

Report on the Specific Absorption Rate Testing of the A3113

Apple Inc.
Model: A3113

In accordance with FCC 47 CFR 2.1093
FCC ID: BCGA3113

Prepared for: Apple Inc.
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EXECUTIVE SUMMARY

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



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SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the A3113



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate testing of the A3113 to the requirements of FCC 47 CFR 2.1093.

Objective	To determine the Equipment Under Test's (EUT) compliance with the requirements specified within FCC 47 CFR 2.1093.
Applicant	Apple Inc
Manufacturer	Apple Inc
Manufacturing Description	Laptop computer
Model Number	A3113
Serial/IMEI Number(s)	XG21Y4J7CN (Conducted) XQLP6F6C2P (Radiated) WRNQ47VJFT (Radiated)
Number of Samples Tested	3
Hardware Version	REV 1.0
Software Version	23A32770p
Test Specification/Issue/Date	FCC 47 CFR 2.1093
Start of Test	19-October-2023
Finish of Test	26-October-2023
Related Document(s)	KDB 865664 - D01 v01r04 KDB 447498 - D01 v06 IEC-IEEE 62209-1528:2020 KDB 248227 - D01 v02r02 IEC/IEEE 63195-1:2022 ICNIRP 2020 FCC 47 CFR 1.1310 SPEAG, DASY8 Application Note: SAR, APD & PD at 6 - 10 GHz (Version 6.0), August 2022 October 2020 TCBC Workshop Notes
Name of Engineer(s)	Kamil Nawabzada Gualberta Madeira Valentinas Luza Sruthy Sudevan Umesh Kabbur Sohaib Bukhari Prince Elvis Gomes



1.2 BRIEF SUMMARY OF RESULTS

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

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

Max 1g SAR (W/kg) Body	0.746 (Measured)	0.901 (Scaled)
The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for FCC General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg in accordance with FCC 47 CFR 1.1310		

The maximum iPD 4cm² found during this assessment:

Max iPD 4cm ² (W/m ²)	2.17 (Measured) (FS)
The maximum iPD averaged over 4cm ² measured for all the tests performed did not exceed the standalone limits for FCC General Population/Uncontrolled Exposure of 10.00 W/m ² in accordance with FCC 47 CFR 1.1310.	

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

Technology	Band	Test Configuration	Max Reported SAR (W/kg)
Bluetooth (5 or 6 GHz WLAN OFF)	2450 MHz	Body	0.342
Bluetooth (5 or 6 GHz WLAN ON)	2450 MHz	Body	0.305
Narrowband (5 or 6 GHz WLAN OFF)	5150-5250 MHz	Body	0.266
Narrowband (5 or 6 GHz WLAN OFF)	5725-5850 MHz	Body	0.609
Narrowband (5 or 6 GHz WLAN ON)	5150-5250 MHz	Body	0.175
Narrowband (5 or 6 GHz WLAN ON)	5725-5850 MHz	Body	0.355
Thread (5 or 6 GHz OFF)	2450 MHz	Body	0.461
Thread (5 or 6 GHz ON)	2450 MHz	Body	0.177
WLAN	2450 MHz	Body	0.901
WLAN	5200 MHz	Body	0.664
WLAN	5300 MHz	Body	0.705
WLAN	5500/5600 MHz	Body	0.703
WLAN	5800 MHz	Body	0.823
WLAN	6500 MHz	Body	0.416
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.			
*Measured results for Thread were scaled down from 100% duty cycle to 59.70% Refer to Annex D			

1.2.1 Simultaneous Transmission.

Combinations of Simultaneous Transmission this EUT can achieve are the following:

- 5 or 6 GHz WLAN + 2.4 GHz Bluetooth
- 5 or 6 GHz WLAN + 2.4 GHz Thread
- 5 or 6 GHz Narrowband + 2.4 GHz WLAN

Position	5 or 6 GHz WLAN 1g SAR (W/kg) (Core 0)	2.4 GHz Bluetooth (5 or 6 GHz WLAN on) 1g SAR (W/kg) (Core 0)	Sum of 1g SAR (W/Kg)	Peak Location Separation Ratio required?	Peak Location Separation Ratio
Bottom	0.823	0.247	1.070	No	N/A

Position	5 or 6 GHz WLAN 1g SAR (W/kg) (Core 0)	Thread (5 or 6 GHz on) 1g SAR (W/kg) (Core 0)	Sum of 1g SAR (W/Kg)	Peak Location Separation Ratio required?	Peak Location Separation Ratio
Bottom	0.823	0.155	0.978	No	N/A

Position	Narrowband UNII-1 (2.4 GHz WLAN ON) 1g SAR (W/kg) (Core 0)	2.4 GHz WLAN 1g SAR (W/kg) (Core 0)	Sum of 1g SAR (W/Kg)	Peak Location Separation Ratio required?	Peak Location Separation Ratio
Bottom	0.175	0.766	0.941	No	N/A

Position	Narrowband UNII-3 (2.4 GHz WLAN ON) 1g SAR (W/kg) (Core 0)	2.4 GHz WLAN 1g SAR (W/kg) (Core 0)	Sum of 1g SAR (W/Kg)	Peak Location Separation Ratio required?	Peak Location Separation Ratio
Bottom	0.355	0.766	1.121	No	N/A

Position	6 GHz WLAN - Exposure Ratio iPD Value (Core 1)	Bluetooth (5 or 6 GHz WLAN on) Exposure ratio (Core 1)	Total Exposure Ratio	Total Exposure Ratio less than 1.0
Bottom	0.217	0.190	0.407	Yes

Each antenna is separated to the extent that the SAR distributions do not overlap and only same core simultaneous transmission is considered.

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 or within the Peak Location Separation Ratio.

1.3 TEST RESULTS SUMMARY

1.3.1 Results Summary Tables

Bluetooth - EDR - SISO Core 0 (5 or 6 GHz WLAN OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	39	2441	15.80	16.50	0.065	0.076	-
0mm Bottom	0	2402	15.55	16.50	0.223	0.278	C.1
0mm Bottom	39	2441	15.80	16.50	0.203	0.239	-
0mm Bottom	78	2480	15.40	16.50	0.136	0.175	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Bluetooth - EDR - SISO Core 1 (5 or 6 GHz WLAN OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	39	2441	15.82	16.50	0.081	0.095	-
0mm Bottom	0	2402	15.35	16.50	0.185	0.241	-
0mm Bottom	39	2441	15.82	16.50	0.261	0.305	-
0mm Bottom	78	2480	15.58	16.50	0.277	0.342	C.2
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Bluetooth - EDR - SISO Core 0 (5 or 6 GHz WLAN ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	39	2441	15.80	16.00	0.065	0.068	-
0mm Bottom	0	2402	15.55	16.00	0.223	0.247	C.1
0mm Bottom	39	2441	15.80	16.00	0.203	0.213	-
0mm Bottom	78	2480	15.40	16.00	0.136	0.156	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



Bluetooth - BT EDR - SISO Core 1(5 or 6 GHz WLAN ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	39	2441	15.82	16.00	0.081	0.084	-
0mm Bottom	0	2402	15.35	16.00	0.185	0.215	-
0mm Bottom	39	2441	15.82	16.00	0.261	0.272	-
0mm Bottom	78	2480	15.58	16.00	0.277	0.305	C.2
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Narrowband - UNII-1 - HDR8 - SISO Core 0 (5 or 6 GHz WLAN OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5200	11.35	12.50	0.051	0.066	-
0mm Bottom	Bottom	5150	11.02	12.50	0.157	0.221	C.3
0mm Bottom	Middle	5200	11.35	12.50	0.148	0.193	-
0mm Bottom	Top	5250	11.30	12.50	0.153	0.202	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Narrowband - UNII-1 - HDR8 - SISO Core 1 (5 or 6 GHz WLAN OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5200	13.85	14.00	0.073	0.076	-
0mm Bottom	Bottom	5150	13.68	14.00	0.247	0.266	C.4
0mm Bottom	Middle	5200	13.85	14.00	0.255	0.264	-
0mm Bottom	Top	5250	13.40	14.00	0.229	0.263	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



Narrowband - UNII-1 - HDR8 - SISO Core 0 (5 or 6 GHz WLAN ON) (ePA):
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5200	11.35	11.50	0.051	0.053	-
0mm Bottom	Bottom	5150	11.02	11.50	0.157	0.175	C.3
0mm Bottom	Middle	5200	11.35	11.50	0.148	0.153	-
0mm Bottom	Top	5250	11.30	11.50	0.153	0.160	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Narrowband - UNII-1 – HDR4 - SISO Core 1 (5 or 6 GHz WLAN ON) (ePA):
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5200	11.35	11.50	0.035	0.036	-
0mm Bottom	Bottom	5150	11.15	11.50	0.122	0.132	-
0mm Bottom	Middle	5200	11.35	11.50	0.129	0.134	-
0mm Bottom	Top	5250	10.78	11.50	0.119	0.140	C.5
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Narrowband - UNII-3 - HDR4 - SISO Core 0 (5 or 6 GHz OFF) (ePA):
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5850	13.60	14.00	0.165	0.181	-
0mm Bottom	Bottom	5725	13.42	14.00	0.447	0.511	-
0mm Bottom	Middle	5788	13.58	14.00	0.511	0.563	-
0mm Bottom	Top	5850	13.60	14.00	0.555	0.609	C.6
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



Narrowband - UNII-3 - HDR4 - SISO Core 1 (5 or 6 GHz OFF) (ePA):
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5850	13.88	14.00	0.122	0.125	-
0mm Bottom	Bottom	5725	13.52	14.00	0.290	0.324	-
0mm Bottom	Middle	5788	13.47	14.00	0.296	0.334	-
0mm Bottom	Top	5850	13.88	14.00	0.425	0.437	C.7
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Narrowband - UNII-3 - HDR4 - SISO Core 0 (5 or 6 GHz ON) (ePA):
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5725	11.20	11.50	0.090	0.096	-
0mm Bottom	Bottom	5725	11.20	11.50	0.288	0.309	-
0mm Bottom	Middle	5788	10.98	11.50	0.291	0.328	-
0mm Bottom	Top	5850	11.05	11.50	0.320	0.355	C.8
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

Narrowband - UNII-3 - HDR4 - SISO Core 1(5 or 6 GHz ON) (ePA):
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	Top	5850	11.35	11.50	0.075	0.078	-
0mm Bottom	Bottom	5725	11.25	11.50	0.175	0.185	-
0mm Bottom	Middle	5788	11.15	11.50	0.161	0.175	-
0mm Bottom	Top	5850	11.35	11.50	0.218	0.226	C.9
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



Thread - SISO Core 0 (5 or 6 GHz OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Rear of Display	26	2480	19.75	20.00	0.072	0.077	-
0mm Bottom	11	2405	19.48	20.00	0.248	0.280	-
0mm Bottom	18	2440	19.42	20.00	0.229	0.262	-
0mm Bottom	26	2480	19.75	20.00	0.304	0.322	C.10
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							
*Measured results for Thread were scaled down from 100% duty cycle to 59.70%. Refer to Annex D							

Thread - SISO Core 1 (5 or 6 GHz OFF) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Rear of Display	26	2480	19.62	20.00	0.107	0.117	-
0mm Bottom	11	2405	19.38	20.00	0.303	0.350	-
0mm Bottom	18	2440	19.58	20.00	0.337	0.371	-
0mm Bottom	26	2480	19.62	20.00	0.423	0.462	C.11
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							
*Measured results for Thread were scaled down from 100% duty cycle to 59.70%. Refer to Annex D							

Thread - SISO Core 0 (5 or 6 GHz ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Rear of Display	11	2405	15.70	16.00	0.051	0.055	-
0mm Bottom	11	2405	15.70	16.00	0.144	0.155	C.12
0mm Bottom	18	2440	15.28	16.00	0.107	0.126	-
0mm Bottom	26	2480	15.58	16.00	0.083	0.091	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							
*Measured results for Thread were scaled down from 100% duty cycle to 59.70%. Refer to Annex D							



Thread - SISO Core 1 (5 or 6 GHz ON) (ePA):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)*	Scan Figure Number
0mm Rear of Display	11	2405	15.38	16.00	0.037	0.043	-
0mm Bottom	11	2405	15.38	16.00	0.109	0.126	-
0mm Bottom	18	2440	15.20	16.00	0.122	0.147	-
0mm Bottom	26	2480	15.30	16.00	0.151	0.177	C.13
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							
*Measured results for Thread were scaled down from 100% duty cycle to 59.70%. Refer to Annex D							

WLAN - 2.4 GHz - 802.11g - 20 MHz - 1 Mbps - SISO (Core 0):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	10	2457	19.70	20.00	0.194	0.208	-
0mm Bottom	2	2417	19.60	20.00	0.690	0.757	C.14
0mm Bottom	6	2437	19.56	20.00	0.638	0.706	-
0mm Bottom	10	2457	19.70	20.00	0.567	0.608	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - 2.4 GHz - 802.11g - 20 MHz - 1 Mbps - SISO (Core 1):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	6	2457	19.69	20.00	0.212	0.228	-
0mm Bottom	2	2417	19.58	20.00	0.713	0.785	-
0mm Bottom	6	2437	19.69	20.00	0.709	0.761	-
0mm Bottom	10	2457	19.40	20.00	0.744	0.854	C.15
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



WLAN - 2.4 GHz - 802.11n - HT20 - 2x2 MIMO Core 0 & Core 1:
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display (Core 0)	2	2417	19.65	20.00	0.250	0.271	-
0mm Rear of Display (Core 1)	2	2417	19.55	20.00	0.210	0.233	
0mm Bottom (Core 0)	2	2417	19.65	20.00	0.743	0.805	-
0mm Bottom (Core 1)	2	2417	19.55	20.00	0.746	0.827	
0mm Bottom (Core 0)	6	2437	19.55	20.00	0.671	0.744	-
0mm Bottom (Core 1)	6	2437	19.60	20.00	0.808	0.886	
0mm Bottom (Core 0)	10	2457	19.45	20.00	0.573	0.650	C.16
0mm Bottom (Core 1)	10	2457	19.18	20.00	0.746	0.901	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1 - 802.11a - 20 MHz - SISO Core 0
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	36	5180	15.85	16.00	0.188	0.195	-
0mm Bottom	36	5180	15.85	16.00	0.626	0.648	-
0mm Bottom	40	5200	15.80	16.00	0.634	0.664	C.17
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



WLAN - U-NII-1 - 802.11a - 20 MHz - SISO Core 1
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	40	5200	15.76	16.00	0.140	0.148	-
0mm Bottom	36	5180	15.72	16.00	0.518	0.552	C.18
0mm Bottom	40	5200	15.76	16.00	0.515	0.544	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1/2A - 802.11n - HT40 - 2x2 MIMO Core 0 & Core 1:
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display (Core 0)	46	5230	15.82	16.00	0.197	0.205	-
0mm Rear of Display (Core 1)	46	5230	15.84	16.00	0.142	0.147	
0mm Bottom (Core 0)	46	5230	15.82	16.00	0.551	0.573	C.19
0mm Bottom (Core 1)	46	5230	15.84	16.00	0.485	0.526	
0mm Bottom (Core 0)	38	5190	15.83	16.00	0.578	0.602	-
0mm Bottom (Core 1)	38	5190	15.65	16.00	0.197	0.205	
0mm Bottom (Core 0)	54	5270	16	15.57	0.553	0.611	-
0mm Bottom (Core 1)	54	5270	16	15.56	0.555	0.614	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



WLAN - U-NII-2A - 802.11ac - VHT40 - SISO (Core 0)
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	46	5230	15.90	16.00	0.205	0.210	-
0mm Bottom	46	5230	15.90	16.00	0.612	0.626	-
0mm Bottom	54	5270	15.54	16.00	0.634	0.705	C.20
0mm Bottom	60	5300	15.40	16.00	0.578	0.664	-
0mm Bottom	64	5320	15.47	16.00	0.581	0.656	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-2A - 802.11ac - VHT40 - SISO (Core 1)
 Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	46	5230	15.78	16.00	0.153	0.161	-
0mm Bottom	46	5230	15.78	16.00	0.536	0.564	-
0mm Bottom	54	5270	15.68	16.00	0.634	0.682	C.21
0mm Bottom	60	5300	15.53	16.00	0.547	0.610	-
0mm Bottom	64	5320	15.65	16.00	0.627	0.680	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



WLAN - U-NII-2A - 802.11ac - VHT20 - 2x2 MIMO (Core 0 & Core 1):
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display (Core 0)	64	5320	15.47	15.50	0.203	0.204	-
0mm Rear of Display (Core 1)	64	5320	15.40	15.50	0.190	0.194	
0mm Bottom (Core 0)	60	5300	15.14	15.50	0.466	0.506	-
0mm Bottom (Core 1)	60	5300	15.06	15.50	0.472	0.522	
0mm Bottom (Core 0)	64	5320	15.47	15.50	0.544	0.548	C.22
0mm Bottom (Core 1)	64	5320	15.40	15.50	0.578	0.591	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-2C - 802.11ac - VHT80 - SISO (Core 0)
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	122	5610	14.07	14.50	0.179	0.198	-
0mm Bottom	106	5530	14.02	14.50	0.574	0.641	-
0mm Bottom	122	5610	14.07	14.50	0.582	0.643	-
0mm Bottom	138	5690	14.06	14.50	0.653	0.723	C.23
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1/2A - 802.11ac - VHT80 - SISO (Core 1)
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	106	5530	14.12	14.50	0.147	0.16	-
0mm Bottom	106	5530	14.12	14.50	0.473	0.516	C.24
0mm Bottom	122	5610	14.03	14.50	0.463	0.516	-
0mm Bottom	138	5690	14.00	14.50	0.470	0.527	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



WLAN - U-NII-2C - 802.11ac - VHT20 - MIMO (Core 0 & Core 1)
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display (Core 0)	136	5680	14.94	15.00	0.254	0.258	-
0mm Rear of Display (Core 1)	136	5680	14.79	15.00	0.194	0.204	
0mm Bottom (Core 0)	100	5500	14.86	15.00	0.647	0.668	-
0mm Bottom (Core 1)	100	5500	14.48	15.00	0.539	0.608	
0mm Bottom (Core 0)	112	5560	14.84	15.00	0.637	0.661	-
0mm Bottom (Core 1)	112	5560	14.6	15.00	0.518	0.568	
0mm Bottom (Core 0)	124	5620	14.88	15.00	0.651	0.669	-
0mm Bottom (Core 1)	124	5620	14.52	15.00	0.485	0.542	
0mm Bottom (Core 0)	136	5680	14.94	15.00	0.693	0.703	C.25
0mm Bottom (Core 1)	136	5680	14.79	15.00	0.521	0.547	
0mm Bottom (Core 0)	144	5720	14.84	15.00	0.663	0.688	-
0mm Bottom (Core 1)	144	5720	14.81	15.00	0.51	0.533	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

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

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	155	5775	14.02	14.50	0.219	0.231	-
0mm Bottom	155	5775	14.02	14.50	0.781	0.823	C.26
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

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

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	155	5775	14.21	14.50	0.173	0.175	-
0mm Bottom	155	5775	14.21	14.50	0.486	0.490	C.27
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



WLAN - U-NII-3 - 802.11ac - VHT80 - MIMO (Core & Core 1)
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display (Core 0)	155	5775	14.11	14.50	0.225	0.232	-
0mm Rear of Display (Core 1)	155	5775	13.99	14.50	0.158	0.168	
0mm Bottom (Core 0)	155	5775	14.11	14.50	0.738	0.762	C.28
0mm Bottom (Core 1)	155	5775	13.99	14.50	0.467	0.496	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - 6 GHz - 802.11ax - HE160 - SISO (Core 0)
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	47	6185	11.16	11.50	0.079	0.085	-
0mm Bottom	15	6025	11.10	11.50	0.318	0.349	C.29
0mm Bottom	47	6185	11.16	11.50	0.286	0.309	-
0mm Bottom	79	6345	11.10	11.50	0.274	0.300	-
0mm Bottom	111	6505	9.81	10.00	0.244	0.255	-
0mm Bottom	143	6665	9.55	10.00	0.278	0.308	-
0mm Bottom	175	6825	9.78	10.00	0.242	0.255	-
0mm Bottom	207	6985	10.49	11.00	0.283	0.318	-
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



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

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display	79	6345	11.43	11.75	0.068	0.073	-
0mm Bottom	15	6025	11.36	11.75	0.307	0.336	-
0mm Bottom	47	6185	11.34	11.75	0.239	0.263	-
0mm Bottom	79	6345	11.43	11.75	0.281	0.302	-
0mm Bottom	111	6505	10.80	11.00	0.345	0.361	-
0mm Bottom	143	6665	10.65	11.00	0.357	0.387	-
0mm Bottom	175	6825	10.51	11.00	0.287	0.321	-
0mm Bottom	207	6985	11.32	12.00	0.356	0.416	C.30
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							



WLAN - 6 GHz - 802.11ax - HE160 - MIMO (Core 0 & Core 1)
Body Specific Absorption Rate (SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear of Display (Core 0)	15	6025	11.30	11.50	0.091	0.095	-
0mm Rear of Display (Core 1)	15	6025	11.03	11.75	0.076	0.09	
0mm Bottom (Core 0)	15	6025	11.30	11.50	0.33	0.346	-
0mm Bottom (Core 1)	15	6025	11.03	11.75	0.266	0.314	
0mm Bottom (Core 0)	47	6185	11.28	11.50	0.285	0.300	-
0mm Bottom (Core 1)	47	6185	11.24	11.75	0.226	0.254	
0mm Bottom (Core 0)	79	6345	11.27	11.50	0.302	0.318	-
0mm Bottom (Core 1)	79	6345	11.26	11.75	0.236	0.264	
0mm Bottom (Core 0)	111	6505	9.37	9.75	0.240	0.262	-
0mm Bottom (Core 1)	111	6505	9.33	9.75	0.251	0.276	
0mm Bottom (Core 0)	143	6665	9.32	10.00	0.298	0.349	C.31
0mm Bottom (Core 1)	143	6665	9.39	11.00	0.258	0.374	
0mm Bottom (Core 0)	175	6825	10.11	10.25	0.291	0.301	-
0mm Bottom (Core 1)	175	6825	10.04	10.25	0.243	0.255	
0mm Bottom (Core 0)	207	6985	10.36	10.75	0.298	0.326	-
0mm Bottom (Core 1)	207	6985	10.38	10.75	0.262	0.285	



WLAN - 6 GHz - 802.11ax - HE160 - SISO (Core 0)
Body Absorbed Power Density (APD) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 4cm ² APD (W/m ²)	Scaled 4cm ² APD (W/m ²)	Scan Figure Number
0mm Rear of Display	47	6185	11.16	11.50	0.557	0.602	-
0mm Bottom	15	6025	11.10	11.50	2.240	2.456	C.29
0mm Bottom	47	6185	11.16	11.50	1.980	2.141	-
0mm Bottom	79	6345	11.10	11.50	1.920	2.105	-
0mm Bottom	111	6505	9.81	10.00	1.680	1.755	-
0mm Bottom	143	6665	9.55	10.00	1.900	2.107	-
0mm Bottom	175	6825	9.78	10.00	1.640	1.725	-
0mm Bottom	207	6985	10.49	11.00	1.920	2.159	-
The APD values above do not have a regulatory limit. They are provided in line with FCC procedures to derive the maximum iPD test position.							

WLAN - 6 GHz - 802.11ax - HE160 - SISO (Core 1)
Body Absorbed Power Density (APD) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 4cm ² APD (W/m ²)	Scaled 4cm ² APD (W/m ²)	Scan Figure Number
0mm Rear of Display	79	6345	11.43	11.75	0.460	0.495	-
0mm Bottom	15	6025	11.36	11.75	2.320	2.538	-
0mm Bottom	47	6185	11.34	11.75	1.760	1.934	-
0mm Bottom	79	6345	11.43	11.75	2.060	2.218	-
0mm Bottom	111	6505	10.80	11.00	2.540	2.66	-
0mm Bottom	143	6665	10.65	11.00	2.600	2.818	-
0mm Bottom	175	6825	10.51	11.00	2.060	2.306	-
0mm Bottom	207	6985	11.32	12.00	2.580	3.017	C.30
The APD values above do not have a regulatory limit. They are provided in line with FCC procedures to derive the maximum iPD test position.							



