On your side

TEST REPORT

FCC SAR Test for certification of A3LSMR825

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-SR-1907-FI005-R1

DATE OF ISSUE
Aug. 12, 2019

HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 F ax. +82 31 645 6401

HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300   Fax. +82 31 645 6401

TEST REPORT

FCC SAR Test for certification

REPORT NO.
HCT-SR-1907-FI005-R1

DATE OF ISSUE
Aug. 12, 2019

Applicant	SAMSUNG Electronics Co., Ltd 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea
Equipment Type Model Name Variant Model Name	Smart watch SM-R825U SM-R825F
FCC ID	A3LSMR825
Date of Test	Jul. 11, 2019 ~ Jul. 25, 2019
FCC Rule Part(s)	CFR §2.1093

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.

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

Tested by
Min Young Kim

Technical Manager
Yun Jeang Heo

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	Jul. 29, 2019	Initial Release
1	Aug. 12, 2019	Revised page 70, 89.

CONTENTS

1. Test Regulations

The tests were performed according to the following regulations:

Test Standard	IEEE Standard 1528-2013 & KDB procedures
Test Method	- FCC KDB Publication 941225 D01 3G SAR Procedures v03r01 - 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 690783 D01 SAR Listings on Grants v01r03 - FCC KDB Publication 865664 D01 SAR measurement 100 ㎒ to 6 GHz v01r04 - FCC KDB Publication 865664 D02 SAR Reporting v01r02 - April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)

2. Test Location

2.1 Test Laboratory

Company Name	HCT Co., Ltd.
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Telephone	031-645-6300
Fax.	031-645-6401

3. Information of the EUT

3.1 General Information of the EUT

Model Name	SM-R825U
Variant Model Name	SM-R825F
Equipment Type	Smart watch
FCC ID	A3LSMR825
Applicant	SAMSUNG Electronics Co., Ltd.

3.2 Attestation of test result of device under test

The Highest Reported SAR (W/Kg)				
Band	Tx. Frequency	Equipment Class	Reported SAR (W/kg)	
			Next-to-Mouth 1g SAR	Extremity 10g SAR
UMTS 850	826.4 ㎒ ~ 846.6 ㎒	PCB	<0.10	0.27
UMTS 1700	1 712.4 ㎒ ~ 1 752.6 ㎒	PCB	0.44	2.19
UMTS 1900	1 852.4 ㎒ ~ 1 907.6 ㎒	PCB	0.50	1.76
LTE Band 2 (PCS)	1 850.7 ㎒ ~ 1 909.3 ㎒	PCB	0.52	1.66
LTE Band 4 (AWS)	1 710.7 ㎒ ~ 1 754.3 ㎒	PCB	0.56	1.80
LTE Band 12	699.7 ㎒ ~ 715.3 ㎒	PCB	<0.10	0.22
LTE Band 13	779.5 ㎒ ~ 784.5 ㎒	PCB	<0.10	0.24
LTE Band 25 (PCS)	1 850.7 ㎒ ~ 1 914.3 ㎒	PCB	0.57	1.17
LTE Band 26 (Cell)	814.7 ㎒ ~ 848.3 ㎒	PCB	0.64	0.30
LTE Band 66 (AWS)	1 710.7 ㎒ ~ 1 779.3 ㎒	PCB	0.40	1.32
802.11b	2 412 ㎒ ~ 2 472 ㎒	DTS	0.14	0.24
Bluetooth	2 402 ㎒~ 2 480 ㎒	DSS	0.14	0.21
Simultaneous SAR per KDB 690783 D01v01r03			0.79	2.43
Date(s) of Tests:	Jul. 11, 2019 ~ Jul. 25, 2019			

4. Device Under Test Description

4.1 DUT specification

Device Wireless specification overview		
Band & Mode	Operating Mode	Tx Frequency
UMTS 850	Voice / Data	826.4 MHz ~ 846.6 MHz
UMTS 1700	Voice / Data	1 712.4 MHz ~ 1 752.6 MHz
UMTS 1900	Voice / Data	1 852.4 MHz ~ 1 907.6 MHz
LTE Band 2 (PCS)	Voice / Data	1 850.7 MHz ~ 1 909.3 MHz
LTE Band 4 (AWS)	Voice / Data	1 710.7 MHz ~ 1 754.3 MHz
LTE Band 5 (Cell)	Voice / Data	824.7 MHz ~ 848.3 MHz
LTE Band 12	Voice / Data	699.7 MHz ~ 715.3 MHz
LTE Band 13	Voice / Data	779.5 MHz ~ 784.5 MHz
LTE Band 25 (PCS)	Voice / Data	1 850.7 MHz ~ 1 914.3 MHz
LTE Band 26 (Cell)	Voice / Data	814.7 MHz ~ 848.3 MHz
LTE Band 66 (AWS)	Voice / Data	1 710.7 MHz ~ 1 779.3 MHz
2.4 GHz WLAN	Data	2 412 MHz ~ 2 472 MHz
Bluetooth / LE 5.0	Data	2 402 MHz~ 2 480 MHz
NFC	Data	13.56 MHz

<table>
<tr><th colspan="3">Device Description</th></tr>
<tr><td>Device Dimension</td><td colspan="2">Diagonal dimension of LCD: 34.5 mm</td></tr>
<tr><td>Battery Information</td><td colspan="2">Battery Model Name: EB-BR820ABY</td></tr>
<tr><td>HW version</td><td colspan="2">REV1.0</td></tr>
<tr><td>SW version</td><td colspan="2">R825U.001</td></tr>
<tr><td rowspan="5">Device Serial Numbers</td><td>Mode</td><td>Serial Number</td></tr>
<tr><td>LTE Bnd 2 / LET Band 66 / LTE Band 12 Head
LTE Band 26 / UMTS 1700 / LTE Band 13 Body
2.4 GHz WLAN / Bluetooth Body</td><td>R3AM6009K5T</td></tr>
<tr><td>LET Band 4 / LET Band 13 Head / UMTS 850
LET Band 25 Head / UMTS 1900 Body
Bluetooth Head</td><td>R3AM6009JSN</td></tr>
<tr><td>LTE Band 25 Head / LTE Band 12 Body
UMTS 1900 Head</td><td>R3AM6009JXB</td></tr>
<tr><td colspan="2">The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units.</td></tr>
</table>

4.2 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.

4.2.1 Maximum Output Power

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 5 (850 ㎒)	Maximum	24.0	22.5	21.0	23.0
	Nominal	23.0	21.5	20.0	22.0
UMTS Band 4 (1700 ㎒)	Maximum	24.0	23.5	21.5	23.5
	Nominal	23.0	22.5	20.5	22.5
UMTS Band 2 (1900 ㎒)	Maximum	24.0	23.5	21.5	23.5
	Nominal	23.0	22.5	20.5	22.5

Mode / Band		Modulated Average (dBm)
LTE Band 2 (PCS)	Maximum	23.8
	Nominal	22.8
LTE Band 4 (AWS)	Maximum	23.8
	Nominal	22.8
LTE Band 5 (Cell)	Maximum	23.8
	Nominal	22.8
LTE Band 12	Maximum	23.8
	Nominal	22.8
LTE Band 13	Maximum	23.8
	Nominal	22.8
LTE Band 25 (PCS)	Maximum	23.4
	Nominal	22.4
LTE Band 26 (Cell)	Maximum	23.8
	Nominal	22.8
LTE Band 66 (AWS)	Maximum	23.5
	Nominal	22.5

4.2.2 Maximum WLAN Power

Mode / Band		Modulated Average (dBm)			
Mode	Channel		802.11b	802.11g	802.11n
2.4 GHz WIFI	Ch.1 ~ Ch.11	Maximum	18	16.5	15
		Nominal	17	15.5	14
	Ch.12	Maximum	13	13	13
		Nominal	12	12	12
	Ch.13	Maximum	7.5	7.5	7.5
		Nominal	6.5	6.5	6.5

4.2.3 Bluetooth Power

Mode / Band		Modulated Average (dBm)
Bluetooth BR	Maximum	16.5
	Nominal	15.5
Bluetooth LE EDR	Maximum	10.3
	Nominal	9.3
Bluetooth LE	Maximum	9.3
	Nominal	8.3

4.3 LTE Information

Item.		Description
Frequency Range	LTE Band 2 (PCS)	1 850.7 MHz ~ 1 909.3 MHz
	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 13	779.5 MHz ~ 784.5 MHz
	LTE Band 25 (PCS)	1850.7 MHz ~ 1914.3 MHz
	LTE Band 26 (Cell)	814.7 MHz ~ 848.3 MHz
	LTE Band 66 (AWS)	1 710.7 MHz ~ 1 779.3 MHz
Channel Bandwidths	LTE Band 2 (PCS)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
	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 13	5 MHz, 10 MHz
	LTE Band 25 (PCS)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
	LTE Band 26 (Cell)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz
	LTE Band 66 (AWS)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz

Ch. No.& Freq.(MHz)		Low	Mid	High
LTE Band 2	1.4 MHz	1 850.7 (18607)	1 880.0 (18900)	1 909.3 (19193)
	3 MHz	1 851.5 (18615)	1 880.0 (18900)	1 908.5 (19185)
	5 MHz	1 852.5 (18625)	1 880.0 (18900)	1 907.5 (19175)
	10 MHz	1 855.0 (18650)	1 880.0 (18900)	1 905.0 (19150)
	15 MHz	1 857.5 (18675)	1 880.0 (18900)	1 902.5 (19125)
	20 MHz	1 860.0 (18700)	1 880.0 (18900)	1 900.0 (19100)
LTE Band 4	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	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)

Ch. No.& Freq.(㎒)		Low	Mid	High
LTE Band 12	1.4 ㎒	699.7 (23017)	707.5 (23095)	715.3 (23173)
	3 ㎒	700.5 (23025)	707.5 (23095)	714.5 (23165)
	5 ㎒	701.5 (23035)	707.5 (23095)	713.5 (23155)
	10 ㎒	704.0 (23060)	707.5 (23095)	711.0 (23130)
LTE Band 13	5 ㎒	779.5 (23205)	782 (23230)	784.5 (23255)
	10 ㎒		782 (23230)	
LTE Band 25	1.4 ㎒	1850.7 (26047)	1882.5 (26365)	1914.3 (26683)
	3 ㎒	1851.5 (26055)	1882.5 (26365)	1913.5 (26675)
	5 ㎒	1852.5 (26065)	1882.5 (26365)	1912.5 (26665)
	10 ㎒	1855 (26090)	1882.5 (26365)	1910 (26640)
	15 ㎒	1857.5 (26115)	1882.5 (26365)	1907.5 (26615)
	20 ㎒	1860 (26140)	1882.5 (26365)	1905 (26590)
LTE Band 26	1.4 ㎒	814.7 (26697)	831.5 (26865)	848.3 (27033)
	3 ㎒	815.5 (26705)	831.5 (26865)	847.5 (27025)
	5 ㎒	816.5 (26715)	831.5 (26865)	846.5 (27015)
	10 ㎒	819.0 (26740)	831.5 (26865)	844.0 (26990)
	15 ㎒	821.5 (26765)	831.5 (26865)	841.5 (26965)
LTE Band 66 (AWS)	1.4 ㎒	1 710.7 (131979)	1 745 (132322)	1 779.3 (132665)
	3 ㎒	1 711.5 (131987)	1 745 (132322)	1 778.5 (132657)
	5 ㎒	1 712.5 (131997)	1 745 (132322)	1 777.5 (132647)
	10 ㎒	1 715.0 (132022)	1 745 (132322)	1 775.0 (132622)
	15 ㎒	1 717.5 (132047)	1 745 (132322)	1 772.5 (132597)
	20 ㎒	1 720.0 (132072)	1 745 (132322)	1 770.0 (132572)
UE Category			LTE Rel. 10, Category 4	
Modulations Supported in UL			QPSK, 16 QAM	
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3			Yes	
A-MPR disabled for SAR Testing.			Yes	
LTE Carrier Aggregation			DL-Link CA & Up-Link CA	This device dose not supports Up-Link/ Down-Link Carrier aggregation.in US.
LTE Release 10 information			This device does not support full CA features on 3GPP Release 10. The following LTE Release 10 features are not supported. Uplink and Downlink Carrier aggregations, Relay, HetNet, Enhanced MIMO, eICl, WiFi offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA	

4.4 DUT Antenna Locations

A diagram showing the location of the DUT antenna can be found in SAR_Setup_Photos.

4.5 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.

4.6 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	Body
UMTS + 2.4 GHz WiFi Antenna	Yes
UMTS + 2.4 GHz Bluetooth	Yes
LTE + 2.4 GHz WiFi Antenna	Yes
LTE + 2.4 GHz Bluetooth	Yes

4.7 SAR Test Considerations

4.7.1 Bluetooth LE

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

$$\frac{MaxPowerofChannel(mW)}{TestSeparationDistance(mm)} * \sqrt{Frequency(GHz)} \leq 3.0(1g\ \ SAR), 7.5(10g\ \ SAR)$$

Mode		Frequency	Maximum Allowed Power	Separation Distance	≤ 3.0	≤ 7.5
		[MHz]	[mW]	[mm]	1-g SAR	10-g SAR
Bluetooth LE	Head SAR	2 480	9	10	1.4	
	Extremity SAR			5		2.8

Based on the maximum conducted power of Bluetooth LE and antenna to use separation distance, Bluetooth LE SAR was not required [(9/10)*√2.480] = 1.4 ≤ 3.0 for 1-g SAR, [(9/5)*√2.480] = 2.8 ≤ 7.5 for 10-g SAR.

The Reported SAR for WLAN and Bluetooth

The Reported SAR = The Measured SAR * $\frac{Maximum\ \ tune-up\ \ (mW)}{Measured\ \ Conducted\ \ Power(mW)}$ * Duty factor

4.7.2 Licensed Transmitter(s)

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r05.

This DUT supports LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same maximum target power. and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range
LTE Band 5 (824.7 ~ 848.3 ㎒) is covered by LTE Band 26 (814.7 ~ 848.3 ㎒) and both LTE bands have the same maximum target power

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

Per FCC KDB 941225 D01v03r01, 12.2 kbps RMC is the primary mode and HSPA (HSUPA/HSDPA with RMC) is the secondary mode.

Per FCC KDB 941225 D01v03r01, The SAR test exclusion is applied to the secondary mode by the following equation.

$$Adjusted\ \ SAR = Highest\ \ Reported\ \ SAR * \frac{Secondary\ \ Max\ \ tune-up\ \ (mW)}{Primary\ \ Max\ \ tune\ \ tune-up(mW)} \leq 1.2\ \ \mathrm{W/kg.}$$

Based on the highest Reported SAR, the secondary mode is not required.

Per FCC KDB 690783 1 D01 SAR Listings on Grants v01r03 and KDB 447498 D01 General RF Exposure Guidance v06 The SAR numbers listed must be consistent with the highest reported test results required by the published RF exposure KDB procedures. When the measured SAR is not at the maximum tune-up tolerance limit or maximum output power allowed for production units, the measured results are scaled to the maximum conditions to determine compliance; the scaled results are referred to as the reported SAR.

The Reported SAR = The Measured SAR *- $\frac{Maximum\ \ tune-up\ \ (mW)}{Measured\ \ Conducted\ \ Power(mW)}$

5. 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.

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

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/m³)

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.

6. Description of test equipment

6.1 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.

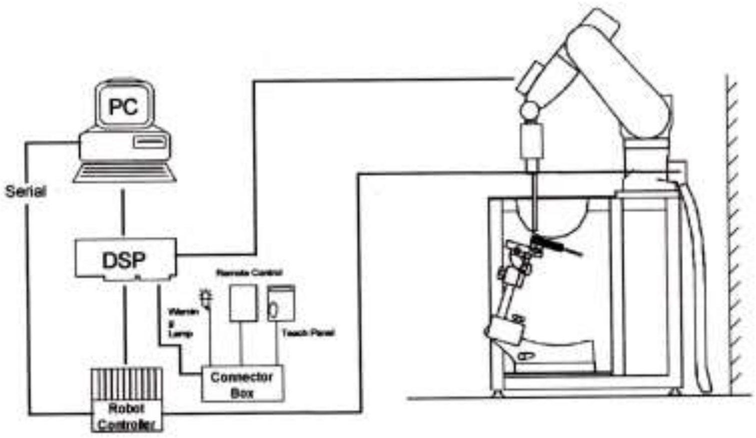


Figure 2. HCT SAR Lab. Test Measurement Set-up

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.

7. 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>$\frac{1}{2}\cdot\delta\cdot\ln(2)\pm0.5$ 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 1st 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>

8. Description of Test Position

8.1 Wrist watch and wrist-worn transmitters

8.1.1 Device Holder

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

8.1.2 Positioning for Head

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

8.1.3 Extremity Exposure Configurations

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

9. RF Exposure Limits

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	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.

10. FCC SAR General Measurement Procedures

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

10.1 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.

10.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB 941225 D01v03r01-3G SAR Measurement Procedures
The handset was placed into a simulated call using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluation SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to Cheek for power drifts. If conducted Power deviations of more than 5 % occurred, the tests were repeated.

10.3 SAR Measurement Conditions for UMTS

10.3.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in sec. 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all "1s" or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

10.3.2 Body SAR measurements

SAR for body exposure configurations is measured using the 12.2kbps RMC with the TPC bits all "1s". the 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using and applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported SAR configuration in 12.2kbps RMC.

10.3.3 SAR Measurements with Rel. 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using and FRC with H-SET 1 in Sub-test and a 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to release 6 HSPA test procedures. 8.4.5 SAR Measurement with Rel.6 HSUPA The 3G SAR test Reduction Procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode.

Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, Using H-Set 1 and QPSK for FRC and a 12.2kbps RMC configured in Test Loop Mode 1 and Power Control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

10.3.4 SAR Measurements with Rel. 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

10.3.5 DC-HSDPA

SAR is required for Rel.8 DC-HSDPA when SAR is required for Rel.5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in table C.8.1.12 of 3GPP TS34.121-1 to determine SAR test reduction. Primary and secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

DC-HSDPA Configurations

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK)was conformed to be used during DC-HSDPA measurements.

10.4 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r05 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluation SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

10.4.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

10.4.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36. 101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

10.4.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

10.4.4 Required RB Size and RB offsets for SAR testing

According to FCC KDB 941225 D05v02r05

a. Per sec 4.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/Kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Sec 4.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Sec 4.2.1.
c. Per Sec. 4.2.3, QPSK SAR is not required for the 100% all0cation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Sec. 4.2.4 and 4.3, SAR test for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sec. 4.2.1 through 4.2.3 is less than or equal to 1/2 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/Kg.

10.5 SAR Testing with 802.11 Transmitters

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

10.5.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.
A periodic duty factor is required for current generation SAR system to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92-96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

10.5.2 2.4 GHz SAR test Requirements

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

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS is that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

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

10.5.3 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate and lowest order 802.11 g/n mode. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

11. Output Power Specifications

Licensed bands

Test Description	Test Procedure Used
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2

Test Overview

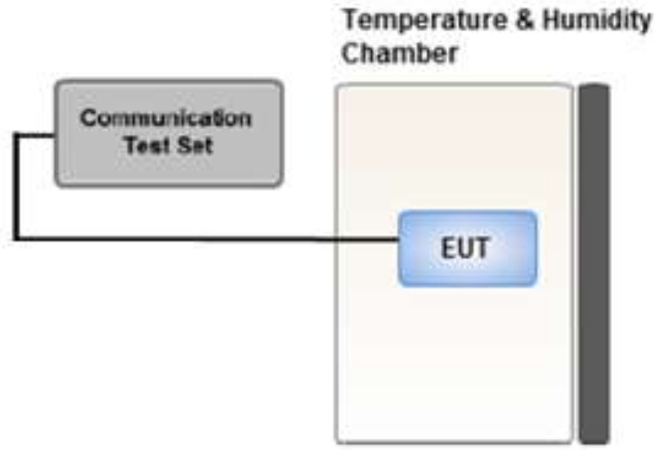
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base station emulator, communications test set, call box, or similar instrumentation that is capable of establishing a communications link with the EUT to enable control over variable parameters (e.g., output power, OBW, etc.).

In some cases, these instruments also include basic digital spectrum analyzer and/or power meter capabilities that can be utilized to measure the RF output power if the specified detectors and requirements can be realized and the measurement functions have been calibrated.

Test Procedure

1. The RF port of the EUT was connected to the Communication Tester via an RF cable.
2. Conducted average power was measured using a calibrated Radio Communication Tester.

Test setup



11.1 UMTS Maximum Conducted Output Power

HSPA+

This DUT is only capable of QPSK HSPA+ in uplink. Therefore, the RF conducted power is not measured according to 941225 D01 3G SAR.

11.1.1 UMTS Maximum Conducted Output Power

WCDMA Band 2

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]			3GPP MPR
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938	
99	WCDMA	12.2 kbps RMC	23.20	23.33	23.34	-
99	WCDMA	12.2 kbps AMR	23.24	23.34	23.36	-
5	HSDPA	Subtest 1	23.12	23.27	23.33	0
5		Subtest 2	22.16	22.31	22.40	0
5		Subtest 3	22.19	22.34	22.42	0.5
5		Subtest 4	21.27	21.36	21.43	0.5
6	HSUPA	Subtest 1	19.73	19.83	19.87	0
6		Subtest 2	17.68	17.87	17.88	2
6		Subtest 3	18.63	18.73	18.85	1
6		Subtest 4	17.71	17.87	17.90	2
6		Subtest 5	21.24	21.36	21.44	0
8	DC-HSDPA	Subtest 1	23.43	23.50	23.31	0
8		Subtest 2	22.52	22.75	22.40	0
8		Subtest 3	21.73	21.93	21.77	0.5
8		Subtest 4	21.72	21.92	21.82	0.5

WCDMA Average Conducted output powers

WCDMA Band 4

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 4 [dBm]			3GPP MPR
		Subtest	UL 1312 DL 1537	UL 1412 DL 1637	UL 1513 DL 1738	
99	WCDMA	12.2 kbps RMC	23.26	23.24	23.32	-
99	WCDMA	12.2 kbps AMR	23.34	23.29	23.37	-
5	HSDPA	Subtest 1	23.11	23.10	23.20	0
5		Subtest 2	22.29	22.28	22.37	0
5		Subtest 3	22.32	22.31	22.30	0.5
5		Subtest 4	21.26	21.25	21.32	0.5
6	HSUPA	Subtest 1	19.79	19.81	19.89	0
6		Subtest 2	17.70	17.61	17.67	2
6		Subtest 3	18.75	18.68	18.75	1
6		Subtest 4	17.68	17.63	17.72	2
6		Subtest 5	21.18	21.21	21.29	0
8	DC-HSDPA	Subtest 1	23.19	22.96	23.34	0
8		Subtest 2	21.89	21.14	22.30	0
8		Subtest 3	21.13	21.39	21.74	0.5
8		Subtest 4	21.21	21.43	21.56	0.5

WCDMA Average Conducted output powers

WCDMA Band 5

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 5 [dBm]			3GPP MPR
		Subtest	UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458	
99	WCDMA	12.2 kbps RMC	22.97	22.94	22.79	-
99	WCDMA	12.2 kbps AMR	22.96	20.96	22.81	-
5	HSDPA	Subtest 1	21.73	21.72	21.57	0
5		Subtest 2	20.86	20.84	20.70	0
5		Subtest 3	20.88	20.84	20.75	0.5
5		Subtest 4	19.91	19.88	19.73	0.5
6	HSUPA	Subtest 1	19.45	19.36	19.26	0
6		Subtest 2	17.41	17.40	17.31	2
6		Subtest 3	18.37	18.33	18.33	1
6		Subtest 4	17.37	17.37	17.22	2
6		Subtest 5	19.92	19.88	19.77	0
8	DC-HSDPA	Subtest 1	22.70	22.47	22.66	0
8		Subtest 2	21.26	21.14	21.76	0
8		Subtest 3	20.98	20.95	20.86	0.5
8		Subtest 4	21.00	20.94	20.84	0.5

WCDMA Average Conducted output powers

11.2 LTE Maximum Output Power

11.2.1 LTE Maximum Conducted Output Power

[LTE Band 2 Conducted Power]

LTE Band 2 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18607 Ch. 1850.7 ㎒	18900 Ch. 1880 ㎒	19193 Ch. 1909.3 ㎒		
1.4 ㎒	QPSK	1	0	22.89	23.13	22.94	0	0
		1	3	22.82	23.11	22.71	0	0
		1	5	22.82	23.12	22.59	0	0
		3	0	22.86	23.18	22.70	0	0
		3	1	22.82	23.11	22.60	0	0
		3	3	22.80	23.15	22.50	0	0
		6	0	20.86	21.15	20.83	0-1	1
	16QAM	1	0	20.54	20.81	20.76	0-1	1
		1	3	20.43	20.71	20.56	0-1	1
		1	5	20.44	20.72	20.62	0-1	1
		3	0	20.71	20.94	20.93	0-1	1
		3	1	20.71	20.97	20.91	0-1	1
		3	3	20.75	20.90	20.90	0-1	1
		6	0	19.77	19.94	19.85	0-2	2

LTE Band 2 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18615 Ch. 1851.5 ㎒	18900 Ch. 1880 ㎒	19185 Ch. 1908.5 ㎒		
3 ㎒	QPSK	1	0	22.77	23.23	23.09	0	0
		1	7	22.71	23.20	23.10	0	0
		1	14	22.76	23.28	23.14	0	0
		8	0	20.86	21.10	20.99	0-1	1
		8	3	20.82	21.10	21.06	0-1	1
		8	7	20.84	21.11	21.04	0-1	1
		15	0	20.83	21.08	21.04	0-1	1
	16QAM	1	0	20.60	20.96	20.74	0-1	1
		1	7	20.57	20.91	20.72	0-1	1
		1	14	20.63	20.82	20.79	0-1	1
		8	0	19.74	19.97	19.81	0-2	2
		8	3	19.70	19.93	19.86	0-2	2
		8	7	19.71	19.93	19.94	0-2	2
		15	0	19.74	20.00	19.88	0-2	2

LTE Band 2 _ 5 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18625 Ch. 1852.5 MHz	18900Ch. 1880 MHz	19175 Ch. 1907.5 MHz		
5 MHz	QPSK	1	0	22.81	23.15	23.06	0	0
		1	12	22.75	23.08	22.96	0	0
		1	24	22.84	23.06	23.03	0	0
		12	0	20.79	21.04	21.03	0-1	1
		12	6	20.79	21.03	20.99	0-1	1
		12	11	20.75	21.06	21.01	0-1	1
		25	0	20.82	21.08	21.00	0-1	1
	16QAM	1	0	20.85	21.13	20.96	0-1	1
		1	12	20.82	21.15	21.11	0-1	1
		1	24	20.83	21.18	21.14	0-1	1
		12	0	19.75	20.14	19.93	0-2	2
		12	6	19.78	20.03	19.88	0-2	2
		12	11	19.75	20.00	19.93	0-2	2
		25	0	19.72	20.01	19.92	0-2	2

LTE Band 2 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18650 Ch. 1855 ㎒	18900 Ch. 1880 ㎒	19150 Ch. 1905 ㎒		
10 ㎒	QPSK	1	0	22.87	23.14	23.08	0	0
		1	24	22.78	23.11	23.07	0	0
		1	49	22.85	23.13	22.86	0	0
		25	0	20.72	21.09	21.08	0-1	1
		25	12	20.74	21.05	21.01	0-1	1
		25	24	20.72	21.09	21.01	0-1	1
		50	0	20.74	21.08	21.06	0-1	1
	16QAM	1	0	20.43	21.13	21.15	0-1	1
		1	24	20.77	21.21	21.15	0-1	1
		1	49	20.75	21.13	21.12	0-1	1
		25	0	19.66	20.06	19.94	0-2	2
		25	12	19.61	19.96	19.92	0-2	2
		25	24	19.69	19.95	20.01	0-2	2
		50	0	19.73	20.05	19.96	0-2	2

LTE Band 2 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18675 Ch. 1857.5 ㎒	18900 Ch. 1880 ㎒	19125 Ch. 1902.5 ㎒		
15 ㎒	QPSK	1	0	22.98	23.15	22.95	0	0
		1	36	22.90	23.26	23.14	0	0
		1	74	22.88	23.29	23.15	0	0
		36	0	20.86	21.14	21.01	0-1	1
		36	18	20.89	21.10	20.99	0-1	1
		36	39	20.87	21.10	20.98	0-1	1
		75	0	20.82	21.14	21.02	0-1	1
	16QAM	1	0	20.61	20.94	20.67	0-1	1
		1	36	20.49	20.86	20.77	0-1	1
		1	74	20.61	20.91	20.88	0-1	1
		36	0	19.73	20.05	19.87	0-2	2
		36	18	19.69	19.99	19.87	0-2	2
		36	39	19.72	20.06	19.89	0-2	2
		75	0	19.81	20.07	19.95	0-2	2

LTE Band 2 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18700 Ch. 1860 ㎒	18900 Ch. 1880 ㎒	19100 Ch. 1900 ㎒		
20 ㎒	QPSK	1	0	22.94	22.77	23.01	0	0
		1	49	22.91	23.13	23.05	0	0
		1	99	22.99	**23.16**	22.78	0	0
		50	0	20.90	21.08	21.05	0-1	1
		50	25	20.88	**21.09**	21.04	0-1	1
		50	49	20.89	21.07	21.05	0-1	1
		100	0	20.90	21.14	20.99	0-1	1
	16QAM	1	0	20.65	21.06	20.97	0-1	1
		1	49	20.92	21.20	21.11	0-1	1
		1	99	21.13	21.22	21.09	0-1	1
		50	0	19.82	20.07	19.94	0-2	2
		50	25	19.87	19.99	19.92	0-2	2
		50	49	19.91	20.03	19.94	0-2	2
		100	0	19.90	20.02	19.92	0-2	2

[LTE Band 4 Conducted Power]

LTE Band 4 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19957 Ch. 1710.7 ㎒	20175 Ch. 1732.5 ㎒	20393 Ch. 1754.3 ㎒		
1.4 ㎒	QPSK	1	0	23.35	23.34	23.37	0	0
		1	3	23.36	23.21	23.53	0	0
		1	5	23.38	23.23	23.55	0	0
		3	0	23.37	23.17	23.37	0	0
		3	1	23.33	23.14	23.43	0	0
		3	3	23.33	23.12	23.37	0	0
		6	0	21.31	21.15	21.24	0-1	1
	16QAM	1	0	20.95	20.77	20.94	0-1	1
		1	3	21.12	20.77	20.99	0-1	1
		1	5	21.13	20.81	21.00	0-1	1
		3	0	21.16	20.97	21.13	0-1	1
		3	1	21.16	20.97	21.15	0-1	1
		3	3	21.14	21.02	21.19	0-1	1
		6	0	20.22	20.14	20.22	0-2	2

LTE Band 4 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19965 Ch. 1711.5 ㎒	20175 Ch. 1732.5 ㎒	20385 Ch. 1753.5 ㎒		
3 ㎒	QPSK	1	0	23.19	23.13	23.36	0	0
		1	7	23.18	23.22	23.36	0	0
		1	14	23.15	23.14	23.39	0	0
		8	0	21.28	21.10	21.30	0-1	1
		8	3	21.27	21.19	21.28	0-1	1
		8	7	21.24	21.16	21.29	0-1	1
		15	0	21.24	21.17	21.31	0-1	1
	16QAM	1	0	21.22	21.20	21.22	0-1	1
		1	7	21.27	21.35	21.39	0-1	1
		1	14	21.32	21.19	21.38	0-1	1
		8	0	20.16	20.11	20.32	0-2	2
		8	3	20.20	20.05	20.25	0-2	2
		8	7	20.25	20.09	20.27	0-2	2
		15	0	20.22	20.19	20.28	0-2	2

LTE Band 4 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19975 Ch. 1712.5 ㎒	20175 Ch. 1732.5 ㎒	20375 Ch. 1752.5 ㎒		
5 ㎒	QPSK	1	0	23.19	23.23	23.37	0	0
		1	12	23.19	23.17	23.34	0	0
		1	24	23.27	23.07	23.41	0	0
		12	0	21.21	21.19	21.29	0-1	1
		12	6	21.27	21.18	21.37	0-1	1
		12	11	21.29	21.10	21.33	0-1	1
		25	0	21.29	21.14	21.28	0-1	1
	16QAM	1	0	21.30	21.12	21.49	0-1	1
		1	12	21.39	21.09	21.32	0-1	1
		1	24	21.36	21.27	21.35	0-1	1
		12	0	20.13	20.07	20.24	0-2	2
		12	6	20.26	20.11	20.28	0-2	2
		12	11	20.26	20.13	20.31	0-2	2
		25	0	20.24	20.13	20.23	0-2	2

LTE Band 4 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20000 Ch. 1715 ㎒	20175 Ch. 1732.5 ㎒	20350 Ch. 1750 ㎒		
10 ㎒	QPSK	1	0	22.95	22.93	23.08	0	0
		1	24	23.19	23.14	23.31	0	0
		1	49	23.36	22.75	23.16	0	0
		25	0	21.22	21.12	21.26	0-1	1
		25	12	21.23	21.14	21.25	0-1	1
		25	24	21.24	21.16	21.23	0-1	1
		50	0	21.26	21.11	21.25	0-1	1
	16QAM	1	0	21.09	21.25	21.33	0-1	1
		1	24	21.33	21.21	21.44	0-1	1
		1	49	21.33	21.14	21.42	0-1	1
		25	0	20.13	20.08	20.18	0-2	2
		25	12	20.12	20.07	20.21	0-2	2
		25	24	20.17	20.13	20.27	0-2	2
		50	0	20.17	20.10	20.28	0-2	2

