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Report On

Specific Absorption Rate Testing of the
BCF Technology Ltd
Duo-Scan:Go Plus

FCC ID: 2AL6R-DSGC02
IC: 22758-DSGC01

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Document 75940062 Report 07 Issue 1 October 2017

TÜV SÜD Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

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REPORT ON	Specific Absorption Rate Testing of the BCF Technology Ltd Duo-Scan:Go Plus Document 75940062 Report 07 Issue 1 October 2017
PREPARED FOR	BCF Technology Ltd Imaging House Phoenix Crescent Strathclyde Business Park Bellshill North Lanarkshire Scotland ML4 3NJ
PREPARED BY	**Stephen Dodd** SAR Engineer
APPROVED BY	**Nigel Grigsby** Authorised Signatory
DATED	16 October 2017

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SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the
BCF Technology Ltd
Duo-Scan:Go Plus

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate Testing of the BCF Technology Ltd, Duo-Scan:Go Plus to the requirements of KDB 447498 D01 v06 General RF Exposure Guidance.

Objective	To perform Specific Absorption Rate Testing to determine the Equipment Under Test's (EUT's) compliance with the requirements specified of KDB 447498 D01 v06 General RF Exposure Guidance, for the series of tests carried out.
Applicant	BCF Technology Ltd
Manufacturer	BCF Technology Ltd
Manufacturing Description	Swine Ultrasound Scanner
Model Number	DSGC02
Serial Number	ASH00005
Number of Samples Tested	1
Hardware Version	PBA-PP520_REV_B
Software Version	b04616d47050f71e21b3b62eb02eb13f26e4ff20 (CE/FCC test SW)
Battery Cell Manufacturer	Shenzen BAK Technology Co., Ltd
Battery Model Number	103450AR2-1S-3M
Test Specification/Issue/Date	KDB 447498 D01 v06 General RF Exposure Guidance
Start of Test	14 September 2017
Finish of Test	14 September 2017
Related Document(s)	FCC 47CFR 2.1093: 2016 KDB 865664 – D01 v01r04 KDB 865664 – D02 v01r02 KDB 248227 – D01 v02r02 IEEE 1528-2013 IC RSS-102 Issue 5: 2015
wName of Engineer	Stephen Dodd

1.2 BRIEF SUMMARY OF RESULTS

Limited testing was performed based on the worst case mode / position, identified from the Duo-Scan:Go (Document 75939174 Report 02 Issue 1).

The measurements shown in this report were made in accordance with the procedures specified KDB 447498 D01 v06 General RF Exposure Guidance.

The maximum 1g volume averaged stand-alone SAR found during this Assessment:

Max 1g SAR (W/kg) Body	**0.13** (Measured)	**0.22**(Scaled)
The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg.		

The maximum 10g volume averaged stand -alone SAR found during this Assessment:

Max 10g SAR (W/kg) Extremity	**0.05** (Measured)	**0.09** (Scaled)
The maximum 10g volume averaged SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 4.0 W/kg.		

The maximum 1g volume averaged stand-alone Reported SAR found during this Assessment for each supported mode:

RAT	Band	Test Configuration	Max Reported SAR (W/kg)
WLAN	5200 MHz	Body	0.22
The maximum 1g volume averaged SAR level measured for all the tests performed (including simultaneous transmission analysis results) did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg.			

The maximum 10g volume averaged stand-alone Reported SAR found during this Assessment for each supported mode:

RAT	Band	Test Configuration	Max Reported SAR (W/kg)
WLAN	5200 MHz	Extremity	0.09
The maximum 10g volume averaged SAR level measured for all the tests performed (including simultaneous transmission analysis results) did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 4.0 W/kg.			

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1.3 TEST RESULTS SUMMARY

1.3.1 System Performance / Validation Check Results

Prior to formal testing being performed a System Check was performed in accordance with KDB 865664 and the results were compared against published data in Standard IEEE 1528-2013. The following results were obtained: -

System performance / Validation results

Date	Frequency (MHz)	Max 1g SAR (W/kg)*	Percentage Drift on Reference
14/09/2017	5200 MHz	66.08	-7.97

*Normalised to a forward power of 1W

1.3.2 Results Summary Tables

WLAN 5000 MHz Body Specific Absorption Rate (Maximum SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	SAR Scan Type	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg	Duty Factor Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Face	36	5180	Full	17.1	19	0.12	0.19	0.20	Figure 2
14mm Bottom Edge PCB	36	5180	Full	17.1	19	0.13	0.21	0.22	Figure 3
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2									

WLAN 5000 MHz Body - Extremity Specific Absorption Rate (Maximum SAR) 10g Results

Test Position	Channel Number	Frequency (MHz)	SAR Scan Type	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg	Duty Factor Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Bottom Face	36	5180	Full	17.1	19	0.05	0.07	0.07	Figure 4
14mm Bottom Edge PCB	36	5180	Full	17.1	19	0.05	0.08	0.09	Figure 5
Limit for General Population (Uncontrolled Exposure) 4.0 W/kg (10g) KDB 248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2									

1.3.3 Standalone SAR Test Exclusion Considerations (KDB 447498 D01)

The 1g SAR Test exclusion thresholds for 100 MHz to 6 GHz *test separation distances* ≤ 50 mm are determined by:

[(*max power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] [√f (GHz)]* ≤ 3.0

The 10g SAR Test exclusion thresholds for 100 MHz to 6 GHz *test separation distances* ≤ 50 mm are determined by:

[(*max power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] [√f (GHz)]* ≤ 7.5, where

where

- f (GHz) is the RF channel transmit frequency in GHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison.
- When the maximum test separation distance is < 5 mm, a distance of 5 mm is applied.

RAT & Band	Frequency (MHz)	Power (dBm)	Power (mW)	Test Position	Distance (mm)	Threshold	Test Exclusion
WLAN 5000 MHz	5180	19.00	79.4	Body	<5	36.2	No

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1.3.4 Technical Description

The equipment under test (EUT) was a BCF Technology Ltd, Duo-Scan:Go Plus. A full technical description can be found in the manufacturer's documentation.

The EUT is a variant of the Duo-Scan:Go differing only in the number of elements used in the ultra sound probe array and front end drive electronics. The Duo-Scan:Go uses a 32 element array ultra sound probe whereas the EUT uses a 64 element array. The wireless section is identical, using the same TI chip, same PCB layout, and the same antenna.

1.3.5 Test Configuration and Modes of Operation

The testing was performed with an integral battery supplied by BCF Technologies LTD and manufactured by Shenzen BAK Technology Co LTD.

The product is a Swine Ultrasound Scanner used in the veterinary industry for scanning pigs, sheep or goats. The product contains a Texas Instruments pre-approved 2.4 GHz and 5 GHz WLAN module which is FCC and Industry Canada certified (FCC ID: Z64-WL18DBMOD). The WLAN module is used to communicate to a commercial smart phone or tablet.

The EUT supports 802.11n20 and 802.11n40 for the 2.4 GHz and 5 GHz frequency bands.WLAN testing was achieved using the EUT's internal software and settings supplied by the customer. For each scan the EUT was configured into a continuous transmission test mode.

Limited testing was performed based on the worst case mode / position, identified from the Duo-Scan:Go (Document 75939650 Report 05). The worst case positions identified from the Duo-Scan:Go SAR test results were the bottom edge of the PCB (removed from its enclosure) and the bottom face or the EUT.

Due to the form factor of the Duo-Scan:Go and the EUT it was not possible to position all of the the faces of the EUT to within ≤ 5mm separation distance or a 0mm separation distance for extremity testing to the base of the elliptical flat phantom. Therefore the PCB was removed from the plastic enclosure of the device for testing. It was found that the bottom face of the devices, which could be positioned close enough to the phantom, yielded the highest SAR.

Test separation distances used were 0mm for the bottom face of the device and 14mm for the bottom edge of the PCB when removed from the plastic casing. 14mm is the same distance the PCB would be from the phantom if it were in the plastic casing positioned with a 0mm separation distance from the phantom.

All testing was performed against an Elliptical Flat Phantom. The Elliptical Phantom dimensions are 600mm major axis and 400mm minor axis with a shell thickness of 2.00mm. The phantom was filled to a minimum depth of 150mm with the appropriate simulant liquid. The dielectric properties were in accordance with the requirements specified in KDB 865665.

