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Report On

Specific Absorption Rate Testing of the A2780

In accordance with FCC 47CFR 2.1093

FCC ID: BCGA2780

COMMERCIAL-IN-CONFIDENCE

Document 75955429 Report 22 Issue 1 **December 2022**

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REPORT ON Specific Absorption Rate Testing of the A2780

Document 75955429 Report 22 Issue 1

December 2022

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DATED 14 December 2022

CONTENTS

SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the A2780

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate testing of the A2780 to the requirements of FCC 47CFR 2.1093

Objective	To perform Specific Absorption Rate Testing to determine the Equipment Under Test's (EUT's) compliance with the requirements specified of FCC 47CFR 2.1093 for the series of tests carried out.
Applicant	Apple Inc
Manufacturer	Apple Inc
Manufacturing Description	Laptop Computer
Model Number	A2780
Serial/IMEI Number(s)	J40D3FJ4PD radiated sample GWV04L19GG conducted sample
Number of Samples Tested	2
Hardware Version	1.0
Software Version	22A31991j
Test Specification/Issue/Date	FCC 47CFR 2.1093
Start of Test	05-September-2022
Finish of Test	18-October-2022
Related Document(s)	KDB 865664 – D01 v01r04 KDB 865664 – D02 v01r02 KDB 648474 – D04 v01r03 KDB 447498 – D01 v06 IEC-IEEE 62209-1528-2020 KDB 248227 – D01 v02r02 IEC/IEEE 63195 ED1 (Draft) ICNIRP 2020 SPEAG, DASY8 Application Note: SAR, APD & PD at 6 – 10 GHz (Version 6.0), August 2022 October 2020 TCBC Workshop Notes
Name of Engineer(s)	Mohamud Mohamud Kamil Nawabzada Ravish Foolchund Fahad Ashfaq

1.2 BRIEF SUMMARY OF RESULTS

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

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

Max 1g SAR (W/kg) Body	1.180 (Measured)	0.970 (Scaled)*
The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg. *Results scaled down from 100% duty cycle to 78% duty cycle		

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

Max APD 4cm^2 (W/m^2)	4.060 (Measured)	4.350 (Scaled)
The maximum APD averaged over 4cm^2 measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure of 20 W/m^2.		

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

Max iPD 4cm^2 (W/m^2)	3.950 (Measured)
The maximum iPD averaged over 4cm^2 measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure of 38.99 W/m^2.	

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

RAT	Band	Test Configuration	Max Scaled SAR (W/kg)
Bluetooth (5GHz WLAN off)	2450 MHz	Body	0.249
Bluetooth (5GHz WLAN on)	2450 MHz	Body	0.222
NB(Narrowband) (2.4GHz WLAN off)	5150-5250MHz 5725-5850MHz	Body	0.970*
NB(Narrowband) (2.4GHz WLAN on)	5150-5250MHz 5725-5850MHz	Body	0.613*
WLAN	2450 MHz	Body	0.621
WLAN	5200 / 5300 MHz	Body	0.800
WLAN	5500 / 5600 MHz	Body	0.651
WLAN	5800 MHz	Body	0.712
WLAN	6000MHz	Body	0.609
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. *Results scaled down from 100% duty cycle to 78% duty cycle			

The maximum APD 4cm^2 found during this Assessment for each supported mode:

RAT	Band	Test Configuration	Max reported APD 4cm^2 (W/m^2)
WLAN	6000MHz	Body	4.350
The maximum APD 4cm^2 measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure of 20 W/m^2.			

The maximum iPD 4cm^2 found during this Assessment for each supported mode:

RAT	Band	Test Configuration	Max reported iPD 4cm^2 (W/m^2)
WLAN	6000MHz	Body	3.950
The maximum iPD 4cm^2 measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure of 38.99 W/m^2.			

Simultaneous Transmission.

Position	2.4GHz WLAN-1g SAR (W/kg)	NB(Narrowband) (2.4GHz WLAN on) 1g SAR(W/kg)	Sum of 1g SAR (W/Kg)	Peak Location Separation Ratio required?	Peak Location Separation Ratio
Bottom	0.621	0.613	1.234	No	N/A

Position	5/6GHz WLAN-1g SAR (W/kg)	Bluetooth (5/6GHz WLAN on) 1g SAR (W/kg)	Sum of 1g SAR (W/Kg)	Peak Location Separation Ratio required?	Peak Location Separation Ratio
Bottom	0.800	0.222	1.022	No	N/A

Position	6GHz WLAN-Exposure Ratio	Bluetooth (5/6GHz WLAN on) Exposure ratio	Total Exposure Ratio	Total Exposure Ratio less than 1.0
Bottom	0.218	0.139	0.357	Yes

Each antenna is separated to the extent that the SAR distributions do not overlap, however Bluetooth/NB and 2.4/5/6GHz WLAN can operate on the same antenna. Bluetooth/NB operates at a lower power level when the 2.4/5/6 GHz WLAN is active. The highest overall reported SAR values of 2.4/5/6GHz WLAN and Bluetooth/NB (2.4/5/6GHz WLAN on) results were used for the summation of the simultaneous transmission as shown in the table above.

KDB 447498 D01 - Section 4.3.2: Simultaneous test exclusion is applicable as the sum of 1g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit.

1.3 TEST RESULTS SUMMARY

1.3.1 System Performance / Validation Check Results

Prior to formal testing being performed a System Check was performed in accordance with KDB 865664 and the results were compared against published data in Standard IEEE 1528-2003. A system performance check in DASY6 Module mmWave was also performed with the Verification Source available at 10 GHz. The following results were obtained: -

System performance / Validation results

Date	Frequency (MHz)	Fluid Type	Measured Max 1g SAR (W/kg) *	Max 1g SAR Target (W/kg)	Percentage Deviation from Target 1g (%)
05/09/2022	2450	HBBL/B2	51.28	51.6	-0.62
06/09/2022	2450	HBBL/B2	50.48	51.6	-2.17
26/09/2022	2450	HBBL/B2	52.08	51.6	0.92
27/09/2022	2450	HBBL/B2	53.47	51.6	3.63
29/09/2022	2450	HBBL/B2	54.07	51.6	4.79
30/09/2022	2450	HBBL/B2	54.07	51.6	4.79
08/09/2022	5200	HBBL/B2	78.01	80.6	-3.21
09/09/2022	5200	HBBL/B1	73.23	80.6	-9.15
10/09/2022	5200	HBBL/B1	74.02	80.6	-8.16
12/09/2022	5200	HBBL/B2	72.63	80.6	-9.89
13/09/2022	5200	HBBL/B1	73.23	80.6	-9.15
15/09/2022	5200	HBBL/B1	72.63	80.6	-9.89
27/09/2022	5200	HBBL/B2	74.62	80.6	-7.42
03/10/2022	5200	HBBL/B3	82.20	80.6	1.99
04/10/2022	5200	HBBL/B3	76.82	80.6	-4.69
09/09/2022	5500	HBBL/B2	83.60	83.6	-4.46
12/09/2022	5500	HBBL/B1	86.79	83.6	3.82
10/09/2022	5600	HBBL/B2	83.20	83.6	-0.48
13/09/2022	5600	HBBL/B1	76.62	83.6	-8.35
26/10/2022	5600	HBBL/B3	79.21	83.6	-5.25
12/09/2022	5800	HBBL/B1	81.41	80.4	1.25
03/10/2022	5800	HBBL/B3	72.63	80.4	-9.67
04/10/2022	5800	HBBL/B3	80.01	80.4	-0.49
23/09/2022	6500	HBBL/B3	291.00	277.00	5.05
27/09/2022	6500	HBBL/B3	298.00	277.00	7.58
17/10/2022	6500	HBBL/B3	287.00	277.00	3.61

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 (%)
23/09/2022	6500	HBBL/B3	1350	1250	8.00
27/09/2022	6500	HBBL/B3	1360	1250	8.80
17/10/2022	6500	HBBL/B3	1310	1250	4.80

Date	Frequency (MHz)	Medium	Measured psPDtot+ (W/m^2)	Target psPDtot+ (W/m^2)	Percentage Deviation from Target (%)
17/11/2022	10000	Air	55.3	49.8	11.0

*Normalised to a forward power of 1W

1.3.2 Results Summary Tables

Bluetooth - EDR – 3-DH5 – SISO Core 0 (5GHz WIFI OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Edge	0	2402	16.50	15.59	Full	0.202	0.249	-
0mm Bottom Edge	39	2441	16.50	15.98	Full	0.221	0.249	C.1
0mm Bottom Edge	78	2480	16.50	15.34	Full	0.189	0.247	-
0mm Rear of Display	39	2441	16.50	15.98	Full	0.080	0.090	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz								

Bluetooth - EDR – 3-DH5 – SISO Core 1 (5GHz WIFI OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Edge	0	2402	16.5	15.73	Full	0.163	0.195	-
0mm Bottom Edge	39	2441	16.5	15.84	Full	0.207	0.241	C.2
0mm Bottom Edge	78	2480	16.5	15.69	Full	0.186	0.224	-
0mm Rear of Display	39	2441	16.5	15.84	Full	0.088	0.102	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz								

Bluetooth - BDR – 3-DH5 – SISO Core 2 (5GHz WIFI OFF) (iPA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Edge	0	2402	13.00	12.62	Full	0.093	0.102	C.3
0mm Bottom Edge	39	2441	13.00	12.80	Full	0.090	0.094	-
0mm Bottom Edge	78	2480	13.00	12.92	Full	0.094	0.096	-
0mm Rear of Display	0	2402	13.00	12.62	Full	0.037	0.04	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz								

Bluetooth - EDR – 3-DH5 – SISO Core 0 (5GHz WIFI ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Edge	0	2402	16.00	15.59	Full	0.202	0.222	-
0mm Bottom Edge	39	2441	16.00	15.98	Full	0.221	0.222	C.1
0mm Bottom Edge	78	2480	16.00	15.34	Full	0.189	0.220	-
0mm Rear of Display	39	2441	16.00	15.98	Full	0.080	0.080	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz								

Bluetooth - EDR – 3-DH5 – SISO Core 1 (5GHz WIFI ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Edge	0	2402	16.00	15.73	Full	0.163	0.173	-
0mm Bottom Edge	39	2441	16.00	15.84	Full	0.207	0.215	C.2
0mm Bottom Edge	78	2480	16.00	15.69	Full	0.186	0.200	-
0mm Rear of Display	39	2441	16.00	15.84	Full	0.088	0.091	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz								

Bluetooth - BDR – 3-DH5 – SISO Core 2 (5GHz WIFI ON) (iPA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Edge	0	2402	13.00	12.62	Full	0.093	0.102	C.3
0mm Bottom Edge	39	2441	13.00	12.80	Full	0.090	0.094	-
0mm Bottom Edge	78	2480	13.00	12.92	Full	0.094	0.096	-
0mm Rear of Display	0	2402	13.00	12.62	Full	0.037	0.040	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz								

NB (Narrowband) - UNII-1 – HDR4 – SISO Core 0 (2.4GHz WIFI ON & OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Bottom Edge	Bottom	5150	12.00	11.62	Full	0.388	0.330	-
0mm Bottom Edge	Middle	5200	12.00	11.70	Full	0.489	0.409	-
0mm Bottom Edge	Top	5250	12.00	11.42	Full	0.497	0.443	C.4
0mm Rear of Display	Top	5250	12.00	11.42	Full	0.139	0.124	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz *Results scaled down from 100% duty cycle to 78% duty cycle								

NB (Narrowband) - UNII-1 – HDR4 – SISO Core 1 (2.4GHz WIFI ON & OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Bottom Edge	Bottom	5150	11.50	11.20	Full	0.257	0.215	-
0mm Bottom Edge	Middle	5200	11.50	10.99	Full	0.272	0.239	-
0mm Bottom Edge	Top	5250	11.50	11.10	Full	0.296	0.253	C.5
0mm Rear of Display	Top	5250	11.50	11.10	Full	0.107	0.092	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz *Results scaled down from 100% duty cycle to 78% duty cycle								

NB(Narrowband) - UNII-3– HDR4 – SISO Core 0 (2.4GHz WIFI OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Bottom Edge	Bottom	5725	15.00	14.73	Full	0.829	0.688	-
0mm Bottom Edge	Middle	5788	15.00	14.76	Full	1.020	0.841	-
0mm Bottom Edge	Top	5850	15.00	14.77	Full	1.180	0.970	C.6
0mm Rear of Display	Top	5850	15.00	14.77	Full	0.325	0.267	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz *Results scaled down from 100% duty cycle to 78% duty cycle								

NB(Narrowband) - UNII-3– HDR4 – SISO Core 1 (2.4GHz WIFI OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Bottom Edge	Bottom	5725	15.00	14.44	Full	0.789	0.700	-
0mm Bottom Edge	Middle	5788	15.00	14.89	Full	0.876	0.701	-
0mm Bottom Edge	Top	5850	15.00	14.99	Full	0.953	0.745	C.7
0mm Rear of Display	Top	5850	15.00	14.99	Full	0.327	0.256	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz *Results scaled down from 100% duty cycle to 78% duty cycle								

NB(Narrowband) - UNII-3– HDR4 – SISO Core 0 (2.4GHz WIFI ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Bottom Edge	Bottom	5725	13.00	12.95	Full	0.495	0.391	-
0mm Bottom Edge	Middle	5788	13.00	12.77	Full	0.698	0.574	-
0mm Bottom Edge	Top	5850	13.00	12.62	Full	0.720	0.613	C.8
0mm Rear of Display	Top	5850	13.00	12.62	Full	0.347	0.295	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz *Results scaled down from 100% duty cycle to 78% duty cycle								

NB(Narrowband) - UNII-3– HDR4 – SISO Core 1 (2.4GHz WIFI ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Bottom Edge	Bottom	5725	13.00	12.53	Full	0.461	0.401	-
0mm Bottom Edge	Middle	5788	13.00	12.54	Full	0.493	0.428	-
0mm Bottom Edge	Top	5850	13.00	12.87	Full	0.596	0.479	C.9
0mm Rear of Display	Top	5850	13.00	12.87	Full	0.219	0.176	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz *Results scaled down from 100% duty cycle to 78% duty cycle								

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps – SISO Core 0:
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	11	2462	19.00	18.24	Full	0.457	0.544	-
0mm Bottom	1	2412	19.00	18.15	Full	0.482	0.586	C.10
0mm Bottom	6	2437	19.00	18.03	Full	0.452	0.565	-
0mm Rear of Display	11	2462	19.00	18.24	Full	0.173	0.206	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps – SISO Core 1:
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	1	2412	19.00	18.12	Full	0.333	0.408	-
0mm Bottom	6	2437	19.00	17.96	Full	0.410	0.521	C.11
0mm Bottom	11	2462	19.00	17.98	Full	0.409	0.517	-
0mm Rear of Display	1	2412	19.00	18.12	Full	0.125	0.153	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN - 2450 MHz - 802.11n - HT20– 2x2 MIMO Core 0 and Core 1:
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom (Core 0)	2	2417	19.00	18.12	Full	0.493	0.604	-
0mm Bottom (Core 1)	2	2417	19.00	18.20	Full	0.393	0.472	
0mm Bottom (Core 0)	6	2437	19.00	18.05	Full	0.499	0.621	C.12
0mm Bottom (core 1)	6	2437	19.00	18.13	Full	0.465	0.568	
0mm Bottom (Core 0)	10	2457	19.00	18.13	Full	0.489	0.597	-
0mm Bottom (Core 1)	10	2457	19.00	18.15	Full	0.432	0.525	
0mm Rear of Display (Core 0)	6	2437	19.00	18.05	Full	0.153	0.190	-
0mm Rear of Display(Core 1)	6	2437	19.00	18.13	Full	0.161	0.197	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN-5GHz - U-NII-1 - 802.11ac – SISO Core 0
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	42	5210	14.75	13.66	Full	0.619	0.796	C.13
0mm Bottom	50	5250	13.50	13.45	Full	0.614	0.621	-
0mm Bottom	58	5290	14.00	13.10	Full	0.365	0.449	-
0mm Rear of Display	42	5210	14.75	13.66	Full	0.222	0.285	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN-5GHz - U-NII-1 - 802.11ac – SISO Core 1
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	42	5210	14.50	13.48	Full	0.433	0.548	-
0mm Bottom	50	5250	13.50	13.24	Full	0.458	0.486	-
0mm Bottom	58	5290	14.00	13.06	Full	0.461	0.572	C.14
0mm Rear of Display	42	5210	14.50	13.48	Full	0.204	0.258	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN-5GHz - U-NII-1 - 802.11ac – VHT80- MCS0 – MIMO Core 0 and Core 1:
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom (Core 0)	42	5210	14.50	14.03	Full	0.738	0.800	C.15
0mm Bottom (Core 1)	42	5210	14.50	14.15	Full	0.505	0.563	
0mm Bottom (Core 0)	58	5290	12.50	12.35	Full	0.558	0.563	-
0mm Bottom (core 1)	58	5290	12.50	12.40	Full	0.427	0.437	
0mm Rear of Display (Core 0)	42	5210	14.50	14.03	Full	0.243	0.263	-
0mm Rear of Display (Core 1)	42	5210	14.50	14.15	Full	0.188	0.209	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN-5GHz - U-NII-2C - 802.11ac - SISO Core 0
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	138	5690	14.00	13.25	Full	0.531	0.631	C.16
0mm Bottom	106	5530	14.00	13.24	Full	0.438	0.522	-
0mm Bottom	122	5610	14.00	13.10	Full	0.280	0.344	-
0mm Rear of Display	138	5690	14.00	13.25	Full	0.198	0.235	-

