



DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

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Date/s Tested: 08/14/2018 - 08/21/2018, 08/24/2018, 08/26/2018 - 08/31/2018, 09/02/2018 - 09/06/2018
Manufacturer: Motorola Solutions Inc.
DUT Description: Handheld, MTP3550, 806 – 870 MHz, MACE
Test TX mode(s): TDMA (PTT); CW(Bluetooth)
Max. Power output: 2.0W (806-870MHz), 4.61mW (Bluetooth) & 2.51mW (Bluetooth LE)
Nominal Power: 1.8W (806-870MHz), 2.0mW (Bluetooth) & 2.0mW (Bluetooth LE)
Tx Frequency Bands: 806-870 MHz, Bluetooth 2.402-2.480 GHz
Signaling type: TDMA, PI/4DQPSK & FHSS (Bluetooth)
Model(s) Tested: AZH63UCH6TZ8AN (PMUF1703A)
Model(s) Certified: AZH63UCH6TZ8AN (PMUF1703A), AZH62UCF6TZ8AN (PMUF1739A)
Serial Number(s): DFLTQU4NJE
Classification: Occupational / Controlled Environment
FCC ID: AZ489FT5876; 809-824 MHz, 854-869 MHz, 2402-2480 MHz
IC: 109U-89FT5876; 806-824 MHz, 851-869 MHz, 2402-2480 MHz
ISED Test Site registration: 109AK
FCC Test Firm Registration Number: 823256

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093 and RSS-102.

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 4.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola Solutions Inc EME Laboratory. I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements. This reporting format is consistent with the suggested guidelines of the TIA TSB-150 December 2004. The results and statements contained in this report pertain only to the device(s) evaluated.

Tiong

Tiong Nguk Ing
Deputy Technical Manager (Approved Signatory)
Approval Date: 10/25/2018

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Report Revision History

Date	Revision	Comments
10/02/2018	A	Initial release
10/25/2018	B	Updated the FCC/IC ID in the header of Part 2 report

1.0 Introduction

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurements performed at the Motorola Solutions Inc. EME Test Laboratory for handheld portable model number PMUF1703A. This device is classified as Occupational/Controlled.

2.0 FCC SAR Summary

Table 1

Equipment Class	Frequency band (MHz)	Max Calc at Body (W/kg)	Max Calc at Face (W/kg)	Max Calc at Head (W/kg)
		1g-SAR	1g-SAR	1g-SAR
TNF	809 - 824	6.83	0.32	2.05
	854 - 869	7.01	0.33	1.97
*DSS	2402 - 2480	NA	NA	NA
*Simultaneous Results		NA	NA	NA

Note: *Results not required per KDB

3.0 Abbreviations / Definitions

- CNR: Calibration Not Required
- EME: Electromagnetic Energy
- CW: Continuous Wave
- DUT: Device Under Test
- BT: Bluetooth
- FHSS: Frequency Hopping Spread Spectrum
- FM: Frequency Modulation
- NA: Not Applicable
- PTT: Push to Talk
- TDMA: Time Division Multiple Access
- SAR: Specific Absorption Rate
- MSPD: Multi Slot Packed Data
- SSPD: Single Slot Packet Data
- DPSK: Differential Phase-Shift Keying
- DSP: Digital Signal Processor
- PI/4DQPSK: Pi/4 Differential Quadrature Phase Shift Keying
- LKP: Limited Keypad
- FKP: Full Keypad
- TNF: Licensed Non-Broadcast Transmitter Held to Face
- DSS: Spread Spectrum Transmitter
- Audio accessories: These accessories allow communication while the DUT is worn on the body.
- Body worn accessories: These accessories allow the DUT to be worn on the body of the user.
- Maximum Power: Defined as the upper limit of the production line final test station.

4.0 Referenced Standards and Guidelines

This product is designed to comply with the following applicable national and international standards and guidelines.

- IEC62209-1 (2005) Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)
- Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, FCC, Washington, D.C.: 1997.
- IEEE 1528 (2013), Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2005
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6 (2015), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- RSS-102 (Issue 5) – Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard (2014)
- ANATEL, Brazil Regulatory Authority, Resolution No. 303 of July 2, 2002 "Regulation of the limitation of exposure to electrical, magnetic, and electromagnetic fields in the radio frequency range between 9 kHz and 300 GHz." and “Attachment to resolution # 303 from July 2, 2002”
- IEC62209-2 Edition 1.0 2010-03, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz).
- FCC KDB – 643646 D01 SAR Test for PTT Radios v01r03
- FCC KDB – 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB – 865664 D02 RF Exposure Reporting v01r02
- FCC KDB – 447498 D01 General RF Exposure Guidance v06
- FCC KDB - 648474 D04 Handset SAR v01r03

5.0 SAR Limits

Table 2

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average - ANSI - (averaged over the whole body)	0.08	0.4
Spatial Peak - ANSI - (averaged over any 1-g of tissue)	1.6	8.0
Spatial Peak – ICNIRP/ANSI - (hands/wrists/feet/ankles averaged over 10-g)	4.0	20.0
Spatial Peak - ICNIRP - (Head and Trunk 10-g)	2.0	10.0

6.0 Description of Device Under Test (DUT)

This portable device model PMUF1703A operates in dispatch and phone modes. It uses two digital technologies: PI/4DQPSK and Time Division Multiple Access (TDMA).

PI/4DQPSK is a modulation technique that transmits information by altering the phase of the radio frequency (RF) signal. Data is converted into complex symbols, which alter the RF signal and transmit the information. When the signal is received, the change in phase is converted back into symbols and then into the original data. The system can accommodate 4-voice channels in the standard 25 kHz channel as used in the two-way radio. Time Division Multiple Access (TDMA) is used to allocate portions of the RF signal by dividing time into four slots, one for each unit. Time allocation enables each unit to transmit its voice information without interference from other transmitting units. Transmission from a unit or base station is accommodated in time-slot lengths of 15 milliseconds and frame lengths of 60 milliseconds.

The TDMA technique requires sophisticated algorithms and a digital signal processor (DSP) to perform voice compressions/decompressions and RF modulation/demodulation. The radios can be used by transmitting MSPD with 6:9 (66.67%) duty cycle for data mode and SSPD with 1:4.55 (22%) duty cycle for voice transmission at maximum transmit power. It can operate in data mode with and without the data cable attached.

This device also incorporates a Class 1 Bluetooth device which is a Frequency Hopping Spread Spectrum (FHSS) technology. The Bluetooth radio modem is used to wireless link audio accessories. The maximum actual transmission duty cycle is imposed by the Bluetooth standard. The maximum duty cycle for BT is 50%. Simultaneous transmission can occur between the BT and primary transmitter. Refer to section 14.0 Simultaneous Transmission Exclusion.

Table 3 below summarizes the technologies, bands, maximum duty cycles and maximum output powers. Maximum output powers are defined as upper limit of the production line final test station.

Table 3

Band (MHz)	Duty Cycle (%)	Max Power (W)
806 - 825	22 (SSPD) / 66.67 (MSPD)	2.0
851-870	22 (SSPD) / 66.67 (MSPD)	2.0
2402 - 2480	50	0.00461

The intended operating positions are “against the head” in phone mode, “in front of the face” in PTT mode with the DUT at least 2.5cm from the mouth, and “against the body” in data, phone or PTT mode by means of the offered body worn accessories. Body worn audio and PTT operation is accomplished by means of optional remote accessories that are connected to the radio. Operation at the body without an audio accessory attached is possible by means of BT accessories.

7.0 Optional Accessories and Test Criteria

This device is offered with optional accessories. All accessories were individually evaluated during the test plan creation to determine if testing was required per the guidelines outlined in “SAR Test Reduction Considerations for Occupational PTT Radios” FCC KDB 643646 to assess compliance of this device. The following sections identify the test criteria and details for each accessory category. Refer to Exhibit 7B for antenna separation distances.

7.1 Antennas

There are two removable antennas and one internal BT antenna offered for this product. The Table below lists their descriptions.

Table 4

Antenna No.	Antenna Models	Description	Selected for test	Tested
1	85012070001	Whip Antenna, 806-870 MHz, ½ wave, 3.15 dBi	Yes	Yes
2	85012069001	Stubby Antenna, 806-870 MHz, ½ wave, 2.65 dBi	Yes	Yes
3	0104042J37*	PIFA Antenna 2402-2480 MHz, ¼ wave, 2.15 dBi	No	No

Note: *Refer to sections 13.8 and 14.0 for BT low power exclusion and simultaneous TX for antenna not tested

7.2 Batteries

There are three batteries offered for this product. The Table below lists their descriptions.

Table 5

Battery No.	Battery Models	Description	Selected for test	Tested	Comments
1	NNTN8020B	Batt Std IP55 Li-ion 1850M 1950T	Yes	Yes	Default battery for body testing
2	NNTN8023C	Batt Li-ion 2200T	Yes	Yes	
3	PMNN4522A	Batt IMPRES2 Li-ion IP68 3400T	Yes	Yes	Default battery for face testing

7.3 Body worn Accessories

All body worn accessories were considered. The Table below lists the body worn accessories and their descriptions.

Table 6

Body worn No.	Body worn Models	Description	Selected for test	Tested	Comments
1	GMDN0386A	Peter Jones Klick Fast sew on dock	Yes	Yes	Tested with PMLN5004B
2	GMDN0445AA	Peter Jones Klick Fast snap on tag dock	Yes	Yes	Tested with PMLN5004B
3	GMDN0445AC	Peter Jones Klick Fast 50mm belt loop with dock	Yes	Yes	Tested with PMLN5004B
4	GMDN0497A	Peter Jones Klick Fast belt dock 38mm	Yes	Yes	Tested with PMLN5004B
5	GMDN0547A	Peter Jones Klick Fast double tongue tag dock	Yes	Yes	Tested with PMLN5004B
6	GMDN0566AC	Peter Jones Klick Fast belt loop with mounting dock (50mm)	Yes	Yes	Tested with PMLN5004B
7	GMLN4488A	Peter Jones Klick Fast belt dock (50mm)	No	No	Non-metallic and further distance compared to GMDN0386A
8	HLN6602A	Universal Chest Pack	Yes	Yes	
9	HLN9714A	Large Belt clip 2.5 inch	Yes	Yes	
10	PMLN5004B	Shoulder Wearing Device with Peter Jones Klick Fast stud	Yes	Yes	Tested with GMDN0386A, GMDN0445AA, GMDN0445AC, GMDN0497A, GMDN0547A, GMDN0566AC, PMLN7961A & WALN4037A
11	PMLN5616B	Short Belt clip 2 inch	Yes	Yes	
12	PMLN5885B	Hard Leather Case with 3 inch swivel belt loop	Yes	Yes	
13	PMLN5887B	Soft leather case with 3 inch swivel belt loop	Yes	Yes	
14	PMLN5888B	Soft leather case with 2.5 inch swivel belt loop	No	No	By similarity to PMLN5887B
15	PMLN5890B	Soft leather pouch	No	No	Non-metallic leather pouch and use with PMLN5004B. Configuration similar to PMLN5004B.
16	PMLN7961A	Shoulder Wearing Device	Yes	Yes	Tested with PMLN5004B
17	RLN4570A	Break-a-way chest pack with radio holder	Yes	Yes	
18	WALN4307A	Peter Jones Klick Fast retro fitting garment with easy screw-to-fit dock	Yes	Yes	Tested with PMLN5004B

7.4 Audio Accessories

All audio accessories were considered. The Table below lists the offered audio accessories and their descriptions. Exhibit 7B illustrates photos of the tested audio accessories.

Table 7

Audio No.	Audio acc. Models	Description	Selected for test	Tested	Comments
1	PMMN4072A	IMPRES RSM Large 3.5mm Jack NC Emergency	Yes	Yes	
2	PMMN4074A	IMPRES RSM with 3.5mm Jack	Yes	No	Per KDB provisions test not required
3	PMMN4075A	RSM small IP57, no Emergency, IP57	No	No	By similarity to PMMN4072A
4	PMMN4078A	RSM small 3.5 Jack, Emergency	No	No	By similarity to PMMN4072A
5	PMLN7269A	New 2-wire Surveillance Kit, black.	Yes	No	Per KDB provisions test not required
6	PMLN7270A	New 2-wire Surveillance Kit, beige.	No	No	By similarity to PMLN7269A
7	PMLN5729A	IMPRES Ear Microphone System	Yes	No	Per KDB provisions test not required
8	PMLN5731A	Heavy Duty Headset	Yes	No	Per KDB provisions test not required
9	PMLN6635A	Lightweight Headset	Yes	No	Per KDB provisions test not required
10	PMLN5727A	Earpiece In-line Mic/PTT, Mag One	Yes	No	Per KDB provisions test not required
11	PMLN5732A	Earset with boom mic, Mag One	Yes	No	Per KDB provisions test not required
12	PMLN5733A	Earbud with in-line MIC/PTT, Mag One	Yes	No	Per KDB provisions test not required
13	GMMN4579B	SAVOX C-C400 Control COM MTP3000	Yes	No	For use with GMMN4585A & GMMN4584A; Per KDB provisions test not required
14	GMMN4585A	SAVOX HC-1 Helmet-COM Unit Bone-Mic	Yes	No	For use with GMMN4579B; Per KDB provisions test not required
15	GMMN4584A	SAVOX HC-2 Helmet-COM Bone-Mic	Yes	No	For use with GMMN4579B; Per KDB provisions test not required
16	PMLN5724A	2-wire surveillance kit, black	Yes	No	Per KDB provisions test not required
17	PMLN5726A	2-wire surveillance kit, beige	No	No	By similarity to PMLN5724A
18	PMLN6754A	3-Wire Surveillance Earpiece, black	Yes	No	Per KDB provisions test not required
19	PMLN6755A	3-Wire Surveillance Earpiece, beige	No	No	By similarity to PMLN6754A
20	PMLN6759A	Impress Temple Transducer	Yes	No	Per KDB provisions test not required
21	PMLN6761A	Breeze Headset MagOne	Yes	No	Per KDB provisions test not required

8.0 Description of Test System



8.1 Descriptions of Robotics/Probes/Readout Electronics

Table 8

Dosimetric System type	System version	DAE type	Probe Type
Schmid & Partner Engineering AG SPEAG DASY 5	52.8.2.969	DAE4	EX3DV4 (E-Field)

The DASY5™ system is operated per the instructions in the DASY5™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess SAR compliance was calibrated according to ISO/IEC 17025 A2LA guidelines. Section 9.0 presents additional test equipment information. Appendices B and C present the applicable calibration certificates. The E-field probe first scans a coarse grid over a large area inside the phantom in order to locate the interpolated maximum SAR distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position as reference for the cube evaluations.