Included in this report are descriptions of the test method; the equipment used and an analysis of the test uncertainties applicable and diagrams indicating the locations of maximum SAR for each test position.

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1.4 FCC POWER MEASUREMENTS

1.4.1 Method

Conducted power measurements were made using a power meter. The measurements were taken from a modified Duo-Scan:Go, (Serial number ASH245417) as there is no conducted port on the EUT.

1.4.2 Conducted Power Measurements

WLAN 5000 MHz

Mode	Frequency (MHz)	Duty Cycle (%)	Burst Average Power (dBm)	Tune Up Value (dBm)
802.11n - 20 MHz - MCS0	5180	95.22	17.10	19.00
802.11n - 20 MHz - MCS0	5200	95.22	17.03	18.50
802.11n - 20 MHz - MCS0	5220	95.22	16.89	18.50
802.11n - 20 MHz - MCS0	5240	95.22	16.86	18.50
802.11n - 40 MHz - MCS0	5190	91.02	13.59	15.00
802.11n - 40 MHz - MCS0	5230	91.02	15.42	17.00

SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the
BCF Technology Ltd
Duo-Scan:Go Plus

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2.1 DASY5 MEASUREMENT SYSTEM

2.1.1 System Description

The DASY5 system for performing compliance tests consists of the following items:

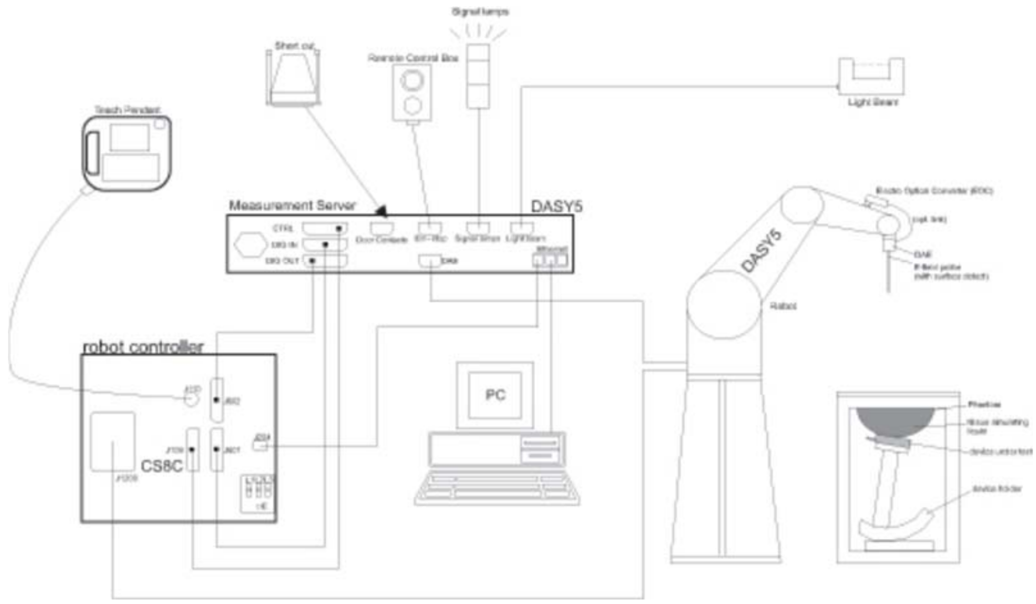

Figure 1 System Description Diagram

A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).

An isotropic field probe optimized and calibrated for the targeted measurement.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.

The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.

The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.

A computer running Win7 professional operating system and the DASY5 software.

Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.

The phantom, the device holder and other accessories according to the targeted measurement.

2.1.2 Probe Specification

The probes used by the DASY system are isotropic E-field probes, constructed with a symmetric design and a triangular core. The probes have built-in shielding against static charges and are contained within a PEEK enclosure material. These probes are specially designed and calibrated for use in liquids with high permittivities. The frequency range of the probes are from 6 MHz to 6 GHz.

2.1.3 Data Acquisition Electronics

The data acquisition electronics (DAE4 or DAE3) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of both the DAE4 as well as of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

2.1.4 SAR Evaluation Description

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values.

Based on the IEEE 1528 standard, a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a "cube" measurement in a volume of 30mm3 (7x7x7 points). The measured volume must include the 1 g and 10 g cubes with the highest averaged SAR values. For that purpose, the centre of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the Post processing engine (SEMCAD X). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location.

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD X). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. extraction of the measured data (grid and values) from the Zoom Scan
2. calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. generation of a high-resolution mesh within the measured volume
4. interpolation of all measured values from the measurement grid to the high-resolution grid
5. extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. calculation of the averaged SAR within masses of 1 g and 10 g

2.1.5 Interpolation, Extrapolation and Detection of Maxima

The probe is calibrated at the centre of the dipole sensors which is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

In DASY5, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and extrapolation routines. The interpolation, extrapolation and maximum search routines are all based on the modified Quadratic Shepard's method [1].Thereby, the interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation. The DASY5 routines construct a once-continuously differentiable function that interpolates the measurement values as follows:

For each measurement point a trivariate (3-D) / bivariate (2-D) quadratic is computed.
It interpolates the measurement values at the data point and forms a least-square fit to neighbouring measurement values. The spatial location of the quadratic with respect to the measurement values is attenuated by an inverse distance weighting. This is performed since the calculated quadratic will fit measurement values at nearby points more accurate than at points located further away.

After the quadratics are calculated for at all measurement points, the interpolating function is calculated as a weighted average of the quadratics.

There are two control parameters that govern the behaviour of the interpolation method. One specifies the number of measurement points to be used in computing the least-square fits for the local quadratics. These measurement points are the ones nearest the input point for which the quadratic is being computed. The second parameter specifies the number of measurement points that will be used in calculating the weights for the quadratics to produce the final function. The input data points used there are the ones nearest the point at which the interpolation is desired. Appropriate defaults are chosen for each of the control parameters

The trivariate quadratics that have been previously computed for the 3-D interpolation and whose input data are at the closest distance from the phantom surface, are used in order to extrapolate the fields to the surface of the phantom.

In order to determine all the field maxima in 2-D (Area Scan) and 3-D (Zoom Scan), the measurement grid is refined by a default factor of 10 and the interpolation function is used to evaluate all field values between corresponding measurement points. Subsequently, a linear search is applied to find all the candidate maxima. In a last step, non physical maxima are removed and only those maxima which are within 2 dB of the global maximum value are retained.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extrema of the SAR distribution. The uncertainty on the locations of the extrema is less than 1/20 of the grid size. Only local maxima within 2 dB of the global maximum are searched and passed for the Zoom Scan measurement.

In the Zoom Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

2.1.6 Averaging and Determination of Spacial Peak SAR

The interpolated data is used to average the SAR over the 1g and 10g cubes by spatially discretising the entire measured volume. The resolution of this spatial grid used to calculate the averaged SAR is 1mm or about 42875 interpolated points. The resulting volumes are defined as cubical volumes containing the appropriate tissue parameters that are cantered at the location. The location is defined as the centre of the incremental volume (voxel).

The spatial-peak SAR must be evaluated in cubical volumes containing a mass that is within 5%of the required mass. The cubical volume centred at each location, as defined above, should be expanded in all directions until the desired value for the mass is reached, with no surface boundaries of the averaging volume extending beyond the outermost surface of the considered region. In addition, the cubical volume should not consist of more than 10% of air. If these conditions are not satisfied then the centre of the averaging volume is moved to the next location. Otherwise, the exact size of the final sampling cube is found using an inverse polynomial approximation algorithm, leading to results with improved accuracy. If one boundary of the averaging volume reaches the boundary of the measured volume during its expansion, it will not be evaluated at all. Reference is kept of all locations used and those not used for averaging the SAR. All average SAR values are finally assigned to the centred location in each valid averaging volume.

All locations included in an averaging volume are marked to indicate that they have been used at least once. If a location has been marked as used, but has never been assigned to the centre of a cube, the highest averaged SAR value of all other cubical volumes which have used this location for averaging is assigned to this location. Only those locations that are not part of any valid averaging volume should be marked as unused. For the case of an unused location, a new averaging volume must be constructed which will have the unused location centred at one surface of the cube. The remaining five surfaces are expanded evenly in all directions until the required mass is enclosed, regardless of the amount of included air. Of the six possible cubes with one surface centred on the unused location, the smallest cube is used, which still contains the required mass.