WLAN - 6 GHz - 802.11ax - HE160 - MIMO (Core 0 & Core 1)
 Body Absorbed Power Density (APD) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured APD 4cm ² (W/m ²)	Scaled APD 4cm ² (W/m ²)	Scan Figure Number
0mm Rear of Display (Core 0)	15	6025	11.30	11.50	0.660	0.691	-
0mm Rear of Display (Core 1)	15	6025	11.03	11.75	0.580	0.685	
0mm Bottom (Core 0)	15	6025	11.30	11.50	2.340	2.450	-
0mm Bottom (Core 1)	15	6025	11.03	11.75	2.000	2.361	
0mm Bottom (Core 0)	47	6185	11.28	11.50	2.000	2.104	-
0mm Bottom (Core 1)	47	6185	11.24	11.75	1.680	1.889	
0mm Bottom (Core 0)	79	6345	11.27	11.50	2.100	2.214	-
0mm Bottom (Core 1)	79	6345	11.26	11.75	1.760	1.970	
0mm Bottom (Core 0)	111	6505	9.37	9.75	1.780	1.943	-
0mm Bottom (Core 1)	111	6505	9.33	9.75	1.760	1.939	
0mm Bottom (Core 0)	143	6665	9.32	10.00	2.060	2.409	C.31
0mm Bottom (Core 1)	143	6665	9.39	11.00	1.920	2.782	
0mm Bottom (Core 0)	175	6825	10.11	10.25	2.040	2.107	-
0mm Bottom (Core 1)	175	6825	10.04	10.25	1.820	1.910	
0mm Bottom (Core 0)	207	6985	10.36	10.75	2.120	2.319	-
0mm Bottom (Core 1)	207	6985	10.38	10.75	1.940	2.113	
The APD values above do not have a regulatory limit. They are provided in line with FCC procedures to derive the maximum iPD test position.							

6 GHz - 802.11ax - HE160 - MCS0 - Core 1 (MIMO)
 Incident Power Density (iPD) 4cm² Results

Test Position	Channel Number	Frequency (MHz)	Measured iPD 4cm ² (W/m ²)	Standalone iPD limit (W/m ²)	Exposure Ratio	Scan Figure Number
0mm Bottom	207	6985	2.17 (FS)	10.00	0.217	C.32



1.3.2 Technical Description

The equipment under test (EUT) was a portable laptop computer.

1.3.3 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.

1.3.4 Test Configuration and Modes of Operation

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

Supported technologies are Bluetooth (EDR), 2.4 GHz Thread, 5 GHz Narrowband ,2.4 GHz WLAN (802.11a/n/ac/g/ax), 5 GHz WLAN (802.11a/n/ac) and 6 GHz WLAN (802.11a/ax).

2x2 MIMO is supported for WLAN.

Where the device supports Low Power (LP) and Standard Power (SP) in a relevant frequency band of operation, the Standard Power option was always selected. This resulted in the highest output power always being selected where a choice is available.

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.

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

For the 5 and 6 GHz 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.

1.3.5 Antenna Location Diagram

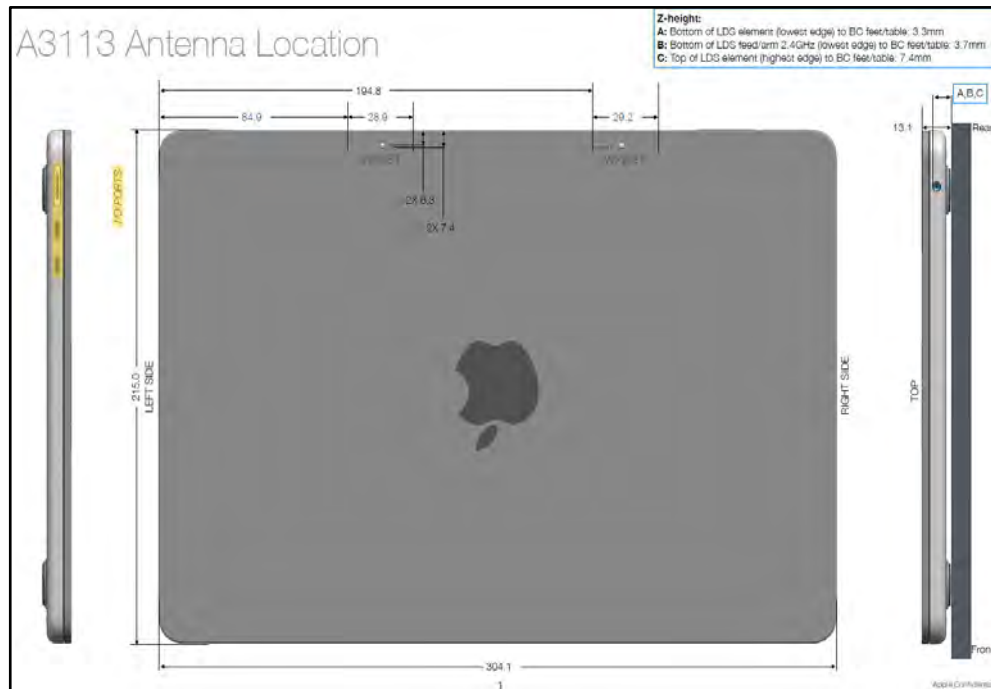


Figure 1

WF1 (Core 1) and WF2 (Core 0) supports :

- 5 or 6 GHz WLAN + 2.4 GHz Bluetooth
- 5 or 6 GHz WLAN + 2.4 GHz Thread
- 5 or 6 GHz Narrowband + 2.4 GHz WLAN

1.3.6 Deviations from Standard

Initially, area scans were completed covering the whole of the bottom surface of the EUT to determine that there were no other RF radiators (unintentional) other than the antennas. The actual SAR measurements were completed using smaller area scans covering the antenna locations only.

2.4 GHz

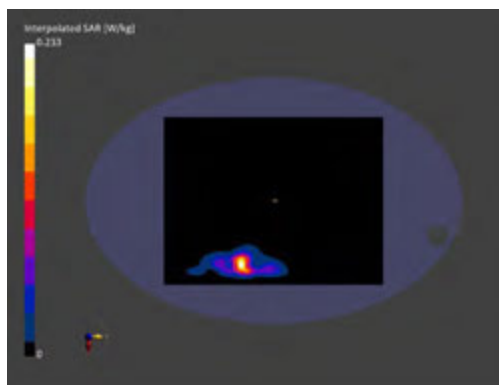


Figure 2 - (Core 0)

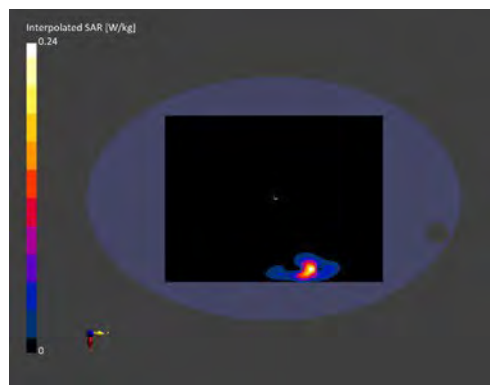


Figure 3 - (Core 1)

5 GHz

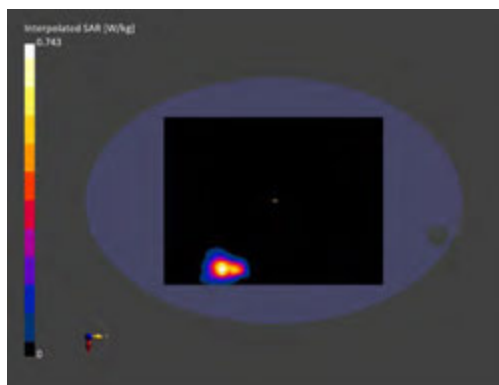


Figure 4 - (Core 0)

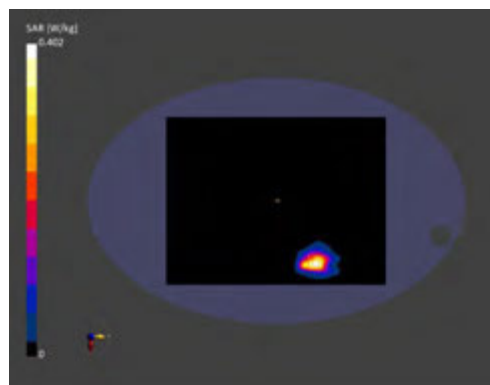


Figure 5 - (Core 1)

6 GHz

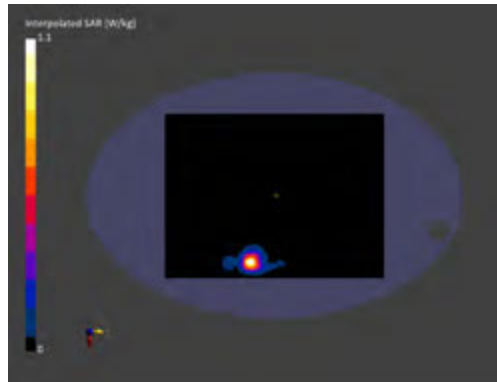


Figure 6 - (Core 0)

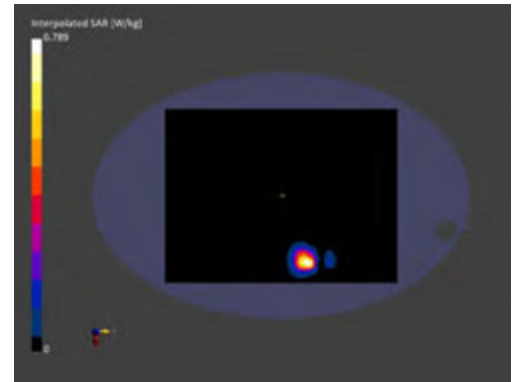


Figure 7 - (Core 1)

1.4 POWER TABLES (TUNE UP VALUES)

Note: All values in dBm
 NS= Not Supported

2.4 GHz Bluetooth 5 GHz OFF

BT Core	PA	Channel	BDR	EDR	LE	HDR4	HDR8
0	iPA	All	13.00	9.50	5.00	6.50	6.50
0	ePA		13.00	16.50	15.50	14.50	13.00
1	iPA		13.00	9.50	5.50	6.50	6.50
1	ePA		13.00	16.50	14.50	14.50	13.00

2.4 GHz Bluetooth 5 GHz OFF - TXBF

BT Core	PA	Channel	BDR TXBF	EDR TXBF	LE TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	13.00	9.50	5.00	6.50	6.50
0	ePA		13.00	13.50	14.00	14.50	13.00
1	iPA		13.00	9.50	5.50	6.50	6.50
1	ePA		13.00	13.50	13.50	14.50	13.00

2.4 GHz Bluetooth 5 GHz ON

BT Core	PA	Channel	BDR	EDR	LE	HDR4	HDR8
0	iPA	All	13.00	9.50	5.00	6.50	6.50
0	ePA		13.00	16.00	15.50	14.50	13.00
1	iPA		13.00	9.50	5.50	6.50	6.50
1	ePA		13.00	16.00	14.50	14.50	13.00

2.4 GHz Bluetooth 5 GHz ON - TXBF

BT Core	PA	Channel	BDR TXBF	EDR TXBF	LE TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	13.00	9.50	5.00	6.50	6.50
0	ePA		13.00	13.50	14.00	14.50	13.00
1	iPA		13.00	9.50	5.50	6.50	6.50
1	ePA		13.00	13.50	13.50	14.50	13.00

Narrowband UNII-1 - When 2.4 GHz WLAN OFF

NB Core	PA	Channel	BDR	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	8.50	3.50	3.50	3.50	3.50	3.50
0	ePA		NS	10.50	12.50	NS	5.50	7.50
1	iPA		10.00	3.50	3.50	3.50	3.50	3.50
1	ePA		NS	12.00	14.00	NS	5.50	7.50

Narrowband UNII-1 - When 2.4 GHz WLAN ON

NB Core	PA	Channel	BDR	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	8.50	3.50	3.50	3.50	3.50	3.50
0	ePA		NS	10.50	11.50	NS	5.50	7.50
1	iPA		10.00	3.50	3.50	3.50	3.50	3.50
1	ePA		NS	11.50	11.50	NS	5.50	7.50

Narrowband UNII-3 - When 2.4 GHz WLAN OFF

NB Core	PA	Channel	BDR	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	10.00	3.50	3.50	10.00	3.50	3.50
0	ePA		NS	14.00	14.00	NS	14.00	14.00
1	iPA		10.00	3.50	3.50	10.00	3.50	3.50
1	ePA		NS	14.00	14.00	NS	14.00	14.00

Narrowband UNII-3 - When 2.4 GHz WLAN ON

NB Core	PA	Channel	BDR	HDR4	HDR8	BDR TXBF	HDR4 TXBF	HDR8 TXBF
0	iPA	All	10.00	3.50	3.50	10.00	3.50	3.50
0	ePA		NS	11.50	11.50	NS	11.50	11.50
1	iPA		10.00	3.50	3.50	10.00	3.50	3.50
1	ePA		NS	11.50	11.5	NS	11.50	11.50

2.4 GHz Thread - When 5 GHz OFF

Core	PA	Channel	Thread (dBm)
0	iPA	All	13.00
0	ePA		20.00
1	iPA		13.00
1	ePA		20.00



2.4 GHz Thread - When 5 GHz ON

Core	PA	Channel	Thread (dBm)
0	iPA	All	13.00
0	ePA		16.00
1	iPA		13.00
1	ePA		16.00

2.4 GHz WLAN SISO Core 0 Or Core 1

Channel	Frequency (MHz)	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	18.00	17.50	16.00	17.50	17.50	14.50
2	2417	20.00	20.00	19.50	20.00	17.50	14.50
3	2422	20.00	20.00	20.00	20.00	17.50	14.50
4	2427	20.00	20.00	20.00	20.00	17.50	14.50
5	2432	20.00	20.00	20.00	20.00	17.50	14.50
6	2437	20.00	20.00	20.00	20.00	17.50	14.50
7	2442	20.00	20.00	20.00	20.00	17.50	14.50
8	2447	20.00	20.00	20.00	20.00	17.50	14.50
9	2452	20.00	20.00	20.00	20.00	17.50	14.50
10	2457	20.00	20.00	20.00	20.00	17.50	14.50
11	2462	17.50	17.50	16.00	17.25	17.00	14.50
12	2467	15.50	15.50	14.00	14.25	15.00	14.00
13	2472	6.00	6.00	4.50	1.00	0.00	-3.00



2.4 GHz WLAN MIMO Core 0 & Core 1

Channel	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)	11n/11ac HT20 (2Tx, TxBF) Low Rate
1	2412	16.00	14.00	17.25	17.50	14.50	NS
2	2417	20.00	18.25	18.75	17.50	14.50	NS
3	2422	20.00	19.75	20.00	17.50	14.50	NS
4	2427	20.00	20.00	20.00	17.50	14.50	NS
5	2432	20.00	20.00	20.00	17.50	14.50	NS
6	2437	20.00	20.00	20.00	17.50	14.50	NS
7	2442	20.00	20.00	20.00	17.50	14.50	NS
8	2447	20.00	20.00	20.00	17.50	14.50	NS
9	2452	20.00	20.00	20.00	17.50	14.50	NS
10	2457	20.00	18.50	20.00	17.50	14.50	NS
11	2462	16.00	14.50	17.25	17.00	14.50	NS
12	2467	13.50	12.00	14.25	15.00	14.00	NS
13	2472	3.50	20.00	-1.00	-2.00	-5.00	NS



5 GHz WLAN - 20 MHz BW - SISO Core 0 or Core 1

Channel	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	16.00	16.00	16.00	13.00	13.25	7.00
40	5200	16.00	16.00	16.00	16.00	13.25	10.25
44	5220	16.00	16.00	16.00	16.00	13.25	10.25
48	5240	16.00	16.00	16.00	16.00	13.25	10.25
52	5260	16.00	16.00	16.00	15.75	12.75	NS
56	5280	16.00	16.00	16.00	15.75	12.75	NS
60	5300	16.00	16.00	16.00	15.75	12.75	NS
64	5320	16.00	16.00	16.00	13.00	10.00	NS
100	5500	14.50	14.50	14.50	14.50	12.75	NS
104	5520	14.50	14.50	14.50	14.50	12.75	NS
108	5540	14.50	14.50	14.50	14.50	12.75	NS
112	5560	14.50	14.50	14.50	14.50	12.75	NS
116	5580	14.50	14.50	14.50	14.50	12.75	NS
120	5600	14.50	14.50	14.50	14.50	12.75	NS
124	5620	14.50	14.50	14.50	14.50	12.75	NS
128	5640	14.50	14.50	14.50	14.50	12.75	NS
132	5660	14.50	14.50	14.50	14.50	12.75	NS
136	5680	14.50	14.50	14.50	14.50	12.75	NS
140	5700	14.50	14.50	14.25	14.50	10.50	NS
144	5720	14.50	14.50	14.50	14.50	12.75	NS
149	5745	14.50	14.50	14.50	14.50	14.50	13.50
153	5765	14.50	14.50	14.50	14.50	14.50	13.50
157	5785	14.50	14.50	14.50	14.50	14.50	13.50
161	5805	14.50	14.50	14.50	14.50	14.50	13.50
165	5825	14.50	14.50	14.50	14.50	14.50	13.50



5 GHz WLAN - 20 MHz Bandwidth - MIMO Core 0 & Core 1 - CDD

Channel	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	13.25	13.25	11.00	8.25	5.25
40	5200	13.25	13.25	11.25	8.25	5.25
44	5220	13.25	13.25	11.25	8.25	5.25
48	5240	13.25	13.25	11.25	8.25	5.25
52	5260	12.50	12.50	10.50	7.50	NS
56	5280	12.50	12.50	10.50	7.50	NS
60	5300	12.50	12.50	10.50	7.50	NS
64	5320	12.50	12.50	10.50	7.50	NS
100	5500	12.00	12.00	10.00	7.00	NS
104	5520	12.00	12.00	10.00	7.00	NS
108	5540	12.00	12.00	10.00	7.00	NS
112	5560	12.00	12.00	10.00	7.00	NS
116	5580	12.00	12.00	10.00	7.00	NS
120	5600	12.00	12.00	10.00	7.00	NS
124	5620	12.00	12.00	10.00	7.00	NS
128	5640	12.00	12.00	10.00	7.00	NS
132	5660	12.00	12.00	10.00	7.00	NS
136	5680	12.00	12.00	10.00	7.00	NS
140	5700	12.00	12.00	10.00	7.00	NS
144	5720	12.00	12.00	10.00	7.00	NS
149	5745	14.50	14.50	14.50	14.50	13.50
153	5765	14.50	14.50	14.50	14.50	13.50
157	5785	14.50	14.50	14.50	14.50	13.50
161	5805	14.50	14.50	14.50	14.50	13.50
165	5825	14.50	14.50	14.50	14.50	13.50



5 GHz WLAN - 20 MHz Bandwidth - MIMO Core 0 & Core 1 - SDM

Channel	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 VHT20 (2Tx, TxBF) Low Rate
36	5180	16.00	16.00	11.00	9.75	8.00	13.25
40	5200	16.00	16.00	14.25	11.25	8.25	13.25
44	5220	16.00	16.00	14.25	11.25	8.25	13.25
48	5240	16.00	16.00	14.25	11.25	8.25	13.25
52	5260	15.50	15.50	13.50	10.50	NS	12.50
56	5280	15.50	15.50	13.50	10.50	NS	12.50
60	5300	15.50	15.50	13.50	10.50	NS	12.50
64	5320	15.50	15.50	12.50	10.50	NS	12.50
100	5500	15.00	15.00	13.00	10.00	NS	12.00
104	5520	15.00	15.00	13.00	10.00	NS	12.00
108	5540	15.00	15.00	13.00	10.00	NS	12.00
112	5560	15.00	15.00	13.00	10.00	NS	12.00
116	5580	15.00	15.00	13.00	10.00	NS	12.00
120	5600	15.00	15.00	13.00	10.00	NS	12.00
124	5620	15.00	15.00	13.00	10.00	NS	12.00
128	5640	15.00	15.00	13.00	10.00	NS	12.00
132	5660	15.00	15.00	13.00	10.00	NS	12.00
136	5680	15.00	15.00	13.00	10.00	NS	12.00
140	5700	15.00	13.75	13.00	8.50	NS	12.00
144	5720	15.00	15.00	13.00	10.00	NS	12.00
149	5745	14.50	14.50	14.50	14.50	13.50	14.50
153	5765	14.50	14.50	14.50	14.50	13.50	14.50
157	5785	14.50	14.50	14.50	14.50	13.50	14.50
161	5805	14.50	14.50	14.50	14.50	13.50	14.50
165	5825	14.50	14.50	14.50	14.50	13.50	14.50



5 GHz WLAN - 40 MHz Bandwidth - SISO Core 0 Or Core 1

Channel	Frequency (MHz)	11n/11ac HT40 (SISO) Low Rate	11ax HE40 (SISO) Low Rate	11ax HE40 RU106 (SISO)	11ax HE40 RU52 (SISO)	11ax HE40 RU26 (SISO)
38	5190	15.75	14.50	16.00	13.25	10.25
46	5230	16.00	16.00	16.00	13.25	10.25
54	5270	16.00	16.00	15.75	12.75	NS
62	5310	15.00	14.50	14.00	11.50	NS
102	5510	14.50	14.50	14.50	12.75	NS
110	5550	14.50	14.50	14.50	12.75	NS
118	5590	14.50	14.50	14.50	12.75	NS
126	5630	14.50	14.50	14.50	12.75	NS
134	5670	14.50	14.50	14.50	12.75	NS
142	5710	14.50	14.50	14.50	12.75	NS
151	5755	14.50	14.50	14.50	13.50	10.50
159	5795	14.50	14.50	14.50	13.50	10.50

5 GHz WLAN - 40 MHz Bandwidth - MIMO Core 0 & Core 1 - CDD

Channel	Frequency (MHz)	11n/11ac HT40 (2Tx, CDD, nonTxBF)	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)
38	5190	15.75	14.00	11.25	8.25	5.25
46	5230	15.75	15.75	11.25	8.25	5.25
54	5270	15.00	15.00	10.50	7.50	NS
62	5310	15.00	13.75	10.50	7.50	NS
102	5510	14.50	14.50	10.00	7.00	NS
110	5550	14.50	14.50	10.00	7.00	NS
118	5590	14.50	14.50	10.00	7.00	NS
126	5630	14.50	14.50	10.00	7.00	NS
134	5670	14.50	14.50	10.00	7.00	NS
142	5710	14.50	14.50	10.00	7.00	NS
151	5755	14.50	14.50	14.50	13.50	10.50
159	5795	14.50	14.50	14.50	13.50	10.50



5 GHz WLAN - 40 MHz Bandwidth - MIMO Core 0 & Core 1 - SDM

Channel	Frequency (MHz)	11n/11ac HT40 (2Tx, SDM, nonTxBF) Low Rate	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)	11n/11ac VHT40 (2Tx, TxBF) Low Rate
38	5190	16.00	14.00	14.25	11.25	8.25	14.50
46	5230	16.00	16.00	14.25	11.25	8.25	15.75
54	5270	16.00	16.00	13.50	10.50	NS	15.00
62	5310	15.25	13.75	12.00	8.00	NS	13.25
102	5510	14.50	14.50	13.00	10.00	NS	14.50
110	5550	14.50	14.50	13.00	10.00	NS	14.50
118	5590	14.50	14.50	13.00	10.00	NS	14.50
126	5630	14.50	14.50	13.00	10.00	NS	14.50
134	5670	14.50	14.50	13.00	10.00	NS	14.50
142	5710	14.50	14.50	13.00	10.00	NS	14.50
151	5755	14.50	14.50	14.50	13.50	10.50	14.50
159	5795	14.50	14.50	14.50	13.50	10.50	14.50

5 GHz WLAN - 80 MHz - SISO Core 0 & Core 1

Channel	Frequency (MHz)	11ac VHT80 (SISO) Low Rate	11ax HE80 (SISO) Low Rate	11ax HE80 RU106 (SISO)	11ax HE80 RU52 (SISO)	11ax HE80 RU26 (SISO)
42	5210	13.50	13.75	13.00	10.50	7.50
58	5290	13.25	13.50	11.00	7.00	NS
106	5530	14.50	14.50	12.00	10.50	NS
122	5610	14.50	14.50	13.50	10.50	NS
138	5690	14.50	14.50	13.50	10.50	NS
155	5775	14.50	14.50	13.50	10.50	7.50

