Celltech
Testing and Engineering Services Lab

Test Report Serial Number:	45461595 R1.0
Test Report Date:	21 July 2020
Project Number:	1503

SAR Test Report - Class II Permissive Change

Applicant:

TEXAS INSTRUMENTS

Texas Instruments Incorporated
12500 TI Boulevard
M/S D2000
Dallas, Texas, 75243, USA

Maximum Reported 1g SAR			
FCC	BODY:	<0.1	W/kg
ISED	BODY:	<0.1	
General Pop. Limit:		1.60	
Maximum Reported 10g SAR			
FCC	Extremity:	0.17	W/kg
ISED	Extremity:	0.17	
General Pop. Limit:		4.00	

FCC ID:
Z64-WL18DBMOD
Product Model Number / HVIN
WL1837MODGI

IC Registration Number
451I-WL18DBMOD
Product Name / PMN
37 Grade: WiLink 8 Dual Band Combo 2x2 MIMO Wi-Fi, Bluetooth and Bluetooth low energy Module. 07 Grade: WiLink 8 Dual Band Combo 2x2 MIMO Wi-Fi Module

In Accordance With:

FCC 47 CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices

IC RSS-102 Issue 5
Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

Approved By:

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Test Lab Certificate: 2470.01

IC Registration 3874A-1

Industry Canada

FCC Registration: CA3874

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1.0 DOCUMENT CONTROL

Revision History				
Samples Tested By:	Art Voss, Irina Stanciu	**Date(s) of Evaluation:**		9 July - 16 July, 2020
Report Prepared By:	Art Voss	**Report Reviewed By:**		Irina Stanciu
Report Revision	**Description of Revision**	**Revised Section**	**Revised By**	**Revision Date**
0.1	Draft Release	n/a	Art Voss	21 July 2020
0.2	Final Draft Release	n/a	Art Voss	23 July 2020
1.0	Initial	n/a	Art Voss	24 July 2020

2.0 CLIENT AND DEVICE INFORMATION

Client Information	
Applicant Name	**Texas Instruments Incorporated**
Applicant Address	12500 TI Boulevard
	M/S D2000
	Dallas, Texas, 75243, USA
DUT Information	
Device Identifier(s):	**FCC ID:** **Z64-WL18DBMOD**
	IC: **451I-WL18DBMOD**
Module Product Marketing Name / PMN:	37 Grade: WiLink 8 Dual Band Combo 2x2 MIMO Wi-Fi, Bluetooth and Bluetooth low energy Module. 07 Grade: WiLink 8 Dual Band Combo 2x2 MIMO Wi-Fi Module
Module Model Number / HVIN:	WL1837MODGI
Host Marketing Name / HMN:	Clarius Scanner
Host Model Number(s) / HVIN	L7, L7VET
	C3, C3VET
	C7, C7VET
	EC7
FCC Equipment Class:	Digital Transmission System (DTS) FCC Part 15
	Spread Spectrum Transmitter (DSS) FCC Part 15
	Digital Transmission System (DTS) FCC Part 15, RSS 247
	Unlicensed National Information Infrastructure (NII) FCC Part 15
	Modular Approval
ISED	Spread Spectrum/Digital Device (2400–2483.5 MHz), RSS-247
	Spread Spectrum/Digital Device (2400–2483.5 MHz), RSS-210
	Spread Spectrum/Digital Device (5725-5850MHz), RSS-210
	WiFi Device, RSS-247
	Modular Approval
Transmit Frequency Range:	DTS, Spread Spectrum/Digital Device: 2412-2462MHz
	DTS, Spread Spectrum/Digital Device: 2402-2480MHz
	DSS, Spread Spectrum/Digital Device: 2402-2480MHz
	U-NII, WiFi Device: 5180-5320MHz, 5745-5825MHz
Number of Channels:	Programmable
Manuf. Max. Rated Output Power:	DTS, Spread Spectrum/Digital Device: 2412-2462MHz: **23.7dBm (0.2432W)**
	DTS, Spread Spectrum/Digital Device: 2402-2480MHz: **7.0dBm (0.0049W)**
	DSS, Spread Spectrum/Digital Device: 2402-2480MHz: **11.6dBm (0.0146W)**
	U-NII, WiFi Device: 5180-5320MHz: **17dBm (0.0525W)**
	U-NII, WiFi Device: 5745-5825MHz: **18.4dBm (0.0698W)**
DUT Power Source:	Rechargeable Li-Ion,
Deviation(s) from standard/procedure:	None
Modification of DUT:	None

3.0 SCOPE OF EVALUATION

This Certification Report was prepared on behalf of:

Texas Instruments Incorporated

,(the '*Applicant*"), in accordance with the applicable Federal Communications Commission (FCC) CFR 47 and Innovation, Scientific and Economic Development (ISED) Canada rules parts and regulations (the '*Rules*'). The scope of this investigation was limited to only the equipment, devices and accessories (the '*Equipment*') supplied by the *Applicant*. The tests and measurements performed on this *Equipment* were only those set forth in the applicable *Rules* and/or the Test and Measurement Standards they reference. The *Rules* applied and the Test and Measurement Standards used during this evaluation appear in the Normative References section of this report. The limits set forth in the technical requirements of the applicable *Rules* were applied to the measurement results obtained during this evaluation and ,unless otherwise noted, these limits were used as the Pass/Fail criteria. The Pass/Fail statements made in this report apply to only the tests and measurements performed on only the *Equipment* tested during this evaluation. Where applicable and permissible, information including test and measurement data and/or results from previous evaluations of same or similar equipment, devices and/or accessories may be cited in this report.

As per FCC 47 CFR Part §2.1091 and §2.1093, an RF Exposure evaluation report is required for this *Equipment* and the results of the RF Exposure evaluation appear in this report.

The WL1837MODGI is a certified single module containing 2.4GHz and 5GHz WiFi and 2.4GHz BlueTooth transmitters. The module is being integrated into the following host model numbers/HVINs Manufactured by Clarius Mobile Health Corp:

L7, L7VET

C3, C3VET

C7, C7VET

EC7

The Clarius Series hosts (Equipment) are portable Medical and Veterinarian ultrasound devices which stream video data via WiFi to another WiFi connected device. The Equipment is handheld by the operator while in contact with a patient. The Equipment ceases to transmit when the ultrasound transducer element is no longer in contact with the patient. Since the Equipment is both handheld and in contact with the body, two RF exposure conditions exist, Extremity and Body. The separation distance between the radiating element and the patient is no less than 100mm. The BlueTooth transmitter is used for a very brief credential and configuration exchange lasting no longer than 10 seconds after which it no longer transmits. The WiFi and Bluetooth transmitters do not simultaneous transmit. The 2.4GHz WiFi and 5GHz WiFi transmitters do not simultaneously transmit.

The Clarius Series hosts (Equipment) are all identical in all aspects of RF circuitry, transmit power, antenna configuration and physical size with the exception of the ultrasound transducer element.

Application:

This is an application for a Class II Permissive Change to modify the grant restrictions from a non-portable application to a portable application and to add the above host model variants to the portable application.

Scope:

Due to the nature of the *Equipment* the scope of this evaluation is to evaluate the SAR for intended use applications. It will include evaluation of the 2.4 GHz and 5GHz WiFi transmitter for all required RF exposure configurations. The SAR Test Plan includes the evaluation of the *Equipment* in an "Extremity" configuration including all surfaces of the *Equipment* as intended for use by the operator. The SAR Test Plan also includes evaluation of the *Equipment* in the "Body" configuration in its intended use while in contact with the patient. Since each variant is identical in nature with the exception of the ultrasound transducer element, a default variant will be used to evaluate the Equipment in the Extremity configuration and each variant will be evaluated in the Body configuration.

The SAR Test Plan developed for this evaluation is based on the required test channels and configurations which produce the highest worst case SAR and where applicable, SAR test reduction and/or SAR test exclusion may be utilized. The *Equipment* will be evaluated for SAR at the maximum output power level, preset by the manufacturer and in accordance with the procedures described in IEEE 1528, IEC 62209-2, FCC KDB 865646, 447498, and RSS 102.

4.0 NORMATIVE REFERENCES

Normative References*	
ANSI / ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
FCC CFR Title 47 Part 2	Code of Federal Regulations
Title 47:	Telecommunication
Part 2.1093:	Radiofrequency Radiation Exposure Evaluation: Portable Devices
Health Canada	
Safety Code 6 (2015)	Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3kHz to 300GHz
Industry Canada Spectrum Management & Telecommunications Policy	
RSS-102 Issue 5:	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
IEEE International Committee on Electromagnetic Safety	
IEEE 1528-2013:	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEC International Standard	
IEC 62209-2 2010	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 2
FCC KDB	
KDB 865664 D01v01r04	SAR Measurement Requirements for 100MHz to 6GHz
FCC KDB	
KDB 447498 D01v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
FCC KDB	
KDB 248227 D01v02r02	SAR Guidance for IEEE 802.11 (WiFi) Transmitters
* When the issue number or issue date is omitted, the latest version is assumed.	

5.0 STATEMENT OF COMPLIANCE

This measurement report demonstrates that samples of the product model(s) were evaluated for Specific Absorption Rate (SAR) on the date(s) shown, in accordance with the Measurement Procedures cited and were found to comply with the Standard(s) Applied based on the Exposure Limits of the Use Group indicated for which the product is intended to be used.

