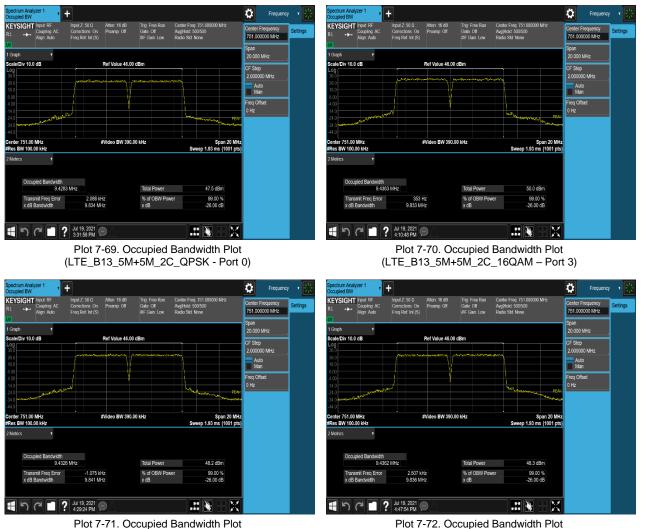


| Channel | Port | OBW (MHz) | | | | | |
|---------|------|-----------|-------|-------|--------|--|--|
| | POIL | QPSK | 16QAM | 64QAM | 256QAM | | |
| Middle | 0 | 9.43 | 9.43 | 9.43 | 9.43 | | |
| | 1 | 9.43 | 9.43 | 9.42 | 9.44 | | |
| | 2 | 9.42 | 9.42 | 9.42 | 9.44 | | |
| | 3 | 9.43 | 9.44 | 9.43 | 9.44 | | |

Table 7-9. Occupied Bandwidth Summary Data (LTE_B13_5M+5M_2C)



(LTE_B13_5M+5M_2C_64QAM - Port 0)

(LTE_B13_5M+5M_2C_256QAM - Port 1)

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| Channel | Port | OBW (MHz) |
|---------|------|-----------|
| | 0 | 4.47 |
| Low | 1 | 4.47 |
| Low | 2 | 4.47 |
| | 3 | 4.47 |
| | 0 | 4.47 |
| Middle | 1 | 4.47 |
| Middle | 2 | 4.47 |
| | 3 | 4.47 |
| | 0 | 4.47 |
| Llich | 1 | 4.47 |
| High | 2 | 4.47 |
| | 3 | 4.47 |

Table 7-10. Occupied Bandwidth Summary Data (LTE_B13_5M+NB-lot(IB)_1C)

| Configuration | Port | OBW (MHz) |
|--------------------------------|------|-----------|
| | 0 | 8.95 |
| B13_10M+Low_NB- | 1 | 8.97 |
| lot(IB)+High_NB- lot(IB)_1C | 2 | 8.95 |
| | 3 | 8.95 |
| | 0 | 8.95 |
| B13_10M+Low_NB- | 1 | 8.94 |
| lot(IB)+Low_NB- lot(IB)_1C | 2 | 8.96 |
| | 3 | 8.95 |
| | 0 | 8.96 |
| B13_10M+High_NB- | 1 | 8.97 |
| lot(IB)+High_NB- lot(IB)_1C | 2 | 8.97 |
| | 3 | 8.97 |

Table 7-11. Occupied Bandwidth Summary Data (LTE_B13_10M+NB-lot(IB)+NB-lot(IB)_1C)

| FCC ID: A3LRF4442D-13B | | MEASUREMENT REPORT (CERTIFICATION) | SAMSUNG | Approved by: Technical Manager |
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Plot 7-73. Occupied Bandwidth Plot (LTE_B13_5M+NB-lot(IB)_1C_QPSK - Low Channel, Port 0)



Plot 7-75. Occupied Bandwidth Plot (LTE_B13_5M+NB-lot(IB)_1C_QPSK - High Channel, Port 0)



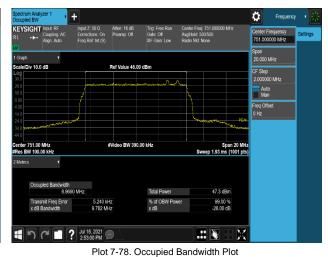
(LTE_B13_10M+Low_NB-lot(IB)+Low_NB-lot(IB)_1C _QPSK-Port 0)



Plot 7-74. Occupied Bandwidth Plot (LTE_B13_5M+NB-lot(IB)_1C_QPSK - Mid Channel, Port 0)



Plot 7-76. Occupied Bandwidth Plot (LTE_B13_10M+Low_NB-lot(IB)+High_NB-lot(IB)_1C _QPSK - Port 1)



(LTE_B13_10M+High_NB-lot(IB)+High_NB-lot(IB)=1C_QPSK-Port 0)

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| Channel | Port | OBW (MHz) |
|---------|------|-----------|
| Middle | 0 | 9.49 |
| | 1 | 9.50 |
| | 2 | 9.49 |
| | 3 | 9.49 |

Table 7-12. Occupied Bandwidth Summary Data (LTE_B13_10M+NB-lot(GB)+ NB-lot(GB)_3C)

| Configuration | Port | OBW (MHz) |
|--------------------------------|------|-----------|
| | 0 | 9.23 |
| B13_10M+Low_NB- | 1 | 9.22 |
| lot(GB)+High_NB- lot(IB)_2C | 2 | 9.22 |
| | 3 | 9.21 |
| | 0 | 9.22 |
| B13_10M+High_NB- | 1 | 9.21 |
| lot(GB)+Low_NB- lot(IB)_2C | 2 | 9.22 |
| | 3 | 9.22 |

