## Appendix A.3 Probe Calibration certificate (EX3DV4_7541)

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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Accreditation No.: SCS 0108

Client KCTL (Dymstec) Certificate No: EX3-7541_Jul20

# CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7541

Calibration procedure(s) QA CAL-01.v9, QA CAL-14.v6, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: July 30, 2020

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 01-Apr-20 (No. 217-03100/03101) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103244 | 01-Apr-20 (No. 217-03100) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103245 | 01-Apr-20 (No. 217-03101) | Apr-21 |
| Reference 20 dB Attenuator | SN: CC2552 (20x) | 31-Mar-20 (No. 217-03106) | Apr-21 |
| DAE4 | SN: 660 | 27-Dec-19 (No. DAE4-660_Dec19) | Dec-20 |
| Reference Probe ES3DV2 | SN: 3013 | 31-Dec-19 (No. ES3-3013_Dec19) | Dec-20 |
| | | | |
| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
| Power meter E4419B | SN: GB41293874 | 06-Apr-16 (in house check Jun-20) | In house check: Jun-22 |
| Power sensor E4412A | SN: MY41498087 | 06-Apr-16 (in house check Jun-20) | In house check: Jun-22 |
| Power sensor E4412A | SN: 000110210 | 06-Apr-16 (in house check Jun-20) | In house check: Jun-22 |
| RF generator HP 8648C | SN: US3642U01700 | 04-Aug-99 (in house check Jun-20) | In house check: Jun-22 |
| Network Analyzer E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeffrey Katzman | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: August 1, 2020

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: EX3-7541_Jul20 Page 1 of 21

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## Glossary:

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C, D | modulation dependent linearization parameters |
| Polarization φ | φ rotation around probe axis |
| Polarization ϑ | ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis |
| Connector Angle | information used in DASY system to align probe sensor X to the robot coordinate system |

## 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"

## Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the $E^2$-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:7541

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm (μV/(V/m)²)[A] | 0.64 | 0.64 | 0.63 | ± 10.1 % |
| DCP (mV)[B] | 99.7 | 97.9 | 98.5 | |

## Calibration Results for Modulation Response

| UID | Communication System Name | | A dB | B dB√μV | C | D dB | VR mV | Max dev. | Max Unc[E] (k=2) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CW | X | 0.00 | 0.00 | 1.00 | 0.00 | 145.9 | ± 3.3 % | ± 4.7 % |
| | | Y | 0.00 | 0.00 | 1.00 | | 168.9 | | |
| | | Z | 0.00 | 0.00 | 1.00 | | 159.2 | | |
| 10352-AAA | Pulse Waveform (200Hz, 10%) | X | 20.00 | 92.88 | 21.47 | 10.00 | 60.0 | ± 4.5 % | ± 9.6 % |
| | | Y | 20.00 | 96.42 | 23.66 | | 60.0 | | |
| | | Z | 1.88 | 63.66 | 8.86 | | 60.0 | | |
| 10353-AAA | Pulse Waveform (200Hz, 20%) | X | 20.00 | 94.19 | 21.32 | 6.99 | 80.0 | ± 3.1 % | ± 9.6 % |
| | | Y | 20.00 | 98.73 | 23.83 | | 80.0 | | |
| | | Z | 1.19 | 62.41 | 7.54 | | 80.0 | | |
| 10354-AAA | Pulse Waveform (200Hz, 40%) | X | 20.00 | 100.29 | 23.23 | 3.98 | 95.0 | ± 1.6 % | ± 9.6 % |
| | | Y | 20.00 | 104.80 | 25.48 | | 95.0 | | |
| | | Z | 0.81 | 62.97 | 7.30 | | 95.0 | | |
| 10355-AAA | Pulse Waveform (200Hz, 60%) | X | 20.00 | 112.20 | 27.73 | 2.22 | 120.0 | ± 1.1 % | ± 9.6 % |
| | | Y | 20.00 | 111.62 | 27.34 | | 120.0 | | |
| | | Z | 2.76 | 73.79 | 10.93 | | 120.0 | | |
| 10387-AAA | QPSK Waveform, 1 MHz | X | 2.00 | 68.13 | 16.71 | 1.00 | 150.0 | ± 1.7 % | ± 9.6 % |
| | | Y | 1.76 | 65.15 | 14.76 | | 150.0 | | |
| | | Z | 1.71 | 65.66 | 14.95 | | 150.0 | | |
| 10388-AAA | QPSK Waveform, 10 MHz | X | 2.73 | 70.99 | 17.52 | 0.00 | 150.0 | ± 1.1 % | ± 9.6 % |
| | | Y | 2.29 | 67.41 | 15.37 | | 150.0 | | |
| | | Z | 2.24 | 67.64 | 15.61 | | 150.0 | | |
| 10396-AAA | 64-QAM Waveform, 100 kHz | X | 3.49 | 73.10 | 20.32 | 3.01 | 150.0 | ± 0.8 % | ± 9.6 % |
| | | Y | 3.07 | 69.98 | 18.52 | | 150.0 | | |
| | | Z | 2.91 | 71.25 | 19.33 | | 150.0 | | |
| 10399-AAA | 64-QAM Waveform, 40 MHz | X | 3.68 | 67.80 | 16.38 | 0.00 | 150.0 | ± 0.8 % | ± 9.6 % |
| | | Y | 3.61 | 67.01 | 15.68 | | 150.0 | | |
| | | Z | 3.53 | 66.97 | 15.72 | | 150.0 | | |
| 10414-AAA | WLAN CCDF, 64-QAM, 40MHz | X | 4.98 | 65.73 | 15.75 | 0.00 | 150.0 | ± 1.8 % | ± 9.6 % |
| | | Y | 4.85 | 64.98 | 15.17 | | 150.0 | | |
| | | Z | 4.91 | 65.55 | 15.49 | | 150.0 | | |

Note: For details on UID parameters see Appendix

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%.

[A] The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 5).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:7541

## Sensor Model Parameters

| | C1 fF | C2 fF | α $V^{-1}$ | T1 $ms.V^{-2}$ | T2 $ms.V^{-1}$ | T3 ms | T4 $V^{-2}$ | T5 $V^{-1}$ | T6 |
|---|---|---|---|---|---|---|---|---|---|
| X | 53.7 | 399.19 | 35.45 | 19.18 | 0.00 | 5.06 | 1.09 | 0.33 | 1.01 |
| Y | 56.4 | 422.98 | 35.71 | 16.12 | 0.00 | 5.10 | 0.88 | 0.37 | 1.01 |
| Z | 49.1 | 364.99 | 35.23 | 10.82 | 0.00 | 4.95 | 1.99 | 0.02 | 1.01 |

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | -91.6 |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 9 mm |
| Tip Diameter | 2.5 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 1.4 mm |

**Note**: Measurement distance from surface can be increased to 3-4 mm for an *Area Scan* job.

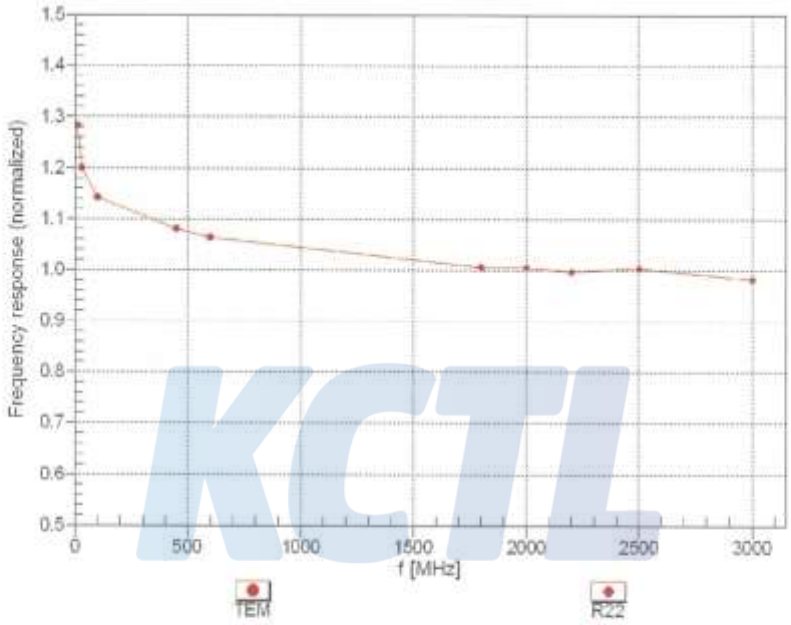
# DASY/EASY - Parameters of Probe: EX3DV4 - SN:7541

## Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) [C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha [G] | Depth [G] (mm) | Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 41.9 | 0.89 | 10.29 | 10.29 | 10.29 | 0.55 | 0.80 | ± 12.0 % |
| 900 | 41.5 | 0.97 | 9.78 | 9.78 | 9.78 | 0.49 | 0.85 | ± 12.0 % |
| 1750 | 40.1 | 1.37 | 8.56 | 8.56 | 8.56 | 0.34 | 0.85 | ± 12.0 % |
| 1900 | 40.0 | 1.40 | 8.27 | 8.27 | 8.27 | 0.30 | 0.85 | ± 12.0 % |
| 2300 | 39.5 | 1.67 | 7.81 | 7.81 | 7.81 | 0.33 | 0.90 | ± 12.0 % |
| 2450 | 39.2 | 1.80 | 7.54 | 7.54 | 7.54 | 0.40 | 0.90 | ± 12.0 % |
| 2600 | 39.0 | 1.96 | 7.35 | 7.35 | 7.35 | 0.37 | 0.90 | ± 12.0 % |
| 5200 | 36.0 | 4.66 | 5.40 | 5.40 | 5.40 | 0.40 | 1.80 | ± 13.1 % |
| 5300 | 35.9 | 4.76 | 5.30 | 5.30 | 5.30 | 0.40 | 1.80 | ± 13.1 % |
| 5500 | 35.6 | 4.96 | 4.78 | 4.78 | 4.78 | 0.40 | 1.80 | ± 13.1 % |
| 5600 | 35.5 | 5.07 | 4.69 | 4.69 | 4.69 | 0.40 | 1.80 | ± 13.1 % |
| 5800 | 35.3 | 5.27 | 4.75 | 4.75 | 4.75 | 0.40 | 1.80 | ± 13.1 % |

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

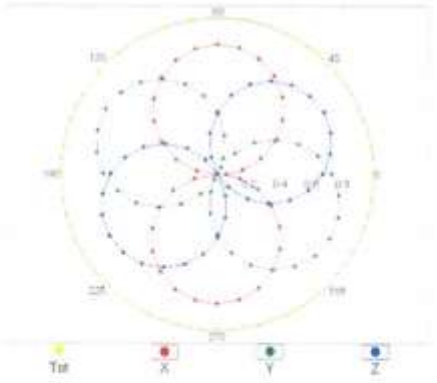
## Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



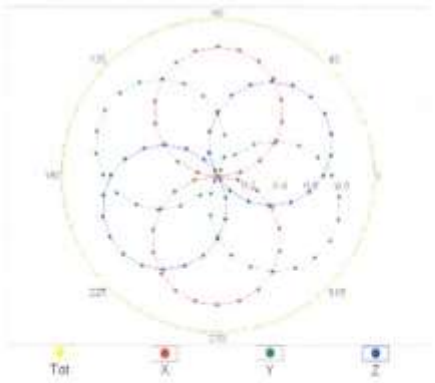

Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

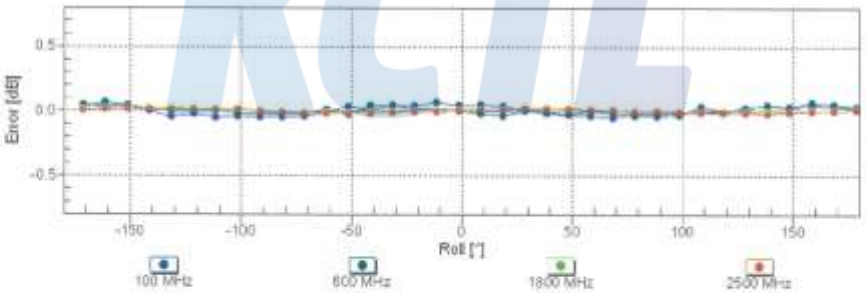
## Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



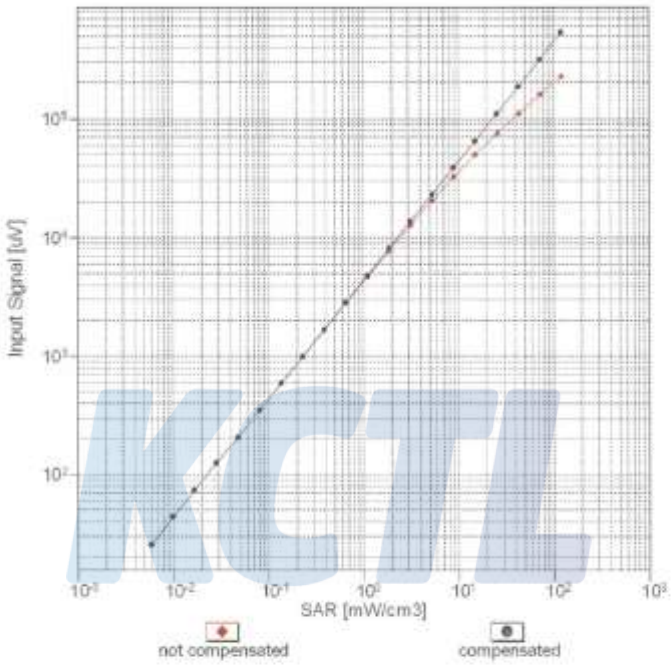

f=1800 MHz,R22

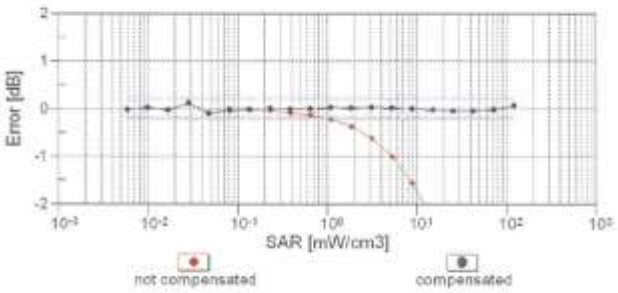



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

## Dynamic Range f(SAR$_{head}$)
(TEM cell , $f_{eval}$= 1900 MHz)

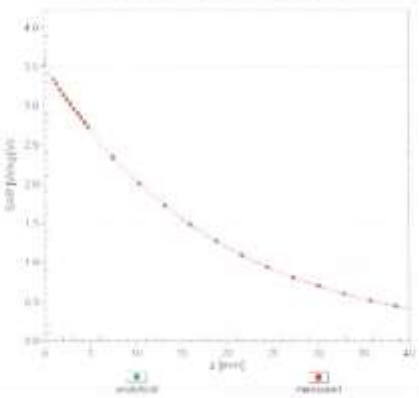


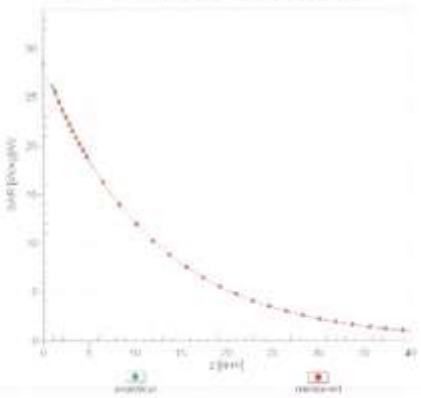

Uncertainty of Linearity Assessment: ± 0.6% (k=2)

## Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

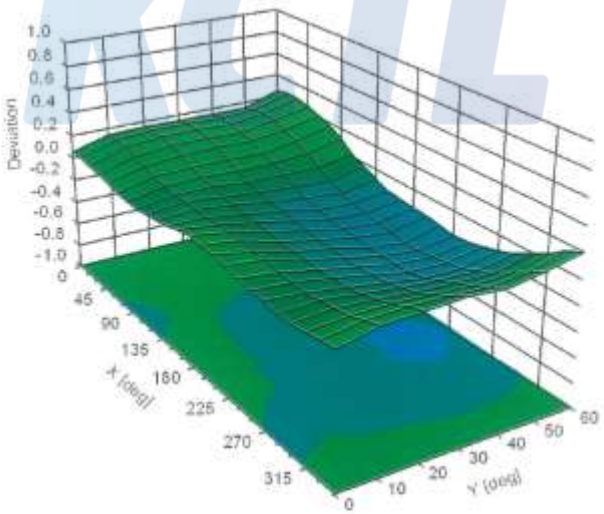


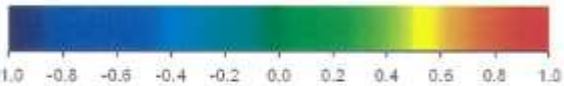
f = 1900 MHz,WGLS R22 (H_convF)



## Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz




Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

## Appendix: Modulation Calibration Parameters

| UID | Rev | Communication System Name | Group | PAR (dB) | Unc[E] (k=2) |
|---|---|---|---|---|---|
| 0 | | CW | CW | 0.00 | ± 4.7 % |
| 10010 | CAA | SAR Validation (Square, 100ms, 10ms) | Test | 10.00 | ± 9.6 % |
| 10011 | CAB | UMTS-FDD (WCDMA) | WCDMA | 2.91 | ± 9.6 % |
| 10012 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) | WLAN | 1.87 | ± 9.6 % |
| 10013 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps) | WLAN | 9.46 | ± 9.6 % |
| 10021 | DAC | GSM-FDD (TDMA, GMSK) | GSM | 9.39 | ± 9.6 % |
| 10023 | DAC | GPRS-FDD (TDMA, GMSK, TN 0) | GSM | 9.57 | ± 9.6 % |
| 10024 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1) | GSM | 6.56 | ± 9.6 % |
| 10025 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0) | GSM | 12.62 | ± 9.6 % |
| 10026 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1) | GSM | 9.55 | ± 9.6 % |
| 10027 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2) | GSM | 4.80 | ± 9.6 % |
| 10028 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2-3) | GSM | 3.55 | ± 9.6 % |
| 10029 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2) | GSM | 7.78 | ± 9.6 % |
| 10030 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH1) | Bluetooth | 5.30 | ± 9.6 % |
| 10031 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH3) | Bluetooth | 1.87 | ± 9.6 % |
| 10032 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH5) | Bluetooth | 1.16 | ± 9.6 % |
| 10033 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1) | Bluetooth | 7.74 | ± 9.6 % |
| 10034 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3) | Bluetooth | 4.53 | ± 9.6 % |
| 10035 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5) | Bluetooth | 3.63 | ± 9.6 % |
| 10036 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH1) | Bluetooth | 8.01 | ± 9.6 % |
| 10037 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH3) | Bluetooth | 4.77 | ± 9.6 % |
| 10038 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH5) | Bluetooth | 4.10 | ± 9.6 % |
| 10039 | CAB | CDMA2000 (1xRTT, RC1) | CDMA2000 | 4.57 | ± 9.6 % |
| 10042 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate) | AMPS | 7.78 | ± 9.6 % |
| 10044 | CAA | IS-91/EIA/TIA-553 FDD (FDMA, FM) | AMPS | 0.00 | ± 9.6 % |
| 10048 | CAA | DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24) | DECT | 13.80 | ± 9.6 % |
| 10049 | CAA | DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12) | DECT | 10.79 | ± 9.6 % |
| 10056 | CAA | UMTS-TDD (TD-SCDMA, 1.28 Mcps) | TD-SCDMA | 11.01 | ± 9.6 % |
| 10058 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3) | GSM | 6.52 | ± 9.6 % |
| 10059 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps) | WLAN | 2.12 | ± 9.6 % |
| 10060 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps) | WLAN | 2.83 | ± 9.6 % |
| 10061 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps) | WLAN | 3.60 | ± 9.6 % |
| 10062 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps) | WLAN | 8.68 | ± 9.6 % |
| 10063 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps) | WLAN | 8.63 | ± 9.6 % |
| 10064 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps) | WLAN | 9.09 | ± 9.6 % |
| 10065 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps) | WLAN | 9.00 | ± 9.6 % |
| 10066 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps) | WLAN | 9.38 | ± 9.6 % |
| 10067 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps) | WLAN | 10.12 | ± 9.6 % |
| 10068 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps) | WLAN | 10.24 | ± 9.6 % |
| 10069 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps) | WLAN | 10.56 | ± 9.6 % |
| 10071 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps) | WLAN | 9.83 | ± 9.6 % |
| 10072 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps) | WLAN | 9.62 | ± 9.6 % |
| 10073 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps) | WLAN | 9.94 | ± 9.6 % |
| 10074 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps) | WLAN | 10.30 | ± 9.6 % |
| 10075 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps) | WLAN | 10.77 | ± 9.6 % |
| 10076 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps) | WLAN | 10.94 | ± 9.6 % |
| 10077 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps) | WLAN | 11.00 | ± 9.6 % |
| 10081 | CAB | CDMA2000 (1xRTT, RC3) | CDMA2000 | 3.97 | ± 9.6 % |
| 10082 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate) | AMPS | 4.77 | ± 9.6 % |
| 10090 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-4) | GSM | 6.56 | ± 9.6 % |
| 10097 | CAB | UMTS-FDD (HSDPA) | WCDMA | 3.98 | ± 9.6 % |
| 10098 | CAB | UMTS-FDD (HSUPA, Subtest 2) | WCDMA | 3.98 | ± 9.6 % |
| 10099 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-4) | GSM | 9.55 | ± 9.6 % |
| 10100 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK) | LTE-FDD | 5.67 | ± 9.6 % |
| 10101 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM) | LTE-FDD | 6.42 | ± 9.6 % |
| 10102 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM) | LTE-FDD | 6.60 | ± 9.6 % |
| 10103 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK) | LTE-TDD | 9.29 | ± 9.6 % |
| 10104 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM) | LTE-TDD | 9.97 | ± 9.6 % |
| 10105 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM) | LTE-TDD | 10.01 | ± 9.6 % |
| 10108 | CAG | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK) | LTE-FDD | 5.80 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10109 | CAG | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM) | LTE-FDD | 6.43 | ± 9.6 % |
| 10110 | CAG | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK) | LTE-FDD | 5.75 | ± 9.6 % |
| 10111 | CAG | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM) | LTE-FDD | 6.44 | ± 9.6 % |
| 10112 | CAG | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM) | LTE-FDD | 6.59 | ± 9.6 % |
| 10113 | CAG | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM) | LTE-FDD | 6.62 | ± 9.6 % |
| 10114 | CAC | IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK) | WLAN | 8.10 | ± 9.6 % |
| 10115 | CAC | IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM) | WLAN | 8.46 | ± 9.6 % |
| 10116 | CAC | IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM) | WLAN | 8.15 | ± 9.6 % |
| 10117 | CAC | IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK) | WLAN | 8.07 | ± 9.6 % |
| 10118 | CAC | IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM) | WLAN | 8.59 | ± 9.6 % |
| 10119 | CAC | IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM) | WLAN | 8.13 | ± 9.6 % |
| 10140 | CAE | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM) | LTE-FDD | 6.49 | ± 9.6 % |
| 10141 | CAE | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM) | LTE-FDD | 6.53 | ± 9.6 % |
| 10142 | CAE | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10143 | CAE | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM) | LTE-FDD | 6.35 | ± 9.6 % |
| 10144 | CAE | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM) | LTE-FDD | 6.65 | ± 9.6 % |
| 10145 | CAF | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK) | LTE-FDD | 5.76 | ± 9.6 % |
| 10146 | CAF | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM) | LTE-FDD | 6.41 | ± 9.6 % |
| 10147 | CAF | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM) | LTE-FDD | 6.72 | ± 9.6 % |
| 10149 | CAE | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM) | LTE-FDD | 6.42 | ± 9.6 % |
| 10150 | CAE | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM) | LTE-FDD | 6.60 | ± 9.6 % |
| 10151 | CAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK) | LTE-TDD | 9.28 | ± 9.6 % |
| 10152 | CAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM) | LTE-TDD | 9.92 | ± 9.6 % |
| 10153 | CAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM) | LTE-TDD | 10.05 | ± 9.6 % |
| 10154 | CAG | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK) | LTE-FDD | 5.75 | ± 9.6 % |
| 10155 | CAG | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM) | LTE-FDD | 6.43 | ± 9.6 % |
| 10156 | CAG | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK) | LTE-FDD | 5.79 | ± 9.6 % |
| 10157 | CAG | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM) | LTE-FDD | 6.49 | ± 9.6 % |
| 10158 | CAG | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM) | LTE-FDD | 6.62 | ± 9.6 % |
| 10159 | CAG | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM) | LTE-FDD | 6.56 | ± 9.6 % |
| 10160 | CAE | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK) | LTE-FDD | 5.82 | ± 9.6 % |
| 10161 | CAE | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM) | LTE-FDD | 6.43 | ± 9.6 % |
| 10162 | CAE | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM) | LTE-FDD | 6.58 | ± 9.6 % |
| 10166 | CAF | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK) | LTE-FDD | 5.46 | ± 9.6 % |
| 10167 | CAF | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM) | LTE-FDD | 6.21 | ± 9.6 % |
| 10168 | CAF | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM) | LTE-FDD | 6.79 | ± 9.6 % |
| 10169 | CAE | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10170 | CAE | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10171 | AAE | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM) | LTE-FDD | 6.49 | ± 9.6 % |
| 10172 | CAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10173 | CAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10174 | CAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10175 | CAG | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK) | LTE-FDD | 5.72 | ± 9.6 % |
| 10176 | CAG | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10177 | CAI | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10178 | CAG | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10179 | CAG | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10180 | CAG | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10181 | CAE | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK) | LTE-FDD | 5.72 | ± 9.6 % |
| 10182 | CAE | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10183 | AAD | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10184 | CAE | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10185 | CAE | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM) | LTE-FDD | 6.51 | ± 9.6 % |
| 10186 | AAE | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10187 | CAF | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10188 | CAF | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10189 | AAF | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10193 | CAC | IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK) | WLAN | 8.09 | ± 9.6 % |
| 10194 | CAC | IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM) | WLAN | 8.12 | ± 9.6 % |
| 10195 | CAC | IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM) | WLAN | 8.21 | ± 9.6 % |
| 10196 | CAC | IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK) | WLAN | 8.10 | ± 9.6 % |
| 10197 | CAC | IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM) | WLAN | 8.13 | ± 9.6 % |
| 10198 | CAC | IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM) | WLAN | 8.27 | ± 9.6 % |
| 10219 | CAC | IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK) | WLAN | 8.03 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10220 | CAC | IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM) | WLAN | 8.13 | ± 9.6 % |
| 10221 | CAC | IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM) | WLAN | 8.27 | ± 9.6 % |
| 10222 | CAC | IEEE 802.11n (HT Mixed, 15 Mbps, BPSK) | WLAN | 8.06 | ± 9.6 % |
| 10223 | CAC | IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM) | WLAN | 8.48 | ± 9.6 % |
| 10224 | CAC | IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM) | WLAN | 8.08 | ± 9.6 % |
| 10225 | CAB | UMTS-FDD (HSPA+) | WCDMA | 5.97 | ± 9.6 % |
| 10226 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM) | LTE-TDD | 9.49 | ± 9.6 % |
| 10227 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM) | LTE-TDD | 10.26 | ± 9.6 % |
| 10228 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK) | LTE-TDD | 9.22 | ± 9.6 % |
| 10229 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10230 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10231 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK) | LTE-TDD | 9.19 | ± 9.6 % |
| 10232 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10233 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10234 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10235 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10236 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10237 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10238 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10239 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10240 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10241 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM) | LTE-TDD | 9.82 | ± 9.6 % |
| 10242 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM) | LTE-TDD | 9.86 | ± 9.6 % |
| 10243 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK) | LTE-TDD | 9.46 | ± 9.6 % |
| 10244 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM) | LTE-TDD | 10.06 | ± 9.6 % |
| 10245 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM) | LTE-TDD | 10.06 | ± 9.6 % |
| 10246 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK) | LTE-TDD | 9.30 | ± 9.6 % |
| 10247 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM) | LTE-TDD | 9.91 | ± 9.6 % |
| 10248 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM) | LTE-TDD | 10.09 | ± 9.6 % |
| 10249 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK) | LTE-TDD | 9.29 | ± 9.6 % |
| 10250 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM) | LTE-TDD | 9.81 | ± 9.6 % |
| 10251 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM) | LTE-TDD | 10.17 | ± 9.6 % |
| 10252 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK) | LTE-TDD | 9.24 | ± 9.6 % |
| 10253 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM) | LTE-TDD | 9.90 | ± 9.6 % |
| 10254 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM) | LTE-TDD | 10.14 | ± 9.6 % |
| 10255 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK) | LTE-TDD | 9.20 | ± 9.6 % |
| 10256 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM) | LTE-TDD | 9.96 | ± 9.6 % |
| 10257 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM) | LTE-TDD | 10.08 | ± 9.6 % |
| 10258 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK) | LTE-TDD | 9.34 | ± 9.6 % |
| 10259 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM) | LTE-TDD | 9.98 | ± 9.6 % |
| 10260 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM) | LTE-TDD | 9.97 | ± 9.6 % |
| 10261 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK) | LTE-TDD | 9.24 | ± 9.6 % |
| 10262 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM) | LTE-TDD | 9.83 | ± 9.6 % |
| 10263 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM) | LTE-TDD | 10.16 | ± 9.6 % |
| 10264 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK) | LTE-TDD | 9.23 | ± 9.6 % |
| 10265 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM) | LTE-TDD | 9.92 | ± 9.6 % |
| 10266 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM) | LTE-TDD | 10.07 | ± 9.6 % |
| 10267 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK) | LTE-TDD | 9.30 | ± 9.6 % |
| 10268 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM) | LTE-TDD | 10.06 | ± 9.6 % |
| 10269 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM) | LTE-TDD | 10.13 | ± 9.6 % |
| 10270 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK) | LTE-TDD | 9.58 | ± 9.6 % |
| 10274 | CAB | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10) | WCDMA | 4.87 | ± 9.6 % |
| 10275 | CAB | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4) | WCDMA | 3.96 | ± 9.6 % |
| 10277 | CAA | PHS (QPSK) | PHS | 11.81 | ± 9.6 % |
| 10278 | CAA | PHS (QPSK, BW 884MHz, Rolloff 0.5) | PHS | 11.81 | ± 9.6 % |
| 10279 | CAA | PHS (QPSK, BW 884MHz, Rolloff 0.38) | PHS | 12.16 | ± 9.6 % |
| 10290 | AAB | CDMA2000, RC1, SO55, Full Rate | CDMA2000 | 3.91 | ± 9.6 % |
| 10291 | AAB | CDMA2000, RC3, SO55, Full Rate | CDMA2000 | 3.46 | ± 9.6 % |
| 10292 | AAB | CDMA2000, RC3, SO32, Full Rate | CDMA2000 | 3.39 | ± 9.6 % |
| 10293 | AAB | CDMA2000, RC3, SO3, Full Rate | CDMA2000 | 3.50 | ± 9.6 % |
| 10295 | AAB | CDMA2000, RC1, SO3, 1/8th Rate 25 fr. | CDMA2000 | 12.49 | ± 9.6 % |
| 10297 | AAD | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK) | LTE-FDD | 5.81 | ± 9.6 % |
| 10298 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK) | LTE-FDD | 5.72 | ± 9.6 % |
| 10299 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM) | LTE-FDD | 6.39 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10300 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM) | LTE-FDD | 6.60 | ± 9.6 % |
| 10301 | AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC) | WiMAX | 12.03 | ± 9.6 % |
| 10302 | AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3CTRL) | WiMAX | 12.57 | ± 9.6 % |
| 10303 | AAA | IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC) | WiMAX | 12.52 | ± 9.6 % |
| 10304 | AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC) | WiMAX | 11.86 | ± 9.6 % |
| 10305 | AAA | IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC) | WiMAX | 15.24 | ± 9.6 % |
| 10306 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC) | WiMAX | 14.67 | ± 9.6 % |
| 10307 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC) | WiMAX | 14.49 | ± 9.6 % |
| 10308 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC) | WiMAX | 14.46 | ± 9.6 % |
| 10309 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM,AMC 2x3) | WiMAX | 14.58 | ± 9.6 % |
| 10310 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3 | WiMAX | 14.57 | ± 9.6 % |
| 10311 | AAD | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK) | LTE-FDD | 6.06 | ± 9.6 % |
| 10313 | AAA | iDEN 1:3 | iDEN | 10.51 | ± 9.6 % |
| 10314 | AAA | iDEN 1:6 | iDEN | 13.48 | ± 9.6 % |
| 10315 | AAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc dc) | WLAN | 1.71 | ± 9.6 % |
| 10316 | AAB | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10317 | AAC | IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10352 | AAA | Pulse Waveform (200Hz, 10%) | Generic | 10.00 | ± 9.6 % |
| 10353 | AAA | Pulse Waveform (200Hz, 20%) | Generic | 6.99 | ± 9.6 % |
| 10354 | AAA | Pulse Waveform (200Hz, 40%) | Generic | 3.98 | ± 9.6 % |
| 10355 | AAA | Pulse Waveform (200Hz, 60%) | Generic | 2.22 | ± 9.6 % |
| 10356 | AAA | Pulse Waveform (200Hz, 80%) | Generic | 0.97 | ± 9.6 % |
| 10387 | AAA | QPSK Waveform, 1 MHz | Generic | 5.10 | ± 9.6 % |
| 10388 | AAA | QPSK Waveform, 10 MHz | Generic | 5.22 | ± 9.6 % |
| 10396 | AAA | 64-QAM Waveform, 100 kHz | Generic | 6.27 | ± 9.6 % |
| 10399 | AAA | 64-QAM Waveform, 40 MHz | Generic | 6.27 | ± 9.6 % |
| 10400 | AAD | IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc dc) | WLAN | 8.37 | ± 9.6 % |
| 10401 | AAD | IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc dc) | WLAN | 8.60 | ± 9.6 % |
| 10402 | AAD | IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc dc) | WLAN | 8.53 | ± 9.6 % |
| 10403 | AAB | CDMA2000 (1xEV-DO, Rev. 0) | CDMA2000 | 3.76 | ± 9.6 % |
| 10404 | AAB | CDMA2000 (1xEV-DO, Rev. A) | CDMA2000 | 3.77 | ± 9.6 % |
| 10406 | AAB | CDMA2000, RC3, SO32, SCH0, Full Rate | CDMA2000 | 5.22 | ± 9.6 % |
| 10410 | AAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,8,9) | LTE-TDD | 7.82 | ± 9.6 % |
| 10414 | AAA | WLAN CCDF, 64-QAM, 40MHz | Generic | 8.54 | ± 9.6 % |
| 10415 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc dc) | WLAN | 1.54 | ± 9.6 % |
| 10416 | AAA | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc dc) | WLAN | 8.23 | ± 9.6 % |
| 10417 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc dc) | WLAN | 8.23 | ± 9.6 % |
| 10418 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Long) | WLAN | 8.14 | ± 9.6 % |
| 10419 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Short) | WLAN | 8.19 | ± 9.6 % |
| 10422 | AAB | IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK) | WLAN | 8.32 | ± 9.6 % |
| 10423 | AAB | IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM) | WLAN | 8.47 | ± 9.6 % |
| 10424 | AAB | IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM) | WLAN | 8.40 | ± 9.6 % |
| 10425 | AAB | IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK) | WLAN | 8.41 | ± 9.6 % |
| 10426 | AAB | IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM) | WLAN | 8.45 | ± 9.6 % |
| 10427 | AAB | IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM) | WLAN | 8.41 | ± 9.6 % |
| 10430 | AAD | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1) | LTE-FDD | 8.28 | ± 9.6 % |
| 10431 | AAD | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1) | LTE-FDD | 8.38 | ± 9.6 % |
| 10432 | AAC | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1) | LTE-FDD | 8.34 | ± 9.6 % |
| 10433 | AAC | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1) | LTE-FDD | 8.34 | ± 9.6 % |
| 10434 | AAA | W-CDMA (BS Test Model 1, 64 DPCH) | WCDMA | 8.60 | ± 9.6 % |
| 10435 | AAF | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub) | LTE-TDD | 7.82 | ± 9.6 % |
| 10447 | AAD | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%) | LTE-FDD | 7.56 | ± 9.6 % |
| 10448 | AAD | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%) | LTE-FDD | 7.53 | ± 9.6 % |
| 10449 | AAC | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%) | LTE-FDD | 7.51 | ± 9.6 % |
| 10450 | AAC | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%) | LTE-FDD | 7.48 | ± 9.6 % |
| 10451 | AAA | W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%) | WCDMA | 7.59 | ± 9.6 % |
| 10453 | AAD | Validation (Square, 10ms, 1ms) | Test | 10.00 | ± 9.6 % |
| 10456 | AAB | IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc dc) | WLAN | 8.63 | ± 9.6 % |
| 10457 | AAA | UMTS-FDD (DC-HSDPA) | WCDMA | 6.62 | ± 9.6 % |
| 10458 | AAA | CDMA2000 (1xEV-DO, Rev. B, 2 carriers) | CDMA2000 | 6.55 | ± 9.6 % |
| 10459 | AAA | CDMA2000 (1xEV-DO, Rev. B, 3 carriers) | CDMA2000 | 8.25 | ± 9.6 % |
| 10460 | AAA | UMTS-FDD (WCDMA, AMR) | WCDMA | 2.39 | ± 9.6 % |
| 10461 | AAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Sub) | LTE-TDD | 7.82 | ± 9.6 % |
| 10462 | AAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.30 | ± 9.6 % |

