br>400.000 kH<br>Ma      |
| 55.0         |                 |   |                |                      |           |            |                      |  |                    |   |             | Freq Offs<br>0 H                |
| 65.0         | 1.915000 (      |   |                |                      |           |            |                      |  | Sport              |   | Log         | Scale Typ                       |
|              | N 13 kHz        | SUL   |                | #VBW                 | / 39 kHz  |            |                      | Sweep 2  | span 2<br>29.27 ms | 1.000 MHz<br>(1001 pts)   |             | _                               |
| ISG          |                 |   |                |                      |           |            |                      | STATU  | s                  |   |             |                                 |

Plot 7-173. Upper Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)



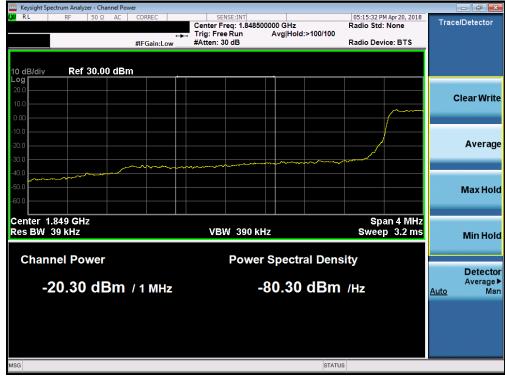
Plot 7-174. Upper Extended Band Edge Plot (Band 25 - 1.4MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | G | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|---|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |   | Dama 440 of 407                 |  |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |   | Page 110 of 197                 |  |
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| Keysight Spectrum Analyze |  |            |           |    |          |  |           |  |             | - 0                       |
|---------------------------|--|------------|-----------|----|----------|--|-----------|--|-------------|---------------------------|
| RL RF                     | 50 Ω AC  | PNO: Wide  |           |    | #Avg Typ | e: RMS                                 | TRAC      | Apr 20, 2018<br>E 1 2 3 4 5 6<br>E A WWWWWW<br>T A N N N N N | Fre         | equency                   |
| 10 dB/div Ref 25.         | 00 dBm   | IFGain:Low | Atten: 30 | dB |          | Mkr1                                   | 1.850 0   |  |             | Auto Tur                  |
| 15.0                      |  |            |           |    |          |  |           |  |             | enter Fre<br>000000 Gi    |
| 5.00                      |  |            |           |    | m        | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |           |  | 1.848       | Start Fre                 |
| 25.0                      |  |            |           | 1  |          |  |           | DL1 -13.00 dBm   | 1.852       | Stop Fre                  |
| 15.0                      | men and a second se | V WWWW     |           |    |          |  |           |  | <u>Auto</u> | CF Ste<br>400.000 kl<br>M |
| 55.0                      |  |            |           |    |          |  |           |  | F           | req Offs<br>0             |
| 55.0<br>Center 1.850000 C | SHz  |            |           |    |          |  | Span 4    | .000 MHz   | tog         | Scale Tyj                 |
| Res BW 30 kHz             |  | #VBW       | 91 kHz    |    |          | Sweep 5                                | .533 ms ( | 1001 pts)  |             |                           |
| SG                        |  |            |           |    |          | STATUS                                 | 5         |  |             |                           |

Plot 7-175. Lower Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



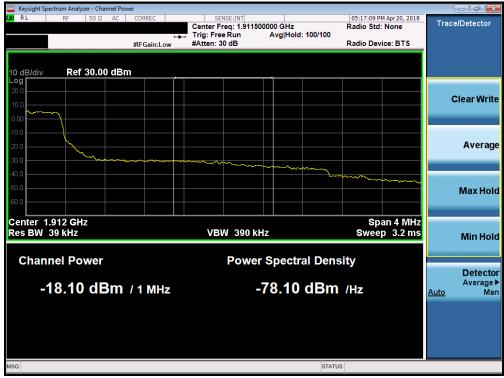
Plot 7-176. Lower Extended Band Edge Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕕 LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 111 of 107                 |  |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 111 of 197                 |  |
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|               | t Spectrum Analy                        |          |  |           |         |   |  |                      |  |             | - 6 <b>-</b> ×                    |
|---------------|---|----------|--|-----------|---------|---|--|----------------------|--|-------------|-----------------------------------|
| X/RL          | RF                                      | 50 Ω AC  | PNO: Wide  |           | NSE:INT | #Avg Typ                                | e: RMS                                 | TRAC                 | Apr 20, 2018<br>E 1 2 3 4 5 6<br>E A WWWW<br>T A N N N N N | Fre         | equency                           |
| 10 dB/di      | v Ref 25                                | i.00 dBm | IFGain:Low   | Atten: 36 | 6 dB    |   | Mkr1                                   | 1.910 0              |  |             | Auto Tun                          |
| 15.0          |   |          |  |           |         |   |  |                      |  |             | enter Fre<br>000000 G⊦            |
| 5.00          | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | www      | and and a second se |           |         |   |  |                      |  | 1.908       | <b>Start Fre</b>                  |
| 25.0          |   |          |  |           | 1       |   |  |                      | DL1 -13.00 dBm   | 1.912       | <b>Stop Fre</b>                   |
| 35.0          |   |          |  |           | Mar     | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | -<br>                | man-   | <u>Auto</u> | <b>CF Ste</b><br>400.000 kł<br>Ma |
| \$5.0 <u></u> |   |          |  |           |         |   |  |                      |  | F           | F <b>req Offs</b><br>0 I          |
| 65.0          |   |          |  |           |         |   |  |                      |  | tog         | Scale Typ                         |
|               | 1.910000<br>W 30 kHz                    | GHZ      | #VB  | W 91 kHz  |         |   | Sweep :                                | Span 4<br>5.533 ms ( | .000 1911 12   | LUg         |                                   |
| ISG           |   |          |  |           |         |   | STATU                                  | S                    |  |             |                                   |

Plot 7-177. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-178. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 112 of 107                 |  |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 112 of 197                 |  |
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| Keysight | Spectrum Anal |              | 000050       |                                |                |   |                                       |
|----------|---------------|--------------|--------------|--------------------------------|----------------|---|---------------------------------------|
| KL       | RF            | 50 Ω AC      | PNO: Wide    | Trig: Free Run<br>Atten: 36 dB | #Avg Type: RMS | 05:15:52 PM Apr 20, 2018<br>TRACE 1 2 3 4 5 6<br>TYPE A WWWW<br>DET A N N N N N | Frequency                             |
| 0 dB/div | Ref 2         | 5.00 dBm     | IFGain:Low _ | Atten: 36 dB                   | Mł             | r1 1.915 008 GHz<br>-21.00 dBm  | Auto Tur                              |
| 15.0     |               |              |              |                                |                |   | Center Fre<br>1.915000000 GF          |
| 5.00     | ~~~~~         | Mar of March | Annone       |                                |                |   | Start Fre<br>1.913000000 GH           |
| 25.0     |               |              |              | 1                              |                | DL1 -13.00 dBm  | <b>Stop Fre</b><br>1.917000000 Gi     |
| 35.0     |               |              |              |                                |                |   | CF Ste<br>400.000 kl<br><u>Auto</u> M |
| i5.0     |               |              |              |                                |                |   | Freq Offs                             |
| 55.0     | 1.915000      | CH2          |              |                                |                | Span 4.000 MHz  | Scale Typ                             |
|          | W 30 kHz      |              | #VB          | W 91 kHz                       | Sweep          | 5.533 ms (1001 pts)   |                                       |
| SG       |               |              |              |                                | ST             | ATUS  |                                       |

Plot 7-179. Upper Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)



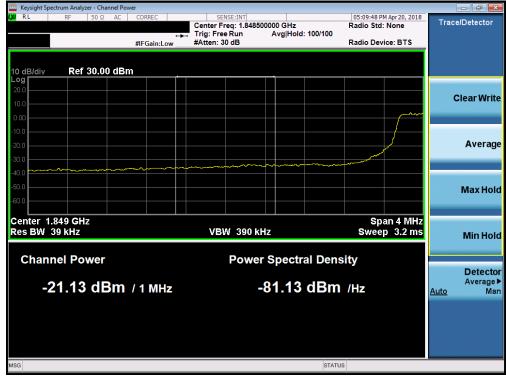
Plot 7-180. Upper Extended Band Edge Plot (Band 25 - 3.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 112 of 107                 |  |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 113 of 197                 |  |
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|                      | pectrum Analyze |         |  |                         |               |          |        |            |  |             |                       |
|----------------------|-----------------|---------|--|-------------------------|---------------|----------|--------|------------|--|-------------|-----------------------|
| LXI RL               | RF              | 50 Ω AC | CORREC                                 |                         | NSE:INT       | #Avg Typ | e: RMS | TRAC       | M Apr 20, 2018                         | Fre         | equency               |
|                      |                 |         | PNO: Wide G                            | Trig: Free<br>Atten: 36 | e Run<br>6 dB |          |        | TYF        |  |             |                       |
|                      |                 |         |  |                         |               |          | Mkr′   | 1 1.849 9  | 92 GHz                                 |             | Auto Tune             |
| 10 dB/div<br>Log     | Ref 25.         | 00 dBm  |  |                         |               |          |        | -26.       | 06 dBm                                 |             |                       |
|                      |                 |         |  |                         | Ť             |          |        |            |  | С           | enter Fred            |
| 15.0                 |                 |         |  |                         |               |          |        |            |  | 1.850       | 000000 GH             |
| 5.00                 |                 |         |  |                         |               |          |        |            |  |             |                       |
| 5.00                 |                 |         |  |                         | $\sim$        |          | m      | m          | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |             | Start Free            |
| -5.00                |                 |         |  |                         |               |          |        |            |  | 1.848       | 000000 GH             |
|                      |                 |         |  |                         |               |          |        |            | DL1 -13.00 dBm                         |             |                       |
| -15.0                |                 |         |  |                         |               |          |        |            |  |             | Stop Free             |
| -25.0                |                 |         |  |                         | 1/            |          |        |            |  | 1.852       | 000000 GH             |
| 20.0                 |                 |         |  | ~~~~~                   |               |          |        |            |  |             |                       |
| -35.0                | ~~~~~           |         | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |                         |               |          |        |            |  |             | CF Stej<br>400.000 kH |
| 15.0                 |                 |         |  |                         |               |          |        |            |  | <u>Auto</u> | Ma                    |
| -45.0                |                 |         |  |                         |               |          |        |            |  |             |                       |
| -55.0                |                 |         |  |                         |               |          |        |            |  | F           | req Offse             |
|                      |                 |         |  |                         |               |          |        |            |  |             | 0 H                   |
| -65.0                |                 |         |  |                         |               |          |        |            |  |             | Scale Type            |
|                      |                 |         |  |                         |               |          |        |            |  |             |                       |
| Center 1.<br>#Res BW | .850000 G       | Hz      | 41) (D)A                               | ( 160 KU=               |               |          | Swoon  | Span 4     | .000 191112                            | Log         | Lii                   |
| #Res BM              | F 5 T KHZ       |         | #VBV                                   | / 160 kHz               |               |          | Sweep  | 1.933 ms ( | 1001 pts)                              |             |                       |
|                      |                 |         |  |                         |               |          | JIATO  |            |  |             |                       |

Plot 7-181. Lower Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-182. Lower Extended Band Edge Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             | Daga 111 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      | Page 114 of 197                 |
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|               | Spectrum Analy       |        |     |          |       |           |      |          |         |                      |  |             |                                   |
|---------------|----------------------|--------|-----|----------|-------|-----------|------|----------|---------|----------------------|--|-------------|-----------------------------------|
| XI RL         | RF                   | 50 Ω / |     | PNO: W   | ide 🖵 | Trig: Fre |      | #Avg Typ | e: RMS  | TRAC                 | M Apr 20, 2018<br>CE 1 2 3 4 5 6<br>PE A WWWWW<br>ET A N N N N N | F           | requency                          |
| 10 dB/div     | Ref 25               | .00 dB |     | IFGain:L | .ow   | Atten: 3  | 6 dB |          | Mkr1    | 1.910 (              | )00 GHz<br>21 dBm  |             | Auto Tun                          |
| 15.0          |                      |        |     |          |       |           |      |          |         |                      |  |             | Center Fre<br>0000000 GH          |
| 5.00          | ~~~~                 | ~~~~~  | ~~~ | ~~~      | ~~~   | ~         |      |          |         |                      |  | 1.90        | <b>Start Fre</b><br>8000000 GH    |
| 25.0          |                      |        |     |          |       | L.        | 1    |          |         |                      | DL1 -13.00 dBm   | 1.91        | <b>Stop Fre</b><br>2000000 GH     |
| 35.0          |                      |        |     |          |       |           |      |          |         |                      | <u>~~~~~</u>   | <u>Auto</u> | <b>CF Ste</b><br>400.000 kH<br>Ma |
| 45.0 <u> </u> |                      |        |     |          |       |           |      |          |         |                      |  |             | Freq Offs<br>0                    |
| 65.0          | 1.010000             | 011-   |     |          |       |           |      |          |         |                      |  | Log         | Scale Typ                         |
|               | 1.910000<br>N 51 kHz | GHZ    |     | \$       | ¢VBW  | 160 kHz   |      |          | Sweep 1 | span 4<br>1.933 ms ( | .000 MHz<br>(1001 pts)   | 209         |                                   |
| ISG           |                      |        |     |          |       |           |      |          | STATU   | S                    |  |             |                                   |

Plot 7-183. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



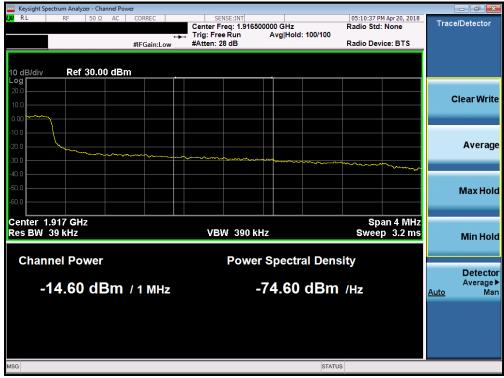
Plot 7-184. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|----|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |    | Daga 115 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |    | Page 115 of 197                 |
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|           | ectrum Analyz | er - Swept | SA                                      |          |       |           |      |          |        |   |  | _           |                                   |
|-----------|---------------|------------|---|----------|-------|-----------|------|----------|--------|---|--|-------------|-----------------------------------|
| XU RL     | RF            | 50 Ω       | AC                                      | CORREC   | ide 😱 | Trig: Fre |      | #Avg Typ | e: RMS | TRAC                                    | M Apr 20, 2018<br>CE 1 2 3 4 5 6<br>PE A WWWWW<br>ET A N N N N N | F           | requency                          |
| 10 dB/div | Ref 25        | .00 dB     | im                                      | IFGain:L | ow    | Atten: 36 | 6 dB |          | Mkr    | 1.915 (                                 | 000 GHz<br>81 dBm  |             | Auto Tun                          |
| 15.0      |               |            |   |          |       |           |      |          |        |   |  |             | Center Fre<br>5000000 GH          |
| 5.00      | ~~~~~~        |            | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~~~     | ~~~   |           |      |          |        |   |  | 1.91        | <b>Start Fre</b><br>3000000 GH    |
| 25.0      |               |            |   |          |       | L.        | 1    |          |        | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | DL1 -13.00 dBm   | 1.91        | <b>Stop Fre</b><br>7000000 GH     |
| 45.0      |               |            |   |          |       |           |      |          |        |   |  | <u>Auto</u> | <b>CF Ste</b><br>400.000 kł<br>Ma |
| 55.0      |               |            |   |          |       |           |      |          |        |   |  |             | Freq Offs<br>0 I                  |
| 65.0      | 915000 (      | 247        |   |          |       |           |      |          |        | Snap                                    | .000 MHz   | Log         | Scale Typ                         |
| Res BW    |               | 51112      |   | ;        | #VBW  | 160 kHz   |      |          | Sweep  | 1.933 ms (                              | (1001 MH2<br>(1001 pts)  |             |                                   |
| SG        |               |            |   |          |       |           |      |          | STATU  | s                                       |  |             |                                   |

Plot 7-185. Upper Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-186. Upper Extended Band Edge Plot (Band 25 - 5.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA   |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |  |  |  |
|---|--------------------------|---------------------------------------|------|---------------------------------|--|--|--|--|
| Test Report S/N:  | Test Dates:              | EUT Type:                             |      | Dage 116 of 107                 |  |  |  |  |
| 1M1804120069-03-R1.ZNF                                      | April 12 - June 19, 2018 | Portable Handset                      |      | Page 116 of 197                 |  |  |  |  |
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| U RL     | RF               | 50 Ω    | AC | CORREC             |       | SEI                     | NSE:INT |          |         |                      | M Apr 20, 2018                         | -           |                               |
|----------|------------------|---------|----|--------------------|-------|-------------------------|---------|----------|---------|----------------------|--|-------------|-------------------------------|
|          |                  |         |    | PNO: W<br>IFGain:L | ide 🖵 | Trig: Free<br>Atten: 36 |         | #Avg Typ | e:RMS   | TRAC<br>TYI<br>DI    | E 1 2 3 4 5 6<br>E A WWWW<br>A NNNN    | Fr          | equency                       |
| 0 dB/div | Ref 25           | 5.00 dl | Bm |                    |       |                         |         |          | Mkr1    | 1.850 (<br>-29.      | 00 GHz<br>31 dBm                       |             | Auto Tun                      |
| 15.0     |                  |         |    |                    |       |                         |         |          |         |                      |  |             | Center Fre<br>0000000 G⊦      |
| 5.00     |                  |         |    |                    |       |                         |         |          | ·····   |                      | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | 1.84        | Start Fre                     |
| 25.0     |                  |         |    |                    |       |                         | 1,      |          |         |                      | DL1 -13.00 dBm                         | 1.85        | <b>Stop Fre</b><br>4000000 GH |
| 35.0     | ~~~~~            |         | ^  | <u></u>            | ~~~~  |                         |         |          |         |                      |  | <u>Auto</u> | CF Ste<br>800.000 kl<br>Ma    |
| 55.0     |                  |         |    |                    |       |                         |         |          |         |                      |  | 1           | F <b>req Offs</b><br>0 I      |
| 65.0     |                  |         |    |                    |       |                         |         |          |         |                      |  |             | Scale Typ                     |
|          | 850000<br>100 kH |         |    | ;                  | ≠vbw  | 300 kHz                 |         |          | Sweep ′ | Span 8<br>1.000 ms ( | .000 MHz<br>1001 pts)                  | Log         | L                             |

Plot 7-187. Lower Band Edge Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-188. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 117 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 117 of 197                 |
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| RL                  | RF                  | 50 Ω AC | CORREC                                  | SE         | NSE:INT |          |         |                     | M Apr 20, 2018                           | Fre              | quency                            |
|---------------------|---------------------|---------|---|------------|---------|----------|---------|---------------------|--|------------------|-----------------------------------|
|                     |                     |         | PNO: Wide<br>IFGain:Lov                 | Trig: Fre  |         | #Avg Typ | be:RMS  | TRAC<br>TYF<br>DE   | E 1 2 3 4 5 6<br>E A WWWW<br>A N N N N N |                  |                                   |
| 0 dB/div            | Ref 25.0            | 00 dBm  | 1                                       |            |         |          | Mkr1    | 1.915 0<br>-25.     | 16 GHz<br>48 dBm                         |                  | Auto Tur                          |
| . <b>og</b>         |                     |         |   |            |         |          |         |                     |  |                  | enter Fre                         |
| 5.00                |                     |         | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ |            |         |          |         |                     |  |                  | Start Fre                         |
| 25.0                |                     |         |   |            | 1       |          |         |                     | DL1 -13.00 dBm                           |                  | Stop Fre                          |
| 45.0                |                     |         |   |            |         |          |         |                     | ~~~~                                     | ع<br><u>Auto</u> | <b>CF Ste</b><br>300.000 kł<br>Ma |
| 55.0                |                     |         |   |            |         |          |         |                     |  | F                | req Offs<br>0 I                   |
| 65.0                |                     |         |   |            |         |          |         |                     |  |                  | cale Typ                          |
| enter 1.9<br>Res BW | 915000 G<br>100 kHz | Hz      | #V                                      | BW 300 kHz | 2       |          | Sweep 1 | Span 8<br>.000 ms ( | .000 MHz<br>1001 pts)                    | Log              | L                                 |

