



| 10494 / 10495 / 10496 / 10497 / 10497 | AAF AAF AAA AAA   | Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | LTE-TDD  LTE-TDD  LTE-TDD  LTE-TDD  LTE-TDD | 8.55<br>7.74<br>8.37<br>8.54 | ± 9.6 %<br>± 9.6 %<br>± 9.6 %<br>± 9.6 % |
|---------------------------------------|-------------------|---|---|------------------------------|--|
| 10495 A<br>10496 A<br>10497 A         | AAF<br>AAA<br>AAA | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)<br>LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)<br>LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)<br>LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)  | LTE-TDD                                     | 8.37                         | ± 9.6 %                                  |
| 10496 A                               | AAF<br>AAA<br>AAA | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)  | LTE-TDD                                     |                              |  |
| 10497                                 | AAA<br>AAA        | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)<br>LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)  |   | 8.54                         | ± 9.6 %                                  |
|                                       | AAA               | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)  | LTE-TDD                                     |                              |  |
| 10498                                 |                   | Subframe=2,3,4,7,8,9)   | AMOSSOCIATE VOLUMESON                       | 7.67                         | ± 9.6 %                                  |
|                                       |                   | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL  | LTE-TDD                                     | 8.40                         | ± 9.6 %                                  |
| 10499                                 |                   | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL  | LTE-TDD                                     | 8.68                         | ± 9.6 %                                  |
|                                       | AAB               | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL  | LTE-TDD                                     | 7.67                         | ± 9.6 %                                  |
|                                       |                   | Subframe=2,3,4,7,8,9)   |   | 1130000                      | 14 200000 3000                           |
|                                       | AAB               | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD                                     | 8.44                         | ± 9.6 %                                  |
|                                       | AAB               | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD                                     | 8.52                         | ± 9.6 %                                  |
| 10503                                 | AAE               | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD                                     | 7.72                         | ± 9.6 %                                  |
| 10504                                 | AAE               | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD                                     | 8.31                         | ± 9.6 %                                  |
| 10505                                 | AAE               | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD                                     | 8.54                         | ± 9.6 %                                  |
| 10506                                 | AAE               | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL   | LTÉ-TDD                                     | 7.74                         | ± 9.6 %                                  |
| 10507                                 | AAE               | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL   | LTE-TDD                                     | 8.36                         | ± 9.6 %                                  |
| 10508                                 | AAE               | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL   | LTE-TDD                                     | 8.55                         | ± 9.6 %                                  |
| 10509                                 | AAE               | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL   | LTE-TDD                                     | 7.99                         | ± 9.6 %                                  |
| 10510                                 | AAE               | Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL  | LTE-TDD                                     | 8.49                         | ± 9.6 %                                  |
| 10511                                 | AAE               | Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL  | LTE-TDD                                     | 8.51                         | ± 9.6 %                                  |
| 10512                                 | AAF               | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL   | LTE-TDD                                     | 7.74                         | ± 9.6 %                                  |
|                                       | AAF               | Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL   | LTE-TDD                                     | 8.42                         | ± 9.6 %                                  |
|                                       |                   | Subframe=2,3,4,7,8,9)   | LTE-TDD                                     | 8.45                         |  |
|                                       | AAF               | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   |   |                              | ± 9.6 %                                  |
|                                       | AAA               | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)   | WLAN  | 1.58                         | ± 9.6 %                                  |
|                                       | AAA               | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)   | WLAN  | 1.57                         | ± 9.6 %                                  |
|                                       | AAA               | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)  | WLAN  | 1.58                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)   | WLAN  | 8.23                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)  | WLAN  | 8.39                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)  | WLAN  | 8.12                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)  | WLAN  | 7.97                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)  | WLAN  | 8.45                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)  | WLAN  | 8.08                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)  | WLAN  | 8.27                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)   | WLAN  | 8.36                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)   | WLAN  | 8.42                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)   | WLAN  | 8.21                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)   | WLAN  | 8.36                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)   | WLAN  | 8.36                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)   | WLAN  | 8.43                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)   | WLAN  | 8.29                         | ± 9.6 %                                  |
|                                       | AAB               | IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)   | WLAN  | 8.38                         | ± 9.6 %                                  |
| 10534                                 | AAB               | IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)   | WLAN  | 8.45                         | ± 9.6 %                                  |