Table 7-13. Occupied Bandwidth Summary Data (LTE_B13_10M+NB-lot(IB)+ NB-lot(GB)_2C)

| FCC ID: A3LRF4442D-13B | | MEASUREMENT REPORT (CERTIFICATION) | SAMSUNG | Approved by: Technical Manager |
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| Spectrum Analyzer 1 | ŀ | | | | Frequency | · • • |
|------------------------------------------------------|----------------------------|--------------------------------------------------------------|-------------------|---------------|------------------------------------|----------|
| KEYSIGHT Input RF RL ↔ Coupling AC Align: Auto | | n: 16 dB Trig: Free Ru amp: Off Gate: Off #IF Gain: Lo | Avg Hold: 500/500 | 00 MHz | Center Frequency 751.000000 MHz | Settings |
| 1 Graph y Scale/Div 10.0 dB | Ref V | /alue 46.00 dBm | | | Span 20.000 MHz CF Step | |
| Log 36.0 26.0 16.0 | Aurona | ar mar a tha tha an ann an a | | | 2.000000 MHz Auto Man | |
| 6 00 -4.00 -14.0 -24.0 | | | In the Render | PEAK | Freq Offset 0 Hz | |
| -34.0 -44.0 Center 751.00 MHz | #Vide | o BW 390.00 kHz | | Span 20 MHz | | |
| #Res BW 100.00 kHz 2 Motrics Y | | | Sweep 1.93 | ms (1001 pts) | | |
| Occupied Bandwidth 9.4968 | MHz | Total Powe | er 48.0 | dBm | | |
| Transmit Freq Error x dB Bandwidth | -3.422 kHz 9.925 MHz | % of OBW x dB | | 00 % 00 dB | | |
| 1 つ つ 1 ? | Jul 16, 2021 5:13:52 PM | | | HX | | |

Plot 7-79. Occupied Bandwidth Plot (LTE_B13_10M+NB-lot(GB)+ NB-lot(GB)_3C_QPSK - Port 1)



Plot 7-81. Occupied Bandwidth Plot (LTE_B13_10M+NB-lot(IB)+ NB-lot(GB)_2C_QPSK - Port 0)



Plot 7-80. Occupied Bandwidth Plot

(LTE_B13_10M+NB-lot(IB)+ NB-lot(GB)_2C_QPSK - Port 0)

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| DSS | 0 | Devi | | OBW | (MHz) | |
|--------|----------|------|------|-------|-------|--------|
| Ratio | Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
| | | 0 | 9.21 | 9.16 | 9.21 | 9.18 |
| Low | | 1 | 9.19 | 9.15 | 9.16 | 9.18 |
| | LOW | 2 | 9.20 | 9.15 | 9.14 | 9.16 |
| | | 3 | 9.23 | 9.19 | 9.19 | 9.14 |
| | | 0 | 9.22 | 9.16 | 9.18 | 9.16 |
| LTE 9: | Middle | 1 | 9.22 | 9.18 | 9.21 | 9.15 |
| NR 1 | Middle | 2 | 9.24 | 9.17 | 9.20 | 9.17 |
| | | 3 | 9.23 | 9.18 | 9.19 | 9.19 |
| | | 0 | 9.19 | 9.19 | 9.20 | 9.15 |
| | Lline | 1 | 9.22 | 9.17 | 9.20 | 9.17 |
| | High – | 2 | 9.22 | 9.21 | 9.21 | 9.18 |
| | | 3 | 9.22 | 9.17 | 9.13 | 9.18 |
| | | 0 | 9.24 | 9.18 | 9.20 | 9.18 |
| | | 1 | 9.24 | 9.19 | 9.20 | 9.18 |
| | Low | 2 | 9.25 | 9.20 | 9.22 | 9.20 |
| | | 3 | 9.26 | 9.19 | 9.21 | 9.19 |
| | | 0 | 9.25 | 9.18 | 9.20 | 9.21 |
| LTE 8: | | 1 | 9.25 | 9.17 | 9.22 | 9.19 |
| NR 2 | Middle | 2 | 9.26 | 9.19 | 9.22 | 9.20 |
| | | 3 | 9.26 | 9.17 | 9.23 | 9.21 |
| | | 0 | 9.26 | 9.18 | 9.22 | 9.21 |
| | | 1 | 9.22 | 9.18 | 9.22 | 9.20 |
| | High | 2 | 9.25 | 9.21 | 9.20 | 9.19 |
| | | 3 | 9.26 | 9.19 | 9.23 | 9.19 |
| | | 0 | 9.26 | 9.18 | 9.23 | 9.20 |
| | | 1 | 9.25 | 9.19 | 9.23 | 9.19 |
| | Low | 2 | 9.27 | 9.17 | 9.23 | 9.19 |
| | | 3 | 9.27 | 9.18 | 9.24 | 9.22 |
| | | 0 | 9.27 | 9.20 | 9.26 | 9.20 |
| LTE 7: | - | 1 | 9.26 | 9.19 | 9.24 | 9.22 |
| NR 3 | Middle – | 2 | 9.27 | 9.19 | 9.22 | 9.22 |
| | | 3 | 9.26 | 9.20 | 9.23 | 9.22 |
| | | 0 | 9.26 | 9.19 | 9.21 | 9.22 |
| | - | 1 | 9.26 | 9.18 | 9.23 | 9.21 |
| | High | 2 | 9.26 | 9.19 | 9.22 | 9.21 |
| | | 3 | 9.26 | 9.19 | 9.22 | 9.22 |
| | <u> </u> | 0 | 9.26 | 9.19 | 9.25 | 9.22 |
| | | 1 | 9.27 | 9.18 | 9.23 | 9.22 |
| | Low | 2 | 9.25 | 9.19 | 9.25 | 9.22 |
| | | 3 | 9.27 | 9.19 | 9.22 | 9.22 |
| | | 0 | 9.27 | 9.19 | 9.25 | 9.22 |
| LTE 6: | | 1 | 9.27 | 9.19 | 9.24 | 9.21 |
| NR 4 | Middle | 2 | 9.27 | 9.20 | 9.26 | 9.23 |
| | | 3 | 9.28 | 9.18 | 9.23 | 9.21 |
| | ├ | 0 | 9.27 | 9.21 | 9.23 | 9.21 |
| | - | 1 | 9.27 | 9.20 | 9.23 | 9.23 |
| | High – | 2 | 9.26 | 9.18 | 9.21 | 9.23 |
| | | | | | | |
| | | 3 | 9.27 | 9.19 | 9.21 | 9.22 |