Plot 7-189. Upper Band Edge Plot (Band 25 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-190. Lower Band Edge Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 119 of 107                 |  |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 118 of 197                 |  |
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|                   | pectrum Anal |         |   |                  |        |        |   |          |         |              |   |                                 | ×         |
|-------------------|--------------|---------|---|------------------|--------|--------|---|----------|---------|--------------|---|---------------------------------|-----------|
| <mark>0</mark> RL | RF           | 50 Ω    | AC                                      | CORREC<br>PNO: W | /ide 🖵 |        |   | #Avg Typ | e: RMS  | TRA          | PM Apr 20, 2018<br>CE 1 2 3 4 5 6<br>PE A MANANA<br>DET A NNNNN | Frequency                       |           |
| I0 dB/div         | Ref 2        | 5.00 dl | Bm                                      | in Guill.        |        |        |   |          | Mkr1    | 1.910<br>-22 | 000 GHz<br>.46 dBm  | Auto T                          | un        |
| 15.0              |              |         |   |                  |        |        |   |          |         |              |   | Center F<br>1.910000000         |           |
| 5.00              |              | ~~~~    | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~~~~            | ~~~~   | $\sim$ |   |          |         |              | DL1 -13.00 dBm  | Start F<br>1.904000000          |           |
| 25.0              |              |         |   |                  |        | t.     | 1 |          |         |              | DET -13.00 dBm  | <b>Stop F</b><br>1.916000000    |           |
| 35.0 <b></b>      |              |         |   |                  |        |        |   | n        |         | ~~~~         |   | CF S<br>1.200000<br><u>Auto</u> |           |
| i5.0              |              |         |   |                  |        |        |   |          |         |              |   | Freq Of                         | fs<br>0   |
| enfer 1           | .910000      | GH7     |   |                  |        |        |   |          |         | Span         | 12.00 MHz   | Scale T                         | 'уг<br>_∟ |
|                   | 150 kH       |         |   |                  | #VBW   | 470 kH | z |          | Sweep ′ | 1.000 ms     | (1001 pts)  |                                 |           |
| SG                |              |         |   |                  |        |        |   |          | STATU   | s            |   |                                 |           |

Plot 7-191. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-192. Upper Band Edge Plot (Band 25 - 15.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             | Dage 110 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      | Page 119 of 197                 |
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| RL RF :                             | 50 Ω AC                | CORREC                                 | SEN  | ISE:INT |  |  | 05:19:46 PM                             | Apr 19, 2018                    | Frequency                            |
|-------------------------------------|------------------------|--|--|---------|--|--|---|---------------------------------|--------------------------------------|
|                                     |                        | PNO: Fast G                            | Trig: Free<br>Atten: 36  |         | #Avg Type                              | RMS                                    | TYPE<br>DET                             | 123456<br>A WWWW<br>A N N N N N |                                      |
| 0 dB/div Ref 25.0                   | 0 dBm                  |  |  |         |  | Mkr1                                   | 1.850 0<br>-30.2                        | 00 GHz<br>20 dBm                | Auto Tu                              |
| 15.0                                |                        |  |  |         |  |  |   |                                 | Center Fr<br>1.850000000 G           |
| 5.00                                |                        |  |  |         | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | , e , e , e , e , e , e , e , e , e , e |                                 | Start Fi<br>1.842000000 G            |
| 25.0                                |                        |  |  | 1,1     |  |  |   | 0L1 -13.00 dBm                  | <b>Stop Fi</b><br>1.858000000 G      |
| 35.0                                | and provide the second | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | and the second |         |  |  |   |                                 | CF St<br>1.600000 M<br><u>Auto</u> M |
| 55.0                                |                        |  |  |         |  |  |   |                                 | Freq Off<br>0                        |
| 65.0                                |                        |  |  |         |  |  |   |                                 | Scale Ty                             |
| Center 1.850000 G<br>Res BW 200 kHz | Hz                     | #VBW                                   | 620 kHz  |         | s                                      | weep 1.0                               | Span 16<br>000 ms <u>(1</u>             | 100 Will 12                     | Log                                  |

Plot 7-193. Lower Band Edge Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-194. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 120 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 120 of 197                 |
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| Keysight Spectru |           |      |            |           |  |  |              |           |   |                                   | ×         |
|------------------|-----------|------|------------|-----------|--|--|--------------|-----------|---|-----------------------------------|-----------|
| XI RL            | RF 50 Ω   | 2 AC | PNO: Fast  |           |  | #Avg Typ                               | e: RMS       | TRAC      | M Apr 19, 2018<br>CE 1 2 3 4 5 6<br>PE A WWWW<br>FT A N N N N N | Frequency                         |           |
| 10 dB/div        | Ref 25.00 | dBm  | IFGain:Low | Atten: 36 | đĐ                                     |  | Mkr          | 1 1.915 4 |   | Auto T                            | un        |
| 15.0             |           |      |            |           |  |  |              |           |   | Center F<br>1.915000000           |           |
| 5.00             |           | r    | *****      |           |  |  |              |           |   | Start F<br>1.907000000            |           |
| 25.0             |           |      |            |           | <u>1</u>                               |  |              |           | DL1 -13.00 dBm  | <b>Stop F</b><br>1.923000000      |           |
| 35.0             |           |      |            |           | ······································ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | mpha-a-mpana | manna     | musamu  | CF S<br>1.600000 I<br><u>Auto</u> |           |
| 5.0              |           |      |            |           |  |  |              |           |   | Freq Ofi                          | fs<br>0   |
| enter 1.91       | 5000 GHz  |      |            |           |  |  |              | Span 1    | 6.00 MHz  | Scale Ty                          | ע'<br>וע' |
| Res BW 20        |           |      | #VB        | W 620 kHz |  |  | Sweep        | 1.000 ms  | (1001 pts)  |                                   |           |
| SG               |           |      |            |           |  |  | STATU        | JS        |   |                                   |           |

Plot 7-195. Upper Band Edge Plot (Band 25 - 20.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 101 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 121 of 197                 |
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| CORREC SENSE:INT                                    |  | 11:45:31 PM May 02, 2018                                   |  |
|---|--|--|--|
| PNO: Wide Trig: Free Run<br>IFGain:Low Atten: 36 dB | #Avg Type: RMS                           | TRACE 123456<br>TYPE A<br>DET ANNNN                        | Frequency  |
|   | Mkr                                      | 1 2.305 000 GHz<br>-29.02 dBm                              | Auto Tun   |
|   |  |  | Center Fre<br>2.305000000 G⊦   |
|   |  | N 4 42 00 45-  | <b>Start Fre</b><br>2.303000000 GF   |
| 1   |  |  | <b>Stop Fre</b><br>2.307000000 GH  |
|   |  |  | CF Ste<br>400.000 kł<br><u>Auto</u> Ma   |
|   |  |  | Freq Offs<br>0 F   |
|   |  |  | Scale Typ  |
| #VBW 160 kHz  | Sweep                                    | Span 4.000 Minz  | Log <u>L</u>   |
|   | PNO: Wide Trig: Free Run<br>Atten: 36 dB | PNO: Wide Trig: Free Run<br>IFGein:Low Atten: 36 dB<br>Mkr | PNO: Wide Trig: Free Run Atten: 36 dB Trig: 56 dB Trig |

Plot 7-196. Lower Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-197. Lower Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dogo 122 of 107                 |  |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 122 of 197                 |  |
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| 50 Ω AC     | CORREC         | SENSE:INT  |                | 11:47:37 PM May 02, 2018  | Frequency   |
|-------------|----------------|--|----------------|---|---|
|             |                | Trig: Free Run<br>Atten: 36 dB                               | #Avg Type: RMS | TRACE 1 2 3 4 5 6<br>TYPE A WWWWW<br>DET A N N N N N  | Frequency   |
| 25.00 dBm   |                |  | Mł             | r1 2.315 03 GHz<br>-26.95 dBm   | Auto Tur  |
|             |                |  |                |   | Center Fre<br>2.315000000 GF  |
| huntur      | - Martin Const |  |                |   | <b>Start Fre</b><br>2.310000000 GH  |
|             |                | 1  |                |   | <b>Stop Fre</b><br>2.320000000 GF   |
|             |                |  | Marken Market  | www.ww  | CF Ste<br>1.000000 MH<br><u>Auto</u> Ma   |
|             |                |  |                |   | Freq Offs<br>0 F  |
|             |                |  |                |   | Scale Typ   |
| 0 GHz<br>Iz | #VBW           | 160 kHz  | Sweep          |   | Log <u>L</u>  |
|             | 25.00 dBm      | 50 Ω AC CORREC<br>PNO: Wide C<br>IFGain:Low<br>25.00 dBm<br> | 25.00 dBm      | S0 Ω AC     CORREC     SENSE:INT     #Avg Type: RMS       PNO: Wide     Trig: Free Run     #Avg Type: RMS       25.00 dBm     1     1 | 50 Ω AC       CORREC       SENSE:INT       11:47:37 PMMay 02,2018         PNO: Wide       Trig: Free Run       #Avg Type: RMS       TRACE       223 4 5 0         JEGain:Low       Trig: Free Run       Mkr1 2.315 03 GHz       -26.95 dBm         25.00 dBm       -26.95 dBm       -26.95 dBm         JEGAIN       JEGAIN       JEGAIN       JEGAIN         25.00 dBm       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN       JEGAIN       JEGAIN         JEGAIN       JEGAIN       JEGAIN |

Plot 7-198. Upper Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-199. Upper Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 122 of 107                 |  |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 123 of 197                 |  |
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| PNO: Wide<br>IFGainLow         Trig: Free Run<br>Atten: 36 dB         #Avg Type: RMS         TRACE<br>Trig: Frequency         Ital as a stress<br>(Inclusion)         Frequency           0 dB/div         Ref 25.00 dBm         Mkr1 2.304 952 GHz<br>-30.41 dBm         Auto Tu           0 dB/div         Ref 25.00 dBm         Start Fr<br>2.30500000 G         Start Fr<br>2.30100000 G           0 dB/div         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G           0 dB/div         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G           0 dB/div         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G           0 dB/div         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G         Start Fr<br>2.30900000 G   | Keysight Spectrum Analy<br>KIRL RF | /zer - Swept SA<br>50 Ω AC | CORREC      | CENCE INT |          |        | 11:40:35 PM May 02, 2018    |                                       |
|--|------------------------------------|----------------------------|-------------|-----------|----------|--------|-----------------------------|---------------------------------------|
| Mkr1 2.304 952 GHz<br>-30.41 dBm         Auto Tu           0         Bidiv         Ref 25.00 dBm         -30.41 dBm           50         -30.41 dBm         -30.41 dBm         -30.41 dBm           60         -30.41 dBm         -30.41 dBm         -30.41 dBm           61         -30.41 dBm         -30.41 dBm         -30.41 dBm           62         -30.41 dBm         -30.41 dBm         -30.41 dBm <th>KL KF</th> <th>50 Ω AC</th> <th>PNO: Wide 🔾</th> <th></th> <th>#Avg Typ</th> <th>e: RMS</th> <th>TRACE 1 2 3 4 5 6</th> <th>Frequency</th> | KL KF                              | 50 Ω AC                    | PNO: Wide 🔾 |           | #Avg Typ | e: RMS | TRACE 1 2 3 4 5 6           | Frequency                             |
| 5.0       Center Fr         5.0       Freq Offs         6.0       Center Fr         6.0       Freq Offs         6.0       Center Fr         6.0       Center Fr <td< th=""><th>10 dB/div Ref 2</th><th>5.00 dBm</th><th>I Gall.LOW</th><th></th><th></th><th>Mkr1</th><th>2.304 952 GHz<br/>-30.41 dBm</th><th>Auto Tun</th></td<>   | 10 dB/div Ref 2                    | 5.00 dBm                   | I Gall.LOW  |           |          | Mkr1   | 2.304 952 GHz<br>-30.41 dBm | Auto Tun                              |
| Start Fr           50         0           50 <td>15.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Center Fre<br/>2.305000000 GF</td>   | 15.0                               |                            |             |           |          |        |                             | Center Fre<br>2.305000000 GF          |
| 50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50<br>50   | 5.00                               |                            |             |           | mm       |        |                             | <b>Start Fre</b><br>2.301000000 GH    |
| Sub         Auto         800.000 k           Sub         Sub         Sub         Sub   | 25.0                               |                            |             | 1/        |          |        |                             | <b>Stop Fre</b><br>2.309000000 GH     |
| enter 2.305000 GHz Span 8.000 MHz Log  | 35.0 <b></b><br>45.0 <b></b>       | ~~~~                       |             | mor and   |          |        |                             | CF Ste<br>800.000 kl<br><u>Auto</u> M |
| enter 2.305000 GHz Scale Ty  | 55.0                               |                            |             |           |          |        |                             | Freq Offs<br>01                       |
| Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)  |                                    |                            |             |           |          |        | Span 8.000 MHz              | Scale Typ                             |
| SG STATUS  | Res BW 100 kH                      | z                          | #VBW        | 300 kHz   |          |        | .000 ms (1001 pts)          |                                       |

Plot 7-200. Lower Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-201. Lower Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | LG              | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|-----------------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |                 | Daga 124 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 |                                       | Page 124 of 197 |                                 |
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| XI RL       | pectrum Ana         | 50 Ω                                    | CORREC    |        | SENSE:INT               |          |         | 11:39:06 PM May 02, 201                   | 8                                       |
|-------------|---------------------|---|-----------|--------|-------------------------|----------|---------|---|---|
|             | 10                  | 5032                                    | PNO: Wide |        | : Free Run<br>en: 36 dB | #Avg Typ | e:RMS   | TRACE 2 3 4 5<br>TYPE A WWW<br>DET A NNNN | 6 Frequency                             |
| 10 dB/div   | Ref 2               | 5.00 dE                                 |           |        |                         |          | Mk      | r1 2.315 00 GH<br>-28.52 dBn              | z Auto Tur<br>1                         |
| - <b>og</b> |                     |   |           |        |                         |          |         |   | Center Fre<br>2.315000000 GH            |
| 5.00        | ~~~~~               | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | <br>~~~~  | m      |                         |          |         |   | Start Fre<br>2.310000000 GF             |
| 25.0        |                     |   |           |        | 1                       |          |         | DL1 -13.00 dB                             | <b>Stop Fre</b><br>2.320000000 GI       |
| 35.0        |                     |   |           |        |                         | ~~~~~    |         |   | CF Ste<br>1.000000 Mi<br><u>Auto</u> Mi |
| 55.0        |                     |   |           |        |                         |          |         |   | Freq Offs<br>01                         |
| .65.0       | 04500               |   |           |        |                         |          |         |   | Scale Typ                               |
|             | .315000<br>V 100 ki |   | #VI       | BW 300 | kHz                     |          | Sweep ′ | Span 10.00 MH<br>1.267 ms (1001 pts       |   |

Plot 7-202. Upper Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-203. Upper Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 💽 LG            | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|-----------------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |                 | Daga 125 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 |                                       | Page 125 of 197 |                                 |
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#### Keysight Spectrum Analyzer - Spurious Em 09:11:36 PM May 03, 2018 RI Frequency Center Freq: 2.498500000 GHz Radio Std: None Trig: Free Run PASS IFGain:Low #Atten: 30 dB Radio Device: BTS Ref 40.00 dBm I0 dB/div Log **Center Freq** 2.498500000 GHz -had been MAN WWW u Lu Stop 2.525 GHz Start 2.475 GHz **CF** Step 400.000 kHz RBW Frequency Auto Man Spur | Range | Start Freq Amplitude Stop Freq ∆ Limit 11 90 dF 000 MHz GH7 2.4940 GHz 1.000 MHz 2.495943333 GHz -27.28 dBm 2.4960 GHz -14.28 dB Freq Offset 2.4990 GHz 1.000 MHz 2.498770000 GHz -30.46 dBm 2.4960 GHz -20.46 dB 0 Hz 91.00 kHz 2.499988333 GHz -24.42 dBm 2.5000 GHz 2.4990 GHz -14.42 dB 2.5250 GHz 240.0 kHz 2.502000000 GHz 12.91 dBm 2.5000 GHz -12.09 dB STATUS

Plot 7-204. Lower ACP Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-205. Upper ACP Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 126 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 126 of 197                 |
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| Keysig<br>X/ RL        |  | n Analyzer - Spurio<br>ξF 50 Ω                        | us Emissions<br>AC CORREC |  | SENSE:INT<br>Freq: 2.4970000<br>Free Run | 00 GHz         | 06:59:19 PM<br>Radio Std: | 1 Apr 23, 2018<br>None    | Frequency      |
|------------------------|--|---|---------------------------|--|--|----------------|---------------------------|---------------------------|----------------|
| PASS                   | <b>S</b>   |   | IFGain:Lov                |  | n: 26 dB                                 |                | Radio Devi                | ice: BTS                  |                |
|                        |  |   | II Guill.EG               |  |  |                |                           |                           |                |
|                        |  |   |                           |  |  |                |                           |                           |                |
| 10 dB/<br>Log <b>[</b> | div  | Ref 40.00   | dBm                       |  |  |                |                           |                           |                |
| 30.0                   |  |   |                           |  |  |                |                           |                           | Contor Fro     |
|                        |  |   |                           |  |  |                |                           |                           | Center Fre     |
| 20.0                   |  |   |                           |  |  |                |                           |                           | 2.497000000 GH |
| 10.0                   |  |   |                           |  | an Manahan Maha                          | And All de lan |                           |                           |                |
| 0.00                   |  |   |                           |  |  |                |                           |                           |                |
| -10.0                  |  |   |                           |  | 11                                       | · · · ·        |                           |                           |                |
| -20.0                  |  |   |                           |  |  |                |                           |                           |                |
|                        |  |   |                           |  |  |                |                           |                           |                |
| -30.0                  |  |   |                           | Han an air | <mark>la d</mark> i                      | 14 M 14        | MANALAN                   |                           |                |
| -40.0                  |  |   |                           |  |  |                |                           | han a state and state and |                |
| -50.0                  |  | 1015-1120 1479-19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Water and a state         |  |  |                | <u> </u>                  | ad a state of the         |                |
|                        | An international states of the second states of the |   |                           |  |  |                |                           | تكليك                     |                |
| Start                  | 2.475 0  | GHz   |                           |  |  |                | Stop 2.                   | .525 GHz                  | CF Ste         |
|                        |  |   |                           |  |  |                |                           |                           | 400.000 kH     |
| Spur                   | Range  | Start Freq  | Stop Freq                 | RBW  | Frequency                                | Amplitude      | ∆ Limit                   |                           | <u>Auto</u> Ma |
| 1                      | 1  | 2.4750 GHz  | 2.4905 GHz                | 1.000 MHz                                      | 2.490267500 GH                           | lz -40.10 dBm  | -15.10 dB                 |                           |                |
| 2                      | 2  | 2.4905 GHz  | 2.4960 GHz                | 1.000 MHz                                      | 2.492571667 GH                           | Iz -32.17 dBm  | -19.17 dB                 |                           | Freq Offse     |
| 3                      | 3  | 2.4960 GHz  | 2.4990 GHz                | 1.000 MHz                                      | 2.498875000 GH                           | lz -29.13 dBm  | -19.13 dB                 |                           |                |
| 4                      | 4  | 2.4990 GHz  | 2.5000 GHz                |  | 2.499923333 GH                           |                | -18.21 dB                 |                           | 0 H            |
| 5                      | 5  | 2.5000 GHz  | 2.5250 GHz                | 240.0 kHz                                      | 2.507000000 GH                           | lz 10.04 dBm   | -14.96 dB                 |                           |                |
|                        |  |   |                           |  |  |                |                           |                           |                |
|                        |  |   |                           |  |  |                |                           |                           |                |
|                        |  |   |                           |  |  |                |                           |                           |                |
|                        |  |   |                           |  |  |                |                           |                           |                |
|                        |  |   |                           |  |  |                |                           |                           |                |
| SG                     |  |   |                           |  |  | 07             | ATUS                      |                           |                |

