

TEST REPORT

FCC SAR Test for VP8000
Class II Permissive Change

APPLICANT
JVCKENWOOD Corporation

REPORT NO.
HCT-SR-2502-FC001-R1

DATE OF ISSUE
March 10, 2025

Tested by
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TEST REPORT

FCC SAR Test for
C2PC certification

REPORT NO.
HCT-SR-2502-FC001-R1

DATE OF ISSUE
Mar. 10, 2025

Applicant	JVCKENWOOD Corporation 3-12, Moriyacho, Kanagawa-ku, Yokohama-shi, Kanagawa, 221-0022, Japan
Equipment Type	MULTIBAND DIGITAL TRANSCEIVER
Model Name	VP8000-F2, VP8000-F3
<hr/>	
FCC ID	K44515000
<hr/>	
Application Type	Class II Permissive Change
<hr/>	
Date of Test	Jan. 08, 2025 ~ Feb. 04, 2025
<hr/>	
Location of Test	<input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing Lab (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
<hr/>	
Test Standard Used	47CFR § 2.1093
<hr/>	
Test Results	PASS (SAR Limit: 8.0 W/kg) Refer to the clause 3.3 Test Result
<hr/>	
The result shown in this test report refer only to the sample(s) tested unless otherwise stated. This test results were applied only to the test methods required by the standard.	

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	Feb. 10. 2025	Initial Release
1	Mar.10. 2025	Added Section 13

Notice

Content

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

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1. Test Regulations

The tests were performed according to the following regulations:

Test Standard	IEEE Standard 1528-2013 & KDB procedures
Test Method	<ul style="list-style-type: none">- FCC KDB Publication 447498 D01 General SAR Guidance v06- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02- FCC KDB Publication 865664 D02 SAR Reporting v01r02- FCC KDB Publication 643646 D01 SAR Test for PTT Radios v01r03

2. Test Location

2.1 Test Laboratory

Company Name	HCT Co., Ltd.
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea
Telephone	031-645-6300
Fax.	031-645-6401

3. Information of the EUT

3.1 General Information of the EUT

Model Name	VP8000-F2, VP8000-F3
Equipment Type	MULTIBAND DIGITAL TRANSCEIVER
FCC ID	K44515000
Application Type	Class II Permissive Change
Applicant	JVCKENWOOD Corporation
Change Note	Batteries models KNB-L13 and KNB-L12 have been added, please refer to the technical documentation for detailed changes.

3.2 Host DUT description

VP8000-F3



VP8000-F2

Standard key



3.3 Attestation of test result of device under test

Band	Tx. Frequency (MHz)	Equipment Class	Reported 1g SAR (W/kg)	
			Hand-held to face SAR	Body-Worn Belt clip SAR
VHF	150 ~ 174	TNF	1.38	1.83
UHF	406.1 ~ 512	TNF	2.63	5.47
700/800 MHz	769 ~ 869	TNF	1.16	4.78
Total Exposure Ratio			0.71	
Date(s) of Tests:		Jan. 08, 2025 ~ Feb. 04, 2025		

Note : The Duty Cycle of PTT was 50 % applied.(VHF, UHF, 700/800 MHz)

The report contains the C2PC test results for the addition of battery models KNB-L13 and KNB-L12 to the VP8000-F2, and VP8000-F3.

4. Output Power Specifications

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB publication 447498 D01v06.

4.1 Maximum Output Power

Band	Frequency	Maximum Power
VHF	150 MHz ~ 174 MHz	6.4 W
UHF	406.1 MHz ~ 512 MHz	5.3 W
700/800 MHz	769 MHz ~ 775 MHz, 799 MHz ~ 805 MHz, 806 MHz ~ 824 MHz, 851 MHz ~ 869 MHz	3.0 W (700 MHz) 3.1 W (800 MHz)

4.2 Output Average Conducted Power

4.2.1 VHF Conducted Power

Frequency (MHz)	Type	Channel	Power (dBm)
150.05	Analog	1	37.90
156.60	Analog	8	38.00
158.05	Analog	2	37.99
165.20	Analog	9	37.77
166.00	Analog	3	37.75
173.95	Analog	4	37.79

For FCC Band:

Per KDB 447498 D01v06 Page 7 section 6) pages 7-8, the number of channels required to be tested is as follows.

$$F_{high} = 174 \text{ MHz}$$

$$F_c = 162 \text{ MHz}$$

$$F_{low} = 150 \text{ MHz}$$

$$N_c = \text{Round} \{ [100(f_{high} - f_{low}) / f_c]^{0.5} \times (f_c / 100)^{0.2} \} = \text{Round} \{ [100(174-150) / 162]^{0.5} \times (162/100)^{0.2} \} = 4$$

Therefore, for the frequency band from 150.05 MHz to 173.95 MHz, 4 channels are required for testing.

4.2.2 UHF Conducted Power

Frequency (MHz)	Type	Channel	Power (dBm)
406.15	Analog	1	37.06
418.05	Analog	8	36.84
429.95	Analog	2	36.77
450.05	Analog	9	36.94
459.95	Analog	3	37.03
460.05	Analog	10	37.02
469.95	Analog	4	37.20
470.05	Analog	5	37.08
491.05	Analog	6	37.10
511.95	Analog	7	37.16

For FCC Band:

Per KDB 447498 D01v06 Page 7 section 6) pages 7-8, the number of channels required to be tested is as follows.

$$F_{high} = 512 \text{ MHz}$$

$$F_c = 459.05 \text{ MHz}$$

$$F_{Low} = 406.1 \text{ MHz}$$

$$N_c = \text{Round} \{ [100(f_{high} - f_{low}) / f_c]^{0.5} \times (f_c / 100)^{0.2} \} = \text{Round} \{ [100(512-406.1) / 459.05]^{0.5} \times (459.05/100)^{0.2} \} = 7$$

Therefore, for the frequency band from 406.1 MHz to 512 MHz, 7 channels are required for testing.

4.2.3 700/800 MHz Conducted Power

Frequency (MHz)	Type	Channel	Power (dBm)
769.05	Analog	11	34.70
799.05	Analog	12	34.71
815.05	Analog	13	34.82
851.05	Analog	14	34.84
868.95	Analog	15	34.90

For FCC Band:

Per KDB 447498 D01v06 Page 7 section 6) pages 7-8, the number of channels required to be tested is as follows.

$$F_{high} = 869 \text{ MHz}$$

$$F_c = 819 \text{ MHz}$$

$$F_{low} = 769 \text{ MHz}$$

$$N_c = \text{Round} \{ [100(f_{high} - f_{low}) / f_c]^{0.5} \times (f_c / 100)^{0.2} \} = \text{Round} \{ [100(869-769) / 819]^{0.5} \times (819/100)^{0.2} \} = 5$$

Therefore, for the frequency band from 769 MHz to 869 MHz, 5 channels are required for testing.

5. Manufacturer's Accessory List

Part No.	Description	Accessory Type	Accessory
KRA-23M	UHF Low Profile Helical Antenna (440-490 MHz)	Antenna	1
KRA-23M2	UHF Low Profile Helical Antenna (470-520 MHz)		2
KRA-23M3	UHF Low Profile Helical Antenna (400-450 MHz)		3
KRA-27M	UHF Whip Antenna (440-490 MHz)		4
KRA-27M2	UHF Whip Antenna (470-520 MHz)		5
KRA-27M3	UHF Whip Antenna (400-450 MHz)		6
KRA-42M	UHF Stubby Antenna (440-490 MHz)		7
KRA-42M2	UHF Stubby Antenna (470-520 MHz)		8
KRA-42M3	UHF Stubby Antenna (400-450 MHz)		9
KRA-22M	VHF Low Profile Helical Antenna (146-162 MHz)		10
KRA-22M2	VHF Low Profile Helical Antenna (162-174 MHz)		11
KRA-26M	VHF Helical Antenna (146-162 MHz)		12
KRA-26M2	VHF Helical Antenna (162-174 MHz)		13
KRA-41M	VHF Stubby antenna (146-162 MHz)		14
KRA-41M2	VHF Stubby antenna (162-174 MHz)		15
KRA-25	High gain VHF helically loaded whip antenna (148-162 MHz)		16
KRA-28	Broad-band VHF helically loaded whip antenna (140-170 MHz)		17
KRA-29	Broad-band UHF Antenna (380-430MHz)		18
KRA-36	700/800 MHz Stubby Antenna		19
KRA-32	700/800MHz Whip Antenna		20
KRA-29P	Broad-band UHF Antenna (400-470MHz)		21
KRA-47MB	MULTIBAND ANTENNA (Helical,136-174 MHz, 380-520 MHz, 763-870 MHz)		22
5010900400	ANTENNA,MULTIBAND,700-800/VHF,GPS,LOGO,WHITE CORE (Helical, 136-174 MHz, 762-870 MHz)		23
KNB-L2	2600mAh Li-ion Battery	Battery	1
KNB-L3	3400mAh Li-ion Battery		2
KNB-LS5	2000mAh Li-ion Battery		3
KNB-LS7	3800mAh Li-ion Battery		4
KNB-L11	3900mAh Li-ion Battery		5
KBP-8	AAx12 Battery Case		6
KNB-L12	3000mAh Li-ion Battery		7
KNB-L13	4000mAh Li-ion Battery		8
KBH-11	Belt Clip	Carrying Accessories	1
KW9140-LF	VP8000 LEATHER CASE, BELT LOOP (SMALL BATT)		2
KW9140-LP	VP8000 LEATHER CASE, D-SWIVEL (SMALL BATT)		3
KW9140-NP	VP8000 NYLON CASE, D-SWIVEL (SMALL BATT)		4
KW9130-LF	VP8000 LEATHER CASE, BELT LOOP (LARGE BATT)		5
KW9130-LP	VP8000 LEATHER CASE, D-SWIVEL (LARGE BATT)		6
KW9130-NP	VP8000 NYLON CASE, D-SWIVEL (LARGE BATT)		7
KCT-30	2.5mm Audio Accessory Adapter for KEP-3/4	Microphones & Audio Accessories	1
KEP-1	3.5mm earphone		2
KEP-2	2.5mm earphone kit for KMC-49 Speaker Mic		3
KEP-3	30" Earphone kit w/ 2.5mm plug for KCT-30		4
KEP-4	48" Earphone kit w/ 2.5mm plug for KCT-30		5
KHS-11BE	2-wire mic w/earphone (Beige)		6
KHS-11BL	2-wire mic w/earphone (Black)		7
KHS-12BE	3-wire mic w/earphone (Beige, non TDMA)		8
KHS-12BL	3-wire mic w/earphone (Black, non TDMA)		9
KHS-14	Light Weight headset		10
KHS-15-BH	Heavy-duty behind-the-headset (non TDMA)		11
KHS-15-OH	Heavy-duty over-the-headset (non TDMA)		12
KMC-49	Mic. with Antenna Connector		13
KMC-70	Speaker Microphone		14
KMC-70GR	Speaker Microphone		15
KMC-SM1	Smart Speaker Microphone		16

*** Note: Battery Dimensions**

No.	description	Size (mm)
KNB-L2	2600mAh Li-ion Battery	WHD 58.0 x 116.4 x 20.5
KNB-L3	3400mAh Li-ion Battery	WHD 58.0 x 116.4 x 25.9
KNB-LS5	2000mAh Li-ion Battery	WHD 58.0 x 116.4 x 20.5
KNB-LS7	3800mAh Li-ion Battery	WHD 58.0 x 116.4 x 26.9
KNB-L11	3900mAh Li-ion Battery	WHD 58.0 x 116.4 x 27.9
KBP-8	AAx12 Battery Case	WHD 68.4 x 195.8 x 36.6
KNB-L12	3000mAh Li-ion Battery	WHD 58.0 x 116.4 x 19.4
KNB-L13	4000mAh Li-ion Battery	WHD 58.0 x 116.4 x 23.5

This SAR report is the result of a change test for adding batteries. Since the additional battery has the biggest capacity of the battery, the Head Face SAR test were performed the Full SAR test, Also, the body worn SAR test were performed Full SAR test because the additional battery was the thinnest.

*** Radio Face Test (Hand-held to Face)**

Battery 7																						
Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Battery 8																						
Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.	Ant.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*** Radio Body Test (Body-Worn)**

Audio Accessory	Battery							
	1	2	3	4	5	6	7	8
1	No	No	No	No	No	No	No	No
2	No	No	No	No	No	No	No	No
3	No	No	No	No	No	No	No	No
4	No	No	No	No	No	No	No	No
5	No	No	No	No	No	No	No	No
6	No	No	No	No	No	No	No	No
7	No	No	No	No	No	No	No	No
8	No	No	No	No	No	No	No	No
9	No	No	No	No	No	No	No	No
10	No	No	No	No	No	No	No	No
11	No	No	No	No	No	No	No	No
12	No	No	No	No	No	No	No	No
13	No	No	No	No	No	No	No	No
14	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	No	No	No	No	No	No	No	No
16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* Manufacture's disclosed accessory listing information provided by Kenwood corporation.

6. Introduction

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

$$SAR = \frac{d}{dt} \left(\frac{dU}{dm} \right)$$

Figure 1. SAR Mathematical Equation
SAR is expressed in units of Watts per Kilogram (W/kg)
 $SAR = \sigma E^2 / \rho$

Where:

σ = conductivity of the tissue-simulant material (S/m)

ρ = mass density of the tissue-simulant material (kg/m³)

E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

7. Description of test equipment

7.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY5 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.2).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC with Windows XP or Windows 7 is working with SAR Measurement system DASY5, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

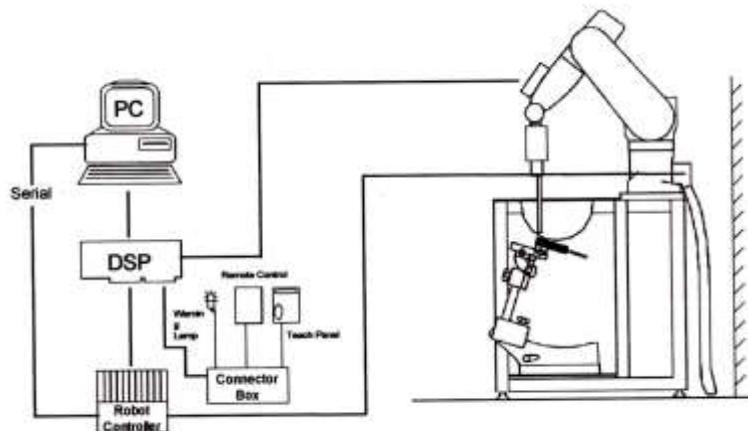


Figure 2. HCT SAR Lab. Test Measurement Set-up

The DAE consists 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 and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

7.2 ELI Phantom

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range

of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-1528 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG diametric probes and dipoles.



Figure 6.1 ELI Phantom

Shell Thickness
Filling Volume
Dimensions

2.0 \pm 0.2mm
approx. 30 liters
Major axis: 600 mm, Minor axis: 400 mm

7.3 Device Holder for Transmitters

Device Holder – Mounting Device	
In combination with the SAM Phantom, the Mounting Device enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatable positioned according to the EN 50360:2001/A:2001 and FCC KDB specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).	
<p>Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations. To produce the Worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.</p>	

7.4 Validation Dipole

The reference dipole should have a return loss better than -20 dB (measured in the setup) at the resonant frequency to reduce the uncertainty in the power measurement.

CLA

System Validation Dipole	
Description	Narrowband antenna is used to simulate the 30-220 MHz range and calculates the SAR antenna system calibration value. A resonant loop antenna is integrated in a metal structure from the environment of the resonant structure.
Frequency	150 MHz
Return Loss	> 10 dB at specified validation position
Power Capability	>10 W continuous
Dimension	CLA150: dipole length : 222.0 mm; overall height : 95.0 mm



Dipole

System Validation Dipole	
Description	symmetrical dipole with $\lambda/4$ balun. Enables measurement of feedpoint impedance with network analyzer (NWA). Matched for use near flat phantoms filled with tissue simulating liquids.
Frequency	450 MHz, 835 MHz
Return Loss	> 20 dB at specified validation position
Power Capability	> 100 W (f < 1GHz), >40 W (f > 1 GHz)
Dimension	D450V2: dipole length : 272.0 mm ; overall height : 330.0 mm D835V2: dipole length : 161.0 mm ; overall height : 340.0 mm



7.5 Brain & Muscle Tissue Simulating Mixture Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 1). Preservation with a bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove.

Frequency (MHz)	30	50	144	450	835	900			
Recipe source number	3	3	2	2	3	2	4	2	2
Ingredients (% by weight)									
Deionised water	48,30	48,30	53,53	55,12	48,30	48,53	56	50,36	50,31
Tween			44,70	43,31		49,51		48,39	48,34
Oxidised mineral oil							44		44
Diethylenglycol monohexylether									
Triton X-100									
Diacetin	50,00	50,00			50,00				
DGBE									
NaCl	1,60	1,60	1,77	1,57	1,60	1,96		1,25	1,35
Additives and salt	0,10	0,10			0,10				
Measured dielectric parameters									
ϵ_r'	54,2	53,1	54,54	52,81	51,0	43,29	42,3	41,6	41,0
σ (S/m)	0,75	0,75	0,76	0,76	0,77	0,88	0,84	0,90	0,98
Temp. (°C)			21	21		21	20	21	21
ϵ_{temp_liquid} uncertainty (%)	0,8	0,1			0,1	0,1		0,04	0,04
σ_{temp_liquid} uncertainty (%)	2,8	2,8			2,6	4,2		1,6	1,6
Target values (from Table 1)									
ϵ_r'	55,0	54,5		52,4		43,5	41,5	41,5	
σ (S/m)	0,75	0,75		0,76		0,87	0,90	0,97	

8. SAR Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013.

1. The SAR distribution at the exposed side of the head or body was measured at a distance no more than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the DUT's head and body area and the horizontal grid resolution was depending on the FCC KDB 865664 D01v01r04 table 4-1 & IEEE 1528-2013.
2. Based on step, the area of the maximum absorption was determined by sophisticated interpolations routines implemented in DASY software. When an Area Scan has measured all reachable point. DASY system computes the field maximal found in the scanned are, within a range of the maximum. SAR at this fixed point was measured and used as a reference value.
3. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB 865664 D01v01r04 table 4-1 and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (reference from the DASY manual.)
 - a. The data at the surface were extrapolated, since the center of the dipoles is no more than 2.7 mm away from the tip of the probe (it is different from the probe type) and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
 - b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
3. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan. If the value changed by more than 5 %, the SAR evaluation and drift measurements were repeated.

Area scan and zoom scan resolution setting follow KDB 865664 D01v01r04 quoted below.