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| 10535 | AAB | IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)                      | WLAN | 8.45 | ± 9.6 % |
|-------|-----|--|------|------|---------|
| 10536 | AAB | IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)                      | WLAN | 8.32 | ± 9.6 % |
| 10537 | AAB | IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)                      | WLAN | 8.44 | ± 9.6 % |
| 10538 | AAB | IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)                      | WLAN | 8.54 | ± 9.6 % |
| 10540 | AAB | IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)                      | WLAN | 8.39 | ± 9.6 % |
| 0541  | AAB | IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)                      | WLAN | 8.46 | ± 9.6 % |
| 0542  | AAB | IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)                      | WLAN | 8.65 | ± 9.6 % |
| 10543 | AAB | IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)                      | WLAN | 8.65 | ± 9.6 % |
| 0544  | AAB | IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)                      | WLAN | 8.47 | ± 9.6 % |
| 10545 | AAB | IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)                      | WLAN | 8.55 | ± 9.6 % |
| 10546 | AAB | IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)                      | WLAN | 8.35 | ± 9.6 % |
| 0547  | AAB | IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)                      | WLAN | 8.49 | ± 9.6 % |
| 0548  | AAB | IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)                      | WLAN | 8.37 | ± 9.6 % |
| 10550 | AAB | IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)                      | WLAN | 8.38 | ± 9.6 % |
| 0551  | AAB | IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)                      | WLAN | 8.50 | ± 9.6 % |
| 0552  | AAB | IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)                      | WLAN | 8.42 | ± 9.6 % |
| 0553  | AAB | IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)                      | WLAN | 8.45 | ± 9.6 % |
| 0554  | AAC | IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)                     | WLAN | 8.48 | ± 9.6 % |
| 0555  | AAC | IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)                     | WLAN | 8.47 | ± 9.6 % |
| 10556 | AAC | IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)                     | WLAN | 8.50 | ± 9.6 % |
| 10557 | AAC | IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)                     | WLAN | 8.52 | ± 9.6 % |
| 10558 | AAC | IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)                     | WLAN | 8.61 | ± 9.6 % |
| 10560 | AAC | IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)                     | WLAN | 8.73 | ± 9.6 % |
| 10561 | AAC | IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)                     | WLAN | 8.56 | ± 9.6 % |
| 10562 |     |  | WLAN | 8.69 | ± 9.6 % |
|       | AAC | IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)                     | WLAN |      |         |
| 10563 | AAC | IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)                     | WLAN | 8.77 | ± 9.6 % |
| 10564 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)         | WLAN | 8.25 | ± 9.6 % |
| 10565 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)        | WLAN | 8.45 | ± 9.6 % |
| 10566 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty               | WLAN | 8.13 | ± 9.6 % |
| 10567 | AAA | cycle) IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle) | WLAN | 8.00 | ± 9.6 % |
| 10568 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)        | WLAN | 8.37 | ± 9.6 % |
| 10569 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)        | WLAN | 8.10 | ± 9.6 % |
| 10570 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)        | WLAN | 8.30 | ± 9.6 % |
| 10571 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)              | WLAN | 1.99 | ± 9.6 % |
| 10572 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)              | WLAN | 1.99 | ± 9.6 % |
| 10573 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)            | WLAN | 1.98 | ± 9.6 % |
| 10574 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)             | WLAN | 1.98 | ± 9.6 % |
| 10575 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)         | WLAN | 8.59 | ± 9.6 % |
| 10576 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)         | WLAN | 8.60 | ± 9.6 % |
| 10577 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)        | WLAN | 8.70 | ± 9.6 % |
| 10578 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)        | WLAN | 8.49 | ± 9.6 % |
| 10579 | AAA | IÉEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)        | WLAN | 8.36 | ± 9.6 % |
| 10580 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)        | WLAN | 8.76 | ± 9.6 % |
| 10581 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)        | WLAN | 8.35 | ± 9.6 % |
| 10582 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)        | WLAN | 8.67 | ± 9.6 % |
| 10583 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)              | WLAN | 8.59 | ± 9.6 9 |
| 10584 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)              | WLAN | 8.60 | ± 9.6 9 |
| 10585 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)             | WLAN | 8.70 | ± 9.6 9 |
| 10586 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)             | WLAN | 8.49 | ± 9.6 9 |
| 10587 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)             | WLAN | 8.36 | ± 9.6 9 |

