Report on the Specific Absorption Rate Testing of the MP11000

Mobile Processor
Model: MP11000

In accordance with FCC 47 CFR 2.1093
FCC ID: YQMMP11000

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Prepared for: FARO Technologies, Inc.
125 Technology Park,
Lake Mary, FL 32746

COMMERCIAL-IN-CONFIDENCE

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NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Jon Kenny	Technical Director	Authorised Signatory	15 July 2024

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR 2.1093 for the tests detailed in section.1

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SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the MP11000

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate testing of the MP11000 to the requirements of FCC 47 CFR 2.1093.

Objective	To determine the Equipment Under Test's (EUT) compliance with the requirements specified within FCC 47 CFR 2.1093.
Applicant	FARO Technologies, Inc.
EUT/Sample Identification	Refer to section 1.2
Manufacturing Description	Mobile processor
Test Specification/Issue/Date	FCC 47 CFR 2.1093
Start of Test	04-March-2024
Finish of Test	21-March-2024
Related Document(s)	KDB 865664 - D01 v01r04 KDB 447498 - D01 v06 IEC-IEEE 62209-1528:2020 KDB 248227 - D01 v02r02 IEC/IEEE 63195-1:2022 ICNIRP 2020 FCC 47 CFR 1.1310 SPEAG, DASY8 Application Note: SAR, APD & PD at 6 - 10 GHz (Version 6.0), August 2022 October 2020 TCBC Workshop Notes
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1.2 IDENTIFICATION OF THE EUT

The table below details identification of the EUT(s) that have been used to carry out the testing within this report.

Model: MP11000			
Serial Number	Hardware Version	Software Version	Firmware
MP11000 - B01 (Radiated)	04	22.200.0.6	N/A
MP11000 - B05 (Radiated)	04	22.200.0.6	N/A
MP11000 - B09 (Conducted)	04	22.200.0.6	N/A

Table 1

1.3 BRIEF SUMMARY OF RESULTS

The measurements shown in this report were made to the requirements of FCC 47 CFR 2.1093.

1.3.1 Summary of Maximum Values

The maximum 1g volume averaged stand-alone SAR found during this Assessment:

Max 1g SAR (W/kg) Body	1.340 (Measured)	1.371(Scaled)
The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for FCC General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg in accordance with FCC 47 CFR 1.1310.		

Table 2

The maximum iPD 4cm^2 found during this Assessment:

Max iPD 4cm^2 (W/m^2)	4.590(Measured)
The maximum iPD averaged over 4cm^2 measured for all the tests performed did not exceed the standalone limits for FCC General Population/Uncontrolled Exposure of 10.00 W/m^2 in accordance with FCC 47 CFR 1.1310.	

Table 3

The maximum 1g volume averaged stand-alone Reported SAR found during this assessment for each supported mode:

Technology	Band	Test Configuration	Max Reported SAR (W/kg)
WLAN	2450 MHz	Body	0.358
WLAN	5200 MHz	Body	0.674
WLAN	5300 MHz	Body	0.663
WLAN	5600 MHz	Body	1.371
WLAN	5800 MHz	Body	0.935
The maximum 1g volume averaged SAR level measured for all the tests performed (including simultaneous transmission analysis results) did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg.			

Table 4

1.3.2 Simultaneous Transmission

This EUT does not have any simultaneous transmission conditions. It is a WLAN only device.
All MIMO SAR distributions are spatially seperated to the extent that they do not overlap.

1.4 TEST RESULTS SUMMARY

1.4.1 Results Summary Tables

WLAN 2.4 GHz - DSSS - 802.11b 20 MHz - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured (W/Kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	6	2437	21.99	22.00	0.006	0.006	-
0mm Bottom	6	2437	21.99	22.00	0.083	0.083	-
0mm Back	6	2437	21.99	22.00	0.001	0.001	-
0mm Bottom	11	2462	21.96	22.00	0.179	0.181	C.1
0mm Bottom	1	2412	21.98	22.00	0.099	0.099	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 5

WLAN 2.4 GHz - DSSS - 802.11b 20 MHz - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured (W/Kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	7	2442	21.98	22.00	0.014	0.014	-
0mm Bottom	7	2442	21.98	22.00	0.131	0.132	-
0mm Back	7	2442	21.98	22.00	0.061	0.061	-
0mm Bottom	3	2422	21.91	22.00	0.103	0.105	-
0mm Bottom	11	2462	21.95	22.00	0.253	0.256	C.2
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 6

WLAN 2.4 GHz - OFDM - 802.11g 20 MHz - MIMO - Antenna A & B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top Antenna A	6	2437	21.50	21.50	0.044	0.044	-
0mm Top Antenna B	6	2437	21.39	21.50	0.040	0.041	
0mm Bottom Antenna A	6	2437	21.50	21.50	0.304	0.304	C.3
0mm Bottom Antenna B	6	2437	21.39	21.50	0.212	0.217	
0mm Back Antenna A	6	2437	21.50	21.50	0.128	0.128	-
0mm Back Antenna B	6	2437	21.39	21.50	0.048	0.049	
0mm Bottom Antenna A	1	2412	17.25	17.75	0.034	0.038	-
0mm Bottom Antenna B	1	2412	17.30	17.75	0.026	0.029	
0mm Bottom Antenna A	11	2462	16.50	17.00	0.188	0.211	-
0mm Bottom Antenna B	11	2462	16.35	17.00	0.160	0.186	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 7

WLAN 2.4 GHz - OFDM - 802.11g 20 MHz - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	6	2437	21.90	22.00	0.022	0.023	-
0mm Bottom	6	2437	21.90	22.00	0.185	0.189	-
0mm Back	6	2437	21.90	22.00	0.007	0.007	-
0mm Bottom	1	2412	19.00	19.50	0.171	0.192	-
0mm Bottom	11	2462	18.20	18.75	0.315	0.358	C.4
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 8

WLAN 2.4 GHz - OFDM - 802.11g 20 MHz - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	6	2437	21.75	22.00	0.031	0.033	-
0mm Bottom	6	2437	21.75	22.00	0.238	0.252	C.5
0mm Back	6	2437	21.75	22.00	0.147	0.156	-
0mm Bottom	1	2412	19.18	19.50	0.049	0.053	-
0mm Bottom	11	2462	17.75	18.50	0.122	0.145	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 9

WLAN 5.2 GHz - OFDM - 802.11ac VHT80 & 802.11n HT40 - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	46[1]	5230	21.98	22.00	0.091	0.091	-
0mm Bottom	46[1]	5230	21.98	22.00	0.403	0.405	C.6
0mm Back	46[1]	5230	21.98	22.00	0.277	0.278	-
0mm Bottom	42[2]	5210	18.15	19.00	0.155	0.189	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 40 MHz Bandwidth channel Note 2: 80 MHz Bandwidth channel							

Table 10

WLAN 5.2 GHz - OFDM - 802.11a 20 MHz - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	44	5220	21.35	22.00	0.032	0.037	-
0mm Bottom	44	5220	21.35	22.00	0.400	0.465	-
0mm Back	44	5220	21.35	22.00	0.387	0.449	-
0mm Bottom	40	5200	21.38	22.00	0.367	0.423	-
0mm Bottom	48	5240	21.35	22.00	0.435	0.505	C.7
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 11

WLAN 5.2 GHz - OFDM - 802.11n HT40 & 802.11a 20 MHz - MIMO - Antenna A & B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top Antenna A	46(1)	5230	19.43	20.50	0.047	0.060	-
0mm Top Antenna B	46(1)	5230	20.38	20.50	0.023	0.024	
0mm Bottom Antenna A	46(1)	5230	19.87	20.50	0.583	0.674	C.8
0mm Bottom Antenna B	46(1)	5230	19.79	20.50	0.158	0.186	
0mm Back Antenna A	46(1)	5230	19.43	20.50	0.119	0.152	-
0mm Back Antenna B	46(1)	5230	20.38	20.50	0.047	0.048	
0mm Bottom Antenna A	36(2)	5180	17.20	18.50	0.286	0.386	-
0mm Bottom Antenna B	36(2)	5180	17.88	18.50	0.140	0.161	
0mm Bottom Antenna A	40(2)	5200	19.43	20.00	0.426	0.486	-
0mm Bottom Antenna B	40(2)	5200	20.38	20.00	0.218	0.200	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 40 MHz Bandwidth channel Note 2: 20 MHz Bandwidth channel							

Table 12

WLAN 5.3 GHz - OFDM - 802.11n HT40 & 802.11a 20 MHz - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	60(2)	5300	20.26	22.00	0.078	0.116	-
0mm Bottom	60(2)	5300	20.26	22.00	0.406	0.606	C.9
0mm Back	60(2)	5300	20.26	22.00	0.323	0.482	-
0mm Bottom	54(1)	5270	20.82	22.00	0.458	0.601	-
0mm Bottom	64(2)	5320	19.46	21.00	0.336	0.479	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 40 MHz Bandwidth channel Note 2: 20 MHz Bandwidth channel							

Table 13

WLAN 5.3 GHz - OFDM - 802.11a 20 MHz - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	56	5280	21.32	22.00	0.043	0.050	-
0mm Bottom	56	5280	21.32	22.00	0.554	0.648	-
0mm Back	56	5280	21.32	22.00	0.459	0.537	-
0mm Bottom	52	5260	21.28	22.00	0.470	0.555	-
0mm Bottom	60	5300	21.40	22.00	0.574	0.659	C.10
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 14

WLAN 5.3 GHz - OFDM - 802.11a 20 MHz - MIMO - Antenna A & B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top Antenna A	56	5280	18.55	20.00	0.048	0.067	-
0mm Top Antenna B	56	5280	19.40	20.00	0.026	0.030	
0mm Bottom Antenna A	56	5280	18.55	20.00	0.250	0.349	-
0mm Bottom Antenna B	56	5280	19.40	20.00	0.515	0.591	
0mm Back Antenna A	56	5280	18.55	20.00	0.358	0.500	-
0mm Back Antenna B	56	5280	19.40	20.00	0.329	0.378	
0mm Bottom Antenna A	52	5260	18.52	20.00	0.284	0.399	-
0mm Bottom Antenna B	52	5260	19.34	20.00	0.511	0.595	
0mm Bottom Antenna A	60	5300	18.61	20.00	0.302	0.416	C.11
0mm Bottom Antenna B	60	5300	19.45	20.00	0.584	0.663	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 15

WLAN 5.6 GHz - OFDM - 802.11ac VHT80 & 802.11a 20 MHz - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	122(1)	5610	21.94	22.00	0.039	0.040	-
0mm Bottom	122(1)	5610	21.94	22.00	0.253	0.257	-
0mm Back	122(1)	5610	21.94	22.00	0.063	0.064	-
0mm Bottom	104(2)	5520	21.48	22.00	0.330	0.372	C.12
0mm Bottom	112(2)	5560	21.50	22.00	0.286	0.321	-
0mm Bottom	138(1)	5690	21.88	22.00	0.281	0.289	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 80 MHz Bandwidth channel Note 2: 20 MHz Bandwidth channel							

Table 16

WLAN 5.6 GHz - OFDM - 802.11ac VHT80 & 802.11a 20 MHz - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Top	122(1)	5610	21.95	22.00	0.092	0.093	-
0mm Bottom	122(1)	5610	21.95	22.00	1.180	1.194	-
0mm Back	122(1)	5610	21.95	22.00	0.436	0.441	-
0mm Bottom	104(2)	5520	21.30	22.00	0.958	1.126	-
0mm Bottom	112(2)	5560	21.22	22.00	0.873	1.045	-
0mm Bottom	138(1)	5690	21.75	22.00	1.210	1.282	C.13
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 80 MHz Bandwidth channel Note 2: 20 MHz Bandwidth channel							

Table 17

WLAN 5.6 GHz - OFDM - 802.11ac VHT80 & 802.11a 20 MHz - MIMO - Antenna A & B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top Antenna A	122(1)	5610	21.97	22.00	0.069	0.069	-
Top Antenna B	122(1)	5610	21.90	22.00	0.063	0.064	
Bottom Antenna A	122(1)	5610	21.97	22.00	1.080	1.087	-
Bottom Antenna B	122(1)	5610	21.90	22.00	0.635	0.650	
Back Antenna A	122(1)	5610	21.97	22.00	0.273	0.275	-
Back Antenna B	122(1)	5610	21.90	22.00	0.065	0.067	
Bottom Antenna A	104(2)	5520	19.73	20.00	0.660	0.702	-
Bottom Antenna B	104(2)	5520	19.40	20.00	0.295	0.339	
Bottom Antenna A	112(2)	5560	19.76	20.00	0.973	1.028	-
Bottom Antenna B	112(2)	5560	19.37	20.00	0.362	0.419	
Bottom Antenna A	138(1)	5690	21.90	22.00	1.340	1.371	C.14
Bottom Antenna B	138(1)	5690	21.70	22.00	0.703	0.753	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 80 MHz Bandwidth channel Note 2: 20 MHz Bandwidth channel							

Table 18

WLAN 5.8 GHz - OFDM - 802.11n HT40 - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	151	5755	21.97	22.00	0.016	0.016	-
Bottom	151	5755	21.97	22.00	0.316	0.318	C.15
Back	151	5755	21.97	22.00	0.096	0.097	-
Bottom	159	5795	21.93	22.00	0.299	0.304	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 19

WLAN 5.8 GHz - OFDM - 802.11n HT40 - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	151	5755	21.95	22.00	0.315	0.319	-
Bottom	151	5755	21.95	22.00	0.869	0.879	C.16
Back	151	5755	21.95	22.00	0.246	0.249	-
Bottom	159	5795	21.88	22.00	0.741	0.762	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 20

