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SAR EVALUATION REPORT

Applicant Name:
LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
11/14/16
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1611151781-R2.ZNF

FCC ID: ZNFW270

APPLICANT: LG ELECTRONICS MOBILECOMM U.S.A., INC.

DUT Type: Portable Wrist Device
Application Type: Class II Permissive Change
FCC Rule Part(s): CFR §2.1093
Model(s): LG-W270, LGW270, W270, LG-W270K, LGW270K, W270K
Permissive Change(s): See FCC Change Document

Equipment Class	Band & Mode	Tx Frequency	SAR	
			1 gm Head (W/kg)	10 gm Extremity (W/kg)
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.27	0.29
DSS/DTS	Bluetooth	2402 - 2480 MHz	< 0.1	< 0.1

Note: This revised Test Report (S/N: 0Y1611151781-R2.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.6 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

TESTING CERT#2041.01

The SAR Tick is an initiative of the Mobile Manufacturers Forum (MMF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MMF. Further details can be obtained by emailing: sartick@mmfai.info.

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
2.4 GHz WLAN	Data	2412 - 2472 MHz
Bluetooth	Data	2402 - 2480 MHz

1.2 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

1.3 Nominal and Maximum Output Power Specifications

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

Mode / Band		Modulated Average (dBm)				
		Ch. 1	Ch. 2-10	Ch. 11	Ch. 12	Ch. 13
IEEE 802.11b (2.4 GHz)	Maximum	**17.0**	**17.0**	**17.0**	**9.0**	**8.0**
	Nominal	**16.0**	**16.0**	**16.0**	**8.0**	**7.0**
IEEE 802.11g (2.4 GHz)	Maximum	**15.0**	**16.0**	**14.0**	**5.5**	**3.5**
	Nominal	**14.0**	**15.0**	**13.0**	**4.5**	**2.5**
IEEE 802.11n (2.4 GHz)	Maximum	**14.0**	**15.0**	**13.0**	**6.0**	**3.5**
	Nominal	**13.0**	**14.0**	**12.0**	**5.0**	**2.5**

Mode / Band		Modulated Average (dBm)
Bluetooth (1 Mbps)	Maximum	**12.0**
	Nominal	**11.0**
Bluetooth (2 Mbps)	Maximum	**11.5**
	Nominal	**10.5**
Bluetooth (3 Mbps)	Maximum	**11.5**
	Nominal	**10.5**
Bluetooth LE (Peak)	Maximum	**3.0**
	Nominal	**2.0**

1.4 DUT Antenna Locations

A diagram showing the location of the device antennas can be found in Appendix F.

1.5 Simultaneous Transmission Capabilities

There are no simultaneous transmission capabilities. 2.4 GHz WLAN and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.

1.6 Guidance Applied

- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance, Wrist Device Considerations)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)

1.7 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

	Head Serial Number	Extremity Serial Number
2.4 GHz WLAN	06685	86684
Bluetooth	06685	86684

2 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

2.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 2-1).

Equation 2-1
SAR Mathematical Equation

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

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

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

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

3 DOSIMETRIC ASSESSMENT

3.1 Measurement Procedure

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

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 3-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 3-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
    a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 3-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
    b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
    c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

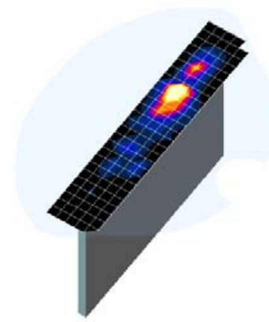

Figure 3-1
Sample SAR Area Scan

Table 3-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

4 TEST CONFIGURATION POSITIONS FOR WRIST-WORN DEVICES

4.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

4.2 Positioning for Head

Devices that are designed to be worn on the wrist may operate in speaker mode for voice communication, with the device worn on the wrist and positioned next to the mouth. When next-to-mouth SAR evaluation is required, the device is positioned at 10 mm from a flat phantom filled with head tissue-equivalent medium. The device is evaluated with wrist bands strapped together to represent normal use conditions. The 1-g head SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

4.3 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. When extremity SAR evaluation is required, the device is evaluated with the back of the device touching the flat phantom, which is filled with body tissue-equivalent medium. The device is evaluated with wrist bands unstrapped and touching the phantom; the space between the device and the phantom must represent actual use conditions. The 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

5 RF EXPOSURE LIMITS

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Table 5-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

6 FCC MEASUREMENT PROCEDURES

6.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

6.2 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

6.2.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

6.2.2 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

7 RF CONDUCTED POWERS

7.1 WLAN Conducted Powers

Table 7-1
2.4 GHz WLAN Average RF Power

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]	
		IEEE Transmission Mode	
		802.11b	802.11g
2412	1	**16.50**	14.18
2437	6	16.18	15.23
2462	11	16.22	13.29

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.
- The bolded data rate and channel above were tested for SAR.

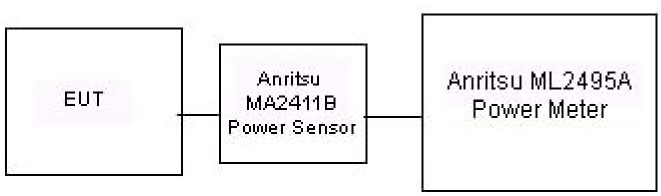

Figure 7-1
Power Measurement Setup

7.2 Bluetooth Conducted Powers and Duty Cycle Calculation

Table 7-2
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	**11.24**	13.300
2441	1.0	39	10.72	11.813
2480	1.0	78	10.23	10.536
2402	2.0	0	10.60	11.491
2441	2.0	39	10.09	10.202
2480	2.0	78	9.53	8.967
2402	3.0	0	10.47	11.131
2441	3.0	39	10.00	9.998
2480	3.0	78	9.23	8.374

Note: The bolded data rate and channel above were tested for SAR.

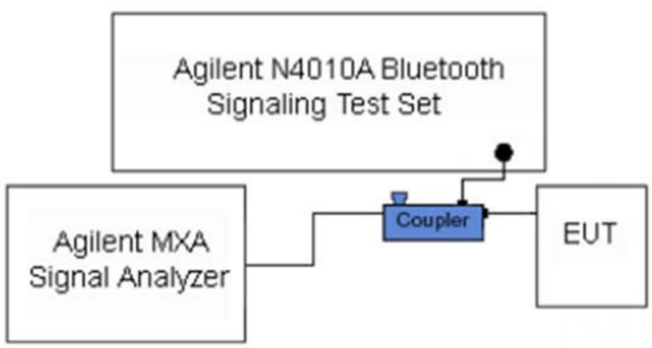

Figure 7-2
Power Measurement Setup

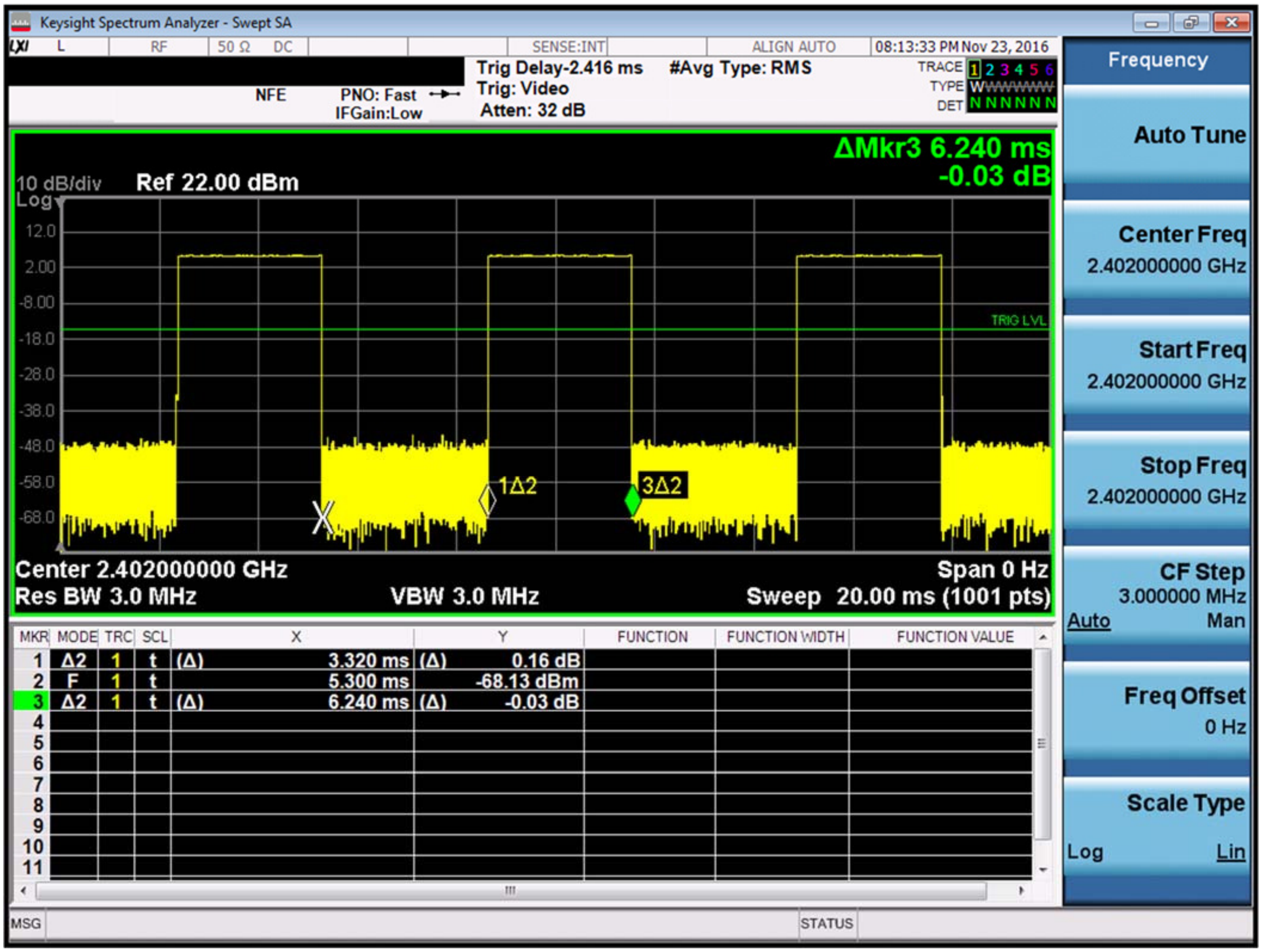

Figure 7-3
Bluetooth Transmission Plot

Equation 7-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{3.320\ ms}{6.240\ ms} * 100\% = 53.2\%$$

8.1 Tissue Verification

Table 8-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
11/14/2016	2450H	24.0	2400	1.812	38.578	1.756	39.289	3.19%	-1.81%
			2450	1.868	38.389	1.800	39.200	3.78%	-2.07%
			2500	1.925	38.180	1.855	39.136	3.77%	-2.44%
11/14/2016	2450B	23.0	2400	1.920	51.363	1.902	52.767	0.95%	-2.66%
			2450	1.987	51.159	1.950	52.700	1.90%	-2.92%
			2500	2.052	50.953	2.021	52.636	1.53%	-3.20%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

8.2 Test System Verification

Prior to SAR assessment, the system is verified to ±10% of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in Appendix E.

Table 8-2
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
I	2450	HEAD	11/14/2016	22.1	24.0	0.100	981	3288	5.080	52.800	50.800	-3.79%

Table 8-3
System Verification Results – 10g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR_{10g} (W/kg)	1 W Target SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	$Deviation_{10g}$ (%)
E	2450	BODY	11/14/2016	22.7	22.0	0.100	797	7406	2.250	24.200	22.500	-7.02%

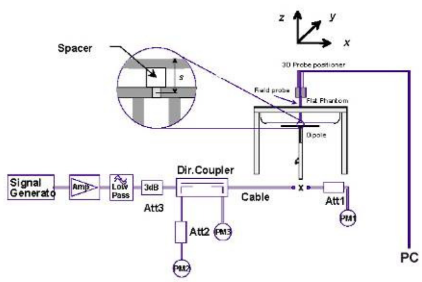

Figure 8-1
System Verification Setup Diagram

Figure 8-2
System Verification Setup Photo

9 SAR DATA SUMMARY

9.1 Standalone Head SAR Data

Table 9-1
2.4 GHz WLAN Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	17.0	16.50	-0.15	10 mm	06685	1	front	99.7	0.287	0.221	1.122	1.003	0.249	
2437	6	802.11b	DSSS	22	17.0	16.18	0.18	10 mm	06685	1	front	99.7	0.316	0.217	1.208	1.003	0.263	
2462	11	802.11b	DSSS	22	17.0	16.22	0.15	10 mm	06685	1	front	99.7	0.302	0.228	1.197	1.003	0.274	A1
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 9-2
DSS Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond. Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402	0	Bluetooth	FHSS	12.0	11.24	-0.13	10 mm	06685	1	front	53.2	0.012	1.191	1.880	0.027	A2
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram									

9.2 Standalone Extremity SAR Data

Table 9-3
2.4 GHz WLAN Extremity SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	17.0	16.50	0.19	0 mm	86684	1	back	99.7	0.883	0.222	1.122	1.003	0.250	
2437	6	802.11b	DSSS	22	17.0	16.18	0.11	0 mm	86684	1	back	99.7	0.998	0.241	1.208	1.003	0.292	A3
2462	11	802.11b	DSSS	22	17.0	16.22	0.14	0 mm	86684	1	back	99.7	0.626	0.241	1.197	1.003	0.289	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Extremity 4.0 W/kg (mW/g) averaged over 10 grams										

Table 9-4
DSS Extremity SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (10g)	Scaling Factor (Cond. Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402	0	Bluetooth	FHSS	12.0	11.24	0.14	0 mm	86684	1	back	53.2	0.016	1.191	1.880	0.036	A4
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Extremity 4.0 W/kg (mW/g) averaged over 10 grams									

9.3 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Per FCC KDB 865664 D01v01r04, variability SAR tests were not required since the measured SAR results for a frequency band were less than 0.8 W/kg for 1g SAR and 2.0 W/kg for 10g SAR. Please see Section 10 for variability analysis.

WLAN/Bluetooth Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 6.2.2 for more information.
2. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.
3. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.
4. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See Section 7.2 for the time-domain plot and calculation for the duty factor of the device.

10 SAR MEASUREMENT VARIABILITY

10.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01, SAR measurement variability is assessed when measured 1g SAR is > 0.80 W/kg or 10g SAR is > 2.0 W/kg. Since highest measured SAR for this device was below these limits, measurement variability was not assessed.

10.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for 1g SAR and <3.75 W/kg for 10g SAR for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

11 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/2/2016	Annual	3/2/2017	MY45470194
Agilent	8753E	(30kHz-6GHz) Network Analyzer	3/2/2016	Annual	3/2/2017	JP38020182
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	E5515C	8960 Series 10 Wireless Communications Test Set	10/5/2016	Annual	10/5/2017	GB42230325
Agilent	E4438C	ESG Vector Signal Generator	2/27/2016	Annual	2/27/2017	MY45091346
Agilent	E4438C	ESG Vector Signal Generator	3/2/2016	Annual	3/2/2017	MY47270002
Agilent	E4432B	ESG-D Series Signal Generator	3/5/2016	Annual	3/5/2017	US40053896
Agilent	N5182A	MXG Vector Signal Generator	2/27/2016	Annual	2/27/2017	MY47420651
Agilent	N5182A	MXG Vector Signal Generator	3/5/2016	Annual	3/5/2017	MY47420800
Agilent	N9020A	MXA Signal Analyzer	10/28/2016	Annual	10/28/2017	US46470561
Agilent	8753ES	S-Parameter Network Analyzer	3/3/2016	Annual	3/3/2017	US39170122
Agilent	8753ES	S-Parameter Network Analyzer	6/28/2016	Annual	6/28/2017	MY40000670
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433978
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	1039008
Anritsu	MA2481A	Power Sensor	3/3/2016	Annual	3/3/2017	5318
Anritsu	MA2481A	Power Sensor	3/3/2016	Annual	3/3/2017	2400
Anritsu	MA2411B	Pulse Power Sensor	12/7/2015	Annual	12/7/2016	1207364
Anritsu	MA2411B	Pulse Power Sensor	12/7/2015	Annual	12/7/2016	1339018
Anritsu	MA24106A	USB Power Sensor	2/27/2016	Annual	2/27/2017	1344559
Anritsu	MA24106A	USB Power Sensor	2/27/2016	Annual	2/27/2017	1349503
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
Control Company	4040	Digital Thermometer	3/15/2015	Biennial	3/15/2017	150194929
Control Company	4353	Long Stem Thermometer	1/22/2015	Biennial	1/22/2017	150053081
Control Company	4352	Ultra Long Stem Thermometer	3/8/2016	Biennial	3/8/2018	160261701
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	13264162
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	5/21/2015	Biennial	5/21/2017	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	12/2/2015	Annual	12/2/2016	833855/0010
Rohde & Schwarz	CMU200	Base Station Simulator	3/29/2016	Annual	3/29/2017	836371/0079
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	N/A
SPEAG	D2450V2	2450 MHz SAR Dipole	7/25/2016	Annual	7/25/2017	981
SPEAG	D2450V2	2450 MHz SAR Dipole	9/13/2016	Annual	9/13/2017	797
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/14/2016	Annual	4/14/2017	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/22/2016	Annual	8/22/2017	1364
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2016	Annual	5/10/2017	1070
SPEAG	DAK-12	Dielectric Assessment Kit (10MHz - 3GHz)	3/1/2016	Annual	3/1/2017	1102
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	7/19/2016	Annual	7/19/2017	1039
SPEAG	EX3DV4	SAR Probe	4/19/2016	Annual	4/19/2017	7406
SPEAG	ES3DV3	SAR Probe	8/24/2016	Annual	8/24/2017	3288

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

12 MEASUREMENT UNCERTAINTIES

a	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	Tol. (± %)	Prob. Dist.	Div.	c_i 1gm	c_i 10 gms	1gm u_i (± %)	10gms u_i (± %)	v_i
Measurement System								
Probe Calibration	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	2.0	R	1.73	1.0	1.0	1.2	1.2	∞
Linearity	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	0.25	R	1.73	1.0	1.0	0.1	0.1	∞
Readout Electronics	0.3	N	1	1.0	1.0	0.3	0.3	∞
Response Time	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions - Noise	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	6.7	R	1.73	1.0	1.0	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	2.7	N	1	1.0	1.0	2.7	2.7	35
Device Holder Uncertainty	1.67	N	1	1.0	1.0	1.7	1.7	5
Output Power Variation - SAR drift measurement	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
SAR Scaling	0.0	R	1.73	1.0	1.0	0.0	0.0	∞
Phantom & Tissue Parameters								
Phantom Uncertainty (Shape & Thickness tolerances)	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	4.2	N	1	0.78	0.71	3.3	3.0	10
Liquid Permittivity - measurement uncertainty	4.1	N	1	0.23	0.26	1.0	1.1	10
Liquid Conductivity - Temperature Uncertainty	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)		RSS				11.5	11.3	60
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2				23.0	22.6	

13 CONCLUSION

13.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFW270; Type: Portable Wrist Device; Serial: 06685

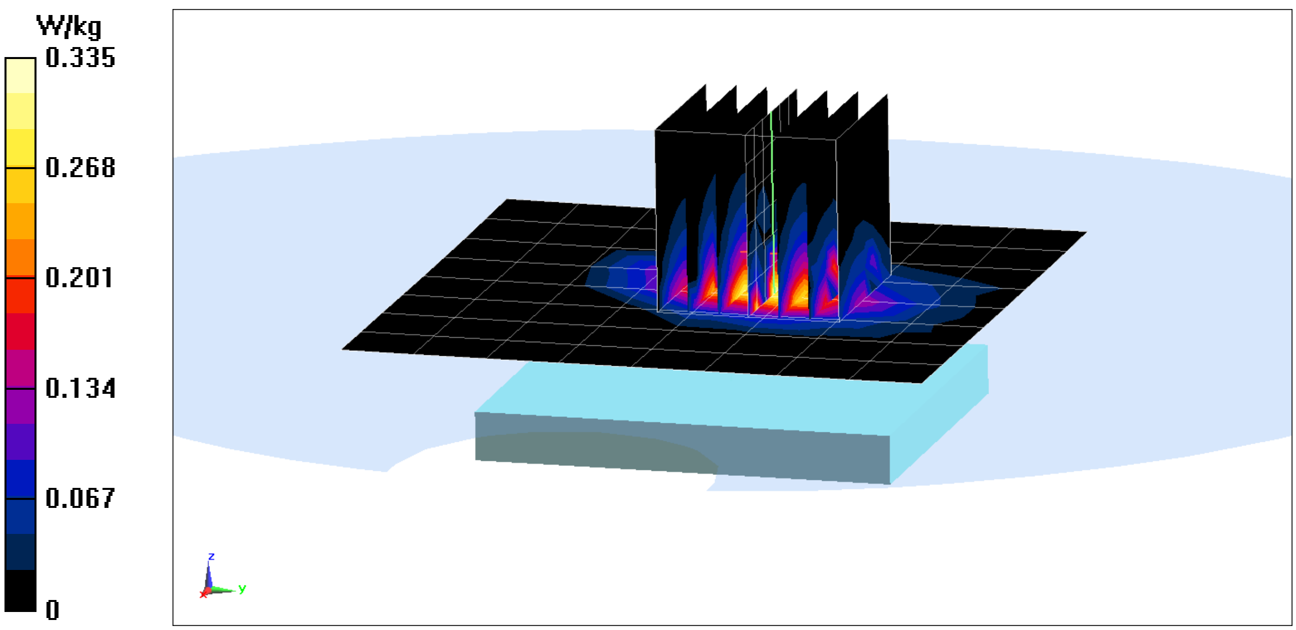
Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.882 S/m; εr = 38.339; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-14-2016; Ambient Temp: 22.1°C; Tissue Temp: 24.0°C

