

SAR Test Report - Class II Permissive Change

Applicant:



Harris Corporation
221 Jefferson Ridge Parkway
Lynchburg, VA, 24501
USA

Maximum Reported 1g SAR				
FCC	LMR	HEAD:	2.48	W/kg
		BODY:	6.43	
	Simultaneous:		6.20	
	Occupational Limit:		8.00	

FCC ID:

OWDTR-0133-E

Product Name / PMN

XL-200P

Product Name / PMN

See Section 2.0

In Accordance With:

FCC 47 CFR §2.1093

Radiofrequency Radiation Exposure Evaluation: Portable Devices

Approved By:



Ben Hewson, President

Celltech Labs Inc.
21-364 Lougheed Rd.
Kelowna, BC, V1X 7R8
Canada



Test Lab Certificate: 2470.01



**Industry
Canada**

IC Registration 3874A-1



FCC Registration: 714830

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1.0 DOCUMENT CONTROL

Revision History				
Samples Tested By:		Date(s) of Evaluation:		26 July - 27 Sep, 2019
Report Prepared By:		Report Reviewed By:		Ben Hewson
Report Revision	Description of Revision	Revised Section	Revised By	Revision Date
0.0	Draft Release	n/a	Trevor Whillock	2 October 2019
0.1	Correction to Model and HVIN's	2.0	Trevor Whillock	31 October 2019
1.0	Initial Release	n/a	Art Voss	31 October 2019
2.0	Correction to PMN	All	Trevor Whillock	07 November 2019
3.0	Correction to Model as Per Client Request	2.0	Trevor Whillock	05 December 2019
	Reference to CH's Revised to Bands	3.0		
	Revised System Validation Summary	19.0		
	Revised Manufacturer's Accessory List	8.1		
	Revised Plot ID's in Table 9.2	9.0		
	Revised Tables 9.13, 9.16, 9.17, 9.18 to Match Plots in Appendix B	9.0		
	Revised Plot ID in Table 9.5 and Added the Correlating SAR Plot to Appendix B	9.0		
	Revised Table 10.1	10.0		
4.0	Added Explanation of Antenna Transmitter Location	11.3	Trevor Whillock	12 December 2019
	Correction to BODY MAX SAR	Cover		
	Revised date in Table 16.1	16.0		
	Revised data in Table 16.2	16.0		
	Added Verification Plot for 1800MHz	Appendix A		
5.0	Revised SAR data in Table 9.7	9.0	Trevor Whillock	13 December 2019
	Revised SAR data in Table 16.5	16.0		
	Revised Verification Plot for 1800MHz	Appendix A		

2.0 CLIENT AND DEVICE INFORMATION

Client Information	
Applicant Name	Harris Corporation
Applicant Address	221 Jefferson Ridge Parkway
	Lynchburg, VA, 24501
	USA
DUT Information	
Device Identifier(s):	FCC ID: OWDTR-0133-E
Type of Equipment:	Licensed Non-Broadcast Transmitter Held to Face (TNF) -LMRS (LMR)
	Licensed Non-Broadcast Station Transmitter (TNB) - LTE
	Digital Transmission System (DTS) - BLE / WiFi
	Digital Spread Spectrum (DSS) - BT
	Unlicensed National Information Infrastructure (NII) - WiFi
Device Marketing Name / PMN:	XL-200P
Device Model(s) / HVIN:	XL-PFM1M-L, XL-PFM1Y-L, XL-PFM1P -L
	XL-PFM1M-NA, XL-PFM1Y-NA, XL-PFM1P-NA
	XS-PFS1M-L, XS-PFS1Y-L, XS-PFS1P -L
	XS-PFS1M-NA, XS-PFS1Y-NA, XS-PFS1P-NA
	XS-PFSVM-L, XS-PFSVY-L, XS-PFSVP -L
	XS-PFSVM-NA, XS-PFSVY-NA, XS-PFSVP-NA
	XS-PFSUM-L, XS-PFSUY-L, XS-PFSUP -L
	XS-PFSUM-NA, XS-PFSUY-NA, XS-PFSUP-NA
	XL-PPM1M-L, XL-PPM1Y-L, XL-PPM1P -L
	XL-PPM1M-NA, XL-PPM1Y-NA, XL-PPM1P-NA
	XS-PPS1M-L, XS-PPS1Y-L, XS-PPS1P -L
	XS-PPS1M-NA, XS-PPS1Y-NA, XS-PPS1P-NA
	XS-PPSVM-L, XS-PPSVY-L, XS-PPSVP -L,
	XS-PPSVM-NA, XS-PPSVY-NA, XS-PPSVP-NA
	XS-PPSUM-L, XS-PPSUY-L, XS-PPSUP -L
	XS-PPSUM-NA, XS-PPSUY-NA, XS-PPSUP-NA
	Test Sample Serial No.:
	XL-PFM1M-L: A40302200750

The above model numbers are electronically identical in all respects with the exception of color, keypad options, LTE configuration and field upgradability options. The -L suffix is not factory shipped with the LTE module subassembly, the -NA suffix is factory shipped with LTE module subassembly. Both of these variants were examined during the course of this evaluation.

DUT Information (Cont.)	
Transmit Frequency Range:	VHF Band: 136-174MHz
	UHF Band: 378-522MHz
	700 Band: 769-775MHz, 799-805MHz
	800 Band: 806-816MHz, 851-861MHz
	BT/BLE: 2402-2480MHz
	WLAN 2.4G: 2412-2462MHz
	WLAN 5G: 5180-5240MHz, 5745-5825MHz
	LTE Uplink Bands: 2, 4, 5, 12, 13, 14, 17, 66
Number of Channels:	Programmable
Rated Output Power:	VHF Band: 6W (37.8dBm)
	UHF Band: 5W (37.0dBm)
	700 Band: 3W (34.8dBm)
	800 Band: 3W (34.8dBm)
	BT: 0.05W (17dBm)
	BLE: 0.0069W (8.4dBm)
	WLAN 2.4G: 0.234W (23.7dBm)
	WLAN 5G: 5180-5240MHz: 0.015W (11.8dBm)
	WLAN 5G: 5745-5825MHz: 0.008W (9.0dBm)
	LTE* Uplink, Bands 2, 5, 12, 13, 14, 17: 0.282W (24.5dBm)
	LTE* Uplink, Bands 4, 66: 0.200W (23dBm)
Duty Cycle:	LTE, BT/BLE, WLAN: 100%, LMR: 50% PTT Duty Cycle
DUT Power Source:	7.2 VDC Li-Ion 3100mAh Rechargeable Battery (Typical)
Deviation(s) from standard/procedure:	None
Modification of DUT:	None

* LTE: 3GPP Release 11
Carrier aggregation is supported for Downlink Only.

Note: Per KDB 941225 D05Av01r02(B), PAG is not required for Downlink only Carrier Aggregation.

3.0 SCOPE OF EVALUATION/DATA REUSE

This Certification Report was prepared on behalf of:

Harris Corporation

,(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 XL-200P, FCC ID: **OWDTR-0133-E**, IC ID: **3636B-0133**, is a multi-band, VHF, UHF and 7/800MHz band Push-To-Talk (PTT), Licensed Mobile Radio Service (LMRS or LMR) transceiver intended for Occupational Use. This "host" employs LTE, WiFi and Bluetooth transceivers.

Application:

This is an application for a Class II Permissive Change to replace the existing LTE transceiver module, FCC ID: **BV8BBPBM214** with LTE transceiver module FCC ID: **N7NEM75S**, IC ID: **2417C-EM75S**. The changes include relocation and redesign of the LTE antenna and modifications to the physical housing to accommodate such changes. The LMR, WiFi and Bluetooth transmitters including their antennas, output power, transmitter circuitry and PCB layout remain unchanged from the previous filings.

Scope:

Due to the nature of the changes, the scope of this evaluation is to re-evaluate the SAR for the changes implemented. It will include an extensive evaluation of the LTE transmitter and all simultaneous transmission conditions that can occur with this host device. However since the LMR, WiFi and Bluetooth transmitters remain unchanged, ONLY the worst case configurations from previous evaluations of these transmitters will be considered for both Standalone and Simultaneous Transmission SAR. The analysis of the Standalone and Simultaneous Transmission SAR is found in Section 11.0 of this report.

The Test Plan developed for this evaluation leverages SAR test data from previous evaluations of the XL-200P System Variant and is based on LTE test bands, configurations and accessories which produced the highest worst case SAR. SAR was evaluated on the LTE bands supported by the host, and did not encompass the full range of bands supported by the LTE transceiver module. The LTE bands evaluated are per the information provided by the client and are LTE bands: 2, 4, 5, 12, 13, 14, 17 and 66. Any subsequent channels intended to be support by the host will require evaluation under a Class II Permissive Change.

4.0 NORMATIVE REFERENCES

Normative References*	
ANSI / ISO 17025:2017	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 248227 D01v02r02	SAR Guidance for IEEE 802.11 (WiFi) Transmitters
FCC KDB	
KDB 447498 D01v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
FCC KDB	
KDB 643646 D01v01r03	SAR Test Reduction Considerations for Occupational PTT Radios
FCC KDB	
KDB 690783 D01v01r03	SAR Listings on Equipment Authorization Grants
FCC KDB	
KDB 865664 D01v01r04	SAR Measurement Requirements for 100MHz to 6GHz
FCC KDB	
KDB 941225 D05v02r05	SAR Evaluation Considerations for LTE Devices
* 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: Harris Corporation	Model Name / PMN: XL-200P	
Standard(s) Applied: FCC 47 CFR §2.1093 Health Canada's Safety Code 6	Measurement Procedure(s): FCC KDB 865664, FCC KDB 447498, FCC KDB 643646, FCC KDB 941225 Industry Canada RSS-102 Issue 5 IEEE Standard 1528-2013, IEC 62209-2	
Reason For Issue: ☐ New Certification ☐ Class I Permissive Change ☒ Class II Permissive Change	Use Group: ☐ General Population / Uncontrolled ☒ Occupational / Controlled	Limits Applied: ☐ 1.6W/kg - 1g Volume ☒ 8.0W/kg - 1g Volume ☐ 4.0W/kg - 10g Volume
Reason for Change: Replacement of LTE Transmitter Module		Date(s) Evaluated: 26 July - 27 Sept, 2019

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.

31 October 2019

Date



6.0 RF CONDUCTED POWER MEASUREMENT, BASE STATION

Conducted Power Overview:

The conducted power measurements reported in this section are measured using the LTE Base Station Simulator (BSS) connected directly to the antenna port of a modified DUT (CP DUT) that is identical in all aspects to the DUT used for Over-The-Air (OTA) SAR evaluation (OTA DUT). The CP DUT was configured using the BSS to set the channel, channel bandwidth, number of resource blocks (RB) and RB offsets.

All DUTs used during the course of this evaluation have the capability of being directly configured through the DUT's serial port using AT commands (Command Line) to set the channel, channel bandwidth, number of RBs and RB offset. The manufacturer has stated however that the maximum output power cannot be achieved using the Command Line method for DUT configuration but rather can be achieved using the BSS for DUT configuration. Since the BSS cannot configure the DUT for all possible RB offsets and modulations, the Command Line method was used to configure the CP DUT for the purposes of measuring the conducted power for the configurations not achievable by the BSS, and ONLY for the purposes of determining if the other RB offset or modulation configurations require SAR evaluation. The Command Line conducted power measurements are found in Appendix H of this report.

Table 6.1 Conducted Power Measurements – LTE Band 2, 20MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		2	Channel Bandwidth:						20MHz
Lower Band Edge		1850(MHz)	Upper Band Edge:						1910(MHz)
Modulation	RB	RB	Low 18700 1860(MHz)		Mid 18900 1880(MHz)		High 19100 1900(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.31	-0.18	24.39	-0.10	24.46	-0.03	Lower
	1	50	24.24	-0.25	24.32	-0.17	24.48	-0.01	Mid
	1	99	24.22	-0.27	24.29	-0.20	24.45	-0.04	Upper
	50	0	24.20	-0.29	24.45	-0.04	24.43	-0.06	Lower
	50	50	24.19	-0.30	24.38	-0.11	24.44	-0.05	Upper
	100	0	24.13	-0.36	24.40	-0.09	24.39	-0.10	Mid
16QAM	1	0	24.10	-0.39	24.47	-0.02	24.31	-0.18	Lower
	1	50	24.49	0.00	24.39	-0.10	24.41	-0.08	Mid
	1	99	24.49	0.00	24.40	-0.09	24.33	-0.16	Upper
	50	0	24.27	-0.22	24.40	-0.09	24.32	-0.17	Lower
	50	50	24.23	-0.26	24.31	-0.18	24.16	-0.33	Upper
	100	0	24.24	-0.25	24.35	-0.14	24.25	-0.24	Mid
Maximum Conducted Power Measured:									24.49

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.2 Conducted Power Measurements – LTE Band 2, 15MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		2	Channel Bandwidth:						15MHz
Lower Band Edge		1850(MHz)	Upper Band Edge:						1910(MHz)
Modulation	RB	RB	Low 18675 1857.5(MHz)		Mid 18900 1880(MHz)		High 19125 1902.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.40	-0.06	24.39	-0.07	24.41	-0.05	Lower
	1	36	24.30	-0.16	24.30	-0.16	24.20	-0.26	Mid
	1	74	24.33	-0.13	24.30	-0.16	24.16	-0.30	Upper
	36	0	23.30	-1.16	24.41	-0.05	24.30	-0.16	Lower
	36	37	23.38	-1.08	24.40	-0.06	24.22	-0.24	Upper
	75	0	24.35	-0.11	24.37	-0.09	24.20	-0.26	Mid
16QAM	1	0	24.46	0.00	24.00	-0.46	24.38	-0.08	Lower
	1	36	24.36	-0.10	24.40	-0.06	24.36	-0.10	Mid
	1	74	24.36	-0.10	24.10	-0.36	24.33	-0.13	Upper
	36	0	23.02	-1.44	24.45	-0.01	24.37	-0.09	Lower
	36	37	22.90	-1.56	24.34	-0.12	24.24	-0.22	Upper
	75	0	23.94	-0.52	24.42	-0.04	24.28	-0.18	Mid
Maximum Conducted Power Measured:									24.46

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.3 Conducted Power Measurements – LTE Band 2, 10MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		2	Channel Bandwidth:						10MHz
Lower Band Edge		1850(MHz)	Upper Band Edge:						1910(MHz)
Modulation	RB	RB	Low 18650 1855(MHz)		Mid 18900 1880(MHz)		High 19150 1905(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	23.80	-0.60	24.10	-0.30	24.28	-0.12	Lower
	1	25	23.70	-0.70	24.03	-0.37	24.05	-0.35	Mid
	1	49	23.77	-0.63	24.02	-0.38	24.02	-0.38	Upper
	25	0	23.83	-0.57	24.07	-0.33	24.15	-0.25	Lower
	25	25	23.84	-0.56	24.07	-0.33	24.10	-0.30	Upper
	50	0	23.83	-0.57	24.04	-0.36	24.10	-0.30	Mid
16QAM	1	0	23.76	-0.64	24.04	-0.36	24.25	-0.15	Lower
	1	25	23.71	-0.69	24.04	-0.36	24.20	-0.20	Mid
	1	49	23.71	-0.69	24.00	-0.40	24.40	0.00	Upper
	25	0	23.67	-0.73	24.20	-0.20	24.20	-0.20	Lower
	25	25	23.67	-0.73	24.19	-0.21	24.19	-0.21	Upper
	50	0	23.65	-0.75	24.10	-0.30	24.15	-0.25	Mid
Maximum Conducted Power Measured:									24.40

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.4 Conducted Power Measurements – LTE Band 2, 5MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		2	Channel Bandwidth:						5MHz
Lower Band Edge		1850(MHz)	Upper Band Edge:						1910(MHz)
Modulation	RB	RB	Low 18625 1852.5(MHz)		Mid 18900 1880(MHz)		High 19175 1907.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.45	-0.04	24.10	-0.39	24.19	-0.30	Lower
	1	12	24.48	-0.01	24.10	-0.39	24.17	-0.32	Mid
	1	24	24.43	-0.06	24.03	-0.46	24.17	-0.32	Upper
	12	0	24.41	-0.08	24.03	-0.46	24.17	-0.32	Lower
	12	13	24.44	-0.05	24.04	-0.45	24.16	-0.33	Upper
	25	0	24.40	-0.09	23.99	-0.50	24.16	-0.33	Mid
16QAM	1	0	24.40	-0.09	24.30	-0.19	24.30	-0.19	Lower
	1	12	24.44	-0.05	24.38	-0.11	24.33	-0.16	Mid
	1	24	24.40	-0.09	24.33	-0.16	24.22	-0.27	Upper
	12	0	24.49	0.00	24.05	-0.44	24.15	-0.34	Lower
	12	13	24.45	-0.04	23.04	-1.45	24.14	-0.35	Upper
	25	0	24.43	-0.06	24.03	-0.46	24.20	-0.29	Mid
Maximum Conducted Power Measured:									24.49

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.5 Conducted Power Measurements – LTE Band 2, 3MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		2	Channel Bandwidth:						3MHz
Lower Band Edge		1850(MHz)	Upper Band Edge:						1910(MHz)
Modulation	RB	RB	Low 18615 1851.5(MHz)		Mid 18900 1880(MHz)		High 19185 1908.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.40	-0.04	24.00	-0.44	24.20	-0.24	Lower
	1	8	24.39	-0.05	23.98	-0.46	24.15	-0.29	Mid
	1	14	24.39	-0.05	23.95	-0.49	24.12	-0.32	Upper
	8	0	24.43	-0.01	24.03	-0.41	24.23	-0.21	Lower
	8	7	24.38	-0.06	24.03	-0.41	24.19	-0.25	Upper
	15	0	24.44	0.00	24.03	-0.41	24.15	-0.29	Mid
16QAM	1	0	23.78	-0.66	24.10	-0.34	24.34	-0.10	Lower
	1	8	23.71	-0.73	24.04	-0.40	24.30	-0.14	Mid
	1	14	23.74	-0.70	24.05	-0.39	24.24	-0.20	Upper
	8	0	23.80	-0.64	23.70	-0.74	24.20	-0.24	Lower
	8	7	23.83	-0.61	23.73	-0.71	24.20	-0.24	Upper
	15	0	23.79	-0.65	23.60	-0.84	24.17	-0.27	Mid
Maximum Conducted Power Measured:									24.44

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.6 Conducted Power Measurements – LTE Band 2, 1.4MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		2	Channel Bandwidth:						1.4MHz
Lower Band Edge		1850(MHz)	Upper Band Edge:						1910(MHz)
Modulation	RB	RB	Low 18607 1850.7(MHz)		Mid 18900 1880(MHz)		High 19193 1909.3(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB
			Meas.	Δ	Meas.	Δ	Meas.	Δ	Pos
QPSK	1	0	24.37	-0.08	23.90	-0.55	24.05	-0.40	Lower
	1	3	24.45	0.00	23.99	-0.46	24.13	-0.32	Mid
	1	6	24.38	-0.07	23.94	-0.51	24.07	-0.38	Upper
	3	0	24.43	-0.02	23.95	-0.50	24.11	-0.34	Lower
	3	4	24.40	-0.05	23.98	-0.47	24.11	-0.34	Upper
	7	0	24.39	-0.06	23.95	-0.50	24.09	-0.36	Mid
16QAM	1	0	24.37	-0.08	23.95	-0.50	24.08	-0.37	Lower
	1	3	24.45	0.00	24.02	-0.43	24.09	-0.36	Mid
	1	6	24.40	-0.05	23.99	-0.46	24.10	-0.35	Upper
	3	0	24.32	-0.13	24.01	-0.44	24.30	-0.15	Lower
	3	4	24.31	-0.14	24.04	-0.41	24.30	-0.15	Upper
	7	0	24.35	-0.10	23.90	-0.55	24.17	-0.28	Mid
Maximum Conducted Power Measured:									24.45

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.7 Conducted Power Measurements – LTE Band 4, 20MHz BW

LTE Conducted Power Measurement - Command Line									
LTE Band:		4	Channel Bandwidth:						20MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1755(MHz)
Modulation	RB	RB	Low 20050 1720(MHz)		Mid 20175 1732.5(MHz)		High 20300 1745(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.58	-0.29	22.69	-0.18	22.61	-0.26	Lower
	1	50	22.52	-0.35	22.70	-0.17	22.72	-0.15	Mid
	1	99	22.47	-0.40	22.72	-0.15	22.62	-0.25	Upper
	50	0	22.81	-0.06	22.51	-0.36	22.63	-0.24	Lower
	50	50	22.50	-0.37	22.78	-0.09	22.66	-0.21	Upper
	100	0	22.56	-0.31	22.63	-0.24	22.83	-0.04	Mid
16QAM	1	0	22.54	-0.33	22.68	-0.19	22.43	-0.44	Lower
	1	50	22.71	-0.16	22.87	0.00	22.55	-0.32	Mid
	1	99	22.71	-0.16	22.72	-0.15	22.48	-0.39	Upper
	50	0	22.77	-0.10	22.55	-0.32	22.42	-0.45	Lower
	50	50	22.53	-0.34	22.81	-0.06	22.64	-0.23	Upper
	100	0	22.61	-0.26	22.43	-0.44	22.86	-0.01	Mid
Maximum Conducted Power Measured:									22.87

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.8 Conducted Power Measurements – LTE Band 4, 15MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		4	Channel Bandwidth:						15MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1755(MHz)
Modulation	RB	RB	Low 20025 1717.5(MHz)		Mid 20175 1732.5(MHz)		High 20325 1747.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.88	-0.07	22.91	-0.04	22.90	-0.05	Lower
	1	36	22.70	-0.25	22.80	-0.15	22.68	-0.27	Mid
	1	74	22.56	-0.39	22.85	-0.10	22.55	-0.40	Upper
	36	0	22.85	-0.10	22.90	-0.05	22.77	-0.18	Lower
	36	37	22.68	-0.27	22.72	-0.23	22.70	-0.25	Upper
	75	0	22.83	-0.12	22.85	-0.10	22.76	-0.19	Mid
16QAM	1	0	22.50	-0.45	22.92	-0.03	22.95	0.00	Lower
	1	36	22.76	-0.19	22.67	-0.28	22.70	-0.25	Mid
	1	74	22.60	-0.35	22.45	-0.50	22.70	-0.25	Upper
	36	0	22.47	-0.48	22.17	-0.78	22.68	-0.27	Lower
	36	37	22.20	-0.75	22.10	-0.85	22.53	-0.42	Upper
	75	0	22.37	-0.58	22.12	-0.83	22.65	-0.30	Mid
Maximum Conducted Power Measured:									22.95

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.9 Conducted Power Measurements – LTE Band 4, 10MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		4	Channel Bandwidth:						10MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1755(MHz)
Modulation	RB	RB	Low 20000 1715(MHz)		Mid 20175 1732.5(MHz)		High 20350 1750(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.84	-0.60	22.86	-0.58	22.70	-0.74	Lower
	1	25	22.75	-0.69	22.72	-0.72	22.50	-0.94	Mid
	1	49	22.58	-0.86	22.65	-0.79	23.44	0.00	Upper
	25	0	22.82	-0.62	22.82	-0.62	22.66	-0.78	Lower
	25	25	22.80	-0.64	22.76	-0.68	22.50	-0.94	Upper
	50	0	22.80	-0.64	22.80	-0.64	22.55	-0.89	Mid
16QAM	1	0	22.64	-0.80	22.33	-1.11	22.95	-0.49	Lower
	1	25	22.56	-0.88	22.20	-1.24	22.85	-0.59	Mid
	1	49	22.42	-1.02	22.10	-1.34	22.90	-0.54	Upper
	25	0	22.57	-0.87	22.20	-1.24	22.85	-0.59	Lower
	25	25	22.46	-0.98	22.08	-1.36	22.82	-0.62	Upper
	50	0	22.42	-1.02	22.08	-1.36	22.90	-0.54	Mid
Maximum Conducted Power Measured:									23.44

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.10 Conducted Power Measurements – LTE Band 4, 5MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		4	Channel Bandwidth:						5MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1755(MHz)
Modulation	RB	RB	Low 19975 1712.5(MHz)		Mid 20175 1732.5(MHz)		High 20375 1752.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.91	-0.04	22.94	-0.01	22.81	-0.14	Lower
	1	12	22.90	-0.05	22.91	-0.04	22.80	-0.15	Mid
	1	24	22.88	-0.07	22.85	-0.10	22.73	-0.22	Upper
	12	0	22.62	-0.33	22.76	-0.19	22.72	-0.23	Lower
	12	13	22.60	-0.35	22.75	-0.20	22.70	-0.25	Upper
	25	0	22.53	-0.42	22.76	-0.19	22.74	-0.21	Mid
16QAM	1	0	22.91	-0.04	22.93	-0.02	22.93	-0.02	Lower
	1	12	22.91	-0.04	22.88	-0.07	22.85	-0.10	Mid
	1	24	22.85	-0.10	22.82	-0.13	22.86	-0.09	Upper
	12	0	22.60	-0.35	22.76	-0.19	22.90	-0.05	Lower
	12	13	22.59	-0.36	22.72	-0.23	22.92	-0.03	Upper
	25	0	22.56	-0.39	22.79	-0.16	22.95	0.00	Mid
Maximum Conducted Power Measured:									22.95

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.11 Conducted Power Measurements – LTE Band 4, 3MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		4	Channel Bandwidth:						3MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1755(MHz)
Modulation	RB	RB	Low 19965 1711.5(MHz)		Mid 20175 1732.5(MHz)		High 20385 1753.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.90	-0.36	22.85	-0.41	22.89	-0.37	Lower
	1	8	22.83	-0.43	22.80	-0.46	22.86	-0.40	Mid
	1	14	22.86	-0.40	22.81	-0.45	22.84	-0.42	Upper
	8	0	22.86	-0.40	22.80	-0.46	22.95	-0.31	Lower
	8	7	22.87	-0.39	22.75	-0.51	22.93	-0.33	Upper
	15	0	22.86	-0.40	22.75	-0.51	22.90	-0.36	Mid
16QAM	1	0	22.70	-0.56	22.78	-0.48	23.26	0.00	Lower
	1	8	22.68	-0.58	22.71	-0.55	23.25	-0.01	Mid
	1	14	22.64	-0.62	22.71	-0.55	23.25	-0.01	Upper
	8	0	22.56	-0.70	22.85	-0.41	22.90	-0.36	Lower
	8	7	22.53	-0.73	22.80	-0.46	22.88	-0.38	Upper
	15	0	22.56	-0.70	22.80	-0.46	22.80	-0.46	Mid
Maximum Conducted Power Measured:									23.26

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.12 Conducted Power Measurements – LTE Band 4, 1.4MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		4	Channel Bandwidth:						1.4MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1755(MHz)
Modulation	RB	RB	Low 19957 1710.7(MHz)	Mid 20175 1732.5(MHz)	High 20393 1754.3(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.80	-0.18	22.81	-0.17	22.86	-0.12	Lower
	1	3	22.84	-0.14	22.86	-0.12	22.93	-0.05	Mid
	1	6	22.80	-0.18	22.82	-0.16	22.86	-0.12	Upper
	3	0	22.84	-0.14	22.86	-0.12	22.91	-0.07	Lower
	3	4	22.84	-0.14	22.86	-0.12	22.92	-0.06	Upper
	7	0	22.80	-0.18	22.82	-0.16	22.94	-0.04	Mid
16QAM	1	0	22.80	-0.18	22.82	-0.16	22.88	-0.10	Lower
	1	3	22.85	-0.13	22.90	-0.08	22.98	0.00	Mid
	1	6	22.80	-0.18	22.85	-0.13	22.88	-0.10	Upper
	3	0	22.83	-0.15	22.77	-0.21	22.95	-0.03	Lower
	3	4	22.85	-0.13	22.76	-0.22	22.96	-0.02	Upper
	7	0	22.90	-0.08	22.78	-0.20	22.80	-0.18	Mid
Maximum Conducted Power Measured:									22.98

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.13 Conducted Power Measurements – LTE Band 5, 10MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		5	Channel Bandwidth:						10MHz
Lower Band Edge		824(MHz)	Upper Band Edge:						849(MHz)
Modulation	RB	RB	Low 20450 829(MHz)		Mid 20525 836.5(MHz)		High 20600 844(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.02	-0.35	24.26	-0.11	24.06	-0.31	Lower
	1	25	23.97	-0.40	24.23	-0.14	23.91	-0.46	Mid
	1	49	23.92	-0.45	24.16	-0.21	23.81	-0.56	Upper
	25	0	23.93	-0.44	24.37	0.00	23.99	-0.38	Lower
	25	25	23.96	-0.41	24.25	-0.12	23.92	-0.45	Upper
	50	0	24.04	-0.33	24.13	-0.24	24.01	-0.36	Mid
16QAM	1	0	23.56	-0.81	23.96	-0.41	23.64	-0.73	Lower
	1	25	23.60	-0.77	23.91	-0.46	23.64	-0.73	Mid
	1	49	23.47	-0.90	23.82	-0.55	23.58	-0.79	Upper
	25	0	23.02	-1.35	23.87	-0.50	23.70	-0.67	Lower
	25	25	23.03	-1.34	23.76	-0.61	24.08	-0.29	Upper
	50	0	24.03	-0.34	23.83	-0.54	24.02	-0.35	Mid
Maximum Conducted Power Measured:									24.37

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.14 Conducted Power Measurements – LTE Band 5, 5MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		5	Channel Bandwidth:						5MHz
Lower Band Edge		824(MHz)	Upper Band Edge:						849(MHz)
Modulation	RB	RB	Low 20425 826.5(MHz)	Mid 20525 836.5(MHz)	High 20625 846.5(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	23.92	-0.25	24.14	-0.03	24.01	-0.16	Lower
	1	12	23.94	-0.23	24.12	-0.05	24.03	-0.14	Mid
	1	24	23.91	-0.26	24.13	-0.04	24.13	-0.04	Upper
	12	0	23.84	-0.33	24.13	-0.04	24.00	-0.17	Lower
	12	13	23.92	-0.25	24.09	-0.08	23.92	-0.25	Upper
	25	0	23.93	-0.24	24.17	0.00	23.99	-0.18	Mid
16QAM	1	0	23.37	-0.80	23.45	-0.72	23.46	-0.71	Lower
	1	12	23.31	-0.86	23.44	-0.73	23.42	-0.75	Mid
	1	24	23.30	-0.87	23.32	-0.85	23.38	-0.79	Upper
	12	0	23.38	-0.79	23.68	-0.49	23.99	-0.18	Lower
	12	13	23.43	-0.74	23.64	-0.53	23.93	-0.24	Upper
	25	0	23.02	-1.15	23.67	-0.50	23.70	-0.47	Mid
Maximum Conducted Power Measured:									24.17

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.15 Conducted Power Measurements – LTE Band 5, 3MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		5	Channel Bandwidth:						3MHz
Lower Band Edge		824(MHz)	Upper Band Edge:						849(MHz)
Modulation	RB	RB	Low 20415 825.5(MHz)	Mid 20525 836.5(MHz)	High 20635 847.5(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.03	-0.23	24.09	-0.17	23.96	-0.30	Lower
	1	8	23.97	-0.29	24.02	-0.24	23.88	-0.38	Mid
	1	14	23.95	-0.31	24.00	-0.26	23.87	-0.39	Upper
	8	0	24.03	-0.23	24.09	-0.17	23.94	-0.32	Lower
	8	7	24.01	-0.25	24.08	-0.18	23.90	-0.36	Upper
	15	0	24.02	-0.24	24.08	-0.18	23.93	-0.33	Mid
16QAM	1	0	23.69	-0.57	23.75	-0.51	23.50	-0.76	Lower
	1	8	23.67	-0.59	23.69	-0.57	23.45	-0.81	Mid
	1	14	23.62	-0.64	23.65	-0.61	23.41	-0.85	Upper
	8	0	24.03	-0.23	24.26	0.00	23.99	-0.27	Lower
	8	7	24.00	-0.26	24.25	-0.01	23.96	-0.30	Upper
	15	0	24.00	-0.26	24.13	-0.13	23.98	-0.28	Mid
Maximum Conducted Power Measured:									24.26

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.16 Conducted Power Measurements – LTE Band 5, 1.4MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		5	Channel Bandwidth:						1.4MHz
Lower Band Edge		824(MHz)	Upper Band Edge:						849(MHz)
Modulation	RB	RB	Low 20407 824.7(MHz)		Mid 20525 836.5(MHz)		High 20643 848.3(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	23.86	-0.18	23.91	-0.13	23.76	-0.28	Lower
	1	3	23.88	-0.16	23.97	-0.07	23.78	-0.26	Mid
	1	6	23.85	-0.19	23.92	-0.12	23.73	-0.31	Upper
	3	0	23.84	-0.20	23.93	-0.11	23.73	-0.31	Lower
	3	4	23.81	-0.23	23.94	-0.10	23.68	-0.36	Upper
	7	0	23.81	-0.23	23.98	-0.06	23.74	-0.30	Mid
16QAM	1	0	23.93	-0.11	23.54	-0.50	23.35	-0.69	Lower
	1	3	23.93	-0.11	23.53	-0.51	23.37	-0.67	Mid
	1	6	23.95	-0.09	23.54	-0.50	23.38	-0.66	Upper
	3	0	24.03	-0.01	23.91	-0.13	23.95	-0.09	Lower
	3	4	24.04	0.00	23.90	-0.14	23.97	-0.07	Upper
	7	0	23.89	-0.15	24.02	-0.02	23.84	-0.20	Mid
Maximum Conducted Power Measured:									24.04

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.17 Conducted Power Measurements – LTE Band 12, 10MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		12	Channel Bandwidth:						10MHz
Lower Band Edge		699(MHz)	Upper Band Edge:						716(MHz)
Modulation	RB	RB	Low 23060 704(MHz)	Mid 23095 707.5(MHz)	High 23130 711(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.37	-0.12	24.38	-0.11	24.33	-0.16	Lower
	1	25	24.30	-0.19	24.38	-0.11	24.34	-0.15	Mid
	1	49	24.28	-0.21	24.40	-0.09	24.34	-0.15	Upper
	25	0	24.40	-0.09	24.39	-0.10	24.33	-0.16	Lower
	25	25	24.49	0.00	24.45	-0.04	24.33	-0.16	Upper
	50	0	24.40	-0.09	24.38	-0.11	24.38	-0.11	Mid
16QAM	1	0	24.38	-0.11	24.35	-0.14	24.25	-0.24	Lower
	1	25	24.35	-0.14	24.35	-0.14	24.22	-0.27	Mid
	1	49	24.38	-0.11	24.40	-0.09	24.28	-0.21	Upper
	25	0	24.35	-0.14	24.25	-0.24	24.25	-0.24	Lower
	25	25	24.25	-0.24	24.35	-0.14	24.26	-0.23	Upper
	50	0	24.28	-0.21	24.25	-0.24	24.25	-0.24	Mid
Maximum Conducted Power Measured:									24.49

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.18 Conducted Power Measurements – LTE Band 12, 5MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		12	Channel Bandwidth:						5MHz
Lower Band Edge		699(MHz)	Upper Band Edge:						716(MHz)
Modulation	RB	RB	Low 23035 701.5(MHz)	Mid 23095 707.5(MHz)	High 23155 713.5(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.34	-0.12	24.37	-0.09	24.36	-0.10	Lower
	1	12	24.32	-0.14	24.43	-0.03	24.37	-0.09	Mid
	1	24	24.25	-0.21	24.45	-0.01	24.40	-0.06	Upper
	12	0	24.32	-0.14	24.44	-0.02	24.42	-0.04	Lower
	12	13	24.25	-0.21	24.40	-0.06	24.40	-0.06	Upper
	25	0	24.28	-0.18	24.42	-0.04	24.36	-0.10	Mid
16QAM	1	0	24.43	-0.03	24.33	-0.13	24.44	-0.02	Lower
	1	12	24.46	0.00	24.43	-0.03	24.42	-0.04	Mid
	1	24	24.38	-0.08	24.45	-0.01	24.45	-0.01	Upper
	12	0	24.24	-0.22	24.17	-0.29	24.32	-0.14	Lower
	12	13	24.18	-0.28	24.15	-0.31	24.42	-0.04	Upper
	25	0	24.14	-0.32	24.10	-0.36	24.31	-0.15	Mid
Maximum Conducted Power Measured:									24.46

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.19 Conducted Power Measurements – LTE Band 12, 3MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		12	Channel Bandwidth:						3MHz
Lower Band Edge		699(MHz)	Upper Band Edge:						716(MHz)
Modulation	RB	RB	Low 23025 700.5(MHz)	Mid 23095 707.5(MHz)	High 23165 714.5(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.37	-0.11	24.31	-0.17	24.33	-0.15	Lower
	1	8	24.35	-0.13	24.34	-0.14	24.37	-0.11	Mid
	1	14	24.31	-0.17	24.33	-0.15	24.35	-0.13	Upper
	8	0	24.43	-0.05	24.41	-0.07	24.43	-0.05	Lower
	8	7	24.34	-0.14	24.38	-0.10	24.46	-0.02	Upper
	15	0	24.37	-0.11	24.38	-0.10	24.48	0.00	Mid
16QAM	1	0	24.39	-0.09	24.38	-0.10	24.36	-0.12	Lower
	1	8	24.33	-0.15	24.42	-0.06	24.44	-0.04	Mid
	1	14	24.30	-0.18	24.37	-0.11	24.38	-0.10	Upper
	8	0	24.34	-0.14	24.11	-0.37	24.33	-0.15	Lower
	8	7	24.26	-0.22	23.97	-0.51	24.31	-0.17	Upper
	15	0	24.32	-0.16	23.86	-0.62	24.31	-0.17	Mid
Maximum Conducted Power Measured:									24.48

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.20 Conducted Power Measurements – LTE Band 12, 1.4MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		12	Channel Bandwidth:						1.4MHz
Lower Band Edge		699(MHz)	Upper Band Edge:						716(MHz)
Modulation	RB	RB	Low 23017 699.7(MHz)		Mid 23095 707.5(MHz)		High 23173 715.3(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	24.38	-0.11	24.39	-0.10	24.40	-0.09	Lower
	1	3	24.41	-0.08	24.43	-0.06	24.45	-0.04	Mid
	1	6	24.38	-0.11	24.41	-0.08	24.39	-0.10	Upper
	3	0	24.38	-0.11	24.43	-0.06	24.44	-0.05	Lower
	3	4	24.41	-0.08	24.38	-0.11	24.47	-0.02	Upper
	7	0	24.43	-0.06	24.38	-0.11	24.41	-0.08	Mid
16QAM	1	0	24.33	-0.16	24.35	-0.14	24.45	-0.04	Lower
	1	3	24.33	-0.16	24.39	-0.10	24.49	0.00	Mid
	1	6	24.41	-0.08	24.33	-0.16	24.44	-0.05	Upper
	3	0	24.37	-0.12	24.45	-0.04	24.32	-0.17	Lower
	3	4	24.43	-0.06	24.46	-0.03	24.28	-0.21	Upper
	7	0	24.34	-0.15	24.30	-0.19	24.41	-0.08	Mid
Maximum Conducted Power Measured:									24.49

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.21 Conducted Power Measurements – LTE Band 13, 10MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		13	Channel Bandwidth:						10MHz
Lower Band Edge		777(MHz)	Upper Band Edge:						787(MHz)
Modulation	RB	RB	Low 23230 782(MHz)		Mid 23230 782(MHz)		High 23230 782(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0			24.29	-0.13			Lower
	1	25			24.32	-0.10			Mid
	1	49			24.25	-0.17			Upper
	25	0			24.42	0.00			Lower
	25	25			24.35	-0.07			Upper
	50	0			24.40	-0.02			Mid
16QAM	1	0			24.37	-0.05			Lower
	1	25			24.40	-0.02			Mid
	1	49			24.29	-0.13			Upper
	25	0			24.00	-0.42			Lower
	25	25			23.96	-0.46			Upper
	50	0			23.94	-0.48			Mid
Maximum Conducted Power Measured:									24.42

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.22 Conducted Power Measurements – LTE Band 13, 5MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		13	Channel Bandwidth:						5MHz
Lower Band Edge		777(MHz)	Upper Band Edge:						787(MHz)
Modulation	RB	RB	Low 23205 779.5(MHz)		Mid 23230 782(MHz)		High 23255 784.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	23.56	-0.46	23.97	-0.05	23.73	-0.29	Lower
	1	12	23.41	-0.61	23.99	-0.03	23.58	-0.44	Mid
	1	24	23.61	-0.41	23.87	-0.15	23.54	-0.48	Upper
	12	0	23.38	-0.64	24.00	-0.02	23.44	-0.58	Lower
	12	13	23.42	-0.60	23.98	-0.04	23.74	-0.28	Upper
	25	0	23.36	-0.66	24.02	0.00	23.58	-0.44	Mid
16QAM	1	0	23.15	-0.87	23.42	-0.60	23.36	-0.66	Lower
	1	12	23.31	-0.71	23.45	-0.57	23.22	-0.80	Mid
	1	24	23.27	-0.75	23.36	-0.66	23.24	-0.78	Upper
	12	0	23.31	-0.71	23.52	-0.50	23.29	-0.73	Lower
	12	13	23.30	-0.72	23.44	-0.58	23.31	-0.71	Upper
	25	0	23.16	-0.86	23.60	-0.42	23.50	-0.52	Mid
Maximum Conducted Power Measured:									24.02

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.23 Conducted Power Measurements – LTE Band 14, 10MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		14	Channel Bandwidth:						10MHz
Lower Band Edge		788(MHz)	Upper Band Edge:						798(MHz)
Modulation	RB	RB	Low 23330 793(MHz)		Mid 23330 793(MHz)		High 23330 793(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0			24.32	-0.12			Lower
	1	25			24.27	-0.17			Mid
	1	49			24.34	-0.10			Upper
	25	0			24.35	-0.09			Lower
	25	25			24.44	0.00			Upper
	50	0			24.33	-0.11			Mid
16QAM	1	0			23.91	-0.53			Lower
	1	25			23.90	-0.54			Mid
	1	49			23.95	-0.49			Upper
	25	0			23.99	-0.45			Lower
	25	25			24.06	-0.38			Upper
	50	0			24.38	-0.06			Mid
Maximum Conducted Power Measured:									24.44

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.24 Conducted Power Measurements – LTE Band 14, 5MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		14	Channel Bandwidth:						5MHz
Lower Band Edge		788(MHz)	Upper Band Edge:						798(MHz)
Modulation	RB	RB	Low 23305 790.5(MHz)		Mid 23330 793(MHz)		High 23355 795.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	23.87	-0.32	24.12	-0.07	23.61	-0.58	Lower
	1	12	23.78	-0.41	24.13	-0.06	23.87	-0.32	Mid
	1	24	23.90	-0.29	24.05	-0.14	23.94	-0.25	Upper
	12	0	24.09	-0.10	24.19	0.00	24.02	-0.17	Lower
	12	13	24.02	-0.17	24.18	-0.01	24.05	-0.14	Upper
	25	0	24.03	-0.16	24.15	-0.04	24.05	-0.14	Mid
16QAM	1	0	23.67	-0.52	23.08	-1.11	23.92	-0.27	Lower
	1	12	23.68	-0.51	23.11	-1.08	23.75	-0.44	Mid
	1	24	23.76	-0.43	23.04	-1.15	23.91	-0.28	Upper
	12	0	23.56	-0.63	23.69	-0.50	23.78	-0.41	Lower
	12	13	23.81	-0.38	23.67	-0.52	23.81	-0.38	Upper
	25	0	23.85	-0.34	23.79	-0.40	23.96	-0.23	Mid
Maximum Conducted Power Measured:									24.19