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| 10588          | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle) | WLAN     | 8.76  | ± 9.6 % |
|----------------|-----|--|----------|-------|---------|
| 10589          | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle) | WLAN     | 8.35  | ± 9.6 % |
| 10590          | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle) | WLAN     | 8.67  | ± 9.6 % |
| 10591          | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)      | WLAN     | 8.63  | ± 9.6 % |
| 10592          | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)      | WLAN     | 8.79  | ± 9.6 % |
| 10593          | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty, cycle)     | WLAN     | 8.64  | ± 9.6 % |
| 0594           | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty_cycle)      | WLAN     | 8.74  | ± 9.6 % |
| 10595          | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)      | WLAN     | 8.74  | ± 9.6 % |
|                |     | IEEE 802.11n (HT Mixed, 20MHz, MCS4, 30pc duty cycle)      | WLAN     | 8.71  | ± 9.6 % |
| 0596           | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)      | WLAN     | 8.72  | ± 9.6 % |
| 10597          | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc daty cycle)      | WLAN     | 8.50  | ± 9.6 % |
| 10598          | AAB |  | WLAN     | 8.79  | ± 9.6 % |
| 10599          | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)      | WLAN     |       | ± 9.6 % |
| 10600          | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)      |          | 8.88  | ± 9.6 % |
| 10601          | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)      | WLAN     | 8.82  |         |
| 10602          | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)      | WLAN     | 8.94  | ± 9.6 % |
| 0603           | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)      | WLAN     | 9.03  | ± 9.6 % |
| 0604           | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)      | WLAN     | 8.76  | ± 9.6 % |
| 0605           | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)      | WLAN     | 8.97  | ± 9.6 % |
| 0606           | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)      | WLAN     | 8.82  | ± 9.6 % |
| 0607           | AAB | IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)          | WLAN     | 8.64  | ± 9.6 % |
| 0608           | AAB | IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)          | WLAN     | 8.77  | ± 9.6 9 |
| 10609          | AAB | IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)          | WLAN     | 8.57  | ± 9.6 9 |
| 10610          | AAB | IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)          | WLAN     | 8.78  | ± 9.6 9 |
| 10611          | AAB | IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)          | WLAN     | 8.70  | ± 9.6 9 |
| 10612          | AAB | IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)          | WLAN     | 8.77  | ± 9.6 9 |
| 10613          | AAB | IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)          | WLAN     | 8.94  | ± 9.6 9 |
| 10614          | AAB | IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)          | WLAN     | 8.59  | ± 9.6   |
| 0615           | AAB | IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)          | WLAN     | 8.82  | ± 9.6 9 |
| 10616          | AAB | IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)          | WLAN     | 8.82  | ± 9.6 9 |
| 10617          | AAB | IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)          | WLAN     | 8.81  | ± 9.6 9 |
| 10618          | AAB | IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)          | WLAN     | 8.58  | ± 9.6   |
| 10619          | AAB | IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)          | WLAN     | 8.86  | ± 9.6   |
| 10620          | AAB | IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)          | WLAN     | 8.87  | ± 9.6   |
| 10621          | AAB | IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)          | WLAN     | 8.77  | ± 9.6   |
| 10622          | AAB | IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)          | WLAN     | 8.68  | ± 9.6 9 |
| 10623          | AAB | IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)          | WLAN     | 8.82  | ± 9.6   |
| 10623          |     | IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)          | WLAN     | 8.96  | ± 9.6   |
|                | AAB |  | WLAN     | 8.96  | ± 9.6   |
| 10625          | AAB | IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)          | WLAN     | 8.83  | ± 9.6 9 |
| 10626          | AAB | IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)          |          |       |         |
| 10627          | AAB | IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)          | WLAN     | 8.88  | ± 9.6 ° |
| 10628          | AAB | IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)          | WLAN     | 8.71  | ± 9.6 ° |
| 10629          | AAB | IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)          | WLAN     | 8.85  | ± 9.6   |
| 10630          | AAB | IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)          | WLAN     | 8.72  | ± 9.6   |
| 10631          | AAB | IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)          | WLAN     | 8.81  | ± 9.6 ° |
| 10632          | AAB | IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)          | WLAN     | 8.74  | ± 9.6   |
| 10633          | AAB | IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)          | WLAN     | 8.83  | ± 9.6   |
| 10634          | AAB | IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)          | WLAN     | 8.80  | ± 9.6   |
| 10635          | AAB | IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)          | WLAN     | 8.81  | ± 9.6   |
| 10636          | AAC | IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         | WLAN     | 8.83  | ± 9.6   |
| 10637          | AAC | IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         | WLAN     | 8.79  | ± 9.6   |
| 10638          | AAC | IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         | WLAN     | 8.86  | ± 9.6   |
| 10639          | AAC | IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         | WLAN     | 8.85  | ± 9.6   |
| 10640          | AAC | IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         | WLAN     | 8.98  | ± 9.6   |
| 10641          | AAC | IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         | WLAN     | 9.06  | ± 9.6   |
| 0642           | AAC | IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         | WLAN     | 9.06  | ± 9.6   |
| 10643          | AAC | IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         | WLAN     | 8.89  | ± 9.6   |
| 10644          | AAC | IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         | WLAN     | 9.05  | ± 9.6   |
| 10645          | AAC | IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         | WLAN     | 9.11  | ± 9.6   |
| 10646          | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)      | LTE-TDD  | 11.96 | ± 9.6   |
|                |     | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,7)      | LTE-TDD  | 11.96 | ± 9.6   |
| 10647          | AAF |  | CDMA2000 | 3.45  | ± 9.6   |
| 10648<br>10652 | AAA | CDMA2000 (1x Advanced)                                     | LTE-TDD  | 6.91  |         |
|                | AAD | LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)             |          |       | ± 9.6   |
| 10653          | AAD | LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)            | LTE-TDD  | 7.42  | ± 9.6   |