8.2 Description of Phantom(s)

Table 9

Phantom Type	Phantom(s) Used	Material Parameters	Phantom Dimensions LxWxD (mm)	Material Thickness (mm)	Support Structure Material	Loss Tangent (wood)
Triple Flat	NA	200MHz -6GHz; Er = 3-5, Loss Tangent = ≤ 0.05	280x175x175	2mm +/- 0.2mm	Wood	< 0.05
SAM	√	300MHz -6GHz; Er = < 5, Loss Tangent = ≤ 0.05	Human Model			
Oval Flat	√	300MHz -6GHz; Er = 4+/- 1, Loss Tangent = ≤ 0.05	600x400x190			

8.3 Description of Simulated Tissue

The sugar based simulate tissue is produced by placing the correct measured amount of De-ionized water into a large container. Each of the dried ingredients are weighed and added to the water carefully to avoid clumping. If the solution has a high sugar concentration the water is pre-heated to aid in dissolving the ingredients. The solution is mixed thoroughly, covered and allowed to sit overnight prior to use.

The simulated tissue mixture was mixed based on the Simulated Tissue Composition indicated in Table 10. During the daily testing of this product, the applicable mixture was used to measure the Di-electric parameters at each of the tested frequencies to verify that the Di-electric parameters were within the tolerance of the tissue specifications.

Simulated Tissue Composition (percent by mass)

Table 10

Ingredients	835MHz	
	Head	Body
Sugar	57.0	44.9
De-ionized Water	40.45	53.06
Salt	1.45	0.94
HEC	1.0	1.0
Bact.	0.1	0.1

9.0 Additional Test Equipment

The Table below lists additional test equipment used during the SAR assessment.

Table 11

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
Speag Probe	EX3DV4	7364	1/17/2018	1/17/2019
Speag DAE	DAE4	1483	1/4/2018	1/4/2019
AMPLIFIER	10WD1000	28782	CNR	CNR
BI-DIRECTIONAL COUPLER	3020A	41935	9/15/2017	9/15/2018
POWER METER	E4419B	MY45103725	5/22/2017	5/22/2019
POWER SENSOR	E9301B	MY50290001	4/24/2018	4/24/2019
POWER METER	E4418B	MY45100911	7/14/2017	7/14/2019
POWER SENSOR	E9301B	MY41495733	4/17/2018	4/17/2019
POWER METER	E4416A	MY50001037	5/22/2017	5/22/2019
POWER SENSOR	E9301B	MY55210003	9/27/2017	9/28/2018
VECTOR SIGNAL GENERATOR	E4438C	MY45091270	8/13/2018	8/13/2020
VECTOR SIGNAL GENERATOR	E4438C	MY44270302	3/8/2018	3/8/2019
THERMOMETER	HH202A	18812	10/13/2017	10/13/2018
TEMPERATURE PROBE	JHSS-18U-RSC-6	AGIL700245	10/13/2017	10/13/2018
TEMPERATURE & HUMINIDITY LOGGER	TM320	12253047	10/26/2017	10/26/2018
THERMOMETER	HH806AU	080307	11/30/2017	11/30/2018
TEMPERATURE PROBE	80PK-22	06032017	3/7/2018	3/7/2019
NETWORK ANALYZER	E5071B	MY42403147	11/15/2017	11/15/2018
NETWORK ANALYZER*	E5071B	MY42403218	8/24/2017	8/24/2018
DIELECTRIC ASSESSMENT KIT	DAK-3.5	1156	1/9/2018	1/9/2019
SPEAG DIPOLE	D835V2	4D029	1/8/2018	1/8/2020

Note: *Equipment used for SAR testing prior to calibration due date

10.0 SAR Measurement System Validation and Verification

DASY output files of the probe/dipole calibration certificates and system verification test results are included in Appendices B, C & E respectively.

10.1 System Validation

The SAR measurement system was validated according to procedures in KDB 865664. The validation status summary Table is below.

Table 12

Dates	Probe Calibration Point		Probe SN	Measured Tissue Parameters		Validation		
				σ	ϵ_r	Sensitivity	Linearity	Isotropy
CW								
02/22/2018	Body	835	7364	1.02	54.8	Pass	Pass	Pass
02/23/2018	Head	835		0.90	41.2	Pass	Pass	Pass

10.2 System Verification

System verification checks were conducted each day during the SAR assessment. The results are normalized to 1W. Appendix F includes DASY plots for each day during the SAR assessment. The Table below summarizes the daily system check results used for the SAR assessment.

Table 13

Probe Serial #	Tissue Type	Dipole Kit / Serial #	Ref SAR @ 1W (W/kg)	System Check Results Measured (W/kg)	System Check Test Results when normalized to 1W (W/kg)	Tested Date	
7364	IEEE/IEC Head	SPEAG D835V2 / 4D029	9.60 +/- 10%	2.30	9.20	08/17/2018#	
				2.30	9.20	08/20/2018	
				2.33	9.32	08/21/2018	
	FCC Body			9.67 +/- 10%	2.37	9.48	08/24/2018#
					2.33	9.32	08/26/2018
					2.39	9.56	08/27/2018#
					2.34	9.36	08/28/2018#
					2.28	9.12	08/29/2018#
					2.33	9.32	08/30/2018#
					2.33	9.32	08/31/2018
					2.38	9.52	09/02/2018#
					2.36	9.44	09/03/2018#
					2.40	9.60	09/04/2018#
					2.51	10.04	09/05/2018#
					2.47	9.88	09/06/2018

Note: #System verification covered for next test day (within 24 hours)

10.3 Equivalent Tissue Test Results

Simulated tissue prepared for SAR measurements is measured daily and within 24 hours prior to actual SAR testing to verify that the tissue is within +/- 5% of target parameters at the center of the transmit band. This measurement is done using the applicable equipment indicated in section 9.0. The Table below summarizes the measured tissue parameters used for the SAR assessment.

Table 14

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
809	IEEE/ IEC Head	0.90	41.6	0.91	40.5	08/17/2018#
				0.91	40.7	08/20/2018
				0.91	40.6	08/21/2018
	FCC Body	0.97	55.3	0.98	53.4	08/24/2018#
				0.99	52.9	08/26/2018
				0.98	53.2	08/27/2018#
				0.99	52.9	08/28/2018
				0.99	53.7	08/29/2018#
816.5	IEEE/ IEC Head	0.90	41.6	0.92	40.4	08/17/2018#
				0.92	40.5	08/21/2018
	FCC Body	0.97	55.3	0.99	53.3	08/24/2018#
				1.00	52.8	08/26/2018
				1.00	52.8	08/28/2018#
				1.00	53.6	08/29/2018#
				0.93	40.3	08/17/2018#
824	IEEE/ IEC Head	0.90	41.6	0.92	40.4	08/21/2018
				1.00	53.2	08/24/2018#
	FCC Body	0.97	55.2	1.01	52.7	08/26/2018
				1.01	52.7	08/28/2018#
				1.01	53.5	08/29/2018
				0.98	52.8	09/06/2018

Note: #Tissue date covered for next test day (within 24 hours)

Table 14 (Continued)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
835	IEEE/ IEC Head	0.90	41.5	0.94	40.2	08/17/2018#
				0.93	40.4	08/20/2018
				0.93	40.2	08/21/2018
	FCC Body	0.97	55.2	1.01	53.1	08/24/2018#
				1.02	52.7	08/26/2018
				1.01	52.9	08/27/2018#
				1.02	52.7	08/28/2018#
				1.02	53.4	08/29/2018#
				1.02	53.0	08/30/2018#
				1.01	53.1	08/31/2018
				1.00	52.8	09/02/2018#
				1.00	52.8	09/03/2018#
				1.01	52.7	09/04/2018#
				1.00	53.0	09/05/2018#
854	IEEE/ IEC Head	0.92	41.5	0.95	40.1	08/20/2018
				0.95	40.0	08/21/2018
	FCC Body	0.99	55.1	1.03	52.8	08/30/2018#
				1.03	52.9	08/31/2018
				1.02	52.6	09/03/2014#
861.5	IEEE/ IEC Head	0.93	41.5	0.97	39.8	08/17/2018#
				0.96	40.0	08/20/2018
				0.96	39.9	08/21/2018
	FCC Body	1.00	55.1	1.04	52.7	08/30/2018#
				1.04	52.8	08/31/2018
				1.02	52.5	09/02/2018#
				1.03	52.5	09/03/2018#
				1.03	52.5	09/04/2018#
869	IEEE/ IEC Head	0.94	41.5	0.97	39.9	08/20/2018
				0.97	39.8	08/21/2018
	FCC Body	1.01	55.1	1.05	52.6	08/30/2018#
				1.03	52.4	09/02/2018
				1.04	52.4	09/04/2018#
				1.03	52.4	09/06/2018

Note: #Tissue date covered for next test day (within 24 hours)

11.0 Environmental Test Conditions

The EME Laboratory’s ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/- 2°C of the temperature at which the dielectric properties were determined. The liquid depth within the phantom used for measurements was at least 15cm. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The Table below presents the range and average environmental conditions during the SAR tests reported herein:

Table 15

	Target	Measured
Ambient Temperature	18 – 25 °C	Range: 19.3-24.2°C Avg. 21.8°C
Tissue Temperature	18 – 25 °C	Range: 20.0-22.0°C Avg. 21.0°C

The EME Lab RF environment uses a Spectrum Analyzer to monitor for extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the SAR scans are repeated.

12.0 DUT Test Setup and Methodology

12.1 Measurements

SAR measurements were performed using the DASY system described in section 8.0 using zoom scans. Oval flat phantoms filled with applicable simulated tissue were used for body and face testing while SAM phantom was used for head testing.

The Table below includes the step sizes and resolution of area and zoom scans per KDB 865664 requirements.

Table 16

Description		≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: ΔxArea, ΔyArea		≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: ΔxZoom, ΔyZoom		≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: ΔzZoom(n)	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.			
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.			

12.2 DUT Configuration(s)

The DUT is a portable device operational at the body and face as described in section 6.0 while using the applicable accessories listed in section 7.0. All accessories listed in section 7.0 of this report were considered when implementing the guidelines specified in KDB 643646.

12.3 DUT Positioning Procedures

The positioning of the device for each body location is described below and illustrated in Appendix H.

12.3.1 Body

The DUT was positioned in normal use configuration against the phantom with the offered body worn accessory as well as with and without the offered audio accessories as applicable.

12.3.2 Head

The DUT was placed against the right and left heads of the SAM phantom in the cheek touch and 15° tilt positions.

12.3.3 Face

The DUT was positioned with its' front side separated 2.5cm from the phantom.

12.4 DUT Test Channels

The number of test channels was determined by using the following IEEE 1528 equation. The use of this equation produces the same or more test channels compared to the FCC KDB 447498 number of test channels formula.

$$N_c = 2 * \text{roundup}[10 * (f_{high} - f_{low}) / f_c] + 1$$

Where

N_c = Number of channels

F_{high} = Upper channel

F_{low} = Lower channel

F_c = Center channel

12.5 SAR Result Scaling Methodology

The calculated 1-gram and 10-gram averaged SAR results indicated as “Max Calc. 1g-SAR” in the data Tables is determined by scaling the measured SAR to account for power leveling variations and drift. Appendix G includes a shortened scan to justify SAR scaling for drift. For this device the “Max Calc. 1g-SAR” is scaled using the following formula:

$$Max_Calc = SAR_meas \cdot 10^{\frac{-Drift}{10}} \cdot \frac{P_max}{P_int} \cdot DC$$

P_max = Maximum Power (W)

P_int = Initial Power (W)

Drift = DASY drift results (dB)

SAR_meas = Measured 1-g or 10-g Avg. SAR (W/kg)

DC = Transmission mode duty cycle in % where applicable

50% duty cycle is applied for PTT operation

Note: for conservative results, the following are applied:

If $P_int > P_max$, then $P_max/P_int = 1$.

Drift = 1 for positive drift

Additional SAR scaling was applied using the methodologies outlined in FCC KDB 865664 using tissue sensitivity values. SAR was scaled for conditions where the tissue permittivity was measured above the nominal target and for tissue conductivity that was measured below the nominal target. Negative or reduced SAR scaling is not permitted.

12.6 DUT Test Plan

The guidelines and requirements outlined in section 4.0 were used to assess compliance of this device. All modes of operation identified in section 6.0 were considered during the development of the test plan. For conservative assessment, MSPD 6:9 (66.7%) data transmission was tested for body exposure; SSPD 1:4.55 (22%) phone mode was tested for head exposure and SSPD 1:4.55 (22%) PTT mode was tested for face exposure. A 50% duty cycle was applied to PTT configurations in the final results.

Standalone and simultaneous BT testing were assessed in sections 13.8 and 14.0 per the guidelines of KDB 447498.

13.0 DUT Test Data

13.1 Assessment at the Body for 809-824 MHz band

Battery NNTN8020B was selected as the default battery for assessments at the Body because it is the thinnest battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (809-824 MHz) which are listed in Table 17. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 17

Test Freq (MHz)	Power (W)
809.0000	1.93
816.5000	1.92
824.0000	1.87

Assessment at the Body with Body worn HLN9714A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 18

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	HLN9714A	None	809.0000	1.90	-0.67	3.97	4.88	AZ-AB-180824-02
				816.5000	1.89	-0.63	4.34	5.31	AZ-AB-180824-03
				824.0000	1.88	-0.57	4.18	5.07	AZ-AB-180824-04
85012070001				809.0000	1.91	-0.75	3.81	4.74	AZ-AB-180825-01#
				816.5000	1.90	-0.75	4.30	5.38	AZ-AB-180825-02#
				824.0000	1.88	-0.72	4.26	5.35	AZ-AB-180825-03#
Assessment of Additional Batteries									
85012069001	NNTN8023C	HLN9714A	None	809.0000					
				816.5000	1.88	-0.72	4.14	5.20	AZ-AB-180825-04#
				824.0000					
85012070001				809.0000					
				816.5000	1.89	-0.75	3.91	4.92	AZ-AB-180825-05#
				824.0000					
85012069001	PMNN4522A	HLN9714A	None	809.0000					
				816.5000	1.90	-0.79	3.77	4.76	AZ-AB-180825-06#
				824.0000					
85012070001				809.0000					
				816.5000	1.91	-0.93	3.18	4.12	AZ-AB-180825-07#
				824.0000					

Assessment at the Body with Body worn PMLN5616B

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 19

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5616B	None	809.0000	1.91	-0.74	3.86	4.79	AZ-AB-180826-02
				816.5000	1.90	-0.88	4.09	5.27	AZ-AB-180826-03
				824.0000	1.88	-0.78	4.22	5.37	AZ-AB-180826-04
85012070001				809.0000	1.90	-0.80	3.95	5.00	AZ-AB-180826-05
				816.5000	1.89	-0.95	4.11	5.41	AZ-AB-180826-06
				824.0000	1.88	-0.76	4.46	5.65	AZ-AB-180826-07
Assessment of Additional Batteries									
85012069001	NNTN8023C	PMLN5616B	None	809.0000					
				816.5000					
				824.0000	1.88	-0.76	4.22	5.35	AZ-AB-180826-08
85012070001				809.0000					
				816.5000					
				824.0000	1.87	-0.89	3.83	5.03	AZ-AB-180826-09
85012069001	PMNN4522A			809.0000					
				816.5000					
				824.0000	1.89	-0.67	3.14	3.88	AZ-AB-180826-12
85012070001				809.0000					
				816.5000					
				824.0000	1.88	-0.67	3.19	3.96	AZ-AB-180826-13

Assessment at the Body with Body worn PMLN5004B with GMDN0386A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 20

