HCT CO.,LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
TEL: +82-31-645-6300 FAX: +82-31-645-6401

SAR TEST REPORT

Applicant Name: **SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea	**Date of Issue:** 05.17, 2018 **Test Report No:** HCT-SR-1805-FC002-R2 **Test Site: HCT CO., LTD.**

FCC ID: **A3LSMG8750**

Equipment Type:	**Mobile Phone**
Application Type	**Class II Permissive change**
FCC Rule Part(s):	**CFR §2.1093**
Model Name:	**SM-G8750**
Permissive Change(s):	**Adding Intra-band contiguous LTE Uplink: CA_41C only**
Date of Test:	**04/02/2018 ~ 04/20/2018**

Note : The following test data were evaluates for the current test report . Please refer to SAR Test Report NO.: HCT-SR-1804-FC004 for original compliance evaluation

This device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in FCC KDB procedures and had been tested in accordance with the measurement procedures specified in FCC KDB procedures.

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

Tested By

Bong-Kyun, Park
Test Engineer
SAR Team
Certification Division

Reviewed By

Yun-Jeang, Heo
Technical Manager
SAR Team
Certification Division

DOCUMENT HISTORY

Rev.	DATE	DESCRIPTION
HCT-SR-1805-FC002	05. 09, 2018	First Approval Report
HCT-SR-1805-FC002-R1	05. 16, 2018	Sec 2.3 was revised.
HCT-SR-1805-FC002-R2	05. 17, 2018	Sec 9 and Attachment 8 (CA_41C 16QAM/ 64QAM Output power) were revised.

Table of Contents

1. ATTESTATION OF TEST RESULT OF DEVICE UNDER TEST

Test Laboratory	
Company Name:	HCT Co., LTD
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of Korea
Telephone	+82 31 645 6300
Fax.	+82 31 645 6401

Attestation of SAR test result	
Applicant Name:	SAMSUNG Electronics Co., Ltd.
FCC ID:	A3LSMG8750
Model:	SM-G8750
EUT Type:	Mobile Phone
Application Type:	Class II Permissive change
Permissive Change(s):	Adding Intra-band contiguous LTE Uplink :CA_41C only

The Highest Reported SAR					
Band	Tx. Frequency	Equipment Class	SAR (W/kg)		
			1g Head	1g Body-Worn	1g Hotspot
	(MHz)		(W/Kg)	(W/Kg)	(W/Kg)
GSM/GPRS/EDGE 850	824.2 ~ 848.8	PCE	0.24	0.23	0.48
GSM/GPRS/EDGE 1900	1 850.2 ~ 1 909.8	PCE	<0.10	0.34	0.53
UMTS 850	826.4 ~ 846.6	PCE	0.24	0.24	0.48
UMTS 1900	1 852.4 ~ 1 907.6	PCE	0.19	0.69	0.69
LTE Band 4 (AWS)	1 710.7 ~ 1 754.3	PCE	0.24	0.64	0.83
LTE Band 5 (Cell)	824.7 ~ 848.3	PCE	0.31	0.31	0.63
LTE Band 12	699.7 715.3	PCE	0.09	0.15	0.25
LTE TDD Band 41	2 555 ~ 2 655	PCE	<0.10	0.28	0.60
802.11b	2 412 ~ 2 462	DTS	0.58	0.10	0.25
U-NII-1	5 180 - 5 240	NII	N/A	N/A	N/A
U-NII-2A	5 260 - 5 320	NII	0.39	0.14	N/A
U-NII-2C	5 500 – 5 720	NII	0.11	0.30	N/A
U-NII-3	5 745 - 5 825	NII	0.14	0.23	0.31
Bluetooth	2 402 ~ 2 480	DSS/DTS	0.23	<0.10	<0.10
Simultaneous SAR per KDB 690783 D01v01r03			0.89	0.98	1.14
Date(s) of Tests:	04/02/2018 ~ 04/20/2018				

2. DEVICE UNDER TEST DESCRIPTION

2.1 DUT specification

Device Wireless specification overview		
Band & Mode	**Operating Mode**	**Tx Frequency**
GSM850	Voice / Data	824.2 ~ 848.8 MHz
GSM1900	Voice / Data	1850.2 ~ 1909.8 MHz
UMTS 850	Voice / Data	826.4 – 846.6 MHz
UMTS 1900	Voice / Data	1 852.4 – 1 907.6 MHz
LTE Band 4 (AWS)	Voice / Data	1 710.7 – 1 754.3 MHz
LTE Band 5 (Cell)	Voice / Data	824.7 – 848.3 MHz
LTE Band 12	Voice / Data	699.7 – 715.3 MHz
LTE Band 17	Voice / Data	706.5 ~ 713.5 MHz
LTE TDD Band 41	Voice / Data	2 555 ~ 2 655 MHz
2.4GHz WLAN	Data	2412 ~ 2462 MHz
U-NII-1	Data	5180 ~5240 MHz
U-NII-2A	Data	5260 ~ 5320 MHz
U-NII-2C	Data	5500 ~ 5720 MHz
U-NII-3	Data	5745 ~ 5825 MHz
Bluetooth	Data	2 402 – 2 480 MHz
NFC	Data	13.56 MHz
ANT+	Data	2402 ~ 2480 MHz
Device Description		
Device Dimension:	Overall (Length x Width): 148.9 mm x 68.1 mm Overall Diagonal: 156.2 mm Display Diagonal: 146.6 mm	
Device Serial Numbers	Mode	Serial Number
	GSM850/ UMTS 850/LTE5,12,41	R28K32H4D4B
	GSM1900/UMTS 1900/ LTE 4/ 2.4GHz WLAN/ BT	R28K32H4C5W
	5GHz WLAN	R28K32H42D
	Several samples with identical hardware were used to SAR testing. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units.	

2.2 Nominal and 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.

2.2.1 Maximum PCE Output Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM/GPRS/EDGE 850	Maximum	33.0	33.0	30.5	29.5	28.5	28.0	26.0	25.0	24.0
	Nominal	32.0	32.0	29.5	28.5	27.5	27.0	25.0	24.0	23.0
GSM/GPRS/EDGE 1900	Maximum	30.0	30.0	28.0	26.5	25.5	27.0	25.5	24.5	23.5
	Nominal	29.0	29.0	27.0	25.5	24.5	26.0	24.5	23.5	22.5

Mode / Band		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	DC-HSDPA
		(dBm)	(dBm)	(dBm)	(dBm)
UMTS Band 5 (850 MHz)	Maximum	23.0	21.5	22.5	21.5
	Nominal	22.0	20.5	21.5	20.5
UMTS Band 2 (1900 MHz)	Maximum	22.7	21.3	22.3	21.3
	Nominal	21.7	20.3	21.3	20.3

Mode / Band		Modulated Average (dBm)
LTE Band 4 (AWS)	Maximum	22.7
	Nominal	21.7
LTE Band 5 (Cell)	Maximum	24.0
	Nominal	23.0
LTE Band 12	Maximum	23.5
	Nominal	22.5
LTE Band 17	Maximum	23.5
	Nominal	22.5
LTE Band 41/CA_41C	Maximum	24.3
	Nominal	23.3

2.2.2 Reduced PCE Power (Hotspot)

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM/GPRS/EDGE 1900	Maximum	27.5	27.5	26.0	24.5	23.5	25.0	23.5	22.5	21.5
	Nominal	26.5	26.5	25.0	23.5	22.5	24.0	22.5	21.5	20.5

Mode / Band		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	DC-HSDPA
		(dBm)	(dBm)	(dBm)	(dBm)
UMTS Band 2 (1900 MHz)	Maximum	20.7	20.7	20.7	20.7
	Nominal	19.7	19.7	19.7	19.7

Mode / Band		Modulated Average (dBm)
LTE Band 4 (AWS)	Maximum	21.2
	Nominal	20.2

2.2.3 Maximum WLAN Power

Mode/Band		Modulated Average (dBm)				
Mode		a	b	g	n	ac
2.4 GHz WIFI	Maximum	N/A	20.0	19.0	18.0	N/A
	Nominal	N/A	19.0	18.0	17.0	N/A

Mode/Band		Modulated Average (dBm)				
Mode		a	b	g	n	ac
5 GHz WIFI	Maximum	18.0	N/A	N/A	17.0	16.0
	Nominal	17.0	N/A	N/A	16.0	15.0

2.2.4 Reduced WLAN Power (Held to ear)

Mode/Band		Modulated Average (dBm)				
Mode		a	b	g	n	ac
2.4 GHz WIFI	Maximum	N/A	18.0	18.0	18.0	N/A
	Nominal	N/A	17.0	17.0	17.0	N/A

Mode/Band		Modulated Average (dBm)				
Mode		a	b	g	n	ac
5 GHz WIFI	Maximum	16.0	N/A	N/A	16.0	16.0
	Nominal	15.0	N/A	N/A	15.0	15.0

2.2.5 Maximum Bluetooth Power

Mode / Band		Modulated Average (dBm)
Bluetooth	Maximum	11.2
	Nominal	10.2
Bluetooth LE	Maximum	2.5
	Nominal	1.5

2.3 LTE information

Item.		Description		
Frequency Range	LTE Band 4 (AWS)	1 710.7 MHz ~ 1 754.3 MHz		
	LTE Band 5 (Cell)	824.7 MHz ~ 848.3 MHz		
	LTE Band 12	699.7 MHz~ 715.3 MHz		
	LTE Band 17	706.5 MHz~ 713.5 MHz		
	LTE TDD Band 41	2 557.5 MHz ~ 2 652.5 MHz		
Channel Bandwidths	LTE Band 4 (AWS)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 5 (Cell)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 12	1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 17	5 MHz, 10 MHz		
	LTE TDD Band 41	5 MHz, 10 MHz, 15 MHz, 20 MHz		
Channel Numbers & Freq.(MHz)		Low	Mid	High
LTE Band 4 (AWS)	1.4 MHz	1 710.7 (19957)	1 732.5 (20175)	1 754.3 (20393)
	3 MHz	1 711.5 (19965)	1 732.5 (20175)	1 753.5 (20385)
	5 MHz	1 712.5 (19975)	1 732.5 (20175)	1 752.5 (20375)
	10 MHz	1 715.0 (20000)	1 732.5 (20175)	1 750.0 (20350)
	15 MHz	1 717.5 (20025)	1 732.5 (20175)	1 747.5 (20325)
	20 MHz	1 720.0 (20050)	1 732.5 (20175)	1 745.0 (20300)
LTE Band 5 (Cell)	1.4 MHz	824.7 (20407)	836.5 (20525)	848.3 (20643)
	3 MHz	825.5 (20415)	836.5 (20525)	847.5 (20635)
	5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)
	10 MHz	829.0 (20450)	836.5 (20525)	844.0 (20600)
LTE Band 12	1.4 MHz	699.7 (23017)	707.5 (23095)	715.3 (23173)
	3 MHz	700.5 (23025)	707.5 (23095)	714.5 (23165)
	5 MHz	701.5 (23035)	707.5 (23095)	713.5 (23155)
	10 MHz	704.0 (23060)	707.5 (23095)	711.0 (23130)
LTE Band 17	5 MHz	706.5 (23755)	710 (23790)	713.5 (23825)
	10 MHz	709.0 (23780)	710 (23790)	711.0 (23800)
LTE Band 41	5 MHz	2 557.5 (40265)	2 605.0 (40740)	2 652.5 (41215)
	10 MHz	2 560.0 (40290)	2 605.0 (40740)	2 650.0 (41190)
	15 MHz	2 562.5 (40315)	2 605.0 (40740)	2 647.5 (41165)
	20 MHz	2 565.0 (40340)	2 605.0 (40740)	2 645.0 (41140)

Item.	Description
UE Category	Rel 12, UL Category 13, DL Category 10
Modulations Supported in UL	QPSK, 16QAM, 64QAM
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3	Yes
A-MPR disabled for SAR Testing.	Yes
LTE Carrier Aggregation	This device only supports Intra -Down-Link Carrier aggregation. CA_41C,CA_41D : And 2 Up-link carrier aggregation is supported.: **CA_41C** Technical document includes all possible carrier aggregation combinations
LTE Additional Information	This device does not support full feature on 3GPP Release 12. All uplink communications are identical to the Release 8 specifications. The following LTE release 12 features are not supported: Replay, HetNet, Enhanced MIMO, elCl, WIFI offloading, MDH, eMBHA, Cross-Carrier Scheduling, Enhanced SC-FDMA.

2.4 DUT Antenna Locations

The overall dimensions of this device are > 9 X 5 cm. The overall diagonal dimension of the device is < 160 mm and the diagonal display is < 150 mm.

This model allows users to exchange data or media files with other Bluetooth enabled devices using Bluetooth, which means they can connect to other Bluetooth enabled devices via Bluetooth tethering. Therefore, SAR test was performed for additional simultaneous transmissions.
Head and Bluetooth Tethering SAR were evaluated for BT BR tethering applications.

Mode	Rear	Front	Left	Right	Bottom	Top
GSM/GPRS/EDGE 850	Yes	Yes	Yes	Yes	Yes	No
GSM/GPRS/EDGE 1900	Yes	Yes	Yes	Yes	Yes	No
UMTS 850	Yes	Yes	Yes	Yes	Yes	No
UMTS 1900	Yes	Yes	Yes	Yes	Yes	No
LTE Band 4	Yes	Yes	Yes	Yes	Yes	No
LTE Band 5	Yes	Yes	Yes	Yes	Yes	No
LTE Band 12	Yes	Yes	Yes	Yes	Yes	No
LTE Band 17	Yes	Yes	Yes	Yes	Yes	No
LTE Band 41	Yes	Yes	Yes	No	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	Yes	No	No	Yes

Particular EUT edges were not required to be evaluated for Bluetooth Tethering SAR if the edges were > 25 mm from the transmitting antenna according to FCC KDB 941225 D06v02r01 on page 2. The distance between the transmit antennas and the edges of the device are included in the filing.

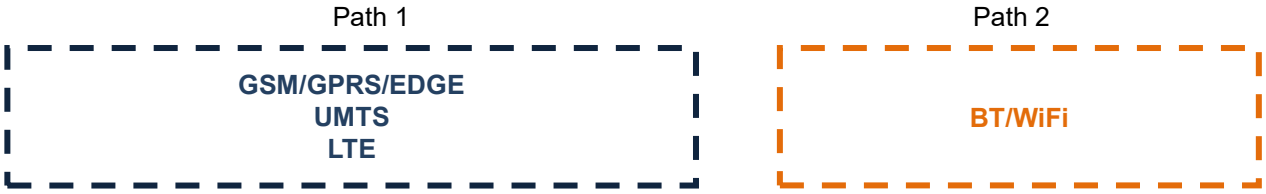
* Note: All test configurations are based on front view position.

2.5 Near Field Communications (NFC) Antenna

This EUT has NFC operations. The NFC antenna is integrated into the device for this model. Therefore, all SAR tests were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the NFC antenna can be found in SAR _ Setup_ photos.

2.6 SAR Summation Scenario

According to FCC KDB 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown below paths and are mode in same rectangle to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



Simultaneous transmission paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB 447498 D01v06.

Simultaneous Transmission Scenarios			
Applicable Combination	Head	Body-Worn	Hotspot
GSM Voice + 2.4 GHz WiFi	Yes	Yes	N/A
GSM Voice + 5 GHz WiFi	Yes	Yes	N/A
GSM Voice + 2.4 GHz Bluetooth	Yes*	Yes	N/A
GPRS + 2.4 GHz WiFi	N/A	N/A	Yes
GPRS + Bluetooth	N/A	N/A	Yes*
GPRS + 5 GHz WiFi	N/A	N/A	Yes
UMTS + 2.4 GHz WiFi	Yes	Yes	Yes
UMTS + 5 GHz WiFi	Yes	Yes	Yes
UMTS + 2.4 GHz Bluetooth	Yes*	Yes	Yes*
LTE + 2.4 GHz WiFi	Yes	Yes	Yes
LTE + 5 GHz WiFi	Yes	Yes	Yes
LTE+ 2.4 GHz Bluetooth	Yes*	Yes	Yes*

1. 2.4 GHz WLAN, Bluetooth and 5GHz WLAN share antenna path and cannot transmit simultaneously.
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. UMTS +WLAN scenario also represents the UMTS Voice/DATA + WLAN hotspot scenario.
4. Per the manufacturer, GPRS does not support VOIP service.
5. This device support VoLTE.
6. The highest reported SAR for each exposure condition is used for SAR summation purpose.
7. Wi-Fi Hotspot is supported for 2.4GHz/ 5GHz WLAN
8. Wi-Fi Direct GO/GC is only supported for 5GHz WLAN Band U-NII-3 and 2.4GHz WLAN, therefore, ,UNII-1 U-NII-2A and U-NII2Cwere not evaluated for wireless router conditions.
9. * Bluetooth tethering is supported.

2.7 LTE UL Carrier Aggregation SAR

This device supports LTE Carrier Aggregation (CA) in the uplink for LTE Band 41 with two component carriers in the Uplink.
This test report only evaluates the additional SAR Measurements for LTE UL CA ,Per 2017,Fall TCB Workshop notes Please refer to SAR Test Report No: HCT-SR-1804-FC004. A3LSMG8750 for SAR compliance evaluation and RF Conducted output Power measurements.

2.8 Test Methodology and Procedures

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

- FCC KDB Publication 941225 D01 3G SAR Procedures v03r01
- FCC KDB Publication 941225 D06 Hot Spot SAR v02r01
- FCC KDB Publication 941225 D05 SAR for LTE Devices v02r05
- FCC KDB Publication 941225 D05A LTE Rel.10 KDB Inquiry sheet v01r02
- FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB Publication 447498 D01 General SAR Guidance v06
- FCC KDB Publication 648474 D04 Handset SAR v01r03
- FCC KDB Publication 616217 D04 v01r02(Proximity Sensor)
- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- FCC KDB Publication 865664 D02 SAR Reporting v01r02
- October 2013 TCB Workshop Notes (GPRS testing criteria)
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)
- Fall 2017 TCBC Workshop Notes(LTE Carrier Aggregation)

3. INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 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.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a given density (*r*). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

$$SAR = \frac{d}{d\ t}\left(\frac{d\ U}{d\ m}\right)$$

Figure 1. SAR Mathematical Equation

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

$$SAR = \sigma\ E^2 / \rho$$

Where:
σ = conductivity of the tissue-simulant material (S/m)
ρ = mass density of the tissue-simulant material (kg/㎥)
E = Total RMS electric field strength (V/m)

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

4. DESCRIPTION OF TEST EQUIPMENT

4.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.2).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC with Windows XP or Windows 7 is working with SAR Measurement system DASY4 & DASY5, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

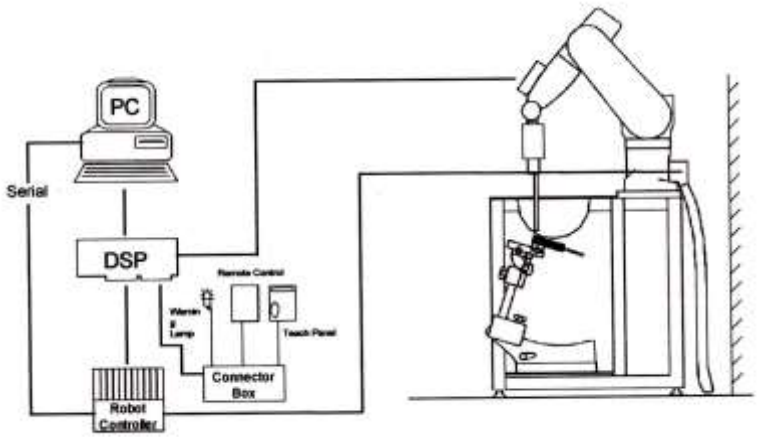


Figure 2. HCT SAR Lab. Test Measurement Set-up

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

5. SAR MEASUREMENT PROCEDURE

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

1. The SAR distribution at the exposed side of the head or body was measured at a distance no more than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the DUT's head and body area and the horizontal grid resolution was depending on the FCC KDB 865664 D01v01r04 table 4-1 & IEEE 1528-2013.

2. Based on step, the area of the maximum absorption was determined by sophisticated interpolations routines implemented in DASY software. When an Area Scan has measured all reachable point. DASY system computes the field maximal found in the scanned are, within a range of the maximum. SAR at this fixed point was measured and used as a reference value.

3. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB 865664 D01v01r04 table 4-1 and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (reference from the DASY manual.)

   a. The data at the surface were extrapolated, since the center of the dipoles is no more than 2.7 mm away from the tip of the probe (it is different from the probe type) and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

   b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan. If the value changed by more than 5 %, the SAR evaluation and drift measurements were repeated.

Area scan and zoom scan resolution setting follow KDB 865664 D01v01r04 quoted below.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5±1 mm</td><td>$^1/_2 \cdot \delta \cdot \ln(2) \pm 0.5$ mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30°±1°</td><td>20°±1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan Spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤15 mm
2-3 GHz: ≤12 mm</td><td>3-4 GHz: ≤12 mm
4-6 GHz: ≤10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan Spatial resolution: Δx_{zoom}, Δy_{zoom}</td><td>≤ 2 GHz: ≤8mm
2-3 GHz: ≤5mm*</td><td>3-4 GHz: ≤5 mm*
4-6 GHz: ≤4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan Spatial resolution normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{zoom}(n)$</td><td>≤ 5 mm</td><td>3-4 GHz: ≤4 mm
4-5 GHz: ≤3 mm
5-6 GHz: ≤2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{zoom}(1)$: between 1 st two Points closest to phantom surface</td><td>≤ 4 mm</td><td>3-4 GHz: ≤3 mm
4-5 GHz: ≤2.5 mm
5-6 GHz: ≤2 mm</td></tr>
<tr><td>$\Delta z_{zoom}(n>1)$: between subsequent Points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3-4 GHz: ≥28 mm
4-5 GHz: ≥25 mm
5-6 GHz: ≥22 mm</td></tr>
<tr><td colspan="5">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.</td></tr>
</table>

6. DESCRIPTION OF TEST POSITION

6.1 EAR REFERENCE POINT

Figure 6-2 shows the front, back and side views of the SAM phantom. The center-of-mouth reference point is labeled “M”, the left ear reference point (ERP) is marked “LE”, and the right ERP is marked “RE.” Each ERP is on the B-M (back-mouth) line located 15 mm behind the entrance-to-ear-canal (EEC) point, as shown in Figure 6-1. The Reference Plane is defined as passing through the two ear reference point and point M. The line N-F (Neck-Front), also called the Reference Pivoting Line, is not perpendicular to the reference plane (See Figure 5-1), Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning.

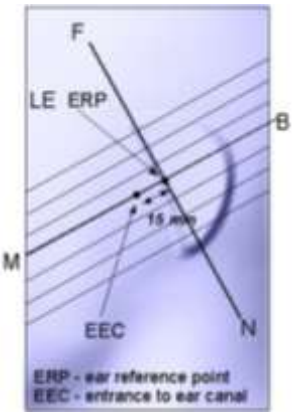


Figure 6-1
Close-up side view of ERP

6.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The device under test was placed in a normal operating position with the acoustic output located along the “vertical centerline” on the front of the device aligned to the “ear reference point”(see Figure 6-3). The acoustic output was than located at the same level as the center of the ear reference point. The device under test was positioned so that the “vertical centerline” was bisecting the front surface of the handset at its top and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head phantoms on the ear reference point.

Figure 6-2
Front, back and side views of SAM Twin Phantom

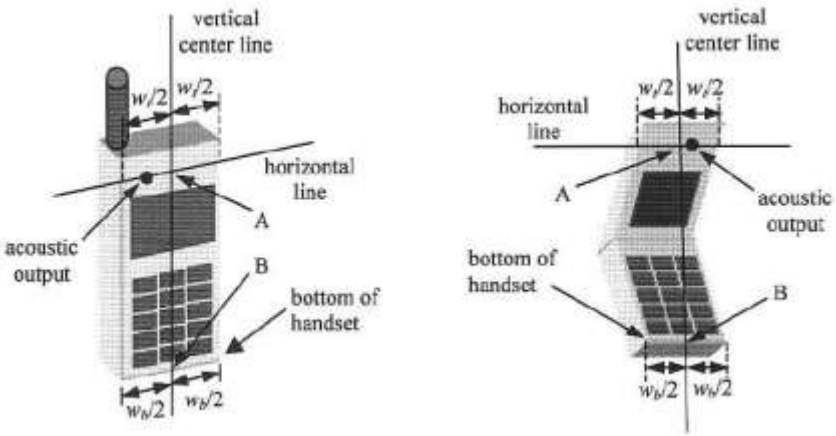


Figure 6-3. Handset vertical and horizontal reference lines

6.3 Device Holder

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

6.4 Position for cheek

Figure 6.4. shows cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

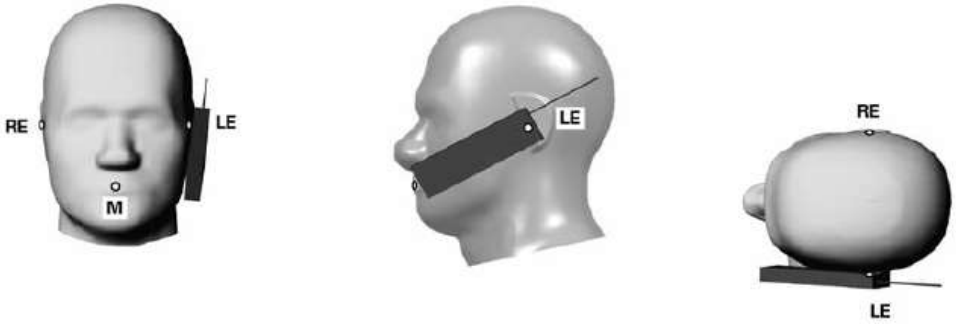


Figure 6.4 Cheek/ Touch position of the wireless device

6.5 Definition of the "tilted" position

Figure 6.5. shows tilted position. Place the device in the cheek position. Then while maintaining the orientation of the device, retract the device parallel to the reference plane far enough away from the phantom to enable a rotation of the device by 15°

Figure 6.5. Tilt 15° position of the wireless device

6.6 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-dips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6-6). Per FCC KDB Publication 648474 D04v01r03 Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in Body-worn accessories. The Body-worn accessory procedures in FCC KDB Publication 447498 D01v06 should be used to test for Body-worn accessory SAR compliance, without a headset connected to it.. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body- worn accessory with a headset attached to the handset.