Applicant:	**Date(s) Evaluated:**
Texas Instruments Incorporated	09 July - 16 July, 2020
Module Product Name / PMN:	**Module Product Model Number / HVIN:**
37 Grade: WiLink 8 Dual Band Combo 2x2 MIMO Wi-Fi, Bluetooth and Bluetooth low energy Module. 07 Grade: WiLink 8 Dual Band Combo 2x2 MIMO Wi-Fi Module	WL1837MODGI
Host Marketing Name / HMN:	**Host Product Model Number / HVIN:**
Clarius Scanner	L7 , L7VET , C3 , C3VET , C7 , C7VET EC7
Standard(s) Applied:	
FCC 47 CFR §2.1093 Health Canada's Safety Code 6	
Measurement Procedures:	
FCC KDB 865664, FCC KDB 447498, FCC KDB 247228 Industry Canada RSS-102 Issue 5 IEEE Standard 1528-2013, IEC 62209-2	
Use Group:	**Limits Applied:**
[X] General Population / User Unaware	[X] 1.6W/kg - 1g Volume - Body
[ ] Occupational / User Aware	[X] 4.0W/kg - 10g Volume - Extremity
Reason for Issue:	
[ ] New Certification	[X] Class II Permissive Change
Reason for Change:	
Revise Grant Restrictions to Portable, Add Host Model Variants	

The results of this investigation are based solely on the test sample(s) provided by the applicant which was not adjusted, modified or altered in any manner whatsoever except as required to carry out specific tests or measurements. A description of the device, operating configuration, detailed summary of the test results, methodologies and procedures used during this evaluation, the equipment used and the various provisions of the rules are included in this test report.

I attest that the data reported herein is true and accurate within the tolerance of the Measurement Instrument Uncertainty; that all tests and measurements were performed in accordance with accepted practices or procedures; and that all tests and measurements were performed by me or by trained personnel under my direct supervision. The results of this investigation are based solely on the test sample(s) provided by the client which were not adjusted, modified or altered in any manner whatsoever, except as required to carry out specific tests or measurements. This test report has been completed in accordance with ISO/IEC 17025.

Art Voss, P.Eng.
Technical Manager
Celltech Labs Inc.
21 July 2020
Date

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA A. F. VOSS # 31327

6.0 SAR MEASUREMENT SYSTEM

SAR Measurement System

Celltech Labs Inc. SAR measurement facility employs a Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY6 measurement system is comprised of the measurement server, a robot controller, a computer, a near-field probe, a probe alignment sensor, an Elliptical Planar Phantom (ELI) phantom and a specific anthropomorphic mannequin (SAM) phantom for Head and/or Body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller and a teach pendant (Joystick) to control the robot's servo motors. 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 form the DAE to digital electronic signal and transfers data to the DASY6 measurement server. The DAE4 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter, a command decoder and a control logic unit. Transmission to the DASY6 measurement server 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. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot utilizes a controller with built in VME-bus computer.

DASY 6 SAR System with SAM Phantom

DASY 6 Measurement Controller

7.0 RF CONDUCTED POWER MEASUREMENT

Table 7.1 Conducted Power Measurements

Conducted Power Measurements						
Channel	**Frequency** *(MHz)*	**Measured Power** *(dBm)*	**Rated Power** *(dBm)*	**Rated Power** *(W)*	**Delta** *(dBm)*	**SAR Test Channel** *(Y/N)*
1	2412	23.70	23.70	0.234	0.00	**Y**
6	2437	23.70	23.70	0.234	0.00	**Y**
11	2462	23.70	23.70	0.234	0.00	**Y**
14	2477	23.70	23.70	0.234	0.00	**Y**
36	5180	17.00	17.00	0.053	0.00	**Y**
44	5220	17.00	17.00	0.053	0.00	**Y**
48	5240	17.00	17.00	0.053	0.00	**Y**
149	5745	18.40	18.40	0.070	0.00	**Y**
157	5785	18.40	18.40	0.070	0.00	**Y**
165	5825	18.40	18.40	0.070	0.00	**Y**

The rated power and tolerance are stated for typical transmission modes and data rates. Some modes and data rates may produce lower than rated conducted power levels. Power measurements taken across the various channels, modes and data rates did not produce levels in excess of the Rated Power plus Tolerance. SAR was evaluated using the power level setting and duty cycle specified by the manufacturer to be the max output power and produce the most conservative SAR. SAR was evaluated at the *maximum average* tune up tolerance. See section 2.0 Client and Device Information for details. The *reported* SAR was not scaled down.

8.0 NUMBER OF TEST CHANNELS (N_C)

As per FCC KDB 248227, the required 2.4GHz 802.11 WiFi test channels are Ch 1, Ch 6 and Ch 11. SAR was evaluated on the low, mid and high channels of the 5GHz U-NII-1 and U-NII-3 bands

BT/BLE SAR Test Evaluation: The output power of the BT/BLE transmitter is 4.9mW which is below the SAR test exclusion threshold for Extremity Configuration. BT/BLE was not evaluated for SAR.

NOTE: This device is not capable of simultaneous transmission between the BT/BLE and WiFi transmitters or the 2.4GHz and 5GHz WiFi transmitters.

9.0 ACCESSORIES EVALUATED

There are no Body Worn or Audio accessories for this *Equipment*.

10.0 SAR MEASUREMENT SUMMARY

Table 10.1: Measured Results - Extremity

Measured SAR Results (10g) - EXTREMITY Configuration (FCC/ISEDC)														
Date	Plot ID	DUT		Test Frequency (*MHz*)	Modulation	Accessories				DUT Spacing		Conducted Power (*dBm*)	Measured SAR (10g) 100% DC (*W/kg*)	SAR Drift (*dB*)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (*mm*)	Antenna (*mm*)			
July 9 2020	B1	C3	Scanner	2462	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.055	0.010
July 9 2020	B2	C3	Scanner	2412	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.058	0.010
July 9 2020	B3	C3	Scanner	2437	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.057	0.010
July 9 2020	B4	C3	Scanner	2412	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.000	0.010
July 9 2020	B5	C3	Scanner	2412	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.004	0.010
July 9 2020	B6	C3	Scanner	2412	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.000	0.010
July 9 2020	B8	C3	Scanner	2412	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.000	0.010
July 10, 2020	B9	C3	Scanner	5220	802.11n	n/a	n/a	n/a	n/a	0	N/A	17.0	0.081	0.010
July 10, 2020	B10	C3	Scanner	5220	802.11n	n/a	n/a	n/a	n/a	0	N/A	17.0	0.000	0.010
July 10, 2020	B12	C3	Scanner	5220	802.11n	n/a	n/a	n/a	n/a	0	N/A	17.0	0.005	0.010
July 10, 2020	B13	C3	Scanner	5220	802.11n	n/a	n/a	n/a	n/a	0	N/A	17.0	0.000	0.010
July 10, 2020	B15	C3	Scanner	5220	802.11n	n/a	n/a	n/a	n/a	0	N/A	17.0	0.000	0.010
July 15, 2020	B16	C3	Scanner	5745	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.131	0.010
July 15, 2020	B17	C3	Scanner	5785	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.000	0.010
July 15, 2020	B18	C3	Scanner	5785	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.030	0.010
July 15, 2020	B19	C3	Scanner	5785	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.000	0.010
July 15, 2020	B20	C3	Scanner	5745	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.000	0.010
July 16, 2020	B21	C3	Scanner	5785	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.172	0.010
July 16, 2020	B22	C3	Scanner	5825	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.152	0.010
July 16, 2020	B24	C3	Scanner	5785	802.11n	n/a	n/a	n/a	n/a	0	n/a	18.4	0.000	0.010
SAR Limit							Spatial Peak			Extremity		RF Exposure Category		
FCC 47 CFR 2.1093				Health Canada Safety Code 6			10 Gram Average			4.0 W/kg		General Population		

Table 10.2: Measured Results - Body

Measured SAR Results (1g) - BODY Configuration (FCC/ISED)														
Date	Plot ID	DUT		Test Frequency (*MHz*)	Modulation	Accessories				DUT Spacing		Conducted Power (*dBm*)	Measured SAR (1g) 100% DC (*W/kg*)	SAR Drift (*dB*)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (*mm*)	Antenna (*mm*)			
July 9 2020	B7	C3	Scanner	2412	802.11n	n/a	n/a	n/a	n/a	0	N/A	23.7	0.000	0.010
July 10, 2020	B14	C3	Scanner	5220	802.11n	n/a	n/a	n/a	n/a	0	N/A	17	0.000	0.010
July 16, 2020	B23	C3	Scanner	5785	802.11n	n/a	n/a	n/a	n/a	0	N/A	18.4	0.010	0.010
SAR Limit							Spatial Peak			Head/Body		RF Exposure Category		
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1 Gram Average			1.6 W/kg		General Population		

Note: Body SAR was evaluated on the worst-case channel configurations from Table 10.1

11.0 SCALING OF MAXIMUM MEASURED SAR

Table 11.1 SAR Scaling

Scaling of Maximum Measured SAR (1g)					
Measured Parameters		Configuration			
		Face	Body	Head	
Plot ID			B21		
Maximum Measured SAR_M			0.172		(W/kg)
Frequency			5785		(MHz)
Power Drift			0.010 (1)		(dB)
Conducted Power			18.400		(dBm)
Fluid Deviation from Target					
Δe	Permitivity		-7.93%		
Δσ	Conductivity		4.19%		

Note(1): Power Drift is Positive, Drift Adjustment not Required.

Fluid Sensitivity Calculation (1g)			IEC 62209-2 Annex F		
Delta SAR = Ce * Δe + Cσ * Δσ					(F.1)
$Ce = (-0.0007854*f^3) + (0.009402*f^2) - (0.02742*f) - 0.2026$					(F.2)
$Cσ = (0.009804*f^3) - (0.08661*f^2) + (0.02981*f) + 0.7829$					(F.3)
f	Frequency (GHz)		5.785		
Ce			-0.199		
Cσ			-0.045		
Ce * Δe			0.016		
Cσ * Δσ			-0.002		
ΔSAR			0.014		(%)

Manufacturer's Tuneup Tolerance				
Measured Conducted Power		18.400		(dBm)
Rated Conducted Power		18.400		(dBm)
ΔP		0.000 (4)		(dB)

Note(4): SAR was Evaluated at the Maximum Tuneup Tolerance. SAR Adjustment is not Required.