WLAN 5.8 GHz - OFDM - 802.11n HT40 - SISO - Antenna A & B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top Antenna A	159	5795	21.62	22.00	0.013	0.014	-
Top Antenna B	159	5795	21.28	22.00	0.009	0.011	
Bottom Antenna A	159	5795	21.62	22.00	0.787	0.859	-
Bottom Antenna B	159	5795	21.28	22.00	0.668	0.788	
Back Antenna A	159	5795	21.62	22.00	0.235	0.256	-
Back Antenna B	159	5795	21.28	22.00	0.170	0.201	
Bottom Antenna A	151	5755	21.70	21.75	0.924	0.935	C.17
Bottom Antenna B	151	5755	21.60	21.75	0.513	0.513	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Table 21

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE160 - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	47(2)	6185	21.38	22.00	0.117	0.135*	-
Bottom	47(2)	6185	21.38	22.00	0.696	0.803*	-
Back	47(2)	6185	21.38	22.00	1.300	1.499*	-
Back	7(1)	5985	20.91	21.75	0.816	0.990**	C.18
Back	23(1)	6065	21.20	22.00	1.330	1.599*	-
Back	79(2)	6345	21.30	22.00	0.718	0.844*	-
*There is no regulatory limit applied to this results. The data is provided to demonstrate the worst case position for iPD testing. ** Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel							

Table 22

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE160 - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	47(2)	6185	21.61	22.00	0.099	0.108*	-
Bottom	47(2)	6185	21.61	22.00	0.715	0.782*	-
Back	47(2)	6185	21.61	22.00	0.036	0.040*	-
Bottom	7(1)	5985	21.00	21.50	0.639	0.717**	C.19
Bottom	23(1)	6065	21.50	22.00	0.711	0.798*	-
Bottom	79(2)	6345	21.41	22.00	0.430	0.493*	-
*There is no regulatory limit applied to this results. The data is provided to demonstrate the worst case position for iPD testing. ** Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel							

Table 23

WLAN 6 GHz - OFDM - 802.11ax HE160 - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	111	6505	14.97	15.00	0.011	0.011	-
Bottom	111	6505	14.97	15.00	0.171	0.172	-
Back	111	6505	14.97	15.00	0.127	0.128	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing.							

Table 24

WLAN 6 GHz - OFDM - 802.11ax HE160 - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	111	6505	14.48	15.00	0.026	0.029	-
Bottom	111	6505	14.48	15.00	0.448	0.505	-
Back	111	6505	14.48	15.00	0.449	0.506	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing.							

Table 25

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE 160 - SISO - Antenna A
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	167[1]	6785	21.91	22.00	0.152	0.155	-
Bottom	167[1]	6785	21.91	22.00	0.502	0.513	-
Back	167[1]	6785	21.91	22.00	0.109	0.111	-
Bottom	143[2]	6665	21.91	22.00	0.690	0.704	-
Bottom	175[2]	6825	14.22	14.25	0.170	0.171	-
Bottom	207[2]	6985	14.21	14.25	0.127	0.128	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel							

Table 26

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE 160 - SISO - Antenna B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Top	167(1)	6785	21.96	22.00	0.116	0.117	-
Bottom	167(1)	6785	21.96	22.00	0.512	0.517	-
Back	167(1)	6785	21.96	22.00	0.019	0.019	-
Bottom	143(2)	6665	21.89	22.00	0.144	0.148	-
Bottom	175(2)	6825	14.23	14.25	0.178	0.179	-
Bottom	207(2)	6985	14.24	14.25	0.029	0.029	
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel							

Table 27

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE 160 - MIMO - Antenna A & B
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Bottom Antenna A	23(1)	6065	21.70	22.00	0.042	0.045	-
Bottom Antenna B	23(1)	6065	21.72	22.00	0.038	0.041	
Bottom Antenna A	111(2)	6505	11.96	12.00	0.248	0.250	-
Bottom Antenna B	111(2)	6505	11.97	12.00	0.131	0.132	
Bottom Antenna A	143(2)	6665	21.90	22.00	1.181	1.209	-
Bottom Antenna B	143(2)	6665	21.92	22.00	0.714	0.727	
Bottom Antenna A	207(2)	6985	11.25	11.25	0.059	0.059	-
Bottom Antenna B	207(2)	6985	11.24	11.25	0.362	0.362	
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel							

Table 28

Absorbed Power Density (APD) Results

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE160 - SISO - Antenna A
Absorbed Power Density (APD) 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Top	47[2]	6185	21.38	22.00	0.620	0.715	0.036	-
Bottom	47[2]	6185	21.38	22.00	6.400	7.382	0.369	-
Back	47[2]	6185	21.38	22.00	11.200	12.919	0.646	-
Back	7[1]	5985	20.91	21.75	7.200	8.736	0.437	-
Back	23[1]	6065	21.20	22.00	11.600	13.946	0.697	-
Back	79[2]	6345	21.30	22.00	5.620	6.603	0.330	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel								

Table 29

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE160 - SISO - Antenna B
Absorbed Power Density (APD) 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Top	47(2)	6185	21.61	22.00	0.940	1.028	0.051	-
Bottom	47(2)	6185	21.61	22.00	5.520	6.039	0.302	-
Back	47(2)	6185	21.61	22.00	3.120	3.413	0.171	-
Bottom	7(1)	5985	21.00	21.50	5.540	6.216	0.311	-
Bottom	23(1)	6065	21.50	22.00	6.160	6.912	0.346	-
Bottom	79(2)	6345	21.41	22.00	3.740	4.284	0.214	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel								

Table 30

WLAN 6 GHz - OFDM - 802.11ax HE160 - SISO - Antenna A
Absorbed Power Density (APD) 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Top	111	6505	14.97	15.00	0.600	0.604	0.030	-
Bottom	111	6505	14.97	15.00	1.540	1.551	0.078	-
Back	111	6505	14.97	15.00	0.860	0.866	0.043	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing.								

Table 31

WLAN 6 GHz - OFDM - 802.11ax HE160 - SISO - Antenna B
Absorbed Power Density (APD) 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Top	111	6505	14.48	15.00	0.220	0.248	0.012	-
Bottom	111	6505	14.48	15.00	3.460	3.900	0.195	-
Back	111	6505	14.48	15.00	1.200	1.353	0.068	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing.								

Table 32

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE 160 - SISO - Antenna A
Absorbed Power Density (APD) 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Top	167[1]	6785	21.91	22.00	1.140	1.164	0.058	-
Bottom	167[1]	6785	21.91	22.00	4.060	4.145	0.207	-
Back	167[1]	6785	21.91	22.00	0.660	0.674	0.034	-
Bottom	143[2]	6665	21.91	22.00	6.280	6.411	0.321	-
Bottom	175[2]	6825	14.22	14.25	1.240	1.249	0.062	-
Bottom	207[2]	6985	14.21	14.25	1.040	1.050	0.053	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel								

Table 33

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE 160 - SISO - Antenna B
Absorbed Power Density (APD) 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Top	167(1)	6785	21.96	22.00	0.980	0.989	0.049	-
Bottom	167(1)	6785	21.96	22.00	4.160	4.198	0.210	-
Back	167(1)	6785	21.96	22.00	0.080	0.081	0.004	-
Bottom	143(2)	6665	21.89	22.00	1.140	1.169	0.058	-
Bottom	175(2)	6825	14.23	14.25	0.660	0.663	0.033	-
Bottom	207(2)	6985	14.24	14.25	0.200	0.200	0.010	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel								

Table 34

WLAN 6 GHz - OFDM - 802.11ax HE80 & 802.11ax HE 160 - SISO - Antenna A & B
Absorbed Power Density (APD) 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Bottom Antenna A	23(1)	6065	21.70	22.00	0.260	0.279	0.014	-
Bottom Antenna B	23(1)	6065	21.72	22.00	0.240	0.256	0.013	
Bottom Antenna A	111(2)	6505	11.96	12.00	1.820	1.837	0.092	-
Bottom Antenna B	111(2)	6505	11.97	12.00	0.800	0.806	0.040	
Bottom Antenna A	143(2)	6665	21.90	22.00	9.460	9.680	0.484	-
Bottom Antenna B	143(2)	6665	21.92	22.00	5.140	5.236	0.262	
Bottom Antenna A	207(2)	6985	11.25	11.25	0.460	0.460	0.023	-
Bottom Antenna B	207(2)	6985	11.24	11.25	0.240	0.241	0.012	
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing. Note 1: 80 MHz Bandwidth channel Note 2: 160 MHz Bandwidth channel								

Table 35

WLAN 6 GHz - OFDM - 802.11ax HE80 - 6 Mbps - SISO - Antenna A
Absorbed Power Density (APD) 4cm^2 Results.

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	Exposure Ratio	Scan Figure Number
Front	23	6065	21.50	22.00	0.180	0.216	0.011	-
Top	23	6065	21.50	22.00	0.200	0.240	0.012	-
Bottom	23	6065	21.50	22.00	4.300	5.170	0.259	-
Left	23	6065	21.50	22.00	0.220	0.264	0.013	-
Right	23	6065	21.50	22.00	0.140	0.168	0.008	-
Back	23	6065	21.50	22.00	11.600	13.946	0.697	-
There are no regulatory limit applied to the results in this table. The data is provided to demonstrate the worst case position for iPD testing.								

Table 36

Incident Power Density (iPD) Results

WLAN 6 GHz - 802.11ax – HE80 - MCS0 - Core 0 - SISO
Incident Power Density

Test Position	Channel Number	Frequency (MHz)	Measured iPD 4cm^2 (W/m^2)	Standalone iPD 4cm^2 limit (W/m^2)	Exposure Ratio	Scan Figure Number
Back	23	6065	4.590	10	0.459	C.20
The measured iPD result above was the highest SAR and APD value recorded and was chosen for the iPD test.						

Table 37

1.4.2 Technical Description

The equipment under test (EUT) was a Mobile processor.

1.4.3 Interim Procedures for FCC Radio Frequency Exposure Evaluations

The interim procedure for FCC Radio Frequency (RF) exposure evaluations of U-NII 6-7 GHz band portable devices have been made available during the TCB workshop in October 2020. The procedure is summarized below:

- Evaluate SAR / APD with DASY Module SAR V16.0 or higher. The configurations to be tested are defined in the relevant Knowledge Database (KDB). The peak spatial averaged SAR (psSAR) and the peak spatial averaged absorbed Power Density (psAPD) are reported.

- For the configuration with the highest SAR / APD, evaluate the PD with DASY Module mmWave V3.0 or higher.

1.4.4 Test Configuration and Modes of Operation

Testing was performed on WLAN and supported technologies include 2.4 GHz WLAN (802.11b/g/n/ax), 5 GHz WLAN (802.11a/n/ac/ax) and 6 GHz WLAN (802.11a/ax).

Testing was conducted using the device's internal software, scripts, and settings provided by the customer. At the time of each scan, the device was configured into a continuous transmission test mode at a maximum power determined by the customer. In each position, the highest output power was tested first, followed by the upper and lower channels on the worst-case scenario. Due to a large operating bandwidth, there may not be a centre channel in some cases. Due to the absence of a centre channel, only two channels were used.

SAR results were power scaled to the maximum level tune-up as declared by the client. Conducted power measurements were made on a modified sample (accessible conducted port). A SAR assessment was conducted on the Top, Bottom, and Back surfaces of the device.

For 2.4, 5 or 6 GHz frequency bands, the transmission mode was determined by the 802.11 configuration with the highest declared output power. In cases where multiple 802.11 configurations have the same specified output power, the mode with the largest channel bandwidth, lowest order modulation, and lowest data rate was tested. For SAR assessment, the relevant surfaces of the device were placed against an Elliptical phantom with a 0mm separation distance.

The Elliptical Flat Phantom dimensions are 600mm major axis and 400mm minor axis with a shell thickness of 2mm. The phantom was filled to a minimum depth of 150mm with the appropriate liquid. The dielectric properties were in accordance with the requirements specified in KDB 865665.

Included in this report are descriptions of the test method; the equipment used and an analysis of the test uncertainties applicable and diagrams indicating the locations of maximum SAR, APD and iPD for each relevant test position.