		$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		$5 \pm 1 \text{ mm}$	$\cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
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: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$		$\leq 2 \text{ GHz}: \leq 15 \text{ mm}$ $2-3 \text{ GHz}: \leq 12 \text{ mm}$	$3-4 \text{ GHz}: \leq 12 \text{ mm}$ $4-6 \text{ GHz}: \leq 10 \text{ mm}$
Maximum zoom scan Spatial resolution: $\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}}$		$\leq 2 \text{ GHz}: \leq 8 \text{ mm}$ $2-3 \text{ GHz}: \leq 5 \text{ mm}^*$	$3-4 \text{ GHz}: \leq 5 \text{ mm}^*$ $4-6 \text{ GHz}: \leq 4 \text{ mm}^*$
Maximum zoom scan Spatial resolution normal to phantom surface	uniform grid: $\Delta z_{\text{zoom}}(n)$	$\leq 5 \text{ mm}$	$3-4 \text{ GHz}: \leq 4 \text{ mm}$ $4-5 \text{ GHz}: \leq 3 \text{ mm}$ $5-6 \text{ GHz}: \leq 2 \text{ mm}$
	graded grid $\Delta z_{\text{zoom}}(1): \text{between } 1^{\text{st}}$ two Points closest to phantom surface	$\leq 4 \text{ mm}$	$3-4 \text{ GHz}: \leq 3 \text{ mm}$ $4-5 \text{ GHz}: \leq 2.5 \text{ mm}$ $5-6 \text{ GHz}: \leq 2 \text{ mm}$
	$\Delta z_{\text{zoom}}(n>1): \text{between}$ subsequent Points		$\leq 1.5 \cdot \Delta z_{\text{zoom}}(n-1)$
Minimum zoom scan volume	x, y, z	$\geq 30 \text{ mm}$	$3-4 \text{ GHz}: \geq 28 \text{ mm}$ $4-5 \text{ GHz}: \geq 25 \text{ mm}$ $5-6 \text{ GHz}: \geq 22 \text{ mm}$
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 reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq 1.4 \text{ W/kg}$, $\leq 8 \text{ mm}$, $\leq 7 \text{ mm}$ and $\leq 5 \text{ mm}$ 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. Description of Test Position

9.1 Body Holster/Belt Clip Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with each accessory. If multiple accessory share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some Devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used.

Since this EUT does not supply any body worn accessory to the end user a distance of 0 cm from the EUT back surface to the liquid interface is configured for the generic test.

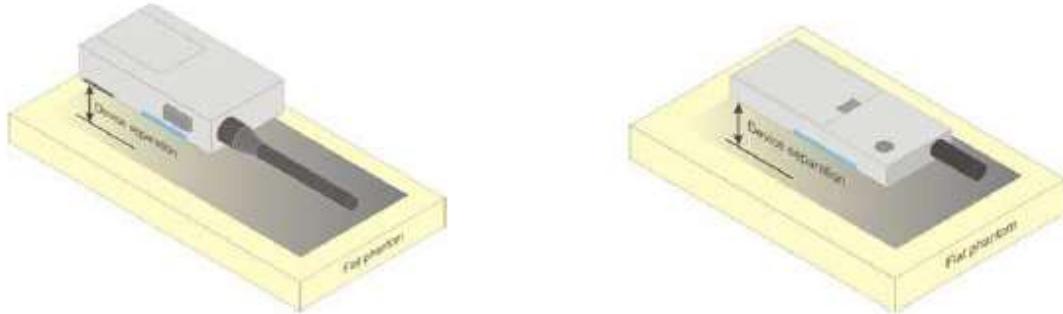
"See the Test SET-UP Photo"

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessory(ies), Including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worst case positioning is then documented and used to perform Body SAR testing.

9.2 Hand-held to Face device

A typical example of a front-of-face device is a two-way radio that is held at a distance from the face of the user when transmitting. In these cases the device under test shall be positioned at the distance to the phantom surface that corresponds to the intended use as specified by the manufacturer in the user instructions. If the intended use is not specified, a separation distance of 25 mm⁵ between the phantom surface and the device shall be used.



10. RF Exposure Limits

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/kg)	CONTROLLED ENVIRONMENT Occupational (W/kg)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

Table 10.1 Safety Limits for Partial Body Exposure

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole-body.

*** The Spatial Peak value of the SAR averaged over any 10 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

11. System Verification

11.1 Tissue Verification

The Head simulating material is calibrated by HCT using the DAKS 12 to determine the conductivity and permittivity.

Table for Head Tissue Verification

Date of Tests	Tissue Temp. (°C)	Tissue Type	Freq. (MHz)	Measured Conductivity σ (S/m)	Measured Dielectric Constant, ε	Target Conductivity σ (S/m)	Target Dielectric Constant, ε	% dev σ	% dev ε
01/08/2025	20.0	150H	100	0.723	56.025	0.756	54.630	-4.37	2.55
			150	0.769	52.849	0.760	52.300	1.18	1.05
			200	0.816	50.262	0.797	49.970	2.38	0.58
01/09/2025	20.4	150H	100	0.722	55.724	0.756	54.630	-4.50	2.00
			150	0.767	52.550	0.760	52.300	0.92	0.48
			200	0.814	49.957	0.797	49.970	2.13	-0.03
01/14/2025	20.4	150H	100	0.721	55.200	0.756	54.630	-4.63	1.04
			150	0.768	52.000	0.760	52.300	1.05	-0.57
			200	0.816	49.400	0.797	49.970	2.38	-1.14
01/30/2025	20.1	450H	400	0.830	44.800	0.870	44.100	-4.60	1.59
			430	0.845	44.000	0.870	43.740	-2.87	0.59
			450	0.861	43.500	0.870	43.500	-1.03	0.00
			500	0.899	42.400	0.874	43.240	2.86	-1.94
01/31/2025	20.3	450H	400	0.832	44.500	0.870	44.100	-4.37	0.91
			430	0.850	43.800	0.870	43.740	-2.30	0.14
			450	0.872	43.400	0.870	43.500	0.23	-0.23
			500	0.914	41.900	0.874	43.240	4.58	-3.10
02/03/2025	21.0	835H	820	0.932	40.800	0.899	41.577	3.67	-1.87
			835	0.937	40.600	0.900	41.500	4.11	-2.17
			850	0.960	40.400	0.916	41.500	4.80	-2.65
			870	0.981	40.100	0.938	41.500	4.58	-3.37
02/04/2025	21.3	835H	820	0.933	40.500	0.899	41.577	3.78	-2.59
			835	0.941	40.400	0.900	41.500	4.56	-2.65
			850	0.958	40.200	0.916	41.500	4.59	-3.13
			870	0.978	40.000	0.938	41.500	4.26	-3.61

11.2 System Verification

* Input Power: 50 mW

Freq. [MHz]	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR _{1g} (SPEAG) [W/kg]	50Mw Measured SAR _{1g} [W/kg]	1 W Normalized SAR _{1g} [W/kg]	Deviation [%]	Limit [%]
150	01/08/2025	7655	4014	Head	20.1	20.0	3.72	0.191	3.82	2.69	± 10
150	01/09/2025	7655	4014	Head	20.5	20.4	3.72	0.190	3.80	2.15	± 10
150	01/14/2025	7655	4014	Head	20.5	20.4	3.72	0.196	3.92	5.38	± 10
450	01/30/2025	7655	1007	Head	20.0	20.1	4.54	0.223	4.46	-1.76	± 10
450	01/31/2025	7655	1007	Head	20.2	20.3	4.54	0.225	4.50	-0.88	± 10
835	02/03/2025	7655	441	Head	21.1	21.0	9.73	0.499	9.98	2.57	± 10
835	02/04/2025	7655	441	Head	21.2	21.3	9.73	0.501	10.02	2.98	± 10

11.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequency band by using the system verification kit. (Graphic Plots Attached)

- Cabling the system, using the verification kit equipment.
- Generate about 50 mW Input level from the signal generator to the Dipole Antenna.
- Dipole antenna was placed below the flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

Note;

SAR Verification was performed according to the FCC KDB 865664 D01v01r04.

12. SAR Test Data Summary

12.1 Hand-held to Face SAR Results

VHF Hand-held to Face SAR												
Model Name	Frequency (MHz)	Ch.	Tune-Up Limit (dBm)	Measured Power (dBm)	Power Drift (dB)	Battery	Antenna	Separation Distance (mm)	Measured SAR (W/Kg)	50% Duty	Reported SAR (W/Kg)	Plot No.
VP8000-F3	156.6	8	38.06	38.00	0.06	KNB-L13	KRA-22M	25	0.151	0.076	0.076	-
VP8000-F3	173.95	4	38.06	37.79	-0.17	KNB-L13	KRA-22M2	25	1.54	0.770	0.852	-
VP8000-F3	156.6	8	38.06	38.00	-0.65	KNB-L13	KRA-26M	25	1.460	0.730	0.860	-
VP8000-F3	173.95	4	38.06	37.79	-0.01	KNB-L13	KRA-26M2	25	0.821	0.411	0.438	-
VP8000-F3	156.6	8	38.06	38.00	0.04	KNB-L13	KRA-41M	25	0.071	0.036	0.036	-
VP8000-F3	173.95	4	38.06	37.79	-0.03	KNB-L13	KRA-41M2	25	0.451	0.226	0.242	-
VP8000-F3	156.6	8	38.06	38.00	-0.77	KNB-L13	KRA-25	25	2.28	1.140	1.380	1
VP8000-F3	156.6	8	38.06	38.00	0.97	KNB-L13	KRA-28	25	0.429	0.215	0.174	-
VP8000-F3	156.6	8	38.06	38.00	0.02	KNB-L13	KRA-47MB	25	0.094	0.047	0.047	-
VP8000-F3	156.6	8	38.06	38.00	-0.59	KNB-L13	5010900400	25	0.820	0.410	0.476	-
VP8000-F3	156.6	8	38.06	38.00	-0.47	KNB-L12	KRA-25	25	2.15	1.075	1.215	-
VP8000-F2	156.6	8	38.06	38.00	-0.44	KNB-L13	KRA-25	25	2.43	1.215	1.363	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Controlled Exposure/ Occupational									Head 8 W/kg Averaged over 1 gram			

UHF Hand-held to Face SAR												
Model Name	Frequency (MHz)	Ch.	Tune-Up Limit (dBm)	Measured Power (dBm)	Power Drift (dB)	Battery	Antenna	Separation Distance (mm)	Measured SAR (W/Kg)	50% Duty	Reported SAR (W/Kg)	Plot No.
VP8000-F3	469.95	4	37.24	37.20	-0.07	KNB-L13	KRA-23M	25	4.13	2.065	2.118	-
VP8000-F3	511.95	7	37.24	37.16	-0.07	KNB-L13	KRA-23M2	25	2.11	1.055	1.092	-
VP8000-F3	406.15	1	37.24	37.06	-0.05	KNB-L13	KRA-23M3	25	4.99	2.495	2.631	2
VP8000-F3	469.95	4	37.24	37.20	-0.03	KNB-L13	KRA-27M	25	3.70	1.850	1.880	-
VP8000-F3	511.95	7	37.24	37.16	-0.00	KNB-L13	KRA-27M2	25	2.75	1.375	1.401	-
VP8000-F3	406.15	1	37.24	37.06	-0.05	KNB-L13	KRA-27M3	25	2.96	1.480	1.560	-
VP8000-F3	469.95	4	37.24	37.20	-0.02	KNB-L13	KRA-42M	25	1.80	0.900	0.913	-
VP8000-F3	511.95	7	37.24	37.16	-0.12	KNB-L13	KRA-42M2	25	1.70	0.850	0.890	-
VP8000-F3	406.15	1	37.24	37.06	-0.01	KNB-L13	KRA-42M3	25	2.01	1.005	1.050	-
VP8000-F3	406.15	1	37.24	37.20	0.01	KNB-L13	KRA-29	25	2.74	1.370	1.379	-
VP8000-F3	469.95	4	37.24	37.20	-0.10	KNB-L13	KRA-47MB	25	0.787	0.394	0.406	-
VP8000-F3	406.15	1	37.24	37.06	-0.00	KNB-L12	KRA-23M3	25	0.867	0.434	0.452	-
VP8000-F2	406.15	1	37.24	37.06	0.04	KNB-L13	KRA-23M3	25	0.829	0.415	0.428	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Controlled Exposure/ Occupational									Head 8 W/kg Averaged over 1 gram			

700/800 MHz Hand-held to Face SAR												
Model Name	Frequency (MHz)	Ch.	Tune-Up Limit (dBm)	Measured Power (dBm)	Power Drift (dB)	Battery	Antenna	Separation Distance (mm)	Measured SAR (W/Kg)	50% Duty	Reported SAR (W/Kg)	Plot No.
VP8000-F3	868.95	15	34.91	34.90	-0.01	KNB-L13	KRA-36	25	1.01	0.505	0.507	-
VP8000-F3	868.95	15	34.91	34.90	-0.32	KNB-L13	KRA-32	25	0.397	0.199	0.214	-
VP8000-F3	868.95	15	34.91	34.90	-0.05	KNB-L13	KRA-47MB	25	0.849	0.425	0.430	-
VP8000-F3	868.95	15	34.91	34.90	0.04	KNB-L13	5010900400	25	0.978	0.489	0.486	-
VP8000-F3	868.95	15	34.91	34.90	-0.06	KNB-L12	KRA-36	25	2.29	1.145	1.164	3
VP8000-F2	868.95	15	34.91	34.90	0.01	KNB-L12	KRA-36	25	0.963	0.482	0.482	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Controlled Exposure/ Occupational									Head 8 W/kg Averaged over 1 gram			

12.2 Body-worn Belt clip SAR Results

VHF Body-worn Belt clip SAR												
Model Name	Frequency (MHz)	Ch.	Tune-Up Limit (dBm)	Measured Power (dBm)	Power Drift (dB)	Battery	Antenna	Separation Distance (mm)	Measured SAR (W/Kg)	50% Duty	Reported SAR (W/Kg)	Plot No.
VP8000-F3	156.6	8	38.06	38.00	-0.14	KNB-L12	KRA-22M	0	0.807	0.404	0.423	-
VP8000-F3	173.95	4	38.06	37.79	-0.02	KNB-L12	KRA-22M2	0	1.60	0.800	0.855	-
VP8000-F3	156.6	8	38.06	38.00	-0.62	KNB-L12	KRA-26M	0	0.819	0.410	0.479	-
VP8000-F3	173.95	4	38.06	37.79	-0.06	KNB-L12	KRA-26M2	0	2.21	1.105	1.192	-
VP8000-F3	156.6	8	38.06	38.00	0.29	KNB-L12	KRA-41M	0	0.162	0.081	0.077	-
VP8000-F3	173.95	4	38.06	37.79	-0.05	KNB-L12	KRA-41M2	0	1.25	0.625	0.673	-
VP8000-F3	156.6	8	38.06	38.00	-0.48	KNB-L12	KRA-25	0	3.23	1.615	1.829	4
VP8000-F3	156.6	8	38.06	38.00	-0.66	KNB-L12	KRA-28	0	1.87	0.935	1.104	-
VP8000-F3	156.6	8	38.06	38.00	-0.14	KNB-L12	KRA-47MB	0	2.57	1.285	1.346	-
VP8000-F3	156.6	8	38.06	38.00	0.27	KNB-L12	5010900400	0	0.885	0.443	0.422	-
VP8000-F3	156.6	8	38.06	38.00	-0.06	KNB-L13	KRA-25	0	1.30	0.65	0.668	-
VP8000-F2	156.6	8	38.06	38.00	0.00	KNB-L12	KRA-25	0	1.70	0.85	0.862	-

ANSI/ IEEE C95.1 - 2005 – Safety Limit
Spatial Peak
Controlled Exposure/ Occupational

Body
8 W/kg
Averaged over 1 gram

UHF Body-worn Belt clip SAR												
Model Name	Frequency (MHz)	Ch.	Tune-Up Limit (dBm)	Measured Power (dBm)	Power Drift (dB)	Battery	Antenna	Separation Distance (mm)	Measured SAR (W/Kg)	50% Duty	Reported SAR (W/Kg)	Plot No.
VP8000-F3	469.95	4	37.24	37.20	-0.12	KNB-L12	KRA-23M	0	8.33	4.165	4.321	-
VP8000-F3	470.05	5	37.24	37.08	-0.10	KNB-L12	KRA-23M	0	7.59	3.795	4.029	-
VP8000-F3	460.05	10	37.24	37.02	0.03	KNB-L12	KRA-23M	0	7.76	3.880	4.054	-
VP8000-F3	459.95	3	37.24	37.03	-0.04	KNB-L12	KRA-23M	0	7.81	3.905	4.136	-
VP8000-F3	450.05	9	37.24	36.94	-0.06	KNB-L12	KRA-23M	0	7.62	3.810	4.139	-
VP8000-F3	406.15	1	37.24	37.06	-0.08	KNB-L12	KRA-23M3	0	8.79	4.395	4.666	-
VP8000-F3	418.05	8	37.24	36.84	-0.04	KNB-L12	KRA-23M3	0	6.49	3.245	3.591	-
VP8000-F3	429.95	2	37.24	36.77	0.02	KNB-L12	KRA-23M3	0	5.75	2.875	3.189	-
VP8000-F3	470.05	5	37.24	37.08	-0.04	KNB-L13	KRA-23M2	0	10.1	5.050	5.288	-
VP8000-F3	491.05	6	37.24	37.10	-0.07	KNB-L12	KRA-23M2	0	6.44	3.220	3.380	-
VP8000-F3	511.95	7	37.24	37.16	-0.05	KNB-L12	KRA-23M2	0	3.61	1.805	1.860	-
VP8000-F3	469.95	4	37.24	37.20	-0.08	KNB-L12	KRA-27M	0	8.34	4.170	4.287	-
VP8000-F3	470.05	5	37.24	37.08	-0.06	KNB-L12	KRA-27M	0	8.7	4.350	4.576	-
VP8000-F3	460.05	10	37.24	37.02	-0.05	KNB-L12	KRA-27M	0	7.25	3.625	3.858	-
VP8000-F3	459.95	3	37.24	37.03	0.00	KNB-L12	KRA-27M	0	7.28	3.640	3.820	-
VP8000-F3	450.05	9	37.24	36.94	-0.01	KNB-L12	KRA-27M	0	7.44	3.720	4.014	-
VP8000-F3	511.95	7	37.24	37.16	0.01	KNB-L12	KRA-27M2	0	6.38	3.190	3.242	-
VP8000-F3	406.15	1	37.24	37.06	-0.01	KNB-L12	KRA-27M3	0	6.96	3.480	3.636	-
VP8000-F3	418.05	8	37.24	36.84	-0.04	KNB-L12	KRA-27M3	0	5.89	2.945	3.259	-
VP8000-F3	429.95	2	37.24	36.77	-0.03	KNB-L12	KRA-27M3	0	6.17	3.085	3.461	-
VP8000-F3	469.95	4	37.24	37.20	-0.01	KNB-L12	KRA-42M	0	4.10	2.050	2.074	-
VP8000-F3	511.95	7	37.24	37.16	-0.10	KNB-L12	KRA-42M2	0	4.05	2.025	2.111	-
VP8000-F3	406.15	1	37.24	37.06	-0.05	KNB-L12	KRA-42M3	0	8.21	4.105	4.328	-
VP8000-F3	418.05	8	37.24	36.84	-0.05	KNB-L12	KRA-42M3	0	3.87	1.935	2.146	-
VP8000-F3	429.95	2	37.24	36.77	-0.00	KNB-L12	KRA-42M3	0	3.03	1.515	1.688	-
VP8000-F3	406.15	1	37.24	37.06	-0.05	KNB-L12	KRA-29	0	6.44	3.220	3.395	-
VP8000-F3	469.95	4	37.24	37.20	-0.11	KNB-L12	KRA-47MB	0	3.26	1.630	1.687	-
VP8000-F3	470.05	5	37.24	37.08	-0.04	KNB-L13	KRA-23M2	0	3.26	1.630	1.707	-
VP8000-F2	470.05	5	37.24	37.08	-0.10	KNB-L12	KRA-23M2	0	10.3	5.150	5.468	5
VP8000-F2	470.05	5	37.24	37.08	-0.04	KNB-L12	KRA-23M2	0	10.1	5.050	5.288	*
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Controlled Exposure/ Occupational									Body 8 W/kg Averaged over 1 gram			