SAR Adjustment for Fluid Sensitivity				
$SAR_1 = SAR_M * ΔSAR$		0.174		(W/kg)

SAR Adjustment for Tuneup Tolerance				
$SAR_2 = SAR_1 + [ΔP]$		0.729		(W/kg)

SAR Adjustment for Drift				
$SAR_3 = SAR_2 + Drift$		0.729		(W/kg)

reported SAR				
$FCC = SAR_2$		**0.17**		(W/kg)
$ISED = SAR_3$		**0.17**		(W/kg)

The SAR test exclusion threshold for the BLE/ANT transmitter as per FCC KDB 447498 4.3.1 is as follows:

[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] X [√f(GHz)] ≤ 7.5 for 10-g SAR

[(4.9)/(100)] X [√2.462] = 0.10 ≤ 7.5

Where:
max. power of channel, including tune-up tolerance, mW = 4.9 mW
min. test separation distance, mm = 100mm
f(GHz) = 2.462 GHz

Therefore; the BLE/ANT Transmitter meets the SAR test exclusion criteria.

NOTE: This device is not capable of simultaneous transmission between the BT/BLE/ANT and WiFi transmitters.
Due to the nature of this device, WiFi and Bluetooth were evaluated for standalone SAR only.

NOTES to Table 11.0
(1) Scaling of the Maximum Measured SAR is based on the highest, 100% duty cycle, Face, Body and/or Head SAR measured of ALL test channels, configurations and accessories used during THIS evaluation. The Measured Fluid Deviation parameters apply only to deviation of the tissue equivalent fluids used at the frequencies which produced the highest measured SAR. The Measured Conducted Power applies to the Conducted Power measured at the frequencies producing the highest Face and Body SAR. The Measured Drift is the SAR drift associated with that specific SAR measurement. The Reported SAR is the accumulation of all SAR Adjustments from the applicable Steps 1 through 4. The Plot ID is for indentification of the SAR Measurement Plots in Annex A of this report. NOTE: Some of the scaling factors in Steps 1 through 4 may not apply and are identified by light gray text.
Step 1
Per IEC-62209-1 and FCC KDB 865664. Scaling required only when Measured Fluid Deviation is greater than 5%. If the Measured Fluid Deviation is greater than 5%, Table 9.1 will be shown and will indicate the SAR scaling factor in percent (%). SAR is MULTIPLIED by this scaling factor only when the scaling factor is positive (+).
Step 2
Per KDB 447498. Scaling required only when the difference (Delta) between the Measured Conducted Power and the Manufacturer's Rated Conducted Power is (-) Negative. The absolute value of Delta is ADDED to the SAR.
Step 3
Per IEC 62209-1. Scaling required only when Measured Drift is (-) Negative. The absolute value of Measured Drift is added to Reported or Simultaneous Reported SAR.
Step 4
Per KDB 447498 4.3.2. The SAR, either measured or calculated, of ANY and ALL simultaneous transmitters must be added together and includes all contributors.
Step 5
The Reported SAR is the Maximum Final Adjusted Cumulative SAR from the applicable Steps 1 through 4 and are reported on Page 1 of this report.

12.0 SAR EXPOSURE LIMITS

Table 12.0 Exposure Limits

SAR RF EXPOSURE LIMITS			
FCC 47 CFR§2.1093	Health Canada Safety Code 6	General Population / Uncontrolled Exposure(4)	Occupational / Controlled Exposure(5)
Spatial Average(1) (averaged over the whole body)		0.08 W/kg	0.4 W/kg
Spatial Peak(2) (Head and Trunk averaged over any 1 g of tissue)		**1.6 W/kg**	8.0 W/kg
Spatial Peak(3) (Hands/Wrists/Feet/Ankles averaged over 10 g)		**4.0 W/kg**	20.0 W/kg
(1) The Spatial Average value of the SAR averaged over the whole body.			
(2) The Spatial Peak value of the SAR averaged over any 1 gram of tissue, defined as a tissue volume in the shape of a cube and over the appropriate averaging time.			
(3) The Spatial Peak value of the SAR averaged over any 10 grams of tissue, defined as a tissue volume in the shape of a cube and over the appropriate averaging time.			
(4) Uncontrolled environments are defined as locations where there is potential exposure to individuals who have no knowledge or control of their potential exposure.			
(5) Controlled environments are defined as locations where there is potential exposure to individuals who have knowledge of their potential exposure and can exercise control over their exposure.			

13.0 DETAILS OF SAR EVALUATION

13.1 Day Log

DAY LOG								
Date	Ambient Temp (° C)	Fluid Temp (° C)	Relative Humidity (%)	Barometric Pressure (kPa)	Fluid Dielectric	SPC	Test	Task
July 8, 2020	23	23.2	38%	101.6	X	X		Fluids, SPC 2400 MHz
July 9, 2020	23	22.9	40%	101.5			X	Testing 2400 GHz
July 10, 2020	23	23.4	36%	101.9	X	X	X	Fluids, SPC 2400 MHz, Testing
July 13, 2020	24	23.4	36%	101.9			X	Testing 5250 GHz
July 14, 2020	25	24.8	31%	101.7	X	X		Fluids, SPC 5750 MHz
July 15, 2020	24	24.4	34%	101.8			X	Testing 5750 GHz
July 16, 2020	24	24.9	38%	101.1			X	Testing 5750 GHz

*Per IEEE 1528 Test Series was started within 24 hours and completed within 48 hours of Fluid Parameter Measurements

13.2 DUT Setup and Configuration

DUT Setup and Configuration

Overview

The Clarius series scanners are a portable handheld Medical and Veterinarian Ultrasound scanner which streams video data via WiFi to another WiFi connected device. The device is intended to be handheld by the operator while it is in contact with a patient. The WiFi transmitter ceases to transmit once the transducer is no longer in contact with the patient. Since both Extremity and Body RF exposures exist, both configurations were evaluated.

The Clarius series scanners are identical in all aspects of RF circuitry, RF Transmit Power, Transmit Antenna, physical size and form factor with the exception of the Ultrasound Transducer element. As such, a default device was selected for Extremity SAR evaluation and each variant was evaluated for Body SAR. Extremity SAR was evaluated on all surfaces of the device, e.g. Front, Back, Left Side, Right Side, Top and Bottom (Tip). The worst case channel configuration in the 2.4GHz, 5250MHz and 5750MHz were used for the Body SAR channel configuration.

The device was configured to transmit at its highest output power as set in the test-mode firmware, on each of the test channels identified in the SAR test plan.

Since in all cases the 10g SAR was less 0.1W/kg, SAR Test reduction was applied to the SAR Test Plan and only the worst case configurations were investigated further.

13.3 DUT Positioning

DUT Positioning
Positioning
The DUT Positioner was securely fastened to the Phantom Platform. Registration marks were placed on the DUT and the Positioner to ensure consistent positioning of the DUT for each test evaluation.
FACE Configuration
This device is not intended to be held to the face and was not tested in the FACE configuration.
BODY Configuration
The DUT was securely clamped into the device holder with the surface of the DUT normally in contact with the body in direct contact with the bottom of the phantom, or 0mm separation from the DUT's accessory to the phantom surface.
HEAD Configuration
This device is not intended to be held to the ear and was not tested in the HEAD configuration.
Limb Worn Configuration
The DUT was positioned with the back side directly against the phantom surface with the strap opened to allow direct contact or 0mm of the DUT and watch band to the phantom surface.

13.4 General Procedures and Report

General Procedures and Reporting
General Procedures
The fluid dielectric parameters of the Active Tissue Simulating Liquid (TSL) were measured as described in this Section, recorded and entered into the DASY Measurement Server. Active meaning the TSL used during the SAR evaluation of the DUT. The temperature of the Active TSL was measured and recorded prior to performing a System Performance Check (SPC). An SPC was performed with the Active TSL prior to the start of the test series. The temperature of the Active TSL was measured throughout the day and the Active TSL temperature was maintained to ± 0.5°C. The Active TSL temperature was maintained to within ±2.0°C throughout the test series. The liquid parameters shall be measured within 24 hours before the start of a test series and if it takes longer than 48 hours, the liquid parameters shall also be measured at the end of the test series. An Area Scan exceeding the length and width of the DUT projection was performed and the locations of all maximas within 2dB of the Peak SAR recorded. A Zoom Scan centered over the Peak SAR location(s) was performed and the 1g and 10g SAR values recorded. The resolutions of the Area Scan and Zoom Scan are described in the Scan Resolution table(s) in this Section. A Power Reference Measurement was taken at the phantom reference point immediately prior to the Area Scan. A Power Drift measurement was taken at the phantom reference point immediately following the Zoom Scan to determine the power drift. A Z-Scan from the *Maximum Distance to Phantom Surface* to the fluid surface was performed following the power drift measurement.
Reporting
The 1g SAR, 10g SAR and power drift measurements are recorded in the SAR Measurement Summary tables in the SAR Measurement Summary Section of this report. The SAR values shown in the 100% DC (Duty Cycle) column are the SAR values reported by the SAR Measurement Server with the DUT operating at 100% transmit duty cycle. These tables also include other information such as transmit channel and frequency, modulation, accessories tested and DUT-phantom separation distance. In the Scaling of Maximum Measured SAR Section of this report, the highest measured SAR in the BODY configuration, within the entire scope of this assessment, are, when applicable, scaled for Fluid Sensitivity, Manufacturer's Tune-Up Tolerance, Simultaneous Transmission and Drift. With the exception of Duty Cycle correction/compensation, SAR values are ONLY scaled up, not down. The final results of this scaling is the *reported SAR* which appears on the Cover Page of this report.