Probe: ES3DV3 - SN3288; ConvF(4.76, 4.76, 4.76); Calibrated: 8/24/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Right; Type: SAM; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Head SAR, Ch 11, 1 Mbps, Front Side

Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.32 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.545 W/kg
SAR(1 g) = 0.228 W/kg



DUT: ZNFW270; Type: Portable Wrist Device; Serial: 06685

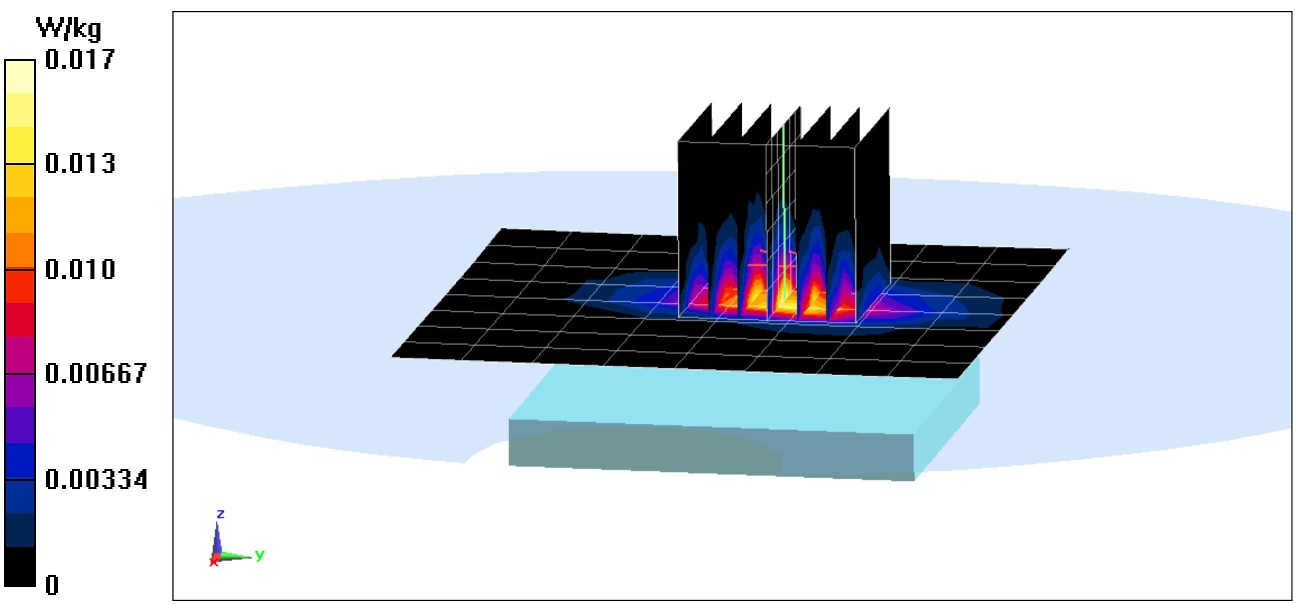
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.880
Medium: 2450 Head Medium parameters used (interpolated):
f = 2402 MHz; σ = 1.814 S/m; ε_r = 38.57; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-14-2016; Ambient Temp: 22.1°C; Tissue Temp: 24.0°C

Probe: ES3DV3 - SN3288; ConvF(4.76, 4.76, 4.76); Calibrated: 8/24/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Right; Type: SAM; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Bluetooth, Head SAR, Ch 0, 1 Mbps, Front Side

Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.947 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.0230 W/kg
SAR(1 g) = 0.012 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFW270; Type: Portable Wrist Device; Serial: 86684

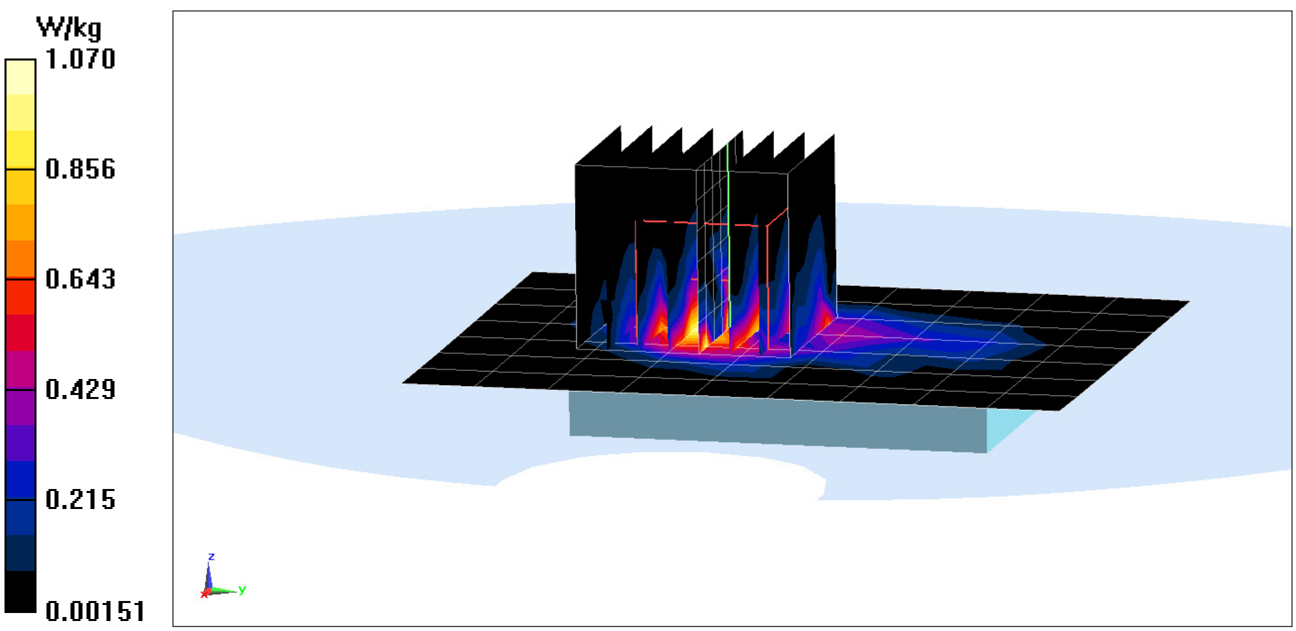
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2437 MHz; σ = 1.97 S/m; ε_r = 51.212; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-14-2016; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Extremity SAR, Ch 06, 1 Mbps, Back Side

Area Scan (8x10x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.21 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(10 g) = 0.241 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFW270; Type: Portable Wrist Device; Serial: 86684

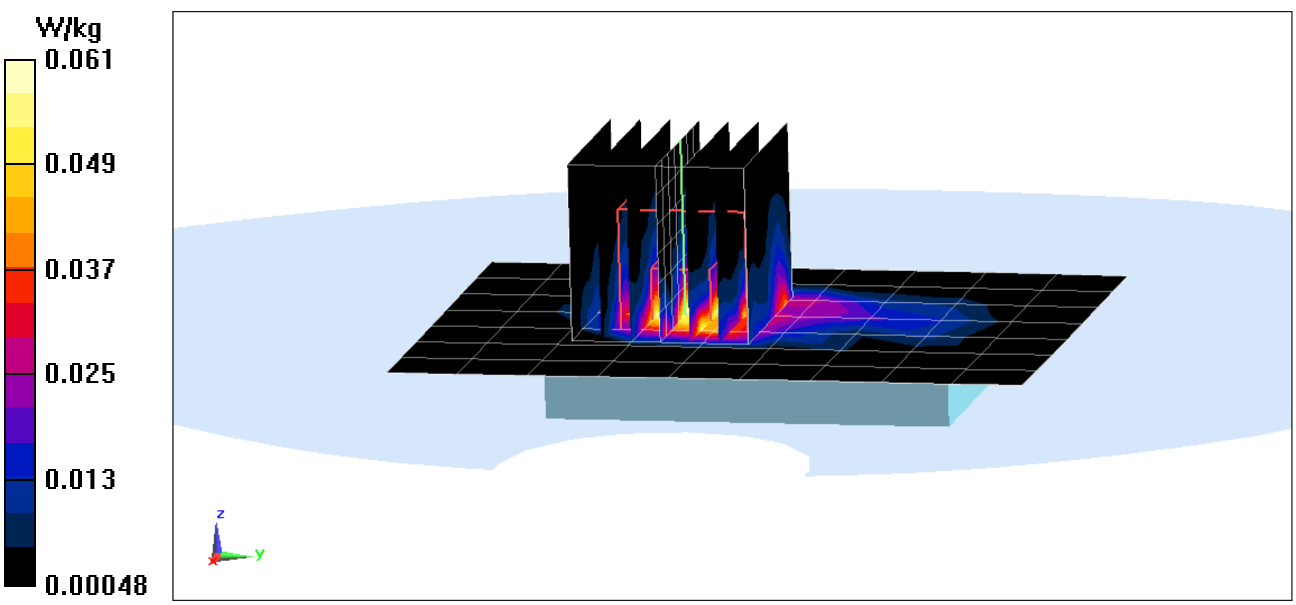
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.880
Medium: 2450 Body Medium parameters used (interpolated):
f = 2402 MHz; σ = 1.923 S/m; ε_r = 51.355; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-14-2016; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Bluetooth, Extremity SAR, Ch 0, 1 Mbps, Back Side

Area Scan (8x10x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.902 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.0820 W/kg
SAR(10 g) = 0.016 W/kg



APPENDIX B: SYSTEM VERIFICATION

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

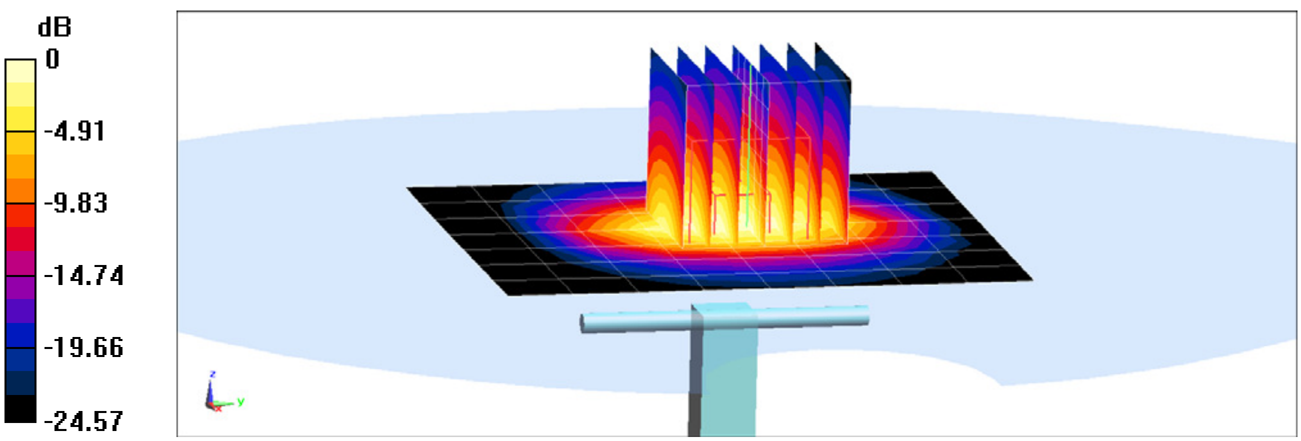
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.868 S/m; ε_r = 38.389; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-14-2016; Ambient Temp: 22.1°C; Tissue Temp: 24.0°C

Probe: ES3DV3 - SN3288; ConvF(4.76, 4.76, 4.76); Calibrated: 8/24/2016;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1364; Calibrated: 8/22/2016
Phantom: SAM Right; Type: SAM; Serial: 1757
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.1 W/kg
SAR(1 g) = 5.08 W/kg
Deviation(1 g) = -3.79%



0 dB = 6.74 W/kg = 8.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

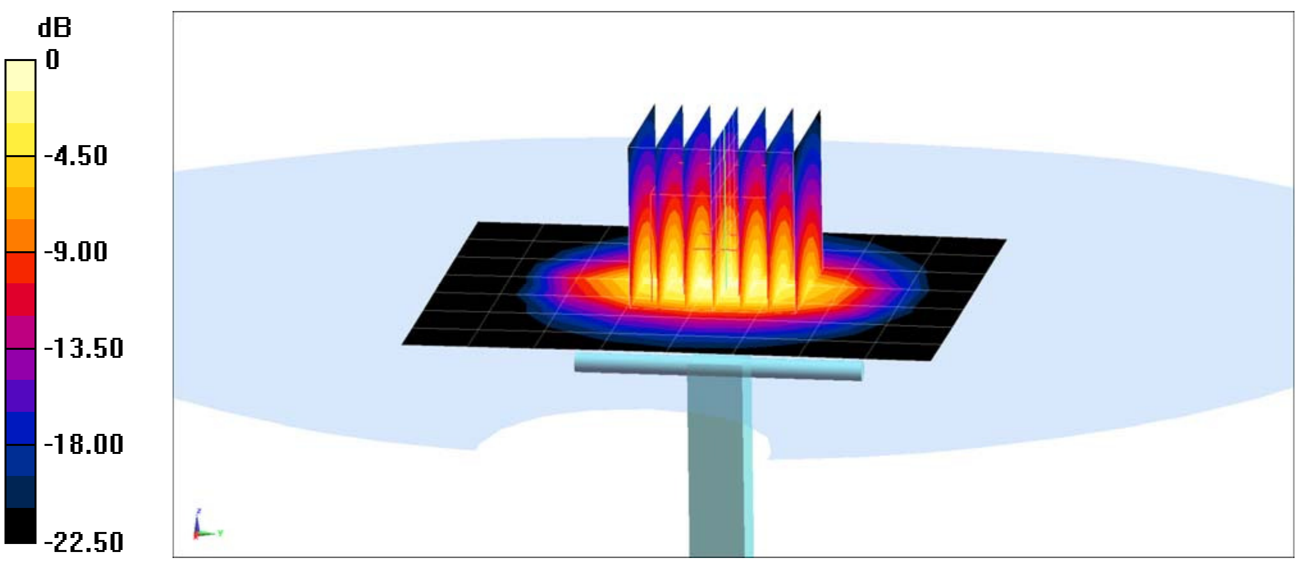
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 1.987 S/m; ε_r = 51.159; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-14-2016; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.3 W/kg
SAR(10 g) = 2.25 W/kg
Deviation(10 g) = -7.02%



0 dB = 8.28 W/kg = 9.18 dBW/kg

APPENDIX C: PROBE CALIBRATION

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 **PC Test**

Certificate No: **D2450V2-981_Jul16**

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:981

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

VPH 8/9/16

Calibration date: July 25, 2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

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

Issued: July 27, 2016

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.0 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.04 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.2 Ω + 3.4 jΩ
Return Loss	- 26.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω + 4.5 jΩ
Return Loss	- 27.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 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
Manufactured on	December 30, 2014

DASY5 Validation Report for Head TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:981

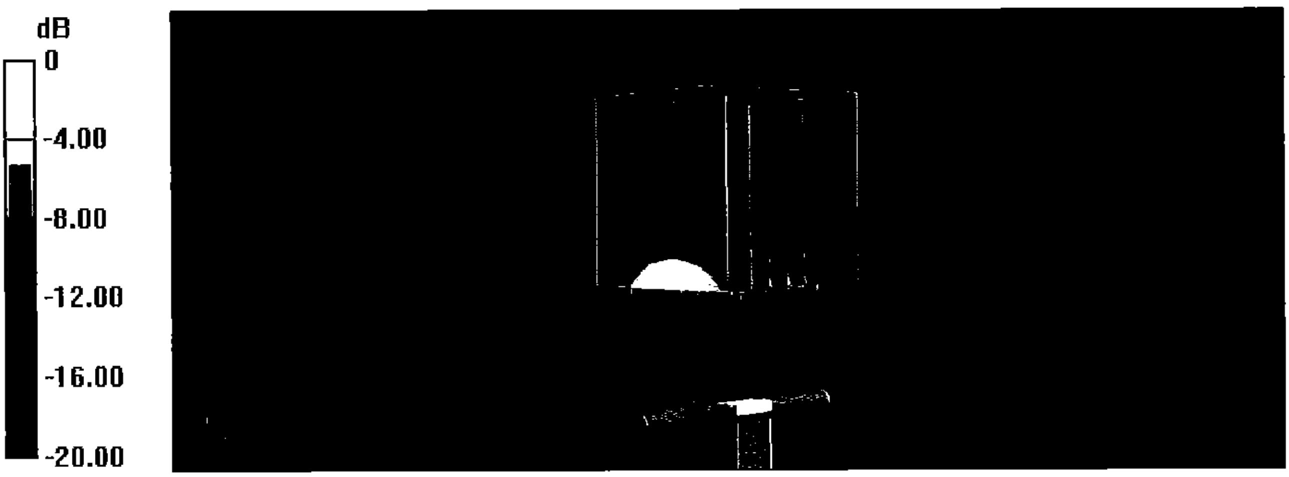
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 38; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.72, 7.72, 7.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

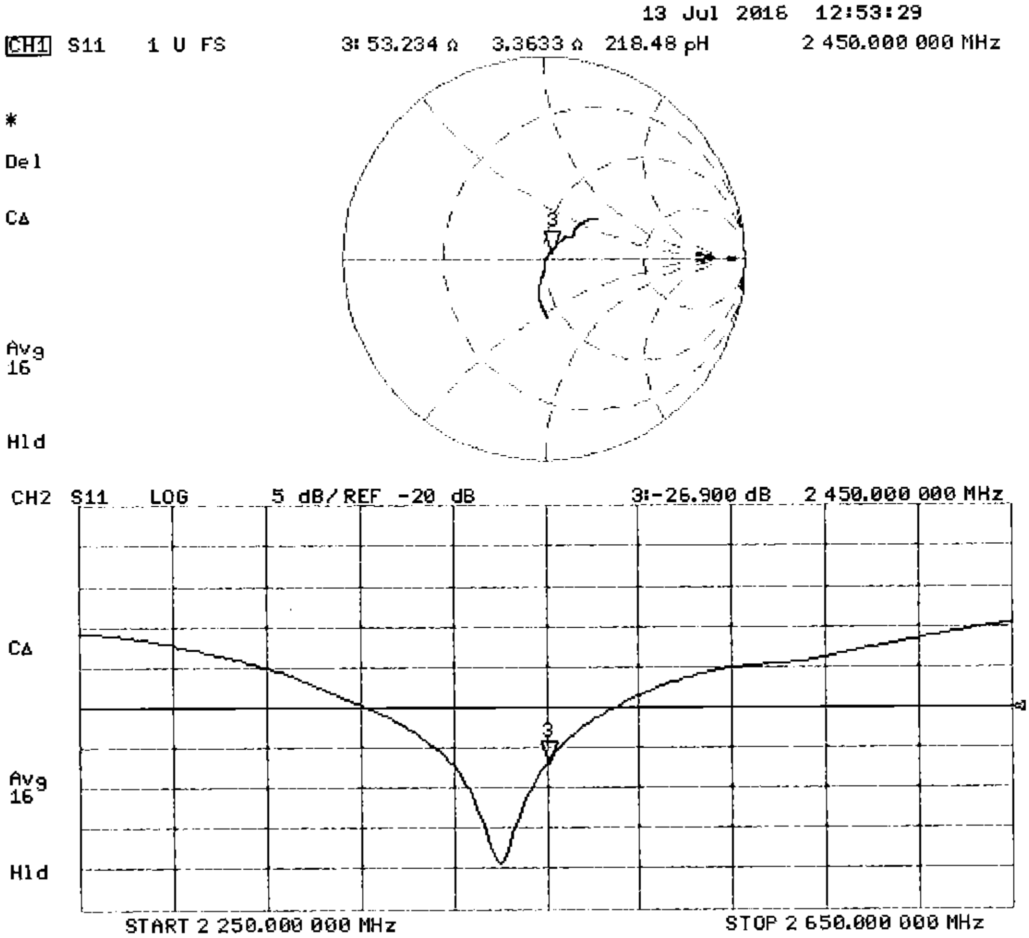
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 115.8 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 27.4 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.26 W/kg
Maximum value of SAR (measured) = 22.5 W/kg



