2/F., Garment Centre,
576 Castle Peak Road, Kowloon,
Hong Kong.

Telephone: (852) 2173 8888
Facsimile: (852) 2785 5487
www.intertek.com

TEST REPORT

SPECIFIC ABSORPTION RATE (SAR) EVALUATION REPORT

For Si200 - Body Worn Camera

Model Number: Si200
Motorola Internal Model(s) No.: HKUN4120A

Brand Name: Motorola

FCC ID: AZ489FT7120

Prepared for
Motorola Solutions Inc.
8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322

This report supersedes previous report with report number 18101181HKG-001R1 dated April 02, 2019. Please refer HEE-S19-0019 Letter issued on April 08, 2019 for amendment/ supersede notification.

TESTED, PREPARED AND CHECKED BY:	APPROVED BY:
Ricky Xu Assistant Manager Shenzhen UnionTrust Quality and Technology Co., Ltd. Date: April 08, 2019	Terry Chan Manager Intertek Testing Services Hong Kong Date: April 08, 2019

Digitally signed by Terry Chan
Location: Intertek Testing Services Hong Kong Ltd.

TEST REPORT

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1. TEST RESULT SUMMARY

Applicant:	Motorola Solutions Inc.
Applicant Address:	8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322
Model:	Si200
Motorola internal Model:	HKUN4120A
Brand Name:	Motorola
Serial Number:	N/A
FCC ID:	AZ489FT7120
Test Device:	Production Unit
Exposure Category:	General Population/Uncontrolled Exposure
Date of Test:	February 27, 2019 to February 28, 2019
Place of Testing:	Shenzhen UnionTrust Quality and Technology Co., Ltd. 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China.
Environmental Conditions:	Temperature: +18 to 25°C Humidity 25 to 75%
Test Specification:	ANSI/IEEE C95.1 IEEE Std 1528: 2013 FCC KDB Publication 447498 D01 v06 FCC KDB Publication 865664 D01 v01r04 FCC KDB Publication 865664 D02 v01r02 FCC KDB Publication 248227 D01 v02r02

The maximum spatial peak SAR value for the sample device averaged over 1g was found to be:

Band	Operating Mode	TX Frequency (MHz)	Highest Reported SAR
			Body-worn
2.4GHz WiFi	Data	2412 - 2462	< 0.10
5.2GHz WiFi	Data	5180 - 5240	N/A
5.3GHz WiFi	Data	5260 - 5320	N/A
5.6GHz WiFi	Data	5500 - 5720	< 0.10
5.8GHz WiFi	Data	5745 - 5825	< 0.10
BT	Data	2402 - 2480	N/A

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.

TEST REPORT

2. GENERAL INFORMATION

2.1. Description of Equipment under test (EUT)

Manufacturer:	Systech Electronics Ltd
Manufacturer Address:	802 Sunbeam Centre, 27 Shing Yip Street, Kwun Tong, Hong Kong
Device dimension (L x W) :	91 (mm) x 62 (mm)
Device thickness:	32 (mm)
Antenna Gain:	2.4G WiFi/BT: -0.04dBi; 5.2G WiFi: 1.23dBi; 5.3G WiFi: 3.01dBi; 5.6G WiFi: 3.91dBi; 5.8G WiFi: 2.99dBi;
Operating Configuration(s) / mode:	Body-worn (Data)
Tx Frequency (MHz):	2412MHz to 2462MHz (2.4GHz WiFi) 5180MHz to 5240MHz (5.2GHz WiFi) 5260MHz to 5320MHz (5.3GHz WiFi) 5500MHz to 5720MHz (5.6GHz WiFi) 5745MHz to 5825MHz (5.8GHz WiFi) 2402MHz to 2480MHz (BT)
Duty Cycle*:	2.4GHz 802.11b: 98.85%; 802.11g: 93.21%; 2.4GHz 802.11n(HT20): 61.91%; 802.11n(HT40):55.22% 5GHz 802.11a: 93.14% 5GHz 802.11n(HT20): 94.55%; 802.11n(HT40): 90.43% 5GHz 802.11ac(VHT20): 93.10%; 802.11ac(VHT40): 86.36% 5GHz 802.11ac(VHT80): 76.74%
H/W Version:	V3
S/W Version:	1811160T
Battery Type:	3.7VDC (1 x 3.7V 3750mAh Li-ion battery) Model name: PMNN4577A Trade Mark : Motorola
Body-worn Accessories:	Holder 1: Magnetic Clip: (PMLN8221A) Holder 2: Swivel Belt Clip (PMLN8220A)

Note*: Per KDB 248227 D01, the reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. They were compensated by the crest factor parameter in SAR measurement system.

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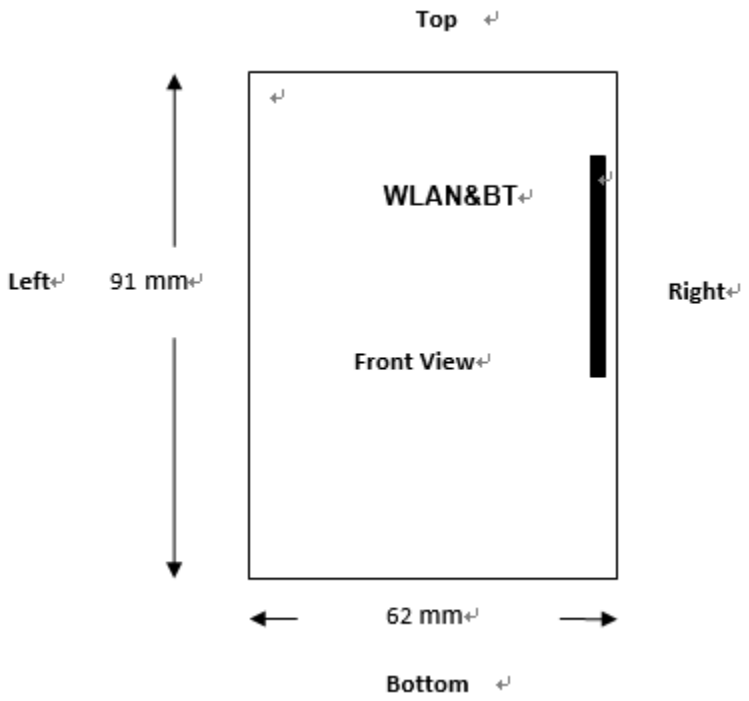
2.2. EUT Antenna Locations



Exposure Position	Separation Distance from the Antenna to the Outer Surface
Front	0 mm
Rear	0 mm
Left	56 mm
Right	3 mm
Top	20 mm
Bottom	40 mm

Details of antenna specification are shown in separate antenna dimension document.

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2.3. Nominal and Maximum Output Power Specifications

The EUT 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.

For 2.4GHz WiFi

Band	Operating Mode	TX Frequency (MHz)	Output Power	
			Nominal (dBm)	Maximum (dBm)
2.4GHz	802.11b	2400.0 – 2483.5	+13.5	+14.0
2.4GHz	802.11g	2412 - 2462	+13.5	+14.0
2.4GHz	802.11n (HT20)	2412 - 2462	+10.5	+11.0
2.4GHz	802.11 (HT40)	2422 - 2452	+10.0	+10.5

For Bluetooth

Band	Operating Mode	TX Frequency (MHz)	Output Power	
			Nominal (dBm)	Maximum (dBm)
2.4GHz	Data	2402 – 2480	+5.0	+5.5

For 5.2GHz WiFi

Band	Operating Mode	Output Power	
		Nominal (dBm)	Maximum (dBm)
5.2GHz	802.11a	+6.5	+7.0
	802.11n HT20	+6.5	+7.0
	802.11n HT40	+6.5	+7.0
	802.11ac VHT20	+6.5	+7.0
	802.11ac VHT40	+6.5	+7.0
	802.11ac VHT80	+5.5	+6.0

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For 5.3GHz WiFi

Band	Operating Mode	Output Power	
		Nominal (dBm)	Maximum (dBm)
5.3GHz	802.11a	+6.5	+7.0
	802.11n HT20	+6.5	+7.0
	802.11n HT40	+6.5	+7.0
	802.11ac VHT20	+6.5	+7.0
	802.11ac VHT40	+6.5	+7.0
	802.11ac VHT80	+5.5	+6.0

For 5.6GHz WiFi

Band	Operating Mode	Output Power	
		Nominal (dBm)	Maximum (dBm)
5.6GHz	802.11a	+10.0	+10.5
	802.11n HT20	+9.5	+10.0
	802.11n HT40	+7.5	+8.0
	802.11ac VHT20	+9.5	+10.0
	802.11ac VHT40	+7.0	+7.5
	802.11ac VHT80	+6.5	+7.0

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For 5.8GHz WiFi

Band	Operating Mode	Output Power	
		Nominal (dBm)	Maximum (dBm)
5.8GHz	802.11a	+11.0	+11.5
	802.11n HT20	+10.5	+11.0
	802.11n HT40	+8.5	+9.0
	802.11ac VHT20	+9.5	+10.0
	802.11ac VHT40	+8.5	+9.0
	802.11ac VHT80	+9.5	+10.0

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3. SAR MEASUREMENT SYSTEM DESCRIPTION

SAR is related to the rate at which energy is absorbed per unit mass in object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.
The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of given mass density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dV}\right)$$

SAR is expressed in units of Watts per kilogram (W/Kg)
SAR can be obtained using either of the following equations:

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

$$SAR = c_h \left.\frac{dT}{dt}\right|_{t=0}$$

Where

SAR is the specific absorption rate in watts per kilogram;
E is the r.m.s. value of the electric field strength in the tissue in volts per meter;
σ is the conductivity of the tissue in siemens per metre;
ρ is the density of the tissue in kilograms per cubic metre;
c_h is the heat capacity of the tissue in joules per kilogram and Kelvin;

$\left.\frac{dT}{dt}\right|_{t=0}$ is the initial time derivative of temperature in the tissue in kelvins per second

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DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

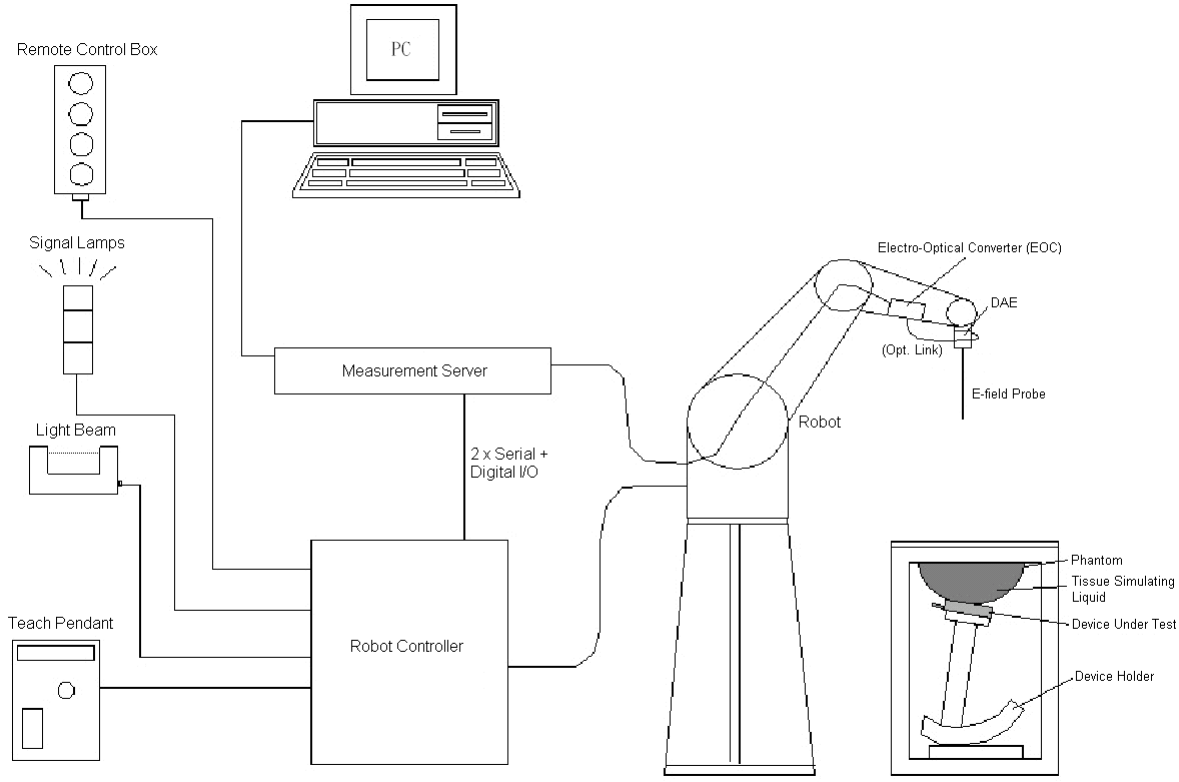

Figure 1: Schematic diagram of the SAR measurement system

TEST REPORT

ROBOT

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

TEST REPORT

E-FIELD PROBE

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Model	EX3DV4
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Model	ES3DV3
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 µW/g to 100 mW/g Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm

TEST REPORT

Data Acquisition Electronics (DAE)

Model	DAE3, DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5µV (with auto zero)
Input Bias Current	< 50 fA
Dimensions	60 x 60 x 68 mm

TEST REPORT

SAM TWIN PHANTOM

Model	Twin SAM
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters

Model	ELI
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters

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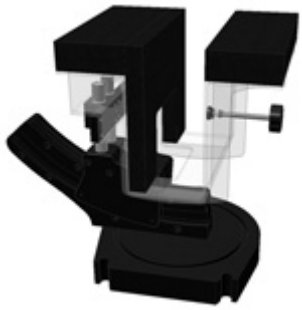
DEVICE HOLDER

Model	Mounting Device
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).
Material	POM

Model	Laptop Extensions Kit
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.
Material	POM, Acrylic glass, Foam



System Validation Dipoles

Model	D-Serial
Construction	Symmetrical dipole with l/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.
Frequency	750 MHz to 5800 MHz
Return Loss	> 20 dB
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)

TEST REPORT

During measurement, the system first does an area (2D) scan at a fixed depth within the liquid from the inside wall of the phantom scanning area is greater than the projection of EUT and antenna.

Area Scan Parameters extracted from KDB 865664

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 mm ± 1 mm	½·δ·ln(2) mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

When the maximum SAR point has been found, the system will then carry out a zoom (3D) scan centered at that point to determine volume averaged SAR level.

Zoom Scan Parameters extracted from KDB 865664

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details. * When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

TEST REPORT

4. TISSUE VERIFICATION

For SAR measurement of field distribution inside phantom, homogeneous tissue simulating liquid as below liquid recipes were filled to a depth of 15cm ± 0.5cm for below 3GHz measurement and of 10cm ± 0.5cm for above 3GHz.

