MOTOROLA SOLUTIONS

MS ISO/IEC 17025
TESTING
SAMM No.0826

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 3

Motorola Solutions Inc
EME Test Laboratory
Motorola Solutions Malaysia Sdn Bhd (Innoplex) (455657-H)
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Date of Report: 05/25/2018
Report Revision: B

Responsible Engineer:	Veeramani Veerapan
Report Author:	Veeramani Veerapan
Date/s Tested:	11/14/2017 – 4/24/2018
Manufacturer:	Motorola Solutions Inc.
DUT Description:	Handheld Portable - APX8000H ST U/V/7_800 M3.5 Black (Standard Top Control, Black Housing, M3.5 Full Keypad)
Test TX mode(s):	CW (PTT), Bluetooth, and WLAN 802.11b/g/n
Max. Power output:	6.6 W (VHF), 5.7 W (UHF), 2.99 W (700 MHz band), 3.6 W (800 MHz band), 10 mW (Bluetooth), 28.3 mW (802.11b), 11.2 mW (802.11g/n)
Nominal Power:	6.0 W (VHF), 5.0 W (UHF), 2.5 W (700 MHz band), 3.0 W (800 MHz band), 10 mW (Bluetooth), 28.3 mW (802.11b), 11.2 mW (802.11g/n)
Tx Frequency Bands:	LMR 136-174 MHz, 380-520 MHz, 762-806 MHz, 806-870 MHz; Bluetooth 2402-2480 MHz; WLAN 2400-2483.5 MHz
Signaling type:	FM, TDMA, FHSS (Bluetooth), 802.11b/g/n (WLAN)
Model(s) Tested:	H91TGD9PW9AN (PNUW1036A / KNUW1036A)
Model(s) Certified:	H91TGD9PW8AN (PNUW1035A / KNUW1035A; PNUW1041A / KNUW1041A) H91TGD9PW9AN (PNUW1036A / KNUW1036A; PNUW1042A / KNUW1042A)
Serial Number(s):	673TTV0841, 673TTV0848, 673TTV1050
Classification:	Occupational/Controlled
FCC ID:	AZ489FT7111; 150.8-173.4 MHz, 406.1-512 MHz, 764-775 MHz, 794-824 MHz, 851-869 MHz. This report contains results that are immaterial for FCC equipment approval, which are clearly identified.
IC ID:	109U-89FT7111; 138- 174 MHz, 406.1-430 MHz, 450-470 MHz, 764-775 MHz, 794-824 MHz, 851-869 MHz. This report contains results that are immaterial for ISED equipment approval, which are clearly identified.
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 ISED RSS-102 (Issue 5).

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 Nguk Ing
Digitally signed by Tiong Nguk Ing
Date: 2018.05.29 15:11:52 +08'00'

Tiong Nguk Ing
Deputy Technical Manager (Approved Signatory)
Approval Date: 5/29/2018

Part 1 of 3

Report Revision History

Date	Revision	Comments
04/24/2018	A	Initial release
5/23/2018	B	Added PSM clip in Table 6. Update result summary table in Table 1, 74, and 75.

1.0 Introduction

This report details the utilization, test setups, test equipments, and test results of the Specific Absorption Rate (SAR) measurements performed at the Motorola Solutions Inc. EME Test Laboratory for handheld portable model number H91TGD9PW9AN (PNUW1036A).
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)
		1g-SAR	1g-SAR
TNF	150.8-173.4 MHz (LMR)	0.71	0.66
	406.1-470 MHz (LMR)	4.54	3.44
	450-512 MHz (LMR)	4.72	3.61
	7/800 (LMR)	3.80	2.68
*DSS	2402-2480 MHz	NA	NA
DTS	2412-2462 MHz	0.0035	0.104
Simultaneous Results		4.72	3.71

*Results not required per KDB (refer to sections 13.17 and 14.0)

3.0 Abbreviations / Definitions

CNR: Calibration Not Required
EME: Electromagnetic Energy
CW: Continuous Wave
DUT: Device Under Test
DC: Duty Cycle
FM: Frequency Modulation
Li-Ion: Lithium-Ion
NiMH: Nickel Metal Hydrate
LMR: Land Mobile Radio
TNF: Licensed Non-Broadcast Transmitter Head on Face
NA: Not Applicable
PTT: Push to Talk
RF: Radio Frequency

SAR: Specific Absorption Rate
DSP: Digital Signal Processor
DSS: Direct Spread Spectrum
DSSS: Direct Sequence Spread Spectrum
DTS: Digital Transmission System
TDMA: Time Division Multiple Access
FHSS: Frequency Hopping Spread Spectrum
GPS: Global Positioning System
MIC: Microphone
PSM: Public Safety Microphone
RSM: Remote Speaker Microphone
WLAN: Wireless Local Area Network

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 Radio communication 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 – 248227 D01 SAR measurement for 802.11 a/b/g v01r02

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 Devices under Test (DUT)

This device is operates in the LMR bands using either frequency modulation (FM) with 100% transmit duty cycle or TDMA signals with maximum of 50% transmit duty cycle. For conservative assessment, FM signal was tested. This device also contain WLAN technology for data capabilities over 802.11b/g/n wireless networks and Bluetooth technology for short range wireless devices.

Time Division Multiple Access (TDMA) is used to allocate portions of the RF signal by dividing time into two slots. 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 during two time-slot lengths of 30 milliseconds with frame

length 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 maximum duty cycle for TDMA 1:2 is 50%.

The LMR bands in this device operates in a half duplex system. A half duplex system only allows the user to transmit or receive. This device cannot transmit and receive simultaneously. The user must stop transmitting in order to receive a signal or listen for a response, regardless of PTT button or use of voice activated audio accessories. This type of operation, along with the RF safety booklet, which instructs the user to transmit no more than 50% of the time, justifies the use of 50% duty factor for this device.

This device also incorporate 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 76.1%. Refer to section 14.0 Simultaneous Transmission Exclusion.

WLAN 802.11b/g/n operates using Direct Sequence Spread Spectrum (DSSS). This device work in accordance with the IEEE 802.11b/g/n standard.

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

Table 3

Technologies	Band (MHz)	Transmission	Duty Cycle (%)	Max Power (W)
LMR (VHF)	136-174	FM or TDMA	*50 / *25	6.60
LMR (UHF 1)	380-470	FM or TDMA	*50 / *25	5.70
LMR (UHF 2)	450-520	FM or TDMA	*50 / *25	5.70
LMR (700 MHz band)	762-776; 792-806	FM or TDMA	*50 / *25	2.99
LMR (800 MHz band)	806-825; 851-870	FM or TDMA	*50 / *25	3.60
BT	2402 - 2480	FHSS	76.1	0.0100
WLAN	2400 - 2483.5	802.11b	100	0.0283
WLAN	2400 - 2483.5	802.11g	100	0.0112
WLAN	2400 - 2483.5	802.11n	100	0.0112

Note - * includes 50% PTT operation

The intended operating positions are “at the face” with the DUT at least 2.5 cm from the mouth, and “at the body” 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 section 4.0 to assess compliance of this device. The following sections identify the test criteria and details for each accessory category.

7.1 Antennas

There are optional removable antennas, PSM antenna, and an internal BT/WLAN antenna offered for this model. The Table below lists the antennas and their descriptions.

Table 4

Antenna No.	Antenna Models	Description	Selected for test	Tested
1	KT000026A01	VHF/7-800/U1/U2/GPS antenna; 136-174 MHz, 380-470 MHz, 450-520 MHz, 760-870 MHz, 1575 MHz; ¼ wave ; -2 dBi gain	Yes	Yes
2	NAR6595A	7-800 Stubby antenna; 762-870 MHz; ¼ wave ; -2 dBi gain	Yes	Yes
3	PMAE4065A	U1/U2/GPS antenna; 380-470 MHz, 450-520 MHz, 1575 MHz; ¼ wave; -2 dBi gain	Yes	Yes
4	PMAF4002A	700/800MHz PSM antenna; 762-870 MHz; ¼ wave ; -2 dBi gain	Yes	Yes*
5	PMAF4040A	700/800MHz Whip antenna; 762-870MHz, ½ wave; 0 dBi gain	Yes	Yes
6	PMAS4001A	U1/U2/7-800/GPS antenna; 380-470 MHz, 450-520 MHz, 762-870 MHz, 1575 MHz; ¼ wave ; -2 dBi gain	Yes	Yes
7	84009370002	Internal BT/WLAN antenna; 2.4 - 2.483.5 GHz; ¼ wave; 2.58 dBi gain	Yes	Yes
8	NAG4000A	1575 MHz, APX GPS Stubby antenna, ¼ wave; -2 dBi gain	No	No

Note - * For PSM only.

7.2 Batteries

There are seven batteries offered for this product. The Table below lists the batteries and their descriptions.

Table 5

Battery No.	Battery Models	Description	Selected for test	Tested	Comments
1	NNTN8921A	Battery Impress 2, Li-Ion TIA4950 R IP68 4500mAh Typical	Yes	Yes	
2	NNTN8930A	Battery Impress 2, Li-Ion TIA4950 R IP68 2650mAh Typical	Yes	Yes	
3	PMNN4485A	Battery Impress 2, Li-Ion R IP68 2550mAh Typical	Yes	Yes	Default battery for body
4	PMNN4486A	Battery Impress 2, Li-Ion R IP67 3400mAh Typical	Yes	Yes	
5	PMNN4487A	Battery Impress 2, Li-Ion R IP68 4850mAh Typical	Yes	Yes	

Continued Table 5

Battery No.	Battery Models	Description	Selected for test	Tested	Comments
6	PMNN4494A	Battery Impress 2, Li-Ion R IP68 5100mAh Typical	Yes	Yes	Default battery for face
7	PMNN4547A	Battery Impress 2, Li-Ion TIA4950 IP68 3100mAh Typical	Yes	Yes	

7.3 Body worn Accessory

There only one body worn accessory were considered. The Table below lists the body worn accessory and its description.

Table 6

Body worn No.	Body worn Model	Description	Selected for test	Tested	Comments
1	PMLN7901A	Carry accessory holster	Yes	Yes	
2	4205823V08 REV.N	Clip for PSM	Yes	Yes*	

Note - * For PSM only.

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	NMN6274A	IMPRES XP RSM W/ Dual MIC Noise Suppression, 3.5 mm Threaded Jack	Yes	Yes	Default audio
2	PMMN4059B	IMPRES Public Safety Microphone - 18 Inch Cable	Yes	Yes	PSM tested with antenna
3	PMMN4060B	IMPRES Public Safety Microphone - 24 Inch Cable	Yes	Yes	PSM tested with antenna
4	PMMN4061B	IMPRES Public Safety Microphone - 30 Inch Cable	Yes	Yes	PSM tested with antenna
5	PMMN4024A	Remote Speaker Microphone	Yes	*No	
6	PMMN4025A	IMPRES Remote Speaker Microphone	Yes	*No	
7	PMMN4102A	Accessory Kit, ANC RSM	Yes	*No	
8	HMN4103B	IMPRES RSM Display With Jack, No Channel	Yes	*No	
9	BDN6783B	Audio accessory adaptor 3.5mm w/ PTT (Non-Operational W/ P3A Hardware)	Yes	*No	Attached with RLN5312B
10	BDN6732A	3-Wire Receive Only Surveillance kit w/ Extra- Loud Earpiece, Black, 3.5mm Threaded	Yes	*No	
11	PMLN7567A	IMPRESS 3-Wire with Translucent, Black	Yes	*No	
12	RLN5312B	Comfort Earpiece w/MIC & PTT, Black	Yes	*No	

Note - * Intended for test. Per KDB provisions tests not required.

Continued Table 7

Audio No.	Audio Acc. Models	Description	Selected for test	Tested	Comments
13	PMLN6127A	IMPRES 2-Wire Surveillance, Black	Yes	*No	
14	PMLN7188B	Earpiece, ENH ATEX 3.5mm Earpiece w/ Translucent Tube	Yes	*No	Attached with PMMN4102B
15	RMN5137B	Audio Accessory-Headset,3M PELTOR MT Series 2-Way Comm Headset MT7H79A-97-UL-34, Headband	Yes	*No	
16	PMLN5096B	D-Style Earset	Yes	*No	
17	PMLN5275C	Heavy Duty Headset	Yes	*No	
18	NNTN8575ABLK	Audio Accessory-Remote Speaker MIC	No	No	By similarity to NNTN8575A
19	NNTN8575AYLW	Audio Accessory-Remote Speaker MIC	No	No	By similarity to NNTN8575A
20	PMLN6129A	IMPRES 2-Wire with Translucent Tube, Black	No	No	By similarity to PMLN6127A
21	PMLN6130A	IMPRES 2-Wire with Translucent Tube, Beige	No	No	By similarity to PMLN6127A
22	PMLN7563A	IMPRES 2-Wire Surveillance Kit, Black	No	No	By similarity to PMLN6127A
23	PMLN7564A	IMPRES 2-Wire Surveillance Kit, Beige	No	No	By similarity to PMLN6127A
24	PMLN7565A	IMPRES 2-Wire with Translucent Tube, Black	No	No	By similarity to PMLN6127A
25	PMLN7566A	IMPRES 2-Wire with Translucent Tube, Beige	No	No	By similarity to PMLN6127A
26	PMLN7568A	IMPRES 3-Wire with Translucent Tube, Beige	No	No	By similarity to PMLN7567A
27	PMLN6123A	IMPRES 3-Wire with Translucent Tube, Black	No	No	By similarity to PMLN7567A
28	PMLN6124A	IMPRES 3-Wire with Translucent Tube, Beige	No	No	By similarity to PMLN7567A
29	PMMN4040A	SUBMERSIBLE REMOTE SPEAKER MIC	No	No	By similarity to PMMN4024A
30	PMMN4062A	IMPRES REMOTE SPEAKER MIC, Noise Cancelling	No	No	By similarity to PMMN4025A
31	PMMN4065A	IMPRES RSM, IP57	No	No	By similarity to PMMN4025A
32	PMMN4069A	IMPRES RSM, 3.5MM JACK, IP55	No	No	By similarity to PMMN4025A
33	PMMN4099A	Audio accessory-REMOTE SPEAKER MIC	No	No	By similarity to PMMN4025A
34	PMMN4102B	IMPRES ANC RSM UL/LONG CBL/NEX/3.5	No	No	By similarity to PMMN4102A
35	PMMN4102BGRN	IMPRES ANC RSM UL/LONG CBL/NEX/3.5, Green	No	No	By similarity to PMMN4102A
36	PMMN4107A	XE500 RSM w/o Channel Knob, Green	No	No	By similarity to NNTN8575A
37	PMMN4107ABLK	XE500 RSM w/o Channel Knob, Black	No	No	By similarity to NNTN8575A
38	PMMN4113A	IMPRES OMNI RSM Long CBL/NEX/3.5	No	No	By similarity to PMMN4102A

Note - * Intended for test. Per KDB provisions tests not required.

Continued Table 7

Audio No.	Audio Acc. Models	Description	Selected for test	Tested	Comments
39	RMN5138B	Audio Accessory-Headset,3M PELTOR MT Series 2-Way Comm Headset MT7H79B-97-UL-34, Neckband	No	No	By similarity to RMN5137A
40	RMN5139B	Audio Accessory-Headset,3M PELTOR MT Series 2-Way Comm Headset MT7H79P3E-97-UL-34,Hard HAT attach Mounted	No	No	By similarity to RMN5137A
41	BDN6668A	3-Wire Receive only Surveillance kit w/ Earpiece, Beige, 3.5mm Threaded. Requires BDN6783B.	No	No	By similarity to BDN6732A
42	BDN6730A	3-Wire Receive only Surveillance kit w/ Earpiece, Black, 3.5mm Threaded. Requires BDN6783B.	No	No	By similarity to BDN6732A
43	BDN6729A	2-Wire Receive only Surveillance kit w/ Earpiece, Black, 3.5mm Threaded. Requires BDN6783B.	No	No	By similarity to RLN5312B
44	BDN6731A	2-Wire Receive only Surveillance kit w/ Extra-Loud Earpiece, Black, 3.5mm Threaded. Requires BDN6783B.	No	No	By similarity to RLN5312B
45	PMLN6853A	Next Gen BTH Heavy Duty Headset GCAI TIA4950	No	No	By similarity to RMN5137A
46	PMLN7467A	Heavy Duty Headset - Next Gen Over The Head (OTH) Headset	No	No	By similarity to RMN5137A
47	NNTN8235A	Remote Speaker microphone, IP57, Brown	No	No	By similarity to PMMN4025A
48	NNTN8236A	Impress remote speaker microphone, Brown	No	No	By similarity to PMMN4025A
49	NNTN8575A	Audio accessory remote speaker microphone	Yes	*No	
50	PMLN6128A	Impress 2 wire surveillance, beige	No	No	By similarity to PMLN6127A
51	BDN6726A	Receive only Earpiece, Black, 1-Wire	No	No	Receive only
52	BDN6727A	Receive only Earpiece, Extra Loud, Black	No	No	Receive only
53	AARLN4885B	Receive only Covered Earbud w/ coiled cord	No	No	Receive only
54	BDN6666A	Earpiece w/ volume control	No	No	Receive only
55	PMLN4620B	D-Shell Receive only Earpiece (One size) for RSM	No	No	Receive only
56	PMLN6125A	1-Wire Surveillance Kit, Black	No	No	Receive only
57	PMLN6126A	1-Wire Surveillance Kit, Beige	No	No	Receive only
58	PMLN7561A	1-Wire Surveillance Kit, Black	No	No	Receive only
59	PMLN7562A	1-Wire Surveillance Kit, Beige	No	No	Receive only
60	RLN5313B	1-Wire Receive only Surveillance Kit w/ Translucent Tube, Black, 3.5mm Threaded	No	No	Receive only

Note - * Intended for test. Per KDB provisions tests 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	52.8.8.1222	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	NA	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. For Diacetin and similar type simulates, sugar and HEC ingredients are not needed. 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

% of Listed Ingredients	150 MHz		450MHz		770MHz		900MHz		2450MHz	
	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Sugar	55.4	49.7	56.0	46.5	57.0	46.0	56.5	44.9	0	0
Diacetin	0	0	0	0	0	0	0	0	51.0	34.5
De ionized - Water	38.35	46.2	39.1	50.53	40.12	51.8	40.95	53.06	48.75	65.20
Salt	5.15	3.00	3.8	1.87	1.78	1.1	1.45	0.94	0.15	0.20
HEC	1	1	1	1	1	1	1	1	0	0
Bact.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	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	3735	3/10/2017	3/10/2018
Speag Probe	EX3DV4	3612	5/17/2017	5/17/2018
Speag Probe	EX3DV4	7485	1/17/2018	1/17/2019
*Speag DAE	DAE4	1488	2/14/2017	2/14/2018
Speag DAE	DAE4	1294	5/23/2017	5/23/2018
Speag DAE	DAE4	688	1/4/2018	1/4/2019
Amplifier	10W1000	312859	CNR	CNR
Amplifier	10W1000	28782	CNR	CNR
Power Sensor	E9301B	MY41495594	7/20/2017	7/20/2018
Power Sensor	8481B	SG41090258	6/27/2017	6/27/2018
Power Sensor	E9301B	MY55210003	9/29/2017	9/29/2018
Power Sensor	E9301B	MY50280001	6/23/2017	6/23/2018
Power Sensor	8481B	MY41091170	5/21/2017	5/21/2018
Power Sensor	E9301B	MY55210006	11/12/2017	11/12/2018
Power Sensor	NRP-Z11	121252	2/6/2017	2/6/2019
Power Meter	E4416A	MY50001037	5/22/2017	5/22/2019
Power Meter	E4418B	MY45100532	11/1/2016	11/1/2018
Power Meter	E4418B	MY45107917	5/22/2017	5/22/2019
Power Meter	E4419B	MY45103725	5/22/2017	5/22/2019
Power Meter	E4418B	MY45100911	7/14/2017	7/14/2019
BI-Directional coupler	3020A	41931	7/21/2017	7/21/2018
BI-Directional coupler	3020A	40295	9/4/2017	9/4/2018
Signal generator (VECTOR ESG 250KHz-6GHz)	E4438C	MY45091270	7/26/2016	7/26/2018
Signal generator (VECTOR ESG 250KHz-6GHz)	E4438C	MY42081753	3/27/2018	3/27/2019
Dickson Temperature Recorder	TM320	06153216	8/11/2017	8/11/2018
*Temperature Probe	80PK-22	06032017	3/24/2017	3/24/2018
†Temperature Probe	JHSS-18U-RSC-6	AGIL700245	10/13/2017	10/13/2018
Thermometer	HH202A	18812	10/13/2017	10/13/2018
Thermometer	HH806AU	080307	11/30/2017	11/30/2018
*Dielectric Assessment Kit	DAK-12	1051	3/16/2017	3/16/2018
*Dielectric Assessment Kit	DAK-3.5	1120	3/16/2017	3/16/2018

Continued Table 11

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
†Dielectric Assessment Kit	DAK-3.5	1156	1/9/2018	1/9/2019
*Network Analyzer	E5071B	MY42403147	11/15/2016	11/15/2017
†Network Analyzer	E5071B	MY42403218	8/24/2017	8/24/2018
Speag Dipole	CLA150	4010	11/8/2016	11/8/2018
*Speag Dipole	D450V3	1077	11/25/2015	11/25/2017
†Speag Dipole	D450V3	1054	10/25/2017	10/25/2019
*Speag Dipole	D750V3	1098	11/24/2015	11/24/2017
†Speag Dipole	D750V3	1142	10/12/2017	10/12/2019
Speag Dipole	D835V2	4d029	1/8/2018	1/8/2020
Speag Dipole	D900V2	1d026	1/18/2017	1/18/2019
Speag Dipole	D2450V2	782	2/15/2017	2/15/2019

Note: * Equipment used for test dates prior to equipment calibration due date.
† Equipment used to replace equipment out for calibration.