0 dB = 22.5 W/kg = 13.52 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

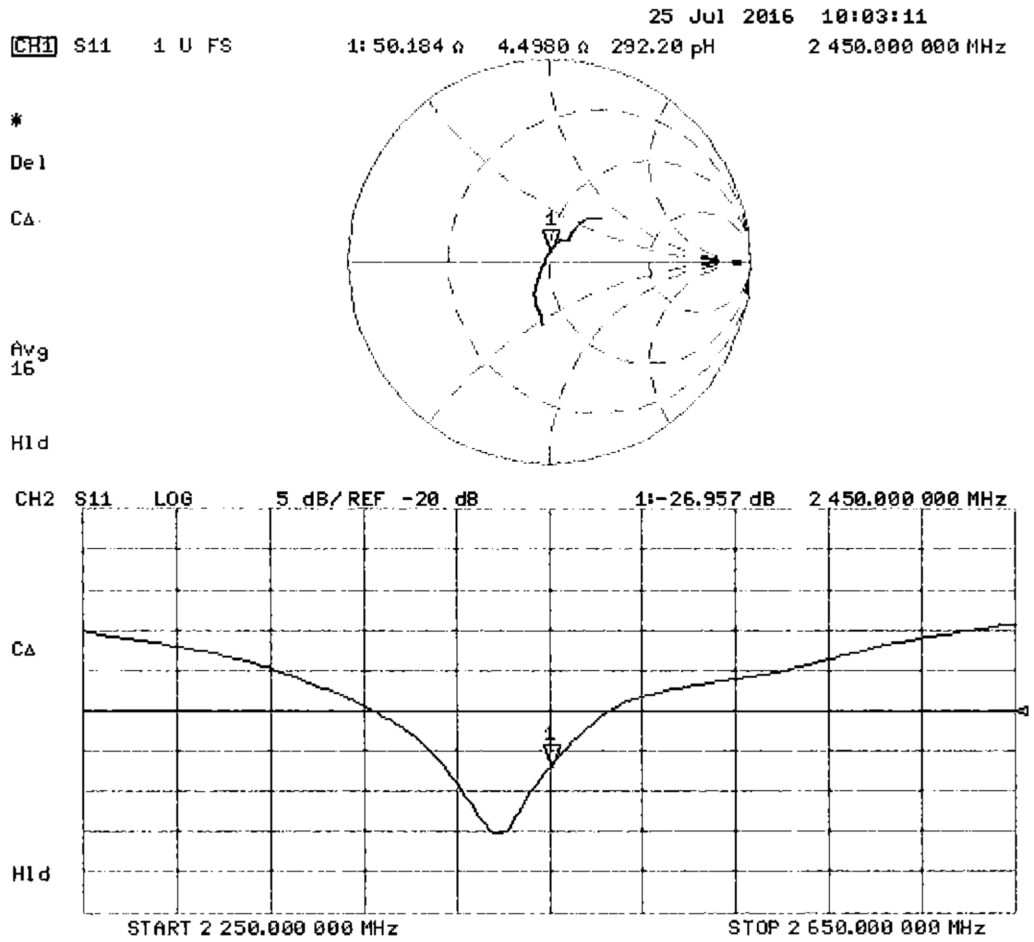
- Probe: EX3DV4 - SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.1 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 26.0 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.04 W/kg
Maximum value of SAR (measured) = 21.4 W/kg

0 dB = 21.4 W/kg = 13.30 dBW/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
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S Schweizerischer Kalibrierdienst
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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D2450V2-797_Sep16**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:797
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 13, 2016

BNV ✓ 09-28-2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	**Jeton Kastrati**	**Laboratory Technician**	
Approved by:	**Katja Pokovic**	**Technical Manager**	

Issued: September 13, 2016

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.9 ± 6 %	1.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.6 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.6 ± 6 %	2.04 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.8 Ω + 6.0 jΩ
Return Loss	- 23.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.8 Ω + 8.0 jΩ
Return Loss	- 22.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.160 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
Manufactured on	January 24, 2006

DASY5 Validation Report for Head TSL

Date: 13.09.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:797

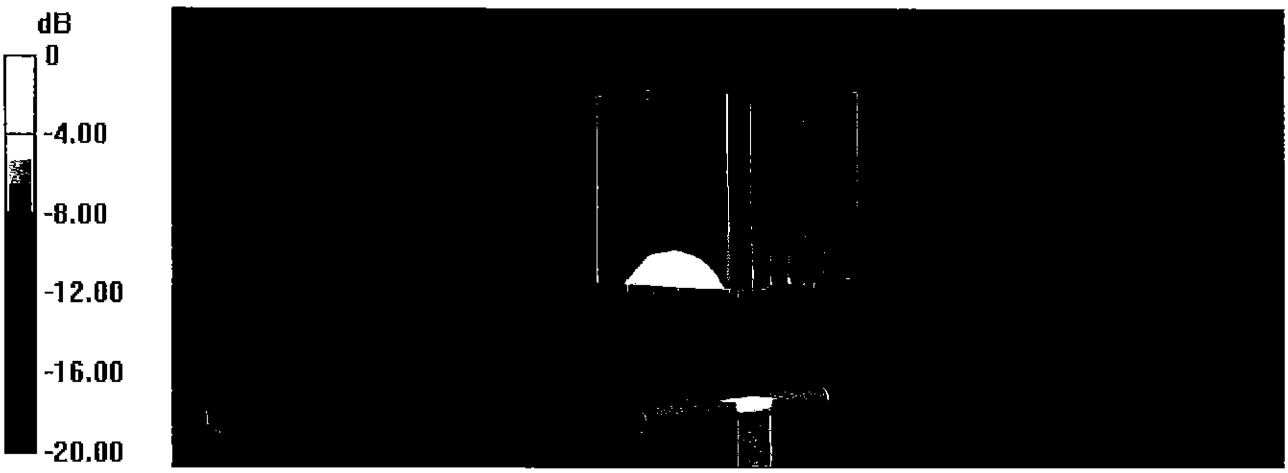
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.88 S/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.72, 7.72, 7.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

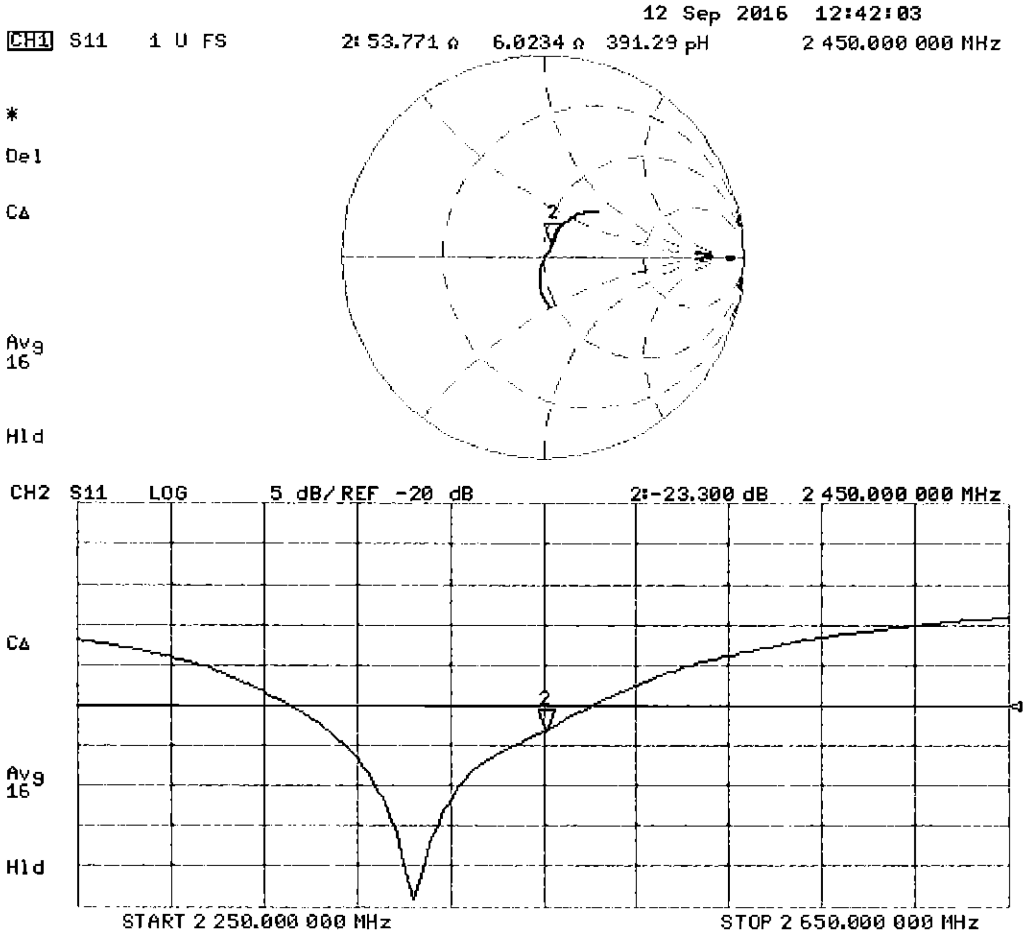
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 113.4 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.26 W/kg
Maximum value of SAR (measured) = 21.9 W/kg



0 dB = 21.9 W/kg = 13.40 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.09.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:797

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.04 S/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

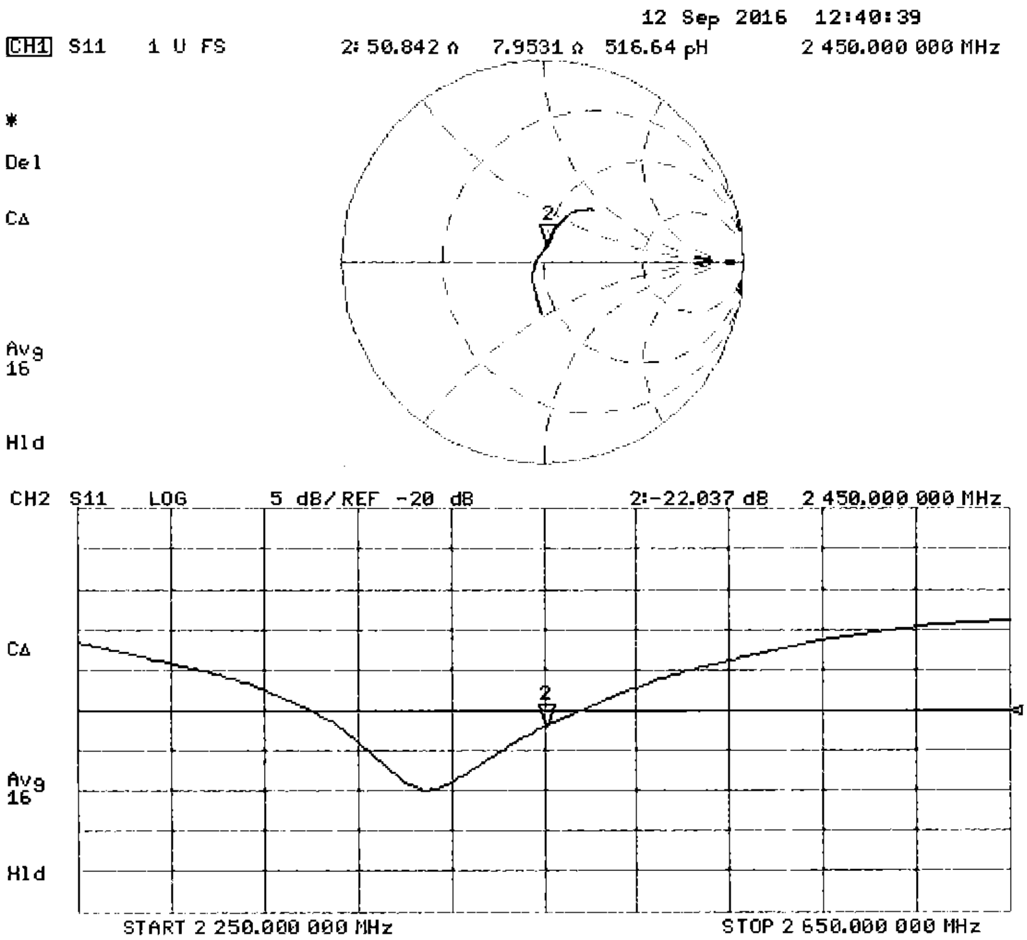
- Probe: EX3DV4 - SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.5 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 25.6 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.13 W/kg
Maximum value of SAR (measured) = 21.2 W/kg

0 dB = 21.2 W/kg = 13.26 dBW/kg

Impedance Measurement Plot for Body TSL



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

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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 **PC Test**

Certificate No: **ES3-3288_Aug16**

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3288

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

BN ✓
09-01-2016

Calibration date: August 24, 2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: S5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: August 25, 2016

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3288

Manufactured: July 6, 2010
Calibrated: August 24, 2016

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3288

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.02	1.13	0.90	± 10.1 %
DCP (mV)[B]	105.9	103.0	105.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	188.3	±3.5 %
		Y	0.0	0.0	1.0		175.6	
		Z	0.0	0.0	1.0		175.8	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	57.6	411.4	35.2	29.47	2.833	5.1	1.309	0.44	1.011
Y	64.05	456	34.96	29.68	3.206	5.1	0.771	0.517	1.008
Z	59.03	414.9	34.23	28.58	2.455	5.1	1.321	0.341	1.009

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

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3288

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)
750	41.9	0.89	7.00	7.00	7.00	0.47	1.56	± 12.0 %
835	41.5	0.90	6.71	6.71	6.71	0.49	1.48	± 12.0 %
1750	40.1	1.37	5.68	5.68	5.68	0.56	1.36	± 12.0 %
1900	40.0	1.40	5.44	5.44	5.44	0.68	1.24	± 12.0 %
2300	39.5	1.67	5.05	5.05	5.05	0.71	1.28	± 12.0 %
2450	39.2	1.80	4.76	4.76	4.76	0.58	1.45	± 12.0 %
2600	39.0	1.96	4.57	4.57	4.57	0.80	1.26	± 12.0 %

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

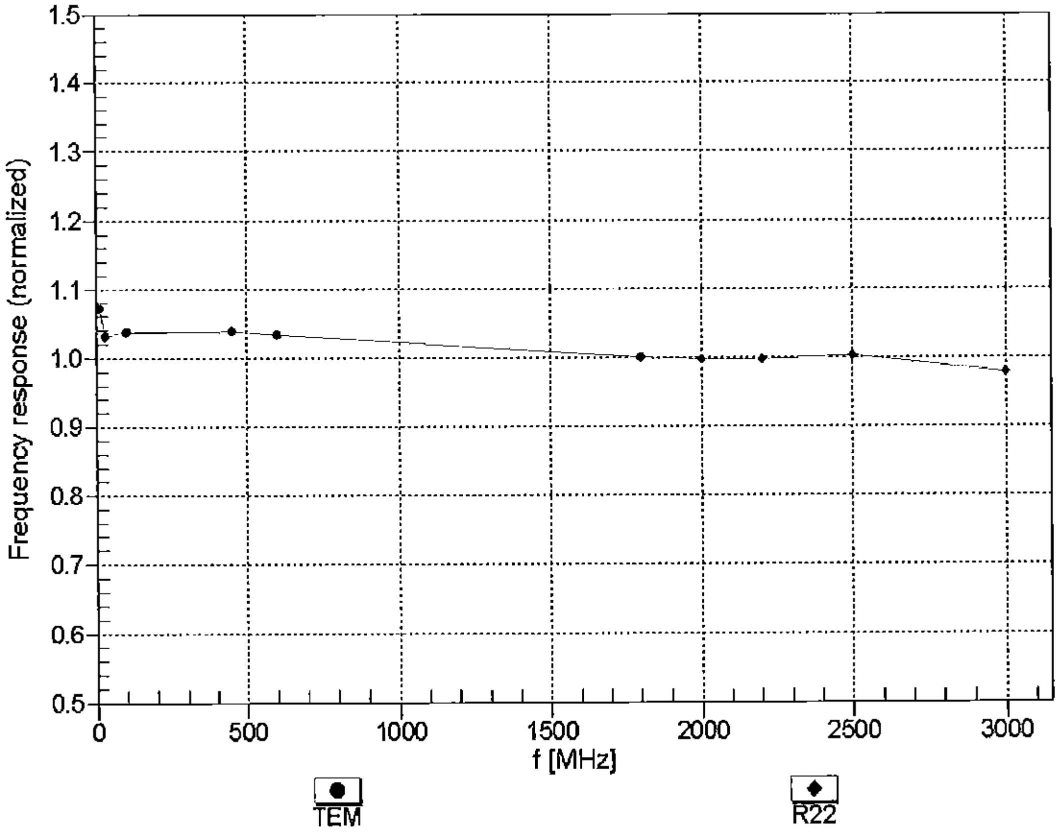
DASY/EASY - Parameters of Probe: ES3DV3 - SN:3288

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	6.46	6.46	6.46	0.57	1.40	± 12.0 %
835	55.2	0.97	6.47	6.47	6.47	0.59	1.35	± 12.0 %
1750	53.4	1.49	5.22	5.22	5.22	0.38	1.84	± 12.0 %
1900	53.3	1.52	4.99	4.99	4.99	0.64	1.38	± 12.0 %
2300	52.9	1.81	4.75	4.75	4.75	0.80	1.28	± 12.0 %
2450	52.7	1.95	4.54	4.54	4.54	0.76	1.18	± 12.0 %
2600	52.5	2.16	4.40	4.40	4.40	0.80	1.13	± 12.0 %

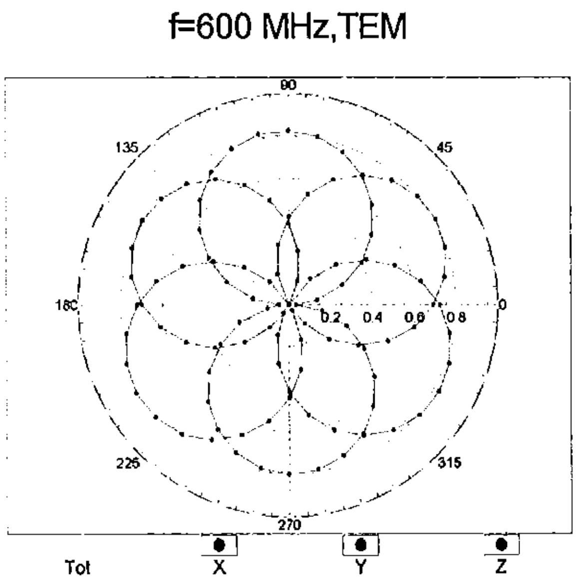
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz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

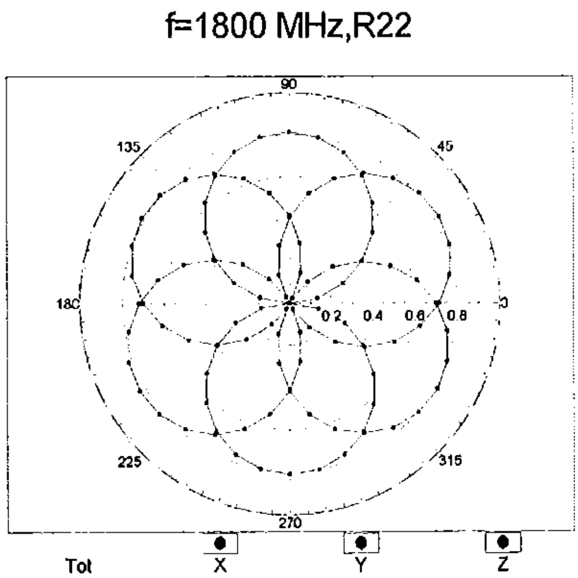
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