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| | High — | 1 2 | 9.28 9.28 | 9.21 9.23 | 9.25 9.25 | 9.27 9.26 |
|----------|----------|------|--------------|---------------------|--------------|--------------|
| | | 0 | 9.29 | 9.22 | 9.26 | 9.27 |
| | | 3 | 9.29 | 9.20 | 9.27 | 9.26 |
| NR 8 | | 2 | 9.29 | 9.22 | 9.27 | 9.25 |
| LTE 2: | Middle — | 1 | 9.29 | 9.23 | 9.27 | 9.26 |
| | | 0 | 9.29 | 9.20 | 9.28 | 9.26 |
| | | 3 | 9.28 | 9.22 | 9.26 | 9.26 |
| | | 2 | 9.28 | 9.19 | 9.26 | 9.25 |
| | Low | 1 | 9.28 | 9.19 | 9.25 | 9.25 |
| | | 0 | 9.29 | 9.21 | 9.25 | 9.25 |
| | | 3 | 9.29 | 9.21 | 9.25 | 9.24 |
| | High — | 2 | 9.29 | 9.22 | 9.25 | 9.24 |
| | Lligh | 1 | 9.28 | 9.21 | 9.26 | 9.24 |
| | | 0 | 9.28 | 9.20 | 9.25 | 9.25 |
| - | | 3 | 9.28 | 9.21 | 9.25 | 9.25 |
| NR 7 | Middle — | 2 | 9.28 | 9.19 | 9.26 | 9.25 |
| LTE 3: | | 1 | 9.28 | 9.22 | 9.27 | 9.24 |
| | | 0 | 9.28 | 9.20 | 9.25 | 9.25 |
| | | 3 | 9.28 | 9.20 | 9.24 | 9.24 |
| | Low | 2 | 9.28 | 9.21 | 9.20 | 9.20 |
| | | 1 | 9.28 | 9.20 | 9.26 | 9.24 |
| | <u>├</u> | 0 | 9.27 | 9.22 | 9.23 | 9.25 |
| | | 2 3 | 9.27 9.27 | 9.19 9.22 | 9.24 9.23 | 9.24 9.25 |
| | High — | 1 | 9.28 | 9.19 | 9.25 | 9.24 |
| | | 0 | 9.28 | 9.19 | 9.25 | 9.25 |
| <u> </u> | 3 | 9.29 | 9.20 | 9.26 | 9.24 | |
| NR 6 | | 2 | 9.28 | 9.20 | 9.25 | 9.24 |
| LTE 4: | Middle | 1 | 9.28 | 9.20 | 9.25 | 9.24 |
| | | 0 | 9.28 | 9.20 | 9.26 | 9.24 |
| | | 3 | 9.28 | 9.19 | 9.25 | 9.23 |
| | 2011 | 2 | 9.28 | 9.19 | 9.25 | 9.24 |
| | Low | 1 | 9.28 | 9.19 | 9.25 | 9.24 |
| | | 0 | 9.28 | 9.19 | 9.26 | 9.24 |
| | | 3 | 9.28 | 9.20 | 9.23 | 9.20 |
| | riigii | 2 | 9.27 | 9.19 | 9.23 | 9.22 |
| | High | 1 | 9.27 | 9.21 | 9.25 | 9.23 |
| | | 0 | 9.27 | 9.21 | 9.24 | 9.23 |
| | | 3 | 9.28 | 9.18 | 9.25 | 9.24 |
| NR 5 | Middle — | 2 | 9.28 | 9.20 | 9.24 | 9.24 |
| LTE 5: | | 1 | 9.28 | 9.22 | 9.24 | 9.23 |
| | | 0 | 9.28 | 9.20 | 9.23 | 9.24 |
| | | 3 | 9.27 | 9.19 | 9.23 | 9.24 |
| | Low - | 2 | 9.27 | 9.20 | 9.24 | 9.24 |
| | | 0 | 9.27 9.28 | 9.19 9.20 | 9.25 9.23 | 9.22 9.22 |

Table 7-14. Occupied Bandwidth Summary Data (DSS_B5_10M_1C)

Note: Test result is no big difference depending on DSS Ratio. So, the only worst-ratio plots are included in this report.

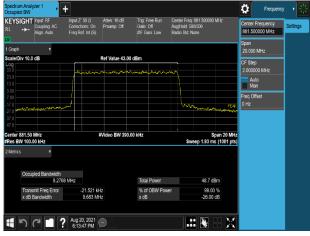
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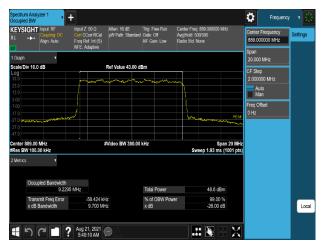


| KEYSIGHT Input: RF L →→ Coupling: AC Align: Auto | | Atten: 16 dB Preamp: Off | Trig: Free Run Gato: Off #IF Gain: Low | Center Freq: 874.000 Avg Hold: 500/500 Radio Std: None | 0000 MHz | Center Frequency 874.000000 MHz | Setting |
|--------------------------------------------------------|-------------------------|-----------------------------|----------------------------------------------|--------------------------------------------------------------|--------------------------------|------------------------------------|---------|
| Graph • | | | | | | Span 20.000 MHz | |
| cale/Div 10.0 dB | | tef Value 43.00 | dBm | | | CF Step | |
| 33.0 | | - | un | ~~~ | | 2.000000 MHz | |
| | | | | | | Auto Man | |
| 3.00 | | | | ļ. | | Freq Offset | |
| 17.0 | w.l. | | | an and the second | FEAK | 0 Hz | |
| 37.0 | | | | | 1999 Barry Constraints | | |
| | | | | | | | |
| enter 874.00 MHz Res BW 100.00 kHz | #\ | /ideo BW 390. | 00 kHz | Sweep 1.9 | Span 20 MHz 3 ms (1001 pts) | | |
| Metrics v | | | | | | | |
| | | | | | | | |
| Occupied Bandwidth | | | | | | | |
| 9.2862 Transmit Freg Error | -4.263 kHz | | Total Power % of OBW Pow | | .6 dBm 9.00 % | | |
| x dB Bandwidth | -4.263 KHz 9.707 MHz | | x dB | | 9.00 % 6.00 dB | | |
| | | | | | | | |

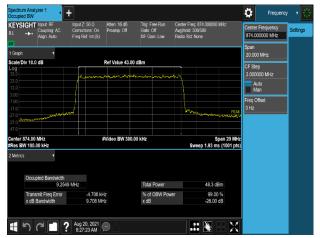
Plot 7-82. Occupied Bandwidth Plot (DSS_B5_10M_2:8_1C__QPSK - Low Channel, Port 0)



Plot 7-84. Occupied Bandwidth Plot (DSS_B5_10M_2:8_1C__64QAM - Mid Channel, Port 0)



Plot 7-83. Occupied Bandwidth Plot (DSS_B5_10M_2:8_1C__16QAM - High Channel, Port 2)



