TESTING
NVLAP LAB CODE 600118-0

SAR TEST REPORT

No. I22Z62049-SEM01

For

unitech electronics co., ltd.

Rugged Handheld Computer

Model Name: PA768

With

Hardware Version: FH09_MB_PCB_V1.3

Software Version: RAYA_V03.25b02_20221010

FCC ID: HLEPA768BWNW

Issued Date: 2023-4-10

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 CTTL.

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Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
I22Z62049-SEM01	Rev.0	2023-2-13	Initial creation of test report
I22Z62049-SEM01	Rev.1	2023-3-9	Update the information on section 2 Update the information on section 11
I22Z62049-SEM01	Rev.2	2023-4-3	Update the information for PD test.
I22Z62049-SEM01	Rev.3	2023-4-10	Update the information for PD test.

TABLE OF CONTENT

1 Test Laboratory

1.1 Testing Location

Company Name:	CTTL
Address:	No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

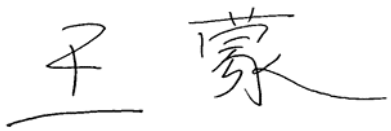
1.2 Testing Environment

Temperature:	18°C~25°C,
Relative humidity:	30%~ 70%
Ground system resistance:	< 0.5 Ω
Ambient noise & Reflection:	< 0.012 W/kg

1.3 Project Data

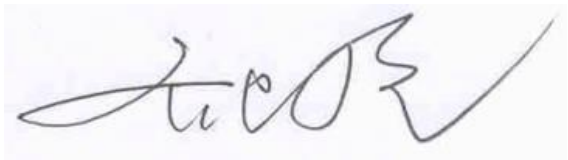
Project Leader:	Qi Dianyuan
Test Engineer:	Wang Meng
Testing Start Date:	November 13, 2022
Testing End Date:	April 9, 2023

1.4 Signature



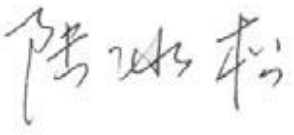
Wang Meng

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of SAR found during testing for unitech electronics co., ltd. Rugged Handheld Computer PA768 are as follows:

Table 2.1: Highest Reported SAR (1g)

Mode	Antenna	Highest Reported SAR (1g)	Highest Reported PD (mW/m2)
WLAN 6 GHz	ANT2	<0.01	0.75
WLAN 6 GHz	ANT3	<0.01	1.24

Table 2.2: The sum of reported SAR values for main antenna and WiFi

Test Postition / SAR 1g/10g(W/kg)		1	2	simultaneous transmission
		WWAN NR n270 Part270	WIFI6E	1+2
Body	Bottom 10mm	1.52[1]	/	1.52
	Bottom 0mm	1.98[1]	/	1.98

[1] - Refer to I22N02185-SAR Report.

3 Client Information

3.1 Applicant Information

Company Name:	unitech electronics co., ltd.
Address/Post:	5F., No. 136, Ln. 235, Baoqiao Rd., Xindian Dist., New Taipei City 231028 , Taiwan
Contact Person:	Ben Chiang
E-mail:	BenC@tw.ute.com
Telephone:	886-2-8912-1122
Fax:	886-2-89121391

3.2 Manufacturer Information

Company Name:	unitech electronics co., ltd.
Address/Post:	5F., No. 136, Ln. 235, Baoqiao Rd., Xindian Dist., New Taipei City 231028 , Taiwan
Contact Person:	Ben Chiang
E-mail:	BenC@tw.ute.com
Telephone:	886-2-8912-1122
Fax:	886-2-89121391

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	Rugged Handheld Computer	
Model name:	PA768	
Operating mode(s):	GSM850/900/1800/1900,WCDMA B1/2/5/8 LTE Band1/2/3/4/5/7/8/12/14/20/28/34/38/39/40/41/71 5G NR n1/2/3/5/28/41/77/78/79 Wi-Fi(2.4G), Wi-Fi(5G), Wi-Fi(6G),BT	
Tested Tx Frequency:	5925 – 6425 MHz	WLAN 6G
	6425 – 6525 MHz	
	6525 – 6875 MHz	
	6875 – 7125 MHz	
Test device Production information:	Production unit	
Device type:	Portable device	
Antenna type:	Integrated antenna	

4.2Internal Identification of EUT used during the test

EUT ID*	IMEI	HW	SW Version
EUT1	358585240002012	FH09_MB_PCB_V1.3	RAYA_V03.25b02_20221010
EUT2	358585240001683	FH09_MB_PCB_V1.3	RAYA_V03.25b02_20221010

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

Note: It is performed to test SAR with the EUT1 and conducted power with the EUT2.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	1400-900069G	/	LIFUN TECHNOLOGY CO.,LTD.

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

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: Measurement Techniques.

KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D06 Hotspot Mode SAR v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

April 27, 2022 TCBC Workshop: 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 (ρ) . 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 head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ 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

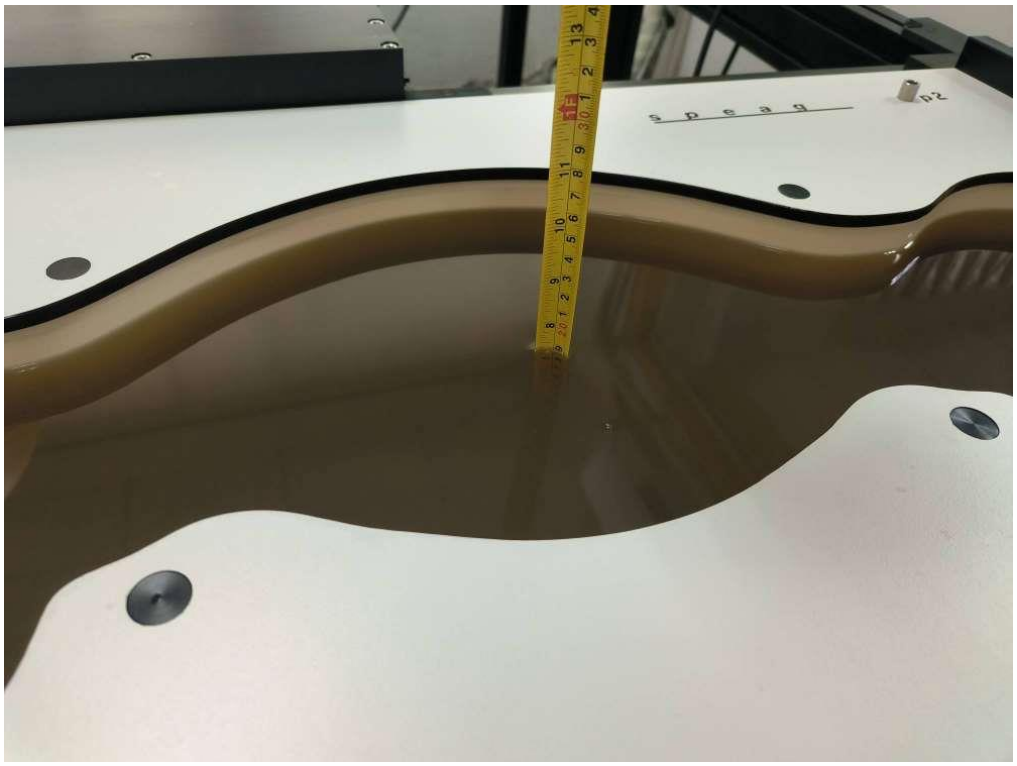
Frequency(MHz)	Liquid Type	Conductivity(σ)	± 5% Range	Permittivity(ε)	± 5% Range
6500	Head	6.07	5.77～6.37	34.50	32.78～36.23

7.2 Dielectric Performance

Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2022/11/13	Head	6500 MHz	32.8	-4.93	6.23	2.64

Note: The liquid temperature is 22.0℃

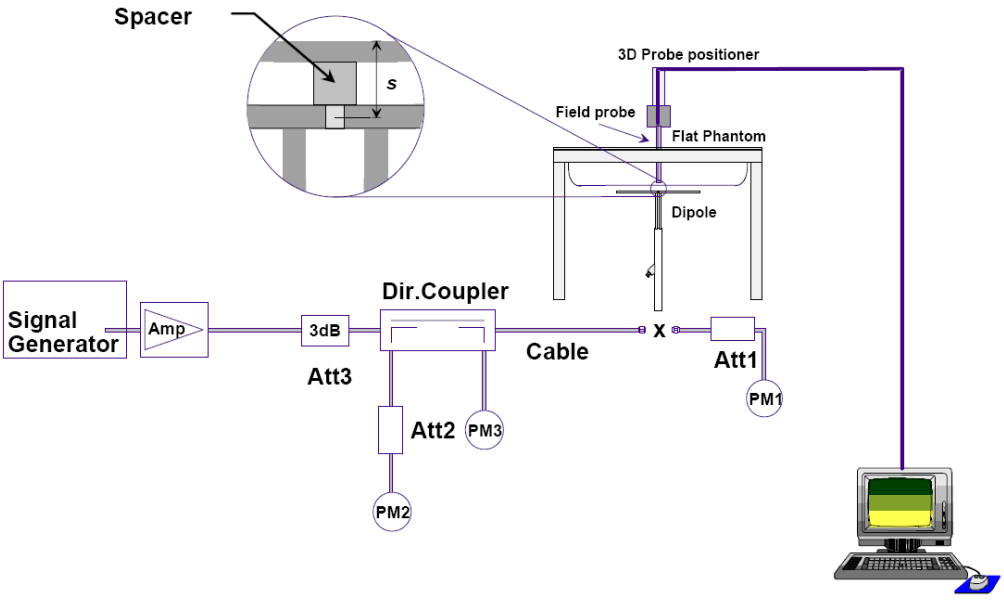


Picture 7-1 Liquid depth in the Flat Phantom

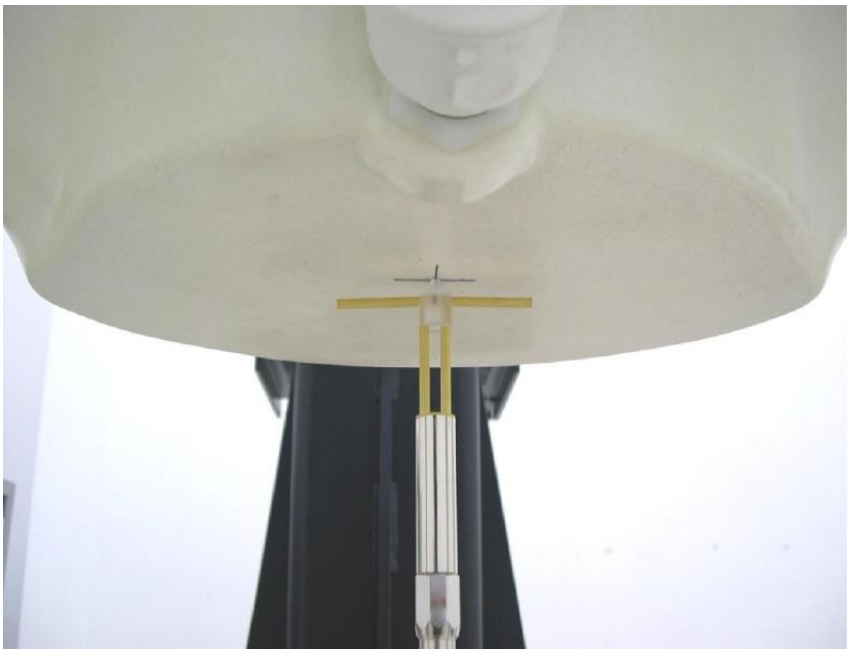
8 System verification

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



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.