* Δ = Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.25 Conducted Power Measurements – LTE Band 66, 20MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		66	Channel Bandwidth:						20MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1780(MHz)
Modulation	RB	RB	Low 132072 1720(MHz)		Mid 132322 1745(MHz)		High 132572 1770(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.82	-0.11	22.70	-0.23	22.93	0.00	Lower
	1	50	22.77	-0.16	22.71	-0.22	22.72	-0.21	Mid
	1	99	22.84	-0.09	22.71	-0.22	22.89	-0.04	Upper
	50	0	22.85	-0.08	22.86	-0.07	22.85	-0.09	Lower
	50	50	22.84	-0.09	22.62	-0.31	22.77	-0.16	Upper
	100	0	22.83	-0.10	22.81	-0.12	22.75	-0.18	Mid
16QAM	1	0	22.71	-0.22	22.74	-0.19	22.61	-0.32	Lower
	1	50	22.70	-0.23	22.40	-0.53	22.40	-0.53	Mid
	1	99	22.75	-0.18	22.31	-0.62	22.65	-0.28	Upper
	50	0	22.79	-0.14	22.81	-0.12	22.86	-0.07	Lower
	50	50	22.86	-0.07	22.57	-0.36	22.75	-0.18	Upper
	100	0	22.88	-0.05	22.83	-0.10	22.76	-0.17	Mid
Maximum Conducted Power Measured:									22.93

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.26 Conducted Power Measurements – LTE Band 66, 15MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		66	Channel Bandwidth:						15MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1780(MHz)
Modulation	RB	RB	Low 132047 1717.5(MHz)		Mid 132322 1745(MHz)		High 132597 1772.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.40	-0.14	22.04	-0.50	22.04	-0.50	Lower
	1	36	22.20	-0.34	21.91	-0.63	21.91	-0.63	Mid
	1	74	22.10	-0.44	21.81	-0.73	21.98	-0.56	Upper
	36	0	22.37	-0.17	21.99	-0.55	21.95	-0.59	Lower
	36	37	22.17	-0.37	21.98	-0.56	21.99	-0.55	Upper
	75	0	22.33	-0.21	21.96	-0.58	21.99	-0.55	Mid
16QAM	1	0	22.39	-0.15	22.25	-0.29	22.54	0.00	Lower
	1	36	22.30	-0.24	22.04	-0.50	22.34	-0.20	Mid
	1	74	22.38	-0.16	21.95	-0.59	22.40	-0.14	Upper
	36	0	22.42	-0.12	22.06	-0.48	21.99	-0.55	Lower
	36	37	22.25	-0.29	21.95	-0.59	22.01	-0.53	Upper
	75	0	22.25	-0.29	22.04	-0.50	21.96	-0.58	Mid
Maximum Conducted Power Measured:									22.54

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.27 Conducted Power Measurements – LTE Band 66, 10MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		66	Channel Bandwidth:						10MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1780(MHz)
Modulation	RB	RB	Low 132022 1715(MHz)		Mid 132322 1745(MHz)		High 132622 1775(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.58	-0.41	22.85	-0.14	22.90	-0.09	Lower
	1	25	22.54	-0.45	22.75	-0.24	22.92	-0.07	Mid
	1	49	22.41	-0.58	22.66	-0.33	22.92	-0.07	Upper
	25	0	22.73	-0.26	22.85	-0.14	22.95	-0.04	Lower
	25	25	22.65	-0.34	22.85	-0.14	22.96	-0.03	Upper
	50	0	22.68	-0.31	22.83	-0.16	22.94	-0.05	Mid
16QAM	1	0	22.92	-0.07	22.90	-0.09	22.90	-0.09	Lower
	1	25	22.90	-0.09	22.91	-0.08	22.95	-0.04	Mid
	1	49	22.91	-0.08	22.81	-0.18	22.96	-0.03	Upper
	25	0	22.80	-0.19	22.92	-0.07	22.95	-0.04	Lower
	25	25	22.72	-0.27	22.85	-0.14	22.91	-0.08	Upper
	50	0	22.69	-0.30	22.75	-0.24	22.99	0.00	Mid
Maximum Conducted Power Measured:									22.99

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.28 Conducted Power Measurements – LTE Band 66, 5MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		66	Channel Bandwidth:						5MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1780(MHz)
Modulation	RB	RB	Low 131997 1712.5(MHz)		Mid 132322 1745(MHz)		High 132647 1777.5(MHz)		Chan Pos EARFCN Chan Freq
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.81	-0.17	22.85	-0.13	22.93	-0.05	Lower
	1	12	22.83	-0.15	22.75	-0.23	22.98	0.00	Mid
	1	24	22.77	-0.21	22.66	-0.32	22.97	-0.01	Upper
	12	0	22.77	-0.21	22.85	-0.13	22.95	-0.03	Lower
	12	13	22.76	-0.22	22.85	-0.13	22.90	-0.08	Upper
	25	0	22.78	-0.20	22.83	-0.15	22.95	-0.03	Mid
16QAM	1	0	22.78	-0.20	22.90	-0.08	22.94	-0.04	Lower
	1	12	22.78	-0.20	22.91	-0.07	22.92	-0.06	Mid
	1	24	22.75	-0.23	22.81	-0.17	22.95	-0.03	Upper
	12	0	22.78	-0.20	22.92	-0.06	22.90	-0.08	Lower
	12	13	22.80	-0.18	22.85	-0.13	22.94	-0.04	Upper
	25	0	22.87	-0.11	22.75	-0.23	22.98	0.00	Mid
Maximum Conducted Power Measured:									22.98

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.29 Conducted Power Measurements – LTE Band 66, 3MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		66	Channel Bandwidth:						3MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1780(MHz)
Modulation	RB	RB	Low 131987 1711.5(MHz)	Mid 132322 1745(MHz)	High 132657 1778.5(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	21.90	-1.08	22.83	-0.15	22.93	-0.05	Lower
	1	8	22.87	-0.11	22.81	-0.17	22.89	-0.09	Mid
	1	14	22.88	-0.10	22.80	-0.18	22.90	-0.08	Upper
	8	0	22.87	-0.11	22.80	-0.18	22.92	-0.06	Lower
	8	7	22.91	-0.07	22.85	-0.13	22.95	-0.03	Upper
	15	0	22.89	-0.09	22.83	-0.15	22.92	-0.06	Mid
16QAM	1	0	22.98	0.00	22.85	-0.13	22.88	-0.10	Lower
	1	8	22.88	-0.10	22.80	-0.18	22.86	-0.12	Mid
	1	14	22.98	0.00	22.81	-0.17	22.88	-0.10	Upper
	8	0	22.90	-0.08	22.92	-0.06	22.79	-0.19	Lower
	8	7	22.88	-0.10	22.91	-0.07	22.87	-0.11	Upper
	15	0	22.90	-0.08	22.89	-0.09	22.89	-0.09	Mid
Maximum Conducted Power Measured:									22.98

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

Table 6.30 Conducted Power Measurements – LTE Band 66, 1.4MHz BW

LTE Conducted Power Measurement - Base Station									
LTE Band:		66	Channel Bandwidth:						1.4MHz
Lower Band Edge		1710(MHz)	Upper Band Edge:						1780(MHz)
Modulation	RB	RB	Low 131979 1710.7(MHz)	Mid 132322 1745(MHz)	High 132665 1779.3(MHz)	Chan Pos EARFCN Chan Freq			
	Size	Offset	Conducted Power (dBm)*						RB Pos
			Meas.	Δ	Meas.	Δ	Meas.	Δ	
QPSK	1	0	22.82	-0.16	22.72	-0.26	22.86	-0.12	Lower
	1	3	22.87	-0.11	22.80	-0.18	22.92	-0.06	Mid
	1	6	22.82	-0.16	22.72	-0.26	22.87	-0.11	Upper
	3	0	22.87	-0.11	22.74	-0.24	22.90	-0.08	Lower
	3	4	22.82	-0.16	22.76	-0.22	22.89	-0.09	Upper
	7	0	22.73	-0.25	22.75	-0.23	22.88	-0.10	Mid
16QAM	1	0	22.90	-0.08	22.75	-0.23	22.80	-0.18	Lower
	1	3	22.98	0.00	22.81	-0.17	22.91	-0.07	Mid
	1	6	22.90	-0.08	22.78	-0.20	22.85	-0.13	Upper
	3	0	22.86	-0.12	22.84	-0.14	22.91	-0.07	Lower
	3	4	22.87	-0.11	22.83	-0.15	22.89	-0.09	Upper
	7	0	22.88	-0.10	22.70	-0.28	22.86	-0.12	Mid
Maximum Conducted Power Measured:									22.98

* Relative to the maximum measured conducted power for this BW, across all channels, RBs, RB Offsets and modulations.

7.0 NUMBER OF TEST CHANNELS (N_c)

LTE Required Test Channels:

As per FCC KDB 941225, the required test channels are:

- 100% RB Allocation (1)
- 50% RB Allocation offset to the lower, middle and upper edge of the channel bandwidth (3)
- 1RB Allocation offset to the lower, middle and upper edge of the channel bandwidth (3)
- For each of the Low, Mid and High channels (3)
- AND
- For each of the QPSK, 16QAM and 64QAM modulations (3)
- AND
- For each of the channel bandwidths (n).

For each channel bandwidth there are a total of:

63 required test channels when the channel bandwidth is less than the width of the LTE band

21 required test channels when the channel bandwidth is equal to the width of the LTE band

Test Reduction:

For QPSK, 1RB & Offset w/ highest output power:

- Testing of all other 1RB & Offset not required when: reported SAR $\leq 0.8\text{W/kg}$
- Testing of only 1RB & Offset with highest output power for each other channel when: $0.8\text{W/kg} < \text{reported SAR} \leq 1.45\text{W/kg}$
- No test reduction when: reported SAR $> 1.45\text{W/kg}$

For QPSK, 50%RB & Offset w/ highest output power:

- Testing of all other 50%RB & Offset not required when: reported SAR $\leq 0.8\text{W/kg}$
- Testing of only 50%RB & Offset with highest output power for each other channel when: $0.8\text{W/kg} < \text{reported SAR} \leq 1.45\text{W/kg}$
- No test reduction when: reported SAR $> 1.45\text{W/kg}$

For QPSK, 100%RB w/ highest output power:

- Testing of 100%RB w/ highest output power not required when the 100%RB output power is less than the 1RB & Offset w/ highest output power AND the 50%RB & Offset w/ highest output power and the reported SAR from above is $\leq 0.8\text{W/kg}$
- Testing of only 100%RB w/ highest output power when the 100%RB output power is greater than the 1RB & Offset w/ highest output power OR the 50%RB & Offset w/ highest output power AND the reported SAR from 1RB AND 50%RB is:
 $0.8\text{W/kg} < \text{reported SAR} \leq 1.45\text{W/kg}$
- No test reduction when the 1RB OR 50%RB reported SAR $> 1.45\text{W/kg}$

For 16QAM or 64QAM:

- Testing not required when the QAM highest output power is $\leq 0.5\text{dB}$ for the same QPSK configuration and the reported SAR from above is $\leq 1.45\text{W/kg}$.
- Test only QAM configuration when QAM highest output power is $> 1/2\text{dB}$ greater than the output power of the QAM configuration.
- Test the QAM configuration when the SAR of the same QPSK configuration is $> 1.45\text{W/kg}$.

For other Channel Bandwidths.

- Testing not required when the highest output power of the smaller bandwidth is $\leq 0.5\text{dB}$ of the output power of the similar configuration in the larger bandwidth and the reported SAR from above is $\leq 1.45\text{W/kg}$.
- Test only the configuration when the highest output power of the smaller bandwidth is $> 1/2\text{dB}$ of the output power of the similar configuration in the larger bandwidth.
- Test the configuration in the smaller bandwidth when the SAR of the similar configuration in the larger bandwidth is $> 1.45\text{W/kg}$.

Overlapping Channels:

Per TCB Council Workshop – April 2015, overlapping channels may be exclude provided:

*“The maximum output power, including tolerance, for the smaller band must be $\leq$ the larger band to qualify for the SAR test exclusion.
The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band “*

LTE Band 66 includes all of LTE Band 4, Band 4 is excluded.

LTE Band 12 includes all of LTE Band 17, Band 17 is excluded.

LMR, WiFi, BlueTooth Required Channels:

Since the circuitry, layout, power amplifiers, etc. of these transmitters have not been modified, only the worst case configurations from previous SAR evaluations will be considered for Standalone and Simultaneous Transmission SAR evaluation.

8.0 ACCESSORIES EVALUATED

Table 8.1 Manufacturer's Accessory List

Change History				
Change ID	Date	Change Type	Description of Change	Test Report Serial Number
1	10 Feb 2015	New Cert	Initial Filing	121814OWD-1302-S
2	17 Feb 2015	C2PC	Added BlueTooth and WiFi Features	031315OWD-1302-S
3	29 Jun 2015	C2PC	Added 14035-4440-01 Antenna (Same as 506/1) and Other Accessories	060515OWD-1328-S
4	09 Oct 2015	C1PC	Added 14035-4440-02 Antenna (Identical to KRE1011506/2 Antenna)	051015WD-1328-S
4	09 Oct 2015	C1PC	Added Modified 14035-4440-01 Antenna (Identical to KRE1011506/1 Antenna)	051015WD-1328-S
5	14 Jan 2016	C2PC	Added 14035-4420-01 Antenna	121815WD-1341-S
6	20 Jun 2016	C1PC	Added 12082-0600-03 Antenna/Spr/MIC	45461353
7	22 Aug 2016	C1PC	Added 14035-4010-04 Li-Ion Battery	45461356
8	23 Mar 2017	C2PC	Added 14035-4450-01, 14035-4450-02 Antennas	45461375
12	9 Aug 2017	C1PC	Added 14035-4045-01 Battery	45461392
22	16 Oct 2017	C1PC	Added 14036-4001-01, -02, -4002-01, -02, -03 Body Accessories	45461404
23	9 Dec 2017	C1PC	Added Fema Green Variants	n/a
24	15 May 2018	C1PC	Added 14036-4003-01, -02 Body Accessories	45461441
24	15 May 2018	C1PC	Added 14036-4020-01, -02 Battery	45461441
27	17 Oct 2018	C1PC	Added 14035-4700-01, 14035-4700-02 Audio Accessories	45461465
29	11 April 2019	C1PC	Added 14035-4750-01 Audio Accessories to ALL Splits	45461495
30	4 July 2019	C1PC	Added 14035-5050-01, -02 High Capacity Battery	45461519
31	23 July 2019	C2PC	Added Global LTE Option, -0133, -0143, -0145	45461519
32	23 July 2019	C2PC	Added 12082-3234-01 D-Swivel	45461519
33	23 July 2019	C2PC	Added 14036-4003-03 Body Accessory	45461531
34	23 July 2019	C2PC	Added 14036-4003-04 Body Accessory	45461531

Manufacturer's Accessory List							
Test Report ID Number	Manufacturer's Part Number	Description	Change ID ⁽¹⁾	UDC Group ⁽²⁾	Type II Group ⁽³⁾	SAR ⁽⁴⁾ Evaluated	SAR ⁽⁵⁾ Tested
Antenna							
T1	KRE1011506/1	1/2 Wave Whip Antenna (764-870 MHz)	1			Y	Y
T2	KRE1011506/2	1/4 Wave Stub Antenna (764-870 MHz)	1			Y	Y
T3	KRE1011219/2	Helical VHF	1			Y	Y
T4	14035-4000-01	Full Spectrum Antenna (136-870 MHz)	1			Y	Y
T5	14035-4420-01	Wideband Whip Antenna (378-520MHz, 762-870 MHz)	5			Y	Y
T6	14035-4440-01	1/2 Wave Whip Antenna (762-870 MHz)	4			Y	Y
T7	14035-4440-02	1/4 Wave Whip Antenna (762-870 MHz)	4			Y	Y
T8	14035-4450-01	1/2 Wave Whip Antenna (762-944 MHz)	8			Y	Y
T9	14035-4450-02	1/4 Wave Whip Antenna (762-944 MHz)	8			Y	Y
T11	E75-0286-001	1/2 Wave Whip Antenna (890-960 MHz)	17			Y	Y

Manufacturer's Accessory List							
Test Report ID Number	Manufacturer's Part Number	Description	Change ID ⁽¹⁾	UDC Group ⁽²⁾	Type II Group ⁽³⁾	SAR ⁽⁴⁾ Evaluated	SAR ⁽⁵⁾ Tested
Battery							
P1	14035-4010-01	Li-Ion Battery 7.2VDC, 3300mAh	1			Y	Y
P2	14035-4010-04	Li-Ion Battery 7.2VDC, 3100mAh, 22Wh	7			Y	Y
P4	14035-4010-05	Li-Ion Battery 7.2VDC, 3100mAh, 22Wh UL	12			Y	Y
P5	14036-4020-01	Li-Ion Battery 7.2VDC, 3100mAh, 22Wh, LTE	24			Y	Y
P6	14036-4020-02	Li-Ion Battery 7.2VDC, 3100mAh, 22Wh, LTE, UL, C1D2	24			Y	Y
P7	14035-5050-01	Li-Ion Battery 7.2VDC, 4700mAh, 24Wh Standard	30			Y	Y
P8	14035-5050-02	Li-Ion Battery 7.2VDC, 4700mAh, 24Wh, C1D2	30			Y	Y

Manufacturer's Accessory List							
Test Report ID Number	Manufacturer's Part Number	Description	Change ID ⁽¹⁾	UDC Group ⁽²⁾	Type II Group ⁽³⁾	SAR ⁽⁴⁾ Evaluated	SAR ⁽⁵⁾ Tested
Audio Accessory							
A1	12082-0600-01	Standard Speaker Microphone	1	7A	PB	Y	Y
A2	12082-0600-02	Storm Speaker Microphone	1	7A	PB	Y	Y
A3	12150-1000-01	Premium Speaker MIC, Fire, NC	1	9	PB	Y	Y
A4	12082-0650-01	Microphone, Palm, 2-Wire Black	1	7A	IL	Y	Y
A5	12082-0650-02	Microphone, Palm, 2-Wire Beige	3	7A	IL	Y	N
A6	12082-0650-03	Microphone, Mini Lapel, 3-Wire Black	1	7A	IL	Y	Y
A7	12082-0650-04	Microphone, Mini Lapel, 3-Wire Beige	3	7A	IL	Y	N
A8	12082-0650-05	Earphone Kit, Black, XG-100P	**	7A	IL	Y	N
A9	12082-0650-06	Earphone Kit, Beige, XG-100P	**	7A	IL	Y	N
A10	12082-0650-07	Headset, In-Ear, Boom MIC, In-Line PTT	3	7A	IL	Y	N
A11	12082-0650-08	Headset, LTWT, OTH, Single Ear, In-Line PTT	3	7A	IL	Y	N
A12	12082-0650-09	Headset, LTWT, BTH, Dual Ear, In-Line PTT	3	7A	IL	Y	N
A13	12082-0650-10	Headset, LTWT, BTH, Dual Ear, Pig Tail PTT	3	7A	PT	Y	Y
A14	12082-0650-11	Headset, LTWT, BTH, Dual In-Ear, In-Line PTT	3	7A	IL	Y	N
A15	12082-0650-12	Headset, LTWT, BTH, Dual In-Ear, Pig Tail PTT	3	7A	PT	Y	Y
A16	12082-0650-13	Headset, Heavy Duty, BTH, w/PTT, XG-100P	3	7A	IL	Y	Y
A17	12082-0650-14	Headset, Heavy Duty, OTH, w/PTT, XG-100P	3	7A	IL	Y	N
A18	12082-0650-15	Headset, BTH, Boom MIC, Earpiece, w/PTT	**	7A	IL	Y	N
A19	12082-0650-16	Headset, Tactical, Boom MIC, Earpiece, w/PTT	3	7A	PT	Y	N
A20	12082-0650-17	Skull MIC, w/Body PTT, Earcup, XG-100P	3	9	BB	Y	Y
A21	12082-0650-18	Throat MIC, w/Acoustic Tube, Body PTT	3	9	BB	Y	N
A22	12082-0650-19	Throat MIC, w/Acoustic Tube, Body & Ring PTT	3	9	RB	Y	N
A23	12082-0681-01	Speaker MIC, Wireless Bluetooth	3	BT	PB	Y	N
A24	12082-0684-01	BlueTooth, Covert, Earpiece, MIC, PTT	3	BT	n/a	Y	N
A25	14002-0197-01	Hirose to Unity Adapter	1	7B	n/a	Y	Y
A26	LS103239V1	Earphone, Lapel MIC, 2.5mm	3	n/a	n/a	Y	Y
A27	LS103239V2	Earphone, Lapel MIC, 2.5mm, Right Angle	4	n/a	n/a	Y	N
A28	12082-0600-03	Storm Speaker Microphone 18"	6	7A	PB	Y	Y
A29	12082-0600-04	Storm Speaker Microphone 25.6"	6	7A	PB	Y	Y
A30	12082-0600-05	Storm Speaker Microphone 30"	6	7A	PB	Y	Y
A31	12150-1000-05	Premium Speaker MIC, Fire, NC, Hi Vis Yellow	1	9	PB	Y	Y
A32	14035-4700-01	SPEAKER MIC, REVO NC2, C1D2 LMR	27	7A	PB	Y	Y
A33	14035-4700-02	SPEAKER MIC, REVO NC2	27	7A	PB	Y	Y
A34	14035-4750-01	SPEAKER MIC, 500F, C1D1 LMR	29	9	PB	Y	N

(1) From the Change History Table - Indicates which change the item was introduced or tested. A "*" in this column indicates these accessories were evaluated on similar product and are deemed compliant.

(2) UDC Group: 9 = 9 Pin, 7A = 7 Pin, 7B = 7 Pin Modified

(3) Type II Group: PB = Palm Button, IL = In-Line Pushbutton, PT = Pigtail Pushbutton, RB = Ring Pushbutton, BB = Body Button, BT = BlueTooth

(4) Accessories are categorized into groups of similar design and construction. Samples of individual groups are SAR Tested and the SAR results apply to ALL members of the Accessory Group. A "Y" in this column indicates the accessory is deemed acceptable.

(5) Accessories and/or Accessory Group members SAR Tested.

Manufacturer's Accessory List							
Test Report ID Number	Manufacturer's Part Number	Description	Change ID ⁽¹⁾	UDC Group ⁽²⁾	Type II Group ⁽³⁾	SAR ⁽⁴⁾ Evaluated	SAR ⁽⁵⁾ Tested
Body-Worn Accessory							
B1	12082-1290-01	Metal Belt Clip, 0mm	1			Y	Y
B2	12082-3230-01	D-Swivel (Used w / 14002-0218-01 and KRY 1011609/1)	1			Y	Y
B3	14002-0218-01	Premium Belt Loop	1			Y	Y
B4	14035-4200-01	Holster, Leather, Radio, Premium	3			Y	Y
B5	14035-4200-02	Holster, Leather w /Rings for Shoulder Strap, Radio, Premium	3			Y	Y
B6	14035-4200-03	Holster, Nylon, Black, Radio, Premium	**			Y	N
B7	14035-4200-04	Holster, Ring, Leather, Radio, Premium	**			Y	N
B8	14035-4201-01	Case, Leather, Premium, Shoulder Strap	**			Y	N
B9	14035-4201-02	Case, Leather, Premium, Shoulder Strap	**			Y	N
B10	14035-4202-01	Holster, Leather, Radio, Standard	**			Y	N
B11	14035-4202-02	Holster, Leather w /Rings for Shoulder Strap, Radio, Standard	**			Y	N
B12	14035-4202-03	Holster, Nylon, Black, Radio, Standard	**			Y	N
B13	14035-4202-04	Holster, Ring, Leather, Radio, Standard	**			Y	N
B14	CC103333V1	Shoulder Strap	1			Y	Y
B15	KRY 1011609/1	Leather Belt Loop	1			Y	Y
B16	12082-1398-01	Side Connector Cover	1			Y	Y
B17	14036-4000-01	Holster, Leather, Premium	**			Y	N
B18	14036-4000-02	Holster, Leather, Premium, Rings	**			Y	N
B19	14036-4001-01	Case, Nylon, Black, Molle Strap	22			Y	Y
B20	14036-4001-02	Case, Nylon, Black, Belt Loop, D-Swivel	22			Y	Y
B21	14036-4002-01	Case, Leather, W/ Belt Loop, BLK HDW	22			Y	N
B22	14036-4002-02	Case, Leather, Belt Loop, D-Swivel	22			Y	N
B23	14036-4001-03	Case, Nylon, W/ Belt Loop, D-Swivel, BLK HDW	22			Y	N
B24	14036-4002-03	Case, Leather, Belt Loop, D-Swivel, BLK HDW	22			Y	N
B25	14036-4003-02	Case, Leather, 3" Belt Loop	24			Y	Y
B26	14036-4003-01	Case, Leather, Belt Loop, D-Swivel	24			Y	Y
B1-02	12082-1290-02	Metal Belt Clip, 5mm - Prototype	1			Y	Y
B1-03	12082-1290-03	Metal Belt Clip, 10mm - Prototype	1			Y	Y
B1-04	12082-1290-04	Metal Belt Clip, 15mm - Prototype	1			Y	Y
B27	14036-4003-04	Case, Leather, 3" Belt Loop	34			Y	Y
B28	14036-4003-03	Case, Leather, Belt Loop, D-Swivel	33			Y	Y

9.0 SAR MEASUREMENT SUMMARY

Table 9.1: Measured Results LTE Band 2 – BODY

Measured SAR Results (1g) - BODY Configuration - LTE Band 2																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
23 Sep 2019	B164	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P2	B1	A1	24.5	24.48	1.120		0.080	<5mm	13
23 Sep 2019	B169	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P7	B1	A1	24.5	24.48	1.150		0.010	<5mm	13
23 Sep 2019	B165	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P2	B26/Strap	A1	24.5	24.48	0.332		-0.090	<5mm	15
20 Sep 2019	B166	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P2	B26	A1	24.5	24.48	0.375		-0.310	<5mm	31
20 Sep 2019	B167	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P2	B28	A1	24.5	24.48	0.497		0.090	<5mm	31
20 Sep 2019	B168	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P2	B25	A1	24.5	24.48	0.334		0.210	<5mm	25
20 Sep 2019	B171	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P2	B27	A1	24.5	24.48	0.300		0.050	<5mm	25
23 Sep 2019	B170	XL-PFM1M-NA	LTE	1880	LTE-QPSK, RB1, RB Offset L, BW=20MHz	T9	P2	B28/Strap	A1	24.5	24.48	0.596		0.100	<5mm	15
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					

* Approximate spacing to LTE Antenna

Table 9.2: Measured Results LTE Band 2 – FACE

Measured SAR Results (1g) - FACE Configuration - LTE Band 2																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
20 Sep 2019	F58	XL-PFM1M-NA	LTE	1900	LTE-QPSK, RB1, RB Offset M, BW=20MHz	T9	P7	n/a	n/a	24.5	24.48	0.021		-0.090	25.4	75
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				

* Approximate spacing to LTE Antenna

Table 9.3: Measured Results LTE Band 5 – BODY

Measured SAR Results (1g) - BODY Configuration - LTE Band 5																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
07 Aug 2019	B155	XL-PFM1M-NA	LTE	836.5	LTE-QPSK, RB 1, RB Offset L, BW=10MHz	T9	P2	B26/Strap	A1	24.5	24.26	0.447		-2.870	<5mm	15
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				

* Approximate spacing to LTE Antenna

Table 9.4: Measured Results LTE Band 5 – FACE

Measured SAR Results (1g) - FACE Configuration - LTE Band 5																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
						Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
07 Aug 2019	F49	XL-PFM1M-NA	LTE	836.5	LTE-QPSK, RB 1, RB Offset L, BW=10MHz	T9	P2	n/a	n/a	24.5	24.26	0.007		1.040	25.4	75
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				

* Approximate spacing to LTE Antenna

Table 9.5: Measured Results LTE Band 12 – BODY

Measured SAR Results (1g) - BODY Configuration - LTE Band 12																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
26 Sep 2019	B273	XL-PFM1M-NA	LTE	707.5	LTE-QPSK, RB 1, RB Offset H, BW=10MHz	T9	P7	B26/Strap	A1	24.5	24.40	0.029		0.490	<5mm	22
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					

* Approximate spacing to LTE Antenna

Table 9.6: Measured Results LTE Band 12 – FACE

Measured SAR Results (1g) - FACE Configuration - LTE Band 12																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna+ (mm)
27 Sep 2019	F61	XL-PFM1M-NA	LTE	707.5	LTE-QPSK, RB 1, RB Offset H, BW=10MHz	T9	P2	n/a	n/a	24.5	24.40	0.007		-0.030	25.4	75
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			

* Approximate spacing to LTE Antenna

Table 9.7: Measured Results LTE Band 13 – BODY

Measured SAR Results (1g) - BODY Configuration - LTE Band 13																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
07 Aug 2019	B156	XL-PFM1M-NA	LTE	782	LTE-QPSK, RB 25, RB Offset L, BW=10MHz	T9	P7	B26/Strap	A1	24.5	24.42	0.471		0.020	<5mm	22
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					

* Approximate spacing to LTE Antenna

Table 9.8: Measured Results LTE Band 13 – FACE

Measured SAR Results (1g) - FACE Configuration - LTE Band 13																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
						Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
07 Aug 2019	F50	XL-PFM1M-NA	LTE	782	LTE-QPSK, RB 1, RB Offset M, BW=10MHz	T9	P2	n/a	n/a	24.5	24.32	0.029		0.420	25.4	75
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				

* Approximate spacing to LTE Antenna

Table 9.9: Measured Results LTE Band 14 – BODY

Measured SAR Results (1g) - BODY Configuration - LTE Band 14																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
07 Aug 2019	B157	XL-PFM1M-NA	LTE	793	LTE-QPSK, RB 1, RB Offset H, BW=10MHz	T9	P2	B1-02	A1	24.5	24.34	0.476		-0.070	<5mm	18
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				

* Approximate spacing to LTE Antenna

Table 9.10: Measured Results LTE Band 14 – FACE

Measured SAR Results (1g) - FACE Configuration - LTE Band 14																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
07 Aug 2019	F51	XL-PFM1M-NA	LTE	793	LTE-QPSK, RB 1, RB Offset H, BW=10MHz	T9	P7	n/a	n/a	24.5	24.34	0.009		3.200	25.4	75
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				

* Approximate spacing to LTE Antenna

Table 9.11: Measured Results LTE Band 66 – BODY

Measured SAR Results (1g) - BODY Configuration - LTE Band 66																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power** Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
23 Sep 20019	B163	XL-PFM1M-NA	LTE	1770	LTE-QPSK, RB 1, RB Offset L, BW=20MHz	T9	P2	B1-02	A1	23	22.93	1.060		1.300	<5mm	18
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					

* Approximate spacing to LTE Antenna

** Due to PTCRB requirements, this device can only transmit at 23dBm in LTE Bands 66 and 4.

Table 9.12: Measured Results LTE Band 66 – FACE

Measured SAR Results (1g) - FACE Configuration - LTE Band 66																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Power** Setting (dBm)	Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	DUT Spacing	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID			100% DC (W/kg)			DUT (mm)	Antenna* (mm)
19 Sep 20019	F57	XL-PFM1M-NA	LTE	1770	LTE-QPSK, RB 1, RB Offset L, BW=20MHz	T9	P2	n/a	n/a	23	22.93	0.013		0.070	25.4	75
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				

* Approximate spacing to LTE Antenna

** Due to PTCRB requirements, this device can only transmit at 23dBm in LTE Bands 66 and 4.

Table 9.13: Measured Results LMR 7/800 Band – BODY

Measured SAR Results (1g) - BODY Configuration - LMR 7/800 Band															
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)	
08 Aug 2019	B158	XL-PFM1M-NA	LTE	806	LMR-CW	T9	P7	B1-02	A1	<5mm	42	35.09	5.730	2.865	-0.260
08 Aug 2019	B159	XL-PFM1M-L	LUE+	806	LMR-CW	T9	P7	B1-02	A1	<5mm	42	35.01	8.470	4.235	-0.260
SAR Limit							Spatial Peak			Head/Body		RF Exposure Category			
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1 Gram Average			8.0 W/kg		Occupational			

* Approximate spacing to center of LMR Antenna

Table 9.14: Measured Results LMR 7/800 Band – FACE

Measured SAR Results (1g) - FACE Configuration - LMR 7/800 Band															
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)	
08 Aug 2019	F52	XL-PFM1M-NA	LTE	806	LMR-CW	T9	P7	n/a	n/a	25.4	55	35.09	1.750	0.875	-0.540
08 Aug 2019	F53	XL-PFM1M-L	LUE+	806	LMR-CW	T9	P7	n/a	n/a	25.4	55	35.01	3.500	1.750	-0.550
SAR Limit							Spatial Peak			Head/Body		RF Exposure Category			
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1 Gram Average			8.0 W/kg		Occupational			

* Approximate spacing to center of LMR Antenna

Table 9.15: Measured Results LMR UHF Band – BODY

Measured SAR Results (1g) - BODY Configuration - LMR UHF															
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)	
24 Sep 2019	B172	XL-PFM1M-NA	LTE	418	LMR-CW	P7	T5	B1-02	A1	<5mm	42	37.75	7.710	4.980	-0.240
24 Sep 2019	B173	XL-PFM1M-L	LTE	418	LMR-CW	P7	T5	B1-02	A1	<5mm	42	37.76	9.730	** 6.430	-0.200
SAR Limit							Spatial Peak			Head/Body		RF Exposure Category			
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1 Gram Average			8.0 W/kg		Occupational			

* Approximate spacing to center of LMR Antenna

** The LUE+ is not LTE Equipped and this SAR is not used for Simultaneous but will be for reporting Max SAR for BODY Configuration

Table 9.16: Measured Results LMR UHF Band – FACE

Measured SAR Results (1g) - FACE Configuration - LMR UHF Band																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)		
24 Sep 2019	F59	XL-PFM1M-NA	LTE	418	LMR-CW	P7	T5	n/a	n/a	25.4	55	37.75	4.670	2.335	-0.210	
25 Sep 2019	F60	XL-PFM1M-L	LUE+	418	LMR-CW	P7	T5	n/a	n/a	25.4	55	37.76	4.960	**2.48	-0.140	
SAR Limit						Spatial Peak				Head/Body		RF Exposure Category				
FCC 47 CFR 2.1093				Health Canada Safety Code 6				1 Gram Average			8.0 W/kg		Occupational			

* Approximate spacing to center of LMR Antenna

** The LUE+ is not LTE Equipped and this SAR is not used for Simultaneous but will be for reporting Max SAR for FACE Configuration

Table 9.17: Measured Results LMR VHF Band – BODY

Measured SAR Results (1g) - BODY Configuration - LMR VHF															
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)	
09 Aug 2019	B161	XL-PFM1M-NA	LTE	156.8	LMR-CW	P2	T4	B1-03	A1	<5mm	47	37.56	6.070	3.035	1.920
09 Aug 2019	B162	XL-PFM1M-L	LUE+	156.8	LMR-CW	P2	T4	B1-03	A1	<5mm	46	37.56	5.790	2.895	-0.460
SAR Limit							Spatial Peak			Head/Body		RF Exposure Category			
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1 Gram Average			8.0 W/kg		Occupational			

* Approximate spacing to center of LMR Antenna

Table 9.18: Measured Results LMR VHF Band – FACE

Measured SAR Results (1g) - FACE Configuration - LMR VHF																
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)	
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)		
09 Aug 2019	F55	XL-PFM1M-NA	LTE	156.8	LMR-CW	P7	T5	n/a	n/a	25.4	75	37.56	1.200	0.600	-0.030	
12 Aug 2019	F56	XL-PFM1M-L	LUE+	156.8	LMR-CW	P7	T5	n/a	n/a	25.4	75	37.56	1.310	0.655	-0.190	
SAR Limit						Spatial Peak				Head/Body		RF Exposure Category				
FCC 47 CFR 2.1093				Health Canada Safety Code 6				1 Gram Average			8.0 W/kg		Occupational			

* Approximate spacing to center of LMR Antenna

Table 9.19: Measured Results WLAN 2.4G & BT Band – BODY

Measured SAR Results (1g) - BODY Configuration - WLAN 2.4G & BT															
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)	
26 July 2019	B144	XL-PFM1M-NA	LTE	2412	WLAN 2.4G	P7	T9	B1	A1	<5mm	≥30mm	23.7	0.002		
29 July 2019	B145	XL-PFM1M-NA	LTE	2480	BT	P7	T9	B1	A1	<5mm	≥30mm	17.00	0.001		
29 July 2019	B146	XL-PFM1M-NA	LTE	2412	WLAN 2.4G	P2	T9	B1	A1	<5mm	≥30mm	23.7	0.002		
30 July 2019	B150	XL-PFM1M-L	LUE +	2412	WLAN 2.4G	P7	T9	B1	A1	<5mm	≥30mm	23.7	0.00004		
30 July 2019	B151	XL-PFM1M-L	LUE +	2480	BT	P7	T9	B1	A1	<5mm	≥30mm	17.00	0.00002		
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			

* Approximate spacing to center of WLAN 2.4G/BT Antenna

Note: Data for Reference Only. See Page 64 for additional details.

Table 9.20: Measured Results WLAN 2.4G & BT Band – FACE

Measured SAR Results (1g) - FACE Configuration - WLAN 2.4G															
Date	Plot ID	DUT		Test Frequency (MHz)	Modulation	Accessories				DUT Spacing		Conducted Power (dBm)	Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (mm)	Antenna* (mm)		100% DC (W/kg)	50% DC (W/kg)	
29 July 2019	F147	XL-PFM1M-NA	LTE	2412	WLAN 2.4G	P7	T9	n/a	n/a	25.4	≥30mm	23.7	0.001		
29 July 2019	F148	XL-PFM1M-NA	LTE	2480	BT	P7	T9	n/a	n/a	25.4	≥30mm	17	0.0005		
30 July 2019	F42	XL-PFM1M-L	LUE +	2412	WLAN 2.4G	P7	T9	n/a	n/a	25.4	≥30mm	23.7	0.0001		
30 July 2019	F43	XL-PFM1M-L	LUE +	2480	BT	P7	T9	n/a	n/a	25.4	≥30mm	17	0.0001		
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			

* Approximate spacing to center of WLAN 2.4G/BT Antenna

Note: Data for Reference Only. See Page 64 for additional details.

10.0 SCALING OF MAXIMUM MEASURE SAR

Table 10.1 SAR Scaling – LTE

Scaling of Maximum Measured SAR (1g)				
Measured Parameters		Configuration		
		Face	Body	Head
Plot ID		F50	B169	
Maximum Measured SAR _M		0.029	1.150	
Frequency		782	1900	
Power Drift		0.420 (1)	0.010 (1)	
Conducted Power		24.320	24.480	
Fluid Deviation from Target				
Δε	Permittivity	0.13%	-5.20%	
Δσ	Conductivity	-5.11%	0.00%	

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

Note(2): Fluid Dielectric Parameters are Within 5% of Targets. SAR Adjustment for Fluid Sensitivity is not Required.

Fluid Sensitivity Calculation (1g)			IEC 62209-2 Annex F	
Delta SAR = Ce * Δε + 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)	0.782	1.9	
Ce		-0.219	-0.226	
Cσ		0.758	0.594	
Ce * Δε		0.130	-5.200	
Cσ * Δσ		-5.110	0.000	
ΔSAR		-3.900 (3)	1.180	(%)

Note(3): Delta SAR is negative, SAR Adjustment for Fluid Sensitivity is not Required.

Manufacturer's Tuneup Tolerance			
Measured Conducted Power	24.320	24.480	(dBm)
Rated Conducted Power	24.500	24.500	(dBm)
ΔP	-0.180	-0.020	(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	0.029	1.164	(W/kg)

SAR Adjustment for Tuneup Tolerance			
SAR ₂ = SAR ₁ + [ΔP]	0.030	1.169	(W/kg)

SAR Adjustment for Drift			
SAR ₃ = SAR ₂ + Drift	0.030	1.169	(W/kg)

reported SAR			
FCC = SAR ₂	0.03	1.17	(W/kg)
ISED = SAR ₃			(W/kg)

Table 10.2 SAR Scaling – LMR

Scaling of Maximum Measured SAR (1g)				
Measured Parameters		Configuration		
		Face	Body	Head
Plot ID		F60*	B173*	
Maximum Measured SAR _M		2.480	6.430	(W/kg)
Frequency		418	418	(MHz)
Power Drift		-0.140	-0.200	(dB)
Conducted Power		37.760	37.760	(dBm)
Fluid Deviation from Target				
Δε	Permittivity	3.98% (2)	3.98% (2)	
Δσ	Conductivity	-2.30% (2)	-2.30% (2)	

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

Note(2): Fluid Dielectric Parameters are Within 5% of Targets. SAR Adjustment for Fluid Sensitivity is not Required.

Fluid Sensitivity Calculation (1g)			IEC 62209-2 Annex F	
Delta SAR = Ce * Δε + 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)	0.418	0.418	
Ce		-0.212	-0.212	
Cσ		0.781	0.781	
Ce * Δε		3.980%	3.980%	
Cσ * Δσ		-2.300%	-2.300%	
ΔSAR		-0.012 (3)	-0.012 (3)	(%)

Note(3): Delta SAR is negative, SAR Adjustment for Fluid Sensitivity is not Required.

Manufacturer's Tuneup Tolerance				
Measured Conducted Power		37.760	37.760	(dBm)
Rated Conducted Power		37.000	37.000	(dBm)
ΔP		0.760 (4)	0.760 (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		2.480	6.430	(W/kg)

SAR Adjustment for Tuneup Tolerance				
SAR ₂ = SAR ₁ + [ΔP]			6.430	(W/kg)

SAR Adjustment for Drift				
SAR ₃ = SAR ₂ + Drift			6.730	(W/kg)

reported SAR				
FCC = SAR ₂		2.48	6.43	(W/kg)
ISED = SAR ₃		2.57	6.73	(W/kg)

* The LUE+ is not LTE Equipped and this SAR is not used for Simultaneous. Plots B173 and F60 will be utilized for reporting of Max SAR for BODY and FACE Configuration

Table 10.3 SAR Scaling – LMR

Scaling of Maximum Measured SAR (1g)				
Measured Parameters		Configuration		
		Face	Body	Head
Plot ID		F59	B172	
Maximum Measured SAR _M		2.335	4.980	
Frequency		418	418	
Power Drift		-0.210	-0.240	
Conducted Power		37.750	37.750	
Fluid Deviation from Target				
Δe	Permittivity	3.98% (2)	3.98% (2)	
Δσ	Conductivity	-2.30% (2)	-2.30% (2)	

(W/kg)
(MHz)
(dB)
(dBm)

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

Note(2): Fluid Dielectric Parameters are Within 5% of Targets. SAR Adjustment for Fluid Sensitivity is 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)	0.418	0.418	
	Ce	-0.212	-0.212	
	Cσ	0.781	0.781	
	Ce * Δe	3.980%	3.980%	
	Cσ * Δσ	-2.300%	-2.300%	
	ΔSAR	-0.012 (3)	-0.012 (3)	(%)

Note(3): Delta SAR is negative, SAR Adjustment for Fluid Sensitivity is not Required.

Manufacturer's Tuneup Tolerance			
Measured Conducted Power	37.750	37.750	(dBm)
Rated Conducted Power	37.000	37.000	(dBm)
ΔP	0.750 (4)	0.750 (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	2.335	4.980	(W/kg)

SAR Adjustment for Tuneup Tolerance			
SAR ₂ = SAR ₁ + [ΔP]	2.335	4.980	(W/kg)

SAR Adjustment for Drift			
SAR ₃ = SAR ₂ + Drift	2.450	5.260	(W/kg)

reported SAR			
FCC = SAR ₂	2.34	4.98	(W/kg)
ISED = SAR ₃	2.45	5.26	(W/kg)

11.0 ANALYSIS OF SIMULTANEOUS TRANSMISSION

Simultaneous Transmission Analysis

The XL-200P employs Wi-Fi, BlueTooth and LTE transmitters capable of simultaneously transmitting with the LMR transmitter. The Wi-Fi and BlueTooth transmitters share the same antenna and the transmissions are interleaved such that only one transmitter is transmitting at a time. As per FCC KDB 447498, simultaneous transmission analysis is required for devices capable of simultaneous transmission. The Wi-Fi, BT and LTE SAR are subject to General Population limits of 1.6W/kg. The LMR SAR is subject to Occupational limits of 8.0W/kg. To determine Simultaneous Transmission SAR Test Exclusion when different SAR limits are applied to the different transmit modes, the Sum-of-the-Ratios of the SAR to the respective SAR limit is applied. When the Sum-of-the-Ratios is ≤ 1.0 , Simultaneous Transmission SAR Test Exclusion may be applied.