HEAD TISSUE RECIPES

Frequency	Ingredients					
	De-ionized Water	Salt	1,2 propanediol	DGBE	DGMH	Triton X100
450 MHz	33.5%	3.4%	63.1%			
750 MHz	34.2%	1.4%	64.4%			
900 MHz	35.3%	1.0%	63.7%			
1800 MHz	55.2%	0.6%		13.8%		30.4%
1900 MHz	55.3%	0.5%		13.8%		30.4%
2000 MHz	55.3%	0.4%		13.8%		30.5%
2450 MHz	55.7%	0.3%		18.7%		25.3%
5000 MHz	65.3%				17.2%	17.5%

BODY TISSUE RECIPES

Frequency	Ingredients					
	De-ionized Water	Salt	1,2 propanediol	DGBE	DGMH	Triton X100
450 MHz	52.4%	1.9%	45.7%			
750 MHz	55.4%	1.3%	43.3%			
900 MHz	52.9%	1.0%	46.1%			
1800 MHz	70.8%	0.5%		8.7%		20.0%
1900 MHz	70.1%	0.4%		8.9%		20.6%
2000 MHz	70.2%	0.3%		8.6%		20.9%
2450 MHz	70.8%	0.3%		8.7%		20.2%
5000 MHz	77.8%				11.7%	11.5%

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The head tissue dielectric parameters recommended by the IEEE Std 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. For other head and body tissue parameters, they are recommended by KDB 865664.

Target Frequency	head		body	
(MHz)	εr	σ (S/m)	εr	σ (S/m)
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	1.01	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)

When a transmission band overlaps with one of the target frequencies, the tissue dielectric parameters of the tissue medium at the middle of a device transmission band should be within ±5% of the parameters specified at that target frequency.

TEST REPORT

The dielectric parameters of the liquids were verified prior to the SAR evaluation.

The dielectric parameters were:

Body Liquid

Freq. (MHz)	Temp. (˚C)	ε_r / Relative Permittivity			σ / Conductivity			ρ **(kg/m^3)
		measured	Target*	Δ (±5%)	measured	Target*	Δ (±5%)	
2450	22.1	52.400	52.70	-0.57	2.000	1.95	2.56	1000

* *Target values refer to KDB 865664*
** *Worst-case assumption*

Note:
1. Date of tissue verification measurement: Feb. 27, 2019

2. Ambient temperature: 23.0 deg C

3. The temperature condition is within +/- 2 deg. C during the SAR measurements.

Body Liquid

Freq. (MHz)	Temp. (˚C)	ε_r / Relative Permittivity			σ / Conductivity			ρ **(kg/m^3)
		measured	Target*	Δ (±5%)	measured	Target*	Δ (±5%)	
5600	22.1	48.547	48.50	0.10	5.869	5.77	1.72	1000

* *Target values refer to KDB 865664*
** *Worst-case assumption*

Note:
1. Date of tissue verification measurement: Feb. 28, 2019

2. Ambient temperature: 23.0 deg C

3. The temperature condition is within +/- 2 deg. C during the SAR measurements.

Body Liquid

Freq. (MHz)	Temp. (˚C)	ε_r / Relative Permittivity			σ / Conductivity			ρ **(kg/m^3)
		measured	Target*	Δ (±5%)	measured	Target*	Δ (±5%)	
5800	22.1	48.040	48.20	-0.33	6.128	6.00	2.13	1000

* *Target values refer to KDB 865664*
** *Worst-case assumption*

Note:
1. Date of tissue verification measurement: Feb. 28, 2019

2. Ambient temperature: 23.0 deg C

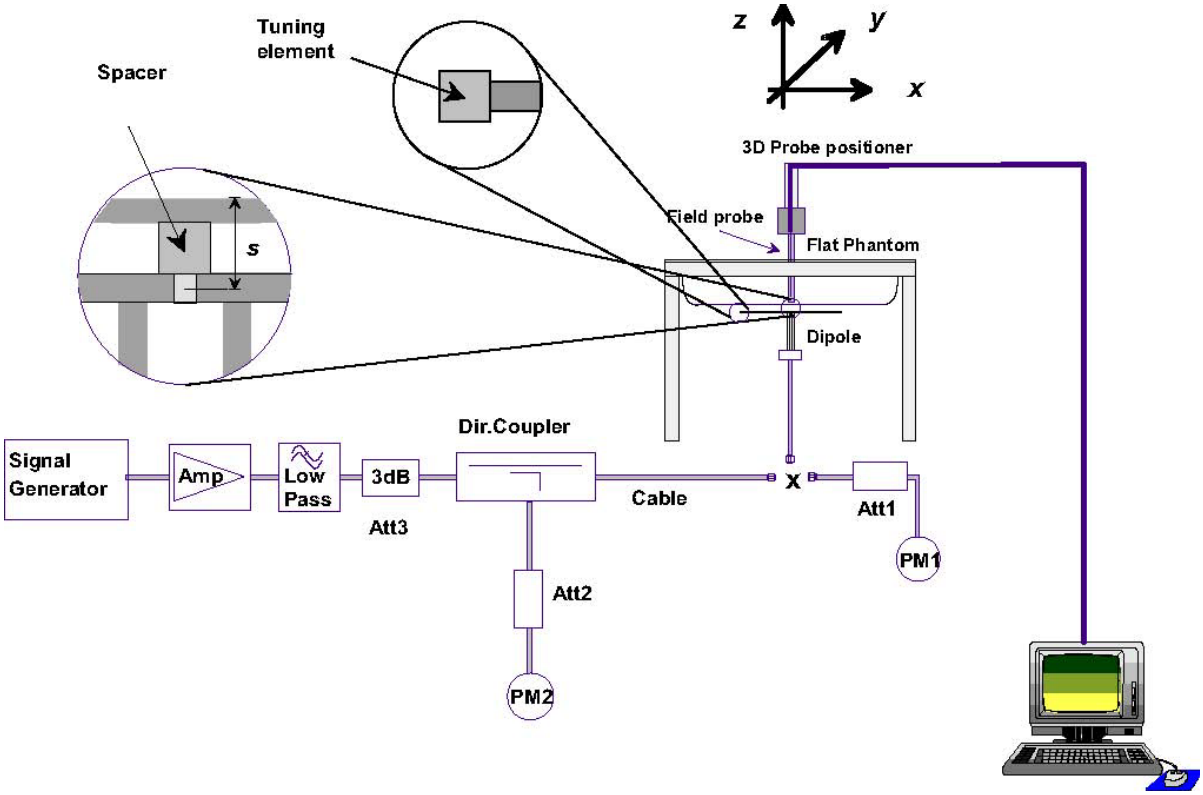
3. The temperature condition is within +/- 2 deg. C during the SAR measurements.

TEST REPORT

5. SAR MEASUREMENT SYSTEM VERIFICATION

Each DASY system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the DASY software, enable user to conduct the system check. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.



TEST REPORT

VALIDATION DIPOLE

The dipoles used is based on the IEEE Std 1528, and is complied with mechanical and electrical specifications in line with the requirements of both FCC and KDB requirement.

SYSTEM CHECK RESULTS

System Verification								
Date	Freq. (MHz)	Liquid Type	System Diople	Serial No.	Target SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (±10%)
Feb. 27, 2019	2450	Body	D2450V2	883	51.80	5.42	54.20	4.63

* the target was quoted from dipole calibration report
* Input power level = 20dBm (0.1W)

System Verification								
Date	Freq. (MHz)	Liquid Type	System Diople	Serial No.	Target SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (±10%)
Feb. 28, 2019	5600	Body	D5GHzV2	1280	79.20	7.86	78.60	-0.76
Feb. 28, 2019	5800	Body	D5GHzV2	1280	75.00	7.56	75.60	0.80

* the target was quoted from dipole calibration report
* Input power level = 20dBm (0.1W)

SAR_{1g} ambient measured value < 12 mW/kg

Details of System Verification plots are shown in the Appendix A - plot 1, 2, 3.

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6. SAR EVALUATION

6.1. Device test positions relative to body-worn accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be reported for that body-worn accessory with a headset attached to the handset.

SAR evaluation is required for body-worn accessories supplied with the host device. The test configurations must be conservative for supporting the body-worn accessory use conditions expected by users. Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. All body-worn accessories containing metallic components, either supplied with the product or available as an option from the device manufacturer, must be tested in conjunction with the host device to demonstrate compliance

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

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6.2. RF Output Power Measurements

For 2.4GHz WiFi

Operating Mode / Band		Date Rate	Channel	Freq. (MHz)	Measured Time-averaged Conducted Power (dBm)
802.11b	2.4G	1Mbps	1	2412	13.36
			6	2437	13.09
			11	2462	13.21
802.11g	2.4G	6Mbps	1	2412	13.24
			6	2437	13.26
			11	2462	13.16
802.11n (HT20)	2.4G	MCS0	1	2412	10.40
			6	2437	10.08
			11	2462	10.29
802.11n (HT40)	2.4G	MCS0	3	2422	9.89
			6	2437	9.93
			9	2452	9.80

For BT

Operating Mode	Band	Channel	Freq. (MHz)	Measured Average Conducted Power (dBm)
LE	BT	0	2402	4.90
		19	2440	4.54
		39	2480	3.25

TEST REPORT

For 5GHz WiFi

Operating Mode	Band	Channel	Freq. (MHz)	Measured Average Conducted Power (dBm)
802.11a	5.2G	36	5180	6.67
		40	5200	6.76
		44	5220	6.82
		48	5240	6.89
	5.3G	52	5260	6.34
		56	5280	6.42
		60	5300	6.56
		64	5320	6.55
	5.6G	100	5500	9.88
		104	5520	9.82
		108	5540	9.90
		112	5560	9.82
		116	5580	9.88
		132	5660	9.94
		136	5680	9.96
		140	5700	9.41
		144	5720	9.55
	5.8G	149	5745	10.82
		157	5785	10.53
		165	5825	10.21
802.11n (HT20)	5.2G	36	5180	6.40
		40	5200	6.46
		44	5220	6.42
		48	5240	6.48
	5.3G	52	5260	5.97
		56	5280	6.16
		60	5300	6.15
		64	5320	6.40
	5.6G	100	5500	9.32
		104	5520	9.41
		108	5540	9.58
		112	5560	9.37
		116	5580	9.22
		132	5660	9.20
		136	5680	9.32
		140	5700	9.24
		144	5720	9.26
	5.8G	149	5745	10.56
		157	5785	10.22
		165	5825	10.04

TEST REPORT

802.11n (HT40)	5.2G	38	5190	6.37
		46	5230	6.48
	5.3G	54	5270	6.89
		62	5310	6.82
	5.6G	102	5510	7.24
		110	5550	7.26
		134	5670	6.93
		142	5710	7.17
	5.8G	151	5755	8.62
		159	5795	8.19
802.11ac (VHT20)	5.2G	36	5180	6.25
		40	5200	6.31
		44	5220	6.26
		48	5240	6.46
	5.3G	52	5260	6.06
		56	5280	5.96
		60	5300	6.22
		64	5320	6.27
	5.6G	100	5500	9.20
		104	5520	9.26
		108	5540	9.24
		112	5560	9.22
		116	5580	9.40
		132	5660	9.08
		136	5680	9.06
		140	5700	9.00
		144	5720	9.06
	5.8G	149	5745	9.37
		157	5785	9.02
		165	5825	8.56
802.11ac (VHT40)	5.2G	38	5190	6.08
		46	5230	6.12
	5.3G	54	5270	6.07
		62	5310	6.21
	5.6G	102	5510	6.94
		110	5550	6.99
		134	5670	6.84
		142	5710	6.97
	5.8G	151	5755	8.53
		159	5795	8.04
802.11ac (VHT80)	5.2G	42	5210	5.29
	5.3G	58	5290	5.26
	5.6G	106	5530	6.13
		138	5690	6.21
	5.8G	155	5775	5.29

TEST REPORT

Note:

1. Fully charged battery was used for each measurement.

2. Per KDB 447498, when antenna port was not available on the device to support conducted power measurement and test software was used to establish transmitter power levels, the power level was verified separately according to design and component specifications and product development information specified by the manufacturer.

3. There was no power reduction used for any band/mode implemented in this device

TEST REPORT

6.3. Exposure Conditions

Body-worn accessory Exposure Conditions

Test Configurations	Distance to phantom	Operation Mode	SAR Required	Note
Rear Face	0 cm	Data	Yes	With Holder 1: Magnetic Clip: (PMLN8221A)
Rear Face	0 cm	Data	Yes	With Holder 2: Swivel Belt Clip (PMLN8220A)

For 2.4GHz WiFi

Test Configurations	Distance to phantom	SAR Exemption limit (mW)	Maximum Time-averaged Conducted power (mW)	SAR Exclusion Result
Rear Face	0 mm	10	25.12	Test Required

For BT

Test Configurations	Distance to phantom	SAR Exemption limit (mW)	Maximum Time-averaged Conducted power (mW)	SAR Exclusion Result
Rear Face	0 mm	10	3.55	Excluded

For 5.2/5.3GHz WiFi

Test Configurations	Distance to phantom	SAR Exemption limit (mW)	Maximum Time-averaged Conducted power (mW)	SAR Exclusion Result
Rear Face	0 mm	7	5.01	Excluded

For 5.6GHz WiFi

Test Configurations	Distance to phantom	SAR Exemption limit (mW)	Maximum Time-averaged Conducted power (mW)	SAR Exclusion Result
Rear Face	0 mm	6	11.22	Test Required

For 5.8GHz WiFi

Test Configurations	Distance to phantom	SAR Exemption limit (mW)	Maximum Time-averaged Conducted power (mW)	SAR Exclusion Result
Rear Face	0 mm	6	14.13	Test Required

Note:

1. EUT is always being used only with the clip/body worn; it will not be used while it is removed from the clip. Thus, only Rear position was tested.
2. EUT cannot transmit WiFi and Bluetooth simultaneously, thus no simultaneous mode will be considered.

TEST REPORT

6.4. Test Result

The results on the following page(s) were obtained when the device was tested in the condition described in this report. Detailed measurement data and plots, which reveal information about the location of the maximum SAR with respect to the device, are reported in Appendix B.

Body-worn SAR

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Holster	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
2.4GHz WiFi												
	802.11b	-	Rear Face	0	1	1	14.0	13.36	0.02	0.013	1.16	0.02
	802.11b	-	Rear Face	0	1	2	14.0	13.36	0.13	0.012	1.16	0.01
	802.11b	-	Rear Face	0	6	1	14.0	13.09	0.05	0.021	1.23	0.03
1	802.11b	-	Rear Face	0	11	1	14.0	13.21	0.00	**0.023**	1.20	**0.03**
5.6GHz WiFi												
	802.11a	-	Rear Face	0	136	1	10.5	9.96	0.00	0.000	1.13	0.00
	802.11a	-	Rear Face	0	136	2	10.5	9.96	0.00	0.000	1.13	0.00
2	802.11a	-	Rear Face	0	100	1	10.5	9.88	0.00	**0.014**	1.15	**0.02**
	802.11a	-	Rear Face	0	100	2	10.5	9.88	0.00	0.013	1.15	0.01
	802.11a	-	Rear Face	0	144	1	10.5	9.55	0.00	0.000	1.24	0.00
5.8GHz WiFi												
3	802.11a	-	Rear Face	0	149	1	11.5	10.82	0.00	0.000	1.17	0.00
	802.11a	-	Rear Face	0	149	2	11.5	10.82	0.00	0.000	1.17	0.00
	802.11a	-	Rear Face	0	157	1	11.5	10.53	0.00	0.000	1.25	0.00
	802.11a	-	Rear Face	0	165	1	11.5	10.21	0.00	0.000	1.35	0.00

Note:

1. The SAR value of WLAN 5.3&5.8GHz is very low, almost equal to 0 W/kg.
2. Fully charged batteries were used at the beginning of each SAR measurement.
3. Per KDB 447498, when the maximum output power variation across the required test channels was < 0.5dB, measurement on middle channel was required.
4. Per KDB 447498, if the reported SAR value was ≤ 0.8 W/kg and the transmission band was ≤ 100MHz, SAR testing was not required for the other test channels in the band.
5. Per KDB 865664, repeated measurement was not required when the original highest measured SAR was < 0.8W/kg.
6. There was no power reduction used for any band/mode implemented in this device.
7. SAR repeated measurement procedure:
   a. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
   b. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
   c. If the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20, or when the original or repeated measurement is >= 1.45 W/kg, perform a second repeated measurement.