The system verification results are required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR. The details are presented in annex B.

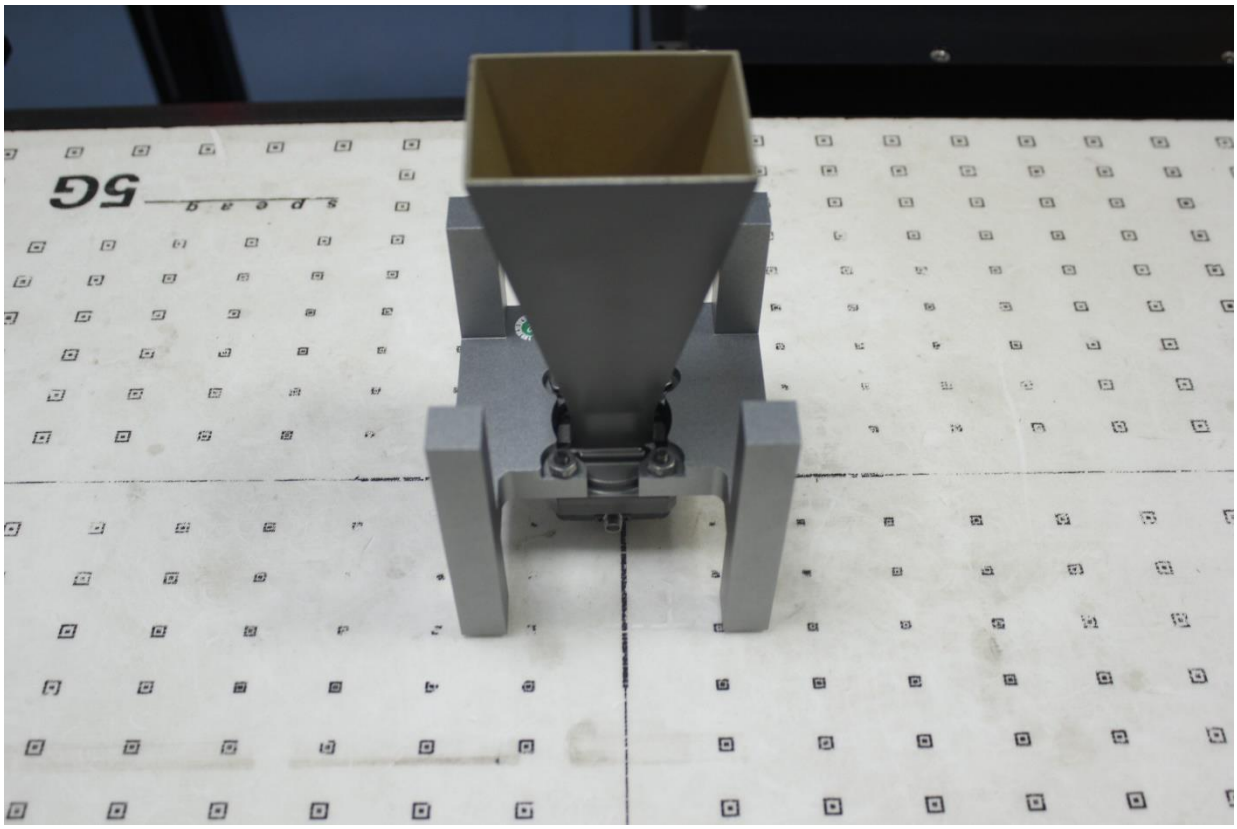
Table 8.1: System Verification of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2022/11/13	6500 MHz	5.33	29.00	5.16	28.50	-3.19%	-1.72%

8.3 PD System Performance Check Results

The system was verified to be within ±0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check. The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.

Date	Frequency (GHz)	5G Verification Source	Probe S/N	Distance (mm)	Measured 4cm^2 (W/m^2)	Targeted 4cm^2 (W/m^2)	Deviation (db)
2023/4/3	10G	10GHz_1005	9492	10	55.6	53.5	0.17
2023/4/9	10G	10GHz_1005	9492	10	49.5	53.5	0.34



Picture 8.3 System Setup for System Evaluation

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.

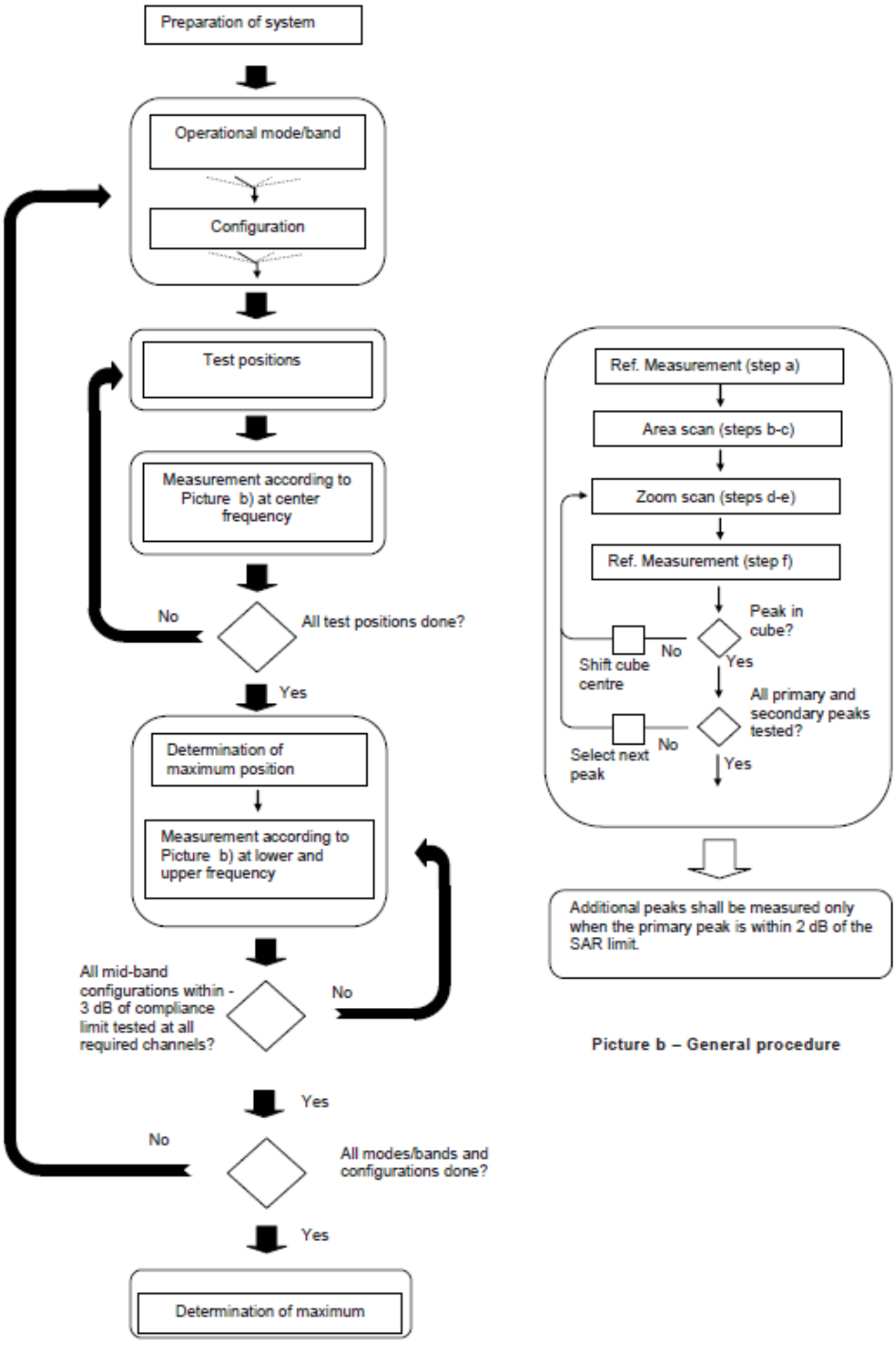
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

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 within3 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 a – Tests to be performed

Picture b – General procedure

Picture 10.1 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.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ 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 <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 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.</td></tr>
</table>

9.3 Wi-Fi 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, DASY6 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 section14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Conducted Output Power

10.1 Wi-Fi Measurement result

Tune up

EUT State	ANT2		
Mode	11ax 20M		
Channel	Ant	Power Setting	MAX(dBm)
1-13	Ant 2	2	1
17-49	Ant 2	2	-2
53-61	Ant 2	2	0
65-77	Ant 2	2	1
81-93	Ant 2	2	3
97-129	Ant 2	2	4
133	Ant 2	2	3
137-141	Ant 2	2	2
145-153	Ant 2	2	0
157-169	Ant 2	2	-1
173-185	Ant 2	2	-3
189-201	Ant 2	2	-4
205-209	Ant 2	2	-1
213-233	Ant 2	2	-3

EUT State	ANT3		
Mode	11ax 20M		
Channel	Ant	Power Setting	MAX(dBm)
1-21	Ant 3	2	5
25-93	Ant 3	2	3
97-113	Ant 3	2	0.5
117-141	Ant 3	2	0
145-157	Ant 3	2	0.5
161-201	Ant 3	2	-2
205-209	Ant 3	2	2
213-233	Ant 3	2	0

EUT State	ANT2		
Mode	11ax 40M		
Channel	Ant	Power Setting	MAX(dBm)
3-91	Ant 2	5	8
99-115	Ant 2	5	8
123-179	Ant 2	5	7
187-195	Ant 2	5	1
203-227	Ant 3	5	0

EUT State	ANT3		
Mode	11ax 40M		
Channel	Ant	Power Setting	MAX(dBm)
3-91	Ant 3	5	8
99-115	Ant 3	5	6
123-179	Ant 3	5	5
187-195	Ant 3	5	3
203-227	Ant 4	5	3

EUT State	ANT2		
Mode	11ax 80M		
Channel	Ant	Power Setting	MAX(dBm)
7-87	Ant 2	7	9
103	Ant 2	7	10
119-183	Ant 2	7	9
199-215	Ant 2	7	3

EUT State	ANT3		
Mode	11ax 80M		
Channel	Ant	Power Setting	MAX(dBm)
7-87	Ant 3	7	10
103	Ant 3	7	8
119-183	Ant 3	7	7
199-215	Ant 3	7	6