13.5 Fluid Dielectric and Systems Performance Check

Fluid Dielectric and Systems Performance Check
Fluid Dielectric Measurement Procedure
The fluid dielectric parameters of the Tissue Simulating Liquid (TSL) are measured using the Open-Ended Coax Method connected to an Agilent 8753ET Network Analyzer connected to a measurement server running Aprel Dielectric Property Measurement System. A frequency range of ± 100MHz for frequencies > 300MHz and ± 50MHz for frequencies ≤ 300MHz with frequency step size of 10MHz is used. The center frequency is centered around the SAR measurement probe's calibration point for that TSL frequency range. A calibration of the setup is performed using a short-open-deionized water (at 23°C in a 300ml beaker) method. A sample of the TSL is placed in a 300ml beaker and the open-ended coax is submerged approximately 8mm below the fluid surface in the approximate center of the beaker. A check of the setup is made to ensure no air is trapped under the open-ended coax. The sample of TSL is measured and compared to the FCC KDB 865664 targets for HEAD or BODY for the entire fluid measurement range. Fluid adjustment are made if the dielectric parameters are > 5% in range that the DUT is to be tested. If the adjustments fail to bring the parameters to ≤ 5% but are < 10%, the SAR Fluid Sensitivity as per IEC 62201-1 and FCC KDB 865664 are applied to the highest measured SAR. A TSL with dielectric parameters > 10% in the DUT test frequency range are not used.
Systems Performance Check
The fluid dielectric parameters of the Active TSL are entered into the DASY Measurement Server at each of the 10MHz step size intervals. Active meaning the TSL used during the SAR evaluation of the DUT. The DASY Measurement System will automatically interpolate the dielectric parameters for DUT test frequencies that fall between the 10MHz step intervals. A Systems Performance Check (SPC) is performed in accordance with IEEE 1528 "System Check" and FCC KDB 865664 "System Verification". A validation source, dipole or Confined Loop Antenna (CLA), is placed under the geometric center of the phantom and separated from the phantom in accordance to the validation source's Calibration Certificate data. A CW signal set to the frequency of the validate source's and SAR measurement probe's calibration frequency with a forward power set to the validation source's Calibration Certificate data power setting is applied to the validation source. An Area Scan is centered over the projection of the validation source's feed point and an Area Scan is taken. A Zoom Scan centered over the Peak SAR measurement of the Area Scan and the 1g and 10g SAR is measured. The measured 1g and 10g SAR is compared to the 1g and 10g SAR measurements from the validation source's Calibration Certificate. When required, the measured SAR is normalized to 1.0W and compared to the normalized SAR indicated on the validation source's Calibration Certificate. The SPC is considered valid when the measured and normalized SAR is ≤ 10% of the measured and normalize SAR of the validation source's Calibration Certificate. The fluid dielectric parameters of the Active TSL and SPC are repeated when the Active TSL has been in use for greater than 84 hours or if the Active TSL temperature has exceed ± 1°C of the initial fluid analysis.

13.6 Scan Resolution 100MHz to 2GHz

Scan Resolution 100MHz to 2GHz	
Maximum distance from the closest measurement point to phantom surface: (Geometric Center of Probe Center)	**4 ± 1 mm**
Maximum probe angle normal to phantom surface. (Flat Section ELI Phantom)	**5° ± 1°**
Area Scan Spatial Resolution ΔX, ΔY	**15 mm**
Zoom Scan Spatial Resolution ΔX, ΔY	**7.5 mm**
Zoom Scan Spatial Resolution ΔZ (Uniform Grid)	**5 mm**
Zoom Scan Volume X, Y, Z	**30 mm**
Phantom	**ELI**
Fluid Depth	**150 ± 5 mm**
An Area Scan with an area extending beyond the device was used to locate the candidate maximas within 2dB of the global maxima.	
A Zoom Scan centered over the peak SAR location(s) determined by the Area Scan was used to determine the 1-gram and 10-gram peak spatial-average SAR	

13.7 Scan Resolution 2GHz to 3GHz

Scan Resolution 2GHz to 3GHz	
Maximum distance from the closest measurement point to phantom surface: (Geometric Center of Probe Center)	**4 ± 1 mm**
Maximum probe angle normal to phantom surface. (Flat Section ELI Phantom)	**5° ± 1°**
Area Scan Spatial Resolution ΔX, ΔY	**12 mm**
Zoom Scan Spatial Resolution ΔX, ΔY	**5 mm**
Zoom Scan Spatial Resolution ΔZ (Uniform Grid)	**5 mm**
Zoom Scan Volume X, Y, Z	**30 mm**
Phantom	**ELI**
Fluid Depth	**150 ± 5 mm**
An Area Scan with an area extending beyond the device was used to locate the candidate maximas within 2dB of the global maxima.	
A Zoom Scan centered over the peak SAR location(s) determined by the Area Scan was used to determine the 1-gram and 10-gram peak spatial-average SAR	

13.8 Scan Resolution 5GHz to 6GHz

Scan Resolution 5GHz to 6GHz	
Maximum distance from the closest measurement point to phantom surface: (Geometric Center of Probe Center)	**4 ± 1 mm**
Maximum probe angle normal to phantom surface. (Flat Section ELI Phantom)	**5° ± 1°**
Area Scan Spatial Resolution ΔX, ΔY	**10 mm**
Zoom Scan Spatial Resolution ΔX, ΔY	**4 mm**
Zoom Scan Spatial Resolution ΔZ (Uniform Grid)	**2 mm**
Zoom Scan Volume X, Y, Z	**22 mm**
Phantom	**ELI**
Fluid Depth	**100 ± 5 mm**
An Area Scan with an area extending beyond the device was used to locate the candidate maximas within 2dB of the global maxima.	
A Zoom Scan centered over the peak SAR location(s) determined by the Area Scan was used to determine the 1-gram and 10-gram peak spatial-average SAR	

14.0 MEASUREMENT UNCERTAINTIES

Table 14.0 Measurement Uncertainty

UNCERTAINTY BUDGET FOR DEVICE EVALUATION (IEEE 1528-2013 Table 9)									
Source of Uncertainty	**IEEE 1528 Section**	**Toler ±%**	**Prob Dist**	**Div**	**c_i**	**c_i**	**Stand Unct ±%**	**Stand Unct ±%**	**V_i or V_{eff}**
Measurement System					**(1g)**	**(10g)**	**(1g)**	**(10g)**	
EX3DV4 Probe Calibration** (*k* =1)	E.2.1	6.7	N	1	1	1	**6.7**	**6.7**	∞
Axial Isotropy** (*k* =1)	E.2.2	0.6	R	√3	0.7	0.7	**0.2**	**0.2**	∞
Hemispherical Isotropy** (*k* =1)	E.2.2	3.2	R	√3	0.7	0.7	**1.3**	**1.3**	∞
Boundary Effect*	E.2.3	1.0	R	√3	1	1	0.6	0.6	∞
Linearity** (*k* =1)	E.2.4	**0.5**	R	√3	1	1	**0.3**	**0.3**	∞
System Detection Limits*	E.2.4	1.0	R	√3	1	1	0.6	0.6	∞
Modulation Response** (*k* =1)	E.2.5	**8.3**	R	√3	1	1	**4.8**	**4.8**	∞
Readout Electronics*	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time*	E.2.7	0.8	R	√3	1	1	0.5	0.5	∞
Integration Time*	E.2.8	2.6	R	√3	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	**0.0**	R	√3	1	1	0.0	0.0	**10**
RF Ambient Conditions - Reflection	E.6.1	**0.0**	R	√3	1	1	0.0	0.0	**10**
Probe Positioner Mechanical Tolerance*	E.6.2	0.0	R	√3	1	1	0.0	0.0	∞
Probe Positioning w rt Phantom Shell*	E.6.3	0.4	R	√3	1	1	0.2	0.2	∞
Post-processing*	E.5	2.0	R	√3	1	1	1.2	1.2	∞
Test Sample Related									
Test Sample Positioning	E.4.2	**2.2**	N	1	1	1	2.2	2.2	**5**
Device Holder Uncertainty*	E.4.1	3.6	N	1	1	1	3.6	3.6	∞
SAR Drift Measurement(2)	E.2.9	0.0	R	√3	1	1	0.0	0.0	∞
SAR Pow er Scaling(3)	E.6.5	0.0	R	√3	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty*	E.3.1	6.1	R	√3	1	1	3.5	3.5	∞
SAR Correction Uncertainty	E.3.2	**1.9**	N	1	1	0.84	1.9	1.6	∞
Liquid Conductivity (measurement)	E.3.3	**5.0**	N	1	0.78	0.71	3.9	3.6	**10**
Liquid Permittivity (measurement)	E.3.3	**5.0**	N	1	0.23	0.26	1.2	1.3	**10**
Liquid Conductivity (Temperature)	E.3.2	**0.4**	R	√3	0.78	0.71	0.2	0.2	**10**
Liquid Permittivity Temperature)	E.3.2	**0.2**	R	√3	0.23	0.26	0.0	0.0	**10**
Effective Degrees of Freedom(1)								**V_{eff} =**	**1161**
Combined Standard Uncertainty			**RSS**				**11.1**	**11.0**	
Expanded Uncertainty (95% Confidence Interval)			**k=2**				**22.3**	**22.0**	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2013									

(1) The Effective Degrees of Freedom is > 30

Therefore a coverage factor of k=2 represents an approximate confidence level of 95%.

(2) The SAR Value is compensated for Drift

(3) SAR Pow er Scaling not Required

* Provided by SPEAG for DASY

** Standard Uncertainty Calibration Data Provided by SPEAG for EX3DEV4 Probe

Table 14.1 Calculation of Degrees of Freedom

Calculation of the Degrees and Effective Degrees of Freedom	
$v_i = n - 1$	$v_{eff} = \dfrac{u_c^4}{\dfrac{m}{\sum_{i=1} \dfrac{c_i^4 u_i^4}{v_i}}}$

15.0 FLUID DIELECTRIC PARAMETERS

****** Note ******

For fluid parameters outside the +/- 5% tolerance, SAR was adjusted in accordance with the Fluid Sensitivity requirements of IEC 62209. See Section 11.0.

