

## Appendix F. – Probe Calibration Data

**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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **HCT (Dymstec)**

Certificate No **EX-3768\_Jun22**

**CALIBRATION CERTIFICATE**

Object **EX3DV4 - SN:3768**

Calibration procedure(s) **QA CAL-01 v9, QA CAL-12 v9, QA CAL-14 v6, QA CAL-23 v5,  
QA CAL-25 v7  
Calibration procedure for dosimetric E-field probes**

Calibration date **June 30, 2022**

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	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
OCF DAK-3.5 (weighted)	SN: 1248	20-Oct-21 (OCF-DAK3.5-1248_Oct21)	Oct-22
OCF DAK-12	SN: 1016	20-Oct-21 (OCF-DAK12-1016_Oct21)	Oct-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	04-Apr-22 (No. 217-03527)	Apr-23
D4E4	SN: 660	13-Oct-21 (No. D4E4-660_Oct21)	Oct-22
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22

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: MY41498067	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 600110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: U53642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: USA1060477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by	Jelion Kasrali	Laboratory Technician	
Approved by	Evelin Könni	Technical Manager	

Issued: June 30, 2022

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

결재	담당자	확인자
	01/박정훈 2022.09.13	01/허민정 2022.09.13

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**Glossary**

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization $\psi$	$\psi$ rotation around probe axis
Polarization $\theta$	$\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ 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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865864, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Methods Applied and Interpretation of Parameters:**

- **NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- **NORM( $\theta$ )<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* 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.
- **DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. 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
- **A<sub>x,y,z</sub>, B<sub>x,y,z</sub>, C<sub>x,y,z</sub>, D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: 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  $f \leq 800$  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 NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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 NORM<sub>x</sub> (no uncertainty required).

EX3DV4 - SN:3768

June 30, 2022

**Parameters of Probe: EX3DV4 - SN:3768**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ( $\mu V/(V/m)^2$ ) <sup>A</sup>	0.48	0.48	0.53	$\pm 10.1\%$
DCP (mV) <sup>B</sup>	109.8	106.4	109.0	$\pm 4.7\%$

**Calibration Results for Modulation Response**

UID	Communication System Name		A dB	B dB $\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc <sup>E</sup> k = 2
0	CW	X	0.00	0.00	1.00	0.00	162.9	$\pm 2.7\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		163.1		
		Z	0.00	0.00	1.00		171.0		
10352	Pulse Waveform (200Hz, 10%)	X	1.75	81.88	7.36	10.00	60.0	$\pm 2.9\%$	$\pm 9.6\%$
		Y	1.41	60.00	5.78		60.0		
		Z	1.70	61.43	6.88		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	0.82	60.00	5.40	6.99	80.0	$\pm 2.6\%$	$\pm 9.6\%$
		Y	20.00	74.00	9.00		80.0		
		Z	0.82	60.00	5.03		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	0.10	126.60	0.01	3.96	95.0	$\pm 2.9\%$	$\pm 9.6\%$
		Y	0.01	129.04	0.24		95.0		
		Z	0.01	123.59	0.19		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	6.76	159.97	16.64	2.22	120.0	$\pm 1.7\%$	$\pm 9.6\%$
		Y	2.33	159.99	1.54		120.0		
		Z	2.59	159.98	0.80		120.0		
10387	QPSK Waveform, 1 MHz	X	0.41	62.62	11.23	1.00	150.0	$\pm 4.5\%$	$\pm 9.6\%$
		Y	0.46	61.95	11.07		150.0		
		Z	0.34	60.43	9.78		150.0		
10388	QPSK Waveform, 10 MHz	X	1.16	65.37	12.92	0.00	150.0	$\pm 1.0\%$	$\pm 9.6\%$
		Y	1.22	64.75	13.22		150.0		
		Z	1.03	63.65	12.08		150.0		
10396	64-QAM Waveform, 100 kHz	X	1.74	65.21	16.21	3.01	150.0	$\pm 1.0\%$	$\pm 9.6\%$
		Y	1.66	64.45	16.04		150.0		
		Z	1.69	64.99	16.22		150.0		
10399	64-QAM Waveform, 40 MHz	X	2.68	66.27	14.88	0.00	150.0	$\pm 2.8\%$	$\pm 9.6\%$
		Y	2.84	66.43	15.08		150.0		
		Z	2.67	66.08	14.73		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	3.58	66.00	15.02	0.00	150.0	$\pm 4.7\%$	$\pm 9.6\%$
		Y	3.83	66.06	15.26		150.0		
		Z	3.60	65.89	14.96		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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TGL (see Pages 5 and 6).  
<sup>B</sup> Linearisation parameter uncertainty for maximum specified field strength.  
<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed by the square of the field value.



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**Parameters of Probe: EX3DV4 - SN:3768**

**Sensor Model Parameters**

	C1 IF	C2 IF	$\alpha$ V <sup>-1</sup>	T1 ms V <sup>-2</sup>	T2 ms V <sup>-1</sup>	T3 ms	T4 V <sup>-2</sup>	T5 V <sup>-1</sup>	T6
x	7.8	56.08	32.91	4.66	0.00	4.98	0.72	0.00	1.00
y	9.9	71.70	33.44	3.41	0.00	4.80	0.42	0.00	1.00
z	8.2	59.23	33.14	3.57	0.00	4.96	0.57	0.00	1.01

**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle	-78.3°
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	1.6 mm

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

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**Parameters of Probe: EX3DV4 - SN:3768**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity <sup>F</sup> (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k = 2)
750	41.9	0.89	9.82	9.82	9.82	0.38	0.97	±12.0%
835	41.5	0.90	9.53	9.53	9.53	0.49	0.80	±12.0%
900	41.5	0.97	9.35	9.35	9.35	0.31	1.05	±12.0%
1450	40.5	1.20	8.92	8.92	8.92	0.60	0.80	±12.0%
1750	40.1	1.37	8.62	8.62	8.62	0.26	0.86	±12.0%
1900	40.0	1.40	8.21	8.21	8.21	0.36	0.86	±12.0%
2300	39.5	1.67	8.01	8.01	8.01	0.23	0.90	±12.0%
2450	39.2	1.80	7.73	7.73	7.73	0.34	0.90	±12.0%
2600	39.0	1.96	7.41	7.41	7.41	0.38	0.90	±12.0%
3300	38.2	2.71	6.94	6.94	6.94	0.30	1.35	±13.1%
3500	37.9	2.91	6.80	6.80	6.80	0.30	1.35	±13.1%
3700	37.7	3.12	6.77	6.77	6.77	0.30	1.35	±13.1%
3900	37.5	3.32	6.31	6.31	6.31	0.40	1.60	±13.1%
5250	35.9	4.71	5.29	5.29	5.29	0.40	1.80	±13.1%
5600	35.5	5.07	4.75	4.75	4.75	0.40	1.80	±13.1%
5750	35.4	5.22	4.80	4.80	4.80	0.40	1.80	±13.1%
5800	35.3	5.27	4.75	4.75	4.75	0.40	1.80	±13.1%

<sup>C</sup> Frequency validity above 300MHz of ±100 MHz only applies for DASy v4.4 and higher (see Page 2), else it is restricted to ±50MHz. 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, 84, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 8 MHz is 4-9MHz, and ConvF assessed at 13MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

<sup>F</sup> At frequencies below 3GHz, 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.

<sup>G</sup> 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 3GHz and below ±2% for frequencies between 3-6 GHz at any distance larger than 1/2F (the probe tip diameter) from the boundary.

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**Parameters of Probe: EX3DV4 - SN:3768**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity <sup>F</sup> (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k = 2)
6500	34.5	6.07	5.10	5.10	5.10	0.20	2.50	±18.6%

<sup>C</sup> Frequency validity at 6.5 GHz is -600/+700 MHz, and ±700 MHz at or above 7 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>F</sup> At frequencies 6-10 GHz, the validity of tissue parameters ( $\epsilon'$  and  $\sigma$ ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

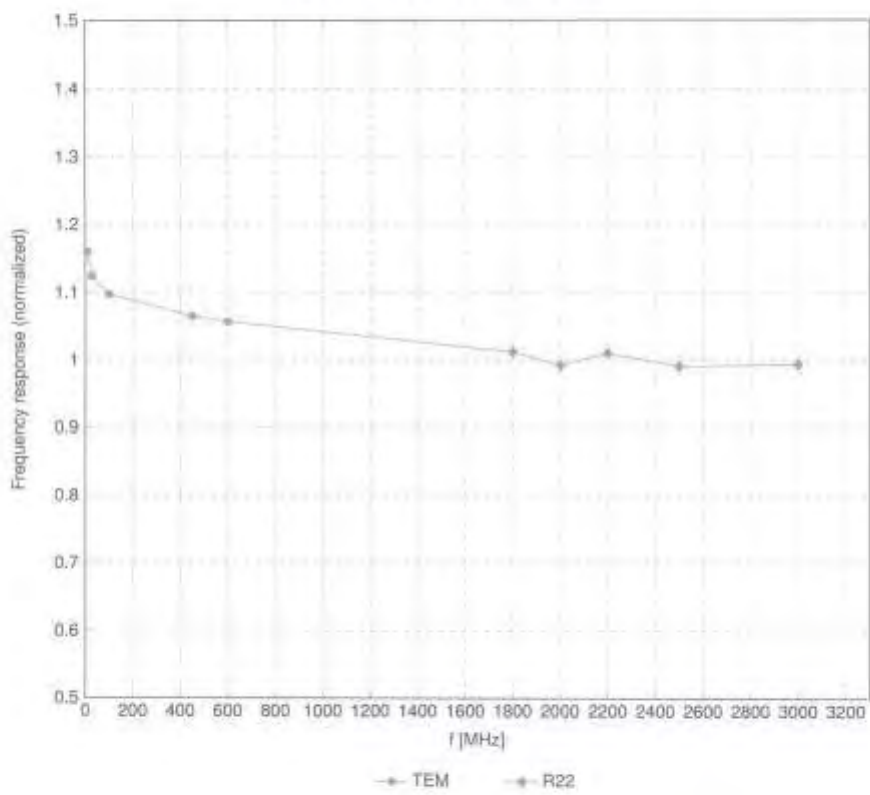
<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz, below ±2% for frequencies between 3-6 GHz, and below ±4% for frequencies between 6-10 GHz at any distance larger than half the probe tip diameter from the boundary.

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### Frequency Response of E-Field

(TEM-Cell:JFI110 EXX, Waveguide:R22)



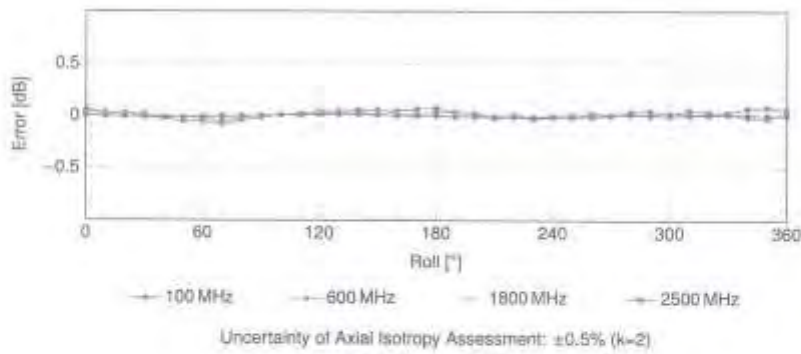
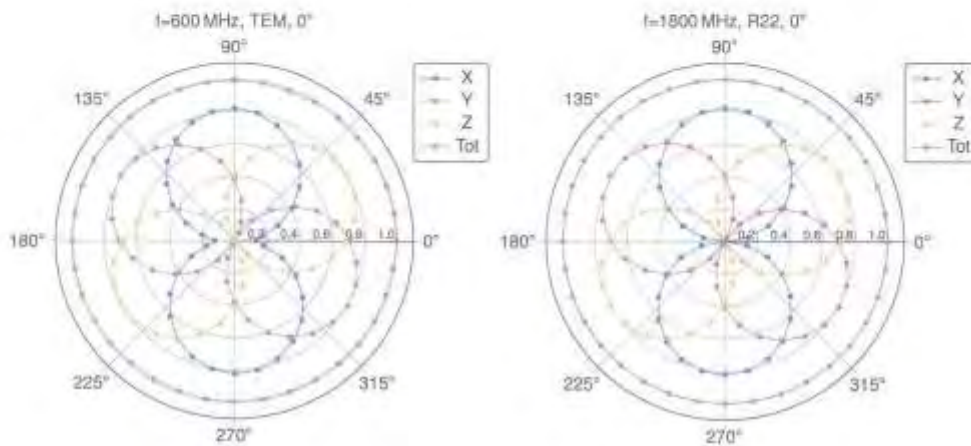
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )



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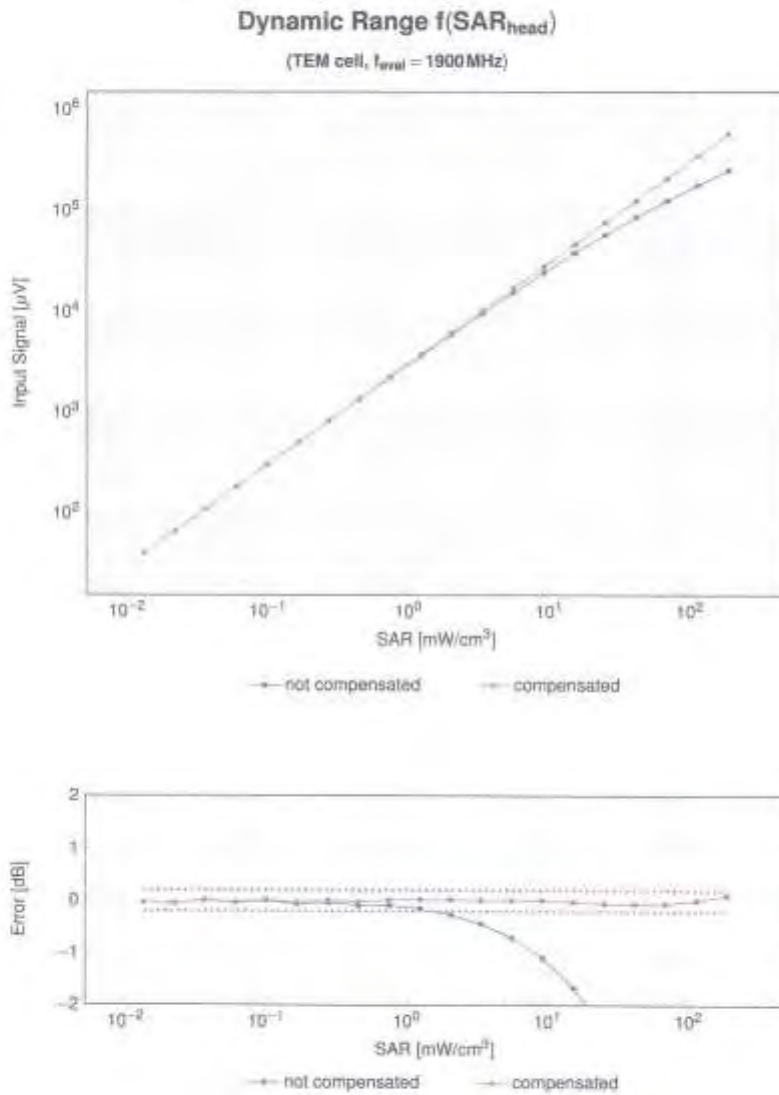
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Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$



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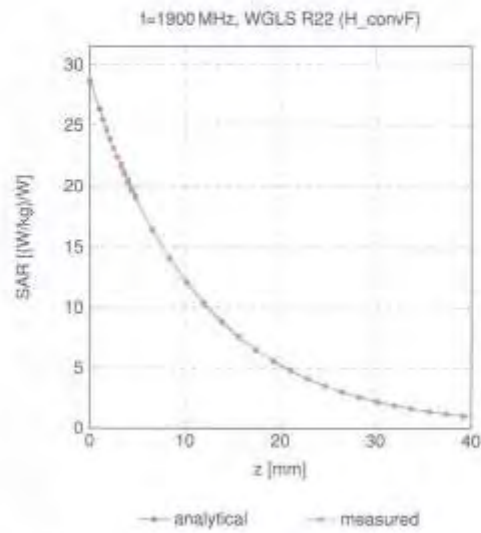


Uncertainty of Linearity Assessment: ±0.6% (k=2)

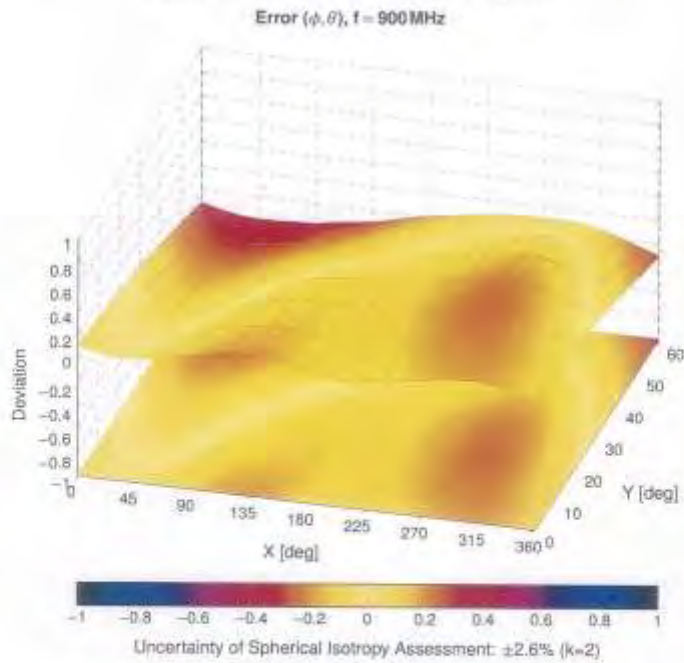
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### Conversion Factor Assessment



### Deviation from Isotropy in Liquid



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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	FAR (dB)	UncF A - 2
11		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 2.4GHz (DSSS, 1Mbps)	WLAN	1.87	+9.6
10013	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 6Mbps)	WLAN	9.46	+9.6
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.38	+9.6
10021	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	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	7.76	+9.6
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	+9.6
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH2)	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 (P4-DQPSK, DH1)	Bluetooth	7.74	+9.6
10034	CAA	IEEE 802.15.1 Bluetooth (P4-DQPSK, DH2)	Bluetooth	4.53	+9.6
10035	CAA	IEEE 802.15.1 Bluetooth (P4-DQPSK, DH5)	Bluetooth	3.83	+9.6
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.91	+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, P4-DQPSK, Fullrate)	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	13.00	+9.6
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.78	+9.6
10050	CAA	UMTS-TDD (TD-SCDMA, 1.28Mbps)	TD-SCDMA	11.01	+9.6
10056	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	8.52	+9.6
10059	CAB	IEEE 802.11b WiFi 2.4GHz (DSSS, 2Mbps)	WLAN	2.12	+9.6
10060	CAB	IEEE 802.11b WiFi 2.4GHz (DSSS, 5.5Mbps)	WLAN	2.83	+9.6
10061	CAB	IEEE 802.11b WiFi 2.4GHz (DSSS, 11Mbps)	WLAN	3.60	+9.6
10062	CAB	IEEE 802.11a/n WiFi 5GHz (OFDM, 6Mbps)	WLAN	8.88	+9.6
10063	CAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 9Mbps)	WLAN	9.83	+9.6
10064	CAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 12Mbps)	WLAN	9.09	+9.6
10065	CAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 18Mbps)	WLAN	9.90	+9.6
10066	CAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 24Mbps)	WLAN	9.38	+9.6
10067	CAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 36Mbps)	WLAN	10.13	+9.6
10068	CAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 48Mbps)	WLAN	10.24	+9.6
10069	CAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 54Mbps)	WLAN	10.56	+9.6
10071	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 9Mbps)	WLAN	9.83	+9.6
10072	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 12Mbps)	WLAN	9.92	+9.6
10073	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 18Mbps)	WLAN	9.94	+9.6
10074	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 24Mbps)	WLAN	10.30	+9.6
10075	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 36Mbps)	WLAN	10.77	+9.6
10076	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 48Mbps)	WLAN	10.94	+9.6
10077	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 54Mbps)	WLAN	11.00	+9.6
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	2.57	+9.6
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, P4-DQPSK, Fullrate)	AMPS	4.77	+9.6
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	+9.6
10097	CAC	UMTS-FDD (HS-DRPA)	WCDMA	3.98	+9.6
10098	DAC	UMTS-FDD (HS-DRPA, Subrate 2)	WCDMA	3.98	+9.6
10098	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	+9.6
10100	CAL	LTE-FDD (SC-FDMA, 100% RB, 20MHz, QPSK)	LTE-FDD	5.87	+9.6
10101	CAB	LTE-FDD (SC-FDMA, 100% RB, 20MHz, 16-QAM)	LTE-FDD	6.43	+9.6
10102	CAB	LTE-FDD (SC-FDMA, 100% RB, 20MHz, 64-QAM)	LTE-FDD	6.80	+9.6
10102	DAC	LTE-TDD (SC-FDMA, 100% RB, 20MHz, QPSK)	LTE-TDD	9.29	+9.6
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 16-QAM)	LTE-TDD	9.97	+9.6
10105	CAE	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 64-QAM)	LTE-TDD	10.01	+9.6
10106	CAE	LTE-FDD (SC-FDMA, 100% RB, 10MHz, QPSK)	LTE-FDD	5.80	+9.6
10106	DAC	LTE-FDD (SC-FDMA, 100% RB, 10MHz, 16-QAM)	LTE-FDD	6.43	+9.6
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5MHz, QPSK)	LTE-FDD	5.75	+9.6
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5MHz, 16-QAM)	LTE-FDD	6.44	+9.6



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10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10MHz, 64-QAM)	LTE-FDD	6.58	±0.6
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5MHz, 64-QAM)	LTE-FDD	6.62	±0.6
10114	CAG	IEEE 802.11n (HT Greenfield, 13.5Mbps, BPSK)	WLAN	8.10	±0.6
10115	CAG	IEEE 802.11n (HT Greenfield, 81Mbps, 16-QAM)	WLAN	6.48	±0.6
10116	CAG	IEEE 802.11n (HT Greenfield, 135Mbps, 64-QAM)	WLAN	6.15	±0.6
10117	CAG	IEEE 802.11n (HT Mixed, 13.5Mbps, BPSK)	WLAN	8.07	±0.6
10118	CAD	IEEE 802.11n (HT Mixed, 81Mbps, 16-QAM)	WLAN	6.59	±0.6
10119	CAD	IEEE 802.11n (HT Mixed, 135Mbps, 64-QAM)	WLAN	6.13	±0.6
10140	CAD	LTE-FDD (SC-FDMA, 100% RB, 15MHz, 16-QAM)	LTE-FDD	6.46	±0.6
10141	CAD	LTE-FDD (SC-FDMA, 100% RB, 15MHz, 64-QAM)	LTE-FDD	6.53	±0.6
10142	CAD	LTE-FDD (SC-FDMA, 100% RB, 3MHz, QPSK)	LTE-FDD	6.73	±0.6
10143	CAD	LTE-FDD (SC-FDMA, 100% RB, 3MHz, 16-QAM)	LTE-FDD	6.35	±0.6
10144	CAG	LTE-FDD (SC-FDMA, 100% RB, 3MHz, 64-QAM)	LTE-FDD	6.65	±0.6
10145	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4MHz, QPSK)	LTE-FDD	6.76	±0.6
10146	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4MHz, 16-QAM)	LTE-FDD	6.41	±0.6
10147	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4MHz, 64-QAM)	LTE-FDD	6.72	±0.6
10148	CAE	LTE-FDD (SC-FDMA, 50% RB, 20MHz, 16-QAM)	LTE-FDD	6.42	±0.6
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20MHz, 64-QAM)	LTE-FDD	6.80	±0.6
10151	CAE	LTE-TDD (SC-FDMA, 50% RB, 20MHz, QPSK)	LTE-TDD	6.28	±0.6
10152	CAE	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 16-QAM)	LTE-TDD	6.32	±0.6
10153	CAE	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 64-QAM)	LTE-TDD	10.05	±0.6
10154	CAF	LTE-FDD (SC-FDMA, 50% RB, 10MHz, QPSK)	LTE-FDD	6.75	±0.6
10155	CAF	LTE-FDD (SC-FDMA, 50% RB, 10MHz, 16-QAM)	LTE-FDD	6.43	±0.6
10156	CAF	LTE-FDD (SC-FDMA, 50% RB, 5MHz, QPSK)	LTE-FDD	6.79	±0.6
10157	CAE	LTE-FDD (SC-FDMA, 50% RB, 5MHz, 16-QAM)	LTE-FDD	6.48	±0.6
10158	CAE	LTE-FDD (SC-FDMA, 50% RB, 10MHz, 64-QAM)	LTE-FDD	6.62	±0.6
10159	CAD	LTE-FDD (SC-FDMA, 50% RB, 5MHz, 64-QAM)	LTE-FDD	6.56	±0.6
10160	CAG	LTE-FDD (SC-FDMA, 50% RB, 16MHz, QPSK)	LTE-FDD	6.82	±0.6
10161	CAG	LTE-FDD (SC-FDMA, 50% RB, 15MHz, 16-QAM)	LTE-FDD	6.43	±0.6
10162	CAG	LTE-FDD (SC-FDMA, 50% RB, 15MHz, 64-QAM)	LTE-FDD	6.58	±0.6
10166	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4MHz, QPSK)	LTE-FDD	6.48	±0.6
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4MHz, 16-QAM)	LTE-FDD	6.21	±0.6
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4MHz, 64-QAM)	LTE-FDD	6.79	±0.6
10169	CAG	LTE-FDD (SC-FDMA, 1 RB, 20MHz, QPSK)	LTE-FDD	6.73	±0.6
10170	CAG	LTE-FDD (SC-FDMA, 1 RB, 20MHz, 16-QAM)	LTE-FDD	6.32	±0.6
10171	CAE	LTE-FDD (SC-FDMA, 1 RB, 20MHz, 64-QAM)	LTE-FDD	6.48	±0.6
10172	CAE	LTE-TDD (SC-FDMA, 1 RB, 20MHz, QPSK)	LTE-TDD	6.21	±0.6
10173	CAE	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 16-QAM)	LTE-TDD	6.48	±0.6
10174	CAF	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 64-QAM)	LTE-TDD	10.25	±0.6
10175	CAF	LTE-FDD (SC-FDMA, 1 RB, 10MHz, QPSK)	LTE-FDD	6.72	±0.6
10178	CAF	LTE-FDD (SC-FDMA, 1 RB, 10MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10177	CAE	LTE-FDD (SC-FDMA, 1 RB, 5MHz, QPSK)	LTE-FDD	6.73	±0.6
10179	CAE	LTE-FDD (SC-FDMA, 1 RB, 5MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10174	AAE	LTE-FDD (SC-FDMA, 1 RB, 10MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10181	CAG	LTE-FDD (SC-FDMA, 1 RB, 16MHz, QPSK)	LTE-FDD	6.72	±0.6
10182	CAG	LTE-FDD (SC-FDMA, 1 RB, 15MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10183	CAG	LTE-FDD (SC-FDMA, 1 RB, 15MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10184	CAG	LTE-FDD (SC-FDMA, 1 RB, 3MHz, QPSK)	LTE-FDD	6.73	±0.6
10185	CAI	LTE-FDD (SC-FDMA, 1 RB, 8MHz, 16-QAM)	LTE-FDD	6.51	±0.6
10186	CAG	LTE-FDD (SC-FDMA, 1 RB, 3MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4MHz, QPSK)	LTE-FDD	6.73	±0.6
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10195	CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10183	CAE	IEEE 802.11n (HT Greenfield, 6.5Mbps, BPSK)	WLAN	8.08	±0.6
10194	AAO	IEEE 802.11n (HT Greenfield, 39Mbps, 16-QAM)	WLAN	8.12	±0.6
10195	CAE	IEEE 802.11n (HT Greenfield, 85Mbps, 64-QAM)	WLAN	8.21	±0.6
10196	CAE	IEEE 802.11n (HT Mixed, 6.5Mbps, BPSK)	WLAN	8.10	±0.6
10197	AAE	IEEE 802.11n (HT Mixed, 39Mbps, 16-QAM)	WLAN	8.13	±0.6
10198	CAF	IEEE 802.11n (HT Mixed, 85Mbps, 64-QAM)	WLAN	8.27	±0.6
10215	CAF	IEEE 802.11n (HT Mixed, 7.2Mbps, BPSK)	WLAN	8.03	±0.6
10250	AAF	IEEE 802.11n (HT Mixed, 43.3Mbps, 16-QAM)	WLAN	8.13	±0.6
10221	CAG	IEEE 802.11n (HT Mixed, 79.2Mbps, 64-QAM)	WLAN	8.27	±0.6
10222	CAC	IEEE 802.11n (HT Mixed, 15Mbps, BPSK)	WLAN	8.06	±0.6
10223	CAD	IEEE 802.11n (HT Mixed, 30Mbps, 16-QAM)	WLAN	8.48	±0.6
10224	CAD	IEEE 802.11n (HT Mixed, 150Mbps, 64-QAM)	WLAN	8.06	±0.6



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10225	CAD	UMTS-FDD (HSPA+)	WCDMA	5.97	±9.6
10226	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	±9.6
10227	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	±9.6
10228	CAD	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	9.46	±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	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10233	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10234	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	±9.6
10235	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10236	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10237	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	±9.6
10238	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10239	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10240	CAB	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	CAD	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	±9.6
10243	CAD	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	CAG	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	±9.6
10246	CAG	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	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	±9.6
10252	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.34	±9.6
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	±9.6
10254	CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	±9.6
10255	CAB	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	9.98	±9.6
10257	CAD	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	±9.6
10258	CAD	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	9.58	±9.6
10260	CAG	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	±9.6
10261	CAG	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	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	±9.6
10267	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.50	±9.6
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	±9.6
10269	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	±9.6
10270	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	±9.6
10274	CAB	UMTS-FDD (HSUPA, Subclass 5, 3GPP RelR 10)	WCDMA	4.97	±9.6
10275	CAD	UMTS-FDD (HSUPA, Subclass 5, 3GPP RelR 4)	WCDMA	3.98	±9.6
10277	CAD	PHS (QPSK)	PHS	11.91	±9.6
10278	CAD	PHS (QPSK, BW 884 MHz, Rx/tx/0.5)	PHS	11.91	±9.6
10279	CAD	PHS (QPSK, BW 884 MHz, Rx/tx/0.3)	PHS	12.18	±9.6
10290	CAG	CDMA2000, RC1, SO5S, Full Rate	CDMA2000	3.91	±9.6
10291	CAG	CDMA2000, RC3, SO5S, Full Rate	CDMA2000	3.48	±9.6
10292	CAG	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	±9.6
10293	CAD	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	±9.6
10295	CAD	CDMA2000, RC1, SO3, 180° Rate 25 ft	CDMA2000	12.49	±9.6
10297	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	±9.6
10298	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	6.72	±9.6
10299	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	±9.6
10300	CAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10301	CAC	IEEE 802.16e WIMAX (20-18, 5ms, 10 MHz, QPSK, PUSC)	WIMAX	12.03	±9.6
10302	CAB	IEEE 802.16e WIMAX (20-18, 5ms, 10 MHz, QPSK, PUSC, 3CTRL)	WIMAX	12.57	±9.6
10303	CAB	IEEE 802.16e WIMAX (31-15, 5ms, 10 MHz, 64QAM, PUSC)	WIMAX	12.52	±9.6
10304	CAB	IEEE 802.16e WIMAX (20-18, 5ms, 10 MHz, 64QAM, PUSC)	WIMAX	11.85	±9.6
10305	CAB	IEEE 802.16e WIMAX (31-15, 10ms, 10 MHz, 64QAM, PUSC)	WIMAX	15.24	±9.6
10306	CAB	IEEE 802.16e WIMAX (20-18, 10ms, 10 MHz, 64QAM, PUSC)	WIMAX	14.67	±9.6

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10307	AAB	IEEE 802.16e WMAX (20:18, 10 ms, 10MHz, QPSK, PUSC)	WIMAX	14.48	±9.6
10308	AAB	IEEE 802.16e WMAX (20:18, 10 ms, 10MHz, 16QAM, PUSC)	WIMAX	14.46	±9.6
10309	AAB	IEEE 802.16e WMAX (20:18, 10 ms, 10MHz, 16QAM, AMC 2x3)	WIMAX	14.58	±9.6
10310	AAB	IEEE 802.16e WMAX (20:18, 10 ms, 10MHz, QPSK, AMC 2x3)	WIMAX	14.57	±9.6
10311	AAB	LTE-FDD (SC-FDMA, 100% RB, 15MHz, QPSK)	LTE-FDD	6.06	±9.6
10313	AAD	IDEN 1.3	IDEN	10.51	±9.6
10314	AAD	IDEN 1.6	IDEN	13.48	±9.6
10315	AAD	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc dc)	WLAN	1.71	±9.6
10318	AAD	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 5 Mbps, 99pc dc)	WLAN	8.38	±9.6
10317	AAA	IEEE 802.11n WiFi 5 GHz (OFDM, 5 Mbps, 99pc dc)	WLAN	8.38	±9.6
10350	AAA	Pulse Waveform (200 Hz, 10%)	Generic	10.00	±9.6
10353	AAA	Pulse Waveform (200 Hz, 20%)	Generic	6.99	±9.6
10354	AAA	Pulse Waveform (200 Hz, 40%)	Generic	3.98	±9.6
10355	AAA	Pulse Waveform (200 Hz, 60%)	Generic	2.22	±9.6
10356	AAA	Pulse Waveform (200 Hz, 80%)	Generic	0.97	±9.6
10387	AAA	QPSK Waveform, 1 MHz	Generic	9.10	±9.6
10388	AAA	QPSK Waveform, 10 MHz	Generic	8.22	±9.6
10389	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	±9.6
10389	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	±9.6
10400	AAD	IEEE 802.11ac WiFi (20 MHz, 64-QAM, 99pc dc)	WLAN	8.57	±9.6
10401	AAA	IEEE 802.11ac WiFi (40 MHz, 64-QAM, 99pc dc)	WLAN	8.60	±9.6
10402	AAA	IEEE 802.11ac WiFi (80 MHz, 64-QAM, 99pc dc)	WLAN	8.93	±9.6
10408	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	5.76	±9.6
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	±9.6
10406	AAD	CDMA2000, RCS, SC32, 9CH0, Full Rate	CDMA2000	5.22	±9.6
10410	AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,6,9)	LTE-TDD	7.82	±9.6
10414	AAA	WLAN CCDF, 64-QAM, 40 MHz	Generic	6.54	±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, 5 Mbps, 99pc dc)	WLAN	8.23	±9.6
10417	AAA	IEEE 802.11n WiFi 5 GHz (OFDM, 5 Mbps, 99pc dc)	WLAN	8.23	±9.6
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 5 Mbps, 99pc, Long)	WLAN	8.14	±9.6
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 5 Mbps, 99pc, Short)	WLAN	8.19	±9.6
10422	AAA	IEEE 802.11n (HT Greenfield, 7.2Mbps, BPSK)	WLAN	8.32	±9.6
10423	AAA	IEEE 802.11n (HT Greenfield, 43.3Mbps, 16-QAM)	WLAN	8.47	±9.6
10424	AAE	IEEE 802.11n (HT Greenfield, 78.2Mbps, 64-QAM)	WLAN	8.46	±9.6
10425	AAE	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	±9.6
10428	AAE	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	AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	±9.6
10431	AAC	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6
10432	AAB	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	AAC	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	6.60	±9.6
10435	AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10447	AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	±9.6
10448	AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±9.6
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±9.6
10450	AAA	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	AAC	Validation (Square, 10 ms, 1 ms)	Test	10.00	±9.6
10458	AAC	IEEE 802.11ac WiFi (160 MHz, 64-QAM, 99pc dc)	WLAN	8.63	±9.6
10457	AAC	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	±9.6
10458	AAC	CDMA2000 (1xEV-DO, Rev. B, 3.1 carrier)	CDMA2000	6.55	±9.6
10458	AAC	CDMA2000 (1xEV-DO, Rev. B, 3 carrier)	CDMA2000	6.25	±9.6
10460	AAC	UMTS-FDD (WCDMA, AMR)	WCDMA	6.59	±9.6
10481	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.83	±9.6
10482	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	±9.6
10483	AAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.58	±9.6
10484	AAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10485	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	±9.6
10486	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10487	AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10488	AAP	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.33	±9.6
10489	AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	±9.6
10470	AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10471	AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±9.6



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10472	AAC	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10473	AAA	LTE-TDD (SC-FDMA, 1 RB, 15MHz, QPSK, UL Sub)	LTE-TDD	7.32	±9.6
10474	AAC	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±9.6
10475	AAD	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10477	AAC	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 16-QAM, UL Sub)	LTE-TDD	8.52	±9.6
10478	AAC	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10479	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10480	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 16-QAM, UL Sub)	LTE-TDD	8.18	±9.6
10481	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 64-QAM, UL Sub)	LTE-TDD	8.43	±9.6
10482	AAA	LTE-TDD (SC-FDMA, 50% RB, 3MHz, QPSK, UL Sub)	LTE-TDD	7.71	±9.6
10483	AAA	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 16-QAM, Sub)	LTE-TDD	8.28	±9.6
10484	AAB	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 64-QAM, UL Sub)	LTE-TDD	8.47	±9.6
10485	AAB	LTE-TDD (SC-FDMA, 50% RB, 5MHz, QPSK, UL Sub)	LTE-TDD	7.59	±9.6
10486	AAB	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 16-QAM, UL Sub)	LTE-TDD	8.38	±9.6
10487	AAC	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 64-QAM, UL Sub)	LTE-TDD	9.60	±9.6
10488	AAC	LTE-TDD (SC-FDMA, 50% RB, 10MHz, QPSK, UL Sub)	LTE-TDD	7.70	±9.6
10489	AAC	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	±9.6
10490	AAF	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	±9.6
10491	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10492	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 16-QAM, UL Sub)	LTE-TDD	8.41	±9.6
10493	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	±9.6
10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 16-QAM, UL Sub)	LTE-TDD	8.37	±9.6
10496	AAL	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	±9.6
10497	AAE	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, QPSK, UL Sub)	LTE-TDD	7.57	±9.6
10498	AAE	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 16-QAM, UL Sub)	LTE-TDD	8.40	±9.6
10499	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 64-QAM, UL Sub)	LTE-TDD	8.68	±9.6
10500	AAF	LTE-TDD (SC-FDMA, 100% RB, 3MHz, QPSK, UL Sub)	LTE-TDD	7.67	±9.6
10501	AAF	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 16-QAM, UL Sub)	LTE-TDD	8.44	±9.6
10502	AAB	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 64-QAM, UL Sub)	LTE-TDD	8.52	±9.6
10503	AAB	LTE-TDD (SC-FDMA, 100% RB, 5MHz, QPSK, UL Sub)	LTE-TDD	7.72	±9.6
10504	AAB	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	±9.6
10505	AAC	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	±9.6
10506	AAC	LTE-TDD (SC-FDMA, 100% RB, 10MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10507	AAC	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 16-QAM, UL Sub)	LTE-TDD	8.36	±9.6
10508	AAF	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 64-QAM, UL Sub)	LTE-TDD	8.58	±9.6
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, QPSK, UL Sub)	LTE-TDD	7.93	±9.6
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 16-QAM, UL Sub)	LTE-TDD	8.49	±9.6
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 64-QAM, UL Sub)	LTE-TDD	8.51	±9.6
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 16-QAM, UL Sub)	LTE-TDD	8.42	±9.6
10514	AAE	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	±9.6
10515	AAE	IEEE 802.11b WiFi 2.4GHz (DSSS, 2Mbps, 99pc dc)	WLAN	1.56	±9.6
10516	AAE	IEEE 802.11b WiFi 2.4GHz (DSSS, 5.5Mbps, 99pc dc)	WLAN	1.57	±9.6
10517	AAF	IEEE 802.11b WiFi 2.4GHz (DSSS, 11Mbps, 99pc dc)	WLAN	1.58	±9.6
10518	AAF	IEEE 802.11a/h WiFi 5GHz (OFDM, 9Mbps, 99pc dc)	WLAN	8.23	±9.6
10519	AAF	IEEE 802.11a/h WiFi 5GHz (OFDM, 12Mbps, 99pc dc)	WLAN	8.38	±9.6
10520	AAB	IEEE 802.11a/h WiFi 5GHz (OFDM, 18Mbps, 99pc dc)	WLAN	8.12	±9.6
10521	AAB	IEEE 802.11a/h WiFi 5GHz (OFDM, 24Mbps, 99pc dc)	WLAN	7.97	±9.6
10522	AAB	IEEE 802.11a/h WiFi 5GHz (OFDM, 36Mbps, 99pc dc)	WLAN	8.45	±9.6
10523	AAC	IEEE 802.11a/h WiFi 5GHz (OFDM, 48Mbps, 99pc dc)	WLAN	8.08	±9.6
10524	AAC	IEEE 802.11a/h WiFi 5GHz (OFDM, 54Mbps, 99pc dc)	WLAN	8.27	±9.6
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.38	±9.6
10526	AAF	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.42	±9.6
10527	AAF	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc)	WLAN	8.21	±9.6
10528	AAF	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc)	WLAN	8.38	±9.6
10529	AAF	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc)	WLAN	8.36	±9.6
10531	AAF	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc)	WLAN	8.43	±9.6
10532	AAF	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc)	WLAN	8.29	±9.6
10533	AAE	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc)	WLAN	8.38	±9.6
10534	AAE	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc)	WLAN	8.45	±9.6
10535	AAE	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc)	WLAN	8.45	±9.6
10530	AAF	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc)	WLAN	8.32	±9.6
10527	AAF	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc)	WLAN	8.44	±9.6
10538	AAF	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc)	WLAN	8.54	±9.6
10540	AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.39	±9.6