If the final cube containing the highest averaged SAR touches the surface of the measured volume, an appropriate warning is issued within the Post-processing engine.

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2.2 WLAN 5000 MHz BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.8.8(1258)	**AMBIENT TEMPERATURE:**	20.7 °C
DATE:	14/09/2017	**RELATIVE HUMIDITY:**	43.9 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.165 S/m
DUT CONFIGURATION:	802.11n HT20	**RELATIVE PERMITTIVITY:**	47.718 ε_r
DUT POSITION:	0 mm Bottom Face	**LIQUID TEMPERATURE:**	20.5 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5180 MHz	**DRIFT:**	-0.23 dB
MODULATION:	OFDM	**PEAK SAR:**	0.44 W/kg
DUTY CYCLE:	95.22 %	**SAR (10g):**	0.20 W/kg

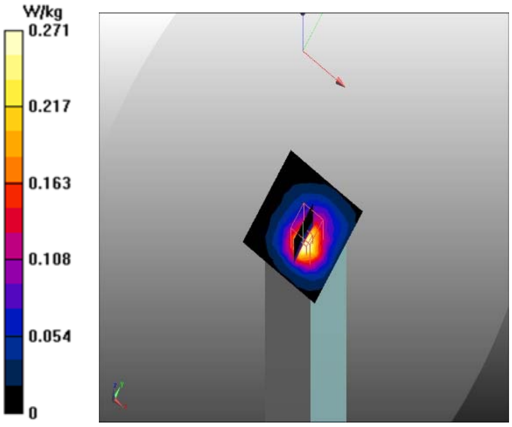

Figure 2: SAR Body Testing Results for the Duo-Scan:Go Plus at 5180 MHz.

SOFTWARE VERSION:	52.8.8(1258)	**AMBIENT TEMPERATURE:**	20.7 °C
DATE:	14/09/2017	**RELATIVE HUMIDITY:**	43.9 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.165 S/m
DUT CONFIGURATION:	802.11n HT20	**RELATIVE PERMITTIVITY:**	47.718 ε_r
DUT POSITION:	14mm - Bottom Edge (PCB)	**LIQUID TEMPERATURE:**	20.5 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5180 MHz	**DRIFT:**	-0.58 dB
MODULATION:	OFDM	**PEAK SAR:**	0.49 W/kg
DUTY CYCLE:	95.22 %	**SAR (10g):**	0.22 W/kg

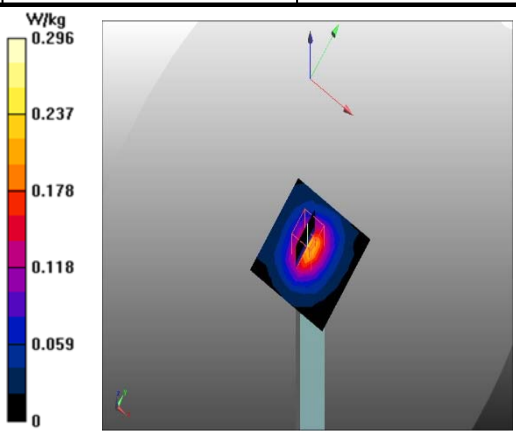

Figure 3: SAR Body Testing Results for the Duo-Scan:Go Plus at 5180 MHz.

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2.3 WLAN 5000 MHz EXTREMITY SAR TEST RESULTS

SOFTWARE VERSION:	52.8.8(1258)	**AMBIENT TEMPERATURE:**	20.7 °C
DATE:	14/09/2017	**RELATIVE HUMIDITY:**	43.9 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.165 S/m
DUT CONFIGURATION:	802.11n HT20	**RELATIVE PERMITTIVITY:**	47.718 ε_r
DUT POSITION:	0 mm Bottom Face	**LIQUID TEMPERATURE:**	20.5 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5180 MHz	**DRIFT:**	-0.23 dB
MODULATION:	OFDM	**PEAK SAR:**	0.44 W/kg
DUTY CYCLE:	95.22 %	**SAR (10g):**	0.07 W/kg

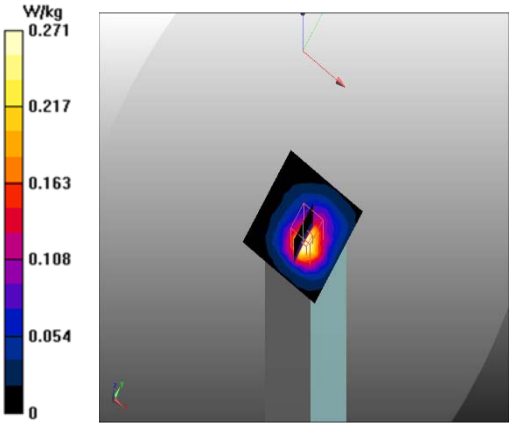

Figure 4: SAR Body Testing Results for the Duo-Scan:Go Plus at 5180 MHz.

SOFTWARE VERSION:	52.8.8(1258)	**AMBIENT TEMPERATURE:**	20.7 °C
DATE:	14/09/2017	**RELATIVE HUMIDITY:**	43.9 %
PHANTOM:	QDOVA003-FB	**CONDUCTIVITY:**	5.165 S/m
DUT CONFIGURATION:	802.11n HT20	**RELATIVE PERMITTIVITY:**	47.718 ε_r
DUT POSITION:	14mm - Bottom Edge (PCB)	**LIQUID TEMPERATURE:**	20.5 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	5180 MHz	**DRIFT:**	-0.58 dB
MODULATION:	OFDM	**PEAK SAR:**	0.49 W/kg
DUTY CYCLE:	95.22 %	**SAR (10g):**	0.09 W/kg

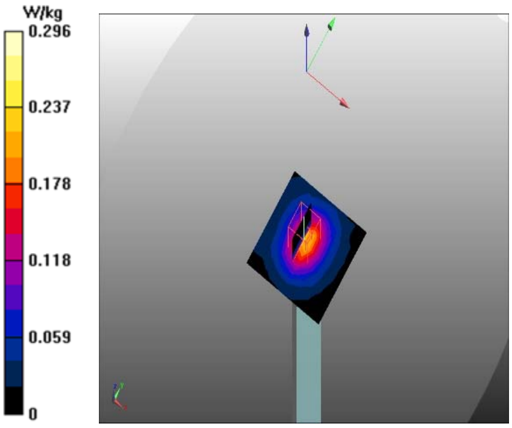

Figure 5: SAR Body Testing Results for the Duo-Scan:Go Plus at 5180 MHz.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

The following test equipment was used at TÜV SÜD Product Service:

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
10MHz - 2.5GHz, 3W, Amplifier	Vectawave Technology	VTL5400	51	-	TU
Power Sensor	Rohde & Schwarz	NRV-Z1	60	12	12-Jun-2018
Signal Generator	Rohde & Schwarz	SMR40	1002	12	14-Oct-2017
Bi-directional Coupler	Hewlett Packard	11692D	452	-	TU
Attenuator (20dB, 10W)	Weinschel	37-20-34	482	12	26-Oct-2017
Thermometer	Digitron	T208	64	12	18-May-2018
Hygrometer	Rotronic	I-1000	2784	12	04-May-2018
Power Sensor	Rohde & Schwarz	NRV- Z5	2878	12	12-Jun-2018
Dual Channel Power Meter	Rohde & Schwarz	NRVD	3259	12	12-Jun-2018
Data Acquisition Electronics	Speag	DAE 4 - SD 000 D04 BM	4689	12	12-Dec-2017
Measurement Server	Speag	DASY 5 Measurement Server	4692	-	TU
Elliptical Phantom	Speag	ELI Phantom	4833	-	TU
Dosimetric SAR Probe	Speag	EX3DV4	4700	12	16-Dec-2017
Mounting Platform for TX90XL Robot and Phantoms	Speag	MP6C-TX90XL Mounting Platform Extended	4702	-	TU
Robot	Speag	TX90 XLspeag Robot	4704	-	TU
5000 MHz Dipole	Speag	D5000V2	4796	12	14-Dec-2017
MBBL Fluid	Speag	Batch 1	N/A	Weekly	18-Sep-2017

TU - Traceability Unscheduled

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3.2 TEST SOFTWARE

The following software was used to control the TÜV SÜD Product Service DASY System.