1.5 POWER TABLES (TUNE UP VALUES)

Note: All values in dBm
NS= Not Supported

2.4 GHz WLAN - SISO - Antenna A

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM-HT	20 MHz OFDM	20 MHz CCK
1	2412	19.50	19.50	19.50	22.00
2	2417	20.75	20.75	20.75	22.00
3	2422	21.25	21.25	21.25	22.00
4	2427	22.00	22.00	22.00	22.00
5	2432	22.00	22.00	22.00	22.00
6	2437	22.00	22.00	22.00	22.00
7	2442	22.00	22.00	22.00	22.00
8	2447	21.25	21.25	21.25	22.00
9	2452	20.50	20.50	20.50	22.00
10	2457	20.25	20.25	20.25	22.00
11	2462	18.75	18.75	18.75	22.00
12	2467	15.00	15.00	15.00	20.00
13	2472	12.75	12.75	12.75	18.50

Table 38

2.4 GHz WLAN - SISO - Antenna B

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM-HT	20 MHz OFDM	20 MHz CCK
1	2412	16.00	16.00	19.50	21.50
2	2417	20.75	20.75	20.75	21.50
3	2422	21.00	21.00	21.00	22.00
4	2427	21.25	21.25	21.25	22.00
5	2432	22.00	22.00	22.00	22.00
6	2437	22.00	22.00	22.00	22.00
7	2442	22.00	22.00	22.00	22.00
8	2447	21.25	21.25	21.25	22.00
9	2452	20.50	20.50	20.50	22.00
10	2457	20.25	20.25	20.25	22.00
11	2462	14.75	14.75	14.75	22.00
12	2467	15.00	15.00	15.00	20.00
13	2472	12.50	12.50	12.50	18.00

Table 39

2.4 GHz WLAN - SISO - Antenna A & B

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM-HT	20 MHz OFDM
1	2412	17.75	17.75	17.75
2	2417	19.75	19.75	19.75
3	2422	21.50	20.50	20.50
4	2427	20.50	20.50	20.50
5	2432	21.50	21.50	21.50
6	2437	21.50	21.50	21.50
7	2442	21.50	21.50	21.50
8	2447	20.75	20.75	20.75
9	2452	20.25	20.25	20.25
10	2457	19.50	19.50	19.50
11	2462	17.00	17.00	17.00
12	2467	14.00	14.00	14.00
13	2472	11.75	11.75	11.75

Table 40

2.4 GHz WLAN - SISO - Antenna A

Channel	Frequency (MHz)	40MHz OFDM-HE	40MHz OFDM-HT
3	2422	17.75	17.75
4	2427	18.75	18.75
5	2432	19.25	19.25
6	2437	19.00	19.00
7	2442	18.00	18.00
8	2447	17.75	17.75
9	2452	17.25	17.25
10	2457	12.75	12.75
11	2462	13.00	13.00

Table 41

2.4 GHz WLAN - SISO - Antenna B

Channel	Frequency (MHz)	40MHz OFDM-HE	40MHz OFDM-HT
3	2422	17.25	17.25
4	2427	17.75	17.75
5	2432	18.75	18.75
6	2437	18.75	18.75
7	2442	18.00	18.00
8	2447	17.25	17.25
9	2452	17.00	17.00
10	2457	12.75	12.75
11	2462	12.50	12.50

Table 42

2.4 GHz WLAN - SISO - Antenna A & B

Channel	Frequency (MHz)	40MHz OFDM-HE	40MHz OFDM-HT
3	2422	16.00	16.00
4	2427	15.75	15.75
5	2432	16.50	16.50
6	2437	17.75	17.75
7	2442	16.75	16.75
8	2447	16.00	16.00
9	2452	15.75	15.75
10	2457	10.00	10.00
11	2462	10.75	10.75

Table 43

5 GHz WLAN - 20 MHz BW - Antenna A

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM-VHT	20 MHz OFDM-HT	20 MHz OFDM
36	5180	20.50	20.50	20.50	20.50
40	5200	22.00	22.00	22.00	22.00
44	5220	22.00	22.00	22.00	22.00
48	5240	22.00	22.00	22.00	22.00
52	5260	22.00	22.00	22.00	22.00
56	5280	22.00	22.00	22.00	22.00
60	5300	22.00	22.00	22.00	22.00
64	5320	21.00	21.00	21.00	21.00
100	5500	21.50	21.50	21.50	21.50
104	5520	22.00	22.00	22.00	22.00
108	5540	22.00	22.00	22.00	22.00
112	5560	22.00	22.00	22.00	22.00
116	5580	22.00	22.00	22.00	22.00
120	5600	22.00	22.00	22.00	22.00
124	5620	22.00	22.00	22.00	22.00
128	5640	22.00	22.00	22.00	22.00
132	5660	22.00	22.00	22.00	22.00
136	5680	22.00	22.00	22.00	22.00
140	5700	21.00	21.00	21.00	21.00
144	5720	22.00	22.00	22.00	22.00
149	5745	22.00	22.00	22.00	22.00
153	5765	22.00	22.00	22.00	22.00
157	5785	22.00	22.00	22.00	22.00
161	5805	22.00	22.00	22.00	22.00
165	5825	22.00	22.00	22.00	22.00

Table 44

5 GHz WLAN - 20 MHz BW - Antenna B

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM-VHT	20 MHz OFDM-HT	20 MHz OFDM
36	5180	20.00	20.00	20.00	20.00
40	5200	22.00	22.00	22.00	22.00
44	5220	22.00	22.00	22.00	22.00
48	5240	22.00	22.00	22.00	22.00
52	5260	22.00	22.00	22.00	22.00
56	5280	22.00	22.00	22.00	22.00
60	5300	22.00	22.00	22.00	22.00
64	5320	21.00	21.00	21.00	21.00
100	5500	21.50	21.50	21.50	21.50
104	5520	22.00	22.00	22.00	22.00
108	5540	22.00	22.00	22.00	22.00
112	5560	22.00	22.00	22.00	22.00
116	5580	22.00	22.00	22.00	22.00
120	5600	22.00	22.00	22.00	22.00
124	5620	22.00	22.00	22.00	22.00
128	5640	22.00	22.00	22.00	22.00
132	5660	22.00	22.00	22.00	22.00
136	5680	22.00	22.00	22.00	22.00
140	5700	21.00	21.00	21.00	21.00
144	5720	22.00	22.00	22.00	22.00
149	5745	22.00	22.00	22.00	22.00
153	5765	22.00	22.00	22.00	22.00
157	5785	22.00	22.00	22.00	22.00
161	5805	22.00	22.00	22.00	22.00
165	5825	22.00	22.00	22.00	22.00

Table 45

5 GHz WLAN - 20 MHz BW - Antenna A & B

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM-VHT	20 MHz OFDM-HT	20 MHz OFDM
36	5180	18.50	18.50	18.50	18.50
40	5200	20.00	20.00	20.00	20.00
44	5220	20.00	20.00	20.00	20.00
48	5240	19.75	19.75	19.75	19.75
52	5260	20.00	20.00	20.00	20.00
56	5280	20.00	20.00	20.00	20.00
60	5300	20.00	20.00	20.00	20.00
64	5320	19.00	19.00	19.00	19.00
100	5500	19.00	19.00	19.00	19.00
104	5520	20.00	20.00	20.00	20.00
108	5540	20.00	20.00	20.00	20.00
112	5560	20.00	20.00	20.00	20.00
116	5580	20.00	20.00	20.00	20.00
120	5600	20.00	20.00	20.00	20.00
124	5620	20.00	20.00	20.00	20.00
128	5640	20.00	20.00	20.00	20.00
132	5660	20.00	20.00	20.00	20.00
136	5680	20.00	20.00	20.00	20.00
140	5700	20.00	20.00	20.00	20.00
144	5720	20.00	20.00	20.00	20.00
149	5745	22.00	22.00	22.00	22.00
153	5765	22.00	22.00	22.00	22.00
157	5785	22.00	22.00	22.00	22.00
161	5805	22.00	22.00	22.00	22.00
165	5825	22.00	22.00	22.00	22.00

Table 46

5 GHz WLAN - 40 MHz BW - Antenna A

Channel	Frequency (MHz)	40MHz OFDM-HE	40MHz OFDM-VHT	40MHz OFDM-HT
38	5190	18.75	18.75	18.75
46	5230	22.00	22.00	22.00
54	5270	22.00	22.00	22.00
62	5310	18.50	18.50	18.50
102	5510	19.75	19.75	19.75
110	5550	21.50	21.50	21.50
118	5590	22.00	22.00	22.00
126	5630	22.00	22.00	22.00
134	5670	21.50	21.50	21.50
142	5710	22.00	22.00	22.00
151	5755	22.00	22.00	22.00
159	5795	22.00	22.00	22.00

Table 47

5 GHz WLAN - 40 MHz BW - Antenna B

Channel	Frequency (MHz)	40MHz OFDM-HE	40MHz OFDM-VHT	40MHz OFDM-HT
38	5190	17.50	17.50	17.50
46	5230	21.50	21.50	21.50
54	5270	21.00	21.00	21.00
62	5310	17.75	17.75	17.75
102	5510	19.50	19.50	19.50
110	5550	20.75	20.75	20.75
118	5590	22.00	22.00	22.00
126	5630	22.00	22.00	22.00
134	5670	21.00	21.00	21.00
142	5710	22.00	22.00	22.00
151	5755	22.00	22.00	22.00
159	5795	22.00	22.00	22.00

Table 48

5 GHz WLAN - 40 MHz BW - Antenna A & B

Channel	Frequency (MHz)	40MHz OFDM-HE	40MHz OFDM-VHT	40MHz OFDM-HT
38	5190	15.00	15.00	15.00
46	5230	20.50	20.50	20.50
54	5270	19.50	19.50	19.50
62	5310	16.75	16.75	16.75
102	5510	17.50	17.50	17.50
110	5550	19.50	19.50	19.50
118	5590	21.75	21.75	21.75
126	5630	22.00	22.00	22.00
134	5670	19.75	19.75	19.75
142	5710	22.00	22.00	22.00
151	5755	21.75	21.75	21.75
159	5795	22.00	22.00	22.00

Table 49

5 GHz WLAN - 80 MHz BW - Antenna A

Channel	Frequency (MHz)	80 MHz OFDM-HE	80 MHz OFDM-VHT
42	5210	19.00	19.00
58	5290	18.50	18.50
106	5530	19.75	19.75
122	5610	22.00	22.00
138	5690	22.00	22.00
155	5775	21.00	21.00

Table 50

5 GHz WLAN - 80 MHz BW - Antenna B

Channel	Frequency (MHz)	80 MHz OFDM-HE	80 MHz OFDM-VHT
42	5210	19.00	19.00
58	5290	17.75	18.50
106	5530	19.25	19.25
122	5610	22.00	22.00
138	5690	22.00	22.00
155	5775	21.00	21.00

Table 51

5 GHz WLAN - 80 MHz BW - Antenna A & B

Channel	Frequency (MHz)	80 MHz OFDM-HE	80 MHz OFDM-VHT
42	5210	17.00	17.00
58	5290	15.50	15.50
106	5530	17.25	17.25
122	5610	22.00	22.00
138	5690	22.00	22.00
155	5775	20.00	20.00

Table 52

5 GHz WLAN - 160 MHz BW - Antenna A

Channel	Frequency (MHz)	80 MHz OFDM-HE	80 MHz OFDM-VHT
50	5250	16.50	16.50
114	5570	17.75	17.75

Table 53

5 GHz WLAN - 160 MHz BW - Antenna B

Channel	Frequency (MHz)	80 MHz OFDM-HE	80 MHz OFDM-VHT
50	5250	16.25	16.25
114	5570	16.50	16.50

Table 54

5 GHz WLAN - 160 MHz BW - Antenna A & B

Channel	Frequency (MHz)	80 MHz OFDM-HE	80 MHz OFDM-VHT
50	5250	14.50	14.50
114	5570	15.50	15.50

Table 55

6 GHz WLAN - 20 MHz BW - Antenna A

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM
1	5955	22.00	22.00
5	5975	22.00	22.00
9	5995	22.00	22.00
13	6015	22.00	22.00
17	6035	22.00	22.00
21	6055	22.00	22.00
25	6075	22.00	22.00
29	6095	22.00	22.00
33	6115	22.00	22.00
37	6135	22.00	22.00
41	6155	22.00	22.00
45	6175	22.00	22.00
49	6195	22.00	22.00
53	6215	22.00	22.00
57	6235	22.00	22.00
61	6255	22.00	22.00
65	6275	22.00	22.00
69	6295	22.00	22.00
73	6315	22.00	22.00
77	6335	22.00	22.00
81	6355	22.00	22.00
85	6375	22.00	22.00
89	6395	22.00	22.00
93	6415	22.00	22.00
97	6435	6.50	6.50
101	6455	6.50	6.50
105	6475	6.50	6.50
109	6495	6.50	6.50
113	6515	6.50	6.50
117	6535	22.00	22.00
121	6555	22.00	22.00
125	6575	22.00	22.00
129	6595	22.00	22.00
133	6615	22.00	22.00
137	6635	22.00	22.00
141	6655	22.00	22.00
145	6675	22.00	22.00

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM
149	6695	22.00	22.00
153	6715	22.00	22.00
157	6735	22.00	22.00
161	6755	22.00	22.00
165	6775	22.00	22.00
169	6795	22.00	22.00
173	6815	22.00	22.00
177	6835	22.00	22.00
181	6855	22.00	22.00
185	6875	5.75	5.75
189	6895	5.75	5.75
193	6915	5.75	5.75
197	6935	5.75	5.75
201	6955	5.75	5.75
205	6975	5.75	5.75
209	6995	5.75	5.75
213	7015	5.75	5.75
217	7035	5.75	5.75
221	7055	5.75	5.75
225	7075	5.75	5.75
229	7095	5.75	5.75
233	7115	0.50	0.50

Table 56

6 GHz WLAN - 20 MHz BW - Antenna B

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM
1	5955	22.00	22.00
5	5975	22.00	22.00
9	5995	22.00	22.00
13	6015	22.00	22.00
17	6035	22.00	22.00
21	6055	22.00	22.00
25	6075	22.00	22.00
29	6095	22.00	22.00
33	6115	22.00	22.00
37	6135	22.00	22.00
41	6155	22.00	22.00
45	6175	22.00	22.00
49	6195	22.00	22.00
53	6215	22.00	22.00
57	6235	22.00	22.00
61	6255	22.00	22.00
65	6275	22.00	22.00
69	6295	22.00	22.00
73	6315	22.00	22.00
77	6335	22.00	22.00
81	6355	22.00	22.00
85	6375	22.00	22.00
89	6395	22.00	22.00
93	6415	22.00	22.00
97	6435	6.50	6.50
101	6455	6.50	6.50
105	6475	6.50	6.50
109	6495	6.50	6.50
113	6515	6.50	6.50
117	6535	22.00	22.00
121	6555	22.00	22.00
125	6575	22.00	22.00
129	6595	22.00	22.00
133	6615	22.00	22.00
137	6635	22.00	22.00
141	6655	22.00	22.00
145	6675	22.00	22.00