TEST REPORT

6.5. SAR Limits

The following FCC limits (Std. C95.1-1992) for SAR apply to devices operate in General Population/Uncontrolled Exposure and Controlled environment:

GENERAL POPULATION / UNCONTROLLED ENVIRONMENTS:
Defined as location where there is the exposure of individuals who have no knowledge or control of their exposure.

EXPOSURE (General Population/Uncontrolled Exposure environment)	SAR (W/kg)
Spatial Peak SAR (Head)*	1.60
Spatial Peak SAR (Partial Body)*	1.60
Spatial Peak SAR (Whole Body)*	0.08
Spatial Peak SAR (Hands / Wrists / Feet / Ankles)**	4.00

OCCUPATIONAL / CONTROLLED ENVIRONMENTS:
Defined as location where there is the exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation)

EXPOSURE (Occupational/Controlled Exposure environment)	SAR (W/kg)
Spatial Peak SAR (Head)*	8.00
Spatial Peak SAR (Partial Body)*	8.00
Spatial Peak SAR (Whole Body)*	0.40
Spatial Peak SAR (Hands / Wrists / Feet / Ankles)**	20.00

Notes:

* 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

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

TEST REPORT

7. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	SN	Cal. Data	Cal. interval
System Validation Dipole	SPEAG	D2450V2	883	Jul. 05, 2016	3 year
System Validation Dipole	SPEAG	D5GHzV2	1280	Jun. 05, 2018	3 year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7506	Jun. 22, 2018	1 year
Data Acquisition Electronics	SPEAG	DAE4	1557	Jun. 05, 2018	1 year
Dosimetric E-Field Probe	SPEAG	ES3DV3	3090	Apr. 03, 2018	1 Year
Data Acquisition Electronics	SPEAG	DAE4	662	May. 11, 2018	1 Year
ENA Series Network Analyzer	Agilent	8753ES	MY40000519	Apr. 14, 2018	1 Year
Dielectric Assessment Kit	SPEAG	DAK-3.5	1056	N/A	N/A
USB/GPIB Interface	Agilent	82357B	N10149	N/A	N/A
EXG-B RF Analog Signal Generator	KEYSIGHT	N5171B	MY53051777	Nov. 24, 2018	1 Year
USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Nov. 24, 2018	1 Year
USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430023	Nov. 24, 2018	1 Year
Thermometer	Shanghai Gao Zhi Precision Instrument Co., Ltd.	HB6801	120100323	Nov. 24, 2018	1 Year
Coupler	REBES	TC-05180-10S	161221001	N/A	1 Year
Amplifier	Mini-Circuit	ZHL42	QA1252001	N/A	N/A
DC Source	Agilent	66319B	MY43000795	N/A	N/A

TEST REPORT

8. MEASUREMENT UNCERTAINTY

Per FCC KDB 865884, the extensive SAR measurement uncertainty analysis was not required when the highest measured SAR was < 1.5W/kg for all frequency band.

9. E-FIELD PROBE AND DIPOLE ANTENNA CALIBRATION

Probe calibration factors and dipole antenna calibration are included in Appendix D.

TEST REPORT

APPENDIX A – SYSTEM CHECK DATA

Plot #1

Test Laboratory: UnionTrust Date: 02/27/2019

System Check_B2450

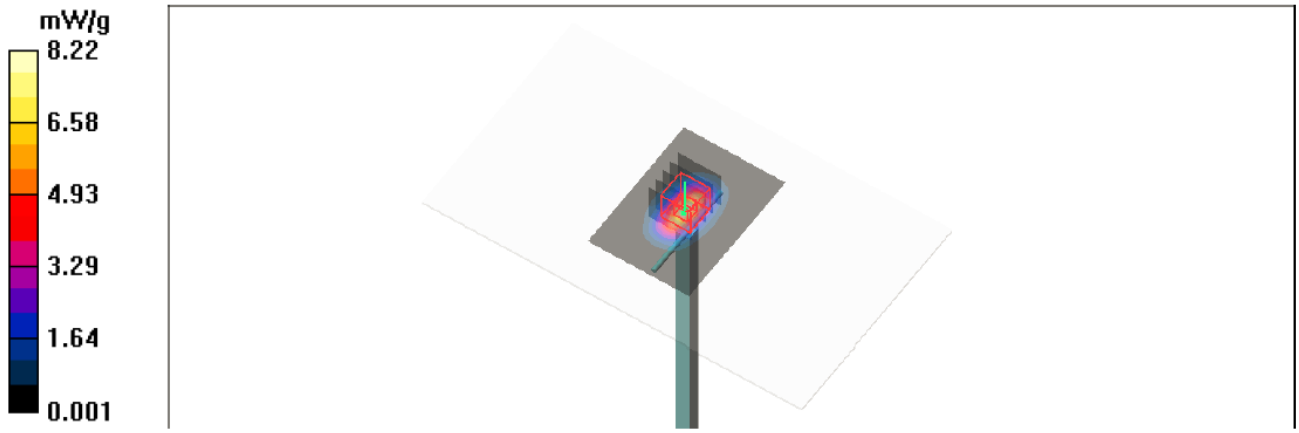
DUT: Dipole 2450 MHz

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL2450 Medium parameters used: f = 2450 MHz; σ = 2 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:
- Probe: ES3DV3 - SN3090; ConvF(4.43, 4.43, 4.43); Calibrated: 2018/4/3
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn662; Calibrated: 2018/5/11
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1125
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

system check/Area Scan (51x71x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 8.22 mW/g

system check/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 60.5 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 11.3 W/kg
SAR(1 g) = 5.42 mW/g; SAR(10 g) = 2.5 mW/g
Maximum value of SAR (measured) = 7.04 mW/g



TEST REPORT

APPENDIX A – SYSTEM CHECK DATA (CONT'D)

Plot#2

Test Laboratory: UnionTrust Date: 02/28/2019

System Check-D5GHz_B5600

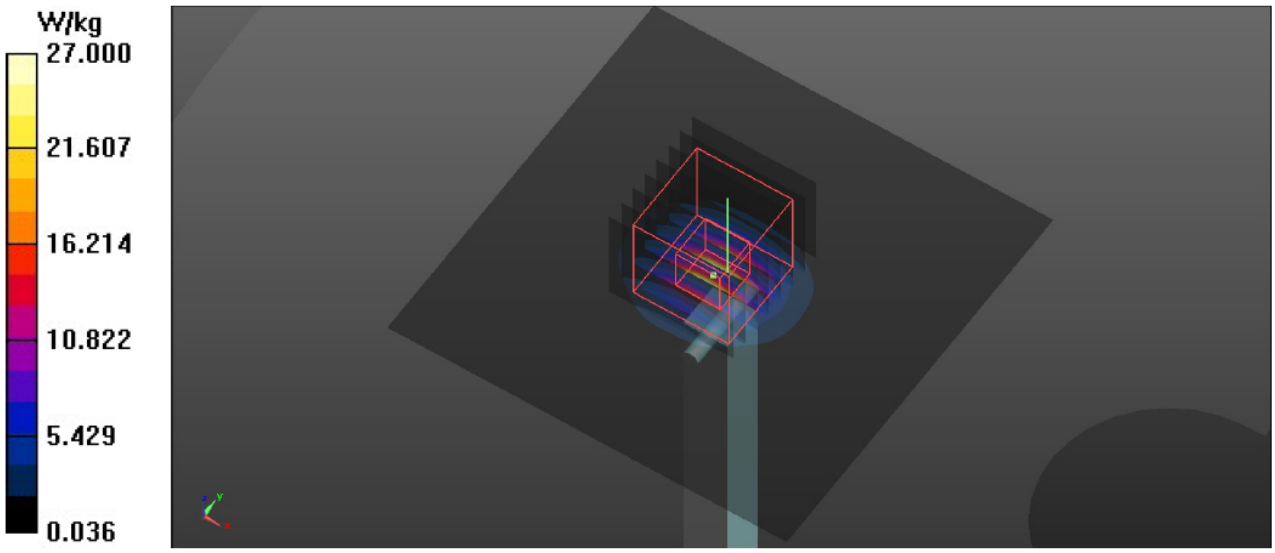
DUT: Dipole D5GHzV2

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: B5G Medium parameters used: f = 5600 MHz; σ = 5.869 S/m; ε_r = 48.547; ρ = 1000 kg/m^3

DASY4 Configuration:
- Probe: EX3DV4 - SN7506; ConvF(4.25, 4.25, 4.25); Calibrated: 6/22/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1557; Calibrated: 6/5/2018
- Phantom: SAM 2; Type: QD 000 P40 CB; Serial: TP-1376
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 27.0 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.16 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 39.6 W/kg
SAR(1 g) = 7.86 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 25.8 W/kg



TEST REPORT

APPENDIX A – SYSTEM CHECK DATA (CONT'D)

Plot #3

Test Laboratory: UnionTrust Date: 02/28/2019

System Check-D5GHz_B5800

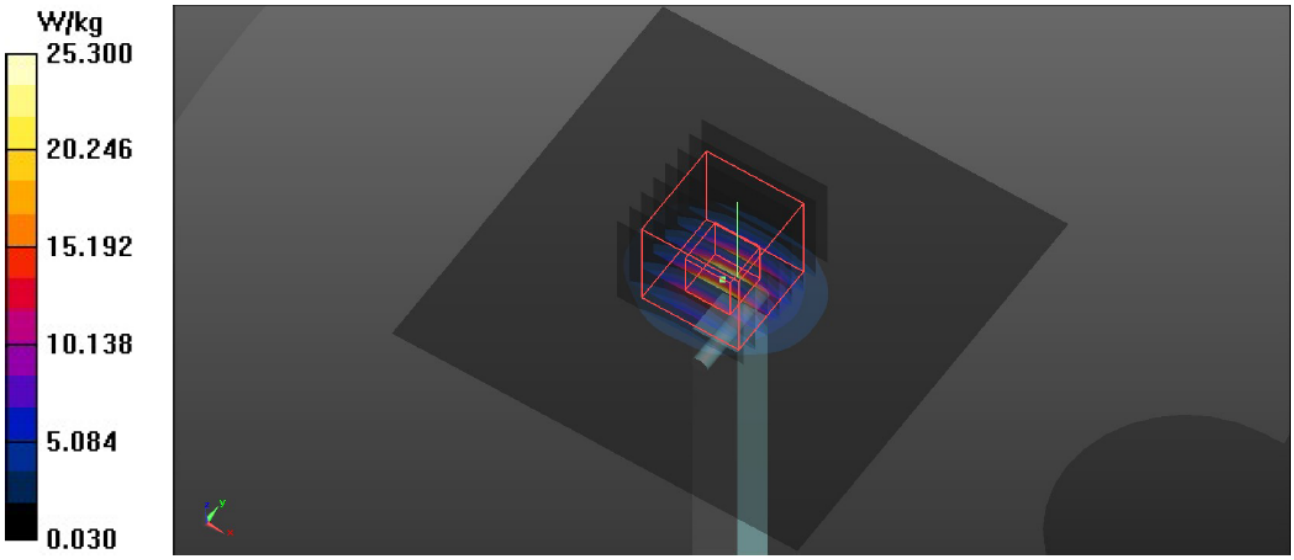
DUT: Dipole D5GHzV2

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: B5G Medium parameters used: f = 5800 MHz; σ = 6.128 S/m; ε_r = 48.04; ρ = 1000 kg/m^3

DASY4 Configuration:
- Probe: EX3DV4 - SN7506; ConvF(4.31, 4.31, 4.31); Calibrated: 6/22/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1557; Calibrated: 6/5/2018
- Phantom: SAM 2; Type: QD 000 P40 CB; Serial: TP-1376
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 25.3 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.18 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 38.1 W/kg
SAR(1 g) = 7.56 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 24.7 W/kg



TEST REPORT

APPENDIX B – SAR EVALUATION DATA

Test Laboratory: UnionTrust Date: 02/27/2019

P01_802.11b_Rear Face_0mm_11

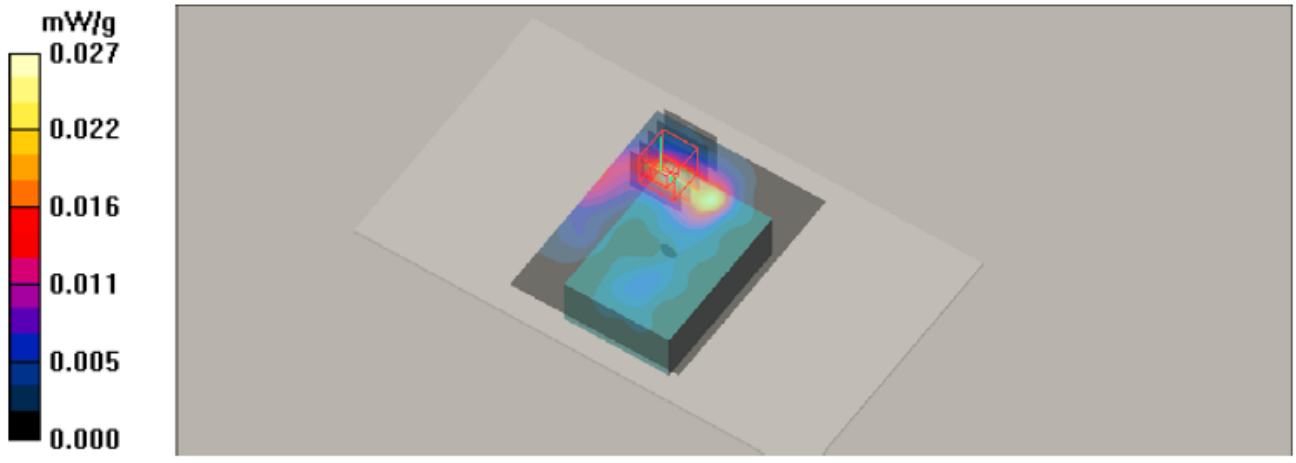
DUT: EUT

Communication System: Wlan 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL2450 Medium parameters used: f = 2462 MHz; σ = 2.02 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3

DASY4 Configuration:
- Probe: ES3DV3 - SN3090; ConvF(4.43, 4.43, 4.43); Calibrated: 2018/4/3
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn662; Calibrated: 2018/5/11
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1125
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

Test/Area Scan (71x91x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.027 mW/g

Test/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.42 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 0.044 W/kg
SAR(1 g) = 0.023 mW/g; SAR(10 g) = 0.011 mW/g
Maximum value of SAR (measured) = 0.029 mW/g



TEST REPORT

APPENDIX B – SAR EVALUATION DATA (CONT'D)