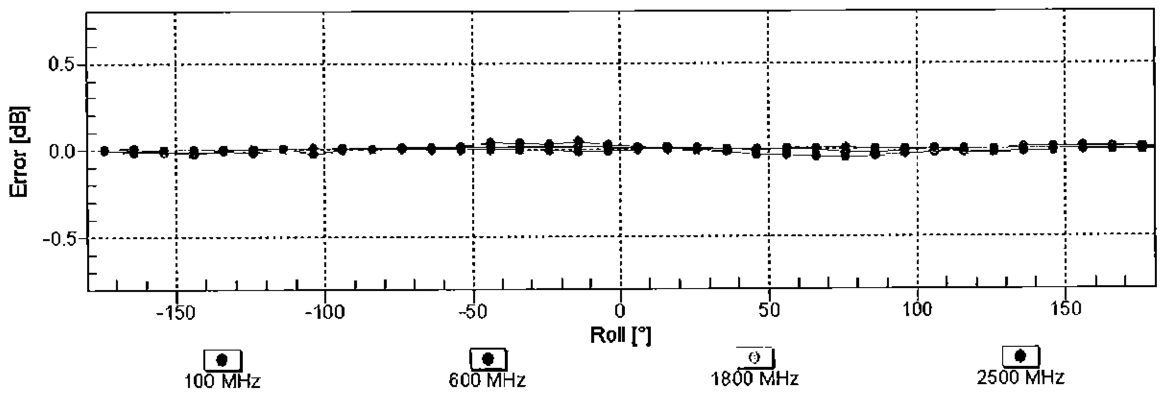


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (φ), ϑ = 0°



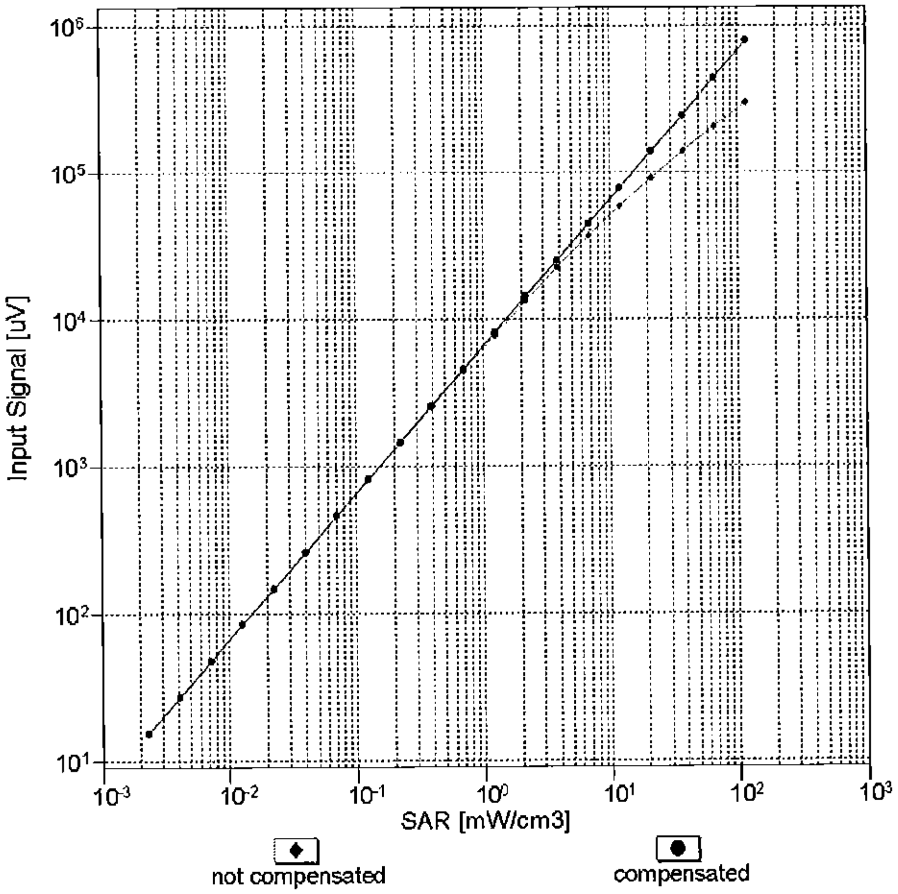


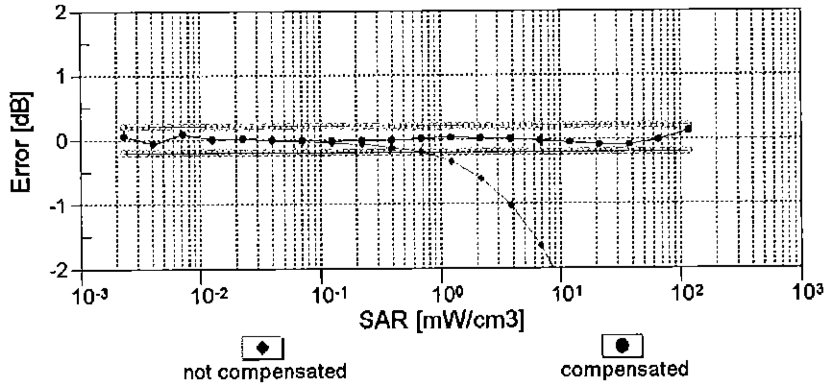


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

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

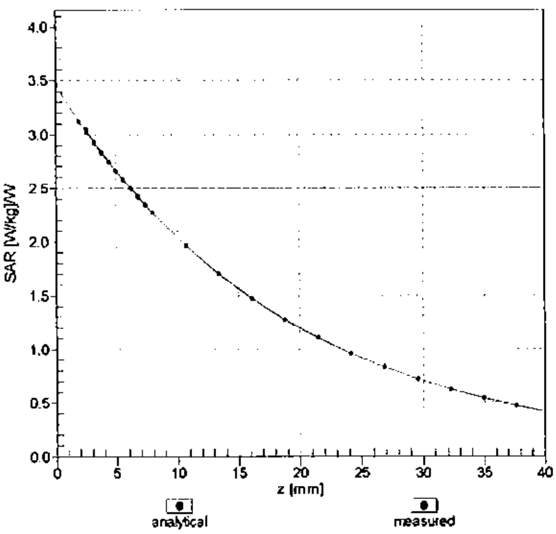




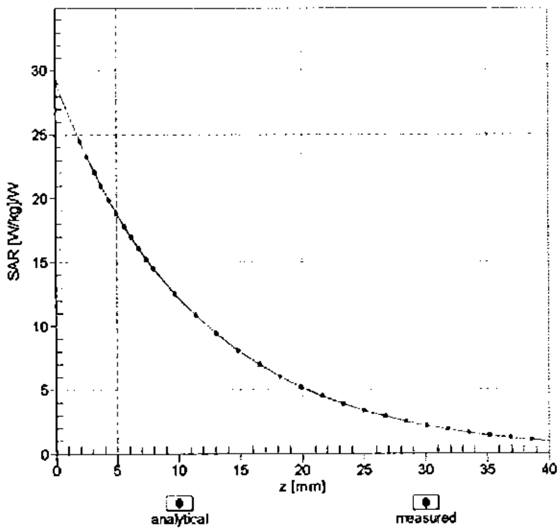
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

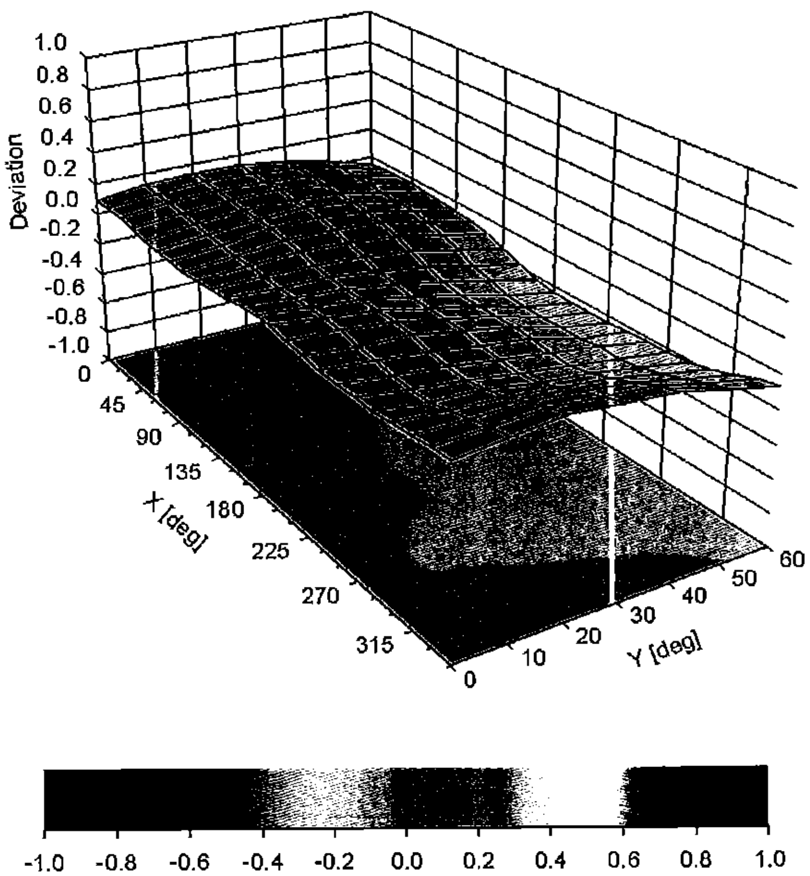


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3288

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	76.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	188.3	± 3.5 %
		Y	0.00	0.00	1.00		175.6	
		Z	0.00	0.00	1.00		175.8	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	9.37	81.05	19.74	10.00	25.0	± 9.6 %
		Y	10.00	82.18	20.61		25.0	
		Z	10.80	83.49	20.45		25.0	
10011-CAB	UMTS-FDD (WCDMA)	X	1.15	69.50	16.43	0.00	150.0	± 9.6 %
		Y	1.11	68.18	15.78		150.0	
		Z	1.14	69.00	16.22		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.32	65.77	16.33	0.41	150.0	± 9.6 %
		Y	1.34	65.34	16.02		150.0	
		Z	1.33	65.62	16.20		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	5.15	67.37	17.53	1.46	150.0	± 9.6 %
		Y	5.22	67.28	17.45		150.0	
		Z	5.15	67.33	17.45		150.0	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	22.72	97.36	27.00	9.39	50.0	± 9.6 %
		Y	20.61	96.11	27.09		50.0	
		Z	39.70	106.89	29.59		50.0	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	20.04	95.12	26.35	9.57	50.0	± 9.6 %
		Y	18.59	94.18	26.52		50.0	
		Z	32.13	103.29	28.63		50.0	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	119.11	30.99	6.56	60.0	± 9.6 %
		Y	100.00	120.52	31.89		60.0	
		Z	100.00	119.06	30.82		60.0	
10025-DAB	EDGE-FDD (TDMA, 8PSK, TN 0)	X	17.25	102.74	39.05	12.57	50.0	± 9.6 %
		Y	14.30	95.56	35.91		50.0	
		Z	18.54	105.67	40.18		50.0	
10026-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	20.66	104.23	35.93	9.56	60.0	± 9.6 %
		Y	16.75	97.96	33.59		60.0	
		Z	20.96	105.02	36.21		60.0	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	117.90	29.47	4.80	80.0	± 9.6 %
		Y	100.00	119.31	30.34		80.0	
		Z	100.00	118.11	29.46		80.0	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	118.00	28.68	3.55	100.0	± 9.6 %
		Y	100.00	119.44	29.53		100.0	
		Z	100.00	118.50	28.82		100.0	
10029-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	14.12	95.78	31.96	7.80	80.0	± 9.6 %
		Y	12.30	91.62	30.30		80.0	
		Z	13.87	95.68	31.93		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	117.53	29.65	5.30	70.0	± 9.6 %
		Y	100.00	118.98	30.55		70.0	
		Z	100.00	117.60	29.56		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	119.01	27.51	1.88	100.0	± 9.6 %
		Y	100.00	120.92	28.55		100.0	
		Z	100.00	120.24	28.01		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	123.38	28.20	1.17	100.0	± 9.6 %
		Y	100.00	125.65	29.39		100.0	
		Z	100.00	125.73	29.19		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	19.09	97.83	27.11	5.30	70.0	± 9.6 %
		Y	15.95	95.07	26.63		70.0	
		Z	24.53	102.63	28.61		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	10.02	91.61	23.64	1.88	100.0	± 9.6 %
		Y	7.61	87.84	22.87		100.0	
		Z	10.27	92.54	24.11		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	5.46	84.57	21.13	1.17	100.0	± 9.6 %
		Y	4.38	81.41	20.43		100.0	
		Z	5.26	84.44	21.27		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	23.37	101.36	28.22	5.30	70.0	± 9.6 %
		Y	18.87	98.11	27.62		70.0	
		Z	31.86	107.19	29.96		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	9.51	90.89	23.38	1.88	100.0	± 9.6 %
		Y	7.33	87.31	22.65		100.0	
		Z	9.74	91.78	23.84		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	5.72	85.51	21.53	1.17	100.0	± 9.6 %
		Y	4.53	82.15	20.77		100.0	
		Z	5.48	85.30	21.66		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	2.26	74.79	17.38	0.00	150.0	± 9.6 %
		Y	2.10	73.08	17.02		150.0	
		Z	2.23	74.47	17.43		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	61.54	110.76	28.95	7.78	50.0	± 9.6 %
		Y	50.64	108.97	29.04		50.0	
		Z	100.00	117.89	30.53		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.00	109.65	2.84	0.00	150.0	± 9.6 %
		Y	0.00	97.22	0.26		150.0	
		Z	0.00	100.19	0.00		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	11.79	84.00	24.40	13.80	25.0	± 9.6 %
		Y	11.77	83.73	24.74		25.0	
		Z	14.15	87.97	25.65		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	14.05	88.49	24.59	10.79	40.0	± 9.6 %
		Y	13.75	88.22	24.96		40.0	
		Z	17.95	93.15	25.98		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	13.46	88.18	24.97	9.03	50.0	± 9.6 %
		Y	12.65	86.94	24.85		50.0	
		Z	15.45	91.20	26.00		50.0	
10058-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	10.37	89.77	29.11	6.55	100.0	± 9.6 %
		Y	9.50	86.96	27.90		100.0	
		Z	10.07	89.34	28.94		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.53	68.23	17.51	0.61	110.0	± 9.6 %
		Y	1.53	67.59	17.11		110.0	
		Z	1.52	67.95	17.34		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	131.49	33.82	1.30	110.0	± 9.6 %
		Y	100.00	131.52	33.99		110.0	
		Z	100.00	132.33	34.18		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	14.76	102.46	28.88	2.04	110.0	± 9.6 %
		Y	9.73	95.00	26.69		110.0	
		Z	13.81	101.74	28.75		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.86	67.12	16.81	0.49	100.0	± 9.6 %
		Y	4.93	67.04	16.75		100.0	
		Z	4.88	67.12	16.75		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.90	67.29	16.95	0.72	100.0	± 9.6 %
		Y	4.98	67.21	16.89		100.0	
		Z	4.92	67.28	16.90		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	5.23	67.62	17.21	0.86	100.0	± 9.6 %
		Y	5.32	67.56	17.16		100.0	
		Z	5.25	67.61	17.16		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	5.14	67.67	17.39	1.21	100.0	± 9.6 %
		Y	5.23	67.61	17.34		100.0	
		Z	5.15	67.64	17.33		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	5.20	67.81	17.63	1.46	100.0	± 9.6 %
		Y	5.29	67.75	17.57		100.0	
		Z	5.21	67.78	17.56		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.53	67.99	18.09	2.04	100.0	± 9.6 %
		Y	5.61	67.89	18.01		100.0	
		Z	5.52	67.92	18.00		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.67	68.36	18.47	2.55	100.0	± 9.6 %
		Y	5.77	68.30	18.40		100.0	
		Z	5.66	68.28	18.37		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.75	68.31	18.66	2.67	100.0	± 9.6 %
		Y	5.84	68.20	18.56		100.0	
		Z	5.74	68.20	18.55		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	5.30	67.63	17.92	1.99	100.0	± 9.6 %
		Y	5.37	67.53	17.84		100.0	
		Z	5.29	67.57	17.83		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	5.37	68.22	18.26	2.30	100.0	± 9.6 %
		Y	5.45	68.12	18.18		100.0	
		Z	5.36	68.14	18.17		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	5.52	68.60	18.70	2.83	100.0	± 9.6 %
		Y	5.59	68.49	18.61		100.0	
		Z	5.49	68.48	18.59		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	5.56	68.70	18.96	3.30	100.0	± 9.6 %
		Y	5.64	68.59	18.88		100.0	
		Z	5.53	68.56	18.85		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	5.73	69.22	19.48	3.82	90.0	± 9.6 %
		Y	5.82	69.14	19.40		90.0	
		Z	5.68	69.05	19.35		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.75	69.03	19.61	4.15	90.0	± 9.6 %
		Y	5.82	68.92	19.51		90.0	
		Z	5.69	68.84	19.47		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.79	69.13	19.72	4.30	90.0	± 9.6 %
		Y	5.86	69.01	19.61		90.0	
		Z	5.73	68.93	19.57		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	1.01	68.38	14.23	0.00	150.0	± 9.6 %
		Y	1.01	67.47	14.16		150.0	
		Z	1.03	68.27	14.39		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	2.25	64.30	9.14	4.77	80.0	± 9.6 %
		Y	2.46	65.03	9.83		80.0	
		Z	2.17	64.23	9.01		80.0	
10090-DAB	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	119.20	31.05	6.56	60.0	± 9.6 %
		Y	100.00	120.60	31.96		60.0	
		Z	100.00	119.14	30.88		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.90	68.39	16.22	0.00	150.0	± 9.6 %
		Y	1.89	67.77	15.95		150.0	
		Z	1.91	68.25	16.16		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.87	68.38	16.20	0.00	150.0	± 9.6 %
		Y	1.85	67.73	15.92		150.0	
		Z	1.87	68.23	16.13		150.0	
10099-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	20.55	104.05	35.87	9.56	60.0	± 9.6 %
		Y	16.69	97.84	33.55		60.0	
		Z	20.87	104.86	36.16		60.0	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.34	71.37	17.14	0.00	150.0	± 9.6 %
		Y	3.35	71.02	16.93		150.0	
		Z	3.36	71.36	17.10		150.0	
10101-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.37	68.13	16.24	0.00	150.0	± 9.6 %
		Y	3.41	68.01	16.14		150.0	
		Z	3.39	68.16	16.20		150.0	
10102-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.46	68.03	16.30	0.00	150.0	± 9.6 %
		Y	3.51	67.93	16.21		150.0	
		Z	3.48	68.06	16.27		150.0	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	8.70	78.35	21.34	3.98	65.0	± 9.6 %
		Y	8.72	77.95	21.17		65.0	
		Z	8.91	78.92	21.54		65.0	
10104-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	8.68	77.16	21.73	3.98	65.0	± 9.6 %
		Y	8.69	76.67	21.48		65.0	
		Z	8.69	77.28	21.74		65.0	
10105-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	7.95	75.40	21.25	3.98	65.0	± 9.6 %
		Y	7.69	74.24	20.70		65.0	
		Z	7.63	74.73	20.92		65.0	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.94	70.58	16.98	0.00	150.0	± 9.6 %
		Y	2.96	70.20	16.75		150.0	
		Z	2.95	70.53	16.93		150.0	
10109-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	3.03	67.97	16.18	0.00	150.0	± 9.6 %
		Y	3.08	67.81	16.08		150.0	
		Z	3.05	67.98	16.15		150.0	
10110-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.41	69.72	16.70	0.00	150.0	± 9.6 %
		Y	2.43	69.22	16.43		150.0	
		Z	2.42	69.59	16.61		150.0	
10111-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.74	68.66	16.50	0.00	150.0	± 9.6 %
		Y	2.78	68.37	16.39		150.0	
		Z	2.76	68.65	16.48		150.0	

10112-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.15	67.89	16.21	0.00	150.0	± 9.6 %
		Y	3.20	67.73	16.11		150.0	
		Z	3.17	67.90	16.17		150.0	
10113-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.89	68.72	16.59	0.00	150.0	± 9.6 %
		Y	2.94	68.43	16.49		150.0	
		Z	2.91	68.70	16.57		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.22	67.44	16.56	0.00	150.0	± 9.6 %
		Y	5.27	67.37	16.49		150.0	
		Z	5.23	67.45	16.50		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.59	67.78	16.74	0.00	150.0	± 9.6 %
		Y	5.65	67.69	16.65		150.0	
		Z	5.59	67.76	16.66		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.35	67.71	16.62	0.00	150.0	± 9.6 %
		Y	5.40	67.65	16.54		150.0	
		Z	5.35	67.72	16.56		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.21	67.41	16.57	0.00	150.0	± 9.6 %
		Y	5.28	67.40	16.52		150.0	
		Z	5.23	67.45	16.52		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.67	67.97	16.85	0.00	150.0	± 9.6 %
		Y	5.71	67.82	16.72		150.0	
		Z	5.67	67.93	16.76		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.32	67.66	16.61	0.00	150.0	± 9.6 %
		Y	5.38	67.60	16.54		150.0	
		Z	5.33	67.66	16.55		150.0	
10140-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.51	68.03	16.22	0.00	150.0	± 9.6 %
		Y	3.56	67.93	16.14		150.0	
		Z	3.53	68.07	16.19		150.0	
10141-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.63	68.07	16.36	0.00	150.0	± 9.6 %
		Y	3.68	67.97	16.28		150.0	
		Z	3.65	68.10	16.33		150.0	
10142-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	2.19	69.78	16.51	0.00	150.0	± 9.6 %
		Y	2.21	69.16	16.26		150.0	
		Z	2.20	69.62	16.45		150.0	
10143-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.63	69.49	16.39	0.00	150.0	± 9.6 %
		Y	2.66	69.08	16.33		150.0	
		Z	2.65	69.47	16.42		150.0	
10144-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.42	67.43	14.93	0.00	150.0	± 9.6 %
		Y	2.48	67.17	14.96		150.0	
		Z	2.45	67.43	14.98		150.0	
10145-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	1.50	67.58	13.73	0.00	150.0	± 9.6 %
		Y	1.59	67.73	14.25		150.0	
		Z	1.56	67.92	14.09		150.0	
10146-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	3.75	74.32	16.15	0.00	150.0	± 9.6 %
		Y	3.28	72.47	15.86		150.0	
		Z	3.39	73.08	15.68		150.0	
10147-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	5.24	78.94	18.09	0.00	150.0	± 9.6 %
		Y	4.17	75.97	17.48		150.0	
		Z	4.56	77.18	17.48		150.0	