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10541	AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc)	WLAN	8.46	±9.6
10542	AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.68	±9.6
10543	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc dc)	WLAN	8.85	±9.6
10544	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc dc)	WLAN	8.47	±9.6
10545	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc dc)	WLAN	8.55	±9.6
10546	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc dc)	WLAN	8.35	±9.6
10547	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc)	WLAN	8.48	±9.6
10548	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc dc)	WLAN	8.37	±9.6
10550	AAC	IEEE 802.11ac WiFi (80MHz, MCS5, 99pc dc)	WLAN	8.38	±9.6
10551	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc dc)	WLAN	8.50	±9.6
10552	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc dc)	WLAN	8.42	±9.6
10553	AAC	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	8.81	±9.6
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc dc)	WLAN	8.73	±9.6
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc dc)	WLAN	8.59	±9.6
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc dc)	WLAN	8.69	±9.6
10563	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc dc)	WLAN	8.77	±9.6
10564	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 9Mbps, 99pc dc)	WLAN	8.25	±9.6
10565	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 12Mbps, 99pc dc)	WLAN	8.45	±9.6
10566	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 18Mbps, 99pc dc)	WLAN	8.13	±9.6
10567	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 24Mbps, 99pc dc)	WLAN	8.00	±9.6
10568	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 36Mbps, 99pc dc)	WLAN	8.37	±9.6
10569	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 48Mbps, 99pc dc)	WLAN	8.10	±9.6
10570	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 54Mbps, 99pc dc)	WLAN	8.30	±9.6
10571	AAC	IEEE 802.11b WiFi 2.4GHz (DSSS, 1Mbps, 99pc dc)	WLAN	1.99	±9.6
10572	AAC	IEEE 802.11b WiFi 2.4GHz (DSSS, 2Mbps, 99pc dc)	WLAN	1.96	±9.6
10573	AAC	IEEE 802.11b WiFi 2.4GHz (DSSS, 5.5Mbps, 99pc dc)	WLAN	1.98	±9.6
10574	AAC	IEEE 802.11b WiFi 2.4GHz (DSSS, 11Mbps, 99pc dc)	WLAN	1.88	±9.6
10575	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 6Mbps, 99pc dc)	WLAN	8.59	±9.6
10576	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 9Mbps, 99pc dc)	WLAN	8.60	±9.6
10577	AAC	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 12Mbps, 99pc dc)	WLAN	8.70	±9.6
10579	AAD	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 18Mbps, 99pc dc)	WLAN	8.49	±9.6
10579	AAD	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 24Mbps, 99pc dc)	WLAN	8.36	±9.6
10580	AAD	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 36Mbps, 99pc dc)	WLAN	8.75	±9.6
10581	AAD	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 48Mbps, 99pc dc)	WLAN	8.35	±9.6
10582	AAD	IEEE 802.11g WiFi 2.4GHz (DSSS-CFDM, 54Mbps, 99pc dc)	WLAN	8.67	±9.6
10583	AAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 6Mbps, 99pc dc)	WLAN	8.59	±9.6
10584	AAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 9Mbps, 99pc dc)	WLAN	8.60	±9.6
10585	AAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 12Mbps, 99pc dc)	WLAN	8.70	±9.6
10586	AAD	IEEE 802.11a/n WiFi 5GHz (OFDM, 18Mbps, 99pc dc)	WLAN	8.49	±9.6
10587	AAA	IEEE 802.11a/n WiFi 5GHz (OFDM, 24Mbps, 99pc dc)	WLAN	8.36	±9.6
10588	AAA	IEEE 802.11a/n WiFi 5GHz (OFDM, 36Mbps, 99pc dc)	WLAN	8.76	±9.6
10589	AAA	IEEE 802.11a/n WiFi 5GHz (OFDM, 48Mbps, 99pc dc)	WLAN	8.35	±9.6
10590	AAA	IEEE 802.11a/n WiFi 5GHz (OFDM, 54Mbps, 99pc dc)	WLAN	8.67	±9.6
10591	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 99pc dc)	WLAN	8.63	±9.6
10592	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 99pc dc)	WLAN	8.79	±9.6
10593	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 99pc dc)	WLAN	8.64	±9.6
10594	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 99pc dc)	WLAN	8.74	±9.6
10595	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 99pc dc)	WLAN	8.74	±9.6
10596	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 99pc dc)	WLAN	8.71	±9.6
10597	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 99pc dc)	WLAN	8.72	±9.6
10598	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 99pc dc)	WLAN	8.80	±9.6
10599	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 99pc dc)	WLAN	8.79	±9.6
10600	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 99pc dc)	WLAN	8.88	±9.6
10601	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 99pc dc)	WLAN	8.89	±9.6
10602	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 99pc dc)	WLAN	8.94	±9.6
10603	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 99pc dc)	WLAN	8.83	±9.6
10604	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 99pc dc)	WLAN	8.76	±9.6
10605	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 99pc dc)	WLAN	8.97	±9.6
10606	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 99pc dc)	WLAN	8.82	±9.6
10607	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.64	±9.6
10608	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.77	±9.6



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10600	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc dc)	WLAN	8.57	±9.6
10610	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc dc)	WLAN	8.78	±9.6
10611	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc dc)	WLAN	8.70	±9.6
10612	AAC	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc dc)	WLAN	8.77	±9.6
10613	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc dc)	WLAN	8.94	±9.6
10614	AAC	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc dc)	WLAN	8.59	±9.6
10615	AAC	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc dc)	WLAN	8.82	±9.6
10616	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc dc)	WLAN	8.82	±9.6
10617	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc dc)	WLAN	8.81	±9.6
10618	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc dc)	WLAN	8.58	±9.6
10619	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc dc)	WLAN	8.88	±9.6
10620	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc dc)	WLAN	8.87	±9.6
10621	AAC	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc dc)	WLAN	8.77	±9.6
10622	AAC	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc dc)	WLAN	8.88	±9.6
10623	AAC	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc dc)	WLAN	8.82	±9.6
10624	AAC	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc dc)	WLAN	8.88	±9.6
10625	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc dc)	WLAN	8.90	±9.6
10626	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc dc)	WLAN	8.83	±9.6
10627	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc dc)	WLAN	8.80	±9.6
10628	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc dc)	WLAN	8.71	±9.6
10629	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc dc)	WLAN	8.85	±9.6
10630	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc dc)	WLAN	8.72	±9.6
10631	AAC	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc dc)	WLAN	8.81	±9.6
10632	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc dc)	WLAN	8.74	±9.6
10633	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc dc)	WLAN	8.83	±9.6
10634	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc dc)	WLAN	8.80	±9.6
10635	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc dc)	WLAN	8.81	±9.6
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 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	8.80	±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	8.88	±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	AAC	LTE-TDD [SC-FDMA, 1 RB, 5MHz, QPSK, UL Sub=2.7]	LTE-TDD	11.96	±9.6
10647	AAC	LTE-TDD [SC-FDMA, 1 RB, 20MHz, QPSK, UL Sub=2.7]	LTE-TDD	11.96	±9.6
10648	AAC	CDMA2000 [1x Advanced]	CDMA2000	9.45	±9.6
10662	AAC	LTE-TDD [OFDMA, 5MHz, E-TM 3.1, Clipping 44%]	LTE-TDD	8.91	±9.6
10663	AAC	LTE-TDD [OFDMA, 10MHz, E-TM 3.1, Clipping 44%]	LTE-TDD	7.42	±9.6
10664	AAC	LTE-TDD [OFDMA, 15MHz, E-TM 3.1, Clipping 44%]	LTE-TDD	6.96	±9.6
10665	AAC	LTE-TDD [OFDMA, 20MHz, E-TM 3.1, Clipping 44%]	LTE-TDD	7.21	±9.6
10666	AAC	Pulse Waveform (200 Hz, 16%)	Test	10.00	±9.6
10666	AAC	Pulse Waveform (200 Hz, 20%)	Test	6.99	±9.6
10666	AAC	Pulse Waveform (200 Hz, 40%)	Test	3.98	±9.6
10666	AAC	Pulse Waveform (200 Hz, 60%)	Test	2.22	±9.6
10666	AAC	Pulse Waveform (200 Hz, 80%)	Test	0.97	±9.6
10670	AAC	Bluetooth Low Energy	Bluetooth	8.15	±9.6
10671	AAD	IEEE 802.11ax (20MHz, MCS9, 90pc dc)	WLAN	8.09	±9.6
10672	AAD	IEEE 802.11ax (20MHz, MCS1, 90pc dc)	WLAN	8.57	±9.6
10673	AAD	IEEE 802.11ax (20MHz, MCS2, 90pc dc)	WLAN	8.78	±9.6
10674	AAD	IEEE 802.11ax (20MHz, MCS3, 90pc dc)	WLAN	8.74	±9.6
10675	AAD	IEEE 802.11ax (20MHz, MCS4, 90pc dc)	WLAN	8.90	±9.6
10676	AAD	IEEE 802.11ax (20MHz, MCS5, 90pc dc)	WLAN	8.77	±9.6
10677	AAD	IEEE 802.11ax (20MHz, MCS6, 90pc dc)	WLAN	8.73	±9.6
10678	AAD	IEEE 802.11ax (20MHz, MCS7, 90pc dc)	WLAN	8.79	±9.6
10679	AAD	IEEE 802.11ax (20MHz, MCS8, 90pc dc)	WLAN	8.69	±9.6
10680	AAD	IEEE 802.11ax (20MHz, MCS9, 90pc dc)	WLAN	8.90	±9.6
10681	AAS	IEEE 802.11ax (20MHz, MCS10, 90pc dc)	WLAN	8.82	±9.6
10682	AAS	IEEE 802.11ax (20MHz, MCS11, 90pc dc)	WLAN	8.83	±9.6
10683	AAS	IEEE 802.11ax (20MHz, MCS9, 90pc dc)	WLAN	9.42	±9.6
10684	AAC	IEEE 802.11ax (20MHz, MCS1, 90pc dc)	WLAN	8.26	±9.6
10685	AAC	IEEE 802.11ax (20MHz, MCS2, 90pc dc)	WLAN	8.33	±9.6
10686	AAC	IEEE 802.11ax (20MHz, MCS3, 90pc dc)	WLAN	8.28	±9.6



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10687	AAE	IEEE 802.11ax (20 MHz, MCS4, 99pc dc)	WLAN	8.43	±9.6
10688	AAE	IEEE 802.11ax (20 MHz, MCS5, 99pc dc)	WLAN	8.29	±9.6
10689	AAD	IEEE 802.11ax (20 MHz, MCS6, 99pc dc)	WLAN	8.55	±9.6
10690	AAE	IEEE 802.11ax (20 MHz, MCS7, 99pc dc)	WLAN	8.29	±9.6
10691	AAU	IEEE 802.11ax (20 MHz, MCS8, 99pc dc)	WLAN	8.35	±9.6
10693	AAA	IEEE 802.11ax (20 MHz, MCS9, 99pc dc)	WLAN	8.29	±9.6
10693	AAA	IEEE 802.11ax (20 MHz, MCS10, 99pc dc)	WLAN	8.25	±9.6
10694	AAA	IEEE 802.11ax (20 MHz, MCS11, 99pc dc)	WLAN	8.57	±9.6
10695	AAA	IEEE 802.11ax (40 MHz, MCS0, 90pc dc)	WLAN	8.78	±9.6
10696	AAA	IEEE 802.11ax (40 MHz, MCS1, 90pc dc)	WLAN	8.91	±9.6
10697	AAA	IEEE 802.11ax (40 MHz, MCS2, 90pc dc)	WLAN	8.61	±9.6
10698	AAA	IEEE 802.11ax (40 MHz, MCS3, 90pc dc)	WLAN	8.69	±9.6
10699	AAA	IEEE 802.11ax (40 MHz, MCS4, 90pc dc)	WLAN	8.62	±9.6
10700	AAA	IEEE 802.11ax (40 MHz, MCS5, 90pc dc)	WLAN	8.73	±9.6
10701	AAA	IEEE 802.11ax (40 MHz, MCS6, 90pc dc)	WLAN	8.66	±9.6
10702	AAA	IEEE 802.11ax (40 MHz, MCS7, 90pc dc)	WLAN	8.70	±9.6
10703	AAA	IEEE 802.11ax (40 MHz, MCS8, 90pc dc)	WLAN	8.82	±9.6
10704	AAA	IEEE 802.11ax (40 MHz, MCS9, 90pc dc)	WLAN	8.56	±9.6
10705	AAA	IEEE 802.11ax (40 MHz, MCS10, 90pc dc)	WLAN	8.69	±9.6
10706	AAC	IEEE 802.11ax (40 MHz, MCS11, 90pc dc)	WLAN	8.66	±9.6
10707	AAC	IEEE 802.11ax (40 MHz, MCS0, 99pc dc)	WLAN	8.28	±9.6
10708	AAC	IEEE 802.11ax (40 MHz, MCS1, 99pc dc)	WLAN	8.55	±9.6
10709	AAC	IEEE 802.11ax (40 MHz, MCS2, 99pc dc)	WLAN	8.33	±9.6
10710	AAC	IEEE 802.11ax (40 MHz, MCS3, 99pc dc)	WLAN	8.29	±9.6
10711	AAC	IEEE 802.11ax (40 MHz, MCS4, 99pc dc)	WLAN	8.39	±9.6
10712	AAC	IEEE 802.11ax (40 MHz, MCS5, 99pc dc)	WLAN	8.67	±9.6
10713	AAC	IEEE 802.11ax (40 MHz, MCS6, 99pc dc)	WLAN	8.33	±9.6
10714	AAC	IEEE 802.11ax (40 MHz, MCS7, 99pc dc)	WLAN	8.29	±9.6
10715	AAC	IEEE 802.11ax (40 MHz, MCS8, 99pc dc)	WLAN	8.45	±9.6
10716	AAC	IEEE 802.11ax (40 MHz, MCS9, 99pc dc)	WLAN	8.30	±9.6
10717	AAC	IEEE 802.11ax (40 MHz, MCS10, 99pc dc)	WLAN	8.48	±9.6
10718	AAC	IEEE 802.11ax (40 MHz, MCS11, 99pc dc)	WLAN	8.24	±9.6
10719	AAG	IEEE 802.11ax (80 MHz, MCS0, 90pc dc)	WLAN	9.81	±9.6
10720	AAC	IEEE 802.11ax (80 MHz, MCS1, 90pc dc)	WLAN	8.87	±9.6
10721	AAC	IEEE 802.11ax (80 MHz, MCS2, 90pc dc)	WLAN	8.76	±9.6
10722	AAC	IEEE 802.11ax (80 MHz, MCS3, 90pc dc)	WLAN	8.55	±9.6
10723	AAC	IEEE 802.11ax (80 MHz, MCS4, 90pc dc)	WLAN	8.70	±9.6
10724	AAC	IEEE 802.11ax (80 MHz, MCS5, 90pc dc)	WLAN	8.90	±9.6
10725	AAC	IEEE 802.11ax (80 MHz, MCS6, 90pc dc)	WLAN	8.74	±9.6
10726	AAC	IEEE 802.11ax (80 MHz, MCS7, 90pc dc)	WLAN	8.72	±9.6
10727	AAC	IEEE 802.11ax (80 MHz, MCS8, 90pc dc)	WLAN	8.86	±9.6
10728	AAC	IEEE 802.11ax (80 MHz, MCS9, 90pc dc)	WLAN	8.66	±9.6
10729	AAC	IEEE 802.11ax (80 MHz, MCS10, 90pc dc)	WLAN	8.84	±9.6
10730	AAC	IEEE 802.11ax (80 MHz, MCS11, 90pc dc)	WLAN	8.67	±9.6
10731	AAC	IEEE 802.11ax (80 MHz, MCS0, 99pc dc)	WLAN	8.42	±9.6
10732	AAC	IEEE 802.11ax (80 MHz, MCS1, 99pc dc)	WLAN	8.48	±9.6
10733	AAC	IEEE 802.11ax (80 MHz, MCS2, 99pc dc)	WLAN	8.40	±9.6
10734	AAC	IEEE 802.11ax (80 MHz, MCS3, 99pc dc)	WLAN	8.25	±9.6
10735	AAC	IEEE 802.11ax (80 MHz, MCS4, 99pc dc)	WLAN	8.33	±9.6
10736	AAC	IEEE 802.11ax (80 MHz, MCS5, 99pc dc)	WLAN	8.27	±9.6
10737	AAC	IEEE 802.11ax (80 MHz, MCS6, 99pc dc)	WLAN	8.26	±9.6
10738	AAC	IEEE 802.11ax (80 MHz, MCS7, 99pc dc)	WLAN	8.42	±9.6
10739	AAC	IEEE 802.11ax (80 MHz, MCS8, 99pc dc)	WLAN	8.29	±9.6
10740	AAC	IEEE 802.11ax (80 MHz, MCS9, 99pc dc)	WLAN	8.48	±9.6
10741	AAC	IEEE 802.11ax (80 MHz, MCS10, 99pc dc)	WLAN	8.40	±9.6
10742	AAC	IEEE 802.11ax (80 MHz, MCS11, 99pc dc)	WLAN	8.43	±9.6
10743	AAC	IEEE 802.11ax (160 MHz, MCS0, 90pc dc)	WLAN	8.94	±9.6
10744	AAC	IEEE 802.11ax (160 MHz, MCS1, 90pc dc)	WLAN	9.16	±9.6
10745	AAC	IEEE 802.11ax (160 MHz, MCS2, 90pc dc)	WLAN	8.93	±9.6
10746	AAC	IEEE 802.11ax (160 MHz, MCS3, 90pc dc)	WLAN	8.11	±9.6
10747	AAC	IEEE 802.11ax (160 MHz, MCS4, 90pc dc)	WLAN	9.04	±9.6
10748	AAC	IEEE 802.11ax (160 MHz, MCS5, 90pc dc)	WLAN	8.93	±9.6
10749	AAC	IEEE 802.11ax (160 MHz, MCS6, 90pc dc)	WLAN	8.99	±9.6
10750	AAC	IEEE 802.11ax (160 MHz, MCS7, 90pc dc)	WLAN	8.78	±9.6
10751	AAC	IEEE 802.11ax (160 MHz, MCS8, 90pc dc)	WLAN	8.62	±9.6
10752	AAC	IEEE 802.11ax (160 MHz, MCS9, 90pc dc)	WLAN	8.61	±9.6

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10752	AAC	IEEE 802.11ax (160MHz, MCS10, 99pc dc)	WLAN	9.00	±9.5
10754	AAC	IEEE 802.11ax (160MHz, MCS11, 99pc dc)	WLAN	9.04	±9.5
10755	AAC	IEEE 802.11ax (160MHz, MCS0, 99pc dc)	WLAN	8.94	±9.5
10756	AAC	IEEE 802.11ax (160MHz, MCS1, 99pc dc)	WLAN	9.77	±9.0
10757	AAC	IEEE 802.11ax (160MHz, MCS2, 99pc dc)	WLAN	9.77	±9.0
10758	AAC	IEEE 802.11ax (160MHz, MCS3, 99pc dc)	WLAN	9.69	±9.5
10759	AAC	IEEE 802.11ax (160MHz, MCS4, 99pc dc)	WLAN	9.58	±9.6
10760	AAC	IEEE 802.11ax (160MHz, MCS5, 99pc dc)	WLAN	9.49	±9.5
10761	AAC	IEEE 802.11ax (160MHz, MCS6, 99pc dc)	WLAN	9.59	±9.5
10762	AAC	IEEE 802.11ax (160MHz, MCS7, 99pc dc)	WLAN	9.40	±9.5
10763	AAC	IEEE 802.11ax (160MHz, MCS8, 99pc dc)	WLAN	9.93	±9.6
10764	AAC	IEEE 802.11ax (160MHz, MCS9, 99pc dc)	WLAN	9.54	±9.5
10765	AAC	IEEE 802.11ax (160MHz, MCS10, 99pc dc)	WLAN	9.54	±9.5
10766	AAC	IEEE 802.11ax (160MHz, MCS11, 99pc dc)	WLAN	9.57	±9.5
10767	AAC	5G NR (CP-OFDM, 1 RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.98	±9.5
10768	AAC	5G NR (CP-OFDM, 1 RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.5
10769	AAC	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.5
10770	AAC	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.5
10771	AAC	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.5
10772	AAC	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	±9.5
10773	AAC	5G NR (CP-OFDM, 1 RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	±9.5
10774	AAC	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.5
10775	AAC	5G NR (CP-OFDM, 50% RB, 3MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.21	±9.5
10776	AAC	5G NR (CP-OFDM, 50% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.5
10777	AAC	5G NR (CP-OFDM, 50% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.5
10778	AAC	5G NR (CP-OFDM, 50% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	±9.5
10779	AAC	5G NR (CP-OFDM, 50% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	±9.5
10780	AAC	5G NR (CP-OFDM, 50% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.5
10781	AAC	5G NR (CP-OFDM, 50% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.5
10782	AAC	5G NR (CP-OFDM, 50% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±9.5
10783	AAC	5G NR (CP-OFDM, 100% RB, 3MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.5
10784	AAC	5G NR (CP-OFDM, 100% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	±9.5
10785	AAC	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	±9.5
10786	AAC	5G NR (CP-OFDM, 100% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	±9.5
10787	AAC	5G NR (CP-OFDM, 100% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	±9.5
10788	AAC	5G NR (CP-OFDM, 100% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.5
10789	AAC	5G NR (CP-OFDM, 100% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	±9.5
10790	AAC	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.5
10791	AAC	5G NR (CP-OFDM, 1 RB, 3MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	±9.5
10792	AAC	5G NR (CP-OFDM, 1 RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±9.5
10793	AAC	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	±9.5
10794	AAC	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±9.5
10795	AAC	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	±9.5
10796	AAC	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.80	±9.5
10797	AAC	5G NR (CP-OFDM, 1 RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	±9.5
10798	AAC	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.5
10799	AAC	5G NR (CP-OFDM, 1 RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.5
10801	AAC	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.69	±9.5
10802	AAC	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	±9.5
10803	AAC	5G NR (CP-OFDM, 1 RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.5
10805	AAD	5G NR (CP-OFDM, 50% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.5
10806	AAD	5G NR (CP-OFDM, 50% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	±9.5
10809	AAD	5G NR (CP-OFDM, 50% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.5
10810	AAD	5G NR (CP-OFDM, 50% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.5
10812	AAD	5G NR (CP-OFDM, 50% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±9.5
10817	AAD	5G NR (CP-OFDM, 100% RB, 3MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.38	±9.5
10819	AAD	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.5
10819	AAD	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	±9.5
10820	AAD	5G NR (CP-OFDM, 100% RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	±9.5
10821	AAC	5G NR (CP-OFDM, 100% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.5
10822	AAD	5G NR (CP-OFDM, 100% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.5
10823	AAC	5G NR (CP-OFDM, 100% RB, 45MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±9.5
10824	AAD	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	±9.5
10825	AAD	5G NR (CP-OFDM, 100% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.5
10827	AAD	5G NR (CP-OFDM, 100% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	±9.5
10828	AAD	5G NR (CP-OFDM, 100% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	±9.5



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10829	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	±9.8
10830	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.83	±9.8
10831	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	±9.8
10832	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	±9.8
10833	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.8
10834	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	±9.8
10835	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.8
10836	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.69	±9.8
10837	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.88	±9.8
10838	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.8
10840	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	±9.8
10841	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	±9.8
10843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.48	±9.8
10844	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.8
10846	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.8
10854	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.8
10855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	±9.8
10856	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.8
10857	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	±9.8
10858	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	±9.8
10859	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.8
10860	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.8
10861	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	±9.8
10862	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.8
10864	AAD	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.8
10865	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.8
10866	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10868	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10869	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.76	±9.8
10870	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.88	±9.8
10871	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.76	±9.8
10872	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	±9.8
10873	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	±9.8
10874	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.8
10875	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.8
10876	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	6.38	±9.8
10877	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	±9.8
10878	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.41	±9.8
10879	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.12	±9.8
10880	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	±9.8
10881	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.8
10882	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	±9.8
10883	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.57	±9.8
10884	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	±9.8
10885	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	±9.8
10886	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.8
10887	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.8
10888	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	9.35	±9.8
10889	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	±9.8
10890	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	±9.8
10891	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	±9.8
10892	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.8
10897	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	±9.8
10898	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.8
10899	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.8
10900	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.8
10901	AAD	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.8
10902	AAD	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.8
10903	AAD	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.8
10904	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.8
10905	AAD	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.8
10906	AAD	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.8
10907	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.79	±9.8
10909	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.8
10909	AAD	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.96	±9.8
10910	AAD	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.8

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UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>†</sup> k=2
10911	AAD	5G NR (DFT-s-OFDM, 50% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.6
10912	AAD	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
10913	AAD	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
10914	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.6
10915	AAD	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.6
10916	AAD	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.6
10917	AAD	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
10918	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6
10919	AAD	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6
10920	AAD	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.6
10921	AAD	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
10922	AAD	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	±9.6
10923	AAD	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
10924	AAD	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6
10925	AAD	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.98	±9.6
10926	AAD	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
10927	AAD	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6
10928	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±9.6
10929	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±9.6
10930	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±9.6
10931	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
10932	AAB	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	AAC	5G NR (DFT-s-OFDM, 50% RB, 8 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.6
10937	AAB	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	±9.6
10938	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.6
10939	AAB	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.6
10940	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	±9.6
10941	AAB	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.6
10942	AAB	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.6
10943	AAB	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	±9.6
10944	AAB	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.6
10945	AAB	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.6
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.6
10947	AAB	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.6
10948	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.6
10949	AAB	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.6
10950	AAB	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.6
10951	AAB	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	±9.6
10952	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	±9.6
10953	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.19	±9.6
10954	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	±9.6
10955	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	±9.6
10956	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	±9.6
10957	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	±9.6
10958	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	±9.6
10959	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	±9.6
10960	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.52	±9.6
10961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.35	±9.6
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	±9.6
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	±9.6
10964	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.29	±9.6
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	±9.6
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.65	±9.6
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	±9.6
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	±9.6
10972	AAB	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	±9.6
10973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.08	±9.6
10974	AAB	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	±9.6
10978	AAA	ULLA BDR	ULLA	2.23	±9.6
10979	AAA	ULLA HDRM	ULLA	7.02	±9.6
10990	AAA	ULLA HDRB	ULLA	8.62	±9.6
10991	AAA	ULLA HDRpd	ULLA	1.50	±9.6
10992	AAA	ULLA HDRpb	ULLA	1.44	±9.6

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June 30, 2022

UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>E</sup> k = 2
10983	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.31	±0.6
10984	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.42	±0.6
10985	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.54	±0.6
10986	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.50	±0.6
10987	AAA	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.53	±0.6
10988	AAA	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.38	±0.6
10989	AAA	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.39	±0.6
10990	AAA	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.52	±0.6

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



**Calibration Laboratory of**  
Schmid & Partner  
Engineering AG  
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Accreditation No.: SCS 0108

Client **HCT (Dymstec)**

Certificate No **EX-7654\_May22**

CALIBRATION CERTIFICATE		결	담당자	확인자
Object	EX3DV4 - SN:7654	재	김리훈 2022.6.28	김리훈 2022.6.28
Calibration procedure(s)	QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v6, QA CAL-23.v5, QA CAL-25.v7 Calibration procedure for dosimetric E-field probes			
Calibration date	May 31, 2022			
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	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
OCP DAK-3.5 (weighted)	SN: 1249	20-Oct-21 (OCP-DAK3 5-1249_Oct21)	Oct-22
OCP DAK-12	SN: 1016	20-Oct-21 (OCP-DAK12-1016_Oct21)	Oct-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	04-Apr-22 (No. 217-03527)	Apr-23
DAE4	SN: 660	13-Oct-21 (No. DAE4-660_Oct21)	Oct-22
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22

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-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by	Jeton Kastali	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	
Issued: June 8, 2022			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

**Calibration Laboratory of**

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Accreditation No.: SCS 0108

**Glossary**

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization $\psi$	$\psi$ rotation around probe axis
Polarization $\theta$	$\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ 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) IEC/IEEE 62209-1528, "Measurement Procedure for the Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-Held and Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation and Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Methods Applied and Interpretation of Parameters:**

- **NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- **NORM( $\theta$ )<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* 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.
- **DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. 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
- **A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: 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  $f \leq 800$  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 NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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 NORM<sub>x</sub> (no uncertainty required).

EX3DV4 - SN:7654

May 31, 2022

**Parameters of Probe: EX3DV4 - SN:7654**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ( $\mu V/(V/m)^2$ ) <sup>A</sup>	0.63	0.59	0.54	±10.1%
DCP (mV) <sup>B</sup>	107.6	103.6	106.3	±4.7%

**Calibration Results for Modulation Response**

UID	Communication System Name		A dB	B dB/√μV	C	D dB	VR mV	Max dev.	Max Unc <sup>E</sup> k = 2
0	CW	X	0.00	0.00	1.00	0.00	139.4	±3.3%	±4.7%
		Y	0.00	0.00	1.00		137.0		
		Z	0.00	0.00	1.00		145.0		
10352	Pulse Waveform (200Hz, 10%)	X	1.55	60.78	6.23	10.00	60.0	±0.7%	±9.6%
		Y	1.37	60.00	6.02		60.0		
		Z	1.60	61.08	6.63		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	20.00	74.00	9.00	6.99	80.0	±0.4%	±9.6%
		Y	22.00	74.00	9.00		80.0		
		Z	0.81	60.00	4.93		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	0.00	122.91	0.40	-3.98	95.0	±0.6%	±9.6%
		Y	0.14	137.42	0.30		95.0		
		Z	0.00	123.24	0.25		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	0.02	158.46	0.57	2.22	120.0	±0.7%	±9.6%
		Y	10.22	158.41	7.86		120.0		
		Z	2.90	160.00	3.74		120.0		
10387	QPSK Waveform, 1 MHz	X	0.63	62.82	11.47	1.00	150.0	±0.8%	±9.6%
		Y	0.71	65.40	12.95		150.0		
		Z	0.45	61.85	10.78		150.0		
10388	QPSK Waveform, 10 MHz	X	1.47	65.68	13.94	0.00	150.0	±0.8%	±9.6%
		Y	1.47	66.29	14.23		150.0		
		Z	1.20	64.43	12.98		150.0		
10396	64-QAM Waveform, 100 kHz	X	1.66	64.06	15.71	3.01	150.0	±0.7%	±9.6%
		Y	1.76	65.20	16.30		150.0		
		Z	1.63	64.15	15.84		150.0		
10399	64-QAM Waveform, 40 MHz	X	2.95	66.20	15.02	0.00	150.0	±0.7%	±9.6%
		Y	2.94	66.51	15.21		150.0		
		Z	2.68	65.53	14.63		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.04	65.80	15.25	0.00	150.0	±0.7%	±9.6%
		Y	3.99	66.10	15.39		150.0		
		Z	3.83	66.02	15.23		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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).  
<sup>B</sup> Linearization parameter uncertainty for maximum specified field strength.  
<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



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**Parameters of Probe: EX3DV4 - SN:7654**

**Sensor Model Parameters**

	C1 fF	C2 fF	$\alpha$ V <sup>-1</sup>	T1 msV <sup>-2</sup>	T2 msV <sup>-1</sup>	T3 ms	T4 V <sup>-2</sup>	T5 V <sup>-1</sup>	T6
x	13.2	96.16	33.90	3.79	0.00	4.90	0.51	0.00	1.00
y	11.3	82.43	33.67	3.48	0.00	4.90	0.47	0.00	1.00
z	10.0	73.25	33.96	3.36	0.00	4.94	0.34	0.01	1.00

**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle	160.5°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	237 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 any Area Scan job.



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**Parameters of Probe: EX3DV4 - SN:7654**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity <sup>F</sup> (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k = 2)
750	41.9	0.89	10.67	10.67	10.67	0.47	0.94	±12.0%
835	41.5	0.90	10.48	10.48	10.48	0.54	0.80	±12.0%
900	41.5	0.97	10.43	10.43	10.43	0.48	0.80	±12.0%
1750	40.1	1.37	9.48	9.48	9.48	0.31	0.80	±12.0%
1900	40.0	1.40	9.09	9.09	9.09	0.34	0.80	±12.0%
2300	39.5	1.67	8.82	8.82	8.82	0.34	0.80	±12.0%
2450	39.2	1.80	8.59	8.59	8.59	0.38	0.82	±12.0%
2600	39.0	1.96	8.32	8.32	8.32	0.40	0.80	±12.0%
3300	38.2	2.71	7.83	7.83	7.83	0.30	1.35	±13.1%
3500	37.9	2.91	7.75	7.75	7.75	0.30	1.35	±13.1%
3700	37.7	3.12	7.60	7.60	7.60	0.30	1.35	±13.1%
3900	37.5	3.32	7.22	7.22	7.22	0.40	1.60	±13.1%
4100	37.2	3.53	7.00	7.00	7.00	0.40	1.60	±13.1%
4400	36.9	3.84	6.83	6.83	6.83	0.40	1.70	±13.1%
4600	36.7	4.04	6.76	6.76	6.76	0.40	1.70	±13.1%
4800	36.4	4.25	6.75	6.75	6.75	0.40	1.80	±13.1%
4950	36.3	4.40	6.55	6.55	6.55	0.40	1.80	±13.1%
5250	35.9	4.71	6.18	6.18	6.18	0.40	1.80	±13.1%
5600	35.5	5.07	5.43	5.43	5.43	0.40	1.80	±13.1%
5750	35.4	5.22	5.40	5.40	5.40	0.40	1.80	±13.1%
5800	35.3	5.27	5.35	5.35	5.35	0.40	1.80	±13.1%

<sup>C</sup> Frequency validity above 300 MHz of ±100MHz 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 8 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-18 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

<sup>F</sup> 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.

<sup>G</sup> 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.

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**Parameters of Probe: EX3DV4 - SN:7654**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity <sup>F</sup> (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k = 2)
6500	34.5	6.07	6.00	6.00	6.00	0.25	2.50	±18.6%
7000	33.9	6.65	5.90	5.90	5.90	0.30	2.70	±18.6%
8000	32.7	7.84	5.70	5.70	5.70	0.50	2.30	±18.6%
9000	31.6	9.08	5.65	5.65	5.65	0.50	2.40	±18.6%

<sup>C</sup> Frequency validity at 6.5GHz is -500+700MHz, and ±700MHz at or above 7GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>F</sup> At frequencies 6-10 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

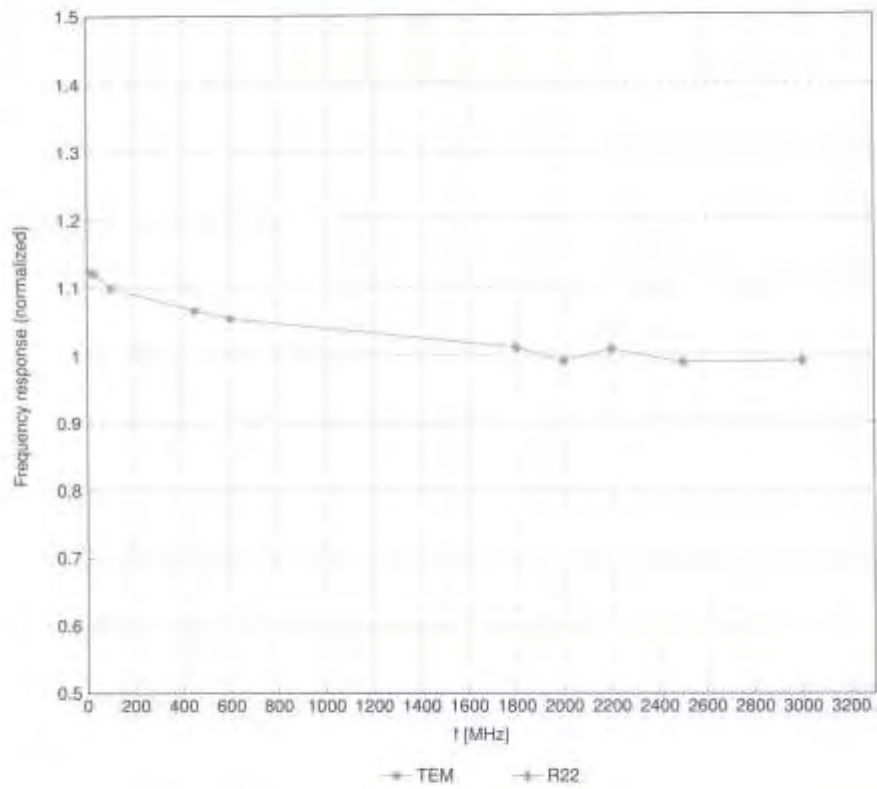
<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warns that the remaining deviation due to the boundary effect after compensation is always less than: ±1% for frequencies below 3 GHz; below ±2% for frequencies between 3-6GHz; and below ±4% for frequencies between 6-10GHz at any distance larger than half the probe tip diameter from the boundary.