Note : Audio Accessory *(KMC-70)

700/800 MHz Body-worn Belt clip SAR

Model Name	Frequency (MHz)	Ch.	Tune-Up Limit (dBm)	Measured Power (dBm)	Power Drift (dB)	Battery	Antenna	Separation Distance (mm)	Measured SAR (W/Kg)	50% Duty	Reported SAR (W/Kg)	Plot No.
VP8000-F3	868.95	15	34.91	34.90	-0.04	KNB-L12	KRA-36	0	9.44	4.720	4.775	6
VP8000-F3	769.05	11	34.91	34.70	-0.04	KNB-L12	KRA-36	0	6.48	3.240	3.432	-
VP8000-F3	799.05	12	34.91	34.71	-0.06	KNB-L12	KRA-36	0	6.97	3.485	3.700	-
VP8000-F3	815.05	13	34.91	34.82	-0.02	KNB-L12	KRA-36	0	5.76	2.880	2.954	-
VP8000-F3	851.05	14	34.91	34.84	-0.01	KNB-L12	KRA-36	0	6.48	3.240	3.300	-
VP8000-F3	868.95	15	34.91	34.90	-0.02	KNB-L12	KRA-32	0	1.78	0.890	0.896	-
VP8000-F3	868.95	15	34.91	34.90	-0.04	KNB-L12	KRA-47MB	0	3.11	1.555	1.573	-
VP8000-F3	868.95	15	34.91	34.90	0.02	KNB-L12	5010900400	0	4.05	2.025	2.020	-
VP8000-F3	868.95	15	34.91	34.90	-0.01	KNB-L13	KRA-36	0	3.88	1.940	1.949	-
VP8000-F2	868.95	15	34.91	34.90	-0.13	KNB-L12	KRA-36	0	4.05	2.025	2.091	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Controlled Exposure/ Occupational								Body 8 W/kg Averaged over 1 gram				

Note : Audio Accessory (KMC-SM1)

12.3 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, FCC KDB Procedure.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v06.
6. Test signal call mode is Manual test cord.
7. The Body-worn SAR evaluation was performed with the Balt-clip body-worn accessory and audio accessory attached to the DUT and touching the outer surface of the planar phantom.
8. The adjusted SAR value was calculated by first scaling the SAR value up by the drift. This value was then scaled up based on the difference of the upper end the tolerance and the measured conducted power. The resultant value is then multiplied by 0.5 to give the SAR value at 50% duty cycle.
9. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v06. Test Procedures applied in accordance with FCC KDB 643646 D01v01r03.
10. Measurement was reduced per KDB 643646 D01v01r03.
11. When the SAR for all antennas tested using the default battery is ≤ 3.5 W/kg, testing of all other required channels is not necessary.
12. When the SAR of an antenna tested on the highest output power using the default battery is > 3.5 W/kg and ≤ 4.0 W/kg, testing of the immediately adjacent channel(s) is not necessary, but testing of other required channels may still be required.
13. When the SAR for all antennas tested using the default battery ≤ 4.0 W/kg, test additional batteries using the antenna and channel configuration that resulted in the highest SAR.
14. When the SAR of an antenna tested on the highest output power channel using the default battery is > 4.0 W/kg and ≤ 6.0 W/kg, testing of the required immediately adjacent channel(s) is necessary. For the remaining channels that cannot be excluded, this rule may be applied recursively with respect to the highest output power channel among the remaining channels.
15. Based on the SAR measured in the body-worn test sequence with default audio accessory, if the SAR for the antenna, body-worn accessory and battery combination(s) applicable to an audio accessory is/are > 4.0 W/kg and < 6.0 W/kg, test that audio accessory using the highest body-worn SAR combination (antenna, battery and body-worn accessory) and channel configuration previously identified that is applicable to the audio accessory.
16. When the SAR of an antenna tested is > 6.0 W/kg, test that battery and antenna combination with the default body-worn and audio accessory on the required immediately adjacent channels.
17. If the SAR measured > 7.0 W/kg, test that battery, antenna, body-worn and audio accessory combination on all required channels.

13. Simultaneous SAR Analysis

This device is containing transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per KDB Publication 447498 D01v06 4.3.2, simultaneous transmission SAR test exclusion may be applied when the sum of 1g SAR and 10g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is $\leq 1.6 \text{ W/kg}$ for 1g SAR and $\leq 4 \text{ W/kg}$ for 10g SAR. The different test positions in an exposure condition may be considered collectively to determine SAR exclusion according to the sum of 1g or 10g SAR.

The Bluetooth and WLAN can transmit simultaneously with the PTT Radio. But The 2.4GHz WLAN and 5GHz WLAN are not simultaneously transmitted. WLAN when used only during program installation.

For the simultaneous transmission analysis of this model, it was evaluated by referring to the report [no : HCT-SR-2209-FI001-R1] of the original model.

13.1 Hand-held to Face SAR Simultaneous Transmission Analysis

Exposure condition	UHF SAR		WLAN2.4G		Bluetooth SAR		TER
	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	
Applicable Limit	8	1	1.6	1	1.6	1	1
Hand-held to Face SAR	2.631	0.329	0.040	0.025	0.0000117	0.00000731	0.354

Exposure condition	UHF SAR		WLAN5G		Bluetooth SAR		TER
	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	
Applicable Limit	8	1	1.6	1	1.6	1	1
Hand-held to Face SAR	2.631	0.329	0.032	0.020	0.0000117	0.00000731	0.349

13.2 Body-worn Belt clip SAR Simultaneous Transmission Analysis

Exposure condition	UHF SAR		WLAN2.4G		Bluetooth SAR		TER
	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	
Applicable Limit	8	1	1.6	1	1.6	1	1
Body-worn Belt clip SAR	5.468	0.684	0.019	0.012	0	0	0.696

Exposure condition	UHF SAR		WLAN5G		Bluetooth SAR		TER
	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	(W/kg)	SAR/Limit	
Applicable Limit	8	1	1.6	1	1.6	1	1
Body-worn Belt clip SAR	5.468	0.684	0.033	0.021	0	0	0.705

13.3 Simultaneous Transmission Conclusion

The above numerical summed TER results for all the worst-case simultaneous transmission conditions were below the TER limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the TER limit. And therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013.

14. Measurement Uncertainty

Measurement Uncertainty for DUT SAR test									
According to KDB Publication 865664 D01 and IEEE Std 1528-2013 (100 MHz - 6 GHz range)									
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h = c x f / e</i>	<i>i = c x g / e</i>	<i>k</i>
Source of uncertainty	Description	Uncertainty ± %	Probability distribution	Div.	<i>ci</i>	<i>ci</i>	Standard Uncertainty	Standard Uncertainty	<i>vi or veff</i>
					(1 g)	(10 g)	± % (1 g)	± % (10 g)	
Measurement system									
Probe calibration	7.2.2.1	6.55	N	1	1	1	6.55	6.55	∞
Axial isotropy	7.2.2.2	4.70	R	1.73	0.71	0.71	1.92	1.92	∞
Hemispherical isotropy	7.2.2.2	9.60	R	1.73	0.71	0.71	3.92	3.92	∞
Boundary effect	7.2.2.6	2.00	R	1.73	1	1	1.15	1.15	∞
Linearity	7.2.2.3	4.70	R	1.73	1	1	2.71	2.71	∞
Detection limits	7.2.2.5	1.00	R	1.73	1	1	0.58	0.58	∞
Modulation response	7.2.2.4	2.40	R	1.73	1	1	1.39	1.39	∞
Readout electronics	7.2.2.7	0.30	N	1	1	1	0.30	0.30	∞
Response time	7.2.2.8	0.80	R	1.73	1	1	0.46	0.46	∞
Integration time	7.2.2.9	2.60	R	1.73	1	1	1.50	1.50	∞
RF ambient conditions - noise	7.2.4.5	3.00	R	1.73	1	1	1.73	1.73	∞
RF ambient conditions - reflections	7.2.4.5	3.00	R	1.73	1	1	1.73	1.73	∞
Probe positioner mechanical tolerance	7.2.3.1	0.80	R	1.73	1	1	0.46	0.46	∞
Probe positioning with respect to phantom shell	7.2.3.3	6.70	R	1.73	1	1	3.87	3.87	∞
Post-processing	7.2.5	4.00	R	1.73	1	1	2.31	2.31	∞
Test sample related									
Test sample positioning	7.2.3.4.3	6.15	N	1	1	1	6.15	6.15	∞
Device holder uncertainty	7.2.3.4.2	2.71	N	1	1	1	2.71	2.71	∞
SAR drift measurement	7.2.2.10	5.00	R	1.73	1	1	2.89	2.89	∞
SAR scaling	L.3	0.00	R	1.73	1	1	0.00	0.00	∞
Phantom and set-up									
Phantom uncertainty (shape and thickness uncertainty)	7.2.3.2	7.60	R	1.73	1	1	4.39	4.39	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	7.2.4.3	1.90	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity (temperature uncertainty)	7.2.4.4	0.25	R	1.73	0.78	0.71	0.11	0.10	∞
Liquid conductivity (measured)	7.2.4.3	1.51	N	1	0.78	0.71	1.18	1.07	∞
Liquid permittivity (temperature uncertainty)	7.2.4.4	0.52	R	1.73	0.23	0.26	0.07	0.08	∞
Liquid permittivity (measured)	7.2.4.3	1.17	N	1	0.23	0.26	0.27	0.30	∞
Combined standard uncertainty			RSS				13.41	13.36	∞
Expanded uncertainty (95% confidence interval)			<i>k</i> = 2				26.82	26.72	

15. SAR Test Equipment

All measurements were performed within the valid calibration period of the specific equipment.

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	ELI Phantom	-	N/A	N/A	N/A
Staubli	CS8Cspeag-TX60	F/20/0018446/C/001	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F07/56W9A1/C/01	N/A	N/A	N/A
Staubli	TX-60 Lspeag	F/20/0018446/A/001	N/A	N/A	N/A
Staubli	TX90 XLSpeag	F07/56W9A1/A/01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	020885	N/A	N/A	N/A
Staubli	D21142102	S-0602	N/A	N/A	N/A
Staubli	Light Alignment Sensor	1159	N/A	N/A	N/A
Staubli	LB	SE UKS 030 AA	N/A	N/A	N/A
TESTO	175-H1/Thermometer	44606611906	03/20/2024	Annual	03/20/2025
TESTO	608-H1/Thermometer	83406789	06/26/2024	Annual	06/26/2025
SPEAG	DAE4	1686	06/19/2024	Annual	06/19/2025
SPEAG	E-Field Probe EX3DV4	7655	05/27/2024	Annual	05/27/2025
SPEAG	Dipole CLA150	4014	08/19/2024	Annual	08/19/2025
SPEAG	Dipole D450V2.5	1007	07/11/2023	Annual	07/11/2025
SPEAG	Dipole D835V2.5	441	04/18/2024	Annual	04/18/2025
Agilent	Power Meter E4419B	MY41291386	09/11/2024	Annual	09/11/2025
Agilent	Power Meter N1911A	MY45101406	05/21/2024	Annual	05/21/2025
EMPOWER	RF Power Amplifier	1084	05/21/2024	Annual	05/21/2025
Agilent	Wideband Power Sensor N1921A	MY55220026	07/30/2024	Annual	07/30/2025
Agilent	Power Sensor 8481A	SG1091286	09/12/2024	Annual	09/12/2025
SPEAG	DAKS 12	1048	03/20/2024	Annual	03/20/2025
SPEAG	Vector Reflectometer	21393001	03/21/2024	Annual	03/21/2025
Agilent	Directional Bridge 86205A	3140A04581	04/22/2024	Annual	04/22/2025
Agilent	SIGNAL GENERATOR N5182A	MY47070230	03/19/2024	Annual	03/19/2025
Agilent	MXA Signal Analyzer N9020A	MY50510407	06/04/2024	Annual	06/04/2025
Agilent	Attenuator (3dB) 8693B	MY39260298	08/20/2024	Annual	08/20/2025
HP	Attenuator (20dB) 8493C	09271	08/20/2024	Annual	08/20/2025
Aeroflex/Weinschel	Fixed Coaxial Attenuator (30 dB)	CE6106	11/13/2024	Annual	11/13/2025
MICRO LAB	LP Filter / LA-15N	10453	09/11/2024	Annual	09/11/2025

1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAK-12 to determine the conductivity and permittivity (dielectric constant) of the brain/body-equivalent material.

16. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/IEEE C95.1-2005.

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

17. References

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Appendix A. – Test Setup Photo

Please refer to test DUT Ant. Information & setup photo file no. as follows:

Report No.

HCT-SR-2502-FC001-P

Appendix B. – SAR Test Plots

Test Laboratory: HCT CO., LTD
Liquid Temperature: 20.0 °C
Ambient Temperature: 20.1 °C
Test Date: 01/08/2025
Plot No.: 1

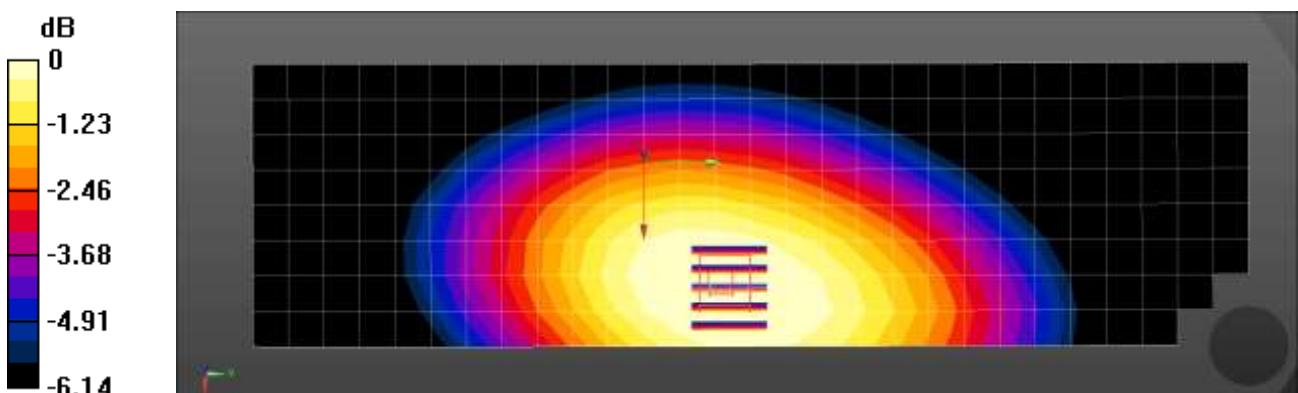
Communication System: UID 0, 150MHz (0); Frequency: 156.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 156.6$ MHz; $\sigma = 0.775$ S/m; $\epsilon_r = 52.489$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7655; ConvF(12.35, 12.35, 12.35) @ 156.6 MHz; Calibrated: 2024-05-28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1686; Calibrated: 2024-06-19
- Phantom: ELI V8.0 (20deg probe tilt); Type: QD OVA 004 Ax; Serial: xxxx
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Hand-held to Face 8ch/Area Scan (9x29x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.23 W/kg

Hand-held to Face 8ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.58 V/m; Power Drift = -0.44 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.91 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (> 16 mm)
Ratio of SAR at M2 to SAR at M1 = 68.5%
Maximum value of SAR (measured) = 3.08 W/kg



Test Laboratory: HCT CO., LTD
Liquid Temperature: 20.1 °C
Ambient Temperature: 20.0 °C
Test Date: 01/30/2025
Plot No.: 2

Measurement Report for Device, FRONT, Custom Band, CW, Channel 406200 (406.200 MHz)**Exposure Conditions**

Phantom Section, TSL	Test Distance [mm]	Position, Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	25.00	FRONT, Custom Band	CW, 0--	406.200, 406200	11.07	0.825	44.7

Hardware Setup

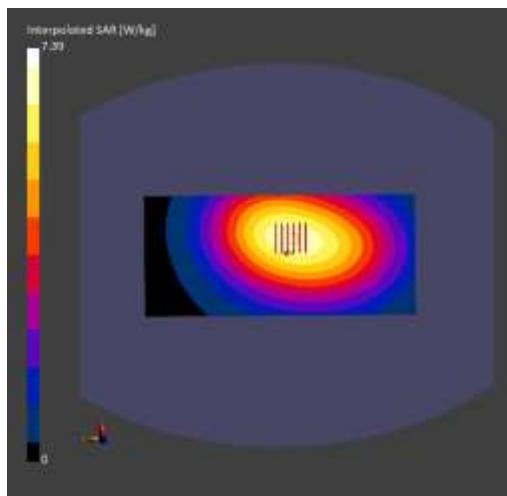
Phantom ELI V6.0 (20deg probe tilt) - xxxx	Probe, Calibration Date EX3DV4 - SN7655, 2024-05-28	DAE, Calibration Date DAE4 Sn1686, 2024-06-19
--	--	--

Scans Setup

Grid Extents [mm]	Area Scan 120.0 x 270.0	Zoom Scan 30.0 x 30.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
psSAR1g [W/Kg]	4.88	4.99
psSAR10g [W/Kg]	3.62	3.81
Power Drift [dB]	-0.13	-0.05
M2/M1 [%]		85.9
Dist 3dB Peak [mm]		> 15.0



Test Laboratory: HCT CO., LTD
Liquid Temperature: 21.0 °C
Ambient Temperature: 21.1 °C
Test Date: 02/03/2025
Plot No.: 3

Measurement Report for Device, FRONT, Custom Band, CW, Channel 869000 (869.000 MHz)**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, Head Simulating Liquid	FRONT, 25.00	Custom Band	CW, 0--	869.000, 869000	8.64	0.979	40.2

Hardware Setup

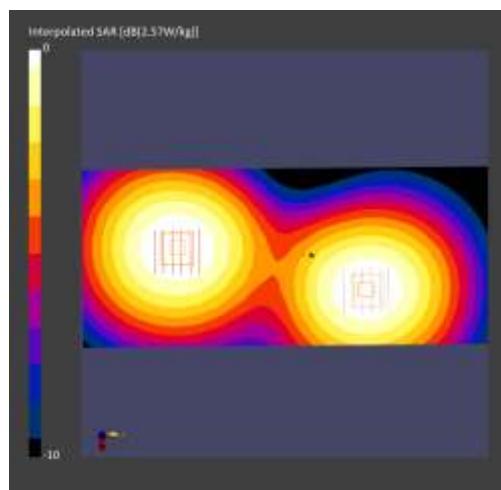
Phantom ELI V6.0 (20deg probe tilt) - xxxx Probe, Calibration Date EX3DV4 - SN7655, 2024-05-28 DAE, Calibration Date DAE4 Sn1686, 2024-06-19