EUT State	ANT2		
Mode	11ax 160M		
Channel	Ant	Power Setting	MAX(dBm)
15-47	Ant 2	9	8
79	Ant 2	9	11
111	Ant 2	9	12
143	Ant 2	9	10
175	Ant 2	9	6
207	Ant 2	9	6

EUT State	ANT3		
Mode	11ax 160M		
Channel	Ant	Power Setting	MAX(dBm)
15	Ant 3	9	12
47	Ant 3	9	11
79	Ant 3	9	12
111	Ant 3	9	8.5
143	Ant 3	9	8.5
175	Ant 3	9	6.5
207	Ant 3	9	8

The conducted output power for WiFi 6G-ANT2 power is as following

802.11ax-160M(dBm)	
Channel\data rate	6Mbps
15(6025 MHz)	7.07
47(6185 MHz)	7.00
79(6345 MHz)	9.56
111(6505 MHz)	11.71
143(6665 MHz)	8.51
175(6825 MHz)	4.68
207(6985 MHz)	4.35

The conducted output power for WiFi 6G-ANT3 power is as following

802.11ax-160M(dBm)	
Channel\data rate	6Mbps
15(6025 MHz)	10.30
47(6185 MHz)	9.40
79(6345 MHz)	10.62
111(6505 MHz)	6.91
143(6665 MHz)	6.89
175(6825 MHz)	4.75
207(6985 MHz)	6.05

11 Simultaneous TX SAR Considerations

11.1 Transmit Antenna Separation Distances

The detail for transmit antenna separation distances is described in the additional document:
Appendix to test report No.I22Z62049-SEM01
The photos of SAR test

11.2 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
ANT2	Yes	Yes	No	Yes	No	No
ANT3	Yes	Yes	No	Yes	Yes	No

11.3 Simultaneous Transmission Consideration

No.	**Simultaneous Transmission Configuration**
01	WWAN + WLAN(2.4GHz) Ant2
02	WWAN + WLAN(2.4GHz) Ant3
03	WWAN + WLAN(5GHz/6GHz) Ant2
04	WWAN + WLAN(5GHz/6GHz) Ant3
05	WWAN + Bluetooth
06	WWAN + WLAN(2.4GHz) Ant2 + WLAN(5GHz/6GHz) Ant3
07	WWAN + WLAN(2.4GHz) Ant3 + WLAN(5GHz/6GHz) Ant2
08	WWAN + WLAN(5GHz/6GHz) Ant2 + Bluetooth
09	WWAN + WLAN(2.4GHz) MIMO
10	WWAN + WLAN(5GHz/6GHz) MIMO
11	WWAN + WLAN(5GHz/6GHz) MIMO + Bluetooth
12	WLAN(2.4GHz) Ant2 + WLAN(5GHz/6GHz) Ant3
13	WLAN(2.4GHz) Ant3 + WLAN(5GHz/6GHz) Ant2
14	WLAN(5GHz/6GHz) Ant2 + Bluetooth
15	WLAN(5GHz/6GHz) MIMO + Bluetooth

11.4 Total Exposure Radio Analysis

The fields generated by the antennas can be correlated or uncorrelated. At different frequencies, fields are always uncorrelated, and the aggregate power density contributions can be summed according to spatially averaged values of corresponding sources at any point in space, r, to determine the total exposure ratio (TER). Assuming I sources, the TER at each point in space is equal to

$$TER^{uncorr}(r) = \sum_{i=1}^{I} ER_i = \sum_{i=1}^{I} \frac{S_{av,i}(r, f_i)}{S_{lim}(f_i)}$$

Where $S_{av,i}$ is the power density for the source I operating at a frequency f_i and S_{lim} is the power density limit as specified by the relevant standard.

Exposure from transmitters operating above and below 6GHz, where 6GHz denotes the transmission frequency where the basic restrictions change from being defined in terms of SAR to being defined in terms of power density, therefore uncorrelated and the TER is determined as

$$TER^{uncorr}(r) = \sum_{i=1}^{I} ER_i = \sum_{i=1}^{I} \frac{S_{av,i}(r, f_i)}{S_{lim}(f_i)}$$

According to the FCC guidance in TCBC workshop and IEC TR 63170, the total exposure ratio calculated by taking ratio of maximum reported SAR divided by SAR limit and adding it to maximum measured power density by its limit. Numerical sum of the ratios should be less or equal to 1. Therefore the simultaneous transmission should be follows:

$$\sum \frac{\text{Max. SAR}}{1.6} + \sum \frac{\text{Max. PD}}{\text{Limit of MPE}} \leqslant 1$$

11.5 Simultaneous transmission

Test Postition / SAR 1g/10g(W/kg)		1	2	simultaneous transmission
		WWAN NR n270 Part270	WIFI6E	1+2
Body	Bottom 10mm	1.52[1]	/	1.52
	Bottom 0mm	1.98[1]	/	1.98

[1] - Refer to I22N02185-SAR Report.

Test Postition / PD(W/m 2)		1	2	simultaneous transmission
		WWAN NR n270 Part270	WIFI6E	1+2
Body	Bottom 10mm	1.52[1]	/	0.95
Body	Bottom 0mm	1.98[1]	/	0.50

[1] - Refer to I22N02185-SAR Report.

Conclusion:

According to the above tables, the sum of reported SAR values is<1.6W/kg and TER≤1. So the simultaneous transmission SAR with volume scans is not required.

12 SAR Test Result

Note:

KDB 447498 D01 General RF Exposure Guidance:

For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor

For BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

$\leqslant$ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is $\leqslant$ 100 MHz

$\leqslant$ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz

$\leqslant$ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is $\geqslant$ 200 MHz

KDB 248227 D01 SAR meas for 802.11:

- Absorbed power density (APD) using a 4cm2 averaging area is reported based on SAR measurements.
- Per FCC guidance and equipment manufacturer guidance, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 1.52 dB (41.9%) was used to determine the psPD measurement scaling factor.

12.1 SAR results for WLAN

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	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	APD (W/m^2)
2	Body	WLAN6G	15	6025	11ax-160M	Front	10mm	/	7.07	8.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	15	6025	11ax-160M	Rear	10mm	/	7.07	8.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	15	6025	11ax-160M	Right	10mm	/	7.07	8.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	79	6345	11ax-160M	Front	10mm	/	9.56	11.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	79	6345	11ax-160M	Rear	10mm	/	9.56	11.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	79	6345	11ax-160M	Right	10mm	/	9.56	11.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	111	6505	11ax-160M	Front	10mm	/	11.71	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	111	6505	11ax-160M	Rear	10mm	/	11.71	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	111	6505	11ax-160M	Right	10mm	/	11.71	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	143	6665	11ax-160M	Front	10mm	/	8.51	10.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	143	6665	11ax-160M	Rear	10mm	/	8.51	10.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	143	6665	11ax-160M	Right	10mm	/	8.51	10.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	207	6985	11ax-160M	Front	10mm	/	4.35	6.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	207	6985	11ax-160M	Rear	10mm	/	4.35	6.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
2	Body	WLAN6G	207	6985	11ax-160M	Right	10mm	/	4.35	6.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	15	6025	11ax-160M	Front	10mm	/	10.30	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	15	6025	11ax-160M	Rear	10mm	/	10.30	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	15	6025	11ax-160M	Right	10mm	/	10.30	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	15	6025	11ax-160M	Top	10mm	/	10.30	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	79	6345	11ax-160M	Front	10mm	/	10.62	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	79	6345	11ax-160M	Rear	10mm	/	10.62	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	79	6345	11ax-160M	Right	10mm	/	10.62	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	79	6345	11ax-160M	Top	10mm	/	10.62	12.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	111	6505	11ax-160M	Front	10mm	/	6.91	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	111	6505	11ax-160M	Rear	10mm	/	6.91	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	111	6505	11ax-160M	Right	10mm	/	6.91	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	111	6505	11ax-160M	Top	10mm	/	6.91	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	143	6665	11ax-160M	Front	10mm	/	6.89	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	143	6665	11ax-160M	Rear	10mm	/	6.89	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	143	6665	11ax-160M	Right	10mm	/	6.89	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	143	6665	11ax-160M	Top	10mm	/	6.89	8.50	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	207	6985	11ax-160M	Front	10mm	/	6.05	8.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	207	6985	11ax-160M	Rear	10mm	/	6.05	8.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	207	6985	11ax-160M	Right	10mm	/	6.05	8.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/
3	Body	WLAN6G	207	6985	11ax-160M	Top	10mm	/	6.05	8.00	<0.01	**<0.01**	<0.01	**<0.01**	/	/

12.2 PD results

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Duty Cycle	Measured Normal psPD (W/m^2)	Calculated Normal psPD (W/m^2)	Measured Total psPD (W/m^2)	Calculated Total psPD (W/m^2)	Power Drift
2	Body	WLAN6G	15	6025	11ax-160M	Rear	0mm	\	7.07	8.00	100.00%	0.215	**0.27**	0.223	**0.28**	-0.19
2	Body	WLAN6G	79	6345	11ax-160M	Rear	0mm	\	9.56	11.00	100.00%	0.223	**0.31**	0.285	**0.40**	0.17
2	Body	WLAN6G	111	6505	11ax-160M	Rear	0mm	\	11.71	12.00	100.00%	0.555	**0.59**	0.674	**0.72**	-0.17
2	Body	WLAN6G	143	6665	11ax-160M	Rear	0mm	\	8.51	10.00	100.00%	0.402	**0.57**	0.405	**0.57**	0.15
2	Body	WLAN6G	207	6985	11ax-160M	Rear	0mm	\	4.35	6.00	100.00%	0.340	**0.50**	0.379	**0.55**	0.19
2	Body	WLAN6G	15	6025	11ax-160M	Front	0mm	\	7.07	8.00	100.00%	0.122	**0.15**	0.191	**0.24**	-0.06
2	Body	WLAN6G	79	6345	11ax-160M	Front	0mm	\	9.56	11.00	100.00%	0.082	**0.11**	0.108	**0.15**	0.19
2	Body	WLAN6G	111	6505	11ax-160M	Front	0mm	\	11.71	12.00	100.00%	0.438	**0.47**	0.574	**0.61**	0.05
2	Body	WLAN6G	143	6665	11ax-160M	Front	0mm	\	8.51	10.00	100.00%	0.201	**0.28**	0.257	**0.36**	-0.09
2	Body	WLAN6G	207	6985	11ax-160M	Front	0mm	F.1	4.35	6.00	100.00%	0.498	**0.73**	0.515	**0.75**	0.15
2	Body	WLAN6G	15	6025	11ax-160M	Right	0mm	\	7.07	8.00	100.00%	0.533	**0.66**	0.540	**0.67**	-0.06
2	Body	WLAN6G	79	6345	11ax-160M	Right	0mm	\	9.56	11.00	100.00%	0.512	**0.71**	0.532	**0.74**	0.13
2	Body	WLAN6G	111	6505	11ax-160M	Right	0mm	\	11.71	12.00	100.00%	0.321	**0.34**	0.339	**0.36**	-0.06
2	Body	WLAN6G	143	6665	11ax-160M	Right	0mm	\	8.51	10.00	100.00%	0.352	**0.50**	0.373	**0.53**	0.03
2	Body	WLAN6G	207	6985	11ax-160M	Right	0mm	\	4.35	6.00	100.00%	0.436	**0.64**	0.441	**0.64**	-0.11