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM
149	6695	22.00	22.00
153	6715	22.00	22.00
157	6735	22.00	22.00
161	6755	22.00	22.00
165	6775	22.00	22.00
169	6795	22.00	22.00
173	6815	22.00	22.00
177	6835	22.00	22.00
181	6855	22.00	22.00
185	6875	5.75	5.75
189	6895	5.75	5.75
193	6915	5.75	5.75
197	6935	5.75	5.75
201	6955	5.75	5.75
205	6975	5.75	5.75
209	6995	5.75	5.75
213	7015	5.75	5.75
217	7035	5.75	5.75
221	7055	5.75	5.75
225	7075	5.75	5.75
229	7095	5.75	5.75
233	7115	0.50	0.50

Table 57

6 GHz WLAN - 20 MHz BW - Antenna A & B

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM
1	5955	22.00	22.00
5	5975	22.00	22.00
9	5995	22.00	22.00
13	6015	22.00	22.00
17	6035	22.00	22.00
21	6055	22.00	22.00
25	6075	22.00	22.00
29	6095	22.00	22.00
33	6115	22.00	22.00
37	6135	22.00	22.00
41	6155	22.00	22.00
45	6175	22.00	22.00
49	6195	22.00	22.00
53	6215	22.00	22.00
57	6235	22.00	22.00
61	6255	22.00	22.00
65	6275	22.00	22.00
69	6295	22.00	22.00
73	6315	22.00	22.00
77	6335	22.00	22.00
81	6355	22.00	22.00
85	6375	22.00	22.00
89	6395	22.00	22.00
93	6415	22.00	22.00
97	6435	3.50	3.50
101	6455	3.50	3.50
105	6475	3.50	3.50
109	6495	3.50	3.50
113	6515	3.50	3.50
117	6535	22.00	22.00
121	6555	22.00	22.00
125	6575	22.00	22.00
129	6595	22.00	22.00
133	6615	22.00	22.00
137	6635	22.00	22.00
141	6655	22.00	22.00
145	6675	22.00	22.00

Channel	Frequency (MHz)	20 MHz OFDM-HE	20 MHz OFDM
149	6695	22.00	22.00
153	6715	22.00	22.00
157	6735	22.00	22.00
161	6755	22.00	22.00
165	6775	22.00	22.00
169	6795	22.00	22.00
173	6815	22.00	22.00
177	6835	22.00	22.00
181	6855	22.00	22.00
185	6875	2.75	2.75
189	6895	2.75	2.75
193	6915	2.75	2.75
197	6935	2.75	2.75
201	6955	2.75	2.75
205	6975	2.75	2.75
209	6995	2.75	2.75
213	7015	2.75	2.75
217	7035	2.75	2.75
221	7055	2.75	2.75
225	7075	2.75	2.75
229	7095	2.75	2.75
233	7115	-2.50	-2.50

Table 58

6 GHz WLAN - 40 MHz BW - Antenna A

Channel	Frequency (MHz)	40MHz OFDM-HE
3	5965	21.50
11	6005	22.00
19	6045	22.00
27	6085	22.00
35	6125	22.00
43	6165	22.00
51	6205	22.00
59	6245	22.00
67	6285	22.00
75	6325	22.00
83	6365	22.00
91	6405	22.00
99	6445	9.75
107	6485	9.75
115	6525	9.75
123	6565	22.00
131	6605	22.00
139	6645	22.00
147	6685	22.00
155	6725	22.00
163	6765	22.00
171	6805	22.00
179	6845	22.00
187	6885	9.00
195	6925	9.00
203	6965	9.00
211	7005	9.00
219	7045	9.00
227	7085	9.00

Table 59

6 GHz WLAN - 40 MHz BW - Antenna B

Channel	Frequency (MHz)	40MHz OFDM-HE
3	5965	21.50
11	6005	22.00
19	6045	22.00
27	6085	22.00
35	6125	22.00
43	6165	22.00
51	6205	22.00
59	6245	22.00
67	6285	22.00
75	6325	22.00
83	6365	22.00
91	6405	22.00
99	6445	9.75
107	6485	9.75
115	6525	9.75
123	6565	22.00
131	6605	22.00
139	6645	22.00
147	6685	22.00
155	6725	22.00
163	6765	22.00
171	6805	22.00
179	6845	22.00
187	6885	9.00
195	6925	9.00
203	6965	9.00
211	7005	9.00
219	7045	9.00
227	7085	9.00

Table 60

6 GHz WLAN - 40 MHz BW - Antenna A & B

Channel	Frequency (MHz)	40MHz OFDM-HE
3	5965	20.50
11	6005	22.00
19	6045	22.00
27	6085	22.00
35	6125	22.00
43	6165	22.00
51	6205	22.00
59	6245	22.00
67	6285	22.00
75	6325	22.00
83	6365	22.00
91	6405	22.00
99	6445	6.75
107	6485	6.75
115	6525	6.75
123	6565	22.00
131	6605	22.00
139	6645	22.00
147	6685	22.00
155	6725	22.00
163	6765	22.00
171	6805	22.00
179	6845	22.00
187	6885	6.00
195	6925	6.00
203	6965	6.00
211	7005	6.00
219	7045	6.00
227	7085	6.00

Table 61

6 GHz WLAN - 80 MHz BW - Antenna A

Channel	Frequency (MHz)	80 MHz OFDM-HE
7	5985	21.75
23	6065	22.00
39	6145	22.00
55	6225	22.00
71	6305	22.00
87	6385	22.00
103	6465	12.25
119	6545	12.25
135	6625	22.00
151	6705	22.00
167	6785	22.00
183	6865	11.75
199	6945	11.75
215	7025	11.75

Table 62

6 GHz WLAN - 80 MHz BW - Antenna B

Channel	Frequency (MHz)	80 MHz OFDM-HE
7	5985	21.75
23	6065	22.00
39	6145	22.00
55	6225	22.00
71	6305	22.00
87	6385	22.00
103	6465	12.25
119	6545	12.25
135	6625	22.00
151	6705	22.00
167	6785	22.00
183	6865	11.75
199	6945	11.75
215	7025	11.75

Table 63

6 GHz WLAN - 80 MHz BW - Antenna A & B

Channel	Frequency (MHz)	80 MHz OFDM-HE
7	5985	21.50
23	6065	22.00
39	6145	22.00
55	6225	22.00
71	6305	22.00
87	6385	22.00
103	6465	9.25
119	6545	9.25
135	6625	22.00
151	6705	22.00
167	6785	22.00
183	6865	8.50
199	6945	8.50
215	7025	8.50

Table 64

6 GHz WLAN - 160 MHz BW - Antenna A

Channel	Frequency (MHz)	160 MHz OFDM-HE
15	6025	20.00
47	6185	22.00
79	6345	22.00
111	6505	15.00
143	6665	22.00
175	6825	14.25
207	6985	14.25

Table 65

6 GHz WLAN - 160 MHz BW - Antenna B

Channel	Frequency (MHz)	160 MHz OFDM-HE
15	6025	20.00
47	6185	22.00
79	6345	22.00
111	6505	15.00
143	6665	22.00
175	6825	14.25
207	6985	14.25

Table 66

6 GHz WLAN - 160 MHz BW - Antenna A & B

Channel	Frequency (MHz)	160 MHz OFDM-HE
15	6025	20.00
47	6185	22.00
79	6345	22.00
111	6505	12.00
143	6665	22.00
175	6825	11.25
207	6985	11.25

Table 67

1.6 CONDUCTED POWER MEASUREMENTS

1.6.1 Method

Conducted power measurements were made using a power meter

1.6.2 Measured Results

WLAN 2.4 GHz - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11b	1	DSSS	100	1	2412	21.98	22.00
802.11b	6	DSSS	100	1	2437	21.99	22.00
802.11b	11	DSSS	100	1	2462	21.96	22.00

Table 68

WLAN 2.4 GHz - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11b	3	DSSS	100	1	2422	21.91	22.00
802.11b	7	DSSS	100	1	2442	21.98	22.00
802.11b	11	DSSS	100	1	2462	21.95	22.00

Table 69

WLAN 2.4 GHz - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g	1	OFDM	100	9	2412	19.00	19.50
802.11g	6	OFDM	100	9	2437	21.90	22.00
802.11g	11	OFDM	100	9	2462	18.20	18.75

Table 70

WLAN 2.4 GHz - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g	1	OFDM	100	9	2412	19.18	19.50
802.11g	6	OFDM	100	9	2437	21.75	22.00
802.11g	11	OFDM	100	9	2462	17.75	18.50

Table 71

WLAN 2.4 GHz - MIMO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g Antenna A	1	OFDM	100	9.00	2412	17.25	17.75
802.11g Antenna B	1	OFDM	100	9.00	2412	17.30	17.75
802.11g Antenna A	6	OFDM	100	9.00	2437	21.50	21.50
802.11g Antenna B	6	OFDM	100	9.00	2437	21.39	21.50
802.11g Antenna A	11	OFDM	100	9.00	2462	16.50	17.00
802.11g Antenna B	11	OFDM	100	9.00	2462	16.35	17.00

Table 72

WLAN U-NII-1/2A - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n VHT80	42	OFDM	100	29.30	5210	18.15	19.00
802.11n HT40	46	OFDM	100	13.50	5230	21.98	22.00
802.11ac HT40	54	OFDM	100	13.50	5270	20.82	22.00
802.11a 20 MHz	60	OFDM	100	6.00	5300	20.26	22.00
802.11a 20 MHz	64	OFDM	100	6.00	5320	19.46	21.00

Table 73

WLAN U-NII-1/2A - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11a 20 MHz	40	OFDM	100	6.00	5200	21.38	22.00
802.11a 20 MHz	44	OFDM	100	6.00	5220	21.35	22.00
802.11a 20 MHz	48	OFDM	100	6.00	5240	21.35	22.00
802.11a 20 MHz	52	OFDM	100	6.00	5260	21.28	22.00
802.11a 20 MHz	56	OFDM	100	6.00	5280	21.32	22.00
802.11a 20 MHz	60	OFDM	100	6.00	5300	21.40	22.00

Table 74

WLAN U-NII-1/2A - SISO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11a 20 MHz Antenna A	36	OFDM	100	6.00	5180	17.20	18.50
802.11a 20 MHz Antenna B	36	OFDM	100	6.00	5180	17.88	18.50
802.11a 20 MHz Antenna A	40	OFDM	100	6.00	5200	18.64	20.00
802.11a 20 MHz Antenna B	40	OFDM	100	6.00	5200	19.40	20.00
802.11n HT 40 Antenna A	46	OFDM	100	27.00	5230	19.87	20.50
802.11n HT 40 Antenna B	46	OFDM	100	27.00	5230	19.79	20.50
802.11a 20 MHz Antenna A	52	OFDM	100	6.00	5260	18.52	20.00
802.11a 20 MHz Antenna B	52	OFDM	100	6.00	5260	19.34	20.00
802.11a 20 MHz Antenna A	56	OFDM	100	6.00	5280	18.55	20.00
802.11a 20 MHz Antenna B	56	OFDM	100	6.00	5280	19.40	20.00
802.11a 20 MHz Antenna A	60	OFDM	100	6.00	5300	18.61	20.00
802.11a 20 MHz Antenna B	60	OFDM	100	6.00	5300	19.45	20.00

Table 75

WLAN U-NII-2C - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11a 20 MHz	104	OFDM	100	6.00	5520	21.48	22.00
802.11a 20 MHz	112	OFDM	100	6.00	5560	21.50	22.00
802.11ac VHT80	122	OFDM	100	29.30	5610	21.94	22.00
802.11ac VHT80	138	OFDM	100	29.30	5690	21.88	22.00

Table 76

WLAN U-NII-2C - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power(dBm)	Tune Up (dBm)
802.11a 20 MHz	104	OFDM	100	6.00	5520	21.30	22.00
802.11a 20 MHz	112	OFDM	100	6.00	5560	21.22	22.00
802.11ac VHT80	122	OFDM	100	29.30	5610	21.95	22.00
802.11ac VHT80	138	OFDM	100	29.30	5690	21.75	22.00

Table 77

WLAN U-NII-2C - MIMO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11a 20 MHz Antenna A	104	OFDM	100	6.00	5520	19.73	20.00
802.11a 20 MHz Antenna B	104	OFDM	100	6.00	5520	19.40	20.00
802.11a 20 MHz Antenna A	112	OFDM	100	6.00	5560	19.76	20.00
802.11a 20 MHz Antenna B	112	OFDM	100	6.00	5560	19.37	20.00
802.11ac VHT80 Antenna A	122	OFDM	100	29.30	5610	21.97	22.00
802.11ac VHT80 Antenna B	122	OFDM	100	29.30	5610	21.90	22.00
802.11ac VHT80 Antenna A	138	OFDM	100	29.30	5690	21.90	22.00
802.11ac VHT80 Antenna B	138	OFDM	100	29.30	5690	21.70	22.00

Table 78

WLAN U-NII-3 - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac HT40	151	OFDM	100	13.50	5755	21.97	22.00
802.11ac HT40	159	OFDM	100	13.50	5795	21.93	22.00