Test Laboratory: UnionTrust Date: 02/28/2019

P02 _802.11a_Rear Face_0cm_Ch100

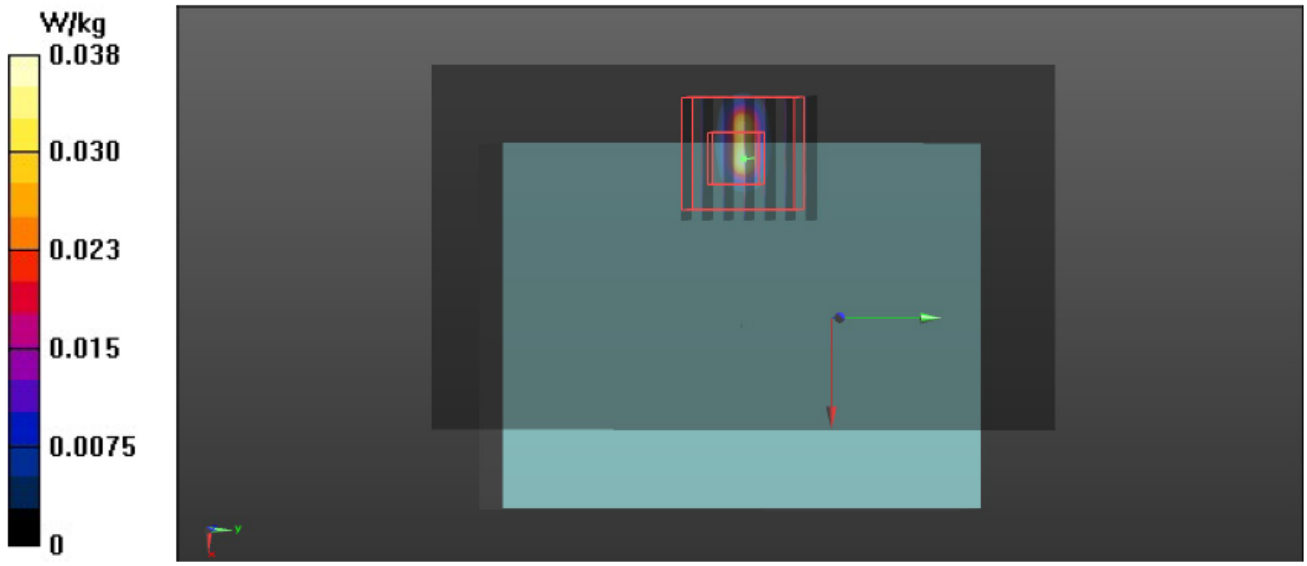
DUT: EUT

Communication System: 802.11a; Frequency: 5500 MHz;Duty Cycle: 1:1.08
Medium: B5G Medium parameters used: f = 5500 MHz; σ = 5.711 S/m; ε_r = 48.808; ρ = 1000 kg/m^3

DASY4 Configuration:
- Probe: EX3DV4 - SN7506; ConvF(4.32, 4.32, 4.32) ; Calibrated: 6/22/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1557; Calibrated: 6/5/2018
- Phantom: SAM 2; Type: QD 000 P40 CB; Serial: TP-1376
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

- Area Scan (71x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0375 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.215 W/kg
SAR(1 g) = 0.014 W/kg; SAR(10 g) = 0.00274 W/kg
Maximum value of SAR (measured) = 0.0481 W/kg



TEST REPORT

APPENDIX B – SAR EVALUATION DATA (CONT'D)

Test Laboratory: UnionTrust Date: 02/28/2019

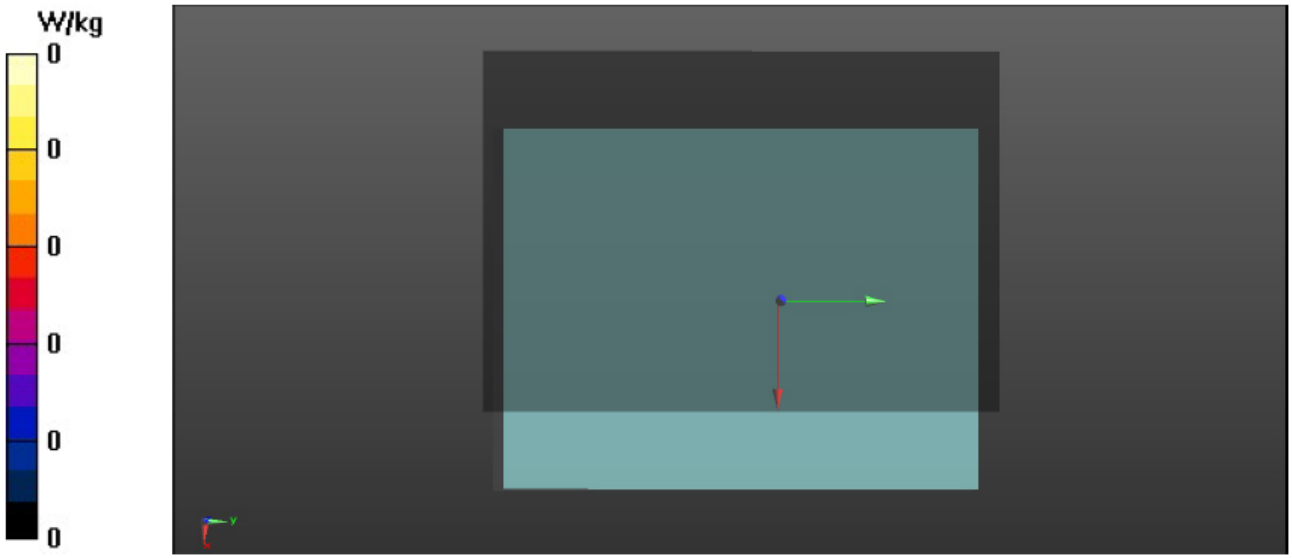
P03 _802.11a_Rear Face_0cm_Ch149

DUT: EUT

Communication System: 802.11a; Frequency: 5745 MHz;Duty Cycle: 1:1.08
Medium: B5G Medium parameters used: f = 5745 MHz; σ = 6.026 S/m; ε_r = 48.398; ρ = 1000 kg/m^3

DASY4 Configuration:
- Probe: EX3DV4 - SN7506; ConvF(4.31, 4.31, 4.31); Calibrated: 6/22/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1557; Calibrated: 6/5/2018
- Phantom: SAM 2; Type: QD 000 P40 CB; Serial: TP-1376
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

- Area Scan (71x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0 W/kg



TEST REPORT

APPENDIX C – SAR SYSTEM VALIDATION

Per KDB 865664, SAR system validation status should be documented to confirm measurement accuracy. SAR measurement systems are validated according to procedures in KDB 865664. The validation status is documented according to the validation date(s), measurement frequencies, SAR probe and tissue dielectric parameters. When multiple SAR system is used, the validation status of each SAR system is needed to be documented separately according to the associated system components.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probe and tissue dielectric parameters are shown as below.

Date	Probe S/N	Tested Freq. (MHz)	Tissue Type	Perm	Cond	CW Validation			Mod. Validation		
						Sensitivity	Probe Linearity	Probe Isotropy	Mod. Type	Duty Factor	Peak to average power ratio
Nov. 12, 2018	3090	2450	Body	2.020	50.710	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 29, 2018	7506	5600	Body	5.851	48.640	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 29, 2018	7506	5800	Body	6.112	48.150	Pass	Pass	Pass	OFDM	N/A	Pass

TEST REPORT

APPENDIX D – E-FIELD PROBE AND DIPOLE ANTENNA CALIBRATION

TEST REPORT

In Collaboration with speag CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Client **Hydsoft Testing Co., Ltd** **Certificate No: Z18-60058**

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3090
Calibration Procedure(s)	FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	April 03, 2018

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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101547	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Power sensor NRP-Z91	101548	27-Jun-17 (CTTL, No.J17X05857)	Jun-18
Reference10dBAttenuator	18N50W-10dB	09-Feb-18(CTTL, No.J18X01133)	Feb-20
Reference20dBAttenuator	18N50W-20dB	09-Feb-18(CTTL, No.J18X01132)	Feb-20
Reference Probe EX3DV4	SN 3846	25-Jan-18(SPEAG,No.EX3-3846_Jan18)	Jan-19
DAE4	SN 777	15-Dec-17(SPEAG, No.DAE4-777_Dec17)	Dec -18
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGeneratorMG3700A	6201052605	27-Jun-17 (CTTL, No.J17X05858)	Jun-18
Network Analyzer E5071C	MY46110673	14-Jan-18 (CTTL, No.J18X00561)	Jan -19

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

Issued: April 04, 2018

TEST REPORT

In Collaboration with
speag
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

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), 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, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

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≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect 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 (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;VRx,y,z:*A,B,C 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≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued 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±50MHz to±100MHz.
- *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).

TEST REPORT

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Probe ES3DV3

SN: 3090

Calibrated: April 03, 2018

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: Z18-60058 Page 3 of 11

TEST REPORT

In Collaboration with
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3090

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)^A	1.25	1.36	1.33	±10.0%
DCP(mV)^B	102.4	104.0	104.8	

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	261.7	±2.5%
		Y	0.0	0.0	1.0		275.7	
		Z	0.0	0.0	1.0		274.7	

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

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

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E-mail: cttl@chinattl.com Http://www.chinattl.cn

DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3090

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)	Unct. (k=2)
750	41.9	0.89	6.34	6.34	6.34	0.40	1.30	±12.1%
900	41.5	0.97	6.14	6.14	6.14	0.32	1.76	±12.1%
1750	40.1	1.37	5.30	5.30	5.30	0.65	1.25	±12.1%
1950	40.0	1.40	4.92	4.92	4.92	0.69	1.24	±12.1%
2300	39.5	1.67	4.75	4.75	4.75	0.90	1.15	±12.1%
2450	39.2	1.80	4.54	4.54	4.54	0.90	1.12	±12.1%
2600	39.0	1.96	4.47	4.47	4.47	0.90	1.10	±12.1%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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 frequency 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3090

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)	Unct. (k=2)
750	55.5	0.96	6.41	6.41	6.41	0.40	1.30	±12.1%
900	55.0	1.05	6.20	6.20	6.20	0.48	1.46	±12.1%
1750	53.4	1.49	4.95	4.95	4.95	0.64	1.29	±12.1%
1950	53.3	1.52	4.48	4.48	4.48	0.66	1.30	±12.1%
2300	52.9	1.81	4.52	4.52	4.52	0.90	1.15	±12.1%
2450	52.7	1.95	4.43	4.43	4.43	0.90	1.12	±12.1%
2600	52.5	2.16	4.20	4.20	4.20	0.90	1.07	±12.1%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of 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 frequency 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 the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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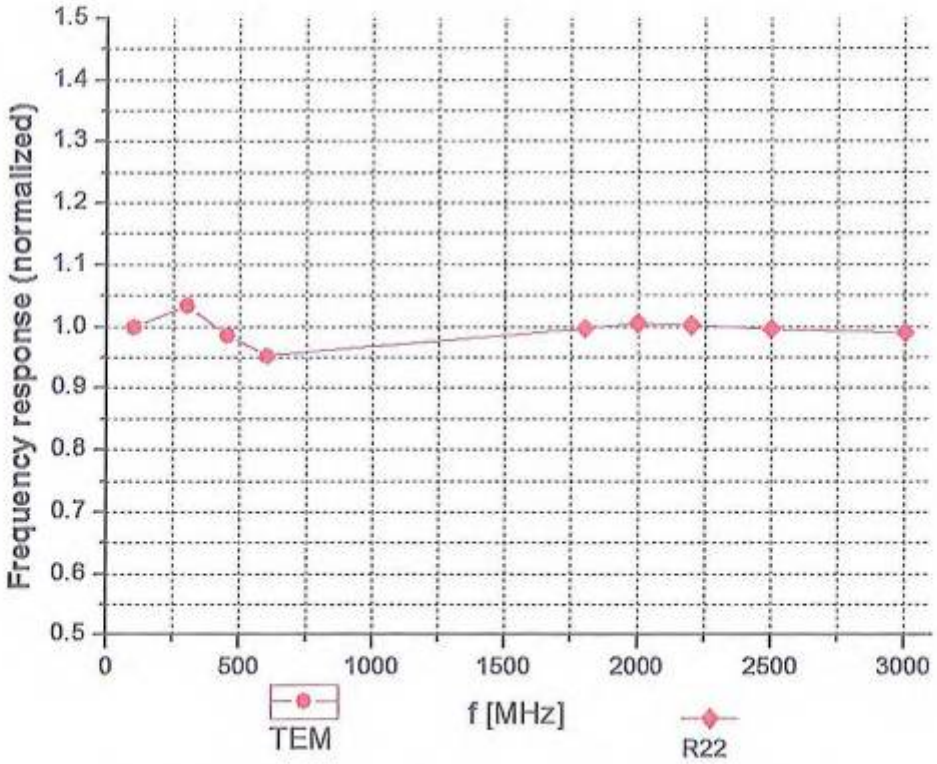
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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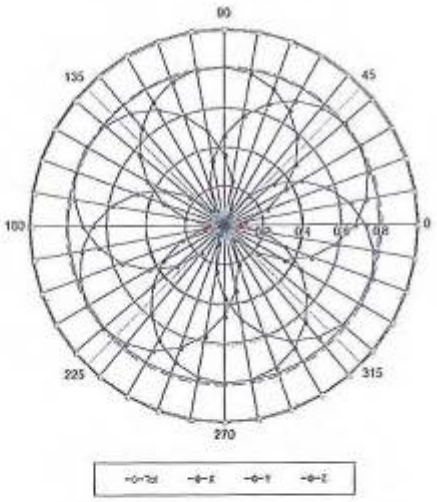
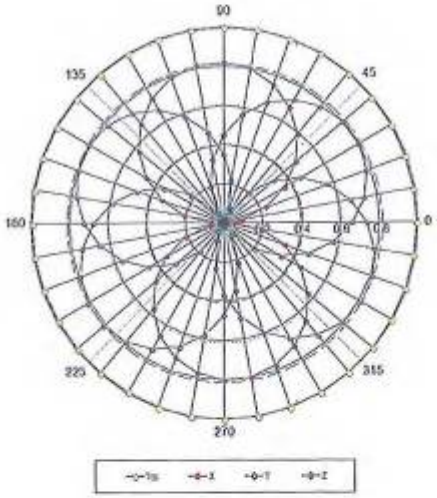
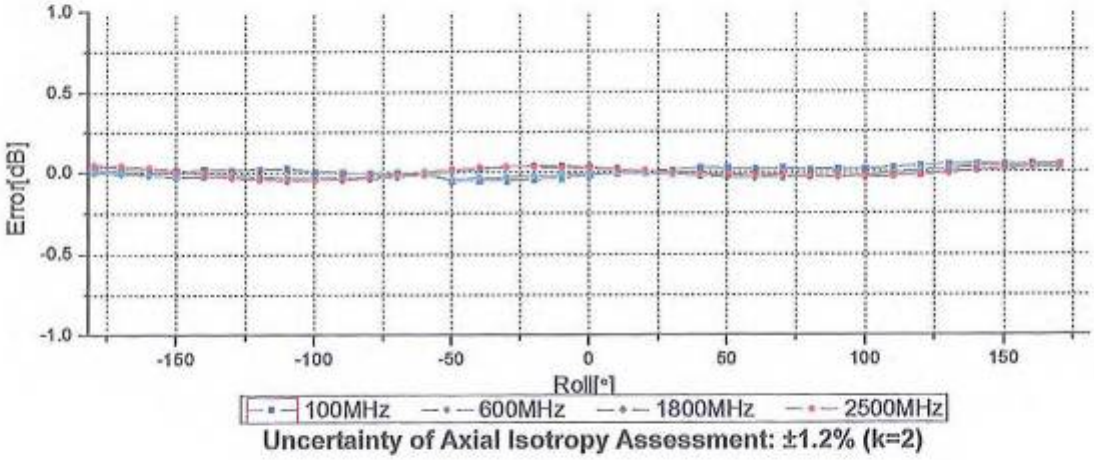
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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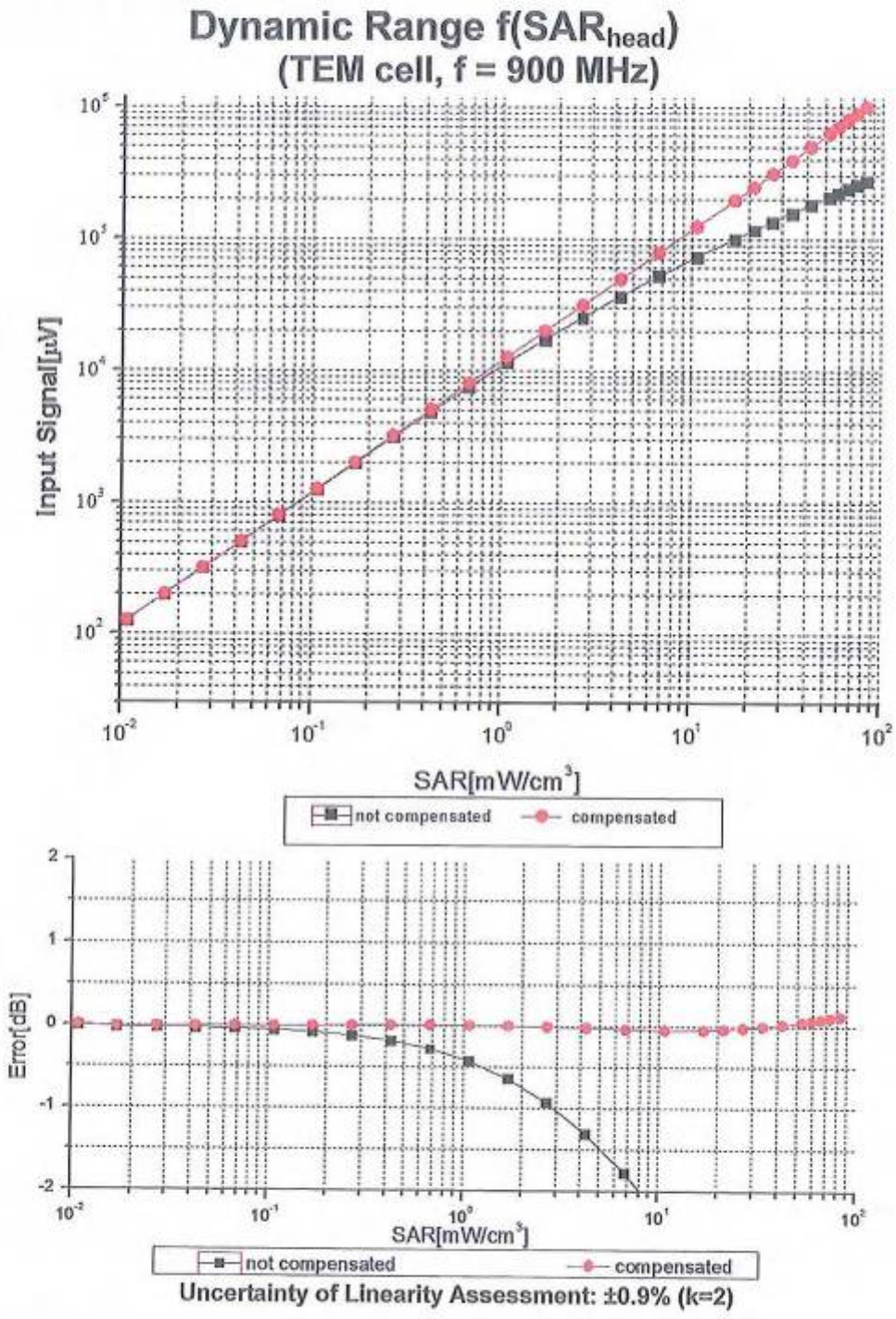