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### Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide:R22)



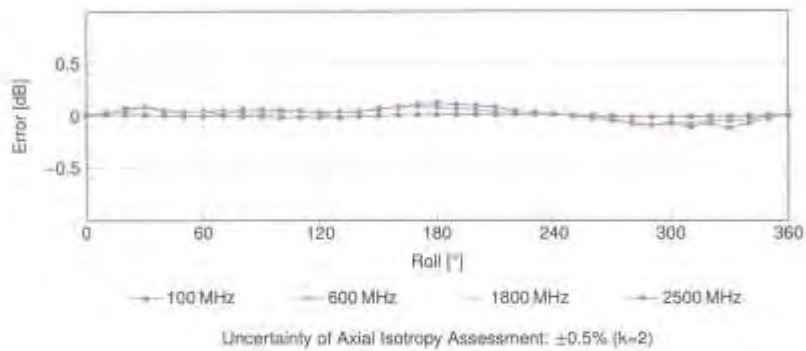
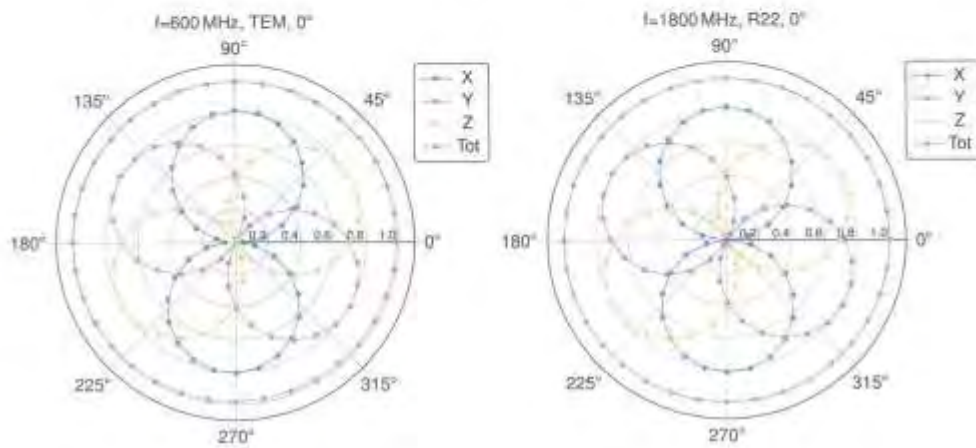
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)



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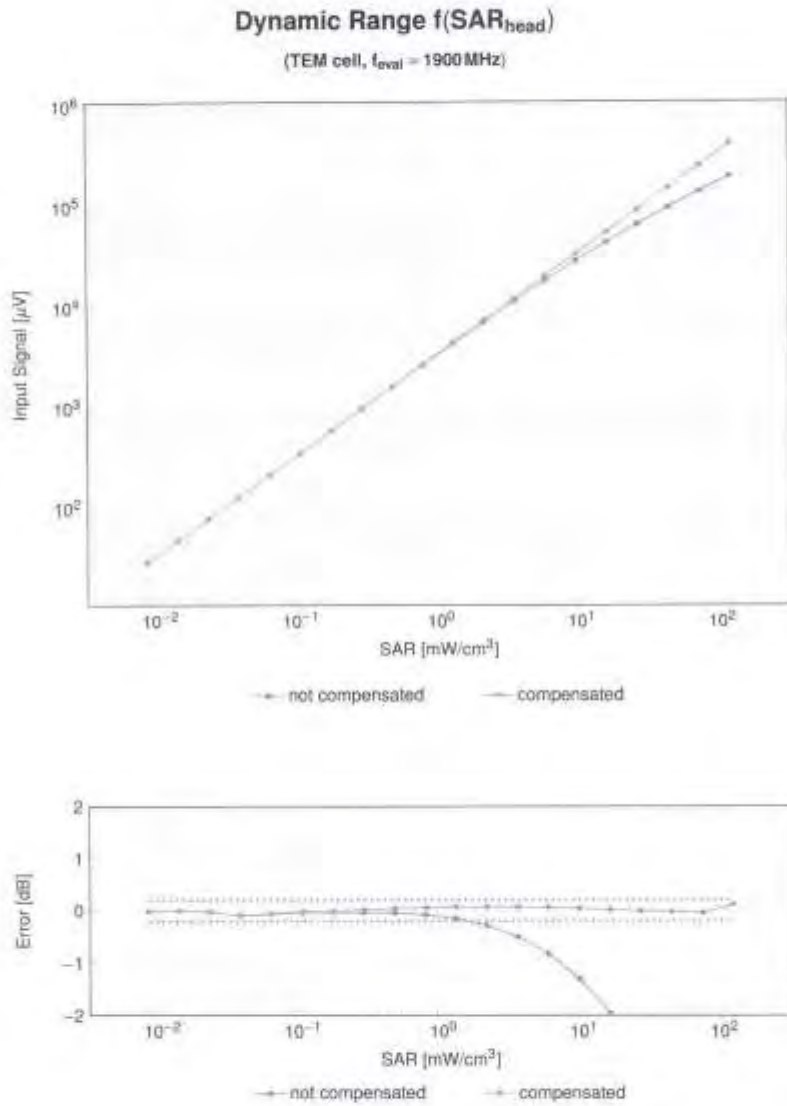
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Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$



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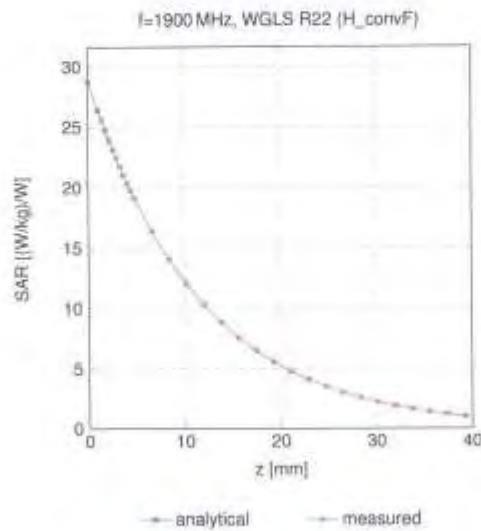


Uncertainty of Linearity Assessment: ±0.6% (k=2)

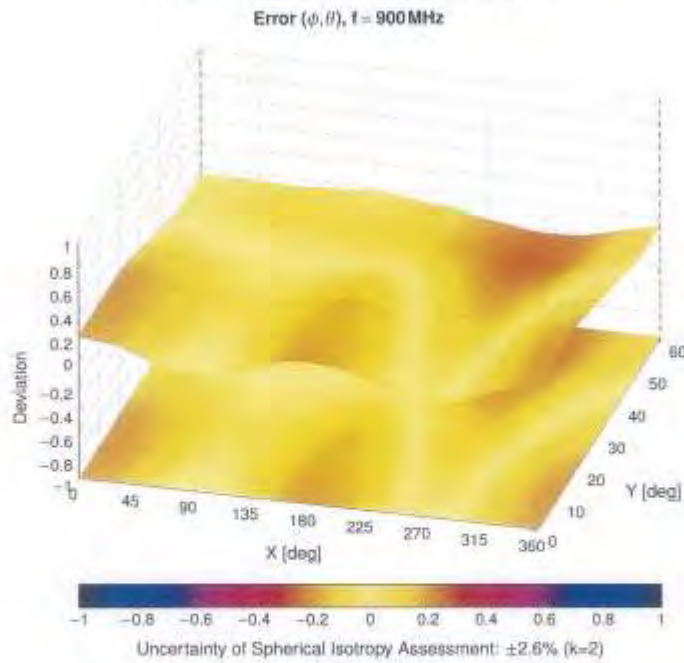
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**Conversion Factor Assessment**



**Deviation from Isotropy in Liquid**





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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>k</sup> 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 2.4GHz (DSSS, 1 Mbps)	WLAN	1.87	±9.6
10013	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 6Mbps)	WLAN	9.45	±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	9.58	±9.6
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.02	±9.6
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.58	±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	3.25	±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	5.90	±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 (P4-DQPSK, DH1)	Bluetooth	7.74	±9.6
10034	CAA	IEEE 802.15.1 Bluetooth (P4-DQPSK, DH3)	Bluetooth	4.53	±9.6
10035	CAA	IEEE 802.15.1 Bluetooth (P4-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, P4-DQPSK, Fullrate)	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 Mbps)	TD-SCDMA	11.01	±9.6
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.53	±9.6
10059	CAB	IEEE 802.11b WiFi 2.4GHz (DSSS, 2Mbps)	WLAN	2.12	±9.6
10060	CAB	IEEE 802.11b WiFi 2.4GHz (DSSS, 5.5Mbps)	WLAN	2.83	±9.6
10061	CAB	IEEE 802.11b WiFi 2.4GHz (DSSS, 11 Mbps)	WLAN	3.60	±9.6
10062	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6Mbps)	WLAN	6.68	±9.6
10063	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9Mbps)	WLAN	6.63	±9.6
10064	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12Mbps)	WLAN	3.09	±9.6
10065	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	±9.6
10066	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	3.38	±9.6
10067	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6
10068	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	±9.6
10069	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.58	±9.6
10071	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS/OFDM, 6Mbps)	WLAN	9.83	±9.6
10072	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.69	±9.6
10073	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	±9.6
10074	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	±9.6
10075	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	±9.6
10076	CAB	IEEE 802.11g WiFi 2.4GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.84	±9.6
10077	CAB	IEEE 802.11g WiFi 2.4GHz (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, P4-DQPSK, Fullrate)	AMPS	4.77	±9.6
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	±9.6
10097	CAC	UMTS-FDD (HSPA)	WCDMA	3.68	±9.6
10098	DAC	UMTS-FDD (HSPA, Subtest 2)	WCDMA	3.86	±9.6
10099	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	±9.6
10100	CAD	LTE-FDD (SC-FDMA, 100% RB, 20MHz, QPSK)	LTE-FDD	5.67	±9.6
10101	CAB	LTE-FDD (SC-FDMA, 100% RB, 20MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10102	CAB	LTE-FDD (SC-FDMA, 100% RB, 20MHz, 64-QAM)	LTE-FDD	8.60	±9.6
10103	DAC	LTE-TDD (SC-FDMA, 100% RB, 20MHz, QPSK)	LTE-TDD	9.25	±9.6
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 16-QAM)	LTE-TDD	9.97	±9.6
10105	CAL	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 64-QAM)	LTE-TDD	10.01	±9.6
10108	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	±9.6
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

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UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>†</sup> k = 2
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	CAG	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.70	±9.6
10115	CAG	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	±9.6
10116	CAG	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	±9.6
10117	CAG	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	±9.6
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	±9.6
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	±9.6
10140	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±9.6
10141	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	±9.6
10142	CAG	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6
10143	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	±9.6
10144	CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	±9.6
10145	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.78	±9.6
10146	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±9.6
10147	CAC	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	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	5.38	±9.6
10152	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	5.92	±9.6
10153	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	±9.6
10154	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	±9.6
10155	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10156	CAF	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	±9.6
10157	CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	±9.6
10158	CAE	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	6.58	±9.6
10160	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	±9.6
10161	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10162	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.56	±9.6
10166	CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	±9.6
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	±9.6
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.75	±9.6
10169	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±9.6
10170	CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10171	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	±9.6
10172	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6
10173	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.49	±9.6
10174	CAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10175	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±9.6
10176	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10177	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±9.6
10178	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10179	AAE	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	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±9.6
10182	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10183	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10184	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6
10185	CAI	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±9.6
10186	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	±9.6
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10189	CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.56	±9.6
10193	CAE	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.00	±9.6
10194	AAE	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	±9.6
10195	CAE	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	±9.6
10196	CAE	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	±9.6
10197	AAE	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	±9.6
10198	CAF	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	±9.6
10219	CAF	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	±9.6
10220	AAF	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	±9.6
10221	CAD	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	CAD	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	±9.6
10224	CAD	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	±9.6



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10225	CAD	UMTS-FDD (HSPA+)	WCDMA	5.97	±9.6
10226	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	±9.6
10227	CAD	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	±9.6
10228	CAD	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	9.45	±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	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10233	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10234	CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	±9.6
10235	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10236	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10237	CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	±9.6
10238	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.49	±9.6
10239	CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10240	CAB	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	CAD	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	±9.6
10243	CAD	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.45	±9.6
10244	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.09	±9.6
10245	CAG	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	±9.6
10246	CAG	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	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	±9.6
10252	CAF	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	CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	±9.6
10255	CAB	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	9.98	±9.6
10257	CAD	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	±9.6
10258	CAD	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	9.96	±9.6
10260	CAG	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	±9.6
10261	CAG	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	±9.6
10262	CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.82	±9.6
10263	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.15	±9.6
10264	CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	±9.6
10265	CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	±9.6
10266	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	±9.6
10267	CAF	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	10.05	±9.6
10269	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	±9.6
10270	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.50	±9.6
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Ref(10))	WCDMA	4.87	±9.6
10275	CAD	UMTS-FDD (HSUPA, Subtest 5, 3GPP Ref(14))	WCDMA	3.96	±9.6
10277	CAD	PHS (QPSK)	PHS	11.87	±9.6
10278	CAD	PHS (QPSK, BW 884 MHz, Roll-off 0.5)	PHS	11.61	±9.6
10279	CAG	PHS (QPSK, BW 884 MHz, Roll-off 0.38)	PHS	12.16	±9.6
10290	CAG	CDMA2000, RC1, SC55, Full Rate	CDMA2000	3.91	±9.6
10291	CAG	CDMA2000, RC3, SC55, Full Rate	CDMA2000	3.46	±9.6
10292	CAG	CDMA2000, RC3, SC32, Full Rate	CDMA2000	3.39	±9.6
10293	CAG	CDMA2000, RC3, SC3, Full Rate	CDMA2000	3.50	±9.6
10295	CAG	CDMA2000, RC1, SC0, 1.89k Rate 25 k	CDMA2000	12.40	±9.6
10297	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	±9.6
10298	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	±9.6
10299	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	±9.6
10300	CAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10301	CAC	IEEE 802.16e WIMAX (29.16, 5ms, 10MHz, QPSK, PUSC)	WIMAX	12.03	±9.6
10302	CAB	IEEE 802.16e WIMAX (29.16, 5ms, 10MHz, QPSK, PUSC, 3C/TRE)	WIMAX	12.57	±9.6
10303	CAB	IEEE 802.16e WIMAX (31.15, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	12.52	±9.6
10304	CAA	IEEE 802.16e WIMAX (29.16, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	11.86	±9.6
10305	CAA	IEEE 802.16e WIMAX (31.15, 10ms, 10MHz, 64QAM, PUSC)	WIMAX	15.24	±9.6
10306	CAA	IEEE 802.16e WIMAX (29.16, 10ms, 10MHz, 64QAM, PUSC)	WIMAX	14.67	±9.6



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10307	AAB	IEEE 802.16e WIMAX (20-18, 10ms, 10MHz, QPSK, PUSC)	WIMAX	14.49	±9.6
10308	AAB	IEEE 802.16e WIMAX (20-18, 10ms, 10MHz, 16QAM, PUSC)	WIMAX	14.46	±9.6
10309	AAB	IEEE 802.16e WIMAX (20-18, 10ms, 10MHz, 16QAM, AMC 2x3)	WIMAX	14.58	±9.6
10310	AAB	IEEE 802.16e WIMAX (20-18, 10ms, 10MHz, QPSK, AMC 2x3)	WIMAX	14.57	±9.6
10311	AAB	LTE-FDD (SC-FDMA, 100% RB, 1.4MHz, QPSK)	LTE-FDD	8.08	±9.6
10313	AAD	iDEN 1:3	iDEN	10.51	±9.0
10314	AAD	iDEN 1:5	iDEN	13.48	±8.6
10315	AAD	IEEE 802.11b WiFi 2.4GHz (DSSS, 1Mbps, 99pc dc)	WLAN	1.71	±9.6
10316	AAD	IEEE 802.11g WiFi 2.4GHz (ERP-OFDM, 6Mbps, 99pc dc)	WLAN	8.36	±9.6
10317	AAA	IEEE 802.11a WiFi 5GHz (OFDM, 6Mbps, 99pc dc)	WLAN	6.36	±9.6
10352	AAA	Pulse Waveform (200 Hz, 10%)	Generic	10.00	±9.6
10353	AAA	Pulse Waveform (200 Hz, 20%)	Generic	6.59	±9.6
10354	AAA	Pulse Waveform (200 Hz, 40%)	Generic	3.96	±9.6
10355	AAA	Pulse Waveform (200 Hz, 60%)	Generic	2.22	±9.6
10356	AAA	Pulse Waveform (200 Hz, 80%)	Generic	0.97	±9.6
10387	AAA	QPSK Waveform, 1MHz	Generic	5.10	±9.6
10388	AAA	QPSK Waveform, 10MHz	Generic	5.22	±9.6
10389	AAA	64-QAM Waveform, 100 kHz	Generic	8.27	±9.6
10399	AAA	64-QAM Waveform, 40MHz	Generic	8.27	±9.6
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc dc)	WLAN	8.37	±9.6
10401	AAA	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc dc)	WLAN	8.60	±9.6
10402	AAA	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	AAD	CDMA2000, RC3, 3032, SCH, Full Rate	CDMA2000	5.22	±9.6
10410	AAA	LTE-TDD (SC-FDMA, 1 RB, 10MHz, QPSK, UL Sub=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10414	AAA	WLAN CDDF, 64-QAM, 40MHz	Generic	8.54	±9.6
10415	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 1Mbps, 99pc dc)	WLAN	1.54	±9.6
10416	AAA	IEEE 802.11g WiFi 2.4GHz (ERP-OFDM, 6Mbps, 99pc dc)	WLAN	8.23	±9.6
10417	AAA	IEEE 802.11a WiFi 5GHz (OFDM, 6Mbps, 99pc dc)	WLAN	8.23	±9.6
10419	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 6Mbps, 99pc, Long)	WLAN	8.14	±9.6
10419	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 6Mbps, 99pc, Short)	WLAN	8.19	±9.6
10422	AAA	IEEE 802.11n (HT Greenfield, 7.2Mbps, BPSK)	WLAN	8.32	±9.6
10423	AAA	IEEE 802.11n (HT Greenfield, 49.3Mbps, 16-QAM)	WLAN	8.47	±9.6
10424	AAE	IEEE 802.11n (HT Greenfield, 72.2Mbps, 64-QAM)	WLAN	8.40	±9.6
10425	AAE	IEEE 802.11n (HT Greenfield, 15Mbps, BPSK)	WLAN	8.41	±9.6
10426	AAE	IEEE 802.11n (HT Greenfield, 90Mbps, 16-QAM)	WLAN	8.45	±9.6
10427	AAB	IEEE 802.11n (HT Greenfield, 150Mbps, 64-QAM)	WLAN	8.41	±9.6
10430	AAB	LTE-FDD (OFDMA, 5MHz, E-TM 3.1)	LTE-FDD	8.28	±9.6
10431	AAC	LTE-FDD (OFDMA, 10MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6
10432	AAB	LTE-FDD (OFDMA, 15MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10433	AAC	LTE-FDD (OFDMA, 20MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10434	AAD	W-CDMA (BS Test Model 1, 84 DPCH)	WCDMA	8.00	±9.6
10435	AAA	LTE-TDD (SC-FDMA, 1 RB, 20MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10447	AAA	LTE-FDD (OFDMA, 5MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	±9.6
10448	AAA	LTE-FDD (OFDMA, 10MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±9.6
10449	AAC	LTE-FDD (OFDMA, 15MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±9.6
10450	AAA	LTE-FDD (OFDMA, 20MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	±9.6
10451	AAA	W-CDMA (BS Test Model 1, 84 DPCH, Clipping 44%)	WCDMA	7.59	±9.6
10453	AAC	Validation (Square, 10ms, 1ms)	Test	10.00	±9.6
10456	AAC	IEEE 802.11ac WiFi (100MHz, 64-QAM, 99pc dc)	WLAN	8.63	±9.6
10457	AAC	UMTS-FDD (DC-HSDPA)	WCDMA	8.63	±9.6
10458	AAC	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	8.55	±9.6
10459	AAC	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	±9.6
10460	AAC	UMTS-FDD (WCDMA, AMR)	WCDMA	2.30	±9.6
10461	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10462	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	±9.6
10463	AAD	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	±9.6
10464	AAD	LTE-TDD (SC-FDMA, 1 RB, 3MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	±9.6
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10467	AAA	LTE-TDD (SC-FDMA, 1 RB, 5MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10468	AAE	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	±9.6
10469	AAD	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	±9.6
10470	AAD	LTE-TDD (SC-FDMA, 1 RB, 10MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10471	AAC	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±9.6

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10472	AAO	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10473	AAA	LTE-TDD (SC-FDMA, 1 RB, 15MHz, QPSK, UL Sub)	LTE-TDD	7.82	±9.6
10474	AAC	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±9.6
10475	AAO	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10477	AAC	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±9.6
10478	AAC	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±9.6
10479	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10480	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 16-QAM, UL Sub)	LTE-TDD	8.18	±9.6
10481	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	±9.6
10482	AAA	LTE-TDD (SC-FDMA, 50% RB, 3MHz, QPSK, UL Sub)	LTE-TDD	7.71	±9.6
10483	AAA	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 16-QAM, Sub)	LTE-TDD	8.38	±9.6
10484	AAO	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 64-QAM, UL Sub)	LTE-TDD	8.47	±9.6
10485	AAO	LTE-TDD (SC-FDMA, 50% RB, 5MHz, QPSK, UL Sub)	LTE-TDD	7.59	±9.6
10486	AAO	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 16-QAM, UL Sub)	LTE-TDD	8.38	±9.6
10487	AAC	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 64-QAM, UL Sub)	LTE-TDD	8.80	±9.6
10488	AAC	LTE-TDD (SC-FDMA, 50% RB, 10MHz, QPSK, UL Sub)	LTE-TDD	7.70	±9.6
10489	AAC	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	±9.6
10490	AAC	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	±9.6
10491	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10492	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 16-QAM, UL Sub)	LTE-TDD	8.41	±9.6
10493	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	±9.6
10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 16-QAM, UL Sub)	LTE-TDD	8.37	±9.6
10496	AAE	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	±9.6
10497	AAE	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, QPSK, UL Sub)	LTE-TDD	7.67	±9.6
10498	AAE	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 16-QAM, UL Sub)	LTE-TDD	8.40	±9.6
10499	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 64-QAM, UL Sub)	LTE-TDD	8.68	±9.6
10500	AAF	LTE-TDD (SC-FDMA, 100% RB, 3MHz, QPSK, UL Sub)	LTE-TDD	7.67	±9.6
10501	AAF	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 16-QAM, UL Sub)	LTE-TDD	8.44	±9.6
10502	AAO	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 64-QAM, UL Sub)	LTE-TDD	8.52	±9.6
10503	AAO	LTE-TDD (SC-FDMA, 100% RB, 5MHz, QPSK, UL Sub)	LTE-TDD	7.72	±9.6
10504	AAO	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	±9.6
10505	AAC	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	±9.6
10506	AAC	LTE-TDD (SC-FDMA, 100% RB, 10MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10507	AAC	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 16-QAM, UL Sub)	LTE-TDD	8.38	±9.6
10508	AAF	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	±9.6
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, QPSK, UL Sub)	LTE-TDD	7.69	±9.6
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 16-QAM, UL Sub)	LTE-TDD	8.49	±9.6
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 64-QAM, UL Sub)	LTE-TDD	8.51	±9.6
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20MHz, QPSK, UL Sub)	LTE-TDD	7.74	±9.6
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 16-QAM, UL Sub)	LTE-TDD	8.42	±9.6
10514	AAE	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 64-QAM, UL Sub)	LTE-TDD	8.40	±9.6
10515	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2Mbps, 99pc dc)	WLAN	1.58	±9.6
10516	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5Mbps, 99pc dc)	WLAN	1.57	±9.6
10517	AAF	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11Mbps, 99pc dc)	WLAN	1.58	±9.6
10518	AAF	IEEE 802.11a/n WiFi 5GHz (OFDM, 9Mbps, 99pc dc)	WLAN	8.23	±9.6
10519	AAF	IEEE 802.11a/n WiFi 5GHz (OFDM, 12Mbps, 99pc dc)	WLAN	8.39	±9.6
10520	AAO	IEEE 802.11a/n WiFi 5GHz (OFDM, 18Mbps, 99pc dc)	WLAN	8.12	±9.6
10521	AAO	IEEE 802.11a/n WiFi 5GHz (OFDM, 24Mbps, 99pc dc)	WLAN	7.97	±9.6
10522	AAO	IEEE 802.11a/n WiFi 5GHz (OFDM, 36Mbps, 99pc dc)	WLAN	8.45	±9.6
10523	AAC	IEEE 802.11a/n WiFi 5GHz (OFDM, 48Mbps, 99pc dc)	WLAN	8.08	±9.6
10524	AAC	IEEE 802.11a/n WiFi 5GHz (OFDM, 54Mbps, 99pc dc)	WLAN	8.27	±9.6
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.36	±9.6
10526	AAF	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.42	±9.6
10527	AAF	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc)	WLAN	8.21	±9.6
10528	AAF	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc)	WLAN	8.36	±9.6
10529	AAF	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc)	WLAN	8.36	±9.6
10531	AAF	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc)	WLAN	8.63	±9.6
10532	AAF	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc)	WLAN	8.29	±9.6
10533	AAE	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc)	WLAN	8.30	±9.6
10534	AAE	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc)	WLAN	8.45	±9.6
10535	AAE	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc)	WLAN	8.45	±9.6
10536	AAF	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc)	WLAN	8.32	±9.6
10537	AAF	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc)	WLAN	8.44	±9.6
10538	AAF	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc)	WLAN	8.54	±9.6
10540	AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc dc)	WLAN	8.39	±9.6



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10541	AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc)	WLAN	8.46	+9.6
10542	AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.65	+9.6
10543	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc dc)	WLAN	8.65	+9.8
10544	AAC	IEEE 802.11ac WiFi (60MHz, MCS0, 99pc dc)	WLAN	8.47	+9.8
10545	AAC	IEEE 802.11ac WiFi (60MHz, MCS1, 99pc dc)	WLAN	8.55	+9.6
10546	AAC	IEEE 802.11ac WiFi (60MHz, MCS2, 99pc dc)	WLAN	8.35	+9.6
10547	AAC	IEEE 802.11ac WiFi (60MHz, MCS3, 99pc dc)	WLAN	8.49	+9.6
10548	AAC	IEEE 802.11ac WiFi (60MHz, MCS4, 99pc dc)	WLAN	8.37	+9.6
10550	AAC	IEEE 802.11ac WiFi (80 MHz, MCS0, 99pc dc)	WLAN	8.36	+9.6
10551	AAC	IEEE 802.11ac WiFi (80 MHz, MCS7, 99pc dc)	WLAN	8.50	+9.6
10552	AAC	IEEE 802.11ac WiFi (80 MHz, MCS8, 99pc dc)	WLAN	8.42	+9.8
10553	AAC	IEEE 802.11ac WiFi (80 MHz, MCS9, 99pc dc)	WLAN	8.45	+9.6
10554	AAC	IEEE 802.11ac WiFi (160 MHz, MCS0, 99pc dc)	WLAN	8.48	+9.6
10555	AAC	IEEE 802.11ac WiFi (160 MHz, MCS1, 99pc dc)	WLAN	8.47	+9.6
10556	AAC	IEEE 802.11ac WiFi (160 MHz, MCS2, 99pc dc)	WLAN	8.50	+9.6
10557	AAC	IEEE 802.11ac WiFi (160 MHz, MCS3, 99pc dc)	WLAN	8.52	+9.8
10558	AAC	IEEE 802.11ac WiFi (160 MHz, MCS4, 99pc dc)	WLAN	8.61	+9.8
10560	AAC	IEEE 802.11ac WiFi (180 MHz, MCS6, 99pc dc)	WLAN	8.73	+9.6
10561	AAC	IEEE 802.11ac WiFi (180 MHz, MCS7, 99pc dc)	WLAN	8.56	+9.8
10562	AAC	IEEE 802.11ac WiFi (180 MHz, MCS8, 99pc dc)	WLAN	8.69	+9.6
10563	AAC	IEEE 802.11ac WiFi (180 MHz, MCS9, 99pc dc)	WLAN	8.77	+9.6
10564	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc dc)	WLAN	8.25	+9.6
10565	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc dc)	WLAN	8.45	+9.6
10566	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc dc)	WLAN	8.13	+9.6
10567	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc dc)	WLAN	8.00	+9.6
10569	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc dc)	WLAN	8.87	+9.6
10569	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc dc)	WLAN	8.10	+9.6
10570	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc dc)	WLAN	8.30	+9.6
10571	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc dc)	WLAN	1.99	+9.8
10572	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc dc)	WLAN	1.95	+9.6
10573	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc dc)	WLAN	1.98	+9.6
10574	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc dc)	WLAN	1.96	+9.6
10576	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc dc)	WLAN	8.58	+9.8
10576	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc dc)	WLAN	8.60	+9.6
10577	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc dc)	WLAN	8.70	+9.6
10578	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc dc)	WLAN	8.49	+9.6
10579	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc dc)	WLAN	8.36	+9.6
10580	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc dc)	WLAN	8.78	+9.8
10580	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc dc)	WLAN	8.35	+9.8
10582	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc dc)	WLAN	8.67	+9.6
10583	AAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps, 90pc dc)	WLAN	8.99	+9.6
10584	AAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9 Mbps, 90pc dc)	WLAN	8.80	+9.6
10585	AAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	+9.6
10586	AAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	+9.6
10587	AAA	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	+9.6
10588	AAA	IEEE 802.11a/n WiFi 5 GHz (OFDM, 36 Mbps, 90pc dc)	WLAN	8.76	+9.6
10588	AAA	IEEE 802.11a/n WiFi 5 GHz (OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	+9.6
10590	AAA	IEEE 802.11a/n WiFi 5 GHz (OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	+9.6
10591	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS0, 90pc dc)	WLAN	8.63	+9.6
10592	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS1, 90pc dc)	WLAN	8.79	+9.6
10593	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS2, 90pc dc)	WLAN	8.54	+9.6
10594	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS3, 90pc dc)	WLAN	8.74	+9.6
10595	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS4, 90pc dc)	WLAN	8.74	+9.6
10596	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS5, 90pc dc)	WLAN	8.71	+9.6
10597	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS6, 90pc dc)	WLAN	8.72	+9.6
10599	AAA	IEEE 802.11n (HT Mixed, 20 MHz, MCS7, 90pc dc)	WLAN	8.50	+9.6
10599	AAA	IEEE 802.11n (HT Mixed, 40 MHz, MCS0, 90pc dc)	WLAN	8.79	+9.6
10600	AAA	IEEE 802.11n (HT Mixed, 40 MHz, MCS1, 90pc dc)	WLAN	8.88	+9.6
10601	AAA	IEEE 802.11n (HT Mixed, 40 MHz, MCS2, 90pc dc)	WLAN	8.80	+9.6
10602	AAA	IEEE 802.11n (HT Mixed, 40 MHz, MCS3, 90pc dc)	WLAN	8.94	+9.6
10603	AAA	IEEE 802.11n (HT Mixed, 40 MHz, MCS4, 90pc dc)	WLAN	8.83	+9.6
10604	AAA	IEEE 802.11n (HT Mixed, 40 MHz, MCS5, 90pc dc)	WLAN	8.76	+9.6
10605	AAA	IEEE 802.11n (HT Mixed, 40 MHz, MCS6, 90pc dc)	WLAN	8.97	+9.6
10606	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS7, 90pc dc)	WLAN	8.82	+9.6
10607	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc dc)	WLAN	8.64	+9.6
10608	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc dc)	WLAN	8.77	+9.6



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10609	AAC	IEEE 802.11ac WiFi (20 MHz, MCS2, 90pc dc)	WLAN	8.57	±9.6
10610	AAC	IEEE 802.11ac WiFi (20 MHz, MCS3, 90pc dc)	WLAN	8.76	±9.0
10611	AAC	IEEE 802.11ac WiFi (20 MHz, MCS4, 90pc dc)	WLAN	8.70	±9.8
10612	AAC	IEEE 802.11ac WiFi (20 MHz, MCS5, 90pc dc)	WLAN	8.77	±9.6
10613	AAC	IEEE 802.11ac WiFi (20 MHz, MCS6, 90pc dc)	WLAN	8.94	±9.8
10614	AAC	IEEE 802.11ac WiFi (20 MHz, MCS7, 90pc dc)	WLAN	8.99	±9.8
10615	AAC	IEEE 802.11ac WiFi (20 MHz, MCS8, 90pc dc)	WLAN	8.82	±9.8
10616	AAC	IEEE 802.11ac WiFi (40 MHz, MCS9, 90pc dc)	WLAN	8.82	±9.6
10617	AAC	IEEE 802.11ac WiFi (40 MHz, MCS1, 90pc dc)	WLAN	8.81	±9.6
10618	AAC	IEEE 802.11ac WiFi (40 MHz, MCS2, 90pc dc)	WLAN	8.58	±9.6
10619	AAC	IEEE 802.11ac WiFi (40 MHz, MCS3, 90pc dc)	WLAN	8.88	±9.6
10620	AAC	IEEE 802.11ac WiFi (40 MHz, MCS4, 90pc dc)	WLAN	8.87	±9.6
10621	AAC	IEEE 802.11ac WiFi (40 MHz, MCS5, 90pc dc)	WLAN	8.77	±9.8
10622	AAC	IEEE 802.11ac WiFi (40 MHz, MCS6, 90pc dc)	WLAN	8.66	±9.6
10623	AAC	IEEE 802.11ac WiFi (40 MHz, MCS7, 90pc dc)	WLAN	8.82	±9.6
10624	AAC	IEEE 802.11ac WiFi (40 MHz, MCS8, 90pc dc)	WLAN	8.95	±9.8
10625	AAC	IEEE 802.11ac WiFi (40 MHz, MCS9, 90pc dc)	WLAN	8.95	±9.6
10626	AAC	IEEE 802.11ac WiFi (80 MHz, MCS0, 90pc dc)	WLAN	8.83	±9.0
10627	AAC	IEEE 802.11ac WiFi (80 MHz, MCS1, 90pc dc)	WLAN	8.88	±9.6
10628	AAC	IEEE 802.11ac WiFi (80 MHz, MCS2, 90pc dc)	WLAN	8.71	±9.6
10629	AAC	IEEE 802.11ac WiFi (80 MHz, MCS3, 90pc dc)	WLAN	8.85	±9.6
10630	AAC	IEEE 802.11ac WiFi (80 MHz, MCS4, 90pc dc)	WLAN	8.72	±9.6
10631	AAC	IEEE 802.11ac WiFi (80 MHz, MCS5, 90pc dc)	WLAN	8.81	±9.6
10632	AAC	IEEE 802.11ac WiFi (80 MHz, MCS6, 90pc dc)	WLAN	8.74	±9.6
10633	AAC	IEEE 802.11ac WiFi (80 MHz, MCS7, 90pc dc)	WLAN	8.83	±9.8
10634	AAC	IEEE 802.11ac WiFi (80 MHz, MCS8, 90pc dc)	WLAN	8.80	±9.6
10635	AAC	IEEE 802.11ac WiFi (80 MHz, MCS9, 90pc dc)	WLAN	8.81	±9.6
10636	AAC	IEEE 802.11ac WiFi (160 MHz, MCS0, 90pc dc)	WLAN	8.83	±9.6
10637	AAC	IEEE 802.11ac WiFi (160 MHz, MCS1, 90pc dc)	WLAN	8.79	±9.6
10638	AAC	IEEE 802.11ac WiFi (160 MHz, MCS2, 90pc dc)	WLAN	8.86	±9.6
10639	AAC	IEEE 802.11ac WiFi (160 MHz, MCS3, 90pc dc)	WLAN	8.85	±9.6
10640	AAC	IEEE 802.11ac WiFi (160 MHz, MCS4, 90pc dc)	WLAN	8.98	±9.6
10641	AAC	IEEE 802.11ac WiFi (160 MHz, MCS5, 90pc dc)	WLAN	9.06	±9.6
10642	AAC	IEEE 802.11ac WiFi (160 MHz, MCS6, 90pc dc)	WLAN	9.06	±9.6
10643	AAC	IEEE 802.11ac WiFi (160 MHz, MCS7, 90pc dc)	WLAN	8.89	±9.6
10644	AAC	IEEE 802.11ac WiFi (160 MHz, MCS8, 90pc dc)	WLAN	9.05	±9.6
10645	AAC	IEEE 802.11ac WiFi (160 MHz, MCS9, 90pc dc)	WLAN	9.11	±9.6
10646	AAC	LTE-TDD (SC-FDMA, 1 RB, 5MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.96	±9.6
10647	AAC	LTE-TDD (SC-FDMA, 1 RB, 20MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.86	±9.6
10648	AAC	CDMA2000 1Tx Advancer9	CDMA2000	3.45	±9.6
10652	AAC	LTE-TDD (OFDMA, 5MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	8.91	±9.6
10653	AAC	LTE-TDD (OFDMA, 10MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	±9.8
10654	AAC	LTE-TDD (OFDMA, 15MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	±9.8
10655	AAC	LTE-TDD (OFDMA, 20MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	±9.6
10658	AAC	Pulse Waveform (200 Hz, 10%)	Test	10.00	±9.0
10659	AAC	Pulse Waveform (200 Hz, 20%)	Test	6.99	±9.8
10660	AAC	Pulse Waveform (200 Hz, 40%)	Test	3.98	±9.6
10661	AAC	Pulse Waveform (200 Hz, 60%)	Test	2.22	±9.6
10662	AAC	Pulse Waveform (200 Hz, 80%)	Test	0.97	±9.6
10670	AAC	Bluetooth Low Energy	Bluetooth	2.19	±9.6
10671	AAD	IEEE 802.11ax (20 MHz, MCS0, 90pc dc)	WLAN	3.09	±9.6
10672	AAD	IEEE 802.11ax (20 MHz, MCS1, 90pc dc)	WLAN	8.57	±9.6
10673	AAD	IEEE 802.11ax (20 MHz, MCS2, 90pc dc)	WLAN	8.78	±9.6
10674	AAD	IEEE 802.11ax (20 MHz, MCS3, 90pc dc)	WLAN	8.74	±9.6
10675	AAD	IEEE 802.11ax (20 MHz, MCS4, 90pc dc)	WLAN	8.90	±9.6
10676	AAD	IEEE 802.11ax (20 MHz, MCS5, 90pc dc)	WLAN	8.77	±9.6
10677	AAD	IEEE 802.11ax (20 MHz, MCS6, 90pc dc)	WLAN	8.73	±9.8
10678	AAD	IEEE 802.11ax (20 MHz, MCS7, 90pc dc)	WLAN	8.78	±9.8
10679	AAD	IEEE 802.11ax (20 MHz, MCS8, 90pc dc)	WLAN	8.89	±9.6
10680	AAD	IEEE 802.11ax (20 MHz, MCS9, 90pc dc)	WLAN	8.80	±9.6
10681	AAG	IEEE 802.11ax (20 MHz, MCS10, 90pc dc)	WLAN	8.62	±9.6
10682	AAG	IEEE 802.11ax (20 MHz, MCS11, 90pc dc)	WLAN	8.83	±9.8
10683	AAA	IEEE 802.11ax (20 MHz, MCS0, 90pc dc)	WLAN	8.62	±9.6
10684	AAC	IEEE 802.11ax (20 MHz, MCS1, 90pc dc)	WLAN	8.26	±9.6
10685	AAC	IEEE 802.11ax (20 MHz, MCS2, 90pc dc)	WLAN	8.33	±9.6
10686	AAC	IEEE 802.11ax (20 MHz, MCS3, 90pc dc)	WLAN	8.28	±9.6

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10687	AAE	IEEE 802.11ax (20MHz, MCS4, 99pc dc)	WLAN	8.45	±9.6
10688	AAE	IEEE 802.11ax (20MHz, MCS5, 99pc dc)	WLAN	8.29	±9.6
10689	AAD	IEEE 802.11ax (20MHz, MCS6, 99pc dc)	WLAN	8.55	±9.6
10690	AAE	IEEE 802.11ax (20MHz, MCS7, 99pc dc)	WLAN	8.29	±9.6
10691	AAD	IEEE 802.11ax (20MHz, MCS8, 99pc dc)	WLAN	8.25	±9.6
10692	AAA	IEEE 802.11ax (20MHz, MCS9, 99pc dc)	WLAN	8.25	±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	8.81	±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	8.66	±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	8.66	±9.6
10705	AAA	IEEE 802.11ax (40MHz, MCS10, 90pc dc)	WLAN	8.69	±9.6
10706	AAC	IEEE 802.11ax (40MHz, MCS11, 90pc dc)	WLAN	8.65	±9.6
10707	AAC	IEEE 802.11ax (40MHz, MCS0, 99pc dc)	WLAN	8.32	±9.6
10708	AAC	IEEE 802.11ax (40MHz, MCS1, 99pc dc)	WLAN	8.55	±9.6
10709	AAC	IEEE 802.11ax (40MHz, MCS2, 99pc dc)	WLAN	8.33	±9.6
10710	AAC	IEEE 802.11ax (40MHz, MCS3, 99pc dc)	WLAN	8.29	±9.6
10711	AAC	IEEE 802.11ax (40MHz, MCS4, 99pc dc)	WLAN	8.39	±9.6
10712	AAC	IEEE 802.11ax (40MHz, MCS5, 99pc dc)	WLAN	8.67	±9.6
10713	AAC	IEEE 802.11ax (40MHz, MCS6, 99pc dc)	WLAN	8.33	±9.6
10714	AAC	IEEE 802.11ax (40MHz, MCS7, 99pc dc)	WLAN	8.26	±9.6
10715	AAC	IEEE 802.11ax (40MHz, MCS8, 99pc dc)	WLAN	8.45	±9.6
10716	AAC	IEEE 802.11ax (40MHz, MCS9, 99pc dc)	WLAN	8.30	±9.6
10717	AAC	IEEE 802.11ax (40MHz, MCS10, 99pc dc)	WLAN	8.40	±9.6
10718	AAC	IEEE 802.11ax (40MHz, MCS11, 99pc dc)	WLAN	8.24	±9.6
10719	AAC	IEEE 802.11ax (80MHz, MCS0, 90pc dc)	WLAN	8.81	±9.6
10720	AAC	IEEE 802.11ax (80MHz, MCS1, 90pc dc)	WLAN	8.87	±9.6
10721	AAC	IEEE 802.11ax (80MHz, MCS2, 90pc dc)	WLAN	8.76	±9.6
10722	AAC	IEEE 802.11ax (80MHz, MCS3, 90pc dc)	WLAN	8.55	±9.6
10723	AAC	IEEE 802.11ax (80MHz, MCS4, 90pc dc)	WLAN	8.70	±9.6
10724	AAC	IEEE 802.11ax (80MHz, MCS5, 90pc dc)	WLAN	8.90	±9.6
10725	AAC	IEEE 802.11ax (80MHz, MCS6, 90pc dc)	WLAN	8.74	±9.6
10726	AAC	IEEE 802.11ax (80MHz, MCS7, 90pc dc)	WLAN	8.72	±9.6
10727	AAC	IEEE 802.11ax (80MHz, MCS8, 90pc dc)	WLAN	8.66	±9.6
10728	AAC	IEEE 802.11ax (80MHz, MCS9, 90pc dc)	WLAN	8.65	±9.6
10729	AAC	IEEE 802.11ax (80MHz, MCS10, 90pc dc)	WLAN	8.64	±9.6
10730	AAC	IEEE 802.11ax (80MHz, MCS11, 90pc dc)	WLAN	8.67	±9.6
10731	AAC	IEEE 802.11ax (80MHz, MCS0, 99pc dc)	WLAN	8.42	±9.6
10732	AAC	IEEE 802.11ax (80MHz, MCS1, 99pc dc)	WLAN	8.46	±9.6
10733	AAC	IEEE 802.11ax (80MHz, MCS2, 99pc dc)	WLAN	8.40	±9.6
10734	AAC	IEEE 802.11ax (80MHz, MCS3, 99pc dc)	WLAN	8.25	±9.6
10735	AAC	IEEE 802.11ax (80MHz, MCS4, 99pc dc)	WLAN	8.33	±9.6
10736	AAC	IEEE 802.11ax (80MHz, MCS5, 99pc dc)	WLAN	8.27	±9.6
10737	AAC	IEEE 802.11ax (80MHz, MCS6, 99pc dc)	WLAN	8.36	±9.6
10738	AAC	IEEE 802.11ax (80MHz, MCS7, 99pc dc)	WLAN	8.42	±9.6
10739	AAC	IEEE 802.11ax (80MHz, MCS8, 99pc dc)	WLAN	8.29	±9.6
10740	AAC	IEEE 802.11ax (80MHz, MCS9, 99pc dc)	WLAN	8.48	±9.6
10741	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc dc)	WLAN	8.40	±9.6
10742	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc dc)	WLAN	8.43	±9.6
10743	AAC	IEEE 802.11ax (160MHz, MCS0, 90pc dc)	WLAN	8.94	±9.6
10744	AAC	IEEE 802.11ax (160MHz, MCS1, 90pc dc)	WLAN	9.18	±9.6
10745	AAC	IEEE 802.11ax (160MHz, MCS2, 90pc dc)	WLAN	8.93	±9.6
10746	AAC	IEEE 802.11ax (160MHz, MCS3, 90pc dc)	WLAN	9.11	±9.6
10747	AAC	IEEE 802.11ax (160MHz, MCS4, 90pc dc)	WLAN	9.04	±9.6
10748	AAC	IEEE 802.11ax (160MHz, MCS5, 90pc dc)	WLAN	8.83	±9.6
10749	AAC	IEEE 802.11ax (160MHz, MCS6, 90pc dc)	WLAN	8.90	±9.6
10750	AAC	IEEE 802.11ax (160MHz, MCS7, 90pc dc)	WLAN	8.78	±9.6
10751	AAC	IEEE 802.11ax (160MHz, MCS8, 90pc dc)	WLAN	8.92	±9.6
10752	AAC	IEEE 802.11ax (160MHz, MCS9, 90pc dc)	WLAN	8.81	±9.6