Instrument	Version Number
DASY system	52.8.8(1258)

3.3 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS

The fluid properties of the simulant fluids used during routine SAR evaluation meet the dielectric properties required KDB 865665.

The dielectric properties of the tissue simulant liquids used for the SAR testing at TÜV SÜD Product Service are as follows:-

Fluid Type and Frequency	Relative Permittivity Target	Relative Permittivity Measured	Conductivity Target	Conductivity Measured
5200 MHz MBBL	49.01	47.68	5.30	5.19

3.4 TEST CONDITIONS

3.4.1 Test Laboratory Conditions

Ambient temperature: Within +15°C to +35°C.
The actual temperature during the testing ranged from 20.7°C to 20.7°C.
The actual humidity during the testing ranged from 43.9% to 43.9% RH

3.4.2 Test Fluid Temperature Range

Frequency	Fluid Type	Min Temperature °C	Max Temperature °C
5200 MHz	MBBL	20.5	20.5

3.4.3 SAR Drift

The SAR Drift was within acceptable limits during scans. The maximum SAR Drift was recorded as -0.45dB

3.5 MEASUREMENT UNCERTAINTY

Body, Fast SAR Measurements, 3 GHz to 6 GHz Using Probe EX3DV4 - SN3759

Source of Uncertainty	Uncertainty ± %	Probability distribution	Div	c_i (10g)	Standard Uncertainty ± % (10g)	v_i (v_{eff})
Measurement System						
Probe calibration	6.6	N	1.00	0.00	0.0	
Axial Isotropy	4.7	R	1.73	0.70	1.9	Infinity
Hemispherical Isotropy	9.6	R	1.73	0.70	3.9	Infinity
Boundary effect	2.0	R	1.73	1.00	1.2	Infinity
Linearity	4.7	R	1.73	1.00	2.7	Infinity
System Detection limits	1.0	R	1.73	1.00	0.6	Infinity
Modulation response	2.4	R	1.73	1.00	1.4	Infinity
Readout electronics	0.3	N	1.00	0.00	0.0	
Response time	0.8	R	1.73	0.00	0.0	
Integration time	2.6	R	1.73	1.00	1.5	Infinity
RF ambient noise	3.0	R	1.73	1.00	1.7	Infinity
RF ambient reflections	3.0	R	1.73	0.00	0.0	
Probe positioner	0.8	R	1.73	1.00	0.5	Infinity
Probe positioning	6.7	R	1.73	1.00	3.9	Infinity
Spatial x-y-Resolution	10.0	R	1.73	1.00	5.8	Infinity
Fast SAR z-Approximation	14.0	R	1.73	1.00	8.1	Infinity
Test sample related						
Device Positioning	2.9	N	1.00	1.00	2.9	145
Device Holder	3.6	N	1.00	1.00	3.6	5
Input Power and SAR Drift	5.0	R	1.73	1.00	0.9	Infinity
Phantom and Setup						
Phantom uncertainty	6.6	R	1.73	1.00	3.8	Infinity
SAR Correction	1.9	R	1.73	0.00	0.0	
Liquid conductivity Meas.	2.5	R	1.73	0.00	0.0	
Liquid Permittivity Meas.	2.5	R	1.73	0.00	0.0	
Temp. Unc. Conductivity	3.4	R	1.73	0.00	0.0	
Temp. Unc. Permittivity	0.4	R	1.73	0.00	0.0	
Combined Standard Uncertainty		**RSS**			13.6	
Expanded Standard Uncertainty		**K=2**			27.2	

Body, Full SAR Measurements, 3 GHz to 6 GHz Using Probe EX3DV4 - SN3759

Source of Uncertainty	Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)	v_i (v_{eff})
Measurement System						
Probe calibration	6.6	N	1.00	1.00	6.6	Infinity
Axial Isotropy	4.7	R	1.73	0.70	1.9	Infinity
Hemispherical Isotropy	9.6	R	1.73	0.70	3.9	Infinity
Boundary effect	2.0	R	1.73	1.00	1.2	Infinity
Linearity	4.7	R	1.73	1.00	2.7	Infinity
System Detection limits	1.0	R	1.73	1.00	0.6	Infinity
Modulation response	2.4	R	1.73	1.00	1.4	Infinity
Readout electronics	0.3	N	1.00	1.00	0.3	Infinity
Response time	0.8	R	1.73	1.00	0.5	Infinity
Integration time	2.6	R	1.73	1.00	1.5	Infinity
RF ambient noise	3.0	R	1.73	1.00	1.7	Infinity
RF ambient reflections	3.0	R	1.73	1.00	1.7	Infinity
Probe positioner	0.8	R	1.73	1.00	0.5	Infinity
Probe positioning	6.7	R	1.73	1.00	3.9	Infinity
Max SAR Evaluation	4.0	R	1.73	1.00	2.3	Infinity
Test sample related						
Device Positioning	2.9	N	1.00	1.00	2.9	145
Device Holder	3.6	N	1.00	1.00	3.6	5
Input Power and SAR Drift	5.0	R	1.73	1.00	0.7	Infinity
Phantom and Setup						
Phantom uncertainty	6.6	R	1.73	1.00	3.8	Infinity
SAR Correction	1.9	R	1.73	1.00	1.1	Infinity
Liquid conductivity Meas.	2.5	R	1.73	0.78	1.1	Infinity
Liquid Permittivity Meas.	2.5	R	1.73	0.23	0.3	Infinity
Temp. Unc. Conductivity	3.4	R	1.73	0.78	1.5	Infinity
Temp. Unc. Permittivity	0.4	R	1.73	0.23	0.1	Infinity
Combined Standard Uncertainty		**RSS**			12.0	748
Expanded Standard Uncertainty		**K=2**			23.9	

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING
0141

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

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ANNEX A

PROBE CALIBRATION REPORT

TÜV SÜD Product Service

Calibration Laboratory of
Schmid & Partner
Engineering AG
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**

Client **TüV SÜD UK**

Certificate No: **EX3-3759_Dec16**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3759
Calibration procedure(s)	QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	December 16, 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	7-Dec-16 (No. DAE4-660_Dec16)	Dec-17
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-16)	In house check: Oct-17

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

Issued: December 19, 2016

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

Certificate No: EX3-3759_Dec16 Page 1 of 38

Product Service

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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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).

Product Service

Probe EX3DV4

SN:3759

Manufactured:	March 16, 2010
Calibrated:	December 16, 2016

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

Product Service

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3759

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.47	0.42	0.45	± 10.1 %
DCP (mV)[B]	101.1	99.1	101.2	

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	149.0	±3.5 %
		Y	0.0	0.0	1.0		147.4	
		Z	0.0	0.0	1.0		138.4	

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	45.34	339.8	35.83	13.18	1.015	4.992	0.942	0.363	1.005
Y	51.23	384.3	35.89	14.75	0.946	5.017	1.083	0.33	1.006
Z	48.36	361.1	35.6	14.31	1.297	4.99	0.629	0.453	1.004

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.