| | | | | | |
|---|---|---|---|---|---|
| 10463 | AAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.56 | ± 9.6 % |
| 10464 | AAC | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Sub) | LTE-TDD | 7.82 | ± 9.6 % |
| 10465 | AAC | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.32 | ± 9.6 % |
| 10466 | AAC | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.57 | ± 9.6 % |
| 10467 | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub) | LTE-TDD | 7.82 | ± 9.6 % |
| 10468 | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.32 | ± 9.6 % |
| 10469 | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.56 | ± 9.6 % |
| 10470 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub) | LTE-TDD | 7.82 | ± 9.6 % |
| 10471 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.32 | ± 9.6 % |
| 10472 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.57 | ± 9.6 % |
| 10473 | AAE | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Sub) | LTE-TDD | 7.82 | ± 9.6 % |
| 10474 | AAE | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.32 | ± 9.6 % |
| 10475 | AAE | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.57 | ± 9.6 % |
| 10477 | AAF | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.32 | ± 9.6 % |
| 10478 | AAF | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.57 | ± 9.6 % |
| 10479 | AAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Sub) | LTE-TDD | 7.74 | ± 9.6 % |
| 10480 | AAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.18 | ± 9.6 % |
| 10481 | AAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.45 | ± 9.6 % |
| 10482 | AAC | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Sub) | LTE-TDD | 7.71 | ± 9.6 % |
| 10483 | AAC | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, Sub) | LTE-TDD | 8.39 | ± 9.6 % |
| 10484 | AAC | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.47 | ± 9.6 % |
| 10485 | AAF | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Sub) | LTE-TDD | 7.59 | ± 9.6 % |
| 10486 | AAF | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.38 | ± 9.6 % |
| 10487 | AAF | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.60 | ± 9.6 % |
| 10488 | AAF | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Sub) | LTE-TDD | 7.70 | ± 9.6 % |
| 10489 | AAF | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.31 | ± 9.6 % |
| 10490 | AAF | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.54 | ± 9.6 % |
| 10491 | AAE | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Sub) | LTE-TDD | 7.74 | ± 9.6 % |
| 10492 | AAE | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.41 | ± 9.6 % |
| 10493 | AAE | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.55 | ± 9.6 % |
| 10494 | AAF | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Sub) | LTE-TDD | 7.74 | ± 9.6 % |
| 10495 | AAF | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.37 | ± 9.6 % |
| 10496 | AAF | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.54 | ± 9.6 % |
| 10497 | AAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Sub) | LTE-TDD | 7.67 | ± 9.6 % |
| 10498 | AAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.40 | ± 9.6 % |
| 10499 | AAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.68 | ± 9.6 % |
| 10500 | AAC | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Sub) | LTE-TDD | 7.67 | ± 9.6 % |
| 10501 | AAC | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.44 | ± 9.6 % |
| 10502 | AAC | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.52 | ± 9.6 % |
| 10503 | AAF | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Sub) | LTE-TDD | 7.72 | ± 9.6 % |
| 10504 | AAF | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.31 | ± 9.6 % |
| 10505 | AAF | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.54 | ± 9.6 % |
| 10506 | AAF | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Sub) | LTE-TDD | 7.74 | ± 9.6 % |
| 10507 | AAF | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.36 | ± 9.6 % |
| 10508 | AAF | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.55 | ± 9.6 % |
| 10509 | AAE | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Sub) | LTE-TDD | 7.99 | ± 9.6 % |
| 10510 | AAE | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.49 | ± 9.6 % |
| 10511 | AAE | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.51 | ± 9.6 % |
| 10512 | AAF | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Sub) | LTE-TDD | 7.74 | ± 9.6 % |
| 10513 | AAF | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Sub) | LTE-TDD | 8.42 | ± 9.6 % |
| 10514 | AAF | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Sub) | LTE-TDD | 8.45 | ± 9.6 % |
| 10515 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc dc) | WLAN | 1.58 | ± 9.6 % |
| 10516 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc dc) | WLAN | 1.57 | ± 9.6 % |
| 10517 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc dc) | WLAN | 1.58 | ± 9.6 % |
| 10518 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc dc) | WLAN | 8.23 | ± 9.6 % |
| 10519 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc dc) | WLAN | 8.39 | ± 9.6 % |
| 10520 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc dc) | WLAN | 8.12 | ± 9.6 % |
| 10521 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc dc) | WLAN | 7.97 | ± 9.6 % |
| 10522 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc dc) | WLAN | 8.45 | ± 9.6 % |
| 10523 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc dc) | WLAN | 8.08 | ± 9.6 % |
| 10524 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc dc) | WLAN | 8.27 | ± 9.6 % |
| 10525 | AAB | IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10526 | AAB | IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc) | WLAN | 8.42 | ± 9.6 % |
| 10527 | AAB | IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc) | WLAN | 8.21 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10528 | AAB | IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10529 | AAB | IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10531 | AAB | IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc) | WLAN | 8.43 | ± 9.6 % |
| 10532 | AAB | IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc) | WLAN | 8.29 | ± 9.6 % |
| 10533 | AAB | IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc) | WLAN | 8.38 | ± 9.6 % |
| 10534 | AAB | IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc) | WLAN | 8.45 | ± 9.6 % |
| 10535 | AAB | IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc) | WLAN | 8.45 | ± 9.6 % |
| 10536 | AAB | IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc) | WLAN | 8.32 | ± 9.6 % |
| 10537 | AAB | IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc) | WLAN | 8.44 | ± 9.6 % |
| 10538 | AAB | IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc) | WLAN | 8.54 | ± 9.6 % |
| 10540 | AAB | IEEE 802.11ac WiFi (40MHz, MCS6, 99pc dc) | WLAN | 8.39 | ± 9.6 % |
| 10541 | AAB | IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc) | WLAN | 8.46 | ± 9.6 % |
| 10542 | AAB | IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc) | WLAN | 8.65 | ± 9.6 % |
| 10543 | AAB | IEEE 802.11ac WiFi (40MHz, MCS9, 99pc dc) | WLAN | 8.65 | ± 9.6 % |
| 10544 | AAB | IEEE 802.11ac WiFi (80MHz, MCS0, 99pc dc) | WLAN | 8.47 | ± 9.6 % |
| 10545 | AAB | IEEE 802.11ac WiFi (80MHz, MCS1, 99pc dc) | WLAN | 8.55 | ± 9.6 % |
| 10546 | AAB | IEEE 802.11ac WiFi (80MHz, MCS2, 99pc dc) | WLAN | 8.35 | ± 9.6 % |
| 10547 | AAB | IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc) | WLAN | 8.49 | ± 9.6 % |
| 10548 | AAB | IEEE 802.11ac WiFi (80MHz, MCS4, 99pc dc) | WLAN | 8.37 | ± 9.6 % |
| 10550 | AAB | IEEE 802.11ac WiFi (80MHz, MCS6, 99pc dc) | WLAN | 8.38 | ± 9.6 % |
| 10551 | AAB | IEEE 802.11ac WiFi (80MHz, MCS7, 99pc dc) | WLAN | 8.50 | ± 9.6 % |
| 10552 | AAB | IEEE 802.11ac WiFi (80MHz, MCS8, 99pc dc) | WLAN | 8.42 | ± 9.6 % |
| 10553 | AAB | IEEE 802.11ac WiFi (80MHz, MCS9, 99pc dc) | WLAN | 8.45 | ± 9.6 % |
| 10554 | AAC | IEEE 802.11ac WiFi (160MHz, MCS0, 99pc dc) | WLAN | 8.48 | ± 9.6 % |
| 10555 | AAC | IEEE 802.11ac WiFi (160MHz, MCS1, 99pc dc) | WLAN | 8.47 | ± 9.6 % |
| 10556 | AAC | IEEE 802.11ac WiFi (160MHz, MCS2, 99pc dc) | WLAN | 8.50 | ± 9.6 % |
| 10557 | AAC | IEEE 802.11ac WiFi (160MHz, MCS3, 99pc dc) | WLAN | 8.52 | ± 9.6 % |
| 10558 | AAC | IEEE 802.11ac WiFi (160MHz, MCS4, 99pc dc) | WLAN | 8.61 | ± 9.6 % |
| 10560 | AAC | IEEE 802.11ac WiFi (160MHz, MCS6, 99pc dc) | WLAN | 8.73 | ± 9.6 % |
| 10561 | AAC | IEEE 802.11ac WiFi (160MHz, MCS7, 99pc dc) | WLAN | 8.56 | ± 9.6 % |
| 10562 | AAC | IEEE 802.11ac WiFi (160MHz, MCS8, 99pc dc) | WLAN | 8.69 | ± 9.6 % |
| 10563 | AAC | IEEE 802.11ac WiFi (160MHz, MCS9, 99pc dc) | WLAN | 8.77 | ± 9.6 % |
| 10564 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc dc) | WLAN | 8.25 | ± 9.6 % |
| 10565 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc dc) | WLAN | 8.45 | ± 9.6 % |
| 10566 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc dc) | WLAN | 8.13 | ± 9.6 % |
| 10567 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc dc) | WLAN | 8.00 | ± 9.6 % |
| 10568 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc dc) | WLAN | 8.37 | ± 9.6 % |
| 10569 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc dc) | WLAN | 8.10 | ± 9.6 % |
| 10570 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc dc) | WLAN | 8.30 | ± 9.6 % |
| 10571 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc dc) | WLAN | 1.99 | ± 9.6 % |
| 10572 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc dc) | WLAN | 1.99 | ± 9.6 % |
| 10573 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc dc) | WLAN | 1.98 | ± 9.6 % |
| 10574 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc dc) | WLAN | 1.98 | ± 9.6 % |
| 10575 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc dc) | WLAN | 8.59 | ± 9.6 % |
| 10576 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc dc) | WLAN | 8.60 | ± 9.6 % |
| 10577 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc dc) | WLAN | 8.70 | ± 9.6 % |
| 10578 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc dc) | WLAN | 8.49 | ± 9.6 % |
| 10579 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10580 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc dc) | WLAN | 8.76 | ± 9.6 % |
| 10581 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc dc) | WLAN | 8.35 | ± 9.6 % |
| 10582 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc dc) | WLAN | 8.67 | ± 9.6 % |
| 10583 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc dc) | WLAN | 8.59 | ± 9.6 % |
| 10584 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc dc) | WLAN | 8.60 | ± 9.6 % |
| 10585 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc dc) | WLAN | 8.70 | ± 9.6 % |
| 10586 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc dc) | WLAN | 8.49 | ± 9.6 % |
| 10587 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10588 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc dc) | WLAN | 8.76 | ± 9.6 % |
| 10589 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc dc) | WLAN | 8.35 | ± 9.6 % |
| 10590 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc dc) | WLAN | 8.67 | ± 9.6 % |
| 10591 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc dc) | WLAN | 8.63 | ± 9.6 % |
| 10592 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc dc) | WLAN | 8.79 | ± 9.6 % |
| 10593 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc dc) | WLAN | 8.64 | ± 9.6 % |
| 10594 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc dc) | WLAN | 8.74 | ± 9.6 % |
| 10595 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc dc) | WLAN | 8.74 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10596 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc dc) | WLAN | 8.71 | ± 9.6 % |
| 10597 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc dc) | WLAN | 8.72 | ± 9.6 % |
| 10598 | AAB | IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc dc) | WLAN | 8.50 | ± 9.6 % |
| 10599 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc dc) | WLAN | 8.79 | ± 9.6 % |
| 10600 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc dc) | WLAN | 8.88 | ± 9.6 % |
| 10601 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10602 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc dc) | WLAN | 8.94 | ± 9.6 % |
| 10603 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc dc) | WLAN | 9.03 | ± 9.6 % |
| 10604 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc dc) | WLAN | 8.76 | ± 9.6 % |
| 10605 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc dc) | WLAN | 8.97 | ± 9.6 % |
| 10606 | AAB | IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10607 | AAB | IEEE 802.11ac WiFi (20MHz, MCS0, 90pc dc) | WLAN | 8.64 | ± 9.6 % |
| 10608 | AAB | IEEE 802.11ac WiFi (20MHz, MCS1, 90pc dc) | WLAN | 8.77 | ± 9.6 % |
| 10609 | AAB | IEEE 802.11ac WiFi (20MHz, MCS2, 90pc dc) | WLAN | 8.57 | ± 9.6 % |
| 10610 | AAB | IEEE 802.11ac WiFi (20MHz, MCS3, 90pc dc) | WLAN | 8.78 | ± 9.6 % |
| 10611 | AAB | IEEE 802.11ac WiFi (20MHz, MCS4, 90pc dc) | WLAN | 8.70 | ± 9.6 % |
| 10612 | AAB | IEEE 802.11ac WiFi (20MHz, MCS5, 90pc dc) | WLAN | 8.77 | ± 9.6 % |
| 10613 | AAB | IEEE 802.11ac WiFi (20MHz, MCS6, 90pc dc) | WLAN | 8.94 | ± 9.6 % |
| 10614 | AAB | IEEE 802.11ac WiFi (20MHz, MCS7, 90pc dc) | WLAN | 8.59 | ± 9.6 % |
| 10615 | AAB | IEEE 802.11ac WiFi (20MHz, MCS8, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10616 | AAB | IEEE 802.11ac WiFi (40MHz, MCS0, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10617 | AAB | IEEE 802.11ac WiFi (40MHz, MCS1, 90pc dc) | WLAN | 8.81 | ± 9.6 % |
| 10618 | AAB | IEEE 802.11ac WiFi (40MHz, MCS2, 90pc dc) | WLAN | 8.58 | ± 9.6 % |
| 10619 | AAB | IEEE 802.11ac WiFi (40MHz, MCS3, 90pc dc) | WLAN | 8.86 | ± 9.6 % |
| 10620 | AAB | IEEE 802.11ac WiFi (40MHz, MCS4, 90pc dc) | WLAN | 8.87 | ± 9.6 % |
| 10621 | AAB | IEEE 802.11ac WiFi (40MHz, MCS5, 90pc dc) | WLAN | 8.77 | ± 9.6 % |
| 10622 | AAB | IEEE 802.11ac WiFi (40MHz, MCS6, 90pc dc) | WLAN | 8.68 | ± 9.6 % |
| 10623 | AAB | IEEE 802.11ac WiFi (40MHz, MCS7, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10624 | AAB | IEEE 802.11ac WiFi (40MHz, MCS8, 90pc dc) | WLAN | 8.96 | ± 9.6 % |
| 10625 | AAB | IEEE 802.11ac WiFi (40MHz, MCS9, 90pc dc) | WLAN | 8.96 | ± 9.6 % |
| 10626 | AAB | IEEE 802.11ac WiFi (80MHz, MCS0, 90pc dc) | WLAN | 8.83 | ± 9.6 % |
| 10627 | AAB | IEEE 802.11ac WiFi (80MHz, MCS1, 90pc dc) | WLAN | 8.88 | ± 9.6 % |
| 10628 | AAB | IEEE 802.11ac WiFi (80MHz, MCS2, 90pc dc) | WLAN | 8.71 | ± 9.6 % |
| 10629 | AAB | IEEE 802.11ac WiFi (80MHz, MCS3, 90pc dc) | WLAN | 8.85 | ± 9.6 % |
| 10630 | AAB | IEEE 802.11ac WiFi (80MHz, MCS4, 90pc dc) | WLAN | 8.72 | ± 9.6 % |
| 10631 | AAB | IEEE 802.11ac WiFi (80MHz, MCS5, 90pc dc) | WLAN | 8.81 | ± 9.6 % |
| 10632 | AAB | IEEE 802.11ac WiFi (80MHz, MCS6, 90pc dc) | WLAN | 8.74 | ± 9.6 % |
| 10633 | AAB | IEEE 802.11ac WiFi (80MHz, MCS7, 90pc dc) | WLAN | 8.83 | ± 9.6 % |
| 10634 | AAB | IEEE 802.11ac WiFi (80MHz, MCS8, 90pc dc) | WLAN | 8.80 | ± 9.6 % |
| 10635 | AAB | IEEE 802.11ac WiFi (80MHz, MCS9, 90pc dc) | WLAN | 8.81 | ± 9.6 % |
| 10636 | AAC | IEEE 802.11ac WiFi (160MHz, MCS0, 90pc dc) | WLAN | 8.83 | ± 9.6 % |
| 10637 | AAC | IEEE 802.11ac WiFi (160MHz, MCS1, 90pc dc) | WLAN | 8.79 | ± 9.6 % |
| 10638 | AAC | IEEE 802.11ac WiFi (160MHz, MCS2, 90pc dc) | WLAN | 8.86 | ± 9.6 % |
| 10639 | AAC | IEEE 802.11ac WiFi (160MHz, MCS3, 90pc dc) | WLAN | 8.85 | ± 9.6 % |
| 10640 | AAC | IEEE 802.11ac WiFi (160MHz, MCS4, 90pc dc) | WLAN | 8.98 | ± 9.6 % |
| 10641 | AAC | IEEE 802.11ac WiFi (160MHz, MCS5, 90pc dc) | WLAN | 9.06 | ± 9.6 % |
| 10642 | AAC | IEEE 802.11ac WiFi (160MHz, MCS6, 90pc dc) | WLAN | 9.06 | ± 9.6 % |
| 10643 | AAC | IEEE 802.11ac WiFi (160MHz, MCS7, 90pc dc) | WLAN | 8.89 | ± 9.6 % |
| 10644 | AAC | IEEE 802.11ac WiFi (160MHz, MCS8, 90pc dc) | WLAN | 9.05 | ± 9.6 % |
| 10645 | AAC | IEEE 802.11ac WiFi (160MHz, MCS9, 90pc dc) | WLAN | 9.11 | ± 9.6 % |
| 10646 | AAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub=2,7) | LTE-TDD | 11.96 | ± 9.6 % |
| 10647 | AAF | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub=2,7) | LTE-TDD | 11.96 | ± 9.6 % |
| 10648 | AAA | CDMA2000 (1x Advanced) | CDMA2000 | 3.45 | ± 9.6 % |
| 10652 | AAE | LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%) | LTE-TDD | 6.91 | ± 9.6 % |
| 10653 | AAE | LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%) | LTE-TDD | 7.42 | ± 9.6 % |
| 10654 | AAD | LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%) | LTE-TDD | 6.96 | ± 9.6 % |
| 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 dc) | WLAN | 9.09 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10672 | AAA | IEEE 802.11ax (20MHz, MCS1, 90pc dc) | WLAN | 8.57 | ± 9.6 % |
| 10673 | AAA | IEEE 802.11ax (20MHz, MCS2, 90pc dc) | WLAN | 8.75 | ± 9.6 % |
| 10674 | AAA | IEEE 802.11ax (20MHz, MCS3, 90pc dc) | WLAN | 8.74 | ± 9.6 % |
| 10675 | AAA | IEEE 802.11ax (20MHz, MCS4, 90pc dc) | WLAN | 8.90 | ± 9.6 % |
| 10676 | AAA | IEEE 802.11ax (20MHz, MCS5, 90pc dc) | WLAN | 8.77 | ± 9.6 % |
| 10677 | AAA | IEEE 802.11ax (20MHz, MCS6, 90pc dc) | WLAN | 8.73 | ± 9.6 % |
| 10678 | AAA | IEEE 802.11ax (20MHz, MCS7, 90pc dc) | WLAN | 8.78 | ± 9.6 % |
| 10679 | AAA | IEEE 802.11ax (20MHz, MCS8, 90pc dc) | WLAN | 8.89 | ± 9.6 % |
| 10680 | AAA | IEEE 802.11ax (20MHz, MCS9, 90pc dc) | WLAN | 8.80 | ± 9.6 % |
| 10681 | AAA | IEEE 802.11ax (20MHz, MCS10, 90pc dc) | WLAN | 8.62 | ± 9.6 % |
| 10682 | AAA | IEEE 802.11ax (20MHz, MCS11, 90pc dc) | WLAN | 8.83 | ± 9.6 % |
| 10683 | AAA | IEEE 802.11ax (20MHz, MCS0, 99pc dc) | WLAN | 8.42 | ± 9.6 % |
| 10684 | AAA | IEEE 802.11ax (20MHz, MCS1, 99pc dc) | WLAN | 8.26 | ± 9.6 % |
| 10685 | AAA | IEEE 802.11ax (20MHz, MCS2, 99pc dc) | WLAN | 8.33 | ± 9.6 % |
| 10686 | AAA | IEEE 802.11ax (20MHz, MCS3, 99pc dc) | WLAN | 8.28 | ± 9.6 % |
| 10687 | AAA | IEEE 802.11ax (20MHz, MCS4, 99pc dc) | WLAN | 8.45 | ± 9.6 % |
| 10688 | AAA | IEEE 802.11ax (20MHz, MCS5, 99pc dc) | WLAN | 8.29 | ± 9.6 % |
| 10689 | AAA | IEEE 802.11ax (20MHz, MCS6, 99pc dc) | WLAN | 8.55 | ± 9.6 % |
| 10690 | AAA | IEEE 802.11ax (20MHz, MCS7, 99pc dc) | WLAN | 8.29 | ± 9.6 % |
| 10691 | AAA | IEEE 802.11ax (20MHz, MCS8, 99pc dc) | WLAN | 8.25 | ± 9.6 % |
| 10692 | AAA | IEEE 802.11ax (20MHz, MCS9, 99pc dc) | WLAN | 8.29 | ± 9.6 % |
| 10693 | AAA | IEEE 802.11ax (20MHz, MCS10, 99pc dc) | WLAN | 8.25 | ± 9.6 % |
| 10694 | AAA | IEEE 802.11ax (20MHz, MCS11, 99pc dc) | WLAN | 8.57 | ± 9.6 % |
| 10695 | AAA | IEEE 802.11ax (40MHz, MCS0, 90pc dc) | WLAN | 8.78 | ± 9.6 % |
| 10696 | AAA | IEEE 802.11ax (40MHz, MCS1, 90pc dc) | WLAN | 8.91 | ± 9.6 % |
| 10697 | AAA | IEEE 802.11ax (40MHz, MCS2, 90pc dc) | WLAN | 8.61 | ± 9.6 % |
| 10698 | AAA | IEEE 802.11ax (40MHz, MCS3, 90pc dc) | WLAN | 8.89 | ± 9.6 % |
| 10699 | AAA | IEEE 802.11ax (40MHz, MCS4, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10700 | AAA | IEEE 802.11ax (40MHz, MCS5, 90pc dc) | WLAN | 8.73 | ± 9.6 % |
| 10701 | AAA | IEEE 802.11ax (40MHz, MCS6, 90pc dc) | WLAN | 8.86 | ± 9.6 % |
| 10702 | AAA | IEEE 802.11ax (40MHz, MCS7, 90pc dc) | WLAN | 8.70 | ± 9.6 % |
| 10703 | AAA | IEEE 802.11ax (40MHz, MCS8, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10704 | AAA | IEEE 802.11ax (40MHz, MCS9, 90pc dc) | WLAN | 8.56 | ± 9.6 % |
| 10705 | AAA | IEEE 802.11ax (40MHz, MCS10, 90pc dc) | WLAN | 8.69 | ± 9.6 % |
| 10706 | AAA | IEEE 802.11ax (40MHz, MCS11, 90pc dc) | WLAN | 8.66 | ± 9.6 % |
| 10707 | AAA | IEEE 802.11ax (40MHz, MCS0, 99pc dc) | WLAN | 8.32 | ± 9.6 % |
| 10708 | AAA | IEEE 802.11ax (40MHz, MCS1, 99pc dc) | WLAN | 8.55 | ± 9.6 % |
| 10709 | AAA | IEEE 802.11ax (40MHz, MCS2, 99pc dc) | WLAN | 8.33 | ± 9.6 % |
| 10710 | AAA | IEEE 802.11ax (40MHz, MCS3, 99pc dc) | WLAN | 8.29 | ± 9.6 % |
| 10711 | AAA | IEEE 802.11ax (40MHz, MCS4, 99pc dc) | WLAN | 8.39 | ± 9.6 % |
| 10712 | AAA | IEEE 802.11ax (40MHz, MCS5, 99pc dc) | WLAN | 8.67 | ± 9.6 % |
| 10713 | AAA | IEEE 802.11ax (40MHz, MCS6, 99pc dc) | WLAN | 8.33 | ± 9.6 % |
| 10714 | AAA | IEEE 802.11ax (40MHz, MCS7, 99pc dc) | WLAN | 8.26 | ± 9.6 % |
| 10715 | AAA | IEEE 802.11ax (40MHz, MCS8, 99pc dc) | WLAN | 8.45 | ± 9.6 % |
| 10716 | AAA | IEEE 802.11ax (40MHz, MCS9, 99pc dc) | WLAN | 8.30 | ± 9.6 % |
| 10717 | AAA | IEEE 802.11ax (40MHz, MCS10, 99pc dc) | WLAN | 8.48 | ± 9.6 % |
| 10718 | AAA | IEEE 802.11ax (40MHz, MCS11, 99pc dc) | WLAN | 8.24 | ± 9.6 % |
| 10719 | AAA | IEEE 802.11ax (80MHz, MCS0, 90pc dc) | WLAN | 8.81 | ± 9.6 % |
| 10720 | AAA | IEEE 802.11ax (80MHz, MCS1, 90pc dc) | WLAN | 8.87 | ± 9.6 % |
| 10721 | AAA | IEEE 802.11ax (80MHz, MCS2, 90pc dc) | WLAN | 8.76 | ± 9.6 % |
| 10722 | AAA | IEEE 802.11ax (80MHz, MCS3, 90pc dc) | WLAN | 8.55 | ± 9.6 % |
| 10723 | AAA | IEEE 802.11ax (80MHz, MCS4, 90pc dc) | WLAN | 8.70 | ± 9.6 % |
| 10724 | AAA | IEEE 802.11ax (80MHz, MCS5, 90pc dc) | WLAN | 8.90 | ± 9.6 % |
| 10725 | AAA | IEEE 802.11ax (80MHz, MCS6, 90pc dc) | WLAN | 8.74 | ± 9.6 % |
| 10726 | AAA | IEEE 802.11ax (80MHz, MCS7, 90pc dc) | WLAN | 8.72 | ± 9.6 % |
| 10727 | AAA | IEEE 802.11ax (80MHz, MCS8, 90pc dc) | WLAN | 8.66 | ± 9.6 % |
| 10728 | AAA | IEEE 802.11ax (80MHz, MCS9, 90pc dc) | WLAN | 8.65 | ± 9.6 % |
| 10729 | AAA | IEEE 802.11ax (80MHz, MCS10, 90pc dc) | WLAN | 8.64 | ± 9.6 % |
| 10730 | AAA | IEEE 802.11ax (80MHz, MCS11, 90pc dc) | WLAN | 8.87 | ± 9.6 % |
| 10731 | AAA | IEEE 802.11ax (80MHz, MCS0, 99pc dc) | WLAN | 8.42 | ± 9.6 % |
| 10732 | AAA | IEEE 802.11ax (80MHz, MCS1, 99pc dc) | WLAN | 8.46 | ± 9.6 % |
| 10733 | AAA | IEEE 802.11ax (80MHz, MCS2, 99pc dc) | WLAN | 8.40 | ± 9.6 % |
| 10734 | AAA | IEEE 802.11ax (80MHz, MCS3, 99pc dc) | WLAN | 8.25 | ± 9.6 % |
| 10735 | AAA | IEEE 802.11ax (80MHz, MCS4, 99pc dc) | WLAN | 8.33 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10736 | AAA | IEEE 802.11ax (80MHz, MCS5, 99pc dc) | WLAN | 8.27 | ± 9.6 % |
| 10737 | AAA | IEEE 802.11ax (80MHz, MCS6, 99pc dc) | WLAN | 8.36 | ± 9.6 % |
| 10738 | AAA | IEEE 802.11ax (80MHz, MCS7, 99pc dc) | WLAN | 8.42 | ± 9.6 % |
| 10739 | AAA | IEEE 802.11ax (80MHz, MCS8, 99pc dc) | WLAN | 8.29 | ± 9.6 % |
| 10740 | AAA | IEEE 802.11ax (80MHz, MCS9, 99pc dc) | WLAN | 8.48 | ± 9.6 % |
| 10741 | AAA | IEEE 802.11ax (80MHz, MCS10, 99pc dc) | WLAN | 8.40 | ± 9.6 % |
| 10742 | AAA | IEEE 802.11ax (80MHz, MCS11, 99pc dc) | WLAN | 8.43 | ± 9.6 % |
| 10743 | AAA | IEEE 802.11ax (160MHz, MCS0, 90pc dc) | WLAN | 8.94 | ± 9.6 % |
| 10744 | AAA | IEEE 802.11ax (160MHz, MCS1, 90pc dc) | WLAN | 9.16 | ± 9.6 % |
| 10745 | AAA | IEEE 802.11ax (160MHz, MCS2, 90pc dc) | WLAN | 8.93 | ± 9.6 % |
| 10746 | AAA | IEEE 802.11ax (160MHz, MCS3, 90pc dc) | WLAN | 9.11 | ± 9.6 % |
| 10747 | AAA | IEEE 802.11ax (160MHz, MCS4, 90pc dc) | WLAN | 9.04 | ± 9.6 % |
| 10748 | AAA | IEEE 802.11ax (160MHz, MCS5, 90pc dc) | WLAN | 8.93 | ± 9.6 % |
| 10749 | AAA | IEEE 802.11ax (160MHz, MCS6, 90pc dc) | WLAN | 8.90 | ± 9.6 % |
| 10750 | AAA | IEEE 802.11ax (160MHz, MCS7, 90pc dc) | WLAN | 8.79 | ± 9.6 % |
| 10751 | AAA | IEEE 802.11ax (160MHz, MCS8, 90pc dc) | WLAN | 8.82 | ± 9.6 % |
| 10752 | AAA | IEEE 802.11ax (160MHz, MCS9, 90pc dc) | WLAN | 8.81 | ± 9.6 % |
| 10753 | AAA | IEEE 802.11ax (160MHz, MCS10, 90pc dc) | WLAN | 9.00 | ± 9.6 % |
| 10754 | AAA | IEEE 802.11ax (160MHz, MCS11, 90pc dc) | WLAN | 8.94 | ± 9.6 % |
| 10755 | AAA | IEEE 802.11ax (160MHz, MCS0, 99pc dc) | WLAN | 8.64 | ± 9.6 % |
| 10756 | AAA | IEEE 802.11ax (160MHz, MCS1, 99pc dc) | WLAN | 8.77 | ± 9.6 % |
| 10757 | AAA | IEEE 802.11ax (160MHz, MCS2, 99pc dc) | WLAN | 8.77 | ± 9.6 % |
| 10758 | AAA | IEEE 802.11ax (160MHz, MCS3, 99pc dc) | WLAN | 8.69 | ± 9.6 % |
| 10759 | AAA | IEEE 802.11ax (160MHz, MCS4, 99pc dc) | WLAN | 8.58 | ± 9.6 % |
| 10760 | AAA | IEEE 802.11ax (160MHz, MCS5, 99pc dc) | WLAN | 8.49 | ± 9.6 % |
| 10761 | AAA | IEEE 802.11ax (160MHz, MCS6, 99pc dc) | WLAN | 8.58 | ± 9.6 % |
| 10762 | AAA | IEEE 802.11ax (160MHz, MCS7, 99pc dc) | WLAN | 8.49 | ± 9.6 % |
| 10763 | AAA | IEEE 802.11ax (160MHz, MCS8, 99pc dc) | WLAN | 8.53 | ± 9.6 % |
| 10764 | AAA | IEEE 802.11ax (160MHz, MCS9, 99pc dc) | WLAN | 8.54 | ± 9.6 % |
| 10765 | AAA | IEEE 802.11ax (160MHz, MCS10, 99pc dc) | WLAN | 8.54 | ± 9.6 % |
| 10766 | AAA | IEEE 802.11ax (160MHz, MCS11, 99pc dc) | WLAN | 8.51 | ± 9.6 % |
| 10767 | AAC | 5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 7.99 | ± 9.6 % |
| 10768 | AAC | 5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.01 | ± 9.6 % |
| 10769 | AAC | 5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.01 | ± 9.6 % |
| 10770 | AAC | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.02 | ± 9.6 % |
| 10771 | AAC | 5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.02 | ± 9.6 % |
| 10772 | AAC | 5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.23 | ± 9.6 % |
| 10773 | AAC | 5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.03 | ± 9.6 % |
| 10774 | AAC | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.02 | ± 9.6 % |
| 10775 | AAB | 5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.31 | ± 9.6 % |
| 10776 | AAC | 5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.30 | ± 9.6 % |
| 10777 | AAB | 5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.30 | ± 9.6 % |
| 10778 | AAC | 5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10779 | AAB | 5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.42 | ± 9.6 % |
| 10780 | AAC | 5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.36 | ± 9.6 % |
| 10781 | AAC | 5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.38 | ± 9.6 % |
| 10782 | AAC | 5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.43 | ± 9.6 % |
| 10783 | AAC | 5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.31 | ± 9.6 % |
| 10784 | AAC | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.29 | ± 9.6 % |
| 10785 | AAC | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.40 | ± 9.6 % |
| 10786 | AAC | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.35 | ± 9.6 % |
| 10787 | AAC | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.44 | ± 9.6 % |
| 10788 | AAC | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.39 | ± 9.6 % |
| 10789 | AAC | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.37 | ± 9.6 % |
| 10790 | AAC | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.39 | ± 9.6 % |
| 10791 | AAC | 5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.83 | ± 9.6 % |
| 10792 | AAC | 5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.92 | ± 9.6 % |
| 10793 | AAC | 5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.95 | ± 9.6 % |
| 10794 | AAC | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.82 | ± 9.6 % |
| 10795 | AAC | 5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.84 | ± 9.6 % |
| 10796 | AAC | 5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.82 | ± 9.6 % |
| 10797 | AAC | 5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.01 | ± 9.6 % |
| 10798 | AAC | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.89 | ± 9.6 % |
| 10799 | AAC | 5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.93 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10801 | AAC | 5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.89 | ± 9.6 % |
| 10802 | AAC | 5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.87 | ± 9.6 % |
| 10803 | AAC | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 7.93 | ± 9.6 % |
| 10805 | AAC | 5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10806 | AAC | 5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.37 | ± 9.6 % |
| 10809 | AAC | 5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10810 | AAC | 5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10812 | AAC | 5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.35 | ± 9.6 % |
| 10817 | AAC | 5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.35 | ± 9.6 % |
| 10818 | AAC | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10819 | AAC | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.33 | ± 9.6 % |
| 10820 | AAC | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.30 | ± 9.6 % |
| 10821 | AAC | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10822 | AAC | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10823 | AAC | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.36 | ± 9.6 % |
| 10824 | AAC | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.39 | ± 9.6 % |
| 10825 | AAC | 5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10827 | AAC | 5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.42 | ± 9.6 % |
| 10828 | AAC | 5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.43 | ± 9.6 % |
| 10829 | AAC | 5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.40 | ± 9.6 % |
| 10830 | AAC | 5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.63 | ± 9.6 % |
| 10831 | AAC | 5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.73 | ± 9.6 % |
| 10832 | AAC | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.74 | ± 9.6 % |
| 10833 | AAC | 5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.70 | ± 9.6 % |
| 10834 | AAC | 5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.75 | ± 9.6 % |
| 10835 | AAC | 5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.70 | ± 9.6 % |
| 10836 | AAC | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.66 | ± 9.6 % |
| 10837 | AAC | 5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.68 | ± 9.6 % |
| 10839 | AAC | 5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.70 | ± 9.6 % |
| 10840 | AAC | 5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.67 | ± 9.6 % |
| 10841 | AAC | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 7.71 | ± 9.6 % |
| 10843 | AAC | 5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.49 | ± 9.6 % |
| 10844 | AAC | 5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10846 | AAC | 5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10854 | AAC | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10855 | AAC | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.36 | ± 9.6 % |
| 10856 | AAC | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.37 | ± 9.6 % |
| 10857 | AAC | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.35 | ± 9.6 % |
| 10858 | AAC | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.36 | ± 9.6 % |
| 10859 | AAC | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10860 | AAC | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10861 | AAC | 5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.40 | ± 9.6 % |
| 10863 | AAC | 5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10864 | AAC | 5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.37 | ± 9.6 % |
| 10865 | AAC | 5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10866 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10868 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.89 | ± 9.6 % |
| 10869 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 5.75 | ± 9.6 % |
| 10870 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 5.86 | ± 9.6 % |
| 10871 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 5.75 | ± 9.6 % |
| 10872 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 6.52 | ± 9.6 % |
| 10873 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 6.61 | ± 9.6 % |
| 10874 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 6.65 | ± 9.6 % |
| 10875 | AAD | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 7.78 | ± 9.6 % |
| 10876 | AAD | 5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 8.39 | ± 9.6 % |
| 10877 | AAD | 5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 7.95 | ± 9.6 % |
| 10878 | AAD | 5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 8.41 | ± 9.6 % |
| 10879 | AAD | 5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 8.12 | ± 9.6 % |
| 10880 | AAD | 5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 8.38 | ± 9.6 % |
| 10881 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 5.75 | ± 9.6 % |
| 10882 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 5.96 | ± 9.6 % |
| 10883 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 6.57 | ± 9.6 % |
| 10884 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 6.53 | ± 9.6 % |
| 10885 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 6.61 | ± 9.6 % |