When the Sum-of-the-Ratios exceeds 1.0, the SAR to Peak Location Separation Ratio (SPLSR) may be used to determine simultaneous transmission SAR test exclusion. However, the equation for determining this exclusion applies to General Population limits only. Reference Operation Description Part 2. When mixed Occupational and General Population exposure limits are used, the SAR of the Occupational configuration is normalized to the General Population limit. For example if $SAR_{Occupational} = 6.4W/kg$ and $SAR_{GenPop} = 0.65W/kg$, normalizing the Occupational SAR to General Population limits yields $SAR_{OccNorm} = 1.28W/kg$. The SPLSR equation of KDB 447498 4.3.2 c) becomes

$$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04 = (SAR_{OccNorm} + SAR_{GenPop})^{1.5}/R_i = (1.28 + 0.65)^{1.5}/R_i \leq 0.04$$

SAR for each transmission band, transmission mode and/or equipment class was evaluated with Body-Worn and Audio Accessories in the BODY configuration and with no Accessories in the HEAD configurations. The DUT was configured with the maximum Transmit Time Interval (TTI) at 100% transmit duty cycle. Only the Maximum reported SAR for BODY and HEAD configuration is used in the Sum-of-the-Ratios or SPLSR calculation and the worst case of all possible combinations is considered.

Table 11.1 List of Possible Transmitters

List of Possible Transmitters				
Type	Class	Frequency Range		Rated Output Power (dBm)
		Lower (MHz)	Upper (MHz)	
LMR 7/800	TNF	768.0	861.0	34.8
LMR UHF	TNF	768.0	861.0	37.0
LMR VHF	TNF	768.0	861.0	37.8
BlueTooth	DSS	2402.0	2480.0	17.0
BLE	DTS	2402.0	2480.0	8.4
WiFi 2.4	DTS	2412.0	2462.0	23.7
WiFi 5	NII	5150.0	5240.0	11.8
WiFi 5	NII	5745.0	5825.0	9.0
LTE	TNB	Bands 2,5,12,13,14,17		24.5
LTE	TNB	Bands 4,66		23.0

Table 11.2 List of Possible Transmitters Combinations

Simultaneous Transmitter Combinations						
Configuration Number	Transmitter					
	LMR 7/800	BlueTooth	BLE	WiFi 2.4	WiFi 5	LTE
1	X	X				X
2	X		X			X
3	X			X		X
4	X				X	X
5	X					X

Simultaneous Transmitter Combinations						
Configuration Number	Transmitter					
	LMR UHF	BlueTooth	BLE	WiFi 2.4	WiFi 5	LTE
1	X	X				X
2	X		X			X
3	X			X		X
4	X				X	X
5	X					X

Simultaneous Transmitter Combinations						
Configuration Number	Transmitter					
	LMR VHF	BlueTooth	BLE	WiFi 2.4	WiFi 5	LTE
1	X	X				X
2	X		X			X
3	X			X		X
4	X				X	X
5	X					X

 Indicates this configuration is not supported

Table 11.3 Analysis of Sum-of-the-Ratios

Analysis of Sum-of-the-Ratios For All Transmitters and Configurations																	
Configuration Number	Configuration	Transmitter Type												Sum of Ratios	Sum of SARs		
		LMR Band		BlueTooth		BLE		WiFi 2.4		WiFi 5		LTE					
		<i>stand-alone</i>	Ratio	<i>stand-alone</i>	Ratio	<i>stand-alone</i>	Ratio	<i>stand-alone</i>	Ratio	<i>stand-alone</i>	Ratio	<i>stand-alone</i>	Ratio				
		SAR (W/kg)	to Limit	SAR (W/kg)	to Limit	SAR (W/kg)	to Limit	SAR (W/kg)	to Limit	SAR (W/kg)	to Limit	SAR (W/kg)	to Limit				
		SAR Limit = 8.0W/kg (Occupational)		SAR Limit = 1.6W/kg (General Population)											(W/kg)		
1	HEAD	2.335	0.292	0.006	0.004							0.030	0.019	0.314	2.371		
2						0.048	0.030									0.341	2.413
3								0.040	0.025							0.336	2.405
4										0.031	0.019					0.330	2.396
1	BODY	4.980	0.623	0.006	0.004							1.170	0.731	1.358	6.156		
2						0.048	0.030									1.384	6.198
3								0.040	0.025							1.379	6.190
4										0.031	0.019					1.373	6.181

 Indicates this combination is not supported

Simultaneous Transmission SAR Test Exclusion may be determined by applying the Sum-of-the-Ratios for the worst case combinations of all simultaneously transmitting transmitters. From the above table, none of the stand-alone transmitters exceed their respective limit. Additionally, the Sum-of-the-Ratios for the worst case combinations of the transmitters with General Population limits do not exceed 1.0. However the Sum-of-the-Ratios for the worst case combinations of transmitters with both General Population and Occupational limits do exceed 1.0. When the Sum-of-the-Ratios exceeds 1.0, Simultaneous Transmission SAR Test Exclusion may be determined the SAR to Peak Location Separation Ratio (SPLSR) as described above. The SAR Peak Location separation distance was determined to be less than 1cm between the LMR and LTE transmitters in most cases. From the above table, the worst case LMR SAR is 4.98W/kg and the LTE SAR is 1.17W/kg. Normalizing the Occupational SAR to General Population Limits gives: LMR SAR = 0.996. Applying the equation from FCC KDB 447498 D01v06 4.3.2 c) and the guidance by the FCC, the following yields:

$$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04 = (SAR_{OccNorm} + SAR_{GenPop})^{1.5}/R_i = (0.996 + 1.17)^{1.5}/10 = 0.32$$

The above results are greater than 0.04 therefore Simultaneous Transmission SAR Test Exclusion cannot be applied. As per the guidance provided by the FCC, when the Simultaneous Transmission SAR is evaluated, as indicated above, the sum of the SAR is applied to Occupational Limits.

Test Exclusion of the BlueTooth Low Energy (BLE) transmitter is evaluated using Max Power = 8.4dBm (7mW), Separation Distance = 30mm*, Transmit Frequency = 2.480GHz.

Per KDB 447498, SAR Test Exclusion is given by:

$$[(\text{Max Power, mW}) / (\text{Separation Distance, mm})] * [\sqrt{f, \text{GHz}}] \leq 3.0 \text{ for } 1g \text{ SAR}$$

$$[(7)/(30)] * [(\sqrt{2.480})] = 0.362 \leq 3.0$$

Therefore the BlueTooth transmitter meets the SAR Test Exclusion criteria.

For reference only, per KDB 447498, the estimated BlueTooth SAR is given by:

$$[(\text{Max Power, mW}) / (\text{Separation Distance, mm})] * [(\sqrt{f, \text{GHz}}) / (x)], \text{ where } x = 7.5 \text{ for } 1g \text{ SAR}$$

$$[(7)/(30)] * [(\sqrt{2.480}) / (7.5)] = 0.048W/kg$$

Note: The WiFi and BlueTooth SAR values shown in this table are the highest worst case SAR values from all configurations and transmission modes from all variants of the and XL-200P and XL-185P series of radios. They are applied in this table to illustrate the most conservative ratio. WIFI and BT evaluated during the course of this evaluation were conducted on a spot check basis and data was found to not degrade previously reported SAR levels. The measured WIFI and BT SAR data included in this report is for reference only and was not included in the calculations above or a contributing factor in the simultaneous transmission analysis.

The WiFi and BT transmitters/antenna are located on the right-hand side of the DUT approximately 45mm from the bottom and approximately 7mm from the front. The location of the WiFi/BT transmitters/antenna and the form factor of the DUT in the area of the WiFi/BT transmitters/antenna has not changed. The LTE antenna is located approximately centered left to right, approximately 130mm from the bottom and approximately 40mm from the front. The geometric distance between the WiFi/BT transmitters/antenna and the LTE antenna is approximately 90mm.

Since the WiFi and BlueTooth transmitters and location have not changed, they would not be influenced by the addition of the LTE Transmitter/antenna.

* Due to the location of the BlueTooth and WiFi antennas, the minimum phantom separation distance in the BODY or FACE configurations that could be achieved is greater than 30mm.

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.



Trevor Whillock
Test Lab Engineer
Celltech Labs Inc.

31 October 2019
Date

12.0 SAR EXPOSURE LIMITS

Table 12.1 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

Table 13.1 Day Log

DAY LOG				Fluid Dielectric	SPC	Test	
Date	Ambient Temp °C	Fluid Temp °C	Humidity				
26 July 2019	21	23.5	42%	X	X	X	WIFI/BT Spot Check-Fluids/SPC
29 July 2019	23	23.2	40%			X	WIFI/BT Spot Check
30 July 2019	22	23.7	36%			X	WIFI/BT Spot Check
31 July 2019	22	23.7	34%	X			Fluids Per IEEE 1528
01 Aug 2019	22	20.7	31%	X	X	X	LMR 7/8/900 LMR-Fluids/SPC
02 Aug 2019	22	20.9	32%			X	LMR 7/8/900
06 Aug 2019	22	22.9	35%	X	X	X	LMR 7/8/900 & Fluids/SPC
07 Aug 2019	22	22.9	30%			X	LTE Band 5,13,14
08 Aug 2019	23	23.1	32%			X	LMR 7/8/900
08 Aug 2019	24	23.3	27%	X			Fluids Per IEEE 1528
09 Aug 2019	24	24.1	31%	X	X	X	LMR 150H Fluids/SPC
12 Aug 2019	24	24.2	38%			X	LMR 150H
19 Sep 2019	23	22.8	38%	X	X	X	LTE Band 66,2 & Fluids/SPC
20 Sep 2019	23	22.9	38%			X	LTE Band 66,2
23 Sep 2019	23	22.9	37%	X	X	X	LTE Band 66,2 & Fluids/SPC
24 Sep 2019	23	23.1	40%	X	X	X	LMR 450H Fluids/SPC
25 Sep 2019	23	23.3	33%			X	LMR 450H
25 Sep 2019	24	23.8	32%	X	X	X	LTE Band 12 Fluids/SPC
26 Sep 2019	23	23.8	35%			X	LTE Band 12
27 Sep 2019	23	23.6	35%			X	LTE Band 12

Table 13.2 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	The DUT was securely clamped into the device holder with the surface of the DUT normally held to the user's face facing the phantom. The device holder was adjusted to ensure that the horizontal axis of the DUT was parallel to the bottom of the phantom. A 25mm spacer block was used to set the separation distance between the DUT and the phantom to 25mm. When applicable and unless by design, the antenna of the DUT was prevented from sagging away from the phantom. The spacer block was removed before testing.
BODY Configuration	Body-Worn and Audio Accessories were affixed to the DUT in the manner in which they are intended to be used. The DUT, with its accessories, were 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. Body-Worn Accessory straps, linkages, etc. were positioned in a fashion resembling that for which they were intended to be used. Audio Accessory cables, etc., were positioned in a fashion resembling that for which they were intended to be used.
HEAD Configuration	This device is not intended to be held to the ear and was not tested in the HEAD configuration.

Table 13.3 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 $\pm 0.5^{\circ}\text{C}$. The Active TSL temperature was maintained to within $\pm 1.0^{\circ}\text{C}$ throughout the test series. TSL analysis and SPC were repeated when the Active TSL use exceeded 84 hours. 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 <u>Maximum Distance to Phantom Surface</u> 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. The SAR values in the 50% DC column have been scaled by 50% for 50% Push-To-Talk duty cycle compensation. 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 and FACE configurations, 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 <u>ONLY</u> scaled up, not down. The final results of this scaling is the <u>reported SAR</u> which appears on the Cover Page of this report.

Table 13.4 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 $\pm 100\text{MHz}$ for frequencies $> 300\text{MHz}$ and $\pm 50\text{MHz}$ for frequencies $\leq 300\text{MHz}$ 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 OET Bulletin 65 Supplement C 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 $\leq 5\%$ 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 $\leq 10\%$ 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 $\pm 1^{\circ}\text{C}$ of the initial fluid analysis.

Table 13.5 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)	$4 \pm 1 \text{ mm}$
Maximum probe angle normal to phantom surface. (Flat Section ELI Phantom)	$5^{\circ} \pm 1^{\circ}$
Area Scan Spatial Resolution $\Delta X, \Delta Y$	15 mm
Zoom Scan Spatial Resolution $\Delta X, \Delta Y$	7.5 mm
Zoom Scan Spatial Resolution ΔZ (Uniform Grid)	5 mm
Zoom Scan Volume X, Y, Z	30 mm
Phantom	ELI
Fluid Depth	$150 \pm 5 \text{ mm}$
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	

Table 13.6 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 $\Delta X, \Delta Y$	12 mm
Zoom Scan Spatial Resolution $\Delta X, \Delta Y$	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	

Table 13.7 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 $\Delta X, \Delta Y$	10 mm
Zoom Scan Spatial Resolution $\Delta X, \Delta Y$	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 14.1 Measurement Uncertainty

IEEE 1528 Table E.9										
UNCERTAINTY BUDGET FOR DEVICE EVALUATION (IEEE 1528-2013 Table 9)										
Source of Uncertainty	IEEE 1528 Section	Toler ±%	Prob Dist	Div	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	1.00	1	1	1	6.7	6.7	∞
Axial Isotropy** (k=1)	E.2.2	0.6	R	1.73	√3	0.7	0.7	0.2	0.2	∞
Hemispherical Isotropy** (k=1)	E.2.2	3.2	R	1.73	√3	0.7	0.7	1.3	1.3	∞
Boundary Effect*	E.2.3	1.0	R	1.73	√3	1	1	0.6	0.6	∞
Linearity** (k=1)	E.2.4	0.5	R	1.73	√3	1	1	0.3	0.3	∞
System Detection Limits*	E.2.4	1.0	R	1.73	√3	1	1	0.6	0.6	∞
Modulation Response** (k=1)	E.2.5	8.3	R	1.73	√3	1	1	4.8	4.8	∞
Readout Electronics*	E.2.6	0.3	N	1.00	1	1	1	0.3	0.3	∞
Response Time*	E.2.7	0.8	R	1.73	√3	1	1	0.5	0.5	∞
Integration Time*	E.2.8	2.6	R	1.73	√3	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	0.0	R	1.73	√3	1	1	0.0	0.0	10
RF Ambient Conditions - Reflection	E.6.1	0.0	R	1.73	√3	1	1	0.0	0.0	10
Probe Positioner Mechanical Tolerance*	E.6.2	0.0	R	1.73	√3	1	1	0.0	0.0	∞
Probe Positioning wrt Phantom Shell*	E.6.3	0.4	R	1.73	√3	1	1	0.2	0.2	∞
Post-processing*	E.5	2.0	R	1.73	√3	1	1	1.2	1.2	∞
Test Sample Related										
Test Sample Positioning	E.4.2	2.2	N	1.00	1	1	1	2.2	2.2	5
Device Holder Uncertainty*	E.4.1	3.6	N	1.00	1	1	1	3.6	3.6	∞
SAR Drift Measurement ⁽²⁾	E.2.9	0.0	R	1.73	√3	1	1	0.0	0.0	∞
SAR Power Scaling ⁽³⁾	E.6.5	0.0	R	1.73	√3	1	1	0.0	0.0	∞
Phantom and Tissue Parameters										
Phantom Uncertainty*	E.3.1	6.1	R	1.73	√3	1	1	3.5	3.5	∞
SAR Correction Uncertainty	E.3.2	1.6	N	1.00	1	1	0.84	1.6	1.3	∞
Liquid Conductivity (measurement)	E.3.3	5.0	N	1.00	1	0.78	0.71	3.9	3.6	10
Liquid Permittivity (measurement)	E.3.3	5.0	N	1.00	1	0.23	0.26	1.2	1.3	10
Liquid Conductivity (Temperature)	E.3.2	0.4	R	1.73	√3	0.78	0.71	0.2	0.2	10
Liquid Permittivity Temperature)	E.3.2	0.2	R	1.73	√3	0.23	0.26	0.0	0.0	10
Effective Degrees of Freedom⁽¹⁾									V_{eff} =	1141
Combined Standard Uncertainty			RSS					11.1	11.0	
Expanded Uncertainty (95% Confidence Interval)			k=2					22.2	21.9	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003										

(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 Power Scaling not Required

* Provided by SPEAG for DASY

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

Table 14.2 Calculation of Degrees of Freedom

Table 13.1	
Calculation of the Degrees and Effective Degrees of Freedom	
$v_i = n - 1$	$v_{\text{eff}} = \frac{u_c^4}{m \sum_{i=1} \frac{c_i^4 u_i^4}{v_i}}$

15.0 FLUID DIELECTRIC PARAMETERS

Note: Effective February 19, 2019 TCB Workshop: FCC has permitted the use of single head-tissue simulating liquid specified in IEC 62209-1 for all SAR tests. TSL can be changed in a Permissive Change. If SAR increased and Original SAR > 1.2W/kg, additional SAR measurements will be required.

Table 15.1 Fluid Dielectric Parameters 835MHz HEAD TSL, 1 August 2019

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Thu 01/Aug/2019 14:39:17
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.7350	42.02 0.89	45.79	0.87
0.7450	41.97 0.89	45.47	0.88
0.7550	41.92 0.89	45.51	0.89
0.7650	41.86 0.89	45.25	0.91
0.7750	41.81 0.90	44.98	0.91
0.7850	41.76 0.90	44.93	0.92
0.7950	41.71 0.90	45.16	0.96
0.8050	41.66 0.90	44.71	0.96
0.8150	41.60 0.90	44.81	0.97
0.8250	41.55 0.90	44.40	0.96
0.8350	41.50 0.90	44.51	0.99
0.8450	41.50 0.91	44.17	0.97
0.8550	41.50 0.92	43.88	0.99
0.8650	41.50 0.93	43.86	1.00
0.8750	41.50 0.94	43.61	1.02
0.8850	41.50 0.95	43.40	1.03
0.8950	41.50 0.96	43.37	1.03
0.9050	41.50 0.97	43.28	1.06
0.9150	41.50 0.98	43.29	1.07
0.9250	41.48 0.98	43.19	1.07
0.9350	41.46 0.99	42.96	1.10

FLUID DIELECTRIC PARAMETERS

Date:	1 Aug 2019	Fluid Temp:	20.7	Frequency:	835MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
735.0000		45.7900	0.8700	42.0200	0.89	8.97%	-2.25%
745.0000		45.4700	0.8800	41.9700	0.89	8.34%	-1.12%
755.0000		45.5100	0.8900	41.9200	0.89	8.56%	0.00%
765.0000		45.2500	0.9100	41.8600	0.89	8.10%	2.25%
775.0000		44.9800	0.9100	41.8100	0.90	7.58%	1.11%
785.0000		44.9300	0.9200	41.7600	0.90	7.59%	2.22%
795.0000		45.1600	0.9600	41.7100	0.90	8.27%	6.67%
805.0000		44.7100	0.9600	41.6600	0.90	7.32%	6.67%
806.0000	*	44.7200	0.9610	41.6540	0.90	7.36%	6.78%
815.0000		44.8100	0.9700	41.6000	0.90	7.72%	7.78%
825.0000		44.4000	0.9600	41.5500	0.90	6.86%	6.67%
835.0000		44.5100	0.9900	41.5000	0.90	7.25%	10.00%
845.0000		44.1700	0.9700	41.5000	0.91	6.43%	6.59%
855.0000		43.8800	0.9900	41.5000	0.92	5.73%	7.61%
861.0000	*	43.8680	0.9960	41.5000	0.93	5.71%	7.56%
865.0000		43.8600	1.0000	41.5000	0.93	5.69%	7.53%
875.0000		43.6100	1.0200	41.5000	0.94	5.08%	8.51%
885.0000		43.4000	1.0300	41.5000	0.95	4.58%	8.42%
895.0000		43.3700	1.0300	41.5000	0.96	4.51%	7.29%
896.0000	*	43.3610	1.0330	41.5000	0.96	4.48%	7.49%
905.0000		43.2800	1.0600	41.5000	0.97	4.29%	9.28%
915.0000		43.2900	1.0700	41.5000	0.98	4.31%	9.18%
925.0000		43.1900	1.0700	41.4800	0.98	4.12%	9.18%
935.0000		42.9600	1.1000	41.4600	0.99	3.62%	11.11%

*Channel Frequency Tested

Table 15.2 Fluid Dielectric Parameters 835MHz HEAD TSL, 6 August 2019

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Tue 06/Aug/2019 09:32:46
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC 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
0.7350	42.02	0.89	42.35	0.81
0.7450	41.97	0.89	42.03	0.80
0.7550	41.92	0.89	42.30	0.81
0.7650	41.86	0.89	41.64	0.83
0.7750	41.81	0.90	41.81	0.84
0.7850	41.76	0.90	41.84	0.86
0.7950	41.71	0.90	41.55	0.86
0.8050	41.66	0.90	41.65	0.88
0.8150	41.60	0.90	41.34	0.88
0.8250	41.55	0.90	41.11	0.90
0.8350	41.50	0.90	40.91	0.89
0.8450	41.50	0.91	40.39	0.91
0.8550	41.50	0.92	40.58	0.91
0.8650	41.50	0.93	40.46	0.92
0.8750	41.50	0.94	40.45	0.92
0.8850	41.50	0.95	40.41	0.95
0.8950	41.50	0.96	40.27	0.95
0.9050	41.50	0.97	39.83	0.96
0.9150	41.50	0.98	40.08	0.97
0.9250	41.48	0.98	39.89	0.98
0.9350	41.46	0.99	39.64	0.99

FLUID DIELECTRIC PARAMETERS

Date:	6 Aug 2019	Fluid Temp:	22.9	Frequency:	835MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
735.0000		42.3500	0.8100	42.0200	0.89	0.79%	-8.99%
745.0000		42.0300	0.8000	41.9700	0.89	0.14%	-10.11%
755.0000		42.3000	0.8100	41.9200	0.89	0.91%	-8.99%
765.0000		41.6400	0.8300	41.8600	0.89	-0.53%	-6.74%
775.0000		41.8100	0.8400	41.8100	0.90	0.00%	-6.67%
782.0000	*	41.8310	0.8540	41.7750	0.90	0.13%	-5.11%
785.0000		41.8400	0.8600	41.7600	0.90	0.19%	-4.44%
795.0000		41.5500	0.8600	41.7100	0.90	-0.38%	-4.44%
805.0000		41.6500	0.8800	41.6600	0.90	-0.02%	-2.22%
806.0000	*	41.6190	0.8800	41.6540	0.90	-0.08%	-2.22%
815.0000		41.3400	0.8800	41.6000	0.90	-0.62%	-2.22%
825.0000		41.1100	0.9000	41.5500	0.90	-1.06%	0.00%
835.0000		40.9100	0.8900	41.5000	0.90	-1.42%	-1.11%
845.0000		40.3900	0.9100	41.5000	0.91	-2.67%	0.00%
855.0000		40.5800	0.9100	41.5000	0.92	-2.22%	-1.09%
861.0000	*	40.5080	0.9160	41.5000	0.93	-2.39%	-1.08%
865.0000		40.4600	0.9200	41.5000	0.93	-2.51%	-1.08%
875.0000		40.4500	0.9200	41.5000	0.94	-2.53%	-2.13%
885.0000		40.4100	0.9500	41.5000	0.95	-2.63%	0.00%
895.0000		40.2700	0.9500	41.5000	0.96	-2.96%	-1.04%
896.0000	*	40.2260	0.9510	41.5000	0.96	-3.07%	-1.04%
905.0000		39.8300	0.9600	41.5000	0.97	-4.02%	-1.03%
915.0000		40.0800	0.9700	41.5000	0.98	-3.42%	-1.02%
925.0000		39.8900	0.9800	41.4800	0.98	-3.83%	0.00%
935.0000		39.6400	0.9900	41.4600	0.99	-4.39%	0.00%

*Channel Frequency Tested

Table 15.3 Fluid Dielectric Parameters 835MHz HEAD TSL, 8 August 2019

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Thu 08/Aug/2019 16:02:46
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.7350	42.02 0.89	40.98	0.78
0.7450	41.97 0.89	40.77	0.80
0.7550	41.92 0.89	40.74	0.79
0.7650	41.86 0.89	40.47	0.80
0.7750	41.81 0.90	40.72	0.82
0.7850	41.76 0.90	40.41	0.84
0.7950	41.71 0.90	40.28	0.84
0.8050	41.66 0.90	40.29	0.85
0.8150	41.60 0.90	40.18	0.85
0.8250	41.55 0.90	40.17	0.87
0.8350	41.50 0.90	40.02	0.87
0.8450	41.50 0.91	39.67	0.88
0.8550	41.50 0.92	39.73	0.88
0.8650	41.50 0.93	39.40	0.89
0.8750	41.50 0.94	39.36	0.90
0.8850	41.50 0.95	39.31	0.92
0.8950	41.50 0.96	39.27	0.92
0.9050	41.50 0.97	39.35	0.94
0.9150	41.50 0.98	39.02	0.95
0.9250	41.48 0.98	39.00	0.96
0.9350	41.46 0.99	38.77	0.96

Per IEEE 1528 Fluid Parameters measured at end of test series

FLUID DIELECTRIC PARAMETERS

Date:	8 Aug 2019	Fluid Temp:	23.3	Frequency:	835MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
735.0000		40.9800	0.7800	42.0200	0.89	-2.48%	-12.36%
745.0000		40.7700	0.8000	41.9700	0.89	-2.86%	-10.11%
755.0000		40.7400	0.7900	41.9200	0.89	-2.81%	-11.24%
765.0000		40.4700	0.8000	41.8600	0.89	-3.32%	-10.11%
775.0000		40.7200	0.8200	41.8100	0.90	-2.61%	-8.89%
785.0000		40.4100	0.8400	41.7600	0.90	-3.23%	-6.67%
795.0000		40.2800	0.8400	41.7100	0.90	-3.43%	-6.67%
805.0000		40.2900	0.8500	41.6600	0.90	-3.29%	-5.56%
806.0000	*	40.2790	0.8500	41.6540	0.90	-3.30%	-5.56%
815.0000		40.1800	0.8500	41.6000	0.90	-3.41%	-5.56%
825.0000		40.1700	0.8700	41.5500	0.90	-3.32%	-3.33%
835.0000		40.0200	0.8700	41.5000	0.90	-3.57%	-3.33%
845.0000		39.6700	0.8800	41.5000	0.91	-4.41%	-3.30%
855.0000		39.7300	0.8800	41.5000	0.92	-4.27%	-4.35%
861.0000	*	39.5320	0.8860	41.5000	0.93	-4.74%	-4.32%
865.0000		39.4000	0.8900	41.5000	0.93	-5.06%	-4.30%
875.0000		39.3600	0.9000	41.5000	0.94	-5.16%	-4.26%
885.0000		39.3100	0.9200	41.5000	0.95	-5.28%	-3.16%
895.0000		39.2700	0.9200	41.5000	0.96	-5.37%	-4.17%
896.0000	*	39.2780	0.9220	41.5000	0.96	-5.35%	-4.06%
905.0000		39.3500	0.9400	41.5000	0.97	-5.18%	-3.09%
915.0000		39.0200	0.9500	41.5000	0.98	-5.98%	-3.06%
925.0000		39.0000	0.9600	41.4800	0.98	-5.98%	-2.04%
935.0000		38.7700	0.9600	41.4600	0.99	-6.49%	-3.03%

*Channel Frequency Tested

Table 15.4 Fluid Dielectric Parameters 750MHz HEAD TSL, 25 September 2019

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Wed 25/Sep/2019 14:45:21
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC 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
0.6500	42.46	0.89	45.55	0.76
0.6600	42.41	0.89	45.56	0.76
0.6700	42.36	0.89	44.88	0.77
0.6800	42.31	0.89	45.34	0.77
0.6900	42.25	0.89	45.39	0.79
0.7000	42.20	0.89	45.28	0.80
0.7100	42.15	0.89	44.66	0.81
0.7200	42.10	0.89	44.91	0.81
0.7300	42.05	0.89	44.59	0.82
0.7400	41.99	0.89	44.31	0.83
0.7500	41.94	0.89	44.15	0.86
0.7600	41.89	0.89	44.27	0.86
0.7700	41.84	0.89	44.11	0.85
0.7800	41.79	0.90	44.28	0.88
0.7900	41.73	0.90	43.92	0.87
0.8000	41.68	0.90	43.42	0.90
0.8100	41.63	0.90	43.37	0.92
0.8200	41.58	0.90	43.18	0.92
0.8300	41.53	0.90	43.33	0.93
0.8400	41.50	0.91	43.05	0.94
0.8500	41.50	0.92	43.05	0.95

FLUID DIELECTRIC PARAMETERS

Date:	25 Sep 2019	Fluid Temp:	23.8	Frequency:	750MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
650.0000		45.5500	0.7600	42.4600	0.89	7.28%	-14.61%
660.0000		45.5600	0.7600	42.4100	0.89	7.43%	-14.61%
670.0000		44.8800	0.7700	42.3600	0.89	5.95%	-13.48%
680.0000		45.3400	0.7700	42.3100	0.89	7.16%	-13.48%
690.0000		45.3900	0.7900	42.2500	0.89	7.43%	-11.24%
700.0000		45.2800	0.8000	42.2000	0.89	7.30%	-10.11%
707.5000	*	44.8150	0.8075	42.1625	0.89	6.29%	-9.27%
710.0000		44.6600	0.8100	42.1500	0.89	5.95%	-8.99%
720.0000		44.9100	0.8100	42.1000	0.89	6.67%	-8.99%
730.0000		44.5900	0.8200	42.0500	0.89	6.04%	-7.87%
740.0000		44.3100	0.8300	41.9900	0.89	5.53%	-6.74%
750.0000		44.1500	0.8600	41.9400	0.89	5.27%	-3.37%
760.0000		44.2700	0.8600	41.8900	0.89	5.68%	-3.37%
770.0000		44.1100	0.8500	41.8400	0.89	5.43%	-4.49%
780.0000		44.2800	0.8800	41.7900	0.90	5.96%	-2.22%
790.0000		43.9200	0.8700	41.7300	0.90	5.25%	-3.33%
800.0000		43.4200	0.9000	41.6800	0.90	4.17%	0.00%
810.0000		43.3700	0.9200	41.6300	0.90	4.18%	2.22%
820.0000		43.1800	0.9200	41.5800	0.90	3.85%	2.22%
830.0000		43.3300	0.9300	41.5300	0.90	4.33%	3.33%
840.0000		43.0500	0.9400	41.5000	0.91	3.73%	3.30%
850.0000		43.0500	0.9500	41.5000	0.92	3.73%	3.26%

*Channel Frequency Tested

Table 15.5 Fluid Dielectric Parameters 1800MHz HEAD TSL, 19 September 2019

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Thu 19/Sep/2019 10:46:28
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC 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
1.7000	40.16	1.34	39.40	1.26
1.7100	40.14	1.35	39.32	1.29
1.7200	40.13	1.35	39.15	1.29
1.7300	40.11	1.36	39.44	1.30
1.7400	40.09	1.37	39.37	1.32
1.7500	40.08	1.37	39.22	1.30
1.7600	40.06	1.38	39.17	1.33
1.7700	40.05	1.38	39.08	1.30
1.7800	40.03	1.39	39.08	1.34
1.7900	40.02	1.39	38.94	1.34
1.8000	40.00	1.40	38.91	1.35
1.8100	40.00	1.40	38.83	1.37
1.8200	40.00	1.40	38.96	1.38
1.8300	40.00	1.40	38.79	1.39
1.8400	40.00	1.40	38.87	1.40
1.8500	40.00	1.40	38.91	1.40
1.8600	40.00	1.40	38.71	1.42
1.8700	40.00	1.40	38.66	1.43
1.8800	40.00	1.40	38.53	1.45
1.8900	40.00	1.40	38.54	1.43
1.9000	40.00	1.40	38.44	1.47

FLUID DIELECTRIC PARAMETERS

Date:	19 Sep 2019	Fluid Temp:	22.8	Frequency:	1800MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
1700.0000		39.4000	1.2600	40.1600	1.34	-1.89%	-5.97%
1710.0000		39.3200	1.2900	40.1400	1.35	-2.04%	-4.44%
1720.0000		39.1500	1.2900	40.1300	1.35	-2.44%	-4.44%
1730.0000		39.4400	1.3000	40.1100	1.36	-1.67%	-4.41%
1740.0000		39.3700	1.3200	40.0900	1.37	-1.80%	-3.65%
1750.0000		39.2200	1.3000	40.0800	1.37	-2.15%	-5.11%
1760.0000		39.1700	1.3300	40.0600	1.38	-2.22%	-3.62%
1770.0000	*	39.0800	1.3000	40.0500	1.38	-2.42%	-5.80%
1780.0000		39.0800	1.3400	40.0300	1.39	-2.37%	-3.60%
1790.0000		38.9400	1.3400	40.0200	1.39	-2.70%	-3.60%
1800.0000		38.9100	1.3500	40.0000	1.40	-2.73%	-3.57%
1810.0000		38.8300	1.3700	40.0000	1.40	-2.93%	-2.14%
1820.0000		38.9600	1.3800	40.0000	1.40	-2.60%	-1.43%
1830.0000		38.7900	1.3900	40.0000	1.40	-3.03%	-0.71%
1840.0000		38.8700	1.4000	40.0000	1.40	-2.83%	0.00%
1850.0000		38.9100	1.4000	40.0000	1.40	-2.73%	0.00%
1860.0000		38.7100	1.4200	40.0000	1.40	-3.23%	1.43%
1870.0000		38.6600	1.4300	40.0000	1.40	-3.35%	2.14%
1880.0000		38.5300	1.4500	40.0000	1.40	-3.68%	3.57%
1890.0000		38.5400	1.4300	40.0000	1.40	-3.65%	2.14%
1900.0000		38.4400	1.4700	40.0000	1.40	-3.90%	5.00%

*Channel Frequency Tested

Table 15.6 Fluid Dielectric Parameters 1800MHz HEAD TSL, 23 September 2019

Aprel Laboratory
 Test Result for UIM Dielectric Parameter
 Mon 23/Sep/2019 12:39:34
 Freq Frequency(GHz)
 FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
 FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
 Test_e Epsilon of UIM
 Test_s Sigma of UIM

Freq	FCC_eHFCC	sHFCC	Test_e	Test_s
1.7000	40.16	1.34	38.86	1.20
1.7100	40.14	1.35	38.77	1.22
1.7200	40.13	1.35	38.69	1.23
1.7300	40.11	1.36	38.70	1.25
1.7400	40.09	1.37	38.76	1.27
1.7500	40.08	1.37	38.70	1.27
1.7600	40.06	1.38	38.73	1.26
1.7700	40.05	1.38	38.58	1.28
1.7800	40.03	1.39	38.56	1.28
1.7900	40.02	1.39	38.42	1.28
1.8000	40.00	1.40	38.44	1.31
1.8100	40.00	1.40	38.18	1.31
1.8200	40.00	1.40	38.20	1.32
1.8300	40.00	1.40	38.06	1.33
1.8400	40.00	1.40	38.04	1.34
1.8500	40.00	1.40	38.17	1.35
1.8600	40.00	1.40	37.90	1.35
1.8700	40.00	1.40	37.94	1.36
1.8800	40.00	1.40	37.84	1.37
1.8900	40.00	1.40	37.86	1.40
1.9000	40.00	1.40	37.92	1.40

FLUID DIELECTRIC PARAMETERS

Date:	23 Sep 2019	Fluid Temp:	22.9	Frequency:	1800MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
1700.0000		38.8600	1.2000	40.1600	1.34	-3.24%	-10.45%
1710.0000		38.7700	1.2200	40.1400	1.35	-3.41%	-9.63%
1720.0000		38.6900	1.2300	40.1300	1.35	-3.59%	-8.89%
1730.0000		38.7000	1.2500	40.1100	1.36	-3.52%	-8.09%
1740.0000		38.7600	1.2700	40.0900	1.37	-3.32%	-7.30%
1750.0000		38.7000	1.2700	40.0800	1.37	-3.44%	-7.30%
1760.0000		38.7300	1.2600	40.0600	1.38	-3.32%	-8.70%
1770.0000	*	38.5800	1.2800	40.0500	1.38	-3.67%	-7.25%
1780.0000		38.5600	1.2800	40.0300	1.39	-3.67%	-7.91%
1790.0000		38.4200	1.2800	40.0200	1.39	-4.00%	-7.91%
1800.0000		38.4400	1.3100	40.0000	1.40	-3.90%	-6.43%
1810.0000		38.1800	1.3100	40.0000	1.40	-4.55%	-6.43%
1820.0000		38.2000	1.3200	40.0000	1.40	-4.50%	-5.71%
1830.0000		38.0600	1.3300	40.0000	1.40	-4.85%	-5.00%
1840.0000		38.0400	1.3400	40.0000	1.40	-4.90%	-4.29%
1850.0000		38.1700	1.3500	40.0000	1.40	-4.58%	-3.57%
1860.0000		37.9000	1.3500	40.0000	1.40	-5.25%	-3.57%
1870.0000		37.9400	1.3600	40.0000	1.40	-5.15%	-2.86%
1880.0000		37.8400	1.3700	40.0000	1.40	-5.40%	-2.14%
1890.0000		37.8600	1.4000	40.0000	1.40	-5.35%	0.00%
1900.0000		37.9200	1.4000	40.0000	1.40	-5.20%	0.00%

*Channel Frequency Tested

Table 15.7 Fluid Dielectric Parameters 450MHz HEAD TSL, 24 September 2019

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Tue 24/Sep/2019 11:11:42
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.3500	44.70	0.87	47.24
0.3600	44.58	0.87	48.03
0.3700	44.46	0.87	47.60
0.3800	44.34	0.87	46.61
0.3900	44.22	0.87	47.24
0.4000	44.10	0.87	46.34
0.4100	43.98	0.87	45.84
0.4200	43.86	0.87	45.58
0.4300	43.74	0.87	45.76
0.4400	43.62	0.87	45.55
0.4500	43.50	0.87	45.59
0.4600	43.45	0.87	44.93
0.4700	43.40	0.87	44.28
0.4800	43.34	0.87	45.01
0.4900	43.29	0.87	44.30
0.5000	43.24	0.87	44.03
0.5100	43.19	0.87	43.68
0.5200	43.14	0.88	43.33
0.5300	43.08	0.88	43.32
0.5400	43.03	0.88	43.01
0.5500	42.98	0.88	43.03

FLUID DIELECTRIC PARAMETERS

Date:	24 Sep 2019	Fluid Temp:	23.1	Frequency:	450MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
350.0000		47.2400	0.8100	44.7000	0.87	5.68%	-6.90%
360.0000		48.0300	0.8100	44.5800	0.87	7.74%	-6.90%
370.0000		47.6000	0.8000	44.4600	0.87	7.06%	-8.05%
380.0000		46.6100	0.8300	44.3400	0.87	5.12%	-4.60%
390.0000		47.2400	0.8500	44.2200	0.87	6.83%	-2.30%
400.0000		46.3400	0.8500	44.1000	0.87	5.08%	-2.30%
410.0000		45.8400	0.8500	43.9800	0.87	4.23%	-2.30%
418.0000	*	45.6320	0.8500	43.8840	0.87	3.98%	-2.30%
420.0000		45.5800	0.8500	43.8600	0.87	3.92%	-2.30%
430.0000		45.7600	0.8700	43.7400	0.87	4.62%	0.00%
440.0000		45.5500	0.8800	43.6200	0.87	4.42%	1.15%
450.0000		45.5900	0.8900	43.5000	0.87	4.80%	2.30%
460.0000		44.9300	0.9100	43.4500	0.87	3.41%	4.60%
470.0000		44.2800	0.9000	43.4000	0.87	2.03%	3.45%
480.0000		45.0100	0.9300	43.3400	0.87	3.85%	6.90%
490.0000		44.3000	0.9200	43.2900	0.87	2.33%	5.75%
500.0000		44.0300	0.9400	43.2400	0.87	1.83%	8.05%
510.0000		43.6800	0.9200	43.1900	0.87	1.13%	5.75%
520.0000		43.3300	0.9400	43.1400	0.88	0.44%	6.82%
530.0000		43.3200	0.9600	43.0800	0.88	0.56%	9.09%
540.0000		43.0100	0.9600	43.0300	0.88	-0.05%	9.09%
550.0000		43.0300	0.9700	42.9800	0.88	0.12%	10.23%

*Channel Frequency Tested

Table 15.8 Fluid Dielectric Parameters 150MHz HEAD TSL, 9 August 2019

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Fri 09/Aug/2019 11:47:56
Freq Frequency(GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.1000	54.63 0.72	53.76	0.74
0.1100	54.17 0.73	52.66	0.73
0.1200	53.70 0.74	52.46	0.76
0.1300	53.23 0.75	50.56	0.76
0.1400	52.77 0.75	48.59	0.77
0.1500	52.30 0.76	50.15	0.78
0.1600	51.83 0.77	49.14	0.80
0.1700	51.37 0.77	48.80	0.78
0.1800	50.90 0.78	48.23	0.79
0.1900	50.43 0.79	48.54	0.80
0.2000	49.97 0.80	47.98	0.80

FLUID DIELECTRIC PARAMETERS

Date:	9 Aug 2019	Fluid Temp:	24.1	Frequency:	150MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
100.0000		53.7600	0.7400	54.6300	0.72	-1.59%	2.78%
110.0000		52.6600	0.7300	54.1700	0.73	-2.79%	0.00%
120.0000		52.4600	0.7600	53.7000	0.74	-2.31%	2.70%
130.0000		50.5600	0.7600	53.2300	0.75	-5.02%	1.33%
140.0000		48.5900	0.7700	52.7700	0.75	-7.92%	2.67%
150.0000		50.1500	0.7800	52.3000	0.76	-4.11%	2.63%
156.8000	*	49.4632	0.7936	51.9804	0.77	-4.84%	3.50%
160.0000		49.1400	0.8000	51.8300	0.77	-5.19%	3.90%
170.0000		48.8000	0.7800	51.3700	0.77	-5.00%	1.30%
180.0000		48.2300	0.7900	50.9000	0.78	-5.25%	1.28%
190.0000		48.5400	0.8000	50.4300	0.79	-3.75%	1.27%
200.0000		47.9800	0.8000	49.9700	0.80	-3.98%	0.00%

*Channel Frequency Tested

Table 15.9 Fluid Dielectric Parameters 2450 MHz HEAD TSL, 26 July 2019

Aprel Laboratory
 Test Result for UIM Dielectric Parameter
 Fri 26/Jul/2019 09:23:15
 Freq Frequency(GHz)
 FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
 FCC_sHFCC 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	39.43	1.78
2.3600	39.36	1.72	39.32	1.77
2.3700	39.34	1.73	39.29	1.78
2.3800	39.32	1.74	39.18	1.80
2.3900	39.31	1.75	39.16	1.80
2.4000	39.29	1.76	39.12	1.82
2.4100	39.27	1.76	39.03	1.84
2.4200	39.25	1.77	38.83	1.86
2.4300	39.24	1.78	38.93	1.87
2.4400	39.22	1.79	38.78	1.90
2.4500	39.20	1.80	38.91	1.91
2.4600	39.19	1.81	38.76	1.92
2.4700	39.17	1.82	38.87	1.93
2.4800	39.16	1.83	38.91	1.93
2.4900	39.15	1.84	38.83	1.90
2.5000	39.14	1.85	38.56	1.93
2.5100	39.12	1.87	38.63	1.95
2.5200	39.11	1.88	38.71	2.00
2.5300	39.10	1.89	38.64	1.98
2.5400	39.09	1.90	38.50	2.01
2.5500	39.07	1.91	38.57	2.02

