



# TEST REPORT

No. I23N00692-SAR

For

**Spectralink Corporation**

**Wifi/BT Phone**

**Model Name: Versity 9740**

With

**Hardware Version: DVT**

**Software Version: vSL25**

**FCC ID: IYG97XX**

**Issued Date: 2023-07-26**

**Designation Number: CN1210**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I23N00692-SAR	Rev.0	1st edition	2023-07-26



# CONTENTS

- 1. SUMMARY OF TEST REPORT .....5**
  - 1.1. TEST ITEMS ..... 5
  - 1.2. TEST STANDARDS ..... 5
  - 1.3. TEST RESULT ..... 5
  - 1.4. TESTING LOCATION ..... 5
  - 1.5. PROJECT DATA ..... 5
  - 1.6. SIGNATURE ..... 5
- 2. STATEMENT OF COMPLIANCE .....6**
- 3. CLIENT INFORMATION .....8**
  - 3.1. APPLICANT INFORMATION ..... 8
  - 3.2. MANUFACTURER INFORMATION ..... 8
- 4. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) .....9**
  - 4.1. ABOUT EUT ..... 9
  - 4.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST..... 9
  - 4.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST ..... 9
- 5. TEST METHODOLOGY .....10**
  - 5.1. APPLICABLE LIMIT REGULATIONS .....10
  - 5.2. APPLICABLE MEASUREMENT STANDARDS .....10
- 6. SPECIFIC ABSORPTION RATE (SAR)..... 11**
  - 6.1. INTRODUCTION ..... 11
  - 6.2. SAR DEFINITION..... 11
- 7. TISSUE SIMULATING LIQUIDS .....12**
  - 7.1. TARGETS FOR TISSUE SIMULATING LIQUID.....12
  - 7.2. DIELECTRIC PERFORMANCE .....12
- 8. SYSTEM VERIFICATION ..... 14**
  - 8.1. SYSTEM SETUP .....14
  - 8.2. SYSTEM VERIFICATION .....15
- 9. MEASUREMENT PROCEDURES .....16**
  - 9.1. TESTS TO BE PERFORMED .....16
  - 9.2. GENERAL MEASUREMENT PROCEDURE .....18
  - 9.3. BLUETOOTH & WLAN MEASUREMENT PROCEDURES FOR SAR .....19
  - 9.4. POWER DRIFT .....19
- 10. CONDUCTED OUTPUT POWER.....20**
- 11. SIMULTANEOUS TX SAR CONSIDERATIONS .....24**
  - 11.1. INTRODUCTION.....24



11.2. TRANSMIT ANTENNA SEPARATION DISTANCES.....24

11.3. SAR MEASUREMENT POSITIONS.....25

**12. EVALUATION OF SIMULTANEOUS.....26**

**13. SUMMARY OF TEST RESULTS.....27**

13.1. TESTING ENVIRONMENT.....28

13.2. BLUETOOTH TEST RESULTS .....28

13.3. WLAN EVALUATION FOR 2.4GHZ .....29

13.4. WLAN EVALUATION FOR 5GHZ .....31

13.5. PRODUCT SPECIFIC 10G SAR .....33

**14. SAR MEASUREMENT VARIABILITY.....34**

**15. MEASUREMENT UNCERTAINTY .....35**

15.1. MEASUREMENT UNCERTAINTY FOR NORMAL SAR TESTS (300MHz~3GHz) .....35

15.2. MEASUREMENT UNCERTAINTY FOR NORMAL SAR TESTS (3GHz~6GHz).....36

**16. MAIN TEST INSTRUMENTS.....37**

**ANNEX A: GRAPH RESULTS .....38**

**ANNEX B: SYSTEMVERIFICATION RESULTS.....45**

**ANNEX C: SAR MEASUREMENT SETUP.....49**

**ANNEX D: POSITION OF THE WIRELESS DEVICE IN RELATION TO THE PHANTOM.....55**

**ANNEX E: EQUIVALENT MEDIA RECIPES .....58**

**ANNEX F: SYSTEM VALIDATION.....59**

**ANNEX G: DAE CALIBRATION CERTIFICATE .....60**

**ANNEX H: PROBE CALIBRATION CERTIFICATE .....63**

**ANNEX I: DIPOLE CALIBRATION CERTIFICATE .....85**

**ANNEX J: EXTENDED CALIBRATION SAR DIPOLE.....99**

## 1. Summary of Test Report

### 1.1. Test Items

Description: Wifi/BT Phone  
Model Name: Versity 9740  
Applicant's Name: Spectralink Corporation  
Manufacturer's Name: Spectralink Corporation

### 1.2. Test Standards

ANSI C95.1:1992, IEEE 1528:2013

### 1.3. Test Result

Pass. Please refer to "13. Summary of Test Results"

### 1.4. Testing Location

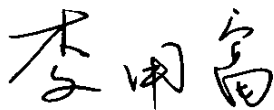
Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road,  
Futian District, Shenzhen, Guangdong, P. R. China

### 1.5. Project Data

Testing Start Date: 2023-06-07

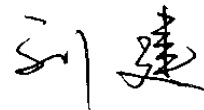
Testing End Date: 2023-06-12

### 1.6. Signature



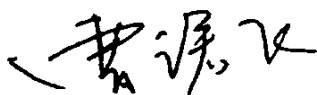
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Li Yongfu  
(Prepared this test report)



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Liu Jian  
(Reviewed this test report)



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Cao Junfei  
(Approved this test report)

## 2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Spectralink Corporation Wifi/BT Phone Versity 9740 are as follows:

**Table 2.1: Highest Reported SAR (1g)**

Equipment Class	Frequency Bands	1g SAR (W/kg)		
		Head (Separation Distance 0mm)	Hotspot (Separation Distance 10mm)	Body-worn (Separation Distance 15mm)
DSS	Bluetooth	0.03	0.01	0.01
DTS	WLAN 2.4GHz	<b>0.79</b>	0.29	0.29
NII	WLAN 5GHz	0.25	<b>0.62</b>	<b>0.62</b>

**Table 2.2: Highest Reported SAR (10g)**

Equipment Class	Frequency Bands	Extremity 10g SAR (W/Kg) (Separation Distance 0mm)
NII	WLAN 5GHz	<b>0.54</b>

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report.

The highest reported SAR value is obtained at the case of **(Table 2.1&2.2)**, Head value is **0.79 W/kg (1g)**, Hotspot value is **0.62 W/kg (1g)**, Body-worn value is **0.62 W/kg (1g)** and Extremity SAR value is **0.54 W/kg (10g)**.

**Table 2.3: Maximum Simultaneous Transmission SAR**

/	Position	Sum (W/kg)
Highest reported SAR value for Head	Left Cheek (WLAN 6GHz MIMO + WLAN 2.4GHz ANT1 + Bluetooth ANT0)	<b>1.36</b>
Highest reported SAR value for Hotspot	Rear Side (WLAN 6GHz MIMO + WLAN 2.4GHz ANT1 + Bluetooth ANT0)	<b>1.32</b>
Highest reported SAR value for Body-worn	Rear Side (WLAN 6GHz MIMO + WLAN 2.4GHz ANT1 + Bluetooth ANT0)	<b>1.41</b>

Note: the test positions of above tables are for the worse case that has been evaluated.

According to the above tables, the highest sum of reported SAR values is **1.41 W/kg (1g)**.

The detail for simultaneous transmission consideration is described in chapter 12.



### 3. Client Information

#### 3.1. Applicant Information

Company Name:	Spectralink Corporation
Address:	2560 55th Street Boulder CO 80301 USA
City:	Boulder
Country:	USA
Telephone:	+1 (303) 441-7618

#### 3.2. Manufacturer Information

Company Name:	Spectralink Corporation
Address:	2560 55th Street Boulder CO 80301 USA
City:	Boulder
Country:	USA
Telephone:	+1 (303) 441-7618



## 4. Equipment under Test (EUT) and Ancillary Equipment (AE)

### 4.1. About EUT

Description:	Wifi/BT Phone
Model Name:	Versity 9740
Condition of EUT as received:	No obvious damage in appearance
Frequency Bands:	Bluetooth, WLAN 2.4GHz/5GHz/6GHz
Tested Tx Frequency:	2402 – 2480MHz (Bluetooth)
	2412 – 2462MHz (WLAN 2.4GHz)
	5150 – 5850MHz (WLAN 5GHz)
	5925 – 7125MHz (WLAN 6GHz)
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support
Product Dimensions:	Long 153.2mm;Wide 76.3mm;Overall Diagonal 170.855mm
<b>Remark:</b>	
1. This device WLAN 5GHz U-NII-2A and U-NII-2C don't support hotspot operation.	
2. The WLAN 6GHz test data is referenced to 2305RSU003-U1 report.	

### 4.2. Internal Identification of EUT used during the test

EUT ID*	SN	HW Version	SW Version	Receipt Date
EUT1	MHNE03BQKGG000E	DVT	vSL25	2023-04-13
EUT2	MHNE03BQKGG000G	DVT	vSL25	2023-04-13
UT01aa	CNNE03BQKGG000H	DVT	vSL25	2023-05-05
UT02aa	CNNE04BBKGG000B	DVT	vSL25	2023-05-05

\*EUT ID: is used to identify the test sample in the lab internally.

**Note:** It is performed to test SAR with the UT01aa & UT02aa, and conducted power with the EUT1 & EUT2.

### 4.3. Internal Identification of AE used during the test

AE ID*	Description	Model	Manufacturer
AE1	Battery	BLI0000100	Ningbo Veken Battery Co. , Ltd.
AE2	Battery	351038PM2	Chongqing VDL Electronics Co., Ltd.

\*AE ID: is used to identify the test sample in the lab internally.

**Note:** The AE2 battery is for system maintenance and do not affect the EUT's working condition

## 5. Test Methodology

### 5.1. Applicable Limit Regulations

**ANSI C95.1:1992** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

### 5.2. Applicable Measurement Standards

**IEEE 1528:2013** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Experimental Techniques.

**KDB 447498 D01 General RF Exposure Guidance v06** RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices

**KDB 648474 D04 Handset SAR v01r03** SAR Evaluation Considerations for Wireless Handsets.

**KDB 941225 D06 Hot Spot SAR v02r01** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

**KDB 248227 D01 802.11 Wi-Fi SAR v02r02** SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters.

**KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04** SAR Measurement Requirements for 100 MHz to 6 GHz

**KDB 865664 D02 RF Exposure Reporting v01r02** RF Exposure Compliance Reporting and Documentation Considerations

**KDB 941225 D07 UMPC Mini Tablet v01r02** SAR Evaluation Procedures for UMPC Mini-Tablet Devices

**TCB workshop April 2019: RF Exposure Procedures**

## 6. Specific Absorption Rate (SAR)

### 6.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

### 6.2. SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy ( $dW$ ) absorbed by (dissipated in) an incremental mass ( $dm$ ) contained in a volume element ( $dv$ ) of a given density ( $\rho$ ). The equation description is as below:

$$SAR = \frac{d}{dt} \left( \frac{dW}{dm} \right) = \frac{d}{dt} \left( \frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c \left( \frac{\delta T}{\delta t} \right)$$

Where:  $C$  is the specific heat capacity,  $\delta T$  is the temperature rise and  $\delta t$  is the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  is the mass density of tissue and  $E$  is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

## 7. Tissue Simulating Liquids

### 7.1. Targets for tissue simulating liquid

**Table 7.1: Targets for tissue simulating liquid**

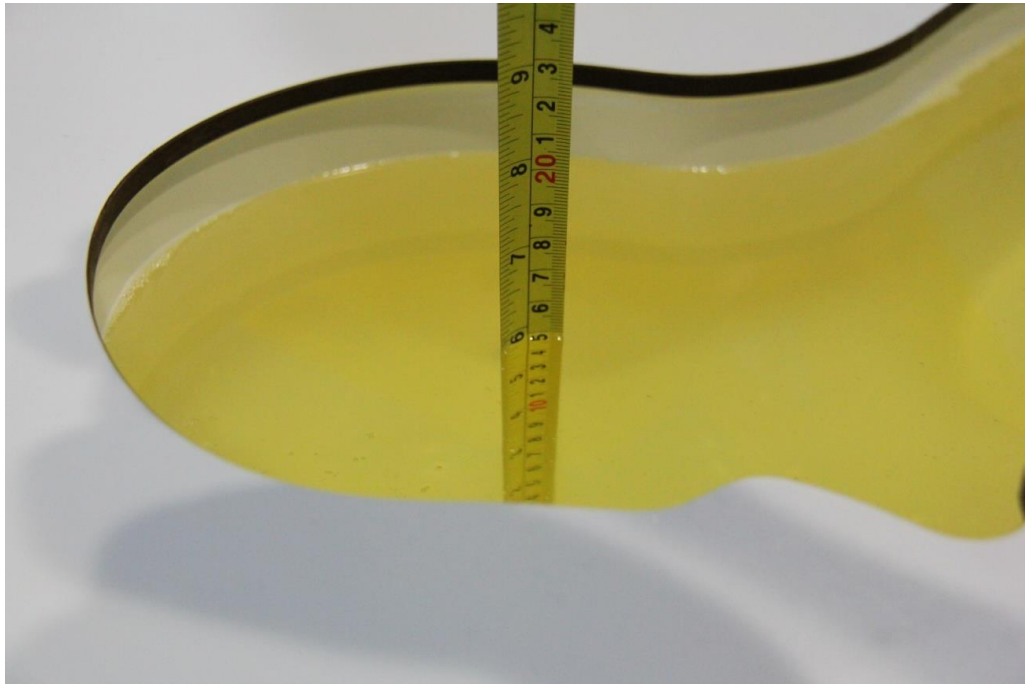
Frequency (MHz)	Liquid Type	Conductivity ( $\sigma$ )	$\pm 5\%$ Range	Permittivity ( $\epsilon$ )	$\pm 5\%$ Range
2450	Head	1.80	1.71~1.89	39.2	37.2~41.2
5250	Head	4.71	4.47~4.95	35.9	34.1~37.7
5600	Head	5.07	4.82~5.32	35.5	33.8~37.3
5750	Head	5.22	4.96~5.48	35.4	33.6~37.1

### 7.2. Dielectric Performance

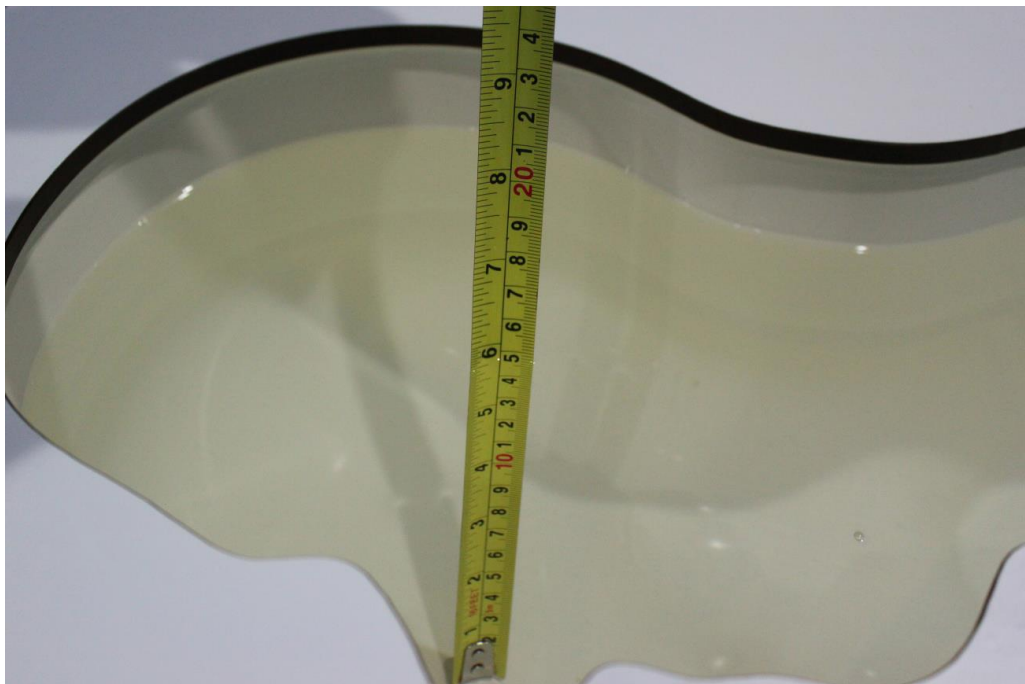
**Table 7.2: Dielectric Performance of Tissue Simulating Liquid**

Measurement Date (yyyy-mm-dd)	Type	Frequency (MHz)	Conductivity $\sigma$ (S/m)	Drift (%)	Permittivity $\epsilon$	Drift (%)
2023-06-12	2450	Head	1.841	2.28	38.37	-2.12
2023-06-07	5250	Head	4.786	1.61	35.17	-2.03
2023-06-07	5600	Head	4.995	-1.48	35.89	1.10
2023-06-07	5750	Head	5.122	-1.88	35.92	1.47

Note: The liquid temperature is 22.0°C.



**Picture 7-1: Liquid depth in the Head Phantom (2450MHz)**

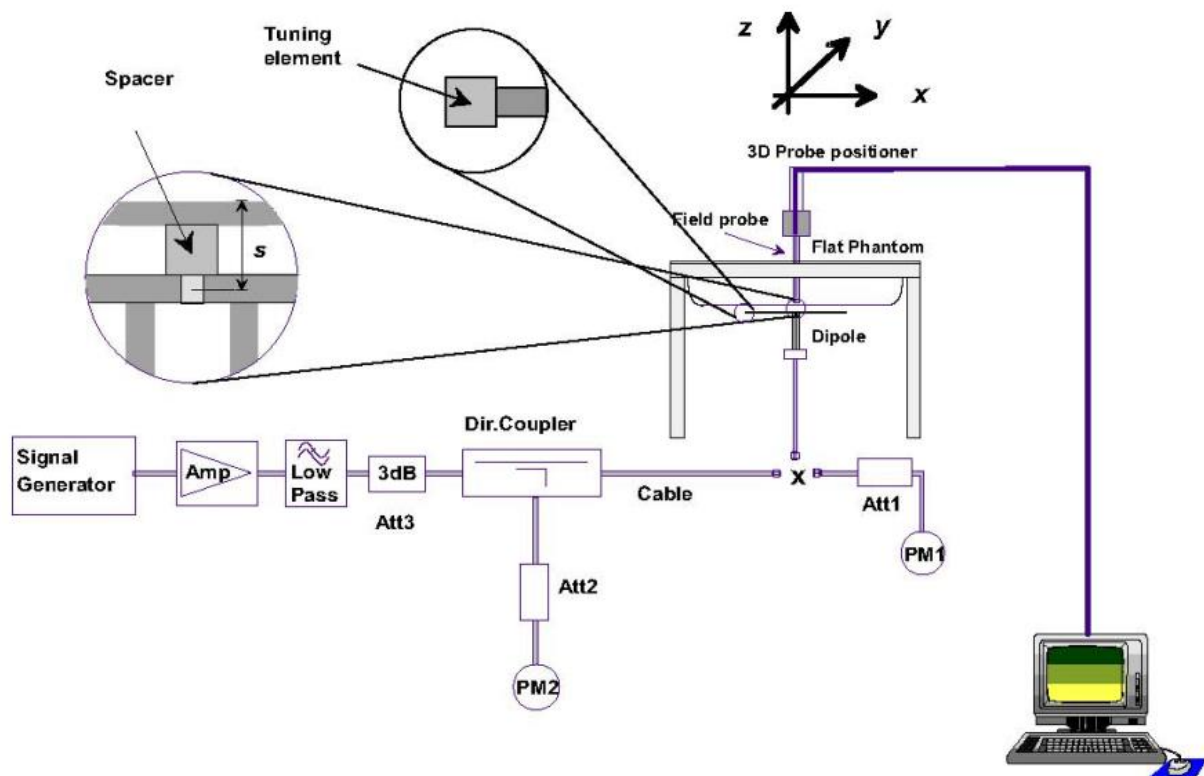


**Picture 7-2: Liquid depth in the Head Phantom (5GHz)**

## 8. System verification

### 8.1. System Setup

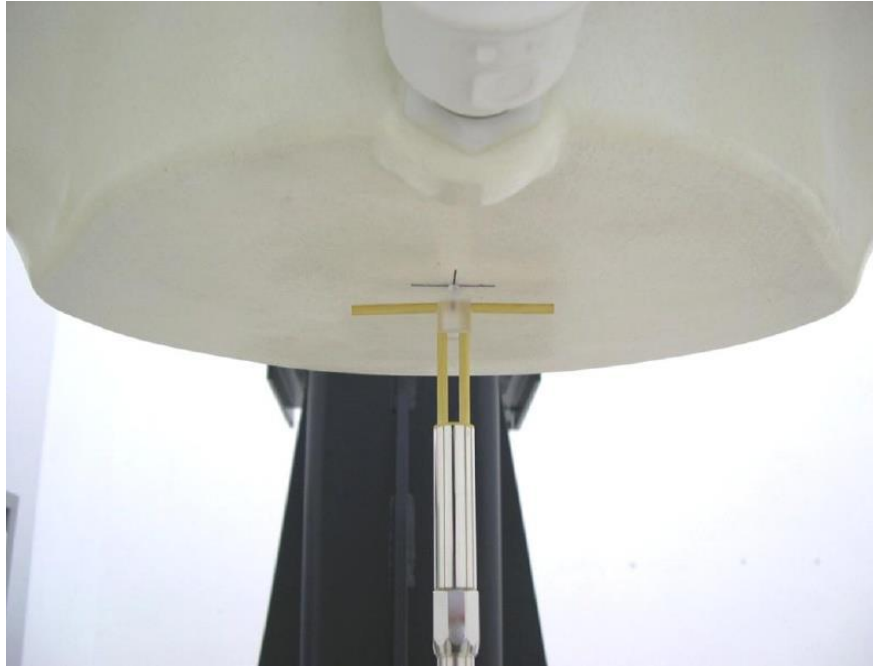
In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8.1 System Setup for System Evaluation

For the dipole below 3GHz, the output power on dipole port must be calibrated to 24 dBm (250mW) before dipole is connected.

For the dipole above 3GHz, the output power on dipole port must be calibrated to 20 dBm (100mW) before dipole is connected.



