Add value.
Inspire trust.

Report On

Specific Absorption Rate Testing of the
Apple Inc, Model: A2141

FCC ID: BCGA2121
IC ID: 579C-A2141

COMMERCIAL-IN-CONFIDENCE

Document 75946284-18 Issue 02 **November 2019**

TÜV SÜD, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

REPORT ON

Specific Absorption Rate Testing of the
Apple Inc, Model: A2141

Document 75946284-18 Issue 02

November 2019

PREPARED FOR

Apple Inc
One Apple Park Way
Cupertino
California 95014
USA

PREPARED BY

Stephen Dodd
Engineer (SAR and RF)

APPROVED BY

Jon Kenny
Authorised Signatory

DATED

04 November 2019

CONTENTS

SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the
A2141

1.1 REPORT MODIFICATION HISTORY

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
01	First Issue	23 October 2019
02	Antenna naming convention changes	04 November 2019

1.2 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate Testing of the A2141 to the requirements of KDB 447498 D01 v06 General RF Exposure Guidance.

Objective	To perform Specific Absorption Rate Testing to determine the Equipment Under Test's (EUT's) compliance with the requirements specified of KDB 447498 D01 v06 General RF Exposure Guidance, for the series of tests carried out.
Applicant	Apple Inc
Manufacturer	Apple Inc
Manufacturing Description	Laptop Computer
Model Number	A2141
Serial/IMEI Number(s)	C02YT009L51N (TSR9 Radiated Sample) C02YT00HL51N (TSR8 Conducted Sample)
Number of Samples Tested	2
Hardware Version	P3
Software Version	19A497
Battery Cell Manufacturer	Not Supplied
Battery Model Number	Not Supplied
Test Specification/Issue/Date	KDB 447498 D01 v06 General RF Exposure Guidance
Order Number	0540180115
Date of Receipt of EUT	11-Aug-2019
Start of Test	13-Aug-2019
Finish of Test	03/09/2019
Related Document(s)	FCC 47CFR 2.1093: 2015 KDB 865664 – D01 v01r04 KDB 865664 – D02 v01r02 KDB 648474 – D04 v01r03 KDB 447498 – D01 v06 IEEE 1528-2013 KDB 248227 – D01 v02r02 RSS 102 Issue 5.
Name of Engineer(s)	Aasim Butt Michael Evans Mohamud Mohamud Stephen Dodd

1.3 BRIEF SUMMARY OF RESULTS

The measurements shown in this report were made in accordance with the procedures specified KDB 447498 D01 v06 General RF Exposure Guidance.

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

Max 1g SAR (W/kg) Body	**0.96** (Measured)	**0.96** (Scaled)
The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure Partial Body of 1.6 W/kg.		

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

RAT	Band	Test Configuration	Max Reported SAR (W/kg)	Highest Simultaneous Transmission SAR (W/kg)
Bluetooth	2450 MHz	Body	0.25	**1.21**
WLAN	2450 MHz	Body	0.78	
WLAN	5200 MHz	Body	**0.96**	
WLAN	5500 MHz	Body	0.89	
WLAN	5800 MHz	Body	0.76	
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 Partial Body of 1.6 W/kg.				

1.4 TEST RESULTS SUMMARY

1.4.1 System Performance / Validation Check Results

Prior to formal testing being performed a System Check was performed in accordance with KDB 865664 and the results were compared against published data in Standard IEEE 1528-2013. The following results were obtained: -

System performance / Validation results

Date	Frequency (MHz)	Max 1g SAR (W/kg) *	Percentage Drift on Reference
12/08/2019	2450 MHz	55.34	8.09
14/08/2019	2450 MHz	50.56	-1.25
14/08/2019	5200 MHz	70.46	-1.87
15/08/2019	5600 MHz	73.65	-3.22
19/08/2019	5200 MHz	66.88	-6.85
19/08/2019	5600 MHz	76.04	-0.08
21/08/2019	5800 MHz	73.25	-1.15
22/08/2019	5200 MHz	69.67	-2.97
22/08/2019	5600 MHz	79.62	4.63
28/08/2019	5200 MHz	64.89	-9.62
27/08/2019	5800 MHz	80.02	7.99
30/08/2019	5200 MHz	66.88	-6.85
30/08/2019	5600 MHz	73.25	-3.75
31/08/2019	5600 MHz	72.85	-4.27
31/08/2019	5800 MHz	73.25	-1.15
03/09/2019	5600 MHz	77.23	1.48

*Normalised to a forward power of 1W

1.4.2 Results Summary Tables

Bluetooth - 2450 MHz - BDR - DH5 - Antenna WF1:
Specific Absorption Rate (Maximum 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 - Bottom	39	2441	11.8	12.0	0.24	0.25	3
0mm - Rear Of Display	39	2441	11.8	12.0	0.02	0.02	4
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps - SISO Antenna WF2:
Specific Absorption Rate (Maximum 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 - Bottom	6	2437	17.0	17.0	0.63	0.63	5
0mm - Rear Of Display	6	2437	17.0	17.0	0.05	0.05	6
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps - SISO Antenna WF1:
Specific Absorption Rate (Maximum 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 - Bottom	6	2437	17.0	17.0	0.69	0.69	7
0mm - Rear Of Display	6	2437	17.0	17.0	0.05	0.05	8
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps - SISO Antenna WF3:
Specific Absorption Rate (Maximum 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 - Bottom	6	2437	17.0	17.0	0.54	0.58	9
0mm - Rear Of Display	6	2437	17.0	17.0	0.04	0.05	10
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps - SISO Antenna WF3 (Auxiliary):
Specific Absorption Rate (Maximum 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 Bottom	11	2462	16.9	17.0	0.65	0.67	11
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps - SISO Antenna WF3 (Auxiliary - Low Power):
Specific Absorption Rate (Maximum 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 Bottom	11	2462	10.0	10.0	0.13	0.13	12
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps – 2x2 MIMO - Antenna WF2 and 1:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	11	2462	16.8	17.0	0.62	0.65	13
0mm Bottom	Antenna WF1	11	2462	17.0	17.0	0.78	0.78	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 Worst case position which was found in 2.4Ghz SISO testing was used.								

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps – 2x2 MIMO - Antenna WF2 and 2:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	11	2462	16.9	17.0	0.58	0.59	14
0mm Bottom	Antenna WF3	11	2462	16.7	17.0	0.65	0.69	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 Worst case position which was found in 2.4Ghz SISO testing was used.								

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps – 2x2 MIMO - Antenna WF1 and 2:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF1	11	2462	16.9	17.0	0.62	0.63	15
0mm Bottom	Antenna WF3	11	2462	16.8	17.0	0.73	0.77	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 Worst case position which was found in 2.4Ghz SISO testing was used.								

WLAN - 2450 MHz - 802.11b - 20 MHz - 1 Mbps – 3x3 MIMO - Antenna WF1,2 and 3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	1	2412	16.7	17.0	0.65	0.70	16
0mm Bottom	Antenna WF1	1	2412	16.9	17.0	0.53	0.54	
0mm Bottom	Antenna WF3	1	2412	16.8	17.0	0.48	0.50	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 Worst case position which was found in 2.4Ghz SISO testing was used.								

WLAN - U-NII-1 - 802.11n - 40 MHz - MCS0 - SISO Antenna WF2
Specific Absorption Rate(Maximum 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 Bottom	46	5230	13.5	13.5	0.71	0.71	17
0mm Rear Of Display	46	5230	13.5	13.5	0.15	0.15	18
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1 - 802.11n - 40 MHz - MCS0 - SISO Antenna WF1
Specific Absorption Rate(Maximum 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 Bottom	46	5230	13.5	13.5	0.96	**0.96**	19
0mm Rear Display	46	5230	13.5	13.5	0.13	0.13	20
0mm Bottom	38	5190	13.5	13.5	0.67	0.67	21
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1 - 802.11n - 40 MHz - MCS0 - SISO Antenna WF3
Specific Absorption Rate(Maximum 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 Bottom Edge	46	5230	13.4	13.5	0.68	0.70	22
0mm Rear Display	46	5230	13.5	13.5	0.10	0.11	23
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1 - 802.11n - 40 MHz - MCS0 - SISO Antenna WF3 (Auxiliary):
Specific Absorption Rate (Maximum 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 Bottom	38	5190	13.4	13.5	0.74	0.76	24
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1 - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF3 (Auxiliary - Low Power):
Specific Absorption Rate (Maximum 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 Bottom	42	5210	6.4	6.5	0.16	0.16	25
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)							

WLAN - U-NII-1 - 802.11n - 20 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF1:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	36	5180	13.5	13.5	0.55	0.55	26
0mm Bottom	Antenna WF1	36	5180	13.2	13.5	0.61	0.65	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used. Note: U-NII-1 MIMO SAR results apply to FCC only (EUT power is reduced for Canada – Additional tests perfomed for U-NII-2A)								

WLAN - U-NII-1 - 802.11n - 20 MHz - MCS0 - 2x2 MIMO - Antenna WF1 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF1	44	5220	13.3	13.5	0.84	0.88	27
0mm Bottom	Antenna WF3	44	5220	13.3	13.5	0.64	0.66	
0mm Bottom	Antenna WF1	48	5240	13.3	13.5	0.83	0.87	28
0mm Bottom	Antenna WF3	48	5240	13.2	13.5	0.71	0.76	
0mm Bottom	Antenna WF1	40	5200	13.3	13.5	0.83	0.87	29
0mm Bottom	Antenna WF3	40	5200	13.2	13.5	0.63	0.67	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used. Note: U-NII-1 MIMO SAR results apply to FCC only (EUT power is reduced for Canada – Additional tests perfomed for U-NII-2A)								

WLAN - U-NII-1 - 802.11n - 20 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	40	5200	13.4	13.5	0.75	0.77	30
0mm Bottom	Antenna WF3	40	5200	13.1	13.5	0.61	0.67	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used. Note: U-NII-1 MIMO SAR results apply to FCC only (EUT power is reduced for Canada – Additional tests perfomed for U-NII-2A)								

WLAN - U-NII-1 - 802.11n - 20 MHz - MCS0 – 3x3 MIMO - Antenna WF2,WF1 and 2WF3
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	40	5200	13.0	13.0	0.65	0.65	31
0mm Bottom	Antenna WF1	40	5200	12.6	13.0	0.74	0.82	
0mm Bottom	Antenna WF3	40	5200	12.6	13.0	0.53	0.58	
0mm Bottom	Antenna WF2	48	5240	12.9	13.0	0.71	0.72	32
0mm Bottom	Antenna WF1	48	5240	12.5	13.0	0.78	0.88	
0mm Bottom	Antenna WF3	48	5240	12.5	13.0	0.64	0.72	
0mm Bottom	Antenna WF2	36	5180	12.8	13.0	0.58	0.61	33
0mm Bottom	Antenna WF1	36	5180	12.5	13.0	0.68	0.77	
0mm Bottom	Antenna WF3	36	5180	12.5	13.0	0.53	0.59	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used. Note: U-NII-1 MIMO SAR results apply to FCC only (EUT power is reduced for Canada – Additional tests perfomed for U-NII-2A)								

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF2
Specific Absorption Rate(Maximum 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 Bottom	106	5530	12.4	12.5	0.66	0.68	34
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF1
Specific Absorption Rate(Maximum 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 Bottom	122	5610	12.5	12.5	0.80	0.80	35
0mm Bottom	106	5530	12.4	12.5	0.72	0.73	36
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF3
Specific Absorption Rate(Maximum 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 Face	138	5690	12.4	12.5	0.63	0.64	37
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF3 (Auxiliary):
Specific Absorption Rate(Maximum 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 Bottom	106	5530	12.5	12.5	0.86	0.86	38
0mm Bottom	122	5610	12.4	12.5	0.58	0.59	39
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF3 (Auxiliary - Low Power):
Specific Absorption Rate(Maximum 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 Bottom	122	5610	5.5	5.5	0.11	0.11	40
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF1:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	138	5690	12.2	12.5	0.81	0.86	41
0mm Bottom	Antenna WF1	138	5690	12.5	12.5	0.84	0.84	
0mm Bottom	Antenna WF2	122	5610	12.0	12.5	0.73	0.82	42
0mm Bottom	Antenna WF1	122	5610	12.4	12.5	0.79	0.81	
0mm Bottom	Antenna WF2	106	5530	12.2	12.5	0.66	0.71	43
0mm Bottom	Antenna WF1	106	5530	12.3	12.5	0.74	0.78	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - 2x2 MIMO - Antenna WF1 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF1	138	5690	12.5	12.5	0.74	0.74	44
0mm Bottom	Antenna WF3	138	5690	11.4	12.5	0.43	0.56	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	138	5690	12.3	12.5	0.75	0.79	45
0mm Bottom	Antenna WF3	138	5690	11.8	12.5	0.43	0.50	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-2C - 802.11ac - 80 MHz - MCS0 - 3x3 MIMO - Antenna WF2,WF1 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	122	5610	12.0	12.5	0.79	0.89	46
0mm Bottom	Antenna WF1	122	5610	12.4	12.5	0.78	0.80	
0mm Bottom	Antenna WF3	122	5610	11.2	12.5	0.43	0.58	
0mm Bottom	Antenna WF2	138	5690	11.9	12.5	0.67	0.77	47
0mm Bottom	Antenna WF1	138	5690	12.3	12.5	0.65	0.68	
0mm Bottom	Antenna WF3	138	5690	11.10	12.5	0.39	0.54	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF2
Specific Absorption Rate(Maximum 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 Bottom	155	5775	12.6	12.75	0.66	0.68	48
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF1
Specific Absorption Rate(Maximum 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 Bottom	155	5775	12.5	12.75	0.66	0.69	49
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF3
Specific Absorption Rate(Maximum 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 Bottom	155	5775	12.5	12.75	0.72	0.76	50
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF3 (Auxiliary):
Specific Absorption Rate(Maximum 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 Bottom	155	5775	12.7	12.75	0.72	0.72	51
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - SISO Antenna WF3 (Auxiliary - Low Power):
Specific Absorption Rate(Maximum 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 Bottom	155	5775	12.7	12.75	0.13	0.13	52
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.							

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF1:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	155	5775	12.6	12.75	0.68	0.70	53
0mm Bottom	Antenna WF1	155	5775	12.6	12.75	0.72	0.75	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - 2x2 MIMO - Antenna WF1 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF1	155	5775	12.6	12.75	0.69	0.72	54
0mm Bottom	Antenna WF3	155	5775	12.0	12.75	0.60	0.71	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	155	5775	12.5	12.75	0.62	0.66	55
0mm Bottom	Antenna WF3	155	5775	11.9	12.75	0.55	0.67	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-3 - 802.11ac - 80 MHz - MCS0 - 3x3 MIMO - Antenna WF2,WF1 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	155	5775	12.6	12.75	0.54	0.56	56
0mm Bottom	Antenna WF1	155	5775	12.7	12.75	0.63	0.63	
0mm Bottom	Antenna WF3	155	5775	12.0	12.75	0.54	0.65	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

Additional tests for ISED

Lower power was declared in the U-NII-1 band to meet Canada regulatory requirements which resulted in additional testing to be performed for the U-NII-2A Band.

WLAN - U-NII-2A - 802.11n - 20 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF1:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	64	5320	13.0	13.0	0.66	0.66	57
0mm Bottom	Antenna WF1	64	5320	12.8	13.0	0.78	0.82	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-2A - 802.11ac - 80 MHz - MCS0 - 2x2 MIMO - Antenna WF2 and WF3:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF1	52	5260	13.0	13.0	0.54	0.54	**58**
0mm Bottom	Antenna WF3	52	5260	12.5	13.0	0.57	0.64	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-2A - 802.11n - 20 MHz - MCS0 - 2x2 MIMO - Antenna WF1 and WF2:
Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	52	5260	13.0	13.0	0.78	0.78	59
0mm Bottom	Antenna WF3	52	5260	12.9	13.0	0.62	0.64	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

WLAN - U-NII-2A - 802.11n - 20 MHz - MCS0 - 3x3 MIMO - Antenna WF2,WF1 and WF3: Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Ant	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 Bottom	Antenna WF2	56	5280	13.0	13.0	0.68	0.68	60
0mm Bottom	Antenna WF1	56	5280	12.8	13.0	0.70	0.73	
0mm Bottom	Antenna WF3	56	5280	12.7	13.0	0.59	0.64	
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) Worst case position which was found in U-NII-1 SISO testing was used.								

1.4.3 Measurement Variability (KDB 865664 D01)

Repeated measurements are required only when the measured SAR is ≥ 0.80 W/kg. If the measured SAR value of the initial repeated measurement is < 1.45 W/kg with ≤ 20% variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds. The repeated measurement results must be clearly identified in the SAR report. All measured SAR, including the repeated results, must be considered to determine compliance.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2 to 4 do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Repeated measurements were required for the U-NII-1 and U-NII-2C frequency bands,
All results for 2.4GHz and U-NII- Bands were all lower than 0.8W/kg

U-NII-1 : SISO CORE 1

Test Position	Ant	Channel Number	Frequency (MHz)	Scaled 1g SAR (W/kg)	Test	Ratio
0mm Bottom	Antenna WF1	46	5230	0.96	Initial	1.08
0mm Bottom	Antenna WF1	46	5230	0.89	Repeated	

U-NII-2C : MIMO CORE 0,1,2

Test Position	Ant	Channel Number	Frequency (MHz)	Scaled 1g SAR (W/kg)	Test	Ratio
0mm Bottom	Antenna WF2	122	5610	0.89	Initial	1.10
0mm Bottom	Antenna WF2	122	5610	0.80	Repeated	

1.4.4 Standalone SAR Test Exclusion Considerations. (KDB 447498 D01)

The 1g SAR Test exclusion thresholds for 100 MHz to 6 GHz *test separation distances* ≤ 50 mm are determined by:

[(*max power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] [√f (GHz)]* ≤ 3.0, where

- f (GHz) is the RF channel transmit frequency in GHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison.
- When the maximum test separation distance is < 5 mm, a distance of 5 mm is applied.

RAT & Band	Frequency (MHz)	Power (dBm)	Power (mW)	Test Position	Distance (mm)	Threshold	Test Exclusion
Bluetooth - 2450 MHz	2402	12.0	15.85	Body	5	4.9	No
WLAN – 2450MHz	2412	17.0	50.12	Body	5	15.6	No
WLAN – U-NII-1	5180	13.5	22.39	Body	5	10.2	No
WLAN – U-NII-2A	5260	13.0	19.95	Body	5	9.2	No
WLAN – U-NII-2C	5500	12.5	17.78	Body	5	8.3	No
WLAN – U-NII-3	5745	13.5	22.39	Body	5	10.7	No

1.4.5 Simultaneous Transmission

Bluetooth	2.4 GHz WLAN													5 GHz WLAN												Sum* 1g SAR (W/Kg)
SISO	SISO			MIMO										SISO			MIMO									
				Antenna WF2 & Antenna WF1		Antenna WF2 & Antenna WF3		Antenna WF1 & Antenna WF3		Antenna WF2 & Antenna WF1 & Antenna WF3				Antenna WF2	Antenna WF1	Antenna WF3	Antenna WF2 & Antenna WF1		Antenna WF2 & Antenna WF3		Antenna WF1 & Antenna WF3	Antenna WF2 & Antenna WF1 & Antenna WF3					
Antenna WF1	Antenna WF2	Antenna WF1	Antenna WF3	Antenna WF2	Antenna WF1	Antenna WF2	Antenna WF3	Antenna WF1	Antenna WF3	Antenna WF2	Antenna WF1	Antenna WF3					Antenna WF2	Antenna WF1	Antenna WF2	Antenna WF3	Antenna WF1	Antenna WF3	Antenna WF2	Antenna WF1	Antenna WF3	
0.25	**0.63**																									n/a
0.25		**0.69**																								0.94
0.25			**0.58**																							n/a
0.25				0.65	**0.78**																					1.03
0.25						0.59	**0.69**																			n/a
0.25								**0.63**	0.77																	0.88
0.25										0.70	**0.54**	0.50														0.79
0.25													**0.74**													n/a
0.25														**0.96**												**1.21**
0.25															**0.79**											n/a
0.25																0.86	**0.84**									1.09
0.25																		**0.79**	0.5							n/a
0.25																				**0.88**	0.66					1.13
0.25																						0.72	**0.88**	0.72		1.13

- *The Antennas were spatially separated from one another to the extent that the SAR distributions from each antenna have no effect on one another. (Antennas > 50mm Separation distance between each other.) Therefore the Sum column of the table contains only the summation of simultaneous transmission technologies operating on the same antenna.

Simultaneous Dual Band Mode (Antenna WF3)

SDB Mode (Core2)				Sum* 1g SAR(W/Kg)
2.4GHz (Main)	5GHz (Main)	2.4GHz (Low Power)	5GHz (Low power)	
0.65	n/a	n/a	0.13	0.79
n/a	0.86	0.13	n/a	0.99

The EUT supports Simultaneous Dual Band (SDB) on Antenna WF3 which allows the device to transmit on different WLAN frequency bands at the same time. In SDB mode this antenna uses two cores (Auxiliary and Main). In this mode the Aux Core transmits at the standard power level whilst the Main Core operates in a low power mode.

1.4.6 Technical Description

The equipment under test (EUT) was a A2141 Laptop Computer. A full technical description can be found in the manufacturer's documentation.

1.4.7 Test Configuration and Modes of Operation

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

Supported technologies are Bluetooth (BDR/EDR/LE), 2.4 GHz WLAN 802.11b/g/n and 5 GHz WLAN 802.11a/n/ac. The EUT supports Simultaneous Dual Band (SDB) on Antenna WF3 which allows the device to transmit on different WLAN frequency bands at the same time. In SDB mode this antenna uses two cores (Auxiliary and Main). In this mode the Aux Core transmits at the standard power level whilst the Main Core operates in a low power mode.

WLAN and Bluetooth testing were achieved using the devices internal software, scripts and settings supplied by the customer. For each scan, the device was configured into a continuous transmission test mode at maximum power. 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 > 0.80 W/kg (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 ports) 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. MIMO testing was carried out on the bottom surface of the EUT only. (Worst case position of SISO results)

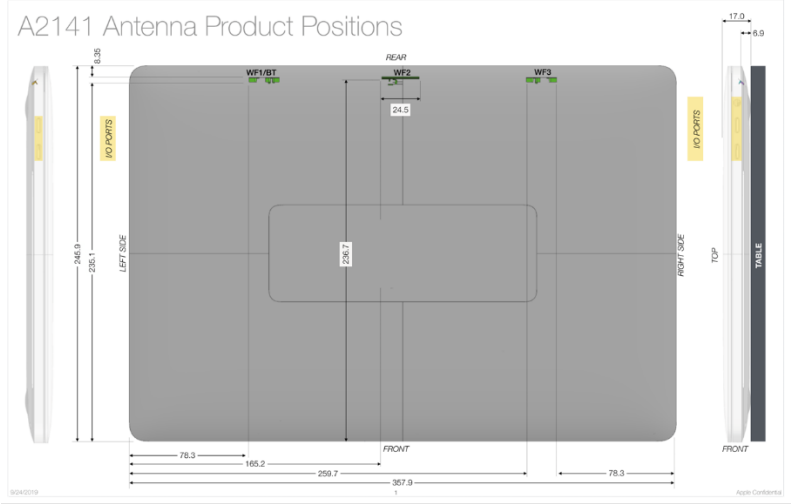


Figure 1 Antenna Location Diagram

2450 MHz 802.11g/n OFDM configurations met the test exclusion requirements of KDB 248227 D01 section 5.2.2 as the highest reported SAR for DSSS was adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR was ≤ 1.2 W/kg.

For the 5GHz 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.

The U-NII-2A Band was not tested for FCC as this met the test exclusion requirements of KDB 248227 D01 section 5.3.1. However, testing was performed in this band for ISED as lower output power was declared in the U-NII-1 band for Canada.

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 body simulant liquid. The dielectric properties were measured and found to be 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 for each test position along with photographs indicating the positioning of the EUT against the elliptical phantom as appropriate.

1.4.8 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.

1.5 POWER TABLES (TUNE UP VALUES)

Note: Power levels highlighted in blue apply to ISED only and values highlighted in green apply to FCC only. All other values are universal

Bluetooth – FCC and ISED

Band	Channel	BDR	EDR	LE/LE2M
2.4GHz	All	12	8.5	7.5

WLAN – FCC and ISED

Band	Channel	Center Frequency (MHz)	802.11b (SISO)	802.11g (SISO)	802.11n HT20 (SISO)	802.11n HT20 (2 Tx, DSSS)	802.11n HT20 (2 Tx, non-TXBF)	802.11n HT20 (2 Tx, TXBF)	802.11n HT20 (3 Tx, DSSS)	802.11n HT20 (3 Tx, non-TXBF)	802.11n HT20 (3 Tx, TXBF)
2.4GHz	1	2412	17	17	17	17	15	14.5	17	14	14
2.4GHz	2	2417	17	17	17	17	17	17	17	16.5	15.5
2.4GHz	3	2422	17	17	17	17	17	17	17	17	17
2.4GHz	4	2427	17	17	17	17	17	17	17	17	17
2.4GHz	5	2432	17	17	17	17	17	17	17	17	17
2.4GHz	6	2437	17	17	17	17	17	17	17	17	17
2.4GHz	7	2442	17	17	17	17	17	17	17	17	17
2.4GHz	8	2447	17	17	17	17	17	17	17	17	17
2.4GHz	9	2452	17	17	17	17	17	17	17	17	16.5
2.4GHz	10	2457	17	17	17	17	17	17	17	16.5	15.5
2.4GHz	11	2462	17	17	17	17	15	14	16.5	15	14
2.4GHz	12	2467	16	14	14	15	13	12	14	10.5	9.5
2.4GHz	13	2472	14	4	4	12	4	3	11.5	3	2

Band	Channel	Center Frequency (MHz)	802.11a (SISO)	802.11n HT20 (SISO)	802.11n HT20 (2 Tx CDD, non-TXBF)		802.11n HT20 (2 Tx SDM, non-TXBF)		802.11n HT20 (2 Tx, TXBF)		802.11n HT20 (3 Tx CDD, non-TXBF)		802.11n HT20 (3 Tx SDM, non-TXBF)		802.11n HT20 (3 Tx, TXBF)	
U-NII-1	36	5180	13.5	13.5	13.5	9	13.5	12	13.5	9	11	6	13	11	11	6
U-NII-1	40	5200	13.5	13.5	13.5	9	13.5	12	13.5	9	13.5	6	13.5	11	13.5	6
U-NII-1	44	5220	13.5	13.5	13.5	9	13.5	12	13.5	9	13.5	6	13.5	11	13.5	6
U-NII-1	48	5240	13.5	13.5	13.5	9	13.5	12	13.5	9	13.5	6	13.5	11	13.5	6
U-NII-2A	52	5260	13	13	13		13		13		13		13		13	
U-NII-2A	56	5280	13	13	13		13		13		13		13		13	
U-NII-2A	60	5300	13	13	13		13		13		13		13		13	
U-NII-2A	64	5320	13	13	13		13		13		11		12.5		10	
U-NII-2C	100	5500	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	104	5520	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	108	5540	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	112	5560	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	116	5580	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	120	5600	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	124	5620	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	128	5640	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	132	5660	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	136	5680	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-2C	140	5700	12.5	12.5	12.5		12.5		12.25		12		12.5		11	
U-NII-2C	144	5720	12.5	12.5	12.5		12.5		12.5		12.5		12.5		12.5	
U-NII-3	149	5745	12.75	12.75	12.75		12.75		12.75		12.75		12.75		12.75	
U-NII-3	153	5765	12.75	12.75	12.75		12.75		12.75		12.75		12.75		12.75	

U-NII-3	157	5785	12.75	12.75	12.75	12.75	12.75	12.75	12.75	12.75
U-NII-3	161	5805	12.75	12.75	12.75	12.75	12.75	12.75	12.75	12.75
U-NII-3	165	5825	12.75	12.75	12.75	12.75	12.75	12.75	12.75	12.75

Band	Channel	Center Frequency (MHz)	802.11n HT40 (1 Tx)	802.11n HT40 (2 Tx CDD, non-TXBF)		802.11n HT40 (2 Tx SDM, non-TXBF)	802.11n HT40 (2 Tx, TXBF)		802.11n HT40 (3 Tx CDD, non-TXBF)		802.11n HT40 (3 Tx SDM, non-TXBF)		802.11n HT40 (3 Tx, TXBF)	
U-NII-1	38	5190	13.5	13	12	13	12	11.25	11	9	12		10	8.25
U-NII-1	46	5230	13.5	13.5	12	13.5	13.5	11.25	13.5	9	13.5	13	13.5	8.25
U-NII-2A	54	5270	13	13		13	13		13		13		13	
U-NII-2A	62	5310	13	12.5		13	12		11		12.5		10	
U-NII-2C	102	5510	12.5	12.5		12.5	12		11.5		12.5		11	
U-NII-2C	110	5550	12.5	12.5		12.5	12.5		12.5		12.5		12.5	
U-NII-2C	118	5590	12.5	12.5		12.5	12.5		12.5		12.5		12.5	
U-NII-2C	126	5630	12.5	12.5		12.5	12.5		12.5		12.5		12.5	
U-NII-2C	134	5670	12.5	12.5		12.5	12.5		12.5		12.5		12.5	
U-NII-2C	142	5710	12.5	12.5		12.5	12.5		12.5		12.5		12.5	
U-NII-3	151	5755	12.75	12.75		12.75	12.75		12.75		12.75		12.75	
U-NII-3	159	5795	12.75	12.75		12.75	12.75		12.75		12.75		12.75	