5 GHz WLAN - 80 MHz - MIMO Core 0 & Core 1 - CDD

Channel	Frequency (MHz)	11ac VHT80 (2Tx, CDD, nonTxBF) Low Rate	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)
42	5210	13.50	12.50	11.00	8.25	5.25
58	5290	12.50	11.75	8.50	5.50	NS
106	5530	13.50	13.50	9.00	7.00	NS
122	5610	14.50	14.50	10.00	7.00	NS
138	5690	14.50	14.50	10.00	7.00	NS
155	5775	14.50	14.50	13.50	10.50	7.50



5 GHz WLAN - 80 MHz - MIMO Core 0 & Core 1 - SDM

Channel	Frequency (MHz)	11ac VHT80 (2Tx, SDM, nonTxBF) Low Rate	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)	11ac VHT80 (2Tx, TxBF) Low Rate
42	5210	13.50	12.50	11.00	9.00	7.00	12.00
58	5290	12.75	11.75	8.50	5.50	NS	11.25
106	5530	14.50	14.50	9.00	7.00	NS	13.00
122	5610	14.50	14.50	13.00	10.00	NS	14.50
138	5690	14.50	14.50	13.00	10.00	NS	14.50
155	5775	14.50	14.50	13.50	10.50	7.50	14.50

5 GHz WLAN - 160 MHz - SISO Core 0 Or Core 1

Channel	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	12.25	12.50	10.50	7.50	NS
114	5570	13.00	13.50	10.50	7.50	NS

5 GHz WLAN - 160 MHz - MIMO Core 0 & Core 1 - CDD

Channel	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	12.25	12.50	10.50	7.50	NS
114	5570	11.50	12.50	10.00	7.00	NS

5 GHz WLAN - 160 MHz - MIMO Core 0 & Core 1 - SDM

Channel	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	11.50	12.50	10.50	7.50	NS
114	5570	11.50	11.50	10.50	7.50	NS



6 GHz WLAN - 20 MHz - SISO Core 0 Or Core 1 - LP

Channel	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	3.25	3.25	0.25	-2.75	-5.75
5	5975	3.25	3.25	0.25	-2.75	-5.75
9-29	5995-6095	3.25	3.25	0.25	-2.75	-5.75
33-61	6115-6255	4.50	4.50	1.50	-1.50	-4.50
65-85	6275-6375	4.25	4.25	1.25	-1.75	-4.75
89	6395	4.25	4.25	1.25	-1.75	-4.75
93	6415	4.25	4.25	1.25	-1.75	-4.75
97-113	6435-6515	4.25	4.25	1.25	-1.75	-4.75
117-181	6535-6855	4.25	4.25	1.25	-1.75	-4.75
185	6875	4.25	4.25	1.25	-1.75	-4.75
189-225	6895-7075	5.25	5.25	2.25	-0.75	-3.75
229	7095	5.25	5.25	2.25	-0.75	-3.75
233	7115	2.75	NS	NS	NS	NS

6 GHz WLAN - 20 MHz - MIMO Core 0 & Core 1 - CDD - LP

Channel	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	-2.00	-5.00	-8.00	NS
5	5975	-2.00	-5.00	-8.00	NS
9-29	5995-6095	-2.00	-5.00	-8.00	NS
33-61	6115-6255	-1.00	-4.00	-7.00	NS
65-85	6275-6375	-1.50	-4.50	-7.50	NS
89	6395	-1.50	-4.50	-7.50	NS
93	6415	-1.50	-4.50	-7.50	NS
97-113	6435-6515	-1.75	-4.75	-7.75	NS
117-181	6535-6855	-1.25	-4.25	-7.25	NS
185	6875	-1.25	-4.25	-7.25	NS
189-225	6895-7075	-0.75	-3.75	-6.75	NS
229	7095	-0.75	-3.75	-6.75	NS
233	7115	-6.00	NS	NS	NS



6 GHz WLAN - 20 MHz - MIMO Core 0 & Core 1 - SDM - LP

Channel	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	1.00	-2.00	-5.00	-8.00	NS
5	5975	1.00	-2.00	-5.00	-8.00	NS
9-29	5995-6095	1.00	-2.00	-5.00	-8.00	NS
33-61	6115-6255	2.00	-1.00	-4.00	-7.00	NS
65-85	6275-6375	1.50	-1.50	-4.50	-7.50	NS
89	6395	1.50	-1.50	-4.50	-7.50	NS
93	6415	1.50	-1.50	-4.50	-7.50	NS
97-113	6435-6515	1.25	-1.75	-4.75	-7.75	NS
117-181	6535-6855	1.75	-1.25	-4.25	-7.25	NS
185	6875	1.75	-1.25	-4.25	-7.25	NS
189-225	6895-7075	2.25	-0.75	-3.75	-6.75	NS
229	7095	2.25	-0.75	-3.75	-6.75	NS
233	7115	NS	NS	NS	NS	NS

6 GHz WLAN - 40 MHz - SISO Core 0 & Core 1 - LP

Channel	Frequency (MHz)	11ax HE40 (SISO) Low Rate	11ax HE40 RU106 (SISO)	11ax HE40 RU52 (SISO)	11ax HE40 RU26 (SISO)
3	5965	5.75	0.25	-2.75	-5.75
11	6005	5.75	0.25	-2.75	-5.75
19-27	6045-6085	5.75	0.25	-2.75	-5.75
35-59	6125-6245	7.00	1.50	-1.50	-4.50
67-75	6285-6325	6.75	1.25	-1.75	-4.75
83	6365	6.75	1.25	-1.75	-4.75
91	6405	6.75	1.25	-1.75	-4.75
99-107	6445-6485	6.75	1.25	-1.75	-4.75
115	6525	6.75	1.25	-1.75	-4.75
123-179	6565-6845	6.75	1.25	-1.75	-4.75
187	6885	6.75	1.25	-1.75	-4.75
195-219	6925-7045	7.75	2.25	-0.75	-3.75
227	7085	7.75	2.25	-0.75	-3.75



6 GHz WLAN - 40 MHz - MIMO Core 0 & Core 1 - CDD - LP

Channel	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	0.50	-5.00	-8.00	NS
11	6005	0.50	-5.00	-8.00	NS
19-27	6045-6085	0.50	-5.00	-8.00	NS
35-59	6125-6245	1.50	-4.00	-7.00	NS
67-75	6285-6325	1.00	-4.50	-7.50	NS
83	6365	1.00	-4.50	-7.50	NS
91	6405	1.00	-4.50	-7.50	NS
99-107	6445-6485	0.75	-4.75	-7.75	NS
115	6525	0.75	-4.75	-7.75	NS
123-179	6565-6845	1.25	-4.25	-7.25	NS
187	6885	1.25	-4.25	-7.25	NS
195-219	6925-7045	1.75	-3.75	-6.75	NS
227	7085	1.75	-3.75	-6.75	NS

6 GHz WLAN - 40 MHz - MIMO Core 0 & Core 1 - CDM - LP

Channel	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	3.50	-2.00	-5.00	-8.00	NS
11	6005	3.50	-2.00	-5.00	-8.00	NS
19-27	6045-6085	3.50	-2.00	-5.00	-8.00	NS
35-59	6125-6245	4.50	-1.00	-4.00	-7.00	1.50
67-75	6285-6325	4.00	-1.50	-4.50	-7.50	NS
83	6365	4.00	-1.50	-4.50	-7.50	NS
91	6405	4.00	-1.50	-4.50	-7.50	NS
99-107	6445-6485	3.75	-1.75	-4.75	-7.75	NS
115	6525	3.75	-1.75	-4.75	-7.75	NS
123-179	6565-6845	4.25	-1.25	-4.25	-7.25	NS
187	6885	4.25	-1.25	-4.25	-7.25	NS
195-219	6925-7045	4.75	-0.75	-3.75	-6.75	1.75
227	7085	4.75	-0.75	-3.75	-6.75	1.75

6 GHz WLAN - 80 MHz - SISO Core 0 & Core 1 - LP

Channel	Frequency (MHz)	11ax HE80 (SISO) Low Rate	11ax HE80 RU106 (SISO)	11ax HE80 RU52 (SISO)	11ax HE80 RU26 (SISO)
7	5985	8.75	0.25	-2.75	-5.75
23	6065	8.75	0.25	-2.75	-5.75
39-55	6145-6225	10.00	1.50	-1.50	-4.50
71	6305	9.75	1.25	-1.75	-4.75
87	6385	9.75	1.25	-1.75	-4.75
103	6465	9.75	1.25	-1.75	-4.75
119	6545	9.75	1.25	-1.75	-4.75
135-167	6625-6785	9.75	1.25	-1.75	-4.75
183	6865	9.75	1.25	-1.75	-4.75
199	6945	10.75	2.25	-0.75	-3.75
215	7025	10.75	2.25	-0.75	-3.75

6 GHz WLAN - 80 MHz - MIMO Core 0 & Core 1 - CDD - LP

Channel	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	3.50	-5.00	-8.00	NS
23	6065	3.50	-5.00	-8.00	NS
39-55	6145-6225	4.50	-4.00	-7.00	NS
71	6305	4.00	-4.50	-7.50	NS
87	6385	4.00	-4.50	-7.50	NS
103	6465	3.75	-4.75	-7.75	NS
119	6545	3.75	-4.75	-7.75	NS
135-167	6625-6785	4.25	-4.25	-7.25	NS
183	6865	4.25	-4.25	-7.25	NS
199	6945	4.75	-3.75	-6.75	NS
215	7025	4.75	-3.75	-6.75	NS



6 GHz WLAN - 80 MHz - MIMO Core 0 & Core 1 - SDM - LP

Channel	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	6.50	-2.00	-5.00	-8.00	3.50
23	6065	6.50	-2.00	-5.00	-8.00	3.50
39-55	6145-6225	7.50	-1.00	-4.00	-7.00	4.50
71	6305	7.00	-1.50	-4.50	-7.50	4.00
87	6385	7.00	-1.50	-4.50	-7.50	4.00
103	6465	6.75	-1.75	-4.75	-7.75	3.75
119	6545	6.75	-1.75	-4.75	-7.75	3.75
135-167	6625-6785	7.25	-1.25	-4.25	-7.25	4.25
183	6865	7.25	-1.25	-4.25	-7.25	4.25
199	6945	7.75	-0.75	-3.75	-6.75	4.75
215	7025	7.75	-0.75	-3.75	-6.75	4.75

6 GHz WLAN - 160 MHz - SISO Core 0 - LP

Channel	Frequency (MHz)	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
15	6025	11.50	0.25	-2.75	-5.75
47	6185	11.50	1.50	-1.50	-4.50
79	6345	11.50	1.25	-1.75	-4.75
111	6505	10.00	1.25	-1.75	-4.75
143	6665	10.00	1.25	-1.75	-4.75
175	6825	10.00	1.25	-1.75	-4.75
207	6985	11.00	2.25	-0.75	-3.75

6 GHz WLAN - 160 MHz - SISO Core 1 - LP

Channel	Frequency (MHz)	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
15	6025	11.75	0.25	-2.75	-5.75
47	6185	11.75	1.50	-1.50	-4.50
79	6345	11.75	1.25	-1.75	-4.75
111	6505	11.00	1.25	-1.75	-4.75
143	6665	11.00	1.25	-1.75	-4.75
175	6825	11.00	1.25	-1.75	-4.75
207	6985	12.00	2.25	-0.75	-3.75



6 GHz WLAN - 160 MHz - MIMO Core 0 & Core 1 CDD - LP

Channel	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	6.50	-5.00	-8.00	NS
47	6185	7.50	-4.00	-7.00	NS
79	6345	7.00	-4.50	-7.50	NS
111	6505	6.75	-4.75	-7.75	NS
143	6665	7.25	-4.25	-7.25	NS
175	6825	7.25	-4.25	-7.25	NS
207	6985	7.75	-3.75	-6.75	NS

6 GHz WLAN - 160 MHz - MIMO Core 0 & Core 1 - SDM - LP

Channel	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	9.50	-2.00	-5.00	-8.00
47	6185	10.50	-1.00	-4.00	-7.00
79	6345	10.00	-1.50	-4.50	-7.50
111	6505	9.75	-1.75	-4.75	-7.75
143	6665	10.25	-1.25	-4.25	-7.25
175	6825	10.25	-1.25	-4.25	-7.25
207	6985	10.75	-0.75	-3.75	-6.75



6 GHz WLAN - 20 MHz - SISO Core 0 - SP

Channel	Frequency (MHz)	a (SISO)	11ax HE20 (SISO)	11ax HE20 RU106 (SISO)	11ax HE20 RU52 (SISO)	11ax HE20 RU26 (SISO)
2	5935	NS	NS	NS	NS	NS
1	5955	11.50	11.50	11.50	11.50	11.50
5	5975	11.50	11.50	11.50	11.50	11.50
9-29	5995-6095	11.50	11.50	11.50	11.50	11.50
33-61	6115-6255	11.50	11.50	11.50	11.50	11.50
65-85	6275-6375	11.50	11.50	11.50	11.50	11.50
89	6395	11.50	11.50	11.50	11.50	11.50
93	6415	11.50	11.50	11.50	11.50	11.50
97-113	6435-6515	NS	NS	NS	NS	NS
117-181	6535-6855	10.00	10.00	10.00	10.00	10.00
185	6875	NS	NS	NS	NS	NS
189-225	6895-7075	NS	NS	NS	NS	NS
229	7095	NS	NS	NS	NS	NS
233	7115	NS	NS	NS	NS	NS

6 GHz WLAN - 20 MHz - SISO Core 1 - SP

Channel	Frequency (MHz)	a (SISO)	11ax HE20 (SISO)	11ax HE20 RU106 (SISO)	11ax HE20 RU52 (SISO)	11ax HE20 RU26 (SISO)
2	5935	NS	NS	NS	NS	NS
1	5955	11.75	11.75	11.75	11.75	11.75
5	5975	11.75	11.75	11.75	11.75	11.75
9-29	5995-6095	11.75	11.75	11.75	11.75	11.75
33-61	6115-6255	11.75	11.75	11.75	11.75	11.75
65-85	6275-6375	11.75	11.75	11.75	11.75	11.75
89	6395	11.75	11.75	11.75	11.75	11.75
93	6415	11.75	11.75	11.75	11.75	11.75
97-113	6435-6515	NS	NS	NS	NS	NS
117-181	6535-6855	11.00	11.00	11.00	11.00	11.00
185	6875	NS	NS	NS	NS	NS
189-225	6895-7075	NS	NS	NS	NS	NS
229	7095	NS	NS	NS	NS	NS
233	7115	NS	NS	NS	NS	NS



6 GHz WLAN - 20 MHz - MIMO Core 0 - CDD - SP

Channel	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	11.50	11.50	9.50	6.50
5	5975	11.50	11.50	9.50	6.50
9-29	5995-6095	11.50	11.50	9.50	6.50
33-61	6115-6255	11.50	11.50	10.50	7.50
65-85	6275-6375	11.50	11.50	10.00	7.00
89	6395	11.50	11.50	10.00	7.00
93	6415	11.50	11.50	10.00	7.00
97-113	6435-6515	NS	NS	NS	NS
117-181	6535-6855	10.00	10.00	10.00	7.25
185	6875	NS	NS	NS	NS
189-225	6895-7075	NS	NS	NS	NS
229	7095	NS	NS	NS	NS
233	7115	NS	NS	NS	NS

6 GHz WLAN - 20 MHz - MIMO Core 1 - CDD - SP

Channel	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	11.75	11.75	9.50	6.50
5	5975	11.75	11.75	9.50	6.50
9-29	5995-6095	11.75	11.75	9.50	6.50
33-61	6115-6255	11.75	11.75	10.50	7.50
65-85	6275-6375	11.75	11.75	10.00	7.00
89	6395	11.75	11.75	10.00	7.00
93	6415	11.75	11.75	10.00	7.00
97-113	6435-6515	NS	NS	NS	NS
117-181	6535-6855	11.00	11.00	10.25	7.25
185	6875	NS	NS	NS	NS
189-225	6895-7075	NS	NS	NS	NS
229	7095	NS	NS	NS	NS
233	7115	NS	NS	NS	NS



6 GHz WLAN - 20 MHz - MIMO Core 0 - SDM - SP

Channel	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	11.50	11.50	11.50	9.50	11.50
5	5975	11.50	11.50	11.50	9.50	11.50
9-29	5995-6095	11.50	11.50	11.50	9.50	11.50
33-61	6115-6255	11.50	11.50	11.50	10.50	11.50
65-85	6275-6375	11.50	11.50	11.50	10.00	11.50
89	6395	11.50	11.50	11.50	10.00	11.50
93	6415	11.50	11.50	11.50	10.00	11.50
97-113	6435-6515	NS	NS	NS	NS	NS
117-181	6535-6855	10.00	10.00	10.00	10.00	10.00
185	6875	NS	NS	NS	NS	NS
189-225	6895-7075	NS	NS	NS	NS	NS
229	7095	NS	NS	NS	NS	NS
233	7115	NS	NS	NS	NS	NS

6 GHz WLAN - 20 MHz - MIMO Core 1 - SDM - SP

Channel	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	11.75	11.75	11.75	9.50	11.75
5	5975	11.75	11.75	11.75	9.50	11.75
9-29	5995-6095	11.75	11.75	11.75	9.50	11.75
33-61	6115-6255	11.75	11.75	11.75	10.50	11.75
65-85	6275-6375	11.75	11.75	11.75	10.00	11.75
89	6395	11.75	11.75	11.75	10.00	11.75
93	6415	11.75	11.75	11.75	10.00	11.75
97-113	6435-6515	NS	NS	NS	NS	NS
117-181	6535-6855	11.00	11.00	11.00	10.25	11.00
185	6875	NS	NS	NS	NS	NS
189-225	6895-7075	NS	NS	NS	NS	NS
229	7095	NS	NS	NS	NS	NS
233	7115	NS	NS	NS	NS	NS



6 GHz WLAN - 40 MHz - SISO Core 0 - SP

Channel	Frequency (MHz)	11ax HE40 (SISO) Low Rate	11ax HE40 RU106 (SISO)	11ax HE40 RU52 (SISO)	11ax HE40 RU26 (SISO)
3	5965	11.50	11.50	11.50	10.50
11	6005	11.50	11.50	11.50	10.50
19-27	6045-6085	11.50	11.50	11.50	10.50
35-59	6125-6245	11.50	11.50	11.50	10.50
67-75	6285-6325	11.50	11.50	11.50	10.50
83	6365	11.50	11.50	11.50	10.50
91	6405	11.50	11.50	11.50	10.50
99-107	6445-6485	NS	NS	NS	NS
115	6525	NS	NS	NS	NS
123-179	6565-6845	10.00	10.00	10.00	10.00
187	6885	NS	NS	NS	NS
195-219	6925-7045	NS	NS	NS	NS
227	7085	NS	NS	NS	NS

6 GHz WLAN - 40 MHz - SISO Core 1 - SP

Channel	Frequency (MHz)	11ax HE40 (SISO) Low Rate	11ax HE40 RU106 (SISO)	11ax HE40 RU52 (SISO)	11ax HE40 RU26 (SISO)
3	5965	11.75	11.75	11.75	10.50
11	6005	11.75	11.75	11.75	10.50
19-27	6045-6085	11.75	11.75	11.75	10.50
35-59	6125-6245	11.75	11.75	11.75	10.50
67-75	6285-6325	11.75	11.75	11.75	10.50
83	6365	11.75	11.75	11.75	10.50
91	6405	11.75	11.75	11.75	10.50
99-107	6445-6485	NS	NS	NS	NS
115	6525	NS	NS	NS	NS
123-179	6565-6845	11.00	11.00	11.00	10.50
187	6885	NS	NS	NS	NS
195-219	6925-7045	NS	NS	NS	NS
227	7085	NS	NS	NS	NS



6 GHz WLAN - 40MHz - MIMO Core 0 - CDD - SP

Channel	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	11.50	11.50	9.50	6.50
11	6005	11.50	11.50	9.50	6.50
19-27	6045-6085	11.50	11.50	9.50	6.50
35-59	6125-6245	11.50	11.50	10.50	7.50
67-75	6285-6325	11.50	11.50	10.00	7.00
83	6365	11.50	11.50	10.00	7.00
91	6405	11.50	11.50	10.00	7.00
99-107	6445-6485	NS	NS	NS	NS
115	6525	NS	NS	NS	NS
123-179	6565-6845	10.00	10.00	10.00	7.25
187	6885	NS	NS	NS	NS
195-219	6925-7045	NS	NS	NS	NS
227	7085	NS	NS	NS	NS

6 GHz WLAN - 40 MHz - MIMO Core 1 - CDD - SP

Channel	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	11.75	11.75	9.50	6.50
11	6005	11.75	11.75	9.50	6.50
19-27	6045-6085	11.75	11.75	9.50	6.50
35-59	6125-6245	11.75	11.75	10.50	7.50
67-75	6285-6325	11.75	11.75	10.00	7.00
83	6365	11.75	11.75	10.00	7.00
91	6405	11.75	11.75	10.00	7.00
99-107	6445-6485	NS	NS	NS	NS
115	6525	NS	NS	NS	NS
123-179	6565-6845	11.00	11.00	10.25	7.25
187	6885	NS	NS	NS	NS
195-219	6925-7045	NS	NS	NS	NS
227	7085	NS	NS	NS	NS



6 GHz WLAN - 40 MHz - MIMO Core 0 - SDM - SP

Channel	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	11.50	11.50	11.50	9.50	11.50
11	6005	11.50	11.50	11.50	9.50	11.50
19-27	6045-6085	11.50	11.50	11.50	9.50	11.50
35-59	6125-6245	11.50	11.50	11.50	10.50	11.50
67-75	6285-6325	11.50	11.50	11.50	10.00	11.50
83	6365	11.50	11.50	11.50	10.00	11.50
91	6405	11.50	11.50	11.50	10.00	11.50
99-107	6445-6485	NS	NS	NS	NS	NS
115	6525	NS	NS	NS	NS	NS
123-179	6565-6845	10.00	10.00	10.00	10.00	10.00
187	6885	NS	NS	NS	NS	NS
195-219	6925-7045	NS	NS	NS	NS	NS
227	7085	NS	NS	NS	NS	NS

6 GHz WLAN - 40 MHz - MIMO Core 1 - SDM - SP

Channel	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	11.75	11.75	11.75	9.50	11.75
11	6005	11.75	11.75	11.75	9.50	11.75
19-27	6045-6085	11.75	11.75	11.75	9.50	11.75
35-59	6125-6245	11.75	11.75	11.75	10.50	11.75
67-75	6285-6325	11.75	11.75	11.75	10.00	11.75
83	6365	11.75	11.75	11.75	10.00	11.75
91	6405	11.75	11.75	11.75	10.00	11.75
99-107	6445-6485	NS	NS	NS	NS	NS
115	6525	NS	NS	NS	NS	NS
123-179	6565-6845	11.00	11.00	11.00	10.25	11.00
187	6885	NS	NS	NS	NS	NS
195-219	6925-7045	NS	NS	NS	NS	NS
227	7085	NS	NS	NS	NS	NS

6 GHz WLAN - 80 MHz - SISO Core 0 - SP

Channel	Frequency (MHz)	11ax HE80 (SISO) Low Rate	11ax HE80 RU106 (SISO)	11ax HE80 RU52 (SISO)	11ax HE80 RU26 (SISO)
7	5985	11.50	11.50	10.50	7.50
23	6065	11.50	11.50	10.50	7.50
39-55	6145-6225	11.50	11.50	10.50	7.50
71	6305	11.50	11.50	10.50	7.50
87	6385	11.50	11.50	10.50	7.50
103	6465	NS	NS	NS	NS
119	6545	NS	NS	NS	NS
135-167	6625-6785	10.00	10.00	10.00	7.50
183	6865	NS	NS	NS	NS
199	6945	NS	NS	NS	NS
215	7025	NS	NS	NS	NS