Table 79

WLAN U-NII-3 - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac HT40	151	OFDM	100	13.50	5755	21.95	22.00
802.11ac HT40	159	OFDM	100	13.50	5795	21.88	22.00

Table 80

WLAN U-NII-3 - MIMO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac HT40 Antenna A	151	OFDM	100	27.00	5755	21.70	21.75
802.11ac HT40 Antenna B	151	OFDM	100	27.00	5755	21.60	21.75
802.11ac HT40 Antenna A	159	OFDM	100	27.00	5795	21.62	22.00
802.11ac HT40 Antenna B	159	OFDM	100	27.00	5795	21.28	22.00

Table 81

WLAN U-NII-5 - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 80	7	OFDM	100	36.00	5985	20.91	21.75
802.11ax HE 80	23	OFDM	100	36.00	6065	21.20	22.00
802.11ax HE 160	47	OFDM	100	72.10	6185	21.38	22.00
802.11ax HE 160	79	OFDM	100	72.10	6345	21.30	22.00

Table 82

WLAN U-NII-5 - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 80	7	OFDM	100	36.00	5985	21.00	21.50
802.11ax HE 80	23	OFDM	100	36.00	6065	21.50	22.00
802.11ax HE 160	47	OFDM	100	72.10	6185	21.61	22.00
802.11ax HE 160	79	OFDM	100	72.10	6345	21.41	22.00

Table 83

WLAN U-NII-5 - MIMO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE80 Antenna A	7	OFDM	100	36.00	5985	21.49	21.50
802.11ax HE80 Antenna B	7	OFDM	100	36.00	5985	21.39	21.50
802.11ax HE80 Antenna A	23	OFDM	100	36.00	6065	21.70	22.00
802.11ax HE80 Antenna B	23	OFDM	100	36.00	6065	21.72	22.00
802.11ax HE160 Antenna A	47	OFDM	100	72.10	6185	21.98	22.00
802.11ax HE160 Antenna B	47	OFDM	100	72.10	6185	21.97	22.00
802.11ax HE160 Antenna A	79	OFDM	100	72.10	6345	21.91	22.00
802.11ax HE160 Antenna B	79	OFDM	100	72.10	6345	21.95	22.00

Table 84

WLAN U-NII-6 - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 160	111	OFDM	100	72.10	6505	14.97	15.00

Table 85

WLAN U-NII-6 - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 160	111	OFDM	100	72.10	6505	14.48	15.00

Table 86

WLAN U-NII-6 - MIMO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE160 Antenna A	111	OFDM	100	72.10	6505	11.96	12.00
802.11ax HE160 Antenna B	111	OFDM	100	72.10	6505	11.97	12.00

Table 87

WLAN U-NII-7 - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 160	143	OFDM	100	72.10	6665	21.91	22.00
802.11ax HE 80	167	OFDM	100	36.00	6785	21.91	22.00
802.11ax HE 160	175	OFDM	100	72.10	6825	14.22	14.25

Table 88

WLAN U-NII-7 - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 160	143	OFDM	100	72.10	6665	21.89	22.00
802.11ax HE 80	167	OFDM	100	36.00	6785	21.96	22.00
802.11ax HE 160	175	OFDM	100	72.10	6825	14.23	14.25

Table 89

WLAN U-NII-7 - MIMO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE160 Antenna A	143	OFDM	100	72.10	6665	21.90	22.00
802.11ax HE160 Antenna B	143	OFDM	100	72.10	6665	21.92	22.00
802.11ax HE80 Antenna A	167	OFDM	100	36.00	6785	21.93	22.00
802.11ax HE80 Antenna B	167	OFDM	100	36.00	6785	21.98	22.00
802.11ax HE160 Antenna A	175	OFDM	100	72.10	6825	11.23	11.25
802.11ax HE160 Antenna B	175	OFDM	100	72.10	6825	11.25	11.25

Table 90

WLAN U-NII-8 - SISO
Antenna A

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 160	207	OFDM	100	72.10	6985	14.21	14.25

Table 91

WLAN U-NII-8 - SISO
Antenna B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE 160	207	OFDM	100	72.10	6985	14.24	14.25

Table 92

WLAN U-NII-7 - MIMO
Antenna A & B

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ax HE160 Antenna A	207	OFDM	100	72	6985	11.25	11.25
802.11ax HE160 Antenna B	207	OFDM	100	72	6985	11.24	11.25

Table 93

SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the MP11000

2.1 DASY6 MEASUREMENT SYSTEM

2.1.1 System Description

The DASY6 system for performing compliance tests consists of the following items:

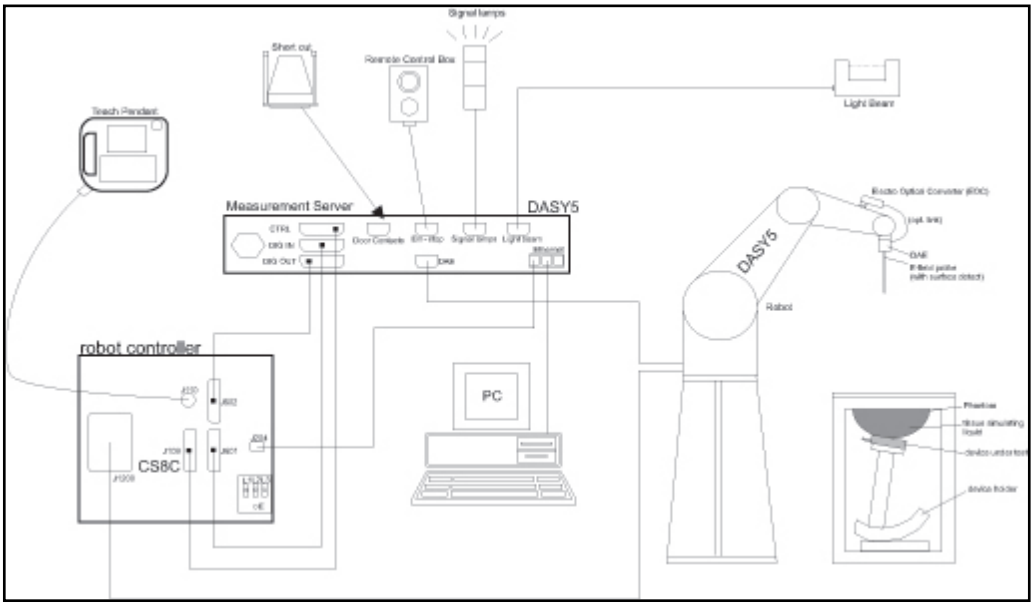

Figure 1 - System Description Diagram

A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).

An isotropic field probe optimized and calibrated for the targeted measurement.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.

The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.

The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.

A computer running the DASY software to display and interact with the robot and information.

There is a remote control and a teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.

The phantom, the device holder and other accessories according to the targeted measurement.

2.1.2 Probe Specification

The probes used by the DASY system are isotropic E-field probes, constructed with a symmetric design and a triangular core. The probes have built-in shielding against static charges and are contained within a PEEK enclosure material. These probes are specially designed and calibrated for use in liquids with high permittivity. The frequency range of the probes are from 6 MHz to 6 GHz.

2.1.3 Data Acquisition Electronics

The data acquisition electronics (DAE4 or DAE3) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of both the DAE4 as well as of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

2.1.4 SAR Evaluation Description

The cDASY6 software includes all numerical procedures necessary to evaluate the spatial peak SAR values.

Fast Area Scan:

The Fast Area Scan provides an easy, time efficient and accurate way to define the optimal power reference location. The location of the power reference and power drift measurements for the subsequent Area, Fast Volume and Zoom Scans will be automatically set at the maximum of the Fast Area Scan.

Area Scan:

Area Scans are used to determine the peak location of the measured field before doing a finer measurement around the hotspot. Peak location can be found accurately even on coarse grids using the advanced interpolation routines implemented in cDASY6 Module SAR. Area Scans measure a two dimensional volume covering the full device under test area. cDASY6 Module SAR uses Fast Averaged SAR algorithm to compute the 1g and 10g of simulated tissue from the Area Scan.

Fast Volume Scans:

Fast Volume Scans are 3D scans used to assess the peak spatial SAR values within an averaging volume containing 1g and 10g of simulated tissue. It is compatible with any phantom. For regular phantoms, the measurement grid is generated by projecting a plane onto the phantom surface as for Area and Zoom scans. For specific phantoms, the measurement grid is generated by a conformal offset to the phantom surface at the desired distances. The grid extents can be set by the end user to cover the DUT dimensions or the whole measurable area of the phantom.

Zoom Scan:

Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1g and 10g of simulated tissue. Zoom scans measure a three dimensional volume (cube). The bottom face of the cube is Centreed on the maximum of the preceding Area Scan in the same measurement group. For maxima at border of the phantom, the zoom scan can be enabled to automattically extend in order to ensure correct evaluation of peak spatial SAR.

Zoom Scans can be performed in two different modes:

- Smart Mode: the grid settings are adjusted on the fly based on the distribution being measured to fulfill to the IEC 62209-2 Amendment 1 criteria on grid resolution.
- Custom Mode: the user specifies the grid settings to be used. In both modes, Zoom Scans are always anchored to the peak location of the preceding Fast Area / Area / Fast Volume Scan.

2.1.5 DASY 6 Absorbed Power Density Evaluation

The DASY 6 measurement system will output the absorbed power density result values by default from version 16.0 of DASY software onwards. All the measurement details described in this section are utilised to collect the required data which is the converted automatically within the software and displayed for frequencies above 5.9 GHz.

2.2 DASY 6 mmWave PD Module

2.2.1 Measurement System

A DASY 6 Measurement System equipped with the DASY 6 mmWave module was used to carry out the peak spatially averaged power density (psPD) measurements. It consists of a 6-axis industrial robot and controller that provides a highly accurate positioning system, a PC for the system control software, a near field probe (EUmmWVx), a probe alignment sensor and the 5G phantom. The high accuracy positioning system places the near field probe at the key location points of the maximum electromagnetic field.

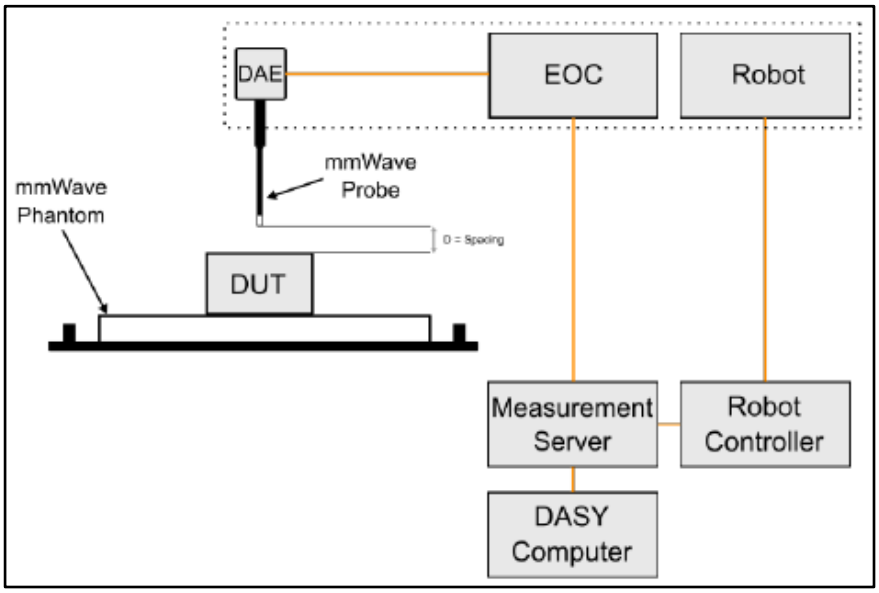

Figure 2 - Typical measurement setup for PD measurement with DASY 6

2.2.2 EUmmWVx E-Field Probe Details

The EUmmWVx probe utilises two dipole elements that are specifically arranged to allow for the generation of pseudo-vector data.