| | | | | | |
|---|---|---|---|---|---|
| 10886 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 6.65 | ± 9.6 % |
| 10887 | AAD | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 7.78 | ± 9.6 % |
| 10888 | AAD | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz) | 5G NR FR2 TDD | 8.35 | ± 9.6 % |
| 10889 | AAD | 5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 8.02 | ± 9.6 % |
| 10890 | AAD | 5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 8.40 | ± 9.6 % |
| 10891 | AAD | 5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 8.13 | ± 9.6 % |
| 10892 | AAD | 5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 8.41 | ± 9.6 % |
| 10897 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.66 | ± 9.6 % |
| 10898 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.67 | ± 9.6 % |
| 10899 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.67 | ± 9.6 % |
| 10900 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10901 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10902 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10903 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10904 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10905 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10906 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.68 | ± 9.6 % |
| 10907 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.78 | ± 9.6 % |
| 10908 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.93 | ± 9.6 % |
| 10909 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.96 | ± 9.6 % |
| 10910 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.83 | ± 9.6 % |
| 10911 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.93 | ± 9.6 % |
| 10912 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.84 | ± 9.6 % |
| 10913 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.84 | ± 9.6 % |
| 10914 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.85 | ± 9.6 % |
| 10915 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.83 | ± 9.6 % |
| 10916 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.87 | ± 9.6 % |
| 10917 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.94 | ± 9.6 % |
| 10918 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.86 | ± 9.6 % |
| 10919 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.86 | ± 9.6 % |
| 10920 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.87 | ± 9.6 % |
| 10921 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.84 | ± 9.6 % |
| 10922 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.82 | ± 9.6 % |
| 10923 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.84 | ± 9.6 % |
| 10924 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.84 | ± 9.6 % |
| 10925 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.95 | ± 9.6 % |
| 10926 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.84 | ± 9.6 % |
| 10927 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 5.94 | ± 9.6 % |
| 10928 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.52 | ± 9.6 % |
| 10929 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.52 | ± 9.6 % |
| 10930 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.52 | ± 9.6 % |
| 10931 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.51 | ± 9.6 % |
| 10932 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.51 | ± 9.6 % |
| 10933 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.51 | ± 9.6 % |
| 10934 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.51 | ± 9.6 % |
| 10935 | AAA | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.51 | ± 9.6 % |
| 10936 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.90 | ± 9.6 % |
| 10937 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.77 | ± 9.6 % |
| 10938 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.90 | ± 9.6 % |
| 10939 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.82 | ± 9.6 % |
| 10940 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.89 | ± 9.6 % |
| 10941 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.83 | ± 9.6 % |
| 10942 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.85 | ± 9.6 % |
| 10943 | AAA | 5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.95 | ± 9.6 % |
| 10944 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.81 | ± 9.6 % |
| 10945 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.85 | ± 9.6 % |
| 10946 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.83 | ± 9.6 % |
| 10947 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.87 | ± 9.6 % |
| 10948 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.94 | ± 9.6 % |
| 10949 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.87 | ± 9.6 % |
| 10950 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.94 | ± 9.6 % |
| 10951 | AAA | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz) | 5G NR FR1 FDD | 5.92 | ± 9.6 % |
| 10952 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.25 | ± 9.6 % |
| 10953 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.15 | ± 9.6 % |

| | | | | | |
|---|---|---|---|---|---|
| 10954 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.23 | ± 9.6 % |
| 10955 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.42 | ± 9.6 % |
| 10956 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.14 | ± 9.6 % |
| 10957 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.31 | ± 9.6 % |
| 10958 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.61 | ± 9.6 % |
| 10959 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.33 | ± 9.6 % |
| 10960 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz) | 5G NR FR1 TDD | 9.32 | ± 9.6 % |
| 10961 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz) | 5G NR FR1 TDD | 9.36 | ± 9.6 % |
| 10962 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz) | 5G NR FR1 TDD | 9.40 | ± 9.6 % |
| 10963 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz) | 5G NR FR1 TDD | 9.55 | ± 9.6 % |
| 10964 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.29 | ± 9.6 % |
| 10965 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.37 | ± 9.6 % |
| 10966 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.55 | ± 9.6 % |
| 10967 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.42 | ± 9.6 % |
| 10968 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.49 | ± 9.6 % |

[1] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

## Appendix A.4 Dipole Calibration certificate (D750V3_1096)

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

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

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**

**Accreditation No.: SCS 0108**

**Client** BV Korea (Dymstec) **Certificate No: D750V3-1096_Apr19**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D750V3 - SN:1096 |
| Calibration procedure(s) | QA CAL-05.v11<br>Calibration Procedure for SAR Validation Sources between 0.7-3 GHz |
| Calibration date: | April 25, 2019 |

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 03-Apr-19 (No. 217-02892/02893) | Apr-20 |
| Power sensor NRP-Z91 | SN: 103244 | 03-Apr-19 (No. 217-02892) | Apr-20 |
| Power sensor NRP-Z91 | SN: 103245 | 03-Apr-19 (No. 217-02893) | Apr-20 |
| Reference 20 dB Attenuator | SN: 5058 (20k) | 04-Apr-19 (No. 217-02894) | Apr-20 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 04-Apr-19 (No. 217-02895) | Apr-20 |
| Reference Probe EX3DV4 | SN: 7349 | 31-Dec-18 (No. EX3-7349_Dec18) | Dec-19 |
| DAE4 | SN: 601 | 04-Oct-18 (No. DAE4-601_Oct18) | Oct-19 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter E4419B | SN: GB39512475 | 07-Oct-15 (in house check Feb-19) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: MY41092317 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-18) | In house check: Oct-20 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-18) | In house check: Oct-19 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Claudio Leubler | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: April 25, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D750V3-1096_Apr19 Page 1 of 8

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

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

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**

**Accreditation No.: SCS 0108**

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | 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%.

## Measurement Conditions

DASY system 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 | 42.0 ± 6 % | 0.88 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 2.06 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **8.32 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 1.34 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **5.40 W/kg ± 16.5 % (k=2)** |

## Body TSL parameters

The following parameters and calculations were applied.

| | **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 | 53.9 ± 6 % | 0.99 mho/m ± 6 % |
| **Body TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Body TSL

| **SAR averaged over 1 cm³ (1 g) of Body TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 2.16 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **8.39 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Body TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 1.42 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **5.55 W/kg ± 16.5 % (k=2)** |

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

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 54.8 Ω + 0.2 jΩ |
| Return Loss | - 26.8 dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 50.4 Ω - 2.9 jΩ |
| Return Loss | - 30.6 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.030 ns |

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 |

**DASY5 Validation Report for Head TSL**

Date: 25.04.2019

Test Laboratory: SPEAG, Zurich, Switzerland

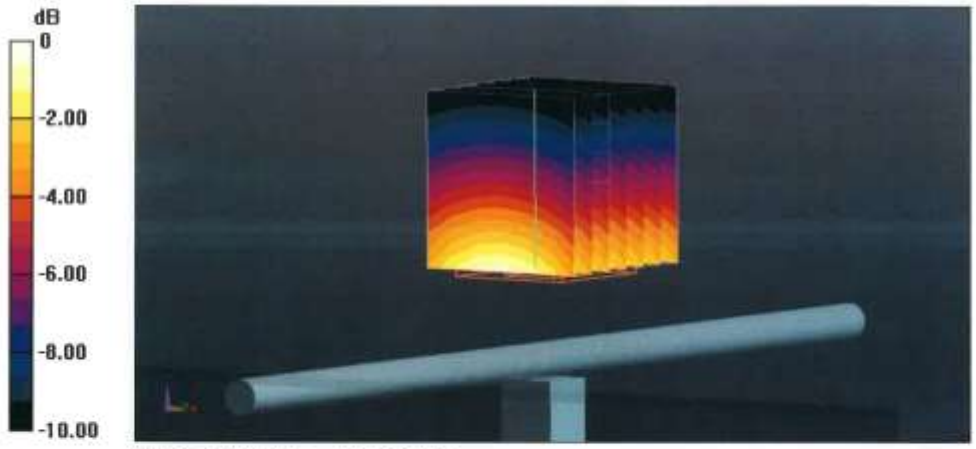
**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1096**

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma$ = 0.88 S/m; $\varepsilon_r$ = 42; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

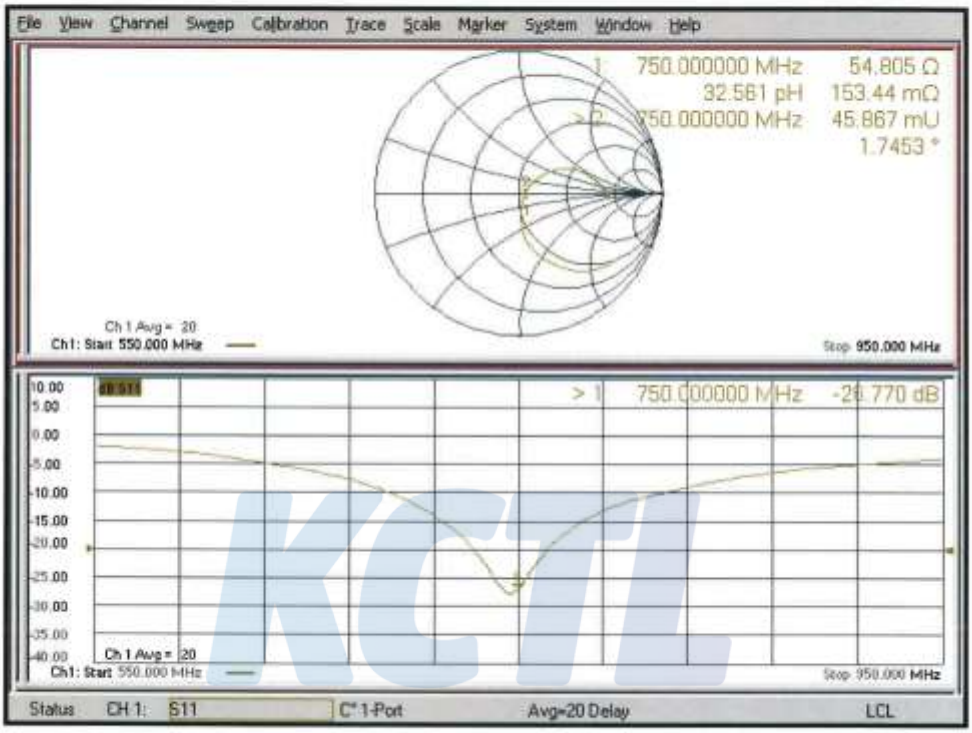
- Probe: EX3DV4 - SN7349; ConvF(10.32, 10.32, 10.32) @ 750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**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 = 59.55 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.11 W/kg
**SAR(1 g) = 2.06 W/kg; SAR(10 g) = 1.34 W/kg**
Maximum value of SAR (measured) = 2.76 W/kg




0 dB = 2.76 W/kg = 4.41 dBW/kg

**Impedance Measurement Plot for Head TSL**



**DASY5 Validation Report for Body TSL**

Date: 25.04.2019

Test Laboratory: SPEAG, Zurich, Switzerland

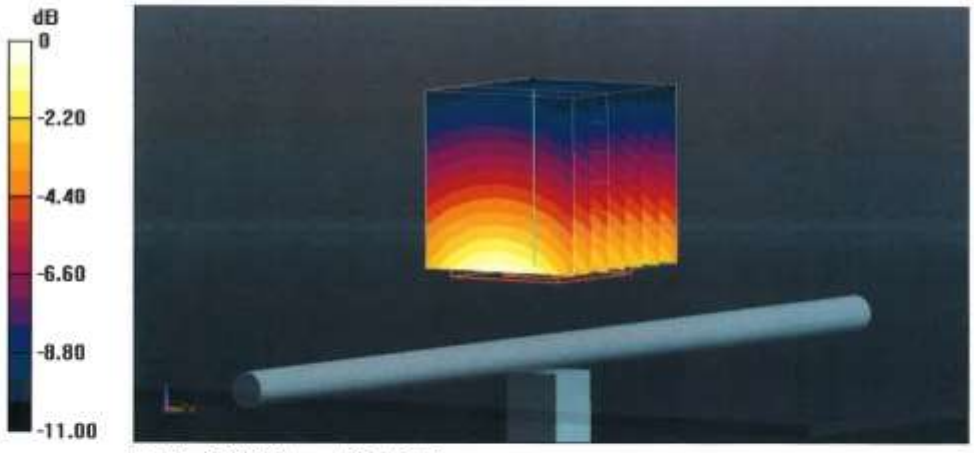
**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1096**

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma$ = 0.99 S/m; $\varepsilon_r$ = 53.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

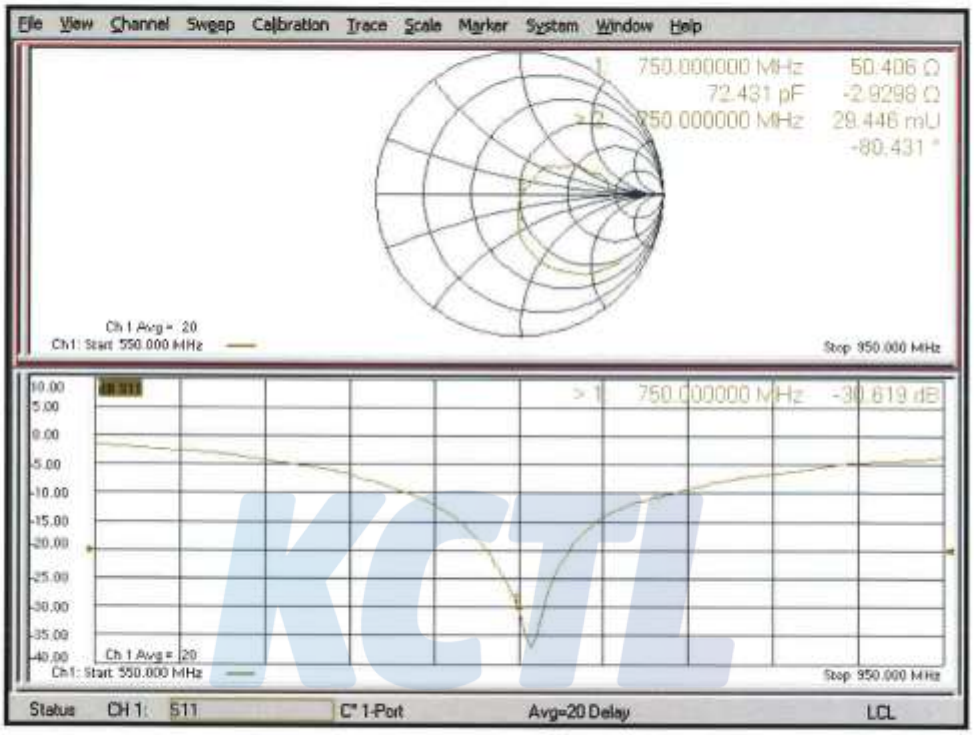
- Probe: EX3DV4 - SN7349; ConvF(10.29, 10.29, 10.29) @ 750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**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 = 54.91 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.23 W/kg
**SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.42 W/kg**
Maximum value of SAR (measured) = 2.88 W/kg




0 dB = 2.88 W/kg = 4.59 dBW/kg

**Impedance Measurement Plot for Body TSL**



## Appendix A.5 Dipole Calibration certificate (D850V2_1006)

**Calibration Laboratory of**
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**Zeughausstrasse 43, 8004 Zurich, Switzerland**

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**Accreditation No.: SCS 0108**

**Client** KCTL (Dymstec) **Certificate No: D850V2-1006_Apr20**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D850V2 - SN:1006 |
| Calibration procedure(s) | QA CAL-05.v11<br>Calibration Procedure for SAR Validation Sources between 0.7-3 GHz |
| Calibration date: | April 21, 2020 |

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 01-Apr-20 (No. 217-03100/03101) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103244 | 01-Apr-20 (No. 217-03100) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103245 | 01-Apr-20 (No. 217-03101) | Apr-21 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 31-Mar-20 (No. 217-03106) | Apr-21 |
| Type-N mismatch combination | SN: 310982 / 06327 | 31-Mar-20 (No. 217-03104) | Apr-21 |
| Reference Probe EX3DV4 | SN: 7349 | 31-Dec-19 (No. EX3-7349_Dec19) | Dec-20 |
| DAE4 | SN: 601 | 27-Dec-19 (No. DAE4-601_Dec19) | Dec-20 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Feb-19) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: MY41092317 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-18) | In house check: Oct-20 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeton Kastrati | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: April 24, 2020

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D850V2-1006_Apr20 Page 1 of 6

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Accreditation No.: SCS 0108

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | 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%.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.10.4 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 15 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 850 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 41.5 | 0.92 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 42.1 ± 6 % | 0.93 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 2.50 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **9.95 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 $cm^3$ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 1.62 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **6.45 W/kg ± 16.5 % (k=2)** |

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

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 51.7 Ω - 2.5 jΩ |
| Return Loss | - 30.4 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.434 ns |

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 |

**DASY5 Validation Report for Head TSL**

Date: 21.04.2020

Test Laboratory: SPEAG, Zurich, Switzerland

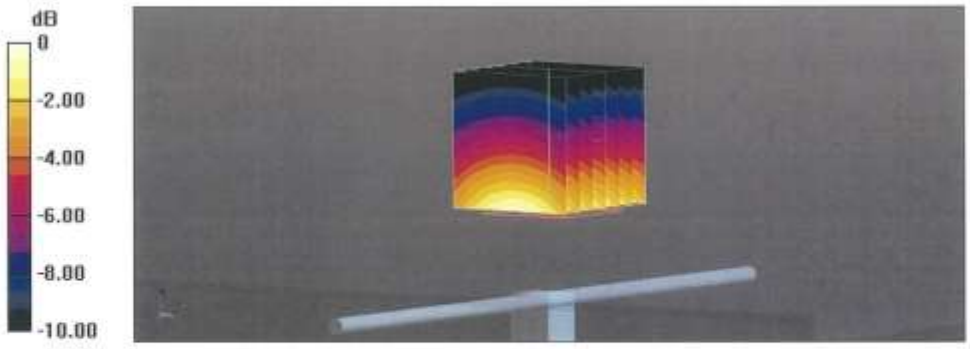
**DUT: Dipole 850 MHz; Type: D850V2; Serial: D850V2 - SN:1006**

Communication System: UID 0 - CW; Frequency: 850 MHz
Medium parameters used: f = 850 MHz; $\sigma$ = 0.93 S/m; $\varepsilon_r$ = 42.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