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ GMDN0386 A	None	809.0000	1.90	-0.65	2.60	3.18	AZ-AB-180827-11
				816.5000					
				824.0000					
85012070001				809.0000	1.90	-0.69	2.53	3.12	AZ-AB-180827-12
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012069001	NNTN8023C	PMLN5004B w/ GMDN0386 A	None	809.0000	1.90	-0.78	2.36	2.97	AZ-AB-180827-13
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.88	-0.89	2.30	3.00	AZ-AB-180827-14
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5004B with GMDN0445AA

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 21

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ GMDN0445AA	None	809.0000	1.86	-0.71	1.92	2.43	ZR-AB-180828-03#
				816.5000					
				824.0000					
85012070001				809.0000	1.87	-0.91	1.89	2.49	ZR-AB-180828-04#
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5004B w/ GMDN0445AA	None	809.0000	1.87	-0.77	1.73	2.21	ZR-AB-180828-05#
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.88	-0.91	1.75	2.30	ZR-AB-180828-06#
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5004B with GMDN0566AC

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 22

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ GMDN0566AC	None	809.0000	1.85	-0.58	1.16	1.43	ZR-AB-180827-19
				816.5000					
				824.0000					
85012070001				809.0000	1.87	-0.57	1.19	1.45	ZR-AB-180827-20
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5004B w/ GMDN0566AC	None	809.0000	1.87	-0.72	1.09	1.38	ZR-AB-180827-21
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.87	-0.83	1.11	1.44	ZR-AB-180827-22
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5004B with GMDN0547A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 23

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ GMDN0547A	None	809.0000	1.86	-0.55	1.87	2.28	ZR-AB-180827-23
				816.5000					
				824.0000					
85012070001				809.0000	1.87	-0.65	1.88	2.34	ZR-AB-180827-24
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5004B w/ GMDN0547A	None	809.0000	1.87	-0.91	1.73	2.28	ZR-AB-180828-01#
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.88	-0.93	1.72	2.27	ZR-AB-180828-02#
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5004B with GMDN0445AC
 DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 24

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ GMDN0445AC	None	809.0000	1.88	-0.73	1.47	1.85	AZ-AB-180828-09
				816.5000					
				824.0000					
85012070001				809.0000	1.89	-0.88	1.50	1.94	AZ-AB-180828-10
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5004B w/ GMDN0445AC	None	809.0000	1.89	-0.81	1.39	1.77	AZ-AB-180828-11
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.90	-0.75	1.39	1.74	AZ-AB-180828-12
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5004B with GMDN0497A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 25

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ GMDN0497A	None	809.0000	1.93	-0.61	2.16	2.58	AZ-AB-180828-13
				816.5000					
				824.0000					
85012070001				809.0000	1.89	-0.71	2.16	2.69	AZ-AB-180828-14
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5004B w/ GMDN0497A	None	809.0000	1.89	-0.70	2.09	2.60	AZ-AB-180828-15
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.90	-0.64	2.00	2.44	AZ-AB-180828-16
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5004B with WALN4307A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 26

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ WALN4307A	None	809.0000	1.90	-0.58	2.01	2.42	AZ-AB-180828-17
				816.5000					
				824.0000					
85012070001				809.0000	1.89	-0.73	2.01	2.52	AZ-AB-180828-18
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5004B w/ WALN4307A	None	809.0000	1.90	-0.75	1.80	2.25	AZ-AB-180828-19
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.87	-0.84	1.84	2.39	AZ-AB-180828-20
				816.5000					
				824.0000					

Assessment at the Body with Body worn HLN6602A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 27

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	HLN6602A	None	809.0000	1.91	-0.90	4.60	5.93	ZR-AB-180828-21
				816.5000	1.92	-0.75	4.92	6.09	ZR-AB-180828-26
				824.0000	1.88	-0.79	4.90	6.25	ZR-AB-180829-01#
85012070001				809.0000	1.92	-0.94	4.87	6.30	ZR-AB-180828-23
816.5000				1.93	-0.96	5.12	6.62	ZR-AB-180828-24	
824.0000				1.88	-0.80	5.34	6.83	ZR-AB-180828-25	
Assessment of Additional Batteries									
85012069001	NNTN8023C	HLN6602A	None	809.0000					
				816.5000	1.90	-0.72	5.03	6.25	ZR-AB-180829-04#
				824.0000	1.92	-0.72	4.97	6.11	ZR-AB-180829-02#
85012070001				809.0000					
816.5000				1.89	-1.05	4.31	5.81	ZR-AB-180829-06#	
824.0000				1.88	-0.83	5.06	6.52	ZR-AB-180829-05#	
85012069001	PMNN4522A	HLN6602A	None	809.0000					
				816.5000	1.88	-0.79	3.87	4.94	AZ-AB-180829-10
				824.0000	1.89	-0.85	4.28	5.51	AZ-AB-180829-08
85012070001				809.0000					
816.5000				1.89	-0.93	3.93	5.15	AZ-AB-180829-12	
824.0000				1.89	-0.90	4.72	6.14	AZ-AB-180829-11	

Assessment at the Body with Body worn RLN4570A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 28

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	RLN4570A	None	809.0000	1.90	-0.82	4.34	5.52	AZ-AB-180829-13
				816.5000	1.90	-0.70	4.67	5.78	AZ-AB-180829-14
				824.0000	1.91	-0.71	4.71	5.81	AZ-AB-180829-15
85012070001				809.0000	1.91	-0.92	4.48	5.80	AZ-AB-180829-16
816.5000				1.89	-0.88	4.65	6.03	AZ-AB-180829-17	
824.0000				1.94	-0.76	5.02	6.16	AZ-AB-180829-18	
Assessment of Additional Batteries									
85012069001	NNTN8023C	RLN4570A	None	809.0000					
				816.5000	1.93	-0.93	5.29	6.79	ZR-AB-180829-20
				824.0000	1.96	-0.72	5.30	6.38	ZR-AB-180829-19
85012070001				809.0000					
816.5000				1.92	-0.94	4.86	6.29	ZR-AB-180829-22	
824.0000				1.92	-0.74	5.29	6.53	ZR-AB-180829-21	
85012069001	PMNN4522A	RLN4570A	None	809.0000					
				816.5000					
				824.0000	1.93	-0.80	3.95	4.92	ZR-AB-180829-23
85012070001				809.0000					
816.5000				1.94	-0.90	4.89	6.20	ZR-AB-180830-01#	
824.0000				1.92	-0.83	4.30	5.42	ZR-AB-180829-24	

Assessment at the Body with Body worn PMLN5885B

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 29

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5885B	None	809.0000	1.93	-0.79	0.97	1.21	ZR-AB-180830-02#
				816.5000					
				824.0000					
85012070001				809.0000	1.93	-0.92	1.00	1.27	ZR-AB-180830-03#
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5885B	None	809.0000	1.93	-0.87	0.93	1.17	ZR-AB-180830-04#
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.96	-0.79	0.89	1.09	ZR-AB-180830-05#
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5887B

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 30

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5887B	None	809.0000	1.92	-0.77	0.91	1.14	AZ-AB-180830-07
				816.5000					
				824.0000					
85012070001				809.0000	1.93	-0.84	0.89	1.12	AZ-AB-180830-08
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012069001	NNTN8023C	PMLN5887B	None	809.0000	1.93	-0.81	0.89	1.11	AZ-AB-180830-09
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.91	-0.73	0.82	1.02	AZ-AB-180830-10
				816.5000					
				824.0000					

Assessment at the Body with Body worn PMLN5004B with PMLN7961A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 31

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ PMLN7961A	None	809.0000	1.91	-0.78	2.03	2.54	AZ-AB-180830-11
				816.5000					
				824.0000					
85012070001				809.0000	1.91	-0.83	1.96	2.48	AZ-AB-180830-12
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012069001	NNTN8023C	PMLN5004B w/ PMLN7961A	None	809.0000	1.89	-0.77	1.92	2.43	AZ-AB-180830-13
				816.5000					
				824.0000					
	PMNN4522A			809.0000	1.88	-0.68	1.75	2.18	AZ-AB-180830-14
				816.5000					
				824.0000					

Assessment at the Body with audio accessory

DUT voice assessment using the overall highest SAR configuration at the body from above with default audio accessory attached. Additional testing in voice mode (SSPD) is not required per IEEE1528 because of lower “maximum sourced-based time averaged output power” as compared to data mode (MSPD). Where “maximum sourced-based time averaged output power” SSPD = 0.44W and MSPD = 1.33W. Assessment per “KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; when overall reported SAR < 4.0 W/kg, SAR tested for that audio accessory is not necessary.” This was applicable to all remaining accessories. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 32

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012070001	NNTN8020B	HLN6602A	PMMN4072A	809.0000					
				816.5000					
				824.0000	2.00	-0.20	1.74	0.91	ZR-AB-180906-09

Assessment of wireless BT configuration

DUT voice assessment using the overall highest SAR configuration at the body from above without an audio accessory attached. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 33

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012070001	NNTN8020B	HLN6602A	None	809.0000					
				816.5000					
				824.0000	2.00	-0.22	2.02	1.06	ZR-AB-180906-10

13.2 Assessment at the Face for 809-824 MHz band

Battery PMNN4522A was selected as the default battery for assessments at the Face because it is the highest capacity battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (809-824 MHz) which are listed in Table 34. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 34

Test Freq (MHz)	Power (W)
809.0000	2.00
816.5000	1.98
824.0000	1.98

DUT voice PTT assessment with offered antennas and default battery with front of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 34 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 35

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	PMNN4522A	None	None	809.0000	1.98	0.13	0.572	0.2889	ZR-FACE-180817-13
				816.5000					
				824.0000					
85012070001				809.0000	1.98	0.07	0.575	0.2904	ZR-FACE-180817-14
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8020B	None	None	809.0000	1.99	0.08	0.577	0.2899	ZR-FACE-180817-15
				816.5000					
				824.0000					
	NNTN8023C			809.0000	1.98	0.12	0.567	0.2874	ZR-FACE-180817-16
				816.5000					
				824.0000					

13.3 Assessment at the Head for 809-824 MHz band

Battery PMNN4522A was selected as the default battery for assessments at the Head because it is the highest capacity battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (809-824 MHz) which are listed in Table 36. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 36

Test Freq (MHz)	Power (W)
809.0000	2.00
816.5000	1.98
824.0000	1.98

Assessment at the Left ear with Cheek Touch and 15° Tilt positions

Left ear position assessment with offered antennas and default battery with the DUT in both the cheek touch and tilt positions per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 36 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 37

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012070001	PMNN4522A	None, Touch	None	809.0000	2.00	0.08	1.90	1.90	ZR-LEAR-180820-04
				816.5000					
				824.0000					
		None, Tilt		809.0000	2.00	0.01	1.54	1.54	ZR-LEAR-180820-05
				816.5000					
				824.0000					
85012069001	PMNN4522A	None, Touch	None	809.0000	2.00	0.17	1.89	1.89	ZR-LEAR-180820-06
				816.5000					
				824.0000					
		None, Tilt		809.0000	2.00	-0.25	1.53	1.62	ZR-LEAR-180820-07
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8020B	None, Touch	None	809.0000	2.00	0.10	1.88	1.88	ZR-LEAR-180820-08
				816.5000					
				824.0000					
	NNTN8023C			809.0000	2.00	0.22	1.94	1.94	ZR-LEAR-180820-09
				816.5000					
				824.0000					

Assessment at the Right ear with Cheek Touch and 15° Tilt positions

Right ear position assessment with offered antennas and default battery with the DUT in both the cheek touch and tilt positions per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 36 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 38

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012070001	PMNN4522A	None, Touch	None	809.0000	2.00	-0.12	1.73	1.78	AZ-REAR-180820-16
				816.5000					
				824.0000					
		None, Tilt		809.0000	2.00	0.03	1.35	1.35	AZ-REAR-180820-17
				816.5000					
				824.0000					
85012069001		None, Touch	None	809.0000	2.00	0.04	1.71	1.71	AR-REAR-180821-02
				816.5000					
				824.0000					
		None, Tilt		809.0000	1.99	0.06	1.35	1.36	AR-REAR-180821-03
				816.5000					
				824.0000					
Assessment of Additional Batteries									
85012070001	NNTN8020B	None, Touch	None	809.0000	2.00	0.08	1.71	1.71	AR-REAR-180821-04
				816.5000					
				824.0000					
	NNTN8023C			809.0000	2.00	-0.04	1.67	1.69	AR-REAR-180821-05
				816.5000					
				824.0000					

13.4 Assessments at the Body for 854-869 MHz band

Battery NNTN8020B was selected as the default battery for assessments at the Body because it is the thinnest battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (854-869 MHz) which are listed in Table 39. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 39

Test Freq (MHz)	Power (W)
854.0000	1.85
861.5000	1.92
869.0000	1.90

Assessment at the Body with Body worn HLN9714A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 40

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	HLN9714A	None	854.0000	1.90	-0.63	4.63	5.63	ZR-AB-180830-16
				861.5000	1.93	-0.68	4.95	6.00	ZR-AB-180830-15
				869.0000	1.95	-0.66	5.06	6.04	ZR-AB-180830-17
85012070001				854.0000	1.90	-0.75	5.00	6.26	ZR-AB-180830-19
				861.5000	1.93	-0.66	4.99	6.02	ZR-AB-180830-18
				869.0000	1.90	-0.71	4.94	6.12	ZR-AB-180830-20
Assessment of Additional Batteries									
85012069001	NNTN8023C	HLN9714A	None	854.0000					
				861.5000	1.95	-0.59	4.13	4.85	ZR-AB-180831-02#
				869.0000	1.95	-0.56	4.47	5.22	ZR-AB-180831-01#
85012070001				854.0000	1.90	-0.74	4.39	5.48	ZR-AB-180831-03#
				861.5000	1.92	-0.69	4.71	5.75	ZR-AB-180831-04#
				869.0000					
85012069001	PMNN4522A	HLN9714A	None	854.0000					
				861.5000	1.95	-0.58	4.08	4.78	ZR-AB-180831-06#
				869.0000	1.93	-0.62	4.35	5.20	ZR-AB-180831-05#
85012070001				854.0000	1.90	-0.68	4.07	5.01	ZR-AB-180831-07#
				861.5000	1.94	-0.72	4.81	5.85	ZR-AB-180831-08#
				869.0000					

Assessment at the Body with Body worn PMLN5616B

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 41

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5616B	None	854.0000	1.90	-0.55	4.78	5.71	ZR-AB-180831-10#
				861.5000	1.94	-0.55	4.83	5.65	ZR-AB-180831-09#
				869.0000	1.91	-0.63	5.10	6.17	ZR-AB-180831-11#
85012070001				854.0000	1.90	-0.68	5.08	6.25	ZR-AB-180831-14
861.5000				1.94	-0.62	5.24	6.23	ZR-AB-180831-13	
869.0000				1.90	-0.85	5.37	6.87	ZR-AB-180902-02	
Assessment of Additional Batteries									
85012069001	NNTN8023C	PMLN5616B	None	854.0000					
				861.5000	1.91	-0.69	4.28	5.25	ZR-AB-180902-04
				869.0000	1.91	-0.62	4.02	4.86	ZR-AB-180902-03
85012070001				854.0000					
861.5000				1.92	-0.65	4.44	5.37	ZR-AB-180902-06	
869.0000				1.92	-0.81	4.79	6.01	ZR-AB-180902-05	
85012069001	PMNN4522A	PMLN5616B	None	854.0000					
				861.5000	1.92	-0.61	4.11	4.93	ZR-AB-180902-08
				869.0000	1.92	-0.62	4.36	5.24	ZR-AB-180902-07
85012070001				854.0000					
861.5000				1.92	-0.64	4.72	5.70	ZR-AB-180902-10	
869.0000				1.92	-0.66	4.53	5.49	ZR-AB-180902-09	