Frequency Range	750 MHz - 110 GHz
Dynamic Range	<20 V/m - 10'000 V/m with PRE-10 (min <20 V/m - 2000 V/m)
Position Precision	<0.2 mm (DASY6)
Dimensions	Overall length: 320 mm (tip: 20 mm) Tip and body diameter: encapsulation 8 mm (internal sensor <1mm) Distance from probe tip to sensor Y cal point:1.5 mm Distance from probe tip to sensor X cal point:1.5 mm
Applications	E-field measurements of 5G devices and other mm-wave transmitters operating above 10GHz in <2 mm distance from device (free-space) Power density, H-field, and far-field analysis using total field reconstruction.
Compatibility	cDASY6 + 5G-Module SW1.0 and higher

Table 94

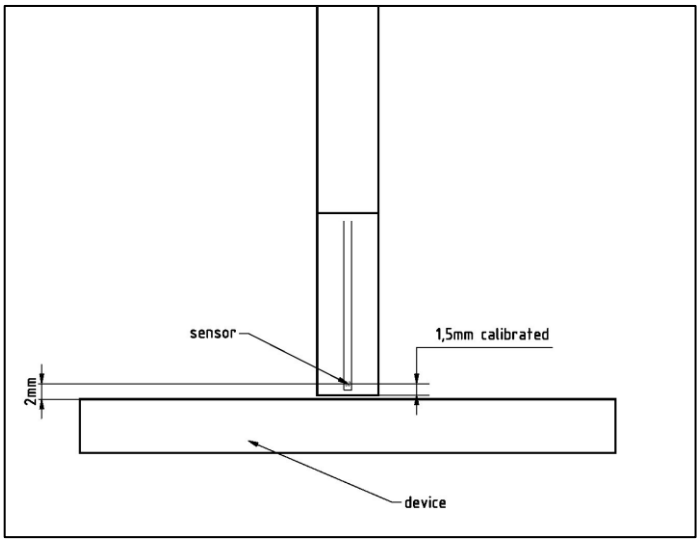

Figure 3 - Diagram of the distance sensor to the EUT surface

2.2.3 Peak Spatially Averaged Power Density Assessment based on E-Field Measurements

Power density was determined for both the electric and magnetic fields within a small distance from the transmitting source. In general, the magnitude and phase of two components of either E-field or H-field are needed on a sufficiently large surface to characterise their total distributions. Despite this being the case, a solution based on the direct measurement of the E and H field can be used to compute power density. The measurement approach to achieve this is given below.

a) The local E-field is measured at a reference point on the measurement surface where the field is well above the system noise floor. This reference point is re-visited at the end of the measurement routine and re-measured to determine and assess the power drift of the EUT.

b) The electric field on the measurement surface was scanned using instructions provided by the test system manufacturer. The spatial resolution of the measurement can depend on the measured field characteristic and measurement methodology used by the test system. The planar scan step size is configured to be λ/4.

c) DASY6 uses a reconstruction algorithm to calculate the H-field from the measured E-field. As the power density calculation requires amplitude and phase, reconstruction algorithms can also be used to obtain field information from the measured E-field data, for example phase information from the amplitude if only the amplitude is measured. Three measurements per point on two measurement planes separated by λ/4 are carried out in order for the H-field and phase data to be reconstructed.

d) Using the equation below the total peak spatially averaged power density (psPD) distribution on the evaluation surface can be determined. The applicable regulatory requirements specify the spatial averaging area A. A circular shape is used.

$$psPD = \frac{1}{2A_{av}} \iint_{A_{av}} || Re\{E \times H^*\} || \, dA$$

e) The final quantity used to determine compliance against the applicable limits is the maximum spatial average on the evaluation.

f) Following the measurement of the power drift as described in step a) the drift was assessed. If the drift deviated by more than 5% then the power density test and drift measurements shall be repeated.

2.2.4 Reconstruction Algorithm

Computation of the PD in general requires knowledge of the electric (E-) and magnetic (H-) field amplitudes and phases in the plane of incidence. Reconstruction of these quantities from pseudo-vector E-field measurements is feasible, as they are constrained by Maxwell's equations.

The test system utilises a reconstruction approach based on the Gerchberg-Saxton algorithm which benefits from the availability of the E-field polarization ellipse information obtained with the EUmmWVx probe. This reconstruction algorithm, together with the ability of the probe to measure extremely close to the source without perturbing the field, permits reconstruction of the E- and H-fields and the PD on measurement planes located as near as λ/2π.

2.2.5 Standalone PD Limit

The following formula provides the reference levels for local exposure to electromagnetic fields from >6 GHz to 300GHz for general public as referenced in ICNIRP 2020:

$$55/f_G{}^{0.177}$$

The FCC Oct 2020 TCB workshop states their own incident power density limit of 1mW/cm^2 plane-wave equivalent, averaged over 4 cm^2 as reflected in FCC 47 CFR 1.1310.

2.2.6 Exposure Ratio

The following formulas used to calculate the exposure ratio of SAR, APD and iPD respectively as referenced in ICNIRP 2020:

SAR $$\sum_{i=100\ \mathrm{kHz}}^{300\ \mathrm{GHz}} \frac{\mathrm{SAR}_i}{\mathrm{SAR}_{\mathrm{BR}}} \leq 1$$

APD $$\sum_{i>6\ \mathrm{GHz}}^{30\ \mathrm{GHz}} \frac{S_{\mathrm{ab},4\mathrm{cm},i}}{S_{\mathrm{ab},4\mathrm{cm},\mathrm{BR}}} \leq 1$$

iPD $$\sum_{i>6\ \mathrm{GHz}}^{30\ \mathrm{GHz}} \left(\frac{S_{\mathrm{inc},4\mathrm{cm},i}}{S_{\mathrm{inc},4\mathrm{cm},\mathrm{RL},i}} \right) \leq 1$$

2.2.7 Total Exposure Ratio (TER)

The total exposure ratio is the sum of local specific absorption rate (SAR), local absorbed power density (APD) and local incident power density (iPD) referenced in ICNIRP 2020:

where, SAR_i and SAR_{BR} are the local SAR level at frequency *i* and the local SAR basic restriction given in ICNIRP 2020. $S_{ab,4cm,i}$ and $S_{ab,4cm,BR}$ are the 4cm² absorbed power density level at frequency *i* and the 4cm² absorbed power density basic restriction given in ICNIRP 2020. $S_{inc,4cm,i}$ and $S_{inc,4cm,RL,i}$ are the local 4cm² incident power density at frequency *i* and the local 4cm² incident power density reference level at frequency *i* given in ICNIRP 2020.

$$\sum_{i=100\ \mathrm{kHz}}^{6\ \mathrm{GHz}} \frac{\mathrm{SAR}_i}{\mathrm{SAR}_{\mathrm{BR}}} + \sum_{i>6\ \mathrm{GHz}}^{30\ \mathrm{GHz}} \frac{S_{ab,4cm,i}}{S_{ab,4cm,BR}} + \sum_{i>6\ \mathrm{GHz}}^{30\ \mathrm{GHz}} \left(\frac{S_{inc,4cm,i}}{S_{inc,4cm,RL,i}} \right) \leq 1$$

TER is applied when simultaneous transmission of the different types of measurement is tested, and basic restriction limits cannot be applied. The TER of the applicable measurements is calculated and summed up to not exceed 1.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

The following test equipment was used at TÜV SÜD Product Service:

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Thermometer	LKM Electronics	-	6693	12	06-Nov-2024
Thermometer	LKM Electronics	-	4697	12	04-Sep-2024
Hygrometer	PCE Instruments	Thermo-Hygro-Barometer	5474	12	21-Apr-2024
SAR holder	Speag	n/a	3870	-	TU
Holder	Speag	n/a	4693	-	TU
Measurement server	Speag	DASY 6	4692	-	TU
Mounting Platform TX90XL Robot & Phantoms	Speag	MP6C-TX90XL	4702	-	TU
Robot	Stäubli	TX90 XL	4704	-	TU
Body Phantom	Speag	ELI V8.0	4833	-	TU
Probe	Speag	EX3DV4	4700	12	14-Dec-2024
Data Acquisition Electronics	Speag	DAE 4 - SD 000 D04 BM	4689	12	11-Dec-2024
Measurement server	Speag	DASY 8	6492	-	TU
Mounting Platform TX90XL Robot & Phantoms	Speag	MP6C-TX90XL	6493	-	TU
Robot	Stäubli	Robot TX2 90XL	6494	-	TU
Body Phantom	Speag	ELI V8.0	6491	-	TU
Probe	Speag	EX3DV4	6498	12	14-Feb-2025
Data Acquisition Electronics	Speag	DAE4ip	6500	12	13-Feb-2025
Dielectric Assessment Kit	Speag	DAK-3.5	4690	-	TU
Dielectric Assessment Kit	Speag	DAK-3.5	6502	12	TU
Network Analyser	Keysight	E5063A	5018	12	10-Oct-2024
Validation Dipole 2450MHz	Speag	D2450V2	3875	12	07-Dec-2024
Validation Dipole 2450MHz	Speag	D2450V2	5329	12	05-Jun-2024

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Validation Dipole 5GHz	Speag	D5GHzV2	4309	12	14-Dec-2024
Validation Dipole 5GHz	Speag	D5GzV2	5328	12	06-Jun-2024
Validation Dipole 6500MHz	Speag	D6.5GHzV2	6156	12	02-Nov-2024
Validation Dipole 6500MHz	Speag	D6.5GHzV2	5328	12	06-Jun-2024
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	6677	12	02-Oct-2024
Amplifier (5 GHz)	IndexSar Ltd	5 GHz	157	-	TU
Amplifier	Amplifier	5.9-18GHz	6540	-	TU
Directional Coupler	Hewlett Packard	11692D	452	-	TU
Attenuator	Aaren	AT40A-4041-D18-10	6549	12	18-Jun-2024
Attenuator	Weinschel	46-30-34	2776	12	09-Aug-2024
Power Meter	Agilent Technologies	N1914A	6678	12	16-Oct-2024
Power Sensor	Agilent Technologies	N8481A	6675	12	27-Sep-2024
Power Sensor	Agilent Technologies	N8481A	6676	12	09-Oct-2024
Data Acquisition Electronics	Speag	DAE4ip	6501	12	03-Apr-2024
E-field Probe	Speag	UmmWV4	6353	12	24-Oct-2024
Vector Network analyser	Rohde & Schwarz	ZVA 40	3548	12	20-Feb-2025
1m Coaxial Cable Assy	Junkosha	MWX221-01000AMSAMS/A	6377	12	17-Apr-2024
1m Coaxial Cable Assy	Junkosha	MWX221-01000AMSAMS/A	6373	12	17-Apr-2024
Tissue Simulant Liquid	Speag	600-10000V6	Batch 1	-	Note 1
Tissue Simulant Liquid	Speag	600-10000V6	Batch 5	-	Note 1

Table 95

TU - Traceability Unscheduled

Note 1: The calibration dates for the relevant batches of TSL can be found in the fluid parameter tables within this report.

3.2 TEST SOFTWARE

The following software was used to control the TÜV SÜD Product Service DASY System.

Instrument	Version Number
DASY System	cDASY6 Module SAR V16.2.2.1588
DASY System	cDASY8 Module SAR V16.2.2.1588
DASY System	cDASY6 Module mmWave V3.2.0.1840

Table 96

3.3 TEST VERIFICATION

3.3.1 System Performance Check Results

Prior to formal testing being performed a System Check was performed in accordance with KDB 865664 and the results were compared against the calibration certificates of each corresponding system verification dipole. The following results were obtained and within the ±10% acceptance criteria. A system performance check in DASY Module mmWave was also performed with the Verification Source available at 10 GHz in accordance with IEC/IEEE 63195.

SAR System Performance Check Results

Date	Frequency (MHz)	Fluid Type	Measured Max 1g SAR* (W/kg)	Max 1g SAR Target (W/kg)	Percentage Deviation from Target (%)
07/03/2024	2450	HBBL B1	48.88	52.60	-7.06
08/03/2024	2450	HBBL B1	48.88	52.60	-7.06
20/03/2024	2450	HBBL B5	47.69	52.20	-8.65
21/03/2024	2450	HBBL B5	47.69	52.20	-8.65
08/03/2024	5200	HBBL B1	78.81	78.20	0.78
09/03/2024	5200	HBBL B1	73.23	78.80	-7.07
09/03/2024	5200	HBBL B5	75.22	76.30	-1.41
13/03/2024	5200	HBBL B1	77.02	76.30	0.94
20/03/2024	5200	HBBL B5	73.43	76.30	-3.77
22/03/2024	5200	HBBL B5	76.22	76.30	-0.11
05/03/2024	5300	HBBL B1	77.42	80.30	-3.59
06/03/2024	5300	HBBL B1	81.61	80.30	1.63
08/03/2024	5300	HBBL B1	81.61	80.30	1.63
08/01/2024	5300	HBBL B5	80.41	80.00	0.51
10/01/2024	5300	HBBL B5	80.01	80.00	0.01
09/03/2024	5300	HBBL B5	80.41	80.00	0.51
13/03/2024	5300	HBBL B5	80.01	80.00	0.01
08/01/2024	5600	HBBL B5	86.00	81.80	5.13
09/03/2024	5600	HBBL B1	89.79	83.00	8.18
10/03/2024	5600	HBBL B1	91.18	83.00	9.86
10/01/2024	5600	HBBL B5	85.00	81.80	3.91
11/03/2024	5600	HBBL B5	83.80	81.80	2.45
20/03/2024	5600	HBBL B5	79.21	81.80	-3.16
08/03/2024	5800	HBBL B5	73.82	79.00	-5.29
10/03/2024	5800	HBBL B1	81.41	81.10	0.38
11/03/2024	5800	HBBL B1	76.62	81.10	-5.53
14/03/2024	5800	HBBL B1	75.22	81.10	-7.25
20/03/2024	5800	HBBL B5	71.23	79.00	-9.83
11/03/2024	6500	HBBL B5	287.00	292.00	-1.71

Date	Frequency (MHz)	Fluid Type	Measured Max 1g SAR* (W/kg)	Max 1g SAR Target (W/kg)	Percentage Deviation from Target (%)
12/03/2024	6500	HBBL B1	291.00	292.00	-0.34
12/03/2024	6500	HBBL B5	277.00	296.00	-6.42
13/03/2024	6500	HBBL B1	295.00	292.00	1.03
13/03/2024	6500	HBBL B5	283.00	296.00	-4.39
14/03/2024	6500	HBBL B1	295.00	292.00	1.03
14/03/2024	6500	HBBL B5	313.00	296.00	5.74

Table 97

APD System Performance Check Results

Date	Frequency (MHz)	Fluid Type	Absorbed Power Density over $4cm^{2.}$ (W/m^2) *	Absorbed Power Density Target over $4cm^{2.}$ (W/m^2)	Percentage Deviation from Target $4cm^2$ (%)
11/03/2024	6500	HBBL B5	1310.00	1330.00	-1.50
12/03/2024	6500	HBBL B1	1324.00	1330.00	-0.34
12/03/2024	6500	HBBL B5	1290.00	1330.00	-3.01
13/03/2024	6500	HBBL B1	1333.00	1330.00	-0.45
13/03/2024	6500	HBBL B5	1310.00	1330.00	-1.50
14/03/2024	6500	HBBL B1	1334.00	1330.00	0.00
14/03/2024	6500	HBBL B5	1450.00	1330.00	9.02

Table 98

iPD System Performance Check Results

Date	Frequency (MHz)	Medium	Measured psPDtot+ (W/m^2)	Target psPDtot+ (W/m^2)	Percentage Deviation from Target (%)
18/03/2024	10000	Air	135.00	156.00	-13.46

Table 99

3.4 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS

The fluid properties of the simulant fluids used during routine SAR evaluation meet the dielectric properties required KDB 865664.