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 300.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan1	Zoom Scan2
psSAR1g [W/Kg]	2.27	2.29	2.25
psSAR10g [W/Kg]	1.60	1.71	1.70
Power Drift [dB]	-0.01	-0.06	-0.02
M2/M1 [%]		90.4	90.7
Dist 3dB Peak [mm]		> 15.0	> 15.0



Test Laboratory: HCT CO., LTD
Liquid Temperature: 20.4 °C
Ambient Temperature: 20.5 °C
Test Date: 01/09/2024
Plot No.: 4

Communication System: UID 0, 150MHz (0); Frequency: 156.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 156.6$ MHz; $\sigma = 0.773$ S/m; $\epsilon_r = 52.19$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7655; ConvF(12.35, 12.35, 12.35) @ 156.6 MHz; Calibrated: 2024-05-28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1686; Calibrated: 2024-06-19
- Phantom: ELI V8.0 (20deg probe tilt); Type: QD OVA 004 Ax; Serial: xxxx
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Bodyworn Belt Clip 8ch/Area Scan (8x29x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 5.69 W/kg

Bodyworn Belt Clip 8ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 61.75 V/m; Power Drift = -0.48 dB

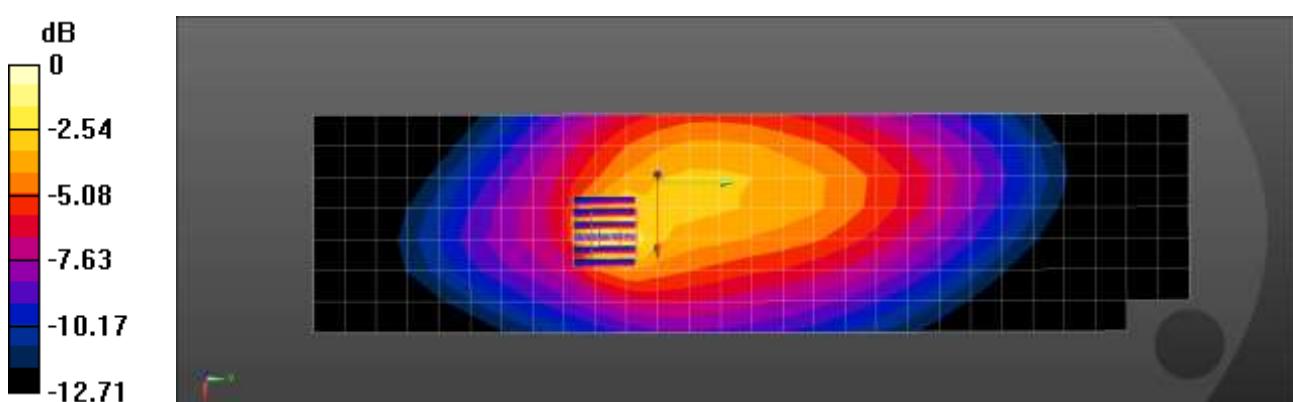
Peak SAR (extrapolated) = 9.79 W/kg

SAR(1 g) = 3.23 W/kg; SAR(10 g) = 1.88 W/kg

Smallest distance from peaks to all points 3 dB below = 8.6 mm

Ratio of SAR at M2 to SAR at M1 = 34.3%

Maximum value of SAR (measured) = 6.34 W/kg



Test Laboratory: HCT CO., LTD
Liquid Temperature: 20.3 °C
Ambient Temperature: 20.2 °C
Test Date: 01/31/2025
Plot No.: 5

Measurement Report for Device, BACK, Custom Band, CW, Channel 470100 (470.100 MHz)**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, Head Simulating Liquid	BACK, 0.00	Custom Band	CW, 0--	470.100, 470100	11.07	0.885	42.5

Hardware Setup

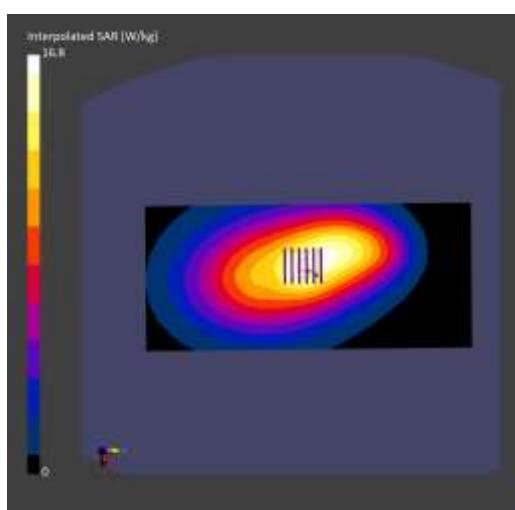
Phantom	Probe, Calibration Date	DAE, Calibration Date
ELI V6.0 (20deg probe tilt) - xxxx	EX3DV4 - SN7655, 2024-05-28	DAE4 Sn1686, 2024-06-19

Scans Setup

Grid Extents [mm]	Area Scan	Zoom Scan
Grid Steps [mm]	120.0 x 270.0	30.0 x 30.0 x 30.0
Sensor Surface [mm]	15.0 x 15.0	6.0 x 6.0 x 1.5

Measurement Results

	Area Scan	Zoom Scan
psSAR1g [W/Kg]	10.0	10.3
psSAR10g [W/Kg]	7.22	7.25
Power Drift [dB]	-0.02	-0.10
M2/M1 [%]		83.0
Dist 3dB Peak [mm]		> 15.0



Test Laboratory: HCT CO., LTD
Liquid Temperature: 21.3 °C
Ambient Temperature: 21.2 °C
Test Date: 02/04/2025
Plot No.: 6

Measurement Report for Device, BACK, Custom Band, CW, Channel 869000 (869.000 MHz)**Exposure Conditions**

Phantom Section, TSL	Test Distance [mm]	Position, Band	Group, UID	Frequency, [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	BACK, 0.00	Custom Band	CW, 0--	869.000, 869000	8.64	0.977	40.0

Hardware Setup

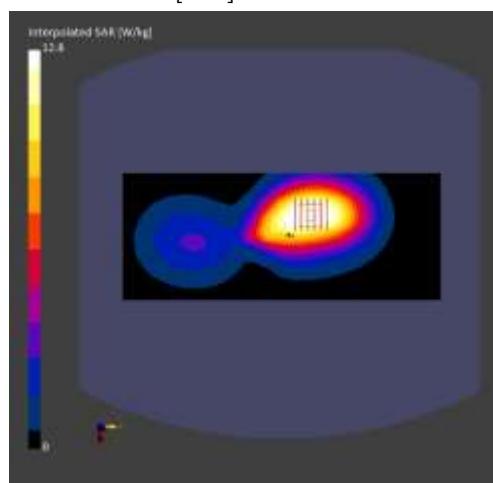
Phantom	Probe, Calibration Date	DAE, Calibration Date
ELI V6.0 (20deg probe tilt) - xxxx	EX3DV4 - SN7655, 2024-05-28	DAE4 Sn1686, 2024-06-19

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 300.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
psSAR1g [W/Kg]	9.38	9.44
psSAR10g [W/Kg]	6.48	6.77
Power Drift [dB]	-0.06	-0.04
M2/M1 [%]		91.2
Dist 3dB Peak [mm]		> 15.0



Appendix C. – Dipole Verification Plots

■ Verification Data (150 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 50 mW
Liquid Temp: 20.0 °C
Test Date: 01/08/2025

DUT: CLA-150 - SN4014; Type: CLA-150; Serial: SN4014

Procedure Name: 150MHz Head Verification

Communication System: UID 0, CW (0); Frequency: 150 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 150$ MHz; $\sigma = 0.769$ S/m; $\epsilon_r = 52.849$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7655; ConvF(12.35, 12.35, 12.35) @ 150 MHz; Calibrated: 2024-05-28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1686; Calibrated: 2024-06-19
- Phantom: ELI V8.0 (20deg probe tilt); Type: QD OVA 004 Ax; Serial: xxxx
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

150MHz Head Verification/Area Scan (17x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.280 W/kg

150MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.12 V/m; Power Drift = -0.02 dB

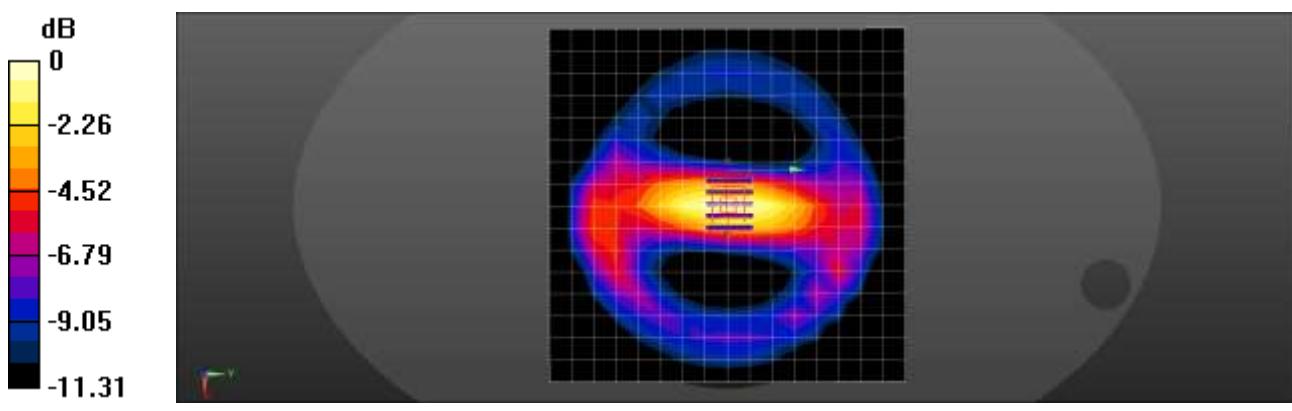
Peak SAR (extrapolated) = 0.356 W/kg

SAR(1 g) = 0.191 W/kg; SAR(10 g) = 0.121 W/kg

Smallest distance from peaks to all points 3 dB below = 14.4 mm

Ratio of SAR at M2 to SAR at M1 = 54.7%

Maximum value of SAR (measured) = 0.283 W/kg



■ Verification Data (150 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 50 mW
Liquid Temp: 20.4 °C
Test Date: 01/09/2025

DUT: CLA-150 - SN4014; Type: CLA-150; Serial: SN4014

Procedure Name: 150MHz Head Verification

Communication System: UID 0, CW (0); Frequency: 150 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 150 \text{ MHz}$; $\sigma = 0.767 \text{ S/m}$; $\epsilon_r = 52.55$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7655; ConvF(12.35, 12.35, 12.35) @ 150 MHz; Calibrated: 2024-05-28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1686; Calibrated: 2024-06-19
- Phantom: ELI V8.0 (20deg probe tilt); Type: QD OVA 004 Ax; Serial: xxxx
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

150MHz Head Verification/Area Scan (17x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (measured) = 0.278 W/kg

150MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.01 V/m; Power Drift = 0.04 dB

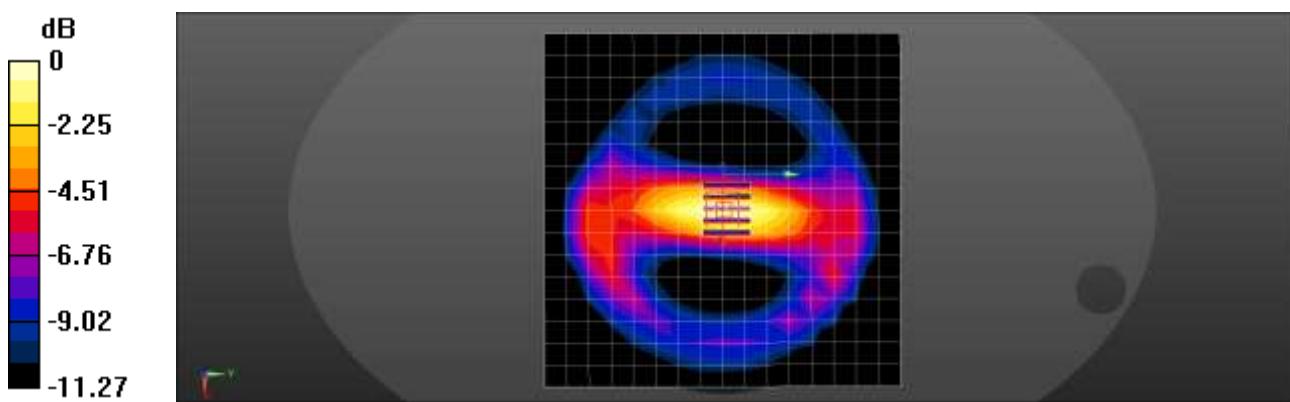
Peak SAR (extrapolated) = 0.354 W/kg

SAR(1 g) = 0.190 W/kg; SAR(10 g) = 0.120 W/kg

Smallest distance from peaks to all points 3 dB below = 14.4 mm

Ratio of SAR at M2 to SAR at M1 = 54.8%

Maximum value of SAR (measured) = 0.281 W/kg



■ Verification Data (150 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 50 mW
Liquid Temp: 20.4 °C
Test Date: 01/14/2025

Measurement Report for Device,,, CW, Channel 0 (150.000 MHz)**Exposure Conditions**

Phantom Section, TSL	Test Distance [mm]	Position, Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	150.000, 0	12.35	0.768	52.0

Hardware Setup

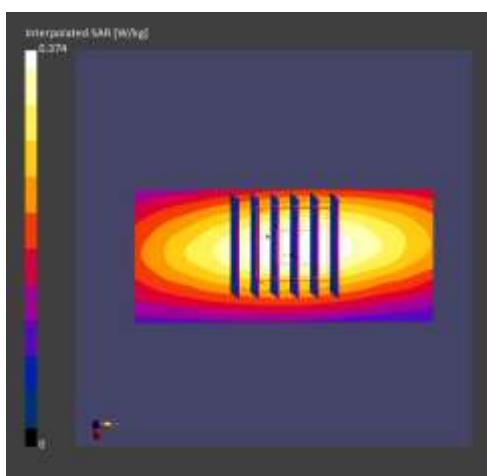
Phantom Probe, Calibration Date DAE, Calibration Date
ELI V6.0 (20deg probe tilt) - xxxx EX3DV4 - SN7655, 2024-05-28 DAE4 Sn1686, 2024-06-19

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 90.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
psSAR1g [W/Kg]	0.195	0.196
psSAR10g [W/Kg]	0.141	0.127
Power Drift [dB]	0.01	0.01
M2/M1 [%]		77.5
Dist 3dB Peak [mm]		16.8



■ Verification Data (450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 50 mW
Liquid Temp: 20.1 °C
Test Date: 01/30/2025

Measurement Report for Device,,, CW, Channel 0 (450.000 MHz)**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, Head Simulating Liquid	,		CW, 0--	450.000, 0	11.07	0.861	43.5

Hardware Setup

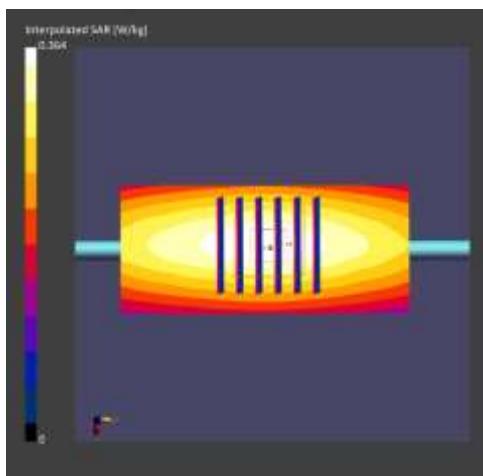
Phantom Probe, Calibration Date DAE, Calibration Date
ELI V6.0 (20deg probe tilt) - xxxx EX3DV4 - SN7655, 2024-05-28 DAE4 Sn1686, 2024-06-19

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 90.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
psSAR1g [W/Kg]	0.221	0.223
psSAR10g [W/Kg]	0.155	0.150
Power Drift [dB]	0.00	0.02
M2/M1 [%]		84.2
Dist 3dB Peak [mm]		> 15.0



■ Verification Data (450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 50 mW
Liquid Temp: 20.3 °C
Test Date: 01/31/2024

Measurement Report for Device,,, CW, Channel 0 (450.000 MHz)**Exposure Conditions**

Phantom Section, TSL	Test Distance [mm]	Position, Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, Head Simulating Liquid	,		CW, 0--	450.000, 0	11.07	0.872	43.4

Hardware Setup

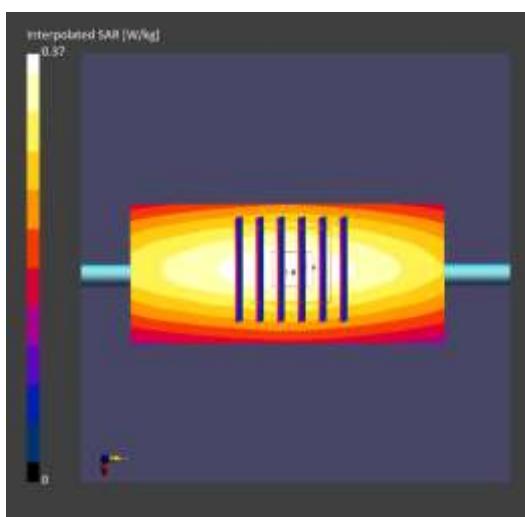
Phantom Probe, Calibration Date DAE, Calibration Date
ELI V6.0 (20deg probe tilt) - xxxx EX3DV4 - SN7655, 2024-05-28 DAE4 Sn1686, 2024-06-19

Scans Setup

Grid Extents [mm]	Area Scan	Zoom Scan
40.0 x 90.0	30.0 x 30.0 x 30.0	
Grid Steps [mm]	10.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

psSAR1g [W/Kg]	Area Scan	Zoom Scan
0.225	0.225	
psSAR10g [W/Kg]		0.151
Power Drift [dB]	0.00	0.02
M2/M1 [%]		83.9
Dist 3dB Peak [mm]		> 15.0



■ Verification Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 50 mW
Liquid Temp: 21.0 °C
Test Date: 02/03/2025

Measurement Report for Device,,, CW, Channel 0 (835.000 MHz)**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, Head Simulating Liquid	,			CW, 0-- 835.000, 0	9.18	0.937	40.6

Hardware Setup

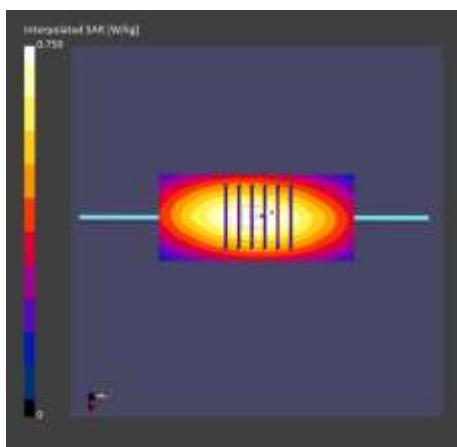
Phantom Probe, Calibration Date DAE, Calibration Date
ELI V6.0 (20deg probe tilt) - xxxx EX3DV4 - SN7655, 2024-05-28 DAE4 Sn1686, 2024-06-19

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 90.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
psSAR1g [W/Kg]	0.499	0.499
psSAR10g [W/Kg]	0.330	0.332
Power Drift [dB]	0.01	0.00
M2/M1 [%]		87.4
Dist 3dB Peak [mm]		22.1



■ Verification Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 50 mW
Liquid Temp: 21.3 °C
Test Date: 02/04/2025

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, Head Simulating Liquid	,		CW, 0--	835.000, 0	9.18	0.941	40.4

Hardware Setup

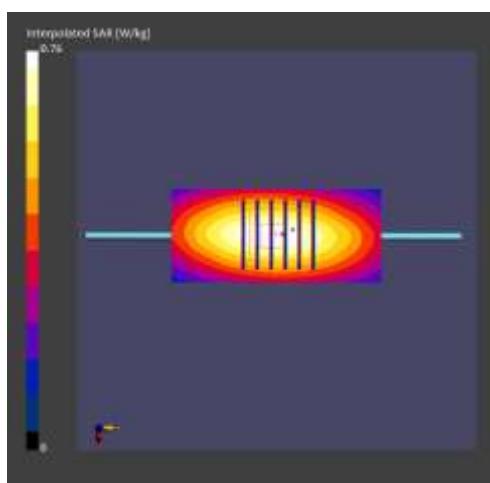
Phantom Probe, Calibration Date DAE, Calibration Date
ELI V6.0 (20deg probe tilt) - xxxx EX3DV4 - SN7655, 2024-05-28 DAE4 Sn1686, 2024-06-19

Scans Setup

Grid Extents [mm]	Area Scan	Zoom Scan
40.0 x 90.0	30.0 x 30.0 x 30.0	
Grid Steps [mm]	10.0 x 15.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
psSAR1g [W/Kg]	0.502	0.501
psSAR10g [W/Kg]	0.331	0.333
Power Drift [dB]	0.00	0.01
M2/M1 [%]		87.7
Dist 3dB Peak [mm]		22.2



Appendix D. – SAR Tissue Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Harts grove.