ANT	RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Duty Cycle	Measured Normal psPD (W/m^2)	Calculated Normal psPD (W/m^2)	Measured Total psPD (W/m^2)	Calculated Total psPD (W/m^2)	Power Drift
3	Body	WLAN6G	15	6025	11ax-160M	Rear	0mm	\	10.30	12.00	100.00%	0.22	**0.33**	0.228	**0.34**	0.16
3	Body	WLAN6G	79	6345	11ax-160M	Rear	0mm	\	10.62	12.00	100.00%	0.307	**0.42**	0.313	**0.43**	-0.09
3	Body	WLAN6G	111	6505	11ax-160M	Rear	0mm	\	6.91	8.50	100.00%	0.295	**0.43**	0.307	**0.44**	0.17
3	Body	WLAN6G	143	6665	11ax-160M	Rear	0mm	\	6.89	8.50	100.00%	0.287	**0.42**	0.293	**0.42**	0.06
3	Body	WLAN6G	207	6985	11ax-160M	Rear	0mm	\	6.05	8.00	100.00%	0.38	**0.60**	0.395	**0.62**	-0.15
3	Body	WLAN6G	15	6025	11ax-160M	Front	0mm	\	10.30	12.00	100.00%	0.76	**1.12**	0.769	**1.14**	-0.05
3	Body	WLAN6G	79	6345	11ax-160M	Front	0mm	\	10.62	12.00	100.00%	0.436	**0.60**	0.546	**0.75**	-0.09
3	Body	WLAN6G	111	6505	11ax-160M	Front	0mm	\	6.91	8.50	100.00%	0.188	**0.27**	0.257	**0.37**	0.17
3	Body	WLAN6G	143	6665	11ax-160M	Front	0mm	\	6.89	8.50	100.00%	0.446	**0.65**	0.703	**1.02**	0.11
3	Body	WLAN6G	207	6985	11ax-160M	Front	0mm	\	6.05	8.00	100.00%	0.21	**0.33**	0.241	**0.38**	0.05
3	Body	WLAN6G	15	6025	11ax-160M	Right	0mm	\	10.30	12.00	100.00%	0.242	**0.36**	0.302	**0.45**	0.01
3	Body	WLAN6G	79	6345	11ax-160M	Right	0mm	\	10.62	12.00	100.00%	0.351	**0.48**	0.363	**0.50**	0.19
3	Body	WLAN6G	111	6505	11ax-160M	Right	0mm	\	6.91	8.50	100.00%	0.428	**0.62**	0.591	**0.85**	-0.07
3	Body	WLAN6G	143	6665	11ax-160M	Right	0mm	\	6.89	8.50	100.00%	0.287	**0.42**	0.437	**0.63**	-0.18
3	Body	WLAN6G	207	6985	11ax-160M	Right	0mm	\	6.05	8.00	100.00%	0.556	**0.87**	0.569	**0.89**	-0.05
3	Body	WLAN6G	15	6025	11ax-160M	Top	0mm	F.2	10.30	12.00	100.00%	0.617	**0.91**	0.836	**1.24**	0.17
3	Body	WLAN6G	79	6345	11ax-160M	Top	0mm	\	10.62	12.00	100.00%	0.528	**0.73**	0.552	**0.76**	0.11
3	Body	WLAN6G	111	6505	11ax-160M	Top	0mm	\	6.91	8.50	100.00%	0.174	**0.25**	0.183	**0.26**	-0.11
3	Body	WLAN6G	143	6665	11ax-160M	Top	0mm	\	6.89	8.50	100.00%	0.104	**0.15**	0.138	**0.20**	0.17
3	Body	WLAN6G	207	6985	11ax-160M	Top	0mm	\	6.05	8.00	100.00%	0.447	**0.70**	0.546	**0.86**	-0.15

13 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; steps2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

14 Measurement Uncertainty

14.1 SAR Uncertainty Budget (6GHz~10GHz)

No.	Error Description	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)
Measurement System Errors								
1	Probe calibration	18.6	N	2	1	1	9.3	9.3
2	Probe Calibration Drift	1.0	R	$\sqrt{3}$	1	1	1.0	1.0
3	Probe Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
4	Broadband Signal	3.0	N	2	1	1	1.5	1.5
5	Probe Isotropy	7.6	R	$\sqrt{3}$	1	1	4.4	4.4
6	Data Acquisition	0.3	N	1	1	1	0.3	0.3
7	RF Ambient	1.8	N	1	1	1	1.8	1.8
8	Probe Positioning	0.2	N	1	0.67	0.67	0.1	0.1
9	Data Processing	3.5	N	1	1	1	3.5	3.5
Phantom and Device Errors								
10	Conductivity (meas.)^{DAK}	2.5	N	1	0.78	0.71	2.0	1.8
11	Conductivity (temp.)^{BB}	2.4	R	$\sqrt{3}$	0.78	0.71	1.1	1.0
12	Phantom Permittivity	14.0	R	$\sqrt{3}$	0.5	0.5	4.0	4.0
13	Distance DUT - TSL	2.0	N	1	2	2	4.0	4.0
14	Device Holder	3.6	N	1	1	1	3.6	3.6
15	DUT Modulation^{m}	2.4	R	$\sqrt{3}$	1	1	1.4	1.4
16	Time-average SAR	2.6	R	$\sqrt{3}$	1	1	1.5	1.5
17	DUT drift	5.0	N	1	1	1	2.9	2.9
Correction to the SAR results								
18	Deviation to Target	1.9	N	1	1	0.84	1.9	1.6
19	SAR scaling^{p}	0	R	$\sqrt{3}$	1	1	0	0
Combined standard uncertainty							14.1	14.0
Expanded uncertainty (confidence interval of 95 %)							28.1	28.0

14.2 PD Uncertainty Budget

The budget is valid for evaluation distance ＞λ/2π. For specific tests and configurations, the uncertainty can be considered smaller.

Error Description		Unc. Value (±dB)	Prob. Dist.	Div.	(C_i)	Std.Unc. (±dB)	(V_i) V_{eff}
Uncertainty terms dependent on the measurement system							
CAL	Calibration	0.49	N	1	1	0.49	∞
FRS	Frequency response	0.20	R	$\sqrt{3}$	1	0.12	∞
ISO	Isotropy	0.50	R	$\sqrt{3}$	1	0.29	∞
LIN	Linearity	0.20	R	$\sqrt{3}$	1	0.12	∞
PPO	Probe positioning offset	0.30	R	$\sqrt{3}$	1	0.17	∞
PPR	Probe positioning repeatability	0.04	R	$\sqrt{3}$	1	0.02	∞
APN	Amplitude and phase noise	0.04	R	$\sqrt{3}$	1	0.02	∞
DAQ	Data acquisition	0.03	N	1	1	0.03	∞
REC	Field reconstruction	0.60	R	$\sqrt{3}$	1	0.35	∞
SAV	Spatial averaging	0.10	R	$\sqrt{3}$	1	0.06	∞
SDL	System detection limit	0.04	R	$\sqrt{3}$	1	0.02	∞
Uncertainty terms dependent on the DUT and environmental factors							
MOD	Modulation response	0.40	R	$\sqrt{3}$	1	0.23	∞
DH	Device holder influence	0.10	R	$\sqrt{3}$	1	0.06	∞
AC	RF ambient conditions	0.04	R	$\sqrt{3}$	1	0.02	∞
AR	Ambient reflections	0.04	R	$\sqrt{3}$	1	0.02	∞
DRI	Drift of the DUT	0.02	R	$\sqrt{3}$	1	0.01	∞
Combined Standard Uncertainty						0.76	∞
Expanded Standard Uncertainty (95%)						1.52	

15 MAIN TEST INSTRUMENTS

Table 15.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	January 4, 2022	One year
02	Power sensor	NRP110T	101139	January 13, 2022	One year
03	Power sensor	NRP110T	101159		
04	Signal Generator	E4438C	MY49071430	January 13, 2022	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	DAE	SPEAG DAE4	777	January 07, 2022	One year
07	E-field Probe	SPEAG EX3DV4	7464	January 26, 2022	One year
08	Dipole Validation Kit	SPEAG D6.5GHzV2	1059	December 01,2021	One year
09	5G Verification Source	10 GHz	1005	January 11,2023	One year
10	EummWV Probe	EummWV4	9492	May 18,2022	One year
11	E-field Probe	SPEAG EX3DV4	7464	January 26, 2022	One year
12	DAE	SPEAG DAE4	1556	January 12, 2022	One year
13	DAE	SPEAG DAE4	1331	September 15,2022	One year

***END OF REPORT BODY**

ANNEX A GRAPH RESULTS

PD-ANT2

Measurement Report for Device, FRONT, Custom Band, IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle), Channel 6985000 (6985.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	190.0 x 90.0 x 15.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 2.00	Custom Band	CW, 10743-AAC	6985.0, 6985000	1.0

Hardware Setup

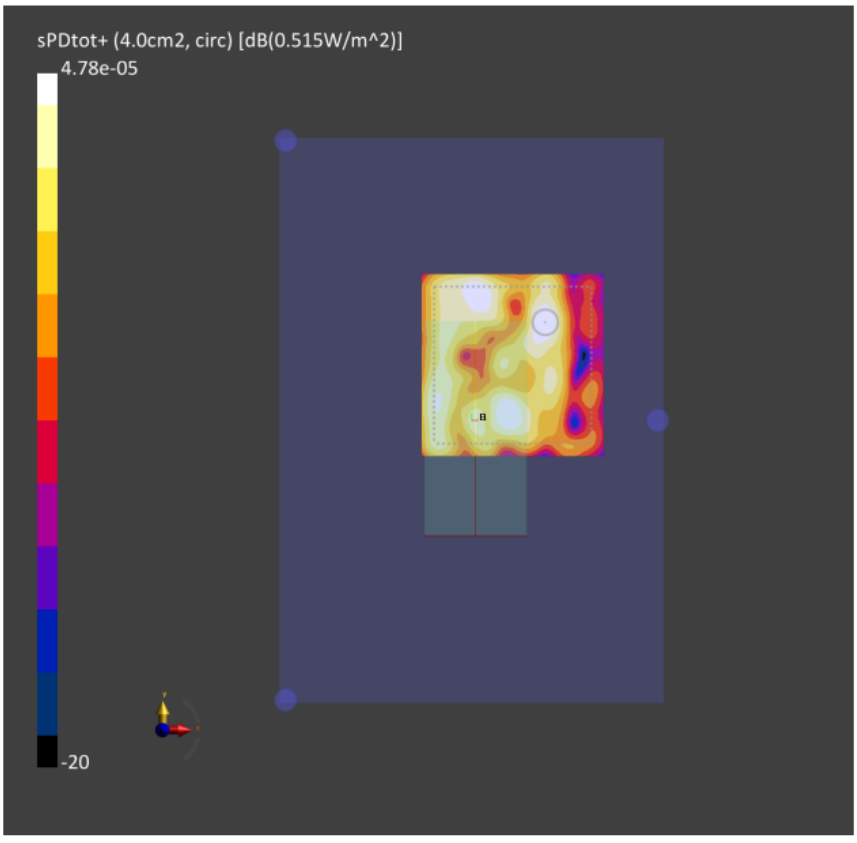
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9492_F1-55GHz, 2022-05-18	DAE4 Sn1331, 2022-09-15