Assessment at the Body with Body worn PMLN5004B with GMDN0386A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 42

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5004B w/ GMDN0386A	None	854.0000						
				861.5000	1.91	-0.42	2.89	3.33	AZ-AB-180902-15	
				869.0000						
85012070001				854.0000						
				861.5000	1.89	-0.56	3.04	3.66	AZ-AB-180902-16	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5004B w/ GMDN0386A	None	854.0000						
				861.5000	1.89	-0.61	2.65	3.23	AZ-AB-180902-17	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.90	-0.58	2.62	3.15	AZ-AB-180902-18	
				869.0000						

Assessment at the Body with Body worn PMLN5004B with GMDN0445AA
 DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 43

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5004B w/ GMDN0445AA	None	854.0000						
				861.5000	1.91	-0.53	2.02	2.39	AZ-AB-180902-19	
				869.0000						
85012070001				854.0000						
				861.5000	1.91	-0.57	2.16	2.58	AZ-AB-180902-20	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5004B w/ GMDN0445AA	None	854.0000						
				861.5000	1.90	-0.58	1.87	2.25	AZ-AB-180903-01#	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.91	-0.77	1.96	2.45	AZ-AB-180903-02#	
				869.0000						

Assessment at the Body with Body worn PMLN5004B with GMDN0566AC
 DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 44

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5004B w/ GMDN0566AC	None	854.0000						
				861.5000	1.91	-0.48	1.50	1.75	AZ-AB-180903-03#	
				869.0000						
85012070001				854.0000						
				861.5000	1.92	-0.57	1.57	1.86	AZ-AB-180903-04#	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5004B w/ GMDN0566AC	None	854.0000						
				861.5000	1.90	-0.71	1.34	1.66	ZR-AB-180903-06	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.90	-0.58	1.38	1.66	ZR-AB-180903-07	
				869.0000						

Assessment at the Body with Body worn PMLN5004B with GMDN0547A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 45

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	PMLN5004B w/ GMDN0547A	None	854.0000					
				861.5000	1.90	-0.52	2.03	2.41	ZR-AB-180903-08
869.0000									
85012070001				854.0000					
				861.5000	1.90	-0.67	2.10	2.58	ZR-AB-180903-09
				869.0000					
Assessment of Additional Batteries									
85012070001	NNTN8023C	PMLN5004B w/ GMDN0547A	None	854.0000					
				861.5000	1.90	-0.76	1.93	2.42	ZR-AB-180903-10
				869.0000					
	PMNN4522A			854.0000					
				861.5000	1.90	-0.54	1.87	2.23	ZR-AB-180903-11
				869.0000					

Assessment at the Body with Body worn PMLN5004B with GMDN0445AC

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 46

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5004B w/ GMDN0445AC	None	854.0000						
				861.5000	1.88	-0.47	1.74	2.06	ZR-AB-180903-12	
				869.0000						
85012070001				854.0000						
				861.5000	1.91	-0.65	1.71	2.08	ZR-AB-180903-13	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5004B w/ GMDN0445AC	None	854.0000						
				861.5000	1.93	-0.57	1.49	1.76	ZR-AB-180903-14	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.88	-0.70	1.49	1.86	ZR-AB-180903-15	
				869.0000						

Assessment at the Body with Body worn PMLN5004B with GMDN0497A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 47

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5004B w/ GMDN0497A	None	854.0000						
				861.5000	1.91	-0.55	2.37	2.82	AZ-AB-180903-16	
				869.0000						
85012070001				854.0000						
				861.5000	1.91	-0.69	2.50	3.07	AZ-AB-180903-17	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5004B w/ GMDN0497A	None	854.0000						
				861.5000	1.88	-0.58	2.23	2.71	AZ-AB-180903-18	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.87	-0.80	2.30	2.82	AZ-AB-180903-19	
				869.0000						

Assessment at the Body with Body worn PMLN5004B with WALN4307A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 48

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5004B w/ WALN4307A	None	854.0000						
				861.5000	1.91	-0.48	2.15	2.51	AZ-AB-180903-20	
869.0000										
85012070001				854.0000						
				861.5000	1.90	-0.55	2.27	2.71	AZ-AB-180903-21	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5004B w/ WALN4307A	None	854.0000						
				861.5000	1.89	-0.65	2.09	2.57	AZ-AB-180903-22	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.87	-0.55	-2.02	2.45	AZ-AB-180904-01#	
				869.0000						

Assessment at the Body with Body worn HLN6602A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 49

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	HLN6602A	None	854.0000	1.90	-0.55	4.49	5.36	AZ-AB-180904-03#
				861.5000	1.91	-0.73	4.48	5.55	AZ-AB-180904-02#
				869.0000	1.94	-0.70	4.90	5.94	ZR-AB-180904-07
85012070001				854.0000	1.89	-0.81	5.28	6.73	ZR-AB-180904-09
861.5000				1.95	-0.82	5.49	6.80	ZR-AB-180904-08	
869.0000				1.92	-0.86	5.44	6.91	ZR-AB-180904-10	
Assessment of Additional Batteries									
85012069001	NNTN8023C	HLN6602A	None	854.0000					
				861.5000					
				869.0000	1.94	-0.78	4.65	5.74	ZR-AB-180904-11
85012070001				854.0000					
861.5000				1.95	-0.94	5.02	6.39	ZR-AB-180904-13	
869.0000				1.95	-0.93	4.73	6.01	ZR-AB-180904-12	
85012069001	PMNN4522A	HLN6602A	None	854.0000					
				861.5000					
				869.0000	1.94	-0.74	4.66	5.70	ZR-AB-180904-14
85012070001				854.0000					
861.5000				1.95	-0.91	4.67	5.91	ZR-AB-180904-16	
869.0000				1.95	-0.90	4.83	6.09	ZR-AB-180904-15	

Assessment at the Body with Body worn RLN4570A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 50

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	NNTN8020B	RLN4570A	None	854.0000	1.91	-0.70	4.91	6.04	AZ-AB-180904-18
				861.5000	1.92	-0.68	5.08	6.19	AZ-AB-180904-17
				869.0000	1.91	-0.71	5.07	6.25	AZ-AB-180904-19
85012070001				854.0000	1.89	-0.76	5.09	6.42	AZ-AB-180904-21
				861.5000	1.91	-0.79	5.45	6.85	AZ-AB-180904-20
				869.0000	1.90	-0.88	5.43	7.00	AZ-AB-180904-22
Assessment of Additional Batteries									
85012069001	NNTN8023C	RLN4570A	None	854.0000					
				861.5000	1.90	-0.77	4.41	5.54	AZ-AB-180905-02#
				869.0000	1.89	-0.73	4.86	6.08	AZ-AB-180905-01#
85012070001				854.0000					
				861.5000	1.91	-0.82	5.28	6.68	AZ-AB-180905-04#
				869.0000	1.92	-0.79	5.19	6.48	AZ-AB-180905-03#
85012069001	PMNN4522A	RLN4570A	None	854.0000					
				861.5000	1.91	-0.77	4.46	5.58	AZ-AB-180905-06#
				869.0000	1.93	-0.70	4.81	5.86	AZ-AB-180905-05#
85012070001				854.0000					
				861.5000	1.95	-0.68	4.90	5.88	ZR-AB-180905-08#
				869.0000	1.90	-0.90	5.13	6.64	AZ-AB-180905-07#

Assessment at the Body with Body worn PMLN5885B

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 51

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5885B	None	854.0000						
				861.5000	1.94	-0.66	1.13	1.36	ZR-AB-180905-10	
				869.0000						
85012070001				854.0000						
				861.5000	1.91	-0.75	1.17	1.46	ZR-AB-180905-11	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5885B	None	854.0000						
				861.5000	1.94	-0.71	1.06	1.29	ZR-AB-180905-12	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.93	-0.67	1.02	1.23	ZR-AB-180905-12	
				869.0000						

Assessment at the Body with Body worn PMLN5887B

DUT data assessment with offered antennas, default battery and above mentioned body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 52

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5887B	None	854.0000						
				861.5000	1.94	-0.51	1.07	1.24	AZ-AB-180905-16	
				869.0000						
85012070001				854.0000						
				861.5000	1.93	-0.63	1.08	1.29	AZ-AB-180905-17	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5887B	None	854.0000						
				861.5000	1.92	-0.65	1.01	1.22	AZ-AB-180905-18	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.93	-0.65	1.01	1.22	AZ-AB-180905-19	
				869.0000						

Assessment at the Body with Body worn PMLN5004B with PMLN7961A

DUT data assessment with offered antennas, default battery and above mentioned body worn accessories per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 53

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012069001	NNTN8020B	PMLN5004B w/ PMLN7961A	None	854.0000						
				861.5000	1.92	-0.50	2.24	2.62	AZ-AB-180906-04#	
				869.0000						
85012070001				854.0000						
				861.5000	1.93	-0.60	2.39	2.84	AZ-AB-180906-05#	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8023C	PMLN5004B w/ PMLN7961A	None	854.0000						
				861.5000	1.91	-0.61	2.10	2.53	AZ-AB-180906-06#	
				869.0000						
	PMNN4522A			854.0000						
				861.5000	1.91	-0.77	2.10	2.63	AZ-AB-180906-07#	
				869.0000						

Assessment at the Body with audio accessory

DUT voice assessment using the overall highest SAR configuration at the body from above with default audio accessory attached. Additional testing in voice mode (SSPD) is not required per IEEE1528 because of lower “maximum source-based time averaged output power” as compared to data mode (MSPD). Where “maximum source-based time averaged output power” SSPD = 0.44W and MSPD = 1.33W. Assessment per “KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; when overall reported SAR < 4.0 W/kg, SAR tested for that audio accessory is not necessary.” This was applicable to all remaining accessories. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 54

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012070001	NNTN8020B	RLN4570A	PMMN4072A	854.0000					
				861.5000					
				869.0000	2.00	-0.21	1.79	0.94	ZR-AB-180906-11

Assessment of wireless BT configuration

DUT voice assessment using the overall highest SAR configuration at the body from above without an audio accessory attached. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 55

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012070001	NNTN8020B	RLN4570A	None	854.0000					
				861.5000					
				869.0000	2.00	-0.18	2.37	1.24	ZR-AB-180906-12

13.5 Assessment at the Face for 854-869 MHz band

Battery PMNN4522A was selected as the default battery for assessments at the Face because it is the highest capacity battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (854-869 MHz) which are listed in Table 56. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 56

Test Freq (MHz)	Power (W)
854.0000	1.95
861.5000	1.99
869.0000	1.97

DUT voice PTT assessment with offered antennas and default battery with front of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 56 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 57

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012069001	PMNN4522A	None	None	854.0000					
				861.5000	1.98	0.15	0.62	0.31	ZR-FACE-180817-17
				869.0000					
85012070001				854.0000					
				861.5000	1.98	0.05	0.63	0.32	ZR-FACE-180817-19
				869.0000					
Assessment of Additional Batteries									
85012070001	NNTN8020B	None	None	854.0000					
				861.5000	1.99	0.06	0.62	0.31	ZR-FACE-180817-20
				869.0000					
	NNTN8023C			854.0000					
				861.5000	1.99	0.10	0.66	0.33	ZR-FACE-180818-01#
				869.0000					

13.6 Assessment at the Head for 854-869 MHz band

Battery PMNN4522A was selected as the default battery for assessments at the Head because it is the highest capacity battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (854-869 MHz) which are listed in Table 58. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 58

Test Freq (MHz)	Power (W)
854.0000	1.95
861.5000	1.99
869.0000	1.97

Assessment at the Left ear with Cheek Touch and 15° Tilt positions

Left ear position assessment with offered antennas and default battery with the DUT in both the cheek touch and tilt positions per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 58 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 59

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012070001	PMNN4522A	None, Touch	None	854.0000						
				861.5000	1.98	0.11	1.95	1.97	ZR-LEAR-180820-10	
				869.0000						
		None, Tilt		854.0000						
				861.5000	1.99	0.04	1.64	1.65	AZ-LEAR-180820-11	
				869.0000						
85012069001	PMNN4522A	None, Touch	None	854.0000						
				861.5000	1.98	0.13	1.71	1.73	AZ-LEAR-180820-12	
				869.0000						
		None, Tilt		854.0000						
				861.5000	1.98	0.07	1.44	1.46	AZ-LEAR-180820-13	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8020B	None, Touch	None	854.0000						
				861.5000	1.98	0.21	1.94	1.96	AZ-LEAR-180820-14	
				869.0000						
	NNTN8023C			854.0000						
				861.5000	1.98	0.19	1.90	1.92	AZ-LEAR-180820-15	
				869.0000						

Assessment at the Right ear with Cheek Touch and 15° Tilt positions

Right ear position assessment with offered antennas and default battery with the DUT in both the cheek touch and tilt positions per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 58 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 60

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#	
85012070001	PMNN4522A	None, Touch	None	854.0000						
				861.5000	1.99	0.00	1.67	1.68	AZ-REAR-180821-07	
				869.0000						
		None, Tilt		854.0000						
				861.5000	1.99	-0.23	1.34	1.42	ZR-REAR-180821-08	
				869.0000						
85012069001		None, Touch	None	854.0000						
				861.5000	1.99	0.06	1.55	1.56	ZR-REAR-180821-09	
				869.0000						
		None, Tilt		854.0000						
				861.5000	1.98	-0.01	1.14	1.15	ZR-REAR-180821-10	
				869.0000						
Assessment of Additional Batteries										
85012070001	NNTN8020B	None, Touch	None	854.0000						
				861.5000	1.99	-0.01	1.77	1.78	ZR-REAR-180821-11	
				869.0000						
	NNTN8023C			854.0000						
				861.5000	1.99	-0.05	1.78	1.81	ZR-REAR-180821-12	
				869.0000						

13.7 Assessment for ISED, Canada

As per ISED Notice 2016-DRS001, additional tests were required for the low, mid and high frequency channels in the ISED, Canada frequency range (806-824 MHz and 851-869 MHz) for the configuration with the highest SAR value. The overall highest test configuration from 809-824 MHz band was repeated with test frequencies 816.5000 and 824.0000 MHz while the overall highest test configuration from 854-869 MHz band was repeated with test frequencies 854.0000 and 869.0000 MHz.