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UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>n</sup> k = 2
10753	AAC	IEEE 802.11ax (160 MHz, MCS10, 99pc dc)	WLAN	8.00	±9.8
10754	AAC	IEEE 802.11ax (160 MHz, MCS11, 99pc dc)	WLAN	8.94	±9.8
10755	AAC	IEEE 802.11ax (160 MHz, MCS0, 99pc dc)	WLAN	8.64	±9.8
10756	AAC	IEEE 802.11ax (160 MHz, MCS1, 99pc dc)	WLAN	8.77	±9.8
10757	AAC	IEEE 802.11ax (160 MHz, MCS2, 99pc dc)	WLAN	8.77	±9.8
10758	AAC	IEEE 802.11ax (160 MHz, MCS3, 99pc dc)	WLAN	8.69	±9.8
10759	AAC	IEEE 802.11ax (160 MHz, MCS4, 99pc dc)	WLAN	8.58	±9.8
10760	AAC	IEEE 802.11ax (160 MHz, MCS5, 99pc dc)	WLAN	8.49	±9.8
10761	AAC	IEEE 802.11ax (160 MHz, MCS6, 99pc dc)	WLAN	8.58	±9.8
10762	AAC	IEEE 802.11ax (160 MHz, MCS7, 99pc dc)	WLAN	8.68	±9.8
10763	AAC	IEEE 802.11ax (160 MHz, MCS8, 99pc dc)	WLAN	8.53	±9.8
10764	AAC	IEEE 802.11ax (160 MHz, MCS9, 99pc dc)	WLAN	8.54	±9.8
10765	AAC	IEEE 802.11ax (160 MHz, MCS10, 99pc dc)	WLAN	8.54	±9.8
10766	AAC	IEEE 802.11ax (160 MHz, MCS11, 99pc dc)	WLAN	8.51	±9.8
10767	AAC	5G NR (CP-OFDM, 1 RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.99	±9.6
10768	AAC	5G NR (CP-OFDM, 1 RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6
10769	AAC	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6
10770	AAC	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10771	AAC	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10772	AAC	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	±9.6
10773	AAC	5G NR (CP-OFDM, 1 RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	±9.6
10774	AAC	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10775	AAC	5G NR (CP-OFDM, 50% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.21	±9.6
10776	AAC	5G NR (CP-OFDM, 50% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.20	±9.6
10777	AAC	5G NR (CP-OFDM, 50% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.20	±9.6
10778	AAC	5G NR (CP-OFDM, 50% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	±9.6
10779	AAC	5G NR (CP-OFDM, 50% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±9.6
10780	AAC	5G NR (CP-OFDM, 50% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10781	AAC	5G NR (CP-OFDM, 50% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10782	AAC	5G NR (CP-OFDM, 50% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±9.6
10783	AAC	5G NR (CP-OFDM, 100% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
10784	AAC	5G NR (CP-OFDM, 100% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	±9.6
10785	AAC	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	±9.6
10786	AAC	5G NR (CP-OFDM, 100% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	±9.6
10787	AAC	5G NR (CP-OFDM, 100% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	±9.6
10788	AAC	5G NR (CP-OFDM, 100% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10789	AAC	5G NR (CP-OFDM, 100% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	±9.6
10790	AAC	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10791	AAC	5G NR (CP-OFDM, 1 RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	±9.6
10792	AAC	5G NR (CP-OFDM, 1 RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±9.6
10793	AAC	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	±9.6
10794	AAC	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±9.6
10795	AAC	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	±9.6
10796	AAC	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.99	±9.6
10797	AAC	5G NR (CP-OFDM, 1 RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	±9.6
10798	AAC	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.6
10799	AAC	5G NR (CP-OFDM, 1 RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.6
10801	AAC	5G NR (CP-OFDM, 1 RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.6
10802	AAC	5G NR (CP-OFDM, 1 RB, 90MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	±9.6
10803	AAC	5G NR (CP-OFDM, 1 RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.6
10805	AAD	5G NR (CP-OFDM, 50% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10806	AAD	5G NR (CP-OFDM, 50% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	±9.6
10809	AAD	5G NR (CP-OFDM, 50% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10810	AAD	5G NR (CP-OFDM, 50% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10812	AAD	5G NR (CP-OFDM, 50% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±9.6
10817	AAD	5G NR (CP-OFDM, 100% RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±9.6
10818	AAD	5G NR (CP-OFDM, 100% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10819	AAD	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	±9.6
10820	AAD	5G NR (CP-OFDM, 100% RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	±9.6
10821	AAC	5G NR (CP-OFDM, 100% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10822	AAD	5G NR (CP-OFDM, 100% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10823	AAC	5G NR (CP-OFDM, 100% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±9.6
10824	AAD	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	±9.6
10825	AAD	5G NR (CP-OFDM, 100% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10827	AAD	5G NR (CP-OFDM, 100% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	±9.6
10828	AAC	5G NR (CP-OFDM, 100% RB, 90MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	±9.6



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10829	AAD	5G NR (CP-OFDM, 100% RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	±9.6
10830	AAD	5G NR (CP-OFDM, 1 RB, 10MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.63	±9.6
10831	AAD	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	±9.6
10832	AAD	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	±9.6
10833	AAD	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6
10834	AAD	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	±9.6
10835	AAD	5G NR (CP-OFDM, 1 RB, 40MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6
10836	AAE	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	±9.6
10837	AAD	5G NR (CP-OFDM, 1 RB, 60MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	±9.6
10839	AAD	5G NR (CP-OFDM, 1 RB, 80MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6
10840	AAD	5G NR (CP-OFDM, 1 RB, 90MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	±9.6
10841	AAD	5G NR (CP-OFDM, 1 RB, 100MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	±9.6
10843	AAD	5G NR (CP-OFDM, 50% RB, 15MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	±9.6
10844	AAD	5G NR (CP-OFDM, 50% RB, 20MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
10845	AAD	5G NR (CP-OFDM, 50% RB, 30MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
10854	AAD	5G NR (CP-OFDM, 100% RB, 10MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
10855	AAD	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	±9.6
10856	AAD	5G NR (CP-OFDM, 100% RB, 20MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6
10857	AAD	5G NR (CP-OFDM, 100% RB, 25MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	±9.6
10858	AAD	5G NR (CP-OFDM, 100% RB, 30MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	±9.6
10859	AAD	5G NR (CP-OFDM, 100% RB, 40MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
10860	AAD	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
10861	AAD	5G NR (CP-OFDM, 100% RB, 60MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	±9.6
10863	AAD	5G NR (CP-OFDM, 100% RB, 80MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
10864	AAE	5G NR (CP-OFDM, 100% RB, 90MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6
10865	AAD	5G NR (CP-OFDM, 100% RB, 100MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
10883	AAD	5G NR (DFT-s-OFDM, 1 RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10886	AAD	5G NR (DFT-s-OFDM, 100% RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.69	±9.6
10889	AAD	5G NR (DFT-s-OFDM, 1 RB, 100MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
10890	AAD	5G NR (DFT-s-OFDM, 100% RB, 100MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	±9.6
10891	AAD	5G NR (DFT-s-OFDM, 1 RB, 100MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
10892	AAD	5G NR (DFT-s-OFDM, 100% RB, 100MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	±9.6
10893	AAD	5G NR (DFT-s-OFDM, 1 RB, 100MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	±9.6
10894	AAD	5G NR (DFT-s-OFDM, 100% RB, 100MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.6
10895	AAD	5G NR (CP-OFDM, 1 RB, 100MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.6
10896	AAD	5G NR (CP-OFDM, 100% RB, 100MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	±9.6
10897	AAD	5G NR (CP-OFDM, 1 RB, 100MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	±9.6
10898	AAD	5G NR (CP-OFDM, 100% RB, 100MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.6
10899	AAD	5G NR (CP-OFDM, 1 RB, 100MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	±9.6
10900	AAD	5G NR (CP-OFDM, 100% RB, 100MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	±9.6
10901	AAE	5G NR (DFT-s-OFDM, 1 RB, 50MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
10902	AAD	5G NR (DFT-s-OFDM, 100% RB, 50MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	±9.6
10903	AAD	5G NR (DFT-s-OFDM, 1 RB, 50MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	±9.6
10904	AAD	5G NR (DFT-s-OFDM, 100% RB, 50MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	±9.6
10905	AAE	5G NR (DFT-s-OFDM, 1 RB, 50MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.81	±9.6
10906	AAD	5G NR (DFT-s-OFDM, 100% RB, 50MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.6
10907	AAD	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.6
10908	AAD	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	±9.6
10909	AAD	5G NR (CP-OFDM, 1 RB, 50MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	±9.6
10910	AAD	5G NR (CP-OFDM, 100% RB, 50MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	±9.6
10911	AAE	5G NR (CP-OFDM, 1 RB, 50MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	±9.6
10912	AAD	5G NR (CP-OFDM, 100% RB, 50MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.6
10917	AAE	5G NR (DFT-s-OFDM, 1 RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	±9.6
10918	AAD	5G NR (DFT-s-OFDM, 1 RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6
10919	AAE	5G NR (DFT-s-OFDM, 1 RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6
10920	AAE	5G NR (DFT-s-OFDM, 1 RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10921	AAD	5G NR (DFT-s-OFDM, 1 RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10922	AAD	5G NR (DFT-s-OFDM, 1 RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10923	AAE	5G NR (DFT-s-OFDM, 1 RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10924	AAD	5G NR (DFT-s-OFDM, 1 RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	±9.6
10925	AAD	5G NR (DFT-s-OFDM, 1 RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10926	AAD	5G NR (DFT-s-OFDM, 1 RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10927	AAD	5G NR (DFT-s-OFDM, 50% RB, 6MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	±9.6
10928	AAD	5G NR (DFT-s-OFDM, 50% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.6
10929	AAD	5G NR (DFT-s-OFDM, 50% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.96	±9.6
10930	AAD	5G NR (DFT-s-OFDM, 50% RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.6

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UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>F</sup> k = 2
10911	AAD	5G NR (DFT-s-OFDM, 50% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.8
10912	AAD	5G NR (DFT-s-OFDM, 50% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10913	AAD	5G NR (DFT-s-OFDM, 50% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10914	AAD	5G NR (DFT-s-OFDM, 50% RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±9.8
10915	AAD	5G NR (DFT-s-OFDM, 50% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.8
10916	AAD	5G NR (DFT-s-OFDM, 50% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.8
10917	AAD	5G NR (DFT-s-OFDM, 50% RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.8
10918	AAD	5G NR (DFT-s-OFDM, 100% RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.8
10919	AAD	5G NR (DFT-s-OFDM, 100% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.8
10920	AAD	5G NR (DFT-s-OFDM, 100% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.8
10921	AAD	5G NR (DFT-s-OFDM, 100% RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10922	AAD	5G NR (DFT-s-OFDM, 100% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	±9.8
10923	AAD	5G NR (DFT-s-OFDM, 100% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10924	AAD	5G NR (DFT-s-OFDM, 100% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10925	AAD	5G NR (DFT-s-OFDM, 100% RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±9.8
10926	AAD	5G NR (DFT-s-OFDM, 100% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10927	AAD	5G NR (DFT-s-OFDM, 100% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.8
10928	AAD	5G NR (DFT-s-OFDM, 1 RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	±9.8
10929	AAD	5G NR (DFT-s-OFDM, 1 RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.93	±9.8
10930	AAD	5G NR (DFT-s-OFDM, 1 RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	±9.8
10931	AAD	5G NR (DFT-s-OFDM, 1 RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.91	±9.8
10932	AAB	5G NR (DFT-s-OFDM, 1 RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.91	±9.8
10933	AAA	5G NR (DFT-s-OFDM, 1 RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.91	±9.8
10934	AAA	5G NR (DFT-s-OFDM, 1 RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.91	±9.8
10935	AAA	5G NR (DFT-s-OFDM, 1 RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.91	±9.8
10936	AAC	5G NR (DFT-s-OFDM, 50% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.8
10937	AAB	5G NR (DFT-s-OFDM, 50% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.8
10938	AAB	5G NR (DFT-s-OFDM, 50% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.8
10939	AAB	5G NR (DFT-s-OFDM, 50% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	±9.8
10940	AAB	5G NR (DFT-s-OFDM, 50% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.88	±9.8
10941	AAB	5G NR (DFT-s-OFDM, 50% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.8
10942	AAB	5G NR (DFT-s-OFDM, 50% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.8
10943	AAB	5G NR (DFT-s-OFDM, 50% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.8
10944	AAB	5G NR (DFT-s-OFDM, 100% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.8
10945	AAB	5G NR (DFT-s-OFDM, 100% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.8
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.8
10947	AAB	5G NR (DFT-s-OFDM, 100% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.8
10948	AAB	5G NR (DFT-s-OFDM, 100% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.8
10949	AAB	5G NR (DFT-s-OFDM, 100% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.8
10950	AAB	5G NR (DFT-s-OFDM, 100% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.8
10951	AAB	5G NR (DFT-s-OFDM, 100% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	±9.8
10952	AAB	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	±9.8
10953	AAB	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	±9.8
10954	AAB	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.22	±9.8
10955	AAB	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	±9.8
10956	AAB	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	±9.8
10957	AAC	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	±9.8
10958	AAB	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	±9.8
10959	AAB	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	±9.8
10960	AAB	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	±9.8
10961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.36	±9.8
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	±9.8
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	±9.8
10964	AAB	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.29	±9.8
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	±9.8
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.59	±9.8
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	±9.8
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	±9.8
10972	AAB	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.99	±9.8
10973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.08	±9.8
10974	AAB	5G NR (CP-OFDM, 100% RB, 100MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	±9.8
10978	AAA	ULLA HDR	ULLA	2.23	±9.8
10979	AAA	ULLA HDR4	ULLA	7.02	±9.8
10980	AAA	ULLA HDR8	ULLA	8.82	±9.8
10981	AAA	ULLA HDRp4	ULLA	1.50	±9.8
10982	AAA	ULLA HDRp8	ULLA	1.44	±9.8



EX3DV4 - SN:7654

May 31, 2022

UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>E</sup> k = 2
10983	AAA	5G NR DL (CP-OFDM, TM 3.1, 40MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.31	±0.6
10984	AAA	5G NR DL (CP-OFDM, TM 3.1, 50MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	±0.6
10985	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.54	±0.6
10986	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.50	±0.6
10987	AAA	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.53	±0.6
10988	AAA	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.38	±0.6
10989	AAA	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	±0.6
10990	AAA	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.52	±0.6

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client: **HCT (Dymstec)**

Certificate No: **EX3-7702\_Jan22**

**CALIBRATION CERTIFICATE**

Object: **EX3DV4 - SN.7702**

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: **January 20, 2022**

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	09-Apr-21 (No. 217-03291/03262)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20s)	09-Apr-21 (No. 217-03343)	Apr-22
DAE4	SN: 660	13-Oct-21 (No. DAE4-660_Oct21)	Oct-22
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22
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: US3942U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41088477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Ulf Klyne	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: January 25, 2022

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

Certificate No: EX3-7702\_Jan22

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제	2	12				
취급/발행 일 기	2022.01.25	14				

Calibration Laboratory of  
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Accreditation No.: SCS 0108

**Glossary:**

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\beta$	$\beta$ rotation around an axis that is in the plane normal to probe axis (at measurement center). i.e., $\beta = 0$ 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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Methods Applied and Interpretation of Parameters:**

- NORM<sub>x,y,z</sub>: Assessed for E-field polarization  $\beta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* 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.
- DCP<sub>x,y,z</sub>: 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, VR<sub>x,y,z</sub>: 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  $f \leq 800$  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 NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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 NORM<sub>x</sub> (no uncertainty required)

EX3DV4 – SN:7702

January 20, 2022

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:7702

### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=3)
Norm ( $\mu V/(V/m)^2$ ) <sup>A</sup>	0.66	0.63	0.63	$\pm 10.1\%$
DCP (mV) <sup>B</sup>	104.1	106.6	106.9	

### Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\mu V$	C	D dB	VR mV	Max dev.	Max Unc <sup>F</sup> (k=2)
0	CW	X	0.00	0.00	1.00	0.00	166.6	$\pm 3.5\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		156.6		
		Z	0.00	0.00	1.00		169.1		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.52	60.55	6.24	10.00	60.0	$\pm 2.7\%$	$\pm 9.6\%$
		Y	1.44	60.11	5.72		60.0		
		Z	1.66	60.39	6.06		60.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	0.79	60.00	4.79	6.99	80.0	$\pm 2.4\%$	$\pm 9.6\%$
		Y	18.00	74.00	9.00		80.0		
		Z	0.61	60.00	4.71		80.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.16	142.25	0.24	3.98	95.0	$\pm 2.6\%$	$\pm 9.6\%$
		Y	0.09	135.71	0.00		95.0		
		Z	0.25	151.49	0.94		95.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	6.67	159.99	13.45	2.22	120.0	$\pm 1.6\%$	$\pm 9.6\%$
		Y	4.25	160.00	3.01		120.0		
		Z	6.83	159.85	16.82		120.0		
10387-AAA	QPSK Waveform, 1 MHz	X	0.70	64.85	12.83	1.00	150.0	$\pm 4.5\%$	$\pm 9.6\%$
		Y	0.47	62.22	10.58		150.0		
		Z	0.69	64.18	12.43		150.0		
10388-AAA	QPSK Waveform, 10 MHz	X	1.44	65.87	14.20	0.00	150.0	$\pm 1.1\%$	$\pm 9.6\%$
		Y	1.21	64.56	12.83		150.0		
		Z	1.37	65.91	14.04		150.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	1.80	63.57	15.72	3.01	150.0	$\pm 1.4\%$	$\pm 9.6\%$
		Y	1.76	65.45	16.33		150.0		
		Z	1.65	64.24	15.97		150.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	2.89	65.06	15.07	0.00	150.0	$\pm 2.7\%$	$\pm 9.6\%$
		Y	2.71	65.73	14.62		150.0		
		Z	2.83	66.17	15.04		150.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	4.11	65.37	15.50	0.00	150.0	$\pm 4.7\%$	$\pm 9.6\%$
		Y	3.68	66.32	16.30		150.0		
		Z	4.00	66.44	15.53		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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6)

<sup>B</sup> Numerical linearization parameter; uncertainty not required

<sup>F</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed by the square of the field value.



EX3DV4- SN:7702

January 20, 2022

### DASY/EASY - Parameters of Probe: EX3DV4 - SN:7702

#### Sensor Model Parameters

	C1 fF	C2 fF	$\alpha$ V <sup>-1</sup>	T1 ms.V <sup>-2</sup>	T2 ms.V <sup>-1</sup>	T3 ms	T4 V <sup>-2</sup>	T5 V <sup>-1</sup>	T6
X	12.2	88.97	34.05	2.26	0.00	4.90	0.00	0.04	1.00
Y	9.9	71.66	33.43	3.81	0.00	4.91	0.60	0.00	1.01
Z	10.9	78.40	33.19	2.97	0.00	4.90	0.16	0.03	1.00

#### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-38.9
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.

EX3DV4- SN:7702

January 20, 2022

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:7702

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>e</sup>	Conductivity (S/m) <sup>f</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>g</sup>	Depth <sup>h</sup> (mm)	Unc (k=2)
750	41.9	0.89	10.49	10.49	10.49	0.56	0.87	± 12.0 %
835	41.5	0.90	10.23	10.23	10.23	0.47	0.90	± 12.0 %
900	41.5	0.97	10.07	10.07	10.07	0.54	0.60	± 12.0 %
1750	40.1	1.37	9.07	9.07	9.07	0.37	0.86	± 12.0 %
1900	40.0	1.40	8.78	8.78	8.78	0.27	0.66	± 12.0 %
2300	39.5	1.67	8.49	8.49	8.49	0.33	0.90	± 12.0 %
2450	39.2	1.80	8.14	8.14	8.14	0.31	0.90	± 12.0 %
2600	39.0	1.96	7.93	7.93	7.93	0.37	0.90	± 12.0 %
3300	38.2	2.71	7.29	7.29	7.29	0.30	1.35	± 13.1 %
3500	37.9	2.81	7.25	7.25	7.25	0.30	1.35	± 13.1 %
3700	37.7	3.12	7.15	7.15	7.15	0.30	1.35	± 13.1 %
3900	37.5	3.32	6.75	6.75	6.75	0.40	1.60	± 13.1 %
4100	37.2	3.53	6.60	6.60	6.60	0.40	1.60	± 13.1 %
5250	35.9	4.71	5.54	5.54	5.54	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.80	4.80	4.80	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.95	4.95	4.95	0.40	1.80	± 13.1 %

<sup>c</sup> 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 4-6 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 6 GHz, frequency validity can be extended to ± 110 MHz.

<sup>d</sup> 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.

<sup>e</sup> 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 lip diameter from the boundary.

EX3DV4- SN:7702

January 20, 2022

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:7702

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>①</sup>	Relative Permittivity <sup>②</sup>	Conductivity (S/m) <sup>③</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>④</sup>	Depth <sup>⑤</sup> (mm)	Unc (k=2)
8500	34.5	6.07	5.50	5.50	5.50	0.20	2.50	± 18.8 %

<sup>①</sup> Frequency validity above 5GHz to ± 700 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>②</sup> At frequencies 6-10 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

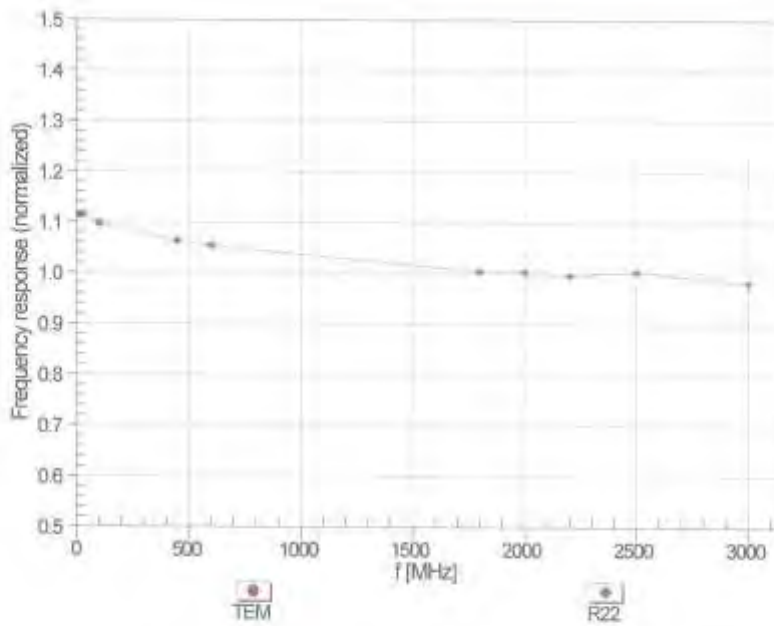
<sup>③</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz; below ± 2% for frequencies between 3-6 GHz; and below ± 4% for frequencies between 6-10 GHz at any distance larger than half the probe tip diameter from the boundary.



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

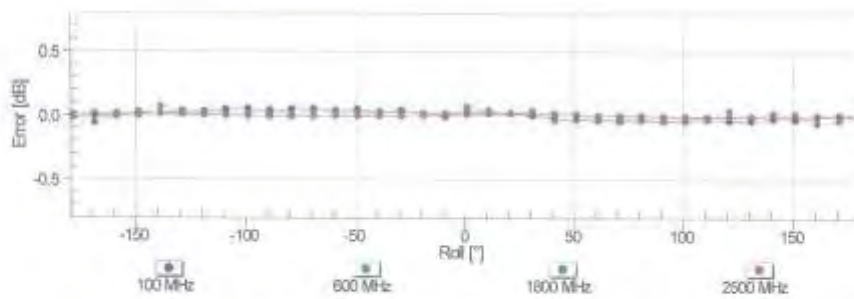
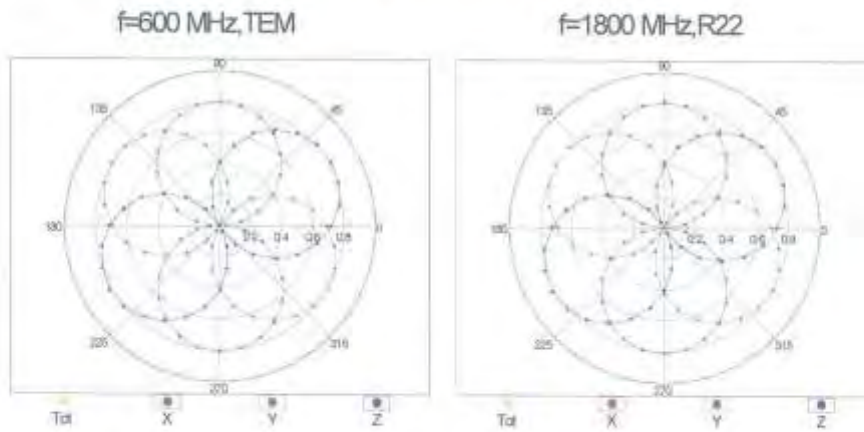


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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**Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$**

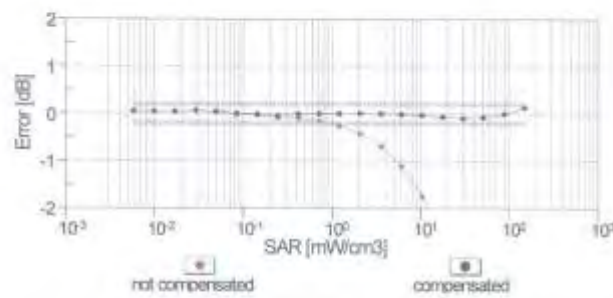
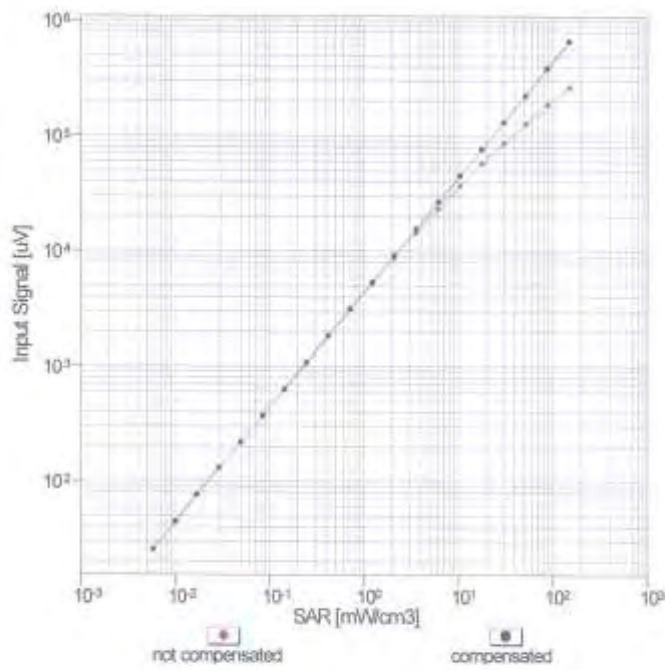


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

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**Dynamic Range f(SAR<sub>head</sub>)**  
(TEM cell , f<sub>eval</sub>= 1900 MHz)



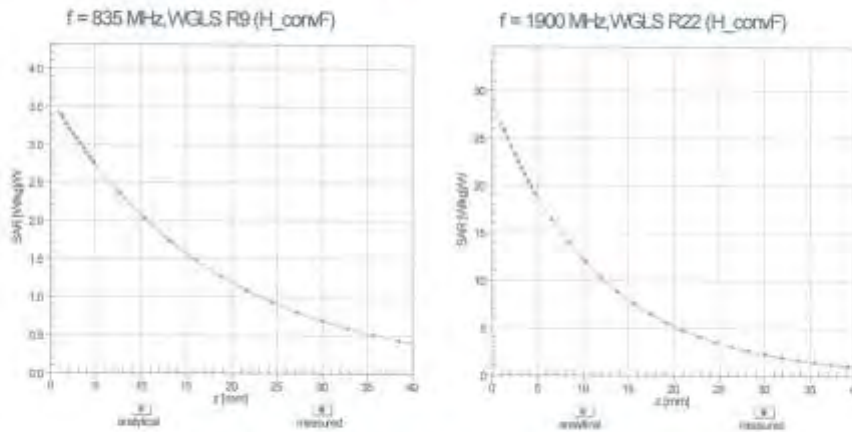
Uncertainty of Linearity Assessment: ± 0.6% (k=2)



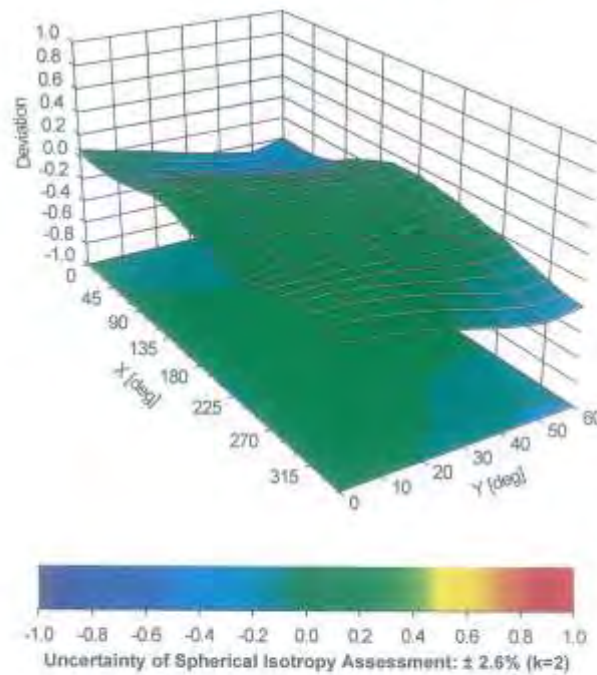
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### Conversion Factor Assessment



### Deviation from Isotropy in Liquid Error ( $\phi$ , $\theta$ ), $f = 900$ MHz



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**Appendix: Modulation Calibration Parameters**

UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>2</sup> (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, 5 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	3.85	±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 (PI4-QPSK, DH1)	Bluetooth	7.74	±9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI4-QPSK, DH3)	Bluetooth	4.53	±9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI4-QPSK, DH5)	Bluetooth	3.83	±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, PI4-QPSK, Fullrate)	AMPS	7.76	±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	13.60	±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 Mbps)	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	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	6.68	±9.6 %
10063	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	6.63	±9.6 %
10064	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	±9.6 %
10065	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	±9.6 %
10066	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.36	±9.6 %
10067	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6 %
10068	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	±9.6 %
10069	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.58	±9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 6 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, PI4-QPSK, Fullrate)	AMPS	4.77	±9.6 %
10080	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	±9.6 %
10097	CAB	UMTS-FDD (HSDPA)	WCDMA	3.96	±9.6 %
10098	CAB	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.96	±9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	8.55	±9.6 %



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10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.97	± 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	8.87	± 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 %
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	5.76	± 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	CAD	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAD	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAD	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAD	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAD	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	9.46	± 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	6.62	± 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	5.73	± 9.6 %



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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	CAD	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	CAD	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAD	IEEE 802.11n (HT Greenfield, 85 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAD	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	CAD	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAD	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAD	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %
10220	CAD	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAD	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAD	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	± 9.6 %
10223	CAD	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAD	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA	5.37	± 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	10.28	± 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	9.81	± 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	9.80	± 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	10.05	± 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	9.86	± 9.6 %
10260	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %

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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	10.15	±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	10.05	±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, Roll-off 0.5)	PHS	11.81	±9.6%
10279	CAA	PHS (QPSK, BW 884MHz, Roll-off 0.38)	PHS	12.18	±9.6%
10290	AAB	CDMA2000, RC1, SQ55, Full Rate	CDMA2000	3.91	±9.6%
10291	AAB	CDMA2000, RC3, SQ55, Full Rate	CDMA2000	3.45	±9.6%
10292	AAB	CDMA2000, RC3, SQ32, Full Rate	CDMA2000	3.30	±9.6%
10293	AAB	CDMA2000, RC3, SQ3, Full Rate	CDMA2000	3.50	±9.6%
10295	AAB	CDMA2000, RC1, SQ3, 1/8th Rate 25 fr	CDMA2000	12.49	±9.6%
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.91	±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%
10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.80	±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	6.05	±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	6.36	±9.6%
10317	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 5 Mbps, 96pc dc)	WLAN	6.36	±9.6%
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	±9.8%
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	8.99	±9.6%
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	2.98	±9.6%
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	±9.6%
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	±9.5%
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	±9.6%
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	±9.6%
10395	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	±9.6%
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	±9.6%
10400	AAE	IEEE 802.11ac WiFi (20MHz, 64-QAM, 96pc dc)	WLAN	6.37	±9.6%
10401	AAE	IEEE 802.11ac WiFi (40MHz, 64-QAM, 96pc dc)	WLAN	6.60	±9.6%
10402	AAE	IEEE 802.11ac WiFi (80MHz, 64-QAM, 96pc dc)	WLAN	6.53	±9.6%
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.75	±9.6%
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	±9.6%
10406	AAB	CDMA2000, RC3, SQ32, SCH0, Full Rate	CDMA2000	5.22	±9.6%
10410	AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,8,9)	LTE-TDD	7.62	±9.6%



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10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	±0.6%
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc dc)	WLAN	1.54	±0.6%
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	±0.6%
10417	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	±0.6%
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc Long)	WLAN	8.14	±0.6%
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc Short)	WLAN	8.19	±0.6%
10422	AAC	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	±0.6%
10423	AAC	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	±0.6%
10424	AAC	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	±0.6%
10425	AAC	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	±0.6%
10426	AAC	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	±0.6%
10427	AAC	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	±0.6%
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.26	±0.6%
10431	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	±0.6%
10432	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	±0.6%
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	±0.6%
10434	AAA	W-CDMA (BS Test Model 1, 84 DPCH)	WCDMA	8.80	±0.6%
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±0.6%
10447	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.86	±0.6%
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±0.6%
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.81	±0.6%
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	±0.6%
10451	AAA	W-CDMA (BS Test Model 1, 84 DPCH, Clipping 44%)	WCDMA	7.59	±0.6%
10453	AAD	Validation (Square, 10ms, 1ms)	Test	10.00	±0.6%
10456	AAC	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc dc)	WLAN	8.03	±0.6%
10457	AAA	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	±0.6%
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	±0.6%
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	±0.6%
10460	AAA	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	±0.6%
10461	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±0.6%
10462	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	±0.6%
10463	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	±0.6%
10464	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±0.6%
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±0.6%
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±0.6%
10467	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±0.6%
10468	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±0.6%
10469	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.65	±0.6%
10470	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±0.6%
10471	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±0.6%
10472	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±0.6%
10473	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.82	±0.6%
10474	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±0.6%
10475	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±0.6%
10477	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	±0.6%
10478	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	±0.6%
10479	AAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.74	±0.6%
10480	AAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.18	±0.6%
10481	AAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	±0.6%
10482	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.71	±0.6%
10483	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, Sub)	LTE-TDD	8.39	±0.6%
10484	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.47	±0.6%
10485	AAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.59	±0.6%
10486	AAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.38	±0.6%
10487	AAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.60	±0.6%
10488	AAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.70	±0.6%



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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	8.88	±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	8.38	±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	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9 Mbps, 99pc dc)	WLAN	8.23	±9.6%
10519	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12 Mbps, 99pc dc)	WLAN	8.39	±9.6%
10520	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18 Mbps, 99pc dc)	WLAN	8.12	±9.6%
10521	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps, 99pc dc)	WLAN	7.97	±9.6%
10522	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 36 Mbps, 99pc dc)	WLAN	8.45	±9.6%
10523	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 48 Mbps, 99pc dc)	WLAN	8.08	±9.6%
10524	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 54 Mbps, 99pc dc)	WLAN	8.27	±9.6%
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.36	±9.6%
10526	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.42	±9.6%
10527	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc)	WLAN	8.21	±9.6%
10528	AAC	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc)	WLAN	8.36	±9.6%
10529	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc)	WLAN	8.36	±9.6%
10531	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc)	WLAN	8.43	±9.6%
10532	AAC	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc)	WLAN	8.29	±9.6%
10533	AAC	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc)	WLAN	8.38	±9.6%
10534	AAC	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc)	WLAN	8.45	±9.6%
10535	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc)	WLAN	8.45	±9.6%
10536	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc)	WLAN	8.32	±9.6%
10537	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc)	WLAN	8.44	±9.6%
10538	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc)	WLAN	8.54	±9.6%
10540	AAC	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc dc)	WLAN	8.38	±9.6%
10541	AAC	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc)	WLAN	8.48	±9.6%
10542	AAC	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.65	±9.6%
10543	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc dc)	WLAN	8.65	±9.6%
10544	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc dc)	WLAN	8.47	±9.6%
10545	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc dc)	WLAN	8.55	±9.6%
10546	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc)	WLAN	8.36	±9.6%

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10547	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc)	WLAN	8.48	± 9.6 %
10548	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc dc)	WLAN	8.37	± 9.6 %
10550	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc dc)	WLAN	8.39	± 9.6 %
10551	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc dc)	WLAN	8.50	± 9.6 %
10552	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc dc)	WLAN	8.42	± 9.6 %
10553	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc dc)	WLAN	8.45	± 9.6 %
10554	AAD	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc dc)	WLAN	8.48	± 9.6 %
10555	AAD	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc dc)	WLAN	8.47	± 9.6 %
10556	AAD	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc dc)	WLAN	8.50	± 9.6 %
10557	AAD	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc dc)	WLAN	8.52	± 9.6 %
10558	AAD	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc dc)	WLAN	8.61	± 9.6 %
10560	AAD	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc dc)	WLAN	8.73	± 9.6 %
10561	AAD	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc dc)	WLAN	8.56	± 9.6 %
10562	AAD	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc dc)	WLAN	8.69	± 9.6 %
10563	AAD	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	8.70	± 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	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps, 90pc dc)	WLAN	8.58	± 9.6 %
10584	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9 Mbps, 90pc dc)	WLAN	8.60	± 9.6 %
10585	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	± 9.6 %
10586	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	± 9.6 %
10587	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	± 9.6 %
10588	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 36 Mbps, 90pc dc)	WLAN	8.70	± 9.6 %
10589	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	± 9.6 %
10590	AAC	IEEE 802.11a/n WiFi 5 GHz (OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	± 9.6 %
10591	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10592	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc dc)	WLAN	8.79	± 9.6 %
10593	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc dc)	WLAN	8.64	± 9.6 %
10594	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc dc)	WLAN	8.74	± 9.6 %
10595	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc dc)	WLAN	8.74	± 9.6 %
10596	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc dc)	WLAN	8.71	± 9.6 %
10597	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc dc)	WLAN	8.72	± 9.6 %
10598	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc dc)	WLAN	8.50	± 9.6 %
10599	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc dc)	WLAN	8.79	± 9.6 %
10600	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc dc)	WLAN	8.86	± 9.6 %
10601	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc dc)	WLAN	8.82	± 9.6 %
10602	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc dc)	WLAN	8.94	± 9.6 %
10603	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc dc)	WLAN	9.03	± 9.6 %
10604	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc dc)	WLAN	8.75	± 9.6 %

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10605	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc dc)	WLAN	8.97	± 9.6 %
10606	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc dc)	WLAN	8.82	± 9.6 %
10607	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc dc)	WLAN	8.84	± 9.6 %
10608	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc dc)	WLAN	8.77	± 9.6 %
10609	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc dc)	WLAN	8.57	± 9.6 %
10610	AAC	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc dc)	WLAN	8.78	± 9.6 %
10611	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc dc)	WLAN	8.70	± 9.6 %
10612	AAC	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10613	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc dc)	WLAN	8.94	± 9.6 %
10614	AAC	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc dc)	WLAN	8.59	± 9.6 %
10615	AAC	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc dc)	WLAN	8.82	± 9.6 %
10616	AAC	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc dc)	WLAN	8.82	± 9.6 %
10617	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc dc)	WLAN	8.81	± 9.6 %
10618	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc dc)	WLAN	8.58	± 9.6 %
10619	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc dc)	WLAN	8.86	± 9.6 %
10620	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc dc)	WLAN	8.87	± 9.6 %
10621	AAC	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10622	AAC	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc dc)	WLAN	8.68	± 9.6 %
10623	AAC	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc dc)	WLAN	8.82	± 9.6 %
10624	AAC	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc dc)	WLAN	8.96	± 9.6 %
10625	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc dc)	WLAN	8.96	± 9.6 %
10626	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10627	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc dc)	WLAN	8.88	± 9.6 %
10628	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc dc)	WLAN	8.71	± 9.6 %
10629	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10630	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc dc)	WLAN	8.72	± 9.6 %
10631	AAC	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc dc)	WLAN	8.81	± 9.6 %
10632	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc dc)	WLAN	8.74	± 9.6 %
10633	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc dc)	WLAN	8.83	± 9.6 %
10634	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc dc)	WLAN	8.80	± 9.6 %
10635	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc dc)	WLAN	8.81	± 9.6 %
10636	AAD	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10637	AAD	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc dc)	WLAN	8.79	± 9.6 %
10638	AAD	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc dc)	WLAN	8.86	± 9.6 %
10639	AAD	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10640	AAD	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc dc)	WLAN	8.98	± 9.6 %
10641	AAD	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc dc)	WLAN	9.06	± 9.6 %
10642	AAD	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc dc)	WLAN	9.06	± 9.6 %
10643	AAD	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc dc)	WLAN	8.89	± 9.6 %
10644	AAD	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc dc)	WLAN	9.05	± 9.6 %
10645	AAD	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc dc)	WLAN	9.11	± 9.6 %
10646	AAE	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	6.98	± 9.6 %
10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6 %
10656	AAA	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
10659	AAA	Pulse Waveform (200Hz, 20%)	Test	6.98	± 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	AAC	IEEE 802.11ax (20MHz, MCS0, 90pc dc)	WLAN	9.09	± 9.6 %
10672	AAC	IEEE 802.11ax (20MHz, MCS1, 90pc dc)	WLAN	8.57	± 9.6 %