Figure 6-6
Sample Body-Worn Diagram

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that

dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-dip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W≥9cmx5 cm) are based on *a* composite test separation distance of 10 mm from the front back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the Body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some Body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The "Portable Hotspot* feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

7. ANSI/ IEEE C95.1 - 2005 RF EXPOSURE LIMITS

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population	CONTROLLED ENVIRONMENT Occupational
	(W/kg) or (mW/g)	(W/kg) or (mW/g)
SPATIAL PEAK SAR * (Head)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

NOTES:

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

** The Spatial Average value of the SAR averaged over the whole-body.

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

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

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

8. FCC SAR GENERAL MEASUREMENT PROCEDURES

Power Measurements for licensed transmitters are performed using a base simulator under digital average power.

8.1 Measured and Reported SAR

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

8.2 LTE UL CA SAR Measurement Procedure

This device is specified with the same maximum output power and Tune-up tolerances for intra-band contiguous up-link LTE CA_41C and the single carrier LTE 41. Both Uplink carrier aggregation and single carrier are operating with Power class 3.
This device support intra-band contiguous UL CA: LTE CA_41C with a maximum of 20MHz component carriers
For intra-band contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that aggregate maximum allowed output power is equivalent to the single carrier scenario.

This device does not have any operating restrictions, Power reduction or variations among the different LTE operating mode configurations on single carrier LTE 41 and intra-band contiguous up-link LTE CA_41C operations.
The measured power results of single carrier LTE41 and intra-band contiguous up-link LTE CA_41C satisfy Maximum output power and Tune-up tolerances.
For intra-band contiguous up-link LTE CA_41C, 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. We measured output power for all BW and modulation combinations of intra-band contiguous uplink LTE CA_41C for this device and confirmed that 3.5 to 8dB MPR is applied to non contiguous RB offsets according to 3GPP 36.101 6.2.3A. Also output power of contiguous RB allocations is typically higher than non-contiguous RB offsets condition

Per Fall 2017 TCB Workshop Notes, the output Power with uplink CA active wasmeasured for the configuration with the Highest Reported SAR with single carrier for each exposure condition. The Power was measured with wideband signal integration over both component carriers.

Intra-band Contiguous LTE Uplink Combination CA_41C

Uplink CA Combinations	Channel Bandwidth for Carrier[MHz]	Channel Bandwidth for Carrier[MHz]	Maximum Aggregated bandwidth[MHz[	Bandwidth combination set
CA_41C	10	20	40	0
	15	15,20		
	20	10,15,20		
	5,10	20	40	1
	15	15,20		
	20	5,10,15,20		
	10	15,20	40	2
	15	10,15,20		
	20	10,15,20		
	10	20	40	3
	20	20		

8.3 LTE UL CA_41C(TDD) Call Setup Considerations

According to KDB 941225 D05v02r05, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33 %) using Uplink-downlink configuration 0 and Special subframe configuration 6.

LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special sub frame configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

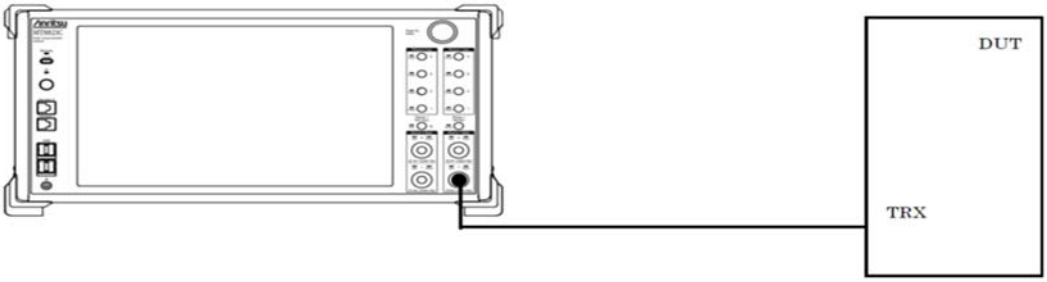
Table 4.2-2: Uplink-downlink configurations.

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

Calculated Duty Cycle – Extended cyclic prefix in uplink x (T_s) x # of S + # of U
Example for calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33 %
Where
T_s = 1/(15000 x 2048) seconds

8.3.1 Call Setup

To measure the LTE UP CA power of this device, Anritsu's MT8821C was used to check the power as follows.

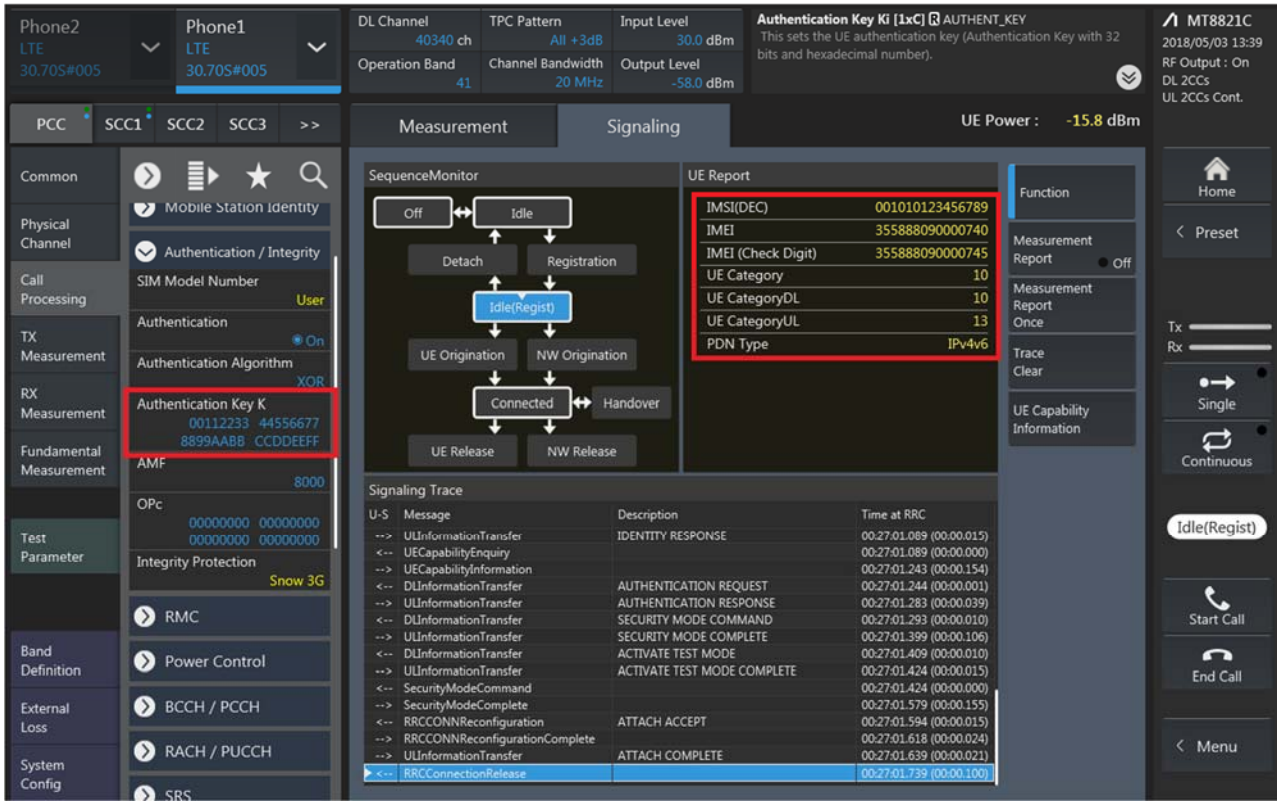


Power Measurement setup

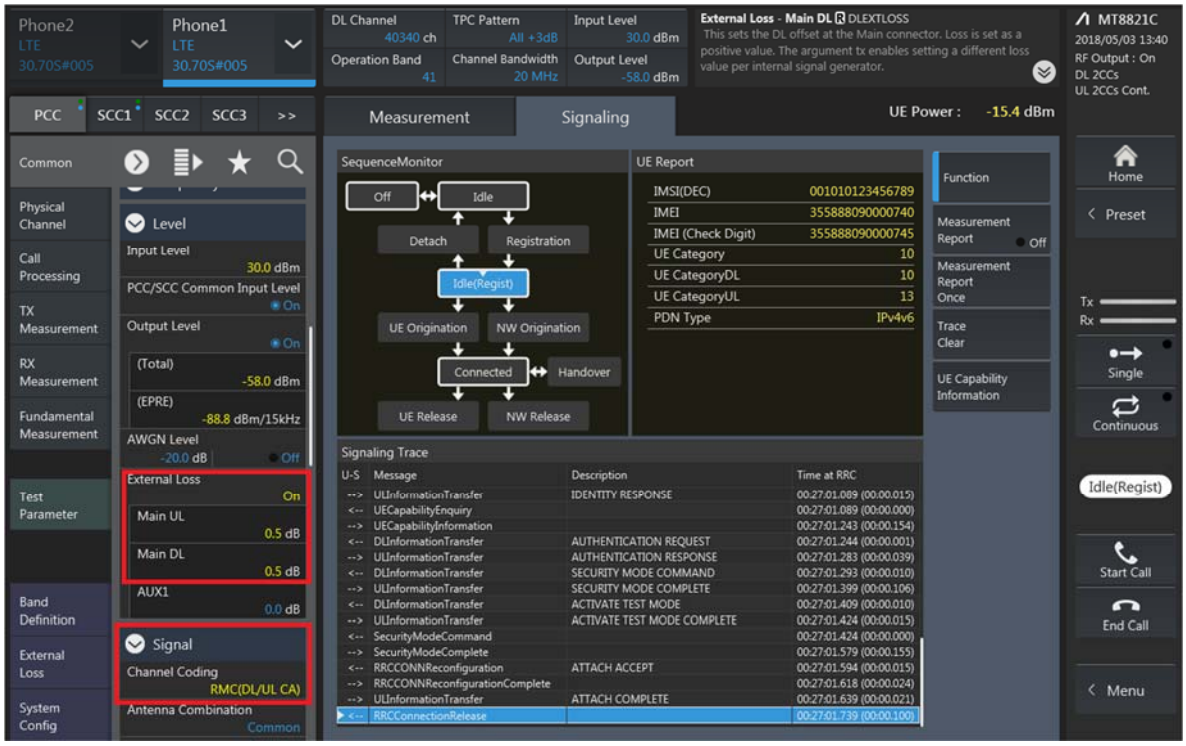
.TDD CA_41C Intra-Band Contiguous Call Connection

Set to MT8821C with following parameters:

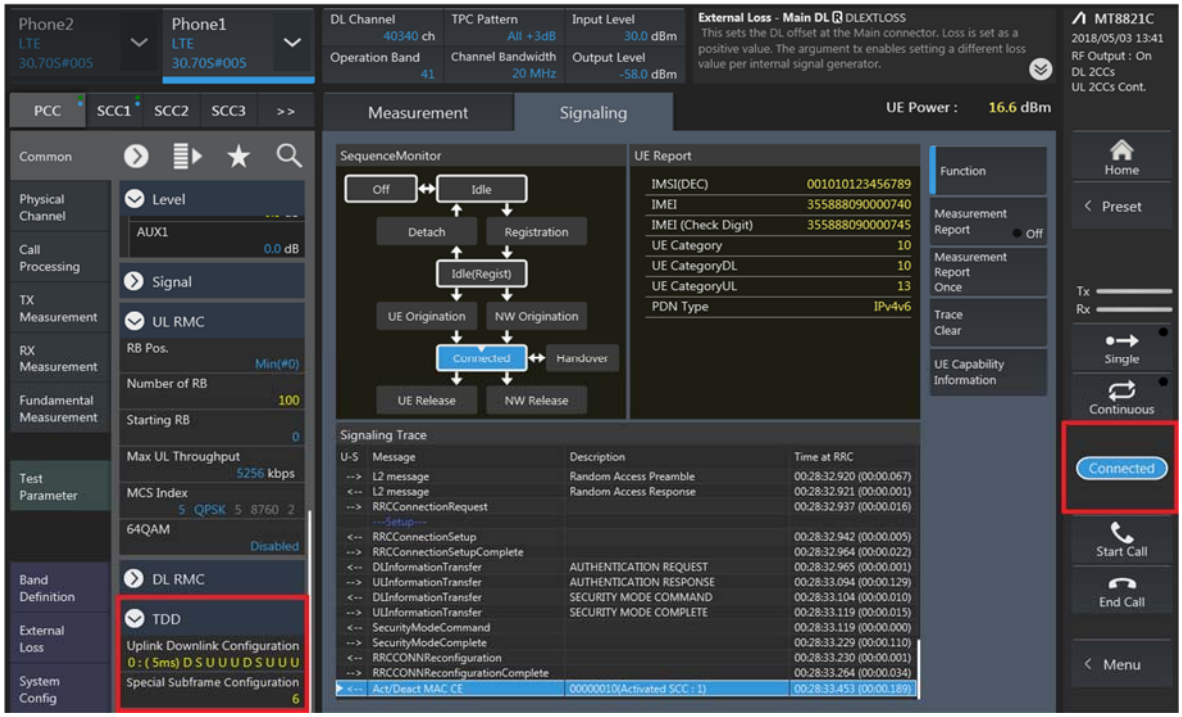
-. Set up the call box for PCC Configuration for LTE Uplink CA
-. Set up the call box for SCC Configuration for LTE Uplink CA
-. Measure the maximum output power in Uplink LTE CA conditions.



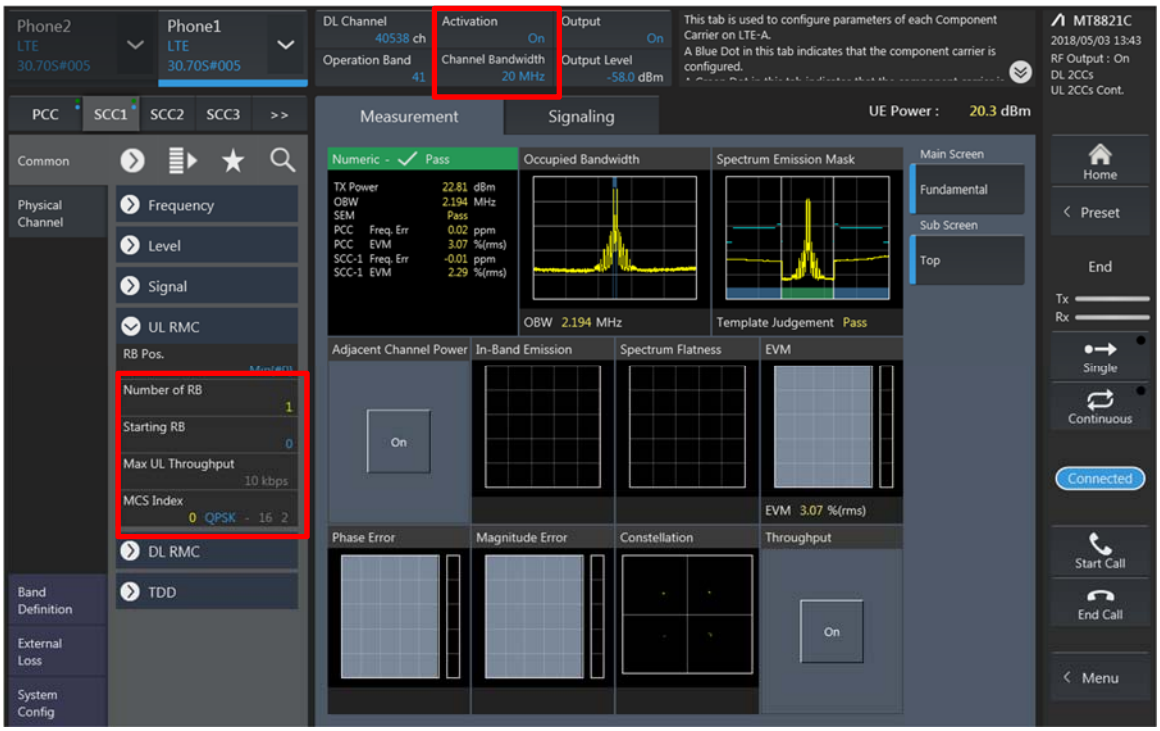
Call 1 :Select PCC Configuration for Authentication key to Register



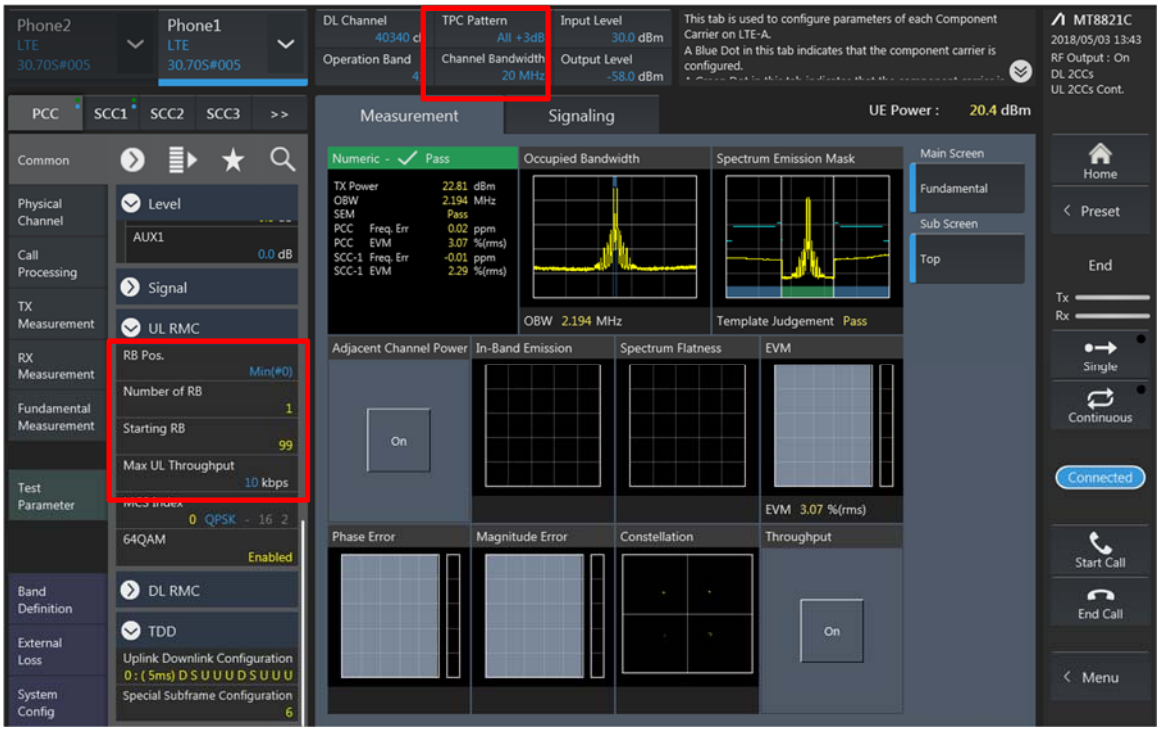
Call 2 :Select PCC Configuration for LTE UL CA and Cable loss



Call 3 :Select PCC Configuration for LTE TDD " Uplink Downlink Configuration" set to "0"
And then Select "connect"button.



Call 4 :Set to RB, offset, BW, modulation of SCC channel.



Call 5: Set to RB, offset, BW, modulation and Max Power conditions of PCC required test channel.

9. 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.

9.1 LTE Up-link Carrier Aggregation Conducted Powers

The output power measurement of LTE Uplink CA_41C were performed the all applicable UL CA Configurations intended for U.S. operations by KDB941225 D05A and TCB workshop notes in fall of 2017.

The SAR measurement were performed as the result of QPSK, which is the worst case of the output Power results, and the output power measurement result of QPSK Modulation is shown below.
Refer to Attachmet 8 for the output power measurement results for 16QAM and 64QAM modulation

Intra-Band Uplink Carrier aggregation conducted Powers

PCC									SCC							Tx Power	
Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Modulation	RB	offset	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with UL CA Enabled(dBm)
41	20	41140	2645	41140	2645	QPSK	1	0	41	20	40942	2625.2	QPSK	1	99	23.64	23.53

CA_41C Uplink Two component carrier Aggregation conducted Power

Uplink Carrier aggregation :

1. This device supports uplink carrier aggregation for LTE CA_41C with a maximum of 20MHz component carriers. For intraband contiguous carrier aggregation scenarios,3GPP36.101 Table 6.2.2A-1 specifies that aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. The conducted Powers and MPR setting in this device are permanently implemented per the above 3GPP requirements.
2. Per Fall 2017 TCBC Workshop Notes, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

9.2 The Worst cases for LTE Uplink CA_41C Conducted Powers for all combinations

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation Low Channel	5	40265	2557.5	QPSK	1	24	20	40382	2569.2	QPSK	1	0	23.33	23.18
	10	40290	2560	QPSK	1	49	15	40410	2572	QPSK	1	0	23.34	23.29
	10	40290	2560	QPSK	1	49	20	40434	2574.4	QPSK	1	0	23.34	23.28
	15	40315	2562.5	QPSK	1	74	10	40435	2574.5	QPSK	1	0	23.36	23.25
	15	40315	2562.5	QPSK	1	74	15	40465	2577.5	QPSK	1	0	23.36	23.00
	15	40315	2562.5	QPSK	1	74	20	40486	2579.6	QPSK	1	0	23.36	23.17
	20	40340	2565	QPSK	1	99	5	40457	2576.7	QPSK	1	0	23.31	23.28
	20	40340	2565	QPSK	1	99	10	40484	2579.4	QPSK	1	0	23.31	23.30
	20	40340	2565	QPSK	1	99	15	40511	2582.1	QPSK	1	0	23.31	23.21
	20	40340	2565	QPSK	1	99	20	40538	2584.8	QPSK	1	0	23.31	23.14

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation Middle Channel	5	40740	2605	QPSK	1	0	20	40623	2593.3	QPSK	1	99	23.28	23.22
	10	40740	2605	QPSK	1	0	15	40620	2593	QPSK	1	74	23.25	23.24
	10	40740	2605	QPSK	1	0	20	40596	2590.6	QPSK	1	99	23.25	23.27
	15	40740	2605	QPSK	1	0	10	40620	2593	QPSK	1	49	23.34	23.16
	15	40740	2605	QPSK	1	0	15	40590	2590	QPSK	1	74	23.34	23.08
	15	40740	2605	QPSK	1	0	20	40569	2587.9	QPSK	1	99	23.34	23.05
	20	40740	2605	QPSK	1	0	5	40623	2593.3	QPSK	1	24	23.39	23.25
	20	40740	2605	QPSK	1	0	10	40596	2590.6	QPSK	1	49	23.39	23.37
	20	40740	2605	QPSK	1	0	15	40569	2587.9	QPSK	1	74	23.39	23.04
	20	40740	2605	QPSK	1	0	20	40542	2585.2	QPSK	1	99	23.39	23.04

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation High Channel	5	41215	2652.5	QPSK	1	0	20	41098	2640.8	QPSK	1	99	23.58	23.48
	10	41190	2650	QPSK	1	0	15	41070	2638	QPSK	1	74	23.55	23.27
	10	41190	2650	QPSK	1	0	20	41046	2635.6	QPSK	1	99	23.55	23.38
	15	41165	2647.5	QPSK	1	0	10	41045	2635.5	QPSK	1	49	23.55	23.53
	15	41165	2647.5	QPSK	1	0	15	41015	2632.5	QPSK	1	74	23.55	23.19
	15	41165	2647.5	QPSK	1	0	20	40994	2630.4	QPSK	1	99	23.55	23.54
	20	41140	2645	QPSK	1	0	5	41023	2633.3	QPSK	1	24	23.64	23.22
	20	41140	2645	QPSK	1	0	10	40996	2630.6	QPSK	1	49	23.64	23.52
	20	41140	2645	QPSK	1	0	15	40969	2627.9	QPSK	1	74	23.64	23.53
	20	41140	2645	QPSK	1	0	20	40942	2625.2	QPSK	1	99	23.64	23.53

10. SYSTEM VERIFICATION

10.1 Tissue Verification

The Head /body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity.