Table 15.1 Fluid Dielectric Parameters 2450MHz HEAD TSL

****

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Wed 08/Jul/2020 12:24:30
Freq Frequency(GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
2.3500	39.38	1.71	36.86	1.79
2.3600	39.36	1.72	36.64	1.81
2.3700	39.34	1.73	36.70	1.81
2.3800	39.32	1.74	36.99	1.82
2.3900	39.31	1.75	36.69	1.82
2.4000	39.29	1.76	36.67	1.83
2.4100	39.27	1.76	36.66	1.85
2.4200	39.25	1.77	36.69	1.88
2.4300	39.24	1.78	36.56	1.88
2.4400	39.22	1.79	36.61	1.91
2.4500	39.20	1.80	36.55	1.91
2.4600	39.19	1.81	36.35	1.90
2.4700	39.17	1.82	36.54	1.92
2.4800	39.16	1.83	36.23	1.94
2.4900	39.15	1.84	36.29	1.96
2.5000	39.14	1.85	36.39	1.96
2.5100	39.12	1.87	36.38	1.96
2.5200	39.11	1.88	36.33	2.01
2.5300	39.10	1.89	36.34	2.02
2.5400	39.09	1.90	36.22	2.00
2.5500	39.07	1.91	36.15	2.01

FLUID DIELECTRIC PARAMETERS

Date:	8 Jul 2020	Fluid Temp:	23.1	Frequency:	2450MHz	Tissue:	Head

Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
2350.0000		36.8600	1.7900	39.3800	1.71	-6.40%	4.68%
2360.0000		36.6400	1.8100	39.3600	1.72	-6.91%	5.23%
2370.0000		36.7000	1.8100	39.3400	1.73	-6.71%	4.62%
2380.0000		36.9900	1.8200	39.3200	1.74	-5.93%	4.60%
2390.0000		36.6900	1.8200	39.3100	1.75	-6.66%	4.00%
2400.0000		36.6700	1.8300	39.2900	1.76	-6.67%	3.98%
2410.0000		36.6600	1.8500	39.2700	1.76	-6.65%	5.11%
2412.0000	*	36.6660	1.8560	39.2660	1.76	-6.62%	5.33%
2420.0000		36.6900	1.8800	39.2500	1.77	-6.52%	6.21%
2430.0000		36.5600	1.8800	39.2400	1.78	-6.83%	5.62%
2437.0000	*	36.5950	1.9010	39.2260	1.79	-6.71%	6.38%
2440.0000		36.6100	1.9100	39.2200	1.79	-6.65%	6.70%
2450.0000		36.5500	1.9100	39.2000	1.80	-6.76%	6.11%
2460.0000		36.3500	1.9000	39.1900	1.81	-7.25%	4.97%
2462.0000	*	36.3880	1.9040	39.1860	1.81	-7.14%	5.08%
2470.0000		36.5400	1.9200	39.1700	1.82	-6.71%	5.49%
2477.0000	*	36.3230	1.9340	39.1630	1.83	-7.25%	5.86%
2480.0000		36.2300	1.9400	39.1600	1.83	-7.48%	6.01%
2490.0000		36.2900	1.9600	39.1500	1.84	-7.31%	6.52%
2500.0000		36.3900	1.9600	39.1400	1.85	-7.03%	5.95%
2510.0000		36.3800	1.9600	39.1200	1.87	-7.00%	4.81%
2520.0000		36.3300	2.0100	39.1100	1.88	-7.11%	6.91%
2530.0000		36.3400	2.0200	39.1000	1.89	-7.06%	6.88%
2540.0000		36.2200	2.0000	39.0900	1.90	-7.34%	5.26%
2550.0000		36.1500	2.0100	39.0700	1.91	-7.47%	5.24%

*Channel Frequency Tested

Table 15.2 Fluid Dielectric Parameters 5250MHz HEAD TSL

****
Aprel Laboratory
Test Result for UIM Dielectric Parameter
Fri 10/Jul/2020 11:33:47
Freq Frequency(GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
5.1500	36.04	4.60	34.08	4.86
5.1600	36.03	4.61	33.90	4.84
5.1700	36.02	4.62	34.00	4.88
5.1800	36.01	4.63	34.04	4.94
5.1900	36.00	4.64	33.66	4.88
5.2000	35.99	4.65	34.04	4.88
5.2100	35.97	4.67	34.12	4.92
5.2200	35.96	4.68	33.89	4.94
5.2300	35.95	4.69	34.19	4.91
5.2400	35.94	4.70	33.83	4.98
5.2500	35.93	4.71	33.86	4.86
5.2600	35.92	4.72	33.59	4.93
5.2700	35.91	4.73	33.63	4.93
5.2800	35.89	4.74	33.81	5.00
5.2900	35.88	4.75	33.51	4.97
5.3000	35.87	4.76	34.01	5.03
5.3100	35.86	4.77	33.71	5.02
5.3200	35.85	4.78	33.67	5.12
5.3300	35.84	4.79	33.64	5.12
5.3400	35.83	4.80	33.68	5.02
5.3500	35.81	4.81	33.61	5.06

FLUID DIELECTRIC PARAMETERS

Date:	10 Jul 2020	Fluid Temp:	23.4	Frequency:	5250MHz	Tissue:	Head

Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
5150.0000		34.0800	4.8600	36.0400	4.60	-5.44%	5.65%
5160.0000		33.9000	4.8400	36.0300	4.61	-5.91%	4.99%
5170.0000		34.0000	4.8800	36.0200	4.62	-5.61%	5.63%
5180.0000	*	34.0400	4.9400	36.0100	4.63	-5.47%	6.70%
5190.0000		33.6600	4.8800	36.0000	4.64	-6.50%	5.17%
5200.0000		34.0400	4.8800	35.9900	4.65	-5.42%	4.95%
5210.0000		34.1200	4.9200	35.9700	4.67	-5.14%	5.35%
5220.0000	*	33.8900	4.9400	35.9600	4.68	-5.76%	5.56%
5230.0000		34.1900	4.9100	35.9500	4.69	-4.90%	4.69%
5240.0000	*	33.8300	4.9800	35.9400	4.70	-5.87%	5.96%
5250.0000		33.8600	4.8600	35.9300	4.71	-5.76%	3.18%
5260.0000		33.5900	4.9300	35.9200	4.72	-6.49%	4.45%
5270.0000		33.6300	4.9300	35.9100	4.73	-6.35%	4.23%
5280.0000		33.8100	5.0000	35.8900	4.74	-5.80%	5.49%
5290.0000		33.5100	4.9700	35.8800	4.75	-6.61%	4.63%
5300.0000		34.0100	5.0300	35.8700	4.76	-5.19%	5.67%
5310.0000		33.7100	5.0200	35.8600	4.77	-6.00%	5.24%
5320.0000		33.6700	5.1200	35.8500	4.78	-6.08%	7.11%
5330.0000		33.6400	5.1200	35.8400	4.79	-6.14%	6.89%
5340.0000		33.6800	5.0200	35.8300	4.80	-6.00%	4.58%
5350.0000		33.6100	5.0600	35.8100	4.81	-6.14%	5.20%

*Channel Frequency Tested

Table 15.3 Fluid Dielectric Parameters 5750MHz HEAD TSL

****
Aprel Laboratory
Test Result for UIM Dielectric Parameter
Mon 14/Jul/2020 16:08:09
Freq Frequency(GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
5.6500	35.47	5.12	32.85	5.34
5.6600	35.46	5.13	32.69	5.27
5.6700	35.45	5.14	32.73	5.35
5.6800	35.44	5.15	32.94	5.38
5.6900	35.43	5.16	32.54	5.31
5.7000	35.41	5.17	32.85	5.36
5.7100	35.40	5.18	32.74	5.37
5.7200	35.39	5.19	32.72	5.40
5.7300	35.38	5.20	32.63	5.43
5.7400	35.37	5.21	32.62	5.40
5.7500	35.36	5.22	32.80	5.39
5.7600	35.35	5.23	32.56	5.37
5.7700	35.33	5.24	32.68	5.45
5.7800	35.32	5.25	32.55	5.48
5.7900	35.31	5.26	32.48	5.47
5.8000	35.30	5.27	32.76	5.50
5.8100	35.29	5.28	32.54	5.49
5.8200	35.28	5.29	32.55	5.47
5.8300	35.27	5.30	32.65	5.49
5.8400	35.25	5.31	32.62	5.50
5.8500	35.24	5.32	32.51	5.55

FLUID DIELECTRIC PARAMETERS

Date:	14 Jul 2020	Fluid Temp:	24.1	Frequency:	5750MHz	Tissue:	Head

Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
5650.0000		32.8500	5.3400	35.4700	5.12	-7.39%	4.30%
5660.0000		32.6900	5.2700	35.4600	5.13	-7.81%	2.73%
5670.0000		32.7300	5.3500	35.4500	5.14	-7.67%	4.09%
5680.0000		32.9400	5.3800	35.4400	5.15	-7.05%	4.47%
5690.0000		32.5400	5.3100	35.4300	5.16	-8.16%	2.91%
5700.0000		32.8500	5.3600	35.4100	5.17	-7.23%	3.68%
5710.0000		32.7400	5.3700	35.4000	5.18	-7.51%	3.67%
5720.0000		32.7200	5.4000	35.3900	5.19	-7.54%	4.05%
5730.0000		32.6300	5.4300	35.3800	5.20	-7.77%	4.42%
5740.0000		32.6200	5.4000	35.3700	5.21	-7.77%	3.65%
5745.0000	*	32.7100	5.3950	35.3650	5.22	-7.51%	3.45%
5750.0000		32.8000	5.3900	35.3600	5.22	-7.24%	3.26%
5760.0000		32.5600	5.3700	35.3500	5.23	-7.89%	2.68%
5770.0000		32.6800	5.4500	35.3300	5.24	-7.50%	4.01%
5780.0000		32.5500	5.4800	35.3200	5.25	-7.84%	4.38%
5785.0000	*	32.5150	5.4750	35.3150	5.26	-7.93%	4.19%
5790.0000		32.4800	5.4700	35.3100	5.26	-8.01%	3.99%
5800.0000		32.7600	5.5000	35.3000	5.27	-7.20%	4.36%
5810.0000		32.5400	5.4900	35.2900	5.28	-7.79%	3.98%
5820.0000		32.5500	5.4700	35.2800	5.29	-7.74%	3.40%
5825.0000	*	32.6000	5.4800	35.2750	5.30	-7.58%	3.49%
5830.0000		32.6500	5.4900	35.2700	5.30	-7.43%	3.58%
5840.0000		32.6200	5.5000	35.2500	5.31	-7.46%	3.58%
5850.0000		32.5100	5.5500	35.2400	5.32	-7.75%	4.32%

*Channel Frequency Tested

16.0 SYSTEM VERIFICATION TEST RESULTS

Table 16.1 System Verification Results 2450MHz HEAD TSL

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N		S/N
July 8, 2020		2450	D2450V2		825
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.2	23	38%	250	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
36.55	39.20	-6.76%	1.91	1.80	6.11%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
13.00	13.30	-2.26%	6.01	6.16	-2.44%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
52.00	52.10	-0.19%	24.04	24.30	-1.07%

Prior to the SAR evaluations, system checks were performed on the planar section of the phantom and a SPEAG validation dipole in accordance with the procedures described in IEEE 1528-2013, FCC KDB 846224 and IEC 62209-1.