Band	Channel	Center Frequency (MHz)	802.11ac VHT80 (1 Tx)	802.11ac VHT80 (2 Tx CDD, non-TXBF)	802.11ac VHT80 (2 Tx SDM, non-TXBF)	802.11ac VHT80 (2 Tx, TXBF)	802.11ac VHT80 (3 Tx CDD, non-TXBF)	802.11ac VHT80 (3 Tx SDM, non-TXBF)	802.11ac VHT80 (3 Tx, TXBF)	
U-NII-1	42	5210	13	12	12.5	11	10	10.5	9	8.25
U-NII-2A	58	5290	13	12	**13**	11	10.5	11	10	
U-NII-2C	106	5530	12.5	12	12.5	11	11	12	10	
U-NII-2C	122	5610	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
U-NII-2C	138	5690	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
U-NII-3	155	5775	12.75	12.75	12.75	12.75	12.75	12.75	12.75	

Simultaneous Dual Band

2.4GHz - Auxiliary Core

Band	Channel	Center Frequency (MHz)	802.11b (SISO)	802.11g (SISO)	802.11n HT20 (SISO)
2.4GHz	1	2412	17	15	15
2.4GHz	2	2417	17	17	17
2.4GHz	3	2422	17	17	17
2.4GHz	4	2427	17	17	17
2.4GHz	5	2432	17	17	17
2.4GHz	6	2437	17	17	17
2.4GHz	7	2442	17	17	17
2.4GHz	8	2447	17	17	17
2.4GHz	9	2452	17	17	17
2.4GHz	10	2457	17	16	16
2.4GHz	11	2462	17	15	15
2.4GHz	12	2467	17	12	12
2.4GHz	13	2472	15	4	4

2.4GHz - Auxiliary Core - Low Power Mode

Band	Channel	Center Frequency (MHz)	802.11b (SISO)	802.11g (SISO)	802.11n HT20 (SISO)
2.4GHz	1	2412	10	10	10
2.4GHz	2	2417	10	10	10
2.4GHz	3	2422	10	10	10
2.4GHz	4	2427	10	10	10
2.4GHz	5	2432	10	10	10
2.4GHz	6	2437	10	10	10
2.4GHz	7	2442	10	10	10
2.4GHz	8	2447	10	10	10
2.4GHz	9	2452	10	10	10
2.4GHz	10	2457	10	10	10
2.4GHz	11	2462	10	10	10
2.4GHz	12	2467	10	10	10
2.4GHz	13	2472	10	4	4

5GHz - Auxiliary Core - 20MHz Channels

Band	Channel	Center Frequency (MHz)	802.11a (SISO)	802.11n HT20
U-NII-1	36	5180	13.5	13.5
U-NII-1	40	5200	13.5	13.5
U-NII-1	44	5220	13.5	13.5
U-NII-1	48	5240	13.5	13.5
U-NII-2A	52	5260	13	13
U-NII-2A	56	5280	13	13
U-NII-2A	60	5300	13	13
U-NII-2A	64	5320	13	13
U-NII-2C	100	5500	12.5	12.5
U-NII-2C	104	5520	12.5	12.5
U-NII-2C	108	5540	12.5	12.5
U-NII-2C	112	5560	12.5	12.5
U-NII-2C	116	5580	12.5	12.5
U-NII-2C	120	5600	12.5	12.5
U-NII-2C	124	5620	12.5	12.5
U-NII-2C	128	5640	12.5	12.5
U-NII-2C	132	5660	12.5	12.5
U-NII-2C	136	5680	12.5	12.5
U-NII-2C	140	5700	12.5	12.5
U-NII-2C	144	5720	12.5	12.5
U-NII-3	149	5745	12.75	12.75
U-NII-3	153	5765	12.75	12.75
U-NII-3	157	5785	12.75	12.75
U-NII-3	161	5805	12.75	12.75
U-NII-3	165	5825	12.75	12.75

5GHz - Auxiliary Core - 20MHz Channels - Low Power Mode

Band	Channel	Center Frequency (MHz)	802.11a (SISO)	802.11n HT20
U-NII-1	36	5180	6.5	6.5
U-NII-1	40	5200	6.5	6.5
U-NII-1	44	5220	6.5	6.5
U-NII-1	48	5240	6.5	6.5
U-NII-2A	52	5260	6.5	6.5
U-NII-2A	56	5280	6.5	6.5
U-NII-2A	60	5300	6.0	6.0
U-NII-2A	64	5320	6.0	6.0
U-NII-2C	100	5500	5.5	5.5
U-NII-2C	104	5520	5.5	5.5
U-NII-2C	108	5540	5.5	5.5
U-NII-2C	112	5560	5.5	5.5
U-NII-2C	116	5580	5.5	5.5
U-NII-2C	120	5600	5.5	5.5
U-NII-2C	124	5620	5.5	5.5
U-NII-2C	128	5640	5.5	5.5
U-NII-2C	132	5660	5.5	5.5
U-NII-2C	136	5680	5.5	5.5
U-NII-2C	140	5700	5.5	5.5
U-NII-2C	144	5720	5.5	5.5
U-NII-3	149	5745	5.75	5.75
U-NII-3	153	5765	5.75	5.75
U-NII-3	157	5785	5.75	5.75
U-NII-3	161	5805	5.75	5.75
U-NII-3	165	5825	5.75	5.75

5GHz - Auxiliary Core - 40MHz Channels

Band	Channel	Center Frequency (MHz)	802.11n HT40
U-NII-1	38	5190	13.5
U-NII-1	46	5230	13.5
U-NII-2A	54	5270	13
U-NII-2A	62	5310	13
U-NII-2C	102	5510	12.5
U-NII-2C	110	5550	12.5
U-NII-2C	118	5590	12.5
U-NII-2C	126	5630	12.5
U-NII-2C	134	5670	12.5
U-NII-2C	142	5710	12.5
U-NII-3	151	5755	12.75
U-NII-3	159	5795	12.75

5GHz - Auxiliary Core - 40MHz Channels - Low Power Mode

Band	Channel	Center Frequency (MHz)	802.11n HT40
U-NII-1	38	5190	6.5
U-NII-1	46	5230	6.5
U-NII-2A	54	5270	6.0
U-NII-2A	62	5310	6.0
U-NII-2C	102	5510	5.5
U-NII-2C	110	5550	5.5
U-NII-2C	118	5590	5.5
U-NII-2C	126	5630	5.5
U-NII-2C	134	5670	5.5
U-NII-2C	142	5710	5.5
U-NII-3	151	5755	5.75
U-NII-3	159	5795	5.75

5GHz - Auxiliary Core - 80MHz Channels

Band	Channel	Center Frequency (MHz)	802.11ac VHT80 (1 Tx)
U-NII-1	42	5210	13
U-NII-2A	58	5290	13
U-NII-2C	106	5530	12.5
U-NII-2C	122	5610	12.5
U-NII-2C	138	5690	12.5
U-NII-3	155	5775	12.75

5GHz - Auxiliary Core - 80MHz Channels - Low Power Mode

Band	Channel	Center Frequency (MHz)	802.11ac VHT80 (1 Tx)
U-NII-1	42	5210	6.5
U-NII-2A	58	5290	6.0
U-NII-2C	106	5530	5.5
U-NII-2C	122	5610	5.5
U-NII-2C	138	5690	5.5
U-NII-3	155	5775	5.75

1.6 POWER MEASUREMENTS

1.6.1 Method

Conducted power measurements were performed with a power meter connected to each port.

Bluetooth- BDR – Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Packet Type	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
BDR	0	GFSK	77.0	DH5	2402	11.8	12.0
BDR	39	GFSK	77.0	DH5	2441	11.8	12.0
BDR	78	GFSK	77.0	DH5	2480	11.8	12.0

Bluetooth BDR has the declared highest output power.Therefore power measurements were not completed for EDR and LE configurations.
Note: Bluetooth operates on Core1 only

WLAN 2450 MHz SISO Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g	1	BPSK	100	6	2412	16.7	17.0
802.11g	6	BPSK	100	6	2437	16.8	17.0
802.11g	11	BPSK	100	6	2462	16.8	17.0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11b	1	BPSK	100	1	2412	16.8	17.0
802.11b	6	BPSK	100	1	2437	17.0	17.0
802.11b	11	BPSK	100	1	2462	16.9	17.0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.6	17.0
802.11n	6	BPSK	100	6.5	2437	16.6	17.0
802.11n	11	BPSK	100	6.5	2462	16.6	17.0

WLAN 2450 MHz SISO Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g	1	BPSK	100	6	2412	16.8	17.0
802.11g	6	BPSK	100	6	2437	16.8	17.0
802.11g	11	BPSK	100	6	2462	16.7	17.0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11b	1	BPSK	100	1	2412	16.9	17.0
802.11b	6	BPSK	100	1	2437	17.0	17.0
802.11b	11	BPSK	100	1	2462	16.9	17.0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.6	17.0
802.11n	6	BPSK	100	6.5	2437	16.6	17.0
802.11n	11	BPSK	100	6.5	2462	16.7	17.0

WLAN 2450 MHz SISO Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11g	1	BPSK	100	6	2412	16.8	17.0
802.11g	6	BPSK	100	6	2437	16.8	17.0
802.11g	11	BPSK	100	6	2462	16.8	17.0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11b	1	BPSK	100	1	2412	16.6	17.0
802.11b	6	BPSK	100	1	2437	16.7	17.0
802.11b	11	BPSK	100	1	2462	16.6	17.0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.8	17.0
802.11n	6	BPSK	100	6.5	2437	16.7	17.0
802.11n	11	BPSK	100	6.5	2462	16.6	17.0

WLAN 2450 MHz SISO Antenna WF3 (Auxiliary)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11b	1	BPSK	100	1	2412	16.8	17.0
802.11b	6	BPSK	100	1	2437	16.8	17.0
802.11b	11	BPSK	100	1	2462	16.9	17.0

WLAN 2450 MHz SISO Antenna WF3 (Auxiliary-Low Power Mode)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11b	1	BPSK	100	1	2412	9.9	10.0
802.11b	6	BPSK	100	1	2437	9.9	10.0
802.11b	11	BPSK	100	1	2462	10.0	10.0

WLAN 2450 MHz 2x2 MIMO - Antenna WF2 and Antenna WF1

Core0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.7	17.0
802.11n	6	BPSK	100	6.5	2437	16.6	17.0
802.11n	11	BPSK	100	6.5	2462	16.8	17.0

Core1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.8	17.0
802.11n	6	BPSK	100	6.5	2437	16.8	17.0
802.11n	11	BPSK	100	6.5	2462	17	17.0

WLAN 2450 MHz 2x2 MIMO - Antenna WF2 and Antenna WF3

Core0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.6	17.0
802.11n	6	BPSK	100	6.5	2437	16.6	17.0
802.11n	11	BPSK	100	6.5	2462	16.9	17.0

Core2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.7	17.0
802.11n	6	BPSK	100	6.5	2437	16.7	17.0
802.11n	11	BPSK	100	6.5	2462	16.7	17.0

WLAN 2450 MHz 2x2 MIMO - Antenna WF1 and Antenna WF3

Core1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.8	17.0
802.11n	6	BPSK	100	6.5	2437	16.7	17.0
802.11n	11	BPSK	100	6.5	2462	16.9	17.0

Core2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.7	17.0
802.11n	6	BPSK	100	6.5	2437	16.7	17.0
802.11n	11	BPSK	100	6.5	2462	16.8	17.0

WLAN 2450 MHz 3x3 MIMO -Antenna WF2, Antenna WF1 and Antenna WF3

Core0

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.7	17.0
802.11n	6	BPSK	100	6.5	2437	16.7	17.0
802.11n	11	BPSK	100	6.5	2462	16.4	16.5

Core1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.9	17.0
802.11n	6	BPSK	100	6.5	2437	16.9	17.0
802.11n	11	BPSK	100	6.5	2462	16.5	16.5

Core2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n	1	BPSK	100	6.5	2412	16.8	17.0
802.11n	6	BPSK	100	6.5	2437	16.7	17.0
802.11n	11	BPSK	100	6.5	2462	16.3	16.5

WLAN U-NII 1 SISO Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	38	BPSK	100	13.5	5190	13.5	13.5
802.11n HT40	46	BPSK	100	13.5	5230	13.5	13.5

WLAN U-NII 1 SISO Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	38	BPSK	100	13.5	5190	13.5	13.5
802.11n HT40	46	BPSK	100	13.5	5230	13.5	13.5

WLAN U-NII 1 SISO Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	38	BPSK	100	13.5	5190	13.5	13.5
802.11n HT40	46	BPSK	100	13.5	5230	13.4	13.5

WLAN U-NII 1 SISO Antenna WF3 (Auxiliary)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	38	BPSK	100	13.5	5190	13.4	13.5
802.11n HT40	46	BPSK	100	13.5	5230	13.3	13.5

WLAN U-NII 1 SISO Antenna WF3 (Auxiliary- Low Power Mode)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	42	BPSK	100	29.3	5200	6.4	6.5

WLAN U-NII 1 2x2 MIMO - Antenna WF2 and Antenna WF1

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	13.5	13.5
802.11n HT20	40	BPSK	100	6.5	5200	13.4	13.5
802.11n HT20	44	BPSK	100	6.5	5220	13.3	13.5
802.11n HT20	48	BPSK	100	6.5	5240	13.3	13.5

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	13.2	13.5
802.11n HT20	40	BPSK	100	6.5	5200	12.9	13.5
802.11n HT20	44	BPSK	100	6.5	5220	13	13.5
802.11n HT20	48	BPSK	100	6.5	5240	13	13.5

WLAN U-NII 1 2x2 MIMO - Antenna WF2 and Antenna WF3

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	13.3	13.5
802.11n HT20	40	BPSK	100	6.5	5200	13.4	13.5
802.11n HT20	44	BPSK	100	6.5	5220	13.3	13.5
802.11n HT20	48	BPSK	100	6.5	5240	13.4	13.5

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	13.0	13.5
802.11n HT20	40	BPSK	100	6.5	5200	13.1	13.5
802.11n HT20	44	BPSK	100	6.5	5220	12.9	13.5
802.11n HT20	48	BPSK	100	6.5	5240	12.9	13.5

WLAN U-NII 1 2x2 MIMO - Antenna WF1 and Antenna WF3

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	13.2	13.5
802.11n HT20	40	BPSK	100	6.5	5200	13.3	13.5
802.11n HT20	44	BPSK	100	6.5	5220	13.3	13.5
802.11n HT20	48	BPSK	100	6.5	5240	13.3	13.5

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	13.1	13.5
802.11n HT20	40	BPSK	100	6.5	5200	13.2	13.5
802.11n HT20	44	BPSK	100	6.5	5220	13.3	13.5
802.11n HT20	48	BPSK	100	6.5	5240	13.2	13.5

WLAN U-NII 1 3x3 MIMO -Antenna WF2, Antenna WF1 and Antenna WF3

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	12.8	13.0
802.11n HT20	40	BPSK	100	6.5	5200	13.0	13.0
802.11n HT20	44	BPSK	100	6.5	5220	12.5	13.0
802.11n HT20	48	BPSK	100	6.5	5240	12.9	13.0

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	12.5	13.0
802.11n HT20	40	BPSK	100	6.5	5200	12.6	13.0
802.11n HT20	44	BPSK	100	6.5	5220	12.5	13.0
802.11n HT20	48	BPSK	100	6.5	5240	12.5	13.0

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT20	36	BPSK	100	6.5	5180	12.5	13.0
802.11n HT20	40	BPSK	100	6.5	5200	12.6	13.0
802.11n HT20	44	BPSK	100	6.5	5220	12.5	13.0
802.11n HT20	48	BPSK	100	6.5	5240	12.5	13.0

WLAN U-NII 2a SISO Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	54	BPSK	100	13.5	5270	12.8	13.0
802.11n HT40	62	BPSK	100	13.5	5310	12.9	13.0

WLAN U-NII 2a SISO Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	54	BPSK	100	13.5	5270	12.8	13.0
802.11n HT40	62	BPSK	100	13.5	5310	12.8	13.0

WLAN U-NII 2a SISO Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	54	BPSK	100	13.3	5270	12.8	13.0
802.11n HT40	62	BPSK	100	13.4	5310	12.8	13.0

WLAN U-NII 2a 2x2 MIMO - Antenna WF2 and Antenna WF1

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	58	BPSK	100	29.3	5290	12.9	13.0

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	58	BPSK	100	29.3	5290	12.9	13.0

WLAN U-NII 2a 2x2 MIMO - Antenna WF2 and Antenna WF3

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	58	BPSK	100	29.3	5290	13.0	13.0

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	58	BPSK	100	29.3	5290	12.8	13.0

WLAN U-NII 2a 2x2 MIMO - Antenna WF1 and Antenna WF3

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	58	BPSK	100	29.3	5290	12.9	13.0

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	58	BPSK	100	29.3	5290	12.6	13.0

WLAN U-NII 2a 3x3 MIMO - Antenna WF2, Antenna WF1 and Antenna WF3

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	54	BPSK	100	13.5	5270	13.0	13.0
802.11n HT40	62	BPSK	100	13.5	5310	12.3	12.5

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	54	BPSK	100	13.5	5270	13.0	13.0
802.11n HT40	62	BPSK	100	13.5	5310	12.3	12.5

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11n HT40	54	BPSK	100	13.5	5270	12.6	13.0
802.11n HT40	62	BPSK	100	13.5	5310	11.8	12.5

WLAN U-NII 2c SISO Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	106	BPSK	100	29.3	5530	12.4	12.5
802.11ac VHT80	122	BPSK	100	29.3	5610	12.3	12.5
802.11ac VHT80	138	BPSK	100	29.3	5690	12.3	12.5

WLAN U-NII 2c SISO Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	106	BPSK	100	29.3	5530	12.4	12.5
802.11ac VHT80	122	BPSK	100	29.3	5610	12.5	12.5
802.11ac VHT80	138	BPSK	100	29.3	5690	12.4	12.5

WLAN U-NII 2c SISO Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	106	BPSK	100	29.3	5530	12.3	12.5
802.11ac VHT80	122	BPSK	100	29.3	5610	12.3	12.5
802.11ac VHT80	138	BPSK	100	29.3	5690	12.4	12.5

WLAN U-NII 2c SISO Antenna WF3 (Auxiliary)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	106	BPSK	100	29.3	5530	12.5	12.5
802.11ac VHT80	122	BPSK	100	29.3	5610	12.4	12.5
802.11ac VHT80	138	BPSK	100	29.3	5690	12.4	12.5

WLAN U-NII 2c SISO Antenna WF3 (Auxiliary- Low Power Mode)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	106	BPSK	100	29.3	5530	5.4	5.5
802.11ac VHT80	122	BPSK	100	29.3	5610	5.5	5.5
802.11ac VHT80	138	BPSK	100	29.3	5690	5.4	5.5

WLAN U-NII 3 SISO Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.6	12.75

WLAN U-NII 3 SISO Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.5	12.75

WLAN U-NII 3 SISO Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.5	12.75

WLAN U-NII 3 SISO Antenna WF3 (Auxiliary)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.7	12.75

WLAN U-NII 3 SISO Antenna WF3 (Auxiliary- Low Power Mode)

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	5.7	5.75

WLAN U-NII 3 2x2 MIMO - Antenna WF2 and Antenna WF1

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.6	12.75

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.6	12.75

WLAN U-NII 3 2x2 MIMO - Antenna WF2 and Antenna WF3

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.5	12.75

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	11.9	12.75

WLAN U-NII 3 2x2 MIMO - Antenna WF1 and Antenna WF3

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.6	12.75

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.0	12.75

WLAN U-NII 3 3x3 MIMO - Antenna WF2, Antenna WF1 and Antenna WF3

Antenna WF2

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.6	12.75

Antenna WF1

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.7	12.75

Antenna WF3

Technology	Channel	Modulation	Duty Cycle (%)	Rate (Mbps)	Frequency (MHz)	Measured Power (dBm)	Tune Up (dBm)
802.11ac VHT80	155	BPSK	100	29.3	5775	12.0	12.75

SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the
A2141

2.1 DASY5 MEASUREMENT SYSTEM

2.1.1 System Description

The DASY5 system for performing compliance tests consists of the following items:

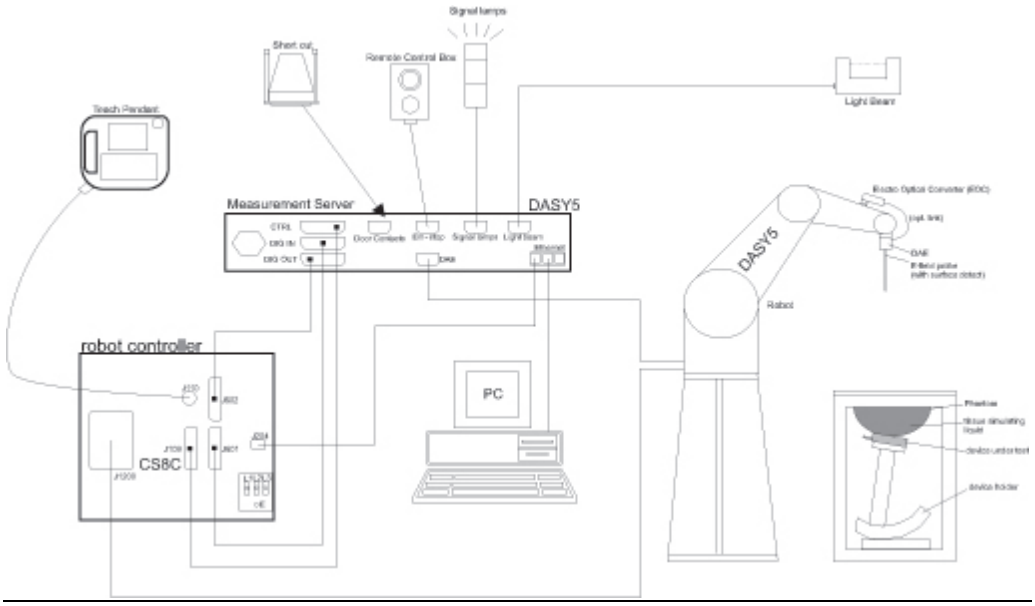


Figure 2 System Description Diagram

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 Win7 professional operating system and the DASY5 software.

Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.

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

2.1.2 Probe Specification

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

2.1.3 Data Acquisition Electronics

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

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

2.1.4 SAR Evaluation Description

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values.

Based on the IEEE 1528 standard, a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a "cube" measurement in a volume of 30mm3 (7x7x7 points). The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the centre of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the Post processing engine (SEMCAD X). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location.

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD X). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. extraction of the measured data (grid and values) from the Zoom Scan
2. calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. generation of a high-resolution mesh within the measured volume
4. interpolation of all measured values from the measurement grid to the high-resolution grid
5. extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. calculation of the averaged SAR within masses of 1g and 10g

2.1.5 Interpolation, Extrapolation and Detection of Maxima

The probe is calibrated at the centre of the dipole sensors which is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

In DASY5, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and extrapolation routines. The interpolation, extrapolation and maximum search routines are all based on the modified Quadratic Shepard's method. Thereby, the interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation. The DASY5 routines construct a once-continuously differentiable function that interpolates the measurement values as follows:

For each measurement point a trivariate (3-D) / bivariate (2-D) quadratic is computed.
It interpolates the measurement values at the data point and forms a least-square fit to neighbouring measurement values. The spatial location of the quadratic with respect to the measurement values is attenuated by an inverse distance weighting. This is performed since the calculated quadratic will fit measurement values at nearby points more accurate than at points located further away.

After the quadratics are calculated for at all measurement points, the interpolating function is calculated as a weighted average of the quadratics.

There are two control parameters that govern the behaviour of the interpolation method. One specifies the number of measurement points to be used in computing the least-square fits for the local quadratics. These measurement points are the ones nearest the input point for which the quadratic is being computed. The second parameter specifies the number of measurement points that will be used in calculating the weights for the quadratics to produce the final function. The input data points used there are the ones nearest the point at which the interpolation is desired. Appropriate defaults are chosen for each of the control parameters

The trivariate quadratics that have been previously computed for the 3-D interpolation and whose input data are at the closest distance from the phantom surface, are used in order to extrapolate the fields to the surface of the phantom.

In order to determine all the field maxima in 2-D (Area Scan) and 3-D (Zoom Scan), the measurement grid is refined by a default factor of 10 and the interpolation function is used to evaluate all field values between corresponding measurement points. Subsequently, a linear search is applied to find all the candidate maxima. In a last step, non-physical maxima are removed and only those maxima which are within 2 dB of the global maximum value are retained.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extrema of the SAR distribution. The uncertainty on the locations of the extrema is less than 1/20 of the grid size. Only local maxima within 2 dB of the global maximum are searched and passed for the Zoom Scan measurement.

In the Zoom Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1g and 10g cubes, the extrapolation distance should not be larger than 5mm.

2.1.6 Averaging and Determination of Spatial Peak SAR

The interpolated data is used to average the SAR over the 1g and 10g cubes by spatially discretising the entire measured volume. The resolution of this spatial grid used to calculate the averaged SAR is 1mm or about 42875 interpolated points. The resulting volumes are defined as cubical volumes containing the appropriate tissue parameters that are cantered at the location. The location is defined as the centre of the incremental volume (voxel).

The spatial-peak SAR must be evaluated in cubical volumes containing a mass that is within 5%of the required mass. The cubical volume centred at each location, as defined above, should be expanded in all directions until the desired value for the mass is reached, with no surface boundaries of the averaging volume extending beyond the outermost surface of the considered region. In addition, the cubical volume should not consist of more than 10% of air. If these conditions are not satisfied, then the centre of the averaging volume is moved to the next location. Otherwise, the exact size of the final sampling cube is found using an inverse polynomial approximation algorithm, leading to results with improved accuracy. If one boundary of the averaging volume reaches the boundary of the measured volume during its expansion, it will not be evaluated at all. Reference is kept of all locations used and those not used for averaging the SAR. All average SAR values are finally assigned to the centred location in each valid averaging volume.

All locations included in an averaging volume are marked to indicate that they have been used at least once. If a location has been marked as used but has never been assigned to the centre of a cube, the highest averaged SAR value of all other cubical volumes which have used this location for averaging is assigned to this location. Only those locations that are not part of any valid averaging volume should be marked as unused. For the case of an unused location, a new averaging volume must be constructed which will have the unused location centred at one surface of the cube. The remaining five surfaces are expanded evenly in all directions until the required mass is enclosed, regardless of the amount of included air. Of the six possible cubes with one surface centred on the unused location, the smallest cube is used, which still contains the required mass.

If the final cube containing the highest averaged SAR touches the surface of the measured volume, an appropriate warning is issued within the Post-processing engine.

2.2 BLUETOOTH 2450 MHz BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.991 S/m
DUT CONFIGURATION:	Bluetooth - BDR - DH5 - Antenna WF1	**RELATIVE PERMITTIVITY:**	53.268
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	Bluetooth	**SCAN TYPE:**	Full
FREQUENCY:	2441 MHz	**DRIFT:**	0.11 dB
MODULATION:	GFSK	**PEAK SAR:**	0.69 W/kg
DUTY CYCLE:	77 %	**SAR (1g):**	0.25 W/kg

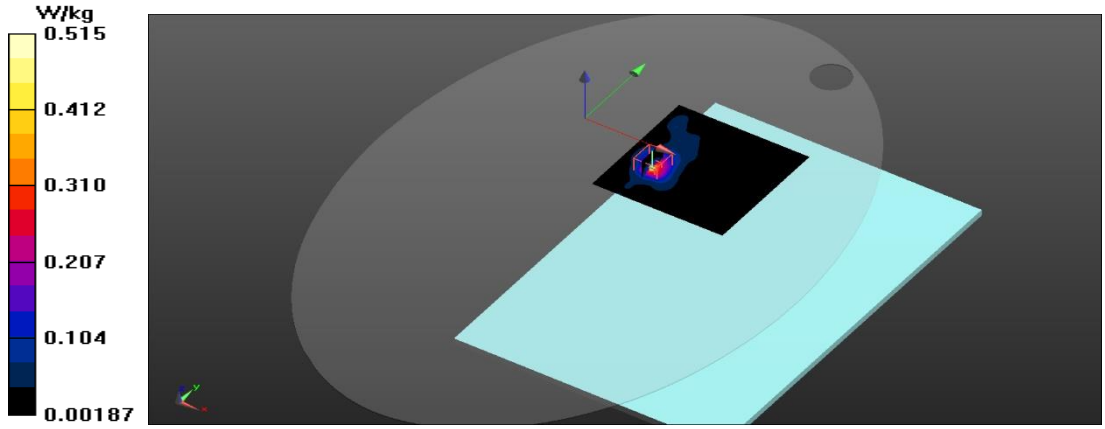


Figure 3: SAR Body Testing Results for the A2141 at 2441 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.991 S/m
DUT CONFIGURATION:	Bluetooth - BDR - DH5 - Antenna WF1	**RELATIVE PERMITTIVITY:**	53.268
DUT POSITION:	0 mm - Rear Of Display	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	Bluetooth	**SCAN TYPE:**	Full
FREQUENCY:	2441 MHz	**DRIFT:**	0.12 dB
MODULATION:	GFSK	**PEAK SAR:**	0.04 W/kg
DUTY CYCLE:	77 %	**SAR (1g):**	0.02 W/kg

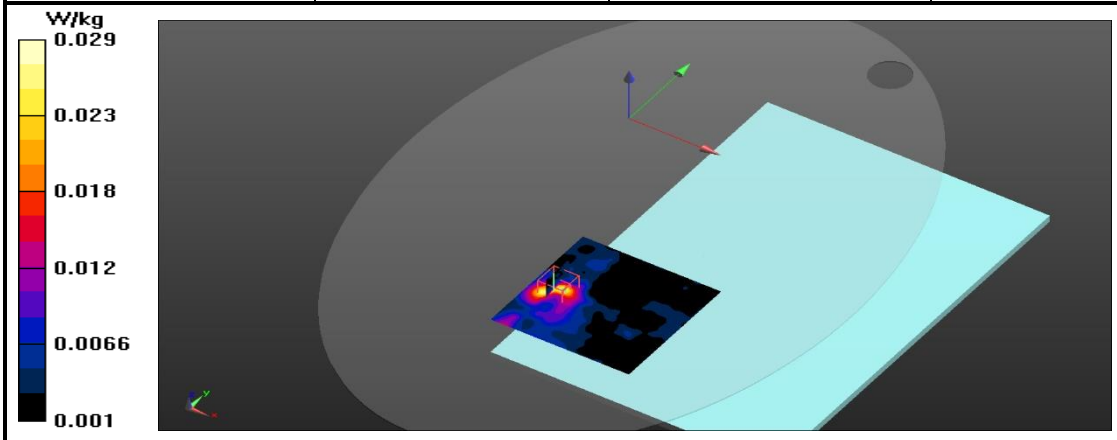


Figure 4: SAR Body Testing Results for the A2141 at 2441 MHz.