Table for Head Tissue Verification

Date of Tests	Tissue Temp. (°C)	Tissue Type	Freq. (MHz)	Measured Conductivity σ (S/m)	Measured Dielectric Constant, ε	Target Conductivity σ (S/m)	Target Dielectric Constant, ε	% dev σ	% dev ε
04/05/2018	19.5	2600H	2500	1.855	38.670	1.855	39.140	0.00%	-1.20%
			2600	1.963	38.240	1.964	39.010	-0.05%	-1.97%
			2700	2.075	38.081	2.073	38.880	0.10%	-2.06%

Table for Body Tissue Verification

Date of Tests	Tissue Temp. (°C)	Tissue Type	Freq. (MHz)	Measured Conductivity σ (S/m)	Measured Dielectric Constant, ε	Target Conductivity σ (S/m)	Target Dielectric Constant, ε	% dev σ	% dev ε
04/05/2018	19.5	2600B	2500	2.022	52.509	2.021	52.640	0.05%	-0.25%
			2600	2.141	52.173	2.163	52.510	-1.02%	-0.64%
			2700	2.263	51.898	2.305	52.380	-1.82%	-0.92%

10.2 System Verification

Prior to assessment, the system is verified to the ± 10 % of the specifications at 2 600 MHz by using the system Verification kit. (Graphic Plots Attached)

System Verification Results *** Input Power: 50mW**

Freq. [MHz]	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{1g} (SPEAG) [W/kg]	Measured SAR_{1g} [W/kg]	1 W Normalized SAR_{1g} [W/kg]	Deviation [%]	Limit [%]
2 600	04/05/2018	3968	1106	Head	19.7	19.5	56.4	2.71	54.2	- 3.90	± 10
2 600	04/05/2018	3968		Body	19.7	19.5	54.6	2.73	54.6	+ 0.00	± 10

10.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequency band by using the system Verification kit. (Graphic Plots Attached)

- Cabling the system, using the Verification kit equipments.
- Generate about 50 mW Input Level from the Signal generator to the Dipole Antenna.
- Dipole Antenna was placed below the Flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

NOTE;
SAR Verification was performed according to the FCC KDB 865664 D01v01r04.

11. SAR TEST DATA SUMMARY

11.1 HEAD SAR Measurement Results

LTE TDD Band 41 Head SAR																	
Frequency			Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz		Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(W/kg)		(W/kg)	
PCC	2645	41140	QPSK	20	24.3	23.53	-0.14	Right Tilt	0	1	0	1:1.58	0.079	1.194	0.094	1
SCC	2625.2	40942								1	99					
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram									

11.2 Body-worn SAR Measurement Results

LTE Body-Worn SAR																	
Frequency			Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz		Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(mm)	(W/kg)		(W/kg)	
PCC	2645	41140	LTE 41 QPSK	20	24.3	23.53	-0.13	Front	0	1	0	1:1.58	15	0.235	1.194	0.281	2
SCC	2625.2	40942								1	99						
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram									

11.3 Hotspot SAR Measurement Results

LTE TDD Band 41 Hotspot SAR																	
Frequency			Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz		Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(mm)	(W/kg)		(W/kg)	
PCC	2645	41140	QPSK	20	24.3	23.53	-0.03	Bottom	0	1	0	1:1.58	10	0.505	1.194	0.603	3
SCC	2625.2	40942								1	99						
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram									

11.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, FCC KDB Procedure.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB 648474 D04v01r03, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluation using a headset cable were required.
8. This device utilizes power reduction for some wireless mode and technologies, as outlined in sec. 2.3 and sec.9. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous scenarios.
9. During SAR testing for the Hotspot conditions per KDB 941225 D06v02, the actual portable hotspot operation (with actual simultaneous transmission of a transmitter with WiFi) was not activated.

LTE Notes:

1. Intra-band LTE Uplink contiguous CA Considerations: Per 2017,Fall TCB Workshop Notes, SAR was first measured with only single carrier active in the uplink(Caarrier aggregation not active). For each exposure condition, the Uplink Carrier aggregation scenario with two component carriers was additionally tested for the configuration with the highest SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.
2. TDD LTE was tested using UL-DL configuration 0 with 6 UL sub frames and 2S subframes using extended cyclic prefix only and special sub frame configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Sec. 4**,** the duty factor using extended cyclic prefix is 0.633(cf=1.58).

.

12. SIMULTANEOUS SAR ANALYSIS

12.1 Simultaneous Transmission Summation for Head

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN(Held to ear)				
Exposure condition	Band	WWAN SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Head SAR	GSM 850	0.239	0.577	0.816
	GSM 1900	0.085	0.577	0.662
	UMTS 850	0.240	0.577	0.817
	UMTS 1900	0.192	0.577	0.769
	LTE Band 4	0.238	0.577	0.815
	LTE Band 5	0.314	0.577	**0.891**
	LTE Band 12	0.091	0.577	0.668
	LTE Band 41	0.094	0.577	0.671

Simultaneous Transmission Summation Scenario with 5 GHz WLAN(Held to ear)				
Exposure condition	Band	WWAN SAR (W/kg)	5 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Head SAR	GSM 850	0.239	0.386	0.625
	GSM 1900	0.085	0.386	0.471
	UMTS 850	0.240	0.386	0.626
	UMTS 1900	0.192	0.386	0.578
	LTE Band 4	0.238	0.386	0.624
	LTE Band 5	0.314	0.386	0.700
	LTE Band 12	0.091	0.386	0.477
	LTE Band 41	0.094	0.386	0.480

Simultaneous Transmission Scenario with Bluetooth				
Exposure condition	Band	WWAN SAR (W/kg)	Bluetooth SAR (W/kg)	∑ 1-g SAR (W/kg)
Head SAR	GSM 850	0.239	0.225	0.464
	GSM 1900	0.085	0.225	0.310
	UMTS 850	0.240	0.225	0.465
	UMTS 1900	0.192	0.225	0.417
	LTE Band 4	0.238	0.225	0.463
	LTE Band 5	0.314	0.225	0.539
	LTE Band 12	0.091	0.225	0.316
	LTE Band 41	0.094	0.225	0.319

12.2 Simultaneous Transmission Summation for Body-Worn

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Body-worn	15	GSM 850	0.229	0.108	0.337
		GSM 1900	0.335	0.108	0.443
		UMTS 850	0.243	0.108	0.351
		UMTS 1900	0.687	0.108	0.795
		LTE Band 4	0.640	0.108	0.748
		LTE Band 5	0.309	0.108	0.417
		LTE Band 12	0.149	0.108	0.257
		LTE Band 41	0.281	0.108	0.389

Simultaneous Transmission Summation Scenario with 5 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	5 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Body-worn	15	GSM 850	0.229	0.297	0.526
		GSM 1900	0.335	0.297	0.632
		UMTS 850	0.243	0.297	0.540
		UMTS 1900	0.687	0.297	**0.984**
		LTE Band 4	0.640	0.297	0.937
		LTE Band 5	0.309	0.297	0.606
		LTE Band 12	0.149	0.297	0.446
		LTE Band 41	0.281	0.297	0.578

Simultaneous Transmission Summation Scenario with Bluetooth					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	Bluetooth SAR (W/kg)	∑ 1-g SAR (W/kg)
Body-worn	15	GSM 850	0.229	0.013	0.242
		GSM 1900	0.335	0.013	0.348
		UMTS 850	0.243	0.013	0.256
		UMTS 1900	0.687	0.013	0.700
		LTE Band 4	0.640	0.013	0.653
		LTE Band 5	0.309	0.013	0.322
		LTE Band 12	0.149	0.013	0.162
		LTE Band 41	0.281	0.013	0.294

12.3 Hotspot SAR Simultaneous Transmission Analysis

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Hotspot	10	GSM 850	0.484	0.250	0.734
		GSM 1900	0.625	0.250	0.875
		UMTS 850	0.484	0.250	0.734
		UMTS 1900	0.688	0.250	0.938
		LTE Band 4	0.829	0.250	1.079
		LTE Band 5	0.634	0.250	0.884
		LTE Band 12	0.246	0.250	0.496
		LTE Band 41	0.603	0.250	0.853

Simultaneous Transmission Summation Scenario with 5 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	5 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Hotspot	10	GSM 850	0.484	0.312	0.796
		GSM 1900	0.625	0.312	0.937
		UMTS 850	0.484	0.312	0.796
		UMTS 1900	0.688	0.312	1.000
		LTE Band 4	0.829	0.312	**1.141**
		LTE Band 5	0.634	0.312	0.946
		LTE Band 12	0.246	0.312	0.558
		LTE Band 41	0.603	0.312	0.915

Simultaneous Transmission Summation Scenario with Bluetooth					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	Bluetooth SAR (W/kg)	∑ 1-g SAR (W/kg)
Hotspot	10	GSM 850	0.484	0.030	0.514
		GSM 1900	0.625	0.030	0.655
		UMTS 850	0.484	0.030	0.514
		UMTS 1900	0.688	0.030	0.718
		LTE Band 4	0.829	0.030	0.859
		LTE Band 5	0.634	0.030	0.664
		LTE Band 12	0.246	0.030	0.276
		LTE Band 41	0.603	0.030	0.633

12.4 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. And therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013.

13. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

In accordance with KDB procedure 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz, SAR additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is 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) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg for 1g SAR or < 2.0 W/kg for 10g SAR; steps 2) through 4) do not apply.

2) When the original highest measured 1g SAR is ≥ 0.80 W/kg or 10g SAR ≥ 2.0W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg for 1g SAR or ≥ 3.625 W/kg for 10g SAR (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg for 1g SAR or ≥3.75 W/kg for 10g SAR and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

14. 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 IEEE1528-2013 was not required.

15. SAR TEST EQUIPMENT

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	SAM Phantom	-	N/A	N/A	N/A
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	TX90 XLspeag	F11/5K3RA1/A/01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F11/5K3RA1/C/01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D21142606B	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D21142605	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D21142603	N/A	N/A	N/A
SPEAG	DAE3	466	08/29/2017	Annual	08/29/2018
SPEAG	E-Field Probe EX3DV4	3968	05/31/2017	Annual	05/31/2018
SPEAG	Dipole D2600V2	1106	12/15/2017	Annual	12/15/2018
Agilent	Power Meter N1911A	MY45101406	09/15/2017	Annual	09/15/2018
HP	Power Sensor N1921A	MY55220026	09/01/2017	Annual	09/01/2018
SPEAG	DAKS 3.5	1038	05/23/2017	Annual	05/23/2018
Agilent	Directional Bridge 86205A	3140A02490	06/09/2017	Annual	06/09/2018
Agilent	Signal Generator N5182A	MY47070230	05/10/2017	Annual	05/10/2018
HP	11636B/Power Divider	07048	05/31/2017	Annual	05/31/2018
TESTO	175-H1/Thermometer	40331949309	02/06/2018	Annual	02/06/2019
EMPOWER	RF Power Amplifier	1041D/C0508	06/16/2017	Annual	06/16/2018
Agilent	Attenuator (3dB) 8491B	MY39270622	06/29/2017	Annual	06/29/2018
Agilent	Attenuator (20dB) 33340C	13311	05/10/2017	Annual	05/10/2018
Anritsu	Radio Communication Tester MT8821C	6201502997	08/10/2017	Annual	08/10/2018

1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity (dielectric constant) of the brain/body-equivalent material.

16. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 - 1992.

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

17. REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1 - 1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 kHz to 300 GHz, New York: IEEE, Sept. 1992

[3] ANSI/IEEE C 95.1 - 2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz, New York: IEEE, 2006

[4 ANSI/IEEE C95.3 - 2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: December 2002.

[5] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2013, IEEE Recommended Practice or Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices

[6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 120-124.

[9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Head Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.

[12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300 MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectro magnetics, Canada: 1987, pp. 29-36.

[14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[15] W. Gander, Computer mathematick, Birkhaeuser, Basel, 1992.

[16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10 kHz-300 GHz, Jan. 1995.

[19] Prof. Dr. Niels Kuster, ETH, EidgenØssische Technische Hoschschule Zòrich, Dosimetric Evaluation of the Cellular Phone.

[20] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation and procedures – Part 1:Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz), July. 2016..

[21] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 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) Mar. 2010.

[22] Industry Canada RSS-102 Radio Frequency Exposure Compliance of Radio Communication Apparatus (All Frequency Band) Issue 5, March 2015.

[23] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Rage from 3 kHz – 300 GHz, 2009

[24] FCC SAR Test procedures for 2G-3G Devices, Mobile Hotspot and UMPC Device KDB 941225 D01.

[25] SAR Measurement Guidance for IEEE 802.11 transmitters, KDB 248227 D01v02r02

[26] SAR Evaluation of Handsets with Multiple Transmitters and Antennas KDB 648474 D03, D04.

[27] SAR Evaluation for Laptop, Notebook, Netbook and Tablet computers KDB 616217 D04.

[28] SAR Measurement and Reporting Requirements for 100 MHz – 6 GHz, KDB 865664 D01, D02.

[29] FCC General RF Exposure Guidance and SAR procedures for Dongles, KDB 447498 D01,D02.

Attachment 1. – SAR Test Plots

Test Laboratory:	HCT CO., LTD
EUT Type:	Mobile Phone
Liquid Temperature:	19.5 ℃
Ambient Temperature:	19.7 ℃
Test Date:	04/05/2018
Plot No.:	1

DUT: SM-G8750; Type: Bar

Communication System: UID 0, LTE Band 41 (FCC) (0); Frequency: 2645 MHz;Duty Cycle: 1:1.58052
Medium parameters used (interpolated): f = 2645 MHz; σ = 2.014 S/m; ε_r = 38.126; ρ = 1000 kg/m^3
Phantom section: Right Section

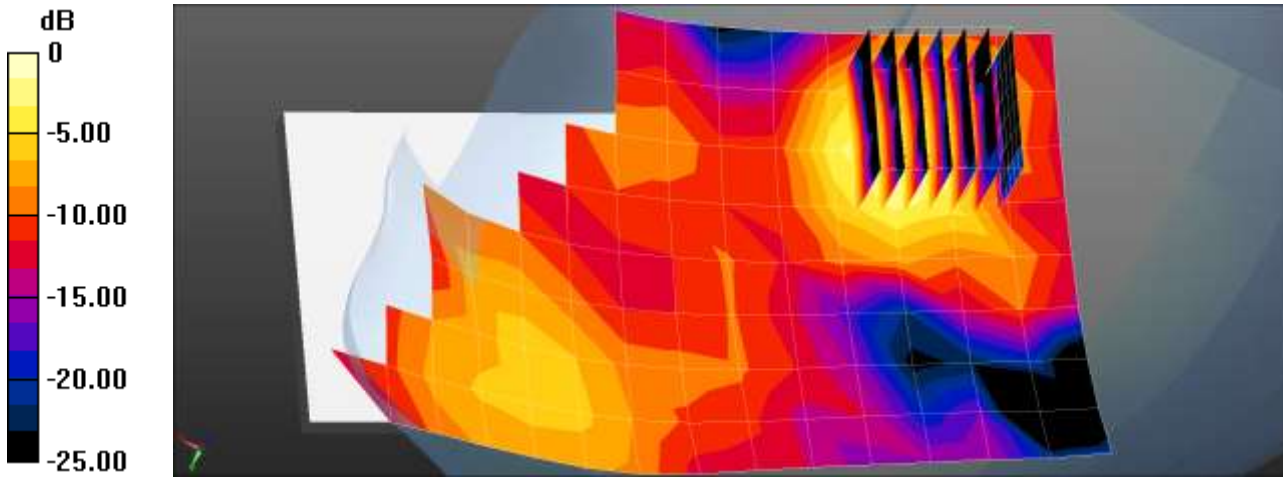
DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.72, 7.72, 7.72); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

PCC:20MHz BW,QPSK, 41140ch,1RB 0offset SCC:20MHz BW,QPSK, 40942ch,1RB 99offset

2CC Uplink CA_41C Head Right Tilt QPSK 20MHz 1RB 0offset 41140ch CA/Area Scan (9x15x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.115 W/kg

2CC Uplink CA_41C Head Right Tilt QPSK 20MHz 1RB 0offset 41140ch CA/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.572 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.159 W/kg
SAR(1 g) = 0.079 W/kg; SAR(10 g) = 0.036 W/kg
Maximum value of SAR (measured) = 0.128 W/kg



0 dB = 0.128 W/kg = −8.93 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Mobile Phone
Liquid Temperature:	19.5 ℃
Ambient Temperature:	19.7 ℃
Test Date:	04/05/2018
Plot No.:	2

DUT: SM-G8750; Type: Bar

Communication System: UID 0, LTE Band 41 (FCC) (0); Frequency: 2645 MHz;Duty Cycle: 1:1.58052
Medium parameters used (interpolated): f = 2645 MHz; σ = 2.198 S/m; ε_r = 52.067; ρ = 1000 kg/m^3
Phantom section: Center Section

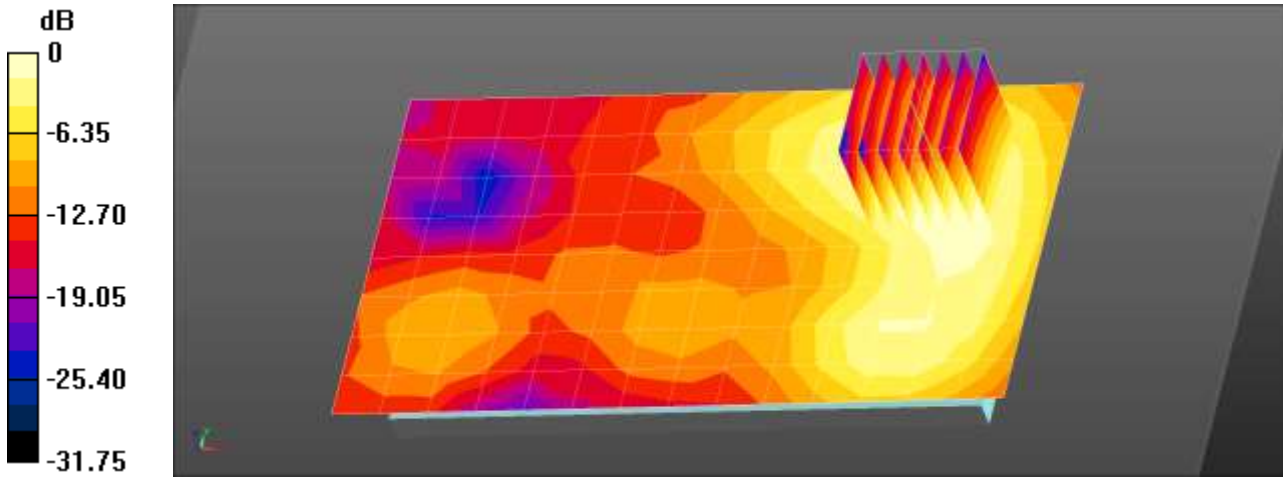
DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.87, 7.87, 7.87); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

PCC:20MHz BW,QPSK, 41140ch,1RB 0offset SCC:20MHz BW,QPSK, 40942ch,1RB 99offset

2CC Uplink CA_41C Body Front QPSK 20MHz 1RB 0offset 41140ch Body worn CA/Area Scan (9x15x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.327 W/kg

2CC Uplink CA_41C Body Front QPSK 20MHz 1RB 0offset 41140ch Body worn CA/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.329 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.419 W/kg
SAR(1 g) = 0.235 W/kg; SAR(10 g) = 0.130 W/kg
Maximum value of SAR (measured) = 0.345 W/kg



0 dB = 0.345 W/kg = −4.62 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Mobile Phone
Liquid Temperature:	19.5 ℃
Ambient Temperature:	19.7 ℃
Test Date:	04/05/2018
Plot No.:	3

DUT: SM-G8750; Type: Bar

Communication System: UID 0, LTE Band 41 (FCC) (0); Frequency: 2645 MHz;Duty Cycle: 1:1.58052
Medium parameters used (interpolated): f = 2645 MHz; σ = 2.198 S/m; ε_r = 52.067; ρ = 1000 kg/m^3
Phantom section: Center Section

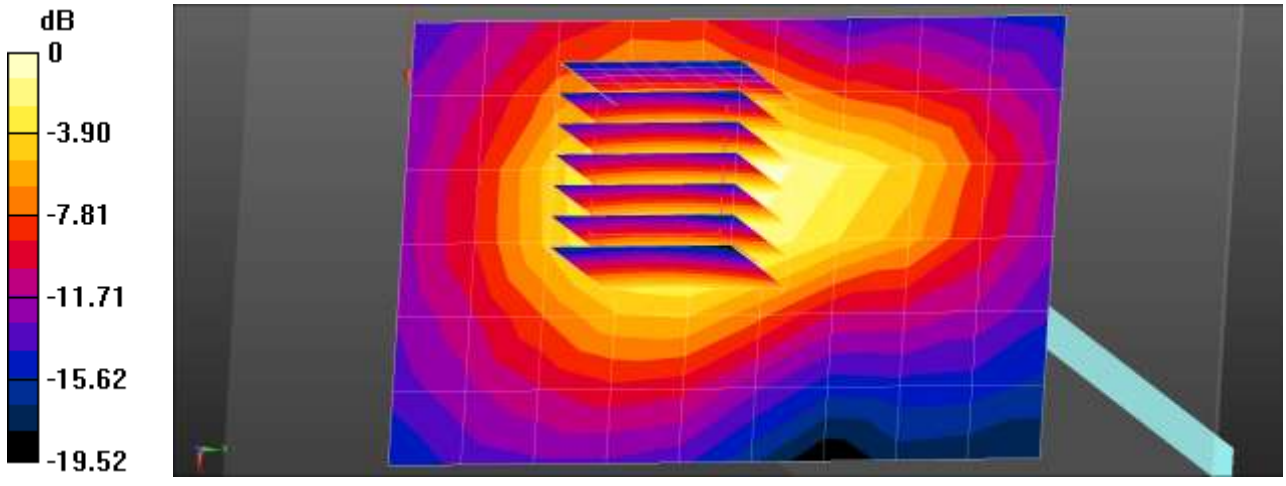
DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.87, 7.87, 7.87); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: Triple Flat Phantom
- Measurement SW: DASY52, Version 52.8 (8);

PCC:20MHz BW,QPSK, 41140ch,1RB 0offset SCC:20MHz BW,QPSK, 40942ch,1RB 99offset

2CC Uplink CA_41C Body Bottom QPSK 20MHz 1RB 0offset 41140ch CA/Area Scan (10x7x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.673 W/kg

2CC Uplink CA_41C Body Bottom QPSK 20MHz 1RB 0offset 41140ch CA/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.24 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.939 W/kg
SAR(1 g) = 0.505 W/kg; SAR(10 g) = 0.261 W/kg
Maximum value of SAR (measured) = 0.762 W/kg



0 dB = 0.673 W/kg = −1.72 dBW/kg

Attachment 2. – Dipole Verification Plots

■ Verification Data (2 600 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	19.5 ℃
Test Date:	04/05/2018

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2

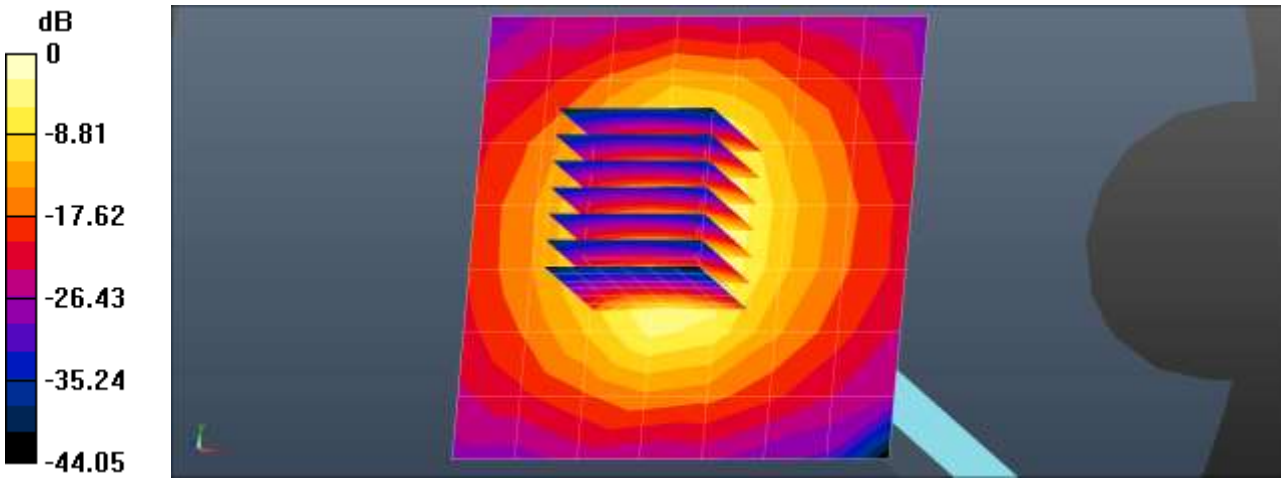
Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.963 S/m; ε_r = 38.24; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.72, 7.72, 7.72); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2 600 MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.96 W/kg

Dipole/2 600 MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.62 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 5.89 W/kg
SAR(1 g) = 2.71 W/kg; SAR(10 g) = 1.2 W/kg
Maximum value of SAR (measured) = 4.68 W/kg



0 dB = 3.96 W/kg = 5.98 dBW/kg

■ Verification Data (2 600 MHz Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	19.5 ℃
Test Date:	04/05/2018

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2

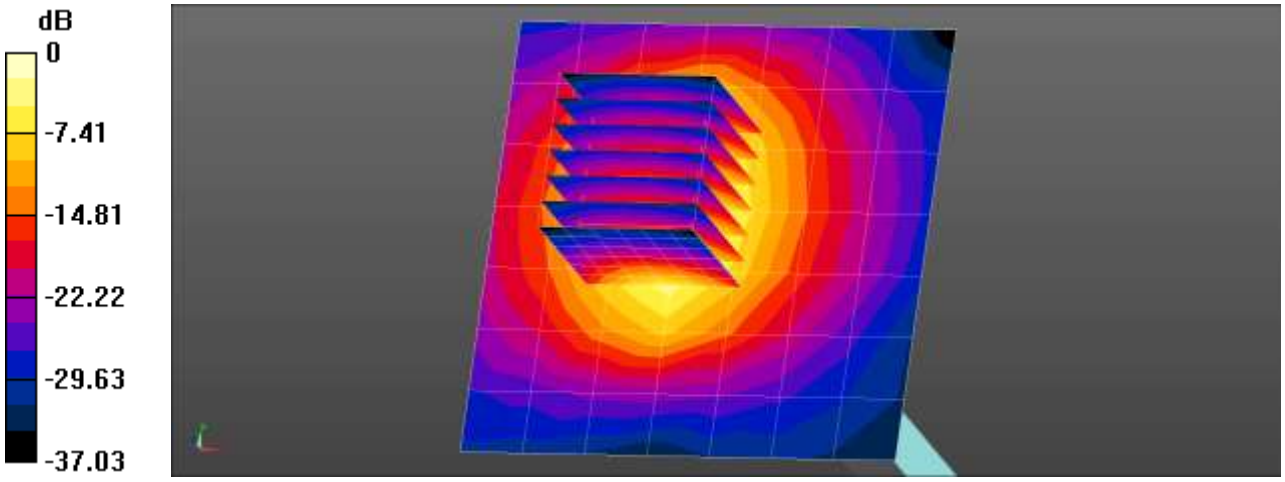
Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.141 S/m; ε_r = 52.173; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.87, 7.87, 7.87); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2 600 MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 4.66 W/kg

Dipole/2 600 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35.96 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 5.92 W/kg
SAR(1 g) = 2.73 W/kg; SAR(10 g) = 1.2 W/kg
Maximum value of SAR (measured) = 4.71 W/kg



0 dB = 4.66 W/kg = 6.69 dBW/kg

Attachment 3. – SAR Tissue Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Harts grove.