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	25.0 x 25.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0
MAIA	N/A

Measurement Results

Scan Type	5G Scan
Date	2023-04-09, 21:07
Avg. Area [cm2]	4.00
psPDn+ [W/m2]	0.498
psPDtot+ [W/m2]	0.515
psPDmod+ [W/m2]	0.567
E_{max} [V/m]	17.3
Power Drift [dB]	0.15



PD-ANT3

Measurement Report for Device, EDGE TOP, Custom Band, IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle), Channel 6025000 (6025.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	190.0 x 90.0 x 15.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	EDGE TOP, 2.00	Custom Band	CW, 10743-AAC	6025.0, 6025000	1.0

Hardware Setup

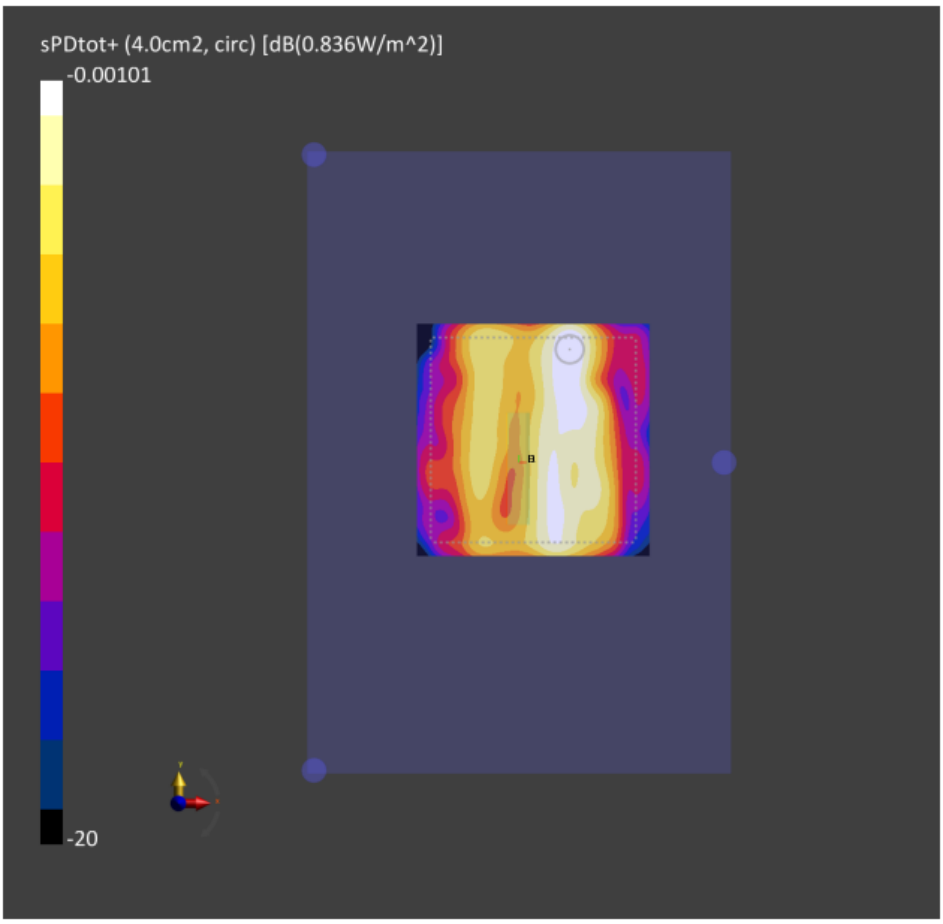
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9492_F1-55GHz, 2022-05-18	DAE4 Sn1331, 2022-09-15

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	25.0 x 25.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0
MAIA	N/A

Measurement Results

Scan Type	5G Scan
Date	2023-04-09, 22:31
Avg. Area [cm2]	4.00
psPDn+ [W/m2]	0.617
psPDtot+ [W/m2]	0.836
psPDmod+ [W/m2]	0.858
E_{max} [V/m]	21.3
Power Drift [dB]	0.17



ANNEX B System Verification Results

6500 MHz

Measurement Report for Device, EDGE TOP, Validation band, CW, Channel 6500 (6500.0 MHz)

Device Under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	20.0 x 20.0 x 8.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, -	EDGE TOP, 5.00	Validation band	CW, 0--	6500.0, 6500	5.55	6.23	32.8

Hardware Setup

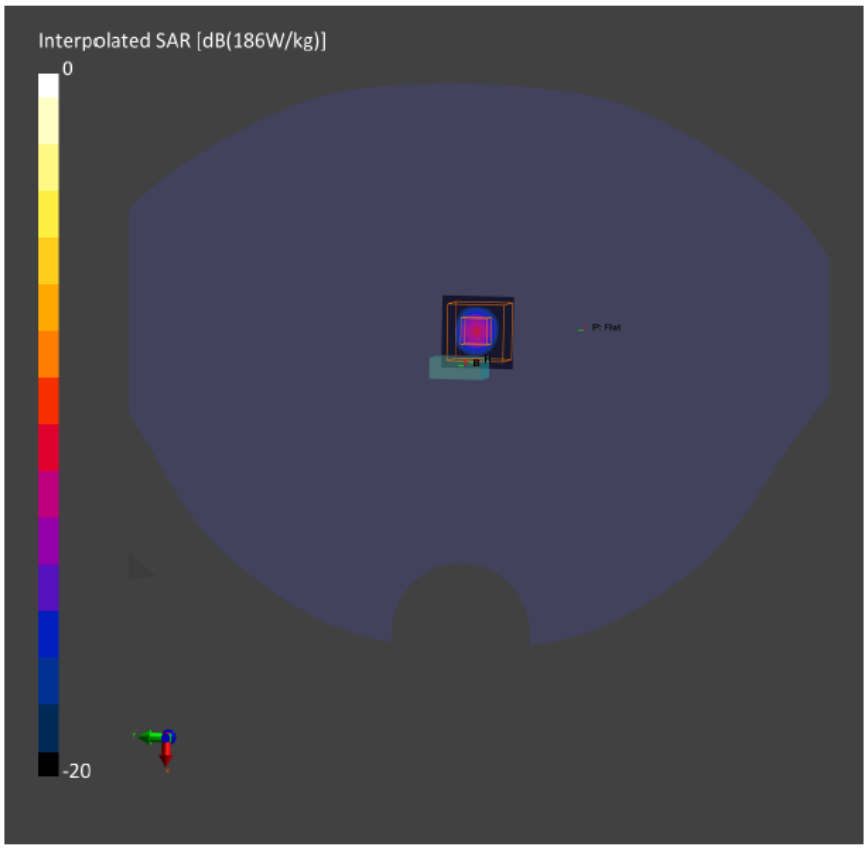
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - xxxx	H650-7500M	EX3DV4 - SN7464, 2022-01-26	DAE4 Sn777, 2022-01-07

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	51.0 x 51.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	8.5 x 8.5	3.4 x 3.4 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	No	Yes
Grading Ratio	n/a	1.4
MAIA	N/A	N/A
Surface Detection	Mother Scan	All points
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2022-11-13, 10:06	2022-11-13, 10:17
psSAR1g [W/Kg]	2.39	28.5
psSAR10g [W/Kg]	0.621	5.16
Power Drift [dB]	0.12	0.12
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction



10 GHz

Measurement Report for Device, FRONT, Validation band, CW, Channel 10000 (10000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	100.0 x 100.0 x 100.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 2.00	Validation band	CW, 0--	10000.0, 10000	1.0

Hardware Setup

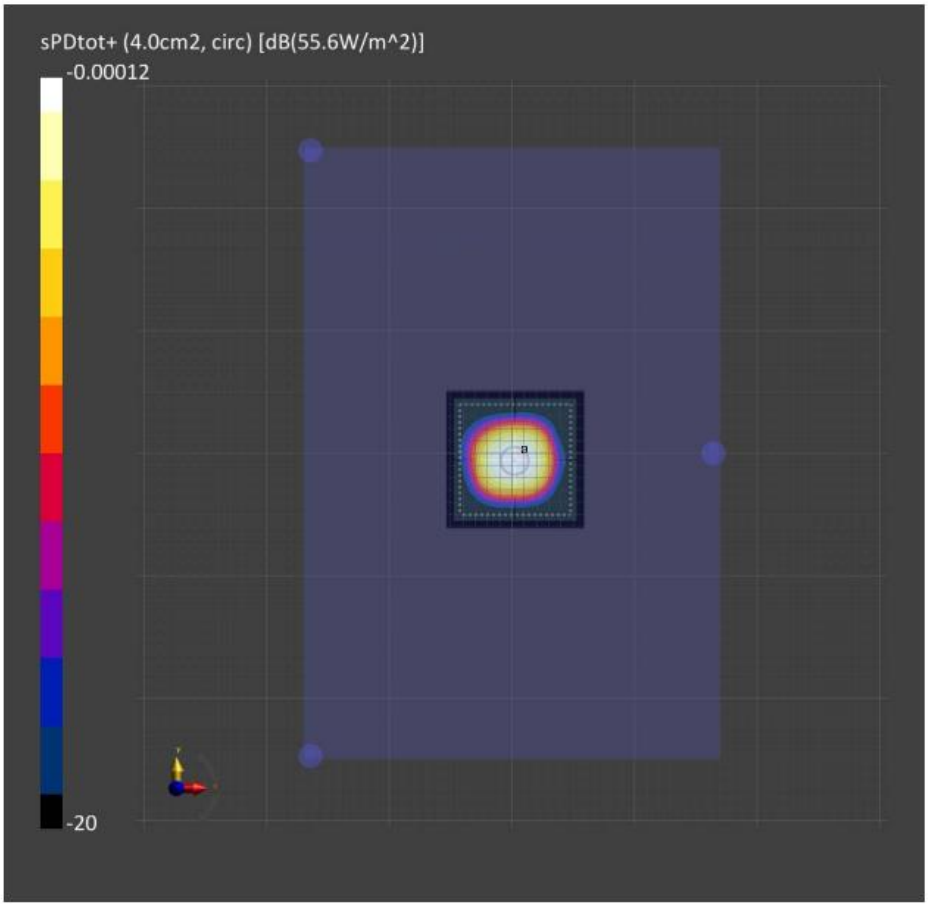
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9492_F1-55GHz, 2022-05-18	DAE4 Sn1331, 2022-09-15