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 & D 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								
4/5/2017	Head	150	3735	0.73	50.3	Pass	Pass	Pass
4/6/2017	Body	150	3735	0.82	60.0	Pass	Pass	Pass
4/7/2017	Head	450	3735	0.87	44.3	Pass	Pass	Pass
4/5/2017	Body	450	3735	0.96	54.4	Pass	Pass	Pass
4/22/2017	Head	750	3735	0.90	43.3	Pass	Pass	Pass
3/24/2017	Body	750	3735	0.96	58.1	Pass	Pass	Pass
4/7/2017	Head	900	3735	0.99	40.0	Pass	Pass	Pass
3/27/2017	Body	900	3735	1.10	55.5	Pass	Pass	Pass
6/6/2017	Head	150	3612	0.76	50.7	Pass	Pass	Pass
6/6/2017	Body	150	3612	0.81	59.7	Pass	Pass	Pass
6/9/2017	Head	450	3612	0.89	43.5	Pass	Pass	Pass
6/6/2017	Body	450	3612	0.93	54.7	Pass	Pass	Pass

Continued Table 12

Dates	Probe Calibration Point		Probe SN	Measured Tissue Parameters		Validation		
				σ	ϵ_r	Sensitivity	Linearity	Isotropy
6/10/2017	Head	750	3612	0.85	41.9	Pass	Pass	Pass
6/11/2017	Body	750	3612	0.94	55.0	Pass	Pass	Pass
02/14/2018	Head	835	7485	0.93	43.5	Pass	Pass	Pass
02/14/2018	Body	835	7485	0.97	54.5	Pass	Pass	Pass
6/10/2017	Head	900	3612	0.99	40.6	Pass	Pass	Pass
6/11/2017	Body	900	3612	1.10	53.5	Pass	Pass	Pass
5/31/2017	Head	2450	3612	1.81	38.1	Pass	Pass	Pass
6/2/2017	Body	2450	3612	1.95	52.4	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 D 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
3735	FCC Body	SPEAG CLA150 / 4010	3.78 +/- 10%	4.11	4.11	#11/20/2017
				4.11	4.11	11/22/2017
	IEEE/IEC Head		3.69 +/- 10%	3.73	3.73	#11/21/2017
				3.92	3.92	11/22/2017
	FCC Body	SPEAG D450V3 / 1077	4.52 +/- 10%	1.23	4.92	#11/14/2017
				1.18	4.72	11/15/2017
				1.16	4.64	11/15/2017
				1.20	4.80	11/20/2017
				1.20	4.80	11/22/2017
	IEEE/IEC Head		4.57 +/- 10%	1.17	4.68	#11/15/2017
				1.14	4.56	#11/16/2017
				1.15	4.60	#11/17/2017
				1.17	4.68	11/19/2017

Note: # System performance check cover next testing day (within 24 hrs)

Continued 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
3735	FCC Body	SPEAG D750V3 / 1098	8.86 +/- 10%	2.22	8.88	11/23/2017
		SPEAG D750V3 / 1142	8.51 +/- 10%	2.09	8.36	12/20/2017
				2.20	8.80	02/05/2018
	IEEE/IEC Head		8.32 +/- 10%	2.26	9.04	#12/18/2017
				2.18	8.72	12/19/2017
				2.25	9.00	12/21/2017
	FCC Body	SPEAG D900V2 / 1d026	11.0 +/- 10%	2.65	10.60	11/24/2017
				2.68	10.72	11/25/2017
				2.67	10.68	12/20/2017
				2.76	11.04	02/05/2018
	IEEE/IEC Head		10.9 +/- 10%	2.56	10.24	12/13/2017
				2.82	11.28	12/15/2017
3612	IEEE/IEC Head	SPEAG CLA150 / 4010	3.69 +/- 10%	3.84	3.84	02/07/2018
	FCC Body	SPEAG D450V3 / 1054	4.57 +/- 10%	1.17	4.68	02/11/2018
				1.12	4.48	#03/27/2018
	IEEE/IEC Head		4.48 +/- 10%	1.19	4.76	#02/08/2018
				1.19	4.76	*02/09/2018
				1.16	4.64	02/11/2018
				1.13	4.52	03/28/2018
		SPEAG D750V3 / 1142	8.32 +/- 10%	2.12	8.48	#12/04/2017
				2.09	8.36	03/13/2018
		SPEAG D900V2 / 1d026	10.90 +/- 10%	2.71	10.84	03/13/2018
	FCC Body	SPEAG D2450V2 / 782	50.5 +/- 10%	13.4	53.60	03/01/2018
	IEEE/IEC Head		53.3 +/- 10%	13.9	55.60	#03/05/2018
7485	FCC Body	SPEAG D835V2 / 4d029	9.67 +/- 10%	2.57	10.28	04/24/2018

Note: # System performance check cover next testing day (within 24 hrs)

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
136	FCC Body	0.79 (0.75-0.83)	62.3 (59.1-65.4)	0.80	63.9	#11/20/2017
				0.75	50.8	#07/02/2018
	IEEE/IEC Head	0.75 (0.71-0.79)	53.0 (50.3-55.6)	0.74	55.2	#11/21/2017
				0.72	55.6	11/22/2017
140	FCC Body	0.79 (0.75-0.83)	62.2 (59.0-65.3)	0.81	63.7	#11/20/2017
	IEEE/IEC Head	0.75 (0.72-0.79)	52.8 (50.1-55.4)	0.75	54.8	#11/21/2017
143	FCC Body	0.80 (0.76-0.83)	62.1 (59.0-65.2)	0.81	63.6	#11/20/2017
	IEEE/IEC Head	0.76 (0.72-0.79)	52.6 (50.0-55.3)	0.75	54.6	#11/21/2017
147	FCC Body	0.80 (0.76-0.84)	62.0 (58.9-65.1)	0.81	63.4	#11/20/2017
	IEEE/IEC Head	0.76 (0.72-0.80)	52.4 (49.8-55.1)	0.75	54.3	#11/21/2017
150	FCC Body	0.80 (0.76-0.84)	61.9 (58.8-65.0)	0.81	63.3	11/20/2017
				0.78	63.7	11/22/2017
				0.79	59.0	02/07/2018
	IEEE/IEC Head	0.76 (0.72-0.80)	52.3 (49.7-54.9)	0.76	54.1	11/21/2017
				0.73	54.6	11/22/2017
				0.76	50.2	02/07/2018
151	FCC Body	0.80 (0.76-0.84)	61.9 (58.8-65.0)	0.78	63.7	11/22/2017
	IEEE/IEC Head	0.76 (0.72-0.80)	52.3 (49.6-54.9)	0.76	50.2	02/07/2018
162	FCC Body	0.81 (0.77-0.85)	61.6 (58.5-64.7)	0.78	63.1	11/22/2017
	IEEE/IEC Head	0.77 (0.73-0.81)	51.7 (49.2-54.3)	0.77	49.8	02/07/2018
173	FCC Body	0.82 (0.78-0.86)	61.3 (58.3-64.4)	0.82	62.2	11/20/2017
	IEEE/IEC Head	0.78 (0.74-0.82)	51.2 (48.7-53.8)	0.78	52.9	11/21/2017
				0.74	52.9	11/22/2017
380	FCC Body	0.93 (0.88-0.98)	57.4 (54.5-60.3)	0.89	56.7	11/15/2017
	IEEE/IEC Head	0.87 (0.83-0.91)	44.3 (42.1-46.6)	0.83	45.5	02/09/2018
				0.84	45.4	02/11/2018
393	FCC Body	0.93 (0.89-0.98)	57.3 (54.4-60.1)	0.90	56.5	11/15/2017
				0.93	55.4	11/22/2017
	IEEE/IEC Head	0.87 (0.83-0.91)	44.2 (42.0-46.4)	0.84	45.2	#02/09/2018
				0.85	45.1	02/11/2018
406	FCC Body	0.93 (0.89-0.98)	57.1 (54.3-60.0)	0.89	56.1	11/14/2017
				0.90	54.8	02/11/2018
	IEEE/IEC Head	0.87 (0.83-0.91)	44.0 (41.8-46.2)	0.85	44.9	02/09/2018

Note: # Tissue sheet date cover next testing day (within 24 hrs)

Continued Table 14

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
422	FCC Body	0.94 (0.89-0.98)	57.0 (54.1-59.8)	0.94	54.6	#03/27/2018
	IEEE/IEC Head	0.87 (0.83-0.91)	43.8 (41.6-46.0)	0.87	42.9	03/28/2018
438	FCC Body	0.94 (0.89-0.99)	56.8 (54.0-59.7)	0.92	55.6	11/14/2017
				0.92	54.3	02/11/2018
	IEEE/IEC Head	0.87 (0.83-0.91)	43.6 (41.5-45.8)	0.86	43.9	#11/15/2017
				0.84	43.1	#11/16/2017
450	FCC Body	0.94 (0.89-0.99)	56.7 (53.9-59.5)	0.92	55.5	#11/14/2017
				0.91	55.2	11/15/2017
				0.95	55.6	11/15/2017
				0.92	54.7	11/20/2017
				0.97	54.6	11/22/2017
				0.93	54.1	02/11/2018
				0.97	54.2	#03/27/2018
	IEEE/IEC Head	0.87 (0.83-0.91)	43.5 (41.3-45.7)	0.87	43.7	#11/15/2017
				0.85	42.9	#11/16/2017
				0.85	42.6	#11/17/2017
				0.85	43.8	11/19/2017
				0.85	42.7	#02/08/2018
				0.89	43.9	#02/09/2018
				0.91	43.9	02/11/2018
				0.90	42.3	03/28/2018
466	FCC Body	0.94 (0.89-0.99)	56.6 (53.8-59.5)	0.98	54.0	#03/27/2018
	IEEE/IEC Head	0.87 (0.83-0.91)	43.4 (41.2-45.6)	0.91	42.0	03/28/2018
470	FCC Body	0.94 (0.89-0.99)	56.6 (53.8-59.5)	0.95	53.8	02/11/2018
				0.98	53.9	#03/27/2018
	IEEE/IEC Head	0.87 (0.83-0.91)	43.4 (41.2-45.6)	0.91	43.5	02/09/2018
				0.91	41.9	03/28/2018
512	FCC Body	0.94 (0.90-0.99)	56.5 (53.6-59.3)	0.98	54.6	11/14/2017
516	FCC Body	0.95 (0.90-0.99)	56.4 (53.6-59.3)	0.98	54.5	#11/14/2017
				0.97	54.2	11/15/2017
	IEEE/IEC Head	0.87 (0.83-0.92)	43.1 (41.0-45.3)	0.89	41.3	#11/17/2017
				0.90	42.4	11/19/2017
				0.91	41.5	#02/08/2018
520	FCC Body	0.95 (0.90-0.99)	56.4 (53.6-59.2)	0.97	54.1	11/15/2017
	IEEE/IEC Head	0.87 (0.83-0.92)	43.1 (41.0-45.3)	0.90	42.4	11/19/2017
				0.91	41.5	#02/08/2018

Note: # Tissue sheet date cover next testing day (within 24 hrs)

Continued Table 14

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
750	FCC Body	0.96 (0.92-1.01)	55.5 (52.8-58.3)	0.92	53.9	11/23/2017
				0.92	55.0	12/20/2017
				0.92	54.5	02/05/2018
	IEEE/IEC Head	0.89 (0.85-0.93)	41.9 (39.8-44.0)	0.86	43.4	#12/04/2017
				0.85	42.0	#12/18/2017
				0.86	43.2	12/19/2017
				0.85	42.8	12/21/2017
				0.86	43.8	03/13/2018
762	FCC Body	0.96 (0.92-1.01)	55.5 (52.7-58.3)	0.93	54.9	12/20/2017
	IEEE/IEC Head	0.89 (0.85-0.94)	41.8 (39.8-43.9)	0.86	41.8	#12/18/2017
				0.87	43.0	12/19/2017
764	FCC Body	0.96 (0.92-1.01)	55.5 (52.7-58.3)	0.93	53.7	11/23/2017
				0.93	54.4	02/05/2018
	IEEE/IEC Head	0.89 (0.85-0.94)	41.8 (39.7-43.9)	0.87	43.1	#12/04/2017
				0.86	41.8	#12/18/2017
770	FCC Body	0.96 (0.92-1.01)	55.5 (52.7-58.2)	0.94	54.3	02/05/2018
	IEEE/IEC Head	0.89 (0.85-0.94)	41.8 (39.7-43.9)	0.88	43.5	03/13/2018
775	FCC Body	0.97 (0.92-1.01)	55.4 (52.7-58.2)	0.95	54.3	02/05/2018
	IEEE/IEC Head	0.89 (0.85-0.94)	41.8 (39.7-43.9)	0.89	43.4	03/13/2018
792	FCC Body	0.97 (0.92-1.01)	55.4 (52.6-58.1)	0.96	54.6	12/20/2017
	IEEE/IEC Head	0.89 (0.85-0.94)	41.7 (39.6-43.8)	0.90	42.6	12/19/2017
794	FCC Body	0.97 (0.92-1.02)	55.4 (52.6-58.1)	0.97	54.1	02/05/2018
	IEEE/IEC Head	0.90 (0.85-0.94)	41.7 (39.6-43.8)	0.90	43.2	03/13/2018
809	FCC Body	0.97 (0.92-1.02)	55.3 (52.5-58.1)	0.98	53.9	02/05/2018
	IEEE/IEC Head	0.90 (0.85-0.94)	41.6 (39.5-43.7)	0.92	43.0	03/13/2018
824	FCC Body	0.97 (0.92-1.02)	55.2 (52.5-58.0)	0.99	53.1	11/23/2017
				0.98	53.2	11/24/2017
	IEEE/IEC Head	0.90 (0.85-0.94)	41.6 (39.5-43.6)	0.92	41.9	#12/13/2017
				0.92	41.6	#12/14/2017
				0.93	41.8	12/21/2017
835	FCC Body	0.97 (0.92-1.02)	55.2 (52.4-58.0)	1.00	52.6	#04/23/2018
851	FCC Body	0.99 (0.94-1.04)	55.2 (52.4-57.9)	1.01	52.9	11/24/2017
				1.01	52.4	#04/23/2018
	IEEE/IEC Head	0.92 (0.87-0.96)	41.5 (39.4-43.6)	0.96	42.4	03/13/2018
861	FCC Body	1.00 (0.95-1.05)	55.1 (52.4-57.9)	1.03	53.4	02/05/2018
	IEEE/IEC Head	0.93 (0.88-0.97)	41.5 (39.4-43.6)	0.97	42.3	03/13/2018

Note: # Tissue sheet date cover next testing day (within 24 hrs)

Continued Table 14

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
869	FCC Body	1.01 (0.96-1.06)	55.1 (52.3-57.8)	1.03	52.7	11/24/2017
				1.06	52.8	11/25/2017
				1.04	53.3	02/05/2018
	IEEE/IEC Head	0.94 (0.89-0.98)	41.5 (39.4-43.6)	0.97	41.0	#12/14/2017
				0.96	39.9	12/15/2017
900	FCC Body	1.05 (1.00-1.10)	55.0 (52.3-57.8)	1.06	52.4	11/24/2017
				1.09	52.5	11/25/2017
				1.08	53.5	12/20/2017
				1.08	53.0	02/05/2018
	IEEE/IEC Head	0.97 (0.92-1.02)	41.5 (39.4-43.6)	0.99	41.0	12/13/2017
				1.00	40.6	#12/14/2017
				0.99	39.5	12/15/2017
				1.01	41.8	03/13/2018
2450	FCC Body	1.95 (1.85-2.05)	52.7 (47.4-58.0)	2.03	48.1	#03/01/2018
	IEEE/IEC Head	1.80 (1.71-1.89)	39.2 (35.3-43.1)	1.88	35.8	03/05/2018
2412	FCC Body	1.91 (1.82-2.01)	52.8 (47.5-58.0)	1.99	48.2	#03/01/2018
	IEEE/IEC Head	1.77 (1.68-1.86)	39.3 (35.3-43.2)	1.84	36.0	#03/05/2018

Note: # Tissue sheet date cover next testing day (within 24 hrs)

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^{o}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: 19.1 – 23.3˚C Avg. 21.5 ˚C
Tissue Temperature	18 – 25 ˚C	Range: 19.1 -22.3˚C Avg. 20.7˚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 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	½·δ·ln(2) ± 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 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.

12.3 DUT Positioning Procedures

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

12.3.1 Body

The DUT was positioned in normal use configuration against the phantom with the offered body worn accessory, battery, and with the offered audio accessories as applicable.

12.3.2 Head

Not applicable.

12.3.3 Face

The DUT was positioned with 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.

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

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 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 F includes a shortened scan to justify SAR scaling for drift. For this device the "Max Calc. 1g-SAR" is scaled using the following formula:

$$Max\_Calc = SAR\_meas \cdot 10^{\frac{-Drift}{10}} \cdot \frac{P\_\max}{P\_\text{int}} \cdot DC$$

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. All tests were performed in CW and 50% duty cycle was applied to PTT configurations in the final results.

WLAN tests were performed in 802.11b mode. Standalone and simultaneous Bluetooth testing were assessed in section 13.17 and 14.0 per the guidelines of KDB 447498.

13.0 DUT Test Data

13.1 LMR assessments at the Body for 150.8-173.4 MHz band

Battery PMNN4485A was selected as default battery for assessment at the Body because it is the thinnest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (150.8-173.4 MHz) which are listed in Table 17. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 17

Test Freq (MHz)	PMNN4485A
	Power (W)
150.800	6.44
156.450	6.46
162.100	6.45
167.750	6.49
173.400	6.53

Assessments at the Body with Body worn PMLN7901A
DUT assessment with offered antenna, default battery and, default 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 E.

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#
KT000026A01	PMNN4485A	PMLN7901A	NMN6274A	150.800					
				156.450					
				162.100					
				167.750					
				173.400	6.50	-1.04	0.55	**0.36**	ZR(AN)-AB-171120-10
Assessment of Additional Batteries									
KT000026A01	NNTN8921A	PMLN7901A	NMN6274A	173.400	6.50	-0.69	0.46	0.27	ZR(AN)-AB-171120-11
	NNTN8930A				6.40	-0.80	0.47	0.29	AZ-AB-171120-12
	PMNN4486A				6.60	-0.76	0.59	0.35	AZ-AB-171120-13
	PMNN4487A				6.60	-0.72	0.51	0.30	AZ-AB-171120-14
	PMNN4494A				6.57	-0.74	0.53	0.32	AZ-AB-171120-15
	PMNN4547A				6.52	-0.78	0.55	0.34	AZ-AB-171120-16

Assessment at the Body with other audio accessories
Assessment per "KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; Sec 1, A. when overall ≤ 4.0 W/kg, SAR tested for that audio accessory is not necessary." This was applicable to all remaining accessories.

Assessment of wireless BT configuration
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 E.

