

TEST REPORT FOR SAR TESTING

Report No.: SRTC2019-9004(F)-19121201(H)

Product Name: LTE USB Dongle

Product Model: MF833U1

Applicant: ZTE Corporation

Manufacturer: ZTE Corporation

Specification: Part 2.1093

IEEE Std 1528

KDB Procedures

FCC ID: SRQ-MF79U

The State Radio_monitoring_center Testing Center (SRTC)

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1. GENERAL INFORMATION

1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC).

The test results relate only to individual items of the samples which have been tested.

The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
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1.3 Applicant's details

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1.4 Manufacturer's details

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Country or Region:	P.R. China
Contacted person:	Gong Yu
Tel:	'86-21-68895397
Fax:	---
Email:	gongyu@zte.com.cn

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2019-12-12
Testing Start Date:	2019-12-12
Testing End Date:	2020-01-08

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40

Normal Supply Voltage (Vdc.):	5.0
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2. DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Wireless Technology and Frequency Bands	☒ GSM Band: GSM850/GSM1900 ☒ WCDMA Band: FDD II/V ☒ LTE Band: 2/5/7
Mode	GSM ☒ GPRS (GMSK) ☒ EGPRS (GMSK/8PSK) WCDMA ☒ UMTS Rel. 99 ☒ HSDPA (Rel. 5) ☒ HSUPA (Rel. 6) ☐ HSPA+ (Rel.7) ☐ DC-HSDPA (Rel.8) LTE ☒ QPSK ☒ 16QAM ☒ 64QAM
Duty Cycle*	GPRS: 12.5% (1 Slot), 25% (2 Slots), 37.5% (3 Slots), 50% (4 Slots) EDGE(GMSK/8PSK) 12.5% (1 Slot), 25% (2 Slots), 37.5% (3 Slots), 50% (4 Slots) WCDMA: 100% LTE: 100%
Multi-Slot Class for GPRS/EDGE	☐ Class 8 - One Up ☐ Class 10 - Two Up ☒ Class 12 - Four Up ☐ Class 33- Four Up
Mobile Phone Capability	☐ Class A - Mobile phones can be connected to both GPRS and GSM services simultaneously. ☒ Class B - Mobile phones can be attached to both GPRS and GSM services, using one service at a time. ☐ Class C - Mobile phones are attached to either GPRS or GSM voice service. You need to switch manually between services
DTM	Not Supported
Note*	For licensed cellular network duty cycle is inherent. For unlicensed network WLAN Duty cycle are depend on the data traffic, and the traffic allocation in operating mode could be the most conservative condition which with 100% duty cycle. SAR measurement also use non signalling mode, so the duty factor shall be taken into consideration.

2.2 Support Equipment

The following support equipment was used to exercise the DUT during testing:

State of sample	Normal
H/W Version	dveB
S/W Version	BD HTXMF833U1V1.0.0B03
IMEI	860220040412853
Notes	As the information described above, we use test sample offered by the customer. The relevant tests have been performed in order to verify in which combination case the EUT would have the worst features.

3. REFERENCE SPECIFICATION

Specification	Version	Title
Part 2.1093	2019	Radiofrequency radiation exposure evaluation: portable devices.
IEEE Std 1528	2013	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 447498 D01	v06	General RF Exposure Guidance
KDB 447498 D02	v02r01	SAR MEASUREMENT PROCEDURES FOR USB DONGLE TRANSMITTERS
KDB 648474 D04	v01r03	Handset SAR
KDB 941225 D01	v03r01	3G SAR Procedures
KDB 248227 D01	v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 865664 D01	v01r04	SAR Measurement from 100 MHz to 6 GHz
KDB 865664 D02	v01r02	RF Exposure Reporting
KDB 941225 D05	v02r05	SAR for LTE Devices

4. TEST CONDITIONS

4.1 Picture to demonstrate the required liquid depth

The liquid depth is large than 15cm in the used SAM phantoms in flat section, and the depth of the tissue simulant was 15.0 ± 0.5 cm measured from the ear reference point during system checking and device measurements.



Liquid depth for SAR Measurement

4.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

In all operating bands the measurements were performed on middle channel, and few of them were also performed on lowest and highest channels.

4.3 SAR Measurement Set-up

The system is based on a high precision robot (working range greater than 0.9m), which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit. A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors.

The PC consists of the Micron Pentium IV computer with Win7 system and SAR Measurement Software DASY5 Professional, A/D interface card, monitor, mouse, and keyboard. The Stäubli 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. The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16bit 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.

4.4 Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528.

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

The SPEAG device holder was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.5 Tissue Simulants

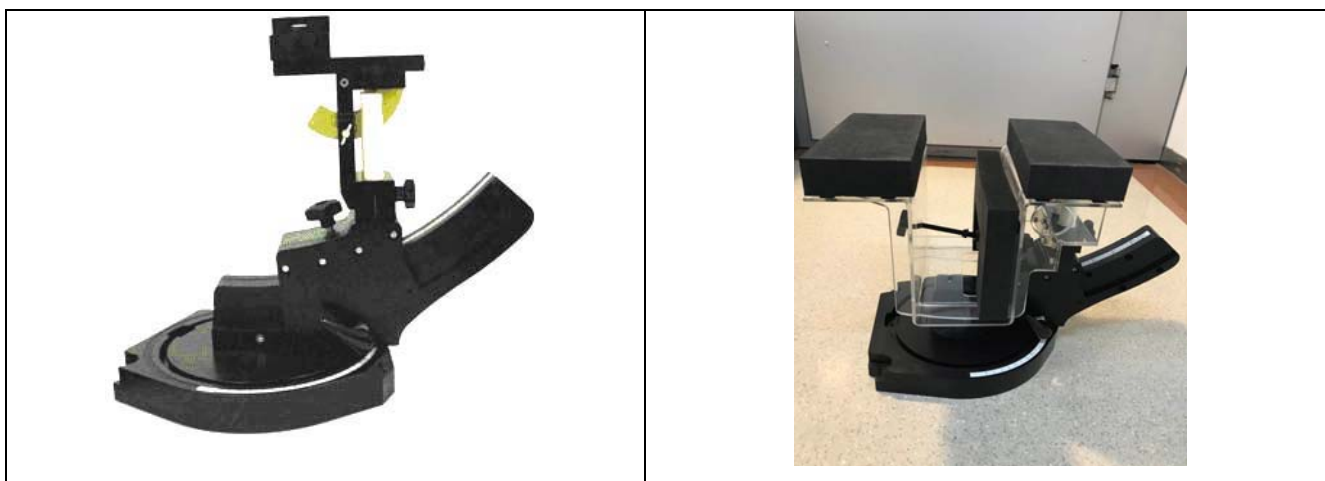
Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528. All tests were carried out using simulants whose dielectric parameters were within $\pm 10\%$ below 3GHz and $\pm 5\%$ above 3GHz of the recommended values when use DASY system according to KDB865664D01. All tests were carried out within 24 hours of measuring the dielectric parameters.

Tissue Stimulant Recipes	
Name	Broadband tissue-equivalent liquid
Type	HBBL600-6000V6 Simulating Liquid
Note: The stimulant could be the same for head and body.	

4.6 DESCRIPTION OF THE TEST PROCEDURE

4.6.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.



Device holder supplied by SPEAG

4.6.2 Test Exposure Conditions

4.6.2.1 Head Configuration

Measurements were made in “cheek” and “tilt” positions on both the left hand and right-hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

4.6.2.2 Body Worn Configuration

The device was placed in the SPEAG holder below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance using a separate flat spacer that was removed before the start of the measurements. And the distance is normally determined according to the actual scene which might be the worst use condition for general exposure. The device's front and rear were oriented facing the phantom since these orientations give higher results for most regular portable devices.

4.6.2.3 Hotspot Configuration

Hotspot mode SAR is measured for all edges and surfaces of the device with a transmitting antenna located within 25 mm from that surface or edge; for the data modes, wireless technologies and frequency bands supporting hotspot mode.

4.6.3 Scan Procedure

First, area scans were used for determination of the field distribution and the approximate location of the local peak SAR values. The SAR distribution is scanned along the inside surface, at least for an area larger than the projection of the handset and antenna. The angle between the probe axis and the surface normal line is recommended but not required to be less than 30°. The SAR distribution is first measured on a 2-D coarse grid. The scan region should cover all areas that are exposed and encompassed by the projection of the handset. There are 15 mm × 15 mm (equal or less than 2GHz), 12 mm × 12 mm (from 2GHz~4GHz) and 10mm x 10mm (from 4GHz~6GHz) measurement grid used when two staggered one-dimensional cubic splines are used to estimate the maximum SAR location.

When the reported 1g-SAR estimated by area scan is less than 1.40 w/kg.

Zoom scan was performed by using the configuration mentioned below or more conservative scan area and step to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

Below 3GHz: 32mmX32mmX30mm scan area with 8 mm X8 mm X5 mm steps

2GHz-3GHz: 32mmX32mmX30mm scan area with 8 mm X8 mm X5 mm steps

3GHz-4GHz: 28mmX28mmX28mm scan area with 7 mm X7 mm X4 mm steps

4GHz-5GHz: 25mmX25mmX24mm scan area with 5 mm X5 mm X3 mm steps

5GHz-6GHz: 25mmX25mmX22mm scan area with 5 mm X5 mm X2 mm steps

4.6.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within DASY5 are all based on the modified Quadratic Shepard's method (Robert J. Renka, Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

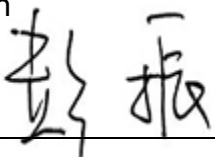
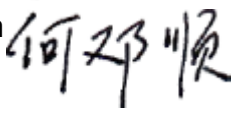
The interpolation scheme combines a least-square fitted function method with a weighted average method. A triradiate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighboring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

5 RESULT SUMMAR

The maximum reported SAR values for Head configuration and Body Worn configuration are given as follows. The device conforms to the requirements of the standard(s) when the maximum reported SAR value is less than or equal to the limit.

Exposure Position	Frequency Band	1g-SAR Reported Result (W/kg)	Highest 1g-SAR Reported Result (W/kg)	Limit(W/kg)/1g	Result
Body-Worn (5mm Gap)	GSM850	0.58	0.85	1.6	PASS
	GSM1900	0.46			
	WCDMA Band2	0.46			
	WCDMA Band5	0.14			
	LTE Band2	0.85			
	LTE Band5	0.35			
	LTE Band7	0.27			

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Mr. He Dengshun 	Issued date: 20200112

6 TEST RESULT

6.1 Manufacturing Tolerance

GSM

GSM 850 GPRS/EGPRS(GMSK)				
Channel		128	189	251
1 Txslot	Tolerance (dBm)	29.5~33.5	29.5~33.5	29.5~33.5
2 Txslot	Tolerance (dBm)	26.5~30.5	26.5~30.5	26.5~30.5
3 Txslot	Tolerance (dBm)	25.5~29.5	25.5~29.5	25.5~29.5
4 Txslot	Tolerance (dBm)	23.5~27.5	23.5~27.5	23.5~27.5

GSM 850 EGPRS(8PSK)				
Channel		128	189	251
1 Txslot	Tolerance (dBm)	22.5~26.5	22.5~26.5	22.5~26.5
2 Txslot	Tolerance (dBm)	20.5~24.5	20.5~24.5	20.5~24.5
3 Txslot	Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
4 Txslot	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

GSM 1900 GPRS/EGPRS(GMSK)				
Channel		512	661	810
1 Txslot	Tolerance (dBm)	22.5~26.5	22.5~26.5	22.5~26.5
2 Txslot	Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
3 Txslot	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
4 Txslot	Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

GSM 1900 EGPRS(8PSK)				
Channel		512	661	810
1 Txslot	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
2 Txslot	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
3 Txslot	Tolerance (dBm)	16.0~20.0	16.0~20.0	16.0~20.0
4 Txslot	Tolerance (dBm)	15.0~19.0	15.0~19.0	15.0~19.0

WCDMA

WCDMA Band II			
Channel	9262	9400	9538
Tolerance (dBm)	18.6~22.6	18.6~22.6	18.6~22.6

HSDPA Band II				
Channel		9262	9400	9538
Sub test 1	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 2	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 3	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 4	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

HSUPA Band II				
Channel		9262	9400	9538
Sub test 1	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 2	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 3	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 4	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 5	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

WCDMA Band V			
Channel	4132	4183	4233
Tolerance (dBm)	18.9~22.9	18.9~22.9	18.9~22.9

HSDPA Band V				
Channel		4132	4183	4233
Sub test 1	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 2	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 3	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 4	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

HSUPA Band V				
Channel		4132	4183	4233
Sub test 1	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 2	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 3	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 4	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 5	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

LTE

Note: RB allocation mentioned below is for all Bandwidths, and the Frequency Range are divided to 3 ranges (Low, Mid, High)

Band 2

QPSK

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

16QAM

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

64QAM

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

Band 5
QPSK

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.7~21.7	17.7~21.7	17.7~21.7
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	19.7~23.7	19.7~23.7	19.7~23.7

16QAM

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0

64QAM

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0

Band 7

QPSK

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.2~21.2	17.2~21.2	17.2~21.2
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	19.3~23.3	19.3~23.3	19.3~23.3

16QAM

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

64QAM

100%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
50%RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
1RB			
Frequency Range	Low	Mid	High
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

6.2 GSM Measurement result

GPRS/EGPRS (GMSK) Measured Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	33.03	33.07	33.11	26.35	26.23	26.14
3Downlink2uplinkPower(dBm)	30.05	30.11	30.14	23.55	23.46	23.37
2Downlink3uplinkPower(dBm)	29.37	29.41	29.43	23.23	23.13	23.07
1Downlink4uplinkPower(dBm)	27.23	27.27	27.26	21.32	21.21	21.14

GPRS/EGPRS (GMSK) Frame Average Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	24.00	24.04	24.08	17.32	17.20	17.11
3Downlink2uplinkPower(dBm)	24.03	24.09	24.12	17.53	17.44	17.35
2Downlink3uplinkPower(dBm)	25.11	25.15	25.17	18.97	18.87	18.81
1Downlink4uplinkPower(dBm)	24.22	24.26	24.25	18.31	18.20	18.13

EGPRS (8PSK) Measured Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	26.11	26.08	25.94	21.74	21.87	21.82
3Downlink2uplinkPower(dBm)	24.33	24.28	24.25	20.37	20.42	20.39
2Downlink3uplinkPower(dBm)	23.78	23.73	23.69	19.83	19.91	19.85
1Downlink4uplinkPower(dBm)	21.79	21.83	21.73	18.32	18.26	18.23

EGPRS (8PSK) Frame Average Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	17.08	17.05	16.91	12.71	12.84	12.79
3Downlink2uplinkPower(dBm)	18.31	18.26	18.23	14.35	14.40	14.37
2Downlink3uplinkPower(dBm)	19.52	19.47	19.43	15.57	15.65	15.59
1Downlink4uplinkPower(dBm)	18.78	18.82	18.72	15.31	15.25	15.22

Division Factors (for Measured Power and Frame Average Power):

To average the power, the division factor is as follows:

1TX-slot (1uplink) = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots(2uplink) = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots (3uplink) = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots (4uplink) = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the frame average conducted power, the SAR measurements are performed with **3Txslots (3uplink)** of GPRS900 (GMSK) and GPRS1800 (GMSK).

6.3 WCDMA Measurement result

Release 99

The following procedures are according to FCC KDB Publication 941225 D01.

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	RMC mode AMR mode	12.2kbps RMC 12.2kbps RMC in 3.4 kbps SRB
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

Measured Results

Mode	Band II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880	1907.6
RB test mode1+64kRMC(dBm)	22.48	21.89	21.69
RB test mode1+12.2kRMC(dBm)	22.52	21.98	21.74
RB test mode1+12.2k AMR in 3.4 kbps SRB (dBm)	22.37	21.86	21.57
RB test mode1+144kRMC(dBm)	22.36	21.78	21.63
RB test mode1+384kRMC(dBm)	22.42	21.75	21.58

Mode	Band V		
Channel	4132	4183	4233
Frequency(MHz)	826.4	836.4	846.6
RB test mode1+64kRMC(dBm)	22.68	22.45	22.08
RB test mode1+12.2kRMC(dBm)	22.86	22.57	22.18
RB test mode1+12.2k AMR in 3.4 kbps SRB (dBm)	22.75	22.62	22.12
RB test mode1+144kRMC(dBm)	22.73	22.43	22.16
RB test mode1+384kRMC(dBm)	22.69	22.53	22.11

Release 5

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM(dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/18	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.

Note3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Measured Results

WCDMA Band II				
Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
HSDPA	Subtest 1	1852.4	9262	21.45
		1880.0	9400	21.12
		1907.6	9538	21.11
	Subtest 2	1852.4	9262	21.37
		1880.0	9400	21.14
		1907.6	9538	21.12
	Subtest 3	1852.4	9262	21.42
		1880.0	9400	21.16
		1907.6	9538	21.13
	Subtest 4	1852.4	9262	21.39
		1880.0	9400	21.14
		1907.6	9538	21.12

WCDMA Band V				
Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
HSDPA	Subtest 1	826.4	4132	21.57
		836.6	4183	21.43
		846.6	4233	21.16
	Subtest 2	826.4	4132	21.54
		836.6	4183	21.46
		846.6	4233	21.13
	Subtest 3	826.4	4132	21.62
		836.6	4183	21.37
		846.6	4233	21.14
	Subtest 4	826.4	4132	21.63
		836.6	4183	21.38
		846.6	4233	21.15

Release 6

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (S F)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (S F)	β_{ed} (code s)	CM ⁽²⁾ (dB)	MP R (dB)	AG ⁽⁴⁾ Index	E-TF CI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/25	1039/25	4	1	1.0	2.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	2.0	2.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	2.0	21	81

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to $\beta_c=10/15$ and $\beta_d=15/15$.

Note4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to $\beta_c=14/15$ and $\beta_d=15/15$.