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0
MAIA	N/A

Measurement Results

Scan Type	5G Scan
Date	2023-04-03, 06:19
Avg. Area [cm2]	4.00
psPDn+ [W/m2]	55.2
psPDtot+ [W/m2]	55.6
psPDmod+ [W/m2]	55.8
E_{max} [V/m]	151
Power Drift [dB]	-0.02



10 GHz

Measurement Report for Device, FRONT, Validation band, CW, Channel 10000 (10000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	100.0 x 100.0 x 100.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 2.00	Validation band	CW, 0--	10000.0, 10000	1.0

Hardware Setup

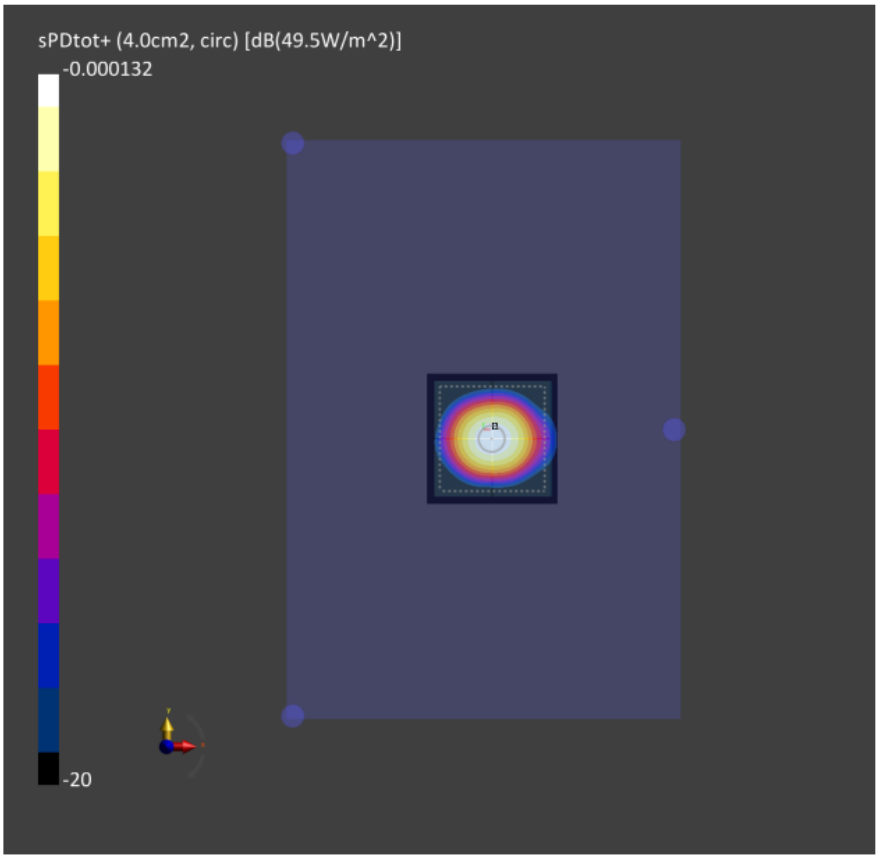
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - xxxx	Air -	EUmmWV4 - SN9492_F1-55GHz, 2022-05-18	DAE4 Sn1331, 2022-09-15

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.25 x 0.25
Sensor Surface [mm]	2.0
MAIA	N/A

Measurement Results

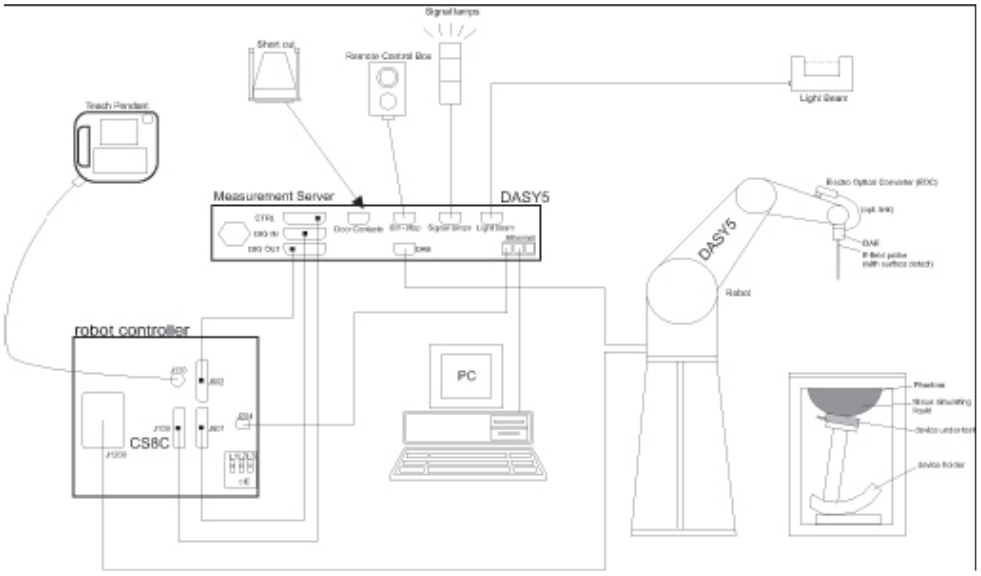
Scan Type	5G Scan
Date	2023-04-09, 10:20
Avg. Area [cm2]	4.00
psPDn+ [W/m2]	49.3
psPDtot+ [W/m2]	49.5
psPDmod+ [W/m2]	49.7
E_{max} [V/m]	149
Power Drift [dB]	-0.13



ANNEX C SAR Measurement Setup

C.1 Measurement Set-up

The Dasy5 or DASY6 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 (StäubliTX=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 or DASY6 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 Dasy6 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 or DASY6 software reads the reflection durning a software approach and looks for the maximum using 2nd ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model: ES3DV3, EX3DV4
Frequency 10MHz — 6.0GHz(EX3DV4)
Range: 10MHz — 4GHz(ES3DV3)
Calibration: In head and body simulating tissue at Frequencies from 835 up to 5800MHz
Linearity: ± 0.2 dB(30 MHz to 6 GHz) for EX3DV4
± 0.2 dB(30 MHz to 4 GHz) for ES3DV3
DynamicRange: 10 mW/kg — 100W/kg
Probe Length: 330 mm
Probe Tip
Length: 20 mm
Body Diameter: 12 mm
Tip Diameter: 2.5 mm (3.9 mm for ES3DV3)
Tip-Center: 1 mm (2.0mm for ES3DV3)
Application: SAR Dosimetry Testing
Compliance tests ofmobile 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^2) 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 inn 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 equates to 1 mW/cm^2.

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:

Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

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 broad 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 broad, which is directly connected to the PC/104 bus of the CPU broad.

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 ±0.5mm would produce a SAR uncertainty of ±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.

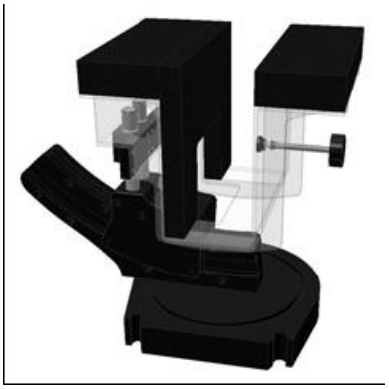
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales are the ear reference 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 ε=3 and loss tangent δ=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 C7-1: 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 90th 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).

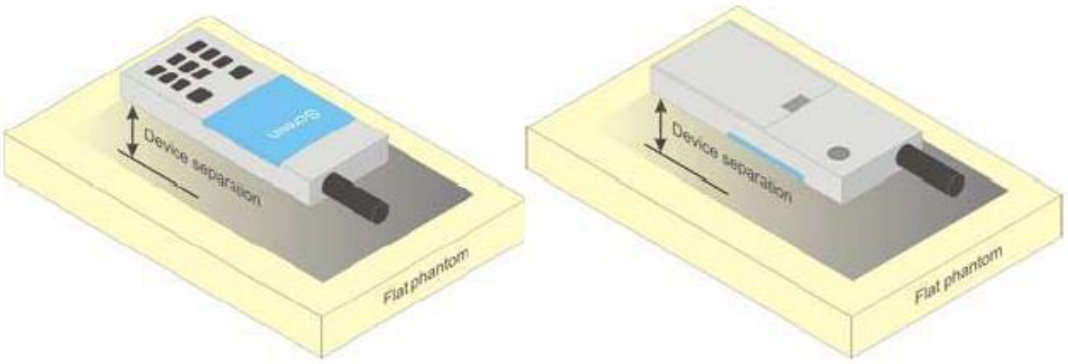
Shell Thickness: 2±0. 2 mm
Filling Volume: Approx. 25 liters
Dimensions: 810 x l000 x 500 mm (H x L x W)
Available: Special

Picture C.8: SAM Twin Phantom

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

D.1 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.