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10673	AAC	IEEE 802.11ax (20MHz, MCS2, 90pc dc)	WLAN	8.78	± 9.6 %
10674	AAC	IEEE 802.11ax (20MHz, MCS3, 90pc dc)	WLAN	8.74	± 9.6 %
10675	AAC	IEEE 802.11ax (20MHz, MCS4, 90pc dc)	WLAN	8.90	± 9.6 %
10676	AAC	IEEE 802.11ax (20MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10677	AAC	IEEE 802.11ax (20MHz, MCS6, 90pc dc)	WLAN	8.75	± 9.6 %
10678	AAC	IEEE 802.11ax (20MHz, MCS7, 90pc dc)	WLAN	8.76	± 9.6 %
10679	AAC	IEEE 802.11ax (20MHz, MCS8, 90pc dc)	WLAN	8.89	± 9.6 %
10680	AAC	IEEE 802.11ax (20MHz, MCS9, 90pc dc)	WLAN	8.80	± 9.6 %
10681	AAC	IEEE 802.11ax (20MHz, MCS10, 90pc dc)	WLAN	8.82	± 9.6 %
10682	AAC	IEEE 802.11ax (20MHz, MCS11, 90pc dc)	WLAN	8.83	± 9.6 %
10683	AAC	IEEE 802.11ax (20MHz, MCS0, 99pc dc)	WLAN	8.42	± 9.6 %
10684	AAC	IEEE 802.11ax (20MHz, MCS1, 99pc dc)	WLAN	8.26	± 9.6 %
10685	AAC	IEEE 802.11ax (20MHz, MCS2, 99pc dc)	WLAN	8.33	± 9.6 %
10686	AAC	IEEE 802.11ax (20MHz, MCS3, 99pc dc)	WLAN	8.28	± 9.6 %
10687	AAC	IEEE 802.11ax (20MHz, MCS4, 99pc dc)	WLAN	8.45	± 9.6 %
10688	AAC	IEEE 802.11ax (20MHz, MCS5, 99pc dc)	WLAN	8.29	± 9.6 %
10689	AAC	IEEE 802.11ax (20MHz, MCS6, 99pc dc)	WLAN	8.55	± 9.6 %
10690	AAC	IEEE 802.11ax (20MHz, MCS7, 99pc dc)	WLAN	8.29	± 9.6 %
10691	AAC	IEEE 802.11ax (20MHz, MCS8, 99pc dc)	WLAN	8.25	± 9.6 %
10692	AAC	IEEE 802.11ax (20MHz, MCS9, 99pc dc)	WLAN	8.29	± 9.6 %
10693	AAC	IEEE 802.11ax (20MHz, MCS10, 99pc dc)	WLAN	8.25	± 9.6 %
10694	AAC	IEEE 802.11ax (20MHz, MCS11, 99pc dc)	WLAN	8.57	± 9.6 %
10695	AAC	IEEE 802.11ax (40MHz, MCS0, 90pc dc)	WLAN	8.78	± 9.6 %
10696	AAC	IEEE 802.11ax (40MHz, MCS1, 90pc dc)	WLAN	8.91	± 9.6 %
10697	AAC	IEEE 802.11ax (40MHz, MCS2, 90pc dc)	WLAN	8.61	± 9.6 %
10698	AAC	IEEE 802.11ax (40MHz, MCS3, 90pc dc)	WLAN	8.89	± 9.6 %
10699	AAC	IEEE 802.11ax (40MHz, MCS4, 90pc dc)	WLAN	8.82	± 9.6 %
10700	AAC	IEEE 802.11ax (40MHz, MCS5, 90pc dc)	WLAN	8.72	± 9.6 %
10701	AAC	IEEE 802.11ax (40MHz, MCS6, 90pc dc)	WLAN	8.86	± 9.6 %
10702	AAC	IEEE 802.11ax (40MHz, MCS7, 90pc dc)	WLAN	8.70	± 9.6 %
10703	AAC	IEEE 802.11ax (40MHz, MCS8, 90pc dc)	WLAN	8.82	± 9.6 %
10704	AAC	IEEE 802.11ax (40MHz, MCS9, 90pc dc)	WLAN	8.96	± 9.6 %
10705	AAC	IEEE 802.11ax (40MHz, MCS10, 90pc dc)	WLAN	8.89	± 9.6 %
10706	AAC	IEEE 802.11ax (40MHz, MCS11, 90pc dc)	WLAN	8.66	± 9.6 %
10707	AAC	IEEE 802.11ax (40MHz, MCS0, 99pc dc)	WLAN	8.32	± 9.6 %
10708	AAC	IEEE 802.11ax (40MHz, MCS1, 99pc dc)	WLAN	8.55	± 9.6 %
10709	AAC	IEEE 802.11ax (40MHz, MCS2, 99pc dc)	WLAN	8.33	± 9.6 %
10710	AAC	IEEE 802.11ax (40MHz, MCS3, 99pc dc)	WLAN	8.29	± 9.6 %
10711	AAC	IEEE 802.11ax (40MHz, MCS4, 99pc dc)	WLAN	8.39	± 9.6 %
10712	AAC	IEEE 802.11ax (40MHz, MCS5, 99pc dc)	WLAN	8.67	± 9.6 %
10713	AAC	IEEE 802.11ax (40MHz, MCS6, 99pc dc)	WLAN	8.31	± 9.6 %
10714	AAC	IEEE 802.11ax (40MHz, MCS7, 99pc dc)	WLAN	8.26	± 9.6 %
10715	AAC	IEEE 802.11ax (40MHz, MCS8, 99pc dc)	WLAN	8.45	± 9.6 %
10716	AAC	IEEE 802.11ax (40MHz, MCS9, 99pc dc)	WLAN	8.30	± 9.6 %
10717	AAC	IEEE 802.11ax (40MHz, MCS10, 99pc dc)	WLAN	8.48	± 9.6 %
10718	AAC	IEEE 802.11ax (40MHz, MCS11, 99pc dc)	WLAN	8.24	± 9.6 %
10719	AAC	IEEE 802.11ax (80MHz, MCS0, 90pc dc)	WLAN	8.81	± 9.6 %
10720	AAC	IEEE 802.11ax (80MHz, MCS1, 90pc dc)	WLAN	8.87	± 9.6 %
10721	AAC	IEEE 802.11ax (80MHz, MCS2, 90pc dc)	WLAN	8.78	± 9.6 %
10722	AAC	IEEE 802.11ax (80MHz, MCS3, 90pc dc)	WLAN	8.55	± 9.6 %
10723	AAC	IEEE 802.11ax (80MHz, MCS4, 90pc dc)	WLAN	8.70	± 9.6 %
10724	AAC	IEEE 802.11ax (80MHz, MCS5, 90pc dc)	WLAN	8.90	± 9.6 %
10725	AAC	IEEE 802.11ax (80MHz, MCS6, 90pc dc)	WLAN	8.74	± 9.6 %
10726	AAC	IEEE 802.11ax (80MHz, MCS7, 90pc dc)	WLAN	8.72	± 9.6 %
10727	AAC	IEEE 802.11ax (80MHz, MCS8, 90pc dc)	WLAN	8.56	± 9.6 %
10728	AAC	IEEE 802.11ax (80MHz, MCS9, 90pc dc)	WLAN	8.65	± 9.6 %

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10729	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc dc)	WLAN	8.64	± 9.6 %
10730	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc dc)	WLAN	8.67	± 9.6 %
10731	AAC	IEEE 802.11ax (80MHz, MCS0, 99pc dc)	WLAN	8.42	± 9.6 %
10732	AAC	IEEE 802.11ax (80MHz, MCS1, 99pc dc)	WLAN	8.46	± 9.6 %
10733	AAC	IEEE 802.11ax (80MHz, MCS2, 99pc dc)	WLAN	8.40	± 9.6 %
10734	AAC	IEEE 802.11ax (80MHz, MCS3, 99pc dc)	WLAN	8.25	± 9.6 %
10735	AAC	IEEE 802.11ax (80MHz, MCS4, 99pc dc)	WLAN	8.33	± 9.6 %
10736	AAC	IEEE 802.11ax (80MHz, MCS5, 99pc dc)	WLAN	8.27	± 9.6 %
10737	AAC	IEEE 802.11ax (80MHz, MCS6, 99pc dc)	WLAN	8.36	± 9.6 %
10738	AAC	IEEE 802.11ax (80MHz, MCS7, 99pc dc)	WLAN	8.42	± 9.6 %
10739	AAC	IEEE 802.11ax (80MHz, MCS8, 99pc dc)	WLAN	8.29	± 9.6 %
10740	AAC	IEEE 802.11ax (80MHz, MCS9, 99pc dc)	WLAN	8.48	± 9.6 %
10741	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc dc)	WLAN	8.40	± 9.6 %
10742	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc dc)	WLAN	8.43	± 9.6 %
10743	AAC	IEEE 802.11ax (160MHz, MCS0, 99pc dc)	WLAN	8.94	± 9.6 %
10744	AAC	IEEE 802.11ax (160MHz, MCS1, 99pc dc)	WLAN	8.16	± 9.6 %
10745	AAC	IEEE 802.11ax (160MHz, MCS2, 99pc dc)	WLAN	8.93	± 9.6 %
10746	AAC	IEEE 802.11ax (160MHz, MCS3, 99pc dc)	WLAN	8.11	± 9.6 %
10747	AAC	IEEE 802.11ax (160MHz, MCS4, 99pc dc)	WLAN	8.04	± 9.6 %
10748	AAC	IEEE 802.11ax (160MHz, MCS5, 99pc dc)	WLAN	8.93	± 9.6 %
10749	AAC	IEEE 802.11ax (160MHz, MCS6, 99pc dc)	WLAN	8.90	± 9.6 %
10750	AAC	IEEE 802.11ax (160MHz, MCS7, 99pc dc)	WLAN	8.79	± 9.6 %
10751	AAC	IEEE 802.11ax (160MHz, MCS8, 99pc dc)	WLAN	8.82	± 9.6 %
10752	AAC	IEEE 802.11ax (160MHz, MCS9, 99pc dc)	WLAN	8.81	± 9.6 %
10753	AAC	IEEE 802.11ax (160MHz, MCS10, 99pc dc)	WLAN	9.00	± 9.6 %
10754	AAC	IEEE 802.11ax (160MHz, MCS11, 99pc dc)	WLAN	8.94	± 9.6 %
10755	AAC	IEEE 802.11ax (180MHz, MCS0, 99pc dc)	WLAN	8.64	± 9.6 %
10756	AAC	IEEE 802.11ax (180MHz, MCS1, 99pc dc)	WLAN	8.77	± 9.6 %
10757	AAC	IEEE 802.11ax (180MHz, MCS2, 99pc dc)	WLAN	8.77	± 9.6 %
10758	AAC	IEEE 802.11ax (180MHz, MCS3, 99pc dc)	WLAN	8.55	± 9.6 %
10759	AAC	IEEE 802.11ax (180MHz, MCS4, 99pc dc)	WLAN	8.58	± 9.6 %
10760	AAC	IEEE 802.11ax (180MHz, MCS5, 99pc dc)	WLAN	8.49	± 9.6 %
10761	AAC	IEEE 802.11ax (180MHz, MCS6, 99pc dc)	WLAN	8.58	± 9.6 %
10762	AAC	IEEE 802.11ax (180MHz, MCS7, 99pc dc)	WLAN	8.49	± 9.6 %
10763	AAC	IEEE 802.11ax (180MHz, MCS8, 99pc dc)	WLAN	8.53	± 9.6 %
10764	AAC	IEEE 802.11ax (180MHz, MCS9, 99pc dc)	WLAN	8.54	± 9.6 %
10765	AAC	IEEE 802.11ax (180MHz, MCS10, 99pc dc)	WLAN	8.54	± 9.6 %
10766	AAC	IEEE 802.11ax (180MHz, MCS11, 99pc dc)	WLAN	8.51	± 9.6 %
10767	AAE	5G NR (CP-OFDM, 1 RB, 3 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.96	± 9.6 %
10768	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10769	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10770	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10771	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10772	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	± 9.6 %
10773	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	± 9.6 %
10774	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10775	AAD	5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	± 9.6 %
10776	AAD	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10777	AAC	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10778	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10779	AAC	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	± 9.6 %
10780	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10781	AAD	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	± 9.6 %
10782	AAD	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	± 9.6 %
10783	AAE	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	± 9.6 %
10784	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	± 9.6 %



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10785	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	± 0.6 %
10786	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	± 0.6 %
10787	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	± 0.6 %
10788	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 0.6 %
10789	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	± 0.6 %
10790	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 0.6 %
10791	AAE	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	± 0.6 %
10792	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	± 0.6 %
10793	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	± 0.6 %
10794	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 0.6 %
10795	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	± 0.6 %
10796	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 0.6 %
10797	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	± 0.6 %
10798	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 0.6 %
10799	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	± 0.6 %
10801	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 0.6 %
10802	AAD	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	± 0.6 %
10803	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	± 0.6 %
10805	AAD	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 0.6 %
10806	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	± 0.6 %
10809	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 0.6 %
10810	AAD	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 0.6 %
10812	AAD	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 0.6 %
10817	AAE	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 0.6 %
10818	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 0.6 %
10819	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	± 0.6 %
10820	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	± 0.6 %
10821	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 0.6 %
10822	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 0.6 %
10823	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	± 0.6 %
10824	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	± 0.6 %
10825	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 0.6 %
10827	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	± 0.6 %
10828	AAD	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	± 0.6 %
10829	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	± 0.6 %
10830	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.63	± 0.6 %
10831	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	± 0.6 %
10832	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	± 0.6 %
10833	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 0.6 %
10834	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	± 0.6 %
10835	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 0.6 %
10836	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	± 0.6 %
10837	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	± 0.6 %
10839	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 0.6 %
10840	AAD	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	± 0.6 %
10841	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	± 0.6 %
10843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.48	± 0.6 %
10844	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 0.6 %
10846	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 0.6 %
10854	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 0.6 %
10855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 0.6 %
10856	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	± 0.6 %
10857	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	± 0.6 %
10858	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 0.6 %
10859	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 0.6 %
10860	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 0.6 %

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10861	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	±9.6%
10863	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6%
10864	AAD	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6%
10865	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6%
10866	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10868	AAD	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	5.95	±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	5.52	±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	6.41	±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	8.36	±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	AAC	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10898	AAB	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6%
10899	AAB	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6%
10900	AAB	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10901	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10902	AAB	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10903	AAB	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10904	AAB	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10905	AAB	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10906	AAB	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6%
10907	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	±9.6%
10908	AAB	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.6%
10909	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6%
10910	AAB	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.6%
10911	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.6%
10912	AAB	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6%
10913	AAB	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6%
10914	AAB	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±9.6%
10915	AAB	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.6%
10916	AAB	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.6%
10917	AAB	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.6%
10918	AAC	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6%
10919	AAB	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6%
10920	AAB	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.6%
10921	AAB	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6%
10922	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	±9.6%

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10923	AAB	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10924	AAB	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10925	AAB	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.95	± 9.6 %
10926	AAB	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10927	AAB	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
10928	AAC	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10929	AAC	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10930	AAC	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10931	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10932	AAC	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10933	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10934	AAC	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10935	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10936	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10937	AAC	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	± 9.6 %
10938	AAC	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10939	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	± 9.6 %
10940	AAC	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	± 9.6 %
10941	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10942	AAC	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10943	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	± 9.6 %
10944	AAC	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	± 9.6 %
10945	AAC	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10947	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10948	AAC	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10949	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10950	AAC	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10951	AAD	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	AAC	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	± 9.6 %
10961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.38	± 9.6 %
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	± 9.6 %
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10964	AAC	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.29	± 9.6 %
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	± 9.6 %
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	± 9.6 %
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	± 9.6 %
10972	AAB	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	± 9.6 %
10973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	± 9.6 %
10974	AAB	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	± 9.6 %
10978	AAA	ULLA 8DR	ULLA	2.23	± 9.6 %
10979	AAA	ULLA 8DR4	ULLA	7.02	± 9.6 %
10980	AAA	ULLA 8DR8	ULLA	8.62	± 9.6 %
10981	AAA	ULLA 8DRp4	ULLA	1.50	± 9.6 %
10982	AAA	ULLA 8DRp8	ULLA	1.44	± 9.6 %

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



**Calibration Laboratory of  
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No **EX-7681\_Nov22**

**CALIBRATION CERTIFICATE**

Object **EX3DV4 - SN:7681**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v6, QA CAL-23.v5,  
QA CAL-25.v7  
Calibration procedure for dosimetric E-field probes.**

Calibration date **November 21, 2022**

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: 104776	04-Apr-22 (No. 217-03526/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
DCP DAK-3.5 (weighted)	SN: 1249	20-Oct-22 (DCP-DAK3.5-1249_Oct22)	Oct-23
DCP DAK-12	SN: 1016	20-Oct-22 (DCP-DAK12-1016_Oct22)	Oct-23
Reference 20 dB Attenuator DAE4	SN: CC2552 (20x) SN: 660	04-Apr-22 (No. 217-03527) 10-Oct-22 (No. DAE4 660_Oct22)	Apr-23 Oct-23
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-89 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by	Jeton Kasiraj	Laboratory Technician	
Approved by	Nimis Kuster	Quality Manager	

Issued: November 21, 2022  
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

결재	담당자	확일자
	김민석 2022.12.05	김민석 2022.12.05



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



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Accreditation No.: SCS 0108

**Glossary**

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\theta$	$\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ 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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Methods Applied and Interpretation of Parameters:**

- NORM<sub>x,y,z</sub>: Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* 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.
- DCP<sub>x,y,z</sub>: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. 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  $f \leq 800$  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 NORM<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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 NORM<sub>x</sub> (no uncertainty required).

EX3DV4 - SN:7681

November 21, 2022

**Parameters of Probe: EX3DV4 - SN:7681**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	0.65	0.63	0.67	±10.1%
DCP ( $\text{mV}$ ) <sup>B</sup>	106.0	107.5	105.0	±4.7%

**Calibration Results for Modulation Response**

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Max Unc <sup>E</sup> k = 2
0	CW	X	0.00	0.00	1.00	0.00	166.5	±2.7%	±4.7%
		Y	0.00	0.00	1.00		151.3		
		Z	0.00	0.00	1.00		167.3		
10352	Pulse Waveform (200Hz, 10%)	X	1.39	60.00	5.70	10.00	60.0	±2.4%	±9.6%
		Y	1.55	60.60	6.23		60.0		
		Z	1.38	60.00	5.72		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	0.82	60.00	4.35	6.99	80.0	±2.5%	±9.6%
		Y	0.80	60.00	4.73		80.0		
		Z	0.80	60.00	4.38		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	0.29	125.07	1.19	3.98	95.0	±2.4%	±9.6%
		Y	0.18	144.05	0.15		95.0		
		Z	0.20	126.60	1.20		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	4.86	168.72	11.02	2.22	120.0	±1.5%	±9.6%
		Y	6.49	159.98	15.39		120.0		
		Z	4.84	168.41	15.27		120.0		
10367	QPSK Waveform, 1 MHz	X	0.45	60.68	9.68	1.00	150.0	±5.0%	±9.6%
		Y	0.82	63.58	11.91		150.0		
		Z	0.47	61.37	10.28		150.0		
10368	QPSK Waveform, 10 MHz	X	1.15	63.19	12.23	0.00	150.0	±1.3%	±9.6%
		Y	1.37	65.25	13.69		150.0		
		Z	1.20	63.87	12.68		150.0		
10396	64-QAM Waveform, 100 kHz	X	1.61	63.81	15.72	3.01	150.0	±1.3%	±9.6%
		Y	1.60	63.64	15.58		150.0		
		Z	1.56	63.25	15.44		150.0		
10399	64-QAM Waveform, 40 MHz	X	2.79	65.73	14.62	0.00	150.0	±3.0%	±9.6%
		Y	2.84	65.91	14.86		150.0		
		Z	2.69	65.21	14.47		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	3.84	65.56	14.97	0.00	150.0	±5.1%	±9.6%
		Y	4.05	66.30	15.45		150.0		
		Z	3.87	65.81	15.16		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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSI. (See Pages 5 and 6).

<sup>B</sup> Linearization parameter uncertainty for maximum specified field strength.

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

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November 21, 2022

**Parameters of Probe: EX3DV4 - SN:7681**

**Sensor Model Parameters**

	C1 fF	C2 fF	$\alpha$ V <sup>-1</sup>	T1 msV <sup>-2</sup>	T2 msV <sup>-1</sup>	T3 ms	T4 V <sup>-2</sup>	T5 V <sup>-1</sup>	T6
x	11.1	81.69	34.33	2.76	0.00	4.90	0.27	0.02	1.01
y	11.8	84.93	33.16	2.22	0.00	4.90	0.02	0.04	1.00
z	10.8	80.15	34.97	2.48	0.00	4.90	0.00	0.05	1.01

**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle	-96.1°
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.



EX3DV4 - SN:7681

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**Parameters of Probe: EX3DV4 - SN:7681**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity <sup>F</sup> (S/m)	CorvF X	CorvF Y	CorvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
750	41.9	0.69	10.81	10.81	10.81	0.49	0.80	±12.0%
835	41.5	0.90	10.50	10.50	10.50	0.48	0.80	±12.0%
900	41.5	0.97	10.28	10.28	10.28	0.44	0.80	±12.0%
1750	40.1	1.37	9.29	9.29	9.29	0.30	0.86	±12.0%
1900	40.0	1.40	8.86	8.86	8.86	0.29	0.86	±12.0%
2450	39.2	1.80	8.28	8.28	8.28	0.41	0.90	±12.0%
2600	39.0	1.96	7.95	7.95	7.95	0.44	0.90	±12.0%
3300	38.2	2.71	7.40	7.40	7.40	0.30	1.35	±13.1%
3500	37.9	2.91	7.11	7.11	7.11	0.30	1.35	±13.1%
3700	37.7	3.12	7.10	7.10	7.10	0.35	1.50	±13.1%
3900	37.5	3.32	6.82	6.82	6.82	0.40	1.60	±13.1%
4100	37.2	3.53	6.56	6.56	6.56	0.40	1.60	±13.1%
4400	36.9	3.84	6.54	6.54	6.54	0.40	1.70	±13.1%
4600	36.7	4.04	6.52	6.52	6.52	0.40	1.70	±13.1%
4900	36.4	4.25	6.45	6.45	6.45	0.40	1.80	±13.1%
4950	36.3	4.40	6.19	6.19	6.19	0.40	1.80	±13.1%
5250	35.9	4.71	6.00	6.00	6.00	0.40	1.80	±13.1%
5600	35.5	5.07	5.35	5.35	5.35	0.40	1.80	±13.1%
5750	35.4	5.22	5.40	5.40	5.40	0.40	1.80	±13.1%
5800	35.3	5.27	5.35	5.35	5.35	0.40	1.80	±13.1%

<sup>C</sup> Frequency validity above 300 MHz of ±100MHz only applies for DASy v4.0 and Higher (See Page 2), also it is restricted to ±50 MHz. The uncertainty is the RSS of the CorvF 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 CorvF assessments at 30, 84, 128, 150 and 200 MHz respectively. Validity of CorvF assessed at 8 MHz is 4-8 MHz, and CorvF assessed at 13 MHz is 8-19 MHz. Above 5 GHz frequency validity can be extended to ±10 MHz.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ±5%. The uncertainty is the RSS of the CorvF uncertainty for indicated target tissue parameters.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAQ warns 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  $\phi$  diameter from the boundary.

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November 21, 2022

**Parameters of Probe: EX3DV4 - SN:7681**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity <sup>F</sup> (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc. (k = 2)
6500	34.5	5.07	5.90	5.90	5.90	0.20	2.50	±15.6%

<sup>C</sup> Frequency validity at 0.5 GHz is -600+700 MHz, and ±700 MHz at or above 7 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

<sup>F</sup> At frequencies 6-10 GHz, the validity of tissue parameters ( $\epsilon'$  and  $\sigma'$ ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

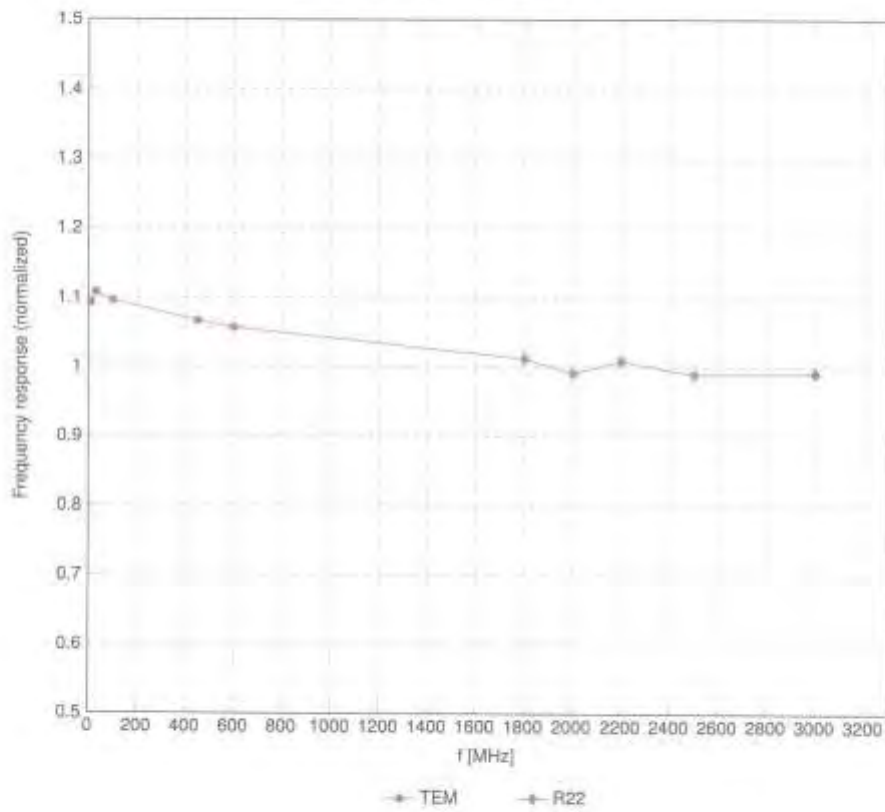
<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz; below +2% for frequencies between 3-6 GHz; and below ±4% for frequencies between 6-10 GHz at any distance larger than half the probe tip diameter from the boundary.

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### Frequency Response of E-Field

(TEM-Cell:if110 EXX, Waveguide:R22)



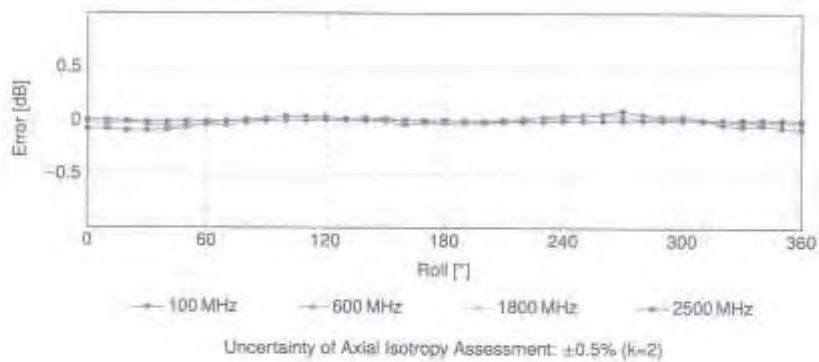
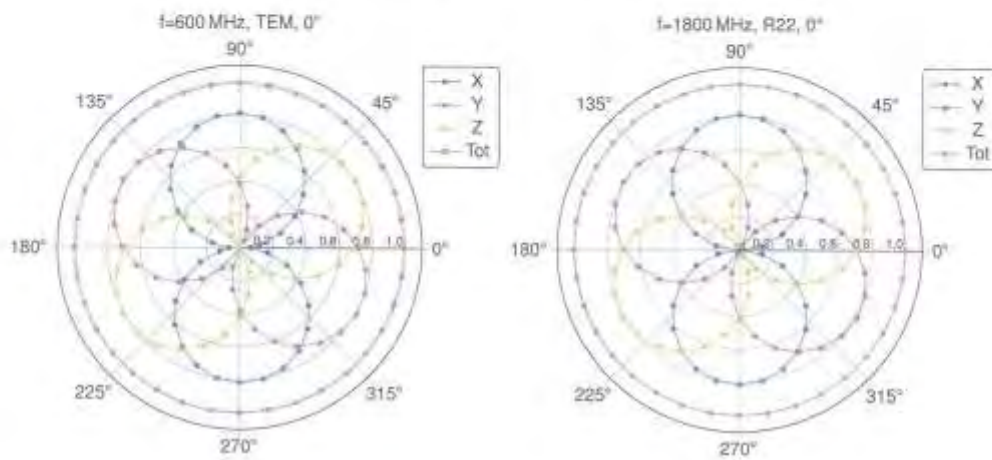
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)



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Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$

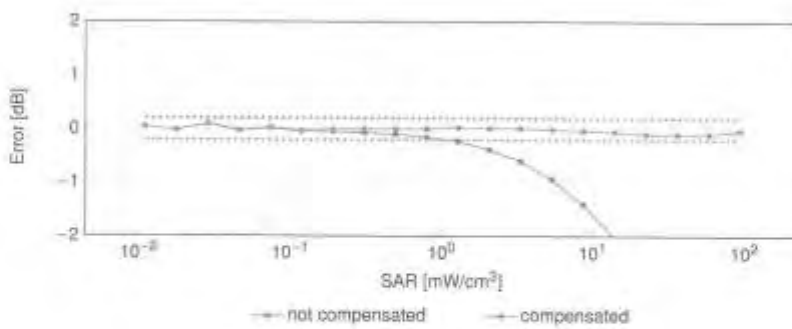
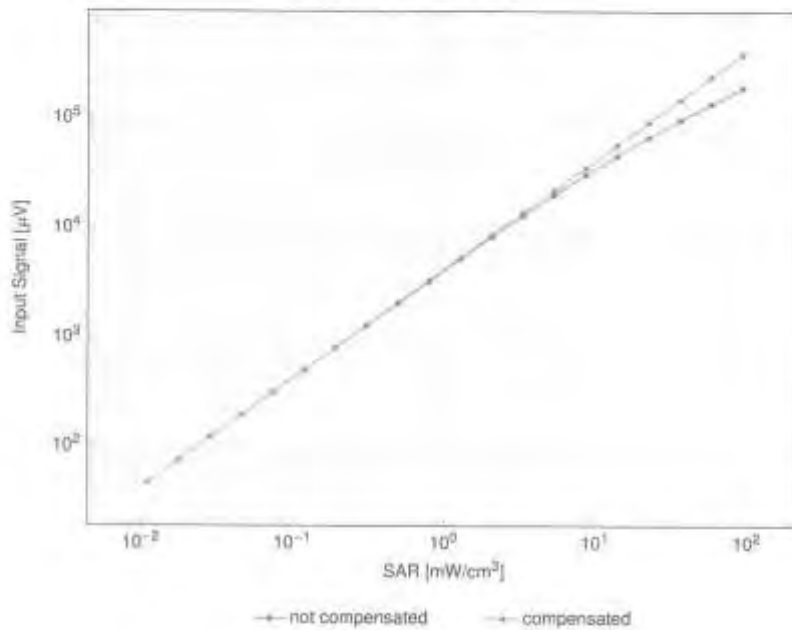


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**Dynamic Range f(SAR<sub>head</sub>)**

(TEM cell,  $f_{\text{eval}} = 1900\text{MHz}$ )

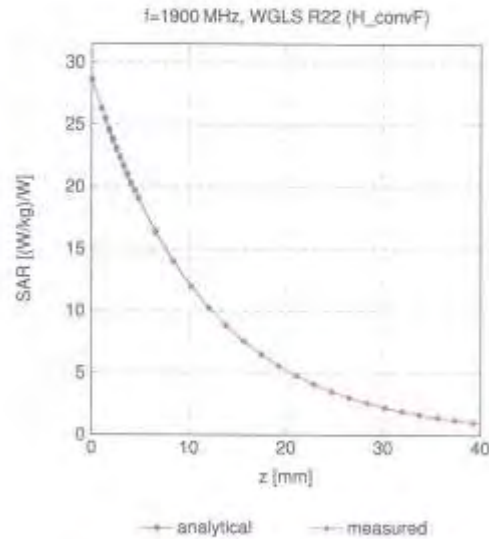


Uncertainty of Linearity Assessment: ±0.6% (k=2)

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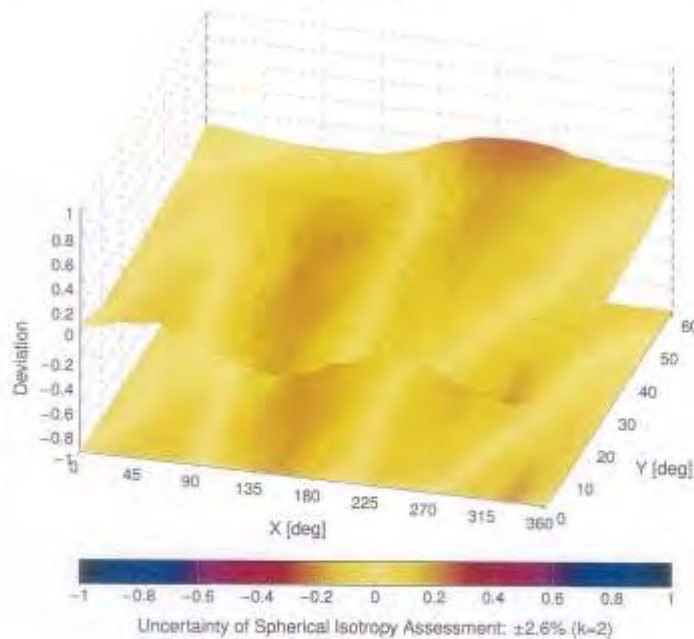
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**Conversion Factor Assessment**



**Deviation from Isotropy in Liquid**

Error ( $\phi, \theta$ ), f=900 MHz





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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>1</sup> k = 2
0		CW	CW	0.00	±4.7
10010	CAB	SAR Validation (Square, 100 ms, 10 ms)	Test	10.00	±9.6
10011	CAC	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	0.46	±9.6
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	0.09	±9.6
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	5.57	±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	6.56	±9.6
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.60	±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	7.28	±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	1.67	±9.6
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	±9.6
10033	CAA	IEEE 802.15.1 Bluetooth (PS4-DQPSK, DH1)	Bluetooth	7.74	±9.6
10034	CAA	IEEE 802.15.1 Bluetooth (PS4-DQPSK, DH3)	Bluetooth	4.53	±9.6
10035	CAA	IEEE 802.15.1 Bluetooth (PS4-DQPSK, DH5)	Bluetooth	3.60	±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	4.67	±9.6
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PS4-DQPSK, Fullrate)	AMPS	1.76	±9.6
10044	CAA	IS-97/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	±9.6
10046	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 2x)	DECT	12.80	±9.6
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 1x)	DECT	10.78	±9.6
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mbps)	TD-SCDMA	11.01	±9.6
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.57	±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	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	6.88	±9.6
10063	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	±9.6
10064	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	±9.6
10065	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	±9.6
10066	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.36	±9.6
10067	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6
10068	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	±9.6
10069	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.58	±9.6
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	6.03	±9.6
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	5.52	±9.6
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	6.94	±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	10.54	±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, PS4-DQPSK, Fullrate)	AMPS	4.77	±9.6
10089	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	±9.6
10087	CAC	UMTS-FDD (HSDPA)	WCDMA	3.98	±9.6
10098	CAC	UMTS-FDD (HSUPA, Submod 2)	WCDMA	3.98	±9.6
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	6.55	±9.6
10100	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	±9.6
10101	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10102	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10103	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	±9.6
10104	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	±9.6
10105	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.91	±9.6
10108	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.20	±9.6
10109	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10110	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	±9.6
10111	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	±9.6

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10112	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	±9.6
10113	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	±9.6
10114	CAD	IEEE 802.11n (HT Greenfield, 13.5Mbps, BPSK)	WLAN	6.10	±9.6
10115	CAD	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	6.48	±9.6
10116	CAD	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	6.15	±9.6
10117	CAD	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	6.07	±9.6
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	6.59	±9.6
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	6.13	±9.6
10140	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±9.6
10141	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	±9.6
10142	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	6.73	±9.6
10143	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	±9.6
10144	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.85	±9.6
10145	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	±9.6
10146	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±9.6
10147	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	±9.6
10149	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10150	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.90	±9.6
10151	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.38	±9.6
10152	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	±9.6
10153	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	±9.6
10154	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	±9.6
10155	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.40	±9.6
10156	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.70	±9.6
10157	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	±9.6
10158	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.92	±9.6
10159	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	±9.6
10160	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	±9.6
10161	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10162	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.56	±9.6
10166	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	±9.6
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	±9.6
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	±9.6
10169	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±9.6
10170	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10171	AAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	±9.6
10172	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6
10173	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.46	±9.6
10174	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10175	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±9.6
10176	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10177	CAJ	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±9.6
10178	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10179	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10180	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10181	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±9.6
10182	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10183	AAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10184	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6
10185	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±9.6
10186	AAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	±9.6
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10189	AAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10193	CAD	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	6.09	±9.6
10194	CAD	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	6.17	±9.6
10195	CAD	IEEE 802.11n (HT Greenfield, 85 Mbps, 64-QAM)	WLAN	6.21	±9.6
10196	CAD	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	6.10	±9.6
10197	CAD	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	6.13	±9.6
10198	CAD	IEEE 802.11n (HT Mixed, 85 Mbps, 64-QAM)	WLAN	6.27	±9.6
10219	CAD	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	6.03	±9.6
10220	CAD	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	6.13	±9.6
10221	CAD	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	6.27	±9.6
10222	CAD	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	6.06	±9.6
10223	CAD	IEEE 802.11n (HT Mixed, 80 Mbps, 16-QAM)	WLAN	6.48	±9.6
10224	CAD	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	6.08	±9.6



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10225	CAC	UMTS-FDD (HSPA+)	WCDMA	9.97	±0.6
10226	CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	9.49	±0.6
10227	CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	10.26	±0.6
10228	CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	9.22	±0.6
10229	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	9.40	±0.6
10230	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	10.25	±0.6
10231	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	9.19	±0.6
10232	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	9.40	±0.6
10233	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	10.25	±0.6
10234	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	9.21	±0.6
10235	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	9.48	±0.6
10236	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	10.25	±0.6
10237	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	9.21	±0.6
10238	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	9.48	±0.6
10239	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	10.25	±0.6
10240	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	9.21	±0.6
10241	CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	9.62	±0.6
10242	CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	9.86	±0.6
10243	CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	9.46	±0.6
10244	CAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	10.06	±0.6
10245	CAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	10.08	±0.6
10246	CAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	9.30	±0.6
10247	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	9.91	±0.6
10248	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	10.09	±0.6
10249	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	9.29	±0.6
10250	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	9.87	±0.6
10251	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	10.17	±0.6
10252	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	9.24	±0.6
10253	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	9.90	±0.6
10254	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	10.14	±0.6
10255	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	9.20	±0.6
10256	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	9.90	±0.6
10257	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	10.00	±0.6
10258	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	9.34	±0.6
10259	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	9.99	±0.6
10260	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	9.97	±0.6
10261	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	9.24	±0.6
10262	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	9.83	±0.6
10263	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	10.19	±0.6
10264	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	9.23	±0.6
10265	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	9.92	±0.6
10266	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	10.07	±0.6
10267	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	9.30	±0.6
10268	CAG	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	10.06	±0.6
10269	CAG	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	10.13	±0.6
10270	CAG	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	9.58	±0.6
10274	CAC	UMTS-FDD (HSPA, Subtest 5, 3GPP Rel8, 10)	WCDMA	4.67	±0.6
10275	CAC	UMTS-FDD (HSPA, Subtest 5, 3GPP Rel8, 4)	WCDMA	3.96	±0.6
10277	CAA	PHS (QPSK)	PHS	11.81	±0.6
10278	CAA	PHS (QPSK, BW 884 MHz, rolloff 0.5)	PHS	11.81	±0.6
10279	CAA	PHS (QPSK, BW 884 MHz, rolloff 0.38)	PHS	12.18	±0.6
10290	AAB	CDMA2000, RC1, SCSS, Full Rate	CDMA2000	3.91	±0.6
10291	AAB	CDMA2000, RC3, SCSS, Full Rate	CDMA2000	3.48	±0.6
10292	AAB	CDMA2000, RC3, SCSS, Full Rate	CDMA2000	3.38	±0.6
10293	AAB	CDMA2000, RC3, SC3, Full Rate	CDMA2000	3.50	±0.6
10295	AAB	CDMA2000, RC1, SC3, 1/8th Rate 25 nt	CDMA2000	12.49	±0.6
10297	AAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	±0.6
10298	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	±0.6
10299	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	±0.6
10300	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.80	±0.6
10301	AAA	IEEE 802.16e WIMAX (20:18, 5 ms, 10 MHz, QPSK, PUSC)	WIMAX	12.03	±0.6
10302	AAA	IEEE 802.16e WIMAX (20:18, 5 ms, 10 MHz, QPSK, PUSC, 3 CTRL symbols)	WIMAX	12.57	±0.6
10303	AAA	IEEE 802.16e WIMAX (21:15, 5 ms, 10 MHz, 64QAM, PUSC)	WIMAX	12.52	±0.6
10304	AAA	IEEE 802.16e WIMAX (20:18, 5 ms, 10 MHz, 64QAM, PUSC)	WIMAX	11.86	±0.6
10305	AAA	IEEE 802.16e WIMAX (31:15, 10 ms, 10 MHz, 64QAM, PUSC, 15 symbols)	WIMAX	15.24	±0.6
10306	AAA	IEEE 802.16e WIMAX (20:18, 10 ms, 10 MHz, 64QAM, PUSC, 18 symbols)	WIMAX	14.67	±0.6