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz

≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz

≤ 0.4W/kg when the transmission band is ≥ 200MHz

KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2

WLAN-5GHz - U-NII-2C - 802.11ac - SISO Core 1
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	106	5530	14.00	13.11	Full	0.320	0.393	-
0mm Bottom	122	5610	14.00	12.92	Full	0.351	0.450	-
0mm Bottom	138	5690	14.00	13.02	Full	0.419	0.525	C.17
0mm Rear of Display	106	5530	14.00	13.11	Full	0.150	0.184	-

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz

≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz

≤ 0.4W/kg when the transmission band is ≥ 200MHz

KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2

WLAN-5GHz - U-NII-2C - 802.11ac - 80 MHz - MCS0 – MIMO Core 0 and Core 1:
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom (Core 0)	138	5690	14.00	13.10	Full	0.529	0.651	C.18
0mm Bottom (Core 1)	138	5690	14.00	12.90	Full	0.427	0.550	
0mm Bottom (Core 0)	106	5530	13.75	13.09	Full	0.322	0.375	-
0mm Bottom (Core 1)	106	5530	13.75	13.01	Full	0.327	0.388	
0mm Bottom (Core 0)	122	5610	14.00	13.10	Full	0.404	0.497	-
0mm Bottom (Core 1)	122	5610	14.00	12.89	Full	0.314	0.405	
0mm Rear of Display (Core 0)	138	5690	14.00	13.10	Full	0.169	0.208	-
0mm Rear of Display (Core 1)	138	5690	14.00	12.90	Full	0.140	0.180	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN-5GHz - U-NII-3 - 802.11ac VHT80 - SISO Core 0
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	155	5775	14.50	13.46	Full	0.560	0.712	C.19
0mm Rear of Display	155	5775	14.50	13.46	Full	0.187	0.238	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN-5GHz - U-NII-3 – 802.11ac VHT80 - SISO Core 1
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom	155	5775	13.50	13.38	Full	0.381	0.392	C.20
0mm Rear of Display	155	5775	13.50	13.38	Full	0.161	0.166	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

WLAN-5GHz - U-NII-3 – 802.11ac – VHT80- MCS0 - MIMO Core 0 and Core 1:
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	SAR Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom (Core 0)	155	5775	14.25	13.29	Full	0.462	0.576	C.21
0mm Bottom (Core 1)	155	5775	14.25	13.26	Full	0.389	0.489	
0mm Rear of Display (Core 0)	155	5775	14.25	13.29	Full	0.171	0.213	-
0mm Rear of Display (Core 1)	155	5775	14.25	13.26	Full	0.172	0.216	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2								

Specific Absorption Rate and Absorbed Power Density
6GHz - 802.11ax – HE160- MCS0 – Core 0:
Body Specific Absorption Rate (SAR) 1g and Absorbed Power Density 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	APD Exposure Ratio	Scan Figure Number
0mm Bottom	15	6025	10.00	9.70	Full	0.241	0.258	1.780	1.907	0.095	-
0mm Bottom	47	6185	10.00	9.86	Full	0.297	0.307	2.200	2.272	0.114	-
0mm Bottom	79	6345	11.00	10.70	Full	0.440	0.471	3.220	3.450	0.173	C.22
0mm Bottom	111	6505	11.00	10.60	Full	0.306	0.336	2.200	2.412	0.121	-
0mm Bottom	143	6665	12.00	11.96	Full	0.388	0.392	2.800	2.826	0.141	-
0mm Bottom	175	6825	11.50	11.30	Full	0.259	0.271	1.840	1.927	0.096	-
0mm Bottom	207	6985	11.50	11.32	Full	0.298	0.311	2.140	2.231	0.112	-
0mm Rear of Display	143	6665	12.00	11.96	Full	0.180	0.182	1.320	1.332	0.067	-

Body Specific Absorption Rate (SAR) limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)
Absorbed Power Density limit for General Population (Uncontrolled Exposure) 20 W/m2 (4cm2)
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)
Limit for General Population (Uncontrolled Exposure) 20 W/m^2 (4cm^2)
KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:
≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz
KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2

Specific Absorption Rate and Absorbed Power Density
6GHz - 802.11ax – HE160- MCS0 – Core 1:
Body Specific Absorption Rate (SAR) 1g and Absorbed Power Density 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	ADP Exposure Ratio	Scan Figure Number
0mm Bottom	15	6025	11.25	11.05	Full	0.271	0.284	2.100	2.199	0.11	-
0mm Bottom	47	6185	11.00	10.70	Full	0.203	0.218	1.240	1.329	0.066	-
0mm Bottom	79	6345	12.00	11.98	Full	0.256	0.257	2.000	2.009	0.100	-
0mm Bottom	111	6505	12.50	12.45	Full	0.297	0.300	2.200	2.225	0.111	-
0mm Bottom	143	6665	12.00	11.85	Full	0.324	0.335	2.320	2.402	0.120	-
0mm Bottom	175	6825	12.00	12.00	Full	0.405	0.405	2.900	2.900	0.145	-
0mm Bottom	207	6985	14.00	13.70	Full	0.568	0.609	4.060	4.350	0.218	C.23
0mm Rear of Display	207	6985	14.00	13.70	Full	0.334	0.358	2.440	2.615	0.131	-

Body Specific Absorption Rate (SAR) limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)
Absorbed Power Density limit for General Population (Uncontrolled Exposure) 20 W/m2 (4cm2)
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)
Limit for General Population (Uncontrolled Exposure) 20 W/m^2 (4cm^2)
KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:
≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz
KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2

Specific Absorption Rate and Absorbed Power Density
6GHz - 802.11ax – HE160- MCS0 – Core 0-1 (MIMO):
Body Specific Absorption Rate (SAR) 1g and Absorbed Power Density 4cm^2 Results

Test Position	Channel Number	Frequency (MHz)	Tune Up (dBm)	Measured Average Power (dBm)	Scan Type	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Measured APD 4cm^2 (W/m^2)	Scaled APD 4cm^2 (W/m^2)	APD Exposure ratio	Scan Figure Number
0mm Bottom (Core 0)	15	6025	9.00	8.79	Full	0.227	0.238	1.660	1.742	0.087	-
0mm Bottom (Core 1)	15	6025	9.00	8.82	Full	0.173	0.180	1.320	1.376	0.069	
0mm Bottom (Core 0)	47	6185	9.00	8.93	Full	0.218	0.222	1.600	1.626	0.081	-
0mm Bottom (Core 1)	47	6185	9.00	9.00	Full	0.173	0.173	1.320	1.320	0.066	
0mm Bottom (Core 0)	79	6345	10.00	9.81	Full	0.299	0.312	2.180	2.277	0.114	-
0mm Bottom (Core 1)	79	6345	10.00	9.70	Full	0.167	0.179	1.280	1.372	0.069	
0mm Bottom (Core 0)	111	6505	9.75	9.55	Full	0.264	0.276	1.880	1.969	0.098	-
0mm Bottom (Core 1)	111	6505	9.75	9.60	Full	0.154	0.159	1.140	1.180	0.059	
0mm Bottom (Core 0)	143	6665	9.25	9.13	Full	0.223	0.229	1.600	1.645	0.082	-
0mm Bottom (Core 1)	143	6665	9.25	9.20	Full	0.180	0.182	1.300	1.315	0.066	
0mm Bottom (Core 0)	175	6825	9.25	8.95	Full	0.178	0.191	1.240	1.329	0.066	-
0mm Bottom (Core 1)	175	6825	9.25	9.10	Full	0.196	0.203	1.400	1.449	0.072	
0mm Bottom (Core 0)	207	6985	11.50	11.36	Full	0.332	0.343	2.340	2.417	0.121	C.24
0mm Bottom (Core 1)	207	6985	11.50	11.36	Full	0.317	0.327	2.240	2.313	0.116	
0mm Rear of Display (Core 0)	207	6985	11.50	11.36	Full	0.181	0.187	1.400	1.446	0.072	-
0mm Rear of Display (Core 1)	207	6985	11.50	11.36	Full	0.194	0.200	1.380	1.425	0.071	

Body Specific Absorption Rate (SAR) limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)
Absorbed Power Density limit for General Population (Uncontrolled Exposure) 20 W/m2 (4cm2)
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)
Limit for General Population (Uncontrolled Exposure) 20 W/m^2 (4cm^2)
KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:
≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz
KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2

Incident Power Density – 6 GHz - 802.11ax – HE160- MCS0 – Core 1

Test Position	Channel Number	Frequency (MHz)	Measured IPD 4cm^2 (W/m^2)	Standalone PD limit (W/m^2)	Exposure Ratio	Scan Figure Number
0mm Bottom	207	6985	3.950	38.989	0.101	C.25

1.3.3 Technical Description

The equipment under test was an Apple laptop computer with Bluetooth and IEEE 802.11 a/b/g/n/ac/ax Wi-Fi in the 2.4 GHz and 5/6 GHz bands. A full technical description can be found in the manufacturer's documentation.

1.3.4 Interim Procedures for FCC Radiofrequency Exposure Evaluations

The interim procedure for FCC radiofrequency (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.

1.3.5 Test Configuration and Modes of Operation

The testing was performed with an integral battery supplied and manufactured by Apple Inc.

Supported technologies are Bluetooth (BDR/EDR//HDR/LE-1M/LE-M2), 2.4 GHz WLAN (802.11b/g/n/ax), 5 GHz WLAN (802.11a/n/ac/ax) and 6 GHz WLAN (802.11a/ax). 2x2 MIMO is supported for WLAN.

Bluetooth operates at lower power when the 5/6GHz WLAN is enabled. The report makes references to Bluetooth (5/6GHz WLAN on) and Bluetooth (5/GHz WLAN off). Testing was performed with the Bluetooth and Wi-Fi transmitters working independently, the on or off references are relating to Bluetooth power levels only.

WLAN and Bluetooth testing were achieved using the device's internal software, scripts and settings supplied by the customer. For each scan, the device was configured into a continuous transmission test mode at a maximum power defined by the customer. Testing was performed in each position at the frequency that gave the highest output power for each band. Some SAR levels were found to be higher than the thresholds set in KDB 447498 D01 therefore additional testing was required at the relevant frequencies / channels of the bands.

Conducted power measurements were performed on a modified device (accessible conducted port) and the measured SAR results were power scaled to the maximum declared tune-up level. Power measurements were only performed for the test configurations, which were determined by the client.

For each antenna, the bottom surface, and the rear of the EUT display were assessed for SAR.

For the 5/6GHz frequency bands the transmission mode used for testing was determined by the 802.11 configuration with the highest declared output power in each frequency band. Where multiple 802.11 configurations have the same specified output power, testing was performed using the mode with the largest channel bandwidth with the lowest order modulation and lowest data rate.

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.

1.4 POWER TABLES (TUNE UP VALUES)

Note: All values in dBm
NS= Not Supported

2.4GHz Bluetooth (5GHz WiFi off)

BT Core	PA	Channel	BDR	EDR	LE Data	HDR4	HDR8
0	iPA	All	13	9.5	6.5	6	6
0	ePA		N/A	16.5	N/A	15	15
1	iPA		13	9.5	6.5	6	6
1	ePA		N/A	16.5	N/A	15	15
2	iPA		13	9.5	6.5	6	6

Bluetooth – TXBF

BT Core	PA	Channel	BDR	EDR	LE Data	HDR4	HDR8
0	iPA	All	13	9.5	6.5	6	6
0	ePA		N/A	13.5	N/A	15	15
1	iPA		13	9.5	6.5	6	6
1	ePA		N/A	13.5	N/A	15	15
2	iPA		N/A	N/A	N/A	N/A	N/A

2.4GHz Bluetooth (5GHz WiFi on)

BT Core	PA	Channel	BDR	EDR	LE Data	HDR4	HDR8
0	iPA	All	13	9.5	6.5	6	6
0	ePA		N/A	16	N/A	15	15
1	iPA		13	9.5	6.5	6	6
1	ePA		N/A	16	N/A	15	15
2	iPA		13	9.5	6.5	6	6

Bluetooth – TXBF

BT Core	PA	Channel	BDR	EDR	LE Data	HDR4	HDR8
0	iPA	All	13	9.5	6.5	6	6
0	ePA		N/A	13.5	N/A	15	15
1	iPA		13	9.5	6.5	6	6
1	ePA		N/A	13.5	N/A	15	15
2	iPA		N/A	N/A	N/A	N/A	N/A

5GHz NB (Narrowband) UNII-1 - When 2.4GHz WLAN OFF & ON

BT Core	PA	Channel	BDR	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	10	4.5	4.5	7	4.5	4.5
0	ePA		N/A	12	12	N/A	9	9
1	iPA		9.5	4.5	4.5	6.5	4.5	4.5
1	ePA		N/A	11.5	11.5	N/A	8.5	8.5
2	iPA		N/A	N/A	N/A	N/A	N/A	N/A

5GHz NB (Narrowband) UNII-3- When 2.4GHz WLAN OFF

BT Core	PA	Channel	BDR (dBm)	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	11	4.5	4.5	11	4.5	4.5
0	ePA		N/A	15	15	N/A	15	15
1	iPA		11	4.5	4.5	11	4.5	4.5
1	ePA		N/A	15	15	N/A	15	15
2	iPA		N/A	N/A	N/A	N/A	N/A	N/A

5GHz NB (Narrowband) UNII-3- When 2.4GHz WLAN ON

BT Core	PA	Channel	BDR	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	11	4.5	4.5	11	4.5	4.5
0	ePA		N/A	13	13	N/A	13	13
1	iPA		11	4.5	4.5	11	4.5	4.5
1	ePA		N/A	13	13	N/A	13	13
2	iPA		N/A	N/A	N/A	N/A	N/A	N/A

5GHz NB (Narrowband) UNII-5

BT Core	PA	Channel	BDR	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	N/A	N/A	N/A	N/A	N/A	N/A
0	ePA		N/A	N/A	N/A	N/A	N/A	N/A
1	iPA		N/A	N/A	N/A	N/A	N/A	N/A
1	ePA		N/A	N/A	N/A	N/A	N/A	N/A
2	iPA		N/A	N/A	N/A	N/A	N/A	N/A

2.4 GHz WLAN – SISO

Channel	Centre Frequency (MHz)	b (SISO)	g (SISO) Low Rate	11n/11ac HT20 (SISO) Low Rate	11ax HE20 (SISO) Low Rate	11ax HE20 RU106 (SISO)	11ax HE20 RU52 (SISO)	11ax HE20 RU26 (SISO)
1	2412	19	17.5	16.75	16	17	17.5	14.5
2	2417	19	19	19	19.25	17.5	17.5	14.5
3	2422	19	19	19	19	19	17.5	14.5
4	2427	19	19	19	19	19	17.5	14.5
5	2432	19	19	19	19	19	17.5	14.5
6	2437	19	19	19	19	19	17.5	14.5
7	2442	19	19	19	19	19	17.5	14.5
8	2447	19	19	19	19	19	17.5	14.5
9	2452	19	19	19	19	19	17.5	14.5
10	2457	19	19	19	19	18	17.5	14.5
11	2462	19	19	19	18	17.75	17.5	14.5
12	2467	17.5	17.5	17.25	16.25	15	16.5	14.5
13	2472	15.75	8	7.5	6.75	1	0	-3