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#
KT000026A01	PMNN4485A	PMLN7901A	BT(None)	150.800					
				156.450					
				162.100					
				167.750					
				173.400	6.60	-0.98	0.68	**0.43**	AZ-AB-171121-01#

13.2 LMR assessments at the Body for 406.1-470 MHz band

Battery PMNN4485A was selected as default battery for assessment at the Body because it is the thinnest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (406.1-470 MHz) which are listed in Table 20. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 20

Test Freq (MHz)	PMNN4485A
	Power (W)
406.125	5.46
422.100	5.47
438.100	5.48
454.000	5.45
470.000	5.46

Assessments at the Body with Body worn PMLN7901A

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 20 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4485A	PMLN7901A	NMN6274A	406.125	5.50	-0.18	4.92	2.66	FD-AB-171114-12
				422.100					
				438.100	5.51	-0.47	6.93	3.99	FD-AB-171114-11
				454.000					
				470.000					
PMAE4065A	PMNN4485A	PMLN7901A	NMN6274A	406.125					
				422.100					
				438.100	5.54	-0.37	5.61	3.14	FD-AB-180211-10
				454.000					
				470.000					
PMAS4001A	PMNN4485A	PMLN7901A	NMN6274A	406.125					
				422.100					
				438.100	5.56	-0.42	5.64	3.18	FD-AB-180211-11
				454.000					
				470.000					

Continued 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#
Assessment of Additional Batteries									
KT000026A01	NNTN8921A	PMLN7901A	NMN6274A	438.100	5.43	-0.42	5.66	3.27	FD-AB-171114-15
	NNTN8930A				5.40	-0.63	6.45	3.94	FD-AB-171114-16
	PMNN4486A				5.54	-0.27	7.21	3.95	ZR-AB-171114-17
	PMNN4487A				5.52	-0.17	4.82	2.59	ZR-AB-171114-18
	PMNN4494A				5.54	0.08	4.45	2.29	ZR-AB-171114-19
	PMNN4547A				5.53	-0.37	7.12	**4.00**	ZR-AB-171114-20

Assessment at the Body with other audio accessories
Assessment per "KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; Sec 1, A. when overall ≤ 4.0 W/kg, SAR tested for that audio accessory is not necessary." This was applicable to all remaining accessories.

Assessment of wireless BT configuration
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 E.

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#
KT000026A01	PMNN4547A	PMLN7901A	BT(None)	406.125					
				422.100					
				438.100	5.51	-0.32	8.15	**4.54**	FD-AB-180211-09
				454.000					
				470.000					

13.3 LMR assessments at the Body for 450-512 MHz band

Battery PMNN4485A was selected as default battery for assessment at the Body because it is the thinnest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (450-512 MHz) which are listed in Table 23. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 23

Test Freq (MHz)	PMNN4485A
	Power (W)
450.000	5.46
465.500	5.45
481.000	5.43
496.500	5.43
512.000	5.45

Assessments at the Body with Body worn PMLN7901A

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 23 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4485A	PMLN7901A	NMN6274A	450.000	5.55	-0.41	6.91	3.90	ZR-AB-171114-22
				465.500					
				481.000					
				496.500					
				512.000	5.50	-0.39	3.09	1.75	ZR-AB-171114-23
PMAE4065A	PMNN4485A	PMLN7901A	NMN6274A	450.000	5.51	-0.36	4.38	2.46	ZR-AB-171115-01#
				465.500					
				481.000					
				496.500					
				512.000					
PMAS4001A	PMNN4485A	PMLN7901A	NMN6274A	450.000	5.51	-0.42	4.13	2.35	ZR-AB-171115-02#
				465.500					
				481.000					
				496.500					
				512.000					
Assessment of Additional Batteries									
KT000026A01	NNTN8921A	PMLN7901A	NMN6274A	450.000	5.54	-0.47	5.23	3.00	ZR-AB-171115-03#
	NNTN8930A				5.35	-0.79	5.91	3.78	ZR-AB-171115-04#
	PMNN4486A				5.56	-0.36	6.82	3.80	ZR-AB-171115-05#
	PMNN4487A				5.51	-0.22	5.15	2.80	ZR-AB-171115-06#
	PMNN4494A				5.54	-0.14	5.01	2.66	ZR-AB-171115-07#
	PMNN4547A				5.56	-0.37	7.04	**3.93**	ZR-AB-171115-08#

Assessment at the Body with other audio accessories
Assessment per "KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; Sec 1, A. when overall ≤ 4.0 W/kg, SAR tested for that audio accessory is not necessary." This was applicable to all remaining accessories.

Assessment of wireless BT configuration
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 E.

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#
KT000026A01	PMNN4547A	PMLN7901A	BT(None)	450.000	5.50	-0.29	8.52	**4.72**	AZ-AB-171115-09#
				465.500					
				481.000					
				496.500					
				512.000					

13.4 LMR assessments at the Body for 764-775 MHz band

Battery PMNN4485A was selected as default battery for assessment at the Body because it is the thinnest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (764-775 MHz) which are listed in Table 26. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 26

Test Freq (MHz)	PMNN4485A
	Power (W)
764.0125	2.95
770.0000	2.95
774.9875	2.95

Assessments at the Body with Body worn PMLN7901A
DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 26 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4485A	PMLN7901A	NMN6274A	764.0125	2.99	-0.42	5.15	2.84	AZ-AB-171123-03
				770.0000					
				774.9875					
NAR6595A	PMNN4485A	PMLN7901A	NMN6274A	764.0125	2.99	-0.34	5.98	**3.23**	AZ-AB-171123-04
				770.0000					
				774.9875					
PMAF4040A	PMNN4485A	PMLN7901A	NMN6274A	764.0125	2.98	-0.06	1.11	0.56	AZ-AB-171123-06
				770.0000					
				774.9875					
PMAS4001A	PMNN4485A	PMLN7901A	NMN6274A	764.0125	2.98	-0.46	3.41	1.90	AZ-AB-171123-07
				770.0000					
				774.9875					
Assessment of Additional Batteries									
NAR6595A	NNTN8921A	PMLN7901A	NMN6274A	764.0125	2.90	-0.14	2.57	1.37	AZ-AB-171123-08
	NNTN8930A				2.90	-0.35	5.12	2.86	AZ-AB-171123-09
	PMNN4486A				2.99	-0.37	5.62	3.06	AZ-AB-171123-10
	PMNN4487A				2.99	-0.32	2.47	1.33	ZR(AN)-AB-171123-11
	PMNN4494A				2.99	-0.40	2.74	1.50	ZR(AN)-AB-171123-12
	PMNN4547A				2.98	-0.30	5.08	2.73	ZR(AN)-AB-171123-13

Assessment at the Body with other audio accessories
Assessment per "KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; Sec 1, A. when overall ≤ 4.0 W/kg, SAR tested for that audio accessory is not necessary." This was applicable to all remaining accessories.

Assessment of wireless BT configuration
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 E.

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#
NAR6595A	PMNN4485A	PMLN7901A	BT(None)	764.0125	2.97	-0.05	7.32	**3.73**	ZR(AN)-AB-180205-03
				770.0000					
				774.9875					

Assessment of PSM configuration

Battery PMNN4494A was selected as the default battery for assessments at the Body with Public Safety Microphone (PSM) because it has the highest capacity (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 (764-775 MHz) which are listed in Table 29. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 29

Test Freq (MHz)	PMNN4494A
	Power (W)
764.0125	2.96
770.0000	2.96
774.9875	2.96

Assessment of offered PSM audio accessories per KDB 643646. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4059B	764.0125	2.99	-0.21	6.42	**3.37**	ZR(AN)-AB-171123-15
				770.0000					
				774.9875					
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4060B	764.0125	2.99	-0.27	4.75	2.53	ZR(AN)-AB-171123-16
				770.0000					
				774.9875					
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4061B	764.0125	2.99	-0.22	4.90	2.58	ZR(AN)-AB-171123-17
				770.0000					
				774.9875					

13.5 LMR assessments at the Body for 794-824 MHz band

Battery PMNN4485A was selected as default battery for assessment at the Body because it is the thinnest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (794-824 MHz) which are listed in Table 31. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 31

Test Freq (MHz)	PMNN4485A
	Power (W)
794.0125	2.96
808.5000	3.50
823.9875	3.51

Assessments at the Body with Body worn PMLN7901A

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 31 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4485A	PMLN7901A	NMN6274A	794.0125					
				808.5000					
				823.9875	3.56	-0.29	5.08	2.75	ZR(AN)-AB-171123-18
NAR6595A	PMNN4485A	PMLN7901A	NMN6274A	794.0125					
				808.5000					
				823.9875	3.56	-0.37	5.47	3.01	ZR(AN)-AB-171123-19
PMAF4040A	PMNN4485A	PMLN7901A	NMN6274A	794.0125					
				808.5000					
				823.9875	3.57	-0.29	1.90	1.02	ZR(AN)-AB-171123-20
PMAS4001A	PMNN4485A	PMLN7901A	NMN6274A	794.0125					
				808.5000					
				823.9875	3.56	-0.26	1.63	0.88	ZR(AN)-AB-171123-21
Assessment of Additional Batteries									
NAR6595A	NNTN8921A	PMLN7901A	NMN6274A	823.9875	3.56	-0.48	3.79	2.14	ZR(AN)-AB-171123-22
	NNTN8930A				3.56	-0.50	5.78	**3.28**	ZR(AN)-AB-171123-23
	PMNN4486A				3.57	-0.52	5.49	3.12	AZ-AB-171123-24
	PMNN4487A				3.57	-0.54	3.52	2.01	AZ-AB-171123-25
	PMNN4494A				3.58	-0.54	3.48	1.98	AZ-AB-171123-26
	PMNN4547A				3.55	-0.36	5.90	3.25	AZ-AB-171123-27

Assessment at the Body with other audio accessories
Assessment per "KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; Sec 1, A. when overall ≤ 4.0 W/kg, SAR tested for that audio accessory is not necessary." This was applicable to all remaining accessories.

Assessment of wireless BT configuration
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 E.

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#
NAR6595A	NNTN8930A	PMLN7901A	BT(None)	794.0125					
				808.5000					
				823.9875	3.55	-0.48	6.37	**3.61**	AZ-AB-171123-28

Assessment of PSM configuration
Battery PMNN4494A was selected as the default battery for assessments at the Body with Public Safety Microphone (PSM) because it has the highest capacity (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 (794-824 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)	PMNN4494A
	Power (W)
794.0125	2.97
808.5000	3.50
823.9875	3.52

Assessment of offered PSM audio accessories per KDB 643646. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4059B	794.0125					
				808.5000					
				823.9875	3.56	-0.20	3.77	2.00	ZR(AN)-AB-171124-13
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4060B	794.0125					
				808.5000					
				823.9875	3.55	-0.37	3.15	1.74	ZR(AN)-AB-171124-14
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4061B	794.0125					
				808.5000					
				823.9875	3.55	-0.38	5.14	**2.84**	AZ-AB-171124-15

13.6 LMR assessments at the Body for 851-870 MHz band

Battery PMNN4485A was selected as default battery for assessment at the Body because it is the thinnest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (851-870 MHz) which are listed in Table 36. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 36

Test Freq (MHz)	PMNN4485A
	Power (W)
851.0125	3.54
860.5000	3.54
868.9875	3.54

Assessments at the Body with Body worn PMLN7901A

DUT assessment with offered antennas, default battery and, default body worn accessory 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 E.

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#
KT000026A01	PMNN4485A	PMLN7901A	NMN6274A	851.0125	3.57	-0.32	3.73	2.02	AZ-AB-171124-02
				860.5000					
				868.9875					
NAR6595A	PMNN4485A	PMLN7901A	NMN6274A	851.0125	3.58	-0.26	4.46	2.38	AZ-AB-171124-03
				860.5000					
				868.9875					
PMAF4040A	PMNN4485A	PMLN7901A	NMN6274A	851.0125	3.58	-0.29	1.70	0.91	AZ-AB-171124-04
				860.5000					
				868.9875					
PMAS4001A	PMNN4485A	PMLN7901A	NMN6274A	851.0125	3.57	-0.26	3.04	1.63	AZ-AB-171124-05
				860.5000					
				868.9875					
Assessment of Additional Batteries									
NAR6595A	NNTN8921A	PMLN7901A	NMN6274A	851.0125	3.53	-0.38	3.38	1.88	AZ-AB-171124-06
	NNTN8930A				3.55	-0.30	4.72	**2.56**	AZ-AB-171124-07
	PMNN4486A				3.58	-0.43	4.33	2.40	ZR(AN)-AB-171124-08
	PMNN4487A				3.58	-0.48	3.50	1.97	ZR(AN)-AB-171124-09
	PMNN4494A				3.57	-0.47	3.41	1.92	ZR(AN)-AB-171124-10
	PMNN4547A				3.56	-0.38	4.56	2.52	ZR(AN)-AB-171124-11

Assessment at the Body with other audio accessories
Assessment per "KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; Sec 1, A. when overall ≤ 4.0 W/kg, SAR tested for that audio accessory is not necessary." This was applicable to all remaining accessories.

Assessment of wireless BT configuration
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 E.

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#
NAR6595A	NNTN8930A	PMLN7901A	BT(None)	851.0125	3.57	-0.62	5.24	**3.05**	ZR(AN)-AB-171124-12
				860.5000					
				868.9875					

Assessment of PSM configuration

Battery PMNN4494A was selected as the default battery for assessments at the Body with Public Safety Microphone (PSM) because it has the highest capacity (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 (851-8270MHz) 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)	PMNN4494A
	Power (W)
851.0125	3.54
860.5000	3.54
868.9875	3.55

Assessment of offered PSM audio accessories per KDB 643646. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4059B	851.0125					
				860.5000					
				868.9875	3.58	-0.37	2.89	**1.58**	AZ-AB-171124-16
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4060B	851.0125					
				860.5000					
				868.9875	3.57	-0.10	1.08	0.56	AZ-AB-171125-04
PMAF4002A	PMNN4494A	4205823V08 REV.N	PMMN4061B	851.0125					
				860.5000					
				868.9875	3.59	-0.15	2.43	1.26	AZ-AB-171125-03

13.7 WLAN assessments at the Body for 802.11b/g/n (2.412 – 2.462 GHz)

The Table below represent the output power measurements for WLAN 2.4GHz 802.11b/g/n for assessments at the Body using battery PMNN4485A because it is the thinnest battery (refer to Exhibit 7B for battery illustration). These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227 D01 SAR Measurement Procedures for 802.11a/b/g/ Transmitters.

The battery was used during conducted power measurements for all test channels within FCC allocated frequency range (2.412 – 2.462 GHz) which are listed in Table 41. The channel with the highest conducted power will be identified as the default

channel per KDB 643646 (SAR Test for PTT Radios). SAR plots of the highest results per Table (bolded) are presented in Appendix E.

SAR is not required for 802.11 g/n when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2W/kg.

In some cases the initial power listed herein may exceed the reported maximum power due to software step size tuning limitations. However, the initial powers measured are not greater than 5% of the reported maximum power.

Table 41

Mode	Channel #	Channel Frequency	Modulation	Battery: PMNN4485A	Antenna Max Power [mW]
				Antenna port[mW]	
802.11b (1Mbps)	1	2412	DSSS	0.0279	0.0283
	6	2437		0.0266	
	11	2462		0.0252	
802.11g (6Mbps)	1	2412	OFDM	0.0108	0.0112
	6	2437		0.0110	
	11	2462		0.0104	
802.11n (MCS0)	1	2412	OFDM	0.0111	0.0112
	6	2437		0.0960	
	11	2462		0.0103	

Assessments at the Body with all offered Body worn

DUT assessment with WLAN internal antenna, all offered batteries without any cable accessory attachment against phantom with the offered body worn. Refer to Table 41 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
Internal WLAN Antenna	PMNN4485A	PMLN7901A	None	2412	0.0279	0.09	0.00001	0.00001	FD-AB-180301-04
	NNTN8921A	PMLN7901A	None	2412	0.0267	0.36	0.000006	0.00001	FD-AB-180301-07
	NNTN8930A	PMLN7901A	None	2412	0.0276	0.23	0.003170	0.00325	FD-AB-180301-09
	PMNN4486A	PMLN7901A	None	2412	0.0266	-0.28	0.002130	0.00242	FD-AB-180301-10
	PMNN4487A	PMLN7901A	None	2412	0.0267	-0.95	0.000056	0.00007	FD-AB-180301-11
	PMNN4494A	PMLN7901A	None	2412	0.0280	-0.81	0.000001	0.000001	ZR(ZZ)-AB-180301-12
	PMNN4547A	PMLN7901A	None	2412	0.0266	-0.31	0.003020	**0.0035**	ZR(ZZ)-AB-180302-02#

Random drifts are due to low SAR values near or below the system noise threshold.

13.8 LMR assessments at the Face for 150.8-173.4 MHz band

Battery PMNN4494A was selected as default battery for assessment at the Face because it is the highest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (150.8 - 173.4 MHz) which are listed in Table 43. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 43

Test Freq (MHz)	PMNN4494A
	Power (W)
150.800	6.45
156.450	6.47
162.100	6.46
167.750	6.50
173.400	6.54

DUT assessment with offered antennas, 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 43 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ front	None	150.800					
				156.450					
				162.100					
				167.750					
				173.400	6.60	-0.93	0.68	0.42	ZR(AN)-FACE-171121-11
Assessment of Additional Batteries									
KT000026A01	NNTN8921A	None; Radio @ front	None	173.400	6.47	-0.68	0.58	0.35	ZR(AN)-FACE-171121-12
	NNTN8930A				6.30	-0.94	0.64	0.42	ZR(AN)-FACE-171121-13
	PMNN4485A				6.60	-1.03	0.77	**0.49**	ZR(AN)-FACE-171121-14
	PMNN4486A				6.60	-0.98	0.78	0.49	ZR(AN)-FACE-171121-15
	PMNN4487A				6.60	-0.84	0.64	0.39	ZR(AN)-FACE-171121-16
	PMNN4547A				6.60	-0.90	0.74	0.46	ZR(AN)-FACE-171121-17

DUT assessment with offered antennas, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 43 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ back	None	150.800					
				156.450					
				162.100					
				167.750					
				173.400	6.60	-0.88	0.72	0.44	ZR(AN)-FACE-171121-18
Assessment of Additional Batteries									
KT000026A01	NNTN8921A	None; Radio @ back	None	173.400	6.39	-0.67	0.65	0.39	ZR(AN)-FACE-171121-19
	NNTN8930A				6.25	-0.88	0.68	0.44	AZ-FACE-171121-20
	PMNN4485A				6.42	-0.42	1.15	**0.65**	FD-FACE-180207-13
	PMNN4486A				6.55	-0.80	0.86	0.52	AZ-FACE-171121-22
	PMNN4487A				6.53	-0.72	0.73	0.43	AZ-FACE-171121-23
	PMNN4547A				6.47	-0.81	0.79	0.48	AZ-FACE-171121-24

13.9 LMR assessments at the Face for 406.1-470 MHz band

Battery PMNN4494A was selected as default battery for assessment at the Face because it is the highest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (406.1 - 470 MHz) which are listed in Table 46. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 46

Test Freq (MHz)	PMNN4494A
	Power (W)
406.125	5.49
422.100	5.50
438.100	5.52
454.000	5.49
470.000	5.52

DUT assessment with offered antennas, 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 46 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ front	None	406.125					
				422.100					
				438.100	5.58	0.29	2.29	1.17	ZR-FACE-171116-01#
				454.000					
				470.000					
PMAE4065A	PMNN4494A	None; Radio @ front	None	406.125					
				422.100					
				438.100	5.56	-1.00	2.30	1.48	ZR-FACE-171116-02#
				454.000					
				470.000					
PMAS4001A	PMNN4494A	None; Radio @ front	None	406.125					
				422.100					
				438.100	5.56	-1.05	2.15	1.40	ZR-FACE-171116-03#
				454.000					
				470.000					
Assessment of Additional Batteries									
PMAE4065A	NNTN8921A	None; Radio @ front	None	438.100	5.47	-0.48	3.43	2.00	ZR-FACE-171116-04#
	NNTN8930A				5.45	-0.44	4.72	2.73	ZR-FACE-171116-05#
	PMNN4485A				5.59	-0.28	5.16	**2.81**	ZR-FACE-171116-06#
	PMNN4486A				5.59	-0.25	5.12	2.77	ZR-FACE-171116-07#
	PMNN4487A				5.58	0.36	3.00	1.53	ZR-FACE-171116-08#
	PMNN4547A				5.59	-0.27	5.06	2.75	ZR-FACE-171116-09#

DUT assessment with offered antennas, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 46 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ back	None	406.125					
				422.100					
				438.100	5.62	0.37	2.84	1.44	FD-FACE-171116-10#
				454.000					
				470.000					
PMAE4065A	PMNN4494A	None; Radio @ back	None	406.125					
				422.100					
				438.100	5.62	-0.56	2.85	1.64	FD-FACE-171116-11#
				454.000					
				470.000					
PMAS4001A	PMNN4494A	None; Radio @ back	None	406.125					
				422.100					
				438.100	5.61	-0.07	4.54	2.34	AZ-FACE-171116-12#
				454.000					
				470.000					
Assessment of Additional Batteries									
PMAS4001A	NNTN8921A	None; Radio @ back	None	438.100	5.56	-0.46	3.00	1.71	AZ-FACE-171116-13#
	NNTN8930A				5.45	-0.33	4.05	2.29	ZR(AN)-FACE-171116-15
	PMNN4485A				5.60	-0.18	5.08	**2.69**	ZR(AN)-FACE-171116-16
	PMNN4486A				5.60	-0.11	4.24	2.21	ZR(AN)-FACE-171116-17
	PMNN4487A				5.59	-0.01	2.54	1.30	ZR(AN)-FACE-171117-01#
	PMNN4547A				5.57	-0.10	3.95	2.07	ZR(AN)-FACE-171117-02#