Ingredients (% by weight)			Frequency (MHz)									
	750		835		1 750		1 900		2 450 – 2 700		5 200 - 5 800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	41.1	51.7	40.45	53.06	52.6	68.8	54.9	70.17	71.88	73.2	65.52	78.66
Salt (NaCl)	1.4	0.9	1.45	0.94	0.4	0.2	0.18	0.39	0.16	0.1	0.0	0.0
Sugar	57.0	47.2	57.0	44.9	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
HEC	0.2	0	1.0	1.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Bactericide	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.97	0.0	17.24	10.67
DGBE	0.0	0.0	0.0	0.0	47	31	44.92	29.44	7.99	26.7	0.0	0.0
Diethylene glycol hexyl ether	-	-	-	-	-	-	-	-	-	-	-	-

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M 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		

Composition of the Tissue Equivalent Matter

Attachment 4. – SAR SYSTEM VALIDATION

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

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

SAR System No.	Probe	Probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
8	3968	EX3DV4	Head	2600	1106	2018-02-08	38.7	1.95	PASS	PASS	PASS	TDD	PASS	NA
9	3968	EX3DV4	Body	2600	1106	2017-12-28	52.7	2.12	PASS	PASS	PASS	TDD	PASS	NA

SAR System Validation Summary 1g

Note;

All measurement were performed using probes calibrated for CW signal only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to KDB 865664 D01v01r04.

Attachment 5. – Probe Calibration Data

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 **HCT (Dymstec)** Certificate No: **EX3-3968_May17**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3968

Calibration procedure(s) QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: May 31, 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
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02525)	Apr-18
Reference 20 dB Attenuator	SN: S5277 (20x)	07-Apr-17 (No. 217-02528)	Apr-18
Reference Probe ES3DV2	SN: 3013	31-Dec-16 (No. ES3-3013_Dec16)	Dec-17
DAE4	SN: 660	7-Dec-16 (No. DAE4-660_Dec16)	Dec-17
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

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

Issued: May 31, 2017

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:3968

Manufactured: September 30, 2013
Calibrated: May 31, 2017

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

EX3DV4– SN:3968 May 31, 2017

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.34	0.33	0.41	± 10.1 %
DCP (mV)[B]	105.3	103.7	101.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	166.8	±2.7 %
		Y	0.0	0.0	1.0		167.0	
		Z	0.0	0.0	1.0		162.8	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	38.91	285.0	34.75	14.00	1.299	4.917	0.303	0.332	1.002
Y	38.40	282.5	34.90	12.77	1.162	4.935	0.244	0.361	1.003
Z	27.87	209.3	36.27	12.33	1.412	4.946	0.00	0.285	1.004

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

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

EX3DV4– SN:3968 May 31, 2017

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

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)
600	42.7	0.88	10.91	10.91	10.91	0.10	1.10	± 13.3 %
750	41.9	0.89	10.78	10.78	10.78	0.58	0.80	± 12.0 %
835	41.5	0.90	10.55	10.55	10.55	0.51	0.80	± 12.0 %
900	41.5	0.97	10.23	10.23	10.23	0.50	0.80	± 12.0 %
1450	40.5	1.20	9.14	9.14	9.14	0.39	0.80	± 12.0 %
1750	40.1	1.37	9.06	9.06	9.06	0.43	0.85	± 12.0 %
1900	40.0	1.40	8.66	8.66	8.66	0.43	0.80	± 12.0 %
2450	39.2	1.80	7.95	7.95	7.95	0.37	0.91	± 12.0 %
2600	39.0	1.96	7.72	7.72	7.72	0.42	0.93	± 12.0 %
5250	35.9	4.71	5.49	5.49	5.49	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.90	4.90	4.90	0.40	1.80	± 13.1 %
5750	35.4	5.22	5.07	5.07	5.07	0.40	1.80	± 13.1 %

[F] 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:3968 May 31, 2017

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

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)
600	56.1	0.95	10.81	10.81	10.81	0.09	1.10	± 13.3 %
750	55.5	0.96	10.57	10.57	10.57	0.46	0.80	± 12.0 %
835	55.2	0.97	10.15	10.15	10.15	0.45	0.88	± 12.0 %
1750	53.4	1.49	8.54	8.54	8.54	0.44	0.84	± 12.0 %
1900	53.3	1.52	8.19	8.19	8.19	0.40	0.80	± 12.0 %
2450	52.7	1.95	8.05	8.05	8.05	0.43	0.90	± 12.0 %
2600	52.5	2.16	7.87	7.87	7.87	0.32	0.98	± 12.0 %
5250	48.9	5.36	4.90	4.90	4.90	0.40	1.90	± 13.1 %
5600	48.5	5.77	4.18	4.18	4.18	0.45	1.90	± 13.1 %
5750	48.3	5.94	4.28	4.28	4.28	0.50	1.90	± 13.1 %

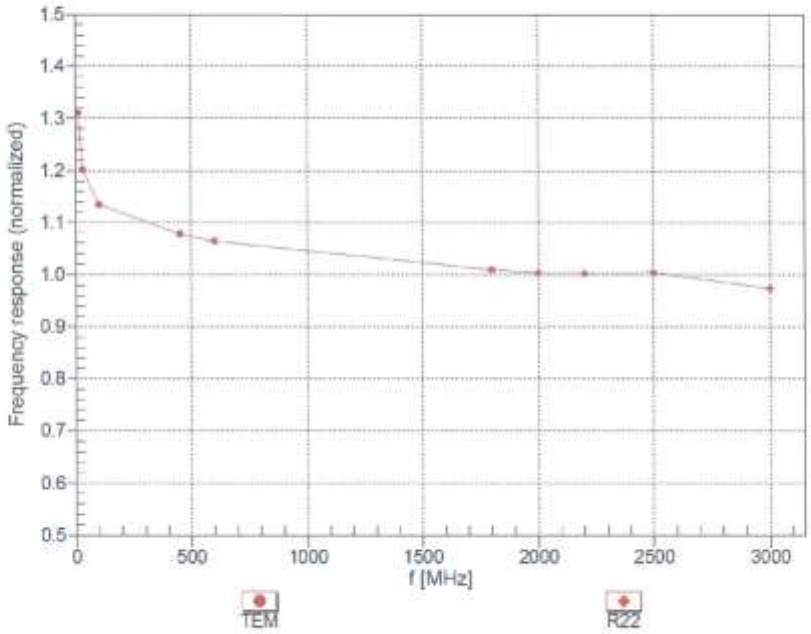
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz 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:3968 May 31, 2017

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

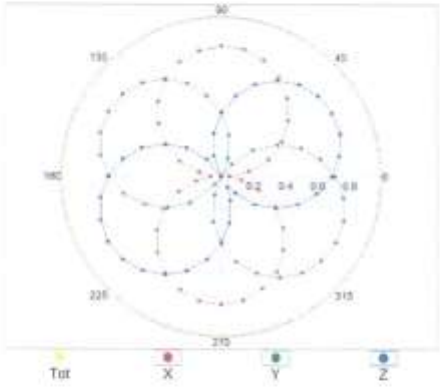


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

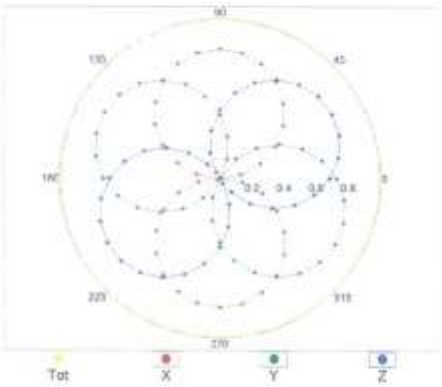
EX3DV4– SN:3968 May 31, 2017

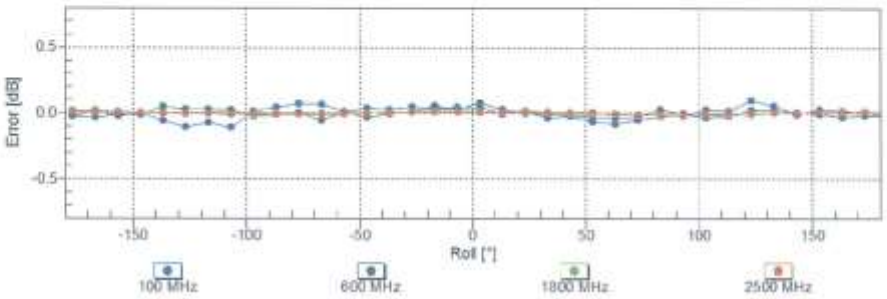
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

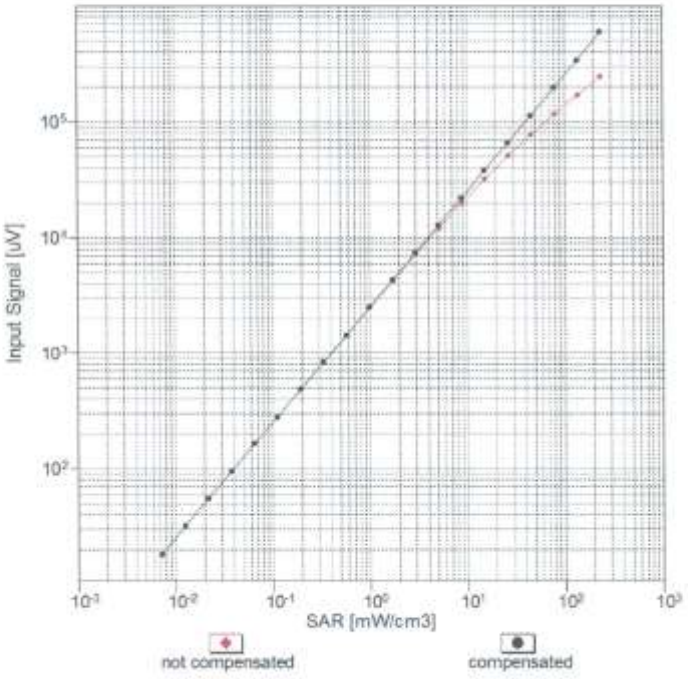


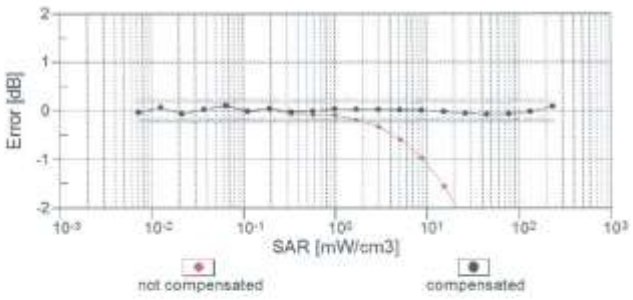


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:3968 May 31, 2017

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



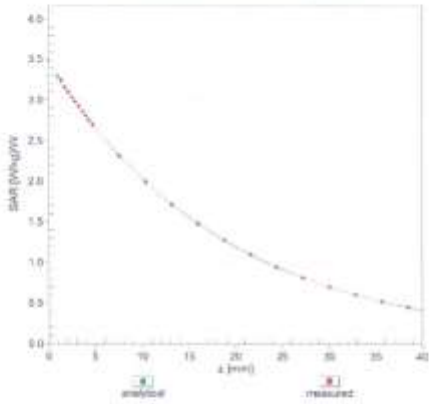


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

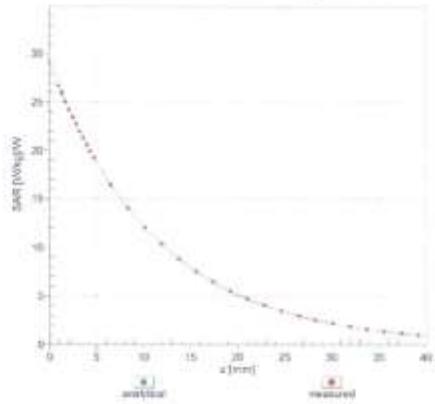
EX3DV4– SN:3968 May 31, 2017

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

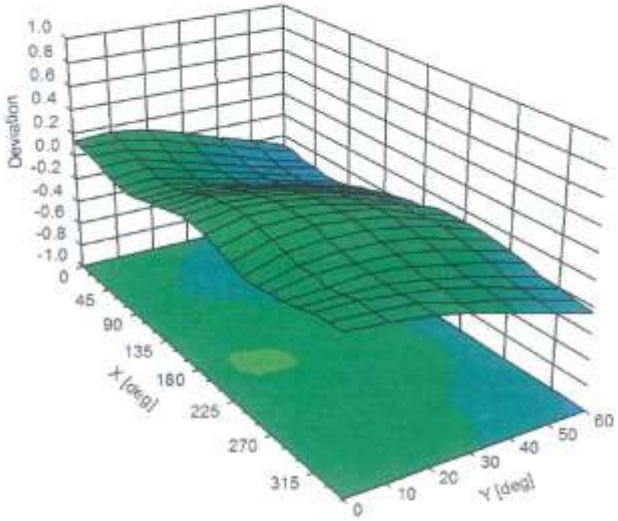


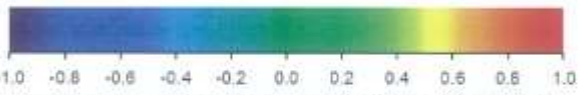
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	63.1
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

EX3DV4- SN:3968 May 31, 2017

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	166.8	± 2.7 %
		Y	0.00	0.00	1.00		167.0	
		Z	0.00	0.00	1.00		162.8	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	2.67	65.27	10.31	10.00	20.0	± 9.6 %
		Y	2.64	65.46	10.40		20.0	
		Z	3.46	68.69	12.53		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	2.04	81.42	22.42	0.00	150.0	± 9.6 %
		Y	1.40	74.05	19.02		150.0	
		Z	2.07	81.87	22.38		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.29	66.65	17.30	0.41	150.0	± 9.6 %
		Y	1.23	65.47	16.42		150.0	
		Z	1.30	66.68	17.29		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.76	66.97	17.12	1.46	150.0	± 9.6 %
		Y	4.74	66.83	17.01		150.0	
		Z	4.66	67.38	17.36		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	5.21	73.16	14.67	9.39	50.0	± 9.6 %
		Y	6.15	75.66	15.67		50.0	
		Z	13.17	86.61	20.51		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	4.93	72.26	14.53	9.57	50.0	± 9.6 %
		Y	5.58	74.24	15.34		50.0	
		Z	9.65	82.17	19.03		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	4.50	73.46	13.82	6.56	60.0	± 9.6 %
		Y	6.18	77.37	15.27		60.0	
		Z	100.00	110.63	25.27		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	5.90	76.91	27.81	12.57	50.0	± 9.6 %
		Y	3.94	66.02	22.20		50.0	
		Z	8.17	86.75	33.07		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	9.94	90.70	30.72	9.56	60.0	± 9.6 %
		Y	8.23	86.52	29.19		60.0	
		Z	9.07	90.03	31.36		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	8.90	81.45	15.73	4.80	80.0	± 9.6 %
		Y	26.42	92.49	18.83		80.0	
		Z	100.00	110.93	24.58		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	104.11	20.79	3.55	100.0	± 9.6 %
		Y	100.00	105.45	21.29		100.0	
		Z	100.00	113.44	24.98		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	6.40	81.85	26.45	7.80	80.0	± 9.6 %
		Y	5.60	79.03	25.33		80.0	
		Z	5.92	81.05	26.87		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	3.52	71.63	12.55	5.30	70.0	± 9.6 %
		Y	4.51	74.62	13.71		70.0	
		Z	83.47	106.60	23.34		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	100.00	104.21	19.69	1.88	100.0	± 9.6 %
		Y	100.00	105.19	20.02		100.0	
		Z	100.00	116.94	25.06		100.0	

EX3DV4– SN:3968 May 31, 2017

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	100.00	116.57	23.84	1.17	100.0	± 9.6 %
		Y	100.00	115.60	23.40		100.0	
		Z	100.00	139.46	33.13		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	4.53	75.57	16.99	5.30	70.0	± 9.6 %
		Y	4.36	75.57	17.12		70.0	
		Z	4.63	75.58	16.67		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	3.55	77.24	16.84	1.88	100.0	± 9.6 %
		Y	2.72	74.13	15.70		100.0	
		Z	2.99	74.09	14.52		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	3.85	80.24	17.98	1.17	100.0	± 9.6 %
		Y	2.43	74.53	15.87		100.0	
		Z	3.13	76.10	15.07		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	5.07	77.22	17.66	5.30	70.0	± 9.6 %
		Y	4.89	77.31	17.83		70.0	
		Z	5.15	77.15	17.32		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	3.16	75.93	16.35	1.88	100.0	± 9.6 %
		Y	2.48	73.10	15.28		100.0	
		Z	2.53	72.37	13.88		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	4.08	81.32	18.49	1.17	100.0	± 9.6 %
		Y	2.50	75.14	16.23		100.0	
		Z	3.35	77.15	15.58		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	100.00	127.95	31.45	0.00	150.0	± 9.6 %
		Y	26.45	108.25	26.43		150.0	
		Z	100.00	116.70	25.69		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	3.92	70.88	12.92	7.78	50.0	± 9.6 %
		Y	4.53	72.92	13.76		50.0	
		Z	15.64	88.11	19.60		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.00	116.31	1.84	0.00	150.0	± 9.6 %
		Y	0.00	105.81	1.81		150.0	
		Z	0.03	60.00	41768.38		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	4.84	68.58	14.54	13.80	25.0	± 9.6 %
		Y	5.18	69.74	15.02		25.0	
		Z	6.81	73.79	17.39		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	4.93	71.14	14.34	10.79	40.0	± 9.6 %
		Y	5.27	72.36	14.86		40.0	
		Z	7.31	77.25	17.52		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	6.42	75.87	17.61	9.03	50.0	± 9.6 %
		Y	6.65	76.85	18.08		50.0	
		Z	7.13	77.78	18.49		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.93	77.31	24.05	6.55	100.0	± 9.6 %
		Y	4.44	75.18	23.16		100.0	
		Z	4.62	76.59	24.40		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.36	68.02	17.83	0.61	110.0	± 9.6 %
		Y	1.28	66.56	16.85		110.0	
		Z	1.38	68.08	17.88		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	100.00	135.52	34.61	1.30	110.0	± 9.6 %
		Y	37.24	120.78	31.25		110.0	
		Z	100.00	139.93	36.67		110.0	

EX3DV4– SN:3968 May 31, 2017

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	4.03	84.42	22.84	2.04	110.0	± 9.6 %
		Y	2.88	79.06	20.91		110.0	
		Z	4.10	85.58	23.75		110.0	
10062-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.60	67.19	16.81	0.49	100.0	± 9.6 %
		Y	4.58	67.01	16.66		100.0	
		Z	4.46	67.43	16.92		100.0	
10063-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.60	67.23	16.85	0.72	100.0	± 9.6 %
		Y	4.58	67.06	16.70		100.0	
		Z	4.47	67.53	17.00		100.0	
10064-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.85	67.38	16.99	0.86	100.0	± 9.6 %
		Y	4.83	67.21	16.85		100.0	
		Z	4.68	67.63	17.12		100.0	
10065-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.71	67.19	17.00	1.21	100.0	± 9.6 %
		Y	4.69	67.03	16.87		100.0	
		Z	4.56	67.43	17.15		100.0	
10066-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.72	67.14	17.09	1.46	100.0	± 9.6 %
		Y	4.69	66.98	16.96		100.0	
		Z	4.56	67.38	17.23		100.0	
10067-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	4.99	67.29	17.45	2.04	100.0	± 9.6 %
		Y	4.97	67.15	17.34		100.0	
		Z	4.83	67.60	17.63		100.0	
10068-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.02	67.19	17.54	2.55	100.0	± 9.6 %
		Y	5.00	67.04	17.43		100.0	
		Z	4.90	67.61	17.81		100.0	
10069-CAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.09	67.20	17.71	2.67	100.0	± 9.6 %
		Y	5.07	67.05	17.60		100.0	
		Z	4.94	67.57	17.94		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.84	66.98	17.32	1.99	100.0	± 9.6 %
		Y	4.83	66.84	17.21		100.0	
		Z	4.76	67.44	17.60		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.81	67.24	17.47	2.30	100.0	± 9.6 %
		Y	4.79	67.08	17.36		100.0	
		Z	4.72	67.65	17.75		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.87	67.38	17.72	2.83	100.0	± 9.6 %
		Y	4.85	67.21	17.60		100.0	
		Z	4.82	67.94	18.09		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.88	67.30	17.82	3.30	100.0	± 9.6 %
		Y	4.86	67.13	17.71		100.0	
		Z	4.87	68.01	18.27		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	4.92	67.37	18.05	3.82	90.0	± 9.6 %
		Y	4.89	67.17	17.93		90.0	
		Z	4.93	68.08	18.51		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	4.96	67.24	18.19	4.15	90.0	± 9.6 %
		Y	4.93	67.04	18.07		90.0	
		Z	4.98	68.00	18.69		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	4.99	67.33	18.28	4.30	90.0	± 9.6 %
		Y	4.96	67.12	18.17		90.0	
		Z	5.03	68.14	18.82		90.0	