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| 10655          | AAE | LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)   | LTE-TDD      | 7.21         | ± 9.6 % |
|----------------|-----|---|--------------|--------------|---------|
| 10658          | AAA | Pulse Waveform (200Hz, 10%)   | Test         | 10.00        | ± 9.6 % |
| 10659          | AAA | Pulse Waveform (200Hz, 20%)   | Test         | 6.99         | ± 9.6 % |
| 10660          | AAA | Pulse Waveform (200Hz, 40%)   | Test         | 3.98         | ± 9.6 % |
| 10661          | AAA | Pulse Waveform (200Hz, 60%)   | Test         | 2.22         | ± 9.6 % |
| 10662          | AAA | Pulse Waveform (200Hz, 80%)   | Test         | 0.97         | ± 9.6 % |
| 10670          | AAA | Bluetooth Low Energy  | Bluetooth    | 2.19         | ± 9.6 % |
| 10671          | AAA | IEEE 802.11ax (20MHz, MCS0, 90pc duty cycle)  | WLAN         | 9.09         | ± 9.6 % |
| 10672          | AAA | IEEE 802.11ax (20MHz, MCS1, 90pc duty cycle)  | WLAN         | 8.57         | ± 9.6 % |
| 10673          | AAA | IEEE 802.11ax (20MHz, MCS2, 90pc duty cycle)  | WLAN         | 8.78         | ± 9.6 % |
| 10674          | AAA | IEEE 802.11ax (20MHz, MCS3, 90pc duty cycle)  | WLAN         | 8.74         | ± 9.6 % |
| 10675          | AAA | IEEE 802.11ax (20MHz, MCS4, 90pc duty cycle)  | WLAN         | 8.90         | ± 9.6 % |
| 10676          | AAA | IEEE 802.11ax (20MHz, MCS5, 90pc duty cycle)  | WLAN         | 8.77         | ± 9.6 % |
| 10677          | AAA | IEEE 802.11ax (20MHz, MCS6, 90pc duty cycle)  | WLAN         | 8.73         | ± 9.6 % |
| 10678          | AAA | IEEE 802.11ax (20MHz, MCS7, 90pc duty cycle)  | WLAN         | 8.78         | ± 9.6 % |
| 10679          | AAA | IEEE 802.11ax (20MHz, MCS8, 90pc duty cycle)  | WLAN         | 8.89         | ± 9.6 % |
| 10680          | AAA | IEEE 802.11ax (20MHz, MCS9, 90pc duty cycle)  | WLAN         | 8.80         | ± 9.6 % |
| 10681          | AAA | IEEE 802.11ax (20MHz, MCS10, 90pc duty cycle)   | WLAN         | 8.62         | ± 9.6 % |
| 10682          | AAA | IEEE 802.11ax (20MHz, MCS11, 90pc duty cycle)   | WLAN         | 8.83         | ± 9.6 % |
| 10683          | AAA | IEEE 802.11ax (20MHz, MCS0, 99pc duty cycle)  | WLAN         | 8.42         | ± 9.6 % |
| 10684          | AAA | IEEE 802.11ax (20MHz, MCS1, 99pc duty cycle)  | WLAN         | 8.26         | ± 9.6 % |
| 10685          | AAA | IEEE 802.11ax (20MHz, MCS2, 99pc duty cycle)  | WLAN         | 8.33         | ± 9.6 % |
| 10686          | AAA | IEEE 802.11ax (20MHz, MCS3, 99pc duty cycle)  | WLAN         | 8.28         | ± 9.6 % |
| 10687          | AAA | IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)  | WLAN         | 8.45         | ± 9.6 % |
| 10688          | AAA | IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)  | WLAN         | 8.29         | ± 9.6 % |
| 10689          | AAA | IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)  | WLAN         | 8.55         | ± 9.6 % |
| 10690          | AAA | IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle)  | WLAN         | 8.29         | ± 9.6 % |
| 10691          | AAA | IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)  | WLAN         | 8.25         | ± 9.6 % |
| 10692          | AAA | IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)  | WLAN         | 8.29         | ± 9.6 % |
| 10693          | AAA | IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)   | WLAN         | 8.25         | ± 9.6 % |
| 10694          | AAA | IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)   | WLAN         | 8.57         | ± 9.6 % |
| 10695          | AAA | IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)  | WLAN         | 8.78         | ± 9.6 % |
| 10696          | AAA | IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)  | WLAN         | 8.91         | ± 9.6 % |
| 10697          | AAA | IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)  | WLAN         | 8.61         | ± 9.6 % |
| 10698          | AAA | IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)  | WLAN         | 8.89         | ± 9.6 % |
| 10699          | AAA | IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)  | WLAN         | 8.82         | ± 9.6 % |
| 10700          | AAA | IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)  | WLAN         | 8.73         | ± 9.6 % |
| 10701          | AAA | IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)  | WLAN         | 8.86         | ± 9.6 % |
| 10702          | AAA | IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)  | WLAN         | 8.70         | ± 9.6 % |
| 10703          | AAA | IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)  | WLAN         | 8.82         | ± 9.6 % |
| 10704          | AAA | IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)  | WLAN         | 8.56         | ± 9.6 % |
| 10705          | AAA | IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)   | WLAN         | 8.69         | ± 9.6 % |
| 10706          | AAA | IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)   | WLAN         | 8.66         | ± 9.6 % |
| 10707          | AAA | IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)  | WLAN         | 8.32         | ± 9.6 % |
| 10708          | AAA | IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)  | WLAN         | 8.55         | ± 9.6 % |
| 10709          | AAA | IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)  | WLAN         | 8.33         | ± 9.6 % |
| 10710          | AAA | IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)  | WLAN         | 8.29         | ± 9.6 % |
| 10711          | AAA | IEEE 802.11ax (40MHz, MCS4, 99pc duty cycle)  | WLAN         | 8.39         | ± 9.6 % |
| 10712          | AAA | IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)  | WLAN         | 8.67         | ± 9.6 % |
| 10713          | AAA | IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)  | WLAN         | 8.33         | ± 9.6 % |
| 10714          | AAA | IEEE 802.11ax (40MHz, MCS7, 99pc duty cycle)  | WLAN<br>WLAN | 8.26         | ± 9.6 % |
| 10715          | AAA | IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)  |              | 8.45         | ± 9.6 % |
| 10716          | AAA | IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)  | WLAN         | 8.30         | ± 9.6 % |
| 10717          | AAA | IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)   | WLAN<br>WLAN | 8.48<br>8.24 | ± 9.6 % |
| 10718          | AAA | IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)   | WLAN         | 8.81         | ± 9.6 % |
| 10719          | AAA | IEEE 802.11ax (80MHz, MCS0, 90pc duty cycle) IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle) | WLAN         | 8.87         | ± 9.6 % |
| 10720          | AAA | IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)  | WLAN         | 8.76         | ± 9.6 % |
| 10721<br>10722 | AAA | IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)  | WLAN         | 8.55         | ± 9.6 % |
| 10722          | AAA | IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)  | WLAN         | 8.70         | ± 9.6 % |
| 10723          | AAA | IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)  | WLAN         | 8.90         | ± 9.6 % |
| 10724          | AAA | IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)  | WLAN         | 8.74         | ± 9.6 % |
| 10725          | AAA | IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)  | WLAN         | 8.72         | ± 9.6 % |
| 10726          | AAA | IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)  | WLAN         | 8.66         | ± 9.6 % |
|                |     |   | A 4 1 1 1 A  |              |         |