2.3 WLAN 2450 MHz BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.7 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	50.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	2.01 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF2	**RELATIVE PERMITTIVITY:**	52.049
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	23.1 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.19 dB
MODULATION:	BPSK	**PEAK SAR:**	1.77 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.63 W/kg

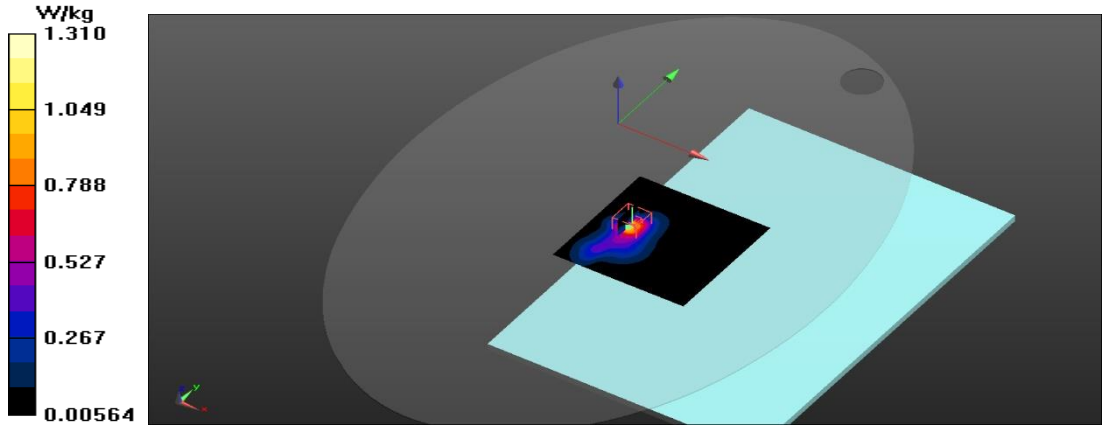


Figure 5: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.987 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF2	**RELATIVE PERMITTIVITY:**	53.273
DUT POSITION:	0 mm - Rear Of Display	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	0.06 dB
MODULATION:	BPSK	**PEAK SAR:**	0.09 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.05 W/kg

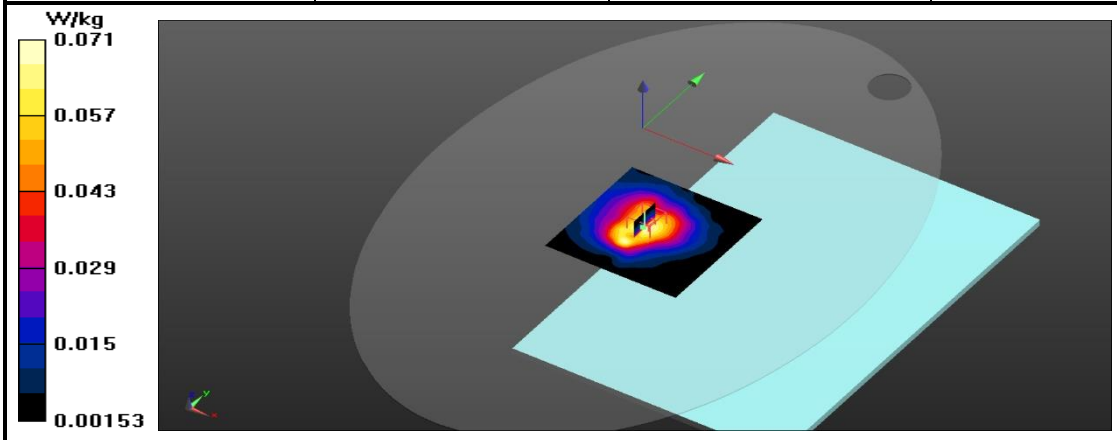


Figure 6: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.987 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	53.273
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.22 dB
MODULATION:	BPSK	**PEAK SAR:**	1.95 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.69 W/kg

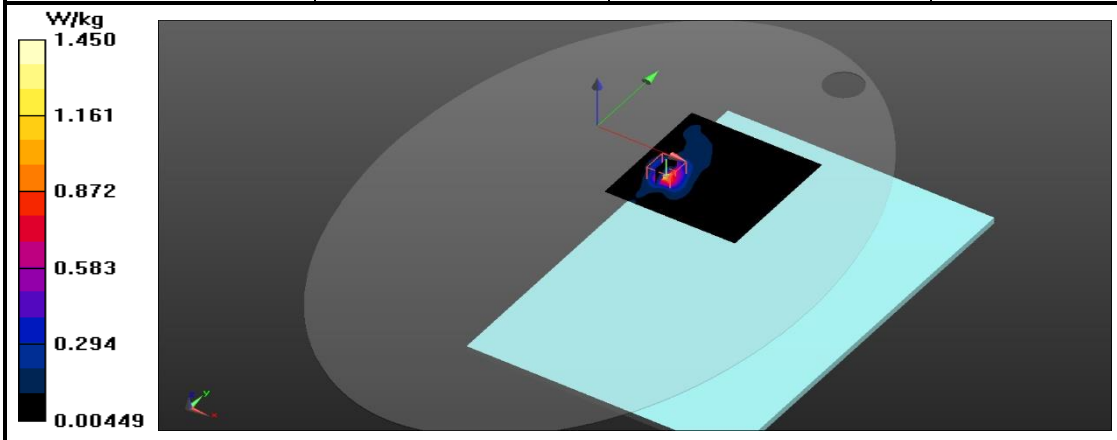


Figure 7: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.987 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	53.273
DUT POSITION:	0 mm - Rear Of Display	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	0.17 dB
MODULATION:	BPSK	**PEAK SAR:**	0.11 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.05 W/kg

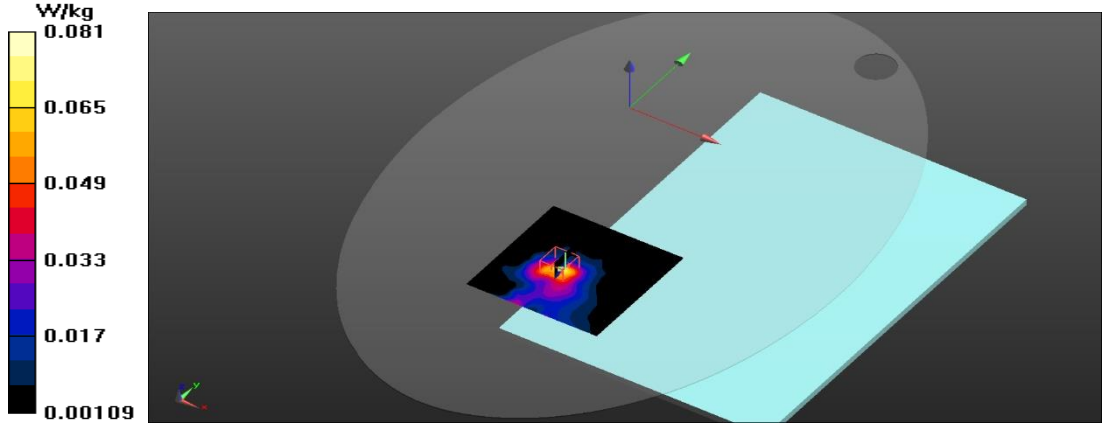


Figure 8: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.987 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF3	**RELATIVE PERMITTIVITY:**	53.273
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.13 dB
MODULATION:	BPSK	**PEAK SAR:**	1.50 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.58 W/kg

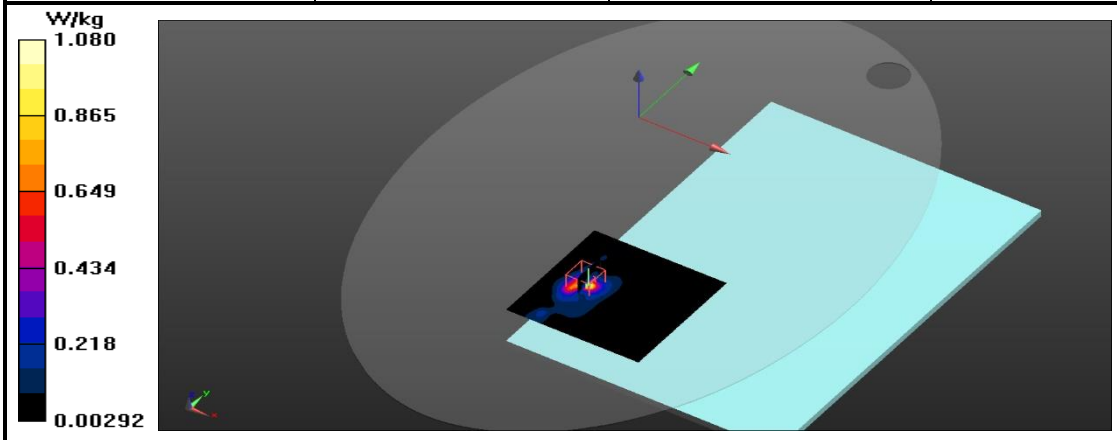


Figure 9: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.987 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF3	**RELATIVE PERMITTIVITY:**	53.273
DUT POSITION:	0 mm - Rear Of Display	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	0.14 dB
MODULATION:	BPSK	**PEAK SAR:**	0.10 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.05 W/kg

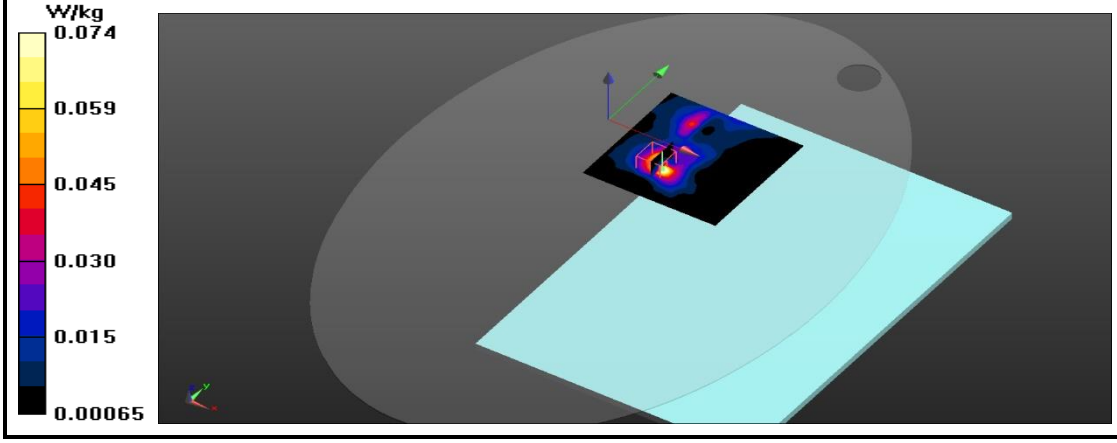


Figure 10: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.2 °C
DATE:	14/08/2019	**RELATIVE HUMIDITY:**	54.2 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.987 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF3 (Aux)	**RELATIVE PERMITTIVITY:**	53.273
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.2 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.11 dB
MODULATION:	BPSK	**PEAK SAR:**	1.77 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.67 W/kg

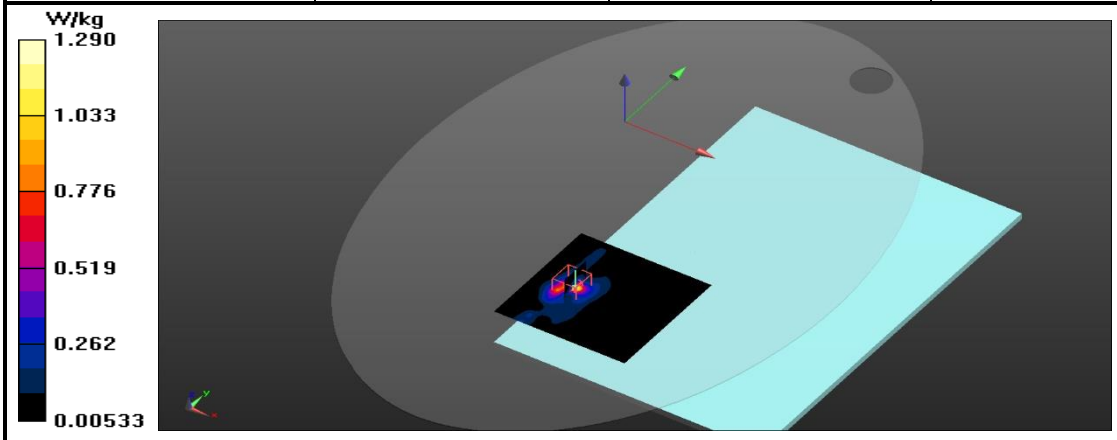


Figure 11: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.2 °C
DATE:	14/08/2019	**RELATIVE HUMIDITY:**	52.4 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	2.01 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - SISO Antenna WF3 (Aux - Low Power)	**RELATIVE PERMITTIVITY:**	53.236
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.2 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	0.07 dB
MODULATION:	BPSK	**PEAK SAR:**	0.34 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.13 W/kg

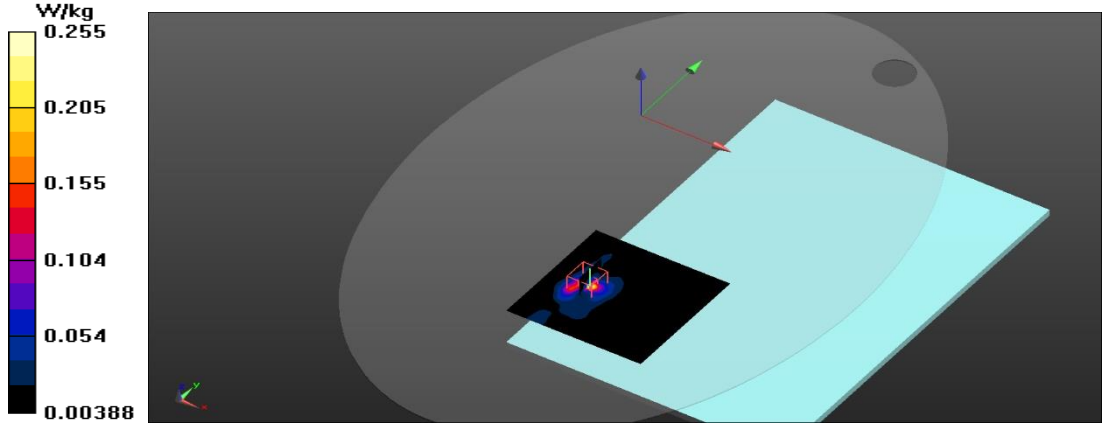


Figure 12: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	2.01 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - MIMO Antenna WF2 & WF1	**RELATIVE PERMITTIVITY:**	53.236
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.04 dB
MODULATION:	BPSK	**PEAK SAR:**	2.17 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.78 W/kg

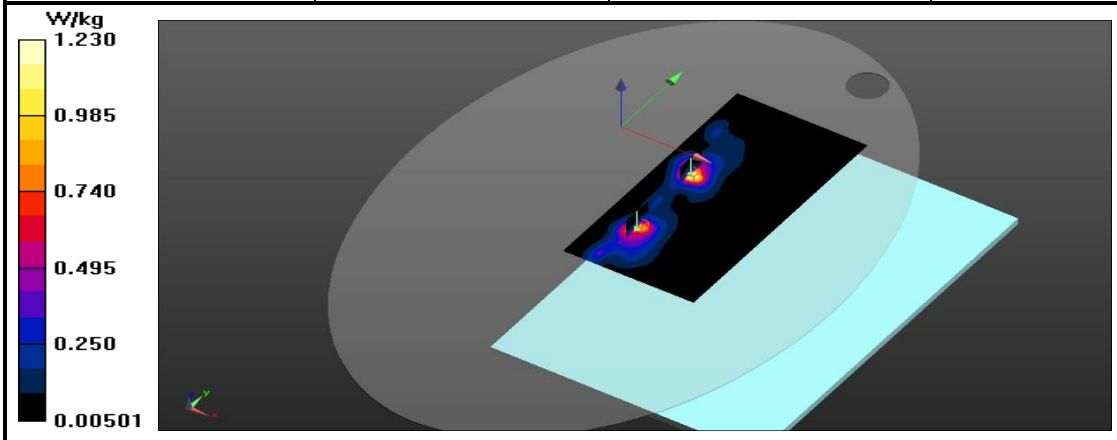


Figure 13: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.7 °C
DATE:	13/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	2.01 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - MIMO Antenna WF2 & a WF3	**RELATIVE PERMITTIVITY:**	53.236
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	21.6 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.22 dB
MODULATION:	BPSK	**PEAK SAR:**	1.71 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.69 W/kg

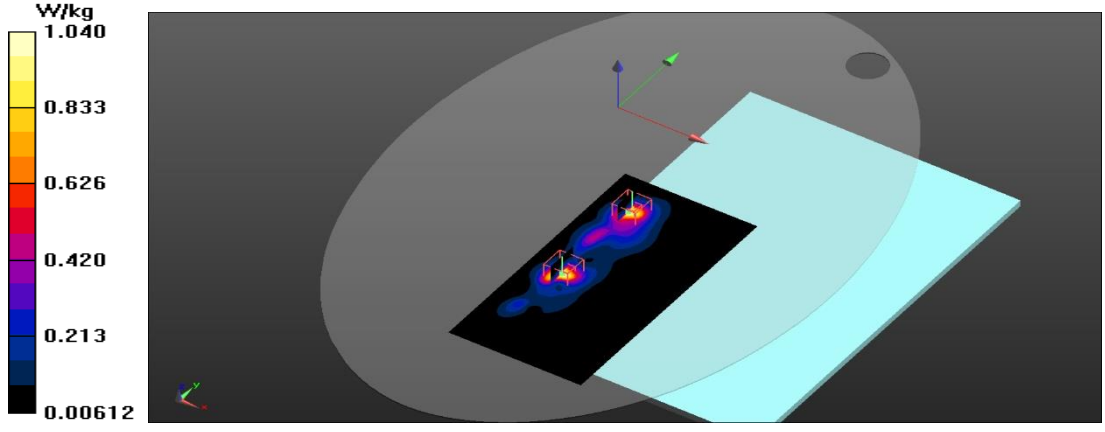


Figure 14: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.2 °C
DATE:	14/08/2019	**RELATIVE HUMIDITY:**	52.4 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.987 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - MIMO Antenna WF1 & WF3	**RELATIVE PERMITTIVITY:**	53.273
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.2 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.21 dB
MODULATION:	BPSK	**PEAK SAR:**	1.97 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.77 W/kg

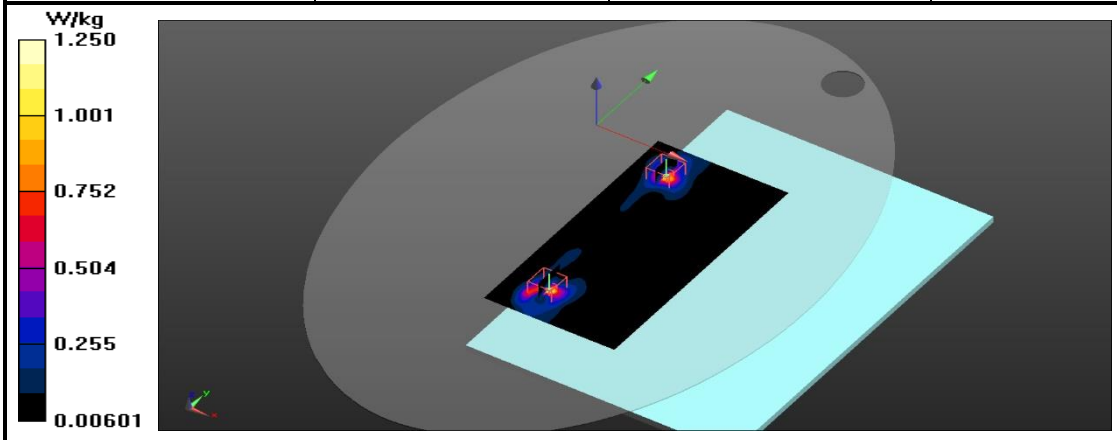


Figure 15: SAR Body Testing Results for the A2141 at 2437 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.2 °C
DATE:	14/08/2019	**RELATIVE HUMIDITY:**	43.1 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	1.965 S/m
DUT CONFIGURATION:	802.11b 20 MHz 1Mbps - MIMO Antenna WF2 & WF1 & WF3	**RELATIVE PERMITTIVITY:**	53.308
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.2 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2437 MHz	**DRIFT:**	-0.18 dB
MODULATION:	BPSK	**PEAK SAR:**	1.70 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.70 W/kg

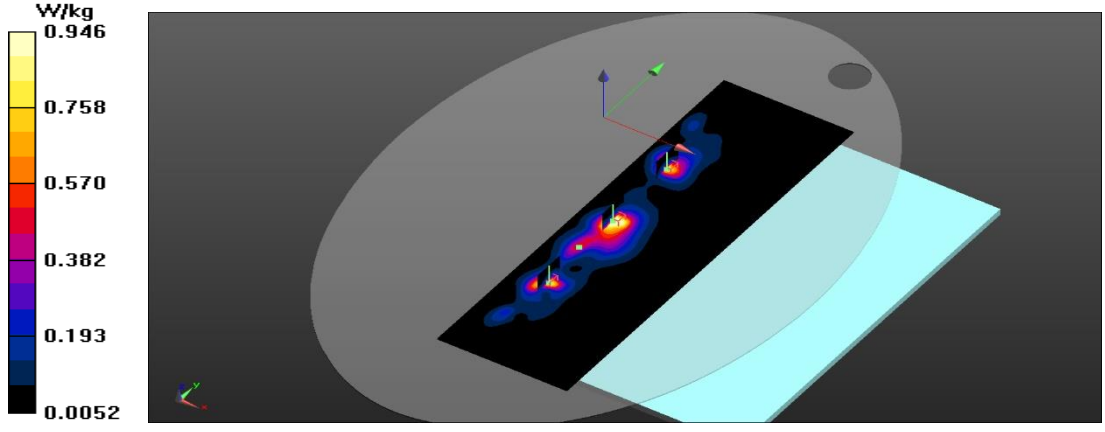


Figure 16: SAR Body Testing Results for the A2141 at 2437 MHz.

2.4 WLAN U-NII 1 BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.7 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	50.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.053 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF2	**RELATIVE PERMITTIVITY:**	47.469
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	23.1 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5230 MHz	**DRIFT:**	-0.10 dB
MODULATION:	BPSK	**PEAK SAR:**	1.64 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.71 W/kg

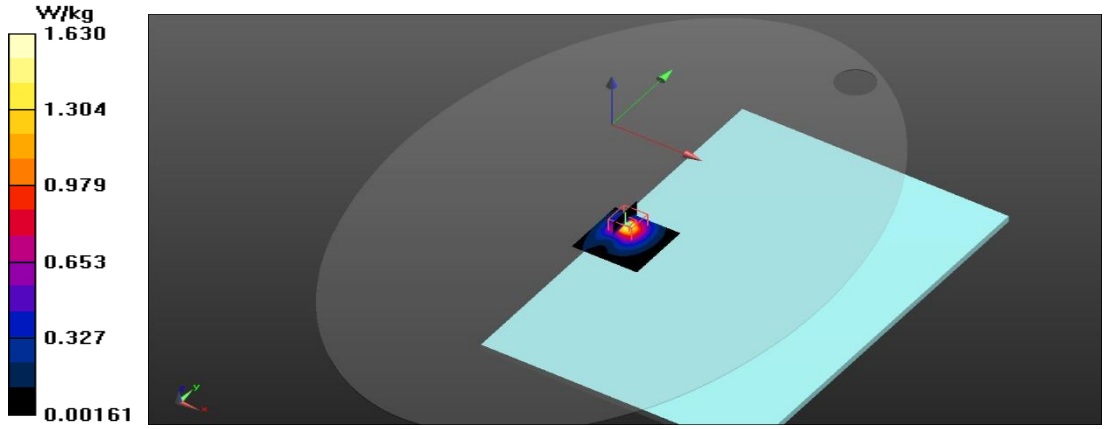


Figure 17: SAR Body Testing Results for the A2141 at 5230 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.5 °C
DATE:	29/08/2019	**RELATIVE HUMIDITY:**	48.6 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.106 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF2	**RELATIVE PERMITTIVITY:**	47.393
DUT POSITION:	0 mm - Rear Of Display	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5230 MHz	**DRIFT:**	-0.08 dB
MODULATION:	BPSK	**PEAK SAR:**	0.31 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.15 W/kg

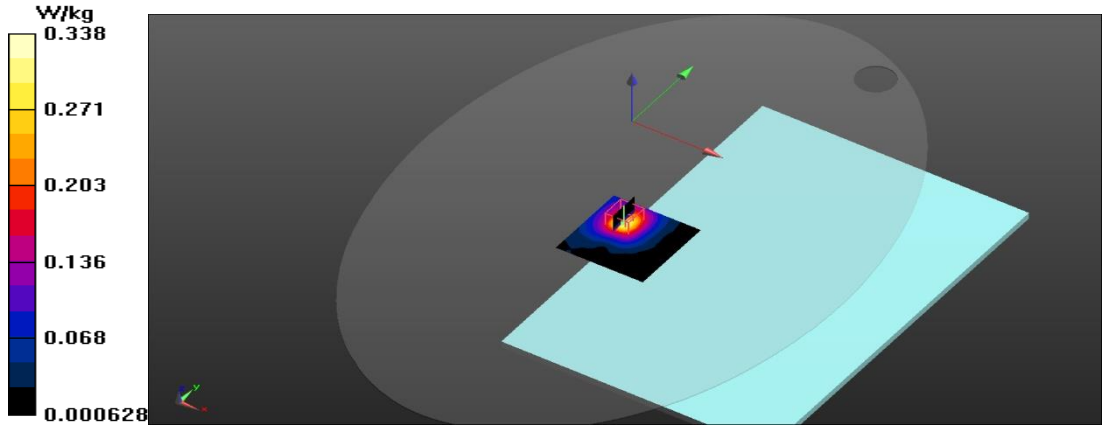


Figure 18: SAR Body Testing Results for the A2141 at 5230 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.7 °C
DATE:	22/08/2019	**RELATIVE HUMIDITY:**	44.6 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.344 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	47.106
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5230 MHz	**DRIFT:**	0.02 dB
MODULATION:	BPSK	**PEAK SAR:**	1.97 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.96 W/kg

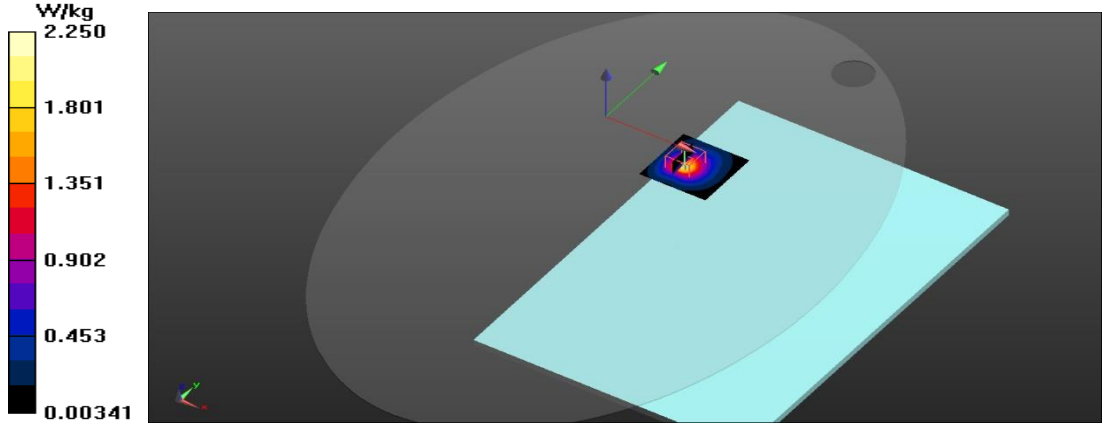


Figure 19: SAR Body Testing Results for the A2141 at 5230 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	15/08/2019	**RELATIVE HUMIDITY:**	60.6 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.106 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	47.393
DUT POSITION:	0 mm - Rear Of Display	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5230 MHz	**DRIFT:**	0.05 dB
MODULATION:	BPSK	**PEAK SAR:**	0.24 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.13 W/kg