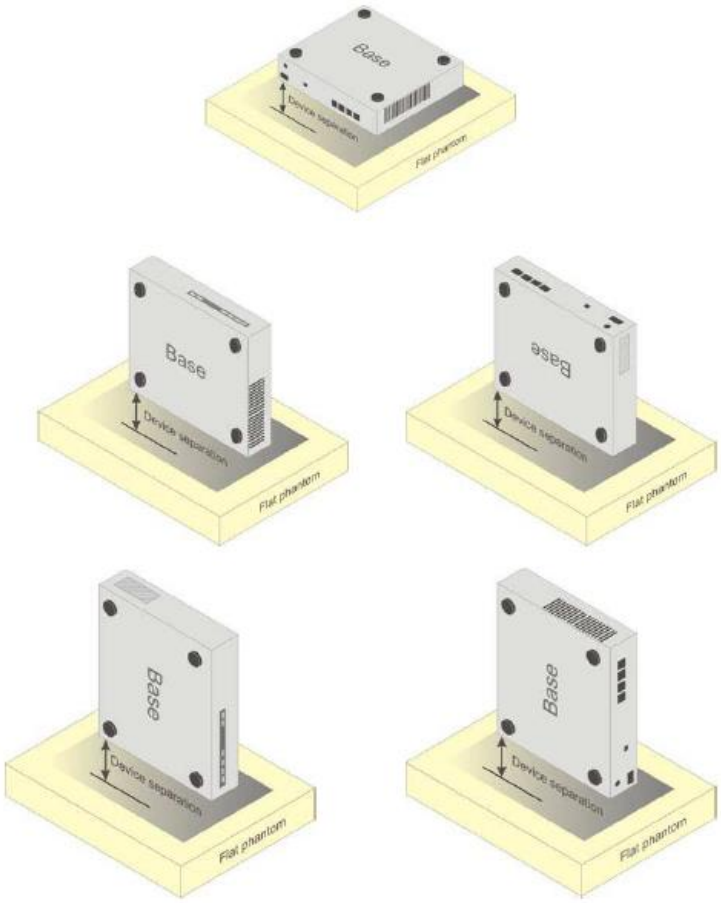


Picture D.1 Test positions for body-worn devices

D.2 Desktop device

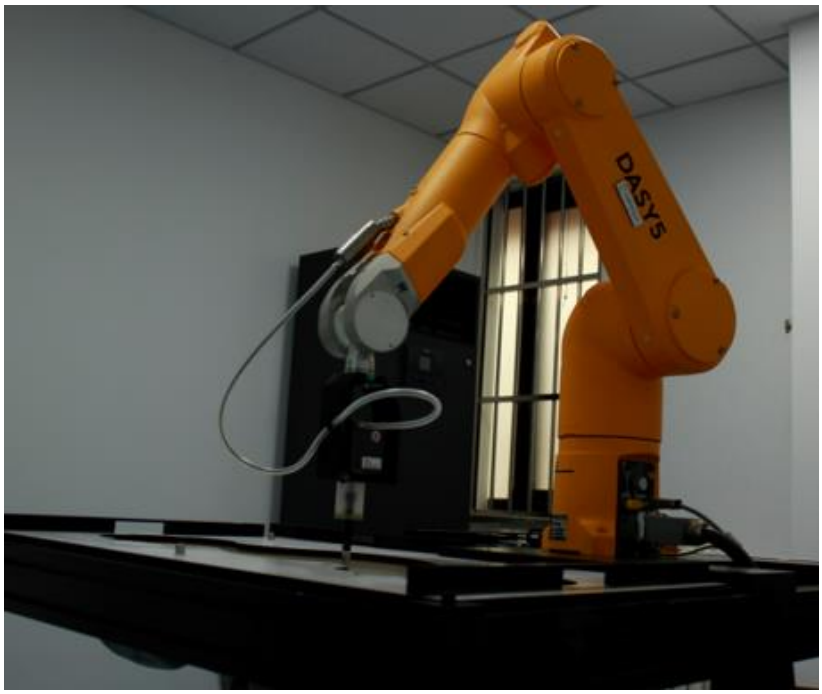
A typical example of a desktop device is a wireless enabled desktop computer placed on a table or desk when used.

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. Picture8.5 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.2 Test positions for desktop devices

D.3 DUT Setup Photos



Picture D.5

ANNEX E Equivalent Media Recipes

The liquid used for the frequency range of 800-3000 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)	835Head	835Body	1900 Head	1900 Body	2450 Head	2450 Body	5800 Head	5800 Body
Ingredients (% by weight)								
Water	41.45	52.5	55.242	69.91	58.79	72.60	65.53	65.53
Sugar	56.0	45.0	\	\	\	\	\	\
Salt	1.45	1.4	0.306	0.13	0.06	0.18	\	\
Preventol	0.1	0.1	\	\	\	\	\	\
Cellulose	1.0	1.0	\	\	\	\	\	\
Glycol Monobutyl	\	\	44.452	29.96	41.15	27.22	\	\
Diethylenglycol monohexylether	\	\	\	\	\	\	17.24	17.24
Triton X-100	\	\	\	\	\	\	17.24	17.24
Dielectric Parameters Target Value	ε=41.5 σ=0.90	ε=55.2 σ=0.97	ε=40.0 σ=1.40	ε=53.3 σ=1.52	ε=39.2 σ=1.80	ε=52.7 σ=1.95	ε=35.3 σ=5.27	ε=48.2 σ=6.00

Note: There are a little adjustment respectively for 750, 1750, 2600, 5200, 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 for 7464

Probe SN.	Liquid name	Validation date	Frequency point	Status (OK or Not)
7464	Head 64MHz	February 04,2022	64MHz	OK
7464	Head 150MHz	February 04,2022	150MHz	OK
7464	Head 300MHz	February 04,2022	300MHz	OK
7464	Head 450MHz	February 04,2022	450MHz	OK
7464	Head 750MHz	February 04,2022	750MHz	OK
7464	Head 835MHz	February 04,2022	835MHz	OK
7464	Head 900MHz	February 04,2022	900MHz	OK
7464	Head 1450MHz	February 04,2022	1450MHz	OK
7464	Head 1750MHz	February 05,2022	1750MHz	OK
7464	Head 1810MHz	February 05,2022	1810MHz	OK
7464	Head 1900MHz	February 05,2022	1900MHz	OK
7464	Head 2000MHz	February 05,2022	2000MHz	OK
7464	Head 2100MHz	February 05,2022	2100MHz	OK
7464	Head 2300MHz	February 05,2022	2300MHz	OK
7464	Head 2450MHz	February 05,2022	2450MHz	OK
7464	Head 2600MHz	February 05,2022	2600MHz	OK
7464	Head 3300MHz	February 06,2022	3300MHz	OK
7464	Head 3500MHz	February 06,2022	3500MHz	OK
7464	Head 3700MHz	February 06,2022	3700MHz	OK
7464	Head 3900MHz	February 06,2022	3900MHz	OK
7464	Head 4100MHz	February 06,2022	4100MHz	OK
7464	Head 4200MHz	February 06,2022	4200MHz	OK
7464	Head 4400MHz	February 06,2022	4400MHz	OK
7464	Head 4600MHz	February 06,2022	4600MHz	OK
7464	Head 4800MHz	February 06,2022	4800MHz	OK
7464	Head 4950MHz	February 06,2022	4950MHz	OK
7464	Head 5200MHz	February 07,2022	5200MHz	OK
7464	Head 5250MHz	February 07,2022	5250MHz	OK
7464	Head 5300MHz	February 07,2022	5300MHz	OK
7464	Head 5500MHz	February 07,2022	5500MHz	OK
7464	Head 5600MHz	February 07,2022	5600MHz	OK
7464	Head 5750MHz	February 07,2022	5750MHz	OK
7464	Head 5800MHz	February 07,2022	5800MHz	OK
7464	Head 6500MHz	February 07,2022	6500MHz	OK
7464	Head 7000MHz	February 07,2022	7000MHz	OK

ANNEX G Probe Calibration Certificate

Probe 7464 Calibration Certificate

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

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

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

Accreditation No.: SCS 0108

Client **CTTL-BJ (Auden)** Certificate No: **EX3-7464_Jan22**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7464

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

Calibration date: January 26, 2022

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

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

Calibration Equipment used (M&TE critical for calibration)

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

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: January 28, 2022

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

Certificate No: EX3-7464_Jan22 Page 1 of 23

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

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

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

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7464

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)²)[A]	0.46	0.44	0.45	± 10.1 %
DCP (mV)[B]	100.5	101.1	99.2	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	129.8	± 2.7 %	± 4.7 %
		Y	0.00	0.00	1.00		143.1		
		Z	0.00	0.00	1.00		149.5		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	20.00	93.08	21.80	10.00	60.0	± 3.7 %	± 9.6 %
		Y	20.00	91.15	21.40		60.0		
		Z	20.00	93.95	22.82		60.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	20.00	94.89	21.67	6.99	80.0	± 2.0 %	± 9.6 %
		Y	20.00	91.07	20.01		80.0		
		Z	20.00	94.48	22.03		80.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	20.00	100.94	23.29	3.98	95.0	± 1.1 %	± 9.6 %
		Y	20.00	91.64	18.69		95.0		
		Z	20.00	98.54	22.66		95.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	20.00	111.81	26.93	2.22	120.0	± 1.2 %	± 9.6 %
		Y	20.00	91.67	17.31		120.0		
		Z	20.00	106.21	24.89		120.0		
10387-AAA	QPSK Waveform, 1 MHz	X	1.95	67.66	16.42	1.00	150.0	± 2.3 %	± 9.6 %
		Y	1.71	65.07	14.73		150.0		
		Z	1.98	67.42	16.43		150.0		
10388-AAA	QPSK Waveform, 10 MHz	X	2.73	71.10	17.33	0.00	150.0	± 0.9 %	± 9.6 %
		Y	2.26	67.69	15.37		150.0		
		Z	2.79	71.26	17.38		150.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	3.50	72.58	19.72	3.01	150.0	± 0.7 %	± 9.6 %
		Y	3.46	71.32	18.87		150.0		
		Z	3.75	73.23	20.03		150.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	3.79	68.38	16.54	0.00	150.0	± 2.0 %	± 9.6 %
		Y	3.52	66.93	15.61		150.0		
		Z	3.82	68.42	16.57		150.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	4.98	65.65	15.65	0.00	150.0	± 3.8 %	± 9.6 %
		Y	4.98	65.46	15.42		150.0		
		Z	5.02	65.62	15.64		150.0		

Note: For details on UID parameters see Appendix

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7464

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	61.5	458.49	35.65	15.95	0.16	5.10	0.72	0.47	1.01
Y	63.7	481.59	36.30	14.98	0.81	5.06	0.73	0.58	1.01
Z	68.2	509.89	35.77	20.70	0.43	5.10	0.63	0.55	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-150.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7464

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
64	54.2	0.75	13.80	13.80	13.80	0.00	1.00	± 13.3 %
150	52.3	0.76	11.94	11.94	11.94	0.00	1.00	± 13.3 %
300	45.3	0.87	11.78	11.78	11.78	0.09	1.00	± 13.3 %
450	43.5	0.87	11.02	11.02	11.02	0.16	1.30	± 13.3 %
750	41.9	0.89	10.26	10.26	10.26	0.56	0.81	± 12.0 %
835	41.5	0.90	9.96	9.96	9.96	0.41	0.91	± 12.0 %
900	41.5	0.97	9.72	9.72	9.72	0.52	0.80	± 12.0 %
1450	40.5	1.20	8.86	8.86	8.86	0.43	0.80	± 12.0 %
1640	40.2	1.31	8.64	8.64	8.64	0.33	0.86	± 12.0 %
1750	40.1	1.37	8.52	8.52	8.52	0.39	0.86	± 12.0 %
1810	40.0	1.40	8.20	8.20	8.20	0.37	0.86	± 12.0 %
1900	40.0	1.40	8.18	8.18	8.18	0.35	0.86	± 12.0 %
2000	40.0	1.40	8.20	8.20	8.20	0.34	0.86	± 12.0 %
2100	39.8	1.49	8.38	8.38	8.38	0.32	0.86	± 12.0 %
2300	39.5	1.67	8.36	8.36	8.36	0.32	0.90	± 12.0 %
2450	39.2	1.80	7.77	7.77	7.77	0.36	0.90	± 12.0 %
2600	39.0	1.96	7.64	7.64	7.64	0.40	0.90	± 12.0 %
3300	38.2	2.71	7.27	7.27	7.27	0.30	1.35	± 13.1 %
3500	37.9	2.91	7.20	7.20	7.20	0.30	1.35	± 13.1 %
3700	37.7	3.12	6.78	6.78	6.78	0.30	1.35	± 13.1 %
3900	37.5	3.32	6.76	6.76	6.76	0.40	1.60	± 13.1 %
4100	37.2	3.53	6.71	6.71	6.71	0.40	1.60	± 13.1 %
4200	37.1	3.63	6.60	6.60	6.60	0.40	1.70	± 13.1 %
4400	36.9	3.84	6.53	6.53	6.53	0.40	1.70	± 13.1 %
4600	36.7	4.04	6.40	6.40	6.40	0.40	1.70	± 13.1 %
4800	36.4	4.25	6.35	6.35	6.35	0.40	1.80	± 13.1 %
4950	36.3	4.40	6.00	6.00	6.00	0.40	1.80	± 13.1 %
5200	36.0	4.66	5.60	5.60	5.60	0.40	1.80	± 13.1 %
5250	35.9	4.71	5.43	5.43	5.43	0.40	1.80	± 13.1 %
5300	35.9	4.76	5.32	5.32	5.32	0.40	1.80	± 13.1 %
5500	35.6	4.96	5.11	5.11	5.11	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.91	4.91	4.91	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.85	4.85	4.85	0.40	1.80	± 13.1 %
5800	35.3	5.27	5.00	5.00	5.00	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7464

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
6500	34.5	6.07	5.45	5.45	5.45	0.20	2.50	± 18.6 %
7000	33.9	6.65	5.75	5.75	5.75	0.20	2.00	± 18.6 %

[C] Frequency validity above 6GHz is ± 700 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies 6-10 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz; below ± 2% for frequencies between 3-6 GHz; and below ± 4% for frequencies between 6-10 GHz at any distance larger than half the probe tip diameter from the boundary.