LTE Band 4 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20025 Ch. 1717.5 ㎒	20175 Ch. 1732.5 ㎒	20325 Ch. 1747.5 ㎒		
15 ㎒	QPSK	1	0	22.31	23.04	23.19	0	0
		1	36	23.29	23.14	23.33	0	0
		1	74	23.27	22.86	23.29	0	0
		36	0	21.22	21.12	21.28	0-1	1
		36	18	21.22	21.14	21.24	0-1	1
		36	39	21.25	21.11	21.27	0-1	1
		75	0	21.23	21.12	21.23	0-1	1
	16QAM	1	0	21.28	20.80	21.30	0-1	1
		1	36	21.33	21.32	21.32	0-1	1
		1	74	21.20	21.34	21.27	0-1	1
		36	0	20.16	20.17	20.20	0-2	2
		36	18	20.20	20.13	20.17	0-2	2
		36	39	20.15	20.15	20.19	0-2	2
		75	0	20.13	20.23	20.23	0-2	2

LTE Band 4 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm] 20175 Ch. 1732.5 ㎒	MPR Allowed Per 3GPP [dB]	MPR [dB]
20 ㎒	QPSK	1	0	23.16	0	0
		1	49	23.14	0	0
		1	99	22.99	0	0
		50	0	21.10	0-1	1
		50	25	21.12	0-1	1
		50	49	21.17	0-1	1
		100	0	21.12	0-1	1
	16QAM	1	0	21.10	0-1	1
		1	49	21.32	0-1	1
		1	99	21.18	0-1	1
		50	0	20.11	0-2	2
		50	25	20.12	0-2	2
		50	49	20.15	0-2	2
		100	0	20.09	0-2	2

Note: LTE Band 4 (AWS) at 20 ㎒ Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 5 Conducted Power]

LTE Band 5 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20407 Ch. 824.7 ㎒	20525 Ch. 836.5 ㎒	20643 Ch. 848.3 ㎒		
1.4 ㎒	QPSK	1	0	22.85	22.87	22.79	0	0
		1	3	22.87	22.86	22.77	0	0
		1	5	22.85	22.85	22.76	0	0
		3	0	22.83	22.86	22.76	0	0
		3	1	22.82	22.86	22.77	0	0
		3	3	22.85	22.91	22.77	0	0
		6	0	20.78	20.80	20.69	0-1	1
	16QAM	1	0	20.44	20.65	20.71	0-1	1
		1	3	20.45	20.35	20.57	0-1	1
		1	5	20.54	20.35	20.50	0-1	1
		3	0	20.69	20.67	20.64	0-1	1
		3	1	20.60	20.68	20.67	0-1	1
		3	3	20.72	20.70	20.71	0-1	1
		6	0	19.88	19.77	19.73	0-2	2

LTE Band 5 _ 3 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20415 Ch. 825.5 MHz	20525 Ch. 836.5 MHz	20635 Ch. 847.5 MHz		
3 MHz	QPSK	1	0	22.83	22.83	22.82	0	0
		1	7	22.79	22.85	22.69	0	0
		1	14	22.77	22.79	22.71	0	0
		8	0	20.71	20.83	20.77	0-1	1
		8	3	20.75	20.76	20.73	0-1	1
		8	7	20.74	20.76	20.72	0-1	1
		15	0	20.80	20.80	20.72	0-1	1
	16QAM	1	0	20.73	20.97	20.60	0-1	1
		1	7	20.35	20.83	20.72	0-1	1
		1	14	20.35	20.78	20.46	0-1	1
		8	0	19.89	19.81	19.70	0-2	2
		8	3	19.79	19.85	19.79	0-2	2
		8	7	19.73	19.77	19.87	0-2	2
		15	0	19.80	19.81	19.69	0-2	2

LTE Band 5 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20425 Ch. 826.5 ㎒	20525 Ch. 836.5 ㎒	20625 Ch. 846.5 ㎒		
5 ㎒	QPSK	1	0	22.92	22.87	22.89	0	0
		1	12	22.90	22.87	22.84	0	0
		1	24	22.91	22.86	22.84	0	0
		12	0	20.83	20.74	20.80	0-1	1
		12	6	20.82	20.75	20.81	0-1	1
		12	11	20.80	20.77	20.80	0-1	1
		25	0	20.81	20.74	20.80	0-1	1
	16QAM	1	0	20.53	20.31	20.52	0-1	1
		1	12	20.48	20.54	20.63	0-1	1
		1	24	20.56	20.51	20.52	0-1	1
		12	0	19.76	19.75	19.78	0-2	2
		12	6	19.70	19.80	19.77	0-2	2
		12	11	19.78	19.78	19.76	0-2	2
		25	0	19.84	19.78	19.84	0-2	2

LTE Band 5 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm] 20525 Ch. 836.5 ㎒	MPR Allowed Per 3GPP [dB]	MPR [dB]
10 ㎒	QPSK	1	0	22.94	0	0
		1	24	22.83	0	0
		1	49	22.88	0	0
		25	0	20.73	0-1	1
		25	12	20.75	0-1	1
		25	24	20.81	0-1	1
		50	0	20.77	0-1	1
	16QAM	1	0	20.59	0-1	1
		1	24	20.37	0-1	1
		1	49	20.49	0-1	1
		25	0	19.71	0-2	2
		25	12	19.88	0-2	2
		25	24	19.80	0-2	2
		50	0	19.82	0-2	2

Note: LTE Band 5 at 10 ㎒ Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 12 Conducted Power]

LTE Band 12 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23017 Ch. 699.7 ㎒	23095 Ch. 707.5 ㎒	23173 Ch. 715.3 ㎒		
1.4 ㎒	QPSK	1	0	23.03	23.18	22.98	0	0
		1	3	22.99	23.22	22.95	0	0
		1	5	23.00	23.17	23.02	0	0
		3	0	23.08	23.11	22.93	0	0
		3	1	23.03	23.13	22.91	0	0
		3	3	23.02	23.12	22.99	0	0
		6	0	20.98	21.03	20.92	0-1	1
	16QAM	1	0	20.59	20.86	20.57	0-1	1
		1	3	20.60	20.59	20.40	0-1	1
		1	5	20.67	20.68	20.51	0-1	1
		3	0	20.95	20.98	20.70	0-1	1
		3	1	20.81	20.94	20.83	0-1	1
		3	3	20.81	20.89	20.72	0-1	1
		6	0	19.72	19.90	19.70	0-2	2

LTE Band 12 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23025 Ch. 700.5 ㎒	23095 Ch. 707.5 ㎒	23165 Ch. 714.5 ㎒		
3 ㎒	QPSK	1	0	22.96	23.08	22.92	0	0
		1	7	22.82	23.10	22.82	0	0
		1	14	22.86	23.11	22.87	0	0
		8	0	20.99	21.18	20.93	0-1	1
		8	3	20.96	21.19	20.90	0-1	1
		8	7	21.00	21.16	20.91	0-1	1
		15	0	20.95	21.14	20.96	0-1	1
	16QAM	1	0	20.57	20.89	20.57	0-1	1
		1	7	20.62	20.81	20.60	0-1	1
		1	14	20.58	20.79	20.65	0-1	1
		8	0	19.80	20.04	19.67	0-2	2
		8	3	19.75	19.97	19.67	0-2	2
		8	7	19.72	19.97	19.63	0-2	2
		15	0	19.73	19.92	19.78	0-2	2

LTE Band 12 _ 5 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23035 Ch. 701.5 MHz	23095 Ch. 707.5 MHz	23155 Ch. 713.5 MHz		
5 MHz	QPSK	1	0	22.95	23.22	23.00	0	0
		1	12	22.94	23.13	22.90	0	0
		1	24	22.91	23.09	22.87	0	0
		12	0	20.96	21.18	20.93	0-1	1
		12	6	20.95	21.14	20.95	0-1	1
		12	11	20.87	21.10	20.93	0-1	1
		25	0	20.91	21.21	20.95	0-1	1
	16QAM	1	0	20.78	20.78	20.72	0-1	1
		1	12	20.74	20.76	20.81	0-1	1
		1	24	20.67	20.77	20.68	0-1	1
		12	0	19.70	19.89	19.68	0-2	2
		12	6	19.63	19.86	19.65	0-2	2
		12	11	19.67	19.86	19.67	0-2	2
		25	0	19.70	20.01	19.74	0-2	2

LTE Band 12 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm] 23095 Ch. 707.5 ㎒	MPR Allowed Per 3GPP [dB]	MPR [dB]
10 ㎒	QPSK	1	0	**23.27**	0	0
		1	24	23.19	0	0
		1	49	23.12	0	0
		25	0	**21.14**	0-1	1
		25	12	21.11	0-1	1
		25	24	21.09	0-1	1
		50	0	21.14	0-1	1
	16QAM	1	0	21.03	0-1	1
		1	24	20.86	0-1	1
		1	49	21.13	0-1	1
		25	0	19.97	0-2	2
		25	12	19.89	0-2	2
		25	24	19.90	0-2	2
		50	0	19.95	0-2	2

Note: LTE Band 12 at 10 ㎒ Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 13 Conducted Power]

LTE Band 13 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23205 Ch. 779.5 ㎒	23230 Ch. 782 ㎒	23255 Ch. 784.5 ㎒		
5 ㎒	QPSK	1	0	23.02	23.09	22.85	0	0
		1	12	22.86	23.06	22.77	0	0
		1	24	22.74	22.97	22.85	0	0
		12	0	20.95	21.02	20.82	0-1	1
		12	6	20.85	21.01	20.79	0-1	1
		12	11	20.82	21.02	20.76	0-1	1
		25	0	20.84	20.99	20.81	0-1	1
	16QAM	1	0	20.74	20.79	20.47	0-1	1
		1	12	20.74	20.66	20.47	0-1	1
		1	24	20.55	20.67	20.52	0-1	1
		12	0	19.75	19.84	19.65	0-2	2
		12	6	19.71	19.91	19.62	0-2	2
		12	11	19.60	19.79	19.71	0-2	2
		25	0	19.76	19.88	19.70	0-2	2

LTE Band 13 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm] 23230 Ch. 782 ㎒	MPR Allowed Per 3GPP [dB]	MPR [dB]
10 ㎒	QPSK	1	0	23.16	0	0
		1	24	23.04	0	0
		1	49	23.04	0	0
		25	0	21.07	0-1	1
		25	12	20.98	0-1	1
		25	24	20.93	0-1	1
		50	0	20.96	0-1	1
	16QAM	1	0	20.95	0-1	1
		1	24	20.77	0-1	1
		1	49	20.56	0-1	1
		25	0	19.97	0-2	2
		25	12	19.90	0-2	2
		25	24	19.84	0-2	2
		50	0	19.87	0-2	2

Note: LTE Band 13 at 10 ㎒ Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

[LTE Band 25 Conducted Power]

LTE Band 25 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26047 Ch. 1850.7 ㎒	26365 Ch. 1882.5 ㎒	26683 Ch. 1914.3 ㎒		
1.4 ㎒	QPSK	1	0	22.88	23.10	21.98	0	0
		1	3	22.81	23.05	21.96	0	0
		1	5	22.78	23.07	21.97	0	0
		3	0	22.86	23.11	21.96	0	0
		3	1	22.87	23.04	22.02	0	0
		3	3	22.79	23.07	21.97	0	0
		6	0	21.17	21.34	20.25	0-1	1
	16QAM	1	0	20.83	20.86	19.98	0-1	1
		1	3	20.93	21.06	20.40	0-1	1
		1	5	20.77	20.93	20.62	0-1	1
		3	0	21.02	21.19	20.08	0-1	1
		3	1	21.02	21.19	20.10	0-1	1
		3	3	20.99	21.22	20.03	0-1	1
		6	0	20.18	20.23	19.13	0-2	2

LTE Band 25 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26055 Ch. 1851.5 ㎒	26365 Ch. 1882.5 ㎒	26675Ch. 1913.5 ㎒		
3 ㎒	QPSK	1	0	22.81	22.96	21.96	0	0
		1	7	22.76	23.03	21.94	0	0
		1	14	22.70	23.03	21.87	0	0
		8	0	21.12	21.35	20.24	0-1	1
		8	3	21.08	21.27	20.26	0-1	1
		8	7	21.16	21.32	20.22	0-1	1
		15	0	21.06	21.31	20.28	0-1	1
	16QAM	1	0	20.82	21.31	19.99	0-1	1
		1	7	20.82	21.12	20.03	0-1	1
		1	14	21.20	21.24	20.20	0-1	1
		8	0	20.06	20.31	19.23	0-2	2
		8	3	20.08	20.20	19.22	0-2	2
		8	7	20.10	20.34	19.23	0-2	2
		15	0	20.08	20.31	19.30	0-2	2

LTE Band 25 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26065 Ch. 1852.5 ㎒	26365 Ch. 1882.5 ㎒	26665 Ch. 1912.5 ㎒		
5 ㎒	QPSK	1	0	22.85	23.14	22.02	0	0
		1	12	22.78	23.13	22.01	0	0
		1	24	22.83	23.18	22.06	0	0
		12	0	21.12	21.34	20.26	0-1	1
		12	6	21.11	21.32	20.30	0-1	1
		12	11	21.06	21.36	20.29	0-1	1
		25	0	21.09	21.32	20.29	0-1	1
	16QAM	1	0	20.92	21.40	20.27	0-1	1
		1	12	21.12	21.33	20.16	0-1	1
		1	24	20.92	21.35	20.05	0-1	1
		12	0	20.03	20.28	19.22	0-2	2
		12	6	20.04	20.29	19.24	0-2	2
		12	11	20.00	20.28	19.16	0-2	2
		25	0	20.08	20.30	19.21	0-2	2

LTE Band 25 _ 10 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26090 Ch. 1855 MHz	26365 Ch. 1882.5 MHz	26640 Ch. 1910 MHz		
10 MHz	QPSK	1	0	22.84	23.09	22.10	0	0
		1	24	22.83	23.04	22.06	0	0
		1	49	22.78	23.11	21.60	0	0
		25	0	21.10	21.31	20.28	0-1	1
		25	12	21.14	21.29	20.23	0-1	1
		25	24	21.13	21.37	20.25	0-1	1
		50	0	21.11	21.31	20.27	0-1	1
	16QAM	1	0	20.84	21.05	20.00	0-1	1
		1	24	20.80	21.11	20.03	0-1	1
		1	49	20.91	21.12	19.91	0-1	1
		25	0	20.08	20.37	19.31	0-2	2
		25	12	20.08	20.30	19.30	0-2	2
		25	24	20.04	20.32	19.32	0-2	2
		50	0	20.11	20.38	19.32	0-2	2

LTE Band 25 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26115 Ch. 1857.5 ㎒	26365 Ch. 1882.5 ㎒	26615 Ch. 1907.5 ㎒		
15 ㎒	QPSK	1	0	22.89	23.11	22.06	0	0
		1	36	22.94	23.04	22.04	0	0
		1	74	22.96	23.09	20.96	0	0
		36	0	21.21	21.38	20.32	0-1	1
		36	18	21.18	21.40	20.32	0-1	1
		36	39	21.22	21.38	20.29	0-1	1
		75	0	21.15	21.37	20.37	0-1	1
	16QAM	1	0	21.05	21.45	20.30	0-1	1
		1	36	21.12	21.27	20.27	0-1	1
		1	74	21.31	21.34	21.22	0-1	1
		36	0	20.07	20.29	19.26	0-2	2
		36	18	20.03	20.29	19.27	0-2	2
		36	39	20.08	20.32	19.30	0-2	2
		75	0	20.11	20.33	19.37	0-2	2

LTE Band 25 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26140 Ch. 1860 ㎒	26365 Ch. 1882.5 ㎒	26590 Ch. 1905 ㎒		
20 ㎒	QPSK	1	0	22.86	22.77	22.14	0	0
		1	49	22.87	**23.19**	22.12	0	0
		1	99	22.94	22.83	21.22	0	0
		50	0	21.21	21.37	20.32	0-1	1
		50	25	21.19	21.37	20.36	0-1	1
		50	49	21.14	**21.43**	20.35	0-1	1
		100	0	21.15	21.34	20.43	0-1	1
	16QAM	1	0	20.94	21.27	20.32	0-1	1
		1	49	20.92	21.13	20.13	0-1	1
		1	99	20.99	21.28	20.02	0-1	1
		50	0	20.12	20.35	19.38	0-2	2
		50	25	20.16	20.33	19.38	0-2	2
		50	49	20.12	20.36	19.39	0-2	2
		100	0	20.10	20.31	19.26	0-2	2

[LTE Band 26 Conducted Power]

LTE Band 26 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26697 Ch. 814.7 ㎒	26865 Ch. 831.5 ㎒	27033 Ch. 848.3 ㎒		
1.4 ㎒	QPSK	1	0	22.87	22.98	22.98	0	0
		1	3	22.96	22.95	22.94	0	0
		1	5	22.94	22.92	22.93	0	0
		3	0	22.91	22.95	22.93	0	0
		3	1	22.92	22.94	22.90	0	0
		3	3	22.92	22.91	22.93	0	0
		6	0	20.84	20.81	20.79	0-1	1
	16QAM	1	0	20.47	20.47	20.51	0-1	1
		1	3	20.57	20.48	20.50	0-1	1
		1	5	20.58	20.43	20.46	0-1	1
		3	0	20.71	20.75	20.69	0-1	1
		3	1	20.75	20.69	20.66	0-1	1
		3	3	20.75	20.74	20.63	0-1	1
		6	0	19.84	19.75	19.83	0-2	2

LTE Band 26 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26705 Ch. 815.5 ㎒	26865 Ch. 831.5 ㎒	27025 Ch. 847.5 ㎒		
3 ㎒	QPSK	1	0	22.86	22.86	22.92	0	0
		1	7	22.80	22.85	22.83	0	0
		1	14	22.87	22.84	22.89	0	0
		8	0	20.78	20.82	20.83	0-1	1
		8	3	20.77	20.86	20.85	0-1	1
		8	7	20.79	20.79	20.80	0-1	1
		15	0	20.78	20.83	20.83	0-1	1
	16QAM	1	0	20.72	20.61	20.56	0-1	1
		1	7	20.54	20.60	20.58	0-1	1
		1	14	20.47	20.52	20.45	0-1	1
		8	0	19.72	19.80	19.78	0-2	2
		8	3	19.77	19.82	19.79	0-2	2
		8	7	19.80	19.82	19.73	0-2	2
		15	0	19.82	19.79	19.80	0-2	2

LTE Band 26 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26715 Ch. 816.5 ㎒	26865 Ch. 831.5 ㎒	27015 Ch. 846.5 ㎒		
5 ㎒	QPSK	1	0	22.89	22.94	23.01	0	0
		1	12	22.89	22.93	22.92	0	0
		1	24	22.86	22.94	22.91	0	0
		12	0	20.79	20.86	20.87	0-1	1
		12	6	20.86	20.82	20.86	0-1	1
		12	11	20.76	20.85	20.82	0-1	1
		25	0	20.84	20.83	20.84	0-1	1
	16QAM	1	0	20.39	20.61	20.61	0-1	1
		1	12	20.52	20.51	20.52	0-1	1
		1	24	20.49	20.44	20.61	0-1	1
		12	0	19.81	19.74	19.78	0-2	2
		12	6	19.74	19.79	19.84	0-2	2
		12	11	19.78	19.73	19.71	0-2	2
		25	0	19.80	19.85	19.84	0-2	2

LTE Band 26 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26740 Ch. 819 ㎒	26865 Ch. 831.5 ㎒	26990 Ch. 844 ㎒		
10 ㎒	QPSK	1	0	23.04	22.96	22.97	0	0
		1	24	22.97	22.91	22.90	0	0
		1	49	22.96	22.89	22.88	0	0
		25	0	20.88	20.81	20.80	0-1	1
		25	12	20.87	20.77	20.82	0-1	1
		25	24	20.80	20.84	20.76	0-1	1
		50	0	20.81	20.79	20.86	0-1	1
	16QAM	1	0	20.65	20.55	20.66	0-1	1
		1	24	20.56	20.41	20.60	0-1	1
		1	49	20.57	20.60	20.47	0-1	1
		25	0	19.86	19.87	19.77	0-2	2
		25	12	19.85	19.80	19.73	0-2	2
		25	24	19.85	19.76	19.75	0-2	2
		50	0	19.83	19.80	19.79	0-2	2

LTE Band 26 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				26765 Ch. 821.5 ㎒	26865 Ch. 831.5 ㎒	26965 Ch. 841.5 ㎒		
15 ㎒	QPSK	1	0	**23.08**	23.00	23.01	0	0
		1	36	23.04	22.93	22.92	0	0
		1	74	22.95	23.00	23.01	0	0
		36	0	**20.90**	20.82	20.88	0-1	1
		36	18	20.84	20.84	20.87	0-1	1
		36	39	20.87	20.80	20.87	0-1	1
		75	0	20.89	20.79	20.90	0-1	1
	16QAM	1	0	20.76	20.69	20.56	0-1	1
		1	36	20.62	20.59	20.57	0-1	1
		1	74	20.57	20.48	20.66	0-1	1
		36	0	19.83	19.75	19.82	0-2	2
		36	18	19.82	19.83	19.81	0-2	2
		36	39	19.78	19.77	19.82	0-2	2
		75	0	19.81	19.81	19.90	0-2	2

[LTE Band 66]

LTE Band 66 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				131979Ch. 1710.7 ㎒	132322 Ch. 1745 ㎒	132665 Ch. 1779.3 ㎒		
1.4 ㎒	QPSK	1	0	23.21	23.33	22.70	0	0
		1	3	23.24	23.33	22.73	0	0
		1	5	23.30	23.32	22.75	0	0
		3	0	23.20	23.27	22.73	0	0
		3	1	23.21	23.31	22.73	0	0
		3	3	23.24	23.24	22.73	0	0
		6	0	21.21	21.28	20.67	0-1	1
	16QAM	1	0	20.88	20.89	20.26	0-1	1
		1	3	20.77	20.88	20.40	0-1	1
		1	5	20.78	20.91	20.36	0-1	1
		3	0	21.05	21.07	20.43	0-1	1
		3	1	21.09	21.07	20.55	0-1	1
		3	3	21.02	21.01	20.56	0-1	1
		6	0	20.15	20.14	19.61	0-2	2

LTE Band 66 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				131987 Ch. 1711.5 ㎒	132322 Ch. 1745 ㎒	132657 Ch. 1778.5 ㎒		
3 ㎒	QPSK	1	0	23.17	23.18	22.57	0	0
		1	7	23.13	23.18	22.60	0	0
		1	14	23.12	23.29	22.62	0	0
		8	0	21.17	21.22	20.66	0-1	1
		8	3	21.19	21.21	20.63	0-1	1
		8	7	21.20	21.24	20.67	0-1	1
		15	0	21.22	21.22	20.67	0-1	1
	16QAM	1	0	21.02	21.19	20.35	0-1	1
		1	7	20.91	21.25	20.26	0-1	1
		1	14	21.16	21.18	20.67	0-1	1
		8	0	20.12	20.15	19.54	0-2	2
		8	3	20.12	20.11	19.58	0-2	2
		8	7	20.16	20.13	19.53	0-2	2
		15	0	20.17	20.13	19.56	0-2	2

LTE Band 66 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				131997 Ch. 1712.5 ㎒	132322Ch. 1745 ㎒	132647 Ch. 1777.5 ㎒		
5 ㎒	QPSK	1	0	23.15	23.23	22.78	0	0
		1	12	23.20	23.20	22.72	0	0
		1	24	23.25	23.17	22.67	0	0
		12	0	21.14	21.18	20.60	0-1	1
		12	6	21.19	21.26	20.67	0-1	1
		12	11	21.14	21.28	20.67	0-1	1
		25	0	21.15	21.21	20.64	0-1	1
	16QAM	1	0	21.16	21.25	20.75	0-1	1
		1	12	21.20	21.29	20.68	0-1	1
		1	24	21.13	21.45	20.68	0-1	1
		12	0	20.18	20.14	19.56	0-2	2
		12	6	20.13	20.17	19.62	0-2	2
		12	11	20.16	20.18	19.55	0-2	2
		25	0	20.08	20.21	19.62	0-2	2

LTE Band 66 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				132022 Ch. 1715 ㎒	132322 Ch. 1745 ㎒	132622 Ch. 1775 ㎒		
10 ㎒	QPSK	1	0	23.18	22.84	22.70	0	0
		1	24	23.19	23.24	22.90	0	0
		1	49	23.26	22.90	22.87	0	0
		25	0	21.19	21.19	20.73	0-1	1
		25	12	21.18	21.28	20.70	0-1	1
		25	24	21.20	21.22	20.67	0-1	1
		50	0	21.19	21.27	20.73	0-1	1
	16QAM	1	0	21.09	21.12	20.38	0-1	1
		1	24	21.09	21.17	20.53	0-1	1
		1	49	21.12	21.11	20.64	0-1	1
		25	0	20.15	20.22	19.64	0-2	2
		25	12	20.13	20.21	19.66	0-2	2
		25	24	20.24	20.18	19.68	0-2	2
		50	0	20.19	20.18	19.64	0-2	2

LTE Band 66 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				132047 Ch. 1717.5 ㎒	132322 Ch. 1745 ㎒	132597 Ch. 1772.5 ㎒		
15 ㎒	QPSK	1	0	23.12	22.95	22.83	0	0
		1	36	23.30	23.16	22.82	0	0
		1	74	23.25	23.01	22.88	0	0
		36	0	21.23	21.23	20.71	0-1	1
		36	18	21.22	21.30	20.67	0-1	1
		36	39	21.24	21.26	20.71	0-1	1
		75	0	21.20	21.21	20.71	0-1	1
	16QAM	1	0	20.91	21.02	20.49	0-1	1
		1	36	21.06	21.16	20.46	0-1	1
		1	74	21.00	21.12	20.52	0-1	1
		36	0	20.16	20.17	19.66	0-2	2
		36	18	20.19	20.20	19.65	0-2	2
		36	39	20.19	20.20	19.60	0-2	2
		75	0	20.15	20.22	19.69	0-2	2

LTE Band 66 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				132072 Ch. 1720 ㎒	132322 Ch. 1745 ㎒	132572 Ch. 1770 ㎒		
20 ㎒	QPSK	1	0	22.93	22.83	22.79	0	0
		1	49	23.07	**23.27**	22.72	0	0
		1	99	23.24	22.97	22.71	0	0
		50	0	21.11	21.23	20.71	0-1	1
		50	25	21.15	21.23	20.73	0-1	1
		50	49	21.16	**21.32**	20.72	0-1	1
		100	0	21.14	21.27	20.73	0-1	1
	16QAM	1	0	20.87	20.93	20.35	0-1	1
		1	49	20.85	21.15	20.48	0-1	1
		1	99	20.82	21.21	20.47	0-1	1
		50	0	20.12	20.21	19.69	0-2	2
		50	25	20.13	20.24	19.69	0-2	2
		50	49	20.12	20.28	19.67	0-2	2
		100	0	20.10	20.17	19.67	0-2	2

11.2 WIFI Conducted Power measurement method

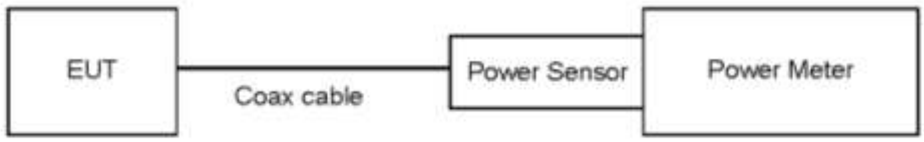
Un-Licensed bands (DTS Band)

Test Description	Test Procedure Used
Conducted Output Power	- KDB 558074 v05r02 - Section 8.3.2.3 - ANSI 63.10-2013 - Section 11.9.2.3

Test Procedure

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Test setup



11.2.1 IEEE 802.11 (2.4 GHz) Maximum Conducted Power

Mode	Frequency [㎒]	Channel	IEEE 802.11 (2.4 ㎓) Average RF Conducted Power [dBm]
802.11b	2 412	1	16.92
	2 437	6	16.94
	2 462	11	17.04
	2 467	12	11.16
	2 472	13	5.84
802.11g	2 412	1	14.05
	2 437	6	14.21
	2 462	11	14.03
	2 467	12	11.59
	2 472	13	6.68
802.11n (HT20)	2 412	1	12.79
	2 437	6	13.01
	2 462	11	12.89
	2 467	12	11.44
	2 472	13	6.71

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

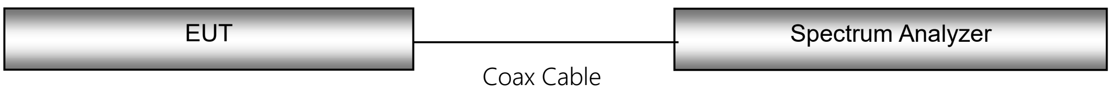
▪ Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.

▪ For transmission mode with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.

▪ For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.

▪ For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.

Test Configuration

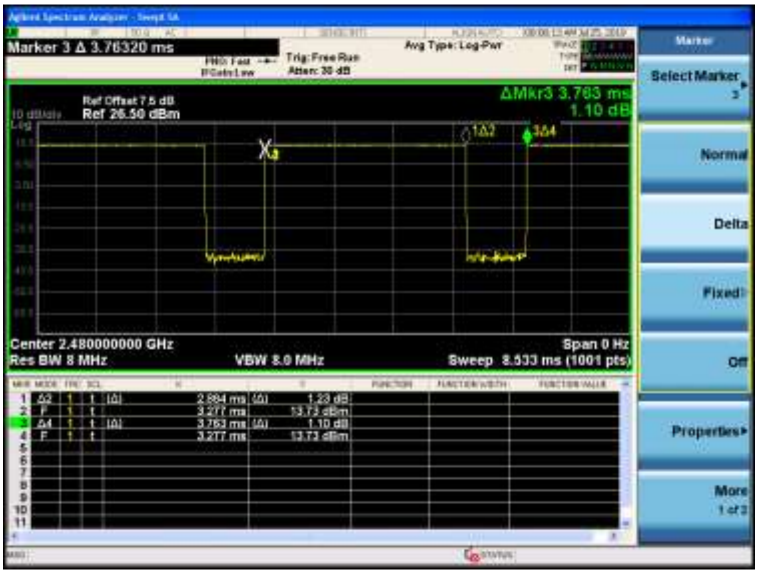


11.3 Bluetooth Conducted Power

The Burst averaged-conducted power

Mode	Channel	Bluetooth Power [dBm]
DH5	0	14.94
	39	15.74
	78	15.32
2-DH5	0	8.58
	39	8.04
	78	7.88
3-DH5	0	8.57
	39	8.05
	78	7.87

Per October 2016 TCB Workshop Notes:
When call box and Bluetooth protocol are used for Bluetooth SAR measurement, time-domain plot is required to identify duty factor for supporting the test setup and result.
Bluetooth duty cycle was measured using Bluetooth tester equipment (CBT / R&S) with Bluetooth protocol. DH5 mode is the highest duty cycle and conducted power. SAR test were performed at DH5 mode.



Duty Cycle

= (BT-On time /BT-Full time) =(2.884/3.763) = 0.766 (DH5)

Duty factor= 1/Duty cycle : 1.305

12. System Verification

12.1 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
07/17/2019	19.3	750H	700	0.854	42.050	0.889	42.200	-3.94%	-0.36%
			750	0.875	41.908	0.893	41.940	-2.02%	-0.08%
			785	0.924	41.430	0.896	41.758	3.13%	-0.79%
07/16/2019	18.5	835H	820	0.894	40.511	0.899	41.577	-0.56%	-2.56%
			835	0.909	40.296	0.900	41.500	1.00%	-2.90%
			850	0.925	40.075	0.916	41.500	0.98%	-3.43%
07/15/2019	20.7	1800H	1710	1.313	41.127	1.348	40.142	-2.60%	2.45%
			1750	1.355	41.071	1.371	40.079	-1.17%	2.48%
			1800	1.407	41.026	1.400	40.000	0.50%	2.57%
07/12/2019	18.0	1900H	1850	1.382	38.862	1.400	40.000	-1.29%	-2.85%
			1900	1.440	38.722	1.400	40.000	2.86%	-3.20%
			1910	1.447	38.718	1.400	40.000	3.36%	-3.20%
07/25/2019	21.1	2450H	2400	1.736	38.531	1.756	39.290	-1.14%	-1.93%
			2450	1.802	38.398	1.800	39.200	0.11%	-2.05%
			2500	1.852	38.208	1.855	39.140	-0.16%	-2.38%

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
07/18/2019	19.4	750B	700	0.912	56.879	0.959	55.730	-4.90%	2.06%
			750	0.962	56.383	0.963	55.530	-0.10%	1.54%
			785	0.998	55.996	0.966	55.397	3.31%	1.08%
07/19/2019	19.7	835B	820	0.944	56.610	0.969	55.260	-2.58%	2.44%
			835	0.959	56.412	0.970	55.200	-1.13%	2.20%
			850	0.971	56.253	0.988	55.150	-1.72%	2.00%
07/22/2019	18.6	1800B	1710	1.398	54.325	1.463	53.534	-4.44%	1.48%
			1750	1.439	54.283	1.488	53.430	-3.29%	1.60%
			1800	1.489	54.065	1.520	53.300	-2.04%	1.44%
07/23/2019	19.9	1900B	1850	1.529	53.658	1.520	53.300	0.59%	0.67%
			1900	1.579	53.529	1.520	53.300	3.88%	0.43%
			1910	1.571	53.571	1.520	53.300	3.36%	0.51%
07/25/2019	21.1	2450B	2400	1.871	53.671	1.902	52.770	-1.63%	1.71%
			2450	1.946	53.619	1.950	52.700	-0.21%	1.74%
			2500	2.002	53.503	2.021	52.640	-0.94%	1.64%

12.2 System Verification

System Verification Results – 1g SAR

* Input Power: 50 mW

Freq. [MHz]	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{1g} (SPEAG) [W/kg]	50mW Measured SAR_{1g} [W/kg]	1 W Normalized SAR_{1g} [W/kg]	Deviation [%]	Limit [%]
750	07/17/2019	3903	1014	Head	19.6	19.3	8.25	0.404	8.08	- 2.06	± 10
835	07/16/2019	3903	4d165	Head	18.8	18.5	9.41	0.469	9.38	- 0.32	± 10
1 800	07/15/2019	3903	2d007	Head	21.0	20.7	39.1	2.05	41.0	+ 4.86	± 10
1 900	07/12/2019	3903	5d032	Head	18.3	18.0	40.0	2.01	40.2	+ 0.50	± 10
2 450	07/25/2019	3968	743	Head	21.4	21.1	51.8	2.84	56.8	+ 9.65	± 10

System Verification Results – 10g SAR

* Input Power: 50 mW

Freq. [MHz]	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{10g} (SPEAG) [W/kg]	50mW Measured SAR_{10g} [W/kg]	1 W Normalized SAR_{10g} [W/kg]	Deviation [%]	Limit [%]
750	07/18/2019	3903	1014	Body	19.7	19.4	5.60	0.266	5.32	- 5.00	± 10
835	07/19/2019	3903	4d165	Body	20.0	19.7	6.21	0.296	5.92	- 4.67	± 10
1 800	07/22/2019	3903	2d007	Body	18.9	18.6	20.0	0.994	19.88	- 0.60	± 10
1 900	07/23/2019	3903	5d032	Body	20.2	19.9	20.8	0.970	19.4	- 6.73	± 10
2 450	07/25/2019	3968	743	Body	21.4	21.1	23.4	1.17	23.4	+ 0.00	± 10

12.3 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 equipment.
- 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.