2.4 GHz WLAN – MIMO

Channel	Centre Frequency (MHz)	11n/11ac HT20 (2Tx, nonTXBF) Low Rate	11ax HE20 (2Tx, nonTXBF) Low Rate	11ax HE20 RU106 (2Tx, nonTxBF)	11ax HE20 RU52 (2Tx, nonTxBF)	11ax HE20 RU26 (2Tx, nonTxBF)
1	2412	15.75	14	16	17.5	14.5
2	2417	19	18.25	16.25	17.5	14.5
3	2422	19	19	18.25	17.5	14.5
4	2427	19	19	19	17.5	14.5
5	2432	19	19	19	17.5	14.5
6	2437	19	19	19	17.5	14.5
7	2442	19	19	19	17.5	14.5
8	2447	19	19	19	17.5	14.5
9	2452	19	19	19	17.5	14.5
10	2457	19	18.5	17.25	17.5	14.5
11	2462	17.5	16	17.25	17.5	14.5
12	2467	15.5	15	14	15.5	14.5
13	2472	7	6.25	-0.5	-1.5	-6

5 GHz – 20 MHz BW – SISO Core 0

Channel	Centre Frequency (MHz)	a (SISO) Low Rate	11n/11ac HT20 (SISO) Low Rate	11ax HE20 (SISO) Low Rate	11ax HE20 RU106 (SISO)	11ax HE20 RU52 (SISO)	11ax HE20 RU26 (SISO)
36	5180	14.75	14.75	14.75	14.75	14.75	11.75
40	5200	14.75	14.75	14.75	14.75	14.75	11.75
44	5220	14.75	14.75	14.75	14.75	14.75	11.75
48	5240	14.75	14.75	14.75	14.75	14.75	11.75
52	5260	14	14	14	14	14	NS
56	5280	14	14	14	14	14	NS
60	5300	14	14	14	14	14	NS
64	5320	14	14	14	14	14	NS
100	5500	14	14	14	14	14	NS
104	5520	14	14	14	14	14	NS
108	5540	14	14	14	14	14	NS
112	5560	14	14	14	14	14	NS
116	5580	14	14	14	14	14	NS
120	5600	14	14	14	14	14	NS
124	5620	14	14	14	14	14	NS
128	5640	14	14	14	14	14	NS
132	5660	14	14	14	14	14	NS
136	5680	14	14	14	14	14	NS
140	5700	14	14	14	14	14	NS
144	5720	14	14	14	14	14	NS
149	5745	14.5	14.5	14.5	14.5	14.5	13
153	5765	14.5	14.5	14.5	14.5	14.5	13
157	5785	14.5	14.5	14.5	14.5	14.5	13
161	5805	14.5	14.5	14.5	14.5	14.5	13
165	5825	14.5	14.5	14.5	14.5	14.5	13

5 GHz – 20 MHz BW – SISO Core 1

Channel	Centre Frequency (MHz)	a (SISO) Low Rate	11n/11ac HT20 (SISO) Low Rate	11ax HE20 (SISO) Low Rate	11ax HE20 RU106 (SISO)	11ax HE20 RU52 (SISO)	11ax HE20 RU26 (SISO)
36	5180	14.5	14.5	14.5	14.5	14.5	11.75
40	5200	14.5	14.5	14.5	14.5	14.5	11.75
44	5220	14.5	14.5	14.5	14.5	14.5	11.75
48	5240	14.5	14.5	14.5	14.5	14.5	11.75
52	5260	14	14	14	14	14	NS
56	5280	14	14	14	14	14	NS
60	5300	14	14	14	14	14	NS
64	5320	14	14	14	14	14	NS
100	5500	14	14	14	14	14	NS
104	5520	14	14	14	14	14	NS
108	5540	14	14	14	14	14	NS
112	5560	14	14	14	14	14	NS
116	5580	14	14	14	14	14	NS
120	5600	14	14	14	14	14	NS
124	5620	14	14	14	14	14	NS
128	5640	14	14	14	14	14	NS
132	5660	14	14	14	14	14	NS
136	5680	14	14	14	14	14	NS
140	5700	14	14	14	14	14	NS
144	5720	14	14	14	14	14	NS
149	5745	14.25	14.25	14.25	14.25	14.25	13
153	5765	14.25	14.25	14.25	14.25	14.25	13
157	5785	14.25	14.25	14.25	14.25	14.25	13
161	5805	14.25	14.25	14.25	14.25	14.25	13
165	5825	14.25	14.25	14.25	14.25	14.25	13

5 GHz – 20 MHz BW – MIMO CORE 0 CDD

Channel	Centre Frequency (MHz)	11n/11ac HT20 (2Tx, CDD, nonTXBF) Low Rate	11ax HE20 (2Tx, CDD, nonTxBF) Low Rate	11ax HE20 RU106 (2Tx, CDD, nonTxBF)	11ax HE20 RU52 (2Tx, CDD, nonTxBF)	11ax HE20 RU26 (2Tx, CDD, nonTxBF)
36	5180	14.5	14.5	12.75	9.75	6.75
40	5200	14.5	14.5	12.75	9.75	6.75
44	5220	14.5	14.5	12.75	9.75	6.75
48	5240	14.5	14.5	12.75	9.75	6.75
52	5260	13.5	13.5	11.5	8.5	NS
56	5280	13.5	13.5	11.5	8.5	NS
60	5300	13.5	13.5	11.5	8.5	NS
64	5320	13.5	13.5	11.5	8.5	NS
100	5500	14	14	12.75	9.75	NS
104	5520	14	14	12.75	9.75	NS
108	5540	14	14	12.75	9.75	NS
112	5560	14	14	12.75	9.75	NS
116	5580	14	14	12.75	9.75	NS
120	5600	14	14	12.75	9.75	NS
124	5620	14	14	12.75	9.75	NS
128	5640	14	14	12.75	9.75	NS
132	5660	14	14	12.75	9.75	NS
136	5680	14	14	12.75	9.75	NS
140	5700	14	14	12.75	9.75	NS
144	5720	14	14	12.75	9.75	NS
149	5745	14.25	14.25	14.25	14.25	13
153	5765	14.25	14.25	14.25	14.25	13
157	5785	14.25	14.25	14.25	14.25	13
161	5805	14.25	14.25	14.25	14.25	13
165	5825	14.25	14.25	14.25	14.25	13

5 GHz – 20 MHz BW – MIMO CORE 0 SDM

Channel	Centre Frequency (MHz)	11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate	11ax HE20 (2Tx, SDM, nonTXBF) Low Rate	11ax HE20 RU106 (2Tx, SDM, nonTxBF)	11ax HE20 RU52 (2Tx, SDM, nonTxBF)	11ax HE20 RU26 (2Tx, SDM, nonTxBF)	11n/11ac HT20 (2Tx, TxBF) Low Rate
36	5180	14.5	14.5	14.5	12	9	14.5
40	5200	14.5	14.5	14.5	12	9	14.5
44	5220	14.5	14.5	14.5	12	9	14.5
48	5240	14.5	14.5	14.5	12	9	14.5
52	5260	14	14	14	11.5	NS	13.5
56	5280	14	14	14	11.5	NS	13.5
60	5300	14	14	14	11.5	NS	13.5
64	5320	14	14	14	11.5	NS	13.5
100	5500	14	14	14	12	NS	14
104	5520	14	14	14	12	NS	14
108	5540	14	14	14	12	NS	14
112	5560	14	14	14	12	NS	14
116	5580	14	14	14	12	NS	14
120	5600	14	14	14	12	NS	14
124	5620	14	14	14	12	NS	14
128	5640	14	14	14	12	NS	14
132	5660	14	14	14	12	NS	14
136	5680	14	14	14	12	NS	14
140	5700	14	14	14	10	NS	14
144	5720	14	14	14	12	NS	14
149	5745	14.25	14.25	14.25	14.25	13	14.25
153	5765	14.25	14.25	14.25	14.25	13	14.25
157	5785	14.25	14.25	14.25	14.25	13	14.25
161	5805	14.25	14.25	14.25	14.25	13	14.25
165	5825	14.25	14.25	14.25	14.25	13	14.25

5 GHz – 20 MHz BW – MIMO CORE 1 CDD

Channel	Centre Frequency (MHz)	11n/11ac HT20 (2Tx, CDD, nonTXBF) Low Rate	11ax HE20 (2Tx, CDD, nonTxBF) Low Rate	11ax HE20 RU106 (2Tx, CDD, nonTxBF)	11ax HE20 RU52 (2Tx, CDD, nonTxBF)	11ax HE20 RU26 (2Tx, CDD, nonTxBF)
36	5180	14.5	14.5	12.75	9.75	6.75
40	5200	14.5	14.5	12.75	9.75	6.75
44	5220	14.5	14.5	12.75	9.75	6.75
48	5240	14.5	14.5	12.75	9.75	6.75
52	5260	13.5	13.5	11.5	8.5	NS
56	5280	13.5	13.5	11.5	8.5	NS
60	5300	13.5	13.5	11.5	8.5	NS
64	5320	13.5	13.5	11.5	8.5	NS
100	5500	14	14	12.75	9.75	NS
104	5520	14	14	12.75	9.75	NS
108	5540	14	14	12.75	9.75	NS
112	5560	14	14	12.75	9.75	NS
116	5580	14	14	12.75	9.75	NS
120	5600	14	14	12.75	9.75	NS
124	5620	14	14	12.75	9.75	NS
128	5640	14	14	12.75	9.75	NS
132	5660	14	14	12.75	9.75	NS
136	5680	14	14	12.75	9.75	NS
140	5700	14	14	12.75	9.75	NS
144	5720	14	14	12.75	9.75	NS
149	5745	14.25	14.25	14.25	14.25	13
153	5765	14.25	14.25	14.25	14.25	13
157	5785	14.25	14.25	14.25	14.25	13
161	5805	14.25	14.25	14.25	14.25	13
165	5825	14.25	14.25	14.25	14.25	13

5 GHz – 20 MHz BW – MIMO CORE 1 SDM

Channel	Centre Frequency (MHz)	11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate	11ax HE20 (2Tx, SDM, nonTXBF) Low Rate	11ax HE20 RU106 (2Tx, SDM, nonTxBF)	11ax HE20 RU52 (2Tx, SDM, nonTxBF)	11ax HE20 RU26 (2Tx, SDM, nonTxBF)	11n/11ac HT20 (2Tx, TxBF) Low Rate
36	5180	14.5	14.5	14.5	12	9	14.5
40	5200	14.5	14.5	14.5	12	9	14.5
44	5220	14.5	14.5	14.5	12	9	14.5
48	5240	14.5	14.5	14.5	12	9	14.5
52	5260	14	14	14	11.5	NS	13.5
56	5280	14	14	14	11.5	NS	13.5
60	5300	14	14	14	11.5	NS	13.5
64	5320	14	14	14	11.5	NS	13.5
100	5500	14	14	14	12	NS	14
104	5520	14	14	14	12	NS	14
108	5540	14	14	14	12	NS	14
112	5560	14	14	14	12	NS	14
116	5580	14	14	14	12	NS	14
120	5600	14	14	14	12	NS	14
124	5620	14	14	14	12	NS	14
128	5640	14	14	14	12	NS	14
132	5660	14	14	14	12	NS	14
136	5680	14	14	14	12	NS	14
140	5700	14	14	14	10	NS	14
144	5720	14	14	14	12	NS	14
149	5745	14.25	14.25	14.25	14.25	13	14.25
153	5765	14.25	14.25	14.25	14.25	13	14.25
157	5785	14.25	14.25	14.25	14.25	13	14.25
161	5805	14.25	14.25	14.25	14.25	13	14.25
165	5825	14.25	14.25	14.25	14.25	13	14.25

5 GHz – 40 MHz BW – SISO Core 0

Channel	Centre Frequency (MHz)	11n/11ac HT40 (SISO)	11ax HE40 (SISO)	11ax HE40 RU106 (SISO)	11ax HE40 RU52 (SISO)	11ax HE40 RU26 (SISO)
38	5190	14.75	14.75	14.75	14.75	11.75
46	5230	14.75	14.75	14.75	14.75	11.75
54	5270	14	14	14	14	NS
62	5310	14	14	13.75	12	NS
102	5510	14	14	14	14	NS
110	5550	14	14	14	14	NS
118	5590	14	14	14	14	NS
126	5630	14	14	14	14	NS
134	5670	14	14	14	14	NS
142	5710	14	14	14	14	NS
151	5755	14.5	14.5	14.5	14.5	13
159	5795	14.5	14.5	14.5	14.5	13

5 GHz – 40 MHz BW – SISO Core 1

Channel	Centre Frequency (MHz)	11n/11ac HT40 (SISO)	11ax HE40 (SISO)	11ax HE40 RU106 (SISO)	11ax HE40 RU52 (SISO)	11ax HE40 RU26 (SISO)
38	5190	14.5	14.5	14.5	14.5	11.75
46	5230	14.5	14.5	14.5	14.5	11.75
54	5270	14	14	14	14	NS
62	5310	14	14	13.75	12	NS
102	5510	14	14	14	14	NS
110	5550	14	14	14	14	NS
118	5590	14	14	14	14	NS
126	5630	14	14	14	14	NS
134	5670	14	14	14	14	NS
142	5710	14	14	14	14	NS
151	5755	14.25	14.25	14.25	14.25	13
159	5795	14.25	14.25	14.25	14.25	13

5 GHz – 40 MHz BW – MIMO Core 0 CDD

Channel	Centre Frequency (MHz)	11n/11ac HT40 (2Tx, CDD, nonTXBF)	11ax HE40 (2Tx, CDD, nonTXBF)	11ax HE40 RU106 (2Tx, CDD, nonTXBF)	11ax HE40 RU52 (2Tx, CDD, nonTXBF)	11ax HE40 RU26 (2Tx, CDD, nonTXBF)
38	5190	14.5	14.5	11	9.5	9
46	5230	14.5	14.5	14.5	12	9
54	5270	14	14	14	11.5	NS
62	5310	14	13.25	9	7	NS
102	5510	14	14	12.5	12	NS
110	5550	14	14	14	12	NS
118	5590	14	14	14	12	NS
126	5630	14	14	14	12	NS
134	5670	14	14	14	12	NS
142	5710	14	14	14	12	NS
151	5755	14.25	14.25	14.25	14.25	13
159	5795	14.25	14.25	14.25	14.25	13

5 GHz – 40 MHz BW – MIMO Core 0 SDM

Channel	Centre Frequency (MHz)	11n/11ac HT40 (2Tx, SDM, nonTXBF)	11ax HE40 (2Tx, SDM, nonTXBF)	11ax HE40 RU106 (2Tx, SDM, nonTXBF)	11ax HE40 RU52 (2Tx, SDM, nonTXBF)	11ax HE40 RU26 (2Tx, SDM, nonTXBF)	11n/11ac HT40 (2Tx, TxBF)
38	5190	14.5	14.5	11	9.5	9	14.5
46	5230	14.5	14.5	14.5	12	9	14.5
54	5270	14	14	14	11.5	NS	14
62	5310	14	13.5	9	7	NS	14
102	5510	14	14	12.25	10.75	NS	14
110	5550	14	14	14	12	NS	14
118	5590	14	14	14	12	NS	14
126	5630	14	14	14	12	NS	14
134	5670	14	14	14	12	NS	14
142	5710	14	14	14	12	NS	14
151	5755	14.25	14.25	14.25	14.25	13	14.25
159	5795	14.25	14.25	14.25	14.25	13	14.25

5 GHz - 40 MHz BW – MIMO Core 1 CDD

Channel	Centre Frequency (MHz)	11n/11ac HT40 (2Tx, CDD, nonTXBF)	11ax HE40 (2Tx, CDD, nonTXBF)	11ax HE40 RU106 (2Tx, CDD, nonTXBF)	11ax HE40 RU52 (2Tx, CDD, nonTXBF)	11ax HE40 RU26 (2Tx, CDD, nonTXBF)
38	5190	14.5	14.5	11	9.5	9
46	5230	14.5	14.5	14.5	12	9
54	5270	14	14	14	11.5	NS
62	5310	14	13.25	9	7	NS
102	5510	14	14	12.5	12	NS
110	5550	14	14	14	12	NS
118	5590	14	14	14	12	NS
126	5630	14	14	14	12	NS
134	5670	14	14	14	12	NS
142	5710	14	14	14	12	NS
151	5755	14.25	14.25	14.25	14.25	13
159	5795	14.25	14.25	14.25	14.25	13