FLUID DIELECTRIC PARAMETERS

Date:	26 Jul 2019	Fluid Temp:	23.5	Frequency:	2450MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
2350.0000		39.4300	1.7800	39.3800	1.71	0.13%	4.09%
2360.0000		39.3200	1.7700	39.3600	1.72	-0.10%	2.91%
2370.0000		39.2900	1.7800	39.3400	1.73	-0.13%	2.89%
2380.0000		39.1800	1.8000	39.3200	1.74	-0.36%	3.45%
2390.0000		39.1600	1.8000	39.3100	1.75	-0.38%	2.86%
2400.0000		39.1200	1.8200	39.2900	1.76	-0.43%	3.41%
2402.0000	*	39.1020	1.8240	39.2860	1.76	-0.47%	3.64%
2410.0000		39.0300	1.8400	39.2700	1.76	-0.61%	4.55%
2412.0000	*	38.9900	1.8440	39.2660	1.76	-0.70%	4.65%
2420.0000		38.8300	1.8600	39.2500	1.77	-1.07%	5.08%
2430.0000		38.9300	1.8700	39.2400	1.78	-0.79%	5.06%
2437.0000	*	38.8250	1.8910	39.2260	1.79	-1.02%	5.82%
2440.0000		38.7800	1.9000	39.2200	1.79	-1.12%	6.15%
2441.0000	*	38.7930	1.9010	39.2180	1.79	-1.08%	6.14%
2450.0000		38.9100	1.9100	39.2000	1.80	-0.74%	6.11%
2460.0000		38.7600	1.9200	39.1900	1.81	-1.10%	6.08%
2462.0000	*	38.7820	1.9220	39.1860	1.81	-1.03%	6.07%
2470.0000		38.8700	1.9300	39.1700	1.82	-0.77%	6.04%
2480.0000	*	38.9100	1.9300	39.1600	1.83	-0.64%	5.46%
2490.0000		38.8300	1.9000	39.1500	1.84	-0.82%	3.26%
2500.0000		38.5600	1.9300	39.1400	1.85	-1.48%	4.32%
2510.0000		38.6300	1.9500	39.1200	1.87	-1.25%	4.28%
2520.0000		38.7100	2.0000	39.1100	1.88	-1.02%	6.38%
2530.0000		38.6400	1.9800	39.1000	1.89	-1.18%	4.76%
2540.0000		38.5000	2.0100	39.0900	1.90	-1.51%	5.79%
2550.0000		38.5700	2.0200	39.0700	1.91	-1.28%	5.76%

*Channel Frequency Tested

Table 15.10 Fluid Dielectric Parameters 2450 MHz HEAD TSL, 31 July 2019

Aprel Laboratory				
Test Result for UIM Dielectric Parameter				
Wed 31/Jul/2019 09:15:51				
Freq Frequency(GHz)				
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon				
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma				
Test_e Epsilon of UIM				
Test_s Sigma of UIM				

Freq	FCC_eHFCC	sHFCC	Test_e	Test_s
2.3500	39.38	1.71	38.50	1.81
2.3600	39.36	1.72	38.44	1.79
2.3700	39.34	1.73	38.31	1.82
2.3800	39.32	1.74	38.32	1.82
2.3900	39.31	1.75	38.27	1.83
2.4000	39.29	1.76	38.35	1.86
2.4100	39.27	1.76	38.05	1.87
2.4200	39.25	1.77	38.11	1.88
2.4300	39.24	1.78	38.02	1.87
2.4400	39.22	1.79	38.04	1.92
2.4500	39.20	1.80	38.10	1.93
2.4600	39.19	1.81	38.01	1.95
2.4700	39.17	1.82	37.82	1.94
2.4800	39.16	1.83	37.91	1.98
2.4900	39.15	1.84	37.95	1.94
2.5000	39.14	1.85	37.80	1.99
2.5100	39.12	1.87	37.63	1.97
2.5200	39.11	1.88	37.72	2.01
2.5300	39.10	1.89	37.58	2.02
2.5400	39.09	1.90	37.86	2.06
2.5500	39.07	1.91	37.80	2.04

Per IEEE 1528 Fluid Parameters measured at end of test series

FLUID DIELECTRIC PARAMETERS

Date:	31 Jul 2019	Fluid Temp:	23.7	Frequency:	2450MHz	Tissue:	Head
Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
2350.0000		38.5000	1.8100	39.3800	1.71	-2.23%	5.85%
2360.0000		38.4400	1.7900	39.3600	1.72	-2.34%	4.07%
2370.0000		38.3100	1.8200	39.3400	1.73	-2.62%	5.20%
2380.0000		38.3200	1.8200	39.3200	1.74	-2.54%	4.60%
2390.0000		38.2700	1.8300	39.3100	1.75	-2.65%	4.57%
2400.0000		38.3500	1.8600	39.2900	1.76	-2.39%	5.68%
2402.0000	*	38.2900	1.8620	39.2860	1.76	-2.54%	5.80%
2410.0000		38.0500	1.8700	39.2700	1.76	-3.11%	6.25%
2412.0000	*	38.0620	1.8720	39.2660	1.76	-3.07%	6.24%
2420.0000		38.1100	1.8800	39.2500	1.77	-2.90%	6.21%
2430.0000		38.0200	1.8700	39.2400	1.78	-3.11%	5.06%
2437.0000	*	38.0340	1.9050	39.2260	1.79	-3.04%	6.60%
2440.0000		38.0400	1.9200	39.2200	1.79	-3.01%	7.26%
2441.0000	*	38.0460	1.9210	39.2180	1.79	-2.99%	7.26%
2450.0000		38.1000	1.9300	39.2000	1.80	-2.81%	7.22%
2460.0000		38.0100	1.9500	39.1900	1.81	-3.01%	7.73%
2462.0000	*	37.9720	1.9480	39.1860	1.81	-3.10%	7.51%
2470.0000		37.8200	1.9400	39.1700	1.82	-3.45%	6.59%
2480.0000	*	37.9100	1.9800	39.1600	1.83	-3.19%	8.20%
2490.0000		37.9500	1.9400	39.1500	1.84	-3.07%	5.43%
2500.0000		37.8000	1.9900	39.1400	1.85	-3.42%	7.57%
2510.0000		37.6300	1.9700	39.1200	1.87	-3.81%	5.35%
2520.0000		37.7200	2.0100	39.1100	1.88	-3.55%	6.91%
2530.0000		37.5800	2.0200	39.1000	1.89	-3.89%	6.88%
2540.0000		37.8600	2.0600	39.0900	1.90	-3.15%	8.42%
2550.0000		37.8000	2.0400	39.0700	1.91	-3.25%	6.81%

*Channel Frequency Tested

16.0 SYSTEM VERIFICATION TEST RESULTS

Table 16.1 System Verification Results 835MHz HEAD TSL, 1 Aug 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
01 Aug 2019		835	D835V2	4d075	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	20.7	22	31%	250	15
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
44.51	41.50	7.25%	0.99	0.90	10.00%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
2.44	2.41	1.24%	1.58	1.55	1.94%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
9.76	9.45	3.28%	6.32	6.11	3.44%
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 835MHz HEAD TSL, 6 Aug 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
06 Aug 2019		835	D835V2	4d075	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	22.1	22	39%	250	15
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
40.91	41.50	-1.42%	0.89	0.90	-1.11%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
2.46	2.41	2.07%	1.60	1.55	2.56%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
9.84	9.45	3.96%	6.40	6.11	4.53%
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 750MHz HEAD TSL, 25 Sep 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
25 Sep 2019		750	D750V3	1061	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.8	24	32%	250	15
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
44.15	41.94	5.27%	0.86	0.89	-3.37%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
1.96	2.08	-5.77%	1.30	1.37	-5.11%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
7.84	8.33	-5.88%	5.20	5.48	-5.11%
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 16.4 System Verification Results 1800MHz HEAD TSL, 19 Sep 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
19 Sep 2019		1800	D1800V2	247	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	22.8	23	38%	250	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
38.91	40.00	-2.73%	1.35	1.40	-3.57%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
9.25	9.63	-3.95%	4.82	5.03	-4.17%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
37.00	38.50	-3.90%	19.28	20.10	-4.08%
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 16.5 System Verification Results 1800MHz HEAD TSL, 23 Sep 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
23 Sep 2019		1800	D1800V2	247	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	22.9	23	37%	250	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
38.44	40.00	-3.90%	1.31	1.40	-6.43%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
9.72	9.63	0.93%	5.09	5.03	1.19%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
38.88	38.50	0.99%	20.36	20.10	1.29%
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 16.6 System Verification Results 450MHz HEAD TSL, 24 Sep 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
24 Sep 2019		450	D450V3	1068	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.1	23	40%	250	15
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
45.59	43.50	4.80%	0.89	0.87	2.30%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
1.15	1.13	1.77%	0.77	0.75	2.52%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
4.60	4.53	1.55%	3.09	3.02	2.25%
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 16.7 System Verification Results 150MHz HEAD TSL, 01 Aug 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
09 Aug 2019		150	CLA-150	4007	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	24.1	24	32%	1000	0
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
50.15	52.30	-4.11%	0.78	0.76	2.63%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
3.91	3.90	0.26%	2.56	2.58	-0.78%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
3.91	3.87	1.03%	2.56	2.56	0.00%
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 16.7 System Verification Results 2450MHz HEAD TSL, 26 July 2019

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N	S/N	
26 July 2019		2450	D2450V2	825	
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.5	21	42%	250	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
38.91	39.20	-0.74%	1.91	1.80	6.11%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
14.00	13.30	5.26%	6.39	6.16	3.73%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
56.00	52.10	7.49%	25.56	24.30	5.19%
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.					

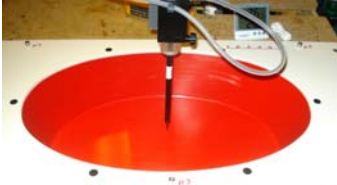
17.0 MEASUREMENT SYSTEM SPECIFICATIONS

Table 17.1 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

Table 17.2 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 6.4.0.12171 / DASY52 V10.2(1504)
	Postprocessing Software: SEMCAD X, V14.6.142(7470)
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	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 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 $\pm 8\%$)	
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 μ W/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 SAM 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 DASY4 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°. 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

18.0 TEST EQUIPMENT LIST

Table 18.1 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	19-Mar-19	19-Mar-20
-EX3DV4 E-Field Probe	00213	3600	26-Mar-19	26-Mar-20
-CLA 30 Validation Dipole	00300	1005	23-Nov-17	23-Nov-20
-CLA150 Validation Dipole	00251	4007	27-Apr-17	27-Apr-20
-D450V3 Validation Dipole	00221	1068	23-Apr-18	23-Apr-21
-D750V3 Validation Dipole	00238	1061	19-Mar-19	19-Mar-22
-D835V2 Validation Dipole	00217	4D075	20-Apr-18	20-Apr-21
-D900V2 Validation Dipole	00020	54	24-Apr-17	24-Apr-20
-D1640/1620-S-2 Validation Dipole	00299	207-00102	07-Nov-17	07-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	00248	1833687	26-Mar-19	26-Mar-22
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	29-May-20
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	00291	-	19-Nov-16	19-Nov-19
Traceable VWR Jumbo Humidity/Thermometer	00295	170120555	17-Feb-17	17-Feb-20
Digital Multi Meter DMR-1800	00250	TE182	6-22-17	6-22-20
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	-	10-Feb-17	10-Feb-20
Rental Equipment				
R&S Base Station (Mobile Phone)	n/a	153128	08-Apr-19	08-Apr-20

CNR = Calibration Not Required

SB=Stand By

COU = Calibrate on Use

* Per KDB 865664 3.2.2; Supporting documentation is included in the report for validation dipoles exceeding the recommended annual 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.

19.0 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
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	02-Apr-19	EX3DV4	3600	D2450V2	825	Head	36.58	1.85	Pass	Pass	Pass

20.0 FLUID COMPOSITION

Table 20.1 Fluid Composition 150MHz HEAD TSL

150			150MHz Head	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	Sugar	Salt ⁽¹⁾	HEC ⁽²⁾	Bacteriacide ⁽³⁾
38.35	55.5	5.15	0.9	0.1

(1) Non-Iodinized

(2) HydroxyEthyl-Cellulose: Sigma-Aldrich P/N 54290-500g

(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 20.2 Fluid Composition 450MHz HEAD TSL

450			450MHz Head	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	Sugar	Salt ⁽¹⁾	HEC ⁽²⁾	Bacteriacide ⁽³⁾
38.56	56.32	3.95	0.98	0.19

(1) Non-Iodinized

(2) HydroxyEthyl-Cellulose: Sigma-Aldrich P/N 54290-500g

(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 20.3 Fluid Composition 750MHz HEAD TSL

750			750MHz Head	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	Sugar	Salt ⁽¹⁾	HEC ⁽²⁾	Bacteriacide ⁽³⁾
40.71	56.63	1.48	0.99	0.19

(1) Non-Iodinized

(2) HydroxyEthyl-Cellulose: Sigma-Aldrich P/N 54290-500g

(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 20.4 Fluid Composition 835MHz HEAD TSL

835			835MHz Head	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	Sugar	Salt ⁽¹⁾	HEC ⁽²⁾	Bacteriacide ⁽³⁾
40.71	56.63	1.48	0.99	0.19

(1) Non-Iodinized

(2) HydroxyEthyl-Cellulose: Sigma-Aldrich P/N 54290-500g

(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 20.5 Fluid Composition 1800MHz HEAD TSL

1800MHz Head		Tissue Simulating Liquid (TSL) Composition		
Component by Percent Weight				
Water	Glycol			
54.8	44.9	0.3	0.0	0.0

(1) Non-Iodinized

(2) HydroxyEthyl-Cellulose: Sigma-Aldrich P/N 54290-500g

(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 20.6 Fluid Composition 2450MHz HEAD TSL

2450			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) HydroxyEthyl-Cellulose: Sigma-Aldrich P/N 54290-500g

(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 20.7 Fluid Composition 5250MHz HEAD TSL

This is a proprietary composition by SPEAG.

APPENDIX A – SYSTEM VERIFICATION PLOTS

Date/Time: 8/1/2019 3:58:14 PM,

Test Laboratory: Celltech Labs

SPC-835H Aug 01 2019

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d075

Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB; PMF: 1

Medium: TSL_835H[01AU19]

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ S/m; $\epsilon_r = 44.51$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.96, 7.96, 7.96); Calibrated: 3/26/2019, ConvF(7.96, 7.96, 7.96); Calibrated: 3/26/2019, ConvF(7.96, 7.96, 7.96); Calibrated: 3/26/2019;
 O Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = -1.5, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax;
- DASY52 52.10.1(1476);

Frequency: 835 MHz

SPC/SPC 835B, Target=2.41W/kg, 1.55W/kg, Input 250mW/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.50 W/kg

SPC/SPC 835B, Target=2.41W/kg, 1.55W/kg, Input 250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 50.32 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.68 W/kg

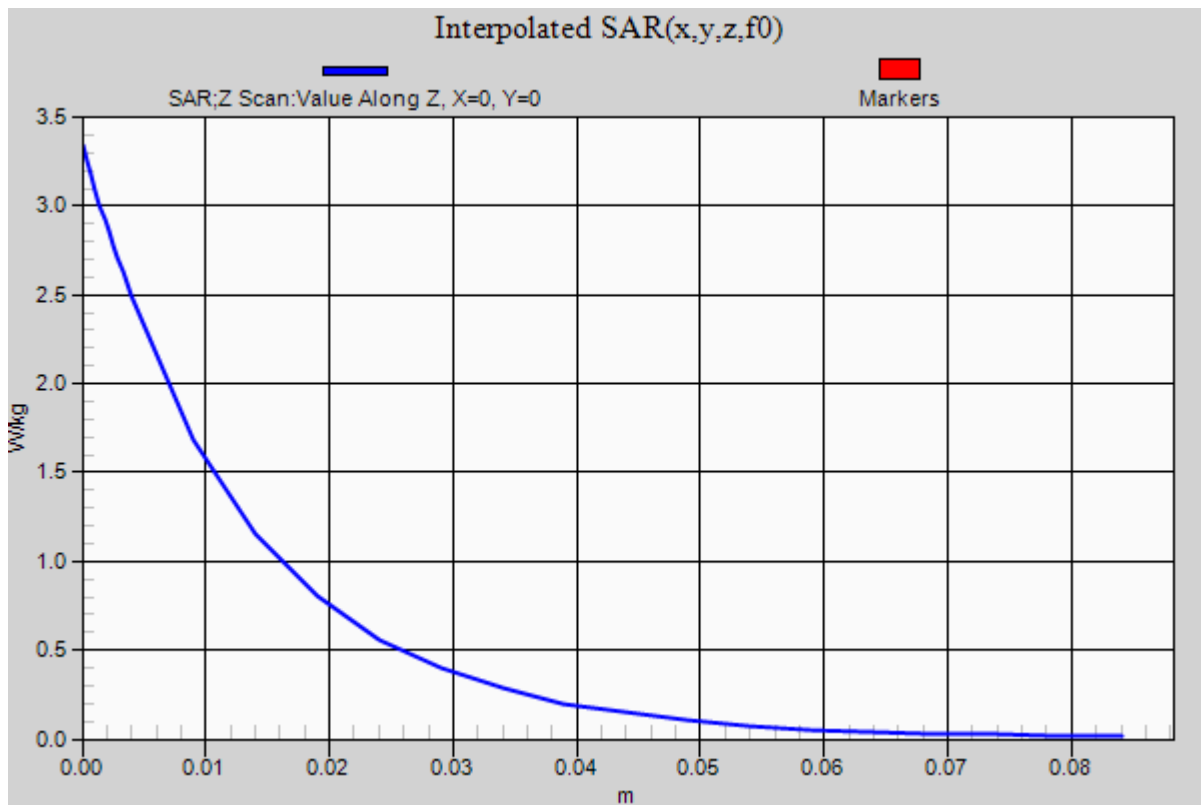
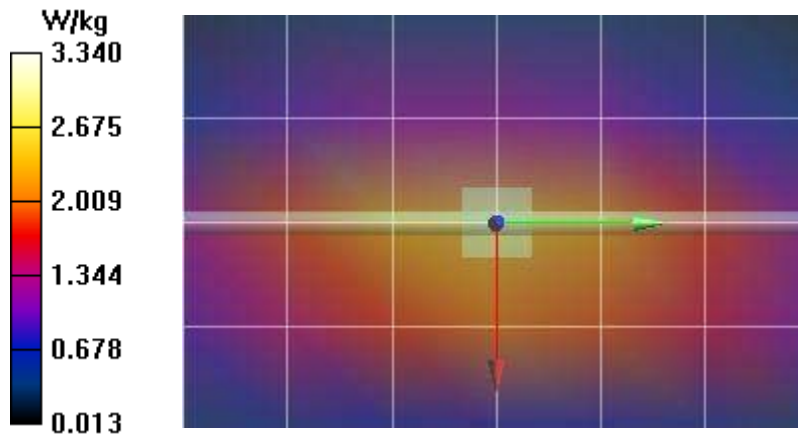
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.58 W/kg

Maximum value of SAR (measured) = 2.63 W/kg

SPC/SPC 835B, Target=2.41W/kg, 1.55W/kg, Input 250mW/Z Scan (1x1x28): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Penetration depth = 13.24 (12.68, 13.79) [mm]

Maximum value of SAR (interpolated) = 3.34 W/kg



Date/Time: 8/6/2019 10:14:02 AM

Test Laboratory: Celltech Labs

SPC-835H Aug 06 2019

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d075

Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB; PMF: 1

Medium: TSL_835H[06AU19]

Medium parameters used: $f = 835$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 40.91$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2011)

DASy Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.96, 7.96, 7.96); Calibrated: 3/26/2019, ConvF(7.96, 7.96, 7.96); Calibrated: 3/26/2019, ConvF(7.96, 7.96, 7.96); Calibrated: 3/26/2019;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = -1.5, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax;
- DASy52 52.10.1(1476);

Frequency: 835 MHz

SPC/SPC 835B, Target=2.41W/kg, 1.55W/kg, Input 250mW/Area Scan (5x7x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (measured) = 2.62 W/kg

SPC/SPC 835B, Target=2.41W/kg, 1.55W/kg, Input 250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 54.45 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.72 W/kg

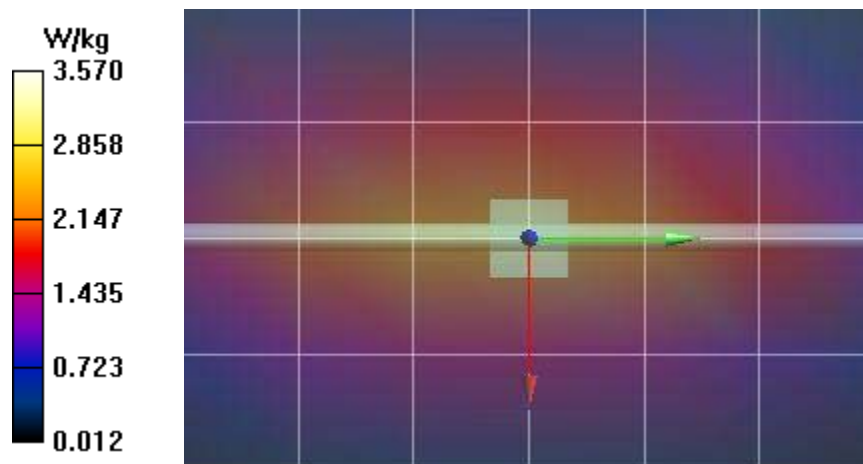
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.6 W/kg

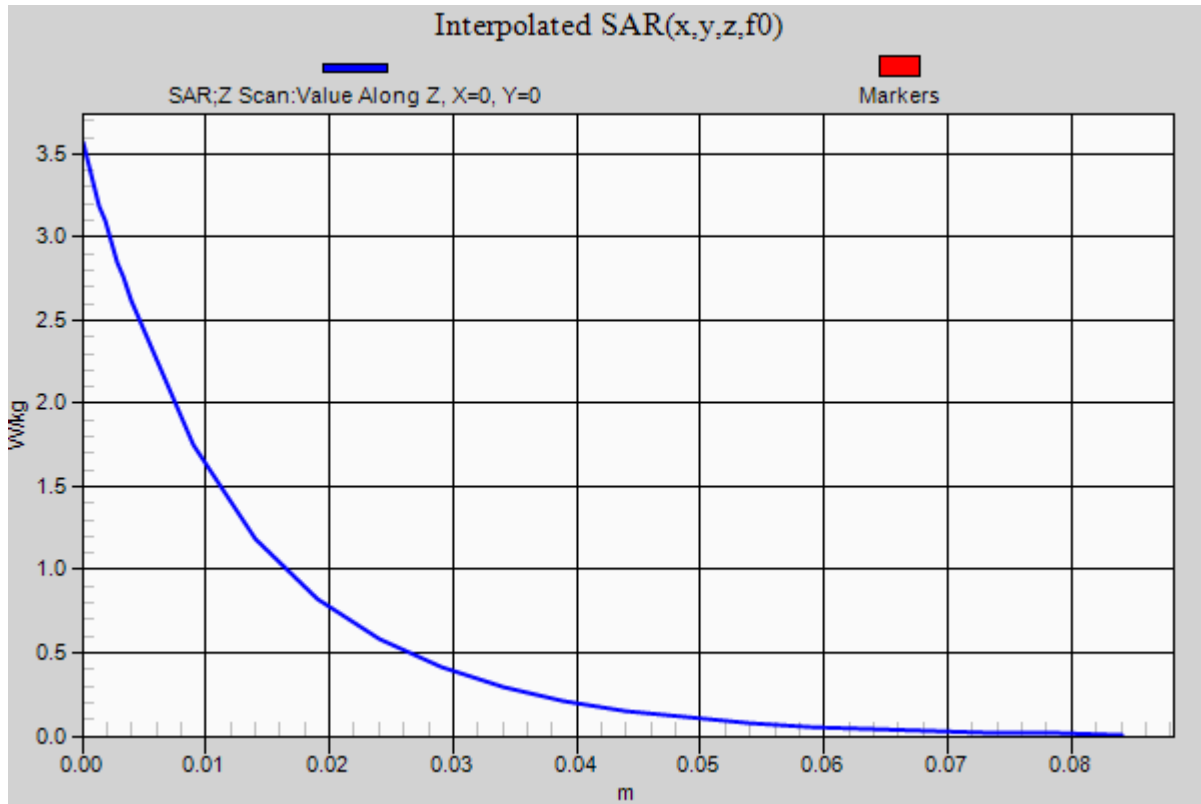
Maximum value of SAR (measured) = 2.66 W/kg

SPC/SPC 835B, Target=2.41W/kg, 1.55W/kg, Input 250mW/Z Scan (1x1x28): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=5$ mm

Penetration depth = 12.98 (12.41, 13.71) [mm]

Maximum value of SAR (interpolated) = 3.57 W/kg





Date/Time: 9/26/2019 8:58:01 AM

Test Laboratory: Celltech Labs

SPC-750H Sep 25 2019

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1061

Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 750 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: $f = 750$ MHz; $\sigma = 0.86$ S/m; $\epsilon_r = 44.15$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 750 MHz; Calibrated: 3/26/2019
O Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = -1.5, 31.0, 151.0
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

SPC/SPC 750H, Target=[2.08] [1.37] W/kg, Input 250mW/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.10 W/kg

SPC/SPC 750H, Target=[2.08] [1.37] W/kg, Input 250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 49.46 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 2.90 W/kg

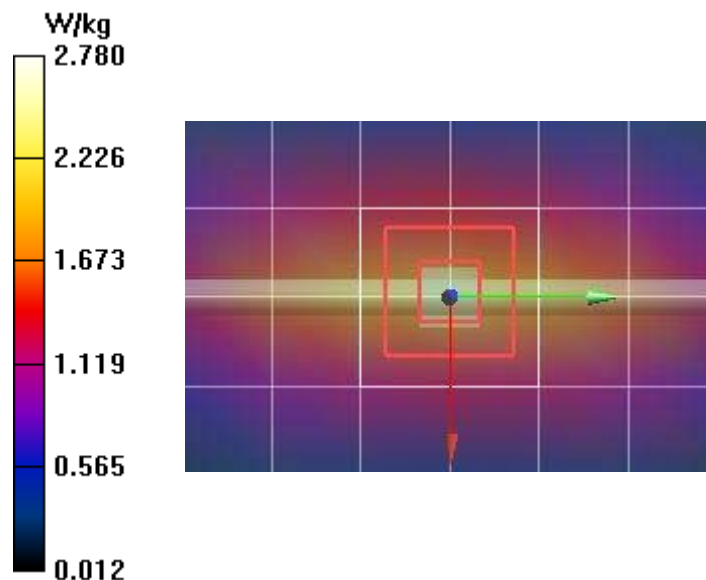
SAR(1 g) = 1.96 W/kg; SAR(10 g) = 1.3 W/kg

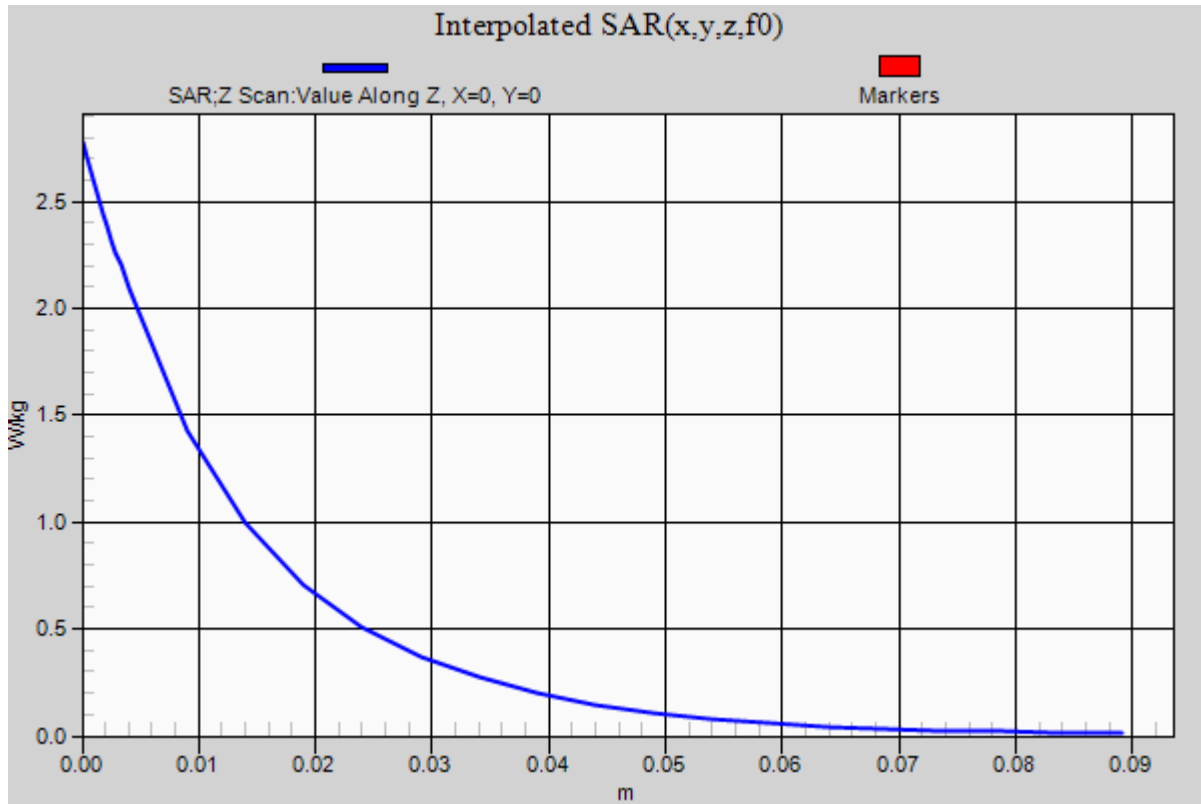
Maximum value of SAR (measured) = 2.12 W/kg

SPC/SPC 750H, Target=[2.08] [1.37] W/kg, Input 250mW/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Penetration depth = 13.94 (13.16, 14.64) [mm]

Maximum value of SAR (interpolated) = 2.78 W/kg





Date/Time: 9/19/2019 11:42:12 AM

Test Laboratory: Celltech Labs

SPC-1800H Sep 19 2019

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:247

Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 1800 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.35$ S/m; $\epsilon_r = 38.91$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.22, 7.22, 7.22) @ 1800 MHz; Calibrated: 3/26/2019
O Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = 16.0, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

SPC/SPC 1800H Input=250mW, Target=[9.63][5.03]W/kg/Area Scan (4x4x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (measured) = 9.18 W/kg

SPC/SPC 1800H Input=250mW, Target=[9.63][5.03]W/kg/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 86.94 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 17.1 W/kg

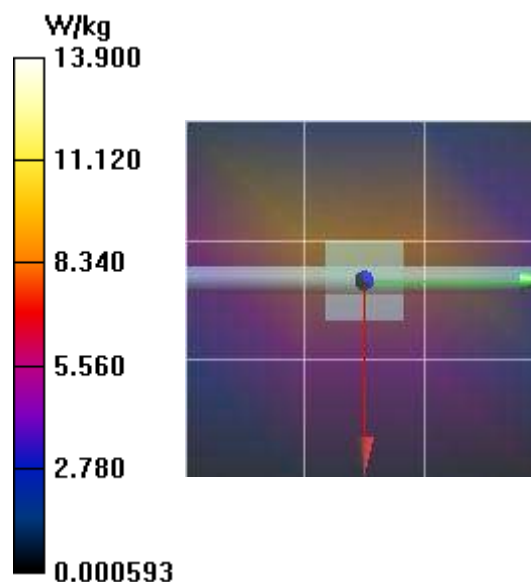
SAR(1 g) = 9.25 W/kg; SAR(10 g) = 4.82 W/kg

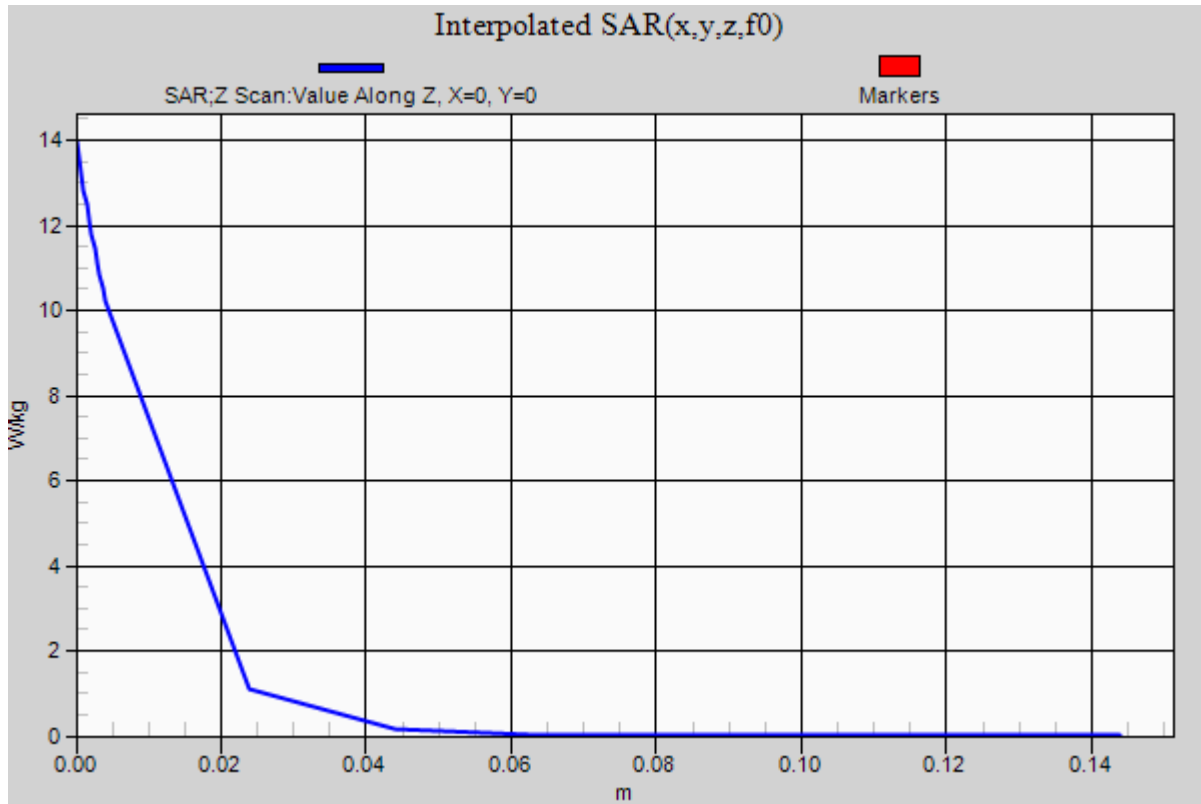
Maximum value of SAR (measured) = 10.4 W/kg

SPC/SPC 1800H Input=250mW, Target=[9.63][5.03]W/kg/Z Scan (1x1x19): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=20$ mm

Penetration depth = n/a (n/a, 9.076) [mm]

Maximum value of SAR (interpolated) = 13.9 W/kg





Date/Time: 9/23/2019 5:28:44 PM

Test Laboratory: Celltech Labs

SPC-1800H Sep 23 2019

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:247

Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 1800 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.31$ S/m; $\epsilon_r = 38.44$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.22, 7.22, 7.22) @ 1800 MHz; Calibrated: 3/26/2019
O Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = 16.0, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASYS 52.10.2(1504); SEMCAD X 14.6.12(7470)

SPC/SPC 1800H Input=250mW, Target=[9.63][5.03]W/kg/Area Scan (4x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 10.0 W/kg

SPC/SPC 1800H Input=250mW, Target=[9.63][5.03]W/kg/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 89.70 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 17.9 W/kg

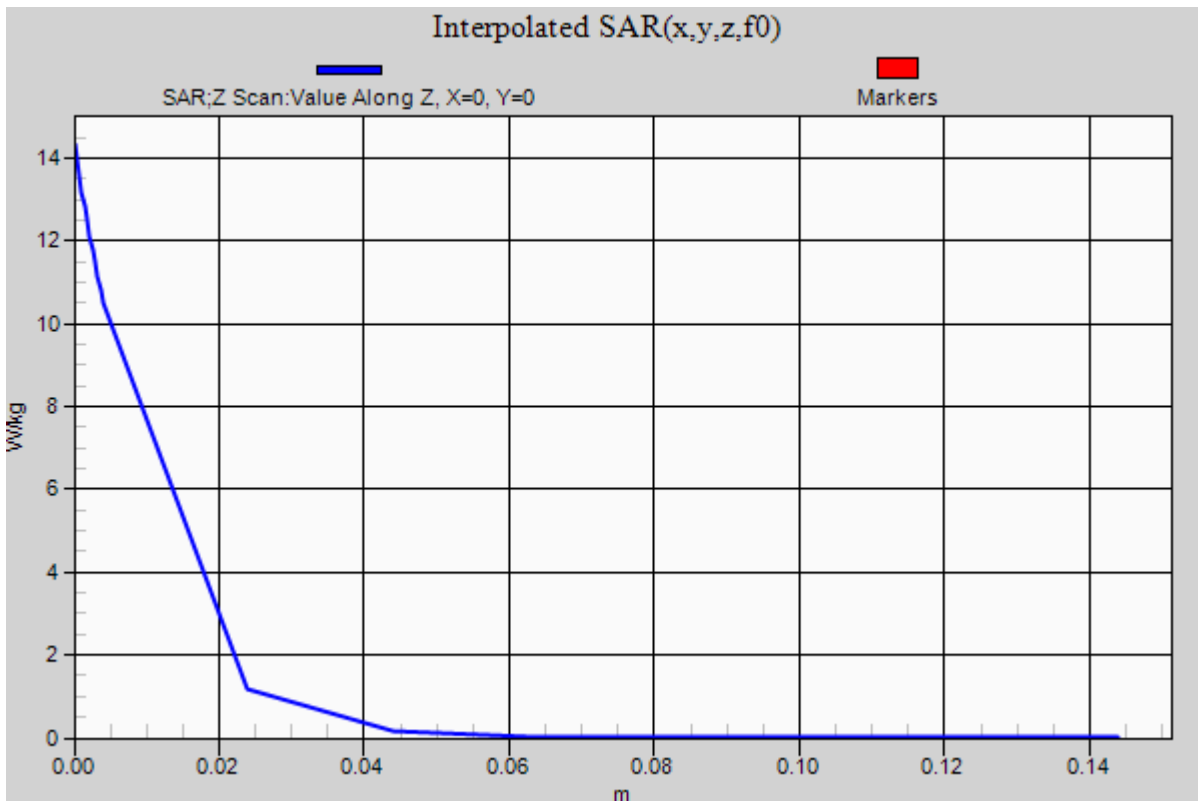
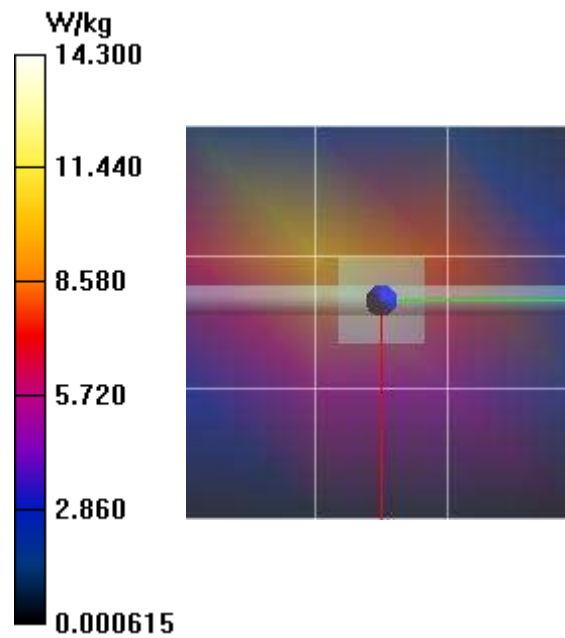
SAR(1 g) = 9.72 W/kg; SAR(10 g) = 5.09 W/kg

Maximum value of SAR (measured) = 10.9 W/kg

SPC/SPC 1800H Input=250mW, Target=[9.63][5.03]W/kg/Z Scan (1x1x19): Measurement grid: dx=20mm, dy=20mm, dz=20mm

Penetration depth = n/a (n/a, 9.138) [mm]

Maximum value of SAR (interpolated) = 14.3 W/kg



Date/Time: 9/24/2019 1:22:39 PM

Test Laboratory: Celltech Labs

SPC-450H Sep 24 2019

DUT: Dipole 450 MHz D450V3; Type: D450V3; Serial: D450V3 - SN:1068

Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 450 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: $f = 450$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 45.59$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.79, 8.79, 8.79) @ 450 MHz; Calibrated: 3/26/2019
O Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = -1.5, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

SPC/SPC 450H, Input 250mW, Target[1.13][0.753] W/kg/Area Scan (6x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.18 W/kg

SPC/SPC 450H, Input 250mW, Target[1.13][0.753] W/kg/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 37.40 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.70 W/kg

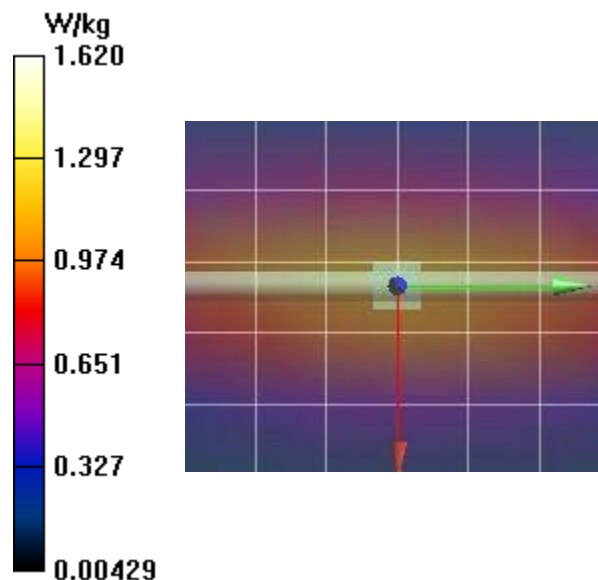
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.772 W/kg

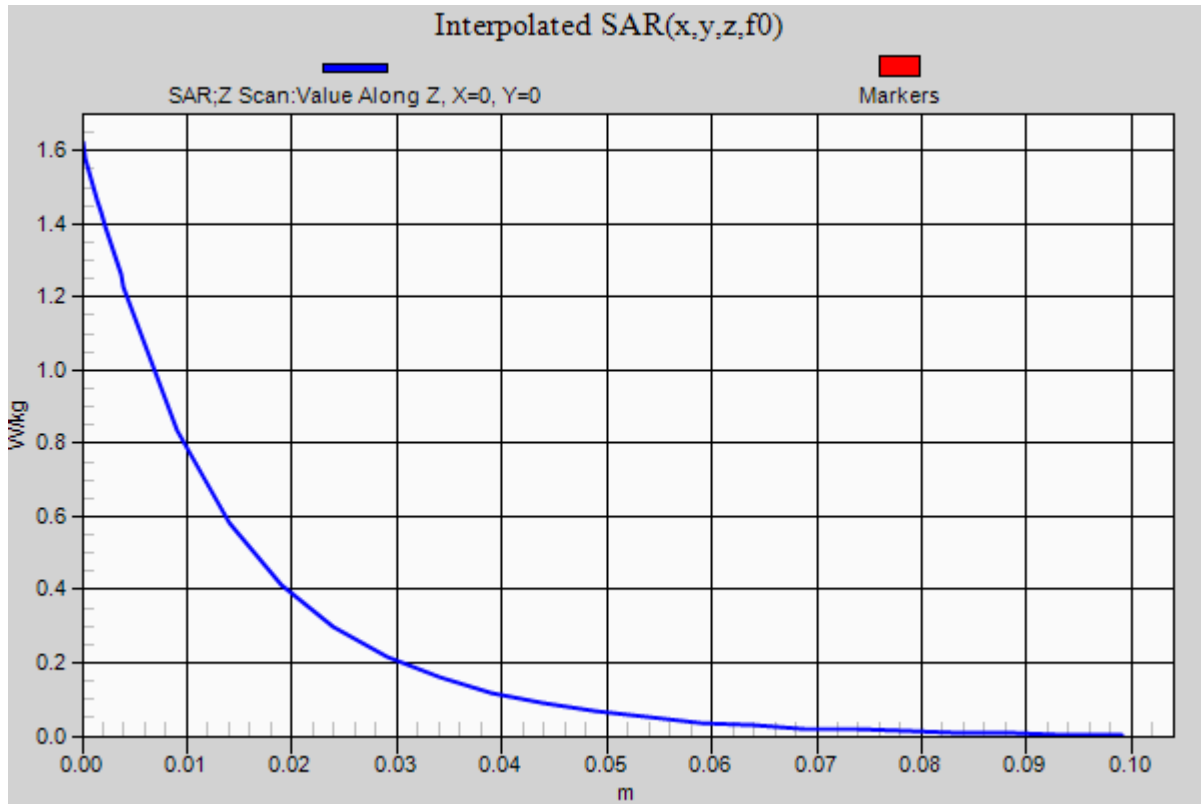
Maximum value of SAR (measured) = 1.23 W/kg