Product Service

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3759

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
450	43.5	0.87	10.95	10.95	10.95	0.15	1.30	± 13.3 %
750	41.9	0.89	10.45	10.45	10.45	0.28	1.01	± 12.0 %
835	41.5	0.90	10.04	10.04	10.04	0.16	1.40	± 12.0 %
900	41.5	0.97	9.94	9.94	9.94	0.24	0.97	± 12.0 %
1640	40.3	1.29	8.63	8.63	8.63	0.19	0.80	± 12.0 %
1750	40.1	1.37	8.58	8.58	8.58	0.18	0.96	± 12.0 %
1900	40.0	1.40	8.32	8.32	8.32	0.14	0.86	± 12.0 %
2100	39.8	1.49	8.45	8.45	8.45	0.23	0.84	± 12.0 %
2300	39.5	1.67	7.80	7.80	7.80	0.15	1.07	± 12.0 %
2450	39.2	1.80	7.42	7.42	7.42	0.23	0.86	± 12.0 %
2600	39.0	1.96	7.16	7.16	7.16	0.20	1.08	± 12.0 %
5200	36.0	4.66	5.68	5.68	5.68	0.30	1.80	± 13.1 %
5300	35.9	4.76	5.46	5.46	5.46	0.30	1.80	± 13.1 %
5500	35.6	4.96	5.05	5.05	5.05	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.72	4.72	4.72	0.40	1.80	± 13.1 %
5800	35.3	5.27	5.02	5.02	5.02	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. 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:3759

Calibration Parameter Determined in Body Tissue Simulating Media

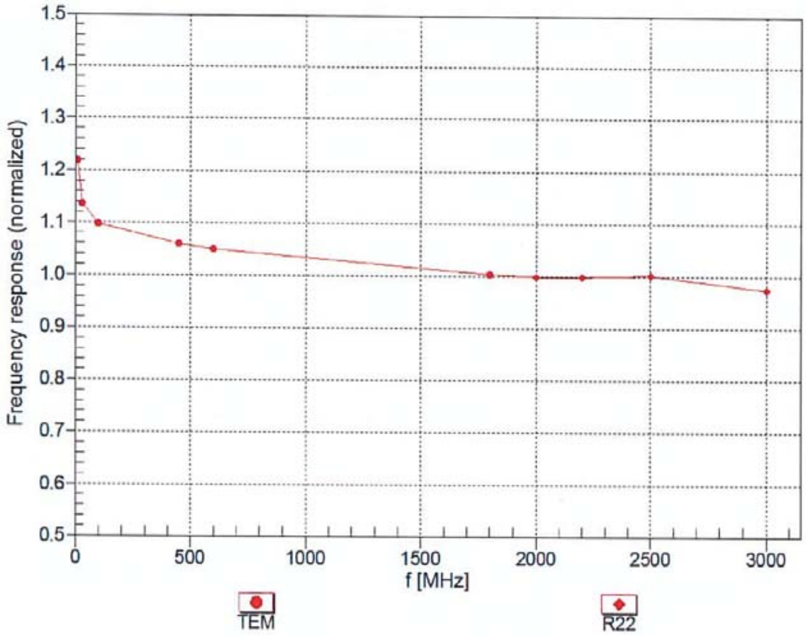
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
450	56.7	0.94	11.67	11.67	11.67	0.05	1.20	± 13.3 %
750	55.5	0.96	10.25	10.25	10.25	0.31	0.85	± 12.0 %
835	55.2	0.97	9.85	9.85	9.85	0.16	1.31	± 12.0 %
900	55.0	1.05	9.83	9.83	9.83	0.29	0.86	± 12.0 %
1640	53.8	1.40	8.63	8.63	8.63	0.26	0.80	± 12.0 %
1750	53.4	1.49	8.16	8.16	8.16	0.27	0.86	± 12.0 %
1900	53.3	1.52	7.87	7.87	7.87	0.21	0.96	± 12.0 %
2100	53.2	1.62	8.26	8.26	8.26	0.16	1.04	± 12.0 %
2300	52.9	1.81	7.56	7.56	7.56	0.29	0.80	± 12.0 %
2450	52.7	1.95	7.49	7.49	7.49	0.11	0.99	± 12.0 %
2600	52.5	2.16	7.31	7.31	7.31	0.14	1.10	± 12.0 %
5200	49.0	5.30	5.00	5.00	5.00	0.35	1.90	± 13.1 %
5300	48.9	5.42	4.78	4.78	4.78	0.35	1.90	± 13.1 %
5500	48.6	5.65	4.27	4.27	4.27	0.40	1.90	± 13.1 %
5600	48.5	5.77	3.98	3.98	3.98	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.20	4.20	4.20	0.50	1.90	± 13.1 %

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

Product Service

Frequency Response of E-Field

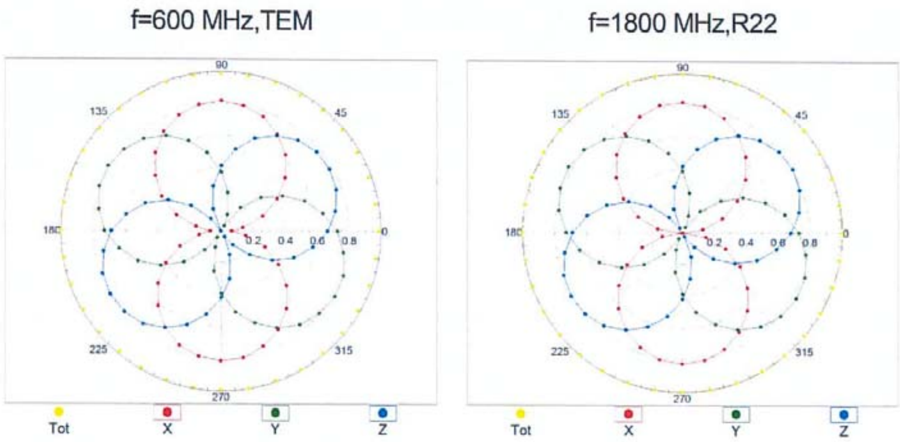
(TEM-Cell:ifi110 EXX, Waveguide: R22)