6 GHz WLAN - 80 MHz - SISO Core 1 - SP

Channel	Frequency (MHz)	11ax HE80 (SISO) Low Rate	11ax HE80 RU106 (SISO)	11ax HE80 RU52 (SISO)	11ax HE80 RU26 (SISO)
7	5985	11.75	11.75	10.50	7.50
23	6065	11.75	11.75	10.50	7.50
39-55	6145-6225	11.75	11.75	10.50	7.50
71	6305	11.75	11.75	10.50	7.50
87	6385	11.75	11.75	10.50	7.50
103	6465	NS	NS	NS	NS
119	6545	NS	NS	NS	NS
135-167	6625-6785	11.00	11.00	10.50	7.50
183	6865	NS	NS	NS	NS
199	6945	NS	NS	NS	NS
215	7025	NS	NS	NS	NS



6 GHz WLAN - 80 MHz - MIMO Core 0 - CDD - SP

Channel	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	11.50	11.50	9.50	6.50
23	6065	11.50	11.50	9.50	6.50
39-55	6145-6225	11.50	11.50	10.50	7.50
71	6305	11.50	11.50	10.00	7.00
87	6385	11.50	11.50	10.00	7.00
103	6465	NS	NS	NS	NS
119	6545	NS	NS	NS	NS
135-167	6625-6785	10.00	10.00	10.00	7.25
183	6865	NS	NS	NS	NS
199	6945	NS	NS	NS	NS
215	7025	NS	NS	NS	NS

6 GHz WLAN - 80 MHz - MIMO Core 1 - CDD - SP

Channel	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	11.75	11.75	9.50	6.50
23	6065	11.75	11.75	9.50	6.50
39-55	6145-6225	11.75	11.75	10.50	7.50
71	6305	11.75	11.75	10.00	7.00
87	6385	11.75	11.75	10.00	7.00
103	6465	NS	NS	NS	NS
119	6545	NS	NS	NS	NS
135-167	6625-6785	11.00	11.00	10.25	7.25
183	6865	NS	NS	NS	NS
199	6945	NS	NS	NS	NS
215	7025	NS	NS	NS	NS



6 GHz WLAN - 80 MHz - MIMO Core 0 - SDM - SP

Channel	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	11.50	11.50	10.50	7.50	11.50
23	6065	11.50	11.50	10.50	7.50	11.50
39-55	6145-6225	11.50	11.50	10.50	7.50	11.50
71	6305	11.50	11.50	10.50	7.50	11.50
87	6385	11.50	11.50	10.50	7.50	11.50
103	6465	NS	NS	NS	NS	NS
119	6545	NS	NS	NS	NS	NS
135-167	6625-6785	10.00	10.00	10.00	7.50	10.00
183	6865	NS	NS	NS	NS	NS
199	6945	NS	NS	NS	NS	NS
215	7025	NS	NS	NS	NS	NS

6 GHz WLAN - 80 MHz - MIMO Core 1 - SDM - SP

Channel	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	11.75	11.75	10.50	7.50	11.75
23	6065	11.75	11.75	10.50	7.50	11.75
39-55	6145-6225	11.75	11.75	10.50	7.50	11.75
71	6305	11.75	11.75	10.50	7.50	11.75
87	6385	11.75	11.75	10.50	7.50	11.75
103	6465	NS	NS	NS	NS	NS
119	6545	NS	NS	NS	NS	NS
135-167	6625-6785	11.00	11.00	10.50	7.50	11.00
183	6865	NS	NS	NS	NS	NS
199	6945	NS	NS	NS	NS	NS
215	7025	NS	NS	NS	NS	NS



6 GHz WLAN - 160 MHz - SISO Core 0 - SP

Channel	Frequency (MHz)	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
15	6025	11.50	10.50	7.50	4.50
47	6185	11.50	10.50	7.50	4.50
79	6345	11.50	10.50	7.50	4.50
111	6505	NS	NS	NS	NS
143	6665	10.00	10.00	7.50	4.50
175	6825	NS	NS	NS	NS
207	6985	NS	NS	NS	NS

6 GHz WLAN - 160 MHz - SISO Core 1 - SP

Channel	Frequency (MHz)	11ax HE160 (SISO) Low Rate	11ax HE160 RU106 (SISO)	11ax HE160 RU52 (SISO)	11ax HE160 RU26 (SISO)
15	6025	11.75	10.50	7.50	4.50
47	6185	11.75	10.50	7.50	4.50
79	6345	11.75	10.50	7.50	4.50
111	6505	NS	NS	NS	NS
143	6665	11.00	10.50	7.50	4.50
175	6825	NS	NS	NS	NS
207	6985	NS	NS	NS	NS

6 GHz WLAN - 160 MHz - MIMO Core 0 - CDD - SP

Channel	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	11.50	10.50	7.50	4.50
47	6185	11.50	10.50	7.50	4.50
79	6345	11.50	10.50	7.50	4.50
111	6505	NS	NS	NS	NS
143	6665	19.00	10.00	7.50	4.50
175	6825	NS	NS	NS	NS
207	6985	NS	NS	NS	NS



6 GHz WLAN - 160 MHz - MIMO Core 1 - CDD - SP

Channel	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	11.75	10.50	7.50	4.50
47	6185	11.75	10.50	7.50	4.50
79	6345	11.75	10.50	7.50	4.50
111	6505	NS	NS	NS	NS
143	6665	11.00	10.50	7.50	4.50
175	6825	NS	NS	NS	NS
207	6985	NS	NS	NS	NS

6 GHz WLAN - 160 MHz - MIMO Core 0 - SDM - SP

Channel	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	11.50	10.50	7.50	4.50
47	6185	11.50	10.50	7.50	4.50
79	6345	11.50	10.50	7.50	4.50
111	6505	NS	NS	NS	NS
143	6665	10.00	10.00	7.50	4.50
175	6825	NS	NS	NS	NS
207	6985	NS	NS	NS	NS

6 GHz WLAN - 160 MHz - MIMO Core 1 - SDM - SP

Channel	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	11.75	10.50	7.50	4.50
47	6185	11.75	10.50	7.50	4.50
79	6345	11.75	10.50	7.50	4.50
111	6505	NS	NS	NS	NS
143	6665	11.00	10.50	7.50	4.50
175	6825	NS	NS	NS	NS
207	6985	NS	NS	NS	NS

1.5 CONDUCTED POWER MEASUREMENTS.

1.5.1 Method

Conducted power measurements were made using a power meter .

1.5.2 Measured Results

Bluetooth (When 5 GHz WLAN OFF)

(BT Core 0 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
EDR	0	GFSK	77	3-DH5	2402	15.55	16.50
EDR	39	GFSK	77	3-DH5	2441	15.80	16.50
EDR	78	GFSK	77	3-DH5	2480	15.40	16.50

(BT Core 1 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
EDR	0	GFSK	77	3-DH5	2402	15.35	16.50
EDR	39	GFSK	77	3-DH5	2441	15.82	16.50
EDR	78	GFSK	77	3-DH5	2480	15.58	16.50

Bluetooth (When 5 GHz WLAN ON)

(BT Core 0 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
EDR	0	GFSK	77	3-DH5	2402	15.55	16.00
EDR	39	GFSK	77	3-DH5	2441	15.80	16.00
EDR	78	GFSK	77	3-DH5	2480	15.40	16.00

(BT Core 1 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
EDR	0	GFSK	77	3-DH5	2402	15.35	16.00
EDR	39	GFSK	77	3-DH5	2441	15.82	16.00
EDR	78	GFSK	77	3-DH5	2480	15.58	16.00

Narrowband UNII-1 - When 2.4 GHz WLAN OFF

(UNII-1 - Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR8	Bottom	8-DPSK	78	8DH5	5150	11.02	12.5
HDR8	Middle	8-DPSK	78	8DH5	5200	11.35	12.5
HDR8	Top	8-DPSK	78	8DH5	5250	11.30	12.5

(UNII-1 - Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR8	Bottom	8-DPSK	78	8DH5	5150	13.68	14.00
HDR8	Middle	8-DPSK	78	8DH5	5200	13.85	14.00
HDR8	Top	8-DPSK	78	8DH5	5250	13.40	14.00

Narrowband UNII-1 - When 2.4 GHz WLAN ON

(UNII-1 - Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR8	Bottom	8-DPSK	78	4DH5	5150	11.02	11.50
HDR8	Middle	8-DPSK	78	4DH5	5200	11.35	11.50
HDR8	Top	8-DPSK	78	4DH5	5250	11.30	11.50

(UNII-1 - Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR8	Bottom	8-DPSK	78	4DH5	5150	11.15	11.50
HDR8	Middle	8-DPSK	78	4DH5	5200	11.35	11.50
HDR8	Top	8-DPSK	78	4DH5	5250	10.78	11.50

Narrowband U-NII-3 - When 2.4 GHz WLAN OFF

(UNII-3 - Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR4	Bottom	8-DPSK	78	4DH5	5725	13.42	14.00
HDR4	Middle	8-DPSK	78	4DH5	5788	13.58	14.00
HDR4	Top	8-DPSK	78	4DH5	5850	13.60	14.00

(UNII-3 - Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR4	Bottom	8-DPSK	78	4DH5	5725	13.52	14.00
HDR4	Middle	8-DPSK	78	4DH5	5788	13.47	14.00
HDR4	Top	8-DPSK	78	4DH5	5850	13.88	14.00

Narrowband U-NII-3 - When 2.4 GHz WLAN ON

(UNII-3 - Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR4	Bottom	8-DPSK	78	4DH5	5725	11.20	11.50
HDR4	Middle	8-DPSK	78	4DH5	5788	10.98	11.50
HDR4	Top	8-DPSK	78	4DH5	5850	11.05	11.50

(UNII-3 - Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
HDR4	Bottom	8-DPSK	78	4DH5	5725	11.25	11.50
HDR4	Middle	8-DPSK	78	4DH5	5788	11.15	11.50
HDR4	Top	8-DPSK	78	4DH5	5850	11.35	11.50

Thread (When 5 GHz WLAN OFF)

(Core 0 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
Thread	11	OQPSK	100	N/A	2405	19.48	20.00
Thread	18	OQPSK	100	N/A	2440	19.42	20.00
Thread	26	OQPSK	100	N/A	2480	19.75	20.00

(Core 1 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
Thread	11	OQPSK	100	N/A	2405	19.38	20.00
Thread	18	OQPSK	100	N/A	2440	19.58	20.00
Thread	26	OQPSK	100	N/A	2480	19.62	20.00



Thread (When 5 GHz WLAN ON)

(Core 0 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
Thread	11	OQPSK	100	N/A	2405	15.70	16.00
Thread	18	OQPSK	100	N/A	2440	15.28	16.00
Thread	26	OQPSK	100	N/A	2480	15.58	16.00

(Core 1 - ePA)

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
Thread	11	OQPSK	100	N/A	2405	15.38	16.00
Thread	18	OQPSK	100	N/A	2440	15.20	16.00
Thread	26	OQPSK	100	N/A	2480	15.30	16.00

WLAN 2.4 GHz - SISO

(Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g	2	BPSK	100	6.00	2417	19.60	20.00
802.11g	6	BPSK	100	6.00	2437	19.56	20.00
802.11g	10	BPSK	100	6.00	2457	19.70	20.00

(Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g	2	BPSK	100	6.00	2417	19.58	20.00
802.11g	6	BPSK	100	6.00	2437	19.69	20.00
802.11g	10	BPSK	100	6.00	2457	19.40	20.00



WLAN 2.4 GHz - 2x2 MIMO

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
11n/11ac HT20(2Tx, nonTXBF) (Core0)	2	BPSK	100	6.5	2417	19.65	20.00
11n/11ac HT20(2Tx, nonTXBF) (Core1)	2	BPSK	100	6.5	2417	19.55	20.00
11n/11ac HT20(2Tx, nonTXBF) (Core0)	6	BPSK	100	6.5	2437	19.55	20.00
11n/11ac HT20(2Tx, nonTXBF) (Core1)	6	BPSK	100	6.5	2437	19.60	20.00
11n/11ac HT20(2Tx, nonTXBF) (Core0)	10	BPSK	100	6.5	2457	19.45	20.00
11n/11ac HT20(2Tx, nonTXBF) (Core1)	10	BPSK	100	6.5	2457	19.18	20.00

WLAN U-NII 1/2A - 5.2/5.3 GHz SISO

(Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11a	36	BPSK	100	29.30	5180	15.85	16.00
802.11a	40	BPSK	100	29.30	5200	15.80	16.00
802.11n/ac HT 40	46	BPSK	100	29.30	5230	15.90	16.00
802.11n/ac HT 40	54	BPSK	100	29.30	5270	15.54	16.00
802.11a	60	BPSK	100	29.30	5300	15.40	16.00
802.11a	64	BPSK	100	29.30	5320	15.47	16.00

(Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11a	36	BPSK	100	29.30	5180	15.72	16.00
802.11a	40	BPSK	100	29.30	5200	15.76	16.00
802.11n/ac HT 40	46	BPSK	100	29.30	5230	15.78	16.00
802.11n/ac HT 40	54	BPSK	100	29.30	5270	15.68	16.00
802.11a	60	BPSK	100	29.30	5300	15.53	16.00
802.11a	64	BPSK	100	29.30	5320	15.65	16.00



WLAN U-NII 1/2A - 5.2/5.3 GHz MIMO

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n/11ac HT40(2Tx,SDM ,non TxBF)Low Rate (Core 0)	38	BPSK	100	29.30	5190	15.85	16.00
802.11n/11ac HT40(2Tx,SDM ,non TxBF)Low Rate (Core 1)	38	BPSK	100	29.30	5190	15.65	16.00
802.11n/11ac HT40(2Tx,SDM ,non TxBF)Low Rate (Core 0)	46	BPSK	100	29.30	5230	15.82	16.00
802.11n/11ac HT40(2Tx,SDM ,non TxBF)Low Rate (Core 1)	46	BPSK	100	29.30	5230	15.84	16.00
802.11n/11ac HT40(2Tx,SDM ,non TxBF)Low Rate (Core 0)	54	BPSK	100	29.30	5270	15.57	16.00
802.11n/11ac HT40(2Tx,SDM ,non TxBF)Low Rate (Core 1)	54	BPSK	100	29.30	5270	15.56	16.00
11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 0)	60	BPSK	100	29.30	5300	15.14	15.50
802.11ac 11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 1)	60	BPSK	100	29.30	5300	15.06	15.50
802.11a11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 0)	64	BPSK	100	29.30	5320	15.47	15.50
802.11a11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 1)	64	BPSK	100	29.30	5320	15.40	15.50

WLAN U-NII 2C - 5.5 GHz SISO

(Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	106	BPSK	100	29.30	5530	14.02	14.50
802.11ac VHT80	122	BPSK	100	29.30	5610	14.07	14.50
802.11ac VHT80	138	BPSK	100	29.30	5690	14.06	14.50

(Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	106	BPSK	100	29.30	5530	14.12	14.50
802.11ac VHT80	122	BPSK	100	29.30	5610	14.03	14.50
802.11ac VHT80	138	BPSK	100	29.30	5690	14.00	14.50



WLAN U-NII 2C - 5.5 GHz MIMO

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 0)	100	BPSK	100	13.50	5500	14.86	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 1)	100	BPSK	100	13.50	5500	14.48	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 0)	122	BPSK	100	29.30	5560	14.84	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 1)	122	BPSK	100	29.30	5560	14.60	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 0)	124	BPSK	100	29.30	5620	14.88	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 1)	124	BPSK	100	29.30	5620	14.52	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 0)	136	BPSK	100	29.30	5680	14.94	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 1)	136	BPSK	100	29.30	5680	14.79	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 0)	144	BPSK	100	29.30	5720	14.84	15.00
802.11n/11ac HT20 (2Tx, SDM, nonTxBF) Low Rate (Core 1)	144	BPSK	100	29.30	5720	14.81	15.00

WLAN U-NII 3 - 5.8 GHz SISO

(Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
11ac VHT 80(SISO) Low Rate	155	BPSK	100	72.10	5775	14.02	14.50



(Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
11ac VHT80(SISO) Low Rate	155	BPSK	100	72.10	5775	14.21	14.50

WLAN U-NII 3 - 5.8 GHz MIMO

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
11ac VHT80 Low Rate (Core 0)	155	BPSK	100	72.10	5775	14.11	14.50
11ac VHT80 Low Rate (Core 1)	155	BPSK	100	72.10	5775	13.99	14.50

WLAN 6 GHz - SISO

(Core 0)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
11ax HE160 (SISO)	15	BPSK	100	72.1	6025	11.10	11.50
11ax HE160 (SISO)	47	BPSK	100	72.1	6185	11.16	11.50
11ax HE160 (SISO)	79	BPSK	100	72.1	6345	11.10	11.50
11ax HE160 (SISO)	111	BPSK	100	72.1	6505	9.81	10.00
11ax HE160 (SISO)	143	BPSK	100	72.1	6665	9.55	10.00
11ax HE160 (SISO)	175	BPSK	100	72.1	6825	9.78	10.00
11ax HE160 (SISO)	207	BPSK	100	72.1	6985	10.49	11.00

(Core 1)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
11ax HE160 (SISO)	15	BPSK	100	72.1	6025	11.36	11.75
11ax HE160 (SISO)	47	BPSK	100	72.1	6185	11.34	11.75
11ax HE160 (SISO)	79	BPSK	100	72.1	6345	11.43	11.75
11ax HE160 (SISO)	111	BPSK	100	72.1	6505	10.80	11.00
11ax HE160 (SISO)	143	BPSK	100	72.1	6665	10.65	11.00
11ax HE160 (SISO)	175	BPSK	100	72.1	6825	10.51	11.00
11ax HE160 (SISO)	207	BPSK	100	72.1	6985	11.32	12.00



WLAN 6 GHz MIMO

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
11ax HE160 (2Tx,SDM nonTxBF) (Core 0)	15	BPSK	100	72.1	6025	11.30	11.50
11ax HE160 (2Tx,SDM nonTxBF) (Core 1)	15	BPSK	100	72.1	6025	11.03	11.75
11ax HE160 (2Tx,SDM nonTxBF) (Core 0)	47	BPSK	100	72.1	6185	11.28	11.50
11ax HE160 (2Tx,SDM nonTxBF) (Core 1)	47	BPSK	100	72.1	6185	11.24	11.75
11ax HE160 (2Tx,SDM nonTxBF) (Core 0)	79	BPSK	100	72.1	6345	11.27	11.50
11ax HE160 (2Tx,SDM nonTxBF) (Core 1)	79	BPSK	100	72.1	6345	11.26	11.75
11ax HE160 (2Tx,SDM nonTxBF) (Core 0)	111	BPSK	100	72.1	6505	9.37	9.75
11ax HE160 (2Tx,SDM nonTxBF) (Core 1)	111	BPSK	100	72.1	6505	9.33	9.75
11ax HE160 (2Tx,SDM nonTxBF) (Core 0)	143	BPSK	100	72.1	6665	9.32	10.00
11ax HE160 (2Tx,SDM nonTxBF) (Core 1)	143	BPSK	100	72.1	6665	9.39	11.00
11ax HE160 (2Tx,SDM nonTxBF) (Core 0)	175	BPSK	100	72.1	6825	10.11	10.25
11ax HE160 (2Tx,SDM nonTxBF) (Core 1)	175	BPSK	100	72.1	6825	10.04	10.25
11ax HE160 (2Tx,SDM nonTxBF) (Core 0)	207	BPSK	100	72.1	6985	10.36	10.75
11ax HE160 (2Tx,SDM nonTxBF) (Core 1)	207	BPSK	100	72.1	6985	10.38	10.75



SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the A3113

2.1 DASY6 MEASUREMENT SYSTEM

2.1.1 System Description

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

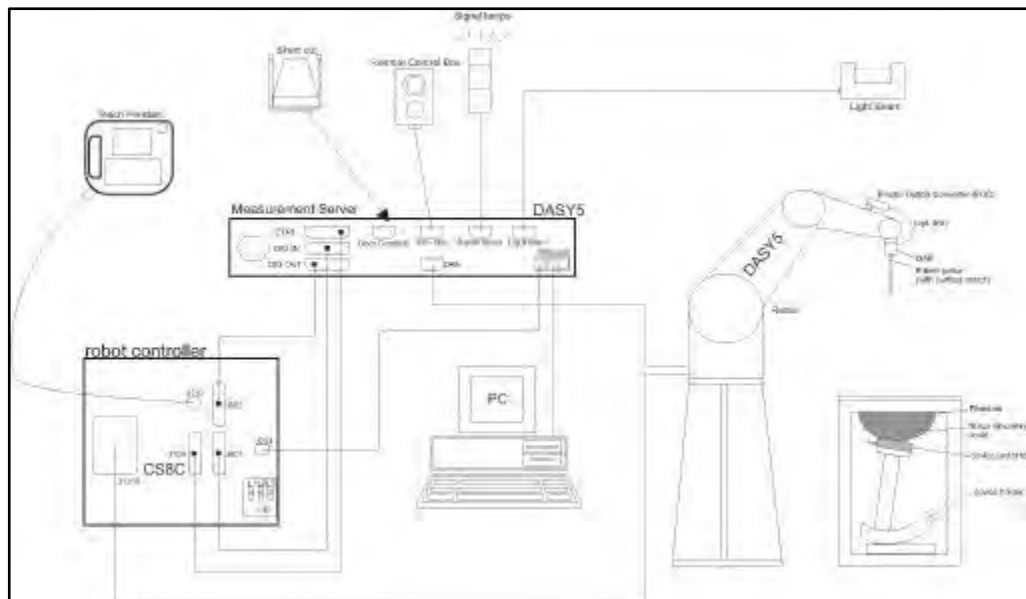


Figure 8 - System Description Diagram

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 DASY6 software to display and interact with the robot and information.

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

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

2.1.2 Probe Specification

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

2.1.3 Data Acquisition Electronics

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

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of both the DAE4 as well as of the DAE3 box is 200M Ω ; 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 automatically extend in order to ensure correct evaluation of peak spatial SAR.

Zoom Scans can be performed in two different modes:

Smart Mode: the grid settings are adjusted on the fly based on the distribution being measured to fulfill to the IEC 62209-2 Amendment 1 criteria on grid resolution.

Custom Mode: the user specifies the grid settings to be used. In both modes, Zoom Scans are always anchored to the peak location of the preceding Fast Area / Area / Fast Volume Scan.

2.1.5 DASY 6 Absorbed Power Density evaluation.

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

2.2 DASY 6 MMWAVE PD MODULE

2.2.1 Measurement system

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

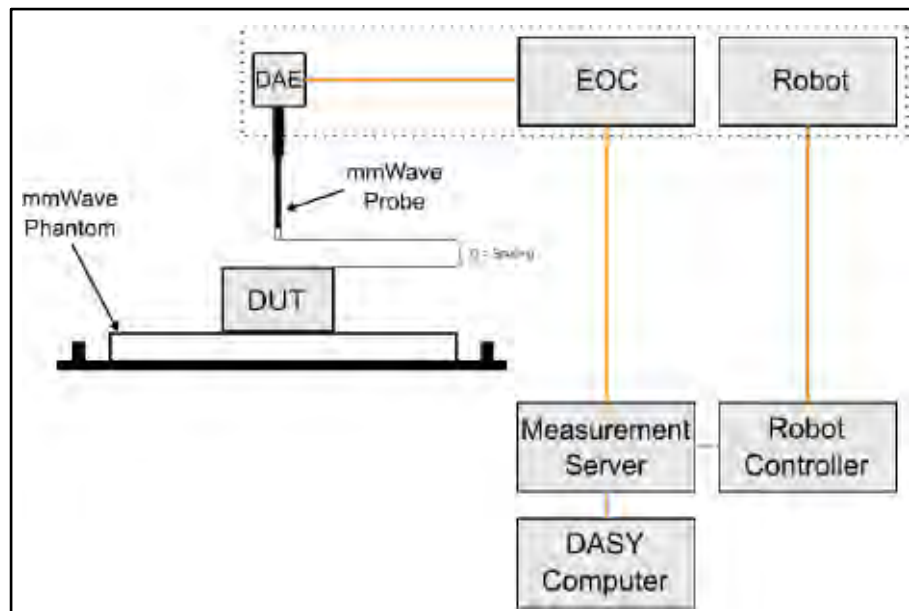


Figure 9 - Typical measurement setup for PD measurement with DASY

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

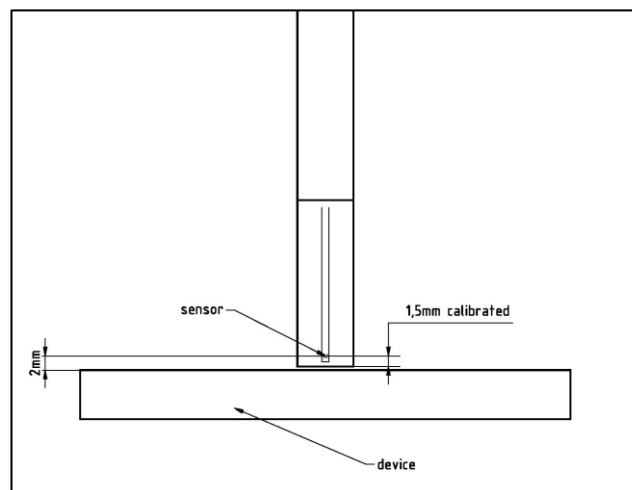


Figure 10 - Diagram of the distance sensor to the EUT surface

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 $\lambda/4$.
- 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 $\lambda/4$ 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 $\lambda/2\pi$.