Plot 7-206. Lower ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-207. Upper ACP Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 197 of 107                 |
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| RL                     | F                    | n Analyzer - Spuri<br>ξF 50 Ω   | AC CORRE   | EC           | Trig: I    | SENSE:INT<br>r Freq: 2.49700<br>Free Run | 0000 GH | łz                                      | Radio Std:          |                             | F    | Frequency            |
|------------------------|----------------------|---|--|--------------|------------|--|---------|---|---------------------|-----------------------------|------|----------------------|
| PASS                   | 5                    |   | IFGai  | in:Low 🗂     | #Atter     | n: 26 dB                                 |         |   | Radio Devi          | ce: BTS                     |      |                      |
|                        |                      |   |  |              |            |  |         |   |                     |                             |      |                      |
|                        |                      |   |  |              |            |  |         |   |                     |                             |      |                      |
| I0 dB/<br>₋og <b>Г</b> | (div                 | Ref 40.00   | aBm  |              |            |  |         |   |                     |                             |      |                      |
| 30.0                   |                      |   |  |              |            |  |         |   |                     |                             |      | Center Fre           |
| 20.0                   |                      |   |  |              |            |  |         |   |                     |                             |      |                      |
|                        |                      |   |  |              |            |  |         |   |                     |                             | 2.4  | 97000000 GH          |
| 10.0                   |                      |   |  |              |            | . 1                                      |         | 1.1.1.1.1.1.1.1                         |                     |                             |      |                      |
| 0.00                   |                      |   |  |              |            |  | WWW     | hand hand hand hand hand hand hand hand |                     |                             |      |                      |
| 10.0                   |                      |   |  |              |            |  |         |   |                     |                             |      |                      |
| 20.0                   |                      |   | ١  |              |            |  |         |   |                     |                             |      |                      |
|                        |                      |   |  |              |            |  |         |   | ul ul.              |                             |      |                      |
| 30.0                   |                      |   |  | alijih aliji | . <u>1</u> |  |         |   | Water Minister and  |                             |      |                      |
| 40.0                   |                      |   | With Mary and a start of the st |              | the state  |  |         |   | I I also the starts | HALL AND A REAL PROPERTY OF |      |                      |
| 50.0                   |                      |   | <b>.</b>   |              |            | <u> </u>                                 |         |   |                     |                             |      |                      |
| ····                   | and the state of the | a la faire ann an tarainn an tarai |  |              |            |  |         |   |                     | · · · · ·                   |      |                      |
| Start                  | 2.475 0              | GHz   |  |              |            |  |         |   | Stop 2              | .525 GHz                    |      | OF Oto               |
|                        |                      |   |  |              |            |  |         |   |                     |                             |      | CF Ste<br>400.000 kH |
| Spur                   | Range                | Start Freq  | Stop Fr  | eq RI        | 3///       | Frequency                                | Δ       | mplitude                                | ∆ Limit             |                             | Auto | Ma                   |
| 1                      | 1                    | 2.4750 GHz  |  |              |            | 2.488485000                              |         |   | -8.867 dB           |                             |      |                      |
| 2                      | 2                    | 2.4905 GHz  |  |              |            | 2.491673333                              |         |   | -18.70 dB           |                             |      |                      |
| 3                      | 3                    | 2.4960 GHz  |  |              |            | 2.497715000                              |         |   | -17.72 dB           |                             |      | Freq Offs            |
|                        | 4                    | 2.4990 GHz  |  |              |            | 2.499633333                              |         |   | -16.13 dB           |                             |      | 0 H                  |
| 5<br>1                 |                      | 2.5000 GHz  |  |              |            | 2.506458333                              |         |   | -16.82 dB           |                             |      |                      |
| ļ.                     | 5                    |   |  |              |            |  |         |   |                     |                             |      |                      |
|                        | 5                    |   |  |              |            |  |         |   |                     |                             |      |                      |
| 1                      | 5                    |   |  |              |            |  |         |   |                     |                             |      |                      |
| 1                      | 5                    |   |  |              |            |  |         |   |                     |                             |      |                      |
| ļ                      | 5                    |   |  |              |            |  |         |   |                     |                             |      |                      |
| ļ                      | 5                    |   |  |              |            |  |         |   |                     |                             |      |                      |

Plot 7-208. Lower ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



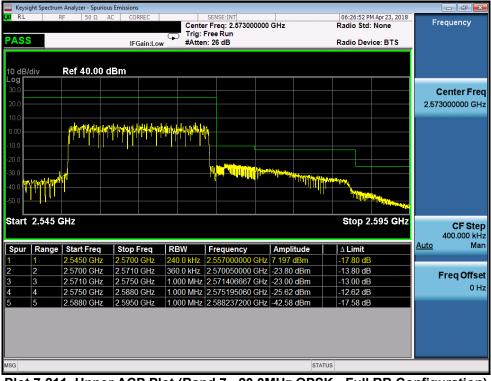
Plot 7-209. Upper ACP Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕕 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |      | Page 128 of 197                 |
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Plot 7-210. Lower ACP Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-211. Upper ACP Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 120 of 107                 |
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# 7.5 Peak-Average Ratio

## **Test Overview**

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

## Test Procedure Used

KDB 971168 D01 v03r01 - Section 5.7.1

### **Test Settings**

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



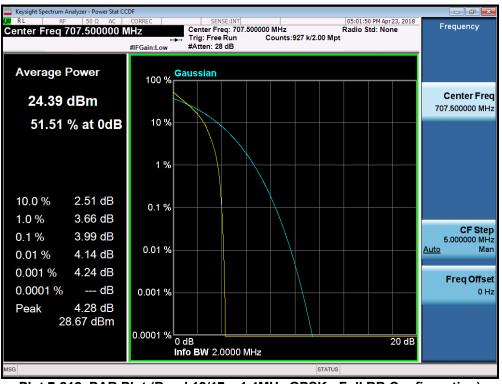
Figure 7-4. Test Instrument & Measurement Setup

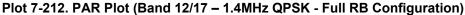
#### Test Notes

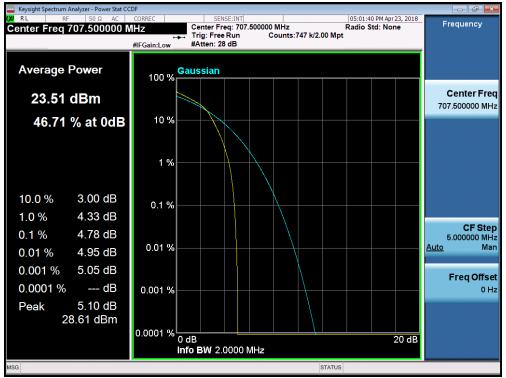
None.

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             | Page 130 of 197                 |
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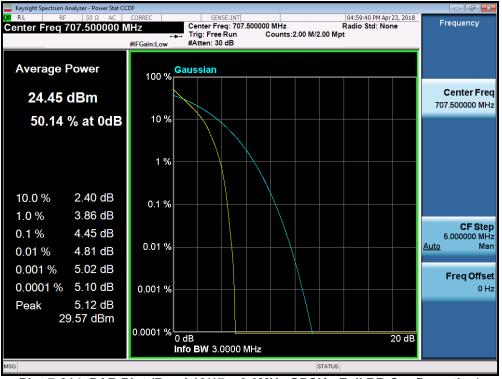




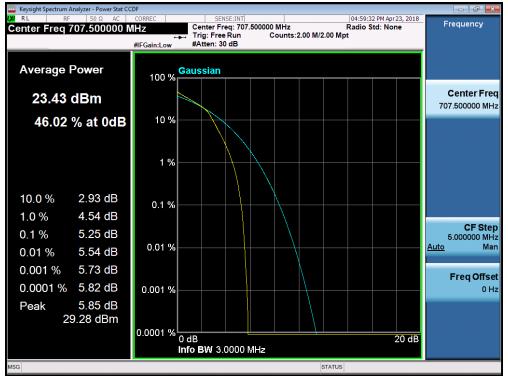
## Plot 7-213. PAR Plot (Band 12/17 – 1.4MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
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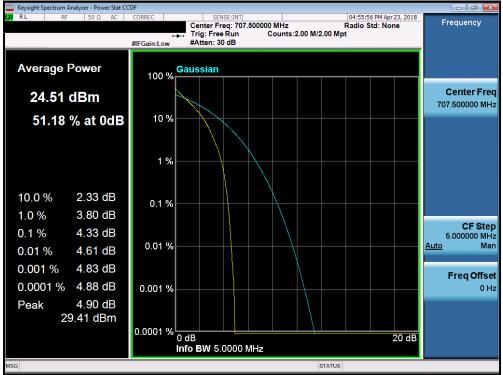
Plot 7-214. PAR Plot (Band 12/17 – 3.0MHz QPSK - Full RB Configuration)



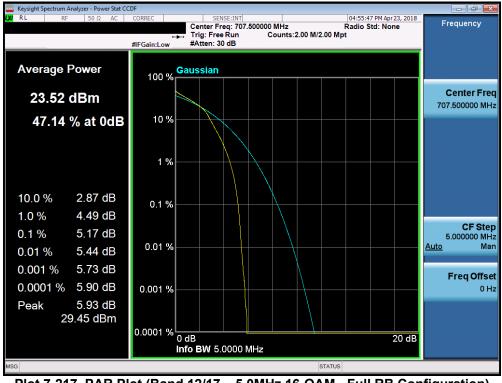
Plot 7-215. PAR Plot (Band 12/17 – 3.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 122 of 107                 |
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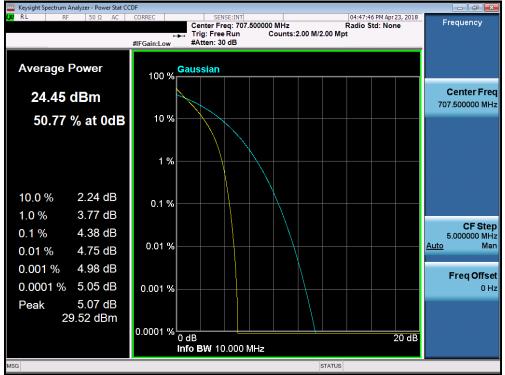
Plot 7-216. PAR Plot (Band 12/17 – 5.0MHz QPSK - Full RB Configuration)



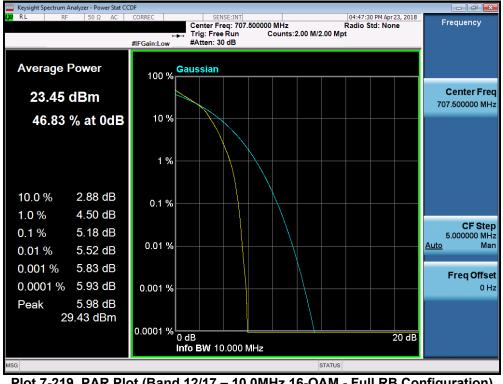
Plot 7-217. PAR Plot (Band 12/17 – 5.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 122 of 107                 |
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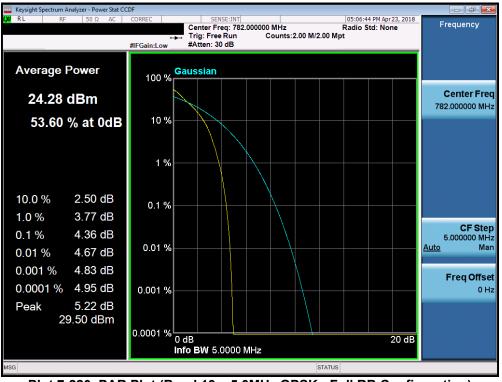
Plot 7-218. PAR Plot (Band 12/17 – 10.0MHz QPSK - Full RB Configuration)



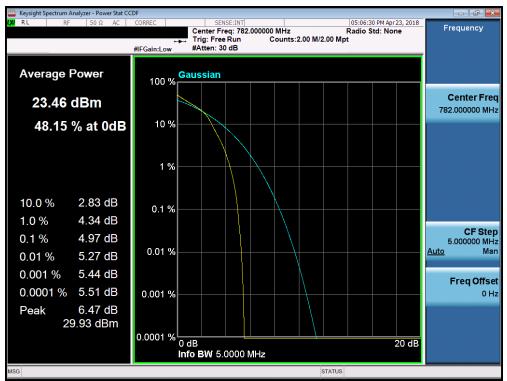
Plot 7-219. PAR Plot (Band 12/17 - 10.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕑 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 124 of 107                 |
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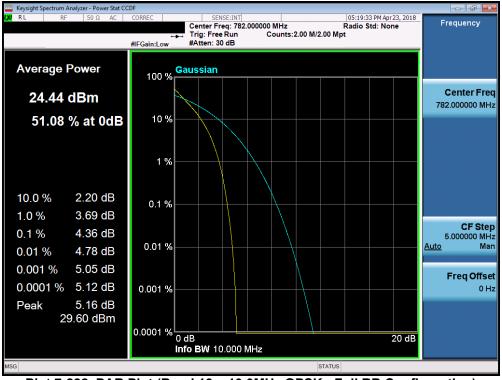
## Plot 7-221. PAR Plot (Band 13 – 5.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA               |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|---------------------------------|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:                | Test Dates:              | EUT Type:                             | Daga 125 of 107                 |
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| © 2010 DOTECT Engine sping Labo | V 0 0 04/0E/2010         |                                       |                                 |

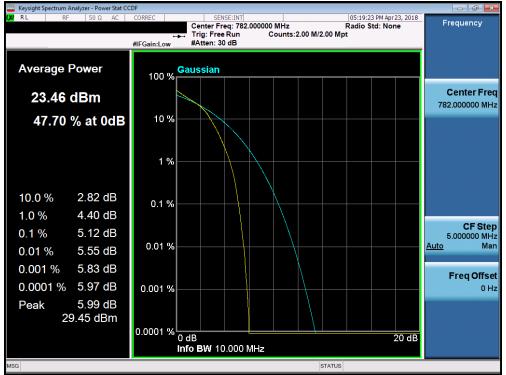
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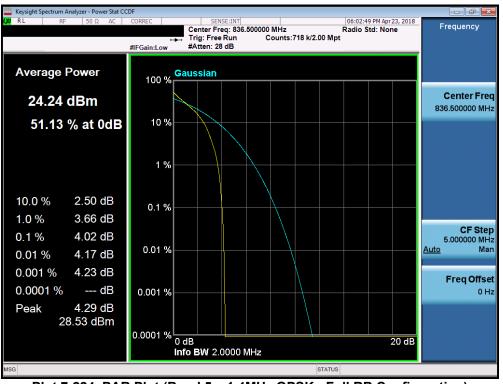
Plot 7-222. PAR Plot (Band 13 – 10.0MHz QPSK - Full RB Configuration)



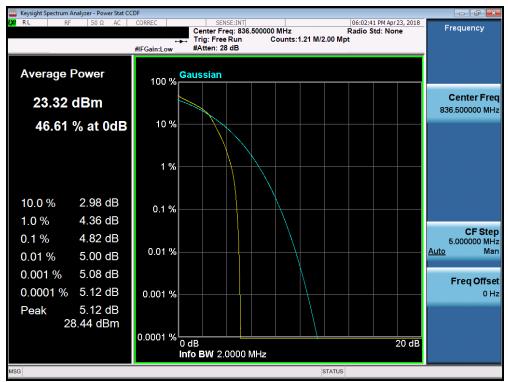
Plot 7-223. PAR Plot (Band 13 – 10.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Daga 126 of 107                 |
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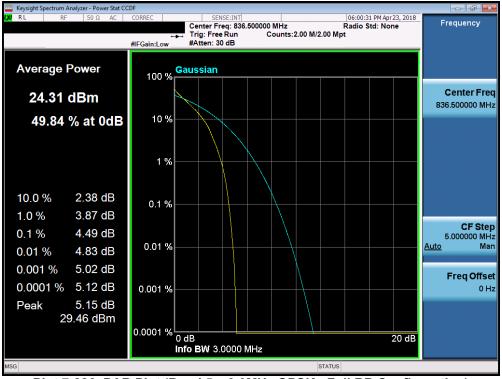
### Plot 7-225. PAR Plot (Band 5 – 1.4MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             | Dege 127 of 107                 |
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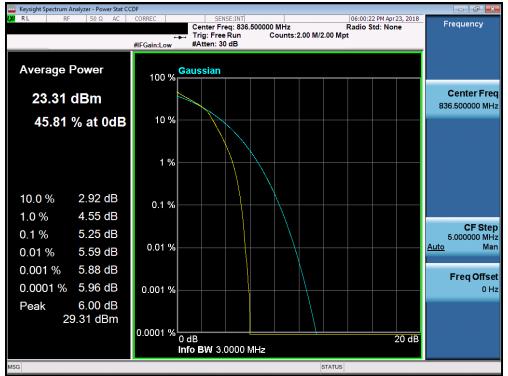
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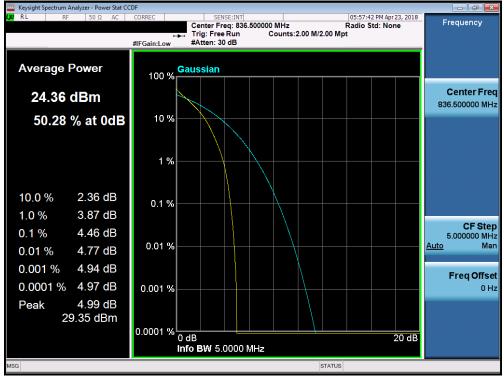
Plot 7-226. PAR Plot (Band 5 – 3.0MHz QPSK - Full RB Configuration)



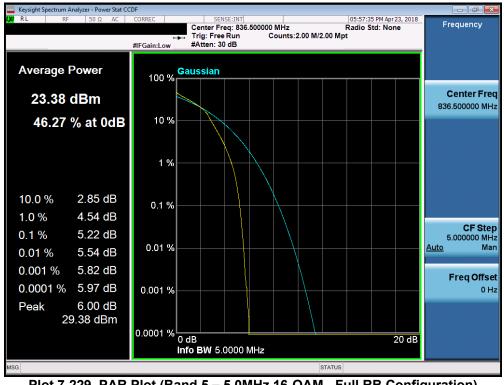
Plot 7-227. PAR Plot (Band 5 – 3.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG             | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------------------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |                  | Daga 129 of 107                 |
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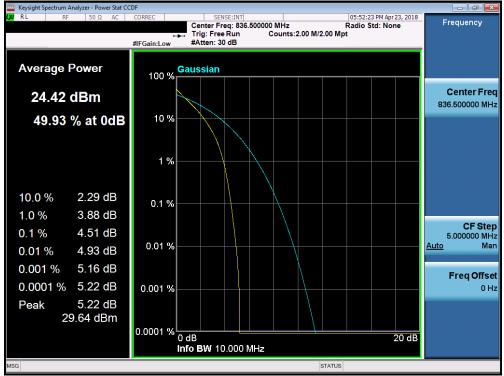
Plot 7-228. PAR Plot (Band 5 – 5.0MHz QPSK - Full RB Configuration)