The dielectric properties of the tissue simulant liquids used are within the ±10% acceptance criteria for the SAR testing at TÜV SÜD Product Service and are as follows:

Fluid Type and Frequency	Relative Permittivity Measured	Relative Permittivity Target	Conductivity Measured (S/m)	Conductivity Target (S/m)	Date	Fluid Temperature °C
2450	40.81	39.20	1.85	1.80	04/03/2024	18.66
2450	40.28	39.20	1.82	1.80	07/03/2024	19.76
2450	38.33	39.20	1.79	1.80	20/03/2024	20.63
5200	35.31	35.98	4.61	4.65	07/03/2024	19.76
5200	33.94	35.98	4.44	4.65	08/03/2024	19.85
5200	34.92	35.98	4.37	4.65	13/03/2024	21.21
5200	33.72	35.98	4.33	4.65	20/03/2024	20.63
5300	35.11	35.87	4.73	4.75	07/03/2024	19.76
5300	33.75	35.87	4.55	4.75	08/03/2024	19.85
5300	34.74	35.87	4.48	4.75	13/03/2024	21.21
5300	33.55	35.87	4.44	4.75	20/03/2024	20.63
5600	34.54	35.52	5.08	5.06	07/03/2024	19.76
5600	33.20	35.52	4.87	5.06	08/03/2024	19.85
5600	33.96	35.52	5.01	5.06	11/03/2024	19.80
5600	33.92	35.52	4.90	5.06	11/01/2024	20.35
5600	33.02	35.52	4.75	5.06	20/03/2024	20.63
5800	32.84	35.30	5.10	5.27	08/03/2024	19.85
5800	34.16	35.30	5.32	5.27	07/03/2024	19.76
5800	32.68	35.30	4.97	5.27	20/03/2024	20.63
6500	31.63	34.46	5.89	6.07	08/03/2024	19.85
6500	32.30	34.46	6.07	6.07	11/03/2024	19.80
6500	32.69	34.46	6.04	6.07	11/03/2024	19.42
6500	32.74	34.46	5.82	6.07	13/03/2024	21.21
6500	32.60	34.46	6.03	6.07	14/03/2024	21.12
6500	31.53	34.46	5.74	6.07	20/03/2024	20.63

Table 100

3.5 TEST CONDITIONS

3.5.1 Test Laboratory Conditions

Ambient temperature: Within +18.00°C to +25.00°C.

The actual temperature during the testing ranged from 18.66°C to 21.21°C.

The actual humidity during the testing ranged from 38.14% to 49.12% RH.

The temperature of the fluid during testing does not deviate by more than 2°C for each set of tests.

3.5.2 Test Fluid Temperature Range

Frequency	Body / Head Fluid	Min Temperature °C	Max Temperature °C
2450 MHz	Head	18.66	19.76
5200 MHz	Head	19.76	21.21
5300 MHz	Head	19.76	21.21
5600 MHz	Head	19.76	20.21
5800 MHz	Head	19.76	19.85
6500 MHz	Head	19.42	21.21

Table 101

3.6 MEASUREMENT UNCERTAINTY

SAR Measurements, 300 MHz to 3 GHz

Source of Uncertainty	Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)
Measurement System Errors					
Probe Calibration	12.0	Normal	2.00	1.00	6.0
Probe Calibration Drift	1.7	Rectangular	1.73	1.00	1.0
Probe Linearity	4.7	Rectangular	1.73	1.00	2.7
Broadband Signal	3.0	Rectangular	1.73	1.00	1.7
Probe Isotropy	7.6	Rectangular	1.73	1.00	4.4
Data Acquisition	0.3	Normal	1.00	1.00	0.3
RF Ambient	1.8	Normal	1.00	1.00	1.8
Probe Positioning	0.2	Normal	1.00	0.14	0.0
Data Processing	1.2	Normal	1.00	1.00	1.2
Phantom and Device errors					
Liquid Conductivity Meas.	2.5	Normal	1.00	0.78	2.0
Liquid Conductivity Temp	3.3	Rectangular	1.73	0.78	1.5
Phantom Permittivity	14.0	Rectangular	1.73	0.00	0.0
Distance DUT - TSL	2.0	Normal	1.00	2.00	4.0
Device Positioning (±0.5mm)	1.0	Normal	1.00	1.00	1.0
Device Holder	3.6	Normal	1.00	1.00	3.6
Device Modulation	2.4	Rectangular	1.73	1.00	1.4
Time-average SAR	2.6	Rectangular	1.73	1.00	1.5
DUT Drift	5.0	Normal	1.00	1.00	5.0
Correction to the SAR results					
Deviation to Target	1.9	Normal	1.00	1.00	1.9
SAR Scaling	0.0	Rectangular	1.73	1.00	0.0
Combined Standard Uncertainty		**RSS**			11.8
Expanded Standard Uncertainty		**K=2**			23.7

Table 102

SAR Measurements, 3 GHz to 6 GHz

Source of Uncertainty	Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)
Measurement System Errors					
Probe Calibration	14.0	Normal	2.00	1.00	7.0
Probe Calibration Drift	1.7	Rectangular	1.73	1.00	1.0
Probe Linearity	4.7	Rectangular	1.73	1.00	2.7
Broadband Signal	2.6	Rectangular	1.73	1.00	1.5
Probe Isotropy	7.6	Rectangular	1.73	1.00	4.4
Data Acquisition	0.3	Normal	1.00	1.00	0.3
RF Ambient	1.8	Normal	1.00	1.00	1.8
Probe Positioning	0.2	Normal	1.00	0.33	0.1
Data Processing	2.3	Normal	1.00	1.00	2.3
Phantom and Device errors					
Liquid Conductivity Meas.	2.5	Normal	1.00	0.78	2.0
Liquid Conductivity Temp	3.4	Rectangular	1.73	0.78	1.5
Phantom Permittivity	14.0	Rectangular	1.73	0.25	2.0
Distance DUT - TSL	2.0	Normal	1.00	2.00	4.0
Device Positioning (±0.5mm)	1.0	Normal	1.00	1.00	1.0
Device Holder	3.6	Normal	1.00	1.00	3.6
Device Modulation	2.4	Rectangular	1.73	1.00	1.4
Time-average SAR	2.6	Rectangular	1.73	1.00	1.5
DUT Drift	5.0	Normal	1.00	1.00	5.0
Correction to the SAR results					
Deviation to Target	1.9	Normal	1.00	1.00	1.9
SAR Scaling	0.0	Rectangular	1.73	1.00	0.0
Combined Standard Uncertainty		**RSS**			12.7
Expanded Standard Uncertainty		**K=2**			25.3

Table 103

SAR Measurements, 6 GHz to 10 GHz

Source of Uncertainty	Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)
Measurement System Errors					
Probe Calibration	18.6	Normal	2.00	1.00	9.3
Probe Calibration Drift	1.7	Rectangular	1.73	1.00	1.0
Probe Linearity	4.7	Rectangular	1.73	1.00	2.7
Broadband Signal	2.8	Rectangular	1.73	1.00	1.6
Probe Isotropy	7.6	Rectangular	1.73	1.00	4.4
Data Acquisition	0.3	Normal	1.00	1.00	0.3
RF Ambient	1.8	Normal	1.00	1.00	1.8
Probe Positioning	0.2	Normal	1.00	0.67	0.1
Data Processing	3.5	Normal	1.00	1.00	3.5
Phantom and Device errors					
Liquid Conductivity Meas.	2.5	Normal	1.00	0.78	2.0
Liquid Conductivity Temp	2.4	Rectangular	1.73	0.78	1.1
Phantom Permittivity	14.0	Rectangular	1.73	0.50	4.0
Distance DUT - TSL	2.0	Normal	1.00	2.00	4.0
Device Positioning (±0.5mm)	1.0	Normal	1.00	1.00	1.0
Device Holder	3.6	Normal	1.00	1.00	3.6
Device Modulation	2.4	Rectangular	1.73	1.00	1.4
Time-average SAR	2.6	Rectangular	1.73	1.00	1.5
DUT Drift	5.0	Normal	1.00	1.00	5.0
Correction to the SAR results					
Deviation to Target	1.9	Normal	1.00	1.00	1.9
SAR Scaling	0.0	Rectangular	1.73	1.00	0.0
Combined Standard Uncertainty		**RSS**			14.7
Expanded Standard Uncertainty		**K=2**			29.4

Table 104

APD Measurements, 6 GHz to 10 GHz

Symbol	Error Description	Value %	Probability distribution	Divisor	c_i (1 g)	Std Uncertainty (1 g)	c_i (10 g)	Std Uncertainty (10 g)
Measurement System Errors								
CF	Probe Calibration	18.60	normal 2	2.000	1	9.30	1	9.30
CF_{DRIFT}	Probe Calibration Drift	1.70	rectangular	1.732	1	0.98	1	0.98
LIN	Probe Linearity	4.70	rectangular	1.732	1	2.71	1	2.71
BBS	Broadband Signal	2.80	rectangular	1.732	1	1.62	1	1.62
ISO	Probe Isotropy	7.60	rectangular	1.732	1	4.39	1	4.39
DAE	Other Probe+Electronic	0.30	normal 1	1.000	1	0.30	1	0.30
DAE	Boundary Effects + Corrections	4.00	rectangular	1.732	1	2.31	1	2.31
DAE	Sensor Offset & Uncertainty	0.10	normal 1	1.000	1	0.10	1	0.10
AMB	RF Ambient	3.00	normal 1	1.000	1	3.00	1	3.00
Δsys	Probe Positioning	0.01	normal 1	1.000	0.5	0.00	0.5	0.00
DAT	Data Processing	1.00	rectangular	1.732	1	0.58	1	0.58
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas)^{DAK}	2.50	normal 1	1.000	0.78	1.95	0.71	1.78
LIQ(Tσ)	Conductivity (temp)^{BB}	2.40	rectangular	1.732	0.78	1.08	0.71	0.98
EPS	Phantom Permittivity	14.00	rectangular	1.732	0.5	4.04	0.5	4.04
DIS	Distance DUT – TSL	2.00	normal 1	1.000	2	4.00	2	4.00
Dxyz	Device Positioning	1.00	normal 1	1.000	1	1.00	1	1.00
H	Device Holder	3.60	normal 1	1.000	1	3.60	1	3.60
MOD	DUT Modulation^{m}	2.40	rectangular	1.732	1	1.39	1	1.39
TAS	Time-average SAR	1.70	rectangular	1.732	1	0.98	1	0.98
Rfdrift	DUT drift	5.00	normal 1	1.000	1	5.00	1	5.00
VAL	Val Antenna Unc.^{val}	0.00	normal 1	1.000	1	0.00	1	0.00
Rfin	Unc. Input Power^{val}	0.00	normal 1	1.000	1	0.00	1	0.00
Correction To The SAR Results								
C(ε, σ)	Deviation to Target	1.90	normal 1	1.000	1	1.90	0.84	1.60
C(R)	SAR scaling	0.00	rectangular	1.732	1	0.00	1	0.00
APD								
PDC	Power Density Conversion	13.50	rectangular	1.732	1	7.79	1	7.79
u(ΔSAR)	Combined Standard Uncertainty	-	normal	-	-	16.58	-	16.52
U	Expanded Uncertainty	-	normal k =	2.00	-	33.2	-	33