2.2.5 Standalone PD limit

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

$$55/f_G^{0.177}$$

The FCC Oct 2020 TCB workshop states their own incident power density limit of 1mW/cm² plane-wave equivalent, averaged over 4 cm² as reflected in FCC 47 CFR 1.1310.

2.2.6 Exposure Ratio

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

$$\begin{aligned} \text{SAR} \quad & \sum_{i=100 \text{ kHz}}^{300 \text{ GHz}} \frac{\text{SAR}_i}{\text{SAR}_{\text{BR}}} \leq 1 \\ \text{APD} \quad & \sum_{i>6 \text{ GHz}}^{30 \text{ GHz}} \frac{S_{\text{ab},4\text{cm},i}}{S_{\text{ab},4\text{cm},\text{BR}}} \leq 1 \\ \text{iPD} \quad & \sum_{i>6 \text{ GHz}}^{30 \text{ GHz}} \left(\frac{S_{\text{inc},4\text{cm},i}}{S_{\text{inc},4\text{cm},\text{RL},i}} \right) \leq 1 \end{aligned}$$

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 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.

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

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



SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Thermometer	LKM Electronics	-	4697	12	04-Sep-2024
Thermohygrometer	PCE Instruments	-	5474	12	21-Apr-2024
DASY 8 Device Positioner	SPEAG	-	6496	-	TU
DASY 8 Device Positioner	SPEAG	-	N/A	-	TU
Laptop Device Holder	SPEAG	MDA4LAP	N/A	-	TU
Laptop Device Holder	SPEAG	MDA4LAP	N/A	-	TU
Measurement server	SPEAG	DASY 6 Measurement Server	5337	-	TU
Measurement server	SPEAG	DASY 8 Measurement Server	6492	-	TU
Measurement server	SPEAG	DASY 8 Measurement Server	SN:10113	-	TU
Mounting Platform	SPEAG	MP6C-TX90XL	N/A	-	TU
Mounting Platform	SPEAG	MP6C-TX90XL	N/A	-	TU
Mounting Platform	SPEAG	MP6C-TX90XL	N/A	-	TU
Robot	Stäubli	TX90 XL	5340	-	TU
Robot	Stäubli	TX2 90XL	6494	-	TU
Robot	Stäubli	TX2 90XL	SN:002	-	TU
Power Source for SAR system validation	SPEAG	POWERSOURCE1-SE UMS 160 BA	6503	12	03-Mar-2024
Power Source for SAR system validation	SPEAG	POWERSOURCE1-SE UMS 160 CB	6504	12	23-Feb-2024
Body Phantom	SPEAG	DASY 6 Flat phantom	SN:2102	-	TU
Body Phantom	SPEAG	DASY 8 Flat phantom	SN:6491	-	TU
Body Phantom	SPEAG	DASY 8 Flat phantom	SN:2203	-	TU
Dielectric Assessment Kit	SPEAG	DAK-3.5	6502	-	03-Apr-2024
Validation Dipole 2450MHz	SPEAG	D2450V2	5329	12	05-Jun-2024
Validation Dipole 5000MHz	SPEAG	D5 GHzV2	4309	12	06-Jun-2024



Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Validation Dipole 6500MHz	SPEAG	D6.5 GHzV2	1071	12	06-Jul-2024
10GHz Verification Source	Speag	5G Verification Source 10GHz	6449	12	27-Oct-2024
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	29-Jun-2024
Directional Coupler	Hewlett Packard	11692D	452	-	TU
Attenuator (10dB)	Aaren	AT40A-4041-D18-10	5493	12	18-Apr-2024
Attenuator (10dB)	Aaren	AT40A-4041-D18-10	6549	12	18-Jun-2024
Power Meter	Rohde & Schwarz	NRX	6535	12	05-Apr-2024
Power Sensor	Rohde & Schwarz	NRP18S	6534	12	17-Apr-2025
Power Sensor	Rohde & Schwarz	NRP18S	6533	12	17-Apr-2025
ENA Series network analyser	Keysight Technologies	E5063A	6499	12	07-Mar-2024
Data Acquisition	SPEAG	DAE4ip	6501	12	03-Apr-2024
Data Acquisition	SPEAG	DAE4ip	6574	12	02-May-2024
Data Acquisition	SPEAG	DAE4ip	6500	12	03-Apr-2024
Dosimetric SAR Probe	SPEAG	EX3DV4	6498	12	06-Apr-2024
Dosimetric SAR Probe	SPEAG	EX3DV4	6573	12	03-May-2024
Dosimetric SAR Probe	SPEAG	EX3DV4	5330	12	17-Jun-2024
PD probe	Speag	EUmmWV4	6353	12	27-Oct-2024
Tissue Simulant Liquid	SPEAG	HBBL 600-10000	Batch 3	-	Note 1
Tissue Simulant Liquid	SPEAG	HBBL 600-10000	Batch 5	-	Note 1
Tissue Simulant Liquid	SPEAG	HBBL 600-10000	Batch 6	-	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 Product Service DASY System.

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



3.3 TEST VERIFICATION

3.3.1 System Performance Check Results

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

System performance / Validation results SAR

Date	Frequency (MHz)	Fluid Type	Measured Max 1g SAR (W/kg) *	Max 1g SAR Target (W/kg)	Percentage Deviation from Target 1g (%)
19/10/2023	2450	HBBL/B3	48.68	52.2	-6.73%
20/10/2023	2450	HBBL/B3	50.48	52.2	-3.29%
18/10/2023	5200	HBBL/B6	80.01	76.30	4.86%
23/10/2023	5200	HBBL/B6	77.02	76.30	0.94%
24/10/2023	5200	HBBL/B6	78.01	76.30	2.25%
25/10/2023	5200	HBBL/B6	81.01	76.30	6.17%
20/10/2023	5300	HBBL/B6	81.81	80.00	2.26%
23/10/2023	5300	HBBL/B6	77.42	80.00	-3.23%
24/10/2023	5300	HBBL/B6	78.41	80.00	-1.98%
24/10/2023	5500	HBBL/B6	84.60	81.70	3.55%
26/10/2023	5500	HBBL/B6	89.19	81.70	9.17%
23/10/2023	5600	HBBL/B6	87.59	81.80	7.08%
24/10/2023	5600	HBBL/B6	86.39	81.80	5.62%
26/10/2023	5600	HBBL/B6	86.39	81.80	5.62%
19/10/2023	5800	HBBL/B6	82.40	79.00	4.31%
20/10/2023	5800	HBBL/B6	82.60	79.00	4.56%
23/10/2023	5800	HBBL/B6	78.41	79.00	-0.74%
24/10/2023	5800	HBBL/B6	76.62	79.00	-3.02%
24/10/2023	6500	HBBL/B5	267.00	292.00	-8.56%
25/10/2023	6500	HBBL/B5	276.00	292.00	-5.46%
26/10/2023	6500	HBBL/B5	284.00	292.00	-2.74%

*Normalised to a forward power of 1W



System performance / Validation results APD

Date	Frequency (MHz)	Fluid Type	Absorbed Power Density 4cm ² (W/m ²)*	APD 4cm ² Normalised to 1W	APD 4cm ² Target (From Dipole Calibration Certificate)	APD 4cm ² Deviation from target (Cal data) (%)
20/10/2023	6500	HBBL/B5	127.00	1270.00	1330	-4.51%
23/10/2023	6500	HBBL/B5	125.00	1250.00	1330	-6.02%
24/10/2023	6500	HBBL/B5	123.00	1230.00	1330	-7.52%
25/10/2023	6500	HBBL/B5	128.00	1280.00	1330	-3.76%
26/10/2023	6500	HBBL/B5	132.00	1320.00	1330	-0.75%

*Normalised to a forward power of 1W

System performance / Validation results iPD

Date	Frequency (MHz)	Medium	Measured psPDtot+ (W/m ²)	Target psPDtot+ (W/m ²)	Percentage Deviation from Target (%)
10/11/2023	10000	Air	57.30	57.80	-0.87%



3.4 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS

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

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

Fluid Type and Frequency	Relative Permittivity Measured	Relative Permittivity Target	Conductivity Measured (S/m)	Conductivity Target (S/m)	Date	Fluid Temperature °C
HBBL/B3 - 2450 MHz	40.05	39.20	1.86	1.80	18/10/2023	20.85
HBBL/B3 - 2450 MHz	39.65	39.20	1.84	1.80	20/10/2023	21.65
HBBL/B6 - 5200 MHz	34.06	35.98	4.59	4.65	18/10/2023	21.83
HBBL/B6 - 5200 MHz	33.94	35.98	4.38	4.65	23/10/2023	20.15
HBBL/B6 - 5300 MHz	33.89	35.87	4.64	4.75	20/10/2023	20.70
HBBL/B6 - 5300 MHz	33.76	35.87	4.49	4.75	23/10/2023	20.15
HBBL/B6 - 5300 MHz	34.27	35.87	4.66	4.75	25/10/2023	20.90
HBBL/B6 - 5500 MHz	33.40	35.64	4.70	4.96	23/10/2023	20.15
HBBL/B6 - 5500 MHz	33.89	35.64	4.89	4.96	25/10/2023	20.90
HBBL/B6 - 5600 MHz	33.22	35.52	4.81	5.06	23/10/2023	20.15
HBBL/B6 - 5600 MHz	33.70	35.52	5.00	5.06	25/10/2023	20.9
HBBL/B6 - 5800 MHz	32.90	35.30	5.27	5.27	18/10/2023	21.83
HBBL/B6 - 5800 MHz	32.95	35.30	5.19	5.27	20/10/2023	20.70
HBBL/B6 - 5800 MHz	32.89	35.30	5.03	5.27	23/10/2023	20.15
HBBL/B5 - 6500 MHz	31.75	34.46	5.76	6.07	23/10/2023	20.35
HBBL/B5 - 6500 MHz	32.52	34.46	6.07	6.07	25/10/2023	21.50

3.5 TEST CONDITIONS

3.5.1 Test Laboratory Conditions

Ambient temperature: Within +18°C to +25°C.

The actual temperature during the testing ranged from +19.60°C to +21.83°C.

The actual humidity during the testing ranged from 40.00% to 59.60% RH.

The temperature of the tissue simulating fluid during test sessions did not deviate by more than 2°C.

3.5.2 Test Fluid Temperature Range

Frequency	Body / Head Fluid	Min Temperature °C	Max Temperature °C
2450 MHz	Head	20.52	21.50
5200 MHz	Head	19.90	21.50
5300 MHz	Head	20.01	21.61
5500 MHz	Head	19.60	21.50
5600 MHz	Head	21.01	21.50
5800 MHz	Head	20.15	21.83
6500 MHz	Head	19.96	21.54



3.6 MEASUREMENT UNCERTAINTY

Body, Full SAR Measurements, 300 MHz to 3 GHz

Source of Uncertainty	Uncertainty $\pm$ %	Probability distribution	Div	c_i (1g)	Standard Uncertainty $\pm$ % (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 (± 0.5 mm)	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 $\pm$ %	Probability distribution	Div	c_i (1g)	Standard Uncertainty $\pm$ % (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 ($\pm 0.5\text{mm}$)	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 $\pm$ %	Probability distribution	Div	c_i (1g)	Standard Uncertainty $\pm$ % (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 (± 0.5 mm)	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
Δ_{sys}	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								
$L/Q(\sigma)$	Conductivity (meas) ^{DAK}	2.50	normal 1	1.000	0.78	1.95	0.71	1.78
$L/Q(T\sigma)$	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
D_{xyz}	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
R_{drift}	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
R_{fin}	Unc. Input Power ^{val}	0.00	normal 1	1.000	1	0.00	1	0.00
Correction To The SAR Results								
$C(\epsilon, \sigma)$	Deviation to Target	1.90	normal 1	1.000	1	1.90	0.84	1.60
$C(R)$	SAR scaling	0.00	rectangular	1.732	1	0.00	1	0.00
APD								
PDC	Power Density Conversion	13.50	rectangular	1.732	1	7.79	1	7.79
$u(\Delta SAR)$	Combined Standard Uncertainty	-	normal	-	-	16.58	-	16.52
U	Expanded Uncertainty	-	normal k =	2.00	-	33.2	-	33



DASY6 Uncertainty Budget for iPD

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

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

3.6.1 Decision Rule

Accuracy Method

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

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



SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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ANNEX A

PROBE CALIBRATION REPORT



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



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

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

Accreditation No.: SCS 0108

Client
TÜV SÜD
Fareham, United Kingdom

Certificate No. **EX-7536_Jun23**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:7536**

Calibration procedure(s) **QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
QA CAL-25.v8
Calibration procedure for dosimetric E-field probes**

Calibration date **June 12, 2023**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
OCP DAK-3.5 (weighted)	SN: 1249	20-Oct-22 (OCP-DAK3.5-1249_Oct22)	Oct-23
OCP DAK-12	SN: 1016	20-Oct-22 (OCP-DAK12-1016_Oct22)	Oct-23
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 660	16-Mar-23 (No. DAE4-660_Mar23)	Mar-24
Reference Probe ES3DV2	SN: 3013	06-Jan-23 (No. ES3-3013_Jan23)	Jan-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by	Name Michael Weber	Function Laboratory Technician	Signature
Approved by	Name Sven Kühn	Function Technical Manager	Signature i.A.

Issued: June 14, 2023

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

**Calibration Laboratory of
Schmid & Partner
Engineering AG**

Zeughausstrasse 43, 8004 Zurich, Switzerland



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

Accredited by the Swiss Accreditation Service (SAS)

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

Accreditation No.: SCS 0108

Glossary

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,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 NORM_x (no uncertainty required).



EX3DV4 - SN:7536

June 12, 2023

Parameters of Probe: EX3DV4 - SN:7536

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ($\mu V/(V/m)^2$) ^A	0.55	0.61	0.65	$\pm 10.1\%$
DGP (mV) ^B	97.3	97.6	98.1	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc ^E k = 2
c	CW	X	0.00	0.00	1.00	0.90	172.0	$\pm 3.3\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		156.0		
		Z	0.00	0.00	1.00		163.5		
10352	Pulse Waveform (200Hz, 10%)	X	3.65	69.60	11.91	10.00	60.0	$\pm 3.6\%$	$\pm 9.6\%$
		Y	20.00	89.11	19.07		60.0		
		Z	2.53	65.18	9.75		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	3.67	71.17	11.63	6.99	80.0	$\pm 2.4\%$	$\pm 9.6\%$
		Y	20.00	95.68	18.67		80.0		
		Z	1.74	63.98	8.49		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	5.31	78.53	12.84	3.98	95.0	$\pm 1.4\%$	$\pm 9.6\%$
		Y	20.00	90.71	17.24		95.0		
		Z	1.68	63.28	7.50		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	8.99	72.59	10.20	2.22	120.0	$\pm 1.0\%$	$\pm 9.6\%$
		Y	20.00	87.61	14.55		120.0		
		Z	0.61	62.35	6.59		120.0		
10387	QPSK Waveform, 1 MHz	X	1.61	65.65	14.53	1.00	150.0	$\pm 2.9\%$	$\pm 9.6\%$
		Y	1.49	64.98	13.78		150.0		
		Z	1.53	65.01	14.06		150.0		
10388	QPSK Waveform, 10 MHz	X	2.17	67.52	15.36	0.00	150.0	$\pm 1.1\%$	$\pm 9.6\%$
		Y	2.02	66.66	14.73		150.0		
		Z	2.04	66.59	14.85		150.0		
10395	64-QAM Waveform, 100 kHz	X	2.65	68.86	18.11	3.01	150.0	$\pm 0.8\%$	$\pm 9.6\%$
		Y	2.57	68.29	17.68		150.0		
		Z	2.87	70.68	18.96		150.0		
10399	64-QAM Waveform, 40 MHz	X	3.49	66.95	15.65	0.00	150.0	$\pm 2.3\%$	$\pm 9.6\%$
		Y	3.40	66.61	15.34		150.0		
		Z	3.39	66.48	15.35		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.88	65.63	15.55	0.00	150.0	$\pm 4.3\%$	$\pm 9.6\%$
		Y	4.78	65.54	15.39		150.0		
		Z	4.77	65.36	15.33		150.0		

Note: For details on UID parameters see Appendix

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

^A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 to 7).

^B Linearization parameter uncertainty for maximum specified field strength.

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



EX3DV4 - SN:7536

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Parameters of Probe: EX3DV4 - SN:7536

Sensor Model Parameters

	C1 IF	C2 IF	α V^{-1}	T1 $ms V^{-2}$	T2 $ms V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
x	45.3	345.15	36.79	14.26	0.00	5.03	0.46	0.34	1.01
y	41.5	314.76	36.30	10.37	0.00	5.09	0.26	0.38	1.01
z	42.4	319.51	35.93	16.54	0.00	4.99	1.51	0.15	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-161.6°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3.4 mm for an Area Scan job



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Parameters of Probe: EX3DV4 - SN:7536

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^E	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k = 2)
128	52.8	0.76	15.23	15.23	15.23	0.00	1.00	±13.3%
450	43.5	0.87	12.05	12.05	12.05	0.16	1.30	±13.3%
750	41.9	0.89	11.18	11.18	11.18	0.59	0.80	±12.0%
835	41.5	0.90	10.77	10.77	10.77	0.48	0.91	±12.0%
900	41.5	0.97	10.52	10.52	10.52	0.48	0.80	±12.0%
1300	40.8	1.14	9.59	9.59	9.59	0.48	0.80	±12.0%
1450	40.5	1.20	9.27	9.27	9.27	0.45	0.80	±12.0%
1640	40.2	1.31	9.14	9.14	9.14	0.42	0.86	±12.0%
1750	40.1	1.37	9.10	9.10	9.10	0.35	0.86	±12.0%
1810	40.0	1.40	8.81	8.81	8.81	0.36	0.86	±12.0%
1900	40.0	1.40	8.70	8.70	8.70	0.34	0.85	±12.0%
2000	40.0	1.40	8.61	8.61	8.61	0.36	0.85	±12.0%
2100	39.8	1.49	8.53	8.53	8.53	0.33	0.86	±12.0%
2300	39.5	1.67	8.12	8.12	8.12	0.36	0.90	±12.0%
2450	39.2	1.80	7.78	7.78	7.78	0.39	0.90	±12.0%
2600	39.0	1.96	7.52	7.52	7.52	0.41	0.90	±12.0%
3300	38.2	2.71	7.13	7.13	7.13	0.30	1.35	±14.0%
3500	37.9	2.91	7.07	7.07	7.07	0.30	1.35	±14.0%
3700	37.7	3.12	7.05	7.05	7.05	0.35	1.35	±14.0%
4100	37.2	3.53	6.61	6.61	6.61	0.40	1.60	±14.0%
5200	36.0	4.66	5.63	5.63	5.63	0.40	1.80	±14.0%
5300	35.9	4.76	5.47	5.47	5.47	0.40	1.80	±14.0%
5500	35.6	4.96	5.10	5.10	5.10	0.40	1.80	±14.0%
5600	35.5	5.07	4.90	4.90	4.90	0.40	1.80	±14.0%
5800	35.3	5.27	4.88	4.88	4.88	0.40	1.80	±14.0%

^C Frequency validity above 300 MHz of ±100 MHz only applies for CASSM v4.4 and higher (see Page 21), 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, 43, 50 and 70 MHz for ConvF assessments at 30, 64, 198, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4 - 8 MHz, and ConvF assessed at 12 MHz is 9 - 18 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

^E The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ' and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10%. If TSL with deviations from the target of less than ±5% are used, the calibration uncertainties are ±1.1% for 0.7 - 3 GHz and ±3.1% for 3 - 6 GHz.

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

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Parameters of Probe: EX3DV4 - SN:7536

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^D	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k = 2)
450	56.7	0.94	12.29	12.29	12.29	0.11	1.20	±13.3%
750	55.5	0.96	10.90	10.90	10.90	0.47	0.87	±12.0%
835	55.2	0.97	10.67	10.67	10.67	0.40	0.94	±12.0%
900	55.0	1.05	10.44	10.44	10.44	0.46	0.84	±12.0%
1300	54.3	1.23	9.36	9.36	9.36	0.20	1.59	±12.0%
1450	54.0	1.30	9.03	9.03	9.03	0.35	0.80	±12.0%
1640	53.7	1.42	8.92	8.92	8.92	0.37	0.86	±12.0%
1750	53.4	1.49	8.87	8.87	8.87	0.36	0.86	±12.0%
1810	53.3	1.52	8.72	8.72	8.72	0.39	0.96	±12.0%
1900	53.3	1.52	8.58	8.58	8.58	0.34	0.66	±12.0%
2000	53.3	1.52	8.47	8.47	8.47	0.40	0.65	±12.0%
2100	53.2	1.62	8.45	8.45	8.45	0.24	0.69	±12.0%
2300	52.9	1.81	8.10	8.10	8.10	0.33	0.90	±12.0%
2450	52.7	1.95	7.77	7.77	7.77	0.32	0.90	±12.0%
2600	52.5	2.16	7.64	7.64	7.64	0.26	0.90	±12.0%
3300	51.8	3.08	6.57	6.57	6.57	0.40	1.35	±14.0%
3500	51.3	3.31	6.54	6.54	6.54	0.40	1.35	±14.0%
3700	51.0	3.55	6.43	6.43	6.43	0.40	1.35	±14.0%
4100	50.5	4.01	5.90	5.90	5.90	0.40	1.70	±14.0%
5200	49.0	5.30	5.04	5.04	5.04	0.50	1.90	±14.0%
5300	48.9	5.42	4.94	4.94	4.94	0.50	1.90	±14.0%
5500	48.6	5.65	4.54	4.54	4.54	0.50	1.90	±14.0%
5600	48.5	5.77	4.41	4.41	4.41	0.50	1.90	±14.0%
5800	48.2	6.00	4.37	4.37	4.37	0.50	1.90	±14.0%

^D Frequency validity above 300 MHz of ±100 MHz; only applies for DASV v4.4 and higher (see Page 2); else, this 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 4–8 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10%. If TSL with deviations from the target of less than ±5% are used, the calibration uncertainties are 2 to 11.1% for 0.7–5 GHz and 13.1% for 3–5 GHz.

^G Alpha/Depth are determined during calibration. SPFLAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3.5 GHz and below ±2% for frequencies between 3–5 GHz at any distance larger than half the probe tip diameter from the boundary.



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Parameters of Probe: EX3DV4 - SN:7536

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^D	Relative Permittivity ^E	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k 2)
6500	34.5	6.07	5.40	5.40	5.40	0.20	2.50	±18.6%

^D Frequency validity at 5.5 GHz to 60 GHz, 700 MHz, and ±700 MHz at or above 7 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^E The probes are calibrated using tissue simulating loads (TSL) that deviate for ϵ' and σ by less than ±10% from the target values (typically better than ±6%), and are valid for TSL with deviations as high as ±10%.