5 GHz – 40 MHz BW – MIMO Core 1 SDM

Channel	Centre Frequency (MHz)	11n/11ac HT40 (2Tx, SDM, nonTXBF)	11ax HE40 (2Tx, SDM, nonTXBF)	11ax HE40 RU106 (2Tx, SDM, nonTXBF)	11ax HE40 RU52 (2Tx, SDM, nonTXBF)	11ax HE40 RU26 (2Tx, SDM, nonTXBF)	11n/11ac HT40 (2Tx, TxBF)
38	5190	14.5	14.5	11	9.5	9	14.5
46	5230	14.5	14.5	14.5	12	9	14.5
54	5270	14	14	14	11.5	NS	14
62	5310	14	13.5	9	7	NS	14
102	5510	14	14	12.25	10.75	NS	14
110	5550	14	14	14	12	NS	14
118	5590	14	14	14	12	NS	14
126	5630	14	14	14	12	NS	14
134	5670	14	14	14	12	NS	14
142	5710	14	14	14	12	NS	14
151	5755	14.25	14.25	14.25	14.25	13	14.25
159	5795	14.25	14.25	14.25	14.25	13	14.25

5 GHz – 80 MHz BW – SISO Core 0

Channel	Centre Frequency (MHz)	11ac VHT80 (SISO)	11ax HE80 (SISO)	11ax HE80 RU106 (SISO)	11ax HE80 RU52 (SISO)	11ax HE80 RU26 (SISO)
42	5210	14.75	14.75	12.25	9.25	7
58	5290	14	13.5	9.75	6	NS
106	5530	14	14	10	8.5	NS
122	5610	14	14	14	14	NS
138	5690	14	14	14	14	NS
155	5775	14.5	14.5	14.5	14.5	12

5 GHz – 80 MHz BW – SISO Core 1

Channel	Centre Frequency (MHz)	11ac VHT80 (SISO)	11ax HE80 (SISO)	11ax HE80 RU106 (SISO)	11ax HE80 RU52 (SISO)	11ax HE80 RU26 (SISO)
42	5210	14.5	14.5	12.25	9.25	7
58	5290	14	13.5	9.75	6	NS
106	5530	14	14	10	8.5	NS
122	5610	14	14	14	14	NS
138	5690	14	14	14	14	NS
155	5775	14.25	14.25	14.25	14.25	12

5 GHz – 80 MHz BW – MIMO Core 0 CDD

Channel	Centre Frequency (MHz)	11ac VHT80 (2Tx, CDD, nonTXBF)	11ax HE80 (2Tx, CDD, nonTXBF)	11ax HE80 RU106 (2Tx, CDD, nonTXBF)	11ax HE80 RU52 (2Tx, CDD, nonTXBF)	11ax HE80 RU26 (2Tx, CDD, nonTXBF)
42	5210	14.5	14.5	7.5	5	4
58	5290	12.5	12.5	7	4	NS
106	5530	13.75	13.25	7	5	NS
122	5610	14	14	14	12	NS
138	5690	14	14	14	12	NS
155	5775	14.25	14.25	14.25	14.25	10

5 GHz – 80 MHz BW – MIMO Core 0 SDM

Channel	Centre Frequency (MHz)	11ac VHT80 (2Tx, SDM, nonTXBF)	11ax HE80 (2Tx, SDM, nonTXBF)	11ax HE80 RU106 (2Tx, SDM, nonTXBF)	11ax HE80 RU52 (2Tx, SDM, nonTXBF)	11ax HE80 RU26 (2Tx, SDM, nonTXBF)	11ac VHT80 (2Tx, TxBF)
42	5210	14.5	14.5	7.5	5	4	14.5
58	5290	12.75	13	7	4	NS	11.25
106	5530	13.75	13.75	7	5	NS	13.5
122	5610	14	14	14	12	NS	14
138	5690	14	14	14	12	NS	14
155	5775	14.25	14.25	14.25	14.25	10	14.25

5 GHz – 80 MHz BW – MIMO Core 1 CDD

Channel	Centre Frequency (MHz)	11ac VHT80 (2Tx, CDD, nonTXBF)	11ax HE80 (2Tx, CDD, nonTXBF)	11ax HE80 RU106 (2Tx, CDD, nonTXBF)	11ax HE80 RU52 (2Tx, CDD, nonTXBF)	11ax HE80 RU26 (2Tx, CDD, nonTXBF)
42	5210	14.5	14.5	7.5	5	4
58	5290	12.5	12.5	7	4	NS
106	5530	13.75	13.25	7	5	NS
122	5610	14	14	14	12	NS
138	5690	14	14	14	12	NS
155	5775	14.25	14.25	14.25	14.25	10

5 GHz – 80 MHz BW – MIMO Core 1 SDM

Channel	Centre Frequency (MHz)	11ac VHT80 (2Tx, SDM, nonTXBF)	11ax HE80 (2Tx, SDM, nonTXBF)	11ax HE80 RU106 (2Tx, SDM, nonTXBF)	11ax HE80 RU52 (2Tx, SDM, nonTXBF)	11ax HE80 RU26 (2Tx, SDM, nonTXBF)	11ac VHT80 (2Tx, TxBF)
42	5210	14.5	14.5	7.5	5	4	14.5
58	5290	12.75	13	7	4	NS	11.25
106	5530	13.75	13.75	7	5	NS	13.5
122	5610	14	14	14	12	NS	14
138	5690	14	14	14	12	NS	14
155	5775	14.25	14.25	14.25	14.25	10	14.25

5 GHz – 160 MHz BW – SISO Core 0

Channel	Centre Frequency (MHz)	11ac VHT160 (SISO) Low Rate	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
50	5250	13.5	13.5	11	7.5	NS
114	5570	12.5	12	10.5	7.5	NS

5 GHz – 160 MHz BW – SISO Core 1

Channel	Centre Frequency (MHz)	11ac VHT160 (SISO) Low Rate	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
50	5250	13.5	13.5	11	7.5	NS
114	5570	12.5	12	10.5	7.5	NS

5 GHz – 160 MHz BW – MIMO Core 0 CDD

Channel	Centre Frequency (MHz)	11ac VHT160 (2Tx, CDD, nonTXBF) Low Rate	11ax HE160 (2Tx, CDD, nonTxBF) Low Rate	11ax HE160 RU106 (2Tx, CDD, nonTxBF)	11ax HE160 RU52 (2Tx, CDD, nonTxBF)	11ax HE160 RU26 (2Tx, CDD, nonTxBF)
50	5250	13	13	8	5	NS
114	5570	12	11.5	8	5	NS

5 GHz – 160 MHz BW – MIMO Core 0 SDM

Channel	Centre Frequency (MHz)	11ac VHT160 (2Tx, SDM, nonTxBF) Low Rate	11ax HE160 (2Tx, SDM, nonTXBF) Low Rate	11ax HE160 RU106 (2Tx, SDM, nonTxBF)	11ax HE160 RU52 (2Tx, SDM, nonTxBF)	11ax HE160 RU26 (2Tx, SDM, nonTxBF)	11ac VHT160 (2Tx, TxBF) Low Rate
50	5250	12.5	13	8	5	NS	NS
114	5570	12	11.5	8	5	NS	NS

5 GHz – 160 MHz BW – MIMO Core 1 CDD

Channel	Centre Frequency (MHz)	11ac VHT160 (2Tx, CDD, nonTXBF) Low Rate	11ax HE160 (2Tx, CDD, nonTxBF) Low Rate	11ax HE160 RU106 (2Tx, CDD, nonTxBF)	11ax HE160 RU52 (2Tx, CDD, nonTxBF)	11ax HE160 RU26 (2Tx, CDD, nonTxBF)
50	5250	13	13	8	5	NS
114	5570	12	11.5	8	5	NS

5 GHz – 160 MHz BW – MIMO Core 1 SDM

Channel	Centre Frequency (MHz)	11ac VHT160 (2Tx, SDM, nonTxBF) Low Rate	11ax HE160 (2Tx, SDM, nonTXBF) Low Rate	11ax HE160 RU106 (2Tx, SDM, nonTxBF)	11ax HE160 RU52 (2Tx, SDM, nonTxBF)	11ax HE160 RU26 (2Tx, SDM, nonTxBF)	11ac VHT160 (2Tx, TxBF) Low Rate
50	5250	12.5	13	8	5	NS	NS
114	5570	12	11.5	8	5	NS	NS

6 GHz – WIFI 20 MHz BW – SISO – Core 0 & Core 1

Channel	Centre Frequency (MHz)	a (SISO) Low Rate	11ax HE20 (SISO) Low Rate	11ax HE20 RU106 (SISO)	11ax HE20 RU52 (SISO)	11ax HE20 RU26 (SISO)
2	5935	NS	NS	NS	NS	NS
1	5955	2.25	2.75	-0.75	-3.75	-6.75
5	5975	2.25	2.75	-0.75	-3.75	-6.75
9-29	5945	2.25	2.75	-0.75	-3.75	-6.75
33-61	6185	2	2.5	-1	-4	-7
65-85	6325	3	3.5	0	-3	-6
89	6395	3	3.5	0	-3	-6
93	6415	3	3.5	0	-3	-6
97-113	6475	3	3.5	0	-3	-6
117-181	6695	3	3.5	0	-3	-6
185	6875	3	3.5	0	-3	-6
189-225	6985	5	5.5	2	-1	-4
229	7095	5	5.5	2	-1	-4
233	7115	3	-5.5	NS	NS	NS

6 GHz – WIFI 20 MHz BW – MIMO – Core 0 & Core 1 CDD

Channel	Centre Frequency (MHz)	11ax HE20 (2Tx, CDD, nonTxBF) Low Rate	11ax HE20 RU106 (2Tx, CDD, nonTxBF)	11ax HE20 RU52 (2Tx, CDD, nonTxBF)	11ax HE20 RU26 (2Tx, CDD, nonTxBF)
2	5935	NS	NS	NS	NS
1	5955	-2.5	-6	NS	NS
5	5975	-2.5	-6	NS	NS
9-29	5945	-2.5	-6	NS	NS
33-61	6185	-2.5	-6	NS	NS
65-85	6325	-1.5	-5	-8	NS
89	6395	-1.5	-5	-8	NS
93	6415	-1.5	-5	-8	NS
97-113	6475	-1.75	-5.25	-8.25	NS
117-181	6695	-2.25	-5.75	NS	NS
185	6875	-2.25	-5.75	NS	NS
189-225	6985	0	-3.5	-6.5	NS
229	7095	0	-3.5	-6.5	NS
233	7115	-6.5	NS	NS	NS

6 GHz – WIFI 20 MHz BW – MIMO – Core 0 & Core 1 SDM

Channel	Centre Frequency (MHz)	11ax HE20 (2Tx, SDM, nonTxBF) Low Rate	11ax HE20 RU106 (2Tx, SDM, nonTxBF)	11ax HE20 RU52 (2Tx, SDM, nonTxBF)	11ax HE20 RU26 (2Tx, SDM, nonTxBF)	11ax HE20 (2Tx, TxBF) Low Rate
2	5935	NS	NS	NS	NS	NS
1	5955	0.5	-3	-6	NS	-2.5
5	5975	0.5	-3	-6	NS	-2.5
9-29	5945	0.5	-3	-6	NS	-2.5
33-61	6185	0.5	-3	-6	NS	-2.5
65-85	6325	1.5	-2	-5	-8	-1.5
89	6395	1.5	-2	-5	-8	-1.5
93	6415	1.5	-2	-5	-8	-1.5
97-113	6475	1.25	-2.25	-5.25	-8.25	-1.75
117-181	6695	0.75	-2.75	-5.75	NS	-2.25
185	6875	0.75	-2.75	-5.75	NS	-2.25
189-225	6985	3	-0.5	-3.5	-6.5	0
229	7095	3	-0.5	-3.5	-6.5	0
233	7115	-5	NS	NS	NS	NS

6 GHz – WIFI 40 MHz BW – SISO – Core 0 & Core 1

Channel	Centre Frequency (MHz)	11ax HE40 (SISO) Low Rate	11ax HE40 RU106 (SISO)	11ax HE40 RU52 (SISO)	11ax HE40 RU26 (SISO)
3	5965	5.25	-0.75	-3.75	-6.75
11	6005	5.25	-0.75	-3.75	-6.75
19-27	6065	5.25	-0.75	-3.75	-6.75
35-59	6185	5	-1	-4	-7
67-75	6305	6	0	-3	-6
83	6365	6	0	-3	-6
91	6405	6	0	-3	-6
99-107	6465	6	0	-3	-6
115	6525	6	0	-3	-6
123-179	6705	6	0	-3	-6
187	6885	6	0	-3	-6
195-219	6985	8	2	-1	-4
227	7085	8	2	-1	-4

6 GHz – WIFI 40 MHz BW – MIMO – Core 0 & Core 1 CDD

Channel	Centre Frequency (MHz)	11ax HE40 (2Tx, CDD, nonTxBF) Low Rate	11ax HE40 RU106 (2Tx, CDD, nonTxBF)	11ax HE40 RU52 (2Tx, CDD, nonTxBF)	11ax HE40 RU26 (2Tx, CDD, nonTxBF)
3	5965	0	-6	NS	NS
11	6005	0	-6	NS	NS
19-27	6065	0	-6	NS	NS
35-59	6185	0	-6	NS	NS
67-75	6305	1	-5	-8	NS
83	6365	1	-5	-8	NS
91	6405	1	-5	-8	NS
99-107	6465	0.75	-5.25	-8.25	NS
115	6525	0.25	-5.75	NS	NS
123-179	6705	0.25	-5.75	NS	NS
187	6885	0.25	-5.75	NS	NS
195-219	6985	2.5	-3.5	-6.5	NS
227	7085	2.5	-3.5	-6.5	NS

6 GHz – WIFI 40 MHz BW – MIMO – Core 0 & Core 1 SDM

Channel	Centre Frequency (MHz)	11ax HE40 (2Tx, SDM, nonTxBF) Low Rate	11ax HE40 RU106 (2Tx, SDM, nonTxBF)	11ax HE40 RU52 (2Tx, SDM, nonTxBF)	11ax HE40 RU26 (2Tx, SDM, nonTxBF)	11ax HE40 (2Tx, TxBF) Low Rate
3	5965	3	-3	-6	NS	0
11	6005	3	-3	-6	NS	0
19-27	6065	3	-3	-6	NS	0
35-59	6185	3	-3	-6	NS	0
67-75	6305	4	-2	-5	-8	1
83	6365	4	-2	-5	-8	1
91	6405	4	-2	-5	-8	1
99-107	6465	3.75	-2.25	-5.25	-8.25	0.75
115	6525	3.25	-2.75	-5.75	NS	0.25
123-179	6705	3.25	-2.75	-5.75	NS	0.25
187	6885	3.25	-2.75	-5.75	NS	0.25
195-219	6985	5.5	-0.5	-3.5	-6.5	2.5
227	7085	5.5	-0.5	-3.5	-6.5	2.5

6 GHz – WIFI 80 MHz BW – SISO – Core 0 & Core 1

Channel	Centre Frequency (MHz)	11ax HE80 (SISO) Low Rate	11ax HE80 RU106 (SISO)	11ax HE80 RU52 (SISO)	11ax HE80 RU26 (SISO)
7	5985	8.25	-0.75	-3.75	-6.75
23	6065	8.25	-0.75	-3.75	-6.75
39-55	6185	8	-1	-4	-7
71	6305	9	0	-3	-6
87	6385	9	0	-3	-6
103	6465	9	0	-3	-6
119	6545	9	0	-3	-6
135-167	6705	9	0	-3	-6
183	6865	9	0	-3	-6
199	6945	11	2	-1	-4
215	7025	11	2	-1	-4

6 GHz – WIFI 80 MHz BW – MIMO – Core 0 & Core 1 CDD

Channel	Centre Frequency (MHz)	11ax HE80 (2Tx, CDD, nonTxBF) Low Rate	11ax HE80 RU106 (2Tx, CDD, nonTxBF)	11ax HE80 RU52 (2Tx, CDD, nonTxBF)	11ax HE80 RU26 (2Tx, CDD, nonTxBF)
7	5985	3	-6	NS	NS
23	6065	3	-6	NS	NS
39-55	6185	3	-6	NS	NS
71	6305	4	-5	-8	NS
87	6385	4	-5	-8	NS
103	6465	3.75	-5.25	-8.25	NS
119	6545	3.25	-5.75	NS	NS
135-167	6705	3.25	-5.75	NS	NS
183	6865	3.25	-5.75	NS	NS
199	6945	5.5	-3.5	-6.5	NS
215	7025	5.5	-3.5	-6.5	NS