13. SAR Test Data Summary

13.1 Standalone Face SAR Results (Stainless material)

UMTS 850 Head SAR (Next-to-Mouth)												
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.											
836.6	4183	RMC	24.0	22.94	-0.16	Front	1:1	10	0.011	1.276	0.014	1
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg Averaged over 1 gram					

UMTS 1700 Head SAR (Next-to-Mouth)												
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.											
1 732.4	1412	RMC	24.0	23.24	-0.10	Front	1:1	10	0.368	1.191	0.438	2
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg Averaged over 1 gram					

UMTS 1900 Head SAR (Next-to-Mouth)												
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.											
1 880	9400	RMC	24.0	23.33	-0.16	Front	1:1	10	0.431	1.167	0.503	3
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg Averaged over 1 gram					

LTE Band 2 Head SAR (Next-to-Mouth)																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 880	18900	QPSK	20	23.8	23.16	-0.02	Front	0	1	99	1:1	10	0.320	1.159	0.371	-
1 880	18900	QPSK	20	22.8	21.09	-0.18	Front	1	50	25	1:1	10	0.352	1.483	**0.522**	4
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram								

LTE Band 4 Head SAR (Next-to-Mouth)																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 732.5	20175	QPSK	20	23.8	23.16	-0.14	Front	0	1	0	1:1	10	0.229	1.159	0.265	-
1 732.5	20175	QPSK	20	22.8	21.17	-0.14	Front	1	50	49	1:1	10	0.384	1.455	**0.559**	5
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram								

LTE Band 12 Head SAR (Next-to-Mouth)																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
707.5	23095	QPSK	10	23.8	23.27	0.10	Front	0	1	0	1:1	10	0.00325	1.130	**0.004**	6
707.5	23095	QPSK	10	22.8	21.14	-0.11	Front	1	25	0	1:1	10	0.00236	1.466	0.003	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram								

LTE Band 13 Head SAR (Next-to-Mouth)																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
782	23230	QPSK	10	23.8	23.16	-0.13	Front	0	1	0	1:1	10	0.00734	1.159	**0.009**	7
782	23230	QPSK	10	22.8	21.07	0.01	Front	1	25	0	1:1	10	0.0043	1.489	0.006	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram								

LTE Band 25 Head SAR (Next-to-Mouth)																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 882.5	26365	QPSK	20	23.4	23.19	0.17	Front	0	1	49	1:1	10	0.543	1.050	**0.570**	8
1 882.5	26365	QPSK	20	22.4	21.43	-0.19	Front	1	50	49	1:1	10	0.349	1.250	0.436	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram								

LTE Band 26 Head SAR (Next-to-Mouth)																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
821.5	26765	QPSK	15	23.8	23.08	0.10	Front	0	1	0	1:1	10	0.544	1.180	**0.642**	9
821.5	26765	QPSK	15	22.8	20.90	0.12	Front	1	36	0	1:1	10	0.399	1.549	0.618	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram								

LTE Band 66 Head SAR (Next-to-Mouth)																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 745	132322	QPSK	20	23.5	23.27	-0.05	Front	0	1	49	1:1	10	0.379	1.054	**0.399**	10
1 745	132322	QPSK	20	22.5	21.32	-0.17	Front	1	50	49	1:1	10	0.275	1.312	0.361	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram								

2.4 ㎓ WLAN Head SAR (Next-to-Mouth)															
Frequency		Mode	Band width (㎒)	Data Rate (Mbps)	Tune-Up Limit (dBm)	Meas. Power (dBm)	Power Drift (dB)	Test Position	Duty Cycle	Distance (mm)	Meas. 1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty)	Reported SAR (W/kg)	Plot No.
㎒	Ch.														
2 462	11	802.11b	22	1	18.0	17.04	-0.13	Front	98.8	10	0.113	1.247	1.012	0.143	11
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population										Head 1.6 W/kg Averaged over 1 gram					

DSS Tethering SAR (Next-to-Mouth)												
Frequency		Mode	Tune-Up Limit (dBm)	Meas. Power (dBm)	Power Drift (dB)	Test Position	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Scaling Factor (Duty)	Reported SAR (W/kg)	Plot No.
㎒	Ch.											
2 441	39	Bluetooth DH5	16.5	15.74	0.01	Front	10	0.088	1.191	1.305	0.137	12
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram					

13.2 Standalone Extremity SAR Results (Stainless material)

UMTS 850 Extremity SAR												
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.											
836.6	4183	RMC	24.0	22.94	-0.18	Rear	1:1	0	0.208	1.276	0.265	13
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population							Extremity SAR 4.0 W/kg Averaged over 10 gram					

UMTS 1700 Extremity SAR												
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.											
1 712.4	1312	RMC	24.0	23.26	-0.14	Rear	1:1	0	1.32	1.186	1.566	-
1 732.4	1412	RMC	24.0	23.24	0.03	Rear	1:1	0	1.84	1.191	2.191	14
1 752.6	1513	RMC	24.0	23.32	-0.02	Rear	1:1	0	1.23	1.169	1.438	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population							Extremity SAR 4.0 W/kg Averaged over 10 gram					

UMTS 1900 Extremity SAR												
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.											
1 880	9400	RMC	24.0	23.33	0.15	Rear	1:1	0	1.51	1.167	1.762	15
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population							Extremity SAR 4.0 W/kg Averaged over 10 gram					

LTE Band 2 Extremity SAR																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 880	18900	QPSK	20	23.8	23.16	0.16	Rear	0	1	99	1:1	0	1.43	1.159	**1.657**	16
1 880	18900	QPSK	20	22.8	21.09	0.08	Rear	1	50	25	1:1	0	0.696	1.483	1.032	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population								Extremity SAR 4.0 W/kg Averaged over 10 gram								

LTE Band 4 Extremity SAR																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 732.5	20175	QPSK	20	23.8	23.16	-0.12	Rear	0	1	0	1:1	0	1.5	1.159	1.739	17-
1 732.5	20175	QPSK	20	22.8	21.17	0.04	Rear	1	50	49	1:1	0	1.24	1.455	1.804	
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population								Extremity SAR 4.0 W/kg Averaged over 10 gram								

LTE Band 12 Extremity SAR																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
707.5	23095	QPSK	10	23.8	23.27	0.18	Rear	0	1	0	1:1	0	0.195	1.130	**0.220**	18
707.5	23095	QPSK	10	22.8	21.14	-0.12	Rear	1	25	0	1:1	0	0.138	1.466	0.202	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population								Extremity SAR 4.0 W/kg Averaged over 10 gram								

LTE Band 13 Extremity SAR																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
782	23230	QPSK	10	23.8	23.16	-0.08	Rear	0	1	0	1:1	0	0.207	1.159	**0.240**	19
782	23230	QPSK	10	22.8	21.07	0.13	Rear	1	25	0	1:1	0	0.150	1.489	0.223	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population								Extremity SAR 4.0 W/kg Averaged over 10 gram								

LTE Band 25 Extremity SAR																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 882.5	26365	QPSK	20	23.4	23.19	-0.19	Rear	0	1	49	1:1	0	1.11	1.050	**1.166**	20
1 882.5	26365	QPSK	20	22.4	21.43	0.10	Rear	1	50	49	1:1	0	0.832	1.250	1.040	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population								Extremity SAR 4.0 W/kg Averaged over 10 gram								

LTE Band 26 Extremity SAR																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
821.5	26765	QPSK	15	23.8	23.08	0.10	Rear	0	1	0	1:1	0	0.250	1.180	**0.295**	21
821.5	26765	QPSK	15	22.8	20.90	0.12	Rear	1	36	0	1:1	0	0.183	1.549	0.283	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population								Extremity SAR 4.0 W/kg Averaged over 10 gram								

LTE Band 66 Extremity SAR																
Frequency		Mode	BW	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Reported SAR (W/kg)	Plot No.
MHz	Ch.															
1 745	132322	QPSK	20	23.5	23.27	-0.14	Rear	0	1	49	1:1	0	1.25	1.054	**1.318**	22
1 745	132322	QPSK	20	22.5	21.32	-0.14	Rear	1	50	49	1:1	0	0.796	1.312	1.044	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population								Extremity SAR 4.0 W/kg Averaged over 10 gram								

2.4 GHz WLAN Extremity SAR															
Frequency		Mode	Band width (MHz)	Data Rate (Mbps)	Tune-Up Limit (dBm)	Meas. Power (dBm)	Power Drift (dB)	Test Position	Duty Cycle	Distance (mm)	Meas. 10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty)	Reported SAR (W/kg)	Plot No.
MHz	Ch.														
2 462	11	802.11b	22	1	18.0	17.04	-0.13	Rear	98.8	0	0.190	1.247	1.012	0.240	23
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population										Extremity SAR 4.0 W/kg Averaged over 10 gram					

DSS Extremity SAR													
Frequency		Mode	Tune-Up Limit (dBm)	Meas. Power (dBm)	Power Drift (dB)	Test Position	Distance (mm)	Meas. 10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty)	Reported SAR (W/kg)	Plot No.
MHz	Ch.											
2 441	39	Bluetooth DH5	16.5	15.74	0.18	Rear	0	0.136	1.191	1.305	0.211	24
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak(Hands / Feet / Ankle / Wrist) Uncontrolled Exposure/ General Population							Extremity SAR 4.0 W/kg Averaged over 10 gram					

13.3 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication.
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. Per FCC KDB 865664 D01v01r04, variability SAR measurement were not performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg for 1g SAR and >2 for 10g SAR Please see Section 14 for variability analysis. the maximum tune-up tolerance limit.
7. Per FCC KDB 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g SAR/ ≤ 2W/kg for 10g SAR then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is 1/2 dB, instead of the middle channel, the highest output power channel must be used.

UMTS Notes:

1. The 12.2 kbps RMC mode is the primary mode per KDB 941225 D01v03r01.
2. UMTS SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
3. Per FCC KDB 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the Maximum output power variation across the channel highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Consideration for LTE Devices in FCC KDB 941225 D05v02r05.
2. According to FCC KDB 941225 D05v02r05:
   When the reported SAR is ≤ 0.8 W/kg, testing of the 100% RB allocation and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the 1RB, 50%RB and 100%RB allocation with highest output power for that channel.
   Only one channel, and as reported SAR values for 1RB allocation and 50%RB allocation were less than 1.45W/Kg only the highest power RB offset for each allocation was required.
3. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to target MPR is indicated alongside the SAR results.
4. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.
5. SAR test reduction is applied using the following criteria:
   Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is >0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel. Testing for 100% RB

configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are >0.8 W/kg, testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation <1.45 W/kg. Testing for 16-QAM modulation is not required because the reported SAR for QPSK is <1.45 W/kg and its output power is not more than 0.5 dB higher than that a QPSK. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is <1.45 W/kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

WLAN Notes:

1. Per KDB 2482227 D01v02r02 justification for test configurations of 2.4 GHz WiFi Single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11 g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.
2. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
3. The device was configured to transmit continuously at the required data rated, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated WLAN test reports.

Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests mode type. Per October 2016 TCBC Workshop Notes, the reported SAR was scaled to 100% transmission duty factor to determine compliance. Please see sec.11.2. for the time-domain plot and calculation for duty factor of the device.

14. Simultaneous SAR Analysis

14.1 Simultaneous Transmission Scenario with 2.4 GHz WLAN & Bluetooth

Configurations	Band	1	2	3	1 + 2	1 + 3	SPLSR (Yes/No)
		WWAN	2.4 GHz	Bluetooth	∑ 1-g SAR	∑ 1-g SAR	
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(W/kg)	
Next-to-Mouth SAR	UMTS850	0.014	0.143	0.137	0.157	0.151	No
	UMTS 1700	0.438	0.143	0.137	0.581	0.575	No
	UMTS 1900	0.503	0.143	0.137	0.646	0.64	No
	LTE Band 2	0.522	0.143	0.137	0.665	0.659	No
	LTE Band 4	0.559	0.143	0.137	0.702	0.696	No
	LTE Band 12	0.004	0.143	0.137	0.147	0.141	No
	LTE Band 13	0.009	0.143	0.137	0.152	0.146	No
	LTE Band 25	0.570	0.143	0.137	0.713	0.707	No
	LTE Band 26	0.642	0.143	0.137	0.785	0.779	No
	LTE Band 66	0.399	0.143	0.137	0.542	0.536	No

Configurations	Band	1	2	3	1 + 2	1 + 3	SPLSR (Yes/No)
		WWAN	2.4 GHz	Bluetooth	∑ 10-g SAR	∑ 10-g SAR	
		(W/kg)	(W/kg)	(W/kg)	(W/kg)	(W/kg)	
Extremity SAR	UMTS850	0.265	0.240	0.211	0.505	0.476	No
	UMTS 1700	2.191	0.240	0.211	2.431	2.402	No
	UMTS 1900	1.762	0.240	0.211	2.002	1.973	No
	LTE Band 2	1.657	0.240	0.211	1.897	1.868	No
	LTE Band 4	1.804	0.240	0.211	2.044	2.015	No
	LTE Band 12	0.220	0.240	0.211	0.46	0.431	No
	LTE Band 13	0.240	0.240	0.211	0.48	0.451	No
	LTE Band 25	1.166	0.240	0.211	1.406	1.377	No
	LTE Band 26	0.295	0.240	0.211	0.535	0.506	No
	LTE Band 66	1.318	0.240	0.211	1.558	1.529	No

14.2 Simultaneous Transmission Conclusion

The above numerical summed SAR Results are 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 IEEE1528-2013.

15. SAR Measurement Variability and Uncertainty

In accordance with KDB procedure 865664 D01v01r04 SAR measurement 100 ㎒ 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.

15. Measurement Uncertainty

The measured SAR was <1.5 W/Kg for 1g SAR and <3.75 W/Kg For 10g SAR for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04,the extended measurement uncertainty analysis per IEEE1528-2013 was not required.

16. SAR Test Equipment

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
SPEAG	SAM Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F12/ 5K9GA1/ C/ 01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F11/5K3RA1/C/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F12/ 5K9GA1/ A/ 01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F11/5K3RA1/A/01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1206 0513	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1203 0309	N/A	N/A	N/A
SPEAG	DAE3	466	08/22/2018	Annual	08/22/2019
SPEAG	DAE4	869	09/19/2018	Annual	09/19/2019
SPEAG	E-Field Probe EX3DV4	3968	09/25/2018	Annual	09/25/2019
SPEAG	E-Field Probe EX3DV4	3903	09/24/2018	Annual	09/24/2019
SPEAG	Dipole D750V3	1014	08/14/2018	Annual	08/14/2019
SPEAG	Dipole D835V2	4d165	09/18/2018	Annual	09/18/2019
SPEAG	Dipole D1800V2	2d007	11/19/2018	Annual	11/19/2019
SPEAG	Dipole D1900V2	5d032	02/21/2019	Annual	02/21/2020
SPEAG	Dipole D2450V2	743	01/28/2019	Annual	01/28/2020
Agilent	Power Meter E4419B	MY41291386	10/11/2018	Annual	10/11/2019
Agilent	Power Meter N1911A	MY45101406	09/06/2018	Annual	09/06/2019
Agilent	Power Sensor 8481A	SG1091286	10/11/2018	Annual	10/11/2019
Agilent	Power Sensor 8481A	MY41090873	10/11/2018	Annual	10/11/2019
Agilent	Power Sensor N1921A	MY55220026	09/06/2018	Annual	09/06/2019
SPEAG	DAKS 3.5	1031	04/16/2019	Annual	04/16/2020
SPEAG	VNA-R140	0050813	03/11/2019	Annual	03/11/2020
Agilent	WIRELESS COMMUNICATION E5515C	MY48361100	10/02/2018	Annual	10/02/2019
Agilent	Signal Generator N5182A	MY47070230	05/08/2019	Annual	05/08/2020
Agilent	11636B/Power Divider	58698	02/28/2019	Annual	03/06/2020

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
TESTO	175-H1/Thermometer	40331939309	01/29/2019	Annual	01/29/2020
TESTO	175-H1/Thermometer	40331949309	01/29/2019	Annual	01/29/2020
EMPOWER	RF Power Amplifier	1084	07/31/2019	Annual	07/31/2020
MICRO LAB	LP Filter / LA-15N	10453	10/11/2018	Annual	10/11/2019
MICRO LAB	LP Filter / LA-30N	-	10/11/2018	Annual	10/11/2019
Apitech	Attenuator (3dB) 18B-03	1	06/04/2019	Annual	06/04/2020
Agilent	Attenuator (20dB) 33340C	1642	05/08/2019	Annual	05/08/2020
Agilent	Directional Bridge	3140A03878	06/12/2019	Annual	06/12/2020
Agilent	MXA Signal Analyzer N9020A	MY50510407	10/31/2018	Annual	10/31/2019
HP	Dual Directional Coupler	16072	10/11/2018	Annual	10/11/2019
Anritsu	Radio Communication Tester MT8820C	6201074225	03/05/2019	Annual	03/05/2020
Anritsu	Radio Communication Tester MT8821C	6201502997	08/13/2018	Annual	08/13/2019
R&S	Bluetooth CBT	100272	03/04/2019	Annual	03/04/2020

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.

17. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 - 2005.

These measurements were taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

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

18. 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 - 2005 , 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 ㎒, 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 ㎒, 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 ㎒ 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 ㎒ 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 ㎒ – 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:	Smart watch
Liquid Temperature:	18.5 ℃
Ambient Temperature:	18.8 ℃
Test Date:	07/16/2019
Plot No.:	1

DUT: SM-R825U

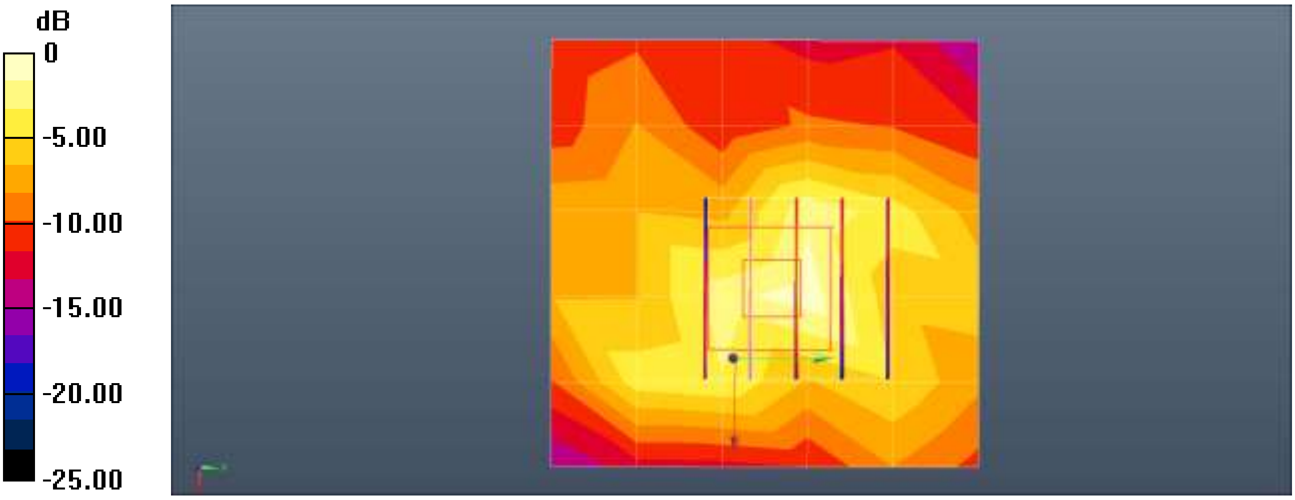
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.911 S/m; ε_r = 40.275; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.25, 10.25, 10.25); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA850 Next-to-Mouth 4183ch/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0138 W/kg

WCDMA850 Next-to-Mouth 4183ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.375 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.0270 W/kg
SAR(1 g) = 0.011 W/kg; SAR(10 g) = 0.00455 W/kg
Maximum value of SAR (measured) = 0.0160 W/kg



0 dB = 0.0160 W/kg = −17.96 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Smart watch
Liquid Temperature:	20.7 ℃
Ambient Temperature:	21.0 ℃
Test Date:	07/15/2019
Plot No.:	2

DUT: SM-R825U

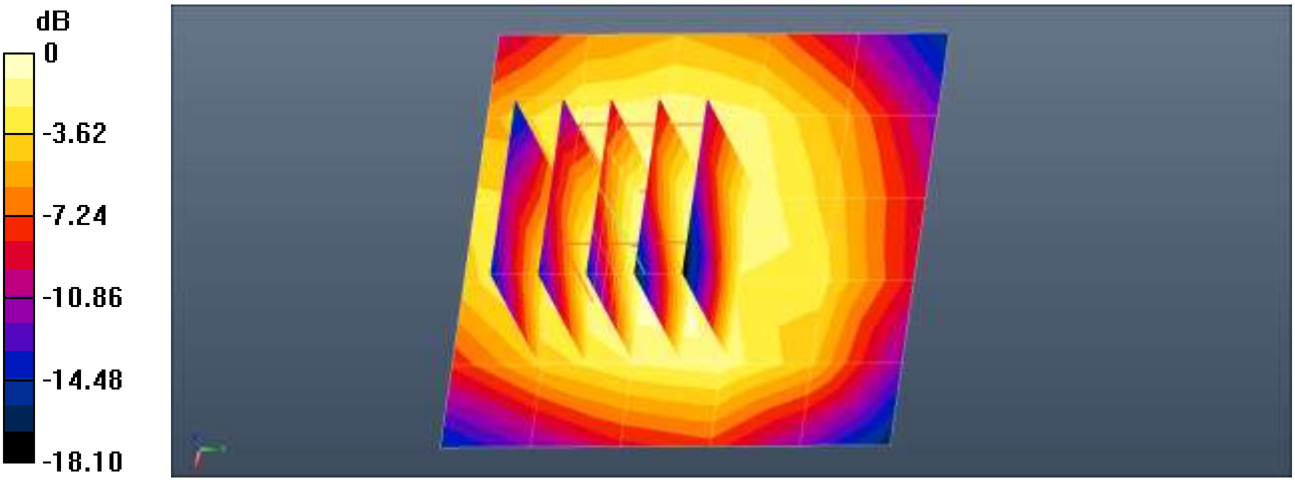
Communication System: UID 0, WCDMA IV (0); Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.34 S/m; ε_r = 41.099; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.64, 8.64, 8.64); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0_Front
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA1700 Next-to-Mouth 1412ch/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.434 W/kg

WCDMA1700 Next-to-Mouth 1412ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.20 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.475 W/kg
SAR(1 g) = 0.368 W/kg; SAR(10 g) = 0.236 W/kg
Maximum value of SAR (measured) = 0.436 W/kg



0 dB = 0.436 W/kg = −3.61 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 18.0 ℃
Ambient Temperature: 18.3 ℃
Test Date: 07/12/2019
Plot No.: 3

DUT: SM-R825U

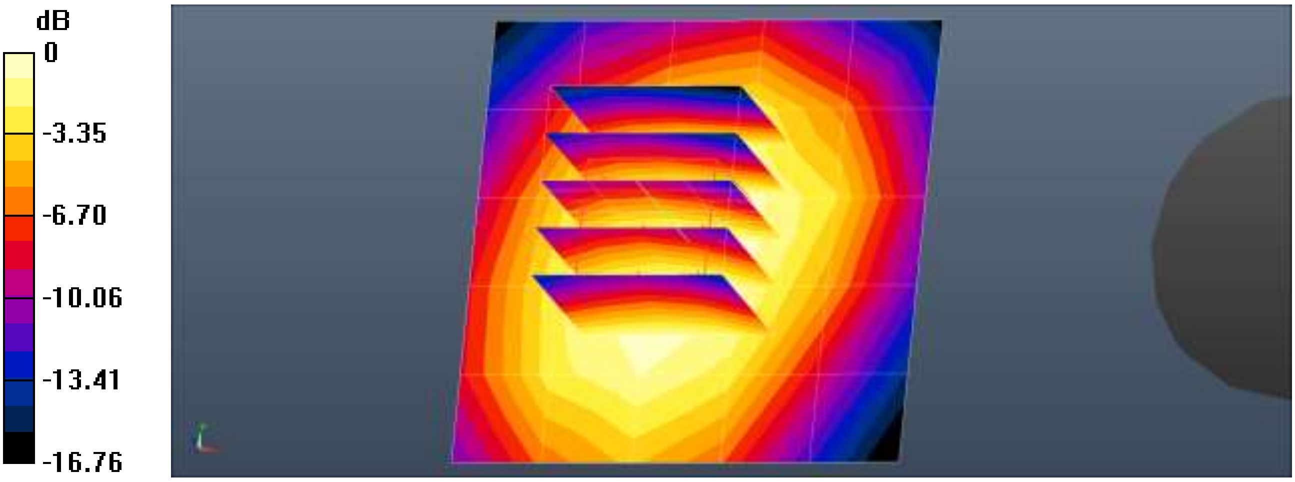
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.418 S/m; ε_r = 38.788; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0_Front
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA1900 Next-to-Mouth 9400ch/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.528 W/kg

WCDMA1900 Next-to-Mouth 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.64 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.591 W/kg
SAR(1 g) = 0.431 W/kg; SAR(10 g) = 0.278 W/kg
Maximum value of SAR (measured) = 0.534 W/kg



0 dB = 0.534 W/kg = −2.72 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 18.0 ℃
Ambient Temperature: 18.3 ℃
Test Date: 07/12/2019
Plot No.: 4

DUT: SM-R825U

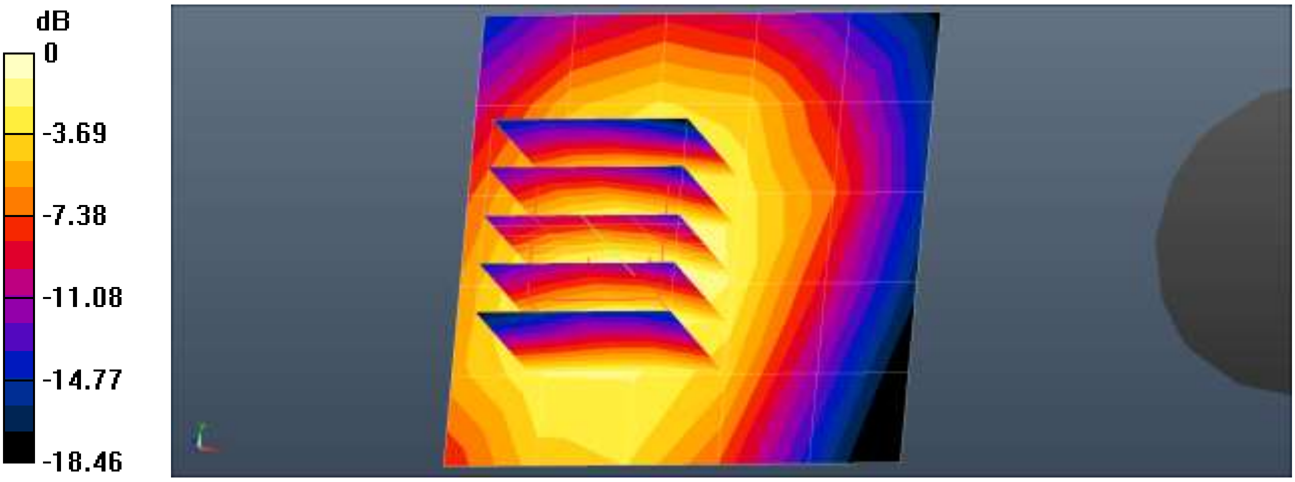
Communication System: UID 0, LTE Band 2 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.418 S/m; ε_r = 38.788; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0_Front
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 2 Next-to-Mouth QPSK 20MHz 50RB 25offset 18900ch 10mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.452 W/kg

LTE Band 2 Next-to-Mouth QPSK 20MHz 50RB 25offset 18900ch 10mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.66 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.492 W/kg
SAR(1 g) = 0.352 W/kg; SAR(10 g) = 0.214 W/kg
Maximum value of SAR (measured) = 0.445 W/kg



0 dB = 0.445 W/kg = −3.52 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Smart watch
Liquid Temperature:	20.7 ℃
Ambient Temperature:	21.0 ℃
Test Date:	07/15/2019
Plot No.:	5

DUT: SM-R825U

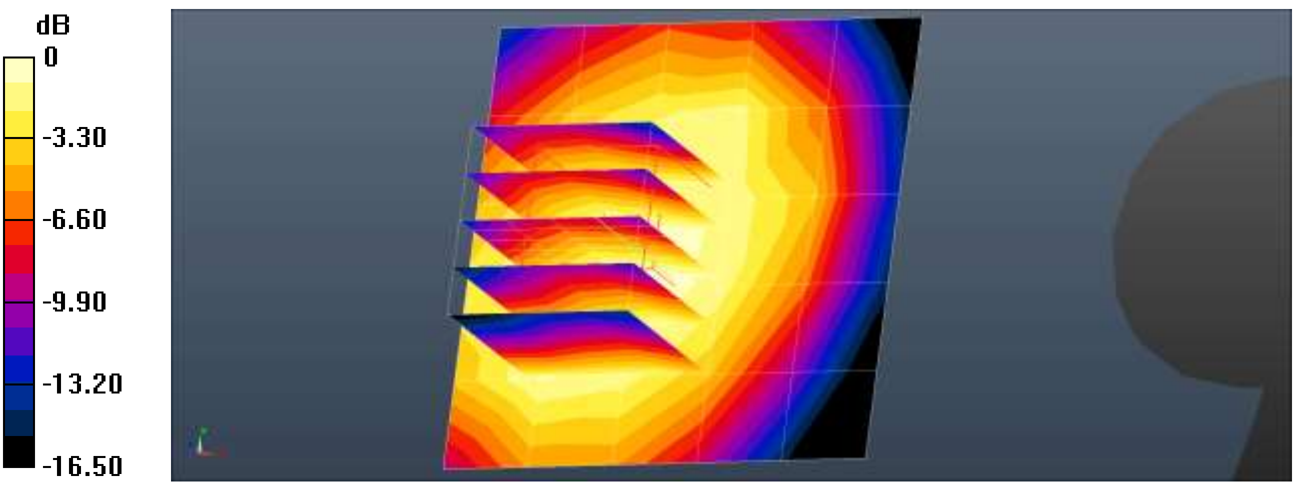
Communication System: UID 0, LTE Band 4 (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.34 S/m; ε_r = 41.099; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.64, 8.64, 8.64); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0_Front
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 4 Next-to-Mouth QPSK 20MHz 50RB 49offset 20175ch 10mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.433 W/kg

LTE Band 4 Next-to-Mouth QPSK 20MHz 50RB 49offset 20175ch 10mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.34 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.502 W/kg
SAR(1 g) = 0.384 W/kg; SAR(10 g) = 0.250 W/kg
Maximum value of SAR (measured) = 0.456 W/kg



0 dB = 0.456 W/kg = −3.41 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.3 ℃
Ambient Temperature: 19.6 ℃
Test Date: 07/17/2019
Plot No.: 6

DUT: SM-R825U

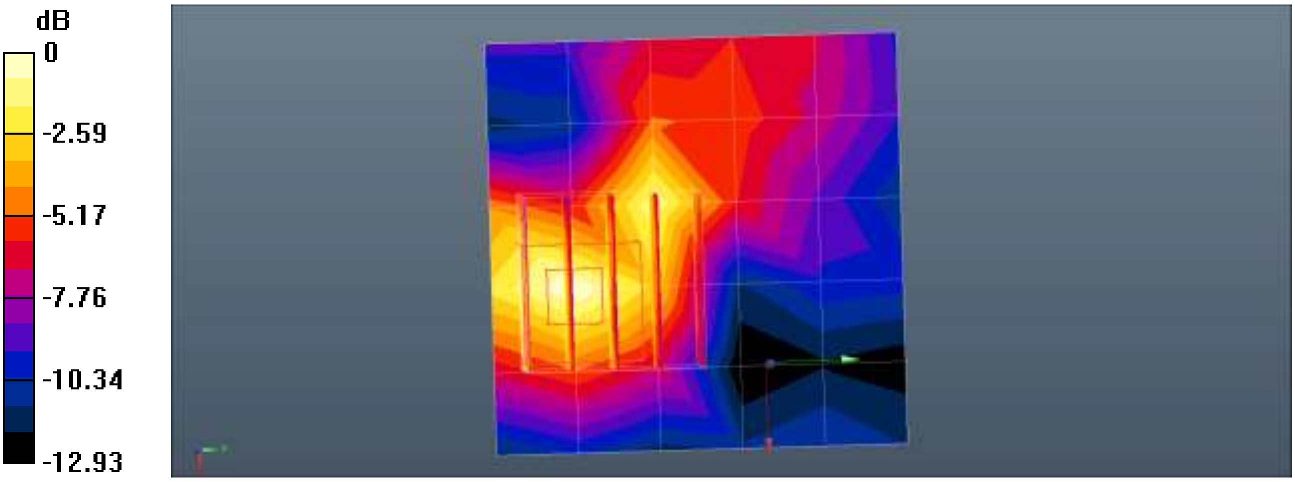
Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.862 S/m; ε_r = 41.941; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.83, 10.83, 10.83); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 12 Next-to-Mouth QPSK 10MHz 1RB 0offset 23095ch 10mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.00599 W/kg