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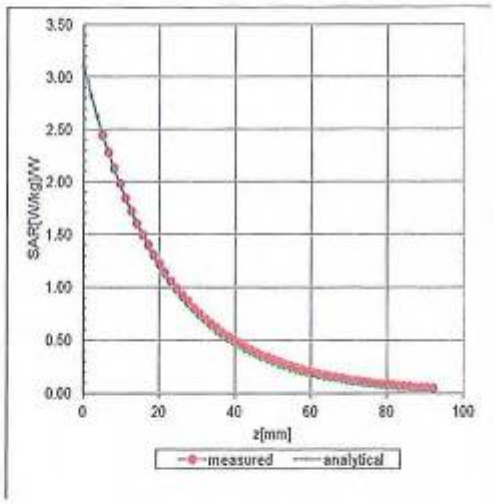
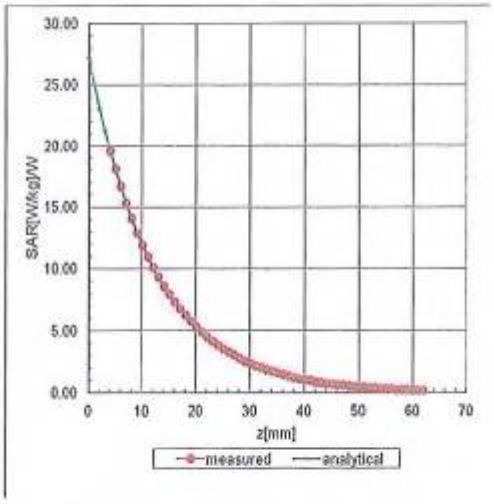
Conversion Factor Assessment

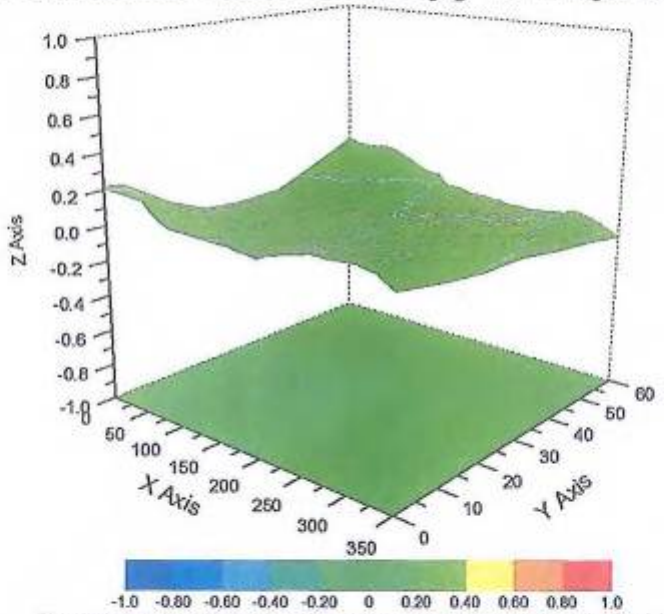
f=750 MHz, WGLS R9(H_convF)



f=1750 MHz, WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3090

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	179.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	4mm
Probe Tip to Sensor X Calibration Point	2mm
Probe Tip to Sensor Y Calibration Point	2mm
Probe Tip to Sensor Z Calibration Point	2mm
Recommended Measurement Distance from Surface	3mm

TEST REPORT

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

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

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

Accreditation No.: SCS 0108

Client: TüV China (Auden)

Certificate No: EX3-7506_Jun18

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7506

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: June 22, 2018

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	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

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

Issued: June 23, 2018

TEST REPORT

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

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Accreditation No.: SCS 0108

Glossary:

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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, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
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:

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- *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).

TEST REPORT

Probe EX3DV4

SN:7506

Manufactured: November 13, 2017
Calibrated: June 22, 2018

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

TEST REPORT

EX3DV4– SN:7506 June 22, 2018

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7506

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.55	0.42	0.52	± 10.1 %
DCP (mV)[B]	103.5	92.7	101.0	

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	145.2	±3.0 %
		Y	0.0	0.0	1.0		148.7	
		Z	0.0	0.0	1.0		144.1	

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	37.72	279.8	35.17	7.945	0.000	5.035	1.979	0.082	1.007
Y	31.70	240.9	36.60	3.393	0.204	5.01	0.000	0.274	1.007
Z	35.25	262.5	35.38	7.701	0.000	5.041	2.000	0.055	1.007

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.

Total Quality. Assured.

TEST REPORT

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7506

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	10.49	10.49	10.49	0.43	0.91	± 12.0 %
835	41.5	0.90	10.07	10.07	10.07	0.46	0.85	± 12.0 %
900	41.5	0.97	9.83	9.83	9.83	0.53	0.80	± 12.0 %
1750	40.1	1.37	9.10	9.10	9.10	0.41	0.87	± 12.0 %
1810	40.0	1.40	8.66	8.66	8.66	0.37	0.85	± 12.0 %
1900	40.0	1.40	8.58	8.58	8.58	0.43	0.80	± 12.0 %
2000	40.0	1.40	8.61	8.61	8.61	0.40	0.80	± 12.0 %
2300	39.5	1.67	8.22	8.22	8.22	0.47	0.80	± 12.0 %
2450	39.2	1.80	7.86	7.86	7.86	0.37	0.85	± 12.0 %
2600	39.0	1.96	7.65	7.65	7.65	0.36	0.88	± 12.0 %
3500	37.9	2.91	7.09	7.09	7.09	0.22	1.20	± 13.1 %
3700	37.7	3.12	7.00	7.00	7.00	0.25	1.20	± 13.1 %
5200	36.0	4.66	5.65	5.65	5.65	0.35	1.80	± 13.1 %
5300	35.9	4.76	5.46	5.46	5.46	0.35	1.80	± 13.1 %
5500	35.6	4.96	5.17	5.17	5.17	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.96	4.96	4.96	0.40	1.80	± 13.1 %
5800	35.3	5.27	5.10	5.10	5.10	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.

TEST REPORT

EX3DV4-- SN:7506 June 22, 2018

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7506

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	10.45	10.45	10.45	0.53	0.83	± 12.0 %
835	55.2	0.97	10.16	10.16	10.16	0.48	0.85	± 12.0 %
900	55.0	1.05	10.04	10.04	10.04	0.51	0.80	± 12.0 %
1750	53.4	1.49	8.43	8.43	8.43	0.43	0.80	± 12.0 %
1810	53.3	1.52	8.21	8.21	8.21	0.35	0.98	± 12.0 %
1900	53.3	1.52	8.08	8.08	8.08	0.41	0.80	± 12.0 %
2000	53.3	1.52	8.15	8.15	8.15	0.47	0.80	± 12.0 %
2300	52.9	1.81	7.73	7.73	7.73	0.37	0.92	± 12.0 %
2450	52.7	1.95	7.65	7.65	7.65	0.37	0.85	± 12.0 %
2600	52.5	2.16	7.56	7.56	7.56	0.34	0.92	± 12.0 %
3500	51.3	3.31	7.02	7.02	7.02	0.23	1.25	± 13.1 %
3700	51.0	3.55	6.98	6.98	6.98	0.24	1.25	± 13.1 %
5200	49.0	5.30	5.09	5.09	5.09	0.55	1.90	± 13.1 %
5300	48.9	5.42	4.91	4.91	4.91	0.55	1.90	± 13.1 %
5500	48.6	5.65	4.32	4.32	4.32	0.55	1.90	± 13.1 %
5600	48.5	5.77	4.25	4.25	4.25	0.55	1.90	± 13.1 %
5800	48.2	6.00	4.31	4.31	4.31	0.55	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.

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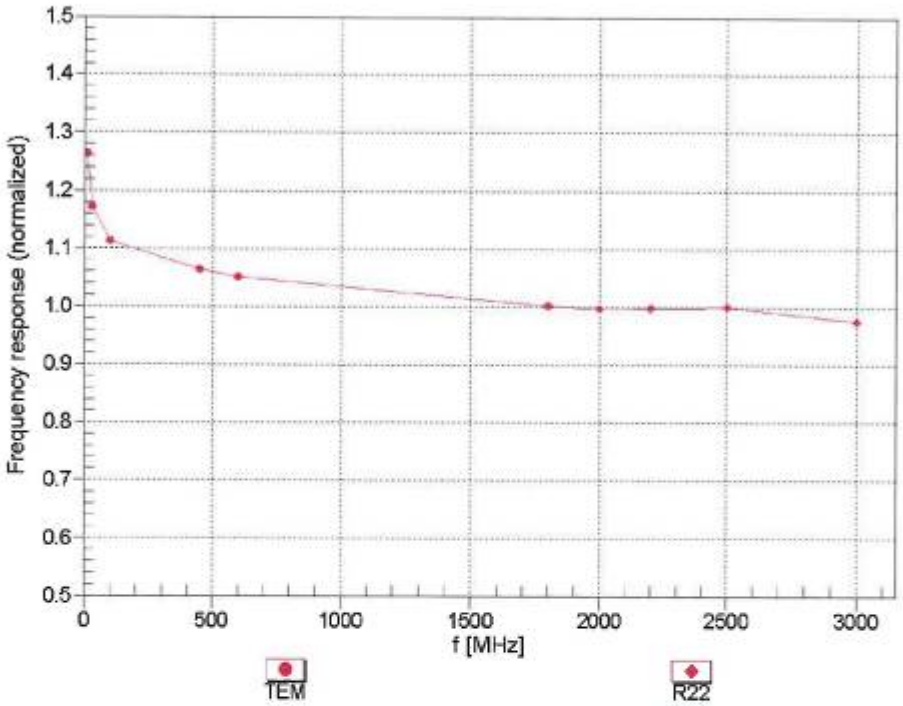
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



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

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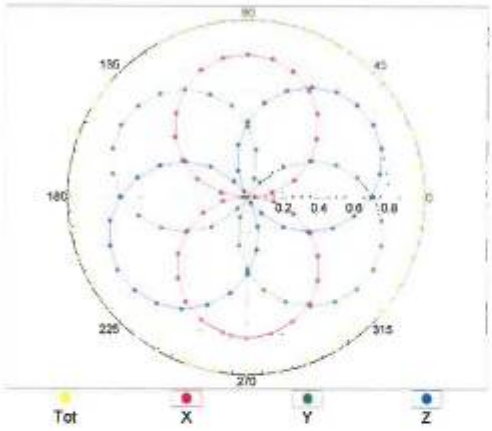
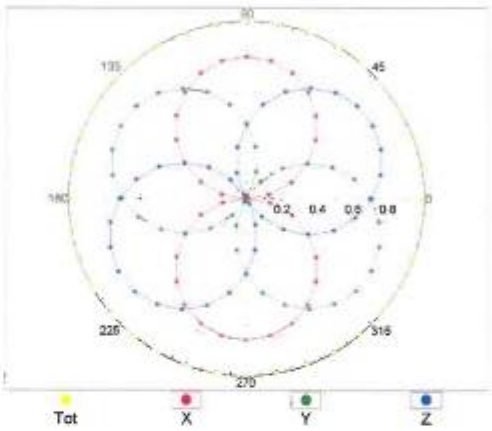
EX3DV4– SN:7506 June 22, 2018