6 GHz – WIFI 80 MHz BW – MIMO – Core 0 & Core 1 SDM

Channel	Centre Frequency (MHz)	11ax HE80 (2Tx, SDM, nonTxBF) Low Rate	11ax HE80 RU106 (2Tx, SDM, nonTxBF)	11ax HE80 RU52 (2Tx, SDM, nonTxBF)	11ax HE80 RU26 (2Tx, SDM, nonTxBF)	11ax HE80 (2Tx, TxBF) Low Rate
7	5985	6	-3	-6	NS	3
23	6065	6	-3	-6	NS	3
39-55	6185	6	-3	-6	NS	3
71	6305	7	-2	-5	-8	4
87	6385	7	-2	-5	-8	4
103	6465	6.75	-2.25	-5.25	-8.25	3.75
119	6545	6.25	-2.75	-5.75	NS	3.25
135-167	6705	6.25	-2.75	-5.75	NS	3.25
183	6865	6.25	-2.75	-5.75	NS	3.25
199	6945	8.5	-0.5	-3.5	-6.5	5.5
215	7025	8.5	-0.5	-3.5	-6.5	5.5

6 GHz – WIFI 160 MHz BW – SISO– Core 0

Channel	Centre Frequency (MHz)	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
15	6025	10	-0.25	-3.25	-6.25
47	6185	10	-0.5	-3.5	-6.5
79	6345	11	0.5	-2.5	-5.5
111	6505	11	0.5	-2.5	-5.5
143	6665	12	0.5	-2.5	-5.5
175	6825	11.5	0.5	-2.5	-5.5
207	6985	11.5	2.5	-0.5	-3.5

6 GHz – WIFI 160 MHz BW – SISO– Core 1

Channel	Centre Frequency (MHz)	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
15	6025	11.25	-0.25	-3.25	-6.25
47	6185	11	-0.5	-3.5	-6.5
79	6345	12	0.5	-2.5	-5.5
111	6505	12.5	0.5	-2.5	-5.5
143	6665	12	0.5	-2.5	-5.5
175	6825	12	0.5	-2.5	-5.5
207	6985	14	2.5	-0.5	-3.5

6 GHz – WIFI 160 MHz BW – MIMO– Core 0 CDD

Channel	Centre Frequency (MHz)	11ax HE160 (2Tx, CDD, nonTxBF) Low Rate	11ax HE160 RU106 (2Tx, CDD, nonTxBF)	11ax HE160 RU52 (2Tx, CDD, nonTxBF)	11ax HE160 RU26 (2Tx, CDD, nonTxBF)
15	6025	6	-5.5	-8.5	NS
47	6185	6	-5.5	-8.5	NS
79	6345	7	-4.5	-7.5	NS
111	6505	6.75	-5.25	-8.25	NS
143	6665	6.25	-5.25	-8.25	NS
175	6825	6.25	-5.25	-8.25	NS
207	6985	8.5	-3	-6	NS

6 GHz – WIFI 160 MHz BW – MIMO– Core 0 SDM

Channel	Centre Frequency (MHz)	11ax HE160 (2Tx, SDM, nonTxBF) Low Rate	11ax HE160 RU106 (2Tx, SDM, nonTxBF)	11ax HE160 RU52 (2Tx, SDM, nonTxBF)	11ax HE160 RU26 (2Tx, SDM, nonTxBF)
15	6025	9	-2.5	-5.5	-8.5
47	6185	9	-2.5	-5.5	-8.5
79	6345	10	-1.5	-4.5	-7.5
111	6505	9.75	-2.25	-5.25	-8.25
143	6665	9.25	-2.25	-5.25	-8.25
175	6825	9.25	-2.25	-5.25	-8.25
207	6985	11.5	0	-3	-6

6 GHz – WIFI 160 MHz BW – MIMO– Core 1 CDD

Channel	Centre Frequency (MHz)	11ax HE160 (2Tx, CDD, nonTxBF) Low Rate	11ax HE160 RU106 (2Tx, CDD, nonTxBF)	11ax HE160 RU52 (2Tx, CDD, nonTxBF)	11ax HE160 RU26 (2Tx, CDD, nonTxBF)
15	6025	6	-5.5	-8.5	NS
47	6185	6	-5.5	-8.5	NS
79	6345	7	-4.5	-7.5	NS
111	6505	6.75	-5.25	-8.25	NS
143	6665	6.25	-5.25	-8.25	NS
175	6825	6.25	-5.25	-8.25	NS
207	6985	8.5	-3	-6	NS

6 GHz – WIFI 160 MHz BW – MIMO– Core 1 SDM

Channel	Centre Frequency (MHz)	11ax HE160 (2Tx, SDM, nonTxBF) Low Rate	11ax HE160 RU106 (2Tx, SDM, nonTxBF)	11ax HE160 RU52 (2Tx, SDM, nonTxBF)	11ax HE160 RU26 (2Tx, SDM, nonTxBF)
15	6025	9	-2.5	-5.5	-8.5
47	6185	9	-2.5	-5.5	-8.5
79	6345	10	-1.5	-4.5	-7.5
111	6505	9.75	-2.25	-5.25	-8.25
143	6665	9.25	-2.25	-5.25	-8.25
175	6825	9.25	-2.25	-5.25	-8.25
207	6985	11.5	0	-3	-6

1.5 CONDUCTED POWER MEASUREMENTS

1.5.1 Method

Conducted power measurements were made using a power meter and a spectrum analyser.

1.5.2 Measured results

Bluetooth (5 GHz Wifi Off) - EDR

(BT Core 0 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune up
EDR	0	8-DPSK	77	3-DH5	2402	15.59	16.50
EDR	39	8-DPSK	77	3-DH5	2441	15.98	16.50
EDR	78	8-DPSK	77	3-DH5	2480	15.34	16.50

(BT Core 1 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune up
EDR	0	8-DPSK	77	3-DH5	2402	15.73	16.50
EDR	39	8-DPSK	77	3-DH5	2441	15.84	16.50
EDR	78	8-DPSK	77	3-DH5	2480	15.69	16.50

BDR

(BT Core 2 - IPA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
BDR	0	8-DPSK	77	DH5	2402	12.62	13.00
BDR	39	8-DPSK	77	DH5	2441	12.80	13.00
BDR	78	8-DPSK	77	DH5	2480	12.92	13.00

Bluetooth (5 GHz Wifi on) - EDR

(BT Core 0 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
EDR	0	8-DPSK	77	3-DH5	2402	15.59	16.00
EDR	39	8-DPSK	77	3-DH5	2441	15.98	16.00
EDR	78	8-DPSK	77	3-DH5	2480	15.34	16.00

(BT Core 1 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
EDR	0	8-DPSK	77	3-DH5	2402	15.73	16.00
EDR	39	8-DPSK	77	3-DH5	2441	15.84	16.00
EDR	78	8-DPSK	77	3-DH5	2480	15.69	16.00

BDR

(BT Core 2 - IPA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
BDR	0	8-DPSK	77	DH5	2402	12.62	13.00
BDR	39	8-DPSK	77	DH5	2441	12.80	13.00
BDR	78	8-DPSK	77	DH5	2480	12.92	13.00

NB (Narrowband) UNII-1 - When 2.4GHz WLAN OFF & ON

(UNII-1- Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
HDR4	Bottom	8-DPSK	100	4DH5	5150	11.62	12.00
HDR4	Middle	8-DPSK	100	4DH5	5200	11.70	12.00
HDR4	Top	8-DPSK	100	4DH5	5250	11.42	12.00

(UNII-1- Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
HDR4	Bottom	8-DPSK	100	4DH5	5150	11.20	11.50
HDR4	Middle	8-DPSK	100	4DH5	5200	10.99	11.50
HDR4	Top	8-DPSK	100	4DH5	5250	11.10	11.50

NB (Narrowband) UNII-3- When 2.4GHz WLAN OFF

(UNII-3- Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
HDR4	Bottom	8-DPSK	100	4DH5	5725	14.73	15.00
HDR4	Middle	8-DPSK	100	4DH5	5788	14.76	15.00
HDR4	Top	8-DPSK	100	4DH5	5850	14.77	15.00

(UNII-3- Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
HDR4	Bottom	8-DPSK	100	4DH5	5725	14.44	15.00
HDR4	Middle	8-DPSK	100	4DH5	5788	14.89	15.00
HDR4	Top	8-DPSK	100	4DH5	5850	14.99	15.00

NB (Narrowband) UNII-3- When 2.4GHz WLAN ON

(UNII-3- Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune Up
HDR4	Bottom	8-DPSK	100	4DH5	5725	12.95	13.00
HDR4	Middle	8-DPSK	100	4DH5	5788	12.77	13.00
HDR4	Top	8-DPSK	100	4DH5	5850	12.62	13.00

(UNII-3- Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power	Tune up
HDR4	Bottom	8-DPSK	100	4DH5	5725	12.53	13.00
HDR4	Middle	8-DPSK	100	4DH5	5788	12.54	13.00
HDR4	Top	8-DPSK	100	4DH5	5850	12.87	13.00

WLAN 2450 MHz - SISO

(2.4GHz Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11b	1	BPSK	100	6.5	2412	18.24	19.00
802.11b	6	BPSK	100	6.5	2437	18.15	19.00
802.11b	11	BPSK	100	6.5	2467	18.03	19.00

(2.4GHz Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune up
802.11b	1	BPSK	100	6.5	2412	18.12	19.00
802.11b	6	BPSK	100	6.5	2437	17.96	19.00
802.11b	12	BPSK	100	6.5	2467	17.98	19.00

WLAN 2450 MHz - 2x2 MIMO

(2.4GHz Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
11n HT20 (2Tx, nonTXBF)	2	BPSK	100	6.5	2417	18.12	19.00
11n HT20 (2Tx, nonTXBF)	6	BPSK	100	6.5	2437	18.05	19.00
11n HT20 (2Tx, nonTXBF)	10	BPSK	100	6.5	2457	18.12	19.00

(2.4GHz Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
11n HT20 (2Tx, nonTXBF)	2	BPSK	100	6.5	2417	18.20	19.00
11n HT20 (2Tx, nonTXBF)	6	BPSK	100	6.5	2437	18.05	19.00
11n HT20 (2Tx, nonTXBF)	10	BPSK	100	6.5	2457	18.13	19.00

WLAN U-NII 1/ 2A - SISO

(5GHz Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80	42	BPSK	100	29.3	5210	14.00	14.75
802.11ac VHT80	50	BPSK	100	29.3	5250	13.45	13.50
802.11ac VHT80	58	BPSK	100	29.3	5290	13.10	14.00

(5GHz Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80	42	BPSK	100	29.3	5310	13.48	14.50
802.11ac VHT80	50	BPSK	100	29.3	5250	13.24	13.50
802.11ac VHT80	58	BPSK	100	29.3	5290	13.06	14.00

WLAN U-NII 1 - 2x2 MIMO

(5GHz Core 0-1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
11ac VHT80 (2Tx, CDD, nonTxBF) (Core 0)	42	BPSK	100	29.3	5210	14.03	14.50
11ac VHT80 (2Tx, CDD, nonTxBF) Core 1	42	BPSK	100	29.3	5210	14.15	14.50
11ac VHT80 (2Tx, CDD, nonTxBF) (Core 0)	58	BPSK	100	29.3	5290	12.35	12.50
11ac VHT80 (2Tx, CDD, nonTxBF) Core 1	58	BPSK	100	29.3	5290	12.40	12.50

WLAN U-NII 2C - SISO

(5GHz Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80	106	BPSK	100	29.3	5530	13.24	14.00
802.11ac VHT80	122	BPSK	100	29.3	5610	13.10	14.00
802.11ac VHT80	138	BPSK	100	29.3	5690	12.25	14.00

(5GHz Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80	106	BPSK	100	29.3	5530	13.11	14.00
802.11ac VHT80	122	BPSK	100	29.3	5610	12.92	14.00
802.11ac VHT80	138	BPSK	100	29.3	5690	13.02	14.00

WLAN U-NII 2C – MIMO

(5GHz Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80 -CDD	106	BPSK	100	29.3	5530	13.09	13.75
802.11ac VHT80 -CDD	122	BPSK	100	29.3	5610	13.10	14.00
802.11ac VHT80 -CDD	138	BPSK	100	29.3	5690	13.10	14.00

(5GHz Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80 -CDD	106	BPSK	100	29.3	5530	13.01	13.75
802.11ac VHT80 -CDD	122	BPSK	100	29.3	5610	12.89	14.00
802.11ac VHT80 -CDD	138	BPSK	100	29.3	5690	12.90	14.00

WLAN U-NII 3 – SISO

(5GHz Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80 -CDD	155	BPSK	100	29.3	5775	13.56	14.50

(5GHz Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80 -CDD	155	BPSK	100	29.3	5775	13.38	13.50

WLAN U-NII 3 – Core 0-1 (MIMO)

(5GHz Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80 -CDD	155	BPSK	100	29.3	5775	13.29	14.25

(5GHz Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
802.11ac VHT80 -CDD	155	BPSK	100	29.3	5775	13.26	14.25

WLAN 6 GHz

(Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
11ax HE160 (SISO) Low Rate	15	BPSK	100	58.5	6025	9.70	10.00
11ax HE160 (SISO) Low Rate	47	BPSK	100	58.5	6185	9.86	10.00
11ax HE160 (SISO) Low Rate	79	BPSK	100	58.5	6345	10.70	11.00
11ax HE160 (SISO) Low Rate	111	BPSK	100	58.5	6505	10.60	11.00
11ax HE160 (SISO) Low Rate	143	BPSK	100	58.5	6665	11.96	12.00
11ax HE160 (SISO) Low Rate	175	BPSK	100	58.5	6825	11.30	11.50
11ax HE160 (SISO) Low Rate	207	BPSK	100	58.5	6985	11.32	11.50

(Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
11ax HE160 (SISO) Low Rate	15	BPSK	100	58.5	6025	11.05	11.25
11ax HE160 (SISO) Low Rate	47	BPSK	100	58.5	6185	10.70	11.00
11ax HE160 (SISO) Low Rate	79	BPSK	100	58.5	6345	11.98	12.00
11ax HE160 (SISO) Low Rate	111	BPSK	100	58.5	6505	12.45	12.50
11ax HE160 (SISO) Low Rate	143	BPSK	100	58.5	6665	11.85	12.00
11ax HE160 (SISO) Low Rate	175	BPSK	100	58.5	6825	12.00	12.00
11ax HE160 (SISO) Low Rate	207	BPSK	100	58.5	6985	13.70	14.00

6 GHz WiFi MIMO (Core 0-1)

Core 0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
11ax HE160 (SISO) Low Rate	15	BPSK	100	58.5	6025	8.79	9.00
11ax HE160 (SISO) Low Rate	47	BPSK	100	58.5	6185	8.93	9.00
11ax HE160 (SISO) Low Rate	79	BPSK	100	58.5	6345	9.81	10.00
11ax HE160 (SISO) Low Rate	111	BPSK	100	58.5	6505	9.55	9.75
11ax HE160 (SISO) Low Rate	143	BPSK	100	58.5	6665	9.13	9.25
11ax HE160 (SISO) Low Rate	175	BPSK	100	58.5	6825	8.95	9.25
11ax HE160 (SISO) Low Rate	207	BPSK	100	58.5	6985	11.36	11.50

Core 1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power	Tune Up
11ax HE160 (SISO) Low Rate	15	BPSK	100	58.5	6025	8.82	9.00
11ax HE160 (SISO) Low Rate	47	BPSK	100	58.5	6185	9.00	9.00
11ax HE160 (SISO) Low Rate	79	BPSK	100	58.5	6345	9.70	10.00
11ax HE160 (SISO) Low Rate	111	BPSK	100	58.5	6505	9.60	9.75
11ax HE160 (SISO) Low Rate	143	BPSK	100	58.5	6665	9.20	9.25
11ax HE160 (SISO) Low Rate	175	BPSK	100	58.5	6825	8.95	9.25
11ax HE160 (SISO) Low Rate	207	BPSK	100	58.5	6985	11.36	11.50

SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the A2780

2.1 DASY6 MEASUREMENT SYSTEM

2.1.1 System Description

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

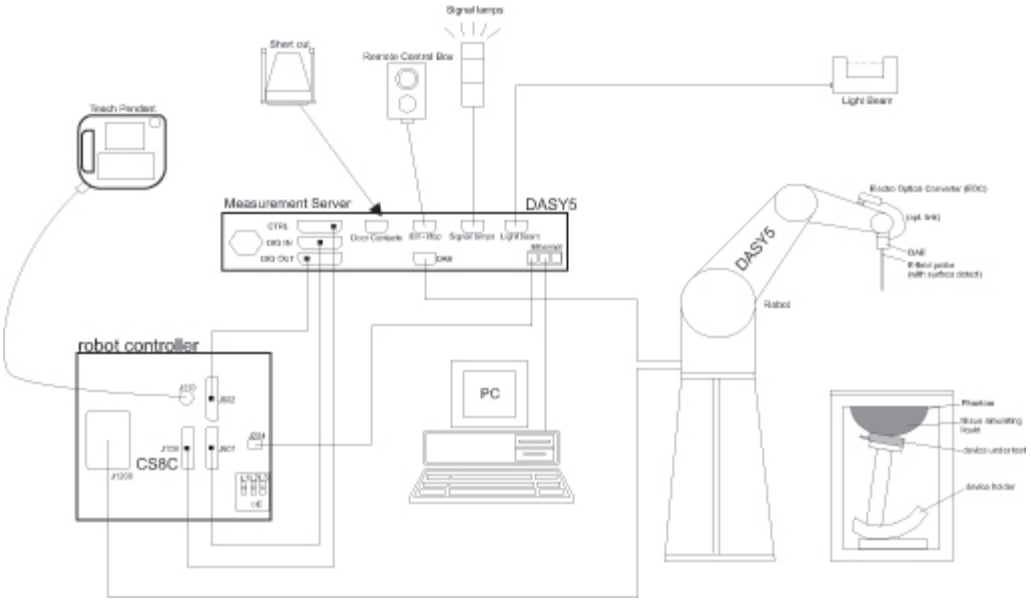


Figure 1 System Description Diagram

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.