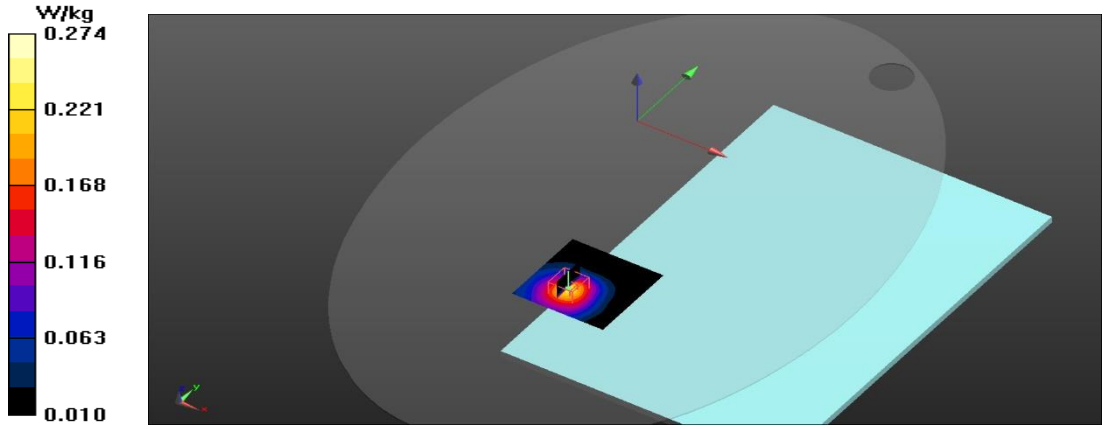


Figure 20: SAR Body Testing Results for the A2141 at 5230 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.6 °C
DATE:	28/08/2019	**RELATIVE HUMIDITY:**	53.5 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.053 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	47.469
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5190 MHz	**DRIFT:**	-0.04 dB
MODULATION:	BPSK	**PEAK SAR:**	1.38 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.67 W/kg

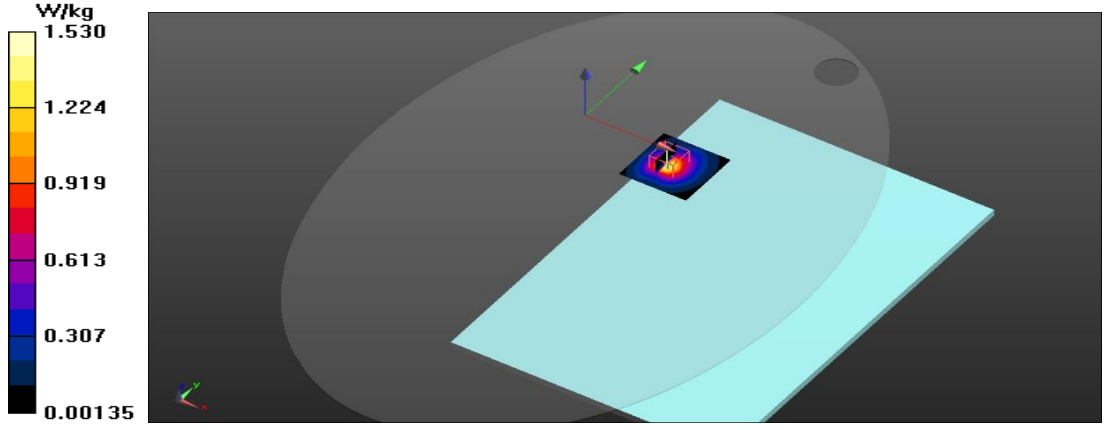


Figure 21: SAR Body Testing Results for the A2141 at 5190 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.7 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	50.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.106 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF3	**RELATIVE PERMITTIVITY:**	47.393
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	23.1 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5230 MHz	**DRIFT:**	-0.01 dB
MODULATION:	BPSK	**PEAK SAR:**	1.27 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.70 W/kg

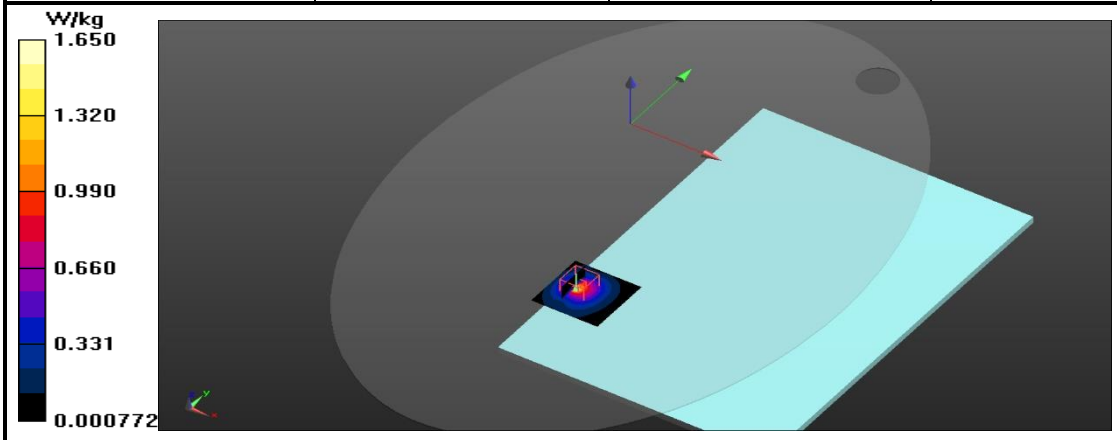


Figure 22: SAR Body Testing Results for the A2141 at 5230 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	15/08/2019	**RELATIVE HUMIDITY:**	60.6 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.106 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF3	**RELATIVE PERMITTIVITY:**	47.393
DUT POSITION:	0 mm - Rear Of Display	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5230 MHz	**DRIFT:**	-0.03 dB
MODULATION:	BPSK	**PEAK SAR:**	0.21 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.11 W/kg

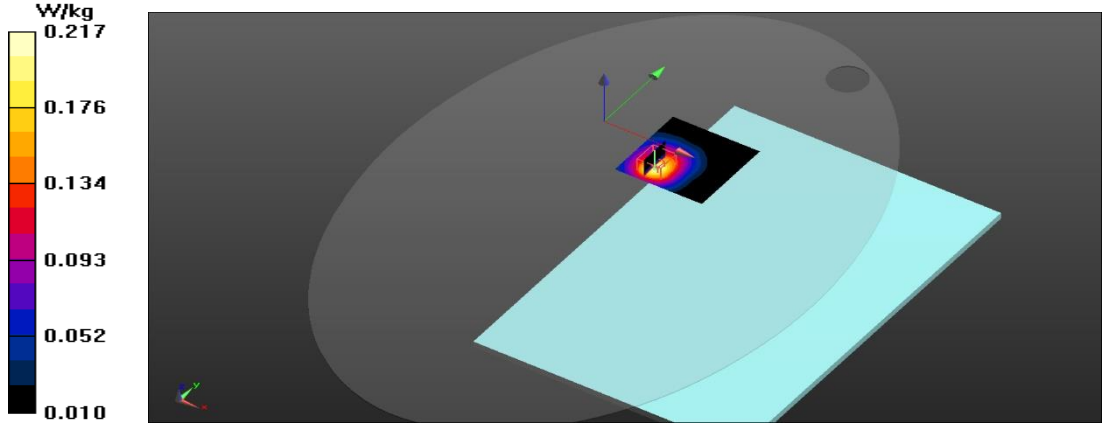


Figure 23: SAR Body Testing Results for the A2141 at 5230 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	14/08/2019	**RELATIVE HUMIDITY:**	60.6 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.428 S/m
DUT CONFIGURATION:	802.11n 40 MHz 13.5 Mbps - SISO Antenna WF3 (Aux)	**RELATIVE PERMITTIVITY:**	48.277
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5190 MHz	**DRIFT:**	0.09 dB
MODULATION:	BPSK	**PEAK SAR:**	1.41 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.76 W/kg

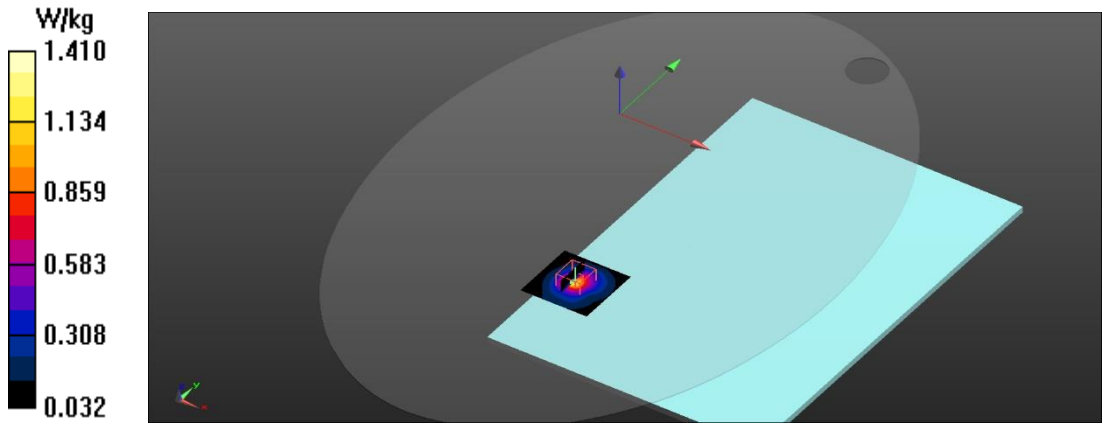


Figure 24: SAR Body Testing Results for the A2141 at 5190 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	14/08/2019	**RELATIVE HUMIDITY:**	60.6 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.399 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3 (Aux - Low Power)	**RELATIVE PERMITTIVITY:**	48.318
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5210 MHz	**DRIFT:**	-0.09 dB
MODULATION:	BPSK	**PEAK SAR:**	0.30 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.16 W/kg

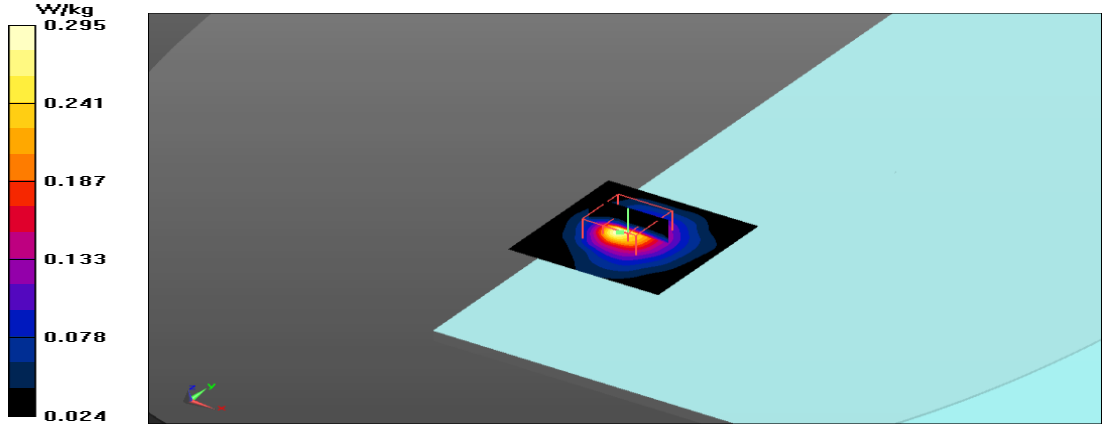


Figure 25: SAR Body Testing Results for the A2141 at 5210 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.7 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	50.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.04 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF2 & WF1	**RELATIVE PERMITTIVITY:**	47.486
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	23.1 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5180 MHz	**DRIFT:**	-0.02 dB
MODULATION:	BPSK	**PEAK SAR:**	1.12 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.65 W/kg

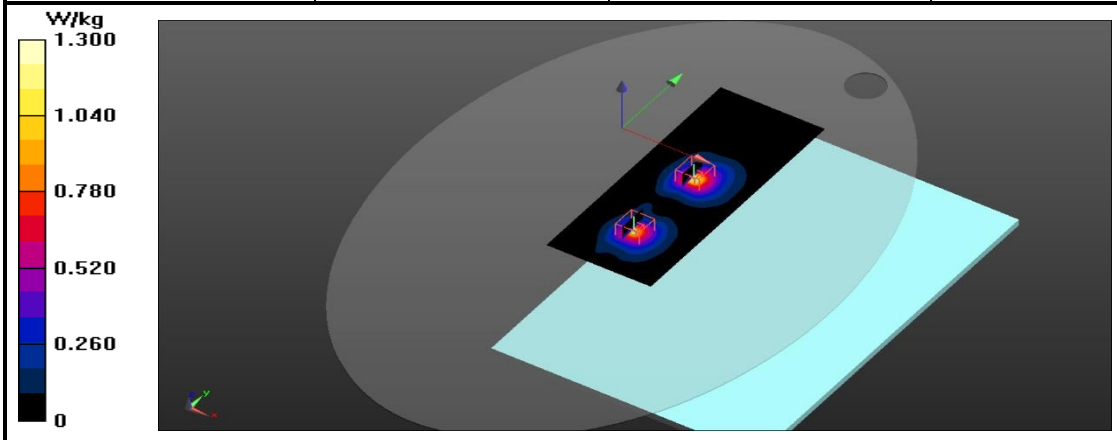


Figure 26: SAR Body Testing Results for the A2141 at 5180 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	20/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.331 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF1 & WF3	**RELATIVE PERMITTIVITY:**	47.128
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5220 MHz	**DRIFT:**	0.03 dB
MODULATION:	BPSK	**PEAK SAR:**	1.68 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.88 W/kg

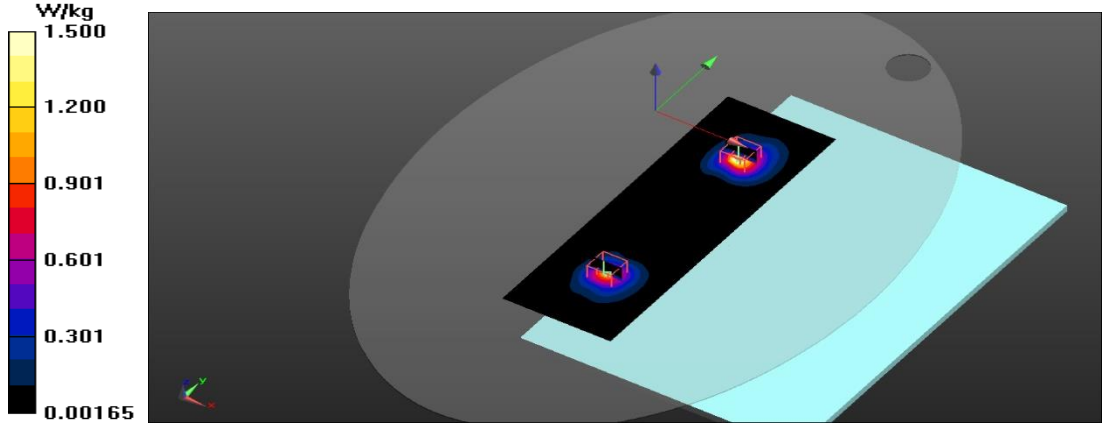


Figure 27: SAR Body Testing Results for the A2141 at 5220 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	20/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.357 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF1 & WF3	**RELATIVE PERMITTIVITY:**	47.084
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5240 MHz	**DRIFT:**	0.01 dB
MODULATION:	BPSK	**PEAK SAR:**	1.51 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.87 W/kg

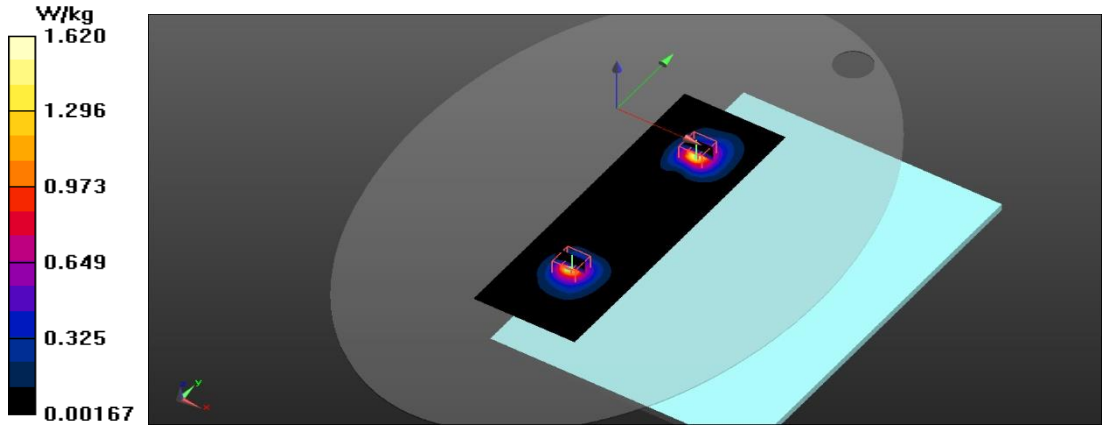


Figure 28: SAR Body Testing Results for the A2141 at 5240 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	20/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.305 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF1 & WF3	**RELATIVE PERMITTIVITY:**	47.172
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5200 MHz	**DRIFT:**	0.03 dB
MODULATION:	BPSK	**PEAK SAR:**	1.66 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.87 W/kg

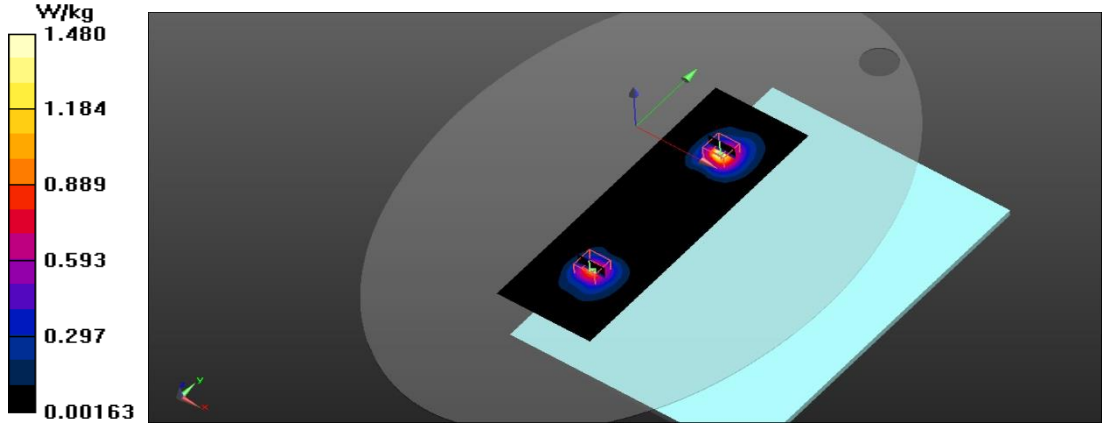


Figure 29: SAR Body Testing Results for the A2141 at 5200 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	15/08/2019	**RELATIVE HUMIDITY:**	60.6 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.385 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF2 & WF3	**RELATIVE PERMITTIVITY:**	48.339
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5200 MHz	**DRIFT:**	-0.00 dB
MODULATION:	BPSK	**PEAK SAR:**	1.61 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.77 W/kg

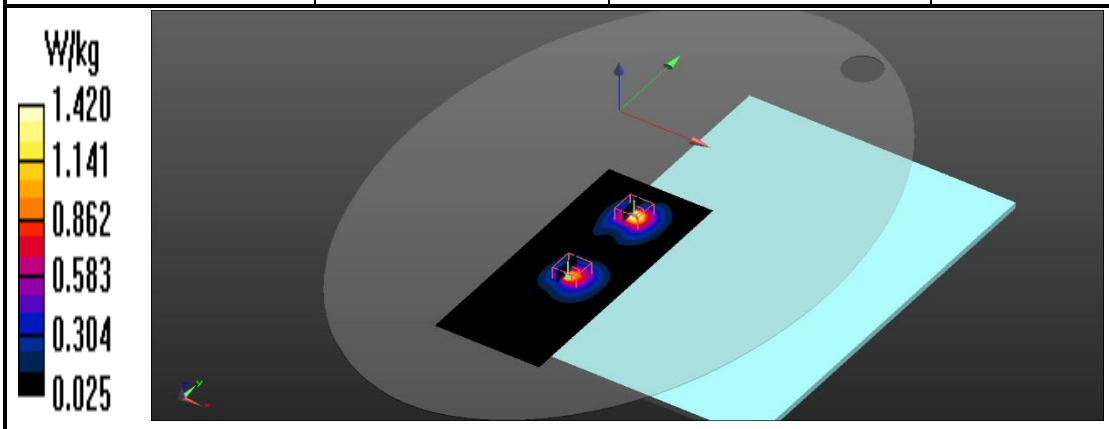


Figure 30: SAR Body Testing Results for the A2141 at 5200 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	15/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.385 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF2 & WF1 & WF3	**RELATIVE PERMITTIVITY:**	48.339
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5200 MHz	**DRIFT:**	-0.16 dB
MODULATION:	BPSK	**PEAK SAR:**	1.44 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.82 W/kg

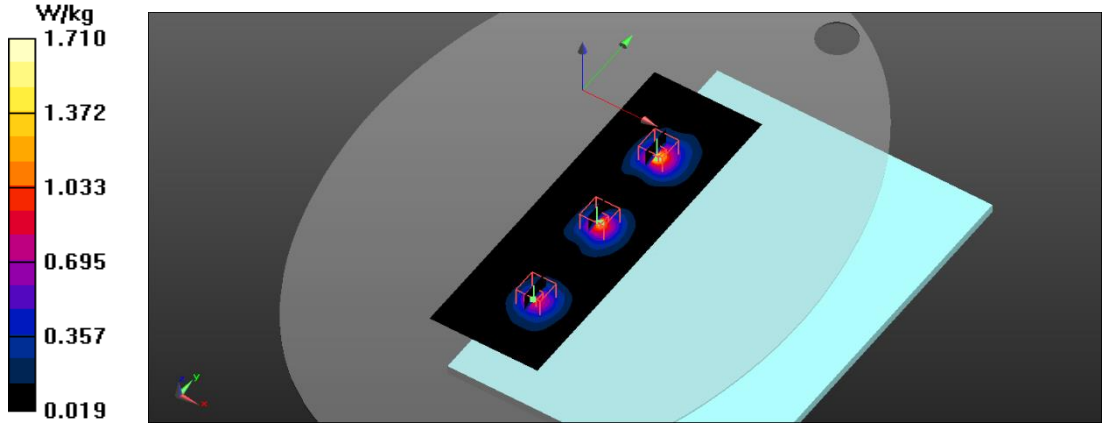


Figure 31: SAR Body Testing Results for the A2141 at 5200 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	15/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.442 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF2 & Antenna WF1 & Antenna WF3	**RELATIVE PERMITTIVITY:**	48.256
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5240 MHz	**DRIFT:**	-0.09 dB
MODULATION:	BPSK	**PEAK SAR:**	1.45 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.88 W/kg

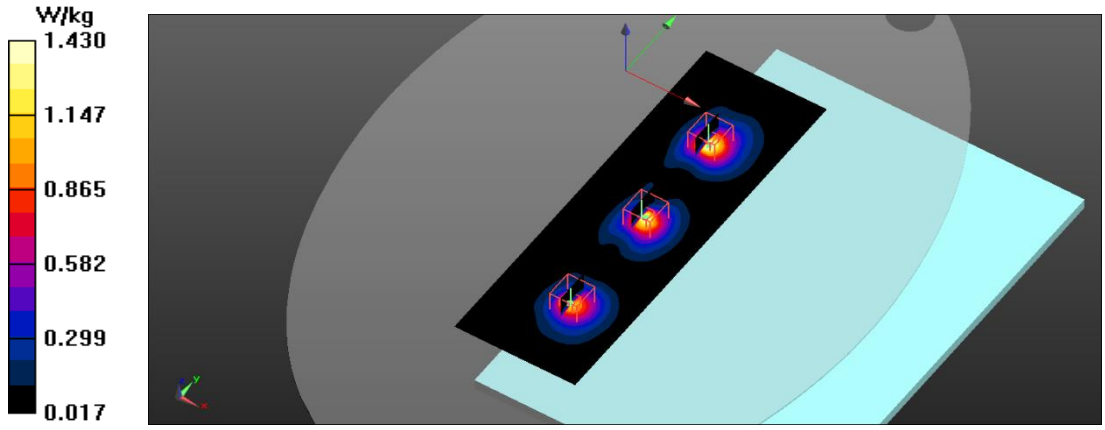


Figure 32: SAR Body Testing Results for the A2141 at 5240 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	15/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.356 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF2 & WF1 & WF3	**RELATIVE PERMITTIVITY:**	48.382
DUT POSITION:	0 mm - Bottom Edge	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5180 MHz	**DRIFT:**	-0.17 dB
MODULATION:	BPSK	**PEAK SAR:**	1.30 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.77 W/kg

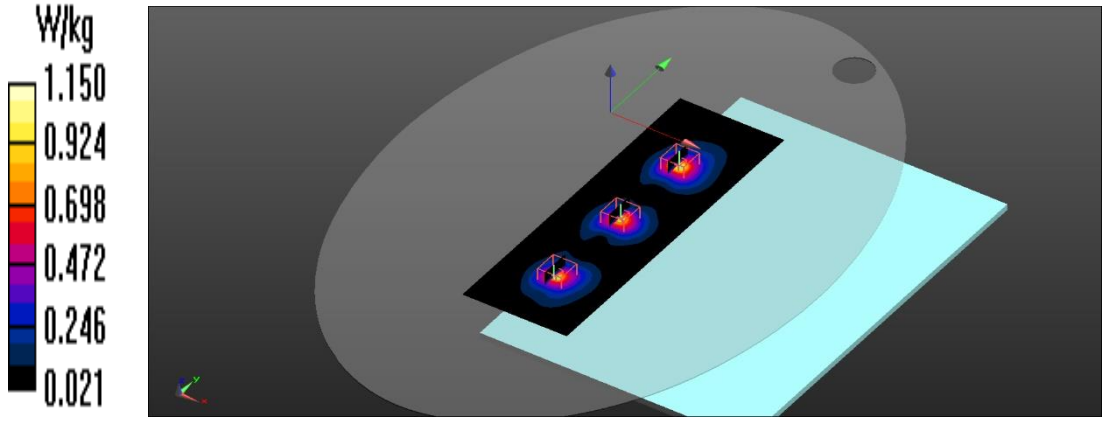


Figure 33: SAR Body Testing Results for the A2141 at 5180 MHz.