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| 10728 | AAA | IEEE 802.11ax (80MHz, MCS9, 90pc duty cycle)   | WLAN | 8.65 | ± 9.6 % |
|-------|-----|--|------|------|---------|
| 10729 | AAA | IEEE 802.11ax (80MHz, MCS10, 90pc duty cycle)  | WLAN | 8.64 | ± 9.6 % |
| 10730 | AAA | IEEE 802.11ax (80MHz, MCS11, 90pc duty cycle)  | WLAN | 8.67 | ± 9.6 % |
| 10731 | AAA | IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)   | WLAN | 8.42 | ± 9.6 % |
| 10732 | AAA | IEEE 802.11ax (80MHz, MCS1, 99pc duty cycle)   | WLAN | 8.46 | ± 9.6 % |
| 10733 | AAA | IEEE 802.11ax (80MHz, MCS2, 99pc duty cycle)   | WLAN | 8.40 | ± 9.6 % |
| 10734 | AAA | IEEE 802.11ax (80MHz, MCS3, 99pc duty cycle)   | WLAN | 8.25 | ± 9.6 % |
| 10735 | AAA | IEEE 802.11ax (80MHz, MCS4, 99pc duty cycle)   | WLAN | 8.33 | ± 9.6 % |
| 10736 | AAA | IEEE 802.11ax (80MHz, MCS5, 99pc duty cycle)   | WLAN | 8.27 | ± 9.6 % |
| 10737 | AAA | IEEE 802.11ax (80MHz, MCS6, 99pc duty cycle)   | WLAN | 8.36 | ± 9.6 % |
| 10738 | AAA | IEEE 802.11ax (80MHz, MCS7, 99pc duty cycle)   | WLAN | 8.42 | ± 9.6 % |
| 10739 | AAA | IEEE 802.11ax (80MHz, MCS8, 99pc duty cycle)   | WLAN | 8.29 | ± 9.6 % |
| 10740 | AAA | IEEE 802.11ax (80MHz, MCS9, 99pc duty cycle)   | WLAN | 8.48 | ± 9.6 % |
| 10741 | AAA | IEEE 802.11ax (80MHz, MCS10, 99pc duty cycle)  | WLAN | 8.40 | ± 9.6 % |
| 10742 | AAA | IEEE 802.11ax (80MHz, MCS11, 99pc duty cycle)  | WLAN | 8.43 | ± 9.6 % |
| 10743 | AAA | IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)  | WLAN | 8.94 | ± 9.6 % |
| 10744 | AAA | IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)  | WLAN | 9.16 | ± 9.6 % |
| 10745 | AAA | IEEE 802.11ax (160MHz, MCS2, 90pc duty cycle)  | WLAN | 8.93 | ± 9.6 % |
| 10746 | AAA | IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)  | WLAN | 9.11 | ± 9.6 % |
| 10747 | AAA | IEEE 802.11ax (160MHz, MCS4, 90pc duty cycle)  | WLAN | 9.04 | ± 9.6 % |
| 10748 | AAA | IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)  | WLAN | 8.93 | ± 9.6 % |
| 10749 | AAA | IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)  | WLAN | 8.90 | ± 9.6 % |
| 10750 | AAA | IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)  | WLAN | 8.79 | ± 9.6 % |
| 10751 | AAA | IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)  | WLAN | 8.82 | ± 9.6 % |
| 10752 | AAA | IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)  | WLAN | 8.81 | ± 9.6 % |
| 10753 | AAA | IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle) | WLAN | 9.00 | ± 9.6 % |
| 10754 | AAA | IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle) | WLAN | 8.94 | ± 9.6 % |
| 10755 | AAA | IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)  | WLAN | 8.64 | ± 9.6 % |
| 10756 | AAA | IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)  | WLAN | 8.77 | ± 9.6 % |
| 10757 | AAA | IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)  | WLAN | 8.77 | ± 9.6 % |
| 10758 | AAA | IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)  | WLAN | 8.69 | ± 9.6 % |
| 10759 | AAA | IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)  | WLAN | 8.58 | ± 9.6 % |
| 10760 | AAA | IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)  | WLAN | 8.49 | ± 9.6 % |
| 10761 | AAA | IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)  | WLAN | 8.58 | ± 9.6 % |
| 10762 | AAA | IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)  | WLAN | 8.49 | ± 9.6 % |
| 10763 | AAA | IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)  | WLAN | 8.53 | ± 9.6 % |
| 10764 | AAA | IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)  | WLAN | 8.54 | ± 9.6 % |
| 10765 | AAA | IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle) | WLAN | 8.54 | ± 9.6 % |
| 10766 | AAA | IEEE 802.11ax (160MHz, MCS11, 99pc duty cycle) | WLAN | 8.51 | ± 9.6 % |