Picture 8.2 Photo of Dipole Setup

## 8.2. System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device.

Table 8.1: System Verification of Head

Measurement Date	Frequency (MHz)	Target value (W/kg)		Measured value (W/kg)				Deviation (%)	
				/		Normalize to 1W			
		10 g	1 g	10 g	1 g	10 g	1 g	10 g	1 g
2023-06-12	2450	24.20	53.20	6.16	13.8	24.64	55.20	1.82	3.76
2023-06-07	5250	22.80	79.70	2.33	8.25	23.30	82.50	2.19	3.51
2023-06-07	5600	23.60	82.60	2.27	7.87	22.70	78.70	-3.81	-4.72
2023-06-07	5750	22.10	78.50	2.15	7.51	21.50	75.10	-2.71	-4.33

## 9. Measurement Procedures

### 9.1. Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

**Step 1:** The tests described in 9.2 shall be performed at the channel that is closest to the center of the transmit frequency band ( $f_c$ ) for:

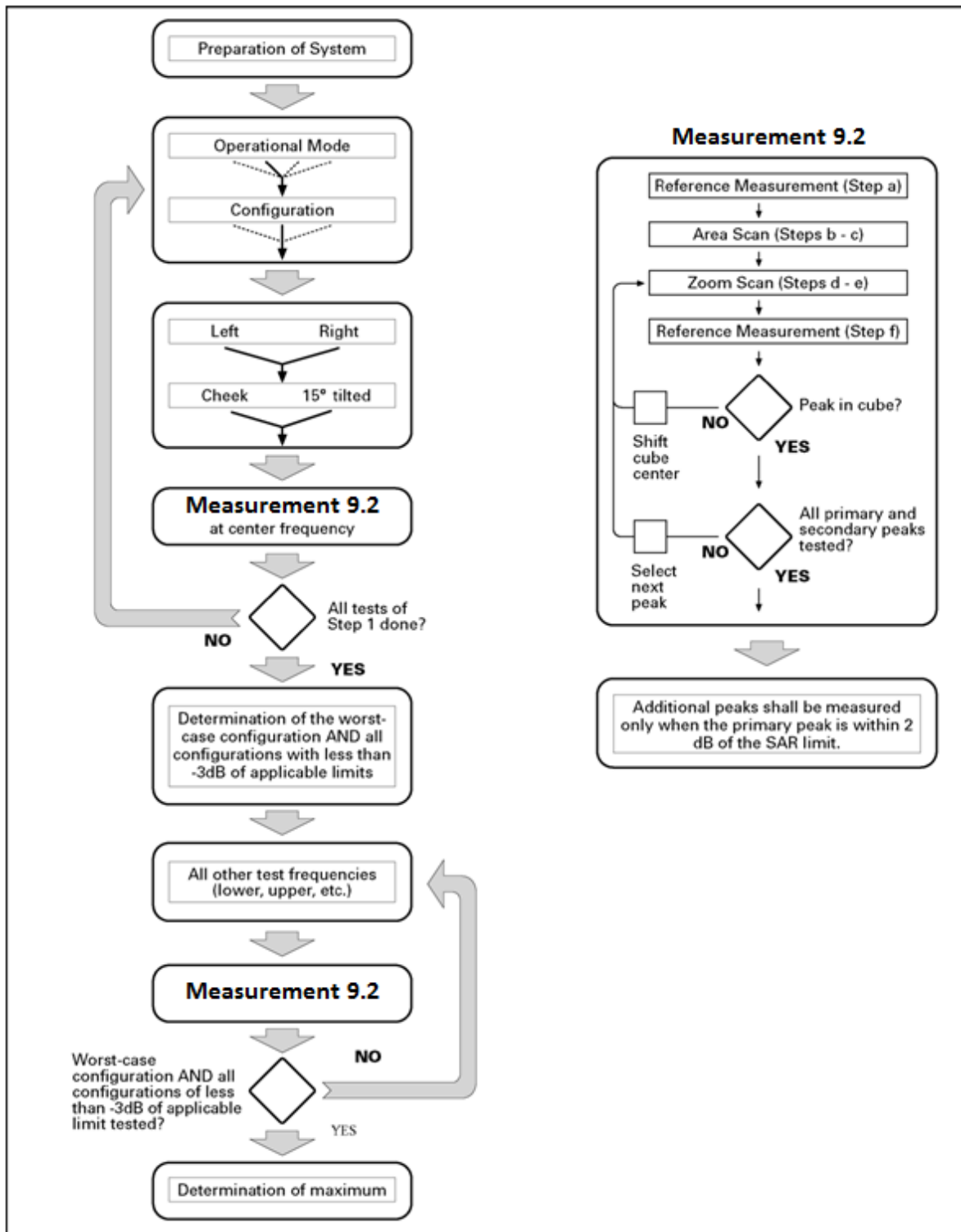
- a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in annex D),
- b) all configurations for each device position in a), e.g., antenna extended and retracted, and
- c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e.,  $N_c > 3$ ), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

**Step 2:** For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

**Step 3:** Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.





Picture 9.1 Block diagram of the tests to be performed

## 9.2. General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

		$\leq 3$ GHz	$> 3$ GHz	
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		$5 \pm 1$ mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm	
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$	
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$		$\leq 2$ GHz: $\leq 15$ mm 2 – 3 GHz: $\leq 12$ mm	3 – 4 GHz: $\leq 12$ mm 4 – 6 GHz: $\leq 10$ mm	
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.		
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$ , $\Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm*	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ mm
		$\Delta z_{Zoom}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm	
Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

### **9.3. Bluetooth & WLAN Measurement Procedures for SAR**

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

### **9.4. Power Drift**

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Section 14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

## 10. Conducted Output Power

**Table 10.1: The conducted power measurement results for Bluetooth**

<b>Ant.0</b>				
Averaged Power (dBm)				
Mode	<b>Tune up</b>	Ch.0 (2402MHz)	Ch.39 (2441MHz)	Ch.78 (2480MHz)
GFSK	<b>7.5</b>	5.78	6.57	5.50
EDR2M-4_DQPSK	<b>7.0</b>	5.05	5.85	4.84
EDR3M-8DPSK	<b>7.5</b>	5.53	6.35	5.35
/	<b>/</b>	Ch.0 (2402MHz)	Ch.19 (2440MHz)	Ch.39 (2480MHz)
BLE(1M)	<b>8.5</b>	6.54	7.48	6.24
BLE(2M)	<b>8.5</b>	6.49	<b>7.32</b>	6.18
<b>Ant.4</b>				
Averaged Power (dBm)				
Mode	<b>Tune up</b>	Ch.0 (2402MHz)	Ch.19 (2440MHz)	Ch.39 (2480MHz)
BLE(1M)	<b>8.5</b>	7.65	7.66	<b>7.78</b>

**Table 10.2: The conducted power measurement results for WLAN 2.4GHz**

<b>Ant.1</b>				
		Averaged Power (dBm)		Duty Cycle: <b>100%</b>
Mode	<b>Tune up</b>	Ch.1 (2412MHz)	Ch.6 (2437MHz)	Ch.11 (2462MHz)
802.11b	<b>21.5</b>	20.37	20.45	<b>20.59</b>
802.11g	<b>19.0</b>	17.62	17.64	18.17
802.11n(20MHz)	<b>18.0</b>	16.78	16.99	17.56
802.11ax(20MHz)	<b>17.0</b>	15.57	15.62	15.96
/	/	Ch.3 (2422MHz)	Ch.6 (2437MHz)	Ch.9 (2452MHz)
802.11n(40MHz)	<b>18.0</b>	16.35	16.55	16.91
802.11ax(40MHz)	<b>17.0</b>	15.28	15.46	15.66
<b>Ant.0</b>				
		Averaged Power (dBm)		Duty Cycle: <b>100%</b>
Mode	<b>Tune up</b>	Ch.1 (2412MHz)	Ch.6 (2437MHz)	Ch.11 (2462MHz)
802.11b	<b>21.5</b>	20.48	20.56	<b>20.65</b>
802.11g	<b>19.5</b>	18.46	18.33	18.51
802.11n(20MHz)	<b>18.5</b>	17.80	17.68	17.88
802.11ax(20MHz)	<b>17.5</b>	16.19	16.09	16.25
/	/	Ch.3 (2422MHz)	Ch.6 (2437MHz)	Ch.9 (2452MHz)
802.11n(40MHz)	<b>18.5</b>	17.50	17.41	17.43
802.11ax(40MHz)	<b>17.5</b>	16.23	16.12	16.18
<b>MIMO</b>				
		Averaged Power (dBm)		Duty Cycle: <b>100%</b>
Mode	<b>Tune up</b>	Ch.1 (2412MHz)	Ch.6 (2437MHz)	Ch.11 (2462MHz)
802.11n(20MHz)	<b>21.5</b>	20.41	20.40	<b>20.74</b>
802.11ax(20MHz)	<b>20.5</b>	18.88	18.89	19.12
/	/	Ch.3 (2422MHz)	Ch.6 (2437MHz)	Ch.9 (2452MHz)
802.11n(40MHz)	<b>21.5</b>	20.11	20.07	20.33
802.11ax(40MHz)	<b>20.5</b>	18.86	18.85	19.05

Note: 802.11ax-20MHz and 802.11ax-40MHz modes (MIMO) as the maximum power is got with these full RU, are selected as the worst case.



Table 10.3: The conducted power measurement results for WLAN 5GHz

Ant.3														
Averaged Power (dBm) Duty Cycle: 100%														
Mode	802.11a	802.11n-20MHz	802.11ac-20MHz	802.11ax-20MHz	Mode	802.11n-40MHz	802.11ac-40MHz	802.11ax-40MHz	Mode	802.11ac-80MHz	802.11ax-80MHz	Mode	802.11ac-160MHz	802.11ax-160MHz
Channel	6Mbps	MCS0	MCS0	MCS0	Channel	MCS0	MCS0	MCS0	Channel	MCS0	MCS0	Channel	MCS0	MCS0
<U-NII-1>														
<b>Tune up</b>	<b>18.0</b>	<b>16.5</b>	<b>15.0</b>	<b>15.0</b>	/	<b>16.0</b>	<b>15.0</b>	<b>15.0</b>	/	<b>14.5</b>	<b>14.5</b>	/	<b>13.5</b>	<b>13.5</b>
36(5180MHz)	17.09	15.46	13.89	13.92	38(5190MHz)	15.01	14.09	13.89	42(5210MHz)	13.17	13.26	50(5250MHz)	12.40	12.45
40(5200MHz)	17.07	15.57	13.96	13.99	46(5230MHz)	14.94	13.84	13.74	/	/	/	/	/	/
44(5220MHz)	16.85	15.36	13.91	13.79	/	/	/	/	/	/	/	/	/	/
48(5240MHz)	16.68	15.03	13.46	13.48	/	/	/	/	/	/	/	/	/	/
<U-NII-2A>														
<b>Tune up</b>	<b>18.0</b>	<b>16.5</b>	<b>15.0</b>	<b>15.0</b>	/	<b>16.0</b>	<b>15.0</b>	<b>15.0</b>	/	<b>14.5</b>	<b>14.5</b>	/	/	/
52(5260MHz)	17.23	15.54	13.96	14.02	54(5270MHz)	15.14	14.09	13.93	58(5290MHz)	13.42	13.52	/	/	/
56(5280MHz)	17.17	15.55	13.92	13.93	62(5310MHz)	14.83	13.86	13.64	/	/	/	/	/	/
60(5300MHz)	16.80	15.27	13.77	13.69	/	/	/	/	/	/	/	/	/	/
64(5320MHz)	16.74	15.22	13.63	13.64	/	/	/	/	/	/	/	/	/	/
<U-NII-2C>														
<b>Tune up</b>	<b>18.0</b>	<b>16.5</b>	<b>15.0</b>	<b>15.0</b>	/	<b>16.0</b>	<b>15.0</b>	<b>15.0</b>	/	<b>14.5</b>	<b>14.5</b>	/	<b>13.5</b>	<b>13.5</b>
100(5500MHz)	17.62	16.03	14.43	14.49	102(5510MHz)	15.62	14.48	14.36	106(5530MHz)	13.81	13.90	114(5570MHz)	12.69	12.74
116(5580MHz)	17.32	15.70	14.12	14.11	110(5550MHz)	15.37	14.50	14.31	122(5610MHz)	13.30	13.41	/	/	/
124(5620MHz)	17.19	15.54	13.92	13.96	126(5630MHz)	15.08	13.97	13.88	/	/	/	/	/	/
132(5660MHz)	17.25	15.63	14.23	14.19	134(5670MHz)	15.24	14.26	14.13	/	/	/	/	/	/
140(5700MHz)	17.12	15.46	14.03	14.09	/	/	/	/	/	/	/	/	/	/
<U-NII-3>														
<b>Tune up</b>	<b>18.0</b>	<b>16.5</b>	<b>15.0</b>	<b>15.0</b>	/	<b>16.0</b>	<b>15.0</b>	<b>15.0</b>	/	<b>14.5</b>	<b>14.5</b>	/	/	/
149(5745MHz)	16.37	14.74	13.30	13.33	151(5755MHz)	14.63	13.68	13.56	155(5775MHz)	12.93	12.99	/	/	/
157(5785MHz)	16.77	15.07	13.70	13.75	159(5795MHz)	14.94	13.95	13.79	/	/	/	/	/	/
165(5825MHz)	16.79	15.13	13.73	13.77	/	/	/	/	/	/	/	/	/	/

Ant.2														
Averaged Power (dBm) Duty Cycle: 100%														
Mode	802.11a	802.11n-20MHz	802.11ac-20MHz	802.11ax-20MHz	Mode	802.11n-40MHz	802.11ac-40MHz	802.11ax-40MHz	Mode	802.11ac-80MHz	802.11ax-80MHz	Mode	802.11ac-160MHz	802.11ax-160MHz
Channel	6Mbps	MCS0	MCS0	MCS0	Channel	MCS0	MCS0	MCS0	Channel	MCS0	MCS0	Channel	MCS0	MCS0
<U-NII-1>														
<b>Tune up</b>	<b>18.5</b>	<b>17.0</b>	<b>15.5</b>	<b>15.5</b>	/	<b>16.5</b>	<b>15.5</b>	<b>15.5</b>	/	<b>15.0</b>	<b>15.0</b>	/	<b>14.0</b>	<b>14.0</b>
36(5180MHz)	17.38	16.23	14.57	14.66	38(5190MHz)	15.75	14.83	14.54	42(5210MHz)	14.18	14.28	50(5250MHz)	12.96	13.04
40(5200MHz)	17.31	16.21	14.59	14.65	46(5230MHz)	15.79	14.90	14.75	/	/	/	/	/	/
44(5220MHz)	17.66	16.38	14.82	14.85	/	/	/	/	/	/	/	/	/	/
48(5240MHz)	17.44	16.15	14.62	14.56	/	/	/	/	/	/	/	/	/	/
<U-NII-2A>														
<b>Tune up</b>	<b>18.5</b>	<b>17.0</b>	<b>15.5</b>	<b>15.5</b>	/	<b>16.5</b>	<b>15.5</b>	<b>15.5</b>	/	<b>15.0</b>	<b>15.0</b>	/	/	/
52(5260MHz)	17.64	16.09	14.47	14.57	54(5270MHz)	15.49	14.53	14.33	58(5290MHz)	13.76	13.82	/	/	/
56(5280MHz)	17.62	15.96	14.38	14.43	62(5310MHz)	14.83	13.84	13.63	/	/	/	/	/	/
60(5300MHz)	16.78	15.40	13.81	13.87	/	/	/	/	/	/	/	/	/	/
64(5320MHz)	16.61	15.26	13.64	13.65	/	/	/	/	/	/	/	/	/	/
<U-NII-2C>														
<b>Tune up</b>	<b>18.5</b>	<b>17.0</b>	<b>15.5</b>	<b>15.5</b>	/	<b>16.5</b>	<b>15.5</b>	<b>15.5</b>	/	<b>15.0</b>	<b>15.0</b>	/	<b>14.0</b>	<b>14.0</b>
100(5500MHz)	18.16	16.77	14.99	15.10	102(5510MHz)	16.13	15.09	15.00	106(5530MHz)	14.27	14.28	114(5570MHz)	12.78	12.79
116(5580MHz)	17.59	16.10	14.40	14.46	110(5550MHz)	15.90	14.79	14.61	122(5610MHz)	13.54	13.59	/	/	/
124(5620MHz)	17.24	15.72	13.97	14.07	126(5630MHz)	15.25	14.02	13.89	/	/	/	/	/	/
132(5660MHz)	17.53	16.04	14.24	14.34	134(5670MHz)	15.51	14.26	14.17	/	/	/	/	/	/
140(5700MHz)	17.87	16.33	14.78	14.87	/	/	/	/	/	/	/	/	/	/
<U-NII-3>														
<b>Tune up</b>	<b>18.5</b>	<b>17.0</b>	<b>15.5</b>	<b>15.5</b>	/	<b>16.5</b>	<b>15.5</b>	<b>15.5</b>	/	<b>15.0</b>	<b>15.0</b>	/	/	/
149(5745MHz)	16.75	15.08	13.24	13.27	151(5755MHz)	15.43	14.50	14.27	155(5775MHz)	13.72	13.77	/	/	/
157(5785MHz)	17.66	15.88	14.42	14.46	159(5795MHz)	16.01	14.90	14.72	/	/	/	/	/	/
165(5825MHz)	17.98	16.34	14.90	14.91	/	/	/	/	/	/	/	/	/	/



MIMO														
Averaged Power (dBm) Duty Cycle: 100%														
Mode	802.11a	802.11n-20MHz	802.11ac-20MHz	802.11ax-20MHz	Mode	802.11n-40MHz	802.11ac-40MHz	802.11ax-40MHz	Mode	802.11ac-80MHz	802.11ax-80MHz	Mode	802.11ac-160MHz	802.11ax-160MHz
Channel	6Mbps	MCS0	MCS0	MCS0	Channel	MCS0	MCS0	MCS0	Channel	MCS0	MCS0	Channel	MCS0	MCS0
<U-NII-1>														
<b>Tune up</b>	/	<b>19.5</b>	<b>18.0</b>	<b>18.0</b>	/	<b>19.0</b>	<b>18.0</b>	<b>18.0</b>	/	<b>17.5</b>	<b>17.5</b>	/	<b>16.5</b>	<b>16.5</b>
36(5180MHz)	/	18.69	17.03	17.17	38(5190MHz)	18.19	17.17	17.10	42(5210MHz)	16.63	16.69	50(5250MHz)	15.66	15.73
40(5200MHz)	/	<b>18.79</b>	17.09	17.14	46(5230MHz)	18.17	17.24	17.10	/	/	/	/	/	/
44(5220MHz)	/	18.73	17.09	17.18	/	/	/	/	/	/	/	/	/	/
48(5240MHz)	/	18.43	16.85	16.89	/	/	/	/	/	/	/	/	/	/
<U-NII-2A>														
<b>Tune up</b>	/	<b>19.5</b>	<b>18.0</b>	<b>18.0</b>	/	<b>19.0</b>	<b>18.0</b>	<b>18.0</b>	/	<b>17.5</b>	<b>17.5</b>	/	/	/
52(5260MHz)	/	<b>18.64</b>	17.05	17.13	54(5270MHz)	18.10	17.16	17.00	58(5290MHz)	16.53	16.58	/	/	/
56(5280MHz)	/	18.56	16.99	17.05	62(5310MHz)	17.63	16.61	16.52	/	/	/	/	/	/
60(5300MHz)	/	18.14	16.55	16.60	/	/	/	/	/	/	/	/	/	/
64(5320MHz)	/	18.02	16.44	16.50	/	/	/	/	/	/	/	/	/	/
<U-NII-2C>														
<b>Tune up</b>	/	<b>19.5</b>	<b>18.0</b>	<b>18.0</b>	/	<b>19.0</b>	<b>18.0</b>	<b>18.0</b>	/	<b>17.5</b>	<b>17.5</b>	/	<b>16.5</b>	<b>16.5</b>
100(5500MHz)	/	<b>19.23</b>	17.54	17.60	102(5510MHz)	18.76	17.71	17.47	106(5530MHz)	16.84	16.97	114(5570MHz)	15.60	15.65
116(5580MHz)	/	18.71	17.05	17.10	110(5550MHz)	18.54	17.42	17.29	122(5610MHz)	16.30	16.43	/	/	/
124(5620MHz)	/	18.41	16.84	16.86	126(5630MHz)	17.91	16.76	16.69	/	/	/	/	/	/
132(5660MHz)	/	18.63	17.00	17.06	134(5670MHz)	18.15	17.12	17.03	/	/	/	/	/	/
140(5700MHz)	/	18.76	17.28	17.30	/	/	/	/	/	/	/	/	/	/
<U-NII-3>														
<b>Tune up</b>	/	<b>19.5</b>	<b>18.0</b>	<b>18.0</b>	/	<b>19.0</b>	<b>18.0</b>	<b>18.0</b>	/	<b>17.5</b>	<b>17.5</b>	/	/	/
149(5745MHz)	/	17.74	16.08	16.11	151(5755MHz)	17.93	16.85	16.78	155(5775MHz)	16.23	16.30	/	/	/
157(5785MHz)	/	18.32	16.92	16.93	159(5795MHz)	18.26	17.20	17.10	/	/	/	/	/	/
165(5825MHz)	/	<b>18.57</b>	17.10	17.16	/	/	/	/	/	/	/	/	/	/

Note: 802.11ax-20MHz, 802.11ax-40MHz, 802.11ax-80MHz and 802.11ax-160MHz modes (MIMO) as the maximum power is got with these full RU, are selected as the worst case.

