FCC SAR TEST REPORT

Test File No : F690501/RF-SAR002460

Equipment Under Test	Air Drop Equipment
Model Name	FAD-1000
Applicant	IO Factory Inc
Address of Applicant	31st Floor S Bulding, Songdo Techno Park IT Center, 32, Songdogwahak-ro, Yeonsu-gu Incheon 21984 Republic of Korea
FCC ID	2ALHLFAD10000
Exposure Category	General Population/Uncontrolled Exposure
Standards	FCC 47 CFR Part 2 (2.1093) IEEE 1528, 2013 ANSI/IEEE C95.1, C95.3
Date of Receipt	2017-02-02
Date of Test(s)	2017-04-21
Date of Issue	2017-04-26
Test Result	Refer to the Page 05

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Korea Co., Ltd. or testing done by SGS Korea Co., Ltd. in connection with distribution or use of the product described in this report must be approved by SGS Korea Co., Ltd. in writing.

Report prepared by /
Matthew Park
Test Engineer

Approved by /
Jongwon Ma
Technical Manager

Revision history

Revision	Date of issue	Revisions	Revised By
-	April 26, 2017	Initial issue	-

Contents

1 Testing Laboratory

Company Name	SGS Korea Co., Ltd. (Gunpo 3 Laboratory)
Address	10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807 Republic of Korea
Telephone	+82 +31 - 428 - 5700
FAX	+82 +31 - 427 - 2371

2 Details of Manufacturer

Applicant	IO Factory Inc
Address	31st Floor S Bulding, Songdo Techno Park IT Center, 32, Songdogwahak-ro, Yeonsu-gu Incheon 21984 Republic of Korea
Email	mspark@tvakorea.com
Phone No.	+82-270-7542-3737

3 Description of EUT(s)

EUT Type	Air Drop Equipment		
Model Name	FAD-1000		
Serial Number	#1		
Mode of Operation	LoRa		
Duty Cycle	1.153 (LoRa)		
Body worn Accessory	None		
Tx Frequency Range	905.0 ㎒ (Low Channel) 915.0 ㎒ (High Channel)		
Antenna Information	Manufacturer	IO Factory Inc	
	Type	Coil Antenna	
	Antenna Gain (dBi)		
	905.0 MHz ~ 915.0 MHz	0.49	

4 The Highest Reported SAR Values

Equipment Class	Band	Highest Reported SAR 1g (W/kg)
DTS	Low Channel	0.07
Simultaneous SAR per KDB 690783 D01v01r03		N/A

5 Test Methodology

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

Test tests documented in this report were performed in accordance with IEEE Standard 1528-2013 and the following published KDB procedures.

In additions;

☒	**KDB 865664 D01v01r04**	**SAR Measurement Requirements for 100 MHz to 6 GHz**
☒	**KDB 447498 D01v06**	**Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies**
☐	KDB 447498 D02v02r01	SAR Measurement Procedures for USB Dongle Transmitters
☐	KDB 248227 D01v02r02	SAR Guidance For IEEE 802.11 (Wi-Fi) Transmitters
☐	KDB 615223 D01v01r01	802.16e/WiMax SAR Measurement Guidance
☐	KDB 616217 D04v01r02	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers
☐	KDB 643646 D01v01r03	SAR Test Reduction Considerations for Occupational PTT Radios
☐	KDB 648474 D03v01r04	Evaluation and Approval Considerations for Handsets with Specific Wireless Charging Battery Covers
☐	KDB 648474 D04v01r03	SAR Evaluation Considerations for Wireless Handsets
☐	KDB 680106 D01v02	RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications
☐	KDB 941225 D01v03r01	3G SAR Measurement Procedures
☐	KDB 941225 D05v02r05	SAR Evaluation Considerations for LTE Devices
☐	KDB 941225 D06v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
☐	KDB 941225 D07v01r02	SAR Evaluation Procedures for UMPC Mini-Tablet Devices

6 Testing Environment

Ambient temperature	: 18°C ~ 25°C
Relative humidity	: 30% ~ 70%
Liquid temperature of during the test	: <± 2°C
Ambient noise & Reflection	: < 0.012 W/kg

7 Specific Absorption Rate (SAR)

7.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an 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

7.2 SAR Definition

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 a given 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 measurement can be either related to the temperature elevation in tissue by

$$SAR = C\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7.3 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (‘‘SAR’’) in Section 4.2 of ‘‘IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 ㎑ to 300 ㎓,’’ ANSI/IEEE C95.3–2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in ‘‘Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,’’ NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting

source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 ㎑ to 6 ㎓. Portable devices that transmit at frequencies above 6 ㎓ are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 ㎓ should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Partial Peak SAR (Partial)	1.60 m W/g	8.00 m W/g
Partial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Partial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

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

2. The spatial Average value of the SAR averaged over the whole body.

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

8 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. 1. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY6 professional system). The model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

The DASY 6 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli TX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A dosimeter probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- Data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

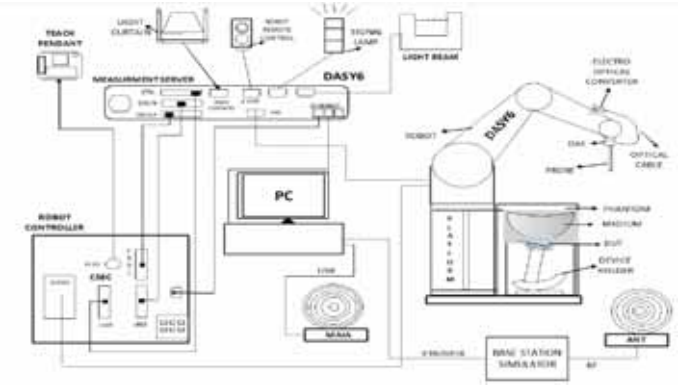


Fig 1. The microwave circuit arrangement used for SAR system verification

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 8.1 Pro.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Verification dipole kits allowing to validate the proper functioning of the system.

9 System Components

9.1 Probe

Construction : Symmetrical design with triangular core.
Built-in shielding against static charges.
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Calibration : Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 835 and HSL1900.
Additional CF-Calibration for other liquids and frequencies upon request.

Frequency : 10 ㎒ to 6 ㎓; Linearity: ± 0.2 ㏈ (30 ㎒ to 6 ㎓)

Directivity : ± 0.3 ㏈ in HSL (rotation around probe axis)
± 0.5 ㏈ in tissue material (rotation normal to probe axis)

Dynamic Range : 10μW/g to > 100 m W/g;
Linearity: ± 0.2 ㏈(noise: typically < 1 μW/g)

Dimensions : Overall length: 337 ㎜ (Tip length: 20 ㎜)
Tip diameter: 2.5 ㎜ (Body diameter: 12 ㎜)
Distance from probe tip to dipole centers: 1 ㎜

Application : High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 ㎓ with precision of better 30%


EX3DV4 E-Field Probe

NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX C” for the Calibration Certification Report.

9.2 SAM Phantom

Construction : The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. 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 the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot

Shell Thickness : 2.0 ㎜ ± 0.1 ㎜

Filling Volume : Approx. 25 liters


SAM Phantom

9.3 Device Holder

Construction: : In combination with the Twin SAM PhantomV4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).


Device Holder

10 SAR Measurement Procedures

10.1 Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 1.4 ㎜. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2 and 3: Area Scan & Zoom Scan Procedures

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

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

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

< Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04 >

			≤3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 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.	
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·$\Delta z_{Zoom}(n-1)$	
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 draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 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.

11 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. 1. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. These tests were done at 835 ㎒. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1. (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range (22 ± 2) ° C, the relative humidity was in the range (55 ± 5) % R.H and the liquid depth above the ear reference points was ≥ 15 cm ± 5 mm (frequency ≤ 3 GHz) or ≥ 10 cm ± 5 mm (frequency > 3 G Hz)in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

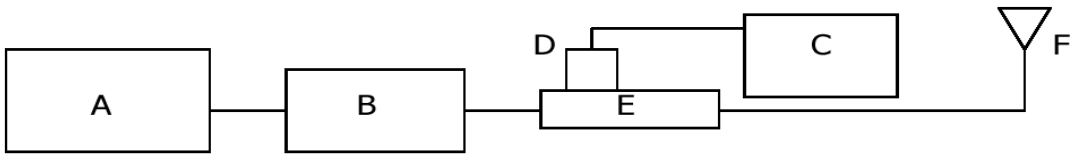


Fig. 1. The microwave circuit arrangement used for SAR system verification

A. R&S Model SMBV100A Vector Signal Generator
B. MECA Model AMP2027 RF Amplifier
C. Agilent Model N1914A Power Meter
D. Agilent Model N8481A Power Sensor
E. Agilent Model 778D Dual Directional Coupler
F. Reference dipole Antenna

Photo of the dipole Antenna

Verification Kit	Probe S/N	Tissue	Target SAR 1 g from Calibration Certificate (1 W)	Measured SAR 1 g (0.1 W)	Normalized SAR 1 g (1 W)	Deviation (%)	Date	Liquid Temp. (°C)
D835V2 SN:490	7413	835	9.40	0.999	9.99	6.28	2017-04-21	21.9

Table1. Results system verification

12 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Speag Model DAK-3.5 Dielectric Probe in conjunction with Agilent E5071C Network Analyzer(300 ㎑ - 6 ㎓) by using a procedure detailed in Section V.

f (㎒)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(℃)
835	Body	Measured, 2017-04-21	53.79	0.94	21.9
		Target Tissue Body	*55.20*	*0.97*	
		Deviation (%)	**-2.55**	**-3.09**	
905		Measured, 2017-04-21	53.17	1.01	
		Deviation (%)	**-3.68**	**4.12**	

The composition of the brain & muscle tissue simulating liquid

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (㎒)									
	450		835		900		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.91	46.21	40.29	50.75	40.29	50.75	55.24	70.17	55.00	68.64
Salt (NaCl)	3.79	2.34	1.38	0.94	1.38	0.94	0.31	0.39	-	-
Sugar	56.93	51.17	57.90	-	57.90	-	-	-	-	-
HEC	0.25	0.15	0.24	0.10	0.24	0.10	-	-	-	-
Bactericide	0.12	0.08	0.18	-	0.18	-	-	-	-	-
Triton X-100	-	-	-	-	-	-	-	-	-	-
DGBE	-	-	-	-	-	-	44.45	70.17	45.00	31.37
Dielectric Constant	43.5	56.7	41.5	55.2	41.5	55.0	40.0	53.3	39.2	52.7
Conductivity (S/m)	0.87	0.94	0.90	0.97	0.97	1.05	1.40	1.52	1.80	1.95

Salt: 99 $^{+}$% Pure Sodium Chloride Sugar: 98 $^{+}$% Pure Sucrose

Water: De-ionized, 16 MΩ^{+} resistivity HEC: Hydroxyethyl Cellulose

DGBE: 99 $^{+}$% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

13 Instruments List

Test Platform	SPEAG DASY6 Professional				
Location	10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807 Republic of Korea				
Manufacture	SPEAG				
Description	SAR Test System (Frequency range 300 MHz – 6 GHz)				
Software Reference	DASY52: 52.8.8(1258) SEMCAD X: 14.6.10(7373)				
Hardware Reference					
Equipment	**Type**	**Serial Number**	**Cal Date**	**Cal Interval**	**Cal Due**
Robot	TX60 L	F16/55FYA1/A/01	N/A	N/A	N/A
Phantom	SAM Phantom	1905	N/A	N/A	N/A
Verification Dipole	D835V2	490	2016-05-25	Biennial	2018-05-25
Dielectric Assessment Kit	DAK-3.5	1228	2016-11-17	Annual	2017-11-17
DAE	DAE4	1430	2017-03-16	Annual	2018-03-16
E-Field Probe	EX3DV4	7413	2016-06-29	Annual	2017-06-29
Network Analyzer	E5071C	MY46111535	2016-05-24	Annual	2017-05-24
Power Meter	N1914A	MY56120017	2016-07-06	Annual	2017-07-06
Power Sensor	N8481A	MY56120026	2016-07-06	Annual	2017-07-06
Power Sensor	N8481A	MY56120030	2016-07-06	Annual	2017-07-06
Vector Signal Generator	SMBV100A	262093	2016-07-06	Annual	2017-07-06
RF Amplifier	AMP2027	10008	2016-07-12	Annual	2017-07-12
Dual Directional Coupler	778D	MY52180578	2016-07-06	Annual	2017-07-06
LP Filter	WLJ5-1500-2355-6000-60EF	1	2016-08-19	Annual	2017-08-19
Attenuator	2	BY6201	2016-08-16	Annual	2017-08-16
Attenuator	2	CB6049	2016-08-16	Annual	2017-08-16
Attenuator	05AS102-K03	A2	2016-12-15	Annual	2017-12-15
Digital Hygro-Thermometer	TE-201	TE-201-1	2016-08-12	Annual	2017-08-12
Digital Thermometer	SDT25	16031500243	2016-08-12	Annual	2017-08-12
Signal Analyzer	FSV7	103082	2016-07-06	Annual	2017-07-06

14 FCC Power Measurement Procedures

The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

15 Measured and Reported SAR

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

16 Maximum Output Power Specifications

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

16.1 LoRa Maximum Output Power Specifications

Average power for Production (dB m)			
Mode	**Channel**	**Normal/Maximum**	**Main**
LoRa	All Channels	Maximum	**17.0**
		Normal	15.0
Tune-up Tolerance: -2.0 dB / +2.0 dB			

17 RF Conducted Power Measurement

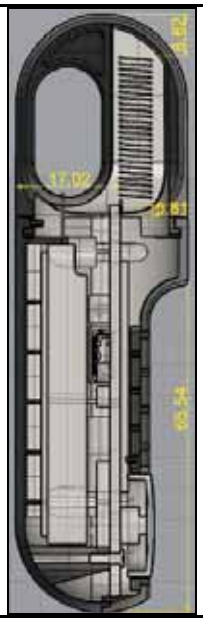
Mode	Freq. (MHz)	Channel	Measured Power [dB m]
LoRa	905.0	Low	16.89
	915.0	High	16.61

18 Transmit Antenna Separation Distances

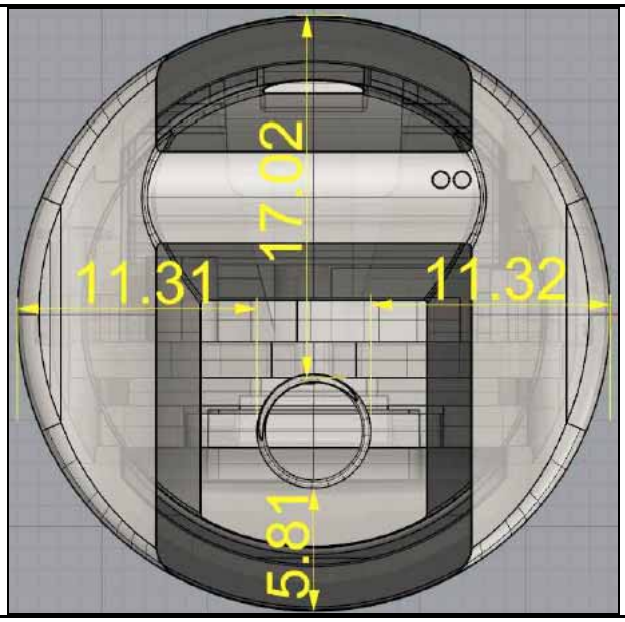
Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances < 50 ㎜ is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Distance (mm)}} * \sqrt{\text{Frequency(GHz)}} \leq 3.0$$