10149-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	3.04	68.03	16.23	0.00	150.0	± 9.6 %
		Y	3.09	67.87	16.12		150.0	
		Z	3.06	68.04	16.19		150.0	
10150-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.16	67.94	16.24	0.00	150.0	± 9.6 %
		Y	3.21	67.78	16.15		150.0	
		Z	3.18	67.95	16.21		150.0	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	9.40	80.95	22.46	3.98	65.0	± 9.6 %
		Y	9.15	79.93	22.06		65.0	
		Z	9.53	81.33	22.58		65.0	
10152-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	8.34	77.44	21.61	3.98	65.0	± 9.6 %
		Y	8.31	76.83	21.36		65.0	
		Z	8.34	77.55	21.63		65.0	
10153-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	8.70	78.15	22.23	3.98	65.0	± 9.6 %
		Y	8.66	77.53	21.98		65.0	
		Z	8.71	78.29	22.27		65.0	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.46	70.17	16.97	0.00	150.0	± 9.6 %
		Y	2.49	69.71	16.73		150.0	
		Z	2.48	70.06	16.90		150.0	
10155-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.74	68.67	16.51	0.00	150.0	± 9.6 %
		Y	2.78	68.36	16.39		150.0	
		Z	2.76	68.65	16.49		150.0	
10156-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	2.06	70.10	16.48	0.00	150.0	± 9.6 %
		Y	2.08	69.44	16.27		150.0	
		Z	2.07	69.94	16.45		150.0	
10157-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	2.28	68.17	15.11	0.00	150.0	± 9.6 %
		Y	2.33	67.84	15.16		150.0	
		Z	2.31	68.18	15.19		150.0	
10158-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.89	68.77	16.63	0.00	150.0	± 9.6 %
		Y	2.94	68.48	16.53		150.0	
		Z	2.92	68.76	16.61		150.0	
10159-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	2.39	68.61	15.39	0.00	150.0	± 9.6 %
		Y	2.45	68.30	15.46		150.0	
		Z	2.43	68.65	15.48		150.0	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.91	69.42	16.71	0.00	150.0	± 9.6 %
		Y	2.92	69.01	16.48		150.0	
		Z	2.90	69.28	16.61		150.0	
10161-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	3.05	67.85	16.19	0.00	150.0	± 9.6 %
		Y	3.10	67.67	16.10		150.0	
		Z	3.07	67.86	16.16		150.0	
10162-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.16	67.93	16.26	0.00	150.0	± 9.6 %
		Y	3.21	67.72	16.16		150.0	
		Z	3.18	67.92	16.23		150.0	
10166-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	4.07	71.45	20.14	3.01	150.0	± 9.6 %
		Y	3.97	70.22	19.43		150.0	
		Z	3.95	70.80	19.71		150.0	
10167-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	5.49	75.62	21.04	3.01	150.0	± 9.6 %
		Y	5.11	73.56	20.08		150.0	
		Z	5.22	74.75	20.57		150.0	

10168-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	6.13	77.98	22.33	3.01	150.0	± 9.6 %
		Y	5.62	75.59	21.27		150.0	
		Z	5.82	77.05	21.86		150.0	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	3.81	73.33	20.96	3.01	150.0	± 9.6 %
		Y	3.65	71.83	20.10		150.0	
		Z	3.62	72.48	20.46		150.0	
10170-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	6.50	82.68	24.25	3.01	150.0	± 9.6 %
		Y	5.61	79.24	22.79		150.0	
		Z	6.05	81.70	23.79		150.0	
10171-AAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	4.97	76.89	21.05	3.01	150.0	± 9.6 %
		Y	4.45	74.28	19.85		150.0	
		Z	4.61	75.89	20.53		150.0	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	52.94	121.29	36.90	6.02	65.0	± 9.6 %
		Y	23.36	103.87	31.78		65.0	
		Z	40.33	116.26	35.48		65.0	
10173-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	58.52	116.94	33.83	6.02	65.0	± 9.6 %
		Y	29.01	103.53	30.11		65.0	
		Z	69.19	120.09	34.52		65.0	
10174-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	40.96	109.01	31.18	6.02	65.0	± 9.6 %
		Y	22.71	97.99	28.00		65.0	
		Z	43.66	110.32	31.42		65.0	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	3.75	72.93	20.69	3.01	150.0	± 9.6 %
		Y	3.59	71.44	19.82		150.0	
		Z	3.56	72.08	20.18		150.0	
10176-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	6.51	82.71	24.26	3.01	150.0	± 9.6 %
		Y	5.62	79.27	22.81		150.0	
		Z	6.06	81.74	23.81		150.0	
10177-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	3.79	73.12	20.79	3.01	150.0	± 9.6 %
		Y	3.63	71.64	19.94		150.0	
		Z	3.60	72.28	20.29		150.0	
10178-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	6.40	82.34	24.10	3.01	150.0	± 9.6 %
		Y	5.52	78.90	22.63		150.0	
		Z	5.95	81.34	23.63		150.0	
10179-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	5.65	79.57	22.48	3.01	150.0	± 9.6 %
		Y	4.96	76.53	21.14		150.0	
		Z	5.25	78.56	21.99		150.0	
10180-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	4.95	76.77	20.98	3.01	150.0	± 9.6 %
		Y	4.43	74.16	19.77		150.0	
		Z	4.58	75.77	20.46		150.0	
10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	3.78	73.10	20.79	3.01	150.0	± 9.6 %
		Y	3.62	71.62	19.93		150.0	
		Z	3.59	72.26	20.28		150.0	
10182-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	6.39	82.31	24.09	3.01	150.0	± 9.6 %
		Y	5.51	78.88	22.62		150.0	
		Z	5.94	81.31	23.62		150.0	
10183-AAA	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	4.93	76.74	20.97	3.01	150.0	± 9.6 %
		Y	4.42	74.13	19.76		150.0	
		Z	4.57	75.74	20.45		150.0	

10184-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	3.80	73.15	20.81	3.01	150.0	± 9.6 %
		Y	3.64	71.67	19.95		150.0	
		Z	3.60	72.31	20.31		150.0	
10185-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	6.42	82.40	24.13	3.01	150.0	± 9.6 %
		Y	5.54	78.96	22.66		150.0	
		Z	5.97	81.41	23.66		150.0	
10186-AAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	4.96	76.83	21.01	3.01	150.0	± 9.6 %
		Y	4.44	74.21	19.80		150.0	
		Z	4.60	75.82	20.49		150.0	
10187-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	3.81	73.21	20.87	3.01	150.0	± 9.6 %
		Y	3.65	71.70	20.00		150.0	
		Z	3.61	72.36	20.36		150.0	
10188-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	6.73	83.38	24.59	3.01	150.0	± 9.6 %
		Y	5.78	79.84	23.11		150.0	
		Z	6.27	82.41	24.14		150.0	
10189-AAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	5.12	77.43	21.34	3.01	150.0	± 9.6 %
		Y	4.56	74.74	20.11		150.0	
		Z	4.75	76.43	20.82		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.63	66.85	16.32	0.00	150.0	± 9.6 %
		Y	4.70	66.78	16.27		150.0	
		Z	4.65	66.88	16.28		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.82	67.21	16.44	0.00	150.0	± 9.6 %
		Y	4.90	67.16	16.38		150.0	
		Z	4.85	67.24	16.40		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.86	67.23	16.45	0.00	150.0	± 9.6 %
		Y	4.94	67.16	16.39		150.0	
		Z	4.89	67.26	16.41		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.64	66.94	16.35	0.00	150.0	± 9.6 %
		Y	4.72	66.89	16.31		150.0	
		Z	4.67	66.98	16.32		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.84	67.23	16.45	0.00	150.0	± 9.6 %
		Y	4.92	67.18	16.39		150.0	
		Z	4.86	67.26	16.41		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.87	67.24	16.46	0.00	150.0	± 9.6 %
		Y	4.95	67.18	16.40		150.0	
		Z	4.89	67.27	16.42		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.59	66.96	16.32	0.00	150.0	± 9.6 %
		Y	4.67	66.90	16.27		150.0	
		Z	4.62	66.99	16.28		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.83	67.21	16.45	0.00	150.0	± 9.6 %
		Y	4.92	67.17	16.39		150.0	
		Z	4.86	67.25	16.41		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.87	67.17	16.45	0.00	150.0	± 9.6 %
		Y	4.95	67.12	16.39		150.0	
		Z	4.90	67.20	16.41		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.19	67.43	16.57	0.00	150.0	± 9.6 %
		Y	5.26	67.42	16.52		150.0	
		Z	5.21	67.47	16.52		150.0	

10223-CAB	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.54	67.71	16.73	0.00	150.0	± 9.6 %
		Y	5.65	67.79	16.73		150.0	
		Z	5.56	67.76	16.69		150.0	
10224-CAB	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.23	67.52	16.54	0.00	150.0	± 9.6 %
		Y	5.31	67.53	16.50		150.0	
		Z	5.25	67.57	16.50		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.90	66.49	15.69	0.00	150.0	± 9.6 %
		Y	2.96	66.31	15.65		150.0	
		Z	2.93	66.49	15.67		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	63.52	118.60	34.35	6.02	65.0	± 9.6 %
		Y	30.69	104.68	30.52		65.0	
		Z	76.61	122.12	35.13		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	44.55	110.64	31.71	6.02	65.0	± 9.6 %
		Y	24.78	99.62	28.58		65.0	
		Z	50.71	113.05	32.23		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	54.07	122.28	37.29	6.02	65.0	± 9.6 %
		Y	26.75	106.96	32.81		65.0	
		Z	50.70	121.15	36.89		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	58.47	116.91	33.84	6.02	65.0	± 9.6 %
		Y	29.07	103.55	30.12		65.0	
		Z	69.21	120.09	34.53		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	41.83	109.42	31.31	6.02	65.0	± 9.6 %
		Y	23.67	98.73	28.24		65.0	
		Z	46.98	111.59	31.77		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	50.27	120.69	36.80	6.02	65.0	± 9.6 %
		Y	25.47	105.89	32.42		65.0	
		Z	46.95	119.49	36.37		65.0	
10232-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	58.50	116.93	33.84	6.02	65.0	± 9.6 %
		Y	29.04	103.55	30.12		65.0	
		Z	69.25	120.11	34.53		65.0	
10233-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	41.89	109.45	31.32	6.02	65.0	± 9.6 %
		Y	23.68	98.75	28.25		65.0	
		Z	47.04	111.62	31.78		65.0	
10234-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	46.62	118.97	36.23	6.02	65.0	± 9.6 %
		Y	24.21	104.73	31.99		65.0	
		Z	43.35	117.68	35.78		65.0	
10235-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	58.83	117.05	33.87	6.02	65.0	± 9.6 %
		Y	29.12	103.60	30.14		65.0	
		Z	69.67	120.23	34.57		65.0	
10236-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	42.33	109.61	31.36	6.02	65.0	± 9.6 %
		Y	23.86	98.86	28.28		65.0	
		Z	47.61	111.80	31.82		65.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	51.00	121.00	36.88	6.02	65.0	± 9.6 %
		Y	25.65	106.05	32.47		65.0	
		Z	47.51	119.75	36.44		65.0	
10238-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	58.59	116.97	33.85	6.02	65.0	± 9.6 %
		Y	29.05	103.56	30.12		65.0	
		Z	69.38	120.15	34.54		65.0	

10239-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	41.95	109.49	31.33	6.02	65.0	± 9.6 %
		Y	23.68	98.76	28.25		65.0	
		Z	47.10	111.66	31.79		65.0	
10240-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	50.80	120.93	36.86	6.02	65.0	± 9.6 %
		Y	25.57	106.00	32.45		65.0	
		Z	47.32	119.68	36.42		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	13.90	89.43	28.51	6.98	65.0	± 9.6 %
		Y	12.38	86.00	27.15		65.0	
		Z	13.25	88.63	28.18		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	13.24	88.30	28.01	6.98	65.0	± 9.6 %
		Y	11.20	83.77	26.19		65.0	
		Z	11.70	85.89	27.05		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	10.45	85.15	27.77	6.98	65.0	± 9.6 %
		Y	9.15	81.09	25.96		65.0	
		Z	9.27	82.54	26.64		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	10.27	81.79	21.54	3.98	65.0	± 9.6 %
		Y	9.75	80.72	21.42		65.0	
		Z	10.26	82.03	21.62		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	10.06	81.22	21.27	3.98	65.0	± 9.6 %
		Y	9.64	80.30	21.22		65.0	
		Z	10.06	81.45	21.36		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	9.67	83.63	22.18	3.98	65.0	± 9.6 %
		Y	9.36	82.86	22.20		65.0	
		Z	10.19	84.79	22.67		65.0	
10247-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	7.85	78.08	20.65	3.98	65.0	± 9.6 %
		Y	7.90	77.83	20.80		65.0	
		Z	7.98	78.59	20.92		65.0	
10248-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	7.82	77.58	20.44	3.98	65.0	± 9.6 %
		Y	7.90	77.37	20.60		65.0	
		Z	7.93	78.02	20.68		65.0	
10249-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	10.64	85.48	23.48	3.98	65.0	± 9.6 %
		Y	9.96	83.94	23.12		65.0	
		Z	11.07	86.38	23.84		65.0	
10250-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	8.70	79.92	22.62	3.98	65.0	± 9.6 %
		Y	8.59	79.17	22.40		65.0	
		Z	8.76	80.21	22.75		65.0	
10251-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	8.24	77.84	21.52	3.98	65.0	± 9.6 %
		Y	8.18	77.17	21.33		65.0	
		Z	8.25	77.99	21.59		65.0	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	10.28	84.31	23.72	3.98	65.0	± 9.6 %
		Y	9.71	82.72	23.19		65.0	
		Z	10.49	84.84	23.92		65.0	
10253-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	8.12	76.85	21.40	3.98	65.0	± 9.6 %
		Y	8.10	76.27	21.18		65.0	
		Z	8.11	76.94	21.42		65.0	
10254-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	8.49	77.57	21.98	3.98	65.0	± 9.6 %
		Y	8.46	76.97	21.75		65.0	
		Z	8.49	77.68	22.01		65.0	

10255-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	9.10	80.60	22.55	3.98	65.0	± 9.6 %
		Y	8.85	79.55	22.14		65.0	
		Z	9.17	80.89	22.64		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	9.01	79.25	19.78	3.98	65.0	± 9.6 %
		Y	8.94	79.06	20.09		65.0	
		Z	9.07	79.62	19.93		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	8.74	78.43	19.38	3.98	65.0	± 9.6 %
		Y	8.79	78.45	19.78		65.0	
		Z	8.79	78.79	19.53		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	8.21	80.54	20.44	3.98	65.0	± 9.6 %
		Y	8.47	80.95	21.00		65.0	
		Z	8.77	81.91	21.05		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	8.18	78.72	21.34	3.98	65.0	± 9.6 %
		Y	8.16	78.25	21.33		65.0	
		Z	8.28	79.12	21.54		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	8.18	78.43	21.24	3.98	65.0	± 9.6 %
		Y	8.19	78.02	21.26		65.0	
		Z	8.28	78.82	21.44		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	10.07	84.33	23.38	3.98	65.0	± 9.6 %
		Y	9.51	82.86	22.97		65.0	
		Z	10.34	85.00	23.65		65.0	
10262-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	8.69	79.88	22.59	3.98	65.0	± 9.6 %
		Y	8.59	79.14	22.37		65.0	
		Z	8.75	80.17	22.72		65.0	
10263-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	8.23	77.83	21.52	3.98	65.0	± 9.6 %
		Y	8.17	77.17	21.33		65.0	
		Z	8.24	77.99	21.59		65.0	
10264-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	10.21	84.16	23.65	3.98	65.0	± 9.6 %
		Y	9.65	82.60	23.12		65.0	
		Z	10.42	84.68	23.85		65.0	
10265-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	8.34	77.44	21.62	3.98	65.0	± 9.6 %
		Y	8.31	76.84	21.36		65.0	
		Z	8.34	77.56	21.64		65.0	
10266-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	8.70	78.15	22.23	3.98	65.0	± 9.6 %
		Y	8.66	77.53	21.97		65.0	
		Z	8.71	78.28	22.26		65.0	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	9.39	80.92	22.44	3.98	65.0	± 9.6 %
		Y	9.13	79.90	22.05		65.0	
		Z	9.51	81.29	22.56		65.0	
10268-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	8.76	76.86	21.73	3.98	65.0	± 9.6 %
		Y	8.77	76.38	21.50		65.0	
		Z	8.75	76.95	21.73		65.0	
10269-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	8.68	76.45	21.63	3.98	65.0	± 9.6 %
		Y	8.70	75.99	21.41		65.0	
		Z	8.66	76.51	21.62		65.0	
10270-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	8.83	78.14	21.51	3.98	65.0	± 9.6 %
		Y	8.76	77.53	21.24		65.0	
		Z	8.89	78.39	21.57		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.66	66.82	15.58	0.00	150.0	± 9.6 %
		Y	2.68	66.51	15.47		150.0	
		Z	2.67	66.79	15.55		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.74	69.18	16.29	0.00	150.0	± 9.6 %
		Y	1.72	68.41	15.92		150.0	
		Z	1.74	68.96	16.19		150.0	
10277-CAA	PHS (QPSK)	X	5.74	69.88	14.27	9.03	50.0	± 9.6 %
		Y	6.29	71.20	15.39		50.0	
		Z	5.61	69.90	14.15		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	9.18	79.65	20.70	9.03	50.0	± 9.6 %
		Y	9.86	81.02	21.73		50.0	
		Z	9.98	81.62	21.46		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	9.34	79.85	20.79	9.03	50.0	± 9.6 %
		Y	10.03	81.20	21.81		50.0	
		Z	10.15	81.81	21.54		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	1.76	71.14	15.57	0.00	150.0	± 9.6 %
		Y	1.74	70.15	15.48		150.0	
		Z	1.78	71.05	15.70		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	0.98	68.06	14.07	0.00	150.0	± 9.6 %
		Y	0.99	67.20	14.01		150.0	
		Z	1.00	67.97	14.23		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	1.37	73.74	17.04	0.00	150.0	± 9.6 %
		Y	1.23	71.32	16.37		150.0	
		Z	1.33	73.08	16.99		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	2.26	81.44	20.55	0.00	150.0	± 9.6 %
		Y	1.72	76.60	19.08		150.0	
		Z	2.04	79.77	20.16		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	11.19	84.64	24.50	9.03	50.0	± 9.6 %
		Y	10.41	83.08	24.22		50.0	
		Z	11.16	85.25	24.81		50.0	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.95	70.68	17.05	0.00	150.0	± 9.6 %
		Y	2.97	70.30	16.82		150.0	
		Z	2.96	70.63	16.99		150.0	
10298-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.82	69.54	15.45	0.00	150.0	± 9.6 %
		Y	1.86	69.05	15.49		150.0	
		Z	1.85	69.53	15.56		150.0	
10299-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	4.42	76.45	17.86	0.00	150.0	± 9.6 %
		Y	3.67	73.55	17.01		150.0	
		Z	3.95	74.91	17.24		150.0	
10300-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	2.89	69.50	14.20	0.00	150.0	± 9.6 %
		Y	2.75	68.47	14.04		150.0	
		Z	2.74	68.79	13.87		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	5.86	68.82	19.11	4.17	80.0	± 9.6 %
		Y	5.80	67.98	18.66		80.0	
		Z	5.64	67.88	18.59		80.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	6.35	69.48	19.90	4.96	80.0	± 9.6 %
		Y	6.33	68.83	19.54		80.0	
		Z	6.19	68.85	19.54		80.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	6.22	69.65	20.00	4.96	80.0	± 9.6 %
		Y	6.20	68.97	19.63		80.0	
		Z	6.04	68.93	19.61		80.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	5.81	68.77	19.09	4.17	80.0	± 9.6 %
		Y	5.81	68.18	18.78		80.0	
		Z	5.67	68.20	18.78		80.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	10.92	86.64	28.18	6.02	50.0	± 9.6 %
		Y	9.49	82.76	26.69		50.0	
		Z	8.57	81.17	26.04		50.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	6.87	73.20	22.32	6.02	50.0	± 9.6 %
		Y	6.66	71.77	21.64		50.0	
		Z	6.43	71.63	21.58		50.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	7.03	74.07	22.52	6.02	50.0	± 9.6 %
		Y	6.77	72.51	21.79		50.0	
		Z	6.52	72.35	21.74		50.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	7.13	74.63	22.78	6.02	50.0	± 9.6 %
		Y	6.82	72.91	21.99		50.0	
		Z	6.57	72.78	21.95		50.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	7.00	73.57	22.52	6.02	50.0	± 9.6 %
		Y	6.78	72.09	21.80		50.0	
		Z	6.54	71.97	21.77		50.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	6.92	73.51	22.37	6.02	50.0	± 9.6 %
		Y	6.68	72.00	21.65		50.0	
		Z	6.44	71.88	21.60		50.0	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	3.31	69.89	16.65	0.00	150.0	± 9.6 %
		Y	3.33	69.61	16.47		150.0	
		Z	3.33	69.90	16.62		150.0	
10313-AAA	iDEN 1:3	X	7.87	79.08	19.05	6.99	70.0	± 9.6 %
		Y	7.77	78.82	19.17		70.0	
		Z	8.36	80.29	19.46		70.0	
10314-AAA	iDEN 1:6	X	10.09	84.89	23.50	10.00	30.0	± 9.6 %
		Y	9.69	83.97	23.40		30.0	
		Z	11.44	87.59	24.44		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.17	65.22	16.05	0.17	150.0	± 9.6 %
		Y	1.19	64.80	15.74		150.0	
		Z	1.18	65.09	15.93		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.74	67.06	16.54	0.17	150.0	± 9.6 %
		Y	4.81	66.98	16.48		150.0	
		Z	4.76	67.07	16.49		150.0	
10317-AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.74	67.06	16.54	0.17	150.0	± 9.6 %
		Y	4.81	66.98	16.48		150.0	
		Z	4.76	67.07	16.49		150.0	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.83	67.29	16.44	0.00	150.0	± 9.6 %
		Y	4.91	67.21	16.38		150.0	
		Z	4.85	67.31	16.40		150.0	
10401-AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.49	67.41	16.57	0.00	150.0	± 9.6 %
		Y	5.53	67.28	16.45		150.0	
		Z	5.49	67.39	16.49		150.0	