Remote control and 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 permittivities. 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.

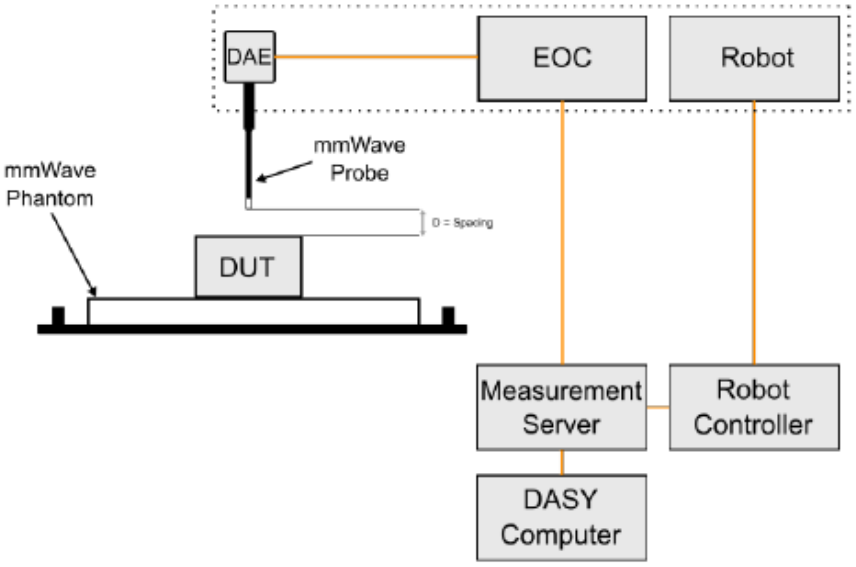
2.1.5 DASY 6 Absorbed Power Density evaluation.

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 DASY6 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.



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

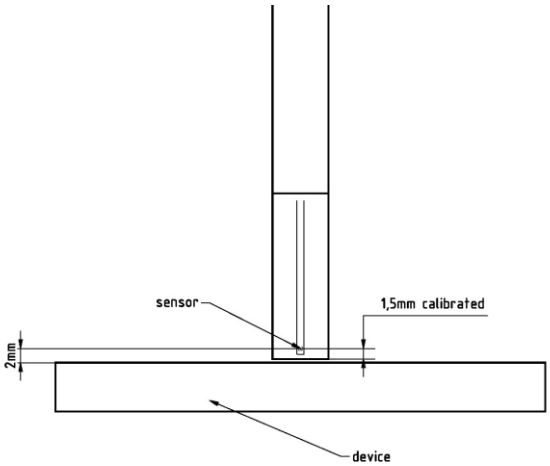


Diagram of the distance sensor to the EUT surface

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 >6GHz to 300GHz for general public as referenced in ICNIRP 2020:

$$55/f_{\mathrm{G}}{}^{0.177}$$

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

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

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.

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 4cm^2 absorbed power density level at frequency *i* and the 4cm^2 absorbed power density basic restriction given in ICNIRP

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

2020. $S_{inc,4cm,i}$ and $S_{inc,4cm,RL,i}$ are the local 4cm^2 incident power density at frequency *i* and the local 4cm^2 incident power density reference level at frequency *i* given in ICNIRP 2020.
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.

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Thermometer	Fluke	51	2267	12	25-Jan-2023
Hygrometer	Rotronic	HP31 Hygropalm	5902	12	17-Feb-2023
SAR phone holder	Speag	n/a	3870	-	TU
SAR phone holder	Speag	SD000H01KA	NA	-	TU
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	08-Nov-2022
Measurement server	Speag	DASY 6 Measurement Server	5337	-	TU
Measurement server	Speag	DASY 6 Measurement Server	4692	-	TU
Mounting Platform TX90XL Robot & Phantoms	Speag	MP6C-TX90XL Mounting Platform Extended	5338	-	TU
Mounting Platform TX90XL Robot & Phantoms	Speag	MP6C-TX90XL Mounting Platform Extended	4702	-	TU
Robot	Speag	TX90 XL Stäubli Robot	5340	-	TU
Robot	Speag	TX90 XL Stäubli Robot	4704	-	TU
Power Source for SAR system validation	Speag	POWERSOURCE1-SE UMS 160 BA	5371	12	08-Dec-2022
Body Phantom	Speag	ELI V8.0	4833	-	TU
Body Phantom	Speag	ELI V8.0	5332	-	TU
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	08-Nov-2022
Dielectric Assessment Kit	Speag	DAK 200MHz to 20GHz	4690	-	TU
Dielectric Probe Stand	Speag	Stand	4691	-	TU
30dB Attenuator	Narda	766-30	4783	12	18-Mar-2023
Attenuator 5W 20dB DC-18GHz	Aaren	AT40A-4041-D18-20	5499	12	21-Apr-2023
Validation Dipole 2450MHz	Speag	D2450V2	3875	12	09-Dec-2022

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Validation Dipole 5000MHz	Speag	D5GHzV2	5328	12	24-Jun-2023
Validation Dipole 6500MHz	Speag	D6.5GHzV2	6157	12	11-Mar-2023
Vector Signal Generator	Keysight Technologies	ESG E4448C	4731	12	10-Feb-2023
Amplifier (5GHz)	IndexSar Ltd	5GHz	157	-	TU
Directional Coupler	Hewlett Packard	11692D	452	-	TU
Power Meter	Rohde & Schwarz	NRVD	2979	12	15-Jun-2023
Power Sensor	Rohde & Schwarz	NRV- Z5	2878	12	15-Jun-2023
Power Sensor	Rohde & Schwarz	NRV-Z1	3563	12	15-Jun-2023
CW TWT (8-18GHz)	Thorn	PTC6348	2067	-	TU
Attenuator (10 dB, 75 W)	Bird	8308-100	386	12	03-Aug-2023
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	28-Feb-2023
Termination (50ohm)	Weinschel	1426-4	4323	12	29-Jun-2023
Load (15 W)	Diamond Antenna	DL-30N	219	12	03-Mar-2023
Verification source 10GHz	Speag	-	1037 (S/N)	12	29-Nov-2022
ENA Series network analyser	Keysight Technologies	E5080A	5247	12	03-Mar-2023
VNA network analyser	Rohde & Schwarz	ZVA 40	3548	12	24-Feb-2023
Data Acquisition Electronics	Speag	DAE 4 - SD 000 D04 BN	6155	12	09-Mar-2023
Data Acquisition Electronics	Speag	DAE 4 - SD 000 D04 BN	4689	12	06-Dec-2022
Dosimetric SAR Probe	Speag	EX3DV4	4700	12	13-Dec-2022
Dosimetric SAR Probe	Speag	EX3DV4	7719 (S/N)	12	11-Mar-2023
Dosimetric SAR Probe	Speag	EX3DV4	5330	12	17-Jun-2023
mmWave Probe	Speag	EUmmWv4	9481 (S/N)	12	23-Feb-2023
Tissue Simulant Liquid	Speag	HBBL 600-6000	Batch 1	Weekly	Note 1
Tissue Simulant Liquid	Speag	HBBL 600-6000	Batch 2	Weekly	Note 1
Tissue Simulant Liquid	Speag	HBBL 600-10000	Batch 3	Weekly	Note 1

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 DASY System.

Instrument	Version Number
DASY system	cDASY6 – V6.14.0959
DASY system	cDASY6 – V16.0.2.136
DASY system	cDASY6 Module mmWave V3.0.0.841

3.3 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS

The fluid properties of the simulant fluids used during routine SAR evaluation meet the dielectric properties required KDB 865665.

The dielectric properties of the tissue simulant liquids used for the SAR testing at TÜV SÜD are as follows:-

Fluid Type and Frequency	Relative Permittivity Measured	Conductivity Measured (S/m)	Relative Permittivity Target	Conductivity Target (S/m)	Date	Fluid Temperature °C
HBBL/B1 - 2450MHz	41.53	1.70	39.2	1.8	30-08-2022	22.1
HBBL/B1 - 2450MHz	40.83	1.71	39.2	1.8	05-09-2022	22.3
HBBL/B2 - 2450MHz	41.44	1.72	39.2	1.8	27-09-2022	19.0
HBBL/B1 – 5200MHz	37.36	4.47	35.99	4.66	07-09-2022	21.5
HBBL/B2 – 5200MHz	36.68	4.54	35.99	4.66	27-09-2022	19.0
HBBL/B1 – 5200MHz	36.57	4.43	35.99	4.66	03-10-2022	19.4
HBBL/B1 – 5200MHz	35.46	4.57	35.99	4.66	12-10-2022	19.1
HBBL/B1 – 5500MHz	36.79	4.82	35.64	4.96	07-09-2022	21.5
HBBL/B1 – 5500MHz	36.44	4.61	35.64	4.96	12-09-2022	22.2
HBBL/B1 – 5600MHz	36.60	4.93	35.53	5.07	07-09-2022	21.5
HBBL/B1 – 5600MHz	36.28	4.72	35.53	5.07	12-09-2022	22.2
HBBL/B1 – 5600MHz	34.52	4.98	35.53	5.07	12-10-2022	19.1
HBBL/B1 – 5800MHz	36.24	5.16	35.30	5.27	07-09-2022	21.5
HBBL/B1 – 5800MHz	35.37	5.10	35.30	5.27	03-10-2022	19.4
HBBL/B1 – 5800MHz	33.94	5.23	35.30	5.27	12-10-2022	19.1
HBBL/B1 – 6500MHz	33.20	6.00	34.48	6.07	20-09-2022	21.8
HBBL/B1 – 6500MHz	33.93	6.14	34.48	6.07	27-09-2022	19.0
HBBL/B1 – 6500MHz	32.44	6.24	34.48	6.07	12-10-2022	19.1

3.4 TEST CONDITIONS

3.4.1 Test Laboratory Conditions

Ambient temperature: Within +18°C to +25°C.
The actual temperature during the testing ranged from 19.8°C to 23.0°C.
The actual humidity during the testing ranged from 38.6% to 64.0% RH.

3.4.2 Test Fluid Temperature Range

Frequency	Fluid Type	Min Temperature °C	Max Temperature °C
2450 MHz	Head	19.0	22.1
5200 MHz	Head	19.0	19.4
5300 MHz	Head	19.0	19.4
5500 MHz	Head	21.5	22.2
5600 MHz	Head	21.5	22.2
5800 MHz	Head	19.1	21.5
6500 MHz	Head	19.0	21.8

3.5 MEASUREMENT UNCERTAINTY

Body, Full 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

Body, Full 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

Body, Full 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

Body, Full 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	0
C(R)	SAR scaling^{p}	0.00	rectangular	1.732	1	0.00	1	0.00	0
APD									
PDC	Power Density Conversion	13.50	rectangular	1.732	1	7.79	1	7.79	0
u(ΔSAR)	Combined Standard Uncertainty		normal			16.58		16.52	0
U	**Expanded Uncertainty**		**normal k =**	**2.00**		**33.2**		33	

DASY6 Uncertainty Budget for PD (avg ≥1cm2)

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	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
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			0.85	0.727	¥	0
$U(F_S)$	Expanded Uncertainty (w/ FTE/MEO)		normal k =	2.00		1.7		¥	

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
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			0.33	0.109	¥	0
$U(F_S)$	**Expanded Uncertainty (w/ FTE/MEO)**		**normal k =**	**2.00**		**0.7**		¥	

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 report relates only to the actual item/items tested.

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

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

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
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 UK**

Certificate No: **EX3-3759_Dec21**

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3759

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

Calibration date: December 13, 2021

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	09-Apr-21 (No. 217-03343)	Apr-22
DAE4	SN: 660	23-Dec-20 (No. DAE4-660_Dec20)	Dec-21
Reference Probe ES3DV2	SN: 3013	30-Dec-20 (No. ES3-3013_Dec20)	Dec-21
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: December 14, 2021

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
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3759

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.47	0.44	0.43	± 10.1 %
DCP (mV)[B]	100.9	99.9	100.8	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	135.1	± 1.9 %	± 4.7 %
		Y	0.00	0.00	1.00		140.4		
		Z	0.00	0.00	1.00		148.7		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	20.00	88.93	18.84	10.00	60.0	± 4.0 %	± 9.6 %
		Y	20.00	90.24	20.31		60.0		
		Z	20.00	91.57	20.69		60.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	20.00	90.21	18.41	6.99	80.0	± 2.6 %	± 9.6 %
		Y	20.00	90.79	19.28		80.0		
		Z	20.00	93.01	20.40		80.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	20.00	93.76	18.81	3.98	95.0	± 1.7 %	± 9.6 %
		Y	20.00	90.62	17.60		95.0		
		Z	20.00	96.75	20.88		95.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	20.00	92.22	16.91	2.22	120.0	± 1.2 %	± 9.6 %
		Y	20.00	85.76	13.95		120.0		
		Z	20.00	100.66	21.33		120.0		
10387-AAA	QPSK Waveform, 1 MHz	X	1.62	66.27	14.69	1.00	150.0	± 3.0 %	± 9.6 %
		Y	1.49	64.76	13.67		150.0		
		Z	1.59	65.96	14.64		150.0		
10388-AAA	QPSK Waveform, 10 MHz	X	2.17	67.87	15.51	0.00	150.0	± 1.0 %	± 9.6 %
		Y	2.02	66.62	14.60		150.0		
		Z	2.13	67.64	15.43		150.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	2.61	68.79	18.10	3.01	150.0	± 0.9 %	± 9.6 %
		Y	2.59	67.83	17.41		150.0		
		Z	3.00	71.03	18.96		150.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	3.50	67.21	15.73	0.00	150.0	± 2.8 %	± 9.6 %
		Y	3.38	66.60	15.27		150.0		
		Z	3.44	66.98	15.63		150.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	4.66	65.15	15.23	0.00	150.0	± 4.6 %	± 9.6 %
		Y	4.83	65.62	15.40		150.0		
		Z	4.79	65.61	15.46		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] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3759

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	41.2	306.62	35.33	11.59	0.00	5.07	0.21	0.35	1.01
Y	44.7	337.78	36.15	11.99	0.41	5.10	0.00	0.51	1.01
Z	42.7	316.28	35.03	14.82	0.06	5.10	1.16	0.27	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	173.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3759