LTE Band 12 Next-to-Mouth QPSK 10MHz 1RB 0offset 23095ch 10mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.401 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.00816 W/kg
SAR(1 g) = 0.00325 W/kg; SAR(10 g) = 0.00162 W/kg
Maximum value of SAR (measured) = 0.00582 W/kg



0 dB = 0.00599 W/kg = −22.23 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Smart watch
Liquid Temperature:	19.3 ℃
Ambient Temperature:	19.6 ℃
Test Date:	07/17/2019
Plot No.:	7

DUT: SM-R825U

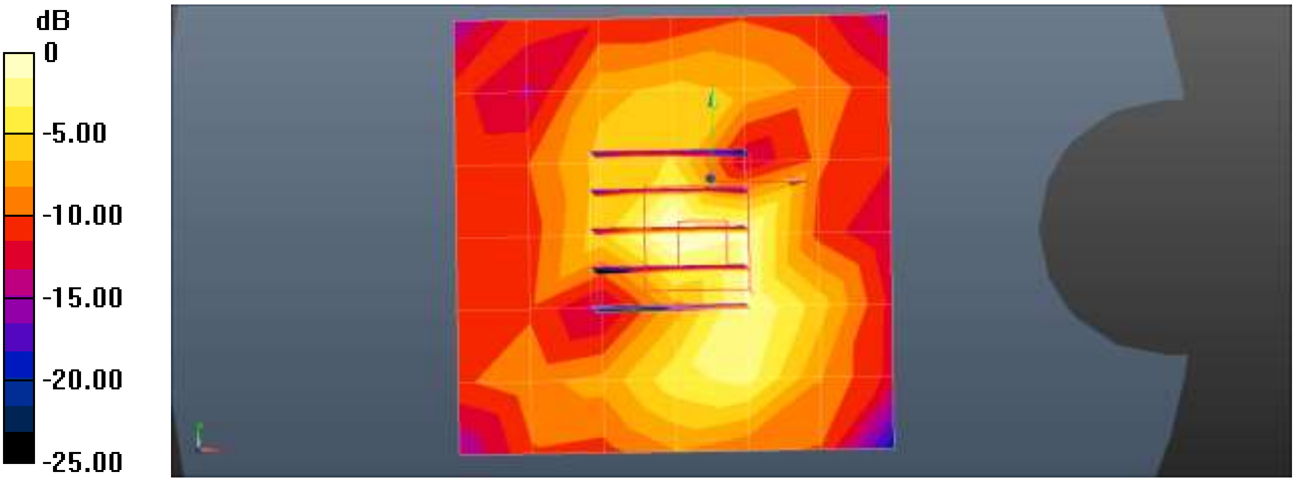
Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 782 MHz; σ = 0.922 S/m; ε_r = 41.474; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.83, 10.83, 10.83); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 13 Next-to-Mouth QPSK 10MHz 1RB 0offset 23230ch 10mm/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0120 W/kg

LTE Band 13 Next-to-Mouth QPSK 10MHz 1RB 0offset 23230ch 10mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.428 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.0180 W/kg
SAR(1 g) = 0.00734 W/kg; SAR(10 g) = 0.00322 W/kg
Maximum value of SAR (measured) = 0.0105 W/kg



0 dB = 0.0105 W/kg = −19.79 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 18.0 ℃
Ambient Temperature: 18.3 ℃
Test Date: 07/12/2019
Plot No.: 8

DUT: SM-R825U

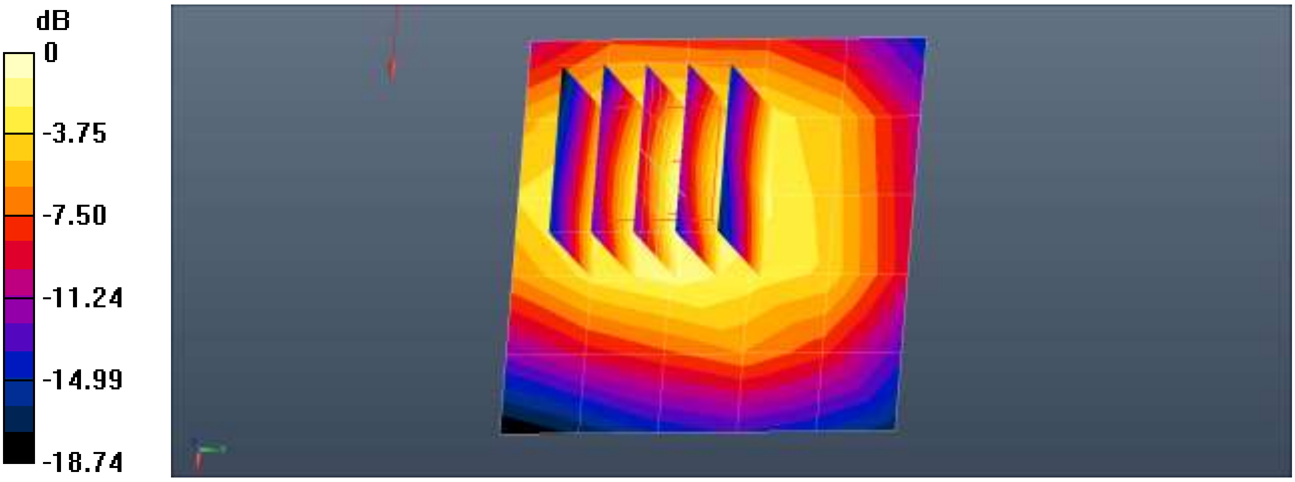
Communication System: UID 0, LTE Band 25 (0); Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.423 S/m; ε_r = 38.779; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0_Front
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 25 Next-to-Mouth QPSK 20MHz 1RB 49offset 26365ch 10mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.568 W/kg

LTE Band 25 Next-to-Mouth QPSK 20MHz 1RB 49offset 26365ch 10mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.37 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.771 W/kg
SAR(1 g) = 0.543 W/kg; SAR(10 g) = 0.325 W/kg
Maximum value of SAR (measured) = 0.697 W/kg



0 dB = 0.697 W/kg = −1.57 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 18.5 °C
Ambient Temperature: 18.8 °C
Test Date: 07/16/2019
Plot No.: 9

DUT: SM-R825U

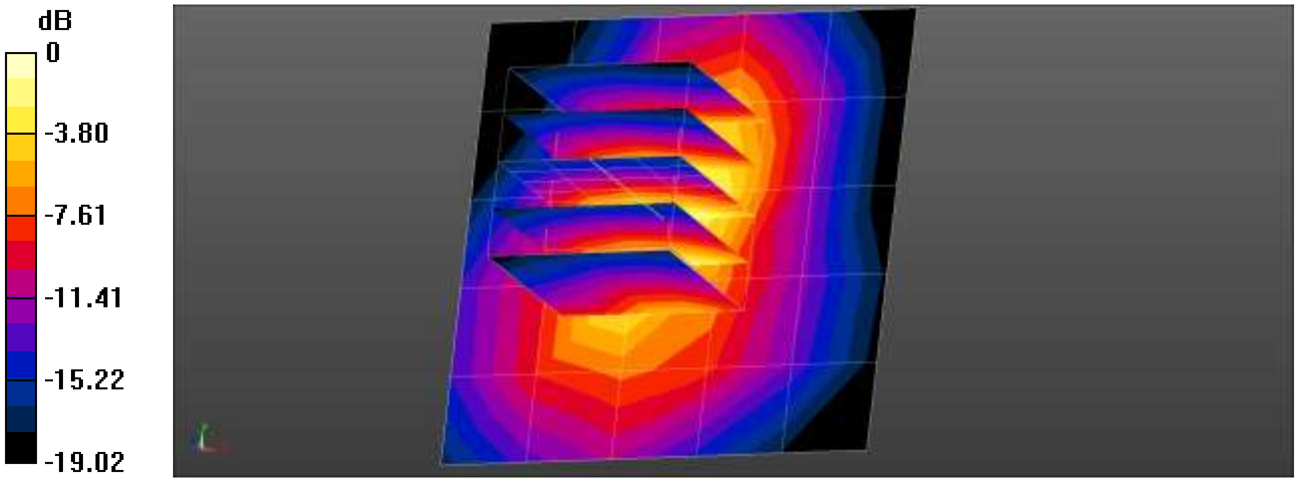
Communication System: UID 0, LTE Band 26 (0); Frequency: 821.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 821.5 MHz; σ = 0.946 S/m; ε_r = 56.585; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10, 10, 10); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 26 Next-to-Mouth QPSK 15MHz 1RB 0offset 26765ch 10mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.509 W/kg

LTE Band 26 Next-to-Mouth QPSK 15MHz 1RB 0offset 26765ch 10mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.95 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.544 W/kg; SAR(10 g) = 0.250 W/kg
Maximum value of SAR (measured) = 0.795 W/kg



0 dB = 0.795 W/kg = −1.00 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 20.7 ℃
Ambient Temperature: 21.0 ℃
Test Date: 07/15/2019
Plot No.: 10

DUT: SM-R825U

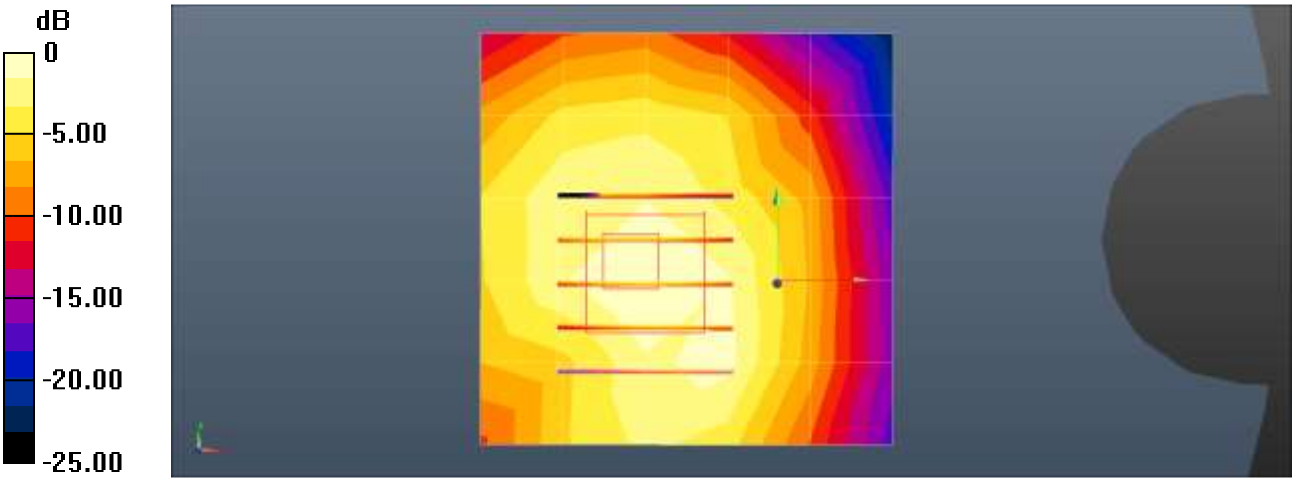
Communication System: UID 0, LTE Band 66 (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1745 MHz; σ = 1.352 S/m; ε_r = 41.076; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.64, 8.64, 8.64); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0_Front
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 66 Next-to-Mouth QPSK 20MHz 1RB 49offset 132322ch 10mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.592 W/kg

LTE Band 66 Next-to-Mouth QPSK 20MHz 1RB 49offset 132322ch 10mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.90 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.580 W/kg
SAR(1 g) = 0.379 W/kg; SAR(10 g) = 0.229 W/kg
Maximum value of SAR (measured) = 0.491 W/kg



0 dB = 0.491 W/kg = −3.09 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Smart watch
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.4 ℃
Test Date:	07/25/2019
Plot No.:	11

DUT: SM-R825U

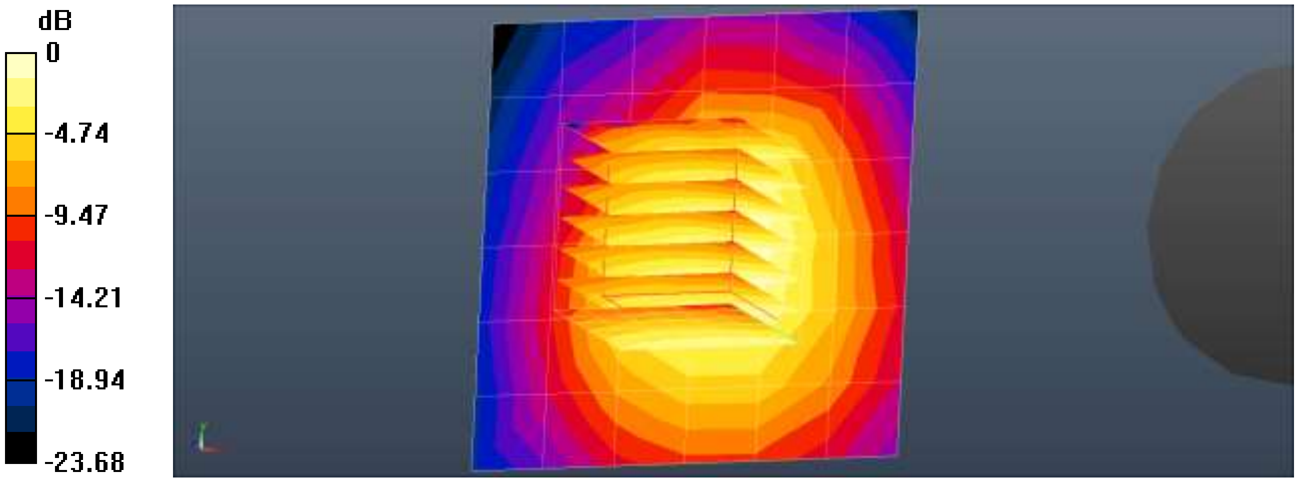
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.811 S/m; ε_r = 38.307; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.52, 7.52, 7.52); Calibrated: 2018-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2018-08-22
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

802.11b Next-to-Mouth 1Mbps 11ch/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.169 W/kg

802.11b Next-to-Mouth 1Mbps 11ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.18 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.211 W/kg
SAR(1 g) = 0.113 W/kg; SAR(10 g) = 0.058 W/kg
Maximum value of SAR (measured) = 0.175 W/kg



0 dB = 0.169 W/kg = −7.72 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.4 ℃
Test Date: 07/25/2019
Plot No.: 12

DUT: SM-R825U

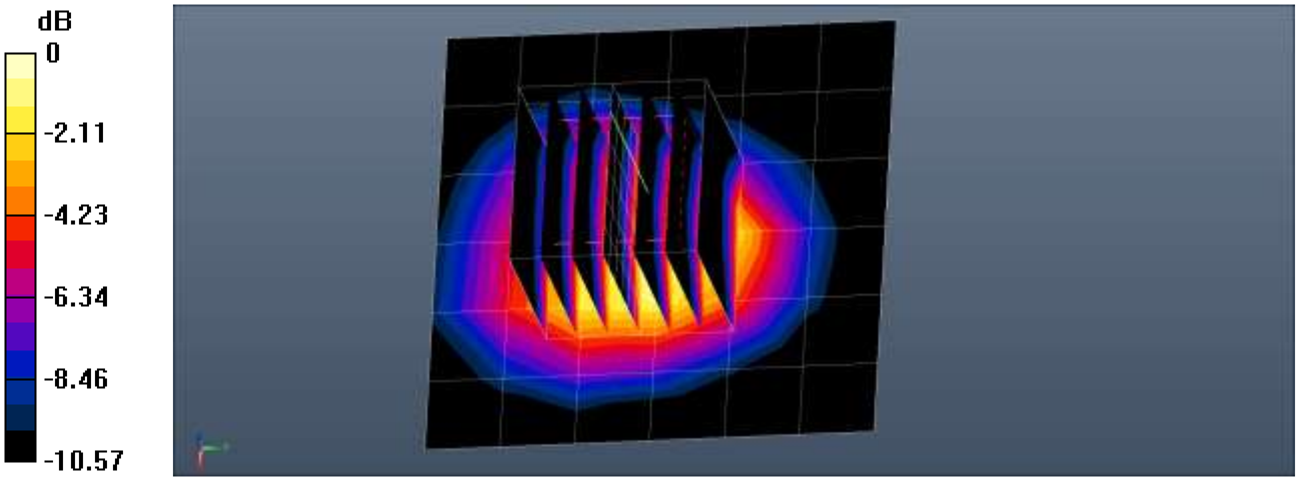
Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz;Duty Cycle: 1:1.305
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.794 S/m; ε_r = 38.454; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.52, 7.52, 7.52); Calibrated: 2018-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2018-08-22
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

Bluetooth Next-to-Mouth DH5 39ch/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.151 W/kg

Bluetooth Next-to-Mouth DH5 39ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.959 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.166 W/kg
SAR(1 g) = 0.088 W/kg; SAR(10 g) = 0.047 W/kg
Maximum value of SAR (measured) = 0.133 W/kg



0 dB = 0.133 W/kg = −8.76 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.7 ℃
Ambient Temperature: 20.0 ℃
Test Date: 07/19/2019
Plot No.: 13

DUT: SM-R825U

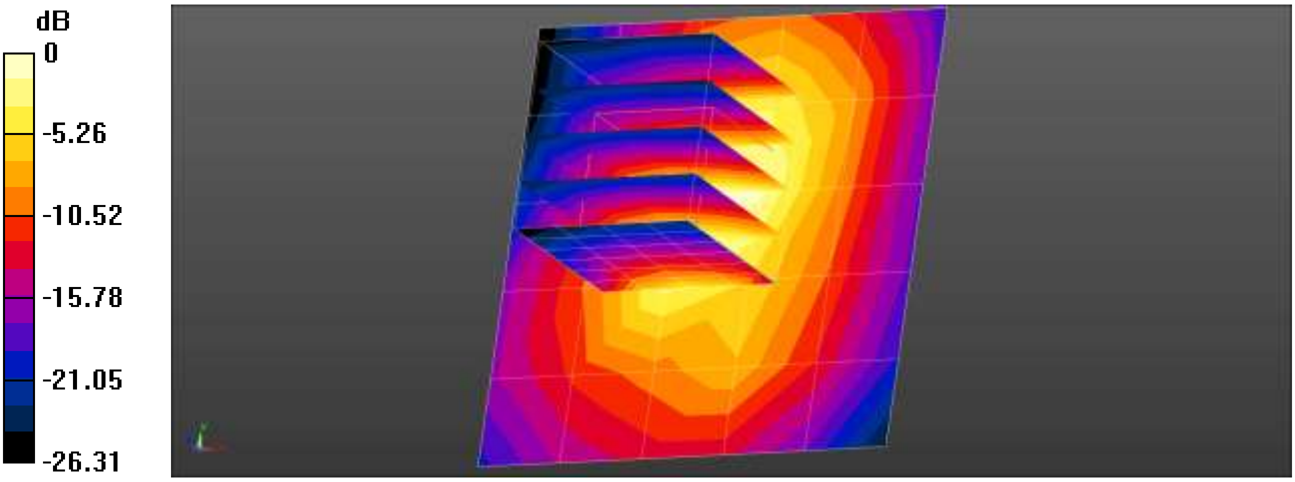
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.961 S/m; ε_r = 56.401; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10, 10, 10); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA850 Extremity 4183ch/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.725 W/kg

WCDMA850 Extremity 4183ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.68 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.464 W/kg; SAR(10 g) = 0.208 W/kg
Maximum value of SAR (measured) = 0.764 W/kg



0 dB = 0.725 W/kg = −1.40 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 18.6 ℃
Ambient Temperature: 18.9 ℃
Test Date: 07/22/2019
Plot No.: 14

DUT: SM-R825U

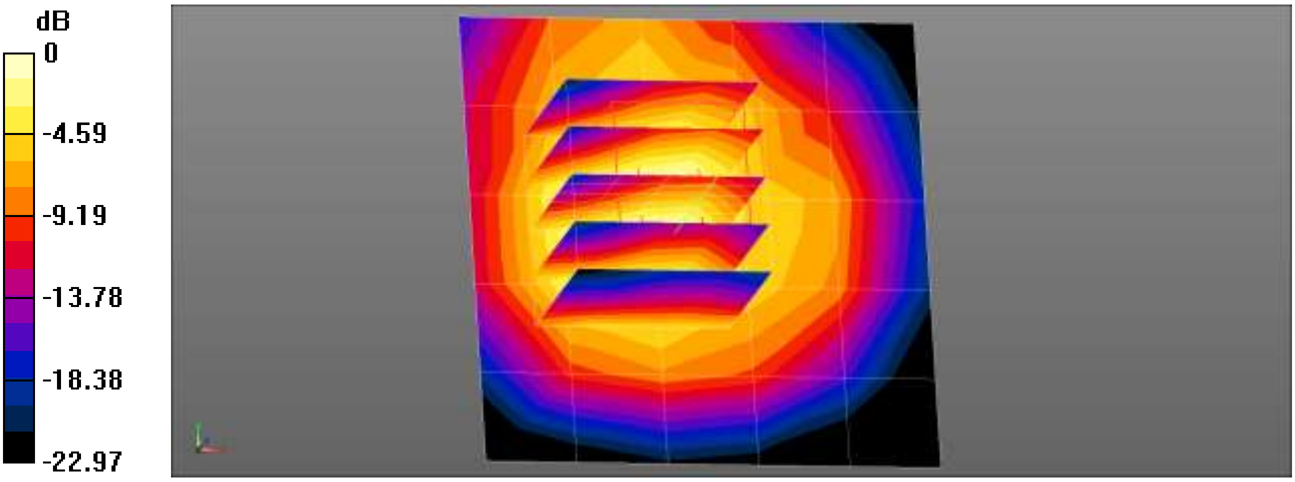
Communication System: UID 0, WCDMA 1700 (0); Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.422 S/m; ε_r = 54.297; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA1700 Extremity 1412ch/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.78 W/kg

WCDMA1700 Extremity 1412ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.36 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 4.60 W/kg
SAR(1 g) = 3.31 W/kg; SAR(10 g) = 1.84 W/kg
Maximum value of SAR (measured) = 4.07 W/kg



0 dB = 4.07 W/kg = 6.10 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.9 ℃
Ambient Temperature: 20.2 ℃
Test Date: 07/23/2019
Plot No.: 15

DUT: SM-R825U

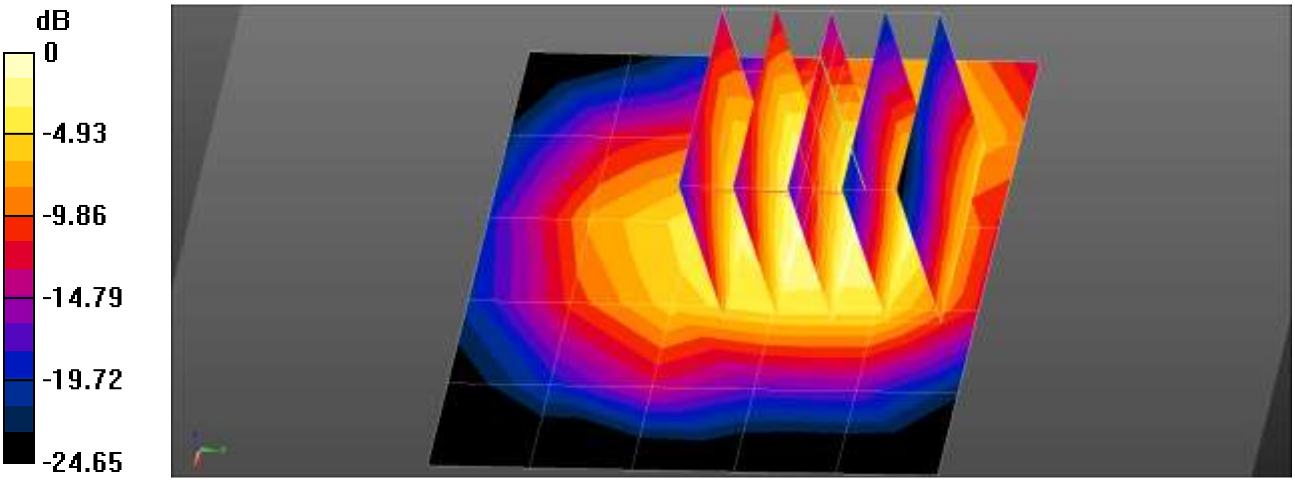
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.568 S/m; ε_r = 53.59; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.92, 7.92, 7.92); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA1900 Extremity 9400ch/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.91 W/kg

WCDMA1900 Extremity 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 36.98 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 4.08 W/kg
SAR(1 g) = 2.6 W/kg; SAR(10 g) = 1.51 W/kg
Maximum value of SAR (measured) = 3.50 W/kg



0 dB = 3.50 W/kg = 5.44 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.9 ℃
Ambient Temperature: 20.2 ℃
Test Date: 07/23/2019
Plot No.: 16

DUT: SM-R825U

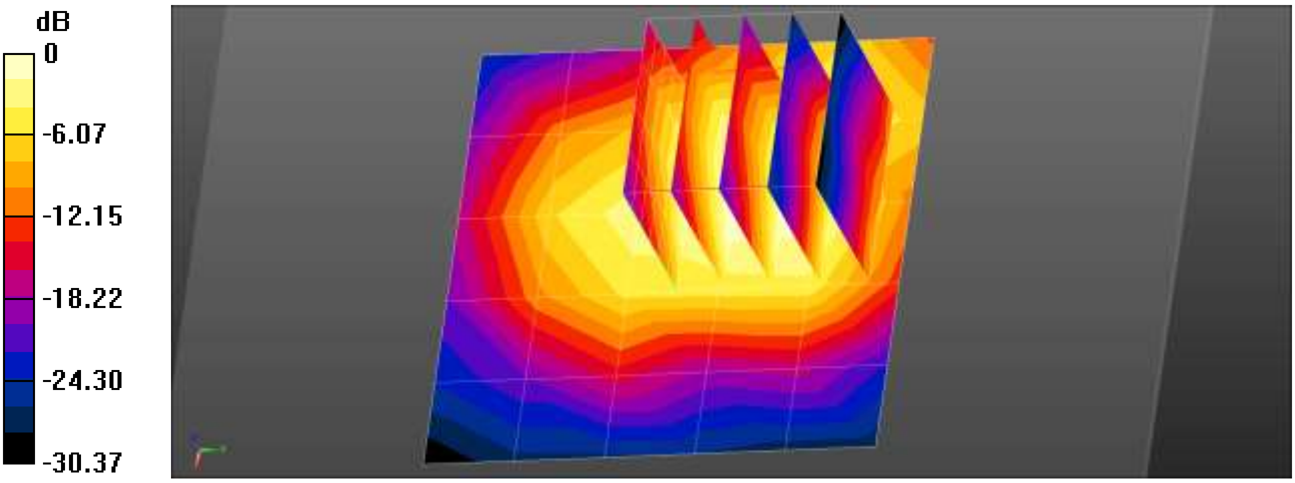
Communication System: UID 0, LTE Band 2 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.568 S/m; ε_r = 53.59; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.92, 7.92, 7.92); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 2 Extremity QPSK 20MHz 1RB 99offset 18900ch 0mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.73 W/kg

LTE Band 2 Extremity QPSK 20MHz 1RB 99offset 18900ch 0mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.72 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 3.75 W/kg
SAR(1 g) = 2.61 W/kg; SAR(10 g) = 1.43 W/kg
Maximum value of SAR (measured) = 2.99 W/kg



0 dB = 2.73 W/kg = 4.37 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 18.6 ℃
Ambient Temperature: 18.9 ℃
Test Date: 07/22/2019
Plot No.: 17

DUT: SM-R825U

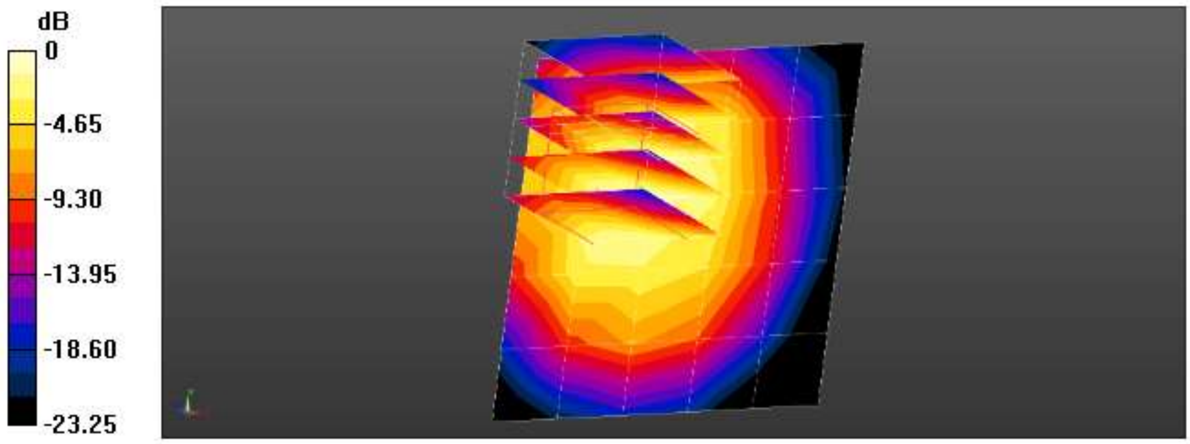
Communication System: UID 0, LTE Band 4 (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.422 S/m; εr = 54.297; ρ = 1000 kg/m3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 4 Extremity QPSK 20MHz 1RB 0offset 20175ch 0mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.58 W/kg

LTE Band 4 Extremity QPSK 20MHz 1RB 0offset 20175ch 0mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 38.90 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 3.52 W/kg
SAR(1 g) = 2.69 W/kg; SAR(10 g) = 1.5 W/kg
Maximum value of SAR (measured) = 3.07 W/kg



0 dB = 3.07 W/kg = 4.87 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.4 ℃
Ambient Temperature: 19.7 ℃
Test Date: 07/18/2019
Plot No.: 18

DUT: SM-R825U

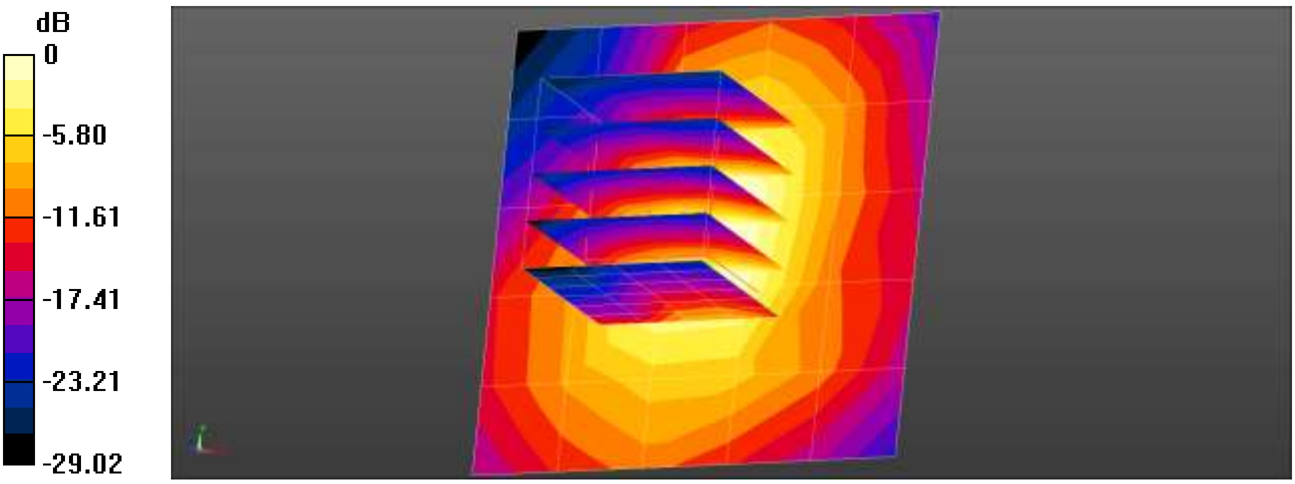
Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.921 S/m; ε_r = 56.84; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.42, 10.42, 10.42); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 12 Extremity QPSK 10MHz 1RB 0offset 23095ch 0mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.552 W/kg

LTE Band 12 Extremity QPSK 10MHz 1RB 0offset 23095ch 0mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.80 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.435 W/kg; SAR(10 g) = 0.195 W/kg
Maximum value of SAR (measured) = 0.637 W/kg



0 dB = 0.552 W/kg = −2.58 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.4 ℃
Ambient Temperature: 19.7 ℃
Test Date: 07/18/2019
Plot No.: 19