Based on the maximum tune-up tolerance limit of LoRa the antenna to use separation distance,



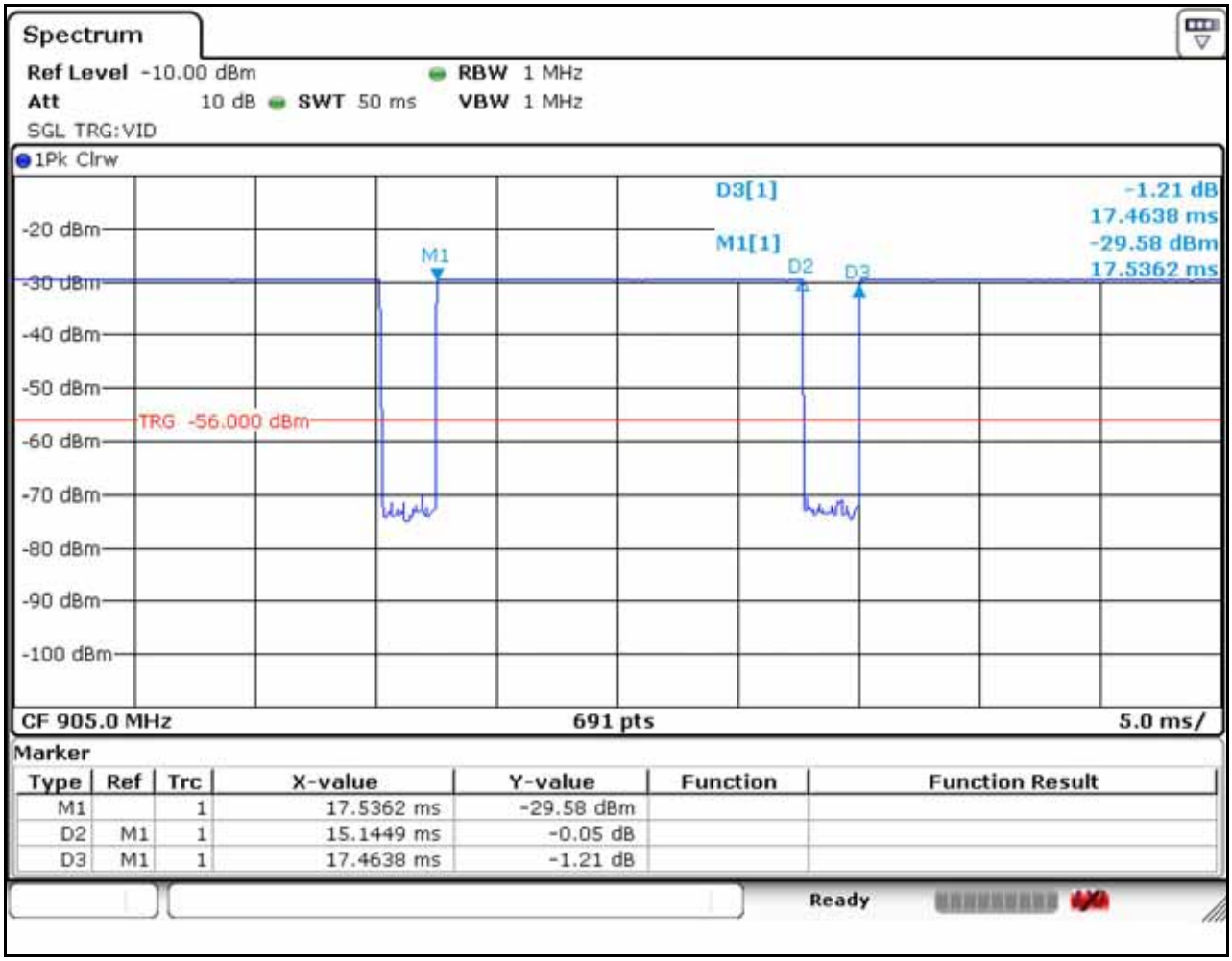
Edge 4 View



Edge 5 View

Antenna	Frequency (MHz)	Output power		Separation distances (mm)						SAR Exemption					
		dBm	mW	Edge 1	Edge 2	Edge 3	Edge 4	Edge 5	Edge 6	Edge 1	Edge 2	Edge 3	Edge 4	Edge 5	Edge 6
LoRa - Coil Antenna															
Coil Antenna	915	17.00	50	10.81	16.32	22.02	16.31	11.62	70.54	4.4 Measure	EXMPT	EXMPT	EXMPT	4.0 Measure	EXMPT

19 Duty Cycle used for SAR Testing



LoRa Duty cycle measurement

T_{on} = 15.14 ms

T_{on}+ T_{off} = 17.46 ms

Duty Cycle = (T_{on} / T_{on}+ T_{off}) x 100

86.7 % = (15.14 / 17.46) x 100

SAR Crest Factor = 1 / 0.867 = **1.153**

LoRa Duty cycle: 86.7%

20 SAR Data Summary

Body SAR

EUT Position	Mode	Traffic Channel		Power(dBm)		Peak SAR of Area Scan(W/kg)	1-g SAR (W/kg))	Scaling Factor (Power)	1-g Scaled SAR (W/kg)	Plot No
		Frequency (㎒)	Channel	Conducted Power	Tune-Up Limit					
Edge1	LoRa	905.0	Low	16.89	17.00	0.10800	0.06800	1.026	0.070	A5
Edge5		905.0	Low	16.89	17.00	0.00376	0.00166	1.026	0.002	-

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04v01r02 and FCC KDB Publication 447498 D01v06.
2. Liquid tissue depth was at least 15 cm for all frequencies.
3. All modes of operation were investigated, and worst-case results are reported.
4. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
5. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
6. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.

21 SAR Measurement Variability

21.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

21.2 Measurement Uncertainty

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

Appendixes List

Appendix A	A.1 Verification Test Plots for 835 MHz A.2 SAR Test Plots for LoRa
Appendix B	B.1 Uncertainty Analysis
Appendix C	C.1 Calibration certificate for Probe (S/N 7413) C.2 Calibration certificate for DAE (S/N 1430) C.3 Calibration certificate for Dipole (S/N 490)

Appendix A.1 Verification Test Plots for 835 MHz

Date: 2017-04-21

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Verification.da53:0

Input Power : 100 mW

Ambient Temp : 22.7 ℃ Tissue Temp : 21.9 ℃

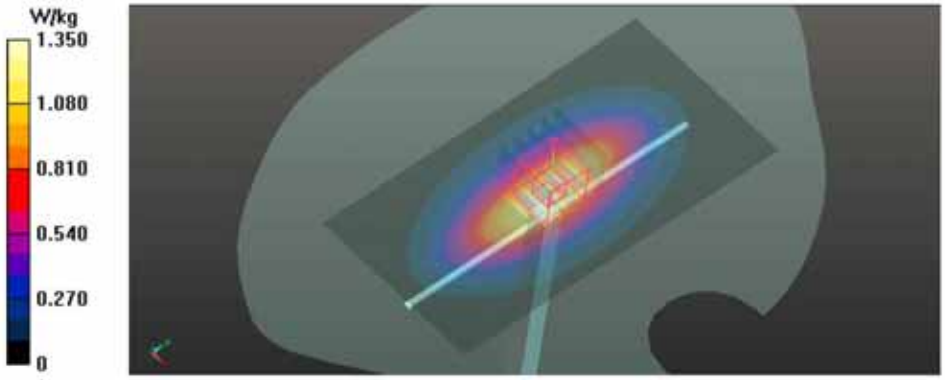
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.936 S/m; ε_r = 53.786; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7413; ConvF(9.34, 9.34, 9.34); Calibrated: 6/29/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 3/16/2017
- Phantom: Twin-SAM V.5.0 SN:1905; Type: SN:1905; Serial: SN:1905
- DASY52 52.8.8(1258)SEMCAD X 14.6.10(7372)

Verification/835MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.35 W/kg

Verification/835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.29 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 0.999 W/kg; SAR(10 g) = 0.665 W/kg
Maximum value of SAR (measured) = 1.32 W/kg



Appendix A.2 SAR Test Plots for LoRa

Date: 2017-04-21

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LoRa_Low Channel_905MHz_Edge1.da53:0

Ambient Temp : 22.7 ℃ Tissue Temp : 21.9 ℃

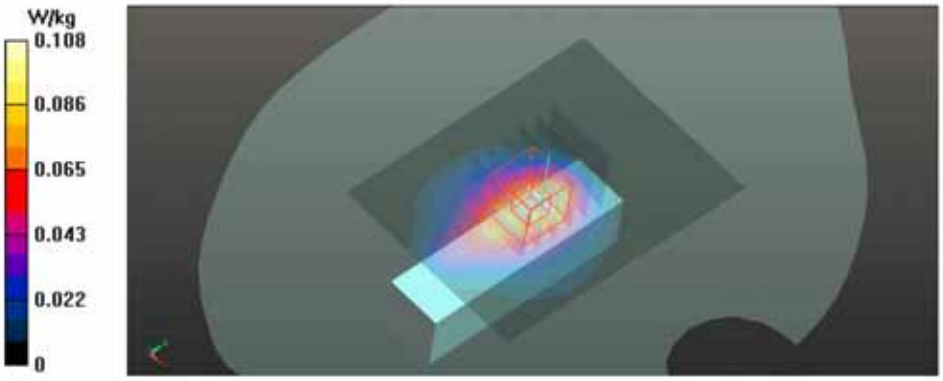
DUT: FAD-1000; Type: Air Drop Equipment; Serial: #1

Communication System: UID 0, LoRa (0); Frequency: 905 MHz;Duty Cycle: 1:1.153
Medium parameters used: f = 905 MHz; σ = 1.009 S/m; ε_r = 53.166; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7413; ConvF(9.34, 9.34, 9.34); Calibrated: 6/29/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1430; Calibrated: 3/16/2017
- Phantom: Twin-SAM V.5.0 SN:1905; Type: SN:1905; Serial: SN:1905
- DASY52 52.8.8(1258)SEMCAD X 14.6.10(7372)

Body/LoRa_Low Channel_905MHz_Edge1/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.108 W/kg

Body/LoRa_Low Channel_905MHz_Edge1/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.862 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.113 W/kg
SAR(1 g) = 0.068 W/kg; SAR(10 g) = 0.042 W/kg
Maximum value of SAR (measured) = 0.0936 W/kg



Appendix B.1 Uncertainty Analysis DASY6#2

Measurement uncertainty for 300 MHz to 6 GHz averaged over 1 gram

a	b	c	d	e = f(d,k)	g	i = cxg/e	k
Uncertainty Component	Section in IEEE 1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.55	N	1	1	6.55	∞
Axial isotropy	E.2.2	4.7	R	1.73	0.71	1.92	∞
Hemispherical isotropy	E.2.2	9.6	R	1.73	0.71	3.92	∞
Boundary effect	E.2.3	1.0	R	1.73	1	0.58	∞
Linearity	E.2.4	4.7	R	1.73	1	2.71	∞
System detection limit	E.2.5	0.3	R	1.73	1	0.14	∞
Readout electronics	E.2.6	0.3	N	1	1	0.30	∞
Response time	E.2.7	0.5	R	1.73	1	0.29	∞
Integration time	E.2.8	2.6	R	1.73	1	1.50	∞
RF ambient Condition - Noise	E.6.1	3.0	R	1.73	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3.0	R	1.73	1	1.73	∞
Probe Positiones	E.6.2	1.5	R	1.73	1	0.87	∞
Probe Positioning	E.6.3	2.9	R	1.73	1	1.67	∞
Max. SAR evaluation	E.5.2	1.0	R	1.73	1	0.58	∞
Test sample positioning	E.4.2	0.3	N	1	1	0.31	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.63	4
Output power variation -SAR drift measurement	6.6.3	5.0	R	1.73	1	2.89	∞
Phantom uncertainty	E.3.1	6.1	R	1.73	1	3.52	∞
Liquid conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	1.8	N	1	0.64	1.13	5
Liquid permittivity - deviation from target values	E.3.3	5.0	R	1.73	0.6	1.73	∞
Liquid permittivity - measurement uncertainty	E.3.3	1.7	N	1	0.6	1.03	9
Combined standard uncertainty				RSS		11.17	359
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		**22.34**	

Appendix C.1 Calibration certificate for Probe(S/N 7413)

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 SGS Korea (Dymstec)

Certificate No: EX3-7413_Jun16

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7413

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 29, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 55277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-15 (No. ES3-3013_Dec15)	Dec-16
DAE4	SN: 660	23-Dec-15 (No. DAE4-660_Dec15)	Dec-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

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

Issued: June 29, 2016

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

Certificate No: EX3-7413_Jun16 Page 1 of 38

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

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

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

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:7413

Manufactured: March 10, 2016
Calibrated: June 29, 2016

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7413

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.46	0.60	0.43	± 10.1 %
DCP (mV)[B]	119.6	99.6	97.1	

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	118.1	±3.5 %
		Y	0.0	0.0	1.0		137.1	
		Z	0.0	0.0	1.0		146.6	

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	51.84	351.8	30.35	15.19	0.528	4.987	0.328	0.295	0.994
Y	50.91	381	35.76	14.85	0.972	5.02	1.629	0.199	1.007
Z	54.25	410.3	36.43	15.21	1.066	5.005	0.612	0.491	1.005

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7413

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	9.74	9.74	9.74	0.44	0.80	± 12.0 %
835	41.5	0.90	9.28	9.28	9.28	0.48	0.80	± 12.0 %
900	41.5	0.97	9.15	9.15	9.15	0.30	1.01	± 12.0 %
1750	40.1	1.37	7.94	7.94	7.94	0.31	0.80	± 12.0 %
1900	40.0	1.40	7.70	7.70	7.70	0.37	0.80	± 12.0 %
2000	40.0	1.40	7.67	7.67	7.67	0.26	0.80	± 12.0 %
2300	39.5	1.67	7.34	7.34	7.34	0.33	0.80	± 12.0 %
2450	39.2	1.80	6.98	6.98	6.98	0.27	0.93	± 12.0 %
2600	39.0	1.96	6.82	6.82	6.82	0.29	0.80	± 12.0 %
5200	36.0	4.66	5.41	5.41	5.41	0.35	1.80	± 13.1 %
5300	35.9	4.76	5.15	5.15	5.15	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.54	4.54	4.54	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.58	4.58	4.58	0.45	1.80	± 13.1 %