The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer.

The forward power was applied to the dipole and the system was verified to a tolerance of +10% from the system manufacturer's dipole calibration target SAR value.

The forward power applied was same forward power applied by the calibration lab during the calibration of this validation source.

Table 16.2 System Verification Results 5250MHz HEAD TSL

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N		S/N
July 10, 2020		5250	D5GHzV2		1031
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.4	23	36%	100	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
33.86	35.93	-5.76%	4.86	4.71	3.18%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
39.70	80.00	2.02%	1.24	22.90	1.85%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
39.70	80.00	2.02%	12.40	22.90	1.85%

Prior to the SAR evaluations, system checks were performed on the planar section of the phantom and a SPEAG validation dipole in accordance with the procedures described in IEEE 1528-2013, FCC KDB 846224 and IEC 62209-1.

The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer.

The forward power was applied to the dipole and the system was verified to a tolerance of +10% from the system manufacturer's dipole calibration target SAR value.

The forward power applied was same forward power applied by the calibration lab during the calibration of this validation source.

Table 16.3 System Verification Results 5750MHz HEAD TSL

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N		S/N
July 14, 2020		5750	D5GHzV2		1031
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	24.8	25	31%	100	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
32.80	35.36	-7.24%	5.39	5.22	3.26%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
78.20	80.40	-1.03%	24.20	22.80	1.06%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
78.20	80.40	-1.03%	24.20	22.80	1.06%

Prior to the SAR evaluations, system checks were performed on the planar section of the phantom and a SPEAG validation dipole in accordance with the procedures described in IEEE 1528-2013, FCC KDB 846224 and IEC 62209-1.

The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer.

The forward power was applied to the dipole and the system was verified to a tolerance of +10% from the system manufacturer's dipole calibration target SAR value.

The forward power applied was same forward power applied by the calibration lab during the calibration of this validation source.

17.0 SYSTEM VALIDATION SUMMARY

Table 17.1 System Validation Summary

System Validation Summary											
Frequency (MHz)	Validation Date	Probe Model	Probe S/N	Validation Source	Source S/N	Tissue	Tissue Dielectrics		Validation Results		
							Permittivity	Conductivity	Sensitivity	Linearity	Isotropy
30	31-May-19	EX3DV4	3600	CLA-30	1005	Head	52.40	0.75	Pass	Pass	Pass
150	12-Aug-19	EX3DV4	3600	CLA-150	4007	Head	49.46	0.79	Pass	Pass	Pass
450	13-Aug-19	EX3DV4	3600	D450V3	1068	Head	43.70	0.83	Pass	Pass	Pass
750	20-Jun-19	EX3DV4	3600	D750V3	1061	Head	44.27	0.83	Pass	Pass	Pass
835	15-Aug-19	EX3DV4	3600	D835V2	4d075	Head	42.01	0.89	Pass	Pass	Pass
1800	18-Jun-19	EX3DV4	3600	D1800V2	247	Head	41.20	1.39	Pass	Pass	Pass
2450	27-May-20	EX3DV4	3600	D2450V2	825	Head	37.21	1.95	Pass	Pass	Pass
5250	29-May-20	EX3DV4	3600	D5GHzV2	1031	Head	34.44	5.07	Pass	Pass	Pass
5750	28-May-20	EX3DV4	3600	D5GHzV2	1031	Head	35.16	5.56	Pass	Pass	Pass

18.0 MEASUREMENT SYSTEM SPECIFICATIONS

Table 18.1 Measurement System Specifications

Measurement System Specification	
Specifications	
Positioner	Stäubli Unimation Corp. Robot Model: TX90XL
Repeatability	+/- 0.035 mm
No. of axis	6.0
Data Acquisition Electronic (DAE) System	
Cell Controller	
Processor	Intel(R) Core(TM) i7-7700
Clock Speed	3.60 GHz
Operating System	Windows 10 Professional
Data Converter	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY6, V 6.10.0.12 / DASY52 V10.3(1513)
	Postprocessing Software: SEMCAD X, V14.6.13(7474)
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
DASY Measurement Server	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	Intel ULV Celeron CPU 400 MHz; 128 MB chip disk; 128 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
E-Field Probe	
Model	EX3DV4
Serial No.	3600
Construction	Triangular core fiber optic detection system
Frequency	4 MHz -10GHz
Linearity	±0.2 dB (30 MHz to 10 GHz)
Phantom	
Type	ELI Elliptical Planar Phantom
Shell Material	Fiberglass
Thickness	2mm +/- .2mm
Volume	> 30 Liter

Measurement System Specification

Probe Specification

Construction:	Symmetrical design with triangular core; Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In head simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity:	± 0.2 dB in head tissue (rotation around probe axis) ± 0.4 dB in head tissue (rotation normal to probe axis)
Dynamic Range:	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Surface Detect:	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm; Tip length: 16 mm; Body diameter: 12 mm; Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz; Compliance tests of mobile phone

EX3DV4 E-Field Probe

Phantom Specification

The ELI V5.0 phantom is an elliptical planar fiberglass shell phantom with a shell thickness of 2.0mm +/- .2mm at the planar area. This phantom conforms to OET Bulletin 65, Supplement C, IEEE 1528-2013, IEC 62209-1 and IEC 62209-2.

ELI Phantom

Device Positioner Specification

The DASY device positioner has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65^{O}. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.

Device Positioner

19.0 TEST EQUIPMENT LIST

Table 19.1 Equipment List and Calibration

Test Equipment List				
DESCRIPTION	ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE
Schmid & Partner DASY 6 System	-	-	-	-
-DASY Measurement Server	00158	1078	CNR	CNR
-Robot	00046	599396-01	CNR	CNR
-DAE4	00019	353	17-Mar-20	17-Mar-23
-EX3DV4 E-Field Probe	00213	3600	25-Mar-20	25-Mar-23
-CLA 30 Validation Dipole	00300	1005	18-Mar-20	18-Mar-23
-CLA150 Validation Dipole	00251	4007	18-Mar-20	18-Mar-23
-D450V3 Validation Dipole	00221	1068	23-Apr-18	23-Apr-21
-D750V3 Validation Dipole	00238	1061	21-Mar-19	21-Mar-22
-D835V2 Validation Dipole	00217	4D075	20-Apr-18	20-Apr-21
-D900V2 Validation Dipole	00020	54	16-Mar-20	16-Mar-23
ALS-D01620-S-2	00299	207-00102	7-Nov-17	7-Nov-20
-D2450V2 Validation Dipole**	00219	825	24-Apr-18	24-Apr-21
-D5GHzV2 Validation Dipole	00126	1031	26-Apr-18	26-Apr-21
ELI Phantom	00247	1234	CNR	CNR
SAM Phantom	00154	1033	CNR	CNR
HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
Gigatronics 8652A Power Meter	00007	1835801	26-Mar-19	26-Mar-22
Gigatronics 80701A Power Sensor	00186	1837002	COU	COU
Gigatronics 80334A Power Sensor	00237	1837001	26-Mar-19	26-Mar-22
HP 8753ET Network Analyzer	00134	US39170292	29-Dec-17	29-Dec-20
Rohde & Schwarz SMR20 Signal Generator	00006	100104	29-May-17	5/29/2020*
Amplifier Research 10W1000C Power Amplifier	00041	27887	CNR	CNR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Narda Directional Coupler 3020A	00064	-	CNR	CNR
Traceable VWR Thermometer	00334	192385455	6-Aug-19	6-Aug-21
Kangaroo VWR Humidity/Thermometer	00334	192385455	5-Aug-19	6-Aug-22
Bipolar Power Supply 6299A	00086	1144A02155	CNR	CNR
DC-18G 10W 30db Attenuator	00102	-	COU	COU
R&S FSP40 Spectrum Analyzer	00241	100500	15-May-18	15-May-21
RF Cable-SMA	00311	-	CNR	CNR
HP Calibration Kit	00145	-	CNR	CNR

CNR = Calibration Not Required

SB=Stand By

COU = Calibrate on Use

*Verifed and Extended

* *Per KDB 865664 3.2.2; Supporting documentation is included in the report for validation dipoles exceeding the recommended anual calibration cycle.
When applicable, reference Appendix F

Note: Per KDB 865664, Dipoles are evaluated annually for return loss and impedance. The dipole's SAR target can only be assessed by the SAR equipment manufacturer and remains the target until the dipole is recalibrated by the manufacturer. The dipole's SAR is evaluated and compared to this target during each and every System Verification which is performed prior to and/or during each DUT SAR evaluation. The results of these verifications are shown in Section 16.0

20.0 FLUID COMPOSITION

Table 20.0 Fluid Composition 2450MHz HEAD TSL

Table 20.0			2450MHz Head	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	**Glycol**	**Salt(1)**	**HEC(2)**	**Bacteriacide(3)**
52.0	48.0	0.0	0.0	0.0