2.5 WLAN U-NII 2C BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	31/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.516 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF2	**RELATIVE PERMITTIVITY:**	46.815
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5530 MHz	**DRIFT:**	0.00 dB
MODULATION:	BPSK	**PEAK SAR:**	1.65 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.68 W/kg

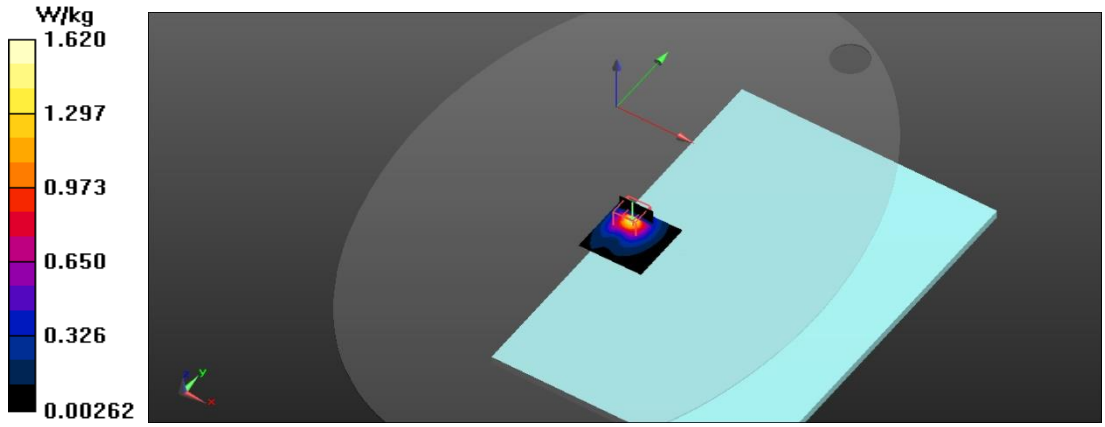


Figure 34: SAR Body Testing Results for the A2141 at 5530 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.5 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	48.6 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.881 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	46.325
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5610 MHz	**DRIFT:**	-0.02 dB
MODULATION:	BPSK	**PEAK SAR:**	1.69 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.80 W/kg

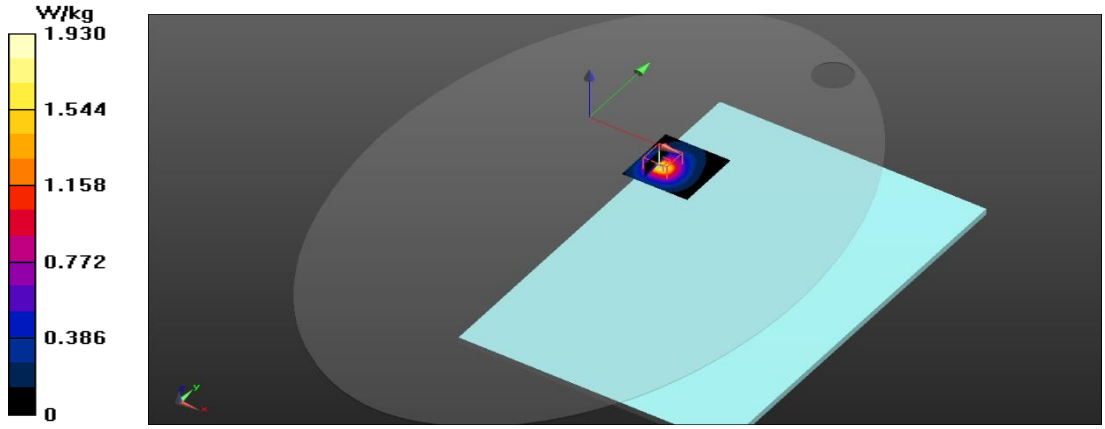


Figure 35: SAR Body Testing Results for the A2141 at 5610 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.5 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	48.6 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.762 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	46.477
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5530 MHz	**DRIFT:**	-0.01 dB
MODULATION:	BPSK	**PEAK SAR:**	1.64 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.73 W/kg

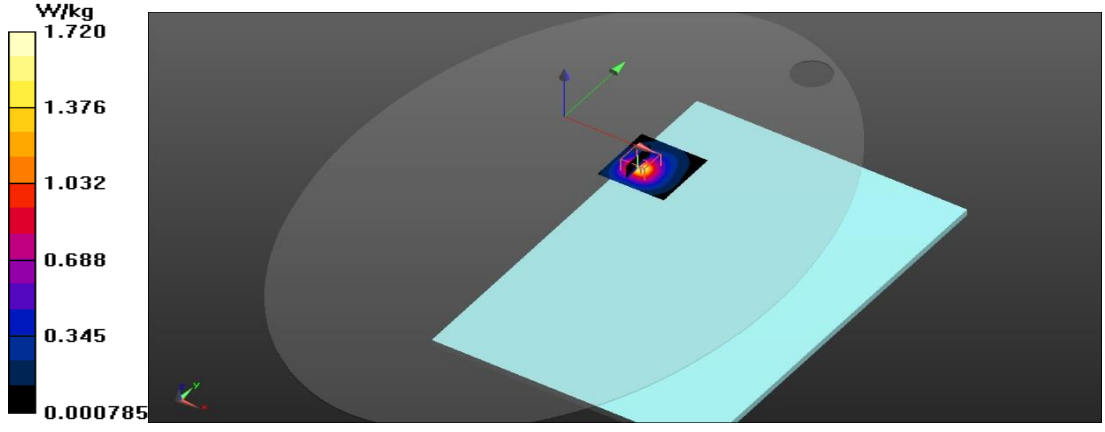


Figure 36: SAR Body Testing Results for the A2141 at 5530 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3	**RELATIVE PERMITTIVITY:**	46.176
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5690 MHz	**DRIFT:**	0.03 dB
MODULATION:	BPSK	**PEAK SAR:**	1.14 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.64 W/kg

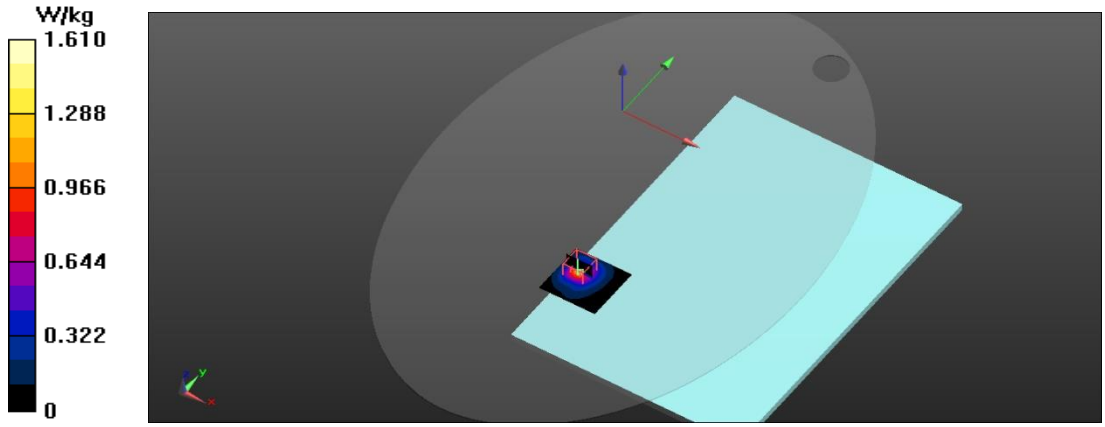


Figure 37: SAR Body Testing Results for the A2141 at 5690 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.762 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3 (Aux)	**RELATIVE PERMITTIVITY:**	46.477
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5530 MHz	**DRIFT:**	0.04 dB
MODULATION:	BPSK	**PEAK SAR:**	1.55 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.86 W/kg

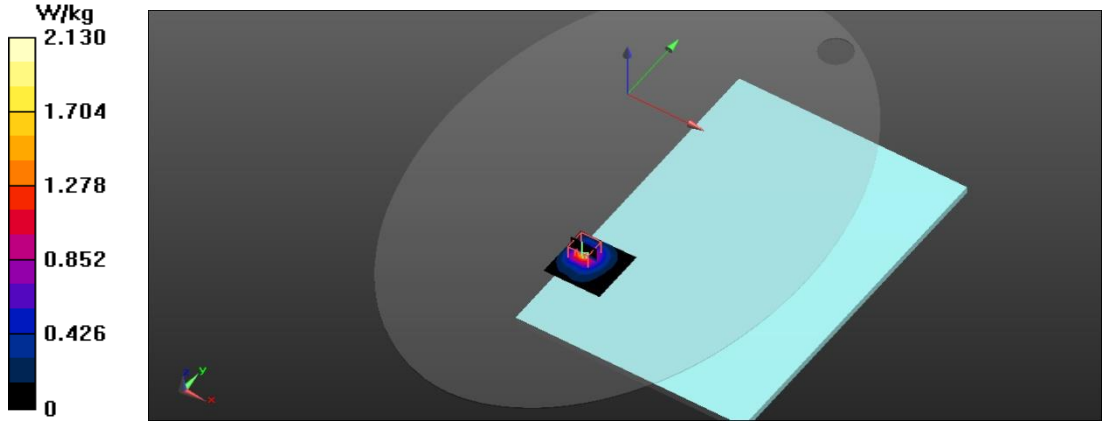


Figure 38: SAR Body Testing Results for the A2141 at 5530 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.881 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3 (Aux)	**RELATIVE PERMITTIVITY:**	46.325
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5610 MHz	**DRIFT:**	-0.03 dB
MODULATION:	BPSK	**PEAK SAR:**	1.18 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.59 W/kg

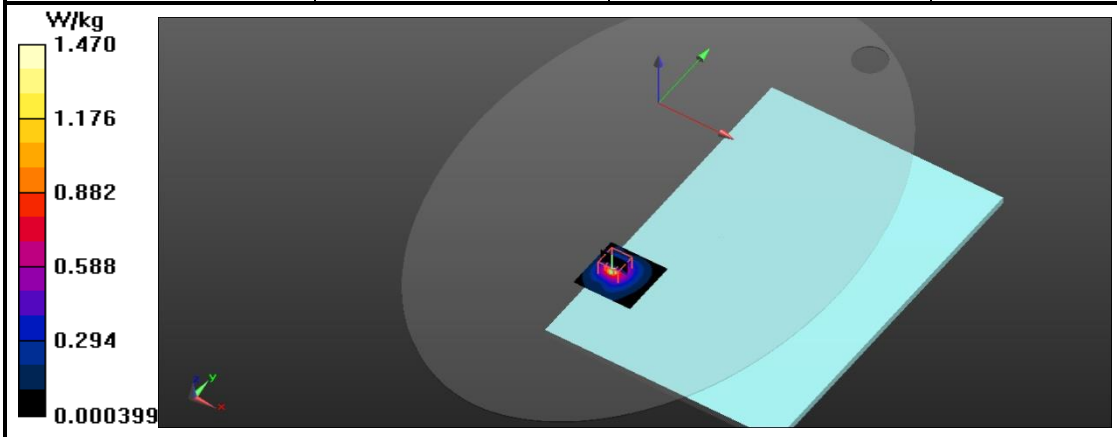


Figure 39: SAR Body Testing Results for the A2141 at 5610 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.881 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3 (Aux - Low Power)	**RELATIVE PERMITTIVITY:**	46.325
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5610 MHz	**DRIFT:**	-0.19 dB
MODULATION:	BPSK	**PEAK SAR:**	0.24 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.11 W/kg

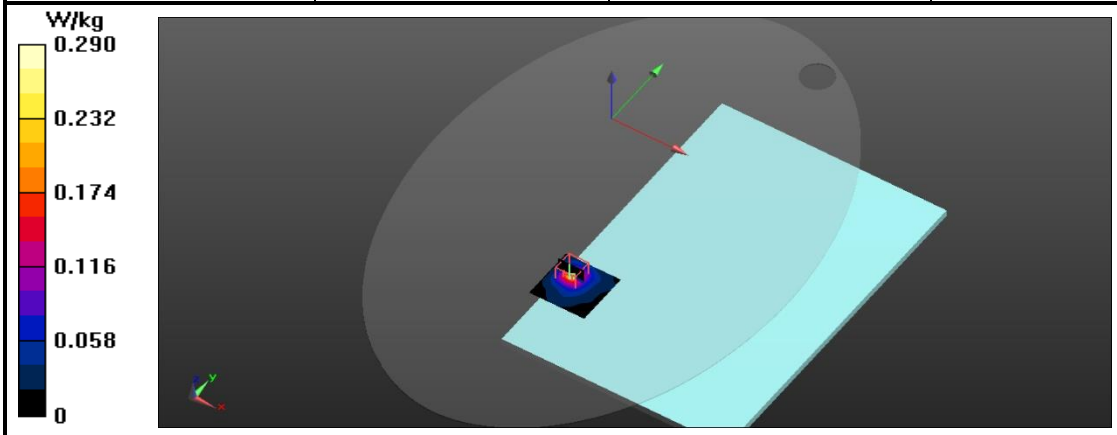


Figure 40: SAR Body Testing Results for the A2141 at 5610 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.021 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF1	**RELATIVE PERMITTIVITY:**	46.997
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5690 MHz	**DRIFT:**	-0.05 dB
MODULATION:	BPSK	**PEAK SAR:**	1.60 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.86 W/kg

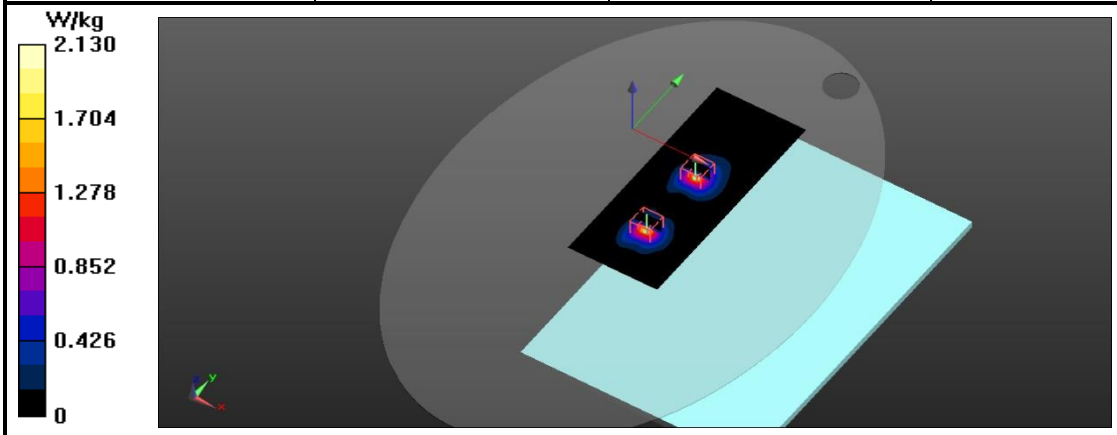


Figure 41: SAR Body Testing Results for the A2141 at 5690 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	16/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.9 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF1	**RELATIVE PERMITTIVITY:**	47.146
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5610 MHz	**DRIFT:**	-0.04 dB
MODULATION:	BPSK	**PEAK SAR:**	1.52 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.82 W/kg

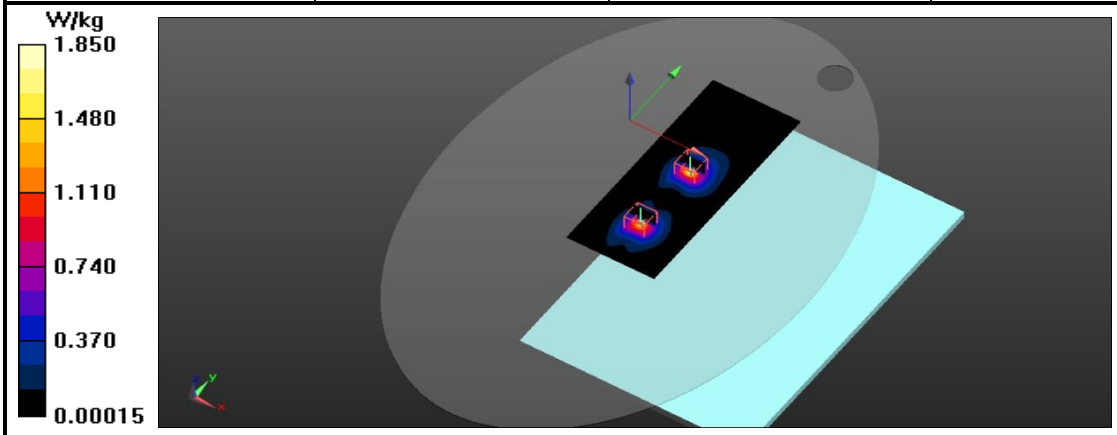


Figure 42: SAR Body Testing Results for the A2141 at 5610 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	22/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.781 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF1	**RELATIVE PERMITTIVITY:**	47.299
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5530 MHz	**DRIFT:**	-0.12 dB
MODULATION:	BPSK	**PEAK SAR:**	1.38 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.78 W/kg

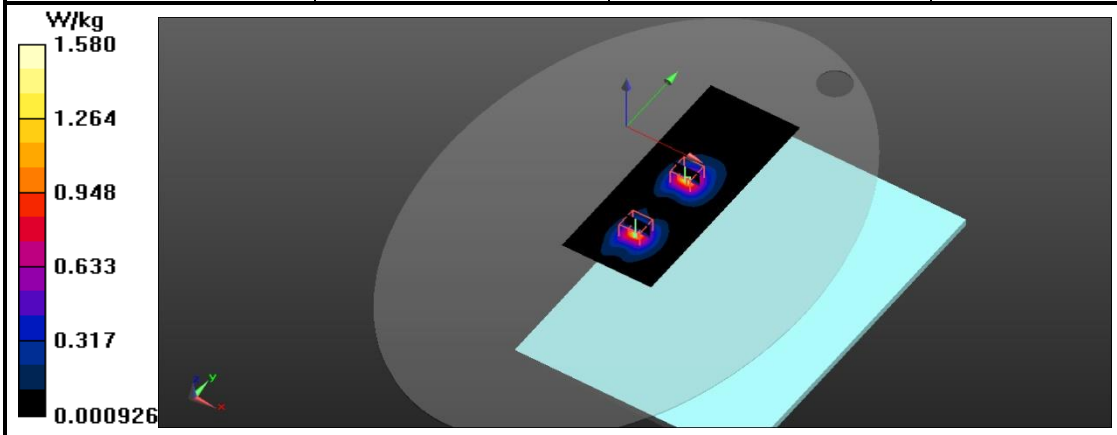


Figure 43: SAR Body Testing Results for the A2141 at 5530 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.738 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF1 & WF3	**RELATIVE PERMITTIVITY:**	46.499
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5690 MHz	**DRIFT:**	-0.05 dB
MODULATION:	BPSK	**PEAK SAR:**	1.28 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.74 W/kg

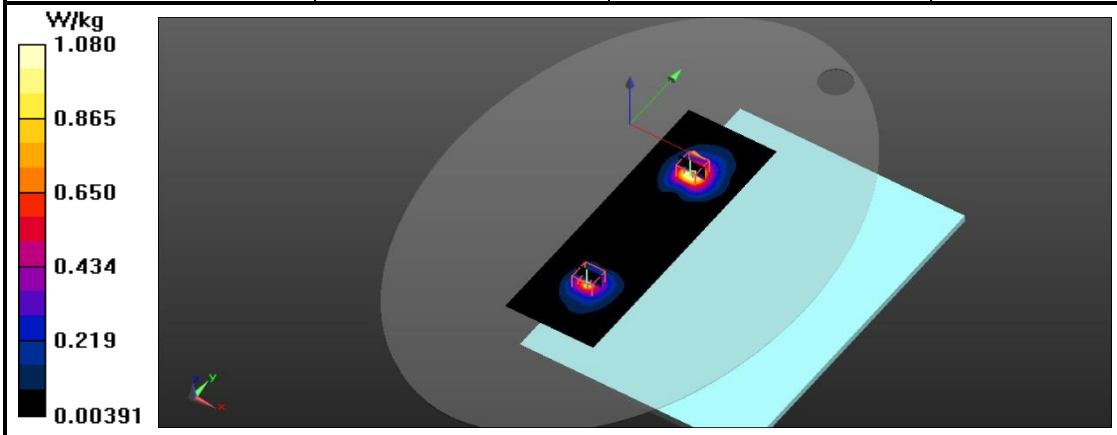


Figure 44: SAR Body Testing Results for the A2141 at 5690 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.738 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF3	**RELATIVE PERMITTIVITY:**	46.499
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5690 MHz	**DRIFT:**	-0.11 dB
MODULATION:	BPSK	**PEAK SAR:**	1.40 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.79 W/kg

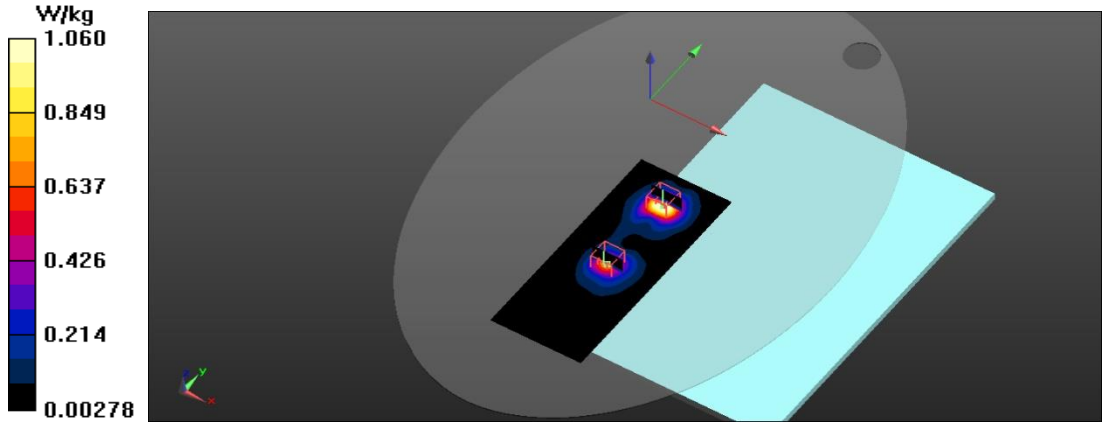


Figure 45: SAR Body Testing Results for the A2141 at 5690 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.627 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF1 & WF3	**RELATIVE PERMITTIVITY:**	46.656
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5610 MHz	**DRIFT:**	-0.07 dB
MODULATION:	BPSK	**PEAK SAR:**	1.66 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.89 W/kg

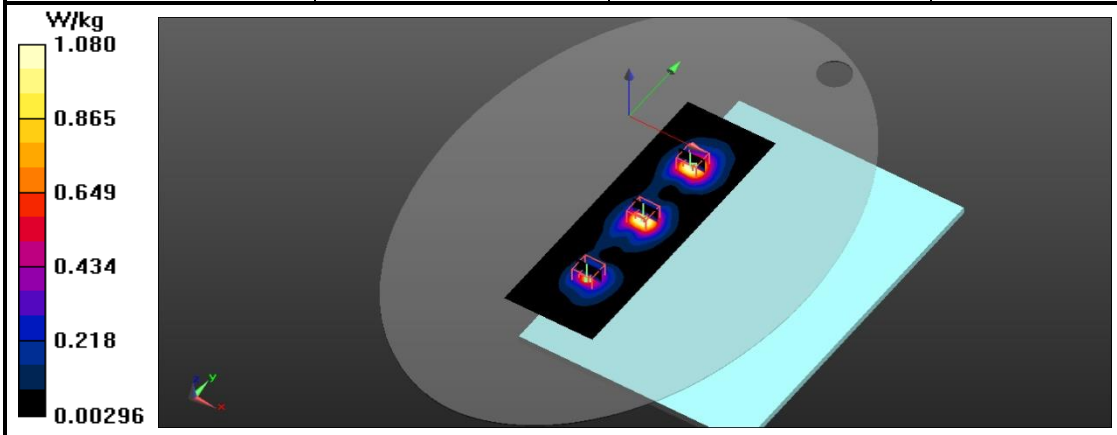


Figure 46: SAR Body Testing Results for the A2141 at 5610 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.0 °C
DATE:	30/08/2019	**RELATIVE HUMIDITY:**	60.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.738 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF1 & WF3	**RELATIVE PERMITTIVITY:**	46.499
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.8 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5690 MHz	**DRIFT:**	0.03 dB
MODULATION:	BPSK	**PEAK SAR:**	1.33 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.77 W/kg

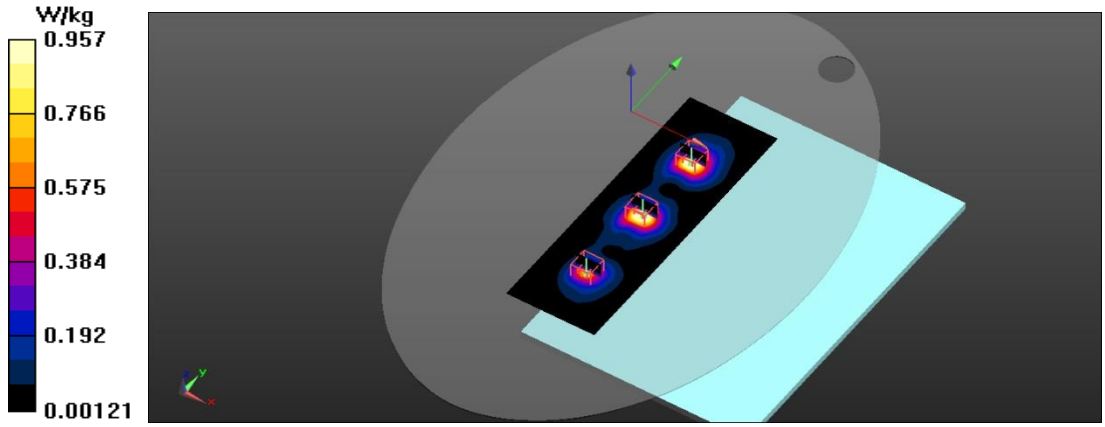


Figure 47: SAR Body Testing Results for the A2141 at 5690 MHz.

2.6 WLAN U-NII 3 BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.8 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	48.9 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF2	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	-0.04 dB
MODULATION:	BPSK	**PEAK SAR:**	1.60 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.68 W/kg

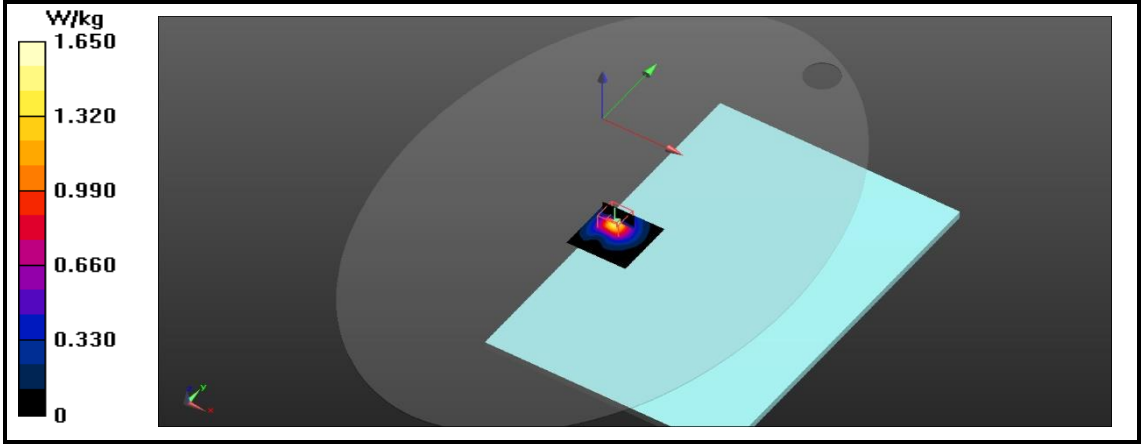


Figure 48: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.8 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	48.9 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF1	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	0.03 dB
MODULATION:	BPSK	**PEAK SAR:**	1.46 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.69 W/kg

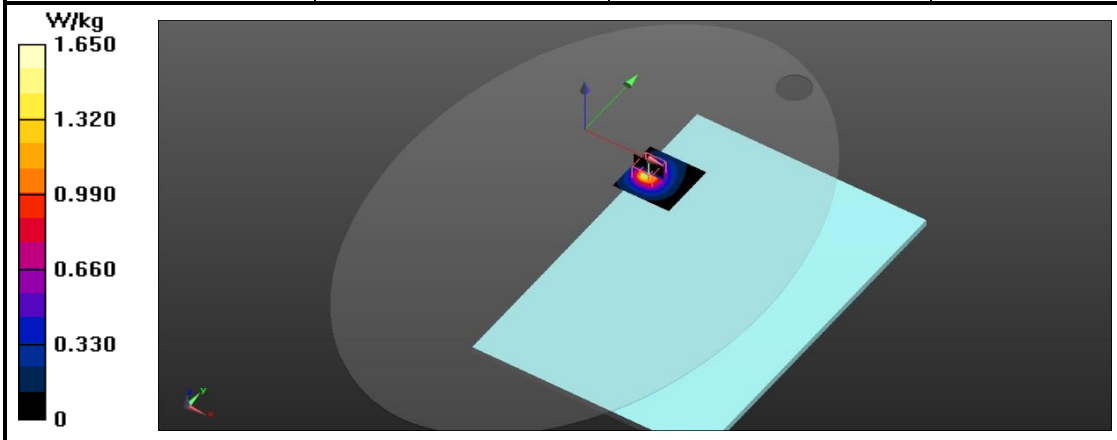


Figure 49: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.8 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	48.9 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	0.00 dB
MODULATION:	BPSK	**PEAK SAR:**	1.26 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.76 W/kg

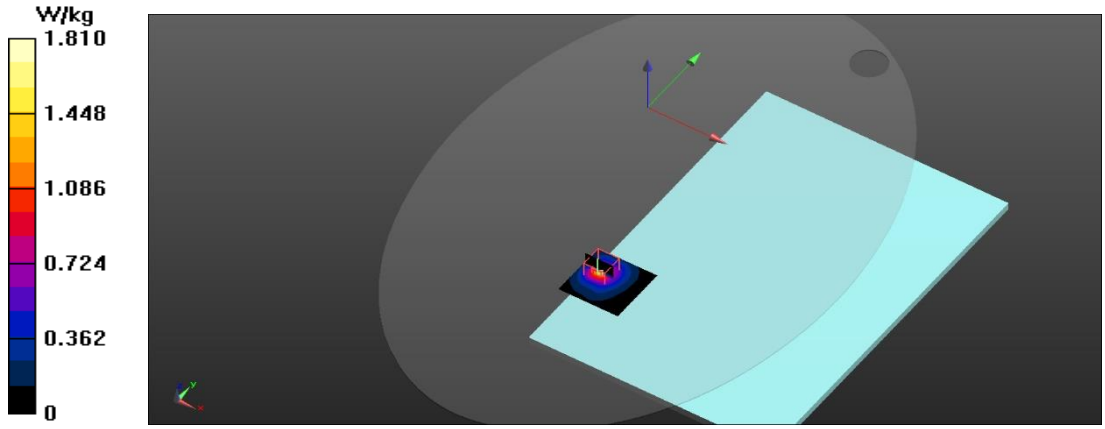


Figure 50: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.8 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	48.9 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3 (Aux)	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	0.10 dB
MODULATION:	BPSK	**PEAK SAR:**	1.32 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.72 W/kg

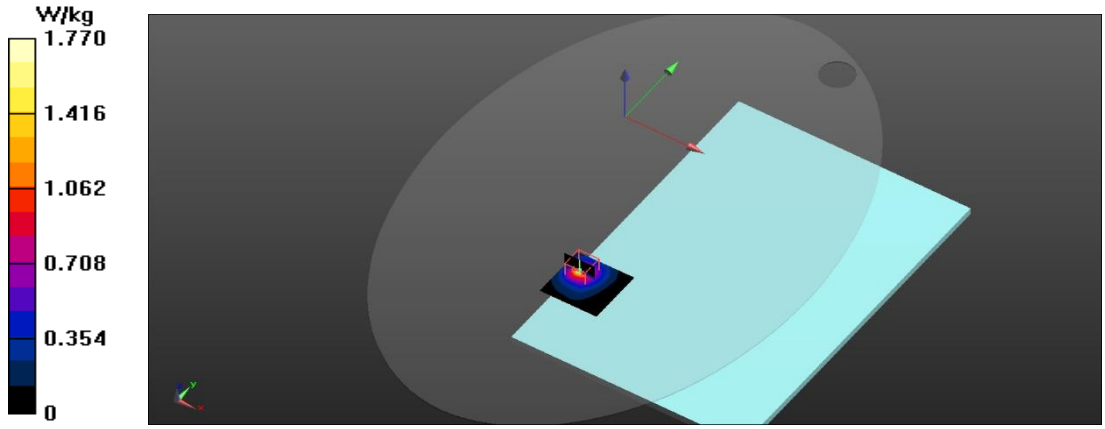


Figure 51: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.8 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	48.9 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - SISO Antenna WF3 (Aux - Low Power)	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	0.18 dB
MODULATION:	BPSK	**PEAK SAR:**	0.26 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.13 W/kg