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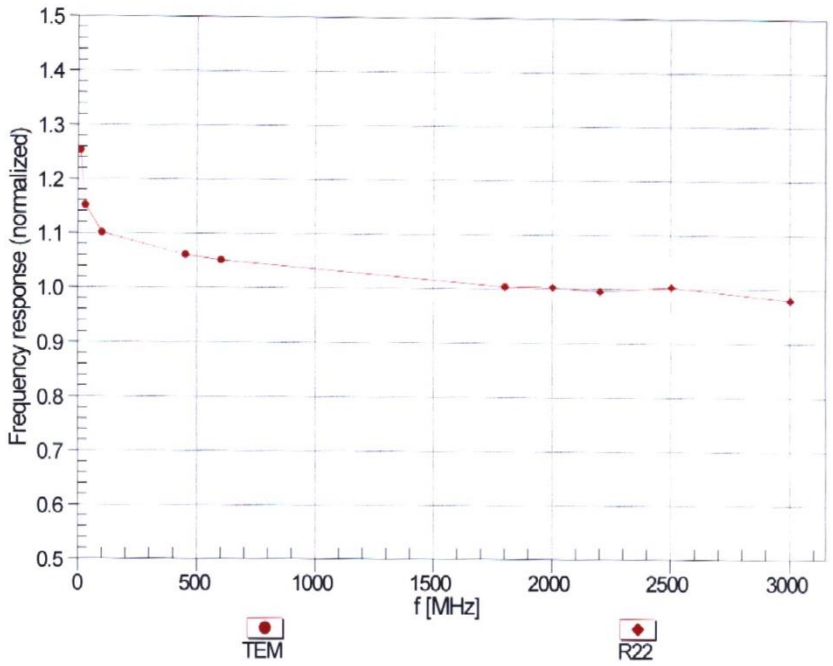
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



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

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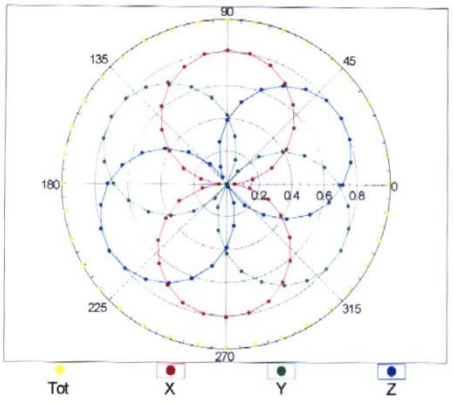
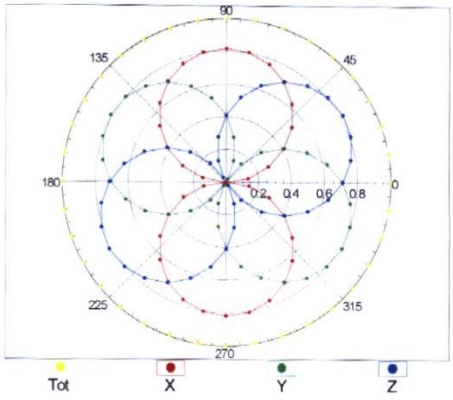
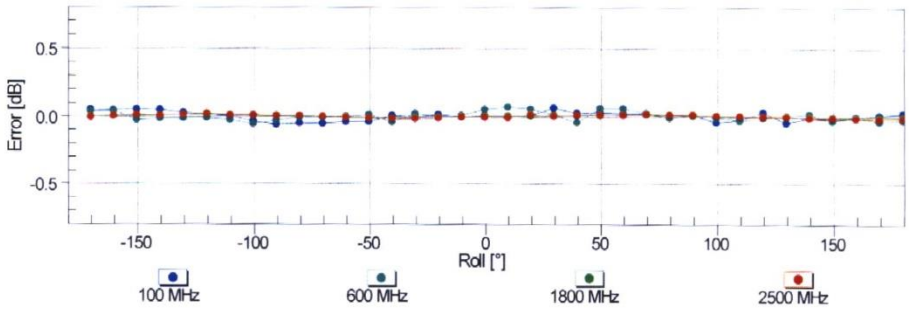
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22





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

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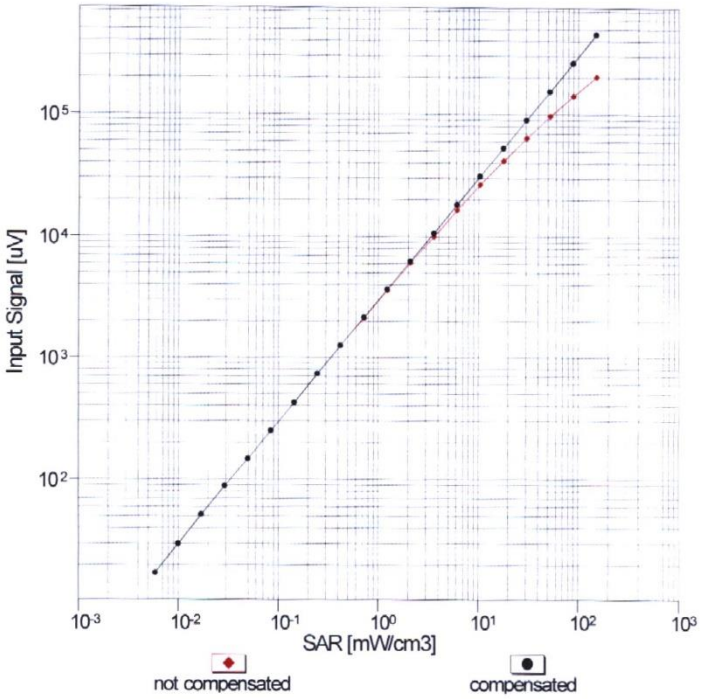
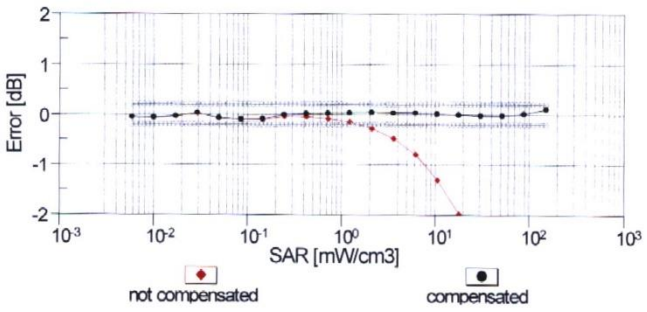
Dynamic Range f(SAR$_{head}$)

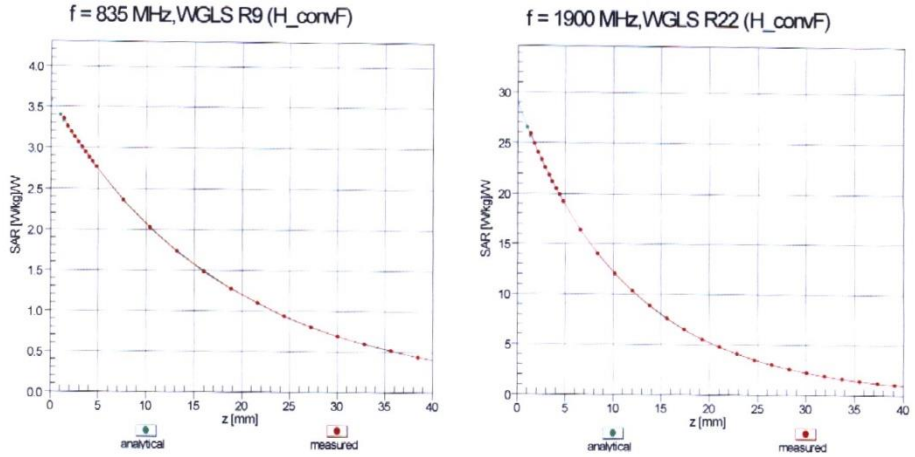
(TEM cell , f_{eval}= 1900 MHz)





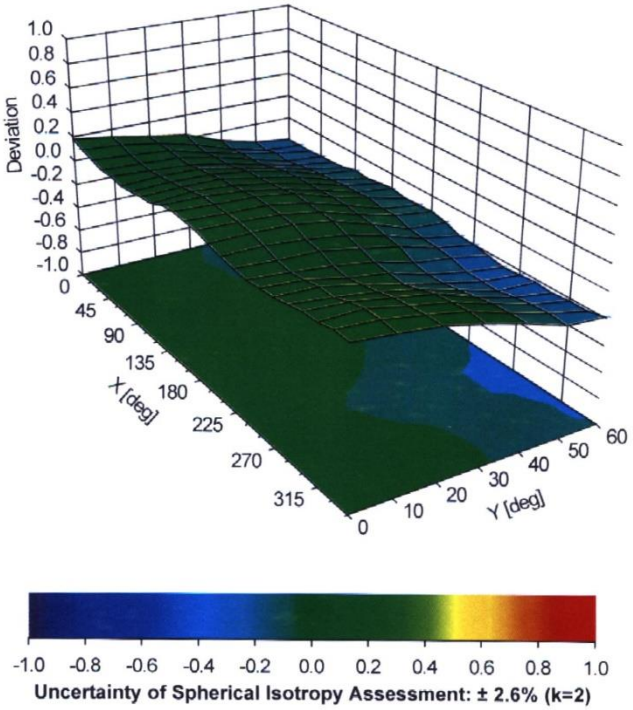
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

Appendix: Modulation Calibration Parameters

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

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

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

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