DUT: SM-R825U

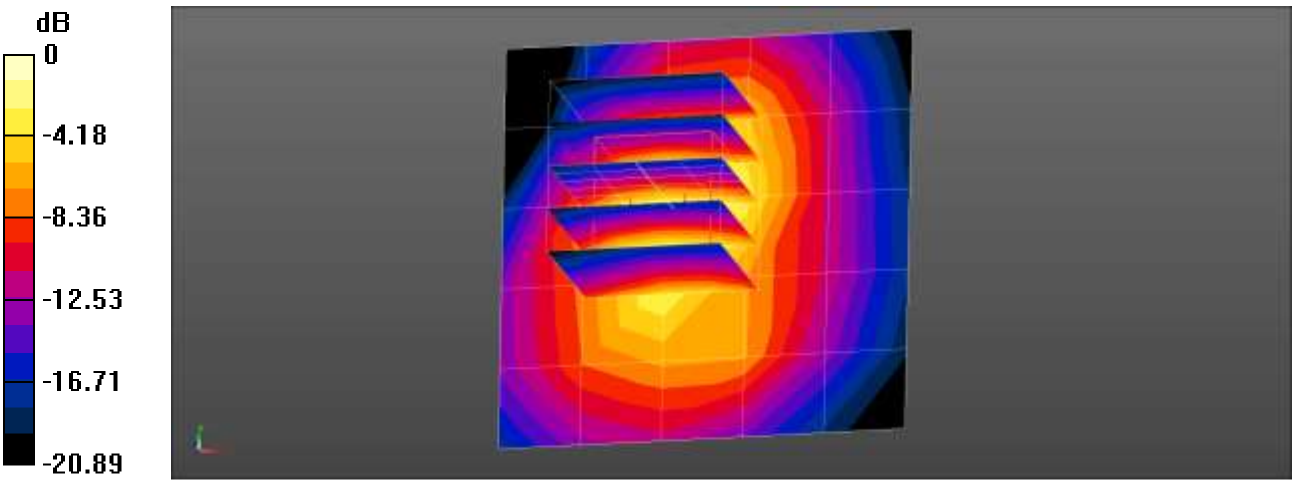
Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 782 MHz; σ = 0.998 S/m; ε_r = 56.032; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.42, 10.42, 10.42); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 13 Extremity QPSK 10MHz 1RB 0offset 23230ch 0mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.786 W/kg

LTE Band 13 Extremity QPSK 10MHz 1RB 0offset 23230ch 0mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.84 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.207 W/kg
Maximum value of SAR (measured) = 0.742 W/kg



0 dB = 0.742 W/kg = −1.30 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.9 ℃
Ambient Temperature: 20.2 ℃
Test Date: 07/23/2019
Plot No.: 20

DUT: SM-R825U

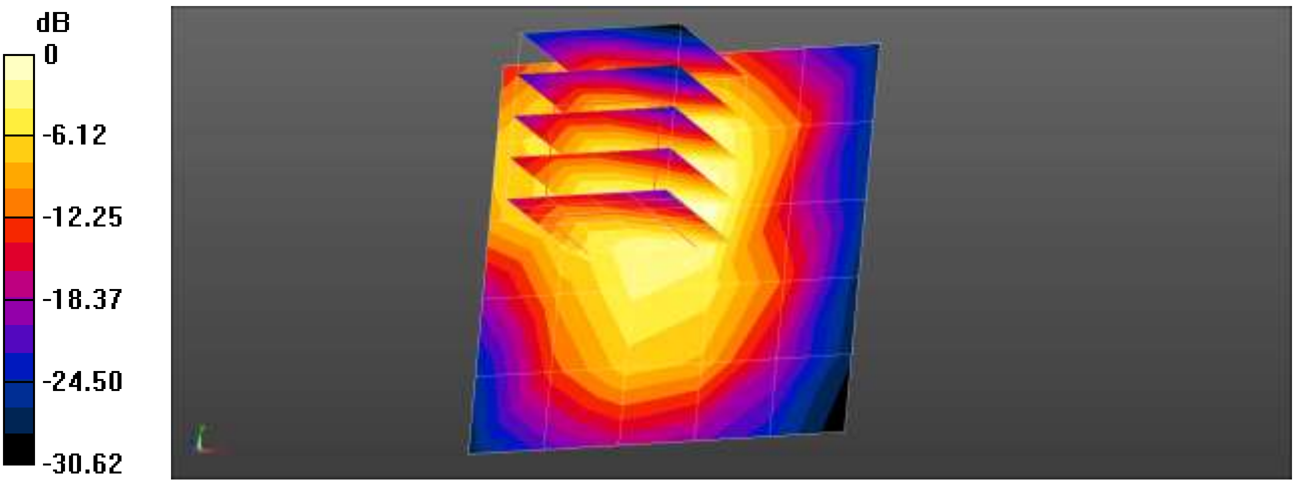
Communication System: UID 0, LTE Band 25 (0); Frequency: 1882.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.569 S/m; ε_r = 53.574; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.92, 7.92, 7.92); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 25 Extremity QPSK 20MHz 1RB 49offset 26365ch 0mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.55 W/kg

LTE Band 25 Extremity QPSK 20MHz 1RB 49offset 26365ch 0mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 38.88 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 3.09 W/kg
SAR(1 g) = 1.89 W/kg; SAR(10 g) = 1.11 W/kg
Maximum value of SAR (measured) = 2.67 W/kg



0 dB = 2.55 W/kg = 4.06 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 19.7 ℃
Ambient Temperature: 20.0 ℃
Test Date: 07/19/2019
Plot No.: 21

DUT: SM-R825U

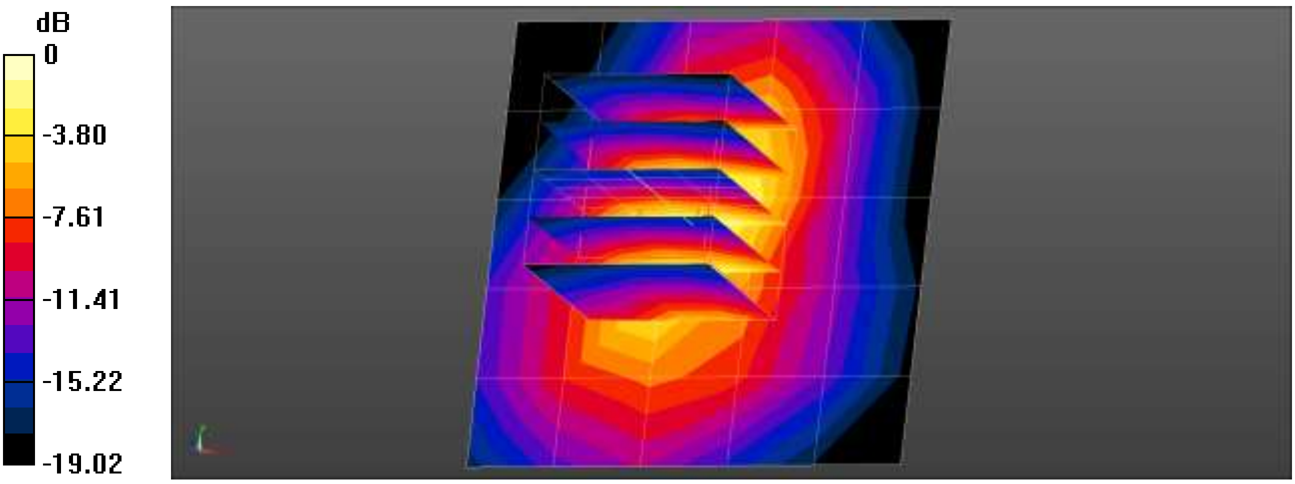
Communication System: UID 0, LTE Band 26 (0); Frequency: 821.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 821.5 MHz; σ = 0.946 S/m; ε_r = 56.585; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10, 10, 10); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 26 Extremity QPSK 15MHz 1RB 0offset 26765ch 0mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.509 W/kg

LTE Band 26 Extremity QPSK 15MHz 1RB 0offset 26765ch 0mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.95 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.544 W/kg; SAR(10 g) = 0.250 W/kg
Maximum value of SAR (measured) = 0.795 W/kg



0 dB = 0.795 W/kg = -1.00 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Smart watch
Liquid Temperature:	18.6 ℃
Ambient Temperature:	18.9 ℃
Test Date:	07/22/2019
Plot No.:	22

DUT: SM-R825U

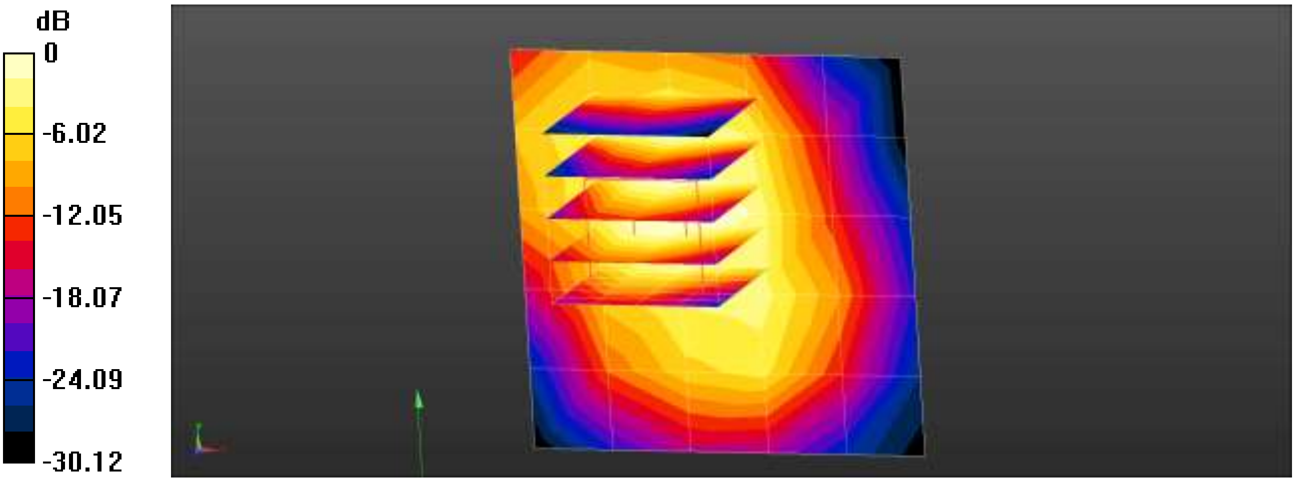
Communication System: UID 0, LTE Band 66(20MHz FCC) (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1745 MHz; σ = 1.436 S/m; ε_r = 54.293; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE Band 66 Extremity QPSK 20MHz 1RB 49offset 132322ch 0mm/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.99 W/kg

LTE Band 66 Extremity QPSK 20MHz 1RB 49offset 132322ch 0mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.80 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 2.80 W/kg
SAR(1 g) = 2.21 W/kg; SAR(10 g) = 1.25 W/kg
Maximum value of SAR (measured) = 2.43 W/kg



0 dB = 2.99 W/kg = 4.76 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Smart watch
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.4 ℃
Test Date: 07/25/2019
Plot No.: 23

DUT: SM-R825U

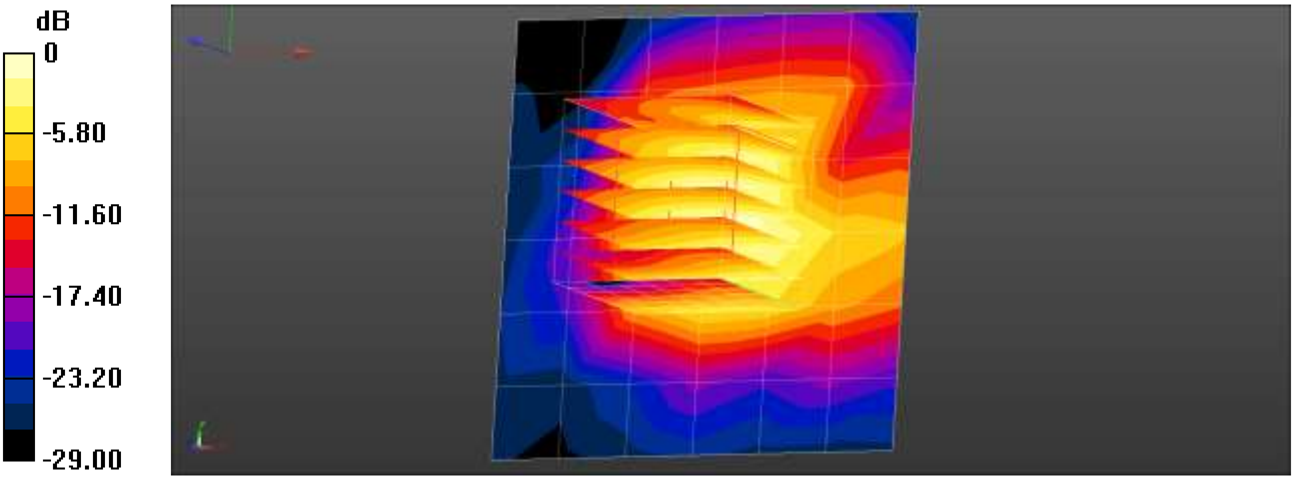
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.96 S/m; ε_r = 53.566; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.54, 7.54, 7.54); Calibrated: 2018-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2018-08-22
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

802.11b Extremity 1Mbps 11ch/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.644 W/kg

802.11b Extremity 1Mbps 11ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.76 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.511 W/kg; SAR(10 g) = 0.190 W/kg
Maximum value of SAR (measured) = 0.832 W/kg



0 dB = 0.644 W/kg = −1.91 dBW/kg

Test Laboratory: HCT CO., LTD

EUT Type: Smart watch
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.4 ℃
Test Date: 07/25/2019
Plot No.: 24

DUT: SM-R825U

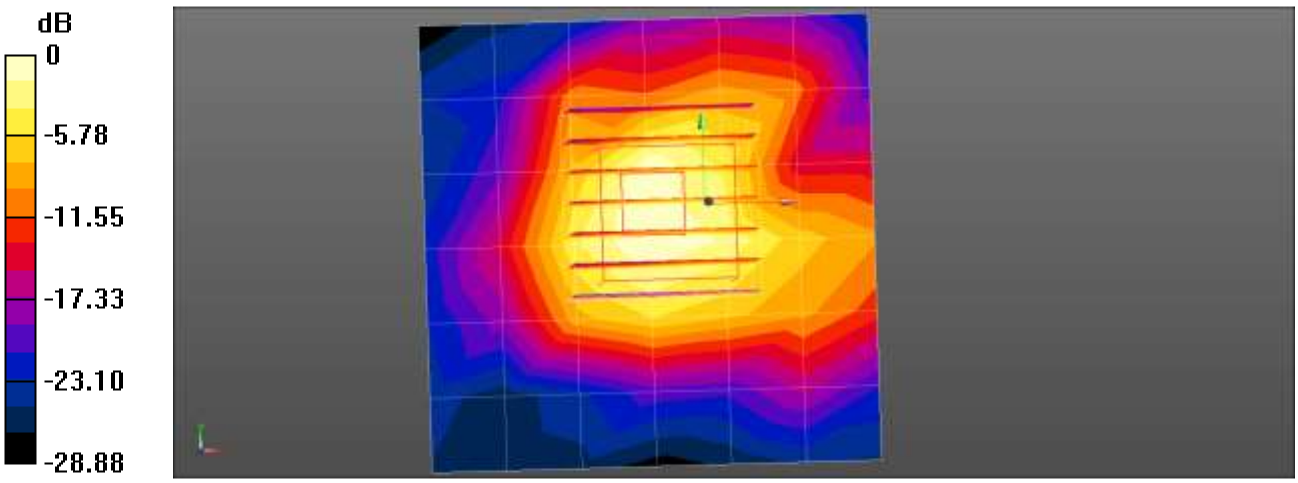
Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz;Duty Cycle: 1: Cycle: 1:1.305
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.936 S/m; ε_r = 53.671; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.54, 7.54, 7.54); Calibrated: 2018-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2018-08-22
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Bluetooth Extremity DH5 39ch/Area Scan (7x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.389 W/kg

Bluetooth Extremity DH5 39ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.65 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.863 W/kg
SAR(1 g) = 0.372 W/kg; SAR(10 g) = 0.136 W/kg
Maximum value of SAR (measured) = 0.641 W/kg



0 dB = 0.389 W/kg = −4.10 dBW/kg

Attachment 2. – Dipole Verification Plots

■ Verification Data (750 ㎒ Head)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 19.3 ℃
Test Date: 07/17/2019

DUT: Dipole ; Type: D750V3

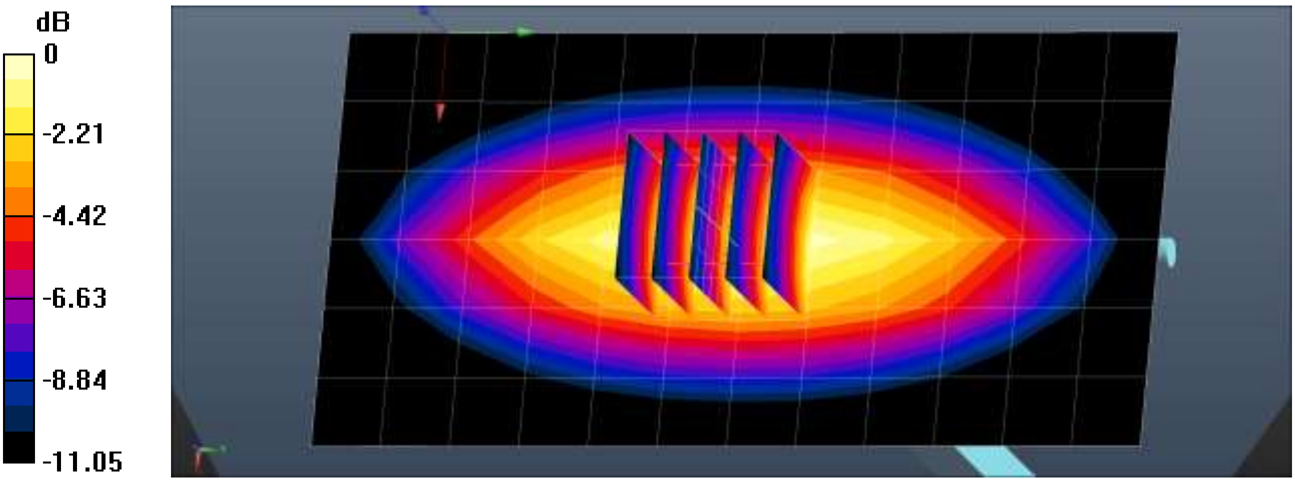
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.875 S/m; ε_r = 41.908; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.83, 10.83, 10.83); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

750MHz Head Verification/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.560 W/kg

750MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.33 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.649 W/kg
SAR(1 g) = 0.404 W/kg; SAR(10 g) = 0.260 W/kg
Maximum value of SAR (measured) = 0.561 W/kg



0 dB = 0.561 W/kg = -2.51 dBW/kg

■ Verification Data (835 ㎒ Head)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	18.5℃
Test Date:	07/16/2019

DUT: Dipole ; Type: D835V2

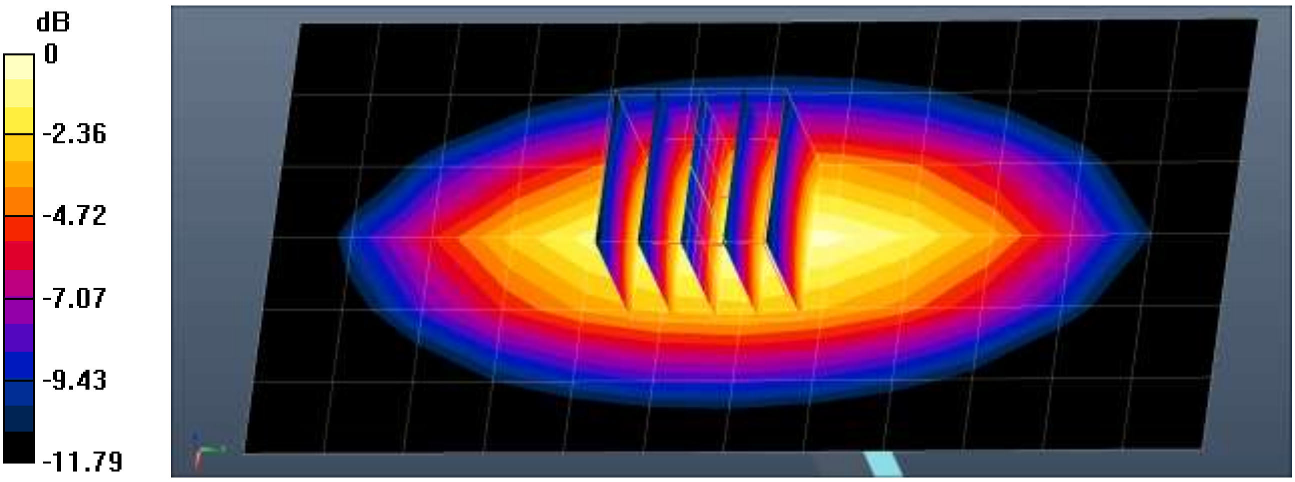
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.909 S/m; ε_r = 40.296; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.25, 10.25, 10.25); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

835MHz Head Verification/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.649 W/kg

835MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.88 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.763 W/kg
SAR(1 g) = 0.469 W/kg; SAR(10 g) = 0.297 W/kg
Maximum value of SAR (measured) = 0.655 W/kg



0 dB = 0.655 W/kg = -1.84 dBW/kg

■ Verification Data (1 800 ㎒ Head)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	20.7 ℃
Test Date:	07/15/2019

DUT: Dipole ; Type: D1800V2

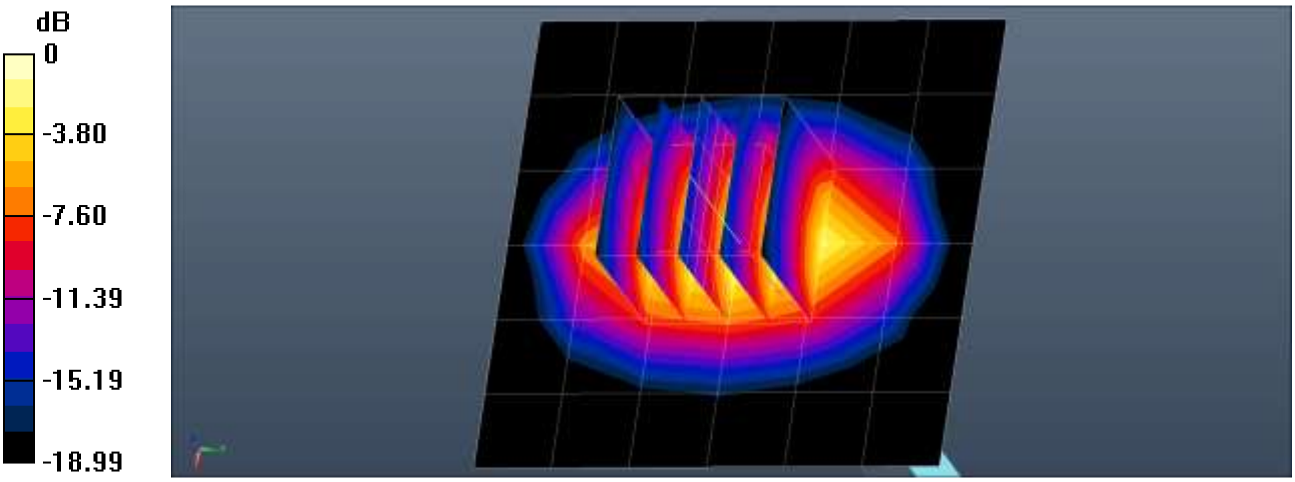
Communication System: UID 0, CW; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.407 S/m; ε_r = 41.026; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.64, 8.64, 8.64); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/1800MHz Head Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.41 W/kg

Dipole/1800MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.00 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 4.16 W/kg
SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.02 W/kg



0 dB = 3.41 W/kg = 5.33 dBW/kg

■ Verification Data (1 900 ㎒ Head)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 18.0 ℃
Test Date: 07/12/2019

DUT: Dipole ; Type: D1900V2

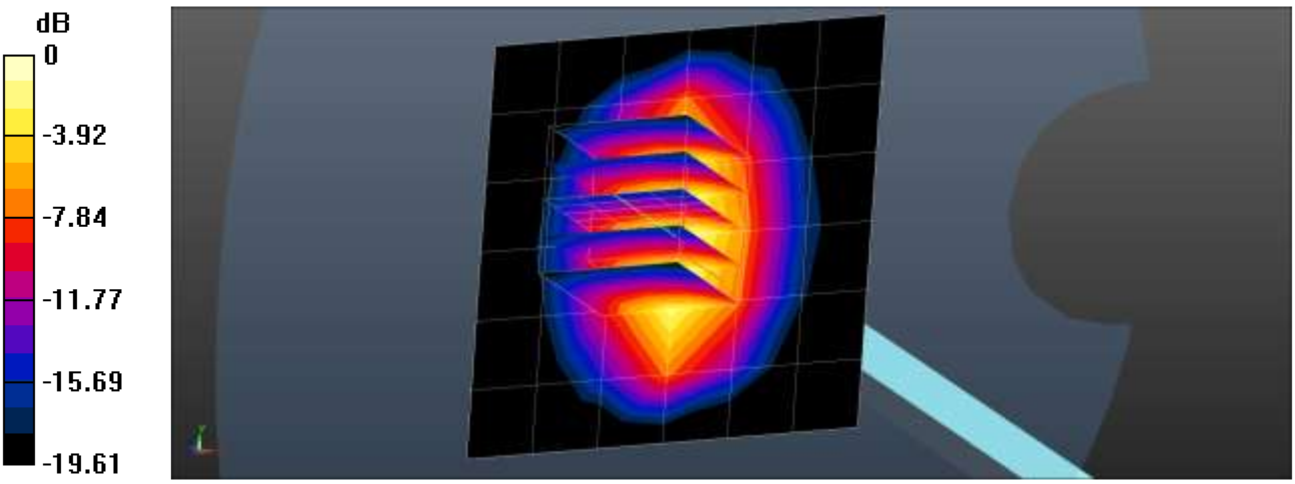
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.44 S/m; ε_r = 38.722; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/1900MHz Head Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.29 W/kg

Dipole/1900MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.70 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 4.07 W/kg
SAR(1 g) = 2.01 W/kg; SAR(10 g) = 0.989 W/kg
Maximum value of SAR (measured) = 3.31 W/kg



0 dB = 3.31 W/kg = 5.20 dBW/kg

■ Verification Data (2 450 ㎒ Head)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 21.1 ℃
Test Date: 07/25/2019

DUT: Dipole 2450 MHz ; Type: D2450V2

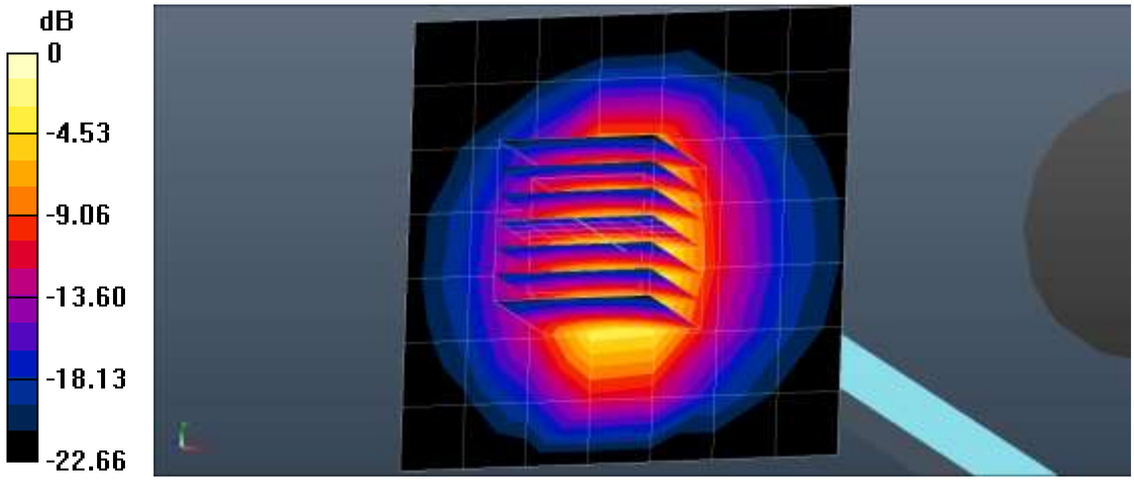
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.802 S/m; ε_r = 38.398; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.52, 7.52, 7.52); Calibrated: 2018-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2018-08-22
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2 450 MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.50 W/kg

Dipole/2 450 MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.24 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 6.53 W/kg
SAR(1 g) = 2.84 W/kg; SAR(10 g) = 1.26 W/kg
Maximum value of SAR (measured) = 5.06 W/kg



0 dB = 5.06 W/kg = 7.04 dBW/kg

■ Verification Data (750 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 19.4 ℃
Test Date: 07/18/2019

DUT: Dipole ; Type: D750V3

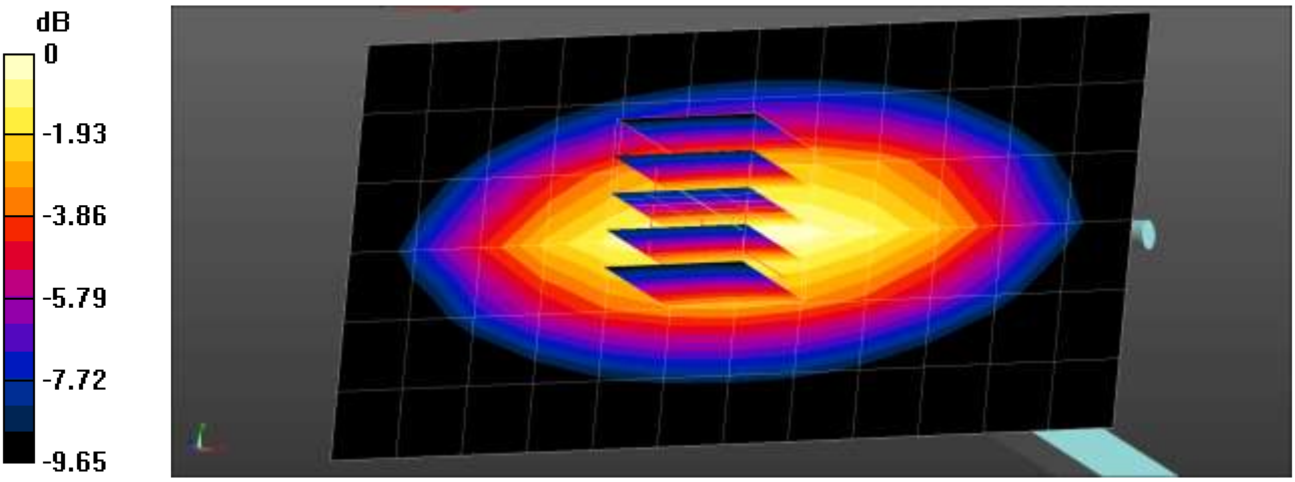
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.962 S/m; ε_r = 56.383; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.42, 10.42, 10.42); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

750MHz Body Verification/Area Scan (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.523 W/kg

750MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.34 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.592 W/kg
SAR(1 g) = 0.396 W/kg; SAR(10 g) = 0.266 W/kg
Maximum value of SAR (measured) = 0.526 W/kg



0 dB = 0.526 W/kg = −2.79 dBW/kg

■ Verification Data (835 ㎒ Body)

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	19.7 ℃
Test Date:	07/19/2019

DUT: Dipole; Type: D835V2

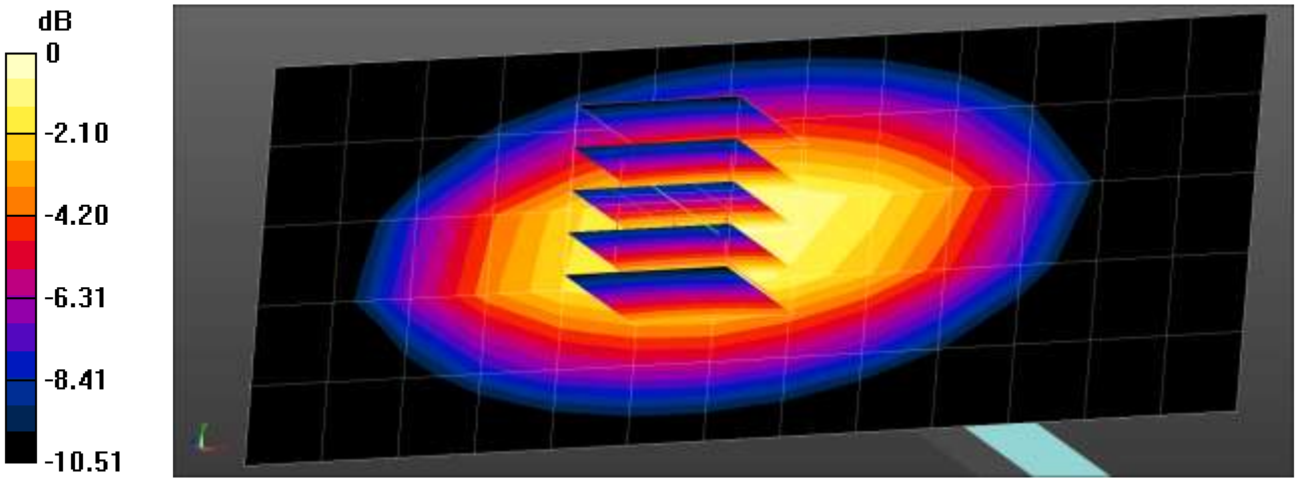
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.959 S/m; ε_r = 56.412; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10, 10, 10); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

835MHz Body Verification/Area Scan (14x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.522 W/kg

835MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.45 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.676 W/kg
SAR(1 g) = 0.450 W/kg; SAR(10 g) = 0.296 W/kg
Maximum value of SAR (measured) = 0.601 W/kg



0 dB = 0.601 W/kg = -2.21 dBW/kg

■ Verification Data (1 800 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 18.6 ℃
Test Date: 07/22/2019