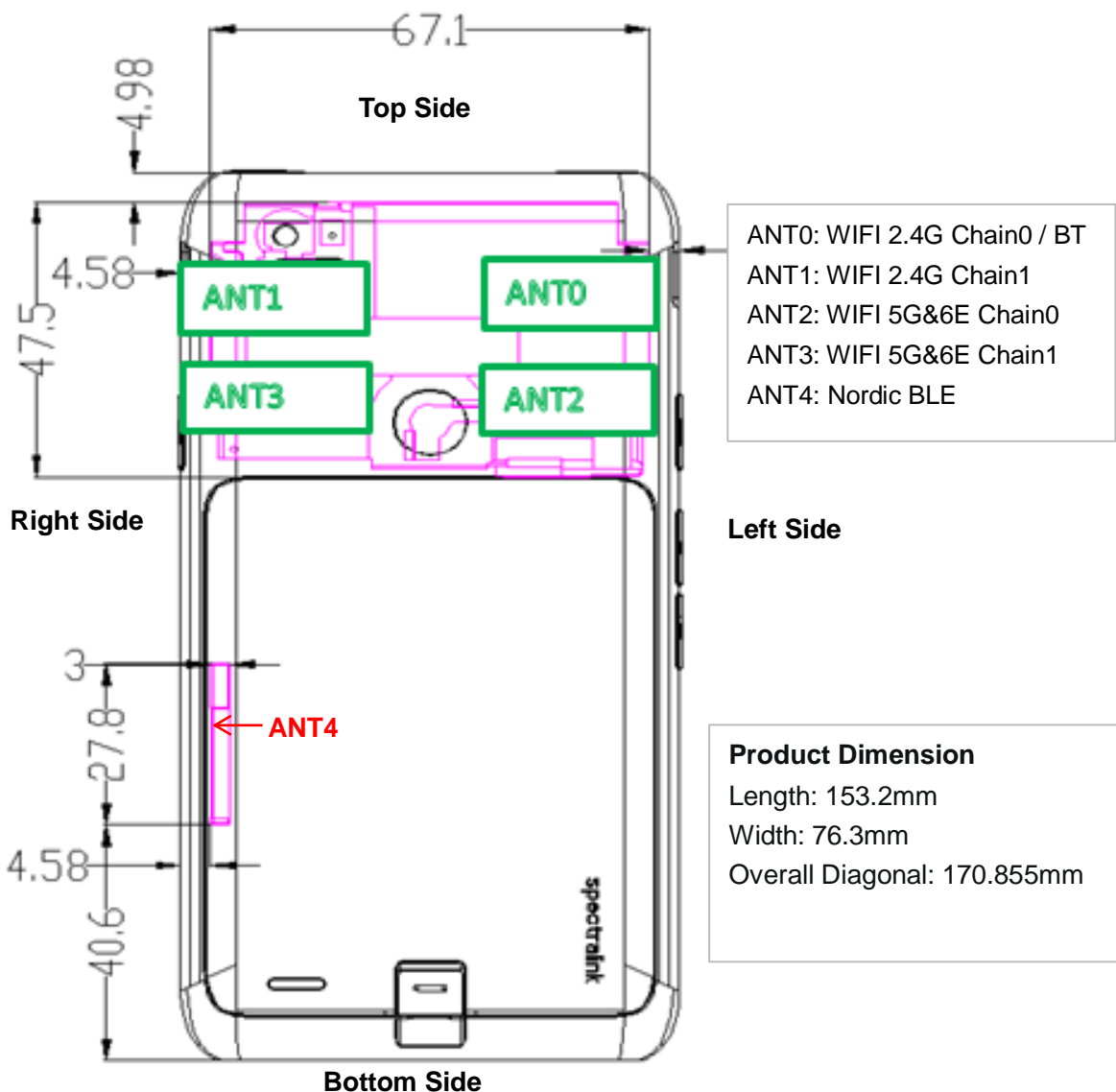
## 11. Simultaneous TX SAR Considerations

### 11.1. Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

For this device, the Bluetooth and WLAN can transmit simultaneous with other transmitters.

### 11.2. Transmit Antenna Separation Distances



Picture 11.1 Antenna Locations (Back View)



### 11.3. SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR, the edges with less than 25mm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Antenna	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
ANT0	Yes	Yes	Yes	Yes	Yes	No
ANT1	Yes	Yes	Yes	Yes	Yes	No
ANT2	Yes	Yes	Yes	Yes	Yes	No
ANT3	Yes	Yes	Yes	Yes	Yes	No
ANT4	Yes	Yes	No	Yes	No	No

## 12. Evaluation of Simultaneous

No.	Simultaneous Transmission Configuration
1	WLAN 2.4GHz 2X2 MIMO(ANT0+ANT1)
2	WLAN 5GHz 2X2 MIMO(ANT2+ANT3)
3	WLAN 6GHz 2X2 MIMO(ANT2+ANT3)
4	WLAN 2.4GHz ANT1 + Bluetooth ANT0
5	WLAN 5GHz 2X2 MIMO(ANT2+ANT3) + Bluetooth ANT0
6	WLAN 6GHz 2X2 MIMO(ANT2+ANT3) + Bluetooth ANT0
7	WLAN 2.4GHz 2X2 MIMO(ANT0+ANT1) + WLAN 5GHz 2X2 MIMO(ANT2+ANT3)
8	WLAN 2.4GHz 2X2 MIMO(ANT0+ANT1) + WLAN 6GHz 2X2 MIMO(ANT2+ANT3)
9	WLAN 5GHz 2X2 MIMO(ANT2+ANT3) + WLAN 2.4GHz ANT1 + Bluetooth ANT0
10	WLAN 6GHz 2X2 MIMO(ANT2+ANT3) + WLAN 2.4GHz ANT1 + Bluetooth ANT0

**Table 12.1: Maximum Simultaneous Transmission SAR**

/	Position	Sum (W/kg)
Highest reported SAR value for Head	Left Cheek (WLAN 6GHz MIMO + WLAN 2.4GHz ANT1 + Bluetooth ANT0)	<b>1.36</b>
Highest reported SAR value for Hotspot	Rear Side (WLAN 6GHz MIMO + WLAN 2.4GHz ANT1 + Bluetooth ANT0)	<b>1.32</b>
Highest reported SAR value for Body-worn	Rear Side (WLAN 6GHz MIMO + WLAN 2.4GHz ANT1 + Bluetooth ANT0)	<b>1.41</b>

Note:

1. The test positions of above tables are for the worse case that has been evaluated.
2. The WLAN 6GHz SAR data is referenced to 2305RSU003-U1 report.

### Conclusion:

According to the above tables, the sum of reported SAR values is less than limit. So the simultaneous transmission SAR with volume scans is not required.

### 13. Summary of Test Results

According to the client's decision rule in the test registration form, which is "based on the measurement results as the basis of the conformity statement", the test conclusion of this report meets the limit requirements.

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{\text{Target}} - P_{\text{Measured}})/10}$$

Where  $P_{\text{Target}}$  is the power of manufacturing upper limit;

$P_{\text{Measured}}$  is the measured power in chapter 10.

**General Note:**

1. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

a. WLAN5GHz U-NII-2A and U-NII-2C tested the product specific 10g SAR since it has no hotspot mode.

b. When 10-g product specific 10g SAR is considered, SAR thresholds is specified in the procedures for SAR test reduction and exclusion should be multiplied by 2.5.

2. Per KDB 447498 D01V06, NFC SAR no need test.

**Duty Cycle**

Mode	Duty Cycle
Bluetooth	1:1
WLAN	1:1

### 13.1. Testing Environment

Temperature:	18°C~25°C
Relative humidity:	30%~70%
Ambient noise & Reflection:	< 0.012 W/kg

### 13.2. Bluetooth Test Results

Table 13.1: Bluetooth SAR Values

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
0	Head	Bluetooth	19	2440	BLE 2M	Cheek Left	0mm	\	7.32	8.5	0.015	<b>0.02</b>	0.007	<b>0.01</b>	0.06
0	Head	Bluetooth	19	2440	BLE 2M	Tilt Left	0mm	\	7.32	8.5	0.014	<b>0.02</b>	0.006	<b>0.01</b>	0.07
0	Head	Bluetooth	19	2440	BLE 2M	Cheek Right	0mm	<b>1</b>	7.32	8.5	<b>0.023</b>	<b>0.03</b>	0.014	<b>0.02</b>	0.11
0	Head	Bluetooth	19	2440	BLE 2M	Tilt Right	0mm	\	7.32	8.5	0.021	<b>0.03</b>	0.009	<b>0.01</b>	0.19
0	Hotspot	Bluetooth	19	2440	BLE 2M	Front	10mm	\	7.32	8.5	0.005	<b>0.01</b>	0.003	<b>0.00</b>	0.04
0	Hotspot	Bluetooth	19	2440	BLE 2M	Rear	10mm	\	7.32	8.5	0.007	<b>0.01</b>	0.003	<b>0.00</b>	0.09
0	Hotspot	Bluetooth	19	2440	BLE 2M	Left	10mm	\	7.32	8.5	0.005	<b>0.01</b>	0.002	<b>0.00</b>	-0.17
0	Hotspot	Bluetooth	19	2440	BLE 2M	Right	10mm	\	7.32	8.5	0.000	<b>0.00</b>	0.000	<b>0.00</b>	0.09
0	Hotspot	Bluetooth	19	2440	BLE 2M	Top	10mm	\	7.32	8.5	0.006	<b>0.01</b>	0.004	<b>0.01</b>	0.01
0	Body-worn	Bluetooth	19	2440	BLE 2M	Front	10mm	\	7.32	8.5	0.005	<b>0.01</b>	0.003	<b>0.00</b>	0.04
0	Body-worn	Bluetooth	19	2440	BLE 2M	Rear	10mm	\	7.32	8.5	0.007	<b>0.01</b>	0.003	<b>0.00</b>	0.09
4	Head	Bluetooth	39	2480	BLE 1M	Cheek Left	0mm	\	7.78	8.5	0.009	<b>0.01</b>	0.003	<b>0.00</b>	0.04
4	Head	Bluetooth	39	2480	BLE 1M	Tilt Left	0mm	\	7.78	8.5	0.009	<b>0.01</b>	0.003	<b>0.00</b>	0.09
4	Head	Bluetooth	39	2480	BLE 1M	Cheek Right	0mm	\	7.78	8.5	0.017	<b>0.02</b>	0.008	<b>0.01</b>	0.09
4	Head	Bluetooth	39	2480	BLE 1M	Tilt Right	0mm	\	7.78	8.5	0.002	<b>0.00</b>	0.001	<b>0.00</b>	0.02
4	Hotspot	Bluetooth	39	2480	BLE 1M	Front	10mm	\	7.78	8.5	0.005	<b>0.01</b>	0.002	<b>0.00</b>	0.04
4	Hotspot	Bluetooth	39	2480	BLE 1M	Rear	10mm	<b>2</b>	7.78	8.5	<b>0.009</b>	<b>0.01</b>	0.004	<b>0.01</b>	0.08
4	Hotspot	Bluetooth	39	2480	BLE 1M	Right	10mm	\	7.78	8.5	0.007	<b>0.01</b>	0.003	<b>0.00</b>	0.12
4	Body-worn	Bluetooth	39	2480	BLE 1M	Front	10mm	\	7.78	8.5	0.005	<b>0.01</b>	0.002	<b>0.00</b>	0.04
4	Body-worn	Bluetooth	39	2480	BLE 1M	Rear	10mm	\	7.78	8.5	0.009	<b>0.01</b>	0.004	<b>0.01</b>	0.08

### 13.3. WLAN Evaluation for 2.4GHz

According to the KDB248227 D01, SAR is measured for 2.4GHz 802.11b DSSS using the initial test position procedure.

**Table 13.2: WLAN 2.4GHz SAR Values**

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
1	Head	WLAN 2.4GHz	11	2462	802.11b	Cheek Left	0mm	3	20.59	21.5	0.642	0.79	0.291	0.36	0.02
1	Head	WLAN 2.4GHz	11	2462	802.11b	Tilt Left	0mm	\	20.59	21.5	0.474	0.58	0.207	0.26	0.08
1	Head	WLAN 2.4GHz	11	2462	802.11b	Cheek Right	0mm	\	20.59	21.5	0.188	0.23	0.102	0.13	0.06
1	Head	WLAN 2.4GHz	11	2462	802.11b	Tilt Right	0mm	\	20.59	21.5	0.156	0.19	0.081	0.10	0.14
1	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Front	10mm	\	20.59	21.5	0.100	0.12	0.051	0.06	-0.05
1	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Rear	10mm	\	20.59	21.5	0.238	0.29	0.118	0.15	-0.09
1	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Left	10mm	\	20.59	21.5	0.042	0.05	0.025	0.03	0.16
1	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Right	10mm	\	20.59	21.5	0.127	0.16	0.064	0.08	-0.16
1	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Top	10mm	\	20.59	21.5	0.093	0.12	0.049	0.06	-0.16
1	Body-worn	WLAN 2.4GHz	11	2462	802.11b	Front	10mm	\	20.59	21.5	0.100	0.12	0.051	0.06	-0.05
1	Body-worn	WLAN 2.4GHz	11	2462	802.11b	Rear	10mm	\	20.59	21.5	0.238	0.29	0.118	0.15	-0.09
0	Head	WLAN 2.4GHz	11	2462	802.11b	Cheek Left	0mm	\	20.65	21.5	0.153	0.19	0.087	0.11	0.04
0	Head	WLAN 2.4GHz	11	2462	802.11b	Tilt Left	0mm	\	20.65	21.5	0.161	0.20	0.085	0.10	0.02
0	Head	WLAN 2.4GHz	11	2462	802.11b	Cheek Right	0mm	\	20.65	21.5	0.311	0.38	0.157	0.19	0.15
0	Head	WLAN 2.4GHz	11	2462	802.11b	Tilt Right	0mm	\	20.65	21.5	0.241	0.29	0.108	0.13	0.11
0	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Front	10mm	\	20.65	21.5	0.064	0.08	0.034	0.04	0.17
0	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Rear	10mm	\	20.65	21.5	0.129	0.16	0.072	0.09	0.10
0	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Left	10mm	\	20.65	21.5	0.048	0.06	0.027	0.03	-0.01
0	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Right	10mm	\	20.65	21.5	0.033	0.04	0.015	0.02	-0.04
0	Hotspot	WLAN 2.4GHz	11	2462	802.11b	Top	10mm	\	20.65	21.5	0.050	0.06	0.028	0.03	-0.16
0	Body-worn	WLAN 2.4GHz	11	2462	802.11b	Front	10mm	\	20.65	21.5	0.064	0.08	0.034	0.04	0.17
0	Body-worn	WLAN 2.4GHz	11	2462	802.11b	Rear	10mm	\	20.65	21.5	0.129	0.16	0.072	0.09	0.10
MIMO	Head	WLAN 2.4GHz	11	2462	802.11n20	Cheek Left	0mm	\	20.74	21.5	0.367	0.44	0.185	0.22	0.14
MIMO	Head	WLAN 2.4GHz	11	2462	802.11n20	Tilt Left	0mm	\	20.74	21.5	0.229	0.27	0.115	0.14	0.02
MIMO	Head	WLAN 2.4GHz	11	2462	802.11n20	Cheek Right	0mm	\	20.74	21.5	0.304	0.36	0.143	0.17	0.12
MIMO	Head	WLAN 2.4GHz	11	2462	802.11n20	Tilt Right	0mm	\	20.74	21.5	0.211	0.25	0.101	0.12	0.10
MIMO	Hotspot	WLAN 2.4GHz	11	2462	802.11n20	Front	10mm	\	20.74	21.5	0.138	0.16	0.074	0.09	-0.14
MIMO	Hotspot	WLAN 2.4GHz	11	2462	802.11n20	Rear	10mm	4	20.74	21.5	0.244	0.29	0.131	0.16	0.05
MIMO	Hotspot	WLAN 2.4GHz	11	2462	802.11n20	Left	10mm	\	20.74	21.5	0.083	0.10	0.043	0.05	-0.07
MIMO	Hotspot	WLAN 2.4GHz	11	2462	802.11n20	Right	10mm	\	20.74	21.5	0.121	0.14	0.061	0.07	-0.06
MIMO	Hotspot	WLAN 2.4GHz	11	2462	802.11n20	Top	10mm	\	20.74	21.5	0.119	0.14	0.064	0.08	0.01
MIMO	Body-worn	WLAN 2.4GHz	11	2462	802.11n20	Front	10mm	\	20.74	21.5	0.138	0.16	0.074	0.09	-0.14
MIMO	Body-worn	WLAN 2.4GHz	11	2462	802.11n20	Rear	10mm	\	20.74	21.5	0.244	0.29	0.131	0.16	0.05

Note: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.



According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

**WLAN 2.4GHz SAR Values - (Scaled Reported SAR)**

Frequency		Test Position		Actual duty factor	Maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
Ch.	MHz						
11	2462	Head	Left Cheek	100%	100%	0.79	<b>0.79</b>
11	2462	Hotspot	Rear	100%	100%	0.29	<b>0.29</b>
11	2462	Body-Worn	Rear	100%	100%	0.29	<b>0.29</b>

SAR is not required for OFDM because the 802.11b adjusted SAR  $\leq 1.2$  W/kg.