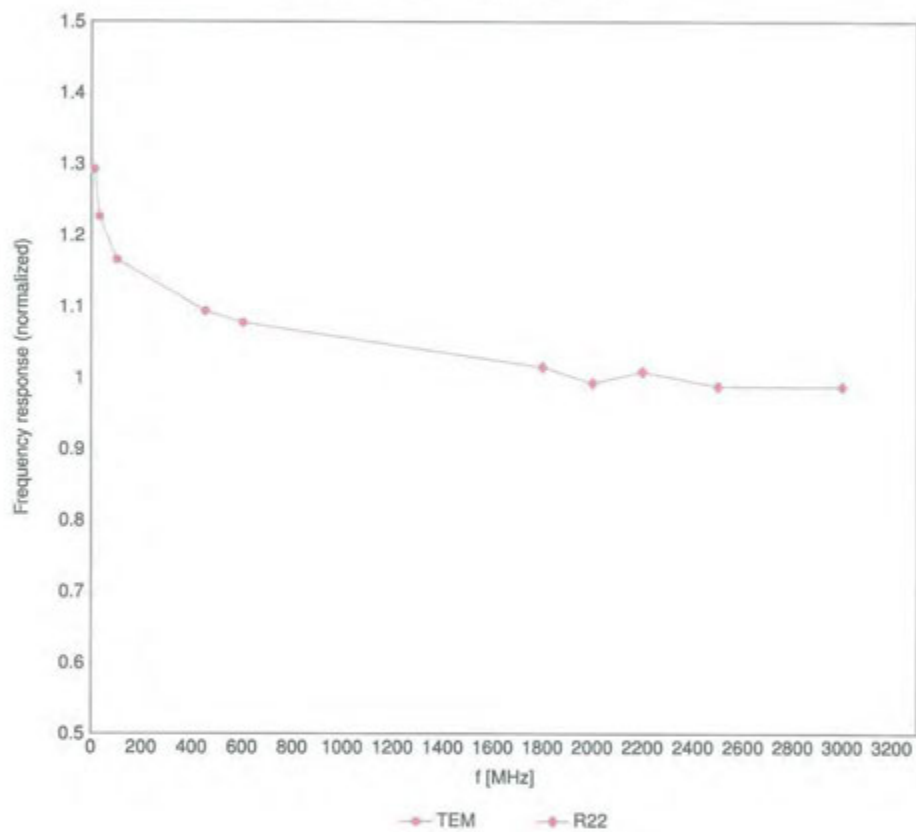
^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz; below ±2% for frequencies between 3–6 GHz; and below ±4% for frequencies between 6–13 GHz at any distance larger than half the probe tip diameter from the boundary.

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Frequency Response of E-Field

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

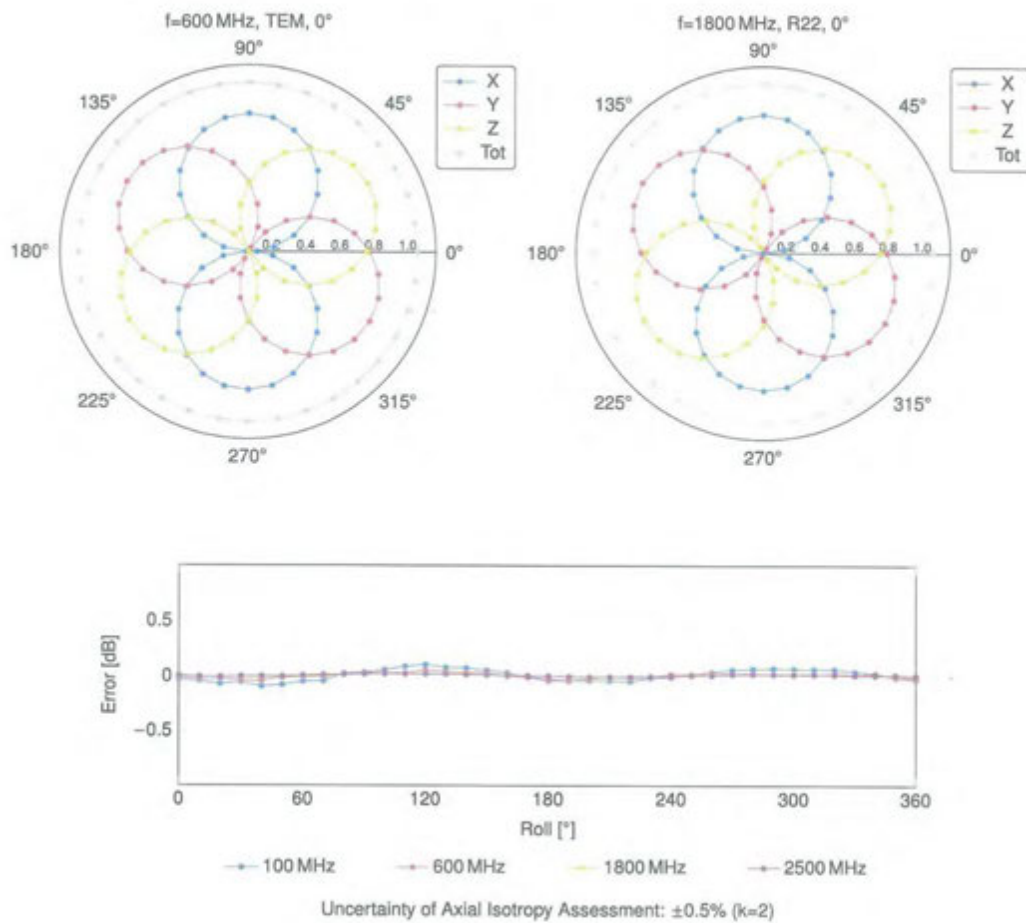


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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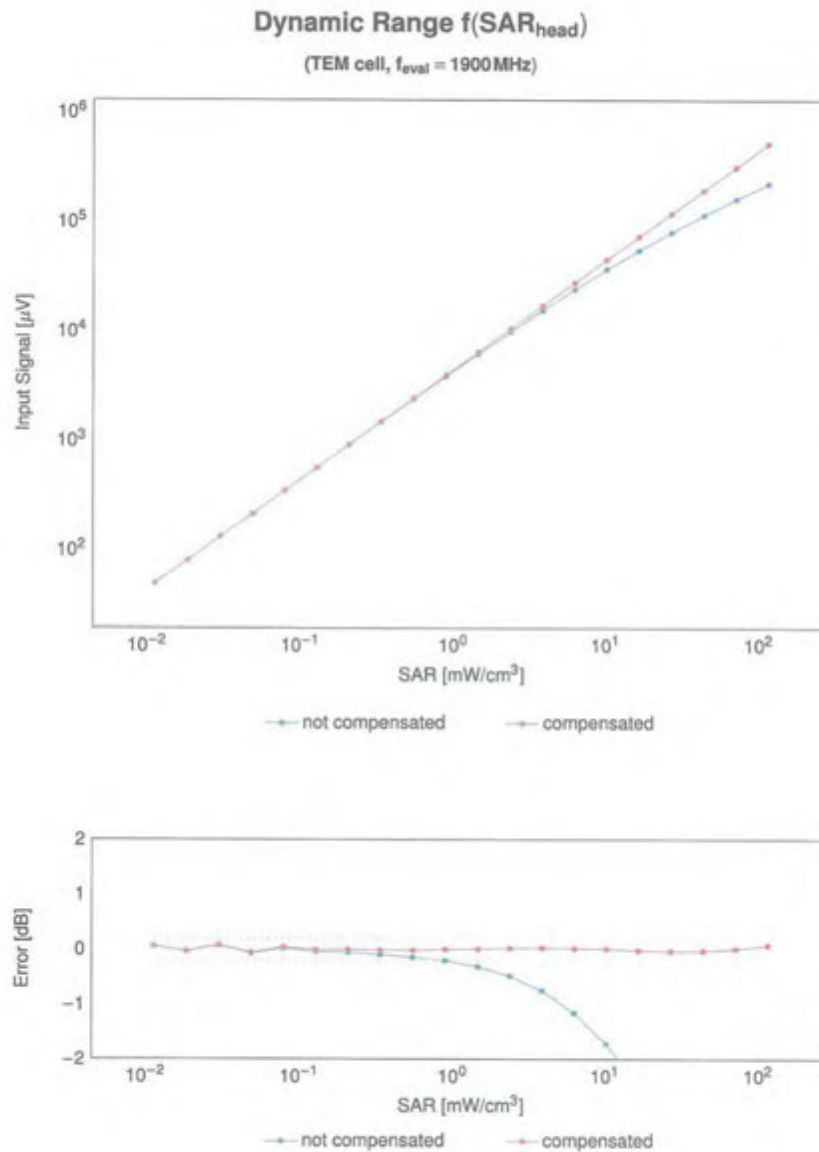
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Receiving Pattern (ϕ), $\theta = 0^\circ$



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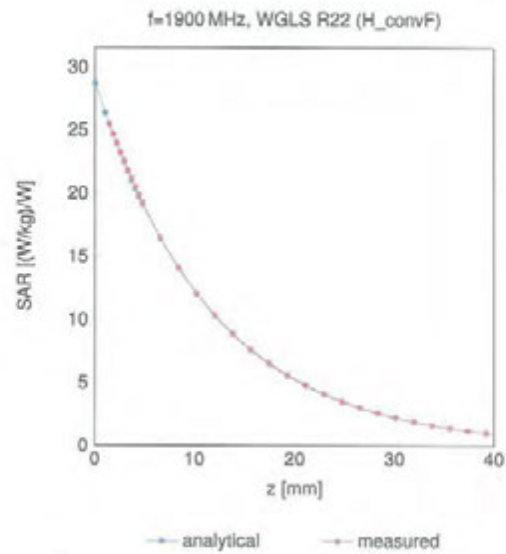


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

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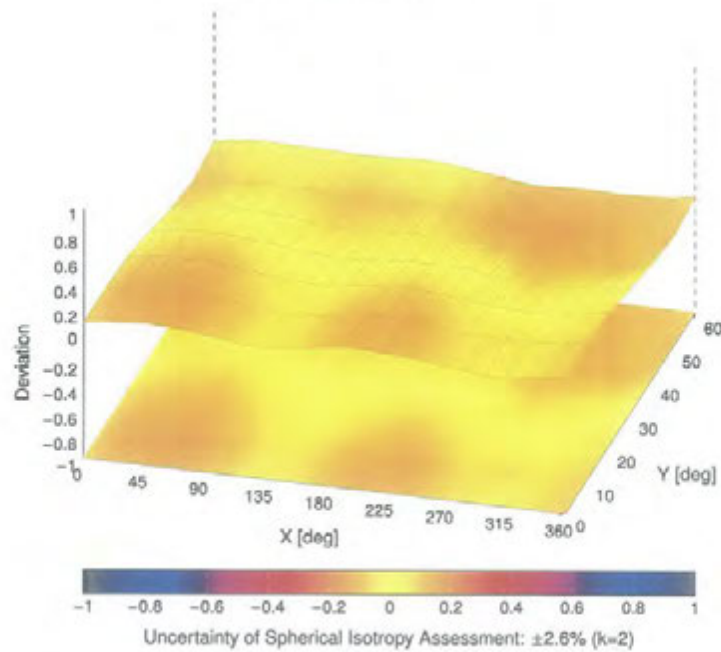
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Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz





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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^k k = 2
0		CW	CW	0.00	±4.7
10010	CAB	SAR Validation (Square, 100ms, 10ms)	Test	10.00	±9.6
10011	CAC	UMTS-FDD (WCDMA)	WCDMA	2.81	±9.6
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1Mbps)	WLAN	1.87	±9.6
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6Mbps)	WLAN	0.46	±9.6
10021	CAC	GSM-FDD (TDMA, GMSK)	GSM	9.29	±9.6
10023	CAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	0.57	±9.6
10024	CAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	0.50	±9.6
10025	CAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	±9.6
10026	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	±9.6
10027	CAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.60	±9.6
10028	CAC	GPRS-FDD (TDMA, GMSK, TN 0-1-3)	GSM	3.55	±9.6
10029	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.70	±9.6
10033	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	±9.6
10037	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	±9.6
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	±9.6
10033	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH1)	Bluetooth	7.74	±9.6
10034	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH3)	Bluetooth	4.53	±9.6
10035	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH5)	Bluetooth	3.88	±9.6
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.07	±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	4.70	±9.6
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	±9.6
10042	CAB	IS-84/IS-136 FDD (TDMA/FDM, PI4-DQPSK, FullRate)	AMPS	7.78	±9.6
10044	CAA	IS-91/IS-97A-553 FDD (FDMA, FM)	AMPS	0.00	±9.6
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.60	±9.6
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	±9.6
10056	CAA	UMTS-TDD (TD-SCDMA, 12.8Mbps)	TD-SCDMA	1.01	±9.6
10058	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	±9.6
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2Mbps)	WLAN	2.12	±9.6
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5Mbps)	WLAN	2.83	±9.6
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11Mbps)	WLAN	3.53	±9.6
10062	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6Mbps)	WLAN	8.58	±9.6
10063	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9Mbps)	WLAN	5.63	±9.6
10064	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12Mbps)	WLAN	3.30	±9.6
10065	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18Mbps)	WLAN	9.00	±9.6
10066	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24Mbps)	WLAN	3.28	±9.6
10067	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 36Mbps)	WLAN	13.12	±9.6
10068	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 48Mbps)	WLAN	10.24	±9.6
10069	CAD	IEEE 802.11a/n WiFi 5 GHz (OFDM, 54Mbps)	WLAN	10.56	±9.6
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9Mbps)	WLAN	9.85	±9.6
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12Mbps)	WLAN	5.62	±9.6
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18Mbps)	WLAN	9.94	±9.6
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24Mbps)	WLAN	10.30	±9.6
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36Mbps)	WLAN	10.77	±9.6
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48Mbps)	WLAN	10.94	±9.6
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54Mbps)	WLAN	11.00	±9.6
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	±9.6
10082	CAB	IS-84/IS-136 FDD (TDMA/FDM, PI4-DQPSK, FullRate)	AMPS	4.77	±9.6
10090	CAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	±9.6
10097	CAC	UMTS-FDD (HSDPA)	WCDMA	3.88	±9.6
10098	CAC	UMTS-FDD (HSUPA, Sub-test 2)	WCDMA	3.90	±9.6
10099	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	±9.6
10100	CAC	LTE-FDD (SC-FDMA, 100% RB, 20MHz, QPSK)	LTE-FDD	5.87	±9.6
10101	CAC	LTE-FDD (SC-FDMA, 100% RB, 20MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10102	CAC	LTE-FDD (SC-FDMA, 100% RB, 20MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10103	CAH	LTE-TDD (SC-FDMA, 100% RB, 20MHz, QPSK)	LTE-TDD	9.25	±9.6
10104	CAH	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 16-QAM)	LTE-TDD	9.57	±9.6
10105	CAH	LTE-TDD (SC-FDMA, 100% RB, 20MHz, 64-QAM)	LTE-TDD	10.07	±9.6
10108	CAH	LTE-FDD (SC-FDMA, 100% RB, 10MHz, QPSK)	LTE-FDD	5.80	±9.6
10109	CAH	LTE-FDD (SC-FDMA, 100% RB, 10MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10110	CAH	LTE-FDD (SC-FDMA, 100% RB, 5MHz, QPSK)	LTE-FDD	5.75	±9.6
10111	CAH	LTE-FDD (SC-FDMA, 100% RB, 5MHz, 16-QAM)	LTE-FDD	6.44	±9.6



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ID	Rev	Communication System Name	Group	PAR (dB)	Unc ² k = 2
10112	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	5.59	±9.6
10113	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.02	±9.6
10114	CAD	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.10	±9.6
10115	CAD	IEEE 802.11n (HT Greenfield, 6.5 Mbps, 16-QAM)	WLAN	8.46	±9.6
10116	CAD	IEEE 802.11n (HT Greenfield, 13.5 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, 13.5 Mbps, 16-QAM)	WLAN	8.59	±9.6
10119	CAD	IEEE 802.11n (HT Mixed, 13.5 Mbps, 64-QAM)	WLAN	8.13	±9.6
10140	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±9.6
10141	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10142	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6
10143	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	±9.6
10144	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	±9.6
10145	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	±9.6
10146	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±9.6
10147	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	±9.6
10149	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10150	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10151	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	±9.6
10152	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	±9.6
10153	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	9.05	±9.6
10154	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	6.75	±9.6
10155	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10156	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	±9.6
10157	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10158	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	±9.6
10159	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	±9.6
10160	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	±9.6
10161	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	5.43	±9.6
10162	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	±9.6
10165	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	±9.6
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	±9.6
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	5.79	±9.6
10169	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±9.6
10170	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10171	AAH	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	5.45	±9.6
10172	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6
10173	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10174	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±9.6
10175	CAH	LTE-FDD (SC-FDMA, 1 RB, 13 MHz, QPSK)	LTE-FDD	5.72	±9.6
10176	CAH	LTE-FDD (SC-FDMA, 1 RB, 13 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10177	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±9.6
10178	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10179	CAF	LTE-FDD (SC-FDMA, 1 RB, 16 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10180	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10181	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±9.6
10182	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10183	AAH	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10184	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6
10185	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±9.6
10186	AAH	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±9.6
10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	±9.6
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	±9.6
10189	AAG	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, 6.5 Mbps, 16-QAM)	WLAN	8.12	±9.6
10195	CAD	IEEE 802.11n (HT Greenfield, 6.5 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, 6.5 Mbps, 16-QAM)	WLAN	8.13	±9.6
10198	CAD	IEEE 802.11n (HT Mixed, 6.5 Mbps, 64-QAM)	WLAN	8.27	±9.6
10199	CAD	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.33	±9.6
10200	CAD	IEEE 802.11n (HT Mixed, 7.2 Mbps, 16-QAM)	WLAN	8.13	±9.6
10221	CAD	IEEE 802.11n (HT Mixed, 7.2 Mbps, 64-QAM)	WLAN	8.27	±9.6
10222	CAD	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.26	±9.6
10223	CAD	IEEE 802.11n (HT Mixed, 15 Mbps, 16-QAM)	WLAN	8.48	±9.6
10224	CAD	IEEE 802.11n (HT Mixed, 15 Mbps, 64-QAM)	WLAN	8.08	±9.6



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UID	Rev	Communication System Name	Group	PAR (dB)	Line# k = 2
10225	CAC	UMTS-FDD (HSPA+)	WCDMA	5.97	±9.6
10226	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10227	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 64-QAM)	LTE-TDD	0.26	±9.6
10228	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, QPSK)	LTE-TDD	9.22	±9.6
10229	CAE	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10230	CAE	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 64-QAM)	LTE-TDD	0.25	±9.6
10231	CAE	LTE-TDD (SC-FDMA, 1 RB, 3MHz, QPSK)	LTE-TDD	9.19	±9.6
10232	CAH	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10233	CAH	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 64-QAM)	LTE-TDD	0.25	±9.6
10234	CAH	LTE-TDD (SC-FDMA, 1 RB, 5MHz, QPSK)	LTE-TDD	9.21	±9.6
10235	CAH	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10236	CAH	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 64-QAM)	LTE-TDD	0.25	±9.6
10237	CAH	LTE-TDD (SC-FDMA, 1 RB, 10MHz, QPSK)	LTE-TDD	9.21	±9.6
10238	CAG	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 16-QAM)	LTE-TDD	9.48	±9.6
10239	CAG	LTE-TDD (SC-FDMA, 1 RB, 15MHz, 64-QAM)	LTE-TDD	0.25	±9.6
10240	CAG	LTE-TDD (SC-FDMA, 1 RB, 15MHz, QPSK)	LTE-TDD	9.21	±9.6
10241	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 16-QAM)	LTE-TDD	9.82	±9.6
10242	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, 64-QAM)	LTE-TDD	9.86	±9.6
10243	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4MHz, QPSK)	LTE-TDD	9.46	±9.6
10244	CAE	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 16-QAM)	LTE-TDD	10.06	±9.6
10245	CAE	LTE-TDD (SC-FDMA, 50% RB, 3MHz, 64-QAM)	LTE-TDD	10.06	±9.6
10246	CAE	LTE-TDD (SC-FDMA, 50% RB, 3MHz, QPSK)	LTE-TDD	9.30	±9.6
10247	CAH	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 16-QAM)	LTE-TDD	9.51	±9.6
10248	CAH	LTE-TDD (SC-FDMA, 50% RB, 5MHz, 64-QAM)	LTE-TDD	10.05	±9.6
10249	CAH	LTE-TDD (SC-FDMA, 50% RB, 5MHz, QPSK)	LTE-TDD	9.29	±9.6
10250	CAH	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 16-QAM)	LTE-TDD	9.81	±9.6
10251	CAH	LTE-TDD (SC-FDMA, 50% RB, 10MHz, 64-QAM)	LTE-TDD	10.17	±9.6
10252	CAH	LTE-TDD (SC-FDMA, 50% RB, 10MHz, QPSK)	LTE-TDD	9.24	±9.6
10253	CAG	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 16-QAM)	LTE-TDD	9.90	±9.6
10254	CAG	LTE-TDD (SC-FDMA, 50% RB, 15MHz, 64-QAM)	LTE-TDD	10.14	±9.6
10255	CAG	LTE-TDD (SC-FDMA, 50% RB, 15MHz, QPSK)	LTE-TDD	9.20	±9.6
10256	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 16-QAM)	LTE-TDD	9.96	±9.6
10257	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, 64-QAM)	LTE-TDD	10.09	±9.6
10258	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4MHz, QPSK)	LTE-TDD	9.34	±9.6
10259	CAE	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 16-QAM)	LTE-TDD	9.99	±9.6
10260	CAE	LTE-TDD (SC-FDMA, 100% RB, 3MHz, 64-QAM)	LTE-TDD	9.97	±9.6
10261	CAE	LTE-TDD (SC-FDMA, 100% RB, 3MHz, QPSK)	LTE-TDD	9.24	±9.6
10262	CAH	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 16-QAM)	LTE-TDD	9.83	±9.6
10263	CAH	LTE-TDD (SC-FDMA, 100% RB, 5MHz, 64-QAM)	LTE-TDD	10.16	±9.6
10264	CAH	LTE-TDD (SC-FDMA, 100% RB, 5MHz, QPSK)	LTE-TDD	9.23	±9.6
10265	CAH	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 16-QAM)	LTE-TDD	9.92	±9.6
10266	CAH	LTE-TDD (SC-FDMA, 100% RB, 10MHz, 64-QAM)	LTE-TDD	10.07	±9.6
10267	CAH	LTE-TDD (SC-FDMA, 100% RB, 10MHz, QPSK)	LTE-TDD	9.03	±9.6
10268	CAG	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 16-QAM)	LTE-TDD	10.06	±9.6
10269	CAG	LTE-TDD (SC-FDMA, 100% RB, 15MHz, 64-QAM)	LTE-TDD	10.13	±9.6
10270	CAG	LTE-TDD (SC-FDMA, 100% RB, 15MHz, QPSK)	LTE-TDD	9.58	±9.6
10274	CAC	UMTS-FDD (HSPA, Subtest 5, 3GPP R0B16)	WCDMA	4.87	±9.6
10275	CAC	UMTS-FDD (HSPA, Subtest 5, 3GPP R0B16)	WCDMA	3.96	±9.6
10277	CAA	PHS (QPSK)	PHS	11.81	±9.6
10278	CAA	PHS (QPSK, BW 634 MHz, Rn c1 3.5)	PHS	11.81	±9.6
10279	CAA	PHS (QPSK, BW 634 MHz, Rn c1 3.5)	PHS	12.18	±9.6
10290	AAB	CDMA2000, RC1, SQ55, Full Rate	CDMA2000	3.91	±9.6
10291	AAB	CDMA2000, RC3, SQ55, Full Rate	CDMA2000	3.46	±9.6
10292	AAB	CDMA2000, RC3, SQ32, Full Rate	CDMA2000	3.39	±9.6
10293	AAB	CDMA2000, RC3, SQ3, Full Rate	CDMA2000	3.50	±9.6
10295	AAB	CDMA2000, RC1, SQ1, 1/8th Rate 25.4	CDMA2000	12.49	±9.6
10297	AAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.61	±9.6
10298	AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	±9.6
10299	AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	±9.6
10300	AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	5.60	±9.6
10301	AAA	IEEE 802.16e WMAX (29 18, 5ms, 10MHz, QPSK, PUSC)	W MAX	12.03	±9.6
10302	AAA	IEEE 802.16e WMAX (29 18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	W MAX	12.57	±9.6
10303	AAA	IEEE 802.16e WMAX (29 18, 5ms, 10MHz, 64QAM, PUSC)	W MAX	12.52	±9.6
10304	AAA	IEEE 802.16e WMAX (29 18, 5ms, 10MHz, 64QAM, PUSC)	W MAX	11.86	±9.6
10305	AAA	IEEE 802.16e WMAX (29 18, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	W MAX	15.24	±9.6
10306	AAA	IEEE 802.16e WMAX (29 18, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	W MAX	14.67	±9.6