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
128	52.8	0.76	12.08	12.08	12.08	0.00	1.00	± 13.3 %
450	43.5	0.87	10.68	10.68	10.68	0.16	1.30	± 13.3 %
750	41.9	0.89	10.22	10.22	10.22	0.29	1.06	± 12.0 %
835	41.5	0.90	9.88	9.88	9.88	0.27	1.06	± 12.0 %
900	41.5	0.97	9.53	9.53	9.53	0.37	0.80	± 12.0 %
1300	40.8	1.14	9.01	9.01	9.01	0.30	1.29	± 12.0 %
1450	40.5	1.20	8.63	8.63	8.63	0.36	0.86	± 12.0 %
1640	40.2	1.31	8.55	8.55	8.55	0.22	0.86	± 12.0 %
1750	40.1	1.37	8.44	8.44	8.44	0.23	0.86	± 12.0 %
1810	40.0	1.40	8.39	8.39	8.39	0.19	0.86	± 12.0 %
1900	40.0	1.40	8.25	8.25	8.25	0.25	0.86	± 12.0 %
2000	40.0	1.40	7.98	7.98	7.98	0.29	0.86	± 12.0 %
2300	39.5	1.67	7.66	7.66	7.66	0.16	0.90	± 12.0 %
2450	39.2	1.80	7.43	7.43	7.43	0.25	0.90	± 12.0 %
2600	39.0	1.96	7.20	7.20	7.20	0.24	0.90	± 12.0 %
3300	38.2	2.71	6.53	6.53	6.53	0.35	1.30	± 13.1 %
3500	37.9	2.91	6.50	6.50	6.50	0.35	1.35	± 13.1 %
3700	37.7	3.12	6.45	6.45	6.45	0.35	1.35	± 13.1 %
4100	37.2	3.53	5.95	5.95	5.95	0.40	1.60	± 13.1 %
5200	36.0	4.66	4.53	4.53	4.53	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.43	4.43	4.43	0.40	1.80	± 13.1 %
5500	35.6	4.96	3.95	3.95	3.95	0.40	1.80	± 13.1 %
5600	35.5	5.07	3.81	3.81	3.81	0.40	1.80	± 13.1 %
5800	35.3	5.27	3.85	3.85	3.85	0.40	1.80	± 13.1 %

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

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

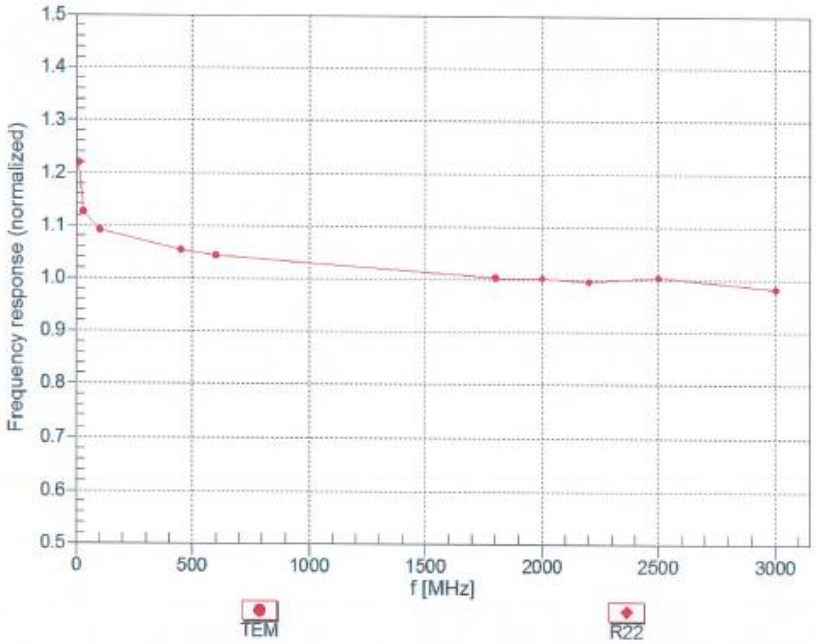
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3759

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz)[C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unc (k=2)
6500	34.5	6.07	5.10	5.10	5.10	0.20	0.25	± 18.6 %

[C] Frequency validity above 6GHz is ± 700 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies 6-10 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[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.

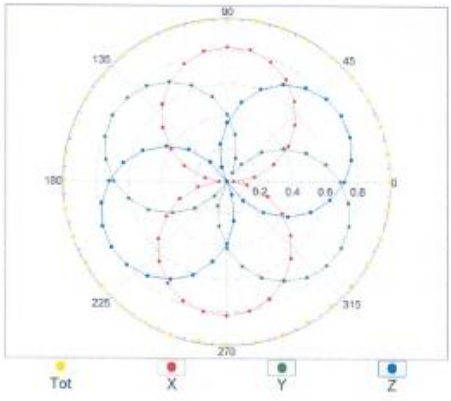
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



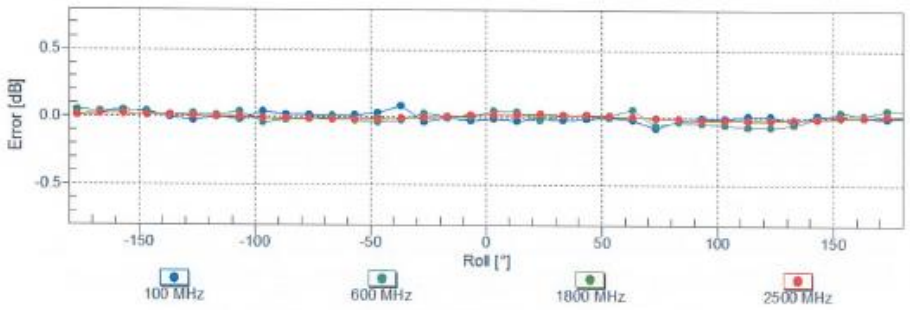
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

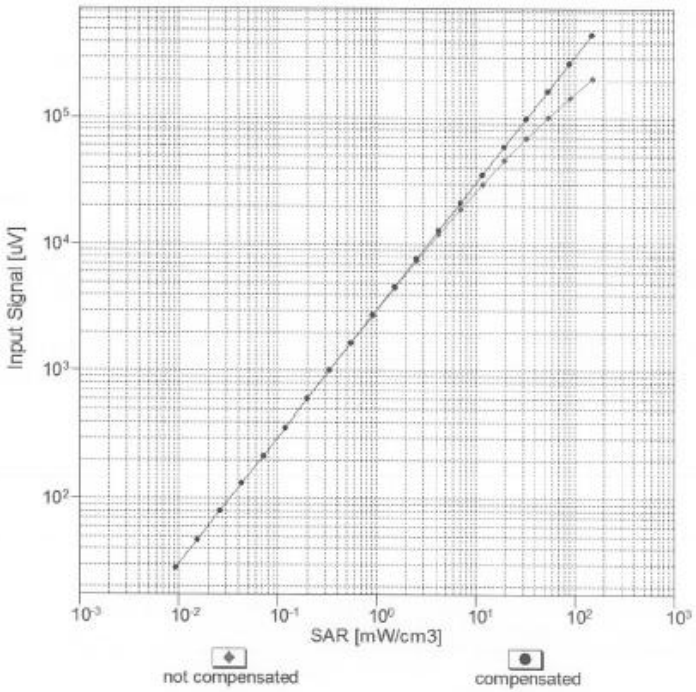


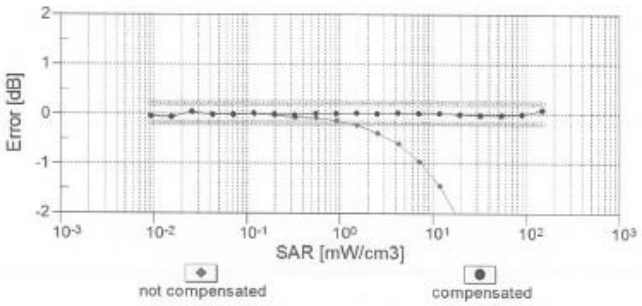
f=1800 MHz,R22



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

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

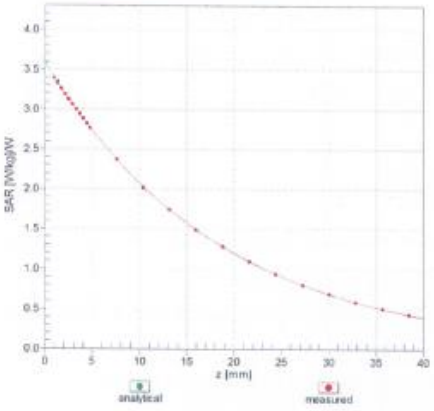




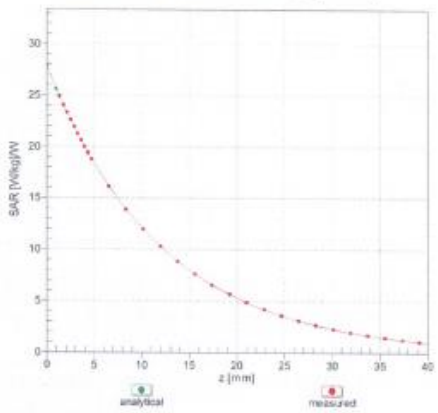
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

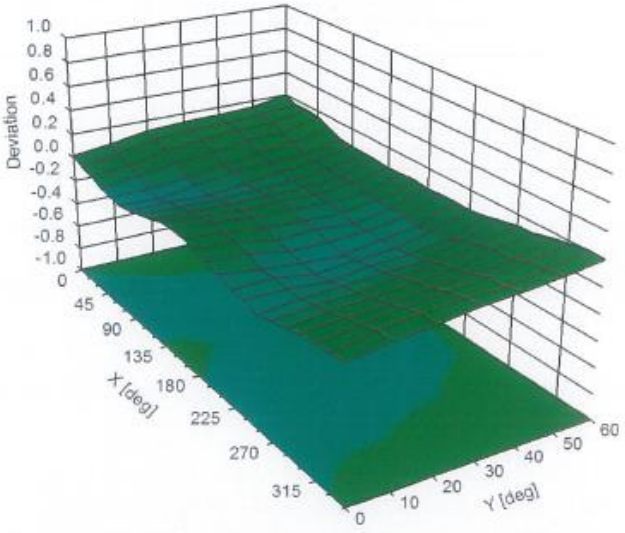


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc[E] (k=2)
0	-	CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAB	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	CAB	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %

10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10114	CAD	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAD	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAD	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAD	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10151	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
10161	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10162	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10178	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10181	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %

10182	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10187	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10193	CAD	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	CAD	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAD	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAD	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	CAD	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAD	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAD	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %
10220	CAD	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAD	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAD	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	± 9.6 %
10223	CAD	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAD	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6 %
10226	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	± 9.6 %
10232	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10233	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10241	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6 %
10242	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	± 9.6 %
10243	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6 %
10244	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10245	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10247	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	± 9.6 %
10248	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	± 9.6 %
10249	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10250	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6 %
10251	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6 %
10252	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6 %
10259	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6 %
10260	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %

10261	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10262	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10266	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6 %
10267	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10269	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6 %
10275	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	AAB	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	AAB	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	AAB	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %
10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WiMAX	12.03	± 9.6 %
10302	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3CTRL)	WiMAX	12.57	± 9.6 %
10303	AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	± 9.6 %
10304	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	11.86	± 9.6 %
10305	AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC)	WiMAX	15.24	± 9.6 %
10306	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC)	WiMAX	14.67	± 9.6 %
10307	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC)	WiMAX	14.49	± 9.6 %
10308	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	± 9.6 %
10309	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM,AMC 2x3)	WiMAX	14.58	± 9.6 %
10310	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3	WiMAX	14.57	± 9.6 %
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	± 9.6 %
10313	AAA	iDEN 1:3	iDEN	10.51	± 9.6 %
10314	AAA	iDEN 1:6	iDEN	13.48	± 9.6 %
10315	AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc dc)	WLAN	1.71	± 9.6 %
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 98pc dc)	WLAN	8.36	± 9.6 %
10317	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc dc)	WLAN	8.36	± 9.6 %
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	± 9.6 %
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	± 9.6 %
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	± 9.6 %
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	± 9.6 %
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	± 9.6 %
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	± 9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	± 9.6 %
10396	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	± 9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	± 9.6 %
10400	AAE	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc dc)	WLAN	8.37	± 9.6 %
10401	AAE	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc dc)	WLAN	8.60	± 9.6 %
10402	AAE	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc dc)	WLAN	8.53	± 9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	± 9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	± 9.6 %
10406	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	± 9.6 %
10410	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %

10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	± 9.6 %
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc dc)	WLAN	1.54	± 9.6 %
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10417	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Long)	WLAN	8.14	± 9.6 %
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Short)	WLAN	8.19	± 9.6 %
10422	AAC	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	± 9.6 %
10423	AAC	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	± 9.6 %
10424	AAC	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	± 9.6 %
10425	AAC	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	± 9.6 %
10426	AAC	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	± 9.6 %
10427	AAC	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	± 9.6 %
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	± 9.6 %
10431	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	± 9.6 %
10432	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10434	AAA	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	± 9.6 %
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10447	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	± 9.6 %
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	LTE-FDD	7.53	± 9.6 %
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	LTE-FDD	7.51	± 9.6 %
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	± 9.6 %
10451	AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	± 9.6 %
10453	AAD	Validation (Square, 10ms, 1ms)	Test	10.00	± 9.6 %
10456	AAC	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc dc)	WLAN	8.63	± 9.6 %
10457	AAA	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	± 9.6 %
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	± 9.6 %
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	± 9.6 %
10460	AAA	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	± 9.6 %
10461	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10462	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	± 9.6 %
10463	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	± 9.6 %
10464	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10467	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10468	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10469	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.56	± 9.6 %
10470	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10471	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10472	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10473	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.82	± 9.6 %
10474	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10475	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10477	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.32	± 9.6 %
10478	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.57	± 9.6 %
10479	AAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10480	AAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.18	± 9.6 %
10481	AAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	± 9.6 %
10482	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.71	± 9.6 %
10483	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, Sub)	LTE-TDD	8.39	± 9.6 %
10484	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.47	± 9.6 %
10485	AAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.59	± 9.6 %
10486	AAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.38	± 9.6 %
10487	AAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.60	± 9.6 %
10488	AAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.70	± 9.6 %

10489	AAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	± 9.6 %
10490	AAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	± 9.6 %
10491	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10492	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.41	± 9.6 %
10493	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	± 9.6 %
10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.37	± 9.6 %
10496	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	± 9.6 %
10497	AAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Sub)	LTE-TDD	7.67	± 9.6 %
10498	AAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Sub)	LTE-TDD	8.40	± 9.6 %
10499	AAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Sub)	LTE-TDD	8.68	± 9.6 %
10500	AAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Sub)	LTE-TDD	7.67	± 9.6 %
10501	AAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Sub)	LTE-TDD	8.44	± 9.6 %
10502	AAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Sub)	LTE-TDD	8.52	± 9.6 %
10503	AAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.72	± 9.6 %
10504	AAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	± 9.6 %
10505	AAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	± 9.6 %
10506	AAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10507	AAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.36	± 9.6 %
10508	AAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	± 9.6 %
10509	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.99	± 9.6 %
10510	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.49	± 9.6 %
10511	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.51	± 9.6 %
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.42	± 9.6 %
10514	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	± 9.6 %
10515	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc dc)	WLAN	1.58	± 9.6 %
10516	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc dc)	WLAN	1.57	± 9.6 %
10517	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc dc)	WLAN	1.58	± 9.6 %
10518	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10519	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc dc)	WLAN	8.39	± 9.6 %
10520	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc dc)	WLAN	8.12	± 9.6 %
10521	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc dc)	WLAN	7.97	± 9.6 %
10522	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc dc)	WLAN	8.45	± 9.6 %
10523	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc dc)	WLAN	8.08	± 9.6 %
10524	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc dc)	WLAN	8.27	± 9.6 %
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.36	± 9.6 %
10526	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.42	± 9.6 %
10527	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc)	WLAN	8.21	± 9.6 %
10528	AAC	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc)	WLAN	8.36	± 9.6 %
10529	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc)	WLAN	8.36	± 9.6 %
10531	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc)	WLAN	8.43	± 9.6 %
10532	AAC	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc)	WLAN	8.29	± 9.6 %
10533	AAC	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc)	WLAN	8.38	± 9.6 %
10534	AAC	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc)	WLAN	8.45	± 9.6 %
10535	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc)	WLAN	8.45	± 9.6 %
10536	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc)	WLAN	8.32	± 9.6 %
10537	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc)	WLAN	8.44	± 9.6 %
10538	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc)	WLAN	8.54	± 9.6 %
10540	AAC	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc dc)	WLAN	8.39	± 9.6 %
10541	AAC	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc)	WLAN	8.46	± 9.6 %
10542	AAC	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.65	± 9.6 %
10543	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc dc)	WLAN	8.65	± 9.6 %
10544	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc dc)	WLAN	8.47	± 9.6 %
10545	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc dc)	WLAN	8.55	± 9.6 %
10546	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc dc)	WLAN	8.35	± 9.6 %