13.10 LMR assessments at the Face for 450-512 MHz band

Battery PMNN4494A was selected as default battery for assessment at the Face because it is the highest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (450 -512 MHz) which are listed in Table 49. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 49

Test Freq (MHz)	PMNN4494A
	Power (W)
450.000	5.50
465.500	5.50
481.000	5.47
496.500	5.46
512.000	5.48

DUT assessment with offered antennas, 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 49 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ front	None	450.000	5.58	0.09	3.50	1.79	ZR(AN)-FACE-171117-03#
				465.500					
				481.000					
				496.500					
				512.000					
PMAE4065A	PMNN4494A	None; Radio @ front	None	450.000	5.59	1.00	2.40	1.22	ZR(AN)-FACE-171117-04#
				465.500					
				481.000					
				496.500					
				512.000					
PMAS4001A	PMNN4494A	None; Radio @ front	None	450.000	5.58	-0.28	2.79	1.52	ZR(AN)-FACE-171117-05#
				465.500					
				481.000					
				496.500					
				512.000					
Assessment of Additional Batteries									
KT000026A01	NNTN8921A	None; Radio @ front	None	450.000	5.58	-0.67	4.29	2.56	AZ-FACE-171117-06#
	NNTN8930A				5.36	-0.66	5.83	**3.61**	AZ-FACE-171117-07#
	PMNN4485A				5.60	-0.35	6.27	3.46	AZ-FACE-171117-08#
	PMNN4486A				5.59	-0.30	6.36	3.47	AZ-FACE-171117-09#
	PMNN4487A				5.57	0.10	3.62	1.85	AZ-FACE-171117-10#
	PMNN4547A				5.55	-0.38	6.32	3.54	AZ-FACE-171117-11#

DUT assessment with offered antennas, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 49 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ back	None	450.000	5.55	0.10	3.33	1.71	AZ-FACE-171117-12#
				465.500					
				481.000					
				496.500					
				512.000					
PMAE4065A	PMNN4494A	None; Radio @ back	None	450.000	5.56	-0.14	2.22	1.18	AZ-FACE-171117-13#
				465.500					
				481.000					
				496.500					
				512.000					
PMAS4001A	PMNN4494A	None; Radio @ back	None	450.000	5.55	-0.27	2.92	1.60	AZ-FACE-171117-14#
				465.500					
				481.000					
				496.500					
				512.000					
Assessment of Additional Batteries									
KT000026A01	NNTN8921A	None; Radio @ back	None	450.000	5.42	-0.44	4.21	2.45	ZR(AN)-FACE-171117-16
	NNTN8930A				5.37	-0.68	5.47	3.40	ZR(AN)-FACE-171117-17
	PMNN4485A				5.58	-0.26	6.59	**3.57**	ZR(AN)-FACE-171118-01#
	PMNN4486A				5.59	-0.23	5.80	3.12	ZR(AN)-FACE-171118-02#
	PMNN4487A				5.57	-0.05	3.80	1.97	ZR(AN)-FACE-171118-04#
	PMNN4547A				5.57	-0.24	5.61	3.03	ZR(AN)-FACE-171118-05#

13.11 LMR assessments at the Face for 764-775 MHz band

Battery PMNN4494A was selected as default battery for assessment at the Face because it is the highest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (764 -775 MHz) which are listed in Table 52. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 52

Test Freq (MHz)	PMNN4494A
	Power (W)
764.0125	2.96
770.0000	2.96
774.9875	2.96

DUT assessment with offered antennas, 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 52 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ front	None	764.0125	2.98	-0.36	1.78	0.97	ZR-FACE-171204-20
				770.0000					
				774.9875					
NAR6595A	PMNN4494A	None; Radio @ front	None	764.0125	2.93	-0.17	2.07	1.10	ZR-FACE-171205-01#
				770.0000					
				774.9875					
PMAF4040A	PMNN4494A	None; Radio @ front	None	764.0125	2.95	-0.11	1.98	1.03	ZR-FACE-171205-02#
				770.0000					
				774.9875					
PMAS4001A	PMNN4494A	None; Radio @ front	None	764.0125	2.96	-0.30	1.72	0.93	ZR-FACE-171205-03#
				770.0000					
				774.9875					
Assessment of Additional Batteries									
NAR6595A	NNTN8921A	None; Radio @ front	None	764.0125	2.93	-0.10	2.27	1.19	ZR-FACE-171205-04#
	NNTN8930A				2.95	-0.30	3.65	1.98	ZR-FACE-171205-05#
	PMNN4485A				2.95	-0.38	4.21	**2.33**	ZR-FACE-171205-06#
	PMNN4486A				2.97	-0.29	3.58	1.93	AZ-FACE-171218-09
	PMNN4487A				2.99	-0.12	2.03	1.04	AZ-FACE-171218-05
	PMNN4547A				2.97	-0.30	3.62	1.95	AZ-FACE-171218-06

DUT assessment with offered antennas, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 52 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ back	None	764.0125	2.98	-0.28	2.02	1.08	AZ-FACE-171218-08
				770.0000					
				774.9875					
NAR6595A	PMNN4494A	None; Radio @ back	None	764.0125	2.97	-0.08	2.44	1.25	ZR(AN)-FACE-171218-10
				770.0000					
				774.9875					
PMAF4040A	PMNN4494A	None; Radio @ back	None	764.0125	2.98	-0.06	1.96	1.00	ZR(AN)-FACE-171218-11
				770.0000					
				774.9875					
PMAS4001A	PMNN4494A	None; Radio @ back	None	764.0125	2.97	-0.16	1.42	0.74	ZR(AN)-FACE-171218-12
				770.0000					
				774.9875					
Assessment of Additional Batteries									
NAR6595A	NNTN8921A	None; Radio @ back	None	764.0125	2.97	-0.08	2.61	1.34	ZR(AN)-FACE-171218-13
	NNTN8930A				2.98	-0.08	3.33	1.70	ZR(AN)-FACE-171218-14
	PMNN4485A				2.96	-0.08	4.36	**2.24**	ZR(AN)-FACE-171219-01#
	PMNN4486A				2.97	-0.06	3.66	1.87	ZR(AN)-FACE-171219-02#
	PMNN4487A				2.98	-0.09	2.38	1.22	ZR(AN)-FACE-171219-03#
	PMNN4547A				2.97	-0.04	3.40	1.73	ZR(AN)-FACE-171219-04#

13.12 LMR assessments at the Face for 794-824 MHz band

Battery PMNN4494A was selected as default battery for assessment at the Face because it is the highest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (794 -824 MHz) which are listed in Table 55. The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 55

Test Freq (MHz)	PMNN4494A
	Power (W)
794.0125	2.97
808.5000	3.50
823.9875	3.52

DUT assessment with offered antennas, 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 55 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

Table 56

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#
KT000026A01	PMNN4494A	None; Radio @ front	None	794.0125					
				808.5000					
				823.9875	3.53	-0.38	2.28	1.27	AZ-FACE-171213-16
NAR6595A	PMNN4494A	None; Radio @ front	None	794.0125					
				808.5000					
				823.9875	3.53	-0.40	2.66	1.49	AZ-FACE-171214-01#
PMAF4040A	PMNN4494A	None; Radio @ front	None	794.0125					
				808.5000					
				823.9875	3.54	-0.30	3.21	1.75	AZ-FACE-171214-02#
PMAS4001A	PMNN4494A	None; Radio @ front	None	794.0125					
				808.5000					
				823.9875	3.54	-0.18	2.53	1.34	AZ-FACE-171214-03#
Assessment of Additional Batteries									
PMAF4040A	NNTN8921A	None; Radio @ front	None	823.9875	3.54	-0.27	3.30	1.79	AZ-FACE-171214-04#
	NNTN8930A				3.54	-0.38	3.54	1.96	AZ-FACE-171214-05#
	PMNN4485A				3.55	-0.34	3.73	**2.05**	AZ-FACE-171214-06#
	PMNN4486A				3.56	-0.36	3.55	1.95	AZ-FACE-171214-07#
	PMNN4487A				3.54	-0.29	3.48	1.89	AZ-FACE-171214-08#
	PMNN4547A				3.54	-0.24	3.26	1.75	ZR(AN)-FACE-171214-09#

DUT assessment with offered antennas, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 55 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ back	None	794.0125					
				808.5000					
				823.9875	3.55	-0.21	2.54	1.35	ZR(AN)-FACE-171214-10#
NAR6595A	PMNN4494A	None; Radio @ back	None	794.0125					
				808.5000					
				823.9875	3.55	-0.25	2.65	1.42	ZR(AN)-FACE-171214-11#
PMAF4040A	PMNN4494A	None; Radio @ back	None	794.0125					
				808.5000					
				823.9875	3.53	-0.21	3.06	1.64	ZR(AN)-FACE-171214-12#
PMAS4001A	PMNN4494A	None; Radio @ back	None	794.0125					
				808.5000					
				823.9875	3.55	-0.29	1.82	0.99	ZR(AN)-FACE-171214-14#
Assessment of Additional Batteries									
PMAF4040A	NNTN8921A	None; Radio @ back	None	823.9875	3.54	-0.33	3.19	1.75	ZR(AN)-FACE-171214-15#
	NNTN8930A				3.52	-0.38	4.17	2.33	ZR(AN)-FACE-171214-16#
	PMNN4485A				3.53	-0.20	5.02	**2.68**	ZR(AN)-FACE-171221-05
	PMNN4486A				3.55	-0.41	3.91	2.18	AZ-FACE-171215-02#
	PMNN4487A				3.55	-0.32	3.36	1.83	AZ-FACE-171215-03#
	PMNN4547A				3.55	-0.28	3.34	1.81	AZ-FACE-171215-04#

13.13 LMR assessments at the Face for 851-870 MHz band

Battery PMNN4494A was selected as default battery for assessment at the Face because it is the highest battery (refer to Exhibit 7b for battery illustration). The default battery was used during conducted power measurement for all test channels within FCC allocated frequency range (851 -870 MHz) which are listed in Table 58 The channel with highest conducted power will be identified as default channel per KDB 643646 (SAR Test for PTT Radios).

Table 58

Test Freq (MHz)	PMNN4494A
	Power (W)
851.0125	3.54
860.5000	3.54
868.9875	3.55

DUT assessment with offered antennas, 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 58 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
KT000026A01	PMNN4494A	None; Radio @ front	None	851.0125					
				860.5000					
				868.9875	3.56	-0.29	2.65	1.43	AZ-FACE-171215-05#
NAR6595A	PMNN4494A	None; Radio @ front	None	851.0125					
				860.5000					
				868.9875	3.55	-0.29	2.61	1.41	AZ-FACE-171215-06#
PMAF4040A	PMNN4494A	None; Radio @ front	None	851.0125					
				860.5000					
				868.9875	3.56	-0.30	3.58	**1.94**	AZ-FACE-171215-07#
PMAS4001A	PMNN4494A	None; Radio @ front	None	851.0125					
				860.5000					
				868.9875	3.56	-0.26	3.19	1.71	ZR(AN)-FACE-171215-08#
Assessment of Additional Batteries									
PMAF4040A	NNTN8921A	None; Radio @ front	None	868.9875	3.57	-0.22	2.95	1.56	ZR(AN)-FACE-171215-09#
	NNTN8930A				3.57	-0.25	2.79	1.49	ZR(AN)-FACE-171215-10#
	PMNN4485A				3.57	-0.20	3.06	1.62	ZR(AN)-FACE-171215-11#
	PMNN4486A				3.55	-0.20	2.88	1.53	ZR(AN)-FACE-171215-12#
	PMNN4487A				3.56	-0.20	3.01	1.59	ZR(AN)-FACE-171215-13#
	PMNN4547A				3.55	-0.30	2.99	1.62	ZR(AN)-FACE-171215-14#

DUT assessment with offered antennas, default battery with back of DUT positioned 2.5cm facing phantom 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 E.

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#
KT000026A01	PMNN4494A	None; Radio @ back	None	851.0125					
				860.5000					
				868.9875	3.56	-0.46	1.40	0.79	AZ-FACE-171215-16#
NAR6595A	PMNN4494A	None; Radio @ back	None	851.0125					
				860.5000					
				868.9875	3.56	-0.34	2.21	1.21	AZ-FACE-171215-17#
PMAF4040A	PMNN4494A	None; Radio @ back	None	851.0125					
				860.5000					
				868.9875	3.56	-0.24	2.84	1.52	AZ-FACE-171215-20
PMAS4001A	PMNN4494A	None; Radio @ back	None	851.0125					
				860.5000					
				868.9875	3.55	-0.15	2.23	1.17	AZ-FACE-171216-01#
Assessment of Additional Batteries									
PMAF4040A	NNTN8921A	None; Radio @ back	None	868.9875	3.57	-0.16	3.54	1.85	AZ-FACE-171216-02#
	NNTN8930A				3.56	-0.20	3.36	1.78	AZ-FACE-171216-03#
	PMNN4485A				3.58	-0.21	4.19	**2.21**	AZ-FACE-171216-04#
	PMNN4486A				3.57	-0.17	3.17	1.66	AZ-FACE-171216-05#
	PMNN4487A				3.57	-0.11	3.95	2.04	AZ-FACE-171216-06#
	PMNN4547A				3.58	-0.11	2.85	1.47	AZ-FACE-171216-07#

13.14 WLAN assessments at the Face for 802.11b/g/n (2.412 – 2.462 GHz)

The Table below represent the output power measurements for WLAN 2.4GHz 802.11b/g/n for assessments at the Face using battery PMNN4494A because it has the highest capacity (refer to Exhibit 7B for battery illustration). These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227 D01 SAR Measurement Procedures for 802.11a/b/g/ Transmitters.

The battery was used during conducted power measurements for all test channels within FCC allocated frequency range (2.412 – 2.462 GHz) which are listed in Table 61. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios). SAR plots of the highest results per Table (bolded) are presented in Appendix E.

SAR is not required for 802.11 g/n when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2W/kg.

In some cases the initial power listed herein may exceed the reported maximum power due to software step size tuning limitations. However, the initial powers measured are not greater than 5% of the reported maximum power.

Table 61

Mode	Channel #	Channel Frequency	Modulation	Battery: PMNN4494A	Antenna Max Power [mW]
				Antenna port[mW]	
802.11b (1Mbps)	1	2412	DSSS	0.0280	0.0283
	6	2437		0.0267	
	11	2462		0.0263	
802.11g (6Mbps)	1	2412	OFDM	0.0112	0.0112
	6	2437		0.0100	
	11	2462		0.0111	
802.11n (MCS0)	1	2412	OFDM	0.0112	0.0112
	6	2437		0.0100	
	11	2462		0.0111	

DUT assessment with WLAN internal antenna using all offered batteries with front and back of the DUT 2.5 cm from the phantom. Refer to Table 61 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

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#
Internal WLAN Antenna	PMNN4494A	None; Radio @ front	None	2412	0.028	-0.43	0.000004	0.000004	ZR(ZZ)-FACE-180305-02
	PMNN4494A	None; Radio @ back	None	2412	0.028	-0.57	0.070	0.081	ZR(ZZ)-FACE-180305-03
Assessment of Additional Batteries									
Internal WLAN Antenna	NNTN8921A	None; Radio @ back	None	2412	0.0267	-0.38	0.087	0.100	AZ(LOH)-FACE-180305-04
	NNTN8930A	None; Radio @ back	None	2412	0.0276	-0.66	0.081	0.097	AZ(LOH)-FACE-180305-05
	PMNN4485A	None; Radio @ back	None	2412	0.0279	-0.70	0.087	**0.104**	AZ(LOH)-FACE-180305-06
	PMNN4486A	None; Radio @ back	None	2412	0.0266	-0.10	0.083	0.090	AZ(LOH)-FACE-180306-01#
	PMNN4487A	None; Radio @ back	None	2412	0.0267	-0.12	0.079	0.086	AZ(LOH)-FACE-180306-02#
	PMNN4547A	None; Radio @ back	None	2412	0.0266	-0.85	0.061	0.079	AZ(LOH)-FACE-180306-04#

Random drifts are due to low SAR values near or below the system noise threshold.

13.15 Assessment for ISED, Canada

Based on the assessment results per KDB643646, additional tests were required for ISED Canada frequency range (138-174 MHz). The overall highest test configuration from 150.8-173.4 MHz band was repeated with test frequencies 139.7 MHz, 143.4 MHz and 147.1 MHz. No additional tests were required for ISED Canada frequency ranges (406.1-430 MHz, 450-470 MHz, 764-775 MHz, 794-824 MHz, and 851-869 MHz) as testing performed above are in compliance with ISED Canada frequency range.

Table 63

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#
Body (VHF)									
KT000026A01	PMNN4485A	PMLN7901A	BT(None)	139.700	6.58	-0.69	2.35	**1.38**	AZ-AB-171121-03#
				143.400	6.55	-0.28	1.57	0.84	AZ-AB-171121-05#
				147.100	6.55	-0.24	0.92	0.49	AZ-AB-171121-06#
Face (VHF)									
KT000026A01	PMNN4485A	None; Radio @ front	NONE	139.700	6.60	-0.64	1.60	0.93	AZ-FACE-171122-08#
				143.400	6.60	-0.13	1.55	0.80	AZ-FACE-171122-07#
				147.100	6.57	-0.10	1.05	0.54	AZ-FACE-171122-06#
KT000026A01	PMNN4485A	None; Radio @ back	NONE	139.700	6.60	-0.65	2.00	**1.16**	AZ-FACE-171122-02#
				143.400	6.60	-0.07	1.70	0.86	AZ-FACE-171122-04#
				147.100	6.59	-0.16	1.25	0.65	AZ-FACE-171122-05#

As per ISED Notice 2016-DRS001, additional tests were required for the low, mid and high frequency channels for the configuration with the highest SAR value. The SAR results are in Tables below. SAR plot of the highest results per Tables (bolded) are presented in Appendix E.