NOTE5: Testing UE using E-DPDCH Physical layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

NOTE6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Measured Results

WCDMA Band II				
Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
HSUPA	Subtest 1	1852.4	9262	21.67
		1880.0	9400	21.12
		1907.6	9538	21.13
	Subtest 2	1852.4	9262	21.57
		1880.0	9400	21.13
		1907.6	9538	21.12
	Subtest 3	1852.4	9262	21.47
		1880.0	9400	21.13
		1907.6	9538	21.14
	Subtest 4	1852.4	9262	21.56
		1880.0	9400	21.11
		1907.6	9538	21.14
	Subtest 5	1852.4	9262	21.57
		1880.0	9400	21.12
		1907.6	9538	21.14

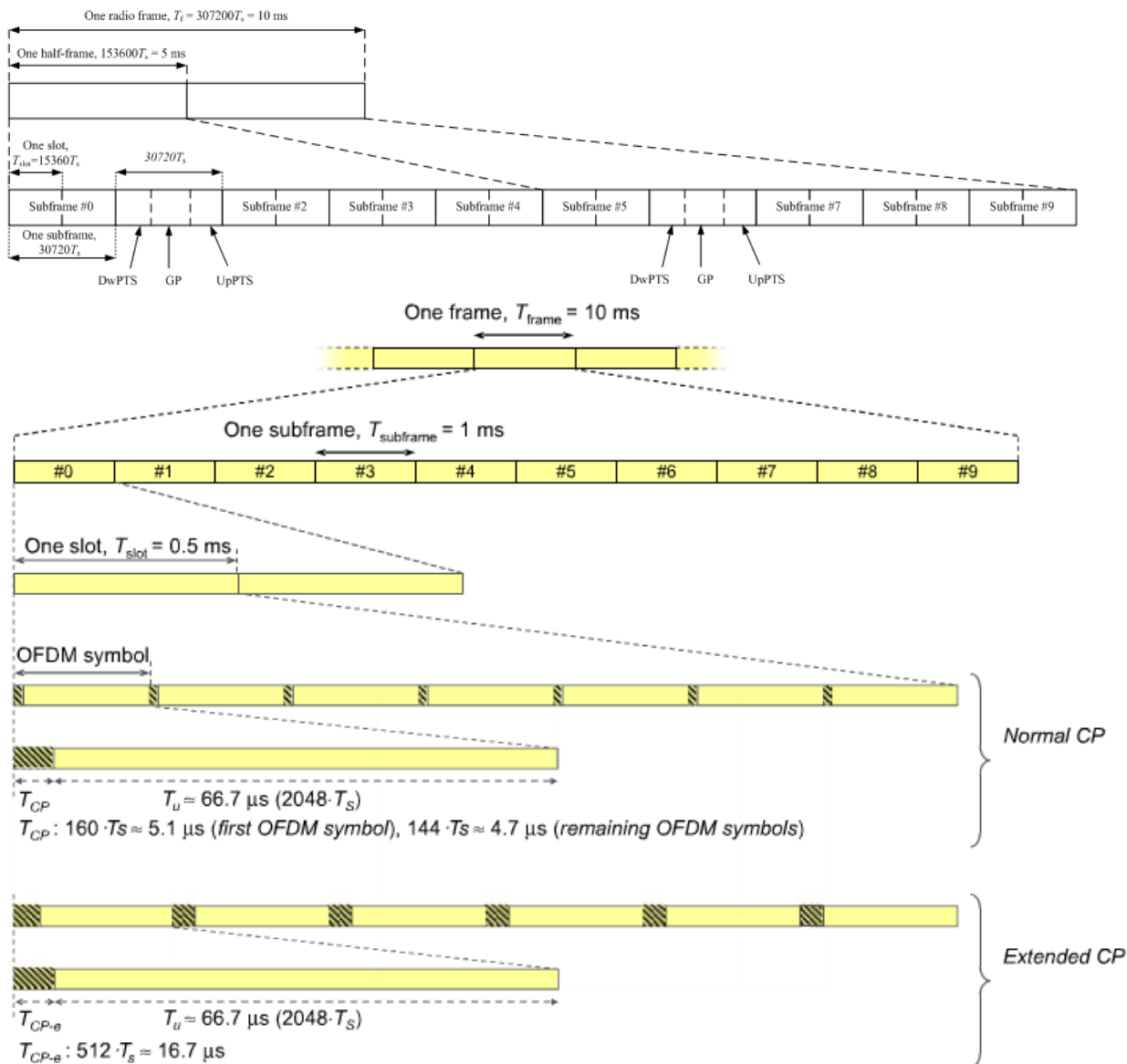
WCDMA Band V				
Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
HSUPA	Subtest 1	826.4	4132	21.62
		836.6	4183	21.38
		846.6	4233	21.14
	Subtest 2	826.4	4132	21.53
		836.6	4183	21.41
		846.6	4233	21.11
	Subtest 3	826.4	4132	21.58
		836.6	4183	21.38
		846.6	4233	21.13
	Subtest 4	826.4	4132	21.69
		836.6	4183	21.37
		846.6	4233	21.12
	Subtest 5	826.4	4132	21.58
		836.6	4183	21.39
		846.6	4233	21.14

Note: UMTS SAR was tested with 12.2 RMC kbps mode per KDB Publication 941225 D01.HSUPA SAR was not required since the average output power of the HSDPA and HSUPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg with RMC mode.

6.4 LTE Measurement result

General description:

TDD-LTE frame structure



Uplink-downlink configuration

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Special sub-frame configuration

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$			$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			-	-	-
8	$24144 \cdot T_s$			-	-	-

Special sub-frame with cyclic prefix uplink

Special sub-frame configuration		Duty factor with normal cyclic prefix in uplink	Duty factor with extended cyclic prefix in uplink
Normal cyclic prefix in downlink	0~4	7.13%	8.33%
	5~9	14.3%	16.7%
Extended cyclic prefix in downlink	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

So we perform SAR test with maximum duty factor equal to 63.3% by using uplink-downlink configuration 0.

Note: One sub-frame is $30720T_s=1\text{ms}$, when UpPTS(uplink) in special sub-frame with extended cyclic prefix, duty factor = $5120/30720=0.167$. There are 5 sub-frames in half frame(3up link), so the final duty factor is $(30720 \cdot 3 + 5120) / (30720 \cdot 5) = 63.3\%$ which we used to evaluate the SAR compliance (worst case)

LTE Band 2

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1850.7	18607	1.4	1	0	21.61
				1	5	21.61
				3	2	20.34
				6	0	20.28
	1880	18900		1	0	21.97
				1	5	21.91
				3	2	20.81
				6	0	20.64
	1909.3	19193		1	0	21.79
				1	5	21.71
				3	2	20.16
				6	0	20.61
16QAM	1850.7	18607	1.4	1	0	21.13
				1	5	21.02
				3	2	19.39
				6	0	19.58
	1880	18900		1	0	21.18
				1	5	21.16
				3	2	19.90
				6	0	19.89
	1909.3	19193		1	0	20.84
				1	5	20.79
				3	2	19.38
				6	0	19.98
64QAM	1850.7	18607	1.4	1	0	21.04
				1	5	21.10
				3	2	19.43
				6	0	19.47
	1880	18900		1	0	21.16
				1	5	21.03
				3	2	19.89
				6	0	19.77
	1909.3	19193		1	0	20.72
				1	5	20.70
				3	2	19.34
				6	0	19.67

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1851.5	18615	3	1	0	21.58
				1	14	21.70
				8	4	20.44
				15	0	20.20
	1880	18900		1	0	21.93
				1	14	21.93
				8	4	20.79
				15	0	20.68
	1908.5	19185		1	0	21.79
				1	14	21.74
				8	4	20.27
				15	0	20.66
16QAM	1851.5	18615	3	1	0	21.13
				1	14	21.11
				8	4	19.35
				15	0	19.59
	1880	18900		1	0	21.23
				1	14	21.18
				8	4	19.96
				15	0	19.82
	1908.5	19185		1	0	20.84
				1	14	20.78
				8	4	19.38
				15	0	19.98
64QAM	1851.5	18615	3	1	0	21.05
				1	14	21.09
				8	4	19.37
				15	0	19.41
	1880	18900		1	0	21.14
				1	14	21.18
				8	4	19.93
				15	0	19.84
	1908.5	19185		1	0	20.68
				1	14	20.77
				8	4	19.26
				15	0	19.70

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1852.5	18625	5	1	0	21.70
				1	24	21.66
				12	6	20.44
				25	0	20.33
	1880	18900		1	0	21.84
				1	24	21.98
				12	6	20.77
				25	0	20.69
	1907.5	19175		1	0	21.74
				1	24	21.76
				12	6	20.18
				25	0	20.70
16QAM	1852.5	18625	5	1	0	21.04
				1	24	21.09
				12	6	19.34
				25	0	19.58
	1880	18900		1	0	21.20
				1	24	21.20
				12	6	19.88
				25	0	19.96
	1907.5	19175		1	0	20.79
				1	24	20.72
				12	6	19.30
				25	0	20.00
64QAM	1852.5	18625	5	1	0	21.04
				1	24	21.09
				12	6	19.43
				25	0	19.37
	1880	18900		1	0	21.12
				1	24	21.05
				12	6	19.97
				25	0	19.84
	1907.5	19175		1	0	20.67
				1	24	20.79
				12	6	19.24
				25	0	19.61

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1855	18650	10	1	0	21.71
				1	49	21.63
				24	12	20.38
				50	0	20.33
	1880	18900		1	0	21.91
				1	49	21.93
				24	12	20.84
				50	0	20.65
	1905	19150		1	0	21.72
				1	49	21.72
				24	12	20.14
				50	0	20.70
16QAM	1855	18650	10	1	0	21.08
				1	49	21.07
				24	12	19.37
				50	0	19.54
	1880	18900		1	0	21.25
				1	49	21.20
				24	12	20.00
				50	0	19.83
	1905	19150		1	0	20.84
				1	49	20.73
				24	12	19.34
				50	0	19.98
64QAM	1855	18650	10	1	0	21.01
				1	49	21.00
				24	12	19.40
				50	0	19.37
	1880	18900		1	0	21.14
				1	49	21.14
				24	12	19.92
				50	0	19.85
	1905	19150		1	0	20.71
				1	49	20.70
				24	12	19.30
				50	0	19.66

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1857.5	18675	15	1	0	21.66
				1	74	21.67
				40	18	20.40
				75	0	20.30
	1880	18900		1	0	21.84
				1	74	21.91
				40	18	20.77
				75	0	20.71
	1902.5	19125		1	0	21.81
				1	74	21.80
				40	18	20.25
				75	0	20.67
16QAM	1857.5	18675	15	1	0	21.06
				1	74	21.14
				40	18	19.36
				75	0	19.60
	1880	18900		1	0	21.24
				1	74	21.25
				40	18	19.90
				75	0	19.88
	1902.5	19125		1	0	20.83
				1	74	20.79
				40	18	19.41
				75	0	19.91
64QAM	1857.5	18675	15	1	0	21.04
				1	74	21.07
				40	18	19.49
				75	0	19.47
	1880	18900		1	0	21.05
				1	74	21.09
				40	18	19.97
				75	0	19.79
	1902.5	19125		1	0	20.74
				1	74	20.74
				40	18	19.32
				75	0	19.69

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1860	18700	20	1	0	21.73
				1	99	21.73
				50	25	20.45
				100	0	20.34
	1880	18900		1	0	21.98
				1	99	21.98
				50	25	20.84
				100	0	20.75
	1900	19100		1	0	21.86
				1	99	21.86
				50	25	20.28
				100	0	20.72
16QAM	1860	18700	20	1	0	21.14
				1	99	21.14
				50	25	19.47
				100	0	19.60
	1880	18900		1	0	21.27
				1	99	21.27
				50	25	20.02
				100	0	19.96
	1900	19100		1	0	20.85
				1	99	20.85
				50	25	19.44
				100	0	20.02
64QAM	1860	18700	20	1	0	21.13
				1	99	21.13
				50	25	19.52
				100	0	19.48
	1880	18900		1	0	21.18
				1	99	21.18
				50	25	19.98
				100	0	19.86
	1900	19100		1	0	20.79
				1	99	20.79
				50	25	19.36
				100	0	19.76

LTE Band 5

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	824.7	20407	1.4	1	0	23.57
				1	5	23.51
				3	2	21.71
				6	0	21.23
	836.5	20525		1	0	22.35
				1	5	22.48
				3	2	20.64
				6	0	21.19
	848.3	20643		1	0	23.51
				1	5	23.52
				3	2	21.79
				6	0	21.63
16QAM	824.7	20407	1.4	1	0	22.53
				1	5	22.62
				3	2	20.89
				6	0	20.42
	836.5	20525		1	0	21.34
				1	5	21.38
				3	2	19.91
				6	0	20.41
	848.3	20643		1	0	22.64
				1	5	22.74
				3	2	21.07
				6	0	20.85
64QAM	824.7	20407	1.4	1	0	22.52
				1	5	22.40
				3	2	20.82
				6	0	20.51
	836.5	20525		1	0	21.32
				1	5	21.37
				3	2	19.90
				6	0	20.41
	848.3	20643		1	0	22.51
				1	5	22.56
				3	2	21.09
				6	0	20.78

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	825.5	20415	3	1	0	23.46
				1	14	23.51
				8	4	21.62
				15	0	21.14
	836.5	20525		1	0	22.48
				1	14	22.47
				8	4	20.59
				15	0	21.11
	847.5	20635		1	0	23.56
				1	14	23.61
				8	4	21.78
				15	0	21.59
16QAM	825.5	20415	3	1	0	22.51
				1	14	22.56
				8	4	20.86
				15	0	20.47
	836.5	20525		1	0	21.33
				1	14	21.42
				8	4	19.85
				15	0	20.38
	847.5	20635		1	0	22.74
				1	14	22.65
				8	4	21.06
				15	0	20.87
64QAM	825.5	20415	3	1	0	22.43
				1	14	22.39
				8	4	20.92
				15	0	20.44
	836.5	20525		1	0	21.41
				1	14	21.35
				8	4	19.93
				15	0	20.37
	847.5	20635		1	0	22.51
				1	14	22.52
				8	4	21.11
				15	0	20.86

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	826.5	20425	5	1	0	23.47
				1	24	23.50
				12	6	21.62
				25	0	21.20
	836.5	20525		1	0	22.46
				1	24	22.45
				12	6	20.63
				25	0	21.16
	846.5	20625		1	0	23.64
				1	24	23.59
				12	6	21.89
				25	0	21.57
16QAM	826.5	20425	5	1	0	22.55
				1	24	22.52
				12	6	20.84
				25	0	20.37
	836.5	20525		1	0	21.38
				1	24	21.47
				12	6	19.87
				25	0	20.40
	846.5	20625		1	0	22.75
				1	24	22.74
				12	6	21.15
				25	0	20.90
64QAM	826.5	20425	5	1	0	22.48
				1	24	22.41
				12	6	20.82
				25	0	20.51
	836.5	20525		1	0	21.31
				1	24	21.34
				12	6	19.82
				25	0	20.47
	846.5	20625		1	0	22.57
				1	24	22.61
				12	6	21.12
				25	0	20.88

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	829	20450	10	1	0	23.58
				1	49	23.58
				24	12	21.71
				50	0	21.27
	836.5	20525		1	0	22.49
				1	49	22.49
				24	12	20.65
				50	0	21.22
	844	20600		1	0	23.64
				1	49	23.64
				24	12	21.91
				50	0	21.64
16QAM	829	20450	10	1	0	22.65
				1	49	22.65
				24	12	20.92
				50	0	20.51
	836.5	20525		1	0	21.48
				1	49	21.48
				24	12	19.93
				50	0	20.49
	844	20600		1	0	22.75
				1	49	22.75
				24	12	21.17
				50	0	20.91
64QAM	829	20450	10	1	0	22.53
				1	49	22.53
				24	12	20.95
				50	0	20.52
	836.5	20525		1	0	21.41
				1	49	21.41
				24	12	19.93
				50	0	20.48
	844	20600		1	0	22.64
				1	49	22.64
				24	12	21.16
				50	0	20.91

LTE Band 7

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	2502.5	20775	5	1	0	22.79
				1	24	22.78
				12	6	21.02
				25	0	21.55
	2535	21100		1	0	22.89
				1	24	22.85
				12	6	20.72
				25	0	20.94
	2567.5	21425		1	0	23.10
				1	24	23.21
				12	6	20.76
				25	0	21.93
16QAM	2502.5	20775	5	1	0	21.38
				1	24	21.37
				12	6	20.52
				25	0	21.02
	2535	21100		1	0	21.37
				1	24	21.37
				12	6	20.42
				25	0	20.53
	2567.5	21425		1	0	21.50
				1	24	21.59
				12	6	20.29
				25	0	20.21
64QAM	2502.5	20775	5	1	0	21.42
				1	24	21.41
				12	6	20.46
				25	0	21.06
	2535	21100		1	0	21.36
				1	24	21.42
				12	6	20.47
				25	0	20.62
	2567.5	21425		1	0	21.63
				1	24	21.60
				12	6	20.34
				25	0	20.20

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	2505	20800	10	1	0	22.87
				1	49	22.89
				24	12	21.02
				50	0	21.59
	2535	21100		1	0	22.88
				1	49	22.91
				24	12	20.80
				50	0	21.05
	2565	21400		1	0	23.12
				1	49	23.09
				24	12	20.79
				50	0	21.84
16QAM	2505	20800	10	1	0	21.41
				1	49	21.33
				24	12	20.47
				50	0	20.99
	2535	21100		1	0	21.38
				1	49	21.32
				24	12	20.32
				50	0	20.59
	2565	21400		1	0	21.61
				1	49	21.54
				24	12	20.22
				50	0	20.23
64QAM	2505	20800	10	1	0	21.32
				1	49	21.39
				24	12	20.51
				50	0	21.04
	2535	21100		1	0	21.38
				1	49	21.39
				24	12	20.41
				50	0	20.59
	2565	21400		1	0	21.64
				1	49	21.62
				24	12	20.26
				50	0	20.17

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	2507.5	20825	15	1	0	22.88
				1	74	22.83
				40	18	20.99
				75	0	21.56
	2535	21100		1	0	22.85
				1	74	22.89
				40	18	20.74
				75	0	21.04
	2562.5	21375		1	0	23.13
				1	74	23.19
				40	18	20.67
				75	0	21.87
16QAM	2507.5	20825	15	1	0	21.33
				1	74	21.38
				40	18	20.49
				75	0	20.96
	2535	21100		1	0	21.29
				1	74	21.38
				40	18	20.28
				75	0	20.44
	2562.5	21375		1	0	21.61
				1	74	21.57
				40	18	20.21
				75	0	20.27
64QAM	2507.5	20825	15	1	0	21.36
				1	74	21.41
				40	18	20.50
				75	0	21.04
	2535	21100		1	0	21.41
				1	74	21.44
				40	18	20.43
				75	0	20.63
	2562.5	21375		1	0	21.56
				1	74	21.59
				40	18	20.31
				75	0	20.24

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	2510	20850	20	1	0	22.91
				1	99	22.91
				50	25	21.11
				100	0	21.60
	2535	21100		1	0	22.96
				1	99	22.96
				50	25	20.81
				100	0	21.09
	2560	21350		1	0	23.23
				1	99	23.23
				50	25	20.82
				100	0	21.96
16QAM	2510	20850	20	1	0	21.41
				1	99	21.41
				50	25	20.56
				100	0	21.05
	2535	21100		1	0	21.41
				1	99	21.41
				50	25	20.42
				100	0	20.59
	2560	21350		1	0	21.64
				1	99	21.64
				50	25	20.32
				100	0	20.30
64QAM	2510	20850	20	1	0	21.43
				1	99	21.43
				50	25	20.59
				100	0	21.09
	2535	21100		1	0	21.47
				1	99	21.47
				50	25	20.51
				100	0	20.64
	2560	21350		1	0	21.64
				1	99	21.64
				50	25	20.34
				100	0	20.28

6.5 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Method1:

According to the KDB447498 4.3.1 (1)

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f} \text{ (GHz)}] \leq 3.0$ for 1-g SAR, where

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

This is equivalent to $[(\text{max. power of channel, including tune-up tolerance, mW}) / (60 / \sqrt{f} \text{ (GHz)}) \text{ mW}] \cdot [20 \text{ mm} / (\text{min. test separation distance, mm})] \leq 1.0$ for 1-g SAR; also see Appendix A for approximate exclusion threshold values at selected frequencies and distances.