10547	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc)	WLAN	8.49	± 9.6 %
10548	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc dc)	WLAN	8.37	± 9.6 %
10550	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc dc)	WLAN	8.39	± 9.6 %
10551	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc dc)	WLAN	8.50	± 9.6 %
10552	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc dc)	WLAN	8.42	± 9.6 %
10553	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc dc)	WLAN	8.45	± 9.6 %
10554	AAD	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc dc)	WLAN	8.48	± 9.6 %
10555	AAD	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc dc)	WLAN	8.47	± 9.6 %
10556	AAD	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc dc)	WLAN	8.50	± 9.6 %
10557	AAD	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc dc)	WLAN	8.52	± 9.6 %
10558	AAD	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc dc)	WLAN	8.61	± 9.6 %
10560	AAD	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc dc)	WLAN	8.73	± 9.6 %
10561	AAD	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc dc)	WLAN	8.56	± 9.6 %
10562	AAD	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc dc)	WLAN	8.69	± 9.6 %
10563	AAD	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc dc)	WLAN	8.77	± 9.6 %
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc dc)	WLAN	8.25	± 9.6 %
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc dc)	WLAN	8.45	± 9.6 %
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc dc)	WLAN	8.13	± 9.6 %
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc dc)	WLAN	8.00	± 9.6 %
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc dc)	WLAN	8.37	± 9.6 %
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc dc)	WLAN	8.10	± 9.6 %
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc dc)	WLAN	8.30	± 9.6 %
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc dc)	WLAN	1.99	± 9.6 %
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc dc)	WLAN	1.99	± 9.6 %
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc dc)	WLAN	1.98	± 9.6 %
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc dc)	WLAN	1.98	± 9.6 %
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc dc)	WLAN	8.59	± 9.6 %
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc dc)	WLAN	8.60	± 9.6 %
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	± 9.6 %
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	± 9.6 %
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	± 9.6 %
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc dc)	WLAN	8.76	± 9.6 %
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	± 9.6 %
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	± 9.6 %
10583	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc dc)	WLAN	8.59	± 9.6 %
10584	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc dc)	WLAN	8.60	± 9.6 %
10585	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	± 9.6 %
10586	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	± 9.6 %
10587	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	± 9.6 %
10588	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc dc)	WLAN	8.76	± 9.6 %
10589	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	± 9.6 %
10590	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	± 9.6 %
10591	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc dc)	WLAN	8.63	± 9.6 %
10592	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc dc)	WLAN	8.79	± 9.6 %
10593	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc dc)	WLAN	8.64	± 9.6 %
10594	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc dc)	WLAN	8.74	± 9.6 %
10595	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc dc)	WLAN	8.74	± 9.6 %
10596	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc dc)	WLAN	8.71	± 9.6 %
10597	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc dc)	WLAN	8.72	± 9.6 %
10598	AAC	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc dc)	WLAN	8.50	± 9.6 %
10599	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc dc)	WLAN	8.79	± 9.6 %
10600	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc dc)	WLAN	8.88	± 9.6 %
10601	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc dc)	WLAN	8.82	± 9.6 %
10602	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc dc)	WLAN	8.94	± 9.6 %
10603	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc dc)	WLAN	9.03	± 9.6 %
10604	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc dc)	WLAN	8.76	± 9.6 %

10605	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc dc)	WLAN	8.97	± 9.6 %
10606	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc dc)	WLAN	8.82	± 9.6 %
10607	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc dc)	WLAN	8.64	± 9.6 %
10608	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc dc)	WLAN	8.77	± 9.6 %
10609	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc dc)	WLAN	8.57	± 9.6 %
10610	AAC	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc dc)	WLAN	8.78	± 9.6 %
10611	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc dc)	WLAN	8.70	± 9.6 %
10612	AAC	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10613	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc dc)	WLAN	8.94	± 9.6 %
10614	AAC	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc dc)	WLAN	8.59	± 9.6 %
10615	AAC	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc dc)	WLAN	8.82	± 9.6 %
10616	AAC	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc dc)	WLAN	8.82	± 9.6 %
10617	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc dc)	WLAN	8.81	± 9.6 %
10618	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc dc)	WLAN	8.58	± 9.6 %
10619	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc dc)	WLAN	8.86	± 9.6 %
10620	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc dc)	WLAN	8.87	± 9.6 %
10621	AAC	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10622	AAC	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc dc)	WLAN	8.68	± 9.6 %
10623	AAC	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc dc)	WLAN	8.82	± 9.6 %
10624	AAC	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc dc)	WLAN	8.96	± 9.6 %
10625	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc dc)	WLAN	8.96	± 9.6 %
10626	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10627	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc dc)	WLAN	8.88	± 9.6 %
10628	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc dc)	WLAN	8.71	± 9.6 %
10629	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10630	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc dc)	WLAN	8.72	± 9.6 %
10631	AAC	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc dc)	WLAN	8.81	± 9.6 %
10632	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc dc)	WLAN	8.74	± 9.6 %
10633	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc dc)	WLAN	8.83	± 9.6 %
10634	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc dc)	WLAN	8.80	± 9.6 %
10635	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc dc)	WLAN	8.81	± 9.6 %
10636	AAD	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10637	AAD	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc dc)	WLAN	8.79	± 9.6 %
10638	AAD	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc dc)	WLAN	8.86	± 9.6 %
10639	AAD	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10640	AAD	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc dc)	WLAN	8.98	± 9.6 %
10641	AAD	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc dc)	WLAN	9.06	± 9.6 %
10642	AAD	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc dc)	WLAN	9.06	± 9.6 %
10643	AAD	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc dc)	WLAN	8.89	± 9.6 %
10644	AAD	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc dc)	WLAN	9.05	± 9.6 %
10645	AAD	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc dc)	WLAN	9.11	± 9.6 %
10646	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.96	± 9.6 %
10647	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.96	± 9.6 %
10648	AAA	CDMA2000 (1x Advanced)	CDMA2000	3.45	± 9.6 %
10652	AAE	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	± 9.6 %
10653	AAE	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	± 9.6 %
10654	AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	± 9.6 %
10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6 %
10658	AAA	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
10659	AAA	Pulse Waveform (200Hz, 20%)	Test	6.99	± 9.6 %
10660	AAA	Pulse Waveform (200Hz, 40%)	Test	3.98	± 9.6 %
10661	AAA	Pulse Waveform (200Hz, 60%)	Test	2.22	± 9.6 %
10662	AAA	Pulse Waveform (200Hz, 80%)	Test	0.97	± 9.6 %
10670	AAA	Bluetooth Low Energy	Bluetooth	2.19	± 9.6 %
10671	AAC	IEEE 802.11ax (20MHz, MCS0, 90pc dc)	WLAN	9.09	± 9.6 %
10672	AAC	IEEE 802.11ax (20MHz, MCS1, 90pc dc)	WLAN	8.57	± 9.6 %

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

10729	AAC	IEEE 802.11ax (80MHz, MCS10, 90pc dc)	WLAN	8.64	± 9.6 %
10730	AAC	IEEE 802.11ax (80MHz, MCS11, 90pc dc)	WLAN	8.67	± 9.6 %
10731	AAC	IEEE 802.11ax (80MHz, MCS0, 99pc dc)	WLAN	8.42	± 9.6 %
10732	AAC	IEEE 802.11ax (80MHz, MCS1, 99pc dc)	WLAN	8.46	± 9.6 %
10733	AAC	IEEE 802.11ax (80MHz, MCS2, 99pc dc)	WLAN	8.40	± 9.6 %
10734	AAC	IEEE 802.11ax (80MHz, MCS3, 99pc dc)	WLAN	8.25	± 9.6 %
10735	AAC	IEEE 802.11ax (80MHz, MCS4, 99pc dc)	WLAN	8.33	± 9.6 %
10736	AAC	IEEE 802.11ax (80MHz, MCS5, 99pc dc)	WLAN	8.27	± 9.6 %
10737	AAC	IEEE 802.11ax (80MHz, MCS6, 99pc dc)	WLAN	8.36	± 9.6 %
10738	AAC	IEEE 802.11ax (80MHz, MCS7, 99pc dc)	WLAN	8.42	± 9.6 %
10739	AAC	IEEE 802.11ax (80MHz, MCS8, 99pc dc)	WLAN	8.29	± 9.6 %
10740	AAC	IEEE 802.11ax (80MHz, MCS9, 99pc dc)	WLAN	8.48	± 9.6 %
10741	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc dc)	WLAN	8.40	± 9.6 %
10742	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc dc)	WLAN	8.43	± 9.6 %
10743	AAC	IEEE 802.11ax (160MHz, MCS0, 90pc dc)	WLAN	8.94	± 9.6 %
10744	AAC	IEEE 802.11ax (160MHz, MCS1, 90pc dc)	WLAN	9.16	± 9.6 %
10745	AAC	IEEE 802.11ax (160MHz, MCS2, 90pc dc)	WLAN	8.93	± 9.6 %
10746	AAC	IEEE 802.11ax (160MHz, MCS3, 90pc dc)	WLAN	9.11	± 9.6 %
10747	AAC	IEEE 802.11ax (160MHz, MCS4, 90pc dc)	WLAN	9.04	± 9.6 %
10748	AAC	IEEE 802.11ax (160MHz, MCS5, 90pc dc)	WLAN	8.93	± 9.6 %
10749	AAC	IEEE 802.11ax (160MHz, MCS6, 90pc dc)	WLAN	8.90	± 9.6 %
10750	AAC	IEEE 802.11ax (160MHz, MCS7, 90pc dc)	WLAN	8.79	± 9.6 %
10751	AAC	IEEE 802.11ax (160MHz, MCS8, 90pc dc)	WLAN	8.82	± 9.6 %
10752	AAC	IEEE 802.11ax (160MHz, MCS9, 90pc dc)	WLAN	8.81	± 9.6 %
10753	AAC	IEEE 802.11ax (160MHz, MCS10, 90pc dc)	WLAN	9.00	± 9.6 %
10754	AAC	IEEE 802.11ax (160MHz, MCS11, 90pc dc)	WLAN	8.94	± 9.6 %
10755	AAC	IEEE 802.11ax (160MHz, MCS0, 99pc dc)	WLAN	8.64	± 9.6 %
10756	AAC	IEEE 802.11ax (160MHz, MCS1, 99pc dc)	WLAN	8.77	± 9.6 %
10757	AAC	IEEE 802.11ax (160MHz, MCS2, 99pc dc)	WLAN	8.77	± 9.6 %
10758	AAC	IEEE 802.11ax (160MHz, MCS3, 99pc dc)	WLAN	8.69	± 9.6 %
10759	AAC	IEEE 802.11ax (160MHz, MCS4, 99pc dc)	WLAN	8.58	± 9.6 %
10760	AAC	IEEE 802.11ax (160MHz, MCS5, 99pc dc)	WLAN	8.49	± 9.6 %
10761	AAC	IEEE 802.11ax (160MHz, MCS6, 99pc dc)	WLAN	8.58	± 9.6 %
10762	AAC	IEEE 802.11ax (160MHz, MCS7, 99pc dc)	WLAN	8.49	± 9.6 %
10763	AAC	IEEE 802.11ax (160MHz, MCS8, 99pc dc)	WLAN	8.53	± 9.6 %
10764	AAC	IEEE 802.11ax (160MHz, MCS9, 99pc dc)	WLAN	8.54	± 9.6 %
10765	AAC	IEEE 802.11ax (160MHz, MCS10, 99pc dc)	WLAN	8.54	± 9.6 %
10766	AAC	IEEE 802.11ax (160MHz, MCS11, 99pc dc)	WLAN	8.51	± 9.6 %
10767	AAE	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.99	± 9.6 %
10768	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10769	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10770	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10771	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10772	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	± 9.6 %
10773	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	± 9.6 %
10774	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	± 9.6 %
10775	AAD	5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	± 9.6 %
10776	AAD	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10777	AAC	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10778	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10779	AAC	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	± 9.6 %
10780	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	± 9.6 %
10781	AAD	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	± 9.6 %
10782	AAD	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	± 9.6 %
10783	AAE	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	± 9.6 %
10784	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	± 9.6 %

10785	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10786	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10787	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	± 9.6 %
10788	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10789	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10790	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10791	AAE	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	± 9.6 %
10792	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	± 9.6 %
10793	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	± 9.6 %
10794	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 9.6 %
10795	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	± 9.6 %
10796	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 9.6 %
10797	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10798	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 9.6 %
10799	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	± 9.6 %
10801	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 9.6 %
10802	AAD	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	± 9.6 %
10803	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	± 9.6 %
10805	AAD	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10806	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10809	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10810	AAD	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10812	AAD	5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10817	AAE	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10818	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10819	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	± 9.6 %
10820	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10821	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10822	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10823	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10824	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10825	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10827	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	± 9.6 %
10828	AAD	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	± 9.6 %
10829	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10830	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.63	± 9.6 %
10831	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	± 9.6 %
10832	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	± 9.6 %
10833	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10834	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	± 9.6 %
10835	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10836	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	± 9.6 %
10837	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	± 9.6 %
10839	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10840	AAD	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	± 9.6 %
10841	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	± 9.6 %
10843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	± 9.6 %
10844	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10846	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10854	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10856	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10857	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10858	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10859	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10860	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %

10861	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10863	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10864	AAD	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10865	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10866	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10868	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	± 9.6 %
10869	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10870	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	± 9.6 %
10871	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10872	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	± 9.6 %
10873	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10874	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10875	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10876	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	± 9.6 %
10877	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	± 9.6 %
10878	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 9.6 %
10879	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	± 9.6 %
10880	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	± 9.6 %
10881	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10882	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	± 9.6 %
10883	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	± 9.6 %
10884	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	± 9.6 %
10885	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10886	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10887	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10888	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	± 9.6 %
10889	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	± 9.6 %
10890	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	± 9.6 %
10891	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	± 9.6 %
10892	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 9.6 %
10897	AAC	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	± 9.6 %
10898	AAB	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	± 9.6 %
10899	AAB	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	± 9.6 %
10900	AAB	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10901	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10902	AAB	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10903	AAB	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10904	AAB	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10905	AAB	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10906	AAB	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10907	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	± 9.6 %
10908	AAB	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	± 9.6 %
10909	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.96	± 9.6 %
10910	AAB	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	± 9.6 %
10911	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	± 9.6 %
10912	AAB	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10913	AAB	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10914	AAB	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	± 9.6 %
10915	AAB	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	± 9.6 %
10916	AAB	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	± 9.6 %
10917	AAB	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
10918	AAC	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	± 9.6 %
10919	AAB	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	± 9.6 %
10920	AAB	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	± 9.6 %
10921	AAB	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10922	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	± 9.6 %

10923	AAB	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10924	AAB	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10925	AAB	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.95	± 9.6 %
10926	AAB	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10927	AAB	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
10928	AAC	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10929	AAC	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10930	AAC	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10931	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10932	AAC	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10933	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10934	AAC	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10935	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10936	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10937	AAC	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	± 9.6 %
10938	AAC	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10939	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	± 9.6 %
10940	AAC	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	± 9.6 %
10941	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10942	AAC	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10943	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	± 9.6 %
10944	AAC	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	± 9.6 %
10945	AAC	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10947	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10948	AAC	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10949	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10950	AAC	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10951	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	± 9.6 %
10952	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	± 9.6 %
10953	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	± 9.6 %
10954	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	± 9.6 %
10955	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	± 9.6 %
10956	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	± 9.6 %
10957	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	± 9.6 %
10958	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	± 9.6 %
10959	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	± 9.6 %
10960	AAC	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	± 9.6 %
10961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.36	± 9.6 %
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	± 9.6 %
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10964	AAC	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.29	± 9.6 %
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	± 9.6 %
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	± 9.6 %
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	± 9.6 %
10972	AAB	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	± 9.6 %
10973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	± 9.6 %
10974	AAB	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	± 9.6 %
10978	AAA	ULLA BDR	ULLA	2.23	± 9.6 %
10979	AAA	ULLA HDR4	ULLA	7.02	± 9.6 %
10980	AAA	ULLA HDR8	ULLA	8.82	± 9.6 %
10981	AAA	ULLA HDRp4	ULLA	1.50	± 9.6 %
10982	AAA	ULLA HDRp8	ULLA	1.44	± 9.6 %

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

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Accreditation No.: SCS 0108

Client TüV SÜD UK

Certificate No: EX3-7719_Mar22

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7719

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

Calibration date: March 11, 2022

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	09-Apr-21 (No. 217-03343)	Apr-22
DAE4	SN: 660	13-Oct-21 (No. DAE4-660_Oct21)	Oct-22
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: March 14, 2022

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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., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

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