Table 64

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#
Body (VHF)									
KT000026A01	PMNN4485A	PMLN7901A	BT(None)	139.700	6.58	-0.69	2.35	**1.38**	AZ-AB-171121-03#
				150.800	6.47	-0.09	1.37	0.71	ZR(AN)-AB-171122-16
				173.400	6.60	-0.98	0.68	0.43	AZ-AB-171121-01#
Face (VHF)									
KT000026A01	PMNN4485A	None; Radio @ back	NONE	139.700	6.60	-0.65	2.00	**1.16**	AZ-FACE-171122-02#
				150.800	6.28	-0.42	1.14	0.66	ZR(ZZ)-FACE-180207-09
				173.400	6.42	-0.42	1.15	0.65	FD-FACE-180207-13

Table 65

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#
Body (UHF 1)									
KT000026A01	PMNN4547A	PMLN7901A	BT(None)	406.125	5.52	-0.14	4.78	2.55	ZR-AB-180211-12
				422.100	5.50	-0.27	6.79	3.74	FD-AB-180328-03#
				470.000	5.52	-0.80	6.85	**4.25**	ZR-AB-180211-13
Face (UHF 1)									
PMAE4065A	PMNN4485A	None; Radio @ front	NONE	406.125	5.54	-0.37	6.14	**3.44**	ZR(ZZ)-FACE-180209-10
				422.100	5.52	-0.43	5.73	3.27	FD-FACE-180328-08
				470.000	5.56	-0.31	3.83	2.11	FD-FACE-180209-12

Table 66

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#
Body (UHF 2)									
KT000026A01	PMNN4547A	PMLN7901A	BT(None)	450.000	5.50	-0.29	8.52	**4.72**	AZ-AB-171115-09#
				465.500	5.43	-0.82	7.10	4.50	FD-AB-180328-01#
				470.000	5.47	-0.87	6.51	4.14	FD-AB-180328-02#
Face (UHF 2)									
KT000026A01	NNTN8930A	None; Radio @ front	NONE	450.000	5.36	-0.66	5.83	**3.61**	AZ-FACE-171117-07#
				465.500	5.20	-0.85	4.15	2.77	FD-FACE-180328-06
				470.000	5.16	-1.06	3.46	2.44	FD-FACE-180328-07

Table 67

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#
Body (7/800 MHz band)									
NAR6595A	PMNN4485A	PMLN7901A	BT(None)	764.0125	2.97	-0.05	7.32	3.73	ZR(AN)-AB-180205-03
				770.0000	2.98	-0.29	7.09	**3.80**	ZR(AN)-AB-180205-04
				774.9875	2.98	-0.31	6.75	3.64	ZR(AN)-AB-180205-05
NAR6595A	NNTN8930A	PMLN7901A	BT(None)	794.0125	2.91	-0.31	5.41	2.99	ZR(AN)-AB-180205-06
				808.5000	3.57	-0.45	6.27	3.51	ZR(AN)-AB-180205-07
				823.9875	3.55	-0.48	6.37	3.61	AZ-AB-171123-28
NAR6595A	NNTN8930A	PMLN7901A	BT(None)	851.0125	3.57	-0.62	5.24	3.05	ZR(AN)-AB-171124-12
				860.5000	3.58	-0.54	4.78	2.72	ZR(AN)-AB-180205-08
				868.9875	3.56	-0.54	4.39	2.51	ZR(AN)-AB-180205-09
Face (7/800 MHz band)									
NAR6595A	PMNN4485A	None; Radio @ front	NONE	764.0125	2.95	-0.38	4.21	2.33	ZR-FACE-171205-06#
				770.0000	2.96	-0.32	4.02	2.19	FD-FACE-180313-03
				774.9875	2.96	-0.33	3.91	2.13	FD-FACE-180313-04
PMAF4040A	PMNN4485A	None; Radio @ back	NONE	794.0125	2.97	-0.20	3.36	1.77	ZR(ZZ)-FACE-180313-05
				808.5000	3.52	-0.35	4.21	2.33	ZR(ZZ)-FACE-180313-06
				823.9875	3.53	-0.20	5.02	**2.68**	ZR(AN)-FACE-171221-05

Continued Table 67

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#
Face (7/800 MHz band)									
PMAF4040A	PMNN4485A	None; Radio @ back	NONE	851.0125	3.56	-0.38	4.26	2.35	ZR(ZZ)-FACE-180313-07
				860.5000	3.55	-0.31	3.87	2.11	ZR(ZZ)-FACE-180313-08
				868.9875	3.58	-0.21	4.19	2.21	AZ-FACE-171216-04#

13.16 Assessment outside FCC and ISED frequency ranges

Assessment of outside FCC and ISED frequency range using highest SAR configuration from above. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

Table 68

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#
Body (VHF)									
KT000026A01	PMNN4485A	PMLN7901A	BT(None)	136.000	6.60	-0.37	2.67	**1.45**	AZ-AB-171121-02#
Face (VHF)									
KT000026A01	PMNN4485A	None; Radio @ front	NONE	136.000	6.60	-0.13	1.85	0.95	ZR(AN)-FACE-171122-09#
KT000026A01	PMNN4485A	None; Radio @ back	NONE	136.000	6.27	-0.20	2.33	**1.28**	ZR(AN)-FACE-171122-12

Table 69

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#
Body (UHF 1)									
KT000026A01	PMNN4547A	PMLN7901A	BT(None)	380.000	5.59	-0.09	2.12	1.10	ZR-AB-171115-21
				393.100	5.68	-0.08	3.08	1.57	ZR-AB-171115-22
PMAE4065A	PMNN4547A	PMLN7901A	BT(None)	380.000	5.56	-0.07	5.98	3.12	ZR-AB-171115-23
				393.100	5.60	-0.20	7.07	3.77	AZ-AB-171122-21
PMAS4001A	PMNN4547A	PMLN7901A	BT(None)	380.000	5.53	-0.15	5.62	3.00	AZ-AB-171115-18
				393.100	5.53	-0.28	7.10	**3.90**	AZ-AB-171115-19

Continued Table 69

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#
Face (UHF 1)									
KT000026A01	PMNN4485A	None; Radio @ front	NONE	380.000	5.55	-0.16	1.60	0.85	FD-FACE-180209-14
				393.100	5.58	-0.18	2.28	1.21	FD-FACE-180209-15
PMAE4065A	PMNN4485A	None; Radio @ front	NONE	380.000	5.56	-0.17	5.13	2.73	FD-FACE-180210-02#
				393.100	5.59	-0.24	6.12	3.30	FD-FACE-180210-03#
PMAS4001A	PMNN4485A	None; Radio @ front	NONE	380.000	5.52	-0.10	4.42	2.34	FD-FACE-180211-04
				393.100	5.56	-0.28	6.02	3.29	FD-FACE-180211-05
KT000026A01	PMNN4485A	None; Radio @ back	NONE	380.000	5.55	-0.12	1.94	1.02	FD-FACE-180209-17
				393.100	5.59	-0.05	2.71	1.40	FD-FACE-180210-01#
PMAE4065A	PMNN4485A	None; Radio @ back	NONE	380.000	5.56	-0.17	5.70	3.04	FD-FACE-180210-04#
				393.100	5.55	-0.25	6.79	**3.69**	FD-FACE-180211-02
PMAS4001A	PMNN4485A	None; Radio @ back	NONE	380.000	5.54	-0.00	5.24	2.70	FD-FACE-180211-06
				393.100	5.56	-0.25	6.79	3.69	FD-FACE-180211-07

Table 70

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#
Body (UHF 2)									
KT000026A01	PMNN4547A	PMLN7901A	BT(None)	516.000	5.54	-0.28	3.71	2.04	AZ-AB-171115-10#
				520.000	5.56	-0.54	3.22	1.87	AZ-AB-171115-12
PMAE4065A	PMNN4547A	PMLN7901A	BT(None)	516.000	5.55	-0.60	4.41	**2.60**	AZ-AB-171115-13
				520.000	5.56	-0.84	3.95	2.46	AZ-AB-171115-14
PMAS4001A	PMNN4547A	PMLN7901A	BT(None)	516.000	5.55	-0.72	3.93	2.38	AZ-AB-171115-15
				520.000	5.52	-0.89	3.47	2.20	AZ-AB-171115-16

Continued Table 70

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#
Face (UHF 2)									
KT000026A01	NNTN8930A	None; Radio @ front	NONE	516.000	5.45	-0.56	1.96	1.17	ZR(AN)-FACE-171118-06#
				520.000	5.33	-0.86	1.59	1.04	AZ-FACE-171119-10
PMAE4065A	NNTN8930A	None; Radio @ front	NONE	516.000	5.41	-0.96	2.17	1.43	AZ-FACE-171119-11
				520.000	5.30	-0.85	1.97	1.29	AZ-FACE-171119-12
PMAS4001A	NNTN8930A	None; Radio @ front	NONE	516.000	5.43	-0.82	1.86	1.18	AZ-FACE-171119-13
				520.000	5.25	-0.76	1.67	1.08	AZ-FACE-171119-14
KT000026A01	PMNN4485A	None; Radio @ back	NONE	516.000	5.47	-0.27	2.63	1.46	FD-FACE-180208-14
				520.000	5.47	-0.45	2.31	1.33	FD-FACE-180209-01#
PMAE4065A	PMNN4485A	None; Radio @ back	NONE	516.000	5.50	-0.45	3.40	**1.95**	FD-FACE-180209-02#
				520.000	5.45	-0.78	2.92	1.83	FD-FACE-180209-03#
PMAS4001A	PMNN4485A	None; Radio @ back	NONE	516.000	5.52	-0.59	2.79	1.65	FD-FACE-180209-04#
				520.000	5.51	-0.82	2.64	1.65	ZR-FACE-180209-05#

Table 71

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#
Body (7/800 MHz bands)									
KT000026A01	PMNN4485A	PMLN7901A	BT(None)	762.000	2.99	-0.44	5.40	2.99	ZR(AN)-AB-171220-03
				792.000	2.97	-0.31	4.99	2.70	ZR(AN)-AB-171220-04
NAR6595A	PMNN4485A	PMLN7901A	BT(None)	762.000	2.99	-0.31	7.02	**3.77**	AZ-AB-171220-05
				792.000	2.99	-0.30	6.03	3.23	AZ-AB-171220-06
PMAF4040A	PMNN4485A	PMLN7901A	BT(None)	762.000	2.98	-0.10	1.07	0.55	AZ(LH)-AB-171220-07
				792.000	2.99	-0.07	1.40	0.71	AZ(LH)-AB-171220-08
PMAS4001A	PMNN4485A	PMLN7901A	BT(None)	762.000	2.97	-0.49	1.85	1.04	AZ(LH)-AB-171220-09
				792.000	2.99	-0.66	1.80	1.05	AZ(LH)-AB-171220-10

Continued Table 71

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#
Face (7/800 MHz bands)									
KT000026A01	PMNN4485A	None; Radio @ front	NONE	762.000	2.99	-0.38	3.05	1.66	ZR(AN)-FACE-171219-05#
				792.000	2.99	-0.26	3.02	1.60	AZ-FACE-171219-07
NAR6595A	PMNN4485A	None; Radio @ front	NONE	762.000	2.98	-0.27	4.08	**2.18**	AZ(LH)-FACE-171219-10
				792.000	2.99	-0.23	3.47	1.83	AZ(LH)-FACE-171219-11
PMAF4040A	PMNN4485A	None; Radio @ front	NONE	762.000	2.98	-0.09	1.67	0.86	AZ(LH)-FACE-171219-14
				792.000	2.98	-0.07	2.42	1.23	AZ(LH)-FACE-171219-15
PMAS4001A	PMNN4485A	None; Radio @ front	NONE	762.000	2.97	-0.42	1.92	1.06	ZR(AN)-FACE-171219-18
				792.000	2.98	-0.25	1.67	0.89	ZR(AN)-FACE-171219-19
KT000026A01	PMNN4485A	None; Radio @ back	NONE	762.000	2.99	-0.17	3.50	1.82	AZ(LH)-FACE-171219-08
				792.000	2.99	-0.05	3.23	1.63	AZ(LH)-FACE-171219-09
NAR6595A	PMNN4485A	None; Radio @ back	NONE	762.000	2.99	-0.07	4.23	2.15	AZ(LH)-FACE-171219-12
				792.000	2.99	-0.00	3.32	1.66	AZ(LH)-FACE-171219-13
PMAF4040A	PMNN4485A	None; Radio @ back	NONE	762.000	2.98	-0.13	2.16	1.12	AZ-FACE-171219-16
				792.000	2.99	-0.07	3.38	1.72	AZ-FACE-171219-17
PMAS4001A	PMNN4485A	None; Radio @ back	NONE	762.000	2.97	-0.26	2.14	1.14	ZR(AN)-FACE-171219-21
				792.000	2.99	-0.29	2.33	1.25	ZR(AN)-FACE-171219-20

13.17 Assessment at the Bluetooth band

13.17.1 FCC US Requirement

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

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *[$\sqrt{F_{(GHz)}}$] = 2.4, which is ≤ 3 for 1-g SAR or 7.5 for 10-g extremity

Where:

Max. Power = 7.61 mW (10 mW*76.1% 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.

13.17.2 ISED Canada Requirement

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

Standalone Bluetooth transmitter operates at

Maximum conducted power:
= 10mW * 76.1%
= 7.61mW or 8.81 dBm

Equivalent isotropically radiated power (EIRP):
= Maximum conducted power, dBm + Antenna gain, dBi
= 8.81 dBm + 2.58 dBi
= 11.39 dBm or 13.78 mW

Higher output power level, maximum EIPR power 13.78 mW was below the threshold power level 20 mW. Hence SAR test was not required for Bluetooth band.

13.18 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 D 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 F.

Table 72

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#
KT000026A01	PMNN4547A	PMLN7901A	BT(None)	450.000	5.56	-0.24	8.24	4.46	TLC(AN)-AB-171120-05

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 ≤ 50mm:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *[√F(GHz)/X] = 0.32 W/kg, which is ≤ 0.4 W/kg (1g)

Where:

X = 7.5 for 1g-SAR; 18.75 for 10g
Max. Power = 7.61mW (10mW*76.1% duty cycle)
Min. test separation distance = 5mm for actual test separation < 5mm
F(GHz) = 2.48 GHz

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

15.0 Simultaneous Transmission between LMR, WLAN and BT

This device is use a single transmitter module and antenna for both WLAN and BT. WLAN and BT cannot transmit simultaneously. Simultaneous transmission for BT had been excluded as mentioned in section 14.0. The maximum sourced-based-time-averaged output power for 802.11 b is 28.3mW while BT is 7.61mW. Therefore the measured SAR from 802.11b is used in conjunction with LMR for simultaneous results.

The Table below summarizes the simultaneous transmissions between LMR and WLAN bands.

Table 73

		LMR Bands			
	Freq. (MHz)	VHF	UHF 1	UHF 2	7/800
WLAN Band	2412 - 2462	√	√	√	√

16.0 Results Summary

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

Table 74

Technologies	Frequency band (MHz)	Max Calc at Body (W/kg)	Max Calc at Face (W/kg)
		1g-SAR	1g-SAR
FCC, US			
LMR (VHF)	150.8-173.4	0.71	0.66
LMR (UHF1)	406.1-470	4.54	3.44
LMR (UHF2)	450-512	4.72	3.61
LMR (7/800)	7/800	3.80	2.68
WLAN	2412-2462	0.0035	0.104
ISED, Canada			
LMR (VHF)	138-174	1.38	1.16
LMR (UHF1)	406.1-430 ; 450-470	4.54	3.44
LMR (UHF2)	450-470	4.72	3.61
LMR (7/800)	7/800	3.80	2.68
WLAN	2412-2462	0.0035	0.104
Overall			
LMR (VHF)	136-174	1.45	1.28
LMR (UHF1)	380-470	4.54	3.69
LMR (UHF2)	450-520	4.72	3.61
LMR (7/800)	7/800	3.80	2.68
WLAN	2412-2483.5	0.0035	0.104

The SAR result for simultaneous is included in the following Table:

Table 75

Designator	Frequency band	1g-SAR (W/kg)
Body		
FCC	LMR (VHF) and WLAN band	0.71
	LMR (UHF1) and WLAN band	4.54
	LMR (UHF2) and WLAN band	4.72
	LMR (7/800) and WLAN band	3.80

Continued Table 75

Designator	Frequency band	1g-SAR (W/kg)
Body		
ISED	LMR (VHF) and WLAN band	1.38
	LMR (UHF1) and WLAN band	4.54
	LMR (UHF2) and WLAN band	4.72
	LMR (7/800) and WLAN band	3.80
Overall	LMR (VHF) and WLAN band	1.45
	LMR (UHF1) and WLAN band	4.54
	LMR (UHF2) and WLAN band	4.72
	LMR (7/800) and WLAN band	3.80
Face		
FCC	LMR (VHF) and WLAN band	0.76
	LMR (UHF1) and WLAN band	3.54
	LMR (UHF2) and WLAN band	3.71
	LMR (7/800) and WLAN band	2.78
ISED	LMR (VHF) and WLAN band	1.26
	LMR (UHF1) and WLAN band	3.54
	LMR (UHF2) and WLAN band	3.71
	LMR (7/800) and WLAN band	2.78
Overall	LMR (VHF) and WLAN band	1.38
	LMR (UHF1) and WLAN band	3.79
	LMR (UHF2) and WLAN band	3.71
	LMR (7/800) and WLAN band	2.78

The test results clearly demonstrate compliance with FCC Occupational /Controlled RF Exposure limits of 8.0 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093 and ISED RSS-102 (Issue 5).

17.0 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 76

Run#	Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Adj Calc. 1g-SAR (W/kg)	Ratio	Comments
AZ-AB-171115-09#	KT000026A01	PMNN4547A	PMLN7901A	BT(None)	450.000	4.55	1.05	No additional repeated scans is required due to the Ratio (SAR_{high}/SAR_{low}) < 1.20
TLC(AN)-AB-171120-05						4.35		

18.0 System Uncertainty

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

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

Appendix A
Measurement Uncertainty Budget

Table A.1: Uncertainty Budget for Device Under Test for 100 MHz to 550 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**ci (1 g)**	**ci (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	v_i
Measurement System									
Probe Calibration	E.2.1	6.7	N	1.00	1	1	6.7	6.7	∞
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				12	11	482
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				23	23	

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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) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *ui* – SAR uncertainty

h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

Table A.2: Uncertainty Budget for Device Under Test for 750 MHz to 2600 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
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	6.0	N	1.00	1	1	6.0	6.0	∞
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	419
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22	22	

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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) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *ui* – SAR uncertainty

h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

Table A.3: Uncertainty Budget for System Validation (dipole & flat phantom) for 100 MHz to 550 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
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	6.7	N	1.00	1	1	6.7	6.7	∞
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				10	9	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				19	18	

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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) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *ui* – SAR uncertainty

h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

Table A.4: Uncertainty Budget for System Validation (dipole & flat phantom) for 750 MHz to 2600 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
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	6.0	N	1.00	1	1	6.0	6.0	∞
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)			*k*=2				18	17	

FCD-0558 Uncertainty Budget Rev.8

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) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *ui* – SAR uncertainty

h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

Appendix B
Probe Calibration Certificate

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: EX3-3735_Mar17

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3735

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: March 10, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: S5277 (20x)	05-Apr-16 (No. 217-02293)	Apr-17
Reference Probe ES3DV2	SN: 3013	31-Dec-16 (No. ES3-3013_Dec16)	Dec-17
DAE4	SN: 660	7-Dec-16 (No. DAE4-660_Dec16)	Dec-17
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-16)	In house check: Jun-18
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-16)	In house check: Jun-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Jelon Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 14, 2017

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

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Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell, f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:3735

Manufactured: February 15, 2010
Calibrated: March 10, 2017

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3735

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.37	0.39	0.46	± 10.1 %
DCP (mV)[B]	105.5	101.6	100.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	141.9	±3.0 %
		Y	0.0	0.0	1.0		141.6	
		Z	0.0	0.0	1.0		149.0	

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3735

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	11.79	11.79	11.79	0.00	1.00	± 13.3 %
300	45.3	0.87	11.08	11.08	11.08	0.08	1.30	± 13.3 %
450	43.5	0.87	10.37	10.37	10.37	0.16	1.30	± 13.3 %
750	41.9	0.89	9.82	9.82	9.82	0.45	0.86	± 12.0 %
835	41.5	0.90	9.44	9.44	9.44	0.50	0.80	± 12.0 %
900	41.5	0.97	9.28	9.28	9.28	0.36	1.00	± 12.0 %
1450	40.5	1.20	8.46	8.46	8.46	0.36	0.80	± 12.0 %
1810	40.0	1.40	7.97	7.97	7.97	0.27	1.01	± 12.0 %
1900	40.0	1.40	7.89	7.89	7.89	0.33	0.85	± 12.0 %
2100	39.8	1.49	7.83	7.83	7.83	0.27	0.80	± 12.0 %
2300	39.5	1.67	7.37	7.37	7.37	0.29	0.88	± 12.0 %
2450	39.2	1.80	7.08	7.08	7.08	0.38	0.86	± 12.0 %
2600	39.0	1.96	6.78	6.78	6.78	0.34	0.89	± 12.0 %
4950	36.3	4.40	5.49	5.49	5.49	0.40	1.80	± 13.1 %
5250	35.9	4.71	4.88	4.88	4.88	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.57	4.57	4.57	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.40	4.40	4.40	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.56	4.56	4.56	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:3735

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	11.23	11.23	11.23	0.00	1.00	± 13.3 %
300	58.2	0.92	10.61	10.61	10.61	0.05	1.20	± 13.3 %
450	56.7	0.94	10.56	10.56	10.56	0.07	1.20	± 13.3 %
750	55.5	0.96	9.52	9.52	9.52	0.30	1.00	± 12.0 %
835	55.2	0.97	9.28	9.28	9.28	0.42	0.87	± 12.0 %
900	55.0	1.05	9.19	9.19	9.19	0.44	0.80	± 12.0 %
1450	54.0	1.30	8.07	8.07	8.07	0.34	0.80	± 12.0 %
1810	53.3	1.52	7.88	7.88	7.88	0.36	0.85	± 12.0 %
1900	53.3	1.52	7.76	7.76	7.76	0.30	0.90	± 12.0 %
2100	53.2	1.62	7.73	7.73	7.73	0.40	0.80	± 12.0 %
2300	52.9	1.81	7.32	7.32	7.32	0.42	0.80	± 12.0 %
2450	52.7	1.95	7.24	7.24	7.24	0.41	0.86	± 12.0 %
2600	52.5	2.16	6.90	6.90	6.90	0.36	0.89	± 12.0 %
4950	49.4	5.01	4.51	4.51	4.51	0.40	1.90	± 13.1 %
5250	48.9	5.36	4.35	4.35	4.35	0.40	1.90	± 13.1 %
5500	48.6	5.65	4.00	4.00	4.00	0.40	1.90	± 13.1 %
5600	48.5	5.77	3.75	3.75	3.75	0.50	1.90	± 13.1 %
5750	48.3	5.94	3.83	3.83	3.83	0.50	1.90	± 13.1 %