Method2:

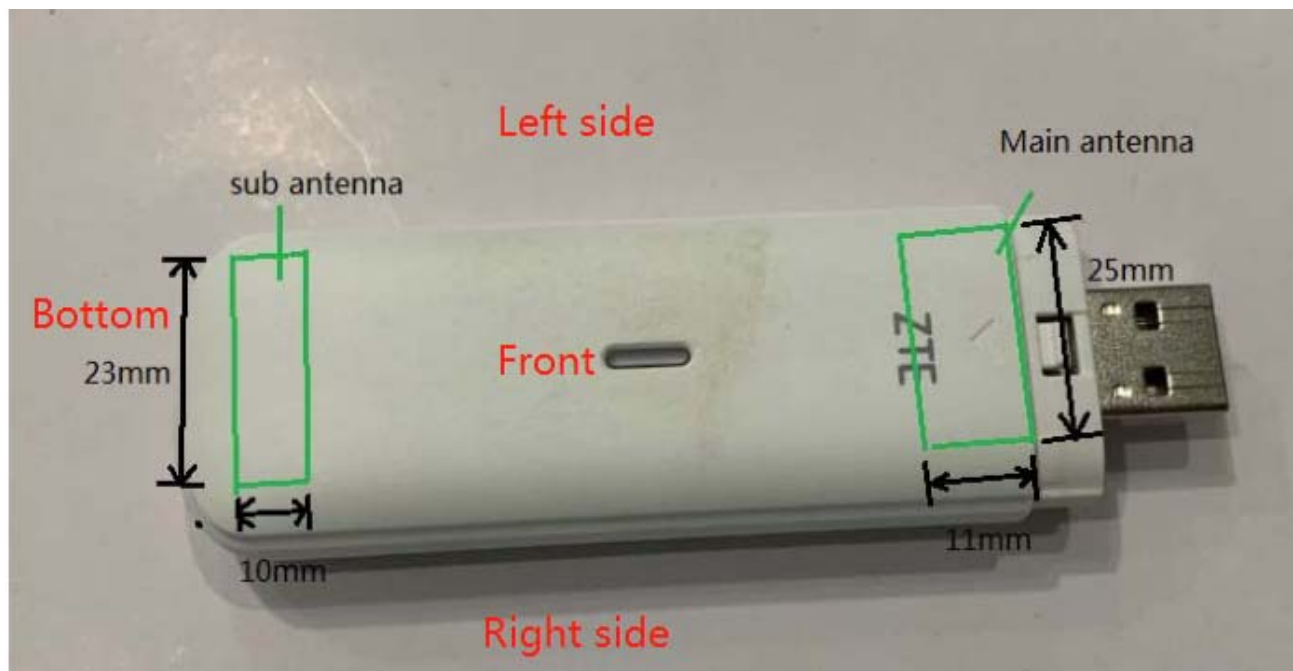
According to the KDB447498 appendix A

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

6.6 RF exposure conditions

Refer to the follow picture “Antenna information” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.



Note: we defined these position when we face the screen of EUT, the reason why we perform SAR test for these edges is that the structures of antennas is close to our body, and for the other edges do not necessary cause we already consider the worst case.

6.6.1 Body Exposure conditions

For WWAN

Test Configurations	SAR Required	Antenna-to-edge(s) distances
Back	Yes	<25mm
Front	Yes	<25mm
Bottom	Yes	<25mm
Left	Yes	<25mm
Right	Yes	<25mm

6.7 System Checking

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. For the measurement of the following parameters the SPEAG DAKS-3.5 dielectric parameter probe is used, representing the open-ended coaxial probe measurement procedure.

Date Tested	Freq. (MHz)	Liquid parameters	measured	Target	Delta (%)	Tolerance (%)
2019.12.19	835	ϵ_r	40.266	41.50	-3.0	± 10
		σ [S/m]	0.911	0.90	1.2	± 10
2019.12.20	1800	ϵ_r	40.688	40.00	1.7	± 10
		σ [S/m]	1.418	1.40	1.3	± 10
2019.12.21	2000	ϵ_r	39.844	40.00	-0.4	± 10
		σ [S/m]	1.427	1.40	1.9	± 10
2019.12.22	2600	ϵ_r	38.67	39.00	-0.8	± 10
		σ [S/m]	1.93	1.96	-1.5	± 10

Note: For DASY system, the conservative tolerance 5% could expand to 10% when the frequency under 3GHz.

A system check measurement was made following once the determination of the dielectric parameters of the simulant, using the dipole validation kit. The system checking results (dielectric parameters and SAR values) are given in the table below.

Date Tested	System dipole	T.S. Liquid	SAR measured (normalized to 1W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
2019.12.19	D835V2	Head	1g	9.56	9.37	2.0	± 10
2019.12.20	D1800V2	Head	1g	37.96	38.9	-2.4	± 10
2019.12.21	D2000V2	Head	1g	39.28	40.3	-2.5	± 10
2019.12.22	D2600V2	Head	1g	59.6	57.6	3.5	± 10

6.8 SAR TEST RESULT

In order to determine the largest value of the peak spatial-average SAR of a handset, all device positions, configurations, and operational modes should be tested for each frequency band according to Steps 1 to 3 below.

Step 1: The tests should be performed at the channel that is closest to the center of the transmit frequency band.

a) All device positions (cheek and tilt, for both left and right sides of the SAM phantom),
b) All configurations for each device position in a), e.g., antenna extended and retracted, and
c) All operational modes for each device position in item a) and configuration in item b) in each frequency band, e.g., analog and digital, If more than three frequencies need to be tested (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

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

Step 3: Examine all data to determine the largest value of the peak.

Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.

Duty Factor = 1 / Duty Cycle(%)

For cellular network:

Reported SAR (W/kg) = Measured SAR (W/kg) * Scaling Factor

For WLAN

Reported SAR (W/kg) = Measured SAR (W/kg) * Scaling Factor * Duty factor

2. Per KDB 447498 D01v06, for each exposure position, if the highest output channel reported SAR ≤ 0.8 W/kg, other channels SAR testing are not necessary.

3. The distance between the EUT and the phantom bottom is 5mm.

Mode		Duty cycle	Duty factor	Note
Licensed Frequency	GSM Band	Depends on UP slots	NA	According to the theory, we configured duty cycle with relevant value on the communication tester, so correction factor do not need such as "duty factor"
	WCDMA Band	100%		
	FDD-LTE Band	100%		
	TDD-LTE Band	63.3%		

The measured and reported Head/body SAR values for the test device are tabulated below:

Mode: GSM 850(GPRS)

fL(MHz)=824.2MHz

fM(MHz)=836.5MHz

fH(MHz)= 848.8MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	GPRS 3TX (body- worn)	L	29.37	29.50	1.03	0.558	0.575
		M	29.41	29.50	1.02	0.571	0.582
		H	29.43	29.50	1.02	0.498	0.508
Front		L	29.37	29.50	1.03	---	---
		M	29.41	29.50	1.02	0.548	0.559
		H	29.43	29.50	1.02	---	---
Bottom		L	29.37	29.50	1.03	---	---
		M	29.41	29.50	1.02	0.126	0.129
		H	29.43	29.50	1.02	---	---
Left		L	29.37	29.50	1.03	---	---
		M	29.41	29.50	1.02	0.377	0.385
		H	29.43	29.50	1.02	---	---
Right		L	29.37	29.50	1.03	---	---
		M	29.41	29.50	1.02	0.305	0.311
		H	29.43	29.50	1.02	---	---

Mode: GSM 1900(GPRS)

fL (MHz)=1850.2MHz fM (MHz)=1880.0MHz fH (MHz)=1909.8MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	GPRS 3TX (body- worn)	L	23.23	23.50	1.06	---	---
		M	23.13	23.50	1.09	0.420	0.458
		H	23.07	23.50	1.10	---	---
Front		L	23.23	23.50	1.06	---	---
		M	23.13	23.50	1.09	0.372	0.405
		H	23.07	23.50	1.10	---	---
Bottom		L	23.23	23.50	1.06	---	---
		M	23.13	23.50	1.09	0.058	0.063
		H	23.07	23.50	1.10	---	---
Left		L	23.23	23.50	1.06	---	---
		M	23.13	23.50	1.09	0.296	0.323
		H	23.07	23.50	1.10	---	---
Right		L	23.23	23.50	1.06	---	---
		M	23.13	23.50	1.09	0.237	0.258
		H	23.07	23.50	1.10	---	---

Mode: WCDMA BAND II

fL (MHz)= 1852.4MHz fM (MHz)= 1880.0MHz fH (MHz)= 1907.6MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	12.2KRMC (body- worn)	L	22.52	22.60	1.02	---	---
		M	21.98	22.60	1.15	0.400	0.460
		H	21.74	22.60	1.22	---	---
Front		L	22.52	22.60	1.02	---	---
		M	21.98	22.60	1.15	0.372	0.428
		H	21.74	22.60	1.22	---	---
Bottom		L	22.52	22.60	1.02	---	---
		M	21.98	22.60	1.15	0.062	0.071
		H	21.74	22.60	1.22	---	---
Left		L	22.52	22.60	1.02	---	---
		M	21.98	22.60	1.15	0.293	0.337
		H	21.74	22.60	1.22	---	---
Right		L	22.52	22.60	1.02	---	---
		M	21.98	22.60	1.15	0.219	0.252
		H	21.74	22.60	1.22	---	---

Mode: WCDMA BAND V

fL (MHz)=826.4MHz

fM (MHz)=836.4MHz

fH (MHz)= 846.6MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	12.2KRMC (body- worn)	L	22.86	22.90	1.01	---	---
		M	22.57	22.90	1.08	0.134	0.145
		H	22.18	22.90	1.18	---	---
Front		L	22.86	22.90	1.01	---	---
		M	22.57	22.90	1.08	0.110	0.119
		H	22.18	22.90	1.18	---	---
Bottom		L	22.86	22.90	1.01	---	---
		M	22.57	22.90	1.08	0.051	0.055
		H	22.18	22.90	1.18	---	---
Left		L	22.86	22.90	1.01	---	---
		M	22.57	22.90	1.08	0.132	0.143
		H	22.18	22.90	1.18	---	---
Right		L	22.86	22.90	1.01	---	---
		M	22.57	22.90	1.08	0.124	0.134
		H	22.18	22.90	1.18	---	---

Mode: LTE Band 2

fL (MHz)= 1860MHz

fM (MHz)= 1880MHz

fH (MHz)= 1900MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	20BW 1RB (body- worn)	L	21.73	22.00	1.06	0.411	0.436
		M1	21.98	22.00	1.00	0.846	0.846
		M1	21.98	22.00	1.00	0.837	0.837
		H	21.14	22.00	1.22	0.384	0.468
Front		L	21.73	22.00	1.06	---	---
		M	21.98	22.00	1.00	0.520	0.520
		H	21.14	22.00	1.22	---	---
Bottom		L	21.73	22.00	1.06	---	---
		M	21.98	22.00	1.00	0.078	0.078
		H	21.14	22.00	1.22	---	---
Left		L	21.73	22.00	1.06	---	---
		M	21.98	22.00	1.00	0.304	0.304
		H	21.14	22.00	1.22	---	---
Right		L	21.73	22.00	1.06	---	---
		M	21.98	22.00	1.00	0.492	0.492
		H	21.14	22.00	1.22	---	---
Back	20BW 50%RB (body- worn)	L	20.45	21.00	1.14	---	---
		M	20.84	21.00	1.04	0.466	0.485
		H	20.28	21.00	1.18	---	---
Front		L	20.45	21.00	1.14	---	---
		M	20.84	21.00	1.04	0.337	0.350
		H	20.28	21.00	1.18	---	---
Bottom		L	20.45	21.00	1.14	---	---
		M	20.84	21.00	1.04	0.057	0.059
		H	20.28	21.00	1.18	---	---
Left		L	20.45	21.00	1.14	---	---
		M	20.84	21.00	1.04	0.152	0.158
		H	20.28	21.00	1.18	---	---
Right		L	20.45	21.00	1.14	---	---
		M	20.84	21.00	1.04	0.248	0.258
		H	20.28	21.00	1.18	---	---

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	20BW 100RB (body- worn)	L	20.34	21.00	1.16	---	---
		M	20.75	21.00	1.06	0.266	0.282
		H	20.72	21.00	1.07	---	---
Front		L	20.34	21.00	1.16	---	---
		M	20.75	21.00	1.06	0.216	0.229
		H	20.72	21.00	1.07	---	---
Bottom		L	20.34	21.00	1.16	---	---
		M	20.75	21.00	1.06	0.043	0.046
		H	20.72	21.00	1.07	---	---
Left		L	20.34	21.00	1.16	---	---
		M	20.75	21.00	1.06	0.118	0.125
		H	20.72	21.00	1.07	---	---
Right		L	20.34	21.00	1.16	---	---
		M	20.75	21.00	1.06	0.191	0.202
		H	20.72	21.00	1.07	---	---
	M	20.34	21.00	1.16	---	---	

Mode: LTE Band 5

fL (MHz)=829 MHz

fM (MHz)=836.5MHz

fH (MHz)= 844MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	10BW 1RB (body- worn)	L	23.58	23.70	1.03	---	---
		M	22.49	23.70	1.32	0.267	0.352
		H	23.64	23.70	1.01	---	---
Front		L	23.58	23.70	1.03	---	---
		M	22.49	23.70	1.32	0.254	0.335
		H	23.64	23.70	1.01	---	---
Bottom		L	23.58	23.70	1.03	---	---
		M	22.49	23.70	1.32	0.087	0.115
		H	23.64	23.70	1.01	---	---
Left		L	23.58	23.70	1.03	---	---
		M	22.49	23.70	1.32	0.222	0.293
		H	23.64	23.70	1.01	---	---
Right		L	23.58	23.70	1.03	---	---
		M	22.49	23.70	1.32	0.187	0.247
		H	23.64	23.70	1.01	---	---
Back	10BW 25RB (body- worn)	L	21.71	22.00	1.07	---	---
		M	20.65	22.00	1.36	0.184	0.250
		H	21.91	22.00	1.02	---	---
Front		L	21.71	22.00	1.07	---	---
		M	20.65	22.00	1.36	0.155	0.211
		H	21.91	22.00	1.02	---	---
Bottom		L	21.71	22.00	1.07	---	---
		M	20.65	22.00	1.36	0.045	0.061
		H	21.91	22.00	1.02	---	---
Left		L	21.71	22.00	1.07	---	---
		M	20.65	22.00	1.36	0.115	0.156
		H	21.91	22.00	1.02	---	---
Right		L	21.71	22.00	1.07	---	---
		M	20.65	22.00	1.36	0.092	0.125
		H	21.91	22.00	1.02	---	---

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	10BW 50RB (body- worn)	L	21.27	21.70	1.10	---	---
		M	21.22	21.70	1.12	0.186	0.208
		H	21.64	21.70	1.01	---	---
Front		L	21.27	21.70	1.10	---	---
		M	21.22	21.70	1.12	0.157	0.176
		H	21.64	21.70	1.01	---	---
Bottom		L	21.27	21.70	1.10	---	---
		M	21.22	21.70	1.12	0.047	0.053
		H	21.64	21.70	1.01	---	---
Left		L	21.27	21.70	1.10	---	---
		M	21.22	21.70	1.12	0.106	0.119
		H	21.64	21.70	1.01	---	---
Right		L	21.27	21.70	1.10	---	---
		M	21.22	21.70	1.12	0.093	0.104
		H	21.64	21.70	1.01	---	---
		M	21.27	21.70	1.10	---	---
		H	21.22	21.70	1.12	0.186	0.208

Mode: LTE Band 7

fL (MHz)=2510 MHz

fM (MHz)=2535MHz

fH (MHz)= 2560MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	20BW 1RB (body- worn)	L	22.91	23.30	1.09	---	---
		M	22.96	23.30	1.08	0.252	0.272
		H	23.23	23.30	1.02	---	---
Front		L	22.91	23.30	1.09	---	---
		M	22.96	23.30	1.08	0.224	0.242
		H	23.23	23.30	1.02	---	---
Bottom		L	22.91	23.30	1.09	---	---
		M	22.96	23.30	1.08	0.103	0.111
		H	23.23	23.30	1.02	---	---
Left		L	22.91	23.30	1.09	---	---
		M	22.96	23.30	1.08	0.226	0.244
		H	23.23	23.30	1.02	---	---
Right		L	22.91	23.30	1.09	---	---
		M	22.96	23.30	1.08	0.161	0.174
		H	23.23	23.30	1.02	---	---
Back	20BW 50%RB (body- worn)	L	21.11	21.20	1.02	---	---
		M	20.81	21.20	1.09	0.239	0.261
		H	20.82	21.20	1.09	---	---
Front		L	21.11	21.20	1.02	---	---
		M	20.81	21.20	1.09	0.219	0.239
		H	20.82	21.20	1.09	---	---
Bottom		L	21.11	21.20	1.02	---	---
		M	20.81	21.20	1.09	0.062	0.068
		H	20.82	21.20	1.09	---	---
Left		L	21.11	21.20	1.02	---	---
		M	20.81	21.20	1.09	0.140	0.153
		H	20.82	21.20	1.09	---	---
Right		L	21.11	21.20	1.02	---	---
		M	20.81	21.20	1.09	0.119	0.130
		H	20.82	21.20	1.09	---	---

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Back	20BW 100RB (body- worn)	L	21.60	22.00	1.10	---	---
		M	21.09	22.00	1.23	0.215	0.264
		H	21.96	22.00	1.01	---	---
Front		L	21.60	22.00	1.10	---	---
		M	21.09	22.00	1.23	0.206	0.253
		H	21.96	22.00	1.01	---	---
Bottom		L	21.60	22.00	1.10	---	---
		M	21.09	22.00	1.23	0.054	0.066
		H	21.96	22.00	1.01	---	---
Left		L	21.60	22.00	1.10	---	---
		M	21.09	22.00	1.23	0.124	0.153
		H	21.96	22.00	1.01	---	---
Right		L	21.60	22.00	1.10	---	---
		M	21.09	22.00	1.23	0.109	0.134
		H	21.96	22.00	1.01	---	---
	M	21.60	22.00	1.10	---	---	
	H	21.09	22.00	1.23	0.215	0.264	

6.9 SAR Measurement Variability

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

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

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

The Highest Reported SAR configuration in Each Frequency Band

Frequency band	Air interface	Body-worn(w/kg)
Below 1GHz	GSM850 WCDMA BANDV LTE BAND5	<0.8
1GHz-2GHz	GSM1900 WCDMA BANDII LTE BAND2	>0.8
2GHz-3GHz	LTE BAND7	<0.8

7 MEASUREMENT UNCERTAINTY

(0.3 - 3 GHz range)								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.0 %	N	1	1	1	±6.0 %	±6.0 %	∞
Axial Isotropy	±4.7 %	R	√3	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	√3	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	√3	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	√3	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	√3	1	1	±0.6 %	±0.6 %	∞
Modulation Response ^m	±2.4 %	R	√3	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	√3	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	√3	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	√3	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	√3	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	√3	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	√3	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±2.0 %	R	√3	1	1	±1.2 %	±1.2 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	√3	1	1	±2.9 %	±2.9 %	∞
Power Scaling ^p	±0 %	R	√3	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.1 %	R	√3	1	1	±3.5 %	±3.5 %	∞
SAR correction	±1.9 %	R	√3	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.) ^{DAK}	±2.5 %	R	√3	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	√3	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	√3	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	√3	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±11.2 %	±11.1 %	361
Expanded STD Uncertainty						±22.3 %	±22.2 %	