Table 61

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
ISED, Canada frequency range (806-824 MHz)									
Body									
85012070001	NNTN8020B	HLN6602A	None	809.0000	1.92	-0.94	4.87	6.30	ZR-AB-180828-23
				816.5000	1.93	-0.96	5.12	6.62	ZR-AB-180828-24
				824.0000	1.88	-0.80	5.34	6.83	ZR-AB-180828-25
Face									
85012070001	PMNN4522A	None	None	809.0000	1.98	0.07	0.58	0.29	ZR-FACE-180817-14
				816.5000	1.99	0.13	0.63	0.32	ZR-FACE-180818-02#
				824.0000	1.96	0.11	0.55	0.28	ZR-FACE-180818-03#
Head									
85012070001	NNTN8023C	LEAR, Touch	None	809.0000	2.00	0.22	1.94	1.94	ZR-LEAR-180820-09
				816.5000	1.98	-0.09	1.87	1.93	ZR-LEAR-180821-13
				824.0000	1.98	-0.37	1.86	2.05	ZR-LEAR-180821-14
ISED, Canada frequency range (851-869 MHz)									
Body									
85012070001	NNTN8020B	RLN4570A	None	854.0000	1.89	-0.76	5.09	6.42	AZ-AB-180904-21
				861.5000	1.91	-0.79	5.45	6.85	AZ-AB-180904-20
				869.0000	1.95	-0.28	6.41	7.01	ZR-AB-180906-13
Face									
85012070001	NNTN8023C	None	None	854.0000	1.96	0.03	0.61	0.31	ZR-FACE-180820-02
				861.5000	1.99	0.10	0.66	0.33	ZR-FACE-180818-01#
				869.0000	1.98	0.06	0.66	0.33	ZR-FACE-180820-03
Head									
85012070001	PMNN4522A	LEAR, Touch	None	854.0000	1.98	0.12	1.85	1.87	ZR-LEAR-180821-15
				861.5000	1.98	0.11	1.95	1.97	ZR-LEAR-180820-10
				869.0000	1.99	0.14	1.92	1.93	ZR-LEAR-180821-16

13.8 Assessment at the Bluetooth band

13.8.1 FCC US Requirement

Per guidelines in KDB 447498, the following formula was used to determine the test exclusion for standalone Bluetooth transmitter;

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] * [\sqrt{F_{(\text{GHz})}}] = 0.73$, which is ≤ 3 for 1-g SAR extremity

where:

Max. power = 2.31mW (4.61mW*50% duty cycle)

Min. test separation distance = 5mm for actual test separation < 5mm

F(GHz) = 2.48 GHz

Per the result from the calculation above, the standalone SAR assessment was not required for Bluetooth band. Therefore, SAR results for Bluetooth are not reported herein.

13.8.2 ISED Canada Requirement

Based on RSS-102 Issue 5, exemption limits for SAR evaluation for controlled devices at Bluetooth frequency band with separation distance ≤ 5 mm was 20 mW.

Standalone Bluetooth transmitter operates at

Maximum conducted power:

= 4.61 mW * 50%

= 2.31 mW or 3.64 dBm

Equivalent isotropically radiated power (EIRP):

= Maximum conducted power, dBm + Antenna gain, dBi

= 3.64 dBm + 2.15 dBi

= 5.79 dBm or 3.79 mW

Higher output power level, maximum EIRP power 3.79 mW was below the threshold power level 20 mW. Hence SAR test was not required for Bluetooth band.

13.9 Shortened Scan Assessment

A “shortened” scan using the highest SAR configuration overall from above was performed to validate the SAR drift of the full DASY5™ coarse and zoom scans. Note that the shortened scan represents the zoom scan performance result; this is obtained by first running a coarse scan to find the peak area and then, using a newly charged battery, a zoom scan only was performed. The results of the shortened cube scan presented in Appendix G demonstrate that the scaling methodology used to determine the calculated SAR results presented herein are valid. The SAR result from the Table below is provided in Appendix G.

Table 62

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
85012070001	NNTN8020B	RLN4570A	None	869.0000	1.95	-0.28	6.41	7.01	ZR-AB-180906-13

14.0 Simultaneous Transmission Exclusion for BT

Per guidelines in KDB 447498, the following formula was used to determine the test exclusion to an antenna that transmits simultaneously with other antennas for test distances $\leq 50\text{mm}$:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] * [\sqrt{F(\text{GHz})/X}] = 0.097 \text{ W/kg, which is } \leq 0.4 \text{ W/kg (1g)}$$

where:

$$X = 7.5 \text{ for 1g-SAR}$$

$$\text{Max. power} = 2.31\text{mW (4.61mW*50\% duty cycle)}$$

$$\text{Min. test separation distance} = 5\text{mm for actual test separation} < 5\text{mm}$$

$$F(\text{GHz}) = 2.48 \text{ GHz}$$

Per the result from the calculation above, simultaneous exclusion is applied and therefore SAR results are not reported herein.

15.0 Results Summary

Based on the test guidelines from section 4.0 and satisfying frequencies within FCC bands and ISED Canada Frequency bands, the highest Operational Maximum Calculated 1-gram average SAR values found for this filing:

Table 63

Designator	Frequency band (MHz)	Max Calc at Body (W/kg)	Max Calc at Face (W/kg)	Max Calc at Head (W/kg)
		1g-SAR	1g-SAR	1g-SAR
FCC US				
LMR	809 - 824	6.83	0.32	2.05
LMR	854 - 869	7.01	0.33	1.97
ISED Canada				
LMR	806 - 824	6.83	0.32	2.05
LMR	851 - 869	7.01	0.33	1.97

All results are scaled to the maximum output power.

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093.

16.0 Variability Assessment

Per the guidelines in KDB 865664 SAR variability assessment is required because SAR results are above 4.0W/kg (Occupational)

The Table below includes test results of the original measurement(s), the repeated measurement(s), and the ratio (SAR_{high}/SAR_{low}) for the applicable test configuration(s).

Table 64

Run#	Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Adj Calc. 1g-SAR (W/kg)	Ratio	Comments
AZ-AB-180904-22	85012070001	NNTN8020B	RLN4570A	None	869.0000	6.65	1.03	No additional repeated scans is required due to the Ratio (SAR_{high}/SAR_{low}) < 1.20
ZR-AB-180906-13						6.84		

17.0 System Uncertainty

A system uncertainty analysis is not required for this report per KDB 865664 because the highest report SAR value for Occupational exposure is less than 7.5W/kg.

Per the guidelines of ISO 17025 a reported system uncertainty is required and therefore measurement uncertainty budget is included in Appendix A.

Appendix A Measurement Uncertainty Budget

Uncertainty Budget for System Validation: 800 - 3000 MHz

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e = f(d,k)</i>	<i>f</i>	<i>g</i>	<i>h = c x f / e</i>	<i>i = c x g / e</i>	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob. Dist.	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</i>
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t. Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Dipole									
Dipole Axis to Liquid Distance	⁸ , E.4.2	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	⁸ , 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	R	1.73	0.64	0.43	1.2	0.8	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	R	1.73	0.6	0.49	0.6	0.5	∞
Combined Standard Uncertainty			RSS				9	9	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			<i>k</i> =2				18	17	

Notes for uncertainty budget Tables:

- a) Column headings *a-k* are given for reference.
- b) Tol. - tolerance in influence quantity.
- c) Prob. Dist. – Probability distribution
- d) N, R - normal, rectangular probability distributions
- e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
- f) *c_i* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
- g) *u_i* – SAR uncertainty
- h) *v_i* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

Uncertainty Budget for Device Under Test: 800 – 3000 MHz

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \cdot x \cdot f / e$	$i = c \cdot x \cdot g / e$	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob. Dist	Div.	c_i (1 g)	c_i (10 g)	1 g u_i (±%)	10 g u_i (±%)	v_i
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11	11	411
Expanded Uncertainty (95% CONFIDENCE LEVEL)			$k=2$				22	22	

Notes for uncertainty budget Tables:

- a) Column headings *a-k* are given for reference.
- b) Tol. - tolerance in influence quantity.
- c) Prob. Dist. – Probability distribution
- d) N, R - normal, rectangular probability distributions
- e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
- f) c_i - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
- g) u_i – SAR uncertainty
- h) v_i - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

Appendix B

Probe Calibration Certificates

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



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

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

Accreditation No.: **SCS 0108**

Client: **Motorola Solutions MY**

Certificate No: **EX3-7364_Jan18**

CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:7364**

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

Calibration date: **January 17, 2018** *1 yr cal*

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02525)	Apr-18
Reference 20 dB Attenuator	SN: S5277 (20x)	07-Apr-17 (No. 217-02528)	Apr-18
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	<i>[Signature]</i>
Approved by:	Katja Pokovic	Technical Manager	<i>[Signature]</i>

Issued: January 17, 2018

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

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



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

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

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}; A, B, C, D** are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

EX3DV4 – SN:7364

January 17, 2018

Probe EX3DV4

SN:7364

Manufactured: February 5, 2015
Calibrated: January 17, 2018

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

EX3DV4- SN:7364

January 17, 2018

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7364

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.42	0.45	0.57	$\pm 10.1\%$
DCP (mV) ^B	100.4	100.7	100.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	193.4	$\pm 3.3\%$
		Y	0.0	0.0	1.0		181.2	
		Z	0.0	0.0	1.0		175.4	

Note: For details on UID parameters see Appendix.

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

^A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter; uncertainty not required.

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7364

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k=2)
150	52.3	0.76	13.60	13.60	13.60	0.00	1.00	± 13.3 %
300	45.3	0.87	12.21	12.21	12.21	0.08	1.20	± 13.3 %
450	43.5	0.87	11.17	11.17	11.17	0.13	1.20	± 13.3 %
750	41.9	0.89	10.73	10.73	10.73	0.40	0.88	± 12.0 %
835	41.5	0.90	10.42	10.42	10.42	0.52	0.80	± 12.0 %
900	41.5	0.97	10.16	10.16	10.16	0.52	0.80	± 12.0 %
1450	40.5	1.20	9.19	9.19	9.19	0.34	0.80	± 12.0 %
1810	40.0	1.40	8.74	8.74	8.74	0.41	0.80	± 12.0 %
1900	40.0	1.40	8.57	8.57	8.57	0.34	0.80	± 12.0 %
2100	39.8	1.49	8.72	8.72	8.72	0.35	0.80	± 12.0 %
2300	39.5	1.67	8.06	8.06	8.06	0.32	0.82	± 12.0 %
2450	39.2	1.80	7.71	7.71	7.71	0.41	0.80	± 12.0 %
2600	39.0	1.96	7.48	7.48	7.48	0.45	0.80	± 12.0 %
4950	36.3	4.40	5.72	5.72	5.72	0.35	1.80	± 13.1 %
5250	35.9	4.71	5.50	5.50	5.50	0.35	1.80	± 13.1 %
5500	35.6	4.96	5.09	5.09	5.09	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.84	4.84	4.84	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.95	4.95	4.95	0.40	1.80	± 13.1 %

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

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7364

Calibration Parameter Determined in Body Tissue Simulating Media

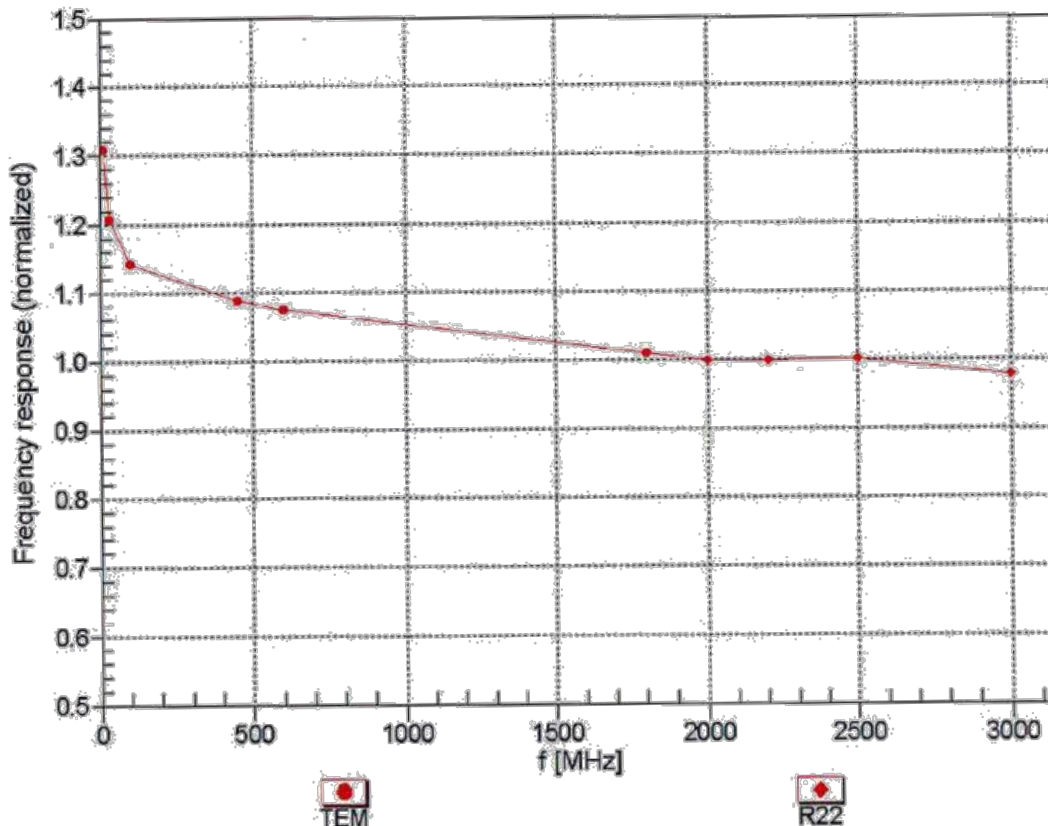
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc. (k=2)
150	61.9	0.80	13.02	13.02	13.02	0.00	1.00	± 13.3 %
300	58.2	0.92	12.20	12.20	12.20	0.04	1.10	± 13.3 %
450	56.7	0.94	11.51	11.51	11.51	0.06	1.10	± 13.3 %
750	55.5	0.96	10.91	10.91	10.91	0.10	0.80	± 12.0 %
835	55.2	0.97	10.16	10.16	10.16	0.42	0.80	± 12.0 %
900	55.0	1.05	10.04	10.04	10.04	0.51	0.80	± 12.0 %
1450	54.0	1.30	8.89	8.89	8.89	0.34	0.80	± 12.0 %
1810	53.3	1.52	8.06	8.06	8.06	0.45	0.80	± 12.0 %
1900	53.3	1.52	8.08	8.08	8.08	0.37	0.80	± 12.0 %
2100	53.2	1.62	8.60	8.60	8.60	0.36	0.93	± 12.0 %
2300	52.9	1.81	7.93	7.93	7.93	0.41	0.80	± 12.0 %
2450	52.7	1.95	7.71	7.71	7.71	0.33	0.80	± 12.0 %
2600	52.5	2.16	7.51	7.51	7.51	0.28	0.80	± 12.0 %
4950	49.4	5.01	5.05	5.05	5.05	0.40	1.90	± 13.1 %
5250	48.9	5.36	4.94	4.94	4.94	0.35	1.90	± 13.1 %
5500	48.6	5.65	4.42	4.42	4.42	0.40	1.90	± 13.1 %
5600	48.5	5.77	4.22	4.22	4.22	0.40	1.90	± 13.1 %
5750	48.3	5.94	4.54	4.54	4.54	0.40	1.90	± 13.1 %