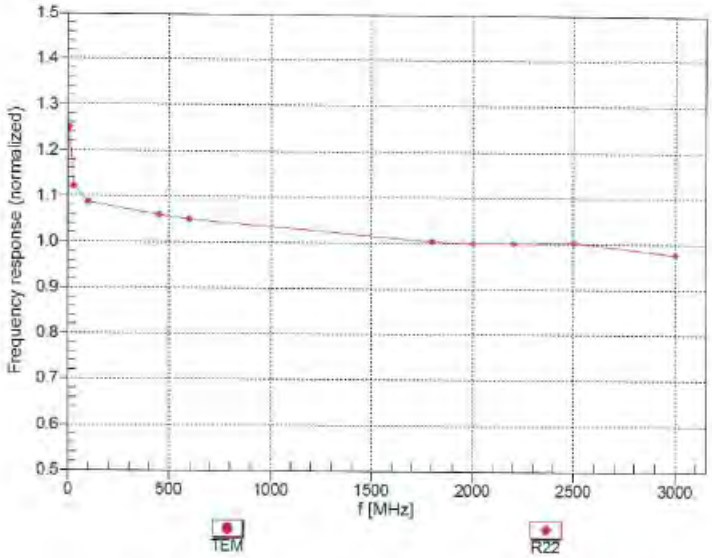
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz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

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

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

EX3DV4- SN:3735 March 10, 2017

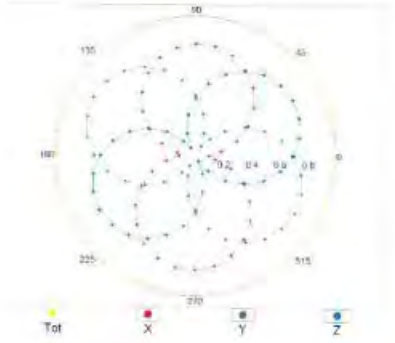
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



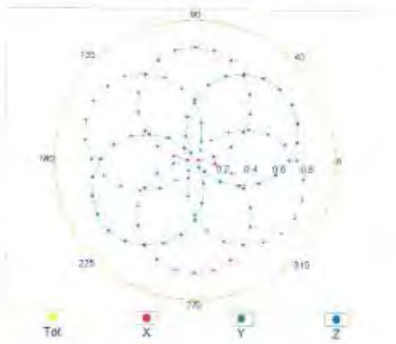
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

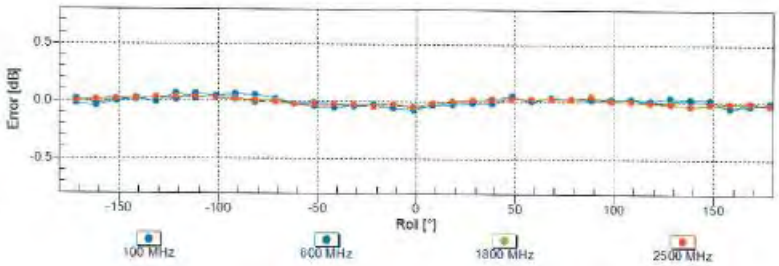
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



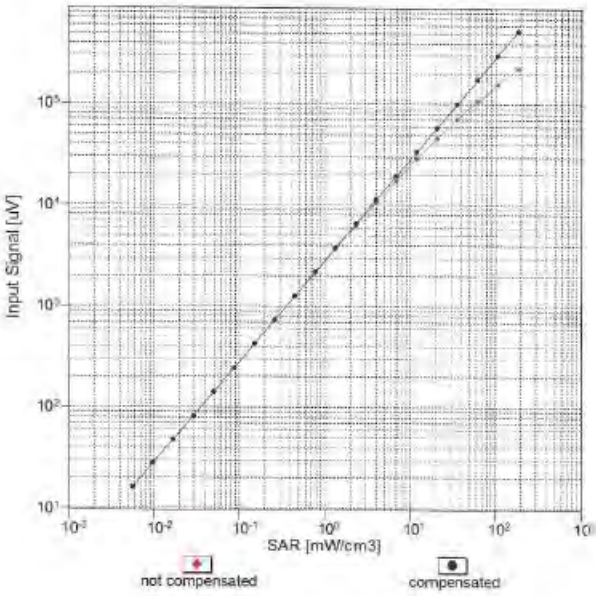
f=1800 MHz,R22

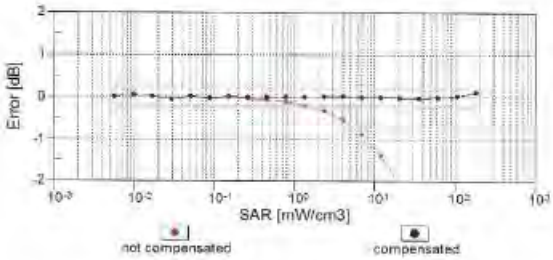




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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



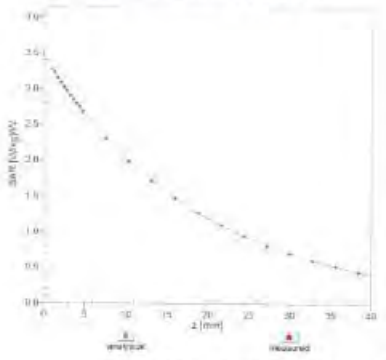


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

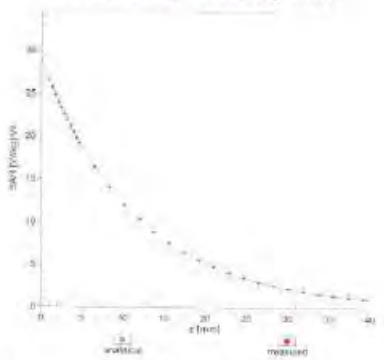
EX3DV4- SN:3735 March 10, 2017

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

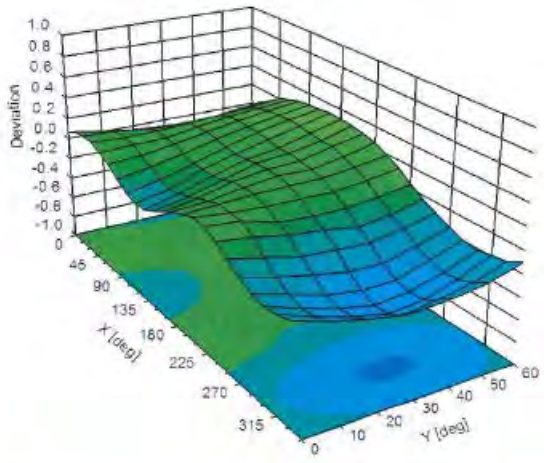


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3735

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-1.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	141.9	±3.0 %
		Y	0.0	0.0	1.0		141.6	
		Z	0.0	0.0	1.0		149.0	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	3.44	68.2	14.9	9.39	118.0	±2.2 %
		Y	3.22	69.4	16.8		85.0	
		Z	12.08	88.1	24.1		147.1	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	4.06	71.2	16.7	9.57	114.5	±2.7 %
		Y	3.01	68.0	16.2		83.3	
		Z	11.22	87.4	24.1		141.6	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	5.62	76.3	17.1	6.56	149.2	±2.2 %
		Y	6.09	79.3	19.0		142.0	
		Z	16.49	90.1	22.6		125.8	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	6.61	75.2	26.4	12.62	77.0	±2.2 %
		Y	5.33	69.5	23.9		56.8	
		Z	7.84	79.0	28.9		89.4	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	7.49	79.8	26.6	9.55	147.0	±2.5 %
		Y	6.75	73.4	23.8		120.4	
		Z	9.68	84.4	28.7		127.8	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	40.65	99.8	23.0	4.80	145.4	±1.7 %
		Y	23.67	96.2	22.9		147.6	
		Z	47.87	100.0	23.5		143.2	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	43.00	100.0	22.3	3.55	130.4	±1.7 %
		Y	38.95	99.6	22.6		133.5	
		Z	50.81	99.8	22.1		126.2	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	7.59	81.3	26.3	7.78	145.1	±2.7 %
		Y	5.99	75.7	23.9		143.3	
		Z	9.66	84.1	27.1		146.1	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	5.02	67.8	19.4	4.57	149.2	±0.9 %
		Y	4.63	66.2	18.6		129.2	
		Z	4.84	66.4	18.5		138.5	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	6.17	75.3	25.9	11.01	118.9	±3.0 %
		Y	4.85	69.1	23.0		86.4	
		Z	9.59	85.3	30.7		147.5	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	6.02	76.9	23.7	6.52	133.6	±2.2 %
		Y	5.32	73.9	22.4		136.6	
		Z	7.69	79.7	24.5		131.6	
10081-CAB	CDMA2000 (1xRTT, RC3)	X	4.24	67.6	19.3	3.97	142.4	±0.7 %
		Y	3.96	66.1	18.4		145.9	
		Z	3.98	65.7	18.0		133.7	

10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	5.59	77.4	18.0	6.56	143.9	±2.5 %
		Y	5.36	77.0	18.0		139.4	
		Z	14.11	87.2	21.4		126.1	
10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	7.91	81.7	27.6	9.55	141.4	±2.2 %
		Y	6.07	75.0	24.6		116.8	
		Z	9.76	84.6	28.7		126.1	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	9.99	68.2	20.8	8.07	124.1	±2.7 %
		Y	10.02	68.1	20.7		128.3	
		Z	10.36	68.9	21.1		144.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	10.14	69.3	21.5	8.10	147.6	±3.0 %
		Y	9.68	67.9	20.6		124.3	
		Z	10.02	68.7	21.1		140.2	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	4.76	69.1	19.8	3.91	148.6	±0.7 %
		Y	4.37	67.2	18.8		127.1	
		Z	4.48	67.1	18.5		141.7	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	4.23	69.8	20.2	3.46	141.9	±0.7 %
		Y	3.74	67.0	18.7		144.4	
		Z	3.66	66.0	17.9		134.6	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	4.06	69.2	19.8	3.39	141.8	±0.7 %
		Y	3.68	67.1	18.7		143.8	
		Z	3.63	66.3	18.0		133.7	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	4.15	69.1	19.8	3.50	140.6	±0.7 %
		Y	3.76	67.0	18.7		142.9	
		Z	3.72	66.3	18.2		133.4	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	7.03	71.7	25.9	12.49	95.3	±2.7 %
		Y	5.88	66.3	22.9		68.8	
		Z	9.34	78.7	29.6		118.5	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	6.00	72.8	20.9	3.76	126.4	±0.7 %
		Y	4.85	68.7	18.9		133.1	
		Z	4.96	68.0	18.5		142.1	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	5.91	72.8	20.9	3.77	127.8	±0.7 %
		Y	4.93	68.9	19.0		130.8	
		Z	4.87	68.0	18.5		141.9	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	6.96	71.2	20.9	5.22	134.2	±0.9 %
		Y	6.38	69.1	19.8		136.9	
		Z	6.47	68.7	19.5		125.4	
10416-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	4.22	76.7	22.6	1.54	149.3	±1.2 %
		Y	3.68	73.6	20.9		128.1	
		Z	2.82	68.3	18.2		138.3	
10417-AAA	IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	10.18	69.2	21.6	8.23	145.8	±3.0 %
		Y	10.09	68.8	21.2		148.6	
		Z	10.04	68.6	21.1		136.8	

10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)	X	10.12	69.4	21.6	8.14	146.6	±2.7 %
		Y	9.97	68.7	21.2		147.5	
		Z	9.96	68.6	21.1		137.7	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)	X	10.24	69.5	21.7	8.19	148.0	±3.0 %
		Y	10.04	68.8	21.2		149.3	
		Z	10.07	68.7	21.2		140.0	
10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	8.54	69.2	20.7	6.55	135.8	±1.9 %
		Y	8.28	68.3	20.1		137.1	
		Z	8.19	67.6	19.7		129.9	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	10.68	69.8	21.8	8.25	136.2	±3.0 %
		Y	10.86	69.4	21.5		138.8	
		Z	10.71	68.6	21.1		133.1	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	5.92	82.8	24.9	1.58	128.2	±0.7 %
		Y	3.52	73.0	20.8		130.5	
		Z	2.89	68.7	18.4		143.9	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	10.26	69.5	21.7	8.23	145.6	±3.0 %
		Y	10.10	68.8	21.2		147.6	
		Z	10.16	68.9	21.3		140.0	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	10.03	68.5	21.2	8.36	122.7	±3.0 %
		Y	10.00	68.2	21.0		124.0	
		Z	10.40	69.1	21.5		142.7	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	10.10	68.5	21.3	8.42	123.6	±2.7 %
		Y	10.05	68.2	21.0		123.9	
		Z	10.48	69.2	21.5		143.3	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	10.58	69.0	21.4	8.45	129.5	±2.7 %
		Y	10.49	68.6	21.2		129.9	
		Z	10.47	68.5	21.1		123.7	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	10.58	69.0	21.4	8.45	129.7	±2.7 %
		Y	10.52	68.7	21.2		132.0	
		Z	10.49	68.5	21.1		124.1	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	11.04	69.5	21.5	8.47	134.3	±2.7 %
		Y	10.75	68.7	21.0		133.9	
		Z	10.88	69.0	21.1		127.7	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	11.10	69.6	21.5	8.55	134.0	±2.7 %
		Y	10.82	68.8	21.1		136.4	
		Z	10.97	69.0	21.2		127.9	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	9.90	68.5	21.2	8.25	122.7	±3.0 %
		Y	9.89	68.3	21.0		124.9	
		Z	10.26	69.1	21.4		142.4	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	6.11	82.4	24.9	1.99	129.0	±0.7 %
		Y	3.48	71.4	20.1		149.7	
		Z	3.49	70.6	19.3		141.5	

10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	8.14	82.6	25.0	1.99	127.7	±0.9 %
		Y	3.59	72.3	20.6		148.0	
		Z	3.56	71.0	19.5		140.0	
10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	10.06	68.6	21.5	8.59	122.5	±3.0 %
		Y	10.34	69.1	21.6		147.4	
		Z	10.50	69.3	21.8		139.6	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	10.61	70.0	22.2	8.60	149.8	±2.7 %
		Y	10.38	69.2	21.7		148.3	
		Z	10.55	69.4	21.8		140.8	
10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	10.11	68.7	21.5	8.59	124.6	±2.7 %
		Y	10.35	69.1	21.6		148.8	
		Z	10.51	69.4	21.8		140.5	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	10.11	68.7	21.5	8.60	123.0	±3.0 %
		Y	10.07	68.4	21.2		123.3	
		Z	10.56	69.5	21.8		141.6	
10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	10.23	68.8	21.6	8.63	125.2	±3.0 %
		Y	10.15	68.4	21.2		124.7	
		Z	10.65	69.4	21.8		142.5	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	10.40	69.0	21.8	8.79	125.2	±2.7 %
		Y	10.34	68.5	21.4		126.6	
		Z	10.85	69.7	22.1		144.2	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	10.88	69.4	21.8	8.79	132.6	±3.0 %
		Y	10.78	69.0	21.5		132.8	
		Z	10.78	68.8	21.5		124.2	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	10.94	69.4	21.9	8.88	131.7	±3.0 %
		Y	10.84	69.0	21.6		132.9	
		Z	10.86	68.9	21.6		124.4	
10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	10.26	68.8	21.6	8.64	125.4	±3.0 %
		Y	10.24	68.5	21.3		126.7	
		Z	10.71	69.6	21.9		144.0	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	10.40	69.0	21.7	8.77	125.8	±3.3 %
		Y	10.36	68.6	21.4		127.2	
		Z	10.87	69.8	22.1		145.4	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	10.90	69.4	21.9	8.82	131.8	±3.0 %
		Y	10.79	68.9	21.5		132.7	
		Z	10.83	68.9	21.5		123.8	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	10.91	69.4	21.9	8.81	132.1	±3.0 %
		Y	10.78	69.0	21.5		133.1	
		Z	10.83	68.9	21.5		124.0	
10628-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	11.37	69.9	21.9	8.83	136.7	±3.0 %
		Y	11.05	69.1	21.4		134.8	
		Z	11.27	69.5	21.6		128.1	

10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	11.44	70.0	22.0	8.88	137.5	±3.0 %
		Y	11.10	69.1	21.5		135.1	
		Z	11.35	69.5	21.7		138.9	
10648-AAA	CDMA2000 (1x Advanced)	X	4.39	70.8	20.9	3.45	148.1	±0.9 %
		Y	3.84	67.8	19.3		148.6	
		Z	3.78	66.9	18.5		139.2	

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

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Accreditation No.: SCS 0108

Client **Motorola MY** Certificate No: **EX3-3612_May17**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3612

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

Calibration date: May 17, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

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

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 18, 2017

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Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:3612

Manufactured: March 23, 2007
Calibrated: May 17, 2017

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3612

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.43	0.48	0.39	± 10.1 %
DCP (mV)[B]	94.2	96.8	97.5	

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	140.4	±2.7 %
		Y	0.0	0.0	1.0		140.7	
		Z	0.0	0.0	1.0		141.7	

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3612

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	10.17	10.17	10.17	0.00	1.00	± 13.3 %
300	45.3	0.87	9.87	9.87	9.87	0.09	1.20	± 13.3 %
450	43.5	0.87	9.25	9.25	9.25	0.16	1.20	± 13.3 %
750	41.9	0.89	8.71	8.71	8.71	0.46	0.93	± 12.0 %
835	41.5	0.90	8.45	8.45	8.45	0.46	0.90	± 12.0 %
900	41.5	0.97	8.27	8.27	8.27	0.48	0.84	± 12.0 %
1450	40.5	1.20	7.78	7.78	7.78	0.39	0.80	± 12.0 %
1810	40.0	1.40	7.18	7.18	7.18	0.33	0.85	± 12.0 %
1900	40.0	1.40	7.16	7.16	7.16	0.25	0.86	± 12.0 %
2100	39.8	1.49	7.17	7.17	7.17	0.33	0.80	± 12.0 %
2300	39.5	1.67	6.88	6.88	6.88	0.32	0.80	± 12.0 %
2450	39.2	1.80	6.59	6.59	6.59	0.35	0.80	± 12.0 %
2600	39.0	1.96	6.49	6.49	6.49	0.37	0.80	± 12.0 %
4950	36.3	4.40	5.12	5.12	5.12	0.35	1.80	± 13.1 %
5250	35.9	4.71	4.76	4.76	4.76	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.56	4.56	4.56	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.36	4.36	4.36	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.85	4.85	4.85	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:3612

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	9.82	9.82	9.82	0.00	1.00	± 13.3 %
300	58.2	0.92	9.51	9.51	9.51	0.05	1.25	± 13.3 %
450	56.7	0.94	9.35	9.35	9.35	0.09	1.25	± 13.3 %
750	55.5	0.96	8.62	8.62	8.62	0.44	0.80	± 12.0 %
835	55.2	0.97	8.41	8.41	8.41	0.52	0.84	± 12.0 %
900	55.0	1.05	8.38	8.38	8.38	0.27	1.11	± 12.0 %
1450	54.0	1.30	7.39	7.39	7.39	0.32	0.80	± 12.0 %
1810	53.3	1.52	7.13	7.13	7.13	0.34	0.94	± 12.0 %
1900	53.3	1.52	7.07	7.07	7.07	0.40	0.80	± 12.0 %
2100	53.2	1.62	7.27	7.27	7.27	0.42	0.80	± 12.0 %
2300	52.9	1.81	6.86	6.86	6.86	0.40	0.80	± 12.0 %
2450	52.7	1.95	6.82	6.82	6.82	0.27	0.92	± 12.0 %
2600	52.5	2.16	6.58	6.58	6.58	0.29	0.90	± 12.0 %
4950	49.4	5.01	4.39	4.39	4.39	0.40	1.90	± 13.1 %
5250	48.9	5.36	4.31	4.31	4.31	0.40	1.90	± 13.1 %
5500	48.6	5.65	3.89	3.89	3.89	0.45	1.90	± 13.1 %
5600	48.5	5.77	3.80	3.80	3.80	0.45	1.90	± 13.1 %
5750	48.3	5.94	4.00	4.00	4.00	0.50	1.90	± 13.1 %

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

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

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

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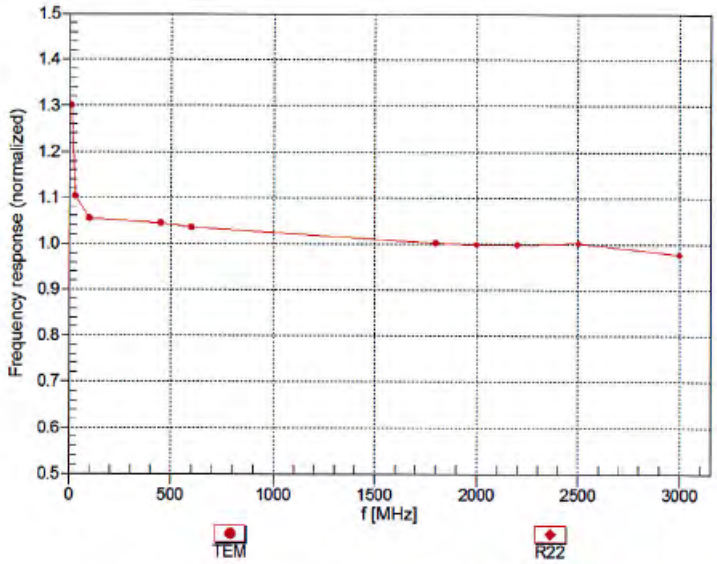
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