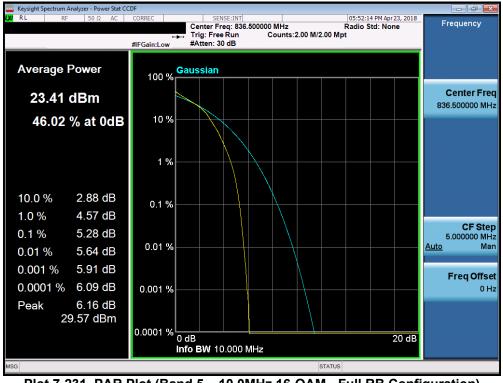
Plot 7-229. PAR Plot (Band 5 – 5.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             | Dage 120 of 107                 |
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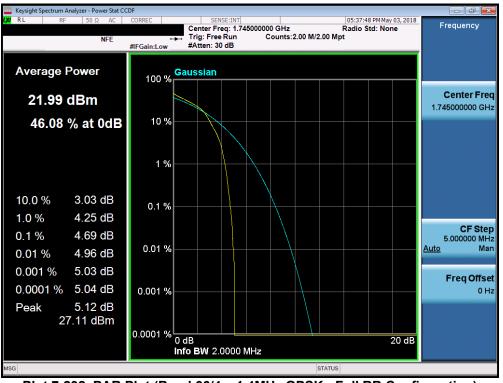
Plot 7-230. PAR Plot (Band 5 – 10.0MHz QPSK - Full RB Configuration)



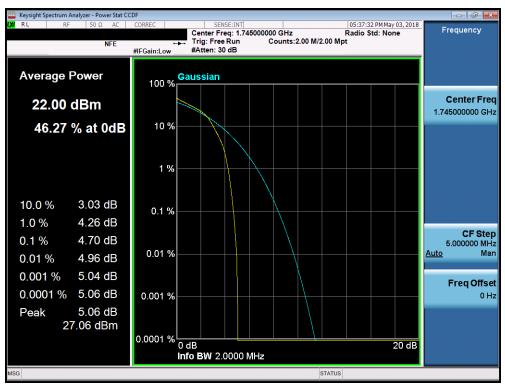
Plot 7-231. PAR Plot (Band 5 – 10.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | LG               | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------------------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |                  | Daga 140 of 107                 |
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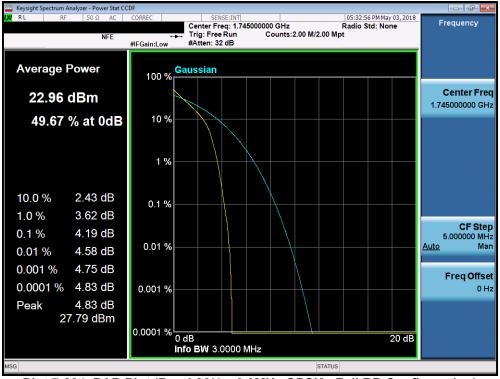




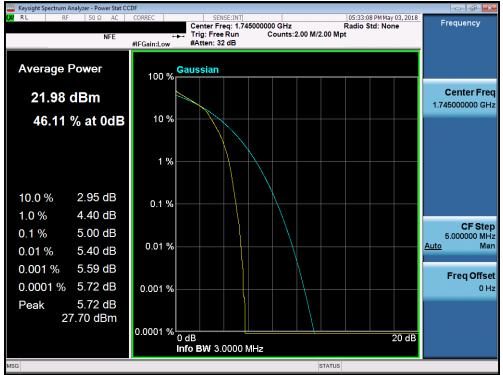
#### Plot 7-233. PAR Plot (Band 66/4 – 1.4MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG             | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------------------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |                  | Dogo 141 of 107                 |
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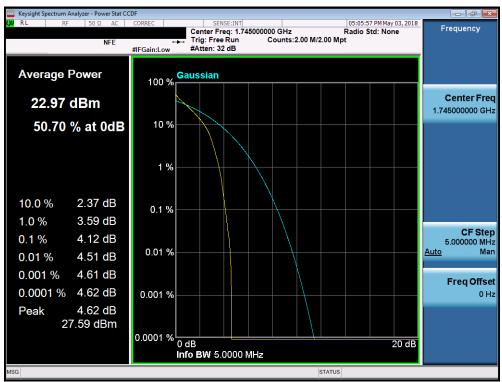
Plot 7-234. PAR Plot (Band 66/4 – 3.0MHz QPSK - Full RB Configuration)



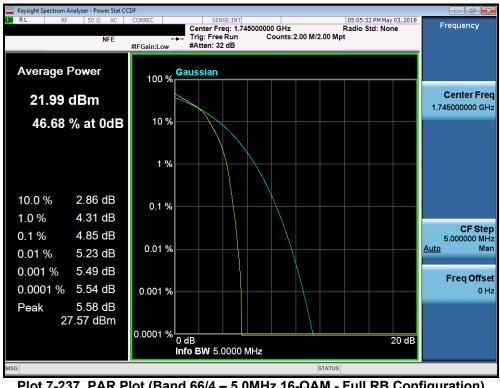
Plot 7-235. PAR Plot (Band 66/4 – 3.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG             | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------------------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |                  | Dage 142 of 107                 |
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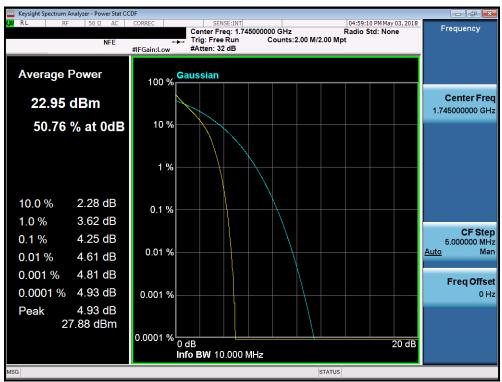
Plot 7-236. PAR Plot (Band 66/4 – 5.0MHz QPSK - Full RB Configuration)



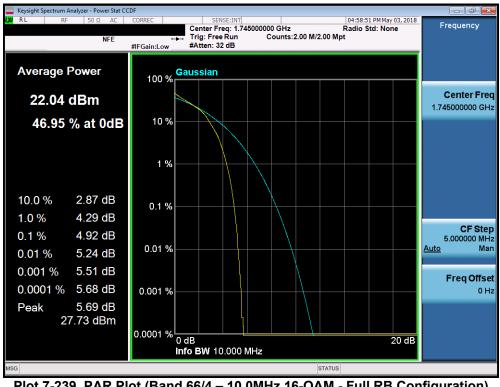
Plot 7-237. PAR Plot (Band 66/4 – 5.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             | Daga 142 of 107                 |
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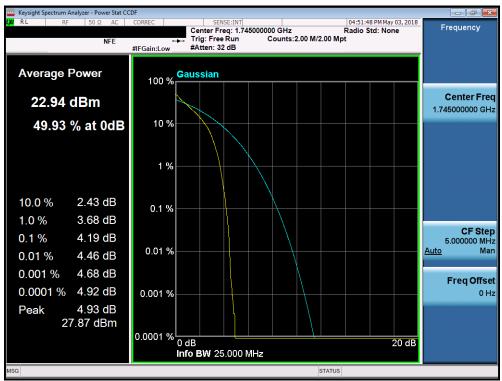
Plot 7-238. PAR Plot (Band 66/4 – 10.0MHz QPSK - Full RB Configuration)



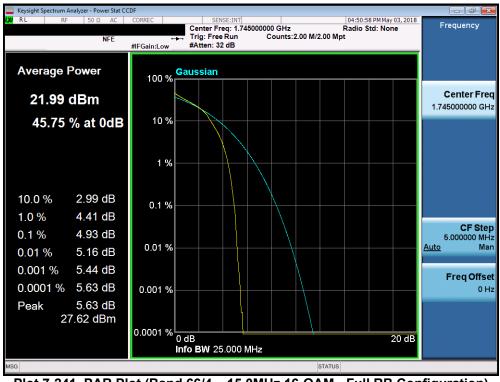
Plot 7-239. PAR Plot (Band 66/4 – 10.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |      | Dogo 111 of 107                 |
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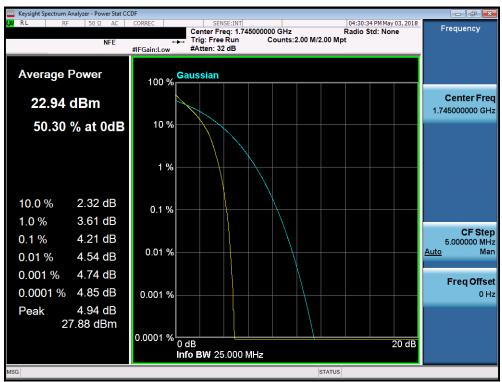
Plot 7-240. PAR Plot (Band 66/4 – 15.0MHz QPSK - Full RB Configuration)



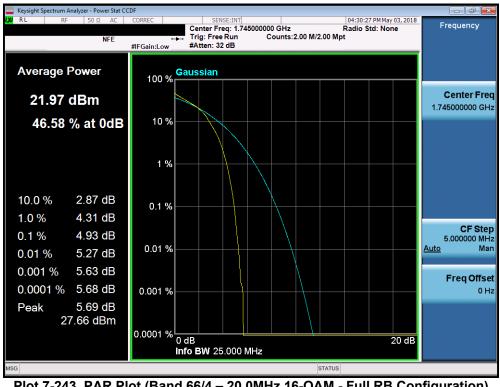
Plot 7-241. PAR Plot (Band 66/4 – 15.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
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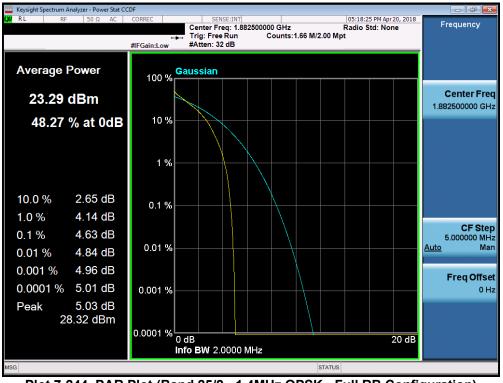
Plot 7-242. PAR Plot (Band 66/4 – 20.0MHz QPSK - Full RB Configuration)



Plot 7-243. PAR Plot (Band 66/4 – 20.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
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Plot 7-244. PAR Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)

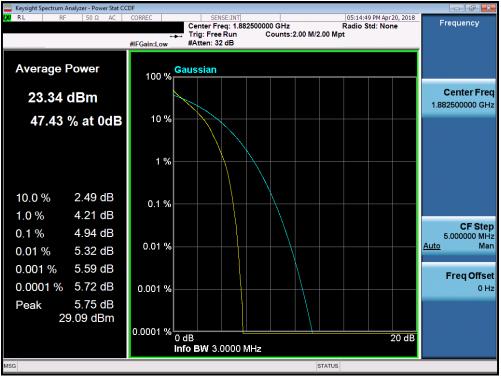


| FCC ID: ZNFQ710WA                     |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|---------------------------------------|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:                      | Test Dates:              | EUT Type:                             | Daga 117 of 107                 |
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| © 0040 DOTEOT Ex size a size of Labor | 1/0.0.04/05/0040         |                                       |                                 |

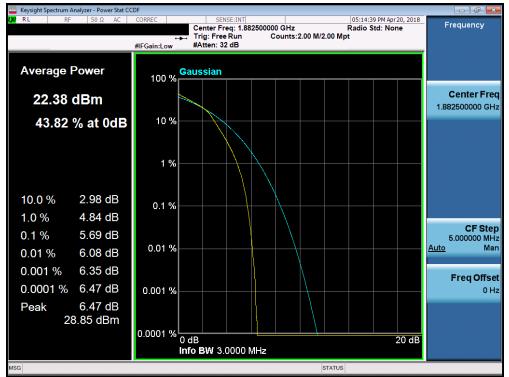
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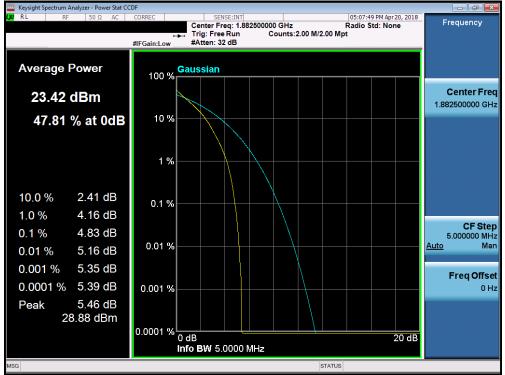




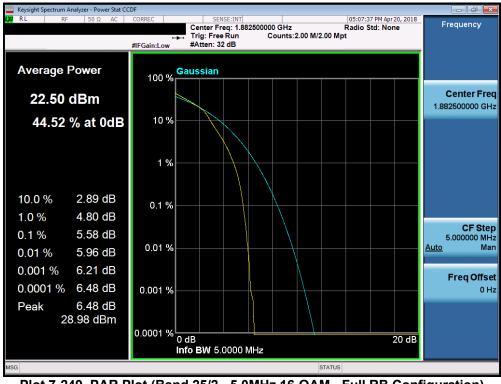
Plot 7-247. PAR Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 💽 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |      | Dogo 149 of 107                 |
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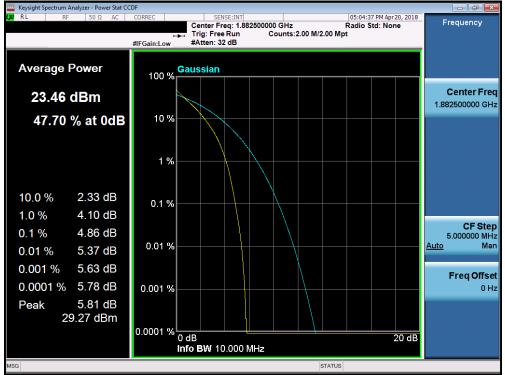




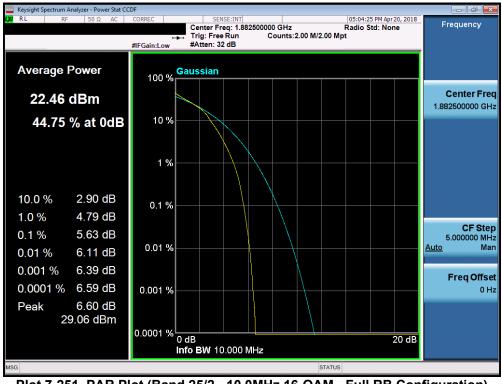
Plot 7-249. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |      | Dogo 140 of 107                 |
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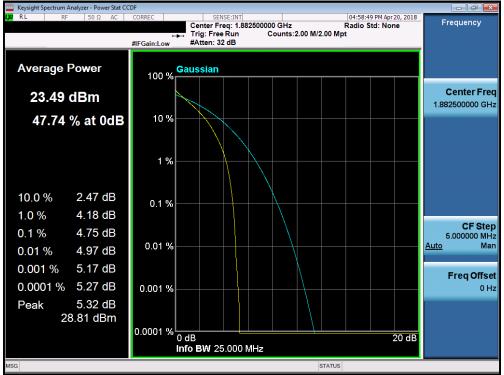
Plot 7-250. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



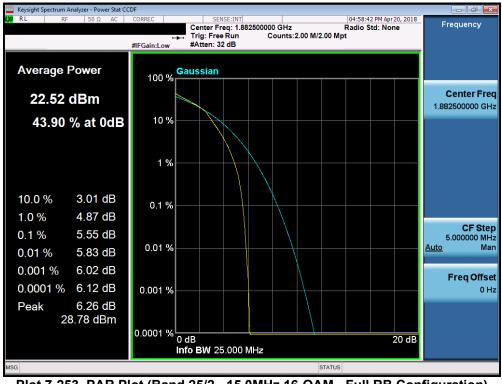
Plot 7-251. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             | Daga 150 of 107                 |
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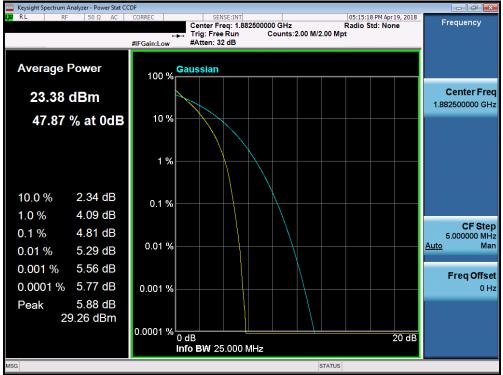
Plot 7-252. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



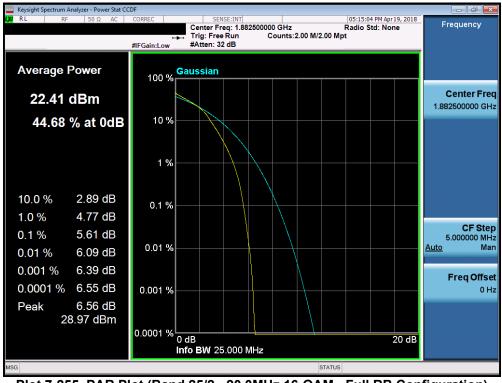
Plot 7-253. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | G | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|---|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |   | Daga 151 of 107                 |
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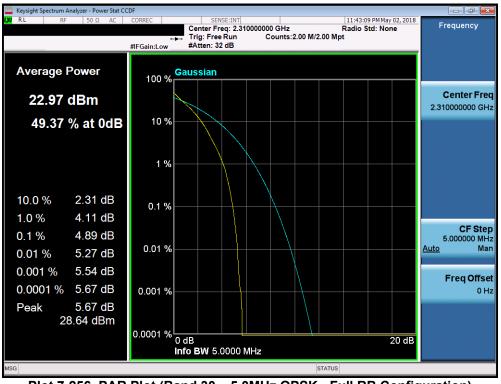
Plot 7-254. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



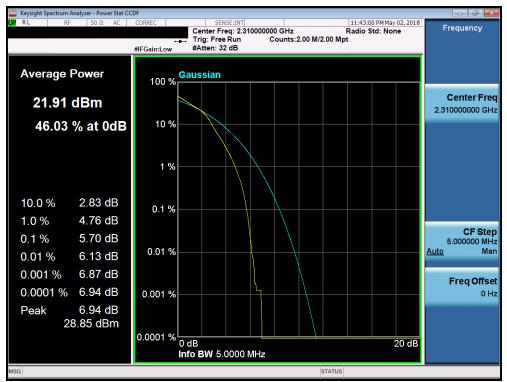
Plot 7-255. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |      | Dogo 152 of 107                 |
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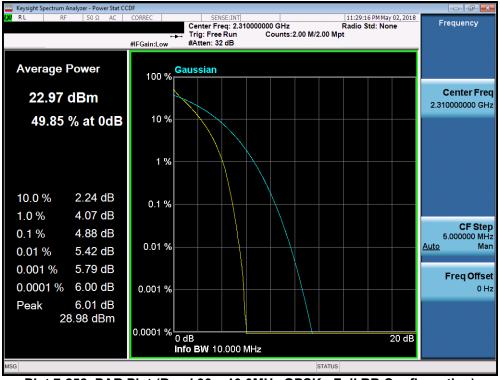