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

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

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

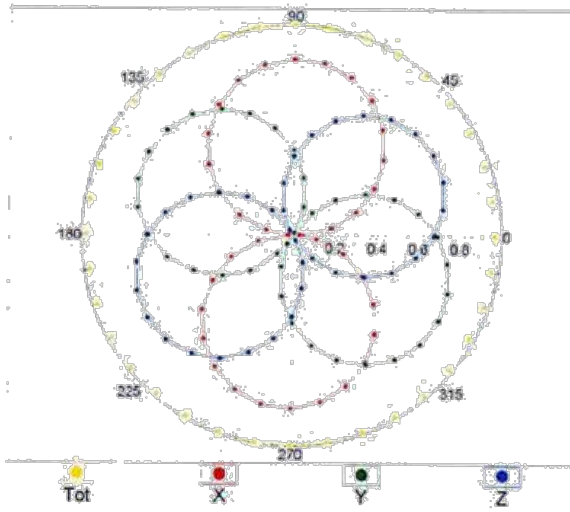
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



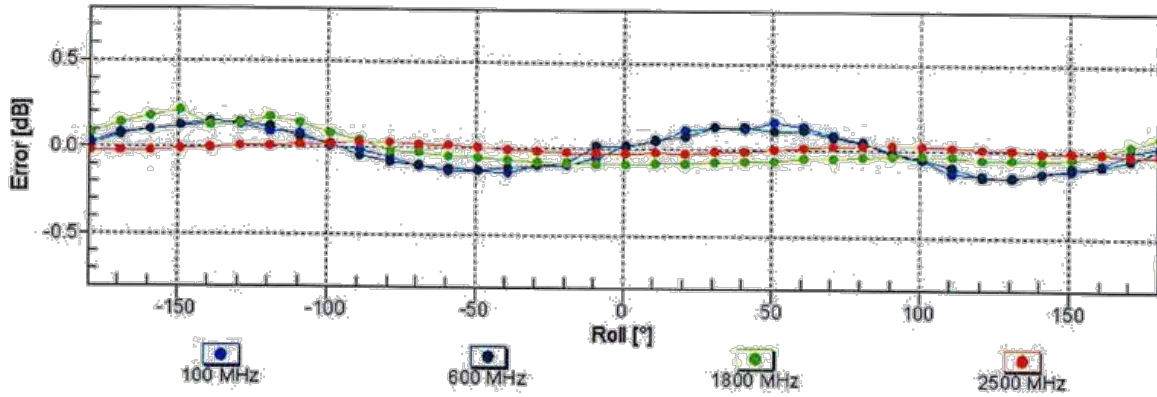
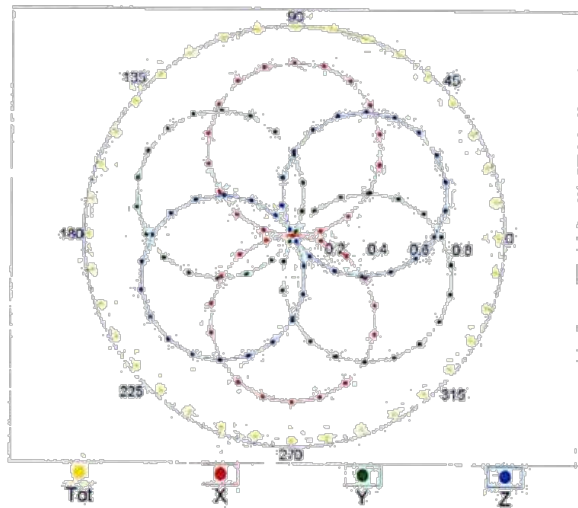
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz, TEM

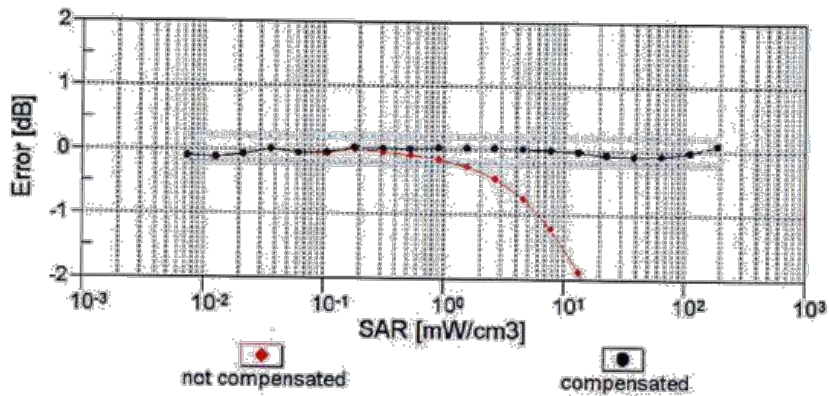
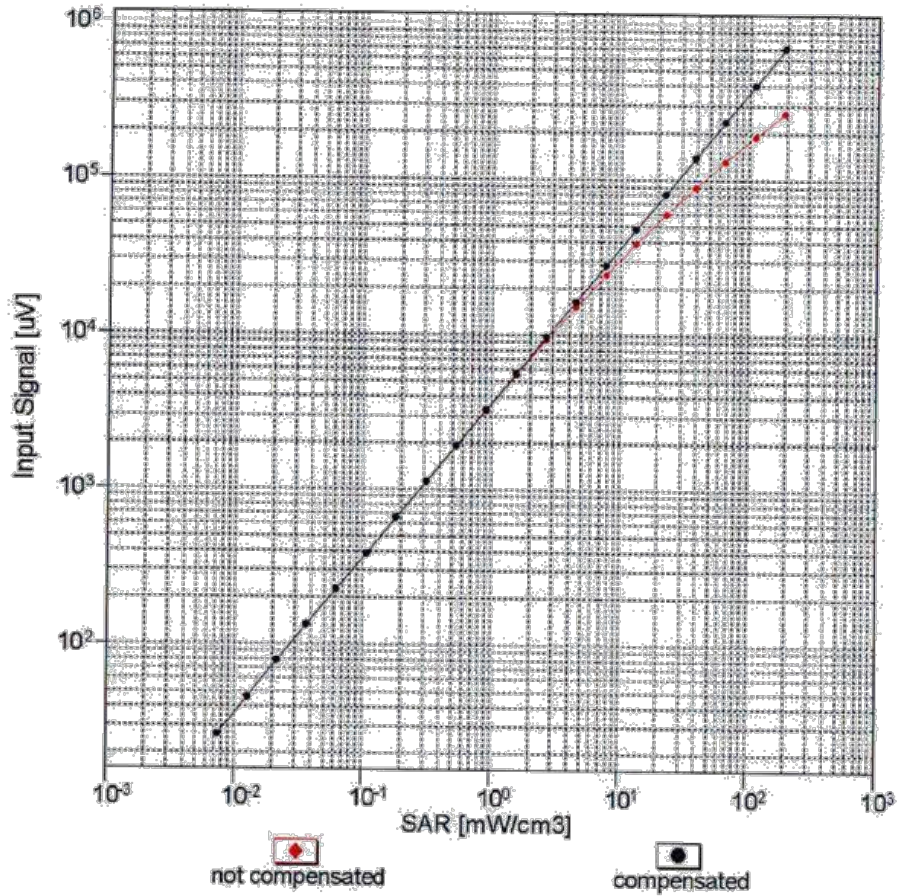


f=1800 MHz, R22



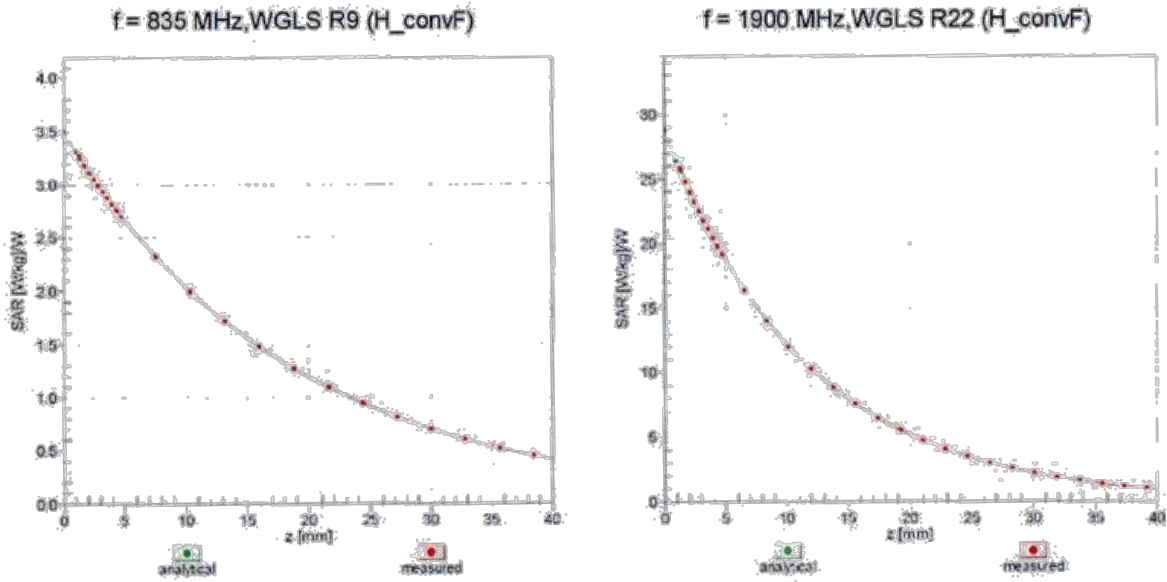
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

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

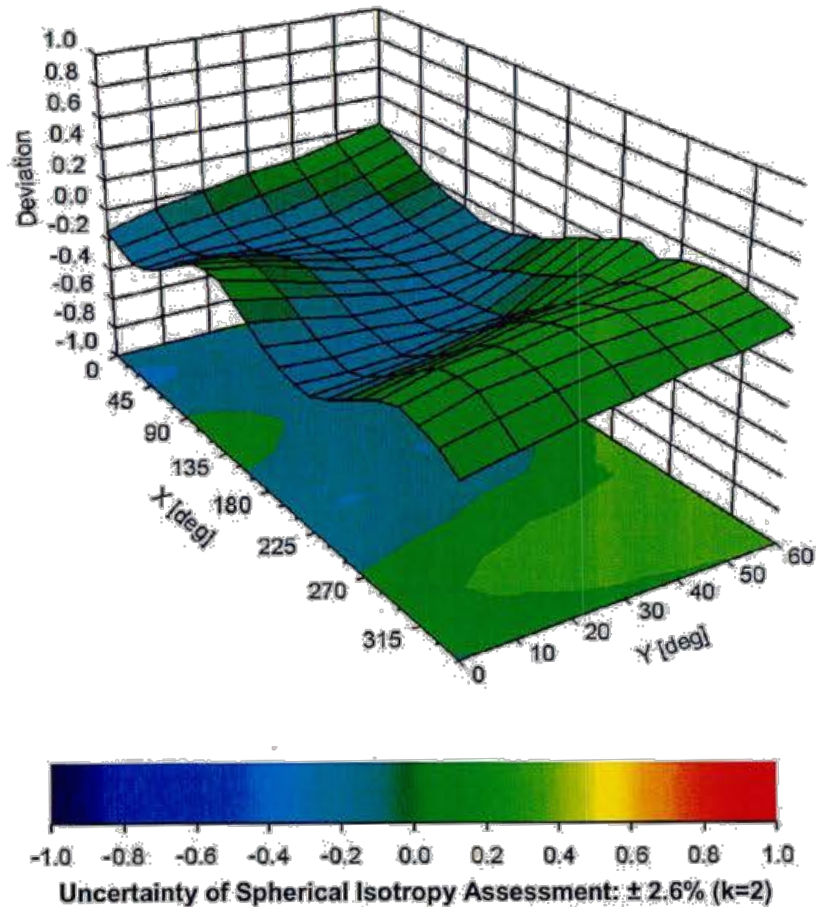


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), f = 900 MHz



DASY/EASY - Parameters of Probe: EX3DV4 - SN:7364

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	130.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc ^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	193.4	±3.3 %
		Y	0.0	0.0	1.0		181.2	
		Z	0.0	0.0	1.0		175.4	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	1.77	63.4	11.3	9.39	100.1	±1.4 %
		Y	1.68	63.9	11.8		69.8	
		Z	2.22	66.1	13.5		108.1	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	1.76	63.2	11.5	9.57	97.3	±1.9 %
		Y	1.75	64.0	11.9		68.1	
		Z	2.18	65.9	13.5		104.1	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	1.73	65.2	10.9	6.56	139.4	±1.9 %
		Y	3.79	77.3	16.6		140.0	
		Z	2.21	67.8	12.6		149.9	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	5.16	72.6	26.0	12.62	71.3	±2.5 %
		Y	4.79	70.1	24.4		49.8	
		Z	5.91	75.8	27.7		76.4	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	4.81	72.7	23.8	9.55	145.5	±2.2 %
		Y	4.23	69.9	22.7		101.8	
		Z	5.53	75.9	25.6		144.0	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	1.20	65.8	10.8	4.80	141.1	±2.2 %
		Y	2.42	73.2	14.2		149.7	
		Z	1.66	66.5	11.4		138.4	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	1.19	67.6	11.3	3.55	131.1	±2.2 %
		Y	27.05	99.7	21.5		131.6	
		Z	50.28	96.5	19.0		133.1	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	2.94	64.5	14.5	7.78	132.6	±1.7 %
		Y	4.27	71.7	22.7		142.8	
		Z	5.94	79.1	26.2		138.5	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	3.38	61.4	13.3	4.57	142.1	±2.5 %
		Y	4.62	66.5	19.0		144.1	
		Z	4.88	67.7	19.6		142.0	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	2.94	63.3	16.2	11.01	93.6	±1.7 %
		Y	3.67	66.9	22.7		72.1	
		Z	4.70	72.2	25.4		111.8	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	2.54	62.9	12.7	6.52	131.8	±2.7 %
		Y	4.06	71.8	22.2		149.7	
		Z	5.22	76.8	24.3		133.3	
10081-CAB	CDMA2000 (1xRTT, RC3)	X	2.60	60.0	11.8	3.97	138.0	±2.7 %
		Y	3.86	66.1	18.7		140.8	
		Z	4.08	67.3	19.3		138.0	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	0.90	62.3	10.4	6.56	139.1	±2.7 %
		Y	2.39	70.7	13.5		138.9	
		Z	2.09	66.7	11.9		149.1	