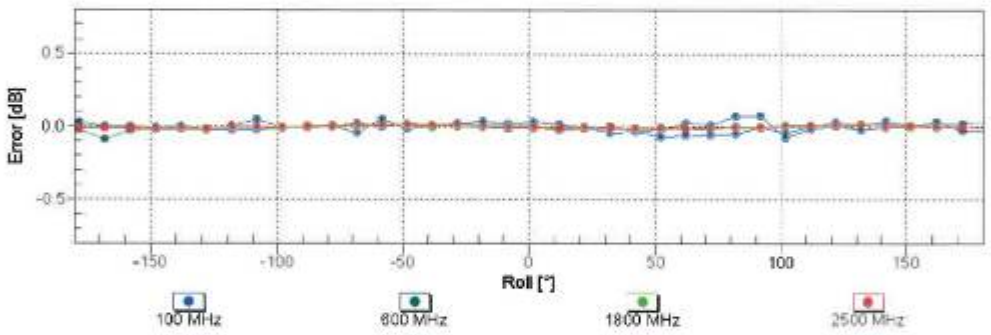
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22



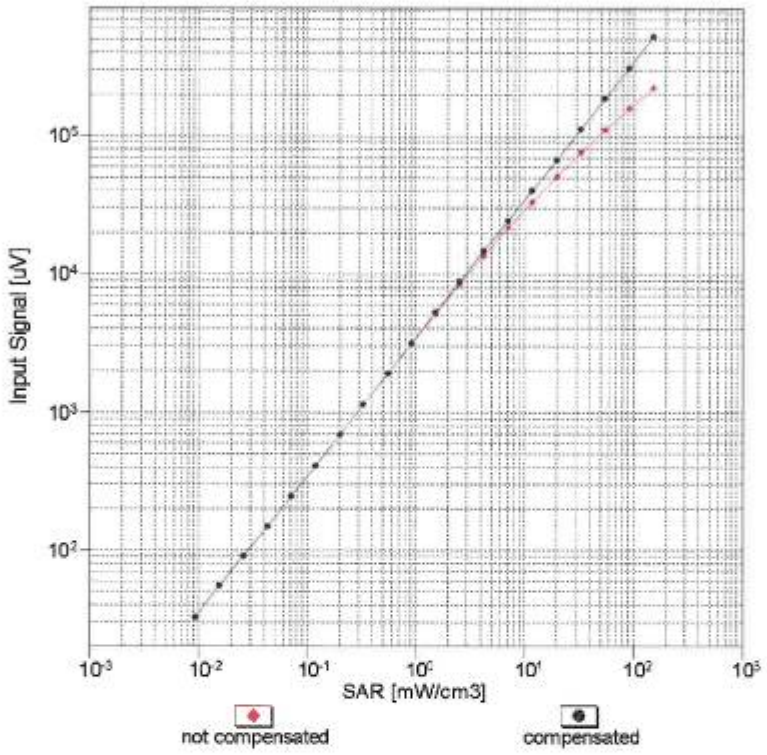


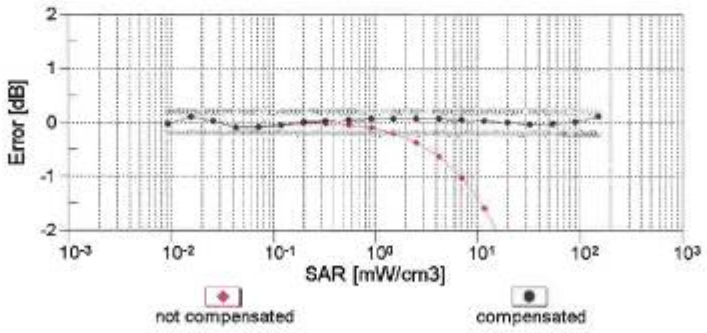
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

TEST REPORT

EX3DV4– SN:7506 June 22, 2018

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





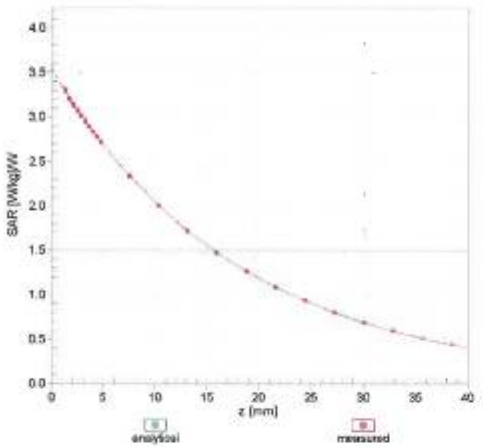
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

TEST REPORT

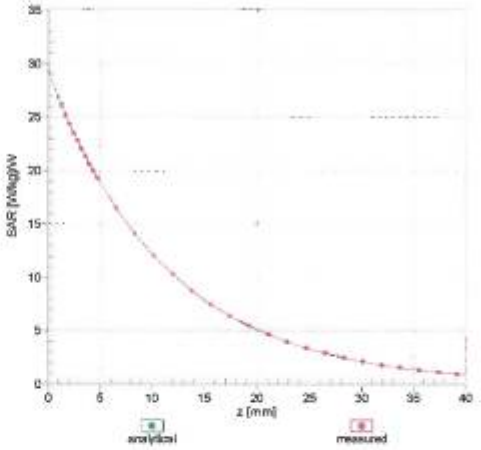
EX3DV4– SN:7506 June 22, 2018

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

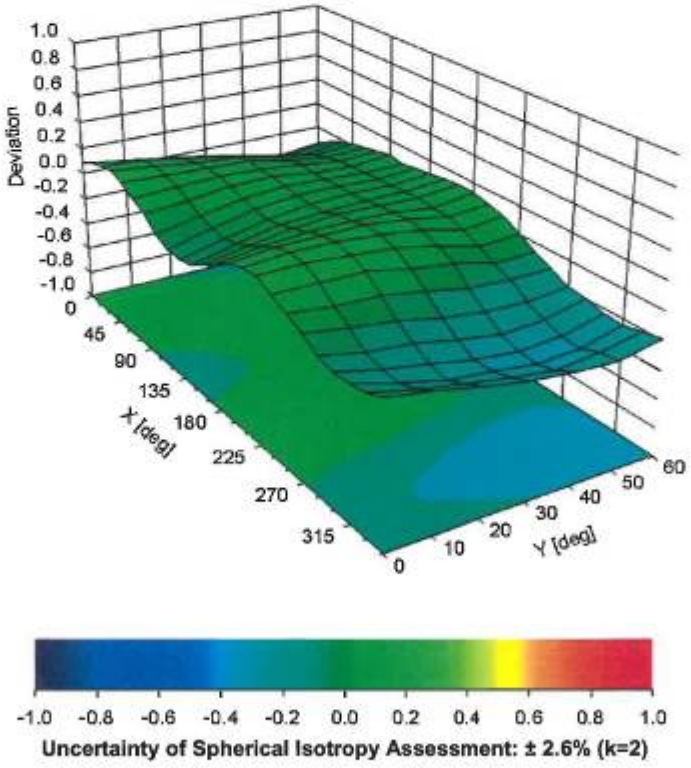


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

TEST REPORT

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7506

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	61.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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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	145.2	± 3.0 %
		Y	0.00	0.00	1.00		148.7	
		Z	0.00	0.00	1.00		144.1	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	1.50	62.85	7.85	10.00	20.0	± 9.6 %
		Y	1.42	61.44	6.91		20.0	
		Z	1.56	63.25	8.14		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	0.96	66.62	14.65	0.00	150.0	± 9.6 %
		Y	0.81	64.97	13.16		150.0	
		Z	0.92	65.94	14.14		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.12	63.35	14.80	0.41	150.0	± 9.6 %
		Y	1.02	62.46	13.98		150.0	
		Z	1.11	63.15	14.59		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.69	66.61	16.91	1.46	150.0	± 9.6 %
		Y	4.50	66.38	16.66		150.0	
		Z	4.65	66.62	16.89		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	100.00	106.44	22.97	9.39	50.0	± 9.6 %
		Y	4.60	72.97	13.10		50.0	
		Z	100.00	107.51	23.48		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	100.00	105.84	22.75	9.57	50.0	± 9.6 %
		Y	3.76	70.66	12.22		50.0	
		Z	100.00	106.80	23.21		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	107.31	22.34	6.56	60.0	± 9.6 %
		Y	2.31	69.64	10.73		60.0	
		Z	100.00	108.80	23.00		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	5.89	85.48	35.06	12.57	50.0	± 9.6 %
		Y	3.25	64.58	22.69		50.0	
		Z	5.89	85.52	35.19		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	6.57	87.74	32.01	9.56	60.0	± 9.6 %
		Y	4.72	78.55	27.43		60.0	
		Z	6.22	86.51	31.63		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	110.01	22.79	4.80	80.0	± 9.6 %
		Y	1.48	68.20	9.44		80.0	
		Z	100.00	111.93	23.62		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	114.27	23.95	3.55	100.0	± 9.6 %
		Y	0.63	64.19	7.22		100.0	
		Z	100.00	116.53	24.89		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	4.17	76.48	25.88	7.80	80.0	± 9.6 %
		Y	3.33	71.26	23.03		80.0	
		Z	4.04	75.80	25.65		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	105.85	21.28	5.30	70.0	± 9.6 %
		Y	0.92	63.64	7.63		70.0	
		Z	100.00	107.19	21.86		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	109.32	20.72	1.88	100.0	± 9.6 %
		Y	0.20	60.00	3.15		100.0	
		Z	100.00	110.21	21.07		100.0	

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10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	1.82	74.80	20.25	2.04	110.0	± 9.6 %
		Y	1.24	68.97	17.06		110.0	
		Z	1.74	73.92	19.83		110.0	
10062-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.50	66.63	16.36	0.49	100.0	± 9.6 %
		Y	4.32	66.38	16.11		100.0	
		Z	4.46	66.59	16.31		100.0	
10063-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.51	66.70	16.45	0.72	100.0	± 9.6 %
		Y	4.33	66.45	16.19		100.0	
		Z	4.47	66.68	16.40		100.0	
10064-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.76	66.92	16.65	0.86	100.0	± 9.6 %
		Y	4.55	66.65	16.39		100.0	
		Z	4.71	66.89	16.61		100.0	
10065-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.62	66.75	16.72	1.21	100.0	± 9.6 %
		Y	4.42	66.43	16.43		100.0	
		Z	4.58	66.72	16.68		100.0	
10066-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.63	66.74	16.87	1.46	100.0	± 9.6 %
		Y	4.41	66.38	16.55		100.0	
		Z	4.58	66.70	16.83		100.0	
10067-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	4.91	66.98	17.34	2.04	100.0	± 9.6 %
		Y	4.69	66.66	17.02		100.0	
		Z	4.87	66.99	17.33		100.0	
10068-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	4.93	66.89	17.50	2.55	100.0	± 9.6 %
		Y	4.71	66.55	17.17		100.0	
		Z	4.89	66.88	17.48		100.0	
10069-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.00	66.91	17.70	2.67	100.0	± 9.6 %
		Y	4.77	66.56	17.34		100.0	
		Z	4.95	66.91	17.68		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.77	66.66	17.20	1.99	100.0	± 9.6 %
		Y	4.59	66.41	16.93		100.0	
		Z	4.74	66.67	17.18		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.72	66.88	17.38	2.30	100.0	± 9.6 %
		Y	4.52	66.55	17.06		100.0	
		Z	4.68	66.88	17.36		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.76	67.00	17.69	2.83	100.0	± 9.6 %
		Y	4.57	66.69	17.36		100.0	
		Z	4.73	67.03	17.69		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.75	66.90	17.83	3.30	100.0	± 9.6 %
		Y	4.57	66.63	17.51		100.0	
		Z	4.73	66.95	17.84		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	4.75	66.89	18.08	3.82	90.0	± 9.6 %
		Y	4.58	66.59	17.72		90.0	
		Z	4.73	66.94	18.09		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	4.78	66.73	18.23	4.15	90.0	± 9.6 %
		Y	4.62	66.47	17.89		90.0	
		Z	4.77	66.80	18.26		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	4.81	66.80	18.33	4.30	90.0	± 9.6 %
		Y	4.65	66.55	18.00		90.0	
		Z	4.79	66.88	18.37		90.0	

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10112-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	2.87	67.18	15.65	0.00	150.0	± 9.6 %
		Y	2.68	66.64	15.17		150.0	
		Z	2.81	66.98	15.48		150.0	
10113-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.61	68.28	15.89	0.00	150.0	± 9.6 %
		Y	2.38	67.60	15.12		150.0	
		Z	2.54	67.99	15.61		150.0	
10114-CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	4.97	67.07	16.33	0.00	150.0	± 9.6 %
		Y	4.83	66.88	16.22		150.0	
		Z	4.92	67.00	16.28		150.0	
10115-CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.22	67.15	16.37	0.00	150.0	± 9.6 %
		Y	5.06	66.94	16.25		150.0	
		Z	5.17	67.07	16.32		150.0	
10116-CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.05	67.26	16.35	0.00	150.0	± 9.6 %
		Y	4.89	67.02	16.22		150.0	
		Z	5.00	67.18	16.30		150.0	
10117-CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	4.96	67.02	16.32	0.00	150.0	± 9.6 %
		Y	4.80	66.76	16.18		150.0	
		Z	4.92	66.95	16.27		150.0	
10118-CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.28	67.31	16.46	0.00	150.0	± 9.6 %
		Y	5.13	67.13	16.35		150.0	
		Z	5.24	67.26	16.42		150.0	
10119-CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.05	67.25	16.35	0.00	150.0	± 9.6 %
		Y	4.90	67.05	16.24		150.0	
		Z	5.00	67.18	16.30		150.0	
10140-CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.23	67.25	15.75	0.00	150.0	± 9.6 %
		Y	3.04	66.70	15.36		150.0	
		Z	3.18	67.06	15.61		150.0	
10141-CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.36	67.40	15.93	0.00	150.0	± 9.6 %
		Y	3.17	66.92	15.59		150.0	
		Z	3.30	67.23	15.81		150.0	
10142-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	1.79	68.06	15.11	0.00	150.0	± 9.6 %
		Y	1.50	66.39	13.62		150.0	
		Z	1.70	67.45	14.62		150.0	
10143-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.27	68.52	15.03	0.00	150.0	± 9.6 %
		Y	1.89	66.68	13.33		150.0	
		Z	2.15	67.90	14.49		150.0	
10144-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	1.99	65.90	13.20	0.00	150.0	± 9.6 %
		Y	1.65	64.20	11.50		150.0	
		Z	1.89	65.35	12.68		150.0	
10145-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	0.88	62.25	9.02	0.00	150.0	± 9.6 %
		Y	0.60	60.00	6.19		150.0	
		Z	0.77	61.26	8.01		150.0	
10146-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.26	62.33	8.17	0.00	150.0	± 9.6 %
		Y	0.80	60.00	5.76		150.0	
		Z	1.11	61.23	7.16		150.0	
10147-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.38	63.03	8.64	0.00	150.0	± 9.6 %
		Y	0.81	60.00	5.82		150.0	
		Z	1.17	61.68	7.49		150.0	