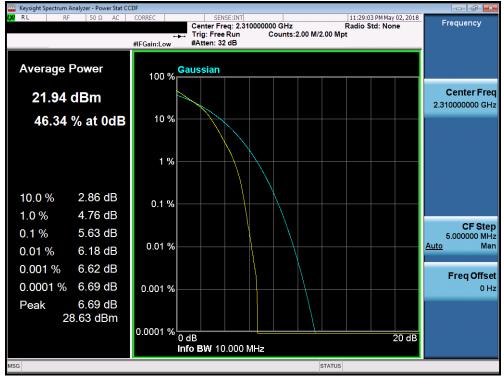
# Plot 7-257. PAR Plot (Band 30 – 5.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕑 LG             | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------------------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |                  | Daga 152 of 107                 |
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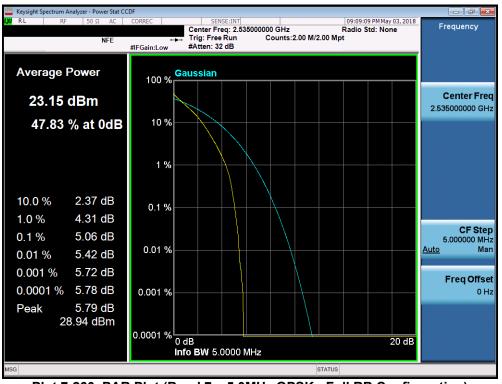
Plot 7-258. PAR Plot (Band 30 – 10.0MHz QPSK - Full RB Configuration)



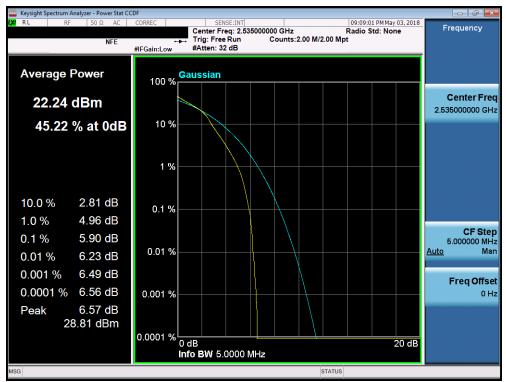
Plot 7-259. PAR Plot (Band 30 – 10.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:                           | Test Dates:              | EUT Type:                             |      | Dago 154 of 107                 |
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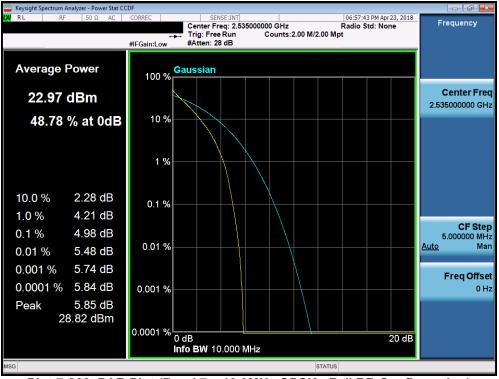
### Plot 7-261. PAR Plot (Band 7 – 5.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA      |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|------------------------|--------------------------|---------------------------------------|------|---------------------------------|
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|                        |                          |                                       |      | 1/00004/05/0040                 |

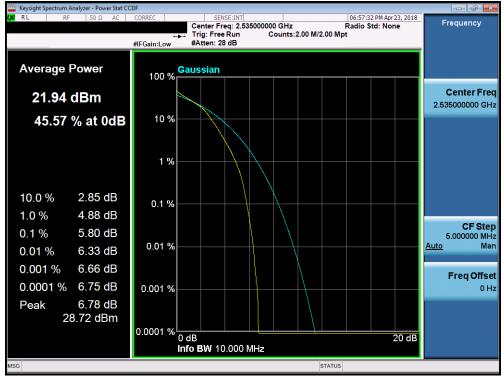
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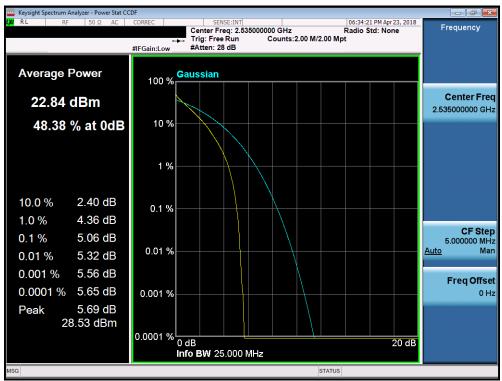
Plot 7-262. PAR Plot (Band 7 – 10.0MHz QPSK - Full RB Configuration)



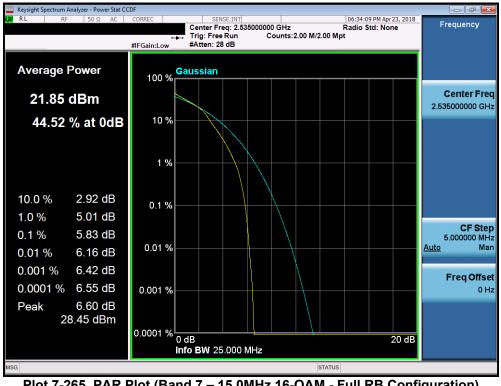
Plot 7-263. PAR Plot (Band 7 – 10.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
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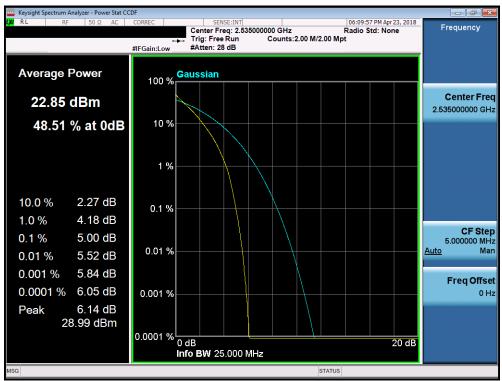
Plot 7-264. PAR Plot (Band 7 – 15.0MHz QPSK - Full RB Configuration)



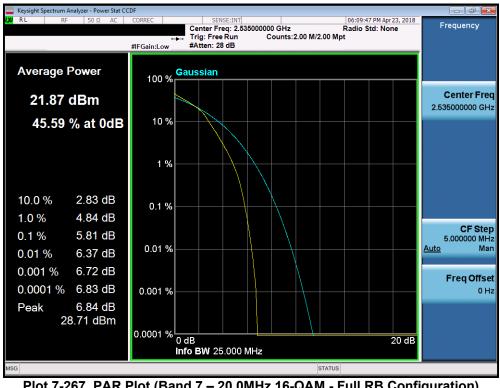
Plot 7-265. PAR Plot (Band 7 – 15.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
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Plot 7-266. PAR Plot (Band 7 – 20.0MHz QPSK - Full RB Configuration)



Plot 7-267. PAR Plot (Band 7 – 20.0MHz 16-QAM - Full RB Configuration)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
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# 7.6 Radiated Power (ERP/EIRP)

# Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

### Test Settings

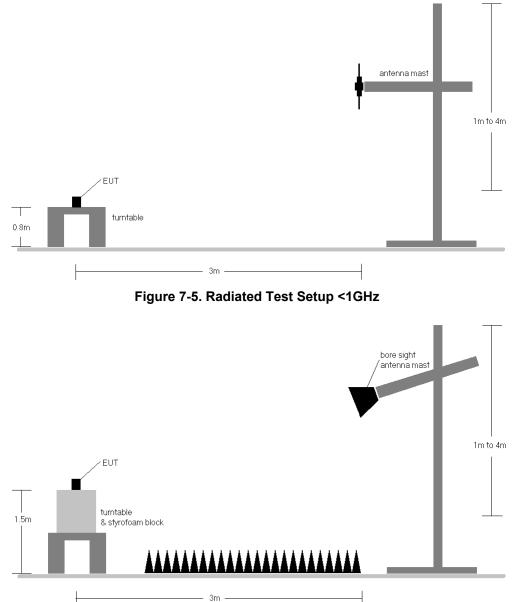
- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

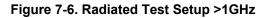
| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
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# Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.





# Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

| FCC ID: ZNFQ710WA   |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |  |  |  |  |  |  |  |
|---|--------------------------|---------------------------------------|---------------------------------|--|--|--|--|--|--|--|
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| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant. Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | ERP<br>[dBm] | ERP<br>[Watts] | ERP<br>Limit<br>[dBm] | Margin<br>[dB] | EIRP<br>[dBm] | EIRP<br>[Watts] | EIRP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|--------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|--------------|----------------|-----------------------|----------------|---------------|-----------------|------------------------|----------------|
| 699.70             | 1.4                           | QPSK   | V                  | 150                       | 98                               | 1/5               | 20.53                        | 1.10                  | 19.48        | 0.089          | 34.77                 | -15.29         | 21.63         | 0.146           | 36.99                  | -15.36         |
| 707.50             | 1.4                           | QPSK   | V                  | 150                       | 98                               | 1/5               | 20.96                        | 1.13                  | 19.94        | 0.099          | 34.77                 | -14.83         | 22.09         | 0.162           | 36.99                  | -14.90         |
| 715.30             | 1.4                           | QPSK   | V                  | 150                       | 98                               | 1 / 5             | 20.35                        | 1.16                  | 19.36        | 0.086          | 34.77                 | -15.41         | 21.51         | 0.142           | 36.99                  | -15.48         |
| 707.50             | 1.4                           | 16-QAM | V                  | 150                       | 98                               | 1 / 5             | 20.08                        | 1.13                  | 19.06        | 0.081          | 34.77                 | -15.71         | 21.21         | 0.132           | 36.99                  | -15.78         |
| 700.50             | 3                             | QPSK   | V                  | 150                       | 99                               | 1 / 14            | 20.82                        | 1.10                  | 19.77        | 0.095          | 34.77                 | -15.00         | 21.92         | 0.156           | 36.99                  | -15.07         |
| 707.50             | 3                             | QPSK   | V                  | 150                       | 99                               | 1 / 14            | 20.59                        | 1.13                  | 19.57        | 0.091          | 34.77                 | -15.20         | 21.72         | 0.149           | 36.99                  | -15.27         |
| 714.50             | 3                             | QPSK   | V                  | 150                       | 99                               | 1 / 14            | 20.18                        | 1.16                  | 19.19        | 0.083          | 34.77                 | -15.58         | 21.34         | 0.136           | 36.99                  | -15.65         |
| 700.50             | 3                             | 16-QAM | V                  | 150                       | 99                               | 1 / 14            | 20.07                        | 1.10                  | 19.02        | 0.080          | 34.77                 | -15.75         | 21.17         | 0.131           | 36.99                  | -15.82         |

Table 7-3. ERP Data (Band 12)

| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant. Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | ERP<br>[dBm] | ERP<br>[Watts] | ERP<br>Limit<br>[dBm] | Margin<br>[dB] | EIRP<br>[dBm] | EIRP<br>[Watts] | EIRP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|--------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|--------------|----------------|-----------------------|----------------|---------------|-----------------|------------------------|----------------|
| 701.50             | 5                             | QPSK   | V                  | 150                       | 101                              | 1 / 24            | 21.08                        | 1.11                  | 20.04        | 0.101          | 34.77                 | -14.74         | 22.19         | 0.165           | 36.99                  | -14.80         |
| 707.50             | 5                             | QPSK   | V                  | 150                       | 101                              | 1 / 24            | 20.93                        | 1.13                  | 19.91        | 0.098          | 34.77                 | -14.86         | 22.06         | 0.161           | 36.99                  | -14.93         |
| 713.50             | 5                             | QPSK   | V                  | 150                       | 101                              | 1 / 24            | 20.52                        | 1.15                  | 19.52        | 0.090          | 34.77                 | -15.25         | 21.67         | 0.147           | 36.99                  | -15.32         |
| 701.50             | 5                             | 16-QAM | V                  | 150                       | 101                              | 1 / 24            | 20.12                        | 1.11                  | 19.08        | 0.081          | 34.77                 | -15.70         | 21.23         | 0.133           | 36.99                  | -15.76         |
| 704.00             | 10                            | QPSK   | V                  | 150                       | 116                              | 1 / 49            | 20.97                        | 1.12                  | 19.94        | 0.099          | 34.77                 | -14.83         | 22.09         | 0.162           | 36.99                  | -14.90         |
| 707.50             | 10                            | QPSK   | V                  | 150                       | 116                              | 1 / 49            | 20.60                        | 1.13                  | 19.58        | 0.091          | 34.77                 | -15.19         | 21.73         | 0.149           | 36.99                  | -15.26         |
| 711.00             | 10                            | QPSK   | V                  | 150                       | 116                              | 1 / 49            | 20.45                        | 1.14                  | 19.44        | 0.088          | 34.77                 | -15.33         | 21.59         | 0.144           | 36.99                  | -15.40         |
| 704.00             | 10                            | 16-QAM | V                  | 150                       | 116                              | 1 / 49            | 20.16                        | 1.12                  | 19.13        | 0.082          | 34.77                 | -15.64         | 21.28         | 0.134           | 36.99                  | -15.71         |
| 701.50             | 5                             | QPSK   | н                  | 150                       | 342                              | 1 / 24            | 19.57                        | 1.11                  | 18.53        | 0.071          | 34.77                 | -16.25         | 20.68         | 0.117           | 36.99                  | -16.31         |

Table 7-4. ERP Data (Band 12/17)

| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | ERP<br>[dBm] | ERP<br>[Watts] | ERP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|-----------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|--------------|----------------|-----------------------|----------------|
| 779.50             | 5                             | QPSK   | V                     | 150                       | 125                              | 1 / 0             | 18.45                        | 1.32                  | 17.62        | 0.058          | 34.77                 | -17.15         |
| 782.00             | 5                             | QPSK   | V                     | 150                       | 125                              | 1 / 0             | 18.34                        | 1.33                  | 17.52        | 0.056          | 34.77                 | -17.25         |
| 784.50             | 5                             | QPSK   | V                     | 150                       | 125                              | 1 / 0             | 18.41                        | 1.34                  | 17.60        | 0.058          | 34.77                 | -17.17         |
| 779.50             | 5                             | 16-QAM | V                     | 150                       | 125                              | 1 / 0             | 17.82                        | 1.32                  | 16.99        | 0.050          | 34.77                 | -17.78         |
| 782.00             | 10                            | QPSK   | V                     | 150                       | 120                              | 1 / 0             | 18.67                        | 1.33                  | 17.85        | 0.061          | 34.77                 | -16.92         |
| 782.00             | 10                            | 16-QAM | V                     | 150                       | 120                              | 1 / 0             | 17.61                        | 1.33                  | 16.79        | 0.048          | 34.77                 | -17.98         |
| 782.00             | 10                            | QPSK   | Н                     | 150                       | 326                              | 1/0               | 17.41                        | 1.33                  | 16.59        | 0.046          | 34.77                 | -18.18         |

Table 7-5. ERP Data (Band 13)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕕 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 161 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 161 of 197                 |
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| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | ERP<br>[dBm] | ERP<br>[Watts] | ERP<br>Limit<br>[dBm] | Margin<br>[dB] | EIRP<br>[dBm] | EIRP<br>[Watts] | EIRP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|-----------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|--------------|----------------|-----------------------|----------------|---------------|-----------------|------------------------|----------------|
| 824.70             | 1.4                           | QPSK   | н                     | 150                       | 100                              | 3/2               | 17.88                        | 1.50                  | 17.23        | 0.053          | 38.45                 | -21.22         | 19.38         | 0.087           | 40.61                  | -21.23         |
| 836.50             | 1.4                           | QPSK   | н                     | 150                       | 100                              | 3/2               | 17.80                        | 1.50                  | 17.15        | 0.052          | 38.45                 | -21.30         | 19.30         | 0.085           | 40.61                  | -21.31         |
| 848.30             | 1.4                           | QPSK   | н                     | 150                       | 100                              | 3/2               | 17.92                        | 1.50                  | 17.27        | 0.053          | 38.45                 | -21.18         | 19.42         | 0.087           | 40.61                  | -21.19         |
| 848.30             | 1.4                           | 16-QAM | н                     | 150                       | 100                              | 3/2               | 16.84                        | 1.50                  | 16.19        | 0.042          | 38.45                 | -22.26         | 18.34         | 0.068           | 40.61                  | -22.27         |
| 825.50             | 3                             | QPSK   | н                     | 150                       | 95                               | 1 / 14            | 17.50                        | 1.50                  | 16.85        | 0.048          | 38.45                 | -21.60         | 19.00         | 0.079           | 40.61                  | -21.61         |
| 836.50             | 3                             | QPSK   | н                     | 150                       | 95                               | 1 / 14            | 17.71                        | 1.50                  | 17.06        | 0.051          | 38.45                 | -21.39         | 19.21         | 0.083           | 40.61                  | -21.40         |
| 847.50             | 3                             | QPSK   | н                     | 150                       | 95                               | 1 / 14            | 18.26                        | 1.50                  | 17.61        | 0.058          | 38.45                 | -20.84         | 19.76         | 0.095           | 40.61                  | -20.85         |
| 847.50             | 3                             | 16-QAM | Н                     | 150                       | 95                               | 1 / 14            | 16.97                        | 1.50                  | 16.32        | 0.043          | 38.45                 | -22.13         | 18.47         | 0.070           | 40.61                  | -22.14         |
| 826.50             | 5                             | QPSK   | н                     | 150                       | 113                              | 1 / 24            | 17.82                        | 1.50                  | 17.17        | 0.052          | 38.45                 | -21.28         | 19.32         | 0.086           | 40.61                  | -21.29         |
| 836.50             | 5                             | QPSK   | н                     | 150                       | 113                              | 1 / 24            | 17.93                        | 1.50                  | 17.28        | 0.053          | 38.45                 | -21.17         | 19.43         | 0.088           | 40.61                  | -21.18         |
| 846.50             | 5                             | QPSK   | н                     | 150                       | 113                              | 1 / 24            | 18.46                        | 1.50                  | 17.81        | 0.060          | 38.45                 | -20.64         | 19.96         | 0.099           | 40.61                  | -20.65         |
| 846.50             | 5                             | 16-QAM | Н                     | 150                       | 113                              | 1 / 24            | 17.28                        | 1.50                  | 16.63        | 0.046          | 38.45                 | -21.82         | 18.78         | 0.076           | 40.61                  | -21.83         |
| 829.00             | 10                            | QPSK   | н                     | 150                       | 110                              | 1 / 49            | 18.28                        | 1.50                  | 17.63        | 0.058          | 38.45                 | -20.82         | 19.78         | 0.095           | 40.61                  | -20.83         |
| 836.50             | 10                            | QPSK   | н                     | 150                       | 110                              | 1 / 49            | 18.31                        | 1.50                  | 17.66        | 0.058          | 38.45                 | -20.79         | 19.81         | 0.096           | 40.61                  | -20.80         |
| 844.00             | 10                            | QPSK   | Н                     | 150                       | 110                              | 1 / 49            | 18.80                        | 1.50                  | 18.15        | 0.065          | 38.45                 | -20.30         | 20.30         | 0.107           | 40.61                  | -20.31         |
| 844.00             | 10                            | 16-QAM | н                     | 150                       | 110                              | 1 / 49            | 17.49                        | 1.50                  | 16.84        | 0.048          | 38.45                 | -21.61         | 18.99         | 0.079           | 40.61                  | -21.62         |
| 844.00             | 10                            | QPSK   | V                     | 150                       | 213                              | 1 / 49            | 17.55                        | 1.50                  | 16.90        | 0.049          | 38.45                 | -21.55         | 19.05         | 0.080           | 40.61                  | -21.56         |