### 13.4. WLAN Evaluation for 5GHz

Table 13.3: WLAN 5GHz SAR Values

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Diff
3	Head	U-NII-2A	52	5260	802.11a	Cheek Left	0mm	\	17.23	18.0	0.134	0.16	0.048	0.06	0.05
3	Head	U-NII-2A	52	5260	802.11a	Tilt Left	0mm	\	17.23	18.0	0.061	0.07	0.026	0.03	0.09
3	Head	U-NII-2A	52	5260	802.11a	Cheek Right	0mm	\	17.23	18.0	0.068	0.08	0.026	0.03	0.07
3	Head	U-NII-2A	52	5260	802.11a	Tilt Right	0mm	\	17.23	18.0	0.048	0.06	0.017	0.02	-0.08
3	Head	U-NII-2C	100	5500	802.11a	Cheek Left	0mm	\	17.62	18.0	0.203	0.22	0.074	0.08	-0.03
3	Head	U-NII-2C	100	5500	802.11a	Tilt Left	0mm	\	17.62	18.0	0.094	0.10	0.035	0.04	0.08
3	Head	U-NII-2C	100	5500	802.11a	Cheek Right	0mm	\	17.62	18.0	0.081	0.09	0.033	0.04	0.14
3	Head	U-NII-2C	100	5500	802.11a	Tilt Right	0mm	\	17.62	18.0	0.069	0.08	0.026	0.03	-0.06
3	Head	U-NII-3	165	5825	802.11a	Cheek Left	0mm	\	16.79	18.0	0.181	0.24	0.063	0.08	0.09
3	Head	U-NII-3	165	5825	802.11a	Tilt Left	0mm	\	16.79	18.0	0.057	0.08	0.011	0.01	-0.15
3	Head	U-NII-3	165	5825	802.11a	Cheek Right	0mm	\	16.79	18.0	0.082	0.11	0.033	0.04	-0.02
3	Head	U-NII-3	165	5825	802.11a	Tilt Right	0mm	\	16.79	18.0	0.075	0.10	0.023	0.03	-0.09
3	Hotspot	U-NII-1	36	5180	802.11a	Front	10mm	\	17.09	18.0	0.107	0.13	0.031	0.04	0.04
3	Hotspot	U-NII-1	36	5180	802.11a	Rear	10mm	\	17.09	18.0	0.124	0.15	0.044	0.05	0.13
3	Hotspot	U-NII-1	36	5180	802.11a	Left	10mm	\	17.09	18.0	0.067	0.08	0.023	0.03	0.09
3	Hotspot	U-NII-1	36	5180	802.11a	Right	10mm	\	17.09	18.0	0.068	0.08	0.029	0.04	0.08
3	Hotspot	U-NII-1	36	5180	802.11a	Top	10mm	\	17.09	18.0	0.062	0.08	0.024	0.03	-0.10
3	Hotspot	U-NII-3	165	5825	802.11a	Front	10mm	\	16.79	18.0	0.063	0.08	0.022	0.03	-0.14
3	Hotspot	U-NII-3	165	5825	802.11a	Rear	10mm	\	16.79	18.0	0.181	0.24	0.064	0.08	-0.09
3	Hotspot	U-NII-3	165	5825	802.11a	Left	10mm	\	16.79	18.0	0.037	0.05	0.011	0.01	-0.18
3	Hotspot	U-NII-3	165	5825	802.11a	Right	10mm	\	16.79	18.0	0.111	0.15	0.040	0.05	-0.06
3	Hotspot	U-NII-3	165	5825	802.11a	Top	10mm	\	16.79	18.0	0.062	0.08	0.014	0.02	-0.08
3	Body-worn	U-NII-2A	52	5260	802.11a	Front	15mm	\	17.23	18.0	0.065	0.08	0.020	0.02	0.18
3	Body-worn	U-NII-2A	52	5260	802.11a	Rear	15mm	\	17.23	18.0	0.117	0.14	0.044	0.05	0.02
3	Body-worn	U-NII-2C	100	5500	802.11a	Front	15mm	\	17.62	18.0	0.058	0.06	0.021	0.02	0.04
3	Body-worn	U-NII-2C	100	5500	802.11a	Rear	15mm	\	17.62	18.0	0.165	0.18	0.064	0.07	-0.19
3	Body-worn	U-NII-3	165	5825	802.11a	Front	10mm	\	16.79	18.0	0.063	0.08	0.022	0.03	-0.14
3	Body-worn	U-NII-3	165	5825	802.11a	Rear	10mm	\	16.79	18.0	0.181	0.24	0.064	0.08	-0.09
2	Head	U-NII-2A	52	5260	802.11a	Cheek Left	0mm	\	17.64	18.5	0.093	0.11	0.031	0.04	0.10
2	Head	U-NII-2A	52	5260	802.11a	Tilt Left	0mm	\	17.64	18.5	0.035	0.04	0.007	0.01	-0.07
2	Head	U-NII-2A	52	5260	802.11a	Cheek Right	0mm	\	17.64	18.5	0.101	0.12	0.037	0.05	0.04
2	Head	U-NII-2A	52	5260	802.11a	Tilt Right	0mm	\	17.64	18.5	0.065	0.08	0.020	0.02	0.13
2	Head	U-NII-2C	100	5500	802.11a	Cheek Left	0mm	\	18.16	18.5	0.074	0.08	0.026	0.03	0.15
2	Head	U-NII-2C	100	5500	802.11a	Tilt Left	0mm	\	18.16	18.5	0.025	0.03	0.006	0.01	-0.10
2	Head	U-NII-2C	100	5500	802.11a	Cheek Right	0mm	\	18.16	18.5	0.084	0.09	0.025	0.03	0.19
2	Head	U-NII-2C	100	5500	802.11a	Tilt Right	0mm	\	18.16	18.5	0.036	0.04	0.010	0.01	-0.10
2	Head	U-NII-3	165	5825	802.11a	Cheek Left	0mm	\	17.98	18.5	0.064	0.07	0.014	0.02	0.02
2	Head	U-NII-3	165	5825	802.11a	Tilt Left	0mm	\	17.98	18.5	0.053	0.06	0.018	0.02	-0.01
2	Head	U-NII-3	165	5825	802.11a	Cheek Right	0mm	\	17.98	18.5	0.102	0.11	0.030	0.03	0.09
2	Head	U-NII-3	165	5825	802.11a	Tilt Right	0mm	\	17.98	18.5	0.079	0.09	0.023	0.03	-0.14
2	Hotspot	U-NII-1	44	5220	802.11a	Front	10mm	\	17.66	18.5	0.029	0.03	0.013	0.02	0.18
2	Hotspot	U-NII-1	44	5220	802.11a	Rear	10mm	\	17.66	18.5	0.080	0.10	0.034	0.04	-0.01
2	Hotspot	U-NII-1	44	5220	802.11a	Left	10mm	\	17.66	18.5	0.080	0.10	0.033	0.04	-0.06
2	Hotspot	U-NII-1	44	5220	802.11a	Right	10mm	\	17.66	18.5	0.033	0.04	0.009	0.01	-0.08
2	Hotspot	U-NII-1	44	5220	802.11a	Top	10mm	\	17.66	18.5	0.023	0.03	0.008	0.01	-0.09
2	Hotspot	U-NII-3	165	5825	802.11a	Front	10mm	\	17.98	18.5	0.079	0.09	0.029	0.03	0.14
2	Hotspot	U-NII-3	165	5825	802.11a	Rear	10mm	6	17.98	18.5	0.551	0.62	0.190	0.21	0.03
2	Hotspot	U-NII-3	165	5825	802.11a	Left	10mm	\	17.98	18.5	0.264	0.30	0.096	0.11	0.09
2	Hotspot	U-NII-3	165	5825	802.11a	Right	10mm	\	17.98	18.5	0.114	0.13	0.025	0.03	-0.18
2	Hotspot	U-NII-3	165	5825	802.11a	Top	10mm	\	17.98	18.5	0.095	0.11	0.036	0.04	0.06
2	Body-worn	U-NII-2A	52	5260	802.11a	Front	15mm	\	17.64	18.5	0.060	0.07	0.024	0.03	0.09
2	Body-worn	U-NII-2A	52	5260	802.11a	Rear	15mm	\	17.64	18.5	0.084	0.10	0.034	0.04	0.01
2	Body-worn	U-NII-2C	100	5500	802.11a	Front	15mm	\	18.16	18.5	0.099	0.11	0.020	0.02	0.07
2	Body-worn	U-NII-2C	100	5500	802.11a	Rear	15mm	\	18.16	18.5	0.128	0.14	0.051	0.05	0.09
2	Body-worn	U-NII-3	165	5825	802.11a	Front	10mm	\	17.98	18.5	0.079	0.09	0.029	0.03	0.14
2	Body-worn	U-NII-3	165	5825	802.11a	Rear	10mm	\	17.98	18.5	0.551	0.62	0.190	0.21	0.03
MIMO	Head	U-NII-2A	52	5260	802.11n20	Cheek Left	0mm	\	18.64	19.5	0.139	0.17	0.044	0.05	-0.18
MIMO	Head	U-NII-2A	52	5260	802.11n20	Tilt Left	0mm	\	18.64	19.5	0.066	0.08	0.029	0.04	0.17
MIMO	Head	U-NII-2A	52	5260	802.11n20	Cheek Right	0mm	\	18.64	19.5	0.150	0.18	0.051	0.06	-0.08
MIMO	Head	U-NII-2A	52	5260	802.11n20	Tilt Right	0mm	\	18.64	19.5	0.092	0.11	0.034	0.04	0.05
MIMO	Head	U-NII-2C	100	5500	802.11n20	Cheek Left	0mm	5	19.23	19.5	0.233	0.25	0.074	0.08	0.04
MIMO	Head	U-NII-2C	100	5500	802.11n20	Tilt Left	0mm	\	19.23	19.5	0.098	0.10	0.040	0.04	-0.17
MIMO	Head	U-NII-2C	100	5500	802.11n20	Cheek Right	0mm	\	19.23	19.5	0.135	0.14	0.048	0.05	0.13
MIMO	Head	U-NII-2C	100	5500	802.11n20	Tilt Right	0mm	\	19.23	19.5	0.058	0.06	0.019	0.02	0.12
MIMO	Head	U-NII-3	165	5825	802.11n20	Cheek Left	0mm	\	18.57	19.5	0.141	0.17	0.048	0.06	0.14
MIMO	Head	U-NII-3	165	5825	802.11n20	Tilt Left	0mm	\	18.57	19.5	0.042	0.05	0.015	0.02	0.04
MIMO	Head	U-NII-3	165	5825	802.11n20	Cheek Right	0mm	\	18.57	19.5	0.075	0.09	0.027	0.03	0.19
MIMO	Head	U-NII-3	165	5825	802.11n20	Tilt Right	0mm	\	18.57	19.5	0.085	0.11	0.033	0.04	0.11
MIMO	Hotspot	U-NII-1	40	5200	802.11n20	Front	10mm	\	18.79	19.5	0.057	0.07	0.021	0.02	0.12
MIMO	Hotspot	U-NII-1	40	5200	802.11n20	Rear	10mm	\	18.79	19.5	0.137	0.16	0.048	0.06	0.09
MIMO	Hotspot	U-NII-1	40	5200	802.11n20	Left	10mm	\	18.79	19.5	0.121	0.14	0.045	0.05	0.19
MIMO	Hotspot	U-NII-1	40	5200	802.11n20	Right	10mm	\	18.79	19.5	0.101	0.12	0.038	0.05	0.15
MIMO	Hotspot	U-NII-1	40	5200	802.11n20	Top	10mm	\	18.79	19.5	0.055	0.07	0.021	0.02	0.15
MIMO	Hotspot	U-NII-3	165	5825	802.11n20	Front	10mm	\	18.57	19.5	0.087	0.11	0.035	0.04	-0.15
MIMO	Hotspot	U-NII-3	165	5825	802.11n20	Rear	10mm	\	18.57	19.5	0.490	0.61	0.170	0.21	0.07
MIMO	Hotspot	U-NII-3	165	5825	802.11n20	Left	10mm	\	18.57	19.5	0.305	0.38	0.119	0.15	0.01
MIMO	Hotspot	U-NII-3	165	5825	802.11n20	Right	10mm	\	18.57	19.5	0.207	0.26	0.081	0.10	0.02
MIMO	Hotspot	U-NII-3	165	5825	802.11n20	Top	10mm	\	18.57	19.5	0.166	0.21	0.062	0.08	0.17
MIMO	Body-worn	U-NII-2A	52	5260	802.11n20	Front	15mm	\	18.64	19.5	0.054	0.07	0.017	0.02	0.13
MIMO	Body-worn	U-NII-2A	52	5260	802.11n20	Rear	15mm	\	18.64	19.5	0.117	0.14	0.044	0.05	0.07
MIMO	Body-worn	U-NII-2C	100	5500	802.11n20	Front	15mm	\	19.23	19.5	0.081	0.09	0.021	0.02	-0.17
MIMO	Body-worn	U-NII-2C	100	5500	802.11n20	Rear	15mm	\	19.23	19.5	0.164	0.17	0.061	0.07	-0.08
MIMO	Body-worn	U-NII-3	165	5825	802.11n20	Front	10mm	\	18.57	19.5	0.087	0.11	0.035	0.04	-0.15
MIMO	Body-worn	U-NII-3	165	5825	802.11n20	Rear	10mm	\	18.57	19.5	0.490	0.61			



**Note:**

1. U-NII-1 and U-NII-2A bands have the same specified maximum output and tolerance; SAR is measured for U-NII-2A band first. Adjusted SAR of U-NII-2A band is  $\leq 1.2$  W/kg, SAR is not required for U-NII-1 band.
2. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is  $> 0.8$  W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is  $\leq 1.2$  W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

**WLAN 5GHzSAR Values - (Scaled Reported SAR)**

Frequency		Test Position		Actual duty factor	Maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
Ch.	MHz						
100	5500	Head	Left Cheek	100%	100%	0.25	<b>0.25</b>
165	5825	Hotspot	Rear	100%	100%	0.62	<b>0.62</b>
165	5825	Body-Worn	Rear	100%	100%	0.62	<b>0.62</b>





13.5. Product specific 10g SAR

Table 13.4: WLAN 5GHz SAR Values (Extremity)

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
3	Extremity	U-NII-2A	52	5260	802.11a	Front	0mm	\	17.23	18.0	0.369	<b>0.44</b>	0.125	<b>0.15</b>	0.15
3	Extremity	U-NII-2A	52	5260	802.11a	Rear	0mm	\	17.23	18.0	1.180	<b>1.41</b>	0.388	<b>0.46</b>	0.03
3	Extremity	U-NII-2A	52	5260	802.11a	Left	0mm	\	17.23	18.0	0.075	<b>0.09</b>	0.021	<b>0.03</b>	0.04
3	Extremity	U-NII-2A	52	5260	802.11a	Right	0mm	\	17.23	18.0	0.453	<b>0.54</b>	0.149	<b>0.18</b>	0.15
3	Extremity	U-NII-2A	52	5260	802.11a	Top	0mm	\	17.23	18.0	0.091	<b>0.11</b>	0.031	<b>0.04</b>	-0.02
3	Extremity	U-NII-2C	100	5500	802.11a	Front	0mm	\	17.62	18.0	0.545	<b>0.59</b>	0.149	<b>0.16</b>	-0.04
3	Extremity	U-NII-2C	100	5500	802.11a	Rear	0mm	7	17.62	18.0	1.520	<b>1.66</b>	<b>0.497</b>	<b>0.54</b>	-0.02
3	Extremity	U-NII-2C	100	5500	802.11a	Left	0mm	\	17.62	18.0	0.074	<b>0.08</b>	0.030	<b>0.03</b>	-0.15
3	Extremity	U-NII-2C	100	5500	802.11a	Right	0mm	\	17.62	18.0	0.562	<b>0.61</b>	0.183	<b>0.20</b>	0.08
3	Extremity	U-NII-2C	100	5500	802.11a	Top	0mm	\	17.62	18.0	0.075	<b>0.08</b>	0.027	<b>0.03</b>	0.16
2	Extremity	U-NII-2A	52	5260	802.11a	Front	0mm	\	17.64	18.5	0.232	<b>0.28</b>	0.085	<b>0.10</b>	0.16
2	Extremity	U-NII-2A	52	5260	802.11a	Rear	0mm	\	17.64	18.5	0.762	<b>0.93</b>	0.297	<b>0.36</b>	0.09
2	Extremity	U-NII-2A	52	5260	802.11a	Left	0mm	\	17.64	18.5	0.537	<b>0.65</b>	0.167	<b>0.20</b>	-0.13
2	Extremity	U-NII-2A	52	5260	802.11a	Right	0mm	\	17.64	18.5	0.053	<b>0.06</b>	0.013	<b>0.02</b>	0.13
2	Extremity	U-NII-2A	52	5260	802.11a	Top	0mm	\	17.64	18.5	0.076	<b>0.09</b>	0.027	<b>0.03</b>	0.04
2	Extremity	U-NII-2C	100	5500	802.11a	Front	0mm	\	18.16	18.5	0.198	<b>0.21</b>	0.067	<b>0.07</b>	0.10
2	Extremity	U-NII-2C	100	5500	802.11a	Rear	0mm	\	18.16	18.5	1.020	<b>1.10</b>	0.289	<b>0.31</b>	0.09
2	Extremity	U-NII-2C	100	5500	802.11a	Left	0mm	\	18.16	18.5	0.779	<b>0.84</b>	0.187	<b>0.20</b>	-0.19
2	Extremity	U-NII-2C	100	5500	802.11a	Right	0mm	\	18.16	18.5	0.079	<b>0.09</b>	0.020	<b>0.02</b>	0.09
2	Extremity	U-NII-2C	100	5500	802.11a	Top	0mm	\	18.16	18.5	0.051	<b>0.05</b>	0.020	<b>0.02</b>	-0.07
MIMO	Extremity	U-NII-2A	52	5260	802.11n20	Front	0mm	\	18.64	19.5	0.371	<b>0.45</b>	0.124	<b>0.15</b>	-0.09
MIMO	Extremity	U-NII-2A	52	5260	802.11n20	Rear	0mm	\	18.64	19.5	0.927	<b>1.13</b>	0.303	<b>0.37</b>	0.09
MIMO	Extremity	U-NII-2A	52	5260	802.11n20	Left	0mm	\	18.64	19.5	0.647	<b>0.79</b>	0.221	<b>0.27</b>	-0.11
MIMO	Extremity	U-NII-2A	52	5260	802.11n20	Right	0mm	\	18.64	19.5	0.472	<b>0.58</b>	0.161	<b>0.20</b>	0.05
MIMO	Extremity	U-NII-2A	52	5260	802.11n20	Top	0mm	\	18.64	19.5	0.097	<b>0.12</b>	0.035	<b>0.04</b>	0.04
MIMO	Extremity	U-NII-2C	100	5500	802.11n20	Front	0mm	\	19.23	19.5	0.427	<b>0.45</b>	0.138	<b>0.15</b>	0.16
MIMO	Extremity	U-NII-2C	100	5500	802.11n20	Rear	0mm	\	19.23	19.5	1.400	<b>1.49</b>	0.443	<b>0.47</b>	0.09
MIMO	Extremity	U-NII-2C	100	5500	802.11n20	Left	0mm	\	19.23	19.5	0.658	<b>0.70</b>	0.201	<b>0.21</b>	-0.03
MIMO	Extremity	U-NII-2C	100	5500	802.11n20	Right	0mm	\	19.23	19.5	0.631	<b>0.67</b>	0.202	<b>0.21</b>	-0.06
MIMO	Extremity	U-NII-2C	100	5500	802.11n20	Top	0mm	\	19.23	19.5	0.097	<b>0.10</b>	0.034	<b>0.04</b>	0.14

## 14. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

- 1) Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  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  $\geq 1.45$  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  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

## 15. Measurement Uncertainty

### 15.1. Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
<b>Measurement system</b>										
1	Probe calibration	B	12.7	N	2	1	1	6.35	6.35	∞
2	Axial isotropy	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	$\sqrt{0.5}$	4.3	4.3	∞
3	Hemispherical isotropy	B	9.6	R	$\sqrt{3}$	1	1	4.8	4.8	∞
4	Boundary effect	B	1.1	R	$\sqrt{3}$	1	1	0.6	0.6	∞
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
6	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
7	Modulation response	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
8	Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
9	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
10	Integration time	B	1.7	R	$\sqrt{3}$	1	1	1.0	1.0	∞
11	RF ambient conditions-noise	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	RF ambient conditions-reflection	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Probe positioned mech. restrictions	B	0.35	R	$\sqrt{3}$	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
15	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
<b>Test sample related</b>										
16	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	5
17	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
18	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
<b>Phantom and set-up</b>										
19	Phantom uncertainty	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
20	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas.)	A	1.3	N	1	0.64	0.43	0.83	0.56	9
22	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
23	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	0.96	0.78	9
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{23} c_i^2 u_i^2}$						11.5	11.4	95.5
Expanded uncertainty (Confidence interval of 95 %)		$u_e = 2u_c$						23.0	22.8	

**15.2. Measurement Uncertainty for Normal SAR Tests (3GHz~6GHz)**

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
<b>Measurement system</b>										
1	Probe calibration	B	13.9	N	2	1	1	6.95	6.95	∞
2	Axial isotropy	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	$\sqrt{0.5}$	4.3	4.3	∞
3	Hemispherical isotropy	B	9.6	R	$\sqrt{3}$	1	1	4.8	4.8	∞
4	Boundary effect	B	1.1	R	$\sqrt{3}$	1	1	0.6	0.6	∞
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
6	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
7	modulation response	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
8	Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
9	Response time	B	0.0	R	$\sqrt{3}$	1	1	0.0	0.0	∞
10	Integration time	B	1.7	R	$\sqrt{3}$	1	1	1.0	1.0	∞
11	RF ambient conditions-noise	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	RF ambient conditions-reflection	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Probe positioned mech. Restrictions	B	0.35	R	$\sqrt{3}$	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
15	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
<b>Test sample related</b>										
16	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	5
17	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
18	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
<b>Phantom and set-up</b>										
19	Phantom uncertainty	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
20	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas.)	A	1.3	N	1	0.64	0.43	0.83	0.56	43
22	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
23	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	0.96	0.78	521
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						11.8	11.7	257
Expanded uncertainty (Confidence interval of 95 %)		$u_e = 2u_c$						23.6	23.4	

## 16. Main Test Instruments

**Table 16.1: List of Main Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46103759	2022-11-14	One year
02	Dielectric probe	85070E	MY44300317	/	/
03	Power meter	E4418B	MY50000366	2022-12-11	One year
04	Power sensor	E9304A	MY50000188	2022-12-11	One year
05	Power meter	NRP	102603	2022-12-29	One year
06	Power sensor	NRP-Z51	102211	2022-12-29	One year
07	Signal Generator	E8257D	MY47461211	2023-01-13	One year
08	Amplifier	VTL5400	0404	/	/
609	E-field Probe	EX3DV4	7683	2023-02-16	One year
10	DAE	DAE4	786	2022-09-29	One year
11	Dipole Validation Kit	D2450V2	873	2021-10-21	Three years
12	Dipole Validation Kit	D5GHzV2	1238	2022-08-17	Three years
13	Thermometer	51II	99250045	2022-11-23	One year
14	Software	DASY5	/	/	/

## ANNEX A: Graph Results

### Bluetooth Head

Date: 2023-6-12

Electronics: DAE4 Sn786

Medium: Head 2450MHz

Medium parameters used:  $f = 2440$  MHz;  $\sigma = 1.829$  S/m;  $\epsilon_r = 38.404$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, BT (0) Frequency: 2440 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

**Right Cheek Ch.19/Area Scan (91x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0761 W/kg

**Right Cheek Ch.19/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.246 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.0590 W/kg

**SAR(1 g) = 0.023 W/kg; SAR(10 g) = 0.014 W/kg**

Maximum value of SAR (measured) = 0.0315 W/kg

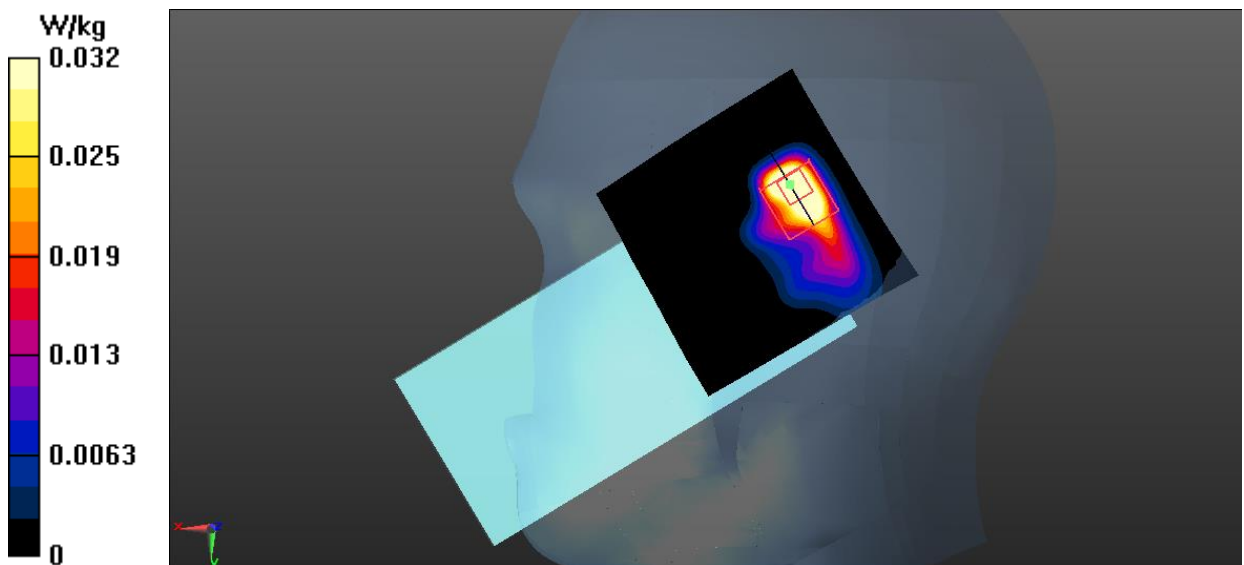


Fig.1 Bluetooth Head

**Bluetooth Body**

Date: 2023-6-12

Electronics: DAE4 Sn786

Medium: Head 2450MHz

Medium parameters used:  $f = 2480$  MHz;  $\sigma = 1.876$  S/m;  $\epsilon_r = 38.272$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, BT (0) Frequency: 2480 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

**Rear Side Ch.39/Area Scan (91x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.0151 W/kg

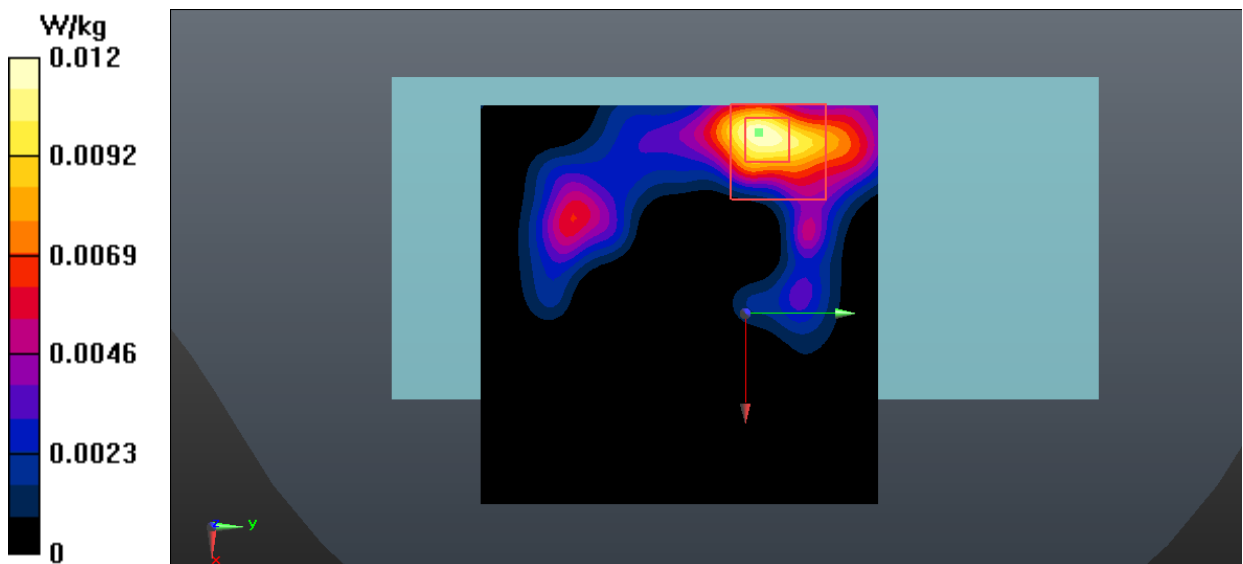
**Rear Side Ch.39/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.415 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.0180 W/kg