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

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7413

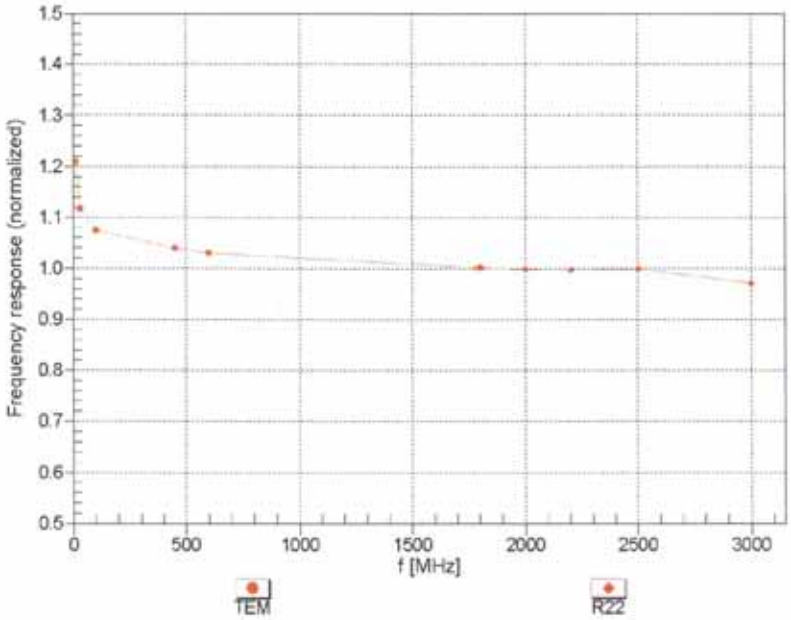
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.31	9.31	9.31	0.42	0.82	± 12.0 %
835	55.2	0.97	9.34	9.34	9.34	0.47	0.83	± 12.0 %
1750	53.4	1.49	7.66	7.66	7.66	0.39	0.80	± 12.0 %
1900	53.3	1.52	7.44	7.44	7.44	0.40	0.89	± 12.0 %
2450	52.7	1.95	7.07	7.07	7.07	0.42	0.80	± 12.0 %
2600	52.5	2.16	6.84	6.84	6.84	0.36	0.80	± 12.0 %
5200	49.0	5.30	4.68	4.68	4.68	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.44	4.44	4.44	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.85	3.85	3.85	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.16	4.16	4.16	0.50	1.90	± 13.1 %

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

EX3DV4– SN:7413 June 29, 2016

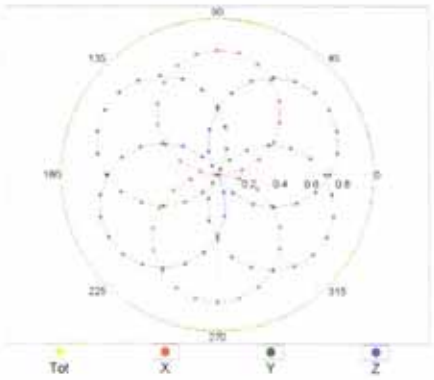
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



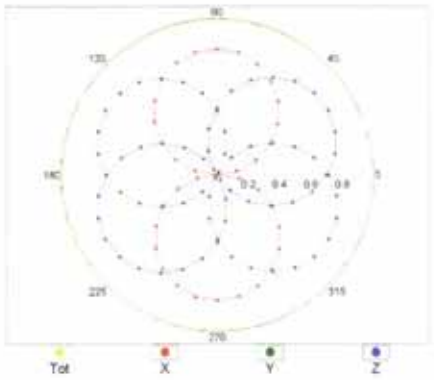
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

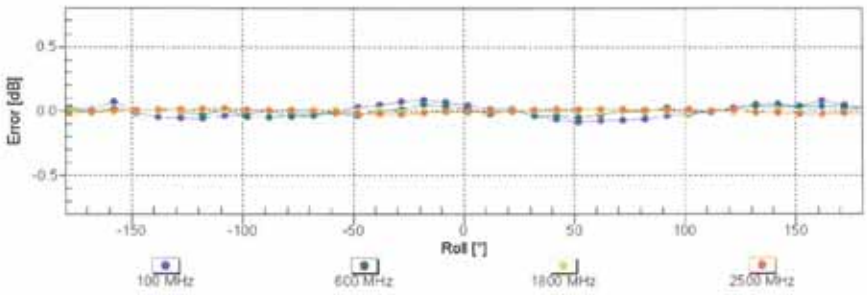
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



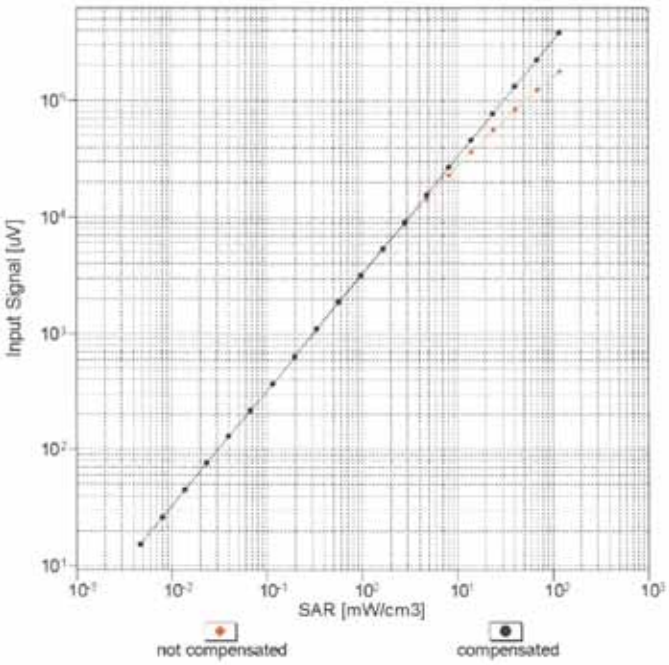
f=1800 MHz,R22

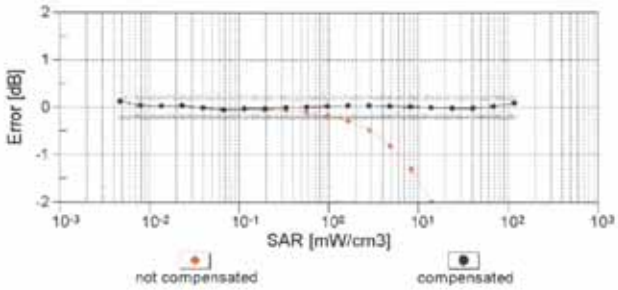




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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



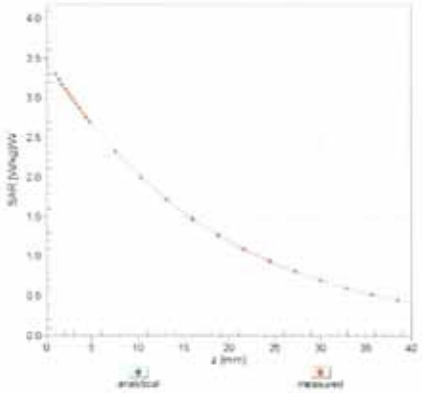


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

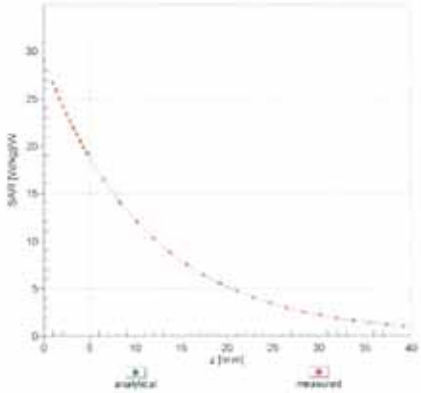
EX3DV4– SN:7413 June 29, 2016

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

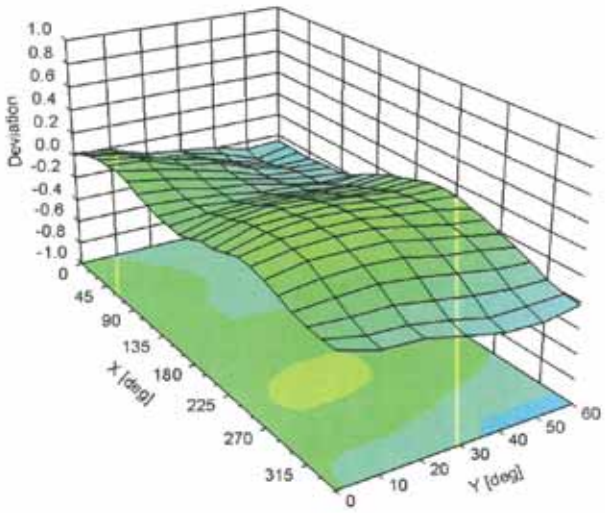


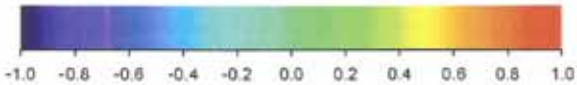
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:7413

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	62
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc^E (k=2)
0	CW	X	0.00	0.00	1.00	0.00	118.1	± 3.5 %
		Y	0.00	0.00	1.00		137.1	
		Z	0.00	0.00	1.00		146.6	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	2.41	64.88	9.47	10.00	20.0	± 9.6 %
		Y	3.52	69.66	12.77		20.0	
		Z	3.04	67.77	11.85		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	1.52	75.62	19.74	0.00	150.0	± 9.6 %
		Y	1.06	67.55	15.45		150.0	
		Z	1.01	66.54	14.85		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.26	66.46	16.91	0.41	150.0	± 9.6 %
		Y	1.20	63.91	15.26		150.0	
		Z	1.17	63.46	14.93		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.85	66.98	16.96	1.46	150.0	± 9.6 %
		Y	4.91	66.60	17.02		150.0	
		Z	4.92	66.40	16.90		150.0	
10021-DAB	GSM-FDD (TDMA, GMSK)	X	27.40	92.23	20.37	9.39	50.0	± 9.6 %
		Y	100.00	113.97	27.83		50.0	
		Z	38.89	100.98	24.44		50.0	
10023-DAB	GPRS-FDD (TDMA, GMSK, TN 0)	X	16.64	86.51	18.78	9.57	50.0	± 9.6 %
		Y	77.35	110.48	27.03		50.0	
		Z	24.41	94.85	22.81		50.0	
10024-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	104.59	22.12	6.56	60.0	± 9.6 %
		Y	100.00	112.13	25.89		60.0	
		Z	100.00	110.44	25.10		60.0	
10025-DAB	EDGE-FDD (TDMA, 8PSK, TN 0)	X	4.97	73.74	26.31	12.57	50.0	± 9.6 %
		Y	12.62	102.74	40.61		50.0	
		Z	4.97	72.63	26.35		50.0	
10026-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	12.64	96.71	32.82	9.56	60.0	± 9.6 %
		Y	13.79	100.77	35.59		60.0	
		Z	9.58	90.06	31.02		60.0	
10027-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	104.57	21.47	4.80	80.0	± 9.6 %
		Y	100.00	112.09	25.09		80.0	
		Z	100.00	109.64	23.98		80.0	
10028-DAB	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	106.09	21.56	3.55	100.0	± 9.6 %
		Y	100.00	113.22	24.91		100.0	
		Z	100.00	109.92	23.45		100.0	
10029-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	7.64	85.93	27.95	7.80	80.0	± 9.6 %
		Y	7.47	86.25	29.10		80.0	
		Z	6.36	81.43	26.65		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	103.49	21.24	5.30	70.0	± 9.6 %
		Y	100.00	110.65	24.75		70.0	
		Z	100.00	108.68	23.85		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	109.31	21.77	1.88	100.0	± 9.6 %
		Y	100.00	113.43	23.69		100.0	
		Z	100.00	108.52	21.62		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	126.66	27.83	1.17	100.0	± 9.6 %
		Y	100.00	120.12	25.51		100.0	
		Z	100.00	112.50	22.40		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	30.77	106.01	27.67	5.30	70.0	± 9.6 %
		Y	10.48	91.31	24.34		70.0	
		Z	7.05	84.65	21.99		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	11.35	96.03	24.45	1.88	100.0	± 9.6 %
		Y	3.10	76.93	18.26		100.0	
		Z	2.57	73.97	17.07		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	6.32	89.72	22.67	1.17	100.0	± 9.6 %
		Y	2.14	73.16	16.62		100.0	
		Z	1.87	71.01	15.72		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	64.87	117.23	30.56	5.30	70.0	± 9.6 %
		Y	13.64	95.62	25.73		70.0	
		Z	8.59	87.89	23.14		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	9.46	93.52	23.68	1.88	100.0	± 9.6 %
		Y	2.94	76.28	17.98		100.0	
		Z	2.45	73.44	16.83		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	6.74	91.05	23.22	1.17	100.0	± 9.6 %
		Y	2.16	73.51	16.87		100.0	
		Z	1.89	71.33	15.96		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	13.14	102.35	26.80	0.00	150.0	± 9.6 %
		Y	1.91	72.32	16.12		150.0	
		Z	1.83	71.35	15.82		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	31.53	91.97	19.04	7.78	50.0	± 9.6 %
		Y	100.00	110.31	25.33		50.0	
		Z	32.46	96.48	21.73		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.00	108.02	0.06	0.00	150.0	± 9.6 %
		Y	0.00	94.69	0.00		150.0	
		Z	0.00	99.36	5.55		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	7.23	74.46	16.06	13.80	25.0	± 9.6 %
		Y	13.30	84.94	21.38		25.0	
		Z	9.90	80.57	19.85		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	7.54	76.74	15.84	10.79	40.0	± 9.6 %
		Y	17.29	90.16	21.90		40.0	
		Z	11.09	83.84	19.77		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	19.62	94.10	24.27	9.03	50.0	± 9.6 %
		Y	16.22	93.30	25.22		50.0	
		Z	10.88	86.41	22.83		50.0	
10058-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	5.67	80.40	25.18	6.55	100.0	± 9.6 %
		Y	5.38	79.49	25.62		100.0	
		Z	4.93	76.78	24.05		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.35	68.10	17.67	0.61	110.0	± 9.6 %
		Y	1.25	65.06	15.85		110.0	
		Z	1.22	64.48	15.43		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	137.85	35.53	1.30	110.0	± 9.6 %
		Y	14.13	106.80	28.14		110.0	
		Z	4.75	89.77	22.92		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	7.36	95.47	26.77	2.04	110.0	± 9.6 %
		Y	3.17	80.64	22.01		110.0	
		Z	2.63	76.91	20.28		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.70	67.21	16.59	0.49	100.0	± 9.6 %
		Y	4.72	66.61	16.48		100.0	
		Z	4.73	66.46	16.40		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.71	67.26	16.66	0.72	100.0	± 9.6 %
		Y	4.73	66.69	16.57		100.0	
		Z	4.75	66.53	16.48		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	5.00	67.47	16.83	0.86	100.0	± 9.6 %
		Y	5.03	66.98	16.81		100.0	
		Z	5.06	66.83	16.73		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.86	67.35	16.90	1.21	100.0	± 9.6 %
		Y	4.90	66.87	16.89		100.0	
		Z	4.92	66.71	16.79		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.86	67.32	17.01	1.46	100.0	± 9.6 %
		Y	4.92	66.90	17.05		100.0	
		Z	4.93	66.72	16.94		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.12	67.28	17.31	2.04	100.0	± 9.6 %
		Y	5.20	67.03	17.47		100.0	
		Z	5.21	66.80	17.32		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.17	67.36	17.50	2.55	100.0	± 9.6 %
		Y	5.27	67.16	17.73		100.0	
		Z	5.28	66.94	17.56		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.24	67.26	17.64	2.67	100.0	± 9.6 %
		Y	5.35	67.14	17.91		100.0	
		Z	5.36	66.89	17.73		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.93	67.00	17.19	1.99	100.0	± 9.6 %
		Y	5.01	66.69	17.32		100.0	
		Z	5.01	66.48	17.17		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.91	67.35	17.39	2.30	100.0	± 9.6 %
		Y	5.00	67.04	17.53		100.0	
		Z	5.00	66.81	17.37		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.96	67.43	17.64	2.83	100.0	± 9.6 %
		Y	5.06	67.21	17.85		100.0	
		Z	5.06	66.94	17.65		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.93	67.30	17.76	3.30	100.0	± 9.6 %
		Y	5.04	67.11	18.01		100.0	
		Z	5.03	66.82	17.79		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	4.98	67.44	18.05	3.82	90.0	± 9.6 %
		Y	5.10	67.31	18.35		90.0	
		Z	5.09	67.00	18.12		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	4.96	67.15	18.10	4.15	90.0	± 9.6 %
		Y	5.10	67.08	18.46		90.0	
		Z	5.08	66.74	18.19		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	4.98	67.20	18.19	4.30	90.0	± 9.6 %
		Y	5.13	67.15	18.55		90.0	
		Z	5.11	66.79	18.28		90.0	