DUT: Dipole ; Type: D1800V2

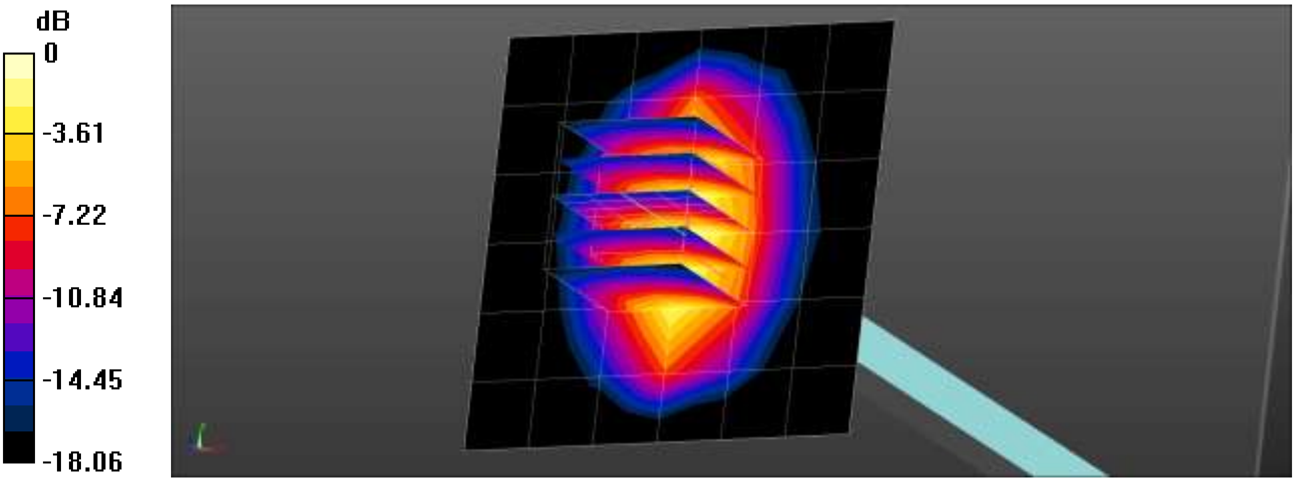
Communication System: UID 0, CW; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.489 S/m; ε_r = 54.065; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/1800MHz Body Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.96 W/kg

Dipole/1800MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.79 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 1.93 W/kg; SAR(10 g) = 0.994 W/kg
Maximum value of SAR (measured) = 3.04 W/kg



0 dB = 3.04 W/kg = 4.83 dBW/kg

■ Verification Data (1 900 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 19.9 ℃
Test Date: 07/23/2019

DUT: Dipole ; Type: D1900V2

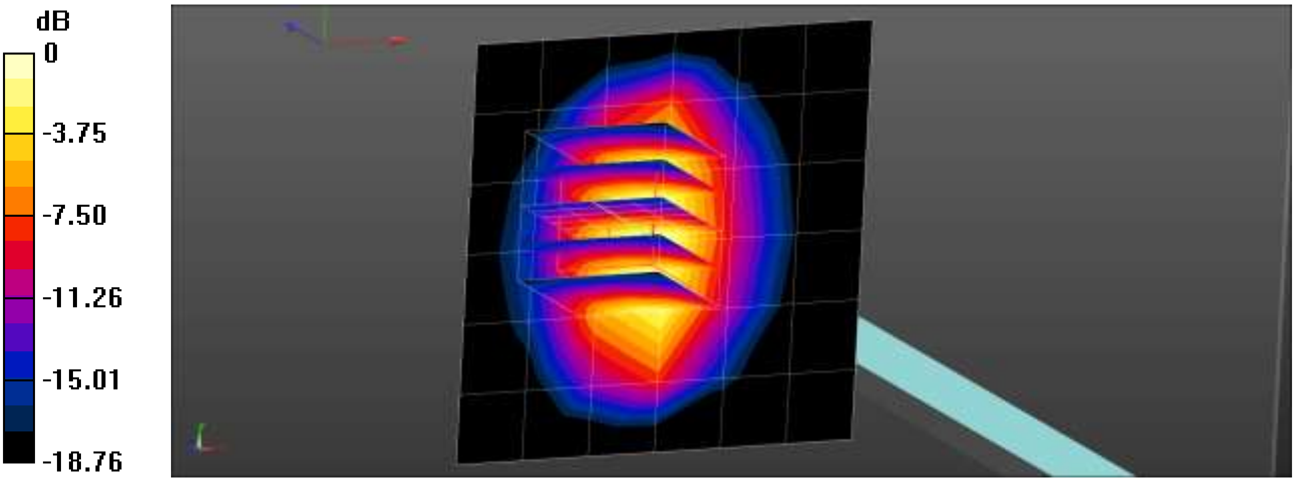
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.579 S/m; ε_r = 53.529; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.92, 7.92, 7.92); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/1900MHz Body Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.64 W/kg

Dipole/1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 42.99 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 3.51 W/kg
SAR(1 g) = 1.9 W/kg; SAR(10 g) = 0.970 W/kg
Maximum value of SAR (measured) = 2.98 W/kg



0 dB = 2.98 W/kg = 4.74 dBW/kg

■ Verification Data (2 450 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 21.1 ℃
Test Date: 07/25/2019

DUT: Dipole 2450 MHz ; Type: D2450V2

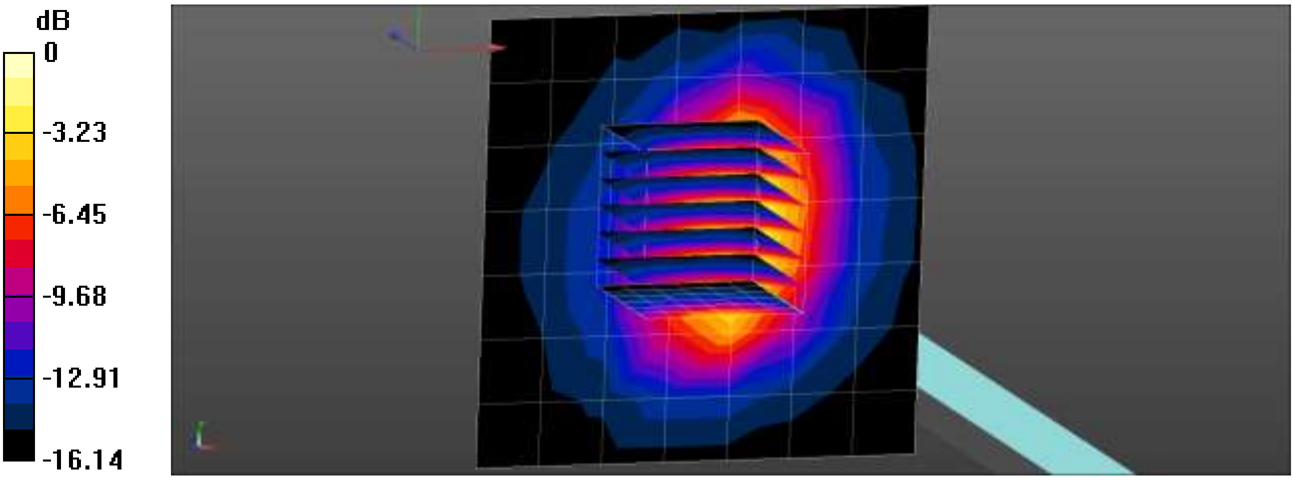
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.946 S/m; ε_r = 53.619; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.54, 7.54, 7.54); Calibrated: 2018-09-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2018-08-22
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2450MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.31 W/kg

Dipole/2450MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 37.84 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 5.44 W/kg
SAR(1 g) = 2.57 W/kg; SAR(10 g) = 1.17 W/kg
Maximum value of SAR (measured) = 3.38 W/kg



0 dB = 3.31 W/kg = 5.20 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	
Tissue Type	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
Salt (NaCl)	1.4	0.9	1.45	0.94	0.4	0.2	0.18	0.39	0.16	0.1
Sugar	57.0	47.2	57.0	44.9	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
Bactericide	0.2	0.1	0.1	0.1	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
DGBE	0.0	0.0	0.0	0.0	47	31	44.92	29.44	7.99	26.7
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
5	3903	EX3DV4	Head	750	1014	2019-06-10	41.7	0.87	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Head	835	4d165	2018-10-04	41.5	0.89	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Head	835	4d165	2018-10-04	41.5	0.89	PASS	PASS	PASS	GMSK	PASS	N/A
5	3903	EX3DV4	Head	1750	2d007	2018-12-03	40.1	1.39	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Head	1900	5d032	2019-03-04	40.1	1.42	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Head	1900	5d032	2019-03-04	40.1	1.41	PASS	PASS	PASS	GMSK	PASS	N/A
9	3968	EX3DV4	Head	2450	743	2019-02-12	39.4	1.81	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary 1g

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
5	3903	EX3DV4	Body	750	1014	2018-10-03	55.6	0.98	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Body	835	4d165	2018-10-03	55.4	0.98	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Body	835	4d165	2018-10-03	55.4	0.98	PASS	PASS	PASS	GMSK	PASS	N/A
5	3903	EX3DV4	Body	1750	2d007	2018-12-03	53.5	1.52	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Body	1900	5d032	2019-03-04	53.3	1.53	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Body	1900	5d032	2019-03-04	53.3	1.53	PASS	PASS	PASS	GMSK	PASS	N/A
9	3968	EX3DV4	Body	2450	743	2019-02-11	52.8	1.94	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary – Extremity SAR Considerations

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

ilac-MRA

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: **EX3-3903_Sep18**

결재	담 당 자	확 인 자
	[signature]	[signature]
직위/성명	SW / [illegible]	[illegible] / [illegible]
일 자	2018 / 10.05	2018 / 10.05

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3903
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:	September 24, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

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

Issued: September 27, 2018

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**

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 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:3903

Manufactured: September 4, 2012
Calibrated: September 24, 2018

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.40	0.36	0.54	± 10.1 %
DCP (mV)[B]	101.0	107.4	100.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	169.1	±2.2 %
		Y	0.0	0.0	1.0		164.6	
		Z	0.0	0.0	1.0		170.5	

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	49.23	373.5	36.55	15.46	1.065	5.041	0.195	0.605	1.008
Y	41.86	298.5	32.94	13.32	0.970	4.978	1.750	0.150	1.004
Z	54.91	423.0	37.50	22.92	1.282	5.100	0.000	0.728	1.011

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

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	11.05	11.05	11.05	0.10	1.20	± 13.3 %
750	41.9	0.89	10.83	10.83	10.83	0.47	0.80	± 12.0 %
835	41.5	0.90	10.25	10.25	10.25	0.36	0.99	± 12.0 %
900	41.5	0.97	10.11	10.11	10.11	0.39	0.91	± 12.0 %
1450	40.5	1.20	8.74	8.74	8.74	0.39	0.80	± 12.0 %
1750	40.1	1.37	8.64	8.64	8.64	0.39	0.80	± 12.0 %
1900	40.0	1.40	8.34	8.34	8.34	0.35	0.84	± 12.0 %
2450	39.2	1.80	7.46	7.46	7.46	0.42	0.84	± 12.0 %
2600	39.0	1.96	7.22	7.22	7.22	0.41	0.84	± 12.0 %
5250	35.9	4.71	5.33	5.33	5.33	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.81	4.81	4.81	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.98	4.98	4.98	0.40	1.80	± 13.1 %

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

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

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

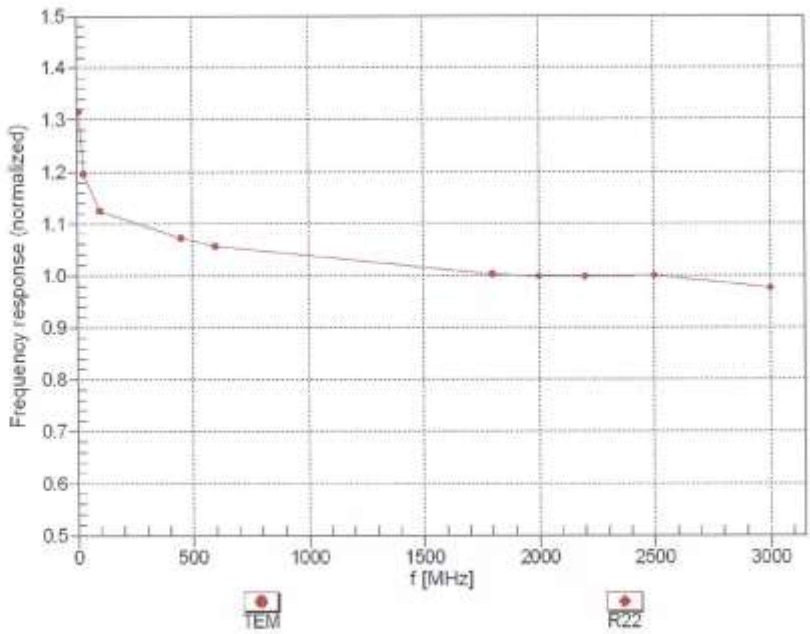
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

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	10.72	10.72	10.72	0.10	1.20	± 13.3 %
750	55.5	0.96	10.42	10.42	10.42	0.44	0.80	± 12.0 %
835	55.2	0.97	10.00	10.00	10.00	0.53	0.84	± 12.0 %
1750	53.4	1.49	8.34	8.34	8.34	0.42	0.90	± 12.0 %
1900	53.3	1.52	7.92	7.92	7.92	0.46	0.90	± 12.0 %
2450	52.7	1.95	7.51	7.51	7.51	0.34	0.90	± 12.0 %
2600	52.5	2.16	7.38	7.38	7.38	0.34	0.89	± 12.0 %
5250	48.9	5.36	4.59	4.59	4.59	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.02	4.02	4.02	0.50	1.90	± 13.1 %
5750	48.3	5.94	4.36	4.36	4.36	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.

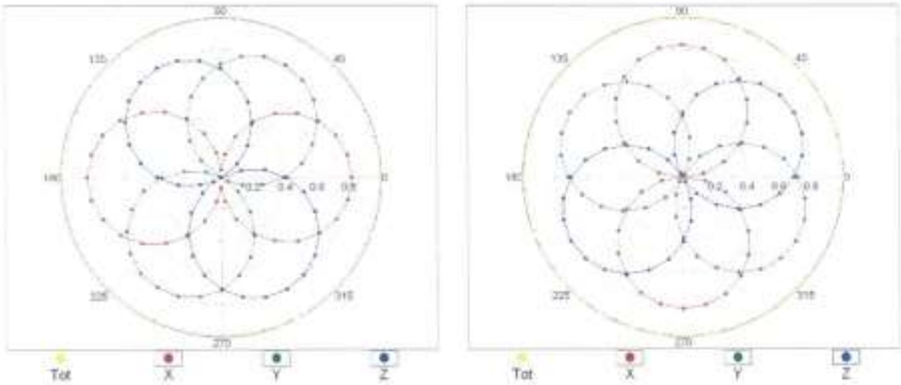
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

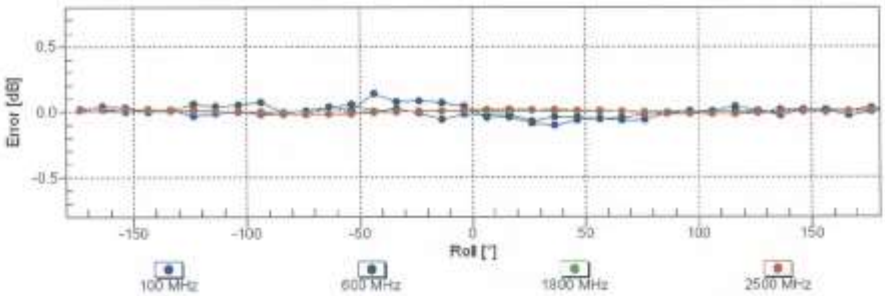


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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

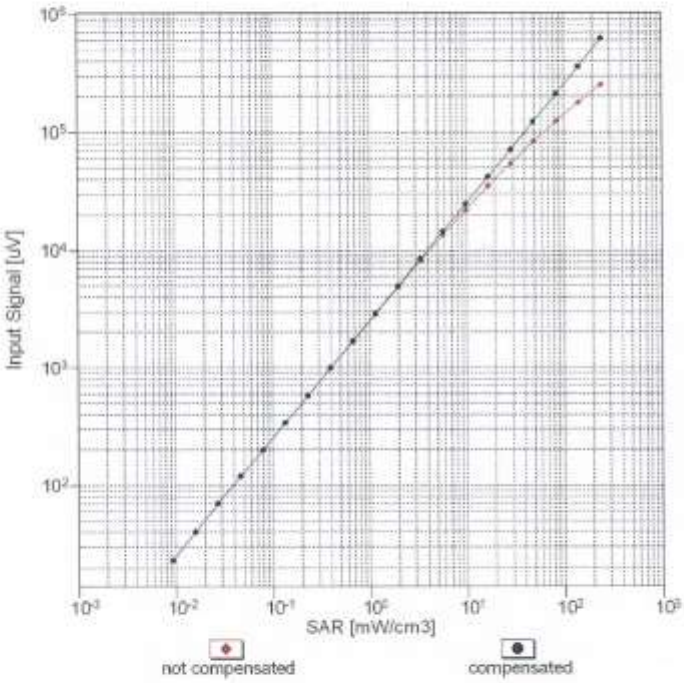
f=600 MHz,TEM f=1800 MHz,R22

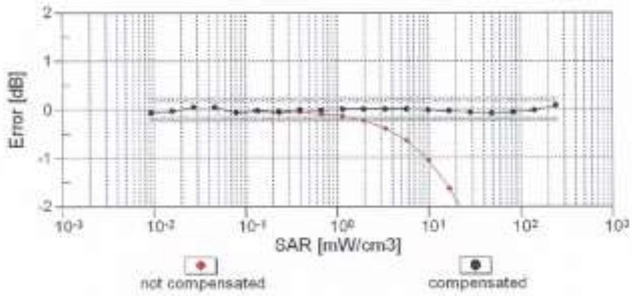




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

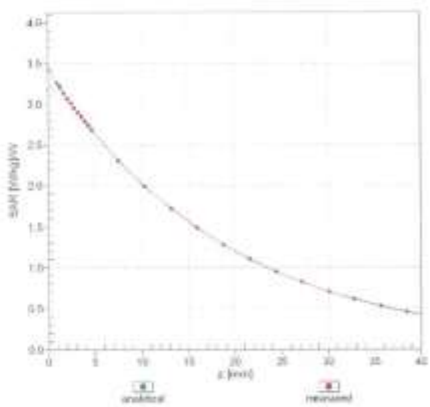
Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

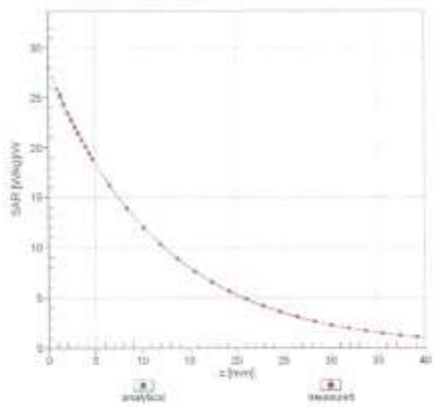




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

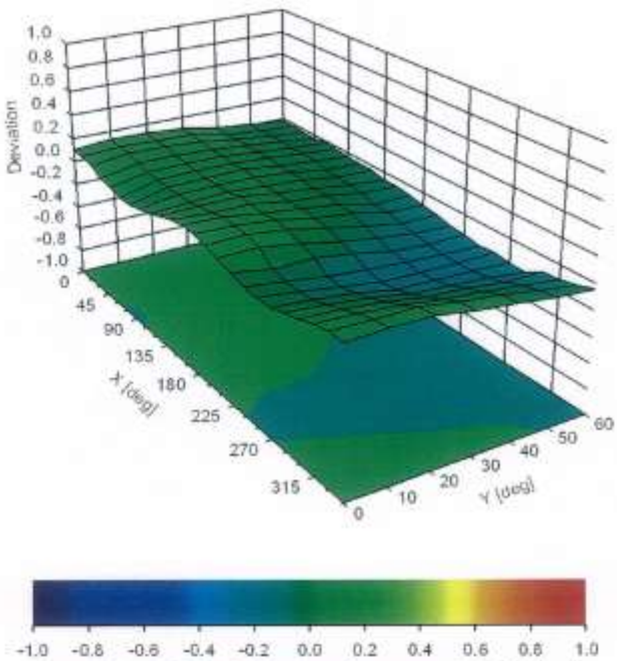
Conversion Factor Assessment





Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-33.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	169.1	± 2.2 %
		Y	0.00	0.00	1.00		164.6	
		Z	0.00	0.00	1.00		170.5	
10010-CAA	SAR Validation (Square, 100ms, 10ms)	X	2.54	65.82	10.61	10.00	20.0	± 9.6 %
		Y	2.66	66.16	10.72		20.0	
		Z	4.66	72.84	14.57		20.0	
10011-CAB	UMTS-FDD (WCDMA)	X	0.87	65.41	13.66	0.00	150.0	± 9.6 %
		Y	1.07	69.01	16.16		150.0	
		Z	0.89	65.14	13.56		150.0	
10012-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	1.09	63.14	14.48	0.41	150.0	± 9.6 %
		Y	1.18	64.45	15.44		150.0	
		Z	1.14	63.42	14.71		150.0	
10013-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	X	4.81	66.43	16.86	1.46	150.0	± 9.6 %
		Y	4.75	66.74	16.83		150.0	
		Z	4.95	66.57	17.09		150.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	60.85	106.27	25.54	9.39	50.0	± 9.6 %
		Y	13.48	86.14	19.57		50.0	
		Z	100.00	117.81	30.10		50.0	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	29.73	97.09	23.20	9.57	50.0	± 9.6 %
		Y	10.31	82.66	18.48		50.0	
		Z	100.00	117.74	30.12		50.0	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	100.00	109.00	24.34	6.56	60.0	± 9.6 %
		Y	58.23	101.87	22.30		60.0	
		Z	100.00	114.47	27.50		60.0	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	4.11	67.75	23.87	12.57	50.0	± 9.6 %
		Y	5.59	76.64	28.14		50.0	
		Z	5.69	76.15	28.67		50.0	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	9.98	91.62	31.66	9.56	60.0	± 9.6 %
		Y	9.71	91.11	31.21		60.0	
		Z	15.49	101.38	35.45		60.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	100.00	107.08	22.72	4.80	80.0	± 9.6 %
		Y	100.00	106.75	22.51		80.0	
		Z	100.00	113.02	26.04		80.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	100.00	105.63	21.42	3.55	100.0	± 9.6 %
		Y	100.00	107.26	22.10		100.0	
		Z	100.00	112.26	24.98		100.0	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	6.56	82.63	27.17	7.80	80.0	± 9.6 %
		Y	6.18	81.52	26.49		80.0	
		Z	9.49	89.98	30.23		80.0	
10030-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	X	100.00	106.63	22.81	5.30	70.0	± 9.6 %
		Y	32.08	94.55	19.72		70.0	
		Z	100.00	112.45	26.09		70.0	
10031-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	X	12.47	83.87	13.90	1.88	100.0	± 9.6 %
		Y	100.00	106.13	20.43		100.0	
		Z	100.00	107.26	21.44		100.0	

10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	0.31	61.44	5.58	1.17	100.0	± 9.6 %
		Y	100.00	112.50	22.19		100.0	
		Z	100.00	103.53	18.97		100.0	
10033-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	X	8.93	87.77	22.60	5.30	70.0	± 9.6 %
		Y	6.24	81.56	19.83		70.0	
		Z	34.10	109.22	29.82		70.0	
10034-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	X	2.58	73.82	16.27	1.88	100.0	± 9.6 %
		Y	2.86	75.19	16.50		100.0	
		Z	4.63	81.44	19.78		100.0	
10035-CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	X	1.74	70.10	14.51	1.17	100.0	± 9.6 %
		Y	2.15	73.13	15.64		100.0	
		Z	2.47	74.12	16.76		100.0	
10036-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	X	11.79	92.11	24.03	5.30	70.0	± 9.6 %
		Y	7.50	84.36	20.85		70.0	
		Z	60.11	118.50	32.26		70.0	
10037-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	X	2.44	73.19	15.99	1.88	100.0	± 9.6 %
		Y	2.63	74.23	16.11		100.0	
		Z	4.36	80.67	19.47		100.0	
10038-CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	X	1.76	70.48	14.78	1.17	100.0	± 9.6 %
		Y	2.18	73.56	15.93		100.0	
		Z	2.53	74.67	17.07		100.0	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	1.39	68.25	13.47	0.00	150.0	± 9.6 %
		Y	2.51	77.26	17.44		150.0	
		Z	1.45	68.11	13.78		150.0	
10042-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	X	18.94	89.46	19.42	7.78	50.0	± 9.6 %
		Y	10.39	82.47	17.14		50.0	
		Z	100.00	112.64	26.85		50.0	
10044-CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	X	0.11	121.46	12.61	0.00	150.0	± 9.6 %
		Y	0.00	103.60	3.33		150.0	
		Z	0.07	121.32	6.93		150.0	
10048-CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	X	9.59	80.51	19.70	13.80	25.0	± 9.6 %
		Y	6.62	74.21	16.94		25.0	
		Z	57.68	111.08	30.35		25.0	
10049-CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	X	10.86	83.57	19.50	10.79	40.0	± 9.6 %
		Y	7.12	77.11	16.82		40.0	
		Z	100.00	118.18	30.66		40.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	11.73	87.48	22.93	9.03	50.0	± 9.6 %
		Y	9.16	82.66	20.62		50.0	
		Z	24.42	100.64	28.16		50.0	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	5.03	77.72	24.47	6.55	100.0	± 9.6 %
		Y	4.75	76.74	23.86		100.0	
		Z	6.88	83.44	26.99		100.0	
10059-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	X	1.14	64.30	15.08	0.61	110.0	± 9.6 %
		Y	1.22	65.55	15.94		110.0	
		Z	1.23	65.01	15.56		110.0	
10060-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	X	7.59	94.98	23.55	1.30	110.0	± 9.6 %
		Y	14.24	106.02	27.35		110.0	
		Z	67.47	124.04	31.09		110.0	

10061-CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	3.01	79.54	21.02	2.04	110.0	± 9.6 %
		Y	2.92	79.24	20.92		110.0	
		Z	5.85	89.35	24.75		110.0	
10062-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	4.60	66.38	16.28	0.49	100.0	± 9.6 %
		Y	4.57	66.82	16.38		100.0	
		Z	4.71	66.41	16.41		100.0	
10063-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	X	4.62	66.48	16.38	0.72	100.0	± 9.6 %
		Y	4.58	66.88	16.44		100.0	
		Z	4.74	66.54	16.53		100.0	
10064-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	X	4.92	66.77	16.62	0.86	100.0	± 9.6 %
		Y	4.84	67.08	16.63		100.0	
		Z	5.06	66.88	16.81		100.0	
10065-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	X	4.79	66.67	16.71	1.21	100.0	± 9.6 %
		Y	4.71	66.95	16.69		100.0	
		Z	4.94	66.85	16.95		100.0	
10066-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	X	4.81	66.71	16.88	1.46	100.0	± 9.6 %
		Y	4.72	66.94	16.81		100.0	
		Z	4.97	66.93	17.15		100.0	
10067-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	X	5.11	66.87	17.32	2.04	100.0	± 9.6 %
		Y	5.01	67.11	17.21		100.0	
		Z	5.28	67.09	17.62		100.0	
10068-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	X	5.17	66.98	17.56	2.55	100.0	± 9.6 %
		Y	5.04	67.07	17.37		100.0	
		Z	5.37	67.33	17.94		100.0	
10069-CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	X	5.25	66.97	17.75	2.67	100.0	± 9.6 %
		Y	5.12	67.08	17.55		100.0	
		Z	5.45	67.28	18.11		100.0	
10071-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	X	4.92	66.54	17.17	1.99	100.0	± 9.6 %
		Y	4.84	66.78	17.08		100.0	
		Z	5.07	66.74	17.45		100.0	
10072-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	X	4.91	66.88	17.38	2.30	100.0	± 9.6 %
		Y	4.81	67.07	17.25		100.0	
		Z	5.08	67.18	17.72		100.0	
10073-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	X	4.98	67.06	17.70	2.83	100.0	± 9.6 %
		Y	4.88	67.23	17.54		100.0	
		Z	5.17	67.43	18.10		100.0	
10074-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	X	4.97	66.98	17.86	3.30	100.0	± 9.6 %
		Y	4.88	67.15	17.67		100.0	
		Z	5.17	67.39	18.30		100.0	
10075-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	X	5.02	67.15	18.19	3.82	90.0	± 9.6 %
		Y	4.92	67.25	17.94		90.0	
		Z	5.26	67.70	18.72		90.0	
10076-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	X	5.03	66.94	18.30	4.15	90.0	± 9.6 %
		Y	4.95	67.10	18.08		90.0	
		Z	5.26	67.45	18.82		90.0	
10077-CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	5.06	67.01	18.39	4.30	90.0	± 9.6 %
		Y	4.98	67.18	18.18		90.0	
		Z	5.29	67.52	18.92		90.0	

EX3DV4– SN:3903 September 24, 2018

10081-CAB	CDMA2000 (1xRTT, RC3)	X	0.66	63.45	10.49	0.00	150.0	± 9.6 %
		Y	0.90	68.08	13.29		150.0	
		Z	0.71	63.55	10.94		150.0	
10082-CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	X	0.85	60.00	4.73	4.77	80.0	± 9.6 %
		Y	0.83	60.00	4.73		80.0	
		Z	1.07	60.00	5.42		80.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	100.00	109.09	24.40	6.56	60.0	± 9.6 %
		Y	53.10	100.91	22.09		60.0	
		Z	100.00	114.57	27.56		60.0	
10097-CAB	UMTS-FDD (HSDPA)	X	1.66	66.43	14.74	0.00	150.0	± 9.6 %
		Y	1.90	69.17	16.32		150.0	
		Z	1.68	66.07	14.67		150.0	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	1.63	66.36	14.69	0.00	150.0	± 9.6 %
		Y	1.86	69.12	16.29		150.0	
		Z	1.64	66.01	14.62		150.0	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	10.03	91.70	31.68	9.56	60.0	± 9.6 %
		Y	9.76	91.17	31.22		60.0	
		Z	15.56	101.44	35.46		60.0	
10100-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	2.93	69.26	15.95	0.00	150.0	± 9.6 %
		Y	3.18	71.32	17.16		150.0	
		Z	2.97	69.09	15.86		150.0	
10101-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	3.12	66.93	15.47	0.00	150.0	± 9.6 %
		Y	3.21	67.98	16.10		150.0	
		Z	3.17	66.87	15.47		150.0	
10102-CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	3.23	66.95	15.60	0.00	150.0	± 9.6 %
		Y	3.31	67.96	16.19		150.0	
		Z	3.28	66.87	15.59		150.0	
10103-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.45	75.40	20.03	3.98	65.0	± 9.6 %
		Y	6.28	75.20	19.71		65.0	
		Z	7.78	77.95	21.27		65.0	
10104-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	6.38	73.48	20.06	3.98	65.0	± 9.6 %
		Y	6.24	73.34	19.73		65.0	
		Z	7.39	75.53	21.15		65.0	
10105-CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	X	6.15	72.69	20.04	3.98	65.0	± 9.6 %
		Y	6.00	72.52	19.68		65.0	
		Z	7.20	75.01	21.24		65.0	
10108-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	2.55	68.50	15.76	0.00	150.0	± 9.6 %
		Y	2.75	70.52	16.97		150.0	
		Z	2.60	68.34	15.68		150.0	
10109-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	2.77	66.72	15.33	0.00	150.0	± 9.6 %
		Y	2.87	67.95	16.05		150.0	
		Z	2.83	66.62	15.33		150.0	
10110-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	2.05	67.51	15.28	0.00	150.0	± 9.6 %
		Y	2.23	69.69	16.59		150.0	
		Z	2.11	67.34	15.23		150.0	
10111-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	2.47	67.37	15.52	0.00	150.0	± 9.6 %
		Y	2.65	69.37	16.57		150.0	
		Z	2.52	67.08	15.47		150.0	

Certificate No: EX3-3903_Sep18 Page 15 of 39

EX3DV4– SN:3903 September 24, 2018

10112-CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	2.90	66.76	15.42	0.00	150.0	± 9.6 %
		Y	2.99	67.96	16.11		150.0	
		Z	2.96	66.64	15.41		150.0	
10113-CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	2.63	67.57	15.69	0.00	150.0	± 9.6 %
		Y	2.81	69.51	16.70		150.0	
		Z	2.67	67.26	15.64		150.0	
10114-CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	X	5.05	66.93	16.23	0.00	150.0	± 9.6 %
		Y	5.03	67.39	16.41		150.0	
		Z	5.11	66.83	16.22		150.0	
10115-CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	X	5.35	67.10	16.33	0.00	150.0	± 9.6 %
		Y	5.28	67.44	16.44		150.0	
		Z	5.46	67.16	16.40		150.0	
10116-CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	X	5.15	67.14	16.26	0.00	150.0	± 9.6 %
		Y	5.11	67.56	16.43		150.0	
		Z	5.23	67.09	16.28		150.0	
10117-CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	5.02	66.80	16.18	0.00	150.0	± 9.6 %
		Y	5.00	67.28	16.38		150.0	
		Z	5.09	66.77	16.21		150.0	
10118-CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	X	5.44	67.32	16.45	0.00	150.0	± 9.6 %
		Y	5.35	67.58	16.52		150.0	
		Z	5.55	67.36	16.51		150.0	
10119-CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	X	5.13	67.08	16.24	0.00	150.0	± 9.6 %
		Y	5.09	67.51	16.42		150.0	
		Z	5.20	67.03	16.26		150.0	
10140-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	3.26	66.95	15.52	0.00	150.0	± 9.6 %
		Y	3.34	67.97	16.10		150.0	
		Z	3.32	66.87	15.51		150.0	
10141-CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	3.39	67.08	15.72	0.00	150.0	± 9.6 %
		Y	3.47	68.10	16.29		150.0	
		Z	3.45	66.98	15.70		150.0	
10142-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	1.81	67.29	14.80	0.00	150.0	± 9.6 %
		Y	2.03	70.03	16.34		150.0	
		Z	1.87	67.08	14.82		150.0	
10143-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	2.29	67.79	15.04	0.00	150.0	± 9.6 %
		Y	2.60	70.68	16.43		150.0	
		Z	2.34	67.45	15.07		150.0	
10144-CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	2.10	65.67	13.49	0.00	150.0	± 9.6 %
		Y	2.21	67.35	14.31		150.0	
		Z	2.18	65.63	13.71		150.0	
10145-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	1.05	63.40	10.48	0.00	150.0	± 9.6 %
		Y	1.16	65.51	11.53		150.0	
		Z	1.16	63.98	11.28		150.0	
10146-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	1.80	65.14	11.03	0.00	150.0	± 9.6 %
		Y	1.63	64.62	9.93		150.0	
		Z	2.37	68.19	13.30		150.0	
10147-CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	2.05	66.72	11.95	0.00	150.0	± 9.6 %
		Y	1.90	66.25	10.85		150.0	
		Z	2.90	70.86	14.66		150.0	