10402-AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.77	67.85	16.62	0.00	150.0	± 9.6 %
		Y	5.84	67.84	16.57		150.0	
		Z	5.79	67.89	16.58		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	1.76	71.14	15.57	0.00	115.0	± 9.6 %
		Y	1.74	70.15	15.48		115.0	
		Z	1.78	71.05	15.70		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	1.76	71.14	15.57	0.00	115.0	± 9.6 %
		Y	1.74	70.15	15.48		115.0	
		Z	1.78	71.05	15.70		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	121.30	30.65	0.00	100.0	± 9.6 %
		Y	98.54	123.04	31.60		100.0	
		Z	100.00	121.24	30.44		100.0	
10410-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.57	62.34	6.89	2.23	80.0	± 9.6 %
		Y	1.83	63.33	7.78		80.0	
		Z	1.40	61.66	6.34		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.01	63.55	15.10	0.00	150.0	± 9.6 %
		Y	1.03	63.22	14.83		150.0	
		Z	1.03	63.51	15.02		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.63	66.89	16.37	0.00	150.0	± 9.6 %
		Y	4.70	66.81	16.31		150.0	
		Z	4.66	66.92	16.33		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.63	66.89	16.37	0.00	150.0	± 9.6 %
		Y	4.70	66.81	16.31		150.0	
		Z	4.66	66.92	16.33		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.62	67.04	16.38	0.00	150.0	± 9.6 %
		Y	4.68	66.95	16.31		150.0	
		Z	4.64	67.06	16.34		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.64	66.99	16.39	0.00	150.0	± 9.6 %
		Y	4.71	66.91	16.32		150.0	
		Z	4.67	67.02	16.34		150.0	
10422-AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.77	67.00	16.40	0.00	150.0	± 9.6 %
		Y	4.84	66.92	16.34		150.0	
		Z	4.79	67.02	16.36		150.0	
10423-AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.96	67.36	16.54	0.00	150.0	± 9.6 %
		Y	5.05	67.31	16.48		150.0	
		Z	4.99	67.39	16.49		150.0	
10424-AAA	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.87	67.30	16.50	0.00	150.0	± 9.6 %
		Y	4.95	67.24	16.44		150.0	
		Z	4.90	67.33	16.46		150.0	
10425-AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.47	67.66	16.68	0.00	150.0	± 9.6 %
		Y	5.53	67.59	16.60		150.0	
		Z	5.47	67.64	16.60		150.0	
10426-AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.47	67.68	16.68	0.00	150.0	± 9.6 %
		Y	5.54	67.63	16.61		150.0	
		Z	5.48	67.67	16.61		150.0	

10427-AAA	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.48	67.65	16.67	0.00	150.0	± 9.6 %
		Y	5.56	67.64	16.62		150.0	
		Z	5.50	67.67	16.61		150.0	
10430-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.31	70.51	18.18	0.00	150.0	± 9.6 %
		Y	4.41	70.35	18.21		150.0	
		Z	4.36	70.57	18.21		150.0	
10431-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.35	67.48	16.43	0.00	150.0	± 9.6 %
		Y	4.44	67.36	16.38		150.0	
		Z	4.38	67.49	16.40		150.0	
10432-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.65	67.35	16.47	0.00	150.0	± 9.6 %
		Y	4.73	67.27	16.41		150.0	
		Z	4.67	67.38	16.43		150.0	
10433-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.89	67.34	16.53	0.00	150.0	± 9.6 %
		Y	4.97	67.29	16.47		150.0	
		Z	4.91	67.38	16.48		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.40	71.29	18.17	0.00	150.0	± 9.6 %
		Y	4.50	71.07	18.22		150.0	
		Z	4.45	71.35	18.23		150.0	
10435-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.57	62.31	6.87	2.23	80.0	± 9.6 %
		Y	1.83	63.29	7.76		80.0	
		Z	1.40	61.64	6.32		80.0	
10447-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.67	67.56	15.91	0.00	150.0	± 9.6 %
		Y	3.76	67.40	15.93		150.0	
		Z	3.70	67.57	15.92		150.0	
10448-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	4.18	67.25	16.29	0.00	150.0	± 9.6 %
		Y	4.26	67.13	16.24		150.0	
		Z	4.21	67.27	16.26		150.0	
10449-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.44	67.18	16.37	0.00	150.0	± 9.6 %
		Y	4.51	67.09	16.31		150.0	
		Z	4.46	67.20	16.33		150.0	
10450-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.62	67.10	16.38	0.00	150.0	± 9.6 %
		Y	4.69	67.04	16.32		150.0	
		Z	4.65	67.13	16.34		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.59	67.84	15.63	0.00	150.0	± 9.6 %
		Y	3.69	67.70	15.70		150.0	
		Z	3.63	67.87	15.67		150.0	
10456-AAA	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.33	68.23	16.83	0.00	150.0	± 9.6 %
		Y	6.38	68.23	16.78		150.0	
		Z	6.33	68.25	16.77		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.84	65.52	16.10	0.00	150.0	± 9.6 %
		Y	3.87	65.45	16.04		150.0	
		Z	3.85	65.55	16.06		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.42	67.18	15.14	0.00	150.0	± 9.6 %
		Y	3.50	66.91	15.21		150.0	
		Z	3.45	67.17	15.18		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.41	64.94	15.71	0.00	150.0	± 9.6 %
		Y	4.60	65.07	15.86		150.0	
		Z	4.55	65.34	15.90		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	1.01	70.61	17.46	0.00	150.0	± 9.6 %
		Y	0.95	68.81	16.56		150.0	
		Z	0.99	69.88	17.14		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	124.09	32.48	3.29	80.0	± 9.6 %
		Y	100.00	122.40	31.91		80.0	
		Z	100.00	123.78	32.21		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	109.33	25.42	3.23	80.0	± 9.6 %
		Y	100.00	109.52	25.72		80.0	
		Z	100.00	108.56	24.91		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.46	24.04	3.23	80.0	± 9.6 %
		Y	72.76	103.48	23.69		80.0	
		Z	100.00	105.54	23.47		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	122.25	31.47	3.23	80.0	± 9.6 %
		Y	100.00	120.68	30.96		80.0	
		Z	100.00	121.86	31.16		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	108.86	25.18	3.23	80.0	± 9.6 %
		Y	100.00	109.08	25.49		80.0	
		Z	100.00	108.05	24.66		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.02	23.82	3.23	80.0	± 9.6 %
		Y	34.01	94.84	21.52		80.0	
		Z	86.63	103.61	22.92		80.0	
10467-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	122.46	31.56	3.23	80.0	± 9.6 %
		Y	100.00	120.86	31.05		80.0	
		Z	100.00	122.07	31.26		80.0	
10468-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	109.01	25.25	3.23	80.0	± 9.6 %
		Y	100.00	109.21	25.56		80.0	
		Z	100.00	108.21	24.73		80.0	
10469-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	106.03	23.82	3.23	80.0	± 9.6 %
		Y	35.12	95.19	21.61		80.0	
		Z	92.33	104.26	23.06		80.0	
10470-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	122.49	31.57	3.23	80.0	± 9.6 %
		Y	100.00	120.89	31.05		80.0	
		Z	100.00	122.09	31.26		80.0	
10471-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	108.96	25.23	3.23	80.0	± 9.6 %
		Y	100.00	109.17	25.53		80.0	
		Z	100.00	108.15	24.70		80.0	
10472-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	105.98	23.80	3.23	80.0	± 9.6 %
		Y	35.19	95.19	21.59		80.0	
		Z	92.17	104.19	23.03		80.0	
10473-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	122.46	31.56	3.23	80.0	± 9.6 %
		Y	100.00	120.86	31.04		80.0	
		Z	100.00	122.06	31.25		80.0	
10474-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	108.97	25.23	3.23	80.0	± 9.6 %
		Y	100.00	109.18	25.53		80.0	
		Z	100.00	108.16	24.70		80.0	
10475-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	105.99	23.80	3.23	80.0	± 9.6 %
		Y	34.55	94.99	21.54		80.0	
		Z	89.20	103.87	22.96		80.0	

10477-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	108.82	25.15	3.23	80.0	± 9.6 %
		Y	100.00	109.03	25.46		80.0	
		Z	100.00	108.00	24.62		80.0	
10478-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	100.00	105.94	23.78	3.23	80.0	± 9.6 %
		Y	33.78	94.72	21.47		80.0	
		Z	85.25	103.36	22.84		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	29.72	90.65	18.88	1.99	80.0	± 9.6 %
		Y	26.20	91.38	19.91		80.0	
		Z	14.60	84.06	17.13		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.73	61.06	7.92	1.99	80.0	± 9.6 %
		Y	2.26	63.23	9.54		80.0	
		Z	1.62	60.75	7.71		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.56	60.00	7.16	1.99	80.0	± 9.6 %
		Y	1.95	61.61	8.52		80.0	
		Z	1.52	60.00	7.10		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.98	83.05	20.48	1.99	80.0	± 9.6 %
		Y	7.13	81.44	20.33		80.0	
		Z	8.29	83.90	20.90		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	12.94	86.61	21.61	1.99	80.0	± 9.6 %
		Y	9.60	82.54	20.66		80.0	
		Z	11.32	84.95	21.09		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	11.11	84.37	20.93	1.99	80.0	± 9.6 %
		Y	8.80	81.13	20.21		80.0	
		Z	9.93	82.99	20.49		80.0	
10485-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.68	85.12	22.07	1.99	80.0	± 9.6 %
		Y	7.46	82.52	21.41		80.0	
		Z	8.62	85.24	22.20		80.0	
10486-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.21	74.83	18.22	1.99	80.0	± 9.6 %
		Y	5.15	74.31	18.29		80.0	
		Z	5.28	75.16	18.44		80.0	
10487-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.08	74.13	17.96	1.99	80.0	± 9.6 %
		Y	5.07	73.74	18.09		80.0	
		Z	5.15	74.46	18.19		80.0	
10488-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.29	81.58	21.58	1.99	80.0	± 9.6 %
		Y	6.74	79.79	20.98		80.0	
		Z	7.22	81.52	21.58		80.0	
10489-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.12	73.83	18.99	1.99	80.0	± 9.6 %
		Y	5.08	73.19	18.80		80.0	
		Z	5.10	73.84	19.01		80.0	
10490-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.13	73.33	18.83	1.99	80.0	± 9.6 %
		Y	5.11	72.73	18.66		80.0	
		Z	5.11	73.32	18.85		80.0	
10491-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.21	77.24	20.23	1.99	80.0	± 9.6 %
		Y	6.03	76.24	19.84		80.0	
		Z	6.19	77.25	20.23		80.0	
10492-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.17	72.16	18.65	1.99	80.0	± 9.6 %
		Y	5.19	71.72	18.47		80.0	
		Z	5.15	72.14	18.63		80.0	

10493-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.20	71.86	18.55	1.99	80.0	± 9.6 %
		Y	5.22	71.44	18.39		80.0	
		Z	5.18	71.84	18.54		80.0	
10494-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.25	79.64	20.88	1.99	80.0	± 9.6 %
		Y	6.97	78.52	20.45		80.0	
		Z	7.28	79.79	20.92		80.0	
10495-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.31	72.83	18.91	1.99	80.0	± 9.6 %
		Y	5.33	72.41	18.73		80.0	
		Z	5.29	72.84	18.90		80.0	
10496-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.29	72.25	18.73	1.99	80.0	± 9.6 %
		Y	5.33	71.87	18.57		80.0	
		Z	5.28	72.25	18.72		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.89	75.93	17.14	1.99	80.0	± 9.6 %
		Y	5.23	76.91	18.04		80.0	
		Z	5.42	77.60	17.93		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.78	66.37	12.49	1.99	80.0	± 9.6 %
		Y	3.38	68.56	14.02		80.0	
		Z	3.02	67.55	13.19		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.67	65.61	12.03	1.99	80.0	± 9.6 %
		Y	3.28	67.89	13.61		80.0	
		Z	2.90	66.75	12.72		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.58	82.75	21.61	1.99	80.0	± 9.6 %
		Y	6.76	80.53	20.97		80.0	
		Z	7.48	82.71	21.66		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.16	74.34	18.49	1.99	80.0	± 9.6 %
		Y	5.09	73.70	18.43		80.0	
		Z	5.18	74.49	18.62		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.14	73.91	18.29	1.99	80.0	± 9.6 %
		Y	5.10	73.33	18.26		80.0	
		Z	5.16	74.07	18.42		80.0	
10503-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.15	81.28	21.46	1.99	80.0	± 9.6 %
		Y	6.63	79.51	20.86		80.0	
		Z	7.08	81.21	21.46		80.0	
10504-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.09	73.72	18.93	1.99	80.0	± 9.6 %
		Y	5.06	73.09	18.74		80.0	
		Z	5.07	73.73	18.95		80.0	
10505-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.10	73.22	18.77	1.99	80.0	± 9.6 %
		Y	5.07	72.62	18.60		80.0	
		Z	5.07	73.21	18.79		80.0	
10506-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.16	79.44	20.80	1.99	80.0	± 9.6 %
		Y	6.89	78.33	20.37		80.0	
		Z	7.19	79.58	20.84		80.0	
10507-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.29	72.76	18.87	1.99	80.0	± 9.6 %
		Y	5.31	72.33	18.69		80.0	
		Z	5.27	72.77	18.86		80.0	

10508-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.27	72.17	18.69	1.99	80.0	± 9.6 %
		Y	5.31	71.79	18.52		80.0	
		Z	5.26	72.17	18.67		80.0	
10509-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.51	75.94	19.59	1.99	80.0	± 9.6 %
		Y	6.46	75.38	19.34		80.0	
		Z	6.55	76.13	19.64		80.0	
10510-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.60	71.76	18.58	1.99	80.0	± 9.6 %
		Y	5.66	71.51	18.44		80.0	
		Z	5.60	71.81	18.57		80.0	
10511-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.59	71.32	18.46	1.99	80.0	± 9.6 %
		Y	5.65	71.09	18.33		80.0	
		Z	5.58	71.35	18.44		80.0	
10512-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.46	78.63	20.37	1.99	80.0	± 9.6 %
		Y	7.30	77.88	20.07		80.0	
		Z	7.56	78.94	20.47		80.0	
10513-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.60	72.40	18.80	1.99	80.0	± 9.6 %
		Y	5.65	72.15	18.66		80.0	
		Z	5.59	72.46	18.80		80.0	
10514-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	5.50	71.71	18.60	1.99	80.0	± 9.6 %
		Y	5.56	71.48	18.47		80.0	
		Z	5.49	71.75	18.59		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	0.98	63.79	15.19	0.00	150.0	± 9.6 %
		Y	0.99	63.42	14.89		150.0	
		Z	0.99	63.73	15.10		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.82	76.78	20.27	0.00	150.0	± 9.6 %
		Y	0.65	71.47	17.88		150.0	
		Z	0.72	73.93	19.16		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.85	66.39	16.18	0.00	150.0	± 9.6 %
		Y	0.85	65.54	15.63		150.0	
		Z	0.86	66.10	15.99		150.0	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.63	66.97	16.35	0.00	150.0	± 9.6 %
		Y	4.70	66.89	16.29		150.0	
		Z	4.65	67.00	16.31		150.0	
10519-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.84	67.25	16.49	0.00	150.0	± 9.6 %
		Y	4.92	67.19	16.44		150.0	
		Z	4.86	67.28	16.45		150.0	
10520-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.69	67.22	16.42	0.00	150.0	± 9.6 %
		Y	4.77	67.17	16.36		150.0	
		Z	4.71	67.26	16.38		150.0	
10521-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.62	67.23	16.40	0.00	150.0	± 9.6 %
		Y	4.70	67.18	16.35		150.0	
		Z	4.65	67.26	16.37		150.0	
10522-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.67	67.25	16.46	0.00	150.0	± 9.6 %
		Y	4.74	67.14	16.37		150.0	
		Z	4.70	67.26	16.41		150.0	

10523-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.54	67.12	16.30	0.00	150.0	± 9.6 %
		Y	4.62	67.05	16.24		150.0	
		Z	4.57	67.15	16.26		150.0	
10524-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.62	67.19	16.44	0.00	150.0	± 9.6 %
		Y	4.70	67.11	16.37		150.0	
		Z	4.65	67.21	16.39		150.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.59	66.21	16.02	0.00	150.0	± 9.6 %
		Y	4.65	66.13	15.95		150.0	
		Z	4.61	66.24	15.98		150.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.78	66.62	16.17	0.00	150.0	± 9.6 %
		Y	4.86	66.54	16.10		150.0	
		Z	4.80	66.64	16.12		150.0	
10527-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.70	66.58	16.12	0.00	150.0	± 9.6 %
		Y	4.77	66.52	16.05		150.0	
		Z	4.72	66.62	16.08		150.0	
10528-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.71	66.60	16.15	0.00	150.0	± 9.6 %
		Y	4.79	66.54	16.09		150.0	
		Z	4.74	66.64	16.11		150.0	
10529-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.71	66.60	16.15	0.00	150.0	± 9.6 %
		Y	4.79	66.54	16.09		150.0	
		Z	4.74	66.64	16.11		150.0	
10531-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.72	66.74	16.18	0.00	150.0	± 9.6 %
		Y	4.80	66.69	16.12		150.0	
		Z	4.75	66.78	16.14		150.0	
10532-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.57	66.60	16.11	0.00	150.0	± 9.6 %
		Y	4.65	66.56	16.06		150.0	
		Z	4.60	66.64	16.08		150.0	
10533-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.73	66.63	16.13	0.00	150.0	± 9.6 %
		Y	4.80	66.56	16.06		150.0	
		Z	4.75	66.66	16.09		150.0	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.24	66.73	16.20	0.00	150.0	± 9.6 %
		Y	5.30	66.71	16.14		150.0	
		Z	5.25	66.77	16.15		150.0	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.30	66.88	16.26	0.00	150.0	± 9.6 %
		Y	5.37	66.85	16.20		150.0	
		Z	5.32	66.91	16.21		150.0	
10536-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	5.17	66.86	16.23	0.00	150.0	± 9.6 %
		Y	5.24	66.84	16.18		150.0	
		Z	5.19	66.90	16.19		150.0	
10537-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.24	66.83	16.22	0.00	150.0	± 9.6 %
		Y	5.31	66.82	16.17		150.0	
		Z	5.25	66.87	16.18		150.0	
10538-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.34	66.89	16.29	0.00	150.0	± 9.6 %
		Y	5.42	66.89	16.25		150.0	
		Z	5.36	66.93	16.25		150.0	
10540-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.25	66.86	16.29	0.00	150.0	± 9.6 %
		Y	5.32	66.83	16.23		150.0	
		Z	5.27	66.89	16.24		150.0	

10541-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.23	66.74	16.22	0.00	150.0	± 9.6 %
		Y	5.31	66.75	16.19		150.0	
		Z	5.25	66.79	16.19		150.0	
10542-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.39	66.80	16.27	0.00	150.0	± 9.6 %
		Y	5.45	66.78	16.22		150.0	
		Z	5.40	66.84	16.22		150.0	
10543-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.47	66.82	16.30	0.00	150.0	± 9.6 %
		Y	5.54	66.79	16.24		150.0	
		Z	5.48	66.85	16.25		150.0	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.53	66.83	16.18	0.00	150.0	± 9.6 %
		Y	5.58	66.82	16.13		150.0	
		Z	5.54	66.88	16.14		150.0	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.74	67.27	16.34	0.00	150.0	± 9.6 %
		Y	5.79	67.23	16.27		150.0	
		Z	5.75	67.28	16.28		150.0	
10546-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.62	67.10	16.28	0.00	150.0	± 9.6 %
		Y	5.68	67.11	16.24		150.0	
		Z	5.63	67.15	16.24		150.0	
10547-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.71	67.19	16.31	0.00	150.0	± 9.6 %
		Y	5.77	67.18	16.26		150.0	
		Z	5.72	67.23	16.27		150.0	
10548-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	6.04	68.37	16.87	0.00	150.0	± 9.6 %
		Y	6.10	68.30	16.79		150.0	
		Z	6.01	68.25	16.74		150.0	
10550-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.63	67.06	16.26	0.00	150.0	± 9.6 %
		Y	5.70	67.05	16.21		150.0	
		Z	5.65	67.11	16.22		150.0	
10551-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.65	67.13	16.26	0.00	150.0	± 9.6 %
		Y	5.72	67.16	16.23		150.0	
		Z	5.66	67.18	16.22		150.0	
10552-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.55	66.90	16.16	0.00	150.0	± 9.6 %
		Y	5.62	66.92	16.12		150.0	
		Z	5.57	66.96	16.12		150.0	
10553-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.64	66.95	16.21	0.00	150.0	± 9.6 %
		Y	5.71	66.96	16.17		150.0	
		Z	5.66	67.01	16.18		150.0	
10554-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.93	67.21	16.27	0.00	150.0	± 9.6 %
		Y	5.98	67.20	16.23		150.0	
		Z	5.94	67.25	16.23		150.0	
10555-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	6.08	67.54	16.41	0.00	150.0	± 9.6 %
		Y	6.14	67.56	16.37		150.0	
		Z	6.08	67.57	16.36		150.0	
10556-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	6.09	67.57	16.42	0.00	150.0	± 9.6 %
		Y	6.14	67.55	16.37		150.0	
		Z	6.10	67.60	16.37		150.0	
10557-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	6.07	67.50	16.41	0.00	150.0	± 9.6 %
		Y	6.13	67.53	16.38		150.0	
		Z	6.08	67.55	16.37		150.0	