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

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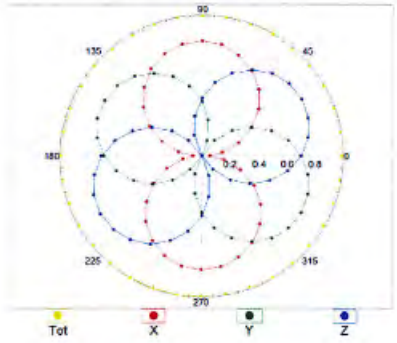
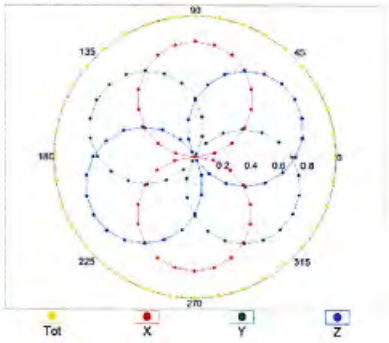
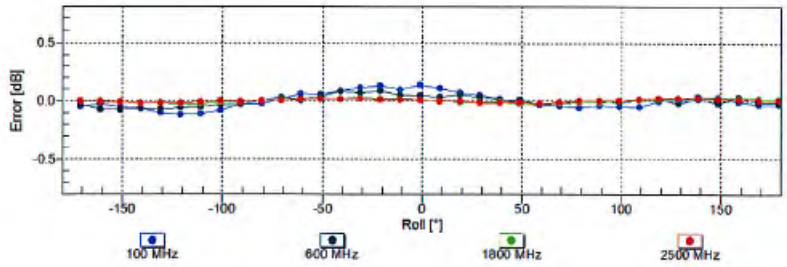
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



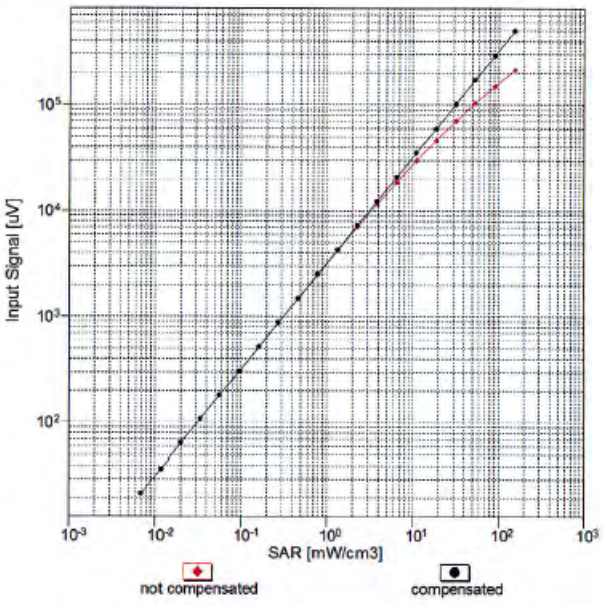
f=1800 MHz,R22

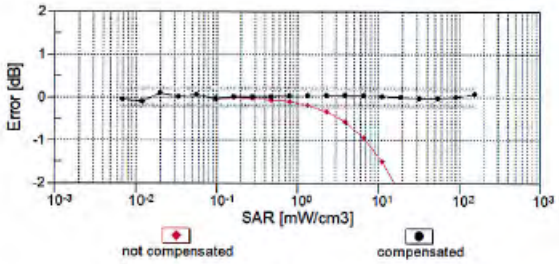




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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





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

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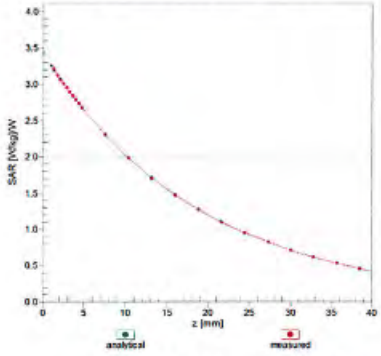
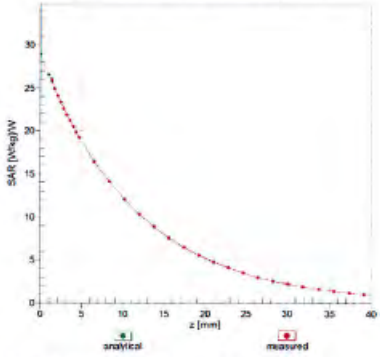
Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

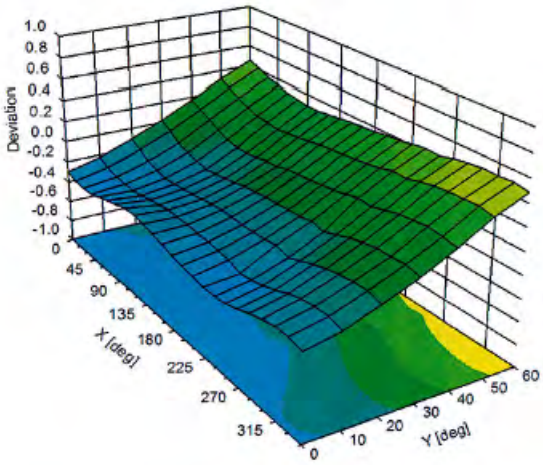


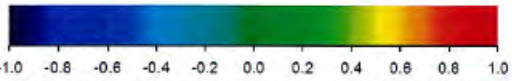
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3612

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	78.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	140.4	±2.7 %
		Y	0.0	0.0	1.0		140.7	
		Z	0.0	0.0	1.0		141.7	
10021-DAC	GSM-FDD (TDMA, GMSK)	X	2.13	66.5	13.8	9.39	117.9	±1.9 %
		Y	1.67	63.5	12.5		76.9	
		Z	2.34	68.1	14.8		107.2	
10023-DAC	GPRS-FDD (TDMA, GMSK, TN 0)	X	2.14	66.8	14.2	9.57	111.5	±3.8 %
		Y	1.63	62.7	12.1		76.2	
		Z	2.63	70.4	16.4		103.6	
10024-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	X	1.99	68.1	13.5	6.56	145.4	±1.7 %
		Y	3.88	78.0	17.9		140.9	
		Z	4.74	79.7	18.3		133.7	
10025-DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	X	5.57	74.0	27.0	12.62	79.2	±1.9 %
		Y	4.98	70.0	24.6		53.4	
		Z	5.49	73.8	27.0		72.1	
10026-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	X	5.37	75.0	25.5	9.55	146.2	±1.7 %
		Y	4.77	71.4	23.6		110.0	
		Z	5.63	76.6	26.4		133.4	
10027-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	X	5.38	81.3	17.6	4.80	147.9	±1.9 %
		Y	23.73	100.0	23.3		131.0	
		Z	24.58	99.7	23.1		133.0	
10028-DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	39.40	99.8	21.2	3.55	136.7	±1.4 %
		Y	31.48	99.6	21.6		141.3	
		Z	28.30	99.9	22.2		145.2	
10029-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	X	5.33	76.0	24.9	7.78	148.8	±1.4 %
		Y	4.63	71.9	22.8		147.6	
		Z	5.44	76.7	25.3		134.9	
10039-CAB	CDMA2000 (1xRTT, RC1)	X	4.85	66.6	18.9	4.57	141.0	±1.2 %
		Y	4.94	67.2	19.4		149.5	
		Z	5.04	68.2	20.1		149.8	
10056-CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	X	4.53	70.5	24.5	11.01	117.8	±1.7 %
		Y	4.00	67.1	22.6		80.0	
		Z	4.65	71.8	25.4		108.8	
10058-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.64	73.1	22.6	6.52	141.0	±1.4 %
		Y	4.57	72.9	22.7		147.2	
		Z	4.81	75.0	24.0		129.0	
10081-CAB	CDMA2000 (1xRTT, RC3)	X	3.96	65.7	18.3	3.97	135.8	±0.9 %
		Y	4.08	66.6	19.0		143.5	
		Z	4.22	67.9	19.8		145.3	
10090-DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	X	2.01	68.4	13.4	6.56	142.9	±2.2 %
		Y	2.59	71.6	15.0		138.5	
		Z	11.30	91.6	22.2		133.5	

10099-DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	X	5.86	77.8	26.9	9.55	141.6	±2.5 %
		Y	5.01	72.9	24.3		106.0	
		Z	6.21	79.8	28.0		149.0	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	10.60	69.2	21.5	8.07	149.0	±3.0 %
		Y	10.31	68.4	21.0		129.5	
		Z	10.46	69.1	21.5		133.8	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	10.22	69.0	21.5	8.10	145.1	±3.0 %
		Y	10.01	68.3	21.0		125.8	
		Z	10.02	68.7	21.4		129.7	
10290-AAB	CDMA2000, RC1, SO55, Full Rate	X	4.45	67.2	18.8	3.91	144.2	±0.9 %
		Y	4.55	67.9	19.5		127.3	
		Z	4.73	69.3	20.4		130.2	
10291-AAB	CDMA2000, RC3, SO55, Full Rate	X	3.70	66.4	18.4	3.46	138.0	±0.7 %
		Y	3.88	67.9	19.6		141.5	
		Z	4.05	69.3	20.4		146.1	
10292-AAB	CDMA2000, RC3, SO32, Full Rate	X	3.62	66.4	18.3	3.39	139.1	±0.7 %
		Y	3.90	68.4	19.8		142.7	
		Z	4.08	70.0	20.7		145.6	
10293-AAB	CDMA2000, RC3, SO3, Full Rate	X	3.72	66.4	18.4	3.50	138.6	±0.7 %
		Y	3.90	67.8	19.6		141.4	
		Z	4.07	69.3	20.4		146.0	
10295-AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	X	5.79	67.9	24.6	12.49	96.8	±1.7 %
		Y	5.20	64.3	22.3		64.1	
		Z	5.69	67.9	24.7		87.8	
10403-AAB	CDMA2000 (1xEV-DO, Rev. 0)	X	4.97	68.6	18.9	3.76	146.2	±0.7 %
		Y	5.26	69.9	19.9		132.8	
		Z	5.62	72.1	20.9		144.9	
10404-AAB	CDMA2000 (1xEV-DO, Rev. A)	X	4.91	68.7	19.0	3.77	146.5	±0.9 %
		Y	5.19	70.0	20.0		130.3	
		Z	5.50	72.0	21.0		143.3	
10406-AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	X	6.36	68.9	19.8	5.22	129.3	±1.2 %
		Y	6.53	69.3	20.1		136.2	
		Z	6.83	71.2	21.2		149.8	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	2.71	67.5	18.2	1.54	144.4	±0.7 %
		Y	3.45	73.1	21.5		128.2	
		Z	3.71	75.0	22.4		141.4	
10417-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	X	10.31	69.0	21.6	8.23	145.7	±3.0 %
		Y	10.10	68.4	21.2		125.0	
		Z	10.29	69.3	21.9		139.9	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	10.22	69.1	21.6	8.14	146.2	±3.0 %
		Y	10.02	68.4	21.2		125.4	
		Z	10.15	69.2	21.7		139.0	

10458-AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	X	8.26	68.0	20.1	6.55	134.0	±1.7 %
		Y	8.55	68.6	20.5		140.6	
		Z	8.23	68.4	20.5		125.9	
10459-AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	X	10.79	68.9	21.5	8.25	137.1	±3.0 %
		Y	11.20	69.7	21.9		143.6	
		Z	10.71	69.2	21.8		127.5	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	2.74	67.8	18.4	1.58	148.0	±0.7 %
		Y	3.62	74.2	22.0		129.4	
		Z	3.89	76.1	22.9		140.5	
10518-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	X	10.45	69.4	21.8	8.23	149.5	±2.5 %
		Y	10.13	68.4	21.2		126.1	
		Z	10.29	69.3	21.8		139.5	
10525-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	X	10.21	68.4	21.3	8.36	126.0	±3.0 %
		Y	10.41	68.7	21.5		129.4	
		Z	10.50	69.4	22.0		142.0	
10526-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	X	10.32	68.5	21.4	8.42	126.6	±3.0 %
		Y	10.47	68.8	21.5		130.1	
		Z	10.61	69.6	22.1		142.2	
10534-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	X	10.83	69.1	21.6	8.45	133.9	±2.7 %
		Y	10.87	69.1	21.6		135.0	
		Z	10.65	68.9	21.6		123.6	
10535-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	X	10.84	69.1	21.6	8.45	134.6	±3.0 %
		Y	10.89	69.1	21.6		135.1	
		Z	10.73	69.1	21.7		125.5	
10544-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	X	11.29	69.6	21.7	8.47	138.9	±3.0 %
		Y	11.10	69.2	21.5		136.9	
		Z	11.14	69.5	21.7		128.7	
10545-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	X	11.46	69.9	21.9	8.55	141.1	±3.0 %
		Y	11.21	69.3	21.6		138.1	
		Z	11.26	69.7	21.9		129.9	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	10.12	68.5	21.3	8.25	127.9	±2.7 %
		Y	10.22	68.6	21.3		127.3	
		Z	10.39	69.5	22.0		142.2	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	2.82	67.6	18.5	1.99	147.5	±0.9 %
		Y	3.44	72.5	21.5		148.6	
		Z	3.68	73.9	21.9		138.7	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	2.93	68.4	18.8	1.99	146.0	±0.7 %
		Y	3.53	73.1	21.7		145.7	
		Z	4.04	76.1	22.9		137.5	
10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	10.18	68.4	21.5	8.59	124.0	±3.0 %
		Y	10.32	68.6	21.6		123.8	
		Z	10.48	69.5	22.2		139.0	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	10.20	68.4	21.5	8.60	123.9	±3.0 %
		Y	10.35	68.7	21.6		123.7	
		Z	10.53	69.6	22.3		140.0	

10583-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	X	10.63	69.6	22.2	8.59	149.6	±2.7 %
		Y	10.33	68.6	21.6		124.0	
		Z	10.48	69.5	22.2		139.5	
10584-AAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	X	10.22	68.5	21.5	8.60	124.2	±3.0 %
		Y	10.35	68.6	21.6		124.1	
		Z	10.52	69.6	22.3		139.8	
10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	10.34	68.5	21.6	8.63	125.6	±3.0 %
		Y	10.51	68.8	21.7		127.7	
		Z	10.66	69.7	22.3		143.1	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	10.51	68.7	21.7	8.79	126.2	±3.0 %
		Y	10.66	68.9	21.8		128.2	
		Z	10.82	69.8	22.5		143.2	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	11.01	69.2	21.9	8.79	133.1	±3.0 %
		Y	11.06	69.3	21.9		134.2	
		Z	10.85	69.1	21.9		123.7	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	11.07	69.3	22.0	8.88	132.7	±3.0 %
		Y	11.11	69.3	21.9		134.8	
		Z	10.95	69.2	22.1		124.9	
10607-AAA	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	X	10.30	68.4	21.5	8.64	124.6	±3.0 %
		Y	10.51	68.8	21.7		129.3	
		Z	10.65	69.6	22.3		142.8	
10608-AAA	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	X	10.49	68.7	21.7	8.77	125.7	±2.7 %
		Y	10.67	69.0	21.8		130.0	
		Z	10.83	69.9	22.5		143.9	
10616-AAA	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	X	11.01	69.2	21.9	8.82	132.0	±2.7 %
		Y	11.09	69.3	21.9		136.2	
		Z	11.34	70.3	22.6		149.7	
10617-AAA	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	X	10.98	69.1	21.8	8.81	131.8	±3.0 %
		Y	11.09	69.3	21.9		135.7	
		Z	10.85	69.0	21.9		123.4	
10626-AAA	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	X	11.48	69.8	22.0	8.83	136.8	±3.0 %
		Y	11.33	69.4	21.8		138.3	
		Z	11.32	69.6	22.0		127.1	
10627-AAA	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	X	11.56	69.9	22.1	8.88	136.8	±3.0 %
		Y	11.40	69.5	21.9		138.3	
		Z	11.37	69.7	22.1		127.3	
10648-AAA	CDMA2000 (1x Advanced)	X	3.75	66.8	18.7	3.45	142.8	±0.7 %
		Y	4.06	69.0	20.3		148.6	
		Z	4.02	69.3	20.5		135.3	

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

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

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Accreditation No.: **SCS 0108**

Client **Motorola Solutions MY**

Certificate No: **EX3-7485_Jan18**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7485

Calibration procedure(s) QA CAL-01.v9, QA CAL-12.v9, 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	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 17, 2018

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Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:7485

Manufactured: March 20, 2017
Calibrated: January 17, 2018

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7485

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.46	0.46	0.46	± 10.1 %
DCP (mV)[B]	102.7	99.0	97.9	

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	158.1	±2.7 %
		Y	0.0	0.0	1.0		154.7	
		Z	0.0	0.0	1.0		154.6	

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7485

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	14.12	14.12	14.12	0.00	1.00	± 13.3 %
300	45.3	0.87	13.18	13.18	13.18	0.08	1.10	± 13.3 %
450	43.5	0.87	11.83	11.83	11.83	0.14	1.20	± 13.3 %
750	41.9	0.89	10.93	10.93	10.93	0.52	0.84	± 12.0 %
835	41.5	0.90	10.73	10.73	10.73	0.49	0.80	± 12.0 %
900	41.5	0.97	10.43	10.43	10.43	0.37	0.92	± 12.0 %
1450	40.5	1.20	9.76	9.76	9.76	0.39	0.85	± 12.0 %
1810	40.0	1.40	9.10	9.10	9.10	0.35	0.80	± 12.0 %
1900	40.0	1.40	8.85	8.85	8.85	0.32	0.80	± 12.0 %
2100	39.8	1.49	9.03	9.03	9.03	0.38	0.80	± 12.0 %
2300	39.5	1.67	8.21	8.21	8.21	0.32	0.85	± 12.0 %
2450	39.2	1.80	7.81	7.81	7.81	0.31	0.90	± 12.0 %
2600	39.0	1.96	7.68	7.68	7.68	0.29	0.98	± 12.0 %

[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:7485

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	13.49	13.49	13.49	0.00	1.00	± 13.3 %
300	58.2	0.92	12.80	12.80	12.80	0.04	1.10	± 13.3 %
450	56.7	0.94	12.71	12.71	12.71	0.08	1.20	± 13.3 %
750	55.5	0.96	10.84	10.84	10.84	0.48	0.84	± 12.0 %
835	55.2	0.97	10.44	10.44	10.44	0.45	0.84	± 12.0 %
900	55.0	1.05	10.26	10.26	10.26	0.38	0.91	± 12.0 %
1450	54.0	1.30	9.08	9.08	9.08	0.28	0.80	± 12.0 %
1810	53.3	1.52	8.61	8.61	8.61	0.41	0.80	± 12.0 %
1900	53.3	1.52	8.33	8.33	8.33	0.31	0.90	± 12.0 %
2100	53.2	1.62	8.85	8.85	8.85	0.39	0.80	± 12.0 %
2300	52.9	1.81	8.09	8.09	8.09	0.40	0.80	± 12.0 %
2450	52.7	1.95	8.03	8.03	8.03	0.26	0.89	± 12.0 %
2600	52.5	2.16	7.73	7.73	7.73	0.21	0.96	± 12.0 %

[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.