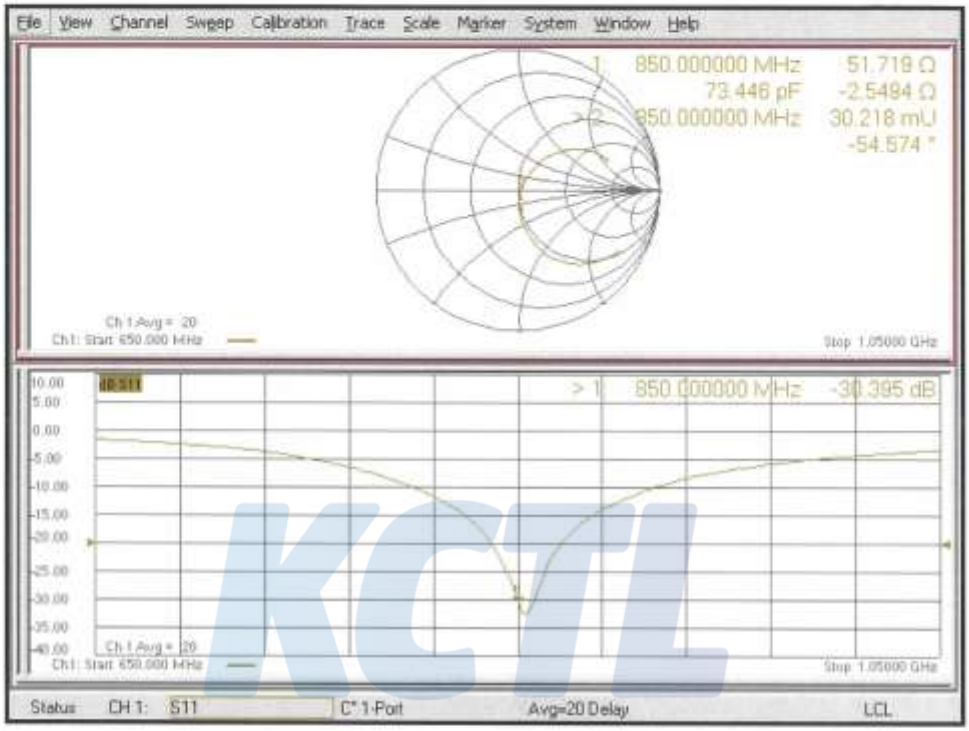
- Probe: EX3DV4 - SN7349; ConvF(9.78, 9.78, 9.78) @ 850 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**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 = 63.51 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.77 W/kg
**SAR(1 g) = 2.5 W/kg; SAR(10 g) = 1.62 W/kg**
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 66%
Maximum value of SAR (measured) = 3.34 W/kg




0 dB = 3.34 W/kg = 5.24 dBW/kg

**Impedance Measurement Plot for Head TSL**



## Appendix A.6 Dipole Calibration certificate (D1750V2_1072)

**Calibration Laboratory of**
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Engineering AG
**Zeughausstrasse 43, 8004 Zurich, Switzerland**

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**Accreditation No.: SCS 0108**

**Client** KCTL (Dymstec)

**Certificate No: D1750V2-1072_Apr20**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1750V2 - SN:1072 |
| Calibration procedure(s) | QA CAL-05.v11<br>Calibration Procedure for SAR Validation Sources between 0.7-3 GHz |
| Calibration date: | April 20, 2020 |

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 01-Apr-20 (No. 217-03100/03101) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103244 | 01-Apr-20 (No. 217-03100) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103245 | 01-Apr-20 (No. 217-03101) | Apr-21 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 31-Mar-20 (No. 217-03106) | Apr-21 |
| Type-N mismatch combination | SN: 310982 / 06327 | 31-Mar-20 (No. 217-03104) | Apr-21 |
| Reference Probe EX3DV4 | SN: 7349 | 31-Dec-19 (No. EX3-7349_Dec19) | Dec-20 |
| DAE4 | SN: 601 | 27-Dec-19 (No. DAE4-601_Dec19) | Dec-20 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Feb-19) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: MY41092317 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-18) | In house check: Oct-20 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Claudio Leubler | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: April 21, 2020

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D1750V2-1072_Apr20 Page 1 of 6

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

Accreditation No.: SCS 0108

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | 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%.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.10.4 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 1750 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 40.1 | 1.37 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 40.5 ± 6 % | 1.35 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 9.02 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **36.5 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 $cm^3$ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 4.75 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **19.1 W/kg ± 16.5 % (k=2)** |

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

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 50.8 Ω - 0.7 jΩ |
| Return Loss | - 39.4 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.217 ns |

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 |

**DASY5 Validation Report for Head TSL**

Date: 20.04.2020

Test Laboratory: SPEAG, Zurich, Switzerland

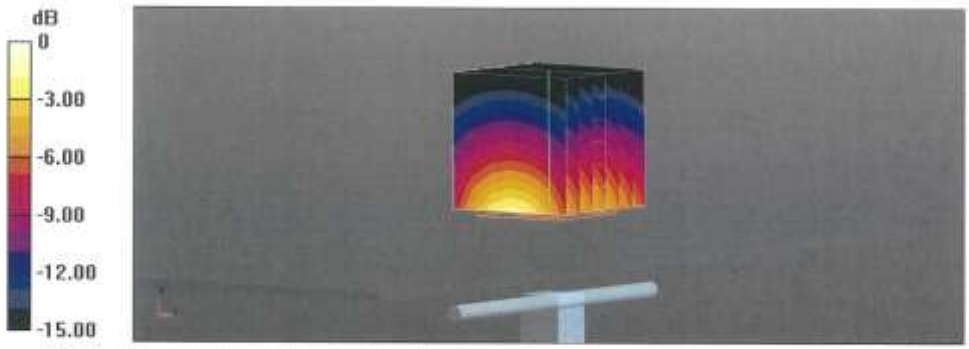
**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1072**

Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; $\sigma$ = 1.35 S/m; $\varepsilon_r$ = 40.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

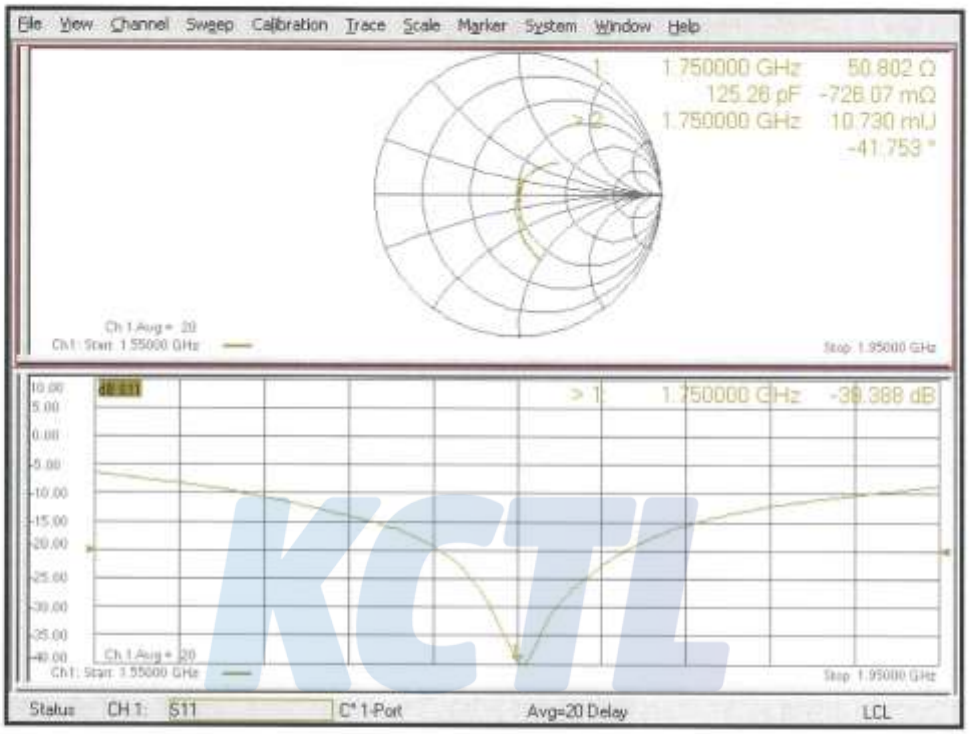
- Probe: EX3DV4 - SN7349; ConvF(8.76, 8.76, 8.76) @ 1750 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.3 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 16.9 W/kg
**SAR(1 g) = 9.02 W/kg; SAR(10 g) = 4.75 W/kg**
Smallest distance from peaks to all points 3 dB below = 10 mm
Ratio of SAR at M2 to SAR at M1 = 53.7%
Maximum value of SAR (measured) = 14.1 W/kg




0 dB = 14.1 W/kg = 11.49 dBW/kg

**Impedance Measurement Plot for Head TSL**



## Appendix A.7 Dipole Calibration certificate (D1900V2_5d160)

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

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S Servizio svizzero di taratura
Swiss Calibration Service

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**

**Accreditation No.: SCS 0108**

**Client** KCTL (Dymstec)

**Certificate No: D1900V2-5d160_Apr20**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1900V2 - SN:5d160 |
| Calibration procedure(s) | QA CAL-05.v11<br>Calibration Procedure for SAR Validation Sources between 0.7-3 GHz |
| Calibration date: | April 22, 2020 |

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 01-Apr-20 (No. 217-03100/03101) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103244 | 01-Apr-20 (No. 217-03100) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103245 | 01-Apr-20 (No. 217-03101) | Apr-21 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 31-Mar-20 (No. 217-03106) | Apr-21 |
| Type-N mismatch combination | SN: 310982 / 06327 | 31-Mar-20 (No. 217-03104) | Apr-21 |
| Reference Probe EX3DV4 | SN: 7349 | 31-Dec-19 (No. EX3-7349_Dec19) | Dec-20 |
| DAE4 | SN: 601 | 27-Dec-19 (No. DAE4-601_Dec19) | Dec-20 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter E4419B | SN: GB38512475 | 30-Oct-14 (in house check Feb-19) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: MY41092317 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-18) | In house check: Oct-20 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeffrey Katzman | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: April 24, 2020

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Certificate No: D1900V2-5d160_Apr20 Page 1 of 6

**Calibration Laboratory of**
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S Swiss Calibration Service

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

Accreditation No.: SCS 0108

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | 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%.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.10.4 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 1900 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 40.0 | 1.40 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 41.1 ± 6 % | 1.39 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 9.75 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **39.4 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 5.10 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **20.5 W/kg ± 16.5 % (k=2)** |

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

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 50.8 Ω + 5.9 jΩ |
| Return Loss | - 24.7 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.195 ns |

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 |

**DASY5 Validation Report for Head TSL**

Date: 22.04.2020

Test Laboratory: SPEAG, Zurich, Switzerland

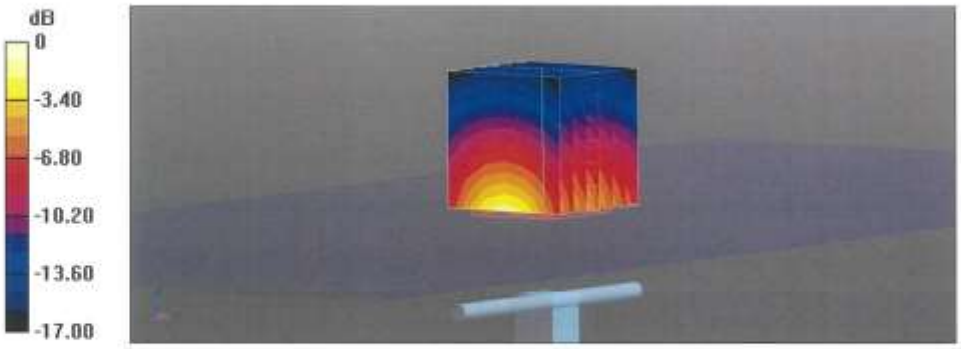
**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d160**

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.39 S/m; $\varepsilon_r$ = 41.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

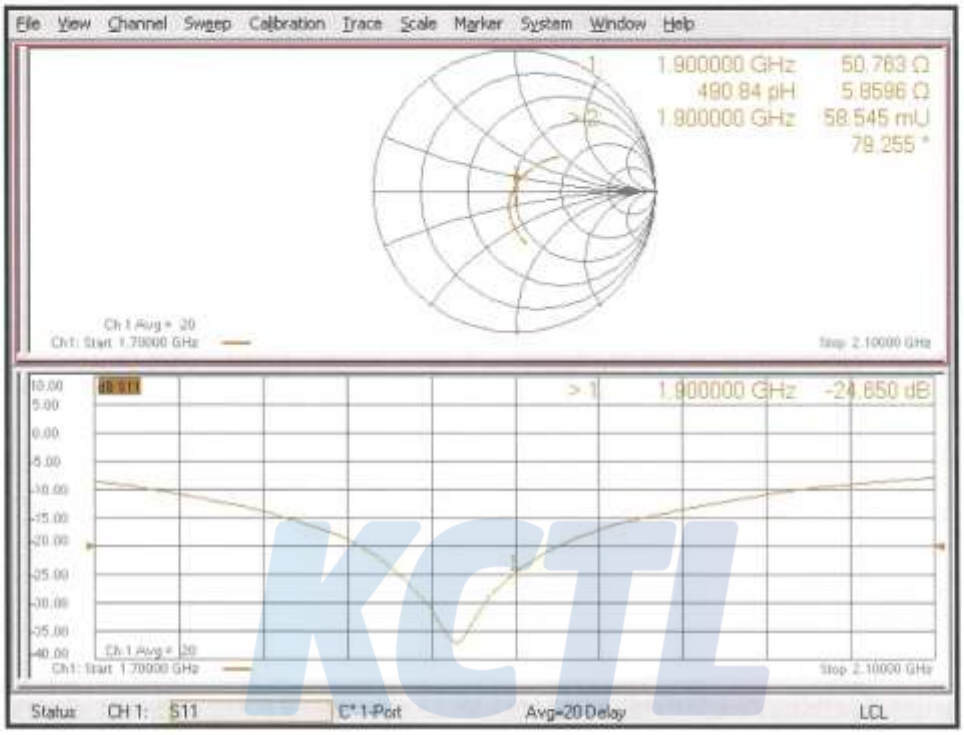
- Probe: EX3DV4 - SN7349; ConvF(8.6, 8.6, 8.6) @ 1900 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.8 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 18.1 W/kg
**SAR(1 g) = 9.75 W/kg; SAR(10 g) = 5.10 W/kg**
Smallest distance from peaks to all points 3 dB below = 10 mm
Ratio of SAR at M2 to SAR at M1 = 54.3%
Maximum value of SAR (measured) = 15.2 W/kg




0 dB = 15.2 W/kg = 11.82 dBW/kg

**Impedance Measurement Plot for Head TSL**



## Appendix A.8 Dipole Calibration certificate (D2450V2_895)

**Calibration Laboratory of**
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client KCTL (Dymstec)

Certificate No: D2450V2-895_Jul20

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D2450V2 - SN:895 |
| Calibration procedure(s) | QA CAL-05.v11<br>Calibration Procedure for SAR Validation Sources between 0.7-3 GHz |
| Calibration date: | July 21, 2020 |

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 01-Apr-20 (No. 217-03100/03101) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103244 | 01-Apr-20 (No. 217-03100) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103245 | 01-Apr-20 (No. 217-03101) | Apr-21 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 31-Mar-20 (No. 217-03106) | Apr-21 |
| Type-N mismatch combination | SN: 310982 / 06327 | 31-Mar-20 (No. 217-03104) | Apr-21 |
| Reference Probe EX3DV4 | SN: 7349 | 29-Jun-20 (No. EX3-7349_Jun20) | Jun-21 |
| DAE4 | SN: 601 | 27-Dec-19 (No. DAE4-601_Dec19) | Dec-20 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Feb-19) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: MY41092317 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-18) | In house check: Oct-20 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeffrey Katzman | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: July 23, 2020

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Certificate No: D2450V2-895_Jul20 Page 1 of 6

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S Swiss Calibration Service

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

Accreditation No.: SCS 0108

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | 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%.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.10.4 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 2450 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 39.2 | 1.80 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 38.5 ± 6 % | 1.84 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 13.3 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **52.4 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 6.12 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **24.3 W/kg ± 16.5 % (k=2)** |

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

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 55.5 Ω + 3.5 jΩ |
| Return Loss | - 24.2 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.158 ns |

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 |

## DASY5 Validation Report for Head TSL

Date: 21.07.2020

Test Laboratory: SPEAG, Zurich, Switzerland

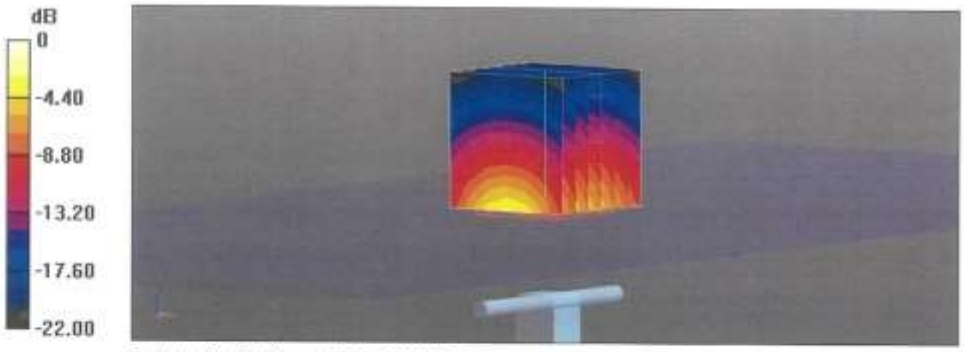
**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 895**

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; $\sigma$ = 1.84 S/m; $\varepsilon_r$ = 38.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

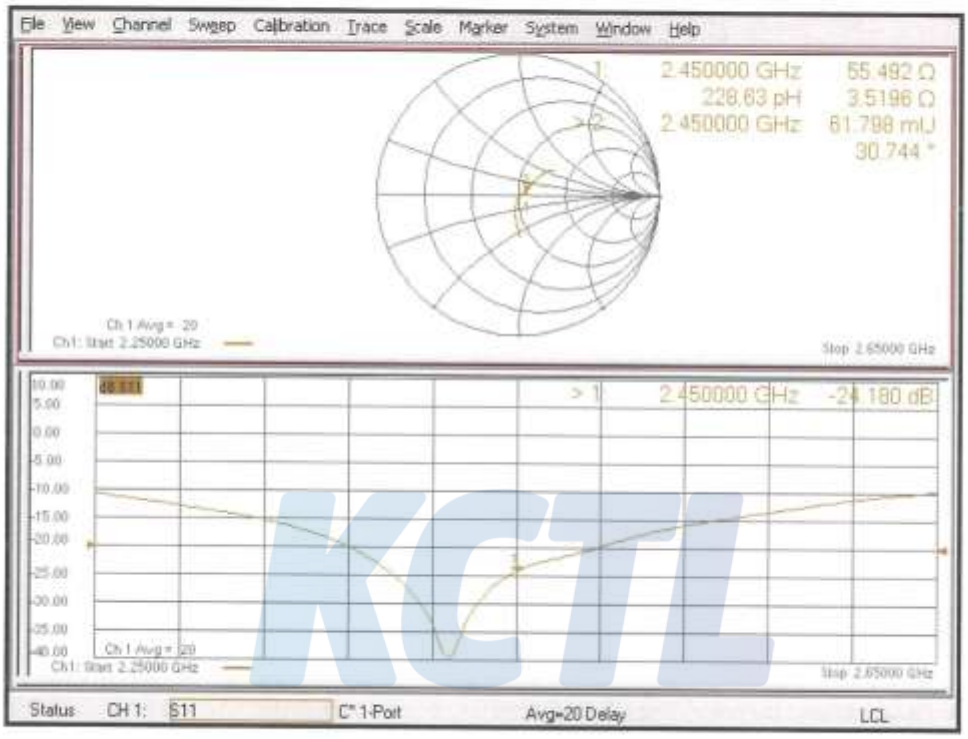
- Probe: EX3DV4 - SN7349; ConvF(7.74, 7.74, 7.74) @ 2450 MHz; Calibrated: 29.06.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 117.4 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 26.4 W/kg
**SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.12 W/kg**
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 50.2%
Maximum value of SAR (measured) = 22.0 W/kg




0 dB = 22.0 W/kg = 13.42 dBW/kg

**Impedance Measurement Plot for Head TSL**



## Appendix A.9 Dipole Calibration certificate (D2600V2_1050)

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

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Accreditation No.: SCS 0108

Client KCTL (Dymstec)

Certificate No: D2600V2-1050_Jul20

# CALIBRATION CERTIFICATE

Object D2600V2 - SN:1050

Calibration procedure(s) QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: July 21, 2020

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 01-Apr-20 (No. 217-03100/03101) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103244 | 01-Apr-20 (No. 217-03100) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103245 | 01-Apr-20 (No. 217-03101) | Apr-21 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 31-Mar-20 (No. 217-03106) | Apr-21 |
| Type-N mismatch combination | SN: 310982 / 06327 | 31-Mar-20 (No. 217-03104) | Apr-21 |
| Reference Probe EX3DV4 | SN: 7349 | 29-Jun-20 (No. EX3-7349_Jun20) | Jun-21 |
| DAE4 | SN: 601 | 27-Dec-19 (No. DAE4-601_Dec19) | Dec-20 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Feb-19) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: MY41092317 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-18) | In house check: Oct-20 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeffrey Katzman | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: July 23, 2020

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Certificate No: D2600V2-1050_Jul20 Page 1 of 6

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Accreditation No.: SCS 0108

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | 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%.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.10.4 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 2600 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 39.0 | 1.96 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 37.9 ± 6 % | 2.01 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 14.3 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **56.2 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 6.30 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **24.9 W/kg ± 16.5 % (k=2)** |

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

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 48.8 Ω - 6.4 jΩ |
| Return Loss | - 23.6 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.150 ns |

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 |

**DASY5 Validation Report for Head TSL**

Date: 21.07.2020

Test Laboratory: SPEAG, Zurich, Switzerland

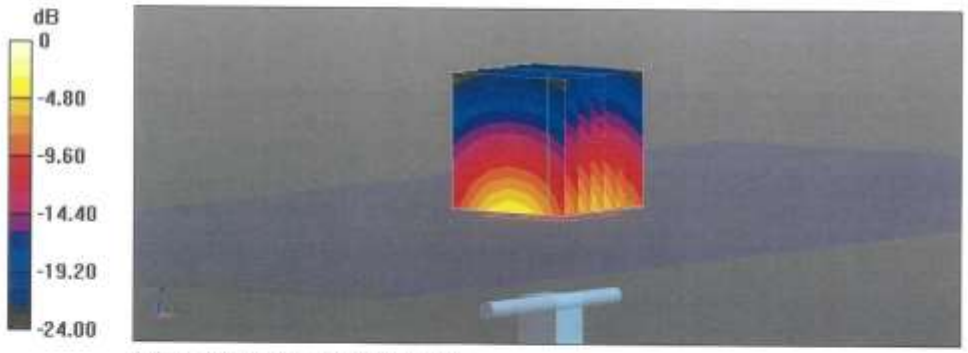
**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1050**

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; $\sigma$ = 2.01 S/m; $\varepsilon_r$ = 37.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