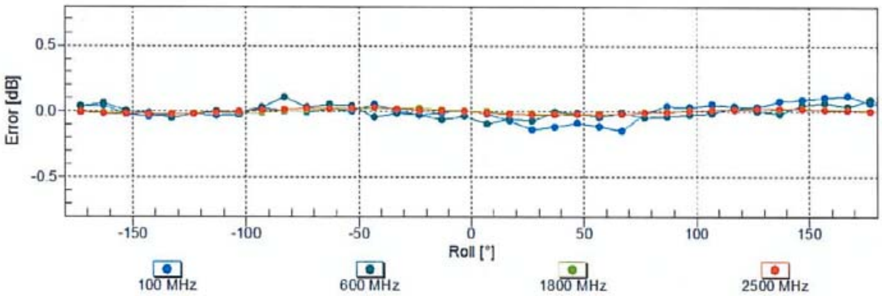


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Product Service

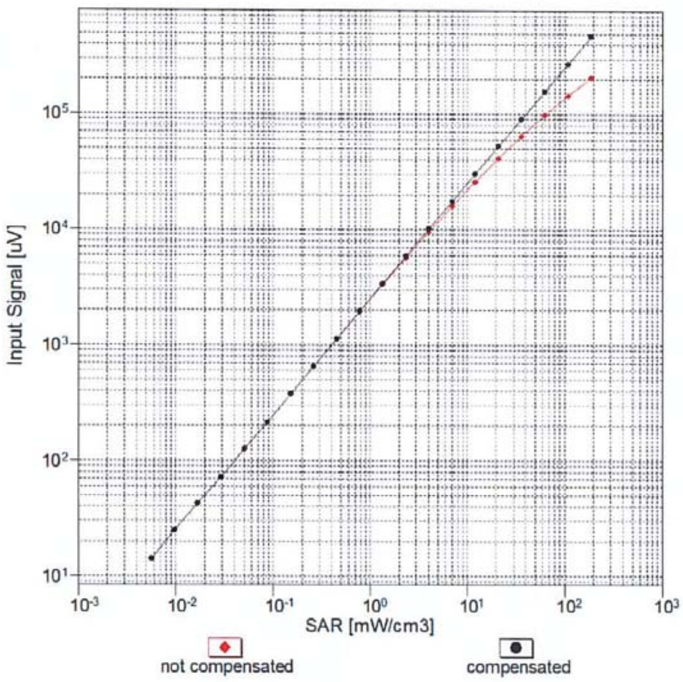
Receiving Pattern (ϕ), $\vartheta = 0°$

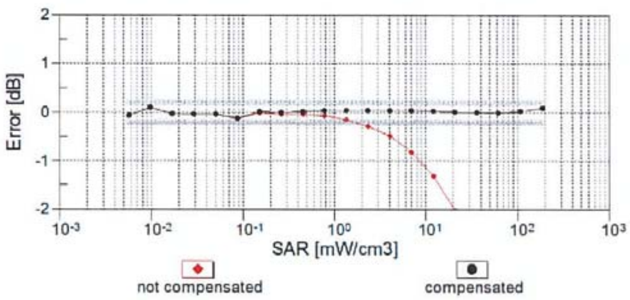




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

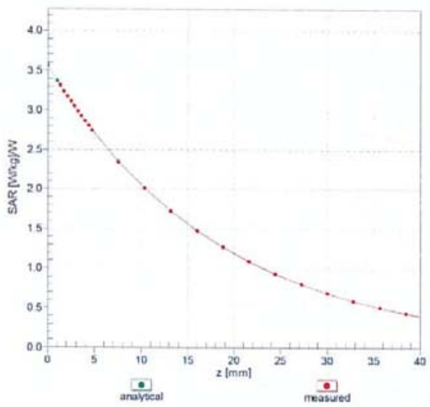




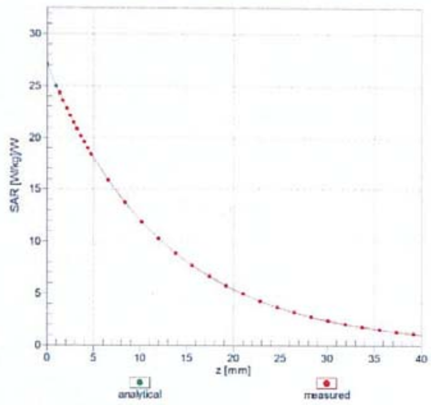
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

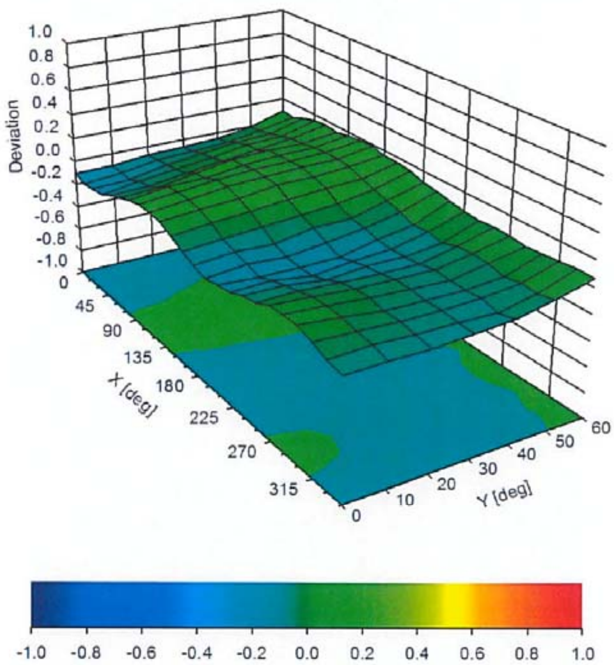


f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

Product Service

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3759

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-3
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: 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	149.0	± 3.5 %
		Y	0.00	0.00	1.00		147.4	
		Z	0.00	0.00	1.00		138.4	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	3.04	67.74	11.79	10.00	20.0	± 9.6 %
		Y	3.27	68.79	12.30		20.0	
		Z	3.42	68.76	12.60		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	0.99	66.30	14.68	0.00	150.0	± 9.6 %
		Y	1.02	66.67	14.90		150.0	
		Z	0.99	66.23	14.64		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.17	63.37	14.79	0.41	150.0	± 9.6 %
		Y	1.18	63.58	14.98		150.0	
		Z	1.18	63.40	14.78		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.83	66.46	16.84	1.46	150.0	± 9.6 %
		Y	4.90	66.50	16.94		150.0	
		Z	4.87	66.45	16.82		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	27.32	96.15	23.00	9.39	50.0	± 9.6 %
		Y	100.00	113.48	27.55		50.0	
		Z	18.13	91.34	22.13		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	17.75	90.44	21.39	9.57	50.0	± 9.6 %
		Y	64.93	107.78	26.22		50.0	
		Z	13.93	87.63	21.03		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	110.23	24.91	6.56	60.0	± 9.6 %
		Y	100.00	111.43	25.52		60.0	
		Z	66.71	106.54	24.55		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	4.69	70.97	25.39	12.57	50.0	± 9.6 %
		Y	9.43	92.86	36.24		50.0	
		Z	4.57	69.11	24.07		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	8.47	87.67	30.15	9.56	60.0	± 9.6 %
		Y	11.37	95.44	33.46		60.0	
		Z	8.88	87.57	29.82		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	109.77	23.94	4.80	80.0	± 9.6 %
		Y	100.00	111.14	24.62		80.0	
		Z	100.00	110.40	24.46		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	110.50	23.60	3.55	100.0	± 9.6 %
		Y	100.00	111.94	24.31		100.0	
		Z	100.00	110.79	23.94		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	5.65	79.24	25.77	7.80	80.0	± 9.6 %
		Y	6.78	83.68	27.89		80.0	
		Z	6.05	79.84	25.79		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	108.40	23.61	5.30	70.0	± 9.6 %
		Y	100.00	109.85	24.34		70.0	
		Z	39.21	99.31	21.96		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	109.64	22.00	1.88	100.0	± 9.6 %
		Y	100.00	111.22	22.73		100.0	
		Z	100.00	109.98	22.33		100.0	