(3 - 6 GHz range)								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_1) 1g	(c_1) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response ^m	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±6.7 %	R	$\sqrt{3}$	1	1	±3.9 %	±3.9 %	∞
Max. SAR Eval.	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling ^p	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.6 %	R	$\sqrt{3}$	1	1	±3.8 %	±3.8 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±12.3 %	±12.2 %	748
Expanded STD Uncertainty						±24.6 %	±24.5 %	

8 TEST EQUIPMENTS

The measurements were performed using an automated near-field scanning system, DASY5, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the ‘advanced extrapolation’ algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Model	Serial Number	Calibration date	Calibration Due data
DAE	DAE4	546	2019.08.28	2020.08.27
Dosimetric E-field Probe	EX4DV3	3708	2019.09.26	2020.09.25
Dipole Validation Kit	D835V2	4d023	2017.09.13	2020.09.12
Dipole Validation Kit	D1800V2	2d084	2017.09.15	2020.09.14
Dipole Validation Kit	D2000V2	1009	2018.02.01	2021.01.31
Dipole Validation Kit	D2600V2	1166	2019.11.08	2020.11.07

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration Due data
Signal Generator	E4428C	MY45280865	2019.08.20	2020.08.19
Signal Generator	SML 03	103514	2019.08.20	2020.08.19
Power meter	E4417A	MY45101182	2019.08.20	2020.08.19
Power Sensor	E4412A	MY41502214	2019.08.20	2020.08.19
Power Sensor	E4412A	MY41502130	2019.08.20	2020.08.19
Power meter	E4417A	MY45101004	2019.08.20	2020.08.19
Power Sensor	E9300B	MY41496001	2019.08.20	2020.08.19
Power Sensor	E9300B	MY41496003	2019.08.20	2020.08.19
Communication Tester	E5515C	MY48367401	2019.08.20	2020.08.19
Communication Tester	CMU500	114666	2019.08.20	2020.08.19
Communication Tester	MT8820C	6201300660	2019.08.20	2020.08.19
Communication Tester	MT8821C	6201547819	2019.08.20	2020.08.19
Vector Network Analyzer	VNA R140	0011213	2019.09.18	2020.09.17
Dielectric Parameter Probe	DAKS-3.5	1042	2019.09.17	2020.09.16

Detailed information of Isotropic E-field Probe Type ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Dynamic Range	5 μ W/g to > 100 W/kg; Linearity: ± 0.2 dB
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

Detailed information of Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Optical Surface Detection	± 0.3 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Dynamic Range	10 μ W/g to > 100 W/kg Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

According to KDB 865664 D01 section 3.2.2, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the **SAR target, impedance and return loss** of a dipole have remain stable according to the following requirements.

- 1) The test laboratory must ensure that the required supporting information and documentation are included in the SAR report to qualify for the three-year extended calibration interval; otherwise, the IEEE Std 1528-2013 recommended annual calibration applies.
- 2) Immediate re-calibration is required for the following conditions.
 - a) After a dipole is damaged and properly repaired to meet required specifications.
 - b) When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions; i.e., the error is not introduced by incorrect measurement procedures or other issues relating to the SAR measurement system.
 - c) When the most recent return-loss result, measured at least annually, deviates by more than 20% from the previous measurement (i.e. value in dB $\times 0.2$) or not meeting the required 20 dB minimum return-loss requirement.
 - d) When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

Dipole 835

SAR target

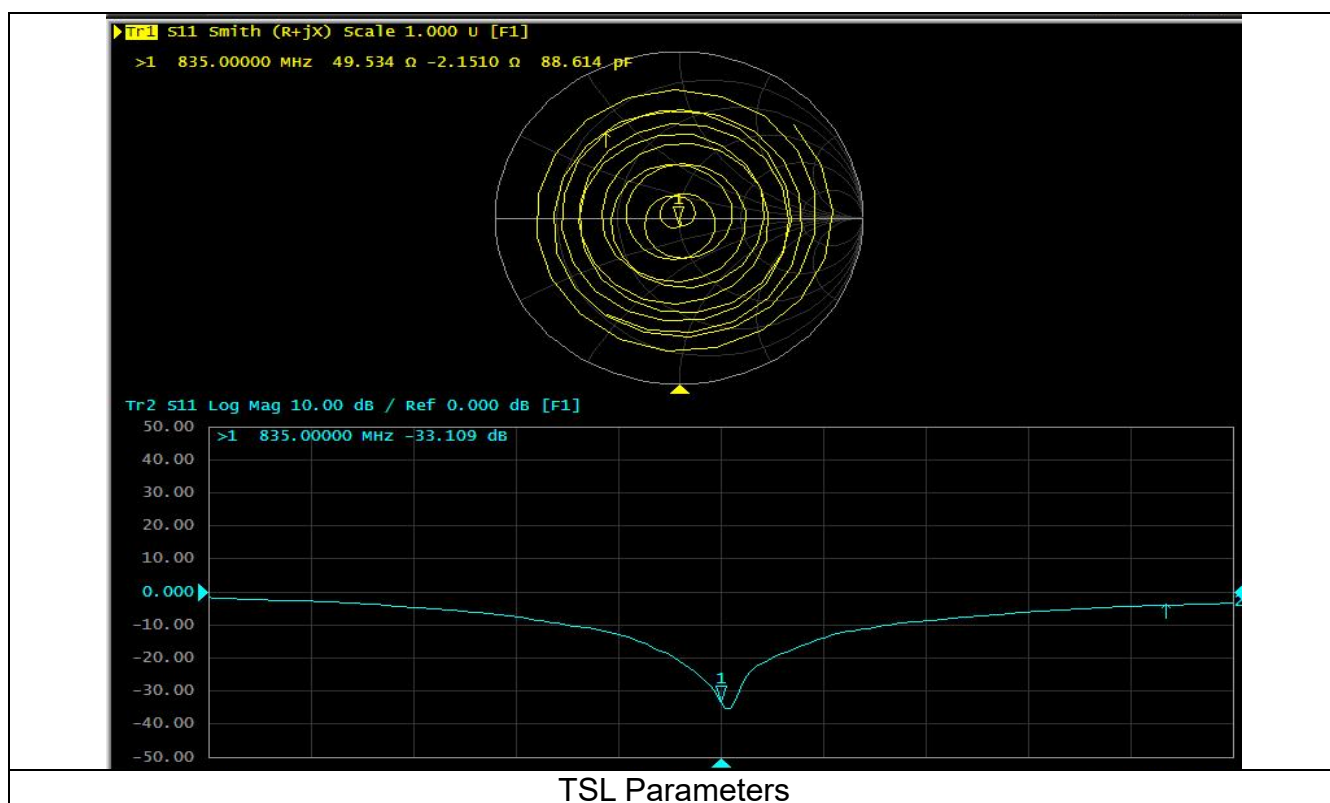
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance, deviates within 5 Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	51.0 Ω -2.79j Ω	49.5 Ω -2.15j Ω	<5 Ω
Return loss	-30.7 dB	-33.1 dB	<20%



TSL Parameters

Dipole1800

SAR target

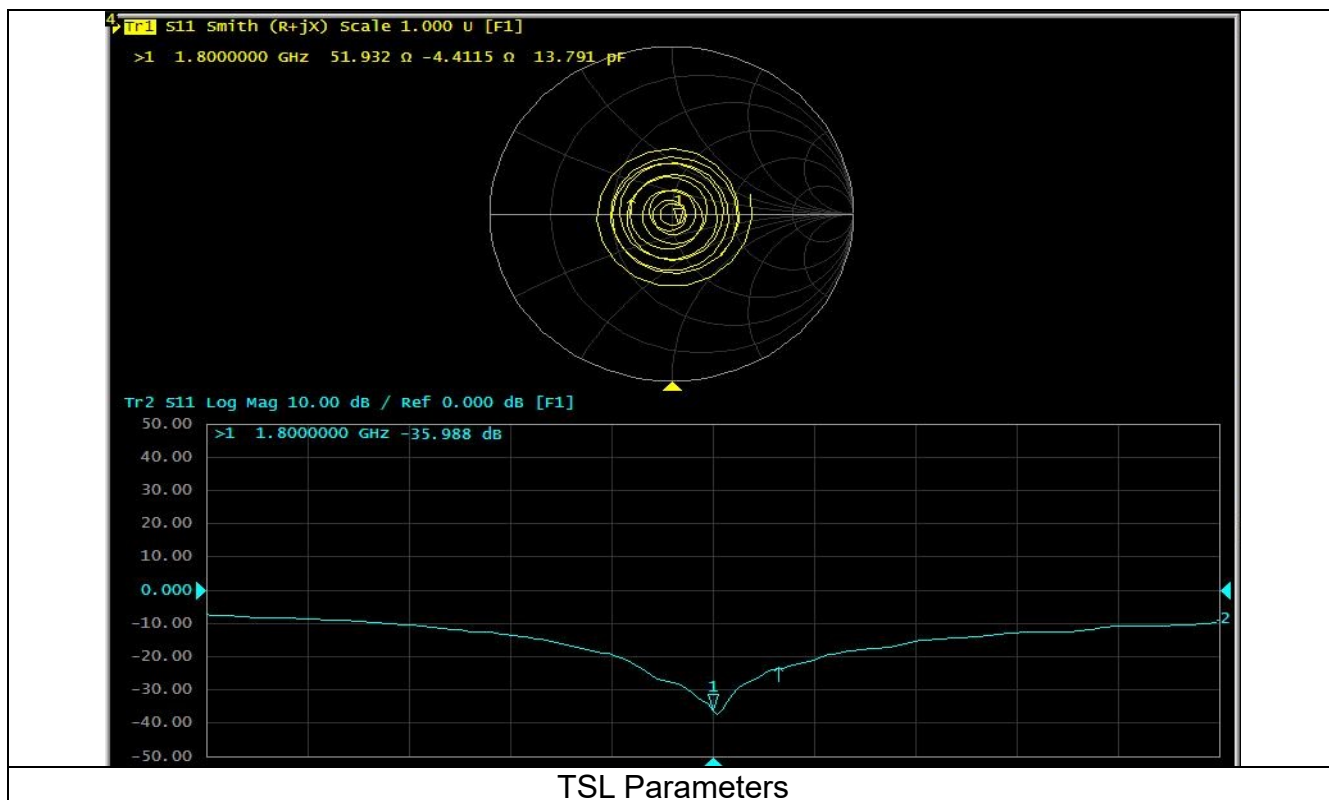
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance, deviates within 5 Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	49.3 Ω -1.55j Ω	51.9 Ω -4.41j Ω	<5 Ω
Return loss	-35.4 dB	-36.0dB	<20%



TSL Parameters

Dipole2000

SAR target

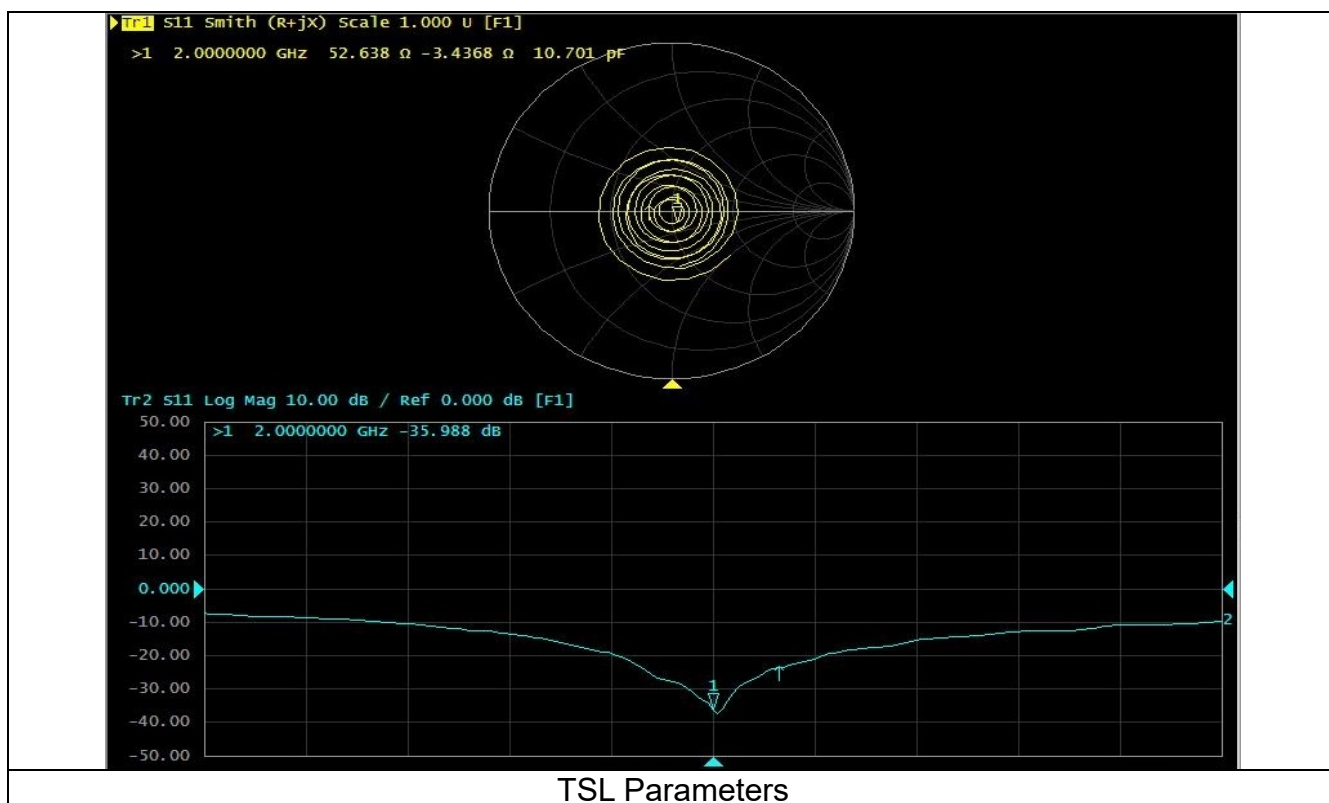
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

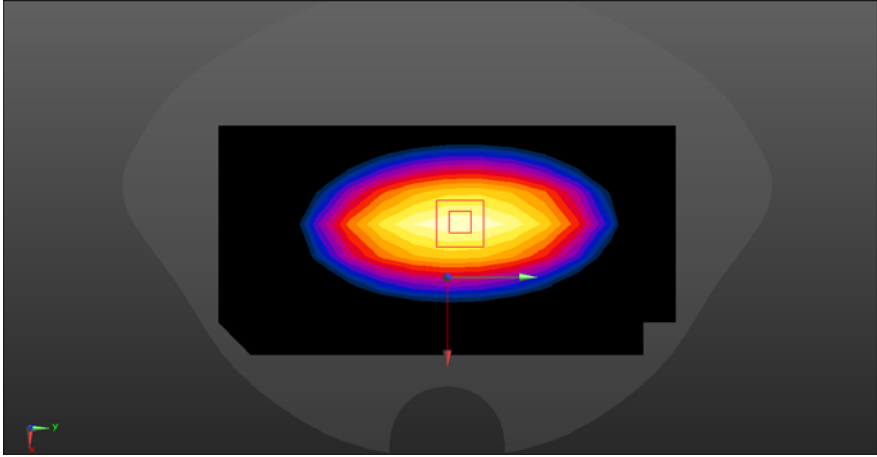
The most recent measurement of the real or imaginary parts of the impedance, deviates within $5\ \Omega$ from the previous measurement. (Data from the last calibration report)

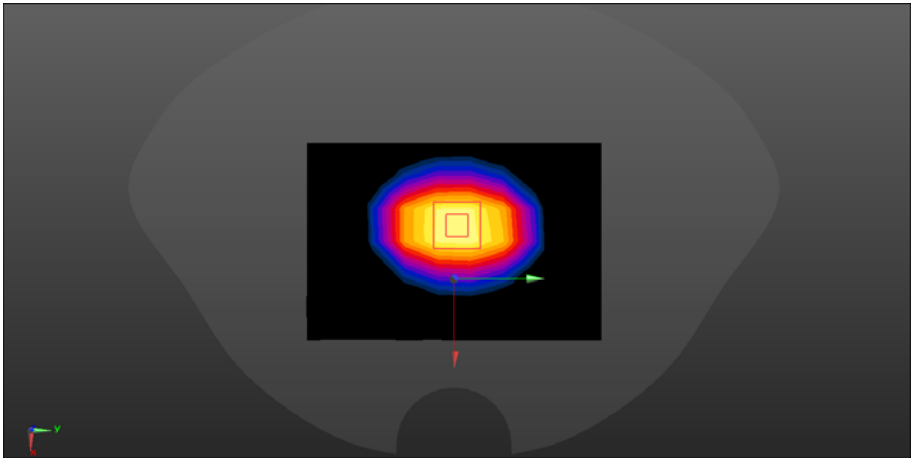
The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

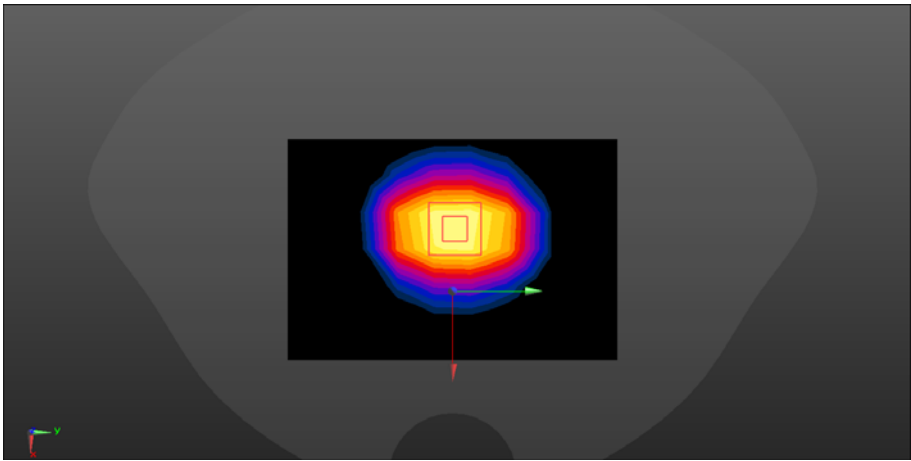
TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	$49.8\Omega - 2.08j\Omega$	$52.6\Omega - 3.44j\Omega$	$<5\Omega$
Return loss	-33.6dB	-36.0dB	$<20\%$