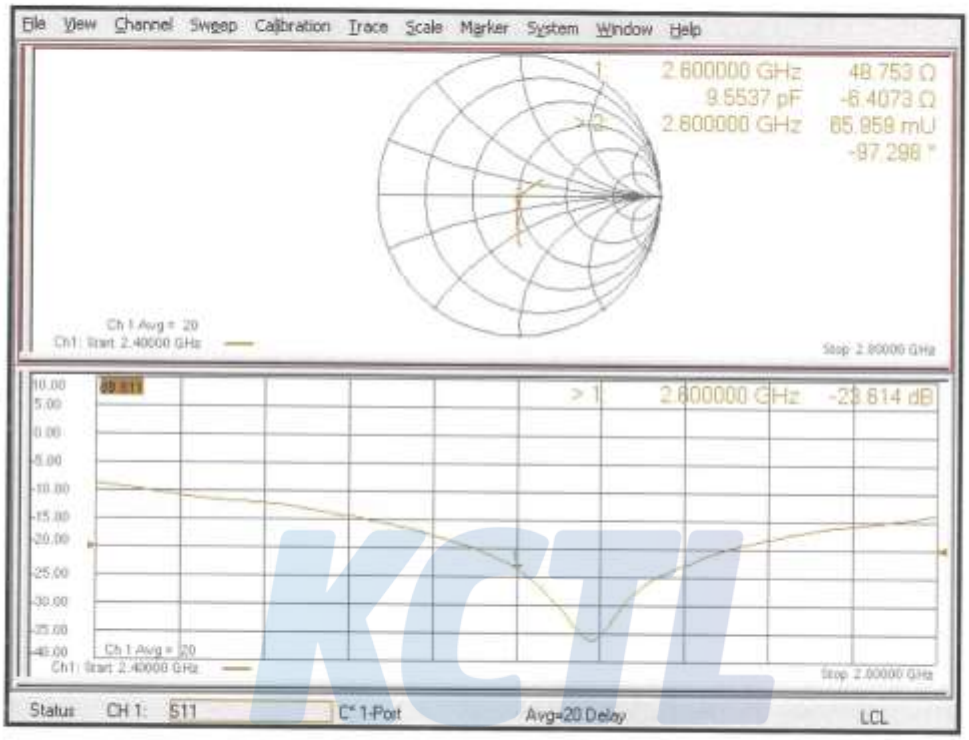
- Probe: EX3DV4 - SN7349; ConvF(7.54, 7.54, 7.54) @ 2600 MHz; Calibrated: 29.06.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 120.5 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 29.4 W/kg
**SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.30 W/kg**
Smallest distance from peaks to all points 3 dB below = 8.9 mm
Ratio of SAR at M2 to SAR at M1 = 48.7%
Maximum value of SAR (measured) = 24.3 W/kg




0 dB = 24.3 W/kg = 13.86 dBW/kg

**Impedance Measurement Plot for Head TSL**



## Appendix A.10 Dipole Calibration certificate (D5GHzV2_1134)

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

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

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**

**Accreditation No.: SCS 0108**

**Client** KCTL (Dymstec)

**Certificate No: D5GHzV2-1134_May20**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D5GHzV2 - SN:1134 |
| Calibration procedure(s) | QA CAL-22.v4<br>Calibration Procedure for SAR Validation Sources between 3-6 GHz |
| Calibration date: | May 20, 2020 |

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 01-Apr-20 (No. 217-03100/03101) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103244 | 01-Apr-20 (No. 217-03100) | Apr-21 |
| Power sensor NRP-Z91 | SN: 103245 | 01-Apr-20 (No. 217-03101) | Apr-21 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 31-Mar-20 (No. 217-03106) | Apr-21 |
| Type-N mismatch combination | SN: 310982 / 06327 | 31-Mar-20 (No. 217-03104) | Apr-21 |
| Reference Probe EX3DV4 | SN: 3503 | 31-Dec-19 (No. EX3-3503_Dec19) | Dec-20 |
| DAE4 | SN: 601 | 27-Dec-19 (No. DAE4-601_Dec19) | Dec-20 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Feb-19) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| Power sensor HP 8481A | SN: MY41092317 | 07-Oct-15 (in house check Oct-18) | In house check: Oct-20 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-18) | In house check: Oct-20 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeffrey Katzman | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: May 20, 2020

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D5GHzV2-1134_May20 Page 1 of 9

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

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

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

Accreditation No.: SCS 0108

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | 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%.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.10.4 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom V5.0 | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy = 10.0 mm, dz = 10.0 mm | Graded Ratio = 1.4 (Z direction) |
| **Frequency** | 5200 MHz ± 1 MHz<br>5300 MHz ± 1 MHz<br>5500 MHz ± 1 MHz<br>5600 MHz ± 1 MHz<br>5800 MHz ± 1 MHz | |

## Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 36.0 | 4.66 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 35.4 ± 6 % | 4.49 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | — | ---- |

## SAR result with Head TSL at 5200 MHz

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 100 mW input power | 7.93 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **79.0 W/kg ± 19.9 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 100 mW input power | 2.25 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **22.4 W/kg ± 19.5 % (k=2)** |

### Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 35.9 | 4.76 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 35.3 ± 6 % | 4.60 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | — | — |

### SAR result with Head TSL at 5300 MHz

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 100 mW input power | 8.26 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **82.3 W/kg ± 19.9 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 100 mW input power | 2.34 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **23.2 W/kg ± 19.5 % (k=2)** |

### Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 35.6 | 4.96 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 35.0 ± 6 % | 4.80 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | — | — |

### SAR result with Head TSL at 5500 MHz

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 100 mW input power | 8.64 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **86.0 W/kg ± 19.9 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 100 mW input power | 2.43 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **24.2 W/kg ± 19.5 % (k=2)** |

### Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 35.5 | 5.07 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 34.8 ± 6 % | 4.90 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | — | — |

### SAR result with Head TSL at 5600 MHz

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 100 mW input power | 8.46 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **84.1 W/kg ± 19.9 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 100 mW input power | 2.40 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **23.8 W/kg ± 19.5 % (k=2)** |

### Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 35.3 | 5.27 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 34.5 ± 6 % | 5.11 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | — | — |

### SAR result with Head TSL at 5800 MHz

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 100 mW input power | 8.20 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **81.5 W/kg ± 19.9 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 100 mW input power | 2.29 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **22.7 W/kg ± 19.5 % (k=2)** |

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

### Antenna Parameters with Head TSL at 5200 MHz

| | |
|---|---|
| Impedance, transformed to feed point | 48.8 Ω - 9.8 jΩ |
| Return Loss | - 20.1 dB |

### Antenna Parameters with Head TSL at 5300 MHz

| | |
|---|---|
| Impedance, transformed to feed point | 49.5 Ω - 7.8 jΩ |
| Return Loss | - 22.1 dB |

### Antenna Parameters with Head TSL at 5500 MHz

| | |
|---|---|
| Impedance, transformed to feed point | 51.2 Ω - 4.0 jΩ |
| Return Loss | - 27.8 dB |

### Antenna Parameters with Head TSL at 5600 MHz

| | |
|---|---|
| Impedance, transformed to feed point | 53.7 Ω - 3.1 jΩ |
| Return Loss | - 26.6 dB |

### Antenna Parameters with Head TSL at 5800 MHz

| | |
|---|---|
| Impedance, transformed to feed point | 54.1 Ω - 3.7 jΩ |
| Return Loss | - 25.4 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.203 ns |

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 |

**DASY5 Validation Report for Head TSL**

Date: 20.05.2020

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1134**

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; $\sigma$ = 4.49 S/m; $\varepsilon_r$ = 35.4; $\rho$ = 1000 kg/m$^3$ ,
Medium parameters used: f = 5300 MHz; $\sigma$ = 4.60 S/m; $\varepsilon_r$ = 35.3; $\rho$ = 1000 kg/m$^3$ ,
Medium parameters used: f = 5500 MHz; $\sigma$ = 4.80 S/m; $\varepsilon_r$ = 35.0; $\rho$ = 1000 kg/m$^3$ ,
Medium parameters used: f = 5600 MHz; $\sigma$ = 4.90 S/m; $\varepsilon_r$ = 34.8; $\rho$ = 1000 kg/m$^3$ ,
Medium parameters used: f = 5800 MHz; $\sigma$ = 5.11 S/m; $\varepsilon_r$ = 34.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.8, 5.8, 5.8) @ 5200 MHz, ConvF(5.49, 5.49, 5.49) @ 5300 MHz, ConvF(5.25, 5.25, 5.25) @ 5500 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.01, 5.01, 5.01) @ 5800 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

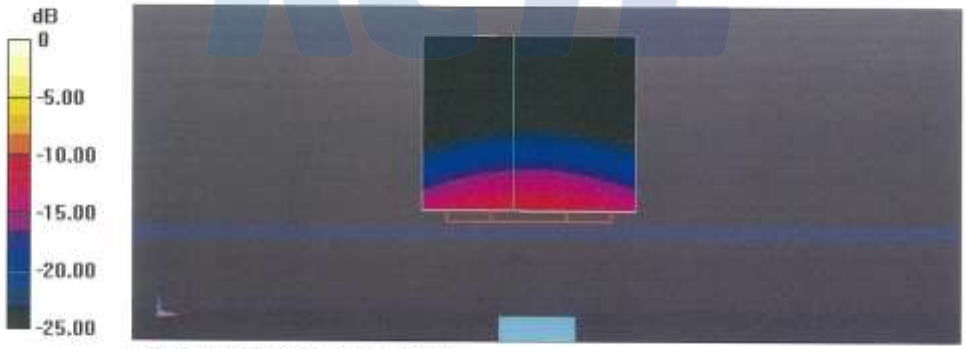
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 76.98 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 28.4 W/kg
**SAR(1 g) = 7.93 W/kg; SAR(10 g) = 2.25 W/kg**
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 68.9%
Maximum value of SAR (measured) = 17.8 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 78.24 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 29.7 W/kg
**SAR(1 g) = 8.26 W/kg; SAR(10 g) = 2.34 W/kg**
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 68.8%
Maximum value of SAR (measured) = 18.6 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 77.84 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 33.6 W/kg
**SAR(1 g) = 8.64 W/kg; SAR(10 g) = 2.43 W/kg**
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.2%
Maximum value of SAR (measured) = 20.0 W/kg

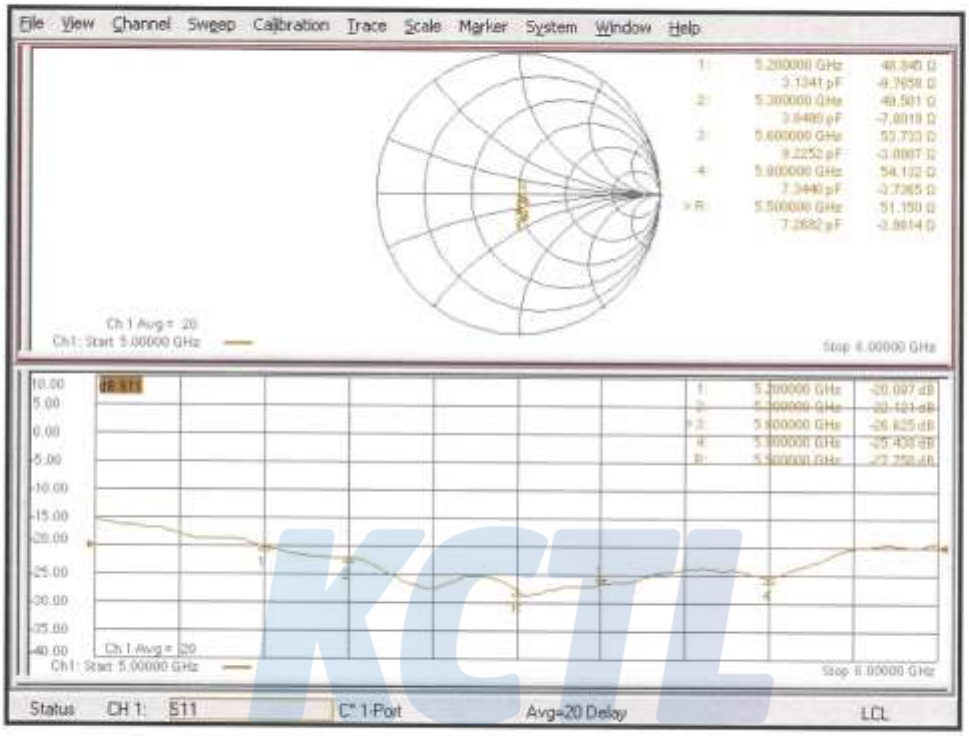
**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 77.98 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 31.8 W/kg
**SAR(1 g) = 8.46 W/kg; SAR(10 g) = 2.4 W/kg**
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.9%
Maximum value of SAR (measured) = 19.8 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.71 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 33.0 W/kg
**SAR(1 g) = 8.20 W/kg; SAR(10 g) = 2.29 W/kg**
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.1%
Maximum value of SAR (measured) = 19.5 W/kg




0 dB = 20.0 W/kg = 13.01 dBW/kg

**Impedance Measurement Plot for Head TSL**



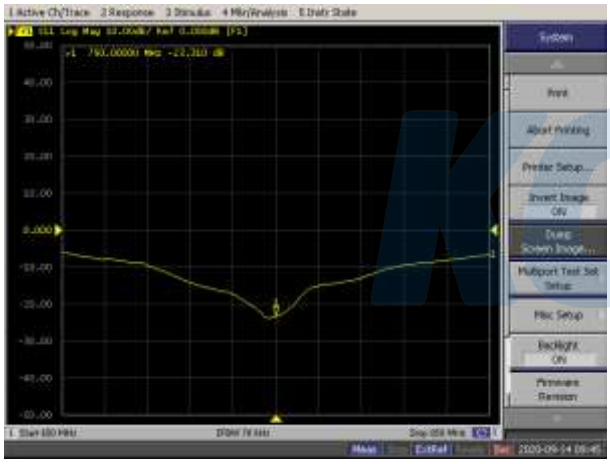
## Appendix A.11 Justification for Extended SAR Dipole Calibrations

Instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements

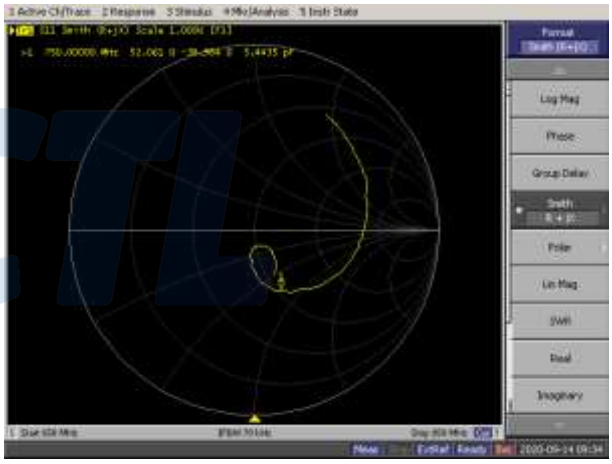
KDB 865664 D01v01r04 requirements
a) Return loss: < - 20 dB, within 20 % of previous measurement
b) Impedance: within 5 Ω from previous measurement.

**750 MHz**

| Dipole Antenna | Head/Body | Date of Measurement | Return Loss (dB) | △ % | Impedance (Ω) | Δ Ω |
|---|---|---|---|---|---|---|
| D750V3 SN 1096 | Head | 2019-04-25 | -26.8 | 12.9 | 54.8 | 2.7 |
| | | 2020-09-14 | -23.3 | | 52.1 | |



**< Figure 1. Measurement result of Head Return Loss>**



**< Figure 2. Measurement result of Head Impedance>**

c) Extrapolated peak SAR: within 15% of that reported in the calibration data

| Dipole Antenna | Head/Body | Date of Measurement | extrapolated peak SAR (W/kg) | △ % |
|---|---|---|---|---|
| D750V3 SN 1096 | Head | 2019-04-25 | 12.44 | - |
| | | 2020-09-14 | 11.84 | 4.82 |
| | | 2020-09-15 | 11.96 | -3.86 |
| | | 2020-09-16 | 11.44 | -8.04 |
| | | 2020-09-17 | 11.88 | -4.50 |

## Appendix B. SAR Tissue Specification

The brain mixtures consist of a viscous gel using hydrox-ethl cellullose(HEC) gelling agent and saline solution. Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue.

| **Frequency (㎒)** | **750 ~ 835** | | **1 750** | | **1 900** | | **2 450** | | **5 200 ~ 5 800** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tissue Type** | Head | Body | Head | Body | Head | Body | Head | Body | Head | Body |
| **Ingredient** | **% by weight** | | | | | | | | | |
| Water | 40.29 | 51.97 | 53.00 | 68.00 | 55.00 | 70.50 | 72.00 | 73.00 | 65.52 | 80.00 |
| Salt (NaCl) | 1.38 | 0.93 | 0.40 | 0.20 | 0.35 | 0.30 | 0.10 | 0.10 | 0 | 0 |
| Sugar | 57.90 | 47.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HEC | 0.24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bactericide | 0.19 | 0.10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Triton X-100 | 0 | 0 | 0 | 0 | 0 | 0 | 20.00 | 0 | 17.24 | 0 |
| DGBE | 0 | 0 | 46.60 | 31.80 | 44.65 | 29.20 | 0 | 26.90 | 0 | 0 |
| Diethylene glycol hexyl ether | 0 | 0 | 0 | 0 | 0 | 0 | 7.90 | 0 | 17.24 | 0 |
| Polysorbate (Tween) 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20.00 |
| **Tissue parameter target by C. Gabriel and G. Harts grove.** | | | | | | | | | | |

Salt: 99 % Pure Sodium Chloride
Sucrose: 98 % Pure Sucrose
Water: De-ionized, 16 M resistivity
HEC: Hydroxyethyl Cellulose
DGBE: 99 % Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy) ethanol]
Triton X-100(ultra-pure): Polyethylene glycol mono[4-(1,1,3,3-tetramethybutyl)phenyl] ether

# Appendix C. Downlink LTE CA RF Conducted Power

## C.1 LTE Downlink Carrier Aggregation

The tables below show the supported frequency bands of the device for DL Inter-band and DL Intra-band combinations.

Power measurements were performed on the channel with the highest maximum output power from Tune-up Procedure.

In applying the power measurement procedures of KDB 941225 D05A for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the subset in each row with the largest combination of frequency bands and CCs

| Index | 2CC | Restriction | Completely Covered by Measurement Superset |
|---|---|---|---|
| 2CC #1 | CA_2C | N/A | No |
| 2CC #2 | CA_2A-2A | N/A | 3CC #1 |
| 2CC #3 | CA_2A-4A | N/A | 3CC #1 |
| 2CC #4 | CA_2A-5A | N/A | 3CC #2 |
| 2CC #5 | CA_2A-7A | N/A | 3CC #10 |
| 2CC #6 | CA_2A-12A | N/A | 3CC #3 |
| 2CC #7 | CA_2A-13A | N/A | 3CC #4 |
| 2CC #8 | CA_2A-29A | 29A SCC Only | 3CC #5 |
| 2CC #9 | CA_2A-66A | N/A | 3CC #6 |
| 2CC #10 | CA_2A-71A | N/A | 3CC #7 |
| 2CC #11 | CA_4A-4A | N/A | 3CC #8 |
| 2CC #12 | CA_4A-5A | N/A | 3CC #9 |
| 2CC #13 | CA_4A-7A | N/A | 3CC #10 |
| 2CC #14 | CA_4A-12A | N/A | 3CC #11 |
| 2CC #15 | CA_4A-13A | N/A | 3CC #12 |
| 2CC #16 | CA_4A-71A | N/A | 3CC #13 |
| 2CC #17 | CA_5A-7A | N/A | No |
| 2CC #18 | CA_5A-66A | N/A | 3CC #14 |
| 2CC #19 | CA_7A-7A | N/A | 3CC #15 |
| 2CC #20 | CA_7A-12A | N/A | 3CC #16 |
| 2CC #21 | CA_7A-66A | N/A | 3CC #17 |
| 2CC #22 | CA_7C | N/A | 3CC #18 |
| 2CC #23 | CA_12A-66A | N/A | 3CC #19 |
| 2CC #24 | CA_13A-66A | N/A | 3CC #20 |
| 2CC #25 | CA_25A-25A | N/A | No |
| 2CC #26 | CA_41C | N/A | No |
| 2CC #27 | CA_66A-29A | 29A SCC Only | 3CC #21 |
| 2CC #28 | CA_66A-66A | N/A | 3CC #22 |
| 2CC #29 | CA_66A-71A | N/A | 3CC #23 |
| 2CC #30 | CA_66B | N/A | 3CC #24 |
| 2CC #31 | CA_66C | N/A | 3CC #25 |

| Index | 3CC | Restriction | Completely Covered by Measurement Superset |
|---|---|---|---|
| 3CC #1 | CA_2A-2A-4A | N/A | No |
| 3CC #2 | CA_2A-2A-5A | N/A | No |
| 3CC #3 | CA_2A-2A-12A | N/A | No |
| 3CC #4 | CA_2A-2A-13A | N/A | No |
| 3CC #5 | CA_2A-2A-29A | 29A SCC Only | No |
| 3CC #6 | CA_2A-2A-66A | N/A | No |
| 3CC #7 | CA_2A-2A-71A | N/A | No |
| 3CC #8 | CA_2A-4A-4A | N/A | No |
| 3CC #9 | CA_2A-4A-5A | N/A | No |
| 3CC #10 | CA_2A-4A-7A | N/A | No |
| 3CC #11 | CA_2A-4A-12A | N/A | No |
| 3CC #12 | CA_2A-4A-13A | N/A | No |
| 3CC #13 | CA_2A-4A-71A | N/A | No |
| 3CC #14 | CA_2A-5A-66A | N/A | No |
| 3CC #15 | CA_2A-7A-7A | N/A | No |
| 3CC #16 | CA_2A-7A-12A | N/A | No |
| 3CC #17 | CA_2A-7A-66A | N/A | No |
| 3CC #18 | CA_2A-7C | N/A | No |
| 3CC #19 | CA_2A-12A-66A | N/A | No |
| 3CC #20 | CA_2A-13A-66A | N/A | No |
| 3CC #21 | CA_2A-29A-66A | 29A SCC Only | No |
| 3CC #22 | CA_2A-66A-66A | N/A | No |
| 3CC #23 | CA_2A-66A-71A | N/A | No |
| 3CC #24 | CA_2A-66B | N/A | No |
| 3CC #25 | CA_2A-66C | N/A | No |
| 3CC #26 | CA_4A-4A-5A | N/A | No |
| 3CC #27 | CA_4A-4A-7A | N/A | No |
| 3CC #28 | CA_4A-4A-12A | N/A | No |
| 3CC #29 | CA_4A-4A-13A | N/A | No |
| 3CC #30 | CA_4A-4A-71A | N/A | No |
| 3CC #31 | CA_4A-7A-7A | N/A | No |
| 3CC #32 | CA_4A-7A-12A | N/A | No |
| 3CC #33 | CA_4A-7C | N/A | No |
| 3CC #34 | CA_5A-66A-66A | N/A | No |
| 3CC #35 | CA_5A-66B | N/A | No |
| 3CC #36 | CA_5A-66C | N/A | No |
| 3CC #37 | CA_7A-66A-66A | N/A | No |
| 3CC #38 | CA_12A-66A-66A | N/A | No |
| 3CC #39 | CA_13A-66A-66A | N/A | No |
| 3CC #40 | CA_13A-66B | N/A | No |
| 3CC #41 | CA_13A-66C | N/A | No |
| 3CC #42 | CA_66A-66C | N/A | No |
| 3CC #43 | CA_66A-66A-71A | N/A | No |

Note: Only yellow highlight cells need power measurement according to LTE DL CA SAR test

Exclusion in TCB workshop (April 2018).