Ingredients (% by weight)	Frequency (MHz)		
	150	450 (MHz)	835
Tissue Type	Head	Head	Head
Water	38.35 %	38.91 %	40.45%
Salt (NaCl)	5.15 %	3.79 %	1.45%
Sugar	55.5 %	56.93 %	57.0%
HEC	0.9 %	0.25 %	1.0%
Bactericide	0.1 %	0.12 %	0.1%
Triton X-100	-	-	0.0%
DGBE	-	-	0.0%
Diethylene glycol hexyl ether	-	-	-

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M resistivity	HEC:	Hydroxyethyl Cellulose
DGBE:	99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]		
Triton X-100(ultra-pure):	Polyethylene glycol mono[4-(1,1,3,3-tetramethylbutyl)phenyl] ether		

Composition of the Tissue Equivalent Matter

Appendix E. – SAR System Validation

Per IEC/IEEE 62209-1528:2020, SAR system validation status should be document to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in IEC/IEEE 62209-1528:2020. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

SAR System No.	Probe	Probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
11	7655	EX3DV4	Head	150	4014	2024-09-02	52.4	0.77	PASS	PASS	PASS	N/A	N/A	N/A
11	7655	EX3DV4	Head	450	1007	2024-07-30	43.6	0.88	PASS	PASS	PASS	N/A	N/A	N/A
11	7655	EX3DV4	Head	835	441	2024-06-11	41.7	0.92	PASS	PASS	PASS	N/A	N/A	N/A

SAR System Validation Summary 1g

Note:

All measurement were performed using probes calibrated for CW signal only. Modulations in the table above represent test configurations for which the measurement system has been validated per IEC/IEEE 62209-1528:2020. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to IEC/IEEE 62209-1528:2020.

Appendix F. – Probe Calibration Data

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



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

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

Accreditation No.: **SCS 0108**

Client

HCT

Gyeonggi-do, Republic of Korea

Certificate No.

EX-7655_May24**CALIBRATION CERTIFICATE**

결	날	당	자	의	한	자
자	지	날	당	의	한	자
자	지	날	당	의	한	자
자	지	날	당	의	한	자

SW / 2024 06 25 2024 06 25

Object

EX3DV4 - SN:7655

Calibration procedure(s)

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

Calibration date

May 28, 2024

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
OCP DAK-3.5 (weighted)	SN: 1249	05-Oct-23 (OCP-DAK3.5-1249, Oct23)	Oct-24
OCP DAK-12	SN: 1016	05-Oct-23 (OCP-DAK12-1016, Oct23)	Oct-24
Reference 20 dB Attenuator	SN: CC2552 (20x)	26-Mar-24 (No. 217-04046)	Mar-25
DAE4	SN: 660	23-Feb-24 (No. DAE4-660, Feb24)	Feb-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24

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

Calibrated by	Name Joanna Llesha	Function Laboratory Technician	Signature
Approved by	Sven Kühn	Technical Manager	

Issued: May 28, 2024
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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



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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

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}*: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)x,y,z = NORM_{x,y,z} * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}*: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and Inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORM_{x,y,z} * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical Isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle*: The angle is assessed using the information gained by determining the *NORM_x* (no uncertainty required).

EX3DV4 - SN:7655

May 28, 2024

Parameters of Probe: EX3DV4 - SN:7655**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.50	0.62	0.51	$\pm 10.1\%$
DCP (mV) ^B	105.9	105.4	107.8	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name	A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Max dev.	Max Unc ^E k = 2
0	CW	X 0.00	0.00	1.00	0.00	123.6	$\pm 2.8\%$	$\pm 4.7\%$
		Y 0.00	0.00	1.00		149.0		
		Z 0.00	0.00	1.00		150.0		
10352	Pulse Waveform (200Hz, 10%)	X 1.77	61.96	7.33	10.00	60.0	$\pm 2.6\%$	$\pm 9.6\%$
		Y 1.53	60.72	6.50		60.0		
		Z 1.67	61.53	7.27		60.0		
10353	Pulse Waveform (200Hz, 20%)	X 0.84	60.02	5.27	6.99	80.0	$\pm 2.0\%$	$\pm 9.6\%$
		Y 46.00	80.00	11.00		80.0		
		Z 0.81	60.00	5.46		80.0		
10354	Pulse Waveform (200Hz, 40%)	X 0.03	118.22	0.35	3.98	95.0	$\pm 2.7\%$	$\pm 9.6\%$
		Y 0.51	159.02	10.78		95.0		
		Z 68.00	78.00	9.00		95.0		
10355	Pulse Waveform (200Hz, 60%)	X 11.59	154.19	7.09	2.22	120.0	$\pm 1.6\%$	$\pm 9.6\%$
		Y 10.49	157.44	14.13		120.0		
		Z 11.11	154.69	15.41		120.0		
10387	QPSK Waveform, 1 MHz	X 0.60	63.80	11.98	1.00	150.0	$\pm 4.3\%$	$\pm 9.6\%$
		Y 0.57	63.21	12.13		150.0		
		Z 0.54	62.15	11.23		150.0		
10388	QPSK Waveform, 10 MHz	X 1.35	65.40	13.61	0.00	150.0	$\pm 1.3\%$	$\pm 9.6\%$
		Y 1.33	65.35	13.68		150.0		
		Z 1.28	64.34	13.18		150.0		
10396	64-QAM Waveform, 100 kHz	X 1.74	64.88	15.91	3.01	150.0	$\pm 1.2\%$	$\pm 9.6\%$
		Y 1.55	63.18	15.32		150.0		
		Z 1.63	63.71	15.32		150.0		
10399	64-QAM Waveform, 40 MHz	X 2.85	66.13	14.92	0.00	150.0	$\pm 1.7\%$	$\pm 9.6\%$
		Y 2.82	66.06	14.95		150.0		
		Z 2.75	65.46	14.80		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X 3.88	65.85	15.16	0.00	150.0	$\pm 3.3\%$	$\pm 9.6\%$
		Y 3.81	65.73	15.12		150.0		
		Z 3.96	66.00	15.25		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 Page 5).

^B Linearization parameter uncertainty for maximum specified field strength.

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

EX3DV4 - SN:7655

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Parameters of Probe: EX3DV4 - SN:7655**Sensor Model Parameters**

	C1 fF	C2 fF	α V ⁻¹	T1 msV ⁻²	T2 msV ⁻¹	T3 ms	T4 V ⁻²	T5 V ⁻¹	T6
x	10.8	77.70	33.08	4.16	0.00	4.94	0.56	0.00	1.00
y	10.1	72.75	33.10	3.11	0.00	4.90	0.05	0.01	1.00
z	11.4	81.54	33.00	3.57	0.00	4.95	0.51	0.00	1.00

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	86.5°
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.

EX3DV4 - SN:7655

May 28, 2024

Parameters of Probe: EX3DV4 - SN:7655**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc ^H (k = 2)
150	52.3	0.76	12.35	12.35	12.35	0.00	1.25	±13.3%
450	43.5	0.87	11.07	11.07	11.07	0.16	1.30	±13.3%
750	41.9	0.89	9.12	9.70	9.50	0.41	1.27	±11.0%
835	41.5	0.90	9.18	9.32	9.14	0.40	1.27	±11.0%
900	41.5	0.97	8.64	9.28	8.95	0.40	1.27	±11.0%
1450	40.5	1.20	7.90	8.31	7.99	0.38	1.27	±11.0%
1750	40.1	1.37	7.69	8.16	7.84	0.27	1.27	±11.0%
1900	40.0	1.40	7.55	8.06	7.74	0.30	1.27	±11.0%
2300	39.5	1.67	7.33	7.85	7.52	0.31	1.27	±11.0%
2450	39.2	1.80	7.25	7.78	7.45	0.31	1.27	±11.0%
2600	39.0	1.96	7.11	7.65	7.32	0.30	1.27	±11.0%
4400	36.9	3.84	6.01	6.51	6.27	0.40	1.27	±13.1%
4600	36.7	4.04	5.96	6.44	6.17	0.38	1.27	±13.1%
4800	36.4	4.25	5.89	6.37	6.08	0.39	1.27	±13.1%
4950	36.3	4.40	5.53	6.02	5.83	0.43	1.36	±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 The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

^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.

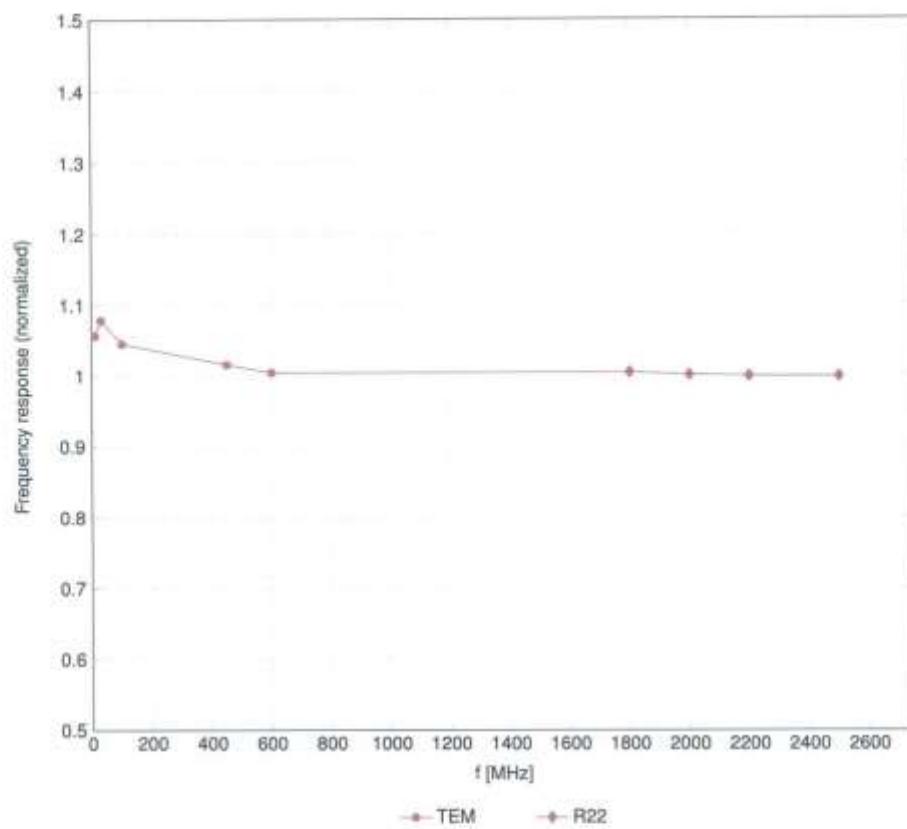
^H The stated uncertainty is the total calibration uncertainty ($k = 2$) of Norm-ConvF. Therefore, The uncertainty stated is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

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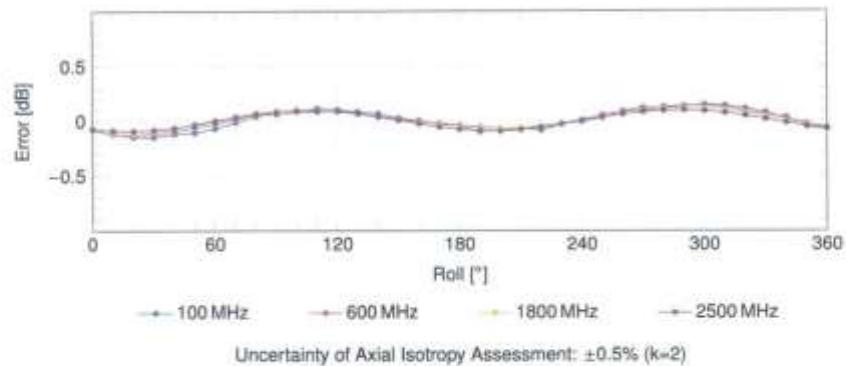
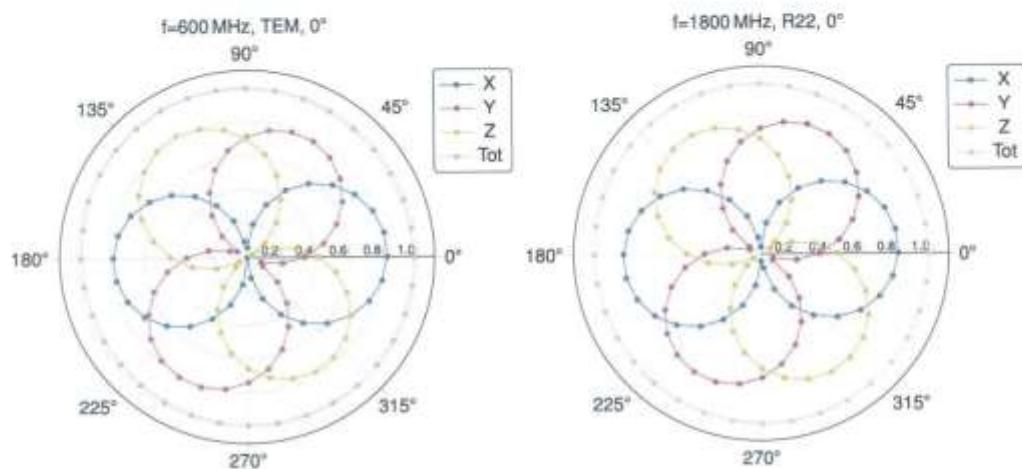
Frequency Response of E-Field

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

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

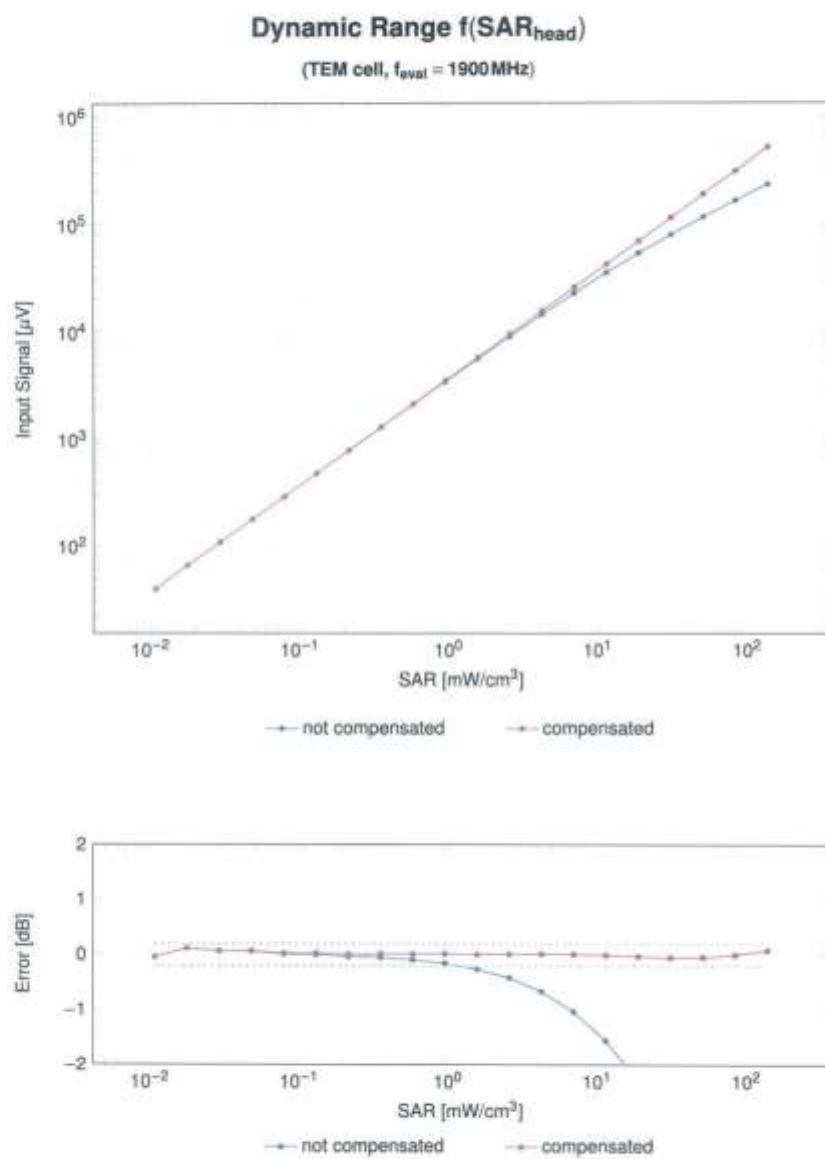
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Receiving Pattern (ϕ), $\theta = 0^\circ$ 