Plot 7-85. Occupied Bandwidth Plot (DSS_B5_10M_2:8_1C__256QAM - High Channel, Port 0)

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| DSS | Channel Port | | OBW (MHz) | | | | |
|--------|--------------|------|-----------|-------|-------|--------|--|
| Ratio | Channel | POIL | QPSK | 16QAM | 64QAM | 256QAM | |
| | | 0 | 14.29 | 14.29 | 14.26 | 14.27 | |
| | Low | 1 | 14.28 | 14.32 | 14.26 | 14.29 | |
| | Low | 2 | 14.27 | 14.28 | 14.28 | 14.28 | |
| | | 3 | 14.26 | 14.27 | 14.23 | 14.26 | |
| | | 0 | 14.26 | 14.31 | 14.25 | 14.28 | |
| LTE 5: | Middle | 1 | 14.29 | 14.36 | 14.27 | 14.30 | |
| NR 5 | wildule | 2 | 14.27 | 14.30 | 14.26 | 14.27 | |
| | | 3 | 14.29 | 14.31 | 14.25 | 14.28 | |
| | | 0 | 14.25 | 14.18 | 14.27 | 14.27 | |
| | High | 1 | 14.28 | 14.17 | 14.27 | 14.24 | |
| | | 2 | 14.27 | 14.18 | 14.25 | 14.27 | |
| | | 3 | 14.26 | 14.16 | 14.26 | 14.26 | |

Table 7-15. Occupied Bandwidth Summary Data (DSS_B5_10M+5M_2C)

| DSS | Channel | Dort | OBW (MHz) | | | | |
|--------|---------|------|-----------|-------|-------|--------|--|
| Ratio | Channel | Port | QPSK | 16QAM | 64QAM | 256QAM | |
| | | 0 | 19.01 | 19.03 | 18.99 | 18.99 | |
| | Low | 1 | 19.01 | 19.04 | 19.02 | 18.98 | |
| | Low | 2 | 19.01 | 19.05 | 19.01 | 18.99 | |
| | | 3 | 19.02 | 19.01 | 19.00 | 18.92 | |
| | | 0 | 19.02 | 19.05 | 18.99 | 19.00 | |
| LTE 5: | Middle | 1 | 19.00 | 19.10 | 18.94 | 18.97 | |
| NR 5 | wildule | 2 | 18.99 | 19.04 | 18.98 | 18.98 | |
| | | 3 | 18.94 | 19.05 | 18.97 | 19.02 | |
| | | 0 | 18.97 | 18.90 | 19.01 | 18.95 | |
| | High | 1 | 18.98 | 18.91 | 19.01 | 18.98 | |
| | | 2 | 18.98 | 18.91 | 19.00 | 18.98 | |
| | | 3 | 18.95 | 18.88 | 19.00 | 18.96 | |

 Table 7-16. Occupied Bandwidth Summary Data (DSS_B5_10M+10M_2C)

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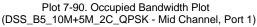


Plot 7-86. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_QPSK - Low Channel, Port 0)



Plot 7-88. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_64QAM - Low Channel, Port 2)



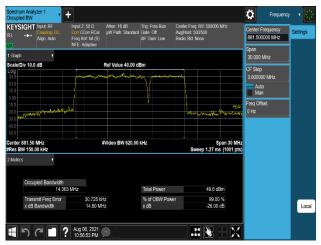




Plot 7-87. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_16QAM - Low Channel, Port 1)



Plot 7-89. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_256QAM - Low Channel, Port 1)



Plot 7-91. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_16QAM - Mid Channel, Port 1)

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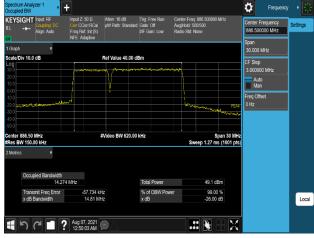


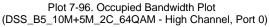


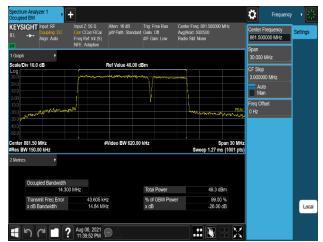
Plot 7-92. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_64QAM - Mid Channel, Port 1)



Plot 7-94. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_QPSK - High Channel, Port 1)



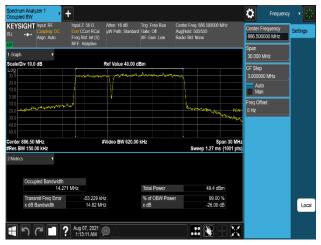




Plot 7-93. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_256QAM – Mid Channel, Port 1)



Plot 7-95. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_16QAM - High Channel, Port 0)



Plot 7-97. Occupied Bandwidth Plot (DSS_B5_10M+5M_2C_256QAM - High Channel, Port 0)

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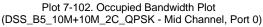


Plot 7-98. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_QPSK - Low Channel, Port 3)



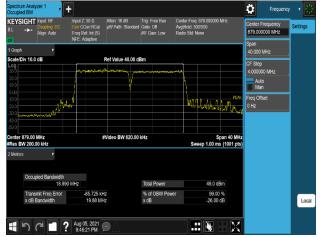
Plot 7-100. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_64QAM - Low Channel, Port 1)



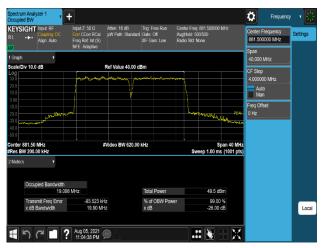




Plot 7-99. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_16QAM - Low Channel, Port 2)



Plot 7-101. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_256QAM - Low Channel, Port 0)

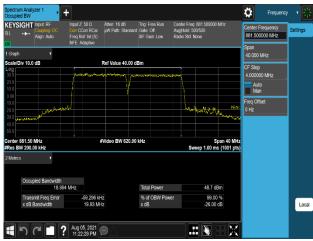


Plot 7-103. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_16QAM - Mid Channel, Port 1)

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Plot 7-104. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_64QAM - Mid Channel, Port 0)



Plot 7-106. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_QPSK - High Channel, Port 1)



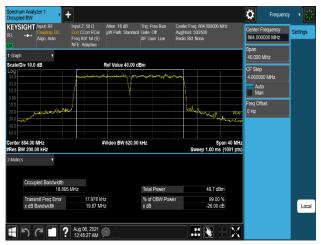
Plot 7-108. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_64QAM - High Channel, Port 0)