Certificate No: EX3-3903_Sep18 Page 16 of 39

EX3DV4– SN:3903 September 24, 2018

10149-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	2.78	66.79	15.38	0.00	150.0	± 9.6 %
		Y	2.88	68.03	16.10		150.0	
		Z	2.84	66.68	15.37		150.0	
10150-CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	2.91	66.81	15.47	0.00	150.0	± 9.6 %
		Y	3.00	68.03	16.15		150.0	
		Z	2.97	66.69	15.45		150.0	
10151-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.67	77.42	20.89	3.98	65.0	± 9.6 %
		Y	6.53	77.30	20.58		65.0	
		Z	8.19	80.26	22.26		65.0	
10152-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	5.89	73.34	19.69	3.98	65.0	± 9.6 %
		Y	5.74	73.13	19.28		65.0	
		Z	6.96	75.64	20.93		65.0	
10153-CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	X	6.30	74.40	20.54	3.98	65.0	± 9.6 %
		Y	6.16	74.26	20.14		65.0	
		Z	7.37	76.59	21.71		65.0	
10154-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	2.10	67.93	15.55	0.00	150.0	± 9.6 %
		Y	2.29	70.22	16.90		150.0	
		Z	2.15	67.74	15.49		150.0	
10155-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	2.47	67.39	15.53	0.00	150.0	± 9.6 %
		Y	2.66	69.39	16.60		150.0	
		Z	2.52	67.09	15.48		150.0	
10156-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	1.65	67.18	14.47	0.00	150.0	± 9.6 %
		Y	1.90	70.37	16.21		150.0	
		Z	1.71	67.01	14.55		150.0	
10157-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	1.91	65.98	13.37	0.00	150.0	± 9.6 %
		Y	2.09	68.23	14.46		150.0	
		Z	1.99	65.94	13.63		150.0	
10158-CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	2.64	67.64	15.74	0.00	150.0	± 9.6 %
		Y	2.82	69.60	16.76		150.0	
		Z	2.68	67.31	15.68		150.0	
10159-CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	2.01	66.42	13.66	0.00	150.0	± 9.6 %
		Y	2.22	68.85	14.81		150.0	
		Z	2.09	66.36	13.91		150.0	
10160-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	2.59	67.79	15.66	0.00	150.0	± 9.6 %
		Y	2.72	69.34	16.60		150.0	
		Z	2.65	67.63	15.62		150.0	
10161-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	2.80	66.73	15.38	0.00	150.0	± 9.6 %
		Y	2.90	68.03	16.10		150.0	
		Z	2.86	66.58	15.37		150.0	
10162-CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	2.91	66.89	15.50	0.00	150.0	± 9.6 %
		Y	3.02	68.21	16.22		150.0	
		Z	2.97	66.71	15.48		150.0	
10166-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	3.56	69.27	18.83	3.01	150.0	± 9.6 %
		Y	3.55	70.42	19.34		150.0	
		Z	3.75	69.55	19.14		150.0	
10167-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	4.37	71.91	19.15	3.01	150.0	± 9.6 %
		Y	4.65	74.57	20.22		150.0	
		Z	4.67	72.28	19.51		150.0	

Certificate No: EX3-3903_Sep18 Page 17 of 39

EX3DV4– SN:3903 September 24, 2018

10168-CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	4.92	74.43	20.62	3.01	150.0	± 9.6 %
		Y	5.50	78.09	22.07		150.0	
		Z	5.17	74.48	20.81		150.0	
10169-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	3.00	68.86	18.61	3.01	150.0	± 9.6 %
		Y	3.02	70.39	19.34		150.0	
		Z	3.27	69.74	19.19		150.0	
10170-CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	4.19	74.72	20.90	3.01	150.0	± 9.6 %
		Y	5.14	80.44	23.18		150.0	
		Z	4.59	75.50	21.37		150.0	
10171-AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	3.37	70.18	17.92	3.01	150.0	± 9.6 %
		Y	3.67	73.50	19.28		150.0	
		Z	3.75	71.24	18.59		150.0	
10172-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	9.18	90.67	27.62	6.02	65.0	± 9.6 %
		Y	8.14	89.55	26.80		65.0	
		Z	20.19	105.22	32.78		65.0	
10173-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	13.43	93.39	26.66	6.02	65.0	± 9.6 %
		Y	16.33	97.03	26.94		65.0	
		Z	27.89	106.05	31.18		65.0	
10174-CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	X	8.77	85.33	23.54	6.02	65.0	± 9.6 %
		Y	10.80	89.32	24.02		65.0	
		Z	21.76	100.18	28.92		65.0	
10175-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	2.96	68.50	18.34	3.01	150.0	± 9.6 %
		Y	2.97	69.98	19.04		150.0	
		Z	3.22	69.39	18.92		150.0	
10176-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	4.20	74.75	20.92	3.01	150.0	± 9.6 %
		Y	5.15	80.47	23.20		150.0	
		Z	4.60	75.53	21.38		150.0	
10177-CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	2.99	68.68	18.45	3.01	150.0	± 9.6 %
		Y	3.00	70.17	19.15		150.0	
		Z	3.25	69.57	19.03		150.0	
10178-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	4.15	74.48	20.78	3.01	150.0	± 9.6 %
		Y	5.06	80.12	23.04		150.0	
		Z	4.54	75.26	21.24		150.0	
10179-CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	3.72	72.22	19.23	3.01	150.0	± 9.6 %
		Y	4.29	76.64	21.02		150.0	
		Z	4.12	73.19	19.82		150.0	
10180-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	3.36	70.10	17.87	3.01	150.0	± 9.6 %
		Y	3.66	73.39	19.22		150.0	
		Z	3.74	71.15	18.54		150.0	
10181-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	2.98	68.66	18.44	3.01	150.0	± 9.6 %
		Y	3.00	70.14	19.14		150.0	
		Z	3.25	69.55	19.02		150.0	
10182-CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	4.14	74.46	20.76	3.01	150.0	± 9.6 %
		Y	5.05	80.09	23.02		150.0	
		Z	4.53	75.24	21.23		150.0	
10183-AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	3.35	70.08	17.86	3.01	150.0	± 9.6 %
		Y	3.65	73.36	19.21		150.0	
		Z	3.73	71.13	18.53		150.0	

Certificate No: EX3-3903_Sep18 Page 18 of 39

10184-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	3.00	68.70	18.46	3.01	150.0	± 9.6 %
		Y	3.01	70.20	19.17		150.0	
		Z	3.26	69.59	19.04		150.0	
10185-CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	4.16	74.53	20.80	3.01	150.0	± 9.6 %
		Y	5.08	80.20	23.07		150.0	
		Z	4.56	75.31	21.26		150.0	
10186-AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	3.37	70.14	17.89	3.01	150.0	± 9.6 %
		Y	3.67	73.45	19.25		150.0	
		Z	3.75	71.19	18.56		150.0	
10187-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	3.00	68.76	18.52	3.01	150.0	± 9.6 %
		Y	3.02	70.28	19.25		150.0	
		Z	3.27	69.64	19.10		150.0	
10188-CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	4.32	75.30	21.23	3.01	150.0	± 9.6 %
		Y	5.37	81.34	23.62		150.0	
		Z	4.72	76.03	21.66		150.0	
10189-AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	3.45	70.58	18.18	3.01	150.0	± 9.6 %
		Y	3.79	74.09	19.61		150.0	
		Z	3.84	71.63	18.84		150.0	
10193-CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	X	4.44	66.31	15.91	0.00	150.0	± 9.6 %
		Y	4.44	66.95	16.16		150.0	
		Z	4.51	66.20	15.93		150.0	
10194-CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	X	4.61	66.63	16.04	0.00	150.0	± 9.6 %
		Y	4.60	67.23	16.29		150.0	
		Z	4.69	66.55	16.05		150.0	
10195-CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	X	4.66	66.66	16.06	0.00	150.0	± 9.6 %
		Y	4.64	67.25	16.30		150.0	
		Z	4.74	66.57	16.07		150.0	
10196-CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	4.45	66.37	15.93	0.00	150.0	± 9.6 %
		Y	4.44	66.98	16.17		150.0	
		Z	4.52	66.28	15.96		150.0	
10197-CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	X	4.63	66.65	16.05	0.00	150.0	± 9.6 %
		Y	4.61	67.24	16.29		150.0	
		Z	4.71	66.57	16.06		150.0	
10198-CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	X	4.66	66.68	16.07	0.00	150.0	± 9.6 %
		Y	4.64	67.26	16.31		150.0	
		Z	4.74	66.59	16.08		150.0	
10219-CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	X	4.39	66.38	15.89	0.00	150.0	± 9.6 %
		Y	4.39	67.01	16.14		150.0	
		Z	4.47	66.29	15.91		150.0	
10220-CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	X	4.62	66.62	16.04	0.00	150.0	± 9.6 %
		Y	4.61	67.20	16.28		150.0	
		Z	4.70	66.55	16.06		150.0	
10221-CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	X	4.67	66.61	16.06	0.00	150.0	± 9.6 %
		Y	4.65	67.19	16.29		150.0	
		Z	4.75	66.53	16.07		150.0	
10222-CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	X	4.99	66.81	16.18	0.00	150.0	± 9.6 %
		Y	4.98	67.29	16.37		150.0	
		Z	5.07	66.78	16.20		150.0	

EX3DV4– SN:3903 September 24, 2018

10223-CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	X	5.30	67.03	16.32	0.00	150.0	± 9.6 %
		Y	5.26	67.45	16.47		150.0	
		Z	5.39	67.02	16.35		150.0	
10224-CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	X	5.04	66.91	16.16	0.00	150.0	± 9.6 %
		Y	5.02	67.40	16.36		150.0	
		Z	5.11	66.87	16.18		150.0	
10225-CAB	UMTS-FDD (HSPA+)	X	2.69	65.58	14.89	0.00	150.0	± 9.6 %
		Y	2.76	66.72	15.43		150.0	
		Z	2.75	65.43	14.95		150.0	
10226-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	14.47	94.81	27.20	6.02	65.0	± 9.6 %
		Y	18.21	98.98	27.61		65.0	
		Z	30.39	107.77	31.76		65.0	
10227-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	X	13.07	91.75	25.66	6.02	65.0	± 9.6 %
		Y	15.31	94.53	25.62		65.0	
		Z	25.51	103.07	29.85		65.0	
10228-CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	10.53	93.71	28.73	6.02	65.0	± 9.6 %
		Y	9.50	92.52	27.83		65.0	
		Z	22.70	108.15	33.78		65.0	
10229-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	13.53	93.50	26.70	6.02	65.0	± 9.6 %
		Y	16.50	97.19	26.99		65.0	
		Z	28.03	106.13	31.21		65.0	
10230-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	X	12.25	90.57	25.20	6.02	65.0	± 9.6 %
		Y	13.95	92.97	25.06		65.0	
		Z	23.75	101.70	29.37		65.0	
10231-CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	9.96	92.55	28.26	6.02	65.0	± 9.6 %
		Y	8.97	91.35	27.36		65.0	
		Z	21.17	106.63	33.25		65.0	
10232-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	13.51	93.48	26.70	6.02	65.0	± 9.6 %
		Y	16.48	97.17	26.99		65.0	
		Z	28.01	106.13	31.20		65.0	
10233-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	X	12.23	90.55	25.20	6.02	65.0	± 9.6 %
		Y	13.92	92.95	25.06		65.0	
		Z	23.72	101.69	29.37		65.0	
10234-CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	9.49	91.47	27.79	6.02	65.0	± 9.6 %
		Y	8.52	90.25	26.87		65.0	
		Z	19.87	105.16	32.70		65.0	
10235-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	13.52	93.52	26.71	6.02	65.0	± 9.6 %
		Y	16.50	97.21	27.00		65.0	
		Z	28.09	106.19	31.22		65.0	
10236-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	X	12.34	90.68	25.23	6.02	65.0	± 9.6 %
		Y	14.08	93.09	25.09		65.0	
		Z	23.99	101.86	29.42		65.0	
10237-CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	9.98	92.62	28.29	6.02	65.0	± 9.6 %
		Y	8.98	91.41	27.38		65.0	
		Z	21.31	106.80	33.30		65.0	
10238-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	13.48	93.46	26.69	6.02	65.0	± 9.6 %
		Y	16.43	97.14	26.97		65.0	
		Z	27.99	106.13	31.20		65.0	

EX3DV4– SN:3903 September 24, 2018

10239-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	X	12.20	90.53	25.19	6.02	65.0	± 9.6 %
		Y	13.87	92.91	25.04		65.0	
		Z	23.69	101.69	29.37		65.0	
10240-CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	9.95	92.57	28.27	6.02	65.0	± 9.6 %
		Y	8.95	91.37	27.37		65.0	
		Z	21.23	106.73	33.28		65.0	
10241-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	8.32	80.56	24.79	6.98	65.0	± 9.6 %
		Y	8.49	82.24	25.04		65.0	
		Z	10.03	83.64	26.45		65.0	
10242-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	X	7.77	79.16	24.14	6.98	65.0	± 9.6 %
		Y	7.66	80.23	24.18		65.0	
		Z	9.64	82.78	26.03		65.0	
10243-CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	6.35	76.29	23.82	6.98	65.0	± 9.6 %
		Y	6.12	76.64	23.62		65.0	
		Z	7.78	79.86	25.76		65.0	
10244-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	5.82	74.60	17.80	3.98	65.0	± 9.6 %
		Y	4.88	71.84	15.65		65.0	
		Z	8.63	80.62	21.03		65.0	
10245-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	5.70	74.03	17.52	3.98	65.0	± 9.6 %
		Y	4.76	71.29	15.36		65.0	
		Z	8.39	79.88	20.70		65.0	
10246-CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	5.26	76.44	18.61	3.98	65.0	± 9.6 %
		Y	4.58	74.28	17.14		65.0	
		Z	8.18	82.79	21.65		65.0	
10247-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	5.02	73.05	17.95	3.98	65.0	± 9.6 %
		Y	4.67	71.99	16.90		65.0	
		Z	6.44	76.50	19.93		65.0	
10248-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	X	5.01	72.55	17.72	3.98	65.0	± 9.6 %
		Y	4.65	71.49	16.67		65.0	
		Z	6.38	75.83	19.64		65.0	
10249-CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	6.50	79.92	20.86	3.98	65.0	± 9.6 %
		Y	5.98	78.54	19.84		65.0	
		Z	9.43	85.42	23.37		65.0	
10250-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	6.00	75.79	20.73	3.98	65.0	± 9.6 %
		Y	5.82	75.40	20.14		65.0	
		Z	7.31	78.59	22.19		65.0	
10251-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	X	5.69	73.59	19.44	3.98	65.0	± 9.6 %
		Y	5.49	73.22	18.86		65.0	
		Z	6.83	76.09	20.84		65.0	
10252-CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.84	80.01	21.85	3.98	65.0	± 9.6 %
		Y	6.61	79.55	21.32		65.0	
		Z	9.00	83.99	23.66		65.0	
10253-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	5.77	72.82	19.47	3.98	65.0	± 9.6 %
		Y	5.64	72.70	19.06		65.0	
		Z	6.76	74.99	20.69		65.0	
10254-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	X	6.14	73.79	20.22	3.98	65.0	± 9.6 %
		Y	6.02	73.70	19.81		65.0	
		Z	7.16	75.91	21.39		65.0	

Certificate No: EX3-3903_Sep18 Page 21 of 39

10255-CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.37	76.83	20.88	3.98	65.0	± 9.6 %
		Y	6.26	76.75	20.55		65.0	
		Z	7.79	79.60	22.25		65.0	
10256-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	4.48	70.56	15.04	3.98	65.0	± 9.6 %
		Y	3.56	67.44	12.56		65.0	
		Z	7.19	77.32	18.84		65.0	
10257-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	X	4.37	69.90	14.66	3.98	65.0	± 9.6 %
		Y	3.49	66.92	12.23		65.0	
		Z	6.89	76.29	18.33		65.0	
10258-CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	3.94	71.85	15.88	3.98	65.0	± 9.6 %
		Y	3.31	69.35	14.10		65.0	
		Z	6.38	78.44	19.31		65.0	
10259-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	5.40	74.08	18.96	3.98	65.0	± 9.6 %
		Y	5.12	73.30	18.09		65.0	
		Z	6.78	77.23	20.72		65.0	
10260-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	X	5.44	73.84	18.87	3.98	65.0	± 9.6 %
		Y	5.15	73.06	18.00		65.0	
		Z	6.78	76.91	20.61		65.0	
10261-CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	6.31	79.15	20.99	3.98	65.0	± 9.6 %
		Y	5.96	78.24	20.18		65.0	
		Z	8.69	83.83	23.17		65.0	
10262-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	5.99	75.73	20.68	3.98	65.0	± 9.6 %
		Y	5.80	75.33	20.08		65.0	
		Z	7.30	78.53	22.15		65.0	
10263-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	X	5.68	73.57	19.43	3.98	65.0	± 9.6 %
		Y	5.48	73.20	18.85		65.0	
		Z	6.82	76.07	20.84		65.0	
10264-CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.77	79.81	21.75	3.98	65.0	± 9.6 %
		Y	6.54	79.34	21.22		65.0	
		Z	8.91	83.77	23.56		65.0	
10265-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	5.89	73.34	19.70	3.98	65.0	± 9.6 %
		Y	5.74	73.13	19.29		65.0	
		Z	6.96	75.64	20.94		65.0	
10266-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	X	6.29	74.38	20.53	3.98	65.0	± 9.6 %
		Y	6.15	74.24	20.13		65.0	
		Z	7.37	76.58	21.70		65.0	
10267-CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.65	77.37	20.88	3.98	65.0	± 9.6 %
		Y	6.52	77.26	20.56		65.0	
		Z	8.17	80.21	22.24		65.0	
10268-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	6.53	73.36	20.14	3.98	65.0	± 9.6 %
		Y	6.40	73.28	19.82		65.0	
		Z	7.49	75.26	21.16		65.0	
10269-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	X	6.51	72.97	20.03	3.98	65.0	± 9.6 %
		Y	6.39	72.93	19.72		65.0	
		Z	7.42	74.79	21.03		65.0	
10270-CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.54	75.01	20.10	3.98	65.0	± 9.6 %
		Y	6.45	75.03	19.86		65.0	
		Z	7.66	77.11	21.18		65.0	

EX3DV4– SN:3903 September 24, 2018

10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	2.46	65.79	14.69	0.00	150.0	± 9.6 %
		Y	2.58	67.27	15.46		150.0	
		Z	2.49	65.56	14.71		150.0	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	1.44	66.40	14.41	0.00	150.0	± 9.6 %
		Y	1.66	69.27	16.19		150.0	
		Z	1.46	66.15	14.35		150.0	
10277-CAA	PHS (QPSK)	X	2.51	62.17	7.90	9.03	50.0	± 9.6 %
		Y	2.38	61.67	7.26		50.0	
		Z	3.27	64.51	10.00		50.0	
10278-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	X	4.62	71.07	14.99	9.03	50.0	± 9.6 %
		Y	3.85	68.04	12.94		50.0	
		Z	8.15	79.79	19.65		50.0	
10279-CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	X	4.75	71.35	15.16	9.03	50.0	± 9.6 %
		Y	3.94	68.26	13.09		50.0	
		Z	8.33	80.02	19.77		50.0	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	1.16	65.91	12.08	0.00	150.0	± 9.6 %
		Y	1.58	70.94	14.61		150.0	
		Z	1.24	66.05	12.53		150.0	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	0.65	63.29	10.39	0.00	150.0	± 9.6 %
		Y	0.88	67.73	13.10		150.0	
		Z	0.70	63.39	10.83		150.0	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	0.76	65.85	12.07	0.00	150.0	± 9.6 %
		Y	1.70	77.44	17.62		150.0	
		Z	0.79	65.62	12.35		150.0	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	1.06	70.13	14.56	0.00	150.0	± 9.6 %
		Y	9.85	102.23	25.91		150.0	
		Z	1.02	68.99	14.44		150.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	8.04	81.06	21.93	9.03	50.0	± 9.6 %
		Y	7.29	78.67	20.25		50.0	
		Z	10.35	86.02	24.73		50.0	
10297-AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	2.56	68.60	15.83	0.00	150.0	± 9.6 %
		Y	2.77	70.65	17.06		150.0	
		Z	2.62	68.43	15.75		150.0	
10298-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	1.35	65.77	12.74	0.00	150.0	± 9.6 %
		Y	1.59	69.04	14.43		150.0	
		Z	1.44	65.90	13.13		150.0	
10299-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	2.43	68.36	13.57	0.00	150.0	± 9.6 %
		Y	2.61	69.77	13.49		150.0	
		Z	2.97	70.69	15.30		150.0	
10300-AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	X	1.88	64.42	10.94	0.00	150.0	± 9.6 %
		Y	1.75	64.34	10.21		150.0	
		Z	2.24	66.02	12.40		150.0	
10301-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	X	4.73	65.33	17.26	4.17	50.0	± 9.6 %
		Y	4.52	65.28	17.16		50.0	
		Z	5.11	66.26	17.83		50.0	
10302-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	X	5.22	65.94	17.96	4.96	50.0	± 9.6 %
		Y	5.07	66.20	18.02		50.0	
		Z	5.54	66.57	18.36		50.0	

EX3DV4– SN:3903 September 24, 2018

10303-AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	X	4.98	65.64	17.81	4.96	50.0	± 9.6 %
		Y	4.83	65.88	17.86		50.0	
		Z	5.32	66.37	18.28		50.0	
10304-AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	X	4.77	65.42	17.27	4.17	50.0	± 9.6 %
		Y	4.64	65.77	17.38		50.0	
		Z	5.07	66.01	17.65		50.0	
10305-AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	X	4.69	68.66	19.95	6.02	35.0	± 9.6 %
		Y	4.49	68.50	19.69		35.0	
		Z	5.36	70.97	21.31		35.0	
10306-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	X	4.88	67.12	19.31	6.02	35.0	± 9.6 %
		Y	4.69	67.04	19.11		35.0	
		Z	5.35	68.62	20.28		35.0	
10307-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	X	4.81	67.43	19.33	6.02	35.0	± 9.6 %
		Y	4.61	67.26	19.10		35.0	
		Z	5.33	69.14	20.39		35.0	
10308-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	X	4.79	67.67	19.49	6.02	35.0	± 9.6 %
		Y	4.60	67.53	19.27		35.0	
		Z	5.33	69.43	20.56		35.0	
10309-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	X	4.94	67.35	19.45	6.02	35.0	± 9.6 %
		Y	4.73	67.18	19.22		35.0	
		Z	5.44	68.92	20.45		35.0	
10310-AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	X	4.84	67.24	19.31	6.02	35.0	± 9.6 %
		Y	4.65	67.15	19.11		35.0	
		Z	5.32	68.80	20.30		35.0	
10311-AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	2.91	67.94	15.55	0.00	150.0	± 9.6 %
		Y	3.15	69.92	16.68		150.0	
		Z	2.96	67.78	15.47		150.0	
10313-AAA	iDEN 1:3	X	3.29	70.42	14.53	6.99	70.0	± 9.6 %
		Y	3.25	70.48	14.53		70.0	
		Z	5.49	76.09	17.25		70.0	
10314-AAA	iDEN 1:6	X	4.50	76.48	19.66	10.00	30.0	± 9.6 %
		Y	4.50	76.41	19.55		30.0	
		Z	8.40	85.50	23.36		30.0	
10315-AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	X	0.99	62.91	14.33	0.17	150.0	± 9.6 %
		Y	1.09	64.48	15.50		150.0	
		Z	1.02	63.00	14.42		150.0	
10316-AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	X	4.50	66.36	16.04	0.17	150.0	± 9.6 %
		Y	4.47	66.85	16.19		150.0	
		Z	4.59	66.36	16.13		150.0	
10317-AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	X	4.50	66.36	16.04	0.17	150.0	± 9.6 %
		Y	4.47	66.85	16.19		150.0	
		Z	4.59	66.36	16.13		150.0	
10400-AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	X	4.60	66.67	16.02	0.00	150.0	± 9.6 %
		Y	4.58	67.24	16.26		150.0	
		Z	4.69	66.60	16.04		150.0	
10401-AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	X	5.32	66.93	16.24	0.00	150.0	± 9.6 %
		Y	5.23	67.14	16.28		150.0	
		Z	5.38	66.83	16.24		150.0	

Certificate No: EX3-3903_Sep18 Page 24 of 39

10402-AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	X	5.56	67.22	16.25	0.00	150.0	± 9.6 %
		Y	5.53	67.64	16.40		150.0	
		Z	5.65	67.23	16.29		150.0	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	1.16	65.91	12.08	0.00	115.0	± 9.6 %
		Y	1.58	70.94	14.61		115.0	
		Z	1.24	66.05	12.53		115.0	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	1.16	65.91	12.08	0.00	115.0	± 9.6 %
		Y	1.58	70.94	14.61		115.0	
		Z	1.24	66.05	12.53		115.0	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	20.49	99.76	25.05	0.00	100.0	± 9.6 %
		Y	100.00	114.51	26.66		100.0	
		Z	18.28	99.16	25.69		100.0	
10410-AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	X	33.60	104.90	25.70	3.23	80.0	± 9.6 %
		Y	21.20	96.90	22.42		80.0	
		Z	100.00	122.01	31.03		80.0	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	0.91	62.07	13.76	0.00	150.0	± 9.6 %
		Y	1.01	63.73	15.07		150.0	
		Z	0.92	61.89	13.67		150.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	4.44	66.35	15.98	0.00	150.0	± 9.6 %
		Y	4.44	66.96	16.23		150.0	
		Z	4.51	66.25	15.99		150.0	
10417-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	4.44	66.35	15.98	0.00	150.0	± 9.6 %
		Y	4.44	66.96	16.23		150.0	
		Z	4.51	66.25	15.99		150.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	4.43	66.50	15.99	0.00	150.0	± 9.6 %
		Y	4.44	67.15	16.27		150.0	
		Z	4.50	66.38	15.99		150.0	
10419-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	X	4.45	66.45	16.00	0.00	150.0	± 9.6 %
		Y	4.46	67.09	16.26		150.0	
		Z	4.52	66.34	16.00		150.0	
10422-AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	X	4.57	66.46	16.02	0.00	150.0	± 9.6 %
		Y	4.57	67.06	16.26		150.0	
		Z	4.65	66.36	16.03		150.0	
10423-AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	X	4.74	66.78	16.14	0.00	150.0	± 9.6 %
		Y	4.71	67.35	16.36		150.0	
		Z	4.83	66.71	16.15		150.0	
10424-AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	X	4.66	66.72	16.10	0.00	150.0	± 9.6 %
		Y	4.64	67.31	16.34		150.0	
		Z	4.74	66.64	16.12		150.0	
10425-AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	X	5.27	67.08	16.32	0.00	150.0	± 9.6 %
		Y	5.21	67.45	16.44		150.0	
		Z	5.35	67.06	16.35		150.0	
10426-AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	X	5.27	67.11	16.33	0.00	150.0	± 9.6 %
		Y	5.22	67.48	16.45		150.0	
		Z	5.35	67.06	16.35		150.0	

10427-AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	X	5.29	67.08	16.31	0.00	150.0	± 9.6 %
		Y	5.23	67.44	16.43		150.0	
		Z	5.36	67.04	16.33		150.0	
10430-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	4.19	70.69	18.03	0.00	150.0	± 9.6 %
		Y	4.46	72.73	18.88		150.0	
		Z	4.17	69.91	17.78		150.0	
10431-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	4.11	66.84	15.92	0.00	150.0	± 9.6 %
		Y	4.11	67.60	16.24		150.0	
		Z	4.20	66.72	15.96		150.0	
10432-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	4.42	66.75	16.03	0.00	150.0	± 9.6 %
		Y	4.41	67.41	16.31		150.0	
		Z	4.51	66.65	16.05		150.0	
10433-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	4.67	66.76	16.13	0.00	150.0	± 9.6 %
		Y	4.66	67.34	16.37		150.0	
		Z	4.76	66.68	16.14		150.0	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	4.29	71.49	17.95	0.00	150.0	± 9.6 %
		Y	4.70	74.07	18.99		150.0	
		Z	4.24	70.59	17.70		150.0	
10435-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	30.06	103.30	25.25	3.23	80.0	± 9.6 %
		Y	18.61	95.21	21.92		80.0	
		Z	100.00	121.83	30.95		80.0	
10447-AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.38	66.68	15.12	0.00	150.0	± 9.6 %
		Y	3.42	67.74	15.54		150.0	
		Z	3.48	66.57	15.24		150.0	
10448-AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	X	3.95	66.60	15.77	0.00	150.0	± 9.6 %
		Y	3.97	67.40	16.12		150.0	
		Z	4.03	66.48	15.80		150.0	
10449-AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	X	4.23	66.57	15.92	0.00	150.0	± 9.6 %
		Y	4.24	67.26	16.22		150.0	
		Z	4.31	66.46	15.93		150.0	
10450-AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.43	66.51	15.97	0.00	150.0	± 9.6 %
		Y	4.44	67.14	16.24		150.0	
		Z	4.50	66.42	15.98		150.0	
10451-AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	X	3.26	66.76	14.67	0.00	150.0	± 9.6 %
		Y	3.29	67.87	15.08		150.0	
		Z	3.37	66.70	14.86		150.0	
10456-AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	X	6.13	67.65	16.49	0.00	150.0	± 9.6 %
		Y	6.10	68.01	16.60		150.0	
		Z	6.21	67.65	16.53		150.0	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	3.70	64.99	15.68	0.00	150.0	± 9.6 %
		Y	3.74	65.64	15.95		150.0	
		Z	3.74	64.87	15.69		150.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	3.88	70.50	17.20	0.00	150.0	± 9.6 %
		Y	4.25	73.02	18.16		150.0	
		Z	3.85	69.68	17.05		150.0	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	5.08	68.52	18.19	0.00	150.0	± 9.6 %
		Y	5.16	69.72	18.53		150.0	
		Z	5.09	67.83	17.99		150.0	

10460-AAA	UMTS-FDD (WCDMA, AMR)	X	0.73	65.77	14.19	0.00	150.0	± 9.6 %
		Y	0.97	70.48	17.39		150.0	
		Z	0.74	65.33	13.98		150.0	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	41.74	110.10	27.72	3.29	80.0	± 9.6 %
		Y	8.04	88.28	21.11		80.0	
		Z	100.00	125.80	32.85		80.0	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.70	64.70	10.75	3.23	80.0	± 9.6 %
		Y	0.89	60.00	7.25		80.0	
		Z	100.00	109.16	25.07		80.0	
10463-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.25	61.45	8.78	3.23	80.0	± 9.6 %
		Y	0.91	60.00	6.74		80.0	
		Z	16.92	87.62	19.12		80.0	
10464-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	21.60	99.74	24.45	3.23	80.0	± 9.6 %
		Y	4.66	80.69	18.13		80.0	
		Z	100.00	123.58	31.66		80.0	
10465-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.55	63.77	10.27	3.23	80.0	± 9.6 %
		Y	0.89	60.00	7.18		80.0	
		Z	83.79	106.68	24.37		80.0	
10466-AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.20	61.02	8.52	3.23	80.0	± 9.6 %
		Y	0.92	60.00	6.70		80.0	
		Z	8.77	80.60	17.05		80.0	
10467-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	26.95	102.65	25.21	3.23	80.0	± 9.6 %
		Y	5.22	82.10	18.61		80.0	
		Z	100.00	123.82	31.77		80.0	
10468-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.58	64.00	10.39	3.23	80.0	± 9.6 %
		Y	0.89	60.00	7.20		80.0	
		Z	100.00	108.76	24.86		80.0	
10469-AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.20	61.02	8.52	3.23	80.0	± 9.6 %
		Y	0.92	60.00	6.69		80.0	
		Z	8.94	80.81	17.11		80.0	
10470-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	27.15	102.75	25.23	3.23	80.0	± 9.6 %
		Y	5.21	82.11	18.60		80.0	
		Z	100.00	123.85	31.77		80.0	
10471-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.57	63.95	10.36	3.23	80.0	± 9.6 %
		Y	0.89	60.00	7.18		80.0	
		Z	100.00	108.70	24.83		80.0	
10472-AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.19	60.99	8.49	3.23	80.0	± 9.6 %
		Y	0.91	60.00	6.68		80.0	
		Z	8.86	80.71	17.06		80.0	
10473-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	26.88	102.61	25.19	3.23	80.0	± 9.6 %
		Y	5.18	82.02	18.57		80.0	
		Z	100.00	123.82	31.76		80.0	
10474-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.56	63.92	10.34	3.23	80.0	± 9.6 %
		Y	0.88	60.00	7.18		80.0	
		Z	100.00	108.71	24.83		80.0	
10475-AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.19	60.97	8.48	3.23	80.0	± 9.6 %
		Y	0.91	60.00	6.68		80.0	
		Z	8.73	80.57	17.02		80.0	