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10307	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	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, 18 symbols)	WIMAX	14.58	±9.6
10310	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	WIMAX	14.57	±9.6
10311	AAE	LTE-FDD (SC-FDMA, 100% RB, 15MHz, QPSK)	LTE-FDD	8.06	±9.6
10313	AAA	IDEN 1.9	IDEN	10.51	±9.6
10314	AAA	IDEN 1.9	IDEN	13.48	±9.6
10315	AAB	IEEE 802.11b WiFi 2.4GHz (DSSS, 1Mbps, 86pc duty cycle)	WLAN	1.71	±9.6
10318	AAB	IEEE 802.11g WiFi 2.4GHz (ERP-OFDM, 6Mbps, 86pc duty cycle)	WLAN	8.36	±9.6
10317	AAD	IEEE 802.11a WiFi 5GHz (OFDM, 6Mbps, 96pc duty cycle)	WLAN	8.36	±9.6
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	±9.6
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	8.99	±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	0.87	±9.6
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	±9.6
10388	AAA	QPSK Waveform, 10MHz	Generic	5.22	±9.6
10390	AAA	64-QAM Waveform, 100 kHz	Generic	9.27	±9.6
10390	AAA	64-QAM Waveform, 40 MHz	Generic	8.27	±9.6
10400	AAE	IEEE 802.11ac WiFi (80MHz, 64-QAM, 96pc duty cycle)	WLAN	8.37	±9.6
10401	AAE	IEEE 802.11ac WiFi (40MHz, 64-QAM, 96pc duty cycle)	WLAN	5.60	±9.6
10402	AAE	IEEE 802.11ac WiFi (80MHz, 64-QAM, 96pc duty cycle)	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
10405	AAB	CDMA2000, RC3, SC32, SCH0, Full Rate	CDMA2000	5.22	±9.6
10410	AAH	LTE-TDD (SC-FDMA, 1 RB, 10MHz, QPSK, UL Subframe=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 2.4GHz (DSSS, 1 Mbps, 96pc duty cycle)	WLAN	1.54	±9.6
10416	AAA	IEEE 802.11g WiFi 2.4GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.23	±9.6
10417	AAD	IEEE 802.11a WiFi 5GHz (OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.23	±9.6
10418	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 6 Mbps, 96pc duty cycle, Long preamble)	WLAN	8.14	±9.6
10418	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 6 Mbps, 96pc duty cycle, Short preamble)	WLAN	8.19	±9.6
10422	AAC	IEEE 802.11n (HT Greenfield, 7.2Mbps, BPSK)	WLAN	8.32	±9.6
10423	AAC	IEEE 802.11n (HT Greenfield, 45.5Mbps, 16-QAM)	WLAN	8.47	±9.6
10424	AAC	IEEE 802.11n (HT Greenfield, 72.2Mbps, 64-QAM)	WLAN	8.40	±9.6
10425	AAC	IEEE 802.11n (HT Greenfield, 15Mbps, BPSK)	WLAN	8.41	±9.6
10426	AAC	IEEE 802.11n (HT Greenfield, 60Mbps, 16-QAM)	WLAN	8.45	±9.6
10427	AAC	IEEE 802.11n (HT Greenfield, 150Mbps, 64-QAM)	WLAN	8.41	±9.6
10480	AAE	LTE-FDD (OFDMA, 5MHz, E-TM 3.1)	LTE-FDD	8.28	±9.6
10481	AAE	LTE-FDD (OFDMA, 10MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6
10482	AAD	LTE-FDD (OFDMA, 15MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10433	AAJ	LTE-FDD (OFDMA, 20MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10434	AAZ	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	±9.6
10435	AAQ	LTE-TDD (SC-FDMA, 1 RB, 30MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10447	AAE	LTE-FDD (OFDMA, 6MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.86	±9.6
10448	AAE	LTE-FDD (OFDMA, 10MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.83	±9.6
10449	AAD	LTE-FDD (OFDMA, 15MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.81	±9.6
10450	AAD	LTE-FDD (OFDMA, 20MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.88	±9.6
10451	AAZ	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	±9.6
10453	AAE	Validation (Square, 10ms, 1ms)	Test	10.00	±9.6
10456	AAC	IEEE 802.11ac WiFi (160MHz, 64-QAM, 96pc duty cycle)	WLAN	8.63	±9.6
10457	AAB	UMTS-FDD (DC-HSDPA)	WCDMA	8.62	±9.6
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	8.55	±9.6
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	±9.6
10460	AAZ	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	±9.6
10481	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10482	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.30	±9.6
10483	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.58	±9.6
10484	AAD	LTE-TDD (SC-FDMA, 1 RB, 3MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10485	AAD	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6
10486	AAD	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±9.6
10487	AAQ	LTE-TDD (SC-FDMA, 1 RB, 5MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.81	±9.6
10488	AAQ	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6
10489	AAQ	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.58	±9.6
10470	AAQ	LTE-TDD (SC-FDMA, 1 RB, 10MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10471	AAQ	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6

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10472	AAG	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±9.6
10473	AAF	LTE-TDD (SC-FDMA, 1 RB, 15MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.02	±8.6
10474	AAF	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±8.6
10475	AAF	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±9.6
10477	AAG	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6
10478	AAG	LTE-TDD (SC-FDMA, 1 RB, 20MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±9.6
10479	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±9.6
10480	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.19	±9.6
10481	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	±9.6
10482	AAD	LTE-TDD (SC-FDMA, 50% RB, 3MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.71	±9.6
10483	AAD	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.39	±9.6
10484	AAD	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.47	±9.6
10485	AAG	LTE-TDD (SC-FDMA, 50% RB, 5MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.59	±9.6
10488	AAG	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.36	±9.6
10487	AAG	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.60	±9.6
10488	AAG	LTE-TDD (SC-FDMA, 50% RB, 10MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	±9.6
10489	AAG	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	±9.6
10490	AAG	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	±9.6
10491	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±9.6
10492	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.41	±9.6
10493	AAF	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	±9.6
10494	AAG	LTE-TDD (SC-FDMA, 50% RB, 20MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±9.6
10495	AAG	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.37	±9.6
10496	AAG	LTE-TDD (SC-FDMA, 50% RB, 20MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	±9.6
10497	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	±9.6
10498	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.40	±9.6
10499	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.66	±9.6
10500	AAO	LTE-TDD (SC-FDMA, 100% RB, 3MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	±9.6
10501	AAO	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.44	±9.6
10502	AAO	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.52	±9.6
10503	AAG	LTE-TDD (SC-FDMA, 100% RB, 5MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.72	±9.6
10504	AAG	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	±9.6
10505	AAG	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	±9.6
10506	AAG	LTE-TDD (SC-FDMA, 100% RB, 10MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±9.6
10507	AAG	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.36	±9.6
10508	AAG	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	±9.6
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.89	±9.6
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.49	±9.6
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.51	±9.6
10512	AAG	LTE-TDD (SC-FDMA, 100% RB, 20MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±9.6
10513	AAG	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.42	±9.6
10514	AAO	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	±9.6
10515	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 2Mbps, 99pc duty cycle)	WLAN	1.58	±9.6
10516	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 5.5Mbps, 99pc duty cycle)	WLAN	1.57	±9.6
10517	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 11Mbps, 99pc duty cycle)	WLAN	1.58	±9.6
10518	AAC	IEEE 802.11a/n WiFi 5GHz (OFDM, 9Mbps, 99pc duty cycle)	WLAN	8.23	±9.6
10519	AAC	IEEE 802.11a/n WiFi 5GHz (OFDM, 12Mbps, 99pc duty cycle)	WLAN	8.38	±9.6
10520	AAC	IEEE 802.11a/n WiFi 5GHz (OFDM, 18Mbps, 99pc duty cycle)	WLAN	8.12	±9.6
10521	AAG	IEEE 802.11a/n WiFi 5GHz (OFDM, 24Mbps, 99pc duty cycle)	WLAN	7.97	±9.6
10522	AAG	IEEE 802.11a/n WiFi 5GHz (OFDM, 36Mbps, 99pc duty cycle)	WLAN	8.40	±9.6
10523	AAC	IEEE 802.11a/n WiFi 5GHz (OFDM, 48Mbps, 99pc duty cycle)	WLAN	8.08	±9.6
10524	AAC	IEEE 802.11a/n WiFi 5GHz (OFDM, 54Mbps, 99pc duty cycle)	WLAN	8.37	±9.6
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	WLAN	8.38	±9.6
10526	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	WLAN	8.42	±9.6
10527	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	WLAN	8.21	±9.6
10528	AAC	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	WLAN	8.38	±9.6
10529	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	WLAN	8.38	±9.6
10531	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	WLAN	8.43	±9.6
10532	AAO	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±9.6
10533	AAO	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	WLAN	8.38	±9.6
10534	AAC	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	WLAN	8.45	±9.6
10535	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	WLAN	8.45	±9.6
10536	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	WLAN	8.32	±9.6
10537	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±9.6
10538	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	WLAN	8.54	±9.6
10540	AAC	IEEE 802.11ac WiFi (40MHz, MCS5, 99pc duty cycle)	WLAN	8.39	±9.6



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10541	AAC	IEEE 802.11ac WiFi (40 MHz, MCS7, 99pc duty cycle)	WLAN	8.48	±0.6
10542	AAC	IEEE 802.11ac WiFi (40 MHz, MCS8, 99pc duty cycle)	WLAN	8.65	±0.6
10543	AAC	IEEE 802.11ac WiFi (40 MHz, MCS9, 99pc duty cycle)	WLAN	8.85	±0.6
10544	AAC	IEEE 802.11ac WiFi (80 MHz, MCS0, 99pc duty cycle)	WLAN	8.47	±0.6
10545	AAC	IEEE 802.11ac WiFi (80 MHz, MCS1, 99pc duty cycle)	WLAN	8.56	±0.6
10546	AAC	IEEE 802.11ac WiFi (80 MHz, MCS2, 99pc duty cycle)	WLAN	8.35	±0.6
10547	AAC	IEEE 802.11ac WiFi (80 MHz, MCS3, 99pc duty cycle)	WLAN	8.49	±0.6
10548	AAC	IEEE 802.11ac WiFi (80 MHz, MCS4, 99pc duty cycle)	WLAN	8.37	±0.6
10550	AAC	IEEE 802.11ac WiFi (80 MHz, MCS6, 99pc duty cycle)	WLAN	8.38	±0.6
10551	AAC	IEEE 802.11ac WiFi (80 MHz, MCS7, 99pc duty cycle)	WLAN	8.50	±0.6
10552	AAC	IEEE 802.11ac WiFi (80 MHz, MCS8, 99pc duty cycle)	WLAN	8.42	±0.6
10553	AAC	IEEE 802.11ac WiFi (80 MHz, MCS9, 99pc duty cycle)	WLAN	8.45	±0.6
10554	AAD	IEEE 802.11ac WiFi (160 MHz, MCS0, 99pc duty cycle)	WLAN	8.48	±0.6
10555	AAD	IEEE 802.11ac WiFi (160 MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±0.6
10556	AAD	IEEE 802.11ac WiFi (160 MHz, MCS2, 99pc duty cycle)	WLAN	8.50	±0.6
10557	AAD	IEEE 802.11ac WiFi (160 MHz, MCS3, 99pc duty cycle)	WLAN	8.52	±0.6
10558	AAD	IEEE 802.11ac WiFi (160 MHz, MCS4, 99pc duty cycle)	WLAN	8.61	±0.6
10560	AAD	IEEE 802.11ac WiFi (160 MHz, MCS6, 99pc duty cycle)	WLAN	8.73	±0.6
10561	AAD	IEEE 802.11ac WiFi (160 MHz, MCS7, 99pc duty cycle)	WLAN	8.56	±0.6
10562	AAD	IEEE 802.11ac WiFi (160 MHz, MCS8, 99pc duty cycle)	WLAN	8.69	±0.6
10563	AAD	IEEE 802.11ac WiFi (160 MHz, MCS9, 99pc duty cycle)	WLAN	8.77	±0.6
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.25	±0.6
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.45	±0.6
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.13	±0.6
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	WLAN	8.00	±0.6
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.37	±0.6
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.10	±0.6
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.30	±0.6
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	WLAN	1.09	±0.6
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	WLAN	1.09	±0.6
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	WLAN	1.08	±0.6
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	WLAN	1.08	±0.6
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	±0.6
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.90	±0.6
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	±0.6
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	±0.6
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	±0.6
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.78	±0.6
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	±0.6
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	±0.6
10583	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.58	±0.6
10584	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	±0.6
10585	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	±0.6
10586	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	±0.6
10587	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.38	±0.6
10588	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.78	±0.6
10589	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	±0.6
10590	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	±0.6
10591	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS0, 90pc duty cycle)	WLAN	8.63	±0.6
10592	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS1, 90pc duty cycle)	WLAN	8.79	±0.6
10593	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS2, 90pc duty cycle)	WLAN	8.64	±0.6
10594	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS3, 90pc duty cycle)	WLAN	8.74	±0.6
10595	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS4, 90pc duty cycle)	WLAN	8.74	±0.6
10596	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS5, 90pc duty cycle)	WLAN	8.71	±0.6
10597	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS6, 90pc duty cycle)	WLAN	8.72	±0.6
10598	AAC	IEEE 802.11n (HT Mixed, 20 MHz, MCS7, 90pc duty cycle)	WLAN	8.50	±0.6
10599	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS0, 90pc duty cycle)	WLAN	8.79	±0.6
10600	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS1, 90pc duty cycle)	WLAN	8.88	±0.6
10601	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS2, 90pc duty cycle)	WLAN	8.92	±0.6
10602	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS3, 90pc duty cycle)	WLAN	8.94	±0.6
10603	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS4, 90pc duty cycle)	WLAN	9.03	±0.6
10604	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS5, 90pc duty cycle)	WLAN	8.78	±0.6
10605	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS6, 90pc duty cycle)	WLAN	8.97	±0.6
10606	AAC	IEEE 802.11n (HT Mixed, 40 MHz, MCS7, 90pc duty cycle)	WLAN	8.82	±0.6
10607	AAC	IEEE 802.11ac WiFi (20 MHz, MCS0, 90pc duty cycle)	WLAN	8.84	±0.6
10608	AAC	IEEE 802.11ac WiFi (20 MHz, MCS1, 90pc duty cycle)	WLAN	8.77	±0.6



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10808	AAC	IEEE 802.11ac WiFi (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.57	±9.6
10810	AAC	IEEE 802.11ac WiFi (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.78	±9.6
10811	AAC	IEEE 802.11ac WiFi (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6
10812	AAC	IEEE 802.11ac WiFi (20 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
10813	AAC	IEEE 802.11ac WiFi (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.94	±9.6
10814	AAC	IEEE 802.11ac WiFi (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.58	±9.6
10815	AAC	IEEE 802.11ac WiFi (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6
10816	AAC	IEEE 802.11ac WiFi (40 MHz, MCS9, 90pc duty cycle)	WLAN	8.82	±9.6
10817	AAC	IEEE 802.11ac WiFi (40 MHz, MCS10, 90pc duty cycle)	WLAN	8.81	±9.6
10818	AAC	IEEE 802.11ac WiFi (40 MHz, MCS11, 90pc duty cycle)	WLAN	8.58	±9.6
10819	AAC	IEEE 802.11ac WiFi (40 MHz, MCS12, 90pc duty cycle)	WLAN	8.98	±9.6
10820	AAC	IEEE 802.11ac WiFi (40 MHz, MCS13, 90pc duty cycle)	WLAN	8.07	±9.6
10821	AAC	IEEE 802.11ac WiFi (40 MHz, MCS14, 90pc duty cycle)	WLAN	8.77	±9.6
10822	AAC	IEEE 802.11ac WiFi (40 MHz, MCS15, 90pc duty cycle)	WLAN	8.68	±9.6
10823	AAC	IEEE 802.11ac WiFi (40 MHz, MCS16, 90pc duty cycle)	WLAN	8.82	±9.6
10824	AAC	IEEE 802.11ac WiFi (40 MHz, MCS17, 90pc duty cycle)	WLAN	8.95	±9.6
10825	AAC	IEEE 802.11ac WiFi (40 MHz, MCS18, 90pc duty cycle)	WLAN	8.98	±9.6
10826	AAC	IEEE 802.11ac WiFi (80 MHz, MCS9, 90pc duty cycle)	WLAN	8.83	±9.6
10827	AAC	IEEE 802.11ac WiFi (80 MHz, MCS10, 90pc duty cycle)	WLAN	8.88	±9.6
10828	AAC	IEEE 802.11ac WiFi (80 MHz, MCS11, 90pc duty cycle)	WLAN	8.71	±9.6
10829	AAC	IEEE 802.11ac WiFi (80 MHz, MCS12, 90pc duty cycle)	WLAN	8.85	±9.6
10830	AAC	IEEE 802.11ac WiFi (80 MHz, MCS13, 90pc duty cycle)	WLAN	8.72	±9.6
10831	AAC	IEEE 802.11ac WiFi (80 MHz, MCS14, 90pc duty cycle)	WLAN	8.81	±9.6
10832	AAC	IEEE 802.11ac WiFi (80 MHz, MCS15, 90pc duty cycle)	WLAN	8.74	±9.6
10833	AAC	IEEE 802.11ac WiFi (80 MHz, MCS16, 90pc duty cycle)	WLAN	8.82	±9.6
10834	AAC	IEEE 802.11ac WiFi (80 MHz, MCS17, 90pc duty cycle)	WLAN	8.90	±9.6
10835	AAC	IEEE 802.11ac WiFi (80 MHz, MCS18, 90pc duty cycle)	WLAN	8.81	±9.6
10836	AAD	IEEE 802.11ac WiFi (160 MHz, MCS9, 90pc duty cycle)	WLAN	8.83	±9.6
10837	AAD	IEEE 802.11ac WiFi (160 MHz, MCS10, 90pc duty cycle)	WLAN	8.75	±9.6
10838	AAD	IEEE 802.11ac WiFi (160 MHz, MCS11, 90pc duty cycle)	WLAN	8.86	±9.6
10839	AAD	IEEE 802.11ac WiFi (160 MHz, MCS12, 90pc duty cycle)	WLAN	8.05	±9.6
10840	AAD	IEEE 802.11ac WiFi (160 MHz, MCS13, 90pc duty cycle)	WLAN	8.98	±9.6
10841	AAD	IEEE 802.11ac WiFi (160 MHz, MCS14, 90pc duty cycle)	WLAN	8.06	±9.6
10842	AAD	IEEE 802.11ac WiFi (160 MHz, MCS15, 90pc duty cycle)	WLAN	8.06	±9.6
10843	AAD	IEEE 802.11ac WiFi (160 MHz, MCS16, 90pc duty cycle)	WLAN	8.89	±9.6
10844	AAD	IEEE 802.11ac WiFi (160 MHz, MCS17, 90pc duty cycle)	WLAN	8.05	±9.6
10845	AAD	IEEE 802.11ac WiFi (160 MHz, MCS18, 90pc duty cycle)	WLAN	8.11	±9.6
10846	AAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.98	±9.6
10847	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.88	±9.6
10848	AAA	CDMA2000 (1x Advanced)	CDMA2000	3.45	±9.6
10852	AAF	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	8.81	±9.6
10853	AAF	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	±9.6
10854	AAE	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	±9.6
10855	AAF	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	±9.6
10858	AAB	Pulse Waveform (200Hz, 10%)	Test	10.00	±9.6
10859	AAB	Pulse Waveform (200Hz, 20%)	Test	8.09	±9.6
10860	AAB	Pulse Waveform (200Hz, 40%)	Test	3.88	±9.6
10861	AAB	Pulse Waveform (200Hz, 60%)	Test	2.22	±9.6
10862	AAB	Pulse Waveform (200Hz, 80%)	Test	0.97	±9.6
10870	AAA	Bluetooth Low Energy	Bluetooth	2.19	±9.6
10871	AAC	IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle)	WLAN	8.08	±9.6
10872	AAC	IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle)	WLAN	8.57	±9.6
10873	AAC	IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle)	WLAN	8.78	±9.6
10874	AAC	IEEE 802.11ax (20 MHz, MCS12, 90pc duty cycle)	WLAN	8.74	±9.6
10875	AAC	IEEE 802.11ax (20 MHz, MCS13, 90pc duty cycle)	WLAN	8.90	±9.6
10876	AAC	IEEE 802.11ax (20 MHz, MCS14, 90pc duty cycle)	WLAN	8.77	±9.6
10877	AAC	IEEE 802.11ax (20 MHz, MCS15, 90pc duty cycle)	WLAN	8.73	±9.6
10878	AAC	IEEE 802.11ax (20 MHz, MCS16, 90pc duty cycle)	WLAN	8.78	±9.6
10879	AAC	IEEE 802.11ax (20 MHz, MCS17, 90pc duty cycle)	WLAN	8.89	±9.6
10880	AAC	IEEE 802.11ax (20 MHz, MCS18, 90pc duty cycle)	WLAN	8.80	±9.6
10881	AAC	IEEE 802.11ax (20 MHz, MCS19, 90pc duty cycle)	WLAN	8.62	±9.6
10882	AAC	IEEE 802.11ax (20 MHz, MCS20, 90pc duty cycle)	WLAN	8.83	±9.6
10883	AAC	IEEE 802.11ax (20 MHz, MCS21, 90pc duty cycle)	WLAN	8.47	±9.6
10884	AAC	IEEE 802.11ax (20 MHz, MCS22, 90pc duty cycle)	WLAN	8.25	±9.6
10885	AAC	IEEE 802.11ax (20 MHz, MCS23, 90pc duty cycle)	WLAN	8.33	±9.6
10886	AAC	IEEE 802.11ax (20 MHz, MCS24, 90pc duty cycle)	WLAN	8.28	±9.6

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10687	AAC	IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)	WLAN	8.45	+9.6
10688	AAC	IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)	WLAN	8.29	+9.6
10689	AAC	IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)	WLAN	8.55	+9.6
10690	AAC	IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle)	WLAN	8.29	+9.6
10691	AAC	IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)	WLAN	8.25	+9.6
10692	AAC	IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)	WLAN	8.29	+9.6
10693	AAC	IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)	WLAN	8.25	+9.6
10694	AAC	IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)	WLAN	8.57	+9.6
10695	AAC	IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)	WLAN	8.78	+9.6
10696	AAC	IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)	WLAN	8.81	+9.6
10697	AAC	IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)	WLAN	8.61	+9.6
10698	AAC	IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)	WLAN	8.89	+9.6
10699	AAC	IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)	WLAN	8.62	+9.6
10700	AAC	IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)	WLAN	8.75	+9.6
10701	AAC	IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)	WLAN	8.86	+9.6
10702	AAC	IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)	WLAN	8.70	+9.6
10703	AAC	IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)	WLAN	8.82	+9.6
10704	AAC	IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)	WLAN	8.56	+9.6
10705	AAC	IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)	WLAN	8.69	+9.6
10706	AAC	IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)	WLAN	8.65	+9.6
10707	AAC	IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)	WLAN	8.32	+9.6
10708	AAC	IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)	WLAN	8.55	+9.6
10709	AAC	IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)	WLAN	8.33	+9.6
10710	AAC	IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)	WLAN	8.25	+9.6
10711	AAC	IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)	WLAN	8.39	+9.6
10712	AAC	IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)	WLAN	8.67	+9.6
10713	AAC	IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)	WLAN	8.33	+9.6
10714	AAC	IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)	WLAN	8.28	+9.6
10715	AAC	IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)	WLAN	8.45	+9.6
10716	AAC	IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)	WLAN	8.30	+9.6
10717	AAC	IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)	WLAN	8.48	+9.6
10718	AAC	IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)	WLAN	8.24	+9.6
10719	AAC	IEEE 802.11ax (80MHz, MCS0, 90pc duty cycle)	WLAN	8.81	+9.6
10720	AAC	IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)	WLAN	8.87	+9.6
10721	AAC	IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)	WLAN	8.78	+9.6
10722	AAC	IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)	WLAN	8.55	+9.6
10723	AAC	IEEE 802.11ax (80MHz, MCS4, 90pc duty cycle)	WLAN	8.70	+9.6
10724	AAC	IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)	WLAN	8.90	+9.6
10725	AAC	IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	+9.6
10726	AAC	IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)	WLAN	8.72	+9.6
10727	AAC	IEEE 802.11ax (80MHz, MCS8, 90pc duty cycle)	WLAN	8.66	+9.6
10728	AAC	IEEE 802.11ax (80MHz, MCS9, 90pc duty cycle)	WLAN	8.65	+9.6
10729	AAC	IEEE 802.11ax (80MHz, MCS10, 90pc duty cycle)	WLAN	8.54	+9.6
10730	AAC	IEEE 802.11ax (80MHz, MCS11, 90pc duty cycle)	WLAN	8.67	+9.6
10731	AAC	IEEE 802.11ax (80MHz, MCS0, 90pc duty cycle)	WLAN	8.42	+9.6
10732	AAC	IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)	WLAN	8.42	+9.6
10733	AAC	IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)	WLAN	8.40	+9.6
10734	AAC	IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)	WLAN	8.25	+9.6
10735	AAC	IEEE 802.11ax (80MHz, MCS4, 90pc duty cycle)	WLAN	8.33	+9.6
10736	AAC	IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)	WLAN	8.27	+9.6
10737	AAC	IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)	WLAN	8.38	+9.6
10738	AAC	IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)	WLAN	8.42	+9.6
10739	AAC	IEEE 802.11ax (80MHz, MCS8, 90pc duty cycle)	WLAN	8.29	+9.6
10740	AAC	IEEE 802.11ax (80MHz, MCS9, 90pc duty cycle)	WLAN	8.48	+9.6
10741	AAC	IEEE 802.11ax (80MHz, MCS10, 90pc duty cycle)	WLAN	8.40	+9.6
10742	AAC	IEEE 802.11ax (80MHz, MCS11, 90pc duty cycle)	WLAN	8.43	+9.6
10743	AAC	IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)	WLAN	8.94	+9.6
10744	AAC	IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)	WLAN	9.18	+9.6
10745	AAC	IEEE 802.11ax (160MHz, MCS2, 90pc duty cycle)	WLAN	8.83	+9.6
10746	AAC	IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)	WLAN	8.11	+9.6
10747	AAC	IEEE 802.11ax (160MHz, MCS4, 90pc duty cycle)	WLAN	8.04	+9.6
10748	AAC	IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)	WLAN	8.93	+9.6
10749	AAC	IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)	WLAN	8.50	+9.6
10750	AAC	IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)	WLAN	8.79	+9.6
10751	AAC	IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)	WLAN	8.62	+9.6
10752	AAC	IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)	WLAN	8.81	+9.6



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10753	AAC	IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)	WLAN	8.00	±0.8
10754	AAC	IEEE 802.11ax (160MHz, MCS11, 99pc duty cycle)	WLAN	8.04	±0.8
10755	AAC	IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)	WLAN	8.54	±0.8
10756	AAC	IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)	WLAN	8.77	±0.8
10757	AAC	IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)	WLAN	8.77	±0.8
10758	AAC	IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)	WLAN	8.89	±0.8
10759	AAC	IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)	WLAN	8.58	±0.8
10760	AAC	IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)	WLAN	8.49	±0.8
10761	AAC	IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)	WLAN	8.55	±0.8
10762	AAC	IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)	WLAN	8.40	±0.8
10763	AAC	IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)	WLAN	8.53	±0.8
10764	AAC	IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)	WLAN	8.54	±0.8
10765	AAC	IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)	WLAN	8.54	±0.8
10766	AAC	IEEE 802.11ax (160MHz, MCS11, 99pc duty cycle)	WLAN	8.51	±0.8
10767	AAE	5G NR (CP-OFDM, 1 RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.88	±0.8
10768	AAE	5G NR (CP-OFDM, 1 RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±0.8
10769	AAE	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±0.8
10770	AAE	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±0.8
10771	AAE	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±0.8
10772	AAE	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	±0.8
10773	AAE	5G NR (CP-OFDM, 1 RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	±0.8
10774	AAE	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±0.8
10775	AAE	5G NR (CP-OFDM, 50% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±0.8
10776	AAE	5G NR (CP-OFDM, 50% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±0.8
10777	AAE	5G NR (CP-OFDM, 50% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±0.8
10778	AAE	5G NR (CP-OFDM, 50% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	±0.8
10779	AAE	5G NR (CP-OFDM, 50% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	±0.8
10780	AAE	5G NR (CP-OFDM, 50% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.36	±0.8
10781	AAE	5G NR (CP-OFDM, 50% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±0.8
10782	AAE	5G NR (CP-OFDM, 50% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±0.8
10783	AAE	5G NR (CP-OFDM, 100% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±0.8
10784	AAE	5G NR (CP-OFDM, 100% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.26	±0.8
10785	AAE	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	±0.8
10786	AAE	5G NR (CP-OFDM, 100% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	±0.8
10787	AAE	5G NR (CP-OFDM, 100% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	±0.8
10788	AAE	5G NR (CP-OFDM, 100% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±0.8
10789	AAE	5G NR (CP-OFDM, 100% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	±0.8
10790	AAE	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±0.8
10791	AAE	5G NR (CP-OFDM, 1 RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	±0.8
10792	AAE	5G NR (CP-OFDM, 1 RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±0.8
10793	AAE	5G NR (CP-OFDM, 1 RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	±0.8
10794	AAE	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±0.8
10795	AAE	5G NR (CP-OFDM, 1 RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.94	±0.8
10796	AAE	5G NR (CP-OFDM, 1 RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±0.8
10797	AAE	5G NR (CP-OFDM, 1 RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	±0.8
10798	AAE	5G NR (CP-OFDM, 1 RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±0.8
10799	AAE	5G NR (CP-OFDM, 1 RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±0.8
10801	AAE	5G NR (CP-OFDM, 1 RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±0.8
10802	AAE	5G NR (CP-OFDM, 1 RB, 90MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	±0.8
10803	AAE	5G NR (CP-OFDM, 1 RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±0.8
10805	AAE	5G NR (CP-OFDM, 50% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±0.8
10806	AAE	5G NR (CP-OFDM, 50% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.27	±0.8
10809	AAE	5G NR (CP-OFDM, 50% RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±0.8
10810	AAE	5G NR (CP-OFDM, 50% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±0.8
10812	AAE	5G NR (CP-OFDM, 50% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±0.8
10817	AAE	5G NR (CP-OFDM, 100% RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±0.8
10818	AAE	5G NR (CP-OFDM, 100% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±0.8
10819	AAE	5G NR (CP-OFDM, 100% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	±0.8
10820	AAE	5G NR (CP-OFDM, 100% RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	±0.8
10821	AAE	5G NR (CP-OFDM, 100% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±0.8
10822	AAE	5G NR (CP-OFDM, 100% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±0.8
10823	AAE	5G NR (CP-OFDM, 100% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±0.8
10824	AAE	5G NR (CP-OFDM, 100% RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	±0.8
10825	AAE	5G NR (CP-OFDM, 100% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±0.8
10827	AAE	5G NR (CP-OFDM, 100% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	±0.8
10828	AAE	5G NR (CP-OFDM, 100% RB, 90MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	±0.8



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ID	Rev	Communication System Name	Group	PAR (dB)	Minc <sup>2</sup> A = 2
10829	AAD	5G NR (CP-OFDM, 100% RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	±9.8
10830	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.83	±9.8
10831	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.73	±9.8
10832	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.74	±9.8
10833	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.70	±9.8
10834	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.75	±9.8
10835	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.70	±9.8
10836	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.68	±9.8
10837	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.60	±9.8
10838	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.70	±9.8
10840	AAD	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.87	±9.8
10841	AAD	5G NR (CP-OFDM, 1 RB, 100MHz, QPSK, 80 kHz)	5G NR FR1 TDD	7.71	±9.8
10843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.49	±9.8
10844	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.34	±9.8
10846	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.41	±9.8
10854	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.34	±9.8
10855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.36	±9.8
10856	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.57	±9.8
10857	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.35	±9.8
10858	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.36	±9.8
10859	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.34	±9.8
10860	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.41	±9.8
10861	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.40	±9.8
10863	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.41	±9.8
10884	AAD	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.37	±9.8
10885	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 80 kHz)	5G NR FR1 TDD	8.41	±9.8
10886	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.8
10888	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10889	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.8
10870	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	±9.8
10871	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	±9.8
10872	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.52	±9.8
10873	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	±9.8
10874	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.8
10875	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.70	±9.8
10876	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	±9.8
10877	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	±9.8
10878	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.8
10879	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	±9.8
10880	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	±9.8
10881	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.8
10882	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	±9.8
10883	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	±9.8
10884	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	±9.8
10885	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.67	±9.8
10886	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.8
10887	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.8
10888	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	±9.8
10889	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.32	±9.8
10890	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	±9.8
10891	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	±9.8
10892	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.8
10897	AAC	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10898	AAB	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.8
10899	AAB	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.8
10900	AAB	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10901	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10902	AAB	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10903	AAB	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10904	AAB	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10905	AAB	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10906	AAB	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10907	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	±9.8
10908	AAB	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.8
10909	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10910	AAB	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	±9.8

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UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>1</sup> k = 2
10911	AAB	5G NR (DFT-s-OFDM, 50% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.8
10912	AAB	5G NR (DFT-s-OFDM, 50% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10913	AAB	5G NR (DFT-s-OFDM, 50% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.8
10914	AAB	5G NR (DFT-s-OFDM, 50% RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±9.8
10915	AAB	5G NR (DFT-s-OFDM, 50% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.8
10916	AAB	5G NR (DFT-s-OFDM, 50% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.8
10917	AAB	5G NR (DFT-s-OFDM, 50% RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.8
10918	AAC	5G NR (DFT-s-OFDM, 100% RB, 5MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10919	AAB	5G NR (DFT-s-OFDM, 100% RB, 10MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.8
10920	AAB	5G NR (DFT-s-OFDM, 100% RB, 15MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.8
10921	AAB	5G NR (DFT-s-OFDM, 100% RB, 20MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10922	AAB	5G NR (DFT-s-OFDM, 100% RB, 25MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	±9.8
10923	AAB	5G NR (DFT-s-OFDM, 100% RB, 30MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10924	AAB	5G NR (DFT-s-OFDM, 100% RB, 40MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10925	AAB	5G NR (DFT-s-OFDM, 100% RB, 50MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±9.8
10926	AAB	5G NR (DFT-s-OFDM, 100% RB, 60MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.8
10927	AAB	5G NR (DFT-s-OFDM, 100% RB, 80MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	±9.8
10928	AAC	5G NR (DFT-s-OFDM, 1 RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.8
10929	AAC	5G NR (DFT-s-OFDM, 1 RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.8
10930	AAC	5G NR (DFT-s-OFDM, 1 RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.8
10931	AAC	5G NR (DFT-s-OFDM, 1 RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.8
10932	AAC	5G NR (DFT-s-OFDM, 1 RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.8
10933	AAC	5G NR (DFT-s-OFDM, 1 RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.8
10934	AAC	5G NR (DFT-s-OFDM, 1 RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.8
10935	AAD	5G NR (DFT-s-OFDM, 1 RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.8
10936	AAC	5G NR (DFT-s-OFDM, 50% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.80	±9.8
10937	AAC	5G NR (DFT-s-OFDM, 50% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	±9.8
10938	AAC	5G NR (DFT-s-OFDM, 50% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.80	±9.8
10939	AAC	5G NR (DFT-s-OFDM, 50% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.8
10940	AAC	5G NR (DFT-s-OFDM, 50% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.88	±9.8
10941	AAC	5G NR (DFT-s-OFDM, 50% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.8
10942	AAC	5G NR (DFT-s-OFDM, 50% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.8
10943	AAD	5G NR (DFT-s-OFDM, 50% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.8
10944	AAC	5G NR (DFT-s-OFDM, 100% RB, 5MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.8
10945	AAC	5G NR (DFT-s-OFDM, 100% RB, 10MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.8
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.8
10947	AAC	5G NR (DFT-s-OFDM, 100% RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.8
10948	AAC	5G NR (DFT-s-OFDM, 100% RB, 25MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.8
10949	AAC	5G NR (DFT-s-OFDM, 100% RB, 30MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.8
10950	AAC	5G NR (DFT-s-OFDM, 100% RB, 40MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.84	±9.8
10951	AAC	5G NR (DFT-s-OFDM, 100% RB, 50MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.8
10952	AAA	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	±9.8
10953	AAA	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	±9.8
10954	AAA	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	±9.8
10955	AAA	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	±9.8
10956	AAA	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	±9.8
10957	AAA	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	±9.8
10958	AAA	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	±9.8
10959	AAA	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.83	±9.8
10960	AAC	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.32	±9.8
10961	AAR	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.38	±9.8
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.40	±9.8
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	8.55	±9.8
10964	AAC	5G NR DL (CP-OFDM, TM 3.1, 5MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.29	±9.8
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.37	±9.8
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.55	±9.8
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.42	±9.8
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	8.48	±9.8
10972	AAB	5G NR (CP-OFDM, 1 RB, 20MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	±9.8
10973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.86	±9.8
10974	AAB	5G NR (CP-OFDM, 100% RB, 100MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	±9.8
10978	AAA	ULLA BDR	ULLA	1.19	±9.8
10979	AAA	ULLA HDR4	ULLA	8.58	±9.8
10980	AAA	ULLA HDR8	ULLA	10.32	±9.8
10981	AAA	ULLA HDR16	ULLA	3.19	±9.8
10982	AAA	ULLA HDR32	ULLA	3.45	±9.8



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DID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>E</sup> $k = 2$
10983	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.31	±0.6
10984	AAA	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	±0.6
10985	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.54	±0.6
10986	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	±0.6
10987	AAA	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.63	±0.6
10988	AAA	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.36	±0.6
10989	AAA	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	±0.6
10990	AAA	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.62	±0.6

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



## Appendix G. – Dipole Calibration Data

**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 **HCT (Dymstec)**

Certificate No: **D750V3-1014\_May22**

**CALIBRATION CERTIFICATE**

Object: **D750V3 - SN:1014**

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

Calibration date: **May 25, 2022**

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: 10477B	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB36512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100872	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: **Aldoria Georgiadou** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Sven Köhn** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: May 30, 2022

Certificate No: D750V3-1014\_May22

Page 1 of 6

발 행 자	검 査 자
<i>[Signature]</i>	<i>[Signature]</i>
01/14/2022 2022.06.16	01/14/2022 2022.06.16

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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	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	40.9 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.71 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.70 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	$54.5 \Omega + 2.9 j\Omega$
Return Loss	- 25.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.040 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: 25.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1014**

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

Medium parameters used:  $f = 750$  MHz;  $\sigma = 0.89$  S/m;  $\epsilon_r = 40.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.11, 10.11, 10.11) @ 750 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 60.50 V/m; Power Drift = -0.01 dB

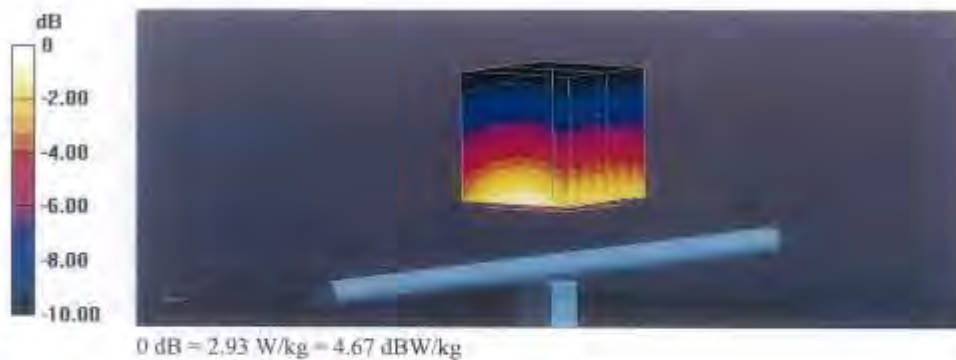
Peak SAR (extrapolated) = 3.36 W/kg

**SAR(1 g) = 2.19 W/kg; SAR(10 g) = 1.43 W/kg**

Smallest distance from peaks to all points 3 dB below = 17 mm

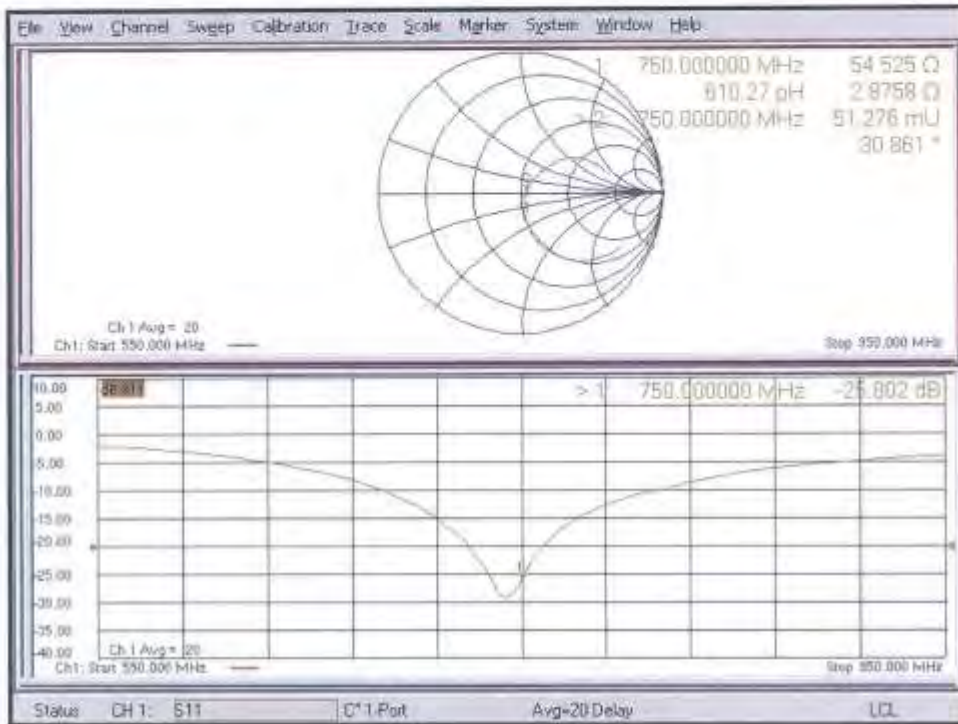
Ratio of SAR at M2 to SAR at M1 = 65.3%

Maximum value of SAR (measured) = 2.93 W/kg





**Impedance Measurement Plot for Head TSL**



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Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)**