Plot 7-105. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_256QAM – Mid Channel, Port 3)



Plot 7-107. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_16QAM - High Channel, Port 1)



Plot 7-109. Occupied Bandwidth Plot (DSS_B5_10M+10M_2C_256QAM - High Channel, Port 1)

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KEYSIGHT

Div 10.0 dB

r 881.50 MHz BW 270.00 kH

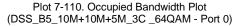
24.209 MHz

Aug 09, 2021 の 7:02:35 PM

| DSS | Channel | Port | OBW (MHz) | | | |
|-------------|---------|-------|-----------|-------|-------|--------|
| Ratio | Channel | POIL | QPSK | 16QAM | 64QAM | 256QAM |
| | LTE 5: | 0 | 24.20 | 24.05 | 24.23 | 24.17 |
| LTE 5: | | 1 | 24.17 | 24.01 | 24.21 | 24.19 |
| NR 5 Middle | 2 | 24.20 | 24.11 | 24.21 | 24.15 | |
| | | 3 | 24.18 | 24.08 | 24.21 | 24.13 |

Table 7-17. Occupied Bandwidth Summary Data (DSS_B5_10M+10M+5M_3C)





lue 40.00 dB

#Video BW 1.0000 MHz

Total Powe

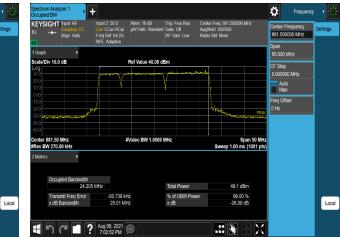
% of OBW Po x dB

Plot 7-112. Occupied Bandwidth Plot

(DSS_B5_10M+10M+5M_3C _64QAM - Port 2)



Plot 7-111. Occupied Bandwidth Plot (DSS_B5_10M+10M+5M_3C_64QAM - Port 1)



Plot 7-113. Occupied Bandwidth Plot (DSS_B5_10M+10M+5M_3C _64QAM - Port 3)

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Ö

Frequ

881.500000 MHz

50.000 MH

CF Step 5.000000 MHz

Auto Man

Freq Offset 0 Hz

Span 50 MH ep 1.00 ms (1001 pts

49.0 dBm

99.00 % -26.00 dB

 \square

...



7.3 Conducted Average Output Power §2.1046

Test Overview

A transmitter port of EUT is connected to the input of a signal analyzer. 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 Procedure Used

KDB 971168 D01 v03r01 – Section 5 KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements ANSI C63.26-2015 – Section 5.2.4.4.1

Test Setting

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The spectrum analyzer settings were as follows:

- 1. Conducted average output power measurements are performed using the signal analyzer's "channel power mode" measurement capability for signals with continuous operation.
- 2. Set span to $2 \times to 3 \times the OBW$.
- 3. Set RBW = 1 5% of the expected OBW
- 4. Set VBW \geq 3 × RBW.
- 5. Set number of measurement points in sweep $\geq 2 \times \text{span} / \text{RBW}$.
- 6. Sweep time:
 - a) Set \geq auto-couple, and enable trace averaging, or
 - b) Set ≥ [10 × (number of points in sweep) × (transmission symbol period)] and enable a single sweep (automation-compatible) measurement. The sweep time should never be faster than the auto-coupled sweep time.
- 7. Detector = power averaging (rms).
- 8. Set sweep trigger to "free run.".
- 9. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.
- 10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges.

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

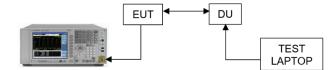


Figure 7-2. Test Instrument & Measurement Setup

Limit

N/A

Test Notes

- 1. The highest values are highlighted in the following tables. The plots are presented only for the highlighted values.
- 1. Consider the following factors for MIMO Output Power:
 - a) Conducted power for each port is measured in dBm.
 - Powers are summed up in linear using the measure-and-sum technique defined in KDB 662911 D01 v02r01-Section D.
 - c) Conducted power per port (dBm) is converted to a linear value (mW). A summation of linear powers for all ports gives us the total MIMO conducted power in milliWatts (mW). We convert this back to logarithmic scale (dBm).
- 2. Sample MIMO Calculation:
 - a. Conducted Average Power for Antenna 1: 40.15 dBm Conducted Average Power for Antenna 2: 40.03 dBm Conducted Average Power for Antenna 3: 40.04 dBm Conducted Average Power for Antenna 4: 40.02 dBm
 - b. (40.15 dBm + 40.03 dBm + 40.04 dBm + 40.02 dBm) = (10351.42 mW + 10069.32 mW + 10092.53 mW + 10046.16 mW) = 40559.43 mW = 46.08 dBm
 - c. Total MIMO Conducted Power as 40.56 Watts.

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| Low Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 40.15 | 40.12 | 40.30 | 40.15 |
| Conducted Average | 1 | 40.03 | 40.13 | 40.29 | 40.22 |
| Power (dBm) | 2 | 40.04 | 40.07 | 40.12 | 40.01 |
| | 3 | 40.02 | 40.20 | 40.34 | 40.35 |
| Total MIMO Conducted Power (mW) | | 40559.43 | 41217.80 | 42500.24 | 41733.36 |
| Total MIMO Conducted Power (dBm) | | 46.08 | 46.15 | 46.28 | 46.20 |

Table 7-18. Conducted Average Output Power Table (LTE_B5_5M_1C - Low Channel)

| Middle Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 40.15 | 40.06 | 40.09 | 40.08 |
| Conducted Average | 1 | 40.22 | 40.28 | 40.26 | 40.20 |
| Power (dBm) | 2 | 40.13 | 40.12 | 40.13 | 40.11 |
| | 3 | 40.34 | 40.36 | 40.23 | 40.27 |
| Total MIMO Conducted Power (mW) | | 41989.24 | 41949.49 | 41674.08 | 41555.15 |
| Total MIMO Conducted Power (dBm) | | 46.23 | 46.23 | 46.20 | 46.19 |