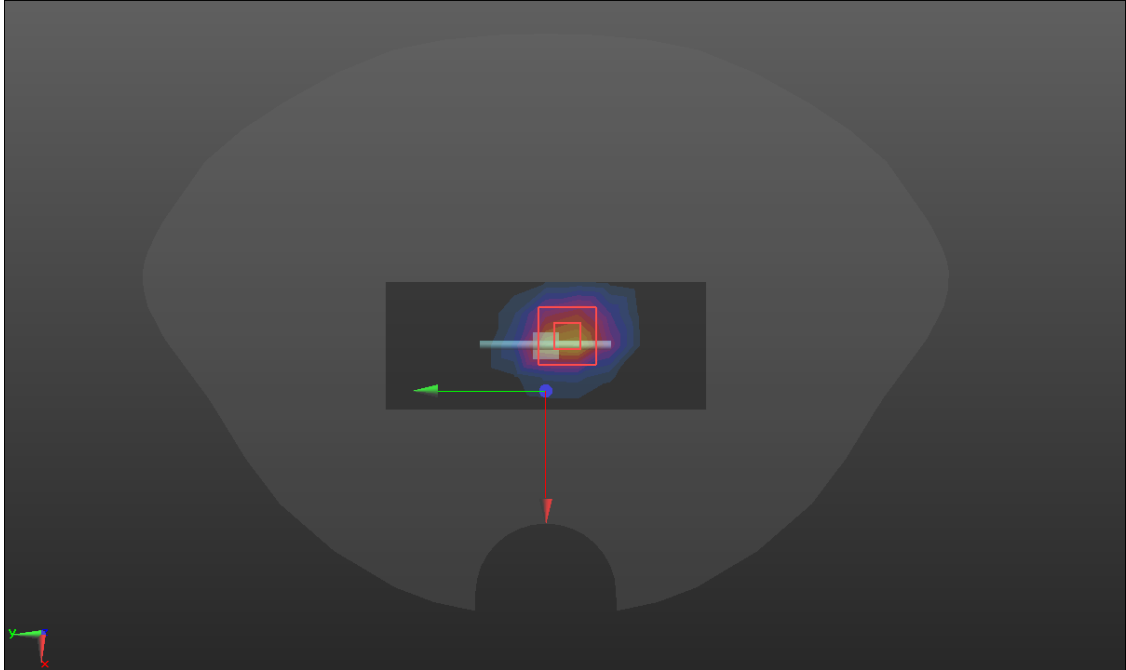


ANNEX A – TEST PLOTS

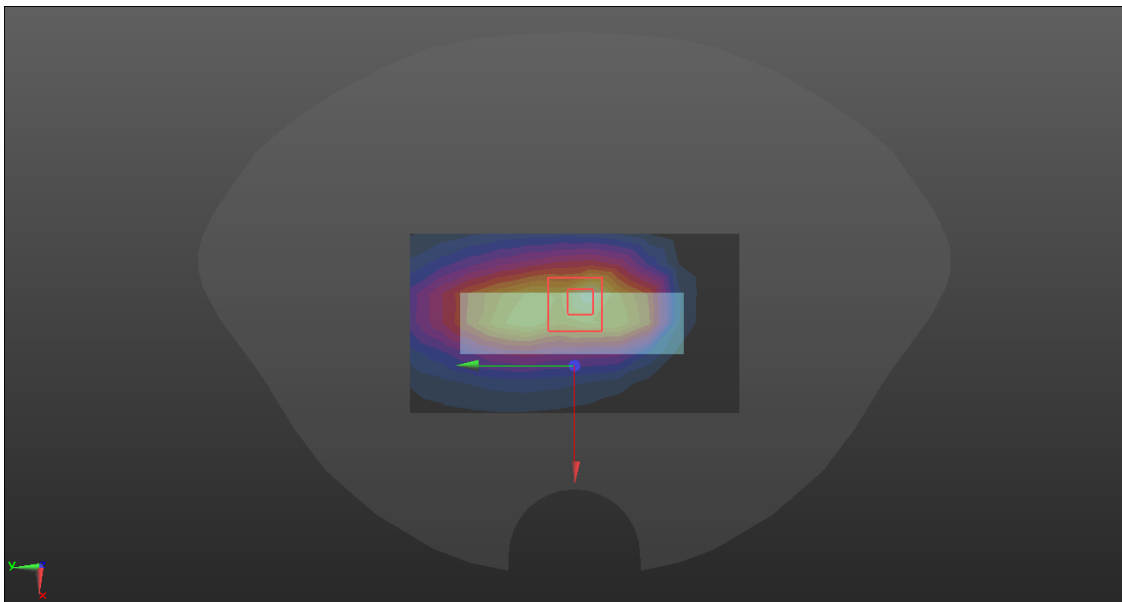
System check	835MHz
Communication System: UID 0, CW (0); Frequency: 835 MHz Medium parameters used (interpolated): $f = 835 \text{ MHz}$; $\sigma = 0.911 \text{ S/m}$; $\epsilon_r = 40.266$ $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(9.48, 9.48, 9.48) @ 835MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) Configuration 835/835/Area Scan (8x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (measured) = 2.72 W/kg Configuration 835/835/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 51.67 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 3.58 W/kg SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.51 W/kg Maximum value of SAR (measured) = 2.75 W/kg 	

System check	1800MHz
Communication System: UID 0, CW (0); Frequency: 1800 MHz Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.418 \text{ S/m}$; $\epsilon_r = 40.688$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(8.1, 8.1, 8.1) @ 1800 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) Configuration 1800/1800/Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (measured) = 8.31 W/kg Configuration 1800/1800/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 76.60 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 17.5 W/kg SAR(1 g) = 9.49 W/kg; SAR(10 g) = 4.97 W/kg Maximum value of SAR (measured) = 12.1 W/kg 	

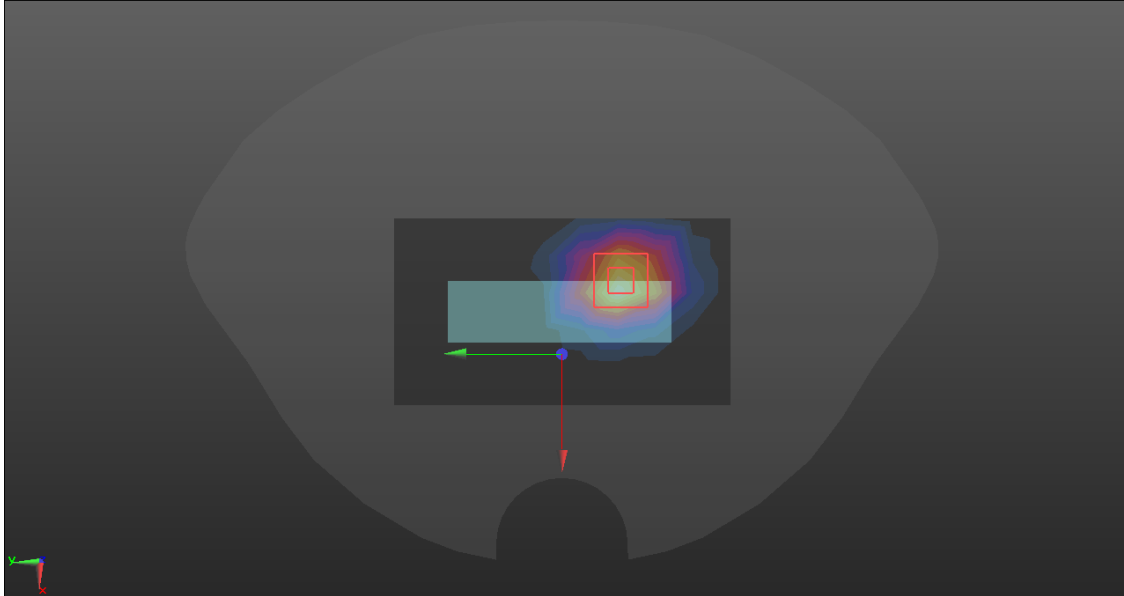
System check	2000MHz
Communication System: UID 0, CW (0); Frequency: 2000 MHz Medium parameters used: $f = 2000 \text{ MHz}$; $\sigma = 1.427 \text{ S/m}$; $\epsilon_r = 39.844$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(8.09, 8.09, 8.09) @ 2000 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) Configuration 2000/2000/Area Scan (7x10x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (measured) = 8.40 W/kg Configuration 2000/2000/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 76.22 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 18.7 W/kg SAR(1 g) = 9.82 W/kg; SAR(10 g) = 4.96 W/kg Maximum value of SAR (measured) = 12.9 W/kg	
	

System check	2600MHz
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1 Medium parameters used: $f = 2600 \text{ MHz}$; $\sigma = 1.93 \text{ S/m}$; $\epsilon_r = 38.67$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(7.37, 7.37, 7.37) @ 2600 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) SYSTEM CHECK 2600/SYSTEM CHECK 2600MHz/Area Scan (5x11x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$ Maximum value of SAR (measured) = 21.6 W/kg SYSTEM CHECK 2600/SYSTEM CHECK 2600MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 104.5 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 33.7 W/kg SAR(1 g) = 14.9 W/kg; SAR(10 g) = 6.56 W/kg Maximum value of SAR (measured) = 26.4 W/kg 	

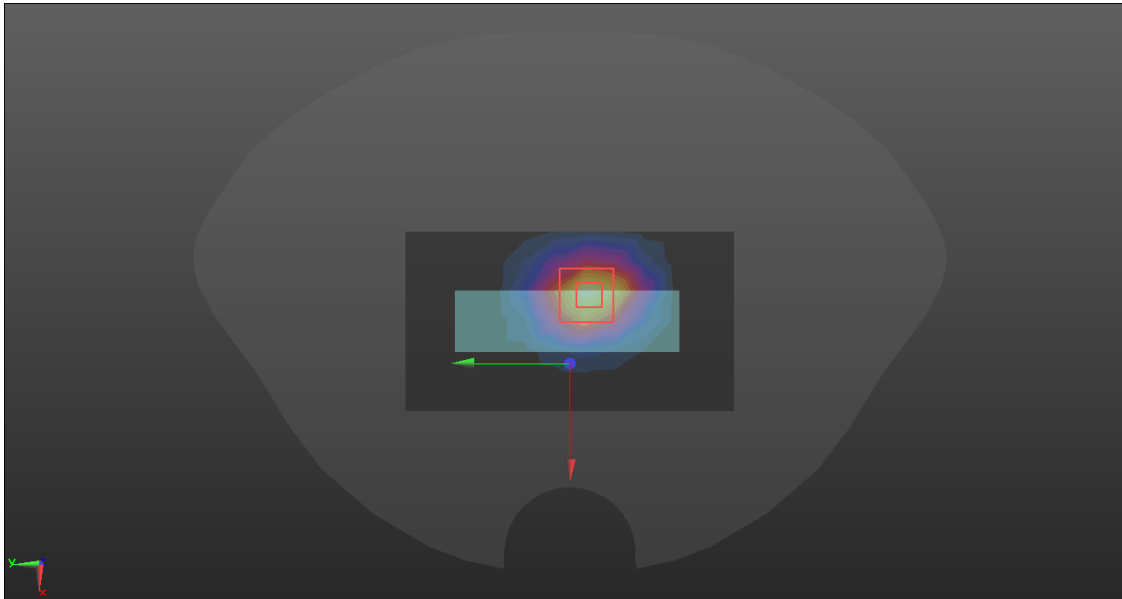
GSM850

Body-worn	Back
Communication System: UID 0, Generic GSM (0); Frequency: 836.6 MHz; Duty Cycle: 3:8.30042 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(9.48, 9.48, 9.48) @ 836.6 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) FLAT 2/BACK GPRS850 3TX/Area Scan (7x12x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.822 W/kg FLAT 2/BACK GPRS850 3TX/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 29.11 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 1.06 W/kg SAR(1 g) = 0.571 W/kg; SAR(10 g) = 0.353 W/kg Maximum value of SAR (measured) = 0.883 W/kg	
	

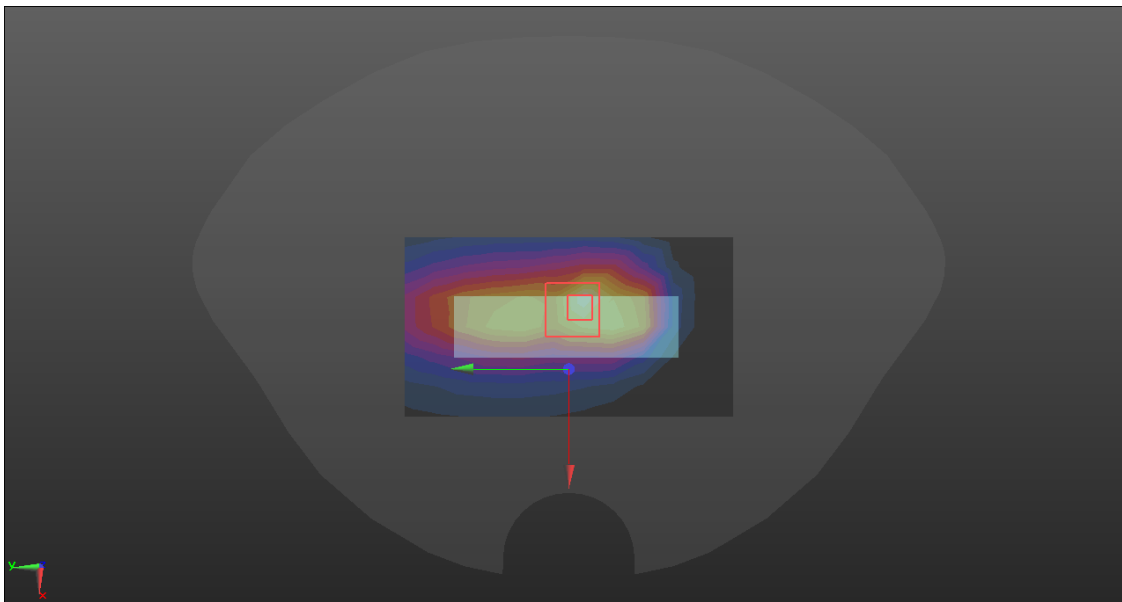
GSM1900

Body-worn	Back
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz; Duty Cycle: 3:8.30042 Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(8.1, 8.1, 8.1) @ 1880 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) Configuration 2/BACK GPRS1900 3TX 3/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.568 W/kg Configuration 2/BACK GPRS1900 3TX 3/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 7.041 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 0.723 W/kg SAR(1 g) = 0.420 W/kg; SAR(10 g) = 0.227 W/kg Maximum value of SAR (measured) = 0.609 W/kg 	

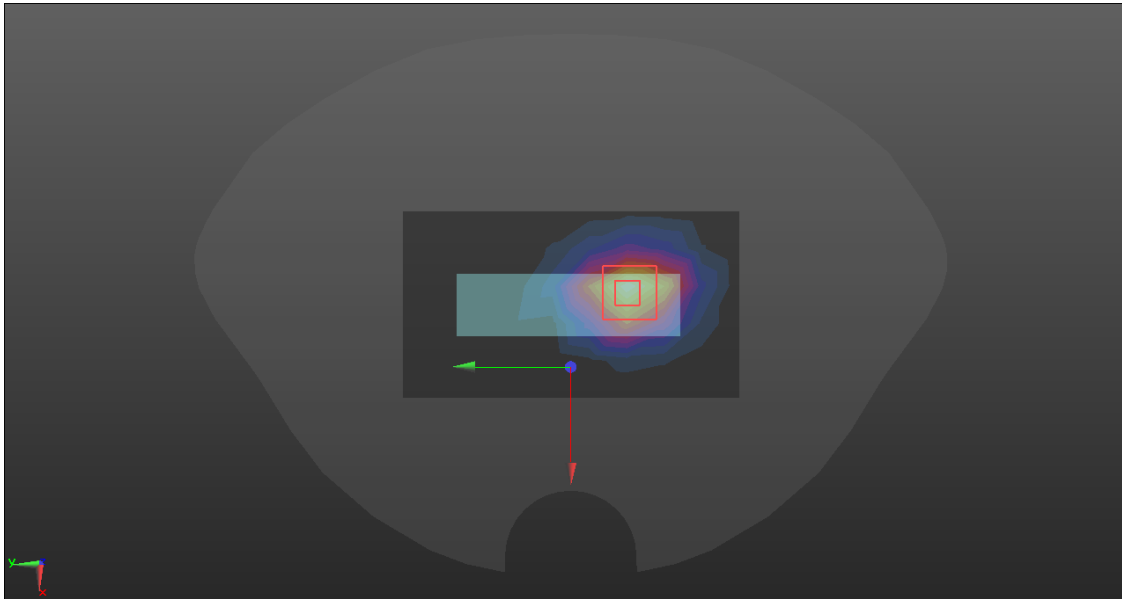
WCDMA B2

Body-worn	Back
Communication System: UID 0, WCDMA BAND2 (0); Frequency: 1880 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1880 \text{ MHz}$; $\sigma = 1.4 \text{ S/m}$; $\epsilon_r = 40$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(8.1, 8.1, 8.1) @ 1880 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) FLAT 2/BACK WCDMA2/Area Scan (7x12x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$ Maximum value of SAR (measured) = 0.609 W/kg FLAT 2/BACK WCDMA2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 17.42 V/m; Power Drift = -0.05 dB Peak SAR (extrapolated) = 0.710 W/kg SAR(1 g) = 0.400 W/kg; SAR(10 g) = 0.216 W/kg Maximum value of SAR (measured) = 0.594 W/kg 	

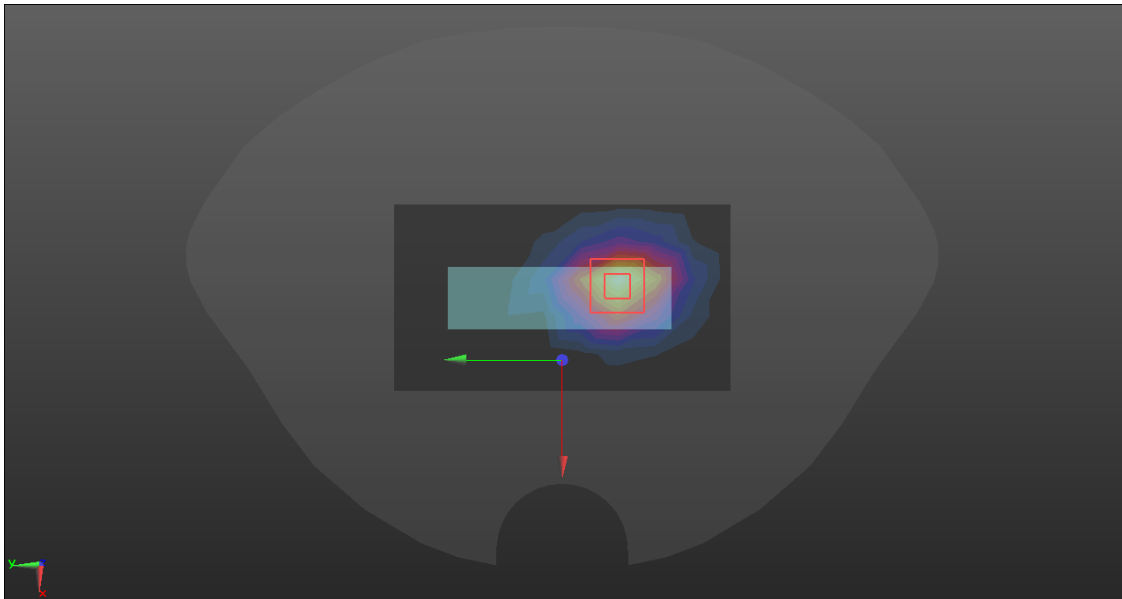
WCDMA B5

Body-worn	Back
Communication System: UID 0, WCDMA BAND 5 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(9.48, 9.48, 9.48) @ 836.6 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) FLAT 2/BACK WCDMA5/Area Scan (7x12x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.206 W/kg FLAT 2/BACK WCDMA5/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 14.20 V/m; Power Drift = -0.13 dB Peak SAR (extrapolated) = 0.254 W/kg SAR(1 g) = 0.134 W/kg; SAR(10 g) = 0.082 W/kg Maximum value of SAR (measured) = 0.208 W/kg	
	