SPC/SPC 450H, Input 250mW, Target[1.13][0.753] W/kg/Z Scan (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Penetration depth = 13.86 (13.03, 14.67) [mm]

Maximum value of SAR (interpolated) = 1.62 W/kg





Date/Time: 8/9/2019 12:38:39 PM,

Test Laboratory: Celltech Labs

SPC-150H Aug 09 2019

DUT: CLA-150; Type: CLA-150; Serial: 4007

Communication System: UID 0, CW (0); Communication System Band: FullSpan (0.0 - 6000.0 MHz); Frequency: 150 MHz; Communication System PAR: 0 dB; PMF: 1

Medium: TSL_150H[09AU19]

Medium parameters used: $f = 150$ MHz; $\sigma = 0.78$ S/m; $\epsilon_r = 50.15$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(9.72, 9.72, 9.72); Calibrated: 3/26/2019, ConvF(9.72, 9.72, 9.72); Calibrated: 3/26/2019, ConvF(9.72, 9.72, 9.72); Calibrated: 3/26/2019;
O Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = 16.0, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax;
- DASY52 52.10.1(1476);

Frequency: 150 MHz

SPC/SPC 150H Input=1.0W, Target=[3.90W/kg][2.58W/kg]/Area Scan (9x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 4.12 W/kg

SPC/SPC 150H Input=1.0W, Target=[3.90W/kg][2.58W/kg]/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 72.78 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 6.09 W/kg

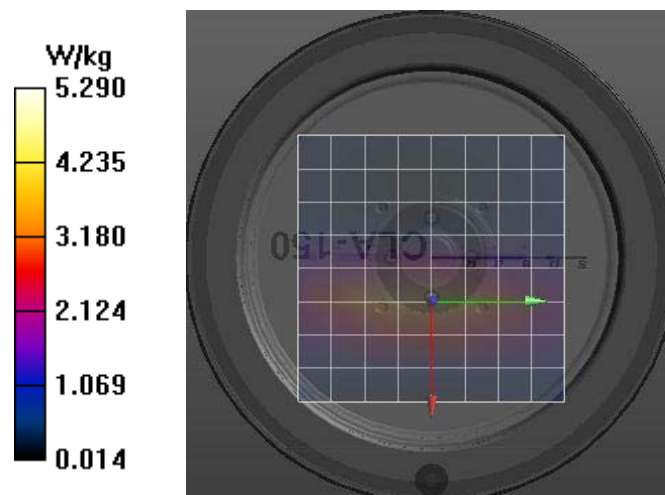
SAR(1 g) = 3.91 W/kg; SAR(10 g) = 2.56 W/kg

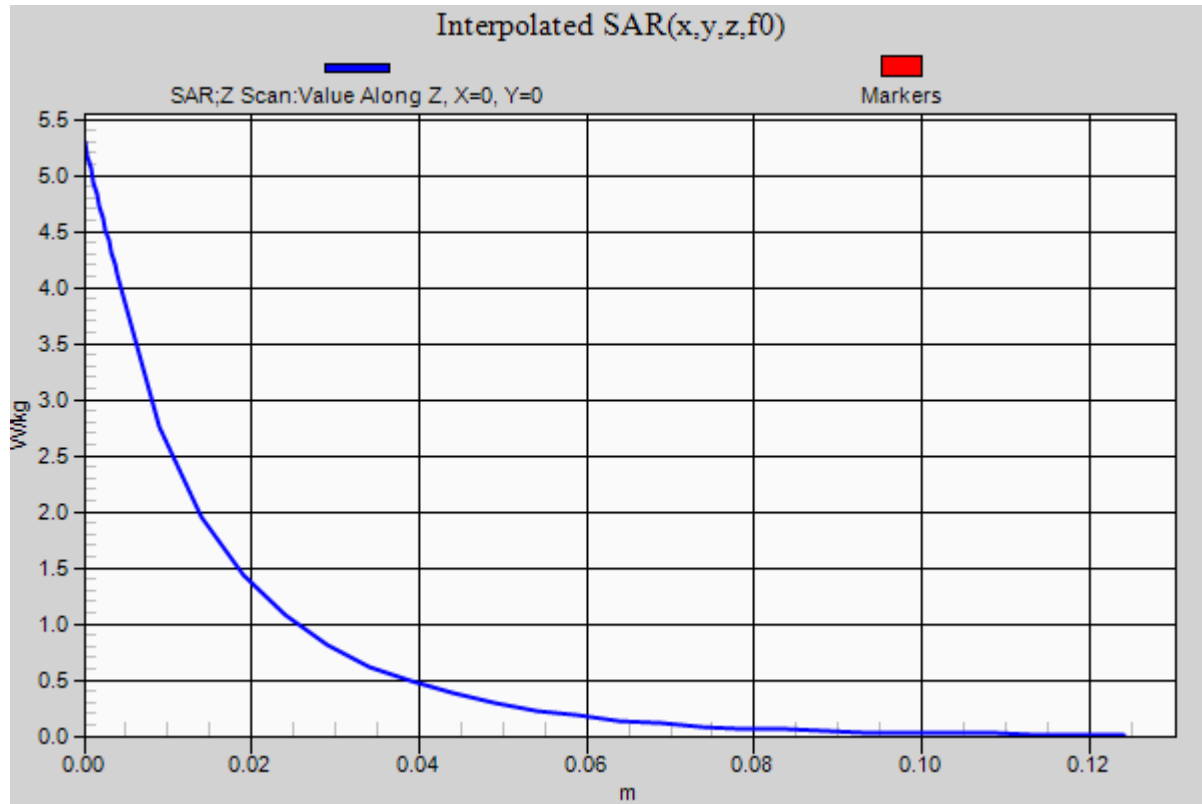
Maximum value of SAR (measured) = 4.19 W/kg

SPC/SPC 150H Input=1.0W, Target=[3.90W/kg][2.58W/kg]/Z Scan (1x1x36): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Penetration depth = 14.53 (12.59, 16.02) [mm]

Maximum value of SAR (interpolated) = 5.29 W/kg





Date/Time: 7/26/2019 9:50:36 AM

Test Laboratory: Celltech Labs

SPC-2450H Jul 26 2019

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: TSL_2450H[26JL19]

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.91$ S/m; $\epsilon_r = 38.91$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(6.46, 6.46, 6.46); Calibrated: 3/26/2019, ConvF(6.46, 6.46, 6.46); Calibrated: 3/26/2019, ConvF(6.46, 6.46, 6.46); Calibrated: 3/26/2019;
O Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = -1.5, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax;
- DASY52 52.10.1(1476);

Frequency: 2450 MHz

SPC/SPC 2450H Input=250mw, Target=13.3W/kg/Area Scan (4x9x1): Measurement grid: $dx=12$ mm, $dy=12$ mm

Maximum value of SAR (measured) = 12.3 W/kg

SPC/SPC 2450H Input=250mw, Target=13.3W/kg/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 96.24 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 30.3 W/kg

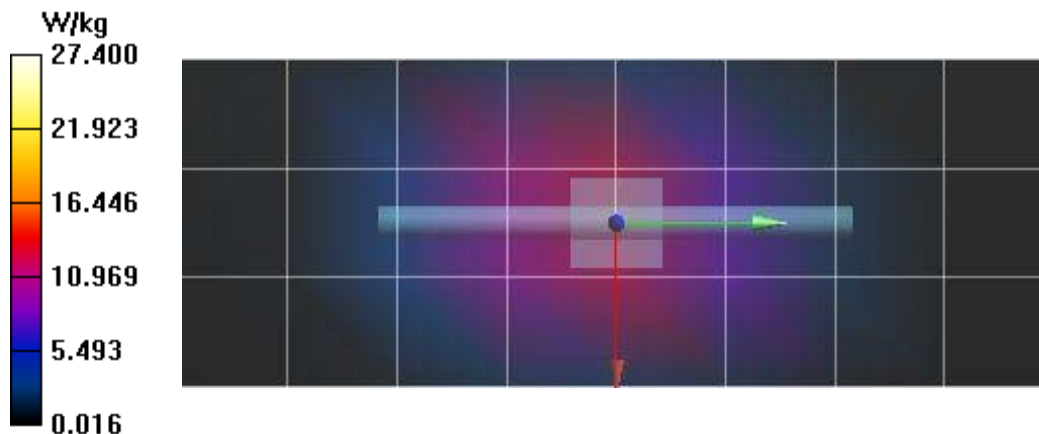
SAR(1 g) = 14 W/kg; SAR(10 g) = 6.39 W/kg

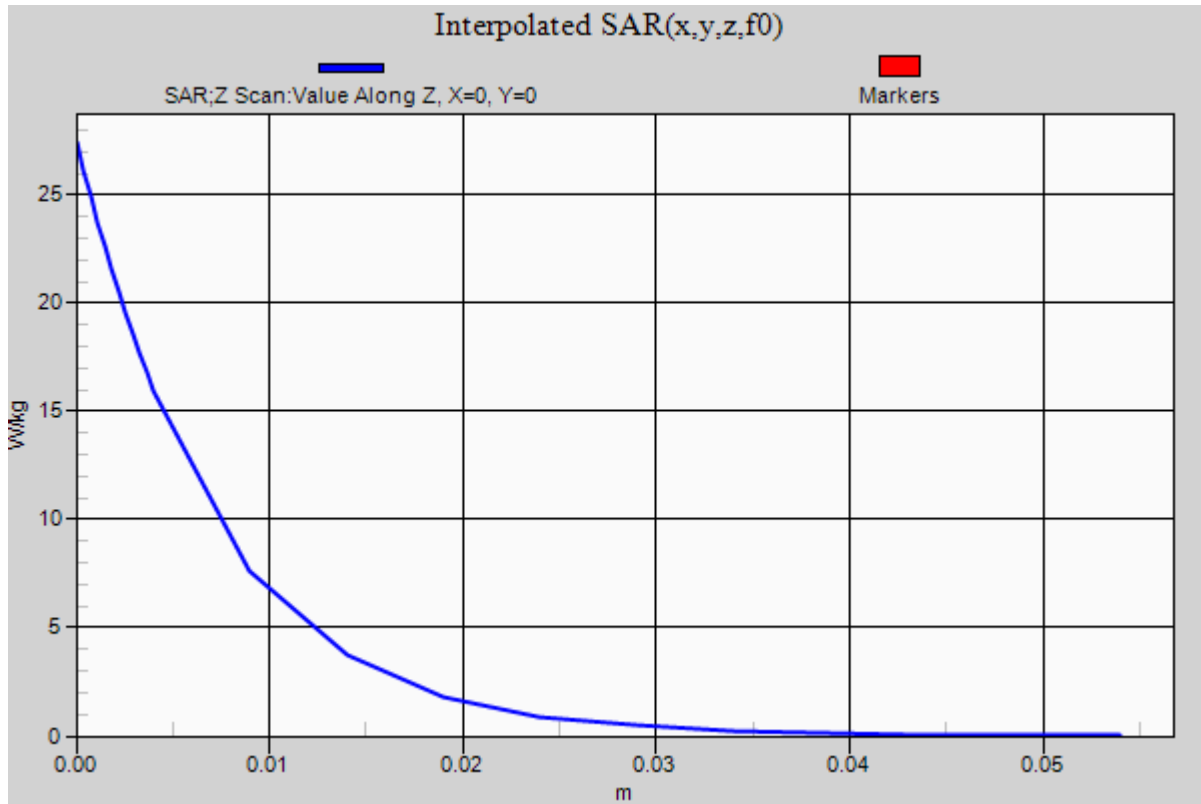
Maximum value of SAR (measured) = 15.9 W/kg

SPC/SPC 2450H Input=250mw, Target=13.3W/kg/Z Scan (1x1x22): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=5$ mm

Penetration depth = 6.994 (6.709, 7.155) [mm]

Maximum value of SAR (interpolated) = 27.4 W/kg





APPENDIX B – MEASUREMENT PLOTS OF MAXIMUM MEASURED SAR

B169

Date/Time: 9/23/2019 7:14:20 PM

Test Laboratory: Celltech Labs

Harris EVM3-U15 Compliance Band 4&6&2 LTE EVAL- Sep 23 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10169 - CAE, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK); Communication System Band: Band 2, E-UTRA/FDD (1850.0 - 1910.0 MHz); Frequency: 1900 MHz; Communication System PAR: 5.73 dB; PMF: 1.13894
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 37.92$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

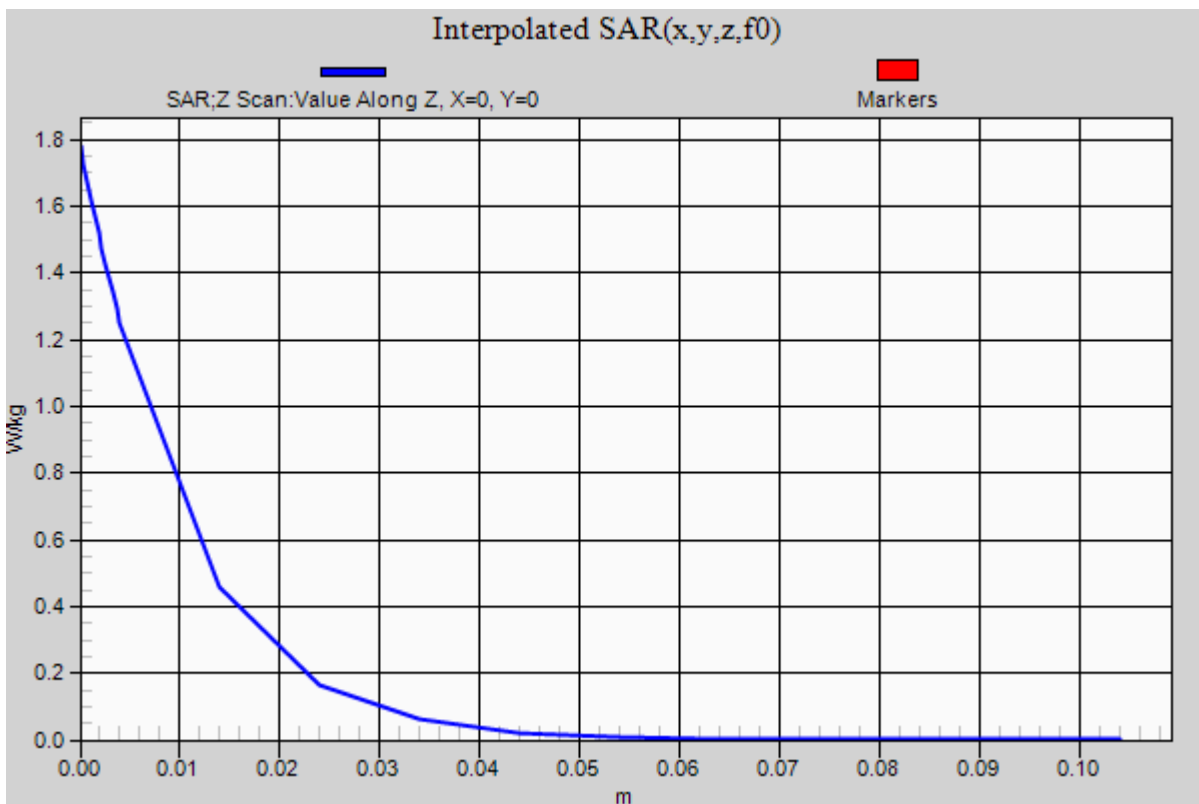
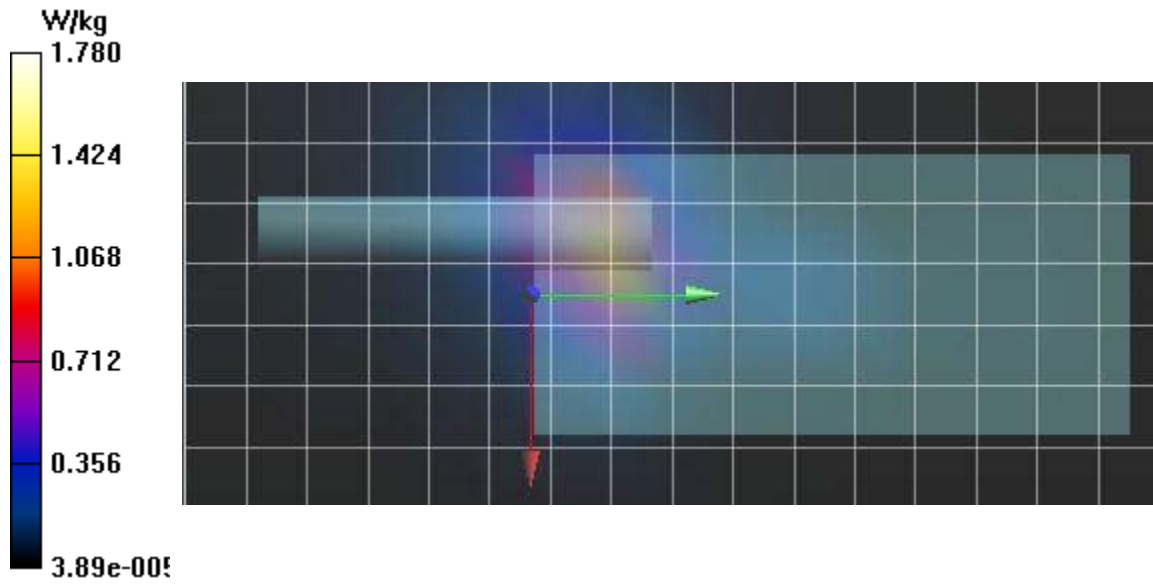
DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.22, 7.22, 7.22) @ 1900 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10169 - CAE, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

1800H/B169 -BODY, Harris EVM3 U15, P7, T9,B1, LTE B2, BW-20, CH-H, RB1-M, 1900 MHz 2 2/Area Scan (8x17x1): Measurement grid: $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (measured) = 1.16 W/kg

1800H/B169 -BODY, Harris EVM3 U15, P7, T9,B1, LTE B2, BW-20, CH-H, RB1-M, 1900 MHz 2 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm
Reference Value = 15.24 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.93 W/kg
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.636 W/kg
Maximum value of SAR (measured) = 1.28 W/kg

1800H/B169 -BODY, Harris EVM3 U15, P7, T9,B1, LTE B2, BW-20, CH-H, RB1-M, 1900 MHz 2 2/Z Scan (1x1x22): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=10$ mm
Penetration depth = 9.903 (n/a, 9.882) [mm]
Maximum value of SAR (interpolated) = 1.78 W/kg



Plot F58

Date/Time: 9/20/2019 3:16:42 PM

Test Laboratory: Celltech Labs

Harris EVM3-U15 Compliance Band 4&66&2 LTE EVAL- Sep 20 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10169 - CAE, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK); Communication System Band: Band 2, E-UTRA/FDD (1850.0 - 1910.0 MHz); Frequency: 1900 MHz; Communication System PAR: 5.73 dB; PMF: 1.13894
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.47$ S/m; $\epsilon_r = 38.44$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

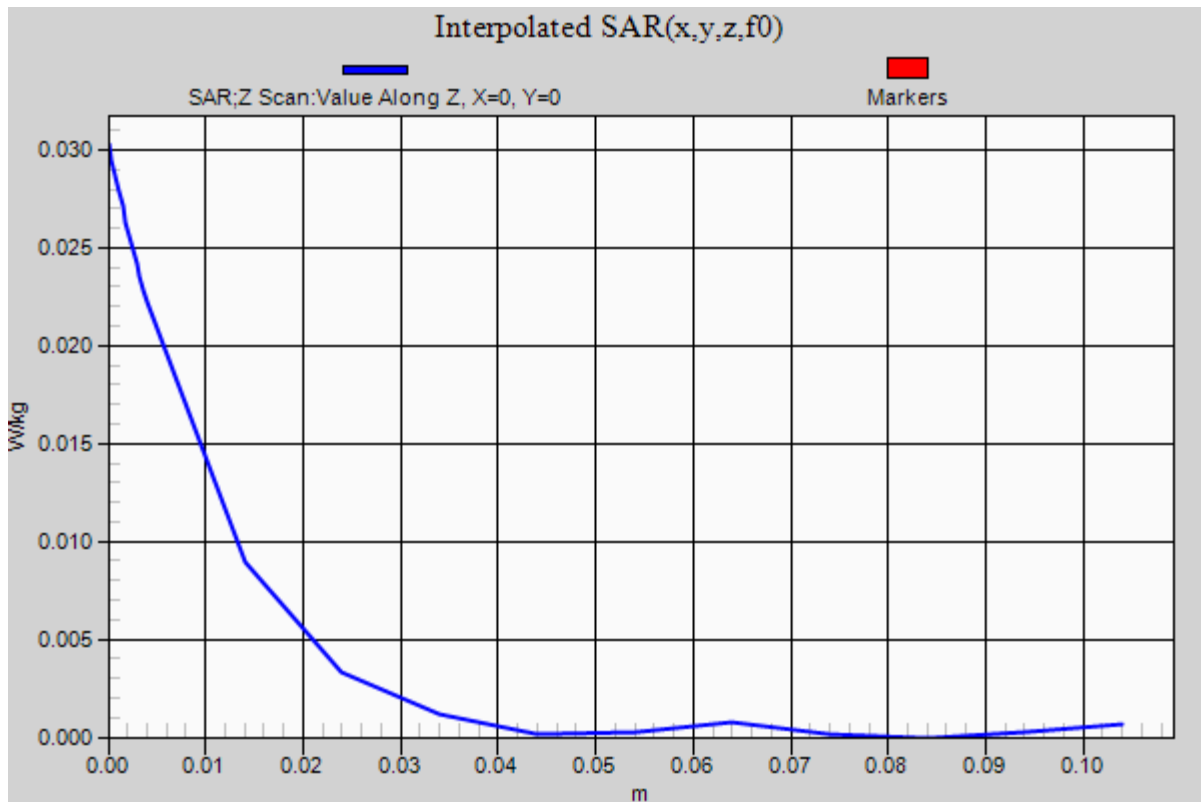
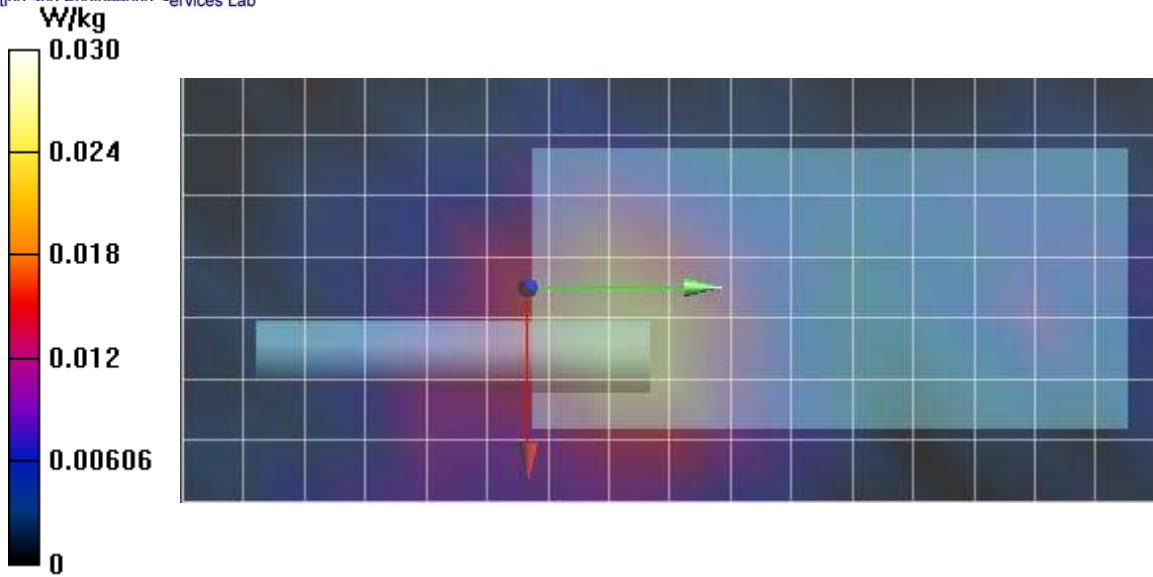
- Probe: EX3DV4 - SN3600; ConvF(7.22, 7.22, 7.22) @ 1900 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10169 - CAE, Calibrated: 3/26/2019
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), $z = -1.5, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

1800H/F58 - FACE, Harris EVM3 U15, P7, T9, LTE B2, BW-20, CH-H, RB1-M, 1900 MHz/Area Scan (8x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0196 W/kg

1800H/F58 - FACE, Harris EVM3 U15, P7, T9, LTE B2, BW-20, CH-H, RB1-M, 1900 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 3.309 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.0340 W/kg
SAR(1 g) = 0.021 W/kg; SAR(10 g) = 0.014 W/kg

Maximum value of SAR (measured) = 0.0230 W/kg

1800H/F58 - FACE, Harris EVM3 U15, P7, T9, LTE B2, BW-20, CH-H, RB1-M, 1900 MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm
Penetration depth = 10.98 (n/a, 10.25) [mm]
Maximum value of SAR (interpolated) = 0.0303 W/kg



Plot B155

Date/Time: 8/7/2019 1:27:31 PM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance Band 5,13,14 LTE EVAL- Aug 07 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 5, E-UTRA/FDD (824.0 - 849.0 MHz); Frequency: 836.5 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894
Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.893$ S/m; $\epsilon_r = 40.832$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2011)

DASy Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.96, 7.96, 7.96) @ 836.5 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = -1.5, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASy52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/B155-BODY, Harris EVM3 U15, P2, T9, B26/STRAP, LTE B5, BW-10, CH-M, RB1-L, 836.5 MHz/Area Scan (7x13x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.576 W/kg

835H/B155-BODY, Harris EVM3 U15, P2, T9, B26/STRAP, LTE B5, BW-10, CH-M, RB1-L, 836.5 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 7.138 V/m; Power Drift = -2.87 dB

Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 0.447 W/kg; SAR(10 g) = 0.178 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

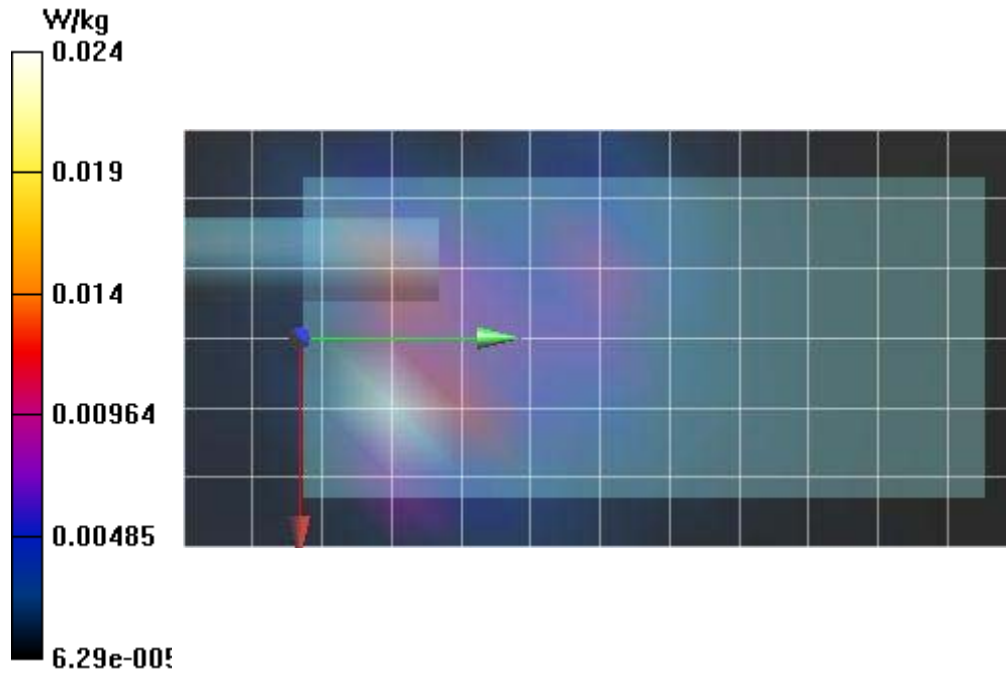
Maximum value of SAR (measured) = 0.545 W/kg

835H/B155-BODY, Harris EVM3 U15, P2, T9, B26/STRAP, LTE B5, BW-10, CH-M, RB1-L, 836.5 MHz/Z Scan (1x1x28): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=5$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 308.1 (89.69, 69.83) [mm]

Maximum value of SAR (interpolated) = 0.0240 W/kg



Plot F49

Date/Time: 8/7/2019 1:53:59 PM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance Band 5,13,14 LTE EVAL- Aug 07 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 5, E-UTRA/FDD (824.0 - 849.0 MHz); Frequency: 836.5 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894
Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.893$ S/m; $\epsilon_r = 40.832$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.96, 7.96, 7.96) @ 836.5 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- Sensor-Surface: 4mm (Mechanical Surface Detection), $z = -1.5, 31.0, 151.0$
- Electronics: DAE4 Sn353; Calibrated: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/F49-FACE, Harris EVM3 U15, P2, T9, LTE B5, BW-10, CH-M, RB1-L, 836.5 MHz/Area Scan (7x13x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.00933 W/kg

835H/F49-FACE, Harris EVM3 U15, P2, T9, LTE B5, BW-10, CH-M, RB1-L, 836.5 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 1.523 V/m; Power Drift = 1.04 dB

Peak SAR (extrapolated) = 0.00972 W/kg

SAR(1 g) = 0.00703 W/kg; SAR(10 g) = 0.00507 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

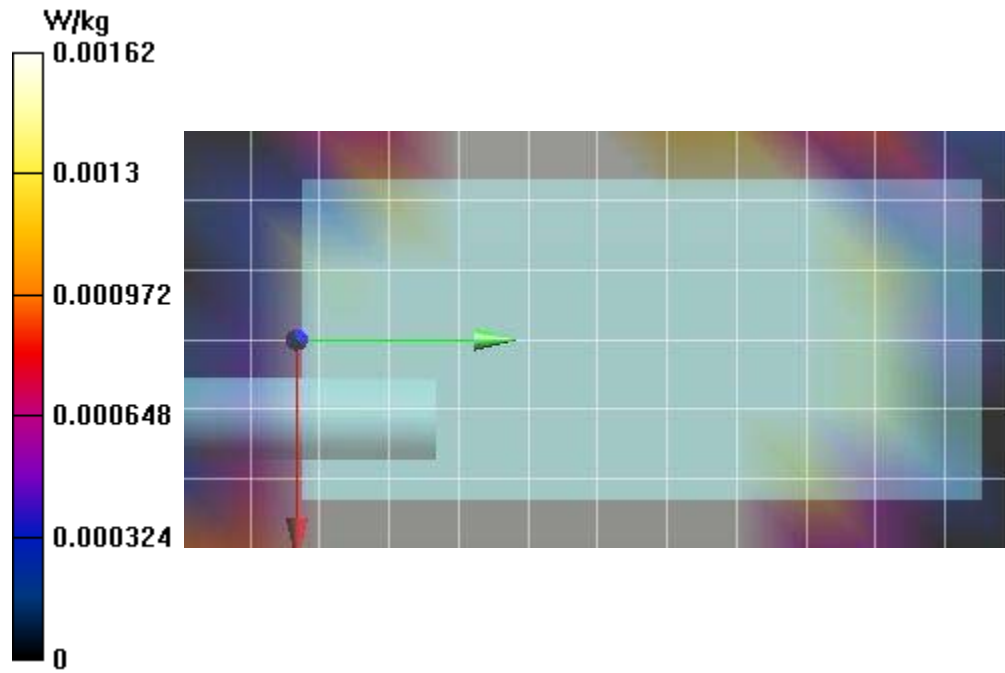
Maximum value of SAR (measured) = 0.00749 W/kg

835H/F49-FACE, Harris EVM3 U15, P2, T9, LTE B5, BW-10, CH-M, RB1-L, 836.5 MHz/Z Scan (1x1x28): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=5$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 8.023 (6.707, 25.93) [mm]

Maximum value of SAR (interpolated) = 0.00162 W/kg



Plot B174

Date/Time: 9/26/2019 11:00:45 AM

Test Laboratory: Celltech Labs

Harris EVM3- Compliance Band 12 LTE EVAL- Sep 26 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 12, E-UTRA/FDD (699.0 - 716.0 MHz); Frequency: 707.5 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894
Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.807$ S/m; $\epsilon_r = 44.815$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 707.5 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

750H/B174-BODY, Harris EVM3 U15, P7, T9, B26/Strap, LTE B12, BW-10, CH-M, RB-H, 707.5 MHz 2/Area Scan (8x17x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.0273 W/kg

750H/B174-BODY, Harris EVM3 U15, P7, T9, B26/Strap, LTE B12, BW-10, CH-M, RB-H, 707.5 MHz 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 1.675 V/m; Power Drift = 0.49 dB

Peak SAR (extrapolated) = 0.0530 W/kg

SAR(1 g) = 0.029 W/kg; SAR(10 g) = 0.017 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

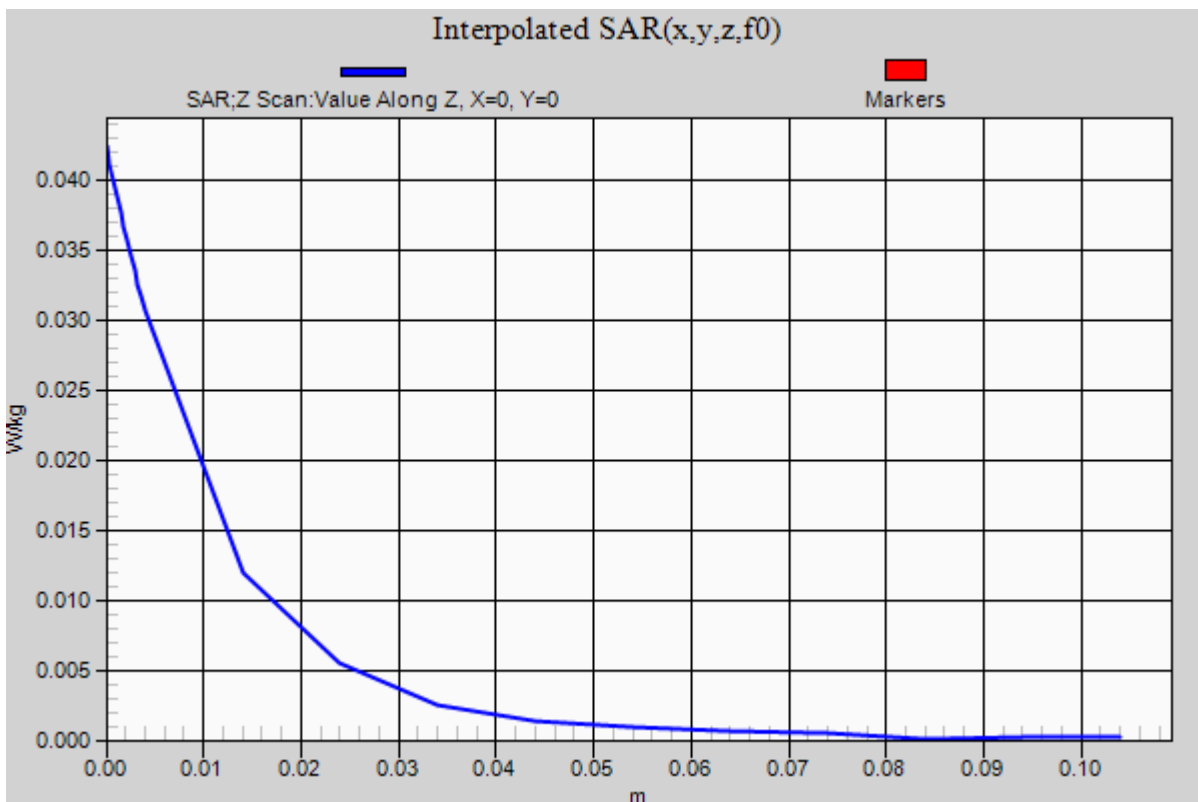
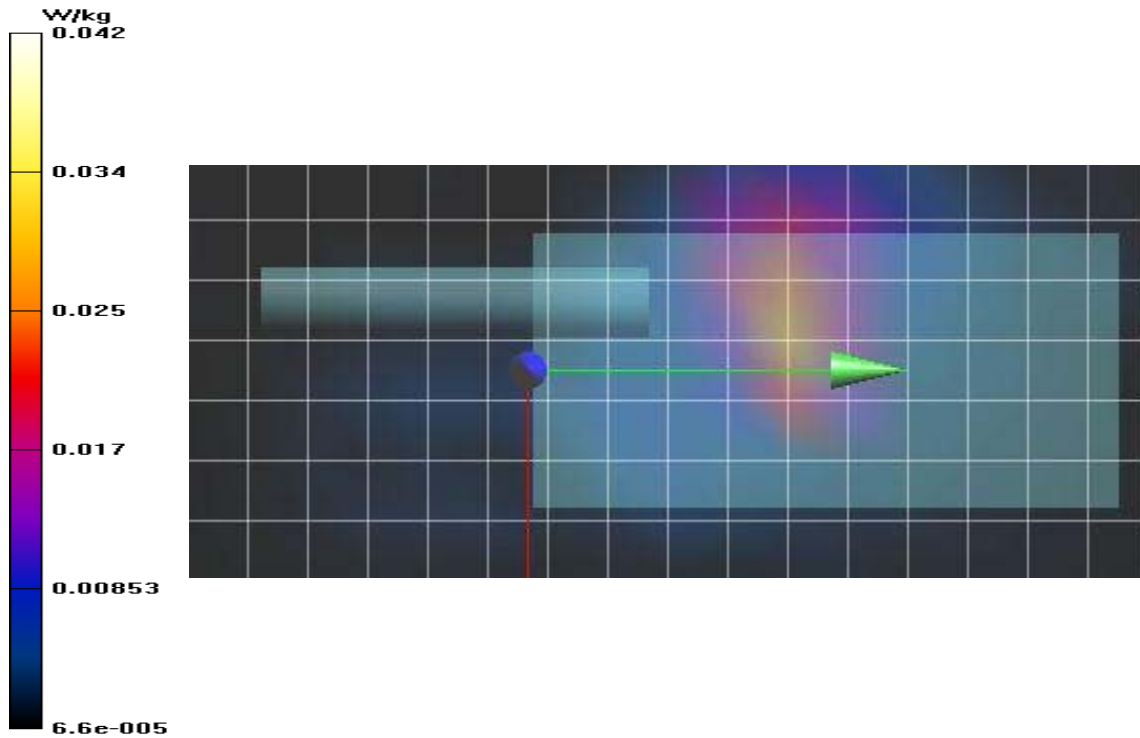
Maximum value of SAR (measured) = 0.0310 W/kg

750H/B174-BODY, Harris EVM3 U15, P7, T9, B26/Strap, LTE B12, BW-10, CH-M, RB-H, 707.5 MHz 2/Z Scan (1x1x22): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=10$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 10.61 (n/a, 12.96) [mm]

Maximum value of SAR (interpolated) = 0.0424 W/kg



Plot B273

Date/Time: 9/26/2019 11:00:45 AM

Test Laboratory: Celltech Labs

Harris EVM3- Compliance Band 12 LTE EVAL- Sep 26 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 12, E-UTRA/FDD (699.0 - 716.0 MHz); Frequency: 707.5 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894
Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.807$ S/m; $\epsilon_r = 44.815$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 707.5 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

750H/B273-BODY, Harris EVM3 U15, P7, T9, B26/Strap, LTE B12, BW-10, CH-M, RB-H, 707.5 MHz 2/Area Scan (8x17x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.0273 W/kg

750H/B273-BODY, Harris EVM3 U15, P7, T9, B26/Strap, LTE B12, BW-10, CH-M, RB-H, 707.5 MHz 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 1.675 V/m; Power Drift = 0.49 dB

Peak SAR (extrapolated) = 0.0530 W/kg

SAR(1 g) = 0.029 W/kg; SAR(10 g) = 0.017 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