Table 105

DASY6 Uncertainty Budget for iPD

Symbol	Error Description	Value dB	Probability distribution	Divisor	c_i	$u_i(y)$ dB	$(u_i(y))^2$	v_i or v_{eff}	ui^4(y)
Uncertainty terms dependent on the measurement system									
CAL	Calibration	0.49	normal 1	1.000	1	0.49	0.240	∞	0
COR	Probe correction	0.00	rectangular	1.732	1	0.00	0.000	∞	0
FRS	Frequency response (BW ≤ 1 GHz)	0.20	rectangular	1.732	1	0.12	0.013	∞	0
SCC	Sensor cross coupling	0.00	rectangular	1.732	1	0.00	0.000	∞	0
ISO	Isotropy	0.50	rectangular	1.732	1	0.29	0.083	∞	0
LIN	Linearity	0.20	rectangular	1.732	1	0.12	0.013	∞	0
PSC	Probe scattering	0.00	rectangular	1.732	1	0.00	0.000	∞	0
PPO	Probe positioning offset	0.30	rectangular	1.732	1	0.17	0.030	∞	0
PPR	Probe positioning repeatability	0.04	rectangular	1.732	1	0.02	0.001	∞	0
SMO	Sensor mechanical offset	0.00	rectangular	1.732	1	0.00	0.000	∞	0
PSR	Probe spatial resolution	0.00	rectangular	1.732	1	0.00	0.000	∞	0
FLD	Field impedance dependence	0.00	rectangular	1.732	1	0.00	0.000	∞	0
APD	Amplitude and phase drift	0.00	rectangular	1.732	1	0.00	0.000	∞	0
APN	Amplitude and phase noise	0.04	rectangular	1.732	1	0.02	0.001	∞	0
TR	Measurement area truncation	0.00	rectangular	1.732	1	0.00	0.000	∞	0
DAQ	Data acquisition	0.03	normal 1	1.000	1	0.03	0.001	∞	0
SMP	Sampling	0.00	rectangular	1.732	1	0.00	0.000	∞	0
REC	Field reconstruction	0.60	rectangular	1.732	1	0.35	0.120	∞	0
TRA	FTE/MEO	0.70	rectangular	1.732	1	0.40	0.163	∞	0
SCA	Power density scaling	0.00	rectangular	1.732	1	0.00	0.000	∞	0
SAV	Spatial averaging	0.10	rectangular	1.732	1	0.06	0.003	∞	0
SDL	System detection limit	0.04	rectangular	1.732	1	0.02	0.001	∞	0
Uncertainty terms dependent on the DUT and environmental factors									
PC	Probe coupling with DUT	0.00	rectangular	1.732	1	0.00	0.000	∞	0
MOD	Modulation response	0.40	rectangular	1.732	1	0.23	0.053	∞	0
IT	Integration time	0.00	rectangular	1.732	1	0.00	0.000	∞	0
RT	Response time	0.00	rectangular	1.732	1	0.00	0.000	∞	0
DH	Device holder influence	0.10	rectangular	1.732	1	0.06	0.003	∞	0
DA	DUT alignment	0.00	rectangular	1.732	1	0.00	0.000	∞	0
REF	Reflections in laboratory	0.10	rectangular	1.732	1	0.06	0.003	∞	0
TEM	Laboratory temperature	0.10	rectangular	1.732	1	0.06	0.003	∞	0
AC	RF ambient conditions	0.04	rectangular	1.732	1	0.02	0.001	∞	0
AR	Ambient reflections	0.04	rectangular	1.732	1	0.02	0.001	∞	0
MSI	Immunity / secondary reception	0.00	rectangular	1.732	1	0.00	0.000	∞	0
DRI	Drift of the DUT	0.00	rectangular	1.732	1	0.00	0.000	∞	0
$u_c(F_S)$	Combined Standard Uncertainty (w/ FTE/MEO)	-	normal	-	-	0.86	0.734	∞	0
$U(F_S)$	Expanded Uncertainty (w/ FTE/MEO)	-	normal k =	2.00	-	1.7	-	∞	-

Table 106

DASY6 mmWave Uncertainty Budget - System Performance Check

Symbol	Error Description	Value dB	Probability distribution	Divisor	c_i	u_i(y) dB	$(u_i(y))^2$ dB	v_i or v_{eff}	ui^4(y)
Uncertainty terms dependent on the measurement system									
CAL	Calibration Repeatability	0.21	normal 1	1.000	1	0.21	0.044	∞	0
COR	Probe correction	0.00	rectangular	1.732	1	0.00	0.000	∞	0
FRS	Frequency response (BW ≤ 1 GHz)	0.20	rectangular	1.732	0	0.00	0.000	∞	0
SCC	Sensor cross coupling	0.00	rectangular	1.732	1	0.00	0.000	∞	0
ISO	Isotropy	0.30	rectangular	1.732	1	0.17	0.030	∞	0
LIN	Linearity	0.20	rectangular	1.732	1	0.12	0.013	∞	0
PSC	Probe scattering	0.00	rectangular	1.732	1	0.00	0.000	∞	0
PPO	Probe positioning offset	0.11	rectangular	1.732	1	0.06	0.004	∞	0
PPR	Probe positioning repeatability	0.04	rectangular	1.732	1	0.02	0.001	∞	0
SMO	Sensor mechanical offset	0.00	rectangular	1.732	1	0.00	0.000	∞	0
PSR	Probe spatial resolution	0.00	rectangular	1.732	1	0.00	0.000	∞	0
FLD	Field impedance dependence	0.00	rectangular	1.732	1	0.00	0.000	∞	0
APD	Amplitude and phase drift	0.00	rectangular	1.732	1	0.00	0.000	∞	0
APN	Amplitude and phase noise	0.04	rectangular	1.732	0	0.00	0.000	∞	0
TR	Measurement area truncation	0.00	rectangular	1.732	1	0.00	0.000	∞	0
DAQ	Data acquisition	0.03	normal 1	1.000	1	0.03	0.001	∞	0
SMP	Sampling	0.00	rectangular	1.732	1	0.00	0.000	∞	0
REC	Field reconstruction	0.60	rectangular	1.732	0.3	0.10	0.011	∞	0
TRA	Forward transformation	0.00	rectangular	1.732	1	0.00	0.000	∞	0
SCA	Power density scaling	0.00	rectangular	1.732	1	0.00	0.000	∞	0
SAV	Spatial averaging	0.10	rectangular	1.732	0	0.00	0.000	∞	0
SDL	System detection limit	0.04	rectangular	1.732	1	0.02	0.001	∞	0
Uncertainty terms dependent on the DUT and environmental factors									
PC	Probe coupling with DUT	0.00	rectangular	1.732	1	0.00	0.000	∞	0
MOD	Modulation response	0.40	rectangular	1.732	0	0.00	0.000	∞	0
IT	Integration time	0.00	rectangular	1.732	1	0.00	0.000	∞	0
RT	Response time	0.00	rectangular	1.732	1	0.00	0.000	∞	0
DH	Device holder influence	0.10	rectangular	1.732	0	0.00	0.000	∞	0
REF	Reflections in laboratory	0.10	rectangular	1.732	1	0.06	0.003	∞	0
TEM	Laboratory temperature	0.10	rectangular	1.732	1	0.06	0.003	∞	0
DA	DUT alignment	0.00	rectangular	1.732	1	0.00	0.000	∞	0
AC	RF ambient conditions	0.04	rectangular	1.732	1	0.02	0.001	∞	0
AR	Ambient reflections	0.04	rectangular	1.732	1	0.02	0.001	∞	0
MSI	Immunity / secondary reception	0.00	rectangular	1.732	0	0.00	0.000	∞	0
DRI	Drift of the DUT	0.10	rectangular	1.732	1	0.06	0.003	∞	0
$u_c(F_S)$	Combined Standard Uncertainty (w/ FTE/MEO)	-	normal	-	-	0.34	0.115	∞	0
$U(F_S)$	Expanded Uncertainty (w/ FTE/MEO)	-	normal k =	2.00	-	0.7		∞	-

Table 107

3.6.1 Decision Rule

Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2007, Clause 4.4.3 and 4.5.1. (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8."

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This non-binding report has been prepared by TÜV SÜD with all reasonable skill and care.

This report relates only to the actual item/items tested.

Results of tests covered by our Flexible UKAS Accreditation Schedule are marked FS (Flexible Scope)

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited)

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation

ANNEX A

PROBE CALIBRATION REPORT

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	TüV SÜD Fareham, United Kingdom	Certificate No.	EX-7805_Feb24

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7805
Calibration procedure(s)	QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6, QA CAL-25.v8 Calibration procedure for dosimetric E-field probes
Calibration date	February 14, 2024

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 NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
OCP DAK-3.5 (weighted)	SN: 1249	05-Oct-23 (OCP-DAK3.5-1249_Oct23)	Oct-24
OCP DAK-12	SN: 1016	05-Oct-23 (OCP-DAK12-1016_Oct23)	Oct-24
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 660	16-Mar-23 (No. DAE4-660_Mar23)	Mar-24
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24

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-99 (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	Jeffrey Katzman	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

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

Accreditation No.: SCS 0108

Glossary

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ 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:

- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. 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 *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ±50 MHz to ±100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Parameters of Probe: EX3DV4 - SN:7805

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm (μV/(V/m)^2) [A]	0.62	0.61	0.71	±10.1%
DCP (mV) [B]	106.5	106.8	106.3	±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[E] $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	143.0	±2.5%	±4.7%
		Y	0.00	0.00	1.00		131.9		
		Z	0.00	0.00	1.00		121.0		
10352	Pulse Waveform (200Hz, 10%)	X	1.54	60.76	6.34	10.00	60.0	±3.0%	±9.6%
		Y	1.39	60.12	6.21		60.0		
		Z	1.47	60.41	6.23		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	22.00	74.00	9.00	6.99	80.0	±2.7%	±9.6%
		Y	0.82	60.00	5.11		80.0		
		Z	0.83	60.00	4.93		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	0.04	125.69	0.10	3.98	95.0	±3.0%	±9.6%
		Y	0.41	158.60	17.89		95.0		
		Z	24.00	72.00	7.00		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	7.72	159.15	26.25	2.22	120.0	±1.5%	±9.6%
		Y	0.33	60.00	3.30		120.0		
		Z	9.77	158.08	12.75		120.0		
10387	QPSK Waveform, 1 MHz	X	0.57	65.44	13.50	1.00	150.0	±2.8%	±9.6%
		Y	0.94	73.38	18.15		150.0		
		Z	0.55	64.20	12.89		150.0		
10388	QPSK Waveform, 10 MHz	X	1.40	67.23	14.48	0.00	150.0	±0.9%	±9.6%
		Y	1.76	70.92	16.71		150.0		
		Z	1.36	66.42	14.19		150.0		
10396	64-QAM Waveform, 100 kHz	X	1.63	64.08	15.63	3.01	150.0	±0.9%	±9.6%
		Y	1.84	66.27	16.88		150.0		
		Z	1.71	64.70	15.80		150.0		
10399	64-QAM Waveform, 40 MHz	X	2.87	66.92	15.41	0.00	150.0	±1.3%	±9.6%
		Y	2.94	67.43	15.91		150.0		
		Z	2.82	66.49	15.20		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	3.82	66.52	15.49	0.00	150.0	±2.1%	±9.6%
		Y	3.97	67.19	16.00		150.0		
		Z	3.77	66.07	15.29		150.0		

Note: For details on UID parameters see Appendix

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

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

Parameters of Probe: EX3DV4 - SN:7805

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 msV^{-2}	T2 msV^{-1}	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
x	8.8	62.84	32.91	4.19	0.00	4.90	0.50	0.00	1.00
y	9.0	63.68	32.62	4.61	0.00	4.90	0.56	0.00	1.00
z	9.2	65.89	32.77	3.99	0.00	4.90	0.58	0.00	1.00

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-7.5°
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.

Parameters of Probe: EX3DV4 - SN:7805

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz)[C]	Relative Permittivity[F]	Conductivity[F] (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unc ($k = 2$)
300	45.3	0.87	11.45	11.45	11.45	0.09	1.00	±13.3%
450	43.5	0.87	10.69	10.69	10.69	0.16	1.30	±13.3%
750	41.9	0.89	9.05	9.34	9.03	0.41	1.27	±11.0%
835	41.5	0.90	8.86	9.29	8.74	0.41	1.27	±11.0%
900	41.5	0.97	8.70	9.27	8.67	0.41	1.27	±11.0%
1300	40.8	1.14	8.19	8.60	8.26	0.34	1.27	±11.0%
1450	40.5	1.20	8.08	8.45	8.15	0.34	1.27	±11.0%
1640	40.2	1.31	7.98	8.33	7.98	0.34	1.27	±11.0%
1750	40.1	1.37	7.83	8.33	7.87	0.28	1.27	±11.0%
1810	40.0	1.40	7.80	8.24	7.84	0.29	1.27	±11.0%
1900	40.0	1.40	7.71	8.12	7.76	0.30	1.27	±11.0%
1950	40.0	1.40	7.63	8.07	7.69	0.30	1.27	±11.0%
2000	40.0	1.40	7.45	7.86	7.51	0.30	1.27	±11.0%
2100	39.8	1.49	7.36	7.76	7.42	0.30	1.27	±11.0%
2300	39.5	1.67	7.21	7.59	7.28	0.32	1.27	±11.0%
2450	39.2	1.80	7.05	7.42	7.11	0.31	1.27	±11.0%
2550	39.1	1.91	6.98	7.33	7.03	0.30	1.27	±11.0%
2600	39.0	1.96	6.91	7.26	6.98	0.30	1.27	±11.0%
3300	38.2	2.71	6.65	6.94	6.70	0.34	1.27	±13.1%
3500	37.9	2.91	6.55	6.85	6.60	0.34	1.27	±13.1%
3700	37.7	3.12	6.47	6.79	6.52	0.34	1.27	±13.1%
4100	37.2	3.53	6.29	6.59	6.32	0.35	1.27	±13.1%
5200	36.0	4.66	5.18	5.44	5.21	0.31	1.60	±13.1%
5300	35.9	4.76	5.01	5.20	4.98	0.35	1.55	±13.1%
5500	35.6	4.96	4.75	4.91	4.69	0.42	1.49	±13.1%
5600	35.5	5.07	4.56	4.72	4.53	0.39	1.67	±13.1%
5800	35.3	5.27	4.63	4.77	4.63	0.36	1.86	±13.1%

[C] Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

[F] The probes are calibrated using tissue simulating liquids (TSL) that deviate for ε and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

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

Parameters of Probe: EX3DV4 - SN:7805

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz)[C]	Relative Permittivity[F]	Conductivity[F] (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unc ($k = 2$)
6500	34.5	6.07	5.02	5.22	4.99	0.20	2.00	±18.6%

[C] 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.
[F] The probes are calibrated using tissue simulating liquids (TSL) that deviate for ε and σ by less than ±10% from the target values (typically better than ±6%) and are valid for TSL with deviations of up to ±10%.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz; 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.