**SAR(1 g) = 0.009 W/kg; SAR(10 g) = 0.004 W/kg**

Maximum value of SAR (measured) = 0.0115 W/kg

**Fig.2 Bluetooth Body**

**WLAN 2.4GHz Head**

Date: 2023-6-12

Electronics: DAE4 Sn786

Medium: Head 2450MHz

Medium parameters used:  $f = 2462$  MHz;  $\sigma = 1.855$  S/m;  $\epsilon_r = 38.331$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, WLAN (0) Frequency: 2462 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

**Left Cheek Ch.11/Area Scan (91x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.876 W/kg

**Left Cheek Ch.11/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.32 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.51 W/kg

**SAR(1 g) = 0.642 W/kg; SAR(10 g) = 0.291 W/kg**

Maximum value of SAR (measured) = 0.891 W/kg

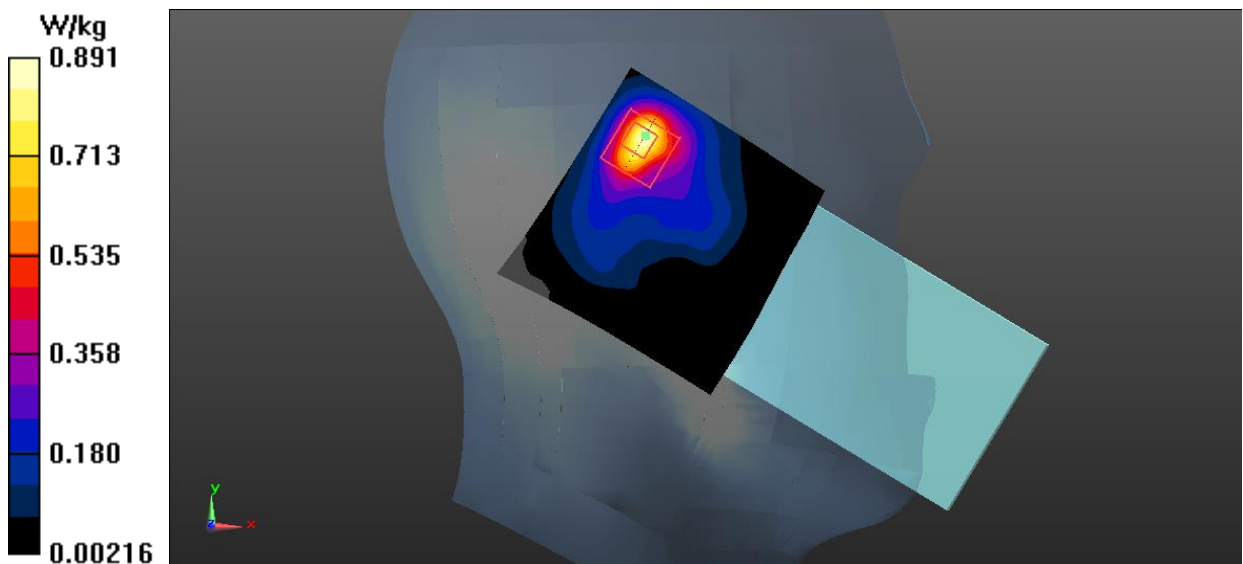


Fig.3 WLAN 2.4GHz Head



**WLAN 2.4GHz Body**

Date: 2023-6-12

Electronics: DAE4 Sn786

Medium: Head 2450MHz

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.855 \text{ S/m}$ ;  $\epsilon_r = 38.331$ ;  $\rho = 1000 \text{ kg/m}^3$

Communication System: UID 0, WLAN (0) Frequency: 2462 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

**Rear Side Ch.11/Area Scan (111x91x1):** Interpolated grid:  $dx=1.000 \text{ mm}$ ,  $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.318 W/kg

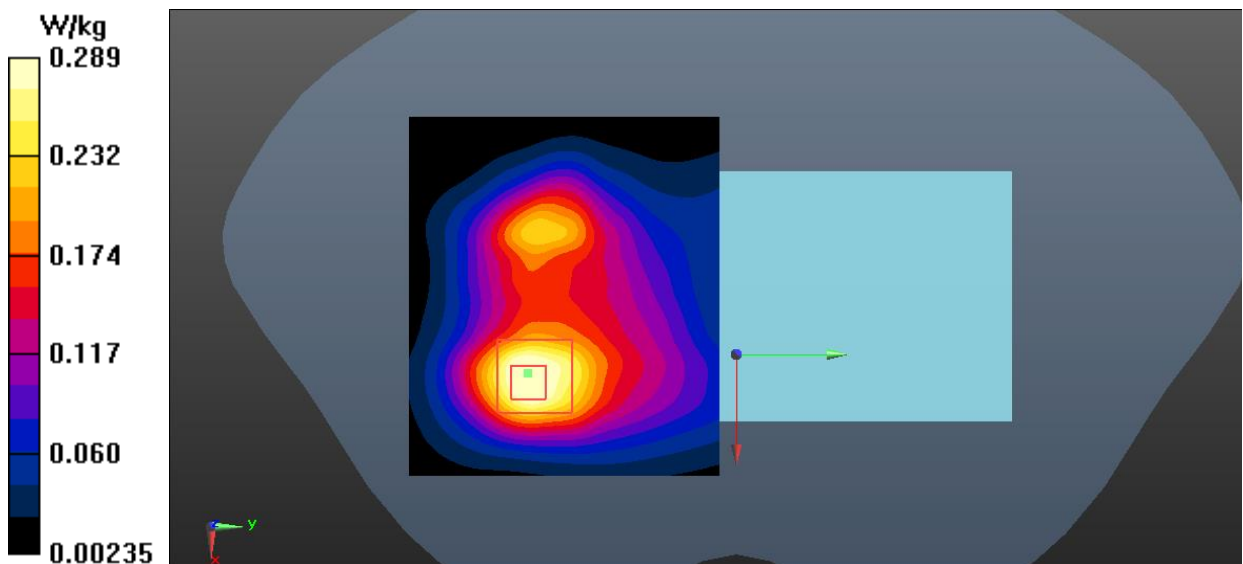
**Rear Side Ch.11/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.067 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.457 W/kg

**SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.131 W/kg**

Maximum value of SAR (measured) = 0.289 W/kg



**Fig.4 WLAN 2.4GHz Body**

**WLAN 5GHz Head**

Date: 2023-6-7

Electronics: DAE4 Sn786

Medium: Head 5600MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 4.86$  S/m;  $\epsilon_r = 36.159$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, WLAN 5G (0) Frequency: 5500 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.13, 5.13, 5.13)

**Left Cheek Ch.100/Area Scan (111x91x1):** Interpolated grid:  $dx=1.000$  mm,  $dy=1.000$  mm  
Maximum value of SAR (interpolated) = 0.690 W/kg**Left Cheek Ch.100/Zoom Scan (8x8x21)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  
 $dz=1.4$ mm

Reference Value = 0.9670 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.700 W/kg

**SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.074 W/kg**

Maximum value of SAR (measured) = 0.333 W/kg

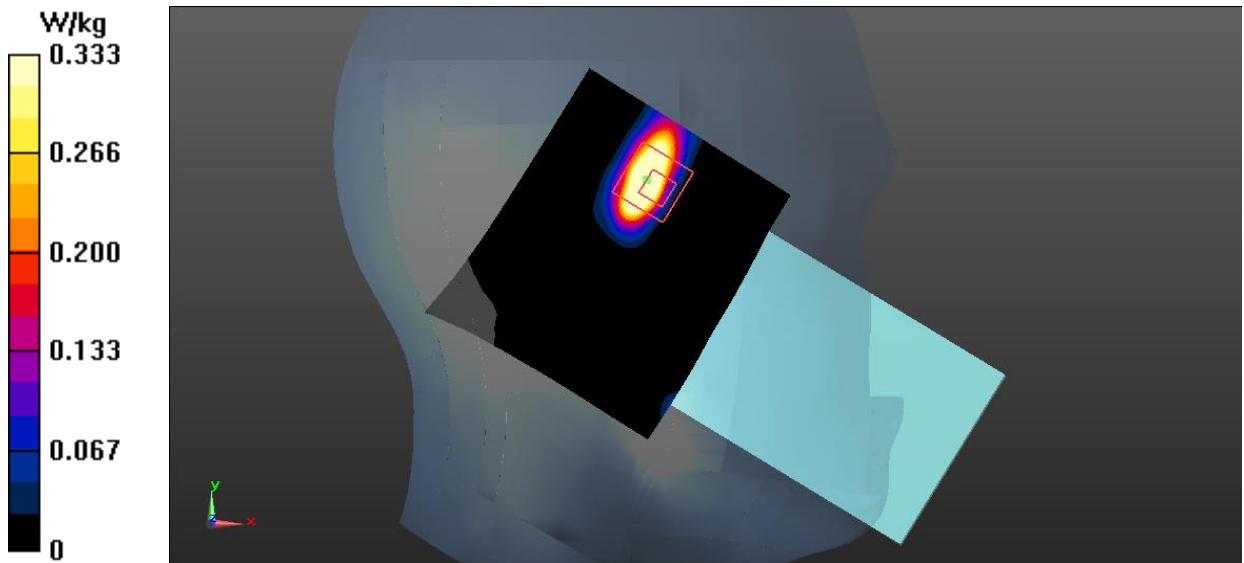


Fig.5 WLAN 5GHz Head

**WLAN 5GHz Body**

Date: 2023-6-7

Electronics: DAE4 Sn786

Medium: Head 57250MHz

Medium parameters used (interpolated):  $f = 5825$  MHz;  $\sigma = 5.223$  S/m;  $\epsilon_r = 35.717$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, WLAN 5G (0) Frequency: 5825 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.23, 5.23, 5.23)

**Rear Side Ch.165/Area Scan (91x91x1):** Interpolated grid:  $dx=1.000$  mm,  $dy=1.000$  mm  
Maximum value of SAR (interpolated) = 0.846 W/kg**Rear Side Ch.165/Zoom Scan (8x8x21)/Cube 0:** Measurement grid:  $dx=4$ mm,  $dy=4$ mm,  
 $dz=1.4$ mm

Reference Value = 1.596 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 2.74 W/kg

**SAR(1 g) = 0.551 W/kg; SAR(10 g) = 0.190 W/kg**

Maximum value of SAR (measured) = 1.03 W/kg

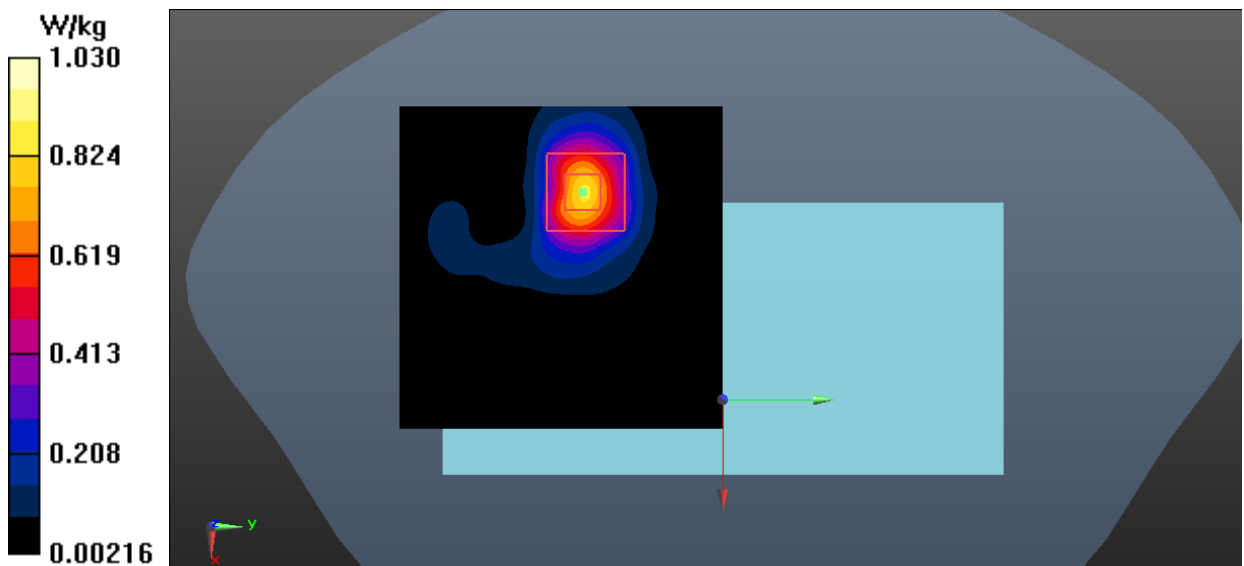


Fig.6 WLAN 5GHz Body

**WLAN 5GHz Extremity**

Date: 2023-6-7

Electronics: DAE4 Sn786

Medium: Head 5600MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 4.86$  S/m;  $\epsilon_r = 36.159$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, WLAN 5G (0) Frequency: 5500 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.13, 5.13, 5.13)

**Rear Side Ch.100/Area Scan (91x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm  
Maximum value of SAR (interpolated) = 2.57 W/kg**Rear Side Ch.100/Zoom Scan (8x8x21)/Cube 0:** Measurement grid: dx=4mm, dy=4mm,  
dz=1.4mm

Reference Value = 1.704 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 8.14 W/kg

**SAR(1 g) = 1.52 W/kg; SAR(10 g) = 0.497 W/kg**

Maximum value of SAR (measured) = 2.00 W/kg

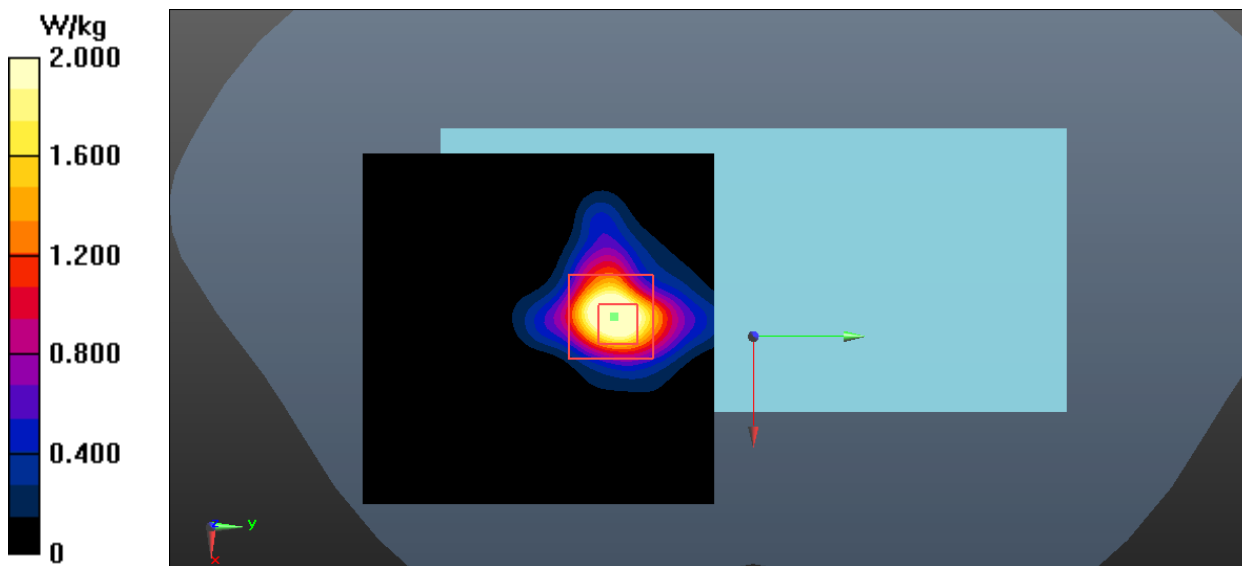


Fig.7 WLAN 5GHz Extremity

## ANNEX B: System Verification Results

### 2450MHz

Date: 2023-6-12

Electronics: DAE4 Sn786

Medium: Head 2450MHz

Medium parameters used:  $f = 2450 \text{ MHz}$ ;  $\sigma = 1.841 \text{ S/m}$ ;  $\epsilon_r = 38.371$ ;  $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (8.02, 8.02, 8.02)

**System Validation/Area Scan (81x121x1):** Interpolated grid:  $dx=1.000 \text{ mm}$ ,  $dy=1.000 \text{ mm}$

Reference Value = 97.065 V/m; Power Drift = 0.12 dB

**SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.07 W/kg**

Maximum value of SAR (interpolated) = 22.5 W/kg

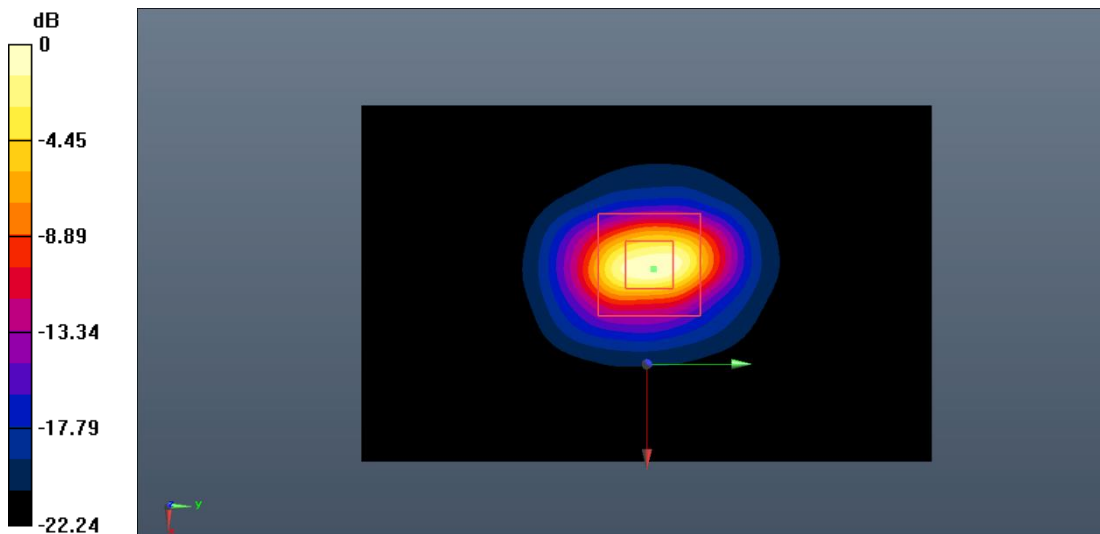
**System Validation/Zoom Scan (7x7x7)/Cube0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 97.065 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 30.3 W/kg

**SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.16 W/kg**

Maximum value of SAR (measured) = 22.2 W/kg



0 dB = 22.2 W/kg = 13.46 dB W/kg

**Fig.B.1. Validation 2450MHz 250mW**

**5250MHz**

Date: 2023-6-7

Electronics: DAE4 Sn786

Medium: Head 5250MHz

Medium parameters used:  $f = 5250 \text{ MHz}$ ;  $\sigma = 4.786 \text{ S/m}$ ;  $\epsilon_r = 35.173$ ;  $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 5250 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.72, 5.72, 5.72)

**System Validation/Area Scan (61x91x1):** Interpolated grid:  $dx=1.000 \text{ mm}$ ,  $dy=1.000 \text{ mm}$

Reference Value = 68.128 V/m; Power Drift = 0.13 dB

**SAR(1 g) = 8.07 W/kg; SAR(10 g) = 2.29 W/kg**

Maximum value of SAR (interpolated) = 19.3 W/kg

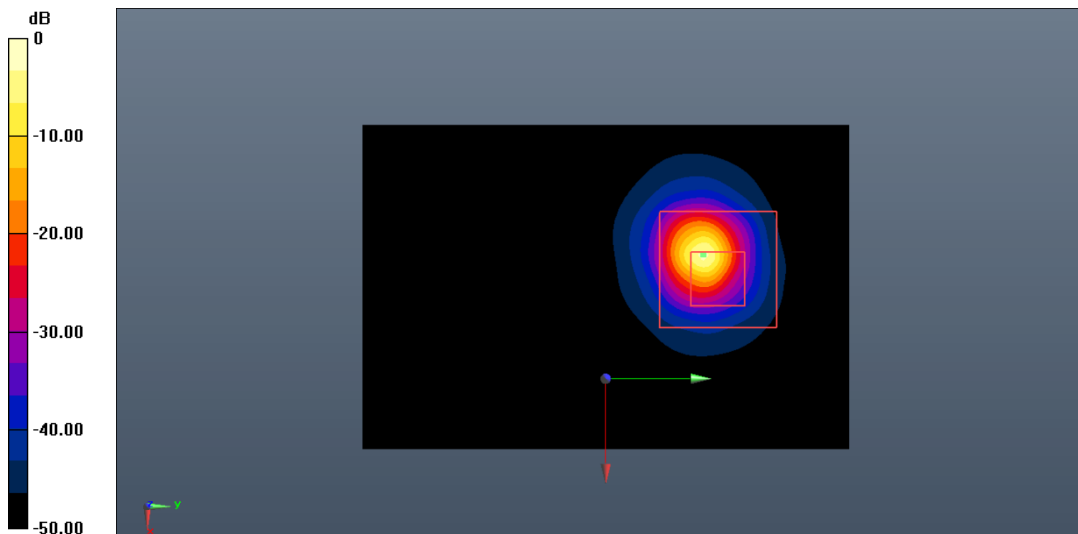
**System Validation/Zoom Scan (8x8x21)/Cube0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$

Reference Value = 68.128 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 35.5 W/kg

**SAR(1 g) = 8.25 W/kg; SAR(10 g) = 2.33 W/kg**

Maximum value of SAR (measured) = 19.5 W/kg



0 dB = 19.5 W/kg = 12.90 dB W/kg

**Fig.B.2. Validation 5250MHz 100mW**

**5600MHz**

Date: 2023-6-7

Electronics: DAE4 Sn786

Medium: Head 5600MHz

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.995$  S/m;  $\epsilon_r = 35.889$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: CW Frequency: 5600 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.13, 5.13, 5.13)

**System Validation/Area Scan (61x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 65.983 V/m; Power Drift = -0.12 dB

**SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.30 W/kg**

Maximum value of SAR (interpolated) = 18.8 W/kg

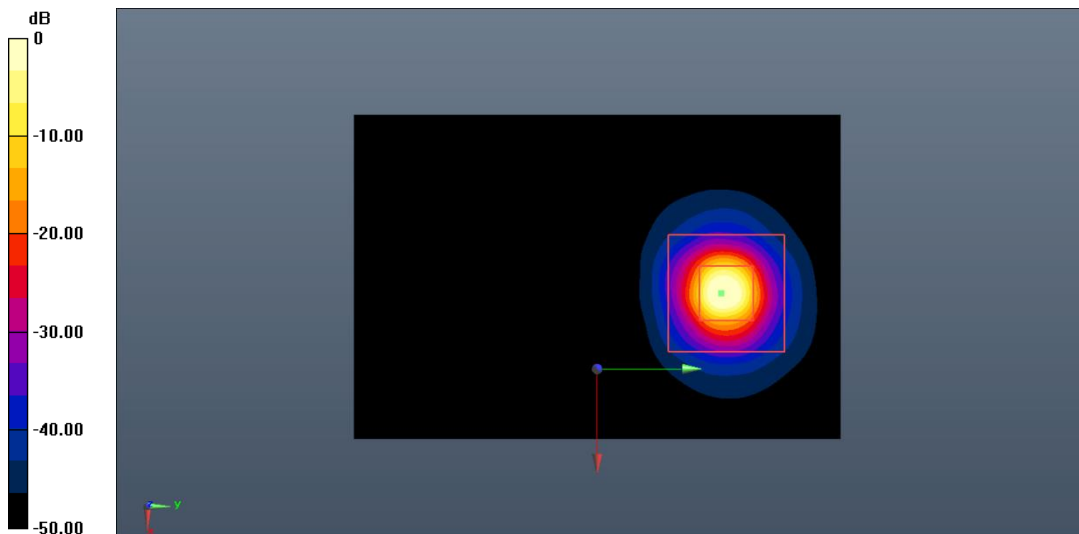
**System Validation/Zoom Scan (8x8x21)/Cube0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 65.983 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 30.4 W/kg

**SAR(1 g) = 7.87 W/kg; SAR(10 g) = 2.27 W/kg**

Maximum value of SAR (measured) = 18.6 W/kg



0 dB = 18.6 W/kg = 12.70 dB W/kg

**Fig.B.3. Validation 5600MHz 100mW**

**5750MHz**

Date: 2023-6-7

Electronics: DAE4 Sn786

Medium: Head 5750 MHz

Medium parameters used:  $f = 5750 \text{ MHz}$ ;  $\sigma = 5.122 \text{ S/m}$ ;  $\epsilon_r = 35.919$ ;  $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 5750 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (5.23, 5.23, 5.23)

**System Validation/Area Scan (61x91x1):** Interpolated grid:  $dx=1.000 \text{ mm}$ ,  $dy=1.000 \text{ mm}$

Reference Value = 64.244 V/m; Power Drift = -0.10 dB

**SAR(1 g) = 7.74 W/kg; SAR(10 g) = 2.18 W/kg**

Maximum value of SAR (interpolated) = 17.8 W/kg

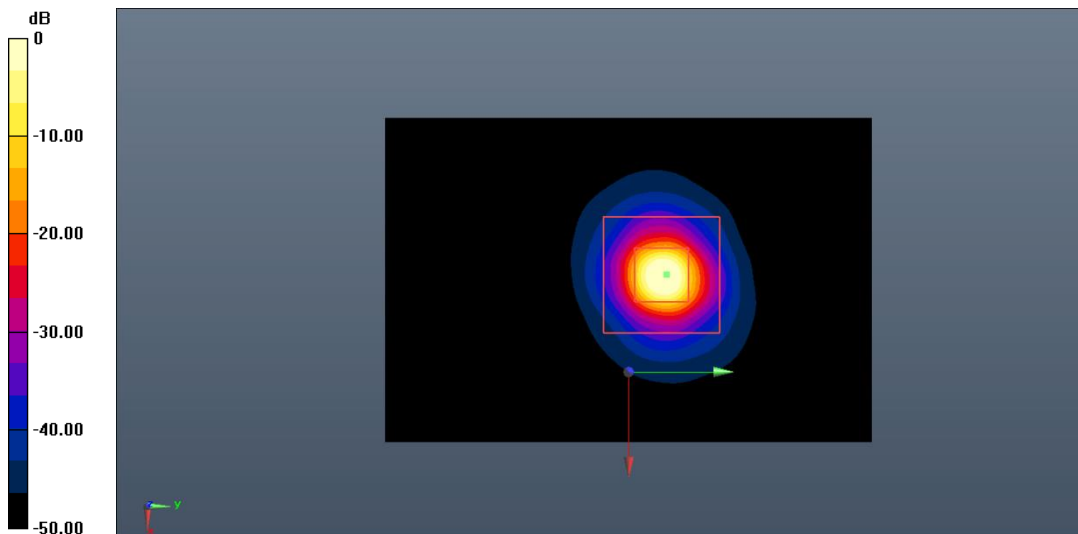
**System Validation/Zoom Scan (8x8x21)/Cube0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$

Reference Value = 64.244 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 28.6 W/kg

**SAR(1 g) = 7.51 W/kg; SAR(10 g) = 2.15 W/kg**

Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dB W/kg

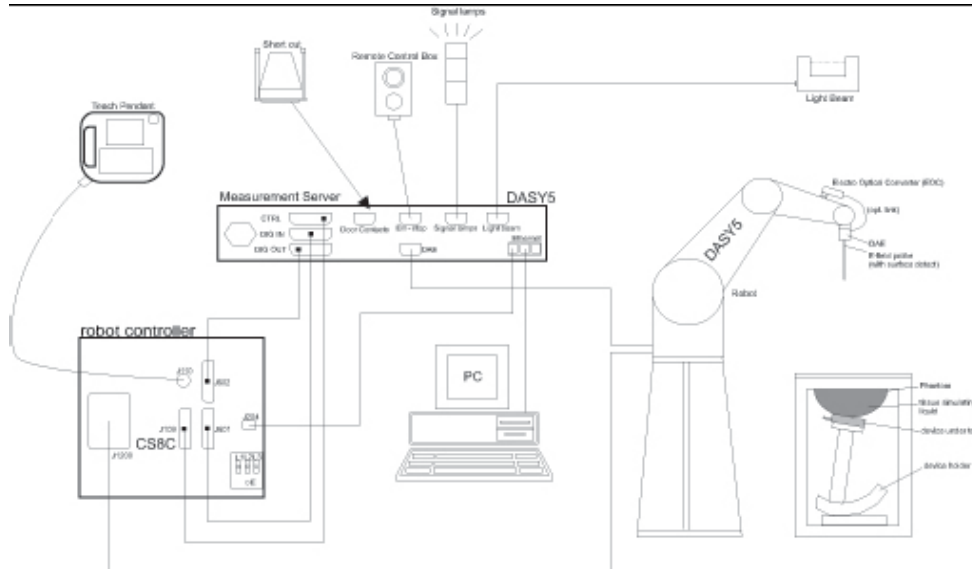
**Fig.B.4. Validation 5750MHz 100mW**



## ANNEX C: SAR Measurement Setup

### C.1. Measurement Set-up

DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture C.1 SAR Lab Test Measurement Set-up

- 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 WinXP 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.

## C.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection during a software approach and looks for the maximum using 2<sup>nd</sup> order curve fitting. The approach is stopped at reaching the maximum.

### Probe Specifications:

<b>Model:</b>	ES3DV3, EX3DV4
<b>Frequency</b>	10MHz — 6.0GHz(EX3DV4)
<b>Range:</b>	10MHz — 4GHz(ES3DV3)
<b>Calibration:</b>	In head and body simulating tissue at Frequencies from 835 up to 5800MHz
<b>Linearity:</b>	± 0.2 dB(30 MHz to 6 GHz) for EX3DV4 ± 0.2 dB(30 MHz to 4 GHz) for ES3DV3
<b>Dynamic Range:</b>	10 mW/kg — 100W/kg
<b>Probe Length:</b>	330 mm
<b>Probe Tip</b>	
<b>Length:</b>	20 mm
<b>Body Diameter:</b>	12 mm
<b>Tip Diameter:</b>	2.5 mm (3.9 mm for ES3DV3)
<b>Tip-Center:</b>	1 mm (2.0mm for ES3DV3)
<b>Application:</b>	SAR Dosimetry Testing Compliance tests of mobile phones Dosimetry in strong gradient fields



Picture C.2 Near-field Probe



Picture C.3 E-field Probe

### C.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm<sup>2</sup>) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equate to 1 mW/cm<sup>2</sup>.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

Where:

$\Delta t$  = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

$\Delta T$  = Temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

Where:

$\sigma$  = Simulated tissue conductivity,

$\rho$  = Tissue density (kg/m<sup>3</sup>).

## C.4. Other Test Equipment

### C.4.1. Data Acquisition Electronics (DAE)

The data acquisition electronics 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 the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



PictureC.4: DAE

### C.4.2. Robot

The SPEAG DASY system uses the high precision robots (DASY5: RX160L) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)



Picture C.5 DASY 5

#### C.4.3. Measurement Server

The Measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5:128MB), RAM (DASY5:128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.



Picture C.6 Server for DASY 5

#### C.4.4. Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of  $\pm 0.5\text{mm}$  would produce a SAR uncertainty of  $\pm 20\%$ . Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric

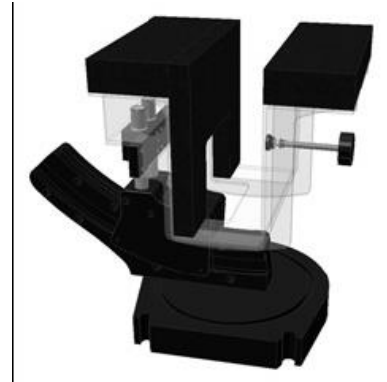
parameters: relative permittivity  $\epsilon = 3$  and loss tangent  $\delta = 0.02$ . The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.



**Picture C.7-1: Device Holder**



**Picture C.7-2: Laptop Extension Kit**

#### **C.4.5. Phantom**

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to represent the 90<sup>th</sup> percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness:  $2 \pm 0.2$  mm  
Filling Volume: Approx. 25 liters  
Dimensions: 810 x 1000 x 500 mm (H x L x W)  
Available: Special

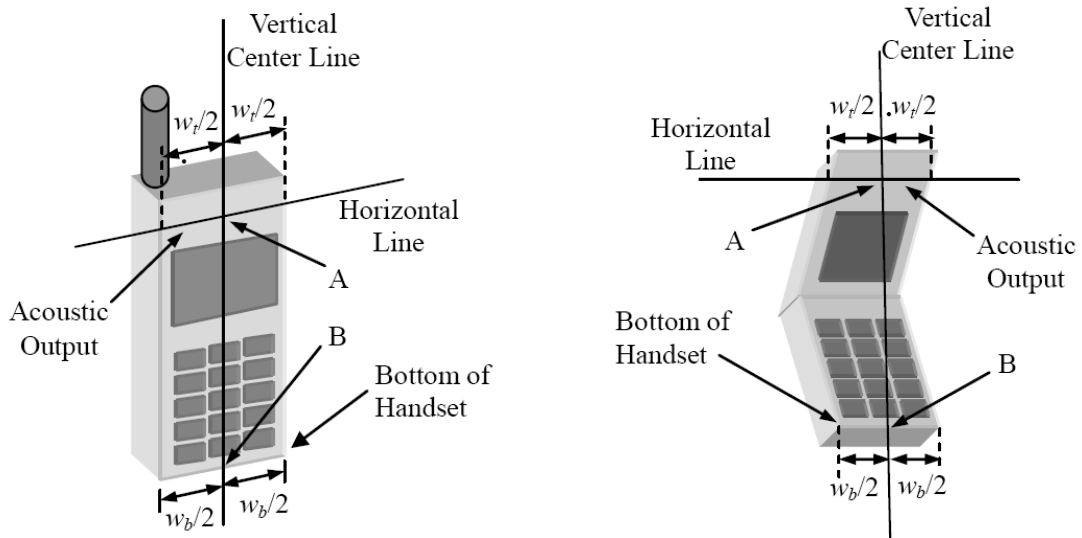


**Picture C.8: SAM Twin Phantom**

## ANNEX D: Position of the wireless device in relation to the phantom

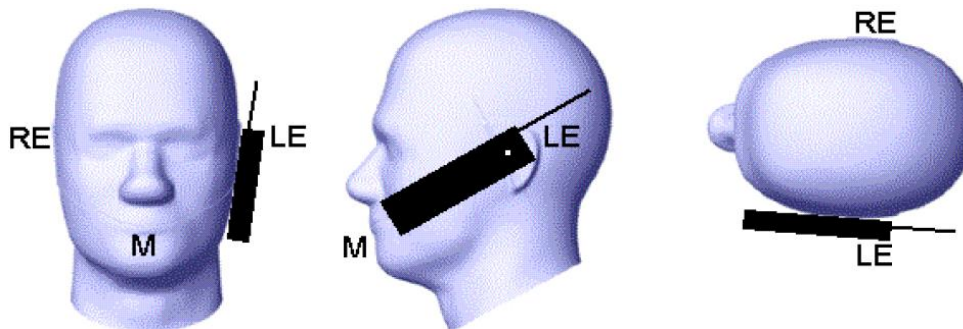
### D.1. General considerations

This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.

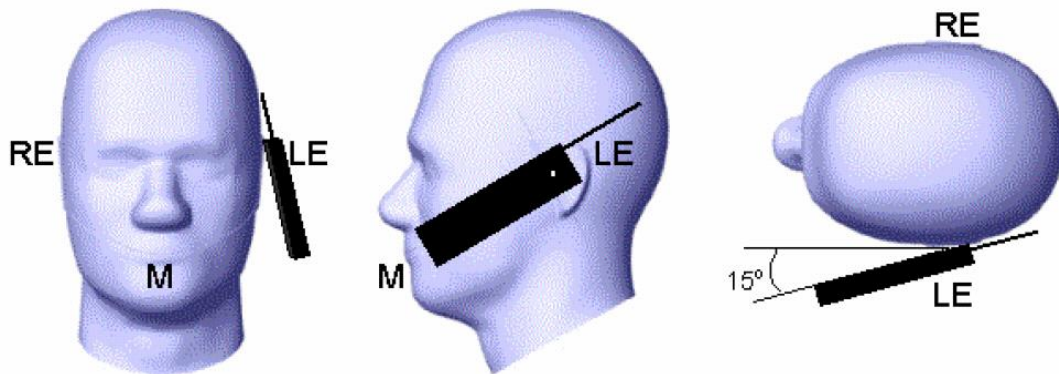


- $w_t$  Width of the handset at the level of the acoustic
- $w_b$  Width of the bottom of the handset
- A Midpoint of the width  $w_t$  of the handset at the level of the acoustic output
- B Midpoint of the width  $w_b$  of the bottom of the handset

Picture D.1-a Typical “fixed” case handset      Picture D.1-b Typical “clam-shell” case handset



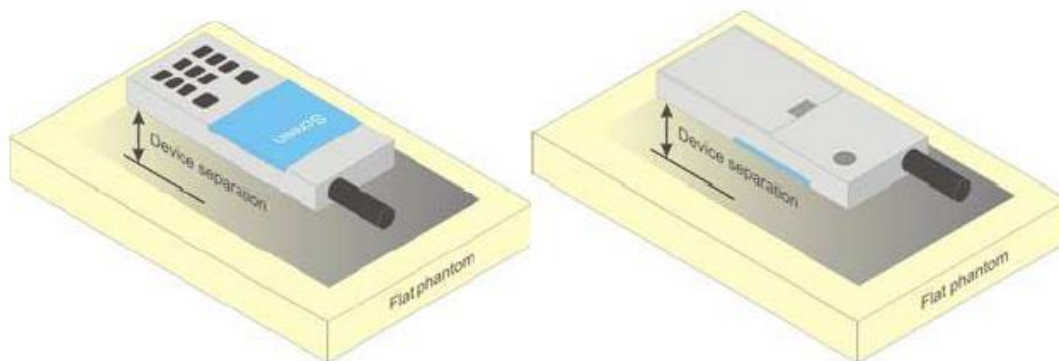
Picture D.2 Cheek position of the wireless device on the left side of SAM



Picture D.3 Tilt position of the wireless device on the left side of SAM

## D.2. Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.



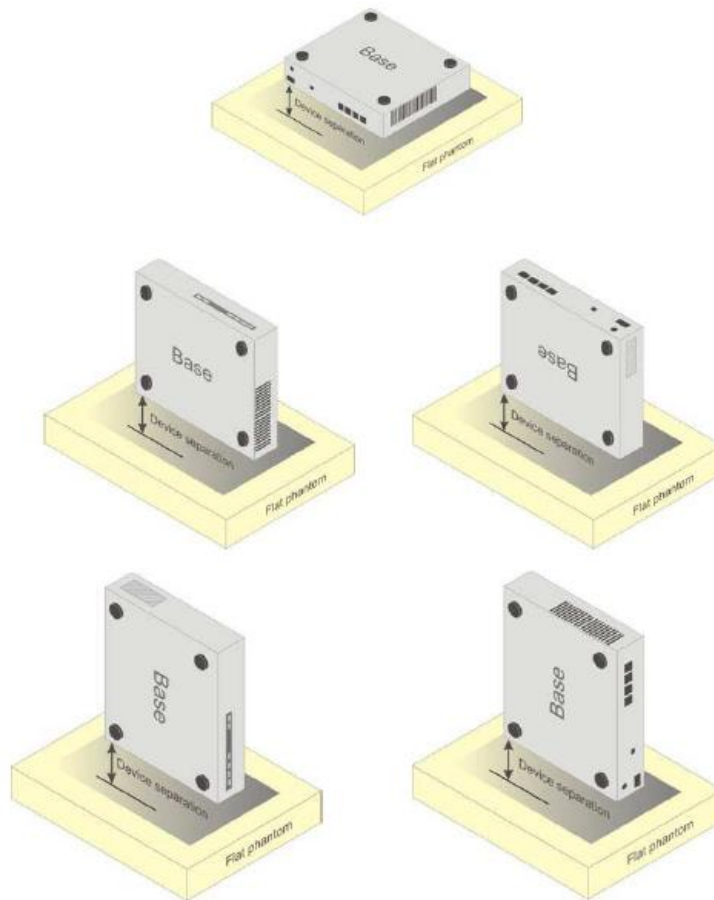
Picture D.4 Test positions for body-worn devices

## D.3. Desktop device

A typical example of a desktop device is a wireless enabled desktop computer placed on a table or desk when used.

The DUT shall be positioned at the distance and in the orientation to the phantom that corresponds to the intended use as specified by the manufacturer in the user instructions. For devices that employ an external antenna with variable positions, tests shall be performed for all antenna positions specified. Picture 8.5 show positions for desktop device SAR tests. If the intended use is not specified, the device shall be tested directly against the flat phantom.





Picture D.5 Test positions for desktop devices

#### D.4. DUT Setup Photos



Picture D.6

## ANNEX E: Equivalent Media Recipes

The liquid used for the frequency range of 700-6000 MHz consisted of water, sugar, salt, preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table E.1 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.

**Table E.1: Composition of the Tissue Equivalent Matter**

Frequency (MHz)	835	1750	1900	2450	2600	5200	5800
Water	41.45	55.242	55.242	58.79	58.79	65.53	66.10
Sugar	56.0	/	/	/	/	/	/
Salt	1.45	0.306	0.306	0.06	0.06		
Preventol	0.1	/	/	/	/	17.24	16.95
Cellulose	1.0	/	/	/	/	17.24	16.95
Glycol Monobutyl	/	44.452	44.452	41.15	41.15	/	/
Diethylenglycol monohexylether	/	/	/	/	/	/	/
Triton X-100	/	/	/	/	/	/	/
Dielectric Parameters Target Value	$\epsilon=41.5$ $\sigma=0.90$	$\epsilon=40.08$ $\sigma=1.37$	$\epsilon=40.0$ $\sigma=1.40$	$\epsilon=39.20$ $\sigma=1.80$	$\epsilon=39.01$ $\sigma=1.96$	$\epsilon=35.99$ $\sigma=4.66$	$\epsilon=35.30$ $\sigma=5.27$

**Note: There is a little adjustment respectively for 750, 5300 and 5600, based on the recipe of closest frequency in table E.1**

## ANNEX F: System Validation

The SAR system must be validated against its performance specifications before it is deployed. When SAR probes, system components or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such components.

**Table F.1: System Validation**

Probe SN.	Liquid name (MHz)	Validation date	Frequency point	CW Validation	Modulation Signal Validation		
					Modulation Type	Duty Factor	PAR
7683	Head 750	2023-02-20	750MHz	Pass	N/A	N/A	N/A
7683	Head 835	2023-02-20	835MHz	Pass	GMSK	Pass	N/A
7683	Head 1750	2023-02-20	1750MHz	Pass	N/A	N/A	N/A
7683	Head 1900	2023-02-20	1900MHz	Pass	GMSK	Pass	N/A
7683	Head 2450	2023-02-22	2450MHz	Pass	OFDM/TDD	Pass	Pass
7683	Head 2550	2023-02-20	2550MHz	Pass	TDD	Pass	N/A
7683	Head 3500	2023-02-21	3500MHz	Pass	TDD	Pass	N/A
7683	Head 3700	2023-02-21	3700MHz	Pass	TDD	Pass	N/A
7683	Head 3900	2023-02-21	3900MHz	Pass	TDD	Pass	N/A
7683	Head 5250	2023-02-22	5250MHz	Pass	OFDM	N/A	Pass
7683	Head 5600	2023-02-22	5600MHz	Pass	OFDM	N/A	Pass
7683	Head 5750	2023-02-22	5750MHz	Pass	OFDM	N/A	Pass

**ANNEX G: DAE Calibration Certificate**

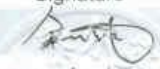

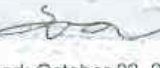


Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China  
 Tel: +86-10-62304633-2117  
 E-mail: emf@caict.ac.cn <http://www.caict.ac.cn>



Client : SAICT

Certificate No: Z22-60439

CALIBRATION CERTIFICATE			
Object	DAE4 - SN: 786		
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)		
Calibration date:	September 29, 2022		
<p>This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity&lt;70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p>			
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	14-Jun-22 (CTTL, No.J22X04180)	Jun-23
Calibrated by:	Name	Function	Signature
	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	
			Issued: October 02, 2022
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



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**Glossary:**

DAE data acquisition electronics  
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

**Methods Applied and Interpretation of Parameters:**

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.