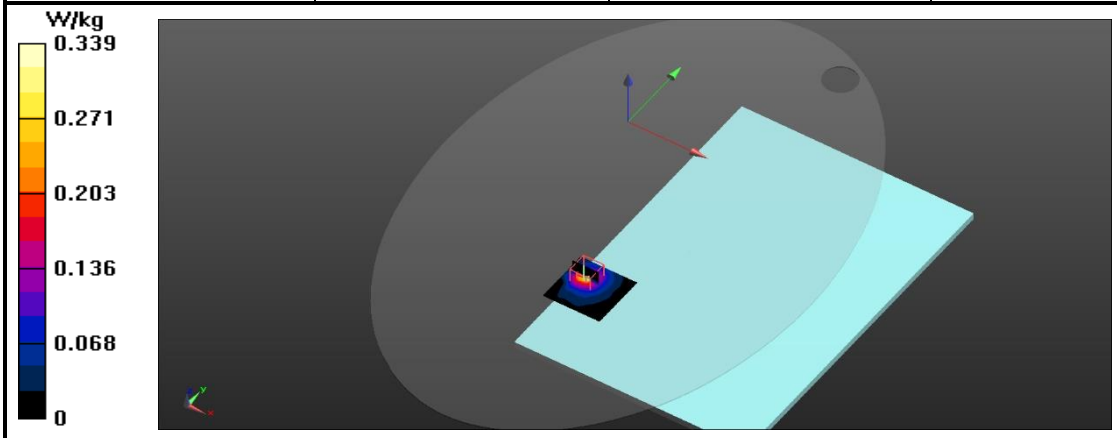


Figure 52: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.8 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	48.9 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF1	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	0.15 dB
MODULATION:	BPSK	**PEAK SAR:**	1.36 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.75 W/kg

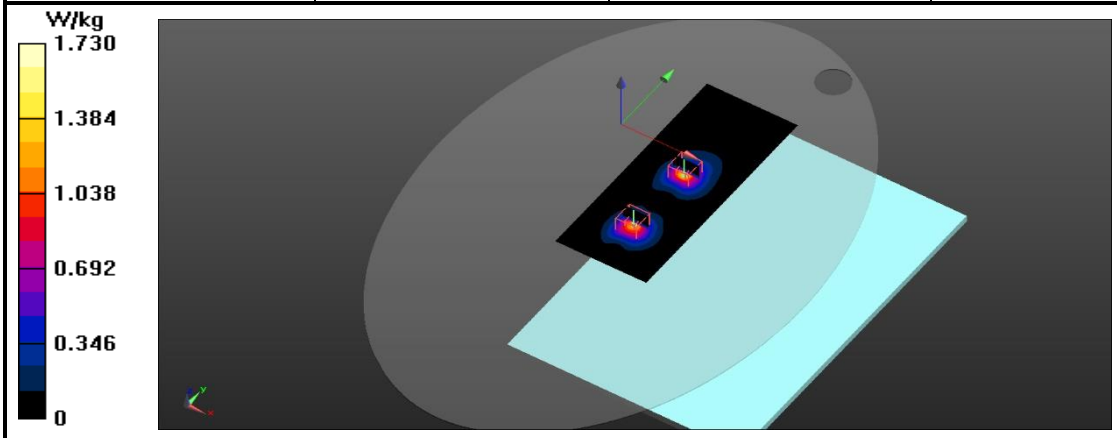


Figure 53: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	23.8 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	48.9 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF1 & WF3	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	-0.00 dB
MODULATION:	BPSK	**PEAK SAR:**	1.36 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.72 W/kg

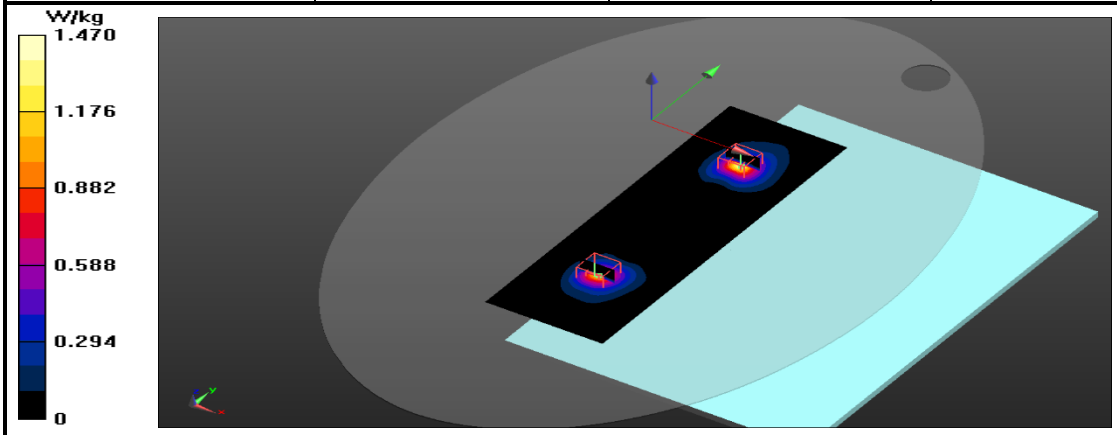


Figure 54: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.7 °C
DATE:	31/08/2019	**RELATIVE HUMIDITY:**	50.0 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	5.853 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF3	**RELATIVE PERMITTIVITY:**	46.337
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	23.1 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	-0.21 dB
MODULATION:	BPSK	**PEAK SAR:**	1.26 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.67 W/kg

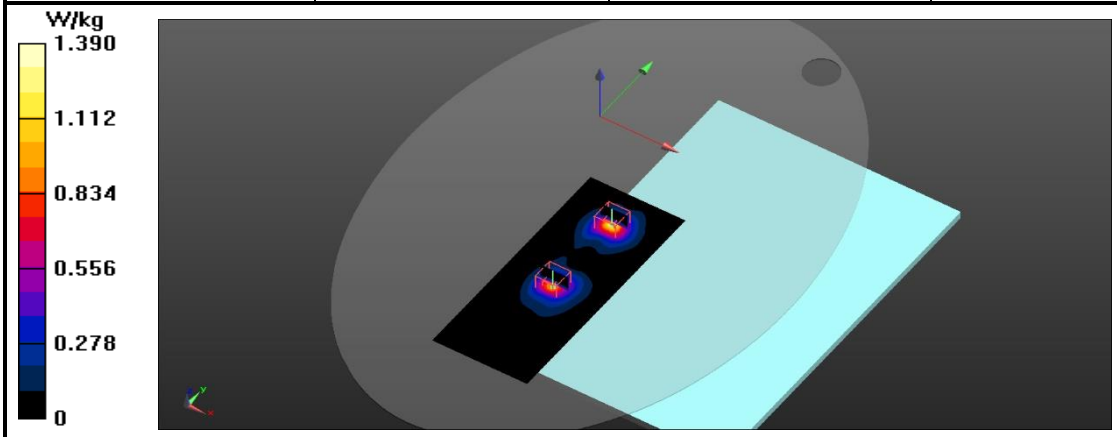


Figure 55: SAR Body Testing Results for the A2141 at 5775 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.4 °C
DATE:	21/08/2019	**RELATIVE HUMIDITY:**	44.6 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	6.127 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF1 & WF3	**RELATIVE PERMITTIVITY:**	46.016
DUT POSITION:	0 mm - Bottom	**LIQUID TEMPERATURE:**	22.9 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5775 MHz	**DRIFT:**	-0.14 dB
MODULATION:	BPSK	**PEAK SAR:**	1.17 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.63 W/kg

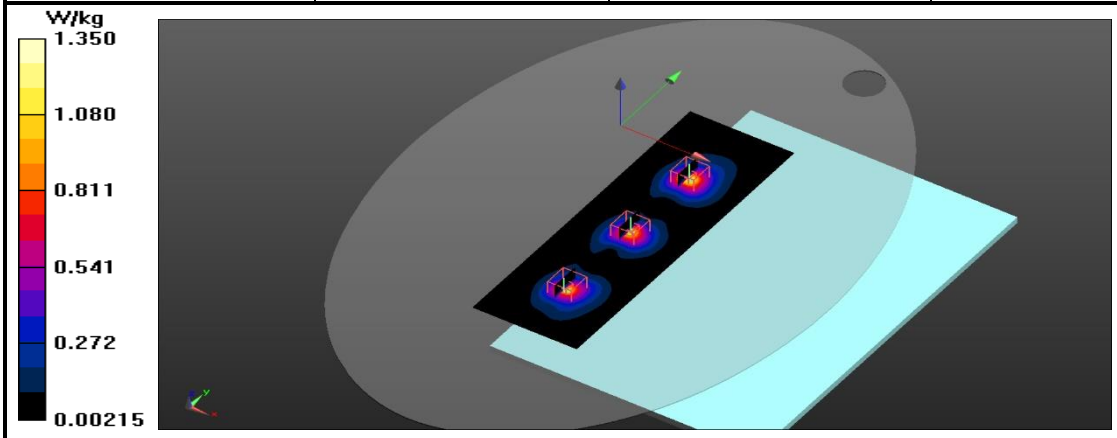


Figure 56: SAR Body Testing Results for the A2141 at 5775 MHz.

2.7 ISED ADDITIONAL TESTS - WLAN U-NII 2A BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.4 °C
DATE:	22/08/2019	**RELATIVE HUMIDITY:**	44.6 %
PHANTOM:	QD OVA 004 Ax	**RELATIVE PERMITTIVITY:**	5.465 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF2 & WF1	**CONDUCTIVITY:**	46.909
DUT POSITION:	0mm - Bottom Edge	**LIQUID TEMPERATURE:**	22.94 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5320 MHz	**DRIFT:**	-0.04 dB
MODULATION:	BPSK	**PEAK SAR:**	1.45 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.82 W/kg

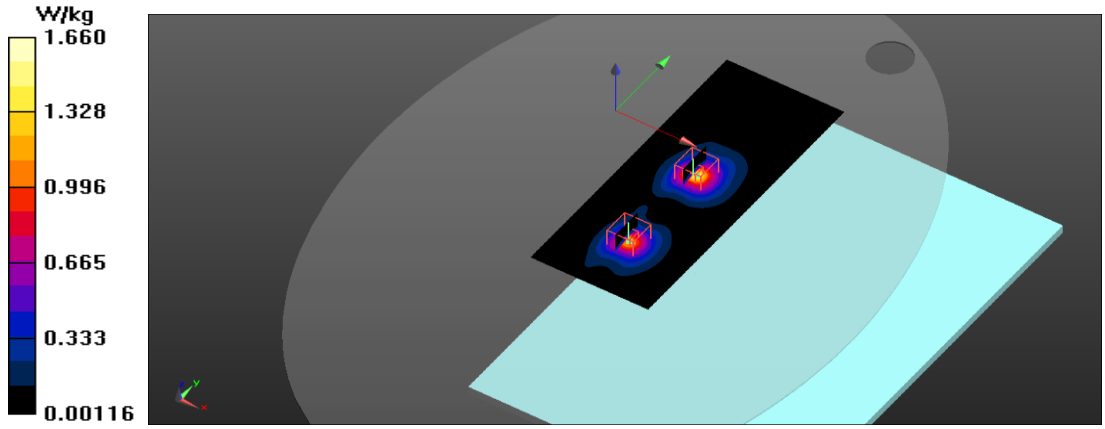


Figure 57: SAR Body Testing Results for the A2141 at 5320 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.4 °C
DATE:	22/08/2019	**RELATIVE HUMIDITY:**	44.6 %
PHANTOM:	QD OVA 004 Ax	**RELATIVE PERMITTIVITY:**	5.384 S/m
DUT CONFIGURATION:	802.11ac 80 MHz 29.3 Mbps - MIMO Antenna WF2 & WF3	**CONDUCTIVITY:**	47.04
DUT POSITION:	0mm - Bottom Edge	**LIQUID TEMPERATURE:**	22.94 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5260 MHz	**DRIFT:**	-0.01 dB
MODULATION:	MCS0	**PEAK SAR:**	1.00 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.64 W/kg

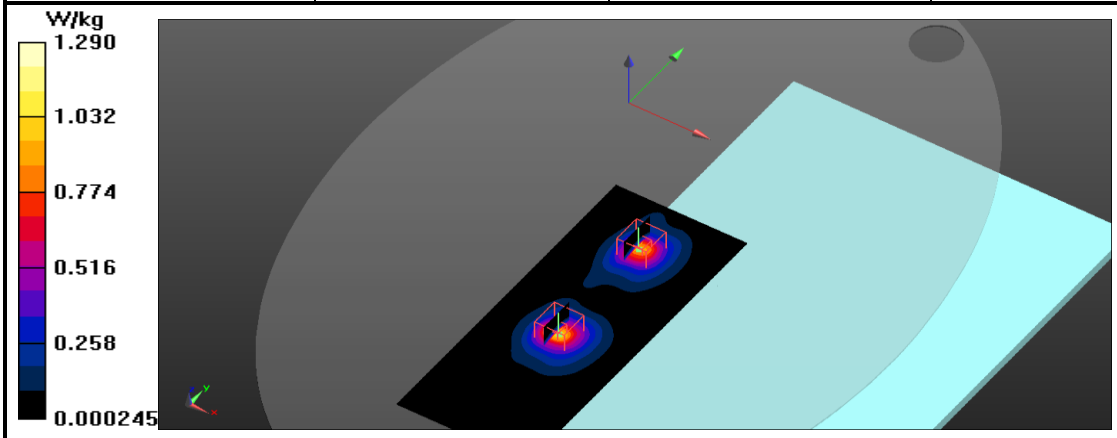


Figure 58: SAR Body Testing Results for the A2141 at 5260 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.4 °C
DATE:	22/08/2019	**RELATIVE HUMIDITY:**	44.6 %
PHANTOM:	QD OVA 004 Ax	**RELATIVE PERMITTIVITY:**	5.384 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF1 & WF3	**CONDUCTIVITY:**	47.04
DUT POSITION:	0mm - Bottom Edge	**LIQUID TEMPERATURE:**	22.94 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5260 MHz	**DRIFT:**	0.01 dB
MODULATION:	MCS0	**PEAK SAR:**	1.35 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.78 W/kg

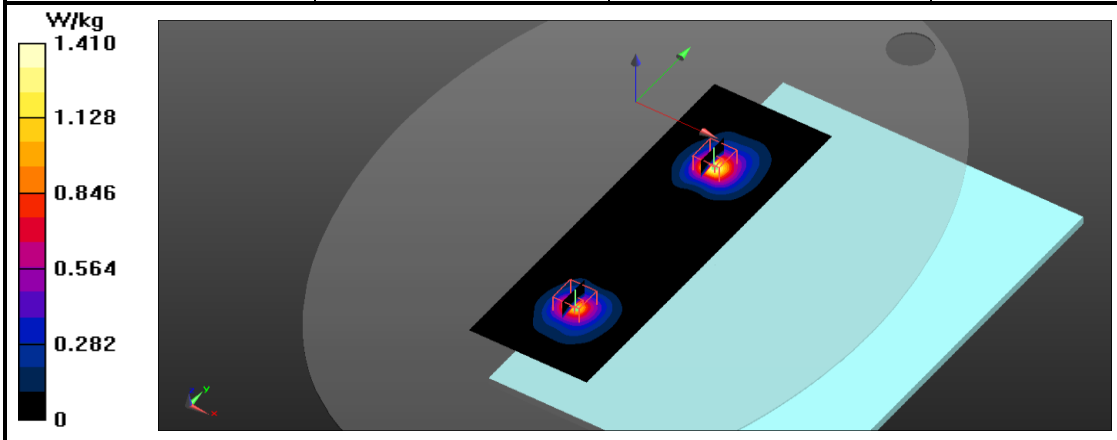


Figure 59: SAR Body Testing Results for the A2141 at 5260 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	24.4 °C
DATE:	22/08/2019	**RELATIVE HUMIDITY:**	44.6 %
PHANTOM:	QD OVA 004 Ax	**RELATIVE PERMITTIVITY:**	5.411 S/m
DUT CONFIGURATION:	802.11n 20 MHz 6.5 Mbps - MIMO Antenna WF2 & WF1 & WF3	**CONDUCTIVITY:**	46.996
DUT POSITION:	0mm - Bottom Edge	**LIQUID TEMPERATURE:**	22.94 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5280 MHz	**DRIFT:**	0.00 dB
MODULATION:	MCS0	**PEAK SAR:**	1.19 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.73 W/kg

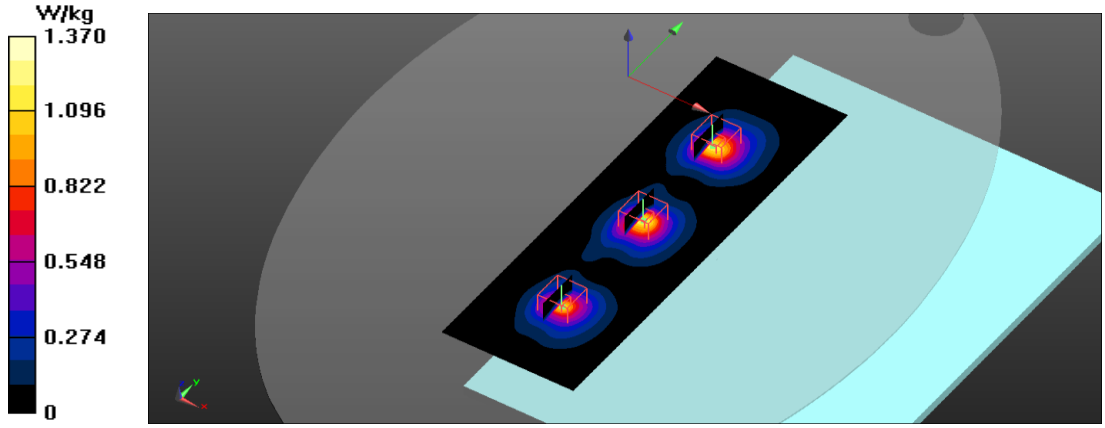


Figure 60: SAR Body Testing Results for the A2141at 5280 MHz.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

The following test equipment was used at TÜV SÜD:

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
10MHz - 2.5GHz, 3W, Amplifier	Vectawave Technology	VTL5400	51	-	TU
Amplifier (5GHz)	IndexSar Ltd	5GHz	157	-	TU
Power Sensor	Rohde & Schwarz	NRV-Z1	178	12	07-Jun-2020
Directional Coupler	Hewlett Packard	11692D	452	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	29-Oct-2019
Bi-directional Coupler	IndexSar Ltd	7401 (VDC0830-20)	2414	-	TU
Attenuator (30dB, 25W)	Weinschel	46-30-34	2776	12	23-Jul-2020
Power Meter	Rohde & Schwarz	NRVD	2979	12	07-Jun-2020
Hygrometer	Rotronic	I-1000	3068	12	27-Jun-2020
Hygrometer	Rotronic	I-1000	2784	12	13-Jun-2020
Power Meter	Rohde & Schwarz	NRP	3491	12	15-Oct-2019
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	15-Oct-2019
Power Sensor	Rohde & Schwarz	NRV-Z1	3563	12	07-Jun-2020
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	29-Sep-2019
P-Series Power Meter	Agilent Technologies	N1911A	3981	12	29-Sep-2019
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	29-Sep-2019
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3983	12	29-Sep-2019
Data Acquisition Electronics	Speag	DAE 4 - SD 000 D04 BM	4689	12	25-Mar-2020
Data Acquisition Electronics	Speag	DAE 4 - SD 000 D04 BN	5327	12	07-Jun-2020
Validation Dipole (5GHz)	Speag	D5GzV2	5328	12	07-Jun-2020
Validation Dipole (5GHz)	Speag	D5GzV2	4309	12	13-Dec-2019
Validation Dipole (2450MHz)	Speag	D2450V2	5329	12	07-Jun-2020
Validation Dipole (2450MHz)	Speag	D2450V2	3875	12	11-Dec-2019
Dosimetric SAR Probe	Speag	EX3DV4	5330	12	07-Jun-2020
Dosimetric SAR Probe	Speag	EX3DV4	4700	12	13-Dec-2019
Body Phantom	Speag	Oval Flat Phantom ELI v8.0	5333	-	TU
Body Phantom	Speag	Oval Flat Phantom ELI v8.0	4833	-	TU
Device Holder	Speag	MD4HHTV5	5335	-	TU
Measurement server	Speag	DASY 6 Measurement Server	5337	-	TU
Measurement server	Speag	DASY 6 Measurement Server	4692	-	TU
Robot	Staubli	TX90 XLRobot	4704	-	TU
Robot	Staubli	TX90 XLRobot	4704	-	TU
MBBL Fluid	Speag	Batch 2	N/A	Weekly	09-Sept-2019
MBBL Fluid	Speag	Batch 3	N/A	Weekly	09-Sept-2019

TU = Traceability Unscheduled
O/P Mon = Output Monitored

3.2 TEST SOFTWARE

The following software was used to control the TÜV SÜD DASY Systems.

Instrument	Version Number
DASY system	52.10.2(1495)

3.3 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS

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

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

Fluid Type and Frequency	Relative Permittivity Target (εr)	Relative Permittivity Measured (εr)	Conductivity Target (S/m)	Conductivity Measured (S/m)	Date	Fluid Temperature °C
MBBL @ 2450 MHz	52.70	52.77	1.95	1.97	12/08/19	21.5
MBBL @ 5200 MHz	49.01	47.95	5.30	5.30	12/08/19	21.5
MBBL @ 5500 MHz	48.61	47.35	5.65	5.73	12/08/19	21.5
MBBL @ 5600 MHz	48.47	47.17	5.77	5.88	12/08/19	21.5
MBBL @ 5800 MHz	48.20	46.79	6.00	6.18	12/08/19	21.5
MBBL @ 2450 MHz	52.70	52.23	1.95	2.00	19/08/19	21.6
MBBL @ 5200 MHz	49.01	47.17	5.30	5.30	19/08/19	21.6
MBBL @ 5500 MHz	48.61	46.53	5.65	5.72	19/08/19	21.6
MBBL @ 5600 MHz	48.47	46.34	5.77	5.86	19/08/19	21.6
MBBL @ 5800 MHz	48.20	45.96	6.00	6.16	19/08/19	21.6
MBBL @ 2450 MHz	52.70	52.03	1.95	2.02	27/08/19	22.5
MBBL @ 5200 MHz	49.01	47.45	5.30	5.06	27/08/19	22.5
MBBL @ 5500 MHz	48.61	46.78	5.65	5.54	27/08/19	22.5
MBBL @ 5600 MHz	48.47	46.68	5.77	5.61	27/08/19	22.5
MBBL @ 5800 MHz	48.2	46.29	6.00	5.89	27/08/19	22.5
MBBL @ 2450 MHz	52.70	52.66	1.95	2.03	02/09/119	21.5
MBBL @ 5200 MHz	49.01	47.64	5.30	5.31	02/09/19	21.5
MBBL @ 5500 MHz	48.61	47.10	5.65	5.73	02/09/19	21.5
MBBL @ 5600 MHz	48.47	46.86	5.77	5.88	02/09/19	21.5
MBBL @ 5800 MHz	48.2	46.48	6.00	6.17	02/09/19	21.5

3.4 TEST CONDITIONS

3.4.1 Test Laboratory Conditions

Ambient temperature: Within +15°C to +35°C.
The actual temperature during the testing ranged from 22.7°C to 24.7°C.
The actual humidity during the testing ranged from 43.1% to 60.6% RH.

3.4.2 Test Fluid Temperature Range

Frequency	Body / Head Fluid	Min Temperature °C	Max Temperature °C
2450 MHz	Body	21.6	23.1
5200 MHz	Body	21.4	23.1
5500 MHz	Body	21.4	23.1
5800 MHz	Body	22.9	23.1

3.4.3 SAR Drift

The maximum SAR Drift was recorded as 0.22 dB. The measurement uncertainty budget for this assessment includes the maximum SAR Drift figures.

3.5 MEASUREMENT UNCERTAINTY

Body, Full SAR Measurements, 300 MHz to 3 GHz

Source of Uncertainty	Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)	v_i (v_{eff})
Measurement System						
Probe calibration	6.0	N	1.00	1.00	6.0	Infinity
Axial Isotropy	4.7	R	1.73	0.70	1.9	Infinity
Hemispherical Isotropy	9.6	R	1.73	0.70	3.9	Infinity
Boundary effect	1.0	R	1.73	1.00	0.6	Infinity
Linearity	4.7	R	1.73	1.00	2.7	Infinity
System Detection limits	1.0	R	1.73	1.00	0.6	Infinity
Modulation response	2.4	R	1.73	1.00	1.4	Infinity
Readout electronics	0.3	N	1.00	1.00	0.3	Infinity
Response time	0.8	R	1.73	1.00	0.5	Infinity
Integration time	2.6	R	1.73	1.00	1.5	Infinity
RF ambient noise	3.0	R	1.73	1.00	1.7	Infinity
RF ambient reflections	3.0	R	1.73	1.00	1.7	Infinity
Probe positioner	0.4	R	1.73	1.00	0.2	Infinity
Probe positioning	2.9	R	1.73	1.00	1.7	Infinity
Max SAR Evaluation	2.0	R	1.73	1.00	1.2	Infinity
Test sample related						
Device Positioning	2.9	N	1.00	1.00	2.9	145
Device Holder	3.6	N	1.00	1.00	3.6	5
Input Power and SAR Drift	5.0	R	1.73	1.00	0.2	Infinity
Phantom and Setup						
Phantom uncertainty	6.1	R	1.73	1.00	3.5	Infinity
SAR Correction	1.9	R	1.73	1.00	1.1	Infinity
Liquid conductivity Meas.	2.5	R	1.73	0.78	1.1	Infinity
Liquid Permittivity Meas.	2.5	R	1.73	0.23	0.3	Infinity
Temp. Unc. Conductivity	3.4	R	1.73	0.78	1.5	Infinity
Temp. Unc. Permittivity	0.4	R	1.73	0.23	0.1	Infinity
Combined Standard Uncertainty		**RSS**			10.8	361
Expanded Standard Uncertainty		**K=2**			21.5	

Body, Full SAR Measurements, 3 GHz to 6 GHz

Source of Uncertainty	Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)	v_i (v_{eff})
Measurement System						
Probe calibration	6.0	N	1.00	0.00	0.0	
Axial Isotropy	4.7	R	1.73	0.70	1.9	Infinity
Hemispherical Isotropy	9.6	R	1.73	0.70	3.9	Infinity
Boundary effect	1.0	R	1.73	1.00	0.6	Infinity
Linearity	4.7	R	1.73	1.00	2.7	Infinity
System Detection limits	1.0	R	1.73	1.00	0.6	Infinity
Modulation response	2.4	R	1.73	1.00	1.4	Infinity
Readout electronics	0.3	N	1.00	0.00	0.0	
Response time	0.8	R	1.73	0.00	0.0	
Integration time	2.6	R	1.73	1.00	1.5	Infinity
RF ambient noise	3.0	R	1.73	1.00	1.7	Infinity
RF ambient reflections	3.0	R	1.73	0.00	0.0	
Probe positioner	0.4	R	1.73	1.00	0.2	Infinity
Probe positioning	2.9	R	1.73	1.00	1.7	Infinity
Spatial x-y-Resolution	10.0	R	1.73	1.00	5.8	Infinity
Fast SAR z-Approximation	7.0	R	1.73	1.00	4.0	Infinity
Test sample related						
Device Positioning	2.9	N	1.00	1.00	2.9	145
Device Holder	3.6	N	1.00	1.00	3.6	5
Input Power and SAR Drift	5.0	R	1.73	1.00	0.2	Infinity
Phantom and Setup						
Phantom uncertainty	6.1	R	1.73	1.00	3.5	Infinity
SAR Correction	1.9	R	1.73	0.00	0.0	
Liquid conductivity Meas.	2.5	R	1.73	0.00	0.0	
Liquid Permittivity Meas.	2.5	R	1.73	0.00	0.0	
Temp. Unc. Conductivity	3.4	R	1.73	0.00	0.0	
Temp. Unc. Permittivity	0.4	R	1.73	0.00	0.0	
Combined Standard Uncertainty		**RSS**			11.0	
Expanded Standard Uncertainty		**K=2**			21.9	

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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

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

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

ANNEX A

PHOTOGRAPHS

TEST POSITIONAL PHOTOGRAPHS

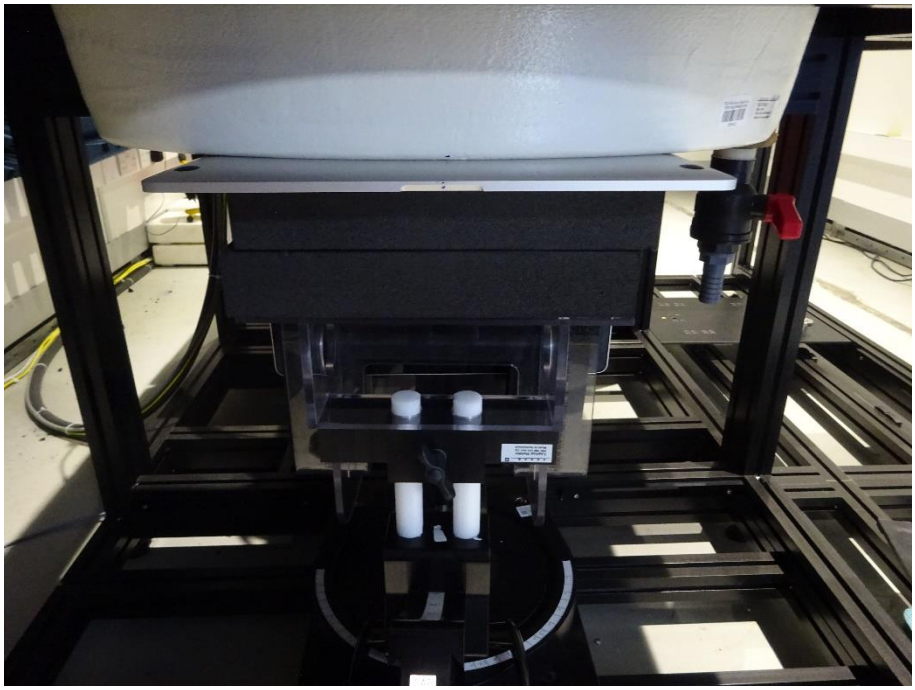


Figure 61
Bottom – 0 mm separation distance.