10081-CAB	CDMA2000 (1xRTT, RC3)	X	2.18	81.13	20.04	0.00	150.0	± 9.6 %
		Y	0.89	66.39	13.08		150.0	
		Z	0.87	65.70	12.80		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.84	60.00	4.53	4.77	80.0	± 9.6 %
		Y	0.87	60.00	5.05		80.0	
		Z	0.73	58.47	3.99		80.0	
10090-DAB	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	104.61	22.14	6.56	60.0	± 9.6 %
		Y	100.00	112.15	25.92		60.0	
		Z	100.00	110.47	25.13		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	2.23	72.19	18.20	0.00	150.0	± 9.6 %
		Y	1.85	67.61	15.74		150.0	
		Z	1.82	67.08	15.48		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	2.19	72.15	18.18	0.00	150.0	± 9.6 %
		Y	1.81	67.58	15.71		150.0	
		Z	1.78	67.02	15.44		150.0	
10099-DAB	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	12.73	96.81	32.84	9.56	60.0	± 9.6 %
		Y	13.87	100.85	35.61		60.0	
		Z	9.62	90.12	31.04		60.0	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.87	74.78	18.70	0.00	150.0	± 9.6 %
		Y	3.19	70.44	16.76		150.0	
		Z	3.15	70.02	16.53		150.0	
10101-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.46	69.47	16.86	0.00	150.0	± 9.6 %
		Y	3.29	67.58	15.98		150.0	
		Z	3.29	67.37	15.86		150.0	
10102-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.57	69.38	16.93	0.00	150.0	± 9.6 %
		Y	3.39	67.52	16.06		150.0	
		Z	3.39	67.35	15.96		150.0	
10103-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	7.54	78.19	20.78	3.98	65.0	± 9.6 %
		Y	6.37	75.10	20.03		65.0	
		Z	6.36	74.71	19.73		65.0	
10104-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.93	75.13	20.40	3.98	65.0	± 9.6 %
		Y	6.62	74.13	20.48		65.0	
		Z	6.48	73.31	19.98		65.0	
10105-CAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	6.64	74.32	20.39	3.98	65.0	± 9.6 %
		Y	6.06	72.29	19.97		65.0	
		Z	6.20	72.39	19.89		65.0	
10108-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	3.33	73.74	18.49	0.00	150.0	± 9.6 %
		Y	2.79	69.63	16.58		150.0	
		Z	2.77	69.23	16.34		150.0	
10109-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	3.15	69.55	16.96	0.00	150.0	± 9.6 %
		Y	2.94	67.40	15.88		150.0	
		Z	2.95	67.18	15.77		150.0	
10110-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.70	72.75	18.23	0.00	150.0	± 9.6 %
		Y	2.27	68.73	16.21		150.0	
		Z	2.25	68.25	15.94		150.0	
10111-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	3.05	71.57	17.96	0.00	150.0	± 9.6 %
		Y	2.65	68.09	16.14		150.0	
		Z	2.66	67.88	16.07		150.0	

10112-CAC	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.27	69.43	16.95	0.00	150.0	± 9.6 %
		Y	3.07	67.37	15.93		150.0	
		Z	3.07	67.18	15.83		150.0	
10113-CAC	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	3.20	71.52	17.99	0.00	150.0	± 9.6 %
		Y	2.80	68.21	16.26		150.0	
		Z	2.82	68.03	16.21		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.15	67.86	16.59	0.00	150.0	± 9.6 %
		Y	5.16	67.18	16.44		150.0	
		Z	5.18	67.08	16.39		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.45	67.98	16.64	0.00	150.0	± 9.6 %
		Y	5.48	67.38	16.55		150.0	
		Z	5.53	67.37	16.55		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.25	68.06	16.61	0.00	150.0	± 9.6 %
		Y	5.27	67.40	16.48		150.0	
		Z	5.30	67.33	16.44		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.13	67.81	16.59	0.00	150.0	± 9.6 %
		Y	5.14	67.08	16.40		150.0	
		Z	5.17	67.01	16.38		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.51	68.08	16.70	0.00	150.0	± 9.6 %
		Y	5.56	67.57	16.65		150.0	
		Z	5.61	67.55	16.64		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.22	68.00	16.60	0.00	150.0	± 9.6 %
		Y	5.24	67.33	16.45		150.0	
		Z	5.27	67.26	16.42		150.0	
10140-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.61	69.35	16.83	0.00	150.0	± 9.6 %
		Y	3.43	67.53	15.98		150.0	
		Z	3.43	67.35	15.88		150.0	
10141-CAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.73	69.40	16.97	0.00	150.0	± 9.6 %
		Y	3.55	67.60	16.14		150.0	
		Z	3.56	67.45	16.05		150.0	
10142-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	2.60	73.76	18.49	0.00	150.0	± 9.6 %
		Y	2.05	68.71	15.92		150.0	
		Z	2.03	68.18	15.67		150.0	
10143-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	3.24	74.09	18.60	0.00	150.0	± 9.6 %
		Y	2.52	68.83	15.92		150.0	
		Z	2.53	68.59	15.89		150.0	
10144-CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.63	69.71	16.09	0.00	150.0	± 9.6 %
		Y	2.31	66.75	14.43		150.0	
		Z	2.32	66.45	14.36		150.0	
10145-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	2.58	76.48	17.82	0.00	150.0	± 9.6 %
		Y	1.33	65.87	12.56		150.0	
		Z	1.36	65.82	12.72		150.0	
10146-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.64	64.90	10.89	0.00	150.0	± 9.6 %
		Y	2.28	67.92	12.65		150.0	
		Z	2.14	66.83	12.42		150.0	
10147-CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.89	66.60	11.89	0.00	150.0	± 9.6 %
		Y	2.79	70.42	13.92		150.0	
		Z	2.50	68.84	13.52		150.0	

10149-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	3.17	69.65	17.02	0.00	150.0	± 9.6 %
		Y	2.95	67.45	15.93		150.0	
		Z	2.96	67.24	15.81		150.0	
10150-CAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.28	69.51	17.01	0.00	150.0	± 9.6 %
		Y	3.07	67.42	15.97		150.0	
		Z	3.08	67.23	15.87		150.0	
10151-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	8.00	80.53	21.76	3.98	65.0	± 9.6 %
		Y	6.93	78.02	21.29		65.0	
		Z	6.56	76.58	20.57		65.0	
10152-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	6.45	75.03	20.11	3.98	65.0	± 9.6 %
		Y	6.16	74.09	20.19		65.0	
		Z	5.98	73.11	19.63		65.0	
10153-CAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	6.94	76.27	21.02	3.98	65.0	± 9.6 %
		Y	6.51	74.92	20.91		65.0	
		Z	6.35	74.05	20.42		65.0	
10154-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.86	73.81	18.77	0.00	150.0	± 9.6 %
		Y	2.32	69.12	16.46		150.0	
		Z	2.31	68.72	16.24		150.0	
10155-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	3.05	71.55	17.95	0.00	150.0	± 9.6 %
		Y	2.65	68.11	16.16		150.0	
		Z	2.66	67.89	16.08		150.0	
10156-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	2.62	75.28	19.00	0.00	150.0	± 9.6 %
		Y	1.90	68.84	15.77		150.0	
		Z	1.88	68.32	15.55		150.0	
10157-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	2.68	71.76	16.89	0.00	150.0	± 9.6 %
		Y	2.15	67.35	14.52		150.0	
		Z	2.15	67.02	14.45		150.0	
10158-CAC	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	3.22	71.63	18.05	0.00	150.0	± 9.6 %
		Y	2.81	68.26	16.30		150.0	
		Z	2.82	68.09	16.26		150.0	
10159-CAC	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	2.93	72.88	17.46	0.00	150.0	± 9.6 %
		Y	2.26	67.79	14.79		150.0	
		Z	2.27	67.53	14.78		150.0	
10160-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	3.07	71.36	17.69	0.00	150.0	± 9.6 %
		Y	2.78	68.62	16.33		150.0	
		Z	2.77	68.29	16.14		150.0	
10161-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	3.19	69.55	17.03	0.00	150.0	± 9.6 %
		Y	2.97	67.35	15.90		150.0	
		Z	2.98	67.15	15.82		150.0	
10162-CAB	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.30	69.58	17.07	0.00	150.0	± 9.6 %
		Y	3.08	67.47	16.00		150.0	
		Z	3.09	67.26	15.91		150.0	
10166-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.25	68.13	17.75	3.01	150.0	± 9.6 %
		Y	3.70	70.04	19.37		150.0	
		Z	3.64	69.02	18.72		150.0	
10167-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	3.83	70.28	17.95	3.01	150.0	± 9.6 %
		Y	4.77	73.90	20.20		150.0	
		Z	4.50	71.81	19.15		150.0	

10168-CAC	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.31	72.71	19.43	3.01	150.0	± 9.6 %
		Y	5.34	76.31	21.55		150.0	
		Z	5.00	74.11	20.51		150.0	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.59	67.50	17.43	3.01	150.0	± 9.6 %
		Y	3.16	70.49	19.62		150.0	
		Z	3.10	69.08	18.71		150.0	
10170-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.46	73.11	19.77	3.01	150.0	± 9.6 %
		Y	4.97	79.09	22.88		150.0	
		Z	4.39	75.29	21.13		150.0	
10171-AAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	2.73	68.39	16.58	3.01	150.0	± 9.6 %
		Y	3.85	73.76	19.71		150.0	
		Z	3.52	70.70	18.17		150.0	
10172-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	6.92	84.75	24.17	6.02	65.0	± 9.6 %
		Y	10.46	94.74	29.37		65.0	
		Z	8.03	87.14	26.09		65.0	
10173-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	9.25	86.12	22.76	6.02	65.0	± 9.6 %
		Y	31.50	109.27	31.36		65.0	
		Z	11.70	90.10	25.29		65.0	
10174-CAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	7.05	81.04	20.53	6.02	65.0	± 9.6 %
		Y	15.68	96.07	27.03		65.0	
		Z	9.37	85.45	23.26		65.0	
10175-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.55	67.14	17.14	3.01	150.0	± 9.6 %
		Y	3.12	70.16	19.37		150.0	
		Z	3.06	68.73	18.44		150.0	
10176-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	3.46	73.13	19.78	3.01	150.0	± 9.6 %
		Y	4.97	79.12	22.89		150.0	
		Z	4.39	75.31	21.15		150.0	
10177-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.58	67.33	17.26	3.01	150.0	± 9.6 %
		Y	3.15	70.32	19.46		150.0	
		Z	3.09	68.91	18.55		150.0	
10178-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.41	72.80	19.60	3.01	150.0	± 9.6 %
		Y	4.90	78.82	22.75		150.0	
		Z	4.33	75.01	20.99		150.0	
10179-CAC	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.03	70.44	17.94	3.01	150.0	± 9.6 %
		Y	4.36	76.25	21.14		150.0	
		Z	3.89	72.76	19.47		150.0	
10180-CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	2.71	68.29	16.51	3.01	150.0	± 9.6 %
		Y	3.84	73.67	19.65		150.0	
		Z	3.51	70.61	18.11		150.0	
10181-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.57	67.31	17.25	3.01	150.0	± 9.6 %
		Y	3.14	70.30	19.46		150.0	
		Z	3.08	68.89	18.54		150.0	
10182-CAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.40	72.77	19.59	3.01	150.0	± 9.6 %
		Y	4.89	78.79	22.73		150.0	
		Z	4.32	74.99	20.98		150.0	
10183-AAA	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	2.71	68.27	16.50	3.01	150.0	± 9.6 %
		Y	3.83	73.64	19.64		150.0	
		Z	3.50	70.59	18.10		150.0	

10184-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.58	67.36	17.28	3.01	150.0	± 9.6 %
		Y	3.15	70.35	19.48		150.0	
		Z	3.10	68.93	18.57		150.0	
10185-CAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.42	72.85	19.63	3.01	150.0	± 9.6 %
		Y	4.92	78.88	22.78		150.0	
		Z	4.35	75.07	21.02		150.0	
10186-AAC	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	2.72	68.33	16.53	3.01	150.0	± 9.6 %
		Y	3.85	73.72	19.68		150.0	
		Z	3.52	70.65	18.13		150.0	
10187-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.59	67.39	17.33	3.01	150.0	± 9.6 %
		Y	3.16	70.40	19.54		150.0	
		Z	3.10	68.97	18.62		150.0	
10188-CAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	3.57	73.73	20.13	3.01	150.0	± 9.6 %
		Y	5.13	79.76	23.22		150.0	
		Z	4.52	75.87	21.46		150.0	
10189-AAC	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	2.79	68.79	16.84	3.01	150.0	± 9.6 %
		Y	3.97	74.27	19.99		150.0	
		Z	3.60	71.11	18.43		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.59	67.40	16.44	0.00	150.0	± 9.6 %
		Y	4.57	66.59	16.16		150.0	
		Z	4.59	66.48	16.13		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.78	67.73	16.54	0.00	150.0	± 9.6 %
		Y	4.74	66.92	16.28		150.0	
		Z	4.77	66.82	16.24		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.82	67.75	16.55	0.00	150.0	± 9.6 %
		Y	4.79	66.95	16.30		150.0	
		Z	4.82	66.84	16.26		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.60	67.48	16.46	0.00	150.0	± 9.6 %
		Y	4.57	66.67	16.19		150.0	
		Z	4.60	66.56	16.15		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.79	67.76	16.55	0.00	150.0	± 9.6 %
		Y	4.76	66.94	16.30		150.0	
		Z	4.79	66.84	16.26		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.82	67.76	16.56	0.00	150.0	± 9.6 %
		Y	4.79	66.97	16.31		150.0	
		Z	4.82	66.86	16.27		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.56	67.51	16.44	0.00	150.0	± 9.6 %
		Y	4.52	66.68	16.15		150.0	
		Z	4.55	66.57	16.11		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.79	67.73	16.54	0.00	150.0	± 9.6 %
		Y	4.75	66.92	16.29		150.0	
		Z	4.79	66.82	16.25		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.82	67.68	16.53	0.00	150.0	± 9.6 %
		Y	4.80	66.90	16.30		150.0	
		Z	4.83	66.79	16.26		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.12	67.84	16.59	0.00	150.0	± 9.6 %
		Y	5.11	67.09	16.40		150.0	
		Z	5.15	67.03	16.38		150.0	