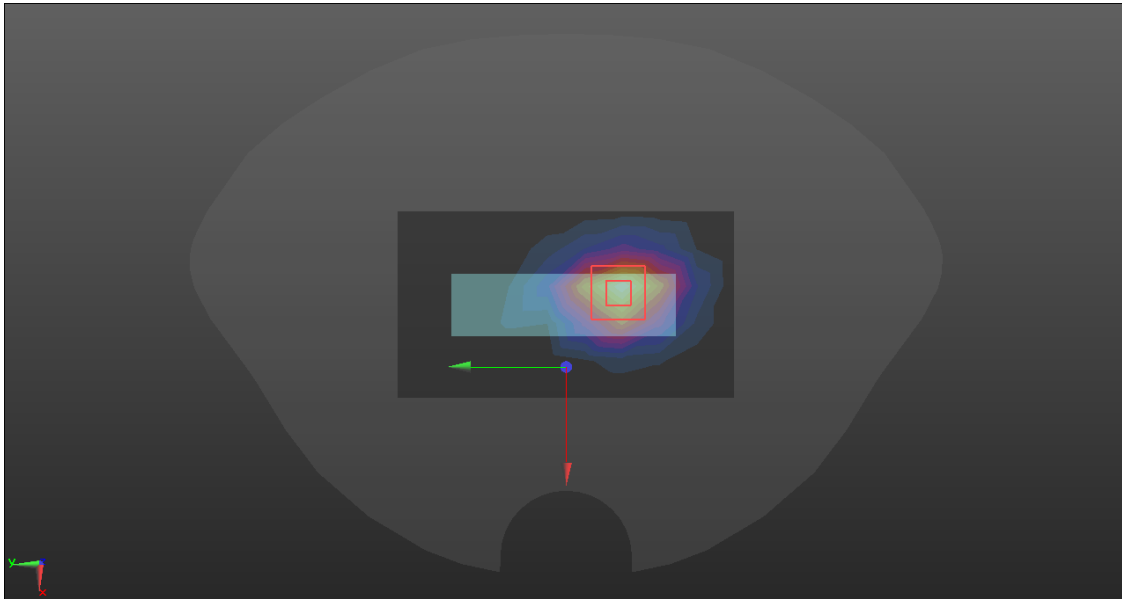
LTE B2

Body-worn	Back
Communication System: UID 0, LTE BAND02 (0); Frequency: 1860 MHz;Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1860 \text{ MHz}$; $\sigma = 1.4 \text{ S/m}$; $\epsilon_r = 40$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(8.1, 8.1, 8.1) @ 1860 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450) Configuration 3/BACK LTE2 1RB LOW/Area Scan (6x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (measured) = 0.588 W/kg Configuration 3/BACK LTE2 1RB LOW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 10.31 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.694 W/kg SAR(1 g) = 0.411 W/kg; SAR(10 g) = 0.226 W/kg Maximum value of SAR (measured) = 0.577 W/kg 	

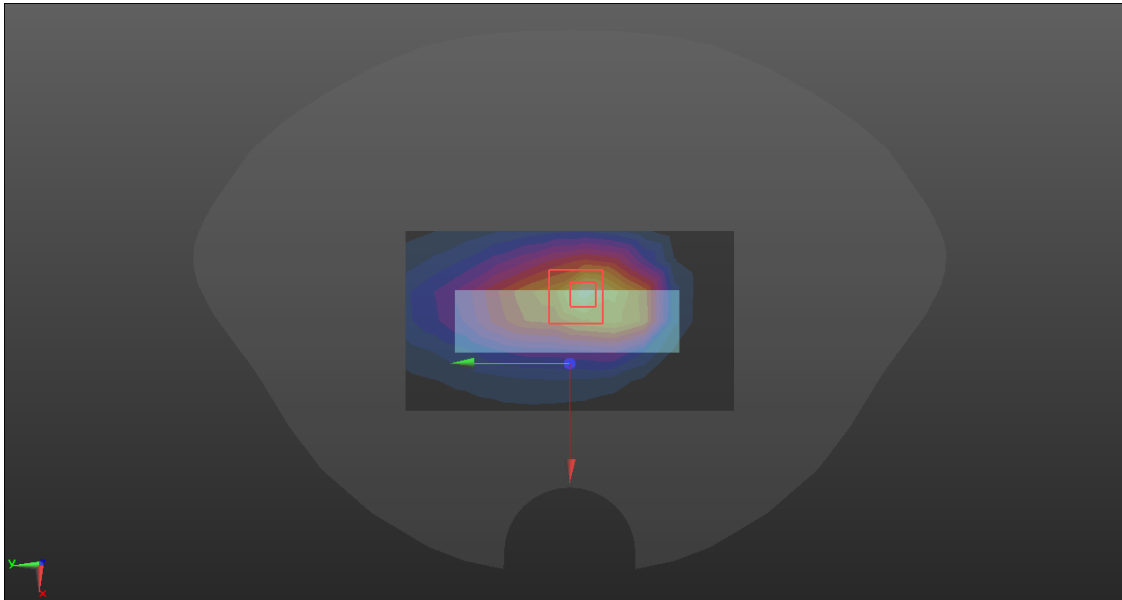
LTE B2

Body-worn	Back
Communication System: UID 0, LTE BAND02 (0); Frequency: 1880 MHz;Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1880 \text{ MHz}$; $\sigma = 1.4 \text{ S/m}$; $\epsilon_r = 40$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(8.1, 8.1, 8.1) @ 1880 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450) Configuration 3/BACK LTE2 1RB 2 2/Area Scan (6x10x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 1.26 W/kg Configuration 3/BACK LTE2 1RB 2 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 16.69 V/m; Power Drift = -0.05 dB Peak SAR (extrapolated) = 1.43 W/kg SAR(1 g) = 0.846 W/kg; SAR(10 g) = 0.464 W/kg Maximum value of SAR (measured) = 1.20 W/kg 	

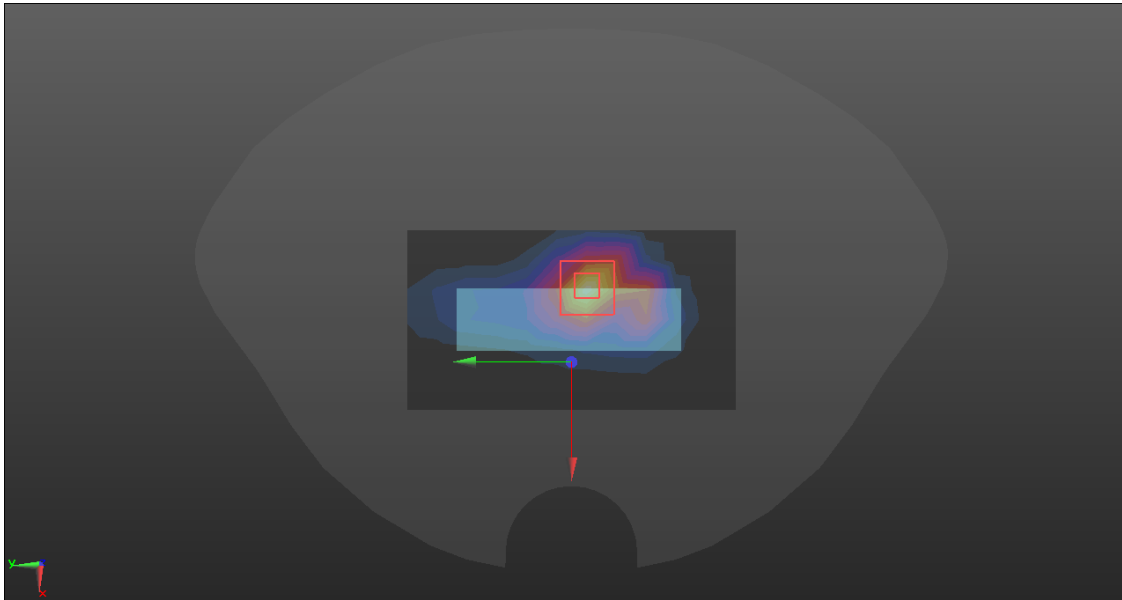
LTE B2

Body-worn	Back
Communication System: UID 0, LTE BAND02 (0); Frequency: 1910 MHz;Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1910 \text{ MHz}$; $\sigma = 1.4 \text{ S/m}$; $\epsilon_r = 40$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(8.1, 8.1, 8.1) @ 1910 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450) Configuration 3/BACK LTE2 1RB HIGH/Area Scan (6x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (measured) = 0.546 W/kg Configuration 3/BACK LTE2 1RB HIGH/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$ Reference Value = 11.72 V/m; Power Drift = 0.18 dB Peak SAR (extrapolated) = 0.667 W/kg SAR(1 g) = 0.384 W/kg; SAR(10 g) = 0.209 W/kg Maximum value of SAR (measured) = 0.563 W/kg 	

LTE B5

Body-worn	Back
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(9.48, 9.48, 9.48) @ 836.5 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) FLAT 2/BACK LTE5 1RB/Area Scan (7x12x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.411 W/kg FLAT 2/BACK LTE5 1RB/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 19.67 V/m; Power Drift = -0.13 dB Peak SAR (extrapolated) = 0.482 W/kg SAR(1 g) = 0.267 W/kg; SAR(10 g) = 0.163 W/kg Maximum value of SAR (measured) = 0.404 W/kg 	

LTE B7

Body-worn	Back
Communication System: UID 0, LTE Band 7 (0); Frequency: 2535 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 2535$ MHz; $\sigma = 1.888$ S/m; $\epsilon_r = 39.084$; $\rho = 1000$ kg/m³ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(7.37, 7.37, 7.37) @ 2535 MHz; Calibrated: 9/26/2019 - Sensor-Surface: 1.4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn546; Calibrated: 8/28/2019 - Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.12 (7450) FLAT 2/BACK LTE7 1RB/Area Scan (7x12x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.477 W/kg FLAT 2/BACK LTE7 1RB/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 13.53 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 0.561 W/kg SAR(1 g) = 0.252 W/kg; SAR(10 g) = 0.122 W/kg Maximum value of SAR (measured) = 0.431 W/kg 	

ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS

DAE4 Sn546

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



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

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

Accreditation No.: SCS 0108

Client **SRTC (Auden)**

Certificate No: DAE4-546_Aug19

CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BM - SN: 546**

Calibration procedure(s) **QA CAL-06.v29
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **August 28, 2019**

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&PE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0610276	03-Sep-16 (No.23488)	Sep-19
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Auto DAE Calibration Unit	SE UWS 053 AA 1001	07-Jan-19 (in house check)	in house check: Jan-20
Calibrator Box V2.1	SF LMS 006 AA 1002	07-Jan-19 (in house check)	in house check: Jan-20

Calibrated by:	Name Eric Hainfeld	Function Laboratory Technician	Signature
Approved by:	Name Sven Kühn	Deputy Manager	

Issued: August 28, 2019

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

Certificate No: DAE4-546_Aug19

Page 1 of 5

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



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

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

Accreditation No.: **SCS 0106**

Glossary

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

Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
 - **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
 - **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
 - **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
 - **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
 - **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
 - **Input resistance:** Typical value for information; DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
 - **Power consumption:** Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	405.352 $\pm$ 0.02% (k=2)	404.098 $\pm$ 0.02% (k=2)	404.222 $\pm$ 0.02% (k=2)
Low Range	3.98830 $\pm$ 1.50% (k=2)	3.95641 $\pm$ 1.50% (k=2)	3.97961 $\pm$ 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	237.0 $^{\circ}$ $\pm$ 1 $^{\circ}$
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Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199995.19	-1.38	-0.00
Channel X	+ Input	20000.83	-0.80	-0.00
Channel X	- Input	-19997.26	4.75	-0.02
Channel Y	+ Input	199969.47	-7.29	-0.00
Channel Y	+ Input	20002.52	0.88	0.00
Channel Y	- Input	-20001.62	0.45	-0.00
Channel Z	+ Input	199996.94	0.28	0.00
Channel Z	+ Input	19998.55	-3.07	-0.02
Channel Z	- Input	-20002.95	-0.90	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.48	0.50	0.03
Channel X	+ Input	201.14	-0.15	-0.07
Channel X	- Input	-198.97	-0.38	0.19
Channel Y	+ Input	2000.52	-0.41	-0.02
Channel Y	+ Input	200.95	-0.13	-0.07
Channel Y	- Input	-199.00	-0.30	0.15
Channel Z	+ Input	2000.96	-0.05	-0.00
Channel Z	+ Input	200.01	-1.11	-0.55
Channel Z	- Input	-199.97	-1.27	0.64

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	2.12	-0.11
	- 200	0.79	-0.91
Channel Y	200	1.95	0.12
	- 200	-0.90	-1.27
Channel Z	200	1.15	1.74
	- 200	-4.83	-4.14

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-2.05	-3.29
Channel Y	200	9.27	-	-0.65
Channel Z	200	4.64	6.99	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15840	15900
Channel Y	16134	12789
Channel Z	15911	16844

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input: 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	1.16	0.11	3.01	0.45
Channel Y	0.12	-0.63	1.50	0.46
Channel Z	-0.42	-1.61	0.51	0.42

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kΩ)	Measuring (MΩ)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-6	-9

EX4DV3 Sn3708

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



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Accreditation No.: **SCS 0108**

Client **SRTC (Auden)**

Certificate No: **EX3-3708_Sep19**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3708**

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

Calibration date: **September 26, 2019**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41499087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:	Name Michael Weber	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature
			issued: October 1, 2019

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

Certificate No: EX3-3708_Sep19

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Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{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:3708

September 26, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$) ^A	0.20	0.34	0.40	± 10.1 %
DCP (mV) ^B	93.8	104.0	101.0	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB μV	C	D dB	VR mV	Max dev.	Max Unc ^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	115.9	± 3.3 %	± 4.7 %
		Y	0.00	0.00	1.00		114.3		
		Z	0.00	0.00	1.00		122.2		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	8.60	78.10	16.56	10.00	60.0	± 2.9 %	± 9.6 %
		Y	7.71	77.21	16.31		60.0		
		Z	15.00	87.55	20.24		60.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	8.62	80.44	16.16	6.99	80.0	± 1.6 %	± 9.6 %
		Y	7.75	79.10	15.69		80.0		
		Z	15.00	88.59	19.45		80.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	15.00	86.19	16.08	3.98	95.0	± 1.4 %	± 9.6 %
		Y	15.00	84.69	15.37		95.0		
		Z	15.00	93.22	20.23		95.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	15.00	85.25	14.18	2.22	120.0	± 1.4 %	± 9.6 %
		Y	1.57	68.62	9.01		120.0		
		Z	15.00	101.50	22.73		120.0		
10387-AAA	QPSK Waveform, 1 MHz	X	0.73	63.32	9.83	0.00	150.0	± 3.2 %	± 9.6 %
		Y	0.47	60.00	6.10		150.0		
		Z	0.85	65.01	10.71		150.0		
10388-AAA	QPSK Waveform, 10 MHz	X	2.60	71.55	17.74	0.00	150.0	± 1.3 %	± 9.6 %
		Y	2.07	68.13	15.80		150.0		
		Z	2.61	71.77	17.79		150.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	2.85	70.16	18.74	3.01	150.0	± 1.2 %	± 9.6 %
		Y	2.62	69.09	18.37		150.0		
		Z	3.89	75.94	21.17		150.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	3.63	68.18	16.59	0.00	150.0	± 2.5 %	± 9.6 %
		Y	3.38	67.09	15.81		150.0		
		Z	3.67	68.54	16.64		150.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	5.03	66.55	16.25	0.00	150.0	± 4.5 %	± 9.6 %
		Y	4.67	65.60	15.59		150.0		
		Z	4.91	66.39	16.01		150.0		

Note: For details on UID parameters see Appendix

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

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

^B Numerical linearization parameter; uncertainty not required.