EX3DV4– SN:3903 September 24, 2018

10477-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.54	63.72	10.23	3.23	80.0	± 9.6 %
		Y	0.89	60.00	7.16		80.0	
		Z	89.93	107.39	24.50		80.0	
10478-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.19	60.94	8.46	3.23	80.0	± 9.6 %
		Y	0.92	60.00	6.67		80.0	
		Z	8.57	80.34	16.95		80.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.61	83.03	21.62	3.23	80.0	± 9.6 %
		Y	5.80	81.37	20.32		80.0	
		Z	14.64	95.43	26.40		80.0	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.45	75.90	17.43	3.23	80.0	± 9.6 %
		Y	3.96	72.24	15.07		80.0	
		Z	14.70	89.62	22.90		80.0	
10481-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.41	72.66	15.88	3.23	80.0	± 9.6 %
		Y	3.00	68.62	13.29		80.0	
		Z	11.76	85.72	21.34		80.0	
10482-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.43	68.59	14.91	2.23	80.0	± 9.6 %
		Y	2.27	68.17	14.33		80.0	
		Z	3.81	74.09	17.74		80.0	
10483-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.79	70.92	15.60	2.23	80.0	± 9.6 %
		Y	2.71	67.01	13.08		80.0	
		Z	8.00	81.16	20.31		80.0	
10484-AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.61	70.05	15.26	2.23	80.0	± 9.6 %
		Y	2.62	66.37	12.80		80.0	
		Z	7.17	79.40	19.70		80.0	
10485-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	2.90	70.80	16.81	2.23	80.0	± 9.6 %
		Y	2.85	71.01	16.62		80.0	
		Z	4.15	75.35	19.07		80.0	
10486-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	2.89	67.56	15.00	2.23	80.0	± 9.6 %
		Y	2.78	67.53	14.57		80.0	
		Z	3.72	70.53	16.78		80.0	
10487-AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	2.90	67.27	14.86	2.23	80.0	± 9.6 %
		Y	2.78	67.19	14.41		80.0	
		Z	3.70	70.12	16.61		80.0	
10488-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.33	70.90	17.61	2.23	80.0	± 9.6 %
		Y	3.27	71.14	17.57		80.0	
		Z	4.32	74.20	19.23		80.0	
10489-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.33	68.05	16.50	2.23	80.0	± 9.6 %
		Y	3.29	68.37	16.40		80.0	
		Z	3.93	70.00	17.66		80.0	
10490-AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.43	67.94	16.48	2.23	80.0	± 9.6 %
		Y	3.37	68.25	16.36		80.0	
		Z	4.01	69.77	17.59		80.0	
10491-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.62	69.85	17.36	2.23	80.0	± 9.6 %
		Y	3.55	70.10	17.34		80.0	
		Z	4.40	72.28	18.60		80.0	
10492-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.71	67.60	16.66	2.23	80.0	± 9.6 %
		Y	3.66	67.88	16.57		80.0	
		Z	4.24	69.13	17.58		80.0	

Certificate No: EX3-3903_Sep18 Page 28 of 39

EX3DV4– SN:3903 September 24, 2018

10493-AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.79	67.51	16.64	2.23	80.0	± 9.6 %
		Y	3.72	67.77	16.54		80.0	
		Z	4.30	68.97	17.53		80.0	
10494-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.88	71.13	17.72	2.23	80.0	± 9.6 %
		Y	3.81	71.36	17.73		80.0	
		Z	4.84	73.97	19.09		80.0	
10495-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.74	67.96	16.84	2.23	80.0	± 9.6 %
		Y	3.68	68.19	16.76		80.0	
		Z	4.29	69.60	17.78		80.0	
10496-AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.83	67.76	16.80	2.23	80.0	± 9.6 %
		Y	3.77	67.99	16.71		80.0	
		Z	4.36	69.27	17.69		80.0	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	1.71	64.34	12.00	2.23	80.0	± 9.6 %
		Y	1.51	63.37	11.02		80.0	
		Z	2.78	69.79	15.16		80.0	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	1.49	60.62	9.16	2.23	80.0	± 9.6 %
		Y	1.31	60.00	8.23		80.0	
		Z	2.15	64.01	11.64		80.0	
10499-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	1.46	60.25	8.83	2.23	80.0	± 9.6 %
		Y	1.33	60.00	8.09		80.0	
		Z	2.10	63.46	11.24		80.0	
10500-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.04	70.63	17.07	2.23	80.0	± 9.6 %
		Y	2.99	70.93	16.97		80.0	
		Z	4.11	74.43	18.99		80.0	
10501-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.09	67.86	15.63	2.23	80.0	± 9.6 %
		Y	3.03	68.06	15.36		80.0	
		Z	3.81	70.30	17.11		80.0	
10502-AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.15	67.75	15.53	2.23	80.0	± 9.6 %
		Y	3.07	67.92	15.24		80.0	
		Z	3.86	70.12	16.99		80.0	
10503-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.29	70.71	17.52	2.23	80.0	± 9.6 %
		Y	3.22	70.95	17.47		80.0	
		Z	4.26	73.98	19.13		80.0	
10504-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.31	67.95	16.44	2.23	80.0	± 9.6 %
		Y	3.27	68.27	16.33		80.0	
		Z	3.91	69.90	17.60		80.0	
10505-AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.41	67.85	16.43	2.23	80.0	± 9.6 %
		Y	3.35	68.15	16.30		80.0	
		Z	3.99	69.68	17.53		80.0	
10506-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	3.85	70.99	17.65	2.23	80.0	± 9.6 %
		Y	3.78	71.21	17.65		80.0	
		Z	4.80	73.81	19.01		80.0	
10507-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	3.73	67.90	16.80	2.23	80.0	± 9.6 %
		Y	3.67	68.13	16.72		80.0	
		Z	4.27	69.54	17.74		80.0	

10508-AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	3.82	67.69	16.75	2.23	80.0	± 9.6 %
		Y	3.75	67.92	16.67		80.0	
		Z	4.34	69.20	17.64		80.0	
10509-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.23	70.08	17.33	2.23	80.0	± 9.6 %
		Y	4.18	70.38	17.36		80.0	
		Z	5.00	72.17	18.39		80.0	
10510-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.23	67.80	16.89	2.23	80.0	± 9.6 %
		Y	4.16	67.99	16.81		80.0	
		Z	4.75	69.17	17.68		80.0	
10511-AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.29	67.59	16.85	2.23	80.0	± 9.6 %
		Y	4.22	67.80	16.78		80.0	
		Z	4.78	68.88	17.61		80.0	
10512-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	4.36	71.34	17.68	2.23	80.0	± 9.6 %
		Y	4.30	71.61	17.71		80.0	
		Z	5.33	73.94	18.92		80.0	
10513-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	4.11	68.01	16.96	2.23	80.0	± 9.6 %
		Y	4.04	68.17	16.88		80.0	
		Z	4.65	69.54	17.82		80.0	
10514-AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	X	4.14	67.66	16.88	2.23	80.0	± 9.6 %
		Y	4.08	67.83	16.79		80.0	
		Z	4.64	69.05	17.68		80.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	0.87	62.19	13.76	0.00	150.0	± 9.6 %
		Y	0.98	63.95	15.17		150.0	
		Z	0.88	62.01	13.66		150.0	
10516-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	X	0.43	66.66	14.13	0.00	150.0	± 9.6 %
		Y	0.69	74.11	19.46		150.0	
		Z	0.43	65.90	13.69		150.0	
10517-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	X	0.70	63.54	13.92	0.00	150.0	± 9.6 %
		Y	0.84	66.25	16.08		150.0	
		Z	0.71	63.29	13.76		150.0	
10518-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	4.44	66.42	15.95	0.00	150.0	± 9.6 %
		Y	4.44	67.05	16.22		150.0	
		Z	4.51	66.31	15.96		150.0	
10519-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	X	4.62	66.66	16.08	0.00	150.0	± 9.6 %
		Y	4.60	67.24	16.31		150.0	
		Z	4.71	66.58	16.10		150.0	
10520-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	X	4.47	66.61	15.99	0.00	150.0	± 9.6 %
		Y	4.46	67.20	16.24		150.0	
		Z	4.56	66.54	16.01		150.0	
10521-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	X	4.40	66.59	15.97	0.00	150.0	± 9.6 %
		Y	4.39	67.20	16.23		150.0	
		Z	4.49	66.53	15.99		150.0	
10522-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	X	4.46	66.69	16.06	0.00	150.0	± 9.6 %
		Y	4.45	67.31	16.32		150.0	
		Z	4.54	66.58	16.06		150.0	

EX3DV4– SN:3903 September 24, 2018

10523-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	X	4.34	66.55	15.90	0.00	150.0	± 9.6 %
		Y	4.35	67.25	16.21		150.0	
		Z	4.41	66.43	15.89		150.0	
10524-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	X	4.41	66.60	16.02	0.00	150.0	± 9.6 %
		Y	4.39	67.23	16.30		150.0	
		Z	4.49	66.51	16.03		150.0	
10525-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	4.39	65.65	15.62	0.00	150.0	± 9.6 %
		Y	4.41	66.34	15.92		150.0	
		Z	4.46	65.54	15.62		150.0	
10526-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	4.56	66.01	15.76	0.00	150.0	± 9.6 %
		Y	4.55	66.66	16.04		150.0	
		Z	4.64	65.92	15.76		150.0	
10527-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	X	4.48	65.96	15.70	0.00	150.0	± 9.6 %
		Y	4.48	66.64	15.99		150.0	
		Z	4.56	65.87	15.70		150.0	
10528-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	X	4.50	65.98	15.73	0.00	150.0	± 9.6 %
		Y	4.49	66.65	16.02		150.0	
		Z	4.57	65.89	15.74		150.0	
10529-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	X	4.50	65.98	15.73	0.00	150.0	± 9.6 %
		Y	4.49	66.65	16.02		150.0	
		Z	4.57	65.89	15.74		150.0	
10531-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	X	4.48	66.08	15.74	0.00	150.0	± 9.6 %
		Y	4.47	66.72	16.02		150.0	
		Z	4.57	66.01	15.75		150.0	
10532-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	X	4.35	65.93	15.67	0.00	150.0	± 9.6 %
		Y	4.35	66.59	15.96		150.0	
		Z	4.43	65.85	15.68		150.0	
10533-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	X	4.50	66.03	15.72	0.00	150.0	± 9.6 %
		Y	4.51	66.72	16.02		150.0	
		Z	4.58	65.93	15.72		150.0	
10534-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	5.04	66.13	15.83	0.00	150.0	± 9.6 %
		Y	5.02	66.65	16.04		150.0	
		Z	5.11	66.08	15.84		150.0	
10535-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	5.10	66.31	15.91	0.00	150.0	± 9.6 %
		Y	5.08	66.80	16.11		150.0	
		Z	5.18	66.24	15.91		150.0	
10536-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	X	4.97	66.24	15.85	0.00	150.0	± 9.6 %
		Y	4.96	66.79	16.09		150.0	
		Z	5.04	66.19	15.86		150.0	
10537-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	X	5.03	66.22	15.84	0.00	150.0	± 9.6 %
		Y	5.01	66.74	16.06		150.0	
		Z	5.10	66.17	15.86		150.0	
10538-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	X	5.12	66.25	15.90	0.00	150.0	± 9.6 %
		Y	5.09	66.73	16.09		150.0	
		Z	5.21	66.23	15.93		150.0	
10540-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	X	5.05	66.27	15.92	0.00	150.0	± 9.6 %
		Y	5.02	66.71	16.10		150.0	
		Z	5.13	66.20	15.93		150.0	

Certificate No: EX3-3903_Sep18 Page 31 of 39

EX3DV4– SN:3903 September 24, 2018

10541-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	X	5.02	66.13	15.85	0.00	150.0	± 9.6 %
		Y	5.01	66.64	16.05		150.0	
		Z	5.10	66.08	15.86		150.0	
10542-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	X	5.18	66.21	15.91	0.00	150.0	± 9.6 %
		Y	5.16	66.70	16.10		150.0	
		Z	5.26	66.16	15.92		150.0	
10543-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	X	5.26	66.25	15.95	0.00	150.0	± 9.6 %
		Y	5.22	66.71	16.12		150.0	
		Z	5.34	66.21	15.96		150.0	
10544-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	5.35	66.26	15.83	0.00	150.0	± 9.6 %
		Y	5.35	66.75	16.03		150.0	
		Z	5.41	66.20	15.84		150.0	
10545-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	5.54	66.67	15.99	0.00	150.0	± 9.6 %
		Y	5.50	67.07	16.14		150.0	
		Z	5.61	66.64	16.00		150.0	
10546-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	X	5.41	66.46	15.90	0.00	150.0	± 9.6 %
		Y	5.39	66.90	16.07		150.0	
		Z	5.49	66.45	15.93		150.0	
10547-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	X	5.48	66.50	15.91	0.00	150.0	± 9.6 %
		Y	5.46	66.94	16.08		150.0	
		Z	5.57	66.53	15.96		150.0	
10548-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	X	5.73	67.42	16.34	0.00	150.0	± 9.6 %
		Y	5.59	67.52	16.34		150.0	
		Z	5.87	67.60	16.46		150.0	
10550-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	X	5.44	66.48	15.92	0.00	150.0	± 9.6 %
		Y	5.42	66.94	16.10		150.0	
		Z	5.51	66.43	15.93		150.0	
10551-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	X	5.45	66.52	15.90	0.00	150.0	± 9.6 %
		Y	5.41	66.93	16.06		150.0	
		Z	5.52	66.48	15.91		150.0	
10552-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	X	5.36	66.32	15.81	0.00	150.0	± 9.6 %
		Y	5.36	66.86	16.03		150.0	
		Z	5.42	66.27	15.82		150.0	
10553-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	X	5.44	66.36	15.86	0.00	150.0	± 9.6 %
		Y	5.43	66.84	16.05		150.0	
		Z	5.52	66.32	15.88		150.0	
10554-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	X	5.76	66.63	15.93	0.00	150.0	± 9.6 %
		Y	5.75	67.07	16.09		150.0	
		Z	5.81	66.59	15.95		150.0	
10555-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	X	5.88	66.92	16.05	0.00	150.0	± 9.6 %
		Y	5.85	67.31	16.19		150.0	
		Z	5.95	66.91	16.08		150.0	
10556-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	X	5.90	66.97	16.07	0.00	150.0	± 9.6 %
		Y	5.87	67.36	16.21		150.0	
		Z	5.97	66.94	16.09		150.0	
10557-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	X	5.87	66.87	16.04	0.00	150.0	± 9.6 %
		Y	5.84	67.29	16.19		150.0	
		Z	5.94	66.87	16.08		150.0	

10558-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	X	5.92	67.03	16.14	0.00	150.0	± 9.6 %
		Y	5.88	67.42	16.27		150.0	
		Z	6.00	67.04	16.18		150.0	
10560-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	X	5.91	66.89	16.11	0.00	150.0	± 9.6 %
		Y	5.88	67.30	16.25		150.0	
		Z	5.99	66.88	16.14		150.0	
10561-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	X	5.84	66.86	16.12	0.00	150.0	± 9.6 %
		Y	5.80	67.25	16.26		150.0	
		Z	5.91	66.85	16.16		150.0	
10562-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	X	5.95	67.23	16.31	0.00	150.0	± 9.6 %
		Y	5.89	67.52	16.39		150.0	
		Z	6.05	67.30	16.38		150.0	
10563-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	X	6.17	67.48	16.39	0.00	150.0	± 9.6 %
		Y	5.96	67.36	16.27		150.0	
		Z	6.41	67.93	16.65		150.0	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	4.76	66.50	16.11	0.46	150.0	± 9.6 %
		Y	4.74	67.04	16.31		150.0	
		Z	4.84	66.45	16.16		150.0	
10565-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	X	4.99	66.97	16.45	0.46	150.0	± 9.6 %
		Y	4.96	67.47	16.63		150.0	
		Z	5.09	66.92	16.49		150.0	
10566-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	X	4.82	66.79	16.25	0.46	150.0	± 9.6 %
		Y	4.79	67.30	16.44		150.0	
		Z	4.92	66.76	16.30		150.0	
10567-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	X	4.86	67.21	16.63	0.46	150.0	± 9.6 %
		Y	4.83	67.76	16.84		150.0	
		Z	4.94	67.14	16.65		150.0	
10568-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	X	4.73	66.54	16.00	0.46	150.0	± 9.6 %
		Y	4.69	67.02	16.17		150.0	
		Z	4.83	66.52	16.06		150.0	
10569-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	X	4.81	67.31	16.69	0.46	150.0	± 9.6 %
		Y	4.81	67.92	16.94		150.0	
		Z	4.89	67.20	16.69		150.0	
10570-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	X	4.85	67.14	16.61	0.46	150.0	± 9.6 %
		Y	4.83	67.72	16.84		150.0	
		Z	4.93	67.06	16.63		150.0	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	1.08	63.56	14.66	0.46	130.0	± 9.6 %
		Y	1.16	64.87	15.60		130.0	
		Z	1.14	64.03	15.00		130.0	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.08	64.07	14.98	0.46	130.0	± 9.6 %
		Y	1.18	65.49	15.99		130.0	
		Z	1.16	64.57	15.33		130.0	
10573-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	X	1.25	76.91	18.60	0.46	130.0	± 9.6 %
		Y	2.38	88.54	24.12		130.0	
		Z	1.66	79.82	19.74		130.0	
10574-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	X	1.15	69.04	17.43	0.46	130.0	± 9.6 %
		Y	1.34	71.96	19.28		130.0	
		Z	1.25	69.77	17.81		130.0	

EX3DV4– SN:3903 September 24, 2018

10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	4.55	66.28	16.14	0.46	130.0	± 9.6 %
		Y	4.52	66.75	16.27		130.0	
		Z	4.65	66.29	16.25		130.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	4.57	66.45	16.21	0.46	130.0	± 9.6 %
		Y	4.55	66.94	16.36		130.0	
		Z	4.67	66.45	16.31		130.0	
10577-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	X	4.78	66.76	16.39	0.46	130.0	± 9.6 %
		Y	4.73	67.19	16.51		130.0	
		Z	4.89	66.76	16.49		130.0	
10578-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	X	4.68	66.91	16.49	0.46	130.0	± 9.6 %
		Y	4.63	67.38	16.64		130.0	
		Z	4.78	66.92	16.58		130.0	
10579-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	X	4.43	66.14	15.75	0.46	130.0	± 9.6 %
		Y	4.38	66.54	15.86		130.0	
		Z	4.55	66.22	15.90		130.0	
10580-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	X	4.48	66.18	15.78	0.46	130.0	± 9.6 %
		Y	4.42	66.58	15.88		130.0	
		Z	4.60	66.24	15.92		130.0	
10581-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	X	4.57	66.93	16.42	0.46	130.0	± 9.6 %
		Y	4.54	67.44	16.59		130.0	
		Z	4.68	66.96	16.52		130.0	
10582-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	X	4.37	65.89	15.53	0.46	130.0	± 9.6 %
		Y	4.31	66.26	15.62		130.0	
		Z	4.50	65.99	15.70		130.0	
10583-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	4.55	66.28	16.14	0.46	130.0	± 9.6 %
		Y	4.52	66.75	16.27		130.0	
		Z	4.65	66.29	16.25		130.0	
10584-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	4.57	66.45	16.21	0.46	130.0	± 9.6 %
		Y	4.55	66.94	16.36		130.0	
		Z	4.67	66.45	16.31		130.0	
10585-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	X	4.78	66.76	16.39	0.46	130.0	± 9.6 %
		Y	4.73	67.19	16.51		130.0	
		Z	4.89	66.76	16.49		130.0	
10586-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	X	4.68	66.91	16.49	0.46	130.0	± 9.6 %
		Y	4.63	67.38	16.64		130.0	
		Z	4.78	66.92	16.58		130.0	
10587-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	X	4.43	66.14	15.75	0.46	130.0	± 9.6 %
		Y	4.38	66.54	15.86		130.0	
		Z	4.55	66.22	15.90		130.0	
10588-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	X	4.48	66.18	15.78	0.46	130.0	± 9.6 %
		Y	4.42	66.58	15.88		130.0	
		Z	4.60	66.24	15.92		130.0	
10589-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	X	4.57	66.93	16.42	0.46	130.0	± 9.6 %
		Y	4.54	67.44	16.59		130.0	
		Z	4.68	66.96	16.52		130.0	
10590-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	X	4.37	65.89	15.53	0.46	130.0	± 9.6 %
		Y	4.31	66.26	15.62		130.0	
		Z	4.50	65.99	15.70		130.0	

EX3DV4– SN:3903 September 24, 2018

10591-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	4.70	66.36	16.26	0.46	130.0	± 9.6 %
		Y	4.67	66.82	16.38		130.0	
		Z	4.80	66.36	16.36		130.0	
10592-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	4.85	66.70	16.39	0.46	130.0	± 9.6 %
		Y	4.81	67.14	16.51		130.0	
		Z	4.96	66.70	16.49		130.0	
10593-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	X	4.77	66.59	16.26	0.46	130.0	± 9.6 %
		Y	4.72	67.02	16.37		130.0	
		Z	4.89	66.62	16.37		130.0	
10594-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	X	4.83	66.77	16.43	0.46	130.0	± 9.6 %
		Y	4.78	67.21	16.54		130.0	
		Z	4.94	66.78	16.52		130.0	
10595-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	X	4.79	66.71	16.31	0.46	130.0	± 9.6 %
		Y	4.74	67.16	16.44		130.0	
		Z	4.91	66.74	16.42		130.0	
10596-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	X	4.73	66.70	16.31	0.46	130.0	± 9.6 %
		Y	4.68	67.14	16.43		130.0	
		Z	4.84	66.73	16.42		130.0	
10597-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	X	4.68	66.59	16.18	0.46	130.0	± 9.6 %
		Y	4.63	67.02	16.30		130.0	
		Z	4.79	66.64	16.31		130.0	
10598-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	X	4.66	66.85	16.46	0.46	130.0	± 9.6 %
		Y	4.62	67.29	16.59		130.0	
		Z	4.77	66.88	16.57		130.0	
10599-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	5.38	66.95	16.50	0.46	130.0	± 9.6 %
		Y	5.30	67.19	16.52		130.0	
		Z	5.47	66.95	16.58		130.0	
10600-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	5.51	67.34	16.67	0.46	130.0	± 9.6 %
		Y	5.38	67.45	16.62		130.0	
		Z	5.65	67.51	16.83		130.0	
10601-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	X	5.40	67.09	16.56	0.46	130.0	± 9.6 %
		Y	5.31	67.34	16.59		130.0	
		Z	5.51	67.18	16.68		130.0	
10602-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	X	5.49	67.12	16.49	0.46	130.0	± 9.6 %
		Y	5.40	67.35	16.51		130.0	
		Z	5.60	67.17	16.60		130.0	
10603-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	X	5.57	67.44	16.79	0.46	130.0	± 9.6 %
		Y	5.49	67.73	16.83		130.0	
		Z	5.69	67.49	16.89		130.0	
10604-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	X	5.39	66.92	16.52	0.46	130.0	± 9.6 %
		Y	5.36	67.36	16.63		130.0	
		Z	5.48	66.92	16.59		130.0	
10605-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	X	5.49	67.22	16.66	0.46	130.0	± 9.6 %
		Y	5.39	67.42	16.66		130.0	
		Z	5.60	67.27	16.77		130.0	
10606-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	X	5.23	66.55	16.18	0.46	130.0	± 9.6 %
		Y	5.16	66.82	16.21		130.0	
		Z	5.36	66.68	16.33		130.0	

Certificate No: EX3-3903_Sep18 Page 35 of 39

EX3DV4– SN:3903 September 24, 2018

10607-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	4.54	65.65	15.87	0.46	130.0	± 9.6 %
		Y	4.51	66.18	16.04		130.0	
		Z	4.63	65.63	15.95		130.0	
10608-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	4.72	66.05	16.03	0.46	130.0	± 9.6 %
		Y	4.68	66.55	16.19		130.0	
		Z	4.82	66.05	16.12		130.0	
10609-AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	X	4.60	65.88	15.86	0.46	130.0	± 9.6 %
		Y	4.57	66.38	16.01		130.0	
		Z	4.71	65.90	15.96		130.0	
10610-AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	X	4.66	66.05	16.03	0.46	130.0	± 9.6 %
		Y	4.62	66.55	16.19		130.0	
		Z	4.76	66.06	16.12		130.0	
10611-AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	X	4.57	65.85	15.87	0.46	130.0	± 9.6 %
		Y	4.53	66.34	16.02		130.0	
		Z	4.68	65.88	15.97		130.0	
10612-AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	X	4.58	65.99	15.90	0.46	130.0	± 9.6 %
		Y	4.53	66.46	16.05		130.0	
		Z	4.69	66.02	16.01		130.0	
10613-AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	X	4.58	65.86	15.78	0.46	130.0	± 9.6 %
		Y	4.53	66.31	15.92		130.0	
		Z	4.70	65.92	15.90		130.0	
10614-AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	X	4.53	66.07	16.03	0.46	130.0	± 9.6 %
		Y	4.49	66.57	16.19		130.0	
		Z	4.64	66.10	16.13		130.0	
10615-AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	X	4.57	65.66	15.63	0.46	130.0	± 9.6 %
		Y	4.52	66.14	15.77		130.0	
		Z	4.68	65.70	15.75		130.0	
10616-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	5.19	66.16	16.09	0.46	130.0	± 9.6 %
		Y	5.14	66.53	16.19		130.0	
		Z	5.29	66.20	16.18		130.0	
10617-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	5.26	66.33	16.15	0.46	130.0	± 9.6 %
		Y	5.19	66.67	16.23		130.0	
		Z	5.35	66.33	16.22		130.0	
10618-AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	X	5.14	66.33	16.17	0.46	130.0	± 9.6 %
		Y	5.09	66.73	16.28		130.0	
		Z	5.24	66.36	16.25		130.0	
10619-AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	X	5.16	66.14	16.00	0.46	130.0	± 9.6 %
		Y	5.10	66.49	16.09		130.0	
		Z	5.26	66.21	16.11		130.0	
10620-AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	X	5.25	66.19	16.08	0.46	130.0	± 9.6 %
		Y	5.18	66.51	16.15		130.0	
		Z	5.36	66.27	16.19		130.0	
10621-AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	X	5.25	66.33	16.28	0.46	130.0	± 9.6 %
		Y	5.20	66.71	16.37		130.0	
		Z	5.34	66.35	16.35		130.0	
10622-AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	X	5.26	66.49	16.35	0.46	130.0	± 9.6 %
		Y	5.19	66.80	16.41		130.0	
		Z	5.36	66.51	16.42		130.0	

Certificate No: EX3-3903_Sep18 Page 36 of 39

EX3DV4– SN:3903 September 24, 2018

10623-AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	X	5.14	66.00	15.97	0.46	130.0	± 9.6 %
		Y	5.08	66.34	16.05		130.0	
		Z	5.23	66.04	16.06		130.0	
10624-AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	X	5.33	66.22	16.15	0.46	130.0	± 9.6 %
		Y	5.27	66.55	16.22		130.0	
		Z	5.43	66.26	16.24		130.0	
10625-AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	X	5.69	67.18	16.68	0.46	130.0	± 9.6 %
		Y	5.48	67.08	16.53		130.0	
		Z	5.85	67.39	16.85		130.0	
10626-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	5.48	66.23	16.06	0.46	130.0	± 9.6 %
		Y	5.45	66.59	16.15		130.0	
		Z	5.56	66.25	16.14		130.0	
10627-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	5.72	66.80	16.30	0.46	130.0	± 9.6 %
		Y	5.64	67.05	16.34		130.0	
		Z	5.82	66.85	16.40		130.0	
10628-AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	X	5.52	66.31	15.99	0.46	130.0	± 9.6 %
		Y	5.45	66.58	16.04		130.0	
		Z	5.62	66.39	16.10		130.0	
10629-AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	X	5.59	66.37	16.02	0.46	130.0	± 9.6 %
		Y	5.52	66.64	16.06		130.0	
		Z	5.70	66.47	16.14		130.0	
10630-AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	X	6.03	67.86	16.76	0.46	130.0	± 9.6 %
		Y	5.75	67.54	16.52		130.0	
		Z	6.25	68.26	17.02		130.0	
10631-AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	X	5.93	67.68	16.87	0.46	130.0	± 9.6 %
		Y	5.78	67.76	16.82		130.0	
		Z	6.08	67.89	17.03		130.0	
10632-AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	X	5.70	66.88	16.49	0.46	130.0	± 9.6 %
		Y	5.63	67.19	16.55		130.0	
		Z	5.78	66.88	16.55		130.0	
10633-AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	X	5.58	66.48	16.11	0.46	130.0	± 9.6 %
		Y	5.52	66.80	16.18		130.0	
		Z	5.68	66.55	16.21		130.0	
10634-AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	X	5.56	66.51	16.19	0.46	130.0	± 9.6 %
		Y	5.52	66.88	16.28		130.0	
		Z	5.66	66.57	16.28		130.0	
10635-AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	X	5.44	65.82	15.56	0.46	130.0	± 9.6 %
		Y	5.37	66.09	15.60		130.0	
		Z	5.55	65.93	15.70		130.0	
10636-AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	X	5.90	66.61	16.16	0.46	130.0	± 9.6 %
		Y	5.86	66.93	16.22		130.0	
		Z	5.98	66.65	16.25		130.0	
10637-AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	X	6.05	66.99	16.33	0.46	130.0	± 9.6 %
		Y	5.98	67.22	16.35		130.0	
		Z	6.15	67.05	16.42		130.0	
10638-AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	X	6.05	66.95	16.29	0.46	130.0	± 9.6 %
		Y	5.99	67.24	16.33		130.0	
		Z	6.14	67.02	16.39		130.0	

10639-AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	X	6.03	66.91	16.31	0.46	130.0	± 9.6 %
		Y	5.97	67.19	16.35		130.0	
		Z	6.13	66.99	16.42		130.0	
10640-AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	X	6.03	66.91	16.25	0.46	130.0	± 9.6 %
		Y	5.95	67.15	16.27		130.0	
		Z	6.15	67.03	16.38		130.0	
10641-AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	X	6.08	66.82	16.23	0.46	130.0	± 9.6 %
		Y	6.00	67.07	16.25		130.0	
		Z	6.16	66.85	16.31		130.0	
10642-AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	X	6.12	67.09	16.54	0.46	130.0	± 9.6 %
		Y	6.06	67.39	16.59		130.0	
		Z	6.22	67.15	16.63		130.0	
10643-AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	X	5.96	66.76	16.26	0.46	130.0	± 9.6 %
		Y	5.89	67.01	16.29		130.0	
		Z	6.05	66.83	16.36		130.0	
10644-AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	X	6.11	67.24	16.52	0.46	130.0	± 9.6 %
		Y	5.99	67.35	16.48		130.0	
		Z	6.26	67.45	16.69		130.0	
10645-AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	X	6.44	67.81	16.76	0.46	130.0	± 9.6 %
		Y	6.09	67.27	16.40		130.0	
		Z	6.75	68.43	17.14		130.0	
10646-AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	X	15.86	102.88	34.20	9.30	60.0	± 9.6 %
		Y	14.56	101.59	33.34		60.0	
		Z	31.86	118.29	39.55		60.0	
10647-AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	X	14.47	101.56	33.92	9.30	60.0	± 9.6 %
		Y	12.88	99.66	32.86		60.0	
		Z	29.55	117.39	39.44		60.0	
10648-AAA	CDMA2000 (1x Advanced)	X	0.55	61.70	8.96	0.00	150.0	± 9.6 %
		Y	0.65	64.10	10.70		150.0	
		Z	0.61	61.96	9.51		150.0	
10652-AAD	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	X	3.51	66.22	16.02	2.23	80.0	± 9.6 %
		Y	3.52	66.85	16.10		80.0	
		Z	3.85	67.13	16.68		80.0	
10653-AAD	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	X	4.07	65.82	16.32	2.23	80.0	± 9.6 %
		Y	4.06	66.27	16.35		80.0	
		Z	4.37	66.54	16.84		80.0	
10654-AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	X	4.05	65.51	16.35	2.23	80.0	± 9.6 %
		Y	4.05	65.94	16.38		80.0	
		Z	4.33	66.21	16.84		80.0	
10655-AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	X	4.12	65.52	16.39	2.23	80.0	± 9.6 %
		Y	4.12	65.90	16.42		80.0	
		Z	4.39	66.23	16.88		80.0	
10658-AAA	Pulse Waveform (200Hz, 10%)	X	7.59	78.34	17.28	10.00	50.0	± 9.6 %
		Y	5.60	73.79	15.18		50.0	
		Z	55.63	107.82	27.51		50.0	
10659-AAA	Pulse Waveform (200Hz, 20%)	X	15.39	86.88	18.55	6.99	60.0	± 9.6 %
		Y	6.62	77.29	15.24		60.0	
		Z	100.00	112.32	26.70		60.0	

EX3DV4– SN:3903 September 24, 2018

10660-AAA	Pulse Waveform (200Hz, 40%)	X	100.00	102.61	20.38	3.98	80.0	± 9.6 %
		Y	100.00	102.96	20.48		80.0	
		Z	100.00	109.14	23.89		80.0	
10661-AAA	Pulse Waveform (200Hz, 60%)	X	29.42	89.49	15.52	2.22	100.0	± 9.6 %
		Y	100.00	103.58	19.69		100.0	
		Z	100.00	106.51	21.49		100.0	
10662-AAA	Pulse Waveform (200Hz, 80%)	X	0.22	60.00	4.16	0.97	120.0	± 9.6 %
		Y	100.00	108.67	20.36		120.0	
		Z	100.00	96.50	15.84		120.0	
10670-AAA	Bluetooth Low Energy	X	100.00	102.44	19.45	2.19	100.0	± 9.6 %
		Y	100.00	107.47	21.61		100.0	
		Z	100.00	109.02	22.88		100.0	

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