10558-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	6.13	67.70	16.52	0.00	150.0	± 9.6 %
		Y	6.20	67.73	16.49		150.0	
		Z	6.14	67.73	16.47		150.0	
10560-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	6.12	67.51	16.47	0.00	150.0	± 9.6 %
		Y	6.19	67.55	16.44		150.0	
		Z	6.13	67.57	16.43		150.0	
10561-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	6.03	67.48	16.49	0.00	150.0	± 9.6 %
		Y	6.10	67.50	16.45		150.0	
		Z	6.04	67.53	16.45		150.0	
10562-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	6.20	67.98	16.74	0.00	150.0	± 9.6 %
		Y	6.26	68.01	16.71		150.0	
		Z	6.20	67.99	16.68		150.0	
10563-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.57	68.64	17.02	0.00	150.0	± 9.6 %
		Y	6.56	68.43	16.86		150.0	
		Z	6.53	68.53	16.90		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.97	67.10	16.54	0.46	150.0	± 9.6 %
		Y	5.04	67.03	16.48		150.0	
		Z	4.99	67.12	16.50		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	5.22	67.56	16.86	0.46	150.0	± 9.6 %
		Y	5.31	67.52	16.81		150.0	
		Z	5.24	67.59	16.81		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	5.05	67.44	16.69	0.46	150.0	± 9.6 %
		Y	5.14	67.40	16.64		150.0	
		Z	5.08	67.46	16.65		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	5.08	67.80	17.02	0.46	150.0	± 9.6 %
		Y	5.16	67.78	16.98		150.0	
		Z	5.10	67.83	16.98		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.97	67.22	16.48	0.46	150.0	± 9.6 %
		Y	5.05	67.11	16.39		150.0	
		Z	4.99	67.23	16.42		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	5.02	67.83	17.04	0.46	150.0	± 9.6 %
		Y	5.10	67.80	17.00		150.0	
		Z	5.05	67.87	17.01		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	5.07	67.70	16.99	0.46	150.0	± 9.6 %
		Y	5.15	67.63	16.93		150.0	
		Z	5.09	67.72	16.95		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.37	66.80	16.80	0.46	130.0	± 9.6 %
		Y	1.38	66.27	16.45		130.0	
		Z	1.37	66.59	16.66		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.41	67.53	17.21	0.46	130.0	± 9.6 %
		Y	1.41	66.94	16.83		130.0	
		Z	1.40	67.30	17.06		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	26.23	123.25	33.36	0.46	130.0	± 9.6 %
		Y	5.19	96.91	26.48		130.0	
		Z	10.84	109.65	30.17		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	1.81	75.77	20.95	0.46	130.0	± 9.6 %
		Y	1.72	74.00	20.11		130.0	
		Z	1.76	74.99	20.61		130.0	

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.79	66.99	16.65	0.46	130.0	± 9.6 %
		Y	4.86	66.91	16.59		130.0	
		Z	4.81	67.00	16.60		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.82	67.14	16.71	0.46	130.0	± 9.6 %
		Y	4.89	67.07	16.65		130.0	
		Z	4.83	67.15	16.66		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	5.04	67.46	16.88	0.46	130.0	± 9.6 %
		Y	5.13	67.40	16.83		130.0	
		Z	5.06	67.47	16.83		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.94	67.62	16.98	0.46	130.0	± 9.6 %
		Y	5.02	67.58	16.93		130.0	
		Z	4.96	67.64	16.93		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.72	67.02	16.37	0.46	130.0	± 9.6 %
		Y	4.80	66.96	16.30		130.0	
		Z	4.74	67.02	16.31		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.76	67.01	16.37	0.46	130.0	± 9.6 %
		Y	4.84	66.91	16.29		130.0	
		Z	4.78	67.00	16.31		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.84	67.70	16.94	0.46	130.0	± 9.6 %
		Y	4.93	67.67	16.89		130.0	
		Z	4.86	67.72	16.89		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.67	66.79	16.17	0.46	130.0	± 9.6 %
		Y	4.75	66.70	16.10		130.0	
		Z	4.69	66.78	16.11		130.0	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.79	66.99	16.65	0.46	130.0	± 9.6 %
		Y	4.86	66.91	16.59		130.0	
		Z	4.81	67.00	16.60		130.0	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.82	67.14	16.71	0.46	130.0	± 9.6 %
		Y	4.89	67.07	16.65		130.0	
		Z	4.83	67.15	16.66		130.0	
10585-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	5.04	67.46	16.88	0.46	130.0	± 9.6 %
		Y	5.13	67.40	16.83		130.0	
		Z	5.06	67.47	16.83		130.0	
10586-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.94	67.62	16.98	0.46	130.0	± 9.6 %
		Y	5.02	67.58	16.93		130.0	
		Z	4.96	67.64	16.93		130.0	
10587-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.72	67.02	16.37	0.46	130.0	± 9.6 %
		Y	4.80	66.96	16.30		130.0	
		Z	4.74	67.02	16.31		130.0	
10588-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.76	67.01	16.37	0.46	130.0	± 9.6 %
		Y	4.84	66.91	16.29		130.0	
		Z	4.78	67.00	16.31		130.0	
10589-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.84	67.70	16.94	0.46	130.0	± 9.6 %
		Y	4.93	67.67	16.89		130.0	
		Z	4.86	67.72	16.89		130.0	
10590-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.67	66.79	16.17	0.46	130.0	± 9.6 %
		Y	4.75	66.70	16.10		130.0	
		Z	4.69	66.78	16.11		130.0	

10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.94	67.03	16.74	0.46	130.0	± 9.6 %
		Y	5.01	66.97	16.68		130.0	
		Z	4.96	67.04	16.69		130.0	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	5.11	67.37	16.86	0.46	130.0	± 9.6 %
		Y	5.19	67.31	16.80		130.0	
		Z	5.13	67.39	16.81		130.0	
10593-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	5.04	67.32	16.77	0.46	130.0	± 9.6 %
		Y	5.12	67.27	16.72		130.0	
		Z	5.06	67.34	16.72		130.0	
10594-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	5.09	67.47	16.91	0.46	130.0	± 9.6 %
		Y	5.17	67.41	16.85		130.0	
		Z	5.11	67.48	16.86		130.0	
10595-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	5.06	67.43	16.81	0.46	130.0	± 9.6 %
		Y	5.15	67.39	16.76		130.0	
		Z	5.08	67.45	16.77		130.0	
10596-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	5.00	67.45	16.82	0.46	130.0	± 9.6 %
		Y	5.09	67.38	16.76		130.0	
		Z	5.02	67.46	16.77		130.0	
10597-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.95	67.38	16.73	0.46	130.0	± 9.6 %
		Y	5.04	67.33	16.67		130.0	
		Z	4.97	67.39	16.67		130.0	
10598-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.93	67.61	16.97	0.46	130.0	± 9.6 %
		Y	5.02	67.58	16.94		130.0	
		Z	4.95	67.63	16.93		130.0	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.61	67.60	16.93	0.46	130.0	± 9.6 %
		Y	5.68	67.58	16.88		130.0	
		Z	5.62	67.62	16.88		130.0	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.80	68.21	17.21	0.46	130.0	± 9.6 %
		Y	5.90	68.24	17.18		130.0	
		Z	5.80	68.15	17.11		130.0	
10601-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.66	67.85	17.04	0.46	130.0	± 9.6 %
		Y	5.74	67.84	16.99		130.0	
		Z	5.66	67.83	16.97		130.0	
10602-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.74	67.84	16.96	0.46	130.0	± 9.6 %
		Y	5.84	67.85	16.92		130.0	
		Z	5.75	67.83	16.89		130.0	
10603-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.82	68.11	17.22	0.46	130.0	± 9.6 %
		Y	5.94	68.22	17.22		130.0	
		Z	5.84	68.12	17.16		130.0	
10604-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.61	67.56	16.93	0.46	130.0	± 9.6 %
		Y	5.69	67.55	16.89		130.0	
		Z	5.62	67.57	16.87		130.0	
10605-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.73	67.91	17.12	0.46	130.0	± 9.6 %
		Y	5.79	67.84	17.03		130.0	
		Z	5.73	67.87	17.03		130.0	
10606-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.49	67.34	16.70	0.46	130.0	± 9.6 %
		Y	5.57	67.34	16.65		130.0	
		Z	5.51	67.36	16.64		130.0	

10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.77	66.33	16.35	0.46	130.0	± 9.6 %
		Y	4.84	66.25	16.28		130.0	
		Z	4.79	66.34	16.30		130.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.98	66.75	16.51	0.46	130.0	± 9.6 %
		Y	5.06	66.68	16.45		130.0	
		Z	5.00	66.77	16.46		130.0	
10609-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.87	66.63	16.37	0.46	130.0	± 9.6 %
		Y	4.94	66.56	16.31		130.0	
		Z	4.89	66.65	16.33		130.0	
10610-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.92	66.78	16.53	0.46	130.0	± 9.6 %
		Y	5.00	66.72	16.47		130.0	
		Z	4.94	66.80	16.48		130.0	
10611-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.84	66.61	16.39	0.46	130.0	± 9.6 %
		Y	4.92	66.56	16.33		130.0	
		Z	4.86	66.63	16.34		130.0	
10612-AAA	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.86	66.78	16.44	0.46	130.0	± 9.6 %
		Y	4.94	66.70	16.37		130.0	
		Z	4.88	66.79	16.39		130.0	
10613-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.87	66.70	16.34	0.46	130.0	± 9.6 %
		Y	4.95	66.63	16.28		130.0	
		Z	4.89	66.71	16.29		130.0	
10614-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.80	66.85	16.55	0.46	130.0	± 9.6 %
		Y	4.88	66.82	16.51		130.0	
		Z	4.82	66.88	16.51		130.0	
10615-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.84	66.45	16.18	0.46	130.0	± 9.6 %
		Y	4.92	66.37	16.11		130.0	
		Z	4.86	66.46	16.13		130.0	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.42	66.85	16.53	0.46	130.0	± 9.6 %
		Y	5.49	66.83	16.48		130.0	
		Z	5.43	66.87	16.48		130.0	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.48	66.96	16.56	0.46	130.0	± 9.6 %
		Y	5.55	66.93	16.50		130.0	
		Z	5.49	66.97	16.50		130.0	
10618-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.38	67.03	16.61	0.46	130.0	± 9.6 %
		Y	5.45	67.01	16.56		130.0	
		Z	5.39	67.05	16.56		130.0	
10619-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.40	66.87	16.47	0.46	130.0	± 9.6 %
		Y	5.47	66.82	16.40		130.0	
		Z	5.41	66.89	16.41		130.0	
10620-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.51	66.95	16.56	0.46	130.0	± 9.6 %
		Y	5.59	66.95	16.51		130.0	
		Z	5.52	66.97	16.51		130.0	
10621-AAA	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.48	66.99	16.69	0.46	130.0	± 9.6 %
		Y	5.56	67.00	16.65		130.0	
		Z	5.50	67.03	16.64		130.0	
10622-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.49	67.13	16.75	0.46	130.0	± 9.6 %
		Y	5.56	67.10	16.70		130.0	
		Z	5.50	67.14	16.69		130.0	

10623-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.37	66.70	16.43	0.46	130.0	± 9.6 %
		Y	5.45	66.72	16.39		130.0	
		Z	5.39	66.74	16.38		130.0	
10624-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.57	66.90	16.58	0.46	130.0	± 9.6 %
		Y	5.64	66.86	16.52		130.0	
		Z	5.58	66.91	16.52		130.0	
10625-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	6.01	68.08	17.22	0.46	130.0	± 9.6 %
		Y	6.04	67.89	17.08		130.0	
		Z	5.98	67.96	17.10		130.0	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.69	66.86	16.46	0.46	130.0	± 9.6 %
		Y	5.74	66.85	16.41		130.0	
		Z	5.70	66.90	16.42		130.0	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.96	67.48	16.72	0.46	130.0	± 9.6 %
		Y	6.00	67.40	16.64		130.0	
		Z	5.95	67.45	16.64		130.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.75	67.05	16.45	0.46	130.0	± 9.6 %
		Y	5.82	67.05	16.40		130.0	
		Z	5.76	67.08	16.40		130.0	
10629-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.83	67.10	16.47	0.46	130.0	± 9.6 %
		Y	5.91	67.12	16.43		130.0	
		Z	5.84	67.13	16.42		130.0	
10630-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	6.44	69.09	17.46	0.46	130.0	± 9.6 %
		Y	6.50	69.01	17.37		130.0	
		Z	6.38	68.90	17.30		130.0	
10631-AAA	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	6.25	68.60	17.40	0.46	130.0	± 9.6 %
		Y	6.34	68.66	17.38		130.0	
		Z	6.25	68.59	17.33		130.0	
10632-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.91	67.48	16.85	0.46	130.0	± 9.6 %
		Y	5.98	67.49	16.81		130.0	
		Z	5.92	67.51	16.80		130.0	
10633-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.83	67.22	16.56	0.46	130.0	± 9.6 %
		Y	5.93	67.33	16.57		130.0	
		Z	5.84	67.28	16.53		130.0	
10634-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.80	67.20	16.61	0.46	130.0	± 9.6 %
		Y	5.89	67.29	16.61		130.0	
		Z	5.82	67.27	16.58		130.0	
10635-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.70	66.62	16.07	0.46	130.0	± 9.6 %
		Y	5.78	66.63	16.03		130.0	
		Z	5.71	66.66	16.02		130.0	
10636-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	6.10	67.26	16.56	0.46	130.0	± 9.6 %
		Y	6.15	67.25	16.51		130.0	
		Z	6.11	67.29	16.51		130.0	
10637-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.27	67.66	16.74	0.46	130.0	± 9.6 %
		Y	6.33	67.66	16.70		130.0	
		Z	6.27	67.67	16.68		130.0	
10638-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.27	67.64	16.71	0.46	130.0	± 9.6 %
		Y	6.32	67.61	16.65		130.0	
		Z	6.27	67.64	16.65		130.0	

10639-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.26	67.61	16.74	0.46	130.0	± 9.6 %
		Y	6.33	67.65	16.71		130.0	
		Z	6.27	67.65	16.69		130.0	
10640-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.29	67.70	16.73	0.46	130.0	± 9.6 %
		Y	6.36	67.74	16.70		130.0	
		Z	6.29	67.72	16.68		130.0	
10641-AAA	IEEE 1602.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.29	67.46	16.63	0.46	130.0	± 9.6 %
		Y	6.35	67.45	16.57		130.0	
		Z	6.29	67.48	16.57		130.0	
10642-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.34	67.74	16.93	0.46	130.0	± 9.6 %
		Y	6.42	67.78	16.91		130.0	
		Z	6.36	67.79	16.89		130.0	
10643-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	6.18	67.46	16.70	0.46	130.0	± 9.6 %
		Y	6.25	67.47	16.66		130.0	
		Z	6.19	67.48	16.64		130.0	
10644-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.41	68.15	17.06	0.46	130.0	± 9.6 %
		Y	6.49	68.20	17.04		130.0	
		Z	6.41	68.15	17.00		130.0	
10645-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.87	69.04	17.45	0.46	130.0	± 9.6 %
		Y	6.80	68.65	17.21		130.0	
		Z	6.79	68.83	17.28		130.0	
10646-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	45.26	122.11	40.13	9.30	60.0	± 9.6 %
		Y	25.14	106.90	35.30		60.0	
		Z	43.20	121.25	39.81		60.0	
10647-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	48.34	124.53	40.96	9.30	60.0	± 9.6 %
		Y	25.79	108.23	35.83		60.0	
		Z	44.73	122.92	40.42		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.79	65.12	12.04	0.00	150.0	± 9.6 %
		Y	0.83	64.89	12.31		150.0	
		Z	0.82	65.22	12.31		150.0	

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

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

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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **EX3-7406_Apr16**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7406
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	April 19, 2016

BN 04/26/2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: S5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (No. 217-02285/02284)	In house check: Jun-16
Power sensor E4412A	SN: MY41498087	06-Apr-16 (No. 217-02285)	In house check: Jun-16
Power sensor E4412A	SN: 000110210	06-Apr-16 (No. 217-02284)	In house check: Jun-16
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Apr-13)	In house check: Jun-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 20, 2016

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
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Swiss Calibration Service

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

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:7406

Manufactured: November 24, 2015
Calibrated: April 19, 2016

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7406

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)[A]	0.48	0.44	0.47	± 10.1 %
DCP (mV)[B]	100.7	97.9	98.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	120.4	±3.3 %
		Y	0.0	0.0	1.0		148.3	
		Z	0.0	0.0	1.0		146.7	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	0.81	54.6	7.4	10.00	50.3	±2.2 %
		Y	0.68	55.1	7.9		47.9	
		Z	1.34	61.0	11.0		46.8	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	2.83	68.0	18.3	1.87	127.8	±0.5 %
		Y	2.82	68.4	18.4		117.8	
		Z	3.00	69.2	19.0		115.9	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.54	67.4	19.5	5.67	142.1	±1.2 %
		Y	6.19	66.7	19.3		127.6	
		Z	6.37	66.7	19.2		125.7	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	7.58	67.9	21.8	9.29	114.4	±1.7 %
		Y	7.34	68.3	22.5		144.3	
		Z	7.53	67.7	21.8		139.5	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.34	66.9	19.4	5.80	137.5	±1.2 %
		Y	5.90	65.9	19.0		123.8	
		Z	6.24	66.4	19.2		123.7	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	7.17	67.2	21.5	9.28	109.5	±1.7 %
		Y	6.83	67.6	22.3		137.0	
		Z	7.23	67.4	21.7		135.1	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	5.99	66.4	19.2	5.75	132.4	±0.9 %
		Y	5.61	65.8	19.1		119.4	
		Z	5.91	65.9	19.0		120.1	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.47	67.0	19.5	5.82	137.0	±1.2 %
		Y	5.96	66.0	19.1		123.9	
		Z	6.33	66.3	19.1		124.2	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.71	65.5	18.9	5.73	113.2	±1.2 %
		Y	4.60	66.2	19.6		144.2	
		Z	4.93	66.5	19.5		143.2	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	5.68	68.2	22.4	9.21	117.6	±1.7 %
		Y	5.56	70.1	24.1		146.1	
		Z	5.87	69.4	23.2		143.7	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.75	65.7	19.1	5.72	112.3	±0.9 %
		Y	4.58	66.1	19.5		143.2	
		Z	4.95	66.7	19.6		142.0	

10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	4.71	65.5	18.9	5.72	110.2	±0.9 %
		Y	4.53	65.8	19.4		141.4	
		Z	4.90	66.5	19.5		138.1	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	5.69	68.3	22.5	9.21	117.3	±1.7 %
		Y	5.47	69.5	23.8		145.1	
		Z	5.85	69.3	23.1		142.0	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	7.04	68.1	22.2	9.24	141.2	±1.9 %
		Y	6.35	67.2	22.2		125.4	
		Z	6.82	67.1	21.7		127.5	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	7.45	68.3	22.2	9.30	148.0	±1.9 %
		Y	6.84	67.5	22.3		132.0	
		Z	7.24	67.4	21.8		134.6	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.35	66.9	19.4	5.81	135.3	±1.2 %
		Y	5.92	65.9	19.0		122.9	
		Z	6.26	66.4	19.2		122.1	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.92	67.4	19.7	6.06	139.3	±1.2 %
		Y	6.52	66.6	19.5		127.9	
		Z	6.82	66.9	19.5		126.8	

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

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 6 and 7).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7406

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)
750	41.9	0.89	10.52	10.52	10.52	0.52	0.89	± 12.0 %
835	41.5	0.90	9.83	9.83	9.83	0.54	0.80	± 12.0 %
1750	40.1	1.37	8.85	8.85	8.85	0.49	0.85	± 12.0 %
1900	40.0	1.40	8.22	8.22	8.22	0.40	0.88	± 12.0 %
2300	39.5	1.67	7.67	7.67	7.67	0.36	0.89	± 12.0 %
2450	39.2	1.80	7.29	7.29	7.29	0.40	0.80	± 12.0 %
2600	39.0	1.96	7.08	7.08	7.08	0.37	0.95	± 12.0 %