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10307	AAA	IEEE 802.11a WiMAX (29.18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	WiMAX	14.49	±9.6
10308	AAA	IEEE 802.11a WiMAX (29.18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	±9.6
10309	AAA	IEEE 802.11a WiMAX (29.18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	WiMAX	14.58	±9.6
10310	AAA	IEEE 802.11a WiMAX (29.18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	WiMAX	14.57	±9.6
10311	AAC	LTE-FDD (SC-FDMA, 100% RB, 15MHz, QPSK)	LTE-FDD	8.08	±9.6
10313	AAA	CDEN 1.3	ISDN	10.51	±9.6
10314	AAA	CDEN 1.0	ISDN	13.48	±9.6
10315	AAB	IEEE 802.11b Wi-Fi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.71	±9.6
10316	AAB	IEEE 802.11g Wi-Fi 2.4 GHz (ERP-OFDM, 6Mbps, 99pc duty cycle)	WLAN	8.36	±9.6
10317	AAB	IEEE 802.11a Wi-Fi 5 GHz (OFDM, 6Mbps, 99pc duty cycle)	WLAN	8.36	±9.6
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	13.00	±9.6
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	8.99	±9.6
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.58	±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	AAC	IEEE 802.11ac Wi-Fi (20MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	±9.6
10401	AAB	IEEE 802.11ac Wi-Fi (40MHz, 64-QAM, 99pc duty cycle)	WLAN	8.60	±9.6
10402	AAB	IEEE 802.11ac Wi-Fi (80MHz, 64-QAM, 99pc duty cycle)	WLAN	8.53	±9.6
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	±9.6
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	±9.6
10406	AAB	CDMA2000, RCS, S032, SCH0, Full Rate	CDMA2000	5.22	±9.6
10410	AAB	LTE-TDD (SC-FDMA, 1 RB, 10MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	LTE-TDD	7.32	±9.6
10414	AAA	WLAN CDDF, 64-QAM, 40MHz	Generic	8.54	±9.6
10415	AAA	IEEE 802.11b Wi-Fi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.54	±9.6
10416	AAA	IEEE 802.11g Wi-Fi 2.4 GHz (ERP-OFDM, 6Mbps, 99pc duty cycle)	WLAN	8.23	±9.6
10417	AAC	IEEE 802.11a Wi-Fi 5 GHz (OFDM, 6Mbps, 99pc duty cycle)	WLAN	8.23	±9.6
10418	AAA	IEEE 802.11g Wi-Fi 2.4 GHz (DSSS-OFDM, 6Mbps, 99pc duty cycle, Long preamble)	WLAN	9.14	±9.6
10419	AAA	IEEE 802.11g Wi-Fi 2.4 GHz (DSSS-OFDM, 6Mbps, 99pc duty cycle, Short preamble)	WLAN	8.19	±9.6
10422	AAC	IEEE 802.11n (HT Greenfield, 7.2Mbps, 50%)	WLAN	9.32	±9.6
10423	AAC	IEEE 802.11n (HT Greenfield, 43.3Mbps, 16-QAM)	WLAN	8.47	±9.6
10424	AAC	IEEE 802.11n (HT Greenfield, 72.3Mbps, 64-QAM)	WLAN	8.40	±9.6
10425	AAC	IEEE 802.11n (HT Greenfield, 15Mbps, BPSK)	WLAN	8.41	±9.6
10426	AAC	IEEE 802.11n (HT Greenfield, 30Mbps, 16-QAM)	WLAN	8.45	±9.6
10427	AAC	IEEE 802.11n (HT Greenfield, 150Mbps, 64-QAM)	WLAN	8.41	±9.6
10430	AAC	LTE-FDD (OFDMA, 5MHz, E-TM 3.1)	LTE-FDD	8.28	±9.6
10431	AAC	LTE-FDD (OFDMA, 10MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6
10432	AAC	LTE-FDD (OFDMA, 15MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10433	AAC	LTE-FDD (OFDMA, 20MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10434	AAB	WCDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	±9.6
10435	AAC	LTE-TDD (SC-FDMA, 1 RB, 20MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10447	AAC	LTE-FDD (OFDMA, 5MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	±9.6
10448	AAC	LTE-FDD (OFDMA, 10MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±9.6
10449	AAC	LTE-FDD (OFDMA, 15MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±9.6
10450	AAC	LTE-FDD (OFDMA, 20MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	±9.6
10451	AAB	WCDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	±9.6
10453	AAC	Wavelength/Square, 10ms, 1ms)	CS	10.30	±9.6
10456	AAC	IEEE 802.11ac Wi-Fi (80MHz, 64-QAM, 99pc duty cycle)	WLAN	8.53	±9.6
10457	AAB	UMTS-FDD (DC-HSDPA)	WCDMA	8.62	±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	AAB	UMTS-FDD (WCDMA, AMR)	WCDMA	2.35	±9.6
10461	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.02	±9.6
10462	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.30	±9.6
10463	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	±9.6
10464	AAC	LTE-TDD (SC-FDMA, 1 RB, 3MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±9.6
10467	AAC	LTE-TDD (SC-FDMA, 1 RB, 5MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10468	AAC	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6
10469	AAC	LTE-TDD (SC-FDMA, 1 RB, 5MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	±9.6
10470	AAC	LTE-TDD (SC-FDMA, 1 RB, 10MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10471	AAC	LTE-TDD (SC-FDMA, 1 RB, 10MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6



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1C472	AAC	LTE-TDD (SC-FDMA) 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.57	±9.6
1C473	AAC	LTE-TDD (SC-FDMA) 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.82	±9.6
1C474	AAC	LTE-TDD (SC-FDMA) 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.32	±9.6
1C475	AAC	LTE-TDD (SC-FDMA) 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.37	±9.6
1C477	AAC	LTE-TDD (SC-FDMA) 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	9.32	±9.6
1C478	AAC	LTE-TDD (SC-FDMA) 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.57	±9.6
1C479	AAC	LTE-TDD (SC-FDMA) 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.71	±9.6
1C480	AAC	LTE-TDD (SC-FDMA) 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.18	±9.6
1C481	AAC	LTE-TDD (SC-FDMA) 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.45	±9.6
1C482	AAC	LTE-TDD (SC-FDMA) 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.71	±9.6
1C483	AAC	LTE-TDD (SC-FDMA) 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.39	±9.6
1C484	AAC	LTE-TDD (SC-FDMA) 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.47	±9.6
1C485	AAC	LTE-TDD (SC-FDMA) 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.59	±9.6
1C486	AAC	LTE-TDD (SC-FDMA) 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.53	±9.6
1C487	AAC	LTE-TDD (SC-FDMA) 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.60	±9.6
1C488	AAC	LTE-TDD (SC-FDMA) 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.70	±9.6
1C489	AAC	LTE-TDD (SC-FDMA) 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.31	±9.6
1C490	AAC	LTE-TDD (SC-FDMA) 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.54	±9.6
1C491	AAC	LTE-TDD (SC-FDMA) 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.74	±9.6
1C492	AAC	LTE-TDD (SC-FDMA) 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.41	±9.6
1C493	AAC	LTE-TDD (SC-FDMA) 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.55	±9.6
1C494	AAC	LTE-TDD (SC-FDMA) 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.74	±9.6
1C495	AAC	LTE-TDD (SC-FDMA) 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.37	±9.6
1C496	AAC	LTE-TDD (SC-FDMA) 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.54	±9.6
1C497	AAC	LTE-TDD (SC-FDMA) 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.57	±9.6
1C498	AAC	LTE-TDD (SC-FDMA) 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.43	±9.6
1C499	AAC	LTE-TDD (SC-FDMA) 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.68	±9.6
1C500	AAC	LTE-TDD (SC-FDMA) 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.67	±9.6
1C501	AAC	LTE-TDD (SC-FDMA) 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.44	±9.6
1C502	AAC	LTE-TDD (SC-FDMA) 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.52	±9.6
1C503	AAC	LTE-TDD (SC-FDMA) 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.72	±9.6
1C504	AAC	LTE-TDD (SC-FDMA) 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.31	±9.6
1C505	AAC	LTE-TDD (SC-FDMA) 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.54	±9.6
1C506	AAC	LTE-TDD (SC-FDMA) 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.74	±9.6
1C507	AAC	LTE-TDD (SC-FDMA) 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.36	±9.6
1C508	AAC	LTE-TDD (SC-FDMA) 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.55	±9.6
1C509	AAC	LTE-TDD (SC-FDMA) 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.98	±9.6
1C510	AAC	LTE-TDD (SC-FDMA) 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.49	±9.6
1C511	AAC	LTE-TDD (SC-FDMA) 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.51	±9.6
1C512	AAC	LTE-TDD (SC-FDMA) 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9	LTE-TDD	7.74	±9.6
1C513	AAC	LTE-TDD (SC-FDMA) 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.42	±9.6
1C514	AAC	LTE-TDD (SC-FDMA) 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9	LTE-TDD	8.45	±9.6
1C515	AAC	IEEE 802.11b Wi-Fi 2.4 GHz DSSS, 2 Mbps, 99pc duty cycle	WLAN	1.58	±9.6
1C516	AAC	IEEE 802.11b Wi-Fi 2.4 GHz DSSS, 5.5 Mbps, 99pc duty cycle	WLAN	1.57	±9.6
1C517	AAC	IEEE 802.11b Wi-Fi 2.4 GHz DSSS, 11 Mbps, 99pc duty cycle	WLAN	1.58	±9.6
1C518	AAC	IEEE 802.11a Wi-Fi 5 GHz OFDM, 9 Mbps, 99pc duty cycle	WLAN	8.23	±9.6
1C519	AAC	IEEE 802.11a Wi-Fi 5 GHz OFDM, 12 Mbps, 99pc duty cycle	WLAN	8.39	±9.6
1C520	AAC	IEEE 802.11a Wi-Fi 5 GHz OFDM, 18 Mbps, 99pc duty cycle	WLAN	8.12	±9.6
1C521	AAC	IEEE 802.11a Wi-Fi 5 GHz OFDM, 24 Mbps, 99pc duty cycle	WLAN	7.97	±9.6
1C522	AAC	IEEE 802.11a Wi-Fi 5 GHz OFDM, 36 Mbps, 99pc duty cycle	WLAN	8.45	±9.6
1C523	AAC	IEEE 802.11a Wi-Fi 5 GHz OFDM, 48 Mbps, 99pc duty cycle	WLAN	8.03	±9.6
1C524	AAC	IEEE 802.11a Wi-Fi 5 GHz OFDM, 54 Mbps, 99pc duty cycle	WLAN	8.27	±9.6
1C525	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS0), 99pc duty cycle	WLAN	8.39	±9.6
1C526	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS1), 99pc duty cycle	WLAN	8.42	±9.6
1C527	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS2), 99pc duty cycle	WLAN	8.21	±9.6
1C528	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS3), 99pc duty cycle	WLAN	8.35	±9.6
1C529	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS4), 99pc duty cycle	WLAN	8.36	±9.6
1C530	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS5), 99pc duty cycle	WLAN	8.43	±9.6
1C531	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS6), 99pc duty cycle	WLAN	8.29	±9.6
1C532	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS7), 99pc duty cycle	WLAN	8.38	±9.6
1C533	AAC	IEEE 802.11ac Wi-Fi (20 MHz, MCS8), 99pc duty cycle	WLAN	8.45	±9.6
1C534	AAC	IEEE 802.11ac Wi-Fi (40 MHz, MCS0), 99pc duty cycle	WLAN	8.45	±9.6
1C535	AAC	IEEE 802.11ac Wi-Fi (40 MHz, MCS1), 99pc duty cycle	WLAN	8.45	±9.6
1C536	AAC	IEEE 802.11ac Wi-Fi (40 MHz, MCS2), 99pc duty cycle	WLAN	8.39	±9.6
1C537	AAC	IEEE 802.11ac Wi-Fi (40 MHz, MCS3), 99pc duty cycle	WLAN	8.44	±9.6
1C538	AAC	IEEE 802.11ac Wi-Fi (40 MHz, MCS4), 99pc duty cycle	WLAN	8.54	±9.6
1C540	AAC	IEEE 802.11ac Wi-Fi (40 MHz, MCS5), 99pc duty cycle	WLAN	8.39	±9.6



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10541	AAC	IEEE 802.11ac WiFi (43MHz, MCS7, 99pc duty cycle)	WLAN	9.46	±9.6
10542	AAC	IEEE 802.11ac WiFi (43MHz, MCS8, 99pc duty cycle)	WLAN	9.65	±9.6
10543	AAC	IEEE 802.11ac WiFi (43MHz, MCS9, 99pc duty cycle)	WLAN	9.85	±9.6
10544	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	WLAN	8.47	±9.6
10545	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	WLAN	8.55	±9.6
10546	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	WLAN	8.55	±9.6
10547	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	WLAN	8.49	±9.6
10548	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	WLAN	8.57	±9.6
10550	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	WLAN	8.39	±9.6
10551	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	WLAN	8.50	±9.6
10552	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	WLAN	8.42	±9.6
10553	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	WLAN	8.45	±9.6
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	WLAN	8.48	±9.6
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	WLAN	8.50	±9.6
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	WLAN	8.52	±9.6
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	WLAN	8.51	±9.6
10559	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 99pc duty cycle)	WLAN	8.73	±9.6
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	WLAN	8.56	±9.6
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	WLAN	8.59	±9.6
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	WLAN	8.77	±9.6
10563	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	WLAN	8.25	±9.6
10564	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 9Mbps, 99pc duty cycle)	WLAN	8.45	±9.6
10565	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 12Mbps, 99pc duty cycle)	WLAN	8.13	±9.6
10566	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 18Mbps, 99pc duty cycle)	WLAN	6.00	±9.6
10567	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 24Mbps, 99pc duty cycle)	WLAN	6.37	±9.6
10568	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 36Mbps, 99pc duty cycle)	WLAN	6.10	±9.6
10569	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 48Mbps, 99pc duty cycle)	WLAN	6.30	±9.6
10570	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 54Mbps, 99pc duty cycle)	WLAN	1.99	±9.6
10571	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 1Mbps, 99pc duty cycle)	WLAN	1.98	±9.6
10572	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 2Mbps, 99pc duty cycle)	WLAN	1.98	±9.6
10573	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 5.5Mbps, 99pc duty cycle)	WLAN	1.98	±9.6
10574	AAA	IEEE 802.11b WiFi 2.4GHz (DSSS, 11Mbps, 99pc duty cycle)	WLAN	1.98	±9.6
10575	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 6Mbps, 99pc duty cycle)	WLAN	9.55	±9.6
10576	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 9Mbps, 99pc duty cycle)	WLAN	9.60	±9.6
10577	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 12Mbps, 99pc duty cycle)	WLAN	8.70	±9.6
10578	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 18Mbps, 99pc duty cycle)	WLAN	8.49	±9.6
10579	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 24Mbps, 99pc duty cycle)	WLAN	8.36	±9.6
10580	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 36Mbps, 99pc duty cycle)	WLAN	8.76	±9.6
10581	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 48Mbps, 99pc duty cycle)	WLAN	8.35	±9.6
10582	AAA	IEEE 802.11g WiFi 2.4GHz (DSSS-OFDM, 54Mbps, 99pc duty cycle)	WLAN	8.67	±9.6
10583	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 6Mbps, 99pc duty cycle)	WLAN	8.59	±9.6
10584	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 9Mbps, 99pc duty cycle)	WLAN	8.50	±9.6
10585	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 12Mbps, 99pc duty cycle)	WLAN	8.73	±9.6
10586	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 18Mbps, 99pc duty cycle)	WLAN	8.49	±9.6
10587	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 24Mbps, 99pc duty cycle)	WLAN	8.35	±9.6
10588	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 36Mbps, 99pc duty cycle)	WLAN	8.78	±9.6
10589	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 48Mbps, 99pc duty cycle)	WLAN	8.35	±9.6
10590	AAC	IEEE 802.11ah WiFi 5GHz (OFDM, 54Mbps, 99pc duty cycle)	WLAN	9.67	±9.6
10591	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS0, 99pc duty cycle)	WLAN	8.63	±9.6
10592	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS1, 99pc duty cycle)	WLAN	8.75	±9.6
10593	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS2, 99pc duty cycle)	WLAN	8.64	±9.6
10594	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS3, 99pc duty cycle)	WLAN	8.74	±9.6
10595	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS4, 99pc duty cycle)	WLAN	8.74	±9.6
10596	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS5, 99pc duty cycle)	WLAN	8.71	±9.6
10597	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS6, 99pc duty cycle)	WLAN	8.79	±9.6
10598	AAC	IEEE 802.11r (HT Mixed, 20MHz, MCS7, 99pc duty cycle)	WLAN	8.50	±9.6
10599	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 99pc duty cycle)	WLAN	8.79	±9.6
10600	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 99pc duty cycle)	WLAN	8.88	±9.6
10601	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 99pc duty cycle)	WLAN	8.82	±9.6
10602	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 99pc duty cycle)	WLAN	8.94	±9.6
10603	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 99pc duty cycle)	WLAN	9.03	±9.6
10604	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 99pc duty cycle)	WLAN	8.76	±9.6
10605	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 99pc duty cycle)	WLAN	8.97	±9.6
10606	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 99pc duty cycle)	WLAN	8.82	±9.6
10607	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	WLAN	8.54	±9.6
10608	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	WLAN	8.77	±9.6



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10609	AAC	IEEE 802.11ac WiFi (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.57	±9.6
10610	AAC	IEEE 802.11ac WiFi (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.78	±9.6
10611	AAC	IEEE 802.11ac WiFi (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6
10612	AAC	IEEE 802.11ac WiFi (20 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
10613	AAC	IEEE 802.11ac WiFi (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.54	±9.6
10614	AAC	IEEE 802.11ac WiFi (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.59	±9.6
10615	AAC	IEEE 802.11ac WiFi (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6
10616	AAC	IEEE 802.11ac WiFi (40 MHz, MCS0, 90pc duty cycle)	WLAN	8.82	±9.6
10617	AAC	IEEE 802.11ac WiFi (40 MHz, MCS1, 90pc duty cycle)	WLAN	8.51	±9.6
10618	AAC	IEEE 802.11ac WiFi (40 MHz, MCS2, 90pc duty cycle)	WLAN	8.58	±9.6
10619	AAC	IEEE 802.11ac WiFi (40 MHz, MCS3, 90pc duty cycle)	WLAN	8.86	±9.6
10620	AAC	IEEE 802.11ac WiFi (40 MHz, MCS4, 90pc duty cycle)	WLAN	8.87	±9.6
10621	AAC	IEEE 802.11ac WiFi (40 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
10622	AAC	IEEE 802.11ac WiFi (40 MHz, MCS6, 90pc duty cycle)	WLAN	8.58	±9.6
10623	AAC	IEEE 802.11ac WiFi (40 MHz, MCS7, 90pc duty cycle)	WLAN	8.82	±9.6
10624	AAC	IEEE 802.11ac WiFi (40 MHz, MCS8, 90pc duty cycle)	WLAN	8.90	±9.6
10625	AAC	IEEE 802.11ac WiFi (80 MHz, MCS0, 90pc duty cycle)	WLAN	8.96	±9.6
10626	AAC	IEEE 802.11ac WiFi (80 MHz, MCS1, 90pc duty cycle)	WLAN	8.83	±9.6
10627	AAC	IEEE 802.11ac WiFi (80 MHz, MCS2, 90pc duty cycle)	WLAN	8.88	±9.6
10628	AAC	IEEE 802.11ac WiFi (80 MHz, MCS3, 90pc duty cycle)	WLAN	8.71	±9.6
10629	AAC	IEEE 802.11ac WiFi (80 MHz, MCS4, 90pc duty cycle)	WLAN	8.85	±9.6
10630	AAC	IEEE 802.11ac WiFi (80 MHz, MCS5, 90pc duty cycle)	WLAN	8.72	±9.6
10631	AAC	IEEE 802.11ac WiFi (80 MHz, MCS6, 90pc duty cycle)	WLAN	8.81	±9.6
10632	AAC	IEEE 802.11ac WiFi (80 MHz, MCS7, 90pc duty cycle)	WLAN	8.74	±9.6
10633	AAC	IEEE 802.11ac WiFi (80 MHz, MCS8, 90pc duty cycle)	WLAN	8.83	±9.6
10634	AAC	IEEE 802.11ac WiFi (160 MHz, MCS0, 90pc duty cycle)	WLAN	8.80	±9.6
10635	AAC	IEEE 802.11ac WiFi (160 MHz, MCS1, 90pc duty cycle)	WLAN	8.81	±9.6
10636	AAC	IEEE 802.11ac WiFi (160 MHz, MCS2, 90pc duty cycle)	WLAN	8.63	±9.6
10637	AAC	IEEE 802.11ac WiFi (160 MHz, MCS3, 90pc duty cycle)	WLAN	8.79	±9.6
10638	AAC	IEEE 802.11ac WiFi (160 MHz, MCS4, 90pc duty cycle)	WLAN	8.85	±9.6
10639	AAC	IEEE 802.11ac WiFi (160 MHz, MCS5, 90pc duty cycle)	WLAN	8.85	±9.6
10640	AAC	IEEE 802.11ac WiFi (160 MHz, MCS6, 90pc duty cycle)	WLAN	8.98	±9.6
10641	AAC	IEEE 802.11ac WiFi (160 MHz, MCS7, 90pc duty cycle)	WLAN	9.06	±9.6
10642	AAC	IEEE 802.11ac WiFi (160 MHz, MCS8, 90pc duty cycle)	WLAN	9.06	±9.6
10643	AAC	IEEE 802.11ac WiFi (160 MHz, MCS9, 90pc duty cycle)	WLAN	9.09	±9.6
10644	AAC	IEEE 802.11ac WiFi (160 MHz, MCS10, 90pc duty cycle)	WLAN	9.05	±9.6
10645	AAC	IEEE 802.11ac WiFi (160 MHz, MCS11, 90pc duty cycle)	WLAN	9.11	±9.6
10646	AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	±9.6
10647	AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.56	±9.6
10648	AAC	CDMA2000 (1X Advanced)	CDMA2000	3.45	±9.6
10649	AAC	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	±9.6
10650	AAC	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	±9.6
10651	AAC	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	±9.6
10652	AAC	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	±9.6
10653	AAC	Pulse Waveform (200Hz, 10%)	Test	10.00	±9.6
10654	AAC	Pulse Waveform (200Hz, 20%)	Test	6.93	±9.6
10655	AAC	Pulse Waveform (200Hz, 40%)	Test	3.98	±9.6
10656	AAC	Pulse Waveform (200Hz, 60%)	Test	2.22	±9.6
10657	AAC	Pulse Waveform (200Hz, 80%)	Test	0.97	±9.6
10658	AAC	Bluetooth Low Energy	Bluetooth	2.10	±9.6
10659	AAC	IEEE 802.11ax (20 MHz, MCS0, 90pc duty cycle)	WLAN	9.09	±9.6
10660	AAC	IEEE 802.11ax (20 MHz, MCS1, 90pc duty cycle)	WLAN	8.57	±9.6
10661	AAC	IEEE 802.11ax (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.78	±9.6
10662	AAC	IEEE 802.11ax (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.74	±9.6
10663	AAC	IEEE 802.11ax (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.50	±9.6
10664	AAC	IEEE 802.11ax (20 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
10665	AAC	IEEE 802.11ax (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.73	±9.6
10666	AAC	IEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.76	±9.6
10667	AAC	IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.36	±9.6
10668	AAC	IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle)	WLAN	8.80	±9.6
10669	AAC	IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle)	WLAN	8.62	±9.6
10670	AAC	IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle)	WLAN	8.63	±9.6
10671	AAC	IEEE 802.11ax (20 MHz, MCS12, 90pc duty cycle)	WLAN	8.42	±9.6
10672	AAC	IEEE 802.11ax (20 MHz, MCS13, 90pc duty cycle)	WLAN	8.26	±9.6
10673	AAC	IEEE 802.11ax (20 MHz, MCS14, 90pc duty cycle)	WLAN	8.33	±9.6
10674	AAC	IEEE 802.11ax (20 MHz, MCS15, 90pc duty cycle)	WLAN	8.28	±9.6