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 E-mail: emf@caict.ac.cn <http://www.caict.ac.cn>

**DC Voltage Measurement**

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV  
 Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.121 ± 0.15% (k=2)	404.267 ± 0.15% (k=2)	404.668 ± 0.15% (k=2)
Low Range	3.97160 ± 0.7% (k=2)	3.97314 ± 0.7% (k=2)	3.95725 ± 0.7% (k=2)

**Connector Angle**

Connector Angle to be used in DASY system	228.5° ± 1 °
---	--------------

## ANNEX H: Probe Calibration Certificate



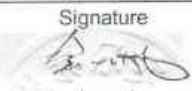

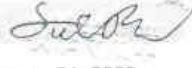
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 CNAS L0570

Client **SAICT**

Certificate No: **Z23-60028**

CALIBRATION CERTIFICATE			
Object	EX3DV4 - SN : 7683		
Calibration Procedure(s)	FF-Z11-004-02 Calibration Procedures for Dosimetric E-field Probes		
Calibration date:	February 16, 2023.		
<p>This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility; environment temperature(22±3)°C and humidity&lt;70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p>			
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101547	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101548	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Reference 10dBAttenuator	18N50W-10dB	19-Jan-23(CTTL, No.J23X00212)	Jan-25
Reference 20dBAttenuator	18N50W-20dB	19-Jan-23(CTTL, No.J23X00211)	Jan-25
Reference Probe EX3DV4	SN 3846	20-May-22(SPEAG, No.EX3-3846_May22)	May-23
DAE4	SN 771	20-Jan-22(SPEAG, No.DAE4-771_Jan22)	Jan-23
DAE4	SN 1555	25-Aug-22(SPEAG, No.DAE4-1555_Aug22)	Aug-23
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGenerator MG3700A	6201052605	14-Jun-22(CTTL, No.J22X04182)	Jun-23
Network Analyzer E5071C	MY46110673	10-Jan-23(CTTL, No.J23X00104)	Jan-24
	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	
Issued: February 21, 2023			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: Z23-60028

Page 1 of 22



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#### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization $\Phi$	$\Phi$ rotation around probe axis
Polarization $\theta$	$\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), $i$ $\theta=0$ is normal to probe axis

Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

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

- 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
- 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
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Methods Applied and Interpretation of Parameters:

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



**DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7683**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm( $\mu\text{V}/(\text{V/m})^2$ ) <sup>A</sup>	0.63	0.63	0.62	±10.0%
DCP(mV) <sup>B</sup>	103.7	104.8	104.6	

**Calibration Results for Modulation Response**

UID	Communication System Name		A dB	B dB· $\mu\text{V}$	C	D dB	VR mV	Max Dev.	Max Unc <sup>E</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	207.3	±2.1%	±4.7%
		Y	0.0	0.0	1.0		206.5		
		Z	0.0	0.0	1.0		208.9		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.41	60.00	5.76	10.00	60	±2.1%	±9.6%
		Y	1.40	60.00	5.71		60		
		Z	1.40	60.00	5.74		60		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	6.00	68.00	7.00	6.99	80	±2.7%	±9.6%
		Y	6.00	68.00	7.00		80		
		Z	0.80	60.00	4.57		80		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.17	139.32	0.54	3.98	95	±2.3%	±9.6%
		Y	0.18	142.45	0.34		95		
		Z	0.39	152.48	0.68		95		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	8.34	159.94	4.53	2.22	120	±1.3%	±9.6%
		Y	6.71	159.96	17.92		120		
		Z	9.39	159.08	22.96		120		
10387-AAA	QPSK Waveform, 1 MHz	X	0.54	62.14	10.35	1.00	150	±4.5%	±9.6%
		Y	0.69	64.27	11.73		150		
		Z	0.65	64.12	11.72		150		
10388-AAA	QPSK Waveform, 10 MHz	X	1.29	64.42	12.76	0.00	150	±1.5%	±9.6%
		Y	1.44	65.67	13.79		150		
		Z	1.42	65.70	13.74		150		
10396-AAA	64-QAM Waveform, 100 kHz	X	1.75	65.11	16.63	3.01	150	±1.1%	±9.6%
		Y	1.85	66.39	17.86		150		
		Z	1.81	65.99	17.68		150		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	3.99	66.17	15.25	0.00	150	±4.7%	±9.6%
		Y	4.14	66.41	15.55		150		
		Z	4.12	66.53	15.58		150		

Note: For details on UID parameters see Appendix

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

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

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

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



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## DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7683

### Sensor Model Parameters

	C1 fF	C2 fF	$\alpha$ V <sup>-1</sup>	T1 ms.V <sup>-2</sup>	T2 ms.V <sup>-1</sup>	T3 ms	T4 V <sup>-2</sup>	T5 V <sup>-1</sup>	T6
X	11.17	81.84	33.99	2.45	0.00	4.90	0.33	0.00	1.01
Y	12.84	94.42	34.34	2.69	0.00	4.90	0.30	0.00	1.02
Z	12.01	88.21	34.28	3.18	0.00	4.90	0.21	0.00	1.02

### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	156.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

## DASY/EASY – Parameters of Probe: EX3DV4 – SN:7683

### Calibration Parameter Determined in Head Tissue Simulating Media

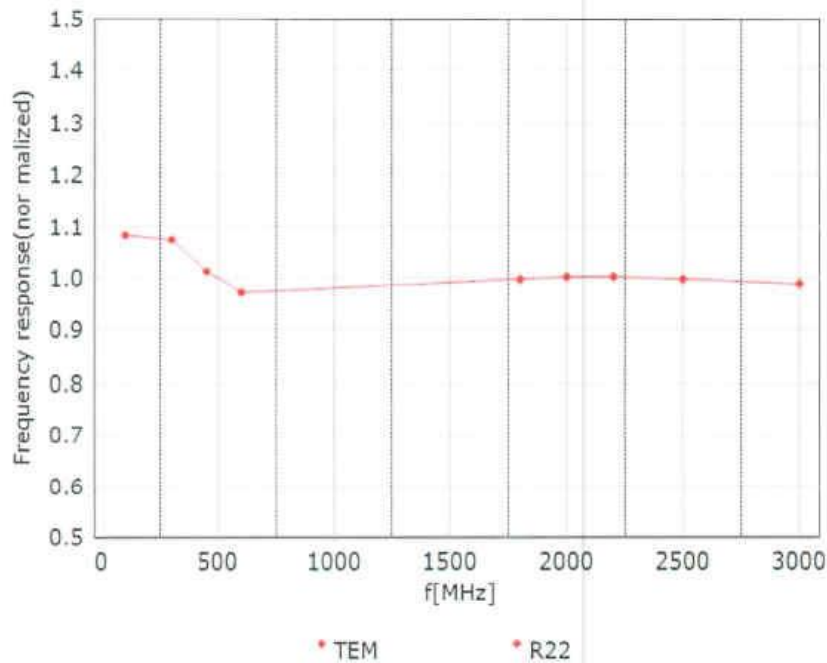
f [MHz] <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)
750	41.9	0.89	10.75	10.75	10.75	0.11	1.60	± 12.7%
900	41.5	0.97	10.28	10.28	10.28	0.17	1.26	± 12.7%
1640	40.3	1.29	9.01	9.01	9.01	0.19	1.12	± 12.7%
1750	40.1	1.37	8.81	8.81	8.81	0.18	1.18	± 12.7%
1900	40.0	1.40	8.55	8.55	8.55	0.24	1.02	± 12.7%
2100	39.8	1.49	8.65	8.65	8.65	0.21	1.08	± 12.7%
2300	39.5	1.67	8.30	8.30	8.30	0.66	0.67	± 12.7%
2450	39.2	1.80	8.02	8.02	8.02	0.66	0.68	± 12.7%
2600	39.0	1.96	7.76	7.76	7.76	0.55	0.75	± 12.7%
3300	38.2	2.71	7.49	7.49	7.49	0.30	1.03	± 13.9%
3500	37.9	2.91	7.34	7.34	7.34	0.31	1.04	± 13.9%
3700	37.7	3.12	7.09	7.09	7.09	0.30	1.06	± 13.9%
3900	37.5	3.32	6.95	6.95	6.95	0.30	1.45	± 13.9%
4100	37.2	3.53	6.91	6.91	6.91	0.30	1.40	± 13.9%
4400	36.9	3.84	6.74	6.74	6.74	0.30	1.50	± 13.9%
4600	36.7	4.04	6.66	6.66	6.66	0.40	1.33	± 13.9%
4800	36.4	4.25	6.58	6.58	6.58	0.40	1.38	± 13.9%
4950	36.3	4.40	6.36	6.36	6.36	0.40	1.35	± 13.9%
5250	35.9	4.71	5.72	5.72	5.72	0.45	1.32	± 13.9%
5600	35.5	5.07	5.13	5.13	5.13	0.40	1.60	± 13.9%
5750	35.4	5.22	5.23	5.23	5.23	0.45	1.40	± 13.9%

<sup>C</sup> Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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.

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

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the 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)

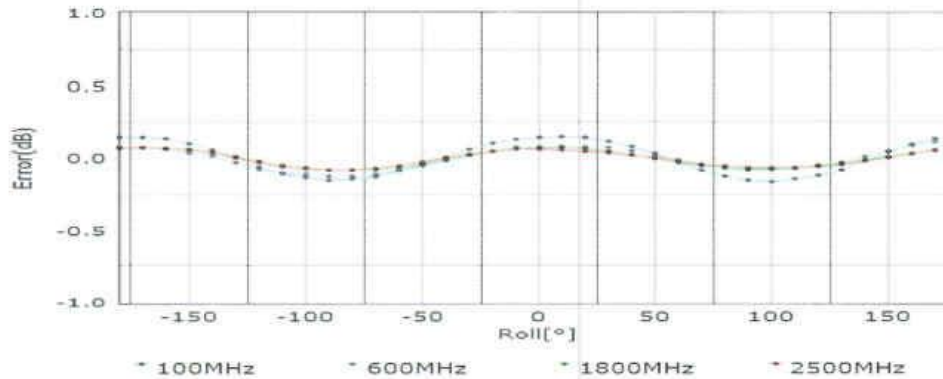
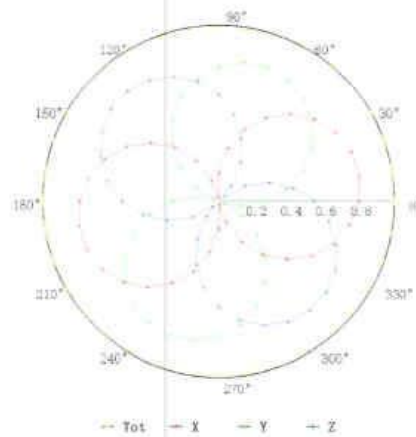
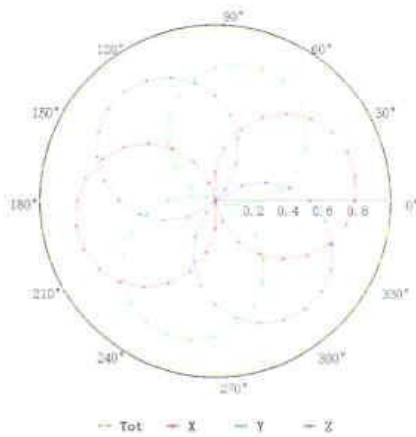


Uncertainty of Frequency Response of E-field:  $\pm 7.4\%$  ( $k=2$ )

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

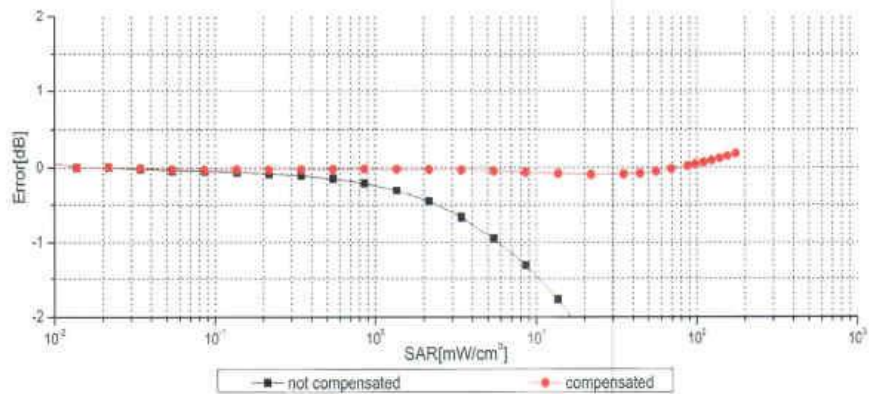
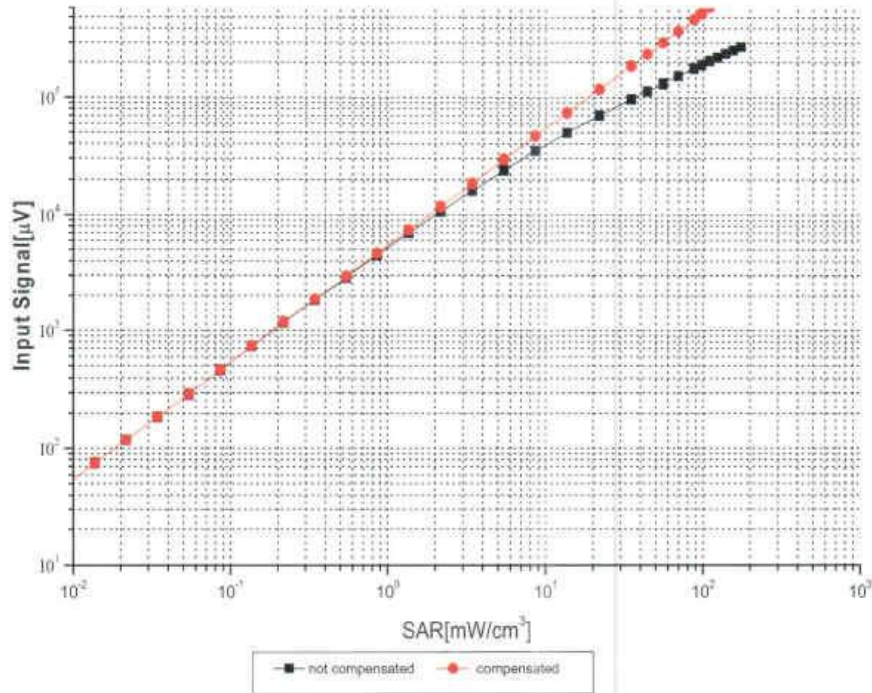
**f=600 MHz, TEM**

**f=1800 MHz, R22**



Uncertainty of Axial Isotropy Assessment:  $\pm 1.2\%$  ( $k=2$ )

### Dynamic Range f(SAR<sub>head</sub>) (TEM cell, f = 900 MHz)

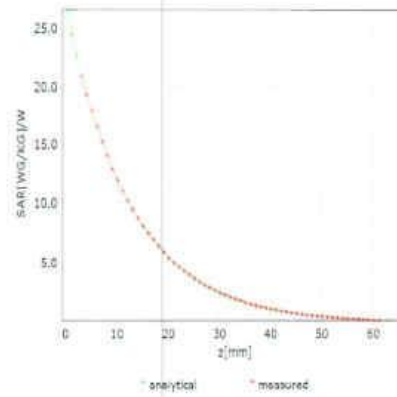
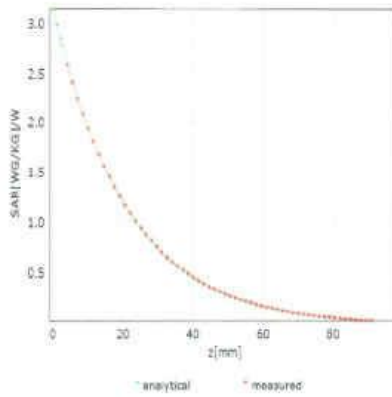


Uncertainty of Linearity Assessment: ±0.9% (k=2)

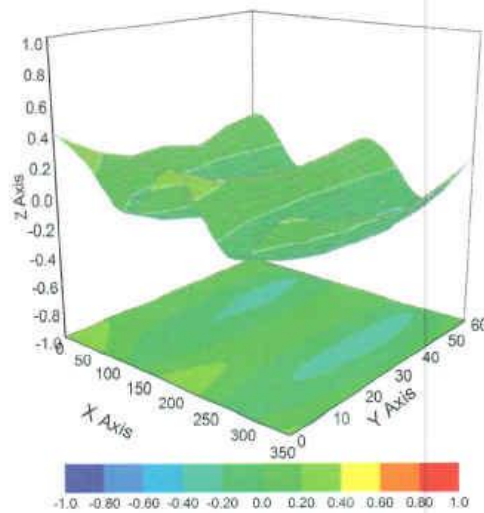
### Conversion Factor Assessment

f=750 MHz,WGLS R9(H\_convF)

f=1750 MHz,WGLS R22(H\_convF)



### Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment:  $\pm 3.2\%$  ( $k=2$ )



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**Appendix: Modulation Calibration Parameters**

UID	Rev	Communication System Name	Group	PAR (dB)	UncE (k=2)
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.8 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAC	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	DAC	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %



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10102	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	DAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10114	CAG	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAG	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAG	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAG	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10151	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAF	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
10161	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10162	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10171	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10178	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	AAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10181	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10182	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAI	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %



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Table with 6 columns: ID, Code, Standard, Modulation, Test Method, and Result. It lists various LTE and UMTS test cases with their corresponding modulation schemes and measured values with error percentages.



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10269	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6 %
10275	CAD	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAD	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAD	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAG	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	CAG	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	CAG	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	CAG	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	CAG	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	CAG	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %
10300	CAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	CAC	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WIMAX	12.03	± 9.6 %
10302	CAB	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3CTRL)	WIMAX	12.57	± 9.6 %
10303	CAB	IEEE 802.16e WIMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	12.52	± 9.6 %
10304	CAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	11.86	± 9.6 %
10305	CAA	IEEE 802.16e WIMAX (31:15, 10ms, 10MHz, 64QAM, PUSC)	WIMAX	15.24	± 9.6 %
10306	CAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 64QAM, PUSC)	WIMAX	14.67	± 9.6 %
10307	AAB	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, PUSC)	WIMAX	14.49	± 9.6 %
10308	AAB	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WIMAX	14.46	± 9.6 %
10309	AAB	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3)	WIMAX	14.58	± 9.6 %
10310	AAB	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3)	WIMAX	14.57	± 9.6 %
10311	AAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	± 9.6 %
10313	AAD	IDEN 1:3	IDEN	10.51	± 9.6 %
10314	AAD	IDEN 1:6	IDEN	13.48	± 9.6 %
10315	AAD	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc dc)	WLAN	1.71	± 9.6 %
10316	AAD	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc dc)	WLAN	8.36	± 9.6 %
10317	AAA	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc dc)	WLAN	8.36	± 9.6 %
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	± 9.6 %
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	± 9.6 %
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	± 9.6 %
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	± 9.6 %
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	± 9.6 %
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	± 9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	± 9.6 %
10396	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	± 9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	± 9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc dc)	WLAN	8.37	± 9.6 %
10401	AAA	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc dc)	WLAN	8.60	± 9.6 %
10402	AAA	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc dc)	WLAN	8.53	± 9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	± 9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	± 9.6 %
10406	AAD	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	± 9.6 %
10410	AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	± 9.6 %
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc dc)	WLAN	1.54	± 9.6 %
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10417	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Long)	WLAN	8.14	± 9.6 %
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc, Short)	WLAN	8.19	± 9.6 %
10422	AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	± 9.6 %
10423	AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	± 9.6 %
10424	AAE	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	± 9.6 %
10425	AAE	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	± 9.6 %
10426	AAE	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	± 9.6 %



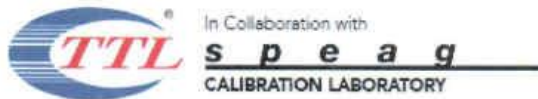
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Table with 6 columns: ID, Code, Test Method, Standard, Result, and Error. Rows include various wireless communication tests like IEEE 802.11n, LTE-FDD, LTE-TDD, W-CDMA, and CDMA2000.