EX3DV4– SN:3968 May 31, 2017

10081-CAB	CDMA2000 (1xRTT, RC3)	X	68.67	125.16	30.28	0.00	150.0	± 9.6 %
		Y	1.87	77.92	17.29		150.0	
		Z	28.98	104.13	22.27		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.89	60.00	4.78	4.77	80.0	± 9.6 %
		Y	0.66	57.32	2.78		80.0	
		Z	0.87	60.00	5.11		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	4.44	73.28	13.76	6.56	60.0	± 9.6 %
		Y	6.04	77.10	15.19		60.0	
		Z	100.00	110.63	25.29		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	2.55	74.94	19.44	0.00	150.0	± 9.6 %
		Y	2.23	72.22	18.02		150.0	
		Z	2.84	77.31	19.86		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	2.51	74.99	19.48	0.00	150.0	± 9.6 %
		Y	2.18	72.20	18.01		150.0	
		Z	2.80	77.36	19.91		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	9.97	90.71	30.71	9.56	60.0	± 9.6 %
		Y	8.26	86.55	29.18		60.0	
		Z	9.10	90.06	31.36		60.0	
10100-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	3.76	74.65	19.15	0.00	150.0	± 9.6 %
		Y	3.44	72.90	18.25		150.0	
		Z	3.41	73.56	18.91		150.0	
10101-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.40	69.35	17.20	0.00	150.0	± 9.6 %
		Y	3.30	68.65	16.74		150.0	
		Z	3.24	69.00	17.13		150.0	
10102-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.49	69.24	17.24	0.00	150.0	± 9.6 %
		Y	3.41	68.62	16.82		150.0	
		Z	3.33	68.95	17.17		150.0	
10103-CAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.09	74.44	19.37	3.98	65.0	± 9.6 %
		Y	5.86	73.97	19.23		65.0	
		Z	6.05	75.35	20.19		65.0	
10104-CAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.32	73.41	19.75	3.98	65.0	± 9.6 %
		Y	6.08	72.80	19.51		65.0	
		Z	6.09	73.52	20.07		65.0	
10105-CAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	5.87	71.91	19.40	3.98	65.0	± 9.6 %
		Y	5.72	71.55	19.26		65.0	
		Z	5.72	72.17	19.76		65.0	
10108-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	3.27	74.13	19.15	0.00	150.0	± 9.6 %
		Y	2.99	72.32	18.18		150.0	
		Z	2.99	73.55	19.04		150.0	
10109-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	3.09	69.75	17.36	0.00	150.0	± 9.6 %
		Y	2.98	68.90	16.81		150.0	
		Z	2.94	69.71	17.28		150.0	
10110-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.75	74.22	19.20	0.00	150.0	± 9.6 %
		Y	2.46	71.96	18.00		150.0	
		Z	2.59	74.44	19.15		150.0	
10111-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	3.10	72.77	18.57	0.00	150.0	± 9.6 %
		Y	2.90	71.37	17.76		150.0	
		Z	3.06	73.60	18.47		150.0	

EX3DV4- SN:3968 May 31, 2017

10112-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	3.21	69.66	17.35	0.00	150.0	± 9.6 %
		Y	3.10	68.88	16.84		150.0	
		Z	3.06	69.73	17.30		150.0	
10113-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	3.24	72.71	18.58	0.00	150.0	± 9.6 %
		Y	3.05	71.45	17.84		150.0	
		Z	3.18	73.49	18.44		150.0	
10114-CAB	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.10	67.80	16.95	0.00	150.0	± 9.6 %
		Y	5.07	67.60	16.78		150.0	
		Z	4.95	67.75	17.03		150.0	
10115-CAB	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.34	67.80	16.94	0.00	150.0	± 9.6 %
		Y	5.31	67.63	16.79		150.0	
		Z	5.18	67.81	17.03		150.0	
10116-CAB	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.19	68.00	16.97	0.00	150.0	± 9.6 %
		Y	5.16	67.80	16.80		150.0	
		Z	5.02	67.94	17.05		150.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.08	67.72	16.93	0.00	150.0	± 9.6 %
		Y	5.05	67.54	16.76		150.0	
		Z	4.92	67.62	16.99		150.0	
10118-CAB	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.41	67.97	17.03	0.00	150.0	± 9.6 %
		Y	5.38	67.80	16.87		150.0	
		Z	5.24	67.98	17.12		150.0	
10119-CAB	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.18	67.97	16.97	0.00	150.0	± 9.6 %
		Y	5.15	67.78	16.80		150.0	
		Z	5.03	67.97	17.07		150.0	
10140-CAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.52	69.25	17.15	0.00	150.0	± 9.6 %
		Y	3.43	68.61	16.72		150.0	
		Z	3.35	69.02	17.10		150.0	
10141-CAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.64	69.34	17.30	0.00	150.0	± 9.6 %
		Y	3.56	68.75	16.90		150.0	
		Z	3.48	69.20	17.28		150.0	
10142-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	2.87	76.71	19.74	0.00	150.0	± 9.6 %
		Y	2.39	73.30	18.07		150.0	
		Z	2.84	77.56	19.40		150.0	
10143-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	3.59	76.68	19.32	0.00	150.0	± 9.6 %
		Y	3.09	73.98	18.00		150.0	
		Z	3.47	76.63	18.17		150.0	
10144-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.58	70.43	16.00	0.00	150.0	± 9.6 %
		Y	2.34	68.71	15.02		150.0	
		Z	2.11	68.46	13.98		150.0	
10145-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	1.80	71.43	14.14	0.00	150.0	± 9.6 %
		Y	1.22	66.46	11.71		150.0	
		Z	0.59	60.37	6.54		150.0	
10146-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.30	63.14	9.02	0.00	150.0	± 9.6 %
		Y	1.23	62.47	8.58		150.0	
		Z	0.74	60.00	5.47		150.0	
10147-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	1.47	64.42	9.80	0.00	150.0	± 9.6 %
		Y	1.35	63.41	9.19		150.0	
		Z	0.75	60.00	5.53		150.0	

10149-CAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	3.10	69.85	17.43	0.00	150.0	± 9.6 %
		Y	2.99	68.99	16.87		150.0	
		Z	2.95	69.81	17.34		150.0	
10150-CAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	3.22	69.74	17.41	0.00	150.0	± 9.6 %
		Y	3.12	68.97	16.90		150.0	
		Z	3.07	69.82	17.36		150.0	
10151-CAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.61	77.26	20.48	3.98	65.0	± 9.6 %
		Y	6.23	76.49	20.24		65.0	
		Z	6.65	78.63	21.37		65.0	
10152-CAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	5.81	73.18	19.23	3.98	65.0	± 9.6 %
		Y	5.56	72.52	18.96		65.0	
		Z	5.58	73.31	19.36		65.0	
10153-CAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	6.26	74.38	20.12	3.98	65.0	± 9.6 %
		Y	6.00	73.76	19.89		65.0	
		Z	6.04	74.64	20.30		65.0	
10154-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.88	75.05	19.63	0.00	150.0	± 9.6 %
		Y	2.56	72.71	18.40		150.0	
		Z	2.69	75.11	19.49		150.0	
10155-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	3.10	72.81	18.60	0.00	150.0	± 9.6 %
		Y	2.90	71.40	17.79		150.0	
		Z	3.08	73.70	18.53		150.0	
10156-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	3.13	79.40	20.43	0.00	150.0	± 9.6 %
		Y	2.38	74.57	18.24		150.0	
		Z	3.10	79.69	19.48		150.0	
10157-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	2.76	73.09	16.84	0.00	150.0	± 9.6 %
		Y	2.33	70.29	15.42		150.0	
		Z	1.97	69.03	13.65		150.0	
10158-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	3.26	72.85	18.66	0.00	150.0	± 9.6 %
		Y	3.07	71.58	17.92		150.0	
		Z	3.21	73.68	18.54		150.0	
10159-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	3.01	74.12	17.33	0.00	150.0	± 9.6 %
		Y	2.51	71.14	15.85		150.0	
		Z	2.07	69.37	13.82		150.0	
10160-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	3.13	72.38	18.51	0.00	150.0	± 9.6 %
		Y	2.93	71.01	17.72		150.0	
		Z	2.96	72.46	18.52		150.0	
10161-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	3.13	69.90	17.42	0.00	150.0	± 9.6 %
		Y	3.02	69.07	16.87		150.0	
		Z	2.98	70.05	17.29		150.0	
10162-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	3.25	70.07	17.52	0.00	150.0	± 9.6 %
		Y	3.14	69.26	16.99		150.0	
		Z	3.10	70.32	17.43		150.0	
10166-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.33	69.90	19.53	3.01	150.0	± 9.6 %
		Y	3.29	69.40	19.18		150.0	
		Z	2.92	68.78	19.45		150.0	
10167-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	4.00	72.90	20.01	3.01	150.0	± 9.6 %
		Y	3.89	72.10	19.55		150.0	
		Z	3.29	71.42	19.88		150.0	

EX3DV4– SN:3968 May 31, 2017

10168-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.63	76.13	21.82	3.01	150.0	± 9.6 %
		Y	4.52	75.41	21.43		150.0	
		Z	3.72	74.32	21.63		150.0	
10169-CAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	2.65	68.33	18.90	3.01	150.0	± 9.6 %
		Y	2.63	67.83	18.51		150.0	
		Z	2.39	66.76	18.51		150.0	
10170-CAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	3.56	74.73	21.63	3.01	150.0	± 9.6 %
		Y	3.49	73.90	21.15		150.0	
		Z	2.83	71.38	20.67		150.0	
10171-AAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	2.85	69.97	18.42	3.01	150.0	± 9.6 %
		Y	2.78	69.08	17.86		150.0	
		Z	2.41	67.99	18.00		150.0	
10172-CAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	5.00	80.18	23.19	6.02	65.0	± 9.6 %
		Y	4.48	78.21	22.53		65.0	
		Z	4.20	78.93	23.75		65.0	
10173-CAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	7.13	83.28	22.36	6.02	65.0	± 9.6 %
		Y	6.38	81.79	22.03		65.0	
		Z	5.93	83.17	23.46		65.0	
10174-CAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	5.18	77.63	19.84	6.02	65.0	± 9.6 %
		Y	3.87	73.57	18.53		65.0	
		Z	4.51	78.07	21.06		65.0	
10175-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.61	68.01	18.63	3.01	150.0	± 9.6 %
		Y	2.60	67.49	18.23		150.0	
		Z	2.37	66.53	18.29		150.0	
10176-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	3.56	74.76	21.64	3.01	150.0	± 9.6 %
		Y	3.49	73.93	21.16		150.0	
		Z	2.83	71.40	20.68		150.0	
10177-CAF	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.63	68.16	18.72	3.01	150.0	± 9.6 %
		Y	2.62	67.64	18.33		150.0	
		Z	2.38	66.62	18.35		150.0	
10178-CAD	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	3.53	74.54	21.53	3.01	150.0	± 9.6 %
		Y	3.46	73.70	21.03		150.0	
		Z	2.82	71.31	20.62		150.0	
10179-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.17	72.23	19.90	3.01	150.0	± 9.6 %
		Y	3.09	71.29	19.33		150.0	
		Z	2.60	69.67	19.26		150.0	
10180-CAD	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	2.84	69.91	18.37	3.01	150.0	± 9.6 %
		Y	2.78	69.02	17.81		150.0	
		Z	2.41	67.97	17.96		150.0	
10181-CAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.63	68.14	18.72	3.01	150.0	± 9.6 %
		Y	2.61	67.62	18.32		150.0	
		Z	2.38	66.61	18.35		150.0	
10182-CAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	3.52	74.52	21.51	3.01	150.0	± 9.6 %
		Y	3.45	73.67	21.01		150.0	
		Z	2.82	71.28	20.60		150.0	
10183-AAB	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	2.84	69.89	18.36	3.01	150.0	± 9.6 %
		Y	2.77	68.99	17.80		150.0	
		Z	2.41	67.95	17.97		150.0	

EX3DV4– SN:3968 May 31, 2017

10184-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	2.64	68.18	18.74	3.01	150.0	± 9.6 %
		Y	2.62	67.67	18.35		150.0	
		Z	2.39	66.64	18.36		150.0	
10185-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	3.54	74.60	21.56	3.01	150.0	± 9.6 %
		Y	3.47	73.75	21.06		150.0	
		Z	2.83	71.35	20.64		150.0	
10186-AAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	2.85	69.96	18.40	3.01	150.0	± 9.6 %
		Y	2.78	69.06	17.83		150.0	
		Z	2.42	68.00	18.00		150.0	
10187-CAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	2.65	68.25	18.82	3.01	150.0	± 9.6 %
		Y	2.63	67.74	18.42		150.0	
		Z	2.40	66.72	18.45		150.0	
10188-CAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	3.66	75.34	21.98	3.01	150.0	± 9.6 %
		Y	3.60	74.54	21.51		150.0	
		Z	2.89	71.81	20.95		150.0	
10189-AAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	2.92	70.41	18.71	3.01	150.0	± 9.6 %
		Y	2.85	69.50	18.14		150.0	
		Z	2.45	68.32	18.25		150.0	
10193-CAB	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.52	67.52	16.76	0.00	150.0	± 9.6 %
		Y	4.48	67.29	16.56		150.0	
		Z	4.37	67.78	16.83		150.0	
10194-CAB	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.67	67.77	16.88	0.00	150.0	± 9.6 %
		Y	4.64	67.54	16.68		150.0	
		Z	4.49	67.92	16.94		150.0	
10195-CAB	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.71	67.79	16.89	0.00	150.0	± 9.6 %
		Y	4.67	67.56	16.69		150.0	
		Z	4.51	67.88	16.93		150.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.51	67.54	16.76	0.00	150.0	± 9.6 %
		Y	4.48	67.31	16.56		150.0	
		Z	4.35	67.73	16.79		150.0	
10197-CAB	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.68	67.78	16.88	0.00	150.0	± 9.6 %
		Y	4.65	67.55	16.69		150.0	
		Z	4.49	67.91	16.94		150.0	
10198-CAB	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.70	67.79	16.89	0.00	150.0	± 9.6 %
		Y	4.67	67.57	16.70		150.0	
		Z	4.50	67.87	16.93		150.0	
10219-CAB	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.47	67.60	16.75	0.00	150.0	± 9.6 %
		Y	4.43	67.36	16.54		150.0	
		Z	4.31	67.83	16.81		150.0	
10220-CAB	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.67	67.74	16.87	0.00	150.0	± 9.6 %
		Y	4.64	67.51	16.67		150.0	
		Z	4.48	67.86	16.92		150.0	
10221-CAB	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.71	67.71	16.87	0.00	150.0	± 9.6 %
		Y	4.68	67.49	16.68		150.0	
		Z	4.52	67.82	16.91		150.0	
10222-CAB	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	5.05	67.71	16.91	0.00	150.0	± 9.6 %
		Y	5.03	67.52	16.75		150.0	
		Z	4.90	67.64	16.98		150.0	

EX3DV4– SN:3968 May 31, 2017

10223-CAB	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.32	67.86	16.99	0.00	150.0	± 9.6 %
		Y	5.30	67.68	16.83		150.0	
		Z	5.10	67.66	16.98		150.0	
10224-CAB	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.10	67.84	16.91	0.00	150.0	± 9.6 %
		Y	5.07	67.64	16.74		150.0	
		Z	4.95	67.80	16.99		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.93	68.25	16.51	0.00	150.0	± 9.6 %
		Y	2.84	67.58	16.02		150.0	
		Z	2.78	68.41	15.93		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	7.54	84.28	22.80	6.02	65.0	± 9.6 %
		Y	6.75	82.79	22.48		65.0	
		Z	6.25	84.16	23.89		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	6.92	81.86	21.35	6.02	65.0	± 9.6 %
		Y	6.37	80.91	21.22		65.0	
		Z	5.81	82.09	22.53		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	6.62	85.29	25.06	6.02	65.0	± 9.6 %
		Y	5.62	82.48	24.18		65.0	
		Z	5.19	83.13	25.38		65.0	
10229-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	7.18	83.37	22.40	6.02	65.0	± 9.6 %
		Y	6.43	81.89	22.07		65.0	
		Z	5.96	83.24	23.49		65.0	
10230-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	6.58	81.03	20.98	6.02	65.0	± 9.6 %
		Y	6.06	80.07	20.84		65.0	
		Z	5.52	81.20	22.15		65.0	
10231-CAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	6.33	84.43	24.68	6.02	65.0	± 9.6 %
		Y	5.39	81.67	23.80		65.0	
		Z	5.00	82.33	25.01		65.0	
10232-CAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	7.17	83.35	22.40	6.02	65.0	± 9.6 %
		Y	6.42	81.87	22.07		65.0	
		Z	5.95	83.23	23.49		65.0	
10233-CAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	6.56	81.01	20.98	6.02	65.0	± 9.6 %
		Y	6.04	80.05	20.84		65.0	
		Z	5.51	81.18	22.15		65.0	
10234-CAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	6.09	83.61	24.26	6.02	65.0	± 9.6 %
		Y	5.21	80.93	23.40		65.0	
		Z	4.86	81.70	24.66		65.0	
10235-CAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	7.17	83.38	22.40	6.02	65.0	± 9.6 %
		Y	6.42	81.89	22.07		65.0	
		Z	5.96	83.26	23.50		65.0	
10236-CAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	6.61	81.10	21.01	6.02	65.0	± 9.6 %
		Y	6.09	80.13	20.86		65.0	
		Z	5.55	81.29	22.18		65.0	
10237-CAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	6.34	84.47	24.69	6.02	65.0	± 9.6 %
		Y	5.39	81.70	23.81		65.0	
		Z	5.00	82.36	25.03		65.0	
10238-CAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	7.15	83.33	22.39	6.02	65.0	± 9.6 %
		Y	6.40	81.85	22.06		65.0	
		Z	5.94	83.21	23.48		65.0	

EX3DV4– SN:3968 May 31, 2017

10239-CAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	6.55	80.98	20.97	6.02	65.0	± 9.6 %
		Y	6.03	80.02	20.83		65.0	
		Z	5.49	81.16	22.14		65.0	
10240-CAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	6.32	84.44	24.68	6.02	65.0	± 9.6 %
		Y	5.38	81.67	23.80		65.0	
		Z	4.99	82.36	25.02		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	7.54	79.78	23.89	6.98	65.0	± 9.6 %
		Y	7.12	78.68	23.50		65.0	
		Z	7.29	81.76	25.37		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	6.65	77.35	22.83	6.98	65.0	± 9.6 %
		Y	6.39	76.59	22.56		65.0	
		Z	6.46	79.39	24.36		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	5.60	74.76	22.64	6.98	65.0	± 9.6 %
		Y	5.39	73.91	22.28		65.0	
		Z	5.48	76.41	24.04		65.0	
10244-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	3.97	68.56	13.68	3.98	65.0	± 9.6 %
		Y	3.88	68.47	13.69		65.0	
		Z	2.96	65.44	11.23		65.0	
10245-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	3.92	68.19	13.46	3.98	65.0	± 9.6 %
		Y	3.83	68.09	13.47		65.0	
		Z	2.93	65.12	11.02		65.0	
10246-CAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	4.09	72.00	15.70	3.98	65.0	± 9.6 %
		Y	3.87	71.55	15.57		65.0	
		Z	3.03	68.36	13.27		65.0	
10247-CAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	4.48	70.89	16.01	3.98	65.0	± 9.6 %
		Y	4.29	70.48	15.86		65.0	
		Z	3.71	68.56	14.08		65.0	
10248-CAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	4.46	70.46	15.82	3.98	65.0	± 9.6 %
		Y	4.28	70.04	15.66		65.0	
		Z	3.64	67.99	13.80		65.0	
10249-CAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	5.68	77.13	18.91	3.98	65.0	± 9.6 %
		Y	5.27	76.33	18.67		65.0	
		Z	4.90	75.49	17.78		65.0	
10250-CAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	5.88	75.29	19.89	3.98	65.0	± 9.6 %
		Y	5.60	74.67	19.68		65.0	
		Z	5.60	75.21	19.60		65.0	
10251-CAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	5.51	73.06	18.59	3.98	65.0	± 9.6 %
		Y	5.25	72.42	18.34		65.0	
		Z	5.09	72.51	18.03		65.0	
10252-CAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.68	79.38	21.06	3.98	65.0	± 9.6 %
		Y	6.19	78.37	20.75		65.0	
		Z	6.73	80.63	21.61		65.0	
10253-CAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	5.72	72.77	18.98	3.98	65.0	± 9.6 %
		Y	5.48	72.14	18.73		65.0	
		Z	5.49	72.91	18.99		65.0	
10254-CAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	6.11	73.81	19.75	3.98	65.0	± 9.6 %
		Y	5.86	73.21	19.52		65.0	
		Z	5.86	73.96	19.75		65.0	

EX3DV4– SN:3968 May 31, 2017

10255-CAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.37	76.83	20.48	3.98	65.0	± 9.6 %
		Y	6.01	76.03	20.21		65.0	
		Z	6.39	78.07	21.20		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	2.99	64.96	10.83	3.98	65.0	± 9.6 %
		Y	2.92	64.89	10.83		65.0	
		Z	2.22	62.40	8.44		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	2.97	64.63	10.57	3.98	65.0	± 9.6 %
		Y	2.90	64.54	10.57		65.0	
		Z	2.21	62.15	8.20		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	2.91	67.08	12.50	3.98	65.0	± 9.6 %
		Y	2.79	66.85	12.43		65.0	
		Z	2.13	63.74	9.80		65.0	
10259-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	5.01	72.58	17.44	3.98	65.0	± 9.6 %
		Y	4.79	72.08	17.26		65.0	
		Z	4.39	71.02	16.07		65.0	
10260-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	5.04	72.34	17.34	3.98	65.0	± 9.6 %
		Y	4.82	71.86	17.17		65.0	
		Z	4.39	70.72	15.92		65.0	
10261-CAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	5.86	77.47	19.56	3.98	65.0	± 9.6 %
		Y	5.44	76.58	19.28		65.0	
		Z	5.45	77.05	19.07		65.0	
10262-CAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	5.86	75.21	19.83	3.98	65.0	± 9.6 %
		Y	5.58	74.59	19.62		65.0	
		Z	5.57	75.10	19.53		65.0	
10263-CAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	5.50	73.03	18.58	3.98	65.0	± 9.6 %
		Y	5.24	72.40	18.33		65.0	
		Z	5.08	72.49	18.02		65.0	
10264-CAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.61	79.16	20.96	3.98	65.0	± 9.6 %
		Y	6.12	78.16	20.64		65.0	
		Z	6.64	80.39	21.49		65.0	
10265-CAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	5.81	73.19	19.23	3.98	65.0	± 9.6 %
		Y	5.56	72.52	18.97		65.0	
		Z	5.58	73.32	19.37		65.0	
10266-CAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	6.25	74.36	20.11	3.98	65.0	± 9.6 %
		Y	5.99	73.74	19.87		65.0	
		Z	6.03	74.63	20.29		65.0	
10267-CAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.59	77.22	20.46	3.98	65.0	± 9.6 %
		Y	6.22	76.45	20.22		65.0	
		Z	6.64	78.58	21.35		65.0	
10268-CAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	6.49	73.39	19.85	3.98	65.0	± 9.6 %
		Y	6.26	72.83	19.63		65.0	
		Z	6.27	73.63	20.18		65.0	
10269-CAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.49	73.06	19.76	3.98	65.0	± 9.6 %
		Y	6.26	72.51	19.54		65.0	
		Z	6.29	73.33	20.07		65.0	
10270-CAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.52	75.03	19.84	3.98	65.0	± 9.6 %
		Y	6.26	74.48	19.66		65.0	
		Z	6.50	76.04	20.64		65.0	

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.83	69.40	16.84	0.00	150.0	± 9.6 %
		Y	2.72	68.44	16.21		150.0	
		Z	2.77	69.99	16.52		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel6.4)	X	2.37	76.27	19.94	0.00	150.0	± 9.6 %
		Y	1.96	72.56	18.08		150.0	
		Z	2.42	77.27	20.03		150.0	
10277-CAA	PHS (QPSK)	X	2.52	61.59	7.17	9.03	50.0	± 9.6 %
		Y	2.39	61.33	6.95		50.0	
		Z	2.48	61.77	7.29		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	3.57	65.95	11.54	9.03	50.0	± 9.6 %
		Y	3.51	66.04	11.58		50.0	
		Z	3.35	64.91	10.65		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	3.64	66.13	11.67	9.03	50.0	± 9.6 %
		Y	3.57	66.21	11.72		50.0	
		Z	3.38	64.97	10.72		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	28.93	109.20	26.52	0.00	150.0	± 9.6 %
		Y	3.08	79.96	17.95		150.0	
		Z	2.21	75.33	14.40		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	37.67	117.33	28.53	0.00	150.0	± 9.6 %
		Y	1.72	76.79	16.85		150.0	
		Z	12.13	95.30	20.16		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	100.00	137.32	34.35	0.00	150.0	± 9.6 %
		Y	100.00	132.22	32.19		150.0	
		Z	100.00	124.89	28.34		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	100.00	143.15	37.02	0.00	150.0	± 9.6 %
		Y	100.00	137.89	34.78		150.0	
		Z	100.00	132.58	31.71		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	7.26	76.93	18.86	9.03	50.0	± 9.6 %
		Y	7.41	77.59	19.20		50.0	
		Z	12.74	84.07	20.73		50.0	
10297-AAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	3.30	74.32	19.25	0.00	150.0	± 9.6 %
		Y	3.02	72.49	18.28		150.0	
		Z	3.01	73.73	19.14		150.0	
10298-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	3.48	80.92	19.41	0.00	150.0	± 9.6 %
		Y	2.06	73.13	16.18		150.0	
		Z	1.48	69.53	13.10		150.0	
10299-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.32	69.41	13.38	0.00	150.0	± 9.6 %
		Y	2.01	67.41	12.36		150.0	
		Z	1.09	62.15	8.23		150.0	
10300-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.48	63.38	9.67	0.00	150.0	± 9.6 %
		Y	1.43	62.86	9.30		150.0	
		Z	0.87	59.93	6.20		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.58	66.01	17.79	4.17	50.0	± 9.6 %
		Y	4.57	65.86	17.62		50.0	
		Z	4.64	67.36	18.12		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.06	66.60	18.47	4.96	50.0	± 9.6 %
		Y	5.01	66.28	18.21		50.0	
		Z	5.06	67.60	18.66		50.0	