Table 7-6. ERP Data (Band 5)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕕 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 162 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 162 of 197                 |
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| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | EIRP<br>[dBm] | EIRP<br>[Watts] | EIRP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|-----------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|---------------|-----------------|------------------------|----------------|
| 1710.70            | 1.4                           | QPSK   | Н                     | 150                       | 335                              | 3/2               | 19.59                        | 5.56                  | 25.15         | 0.327           | 30.00                  | -4.85          |
| 1745.00            | 1.4                           | QPSK   | Н                     | 150                       | 335                              | 3/2               | 19.04                        | 5.32                  | 24.36         | 0.273           | 30.00                  | -5.64          |
| 1779.30            | 1.4                           | QPSK   | Н                     | 150                       | 335                              | 3/2               | 19.16                        | 5.09                  | 24.25         | 0.266           | 30.00                  | -5.75          |
| 1710.70            | 1.4                           | 16-QAM | Н                     | 150                       | 335                              | 3/2               | 19.00                        | 5.56                  | 24.56         | 0.286           | 30.00                  | -5.44          |
| 1711.50            | 3                             | QPSK   | Н                     | 150                       | 342                              | 1 / 14            | 18.97                        | 5.55                  | 24.52         | 0.283           | 30.00                  | -5.48          |
| 1745.00            | 3                             | QPSK   | Н                     | 150                       | 342                              | 1 / 14            | 19.90                        | 5.32                  | 25.22         | 0.333           | 30.00                  | -4.78          |
| 1778.50            | 3                             | QPSK   | Н                     | 150                       | 342                              | 1 / 14            | 18.21                        | 5.10                  | 23.31         | 0.214           | 30.00                  | -6.69          |
| 1745.00            | 3                             | 16-QAM | Н                     | 150                       | 342                              | 1 / 14            | 18.85                        | 5.32                  | 24.17         | 0.261           | 30.00                  | -5.83          |
| 1712.50            | 5                             | QPSK   | Н                     | 150                       | 344                              | 1 / 24            | 20.27                        | 5.55                  | 25.82         | 0.382           | 30.00                  | -4.18          |
| 1745.00            | 5                             | QPSK   | Н                     | 150                       | 344                              | 1 / 24            | 20.02                        | 5.32                  | 25.34         | 0.342           | 30.00                  | -4.66          |
| 1777.50            | 5                             | QPSK   | Н                     | 150                       | 344                              | 1 / 24            | 20.45                        | 5.10                  | 25.55         | 0.359           | 30.00                  | -4.45          |
| 1777.50            | 5                             | 16-QAM | Н                     | 150                       | 344                              | 1 / 24            | 19.57                        | 5.10                  | 24.67         | 0.293           | 30.00                  | -5.33          |
| 1715.00            | 10                            | QPSK   | Н                     | 150                       | 349                              | 1 / 49            | 20.15                        | 5.53                  | 25.67         | 0.369           | 30.00                  | -4.33          |
| 1745.00            | 10                            | QPSK   | Н                     | 150                       | 349                              | 1 / 49            | 20.50                        | 5.32                  | 25.82         | 0.382           | 30.00                  | -4.18          |
| 1775.00            | 10                            | QPSK   | Н                     | 150                       | 349                              | 1 / 49            | 20.81                        | 5.12                  | 25.93         | 0.392           | 30.00                  | -4.07          |
| 1775.00            | 10                            | 16-QAM | Н                     | 150                       | 349                              | 1 / 49            | 19.76                        | 5.12                  | 24.88         | 0.308           | 30.00                  | -5.12          |
| 1717.50            | 15                            | QPSK   | Н                     | 150                       | 344                              | 1 / 74            | 20.13                        | 5.51                  | 25.64         | 0.366           | 30.00                  | -4.36          |
| 1745.00            | 15                            | QPSK   | Н                     | 150                       | 344                              | 1 / 74            | 20.36                        | 5.32                  | 25.68         | 0.370           | 30.00                  | -4.32          |
| 1772.50            | 15                            | QPSK   | Н                     | 150                       | 344                              | 1 / 74            | 19.55                        | 5.14                  | 24.69         | 0.294           | 30.00                  | -5.31          |
| 1745.00            | 15                            | 16-QAM | Н                     | 150                       | 344                              | 1 / 74            | 19.80                        | 5.32                  | 25.12         | 0.325           | 30.00                  | -4.88          |
| 1720.00            | 20                            | QPSK   | Н                     | 150                       | 346                              | 1 / 99            | 20.80                        | 5.49                  | 26.29         | 0.426           | 30.00                  | -3.71          |
| 1745.00            | 20                            | QPSK   | Н                     | 150                       | 346                              | 1 / 99            | 20.32                        | 5.32                  | 25.64         | 0.367           | 30.00                  | -4.36          |
| 1770.00            | 20                            | QPSK   | Н                     | 150                       | 346                              | 1 / 99            | 20.53                        | 5.15                  | 25.68         | 0.370           | 30.00                  | -4.32          |
| 1720.00            | 20                            | 16-QAM | Н                     | 150                       | 346                              | 1 / 99            | 19.96                        | 5.49                  | 25.45         | 0.351           | 30.00                  | -4.55          |
| 1720.00            | 20                            | QPSK   | V                     | 150                       | 256                              | 1 / 99            | 16.88                        | 5.49                  | 22.37         | 0.173           | 30.00                  | -7.63          |

Table 7-7. EIRP Data (Band 66/4)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Page 163 of 197                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 103 01 197                 |
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| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | EIRP<br>[dBm] | EIRP<br>[Watts] | EIRP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|-----------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|---------------|-----------------|------------------------|----------------|
| 1850.70            | 1.4                           | QPSK   | Н                     | 150                       | 360                              | 1 / 0             | 19.57                        | 4.82                  | 24.39         | 0.275           | 33.01                  | -8.62          |
| 1882.50            | 1.4                           | QPSK   | Н                     | 150                       | 360                              | 1 / 0             | 19.70                        | 4.73                  | 24.43         | 0.278           | 33.01                  | -8.58          |
| 1914.30            | 1.4                           | QPSK   | Н                     | 150                       | 3630                             | 1 / 0             | 18.36                        | 4.68                  | 23.04         | 0.201           | 33.01                  | -9.97          |
| 1882.50            | 1.4                           | 16-QAM | н                     | 150                       | 360                              | 1 / 0             | 19.04                        | 4.73                  | 23.77         | 0.238           | 33.01                  | -9.24          |
| 1851.50            | 3                             | QPSK   | Н                     | 150                       | 351                              | 1 / 0             | 19.77                        | 4.82                  | 24.59         | 0.287           | 33.01                  | -8.42          |
| 1882.50            | 3                             | QPSK   | Н                     | 150                       | 351                              | 1 / 0             | 19.85                        | 4.73                  | 24.58         | 0.287           | 33.01                  | -8.43          |
| 1913.50            | 3                             | QPSK   | Н                     | 150                       | 351                              | 1 / 0             | 18.97                        | 4.68                  | 23.65         | 0.232           | 33.01                  | -9.36          |
| 1882.50            | 3                             | 16-QAM | Н                     | 150                       | 351                              | 1 / 0             | 18.76                        | 4.73                  | 23.49         | 0.224           | 33.01                  | -9.52          |
| 1852.50            | 5                             | QPSK   | Н                     | 150                       | 355                              | 1 / 0             | 19.25                        | 4.81                  | 24.06         | 0.255           | 33.01                  | -8.95          |
| 1882.50            | 5                             | QPSK   | н                     | 150                       | 355                              | 1 / 24            | 19.43                        | 4.73                  | 24.16         | 0.261           | 33.01                  | -8.85          |
| 1912.50            | 5                             | QPSK   | Н                     | 150                       | 355                              | 1 / 0             | 18.13                        | 4.68                  | 22.81         | 0.191           | 33.01                  | -10.20         |
| 1882.50            | 5                             | 16-QAM | Н                     | 150                       | 355                              | 1 / 0             | 18.83                        | 4.73                  | 23.56         | 0.227           | 33.01                  | -9.45          |
| 1855.00            | 10                            | QPSK   | Н                     | 150                       | 357                              | 1 / 0             | 19.91                        | 4.81                  | 24.72         | 0.296           | 33.01                  | -8.29          |
| 1882.50            | 10                            | QPSK   | Н                     | 150                       | 357                              | 1 / 0             | 20.03                        | 4.73                  | 24.76         | 0.299           | 33.01                  | -8.25          |
| 1910.00            | 10                            | QPSK   | Н                     | 150                       | 357                              | 1 / 0             | 18.50                        | 4.68                  | 23.18         | 0.208           | 33.01                  | -9.83          |
| 1882.50            | 10                            | 16-QAM | Н                     | 150                       | 357                              | 1 / 0             | 19.45                        | 4.73                  | 24.18         | 0.262           | 33.01                  | -8.83          |
| 1857.50            | 15                            | QPSK   | н                     | 150                       | 359                              | 1 / 0             | 19.77                        | 4.80                  | 24.57         | 0.286           | 33.01                  | -8.44          |
| 1882.50            | 15                            | QPSK   | н                     | 150                       | 359                              | 1 / 0             | 19.83                        | 4.73                  | 24.56         | 0.286           | 33.01                  | -8.45          |
| 1907.50            | 15                            | QPSK   | Н                     | 150                       | 359                              | 1 / 0             | 18.26                        | 4.68                  | 22.94         | 0.197           | 33.01                  | -10.07         |
| 1882.50            | 15                            | 16-QAM | н                     | 150                       | 359                              | 1/0               | 18.22                        | 4.73                  | 22.95         | 0.197           | 33.01                  | -10.06         |
| 1860.00            | 20                            | QPSK   | Н                     | 150                       | 355                              | 1/0               | 20.16                        | 4.79                  | 24.95         | 0.313           | 33.01                  | -8.06          |
| 1882.50            | 20                            | QPSK   | Н                     | 150                       | 359                              | 1/0               | 20.21                        | 4.73                  | 24.94         | 0.312           | 33.01                  | -8.07          |
| 1905.00            | 20                            | QPSK   | Н                     | 150                       | 358                              | 1/0               | 18.60                        | 4.68                  | 23.28         | 0.213           | 33.01                  | -9.73          |
| 1882.50            | 20                            | 16-QAM | Н                     | 150                       | 359                              | 1/0               | 18.52                        | 4.73                  | 23.25         | 0.212           | 33.01                  | -9.76          |
| 1860.00            | 20                            | QPSK   | V                     | 150                       | 288                              | 1 / 0             | 17.14                        | 4.79                  | 21.93         | 0.156           | 33.01                  | -11.08         |

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Table 7-8. EIRP Data (Band 25/2)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dogo 164 of 107                 |
| 1M1804120069-03-R1.ZNF         | April 12 - June 19, 2018 | Portable Handset                      |      | Page 164 of 197                 |
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| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | EIRP<br>[dBm] | EIRP<br>[Watts] | EIRP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|-----------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|---------------|-----------------|------------------------|----------------|
| 2307.50            | 5                             | QPSK   | V                     | 150                       | 270                              | 1 / 0             | 12.95                        | 5.74                  | 18.69         | 0.074           | 23.98                  | -5.29          |
| 2312.50            | 5                             | QPSK   | V                     | 150                       | 353                              | 1 / 0             | 12.62                        | 5.74                  | 18.36         | 0.068           | 23.98                  | -5.62          |
| 2307.50            | 5                             | 16-QAM | V                     | 150                       | 270                              | 1 / 0             | 11.99                        | 5.74                  | 17.73         | 0.059           | 23.98                  | -6.25          |
| 2310.00            | 10                            | QPSK   | V                     | 150                       | 355                              | 1 / 0             | 12.14                        | 5.74                  | 17.88         | 0.061           | 23.98                  | -6.10          |
| 2310.00            | 10                            | 16-QAM | V                     | 150                       | 355                              | 1 / 0             | 11.19                        | 5.74                  | 16.93         | 0.049           | 23.98                  | -7.05          |
| 2307.50            | 5                             | QPSK   | Н                     | 150                       | 353                              | 1/0               | 12.66                        | 5.74                  | 18.40         | 0.069           | 23.98                  | -5.58          |

Table 7-9. EIRP Data (Band 30)

| Frequency<br>[MHz] | Channel<br>Bandwidth<br>[MHz] | Mod.   | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | RB<br>Size/Offset | Substitute<br>Level<br>[dBm] | Ant.<br>Gain<br>[dBi] | EIRP<br>[dBm] | EIRP<br>[Watts] | EIRP<br>Limit<br>[dBm] | Margin<br>[dB] |
|--------------------|-------------------------------|--------|-----------------------|---------------------------|----------------------------------|-------------------|------------------------------|-----------------------|---------------|-----------------|------------------------|----------------|
| 2502.50            | 5                             | QPSK   | V                     | 150                       | 220                              | 1 / 24            | 11.61                        | 5.74                  | 17.35         | 0.054           | 33.01                  | -15.66         |
| 2535.00            | 5                             | QPSK   | V                     | 150                       | 220                              | 1 / 24            | 12.41                        | 5.86                  | 18.27         | 0.067           | 33.01                  | -14.74         |
| 2567.50            | 5                             | QPSK   | V                     | 150                       | 220                              | 1 / 24            | 11.66                        | 5.98                  | 17.64         | 0.058           | 33.01                  | -15.37         |
| 2535.00            | 5                             | 16-QAM | V                     | 150                       | 220                              | 1 / 24            | 11.27                        | 5.86                  | 17.13         | 0.052           | 33.01                  | -15.88         |
| 2505.00            | 10                            | QPSK   | V                     | 150                       | 220                              | 1 / 49            | 11.53                        | 5.75                  | 17.28         | 0.053           | 33.01                  | -15.73         |
| 2535.00            | 10                            | QPSK   | V                     | 150                       | 220                              | 1 / 49            | 12.37                        | 5.86                  | 18.23         | 0.067           | 33.01                  | -14.78         |
| 2565.00            | 10                            | QPSK   | V                     | 150                       | 220                              | 1 / 49            | 11.62                        | 5.97                  | 17.59         | 0.057           | 33.01                  | -15.42         |
| 2535.00            | 10                            | 16-QAM | V                     | 150                       | 220                              | 1 / 49            | 11.25                        | 5.86                  | 17.11         | 0.051           | 33.01                  | -15.90         |
| 2507.50            | 15                            | QPSK   | V                     | 150                       | 224                              | 1 / 74            | 11.40                        | 5.76                  | 17.16         | 0.052           | 33.01                  | -15.85         |
| 2535.00            | 15                            | QPSK   | V                     | 150                       | 224                              | 1 / 74            | 12.02                        | 5.86                  | 17.88         | 0.061           | 33.01                  | -15.13         |
| 2562.50            | 15                            | QPSK   | V                     | 150                       | 224                              | 1 / 74            | 11.45                        | 5.96                  | 17.41         | 0.055           | 33.01                  | -15.60         |
| 2535.00            | 15                            | 16-QAM | V                     | 150                       | 224                              | 1 / 74            | 11.24                        | 5.86                  | 17.10         | 0.051           | 33.01                  | -15.91         |
| 2510.00            | 20                            | QPSK   | V                     | 150                       | 221                              | 1 / 99            | 11.28                        | 5.77                  | 17.05         | 0.051           | 33.01                  | -15.96         |
| 2535.00            | 20                            | QPSK   | V                     | 150                       | 221                              | 1 / 99            | 12.18                        | 5.86                  | 18.04         | 0.064           | 33.01                  | -14.97         |
| 2560.00            | 20                            | QPSK   | V                     | 150                       | 221                              | 1 / 99            | 11.33                        | 5.95                  | 17.28         | 0.053           | 33.01                  | -15.73         |
| 2535.00            | 20                            | 16-QAM | V                     | 150                       | 221                              | 1 / 99            | 11.17                        | 5.86                  | 17.03         | 0.050           | 33.01                  | -15.98         |
| 2535.00            | 5                             | QPSK   | Н                     | 150                       | 219                              | 1 / 24            | 10.86                        | 5.86                  | 16.72         | 0.047           | 33.01                  | -16.29         |

Table 7-10. EIRP Data (Band 7)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
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# 7.7 Radiated Spurious Emissions Measurements

## **Test Overview**

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

### **Test Procedures Used**

KDB 971168 D01 v03r01 - Section 5.8

ANSI/TIA-603-E-2016 - Section 2.2.12

#### **Test Settings**

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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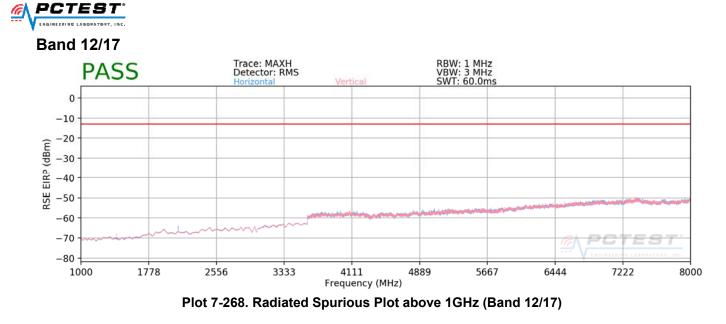
The EUT and measurement equipment were set up as shown in the diagram below.