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

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

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

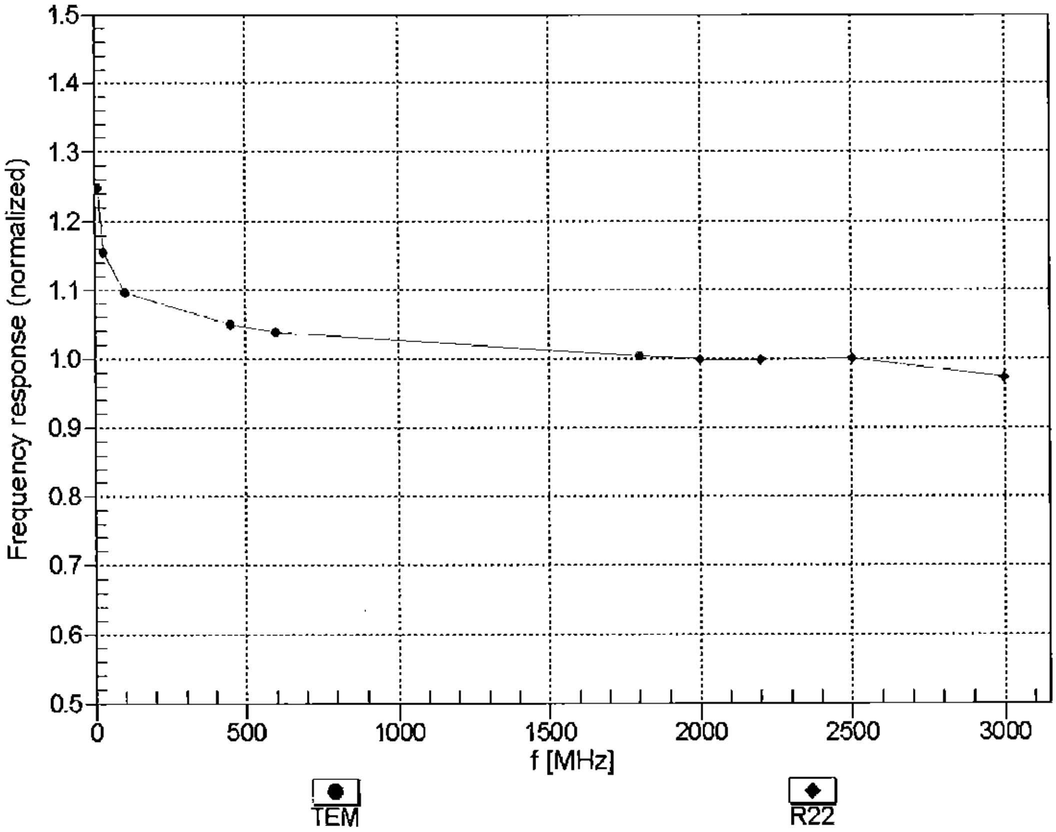
DASY/EASY - Parameters of Probe: EX3DV4 - SN:7406

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.54	9.54	9.54	0.46	0.80	± 12.0 %
835	55.2	0.97	9.35	9.35	9.35	0.45	0.84	± 12.0 %
1750	53.4	1.49	7.78	7.78	7.78	0.37	0.85	± 12.0 %
1900	53.3	1.52	7.49	7.49	7.49	0.33	0.91	± 12.0 %
2300	52.9	1.81	7.37	7.37	7.37	0.42	0.80	± 12.0 %
2450	52.7	1.95	7.24	7.24	7.24	0.37	0.88	± 12.0 %
2600	52.5	2.16	6.94	6.94	6.94	0.27	0.99	± 12.0 %

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

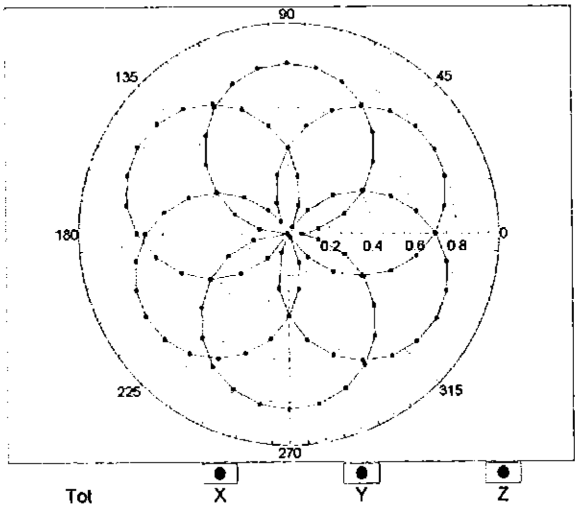
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



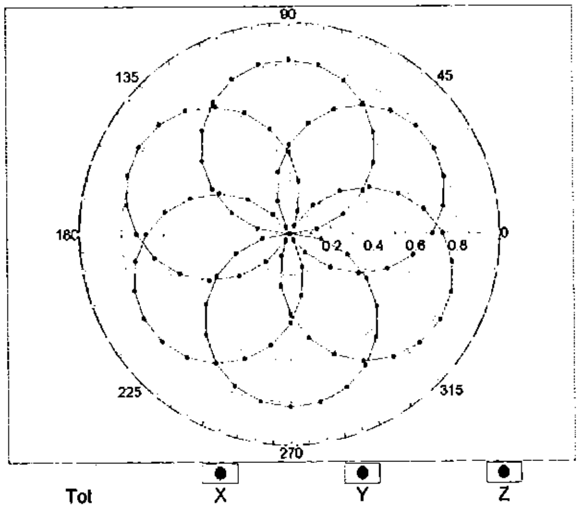
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

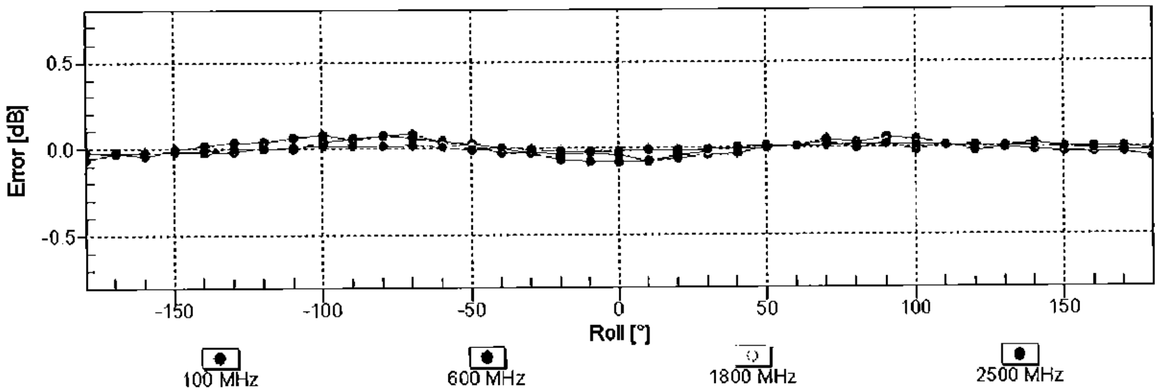
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



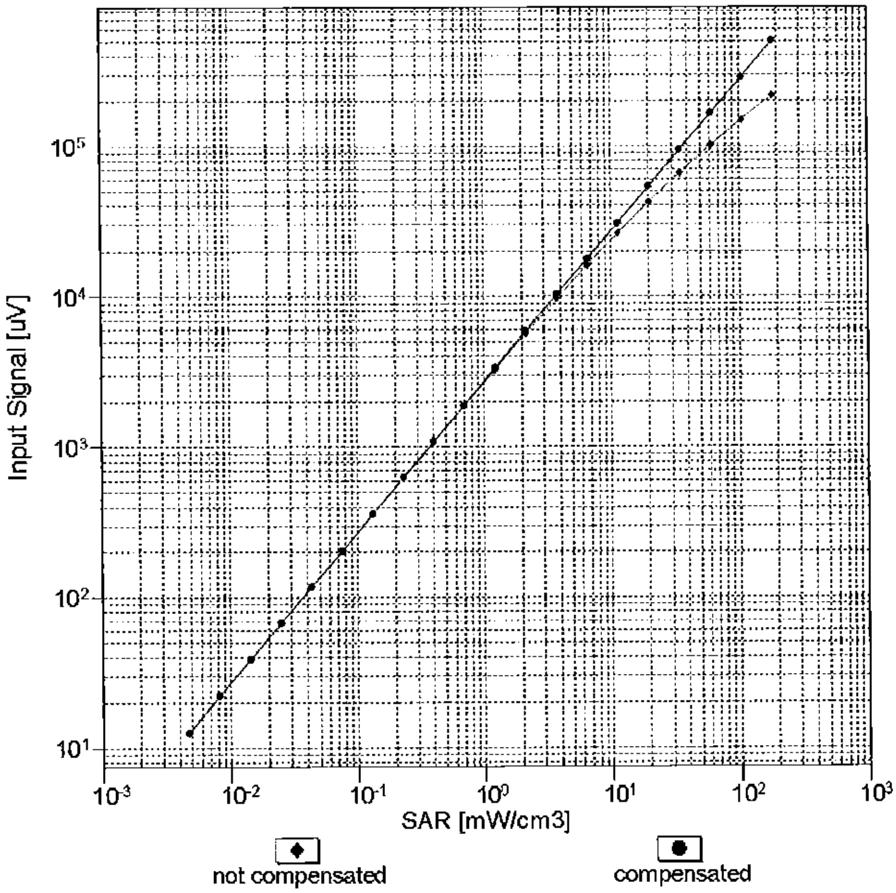
f=1800 MHz,R22

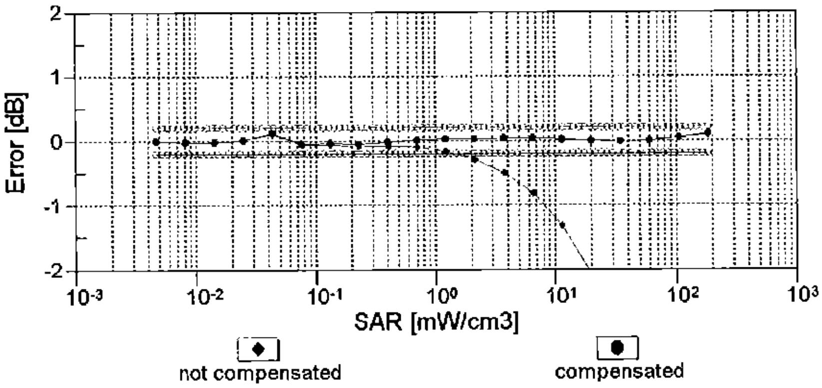




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

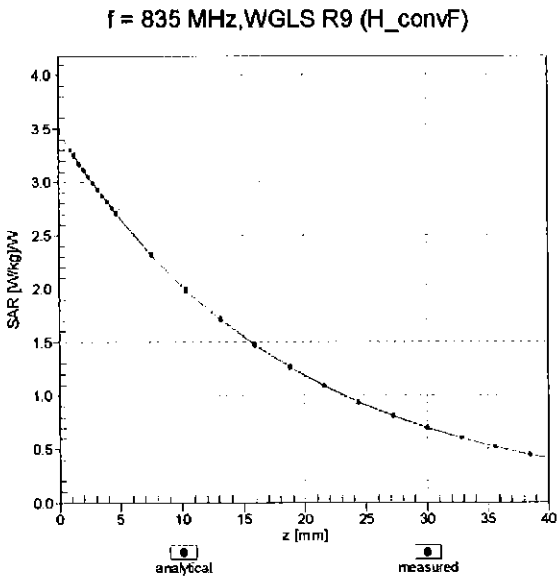
Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

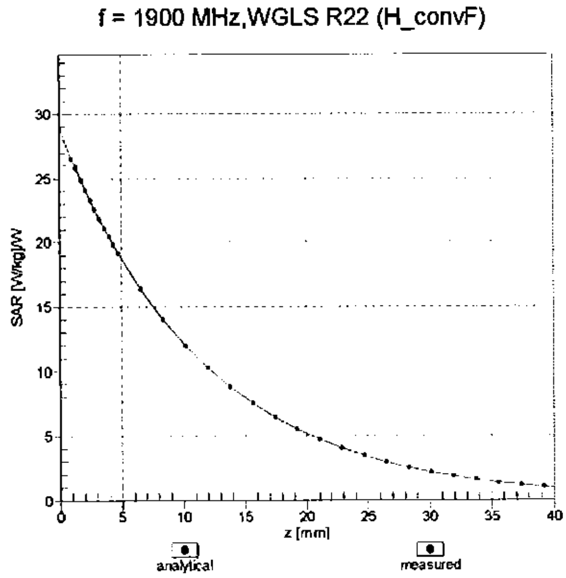




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

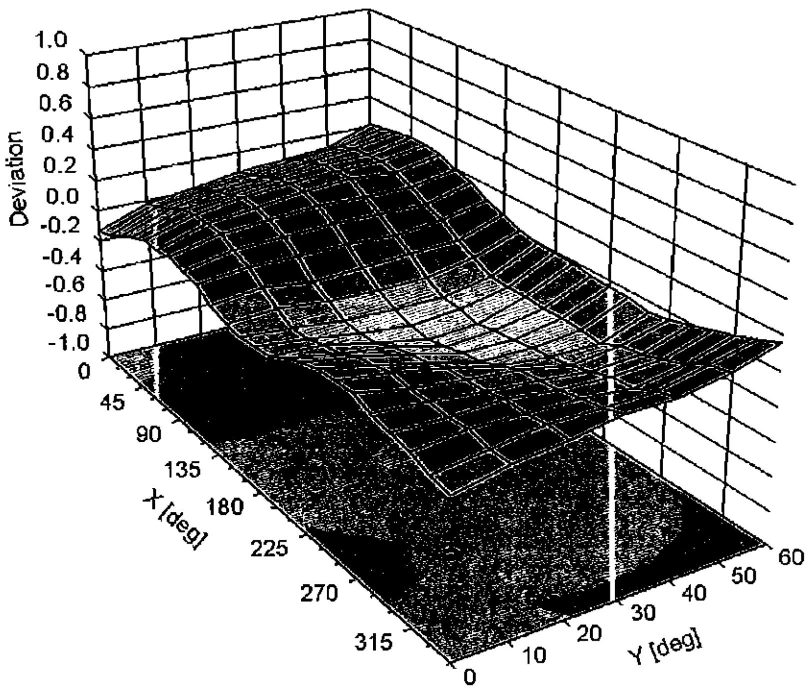
Conversion Factor Assessment

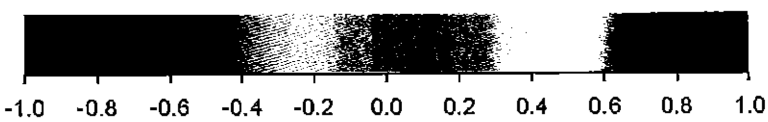




Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7406

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	0.4
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

APPENDIX D: SAR TISSUE SPECIFICATIONS

Measurement Procedure for Tissue verification:

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the tissue. The tissue was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity ε' can be calculated from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

Table D-I
Composition of the Tissue Equivalent Matter

Frequency (MHz)	2450	2450
Tissue	Head	Body
Ingredients (% by weight)		
DGBE	See page 2	26.7
NaCl		0.1
Water		73.2

2 Composition / Information on ingredients

The Item is composed of the following ingredients:

H_2O	Water, 52 – 75%
$C_8H_{18}O_3$	Diethylene glycol monobutyl ether (DGBE), 25 – 48% (CAS-No. 112-34-5, EC-No. 203-961-6, EC-index-No. 603-096-00-8) Relevant for safety; Refer to the respective Safety Data Sheet*.
NaCl	Sodium Chloride, <1.0%

Figure D-1
Composition of 2.4 GHz Head Tissue Equivalent Matter

Note: 2.4 GHz head liquid recipes are proprietary SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer tissue-equivalent liquid data sheets are provided below.

Measurement Certificate / Material Test

Item Name	**Head Tissue Simulating Liquid (HSL2450V2)**
Product No.	SL AAH 245 BA (Charge: 150206-3)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

Setup Validation

Validation results were within ± 2.5% towards the target values of Methanol.

Target Parameters

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

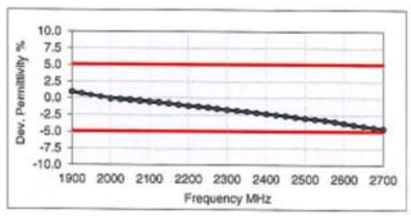
Test Condition

Ambient	Environment temperatur (22 ± 3)°C and humidity < 70%.
TSL Temperature	23°C
Test Date	11-Feb-15
Operator	IEN

Additional Information

TSL Density	0.988 g/cm^3
TSL Heat-capacity	3.680 kJ/(kg*K)

	Measured			Target		Diff.to Target [%]	
f [MHz]	HP-e'	HP-e"	sigma	eps	sigma	Δ-eps	Δ-sigma
1900	40.4	11.89	1.26	40.0	1.40	1.0	-10.2
1925	40.3	11.98	1.28	40.0	1.40	0.7	-8.3
1950	40.2	12.07	1.31	40.0	1.40	0.4	-6.4
1975	40.1	12.15	1.34	40.0	1.40	0.2	-4.6
2000	40.0	12.23	1.36	40.0	1.40	-0.1	-2.8
2025	39.9	12.32	1.39	40.0	1.42	-0.2	-2.4
2050	39.8	12.41	1.42	39.9	1.44	-0.3	-2.0
2075	39.7	12.50	1.44	39.9	1.47	-0.4	-1.6
2100	39.6	12.59	1.47	39.8	1.49	-0.5	-1.2
2125	39.5	12.66	1.50	39.8	1.51	-0.7	-0.9
2150	39.4	12.73	1.52	39.7	1.53	-0.8	-0.7
2175	39.3	12.83	1.55	39.7	1.56	-0.9	-0.2
2200	39.2	12.92	1.58	39.6	1.58	-1.1	0.2
2225	39.1	13.00	1.61	39.6	1.60	-1.2	0.6
2250	39.0	13.08	1.64	39.6	1.62	-1.3	0.9
2275	38.9	13.17	1.67	39.5	1.64	-1.5	1.4
2300	38.8	13.26	1.70	39.5	1.67	-1.7	1.8
2325	38.7	13.34	1.73	39.4	1.69	-1.8	2.2
2350	38.6	13.42	1.75	39.4	1.71	-2.0	2.5
2375	38.5	13.50	1.78	39.3	1.73	-2.1	2.9
2400	38.4	13.58	1.81	39.3	1.76	-2.3	3.3
2425	38.3	13.65	1.84	39.2	1.78	-2.4	3.6
2450	38.2	13.73	1.87	39.2	1.80	-2.6	3.9
2475	38.1	13.80	1.90	39.2	1.83	-2.8	4.0
2500	38.0	13.87	1.93	39.1	1.85	-3.0	4.0
2525	37.9	13.90	1.95	39.1	1.88	-3.1	3.8
2550	37.8	13.93	1.98	39.1	1.91	-3.2	3.5
2575	37.7	14.05	2.01	39.0	1.94	-3.5	4.0
2600	37.6	14.17	2.05	39.0	1.96	-3.7	4.4
2625	37.4	14.23	2.08	39.0	1.99	-3.9	4.4
2650	37.3	14.29	2.11	38.9	2.02	-4.1	4.4
2675	37.2	14.37	2.14	38.9	2.05	-4.3	4.6
2700	37.1	14.45	2.17	38.9	2.07	-4.5	4.7



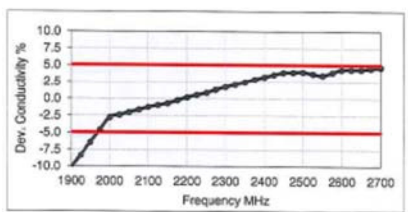


Figure D-2
2.4 GHz Head Tissue Equivalent Matter

APPENDIX E: SAR SYSTEM VALIDATION

Per FCC KDB Publication 865664 D02v01r02, SAR system validation status should be documented to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

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

Table E-I
SAR System Validation Summary – 1g

SAR SYSTEM #	FREQ. [MHz]	DATE	PROBE SN	PROBE TYPE	PROBE CAL. POINT		COND. (σ)	PERM. (εr)	CW VALIDATION			MOD. VALIDATION		
									SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
I	2450	9/12/2016	3288	ES3DV3	2450	Head	1.878	38.684	PASS	PASS	PASS	OFDM/TDD	PASS	PASS

Table E-II
SAR System Validation Summary – 10g

SAR SYSTEM #	FREQ. [MHz]	DATE	PROBE SN	PROBE TYPE	PROBE CAL. POINT		COND. (σ)	PERM. (εr)	CW VALIDATION			MOD. VALIDATION		
									SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
E	2450	4/27/2016	7406	EX3DV4	2450	Body	2.016	51.629	PASS	PASS	PASS	OFDM/TDD	PASS	PASS

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to FCC KDB Publication 865664 D01v01r04.