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10687	AAC	IEEE 802.11ax (20 MHz, MCS4, 99pc duty cycle)	WLAN	8.45	±9.6
10688	AAC	IEEE 802.11ax (20 MHz, MCS5, 99pc duty cycle)	WLAN	8.29	±9.6
10689	AAC	IEEE 802.11ax (20 MHz, MCS6, 99pc duty cycle)	WLAN	8.55	±9.5
10690	AAC	IEEE 802.11ax (20 MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±9.5
10691	AAC	IEEE 802.11ax (20 MHz, MCS8, 99pc duty cycle)	WLAN	8.25	±9.6
10692	AAC	IEEE 802.11ax (20 MHz, MCS9, 99pc duty cycle)	WLAN	8.29	±9.6
10693	AAC	IEEE 802.11ax (20 MHz, MCS10, 99pc duty cycle)	WLAN	8.25	±9.6
10694	AAC	IEEE 802.11ax (20 MHz, MCS11, 99pc duty cycle)	WLAN	8.51	±9.6
10695	AAC	IEEE 802.11ax (40 MHz, MCS0, 99pc duty cycle)	WLAN	8.72	±9.6
10696	AAC	IEEE 802.11ax (40 MHz, MCS1, 99pc duty cycle)	WLAN	8.91	±9.5
10697	AAC	IEEE 802.11ax (40 MHz, MCS2, 99pc duty cycle)	WLAN	8.61	±9.5
10698	AAC	IEEE 802.11ax (40 MHz, MCS3, 99pc duty cycle)	WLAN	8.89	±9.5
10699	AAC	IEEE 802.11ax (40 MHz, MCS4, 99pc duty cycle)	WLAN	8.82	±9.5
10700	AAC	IEEE 802.11ax (40 MHz, MCS5, 99pc duty cycle)	WLAN	8.73	±9.6
10701	AAC	IEEE 802.11ax (40 MHz, MCS6, 99pc duty cycle)	WLAN	8.85	±9.6
10702	AAC	IEEE 802.11ax (40 MHz, MCS7, 99pc duty cycle)	WLAN	8.73	±9.6
10703	AAC	IEEE 802.11ax (40 MHz, MCS8, 99pc duty cycle)	WLAN	8.82	±9.6
10704	AAC	IEEE 802.11ax (40 MHz, MCS9, 99pc duty cycle)	WLAN	8.85	±9.6
10705	AAC	IEEE 802.11ax (40 MHz, MCS10, 99pc duty cycle)	WLAN	8.69	±9.6
10706	AAC	IEEE 802.11ax (40 MHz, MCS11, 99pc duty cycle)	WLAN	8.66	±9.6
10707	AAC	IEEE 802.11ax (40 MHz, MCS0, 99pc duty cycle)	WLAN	9.32	±9.6
10708	AAC	IEEE 802.11ax (40 MHz, MCS1, 99pc duty cycle)	WLAN	8.55	±9.6
10709	AAC	IEEE 802.11ax (40 MHz, MCS2, 99pc duty cycle)	WLAN	8.32	±9.6
10710	AAC	IEEE 802.11ax (40 MHz, MCS3, 99pc duty cycle)	WLAN	8.29	±9.6
10711	AAC	IEEE 802.11ax (40 MHz, MCS4, 99pc duty cycle)	WLAN	8.39	±9.6
10712	AAC	IEEE 802.11ax (40 MHz, MCS5, 99pc duty cycle)	WLAN	8.67	±9.6
10713	AAC	IEEE 802.11ax (40 MHz, MCS6, 99pc duty cycle)	WLAN	8.33	±9.6
10714	AAC	IEEE 802.11ax (40 MHz, MCS7, 99pc duty cycle)	WLAN	8.20	±9.6
10715	AAC	IEEE 802.11ax (40 MHz, MCS8, 99pc duty cycle)	WLAN	8.45	±9.6
10716	AAC	IEEE 802.11ax (40 MHz, MCS9, 99pc duty cycle)	WLAN	8.30	±9.5
10717	AAC	IEEE 802.11ax (40 MHz, MCS10, 99pc duty cycle)	WLAN	8.48	±9.6
10718	AAC	IEEE 802.11ax (40 MHz, MCS11, 99pc duty cycle)	WLAN	8.24	±9.5
10719	AAC	IEEE 802.11ax (80 MHz, MCS0, 99pc duty cycle)	WLAN	8.81	±9.6
10720	AAC	IEEE 802.11ax (80 MHz, MCS1, 99pc duty cycle)	WLAN	8.87	±9.5
10721	AAC	IEEE 802.11ax (80 MHz, MCS2, 99pc duty cycle)	WLAN	8.75	±9.5
10722	AAC	IEEE 802.11ax (80 MHz, MCS3, 99pc duty cycle)	WLAN	8.55	±9.6
10723	AAC	IEEE 802.11ax (80 MHz, MCS4, 99pc duty cycle)	WLAN	8.70	±9.6
10724	AAC	IEEE 802.11ax (80 MHz, MCS5, 99pc duty cycle)	WLAN	8.93	±9.6
10725	AAC	IEEE 802.11ax (80 MHz, MCS6, 99pc duty cycle)	WLAN	8.74	±9.6
10726	AAC	IEEE 802.11ax (80 MHz, MCS7, 99pc duty cycle)	WLAN	8.72	±9.6
10727	AAC	IEEE 802.11ax (80 MHz, MCS8, 99pc duty cycle)	WLAN	8.66	±9.6
10728	AAC	IEEE 802.11ax (80 MHz, MCS9, 99pc duty cycle)	WLAN	8.85	±9.6
10729	AAC	IEEE 802.11ax (80 MHz, MCS10, 99pc duty cycle)	WLAN	8.64	±9.6
10730	AAC	IEEE 802.11ax (80 MHz, MCS11, 99pc duty cycle)	WLAN	8.67	±9.6
10731	AAC	IEEE 802.11ax (80 MHz, MCS0, 99pc duty cycle)	WLAN	8.42	±9.6
10732	AAC	IEEE 802.11ax (80 MHz, MCS1, 99pc duty cycle)	WLAN	8.46	±9.6
10733	AAC	IEEE 802.11ax (80 MHz, MCS2, 99pc duty cycle)	WLAN	8.40	±9.6
10734	AAC	IEEE 802.11ax (80 MHz, MCS3, 99pc duty cycle)	WLAN	8.25	±9.6
10735	AAC	IEEE 802.11ax (80 MHz, MCS4, 99pc duty cycle)	WLAN	8.33	±9.6
10736	AAC	IEEE 802.11ax (80 MHz, MCS5, 99pc duty cycle)	WLAN	8.27	±9.6
10737	AAC	IEEE 802.11ax (80 MHz, MCS6, 99pc duty cycle)	WLAN	8.36	±9.6
10738	AAC	IEEE 802.11ax (80 MHz, MCS7, 99pc duty cycle)	WLAN	8.49	±9.6
10739	AAC	IEEE 802.11ax (80 MHz, MCS8, 99pc duty cycle)	WLAN	8.29	±9.6
10740	AAC	IEEE 802.11ax (80 MHz, MCS9, 99pc duty cycle)	WLAN	8.48	±9.6
10741	AAC	IEEE 802.11ax (80 MHz, MCS10, 99pc duty cycle)	WLAN	8.40	±9.6
10742	AAC	IEEE 802.11ax (80 MHz, MCS11, 99pc duty cycle)	WLAN	8.43	±9.6
10743	AAC	IEEE 802.11ax (160 MHz, MCS0, 99pc duty cycle)	WLAN	8.94	±9.6
10744	AAC	IEEE 802.11ax (160 MHz, MCS1, 99pc duty cycle)	WLAN	9.18	±9.6
10745	AAC	IEEE 802.11ax (160 MHz, MCS2, 99pc duty cycle)	WLAN	8.93	±9.6
10746	AAC	IEEE 802.11ax (160 MHz, MCS3, 99pc duty cycle)	WLAN	9.11	±9.6
10747	AAC	IEEE 802.11ax (160 MHz, MCS4, 99pc duty cycle)	WLAN	9.04	±9.6
10748	AAC	IEEE 802.11ax (160 MHz, MCS5, 99pc duty cycle)	WLAN	8.93	±9.6
10749	AAC	IEEE 802.11ax (160 MHz, MCS6, 99pc duty cycle)	WLAN	8.90	±9.6
10750	AAC	IEEE 802.11ax (160 MHz, MCS7, 99pc duty cycle)	WLAN	8.79	±9.6
10751	AAC	IEEE 802.11ax (160 MHz, MCS8, 99pc duty cycle)	WLAN	8.82	±9.6
10752	AAC	IEEE 802.11ax (160 MHz, MCS9, 99pc duty cycle)	WLAN	8.61	±9.6



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10753	AAC	IEEE 802.11ax (160 MHz, MCS 0, 99pc duty cycle)	WLAN	9.00	+9.6
10754	AAC	IEEE 802.11ax (160 MHz, MCS 1, 99pc duty cycle)	WLAN	9.04	+9.6
10755	AAC	IEEE 802.11ax (160 MHz, MCS 0, 99pc duty cycle)	WLAN	9.01	+9.6
10756	AAC	IEEE 802.11ax (160 MHz, MCS 1, 99pc duty cycle)	WLAN	9.77	+9.6
10757	AAC	IEEE 802.11ax (160 MHz, MCS 2, 99pc duty cycle)	WLAN	9.77	+9.6
10758	AAC	IEEE 802.11ax (160 MHz, MCS 3, 99pc duty cycle)	WLAN	9.69	+9.6
10759	AAC	IEEE 802.11ax (160 MHz, MCS 4, 99pc duty cycle)	WLAN	9.58	+9.6
10760	AAC	IEEE 802.11ax (160 MHz, MCS 5, 99pc duty cycle)	WLAN	9.49	+9.6
10761	AAC	IEEE 802.11ax (160 MHz, MCS 6, 99pc duty cycle)	WLAN	9.58	+9.6
10762	AAC	IEEE 802.11ax (160 MHz, MCS 7, 99pc duty cycle)	WLAN	9.49	+9.6
10763	AAC	IEEE 802.11ax (160 MHz, MCS 8, 99pc duty cycle)	WLAN	9.53	+9.6
10764	AAC	IEEE 802.11ax (160 MHz, MCS 9, 99pc duty cycle)	WLAN	9.54	+9.6
10765	AAC	IEEE 802.11ax (160 MHz, MCS 0, 99pc duty cycle)	WLAN	9.54	+9.6
10766	AAC	IEEE 802.11ax (160 MHz, MCS 1, 99pc duty cycle)	WLAN	9.51	+9.6
10767	AAC	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.99	+9.6
10768	AAC	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	+9.6
10769	AAC	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	+9.6
10770	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	+9.6
10771	AAC	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	+9.6
10772	AAC	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	+9.6
10773	AAC	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	+9.6
10774	AAC	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.32	+9.6
10775	AAC	5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	+9.6
10776	AAC	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	+9.6
10777	AAC	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	+9.6
10778	AAC	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	+9.6
10779	AAC	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	+9.6
10780	AAC	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	+9.6
10781	AAC	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	+9.6
10782	AAC	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	+9.6
10783	AAC	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.21	+9.6
10784	AAC	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	+9.6
10785	AAC	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	+9.6
10786	AAC	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	+9.6
10787	AAC	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	+9.6
10788	AAC	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	+9.6
10789	AAC	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	+9.6
10790	AAC	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	+9.6
10791	AAC	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	+9.6
10792	AAC	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	+9.6
10793	AAC	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	+9.6
10794	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	+9.6
10795	AAC	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.94	+9.6
10796	AAC	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	+9.6
10797	AAC	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.91	+9.6
10798	AAC	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	+9.6
10799	AAC	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	+9.6
10800	AAC	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	+9.6
10801	AAC	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	+9.6
10802	AAC	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	+9.6
10803	AAC	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	+9.6
10804	AAC	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	+9.6
10805	AAC	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	+9.6
10806	AAC	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	+9.6
10807	AAC	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	+9.6
10808	AAC	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	+9.6
10809	AAC	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	+9.6
10810	AAC	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	+9.6
10811	AAC	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	+9.6
10812	AAC	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	+9.6
10813	AAC	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	+9.6
10814	AAC	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	+9.6
10815	AAC	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	+9.6
10816	AAC	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	+9.6
10817	AAC	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	+9.6
10818	AAC	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	+9.6
10819	AAC	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	+9.6
10820	AAC	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	+9.6
10821	AAC	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	+9.6
10822	AAC	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	+9.6
10823	AAC	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	+9.6
10824	AAC	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	+9.6
10825	AAC	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	+9.6
10826	AAC	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	+9.6
10827	AAC	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	+9.6

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10829	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 50 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	7.03	±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	±9.5
10843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	±9.5
10844	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.54	±9.5
10846	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.5
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	8.35	±9.5
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	5.66	±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	3.39	±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	5.90	±9.6
10883	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.57	±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	6.6	±9.6
10886	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.63	±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	8.05	±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	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	±9.6
10898	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6
10899	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6
10900	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10901	AAD	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10902	AAD	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10903	AAD	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.58	±9.6
10904	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10905	AAD	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.58	±9.6
10906	AAD	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10907	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	±9.6
10908	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.6
10909	AAD	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.96	±9.6
10910	AAD	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	±9.6



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June 12, 2023

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ² k = 2
10911	AAR	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±0.6
10912	AAB	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10913	AAB	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10914	AAB	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±0.6
10915	AAB	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±0.6
10916	AAB	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±0.6
10917	AAB	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10918	AAC	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	±0.6
10919	AAB	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.65	±0.6
10920	AAB	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±0.6
10921	AAB	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10922	AAR	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±0.6
10923	AAB	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10924	AAB	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10925	AAB	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±0.6
10926	AAB	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10927	AAB	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±0.6
10928	AAC	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±0.6
10929	AAC	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±0.6
10930	AAC	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±0.6
10931	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±0.6
10932	AAC	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±0.6
10933	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±0.6
10934	AAC	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±0.6
10935	AAC	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±0.6
10936	AAC	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.50	±0.6
10937	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	±0.6
10938	AAC	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	±0.6
10939	AAC	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±0.6
10940	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±0.6
10941	AAC	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±0.6
10942	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±0.6
10943	AAC	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±0.6
10944	AAC	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±0.6
10945	AAC	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±0.6
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±0.6
10947	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±0.6
10948	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±0.6
10949	AAC	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±0.6
10950	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.84	±0.6
10951	AAC	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±0.6
10952	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	±0.6
10953	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	±0.6
10954	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	±0.6
10955	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	±0.6
10956	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	±0.6
10957	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	±0.6
10958	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	±0.6
10959	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	±0.6
10960	AAC	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	±0.6
10961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.25	±0.6
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	±0.6
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	±0.6
10964	AAC	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.23	±0.6
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	±0.6
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.55	±0.6
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	±0.6
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	±0.6
10972	AAR	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	±0.6
10974	AAB	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	±0.6
10974	AAB	5G NR (CP-OFDM, 1 RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	±0.6
10978	AAA	ULLA BDR	LLA	1.16	±0.6
10979	AAA	ULLA HDR	LLA	8.58	±0.6
10980	AAA	ULLA HDRs	LLA	10.32	±0.6
10981	AAA	ULLA HDRpt	LLA	3.19	±0.6
10982	AAA	ULLA HDRps	LLA	3.43	±0.6

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June 12, 2023

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10983	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.31	±9.6
10984	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	±9.6
10985	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.54	±9.6
10986	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	±9.6
10987	AAA	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.53	±9.5
10988	AAA	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.36	±9.6
10989	AAA	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	±9.6
10990	AAA	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.52	±9.6
11003	AAA	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	10.24	±9.6
11004	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	10.73	±9.6
11005	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	9.73	±9.6
11006	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	9.55	±9.6
11007	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.46	±9.6
11008	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.51	±9.6
11009	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.76	±9.6
11010	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.56	±9.6
11011	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.56	±9.6
11012	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.68	±9.6
11013	AAA	IEEE 802.11be (320 MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6
11014	AAA	IEEE 802.11be (320 MHz, MCS2, 99pc duty cycle)	WLAN	8.15	±9.6
11015	AAA	IEEE 802.11be (320 MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±9.6
11016	AAA	IEEE 802.11be (320 MHz, MCS4, 99pc duty cycle)	WLAN	8.44	±9.6
11017	AAA	IEEE 802.11be (320 MHz, MCS5, 99pc duty cycle)	WLAN	8.41	±9.6
11018	AAA	IEEE 802.11be (320 MHz, MCS6, 99pc duty cycle)	WLAN	8.43	±9.6
11019	AAA	IEEE 802.11be (320 MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±9.6
11020	AAA	IEEE 802.11be (320 MHz, MCS8, 99pc duty cycle)	WLAN	8.27	±9.6
11021	AAA	IEEE 802.11be (320 MHz, MCS9, 99pc duty cycle)	WLAN	8.46	±9.6
11022	AAA	IEEE 802.11be (320 MHz, MCS10, 99pc duty cycle)	WLAN	8.38	±9.6
11023	AAA	IEEE 802.11be (320 MHz, MCS11, 99pc duty cycle)	WLAN	8.09	±9.6
11024	AAA	IEEE 802.11be (320 MHz, MCS12, 99pc duty cycle)	WLAN	8.42	±9.6
11025	AAA	IEEE 802.11be (320 MHz, MCS13, 99pc duty cycle)	WLAN	8.37	±9.6
11026	AAA	IEEE 802.11be (320 MHz, MCS14, 99pc duty cycle)	WLAN	8.38	±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.

Calibration Laboratory of
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **TÜV SÜD**
Fareham, United Kingdom

Certificate No. **EX-7805_Apr23**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:7805**

Calibration procedure(s) **QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
QA CAL-25.v8
Calibration procedure for dosimetric E-field probes**

Calibration date **April 06, 2023**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3) °C and humidity < 70%.
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
OCP DAK-3.5 (weighted)	SN: 1249	20-Oct-22 (OCP-DAK3.5-1249_Oct22)	Oct-23
OCP DAK-12	SN: 1016	20-Oct-22 (OCP-DAK12-1016_Oct22)	Oct-23
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 660	16-Mar-23 (No. DAE4-660_Mar23)	Mar-24
Reference Probe ES3DV2	SN: 3013	06-Jan-23 (No. ES3-3013_Jan23)	Jan-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498067	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by	Name Jeffrey Katzman	Function Laboratory Technician	Signature 
Approved by	Name Sven Kühn	Function Technical Manager	Signature 

Issued: April 07, 2023

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

**Calibration Laboratory of
Schmid & Partner
Engineering AG**

Zeughausstrasse 43, 8004 Zurich, Switzerland



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,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 NORM_x (no uncertainty required).

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Parameters of Probe: EX3DV4 - SN:7805

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.62	0.60	0.71	±10.1%
DCP (mV) ^B	103.0	102.0	104.0	±4.7%

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Max Unc ^E k = 2
0	CW	X	0.00	0.00	1.00	0.00	114.0	±2.4%	±4.7%
		Y	0.00	0.00	1.00		113.6		
		Z	0.00	0.00	1.00		124.2		
10352	Pulse Waveform (200Hz, 10%)	X	1.35	60.00	6.03	10.00	60.0	±3.1%	±9.6%
		Y	1.68	61.71	7.29		60.0		
		Z	1.46	60.39	6.22		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	10.00	72.00	9.00	6.99	80.0	±2.5%	±9.6%
		Y	0.91	60.40	5.63		80.0		
		Z	0.84	60.00	5.00		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	0.45	60.00	3.80	3.98	95.0	±1.8%	±9.6%
		Y	0.46	60.00	4.49		95.0		
		Z	0.48	60.00	3.87		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	0.31	60.00	2.97	2.22	120.0	±1.9%	±9.6%
		Y	12.99	159.86	1.57		120.0		
		Z	10.02	84.67	3.26		120.0		
10387	QPSK Waveform, 1 MHz	X	0.63	67.34	14.78	1.00	150.0	±3.3%	±9.6%
		Y	0.56	64.10	12.53		150.0		
		Z	0.59	65.65	13.87		150.0		
10388	QPSK Waveform, 10 MHz	X	1.48	68.40	15.12	0.00	150.0	±1.0%	±9.6%
		Y	1.35	66.06	13.93		150.0		
		Z	1.42	67.37	14.72		150.0		
10396	64-QAM Waveform, 100 kHz	X	1.84	66.17	16.65	3.01	150.0	±1.2%	±9.6%
		Y	1.84	65.74	16.35		150.0		
		Z	1.64	64.22	15.77		150.0		
10399	64-QAM Waveform, 40 MHz	X	2.89	67.21	15.63	0.00	150.0	±1.7%	±9.6%
		Y	2.83	66.37	15.10		150.0		
		Z	2.85	66.76	15.39		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	3.81	66.67	15.60	0.00	150.0	±3.1%	±9.6%
		Y	3.80	66.03	15.25		150.0		
		Z	3.77	66.25	15.40		150.0		

Note: For details on UID parameters see Appendix

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

^A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Linearization parameter uncertainty for maximum specified field strength.

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



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Parameters of Probe: EX3DV4 - SN:7805

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	8.5	60.88	33.01	4.65	0.00	4.90	0.67	0.00	1.00
y	9.5	68.51	33.09	5.59	0.00	4.95	0.73	0.00	1.00
z	9.0	64.04	32.66	4.94	0.00	4.90	0.25	0.02	1.00

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-7.8°
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.

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Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k = 2)
128	52.8	0.76	12.30	12.30	12.30	0.00	1.25	±13.3%
450	43.5	0.87	10.62	10.62	10.62	0.16	1.30	±13.3%
750	41.9	0.89	9.02	9.55	9.06	0.39	1.27	±12.0%
835	41.5	0.90	8.96	9.50	9.01	0.38	1.27	±12.0%
900	41.5	0.97	8.93	9.61	9.03	0.38	1.27	±12.0%
1300	40.8	1.14	7.78	8.31	7.96	0.50	1.27	±12.0%
1450	40.5	1.20	7.69	8.18	7.86	0.47	1.27	±12.0%
1640	40.2	1.31	7.64	8.14	7.88	0.43	1.27	±12.0%
1750	40.1	1.37	8.00	8.66	8.21	0.26	1.27	±12.0%
1810	40.0	1.40	7.81	8.37	7.98	0.29	1.27	±12.0%
1900	40.0	1.40	7.65	8.19	7.83	0.29	1.27	±12.0%
2000	40.0	1.40	7.47	8.00	7.63	0.29	1.27	±12.0%
2100	39.8	1.49	7.33	7.85	7.47	0.30	1.27	±12.0%
2300	39.5	1.67	7.18	7.68	7.34	0.30	1.27	±12.0%
2450	39.2	1.80	7.04	7.51	7.18	0.29	1.27	±12.0%
2600	39.0	1.96	6.95	7.45	7.07	0.27	1.27	±12.0%
3300	38.2	2.71	6.66	7.13	6.76	0.34	1.27	±14.0%
3500	37.9	2.91	6.63	7.08	6.72	0.36	1.27	±14.0%
3700	37.7	3.12	6.52	6.97	6.64	0.35	1.27	±14.0%
4100	37.2	3.53	6.37	6.79	6.46	0.35	1.27	±14.0%
5200	36.0	4.66	5.21	5.54	5.30	0.30	1.67	±14.0%
5300	35.9	4.76	5.02	5.32	5.09	0.33	1.64	±14.0%
5500	35.6	4.96	4.82	5.07	4.89	0.36	1.61	±14.0%
5600	35.5	5.07	4.65	4.86	4.76	0.36	1.67	±14.0%
5800	35.3	5.27	4.66	4.92	4.77	0.34	1.87	±14.0%

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

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10%. If TSL with deviations from the target of less than ±5% are used, the calibration uncertainties are 11.1% for 0.7 - 3 GHz and 13.1% for 3 - 6 GHz.

^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.