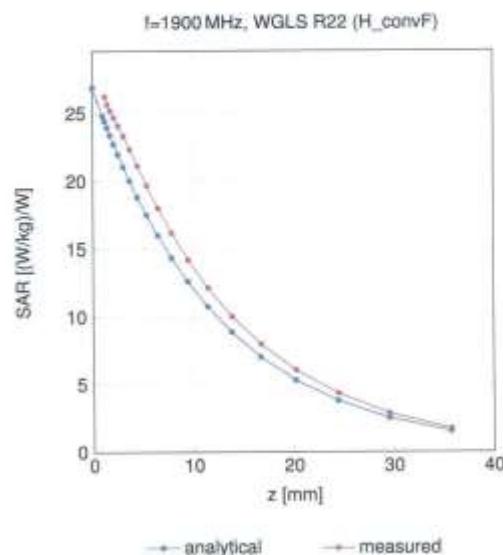
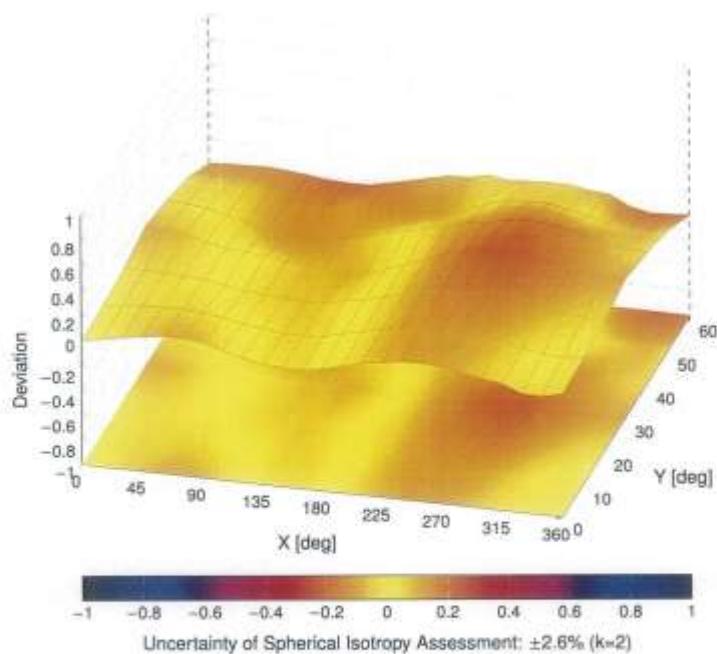
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Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

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Conversion Factor Assessment**Deviation from Isotropy in Liquid**Error (ϕ, θ) , $f = 900 \text{ MHz}$ 

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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
0		CW	CW	0.00	±9.7
10010	CAB	SAR Validation (Square, 100 ms, 10 ms)	Test	10.00	±9.6
10011	CAC	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	6.55	±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 (PI4-DQPSK, DH1)	Bluetooth	7.74	±9.6
10034	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH3)	Bluetooth	4.53	±9.6
10035	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH5)	Bluetooth	3.83	±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, PI4-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	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.88	±9.6
10063	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	±9.6
10064	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.08	±9.6
10065	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	±9.6
10066	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	±9.6
10067	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6
10068	CAE	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	±9.6
10069	CAE	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, PI4-DQPSK, Fullrate)	AMPS	4.77	±9.6
10080	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	±9.6
10087	CAC	UMTS-FDD (HSDPN)	WCDMA	3.98	±9.6
10088	CAC	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	±9.6
10089	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	±9.6
10100	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	±9.6
10101	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6
10102	CAF	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10103	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	±9.6
10104	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	±9.6
10105	CAH	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	±9.6
10108	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	±9.6
10109	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6
10110	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	±9.6
10111	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	±9.6

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UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10112	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6
10113	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6
10114	CAE	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6
10115	CAE	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6
10116	CAE	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6
10117	CAE	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6
10118	CAE	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.58	± 9.6
10119	CAE	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6
10140	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6
10141	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6
10142	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6
10143	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6
10144	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6
10145	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6
10146	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6
10147	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6
10149	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6
10150	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6
10151	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6
10152	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6
10153	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6
10154	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6
10155	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6
10156	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	5.79	± 9.6
10157	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.48	± 9.6
10158	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6
10159	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6
10160	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6
10161	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6
10162	CAF	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	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6
10170	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6
10171	AAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6
10172	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6
10173	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6
10174	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6
10175	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6
10176	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6
10177	CAJ	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6
10178	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6
10179	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6
10180	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6
10181	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6
10182	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6
10183	AAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6
10184	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6
10185	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6
10186	AAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6
10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6
10193	CAE	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6
10194	CAE	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6
10195	CAE	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6
10196	CAE	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6
10197	CAE	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6
10198	CAE	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6
10219	CAE	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6
10220	CAE	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6
10221	CAE	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6
10222	CAE	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	± 9.6
10223	CAE	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6
10224	CAE	IEEE 802.11n (HT Mixed, 155 Mbps, 64-QAM)	WLAN	8.08	± 9.6

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10225	CAC	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6
10226	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6
10227	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6
10228	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6
10229	CAE	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 16-QAM)	LTE-TDD	9.48	± 9.6
10230	CAE	LTE-TDD (SC-FDMA, 1 RB, 3MHz, 64-QAM)	LTE-TDD	10.25	± 9.6
10231	CAE	LTE-TDD (SC-FDMA, 1 RB, 3MHz, QPSK)	LTE-TDD	9.19	± 9.6
10232	CAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6
10233	CAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6
10234	CAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6
10235	CAH	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6
10236	CAH	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6
10237	CAH	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6
10238	CAG	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6
10239	CAG	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6
10240	CAG	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	± 9.6
10241	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6
10242	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	± 9.6
10243	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6
10244	CAE	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6
10245	CAE	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6
10246	CAE	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	± 9.6
10247	CAH	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	± 9.6
10248	CAH	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6
10249	CAH	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	± 9.6
10250	CAH	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6
10251	CAH	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6
10252	CAH	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	± 9.6
10253	CAG	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6
10254	CAG	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6
10255	CAG	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6
10256	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6
10257	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6
10258	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6
10259	CAE	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6
10260	CAE	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6
10261	CAE	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6
10262	CAH	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6
10263	CAH	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6
10264	CAH	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6
10265	CAH	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6
10266	CAH	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6
10267	CAH	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6
10268	CAG	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6
10269	CAG	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6
10270	CAG	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6
10274	CAC	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6
10275	CAC	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 884 MHz, Rolloff 0.5)	PHS	11.81	± 9.6
10279	CAA	PHS (QPSK, BW 884 MHz, 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	AAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6
10298	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6
10299	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6
10300	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	8.60	± 9.6
10301	AAA	IEEE 802.16e WIMAX (29:18, 5 ms, 10 MHz, QPSK, PUSC)	WIMAX	12.03	± 9.6
10302	AAA	IEEE 802.16e WIMAX (29:18, 5 ms, 10 MHz, QPSK, PUSC, 3 CTRL symbols)	WIMAX	12.57	± 9.6
10303	AAA	IEEE 802.16e WIMAX (31:16, 5 ms, 10 MHz, 64QAM, PUSC)	WIMAX	12.52	± 9.6
10304	AAA	IEEE 802.16e WIMAX (29:18, 5 ms, 10 MHz, 64QAM, PUSC)	WIMAX	11.86	± 9.6
10305	AAA	IEEE 802.16e WIMAX (31:16, 10 ms, 10 MHz, 64QAM, PUSC, 15 symbols)	WIMAX	15.24	± 9.6
10306	AAA	IEEE 802.16e WIMAX (29:18, 10 ms, 10 MHz, 64QAM, PUSC, 18 symbols)	WIMAX	14.67	± 9.6

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10307	AAA	IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, QPSK, PUSC, 18 symbols)	WiMAX	14.49	±9.6
10308	AAA	IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, 16QAM, PUSC)	WiMAX	14.46	±9.6
10309	AAA	IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, 16QAM, AMC 2x3, 18 symbols)	WiMAX	14.58	±9.6
10310	AAA	IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, QPSK, AMC 2x3, 18 symbols)	WiMAX	14.57	±9.6
10311	AAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	±9.6
10313	AAA	IDEN 1:9	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, 99pc duty cycle)	WLAN	1.71	±9.6
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.36	±9.6
10317	AAE	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	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
10367	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	AAF	IEEE 802.11ac WiFi (20 MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	±9.6
10401	AAF	IEEE 802.11ac WiFi (40 MHz, 64-QAM, 99pc duty cycle)	WLAN	8.60	±9.6
10402	AAF	IEEE 802.11ac WiFi (80 MHz, 64-QAM, 99pc duty cycle)	WLAN	8.53	±9.6
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	±9.6
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	±9.6
10408	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	±9.6
10410	AAH	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Cont=4)	LTE-TDD	7.82	±9.6
10414	AAA	WLAN CCDF, 64-QAM, 40 MHz	Generic	8.54	±9.6
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.54	±9.6
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	±9.6
10417	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	±9.6
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	WLAN	8.14	±9.6
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)	WLAN	8.18	±9.6
10422	AAD	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	±9.6
10423	AAD	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	±9.6
10424	AAD	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	±9.6
10425	AAD	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	±9.6
10426	AAD	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	±9.6
10427	AAD	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	±9.6
10430	AAE	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	±9.6
10431	AAE	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6
10432	AAE	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10433	AAE	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6
10434	AAB	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	±9.6
10435	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10447	AAE	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.58	±9.6
10448	AAE	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±9.6
10449	AAD	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±9.6
10450	AAD	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	±9.6
10451	AAB	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	±9.6
10453	AAE	Validation (Square, 10 ms, 1 ms)	Test	10.00	±9.6
10456	AAD	IEEE 802.11ac WiFi (160 MHz, 64-QAM, 99pc duty cycle)	WLAN	8.63	±9.6
10457	AAB	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	±9.6
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	±9.6
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	±9.6
10460	AAB	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	±9.6
10461	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10482	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.30	±9.6
10463	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.58	±9.6
10464	AAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10485	AAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6
10486	AAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±9.6
10487	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10488	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6
10469	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.58	±9.6
10470	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6
10471	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±9.6

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10472	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6
10473	AAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6
10474	AAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6
10475	AAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6
10477	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6
10478	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6
10479	AAG	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6
10480	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.18	± 9.6
10481	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6
10482	AAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.71	± 9.6
10483	AAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.39	± 9.6
10484	AAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.47	± 9.6
10485	AAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.59	± 9.6
10486	AAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.38	± 9.6
10487	AAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.60	± 9.6
10488	AA3	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	± 9.6
10489	AAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	± 9.6
10490	AAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6
10491	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6
10492	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.41	± 9.6
10493	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	± 9.6
10494	AAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6
10495	AAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.37	± 9.6
10496	AAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6
10497	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6
10498	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.40	± 9.6
10499	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.68	± 9.6
10500	AAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6
10501	AAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.44	± 9.6
10502	AAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.52	± 9.6
10503	AAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.72	± 9.6
10504	AAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	± 9.6
10505	AAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6
10506	AAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6
10507	AAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.36	± 9.6
10508	AAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	± 9.6
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.99	± 9.6
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.49	± 9.6
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.51	± 9.6
10512	AAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6
10513	AAD	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.42	± 9.6
10514	AAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6
10515	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	WLAN	1.58	± 9.6
10516	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	WLAN	1.57	± 9.6
10517	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	WLAN	1.58	± 9.6
10518	AAA	IEEE 802.11ah WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6
10519	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.39	± 9.6
10520	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.12	± 9.6
10521	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	WLAN	7.97	± 9.6
10522	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.45	± 9.6
10523	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.08	± 9.6
10524	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.27	± 9.6
10525	AAD	IEEE 802.11ac WiFi (20 MHz, MCS0, 99pc duty cycle)	WLAN	8.36	± 9.6
10526	AAD	IEEE 802.11ac WiFi (20 MHz, MCS1, 99pc duty cycle)	WLAN	8.42	± 9.6
10527	AAD	IEEE 802.11ac WiFi (20 MHz, MCS2, 99pc duty cycle)	WLAN	8.21	± 9.6
10528	AAD	IEEE 802.11ac WiFi (20 MHz, MCS3, 99pc duty cycle)	WLAN	8.36	± 9.6
10529	AAD	IEEE 802.11ac WiFi (20 MHz, MCS4, 99pc duty cycle)	WLAN	8.36	± 9.6
10531	AAD	IEEE 802.11ac WiFi (20 MHz, MCS5, 99pc duty cycle)	WLAN	8.43	± 9.6
10532	AAD	IEEE 802.11ac WiFi (20 MHz, MCS7, 99pc duty cycle)	WLAN	8.29	± 9.6
10533	AAD	IEEE 802.11ac WiFi (20 MHz, MCS8, 99pc duty cycle)	WLAN	8.38	± 9.6
10534	AAD	IEEE 802.11ac WiFi (40 MHz, MCS0, 99pc duty cycle)	WLAN	8.45	± 9.6
10535	AAD	IEEE 802.11ac WiFi (40 MHz, MCS1, 99pc duty cycle)	WLAN	8.45	± 9.6
10536	AAD	IEEE 802.11ac WiFi (40 MHz, MCS2, 99pc duty cycle)	WLAN	8.32	± 9.6
10537	AAD	IEEE 802.11ac WiFi (40 MHz, MCS3, 99pc duty cycle)	WLAN	8.44	± 9.6
10538	AAD	IEEE 802.11ac WiFi (40 MHz, MCS4, 99pc duty cycle)	WLAN	8.54	± 9.6
10540	AAD	IEEE 802.11ac WiFi (40 MHz, MCS6, 99pc duty cycle)	WLAN	8.39	± 9.6

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10541	AAD	IEEE 802.11ac WiFi (40 MHz, MCS7, 99pc duty cycle)	WLAN	8.46	±9.6
10542	AAD	IEEE 802.11ac WiFi (40 MHz, MCS8, 99pc duty cycle)	WLAN	8.65	±9.6
10543	AAD	IEEE 802.11ac WiFi (40 MHz, MCS9, 99pc duty cycle)	WLAN	8.65	±9.6
10544	AAD	IEEE 802.11ac WiFi (80 MHz, MCS0, 99pc duty cycle)	WLAN	8.47	±9.6
10545	AAD	IEEE 802.11ac WiFi (80 MHz, MCS1, 99pc duty cycle)	WLAN	8.55	±9.6
10546	AAD	IEEE 802.11ac WiFi (80 MHz, MCS2, 99pc duty cycle)	WLAN	8.35	±9.6
10547	AAD	IEEE 802.11ac WiFi (80 MHz, MCS3, 99pc duty cycle)	WLAN	8.49	±9.6
10548	AAD	IEEE 802.11ac WiFi (80 MHz, MCS4, 99pc duty cycle)	WLAN	8.37	±9.6
10550	AAD	IEEE 802.11ac WiFi (80 MHz, MCS6, 99pc duty cycle)	WLAN	8.38	±9.6
10551	AAD	IEEE 802.11ac WiFi (80 MHz, MCS7, 99pc duty cycle)	WLAN	8.50	±9.6
10552	AAD	IEEE 802.11ac WiFi (80 MHz, MCS8, 99pc duty cycle)	WLAN	8.42	±9.6
10553	AAD	IEEE 802.11ac WiFi (80 MHz, MCS9, 99pc duty cycle)	WLAN	8.45	±9.6
10554	AAE	IEEE 802.11ac WiFi (160 MHz, MCS0, 99pc duty cycle)	WLAN	8.48	±9.6
10555	AAE	IEEE 802.11ac WiFi (160 MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6
10556	AAE	IEEE 802.11ac WiFi (160 MHz, MCS2, 99pc duty cycle)	WLAN	8.50	±9.6
10557	AAE	IEEE 802.11ac WiFi (160 MHz, MCS3, 99pc duty cycle)	WLAN	8.52	±9.6
10558	AAE	IEEE 802.11ac WiFi (160 MHz, MCS4, 99pc duty cycle)	WLAN	8.61	±9.6
10560	AAE	IEEE 802.11ac WiFi (160 MHz, MCS6, 99pc duty cycle)	WLAN	8.73	±9.6
10561	AAE	IEEE 802.11ac WiFi (160 MHz, MCS7, 99pc duty cycle)	WLAN	8.56	±9.6
10562	AAE	IEEE 802.11ac WiFi (160 MHz, MCS8, 99pc duty cycle)	WLAN	8.69	±9.6
10563	AAE	IEEE 802.11ac WiFi (160 MHz, MCS9, 99pc duty cycle)	WLAN	8.77	±9.6
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.25	±9.6
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.45	±9.6
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.13	±9.6
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	WLAN	8.00	±9.6
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.37	±9.6
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.10	±9.6
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.90	±9.6
10571	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.99	±9.6
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	WLAN	1.99	±9.6
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	WLAN	1.98	±9.6
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	WLAN	1.98	±9.6
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.59	±9.6
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.60	±9.6
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.70	±9.6
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.49	±9.6
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	WLAN	8.36	±9.6
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.76	±9.6
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.35	±9.6
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.67	±9.6
10583	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.59	±9.6
10584	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.60	±9.6
10585	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.70	±9.6
10586	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.49	±9.6
10587	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	WLAN	8.38	±9.6
10588	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.76	±9.6
10589	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.35	±9.6
10590	AAD	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.67	±9.6
10591	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS0, 99pc duty cycle)	WLAN	8.63	±9.6
10592	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS1, 99pc duty cycle)	WLAN	8.79	±9.6
10593	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS2, 99pc duty cycle)	WLAN	8.64	±9.6
10594	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS3, 99pc duty cycle)	WLAN	8.74	±9.6
10595	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS4, 99pc duty cycle)	WLAN	8.74	±9.6
10596	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS5, 99pc duty cycle)	WLAN	8.71	±9.6
10597	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS6, 99pc duty cycle)	WLAN	8.72	±9.6
10598	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS7, 99pc duty cycle)	WLAN	8.50	±9.6
10599	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS0, 99pc duty cycle)	WLAN	8.79	±9.6
10600	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS1, 99pc duty cycle)	WLAN	8.88	±9.6
10601	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS2, 99pc duty cycle)	WLAN	8.82	±9.6
10602	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS3, 99pc duty cycle)	WLAN	8.94	±9.6
10603	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS4, 99pc duty cycle)	WLAN	9.03	±9.6
10604	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS5, 99pc duty cycle)	WLAN	8.76	±9.6
10605	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS6, 99pc duty cycle)	WLAN	8.97	±9.6
10606	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS7, 99pc duty cycle)	WLAN	8.82	±9.6
10607	AAD	IEEE 802.11ac WiFi (20 MHz, MCS0, 99pc duty cycle)	WLAN	8.64	±9.6
10608	AAD	IEEE 802.11ac WiFi (20 MHz, MCS1, 99pc duty cycle)	WLAN	8.77	±9.6