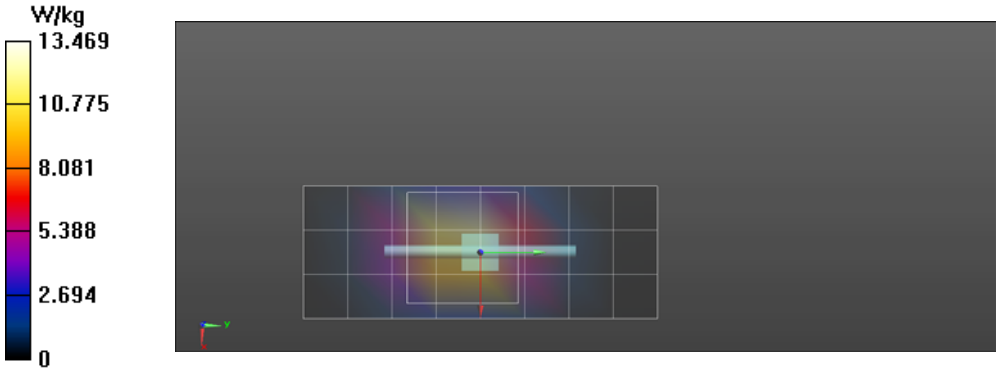
(1) Non-Iodinized
(2) **H**ydroxy**E**thyl-**C**ellulose: Sigma-Aldrich P/N 54290-500g
(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

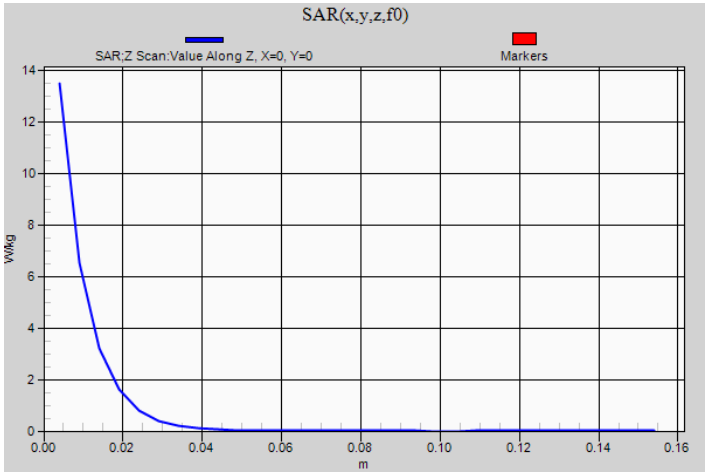
APPENDIX A – SYSTEM VERIFICATION PLOTS

Date/Time: 7/8/2020 2:16:37 PM
Test Laboratory: Celltech Labs
SPC-2450H July 8 2020
DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:825
Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 2450 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 1.91 S/m; ε_r = 36.55; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(6.45, 6.45, 6.45) @ 2450 MHz; Calibrated: 3/25/2020
  - Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = -1.5, 31.0, 151.0
- Electronics: DAE4 Sn353; Calibrated: 3/17/2020
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

SPC/SPC 2450H Input=250mw, Target=[14.63][13.3][11.97]W/kg 2/Area Scan (4x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 12.1 W/kg
SPC/SPC 2450H Input=250mw, Target=[14.63][13.3][11.97]W/kg 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 84.42 V/m; Power Drift = 0.02 dB
Maximum value of SAR (measured) = 14.7 W/kg
SPC/SPC 2450H Input=250mw, Target=[14.63][13.3][11.97]W/kg 2/Z Scan (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 13.5 W/kg

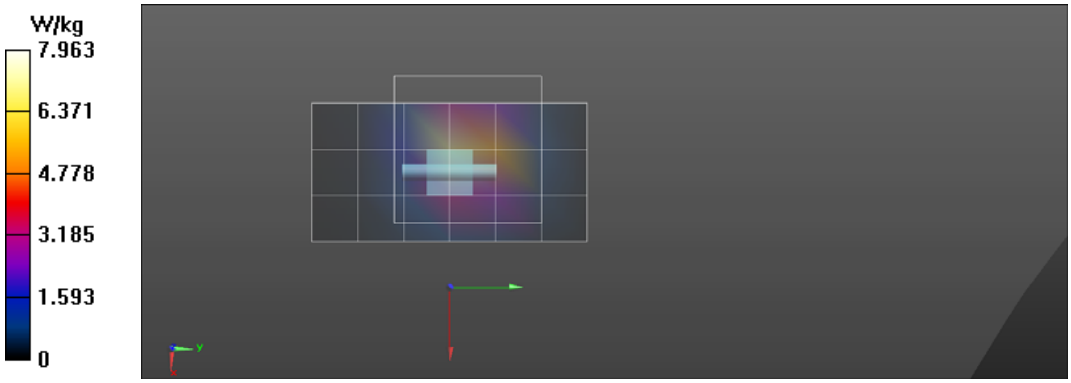


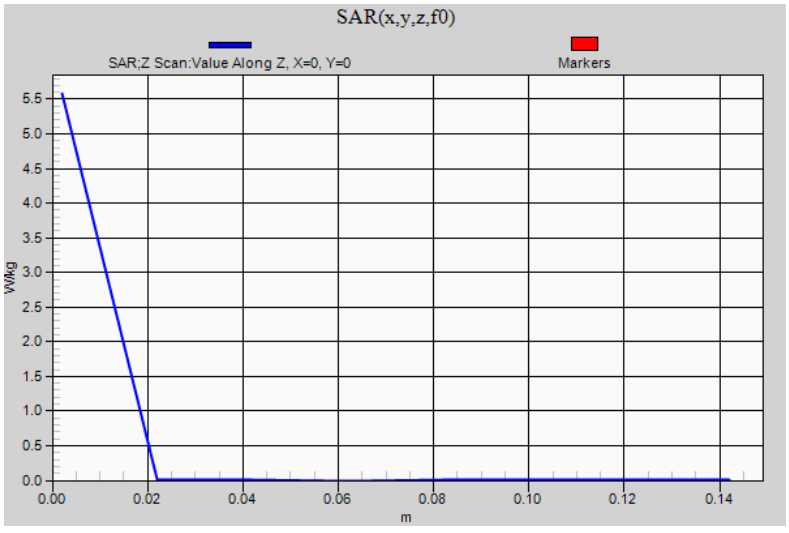


Date/Time: 7/10/2020 12:39:08 PM
Test Laboratory: Celltech Labs
Date/Time: 7/10/2020 12:39:08 PM
Test Laboratory: Celltech Labs
SPC-5250H July 10 2020
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1031
Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 5250 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5250 MHz; σ = 4.86 S/m; ε_r = 33.86; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(4.47, 4.47, 4.47) @ 5250 MHz; Calibrated: 3/25/2020
  - Modulation Compensation:
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = -1.5, 25.0, 151.0
- Electronics: DAE4 Sn353; Calibrated: 3/17/2020
- Phantom: Twin-SAM V4.0 (30deg probe tilt); Type: QD 000 P40 CC; Serial: xxxx
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

SPC/SPC 5250H Input=50 mw, Target= [3.6][4.0][4.4], Target=80.0W/kg@1000mw/Area Scan (4x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.10 W/kg
SPC/SPC 5250H Input=50 mw, Target= [3.6][4.0][4.4], Target=80.0W/kg@1000mw/Zoom Scan (9x9x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 26.23 V/m; Power Drift = 0.04 dB
Maximum value of SAR (measured) = 7.96 W/kg
SPC/SPC 5250H Input=50 mw, Target= [3.6][4.0][4.4], Target=80.0W/kg@1000mw/Z Scan (1x1x8): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Maximum value of SAR (measured) = 5.58 W/kg

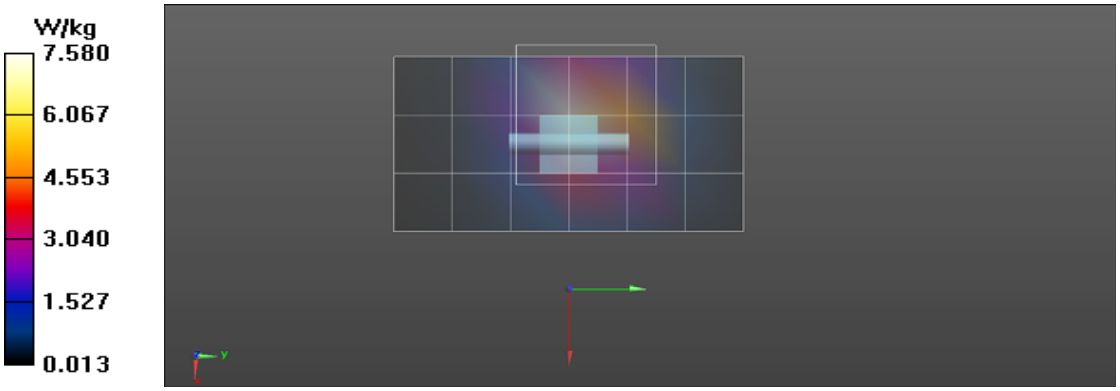


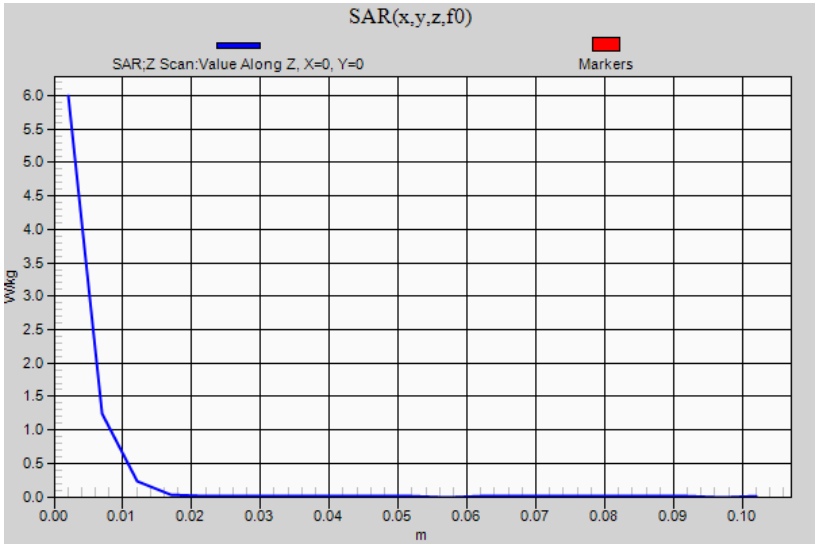


Date/Time: 7/14/2020 3:20:51 PM
Test Laboratory: Celltech Labs
Date/Time: 7/14/2020 3:20:51 PM
Test Laboratory: Celltech Labs
SPC-5750H July 14 2020
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:xxx
Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 5750 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5750 MHz; σ = 5.39 S/m; ε_r = 32.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(4.12, 4.12, 4.12) @ 5750 MHz; Calibrated: 3/25/2020
  - Modulation Compensation:
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = -1.5, 25.0, 101.0
- Electronics: DAE4 Sn353; Calibrated: 3/17/2020
- Phantom: Twin-SAM V4.0 (30deg probe tilt); Type: QD 000 P40 CC; Serial: xxxx
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