<sup>&</sup>lt;sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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# **ANNEX H** Dipole Calibration Certificate

# 750 MHz Dipole Calibration Certificate

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

Client

CTTL (Auden)

Certificate No: D750V3-1017\_Jul19

| Object   | D750V3 - SN:101   | 7  |  |
|--|---|--|--|
| alibration procedure(s)  | QA CAL-05.v11<br>Calibration Proce  | dure for SAR Validation Sources  | between 0.7-3 GHz  |
| alibration date:   | July 18, 2019   |  |  |
|  |   | onal standards, which realize the physical uni   |  |
| Il calibrations have been conducte   | ed in the closed laborato   | ry facility: environment temperature (22 $\pm$ 3)°C  | C and humidity < 70%.  |
| Calibration Equipment used (M&TE   |   |  |  |
|  |   |  |  |
| rimary Standards   | ID#   | Cal Date (Certificate No.)   | Scheduled Calibration  |
| The second secon | ID #<br>SN: 104778  | Cal Date (Certificate No.) 03-Apr-19 (No. 217-02892/02893)   | Scheduled Calibration Apr-20   |
| ower meter NRP   |   |  |  |
| ower meter NRP<br>ower sensor NRP-Z91  | SN: 104778  | 03-Apr-19 (No. 217-02892/02893)  | Apr-20   |
| ower meter NRP<br>ower sensor NRP-Z91<br>ower sensor NRP-Z91   | SN: 104778<br>SN: 103244  | 03-Apr-19 (No. 217-02892/02893)<br>03-Apr-19 (No. 217-02892)   | Apr-20<br>Apr-20   |
| ower meter NRP<br>ower sensor NRP-Z91<br>ower sensor NRP-Z91<br>leference 20 dB Attenuator   | SN: 104778<br>SN: 103244<br>SN: 103245  | 03-Apr-19 (No. 217-02892/02893)<br>03-Apr-19 (No. 217-02892)<br>03-Apr-19 (No. 217-02893)  | Apr-20<br>Apr-20<br>Apr-20   |
| ower meter NRP ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator ype-N mismatch combination  | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)  | 03-Apr-19 (No. 217-02892/02893)<br>03-Apr-19 (No. 217-02892)<br>03-Apr-19 (No. 217-02893)<br>04-Apr-19 (No. 217-02894)   | Apr-20<br>Apr-20<br>Apr-20<br>Apr-20   |
| ower meter NRP ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator ype-N mismatch combination eference Probe EX3DV4  | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327  | 03-Apr-19 (No. 217-02892/02893)<br>03-Apr-19 (No. 217-02892)<br>03-Apr-19 (No. 217-02893)<br>04-Apr-19 (No. 217-02894)<br>04-Apr-19 (No. 217-02895)  | Apr-20<br>Apr-20<br>Apr-20<br>Apr-20<br>Apr-20   |
| Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards   | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349  | 03-Apr-19 (No. 217-02892/02893)<br>03-Apr-19 (No. 217-02892)<br>03-Apr-19 (No. 217-02893)<br>04-Apr-19 (No. 217-02894)<br>04-Apr-19 (No. 217-02895)<br>29-May-19 (No. EX3-7349_May19)  | Apr-20<br>Apr-20<br>Apr-20<br>Apr-20<br>Apr-20<br>May-20   |
| ower meter NRP ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator ype-N mismatch combination eference Probe EX3DV4 AE4 econdary Standards   | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349<br>SN: 601   | 03-Apr-19 (No. 217-02892/02893)<br>03-Apr-19 (No. 217-02892)<br>03-Apr-19 (No. 217-02893)<br>04-Apr-19 (No. 217-02894)<br>04-Apr-19 (No. 217-02895)<br>29-May-19 (No. EX3-7349_May19)<br>30-Apr-19 (No. DAE4-601_Apr19)  | Apr-20<br>Apr-20<br>Apr-20<br>Apr-20<br>Apr-20<br>May-20<br>Apr-20   |
| ower meter NRP ower sensor NRP-Z91 ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator ope-N mismatch combination eference Probe EX3DV4 AE4 econdary Standards ower meter E4419B   | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349<br>SN: 601   | 03-Apr-19 (No. 217-02892/02893)<br>03-Apr-19 (No. 217-02892)<br>03-Apr-19 (No. 217-02893)<br>04-Apr-19 (No. 217-02894)<br>04-Apr-19 (No. 217-02895)<br>29-May-19 (No. EX3-7349_May19)<br>30-Apr-19 (No. DAE4-601_Apr19)  | Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 May-20 Apr-20 Scheduled Check In house check: Oct-20  |
| ower meter NRP ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator ype-N mismatch combination leference Probe EX3DV4 AE4 econdary Standards lower meter E4419B lower sensor HP 8481A   | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349<br>SN: 601   | 03-Apr-19 (No. 217-02892/02893) 03-Apr-19 (No. 217-02892) 03-Apr-19 (No. 217-02893) 04-Apr-19 (No. 217-02894) 04-Apr-19 (No. 217-02895) 29-May-19 (No. EX3-7349_May19) 30-Apr-19 (No. DAE4-601_Apr19) Check Date (in house)  | Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 May-20 Apr-20 Scheduled Check In house check: Oct-20 In house check: Oct-20  |