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10609	AAD	IEEE 802.11ac WiFi (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.57	± 9.6
10610	AAD	IEEE 802.11ac WiFi (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.78	± 9.6
10611	AAD	IEEE 802.11ac WiFi (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.70	± 9.6
10612	AAD	IEEE 802.11ac WiFi (20 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6
10613	AAD	IEEE 802.11ac WiFi (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.94	± 9.6
10614	AAD	IEEE 802.11ac WiFi (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.59	± 9.6
10615	AAD	IEEE 802.11ac WiFi (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6
10616	AAD	IEEE 802.11ac WiFi (40 MHz, MCS0, 90pc duty cycle)	WLAN	8.82	± 9.6
10617	AAD	IEEE 802.11ac WiFi (40 MHz, MCS1, 90pc duty cycle)	WLAN	8.81	± 9.6
10618	AAD	IEEE 802.11ac WiFi (40 MHz, MCS2, 90pc duty cycle)	WLAN	8.58	± 9.6
10619	AAD	IEEE 802.11ac WiFi (40 MHz, MCS3, 90pc duty cycle)	WLAN	8.86	± 9.6
10620	AAD	IEEE 802.11ac WiFi (40 MHz, MCS4, 90pc duty cycle)	WLAN	8.87	± 9.6
10621	AAD	IEEE 802.11ac WiFi (40 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6
10622	AAD	IEEE 802.11ac WiFi (40 MHz, MCS6, 90pc duty cycle)	WLAN	8.68	± 9.6
10623	AAD	IEEE 802.11ac WiFi (40 MHz, MCS7, 90pc duty cycle)	WLAN	8.82	± 9.6
10624	AAD	IEEE 802.11ac WiFi (40 MHz, MCS8, 90pc duty cycle)	WLAN	8.96	± 9.6
10625	AAD	IEEE 802.11ac WiFi (40 MHz, MCS9, 90pc duty cycle)	WLAN	8.96	± 9.6
10626	AAD	IEEE 802.11ac WiFi (80 MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6
10627	AAD	IEEE 802.11ac WiFi (80 MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6
10628	AAD	IEEE 802.11ac WiFi (80 MHz, MCS2, 90pc duty cycle)	WLAN	8.71	± 9.6
10629	AAD	IEEE 802.11ac WiFi (80 MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6
10630	AAD	IEEE 802.11ac WiFi (80 MHz, MCS4, 90pc duty cycle)	WLAN	8.72	± 9.6
10631	AAD	IEEE 802.11ac WiFi (80 MHz, MCS5, 90pc duty cycle)	WLAN	8.81	± 9.6
10632	AAD	IEEE 802.11ac WiFi (80 MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6
10633	AAD	IEEE 802.11ac WiFi (80 MHz, MCS7, 90pc duty cycle)	WLAN	8.83	± 9.6
10634	AAD	IEEE 802.11ac WiFi (80 MHz, MCS8, 90pc duty cycle)	WLAN	8.86	± 9.6
10635	AAD	IEEE 802.11ac WiFi (80 MHz, MCS9, 90pc duty cycle)	WLAN	8.81	± 9.6
10636	AAE	IEEE 802.11ac WiFi (160 MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6
10637	AAE	IEEE 802.11ac WiFi (160 MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6
10638	AAE	IEEE 802.11ac WiFi (160 MHz, MCS2, 90pc duty cycle)	WLAN	8.86	± 9.6
10639	AAE	IEEE 802.11ac WiFi (160 MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6
10640	AAE	IEEE 802.11ac WiFi (160 MHz, MCS4, 90pc duty cycle)	WLAN	8.98	± 9.6
10641	AAE	IEEE 802.11ac WiFi (160 MHz, MCS5, 90pc duty cycle)	WLAN	9.05	± 9.6
10642	AAE	IEEE 802.11ac WiFi (160 MHz, MCS6, 90pc duty cycle)	WLAN	9.06	± 9.6
10643	AAE	IEEE 802.11ac WiFi (160 MHz, MCS7, 90pc duty cycle)	WLAN	8.89	± 9.6
10644	AAE	IEEE 802.11ac WiFi (160 MHz, MCS8, 90pc duty cycle)	WLAN	9.05	± 9.6
10645	AAE	IEEE 802.11ac WiFi (160 MHz, MCS9, 90pc duty cycle)	WLAN	9.11	± 9.6
10646	AAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6
10647	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6
10648	AAA	CDMA2000 (1x Advanced)	CDMA2000	3.45	± 9.6
10652	AAF	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	± 9.6
10653	AAF	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	± 9.6
10654	AAF	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.86	± 9.6
10655	AAF	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6
10658	AAB	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6
10659	AAB	Pulse Waveform (200Hz, 20%)	Test	6.99	± 9.6
10660	AAB	Pulse Waveform (200Hz, 40%)	Test	3.98	± 9.6
10661	AAB	Pulse Waveform (200Hz, 60%)	Test	2.22	± 9.6
10662	AAB	Pulse Waveform (200Hz, 80%)	Test	0.97	± 9.6
10670	AAA	Bluetooth Low Energy	Bluetooth	2.19	± 9.6
10671	AAC	IEEE 802.11ax (20 MHz, MCS0, 90pc duty cycle)	WLAN	9.09	± 9.6
10672	AAC	IEEE 802.11ax (20 MHz, MCS1, 90pc duty cycle)	WLAN	8.57	± 9.6
10673	AAC	IEEE 802.11ax (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.78	± 9.6
10674	AAC	IEEE 802.11ax (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.74	± 9.6
10675	AAC	IEEE 802.11ax (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.90	± 9.6
10676	AAC	IEEE 802.11ax (20 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6
10677	AAC	IEEE 802.11ax (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.73	± 9.6
10678	AAC	IEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.78	± 9.6
10679	AAC	IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.89	± 9.6
10680	AAC	IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle)	WLAN	8.80	± 9.6
10681	AAC	IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle)	WLAN	8.62	± 9.6
10682	AAC	IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle)	WLAN	8.83	± 9.6
10683	AAC	IEEE 802.11ax (20 MHz, MCS0, 99pc duty cycle)	WLAN	8.42	± 9.6
10684	AAC	IEEE 802.11ax (20 MHz, MCS1, 99pc duty cycle)	WLAN	8.26	± 9.6
10685	AAC	IEEE 802.11ax (20 MHz, MCS2, 99pc duty cycle)	WLAN	8.33	± 9.6
10686	AAC	IEEE 802.11ax (20 MHz, MCS3, 99pc duty cycle)	WLAN	8.28	± 9.6

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10687	AAC	IEEE 802.11ax (20 MHz, MCS4, 99pc duty cycle)	WLAN	8.45	±9.6
10688	AAC	IEEE 802.11ax (20 MHz, MCS5, 99pc duty cycle)	WLAN	8.29	±9.6
10689	AAC	IEEE 802.11ax (20 MHz, MCS6, 99pc duty cycle)	WLAN	8.55	±9.6
10690	AAC	IEEE 802.11ax (20 MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±9.6
10691	AAC	IEEE 802.11ax (20 MHz, MCS8, 99pc duty cycle)	WLAN	8.25	±9.6
10692	AAC	IEEE 802.11ax (20 MHz, MCS9, 99pc duty cycle)	WLAN	8.29	±9.6
10693	AAC	IEEE 802.11ax (20 MHz, MCS10, 99pc duty cycle)	WLAN	8.25	±9.6
10694	AAC	IEEE 802.11ax (20 MHz, MCS11, 99pc duty cycle)	WLAN	8.57	±9.6
10695	AAC	IEEE 802.11ax (40 MHz, MCS0, 90pc duty cycle)	WLAN	8.78	±9.6
10696	AAC	IEEE 802.11ax (40 MHz, MCS1, 90pc duty cycle)	WLAN	8.91	±9.6
10697	AAC	IEEE 802.11ax (40 MHz, MCS2, 90pc duty cycle)	WLAN	8.51	±9.6
10698	AAC	IEEE 802.11ax (40 MHz, MCS3, 90pc duty cycle)	WLAN	8.89	±9.6
10699	AAC	IEEE 802.11ax (40 MHz, MCS4, 90pc duty cycle)	WLAN	8.82	±9.6
10700	AAC	IEEE 802.11ax (40 MHz, MCS5, 90pc duty cycle)	WLAN	8.73	±9.6
10701	AAC	IEEE 802.11ax (40 MHz, MCS6, 90pc duty cycle)	WLAN	8.86	±9.6
10702	AAC	IEEE 802.11ax (40 MHz, MCS7, 90pc duty cycle)	WLAN	8.70	±9.6
10703	AAC	IEEE 802.11ax (40 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6
10704	AAC	IEEE 802.11ax (40 MHz, MCS9, 90pc duty cycle)	WLAN	8.56	±9.6
10705	AAC	IEEE 802.11ax (40 MHz, MCS10, 90pc duty cycle)	WLAN	8.69	±9.6
10706	AAC	IEEE 802.11ax (40 MHz, MCS11, 90pc duty cycle)	WLAN	8.66	±9.6
10707	AAC	IEEE 802.11ax (40 MHz, MCS0, 99pc duty cycle)	WLAN	8.32	±9.6
10708	AAC	IEEE 802.11ax (40 MHz, MCS1, 99pc duty cycle)	WLAN	8.55	±9.6
10709	AAC	IEEE 802.11ax (40 MHz, MCS2, 99pc duty cycle)	WLAN	8.33	±9.6
10710	AAC	IEEE 802.11ax (40 MHz, MCS3, 99pc duty cycle)	WLAN	8.29	±9.6
10711	AAC	IEEE 802.11ax (40 MHz, MCS4, 99pc duty cycle)	WLAN	8.39	±9.6
10712	AAC	IEEE 802.11ax (40 MHz, MCS5, 99pc duty cycle)	WLAN	8.67	±9.6
10713	AAC	IEEE 802.11ax (40 MHz, MCS6, 99pc duty cycle)	WLAN	8.33	±9.6
10714	AAC	IEEE 802.11ax (40 MHz, MCS7, 99pc duty cycle)	WLAN	8.26	±9.6
10715	AAC	IEEE 802.11ax (40 MHz, MCS8, 99pc duty cycle)	WLAN	8.45	±9.6
10716	AAC	IEEE 802.11ax (40 MHz, MCS9, 99pc duty cycle)	WLAN	8.30	±9.6
10717	AAC	IEEE 802.11ax (40 MHz, MCS10, 99pc duty cycle)	WLAN	8.48	±9.6
10718	AAC	IEEE 802.11ax (40 MHz, MCS11, 99pc duty cycle)	WLAN	8.24	±9.6
10719	AAC	IEEE 802.11ax (80 MHz, MCS0, 90pc duty cycle)	WLAN	8.81	±9.6
10720	AAC	IEEE 802.11ax (80 MHz, MCS1, 90pc duty cycle)	WLAN	8.87	±9.6
10721	AAC	IEEE 802.11ax (80 MHz, MCS2, 90pc duty cycle)	WLAN	8.76	±9.6
10722	AAC	IEEE 802.11ax (80 MHz, MCS3, 90pc duty cycle)	WLAN	8.55	±9.6
10723	AAC	IEEE 802.11ax (80 MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6
10724	AAC	IEEE 802.11ax (80 MHz, MCS5, 90pc duty cycle)	WLAN	8.90	±9.6
10725	AAC	IEEE 802.11ax (80 MHz, MCS6, 90pc duty cycle)	WLAN	8.74	±9.6
10726	AAC	IEEE 802.11ax (80 MHz, MCS7, 90pc duty cycle)	WLAN	8.72	±9.6
10727	AAC	IEEE 802.11ax (80 MHz, MCS8, 90pc duty cycle)	WLAN	8.66	±9.6
10728	AAC	IEEE 802.11ax (80 MHz, MCS9, 90pc duty cycle)	WLAN	8.65	±9.6
10729	AAC	IEEE 802.11ax (80 MHz, MCS10, 90pc duty cycle)	WLAN	8.64	±9.6
10730	AAC	IEEE 802.11ax (80 MHz, MCS11, 90pc duty cycle)	WLAN	8.67	±9.6
10731	AAC	IEEE 802.11ax (80 MHz, MCS0, 99pc duty cycle)	WLAN	8.42	±9.6
10732	AAC	IEEE 802.11ax (80 MHz, MCS1, 99pc duty cycle)	WLAN	8.46	±9.6
10733	AAC	IEEE 802.11ax (80 MHz, MCS2, 99pc duty cycle)	WLAN	8.40	±9.6
10734	AAC	IEEE 802.11ax (80 MHz, MCS3, 99pc duty cycle)	WLAN	8.25	±9.6
10735	AAC	IEEE 802.11ax (80 MHz, MCS4, 99pc duty cycle)	WLAN	8.33	±9.6
10736	AAC	IEEE 802.11ax (80 MHz, MCS5, 99pc duty cycle)	WLAN	8.27	±9.6
10737	AAC	IEEE 802.11ax (80 MHz, MCS6, 99pc duty cycle)	WLAN	8.36	±9.6
10738	AAC	IEEE 802.11ax (80 MHz, MCS7, 99pc duty cycle)	WLAN	8.42	±9.6
10739	AAC	IEEE 802.11ax (80 MHz, MCS8, 99pc duty cycle)	WLAN	8.29	±9.6
10740	AAC	IEEE 802.11ax (80 MHz, MCS9, 99pc duty cycle)	WLAN	8.48	±9.6
10741	AAC	IEEE 802.11ax (80 MHz, MCS10, 99pc duty cycle)	WLAN	8.40	±9.6
10742	AAC	IEEE 802.11ax (80 MHz, MCS11, 99pc duty cycle)	WLAN	8.43	±9.6
10743	AAC	IEEE 802.11ax (160 MHz, MCS0, 90pc duty cycle)	WLAN	8.94	±9.6
10744	AAC	IEEE 802.11ax (160 MHz, MCS1, 90pc duty cycle)	WLAN	9.16	±9.6
10745	AAC	IEEE 802.11ax (160 MHz, MCS2, 90pc duty cycle)	WLAN	8.93	±9.6
10746	AAC	IEEE 802.11ax (160 MHz, MCS3, 90pc duty cycle)	WLAN	9.11	±9.6
10747	AAC	IEEE 802.11ax (160 MHz, MCS4, 90pc duty cycle)	WLAN	9.04	±9.6
10748	AAC	IEEE 802.11ax (160 MHz, MCS5, 90pc duty cycle)	WLAN	8.93	±9.6
10749	AAC	IEEE 802.11ax (160 MHz, MCS6, 90pc duty cycle)	WLAN	8.90	±9.6
10750	AAC	IEEE 802.11ax (160 MHz, MCS7, 90pc duty cycle)	WLAN	8.79	±9.6
10751	AAC	IEEE 802.11ax (160 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6
10752	AAC	IEEE 802.11ax (160 MHz, MCS9, 90pc duty cycle)	WLAN	8.81	±9.6

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10753	AAC	IEEE 802.11ax (160 MHz, MCS10, 90pc duty cycle)	WLAN	8.00	±9.6
10754	AAC	IEEE 802.11ax (160 MHz, MCS11, 90pc duty cycle)	WLAN	8.94	±9.6
10755	AAC	IEEE 802.11ax (160 MHz, MCS0, 99pc duty cycle)	WLAN	8.64	±9.6
10756	AAC	IEEE 802.11ax (160 MHz, MCS1, 99pc duty cycle)	WLAN	8.77	±9.6
10757	AAC	IEEE 802.11ax (160 MHz, MCS2, 99pc duty cycle)	WLAN	8.77	±9.6
10758	AAC	IEEE 802.11ax (160 MHz, MCS3, 99pc duty cycle)	WLAN	8.69	±9.6
10759	AAC	IEEE 802.11ax (160 MHz, MCS4, 99pc duty cycle)	WLAN	8.58	±9.6
10760	AAC	IEEE 802.11ax (160 MHz, MCS5, 99pc duty cycle)	WLAN	8.49	±9.6
10761	AAC	IEEE 802.11ax (160 MHz, MCS6, 99pc duty cycle)	WLAN	8.56	±9.6
10762	AAC	IEEE 802.11ax (160 MHz, MCS7, 99pc duty cycle)	WLAN	8.49	±9.6
10763	AAC	IEEE 802.11ax (160 MHz, MCS8, 99pc duty cycle)	WLAN	8.53	±9.6
10764	AAC	IEEE 802.11ax (160 MHz, MCS9, 99pc duty cycle)	WLAN	8.54	±9.6
10765	AAC	IEEE 802.11ax (160 MHz, MCS10, 99pc duty cycle)	WLAN	8.54	±9.6
10766	AAC	IEEE 802.11ax (160 MHz, MCS11, 99pc duty cycle)	WLAN	8.51	±9.6
10767	AAE	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.99	±9.6
10768	AAE	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6
10769	AAE	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6
10770	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10771	AAE	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10772	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	±9.6
10773	AAE	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	±9.6
10774	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10775	AAE	5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
10776	AAE	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.6
10777	AAE	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.6
10778	AAE	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	±9.6
10779	AAE	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	±9.6
10780	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10781	AAE	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10782	AAE	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±9.6
10783	AAG	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
10784	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	±9.6
10785	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	±9.6
10786	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	±9.6
10787	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	±9.6
10788	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.6
10789	AAE	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	±9.6
10790	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.6
10791	AAG	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	±9.6
10792	AAE	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±9.6
10793	AAD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	±9.6
10794	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±9.6
10795	AAD	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	±9.6
10796	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±9.6
10797	AAE	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	±9.6
10798	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.6
10799	AAF	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.6
10801	AAF	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.6
10802	AAE	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	±9.6
10803	AAF	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	±9.6
10805	AAE	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10806	AAD	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	±9.6
10809	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10810	AAF	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10812	AAF	5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±9.6
10817	AAG	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	±9.6
10818	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10819	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	±9.6
10820	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	±9.6
10821	AAD	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10822	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10823	AAF	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±9.6
10824	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	±9.6
10825	AAF	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10827	AAF	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

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10829	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	±9.6
10830	AAE	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	AAE	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	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	±9.6
10835	AAE	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	AAF	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	±9.6
10838	AAF	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6
10840	AAE	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	±9.6
10841	AAF	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	AAE	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
10845	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
10854	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
10855	AAD	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	±9.6
10856	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6
10857	AAE	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	±9.6
10858	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	±9.6
10859	AAF	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6
10860	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
10861	AAF	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	±9.6
10863	AAF	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	AAF	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6
10866	AAF	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	±9.6
10868	AAF	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	±9.6
10869	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
10870	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	±9.6
10871	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
10872	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	±9.6
10873	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	±9.6
10874	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.6
10875	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.6
10876	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	±9.6
10877	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.85	±9.6
10878	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.6
10879	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	±9.6
10880	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	±9.6
10881	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6
10882	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	±9.6
10883	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	±9.6
10884	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	±9.6
10885	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	±9.6
10886	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	±9.6
10887	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	±9.6
10888	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	±9.6
10889	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	±9.6
10890	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	±9.6
10891	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	±9.6
10892	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	±9.6
10897	AAE	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.66	±9.6
10898	AAC	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6
10899	AAB	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	±9.6
10900	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10901	AAB	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6
10902	AAC	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	AAC	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	AAE	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	±9.6
10908	AAC	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.6
10909	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.98	±9.6
10910	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	±9.6

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10911	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	±9.6
10912	AAC	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	AAC	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	AAE	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.86	±9.6
10919	AAC	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	±9.6
10920	AAB	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.87	±9.6
10921	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.84	±9.6
10922	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.82	±9.6
10923	AAC	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	AAC	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	AAC	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.52	±9.6
10931	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
10932	AAC	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
10933	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
10934	AAC	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
10935	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.51	±9.6
10936	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.6
10937	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.77	±9.6
10938	AAC	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.90	±9.6
10939	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.82	±9.6
10940	AAC	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.89	±9.6
10941	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.6
10942	AAC	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.6
10943	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.95	±9.6
10944	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.81	±9.6
10945	AAD	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.85	±9.6
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.83	±9.6
10947	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.6
10948	AAC	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.6
10949	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.87	±9.6
10950	AAC	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.94	±9.6
10951	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 FDD	5.92	±9.6
10952	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.25	±9.6
10953	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.15	±9.6
10954	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.23	±9.6
10955	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.42	±9.6
10956	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.14	±9.6
10957	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.31	±9.6
10958	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.61	±9.6
10959	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.33	±9.6
10960	AAE	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.32	±9.6
10961	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.96	±9.6
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.40	±9.6
10963	AAC	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.55	±9.6
10964	AAE	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.29	±9.6
10965	AAC	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	AAC	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.42	±9.6
10968	AAD	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.49	±9.6
10972	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	11.59	±9.6
10973	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	9.06	±9.6
10974	AAD	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