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10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	115.35	23.50	1.17	100.0	± 9.6 %
		Y	100.00	116.40	23.97		100.0	
		Z	100.00	114.90	23.50		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	5.50	80.43	20.01	5.30	70.0	± 9.6 %
		Y	8.78	88.43	23.32		70.0	
		Z	5.52	79.91	19.94		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	2.26	72.05	15.71	1.88	100.0	± 9.6 %
		Y	2.75	75.11	17.48		100.0	
		Z	2.35	72.23	15.94		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	1.71	69.83	14.64	1.17	100.0	± 9.6 %
		Y	1.95	71.69	15.93		100.0	
		Z	1.77	69.99	14.88		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	6.42	82.93	20.96	5.30	70.0	± 9.6 %
		Y	11.14	92.31	24.62		70.0	
		Z	6.34	82.16	20.81		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	2.14	71.45	15.43	1.88	100.0	± 9.6 %
		Y	2.61	74.51	17.21		100.0	
		Z	2.24	71.69	15.69		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	1.72	70.07	14.85	1.17	100.0	± 9.6 %
		Y	1.96	72.01	16.17		100.0	
		Z	1.78	70.24	15.09		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	1.67	70.78	15.04	0.00	150.0	± 9.6 %
		Y	1.78	71.15	15.56		150.0	
		Z	1.72	70.94	15.32		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	22.45	92.22	20.50	7.78	50.0	± 9.6 %
		Y	100.00	109.74	25.02		50.0	
		Z	17.06	89.50	20.18		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.00	92.98	2.04	0.00	150.0	± 9.6 %
		Y	0.00	94.50	2.19		150.0	
		Z	0.00	94.03	3.01		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	8.86	78.37	18.88	13.80	25.0	± 9.6 %
		Y	12.87	84.32	21.06		25.0	
		Z	8.56	78.04	19.28		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	9.63	81.59	18.85	10.79	40.0	± 9.6 %
		Y	15.92	88.85	21.37		40.0	
		Z	9.22	81.13	19.17		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	9.68	84.10	21.63	9.03	50.0	± 9.6 %
		Y	14.40	91.26	24.48		50.0	
		Z	8.89	82.35	21.22		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.44	74.95	23.28	6.55	100.0	± 9.6 %
		Y	5.07	77.93	24.80		100.0	
		Z	4.74	75.63	23.39		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.20	64.26	15.22	0.61	110.0	± 9.6 %
		Y	1.22	64.64	15.52		110.0	
		Z	1.22	64.34	15.22		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	3.05	83.81	21.08	1.30	110.0	± 9.6 %
		Y	6.45	94.80	24.64		110.0	
		Z	3.16	83.51	20.82		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	2.26	74.64	19.29	2.04	110.0	± 9.6 %
		Y	2.80	78.34	20.99		110.0	
		Z	2.40	74.91	19.27		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.64	66.51	16.35	0.49	100.0	± 9.6 %
		Y	4.71	66.52	16.41		100.0	
		Z	4.68	66.50	16.34		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.65	66.58	16.42	0.72	100.0	± 9.6 %
		Y	4.72	66.60	16.50		100.0	
		Z	4.69	66.57	16.41		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.93	66.82	16.63	0.86	100.0	± 9.6 %
		Y	5.02	66.89	16.73		100.0	
		Z	4.98	66.83	16.63		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.80	66.69	16.70	1.21	100.0	± 9.6 %
		Y	4.89	66.77	16.81		100.0	
		Z	4.84	66.71	16.69		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.81	66.69	16.83	1.46	100.0	± 9.6 %
		Y	4.90	66.80	16.97		100.0	
		Z	4.86	66.71	16.83		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.10	66.85	17.25	2.04	100.0	± 9.6 %
		Y	5.19	66.91	17.37		100.0	
		Z	5.15	66.85	17.23		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.14	66.87	17.43	2.55	100.0	± 9.6 %
		Y	5.25	67.04	17.62		100.0	
		Z	5.21	66.92	17.43		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.22	66.88	17.62	2.67	100.0	± 9.6 %
		Y	5.33	67.01	17.80		100.0	
		Z	5.29	66.91	17.62		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.92	66.52	17.10	1.99	100.0	± 9.6 %
		Y	4.99	66.58	17.23		100.0	
		Z	4.96	66.52	17.09		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.90	66.80	17.28	2.30	100.0	± 9.6 %
		Y	4.98	66.91	17.43		100.0	
		Z	4.95	66.83	17.27		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.96	66.95	17.56	2.83	100.0	± 9.6 %
		Y	5.04	67.07	17.74		100.0	
		Z	5.01	66.98	17.56		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.95	66.85	17.70	3.30	100.0	± 9.6 %
		Y	5.02	66.97	17.89		100.0	
		Z	5.01	66.89	17.70		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	4.99	66.96	17.98	3.82	90.0	± 9.6 %
		Y	5.08	67.14	18.22		90.0	
		Z	5.06	67.04	18.00		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.01	66.78	18.11	4.15	90.0	± 9.6 %
		Y	5.08	66.91	18.32		90.0	
		Z	5.08	66.85	18.11		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.04	66.85	18.20	4.30	90.0	± 9.6 %
		Y	5.10	66.97	18.41		90.0	
		Z	5.10	66.92	18.20		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	0.80	65.24	12.08	0.00	150.0	± 9.6 %
		Y	0.85	65.56	12.59		150.0	
		Z	0.82	65.35	12.34		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.68	58.27	3.79	4.77	80.0	± 9.6 %
		Y	0.86	60.00	4.99		80.0	
		Z	0.80	58.87	4.46		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	110.24	24.94	6.56	60.0	± 9.6 %
		Y	100.00	111.45	25.55		60.0	
		Z	61.75	105.66	24.37		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.80	67.24	15.39	0.00	150.0	± 9.6 %
		Y	1.81	67.18	15.46		150.0	
		Z	1.80	67.11	15.37		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.76	67.18	15.35	0.00	150.0	± 9.6 %
		Y	1.78	67.13	15.43		150.0	
		Z	1.76	67.04	15.33		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	8.51	87.74	30.17	9.56	60.0	± 9.6 %
		Y	11.43	95.53	33.48		60.0	
		Z	8.91	87.61	29.83		60.0	
10100-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.05	69.78	16.46	0.00	150.0	± 9.6 %
		Y	3.13	70.04	16.53		150.0	
		Z	3.07	69.82	16.43		150.0	
10101-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.21	67.25	15.78	0.00	150.0	± 9.6 %
		Y	3.26	67.38	15.84		150.0	
		Z	3.23	67.28	15.77		150.0	
10102-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.31	67.26	15.89	0.00	150.0	± 9.6 %
		Y	3.37	67.35	15.94		150.0	
		Z	3.34	67.28	15.89		150.0	
10103-CAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	5.95	73.98	19.42	3.98	65.0	± 9.6 %
		Y	6.46	75.28	20.05		65.0	
		Z	5.88	73.30	19.04		65.0	
10104-CAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.15	72.74	19.68	3.98	65.0	± 9.6 %
		Y	6.50	73.70	20.23		65.0	
		Z	6.36	72.92	19.68		65.0	
10105-CAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	5.78	71.44	19.39	3.98	65.0	± 9.6 %
		Y	6.20	72.69	20.09		65.0	
		Z	6.26	72.53	19.82		65.0	
10108-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.66	69.02	16.27	0.00	150.0	± 9.6 %
		Y	2.74	69.24	16.34		150.0	
		Z	2.69	69.04	16.24		150.0	
10109-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	2.86	67.09	15.67	0.00	150.0	± 9.6 %
		Y	2.92	67.19	15.74		150.0	
		Z	2.89	67.10	15.67		150.0	
10110-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.15	68.08	15.82	0.00	150.0	± 9.6 %
		Y	2.23	68.29	15.94		150.0	
		Z	2.18	68.07	15.80		150.0	
10111-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.58	67.97	15.95	0.00	150.0	± 9.6 %
		Y	2.63	67.86	15.99		150.0	
		Z	2.60	67.91	15.97		150.0	

10112-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	2.99	67.13	15.75	0.00	150.0	± 9.6 %
		Y	3.05	67.18	15.80		150.0	
		Z	3.01	67.13	15.74		150.0	
10113-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.73	68.15	16.11	0.00	150.0	± 9.6 %
		Y	2.78	68.00	16.13		150.0	
		Z	2.76	68.09	16.12		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.12	67.14	16.40	0.00	150.0	± 9.6 %
		Y	5.16	67.11	16.38		150.0	
		Z	5.14	67.13	16.37		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.39	67.23	16.45	0.00	150.0	± 9.6 %
		Y	5.47	67.32	16.49		150.0	
		Z	5.43	67.27	16.45		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.20	67.31	16.41	0.00	150.0	± 9.6 %
		Y	5.26	67.33	16.42		150.0	
		Z	5.23	67.32	16.39		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.08	66.99	16.34	0.00	150.0	± 9.6 %
		Y	5.13	67.01	16.35		150.0	
		Z	5.10	67.00	16.32		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.47	67.43	16.56	0.00	150.0	± 9.6 %
		Y	5.55	67.51	16.60		150.0	
		Z	5.51	67.48	16.56		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.19	67.27	16.40	0.00	150.0	± 9.6 %
		Y	5.23	67.26	16.40		150.0	
		Z	5.21	67.26	16.38		150.0	
10140-CAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.35	67.26	15.81	0.00	150.0	± 9.6 %
		Y	3.41	67.36	15.86		150.0	
		Z	3.37	67.28	15.80		150.0	
10141-CAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.47	67.39	16.00	0.00	150.0	± 9.6 %
		Y	3.53	67.45	16.03		150.0	
		Z	3.50	67.41	15.99		150.0	
10142-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	1.92	68.04	15.43	0.00	150.0	± 9.6 %
		Y	2.00	68.21	15.62		150.0	
		Z	1.95	68.01	15.47		150.0	
10143-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.43	68.67	15.60	0.00	150.0	± 9.6 %
		Y	2.48	68.53	15.74		150.0	
		Z	2.46	68.63	15.70		150.0	
10144-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.19	66.27	13.92	0.00	150.0	± 9.6 %
		Y	2.28	66.45	14.25		150.0	
		Z	2.23	66.33	14.07		150.0	
10145-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	1.16	64.50	11.31	0.00	150.0	± 9.6 %
		Y	1.29	65.42	12.29		150.0	
		Z	1.24	65.05	11.89		150.0	
10146-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.75	64.91	10.68	0.00	150.0	± 9.6 %
		Y	2.10	66.86	12.19		150.0	
		Z	1.85	65.40	11.22		150.0	
10147-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.99	66.41	11.55	0.00	150.0	± 9.6 %
		Y	2.48	68.95	13.31		150.0	
		Z	2.12	67.01	12.15		150.0	