| ower meter NRP ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator ype-N mismatch combination eference Probe EX3DV4 /AE4 econdary Standards ower meter E4419B ower sensor HP 8481A   | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349<br>SN: 601<br>ID #<br>SN: GB39512475<br>SN: US37292783   | 03-Apr-19 (No. 217-02892/02893) 03-Apr-19 (No. 217-02892) 03-Apr-19 (No. 217-02893) 04-Apr-19 (No. 217-02894) 04-Apr-19 (No. 217-02895) 29-May-19 (No. EX3-7349_May19) 30-Apr-19 (No. DAE4-601_Apr19) Check Date (in house) 30-Oct-14 (in house check Feb-19) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18)  | Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 May-20 Apr-20 Scheduled Check In house check: Oct-20 In house check: Oct-20 In house check: Oct-20 In house check: Oct-20  |
| ower meter NRP ower sensor NRP-Z91 ower sensor NRP-Z91 eference 20 dB Attenuator ype-N mismatch combination eference Probe EX3DV4 AE4 econdary Standards ower meter E4419B ower sensor HP 8481A ower sensor HP 8481A iF generator R&S SMT-06   | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349<br>SN: 601<br>ID #<br>SN: GB39512475<br>SN: US37292783<br>SN: MY41092317                                 | 03-Apr-19 (No. 217-02892/02893) 03-Apr-19 (No. 217-02892) 03-Apr-19 (No. 217-02893) 04-Apr-19 (No. 217-02894) 04-Apr-19 (No. 217-02895) 29-May-19 (No. EX3-7349_May19) 30-Apr-19 (No. DAE4-601_Apr19) Check Date (in house) 30-Oct-14 (in house check Feb-19) 07-Oct-15 (in house check Oct-18)  | Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 May-20 Apr-20 Scheduled Check In house check: Oct-20 In house check: Oct-20  |
| Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter E4419B Power sensor HP 8481A RF generator R&S SMT-06  | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349<br>SN: 601<br>ID #<br>SN: GB39512475<br>SN: US37292783<br>SN: MY41092317<br>SN: 100972                   | 03-Apr-19 (No. 217-02892/02893) 03-Apr-19 (No. 217-02892) 03-Apr-19 (No. 217-02893) 04-Apr-19 (No. 217-02894) 04-Apr-19 (No. 217-02895) 29-May-19 (No. EX3-7349_May19) 30-Apr-19 (No. DAE4-601_Apr19) Check Date (in house) 30-Oct-14 (in house check Feb-19) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18)  | Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 May-20 Apr-20 Scheduled Check In house check: Oct-20 In house check: Oct-20 In house check: Oct-20 In house check: Oct-20  |
| Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Power meter E43DV4 Power meter E4419B Power meter E4419B Power sensor HP 8481A RF generator R&S SMT-06 Retwork Analyzer Agilent E8358A   | SN: 104778<br>SN: 103244<br>SN: 103245<br>SN: 5058 (20k)<br>SN: 5047.2 / 06327<br>SN: 7349<br>SN: 601<br>ID #<br>SN: GB39512475<br>SN: US37292783<br>SN: MY41092317<br>SN: 100972<br>SN: US41080477 | 03-Apr-19 (No. 217-02892/02893) 03-Apr-19 (No. 217-02892) 03-Apr-19 (No. 217-02893) 04-Apr-19 (No. 217-02894) 04-Apr-19 (No. 217-02895) 29-May-19 (No. EX3-7349_May19) 30-Apr-19 (No. DAE4-601_Apr19)  Check Date (in house) 30-Oct-14 (in house check Feb-19) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)                                   | Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 May-20 Apr-20 Scheduled Check In house check: Oct-20 In house check: Oct-18 |
| Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4   | SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID # SN: GB39512475 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477  Name                              | 03-Apr-19 (No. 217-02892/02893) 03-Apr-19 (No. 217-02892) 03-Apr-19 (No. 217-02893) 04-Apr-19 (No. 217-02894) 04-Apr-19 (No. 217-02895) 29-May-19 (No. EX3-7349_May19) 30-Apr-19 (No. DAE4-601_Apr19)  Check Date (in house) 30-Oct-14 (in house check Feb-19) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18) | Apr-20 Apr-20 Apr-20 Apr-20 Apr-20 May-20 Apr-20 Scheduled Check In house check: Oct-20 In house check: Oct-18 |