EX3DV4– SN:3968 May 31, 2017

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.83	66.30	18.31	4.96	50.0	± 9.6 %
		Y	4.78	65.96	18.04		50.0	
		Z	4.88	67.53	18.55		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.65	66.26	17.89	4.17	50.0	± 9.6 %
		Y	4.60	65.95	17.63		50.0	
		Z	4.67	67.39	18.08		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.64	69.67	20.36	6.02	35.0	± 9.6 %
		Y	4.49	68.76	19.76		35.0	
		Z	5.52	73.70	21.11		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.74	67.70	19.59	6.02	35.0	± 9.6 %
		Y	4.65	67.17	19.19		35.0	
		Z	5.13	70.44	20.25		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.67	67.99	19.62	6.02	35.0	± 9.6 %
		Y	4.57	67.39	19.18		35.0	
		Z	5.10	70.79	20.28		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.67	68.31	19.82	6.02	35.0	± 9.6 %
		Y	4.56	67.65	19.36		35.0	
		Z	5.15	71.28	20.56		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.77	67.81	19.69	6.02	35.0	± 9.6 %
		Y	4.68	67.26	19.28		35.0	
		Z	5.12	70.46	20.33		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.71	67.86	19.62	6.02	35.0	± 9.6 %
		Y	4.62	67.30	19.21		35.0	
		Z	5.14	70.74	20.36		35.0	
10311-AAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	3.69	73.06	18.59	0.00	150.0	± 9.6 %
		Y	3.41	71.48	17.76		150.0	
		Z	3.35	72.16	18.40		150.0	
10313-AAA	iDEN 1:3	X	3.19	69.59	14.03	6.99	70.0	± 9.6 %
		Y	3.06	69.62	14.17		70.0	
		Z	3.95	73.55	16.44		70.0	
10314-AAA	iDEN 1:6	X	4.34	74.73	18.66	10.00	30.0	± 9.6 %
		Y	4.44	75.75	19.25		30.0	
		Z	5.90	80.62	21.70		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	1.21	67.12	17.72	0.17	150.0	± 9.6 %
		Y	1.16	65.82	16.72		150.0	
		Z	1.23	67.09	17.63		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.51	67.28	16.67	0.17	150.0	± 9.6 %
		Y	4.49	67.07	16.49		150.0	
		Z	4.36	67.48	16.75		150.0	
10317-AAB	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.51	67.28	16.67	0.17	150.0	± 9.6 %
		Y	4.49	67.07	16.49		150.0	
		Z	4.36	67.48	16.75		150.0	
10400-AAC	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.64	67.79	16.86	0.00	150.0	± 9.6 %
		Y	4.60	67.54	16.65		150.0	
		Z	4.41	67.81	16.87		150.0	
10401-AAC	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.28	67.49	16.76	0.00	150.0	± 9.6 %
		Y	5.25	67.30	16.59		150.0	
		Z	5.12	67.47	16.84		150.0	

EX3DV4– SN:3968 May 31, 2017

10402-AAC	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.60	67.98	16.88	0.00	150.0	± 9.6 %
		Y	5.58	67.81	16.73		150.0	
		Z	5.46	67.90	16.96		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	28.93	109.20	26.52	0.00	115.0	± 9.6 %
		Y	3.08	79.96	17.95		115.0	
		Z	2.21	75.33	14.40		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	28.93	109.20	26.52	0.00	115.0	± 9.6 %
		Y	3.08	79.96	17.95		115.0	
		Z	2.21	75.33	14.40		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	100.00	125.52	31.37	0.00	100.0	± 9.6 %
		Y	100.00	124.20	30.84		100.0	
		Z	100.00	128.01	31.68		100.0	
10410-AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.07	80.58	17.68	3.23	80.0	± 9.6 %
		Y	4.32	79.23	17.48		80.0	
		Z	10.97	94.77	23.32		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.12	66.35	17.40	0.00	150.0	± 9.6 %
		Y	1.08	65.14	16.40		150.0	
		Z	1.14	66.31	17.26		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.51	67.52	16.83	0.00	150.0	± 9.6 %
		Y	4.48	67.29	16.63		150.0	
		Z	4.35	67.67	16.87		150.0	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.51	67.52	16.83	0.00	150.0	± 9.6 %
		Y	4.48	67.29	16.63		150.0	
		Z	4.35	67.67	16.87		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.52	67.76	16.90	0.00	150.0	± 9.6 %
		Y	4.48	67.51	16.69		150.0	
		Z	4.35	67.95	16.98		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.53	67.67	16.87	0.00	150.0	± 9.6 %
		Y	4.50	67.43	16.67		150.0	
		Z	4.36	67.85	16.94		150.0	
10422-AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.63	67.60	16.85	0.00	150.0	± 9.6 %
		Y	4.60	67.38	16.66		150.0	
		Z	4.45	67.76	16.92		150.0	
10423-AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.77	67.88	16.94	0.00	150.0	± 9.6 %
		Y	4.74	67.65	16.75		150.0	
		Z	4.56	67.99	16.99		150.0	
10424-AAA	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.70	67.85	16.94	0.00	150.0	± 9.6 %
		Y	4.67	67.62	16.74		150.0	
		Z	4.50	67.93	16.97		150.0	
10425-AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.29	67.89	16.98	0.00	150.0	± 9.6 %
		Y	5.27	67.71	16.82		150.0	
		Z	5.11	67.80	17.03		150.0	
10426-AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.30	67.95	17.01	0.00	150.0	± 9.6 %
		Y	5.28	67.77	16.85		150.0	
		Z	5.16	68.01	17.13		150.0	

EX3DV4– SN:3968 May 31, 2017

10427-AAA	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.29	67.81	16.94	0.00	150.0	± 9.6 %
		Y	5.26	67.63	16.77		150.0	
		Z	5.11	67.74	17.00		150.0	
10430-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	5.05	75.77	20.50	0.00	150.0	± 9.6 %
		Y	5.01	75.52	20.30		150.0	
		Z	5.26	77.59	20.50		150.0	
10431-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.21	68.46	16.96	0.00	150.0	± 9.6 %
		Y	4.15	68.11	16.69		150.0	
		Z	3.98	68.69	16.84		150.0	
10432-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.49	68.06	16.95	0.00	150.0	± 9.6 %
		Y	4.44	67.79	16.72		150.0	
		Z	4.28	68.23	16.96		150.0	
10433-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.72	67.89	16.96	0.00	150.0	± 9.6 %
		Y	4.68	67.66	16.76		150.0	
		Z	4.52	67.98	17.00		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	5.66	78.13	20.93	0.00	150.0	± 9.6 %
		Y	5.55	77.68	20.64		150.0	
		Z	5.82	79.40	20.42		150.0	
10435-AAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.77	79.73	17.34	3.23	80.0	± 9.6 %
		Y	4.12	78.53	17.19		80.0	
		Z	9.86	93.17	22.80		80.0	
10447-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.59	69.14	16.44	0.00	150.0	± 9.6 %
		Y	3.48	68.49	15.99		150.0	
		Z	3.25	68.82	15.52		150.0	
10448-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	4.07	68.28	16.85	0.00	150.0	± 9.6 %
		Y	4.01	67.91	16.57		150.0	
		Z	3.87	68.53	16.75		150.0	
10449-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.32	67.94	16.88	0.00	150.0	± 9.6 %
		Y	4.28	67.65	16.65		150.0	
		Z	4.14	68.10	16.89		150.0	
10450-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.51	67.71	16.85	0.00	150.0	± 9.6 %
		Y	4.48	67.46	16.64		150.0	
		Z	4.34	67.79	16.88		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.49	69.42	16.00	0.00	150.0	± 9.6 %
		Y	3.35	68.60	15.46		150.0	
		Z	2.95	68.04	14.36		150.0	
10456-AAA	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.21	68.40	17.09	0.00	150.0	± 9.6 %
		Y	6.19	68.25	16.96		150.0	
		Z	6.42	69.29	17.68		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.81	66.18	16.56	0.00	150.0	± 9.6 %
		Y	3.79	65.98	16.36		150.0	
		Z	3.76	66.54	16.65		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.17	68.04	14.87	0.00	150.0	± 9.6 %
		Y	3.04	67.24	14.33		150.0	
		Z	2.32	64.70	11.78		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	4.29	66.38	15.98	0.00	150.0	± 9.6 %
		Y	4.06	65.37	15.37		150.0	
		Z	3.61	64.80	14.10		150.0	

EX3DV4– SN:3968 May 31, 2017

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	2.58	90.05	26.41	0.00	150.0	± 9.6 %
		Y	1.45	78.32	21.49		150.0	
		Z	2.79	91.24	26.54		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.12	76.58	17.21	3.29	80.0	± 9.6 %
		Y	2.41	73.81	16.46		80.0	
		Z	10.41	96.12	24.53		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.87	60.00	7.19	3.23	80.0	± 9.6 %
		Y	0.86	60.00	7.41		80.0	
		Z	0.75	60.00	7.65		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.89	60.00	6.68	3.23	80.0	± 9.6 %
		Y	0.88	60.00	6.89		80.0	
		Z	0.76	60.00	7.01		80.0	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.08	71.38	14.72	3.23	80.0	± 9.6 %
		Y	1.78	69.87	14.37		80.0	
		Z	6.21	88.00	21.46		80.0	
10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.87	60.00	7.13	3.23	80.0	± 9.6 %
		Y	0.86	60.00	7.35		80.0	
		Z	0.75	60.00	7.60		80.0	
10466-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.90	60.00	6.64	3.23	80.0	± 9.6 %
		Y	0.88	60.00	6.85		80.0	
		Z	0.76	60.00	6.97		80.0	
10467-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.21	72.14	15.04	3.23	80.0	± 9.6 %
		Y	1.86	70.47	14.64		80.0	
		Z	7.28	90.21	22.16		80.0	
10468-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.87	60.00	7.15	3.23	80.0	± 9.6 %
		Y	0.86	60.00	7.36		80.0	
		Z	0.75	60.00	7.62		80.0	
10469-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.89	60.00	6.64	3.23	80.0	± 9.6 %
		Y	0.88	60.00	6.85		80.0	
		Z	0.76	60.00	6.98		80.0	
10470-AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.20	72.13	15.02	3.23	80.0	± 9.6 %
		Y	1.86	70.46	14.63		80.0	
		Z	7.38	90.41	22.21		80.0	
10471-AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.87	60.00	7.13	3.23	80.0	± 9.6 %
		Y	0.86	60.00	7.35		80.0	
		Z	0.75	60.00	7.61		80.0	
10472-AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.89	60.00	6.62	3.23	80.0	± 9.6 %
		Y	0.88	60.00	6.83		80.0	
		Z	0.76	60.00	6.96		80.0	
10473-AAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.20	72.08	15.00	3.23	80.0	± 9.6 %
		Y	1.85	70.42	14.61		80.0	
		Z	7.31	90.27	22.17		80.0	
10474-AAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.87	60.00	7.13	3.23	80.0	± 9.6 %
		Y	0.86	60.00	7.35		80.0	
		Z	0.75	60.00	7.61		80.0	
10475-AAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.89	60.00	6.62	3.23	80.0	± 9.6 %
		Y	0.88	60.00	6.83		80.0	
		Z	0.76	60.00	6.96		80.0	

10477-AAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	0.87	60.00	7.11	3.23	80.0	± 9.6 %
		Y	0.86	60.00	7.33		80.0	
		Z	0.75	60.00	7.58		80.0	
10478-AAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	0.89	60.00	6.61	3.23	80.0	± 9.6 %
		Y	0.88	60.00	6.82		80.0	
		Z	0.76	60.00	6.95		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.13	79.55	19.37	3.23	80.0	± 9.6 %
		Y	4.22	77.09	18.60		80.0	
		Z	21.65	102.19	26.38		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.66	67.78	13.04	3.23	80.0	± 9.6 %
		Y	2.55	67.43	12.98		80.0	
		Z	2.99	70.98	14.03		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.13	64.99	11.45	3.23	80.0	± 9.6 %
		Y	2.09	64.87	11.48		80.0	
		Z	1.84	65.40	11.31		80.0	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.32	68.30	14.02	2.23	80.0	± 9.6 %
		Y	2.01	66.66	13.30		80.0	
		Z	1.48	63.65	10.80		80.0	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.07	63.78	11.13	2.23	80.0	± 9.6 %
		Y	1.98	63.38	10.95		80.0	
		Z	1.30	60.00	8.01		80.0	
10484-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.03	63.37	10.93	2.23	80.0	± 9.6 %
		Y	1.95	63.00	10.76		80.0	
		Z	1.32	60.00	7.99		80.0	
10485-AAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.25	72.90	17.20	2.23	80.0	± 9.6 %
		Y	2.75	70.63	16.28		80.0	
		Z	3.15	72.97	16.56		80.0	
10486-AAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.82	67.74	14.41	2.23	80.0	± 9.6 %
		Y	2.59	66.65	13.89		80.0	
		Z	2.10	64.72	12.00		80.0	
10487-AAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.80	67.30	14.19	2.23	80.0	± 9.6 %
		Y	2.58	66.29	13.71		80.0	
		Z	2.07	64.20	11.71		80.0	
10488-AAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.62	72.90	18.33	2.23	80.0	± 9.6 %
		Y	3.22	71.10	17.57		80.0	
		Z	3.69	74.34	18.95		80.0	
10489-AAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.46	69.30	16.80	2.23	80.0	± 9.6 %
		Y	3.24	68.32	16.33		80.0	
		Z	3.42	70.03	16.82		80.0	
10490-AAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.53	69.11	16.73	2.23	80.0	± 9.6 %
		Y	3.33	68.19	16.29		80.0	
		Z	3.45	69.69	16.65		80.0	
10491-AAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.79	71.27	17.94	2.23	80.0	± 9.6 %
		Y	3.50	70.00	17.38		80.0	
		Z	3.72	72.09	18.48		80.0	
10492-AAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.79	68.57	16.95	2.23	80.0	± 9.6 %
		Y	3.61	67.82	16.59		80.0	
		Z	3.70	69.13	17.15		80.0	

10493-AAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.84	68.43	16.90	2.23	80.0	± 9.6 %
		Y	3.68	67.71	16.55		80.0	
		Z	3.73	68.93	17.04		80.0	
10494-AAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.11	72.66	18.38	2.23	80.0	± 9.6 %
		Y	3.74	71.19	17.76		80.0	
		Z	4.03	73.42	19.00		80.0	
10495-AAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.82	68.90	17.17	2.23	80.0	± 9.6 %
		Y	3.64	68.12	16.79		80.0	
		Z	3.74	69.38	17.45		80.0	
10496-AAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.90	68.65	17.10	2.23	80.0	± 9.6 %
		Y	3.73	67.93	16.75		80.0	
		Z	3.80	69.14	17.36		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.35	62.07	9.89	2.23	80.0	± 9.6 %
		Y	1.26	61.45	9.55		80.0	
		Z	1.00	60.00	7.36		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.29	60.00	7.73	2.23	80.0	± 9.6 %
		Y	1.28	60.00	7.70		80.0	
		Z	1.19	60.00	6.08		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.31	60.00	7.59	2.23	80.0	± 9.6 %
		Y	1.30	60.00	7.56		80.0	
		Z	1.22	60.00	5.90		80.0	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.38	72.81	17.64	2.23	80.0	± 9.6 %
		Y	2.93	70.77	16.79		80.0	
		Z	3.45	73.92	17.65		80.0	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.15	68.71	15.47	2.23	80.0	± 9.6 %
		Y	2.91	67.62	14.97		80.0	
		Z	2.74	67.51	14.14		80.0	
10502-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.18	68.47	15.30	2.23	80.0	± 9.6 %
		Y	2.94	67.44	14.82		80.0	
		Z	2.71	67.08	13.86		80.0	
10503-AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.57	72.66	18.22	2.23	80.0	± 9.6 %
		Y	3.17	70.88	17.47		80.0	
		Z	3.63	74.08	18.82		80.0	
10504-AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.44	69.18	16.73	2.23	80.0	± 9.6 %
		Y	3.22	68.21	16.26		80.0	
		Z	3.39	69.89	16.74		80.0	
10505-AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.51	69.00	16.66	2.23	80.0	± 9.6 %
		Y	3.30	68.08	16.22		80.0	
		Z	3.42	69.56	16.58		80.0	
10506-AAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.07	72.49	18.29	2.23	80.0	± 9.6 %
		Y	3.70	71.04	17.68		80.0	
		Z	3.99	73.25	18.92		80.0	
10507-AAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.80	68.83	17.12	2.23	80.0	± 9.6 %
		Y	3.63	68.04	16.75		80.0	
		Z	3.72	69.31	17.41		80.0	

EX3DV4– SN:3968 May 31, 2017

10508-AAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.88	68.57	17.05	2.23	80.0	± 9.6 %
		Y	3.71	67.85	16.70		80.0	
		Z	3.78	69.05	17.31		80.0	
10509-AAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.38	71.20	17.84	2.23	80.0	± 9.6 %
		Y	4.10	70.16	17.39		80.0	
		Z	4.26	71.62	18.37		80.0	
10510-AAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.27	68.48	17.16	2.23	80.0	± 9.6 %
		Y	4.11	67.85	16.86		80.0	
		Z	4.13	68.66	17.43		80.0	
10511-AAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.33	68.26	17.11	2.23	80.0	± 9.6 %
		Y	4.18	67.68	16.82		80.0	
		Z	4.20	68.49	17.38		80.0	
10512-AAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.57	72.57	18.24	2.23	80.0	± 9.6 %
		Y	4.21	71.30	17.71		80.0	
		Z	4.41	72.82	18.74		80.0	
10513-AAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.16	68.68	17.24	2.23	80.0	± 9.6 %
		Y	4.00	68.00	16.92		80.0	
		Z	4.03	68.78	17.51		80.0	
10514-AAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.19	68.31	17.14	2.23	80.0	± 9.6 %
		Y	4.04	67.69	16.84		80.0	
		Z	4.07	68.43	17.40		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	1.10	66.90	17.70	0.00	150.0	± 9.6 %
		Y	1.05	65.52	16.60		150.0	
		Z	1.11	66.83	17.54		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	99.99	177.80	50.50	0.00	150.0	± 9.6 %
		Y	1.87	94.13	28.28		150.0	
		Z	15.95	138.93	41.89		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	1.12	73.13	20.66	0.00	150.0	± 9.6 %
		Y	0.98	69.56	18.47		150.0	
		Z	1.11	72.41	20.24		150.0	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.51	67.64	16.83	0.00	150.0	± 9.6 %
		Y	4.48	67.40	16.62		150.0	
		Z	4.35	67.84	16.89		150.0	
10519-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.66	67.79	16.90	0.00	150.0	± 9.6 %
		Y	4.63	67.56	16.70		150.0	
		Z	4.47	67.95	16.95		150.0	
10520-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.53	67.79	16.85	0.00	150.0	± 9.6 %
		Y	4.49	67.54	16.64		150.0	
		Z	4.34	67.91	16.89		150.0	
10521-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.46	67.79	16.86	0.00	150.0	± 9.6 %
		Y	4.42	67.53	16.64		150.0	
		Z	4.27	67.84	16.86		150.0	
10522-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.52	67.91	16.95	0.00	150.0	± 9.6 %
		Y	4.48	67.65	16.73		150.0	
		Z	4.29	67.87	16.90		150.0	

10523-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.44	67.91	16.87	0.00	150.0	± 9.6 %
		Y	4.40	67.64	16.65		150.0	
		Z	4.28	68.14	16.98		150.0	
10524-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.47	67.86	16.93	0.00	150.0	± 9.6 %
		Y	4.43	67.60	16.72		150.0	
		Z	4.26	67.97	16.98		150.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.50	66.97	16.56	0.00	150.0	± 9.6 %
		Y	4.46	66.72	16.34		150.0	
		Z	4.34	67.16	16.63		150.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.64	67.28	16.68	0.00	150.0	± 9.6 %
		Y	4.59	67.02	16.46		150.0	
		Z	4.43	67.37	16.72		150.0	
10527-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.57	67.28	16.64	0.00	150.0	± 9.6 %
		Y	4.53	67.01	16.42		150.0	
		Z	4.38	67.39	16.69		150.0	
10528-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.58	67.29	16.66	0.00	150.0	± 9.6 %
		Y	4.54	67.02	16.44		150.0	
		Z	4.39	67.38	16.71		150.0	
10529-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.58	67.29	16.66	0.00	150.0	± 9.6 %
		Y	4.54	67.02	16.44		150.0	
		Z	4.39	67.38	16.71		150.0	
10531-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.56	67.36	16.67	0.00	150.0	± 9.6 %
		Y	4.51	67.07	16.44		150.0	
		Z	4.34	67.37	16.67		150.0	
10532-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.44	67.24	16.62	0.00	150.0	± 9.6 %
		Y	4.39	66.95	16.39		150.0	
		Z	4.24	67.27	16.63		150.0	
10533-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.60	67.38	16.68	0.00	150.0	± 9.6 %
		Y	4.55	67.11	16.45		150.0	
		Z	4.40	67.52	16.74		150.0	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.10	67.10	16.58	0.00	150.0	± 9.6 %
		Y	5.07	66.89	16.41		150.0	
		Z	4.94	67.03	16.64		150.0	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.16	67.26	16.66	0.00	150.0	± 9.6 %
		Y	5.12	67.04	16.48		150.0	
		Z	4.97	67.13	16.69		150.0	
10536-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	5.05	67.29	16.66	0.00	150.0	± 9.6 %
		Y	5.02	67.07	16.47		150.0	
		Z	4.87	67.16	16.69		150.0	
10537-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.10	67.23	16.63	0.00	150.0	± 9.6 %
		Y	5.07	67.02	16.45		150.0	
		Z	4.96	67.24	16.73		150.0	
10538-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.17	67.18	16.64	0.00	150.0	± 9.6 %
		Y	5.14	66.97	16.46		150.0	
		Z	4.98	67.06	16.67		150.0	
10540-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.10	67.17	16.65	0.00	150.0	± 9.6 %
		Y	5.07	66.96	16.48		150.0	
		Z	4.92	67.03	16.68		150.0	

EX3DV4– SN:3968 May 31, 2017

10541-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.08	67.07	16.59	0.00	150.0	± 9.6 %
		Y	5.05	66.86	16.41		150.0	
		Z	4.92	67.00	16.64		150.0	
10542-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.23	67.13	16.63	0.00	150.0	± 9.6 %
		Y	5.20	66.94	16.46		150.0	
		Z	5.05	67.04	16.67		150.0	
10543-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.29	67.14	16.65	0.00	150.0	± 9.6 %
		Y	5.26	66.96	16.49		150.0	
		Z	5.12	67.14	16.75		150.0	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.43	67.12	16.52	0.00	150.0	± 9.6 %
		Y	5.40	66.93	16.36		150.0	
		Z	5.30	66.95	16.56		150.0	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.61	67.53	16.68	0.00	150.0	± 9.6 %
		Y	5.58	67.34	16.52		150.0	
		Z	5.47	67.44	16.77		150.0	
10546-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.47	67.27	16.56	0.00	150.0	± 9.6 %
		Y	5.44	67.07	16.40		150.0	
		Z	5.32	67.06	16.58		150.0	
10547-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.54	67.33	16.59	0.00	150.0	± 9.6 %
		Y	5.51	67.14	16.43		150.0	
		Z	5.46	67.39	16.75		150.0	
10548-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.71	68.04	16.91	0.00	150.0	± 9.6 %
		Y	5.68	67.82	16.74		150.0	
		Z	5.50	67.68	16.87		150.0	
10550-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.52	67.38	16.63	0.00	150.0	± 9.6 %
		Y	5.49	67.20	16.48		150.0	
		Z	5.45	67.53	16.83		150.0	
10551-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.48	67.26	16.54	0.00	150.0	± 9.6 %
		Y	5.45	67.06	16.37		150.0	
		Z	5.30	66.98	16.53		150.0	
10552-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.45	67.24	16.53	0.00	150.0	± 9.6 %
		Y	5.42	67.05	16.37		150.0	
		Z	5.31	67.13	16.59		150.0	
10553-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.50	67.19	16.53	0.00	150.0	± 9.6 %
		Y	5.47	67.00	16.37		150.0	
		Z	5.34	67.00	16.55		150.0	
10554-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.84	67.40	16.56	0.00	150.0	± 9.6 %
		Y	5.82	67.23	16.41		150.0	
		Z	5.74	67.21	16.59		150.0	
10555-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.95	67.66	16.66	0.00	150.0	± 9.6 %
		Y	5.92	67.47	16.51		150.0	
		Z	5.81	67.40	16.67		150.0	
10556-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.98	67.74	16.70	0.00	150.0	± 9.6 %
		Y	5.95	67.56	16.55		150.0	
		Z	5.88	67.60	16.76		150.0	
10557-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.94	67.62	16.66	0.00	150.0	± 9.6 %
		Y	5.91	67.45	16.51		150.0	
		Z	5.81	67.39	16.67		150.0	