10223-CAB	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.41	67.91	16.63	0.00	150.0	± 9.6 %
		Y	5.42	67.27	16.51		150.0	
		Z	5.46	67.23	16.50		150.0	
10224-CAB	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.17	67.98	16.59	0.00	150.0	± 9.6 %
		Y	5.16	67.20	16.38		150.0	
		Z	5.19	67.13	16.35		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.98	67.76	16.31	0.00	150.0	± 9.6 %
		Y	2.84	66.11	15.39		150.0	
		Z	2.85	65.91	15.34		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	10.02	87.49	23.32	6.02	65.0	± 9.6 %
		Y	35.25	111.42	32.05		65.0	
		Z	12.47	91.31	25.78		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	8.64	83.95	21.57	6.02	65.0	± 9.6 %
		Y	26.75	104.64	29.49		65.0	
		Z	11.17	88.23	24.22		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	8.18	87.83	25.28	6.02	65.0	± 9.6 %
		Y	15.31	102.19	31.73		65.0	
		Z	9.11	89.79	27.08		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	9.35	86.27	22.83	6.02	65.0	± 9.6 %
		Y	31.73	109.38	31.40		65.0	
		Z	11.78	90.21	25.34		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	8.10	82.91	21.13	6.02	65.0	± 9.6 %
		Y	24.40	102.98	28.94		65.0	
		Z	10.58	87.26	23.83		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	7.74	86.76	24.83	6.02	65.0	± 9.6 %
		Y	14.44	100.93	31.27		65.0	
		Z	8.71	88.86	26.68		65.0	
10232-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	9.33	86.24	22.81	6.02	65.0	± 9.6 %
		Y	31.71	109.38	31.40		65.0	
		Z	11.76	90.19	25.33		65.0	
10233-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	8.08	82.89	21.12	6.02	65.0	± 9.6 %
		Y	24.37	102.97	28.94		65.0	
		Z	10.56	87.24	23.82		65.0	
10234-CAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	7.35	85.71	24.35	6.02	65.0	± 9.6 %
		Y	13.68	99.69	30.77		65.0	
		Z	8.36	87.96	26.26		65.0	
10235-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	9.32	86.25	22.82	6.02	65.0	± 9.6 %
		Y	31.83	109.46	31.43		65.0	
		Z	11.77	90.21	25.34		65.0	
10236-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	8.14	82.97	21.14	6.02	65.0	± 9.6 %
		Y	24.77	103.21	29.00		65.0	
		Z	10.65	87.35	23.85		65.0	
10237-CAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	7.74	86.79	24.84	6.02	65.0	± 9.6 %
		Y	14.52	101.07	31.31		65.0	
		Z	8.72	88.91	26.70		65.0	
10238-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	9.30	86.21	22.80	6.02	65.0	± 9.6 %
		Y	31.66	109.37	31.40		65.0	
		Z	11.74	90.16	25.32		65.0	

10239-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	8.06	82.86	21.11	6.02	65.0	± 9.6 %
		Y	24.31	102.96	28.94		65.0	
		Z	10.53	87.22	23.81		65.0	
10240-CAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	7.72	86.75	24.82	6.02	65.0	± 9.6 %
		Y	14.46	101.01	31.29		65.0	
		Z	8.69	88.87	26.68		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	7.32	78.08	22.98	6.98	65.0	± 9.6 %
		Y	9.07	83.22	26.13		65.0	
		Z	8.09	79.38	24.23		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	6.82	76.72	22.33	6.98	65.0	± 9.6 %
		Y	7.76	79.93	24.73		65.0	
		Z	7.58	78.06	23.61		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	5.71	74.22	22.08	6.98	65.0	± 9.6 %
		Y	6.19	76.20	24.07		65.0	
		Z	6.19	75.06	23.19		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	5.10	72.43	16.23	3.98	65.0	± 9.6 %
		Y	6.19	75.71	18.42		65.0	
		Z	5.69	73.92	17.72		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	5.04	72.05	16.03	3.98	65.0	± 9.6 %
		Y	6.07	75.14	18.14		65.0	
		Z	5.63	73.53	17.50		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	7.96	82.92	21.08	3.98	65.0	± 9.6 %
		Y	5.76	77.95	19.59		65.0	
		Z	5.31	76.30	18.93		65.0	
10247-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	6.03	76.23	19.29	3.98	65.0	± 9.6 %
		Y	5.28	73.85	18.59		65.0	
		Z	5.13	73.04	18.25		65.0	
10248-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	5.91	75.38	18.92	3.98	65.0	± 9.6 %
		Y	5.30	73.41	18.39		65.0	
		Z	5.17	72.64	18.06		65.0	
10249-CAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	9.42	85.93	22.94	3.98	65.0	± 9.6 %
		Y	6.89	80.95	21.56		65.0	
		Z	6.21	78.76	20.65		65.0	
10250-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	6.97	78.55	21.65	3.98	65.0	± 9.6 %
		Y	6.17	76.16	21.06		65.0	
		Z	5.99	75.22	20.58		65.0	
10251-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	6.32	75.52	20.05	3.98	65.0	± 9.6 %
		Y	5.95	74.32	19.96		65.0	
		Z	5.76	73.30	19.43		65.0	
10252-CAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	8.88	84.37	23.20	3.98	65.0	± 9.6 %
		Y	7.13	80.67	22.32		65.0	
		Z	6.56	78.68	21.40		65.0	
10253-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	6.27	74.40	19.87	3.98	65.0	± 9.6 %
		Y	6.01	73.52	19.96		65.0	
		Z	5.85	72.57	19.42		65.0	
10254-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	6.71	75.52	20.68	3.98	65.0	± 9.6 %
		Y	6.35	74.32	20.61		65.0	
		Z	6.20	73.46	20.13		65.0	

10255-CAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	7.48	79.63	21.67	3.98	65.0	± 9.6 %
		Y	6.62	77.43	21.29		65.0	
		Z	6.28	76.01	20.57		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	3.98	68.95	13.73	3.98	65.0	± 9.6 %
		Y	4.84	71.85	15.80		65.0	
		Z	4.62	70.76	15.41		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	3.94	68.54	13.47	3.98	65.0	± 9.6 %
		Y	4.73	71.16	15.42		65.0	
		Z	4.56	70.27	15.11		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	5.85	77.84	18.46	3.98	65.0	± 9.6 %
		Y	4.44	73.69	17.10		65.0	
		Z	4.27	72.85	16.79		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	6.37	76.98	20.09	3.98	65.0	± 9.6 %
		Y	5.64	74.73	19.49		65.0	
		Z	5.47	73.83	19.08		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	6.36	76.63	19.97	3.98	65.0	± 9.6 %
		Y	5.67	74.49	19.40		65.0	
		Z	5.52	73.65	19.02		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	8.46	84.00	22.64	3.98	65.0	± 9.6 %
		Y	6.66	80.04	21.61		65.0	
		Z	6.08	78.02	20.72		65.0	
10262-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	6.95	78.47	21.59	3.98	65.0	± 9.6 %
		Y	6.17	76.12	21.02		65.0	
		Z	5.98	75.17	20.54		65.0	
10263-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	6.32	75.50	20.05	3.98	65.0	± 9.6 %
		Y	5.94	74.30	19.96		65.0	
		Z	5.75	73.28	19.43		65.0	
10264-CAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	8.75	84.09	23.08	3.98	65.0	± 9.6 %
		Y	7.07	80.50	22.23		65.0	
		Z	6.50	78.52	21.32		65.0	
10265-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	6.44	75.03	20.11	3.98	65.0	± 9.6 %
		Y	6.16	74.09	20.20		65.0	
		Z	5.98	73.11	19.64		65.0	
10266-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	6.93	76.25	21.01	3.98	65.0	± 9.6 %
		Y	6.51	74.91	20.90		65.0	
		Z	6.35	74.04	20.41		65.0	
10267-CAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	7.97	80.47	21.74	3.98	65.0	± 9.6 %
		Y	6.92	77.98	21.28		65.0	
		Z	6.55	76.55	20.55		65.0	
10268-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	7.05	74.88	20.43	3.98	65.0	± 9.6 %
		Y	6.76	73.93	20.51		65.0	
		Z	6.63	73.17	20.05		65.0	
10269-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.98	74.40	20.30	3.98	65.0	± 9.6 %
		Y	6.72	73.52	20.41		65.0	
		Z	6.60	72.80	19.96		65.0	
10270-CAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	7.40	77.26	20.66	3.98	65.0	± 9.6 %
		Y	6.76	75.49	20.42		65.0	
		Z	6.55	74.54	19.89		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.77	68.41	16.38	0.00	150.0	± 9.6 %
		Y	2.62	66.45	15.30		150.0	
		Z	2.60	66.13	15.17		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	2.09	73.40	18.48	0.00	150.0	± 9.6 %
		Y	1.65	67.98	15.67		150.0	
		Z	1.60	67.29	15.29		150.0	
10277-CAA	PHS (QPSK)	X	2.42	61.80	7.28	9.03	50.0	± 9.6 %
		Y	2.70	62.92	8.55		50.0	
		Z	2.70	62.80	8.53		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	5.48	73.30	15.48	9.03	50.0	± 9.6 %
		Y	5.48	73.80	16.53		50.0	
		Z	5.19	72.87	16.16		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	5.66	73.66	15.69	9.03	50.0	± 9.6 %
		Y	5.64	74.10	16.70		50.0	
		Z	5.33	73.14	16.32		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	4.13	84.84	21.16	0.00	150.0	± 9.6 %
		Y	1.53	69.15	14.45		150.0	
		Z	1.50	68.44	14.23		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	2.02	80.05	19.63	0.00	150.0	± 9.6 %
		Y	0.88	66.15	12.95		150.0	
		Z	0.85	65.49	12.68		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	31.69	123.49	32.65	0.00	150.0	± 9.6 %
		Y	1.12	70.49	15.42		150.0	
		Z	1.04	69.09	14.85		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	100.00	145.27	38.53	0.00	150.0	± 9.6 %
		Y	1.69	76.51	18.41		150.0	
		Z	1.50	74.53	17.70		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	7.78	81.06	21.76	9.03	50.0	± 9.6 %
		Y	8.55	82.70	22.99		50.0	
		Z	7.34	79.63	21.74		50.0	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	3.37	73.93	18.60	0.00	150.0	± 9.6 %
		Y	2.80	69.73	16.64		150.0	
		Z	2.78	69.34	16.41		150.0	
10298-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	2.76	77.13	18.96	0.00	150.0	± 9.6 %
		Y	1.64	67.99	14.49		150.0	
		Z	1.64	67.61	14.41		150.0	
10299-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.11	67.30	12.94	0.00	150.0	± 9.6 %
		Y	3.04	71.26	15.10		150.0	
		Z	2.68	69.19	14.38		150.0	
10300-AAB	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.69	63.89	10.55	0.00	150.0	± 9.6 %
		Y	2.18	66.11	12.03		150.0	
		Z	2.12	65.32	11.84		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.58	65.03	17.13	4.17	50.0	± 9.6 %
		Y	4.90	65.89	17.77		50.0	
		Z	4.71	64.70	17.13		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.12	65.95	17.98	4.96	50.0	± 9.6 %
		Y	5.36	66.42	18.45		50.0	
		Z	5.28	65.73	18.05		50.0	

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.88	65.60	17.84	4.96	50.0	± 9.6 %
		Y	5.11	66.11	18.32		50.0	
		Z	5.04	65.42	17.92		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.71	65.62	17.43	4.17	50.0	± 9.6 %
		Y	4.89	65.84	17.72		50.0	
		Z	4.83	65.24	17.39		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.26	66.69	19.17	6.02	35.0	± 9.6 %
		Y	4.74	68.89	20.52		35.0	
		Z	4.56	67.41	19.68		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.59	65.87	18.72	6.02	35.0	± 9.6 %
		Y	4.95	67.33	19.78		35.0	
		Z	4.84	66.29	19.15		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.50	66.11	18.74	6.02	35.0	± 9.6 %
		Y	4.88	67.65	19.82		35.0	
		Z	4.76	66.58	19.18		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.47	66.27	18.86	6.02	35.0	± 9.6 %
		Y	4.86	67.90	19.98		35.0	
		Z	4.73	66.74	19.30		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.65	66.08	18.86	6.02	35.0	± 9.6 %
		Y	5.02	67.61	19.95		35.0	
		Z	4.91	66.54	19.30		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.54	65.95	18.71	6.02	35.0	± 9.6 %
		Y	4.90	67.44	19.77		35.0	
		Z	4.79	66.38	19.14		35.0	
10311-AAA	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	3.82	73.23	18.19	0.00	150.0	± 9.6 %
		Y	3.16	69.03	16.29		150.0	
		Z	3.14	68.69	16.09		150.0	
10313-AAA	iDEN 1:3	X	4.26	73.34	15.30	6.99	70.0	± 9.6 %
		Y	3.95	73.44	16.30		70.0	
		Z	3.42	71.14	15.17		70.0	
10314-AAA	iDEN 1:6	X	13.47	92.17	24.33	10.00	30.0	± 9.6 %
		Y	5.16	79.23	21.27		30.0	
		Z	4.48	76.56	20.07		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.18	66.73	17.16	0.17	150.0	± 9.6 %
		Y	1.10	63.75	15.16		150.0	
		Z	1.08	63.34	14.87		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.61	67.28	16.42	0.17	150.0	± 9.6 %
		Y	4.62	66.62	16.27		150.0	
		Z	4.64	66.47	16.19		150.0	
10317-AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.61	67.28	16.42	0.17	150.0	± 9.6 %
		Y	4.62	66.62	16.27		150.0	
		Z	4.64	66.47	16.19		150.0	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.77	67.73	16.49	0.00	150.0	± 9.6 %
		Y	4.74	66.99	16.29		150.0	
		Z	4.77	66.86	16.23		150.0	
10401-AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.34	67.52	16.40	0.00	150.0	± 9.6 %
		Y	5.42	67.15	16.44		150.0	
		Z	5.45	67.02	16.37		150.0	