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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSI

tissue simulating liquid

ConvF N/A sensitivity in TSL / NORM x,y,z not applicable or not measured

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

# Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end
  of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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#### **Measurement Conditions**

configuration, as far as not given on page 1

| DASY Version                 | DASY5                  | V52.10.2    |
|------------------------------|------------------------|-------------|
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 15 mm                  | with Spacer |
| Zoom Scan Resolution         | dx, $dy$ , $dz = 5 mm$ |             |
| Frequency                    | 750 MHz ± 1 MHz        |             |

Head TSL parameters

The following parameters and calculations were applied.

| •                                       | Temperature     | Permittivity | Conductivity     |
|---|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 41.9         | 0.89 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 42.2 ± 6 %   | 0.89 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        |              |                  |

## SAR result with Head TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                          |
|---|--------------------|--------------------------|
| SAR measured  | 250 mW input power | 2.14 W/kg                |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 8.57 W/kg ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                          |
|---|--------------------|--------------------------|
| SAR measured  | 250 mW input power | 1.39 W/kg                |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 5.57 W/kg ± 16.5 % (k=2) |

# **Body TSL parameters**

|   | Temperature     | Permittivity | Conductivity     |
|---|-----------------|--------------|------------------|
| Nominal Body TSL parameters             | 22.0 °C         | 55.5         | 0.96 mho/m       |
| Measured Body TSL parameters            | (22.0 ± 0.2) °C | 55.1 ± 6 %   | 0.96 mho/m ± 6 % |
| Body TSL temperature change during test | < 0.5 °C        |              |                  |

## SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                          |
|---|--------------------|--------------------------|
| SAR measured  | 250 mW input power | 2.14 W/kg                |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 8.55 W/kg ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                          |
|---|--------------------|--------------------------|
| SAR measured  | 250 mW input power | 1.41 W/kg                |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 5.63 W/kg ± 16.5 % (k=2) |

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# Appendix (Additional assessments outside the scope of SCS 0108)

# **Antenna Parameters with Head TSL**

| Impedance, transformed to feed point | 53.1 Ω - 1.3 jΩ |  |
|--------------------------------------|-----------------|--|
| Return Loss                          | - 29.6 dB       |  |

# **Antenna Parameters with Body TSL**

| Impedance, transformed to feed point | 48.9 Ω - 4.3 jΩ |  |
|--------------------------------------|-----------------|--|
| Return Loss                          | - 27.0 dB       |  |

# **General Antenna Parameters and Design**

| Electrical Delay (one direction) | 1.041 ns |
|----------------------------------|----------|
| Electrical Delay (one direction) |          |

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

| Manufactured by | SPEAG |
|-----------------|-------|

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#### **DASY5 Validation Report for Head TSL**

Date: 18.07.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1017

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma = 0.89$  S/m;  $\varepsilon_r = 42.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07) @ 750 MHz; Calibrated: 29.05.2019

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 30.04.2019

Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001

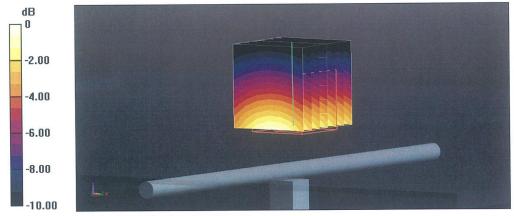
• DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 59.72 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.21 W/kg

SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.39 W/kg Maximum value of SAR (measured) = 2.84 W/kg



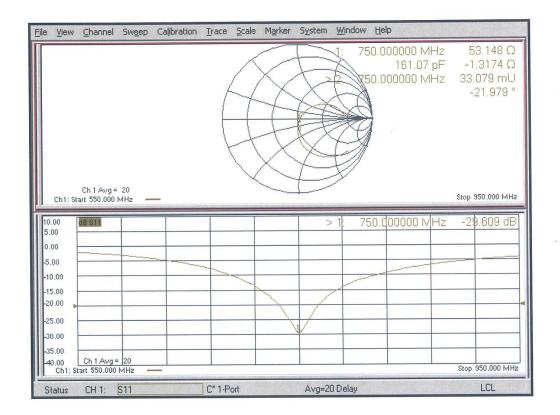
0 dB = 2.84 W/kg = 4.53 dBW/kg

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# Impedance Measurement Plot for Head TSL





#### **DASY5 Validation Report for Body TSL**

Date: 18.07.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1017

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma = 0.96$  S/m;  $\varepsilon_r = 55.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(10.4, 10.4, 10.4) @ 750 MHz; Calibrated: 29.05.2019

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 30.04.2019

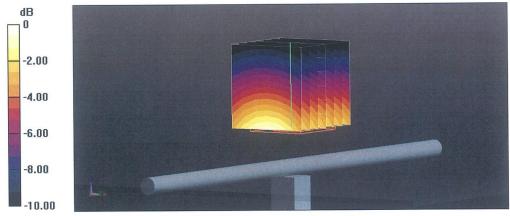
Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005

• DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 55.74 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 3.18 W/kg

SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.41 W/kgMaximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

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