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10503	AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.72	± 9.6 %
10504	AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	± 9.6 %
10505	AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	± 9.6 %
10506	AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10507	AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.36	± 9.6 %
10508	AAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	± 9.6 %
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.99	± 9.6 %
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.49	± 9.6 %
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.51	± 9.6 %
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.74	± 9.6 %
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.42	± 9.6 %
10514	AAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	± 9.6 %
10515	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc dc)	WLAN	1.58	± 9.6 %
10516	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc dc)	WLAN	1.57	± 9.6 %
10517	AAF	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc dc)	WLAN	1.58	± 9.6 %
10518	AAF	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc dc)	WLAN	8.23	± 9.6 %
10519	AAF	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc dc)	WLAN	8.39	± 9.6 %
10520	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc dc)	WLAN	8.12	± 9.6 %
10521	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc dc)	WLAN	7.97	± 9.6 %
10522	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc dc)	WLAN	8.45	± 9.6 %
10523	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc dc)	WLAN	8.08	± 9.6 %
10524	AAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc dc)	WLAN	8.27	± 9.6 %
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.36	± 9.6 %
10526	AAF	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.42	± 9.6 %
10527	AAF	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc)	WLAN	8.21	± 9.6 %
10528	AAF	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc)	WLAN	8.36	± 9.6 %
10529	AAF	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc)	WLAN	8.36	± 9.6 %
10531	AAF	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc)	WLAN	8.43	± 9.6 %
10532	AAF	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc)	WLAN	8.29	± 9.6 %
10533	AAE	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc)	WLAN	8.38	± 9.6 %
10534	AAE	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc)	WLAN	8.45	± 9.6 %
10535	AAE	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc)	WLAN	8.45	± 9.6 %
10536	AAF	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc)	WLAN	8.32	± 9.6 %
10537	AAF	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc)	WLAN	8.44	± 9.6 %
10538	AAF	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc)	WLAN	8.54	± 9.6 %
10540	AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc dc)	WLAN	8.39	± 9.6 %
10541	AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc)	WLAN	8.46	± 9.6 %
10542	AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.65	± 9.6 %
10543	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc dc)	WLAN	8.65	± 9.6 %
10544	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc dc)	WLAN	8.47	± 9.6 %
10545	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc dc)	WLAN	8.55	± 9.6 %
10546	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc dc)	WLAN	8.35	± 9.6 %
10547	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc)	WLAN	8.49	± 9.6 %
10548	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc dc)	WLAN	8.37	± 9.6 %
10550	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc dc)	WLAN	8.38	± 9.6 %
10551	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc dc)	WLAN	8.50	± 9.6 %
10552	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc dc)	WLAN	8.42	± 9.6 %
10553	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc dc)	WLAN	8.45	± 9.6 %
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc dc)	WLAN	8.48	± 9.6 %
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc dc)	WLAN	8.47	± 9.6 %
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc dc)	WLAN	8.50	± 9.6 %
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc dc)	WLAN	8.52	± 9.6 %
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc dc)	WLAN	8.61	± 9.6 %
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc dc)	WLAN	8.73	± 9.6 %
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc dc)	WLAN	8.56	± 9.6 %
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc dc)	WLAN	8.69	± 9.6 %
10563	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc dc)	WLAN	8.77	± 9.6 %
10564	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc dc)	WLAN	8.25	± 9.6 %
10565	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc dc)	WLAN	8.45	± 9.6 %



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10566	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc dc)	WLAN	8.13	±9.6 %
10567	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc dc)	WLAN	8.00	±9.6 %
10568	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc dc)	WLAN	8.37	±9.6 %
10569	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc dc)	WLAN	8.10	±9.6 %
10570	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc dc)	WLAN	8.30	±9.6 %
10571	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc dc)	WLAN	1.99	±9.6 %
10572	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc dc)	WLAN	1.99	±9.6 %
10573	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc dc)	WLAN	1.98	±9.6 %
10574	AAC	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc dc)	WLAN	1.98	±9.6 %
10575	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc dc)	WLAN	8.59	±9.6 %
10576	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc dc)	WLAN	8.60	±9.6 %
10577	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	±9.6 %
10578	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	±9.6 %
10579	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	±9.6 %
10580	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc dc)	WLAN	8.76	±9.6 %
10581	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	±9.6 %
10582	AAD	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	±9.6 %
10583	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc dc)	WLAN	8.59	±9.6 %
10584	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc dc)	WLAN	8.60	±9.6 %
10585	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc dc)	WLAN	8.70	±9.6 %
10586	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc dc)	WLAN	8.49	±9.6 %
10587	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc dc)	WLAN	8.36	±9.6 %
10588	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc dc)	WLAN	8.76	±9.6 %
10589	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc dc)	WLAN	8.35	±9.6 %
10590	AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc dc)	WLAN	8.67	±9.6 %
10591	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc dc)	WLAN	8.63	±9.6 %
10592	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc dc)	WLAN	8.79	±9.6 %
10593	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc dc)	WLAN	8.64	±9.6 %
10594	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc dc)	WLAN	8.74	±9.6 %
10595	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc dc)	WLAN	8.74	±9.6 %
10596	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc dc)	WLAN	8.71	±9.6 %
10597	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc dc)	WLAN	8.72	±9.6 %
10598	AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc dc)	WLAN	8.50	±9.6 %
10599	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc dc)	WLAN	8.79	±9.6 %
10600	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc dc)	WLAN	8.88	±9.6 %
10601	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc dc)	WLAN	8.82	±9.6 %
10602	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc dc)	WLAN	8.94	±9.6 %
10603	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc dc)	WLAN	9.03	±9.6 %
10604	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc dc)	WLAN	8.76	±9.6 %
10605	AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc dc)	WLAN	8.97	±9.6 %
10606	AAC	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc dc)	WLAN	8.82	±9.6 %
10607	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc dc)	WLAN	8.64	±9.6 %
10608	AAC	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc dc)	WLAN	8.77	±9.6 %
10609	AAC	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc dc)	WLAN	8.57	±9.6 %
10610	AAC	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc dc)	WLAN	8.78	±9.6 %
10611	AAC	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc dc)	WLAN	8.70	±9.6 %
10612	AAC	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc dc)	WLAN	8.77	±9.6 %
10613	AAC	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc dc)	WLAN	8.94	±9.6 %
10614	AAC	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc dc)	WLAN	8.59	±9.6 %
10615	AAC	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc dc)	WLAN	8.82	±9.6 %
10616	AAC	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc dc)	WLAN	8.82	±9.6 %
10617	AAC	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc dc)	WLAN	8.81	±9.6 %
10618	AAC	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc dc)	WLAN	8.58	±9.6 %
10619	AAC	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc dc)	WLAN	8.86	±9.6 %
10620	AAC	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc dc)	WLAN	8.87	±9.6 %
10621	AAC	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc dc)	WLAN	8.77	±9.6 %
10622	AAC	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc dc)	WLAN	8.68	±9.6 %
10623	AAC	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc dc)	WLAN	8.82	±9.6 %
10624	AAC	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc dc)	WLAN	8.96	±9.6 %



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10625	AAC	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc dc)	WLAN	8.96	± 9.6 %
10626	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10627	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc dc)	WLAN	8.88	± 9.6 %
10628	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc dc)	WLAN	8.71	± 9.6 %
10629	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10630	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc dc)	WLAN	8.72	± 9.6 %
10631	AAC	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc dc)	WLAN	8.81	± 9.6 %
10632	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc dc)	WLAN	8.74	± 9.6 %
10633	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc dc)	WLAN	8.83	± 9.6 %
10634	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc dc)	WLAN	8.80	± 9.6 %
10635	AAC	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc dc)	WLAN	8.81	± 9.6 %
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc dc)	WLAN	8.83	± 9.6 %
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc dc)	WLAN	8.79	± 9.6 %
10638	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc dc)	WLAN	8.86	± 9.6 %
10639	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc dc)	WLAN	8.85	± 9.6 %
10640	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc dc)	WLAN	8.98	± 9.6 %
10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc dc)	WLAN	9.06	± 9.6 %
10642	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc dc)	WLAN	9.06	± 9.6 %
10643	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc dc)	WLAN	8.89	± 9.6 %
10644	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc dc)	WLAN	9.05	± 9.6 %
10645	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc dc)	WLAN	9.11	± 9.6 %
10646	AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.96	± 9.6 %
10647	AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Sub=2,7)	LTE-TDD	11.96	± 9.6 %
10648	AAC	CDMA2000 (1x Advanced)	CDMA2000	3.45	± 9.6 %
10652	AAC	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	± 9.6 %
10653	AAC	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	± 9.6 %
10654	AAC	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	± 9.6 %
10655	AAC	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6 %
10658	AAC	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
10659	AAC	Pulse Waveform (200Hz, 20%)	Test	6.99	± 9.6 %
10660	AAC	Pulse Waveform (200Hz, 40%)	Test	3.98	± 9.6 %
10661	AAC	Pulse Waveform (200Hz, 60%)	Test	2.22	± 9.6 %
10662	AAC	Pulse Waveform (200Hz, 80%)	Test	0.97	± 9.6 %
10670	AAC	Bluetooth Low Energy	Bluetooth	2.19	± 9.6 %
10671	AAD	IEEE 802.11ax (20MHz, MCS0, 90pc dc)	WLAN	9.09	± 9.6 %
10672	AAD	IEEE 802.11ax (20MHz, MCS1, 90pc dc)	WLAN	8.57	± 9.6 %
10673	AAD	IEEE 802.11ax (20MHz, MCS2, 90pc dc)	WLAN	8.78	± 9.6 %
10674	AAD	IEEE 802.11ax (20MHz, MCS3, 90pc dc)	WLAN	8.74	± 9.6 %
10675	AAD	IEEE 802.11ax (20MHz, MCS4, 90pc dc)	WLAN	8.90	± 9.6 %
10676	AAD	IEEE 802.11ax (20MHz, MCS5, 90pc dc)	WLAN	8.77	± 9.6 %
10677	AAD	IEEE 802.11ax (20MHz, MCS6, 90pc dc)	WLAN	8.73	± 9.6 %
10678	AAD	IEEE 802.11ax (20MHz, MCS7, 90pc dc)	WLAN	8.78	± 9.6 %
10679	AAD	IEEE 802.11ax (20MHz, MCS8, 90pc dc)	WLAN	8.89	± 9.6 %
10680	AAD	IEEE 802.11ax (20MHz, MCS9, 90pc dc)	WLAN	8.80	± 9.6 %
10681	AAG	IEEE 802.11ax (20MHz, MCS10, 90pc dc)	WLAN	8.62	± 9.6 %
10682	AAF	IEEE 802.11ax (20MHz, MCS11, 90pc dc)	WLAN	8.83	± 9.6 %
10683	AAA	IEEE 802.11ax (20MHz, MCS0, 99pc dc)	WLAN	8.42	± 9.6 %
10684	AAC	IEEE 802.11ax (20MHz, MCS1, 99pc dc)	WLAN	8.26	± 9.6 %
10685	AAC	IEEE 802.11ax (20MHz, MCS2, 99pc dc)	WLAN	8.33	± 9.6 %
10686	AAC	IEEE 802.11ax (20MHz, MCS3, 99pc dc)	WLAN	8.28	± 9.6 %
10687	AAE	IEEE 802.11ax (20MHz, MCS4, 99pc dc)	WLAN	8.45	± 9.6 %
10688	AAE	IEEE 802.11ax (20MHz, MCS5, 99pc dc)	WLAN	8.29	± 9.6 %
10689	AAD	IEEE 802.11ax (20MHz, MCS6, 99pc dc)	WLAN	8.55	± 9.6 %
10690	AAE	IEEE 802.11ax (20MHz, MCS7, 99pc dc)	WLAN	8.29	± 9.6 %
10691	AAB	IEEE 802.11ax (20MHz, MCS8, 99pc dc)	WLAN	8.25	± 9.6 %
10692	AAA	IEEE 802.11ax (20MHz, MCS9, 99pc dc)	WLAN	8.29	± 9.6 %
10693	AAA	IEEE 802.11ax (20MHz, MCS10, 99pc dc)	WLAN	8.25	± 9.6 %
10694	AAA	IEEE 802.11ax (20MHz, MCS11, 99pc dc)	WLAN	8.57	± 9.6 %
10695	AAA	IEEE 802.11ax (40MHz, MCS0, 90pc dc)	WLAN	8.78	± 9.6 %



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10696	AAA	IEEE 802.11ax (40MHz, MCS1, 90pc dc)	WLAN	8.91	±9.6 %
10697	AAA	IEEE 802.11ax (40MHz, MCS2, 90pc dc)	WLAN	8.61	±9.6 %
10698	AAA	IEEE 802.11ax (40MHz, MCS3, 90pc dc)	WLAN	8.89	±9.6 %
10699	AAA	IEEE 802.11ax (40MHz, MCS4, 90pc dc)	WLAN	8.82	±9.6 %
10700	AAA	IEEE 802.11ax (40MHz, MCS5, 90pc dc)	WLAN	8.73	±9.6 %
10701	AAA	IEEE 802.11ax (40MHz, MCS6, 90pc dc)	WLAN	8.86	±9.6 %
10702	AAA	IEEE 802.11ax (40MHz, MCS7, 90pc dc)	WLAN	8.70	±9.6 %
10703	AAA	IEEE 802.11ax (40MHz, MCS8, 90pc dc)	WLAN	8.82	±9.6 %
10704	AAA	IEEE 802.11ax (40MHz, MCS9, 90pc dc)	WLAN	8.56	±9.6 %
10705	AAA	IEEE 802.11ax (40MHz, MCS10, 90pc dc)	WLAN	8.69	±9.6 %
10706	AAC	IEEE 802.11ax (40MHz, MCS11, 90pc dc)	WLAN	8.66	±9.6 %
10707	AAC	IEEE 802.11ax (40MHz, MCS0, 99pc dc)	WLAN	8.32	±9.6 %
10708	AAC	IEEE 802.11ax (40MHz, MCS1, 99pc dc)	WLAN	8.55	±9.6 %
10709	AAC	IEEE 802.11ax (40MHz, MCS2, 99pc dc)	WLAN	8.33	±9.6 %
10710	AAC	IEEE 802.11ax (40MHz, MCS3, 99pc dc)	WLAN	8.29	±9.6 %
10711	AAC	IEEE 802.11ax (40MHz, MCS4, 99pc dc)	WLAN	8.39	±9.6 %
10712	AAC	IEEE 802.11ax (40MHz, MCS5, 99pc dc)	WLAN	8.67	±9.6 %
10713	AAC	IEEE 802.11ax (40MHz, MCS6, 99pc dc)	WLAN	8.33	±9.6 %
10714	AAC	IEEE 802.11ax (40MHz, MCS7, 99pc dc)	WLAN	8.26	±9.6 %
10715	AAC	IEEE 802.11ax (40MHz, MCS8, 99pc dc)	WLAN	8.45	±9.6 %
10716	AAC	IEEE 802.11ax (40MHz, MCS9, 99pc dc)	WLAN	8.30	±9.6 %
10717	AAC	IEEE 802.11ax (40MHz, MCS10, 99pc dc)	WLAN	8.48	±9.6 %
10718	AAC	IEEE 802.11ax (40MHz, MCS11, 99pc dc)	WLAN	8.24	±9.6 %
10719	AAC	IEEE 802.11ax (80MHz, MCS0, 90pc dc)	WLAN	8.81	±9.6 %
10720	AAC	IEEE 802.11ax (80MHz, MCS1, 90pc dc)	WLAN	8.87	±9.6 %
10721	AAC	IEEE 802.11ax (80MHz, MCS2, 90pc dc)	WLAN	8.76	±9.6 %
10722	AAC	IEEE 802.11ax (80MHz, MCS3, 90pc dc)	WLAN	8.55	±9.6 %
10723	AAC	IEEE 802.11ax (80MHz, MCS4, 90pc dc)	WLAN	8.70	±9.6 %
10724	AAC	IEEE 802.11ax (80MHz, MCS5, 90pc dc)	WLAN	8.90	±9.6 %
10725	AAC	IEEE 802.11ax (80MHz, MCS6, 90pc dc)	WLAN	8.74	±9.6 %
10726	AAC	IEEE 802.11ax (80MHz, MCS7, 90pc dc)	WLAN	8.72	±9.6 %
10727	AAC	IEEE 802.11ax (80MHz, MCS8, 90pc dc)	WLAN	8.66	±9.6 %
10728	AAC	IEEE 802.11ax (80MHz, MCS9, 90pc dc)	WLAN	8.65	±9.6 %
10729	AAC	IEEE 802.11ax (80MHz, MCS10, 90pc dc)	WLAN	8.64	±9.6 %
10730	AAC	IEEE 802.11ax (80MHz, MCS11, 90pc dc)	WLAN	8.67	±9.6 %
10731	AAC	IEEE 802.11ax (80MHz, MCS0, 99pc dc)	WLAN	8.42	±9.6 %
10732	AAC	IEEE 802.11ax (80MHz, MCS1, 99pc dc)	WLAN	8.46	±9.6 %
10733	AAC	IEEE 802.11ax (80MHz, MCS2, 99pc dc)	WLAN	8.40	±9.6 %
10734	AAC	IEEE 802.11ax (80MHz, MCS3, 99pc dc)	WLAN	8.25	±9.6 %
10735	AAC	IEEE 802.11ax (80MHz, MCS4, 99pc dc)	WLAN	8.33	±9.6 %
10736	AAC	IEEE 802.11ax (80MHz, MCS5, 99pc dc)	WLAN	8.27	±9.6 %
10737	AAC	IEEE 802.11ax (80MHz, MCS6, 99pc dc)	WLAN	8.36	±9.6 %
10738	AAC	IEEE 802.11ax (80MHz, MCS7, 99pc dc)	WLAN	8.42	±9.6 %
10739	AAC	IEEE 802.11ax (80MHz, MCS8, 99pc dc)	WLAN	8.29	±9.6 %
10740	AAC	IEEE 802.11ax (80MHz, MCS9, 99pc dc)	WLAN	8.48	±9.6 %
10741	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc dc)	WLAN	8.40	±9.6 %
10742	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc dc)	WLAN	8.43	±9.6 %
10743	AAC	IEEE 802.11ax (160MHz, MCS0, 90pc dc)	WLAN	8.94	±9.6 %
10744	AAC	IEEE 802.11ax (160MHz, MCS1, 90pc dc)	WLAN	9.16	±9.6 %
10745	AAC	IEEE 802.11ax (160MHz, MCS2, 90pc dc)	WLAN	8.93	±9.6 %
10746	AAC	IEEE 802.11ax (160MHz, MCS3, 90pc dc)	WLAN	9.11	±9.6 %
10747	AAC	IEEE 802.11ax (160MHz, MCS4, 90pc dc)	WLAN	9.04	±9.6 %
10748	AAC	IEEE 802.11ax (160MHz, MCS5, 90pc dc)	WLAN	8.93	±9.6 %
10749	AAC	IEEE 802.11ax (160MHz, MCS6, 90pc dc)	WLAN	8.90	±9.6 %
10750	AAC	IEEE 802.11ax (160MHz, MCS7, 90pc dc)	WLAN	8.79	±9.6 %
10751	AAC	IEEE 802.11ax (160MHz, MCS8, 90pc dc)	WLAN	8.82	±9.6 %
10752	AAC	IEEE 802.11ax (160MHz, MCS9, 90pc dc)	WLAN	8.81	±9.6 %
10753	AAC	IEEE 802.11ax (160MHz, MCS10, 90pc dc)	WLAN	9.00	±9.6 %
10754	AAC	IEEE 802.11ax (160MHz, MCS11, 90pc dc)	WLAN	8.94	±9.6 %





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Table with 6 columns: ID, Modulation, Standard, Modulation, Modulation, and Error. Rows include IEEE 802.11ax (160MHz, MCS0-11) and 5G NR (CP-OFDM, 1 RB, 5-100 MHz, QPSK, 15 kHz) configurations.



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10823	AAC	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10824	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10825	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10827	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	± 9.6 %
10828	AAE	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	± 9.6 %
10829	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10830	AAD	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.63	± 9.6 %
10831	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	± 9.6 %
10832	AAD	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	± 9.6 %
10833	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10834	AAD	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	± 9.6 %
10835	AAD	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10836	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	± 9.6 %
10837	AAD	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	± 9.6 %
10839	AAD	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	± 9.6 %
10840	AAD	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	± 9.6 %
10841	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	± 9.6 %
10843	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	± 9.6 %
10844	AAD	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10846	AAD	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10854	AAD	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10856	AAD	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10857	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10858	AAD	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10859	AAD	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10860	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10861	AAD	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10863	AAD	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10864	AAE	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10865	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10866	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10868	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	± 9.6 %
10869	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10870	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	± 9.6 %
10871	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10872	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	± 9.6 %
10873	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10874	AAD	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10875	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10876	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	± 9.6 %
10877	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	± 9.6 %
10878	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 9.6 %
10879	AAD	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	± 9.6 %
10880	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	± 9.6 %
10881	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10882	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	± 9.6 %
10883	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	± 9.6 %
10884	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	± 9.6 %
10885	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10886	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10887	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10888	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	± 9.6 %
10889	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	± 9.6 %
10890	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	± 9.6 %
10891	AAD	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	± 9.6 %
10892	AAD	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 9.6 %
10897	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	± 9.6 %
10898	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	± 9.6 %



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10899	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	± 9.6 %
10900	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10901	AAD	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10902	AAD	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10903	AAD	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10904	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10905	AAD	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10906	AAD	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	± 9.6 %
10907	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	± 9.6 %
10908	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	± 9.6 %
10909	AAD	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.96	± 9.6 %
10910	AAD	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	± 9.6 %
10911	AAD	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	± 9.6 %
10912	AAD	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10913	AAD	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10914	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	± 9.6 %
10915	AAD	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	± 9.6 %
10916	AAD	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	± 9.6 %
10917	AAD	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
10918	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	± 9.6 %
10919	AAD	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	± 9.6 %
10920	AAD	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	± 9.6 %
10921	AAD	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10922	AAD	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	± 9.6 %
10923	AAD	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10924	AAD	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10925	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.95	± 9.6 %
10926	AAD	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	± 9.6 %
10927	AAD	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.94	± 9.6 %
10928	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10929	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10930	AAD	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	± 9.6 %
10931	AAD	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10932	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10933	AAA	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10934	AAA	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10935	AAA	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	± 9.6 %
10936	AAC	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10937	AAB	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	± 9.6 %
10938	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	± 9.6 %
10939	AAB	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	± 9.6 %
10940	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	± 9.6 %
10941	AAB	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10942	AAB	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10943	AAB	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	± 9.6 %
10944	AAB	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	± 9.6 %
10945	AAB	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	± 9.6 %
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	± 9.6 %
10947	AAB	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10948	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10949	AAB	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	± 9.6 %
10950	AAB	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	± 9.6 %
10951	AAB	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	± 9.6 %
10952	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	± 9.6 %
10953	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	± 9.6 %
10954	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	± 9.6 %
10955	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	± 9.6 %
10956	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	± 9.6 %
10957	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	± 9.6 %



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10958	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	± 9.6 %
10959	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	± 9.6 %
10960	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	± 9.6 %
10961	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.36	± 9.6 %
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	± 9.8 %
10963	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10964	AAB	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.29	± 9.6 %
10965	AAB	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.37	± 9.6 %
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.55	± 9.6 %
10967	AAB	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	± 9.6 %
10968	AAB	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	± 9.6 %
10972	AAB	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	± 9.6 %
10973	AAB	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	± 9.6 %
10974	AAB	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)	5G NR FR1 TDD	10.28	± 9.6 %
10978	AAA	ULLA BDR	ULLA	1.16	± 9.6 %
10979	AAA	ULLA HDR4	ULLA	8.58	± 9.6 %
10980	AAA	ULLA HDR8	ULLA	10.32	± 9.6 %
10981	AAA	ULLA HDRp4	ULLA	3.19	± 9.6 %
10982	AAA	ULLA HDRp8	ULLA	3.43	± 9.6 %
10983	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.31	± 9.6 %
10984	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	± 9.6 %
10985	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.54	± 9.6 %
10986	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	± 9.6 %
10987	AAA	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.53	± 9.6 %
10988	AAA	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.38	± 9.6 %
10989	AAA	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	± 9.6 %
10990	AAA	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.52	± 9.6 %

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



# ANNEX I: Dipole Calibration Certificate

## 2450MHz Dipole

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Client **SAICT** Certificate No: **Z21-60358**

<b>CALIBRATION CERTIFICATE</b>			
Object	D2450V2 - SN: 873		
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits		
Calibration date:	October 21, 2021		
<p>This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity&lt;70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p>			
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG.No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22
Calibrated by:	Name Zhao Jing	Function SAR Test Engineer	Signature 
Reviewed by:	Name Lin Hao	Function SAR Test Engineer	Signature 
Approved by:	Name Qi Dianyuan	Function SAR Project Leader	Signature 
Issued: October 27, 2021 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



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**Glossary:**

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
N/A	not applicable or not measured

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

- 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
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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