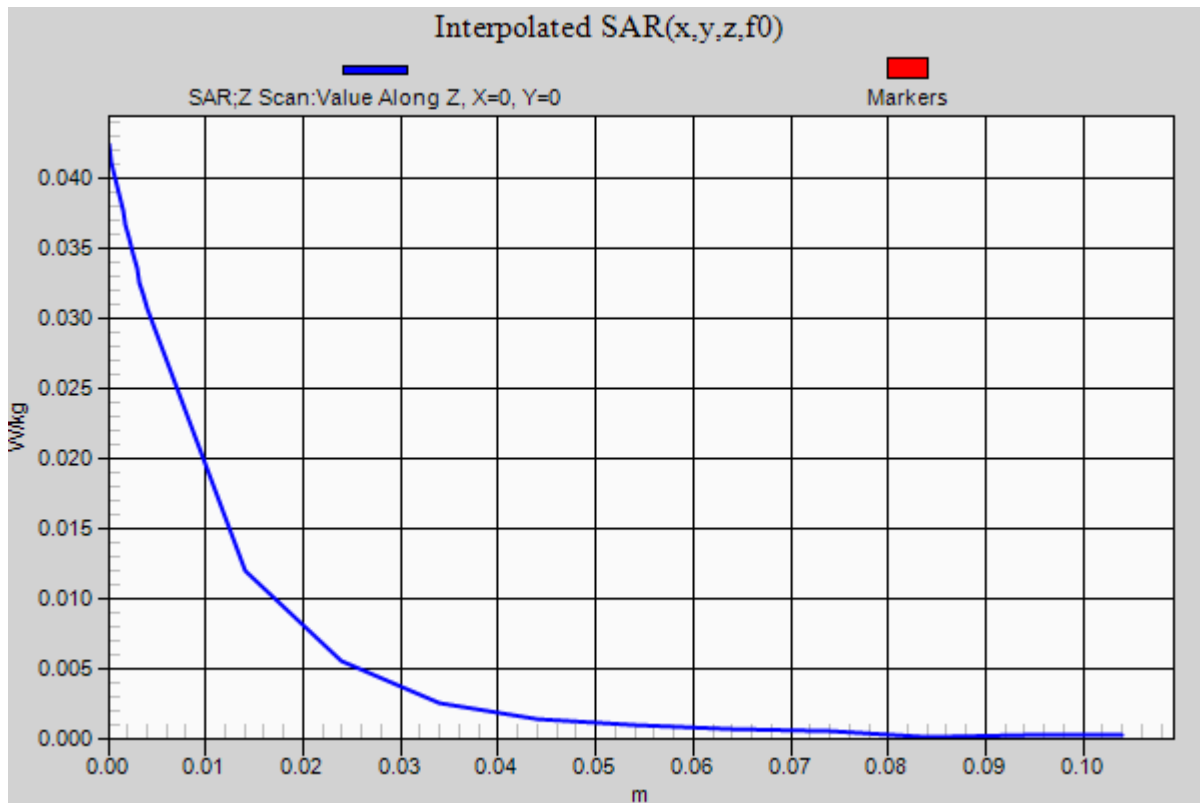
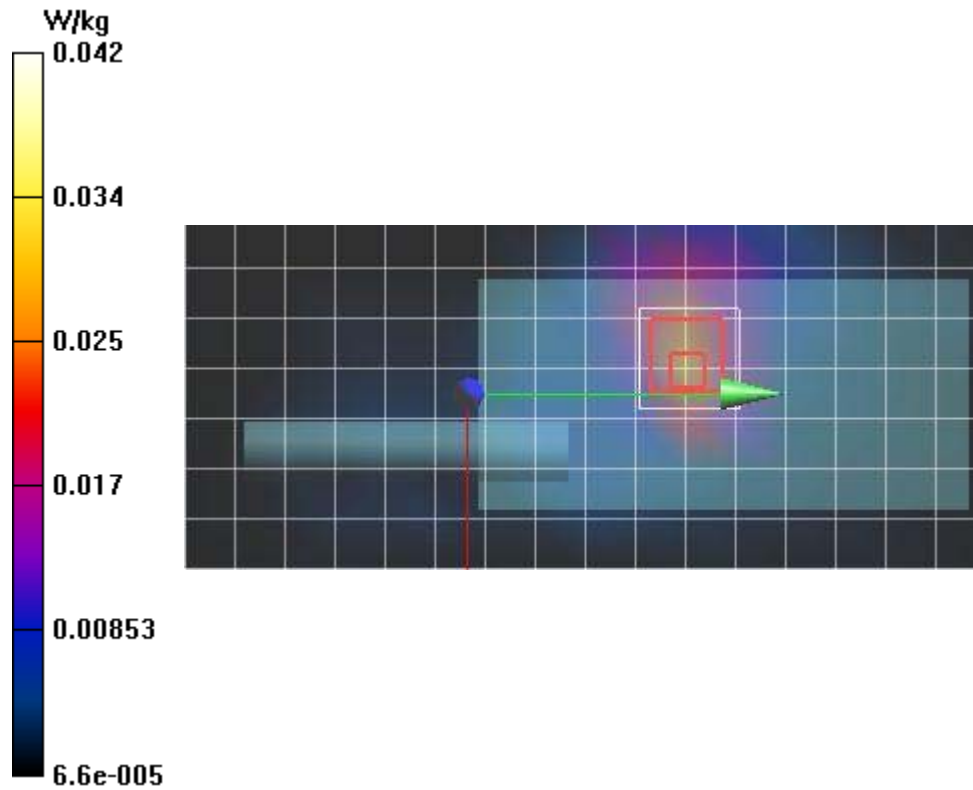
Maximum value of SAR (measured) = 0.0310 W/kg

750H/B273-BODY, Harris EVM3 U15, P7, T9, B26/Strap, LTE B12, BW-10, CH-M, RB-H, 707.5 MHz 2/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 10.61 (n/a, 12.96) [mm]

Maximum value of SAR (interpolated) = 0.0424 W/kg



Plot F61

Date/Time: 9/27/2019 8:56:02 AM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance Band 12 LTE EVAL- Sep 27 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 12, E-UTRA/FDD (699.0 - 716.0 MHz); Frequency: 707.5 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894
Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.807$ S/m; $\epsilon_r = 44.815$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 707.5 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

750H/F61-FACE, Harris EVM3 U15, P2, T9, LTE B12, CH-M, RB1-H, 707.5 MHz 3/Area Scan (8x17x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.00843 W/kg

750H/F61-FACE, Harris EVM3 U15, P2, T9, LTE B12, CH-M, RB1-H, 707.5 MHz 3/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 2.095 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.00844 W/kg

SAR(1 g) = 0.00651 W/kg; SAR(10 g) = 0.00492 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

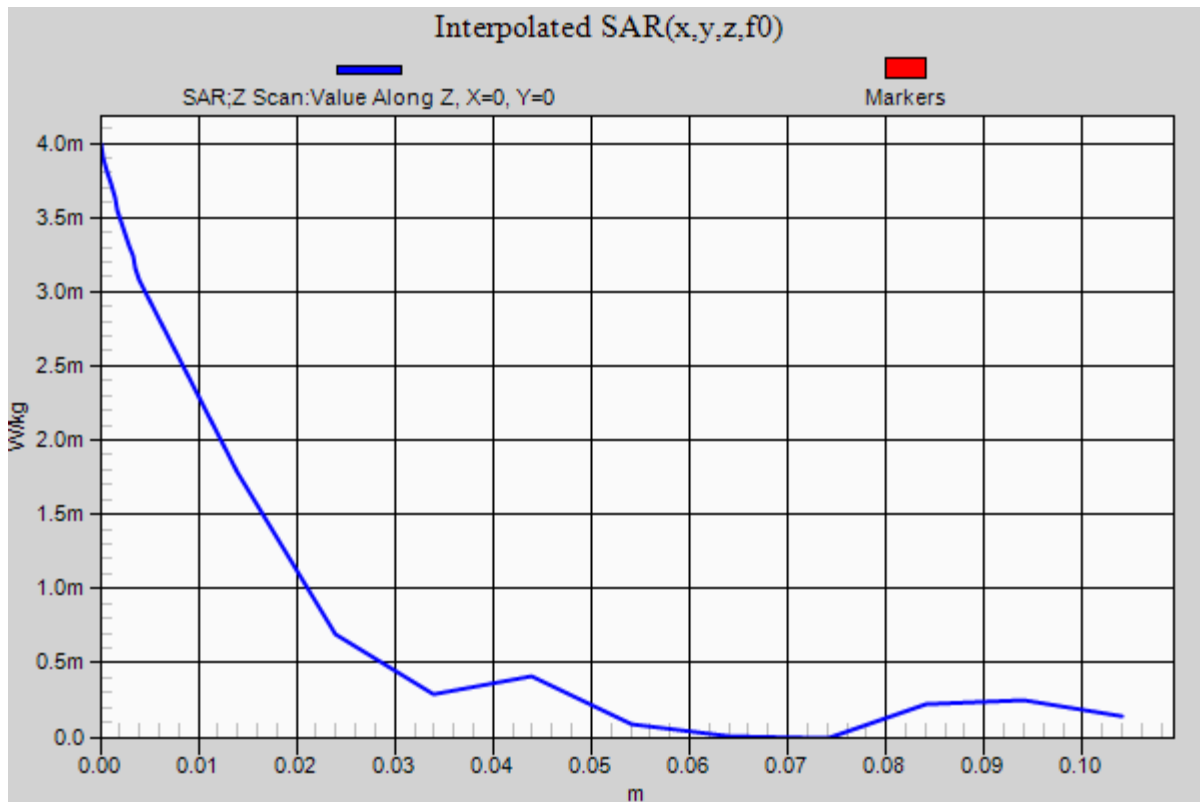
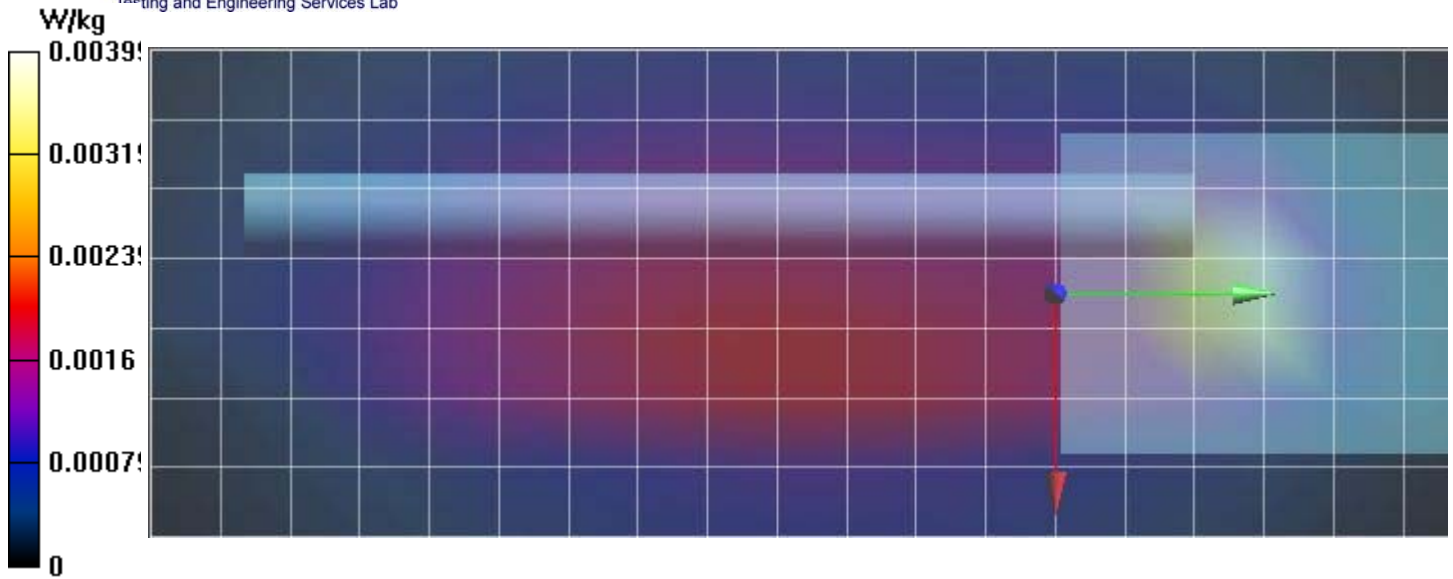
Maximum value of SAR (measured) = 0.00703 W/kg

750H/F61-FACE, Harris EVM3 U15, P2, T9, LTE B12, CH-M, RB1-H, 707.5 MHz 3/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 18.29 (n/a, 10.69) [mm]

Maximum value of SAR (interpolated) = 0.00399 W/kg



Plot B156

Date/Time: 8/7/2019 2:30:57 PM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance Band 5,13,14 LTE EVAL- Aug 07 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10154 - CAG, LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK); Communication System Band: Band 13, E-UTRA/FDD (777.0 - 787.0 MHz); Frequency: 782 MHz; Communication System PAR: 5.75 dB; PMF: 1.01391
Medium parameters used (interpolated): $f = 782$ MHz; $\sigma = 0.854$ S/m; $\epsilon_r = 41.831$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 782 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10154 - CAG, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/B156-BODY, Harris EVM3 U15, P7, T9, B26/STRAP, LTE B13, BW-10, CH-M, RB25-L, 782 MHz/Area Scan (7x13x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.521 W/kg

835H/B156-BODY, Harris EVM3 U15, P7, T9, B26/STRAP, LTE B13, BW-10, CH-M, RB25-L, 782 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm
Reference Value = 4.996 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.831 W/kg
SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.278 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

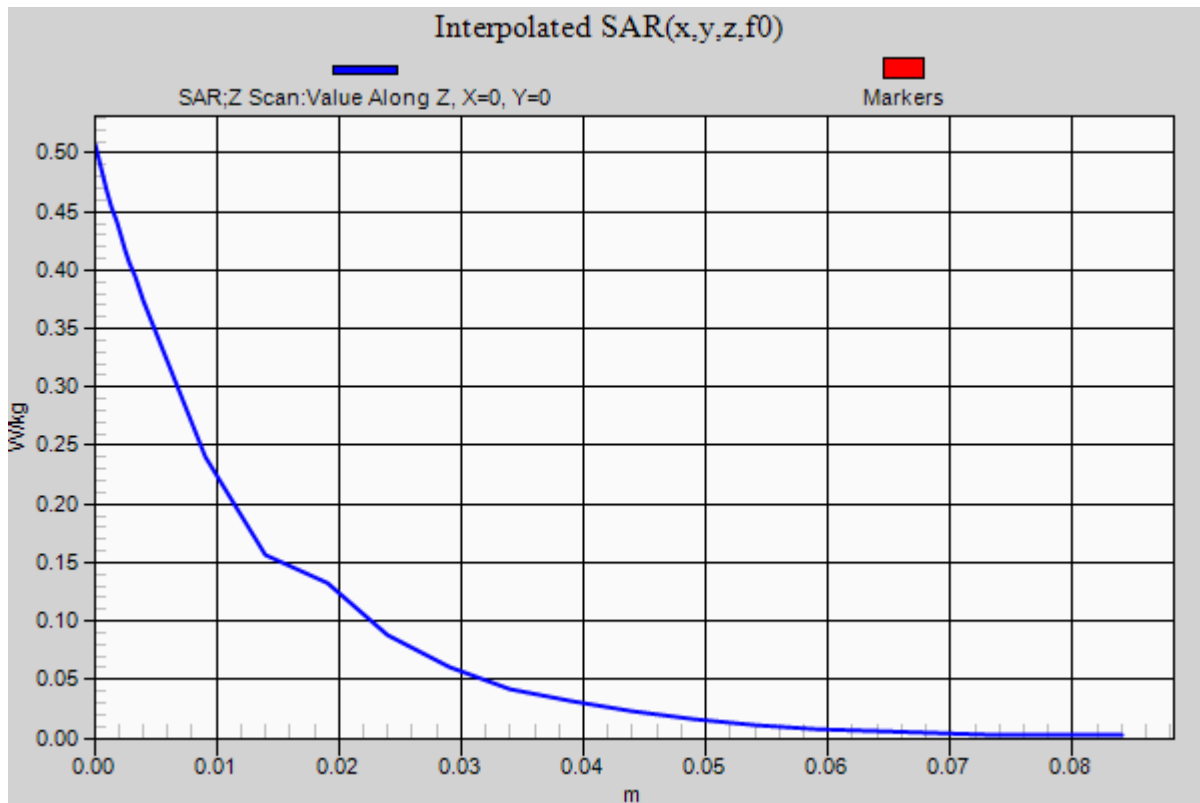
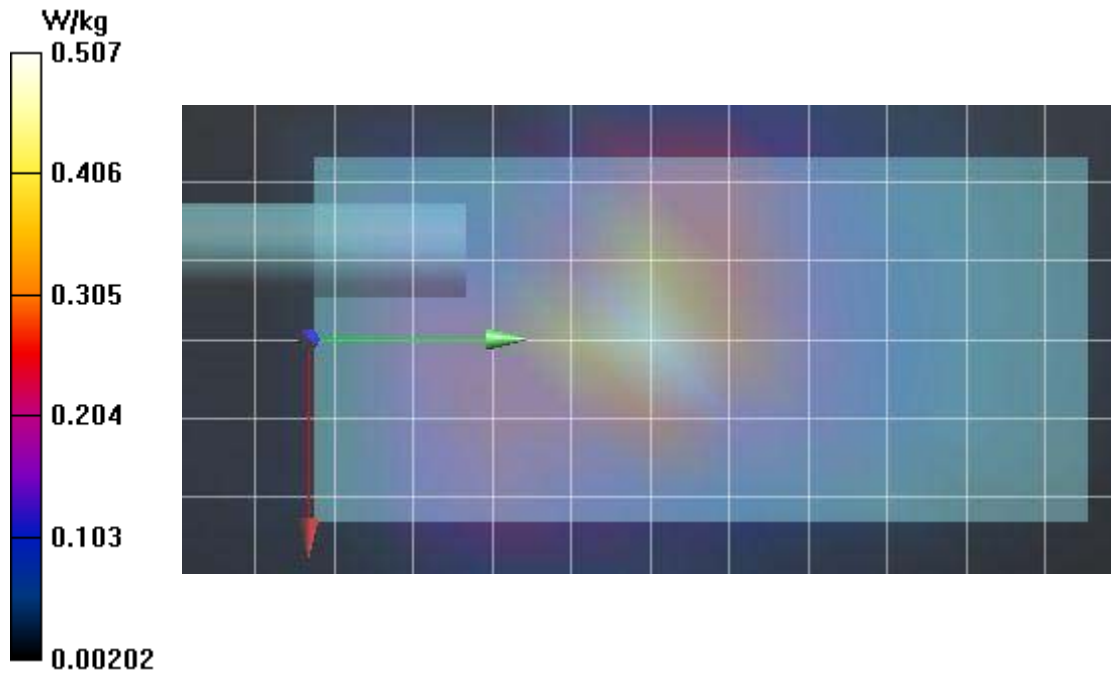
Maximum value of SAR (measured) = 0.505 W/kg

835H/B156-BODY, Harris EVM3 U15, P7, T9, B26/STRAP, LTE B13, BW-10, CH-M, RB25-L, 782 MHz/Z Scan (1x1x28): Measurement grid: $dx=20$ mm, $dy=20$ mm, $dz=5$ mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 11.83 (11.28, 29.21) [mm]

Maximum value of SAR (interpolated) = 0.507 W/kg



Plot F50

Date/Time: 8/7/2019 3:08:27 PM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance Band 5,13,14 LTE EVAL- Aug 07 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 13, E-UTRA/FDD (777.0 - 787.0 MHz); Frequency: 782 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894

Medium parameters used (interpolated): $f = 782 \text{ MHz}$; $\sigma = 0.854 \text{ S/m}$; $\epsilon_r = 41.831$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 782 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/F50-FACE, Harris EVM3 U15, P2, T9, LTE B13, BW-10, CH-M, RB1-M, 782 MHz/Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.0311 W/kg

835H/F50-FACE, Harris EVM3 U15, P2, T9, LTE B13, BW-10, CH-M, RB1-M, 782 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.307 V/m; Power Drift = 0.42 dB

Peak SAR (extrapolated) = 0.0410 W/kg

SAR(1 g) = 0.029 W/kg; SAR(10 g) = 0.021 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

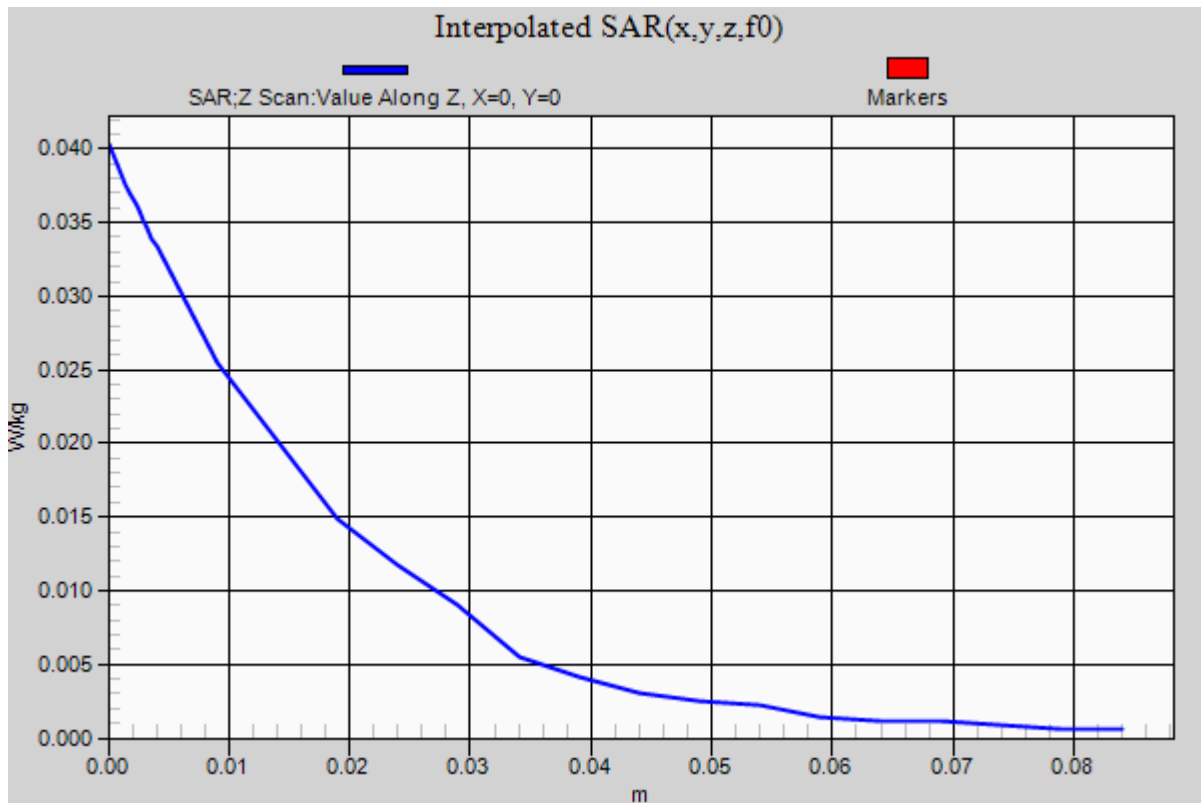
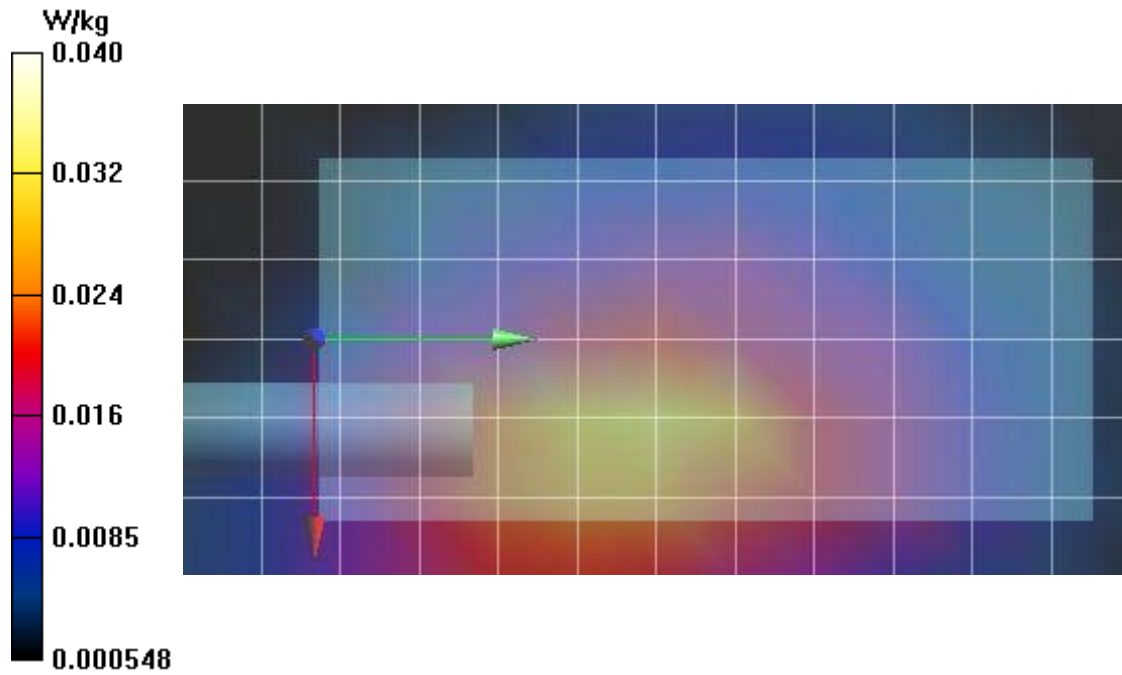
Maximum value of SAR (measured) = 0.0330 W/kg

835H/F50-FACE, Harris EVM3 U15, P2, T9, LTE B13, BW-10, CH-M, RB1-M, 782 MHz/Z Scan (1x1x28): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 21.32 (18.56, 16.40) [mm]

Maximum value of SAR (interpolated) = 0.0403 W/kg



Plot B157

Date/Time: 8/7/2019 3:29:08 PM

Test Laboratory: Celltech Labs

Harris EVM3-U15 Compliance Band 5,13,14 LTE EVAL- Aug 07 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 14, E-UTRA/FDD (788.0 - 798.0 MHz); Frequency: 793 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894
Medium parameters used (interpolated): $f = 793$ MHz; $\sigma = 0.86$ S/m; $\epsilon_r = 41.608$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2011)

DASy Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 793 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASy52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/B157-BODY, Harris EVM3 U15, P2, T9, B1-02, LTE B14, BW-10, CH-M, RB1-H, 793 MHz/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.465 W/kg

835H/B157-BODY, Harris EVM3 U15, P2, T9, B1-02, LTE B14, BW-10, CH-M, RB1-H, 793 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 9.457 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.660 W/kg

SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.321 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

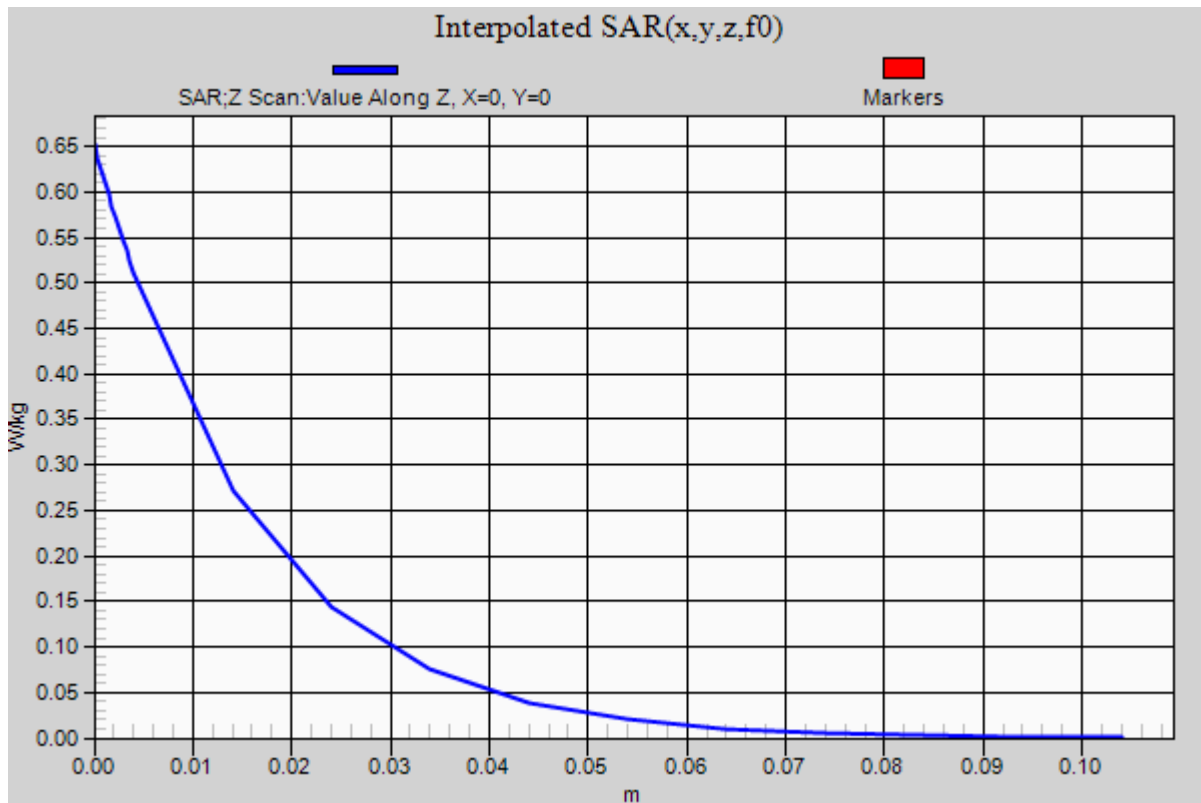
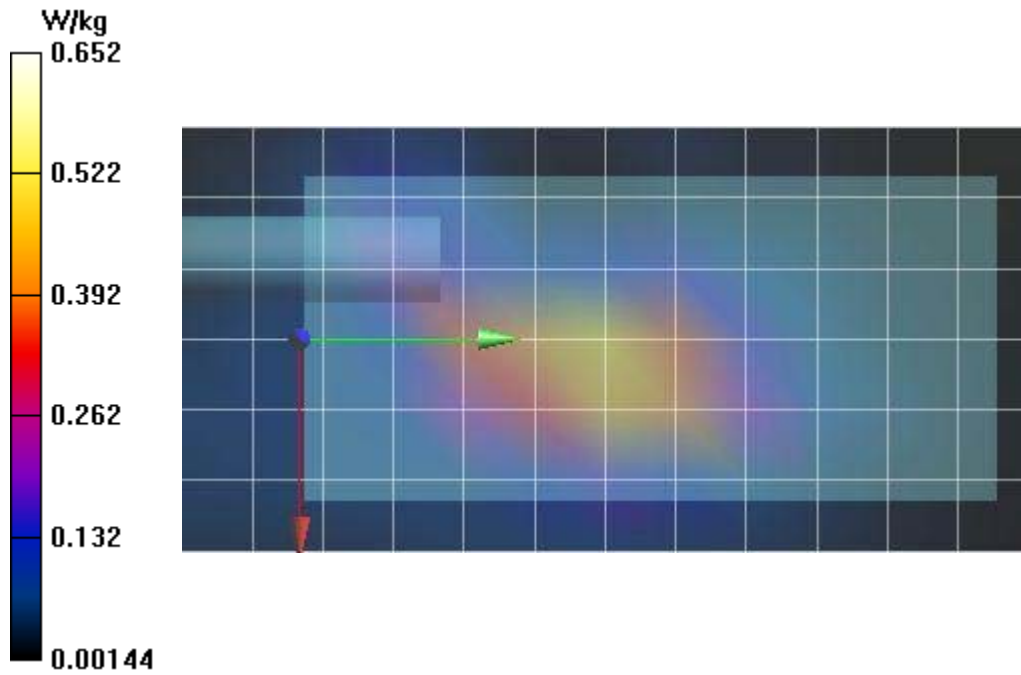
Maximum value of SAR (measured) = 0.509 W/kg

835H/B157-BODY, Harris EVM3 U15, P2, T9, B1-02, LTE B14, BW-10, CH-M, RB1-H, 793 MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 15.72 (n/a, 15.89) [mm]

Maximum value of SAR (interpolated) = 0.652 W/kg



Plot F51

Date/Time: 8/7/2019 3:53:45 PM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance Band 5,13,14 LTE EVAL- Aug 07 2019

DUT: EVM3-U15; Type: PTT; Communication System: UID 10175 - CAG, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 14, E-UTRA/FDD (788.0 - 798.0 MHz); Frequency: 793 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894
Medium parameters used (interpolated): $f = 793$ MHz; $\sigma = 0.86$ S/m; $\epsilon_r = 41.608$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 793 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10175 - CAG, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/F51-FACE, Harris EVM3 U15, P7, T9, LTE B14, BW-10, CH-M, RB1-H, 793 MHz/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.0107 W/kg

835H/F51-FACE, Harris EVM3 U15, P7, T9, LTE B14, BW-10, CH-M, RB1-H, 793 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 1.205 V/m; Power Drift = 3.20 dB

Peak SAR (extrapolated) = 0.0140 W/kg

SAR(1 g) = 0.00934 W/kg; SAR(10 g) = 0.00689 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

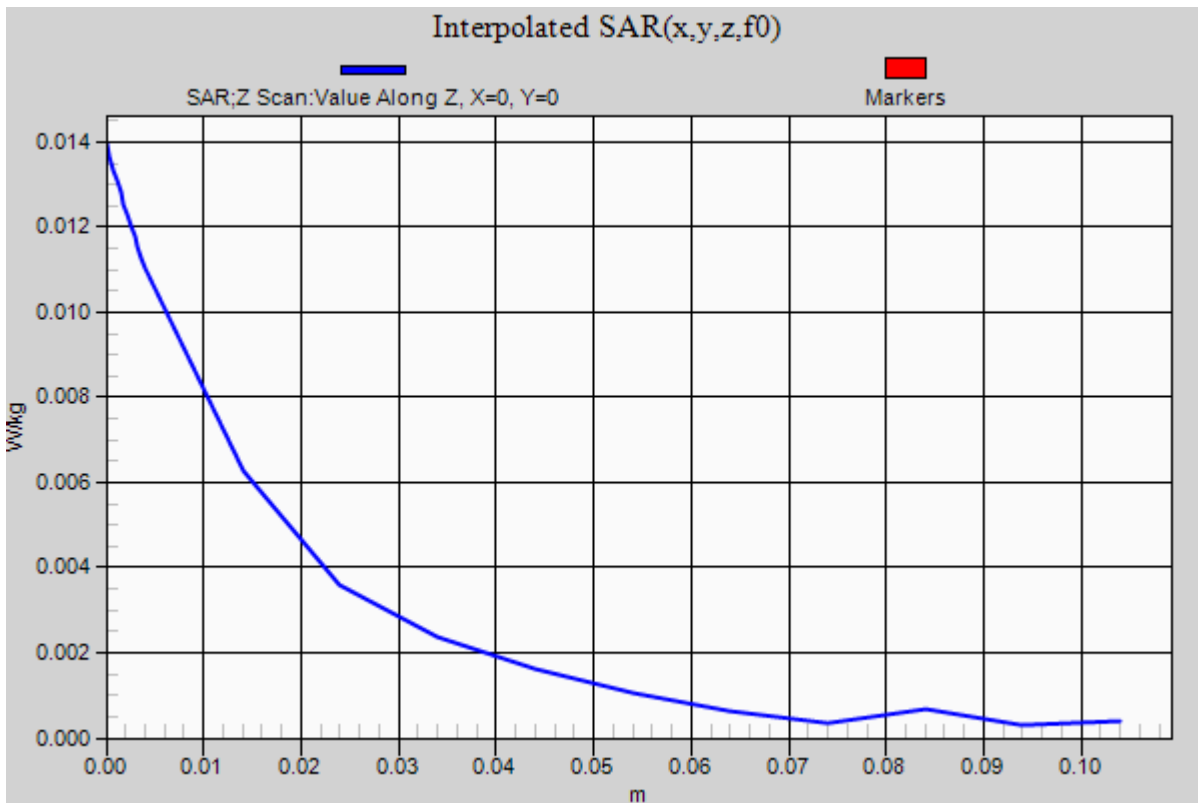
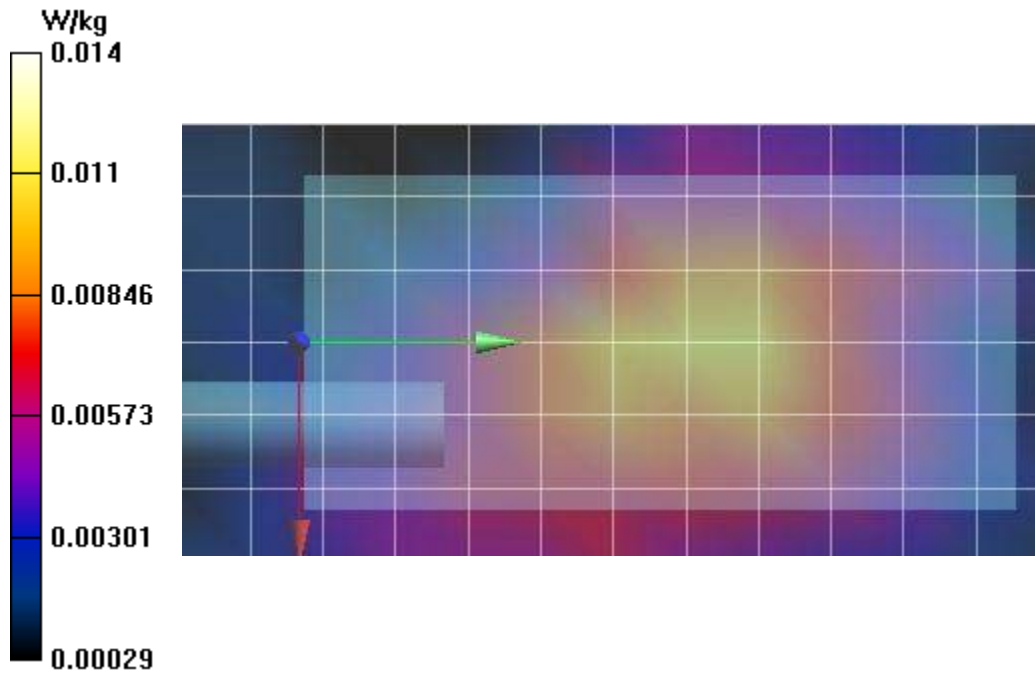
Maximum value of SAR (measured) = 0.0111 W/kg

835H/F51-FACE, Harris EVM3 U15, P7, T9, LTE B14, BW-10, CH-M, RB1-H, 793 MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 17.73 (n/a, 17.82) [mm]

Maximum value of SAR (interpolated) = 0.0139 W/kg



Plot B163

Date/Time: 9/20/2019 11:48:26 AM

Test Laboratory: Celltech Labs

Harris EVM3-U15 Compliance Band 4&66&2 LTE EVAL- Sep 23 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10169 - CAE, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK); Communication System Band: Band 66, E-UTRA/FDD (1710.0 - 1780.0 MHz); Frequency: 1770 MHz; Communication System PAR: 5.73 dB; PMF: 1.13894
Medium parameters used: $f = 1770$ MHz; $\sigma = 1.28$ S/m; $\epsilon_r = 38.58$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2011)

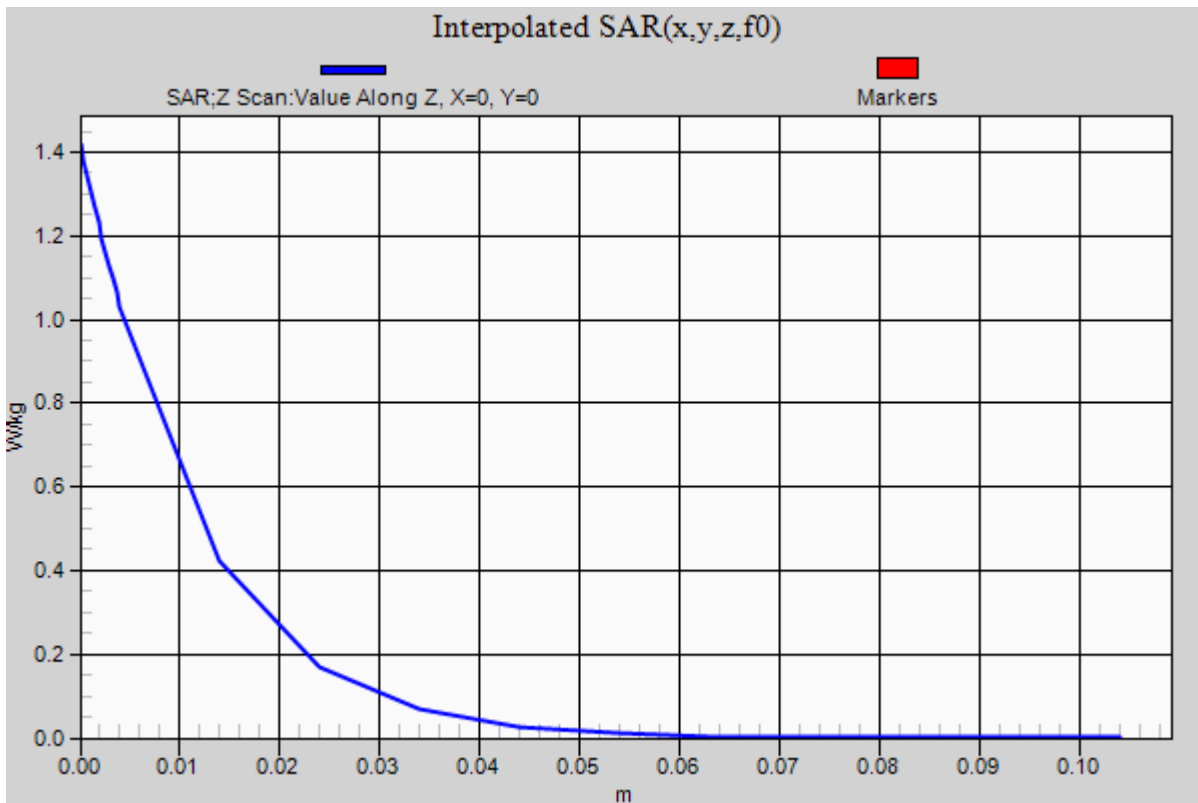
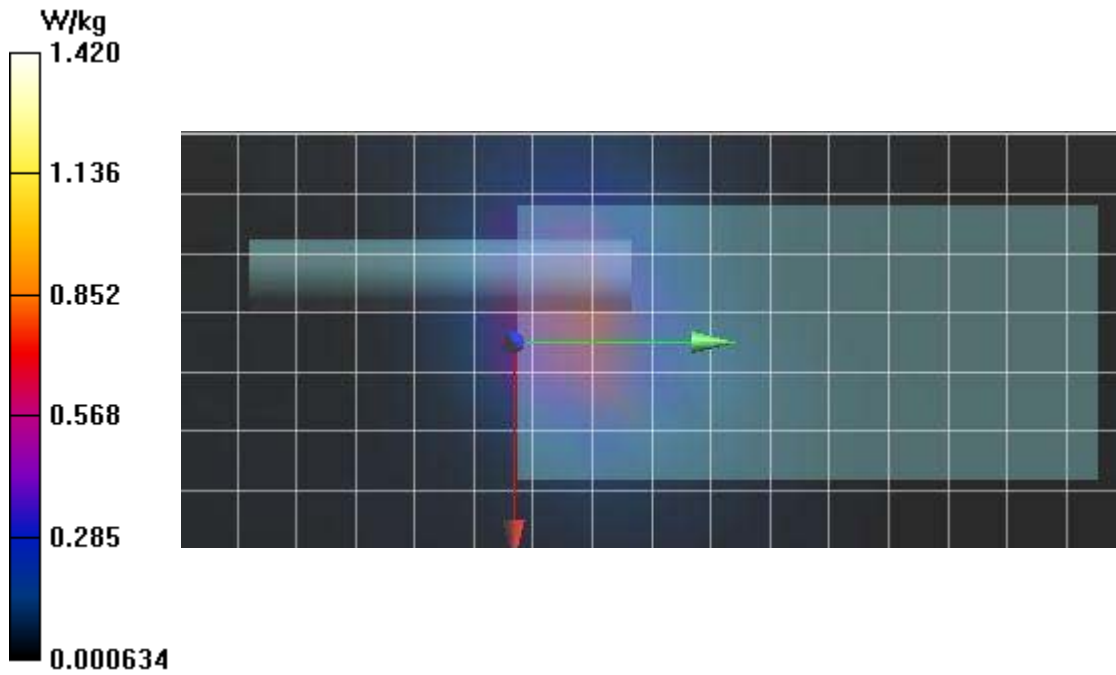
DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.22, 7.22, 7.22) @ 1770 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10169 - CAE, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

1800H/B163 - BODY, Harris EVM3 U15, P2, T9,B1-02, LTE B66, BW-20, CH-H, RB1-L, 1770 MHz 2 2/Area Scan (8x17x1): Measurement grid:
 $dx=15$ mm, $dy=15$ mm
Maximum value of SAR (measured) = 0.730 W/kg

1800H/B163 - BODY, Harris EVM3 U15, P2, T9,B1-02, LTE B66, BW-20, CH-H, RB1-L, 1770 MHz 2 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm
Reference Value = 17.21 V/m; Power Drift = 1.30 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.625 W/kg
Maximum value of SAR (measured) = 1.13 W/kg

1800H/B163 - BODY, Harris EVM3 U15, P2, T9,B1-02, LTE B66, BW-20, CH-H, RB1-L, 1770 MHz 2 2/Z Scan (1x1x22): Measurement grid:
 $dx=20$ mm, $dy=20$ mm, $dz=10$ mm
Penetration depth = 11.17 (n/a, 11.08) [mm]
Maximum value of SAR (interpolated) = 1.42 W/kg



Plot F57

Date/Time: 9/19/2019 2:34:28 PM

Test Laboratory: Celltech Labs

Harris EVM3-U15 Compliance Band 4&66&2 LTE EVAL- Sep 20 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 10169 - CAE, LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK); Communication System Band: Band 66, E-UTRA/FDD (1710.0 - 1780.0 MHz); Frequency: 1770 MHz; Communication System PAR: 5.73 dB; PMF: 1.13894
Medium parameters used: $f = 1770$ MHz; $\sigma = 1.3$ S/m; $\epsilon_r = 39.08$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2011)