In applying the power measurement procedures of KDB 941225 D05A for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the CA configuration with the largest aggregated DL CA BW in each frequency band, independently for contiguous and non-contiguous CA; however, if the same frequency band is used for both contiguous and non-contiguous CA, power measurement was performed using the configuration with the largest aggregated BW and maximum output power among contiguous and non-contiguous CA.

## C.2 Downlink Carrier Aggregation RF Conducted Powers

### C.2.1 LTE Band 2 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_2C | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 902 | 1960.2 | N/A | | | | 23.97 | 24.09 |
| CA_2A-2A-4A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 700 | 1940.0 | LTE B4 | 20 | 2175 | 2132.5 | 23.90 | 24.09 |
| CA_2A-2A-5A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 700 | 1940.0 | LTE B5 | 10 | 2525 | 881.5 | 24.01 | 24.09 |
| CA_2A-2A-12A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 700 | 1940.0 | LTE B12 | 10 | 5095 | 737.5 | 23.97 | 24.09 |
| CA_2A-2A-13A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 700 | 1940.0 | LTE B13 | 10 | 5230 | 751.0 | 23.92 | 24.09 |
| CA_2A-2A-29A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 700 | 1940.0 | LTE B29 | 10 | 9715 | 722.5 | 23.97 | 24.09 |
| CA_2A-2A-66A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 700 | 1940.0 | LTE B66 | 20 | 66786 | 2145.0 | 23.97 | 24.09 |
| CA_2A-2A-71A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B2 | 20 | 700 | 1940.0 | LTE B71 | 20 | 68761 | 634.5 | 23.94 | 24.09 |
| CA_2A-4A-4A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B4 | 20 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | 24.07 | 24.09 |
| CA_2A-4A-5A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B4 | 20 | 2175 | 2132.5 | LTE B5 | 10 | 2525 | 881.5 | 23.93 | 24.09 |
| CA_2A-4A-7A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B4 | 20 | 2175 | 2132.5 | LTE B7 | 20 | 3100 | 2655.0 | 24.05 | 24.09 |
| CA_2A-4A-12A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B4 | 20 | 2175 | 2132.5 | LTE B12 | 10 | 5095 | 737.5 | 23.94 | 24.09 |
| CA_2A-4A-13A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B4 | 20 | 2175 | 2132.5 | LTE B13 | 10 | 5230 | 751.0 | 23.98 | 24.09 |
| CA_2A-4A-71A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B4 | 20 | 2175 | 2132.5 | LTE B71 | 20 | 68761 | 634.5 | 24.06 | 24.09 |
| CA_2A-5A-66A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B5 | 10 | 2525 | 881.5 | LTE B66 | 20 | 66786 | 2145.0 | 24.07 | 24.09 |
| CA_2A-7A-7A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B7 | 20 | 3100 | 2655.0 | LTE B7 | 20 | 2850 | 2630.0 | 24.00 | 24.09 |
| CA_2A-7A-12A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B7 | 20 | 3100 | 2655.0 | LTE B12 | 10 | 5095 | 737.5 | 24.07 | 24.09 |
| CA_2A-7A-66A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B7 | 20 | 3100 | 2655.0 | LTE B66 | 20 | 66786 | 2145.0 | 24.01 | 24.09 |
| CA_2A-7C | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B7 | 20 | 3100 | 2655.0 | LTE B7 | 20 | 2902 | 2635.2 | 24.03 | 24.09 |
| CA_2A-12A-66A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B12 | 10 | 5095 | 737.5 | LTE B66 | 20 | 66786 | 2145.0 | 23.97 | 24.09 |
| CA_2A-13A-66A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B13 | 10 | 5230 | 751.0 | LTE B66 | 20 | 66786 | 2145.0 | 23.91 | 24.09 |
| CA_2A-29A-66A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B29 | 10 | 9715 | 722.5 | LTE B66 | 20 | 66786 | 2145.0 | 23.96 | 24.09 |
| CA_2A-66A-66A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | 24.02 | 24.09 |
| CA_2A-66A-71A | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B66 | 20 | 66786 | 2145.0 | LTE B71 | 20 | 68761 | 634.5 | 24.06 | 24.09 |
| CA_2A-66B | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B66 | 15 | 66786 | 2145.0 | LTE B66 | 5 | 66873 | 2153.7 | 24.01 | 24.09 |
| CA_2A-66C | LTE B2 | 20 | 19100 | 1900.0 | QPSK | 1 | 99 | 1100 | 1980.0 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66588 | 2125.2 | 24.00 | 24.09 |

## C.2.2 LTE Band 4 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_2A-2A-4A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B2 | 20 | 700 | 1940.0 | 24.29 | 24.48 |
| CA_2A-4A-4A | LTE B4 | 20 | 20050 | 1720.0 | QPSK | 1 | 99 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | 24.18 | 24.20 |
| CA_2A-4A-5A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B5 | 10 | 2525 | 881.5 | 24.42 | 24.48 |
| CA_2A-4A-7A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B7 | 20 | 3100 | 2655.0 | 24.29 | 24.48 |
| CA_2A-4A-12A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B12 | 10 | 5095 | 737.5 | 24.33 | 24.48 |
| CA_2A-4A-13A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B13 | 10 | 5230 | 751.0 | 24.42 | 24.48 |
| CA_2A-4A-71A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B71 | 20 | 68761 | 634.5 | 24.33 | 24.48 |
| CA_4A-4A-5A | LTE B4 | 20 | 20050 | 1720.0 | QPSK | 1 | 99 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | LTE B5 | 10 | 2525 | 881.5 | 24.13 | 24.20 |
| CA_4A-4A-7A | LTE B4 | 20 | 20050 | 1720.0 | QPSK | 1 | 99 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | LTE B7 | 20 | 3100 | 2655.0 | 24.01 | 24.20 |
| CA_4A-4A-12A | LTE B4 | 20 | 20050 | 1720.0 | QPSK | 1 | 99 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | LTE B12 | 10 | 5095 | 737.5 | 24.18 | 24.20 |
| CA_4A-4A-13A | LTE B4 | 20 | 20050 | 1720.0 | QPSK | 1 | 99 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | LTE B13 | 10 | 5230 | 751.0 | 24.13 | 24.20 |
| CA_4A-4A-71A | LTE B4 | 20 | 20050 | 1720.0 | QPSK | 1 | 99 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | LTE B71 | 20 | 68761 | 634.5 | 24.05 | 24.20 |
| CA_4A-7A-7A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B7 | 20 | 3100 | 2655.0 | LTE B7 | 20 | 2850 | 2630.0 | 24.45 | 24.48 |
| CA_4A-7A-12A | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B7 | 20 | 3100 | 2655.0 | LTE B12 | 10 | 5095 | 737.5 | 24.32 | 24.48 |
| CA_4A-7C | LTE B4 | 20 | 20175 | 1732.5 | QPSK | 1 | 99 | 2175 | 2132.5 | LTE B7 | 20 | 3100 | 2655.0 | LTE B7 | 20 | 2902 | 2635.2 | 24.29 | 24.48 |

## C.2.3 LTE Band 5 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_5A-7A | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B7 | 20 | 3100 | 2655.0 | N/A | | | | 24.19 | 24.24 |
| CA_2A-2A-5A | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B2 | 20 | 700 | 1940.0 | 24.12 | 24.24 |
| CA_2A-4A-5A | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B4 | 20 | 2175 | 2132.5 | 24.13 | 24.24 |
| CA_2A-5A-66A | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B66 | 20 | 66786 | 2145.0 | 24.05 | 24.24 |
| CA_4A-4A-5A | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B4 | 20 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | 24.11 | 24.24 |
| CA_5A-66A-66A | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | 24.19 | 24.24 |
| CA_5A-66B | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B66 | 15 | 66786 | 2145.0 | LTE B66 | 5 | 66873 | 2153.7 | 24.18 | 24.24 |
| CA_5A-66C | LTE B5 | 10 | 20525 | 836.5 | QPSK | 1 | 25 | 2525 | 881.5 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66588 | 2125.2 | 24.13 | 24.24 |

## C.2.4 LTE Band 7 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_5A-7A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B5 | 10 | 2525 | 881.5 | N/A | | | | 22.53 | 22.68 |
| CA_2A-4A-7A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B4 | 20 | 2175 | 2132.5 | 22.48 | 22.68 |
| CA_2A-7A-7A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B7 | 20 | 2850 | 2630.0 | LTE B2 | 20 | 900 | 1960.0 | 22.60 | 22.68 |
| CA_2A-7A-12A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B12 | 10 | 5095 | 737.5 | 22.49 | 22.68 |
| CA_2A-7A-66A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B66 | 20 | 66786 | 2145.0 | 22.59 | 22.68 |
| CA_2A-7C | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B7 | 20 | 2902 | 2635.2 | LTE B2 | 20 | 900 | 1960.0 | 22.54 | 22.68 |
| CA_4A-4A-7A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B4 | 20 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | 22.55 | 22.68 |
| CA_4A-7A-7A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B7 | 20 | 2850 | 2630.0 | LTE B4 | 20 | 2175 | 2132.5 | 22.61 | 22.68 |
| CA_4A-7A-12A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B4 | 20 | 2175 | 2132.5 | LTE B12 | 10 | 5095 | 737.5 | 22.52 | 22.68 |
| CA_4A-7C | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B7 | 20 | 2902 | 2635.2 | LTE B4 | 20 | 2175 | 2132.5 | 22.60 | 22.68 |
| CA_7A-66A-66A | LTE B7 | 20 | 21100 | 2535.0 | QPSK | 1 | 99 | 3100 | 2655.0 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | 22.54 | 22.68 |

## C.2.5 LTE Band 12 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_2A-2A-12A | LTE B12 | 10 | 23095 | 707.5 | QPSK | 1 | 25 | 5095 | 737.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B2 | 20 | 700 | 1940.0 | 24.42 | 24.45 |
| CA_2A-4A-12A | LTE B12 | 10 | 23095 | 707.5 | QPSK | 1 | 25 | 5095 | 737.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B4 | 20 | 2175 | 2132.5 | 24.27 | 24.45 |
| CA_2A-7A-12A | LTE B12 | 10 | 23095 | 707.5 | QPSK | 1 | 25 | 5095 | 737.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B7 | 20 | 3100 | 2655.0 | 24.33 | 24.45 |
| CA_2A-12A-66A | LTE B12 | 10 | 23095 | 707.5 | QPSK | 1 | 25 | 5095 | 737.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B66 | 20 | 66786 | 2145.0 | 24.32 | 24.45 |
| CA_4A-4A-12A | LTE B12 | 10 | 23095 | 707.5 | QPSK | 1 | 25 | 5095 | 737.5 | LTE B4 | 20 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | 24.37 | 24.45 |
| CA_4A-7A-12A | LTE B12 | 10 | 23095 | 707.5 | QPSK | 1 | 25 | 5095 | 737.5 | LTE B4 | 20 | 2175 | 2132.5 | LTE B7 | 20 | 3100 | 2655.0 | 24.39 | 24.45 |
| CA_12A-66A-66A | LTE B12 | 10 | 23095 | 707.5 | QPSK | 1 | 25 | 5095 | 737.5 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | 24.28 | 24.45 |

## C.2.6 LTE Band 13 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_2A-2A-13A | LTE B13 | 10 | 23230 | 782.0 | QPSK | 1 | 49 | 5230 | 751.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B2 | 20 | 700 | 1940.0 | 23.96 | 24.11 |
| CA_2A-4A-13A | LTE B13 | 10 | 23230 | 782.0 | QPSK | 1 | 49 | 5230 | 751.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B4 | 20 | 2175 | 2132.5 | 24.03 | 24.11 |
| CA_2A-13A-66A | LTE B13 | 10 | 23230 | 782.0 | QPSK | 1 | 49 | 5230 | 751.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B66 | 20 | 66786 | 2145.0 | 23.93 | 24.11 |
| CA_4A-4A-13A | LTE B13 | 10 | 23230 | 782.0 | QPSK | 1 | 49 | 5230 | 751.0 | LTE B4 | 20 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | 23.91 | 24.11 |
| CA_13A-66A-66A | LTE B13 | 10 | 23230 | 782.0 | QPSK | 1 | 49 | 5230 | 751.0 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | 23.97 | 24.11 |
| CA_13A-66B | LTE B13 | 10 | 23230 | 782.0 | QPSK | 1 | 49 | 5230 | 751.0 | LTE B66 | 15 | 66786 | 2145.0 | LTE B66 | 5 | 66873 | 2153.7 | 24.02 | 24.11 |
| CA_13A-66C | LTE B13 | 10 | 23230 | 782.0 | QPSK | 1 | 49 | 5230 | 751.0 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66588 | 2125.2 | 23.99 | 24.11 |

## C.2.7 LTE Band 25 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_25A-25A | LTE B25 | 20 | 26590 | 1905.0 | QPSK | 1 | 99 | 8590 | 1985.0 | LTE B25 | 20 | 8140 | 1940.0 | N/A | | | | 24.38 | 24.42 |

## C.2.8 LTE Band 41 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_41C | LTE B41 | 20 | 41490 | 2680.0 | QPSK | 1 | 99 | 41490 | 2680.0 | LTE B41 | 20 | 41292 | 2660.2 | N/A | | | | 23.65 | 23.76 |

## C.2.9 LTE Band 66 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_2A-2A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B2 | 20 | 700 | 1940.0 | 24.49 | 24.56 |
| CA_2A-5A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B5 | 10 | 2525 | 881.5 | 24.40 | 24.56 |
| CA_2A-7A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B7 | 20 | 3100 | 2655.0 | 24.36 | 24.56 |
| CA_2A-12A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B12 | 10 | 5095 | 737.5 | 24.39 | 24.56 |
| CA_2A-13A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B13 | 10 | 5230 | 751.0 | 24.39 | 24.56 |
| CA_2A-29A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B29 | 10 | 9715 | 722.5 | 24.37 | 24.56 |
| CA_2A-66A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | LTE B2 | 20 | 900 | 1960.0 | 24.41 | 24.56 |
| CA_2A-66A-71A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B2 | 20 | 900 | 1960.0 | LTE B71 | 20 | 68761 | 634.5 | 24.52 | 24.56 |
| CA_2A-66B | LTE B66 | 15 | 132047 | 1717.5 | QPSK | 1 | 36 | 66511 | 2117.5 | LTE B66 | 5 | 66604 | 2126.8 | LTE B2 | 20 | 900 | 1960.0 | 24.42 | 24.42 |
| CA_2A-66C | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66588 | 2125.2 | LTE B2 | 20 | 900 | 1960.0 | 24.36 | 24.56 |
| CA_5A-66A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | LTE B5 | 10 | 2525 | 881.5 | 24.49 | 24.56 |
| CA_5A-66B | LTE B66 | 15 | 132047 | 1717.5 | QPSK | 1 | 36 | 66511 | 2117.5 | LTE B66 | 5 | 66604 | 2126.8 | LTE B5 | 10 | 2525 | 881.5 | 24.52 | 24.42 |
| CA_5A-66C | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66588 | 2125.2 | LTE B5 | 10 | 2525 | 881.5 | 24.42 | 24.56 |
| CA_7A-66A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | LTE B7 | 20 | 3100 | 2655.0 | 24.45 | 24.56 |
| CA_12A-66A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | LTE B12 | 10 | 5095 | 737.5 | 24.52 | 24.56 |
| CA_13A-66A-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | LTE B13 | 10 | 5230 | 751.0 | 24.46 | 24.56 |
| CA_13A-66B | LTE B66 | 15 | 132047 | 1717.5 | QPSK | 1 | 36 | 66511 | 2117.5 | LTE B66 | 5 | 66604 | 2126.8 | LTE B13 | 10 | 5230 | 751.0 | 24.44 | 24.42 |
| CA_13A-66C | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66588 | 2125.2 | LTE B13 | 10 | 5230 | 751.0 | 24.47 | 24.56 |
| CA_66A-66C | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | LTE B66 | 20 | 66734 | 2139.8 | 24.36 | 24.56 |
| CA_66C-66A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66588 | 2125.2 | LTE B66 | 20 | 67036 | 2170.0 | 24.44 | 24.56 |
| CA_66A-66A-71A | LTE B66 | 20 | 132322 | 1745.0 | QPSK | 1 | 49 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | LTE B71 | 20 | 68761 | 634.5 | 24.46 | 24.56 |

## C.2.10 LTE Band 71 as PCC

| Combination | PCC | | | | | | | | | SCC 1 | | | | SCC 2 | | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | BW [MHz] | (UL) Ch. | (UL) Freq. [MHz] | Mod. | (UL) RB Size | (UL) RB Offset | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | Band | BW [MHz] | (DL) Ch. | (DL) Freq. [MHz] | LTE Tx. Power with DL CA Enabled (dBm) | LTE Single Carrier Tx Power (dBm) |
| CA_2A-2A-71A | LTE B71 | 20 | 133297 | 680.5 | QPSK | 1 | 0 | 68761 | 634.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B2 | 20 | 700 | 1940.0 | 24.03 | 24.11 |
| CA_2A-4A-71A | LTE B71 | 20 | 133297 | 680.5 | QPSK | 1 | 0 | 68761 | 634.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B4 | 20 | 2175 | 2132.5 | 24.07 | 24.11 |
| CA_2A-66A-71A | LTE B71 | 20 | 133297 | 680.5 | QPSK | 1 | 0 | 68761 | 634.5 | LTE B2 | 20 | 900 | 1960.0 | LTE B66 | 20 | 66786 | 2145.0 | 23.94 | 24.11 |
| CA_4A-4A-71A | LTE B71 | 20 | 133297 | 680.5 | QPSK | 1 | 0 | 68761 | 634.5 | LTE B4 | 20 | 2050 | 2120.0 | LTE B4 | 20 | 2300 | 2145.0 | 23.91 | 24.11 |
| CA_66A-66A-71A | LTE B71 | 20 | 133297 | 680.5 | QPSK | 1 | 0 | 68761 | 634.5 | LTE B66 | 20 | 66786 | 2145.0 | LTE B66 | 20 | 66536 | 2120.0 | 23.97 | 24.11 |

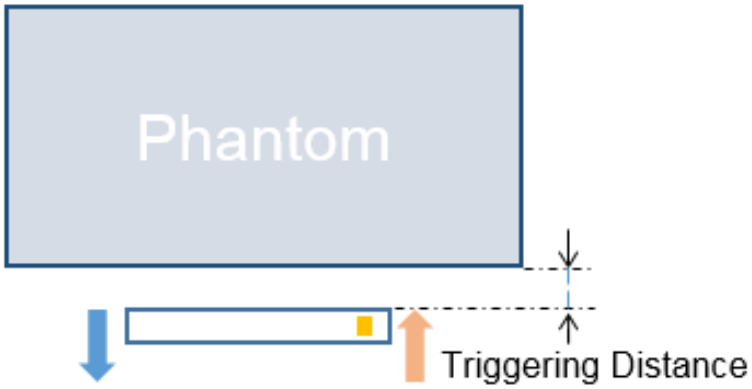
# Appendix D. Power Reduction Verification

**Proximity Sensor Triggering Distance (KDB 616217 §6.2)**

Rear, Right Edge, Left Edge and Top of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The DUT featured a visual indicator on its display that showed the status of the proximity sensor (Triggered or not triggered).This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power contains both the full and reduced conducted power measurements.




LEGEND
Direction of DUT travel for determination of power reduction triggering point
Direction of DUT travel for determination of full power resumption triggering point

**Resulting test positions for SAR mearsurementes**

| Tissue simulating liquid | Band | Trigger distance – Rear | | |
|---|---|---|---|---|
| | | Moving toward phantom | Moving from phantom | Worst case distance for SAR |
| 750 Head | LTE Band 12 | 20mm | 20mm | 19mm |
| | LTE Band 13 | | | |
| | LTE Band 14 | | | |
| | LTE Band 71 | | | |
| 900 Head | WCDMA V | 20mm | 20mm | 19mm |
| | LTE Band 5 | | | |
| | LTE Band 26 | | | |
| 1750 Head | WCDMA IV | 20mm | 20mm | 19mm |
| | LTE Band 4 | | | |
| | LTE Band 66 | | | |
| 1900 Head | WCDMA II | 20mm | 20mm | 19mm |
| | LTE Band 2 | | | |
| | LTE Band 25 | | | |
| 2600 Head | LTE Band 7 | 20mm | 20mm | 19mm |
| | LTE Band 41 PC3 | | | |
| | LTE Band 41 PC2 | | | |
| 2450 Head | WLAN Ant.1 | 13mm | 13mm | 12mm |
| 5000 Head | | 13mm | 13mm | 12mm |
| 2450 Head | WLAN Ant.2 | 13mm | 13mm | 12mm |
| 5000 Head | | 13mm | 13mm | 12mm |

## Proximity Sensor Triggering Distance Measurement Results – Rear Side

DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT Output Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance (mm) | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| WCDMA II | 24.16 | 24.11 | 24.16 | 24.18 | 24.11 | 14.32 | 14.29 | 14.28 | 14.33 | 14.26 |
| WCDMA IV | 24.18 | 24.11 | 24.20 | 24.13 | 24.19 | 15.01 | 15.10 | 15.03 | 15.13 | 15.02 |
| WCDMA V | 24.09 | 24.07 | 24.16 | 24.12 | 24.09 | 20.12 | 20.20 | 20.22 | 20.17 | 20.16 |
| LTE Band 2 | 24.10 | 24.08 | 24.11 | 24.09 | 24.03 | 14.34 | 14.39 | 14.33 | 14.40 | 14.36 |
| LTE Band 4 | 24.54 | 24.45 | 24.52 | 24.54 | 24.51 | 14.88 | 14.93 | 14.94 | 14.95 | 14.92 |
| LTE Band 5 | 24.21 | 24.21 | 24.28 | 24.24 | 24.22 | 19.21 | 19.24 | 19.23 | 19.25 | 19.23 |
| LTE Band 7 | 22.66 | 22.72 | 22.67 | 22.73 | 22.71 | 12.47 | 12.45 | 12.51 | 12.50 | 12.49 |
| LTE Band 12 | 24.46 | 24.40 | 24.38 | 24.40 | 24.35 | 17.25 | 17.24 | 17.30 | 17.27 | 17.35 |
| LTE Band 13 | 24.12 | 24.06 | 24.15 | 24.17 | 24.14 | 16.92 | 16.97 | 16.90 | 16.95 | 17.00 |
| LTE Band 14 | 24.27 | 24.18 | 24.24 | 24.19 | 24.19 | 16.93 | 16.99 | 16.90 | 16.95 | 16.89 |
| LTE Band 25 | 24.45 | 24.37 | 24.40 | 24.37 | 24.47 | 14.36 | 14.38 | 14.42 | 14.45 | 14.36 |
| LTE Band 26 | 24.25 | 24.28 | 24.23 | 24.27 | 24.33 | 19.31 | 19.38 | 19.41 | 19.40 | 19.42 |
| LTE Band 41 PC3 | 23.73 | 23.82 | 23.79 | 23.79 | 23.81 | 14.36 | 14.46 | 14.37 | 14.47 | 14.48 |
| LTE Band 41 PC2 | 25.33 | 25.41 | 25.38 | 25.35 | 25.34 | 14.41 | 14.38 | 14.38 | 14.41 | 14.45 |
| LTE Band 66 | 24.50 | 24.61 | 24.56 | 24.51 | 24.62 | 14.87 | 14.97 | 14.91 | 14.93 | 14.90 |
| LTE Band 71 | 24.06 | 24.11 | 24.08 | 24.05 | 24.11 | 17.27 | 17.33 | 17.23 | 17.27 | 17.32 |