Certificate No: **D835V2-441\_Jul22**

**CALIBRATION CERTIFICATE**

Object: **D835V2 - SN:441**

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

Calibration date: **July 15, 2022**

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&PE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03625/03624)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03624)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03625)	Apr-23
Reference 20 dB Attenuator	SN: BHR394 (20k)	04-Apr-22 (No. 217-03627)	Apr-23
Type-N mismatch combinator	SN: 310982 / 06327	04-Apr-22 (No. 217-03628)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-08	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8356A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: **Aldona Georgiadou** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Eysel Kühn** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: July 25, 2022

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결	담당자	확인자
재	<i>[Signature]</i> DL / 박재현 2022.08.10	<i>[Signature]</i> KS / 최희성 2022.08.10

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Accreditation No.: **SCS 0108**

**Glossary:**

TSL tissue simulating liquid  
ConyF sensitivity in TSL / NORM x,y,z  
N/A not applicable or not measured

**Calibration is Performed According to the Following Standards:**

- a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 885664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	835 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	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 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 <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>9.73 W/kg ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>6.33 W/kg ± 16.5 % (k=2)</b>

**Appendix (Additional assessments outside the scope of SCS 0108)****Antenna Parameters with Head TSL**

Impedance, transformed to feed point	52.4 $\Omega$ + 5.5 j $\Omega$
Return Loss	-24.7 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.372 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
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**DASY5 Validation Report for Head TSL**

Date: 15.07.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441**

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.93$  S/m;  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.69, 9.69, 9.69) @ 835 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 64.34 V/m; Power Drift = -0.01 dB

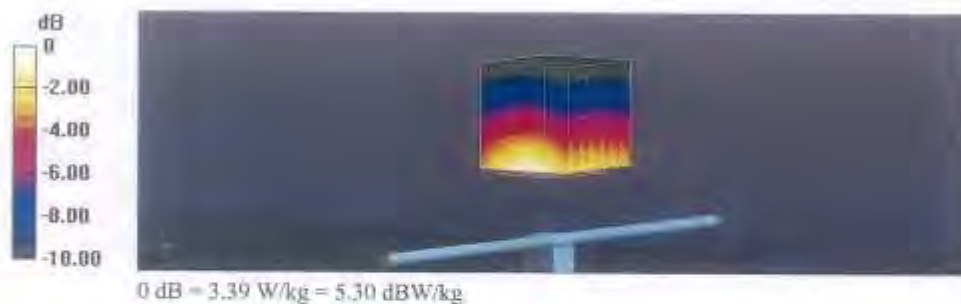
Peak SAR (extrapolated) = 3.83 W/kg

**SAR(1 g) = 2.51 W/kg; SAR(10 g) = 1.62 W/kg**

Smallest distance from peaks to all points 3 dB below = 16 mm

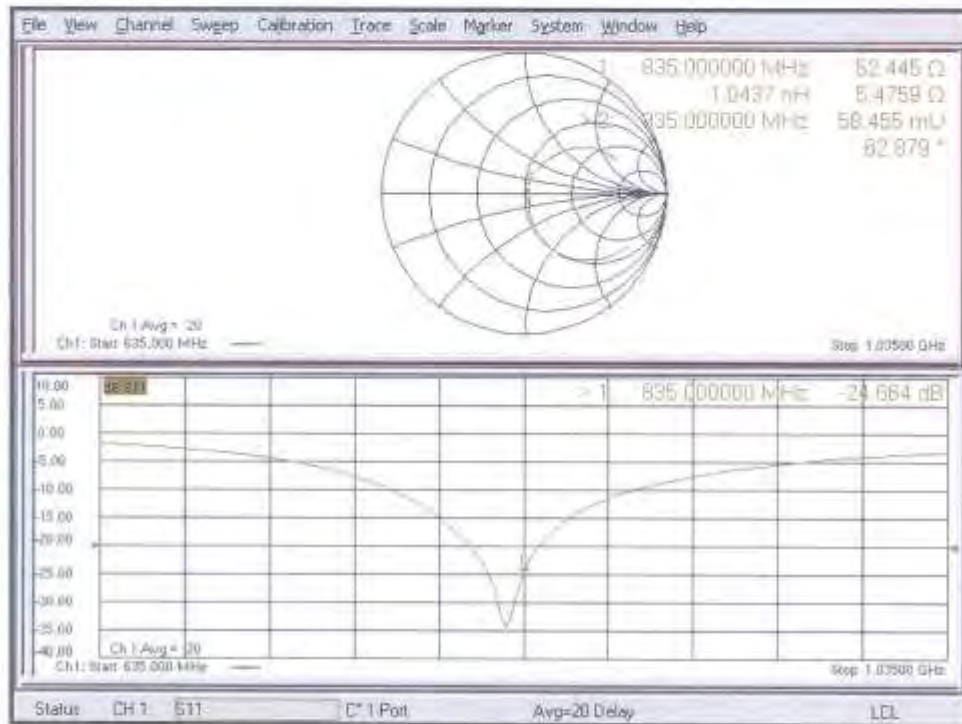
Ratio of SAR at M2 to SAR at MI = 65.4%

Maximum value of SAR (measured) = 3.39 W/kg





Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)**

Certificate No: **D1800V2-2d007\_Jul22**

**CALIBRATION CERTIFICATE**

Object: **D1800V2 - SN:2d007**

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

Calibration date: **July 18, 2022**

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	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH6394 (ZPK)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 08327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB30512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
RF generator R&S SMT-06	SN: 100972	18-Jun-15 (in house check Oct-20)	in house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41090477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22

Calibrated by: **Ugenna Lüssing** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Sven Kölln** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: July 25, 2022

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결재	담당자	확인자
	<i>[Signature]</i>	<i>[Signature]</i>
	DL 박지현 2022.08.10	CS 최윤성 2022.08.10

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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	1800 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	38.4 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>38.2 W/kg ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>19.8 W/kg ± 16.5 % (k=2)</b>

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

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	46.5 $\Omega$ - 8.1 j $\Omega$
Return Loss	- 20.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.204 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: 18.07.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d007**

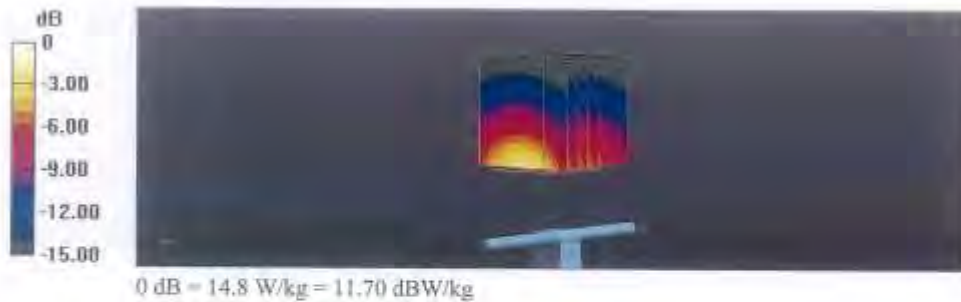
Communication System: UID 0 - CW; Frequency: 1800 MHz  
Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.38$  S/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.63, 8.63, 8.63) @ 1800 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

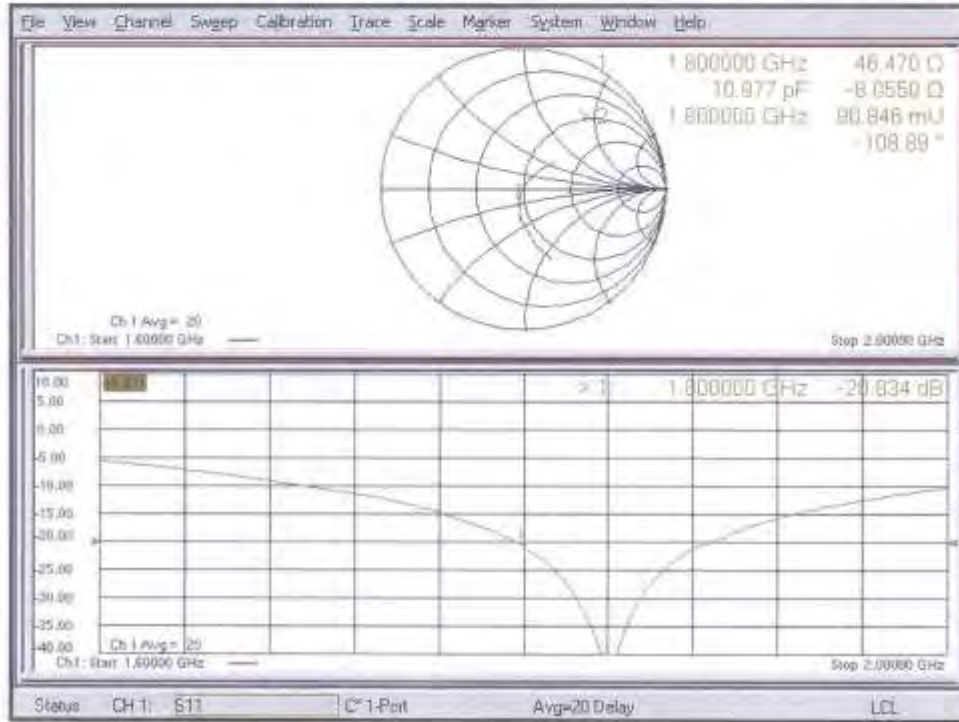
**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 108,9 V/m; Power Drift = 0,04 dB  
Peak SAR (extrapolated) = 18,1 W/kg  
**SAR(1 g) = 9,55 W/kg; SAR(10 g) = 4,95 W/kg**  
Smallest distance from peaks to all points 3 dB below = 10 mm  
Ratio of SAR at M2 to SAR at M1 = 53,2%  
Maximum value of SAR (measured) = 14,8 W/kg





Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **HCT (Dymatec)**

Certificate No: **D1900V2-5d032\_Jan22**

**CALIBRATION CERTIFICATE**

Object: **D1900V2 - SN:5d032**

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

Calibration date: **January 28, 2022**

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 (MSTE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH0394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 05027	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 734B	31-Dec-21 (No. EX3-734B_Dec21)	Dec-22
DAE4	SN: 601	01-Nov-21 (No. DAE4-601_Nov21)	Nov-22

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: 0E38512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: U837262763	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: MY41083315	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	in house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22

	Name	Function	Signature
Calibrated by:	Journa Leuthy	Laboratory Technician	
Approved by:	Sven Kuber	Deputy Manager	

Issued: January 31, 2022

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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:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Heid And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020,
- KDB 866664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	39.8 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0,5 °C	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.0 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.9 W/kg ± 16.5 % (k=2)

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

**Antenna Parameters with Head TSL**

Impadance, transformed to feed point)	51.8 $\Omega$ + 7.4 $j\Omega$
Return Loss	- 22.5 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.191 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
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**DASY5 Validation Report for Head TSL**

Date: 28.01.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d032**

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.4$  S/m;  $\epsilon_r = 39.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1900 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 01.11.2021
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 109.8 V/m; Power Drift = 0.05 dB

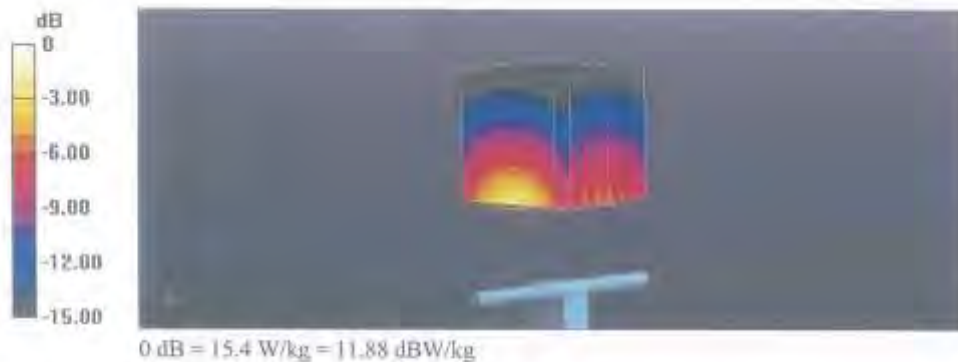
Peak SAR (extrapolated) = 18.3 W/kg

**SAR(1 g) = 10.0 W/kg; SAR(10 g) = 5.23 W/kg**

Smallest distance from peaks to all points 3 dB below = 10 mm

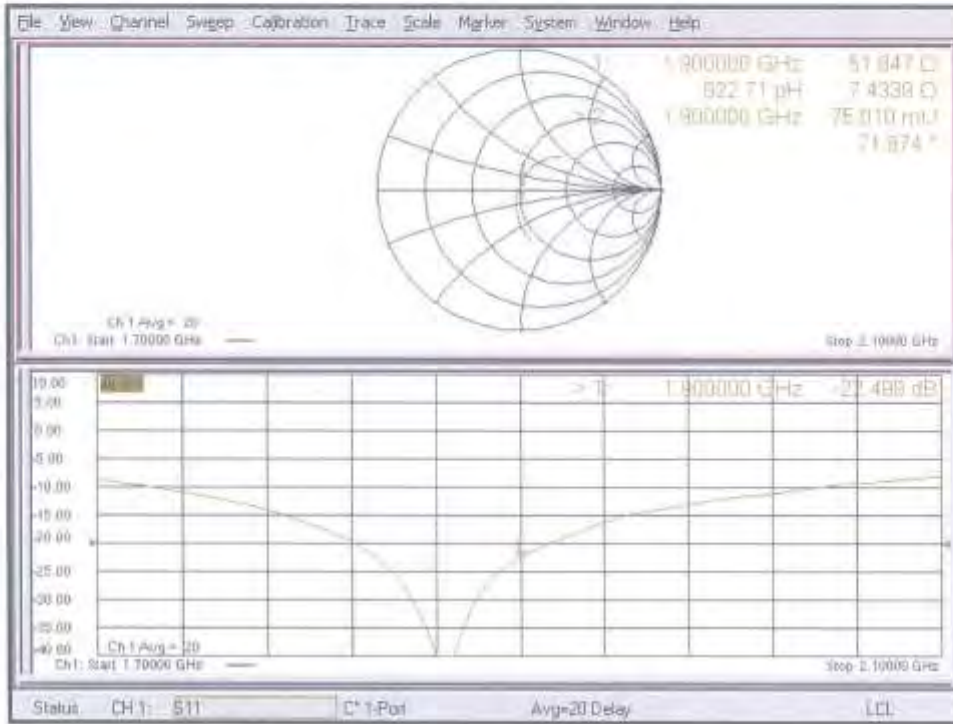
Ratio of SAR at M2 to SAR at M1 = 55.2%

Maximum value of SAR (measured) = 15.4 W/kg





Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)**

Certificate No: **D2450V2-743\_May22**

**CALIBRATION CERTIFICATE**

		검	담당자	하	이	자																																																								
Object:	D2450V2 - SN:743	김	김	이	영	재																																																								
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz	재	김/김리영	재	김/김리영	재																																																								
Calibration date:	May 31, 2022																																																													
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility, environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter NRP</td> <td>SN: 104778</td> <td>04-Apr-22 (No. 217-03525/03524)</td> <td>Apr-23</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103244</td> <td>04-Apr-22 (No. 217-03524)</td> <td>Apr-23</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103245</td> <td>04-Apr-22 (No. 217-03525)</td> <td>Apr-23</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 5H9394 (20K)</td> <td>04-Apr-22 (No. 217-03527)</td> <td>Apr-23</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 310962 / 06327</td> <td>04-Apr-22 (No. 217-03528)</td> <td>Apr-23</td> </tr> <tr> <td>Reference Probe EX3DV4</td> <td>SN: 7349</td> <td>31-Dec-21 (No. EX3-7349_Dec21)</td> <td>Dec-22</td> </tr> <tr> <td>DAE4</td> <td>SN: 801</td> <td>02-May-22 (No. DAE4-801_May22)</td> <td>May-23</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power meter E4419B</td> <td>SN: G839512475</td> <td>30-Oct-14 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: US37292783</td> <td>07-Oct-15 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: MY41093315</td> <td>07-Oct-15 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>RF generator R&amp;S SMT-05</td> <td>SN: 100972</td> <td>15-Jun-15 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>Network Analyzer Agilent E8358A</td> <td>SN: US41080477</td> <td>31-Mar-14 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> </tbody> </table>							Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23	Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23	Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23	Reference 20 dB Attenuator	SN: 5H9394 (20K)	04-Apr-22 (No. 217-03527)	Apr-23	Type-N mismatch combination	SN: 310962 / 06327	04-Apr-22 (No. 217-03528)	Apr-23	Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22	DAE4	SN: 801	02-May-22 (No. DAE4-801_May22)	May-23	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power meter E4419B	SN: G839512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22	Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	in house check: Oct-22	Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	in house check: Oct-22	RF generator R&S SMT-05	SN: 100972	15-Jun-15 (in house check Oct-20)	in house check: Oct-22	Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22
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Calibrated by:	Name: Joanna Uleshaj Function: Laboratory Technician	Signature:																																																												
Approved by:	Sven KZhn Technical Manager	Signature:																																																												
				Issued: June 3, 2022																																																										
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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020,
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	38.3 ± 8 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0,5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.8 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	54.7 $\Omega$ + 5.9 j $\Omega$
Return Loss	- 22.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.160 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
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**DASY5 Validation Report for Head TSL**

Date: 31.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:743**

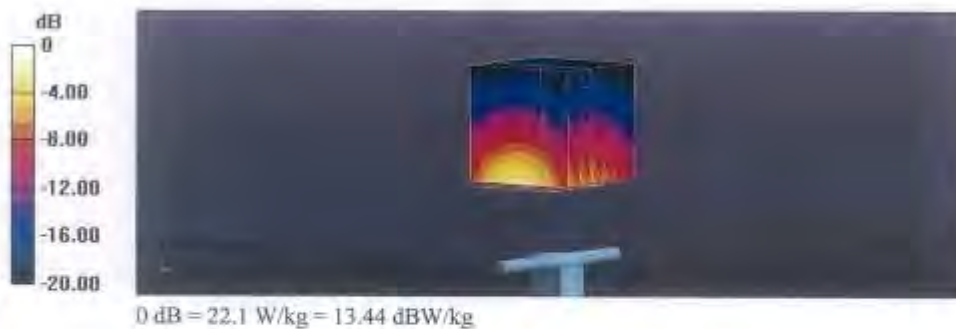
Communication System: UID 0 - CW; Frequency: 2450 MHz  
Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.84$  S/m;  $\epsilon_r = 38.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96) @ 2450 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 100I
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

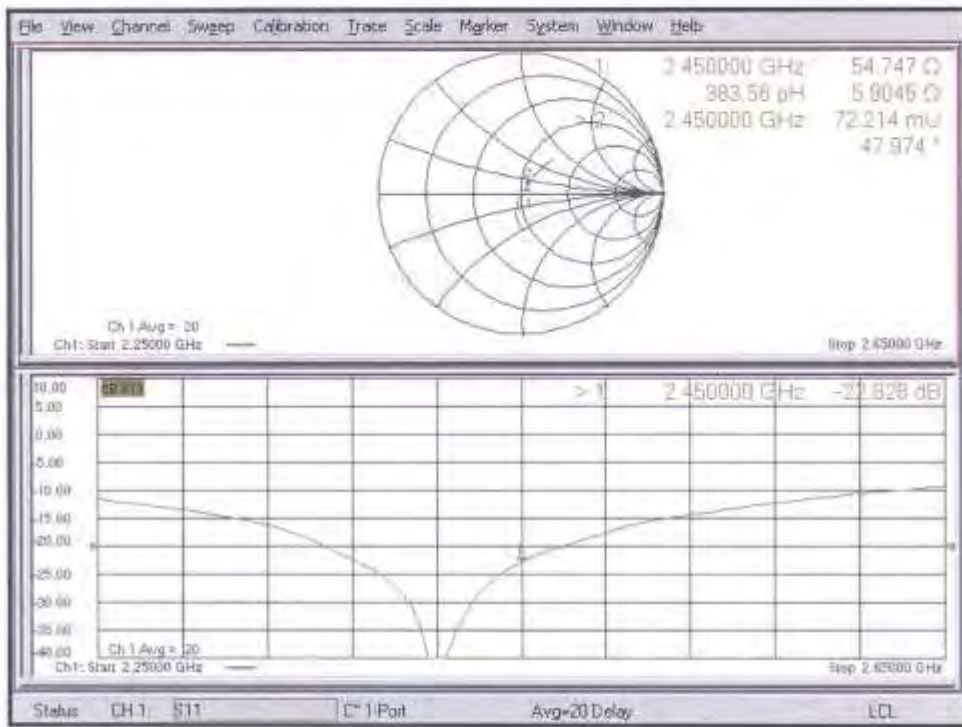
**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 116.2 V/m; Power Drift = 0.08 dB  
Peak SAR (extrapolated) = 27.0 W/kg  
**SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.26 W/kg**  
Smallest distance from peaks to all points 3 dB below = 9 mm  
Ratio of SAR at M2 to SAR at M1 = 50%  
Maximum value of SAR (measured) = 22.1 W/kg





**Impedance Measurement Plot for Head TSL**



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D2600V2-1015\_Jul22**

**CALIBRATION CERTIFICATE**

Object: **D2600V2 - SN:1015**

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

Calibration date: **July 15, 2022**

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	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / D6327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: BB39512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22
Power sensor HP B481A	SN: US37292763	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
Power sensor HP B481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	in house check: Oct-22
Network Analyzer Agilent E8358A	SN: USA1080477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22

Calibrated by: **Aldona Georgiadou** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Sven Kühn** (Name), **Deputy Manager** (Function), *[Signature]* (Signature)

Issued: July 25, 2022

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결 제	담당자 OL / W/S 2022. 7. 15	확인자 [Signature] 2022. 7. 15
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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY System Handbook

**Methods Applied and Interpretation of Parameters:**

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- *Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	37.3 ± 6 %	2.01 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>56.3 W/kg ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>25.2 W/kg ± 16.5 % (k=2)</b>

**Appendix (Additional assessments outside the scope of SCS 0108)****Antenna Parameters with Head TSL**

Impedance, transformed to feed point	48.9 $\Omega$ - 4.5 $j\Omega$
Return Loss	- 26,6 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.148 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
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**DASY5 Validation Report for Head TSL**

Date: 15.07.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1015**

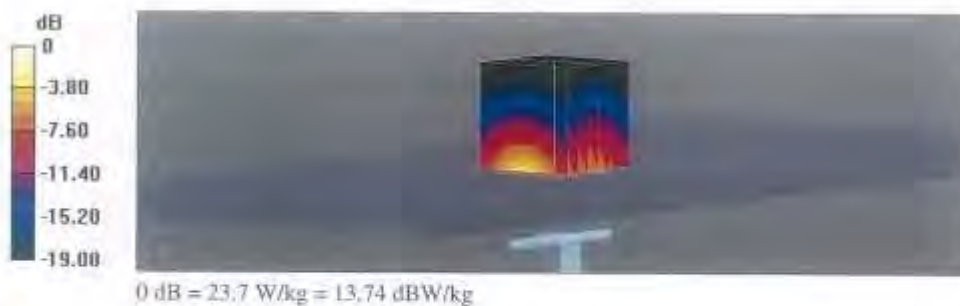
Communication System: UID 0 - CW; Frequency: 2600 MHz  
Medium parameters used:  $f = 2600$  MHz;  $\sigma = 2.01$  S/m;  $\epsilon_r = 37.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.84, 7.84, 7.84) @ 2600 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

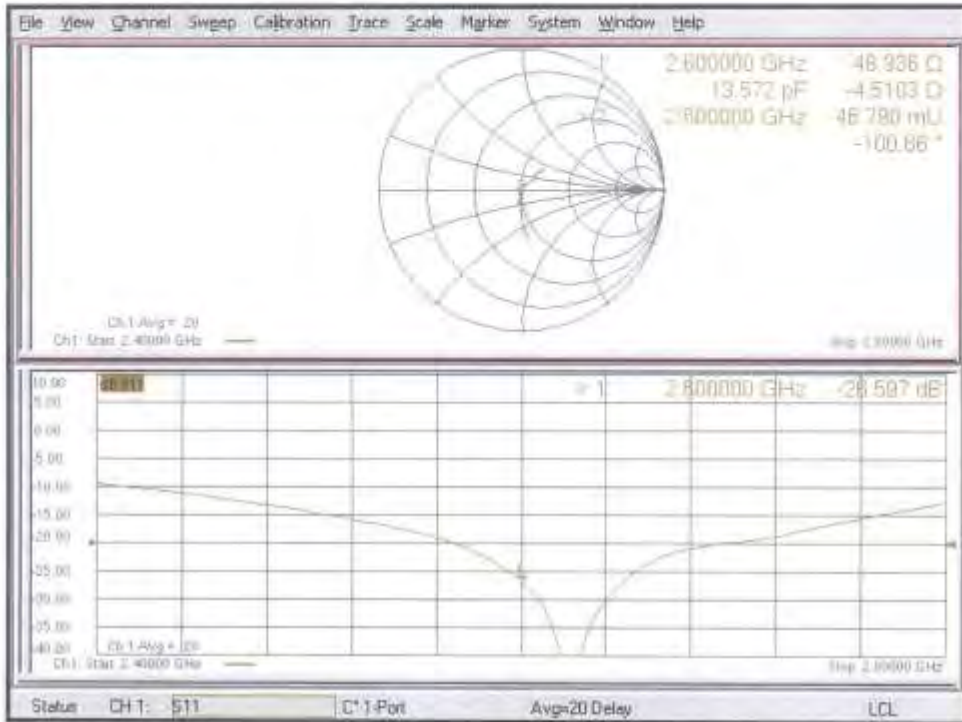
**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 117.2 V/m; Power Drift = 0.08 dB  
Peak SAR (extrapolated) = 28.3 W/kg  
**SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.40 W/kg**  
Smallest distance from peaks to all points 3 dB below = 8.5 mm  
Ratio of SAR at M2 to SAR at M1 = 50.6%  
Maximum value of SAR (measured) = 23.7 W/kg





Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **HCT (Dymstec)**

Certificate No: D3500V2-1132\_Jan22

**CALIBRATION CERTIFICATE**

Object: D3500V2 - SN:1132

Calibration procedure(s): QA CAL-22.v6  
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: January 24, 2022

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	08-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: 818394 (20K)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 3503	31-Dec-21 (No. EX3-3503_Dec21)	Dec-22
DAE4	SN: 601	01-Nov-21 (No. DAE4-601_Nov21)	Nov-22

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100672	15-Jun-15 (in house check Oct-20)	In House check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: Name: Michael Weber, Function: Laboratory Technician, Signature: *M. Weber*

Approved by: Name: Sven Kühn, Function: Deputy Manager, Signature: *S. Kühn*

Issued: January 24, 2022

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결	기	인	검	통	승	인
재	김기현					
취급/인	2022/01/24					
일	2022/01/24					

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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3500 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.9	2.91 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.56 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	65.2 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.46 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.5 W/kg ± 19.5 % (k=2)

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

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	52.2 $\Omega$ - 5.5 j $\Omega$
Return Loss	-24,7 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.130 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
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**DASY5 Validation Report for Head TSL**

Date: 24.01.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 3500 MHz; Type: D3500V2; Serial: D3500V2 - SN:1132**

Communication System: UTD 0 - CW; Frequency: 3500 MHz

Medium parameters used:  $f = 3500$  MHz;  $\sigma = 2.93$  S/m;  $\epsilon_r = 37.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.91, 7.91, 7.91) @ 3500 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 01.11.2021
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3500MHz/Zoom Scan,**

**dist=1.4mm (8x8x8)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 70.40 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 17.3 W/kg

**SAR(1 g) = 6.56 W/kg; SAR(10 g) = 2.46 W/kg**

Smallest distance from peaks to all points 3 dB below = 8.4 mm

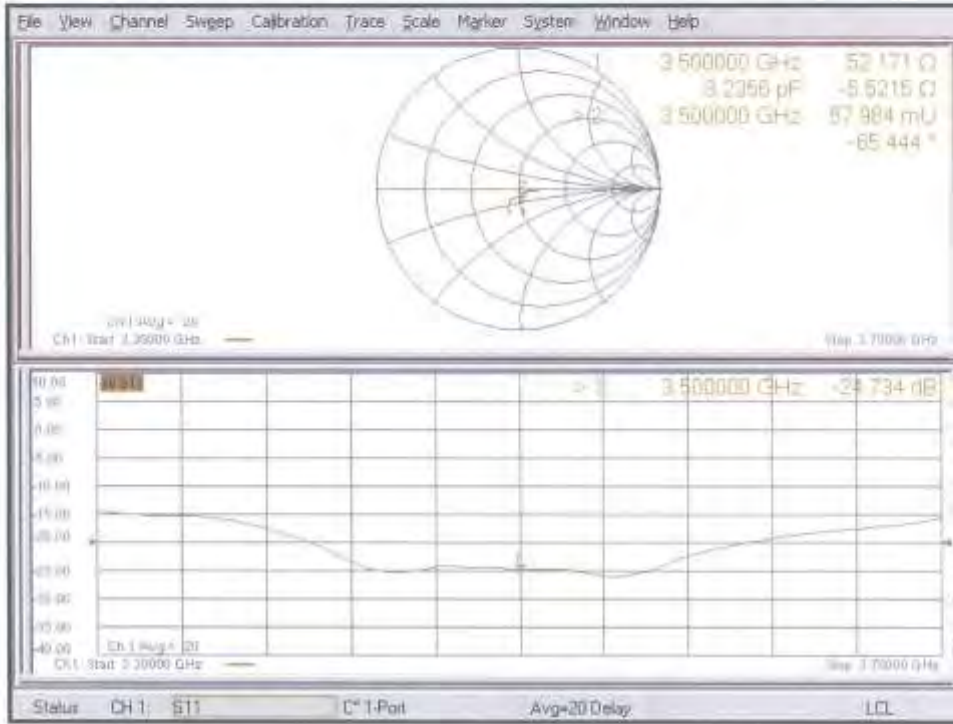
Ratio of SAR at M2 to SAR at M1 = 75.7%

Maximum value of SAR (measured) = 12.3 W/kg





Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **HCT (Dymstec)**

Certificate No: **D3700V2-1066\_Nov22**

**CALIBRATION CERTIFICATE**

Object: **D3700V2 - SN:1066**

Calibration procedure(s): **QA CAL-22.v6  
Calibration Procedure for SAR Validation Sources between 3-10 GHz**

Calibration date: **November 14, 2022**

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	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9304 (20K)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-0503_Mar22)	Mar-23
DAE4	SN: 601	31-Aug-22 (No. DAE4-601_Aug22)	Aug-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: 0639512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Jaanna Uoshaj** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Sven Köhn** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

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Issued: November 24, 2022

발행 담당자	확인자
<i>[Signature]</i>	<i>[Signature]</i>
06/14/2022	15/11/2022
2022.12.05	2022.12.05

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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:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865864, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3700 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37,7	3.12 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38,1 ± 6 %	3.08 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>67.9 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.46 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>24.7 W/kg ± 19.5 % (k=2)</b>

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

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	48.7 $\Omega$ + 0.6 $j\Omega$
Return Loss	- 36.9 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.130 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
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**DASY5 Validation Report for Head TSL**

Date: 14.11.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 3700 MHz; Type: D3700V2; Serial: D3700V2 - SN:1066**

Communication System: UID 0 - CW; Frequency: 3700 MHz  
Medium parameters used:  $f = 3700$  MHz;  $\sigma = 3.08$  S/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.73, 7.73, 7.73) @ 3700 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 31.08.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3700MHz/Zoom Scan,**

**dist=1.4mm (8x8x8)/Cube 0;** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 69.55 V/m; Power Drift = 0.00 dB

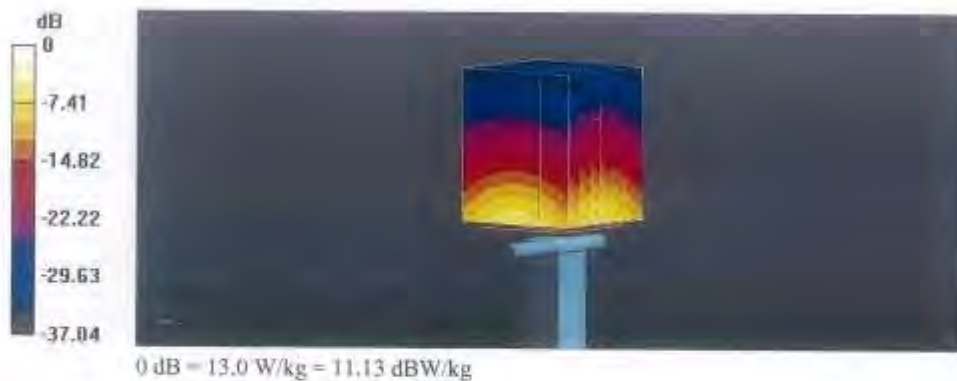
Peak SAR (extrapolated) = 18.5 W/kg

**SAR(1 g) = 6.76 W/kg; SAR(10 g) = 2.46 W/kg**

Smallest distance from peaks to all points 3 dB below = 8 mm

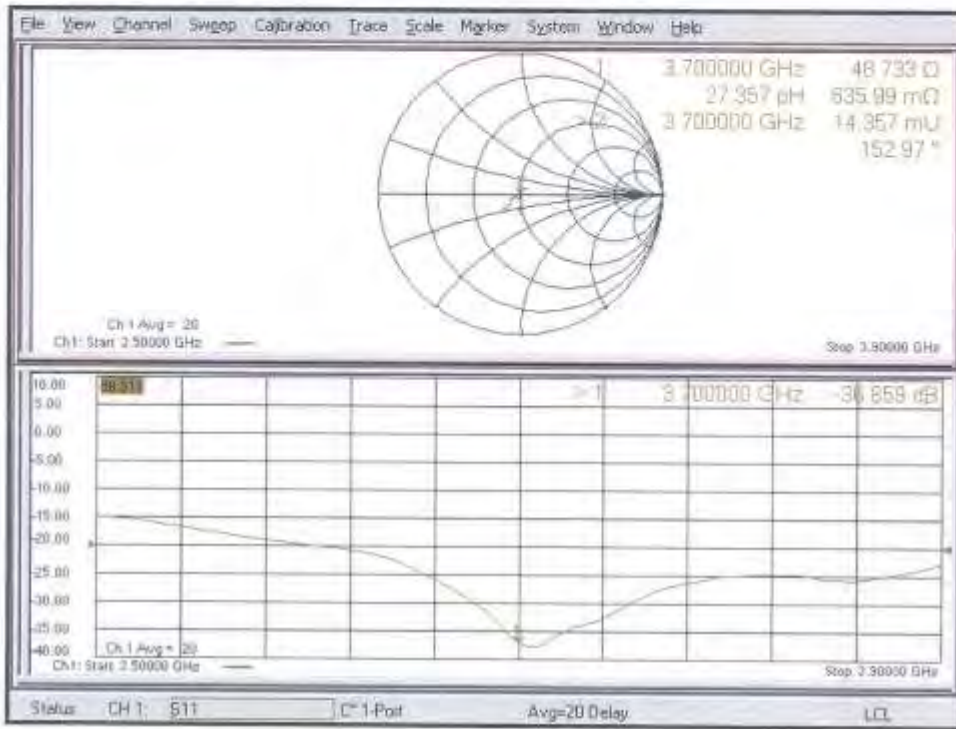
Ratio of SAR at M2 to SAR at M1 = 74.4%

Maximum value of SAR (measured) = 13.0 W/kg





Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D3900V2-1086\_May22**

**CALIBRATION CERTIFICATE**

Object: **D3900V2 - SN:1086**

Calibration procedure(s): **QA CAL-22.v6  
Calibration Procedure for SAR Validation Sources between 3-10 GHz**

Calibration date: **May 25, 2022**

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: 10477II	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH8394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: **Michael Weber** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Sven Kühn** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

This calibration certificate shall not be reproduced except in full without written approval of the laboratory. Issued: **May 25, 2022**

발 행 자	확인 자
<i>[Signature]</i>	<i>[Signature]</i>
재 발 행 일 2022.06.16	재 확인 일 2022.06.16

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

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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:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3900 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.5	3.32 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	3.28 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.89 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>68.9 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>23.9 W/kg ± 19.5 % (k=2)</b>

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

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	45.4 $\Omega$ - 5.9 $\mu\Omega$
Return Loss	-22.1 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.099 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
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**DASY5 Validation Report for Head TSL**

Date: 25.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN: 1086**

Communication System: UID 0 - CW; Frequency: 3900 MHz  
Medium parameters used:  $f = 3900$  MHz;  $\sigma = 3.28$  S/m;  $\epsilon_r = 37.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

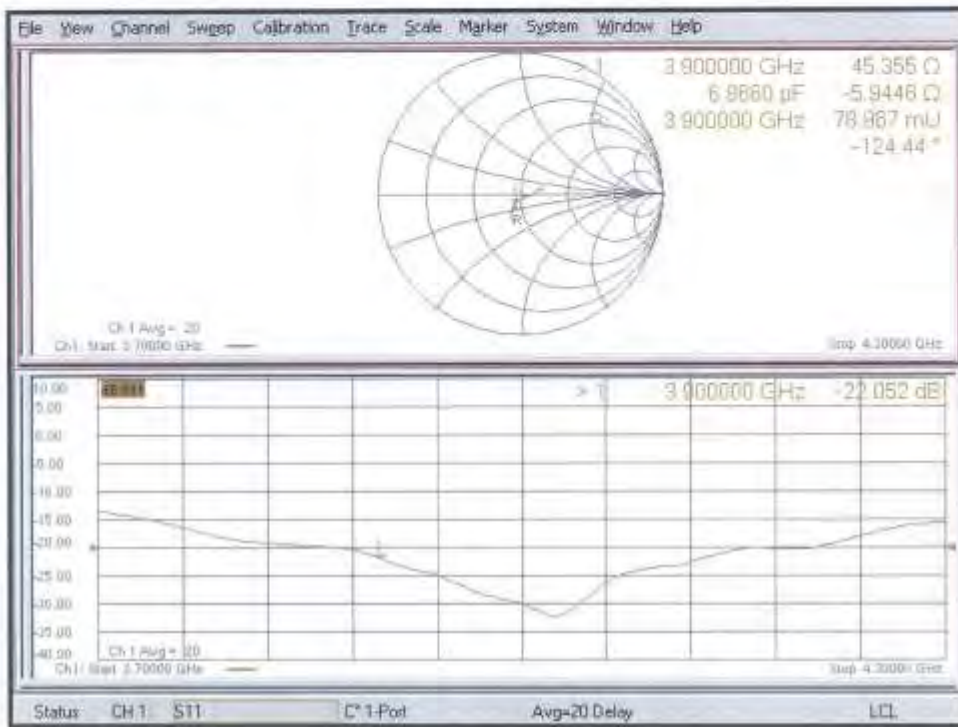
- Probe: EX3DV4 - SN3503; ConvF(7.39, 7.39, 7.39) @ 3900 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3900MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
Reference Value = 70.65 V/m; Power Drift = -0.00 dB  
Peak SAR (extrapolated) = 19.8 W/kg  
SAR(1 g) = 6.89 W/kg; SAR(10 g) = 2.40 W/kg  
Smallest distance from peaks to all points 3 dB below = 8.2 mm  
Ratio of SAR at M2 to SAR at M1 = 73.5%  
Maximum value of SAR (measured) = 13.7 W/kg





Impedance Measurement Plot for Head TSL



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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **HCT (Dymstec)**

Certificate No: **D5GHzV2-1253\_May22**

**CALIBRATION CERTIFICATE**

		검	담당자	확인자																																																								
Object:	D5GHzV2 - SN:1253	김기현	김기현	김기현																																																								
Calibration procedure(s):	QA CAL-22.v6 Calibration Procedure for SAR Validation Sources between 3-10 GHz	김기현	김기현	김기현																																																								
Calibration date:	May 31, 2022	김기현	김기현	김기현																																																								
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter NRP</td> <td>SN: 104778</td> <td>04-Apr-22 (No. 217-03525/03524)</td> <td>Apr-23</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103244</td> <td>04-Apr-22 (No. 217-03524)</td> <td>Apr-23</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>SN: 103245</td> <td>04-Apr-22 (No. 217-03525)</td> <td>Apr-23</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: 8H9384 (20k)</td> <td>04-Apr-22 (No. 217-03527)</td> <td>Apr-23</td> </tr> <tr> <td>Type-N mismatch combination</td> <td>SN: 310962 / 06327</td> <td>04-Apr-22 (No. 217-03528)</td> <td>Apr-23</td> </tr> <tr> <td>Reference Probe EX3DV4</td> <td>SN: 3503</td> <td>08-Mar-22 (No. EX3-3503_Mar22)</td> <td>Mar-23</td> </tr> <tr> <td>DAE4</td> <td>SN: 601</td> <td>02-May-22 (No. DAE4-601_May22)</td> <td>May-23</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>Power meter E4419B</td> <td>SN: 6B38512475</td> <td>30-Oct-14 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: US37202783</td> <td>07-Oct-15 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>SN: MY41093315</td> <td>07-Oct-15 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>RF generator R&amp;S SMT-06</td> <td>SN: 100972</td> <td>15-Jun-15 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> <tr> <td>Network Analyzer Agilent E8358A</td> <td>SN: US41080477</td> <td>31-Mar-14 (in house check Oct-20)</td> <td>in house check: Oct-22</td> </tr> </tbody> </table>					Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23	Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23	Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23	Reference 20 dB Attenuator	SN: 8H9384 (20k)	04-Apr-22 (No. 217-03527)	Apr-23	Type-N mismatch combination	SN: 310962 / 06327	04-Apr-22 (No. 217-03528)	Apr-23	Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23	DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Power meter E4419B	SN: 6B38512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22	Power sensor HP 8481A	SN: US37202783	07-Oct-15 (in house check Oct-20)	in house check: Oct-22	Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	in house check: Oct-22	RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	in house check: Oct-22	Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22
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Calibrated by:	Name: Joanna Liestaj Function: Laboratory Technician	Signature: <i>Joanna Liestaj</i>																																																										
Approved by:	Name: Syver Kälin Function: Technical Manager	Signature: <i>Syver Kälin</i>																																																										
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.				Issued: June 3, 2022																																																								