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10168-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	5.19	77.75	22.14	3.01	150.0	± 9.6 %
		Y	3.52	72.25	20.07		150.0	
		Z	4.97	77.39	22.02		150.0	
10169-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.89	69.70	19.27	3.01	150.0	± 9.6 %
		Y	2.26	65.50	17.29		150.0	
		Z	2.81	69.24	19.06		150.0	
10170-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	4.59	78.92	22.86	3.01	150.0	± 9.6 %
		Y	2.59	69.39	19.12		150.0	
		Z	4.31	78.05	22.54		150.0	
10171-AAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	3.48	73.12	19.40	3.01	150.0	± 9.6 %
		Y	2.20	66.07	16.41		150.0	
		Z	3.31	72.53	19.17		150.0	
10172-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.25	82.41	26.10	6.02	65.0	± 9.6 %
		Y	2.64	73.12	21.93		65.0	
		Z	3.88	80.95	25.68		65.0	
10173-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	19.29	107.38	31.82	6.02	65.0	± 9.6 %
		Y	3.34	76.88	21.72		65.0	
		Z	15.68	104.61	31.25		65.0	
10174-CAD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	16.57	102.91	29.80	6.02	65.0	± 9.6 %
		Y	2.58	72.15	19.23		65.0	
		Z	14.37	101.42	29.58		65.0	
10175-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.86	69.38	19.01	3.01	150.0	± 9.6 %
		Y	2.24	65.25	17.06		150.0	
		Z	2.77	68.94	18.81		150.0	
10176-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	4.60	78.95	22.87	3.01	150.0	± 9.6 %
		Y	2.60	69.41	19.13		150.0	
		Z	4.32	78.08	22.55		150.0	
10177-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.88	69.52	19.09	3.01	150.0	± 9.6 %
		Y	2.25	65.36	17.13		150.0	
		Z	2.79	69.07	18.89		150.0	
10178-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	4.55	78.72	22.76	3.01	150.0	± 9.6 %
		Y	2.58	69.30	19.06		150.0	
		Z	4.28	77.88	22.45		150.0	
10179-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.97	75.84	20.97	3.01	150.0	± 9.6 %
		Y	2.37	67.62	17.63		150.0	
		Z	3.76	75.12	20.70		150.0	
10180-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	3.47	73.06	19.36	3.01	150.0	± 9.6 %
		Y	2.20	66.05	16.38		150.0	
		Z	3.31	72.48	19.13		150.0	
10181-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.87	69.51	19.09	3.01	150.0	± 9.6 %
		Y	2.25	65.34	17.12		150.0	
		Z	2.79	69.05	18.88		150.0	
10182-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	4.54	78.69	22.74	3.01	150.0	± 9.6 %
		Y	2.58	69.27	19.05		150.0	
		Z	4.27	77.84	22.44		150.0	
10183-AAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	3.47	73.03	19.35	3.01	150.0	± 9.6 %
		Y	2.20	66.03	16.37		150.0	
		Z	3.30	72.45	19.12		150.0	

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10223-CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.20	67.20	16.42	0.00	150.0	± 9.6 %
		Y	5.02	66.91	16.25		150.0	
		Z	5.15	67.13	16.37		150.0	
10224-CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	4.97	67.11	16.28	0.00	150.0	± 9.6 %
		Y	4.82	66.89	16.16		150.0	
		Z	4.93	67.04	16.24		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.65	66.05	14.87	0.00	150.0	± 9.6 %
		Y	2.44	65.46	14.07		150.0	
		Z	2.59	65.87	14.61		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	22.08	110.03	32.67	6.02	65.0	± 9.6 %
		Y	3.49	77.77	22.17		65.0	
		Z	17.77	107.09	32.07		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	21.78	107.42	31.06	6.02	65.0	± 9.6 %
		Y	3.49	77.13	21.24		65.0	
		Z	17.94	105.08	30.62		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	5.89	89.13	28.61	6.02	65.0	± 9.6 %
		Y	2.76	74.18	22.46		65.0	
		Z	5.16	86.90	27.96		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	19.51	107.55	31.87	6.02	65.0	± 9.6 %
		Y	3.36	76.97	21.76		65.0	
		Z	15.85	104.77	31.30		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	18.95	104.89	30.27	6.02	65.0	± 9.6 %
		Y	3.33	76.26	20.83		65.0	
		Z	15.70	102.64	29.84		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	5.63	88.15	28.17	6.02	65.0	± 9.6 %
		Y	2.69	73.62	22.13		65.0	
		Z	4.95	85.99	27.54		65.0	
10232-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	19.47	107.53	31.87	6.02	65.0	± 9.6 %
		Y	3.35	76.95	21.75		65.0	
		Z	15.81	104.75	31.29		65.0	
10233-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	18.85	104.82	30.26	6.02	65.0	± 9.6 %
		Y	3.32	76.23	20.82		65.0	
		Z	15.61	102.57	29.83		65.0	
10234-CAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	5.45	87.36	27.76	6.02	65.0	± 9.6 %
		Y	2.64	73.18	21.82		65.0	
		Z	4.80	85.28	27.16		65.0	
10235-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	19.53	107.61	31.89	6.02	65.0	± 9.6 %
		Y	3.35	76.96	21.76		65.0	
		Z	15.86	104.82	31.32		65.0	
10236-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	19.32	105.19	30.35	6.02	65.0	± 9.6 %
		Y	3.35	76.35	20.86		65.0	
		Z	15.99	102.93	29.92		65.0	
10237-CAD	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	5.63	88.20	28.20	6.02	65.0	± 9.6 %
		Y	2.69	73.61	22.13		65.0	
		Z	4.95	86.02	27.56		65.0	
10238-CAD	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	19.41	107.50	31.86	6.02	65.0	± 9.6 %
		Y	3.34	76.93	21.74		65.0	
		Z	15.76	104.71	31.28		65.0	

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10255-CAD	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	5.17	76.03	21.01	3.98	65.0	± 9.6 %
		Y	4.15	72.78	19.31		65.0	
		Z	5.07	75.91	20.96		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	2.73	66.15	11.81	3.98	65.0	± 9.6 %
		Y	1.74	61.79	8.43		65.0	
		Z	2.48	65.11	10.98		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	2.65	65.49	11.37	3.98	65.0	± 9.6 %
		Y	1.74	61.53	8.17		65.0	
		Z	2.42	64.52	10.57		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	2.42	67.72	13.32	3.98	65.0	± 9.6 %
		Y	1.51	62.43	9.30		65.0	
		Z	2.19	66.50	12.43		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	4.15	72.23	17.99	3.98	65.0	± 9.6 %
		Y	3.17	68.42	15.39		65.0	
		Z	4.01	71.79	17.61		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	4.17	71.94	17.84	3.98	65.0	± 9.6 %
		Y	3.21	68.24	15.29		65.0	
		Z	4.03	71.50	17.46		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	4.90	78.24	20.83	3.98	65.0	± 9.6 %
		Y	3.34	72.46	17.68		65.0	
		Z	4.72	77.76	20.53		65.0	
10262-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	4.69	73.94	20.07	3.98	65.0	± 9.6 %
		Y	3.83	70.99	18.23		65.0	
		Z	4.58	73.71	19.88		65.0	
10263-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	4.49	71.96	18.80	3.98	65.0	± 9.6 %
		Y	3.66	69.08	16.90		65.0	
		Z	4.37	71.69	18.58		65.0	
10264-CAD	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	5.34	79.07	21.92	3.98	65.0	± 9.6 %
		Y	3.91	74.33	19.52		65.0	
		Z	5.19	78.81	21.79		65.0	
10265-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	4.76	71.82	19.32	3.98	65.0	± 9.6 %
		Y	4.04	69.39	17.87		65.0	
		Z	4.67	71.65	19.22		65.0	
10266-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	5.10	72.82	20.12	3.98	65.0	± 9.6 %
		Y	4.36	70.51	18.78		65.0	
		Z	5.02	72.67	20.04		65.0	
10267-CAD	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	5.44	76.75	21.13	3.98	65.0	± 9.6 %
		Y	4.31	73.31	19.44		65.0	
		Z	5.32	76.60	21.10		65.0	
10268-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	5.41	71.89	19.80	3.98	65.0	± 9.6 %
		Y	4.72	69.84	18.66		65.0	
		Z	5.32	71.75	19.75		65.0	
10269-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	5.42	71.53	19.67	3.98	65.0	± 9.6 %
		Y	4.76	69.60	18.57		65.0	
		Z	5.34	71.42	19.63		65.0	
10270-CAD	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	5.45	74.16	20.18	3.98	65.0	± 9.6 %
		Y	4.61	71.72	18.96		65.0	
		Z	5.37	74.07	20.18		65.0	

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10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.59	65.15	17.50	4.96	50.0	± 9.6 %
		Y	4.35	64.95	17.15		50.0	
		Z	4.55	65.21	17.44		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.43	65.14	17.06	4.17	50.0	± 9.6 %
		Y	4.17	64.73	16.57		50.0	
		Z	4.39	65.19	16.99		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	3.81	65.65	18.15	6.02	35.0	± 9.6 %
		Y	3.61	65.33	17.29		35.0	
		Z	3.79	65.81	18.03		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.24	65.34	18.17	6.02	35.0	± 9.6 %
		Y	4.02	65.08	17.54		35.0	
		Z	4.21	65.48	18.11		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.10	65.28	18.03	6.02	35.0	± 9.6 %
		Y	3.89	64.99	17.37		35.0	
		Z	4.08	65.41	17.95		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.07	65.43	18.16	6.02	35.0	± 9.6 %
		Y	3.86	65.13	17.49		35.0	
		Z	4.05	65.56	18.08		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.26	65.44	18.28	6.02	35.0	± 9.6 %
		Y	4.03	65.11	17.61		35.0	
		Z	4.23	65.56	18.20		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.18	65.34	18.13	6.02	35.0	± 9.6 %
		Y	3.97	65.10	17.51		35.0	
		Z	4.16	65.49	18.07		35.0	
10311-AAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	2.91	68.44	15.99	0.00	150.0	± 9.6 %
		Y	2.65	67.41	15.41		150.0	
		Z	2.83	68.04	15.78		150.0	
10313-AAA	iDEN 1:3	X	2.65	72.33	15.95	6.99	70.0	± 9.6 %
		Y	1.60	66.26	12.84		70.0	
		Z	2.64	72.46	16.12		70.0	
10314-AAA	iDEN 1:6	X	4.23	81.41	22.53	10.00	30.0	± 9.6 %
		Y	2.80	73.62	18.77		30.0	
		Z	4.15	81.28	22.61		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.04	63.35	14.75	0.17	150.0	± 9.6 %
		Y	0.95	62.52	13.96		150.0	
		Z	1.03	63.13	14.51		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.41	66.63	16.13	0.17	150.0	± 9.6 %
		Y	4.22	66.36	15.88		150.0	
		Z	4.36	66.58	16.07		150.0	
10317-AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.41	66.63	16.13	0.17	150.0	± 9.6 %
		Y	4.22	66.36	15.88		150.0	
		Z	4.36	66.58	16.07		150.0	
10400-AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.49	66.95	16.15	0.00	150.0	± 9.6 %
		Y	4.29	66.67	15.92		150.0	
		Z	4.43	66.87	16.07		150.0	
10401-AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.16	66.86	16.21	0.00	150.0	± 9.6 %
		Y	4.97	66.49	16.00		150.0	
		Z	5.10	66.73	16.13		150.0	

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10427-AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.16	67.13	16.35	0.00	150.0	± 9.6 %
		Y	4.99	66.88	16.21		150.0	
		Z	5.10	67.03	16.28		150.0	
10430-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.11	71.32	17.94	0.00	150.0	± 9.6 %
		Y	4.01	71.85	17.74		150.0	
		Z	4.02	71.19	17.71		150.0	
10431-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.00	67.22	15.98	0.00	150.0	± 9.6 %
		Y	3.77	66.93	15.61		150.0	
		Z	3.93	67.13	15.86		150.0	
10432-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.32	67.08	16.14	0.00	150.0	± 9.6 %
		Y	4.11	66.84	15.89		150.0	
		Z	4.26	67.01	16.05		150.0	
10433-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.57	67.04	16.24	0.00	150.0	± 9.6 %
		Y	4.38	66.81	16.04		150.0	
		Z	4.52	66.97	16.17		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.18	72.10	17.75	0.00	150.0	± 9.6 %
		Y	3.97	72.08	17.14		150.0	
		Z	4.06	71.81	17.41		150.0	
10435-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	100.00	124.04	30.30	3.23	80.0	± 9.6 %
		Y	2.07	76.37	17.41		80.0	
		Z	100.00	125.10	30.68		80.0	
10447-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.24	67.02	14.93	0.00	150.0	± 9.6 %
		Y	2.93	66.23	13.99		150.0	
		Z	3.15	66.78	14.63		150.0	
10448-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	3.86	67.01	15.86	0.00	150.0	± 9.6 %
		Y	3.65	66.73	15.49		150.0	
		Z	3.80	66.93	15.73		150.0	
10449-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.15	66.91	16.04	0.00	150.0	± 9.6 %
		Y	3.96	66.67	15.79		150.0	
		Z	4.10	66.84	15.95		150.0	
10450-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.37	66.82	16.09	0.00	150.0	± 9.6 %
		Y	4.19	66.58	15.89		150.0	
		Z	4.32	66.75	16.02		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.06	66.87	14.27	0.00	150.0	± 9.6 %
		Y	2.66	65.61	12.96		150.0	
		Z	2.93	66.48	13.86		150.0	
10456-AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.09	67.84	16.61	0.00	150.0	± 9.6 %
		Y	5.97	67.59	16.50		150.0	
		Z	6.04	67.69	16.52		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.72	65.40	15.82	0.00	150.0	± 9.6 %
		Y	3.60	65.30	15.64		150.0	
		Z	3.69	65.39	15.75		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.70	70.76	16.66	0.00	150.0	± 9.6 %
		Y	3.11	68.73	14.83		150.0	
		Z	3.50	70.06	16.04		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.83	68.67	17.73	0.00	150.0	± 9.6 %
		Y	4.63	68.83	17.30		150.0	
		Z	4.71	68.47	17.43		150.0	

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10477-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.69	60.00	7.35	3.23	80.0	± 9.6 %
		Y	0.58	60.00	6.88		80.0	
		Z	0.66	60.00	7.28		80.0	
10478-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.72	60.00	6.67	3.23	80.0	± 9.6 %
		Y	0.30	55.57	3.78		80.0	
		Z	0.69	60.00	6.57		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.47	91.75	24.35	3.23	80.0	± 9.6 %
		Y	3.48	78.35	19.37		80.0	
		Z	10.05	93.01	24.66		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.49	79.97	17.95	3.23	80.0	± 9.6 %
		Y	1.63	65.31	11.76		80.0	
		Z	5.95	79.11	17.46		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.78	72.96	15.07	3.23	80.0	± 9.6 %
		Y	1.27	62.37	9.92		80.0	
		Z	3.30	71.67	14.39		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.78	66.74	13.70	2.23	80.0	± 9.6 %
		Y	0.97	60.41	9.27		80.0	
		Z	1.58	65.34	12.77		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.35	66.64	12.84	2.23	80.0	± 9.6 %
		Y	1.19	60.00	8.40		80.0	
		Z	1.98	64.76	11.67		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.23	65.75	12.43	2.23	80.0	± 9.6 %
		Y	1.22	60.00	8.38		80.0	
		Z	1.90	64.02	11.31		80.0	
10485-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.34	70.06	16.50	2.23	80.0	± 9.6 %
		Y	1.50	64.66	13.11		80.0	
		Z	2.20	69.28	15.99		80.0	
10486-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.32	66.39	14.06	2.23	80.0	± 9.6 %
		Y	1.55	61.94	10.84		80.0	
		Z	2.15	65.55	13.42		80.0	
10487-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.32	66.02	13.86	2.23	80.0	± 9.6 %
		Y	1.57	61.75	10.71		80.0	
		Z	2.16	65.20	13.22		80.0	
10488-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.75	70.05	17.57	2.23	80.0	± 9.6 %
		Y	2.11	66.76	15.63		80.0	
		Z	2.64	69.65	17.34		80.0	
10489-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.87	67.47	16.26	2.23	80.0	± 9.6 %
		Y	2.37	65.27	14.70		80.0	
		Z	2.80	67.24	16.06		80.0	
10490-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.96	67.37	16.21	2.23	80.0	± 9.6 %
		Y	2.45	65.23	14.68		80.0	
		Z	2.88	67.15	16.01		80.0	
10491-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.07	69.06	17.34	2.23	80.0	± 9.6 %
		Y	2.51	66.58	15.92		80.0	
		Z	2.98	68.76	17.19		80.0	
10492-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.25	66.97	16.47	2.23	80.0	± 9.6 %
		Y	2.82	65.36	15.37		80.0	
		Z	3.19	66.82	16.34		80.0	