Figure 7-7. Test Instrument & Measurement Setup

#### Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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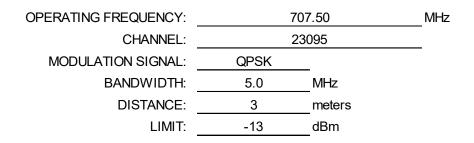
| OPERATING FREQUENCY: | 70    | 1.50   | MHz |  |
|----------------------|-------|--------|-----|--|
| CHANNEL:             | 23035 |        |     |  |
| MODULATION SIGNAL:   | QPSK  | _      |     |  |
| BANDWIDTH:           | 5.0   | MHz    |     |  |
| DISTANCE:            | 3     | meters |     |  |
| LIMIT:               | -13   | dBm    |     |  |
|                      |       |        |     |  |

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 1403.00            | Н                     | 145                       | 249                              | -77.10                              | 7.94                                | -69.16                              | -56.2          |
| 2104.50            | Н                     | 205                       | 200                              | -74.96                              | 8.90                                | -66.06                              | -53.1          |
| 2806.00            | Н                     | -                         | -                                | -77.40                              | 10.07                               | -67.33                              | -54.3          |
| 3507.50            | Н                     | -                         | -                                | -75.28                              | 9.67                                | -65.61                              | -52.6          |
| ,                  | T.                    | -                         | adiated Cr                       | urique Data (Pana                   | 12/17 Low Cha                       | nn all                              |                |

Table 7-11. Radiated Spurious Data (Band 12/17 – Low Channel)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
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| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 1415.00            | Н                     | 153                       | 234                              | -77.97                              | 8.09                                | -69.88                              | -56.9          |
| 2122.50            | Н                     | 218                       | 206                              | -73.91                              | 8.88                                | -65.03                              | -52.0          |
| 2830.00            | Н                     | -                         | -                                | -76.69                              | 10.13                               | -66.56                              | -53.6          |
| 3537.50            | Н                     | -                         | -                                | -74.92                              | 9.69                                | -65.22                              | -52.2          |

Table 7-12. Radiated Spurious Data (Band 12/17 – Mid Channel)

| OPERATING FREQUENCY: | 713  | 3.50   | MHz |
|----------------------|------|--------|-----|
| CHANNEL:             | 23   | _      |     |
| MODULATION SIGNAL:   | QPSK | _      |     |
| BANDWIDTH:           | 5.0  | MHz    |     |
| DISTANCE:            | 3    | meters |     |
| LIMIT:               | -13  | dBm    |     |
|                      |      |        |     |

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 1427.00            | Н                     | 148                       | 229                              | -78.63                              | 8.23                                | -70.40                              | -57.4          |
| 2140.50            | Н                     | 209                       | 200                              | -76.09                              | 8.86                                | -67.23                              | -54.2          |
| 2854.00            | Н                     | -                         | -                                | -77.83                              | 10.18                               | -67.65                              | -54.7          |
| 3567.50            | Н                     | -                         | -                                | -74.57                              | 9.75                                | -64.83                              | -51.8          |

Table 7-13. Radiated Spurious Data (Band 12/17 – High Channel)

| FCC ID: ZNFQ710WA              |   | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|---|---------------------------------------|------|---------------------------------|
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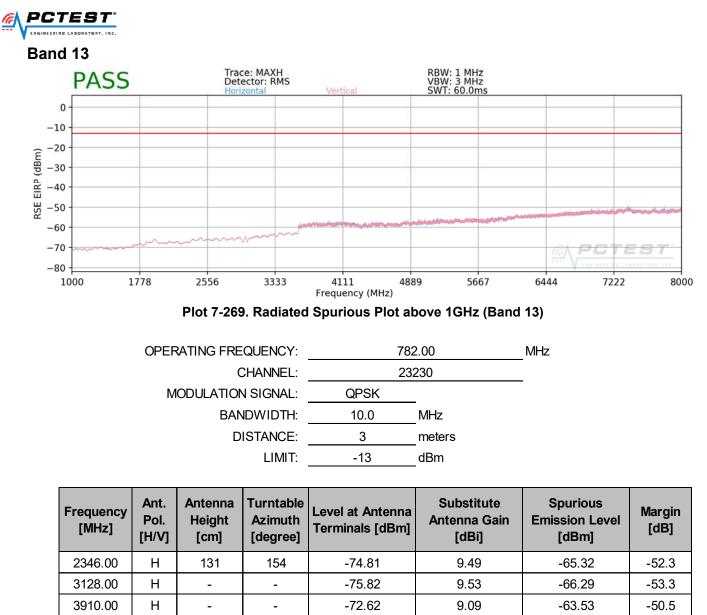


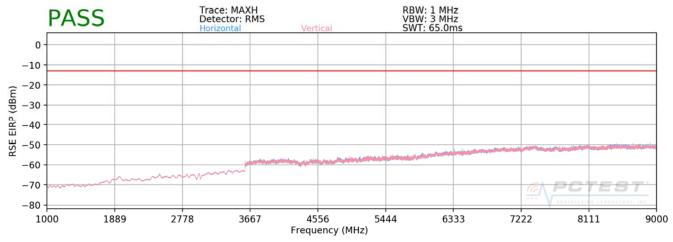
Table 7-14. Radiated Spurious Data (Band 13)

MODULATION SIGNAL: **QPSK BANDWIDTH:** 10.00 MHz 3 DISTANCE: meters NARROWBAND EMISSION LIMIT: -50 dBm WIDEBAND EMISSION LIMIT: -40 dBm/MHz

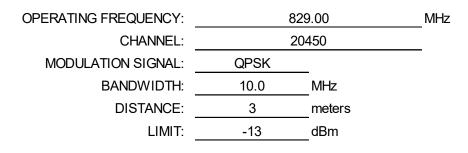
|          | Frequency<br>[MHz]  | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurio<br>Emission<br>[dBn | Level            | Margin<br>[dB] |
|----------|---|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|----------------------------|------------------|----------------|
|          | 1564.00   | Н                     | -                         | -                                | -80.93                              | 8.73                                | -72.2                      | 20               | -32.2          |
|          |   | Та                    | ble 7-15. R               | adiated Sp                       | ourious Data (Ban                   | d 13 – 1559-1610                    | MHz Band                   | )                |                |
| ECC IF   |   | (a)                   | PCTEST                    |                                  | MEASUREMENT REPOR                   | т 🍙                                 | LG                         | Approv           | ed by:         |
| FCCIL    |   |                       | V                         | NT.                              | (CERTIFICATION)                     |                                     | LG                         | Quality Manager  |                |
| Test R   | Test Report S/N: Test Dates:                              |                       |                           | EUT Typ                          | EUT Type:                           |                                     |                            | Page 170 of 197  |                |
| 1M180    | 1M1804120069-03-R1.ZNF April 12 - June 19, 2018           |                       |                           | 018 Portable I                   | Handset                             |                                     |                            | i age i i        | 001137         |
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Band 5



Plot 7-270. Radiated Spurious Plot above 1GHz (Band 5)

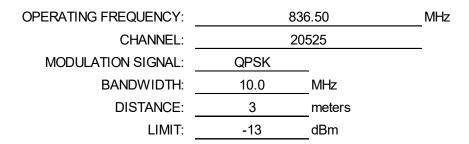


| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 1658.00            | Н                     | 115                       | 185                              | -79.29                              | 8.96                                | -70.33                              | -57.3          |
| 2487.00            | Н                     | 106                       | 250                              | -74.32                              | 9.13                                | -65.19                              | -52.2          |
| 3316.00            | Н                     | -                         | -                                | -74.25                              | 9.36                                | -64.88                              | -51.9          |
| 4145.00            | Н                     | -                         | -                                | -73.70                              | 9.95                                | -63.75                              | -50.8          |

Table 7-16. Radiated Spurious Data (Band 5 – Low Channel)

| FCC ID: ZNFQ710WA              |   | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
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| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 1673.00            | Н                     | 119                       | 9                                | -78.36                              | 8.85                                | -69.51                              | -56.5          |
| 2509.50            | Н                     | 125                       | 190                              | -76.10                              | 9.17                                | -66.93                              | -53.9          |
| 3346.00            | Н                     | -                         | -                                | -75.74                              | 9.36                                | -66.38                              | -53.4          |
| 4182.50            | Н                     | -                         | -                                | -72.86                              | 10.19                               | -62.67                              | -49.7          |

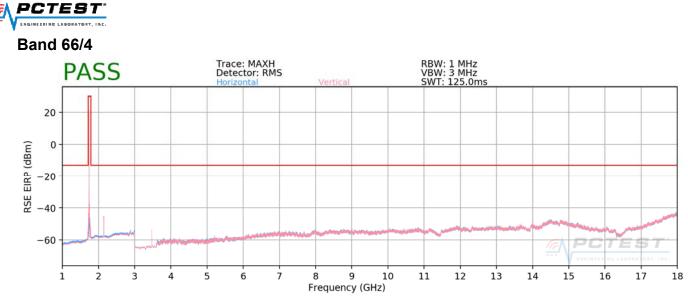
Table 7-17. Radiated Spurious Data (Band 5 – Mid Channel)

**OPERATING FREQUENCY:** 844.00 MHz CHANNEL: 20600 MODULATION SIGNAL: QPSK BANDWIDTH: 10.0 MHz DISTANCE: 3 meters LIMIT: -13 dBm

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 1688.00            | Н                     | 100                       | 358                              | -77.99                              | 8.74                                | -69.25                              | -56.2          |
| 2532.00            | Н                     | -                         | -                                | -77.28                              | 9.24                                | -68.05                              | -55.0          |
| 3376.00            | Н                     | -                         | -                                | -75.29                              | 9.42                                | -65.87                              | -52.9          |

Table 7-18. Radiated Spurious Data (Band 5 – High Channel)

| FCC ID: ZNFQ710WA              |   | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
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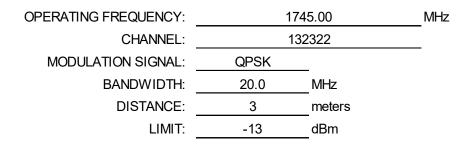
| 172  | 20.00 MHz                |
|------|--------------------------|
| 133  | 2072                     |
| QPSK | _                        |
| 20.0 | MHz                      |
| 3    | meters                   |
| -13  | dBm                      |
|      | 132<br>QPSK<br>20.0<br>3 |

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 3440.00            | Н                     | 130                       | 319                              | -57.09                              | 9.54                                | -47.55                              | -34.5          |
| 5160.00            | Н                     | 110                       | 290                              | -69.31                              | 10.79                               | -58.51                              | -45.5          |
| 6880.00            | Н                     | 109                       | 6                                | -68.43                              | 10.86                               | -57.58                              | -44.6          |
| 8600.00            | Н                     | -                         | -                                | -69.35                              | 11.69                               | -57.66                              | -44.7          |
| 10320.00           | Н                     | -                         | -                                | -68.28                              | 12.49                               | -55.78                              | -42.8          |

Table 7-19. Radiated Spurious Data (Band 66/4 – Low Channel)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
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| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 3490.00            | Н                     | 123                       | 328                              | -59.91                              | 9.65                                | -50.26                              | -37.3          |
| 5235.00            | Н                     | 115                       | 222                              | -68.70                              | 10.93                               | -57.77                              | -44.8          |
| 6980.00            | Н                     | 120                       | 6                                | -68.64                              | 10.96                               | -57.68                              | -44.7          |
| 8725.00            | Н                     | -                         | -                                | -69.33                              | 11.83                               | -57.50                              | -44.5          |
| 10470.00           | Н                     | -                         | -                                | -69.39                              | 12.56                               | -56.83                              | -43.8          |

Table 7-20. Radiated Spurious Data (Band 66/4 - Mid Channel)

**OPERATING FREQUENCY:** 

CHANNEL:

MODULATION SIGNAL:

BANDWIDTH: DISTANCE:

QPSK 20.0 MHz 3 meters -13 LIMIT: dBm

1770.00

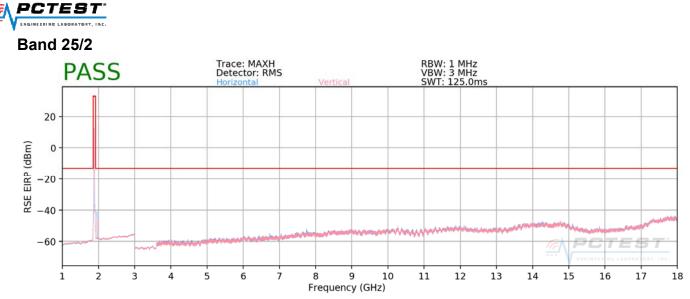
132572

MHz

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 3540.00            | Н                     | 115                       | 327                              | -63.90                              | 9.69                                | -54.20                              | -41.2          |
| 5310.00            | Н                     | 111                       | 231                              | -69.31                              | 10.97                               | -58.35                              | -45.3          |
| 7080.00            | Н                     | 119                       | 10                               | -68.42                              | 11.01                               | -57.41                              | -44.4          |
| 8850.00            | Н                     | -                         | -                                | -69.39                              | 11.95                               | -57.44                              | -44.4          |
| 10620.00           | Н                     | -                         | -                                | -69.51                              | 12.66                               | -56.85                              | -43.8          |

Table 7-21. Radiated Spurious Data (Band 66/4 – High Channel)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
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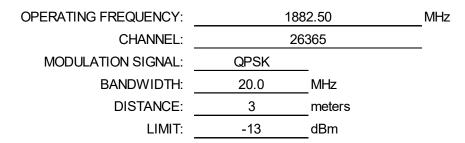
| OPERATING FREQUENCY: | 186  | 0.00   | MHz |
|----------------------|------|--------|-----|
| CHANNEL:             | 26   | 140    | _   |
| MODULATION SIGNAL:   | QPSK | _      |     |
| BANDWIDTH:           | 20.0 | MHz    |     |
| DISTANCE:            | 3    | meters |     |
| LIMIT:               | -13  | dBm    |     |
|                      |      |        |     |

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 3720.00            | V                     | 150                       | 5                                | -71.00                              | 9.51                                | -61.50                              | -48.5          |
| 5580.00            | V                     | -                         | -                                | -72.72                              | 10.99                               | -61.73                              | -48.7          |
| 7440.00            | V                     | 136                       | 0                                | -68.69                              | 10.99                               | -57.70                              | -44.7          |
| 9300.00            | V                     | -                         | -                                | -67.40                              | 11.61                               | -55.80                              | -42.8          |
| 11160.00           | V                     | -                         | -                                | -67.90                              | 12.73                               | -55.17                              | -42.2          |

Table 7-22. Radiated Spurious Data (Band 25/2 – Low Channel)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
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| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 3765.00            | V                     | 127                       | 10                               | -71.16                              | 9.36                                | -61.80                              | -48.8          |
| 5647.50            | V                     | 125                       | 0                                | -72.74                              | 11.19                               | -61.55                              | -48.5          |
| 7530.00            | V                     | 106                       | 10                               | -68.36                              | 11.13                               | -57.23                              | -44.2          |
| 9412.50            | V                     | -                         | -                                | -67.99                              | 11.57                               | -56.42                              | -43.4          |
| 11295.00           | V                     | -                         | -                                | -67.27                              | 12.71                               | -54.56                              | -41.6          |

Table 7-23. Radiated Spurious Data (Band 25/2 – Mid Channel)

**OPERATING FREQUENCY:** 

CHANNEL: MODULATION SIGNAL:

DISTANCE:

26590 QPSK BANDWIDTH: 20.0 MHz 3 meters LIMIT: -13 dBm

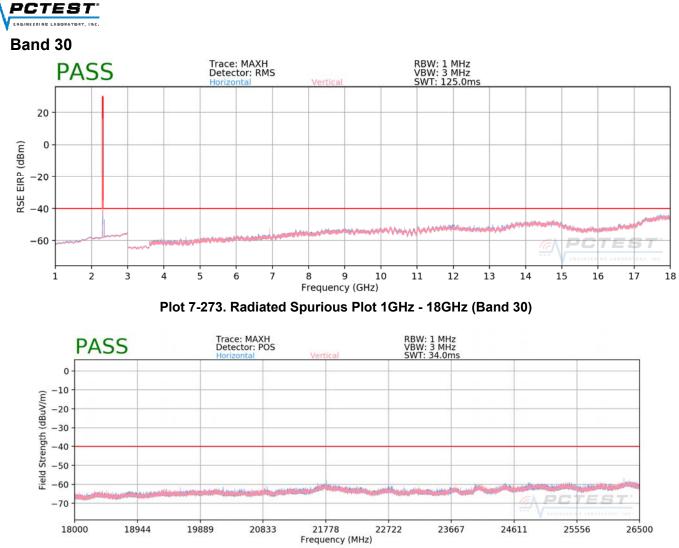
1905.00

MHz

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 3810.00            | V                     | 114                       | 360                              | -71.05                              | 9.29                                | -61.76                              | -48.8          |
| 5715.00            | V                     | -                         | -                                | -73.20                              | 11.35                               | -61.86                              | -48.9          |
| 7620.00            | V                     | 120                       | 358                              | -68.36                              | 11.29                               | -57.07                              | -44.1          |
| 9525.00            | V                     | -                         | -                                | -67.88                              | 11.73                               | -56.15                              | -43.1          |
| 11430.00           | V                     | -                         | -                                | -67.16                              | 12.83                               | -54.33                              | -41.3          |

Table 7-24. Radiated Spurious Data (Band 25/2 – High Channel)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
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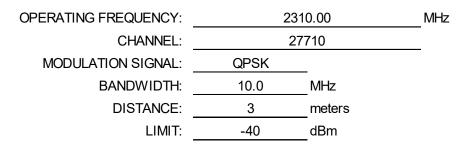


(G

Plot 7-274. Radiated Spurious Plot 18GHz – 26.5GHz (Band 30)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|----|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |    | Dega 177 of 107                 |
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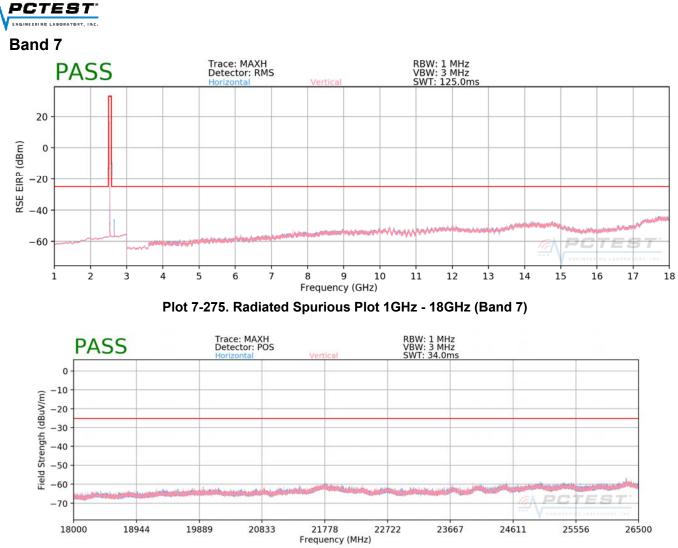




| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 4620.00            | V                     | 324                       | 241                              | -68.76                              | 10.92                               | -57.85                              | -17.8          |
| 6930.00            | V                     | 234                       | 314                              | -64.34                              | 11.74                               | -52.60                              | -12.6          |
| 9240.00            | V                     | -                         | -                                | -68.97                              | 11.62                               | -57.35                              | -17.3          |
| 11550.00           | V                     | -                         | -                                | -67.79                              | 12.72                               | -55.07                              | -15.1          |

Table 7-25. Radiated Spurious Data (Band 30)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 179 of 107                 |  |
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| © 2018 PCTEST Engineering Labo | V 8.0 04/05/2018         |                                       |      |                                 |  |

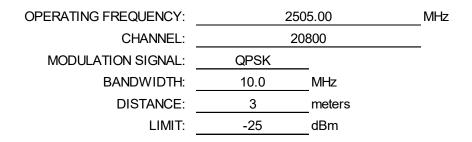


(G

Plot 7-276. Radiated Spurious Plot 18GHz - 26.5GHz (Band 7)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |  |
|--------------------------------|--------------------------|---------------------------------------|----|---------------------------------|--|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |    | Page 179 of 197                 |  |
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| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 5010.00            | V                     | 379                       | 0                                | -71.45                              | 10.91                               | -60.54                              | -35.5          |
| 7515.00            | V                     | 400                       | 330                              | -61.37                              | 11.10                               | -50.27                              | -25.3          |
| 10020.00           | V                     | -                         | -                                | -68.49                              | 11.99                               | -56.49                              | -31.5          |
| 12525.00           | V                     | -                         | -                                | -70.30                              | 13.56                               | -56.74                              | -31.7          |

Table 7-26. Radiated Spurious Data (Band 7 – Low Channel)

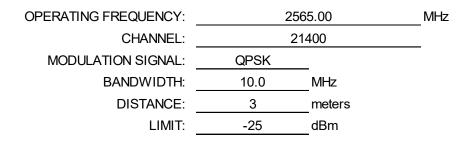
| OPERATING FREQUENCY: | 253  | 5.00   | MHz |
|----------------------|------|--------|-----|
| CHANNEL:             | 21   | 100    | _   |
| MODULATION SIGNAL:   | QPSK | _      |     |
| BANDWIDTH:           | 10.0 | MHz    |     |
| DISTANCE:            | 3    | meters |     |
| LIMIT:               | -25  | dBm    |     |
|                      |      |        |     |

| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 5070.00            | V                     | 341                       | 16                               | -70.96                              | 10.75                               | -60.22                              | -35.2          |
| 7605.00            | V                     | 116                       | 356                              | -64.15                              | 11.25                               | -52.91                              | -27.9          |
| 10140.00           | V                     | -                         | -                                | -67.55                              | 12.07                               | -55.48                              | -30.5          |
| 12675.00           | V                     | -                         | -                                | -69.64                              | 13.66                               | -55.97                              | -31.0          |