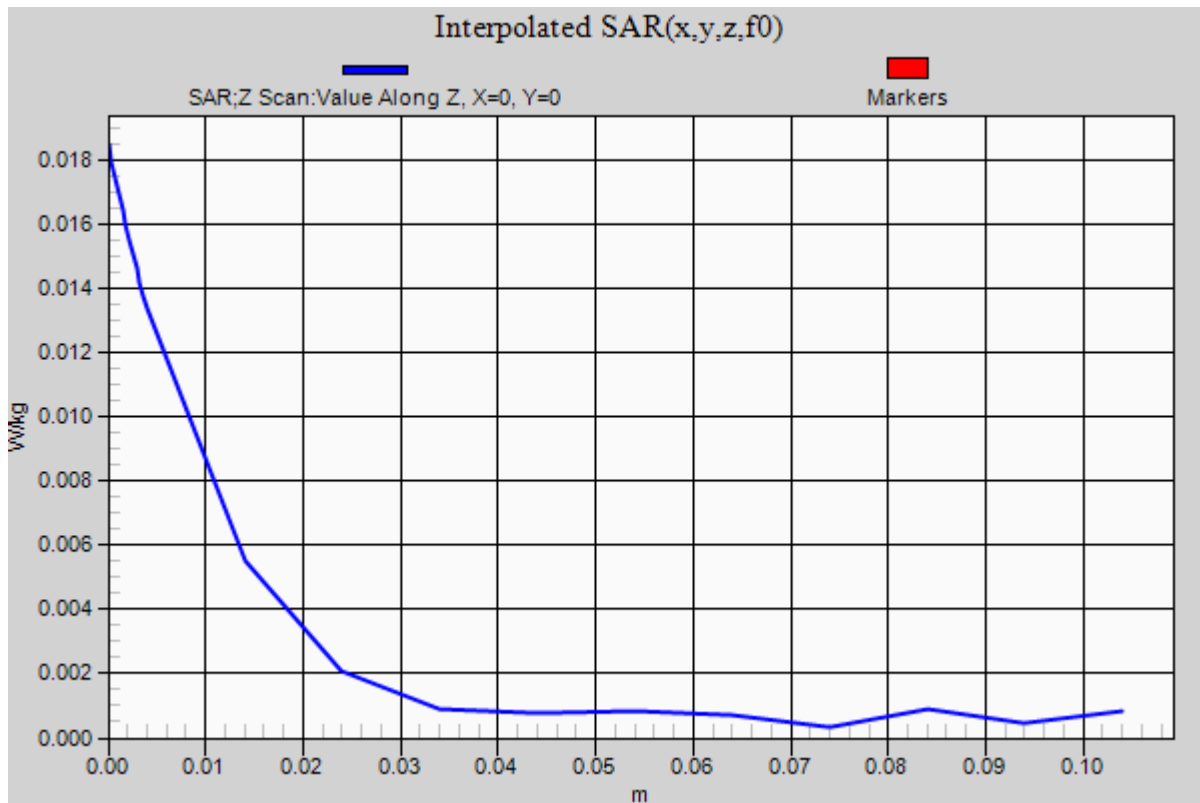
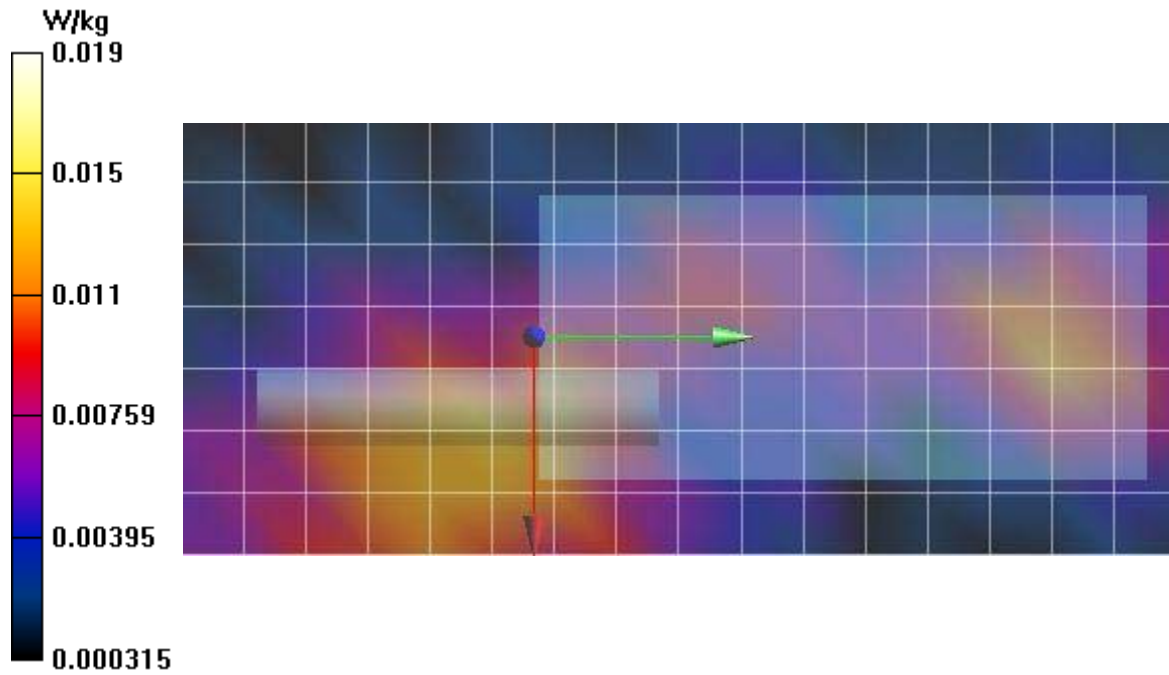
DASy Configuration:

- Probe: EX3DV4 - SN3600; ConvF(7.22, 7.22, 7.22) @ 1770 MHz; Calibrated: 3/26/2019
O Modulation Compensation: PMR for UID 10169 - CAE, Calibrated: 3/26/2019
- 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASy52 52.10.2(1504); SEMCAD X 14.6.12(7470)

1800H/F57 - FACE, Harris EVM3 U15, P2, T9, LTE B66, BW-20, CH-H, RB1-L, 1770 MHz/Area Scan (8x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0140 W/kg

1800H/F57 - FACE, Harris EVM3 U15, P2, T9, LTE B66, BW-20, CH-H, RB1-L, 1770 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 2.693 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.0200 W/kg
SAR(1 g) = 0.013 W/kg; SAR(10 g) = 0.00853 W/kg
Maximum value of SAR (measured) = 0.0144 W/kg

1800H/F57 - FACE, Harris EVM3 U15, P2, T9, LTE B66, BW-20, CH-H, RB1-L, 1770 MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm
Penetration depth = 11.32 (n/a, 10.16) [mm]
Maximum value of SAR (interpolated) = 0.0185 W/kg



Plot B161

Date/Time: 8/9/2019 2:40:12 PM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance LMR VHF EVAL- Aug 09 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: VHF; Frequency: 156.8 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 156.8$ MHz; $\sigma = 0.794$ S/m; $\epsilon_r = 49.463$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(9.72, 9.72, 9.72) @ 156.8 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASYS52 10.2(1504); SEMCAD X 14.6.12(7470)

150H/B161-BODY, Harris EVM3 U15, P2, T4, B1-03, LMR, CW, 156.8MHz 2/Area Scan (8x24x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 3.76 W/kg

150H/B161-BODY, Harris EVM3 U15, P2, T4, B1-03, LMR, CW, 156.8MHz 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 34.46 V/m; Power Drift = 1.92 dB

Peak SAR (extrapolated) = 19.4 W/kg

SAR(1 g) = 6.07 W/kg; SAR(10 g) = 2.64 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

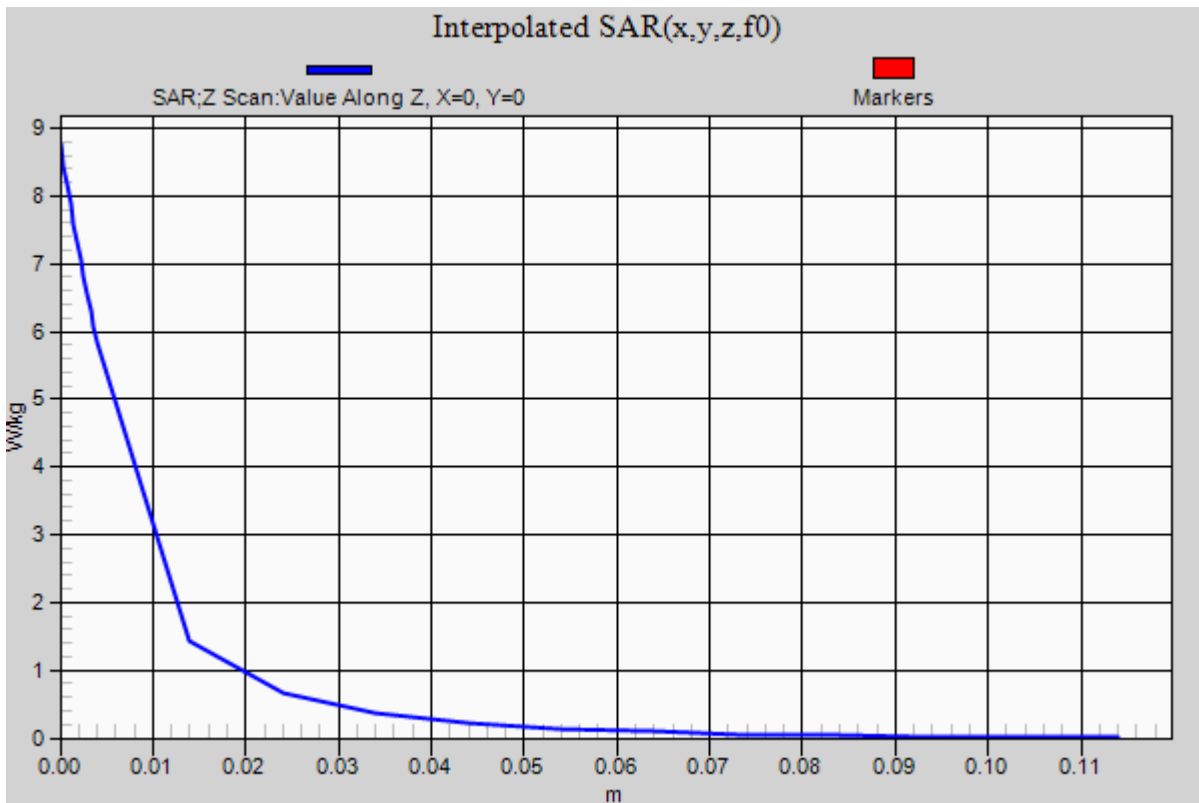
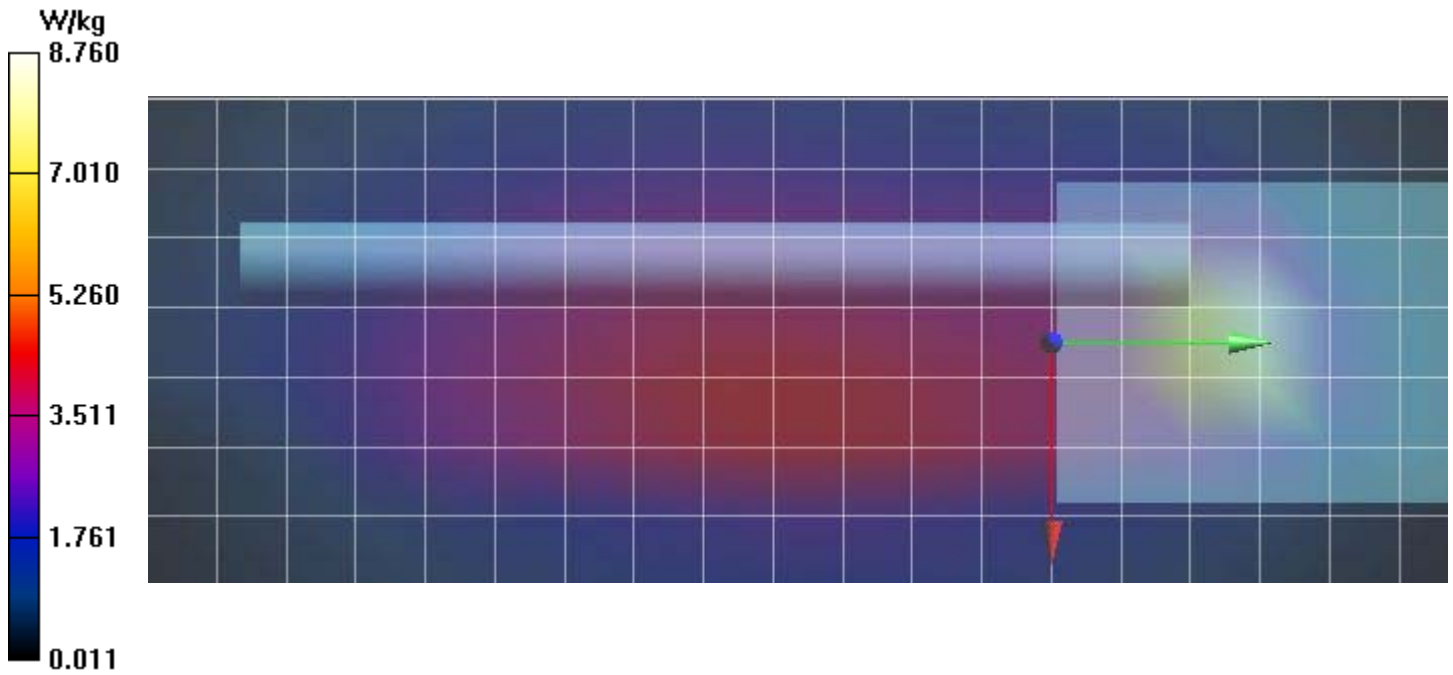
Maximum value of SAR (measured) = 6.31 W/kg

150H/B161-BODY, Harris EVM3 U15, P2, T4, B1-03, LMR, CW, 156.8MHz 2/Z Scan (1x1x23): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 7.126 (n/a, 12.62) [mm]

Maximum value of SAR (interpolated) = 8.76 W/kg



Plot B162

Date/Time: 8/9/2019 3:47:03 PM

Test Laboratory: Celltech Labs

Harris EVM3- U44 Compliance LMR VHF EVAL- Aug 09 2019

DUT: EVM3-U44; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: VHF; Frequency: 156.8 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 156.8$ MHz; $\sigma = 0.794$ S/m; $\epsilon_r = 49.463$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(9.72, 9.72, 9.72) @ 156.8 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASYS52 52.10.2(1504); SEMCAD X 14.6.12(7470)

150H/B162-BODY, Harris EVM3 U44, P2, T4, B1-03, LMR, CW, 156.8MHz/Area Scan (8x24x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 6.77 W/kg

150H/B162-BODY, Harris EVM3 U44, P2, T4, B1-03, LMR, CW, 156.8MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 48.02 V/m; Power Drift = -0.47 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 5.79 W/kg; SAR(10 g) = 2.61 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

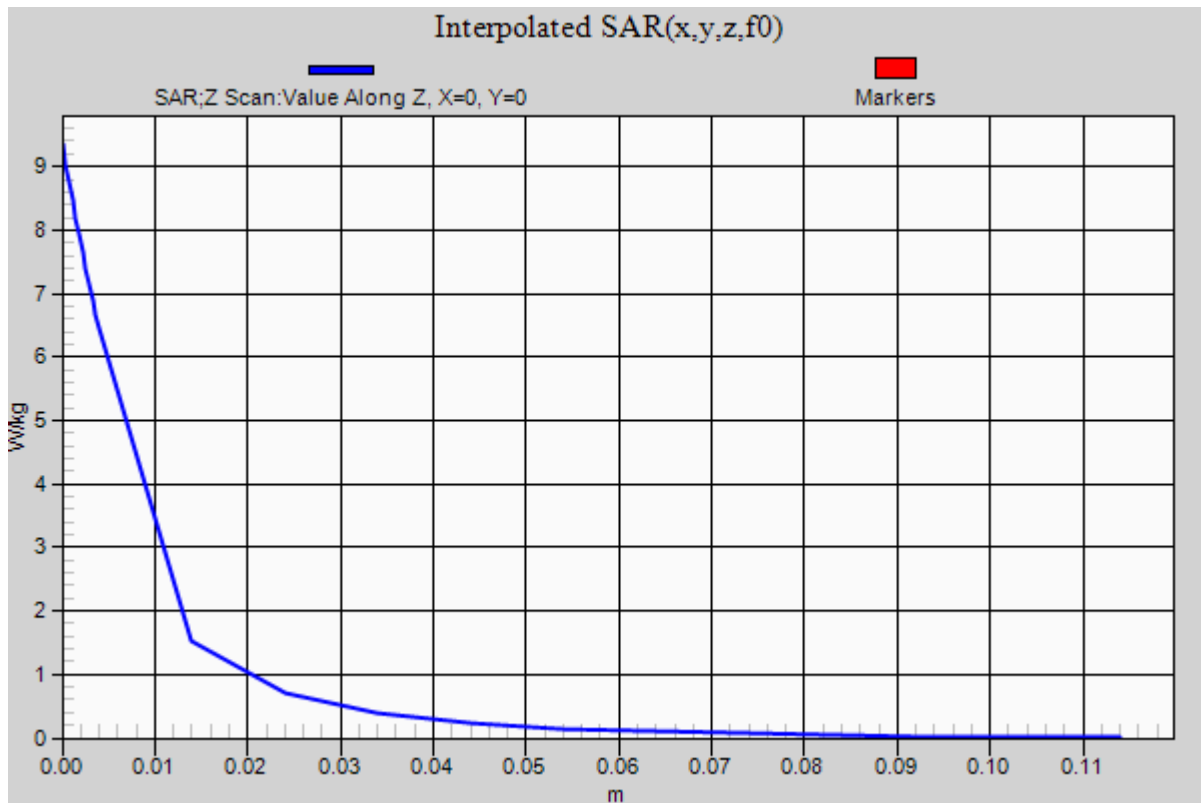
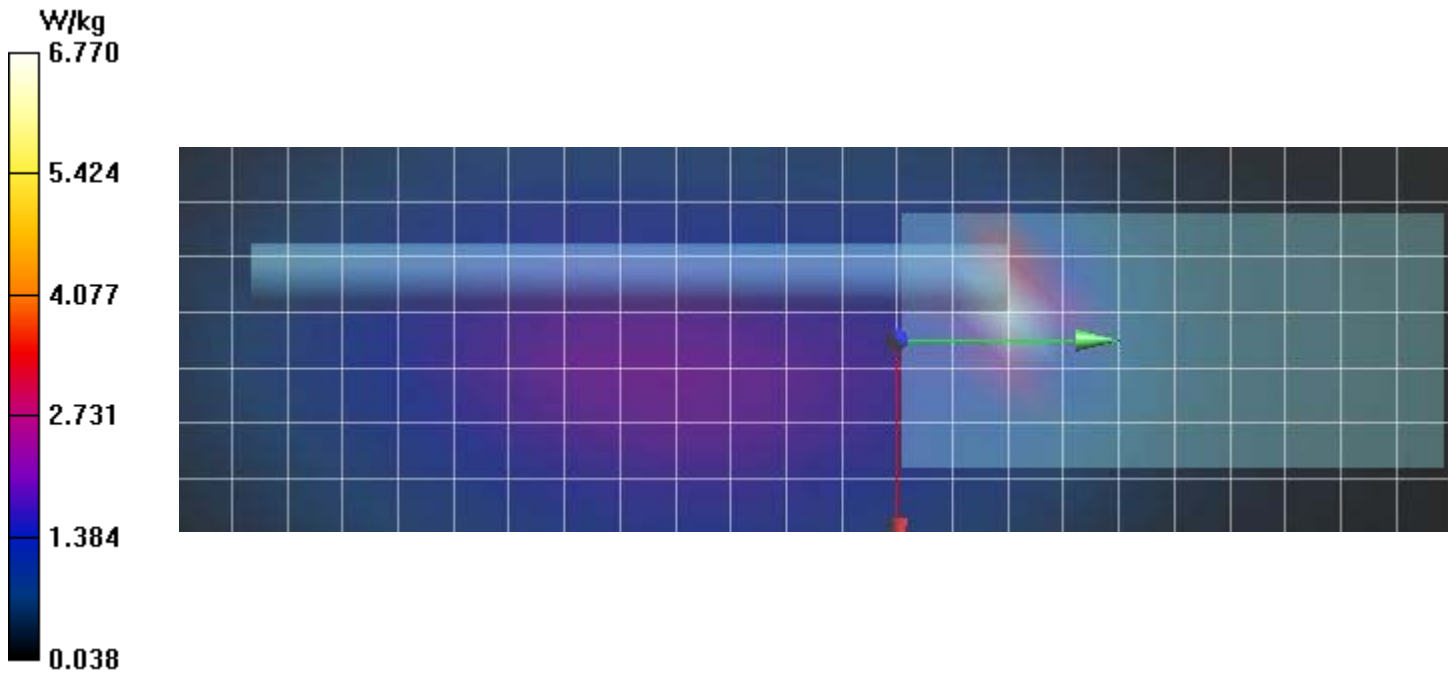
Maximum value of SAR (measured) = 6.51 W/kg

150H/B162-BODY, Harris EVM3 U44, P2, T4, B1-03, LMR, CW, 156.8MHz/Z Scan (1x1x23): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 7.001 (n/a, 12.75) [mm]

Maximum value of SAR (interpolated) = 9.34 W/kg



Plot F55

Date/Time: 8/9/2019 3:17:43 PM

Test Laboratory: Celltech Labs

Harris EVM3- U15 Compliance LMR VHF EVAL- Aug 09 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: VHF; Frequency: 156.8 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 156.8$ MHz; $\sigma = 0.794$ S/m; $\epsilon_r = 49.463$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(9.72, 9.72, 9.72) @ 156.8 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

150H/F55-FACE, Harris EVM3 U15, P7, T4, LMR, CW, 156.8MHz/Area Scan (8x24x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.25 W/kg

150H/F55-FACE, Harris EVM3 U15, P7, T4, LMR, CW, 156.8MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 35.47 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 1.2 W/kg; SAR(10 g) = 0.952 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

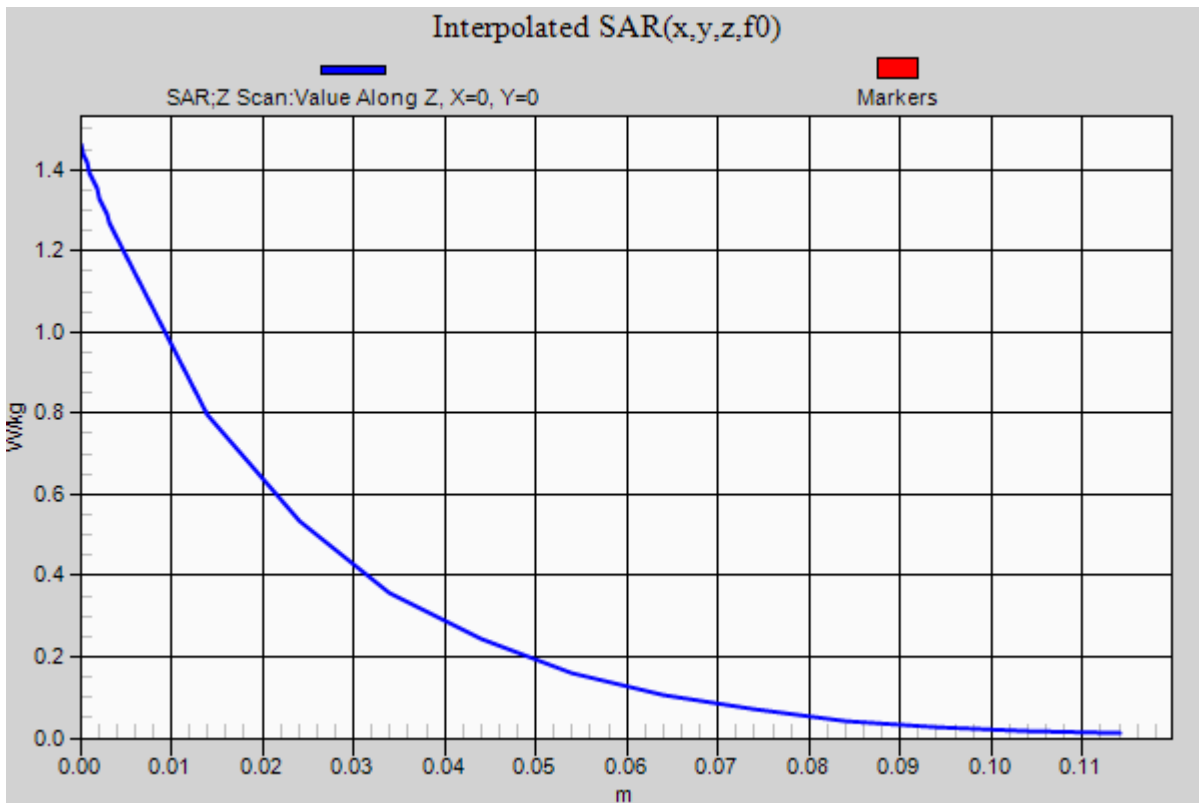
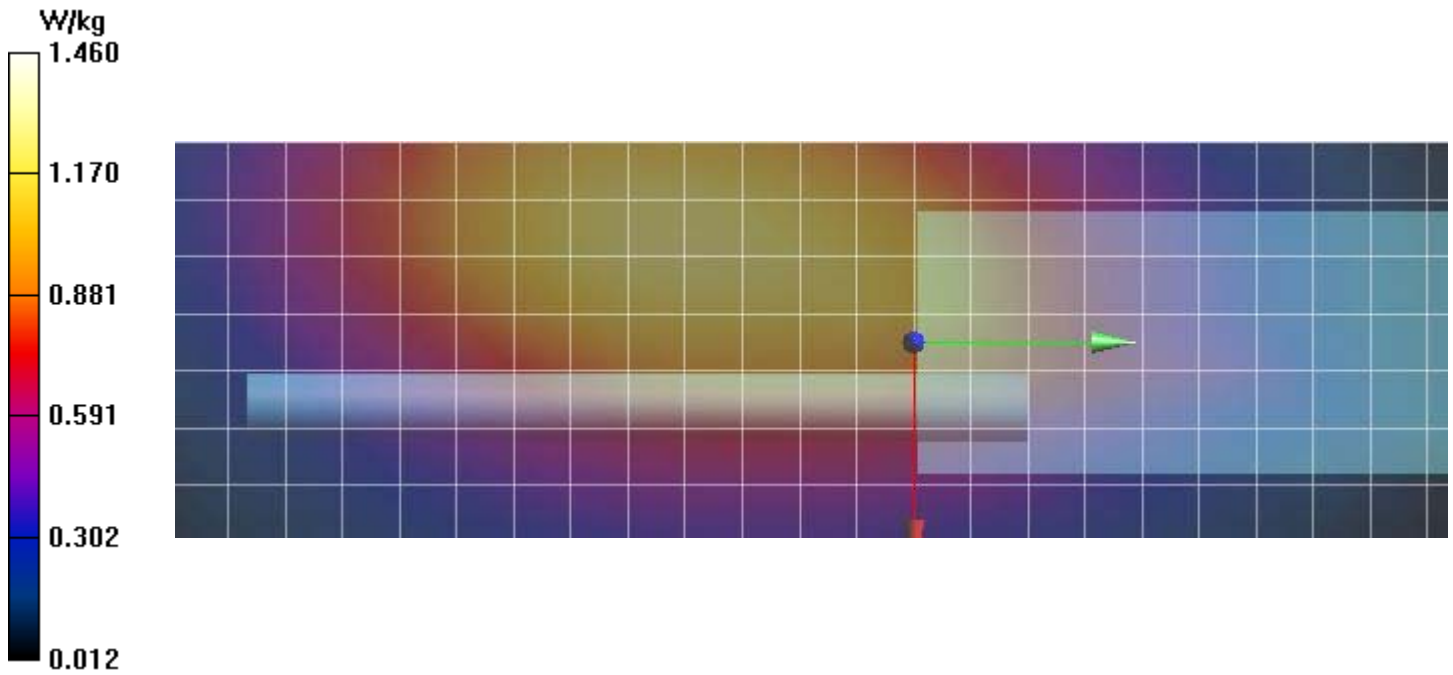
Maximum value of SAR (measured) = 1.24 W/kg

150H/F55-FACE, Harris EVM3 U15, P7, T4, LMR, CW, 156.8MHz/Z Scan (1x1x23): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 23.04 (n/a, 24.83) [mm]

Maximum value of SAR (interpolated) = 1.46 W/kg



Plot F56

Date/Time: 8/12/2019 9:15:27 AM

Test Laboratory: Celltech Labs

Harris EVM3- U44 Compliance LMR VHF EVAL- Aug 12 2019

DUT: EVM3-U44; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: VHF; Frequency: 156.8 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 156.8$ MHz; $\sigma = 0.794$ S/m; $\epsilon_r = 49.463$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(9.72, 9.72, 9.72) @ 156.8 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASYS52 52.10.2(1504); SEMCAD X 14.6.12(7470)

150H/F56-FACE, Harris EVM3 U44, P7, T4, LMR, CW, 156.8MHz/Area Scan (8x24x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.46 W/kg

150H/F56-FACE, Harris EVM3 U44, P7, T4, LMR, CW, 156.8MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 35.53 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 1.63 W/kg

SAR(1 g) = 1.31 W/kg; SAR(10 g) = 1.04 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

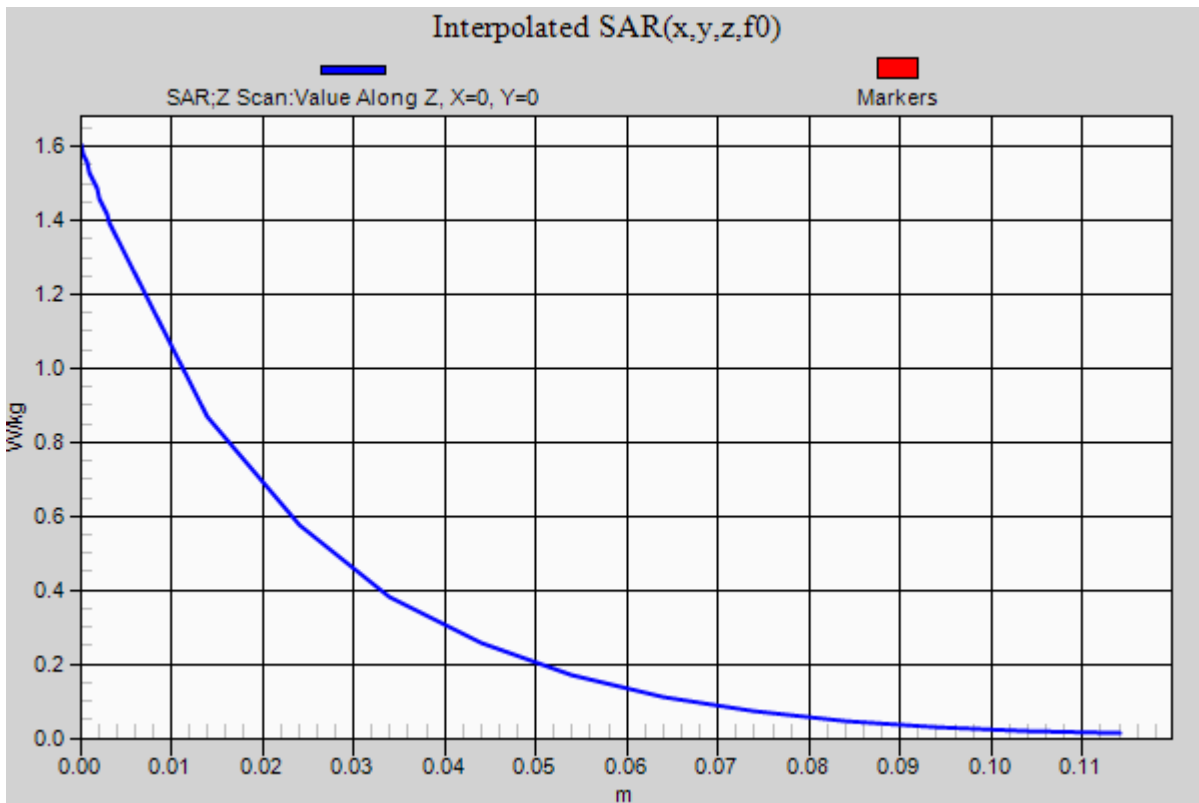
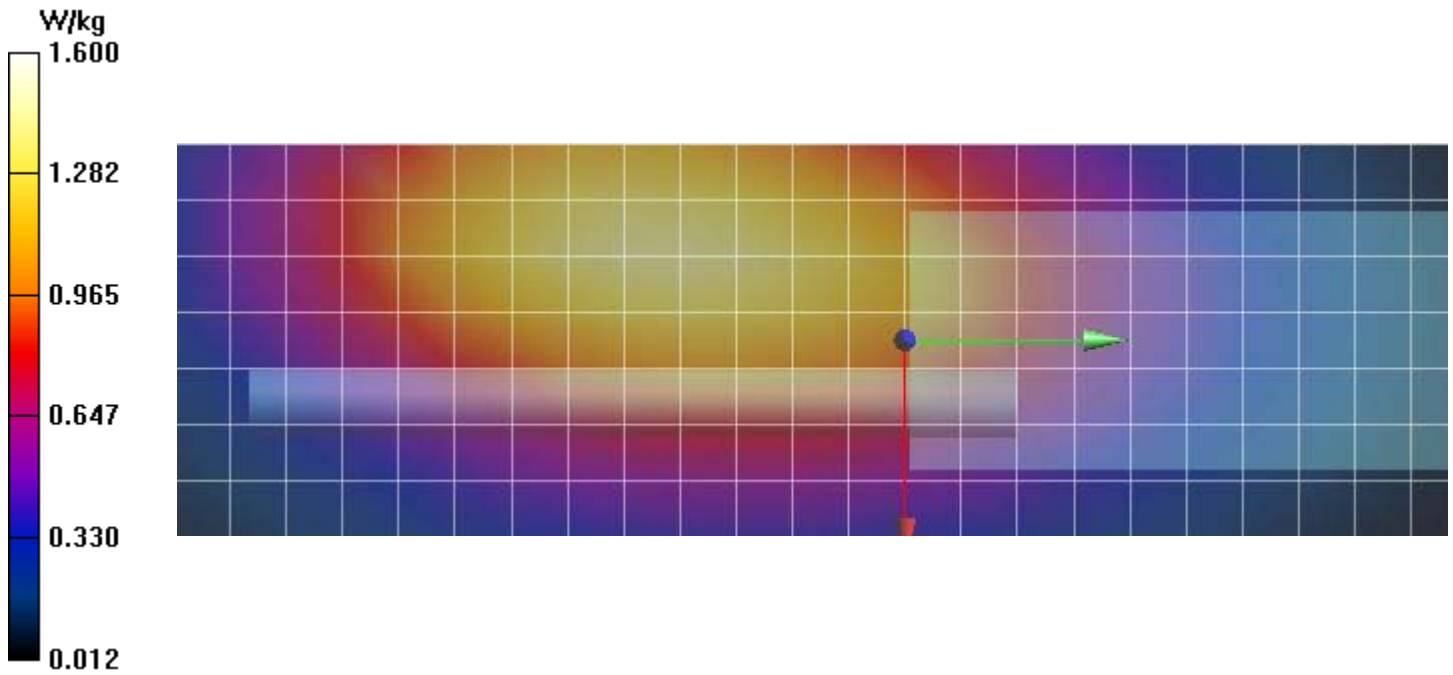
Maximum value of SAR (measured) = 1.36 W/kg

150H/F56-FACE, Harris EVM3 U44, P7, T4, LMR, CW, 156.8MHz/Z Scan (1x1x23): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 22.62 (n/a, 24.10) [mm]

Maximum value of SAR (interpolated) = 1.60 W/kg



Plot B172

Date/Time: 9/25/2019 12:07:44 PM

Test Laboratory: Celltech Labs

Harris EVM3-U15 Compliance LMR UHF EVAL- Sep 25 2019

DUT: EVM3-U15 ; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: D400 (400.0 MHz); Frequency: 418 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): $f = 418$ MHz; $\sigma = 0.85$ S/m; $\epsilon_r = 45.632$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.79, 8.79, 8.79) @ 418 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

450H/B172-BODY, Harris EVM3 U15, P7, T5, B1-02, LMR, CW, 418MHz/Area Scan (8x21x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 8.62 W/kg

450H/B172-BODY, Harris EVM3 U15, P7, T5, B1-02, LMR, CW, 418MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 82.43 V/m; Power Drift = -0.24 dB

Peak SAR (extrapolated) = 13.0 W/kg

SAR(1 g) = 7.71 W/kg; SAR(10 g) = 4.98 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

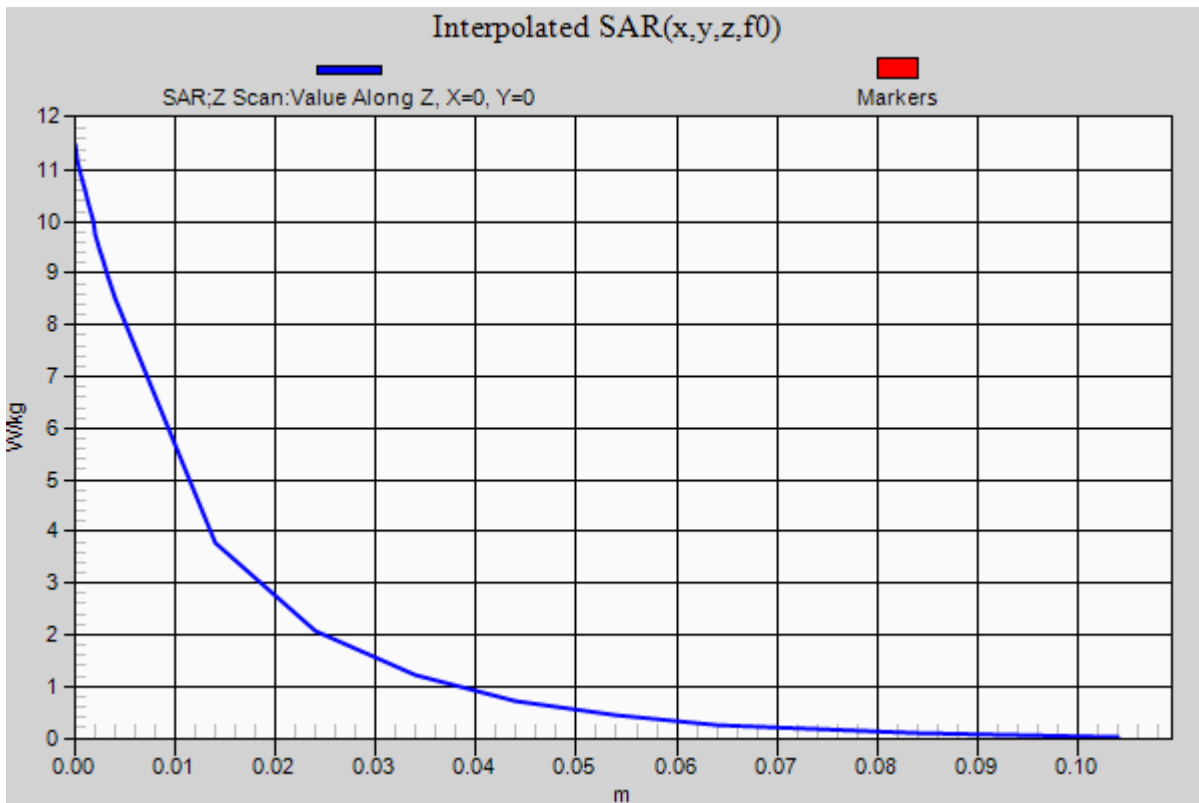
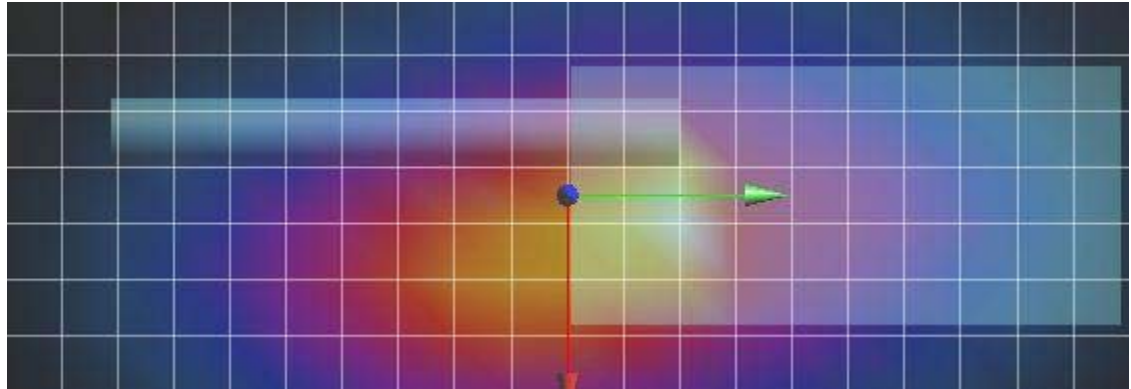
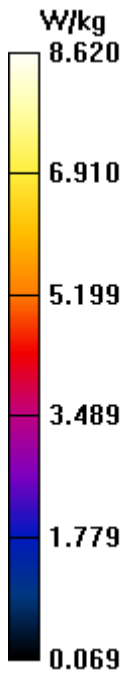
Maximum value of SAR (measured) = 8.55 W/kg

450H/B172-BODY, Harris EVM3 U15, P7, T5, B1-02, LMR, CW, 418MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 12.39 (n/a, 16.75) [mm]

Maximum value of SAR (interpolated) = 11.5 W/kg



Plot B173

Date/Time: 9/25/2019 10:54:17 AM

Test Laboratory: Celltech Labs

Harris EVM3- U44 Compliance LMR UHF EVAL- Sep 25 2019

DUT: EVM3-U44 ; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: D400 (400.0 MHz); Frequency: 418 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): $f = 418$ MHz; $\sigma = 0.85$ S/m; $\epsilon_r = 45.632$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.79, 8.79, 8.79) @ 418 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

450H/B173-BODY, Harris EVM3 U44[LUE+], P7, T5, B1-02, LMR, CW, 418MHz 2/Area Scan (8x21x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 10.2 W/kg

450H/B173-BODY, Harris EVM3 U44[LUE+], P7, T5, B1-02, LMR, CW, 418MHz 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 88.42 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 15.5 W/kg

SAR(1 g) = 9.73 W/kg; SAR(10 g) = 6.43 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