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

EX3DV4- SN:3708

September 26, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	44.6	339.24	37.00	9.24	1.08	5.00	0.00	0.50	1.00
Y	36.2	275.04	36.77	10.87	1.03	5.03	0.00	0.45	1.01
Z	41.8	304.10	34.22	14.01	0.71	5.05	1.68	0.24	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-4.2
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

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k=2)
450	43.5	0.87	10.04	10.04	10.04	0.15	1.20	± 13.3 %
750	41.9	0.89	9.63	9.63	9.63	0.67	0.80	± 12.0 %
835	41.5	0.90	9.48	9.48	9.48	0.60	0.80	± 12.0 %
1450	40.5	1.20	8.59	8.59	8.59	0.41	0.80	± 12.0 %
1750	40.1	1.37	8.41	8.41	8.41	0.36	0.87	± 12.0 %
1900	40.0	1.40	8.10	8.10	8.10	0.36	0.87	± 12.0 %
2000	40.0	1.40	8.09	8.09	8.09	0.35	0.87	± 12.0 %
2300	39.5	1.67	7.69	7.69	7.69	0.30	0.90	± 12.0 %
2450	39.2	1.80	7.50	7.50	7.50	0.28	0.90	± 12.0 %
2600	39.0	1.96	7.37	7.37	7.37	0.32	0.90	± 12.0 %
3300	38.2	2.71	6.91	6.91	6.91	0.40	1.35	± 13.1 %
3500	37.9	2.91	6.78	6.78	6.78	0.40	1.35	± 13.1 %
3700	37.7	3.12	6.50	6.50	6.50	0.40	1.35	± 13.1 %
3900	37.5	3.32	6.34	6.34	6.34	0.40	1.60	± 13.1 %
4100	37.2	3.53	6.23	6.23	6.23	0.35	1.60	± 13.1 %
4200	37.1	3.63	6.22	6.22	6.22	0.40	1.60	± 13.1 %
4400	36.9	3.84	5.82	5.82	5.82	0.40	1.70	± 13.1 %
4600	36.7	4.04	5.81	5.81	5.81	0.40	1.70	± 13.1 %
4800	36.4	4.25	5.80	5.80	5.80	0.40	1.80	± 13.1 %
4950	36.3	4.40	5.70	5.70	5.70	0.40	1.80	± 13.1 %
5200	36.0	4.66	5.63	5.63	5.63	0.40	1.80	± 13.1 %
5300	35.9	4.76	5.46	5.46	5.46	0.40	1.80	± 13.1 %
5500	35.6	4.96	5.20	5.20	5.20	0.40	1.80	± 13.1 %
5600	35.5	5.07	5.05	5.05	5.05	0.40	1.80	± 13.1 %
5800	35.3	5.27	5.17	5.17	5.17	0.40	1.80	± 13.1 %

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

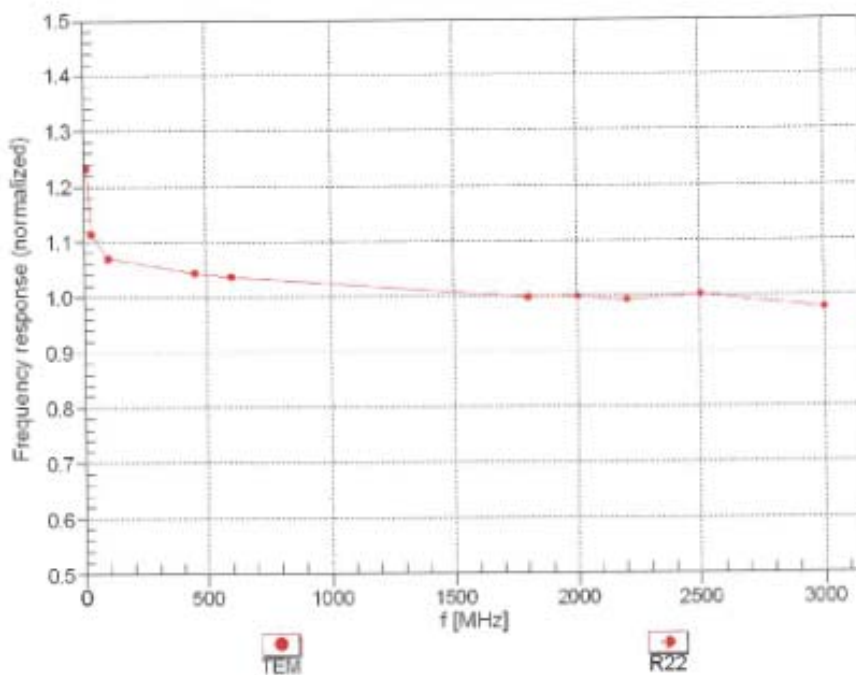
^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty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

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

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

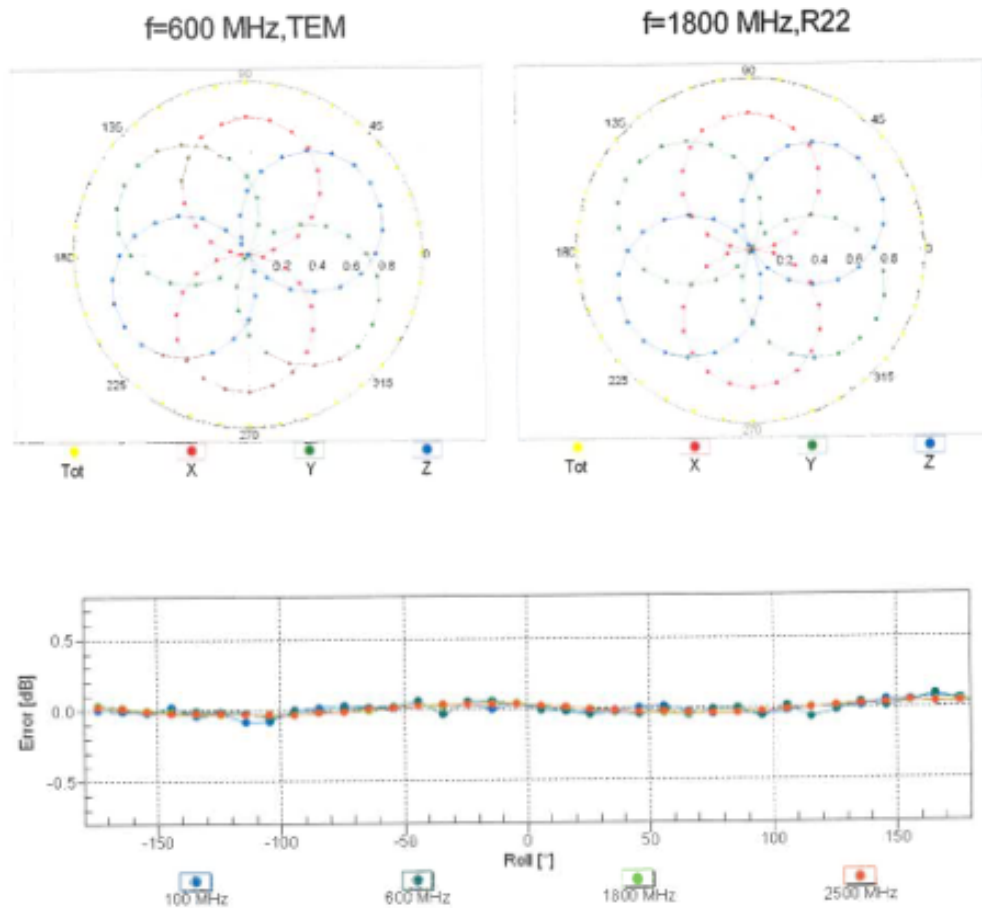


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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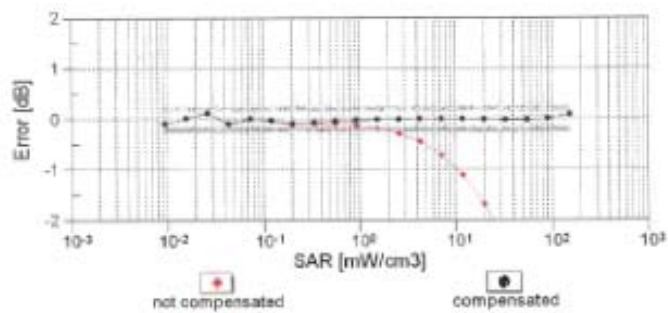
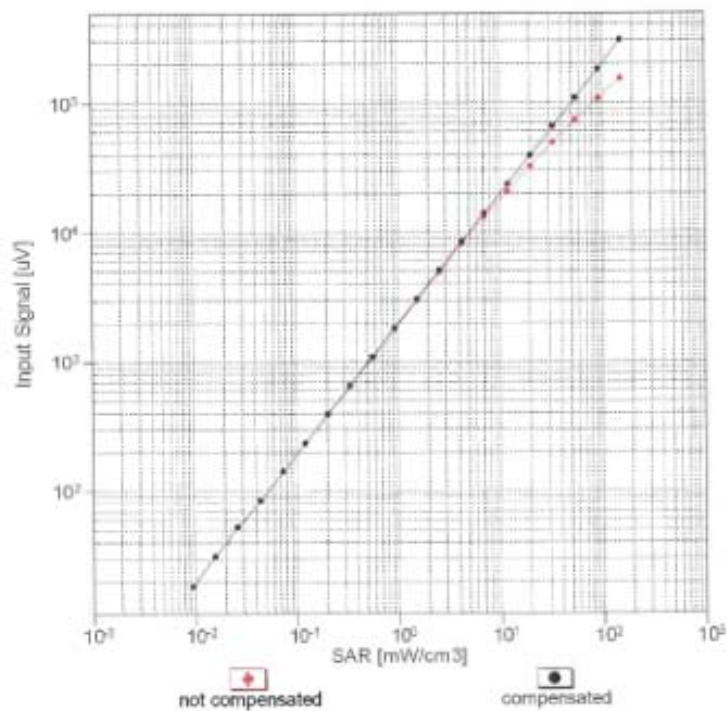
Receiving Pattern (ϕ), $\theta = 0^\circ$



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



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

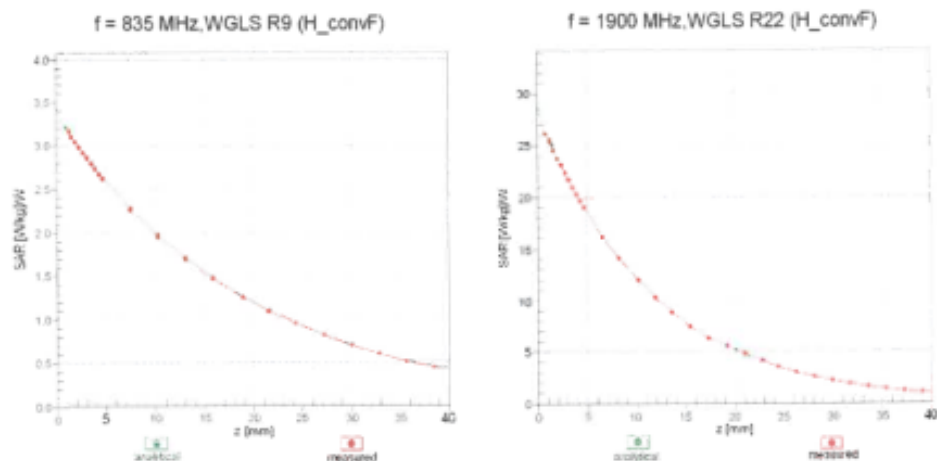
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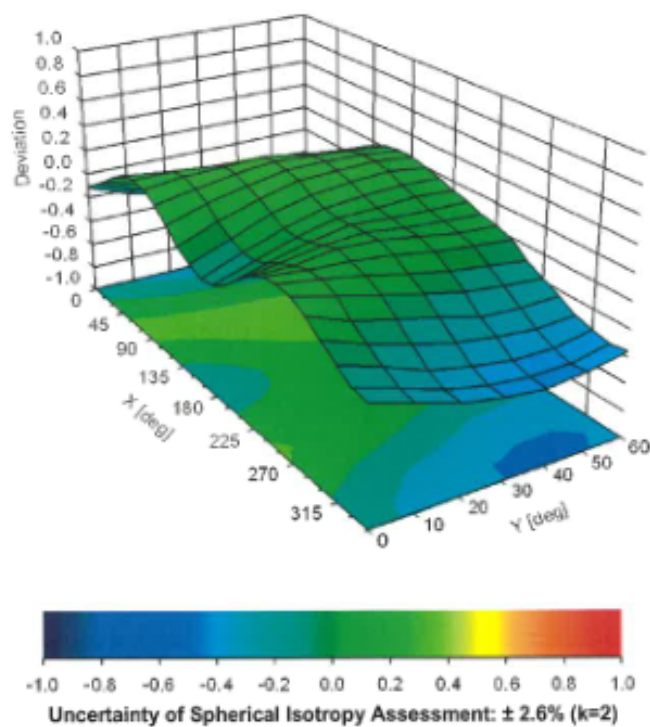
September 26, 2019

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 ² (k=2)
0		CW			
10010	CAA	SAR Validation (Square, 100ms, 10ms)	CW	0.00	± 4.7 %
10011	CAB	UMTS-FDD (WCDMA)	Test	10.00	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WCDMA	2.91	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	1.87	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	WLAN	9.46	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.39	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	9.57	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	6.56	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	12.62	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	9.55	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	4.80	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	3.55	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	GSM	7.78	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	5.30	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.87	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	1.16	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	7.74	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	4.53	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	3.83	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	8.01	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.77	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	Bluetooth	4.10	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	CDMA2000	4.57	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	7.78	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	AMPS	0.00	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	13.80	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	DECT	10.79	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	TD-SCDMA	11.01	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	GSM	6.52	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.12	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	2.83	± 9.6 %
10062	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	3.60	± 9.6 %
10063	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.68	± 9.6 %
10064	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	8.83	± 9.6 %
10065	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.09	± 9.6 %
10066	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.00	± 9.6 %
10067	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	9.38	± 9.6 %
10068	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.12	± 9.6 %
10069	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.24	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	10.56	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.83	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.62	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	9.94	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.30	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.77	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	10.94	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	WLAN	11.00	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	CDMA2000	3.97	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	AMPS	4.77	± 9.6 %
10097	CAB	UMTS-FDD (HSDPA)	GSM	6.56	± 9.6 %
10098	CAB	UMTS-FDD (HSPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	WCDMA	3.98	± 9.6 %
10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	GSM	9.55	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	5.67	± 9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.42	± 9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	6.60	± 9.6 %
10104	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.29	± 9.6 %
10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %
10108	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	10.01	± 9.6 %
			LTE-FDD	5.80	± 9.6 %

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10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	±9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	±9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	±9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	±9.6 %
10114	CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	±9.6 %
10115	CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	±9.6 %
10116	CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	±9.6 %
10117	CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	±9.6 %
10118	CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	±9.6 %
10119	CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	±9.6 %
10140	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	±9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10143	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	±9.6 %
10144	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	±9.6 %
10145	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	±9.6 %
10146	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±9.6 %
10147	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	±9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6 %
10151	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	±9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	±9.6 %
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	±9.6 %
10154	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	±9.6 %
10155	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	±9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	±9.6 %
10158	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	±9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	±9.6 %
10160	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	±9.6 %
10161	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	±9.6 %
10162	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	±9.6 %
10166	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	±9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	±9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	±9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	±9.6 %
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	±9.6 %
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±9.6 %
10175	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10177	CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10178	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10181	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±9.6 %
10182	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10184	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±9.6 %
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10187	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	±9.6 %
10193	CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	±9.6 %
10194	CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	±9.6 %
10195	CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	±9.6 %
10196	CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	±9.6 %
10197	CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	±9.6 %
10198	CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	±9.6 %
10219	CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	±9.6 %

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10220	CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	±9.6 %
10221	CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	±9.6 %
10222	CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	±9.6 %
10223	CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	±9.6 %
10224	CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	±9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA	5.97	±9.6 %
10226	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	±9.6 %
10227	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	±9.6 %
10228	CAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	±9.6 %
10229	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	±9.6 %
10230	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	±9.6 %
10231	CAD	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	±9.6 %
10232	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	±9.6 %
10233	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	±9.6 %
10234	CAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	±9.6 %
10235	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	±9.6 %
10236	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	±9.6 %
10237	CAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	±9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	±9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	±9.6 %
10240	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	±9.6 %
10241	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	±9.6 %
10242	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	±9.6 %
10243	CAB	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	±9.6 %
10244	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	±9.6 %
10245	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	±9.6 %
10246	CAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	±9.6 %
10247	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	±9.6 %
10248	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	±9.6 %
10249	CAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	±9.6 %
10250	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	±9.6 %
10251	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	±9.6 %
10252	CAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	±9.6 %
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	±9.6 %
10254	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	±9.6 %
10255	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	±9.6 %
10256	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	±9.6 %
10257	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	±9.6 %
10258	CAB	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	±9.6 %
10259	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	±9.6 %
10260	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	±9.6 %
10261	CAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	±9.6 %
10262	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	±9.6 %
10263	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	±9.6 %
10264	CAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	±9.6 %
10265	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	±9.6 %
10266	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	±9.6 %
10267	CAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	±9.6 %
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	±9.6 %
10269	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	±9.6 %
10270	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	±9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	±9.6 %
10275	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	±9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	±9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Roll-off 0.5)	PHS	11.81	±9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Roll-off 0.38)	PHS	12.18	±9.6 %
10290	AAB	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	±9.6 %
10291	AAB	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	±9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	±9.6 %
10293	AAB	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	±9.6 %
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	±9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	±9.6 %
10298	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	±9.6 %
10299	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	±9.6 %

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10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	±9.6 %
10301	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WiMAX	12.03	±9.6 %
10302	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	WiMAX	12.57	±9.6 %
10303	AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	±9.6 %
10304	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	11.86	±9.6 %
10305	AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	WiMAX	15.24	±9.6 %
10306	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	WiMAX	14.67	±9.6 %
10307	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	WiMAX	14.49	±9.6 %
10308	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	±9.6 %
10309	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	WiMAX	14.58	±9.6 %
10310	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	WiMAX	14.57	±9.6 %
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	±9.6 %
10313	AAA	iDEN 1:3	iDEN	10.51	±9.6 %
10314	AAA	iDEN 1:6	iDEN	13.48	±9.6 %
10315	AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	WLAN	1.71	±9.6 %
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	±9.6 %
10317	AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc 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 %
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	±9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	±9.6 %
10396	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	±9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	±9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	±9.6 %
10401	AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	WLAN	8.60	±9.6 %
10402	AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	WLAN	8.53	±9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	±9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	±9.6 %
10406	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	±9.6 %
10410	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	LTE-TDD	7.82	±9.6 %
10414	AAA	WLAN CDF, 64-QAM, 40MHz	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	AAB	IEEE 802.11a/h 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	8.19	±9.6 %
10422	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	±9.6 %
10423	AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	±9.6 %
10424	AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	±9.6 %
10425	AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	±9.6 %
10426	AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	±9.6 %
10427	AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	±9.6 %
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	±9.6 %
10431	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6 %
10432	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6 %
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6 %
10434	AAA	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	±9.6 %
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6 %
10447	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	±9.6 %
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±9.6 %
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±9.6 %
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	±9.6 %

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10451	AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	± 9.6 %
10456	AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	WLAN	8.63	± 9.6 %
10457	AAA	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	AAA	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	± 9.6 %
10461	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10462	AAB	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	AAB	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9.6 %
10464	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10467	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10468	AAF	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	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9.6 %
10470	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10471	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10472	AAF	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	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10474	AAE	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	AAE	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	AAF	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	AAF	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	AAB	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	AAB	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	AAB	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	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.71	± 9.6 %
10483	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.39	± 9.6 %
10484	AAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.47	± 9.6 %
10485	AAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.59	± 9.6 %
10486	AAF	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	AAF	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	AAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	± 9.6 %
10489	AAF	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	AAF	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	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %

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10492	AAE	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	AAE	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	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10495	AAF	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	AAF	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	AAB	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	AAB	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	AAB	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	AAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6 %
10501	AAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.44	± 9.6 %
10502	AAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.52	± 9.6 %
10503	AAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.72	± 9.6 %
10504	AAF	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	AAF	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	AAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10507	AAF	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	AAF	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	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.99	± 9.6 %
10510	AAE	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	AAE	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	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10513	AAF	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	AAF	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	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10519	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.39	± 9.6 %
10520	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.12	± 9.6 %
10521	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	WLAN	7.97	± 9.6 %
10522	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10523	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.08	± 9.6 %
10524	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.27	± 9.6 %
10525	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10526	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10527	AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	WLAN	8.21	± 9.6 %
10528	AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10529	AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10531	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	WLAN	8.43	± 9.6 %
10532	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10533	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	WLAN	8.38	± 9.6 %
10534	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	WLAN	8.45	± 9.6 %

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10535	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	WLAN	8.45	±9.6 %
10536	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	WLAN	8.32	±9.6 %
10537	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±9.6 %
10538	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	WLAN	8.54	±9.6 %
10540	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	WLAN	8.39	±9.6 %
10541	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	WLAN	8.46	±9.6 %
10542	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	WLAN	8.65	±9.6 %
10543	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	WLAN	8.65	±9.6 %
10544	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	WLAN	8.47	±9.6 %
10545	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	WLAN	8.55	±9.6 %
10546	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	WLAN	8.35	±9.6 %
10547	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	WLAN	8.49	±9.6 %
10548	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	WLAN	8.37	±9.6 %
10550	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	WLAN	8.38	±9.6 %
10551	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	WLAN	8.50	±9.6 %
10552	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	WLAN	8.42	±9.6 %
10553	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	WLAN	8.45	±9.6 %
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	WLAN	8.48	±9.6 %
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6 %
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	WLAN	8.50	±9.6 %
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	WLAN	8.52	±9.6 %
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	WLAN	8.61	±9.6 %
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	WLAN	8.73	±9.6 %
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	WLAN	8.56	±9.6 %
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	WLAN	8.69	±9.6 %
10563	AAC	IEEE 802.11ac WiFi (160MHz, 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	8.30	±9.6 %
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	WLAN	1.99	±9.6 %
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	WLAN	1.99	±9.6 %
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	WLAN	1.98	±9.6 %
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	WLAN	1.98	±9.6 %
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	±9.6 %
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	±9.6 %
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	±9.6 %
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	±9.6 %
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	±9.6 %
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	±9.6 %
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	±9.6 %
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	±9.6 %
10583	AAB	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	±9.6 %
10584	AAB	IEEE 802.11a/n WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	±9.6 %
10585	AAB	IEEE 802.11a/n WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	±9.6 %
10586	AAB	IEEE 802.11a/n WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	±9.6 %
10587	AAB	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	±9.6 %