EX3DV4 - SN:7655

May 28, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10983	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.31	±9.6
10984	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	±9.6
10985	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.54	±9.6
10986	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	±9.6
10987	AAC	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.53	±9.6
10988	AAB	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.38	±9.6
10989	AAC	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	±9.6
10990	AAB	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.52	±9.6
11003	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	10.24	±9.6
11004	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	10.73	±9.6
11005	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.70	±9.6
11006	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.55	±9.6
11007	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.46	±9.6
11008	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.51	±9.6
11009	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.76	±9.6
11010	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.95	±9.6
11011	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.98	±9.6
11012	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.68	±9.6
11013	AAB	IEEE 802.11be (320 MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6
11014	AAB	IEEE 802.11be (320 MHz, MCS2, 99pc duty cycle)	WLAN	8.45	±9.6
11015	AAB	IEEE 802.11be (320 MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±9.6
11016	AAB	IEEE 802.11be (320 MHz, MCS4, 99pc duty cycle)	WLAN	8.44	±9.6
11017	AAB	IEEE 802.11be (320 MHz, MCS5, 99pc duty cycle)	WLAN	8.41	±9.6
11018	AAB	IEEE 802.11be (320 MHz, MCS6, 99pc duty cycle)	WLAN	8.40	±9.6
11019	AAB	IEEE 802.11be (320 MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±9.6
11020	AAB	IEEE 802.11be (320 MHz, MCS8, 99pc duty cycle)	WLAN	8.27	±9.6
11021	AAB	IEEE 802.11be (320 MHz, MCS9, 99pc duty cycle)	WLAN	8.46	±9.6
11022	AAB	IEEE 802.11be (320 MHz, MCS10, 99pc duty cycle)	WLAN	8.36	±9.6
11023	AAB	IEEE 802.11be (320 MHz, MCS11, 99pc duty cycle)	WLAN	8.09	±9.6
11024	AAB	IEEE 802.11be (320 MHz, MCS12, 99pc duty cycle)	WLAN	8.42	±9.6
11025	AAB	IEEE 802.11be (320 MHz, MCS13, 99pc duty cycle)	WLAN	8.37	±9.6
11026	AAB	IEEE 802.11be (320 MHz, MCS0, 99pc duty cycle)	WLAN	8.39	±9.6

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

Appendix G. – Dipole Calibration Data

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



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S Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: **SCS 0108**

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.Client: **HCT**Certificate No. **CLA150-4014_Aug24**

Gyeonggi-do, Republic of Korea

CALIBRATION CERTIFICATE

Object	CLA150 - SN: 4014	검사자 자	담당자 자			
Calibration procedure(s)	QA CAL-15.v11 Calibration Procedure for SAR Validation Sources below 700 MHz	SW / 7/24 # 2024.09.02	RJ / 7/24 2024.09.02			
Calibration date:	August 19, 2024					
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.						
All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.						
Calibration Equipment used (M&TE critical for calibration)						
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration			
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25			
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25			
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25			
Reference 20 dB Attenuator	SN: CC2552 (20x)	26-Mar-24 (No. 217-04046)	Mar-25			
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25			
Reference Probe EX3DV4	SN: 3877	10-Jan-24 (No. EX3-3877_Jan24)	Jan-25			
DAE4	SN: 654	15-Jan-24 (No. DAE4-654_Jan24)	Jan-25			
Secondary Standards	ID #	Check Date (in house)	Scheduled Check			
Power meter NRP2	SN: 107193	08-Nov-21 (in house check Dec-22)	In house check: Dec-24			
Power sensor NRP-Z91	SN: 100922	15-Dec-09 (in house check Dec-22)	In house check: Dec-24			
Power sensor NRP-Z91	SN: 100418	01-Jan-04 (in house check Dec-22)	In house check: Dec-24			
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-24)	In house check: Jun-26			
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24			
Calibrated by:	Name Krešimir Franjić	Function Laboratory Technician	Signature 			
Approved by:	Sven Kühn	Technical Manager	Signature 			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			Issued: August 19, 2024			

Certificate No: CLA150-4014_Aug24

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Calibration Laboratory of
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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
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: 2 ± 0.2 mm
EUT Positioning	Touch Position	
Zoom Scan Resolution	$dx, dy = 4.0$ mm, $dz = 1.4$ mm	Graded Ratio = 1.4 (Z direction)
Frequency	150 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	52.3	0.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	50.5 ± 6 %	0.78 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	1 W input power	3.82 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	3.72 W/kg ± 18.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	1 W input power	2.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	2.47 W/kg ± 18.0 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	48.2 Ω + 5.8 $j\Omega$
Return Loss	- 24.2 dB

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 19.08.2024

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: CLA150; Type: CLA150; Serial: CLA150 - SN: 4014

Communication System: UID 0 - CW; Frequency: 150 MHz
Medium parameters used: $f = 150$ MHz; $\sigma = 0.78$ S/m; $\epsilon_r = 50.5$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(12.11, 12.11, 12.11) @ 150 MHz; Calibrated: 10.01.2024
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 15.01.2024
- Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2034
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7501)

CLA Calibration for HSL-LF Tissue/CLA150, touch configuration, Pin=1W/Zoom Scan,**dist=1.4mm (8x10x8)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 83.15 V/m; Power Drift = 0.00 dB

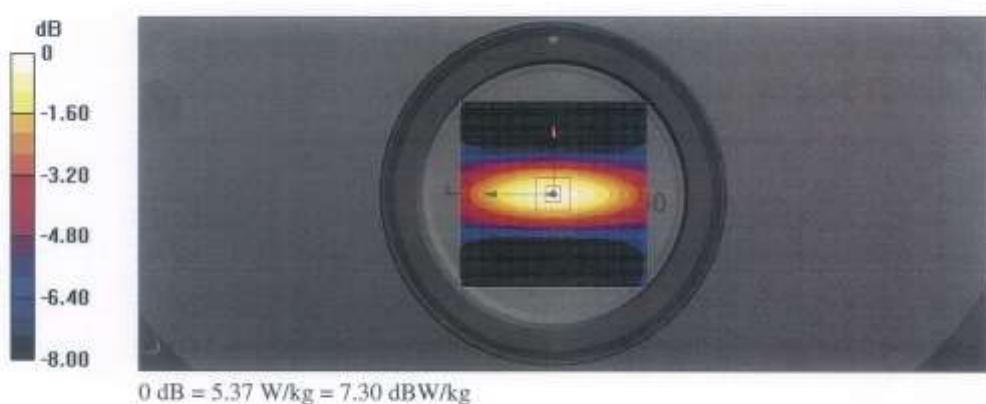
Peak SAR (extrapolated) = 7.29 W/kg

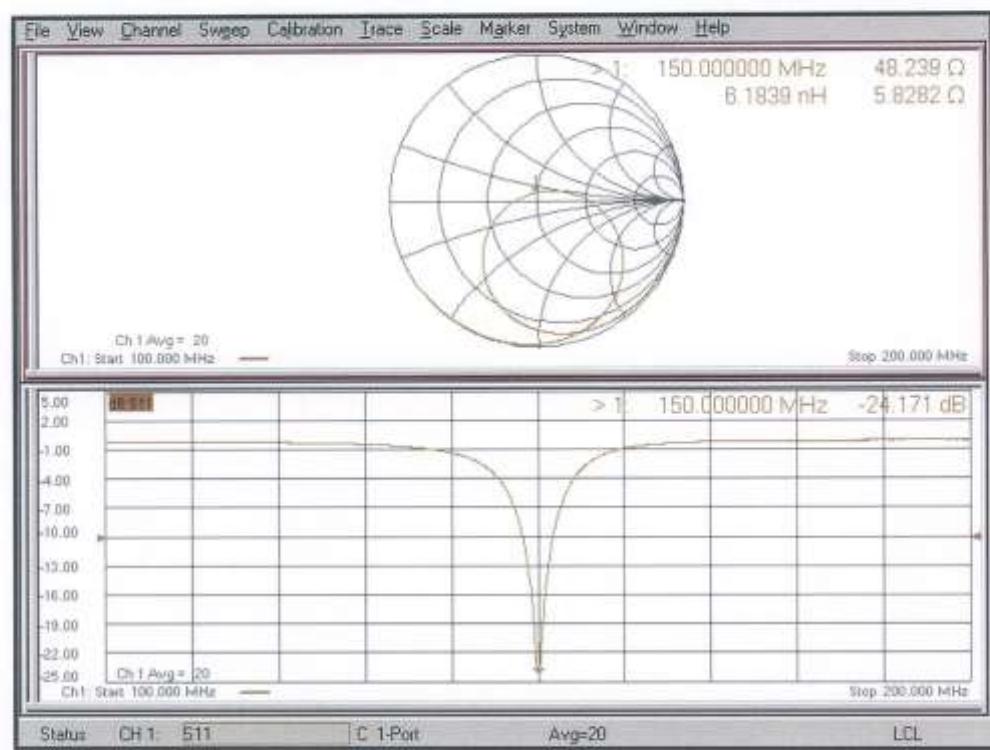
SAR(1 g) = 3.82 W/kg; SAR(10 g) = 2.53 W/kg

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (> 14 mm)

Ratio of SAR at M2 to SAR at M1 = 80.1%

Maximum value of SAR (measured) = 5.37 W/kg



Impedance Measurement Plot for Head TSL

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



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Accreditation No.: **SCS 0108**

Client **HCT**

Certificate No. **D450V2.5-1007_Jul23**

Gyeonggi-do, Republic of Korea

CALIBRATION CERTIFICATE

Object **D450V2.5 - SN:1007**

Calibration procedure(s) **QA-CAL-15.v10**
 Calibration Procedure for SAR Validation Sources below 700 MHz

Calibration date: **July 11, 2023**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: BH9394 (20k)	30-Mar-23 (No. 217-03809)	Mar-24
Type-N mismatch combination	SN: 310982 / 06327	30-Mar-23 (No. 217-03810)	Mar-24
Reference Probe EX3DV4	SN: 3877	06-Jan-23 (No. EX3-3877_Jan23)	Jan-24
DAE4	SN: 654	27-Jan-23 (No. DAE4-654_Jan23)	Jan-24
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter NRP2	SN: 107193	08-Nov-21 (in house check Dec-22)	In house check: Dec-24
Power sensor NRP-Z91	SN: 100922	15-Dec-09 (in house check Dec-22)	In house check: Dec-24
Power sensor NRP-Z91	SN: 100418	01-Jan-04 (in house check Dec-22)	In house check: Dec-24
RF generator HP 8648C	SN: US53642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by: **Jeffrey Katzman** Function: **Laboratory Technician**

Approved by: **Sven Kühn** Function: **Technical Manager**

Issued: July 20, 2023

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

Certificate No: **D450V2.5-1007_Jul23**

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설	정	자
재	재	자
기기/일련	11 / 05268	CJ / 01936
날짜	2023 / 08.03	2023 / 08.03

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



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Multilateral Agreement for the recognition of calibration certificates.

Accreditation No.: **SCS 0108**

Glossary:

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

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"

Additional Documentation:

- c) DASY 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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	ELI6 Flat Phantom	Shell thickness: 2 ± 0.2 mm
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	43.5	0.87 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	44.5 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	4.54 W/kg ± 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	0.754 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	3.00 W/kg ± 17.6 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	59.3 Ω + 1.5 $j\Omega$
Return Loss	-21.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.350 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 11.07.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 450 MHz; Type: D450V2.5; Serial: D450V2.5 - SN:1007

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used: $f = 450$ MHz; $\sigma = 0.88$ S/m; $\epsilon_r = 44.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(10.64, 10.64, 10.64) @ 450 MHz; Calibrated: 06.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 27.01.2023
- Phantom: ELI v6.0; Type: QDOVA003AA; Serial: TP:2034
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 38.69 V/m; Power Drift = 0.00 dB

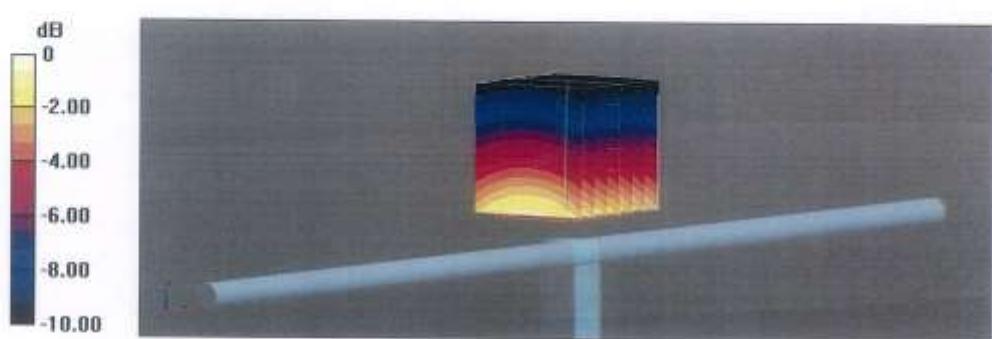
Peak SAR (extrapolated) = 1.78 W/kg

SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.754 W/kg

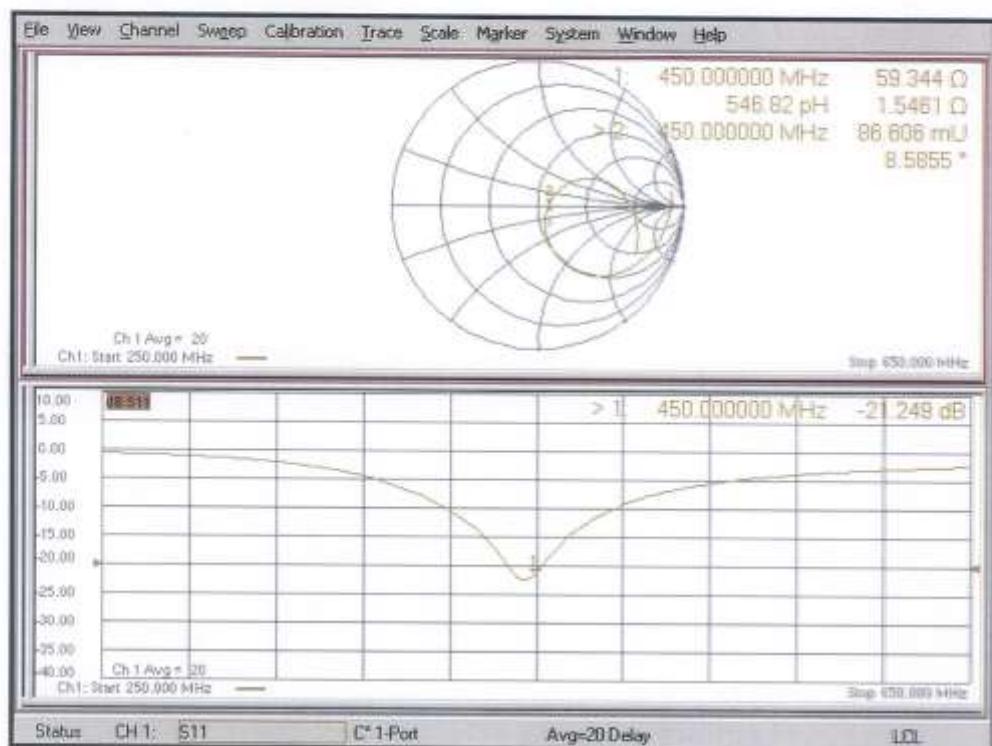
Smallest distance from peaks to all points 3 dB below; Larger than measurement grid (> 15 mm)

Ratio of SAR at M2 to SAR at M1 = 63.8%

Maximum value of SAR (measured) = 1.54 W/kg



0 dB = 1.54 W/kg = 1.88 dBW/kg

Impedance Measurement Plot for Head TSL

Certification of Calibration

Object	D450V2.5 – SN:1007
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date	Jul.11, 2025
Description	SAR Validation Dipole at 450 MHz

Note: Calibrated Before Testing. Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. signal generator) to determine the losses of the measurement path.

Dipole Calibration Extension

Per HDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

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Accreditation No.: **SCS 0108**

Client **HCT**

Gyeonggi-do, Republic of Korea

Certificate No. **D835V2-441_Apr24**

CALIBRATION CERTIFICATE

Object **D835V2 - SN:441**

날짜	2024.04.18	인증
기밀번호	SW / 024	03 / 2024
설명	2024-04-18	2024-04-18

Calibration procedure(s)

QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date:

April 18, 2024

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04036)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH9394 (20k)	26-Mar-24 (No. 217-04046)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by:	Name	Function	Signature
	Paulo Pina	Laboratory Technician	

Approved by:	Name	Function	Signature
	Sven Kühn	Technical Manager	

issued: April 23, 2024

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 x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY 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 source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. 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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.6 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	—	—

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.48 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.73 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.62 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.37 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	49.5 Ω - 2.5 $j\Omega$
Return Loss	- 31.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.374 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 18.04.2024

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.93$ S/m; $\epsilon_r = 42.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.69, 9.69, 9.69) @ 835 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (8x8x7)/Cube 0:Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 63.37 V/m; Power Drift = 0.00 dB

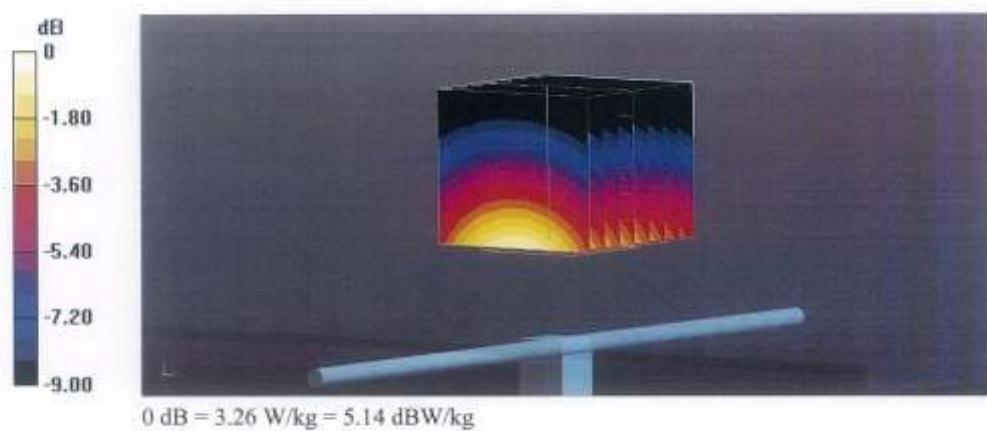
Peak SAR (extrapolated) = 3.71 W/kg

SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.62 W/kg

Smallest distance from peaks to all points 3 dB below = 16 mm

Ratio of SAR at M2 to SAR at M1 = 66.8%

Maximum value of SAR (measured) = 3.26 W/kg



Impedance Measurement Plot for Head TSL