10402-AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.67	68.17	16.58	0.00	150.0	± 9.6 %
		Y	5.68	67.50	16.46		150.0	
		Z	5.72	67.46	16.44		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	4.13	84.84	21.16	0.00	115.0	± 9.6 %
		Y	1.53	69.15	14.45		115.0	
		Z	1.50	68.44	14.23		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	4.13	84.84	21.16	0.00	115.0	± 9.6 %
		Y	1.53	69.15	14.45		115.0	
		Z	1.50	68.44	14.23		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	11.75	93.45	22.58	0.00	100.0	± 9.6 %
		Y	100.00	118.48	28.80		100.0	
		Z	19.61	98.98	24.92		100.0	
10410-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	24.11	60.63	1.60	2.23	80.0	± 9.6 %
		Y	0.74	60.00	3.86		80.0	
		Z	0.79	60.00	4.26		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.08	65.70	16.62	0.00	150.0	± 9.6 %
		Y	1.02	62.98	14.66		150.0	
		Z	1.01	62.61	14.40		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.59	67.43	16.48	0.00	150.0	± 9.6 %
		Y	4.57	66.64	16.23		150.0	
		Z	4.60	66.52	16.18		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.59	67.43	16.48	0.00	150.0	± 9.6 %
		Y	4.57	66.64	16.23		150.0	
		Z	4.60	66.52	16.18		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.59	67.62	16.52	0.00	150.0	± 9.6 %
		Y	4.56	66.79	16.24		150.0	
		Z	4.58	66.66	16.19		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.61	67.55	16.51	0.00	150.0	± 9.6 %
		Y	4.58	66.74	16.24		150.0	
		Z	4.60	66.62	16.20		150.0	
10422-AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.72	67.51	16.49	0.00	150.0	± 9.6 %
		Y	4.70	66.74	16.26		150.0	
		Z	4.73	66.63	16.21		150.0	
10423-AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.91	67.84	16.61	0.00	150.0	± 9.6 %
		Y	4.87	67.07	16.38		150.0	
		Z	4.91	66.97	16.34		150.0	
10424-AAA	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.82	67.81	16.59	0.00	150.0	± 9.6 %
		Y	4.79	67.02	16.35		150.0	
		Z	4.82	66.91	16.31		150.0	
10425-AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.34	67.87	16.59	0.00	150.0	± 9.6 %
		Y	5.38	67.33	16.52		150.0	
		Z	5.42	67.27	16.49		150.0	
10426-AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.35	67.89	16.60	0.00	150.0	± 9.6 %
		Y	5.39	67.34	16.52		150.0	
		Z	5.42	67.27	16.49		150.0	

10427-AAA	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.37	67.92	16.61	0.00	150.0	± 9.6 %
		Y	5.40	67.33	16.51		150.0	
		Z	5.44	67.26	16.48		150.0	
10430-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.95	74.23	19.98	0.00	150.0	± 9.6 %
		Y	4.23	70.36	18.00		150.0	
		Z	4.36	70.73	18.32		150.0	
10431-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.34	68.18	16.66	0.00	150.0	± 9.6 %
		Y	4.26	67.18	16.24		150.0	
		Z	4.29	67.04	16.19		150.0	
10432-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.61	67.93	16.61	0.00	150.0	± 9.6 %
		Y	4.56	67.06	16.30		150.0	
		Z	4.59	66.94	16.26		150.0	
10433-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.84	67.86	16.62	0.00	150.0	± 9.6 %
		Y	4.81	67.05	16.37		150.0	
		Z	4.84	66.95	16.33		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	5.37	76.04	20.39	0.00	150.0	± 9.6 %
		Y	4.32	71.16	17.97		150.0	
		Z	4.48	71.59	18.33		150.0	
10435-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	23.03	60.77	1.67	2.23	80.0	± 9.6 %
		Y	0.74	60.00	3.85		80.0	
		Z	0.79	60.00	4.25		80.0	
10447-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.73	68.71	16.41	0.00	150.0	± 9.6 %
		Y	3.56	67.19	15.60		150.0	
		Z	3.59	67.02	15.59		150.0	
10448-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	4.18	68.00	16.55	0.00	150.0	± 9.6 %
		Y	4.10	66.96	16.10		150.0	
		Z	4.12	66.81	16.05		150.0	
10449-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.42	67.83	16.56	0.00	150.0	± 9.6 %
		Y	4.37	66.89	16.20		150.0	
		Z	4.39	66.77	16.15		150.0	
10450-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.60	67.69	16.52	0.00	150.0	± 9.6 %
		Y	4.56	66.82	16.22		150.0	
		Z	4.58	66.71	16.18		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.70	69.22	16.26	0.00	150.0	± 9.6 %
		Y	3.46	67.39	15.25		150.0	
		Z	3.50	67.24	15.27		150.0	
10456-AAA	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.18	68.42	16.70	0.00	150.0	± 9.6 %
		Y	6.24	67.88	16.67		150.0	
		Z	6.28	67.84	16.65		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.81	66.07	16.24	0.00	150.0	± 9.6 %
		Y	3.81	65.27	15.94		150.0	
		Z	3.82	65.15	15.89		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.48	68.28	15.61	0.00	150.0	± 9.6 %
		Y	3.29	66.78	14.72		150.0	
		Z	3.32	66.55	14.72		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.52	66.07	16.11	0.00	150.0	± 9.6 %
		Y	4.52	65.63	15.92		150.0	
		Z	4.43	64.88	15.61		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	1.56	80.13	22.34	0.00	150.0	± 9.6 %
		Y	0.92	68.16	16.20		150.0	
		Z	0.87	66.99	15.51		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.93	69.49	13.87	3.29	80.0	± 9.6 %
		Y	51.71	114.41	29.02		80.0	
		Z	5.52	82.54	20.04		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.91	60.00	6.95	3.23	80.0	± 9.6 %
		Y	1.68	65.15	10.62		80.0	
		Z	1.49	63.07	9.94		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.95	60.00	6.51	3.23	80.0	± 9.6 %
		Y	1.15	61.32	8.39		80.0	
		Z	1.22	60.87	8.44		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.48	66.41	12.06	3.23	80.0	± 9.6 %
		Y	35.76	107.35	26.57		80.0	
		Z	4.21	78.46	18.15		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.91	60.00	6.88	3.23	80.0	± 9.6 %
		Y	1.50	64.07	10.08		80.0	
		Z	1.40	62.47	9.59		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.95	60.00	6.47	3.23	80.0	± 9.6 %
		Y	1.09	60.86	8.12		80.0	
		Z	1.18	60.54	8.22		80.0	
10467-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.52	66.74	12.23	3.23	80.0	± 9.6 %
		Y	44.94	110.43	27.34		80.0	
		Z	4.47	79.28	18.46		80.0	
10468-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.91	60.00	6.89	3.23	80.0	± 9.6 %
		Y	1.53	64.33	10.21		80.0	
		Z	1.42	62.61	9.67		80.0	
10469-AAA	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.95	60.00	6.46	3.23	80.0	± 9.6 %
		Y	1.09	60.87	8.12		80.0	
		Z	1.18	60.55	8.22		80.0	
10470-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.51	66.70	12.20	3.23	80.0	± 9.6 %
		Y	45.60	110.63	27.38		80.0	
		Z	4.45	79.26	18.45		80.0	
10471-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.91	60.00	6.88	3.23	80.0	± 9.6 %
		Y	1.52	64.26	10.17		80.0	
		Z	1.42	62.57	9.64		80.0	
10472-AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.95	60.00	6.45	3.23	80.0	± 9.6 %
		Y	1.09	60.83	8.08		80.0	
		Z	1.18	60.52	8.20		80.0	
10473-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.51	66.68	12.19	3.23	80.0	± 9.6 %
		Y	45.41	110.55	27.35		80.0	
		Z	4.44	79.22	18.43		80.0	
10474-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.91	60.00	6.88	3.23	80.0	± 9.6 %
		Y	1.52	64.23	10.16		80.0	
		Z	1.41	62.55	9.63		80.0	
10475-AAA	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.95	60.00	6.45	3.23	80.0	± 9.6 %
		Y	1.08	60.81	8.08		80.0	
		Z	1.17	60.51	8.19		80.0	

10477-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.91	60.00	6.86	3.23	80.0	± 9.6 %
		Y	1.48	64.00	10.03		80.0	
		Z	1.39	62.43	9.55		80.0	
10478-AAA	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.95	60.00	6.44	3.23	80.0	± 9.6 %
		Y	1.08	60.78	8.05		80.0	
		Z	1.17	60.48	8.17		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	0.95	60.00	5.70	1.99	80.0	± 9.6 %
		Y	0.96	60.00	6.66		80.0	
		Z	1.01	60.00	6.94		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.29	60.00	5.07	1.99	80.0	± 9.6 %
		Y	1.28	60.00	5.73		80.0	
		Z	1.31	60.00	6.25		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.39	60.00	4.83	1.99	80.0	± 9.6 %
		Y	1.33	60.00	5.49		80.0	
		Z	1.35	60.00	6.03		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.61	80.41	19.03	1.99	80.0	± 9.6 %
		Y	2.54	69.54	14.99		80.0	
		Z	2.30	67.89	14.32		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.19	64.58	11.70	1.99	80.0	± 9.6 %
		Y	3.37	69.65	14.64		80.0	
		Z	2.93	67.40	13.74		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.19	64.38	11.65	1.99	80.0	± 9.6 %
		Y	3.24	68.94	14.38		80.0	
		Z	2.88	66.99	13.59		80.0	
10485-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.24	82.78	20.91	1.99	80.0	± 9.6 %
		Y	3.21	72.72	17.32		80.0	
		Z	2.83	70.50	16.37		80.0	
10486-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.05	73.34	17.24	1.99	80.0	± 9.6 %
		Y	2.92	68.11	15.06		80.0	
		Z	2.79	67.15	14.67		80.0	
10487-AAA	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.94	72.61	16.96	1.99	80.0	± 9.6 %
		Y	2.92	67.77	14.92		80.0	
		Z	2.81	66.91	14.57		80.0	
10488-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.29	79.12	20.43	1.99	80.0	± 9.6 %
		Y	3.63	72.76	18.17		80.0	
		Z	3.32	70.95	17.31		80.0	
10489-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.99	72.10	18.02	1.99	80.0	± 9.6 %
		Y	3.38	68.80	16.71		80.0	
		Z	3.26	67.91	16.26		80.0	
10490-AAA	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.03	71.64	17.86	1.99	80.0	± 9.6 %
		Y	3.47	68.64	16.68		80.0	
		Z	3.37	67.80	16.26		80.0	
10491-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.78	75.35	19.23	1.99	80.0	± 9.6 %
		Y	3.80	71.14	17.74		80.0	
		Z	3.59	69.86	17.08		80.0	
10492-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.13	70.50	17.68	1.99	80.0	± 9.6 %
		Y	3.74	68.21	16.84		80.0	
		Z	3.66	67.52	16.46		80.0	

10493-AAA	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.17	70.22	17.58	1.99	80.0	± 9.6 %
		Y	3.81	68.08	16.81		80.0	
		Z	3.73	67.43	16.45		80.0	
10494-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.77	78.25	20.07	1.99	80.0	± 9.6 %
		Y	4.16	72.67	18.15		80.0	
		Z	3.88	71.19	17.41		80.0	
10495-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.24	71.18	17.96	1.99	80.0	± 9.6 %
		Y	3.78	68.64	17.03		80.0	
		Z	3.69	67.93	16.64		80.0	
10496-AAA	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.26	70.66	17.79	1.99	80.0	± 9.6 %
		Y	3.85	68.36	16.97		80.0	
		Z	3.78	67.71	16.60		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.78	71.14	14.64	1.99	80.0	± 9.6 %
		Y	1.60	64.00	11.51		80.0	
		Z	1.57	63.54	11.40		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.59	62.28	9.87	1.99	80.0	± 9.6 %
		Y	1.37	60.14	8.66		80.0	
		Z	1.44	60.36	8.95		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.53	61.65	9.43	1.99	80.0	± 9.6 %
		Y	1.38	60.00	8.45		80.0	
		Z	1.43	60.06	8.67		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.38	80.15	20.39	1.99	80.0	± 9.6 %
		Y	3.34	72.50	17.61		80.0	
		Z	2.99	70.46	16.69		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.02	72.80	17.53	1.99	80.0	± 9.6 %
		Y	3.14	68.52	15.77		80.0	
		Z	3.01	67.55	15.34		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.04	72.44	17.35	1.99	80.0	± 9.6 %
		Y	3.19	68.35	15.65		80.0	
		Z	3.07	67.44	15.26		80.0	
10503-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.14	78.69	20.26	1.99	80.0	± 9.6 %
		Y	3.58	72.55	18.07		80.0	
		Z	3.27	70.74	17.20		80.0	
10504-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.95	71.93	17.93	1.99	80.0	± 9.6 %
		Y	3.36	68.71	16.66		80.0	
		Z	3.24	67.81	16.21		80.0	
10505-AAA	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.99	71.48	17.78	1.99	80.0	± 9.6 %
		Y	3.45	68.54	16.62		80.0	
		Z	3.35	67.70	16.20		80.0	
10506-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.65	77.94	19.95	1.99	80.0	± 9.6 %
		Y	4.13	72.52	18.08		80.0	
		Z	3.84	71.03	17.34		80.0	
10507-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.21	71.08	17.90	1.99	80.0	± 9.6 %
		Y	3.77	68.58	17.00		80.0	
		Z	3.67	67.87	16.60		80.0	

10508-AAA	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.23	70.54	17.73	1.99	80.0	± 9.6 %
		Y	3.84	68.29	16.93		80.0	
		Z	3.76	67.64	16.56		80.0	
10509-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.44	75.05	18.94	1.99	80.0	± 9.6 %
		Y	4.39	71.08	17.58		80.0	
		Z	4.19	70.05	17.03		80.0	
10510-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.61	70.37	17.71	1.99	80.0	± 9.6 %
		Y	4.25	68.34	17.03		80.0	
		Z	4.18	67.79	16.71		80.0	
10511-AAA	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.62	69.95	17.59	1.99	80.0	± 9.6 %
		Y	4.30	68.08	16.98		80.0	
		Z	4.24	67.56	16.67		80.0	
10512-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.34	78.05	19.83	1.99	80.0	± 9.6 %
		Y	4.63	72.68	18.02		80.0	
		Z	4.34	71.36	17.36		80.0	
10513-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.56	70.92	17.91	1.99	80.0	± 9.6 %
		Y	4.15	68.64	17.14		80.0	
		Z	4.07	68.05	16.78		80.0	
10514-AAA	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.50	70.25	17.71	1.99	80.0	± 9.6 %
		Y	4.16	68.21	17.03		80.0	
		Z	4.09	67.66	16.70		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	1.05	66.12	16.84	0.00	150.0	± 9.6 %
		Y	0.99	63.17	14.72		150.0	
		Z	0.97	62.76	14.44		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	2.44	101.37	30.94	0.00	150.0	± 9.6 %
		Y	0.62	70.29	17.34		150.0	
		Z	0.54	67.97	15.98		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	1.01	70.74	19.00	0.00	150.0	± 9.6 %
		Y	0.84	65.07	15.36		150.0	
		Z	0.81	64.38	14.88		150.0	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.59	67.52	16.47	0.00	150.0	± 9.6 %
		Y	4.56	66.71	16.20		150.0	
		Z	4.59	66.59	16.16		150.0	
10519-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.79	67.74	16.57	0.00	150.0	± 9.6 %
		Y	4.75	66.95	16.33		150.0	
		Z	4.79	66.85	16.29		150.0	
10520-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.65	67.76	16.53	0.00	150.0	± 9.6 %
		Y	4.60	66.91	16.25		150.0	
		Z	4.64	66.82	16.21		150.0	
10521-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.59	67.80	16.54	0.00	150.0	± 9.6 %
		Y	4.54	66.91	16.23		150.0	
		Z	4.57	66.81	16.19		150.0	
10522-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.64	67.81	16.59	0.00	150.0	± 9.6 %
		Y	4.60	66.99	16.32		150.0	
		Z	4.63	66.86	16.26		150.0	