Table 7-19. Conducted Average Output Power Table (LTE_B5_5M_1C - Middle Channel)

| High Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 40.19 | 40.10 | 40.11 | 40.12 |
| Conducted Average | 1 | 40.27 | 40.28 | 40.16 | 40.21 |
| Power (dBm) | 2 | 40.27 | 40.17 | 40.23 | 40.14 |
| | 3 | 40.33 | 40.31 | 40.20 | 40.35 |
| Total MIMO Conducted Power (mW) | | 42519.53 | 42037.99 | 41646.96 | 41942.47 |
| Total MIMO Conducted Power (dBm) | | 46.29 | 46.24 | 46.20 | 46.23 |

Table 7-20. Conducted Average Output Power Table (LTE_B5_5M_1C - High Channel)

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| Low Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 39.93 | 39.85 | 39.85 | 39.81 |
| Conducted Average | 1 | 40.07 | 40.00 | 40.00 | 39.99 |
| Power (dBm) | 2 | 40.11 | 40.03 | 40.03 | 40.01 |
| | 3 | 40.01 | 40.03 | 39.96 | 39.97 |
| Total MIMO Conducted Power (mW) | | 40282.17 | 39799.14 | 39638.14 | 39503.15 |
| Total MIMO Conducted Power (dBm) | | 46.05 | 46.00 | 45.98 | 45.97 |

Table 7-21. Conducted Average Output Power Table (LTE_B5_10M_1C - Low Channel)

| Middle Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 39.81 | 40.09 | 40.00 | 39.97 |
| Conducted Average | 1 | 40.16 | 40.26 | 40.09 | 40.16 |
| Power (dBm) | 2 | 40.09 | 40.16 | 40.09 | 40.16 |
| | 3 | 40.09 | 40.39 | 40.03 | 40.05 |
| Total MIMO Conducted Power (mW) | | 40366.01 | 42141.20 | 40488.11 | 40797.52 |
| Total MIMO Conducted Power (dBm) | | 46.06 | 46.25 | 46.07 | 46.11 |

Table 7-22. Conducted Average Output Power Table (LTE_B5_10M_1C - Middle Channel)

| High Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 39.98 | 40.00 | 39.97 | 39.98 |
| Conducted Average | 1 | 40.12 | 40.20 | 40.13 | 40.12 |
| Power (dBm) | 2 | 40.15 | 40.15 | 40.16 | 40.15 |
| | 3 | 40.02 | 40.05 | 40.03 | 40.06 |
| Total MIMO Conducted Power (mW) | | 40631.80 | 40938.50 | 40679.62 | 40724.75 |
| Total MIMO Conducted Power (dBm) | | 46.09 | 46.12 | 46.09 | 46.10 |

Table 7-23. Conducted Average Output Power Table (LTE_B5_10M_1C - High Channel)

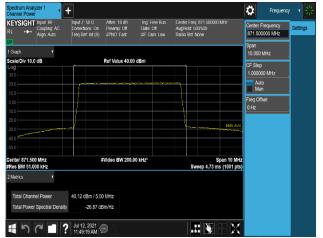
| FCC ID: A3LRF4442D-13B | | MEASUREMENT REPORT (CERTIFICATION) | SAMSUNG | Approved by: Technical Manager |
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| Spectrum Analyzer 1 Channel Power | | Amon. 417 (13) | In the local bar | Control or an A (DD) | 20 M In | 🔅 Freque | incy 🕴 🗦 |
|------------------------------------------|-----------------------|-------------------------------------------|----------------------------------------------|---------------------------------------------------------------|------------------------------|------------------------------------|----------|
| RL ++ Align: Auto | Corrections: On | Atten: 16 dB Preamp: Ott #PNO: Fast | Trig: Free Run Gate: Off #IF Gain: Low | Center Freq: 871 5000 Avg[Hold: 500/500 Radio Std: None | CU MH2 | Center Frequency 871.500000 MHz | Settings |
| UV 1 Giaph V | | | | | | Span 10.000 MHz | |
| Scale/Div 10.0 dB | | Ref Value 40.00 |) dBm | | | CF Step | |
| | | | | | | 1.000000 MHz Auto Man | |
| | | | | | | Freq Offset 0 Hz | |
| 20.0 | _ | | | | RMS AVG | | |
| -40.0 | | | | | | | |
| Center 871.500 MHz #Res BW 51.000 kHz | #/ | /ideo BW 200.0 | 00 kHz ^x | Sweep 4.73 | Span 10 MHz ms (1001 pts) | | |
| 2 Metrics 🔻 | | | | | | | |
| Total Channel Power | 40.30 dBm / 5.00 | MHz | | | | | |
| Total Power Spectral Densi | ity -26.69 dBr | n/Hz | | | | | |
| 1 7 7 1 | ? Jul 12, 2021 | | | | | | |

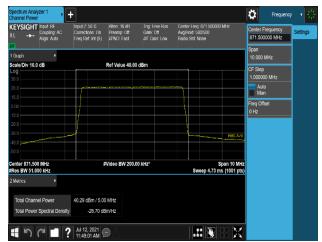
Plot 7-114. Conducted Average Output Power Plot (LTE_B5_5M_1C_64QAM - Low Channel, Port 0)



Plot 7-116. Conducted Average Output Power Plot (LTE_B5_5M_1C_64QAM - Low Channel, Port 2)



Plot 7-118. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK - Mid Channel, Port 0)



Plot 7-115. Conducted Average Output Power Plot (LTE_B5_5M_1C_64QAM - Low Channel, Port 1)



Plot 7-117. Conducted Average Output Power Plot (LTE_B5_5M_1C_64QAM - Low Channel, Port 3)



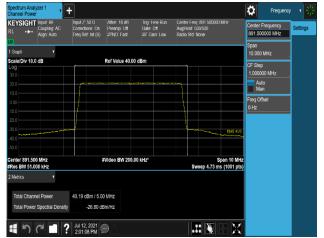
Plot 7-119. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK - Mid Channel, Port 1)

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| KEYSIGHT Input: RE RL ++ Couping: AC Align: Auto | Corrections: On Pre | amp:Off (| ing: Free Run Sate: Ott 4F Gain: Low | Center Freq Avg Hold: 50 Radio Std: N | | MH7 | Center Freq 881.50000 | | Settings |
|--------------------------------------------------------|-------------------------------------------|-----------------|--------------------------------------------|---------------------------------------------|------------|------------|--------------------------------------|-----|----------|
| 1 Graph V Scale/Div 10.0 dB | Ref | Value 40.00 dBr | n | | | | Span 10.000 MH | z | |
| 20.0 | | | | ~ | | | CF Step 1.000000 M Auto Man | /Hz | |
| | | | | | | | Freq Offset 0 Hz | | |
| 20.0 | | | | | | EMS AVO | | | |
| 50.0 Senter 881.500 MHz | #Vide | o BW 200.00 kł | łz ^x | | | an 10 MHz | | | |
| Res BW 51.000 kHz Metrics v | | | | Swe | ep 4.73 ms | (1001 pts) | | | |
| Total Channel Power Total Power Spectral Dens | 40.13 dBm / 5.00 MH; ity -26.86 dBm/H; | | | | | | | | |
| 190 | ? Jul 12, 2021 | A | | | | F M | | | |