10558-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	5.97	67.74	16.73	0.00	150.0	± 9.6 %
		Y	5.94	67.55	16.58		150.0	
		Z	5.78	67.33	16.66		150.0	
10560-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	5.97	67.61	16.71	0.00	150.0	± 9.6 %
		Y	5.94	67.44	16.56		150.0	
		Z	5.81	67.31	16.69		150.0	
10561-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.90	67.59	16.73	0.00	150.0	± 9.6 %
		Y	5.87	67.42	16.58		150.0	
		Z	5.75	67.31	16.72		150.0	
10562-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	5.97	67.83	16.85	0.00	150.0	± 9.6 %
		Y	5.94	67.63	16.69		150.0	
		Z	5.79	67.44	16.78		150.0	
10563-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.04	67.69	16.74	0.00	150.0	± 9.6 %
		Y	6.02	67.52	16.60		150.0	
		Z	5.93	67.56	16.81		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.80	67.49	16.83	0.46	150.0	± 9.6 %
		Y	4.77	67.28	16.64		150.0	
		Z	4.63	67.66	16.91		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	5.01	67.93	17.15	0.46	150.0	± 9.6 %
		Y	4.98	67.73	16.98		150.0	
		Z	4.81	68.06	17.21		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.85	67.77	16.97	0.46	150.0	± 9.6 %
		Y	4.81	67.56	16.79		150.0	
		Z	4.65	67.87	17.03		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.90	68.26	17.40	0.46	150.0	± 9.6 %
		Y	4.87	68.07	17.23		150.0	
		Z	4.70	68.33	17.45		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.73	67.45	16.67	0.46	150.0	± 9.6 %
		Y	4.70	67.21	16.47		150.0	
		Z	4.51	67.41	16.65		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.88	68.50	17.53	0.46	150.0	± 9.6 %
		Y	4.86	68.30	17.37		150.0	
		Z	4.72	68.70	17.66		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.89	68.25	17.42	0.46	150.0	± 9.6 %
		Y	4.86	68.06	17.25		150.0	
		Z	4.68	68.36	17.49		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.29	67.25	17.52	0.46	130.0	± 9.6 %
		Y	1.22	65.91	16.56		130.0	
		Z	1.30	67.30	17.53		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.32	68.20	18.07	0.46	130.0	± 9.6 %
		Y	1.25	66.70	17.04		130.0	
		Z	1.34	68.20	18.06		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	100.00	157.88	43.29	0.46	130.0	± 9.6 %
		Y	12.33	118.14	33.50		130.0	
		Z	100.00	159.43	44.14		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	2.02	80.96	24.00	0.46	130.0	± 9.6 %
		Y	1.63	76.18	21.71		130.0	
		Z	1.89	79.55	23.50		130.0	

EX3DV4- SN:3968 May 31, 2017

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.55	67.14	16.73	0.46	130.0	± 9.6 %
		Y	4.53	66.95	16.56		130.0	
		Z	4.40	67.34	16.81		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.59	67.37	16.84	0.46	130.0	± 9.6 %
		Y	4.56	67.18	16.67		130.0	
		Z	4.44	67.63	16.95		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.76	67.60	16.98	0.46	130.0	± 9.6 %
		Y	4.73	67.42	16.81		130.0	
		Z	4.58	67.82	17.07		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.68	67.83	17.14	0.46	130.0	± 9.6 %
		Y	4.65	67.64	16.97		130.0	
		Z	4.50	68.03	17.23		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.41	66.91	16.31	0.46	130.0	± 9.6 %
		Y	4.38	66.67	16.11		130.0	
		Z	4.23	67.00	16.35		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.44	66.95	16.32	0.46	130.0	± 9.6 %
		Y	4.41	66.71	16.12		130.0	
		Z	4.23	66.96	16.31		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.59	67.94	17.12	0.46	130.0	± 9.6 %
		Y	4.56	67.73	16.94		130.0	
		Z	4.44	68.22	17.27		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.33	66.63	16.06	0.46	130.0	± 9.6 %
		Y	4.30	66.38	15.85		130.0	
		Z	4.14	66.74	16.11		130.0	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.55	67.14	16.73	0.46	130.0	± 9.6 %
		Y	4.53	66.95	16.56		130.0	
		Z	4.40	67.34	16.81		130.0	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.59	67.37	16.84	0.46	130.0	± 9.6 %
		Y	4.56	67.18	16.67		130.0	
		Z	4.44	67.63	16.95		130.0	
10585-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.76	67.60	16.98	0.46	130.0	± 9.6 %
		Y	4.73	67.42	16.81		130.0	
		Z	4.58	67.82	17.07		130.0	
10586-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.68	67.83	17.14	0.46	130.0	± 9.6 %
		Y	4.65	67.64	16.97		130.0	
		Z	4.50	68.03	17.23		130.0	
10587-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.41	66.91	16.31	0.46	130.0	± 9.6 %
		Y	4.38	66.67	16.11		130.0	
		Z	4.23	67.00	16.35		130.0	
10588-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.44	66.95	16.32	0.46	130.0	± 9.6 %
		Y	4.41	66.71	16.12		130.0	
		Z	4.23	66.96	16.31		130.0	
10589-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.59	67.94	17.12	0.46	130.0	± 9.6 %
		Y	4.56	67.73	16.94		130.0	
		Z	4.44	68.22	17.27		130.0	
10590-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.33	66.63	16.06	0.46	130.0	± 9.6 %
		Y	4.30	66.38	15.85		130.0	
		Z	4.14	66.74	16.11		130.0	

EX3DV4– SN:3968 May 31, 2017

10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.71	67.20	16.84	0.46	130.0	± 9.6 %
		Y	4.68	67.03	16.68		130.0	
		Z	4.56	67.44	16.95		130.0	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.84	67.52	16.97	0.46	130.0	± 9.6 %
		Y	4.81	67.34	16.81		130.0	
		Z	4.65	67.68	17.06		130.0	
10593-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.75	67.39	16.82	0.46	130.0	± 9.6 %
		Y	4.73	67.20	16.66		130.0	
		Z	4.58	67.57	16.92		130.0	
10594-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.81	67.59	17.00	0.46	130.0	± 9.6 %
		Y	4.79	67.41	16.84		130.0	
		Z	4.63	67.76	17.10		130.0	
10595-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.78	67.56	16.90	0.46	130.0	± 9.6 %
		Y	4.75	67.37	16.74		130.0	
		Z	4.60	67.75	17.01		130.0	
10596-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.71	67.53	16.90	0.46	130.0	± 9.6 %
		Y	4.68	67.33	16.72		130.0	
		Z	4.52	67.66	16.98		130.0	
10597-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.66	67.40	16.75	0.46	130.0	± 9.6 %
		Y	4.63	67.19	16.57		130.0	
		Z	4.48	67.52	16.82		130.0	
10598-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.66	67.70	17.06	0.46	130.0	± 9.6 %
		Y	4.63	67.50	16.90		130.0	
		Z	4.50	67.86	17.15		130.0	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.35	67.53	16.97	0.46	130.0	± 9.6 %
		Y	5.34	67.40	16.84		130.0	
		Z	5.33	68.01	17.32		130.0	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.45	67.87	17.10	0.46	130.0	± 9.6 %
		Y	5.44	67.72	16.97		130.0	
		Z	5.33	68.04	17.31		130.0	
10601-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.36	67.68	17.03	0.46	130.0	± 9.6 %
		Y	5.35	67.54	16.90		130.0	
		Z	5.29	68.02	17.32		130.0	
10602-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.48	67.77	16.99	0.46	130.0	± 9.6 %
		Y	5.45	67.61	16.84		130.0	
		Z	5.31	67.79	17.11		130.0	
10603-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.56	68.13	17.31	0.46	130.0	± 9.6 %
		Y	5.54	67.96	17.17		130.0	
		Z	5.32	67.91	17.32		130.0	
10604-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.44	67.76	17.11	0.46	130.0	± 9.6 %
		Y	5.42	67.61	16.98		130.0	
		Z	5.22	67.53	17.10		130.0	
10605-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.45	67.78	17.11	0.46	130.0	± 9.6 %
		Y	5.43	67.63	16.97		130.0	
		Z	5.27	67.74	17.21		130.0	
10606-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.21	67.14	16.64	0.46	130.0	± 9.6 %
		Y	5.20	66.99	16.50		130.0	
		Z	5.15	67.48	16.93		130.0	

EX3DV4- SN:3968 May 31, 2017

10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.57	66.63	16.53	0.46	130.0	± 9.6 %
		Y	4.54	66.43	16.36		130.0	
		Z	4.43	66.89	16.66		130.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.72	66.99	16.68	0.46	130.0	± 9.6 %
		Y	4.69	66.78	16.51		130.0	
		Z	4.54	67.15	16.78		130.0	
10609-AAA	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.62	66.82	16.50	0.46	130.0	± 9.6 %
		Y	4.58	66.59	16.32		130.0	
		Z	4.44	66.99	16.60		130.0	
10610-AAA	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.67	67.01	16.68	0.46	130.0	± 9.6 %
		Y	4.64	66.79	16.51		130.0	
		Z	4.49	67.19	16.79		130.0	
10611-AAA	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.58	66.79	16.52	0.46	130.0	± 9.6 %
		Y	4.55	66.56	16.33		130.0	
		Z	4.40	66.94	16.61		130.0	
10612-AAA	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.58	66.92	16.55	0.46	130.0	± 9.6 %
		Y	4.54	66.68	16.36		130.0	
		Z	4.37	67.01	16.62		130.0	
10613-AAA	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.57	66.73	16.40	0.46	130.0	± 9.6 %
		Y	4.53	66.49	16.20		130.0	
		Z	4.37	66.81	16.45		130.0	
10614-AAA	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.55	67.04	16.71	0.46	130.0	± 9.6 %
		Y	4.51	66.82	16.52		130.0	
		Z	4.37	67.15	16.77		130.0	
10615-AAA	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.56	66.56	16.25	0.46	130.0	± 9.6 %
		Y	4.53	66.33	16.05		130.0	
		Z	4.38	66.75	16.35		130.0	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.19	66.85	16.62	0.46	130.0	± 9.6 %
		Y	5.17	66.69	16.48		130.0	
		Z	5.04	66.86	16.74		130.0	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.24	67.01	16.67	0.46	130.0	± 9.6 %
		Y	5.22	66.83	16.53		130.0	
		Z	5.07	66.94	16.76		130.0	
10618-AAA	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.16	67.11	16.75	0.46	130.0	± 9.6 %
		Y	5.13	66.93	16.60		130.0	
		Z	4.98	67.03	16.82		130.0	
10619-AAA	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.15	66.84	16.54	0.46	130.0	± 9.6 %
		Y	5.13	66.66	16.39		130.0	
		Z	5.04	66.98	16.73		130.0	
10620-AAA	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.23	66.84	16.58	0.46	130.0	± 9.6 %
		Y	5.20	66.67	16.44		130.0	
		Z	5.05	66.77	16.66		130.0	
10621-AAA	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.25	67.02	16.81	0.46	130.0	± 9.6 %
		Y	5.23	66.87	16.68		130.0	
		Z	5.08	66.95	16.88		130.0	
10622-AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.25	67.14	16.86	0.46	130.0	± 9.6 %
		Y	5.22	66.98	16.72		130.0	
		Z	5.07	67.05	16.93		130.0	

EX3DV4– SN:3968 May 31, 2017

10623-AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.12	66.62	16.46	0.46	130.0	± 9.6 %
		Y	5.09	66.44	16.31		130.0	
		Z	4.98	66.65	16.57		130.0	
10624-AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.31	66.86	16.64	0.46	130.0	± 9.6 %
		Y	5.29	66.70	16.50		130.0	
		Z	5.15	66.84	16.74		130.0	
10625-AAA	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.46	67.18	16.86	0.46	130.0	± 9.6 %
		Y	5.43	66.99	16.71		130.0	
		Z	5.24	67.04	16.91		130.0	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.50	66.84	16.54	0.46	130.0	± 9.6 %
		Y	5.49	66.69	16.41		130.0	
		Z	5.39	66.76	16.64		130.0	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.73	67.41	16.79	0.46	130.0	± 9.6 %
		Y	5.71	67.26	16.66		130.0	
		Z	5.61	67.41	16.94		130.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.50	66.82	16.42	0.46	130.0	± 9.6 %
		Y	5.48	66.65	16.29		130.0	
		Z	5.37	66.70	16.51		130.0	
10629-AAA	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.58	66.92	16.47	0.46	130.0	± 9.6 %
		Y	5.56	66.77	16.34		130.0	
		Z	5.57	67.23	16.77		130.0	
10630-AAA	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	5.86	67.97	17.00	0.46	130.0	± 9.6 %
		Y	5.83	67.78	16.85		130.0	
		Z	5.63	67.59	16.96		130.0	
10631-AAA	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.85	68.09	17.26	0.46	130.0	± 9.6 %
		Y	5.83	67.94	17.14		130.0	
		Z	5.64	67.78	17.25		130.0	
10632-AAA	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.72	67.59	17.03	0.46	130.0	± 9.6 %
		Y	5.71	67.46	16.92		130.0	
		Z	5.71	67.92	17.34		130.0	
10633-AAA	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.56	67.02	16.57	0.46	130.0	± 9.6 %
		Y	5.54	66.85	16.43		130.0	
		Z	5.38	66.77	16.59		130.0	
10634-AAA	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.57	67.13	16.68	0.46	130.0	± 9.6 %
		Y	5.55	66.98	16.56		130.0	
		Z	5.43	67.04	16.77		130.0	
10635-AAA	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.40	66.27	15.95	0.46	130.0	± 9.6 %
		Y	5.38	66.10	15.80		130.0	
		Z	5.26	66.16	16.04		130.0	
10636-AAA	IEEE 1602.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.92	67.15	16.59	0.46	130.0	± 9.6 %
		Y	5.91	67.02	16.48		130.0	
		Z	5.84	67.05	16.69		130.0	
10637-AAA	IEEE 1602.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.05	67.48	16.74	0.46	130.0	± 9.6 %
		Y	6.03	67.33	16.62		130.0	
		Z	5.94	67.32	16.62		130.0	
10638-AAA	IEEE 1602.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.07	67.51	16.73	0.46	130.0	± 9.6 %
		Y	6.05	67.36	16.61		130.0	
		Z	6.02	67.55	16.90		130.0	

EX3DV4– SN:3968 May 31, 2017

10639-AAA	IEEE 1602.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.03	67.41	16.73	0.46	130.0	± 9.6 %
		Y	6.01	67.27	16.61		130.0	
		Z	5.92	67.26	16.80		130.0	
10640-AAA	IEEE 1602.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.01	67.35	16.64	0.46	130.0	± 9.6 %
		Y	5.99	67.19	16.50		130.0	
		Z	5.84	67.01	16.62		130.0	
10641-AAA	IEEE 1602.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.08	67.33	16.64	0.46	130.0	± 9.6 %
		Y	6.06	67.19	16.52		130.0	
		Z	5.97	67.23	16.75		130.0	
10642-AAA	IEEE 1602.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.12	67.61	16.97	0.46	130.0	± 9.6 %
		Y	6.11	67.48	16.86		130.0	
		Z	5.98	67.36	16.99		130.0	
10643-AAA	IEEE 1602.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.96	67.26	16.67	0.46	130.0	± 9.6 %
		Y	5.94	67.11	16.55		130.0	
		Z	5.82	67.03	16.70		130.0	
10644-AAA	IEEE 1602.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.04	67.53	16.83	0.46	130.0	± 9.6 %
		Y	6.02	67.37	16.70		130.0	
		Z	5.87	67.20	16.81		130.0	
10645-AAA	IEEE 1602.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.15	67.50	16.78	0.46	130.0	± 9.6 %
		Y	6.13	67.36	16.65		130.0	
		Z	6.00	67.29	16.82		130.0	
10646-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	11.81	95.73	30.81	9.30	60.0	± 9.6 %
		Y	9.29	91.01	29.34		60.0	
		Z	8.85	92.75	31.14		60.0	
10647-AAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	10.77	94.53	30.54	9.30	60.0	± 9.6 %
		Y	8.45	89.70	29.01		60.0	
		Z	7.92	91.02	30.68		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	1.41	74.35	15.50	0.00	150.0	± 9.6 %
		Y	0.80	67.01	12.12		150.0	
		Z	0.57	64.32	9.21		150.0	

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

Attachment 6. – Dipole Calibration Data

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

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

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

Accreditation No.: SCS 0108

Client HCT (Dymstec) Certificate No: D2600V2-1106_Dec17

CALIBRATION CERTIFICATE

Object D2600V2 - SN:1106

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

Calibration date: December 15, 2017

결재	담당자	확인자
	2018.01.04	2018.1.4

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

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

Issued: December 18, 2017

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
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, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

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	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.1 ± 6 %	2.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.0 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.0 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**54.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.8 Ω - 8.3 jΩ
Return Loss	- 21.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.7 Ω - 5.9 jΩ
Return Loss	- 21.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 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	February 18, 2015

DASY5 Validation Report for Head TSL

Date: 15.12.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1106

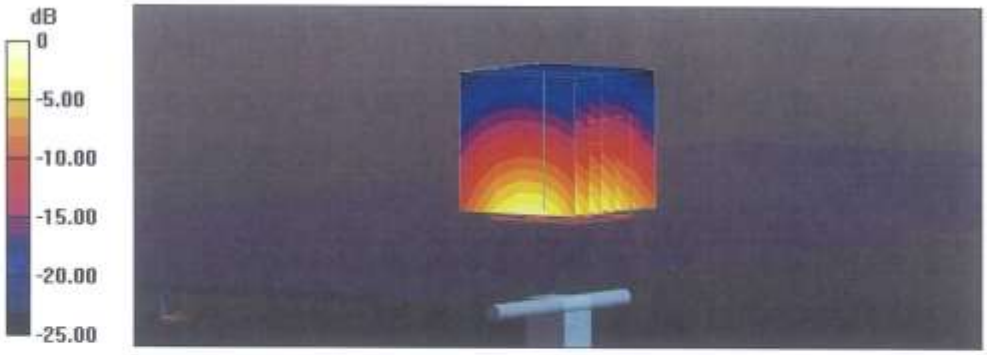
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.03 S/m; ε_r = 37.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

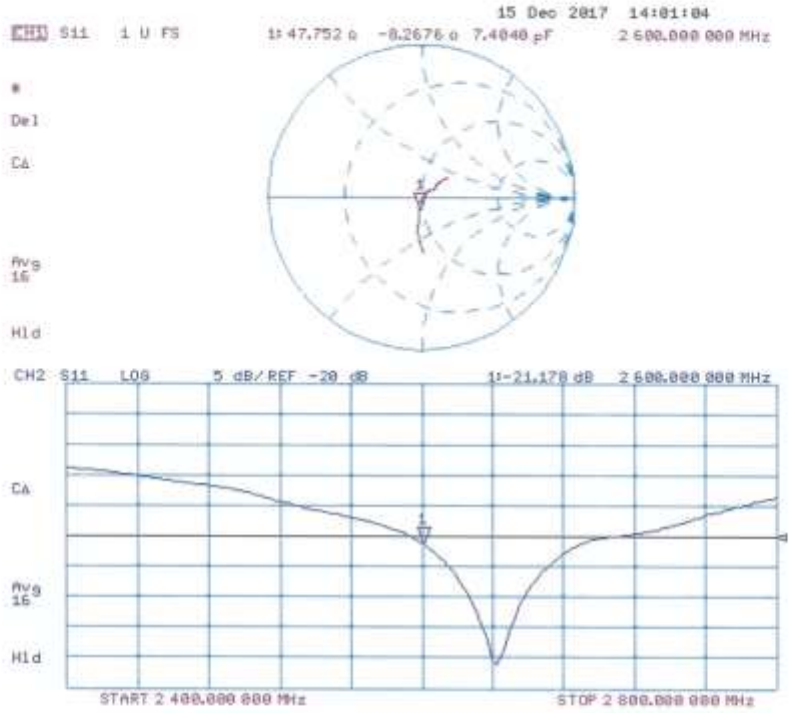
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 113.0 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 32.1 W/kg
SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.35 W/kg
Maximum value of SAR (measured) = 23.6 W/kg



0 dB = 23.6 W/kg = 13.73 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.12.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1106

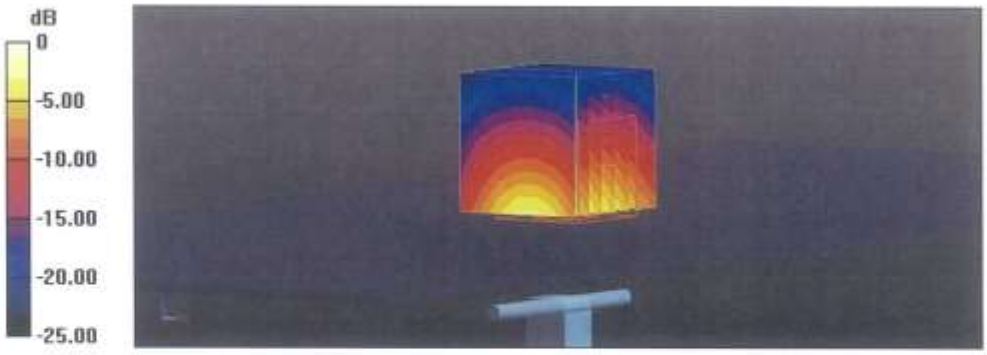
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.22 S/m; ε_r = 51; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

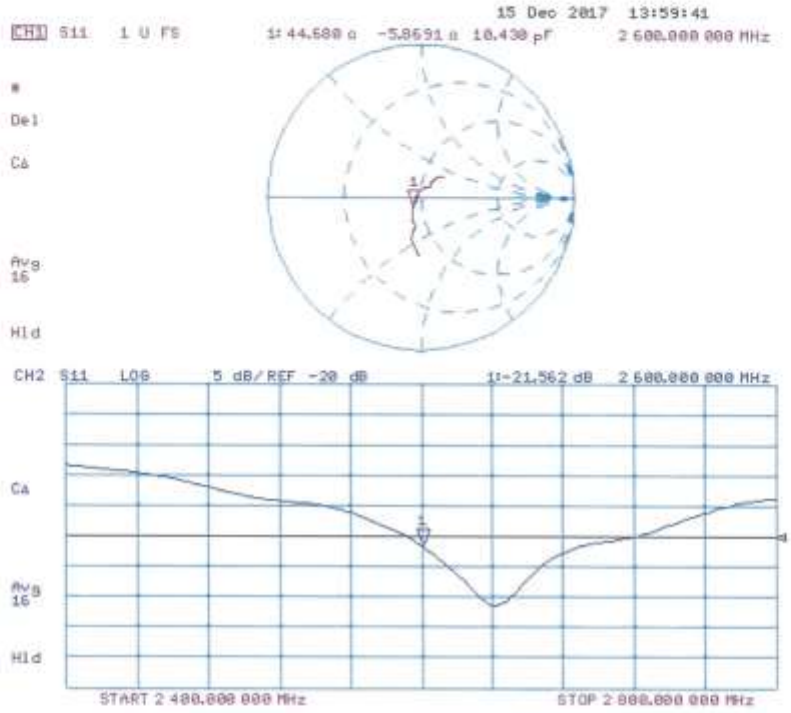
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.4 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 29.9 W/kg
SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.13 W/kg
Maximum value of SAR (measured) = 22.4 W/kg



0 dB = 22.4 W/kg = 13.50 dBW/kg

Impedance Measurement Plot for Body TSL



Attachment 8

LTE UP link CA Output Power Verifications

This device is specified with the same maximum output power and Tune-up tolerances for intra-band contiguous up-link LTE CA_41C and the single carrier LTE 41. Both Uplink carrier aggregation and single carrier are operating with power class 3.
This device support intra-band contiguous UL CA: LTE CA_41C with a maximum of 20MHz component carriers.
For intra-band contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that aggregate maximum allowed output power is equivalent to the single carrier scenario.