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10508-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.35	66.98	16.57	2.23	80.0	± 9.6 %
		Y	2.93	65.43	15.56		80.0	
		Z	3.28	66.82	16.46		80.0	
10509-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.68	69.39	17.37	2.23	80.0	± 9.6 %
		Y	3.11	67.18	16.22		80.0	
		Z	3.59	69.10	17.26		80.0	
10510-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.74	67.04	16.73	2.23	80.0	± 9.6 %
		Y	3.34	65.61	15.89		80.0	
		Z	3.68	66.87	16.64		80.0	
10511-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.82	66.88	16.69	2.23	80.0	± 9.6 %
		Y	3.42	65.54	15.89		80.0	
		Z	3.76	66.73	16.61		80.0	
10512-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.75	70.55	17.73	2.23	80.0	± 9.6 %
		Y	3.07	67.83	16.37		80.0	
		Z	3.63	70.15	17.58		80.0	
10513-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.62	67.15	16.79	2.23	80.0	± 9.6 %
		Y	3.22	65.61	15.90		80.0	
		Z	3.56	66.95	16.69		80.0	
10514-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.67	66.85	16.70	2.23	80.0	± 9.6 %
		Y	3.29	65.43	15.86		80.0	
		Z	3.62	66.67	16.61		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	0.95	63.00	14.38	0.00	150.0	± 9.6 %
		Y	0.88	62.29	13.63		150.0	
		Z	0.95	62.77	14.12		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.54	68.56	16.16	0.00	150.0	± 9.6 %
		Y	0.43	66.08	13.93		150.0	
		Z	0.51	67.20	15.26		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.79	64.56	14.82	0.00	150.0	± 9.6 %
		Y	0.70	63.40	13.72		150.0	
		Z	0.77	64.10	14.42		150.0	
10518-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.37	66.77	16.09	0.00	150.0	± 9.6 %
		Y	4.19	66.58	15.89		150.0	
		Z	4.32	66.72	16.02		150.0	
10519-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.52	66.95	16.18	0.00	150.0	± 9.6 %
		Y	4.32	66.73	15.98		150.0	
		Z	4.46	66.89	16.11		150.0	
10520-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.37	66.88	16.09	0.00	150.0	± 9.6 %
		Y	4.18	66.64	15.88		150.0	
		Z	4.32	66.81	16.02		150.0	
10521-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.31	66.85	16.08	0.00	150.0	± 9.6 %
		Y	4.12	66.59	15.85		150.0	
		Z	4.25	66.77	16.00		150.0	
10522-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.36	66.98	16.17	0.00	150.0	± 9.6 %
		Y	4.15	66.67	15.92		150.0	
		Z	4.30	66.88	16.08		150.0	

10541-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	4.94	66.30	15.94	0.00	150.0	± 9.6 %
		Y	4.78	66.03	15.79		150.0	
		Z	4.89	66.21	15.88		150.0	
10542-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.09	66.39	16.01	0.00	150.0	± 9.6 %
		Y	4.92	66.14	15.87		150.0	
		Z	5.04	66.32	15.95		150.0	
10543-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.16	66.44	16.06	0.00	150.0	± 9.6 %
		Y	5.01	66.27	15.97		150.0	
		Z	5.12	66.40	16.02		150.0	
10544-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.30	66.43	15.94	0.00	150.0	± 9.6 %
		Y	5.16	66.14	15.80		150.0	
		Z	5.26	66.34	15.89		150.0	
10545-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.47	66.83	16.10	0.00	150.0	± 9.6 %
		Y	5.33	66.60	16.00		150.0	
		Z	5.43	66.75	16.06		150.0	
10546-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.33	66.55	15.97	0.00	150.0	± 9.6 %
		Y	5.19	66.24	15.82		150.0	
		Z	5.29	66.45	15.92		150.0	
10547-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.41	66.64	16.01	0.00	150.0	± 9.6 %
		Y	5.29	66.46	15.93		150.0	
		Z	5.37	66.57	15.97		150.0	
10548-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.55	67.25	16.30	0.00	150.0	± 9.6 %
		Y	5.38	66.91	16.14		150.0	
		Z	5.49	67.13	16.23		150.0	
10550-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.38	66.69	16.05	0.00	150.0	± 9.6 %
		Y	5.28	66.55	16.00		150.0	
		Z	5.35	66.64	16.02		150.0	
10551-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.33	66.53	15.94	0.00	150.0	± 9.6 %
		Y	5.17	66.18	15.77		150.0	
		Z	5.28	66.42	15.88		150.0	
10552-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.31	66.53	15.94	0.00	150.0	± 9.6 %
		Y	5.17	66.27	15.81		150.0	
		Z	5.27	66.46	15.89		150.0	
10553-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.37	66.50	15.95	0.00	150.0	± 9.6 %
		Y	5.21	66.19	15.81		150.0	
		Z	5.32	66.41	15.90		150.0	
10554-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.72	66.76	16.02	0.00	150.0	± 9.6 %
		Y	5.60	66.48	15.90		150.0	
		Z	5.68	66.68	15.97		150.0	
10555-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.81	66.99	16.12	0.00	150.0	± 9.6 %
		Y	5.67	66.67	15.98		150.0	
		Z	5.77	66.89	16.07		150.0	
10556-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.84	67.08	16.16	0.00	150.0	± 9.6 %
		Y	5.73	66.84	16.05		150.0	
		Z	5.81	67.00	16.11		150.0	
10557-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.81	66.97	16.12	0.00	150.0	± 9.6 %
		Y	5.67	66.67	15.99		150.0	
		Z	5.77	66.88	16.07		150.0	

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10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.45	66.54	16.23	0.46	130.0	± 9.6 %
		Y	4.27	66.28	15.98		130.0	
		Z	4.41	66.50	16.17		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.48	66.73	16.31	0.46	130.0	± 9.6 %
		Y	4.30	66.51	16.08		130.0	
		Z	4.43	66.70	16.26		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.65	66.97	16.46	0.46	130.0	± 9.6 %
		Y	4.45	66.73	16.23		130.0	
		Z	4.59	66.92	16.40		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.55	67.10	16.55	0.46	130.0	± 9.6 %
		Y	4.36	66.87	16.34		130.0	
		Z	4.50	67.05	16.49		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.31	66.33	15.83	0.46	130.0	± 9.6 %
		Y	4.10	65.95	15.51		130.0	
		Z	4.25	66.26	15.76		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.35	66.39	15.86	0.46	130.0	± 9.6 %
		Y	4.12	65.96	15.50		130.0	
		Z	4.29	66.31	15.78		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.46	67.16	16.51	0.46	130.0	± 9.6 %
		Y	4.27	66.96	16.32		130.0	
		Z	4.41	67.12	16.46		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.24	66.10	15.62	0.46	130.0	± 9.6 %
		Y	4.02	65.70	15.27		130.0	
		Z	4.18	66.04	15.55		130.0	
10583-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.45	66.54	16.23	0.46	130.0	± 9.6 %
		Y	4.27	66.28	15.98		130.0	
		Z	4.41	66.50	16.17		130.0	
10584-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.48	66.73	16.31	0.46	130.0	± 9.6 %
		Y	4.30	66.51	16.08		130.0	
		Z	4.43	66.70	16.26		130.0	
10585-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.65	66.97	16.46	0.46	130.0	± 9.6 %
		Y	4.45	66.73	16.23		130.0	
		Z	4.59	66.92	16.40		130.0	
10586-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.55	67.10	16.55	0.46	130.0	± 9.6 %
		Y	4.36	66.87	16.34		130.0	
		Z	4.50	67.05	16.49		130.0	
10587-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.31	66.33	15.83	0.46	130.0	± 9.6 %
		Y	4.10	65.95	15.51		130.0	
		Z	4.25	66.26	15.76		130.0	
10588-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.35	66.39	15.86	0.46	130.0	± 9.6 %
		Y	4.12	65.96	15.50		130.0	
		Z	4.29	66.31	15.78		130.0	
10589-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.46	67.16	16.51	0.46	130.0	± 9.6 %
		Y	4.27	66.96	16.32		130.0	
		Z	4.41	67.12	16.46		130.0	
10590-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.24	66.10	15.62	0.46	130.0	± 9.6 %
		Y	4.02	65.70	15.27		130.0	
		Z	4.18	66.04	15.55		130.0	

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10607-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.46	65.97	15.99	0.46	130.0	± 9.6 %
		Y	4.28	65.74	15.77		130.0	
		Z	4.41	65.94	15.94		130.0	
10608-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.60	66.30	16.14	0.46	130.0	± 9.6 %
		Y	4.39	66.02	15.91		130.0	
		Z	4.54	66.25	16.08		130.0	
10609-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.49	66.14	15.96	0.46	130.0	± 9.6 %
		Y	4.29	65.83	15.71		130.0	
		Z	4.44	66.08	15.90		130.0	
10610-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.54	66.30	16.13	0.46	130.0	± 9.6 %
		Y	4.34	66.02	15.89		130.0	
		Z	4.49	66.25	16.07		130.0	
10611-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.46	66.10	15.97	0.46	130.0	± 9.6 %
		Y	4.25	65.79	15.72		130.0	
		Z	4.40	66.04	15.91		130.0	
10612-AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.45	66.23	16.01	0.46	130.0	± 9.6 %
		Y	4.23	65.87	15.73		130.0	
		Z	4.39	66.16	15.95		130.0	
10613-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.45	66.06	15.86	0.46	130.0	± 9.6 %
		Y	4.23	65.69	15.57		130.0	
		Z	4.39	65.98	15.79		130.0	
10614-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.41	66.27	16.11	0.46	130.0	± 9.6 %
		Y	4.21	65.95	15.85		130.0	
		Z	4.36	66.20	16.04		130.0	
10615-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.45	65.95	15.75	0.46	130.0	± 9.6 %
		Y	4.24	65.61	15.46		130.0	
		Z	4.40	65.89	15.69		130.0	
10616-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.09	66.31	16.18	0.46	130.0	± 9.6 %
		Y	4.93	66.04	16.02		130.0	
		Z	5.05	66.25	16.14		130.0	
10617-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.14	66.45	16.23	0.46	130.0	± 9.6 %
		Y	4.95	66.12	16.04		130.0	
		Z	5.09	66.36	16.17		130.0	
10618-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.05	66.51	16.27	0.46	130.0	± 9.6 %
		Y	4.86	66.17	16.07		130.0	
		Z	5.00	66.43	16.22		130.0	
10619-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.06	66.31	16.11	0.46	130.0	± 9.6 %
		Y	4.91	66.10	15.97		130.0	
		Z	5.02	66.27	16.08		130.0	
10620-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.14	66.32	16.16	0.46	130.0	± 9.6 %
		Y	4.96	66.02	15.98		130.0	
		Z	5.09	66.26	16.12		130.0	
10621-AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.15	66.45	16.34	0.46	130.0	± 9.6 %
		Y	4.98	66.16	16.18		130.0	
		Z	5.10	66.37	16.29		130.0	
10622-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.14	66.54	16.39	0.46	130.0	± 9.6 %
		Y	4.96	66.24	16.21		130.0	
		Z	5.08	66.45	16.33		130.0	

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10639-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	5.95	66.97	16.37	0.46	130.0	± 9.6 %
		Y	5.81	66.65	16.21		130.0	
		Z	5.92	66.89	16.33		130.0	
10640-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	5.93	66.91	16.28	0.46	130.0	± 9.6 %
		Y	5.74	66.45	16.05		130.0	
		Z	5.87	66.78	16.22		130.0	
10641-AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.01	66.93	16.32	0.46	130.0	± 9.6 %
		Y	5.88	66.65	16.18		130.0	
		Z	5.97	66.86	16.28		130.0	
10642-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.04	67.14	16.58	0.46	130.0	± 9.6 %
		Y	5.88	66.80	16.43		130.0	
		Z	5.99	67.05	16.54		130.0	
10643-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.88	66.84	16.33	0.46	130.0	± 9.6 %
		Y	5.73	66.47	16.14		130.0	
		Z	5.84	66.75	16.28		130.0	
10644-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	5.95	67.07	16.46	0.46	130.0	± 9.6 %
		Y	5.77	66.62	16.23		130.0	
		Z	5.90	66.93	16.39		130.0	
10645-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.07	67.08	16.43	0.46	130.0	± 9.6 %
		Y	5.92	66.75	16.27		130.0	
		Z	6.02	66.97	16.38		130.0	
10646-AAD	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	9.77	101.08	35.81	9.30	60.0	± 9.6 %
		Y	4.48	81.78	27.93		60.0	
		Z	8.20	97.48	34.82		60.0	
10647-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	8.10	97.02	34.55	9.30	60.0	± 9.6 %
		Y	4.04	79.86	27.26		60.0	
		Z	6.89	93.69	33.59		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.53	61.84	8.75	0.00	150.0	± 9.6 %
		Y	0.37	60.00	6.01		150.0	
		Z	0.48	61.10	7.93		150.0	
10652-AAB	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.21	66.07	15.87	2.23	80.0	± 9.6 %
		Y	2.85	64.87	14.87		80.0	
		Z	3.15	65.96	15.72		80.0	
10653-AAB	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	3.77	65.52	16.19	2.23	80.0	± 9.6 %
		Y	3.48	64.70	15.55		80.0	
		Z	3.72	65.45	16.10		80.0	
10654-AAB	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	3.79	65.17	16.22	2.23	80.0	± 9.6 %
		Y	3.54	64.39	15.66		80.0	
		Z	3.75	65.10	16.15		80.0	
10655-AAB	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	3.86	65.11	16.26	2.23	80.0	± 9.6 %
		Y	3.63	64.32	15.73		80.0	
		Z	3.83	65.03	16.20		80.0	
10658-AAA	Pulse Waveform (200Hz, 10%)	X	7.30	77.44	14.96	10.00	50.0	± 9.6 %
		Y	2.77	66.20	10.30		50.0	
		Z	10.17	81.09	16.28		50.0	
10659-AAA	Pulse Waveform (200Hz, 20%)	X	100.00	102.21	20.33	6.99	60.0	± 9.6 %
		Y	1.32	63.44	7.96		60.0	
		Z	100.00	103.16	20.77		60.0	