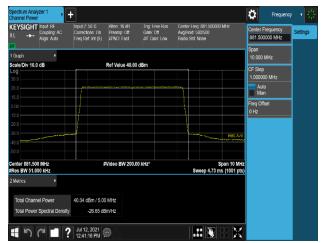
Plot 7-120. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK - Mid Channel, Port 2)



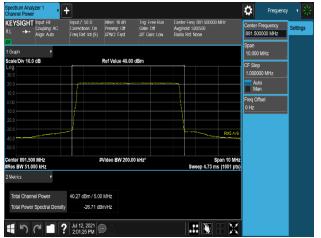
Plot 7-122. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK – High Channel, Port 0)



Plot 7-124. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK – High Channel, Port 2)



Plot 7-121. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK - Mid Channel, Port 3)



Plot 7-123. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK – High Channel, Port 1)



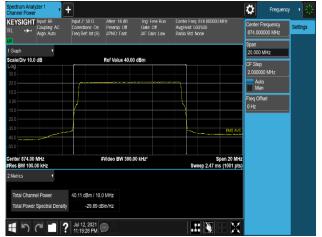
Plot 7-125. Conducted Average Output Power Plot (LTE_B5_5M_1C_QPSK – High Channel, Port 3)

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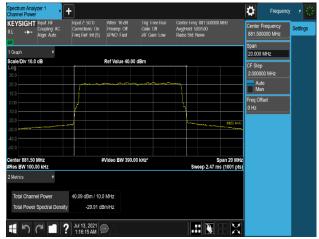


| KEYSIGHT Input: RE R L ↔ Align: Auto | Input Z: 50 0 Corrections: On Freq Ref: Int (S) | Atten: 16 dB Preamp: Otf #PNO: Fast | Ting: Free Run Gate: Off #IF Gain: Low | Center Freq: 874 00 Avg Hold: 500/500 Radio Std: None | ICCO MH2 | Center Frequency 874.000000 MHz | Settings |
|------------------------------------------------|-------------------------------------------------------|-------------------------------------------|----------------------------------------------|-------------------------------------------------------------|--------------------------------|------------------------------------|----------|
| 1 Graph v Scale/Div 10.0 dB | | Ref Value 40.00 | l dBm | | | Span 20.000 MHz CF Step | |
| 30.0 20.0 | | | | | | 2.000000 MHz Auto Man | |
| | | | | | | Freq Offset 0 Hz | |
| 20.0 | | | | | RMS AVG | | |
| 50.0 Center 874.00 MHz Res BW 100.00 KHz | | FVideo BW 390.0 | 00 kHz* | Sweep 2.4 | Span 20 MHz 7 ms (1001 pts) | | |
| 2 Metrics | 39.93 dBm / 10. | | | | | | |
| Total Power Spectral De | | | | | | | |
| 4 h C - | Jul 12, 2021 11:18:53 PM | ÐA | | | | | |

Plot 7-126. Conducted Average Output Power Plot (LTE_B5_10M_1C_QPSK - Low Channel, Port 0)



Plot 7-128. Conducted Average Output Power Plot (LTE_B5_10M_1C_QPSK - Low Channel, Port 2)



lot 7-130. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM – Mid Channel, Port 0)



Plot 7-127. Conducted Average Output Power Plot (LTE_B5_10M_1C_QPSK - Low Channel, Port 1)



Plot 7-129. Conducted Average Output Power Plot (LTE_B5_10M_1C_QPSK - Low Channel, Port 3)



Plot 7-131. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM – Mid Channel, Port 1)

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| I Graph Scale/Div 10.0 dB .0g .0g .0g .0g .0g .0g .0g .0 | Ref Value 4 | 0.00 dBm | | Span 20.000 MHz CF Step 2.000000 MH Auto Man | łz |
|--------------------------------------------------------------------|---------------------------------------|------------|----------------------|-------------------------------------------------------------|----|
| 0.0 | | | | Auto | łz |
| | | | | | |
| | <u>/</u> | | -\ | Freq Offset 0 Hz | |
| 0.0 | | | | FINS AV46 | |
| 50.0 | | | | | |
| enter 881.50 MHz Res BW 100.00 kHz | #Video BW 3 | 90.00 kHz* | Spa Sweep 2.47 ms | an 20 MHz (1001 pts) | |
| Metrics v | | | | | |
| Total Channel Power | 40.16 dBm / 10.0 MHz -29.84 dBm/Hz | | | | |
| | Jul 13, 2021 | | .:: 🔖 - | EX | |

Plot 7-132. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM - Mid Channel, Port 2)



Plot 7-134. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM - High Channel, Port 0)



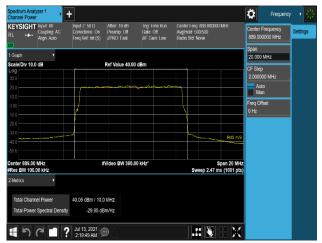
Plot 7-136. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM - High Channel, Port 2)

| EYSIGHT Input: RF Coupling: AC Align: Auto | Input Z' 50 0 Corrections: On Freq Ref: Int (S) | Atten: 16 dB Preamp: Off #PNO: Fast | Trig: Free Run Gate: Ott AIF Gain: Low | Center Freq: 881 500000 MHz Avg[Hold: 500/500 Radio Std: None | Center Frequency 881.500000 MHz Soan |
|--------------------------------------------------|-------------------------------------------------------|-------------------------------------------|----------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------|
| Graph v cale/Div 10.0 dB 0 0 0 0 | | Ref Value 40.00 |) dBm | | 20.000 MHz CF Step 2.000000 MHz Auto |
| | | | | | Man Freq Offset 0 Hz |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | Video BW 390.0 | 00 kHz* | FMS Span 20 l | Andrea MHZ |
| Res BW 100.00 kHz Metrics • | 40.39 dBm / 10. | | | Sweep 2.47 ms (1001 | |