Table 7-27. Radiated Spurious Data (Band 7 – Mid Channel)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
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| Frequency<br>[MHz] | Ant.<br>Pol.<br>[H/V] | Antenna<br>Height<br>[cm] | Turntable<br>Azimuth<br>[degree] | Level at Antenna<br>Terminals [dBm] | Substitute<br>Antenna Gain<br>[dBi] | Spurious<br>Emission Level<br>[dBm] | Margin<br>[dB] |
|--------------------|-----------------------|---------------------------|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|
| 5130.00            | V                     | 338                       | 0                                | -69.83                              | 10.69                               | -59.15                              | -34.1          |
| 7695.00            | V                     | 106                       | 325                              | -59.74                              | 11.41                               | -48.33                              | -23.3          |
| 10260.00           | V                     | -                         | -                                | -66.74                              | 12.20                               | -54.54                              | -29.5          |
| 12825.00           | V                     | -                         | -                                | -69.42                              | 13.48                               | -55.93                              | -30.9          |

Table 7-28. Radiated Spurious Data (Band 7 – High Channel)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 191 of 107                 |
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## 7.8 Frequency Stability / Temperature Variation

#### **Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24, Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### Test Procedure Used

ANSI/TIA-603-E-2016

#### Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

#### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

#### Test Notes

None

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
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## **Band 12 Frequency Stability Measurements**

| OPERATING FREQUENCY: | 707,500,000 | Hz  |
|----------------------|-------------|-----|
| CHANNEL:             | 23790       | _   |
| REFERENCE VOLTAGE:   | 3.85        | VDC |

| VOLTAGE<br>(%) | POWER<br>(VDC) | TEMP<br>(°C) | FREQUENCY<br>(Hz) | Freq. Dev.<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|--------------|-------------------|--------------------|------------------|
| 100 %          | 3.85           | + 20 (Ref)   | 707,500,088       | 88                 | 0.0000124        |
| 100 %          |                | - 30         | 707,500,163       | 163                | 0.0000230        |
| 100 %          |                | - 20         | 707,500,350       | 350                | 0.0000495        |
| 100 %          |                | - 10         | 707,499,866       | -134               | -0.0000189       |
| 100 %          |                | 0            | 707,500,072       | 72                 | 0.0000102        |
| 100 %          |                | + 10         | 707,499,750       | -250               | -0.0000353       |
| 100 %          |                | + 20         | 707,500,145       | 145                | 0.0000205        |
| 100 %          |                | + 30         | 707,500,056       | 56                 | 0.0000079        |
| 100 %          |                | + 40         | 707,500,044       | 44                 | 0.0000062        |
| 100 %          |                | + 50         | 707,499,991       | -9                 | -0.0000013       |
| BATT. ENDPOINT | 3.45           | + 20         | 707,500,110       | 110                | 0.0000155        |

 Table 7-29. Frequency Stability Data (Band 12)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
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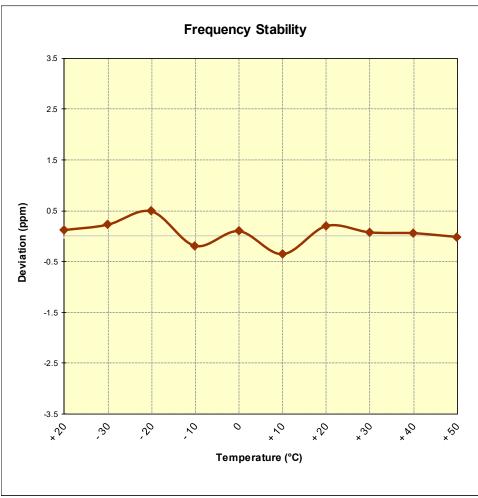


Figure 7-8. Frequency Stability Graph (Band 12)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Page 184 of 197                 |
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## **Band 13 Frequency Stability Measurements**

| OPERATING FREQUENCY: | 782,000,000 | Hz  |
|----------------------|-------------|-----|
| CHANNEL:             | 23230       | _   |
| REFERENCE VOLTAGE:   | 3.85        | VDC |

| VOLTAGE<br>(%) | POWER<br>(VDC) | <b>ТЕМР</b><br>( <sup>°</sup> С) | FREQUENCY<br>(Hz) | Freq. Dev.<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|----------------------------------|-------------------|--------------------|------------------|
| 100 %          | 3.85           | + 20 (Ref)                       | 782,000,186       | 186                | 0.0000238        |
| 100 %          |                | - 30                             | 782,000,125       | 125                | 0.0000160        |
| 100 %          |                | - 20                             | 782,000,249       | 249                | 0.0000318        |
| 100 %          |                | - 10                             | 782,000,056       | 56                 | 0.0000072        |
| 100 %          |                | 0                                | 781,999,895       | -105               | -0.0000134       |
| 100 %          |                | + 10                             | 781,999,787       | -213               | -0.0000272       |
| 100 %          |                | + 20                             | 781,999,786       | -214               | -0.0000274       |
| 100 %          |                | + 30                             | 781,999,953       | -47                | -0.0000060       |
| 100 %          |                | + 40                             | 781,999,956       | -44                | -0.0000056       |
| 100 %          |                | + 50                             | 782,000,090       | 90                 | 0.0000115        |
| BATT. ENDPOINT | 3.45           | + 20                             | 782,000,289       | 289                | 0.0000370        |

 Table 7-30. Frequency Stability Data (Band 13)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|---------------------------------|
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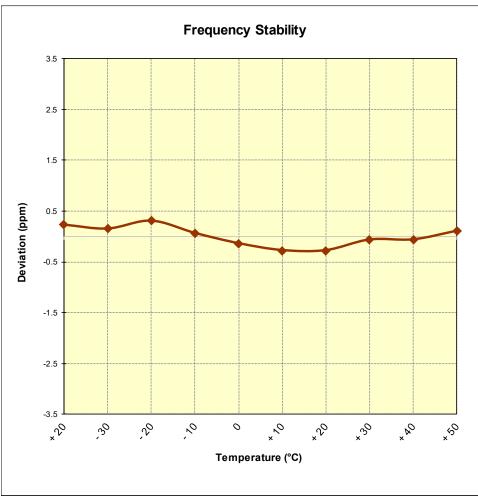


Figure 7-9. Frequency Stability Graph (Band 13)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dage 196 of 107                 |
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# **Band 5 Frequency Stability Measurements**

| OPERATING FREQUENCY: | 836,500,000            | Hz  |
|----------------------|------------------------|-----|
| CHANNEL:             | 20525                  | _   |
| REFERENCE VOLTAGE:   | 3.85                   | VDC |
| DEVIATION LIMIT:     | ± 0.00025 % or 2.5 ppm |     |

| VOLTAGE<br>(%) | POWER<br>(VDC) | <b>TEMP</b><br>(°C) | FREQUENCY<br>(Hz) | Freq. Dev.<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|---------------------|-------------------|--------------------|------------------|
| 100 %          | 3.85           | + 20 (Ref)          | 836,499,631       | -369               | -0.0000441       |
| 100 %          |                | - 30                | 836,499,602       | -398               | -0.0000476       |
| 100 %          |                | - 20                | 836,500,018       | 18                 | 0.0000022        |
| 100 %          |                | - 10                | 836,500,140       | 140                | 0.0000167        |
| 100 %          |                | 0                   | 836,499,627       | -373               | -0.0000446       |
| 100 %          |                | + 10                | 836,499,967       | -33                | -0.000039        |
| 100 %          |                | + 20                | 836,500,212       | 212                | 0.0000253        |
| 100 %          |                | + 30                | 836,499,900       | -100               | -0.0000120       |
| 100 %          |                | + 40                | 836,499,780       | -220               | -0.0000263       |
| 100 %          |                | + 50                | 836,499,984       | -16                | -0.0000019       |
| 85 %           | 3.27           | + 20                | 836,500,084       | 84                 | 0.0000100        |
| BATT. ENDPOINT | 3.45           | + 20                | 836,500,271       | 271                | 0.0000324        |

Table 7-31. Frequency Stability Data (Band 5)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|---------------------------------|
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# **Band 5 Frequency Stability Measurements**

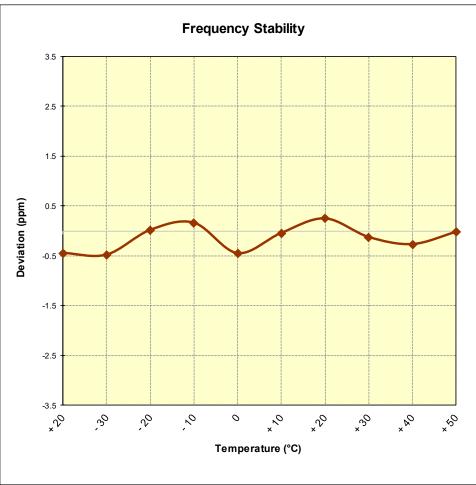


Figure 7-10. Frequency Stability Graph (Band 5)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|---------------------------------|
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### **Band 66/4 Frequency Stability Measurements**

| OPERATING FREQUENCY: | 1,745,000,000 | Hz  |
|----------------------|---------------|-----|
| CHANNEL:             | 132322        |     |
| REFERENCE VOLTAGE:   | 3.85          | VDC |

| VOLTAGE<br>(%) | POWER<br>(VDC) | <b>ТЕМР</b><br>( <sup>°</sup> С) | FREQUENCY<br>(Hz) | Freq. Dev.<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|----------------------------------|-------------------|--------------------|------------------|
| 100 %          | 3.85           | + 20 (Ref)                       | 1,744,999,791     | -209               | -0.0000120       |
| 100 %          |                | - 30                             | 1,745,000,014     | 14                 | 0.000008         |
| 100 %          |                | - 20                             | 1,744,999,984     | -16                | -0.0000009       |
| 100 %          |                | - 10                             | 1,745,000,139     | 139                | 0.0000080        |
| 100 %          |                | 0                                | 1,744,999,917     | -83                | -0.0000048       |
| 100 %          |                | + 10                             | 1,745,000,075     | 75                 | 0.0000043        |
| 100 %          |                | + 20                             | 1,744,999,732     | -268               | -0.0000154       |
| 100 %          |                | + 30                             | 1,745,000,321     | 321                | 0.0000184        |
| 100 %          |                | + 40                             | 1,744,999,943     | -57                | -0.0000033       |
| 100 %          |                | + 50                             | 1,744,999,687     | -313               | -0.0000179       |
| BATT. ENDPOINT | 3.45           | + 20                             | 1,744,999,704     | -296               | -0.0000170       |

 Table 7-32. Frequency Stability Data (Band 66)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--------------------------------|--------------------------|---------------------------------------|------|---------------------------------|
| Test Report S/N:               | Test Dates:              | EUT Type:                             |      | Dega 190 of 107                 |
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# **Band 66/4 Frequency Stability Measurements**

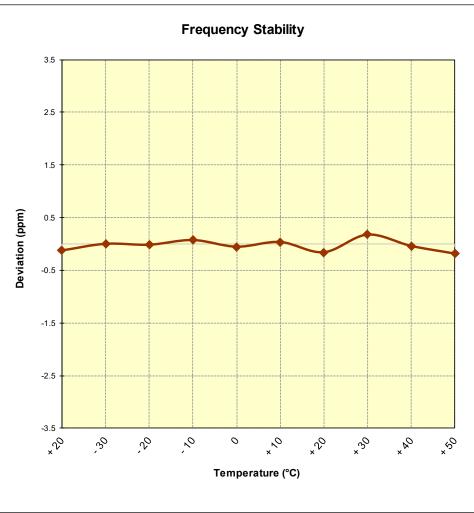


Figure 7-11. Frequency Stability Graph (Band 66/4)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|---------------------------------|
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### **Band 25/2 Frequency Stability Measurements**

| OPERATING FREQUENCY: | 1,882,500,000          | Hz  |
|----------------------|------------------------|-----|
| CHANNEL:             | 26365                  | _   |
| REFERENCE VOLTAGE:   | 3.85                   | VDC |
| DEVIATION LIMIT:     | ± 0.00025 % or 2.5 ppm | _   |

| VOLTAGE<br>(%) | POWER<br>(VDC) | <b>ТЕМР</b><br>( <sup>°</sup> С) | FREQUENCY<br>(Hz) | Freq. Dev.<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|----------------------------------|-------------------|--------------------|------------------|
| 100 %          | 3.85           | + 20 (Ref)                       | 1,882,500,095     | 95                 | 0.0000050        |
| 100 %          |                | - 30                             | 1,882,500,335     | 335                | 0.0000178        |
| 100 %          |                | - 20                             | 1,882,500,068     | 68                 | 0.0000036        |
| 100 %          |                | - 10                             | 1,882,499,731     | -269               | -0.0000143       |
| 100 %          |                | 0                                | 1,882,499,868     | -132               | -0.0000070       |
| 100 %          |                | + 10                             | 1,882,499,902     | -98                | -0.0000052       |
| 100 %          |                | + 20                             | 1,882,499,934     | -66                | -0.0000035       |
| 100 %          |                | + 30                             | 1,882,500,039     | 39                 | 0.0000021        |
| 100 %          |                | + 40                             | 1,882,500,004     | 4                  | 0.0000002        |
| 100 %          |                | + 50                             | 1,882,500,135     | 135                | 0.0000072        |
| BATT. ENDPOINT | 3.45           | + 20                             | 1,882,500,009     | 9                  | 0.0000005        |

Table 7-33. Frequency Stability Data (Band 25/2)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕕 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
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**Band 25/2 Frequency Stability Measurements** 

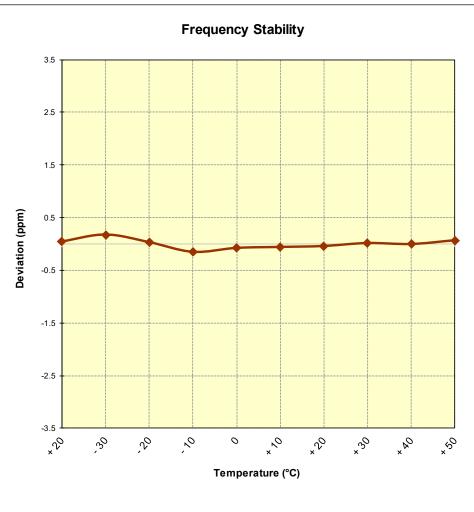


Figure 7-12. Frequency Stability Graph (Band 25/2)

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
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## **Band 30 Frequency Stability Measurements**

| OPERATING FREQUENCY: | 2,310,000,000 | Hz  |
|----------------------|---------------|-----|
| CHANNEL:             | 27710         | -   |
| REFERENCE VOLTAGE:   | 3.85          | VDC |

| VOLTAGE<br>(%) | POWER<br>(VDC) | <b>ТЕМР</b><br>( <sup>°</sup> С) | FREQUENCY<br>(Hz) | Freq. Dev.<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|----------------------------------|-------------------|--------------------|------------------|
| 100 %          | 3.85           | + 20 (Ref)                       | 2,309,999,814     | -186               | -0.0000081       |
| 100 %          |                | - 30                             | 2,310,000,051     | 51                 | 0.0000022        |
| 100 %          |                | - 20                             | 2,309,999,978     | -22                | -0.0000010       |
| 100 %          |                | - 10                             | 2,309,999,834     | -166               | -0.0000072       |
| 100 %          |                | 0                                | 2,309,999,957     | -43                | -0.0000019       |
| 100 %          |                | + 10                             | 2,309,999,752     | -248               | -0.0000107       |
| 100 %          |                | + 20                             | 2,310,000,042     | 42                 | 0.0000018        |
| 100 %          |                | + 30                             | 2,309,999,953     | -47                | -0.0000020       |
| 100 %          |                | + 40                             | 2,310,000,104     | 104                | 0.0000045        |
| 100 %          |                | + 50                             | 2,309,999,769     | -231               | -0.0000100       |
| BATT. ENDPOINT | 3.45           | + 20                             | 2,309,999,906     | -94                | -0.0000041       |

 Table 7-34. Frequency Stability Data (Band 30)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

| FCC ID: ZNFQ710WA              |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Quality Manager |
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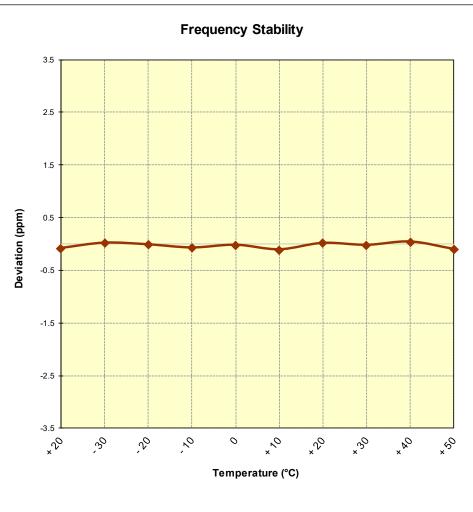


Figure 7-13. Frequency Stability Graph (Band 30)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG             | Approved by:<br>Quality Manager |
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## **Band 7 Frequency Stability Measurements**

| OPERATING FREQUENCY: | 2,535,000,000 | Hz  |
|----------------------|---------------|-----|
| CHANNEL:             | 21100         | _   |
| REFERENCE VOLTAGE:   | 3.85          | VDC |

| VOLTAGE<br>(%) | POWER<br>(VDC) | TEMP<br>(°C) | FREQUENCY<br>(Hz) | Freq. Dev.<br>(Hz) | Deviation<br>(%) |
|----------------|----------------|--------------|-------------------|--------------------|------------------|
| 100 %          | 3.85           | + 20 (Ref)   | 2,534,999,992     | -8                 | -0.0000003       |
| 100 %          |                | - 30         | 2,535,000,277     | 277                | 0.0000109        |
| 100 %          |                | - 20         | 2,534,999,955     | -45                | -0.0000018       |
| 100 %          |                | - 10         | 2,535,000,309     | 309                | 0.0000122        |
| 100 %          |                | 0            | 2,534,999,820     | -180               | -0.0000071       |
| 100 %          |                | + 10         | 2,534,999,970     | -30                | -0.0000012       |
| 100 %          |                | + 20         | 2,535,000,029     | 29                 | 0.0000011        |
| 100 %          |                | + 30         | 2,535,000,161     | 161                | 0.0000064        |
| 100 %          |                | + 40         | 2,534,999,620     | -380               | -0.0000150       |
| 100 %          |                | + 50         | 2,534,999,902     | -98                | -0.0000039       |
| BATT. ENDPOINT | 3.45           | + 20         | 2,534,999,787     | -213               | -0.0000084       |

 Table 7-35. Frequency Stability Data (Band 7)

### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
|--|--------------------------|---------------------------------------|------|---------------------------------|
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# **Band 7 Frequency Stability Measurements**

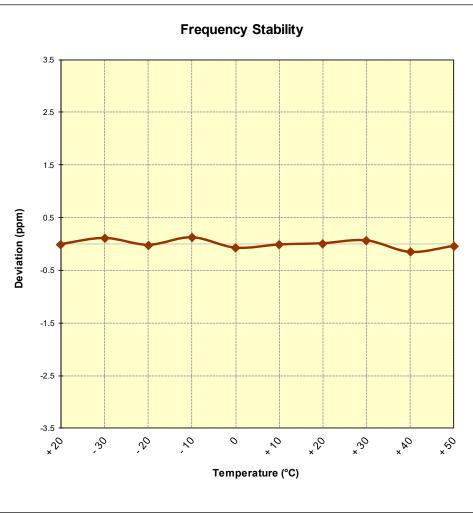


Figure 7-14. Frequency Stability Graph (Band 7)

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
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# 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFQ710WA** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules and RSS-130, RSS-132, RSS-133, RSS-139, RSS-195, RSS-199 of the Innovation, Science and Economic Development Canada Rules for LTE operation.

| FCC ID: ZNFQ710WA                          |                          | MEASUREMENT REPORT<br>(CERTIFICATION) | 🕒 LG | Approved by:<br>Quality Manager |
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