10523-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.52	67.76	16.48	0.00	150.0	± 9.6 %
		Y	4.48	66.86	16.16		150.0	
		Z	4.50	66.73	16.11		150.0	
10524-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.58	67.74	16.56	0.00	150.0	± 9.6 %
		Y	4.54	66.91	16.28		150.0	
		Z	4.57	66.79	16.23		150.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.57	66.86	16.20	0.00	150.0	± 9.6 %
		Y	4.52	65.96	15.87		150.0	
		Z	4.54	65.83	15.82		150.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.75	67.24	16.33	0.00	150.0	± 9.6 %
		Y	4.70	66.33	16.02		150.0	
		Z	4.73	66.21	15.97		150.0	
10527-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.68	67.24	16.30	0.00	150.0	± 9.6 %
		Y	4.62	66.29	15.96		150.0	
		Z	4.64	66.18	15.91		150.0	
10528-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.69	67.25	16.33	0.00	150.0	± 9.6 %
		Y	4.63	66.31	15.99		150.0	
		Z	4.66	66.19	15.95		150.0	
10529-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.69	67.25	16.33	0.00	150.0	± 9.6 %
		Y	4.63	66.31	15.99		150.0	
		Z	4.66	66.19	15.95		150.0	
10531-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.70	67.39	16.36	0.00	150.0	± 9.6 %
		Y	4.63	66.42	16.01		150.0	
		Z	4.66	66.31	15.96		150.0	
10532-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.56	67.29	16.32	0.00	150.0	± 9.6 %
		Y	4.48	66.27	15.94		150.0	
		Z	4.51	66.17	15.90		150.0	
10533-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.71	67.30	16.32	0.00	150.0	± 9.6 %
		Y	4.64	66.35	15.98		150.0	
		Z	4.67	66.23	15.93		150.0	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.18	67.23	16.28	0.00	150.0	± 9.6 %
		Y	5.16	66.42	16.05		150.0	
		Z	5.19	66.35	16.02		150.0	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.24	67.37	16.33	0.00	150.0	± 9.6 %
		Y	5.23	66.58	16.12		150.0	
		Z	5.26	66.50	16.08		150.0	
10536-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	5.13	67.41	16.34	0.00	150.0	± 9.6 %
		Y	5.10	66.54	16.08		150.0	
		Z	5.12	66.46	16.05		150.0	
10537-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.18	67.34	16.31	0.00	150.0	± 9.6 %
		Y	5.15	66.51	16.07		150.0	
		Z	5.18	66.43	16.04		150.0	
10538-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.26	67.32	16.33	0.00	150.0	± 9.6 %
		Y	5.25	66.54	16.12		150.0	
		Z	5.29	66.48	16.10		150.0	
10540-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.19	67.32	16.35	0.00	150.0	± 9.6 %
		Y	5.18	66.55	16.14		150.0	
		Z	5.20	66.46	16.10		150.0	

10541-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.17	67.25	16.31	0.00	150.0	± 9.6 %
		Y	5.15	66.42	16.07		150.0	
		Z	5.18	66.35	16.04		150.0	
10542-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.32	67.25	16.32	0.00	150.0	± 9.6 %
		Y	5.30	66.49	16.12		150.0	
		Z	5.34	66.42	16.09		150.0	
10543-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.40	67.27	16.34	0.00	150.0	± 9.6 %
		Y	5.38	66.52	16.16		150.0	
		Z	5.42	66.45	16.12		150.0	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.47	67.33	16.25	0.00	150.0	± 9.6 %
		Y	5.47	66.54	16.04		150.0	
		Z	5.49	66.46	16.01		150.0	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.63	67.60	16.32	0.00	150.0	± 9.6 %
		Y	5.65	66.93	16.19		150.0	
		Z	5.69	66.87	16.16		150.0	
10546-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.54	67.56	16.32	0.00	150.0	± 9.6 %
		Y	5.53	66.75	16.12		150.0	
		Z	5.57	66.70	16.10		150.0	
10547-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.61	67.57	16.32	0.00	150.0	± 9.6 %
		Y	5.60	66.79	16.12		150.0	
		Z	5.65	66.76	16.11		150.0	
10548-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.71	68.01	16.51	0.00	150.0	± 9.6 %
		Y	5.84	67.67	16.54		150.0	
		Z	5.91	67.72	16.56		150.0	
10550-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.57	67.55	16.32	0.00	150.0	± 9.6 %
		Y	5.56	66.75	16.13		150.0	
		Z	5.59	66.69	16.10		150.0	
10551-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.57	67.57	16.30	0.00	150.0	± 9.6 %
		Y	5.57	66.81	16.11		150.0	
		Z	5.60	66.74	16.09		150.0	
10552-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.50	67.43	16.25	0.00	150.0	± 9.6 %
		Y	5.48	66.61	16.02		150.0	
		Z	5.51	66.53	15.99		150.0	
10553-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.58	67.46	16.28	0.00	150.0	± 9.6 %
		Y	5.57	66.65	16.07		150.0	
		Z	5.60	66.58	16.05		150.0	
10554-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.85	67.64	16.30	0.00	150.0	± 9.6 %
		Y	5.87	66.90	16.13		150.0	
		Z	5.89	66.84	16.11		150.0	
10555-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.97	67.89	16.39	0.00	150.0	± 9.6 %
		Y	5.99	67.19	16.25		150.0	
		Z	6.02	67.14	16.23		150.0	
10556-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.99	67.93	16.41	0.00	150.0	± 9.6 %
		Y	6.02	67.24	16.27		150.0	
		Z	6.04	67.18	16.25		150.0	
10557-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.97	67.89	16.41	0.00	150.0	± 9.6 %
		Y	5.99	67.16	16.25		150.0	
		Z	6.02	67.11	16.23		150.0	

10558-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	6.01	68.01	16.48	0.00	150.0	± 9.6 %
		Y	6.03	67.31	16.35		150.0	
		Z	6.07	67.27	16.33		150.0	
10560-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	6.03	67.92	16.47	0.00	150.0	± 9.6 %
		Y	6.03	67.18	16.31		150.0	
		Z	6.07	67.12	16.29		150.0	
10561-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.93	67.84	16.47	0.00	150.0	± 9.6 %
		Y	5.95	67.14	16.33		150.0	
		Z	5.98	67.08	16.31		150.0	
10562-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	6.02	68.12	16.61	0.00	150.0	± 9.6 %
		Y	6.08	67.52	16.52		150.0	
		Z	6.12	67.50	16.52		150.0	
10563-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.25	68.38	16.68	0.00	150.0	± 9.6 %
		Y	6.33	67.88	16.66		150.0	
		Z	6.45	68.06	16.74		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.88	67.42	16.50	0.46	150.0	± 9.6 %
		Y	4.89	66.80	16.37		150.0	
		Z	4.91	66.66	16.30		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	5.14	67.94	16.85	0.46	150.0	± 9.6 %
		Y	5.12	67.24	16.68		150.0	
		Z	5.16	67.14	16.64		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.97	67.79	16.67	0.46	150.0	± 9.6 %
		Y	4.95	67.09	16.50		150.0	
		Z	4.99	66.98	16.45		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	5.03	68.35	17.13	0.46	150.0	± 9.6 %
		Y	4.98	67.45	16.83		150.0	
		Z	5.02	67.40	16.82		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.85	67.41	16.35	0.46	150.0	± 9.6 %
		Y	4.87	66.88	16.28		150.0	
		Z	4.89	66.70	16.18		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.99	68.46	17.20	0.46	150.0	± 9.6 %
		Y	4.93	67.52	16.87		150.0	
		Z	4.96	67.44	16.85		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	5.01	68.21	17.08	0.46	150.0	± 9.6 %
		Y	4.97	67.38	16.82		150.0	
		Z	5.01	67.30	16.79		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.27	67.16	17.22	0.46	130.0	± 9.6 %
		Y	1.18	64.33	15.45		130.0	
		Z	1.16	63.83	15.08		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.31	68.13	17.79	0.46	130.0	± 9.6 %
		Y	1.20	64.86	15.77		130.0	
		Z	1.17	64.34	15.40		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	100.00	156.68	42.65	0.46	130.0	± 9.6 %
		Y	1.76	82.46	22.02		130.0	
		Z	1.29	76.91	19.62		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	2.02	80.92	23.70	0.46	130.0	± 9.6 %
		Y	1.28	70.02	18.39		130.0	
		Z	1.24	69.25	17.91		130.0	

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.65	67.14	16.48	0.46	130.0	± 9.6 %
		Y	4.67	66.54	16.37		130.0	
		Z	4.69	66.39	16.29		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.69	67.35	16.58	0.46	130.0	± 9.6 %
		Y	4.69	66.70	16.43		130.0	
		Z	4.71	66.55	16.36		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.90	67.64	16.74	0.46	130.0	± 9.6 %
		Y	4.90	67.00	16.60		130.0	
		Z	4.93	66.88	16.55		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.82	67.92	16.92	0.46	130.0	± 9.6 %
		Y	4.79	67.13	16.69		130.0	
		Z	4.83	67.04	16.65		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.54	66.99	16.09	0.46	130.0	± 9.6 %
		Y	4.56	66.47	16.04		130.0	
		Z	4.58	66.29	15.93		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.58	66.95	16.07	0.46	130.0	± 9.6 %
		Y	4.61	66.51	16.07		130.0	
		Z	4.63	66.30	15.94		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.72	67.99	16.87	0.46	130.0	± 9.6 %
		Y	4.69	67.15	16.62		130.0	
		Z	4.72	67.06	16.57		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.47	66.63	15.81	0.46	130.0	± 9.6 %
		Y	4.51	66.25	15.85		130.0	
		Z	4.53	66.04	15.71		130.0	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.65	67.14	16.48	0.46	130.0	± 9.6 %
		Y	4.67	66.54	16.37		130.0	
		Z	4.69	66.39	16.29		130.0	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.69	67.35	16.58	0.46	130.0	± 9.6 %
		Y	4.69	66.70	16.43		130.0	
		Z	4.71	66.55	16.36		130.0	
10585-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.90	67.64	16.74	0.46	130.0	± 9.6 %
		Y	4.90	67.00	16.60		130.0	
		Z	4.93	66.88	16.55		130.0	
10586-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.82	67.92	16.92	0.46	130.0	± 9.6 %
		Y	4.79	67.13	16.69		130.0	
		Z	4.83	67.04	16.65		130.0	
10587-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.54	66.99	16.09	0.46	130.0	± 9.6 %
		Y	4.56	66.47	16.04		130.0	
		Z	4.58	66.29	15.93		130.0	
10588-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.58	66.95	16.07	0.46	130.0	± 9.6 %
		Y	4.61	66.51	16.07		130.0	
		Z	4.63	66.30	15.94		130.0	
10589-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.72	67.99	16.87	0.46	130.0	± 9.6 %
		Y	4.69	67.15	16.62		130.0	
		Z	4.72	67.06	16.57		130.0	
10590-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.47	66.63	15.81	0.46	130.0	± 9.6 %
		Y	4.51	66.25	15.85		130.0	
		Z	4.53	66.04	15.71		130.0	

10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.80	67.21	16.58	0.46	130.0	± 9.6 %
		Y	4.82	66.60	16.47		130.0	
		Z	4.84	66.47	16.40		130.0	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.97	67.56	16.71	0.46	130.0	± 9.6 %
		Y	4.97	66.94	16.60		130.0	
		Z	5.00	66.81	16.53		130.0	
10593-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.89	67.46	16.59	0.46	130.0	± 9.6 %
		Y	4.90	66.85	16.48		130.0	
		Z	4.92	66.72	16.42		130.0	
10594-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.95	67.66	16.77	0.46	130.0	± 9.6 %
		Y	4.95	67.01	16.63		130.0	
		Z	4.98	66.89	16.57		130.0	
10595-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.91	67.59	16.65	0.46	130.0	± 9.6 %
		Y	4.92	66.96	16.53		130.0	
		Z	4.95	66.83	16.46		130.0	
10596-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.85	67.58	16.64	0.46	130.0	± 9.6 %
		Y	4.85	66.96	16.53		130.0	
		Z	4.88	66.82	16.46		130.0	
10597-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.80	67.49	16.54	0.46	130.0	± 9.6 %
		Y	4.80	66.87	16.42		130.0	
		Z	4.83	66.73	16.35		130.0	
10598-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.80	67.85	16.88	0.46	130.0	± 9.6 %
		Y	4.78	67.08	16.66		130.0	
		Z	4.81	66.99	16.62		130.0	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.43	67.64	16.68	0.46	130.0	± 9.6 %
		Y	5.48	67.15	16.67		130.0	
		Z	5.51	67.05	16.61		130.0	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.51	67.84	16.74	0.46	130.0	± 9.6 %
		Y	5.61	67.54	16.84		130.0	
		Z	5.67	67.52	16.82		130.0	
10601-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.44	67.75	16.72	0.46	130.0	± 9.6 %
		Y	5.50	67.31	16.74		130.0	
		Z	5.54	67.24	16.70		130.0	
10602-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.51	67.66	16.58	0.46	130.0	± 9.6 %
		Y	5.59	67.32	16.67		130.0	
		Z	5.62	67.22	16.60		130.0	
10603-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.61	68.06	16.92	0.46	130.0	± 9.6 %
		Y	5.68	67.64	16.95		130.0	
		Z	5.72	67.58	16.91		130.0	
10604-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.43	67.58	16.68	0.46	130.0	± 9.6 %
		Y	5.49	67.11	16.68		130.0	
		Z	5.51	67.01	16.62		130.0	
10605-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.49	67.71	16.73	0.46	130.0	± 9.6 %
		Y	5.59	67.43	16.84		130.0	
		Z	5.62	67.32	16.77		130.0	
10606-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.29	67.26	16.37	0.46	130.0	± 9.6 %
		Y	5.36	66.84	16.41		130.0	
		Z	5.39	66.76	16.35		130.0	