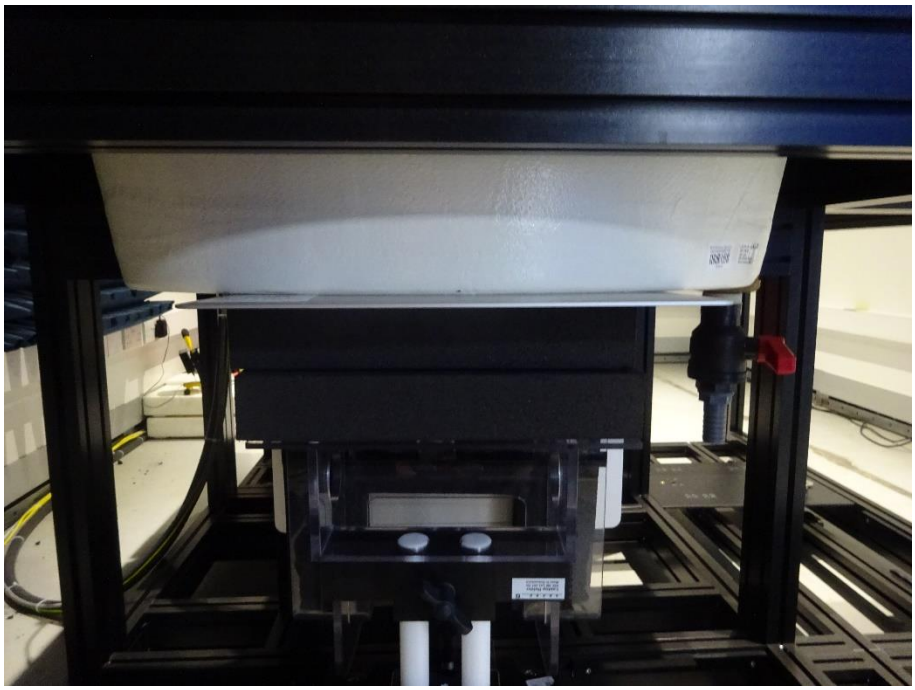


Figure 62
Rear Of Display – 0 mm separation distance.

PHOTOGRAPHS OF EQUIPMENT UNDER TEST (EUT)

Figure 63
Top

Figure 64
Bottom

Figure 65
Top - Open

ANNEX B

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 UK

Certificate No: EX3-3759_Dec18

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3759

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: December 13, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: December 13, 2018

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

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

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

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3759

Manufactured: March 16, 2010
Calibrated: December 13, 2018

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.47	0.43	0.43	± 10.1 %
DCP (mV)[B]	98.8	100.7	99.7	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	196.6	±3.5 %
		Y	0.0	0.0	1.0		173.4	
		Z	0.0	0.0	1.0		184.7	

Note: For details on UID parameters see Appendix.

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	43.15	332.9	37.58	13.15	0.734	5.080	0.000	0.592	1.010
Y	49.34	366.8	35.30	18.32	0.514	5.094	0.953	0.401	1.007
Z	42.84	329.4	37.39	15.09	1.018	5.074	0.000	0.598	1.011

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
450	43.5	0.87	11.05	11.05	11.05	0.13	1.20	± 13.3 %
750	41.9	0.89	10.48	10.48	10.48	0.34	0.89	± 12.0 %
835	41.5	0.90	10.23	10.23	10.23	0.25	1.09	± 12.0 %
900	41.5	0.97	9.80	9.80	9.80	0.21	1.22	± 12.0 %
1640	40.2	1.31	8.57	8.57	8.57	0.20	0.93	± 12.0 %
1750	40.1	1.37	8.48	8.48	8.48	0.22	0.98	± 12.0 %
1900	40.0	1.40	8.14	8.14	8.14	0.30	0.85	± 12.0 %
2100	39.8	1.49	8.07	8.07	8.07	0.24	0.88	± 12.0 %
2300	39.5	1.67	7.69	7.69	7.69	0.23	0.90	± 12.0 %
2450	39.2	1.80	7.24	7.24	7.24	0.22	0.99	± 12.0 %
2600	39.0	1.96	6.98	6.98	6.98	0.26	0.99	± 12.0 %
5200	36.0	4.66	4.60	4.60	4.60	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.38	4.38	4.38	0.40	1.80	± 13.1 %
5500	35.6	4.96	3.94	3.94	3.94	0.40	1.80	± 13.1 %
5600	35.5	5.07	3.91	3.91	3.91	0.40	1.80	± 13.1 %
5800	35.3	5.27	3.89	3.89	3.89	0.40	1.80	± 13.1 %

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

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

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

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

Calibration Parameter Determined in Body Tissue Simulating Media

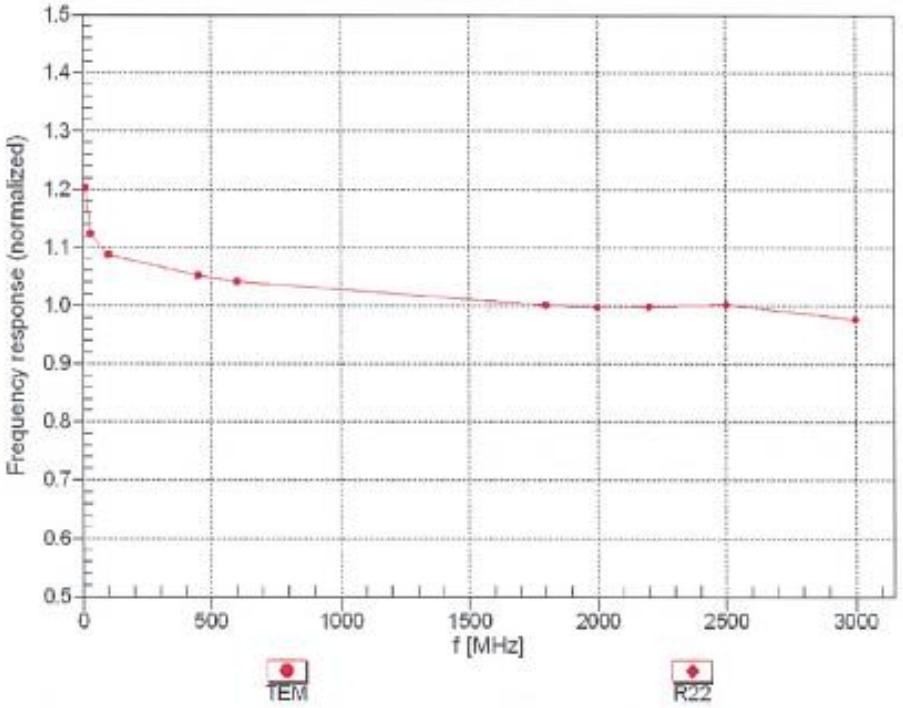
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
450	56.7	0.94	11.27	11.27	11.27	0.07	1.20	± 13.3 %
750	55.5	0.96	10.34	10.34	10.34	0.28	0.95	± 12.0 %
835	55.2	0.97	9.98	9.98	9.98	0.36	0.80	± 12.0 %
900	55.0	1.05	9.87	9.87	9.87	0.23	1.03	± 12.0 %
1640	53.7	1.42	8.59	8.59	8.59	0.29	0.83	± 12.0 %
1750	53.4	1.49	8.25	8.25	8.25	0.15	1.30	± 12.0 %
1900	53.3	1.52	7.93	7.93	7.93	0.19	0.99	± 12.0 %
2100	53.2	1.62	7.65	7.65	7.65	0.18	1.20	± 12.0 %
2300	52.9	1.81	7.52	7.52	7.52	0.29	0.90	± 12.0 %
2450	52.7	1.95	7.37	7.37	7.37	0.23	0.95	± 12.0 %
2600	52.5	2.16	7.15	7.15	7.15	0.13	1.20	± 12.0 %
5200	49.0	5.30	3.99	3.99	3.99	0.50	1.90	± 13.1 %
5300	48.9	5.42	3.81	3.81	3.81	0.50	1.90	± 13.1 %
5500	48.6	5.65	3.40	3.40	3.40	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.26	3.26	3.26	0.50	1.90	± 13.1 %
5800	48.2	6.00	3.28	3.28	3.28	0.50	1.90	± 13.1 %

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

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

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

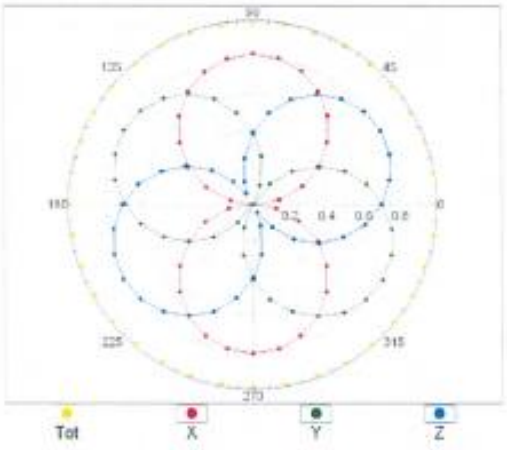
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



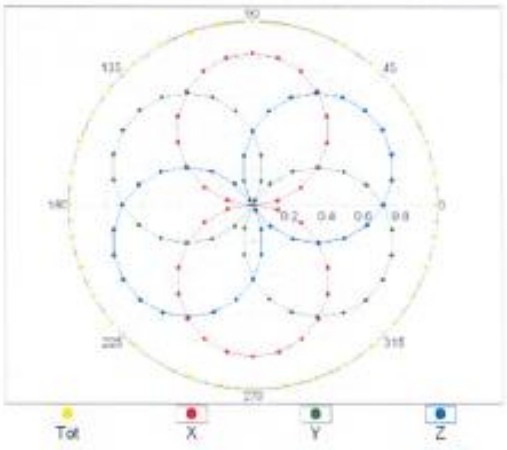
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

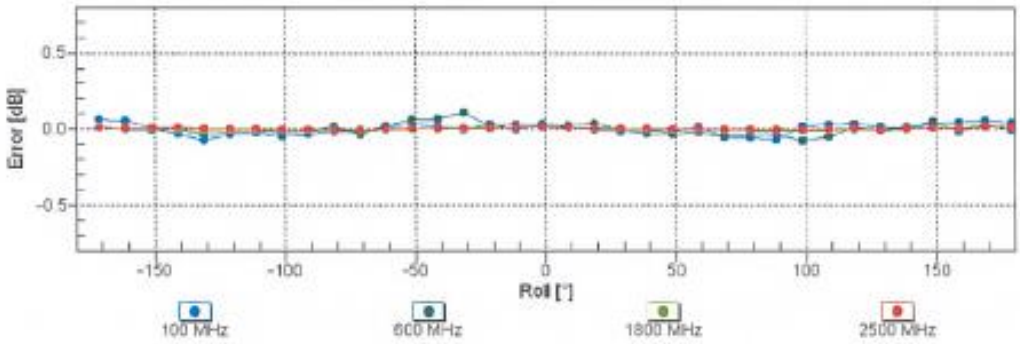
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



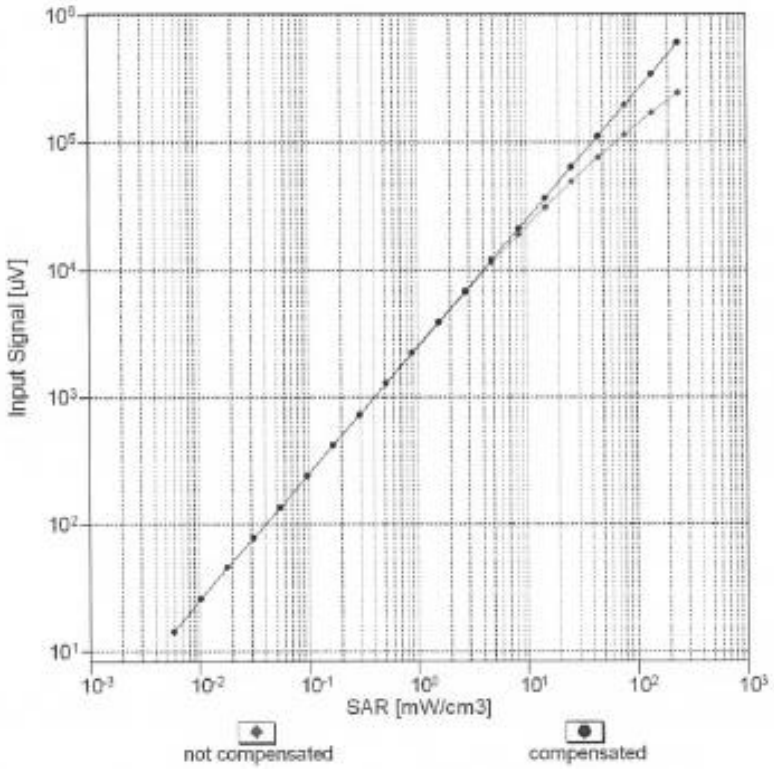
f=1800 MHz,R22

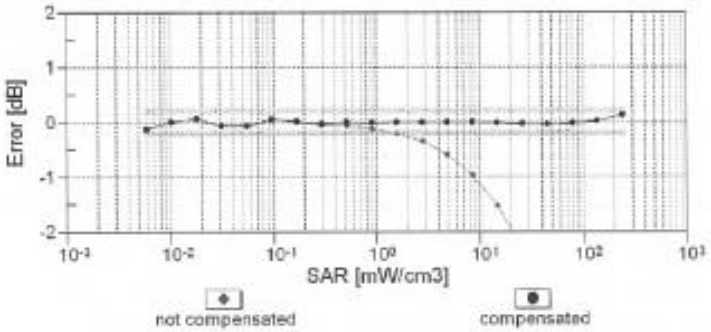




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

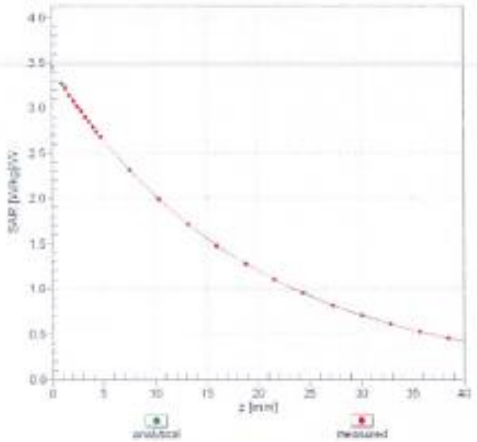




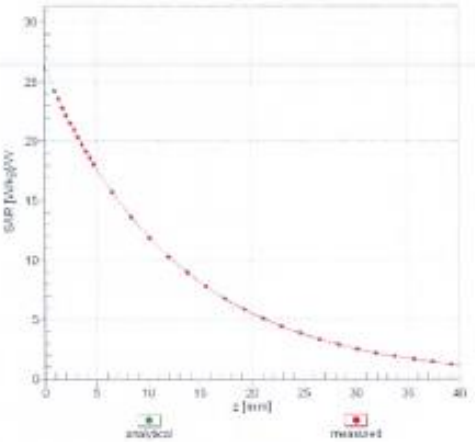
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

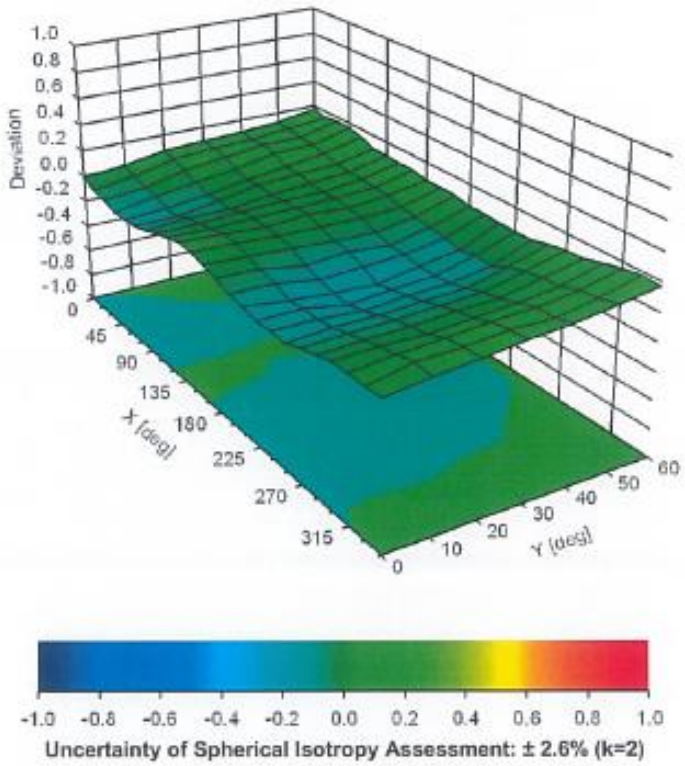


f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-1.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	196.6	± 3.5 %
		Y	0.00	0.00	1.00		173.4	
		Z	0.00	0.00	1.00		184.7	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	2.33	65.72	10.32	10.00	20.0	± 9.6 %
		Y	4.70	74.09	14.23		20.0	
		Z	2.50	65.82	10.56		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	0.82	64.61	13.00	0.00	150.0	± 9.6 %
		Y	0.96	66.19	14.43		150.0	
		Z	0.81	65.02	13.15		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.06	62.79	14.23	0.41	150.0	± 9.6 %
		Y	1.17	63.77	15.05		150.0	
		Z	1.05	63.09	14.40		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.75	66.48	16.94	1.46	150.0	± 9.6 %
		Y	4.90	66.71	17.09		150.0	
		Z	4.74	66.56	16.96		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	100.00	113.54	27.20	9.39	50.0	± 9.6 %
		Y	100.00	117.10	28.93		50.0	
		Z	100.00	113.57	27.48		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	113.18	27.08	9.57	50.0	± 9.6 %
		Y	100.00	116.77	28.82		50.0	
		Z	100.00	113.33	27.42		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	111.17	25.03	6.56	60.0	± 9.6 %
		Y	100.00	115.70	27.38		60.0	
		Z	100.00	110.16	24.82		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	3.96	68.09	24.76	12.57	50.0	± 9.6 %
		Y	6.45	84.18	33.68		50.0	
		Z	3.95	66.98	23.71		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	8.81	91.01	32.27	9.56	60.0	± 9.6 %
		Y	14.33	103.33	36.99		60.0	
		Z	9.84	92.33	32.30		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	109.91	23.68	4.80	80.0	± 9.6 %
		Y	100.00	116.12	26.85		80.0	
		Z	100.00	108.13	23.12		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	108.60	22.41	3.55	100.0	± 9.6 %
		Y	100.00	117.50	26.78		100.0	
		Z	100.00	106.16	21.57		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	5.69	81.09	27.21	7.80	80.0	± 9.6 %
		Y	7.91	88.40	30.27		80.0	
		Z	6.40	82.89	27.60		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	108.69	23.44	5.30	70.0	± 9.6 %
		Y	100.00	114.15	26.27		70.0	
		Z	100.00	107.47	23.12		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	96.91	16.29	1.88	100.0	± 9.6 %
		Y	100.00	115.98	24.77		100.0	
		Z	1.42	68.65	9.07		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	0.21	60.00	4.41	1.17	100.0	± 9.6 %
		Y	100.00	119.38	25.17		100.0	
		Z	0.23	60.00	4.22		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	15.56	97.63	25.77	5.30	70.0	± 9.6 %
		Y	100.00	129.32	35.00		70.0	
		Z	14.06	94.36	24.43		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	2.47	73.76	15.94	1.88	100.0	± 9.6 %
		Y	5.68	85.89	21.48		100.0	
		Z	2.69	74.13	15.79		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	1.55	69.04	13.61	1.17	100.0	± 9.6 %
		Y	2.74	76.75	17.96		100.0	
		Z	1.65	69.41	13.52		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	26.25	105.76	28.09	5.30	70.0	± 9.6 %
		Y	100.00	129.75	35.21		70.0	
		Z	22.10	101.22	26.45		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	2.29	72.93	15.58	1.88	100.0	± 9.6 %
		Y	5.16	84.61	21.03		100.0	
		Z	2.49	73.27	15.43		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	1.57	69.38	13.87	1.17	100.0	± 9.6 %
		Y	2.79	77.26	18.27		100.0	
		Z	1.68	69.84	13.81		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	1.08	65.59	11.46	0.00	150.0	± 9.6 %
		Y	1.61	70.06	14.76		150.0	
		Z	1.06	65.68	11.34		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	100.00	108.33	24.00	7.78	50.0	± 9.6 %
		Y	100.00	112.59	26.15		50.0	
		Z	100.00	108.01	24.09		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.13	122.60	6.71	0.00	150.0	± 9.6 %
		Y	0.00	105.21	9.60		150.0	
		Z	0.29	126.05	7.74		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	44.32	101.19	25.43	13.80	25.0	± 9.6 %
		Y	100.00	117.80	30.49		25.0	
		Z	16.55	88.46	22.34		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	96.20	112.09	27.05	10.79	40.0	± 9.6 %
		Y	100.00	116.04	28.74		40.0	
		Z	21.78	93.24	22.57		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	25.89	101.25	27.24	9.03	50.0	± 9.6 %
		Y	100.00	126.03	34.65		50.0	
		Z	16.13	92.71	24.56		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.42	76.21	24.38	6.55	100.0	± 9.6 %
		Y	5.72	81.33	26.62		100.0	
		Z	4.91	77.90	24.83		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.10	63.87	14.86	0.61	110.0	± 9.6 %
		Y	1.23	65.18	15.84		110.0	
		Z	1.11	64.36	15.09		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	7.45	96.67	24.42	1.30	110.0	± 9.6 %
		Y	100.00	136.09	35.03		110.0	
		Z	20.40	109.23	26.87		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	2.79	79.80	21.58	2.04	110.0	± 9.6 %
		Y	4.85	88.66	25.17		110.0	
		Z	3.59	83.15	22.48		110.0	
10062-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.53	66.35	16.28	0.49	100.0	± 9.6 %
		Y	4.68	66.62	16.44		100.0	
		Z	4.51	66.42	16.30		100.0	
10063-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.55	66.46	16.39	0.72	100.0	± 9.6 %
		Y	4.70	66.73	16.56		100.0	
		Z	4.53	66.53	16.41		100.0	
10064-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.82	66.74	16.64	0.86	100.0	± 9.6 %
		Y	5.00	67.02	16.81		100.0	
		Z	4.81	66.80	16.66		100.0	
10065-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.70	66.64	16.75	1.21	100.0	± 9.6 %
		Y	4.87	66.96	16.94		100.0	
		Z	4.69	66.72	16.77		100.0	
10066-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.73	66.69	16.94	1.46	100.0	± 9.6 %
		Y	4.90	67.01	17.13		100.0	
		Z	4.72	66.78	16.96		100.0	
10067-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.03	66.95	17.44	2.04	100.0	± 9.6 %
		Y	5.19	67.17	17.59		100.0	
		Z	5.03	67.06	17.46		100.0	
10068-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.08	66.98	17.66	2.55	100.0	± 9.6 %
		Y	5.26	67.30	17.86		100.0	
		Z	5.08	67.09	17.68		100.0	
10069-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.16	67.01	17.86	2.67	100.0	± 9.6 %
		Y	5.34	67.27	18.04		100.0	
		Z	5.16	67.13	17.89		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.86	66.60	17.27	1.99	100.0	± 9.6 %
		Y	5.00	66.83	17.42		100.0	
		Z	4.85	66.69	17.29		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.84	66.92	17.49	2.30	100.0	± 9.6 %
		Y	4.99	67.21	17.68		100.0	
		Z	4.84	67.04	17.53		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.91	67.13	17.85	2.83	100.0	± 9.6 %
		Y	5.06	67.41	18.04		100.0	
		Z	4.92	67.28	17.89		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.91	67.06	18.02	3.30	100.0	± 9.6 %
		Y	5.05	67.33	18.22		100.0	
		Z	4.93	67.24	18.07		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	4.95	67.18	18.34	3.82	90.0	± 9.6 %
		Y	5.10	67.51	18.58		90.0	
		Z	4.98	67.38	18.39		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	4.97	67.01	18.48	4.15	90.0	± 9.6 %
		Y	5.10	67.27	18.69		90.0	
		Z	5.02	67.23	18.55		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.00	67.09	18.59	4.30	90.0	± 9.6 %
		Y	5.13	67.33	18.79		90.0	
		Z	5.05	67.32	18.65		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	0.55	61.87	8.84	0.00	150.0	± 9.6 %
		Y	0.77	64.72	11.77		150.0	
		Z	0.52	61.69	8.50		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.74	60.00	4.43	4.77	80.0	± 9.6 %
		Y	0.85	60.00	4.95		80.0	
		Z	0.83	60.00	4.63		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	111.28	25.10	6.56	60.0	± 9.6 %
		Y	100.00	115.76	27.43		60.0	
		Z	100.00	110.27	24.89		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.60	65.98	14.26	0.00	150.0	± 9.6 %
		Y	1.76	66.96	15.19		150.0	
		Z	1.59	66.29	14.39		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.56	65.91	14.21	0.00	150.0	± 9.6 %
		Y	1.72	66.91	15.15		150.0	
		Z	1.56	66.22	14.34		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	8.87	91.15	32.31	9.56	60.0	± 9.6 %
		Y	14.47	103.54	37.06		60.0	
		Z	9.90	92.43	32.33		60.0	
10100-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	2.79	68.59	15.64	0.00	150.0	± 9.6 %
		Y	3.04	69.80	16.31		150.0	
		Z	2.80	68.86	15.75		150.0	
10101-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.03	66.57	15.28	0.00	150.0	± 9.6 %
		Y	3.20	67.25	15.69		150.0	
		Z	3.01	66.69	15.34		150.0	
10102-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.14	66.60	15.41	0.00	150.0	± 9.6 %
		Y	3.31	67.24	15.79		150.0	
		Z	3.12	66.73	15.47		150.0	
10103-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	5.97	75.10	20.26	3.98	65.0	± 9.6 %
		Y	7.36	78.24	21.54		65.0	
		Z	6.43	76.00	20.48		65.0	
10104-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.02	73.24	20.24	3.98	65.0	± 9.6 %
		Y	6.93	75.40	21.20		65.0	
		Z	6.28	73.73	20.33		65.0	
10105-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	5.56	71.54	19.79	3.98	65.0	± 9.6 %
		Y	6.52	74.14	20.96		65.0	
		Z	5.94	72.54	20.12		65.0	
10108-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.42	67.88	15.43	0.00	150.0	± 9.6 %
		Y	2.66	69.00	16.11		150.0	
		Z	2.42	68.16	15.56		150.0	
10109-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	2.67	66.35	15.07	0.00	150.0	± 9.6 %
		Y	2.86	67.05	15.56		150.0	
		Z	2.66	66.50	15.15		150.0	
10110-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	1.92	66.90	14.85	0.00	150.0	± 9.6 %
		Y	2.15	68.03	15.68		150.0	
		Z	1.92	67.19	14.98		150.0	
10111-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.35	66.93	15.09	0.00	150.0	± 9.6 %
		Y	2.56	67.71	15.78		150.0	
		Z	2.35	67.19	15.21		150.0	