## Proximity Sensor Triggering Distance Measurement Results – Rear Side (Ant.1)

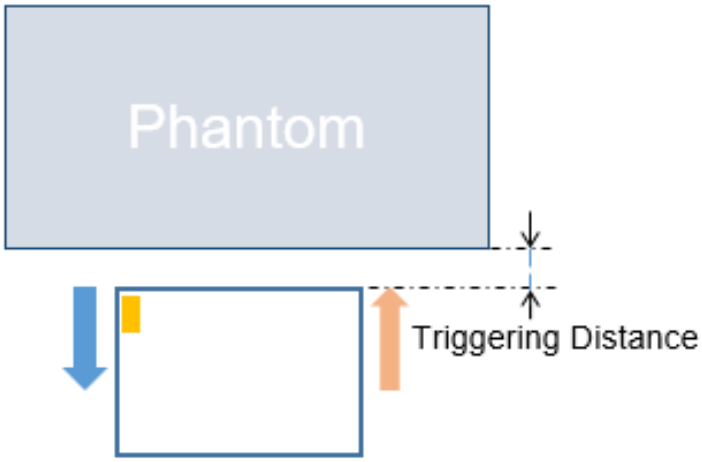
DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT Output Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance (mm) | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| 2.4 GHz 802.11b | 17.96 | 17.93 | 18.03 | 18.02 | 17.93 | 8.42 | 8.48 | 8.48 | 8.49 | 8.54 |
| 2.4 GHz 802.11g | 14.73 | 14.76 | 14.71 | 14.76 | 14.73 | 8.38 | 8.46 | 8.38 | 8.40 | 8.39 |
| 2.4 GHz 802.11n | 14.33 | 14.41 | 14.38 | 14.34 | 14.32 | 8.32 | 8.36 | 8.31 | 8.30 | 8.28 |
| 5 GHz 802.11a | 14.96 | 14.90 | 14.92 | 14.94 | 14.96 | 3.54 | 3.56 | 3.58 | 3.57 | 3.59 |
| 5 GHz 802.11n 20 MHz | 14.86 | 14.94 | 14.90 | 14.89 | 14.89 | 3.57 | 3.62 | 3.64 | 3.66 | 3.57 |
| 5 GHz 802.11n 40 MHz | 13.95 | 13.85 | 13.91 | 13.93 | 13.90 | 3.42 | 3.38 | 3.37 | 3.35 | 3.33 |
| 5 GHz 802.11ac 20 MHz | 14.64 | 14.65 | 14.76 | 14.76 | 14.67 | 3.56 | 3.60 | 3.61 | 3.62 | 3.64 |
| 5 GHz 802.11ac 40 MHz | 13.95 | 13.91 | 13.99 | 13.98 | 13.87 | 3.46 | 3.42 | 3.45 | 3.45 | 3.41 |
| 5 GHz 802.11ac 80 MHz | 12.62 | 12.65 | 12.70 | 12.64 | 12.63 | 3.55 | 3.65 | 3.63 | 3.54 | 3.53 |

## Proximity Sensor Triggering Distance Measurement Results – Rear Side (Ant.2)

DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT Output Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance (mm) | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| 2.4 GHz 802.11b | 17.94 | 17.99 | 17.98 | 17.89 | 17.96 | 8.47 | 8.45 | 8.50 | 8.50 | 8.43 |
| 2.4 GHz 802.11g | 14.90 | 14.91 | 14.91 | 14.97 | 14.93 | 8.18 | 8.08 | 8.19 | 8.14 | 8.16 |
| 2.4 GHz 802.11n | 14.04 | 14.05 | 14.03 | 14.04 | 13.97 | 8.32 | 8.26 | 8.31 | 8.30 | 8.29 |
| 5 GHz 802.11a | 14.79 | 14.79 | 14.76 | 14.72 | 14.79 | 3.68 | 3.67 | 3.78 | 3.74 | 3.77 |
| 5 GHz 802.11n 20 MHz | 14.57 | 14.57 | 14.64 | 14.53 | 14.58 | 3.61 | 3.72 | 3.66 | 3.62 | 3.63 |
| 5 GHz 802.11n 40 MHz | 13.85 | 13.87 | 13.85 | 13.90 | 13.84 | 3.44 | 3.42 | 3.32 | 3.42 | 3.32 |
| 5 GHz 802.11ac 20 MHz | 14.71 | 14.59 | 14.68 | 14.62 | 14.71 | 3.66 | 3.67 | 3.68 | 3.62 | 3.63 |
| 5 GHz 802.11ac 40 MHz | 13.71 | 13.68 | 13.80 | 13.78 | 13.80 | 3.45 | 3.47 | 3.48 | 3.50 | 3.55 |
| 5 GHz 802.11ac 80 MHz | 12.58 | 12.48 | 12.55 | 12.56 | 12.49 | 3.45 | 3.40 | 3.45 | 3.43 | 3.39 |




LEGEND
Direction of DUT travel for determination of power reduction triggering point
Direction of DUT travel for determination of full power resumption triggering point

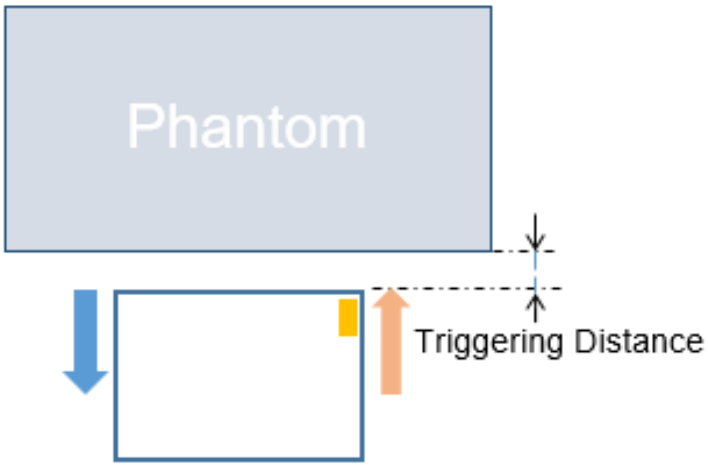
## Resulting test positions for SAR mearsurementes

| Tissue simulating liquid | Band | Trigger distance – Right | | |
|---|---|---|---|---|
| | | Moving toward phantom | Moving from phantom | Worst case distance for SAR |
| 750 Head | LTE Band 12 | 7mm | 7mm | 6mm |
| | LTE Band 13 | | | |
| | LTE Band 14 | | | |
| | LTE Band 71 | | | |
| 900 Head | WCDMA V | 7mm | 7mm | 6mm |
| | LTE Band 5 | | | |
| | LTE Band 26 | | | |
| 1750 Head | WCDMA IV | 7mm | 7mm | 6mm |
| | LTE Band 4 | | | |
| | LTE Band 66 | | | |
| 1900 Head | WCDMA II | 7mm | 7mm | 6mm |
| | LTE Band 2 | | | |
| | LTE Band 25 | | | |
| 2600 Head | LTE Band 7 | 7mm | 7mm | 6mm |
| | LTE Band 41 PC3 | | | |
| | LTE Band 41 PC2 | | | |

## Proximity Sensor Triggering Distance Measurement Results – Right Edge

DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT Output Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance (mm) | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 |
| WCDMA II | 24.13 | 24.13 | 24.12 | 24.10 | 24.20 | 14.27 | 14.27 | 14.28 | 14.36 | 14.30 |
| WCDMA IV | 24.18 | 24.14 | 24.13 | 24.14 | 24.10 | 15.04 | 15.05 | 15.02 | 15.06 | 15.11 |
| WCDMA V | 24.12 | 24.08 | 24.04 | 24.11 | 24.13 | 20.18 | 20.13 | 20.18 | 20.16 | 20.16 |
| LTE Band 2 | 24.13 | 24.13 | 24.10 | 24.14 | 24.06 | 14.42 | 14.39 | 14.31 | 14.37 | 14.37 |
| LTE Band 4 | 24.42 | 24.47 | 24.50 | 24.53 | 24.44 | 14.96 | 14.96 | 14.97 | 14.90 | 14.92 |
| LTE Band 5 | 24.20 | 24.20 | 24.22 | 24.27 | 24.20 | 19.15 | 19.19 | 19.25 | 19.18 | 19.23 |
| LTE Band 7 | 22.70 | 22.72 | 22.63 | 22.71 | 22.62 | 12.47 | 12.50 | 12.52 | 12.52 | 12.53 |
| LTE Band 12 | 24.44 | 24.45 | 24.49 | 24.49 | 24.46 | 17.26 | 17.23 | 17.28 | 17.23 | 17.27 |
| LTE Band 13 | 24.13 | 24.06 | 24.05 | 24.14 | 24.11 | 16.93 | 16.98 | 16.94 | 16.96 | 16.95 |
| LTE Band 14 | 24.27 | 24.21 | 24.21 | 24.22 | 24.24 | 16.93 | 16.97 | 16.92 | 16.95 | 16.95 |
| LTE Band 25 | 24.48 | 24.37 | 24.40 | 24.36 | 24.47 | 14.47 | 14.42 | 14.36 | 14.35 | 14.44 |
| LTE Band 26 | 24.29 | 24.23 | 24.33 | 24.25 | 24.25 | 19.41 | 19.38 | 19.39 | 19.35 | 19.38 |
| LTE Band 41 PC3 | 23.71 | 23.73 | 23.78 | 23.72 | 23.74 | 14.45 | 14.37 | 14.45 | 14.41 | 14.37 |
| LTE Band 41 PC2 | 25.39 | 25.39 | 25.43 | 25.34 | 25.38 | 14.47 | 14.41 | 14.43 | 14.40 | 14.47 |
| LTE Band 66 | 24.60 | 24.54 | 24.52 | 24.55 | 24.50 | 14.94 | 14.87 | 14.87 | 14.98 | 14.93 |
| LTE Band 71 | 24.05 | 24.09 | 24.09 | 24.10 | 24.09 | 17.35 | 17.31 | 17.26 | 17.25 | 17.33 |




LEGEND
Direction of DUT travel for determination of power reduction triggering point
Direction of DUT travel for determination of full power resumption triggering point

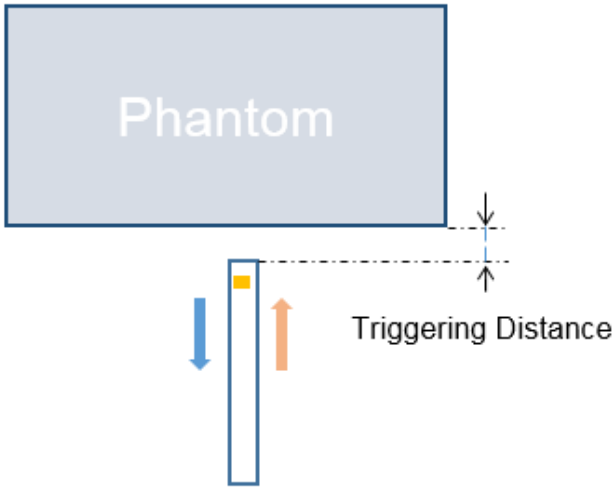
## Resulting test positions for SAR mearsurementes

| Tissue simulating liquid | Band | Trigger distance – Left Edge | | |
|---|---|---|---|---|
| | | Moving toward phantom | Moving from phantom | Worst case distance for SAR |
| 2450 Head | WLAN Ant.1 | 6mm | 6mm | 5mm |
| 5000 Head | | 6mm | 6mm | 5mm |

## Proximity Sensor Triggering Distance Measurement Results – Left Edge

DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT Output Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance (mm) | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 |
| 2.4 GHz 802.11b | 17.99 | 17.96 | 17.94 | 18.04 | 17.99 | 8.50 | 8.47 | 8.49 | 8.54 | 8.43 |
| 2.4 GHz 802.11g | 14.68 | 14.74 | 14.65 | 14.72 | 14.72 | 8.40 | 8.47 | 8.44 | 8.43 | 8.43 |
| 2.4 GHz 802.11n | 14.36 | 14.36 | 14.41 | 14.40 | 14.33 | 8.29 | 8.31 | 8.29 | 8.28 | 8.28 |
| 5 GHz 802.11a | 14.99 | 14.98 | 14.87 | 14.87 | 14.94 | 3.61 | 3.54 | 3.63 | 3.59 | 3.64 |
| 5 GHz 802.11n 20 ㎒ | 14.89 | 14.92 | 14.97 | 14.88 | 14.97 | 3.60 | 3.56 | 3.59 | 3.64 | 3.62 |
| 5 GHz 802.11n 40 ㎒ | 13.87 | 13.96 | 13.88 | 13.85 | 13.92 | 3.33 | 3.30 | 3.37 | 3.40 | 3.38 |
| 5 GHz 802.11ac 20 ㎒ | 14.64 | 14.72 | 14.76 | 14.64 | 14.76 | 3.62 | 3.53 | 3.57 | 3.54 | 3.63 |
| 5 GHz 802.11ac 40 ㎒ | 13.96 | 13.89 | 13.89 | 13.88 | 13.99 | 3.51 | 3.46 | 3.51 | 3.46 | 3.50 |
| 5 GHz 802.11ac 80 ㎒ | 12.65 | 12.62 | 12.66 | 12.68 | 12.59 | 3.56 | 3.54 | 3.60 | 3.56 | 3.63 |




LEGEND
Direction of DUT travel for determination of power reduction triggering point
Direction of DUT travel for determination of full power resumption triggering point

## Resulting test positions for SAR mearsurementes

| Tissue simulating liquid | Band | Trigger distance – Top | | |
|---|---|---|---|---|
| | | Moving toward phantom | Moving from phantom | Worst case distance for SAR |
| 750 Head | LTE Band 12 | 15mm | 15mm | 14mm |
| | LTE Band 13 | | | |
| | LTE Band 14 | | | |
| | LTE Band 71 | | | |
| 900 Head | WCDMA V | 15mm | 15mm | 14mm |
| | LTE Band 5 | | | |
| | LTE Band 26 | | | |
| 1750 Head | WCDMA IV | 15mm | 15mm | 14mm |
| | LTE Band 4 | | | |
| | LTE Band 66 | | | |
| 1900 Head | WCDMA II | 15mm | 15mm | 14mm |
| | LTE Band 2 | | | |
| | LTE Band 25 | | | |
| 2600 Head | LTE Band 7 | 15mm | 15mm | 14mm |
| | LTE Band 41 PC3 | | | |
| | LTE Band 41 PC2 | | | |
| 2450 Head | WLAN Ant.2 | 8mm | 8mm | 7mm |
| 5000 Head | | 8mm | 8mm | 7mm |

## Proximity Sensor Triggering Distance Measurement Results – Top Side

DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT Output Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance (mm) | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 |
| WCDMA II | 24.19 | 24.12 | 24.18 | 24.19 | 24.11 | 14.36 | 14.34 | 14.29 | 14.26 | 14.34 |
| WCDMA IV | 24.20 | 24.20 | 24.08 | 24.18 | 24.16 | 15.07 | 15.08 | 15.12 | 15.08 | 15.03 |
| WCDMA V | 24.07 | 24.11 | 24.16 | 24.11 | 24.11 | 20.20 | 20.18 | 20.19 | 20.22 | 20.14 |
| LTE Band 2 | 24.05 | 24.06 | 24.08 | 24.10 | 24.04 | 14.43 | 14.31 | 14.39 | 14.32 | 14.36 |
| LTE Band 4 | 24.49 | 24.51 | 24.42 | 24.43 | 24.53 | 14.97 | 14.87 | 14.89 | 14.94 | 14.89 |
| LTE Band 5 | 24.25 | 24.23 | 24.27 | 24.26 | 24.20 | 19.26 | 19.21 | 19.24 | 19.16 | 19.24 |
| LTE Band 7 | 22.63 | 22.69 | 22.62 | 22.65 | 22.64 | 12.47 | 12.46 | 12.42 | 12.43 | 12.46 |
| LTE Band 12 | 24.38 | 24.39 | 24.39 | 24.38 | 24.48 | 17.35 | 17.31 | 17.23 | 17.25 | 17.27 |
| LTE Band 13 | 24.12 | 24.07 | 24.06 | 24.06 | 24.05 | 16.94 | 16.97 | 16.92 | 16.93 | 17.01 |
| LTE Band 14 | 24.29 | 24.25 | 24.21 | 24.23 | 24.28 | 16.98 | 17.00 | 16.89 | 16.88 | 16.93 |
| LTE Band 25 | 24.40 | 24.36 | 24.42 | 24.42 | 24.41 | 14.48 | 14.47 | 14.45 | 14.43 | 14.36 |
| LTE Band 26 | 24.31 | 24.27 | 24.29 | 24.34 | 24.28 | 19.39 | 19.40 | 19.39 | 19.40 | 19.32 |
| LTE Band 41 PC3 | 23.74 | 23.82 | 23.74 | 23.78 | 23.70 | 14.40 | 14.42 | 14.42 | 14.43 | 14.46 |
| LTE Band 41 PC2 | 25.33 | 25.35 | 25.36 | 25.38 | 25.38 | 14.48 | 14.45 | 14.43 | 14.44 | 14.42 |
| LTE Band 66 | 24.57 | 24.56 | 24.56 | 24.50 | 24.50 | 14.95 | 14.99 | 14.96 | 14.96 | 14.98 |
| LTE Band 71 | 24.11 | 24.15 | 24.15 | 24.10 | 24.05 | 17.24 | 17.31 | 17.28 | 17.31 | 17.34 |

## Proximity Sensor Triggering Distance Measurement Results – Top Side (Ant.2)

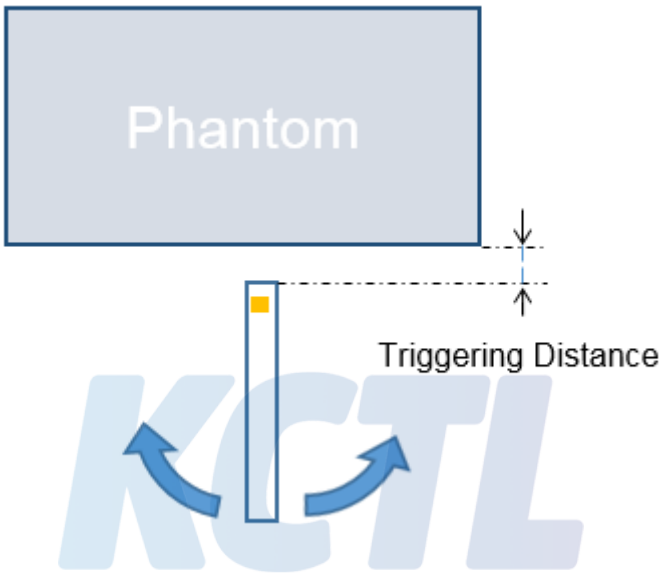
DUT Moving Toward (Trigger) and Away (Release) from the Phantom

| Distance to DUT Output Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance (mm) | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 |
| 2.4 GHz 802.11b | 17.94 | 17.89 | 17.96 | 17.90 | 17.88 | 8.40 | 8.42 | 8.46 | 8.52 | 8.52 |
| 2.4 GHz 802.11g | 14.96 | 14.98 | 14.91 | 14.89 | 14.98 | 8.19 | 8.11 | 8.14 | 8.15 | 8.17 |
| 2.4 GHz 802.11n | 14.04 | 13.94 | 14.04 | 14.05 | 14.03 | 8.25 | 8.24 | 8.23 | 8.23 | 8.29 |
| 5 GHz 802.11a | 14.69 | 14.78 | 14.72 | 14.69 | 14.72 | 3.78 | 3.70 | 3.69 | 3.73 | 3.78 |
| 5 GHz 802.11n 20 ㎒ | 14.59 | 14.63 | 14.57 | 14.60 | 14.61 | 3.64 | 3.65 | 3.68 | 3.70 | 3.65 |
| 5 GHz 802.11n 40 ㎒ | 13.89 | 13.89 | 13.79 | 13.80 | 13.87 | 3.41 | 3.36 | 3.36 | 3.36 | 3.36 |
| 5 GHz 802.11ac 20 ㎒ | 14.68 | 14.66 | 14.59 | 14.69 | 14.61 | 3.59 | 3.69 | 3.60 | 3.61 | 3.69 |
| 5 GHz 802.11ac 40 ㎒ | 13.77 | 13.78 | 13.73 | 13.68 | 13.79 | 3.51 | 3.55 | 3.57 | 3.46 | 3.48 |
| 5 GHz 802.11ac 80 ㎒ | 12.54 | 12.51 | 12.55 | 12.55 | 12.58 | 3.39 | 3.40 | 3.47 | 3.51 | 3.39 |

## Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Bottom parallel to the base of the flat phantom for each band.

The EUT was rotated about Bottom for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated.
This procedure was repeated until the power remained reduced for all angles up to +/- 45°.




Proximity sensor tilt angle assessment KDB 616217 §6.4

Summary of Tilt Angle Influence to Proximity Sensor Triggering (Top)

| Band [㎒] | Minimum trigger distance measured according to KDB 616217 §6.2 | Minimum distance at which power reduction was maintained over +/-45° | Power reduction status | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | -45° | -40° | -30° | -20° | -10° | 0° | 10° | 20° | 30° | 40° | 45° |
| 750 | 15 mm | 15 mm | On | On | On | On | On | On | On | On | On | On | On |
| 850 | 15 mm | 15 mm | On | On | On | On | On | On | On | On | On | On | On |
| 1750 | 15 mm | 15 mm | On | On | On | On | On | On | On | On | On | On | On |
| 1900 | 15 mm | 15 mm | On | On | On | On | On | On | On | On | On | On | On |
| 2600 | 15 mm | 15 mm | On | On | On | On | On | On | On | On | On | On | On |
| 2450 (Ant.2) | 8 mm | 8 mm | On | On | On | On | On | On | On | On | On | On | On |
| 5000 (Ant.2) | 8 mm | 8 mm | On | On | On | On | On | On | On | On | On | On | On |

## Summary of Tilt Angle Influence to Proximity Sensor Triggering (Left)

| Band [㎒] | Minimum trigger distance measured according to KDB 616217 §6.2 | Minimum distance at which power reduction was maintained over +/-45° | Power reduction status | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | -45° | -40° | -30° | -20° | -10° | 0° | 10° | 20° | 30° | 40° | 45° |
| 2450 (Ant.1) | 6 mm | 6 mm | On | On | On | On | On | On | On | On | On | On | On |
| 5000 (Ant.1) | 6 mm | 6 mm | On | On | On | On | On | On | On | On | On | On | On |

## Summary of Tilt Angle Influence to Proximity Sensor Triggering (Right)

| Band [㎒] | Minimum trigger distance measured according to KDB 616217 §6.2 | Minimum distance at which power reduction was maintained over +/-45° | Power reduction status | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | -45° | -40° | -30° | -20° | -10° | 0° | 10° | 20° | 30° | 40° | 45° |
| 750 | 7 mm | 7 mm | On | On | On | On | On | On | On | On | On | On | On |
| 850 | 7 mm | 7 mm | On | On | On | On | On | On | On | On | On | On | On |
| 1750 | 7 mm | 7 mm | On | On | On | On | On | On | On | On | On | On | On |
| 1900 | 7 mm | 7 mm | On | On | On | On | On | On | On | On | On | On | On |
| 2600 | 7 mm | 7 mm | On | On | On | On | On | On | On | On | On | On | On |