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10149-CAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	2.87	67.16	15.72	0.00	150.0	± 9.6 %
		Y	2.93	67.25	15.78		150.0	
		Z	2.90	67.17	15.71		150.0	
10150-CAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.00	67.19	15.79	0.00	150.0	± 9.6 %
		Y	3.05	67.23	15.84		150.0	
		Z	3.02	67.19	15.79		150.0	
10151-CAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.19	76.09	20.32	3.98	65.0	± 9.6 %
		Y	6.72	77.39	20.98		65.0	
		Z	6.36	75.98	20.19		65.0	
10152-CAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	5.64	72.49	19.24	3.98	65.0	± 9.6 %
		Y	6.02	73.58	19.91		65.0	
		Z	5.85	72.65	19.26		65.0	
10153-CAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	6.03	73.53	20.06	3.98	65.0	± 9.6 %
		Y	6.38	74.47	20.65		65.0	
		Z	6.24	73.66	20.07		65.0	
10154-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.20	68.51	16.09	0.00	150.0	± 9.6 %
		Y	2.28	68.70	16.20		150.0	
		Z	2.23	68.51	16.09		150.0	
10155-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.58	67.98	15.97	0.00	150.0	± 9.6 %
		Y	2.63	67.87	16.01		150.0	
		Z	2.61	67.92	15.98		150.0	
10156-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	1.76	68.06	15.17	0.00	150.0	± 9.6 %
		Y	1.85	68.29	15.45		150.0	
		Z	1.80	68.08	15.26		150.0	
10157-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	2.02	66.77	13.91	0.00	150.0	± 9.6 %
		Y	2.12	66.99	14.30		150.0	
		Z	2.07	66.86	14.11		150.0	
10158-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.74	68.22	16.16	0.00	150.0	± 9.6 %
		Y	2.79	68.06	16.17		150.0	
		Z	2.77	68.16	16.17		150.0	
10159-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	2.12	67.25	14.20	0.00	150.0	± 9.6 %
		Y	2.23	67.45	14.59		150.0	
		Z	2.18	67.37	14.42		150.0	
10160-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.69	68.25	16.09	0.00	150.0	± 9.6 %
		Y	2.75	68.31	16.13		150.0	
		Z	2.71	68.19	16.05		150.0	
10161-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	2.89	67.14	15.71	0.00	150.0	± 9.6 %
		Y	2.95	67.16	15.77		150.0	
		Z	2.92	67.13	15.72		150.0	
10162-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.00	67.31	15.83	0.00	150.0	± 9.6 %
		Y	3.06	67.29	15.87		150.0	
		Z	3.03	67.28	15.83		150.0	
10166-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.52	69.26	18.89	3.01	150.0	± 9.6 %
		Y	3.63	69.41	18.97		150.0	
		Z	3.54	68.96	18.65		150.0	
10167-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	4.34	72.30	19.40	3.01	150.0	± 9.6 %
		Y	4.53	72.61	19.56		150.0	
		Z	4.33	71.71	19.05		150.0	

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10168-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.92	75.00	20.95	3.01	150.0	± 9.6 %
		Y	5.05	74.92	20.91		150.0	
		Z	4.86	74.20	20.52		150.0	
10169-CAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.94	68.69	18.63	3.01	150.0	± 9.6 %
		Y	3.06	69.43	19.00		150.0	
		Z	2.97	68.51	18.42		150.0	
10170-CAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	4.15	75.29	21.28	3.01	150.0	± 9.6 %
		Y	4.43	76.35	21.68		150.0	
		Z	4.11	74.52	20.83		150.0	
10171-AAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	3.30	70.50	18.18	3.01	150.0	± 9.6 %
		Y	3.54	71.68	18.72		150.0	
		Z	3.31	70.02	17.86		150.0	
10172-CAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	5.72	82.17	24.47	6.02	65.0	± 9.6 %
		Y	9.41	91.72	28.09		65.0	
		Z	7.05	84.62	25.03		65.0	
10173-CAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	10.09	89.06	25.03	6.02	65.0	± 9.6 %
		Y	16.80	97.79	27.98		65.0	
		Z	9.48	86.64	24.01		65.0	
10174-CAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	7.37	83.04	22.50	6.02	65.0	± 9.6 %
		Y	11.94	90.83	25.28		65.0	
		Z	6.31	79.38	21.04		65.0	
10175-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.90	68.35	18.36	3.01	150.0	± 9.6 %
		Y	3.02	69.11	18.74		150.0	
		Z	2.93	68.17	18.15		150.0	
10176-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	4.15	75.31	21.29	3.01	150.0	± 9.6 %
		Y	4.43	76.38	21.69		150.0	
		Z	4.12	74.55	20.84		150.0	
10177-CAF	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.92	68.51	18.47	3.01	150.0	± 9.6 %
		Y	3.05	69.27	18.84		150.0	
		Z	2.95	68.34	18.26		150.0	
10178-CAD	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	4.11	75.05	21.16	3.01	150.0	± 9.6 %
		Y	4.38	76.11	21.55		150.0	
		Z	4.07	74.28	20.70		150.0	
10179-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.67	72.68	19.56	3.01	150.0	± 9.6 %
		Y	3.93	73.84	20.04		150.0	
		Z	3.66	72.05	19.16		150.0	
10180-CAD	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	3.29	70.43	18.13	3.01	150.0	± 9.6 %
		Y	3.53	71.60	18.66		150.0	
		Z	3.30	69.94	17.80		150.0	
10181-CAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.92	68.49	18.46	3.01	150.0	± 9.6 %
		Y	3.04	69.25	18.83		150.0	
		Z	2.95	68.32	18.25		150.0	
10182-CAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	4.10	75.03	21.14	3.01	150.0	± 9.6 %
		Y	4.37	76.08	21.54		150.0	
		Z	4.06	74.26	20.69		150.0	
10183-AAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	3.29	70.40	18.12	3.01	150.0	± 9.6 %
		Y	3.52	71.58	18.65		150.0	
		Z	3.30	69.92	17.79		150.0	

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10184-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.93	68.54	18.48	3.01	150.0	± 9.6 %
		Y	3.05	69.29	18.86		150.0	
		Z	2.96	68.36	18.28		150.0	
10185-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	4.12	75.11	21.19	3.01	150.0	± 9.6 %
		Y	4.39	76.16	21.58		150.0	
		Z	4.08	74.34	20.73		150.0	
10186-AAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	3.30	70.47	18.15	3.01	150.0	± 9.6 %
		Y	3.54	71.65	18.69		150.0	
		Z	3.31	69.98	17.83		150.0	
10187-CAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.94	68.60	18.55	3.01	150.0	± 9.6 %
		Y	3.06	69.34	18.92		150.0	
		Z	2.97	68.41	18.34		150.0	
10188-CAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	4.28	75.90	21.62	3.01	150.0	± 9.6 %
		Y	4.56	76.93	22.00		150.0	
		Z	4.23	75.10	21.16		150.0	
10189-AAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	3.38	70.93	18.45	3.01	150.0	± 9.6 %
		Y	3.63	72.12	18.98		150.0	
		Z	3.39	70.42	18.11		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.51	66.56	16.08	0.00	150.0	± 9.6 %
		Y	4.56	66.52	16.10		150.0	
		Z	4.53	66.54	16.07		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.67	66.86	16.21	0.00	150.0	± 9.6 %
		Y	4.74	66.84	16.22		150.0	
		Z	4.71	66.85	16.19		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.71	66.89	16.23	0.00	150.0	± 9.6 %
		Y	4.78	66.87	16.24		150.0	
		Z	4.75	66.88	16.21		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.51	66.61	16.10	0.00	150.0	± 9.6 %
		Y	4.57	66.59	16.12		150.0	
		Z	4.54	66.60	16.09		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.68	66.88	16.22	0.00	150.0	± 9.6 %
		Y	4.75	66.87	16.23		150.0	
		Z	4.72	66.87	16.21		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.71	66.91	16.24	0.00	150.0	± 9.6 %
		Y	4.78	66.89	16.25		150.0	
		Z	4.75	66.90	16.22		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.45	66.63	16.06	0.00	150.0	± 9.6 %
		Y	4.52	66.60	16.08		150.0	
		Z	4.49	66.61	16.05		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.68	66.85	16.21	0.00	150.0	± 9.6 %
		Y	4.75	66.84	16.23		150.0	
		Z	4.71	66.84	16.20		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.72	66.84	16.22	0.00	150.0	± 9.6 %
		Y	4.79	66.82	16.24		150.0	
		Z	4.76	66.83	16.21		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.05	67.00	16.34	0.00	150.0	± 9.6 %
		Y	5.11	67.02	16.35		150.0	
		Z	5.08	67.01	16.32		150.0	