10112-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	2.80	66.42	15.18	0.00	150.0	± 9.6 %
		Y	2.98	67.06	15.63		150.0	
		Z	2.79	66.57	15.25		150.0	
10113-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.50	67.16	15.29	0.00	150.0	± 9.6 %
		Y	2.71	67.87	15.93		150.0	
		Z	2.50	67.43	15.41		150.0	
10114-CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	4.98	66.83	16.20	0.00	150.0	± 9.6 %
		Y	5.10	67.07	16.29		150.0	
		Z	4.96	66.86	16.22		150.0	
10115-CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.25	66.92	16.26	0.00	150.0	± 9.6 %
		Y	5.40	67.23	16.38		150.0	
		Z	5.22	66.94	16.27		150.0	
10116-CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.07	67.00	16.22	0.00	150.0	± 9.6 %
		Y	5.20	67.27	16.32		150.0	
		Z	5.04	67.03	16.23		150.0	
10117-CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	4.95	66.68	16.15	0.00	150.0	± 9.6 %
		Y	5.07	66.96	16.25		150.0	
		Z	4.92	66.71	16.16		150.0	
10118-CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.33	67.14	16.38	0.00	150.0	± 9.6 %
		Y	5.48	67.43	16.49		150.0	
		Z	5.30	67.16	16.39		150.0	
10119-CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.06	66.97	16.22	0.00	150.0	± 9.6 %
		Y	5.17	67.21	16.30		150.0	
		Z	5.03	67.00	16.23		150.0	
10140-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.16	66.61	15.33	0.00	150.0	± 9.6 %
		Y	3.34	67.24	15.71		150.0	
		Z	3.15	66.73	15.38		150.0	
10141-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.29	66.77	15.54	0.00	150.0	± 9.6 %
		Y	3.47	67.35	15.89		150.0	
		Z	3.28	66.89	15.60		150.0	
10142-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	1.67	66.50	14.13	0.00	150.0	± 9.6 %
		Y	1.92	67.89	15.30		150.0	
		Z	1.66	66.82	14.25		150.0	
10143-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.12	67.00	14.26	0.00	150.0	± 9.6 %
		Y	2.40	68.29	15.45		150.0	
		Z	2.12	67.29	14.37		150.0	
10144-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	1.93	64.97	12.74	0.00	150.0	± 9.6 %
		Y	2.20	66.19	13.93		150.0	
		Z	1.91	65.07	12.74		150.0	
10145-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	0.85	61.55	8.62	0.00	150.0	± 9.6 %
		Y	1.18	64.59	11.53		150.0	
		Z	0.81	61.36	8.35		150.0	
10146-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.43	63.03	9.30	0.00	150.0	± 9.6 %
		Y	2.05	66.66	11.93		150.0	
		Z	1.41	63.09	9.27		150.0	
10147-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.55	63.93	9.89	0.00	150.0	± 9.6 %
		Y	2.44	68.79	13.06		150.0	
		Z	1.55	64.07	9.91		150.0	

10149-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	2.68	66.41	15.12	0.00	150.0	± 9.6 %
		Y	2.86	67.11	15.61		150.0	
		Z	2.67	66.56	15.19		150.0	
10150-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	2.81	66.48	15.22	0.00	150.0	± 9.6 %
		Y	2.99	67.11	15.67		150.0	
		Z	2.79	66.63	15.30		150.0	
10151-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.48	78.18	21.55	3.98	65.0	± 9.6 %
		Y	8.01	81.29	22.83		65.0	
		Z	6.88	78.76	21.62		65.0	
10152-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	5.54	73.19	19.87	3.98	65.0	± 9.6 %
		Y	6.50	75.55	21.00		65.0	
		Z	5.81	73.69	19.94		65.0	
10153-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	5.95	74.31	20.74	3.98	65.0	± 9.6 %
		Y	6.90	76.53	21.77		65.0	
		Z	6.25	74.89	20.85		65.0	
10154-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	1.96	67.24	15.08	0.00	150.0	± 9.6 %
		Y	2.20	68.42	15.93		150.0	
		Z	1.96	67.57	15.22		150.0	
10155-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.35	66.95	15.11	0.00	150.0	± 9.6 %
		Y	2.56	67.73	15.80		150.0	
		Z	2.35	67.21	15.23		150.0	
10156-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	1.48	66.14	13.57	0.00	150.0	± 9.6 %
		Y	1.76	67.88	15.05		150.0	
		Z	1.48	66.45	13.67		150.0	
10157-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	1.72	65.00	12.38	0.00	150.0	± 9.6 %
		Y	2.02	66.64	13.92		150.0	
		Z	1.70	65.11	12.37		150.0	
10158-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.51	67.23	15.34	0.00	150.0	± 9.6 %
		Y	2.72	67.93	15.97		150.0	
		Z	2.51	67.50	15.46		150.0	
10159-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	1.80	65.32	12.61	0.00	150.0	± 9.6 %
		Y	2.13	67.09	14.20		150.0	
		Z	1.78	65.46	12.61		150.0	
10160-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.50	67.45	15.43	0.00	150.0	± 9.6 %
		Y	2.67	68.11	15.92		150.0	
		Z	2.49	67.68	15.53		150.0	
10161-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	2.70	66.39	15.10	0.00	150.0	± 9.6 %
		Y	2.88	67.04	15.60		150.0	
		Z	2.69	66.55	15.18		150.0	
10162-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	2.81	66.59	15.25	0.00	150.0	± 9.6 %
		Y	2.99	67.18	15.71		150.0	
		Z	2.80	66.76	15.32		150.0	
10166-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.42	69.15	18.92	3.01	150.0	± 9.6 %
		Y	3.64	69.65	19.05		150.0	
		Z	3.44	69.55	19.16		150.0	
10167-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	4.12	71.69	19.19	3.01	150.0	± 9.6 %
		Y	4.58	72.87	19.63		150.0	
		Z	4.19	72.21	19.45		150.0	

10168-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.64	74.28	20.71	3.01	150.0	± 9.6 %
		Y	5.12	75.26	21.00		150.0	
		Z	4.78	75.11	21.12		150.0	
10169-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.82	68.04	18.40	3.01	150.0	± 9.6 %
		Y	3.10	69.64	19.05		150.0	
		Z	2.85	68.47	18.67		150.0	
10170-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.75	73.33	20.53	3.01	150.0	± 9.6 %
		Y	4.52	76.49	21.67		150.0	
		Z	3.89	74.29	21.01		150.0	
10171-AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	3.09	69.27	17.71	3.01	150.0	± 9.6 %
		Y	3.61	71.81	18.72		150.0	
		Z	3.14	69.73	17.95		150.0	
10172-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	6.61	87.05	27.32	6.02	65.0	± 9.6 %
		Y	14.89	102.54	32.37		65.0	
		Z	8.81	92.01	28.81		65.0	
10173-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	13.85	97.13	28.75	6.02	65.0	± 9.6 %
		Y	48.27	118.57	34.60		65.0	
		Z	16.93	99.90	29.38		65.0	
10174-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	9.88	90.07	25.94	6.02	65.0	± 9.6 %
		Y	27.82	107.05	30.90		65.0	
		Z	10.47	90.42	25.88		65.0	
10175-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.79	67.73	18.15	3.01	150.0	± 9.6 %
		Y	3.06	69.31	18.79		150.0	
		Z	2.81	68.13	18.39		150.0	
10176-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	3.76	73.36	20.54	3.01	150.0	± 9.6 %
		Y	4.52	76.52	21.68		150.0	
		Z	3.90	74.31	21.02		150.0	
10177-CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.81	67.88	18.24	3.01	150.0	± 9.6 %
		Y	3.09	69.47	18.89		150.0	
		Z	2.83	68.28	18.49		150.0	
10178-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.73	73.16	20.43	3.01	150.0	± 9.6 %
		Y	4.47	76.26	21.55		150.0	
		Z	3.86	74.09	20.89		150.0	
10179-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.38	71.14	18.97	3.01	150.0	± 9.6 %
		Y	4.01	73.98	20.04		150.0	
		Z	3.47	71.80	19.31		150.0	
10180-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	3.09	69.21	17.67	3.01	150.0	± 9.6 %
		Y	3.59	71.73	18.66		150.0	
		Z	3.13	69.66	17.90		150.0	
10181-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.80	67.86	18.23	3.01	150.0	± 9.6 %
		Y	3.08	69.45	18.88		150.0	
		Z	2.83	68.27	18.48		150.0	
10182-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.72	73.14	20.42	3.01	150.0	± 9.6 %
		Y	4.46	76.24	21.54		150.0	
		Z	3.85	74.06	20.88		150.0	
10183-AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	3.08	69.19	17.66	3.01	150.0	± 9.6 %
		Y	3.59	71.70	18.65		150.0	
		Z	3.13	69.64	17.89		150.0	

10184-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.81	67.90	18.25	3.01	150.0	± 9.6 %
		Y	3.09	69.50	18.90		150.0	
		Z	2.84	68.31	18.51		150.0	
10185-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.74	73.21	20.46	3.01	150.0	± 9.6 %
		Y	4.48	76.32	21.58		150.0	
		Z	3.87	74.14	20.92		150.0	
10186-AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	3.10	69.25	17.69	3.01	150.0	± 9.6 %
		Y	3.61	71.77	18.69		150.0	
		Z	3.14	69.70	17.92		150.0	
10187-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.82	67.96	18.33	3.01	150.0	± 9.6 %
		Y	3.10	69.55	18.97		150.0	
		Z	2.85	68.38	18.58		150.0	
10188-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	3.85	73.85	20.84	3.01	150.0	± 9.6 %
		Y	4.65	77.08	21.99		150.0	
		Z	4.01	74.87	21.34		150.0	
10189-AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	3.16	69.64	17.96	3.01	150.0	± 9.6 %
		Y	3.70	72.24	18.98		150.0	
		Z	3.21	70.13	18.21		150.0	
10193-CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.36	66.21	15.83	0.00	150.0	± 9.6 %
		Y	4.50	66.48	16.00		150.0	
		Z	4.33	66.27	15.85		150.0	
10194-CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.52	66.50	15.96	0.00	150.0	± 9.6 %
		Y	4.67	66.80	16.12		150.0	
		Z	4.49	66.55	15.98		150.0	
10195-CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.56	66.54	15.98	0.00	150.0	± 9.6 %
		Y	4.72	66.83	16.14		150.0	
		Z	4.53	66.59	16.01		150.0	
10196-CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.35	66.25	15.83	0.00	150.0	± 9.6 %
		Y	4.51	66.54	16.02		150.0	
		Z	4.33	66.30	15.86		150.0	
10197-CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.53	66.52	15.97	0.00	150.0	± 9.6 %
		Y	4.69	66.82	16.13		150.0	
		Z	4.50	66.57	16.00		150.0	
10198-CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.55	66.55	15.99	0.00	150.0	± 9.6 %
		Y	4.72	66.85	16.15		150.0	
		Z	4.53	66.60	16.02		150.0	
10219-CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.30	66.26	15.79	0.00	150.0	± 9.6 %
		Y	4.46	66.55	15.98		150.0	
		Z	4.28	66.31	15.81		150.0	
10220-CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.52	66.49	15.96	0.00	150.0	± 9.6 %
		Y	4.68	66.79	16.12		150.0	
		Z	4.50	66.54	15.98		150.0	
10221-CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.57	66.49	15.98	0.00	150.0	± 9.6 %
		Y	4.73	66.78	16.14		150.0	
		Z	4.54	66.54	16.01		150.0	
10222-CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	4.92	66.67	16.14	0.00	150.0	± 9.6 %
		Y	5.05	66.97	16.25		150.0	
		Z	4.90	66.71	16.15		150.0	

10223-CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.23	66.95	16.30	0.00	150.0	± 9.6 %
		Y	5.35	67.15	16.36		150.0	
		Z	5.20	66.98	16.32		150.0	
10224-CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	4.96	66.78	16.11	0.00	150.0	± 9.6 %
		Y	5.09	67.08	16.23		150.0	
		Z	4.94	66.81	16.13		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.59	65.32	14.53	0.00	150.0	± 9.6 %
		Y	2.77	65.86	15.10		150.0	
		Z	2.58	65.43	14.58		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	15.04	98.77	29.35	6.02	65.0	± 9.6 %
		Y	55.58	121.36	35.42		65.0	
		Z	18.66	101.82	30.05		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	14.65	96.82	28.11	6.02	65.0	± 9.6 %
		Y	44.89	115.25	33.13		65.0	
		Z	17.65	99.26	28.64		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	8.97	93.60	29.69	6.02	65.0	± 9.6 %
		Y	20.04	108.84	34.33		65.0	
		Z	11.30	97.46	30.72		65.0	
10229-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	13.95	97.24	28.79	6.02	65.0	± 9.6 %
		Y	48.69	118.71	34.65		65.0	
		Z	17.07	100.03	29.42		65.0	
10230-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	13.52	95.32	27.57	6.02	65.0	± 9.6 %
		Y	39.77	112.98	32.45		65.0	
		Z	16.11	97.57	28.06		65.0	
10231-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	8.50	92.43	29.21	6.02	65.0	± 9.6 %
		Y	18.60	107.20	33.76		65.0	
		Z	10.59	96.06	30.18		65.0	
10232-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	13.93	97.22	28.78	6.02	65.0	± 9.6 %
		Y	48.65	118.71	34.65		65.0	
		Z	17.04	100.01	29.42		65.0	
10233-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	13.48	95.29	27.56	6.02	65.0	± 9.6 %
		Y	39.68	112.96	32.45		65.0	
		Z	16.06	97.53	28.05		65.0	
10234-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	8.15	91.43	28.75	6.02	65.0	± 9.6 %
		Y	17.44	105.69	33.19		65.0	
		Z	10.04	94.83	29.66		65.0	
10235-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	13.95	97.27	28.80	6.02	65.0	± 9.6 %
		Y	48.87	118.81	34.67		65.0	
		Z	17.08	100.06	29.44		65.0	
10236-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	13.65	95.47	27.61	6.02	65.0	± 9.6 %
		Y	40.47	113.26	32.52		65.0	
		Z	16.26	97.71	28.09		65.0	
10237-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	8.52	92.50	29.23	6.02	65.0	± 9.6 %
		Y	18.71	107.36	33.81		65.0	
		Z	10.61	96.14	30.21		65.0	
10238-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	13.90	97.20	28.78	6.02	65.0	± 9.6 %
		Y	48.60	118.71	34.64		65.0	
		Z	17.01	99.99	29.41		65.0	

10239-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	13.44	95.25	27.55	6.02	65.0	± 9.6 %
		Y	39.57	112.94	32.44		65.0	
		Z	16.01	97.50	28.04		65.0	
10240-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	8.49	92.45	29.22	6.02	65.0	± 9.6 %
		Y	18.64	107.29	33.79		65.0	
		Z	10.58	96.09	30.20		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	7.99	81.31	25.53	6.98	65.0	± 9.6 %
		Y	9.43	84.22	26.74		65.0	
		Z	8.52	82.35	25.81		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	7.10	78.80	24.41	6.98	65.0	± 9.6 %
		Y	8.49	81.98	25.78		65.0	
		Z	7.78	80.41	24.94		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	5.74	75.35	23.83	6.98	65.0	± 9.6 %
		Y	6.67	78.08	25.09		65.0	
		Z	6.25	76.98	24.42		65.0	
10244-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	5.58	74.97	17.83	3.98	65.0	± 9.6 %
		Y	7.87	80.04	20.37		65.0	
		Z	5.94	75.42	17.90		65.0	
10245-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	5.38	74.13	17.42	3.98	65.0	± 9.6 %
		Y	7.56	79.13	19.97		65.0	
		Z	5.70	74.53	17.48		65.0	
10246-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	4.98	76.70	18.61	3.98	65.0	± 9.6 %
		Y	8.43	84.78	22.34		65.0	
		Z	5.20	76.66	18.37		65.0	
10247-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	4.65	72.79	17.74	3.98	65.0	± 9.6 %
		Y	6.06	76.74	19.98		65.0	
		Z	4.87	73.04	17.67		65.0	
10248-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	4.61	72.15	17.43	3.98	65.0	± 9.6 %
		Y	5.95	75.91	19.61		65.0	
		Z	4.82	72.39	17.37		65.0	
10249-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	6.54	81.39	21.52	3.98	65.0	± 9.6 %
		Y	9.88	87.89	24.33		65.0	
		Z	7.04	81.83	21.45		65.0	
10250-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	5.68	75.92	20.95	3.98	65.0	± 9.6 %
		Y	6.85	78.71	22.33		65.0	
		Z	6.05	76.61	21.08		65.0	
10251-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	5.34	73.52	19.53	3.98	65.0	± 9.6 %
		Y	6.39	76.13	20.91		65.0	
		Z	5.61	73.99	19.58		65.0	
10252-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.77	81.31	22.67	3.98	65.0	± 9.6 %
		Y	8.98	85.60	24.44		65.0	
		Z	7.34	82.11	22.76		65.0	
10253-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	5.44	72.71	19.62	3.98	65.0	± 9.6 %
		Y	6.32	74.91	20.72		65.0	
		Z	5.70	73.20	19.69		65.0	
10254-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	5.80	73.72	20.38	3.98	65.0	± 9.6 %
		Y	6.70	75.83	21.43		65.0	
		Z	6.09	74.28	20.49		65.0	

10255-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.16	77.48	21.47	3.98	65.0	± 9.6 %
		Y	7.52	80.38	22.72		65.0	
		Z	6.55	78.12	21.56		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	3.97	69.74	14.41	3.98	65.0	± 9.6 %
		Y	6.06	75.59	17.59		65.0	
		Z	4.16	69.90	14.37		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	3.82	68.88	13.90	3.98	65.0	± 9.6 %
		Y	5.74	74.42	17.02		65.0	
		Z	3.99	69.02	13.87		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	3.39	70.65	15.07	3.98	65.0	± 9.6 %
		Y	6.10	79.09	19.42		65.0	
		Z	3.50	70.44	14.78		65.0	
10259-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	5.07	74.05	18.94	3.98	65.0	± 9.6 %
		Y	6.37	77.46	20.82		65.0	
		Z	5.35	74.45	18.94		65.0	
10260-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	5.09	73.73	18.81	3.98	65.0	± 9.6 %
		Y	6.36	77.06	20.66		65.0	
		Z	5.35	74.12	18.80		65.0	
10261-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	6.26	80.39	21.64	3.98	65.0	± 9.6 %
		Y	8.74	85.57	23.93		65.0	
		Z	6.76	81.00	21.65		65.0	
10262-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	5.67	75.84	20.90	3.98	65.0	± 9.6 %
		Y	6.84	78.65	22.29		65.0	
		Z	6.03	76.53	21.02		65.0	
10263-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	5.33	73.49	19.52	3.98	65.0	± 9.6 %
		Y	6.38	76.11	20.90		65.0	
		Z	5.60	73.97	19.57		65.0	
10264-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.69	81.07	22.55	3.98	65.0	± 9.6 %
		Y	8.87	85.35	24.33		65.0	
		Z	7.25	81.85	22.64		65.0	
10265-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	5.54	73.19	19.88	3.98	65.0	± 9.6 %
		Y	6.49	75.55	21.00		65.0	
		Z	5.81	73.69	19.95		65.0	
10266-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	5.94	74.29	20.73	3.98	65.0	± 9.6 %
		Y	6.90	76.51	21.76		65.0	
		Z	6.24	74.87	20.84		65.0	
10267-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.46	78.13	21.53	3.98	65.0	± 9.6 %
		Y	7.99	81.24	22.81		65.0	
		Z	6.86	78.71	21.60		65.0	
10268-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	6.17	73.14	20.30	3.98	65.0	± 9.6 %
		Y	7.04	75.12	21.19		65.0	
		Z	6.43	73.63	20.40		65.0	
10269-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.16	72.73	20.18	3.98	65.0	± 9.6 %
		Y	6.97	74.62	21.04		65.0	
		Z	6.41	73.22	20.27		65.0	
10270-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.28	75.29	20.55	3.98	65.0	± 9.6 %
		Y	7.36	77.58	21.50		65.0	
		Z	6.58	75.77	20.61		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.39	65.58	14.37	0.00	150.0	± 9.6 %
		Y	2.54	66.14	14.96		150.0	
		Z	2.37	65.73	14.43		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.36	65.75	13.87	0.00	150.0	± 9.6 %
		Y	1.54	67.06	14.96		150.0	
		Z	1.35	66.07	14.00		150.0	
10277-CAA	PHS (QPSK)	X	2.12	61.32	6.97	9.03	50.0	± 9.6 %
		Y	2.40	62.62	8.13		50.0	
		Z	2.36	61.74	7.42		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	4.20	70.41	14.35	9.03	50.0	± 9.6 %
		Y	9.00	82.55	20.06		50.0	
		Z	4.22	69.72	14.05		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	4.32	70.71	14.54	9.03	50.0	± 9.6 %
		Y	9.21	82.81	20.21		50.0	
		Z	4.33	69.98	14.22		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	0.93	63.86	10.31	0.00	150.0	± 9.6 %
		Y	1.32	67.34	13.23		150.0	
		Z	0.90	63.80	10.11		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	0.54	61.76	8.75	0.00	150.0	± 9.6 %
		Y	0.76	64.54	11.66		150.0	
		Z	0.51	61.58	8.42		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	0.60	63.50	10.03	0.00	150.0	± 9.6 %
		Y	0.91	67.80	13.68		150.0	
		Z	0.57	63.42	9.74		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	0.78	66.43	11.98	0.00	150.0	± 9.6 %
		Y	1.31	72.81	16.39		150.0	
		Z	0.78	66.82	11.92		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	11.88	88.43	24.43	9.03	50.0	± 9.6 %
		Y	11.50	90.15	26.20		50.0	
		Z	10.98	86.07	23.41		50.0	
10297-AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.43	67.97	15.50	0.00	150.0	± 9.6 %
		Y	2.67	69.10	16.18		150.0	
		Z	2.43	68.26	15.63		150.0	
10298-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.14	64.11	11.26	0.00	150.0	± 9.6 %
		Y	1.48	66.77	13.58		150.0	
		Z	1.12	64.18	11.18		150.0	
10299-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.05	66.66	12.29	0.00	150.0	± 9.6 %
		Y	2.75	69.90	14.39		150.0	
		Z	2.12	67.25	12.55		150.0	
10300-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.61	63.18	9.81	0.00	150.0	± 9.6 %
		Y	2.03	65.31	11.51		150.0	
		Z	1.60	63.28	9.82		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.73	65.80	17.42	4.17	50.0	± 9.6 %
		Y	4.94	66.02	17.64		50.0	
		Z	4.79	66.07	17.49		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.13	65.96	17.87	4.96	50.0	± 9.6 %
		Y	5.34	66.38	18.24		50.0	
		Z	5.17	66.19	17.94		50.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.89	65.63	17.69	4.96	50.0	± 9.6 %
		Y	5.10	66.07	18.10		50.0	
		Z	4.94	65.90	17.78		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.68	65.44	17.16	4.17	50.0	± 9.6 %
		Y	4.89	65.86	17.54		50.0	
		Z	4.72	65.67	17.23		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.58	68.65	19.65	6.02	35.0	± 9.6 %
		Y	4.67	68.59	20.11		35.0	
		Z	4.89	70.03	20.21		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.78	67.22	19.17	6.02	35.0	± 9.6 %
		Y	4.91	67.24	19.51		35.0	
		Z	4.95	68.05	19.51		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.69	67.41	19.13	6.02	35.0	± 9.6 %
		Y	4.83	67.50	19.52		35.0	
		Z	4.89	68.35	19.52		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.68	67.67	19.30	6.02	35.0	± 9.6 %
		Y	4.81	67.73	19.67		35.0	
		Z	4.89	68.67	19.70		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.82	67.40	19.30	6.02	35.0	± 9.6 %
		Y	4.97	67.49	19.67		35.0	
		Z	5.00	68.23	19.64		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.74	67.32	19.16	6.02	35.0	± 9.6 %
		Y	4.86	67.33	19.50		35.0	
		Z	4.92	68.20	19.52		35.0	
10311-AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	2.77	67.31	15.25	0.00	150.0	± 9.6 %
		Y	3.02	68.45	15.87		150.0	
		Z	2.78	67.57	15.37		150.0	
10313-AAA	iDEN 1:3	X	3.38	72.32	15.61	6.99	70.0	± 9.6 %
		Y	6.56	80.70	19.09		70.0	
		Z	3.52	71.67	15.12		70.0	
10314-AAA	iDEN 1:6	X	5.50	81.58	21.98	10.00	30.0	± 9.6 %
		Y	11.01	93.51	26.47		30.0	
		Z	5.77	80.74	21.31		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	0.96	62.54	14.02	0.17	150.0	± 9.6 %
		Y	1.06	63.49	14.83		150.0	
		Z	0.95	62.82	14.19		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.42	66.30	16.01	0.17	150.0	± 9.6 %
		Y	4.57	66.59	16.18		150.0	
		Z	4.40	66.35	16.03		150.0	
10317-AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.42	66.30	16.01	0.17	150.0	± 9.6 %
		Y	4.57	66.59	16.18		150.0	
		Z	4.40	66.35	16.03		150.0	
10400-AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.50	66.54	15.95	0.00	150.0	± 9.6 %
		Y	4.67	66.85	16.11		150.0	
		Z	4.47	66.59	15.97		150.0	
10401-AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.27	66.91	16.25	0.00	150.0	± 9.6 %
		Y	5.36	67.03	16.28		150.0	
		Z	5.24	66.92	16.25		150.0	

10402-AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.48	67.05	16.19	0.00	150.0	± 9.6 %
		Y	5.61	67.38	16.31		150.0	
		Z	5.45	67.08	16.20		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	0.93	63.86	10.31	0.00	115.0	± 9.6 %
		Y	1.32	67.34	13.23		115.0	
		Z	0.90	63.80	10.11		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	0.93	63.86	10.31	0.00	115.0	± 9.6 %
		Y	1.32	67.34	13.23		115.0	
		Z	0.90	63.80	10.11		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	23.71	102.36	25.63	0.00	100.0	± 9.6 %
		Y	100.00	119.74	29.53		100.0	
		Z	100.00	122.04	30.37		100.0	
10410-AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	X	100.00	124.47	31.30	3.23	80.0	± 9.6 %
		Y	100.00	122.62	30.76		80.0	
		Z	100.00	123.15	30.75		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	0.90	61.77	13.43	0.00	150.0	± 9.6 %
		Y	0.98	62.53	14.15		150.0	
		Z	0.87	61.91	13.55		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.36	66.25	15.90	0.00	150.0	± 9.6 %
		Y	4.50	66.52	16.06		150.0	
		Z	4.33	66.30	15.93		150.0	
10417-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.36	66.25	15.90	0.00	150.0	± 9.6 %
		Y	4.50	66.52	16.06		150.0	
		Z	4.33	66.30	15.93		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.35	66.41	15.93	0.00	150.0	± 9.6 %
		Y	4.49	66.67	16.08		150.0	
		Z	4.33	66.46	15.95		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.37	66.36	15.93	0.00	150.0	± 9.6 %
		Y	4.51	66.62	16.08		150.0	
		Z	4.34	66.41	15.95		150.0	
10422-AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.48	66.36	15.95	0.00	150.0	± 9.6 %
		Y	4.63	66.63	16.10		150.0	
		Z	4.46	66.41	15.98		150.0	
10423-AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.63	66.65	16.06	0.00	150.0	± 9.6 %
		Y	4.80	66.95	16.22		150.0	
		Z	4.60	66.70	16.08		150.0	
10424-AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.55	66.60	16.03	0.00	150.0	± 9.6 %
		Y	4.72	66.90	16.19		150.0	
		Z	4.53	66.65	16.05		150.0	
10425-AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.18	66.94	16.27	0.00	150.0	± 9.6 %
		Y	5.31	67.20	16.36		150.0	
		Z	5.16	66.97	16.29		150.0	
10426-AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.21	67.05	16.32	0.00	150.0	± 9.6 %
		Y	5.31	67.21	16.37		150.0	
		Z	5.18	67.08	16.34		150.0	

10427-AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.20	66.95	16.27	0.00	150.0	± 9.6 %
		Y	5.33	67.21	16.36		150.0	
		Z	5.17	66.98	16.28		150.0	
10430-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.03	70.50	17.69	0.00	150.0	± 9.6 %
		Y	4.20	70.46	17.93		150.0	
		Z	4.08	70.95	17.91		150.0	
10431-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	3.99	66.70	15.76	0.00	150.0	± 9.6 %
		Y	4.18	67.03	16.04		150.0	
		Z	3.97	66.77	15.79		150.0	
10432-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.31	66.62	15.93	0.00	150.0	± 9.6 %
		Y	4.49	66.93	16.13		150.0	
		Z	4.29	66.68	15.96		150.0	
10433-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.57	66.63	16.05	0.00	150.0	± 9.6 %
		Y	4.73	66.93	16.21		150.0	
		Z	4.54	66.68	16.07		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.08	71.14	17.46	0.00	150.0	± 9.6 %
		Y	4.29	71.27	17.88		150.0	
		Z	4.15	71.66	17.70		150.0	
10435-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	124.23	31.18	3.23	80.0	± 9.6 %
		Y	100.00	122.40	30.66		80.0	
		Z	100.00	122.90	30.63		80.0	
10447-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.22	66.37	14.70	0.00	150.0	± 9.6 %
		Y	3.47	66.95	15.33		150.0	
		Z	3.21	66.48	14.73		150.0	
10448-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	3.84	66.47	15.61	0.00	150.0	± 9.6 %
		Y	4.02	66.80	15.90		150.0	
		Z	3.82	66.55	15.65		150.0	
10449-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.13	66.43	15.81	0.00	150.0	± 9.6 %
		Y	4.30	66.75	16.02		150.0	
		Z	4.11	66.50	15.84		150.0	
10450-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.34	66.38	15.88	0.00	150.0	± 9.6 %
		Y	4.49	66.69	16.06		150.0	
		Z	4.32	66.44	15.91		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.06	66.27	14.09	0.00	150.0	± 9.6 %
		Y	3.35	67.09	14.93		150.0	
		Z	3.04	66.36	14.10		150.0	
10456-AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.11	67.61	16.51	0.00	150.0	± 9.6 %
		Y	6.17	67.77	16.53		150.0	
		Z	6.08	67.64	16.52		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.66	64.92	15.60	0.00	150.0	± 9.6 %
		Y	3.76	65.17	15.77		150.0	
		Z	3.64	64.96	15.63		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.65	69.96	16.50	0.00	150.0	± 9.6 %
		Y	3.92	70.48	17.26		150.0	
		Z	3.69	70.37	16.67		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.93	68.53	17.94	0.00	150.0	± 9.6 %
		Y	5.04	68.13	17.95		150.0	
		Z	4.94	68.79	18.08		150.0	