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10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	3.72	68.1	18.2	9.55	134.0	±2.5 %
		Y	4.76	73.4	24.6		100.9	
		Z	6.17	79.5	27.7		143.7	
10117-CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	9.20	66.8	19.1	8.07	149.3	±3.0 %
		Y	9.86	68.2	20.9		147.0	
		Z	10.11	68.8	21.4		145.8	
10196-CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	8.83	66.4	19.0	8.10	143.8	±3.0 %
		Y	9.57	68.0	21.0		141.5	
		Z	9.77	68.6	21.4		140.5	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	3.00	61.6	13.4	3.91	143.4	±2.5 %
		Y	4.24	67.2	19.1		145.0	
		Z	4.55	68.6	19.8		142.3	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	2.31	59.8	11.4	3.46	139.0	±2.7 %
		Y	3.61	67.1	19.0		140.0	
		Z	3.96	68.9	19.9		137.7	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	2.31	60.1	11.6	3.39	139.4	±2.2 %
		Y	3.62	67.5	19.3		140.4	
		Z	3.92	69.1	20.0		137.4	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	2.20	59.0	10.9	3.50	117.7	±1.7 %
		Y	3.50	65.9	18.2		119.5	
		Z	3.73	66.6	18.4		135.7	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	4.65	64.5	22.7	12.49	80.2	±2.2 %
		Y	4.63	62.8	21.6		58.7	
		Z	5.66	68.1	24.7		91.9	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	3.38	62.6	14.0	3.76	127.5	±1.4 %
		Y	4.82	69.1	19.3		148.9	
		Z	5.32	70.9	20.2		145.2	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	3.45	63.3	14.5	3.77	127.4	±1.4 %
		Y	4.93	70.0	19.8		147.6	
		Z	5.43	71.7	20.6		144.8	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	5.00	64.9	16.3	5.22	132.4	±1.7 %
		Y	6.30	69.7	20.3		128.8	
		Z	6.46	70.0	20.5		127.6	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	1.54	60.1	11.1	1.54	149.5	±1.4 %
		Y	2.92	70.6	20.2		147.0	
		Z	3.62	74.5	21.7		143.7	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	9.23	67.2	19.8	8.23	147.0	±3.0 %
		Y	9.66	68.1	21.1		141.3	
		Z	9.89	68.7	21.6		140.4	

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10417-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	9.38	67.5	20.1	8.23	149.1	±2.7 %
		Y	9.64	68.0	21.0		141.3	
		Z	9.87	68.7	21.5		140.0	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	X	9.24	67.4	20.1	8.14	147.9	±2.7 %
		Y	9.53	68.0	21.0		140.0	
		Z	9.76	68.7	21.5		139.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	7.39	66.3	18.5	6.55	135.6	±2.5 %
		Y	8.01	67.9	20.1		129.0	
		Z	8.04	68.0	20.2		128.3	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	10.01	67.8	20.4	8.25	137.7	±3.0 %
		Y	10.38	68.5	21.2		126.7	
		Z	10.45	68.7	21.5		128.0	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	1.69	61.0	12.7	1.58	129.8	±0.9 %
		Y	3.13	72.1	20.9		146.4	
		Z	3.85	75.8	22.3		144.0	
10518-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	9.46	67.8	20.4	8.23	149.7	±2.7 %
		Y	9.65	68.1	21.1		140.4	
		Z	9.89	68.7	21.6		139.4	
10525-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	9.29	66.9	20.0	8.36	125.6	±3.0 %
		Y	9.85	68.2	21.2		142.2	
		Z	10.11	68.9	21.7		141.4	
10526-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	9.38	67.0	20.1	8.42	126.0	±3.0 %
		Y	9.93	68.3	21.3		143.4	
		Z	10.19	69.0	21.8		141.8	
10534-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	9.79	67.4	20.2	8.45	131.8	±3.0 %
		Y	10.28	68.5	21.3		148.9	
		Z	10.60	69.3	21.9		148.4	
10535-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	9.81	67.4	20.2	8.45	132.9	±3.3 %
		Y	10.29	68.5	21.3		148.8	
		Z	10.61	69.4	21.9		148.7	
10544-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	10.18	67.8	20.3	8.47	137.6	±3.3 %
		Y	10.16	67.8	20.8		126.4	
		Z	10.52	68.6	21.4		126.2	
10545-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	10.23	67.9	20.5	8.55	137.0	±3.0 %
		Y	10.26	67.9	20.9		126.2	
		Z	10.59	68.7	21.4		126.4	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	9.18	66.9	20.0	8.25	125.4	±2.7 %
		Y	9.70	68.1	21.1		141.2	
		Z	9.92	68.8	21.6		139.9	

10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	2.02	62.8	14.1	1.99	149.5	±0.9 %
		Y	3.16	71.3	20.7		142.8	
		Z	4.03	75.9	22.5		140.7	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	1.80	61.3	12.5	1.99	147.0	±0.7 %
		Y	3.13	71.4	20.7		141.9	
		Z	4.17	76.8	22.9		140.5	
10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	9.52	67.7	20.5	8.59	145.8	±3.0 %
		Y	9.75	68.0	21.3		136.9	
		Z	10.03	68.8	21.9		137.7	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	9.51	67.7	20.5	8.60	144.9	±2.7 %
		Y	9.77	68.1	21.3		137.2	
		Z	10.06	68.9	21.9		137.4	
10583-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	9.45	67.5	20.4	8.59	145.2	±3.3 %
		Y	9.75	68.0	21.3		137.4	
		Z	10.04	68.9	21.9		137.6	
10584-AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	9.47	67.6	20.3	8.60	144.5	±3.3 %
		Y	9.77	68.1	21.3		137.3	
		Z	10.06	68.9	21.9		137.3	
10591-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	9.53	67.5	20.2	8.63	146.3	±3.0 %
		Y	9.87	68.1	21.3		139.3	
		Z	10.17	68.9	21.9		139.4	
10592-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	9.88	68.2	20.9	8.79	148.1	±3.3 %
		Y	10.04	68.3	21.5		139.5	
		Z	10.33	69.1	22.1		139.5	
10599-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	9.84	67.3	20.3	8.79	128.8	±3.3 %
		Y	10.37	68.5	21.5		144.3	
		Z	10.76	69.5	22.2		146.7	
10600-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	9.93	67.4	20.4	8.88	129.6	±3.3 %
		Y	10.47	68.6	21.7		145.3	
		Z	10.84	69.6	22.3		146.5	
10607-AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	9.63	67.8	20.5	8.64	147.1	±3.3 %
		Y	9.90	68.1	21.4		139.1	
		Z	10.20	69.0	22.0		139.8	
10608-AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	9.79	67.9	20.6	8.77	147.6	±3.3 %
		Y	10.02	68.2	21.5		139.7	
		Z	10.35	69.2	22.1		139.8	
10616-AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	9.89	67.3	20.3	8.82	129.8	±3.3 %
		Y	10.41	68.5	21.6		145.4	
		Z	10.77	69.5	22.2		146.5	
10617-AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	9.82	67.2	20.1	8.81	129.4	±3.3 %
		Y	10.40	68.5	21.6		145.4	
		Z	10.78	69.5	22.2		146.8	

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10626-AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	10.24	67.7	20.5	8.83	134.6	±3.3 %
		Y	10.58	68.6	21.5		148.1	
		Z	10.66	68.7	21.6		124.6	
10627-AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	10.19	67.6	20.4	8.88	134.0	±3.3 %
		Y	10.65	68.7	21.5		149.0	
		Z	10.73	68.8	21.7		124.8	
10648-AAA	CDMA2000 (1x Advanced)	X	2.98	63.3	15.2	3.45	146.8	±1.4 %
		Y	3.65	67.4	19.3		141.0	
		Z	4.05	69.6	20.4		137.8	

⁶ Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Appendix C Dipole Calibration Certificates

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



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

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

Accreditation No.: **SCS 0108**

Client: **Motorola Solutions MY**

Certificate No: **D835V2-4d029_Jan18**

CALIBRATION CERTIFICATE

Object: **D835V2 - SN:4d029**

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

Calibration date: **January 08, 2018 *+ 2 yrs cal***

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by: **Name: Michael Weber, Function: Laboratory Technician, Signature: [Signature]**

Approved by: **Name: Katja Pokovic, Function: Technical Manager, Signature: [Signature]**

Issued: January 9, 2018

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

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



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

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

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.7 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.45 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.60 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.22 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.8 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.67 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.36 W/kg ± 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω - 3.4 j Ω
Return Loss	-28.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.7 Ω - 7.8 j Ω
Return Loss	-21.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.387 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 17, 2004

DASY5 Validation Report for Head TSL

Date: 08.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d029

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 40.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

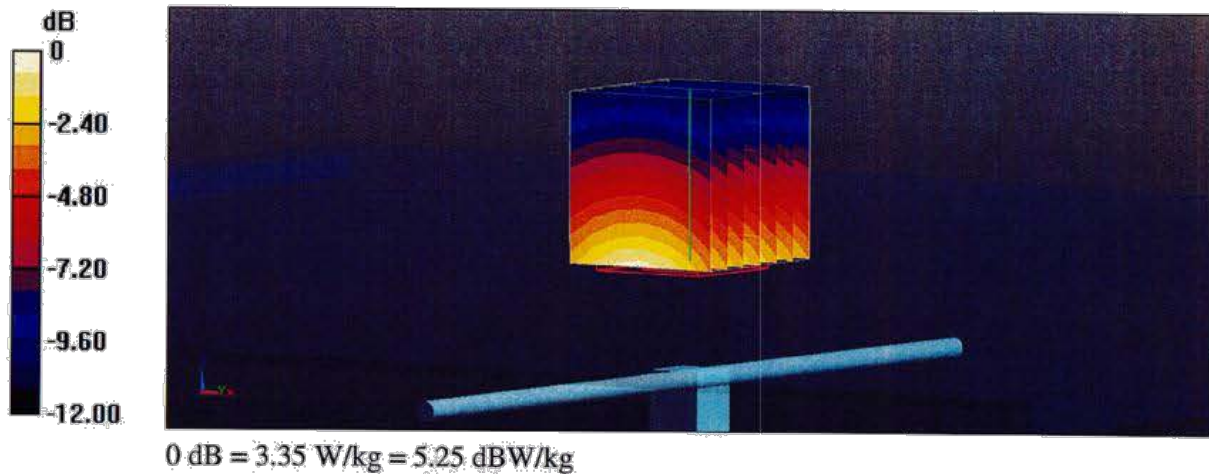
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 63.29 V/m; Power Drift = 0.02 dB

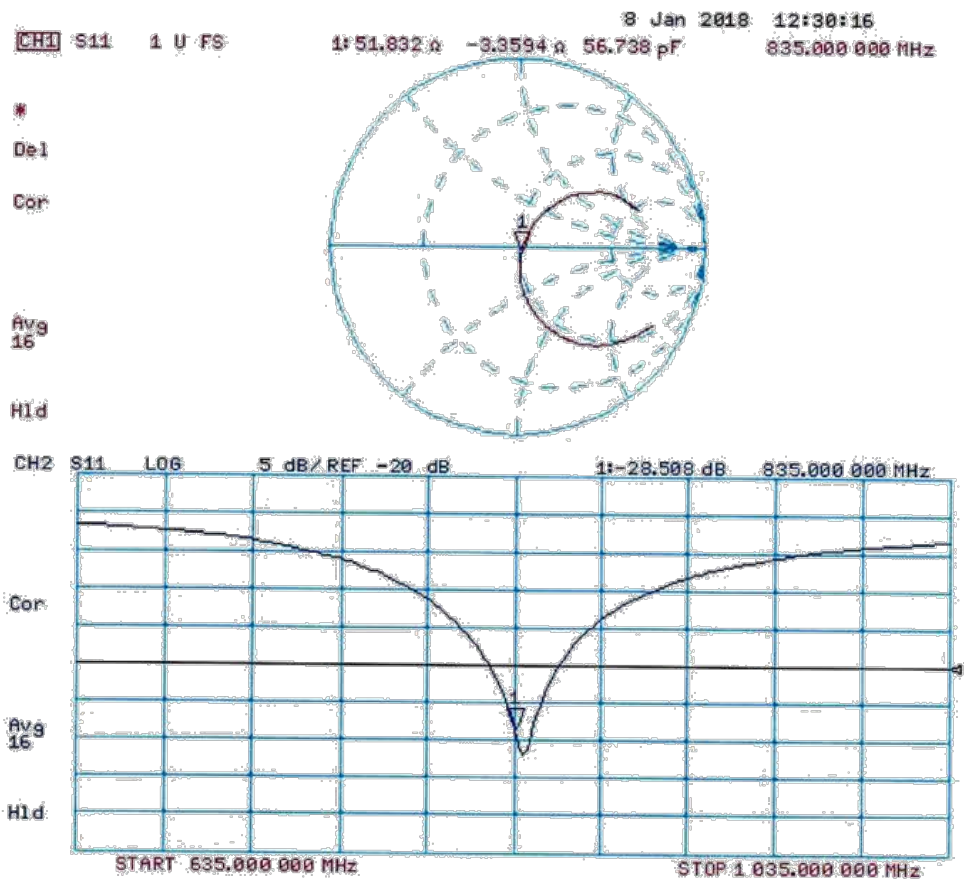
Peak SAR (extrapolated) = 3.83 W/kg

SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.58 W/kg

Maximum value of SAR (measured) = 3.35 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d029

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ S/m}$; $\epsilon_r = 54.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

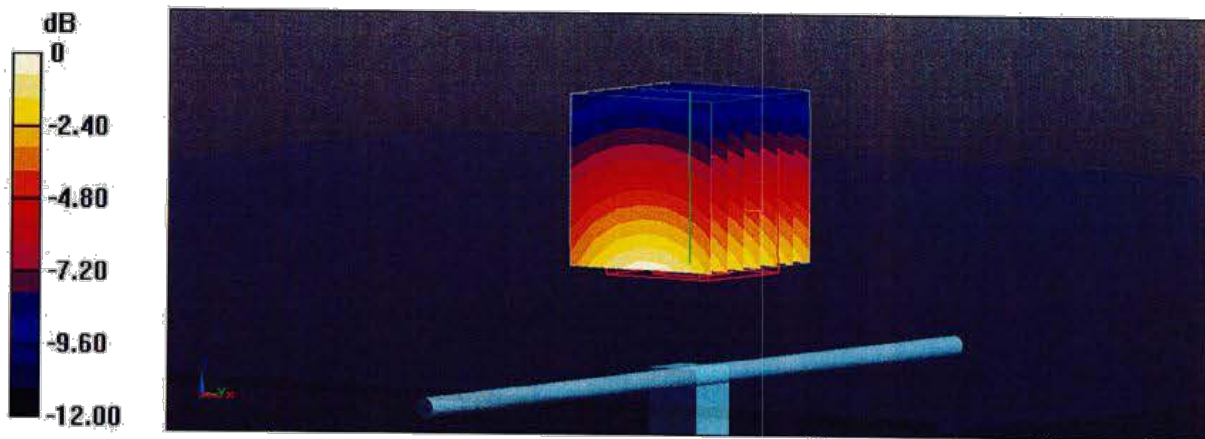
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 60.67 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.69 W/kg