This device does not have any operating restrictions, power reduction or variations among the different LTE operating mode configurations on single carrier LTE 41 and intra-band contiguous up-link LTE CA_41C operations.
The measured power results of single carrier LTE 41 and intra-band contiguous up-link LTE CA_41C satisfy Maximum output power and Tune-up tolerances.
For intra-band contiguous up-link LTE CA_41C, 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. We measured output power for all BW and modulation combinations of intra-band contiguous uplink LTE CA_41C for this device and confirmed that 3.5 to 8dB MPR is applied to non contiguous RB offsets according to 3GPP 36.101 6.2.3A. Also output power of contiguous RB allocations is typically higher than non-contiguous RB offsets condition.

Per Fall 2017 TCB Workshop Notes, the output Power with uplink CA active was measured for the configuration with the Highest Reported SAR with single carrier for each exposure condition. The Power was measured with wideband signal integration over both component carriers.

Intra-band Contiguous LTE Uplink Combination CA_41C.

Uplink CA Combinations	Channel Bandwidth for Carrier [MHz]	Channel Bandwidth for Carrier [MHz]	Maximum Aggregated bandwidth [MHz]	Bandwidth combination set
CA_41C	10	20	40	0
	15	15,20		
	20	10,15,20		
	5,10	20	40	1
	15	15,20		
	20	5,10,15,20		
	10	15,20	40	2
	15	10,15,20		
	20	10,15,20		
	10	20	40	3
	20	20		

1. The Worst cases for LTE Uplink CA_41C Conducted Powers for all combinations

The output power measurement of LTE Uplink CA_41C were performed the all applicable UL CA Configurations intended for U.S. operations by KDB941225 D05A and TCB workshop notes in fall of 2017.

The worst case of output power measurement result for QPSK Full RB and 16QAM ,64QAM Modulation are shown below.

Please refer to SAR Report Sec 9 for the power of the Worst case QPSK 1RB configuration of this LTE UP CA_41C.

1.1 QPSK Modulation Full RB

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation Low Channel	5	40265	2557.5	QPSK	25	0	20	40382	2569.2	QPSK	100	0	22.32	21.36
	10	40290	2560	QPSK	50	0	15	40410	2572	QPSK	75	0	22.31	21.50
	10	40290	2560	QPSK	50	0	20	40434	2574.4	QPSK	100	0	22.31	21.44
	15	40315	2562.5	QPSK	75	0	10	40435	2574.5	QPSK	50	0	22.39	21.47
	15	40315	2562.5	QPSK	75	0	15	40465	2577.5	QPSK	75	0	22.39	20.79
	15	40315	2562.5	QPSK	75	0	20	40486	2579.6	QPSK	100	0	22.39	20.66
	20	40340	2565	QPSK	100	0	5	40457	2576.7	QPSK	25	0	22.36	21.23
	20	40340	2565	QPSK	100	0	10	40484	2579.4	QPSK	50	0	22.36	21.51
	20	40340	2565	QPSK	100	0	15	40511	2582.1	QPSK	75	0	22.36	20.42
	20	40340	2565	QPSK	100	0	20	40538	2584.8	QPSK	100	0	22.36	20.55

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation Middle Channel	5	40740	2605	QPSK	25	0	20	40623	2593.3	QPSK	100	0	22.34	21.45
	10	40740	2605	QPSK	50	0	15	40620	2593	QPSK	75	0	22.34	21.36
	10	40740	2605	QPSK	50	0	20	40596	2590.6	QPSK	100	0	22.34	21.49
	15	40740	2605	QPSK	75	0	10	40620	2593	QPSK	50	0	22.36	21.51
	15	40740	2605	QPSK	75	0	15	40590	2590	QPSK	75	0	22.36	20.80
	15	40740	2605	QPSK	75	0	20	40569	2587.9	QPSK	100	0	22.36	20.82
	20	40740	2605	QPSK	100	0	5	40623	2593.3	QPSK	25	0	22.34	21.46
	20	40740	2605	QPSK	100	0	10	40596	2590.6	QPSK	50	0	22.34	21.40
	20	40740	2605	QPSK	100	0	15	40569	2587.9	QPSK	75	0	22.34	20.66
	20	40740	2605	QPSK	100	0	20	40542	2585.2	QPSK	100	0	22.34	20.65

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation High Channel	5	41215	2652.5	QPSK	25	0	20	41098	2640.8	QPSK	100	0	22.61	21.77
	10	41190	2650	QPSK	50	0	15	41070	2638	QPSK	75	0	22.53	21.79
	10	41190	2650	QPSK	50	0	20	41046	2635.6	QPSK	100	0	22.53	21.85
	15	41165	2647.5	QPSK	75	0	10	41045	2635.5	QPSK	50	0	22.55	21.57
	15	41165	2647.5	QPSK	75	0	15	41015	2632.5	QPSK	75	0	22.55	20.08
	15	41165	2647.5	QPSK	75	0	20	40994	2630.4	QPSK	100	0	22.55	20.22
	20	41140	2645	QPSK	100	0	5	41023	2633.3	QPSK	25	0	22.5	21.56
	20	41140	2645	QPSK	100	0	10	40996	2630.6	QPSK	50	0	22.5	21.76
	20	41140	2645	QPSK	100	0	15	40969	2627.9	QPSK	75	0	22.5	21.27
	20	41140	2645	QPSK	100	0	20	40942	2625.2	QPSK	100	0	22.5	21.59

1.2 16QAM Modulation

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation Low Channel	5	40265	2557.5	16QAM	1	24	20	40382	2569.2	16QAM	1	0	22.55	22.09
	10	40290	2560	16QAM	1	49	15	40410	2572	16QAM	1	0	22.53	22.15
	10	40290	2560	16QAM	1	49	20	40434	2574.4	16QAM	1	0	22.53	22.24
	15	40315	2562.5	16QAM	1	74	10	40435	2574.5	16QAM	1	0	22.63	22.19
	15	40315	2562.5	16QAM	1	74	15	40465	2577.5	16QAM	1	0	22.63	22.34
	15	40315	2562.5	16QAM	1	74	20	40486	2579.6	16QAM	1	0	22.63	22.26
	20	40340	2565	16QAM	1	99	5	40457	2576.7	16QAM	1	0	22.57	22.14
	20	40340	2565	16QAM	1	99	10	40484	2579.4	16QAM	1	0	22.57	22.09
	20	40340	2565	16QAM	1	99	15	40511	2582.1	16QAM	1	0	22.57	22.14
	5	40265	2557.5	16QAM	1	24	20	40382	2569.2	16QAM	1	0	22.55	22.09

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation Middle Channel	20	40340	2565	16QAM	1	99	20	40538	2584.8	16QAM	1	0	22.57	22.17
	5	40740	2605	16QAM	1	0	20	40623	2593.3	16QAM	1	99	22.48	22.01
	10	40740	2605	16QAM	1	0	15	40620	2593	16QAM	1	74	22.56	22.23
	10	40740	2605	16QAM	1	0	20	40596	2590.6	16QAM	1	99	22.56	22.25
	15	40740	2605	16QAM	1	0	10	40620	2593	16QAM	1	49	22.6	22.17
	15	40740	2605	16QAM	1	0	15	40590	2590	16QAM	1	74	22.6	22.12
	15	40740	2605	16QAM	1	0	20	40569	2587.9	16QAM	1	99	22.6	22.28
	20	40740	2605	16QAM	1	0	5	40623	2593.3	16QAM	1	24	22.59	22.16
	20	40740	2605	16QAM	1	0	10	40596	2590.6	16QAM	1	49	22.59	22.24
	20	40740	2605	16QAM	1	0	15	40569	2587.9	16QAM	1	74	22.59	22.26

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation High Channel	5	41215	2652.5	16QAM	1	0	20	41098	2640.8	16QAM	1	99	22.79	22.43
	10	41190	2650	16QAM	1	0	15	41070	2638	16QAM	1	74	22.79	22.35
	10	41190	2650	16QAM	1	0	20	41046	2635.6	16QAM	1	99	22.79	22.37
	15	41165	2647.5	16QAM	1	0	10	41045	2635.5	16QAM	1	49	22.84	22.55
	15	41165	2647.5	16QAM	1	0	15	41015	2632.5	16QAM	1	74	22.84	22.44
	15	41165	2647.5	16QAM	1	0	20	40994	2630.4	16QAM	1	99	22.84	22.44
	20	41140	2645	16QAM	1	0	5	41023	2633.3	16QAM	1	24	22.75	22.30
	20	41140	2645	16QAM	1	0	10	40996	2630.6	16QAM	1	49	22.75	22.37
	20	41140	2645	16QAM	1	0	15	40969	2627.9	16QAM	1	74	22.75	22.49
	20	41140	2645	16QAM	1	0	20	40942	2625.2	16QAM	1	99	22.75	22.27

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation Low Channel	5	40265	2557.5	16QAM	25	0	20	40382	2569.2	16QAM	100	0	21.49	20.29
	10	40290	2560	16QAM	50	0	15	40410	2572	16QAM	75	0	21.48	20.27
	10	40290	2560	16QAM	50	0	20	40434	2574.4	16QAM	100	0	21.48	20.20
	15	40315	2562.5	16QAM	75	0	10	40435	2574.5	16QAM	50	0	21.53	20.35
	15	40315	2562.5	16QAM	75	0	15	40465	2577.5	16QAM	75	0	21.53	20.25
	15	40315	2562.5	16QAM	75	0	20	40486	2579.6	16QAM	100	0	21.53	20.24
	20	40340	2565	16QAM	100	0	5	40457	2576.7	16QAM	25	0	21.52	20.32
	20	40340	2565	16QAM	100	0	10	40484	2579.4	16QAM	50	0	21.52	20.17
	20	40340	2565	16QAM	100	0	15	40511	2582.1	16QAM	75	0	21.52	20.21
	20	40340	2565	16QAM	100	0	20	40538	2584.8	16QAM	100	0	21.52	20.18

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation Middle Channel	5	40740	2605	16QAM	25	0	20	40623	2593.3	16QAM	100	0	21.48	20.24
	10	40740	2605	16QAM	50	0	15	40620	2593	16QAM	75	0	21.47	20.23
	10	40740	2605	16QAM	50	0	20	40596	2590.6	16QAM	100	0	21.47	20.29
	15	40740	2605	16QAM	75	0	10	40620	2593	16QAM	50	0	21.5	20.18
	15	40740	2605	16QAM	75	0	15	40590	2590	16QAM	75	0	21.5	20.28
	15	40740	2605	16QAM	75	0	20	40569	2587.9	16QAM	100	0	21.5	20.16
	20	40740	2605	16QAM	100	0	5	40623	2593.3	16QAM	25	0	21.48	20.19
	20	40740	2605	16QAM	100	0	10	40596	2590.6	16QAM	50	0	21.48	20.21
	20	40740	2605	16QAM	100	0	15	40569	2587.9	16QAM	75	0	21.48	20.14
	20	40740	2605	16QAM	100	0	20	40542	2585.2	16QAM	100	0	21.48	20.25

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation High Channel	5	41215	2652.5	16QAM	25	0	20	41098	2640.8	16QAM	100	0	21.74	20.38
	10	41190	2650	16QAM	50	0	15	41070	2638	16QAM	75	0	21.78	20.54
	10	41190	2650	16QAM	50	0	20	41046	2635.6	16QAM	100	0	21.78	20.59
	15	41165	2647.5	16QAM	75	0	10	41045	2635.5	16QAM	50	0	21.83	20.45
	15	41165	2647.5	16QAM	75	0	15	41015	2632.5	16QAM	75	0	21.83	20.59
	15	41165	2647.5	16QAM	75	0	20	40994	2630.4	16QAM	100	0	21.83	20.65
	20	41140	2645	16QAM	100	0	5	41023	2633.3	16QAM	25	0	21.67	20.48
	20	41140	2645	16QAM	100	0	10	40996	2630.6	16QAM	50	0	21.67	20.33
	20	41140	2645	16QAM	100	0	15	40969	2627.9	16QAM	75	0	21.67	20.12
	20	41140	2645	16QAM	100	0	20	40942	2625.2	16QAM	100	0	21.67	20.23

1.3 64QAM Modulation

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation Low Channel	5	40265	2557.5	64QAM	1	24	20	40382	2569.2	64QAM	1	0	21.16	20.56
	10	40290	2560	64QAM	1	49	15	40410	2572	64QAM	1	0	21.16	20.60
	10	40290	2560	64QAM	1	49	20	40434	2574.4	64QAM	1	0	21.16	20.56
	15	40315	2562.5	64QAM	1	74	10	40435	2574.5	64QAM	1	0	21.24	20.72
	15	40315	2562.5	64QAM	1	74	15	40465	2577.5	64QAM	1	0	21.24	20.64
	15	40315	2562.5	64QAM	1	74	20	40486	2579.6	64QAM	1	0	21.24	20.67
	20	40340	2565	64QAM	1	99	5	40457	2576.7	64QAM	1	0	21.35	20.67
	20	40340	2565	64QAM	1	99	10	40484	2579.4	64QAM	1	0	21.35	20.75
	20	40340	2565	64QAM	1	99	15	40511	2582.1	64QAM	1	0	21.35	20.72
	20	40340	2565	64QAM	1	99	20	40538	2584.8	64QAM	1	0	21.35	20.83

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation Middle Channel	5	40740	2605	64QAM	1	0	20	40623	2593.3	64QAM	1	99	21.12	20.58
	10	40740	2605	64QAM	1	0	15	40620	2593	64QAM	1	74	21.12	20.56
	10	40740	2605	64QAM	1	0	20	40596	2590.6	64QAM	1	99	21.12	20.50
	15	40740	2605	64QAM	1	0	10	40620	2593	64QAM	1	49	21.21	20.64
	15	40740	2605	64QAM	1	0	15	40590	2590	64QAM	1	74	21.21	20.56
	15	40740	2605	64QAM	1	0	20	40569	2587.9	64QAM	1	99	21.21	20.59
	20	40740	2605	64QAM	1	0	5	40623	2593.3	64QAM	1	24	21.18	20.59
	20	40740	2605	64QAM	1	0	10	40596	2590.6	64QAM	1	49	21.18	20.67
	20	40740	2605	64QAM	1	0	15	40569	2587.9	64QAM	1	74	21.18	20.67
	20	40740	2605	64QAM	1	0	20	40542	2585.2	64QAM	1	99	21.18	20.63

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
1RB Contiguous Allocation High Channel	5	41215	2652.5	64QAM	1	0	20	41098	2640.8	64QAM	1	99	21.42	20.83
	10	41190	2650	64QAM	1	0	15	41070	2638	64QAM	1	74	21.36	20.79
	10	41190	2650	64QAM	1	0	20	41046	2635.6	64QAM	1	99	21.36	20.83
	15	41165	2647.5	64QAM	1	0	10	41045	2635.5	64QAM	1	49	21.47	20.81
	15	41165	2647.5	64QAM	1	0	15	41015	2632.5	64QAM	1	74	21.47	20.83
	15	41165	2647.5	64QAM	1	0	20	40994	2630.4	64QAM	1	99	21.47	20.86
	20	41140	2645	64QAM	1	0	5	41023	2633.3	64QAM	1	24	21.35	20.66
	20	41140	2645	64QAM	1	0	10	40996	2630.6	64QAM	1	49	21.35	20.71
	20	41140	2645	64QAM	1	0	15	40969	2627.9	64QAM	1	74	21.35	20.76
	20	41140	2645	64QAM	1	0	20	40942	2625.2	64QAM	1	99	21.35	20.69

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation Low Channel	5	40265	2557.5	64QAM	25	0	20	40382	2569.2	64QAM	100	0	20.52	20.07
	10	40290	2560	64QAM	50	0	15	40410	2572	64QAM	75	0	20.49	20.06
	10	40290	2560	64QAM	50	0	20	40434	2574.4	64QAM	100	0	20.49	20.06
	15	40315	2562.5	64QAM	75	0	10	40435	2574.5	64QAM	50	0	20.48	19.88
	15	40315	2562.5	64QAM	75	0	15	40465	2577.5	64QAM	75	0	20.48	19.97
	15	40315	2562.5	64QAM	75	0	20	40486	2579.6	64QAM	100	0	20.48	19.90
	20	40340	2565	64QAM	100	0	5	40457	2576.7	64QAM	25	0	20.53	19.99
	20	40340	2565	64QAM	100	0	10	40484	2579.4	64QAM	50	0	20.53	19.92
	20	40340	2565	64QAM	100	0	15	40511	2582.1	64QAM	75	0	20.53	20.06
	20	40340	2565	64QAM	100	0	20	40538	2584.8	64QAM	100	0	20.53	19.98

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation Middle Channel	5	40740	2605	64QAM	25	0	20	40623	2593.3	64QAM	100	0	20.5	20.05
	10	40740	2605	64QAM	50	0	15	40620	2593	64QAM	75	0	20.43	19.86
	10	40740	2605	64QAM	50	0	20	40596	2590.6	64QAM	100	0	20.43	19.86
	15	40740	2605	64QAM	75	0	10	40620	2593	64QAM	50	0	20.46	19.92
	15	40740	2605	64QAM	75	0	15	40590	2590	64QAM	75	0	20.46	19.98
	15	40740	2605	64QAM	75	0	20	40569	2587.9	64QAM	100	0	20.46	19.84
	20	40740	2605	64QAM	100	0	5	40623	2593.3	64QAM	25	0	20.39	19.83
	20	40740	2605	64QAM	100	0	10	40596	2590.6	64QAM	50	0	20.39	19.81
	20	40740	2605	64QAM	100	0	15	40569	2587.9	64QAM	75	0	20.39	19.90
	20	40740	2605	64QAM	100	0	20	40542	2585.2	64QAM	100	0	20.39	19.81

Channel	PCC						SCC						Tx. Power [dBm]	
	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	BW [MHz]	Channel	Frequency [MHz]	Mod	RB	RB Offset	LTE Single Carrier Tx	LTE Tx Power with UL CA Enabled
Full RB Contiguous Allocation High Channel	5	41215	2652.5	64QAM	25	0	20	41098	2640.8	64QAM	100	0	20.82	20.37
	10	41190	2650	64QAM	50	0	15	41070	2638	64QAM	75	0	20.71	20.17
	10	41190	2650	64QAM	50	0	20	41046	2635.6	64QAM	100	0	20.71	20.29
	15	41165	2647.5	64QAM	75	0	10	41045	2635.5	64QAM	50	0	20.81	20.24
	15	41165	2647.5	64QAM	75	0	15	41015	2632.5	64QAM	75	0	20.81	20.36
	15	41165	2647.5	64QAM	75	0	20	40994	2630.4	64QAM	100	0	20.81	20.28
	20	41140	2645	64QAM	100	0	5	41023	2633.3	64QAM	25	0	20.7	20.28
	20	41140	2645	64QAM	100	0	10	40996	2630.6	64QAM	50	0	20.7	20.28
	20	41140	2645	64QAM	100	0	15	40969	2627.9	64QAM	75	0	20.7	20.19
	20	41140	2645	64QAM	100	0	20	40942	2625.2	64QAM	100	0	20.7	20.15

1.4 The Worst case Conducted Powers CA_41C with Various combinations for 20MHz Channel BW

The worst case of output power measurement result for CA_41C with Variable combinations for 20MHz Channel Bandwidth are shown below

PCC UL/DL LTE 41[20MHz]					SCC UL/DL LTE 41[20MHz]					Tx. Power [dBm]	
UL/DL Channel	Frequency	Modulation	RB	offset	SCC UL/DL Channel	SCC UL/DL Frequency	Modulation	RB	offset	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with UL CA Enabled(dBm)
41140	2645	QPSK	1	99	40942	2625.2	QPSK	1	0	23.46	15.02
41140	2645	QPSK	1	99	40942	2625.2	QPSK	1	49	23.46	15.01
41140	2645	QPSK	1	99	40942	2625.2	QPSK	1	99	23.46	19.04
41140	2645	QPSK	1	0	40942	2625.2	QPSK	1	0	23.64	19.11
41140	2645	QPSK	1	0	40942	2625.2	QPSK	1	49	23.64	19.1
41140	2645	QPSK	1	0	40942	2625.2	QPSK	1	99	23.64	23.53
41140	2645	QPSK	1	49	40942	2625.2	QPSK	1	0	23.57	15.05
41140	2645	QPSK	1	49	40942	2625.2	QPSK	1	49	23.57	19.02
41140	2645	QPSK	1	49	40942	2625.2	QPSK	1	99	23.57	19.09
41140	2645	QPSK	50	0	40942	2625.2	QPSK	50	0	22.49	20.06
41140	2645	QPSK	50	0	40942	2625.2	QPSK	50	25	22.49	20.08
41140	2645	QPSK	50	0	40942	2625.2	QPSK	50	49	22.49	20.09
41140	2645	QPSK	50	25	40942	2625.2	QPSK	50	0	22.6	20.07
41140	2645	QPSK	50	25	40942	2625.2	QPSK	50	25	22.6	20.06
41140	2645	QPSK	50	25	40942	2625.2	QPSK	50	49	22.6	20.05
41140	2645	QPSK	50	49	40942	2625.2	QPSK	50	0	22.58	20.06
41140	2645	QPSK	50	49	40942	2625.2	QPSK	50	25	22.58	20.08
41140	2645	QPSK	50	49	40942	2625.2	QPSK	50	49	22.58	20.03
41140	2645	QPSK	100	0	40942	2625.2	QPSK	100	0	22.5	21.59
41140	2645	16QAM	1	99	40942	2625.2	16QAM	1	0	22.81	15.19
41140	2645	16QAM	1	99	40942	2625.2	16QAM	1	49	22.81	15.16
41140	2645	16QAM	1	99	40942	2625.2	16QAM	1	99	22.81	19.29
41140	2645	16QAM	1	0	40942	2625.2	16QAM	1	0	22.75	19.32
41140	2645	16QAM	1	0	40942	2625.2	16QAM	1	49	22.75	19.3
41140	2645	16QAM	1	0	40942	2625.2	16QAM	1	99	22.75	22.27
41140	2645	16QAM	1	49	40942	2625.2	16QAM	1	0	22.87	15.2
41140	2645	16QAM	1	49	40942	2625.2	16QAM	1	49	22.87	19.25
41140	2645	16QAM	1	49	40942	2625.2	16QAM	1	99	22.87	19.31
41140	2645	16QAM	50	0	40942	2625.2	16QAM	50	0	21.71	20.21
41140	2645	16QAM	50	0	40942	2625.2	16QAM	50	25	21.71	20.23
41140	2645	16QAM	50	0	40942	2625.2	16QAM	50	49	21.71	20.24
41140	2645	16QAM	50	25	40942	2625.2	16QAM	50	0	21.83	20.22
41140	2645	16QAM	50	25	40942	2625.2	16QAM	50	25	21.83	20.25
41140	2645	16QAM	50	25	40942	2625.2	16QAM	50	49	21.83	20.24
41140	2645	16QAM	50	49	40942	2625.2	16QAM	50	0	21.84	20.16
41140	2645	16QAM	50	49	40942	2625.2	16QAM	50	25	21.84	20.19
41140	2645	16QAM	50	49	40942	2625.2	16QAM	50	49	21.84	20.19
41140	2645	16QAM	100	0	40942	2625.2	16QAM	100	0	21.67	20.23
41140	2645	64QAM	1	99	40942	2625.2	64QAM	1	0	21.35	14.75
41140	2645	64QAM	1	99	40942	2625.2	64QAM	1	49	21.35	14.71
41140	2645	64QAM	1	99	40942	2625.2	64QAM	1	99	21.35	18.85
41140	2645	64QAM	1	0	40942	2625.2	64QAM	1	0	21.35	18.96
41140	2645	64QAM	1	0	40942	2625.2	64QAM	1	49	21.35	18.88

41140	2645	64QAM	1	0	40942	2625.2	64QAM	1	99	21.35	20.69
41140	2645	64QAM	1	49	40942	2625.2	64QAM	1	0	21.43	14.77
41140	2645	64QAM	1	49	40942	2625.2	64QAM	1	49	21.43	18.79
41140	2645	64QAM	1	49	40942	2625.2	64QAM	1	99	21.43	18.9
41140	2645	64QAM	50	0	40942	2625.2	64QAM	50	0	20.69	20.19
41140	2645	64QAM	50	0	40942	2625.2	64QAM	50	25	20.69	20.21
41140	2645	64QAM	50	0	40942	2625.2	64QAM	50	49	20.69	20.18
41140	2645	64QAM	50	25	40942	2625.2	64QAM	50	0	20.8	20.19
41140	2645	64QAM	50	25	40942	2625.2	64QAM	50	25	20.8	20.17
41140	2645	64QAM	50	25	40942	2625.2	64QAM	50	49	20.8	20.17
41140	2645	64QAM	50	49	40942	2625.2	64QAM	50	0	20.8	20.15
41140	2645	64QAM	50	49	40942	2625.2	64QAM	50	25	20.8	20.14
41140	2645	64QAM	50	49	40942	2625.2	64QAM	50	49	20.8	20.12
41140	2645	64QAM	100	0	40942	2625.2	64QAM	100	0	20.7	20.15