10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.66	66.63	16.27	0.46	130.0	± 9.6 %
		Y	4.65	65.90	16.08		130.0	
		Z	4.67	65.76	16.01		130.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.86	67.05	16.44	0.46	130.0	± 9.6 %
		Y	4.84	66.31	16.25		130.0	
		Z	4.87	66.17	16.18		130.0	
10609-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.74	66.89	16.27	0.46	130.0	± 9.6 %
		Y	4.73	66.17	16.09		130.0	
		Z	4.75	66.01	16.01		130.0	
10610-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.80	67.09	16.46	0.46	130.0	± 9.6 %
		Y	4.78	66.31	16.25		130.0	
		Z	4.81	66.18	16.18		130.0	
10611-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.71	66.86	16.29	0.46	130.0	± 9.6 %
		Y	4.70	66.13	16.10		130.0	
		Z	4.72	65.98	16.02		130.0	
10612-AAA	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.72	66.99	16.31	0.46	130.0	± 9.6 %
		Y	4.71	66.29	16.15		130.0	
		Z	4.73	66.12	16.05		130.0	
10613-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.72	66.86	16.19	0.46	130.0	± 9.6 %
		Y	4.71	66.18	16.04		130.0	
		Z	4.74	66.02	15.95		130.0	
10614-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.69	67.20	16.52	0.46	130.0	± 9.6 %
		Y	4.65	66.34	16.25		130.0	
		Z	4.68	66.22	16.19		130.0	
10615-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.69	66.58	16.00	0.46	130.0	± 9.6 %
		Y	4.70	65.98	15.89		130.0	
		Z	4.72	65.79	15.79		130.0	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.28	67.04	16.39	0.46	130.0	± 9.6 %
		Y	5.30	66.40	16.28		130.0	
		Z	5.33	66.31	16.23		130.0	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.33	67.12	16.39	0.46	130.0	± 9.6 %
		Y	5.36	66.56	16.33		130.0	
		Z	5.39	66.43	16.26		130.0	
10618-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.24	67.26	16.49	0.46	130.0	± 9.6 %
		Y	5.25	66.57	16.35		130.0	
		Z	5.28	66.47	16.30		130.0	
10619-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.24	66.98	16.27	0.46	130.0	± 9.6 %
		Y	5.27	66.40	16.21		130.0	
		Z	5.30	66.30	16.15		130.0	
10620-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.33	67.02	16.34	0.46	130.0	± 9.6 %
		Y	5.36	66.45	16.28		130.0	
		Z	5.40	66.37	16.23		130.0	
10621-AAA	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.36	67.27	16.60	0.46	130.0	± 9.6 %
		Y	5.36	66.55	16.44		130.0	
		Z	5.39	66.47	16.41		130.0	
10622-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.34	67.34	16.62	0.46	130.0	± 9.6 %
		Y	5.37	66.70	16.51		130.0	
		Z	5.40	66.61	16.46		130.0	

10623-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.22	66.85	16.25	0.46	130.0	± 9.6 %
		Y	5.25	66.26	16.17		130.0	
		Z	5.27	66.14	16.10		130.0	
10624-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.40	67.02	16.39	0.46	130.0	± 9.6 %
		Y	5.44	66.45	16.33		130.0	
		Z	5.47	66.36	16.28		130.0	
10625-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.68	67.68	16.76	0.46	130.0	± 9.6 %
		Y	5.81	67.42	16.86		130.0	
		Z	5.87	67.40	16.85		130.0	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.55	67.10	16.33	0.46	130.0	± 9.6 %
		Y	5.59	66.47	16.24		130.0	
		Z	5.61	66.37	16.19		130.0	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.74	67.46	16.46	0.46	130.0	± 9.6 %
		Y	5.82	67.00	16.47		130.0	
		Z	5.85	66.92	16.42		130.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.57	67.13	16.23	0.46	130.0	± 9.6 %
		Y	5.63	66.58	16.20		130.0	
		Z	5.65	66.49	16.14		130.0	
10629-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.65	67.16	16.23	0.46	130.0	± 9.6 %
		Y	5.71	66.66	16.23		130.0	
		Z	5.74	66.58	16.18		130.0	
10630-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	5.85	67.94	16.62	0.46	130.0	± 9.6 %
		Y	6.12	68.08	16.94		130.0	
		Z	6.22	68.15	16.96		130.0	
10631-AAA	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.95	68.39	17.06	0.46	130.0	± 9.6 %
		Y	6.03	67.88	17.02		130.0	
		Z	6.11	67.96	17.06		130.0	
10632-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.78	67.75	16.76	0.46	130.0	± 9.6 %
		Y	5.79	67.05	16.62		130.0	
		Z	5.82	67.00	16.60		130.0	
10633-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.66	67.36	16.38	0.46	130.0	± 9.6 %
		Y	5.69	66.74	16.30		130.0	
		Z	5.72	66.66	16.26		130.0	
10634-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.67	67.48	16.51	0.46	130.0	± 9.6 %
		Y	5.68	66.76	16.37		130.0	
		Z	5.71	66.70	16.34		130.0	
10635-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.50	66.58	15.75	0.46	130.0	± 9.6 %
		Y	5.57	66.15	15.82		130.0	
		Z	5.59	66.01	15.72		130.0	
10636-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.94	67.41	16.37	0.46	130.0	± 9.6 %
		Y	6.00	66.84	16.33		130.0	
		Z	6.02	66.76	16.29		130.0	
10637-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.07	67.70	16.49	0.46	130.0	± 9.6 %
		Y	6.15	67.21	16.50		130.0	
		Z	6.18	67.14	16.45		130.0	
10638-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.07	67.68	16.46	0.46	130.0	± 9.6 %
		Y	6.15	67.19	16.47		130.0	
		Z	6.18	67.11	16.42		130.0	

10639-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.08	67.71	16.53	0.46	130.0	± 9.6 %
		Y	6.14	67.15	16.49		130.0	
		Z	6.17	67.09	16.46		130.0	
10640-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.06	67.64	16.42	0.46	130.0	± 9.6 %
		Y	6.14	67.18	16.45		130.0	
		Z	6.18	67.11	16.40		130.0	
10641-AAA	IEEE 1602.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.09	67.50	16.37	0.46	130.0	± 9.6 %
		Y	6.18	67.06	16.41		130.0	
		Z	6.20	66.95	16.34		130.0	
10642-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.20	67.98	16.80	0.46	130.0	± 9.6 %
		Y	6.23	67.31	16.70		130.0	
		Z	6.26	67.27	16.68		130.0	
10643-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.98	67.49	16.43	0.46	130.0	± 9.6 %
		Y	6.06	67.01	16.45		130.0	
		Z	6.09	66.92	16.39		130.0	
10644-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.12	67.90	16.66	0.46	130.0	± 9.6 %
		Y	6.23	67.53	16.73		130.0	
		Z	6.28	67.50	16.70		130.0	
10645-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.40	68.30	16.80	0.46	130.0	± 9.6 %
		Y	6.61	68.23	17.04		130.0	
		Z	6.73	68.38	17.09		130.0	

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

Appendix C.2 Calibration certificate for DAE(S/N 1430)

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Client SGS Korea (Dymstec)

Certificate No: DAE4-1430_Mar17

CALIBRATION CERTIFICATE

기술 적합지

Object	DAE4 - SD 000 D04 BM - SN: 1430
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	March 16, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-16 (No:19065)	Sep-17
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-17 (in house check)	In house check: Jan-18
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-17 (in house check)	In house check: Jan-18

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: March 16, 2017

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Certificate No: DAE4-1430_Mar17 Page 1 of 5

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Accreditation No.: SCS 0108

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	403.936 ± 0.02% (k=2)	404.124 ± 0.02% (k=2)	403.958 ± 0.02% (k=2)
Low Range	3.99686 ± 1.50% (k=2)	3.98021 ± 1.50% (k=2)	3.99881 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	253.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200033.73	-2.26	-0.00
Channel X	+ Input	20008.28	3.63	0.02
Channel X	- Input	-20004.55	1.38	-0.01
Channel Y	+ Input	200034.82	-0.96	-0.00
Channel Y	+ Input	20004.90	0.21	0.00
Channel Y	- Input	-20006.47	-0.42	0.00
Channel Z	+ Input	200034.13	-1.37	-0.00
Channel Z	+ Input	20004.91	0.31	0.00
Channel Z	- Input	-20007.89	-1.74	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.06	0.21	0.01
Channel X	+ Input	200.89	0.00	0.00
Channel X	- Input	-198.61	0.62	-0.31
Channel Y	+ Input	2000.84	-0.01	-0.00
Channel Y	+ Input	199.99	-0.65	-0.32
Channel Y	- Input	-200.22	-0.87	0.44
Channel Z	+ Input	2000.72	0.03	0.00
Channel Z	+ Input	199.54	-1.04	-0.52
Channel Z	- Input	-200.62	-1.20	0.60

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	3.51	1.53
	- 200	-0.24	-1.92
Channel Y	200	-20.17	-20.84
	- 200	19.65	19.47
Channel Z	200	-17.69	-18.24
	- 200	15.64	15.92

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.15	-3.78
Channel Y	200	7.94	-	2.96
Channel Z	200	9.76	5.35	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	16021	16044
Channel Y	16227	15939
Channel Z	15849	15529

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.86	-0.36	2.02	0.44
Channel Y	-1.17	-2.17	0.41	0.44
Channel Z	-0.84	-2.34	1.10	0.59

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

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

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

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9

Appendix C.3 Calibration certificate for Dipole(S/N 490)

Calibration Laboratory of
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Accreditation No.: SCS 0108

Client SGS Korea (Dymstec) Certificate No: D835V2-490_May16

CALIBRATION CERTIFICATE

Object	D835V2 - SN:490
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 25, 2016

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

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

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

Issued: May 26, 2016

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Certificate No: D835V2-490_May16 Page 1 of 8

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.4 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.28 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.08 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.2 ± 6 %	1.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.40 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.17 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.7 Ω - 5.3 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.5 Ω - 6.7 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.379 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 19, 2003

DASY5 Validation Report for Head TSL

Date: 25.05.2016

Test Laboratory: SPEAG, Zurich, Switzerland

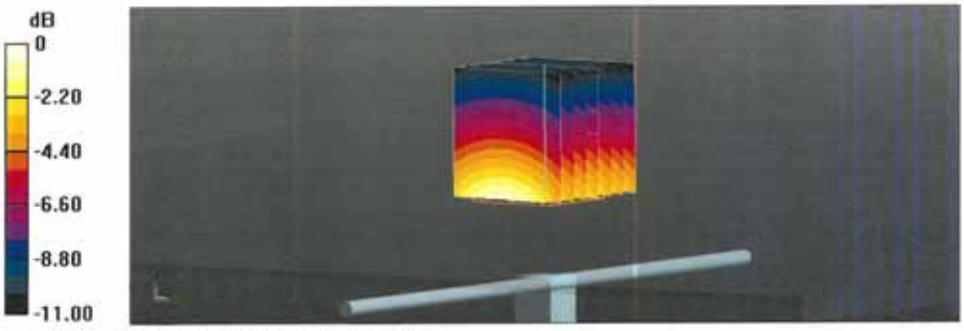
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

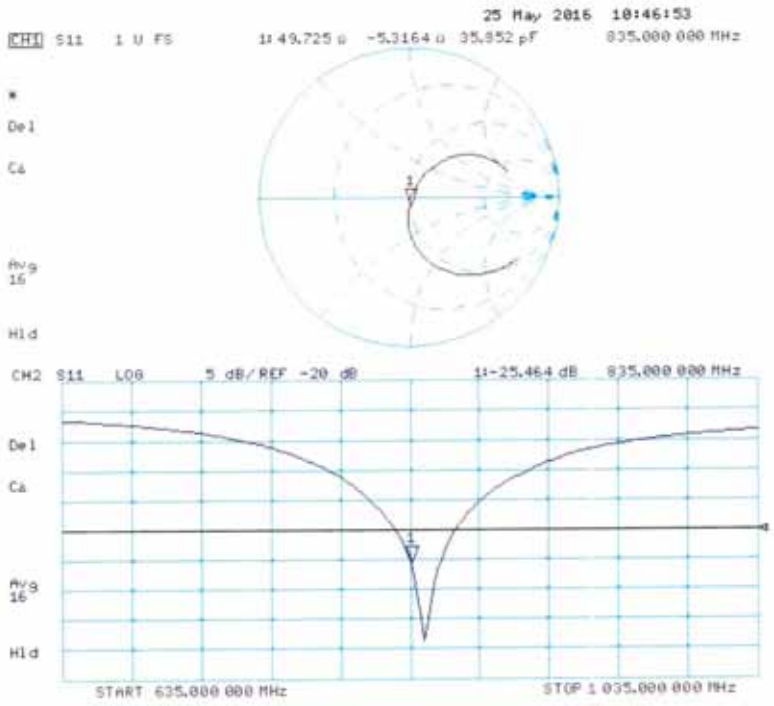
- Probe: EX3DV4 - SN7349; ConvF(9.83, 9.83, 9.83); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.33 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 3.14 W/kg



0 dB = 3.14 W/kg = 4.97 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.05.2016

Test Laboratory: SPEAG, Zurich, Switzerland

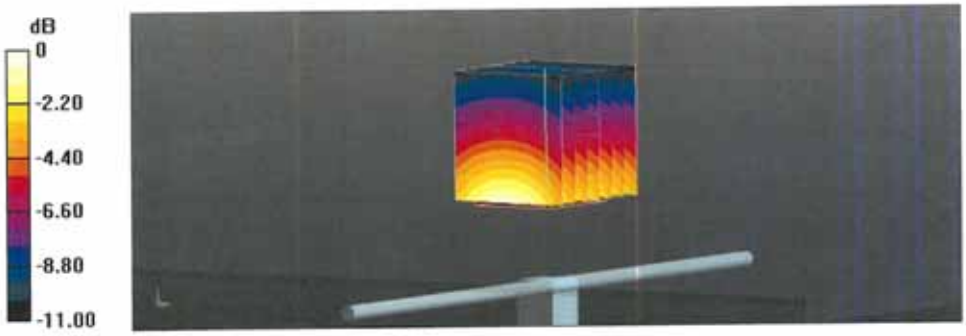
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.02 S/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

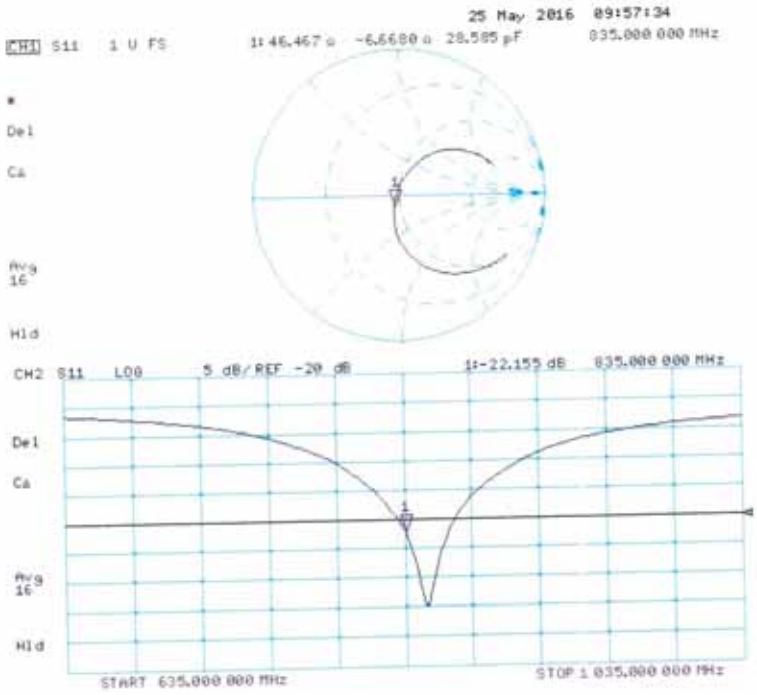
- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.38 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.59 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

Impedance Measurement Plot for Body TSL



-THE END-