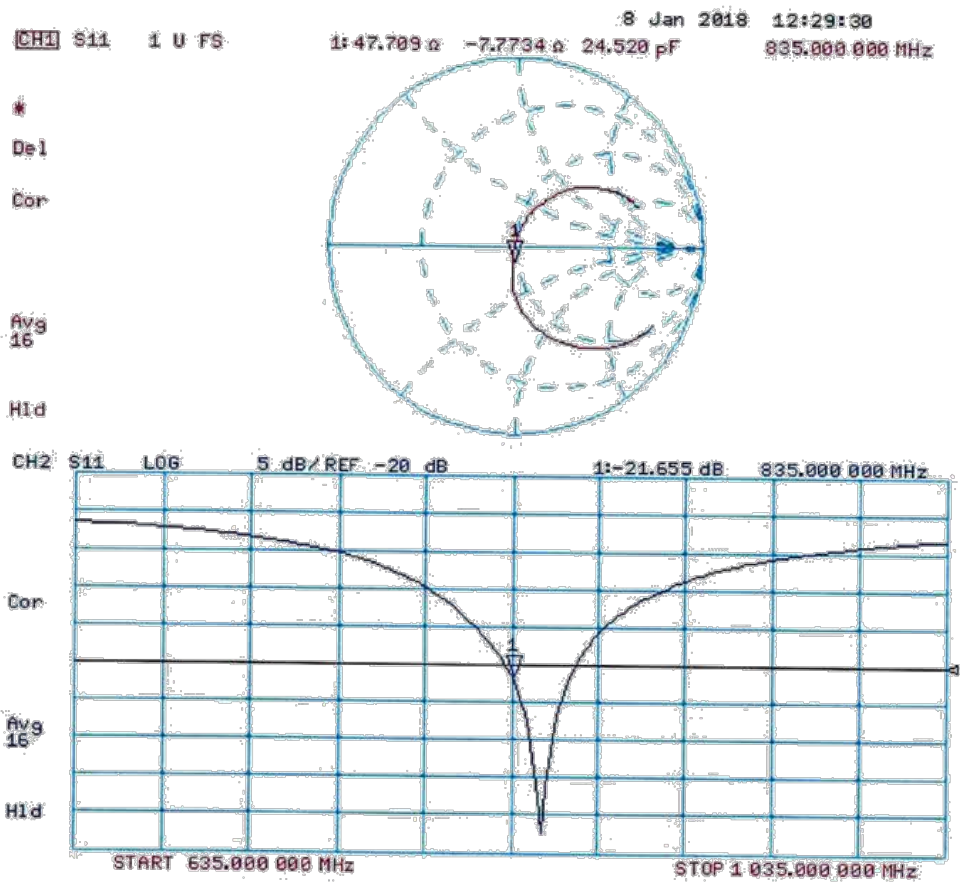
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.61 W/kg

Maximum value of SAR (measured) = 3.25 W/kg



0 dB = 3.25 W/kg = 5.12 dBW/kg

Impedance Measurement Plot for Body TSL



Appendix D
SAR Summary Results Table for FCC PAG review

Table D.1 809-824 MHz SAR Summary Result

Table #	Body / Head / Face	Antenna No.	Battery No.	Body Worn No.	Audio No.	Front / Back	F1	F2	F3
							809.0000	816.5000	824.0000
18	Body	2	1	9	None	Back	4.88		
18	Body	2	1	9	None	Back		5.31	
18	Body	2	1	9	None	Back			5.07
18	Body	1	1	9	None	Back	4.74		
18	Body	1	1	9	None	Back		5.38	
18	Body	1	1	9	None	Back			5.35
18	Body	2	2	9	None	Back		5.20	
18	Body	1	2	9	None	Back		4.92	
18	Body	2	3	9	None	Back		4.76	
18	Body	1	3	9	None	Back		4.12	
19	Body	2	1	11	None	Back	4.79		
19	Body	2	1	11	None	Back		5.27	
19	Body	2	1	11	None	Back			5.37
19	Body	1	1	11	None	Back	5.00		
19	Body	1	1	11	None	Back		5.41	
19	Body	1	1	11	None	Back			5.65
19	Body	2	2	11	None	Back			5.35
19	Body	1	2	11	None	Back			5.03
19	Body	2	3	11	None	Back			3.88
19	Body	1	3	11	None	Back			3.96
20	Body	2	1	1 & 10	None	Back	3.18		
20	Body	1	1	1 & 10	None	Back	3.12		
20	Body	2	2	1 & 10	None	Back	2.97		
20	Body	2	3	1 & 10	None	Back	3.00		
21	Body	2	1	2 & 10	None	Back	2.43		
21	Body	1	1	2 & 10	None	Back	2.49		
21	Body	1	2	2 & 10	None	Back	2.21		
21	Body	1	3	2 & 10	None	Back	2.30		
22	Body	2	1	6 & 10	None	Back	1.43		
22	Body	1	1	6 & 10	None	Back	1.45		
22	Body	1	2	6 & 10	None	Back	1.38		
22	Body	1	3	6 & 10	None	Back	1.44		
23	Body	2	1	5 & 10	None	Back	2.28		
23	Body	1	1	5 & 10	None	Back	2.34		
23	Body	1	2	5 & 10	None	Back	2.28		
23	Body	1	3	5 & 10	None	Back	2.27		
24	Body	2	1	3 & 10	None	Back	1.85		
24	Body	1	1	3 & 10	None	Back	1.94		
24	Body	1	2	3 & 10	None	Back	1.77		
24	Body	1	3	3 & 10	None	Back	1.74		
25	Body	2	1	4 & 10	None	Back	2.58		
25	Body	1	1	4 & 10	None	Back	2.69		
25	Body	1	2	4 & 10	None	Back	2.60		
25	Body	1	3	4 & 10	None	Back	2.44		
26	Body	2	1	10 & 18	None	Back	2.42		
26	Body	1	1	10 & 18	None	Back	2.52		
26	Body	1	2	10 & 18	None	Back	2.25		
26	Body	1	3	10 & 18	None	Back	2.39		
27	Body	2	1	8	None	Back	5.93		
27	Body	2	1	8	None	Back		6.09	
27	Body	2	1	8	None	Back			6.25
27	Body	1	1	8	None	Back	6.30		
27	Body	1	1	8	None	Back		6.62	
27	Body	1	1	8	None	Back			6.83
27	Body	2	2	8	None	Back		6.25	

Table D.1 (continued)

Table #	Body / Head / Face	Antenna No.	Battery No.	Body Worn No.	Audio No.	Front / Back	F1	F2	F3
							809.0000	816.5000	824.0000
27	Body	2	2	8	None	Back			6.11
27	Body	1	2	8	None	Back		5.81	
27	Body	1	2	8	None	Back			6.52
27	Body	2	3	8	None	Back		4.94	
27	Body	2	3	8	None	Back			5.51
27	Body	1	3	8	None	Back		5.15	
27	Body	1	3	8	None	Back			6.14
28	Body	2	1	17	None	Back	5.52		
28	Body	2	1	17	None	Back		5.78	
28	Body	2	1	17	None	Back			5.81
28	Body	1	1	17	None	Back	5.80		
28	Body	1	1	17	None	Back		6.03	
28	Body	1	1	17	None	Back			6.16
28	Body	2	2	17	None	Back		6.79	
28	Body	2	2	17	None	Back			6.38
28	Body	1	2	17	None	Back		6.29	
28	Body	1	2	17	None	Back			6.53
28	Body	2	3	17	None	Back			4.92
28	Body	1	3	17	None	Back		6.20	
28	Body	1	3	17	None	Back			5.42
29	Body	2	1	12	None	Back	1.21		
29	Body	1	1	12	None	Back	1.27		
29	Body	1	2	12	None	Back	1.17		
29	Body	1	3	12	None	Back	1.09		
30	Body	2	1	13	None	Back	1.14		
30	Body	1	1	13	None	Back	1.12		
30	Body	2	2	13	None	Back	1.11		
30	Body	2	3	13	None	Back	1.02		
31	Body	2	1	10 & 16	None	Back	2.54		
31	Body	1	1	10 & 16	None	Back	2.48		
31	Body	2	2	10 & 16	None	Back	2.43		
31	Body	2	3	10 & 16	None	Back	2.18		
32	Body	1	1	8	1	Back			0.91
33	Body	1	1	8	None	Back			1.06
35	Face	2	3	None	None	Front	0.2889		
35	Face	1	3	None	None	Front	0.2904		
35	Face	1	1	None	None	Front	0.2899		
35	Face	1	2	None	None	Front	0.2874		
37	Head	1	3	None	None	Front	1.90		
37	Head	1	3	None	None	Front	1.54		
37	Head	2	3	None	None	Front	1.89		
37	Head	2	3	None	None	Front	1.62		
37	Head	1	1	None	None	Front	1.88		
37	Head	1	2	None	None	Front	1.94		
38	Head	1	3	None	None	Front	1.78		
38	Head	1	3	None	None	Front	1.35		
38	Head	2	3	None	None	Front	1.71		
38	Head	2	3	None	None	Front	1.36		
38	Head	1	1	None	None	Front	1.71		
38	Head	1	2	None	None	Front	1.69		

Table D.2 854-869 MHz SAR Summary Result

Table #	Body / Head / Face	Antenna No.	Battery No.	Body Worn No.	Audio No.	Front / Back	F1	F2	F3
							854.0000	861.5000	869.0000
40	Body	2	1	9	None	Back	5.63		
40	Body	2	1	9	None	Back		6.00	
40	Body	2	1	9	None	Back			6.04
40	Body	1	1	9	None	Back	6.26		
40	Body	1	1	9	None	Back		6.02	
40	Body	1	1	9	None	Back			6.12
40	Body	2	2	9	None	Back		4.85	
40	Body	2	2	9	None	Back			5.22
40	Body	1	2	9	None	Back	5.48		
40	Body	1	2	9	None	Back		5.75	
40	Body	2	3	9	None	Back		4.78	
40	Body	2	3	9	None	Back			5.20
40	Body	1	3	9	None	Back	5.01		
40	Body	1	3	9	None	Back		5.85	
41	Body	2	1	11	None	Back	5.71		
41	Body	2	1	11	None	Back		5.65	
41	Body	2	1	11	None	Back			6.17
41	Body	1	1	11	None	Back	6.25		
41	Body	1	1	11	None	Back		6.23	
41	Body	1	1	11	None	Back			6.87
41	Body	2	2	11	None	Back		5.25	
41	Body	2	2	11	None	Back			4.86
41	Body	1	2	11	None	Back		5.37	
41	Body	1	2	11	None	Back			6.01
41	Body	2	3	11	None	Back		4.93	
41	Body	2	3	11	None	Back			5.24
41	Body	1	3	11	None	Back		5.70	
41	Body	1	3	11	None	Back			5.49
42	Body	2	1	1 & 10	None	Back		3.33	
42	Body	1	1	1 & 10	None	Back		3.66	
42	Body	1	2	1 & 10	None	Back		3.23	
42	Body	1	3	1 & 10	None	Back		3.15	
43	Body	2	1	2 & 10	None	Back		2.39	
43	Body	1	1	2 & 10	None	Back		2.58	
43	Body	1	2	2 & 10	None	Back		2.25	
43	Body	1	3	2 & 10	None	Back		2.45	
44	Body	2	1	6 & 10	None	Back		1.75	
44	Body	1	1	6 & 10	None	Back		1.86	
44	Body	1	2	6 & 10	None	Back		1.66	
44	Body	1	3	6 & 10	None	Back		1.66	
45	Body	2	1	5 & 10	None	Back		2.41	
45	Body	1	1	5 & 10	None	Back		2.58	
45	Body	1	2	5 & 10	None	Back		2.42	
45	Body	1	3	5 & 10	None	Back		2.23	
46	Body	2	1	3 & 10	None	Back		2.06	
46	Body	1	1	3 & 10	None	Back		2.08	
46	Body	1	2	3 & 10	None	Back		1.76	
46	Body	1	3	3 & 10	None	Back		1.86	
47	Body	2	1	4 & 10	None	Back		2.82	
47	Body	1	1	4 & 10	None	Back		3.07	
47	Body	1	2	4 & 10	None	Back		2.71	
47	Body	1	3	4 & 10	None	Back		2.82	
48	Body	2	1	10 & 18	None	Back		2.51	
48	Body	1	1	10 & 18	None	Back		2.71	
48	Body	1	2	10 & 18	None	Back		2.57	

Table D.2 (continued)

Table #	Body / Head / Face	Antenna No.	Battery No.	Body Worn No.	Audio No.	Front / Back	F1	F2	F3
							854.0000	861.5000	869.0000
48	Body	1	3	10 & 18	None	Back		2.45	
49	Body	2	1	8	None	Back	5.36		
49	Body	2	1	8	None	Back		5.55	
49	Body	2	1	8	None	Back			5.94
49	Body	1	1	8	None	Back	6.73		
49	Body	1	1	8	None	Back		6.80	
49	Body	1	1	8	None	Back			6.91
49	Body	2	2	8	None	Back			5.74
49	Body	1	2	8	None	Back		6.39	
49	Body	1	2	8	None	Back			6.01
49	Body	2	3	8	None	Back			5.70
49	Body	1	3	8	None	Back		5.91	
49	Body	1	3	8	None	Back			6.09
50	Body	2	1	17	None	Back	6.04		
50	Body	2	1	17	None	Back		6.19	
50	Body	2	1	17	None	Back			6.25
50	Body	1	1	17	None	Back	6.42		
50	Body	1	1	17	None	Back		6.85	
50	Body	1	1	17	None	Back			7.00
50	Body	2	2	17	None	Back		5.54	
50	Body	2	2	17	None	Back			6.08
50	Body	1	2	17	None	Back		6.68	
50	Body	1	2	17	None	Back			6.48
50	Body	2	3	17	None	Back		5.58	
50	Body	2	3	17	None	Back			5.86
50	Body	1	3	17	None	Back		5.88	
50	Body	1	3	17	None	Back			6.64
51	Body	2	1	12	None	Back		1.36	
51	Body	1	1	12	None	Back		1.46	
51	Body	1	2	12	None	Back		1.29	
51	Body	1	3	12	None	Back		1.23	
52	Body	2	1	13	None	Back		1.24	
52	Body	1	1	13	None	Back		1.29	
52	Body	1	2	13	None	Back		1.22	
52	Body	1	3	13	None	Back		1.22	
53	Body	2	1	10 & 16	None	Back		2.62	
53	Body	1	1	10 & 16	None	Back		2.84	
53	Body	1	2	10 & 16	None	Back		2.53	
53	Body	1	3	10 & 16	None	Back		2.63	
54	Body	1	1	17	None	Back			0.94
55	Body	1	1	17	None	Back			1.24
57	Face	2	3	None	None	Front		0.31	
57	Face	1	3	None	None	Front		0.32	
57	Face	1	1	None	None	Front		0.31	
57	Face	1	2	None	None	Front		0.33	
59	Head	1	3	None	None	Front		1.97	
59	Head	1	3	None	None	Front		1.65	
59	Head	2	3	None	None	Front		1.73	
59	Head	2	3	None	None	Front		1.46	
59	Head	1	1	None	None	Front		1.96	
59	Head	1	2	None	None	Front		1.92	
60	Head	1	3	None	None	Front		1.68	
60	Head	1	3	None	None	Front		1.42	
60	Head	2	3	None	None	Front		1.56	
60	Head	2	3	None	None	Front		1.15	
60	Head	1	1	None	None	Front		1.78	
60	Head	1	2	None	None	Front		1.81	