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10588	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	±9.6 %
10589	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	±9.6 %
10590	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	±9.6 %
10591	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	WLAN	8.63	±9.6 %
10592	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	WLAN	8.79	±9.6 %
10593	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	WLAN	8.64	±9.6 %
10594	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	±9.6 %
10595	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	WLAN	8.74	±9.6 %
10596	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	WLAN	8.71	±9.6 %
10597	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	WLAN	8.72	±9.6 %
10598	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	WLAN	8.50	±9.6 %
10599	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	WLAN	8.79	±9.6 %
10600	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	WLAN	8.88	±9.6 %
10601	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	WLAN	8.82	±9.6 %
10602	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	WLAN	8.94	±9.6 %
10603	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	WLAN	9.03	±9.6 %
10604	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	WLAN	8.76	±9.6 %
10605	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	WLAN	8.97	±9.6 %
10606	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	±9.6 %
10607	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	WLAN	8.64	±9.6 %
10608	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	WLAN	8.77	±9.6 %
10609	AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	WLAN	8.57	±9.6 %
10610	AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	WLAN	8.78	±9.6 %
10611	AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6 %
10612	AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6 %
10613	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	WLAN	8.94	±9.6 %
10614	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	WLAN	8.59	±9.6 %
10615	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6 %
10616	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	WLAN	8.82	±9.6 %
10617	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	WLAN	8.81	±9.6 %
10618	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	WLAN	8.58	±9.6 %
10619	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	WLAN	8.86	±9.6 %
10620	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	WLAN	8.87	±9.6 %
10621	AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6 %
10622	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	WLAN	8.68	±9.6 %
10623	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	±9.6 %
10624	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	WLAN	8.96	±9.6 %
10625	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	WLAN	8.83	±9.6 %
10626	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	WLAN	8.88	±9.6 %
10627	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	WLAN	8.71	±9.6 %
10628	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	WLAN	8.85	±9.6 %
10629	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	WLAN	8.72	±9.6 %
10630	AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	WLAN	8.81	±9.6 %
10631	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	±9.6 %
10632	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	WLAN	8.83	±9.6 %
10633	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	WLAN	8.80	±9.6 %
10634	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	WLAN	8.81	±9.6 %
10635	AAB	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	WLAN	8.83	±9.6 %
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	WLAN	8.79	±9.6 %
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	WLAN	8.86	±9.6 %
10638	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	WLAN	8.85	±9.6 %
10639	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	WLAN	8.98	±9.6 %
10640	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	WLAN	9.06	±9.6 %
10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	WLAN	9.06	±9.6 %
10642	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	WLAN	8.89	±9.6 %
10643	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	WLAN	9.05	±9.6 %
10644	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	WLAN	9.11	±9.6 %
10645	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	WLAN	9.11	±9.6 %
10646	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	±9.6 %
10647	AAF	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	AAE	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	±9.6 %
10653	AAE	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	±9.6 %
10654	AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	±9.6 %

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10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	±9.6 %
10656	AAA	Pulse Waveform (200Hz, 10%)	Test	10.00	±9.6 %
10659	AAA	Pulse Waveform (200Hz, 20%)	Test	6.99	±9.6 %
10660	AAA	Pulse Waveform (200Hz, 40%)	Test	3.98	±9.6 %
10661	AAA	Pulse Waveform (200Hz, 60%)	Test	2.22	±9.6 %
10662	AAA	Pulse Waveform (200Hz, 80%)	Test	0.97	±9.6 %
10670	AAA	Bluetooth Low Energy	Bluetooth	2.19	±9.6 %
10671	AAA	IEEE 802.11ax (20MHz, MCS0, 90pc duty cycle)	WLAN	9.09	±9.6 %
10672	AAA	IEEE 802.11ax (20MHz, MCS1, 90pc duty cycle)	WLAN	8.57	±9.6 %
10673	AAA	IEEE 802.11ax (20MHz, MCS2, 90pc duty cycle)	WLAN	8.78	±9.6 %
10674	AAA	IEEE 802.11ax (20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	±9.6 %
10675	AAA	IEEE 802.11ax (20MHz, MCS4, 90pc duty cycle)	WLAN	8.90	±9.6 %
10676	AAA	IEEE 802.11ax (20MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6 %
10677	AAA	IEEE 802.11ax (20MHz, MCS6, 90pc duty cycle)	WLAN	8.73	±9.6 %
10678	AAA	IEEE 802.11ax (20MHz, MCS7, 90pc duty cycle)	WLAN	8.78	±9.6 %
10679	AAA	IEEE 802.11ax (20MHz, MCS8, 90pc duty cycle)	WLAN	8.89	±9.6 %
10680	AAA	IEEE 802.11ax (20MHz, MCS9, 90pc duty cycle)	WLAN	8.80	±9.6 %
10681	AAA	IEEE 802.11ax (20MHz, MCS10, 90pc duty cycle)	WLAN	8.62	±9.6 %
10682	AAA	IEEE 802.11ax (20MHz, MCS11, 90pc duty cycle)	WLAN	8.83	±9.6 %
10683	AAA	IEEE 802.11ax (20MHz, MCS0, 99pc duty cycle)	WLAN	8.42	±9.6 %
10684	AAA	IEEE 802.11ax (20MHz, MCS1, 99pc duty cycle)	WLAN	8.26	±9.6 %
10685	AAA	IEEE 802.11ax (20MHz, MCS2, 99pc duty cycle)	WLAN	8.33	±9.6 %
10686	AAA	IEEE 802.11ax (20MHz, MCS3, 99pc duty cycle)	WLAN	8.28	±9.6 %
10687	AAA	IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)	WLAN	8.45	±9.6 %
10688	AAA	IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)	WLAN	8.29	±9.6 %
10689	AAA	IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)	WLAN	8.55	±9.6 %
10690	AAA	IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±9.6 %
10691	AAA	IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)	WLAN	8.25	±9.6 %
10692	AAA	IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)	WLAN	8.29	±9.6 %
10693	AAA	IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)	WLAN	8.25	±9.6 %
10694	AAA	IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)	WLAN	8.57	±9.6 %
10695	AAA	IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)	WLAN	8.78	±9.6 %
10696	AAA	IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)	WLAN	8.91	±9.6 %
10697	AAA	IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)	WLAN	8.61	±9.6 %
10698	AAA	IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)	WLAN	8.89	±9.6 %
10699	AAA	IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)	WLAN	8.82	±9.6 %
10700	AAA	IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)	WLAN	8.73	±9.6 %
10701	AAA	IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)	WLAN	8.86	±9.6 %
10702	AAA	IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)	WLAN	8.70	±9.6 %
10703	AAA	IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6 %
10704	AAA	IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)	WLAN	8.56	±9.6 %
10705	AAA	IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)	WLAN	8.69	±9.6 %
10706	AAA	IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)	WLAN	8.66	±9.6 %
10707	AAA	IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)	WLAN	8.32	±9.6 %
10708	AAA	IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)	WLAN	8.55	±9.6 %
10709	AAA	IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)	WLAN	8.33	±9.6 %
10710	AAA	IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)	WLAN	8.29	±9.6 %
10711	AAA	IEEE 802.11ax (40MHz, MCS4, 99pc duty cycle)	WLAN	8.39	±9.6 %
10712	AAA	IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)	WLAN	8.67	±9.6 %
10713	AAA	IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)	WLAN	8.33	±9.6 %
10714	AAA	IEEE 802.11ax (40MHz, MCS7, 99pc duty cycle)	WLAN	8.26	±9.6 %
10715	AAA	IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)	WLAN	8.45	±9.6 %
10716	AAA	IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)	WLAN	8.30	±9.6 %
10717	AAA	IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)	WLAN	8.48	±9.6 %
10718	AAA	IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)	WLAN	8.24	±9.6 %
10719	AAA	IEEE 802.11ax (80MHz, MCS0, 90pc duty cycle)	WLAN	8.81	±9.6 %
10720	AAA	IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)	WLAN	8.87	±9.6 %
10721	AAA	IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)	WLAN	8.76	±9.6 %
10722	AAA	IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)	WLAN	8.55	±9.6 %
10723	AAA	IEEE 802.11ax (80MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6 %
10724	AAA	IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)	WLAN	8.90	±9.6 %
10725	AAA	IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	±9.6 %
10726	AAA	IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)	WLAN	8.72	±9.6 %
10727	AAA	IEEE 802.11ax (80MHz, MCS8, 90pc duty cycle)	WLAN	8.66	±9.6 %

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10728	AAA	IEEE 802.11ax (80MHz, MCS9, 90pc duty cycle)	WLAN	8.65	±9.6 %
10729	AAA	IEEE 802.11ax (80MHz, MCS10, 90pc duty cycle)	WLAN	8.64	±9.6 %
10730	AAA	IEEE 802.11ax (80MHz, MCS11, 90pc duty cycle)	WLAN	8.67	±9.6 %
10731	AAA	IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)	WLAN	8.42	±9.6 %
10732	AAA	IEEE 802.11ax (80MHz, MCS1, 99pc duty cycle)	WLAN	8.46	±9.6 %
10733	AAA	IEEE 802.11ax (80MHz, MCS2, 99pc duty cycle)	WLAN	8.40	±9.6 %
10734	AAA	IEEE 802.11ax (80MHz, MCS3, 99pc duty cycle)	WLAN	8.25	±9.6 %
10735	AAA	IEEE 802.11ax (80MHz, MCS4, 99pc duty cycle)	WLAN	8.33	±9.6 %
10736	AAA	IEEE 802.11ax (80MHz, MCS5, 99pc duty cycle)	WLAN	8.27	±9.6 %
10737	AAA	IEEE 802.11ax (80MHz, MCS6, 99pc duty cycle)	WLAN	8.36	±9.6 %
10738	AAA	IEEE 802.11ax (80MHz, MCS7, 99pc duty cycle)	WLAN	8.42	±9.6 %
10739	AAA	IEEE 802.11ax (80MHz, MCS8, 99pc duty cycle)	WLAN	8.29	±9.6 %
10740	AAA	IEEE 802.11ax (80MHz, MCS9, 99pc duty cycle)	WLAN	8.48	±9.6 %
10741	AAA	IEEE 802.11ax (80MHz, MCS10, 99pc duty cycle)	WLAN	8.40	±9.6 %
10742	AAA	IEEE 802.11ax (80MHz, MCS11, 99pc duty cycle)	WLAN	8.43	±9.6 %
10743	AAA	IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)	WLAN	8.94	±9.6 %
10744	AAA	IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)	WLAN	9.16	±9.6 %
10745	AAA	IEEE 802.11ax (160MHz, MCS2, 90pc duty cycle)	WLAN	8.93	±9.6 %
10746	AAA	IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)	WLAN	9.11	±9.6 %
10747	AAA	IEEE 802.11ax (160MHz, MCS4, 90pc duty cycle)	WLAN	9.04	±9.6 %
10748	AAA	IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)	WLAN	8.93	±9.6 %
10749	AAA	IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)	WLAN	8.90	±9.6 %
10750	AAA	IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)	WLAN	8.79	±9.6 %
10751	AAA	IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6 %
10752	AAA	IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)	WLAN	8.81	±9.6 %
10753	AAA	IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)	WLAN	9.00	±9.6 %
10754	AAA	IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)	WLAN	8.94	±9.6 %
10755	AAA	IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)	WLAN	8.64	±9.6 %
10756	AAA	IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)	WLAN	8.77	±9.6 %
10757	AAA	IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)	WLAN	8.77	±9.6 %
10758	AAA	IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)	WLAN	8.69	±9.6 %
10759	AAA	IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)	WLAN	8.58	±9.6 %
10760	AAA	IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)	WLAN	8.49	±9.6 %
10761	AAA	IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)	WLAN	8.58	±9.6 %
10762	AAA	IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)	WLAN	8.49	±9.6 %
10763	AAA	IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)	WLAN	8.53	±9.6 %
10764	AAA	IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)	WLAN	8.54	±9.6 %
10765	AAA	IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)	WLAN	8.54	±9.6 %
10766	AAA	IEEE 802.11ax (160MHz, MCS11, 99pc duty cycle)	WLAN	8.51	±9.6 %
10767	AAA	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.99	±9.6 %
10768	AAA	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6 %
10769	AAA	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6 %
10770	AAA	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6 %
10771	AAA	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6 %
10772	AAA	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	±9.6 %
10773	AAA	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.03	±9.6 %
10774	AAA	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6 %
10776	AAA	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.6 %
10778	AAA	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	±9.6 %
10780	AAA	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6 %
10781	AAA	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6 %
10782	AAA	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±9.6 %

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10783	AAA	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	± 9.6 %
10784	AAA	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	± 9.6 %
10785	AAA	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	± 9.6 %
10786	AAA	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10787	AAA	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	± 9.6 %
10788	AAA	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10789	AAA	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10790	AAA	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	± 9.6 %
10791	AAA	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	± 9.6 %
10792	AAA	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	± 9.6 %
10793	AAA	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	± 9.6 %
10794	AAA	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 9.6 %
10795	AAA	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	± 9.6 %
10796	AAA	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	± 9.6 %
10797	AAA	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	± 9.6 %
10798	AAA	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 9.6 %
10799	AAA	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	± 9.6 %
10801	AAA	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	± 9.6 %
10802	AAA	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	± 9.6 %
10803	AAA	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.93	± 9.6 %
10805	AAA	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10806	AAA	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	± 9.6 %
10809	AAA	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10810	AAA	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10812	AAA	5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10817	AAA	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.35	± 9.6 %
10818	AAA	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	± 9.6 %
10819	AAA	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	± 9.6 %
10820	AAA	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	± 9.6 %
10821	AAA	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10822	AAA	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	± 9.6 %
10823	AAA	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	± 9.6 %
10824	AAA	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	± 9.6 %

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10825	AAA	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6 %
10827	AAA	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	±9.6 %
10828	AAA	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	±9.6 %
10829	AAA	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.40	±9.6 %
10830	AAA	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.63	±9.6 %
10831	AAA	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	±9.6 %
10832	AAA	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	±9.6 %
10833	AAA	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6 %
10834	AAA	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	±9.6 %
10835	AAA	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6 %
10836	AAA	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.66	±9.6 %
10837	AAA	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.68	±9.6 %
10839	AAA	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	±9.6 %
10840	AAA	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	±9.6 %
10841	AAA	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	±9.6 %
10843	AAA	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	±9.6 %
10844	AAA	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6 %
10846	AAA	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6 %
10854	AAA	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6 %
10855	AAA	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	±9.6 %
10856	AAA	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6 %
10857	AAA	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	±9.6 %
10858	AAA	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	±9.6 %
10859	AAA	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	±9.6 %
10860	AAA	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6 %
10861	AAA	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	±9.6 %
10863	AAA	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6 %
10864	AAA	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	±9.6 %
10865	AAA	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	±9.6 %
10866	AAA	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	±9.6 %
10868	AAA	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	±9.6 %
10869	AAA	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	±9.6 %
10870	AAA	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	±9.6 %

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September 26, 2019

10871	AAA	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10872	AAA	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.52	± 9.6 %
10873	AAA	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10874	AAA	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10875	AAA	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10876	AAA	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.39	± 9.6 %
10877	AAA	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.95	± 9.6 %
10878	AAA	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 9.6 %
10879	AAA	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	± 9.6 %
10880	AAA	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	± 9.6 %
10881	AAA	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	± 9.6 %
10882	AAA	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.96	± 9.6 %
10883	AAA	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	± 9.6 %
10884	AAA	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	± 9.6 %
10885	AAA	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	± 9.6 %
10886	AAA	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	± 9.6 %
10887	AAA	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	± 9.6 %
10888	AAA	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	± 9.6 %
10889	AAA	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	± 9.6 %
10890	AAA	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	± 9.6 %
10891	AAA	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	± 9.6 %
10892	AAA	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	± 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.

D835V2Sn:4d0232



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Client

SRTC

Certificate No:

Z17-97135

CALIBRATION CERTIFICATE

Object D835V2 - SN: 4d023

Calibration Procedure(s) FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: September 13, 2017

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(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102196	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Power sensor NR-VZ5	100596	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG,No.EX3-7433_Sep16)	Sep-17
DAL4	SN 1331	19-Jan-17(CTTL-SPEAG,No.Z17-97015)	Jan-18
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Yu Zongying	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 16, 2017

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

Certificate No: Z17-97135

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Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** Those 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%.



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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 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 $\pm$ 0.2) °C	41.3 $\pm$ 6 %	0.90 mho/m $\pm$ 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.37 mW / g $\pm$ 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.06 mW / g $\pm$ 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	55.7 $\pm$ 6 %	0.96 mho/m $\pm$ 5 %
Body TSL temperature change during test	<1.0 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.34 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.47 mW / g $\pm$ 18.8 % (k=2)
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.53 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.17 mW / g $\pm$ 18.7 % (k=2)

Certificate No: Z17-97135

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0Ω- 2.79jΩ
Return Loss	- 30.7dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6Ω- 3.61jΩ
Return Loss	- 25.8dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.495 ns
----------------------------------	----------

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: 09.13.2017

Test Laboratory: CTTI, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d023

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.903 \text{ S/m}$; $\epsilon_r = 41.34$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(9.82, 9.82, 9.82); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1321; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

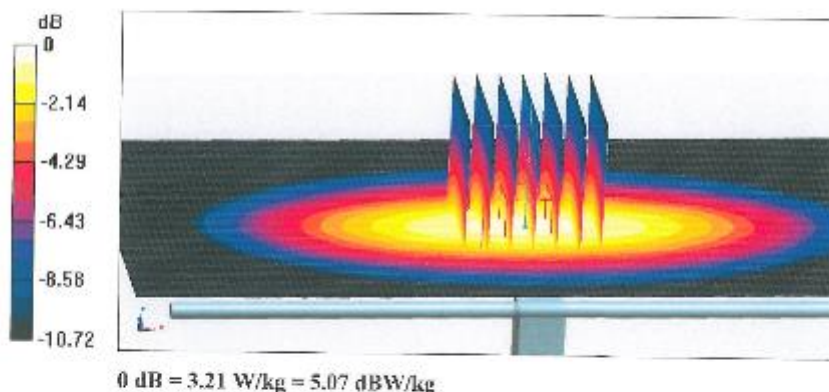
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.28V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.66 W/kg

SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.52 W/kg

Maximum value of SAR (measured) = 3.21 W/kg





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Impedance Measurement Plot for Head TSL