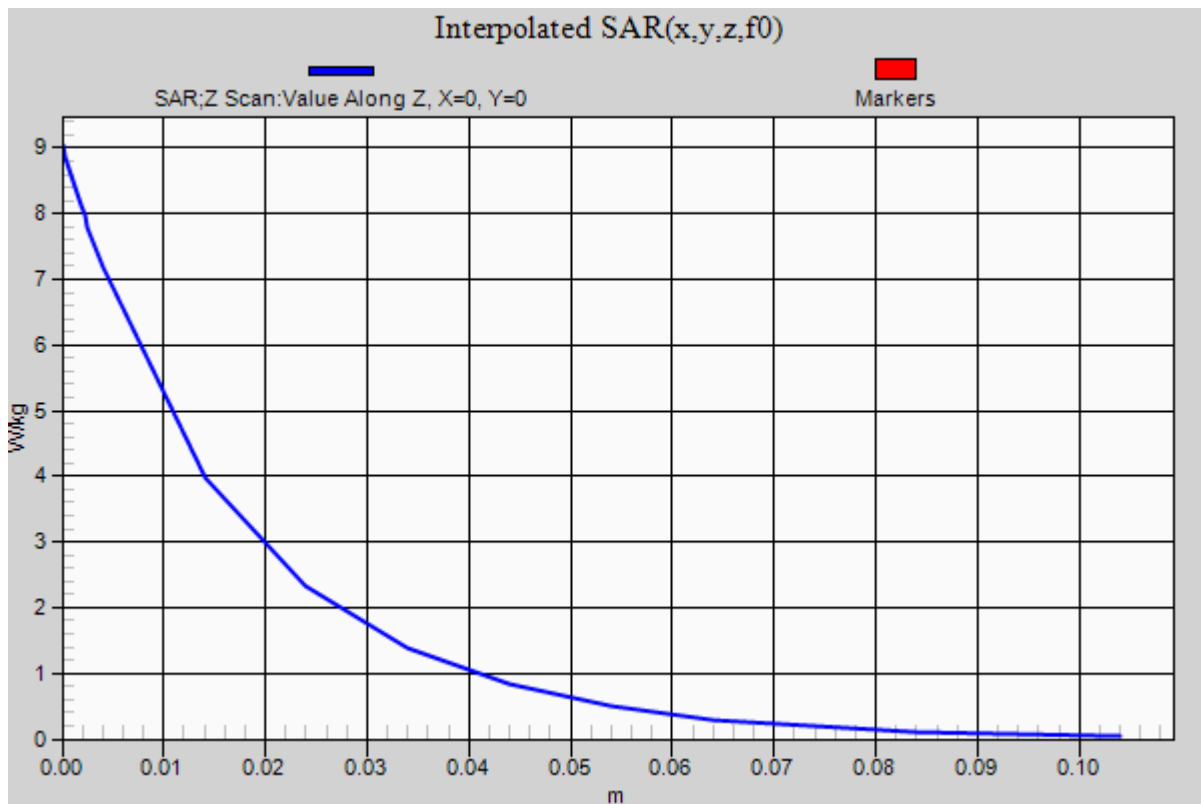
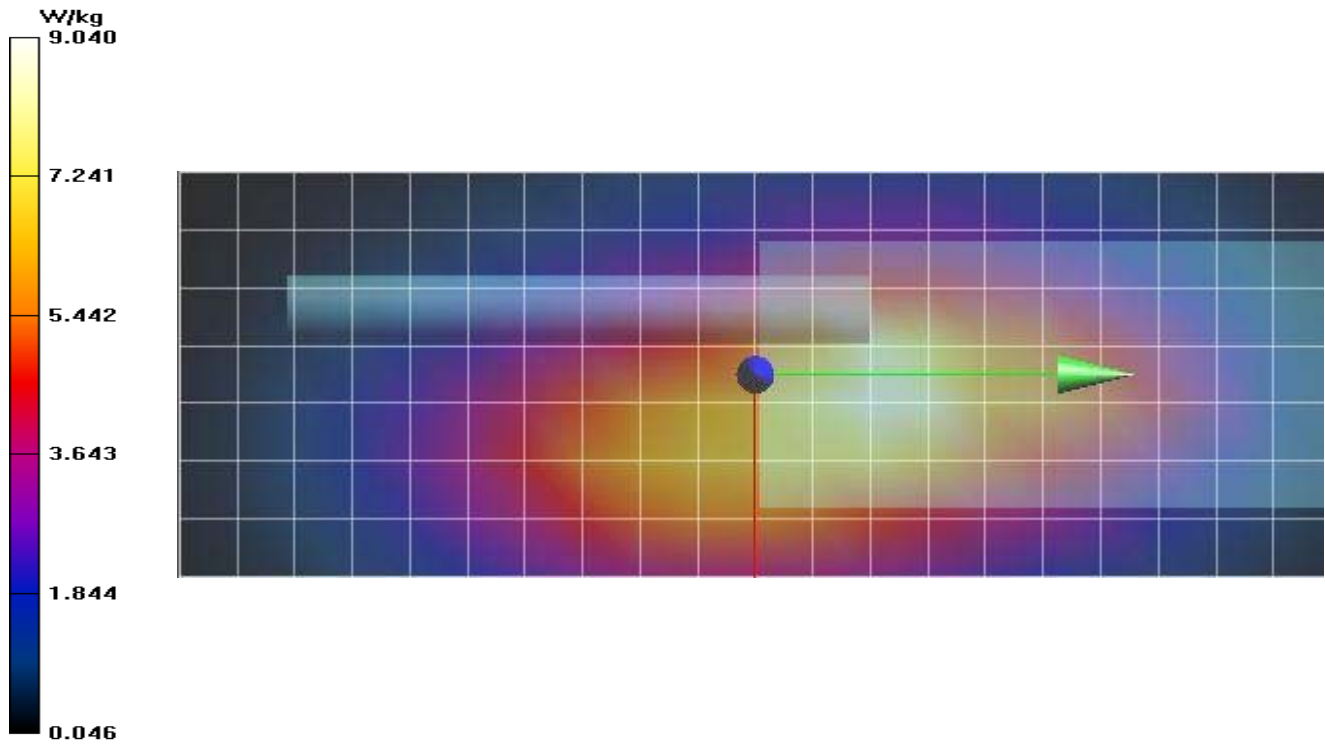
Maximum value of SAR (measured) = 10.3 W/kg

450H/B173-BODY, Harris EVM3 U44[LUE+], P7, T5, B1-02, LMR, CW, 418MHz 2/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 16.94 (n/a, 18.60) [mm]

Maximum value of SAR (interpolated) = 9.04 W/kg



Plot F59

Date/Time: 9/24/2019 3:51:48 PM

Test Laboratory: Celltech Labs

Harris EVM3-U15 Compliance LMR UHF EVAL- Sep 24 2019

DUT: EVM3-U15 ; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: D400 (400.0 MHz); Frequency: 418 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): $f = 418$ MHz; $\sigma = 0.85$ S/m; $\epsilon_r = 45.632$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.79, 8.79, 8.79) @ 418 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

450H/F59-FACE, EVM3 U15, P7, T5, LMR, CW, 418MHz/Area Scan (8x21x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 4.90 W/kg

450H/F59-FACE, EVM3 U15, P7, T5, LMR, CW, 418MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 74.75 V/m; Power Drift = -0.21 dB

Peak SAR (extrapolated) = 5.93 W/kg

SAR(1 g) = 4.67 W/kg; SAR(10 g) = 3.58 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

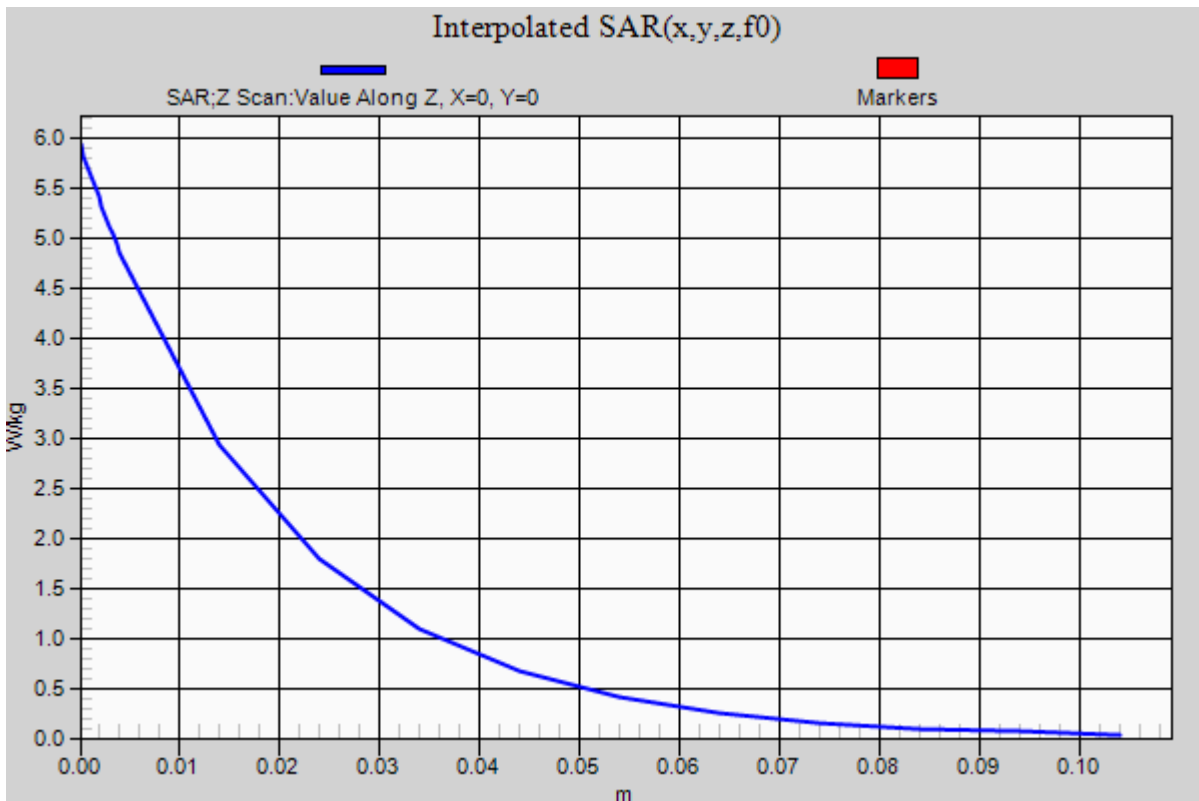
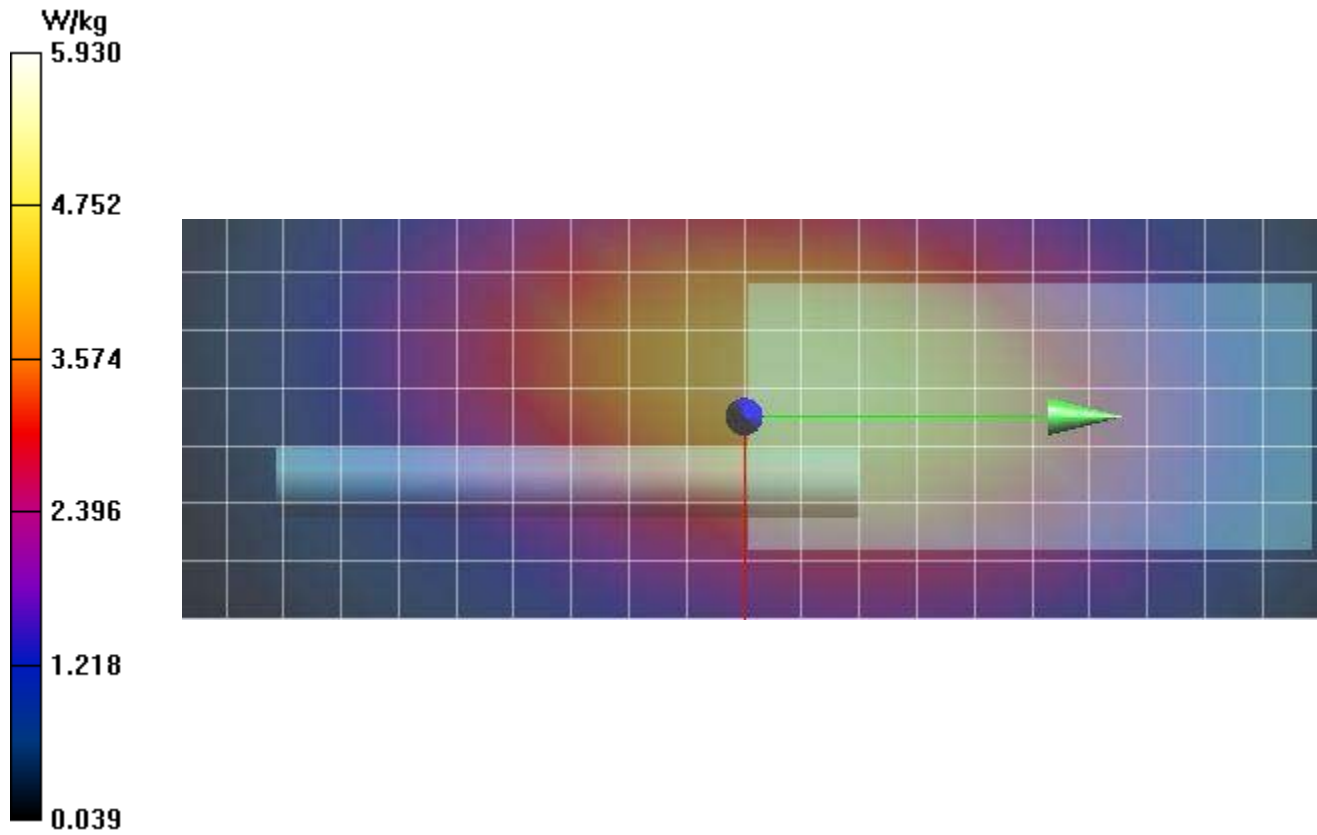
Maximum value of SAR (measured) = 4.89 W/kg

450H/F59-FACE, EVM3 U15, P7, T5, LMR, CW, 418MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 19.80 (n/a, 20.22) [mm]

Maximum value of SAR (interpolated) = 5.93 W/kg



Plot F60

Date/Time: 9/25/2019 11:31:15 AM

Test Laboratory: Celltech Labs

Harris EVM3- U44 Compliance LMR UHF EVAL- Sep 25 2019

DUT: EVM3-U44 ; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: D400 (400.0 MHz); Frequency: 418 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): $f = 418$ MHz; $\sigma = 0.85$ S/m; $\epsilon_r = 45.632$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.79, 8.79, 8.79) @ 418 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

450H/F60-FACE, EVM3 U44[LUE+], P7, T5, LMR, CW, 418MHz/Area Scan (8x21x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 5.20 W/kg

450H/F60-FACE, EVM3 U44[LUE+], P7, T5, LMR, CW, 418MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 75.89 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 6.27 W/kg

SAR(1 g) = 4.96 W/kg; SAR(10 g) = 3.82 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

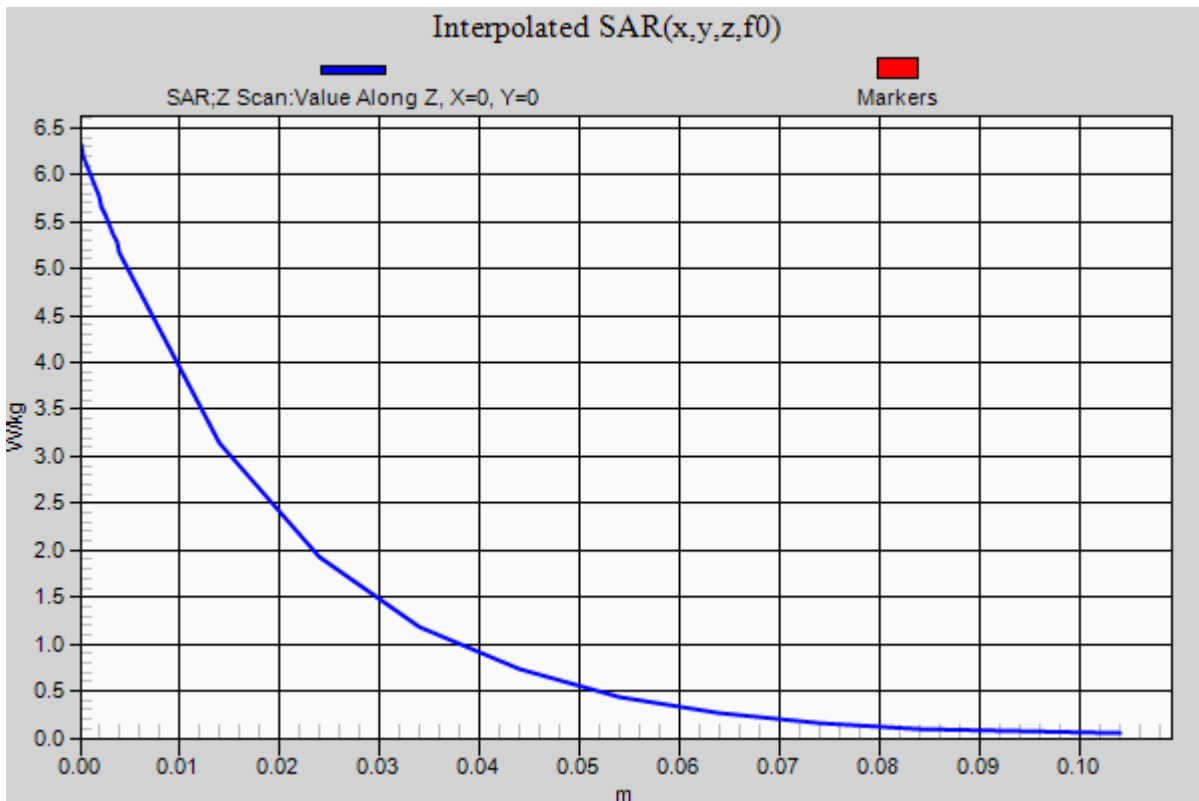
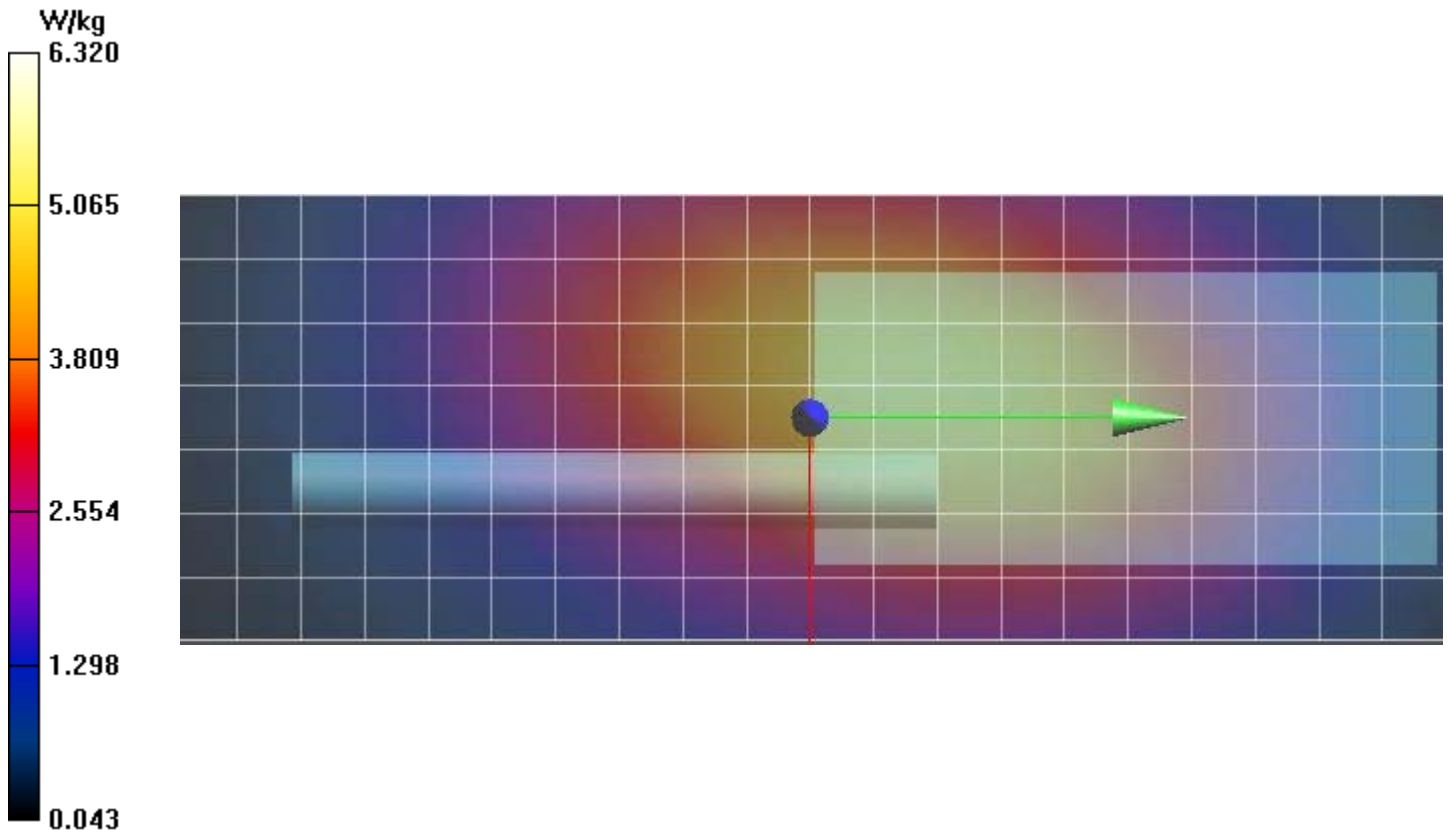
Maximum value of SAR (measured) = 5.18 W/kg

450H/F60-FACE, EVM3 U44[LUE+], P7, T5, LMR, CW, 418MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 20.01 (n/a, 20.33) [mm]

Maximum value of SAR (interpolated) = 6.32 W/kg



Plot B158

Date/Time: 8/8/2019 9:56:51 AM

Test Laboratory: Celltech Labs

Harris EVM3 U15 - Compliance LMR 7-8-900 EVAL- Aug 08 2019

DUT: EVM3- U15; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: 7/8/900; Frequency: 806 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 806$ MHz; $\sigma = 0.88$ S/m; $\epsilon_r = 41.619$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 806 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/B158 BODY, Harris EVM3 U15, P7, T9, B1-02,A1 LMR, CW, 806MHz/Area Scan (8x18x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 5.22 W/kg

835H/B158 BODY, Harris EVM3 U15, P7, T9, B1-02,A1 LMR, CW, 806MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 53.16 V/m; Power Drift = -0.26 dB

Peak SAR (extrapolated) = 10.7 W/kg

SAR(1 g) = 5.73 W/kg; SAR(10 g) = 3.32 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

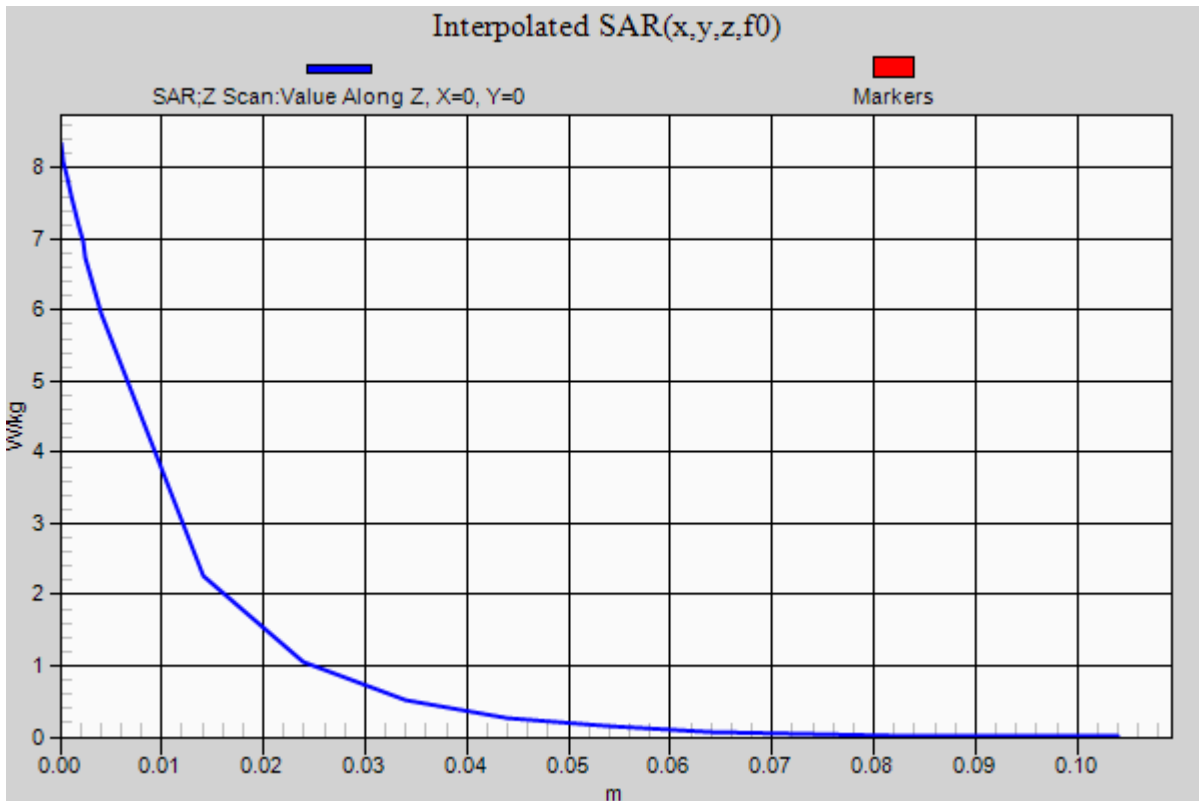
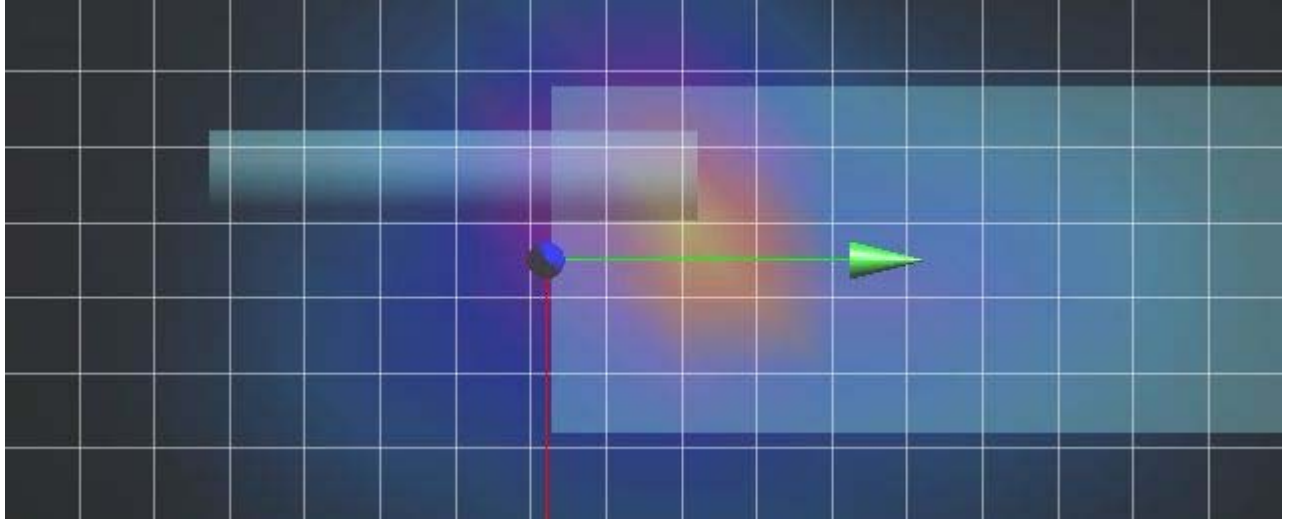
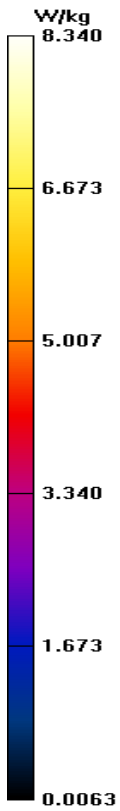
Maximum value of SAR (measured) = 6.46 W/kg

835H/B158 BODY, Harris EVM3 U15, P7, T9, B1-02,A1 LMR, CW, 806MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 10.35 (n/a, 13.05) [mm]

Maximum value of SAR (interpolated) = 8.34 W/kg



Plot B159

Date/Time: 8/8/2019 10:50:50 AM

Test Laboratory: Celltech Labs

Harris EVM3 U44 - Compliance LMR 7-8-900 EVAL- Aug 08 2019

DUT: EVM3-U44; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: 7/8/900; Frequency: 806 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 806$ MHz; $\sigma = 0.88$ S/m; $\epsilon_r = 41.619$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 806 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASYS2 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/B159 BODY, Harris EVM3 U44, P7, T9, B1-02,A1 LMR, CW, 806MHz/Area Scan (8x18x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 8.06 W/kg

835H/B159 BODY, Harris EVM3 U44, P7, T9, B1-02,A1 LMR, CW, 806MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 49.27 V/m; Power Drift = -0.26 dB

Peak SAR (extrapolated) = 14.5 W/kg

SAR(1 g) = 8.47 W/kg; SAR(10 g) = 5.06 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

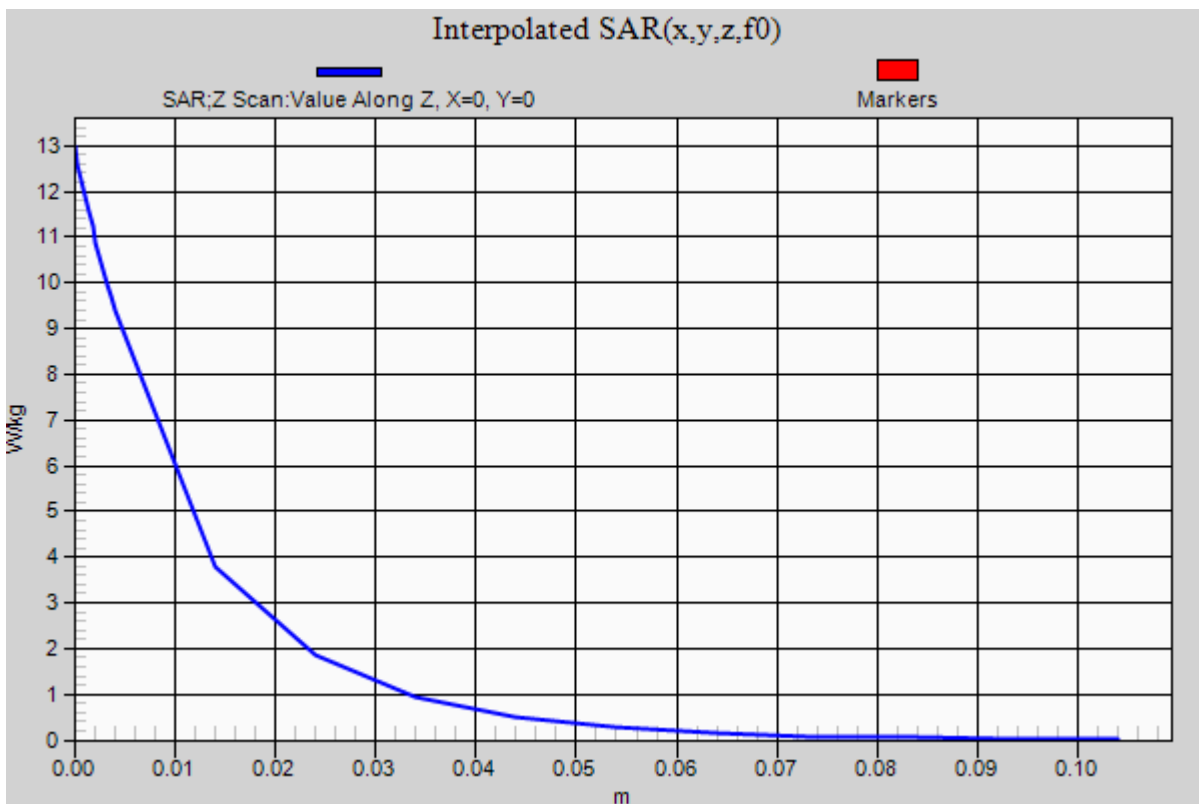
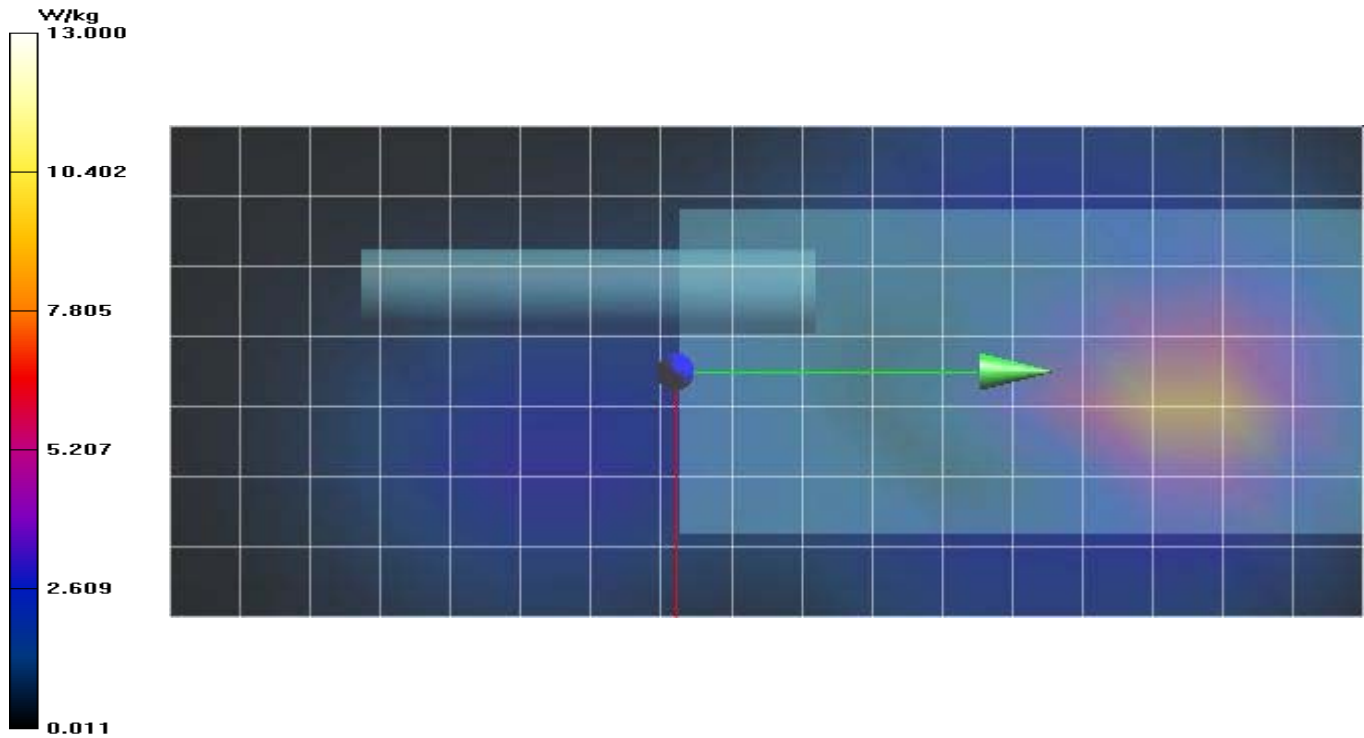
Maximum value of SAR (measured) = 9.51 W/kg

835H/B159 BODY, Harris EVM3 U44, P7, T9, B1-02,A1 LMR, CW, 806MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 11.01 (n/a, 13.83) [mm]

Maximum value of SAR (interpolated) = 13.0 W/kg



Plot F52

Date/Time: 8/8/2019 10:29:48 AM

Test Laboratory: Celltech Labs

Harris EVM3 U15- Compliance LMR 7-8-900 EVAL- Aug 08 2019

DUT: EVM3-U15; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: 7/8/900; Frequency: 806 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 806$ MHz; $\sigma = 0.88$ S/m; $\epsilon_r = 41.619$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 806 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASYS52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/F52 FACE, Harris EVM3 U15, P7, T9, LMR, CW, 806MHz/Area Scan (8x18x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 2.04 W/kg

835H/F52 FACE, Harris EVM3 U15, P7, T9, LMR, CW, 806MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 37.88 V/m; Power Drift = -0.54 dB

Peak SAR (extrapolated) = 2.26 W/kg

SAR(1 g) = 1.75 W/kg; SAR(10 g) = 1.32 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

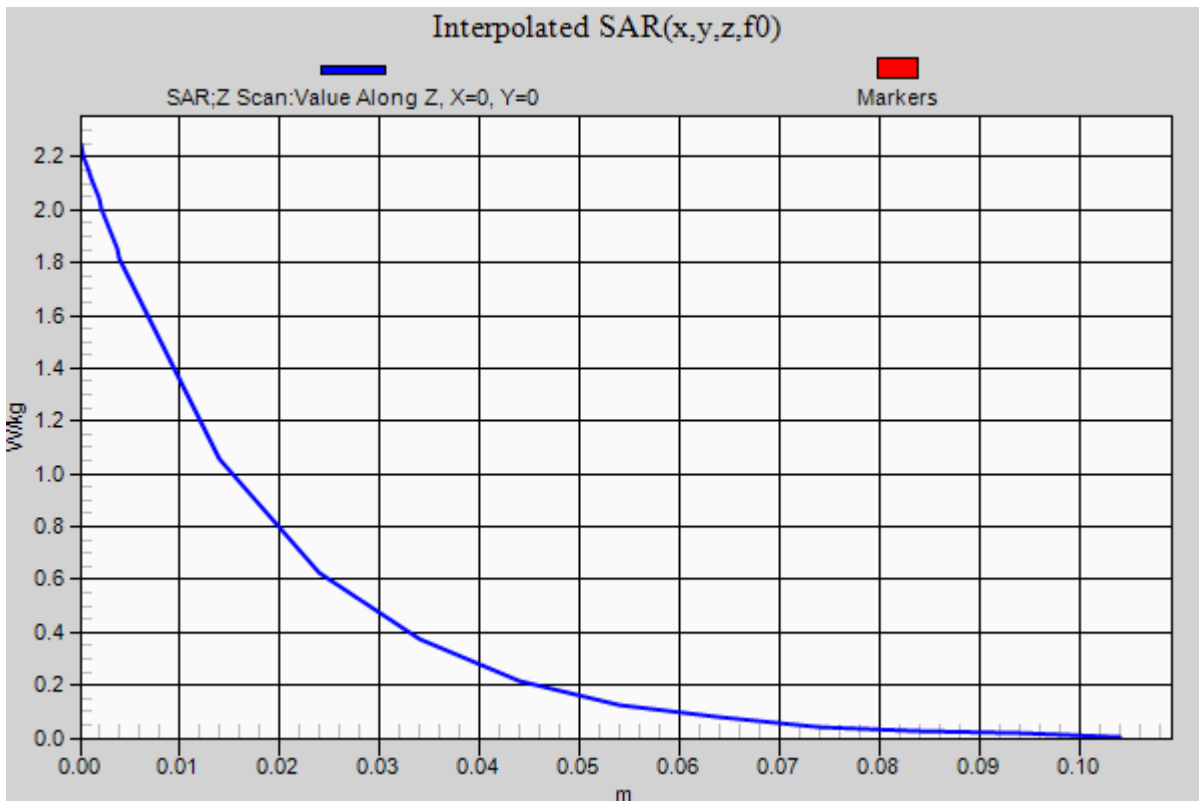
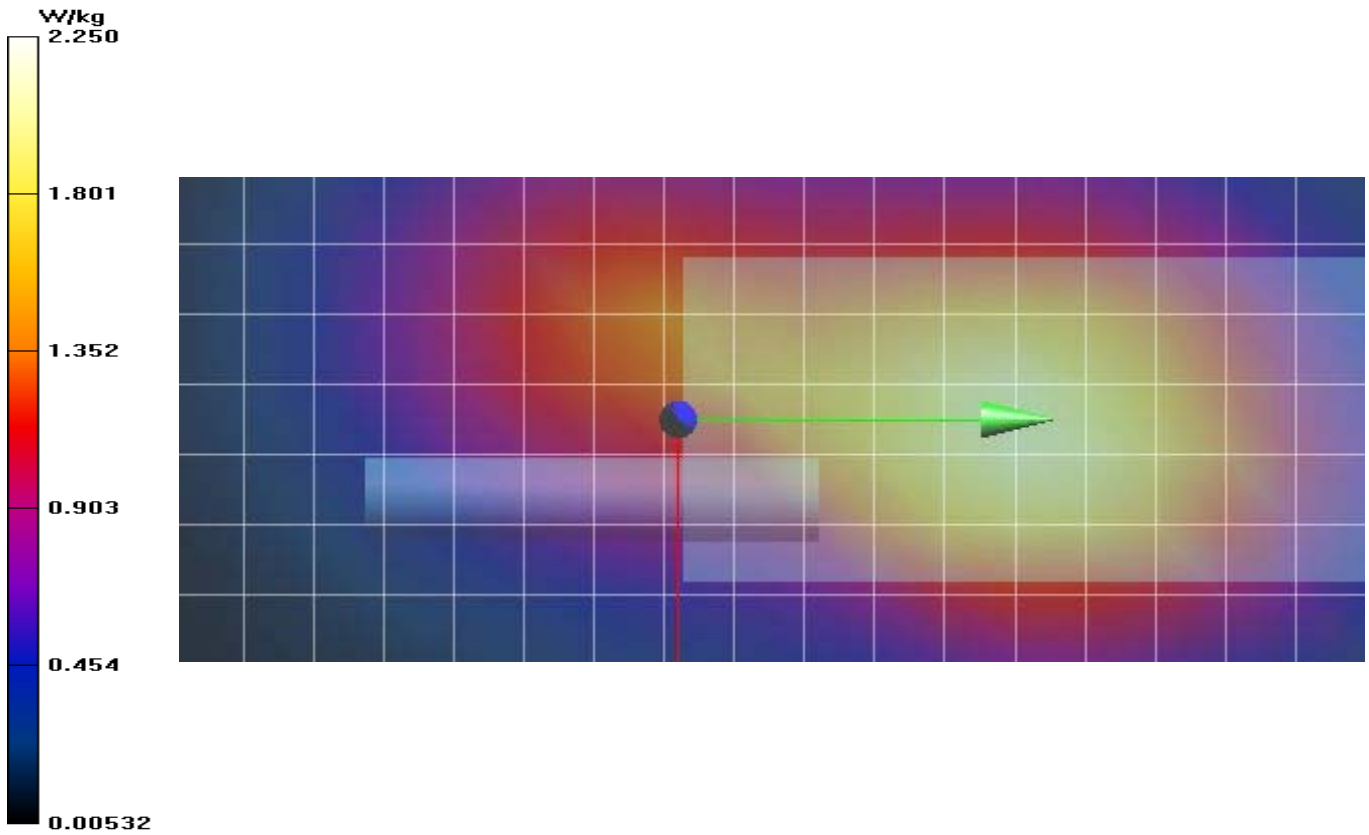
Maximum value of SAR (measured) = 1.84 W/kg

835H/F52 FACE, Harris EVM3 U15, P7, T9, LMR, CW, 806MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 18.52 (n/a, 19.06) [mm]

Maximum value of SAR (interpolated) = 2.25 W/kg



Plot F53

Date/Time: 8/8/2019 12:05:18 PM

Test Laboratory: Celltech Labs

Harris EVM3 U44- Compliance LMR 7-8-900 EVAL- Aug 08 2019

DUT: EVM3-U44; Type: PTT;

Communication System: UID 0, CW (0); Communication System Band: 7/8/900; Frequency: 806 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): $f = 806$ MHz; $\sigma = 0.88$ S/m; $\epsilon_r = 41.619$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3600; ConvF(8.13, 8.13, 8.13) @ 806 MHz; Calibrated: 3/26/2019
O 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: 3/19/2019
- Phantom: ELI V5.0 (20deg probe tilt); Type: QD OVA 002 Ax; Serial: 1234
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

835H/F53 FACE, Harris EVM3 U44, P7, T9, LMR, CW, 806MHz/Area Scan (8x18x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 3.85 W/kg

835H/F53 FACE, Harris EVM3 U44, P7, T9, LMR, CW, 806MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 35.65 V/m; Power Drift = -0.55 dB

Peak SAR (extrapolated) = 4.53 W/kg

SAR(1 g) = 3.5 W/kg; SAR(10 g) = 2.62 W/kg

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 3.68 W/kg

835H/F53 FACE, Harris EVM3 U44, P7, T9, LMR, CW, 806MHz/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Penetration depth = 18.28 (n/a, 18.45) [mm]

Maximum value of SAR (interpolated) = 4.52 W/kg