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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865864, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY62	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distancia Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

**Head TSL parameters at 5250 MHz**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.9 ± 6 %	4.52 mho/m ± 6 %
Head TSL temperature change during test	< 0,5 °C	—	—

**SAR result with Head TSL at 5250 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>80.4 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>22.9 W/kg ± 19.5 % (k=2)</b>

**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	34.4 ± 6 %	4.87 mho/m ± 6 %
Head TSL temperature change during test	< 0,5 °C	—	—

**SAR result with Head TSL at 5600 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>82.1 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>23.5 W/kg ± 19.5 % (k=2)</b>

**Head TSL parameters at 5750 MHz**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	5.02 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL at 5750 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>79.9 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>22.6 W/kg ± 19.5 % (k=2)</b>

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

**Antenna Parameters with Head TSL at 5250 MHz**

Impedance, transformed to feed point	49.6 $\Omega$ - 3.2 $j\Omega$
Return Loss	-29.8 dB

**Antenna Parameters with Head TSL at 5600 MHz**

Impedance, transformed to feed point	52.2 $\Omega$ + 3.1 $j\Omega$
Return Loss	-28.5 dB

**Antenna Parameters with Head TSL at 5750 MHz**

Impedance, transformed to feed point	53.8 $\Omega$ + 2.9 $j\Omega$
Return Loss	-27.0 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1,196 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
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**DASY5 Validation Report for Head TSL**

Date: 31.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1253**

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz

Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.52$  S/m;  $\epsilon_r = 34.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.87$  S/m;  $\epsilon_r = 34.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.02$  S/m;  $\epsilon_r = 34.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.5, 5.5, 5.5) @ 5250 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.08, 5.08, 5.08) @ 5750 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan,****dist=1.4mm (8x8x7)/Cube 0;** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.61 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 28.5 W/kg

**SAR(1 g) = 8.10 W/kg; SAR(10 g) = 2.31 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 69.6%

Maximum value of SAR (measured) = 18.4 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 = 75.75 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 31.2 W/kg

**SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.37 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 66.7%

Maximum value of SAR (measured) = 19.7 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan,**

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 73.51 V/m; Power Drift = 0.06 dB

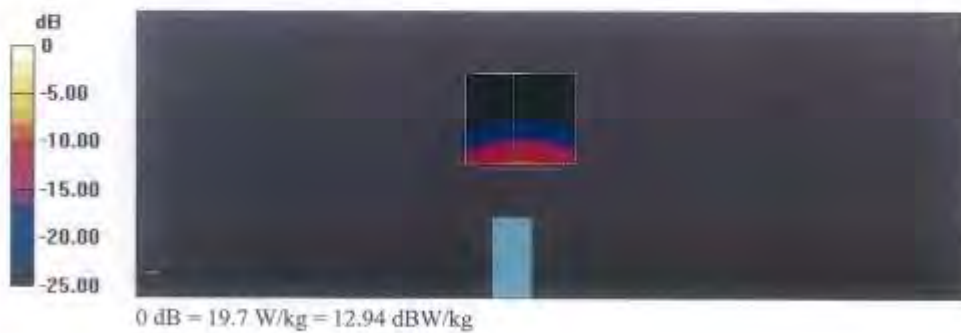
Peak SAR (extrapolated) = 32.3 W/kg

SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.29 W/kg

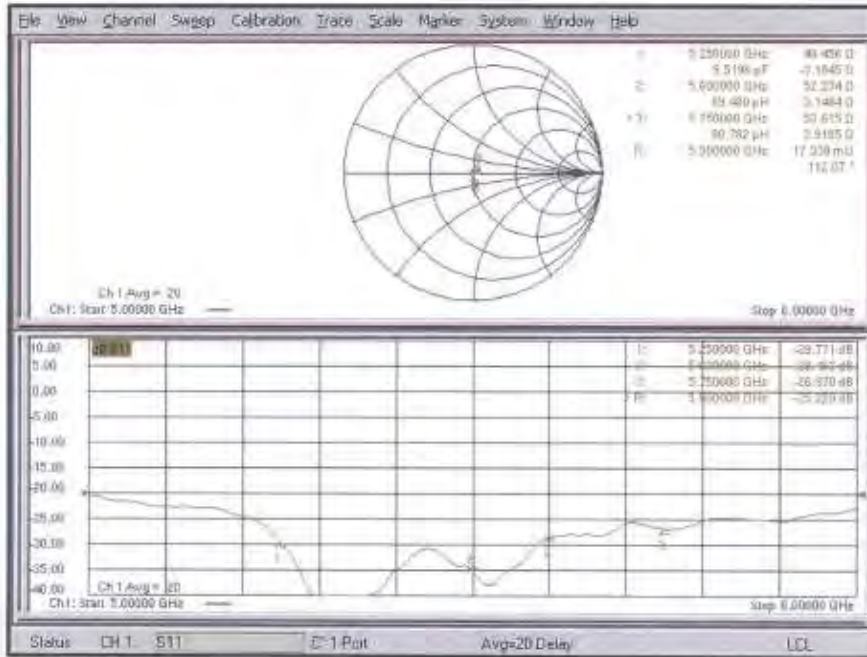
Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 65.3%

Maximum value of SAR (measured) = 19.2 W/kg



**Impedance Measurement Plot for Head TSL**





**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D750V3-1014\_May22**

**CALIBRATION CERTIFICATE**

Object: **D750V3 - SN:1014**

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

Calibration date: **May 25, 2022**

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: 10477B	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BHP394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB36512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100672	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by:	Name	Function	Signature
	Aldoria Georgiadou	Laboratory Technician	
Approved by:	Sven Köhn	Technical Manager	

Issued: May 30, 2022

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결	안	회
제	26	자
	01/14/2022	01/14/2022
	2022.06.16	2022.06.16

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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	750 MHz $\pm$ 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 $\pm$ 0.2) °C	40.9 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>8.71 W/kg <math>\pm</math> 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>5.70 W/kg <math>\pm</math> 16.5 % (k=2)</b>



**Appendix (Additional assessments outside the scope of SCS 0108)****Antenna Parameters with Head TSL**

Impedance, transformed to feed point	$54.5 \Omega + 2.9 j\Omega$
Return Loss	- 25.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.040 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
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**DASY5 Validation Report for Head TSL**

Date: 25.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1014**

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

Medium parameters used:  $f = 750$  MHz;  $\sigma = 0.89$  S/m;  $\epsilon_r = 40.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.11, 10.11, 10.11) @ 750 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 4,9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 60.50 V/m; Power Drift = -0.01 dB

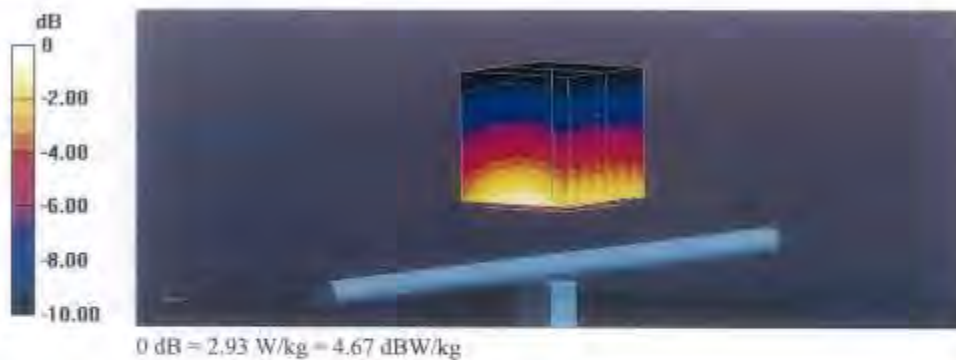
Peak SAR (extrapolated) = 3.36 W/kg

**SAR(1 g) = 2.19 W/kg; SAR(10 g) = 1.43 W/kg**

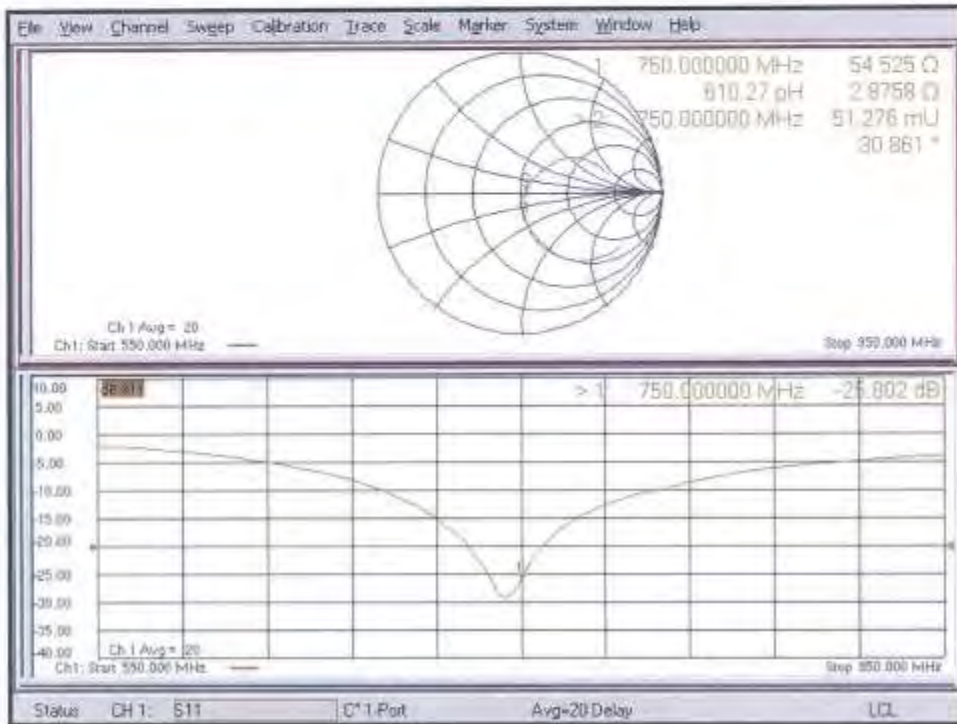
Smallest distance from peaks to all points 3 dB below = 17 mm

Ratio of SAR at M2 to SAR at M1 = 65.3%

Maximum value of SAR (measured) = 2.93 W/kg



**Impedance Measurement Plot for Head TSL**





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Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)**

Certificate No: **D835V2-441\_Jul22**

**CALIBRATION CERTIFICATE**

Object: **D835V2 - SN:441**

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

Calibration date: **July 15, 2022**

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 this closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BHR394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combiner	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-08	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8356A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: **Aldona Georgiadou** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Eysel Kühn** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: July 25, 2022

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결	담	화
재	인	인
	<i>[Signature]</i>	<i>[Signature]</i>
	2022.08.10	2022.08.10

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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:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	835 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	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 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 <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.73 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.62 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.33 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	52.4 $\Omega$ + 5.5 j $\Omega$
Return Loss	- 24.7 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.372 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: 15.07.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441**

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.93$  S/m;  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.69, 9.69, 9.69) @ 835 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 64.34 V/m; Power Drift = -0.01 dB

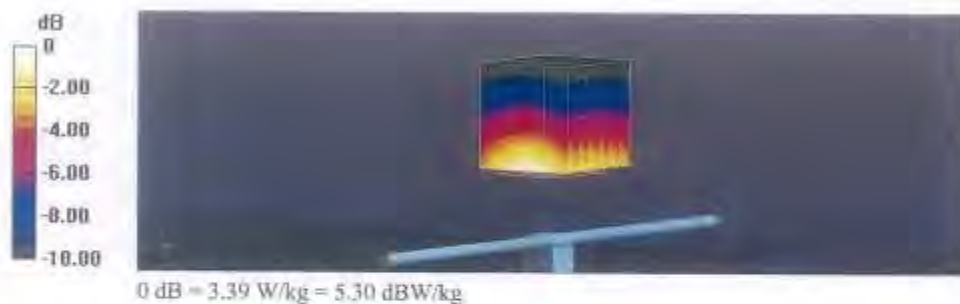
Peak SAR (extrapolated) = 3.83 W/kg

**SAR(1 g) = 2.51 W/kg; SAR(10 g) = 1.62 W/kg**

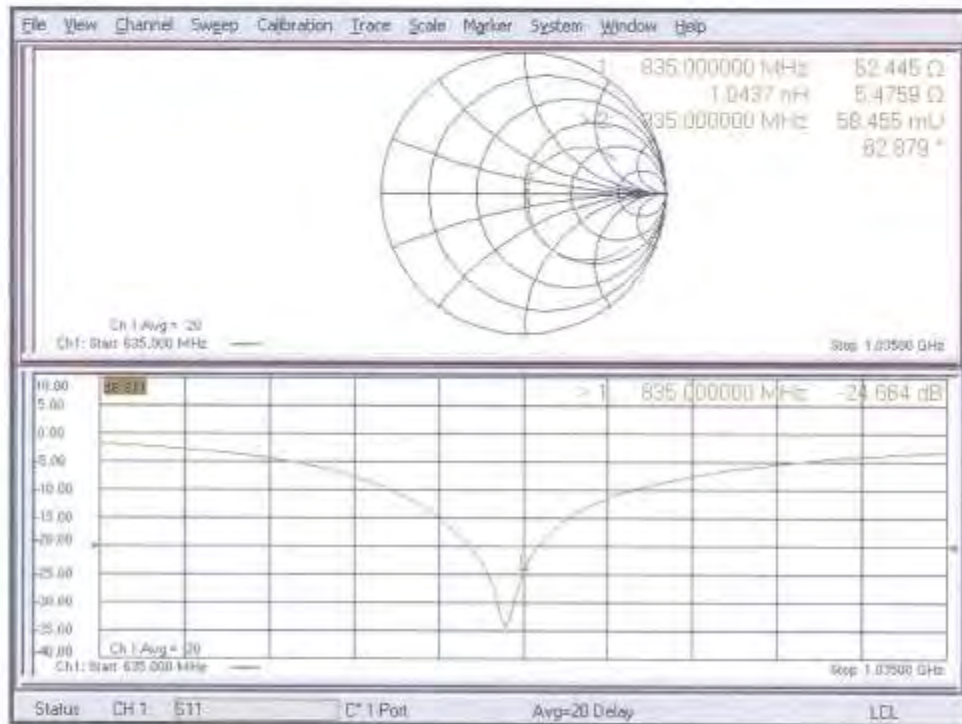
Smallest distance from peaks to all points 3 dB below = 16 mm

Ratio of SAR at M2 to SAR at MI = 65.4%

Maximum value of SAR (measured) = 3.39 W/kg



Impedance Measurement Plot for Head TSL





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Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)**

Certificate No: **D1800V2-2d007\_Jul22**

**CALIBRATION CERTIFICATE**

Object: **D1800V2 - SN:2d007**

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

Calibration date: **July 18, 2022**

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&E critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH6394 (ZPK)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 08327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB30512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
RF generator R&S SMT-06	SN: 100972	18-Jun-15 (in house check Oct-20)	in house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41090477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22

Calibrated by: **Ugenna Lüssling** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Sven Kölln** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

Issued: July 25, 2022

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결재	담당자	확인자
	<i>[Signature]</i>	<i>[Signature]</i>
	DL / 박지현	CF / 최윤성
	2022. 08. 10	2022. 08. 10

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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:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	1800 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	38.4 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>38.2 W/kg ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>19.8 W/kg ± 16.5 % (k=2)</b>



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

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	46.5 $\Omega$ - 8.1 $j\Omega$
Return Loss	- 20.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.204 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
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**DASY5 Validation Report for Head TSL**

Date: 18.07.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d007**

Communication System: UID 0 - CW; Frequency: 1800 MHz

Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.38$  S/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.63, 8.63, 8.63) @ 1800 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 108,9 V/m; Power Drift = 0,04 dB

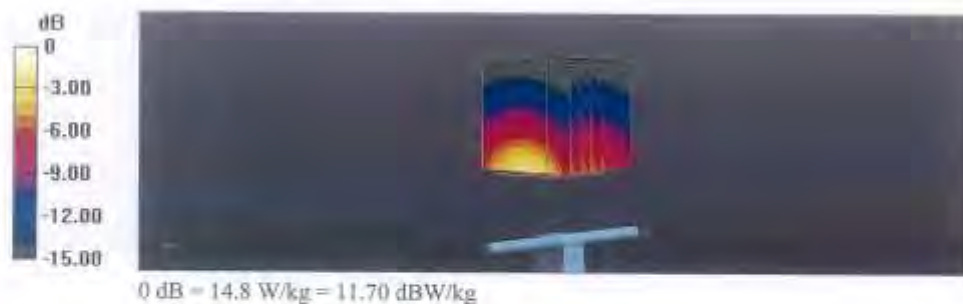
Peak SAR (extrapolated) = 18,1 W/kg

**SAR(1 g) = 9,55 W/kg; SAR(10 g) = 4,95 W/kg**

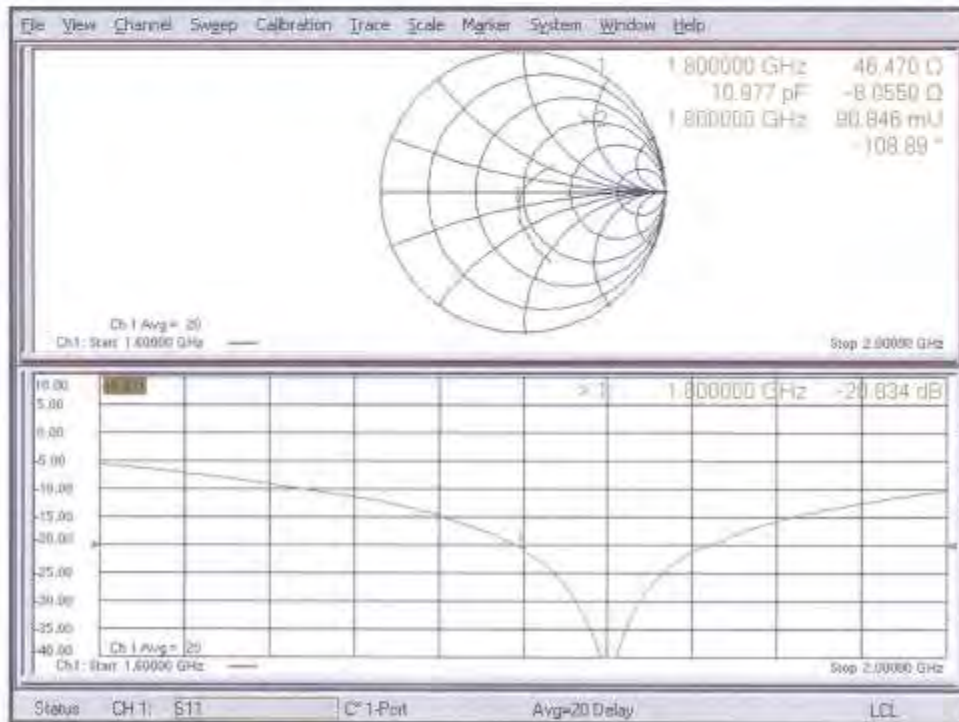
Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 53,2%

Maximum value of SAR (measured) = 14,8 W/kg



Impedance Measurement Plot for Head TSL





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Accreditation No.: SCS 0108

Client **HCT (Dymatec)**

Certificate No: **D1900V2-5d032\_Jan22**

**CALIBRATION CERTIFICATE**

Object: **D1900V2 - SN:5d032**

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

Calibration date: **January 28, 2022**

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 (MSTE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH0394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 05027	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 734B	31-Dec-21 (No. EX3-734B_Dec21)	Dec-22
DAE4	SN: 601	01-Nov-21 (No. DAE4-601_Nov21)	Nov-22

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: 0E38512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: U837262763	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
Power sensor HP 8481A	SN: MY41083315	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	in house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22

	Name	Function	Signature
Calibrated by:	Journa Leuthy	Laboratory Technician	
Approved by:	Oliver Kuber	Deputy Manager	

Issued: January 31, 2022

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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:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	39.8 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0,5 °C	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.0 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.9 W/kg ± 16.5 % (k=2)



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

**Antenna Parameters with Head TSL**

Impadance, transformed to feed point)	51.8 $\Omega$ + 7.4 j $\Omega$
Return Loss	- 22.5 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.191 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
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**DASY5 Validation Report for Head TSL**

Date: 28.01.2022

Test Laboratory: SPÉAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d032**

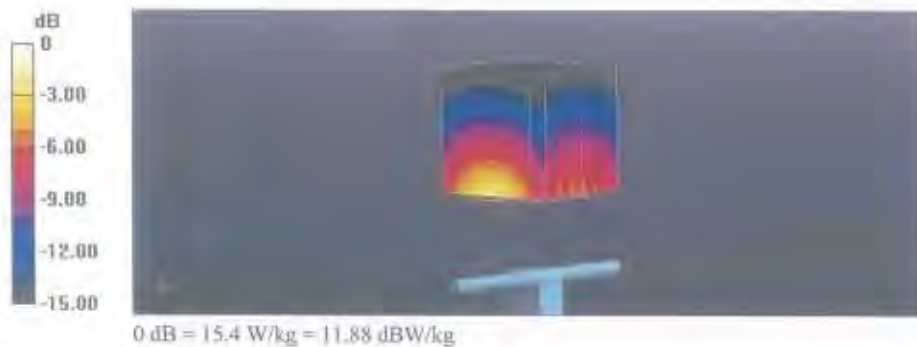
Communication System: UID 0 - CW; Frequency: 1900 MHz  
Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.4$  S/m;  $\epsilon_r = 39.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

**DASY52 Configuration:**

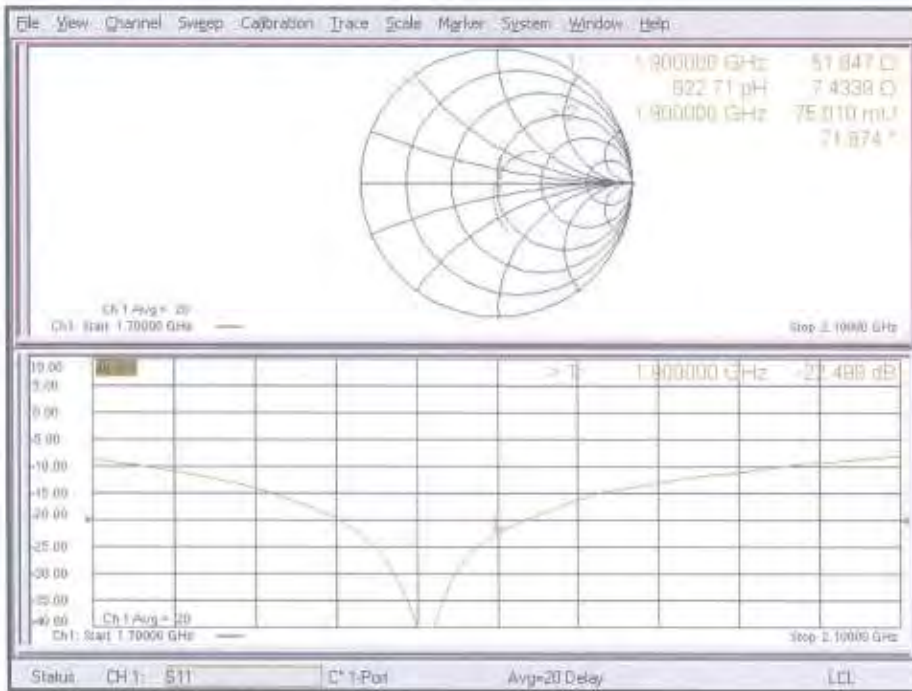
- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1900 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 01.11.2021
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 109.8 V/m; Power Drift = 0.05 dB  
Peak SAR (extrapolated) = 18.3 W/kg  
**SAR(1 g) = 10.0 W/kg; SAR(10 g) = 5.23 W/kg**  
Smallest distance from peaks to all points 3 dB below = 10 mm  
Ratio of SAR at M2 to SAR at M1 = 55.2%  
Maximum value of SAR (measured) = 15.4 W/kg



Impedance Measurement Plot for Head TSL





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Accreditation No.: **SCS 0108**

Client: **HCT (Dymstec)**

Certificate No: **D2450V2-743\_May22**

**CALIBRATION CERTIFICATE**

검	다 다 자	하 이 자
제	김 리 한 2022.6.20	김 리 한 2022.6.20

Object: **D2450V2 - SN:743**

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

Calibration date: **May 31, 2022**

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: 104776	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: 5H9394 (20x)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310862 / 06327	04-Apr-22 (No. 217-03526)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 801	02-May-22 (No. DAE4-801_May22)	May-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by:	Name	Function	Signature
	Juana Lieshaj	Laboratory Technician	
Approved by:	Sven Köhn	Technical Manager	

Issued: June 3, 2022

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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:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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	38.3 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.8 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	54.7 $\Omega$ + 5.9 j $\Omega$
Return Loss	-22.8 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.160 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
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**DASY5 Validation Report for Head TSL**

Date: 31.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:743**

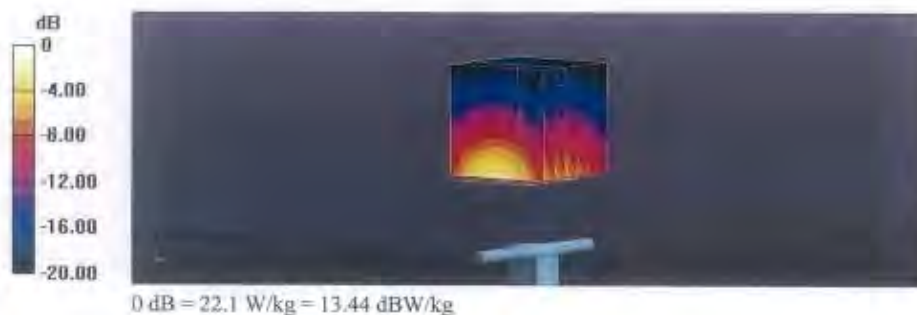
Communication System: UID 0 - CW; Frequency: 2450 MHz  
Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.84$  S/m;  $\epsilon_0 = 38.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

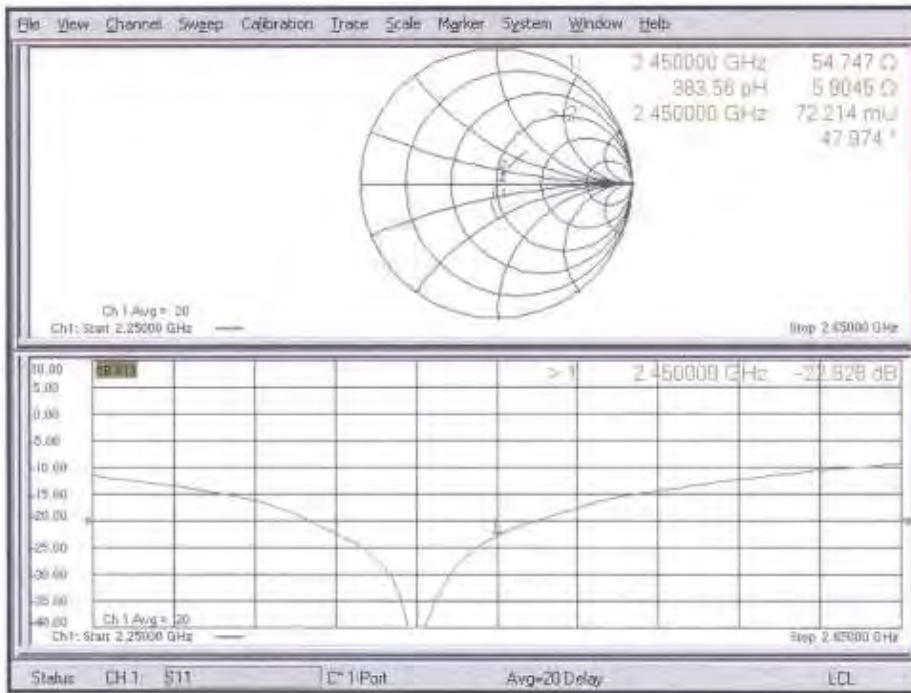
- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96) @ 2450 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 116.2 V/m; Power Drift = 0.08 dB  
Peak SAR (extrapolated) = 27.0 W/kg  
**SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.26 W/kg**  
Smallest distance from peaks to all points 3 dB below = 9 mm  
Ratio of SAR at M2 to SAR at M1 = 50%  
Maximum value of SAR (measured) = 22.1 W/kg



Impedance Measurement Plot for Head TSL





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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D2600V2-1015\_Jul22**

**CALIBRATION CERTIFICATE**

Object: **D2600V2 - SN:1015**

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

Calibration date: **July 15, 2022**

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 ( $22 \pm 3^\circ\text{C}$ ) 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	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / D6327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EXSDIV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	in house check: Oct-22
Power sensor HP B481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
Power sensor HP B481A	SN: MY41093815	07-Oct-15 (in house check Oct-20)	in house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	in house check: Oct-22
Network Analyzer Agilent E8358A	SN: USA1080477	31-Mar-14 (in house check Oct-20)	in house check: Oct-22

Calibrated by:	Name: <b>Aldonia Georgiadou</b>	Function: <b>Laboratory Technician</b>	Signature:
Approved by:	Name: <b>Sven Kitzin</b>	Function: <b>Deputy Manager</b>	Signature:

issued: July 25, 2022

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결	담당자	확인자
제		
	2022. 7. 15	2022. 7. 15

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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	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 $\pm$ 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 $\pm$ 0.2) °C	37.3 $\pm$ 6 %	2.01 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	56.3 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.2 W/kg $\pm$ 16.5 % (k=2)



**Appendix (Additional assessments outside the scope of SCS 0108)****Antenna Parameters with Head TSL**

Impedance, transformed to feed point	48.9 $\Omega$ - 4.5 j $\Omega$
Return Loss	-26,6 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.146 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
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**DASY5 Validation Report for Head TSL**

Date: 15.07.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1015**

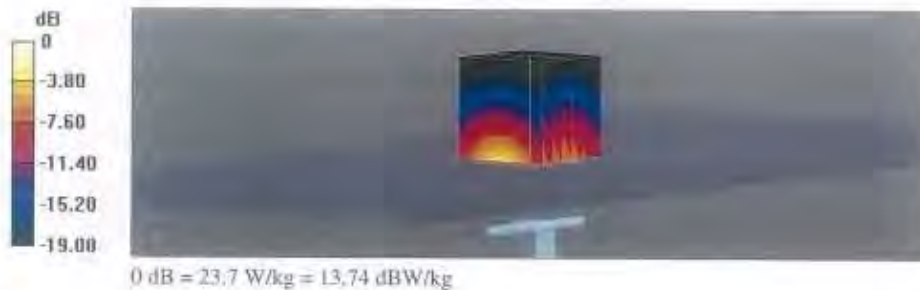
Communication System: UID 0 - CW; Frequency: 2600 MHz  
Medium parameters used:  $f = 2600$  MHz;  $\sigma = 2.01$  S/m;  $\epsilon_r = 37.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

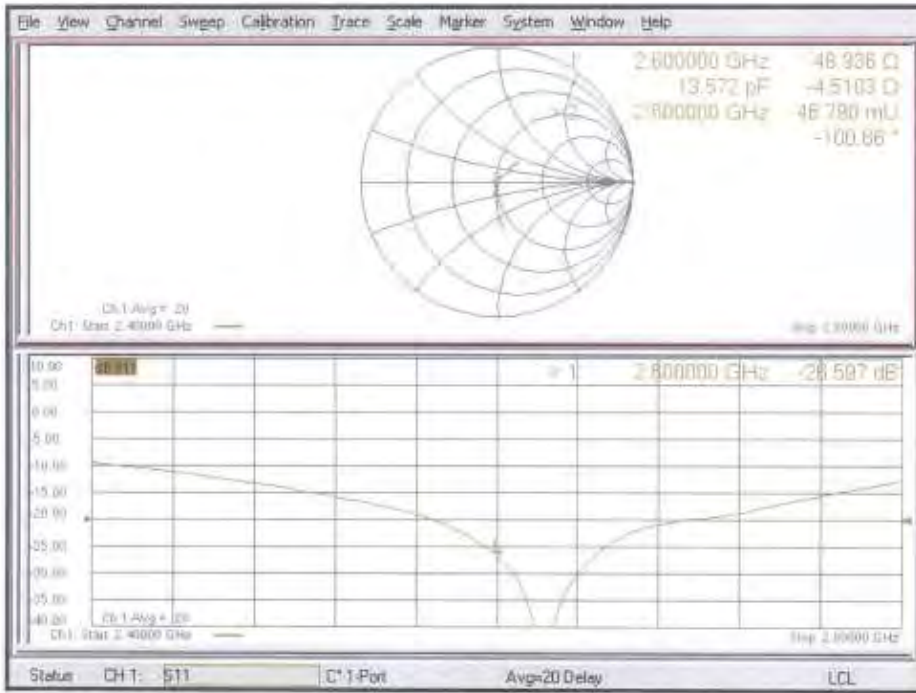
- Probe: EX3DV4 - SN7349; ConvF(7.84, 7.84, 7.84) @ 2600 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**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 = 117.2 V/m; Power Drift = 0.08 dB  
Peak SAR (extrapolated) = 28.3 W/kg  
**SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.40 W/kg**  
Smallest distance from peaks to all points 3 dB below = 8.5 mm  
Ratio of SAR at M2 to SAR at M1 = 50.6%  
Maximum value of SAR (measured) = 23.7 W/kg



Impedance Measurement Plot for Head TSL





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Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D3900V2-1086\_May22**

**CALIBRATION CERTIFICATE**

Object: **D3900V2 - SN:1086**

Calibration procedure(s): **QA CAL-22.v6  
Calibration Procedure for SAR Validation Sources between 3-10 GHz**

Calibration date: **May 25, 2022**

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: 10477II	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH8394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar-23
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

Calibrated by: **Michael Weber** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Sven Kühn** (Name), **Technical Manager** (Function), *[Signature]* (Signature)

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

Issued: May 25, 2022

발행	확인자
재	2022.06.16
2022.06.16	2022.06.16

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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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1,4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	3900 MHz ± 1 MHz	

**Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	37.5	3.32 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	3.28 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

**SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.89 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>68.9 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>23.9 W/kg ± 19.5 % (k=2)</b>



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

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	45.4 $\Omega$ - 5.9 $\mu\Omega$
Return Loss	-22.1 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.099 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

**Additional EUT Data**

Manufactured by	SPEAG
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**DASY5 Validation Report for Head TSL**

Date: 25.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 3900 MHz; Type: D3900V2; Serial: D3900V2 - SN: 1086**

Communication System: UID 0 - CW; Frequency: 3900 MHz  
Medium parameters used:  $f = 3900$  MHz;  $\sigma = 3.28$  S/m;  $\epsilon_r = 37.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

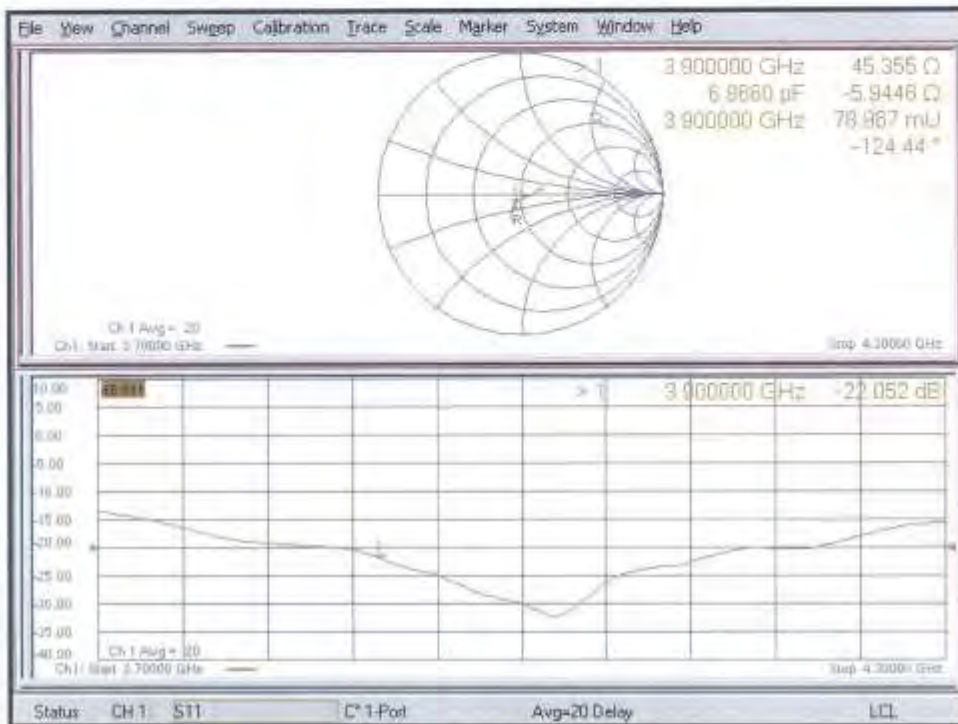
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(7.39, 7.39, 7.39) @ 3900 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/Pin=100 mW, d=10mm, f=3900MHz/Zoom Scan, dist=1.4mm (8x8x8)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
Reference Value = 70.65 V/m; Power Drift = -0.00 dB  
Peak SAR (extrapolated) = 19.8 W/kg  
**SAR(1 g) = 6.89 W/kg; SAR(10 g) = 2.40 W/kg**  
Smallest distance from peaks to all points 3 dB below = 8.2 mm  
Ratio of SAR at M2 to SAR at M1 = 73.5%  
Maximum value of SAR (measured) = 13.7 W/kg



Impedance Measurement Plot for Head TSL





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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D5GHzV2-1253\_May22**

**CALIBRATION CERTIFICATE**

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Object:	D5GHzV2 - SN:1253	검	다	다	가	하	이	자																																																								
Calibration procedure(s):	QA CAL-22.v6 Calibration Procedure for SAR Validation Sources between 3-10 GHz	재	50 / 7 + 18	22.6.20																																																												
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Calibrated by:	Name: Joanna Liestaj Function: Laboratory Technician Signature: <i>Joanna Liestaj</i>																																																															
Approved by:	Name: Sven Kälin Function: Technical Manager Signature: <i>Sven Kälin</i>																																																															
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**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) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- b) KDB 865864, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- *Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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	DASY62	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 = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

**Head TSL parameters at 5250 MHz**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.9 ± 6 %	4.52 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL at 5250 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>80.4 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>22.9 W/kg ± 19.5 % (k=2)</b>

**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	34.4 ± 6 %	4.87 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL at 5600 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>82.1 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>23.5 W/kg ± 19.5 % (k=2)</b>



**Head TSL parameters at 5750 MHz**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	5.02 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

**SAR result with Head TSL at 5750 MHz**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	<b>79.9 W/kg ± 19.9 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (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	<b>22.6 W/kg ± 19.5 % (k=2)</b>

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

**Antenna Parameters with Head TSL at 5250 MHz**

Impedance, transformed to feed point	49.5 $\Omega$ - 3.2 $\mu\Omega$
Return Loss	-29.8 dB

**Antenna Parameters with Head TSL at 5600 MHz**

Impedance, transformed to feed point	52.2 $\Omega$ + 3.1 $\mu\Omega$
Return Loss	-28.5 dB

**Antenna Parameters with Head TSL at 5750 MHz**

Impedance, transformed to feed point	53.8 $\Omega$ + 2.9 $\mu\Omega$
Return Loss	-27.0 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1,196 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

**Additional EUT Data**

Manufactured by	SPEAG
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**DASY5 Validation Report for Head TSL**

Date: 31.05.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1253**

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz

Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.52$  S/m;  $\epsilon_r = 34.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.87$  S/m;  $\epsilon_r = 34.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>,Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.02$  S/m;  $\epsilon_r = 34.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.5, 5.5, 5.5) @ 5250 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.08, 5.08, 5.08) @ 5750 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.05.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan,****dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.61 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 28.5 W/kg

**SAR(1 g) = 8.10 W/kg; SAR(10 g) = 2.31 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 69.6%

Maximum value of SAR (measured) = 18.4 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 = 75.75 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 31.2 W/kg

**SAR(1 g) = 8.28 W/kg; SAR(10 g) = 2.37 W/kg**

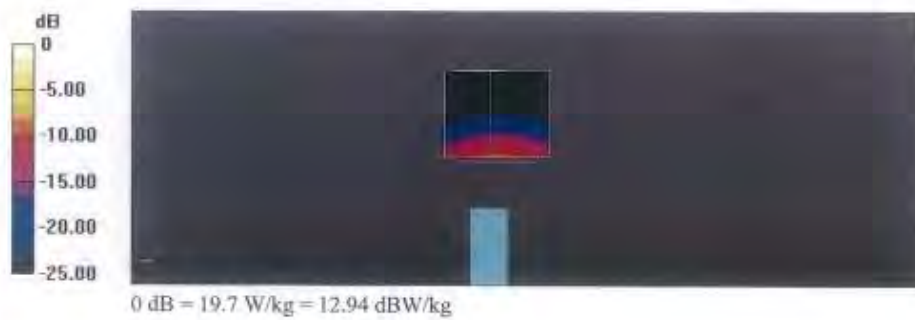
Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 66.7%

Maximum value of SAR (measured) = 19.7 W/kg



**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm  
Reference Value = 73.51 V/m; Power Drift = 0.06 dB  
Peak SAR (extrapolated) = 32.3 W/kg  
SAR(1 g) = 8.06 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 = 65.3%  
Maximum value of SAR (measured) = 19.2 W/kg



**Impedance Measurement Plot for Head TSL**