SPC/SPC 5750H Input=50 mw 1g SAR extrapolated to 4.02, Target=8.04W/kg@100mw/Area Scan (4x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.58 W/kg
SPC/SPC 5750H Input=50 mw 1g SAR extrapolated to 4.02, Target=8.04W/kg@100mw/Zoom Scan (7x7x6)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 24.93 V/m; Power Drift = 0.04 dB
Maximum value of SAR (measured) = 8.06 W/kg
SPC/SPC 5750H Input=50 mw 1g SAR extrapolated to 4.02, Target=8.04W/kg@100mw/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 6.00 W/kg





APPENDIX B – MEASUREMENT PLOTS OF MAXIMUM MEASURED SAR

Plot B2

Date/Time: 7/9/2020 12:43:18 PM

Test Laboratory: Celltech Labs

2450H 9 JULY 2020

DUT: Clarius ; Type: Transmitter; Serial: Not Specified

Communication System: UID 10598 - AAB, IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle); Communication System Band: WLAN 2.4GHz (2412.0 - 2484.0 MHz); Frequency: 2412 MHz;Communication System PAR: 8.496 dB; PMF: 1.08518
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.856 S/m; ε_r = 36.666; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)
DASY Configuration:

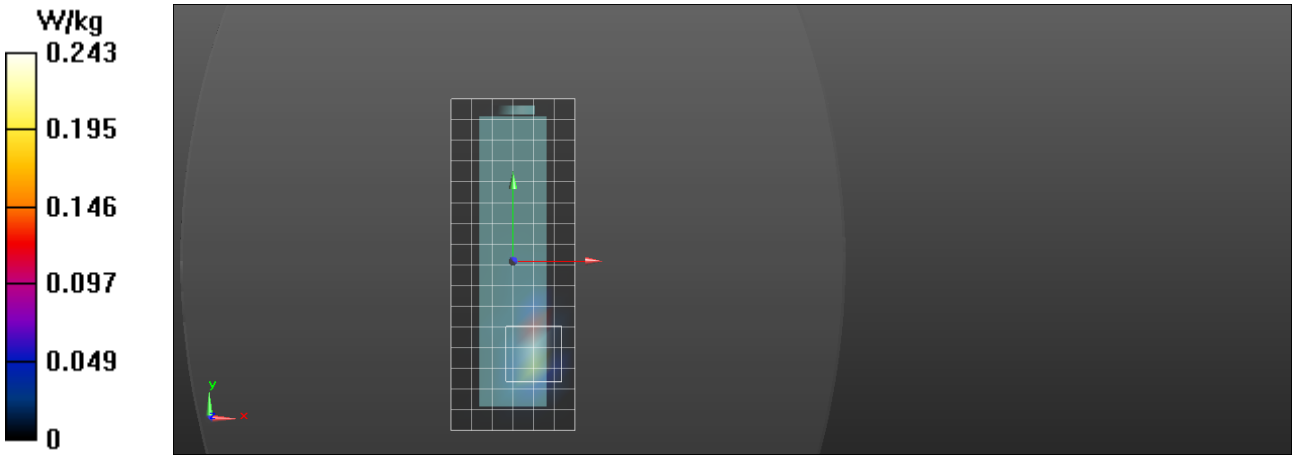
- Probe: EX3DV4 - SN3600; ConvF(6.45, 6.45, 6.45) @ 2412 MHz; Calibrated: 3/25/2020
  - Modulation Compensation: PMR for UID 10598 - AAB, Calibrated: 3/25/2020
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = -54.0, 31.0
- Electronics: DAE4 Sn353; Calibrated: 3/17/2020
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

2450 H/B2 - [C3] 2.4G WiFi - Right, Ch 1 (2412MHz)/Area Scan (7x17x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.252 W/kg

2450 H/B2 - [C3] 2.4G WiFi - Right, Ch 1 (2412MHz)/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.215 V/m; Power Drift = 3.49 dB

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.243 W/kg



Plot B9

Date/Time: 7/10/2020 1:53:41 PM

Test Laboratory: Celltech Labs

5250H Jul 10 2020

DUT: Clarius ; Type: Transmitter; Serial: Not Specified

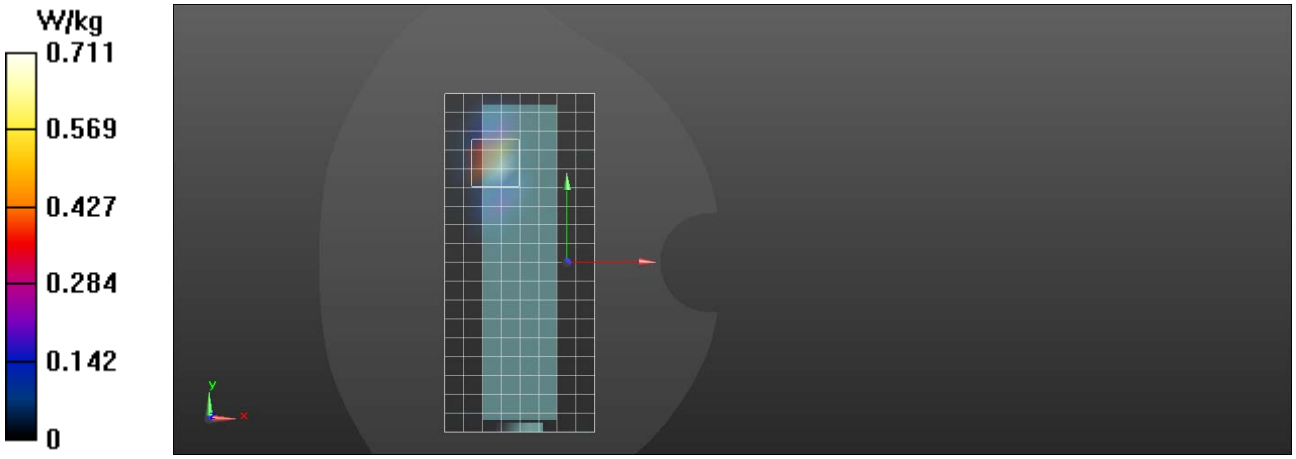
Communication System: UID 10598 - AAB, IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle); Communication System Band: WLAN 5GHz (4915.0 - 5825.0 MHz); Frequency: 5220 MHz;Communication System PAR: 8.496 dB; PMF: 1.08518
Medium parameters used: f = 5220 MHz; σ = 4.94 S/m; ε_r = 33.89; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(4.47, 4.47, 4.47) @ 5220 MHz; Calibrated: 3/25/2020
  - Modulation Compensation: PMR for UID 10598 - AAB, Calibrated: 3/25/2020
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = -49.0, 25.0
- Electronics: DAE4 Sn353; Calibrated: 3/17/2020
- Phantom: Twin-SAM V4.0 (30deg probe tilt); Type: QD 000 P40 CC; Serial: xxxx
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)

5250H/B9 - [C3] 5G WiFi, Right, Ch 44 (5220MHz)/Area Scan (9x19x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.711 W/kg

5250H/B9 - [C3] 5G WiFi, Right, Ch 44 (5220MHz)/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 2.493 V/m; Power Drift = -11.26 dB
Maximum value of SAR (measured) = 0.763 W/kg



Plot B21

Date/Time: 7/16/2020 12:50:41 PM

Test Laboratory: Celltech Labs

5750H Jul 14 2020

DUT: Clarius ; Type: Transmitter; Serial: Not Specified

Communication System: UID 10598 - AAB, IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle); Communication System Band: WLAN 5GHz (4915.0 - 5825.0 MHz); Frequency: 5785 MHz;Communication System PAR: 8.496 dB; PMF: 1.08518
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.475 S/m; ε_r = 32.515; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(4.12, 4.12, 4.12) @ 5785 MHz; Calibrated: 3/25/2020
  - Modulation Compensation: PMR for UID 10598 - AAB, Calibrated: 3/25/2020
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = -49.0, 25.0
- Electronics: DAE4 Sn353; Calibrated: 3/17/2020
- Phantom: Twin-SAM V4.0 (30deg probe tilt); Type: QD 000 P40 CC; Serial: xxxx
- DASY52 52.10.3(1513); SEMCAD X 14.6.13(7474)
  5750H/B21 - [C3] 5G WiFi, Right, Ch 157 (5785MHz)/Area Scan (9x19x1): Measurement grid: dx=10mm, dy=10mm

  Info: Interpolated medium parameters used for SAR evaluation.
  Maximum value of SAR (measured) = 1.62 W/kg

  5750H/B21 - [C3] 5G WiFi, Right, Ch 157 (5785MHz)/Zoom Scan (6x6x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
  Reference Value = 0 V/m; Power Drift = 999.00 dB

  Info: Interpolated medium parameters used for SAR evaluation.
  Maximum value of SAR (measured) = 1.70 W/k