Plot 7-133. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM - Mid Channel, Port 3)



Plot 7-135. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM - High Channel, Port 1)



Plot 7-137. Conducted Average Output Power Plot (LTE_B5_10M_1C_16QAM - High Channel, Port 3)

| FCC ID: A3LRF4442D-13B | | MEASUREMENT REPORT (CERTIFICATION) | SAMSUNG | Approved by: Technical Manager |
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| Low Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|------------------------------------|----------------------------|----------|----------|----------|----------|
| | 0 | 40.03 | 39.95 | 39.93 | 39.94 |
| Conducted Average | 1 | 39.94 | 39.94 | 39.95 | 40.02 |
| Power (dBm) | 2 | 40.18 | 40.12 | 40.17 | 40.14 |
| | 3 | 39.76 | 39.74 | 39.74 | 39.78 |
| Total MIMO Conducted Power (mW) | | 39817.66 | 39447.38 | 39543.74 | 39742.61 |
| Total MIMO Conducte (dBm) | Total MIMO Conducted Power | | 45.96 | 45.97 | 45.99 |

Table 7-24. Conducted Average Output Power Table (LTE_B5_5M+5M_2C - Low Channel)

| Middle Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 39.88 | 39.86 | 39.82 | 39.90 |
| Conducted Average Power (dBm) 2 | 1 | 40.08 | 40.12 | 40.14 | 40.07 |
| | 2 | 40.26 | 40.22 | 40.24 | 40.23 |
| | 3 | 39.91 | 39.81 | 39.82 | 39.90 |
| Total MIMO Conducted Power (mW) | | 40325.24 | 40054.50 | 40083.80 | 40251.10 |
| Total MIMO Conducted Power (dBm) | | 46.06 | 46.03 | 46.03 | 46.05 |

Table 7-25. Conducted Average Output Power Table (LTE_B5_5M+5M_2C - Middle Channel)

| High Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 39.98 | 39.91 | 40.00 | 39.96 |
| Conducted Average | 1 | 40.14 | 40.14 | 40.19 | 40.10 |
| Power (dBm) | 2 | 40.29 | 40.31 | 40.27 | 40.21 |
| | 3 | 39.92 | 39.92 | 39.98 | 39.88 |
| Total MIMO Conducted Power (mW) | | 40789.70 | 40679.89 | 41042.69 | 40364.15 |
| Total MIMO Conducted Power (dBm) | | 46.11 | 46.09 | 46.13 | 46.06 |

Table 7-26. Conducted Average Output Power Table (LTE_B5_5M+5M_2C - High Channel)

| FCC ID: A3LRF4442D-13B | | MEASUREMENT REPORT (CERTIFICATION) | SAMSUNG | Approved by: Technical Manager | |
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| Low Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| Conducted Average Power (dBm) | 0 | 39.99 | 39.94 | 40.01 | 39.99 |
| | 1 | 40.07 | 40.02 | 40.02 | 40.12 |
| | 2 | 40.25 | 40.20 | 40.22 | 40.22 |
| | 3 | 39.79 | 39.83 | 39.80 | 39.85 |
| Total MIMO Conducted Power (mW) | | 40259.99 | 39996.36 | 40138.75 | 40437.29 |
| Total MIMO Conducted Power (dBm) | | 46.05 | 46.02 | 46.04 | 46.07 |

Table 7-27. Conducted Average Output Power Table (LTE_B5_10M+10M_2C - Low Channel)

| Middle Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 39.79 | 39.77 | 39.86 | 39.84 |
| Conducted Average | 1 | 40.14 | 40.06 | 40.16 | 40.10 |
| Power (dBm) | 2 | 40.23 | 40.26 | 40.34 | 40.24 |
| | 3 | 39.89 | 39.85 | 39.90 | 39.83 |
| Total MIMO Conducted Power (mW) | | 40149.34 | 39900.76 | 40644.77 | 40055.52 |
| Total MIMO Conducted Power (dBm) | | 46.04 | 46.01 | 46.09 | 46.03 |

Table 7-28. Conducted Average Output Power Table (LTE_B5_10M+10M_2C - Middle Channel)

| High Channel | Port | QPSK | 16QAM | 64QAM | 256QAM |
|-------------------------------------|------|----------|----------|----------|----------|
| | 0 | 39.85 | 39.85 | 39.90 | 39.84 |
| Conducted Average | 1 | 40.17 | 40.14 | 40.14 | 40.22 |
| Power (dBm) | 2 | 40.28 | 40.25 | 40.25 | 40.29 |
| | 3 | 39.88 | 39.94 | 39.91 | 39.91 |
| Total MIMO Conducted Power (mW) | | 40453.14 | 40443.45 | 40487.42 | 40643.36 |
| Total MIMO Conducted Power (dBm) | | 46.07 | 46.07 | 46.07 | 46.09 |

Table 7-29. Conducted Average Output Power Table (LTE_B5_10M+10M_2C - High Channel)

| FCC ID: A3LRF4442D-13B | | MEASUREMENT REPORT (CERTIFICATION) | SAMSUNG | Approved by: Technical Manager | |
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Plot 7-138. Conducted Average Output Power Plot (LTE_B5_5M+5M_2C_QPSK - Low Channel, Port 0)



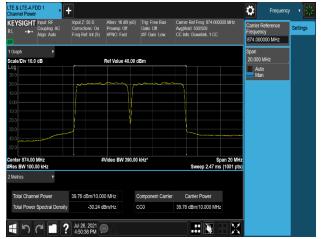
Plot 7-140. Conducted Average Output Power Plot (LTE_B5_5M+5M_2C_QPSK - Low Channel, Port 2)



Plot 7-142. Conducted Average Output Power Plot (LTE_B5_5M+5M_2C_QPSK - Mid Channel, Port 0)



Plot 7-139. Conducted Average Output Power Plot (LTE_B5_5M+5M_2C_QPSK - Low Channel, Port 1)



Plot 7-141. Conducted Average Output Power Plot (LTE_B5_5M+5M_2C_QPSK - Low Channel, Port 3)



Plot 7-143. Conducted Average Output Power Plot (LTE_B5_5M+5M_2C_QPSK - Mid Channel, Port 1)

| FCC ID: A3LRF4442D-13B | | MEASUREMENT REPORT (CERTIFICATION) | SAMSUNG | Approved by: Technical Manager | |
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