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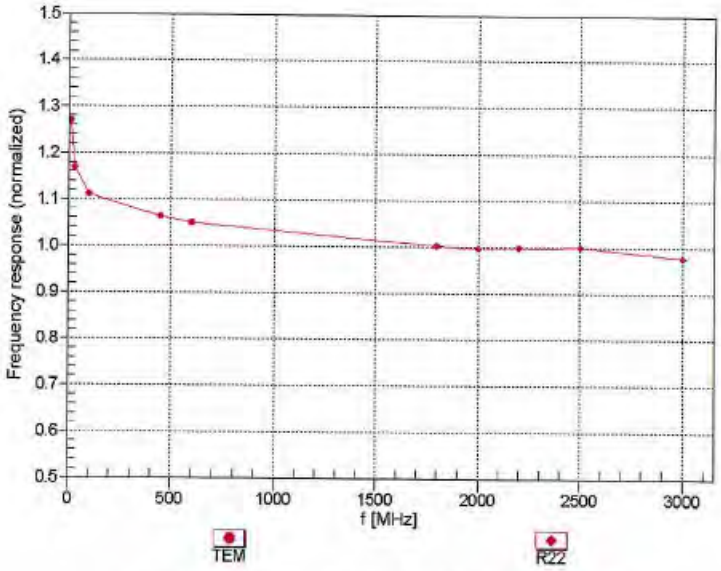
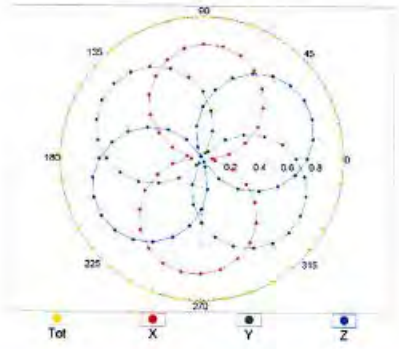
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



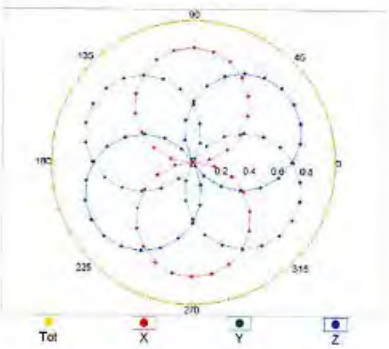
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

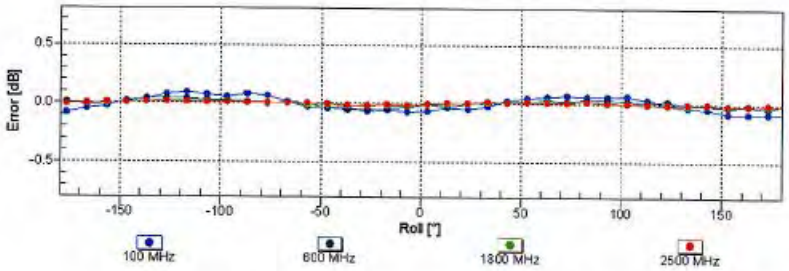
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

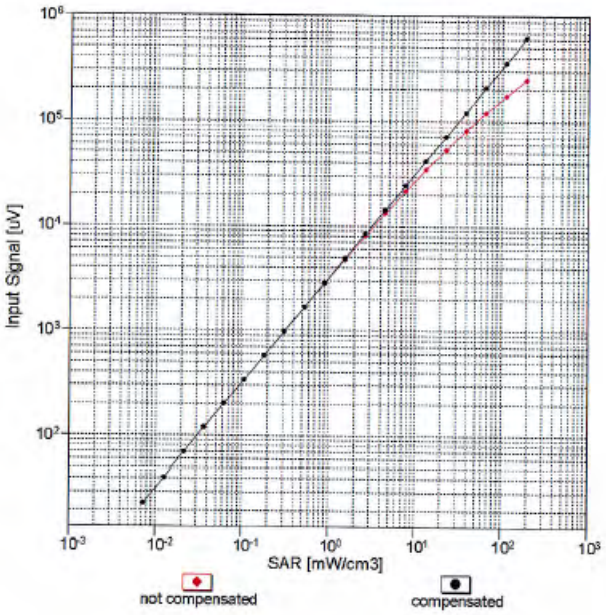


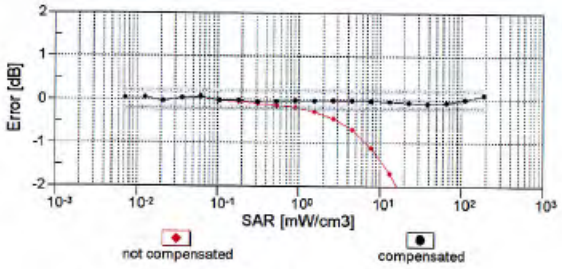


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)

(TEM cell , f_{eval}= 1900 MHz)





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

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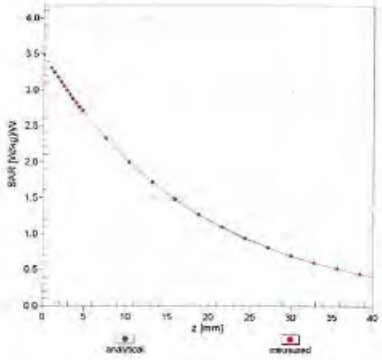
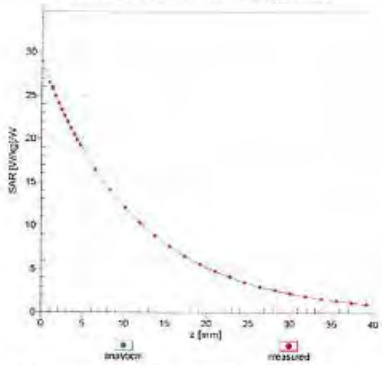
Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

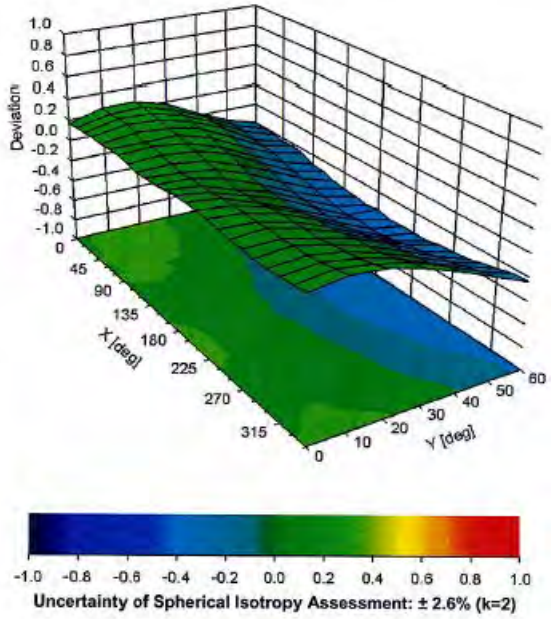


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7485

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-6.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Appendix: Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	158.1	±2.7 %
		Y	0.0	0.0	1.0		154.7	
		Z	0.0	0.0	1.0		154.6	
10011-CAB	UMTS-FDD (WCDMA)	X	3.19	66.3	17.8	2.91	146.0	±0.9 %
		Y	2.95	64.7	16.9		141.9	
		Z	2.99	64.3	16.3		142.9	
10097-CAB	UMTS-FDD (HSDPA)	X	4.32	65.8	17.8	3.98	130.6	±0.9 %
		Y	4.15	64.7	17.3		128.0	
		Z	4.19	64.5	16.9		128.6	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	4.35	65.9	17.9	3.98	130.3	±0.9 %
		Y	4.11	64.5	17.1		127.6	
		Z	4.20	64.6	16.9		128.9	
10100-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.07	66.3	18.9	5.67	137.2	±1.7 %
		Y	5.85	65.4	18.4		133.2	
		Z	5.98	65.6	18.3		135.5	
10101-CAD	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	7.15	66.9	19.5	6.42	146.3	±2.2 %
		Y	6.95	66.1	19.1		141.1	
		Z	7.11	66.4	19.1		144.1	
10108-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	5.91	65.8	18.8	5.80	134.0	±1.9 %
		Y	5.76	65.2	18.4		130.6	
		Z	5.88	65.3	18.4		132.5	
10109-CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	6.89	66.6	19.4	6.43	141.9	±2.2 %
		Y	6.73	66.0	19.0		136.6	
		Z	6.86	66.2	19.0		139.5	
10110-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	5.61	65.5	18.6	5.75	130.4	±1.7 %
		Y	5.65	65.5	18.6		148.2	
		Z	5.59	65.0	18.2		129.1	
10111-CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	6.60	66.5	19.3	6.44	136.2	±2.2 %
		Y	6.47	65.8	19.0		131.7	
		Z	6.62	66.1	19.0		135.1	
10117-CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	9.81	68.2	20.8	8.07	147.7	±2.7 %
		Y	9.60	67.6	20.5		141.2	
		Z	9.85	68.1	20.7		146.3	
10140-CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	7.30	67.0	19.6	6.49	147.7	±2.2 %
		Y	7.11	66.3	19.2		142.0	
		Z	7.31	66.7	19.3		146.8	
10142-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	5.45	65.5	18.6	5.73	127.8	±1.7 %
		Y	5.50	65.5	18.6		146.9	
		Z	5.65	65.8	18.7		149.6	
10143-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	6.34	66.5	19.3	6.35	132.1	±1.9 %
		Y	6.22	65.8	18.9		128.1	
		Z	6.34	66.1	19.0		131.4	

10145-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	5.42	66.4	19.1	5.76	145.2	±1.7 %
		Y	5.30	65.7	18.7		141.3	
		Z	5.40	65.8	18.6		144.1	
10146-CAE	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	6.27	67.7	19.9	6.41	147.7	±1.7 %
		Y	6.12	66.8	19.5		143.0	
		Z	6.29	67.1	19.5		147.1	
10149-CAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	6.89	66.6	19.4	6.42	141.5	±2.2 %
		Y	6.72	65.9	19.0		136.2	
		Z	6.87	66.2	19.1		139.0	
10154-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	5.63	65.6	18.7	5.75	130.5	±1.7 %
		Y	5.66	65.6	18.7		148.2	
		Z	5.61	65.0	18.2		128.9	
10155-CAE	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	6.60	66.5	19.3	6.43	136.2	±1.9 %
		Y	6.47	65.8	19.0		131.6	
		Z	6.61	66.1	19.0		135.2	
10156-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	5.61	66.3	19.1	5.79	149.4	±1.7 %
		Y	5.47	65.5	18.7		144.5	
		Z	5.60	65.7	18.6		147.8	
10157-CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	6.34	66.6	19.4	6.49	130.0	±1.9 %
		Y	6.41	66.6	19.5		149.5	
		Z	6.35	66.1	19.1		129.4	
10160-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.00	65.9	18.8	5.82	134.7	±1.9 %
		Y	5.88	65.3	18.5		131.5	
		Z	6.00	65.5	18.4		134.0	
10161-CAD	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	6.91	66.7	19.4	6.43	141.7	±2.2 %
		Y	6.75	66.0	19.1		136.2	
		Z	6.91	66.4	19.1		139.8	
10166-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	4.84	66.2	18.9	5.46	139.1	±1.4 %
		Y	4.74	65.4	18.5		135.4	
		Z	4.81	65.4	18.3		137.8	
10167-CAE	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	5.67	67.5	19.8	6.21	139.2	±1.7 %
		Y	5.55	66.6	19.3		136.6	
		Z	5.68	66.8	19.3		138.8	
10169-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	4.67	66.1	19.1	5.73	132.8	±1.4 %
		Y	4.60	65.4	18.7		128.7	
		Z	4.67	65.5	18.6		131.6	
10170-CAD	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	5.26	66.8	19.8	6.52	129.5	±1.7 %
		Y	5.21	66.1	19.4		128.0	
		Z	5.31	66.4	19.4		128.9	
10175-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	4.66	66.1	19.1	5.72	132.1	±1.4 %
		Y	4.59	65.3	18.6		128.8	
		Z	4.67	65.5	18.6		131.6	
10176-CAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	5.26	66.8	19.8	6.52	128.9	±1.7 %
		Y	5.40	67.0	19.9		149.6	
		Z	5.30	66.3	19.4		128.8	

10177-CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	4.64	66.0	19.0	5.73	131.9	±1.4 %
		Y	4.59	65.3	18.7		129.3	
		Z	4.66	65.4	18.5		131.4	
10178-CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	5.25	66.8	19.8	6.52	129.1	±1.7 %
		Y	5.23	66.2	19.5		127.9	
		Z	5.30	66.4	19.4		128.4	
10181-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	4.67	66.1	19.1	5.72	131.9	±1.4 %
		Y	4.60	65.4	18.7		128.9	
		Z	4.67	65.5	18.6		131.1	
10182-CAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	5.26	66.8	19.8	6.52	129.3	±1.7 %
		Y	5.38	66.9	19.8		149.9	
		Z	5.29	66.3	19.4		128.8	
10184-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	4.65	66.0	19.0	5.73	132.1	±1.4 %
		Y	4.62	65.5	18.8		129.6	
		Z	4.67	65.4	18.5		131.3	
10185-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	5.25	66.8	19.7	6.51	129.2	±1.7 %
		Y	5.40	67.0	19.9		149.7	
		Z	5.28	66.3	19.3		128.6	
10187-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	4.66	66.1	19.0	5.73	132.0	±1.4 %
		Y	4.61	65.4	18.7		129.6	
		Z	4.66	65.4	18.5		131.1	
10188-CAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	5.27	66.8	19.8	6.52	129.2	±1.7 %
		Y	5.40	67.0	19.9		149.9	
		Z	5.31	66.3	19.4		128.5	
10196-CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	9.40	68.0	20.8	8.10	138.9	±2.5 %
		Y	9.27	67.5	20.5		135.2	
		Z	9.45	67.8	20.6		138.6	
10225-CAB	UMTS-FDD (HSPA+)	X	6.71	66.9	19.2	5.97	142.8	±2.2 %
		Y	6.58	66.3	18.9		138.7	
		Z	6.69	66.3	18.8		141.9	
10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	5.65	66.4	18.4	4.87	138.8	±1.4 %
		Y	5.46	65.6	18.0		135.2	
		Z	5.59	65.7	17.9		137.2	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	4.27	66.3	18.2	3.96	148.1	±0.9 %
		Y	4.06	65.1	17.6		143.5	
		Z	4.19	65.3	17.4		146.7	
10297-AAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	5.90	65.8	18.8	5.81	132.3	±1.7 %
		Y	5.81	65.4	18.6		129.5	
		Z	5.90	65.4	18.4		131.3	
10298-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	5.45	66.4	19.1	5.72	145.4	±1.7 %
		Y	5.34	65.6	18.7		142.5	
		Z	5.47	65.9	18.7		145.3	
10299-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	6.36	67.6	19.8	6.39	149.6	±1.9 %
		Y	6.24	66.8	19.5		146.3	
		Z	6.41	67.1	19.6		149.7	

10311-AAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	6.44	66.3	19.1	6.06	137.9	±1.9 %
		Y	6.29	65.7	18.8		133.6	
		Z	6.45	66.0	18.8		137.4	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	2.57	67.0	17.4	1.54	148.6	±0.5 %
		Y	2.36	65.6	16.8		144.8	
		Z	2.29	64.1	15.5		147.0	
10416-AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	X	9.52	68.1	20.9	8.23	140.4	±3.0 %
		Y	9.36	67.5	20.6		135.6	
		Z	9.57	67.9	20.8		139.4	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	9.37	67.9	20.8	8.14	139.2	±2.7 %
		Y	9.23	67.5	20.6		135.0	
		Z	9.43	67.8	20.7		138.2	
10430-AAB	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	8.95	68.8	21.4	8.28	147.0	±3.0 %
		Y	8.79	68.1	21.0		143.3	
		Z	9.03	68.6	21.3		146.9	
10431-AAB	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	9.17	67.9	20.9	8.38	131.4	±3.0 %
		Y	9.09	67.5	20.7		128.3	
		Z	9.27	67.8	20.9		131.3	
10432-AAB	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	9.47	68.1	21.0	8.34	137.6	±2.5 %
		Y	9.33	67.6	20.7		133.6	
		Z	9.54	68.0	20.9		136.8	
10433-AAB	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	9.68	68.2	21.0	8.34	141.7	±3.0 %
		Y	9.53	67.7	20.8		137.0	
		Z	9.73	68.1	20.9		140.6	
10435-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.30	67.7	21.2	7.82	130.4	±1.9 %
		Y	5.27	67.2	21.0		145.6	
		Z	5.35	67.3	20.9		130.1	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	7.91	66.5	19.3	6.62	136.4	±2.2 %
		Y	7.83	66.1	19.1		132.4	
		Z	7.92	66.2	19.0		135.1	
10460-AAA	UMTS-FDD (WCDMA, AMR)	X	2.79	67.0	17.9	2.39	141.6	±0.7 %
		Y	2.56	65.4	17.2		138.4	
		Z	2.59	64.8	16.4		140.1	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.32	67.8	21.3	7.82	131.0	±1.9 %
		Y	5.26	67.1	20.9		145.4	
		Z	5.36	67.3	20.9		129.8	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.92	69.6	22.4	8.30	148.8	±2.2 %
		Y	5.68	68.0	21.6		143.0	
		Z	5.99	69.2	22.1		148.3	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.31	67.8	21.3	7.82	130.4	±1.9 %
		Y	5.25	67.1	20.9		145.8	
		Z	5.36	67.4	21.0		129.7	

10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.93	69.5	22.4	8.32	148.7	±2.2 %
		Y	5.67	67.8	21.4		142.9	
		Z	6.01	69.2	22.2		148.1	
10467-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.31	67.8	21.3	7.82	130.4	±1.9 %
		Y	5.26	67.2	20.9		145.2	
		Z	5.34	67.3	20.9		129.3	
10468-AAC	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.92	69.5	22.4	8.32	148.7	±2.2 %
		Y	5.67	67.9	21.5		143.2	
		Z	5.98	69.1	22.1		148.0	
10470-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.29	67.7	21.2	7.82	130.3	±1.9 %
		Y	5.26	67.1	20.9		145.4	
		Z	5.34	67.3	20.9		129.2	
10471-AAC	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.94	69.6	22.5	8.32	149.1	±2.2 %
		Y	5.69	68.0	21.5		143.2	
		Z	5.98	69.1	22.1		148.0	
10473-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.30	67.8	21.3	7.82	130.2	±1.9 %
		Y	5.25	67.1	20.9		145.7	
		Z	5.34	67.3	20.9		129.6	
10474-AAC	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.93	69.6	22.4	8.32	148.6	±2.2 %
		Y	5.67	67.9	21.5		143.2	
		Z	5.99	69.1	22.1		147.9	
10477-AAC	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	5.91	69.5	22.4	8.32	148.6	±2.5 %
		Y	5.68	67.9	21.5		143.5	
		Z	5.98	69.1	22.1		148.0	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.59	67.5	21.0	7.74	137.2	±1.9 %
		Y	5.38	66.1	20.2		133.6	
		Z	5.63	67.0	20.6		136.5	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.21	68.8	21.8	8.18	137.9	±1.9 %
		Y	5.92	67.1	20.8		133.2	
		Z	6.26	68.2	21.4		137.2	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.97	67.4	20.9	7.71	145.1	±2.2 %
		Y	5.71	66.0	20.1		139.9	
		Z	6.04	67.1	20.7		144.5	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.93	68.7	21.7	8.39	148.9	±2.2 %
		Y	6.65	67.3	21.0		143.0	
		Z	7.03	68.4	21.6		148.8	
10485-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.96	67.3	20.8	7.59	147.8	±2.2 %
		Y	5.70	65.9	20.0		142.0	
		Z	6.03	67.0	20.6		146.7	
10486-AAC	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.87	67.6	21.2	8.38	130.3	±2.2 %
		Y	6.76	67.0	20.9		146.6	
		Z	6.95	67.4	21.0		129.8	
10488-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.17	66.7	20.5	7.70	130.9	±2.2 %
		Y	6.04	66.0	20.1		147.0	
		Z	6.22	66.4	20.2		129.7	

10489-AAC	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.13	67.5	21.1	8.31	136.9	±2.2 %
		Y	6.85	66.2	20.4		131.9	
		Z	7.21	67.3	21.0		136.3	
10491-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.54	67.0	20.6	7.74	136.1	±2.2 %
		Y	6.24	65.7	19.9		131.1	
		Z	6.59	66.7	20.4		135.2	
10492-AAC	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.60	67.8	21.3	8.41	143.0	±2.5 %
		Y	7.29	66.5	20.6		137.1	
		Z	7.67	67.6	21.2		142.3	
10494-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.52	67.0	20.6	7.74	135.5	±2.2 %
		Y	6.21	65.7	19.9		130.8	
		Z	6.57	66.8	20.4		134.6	
10495-AAC	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.52	67.6	21.2	8.37	143.1	±2.5 %
		Y	7.20	66.3	20.5		137.1	
		Z	7.60	67.5	21.1		142.5	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	5.90	67.6	20.9	7.67	143.7	±1.9 %
		Y	5.64	66.1	20.1		139.0	
		Z	5.94	67.1	20.6		143.2	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	6.83	68.8	21.8	8.40	145.9	±2.2 %
		Y	6.54	67.3	21.0		140.4	
		Z	6.92	68.4	21.6		145.8	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.14	67.3	20.9	7.67	149.2	±2.2 %
		Y	5.87	66.0	20.1		144.0	
		Z	6.20	67.0	20.6		148.8	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.04	67.6	21.2	8.44	132.5	±2.2 %
		Y	6.93	67.0	20.9		148.8	
		Z	7.13	67.4	21.1		132.2	
10503-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.19	66.7	20.5	7.72	130.8	±2.2 %
		Y	6.06	66.0	20.2		147.2	
		Z	6.24	66.4	20.3		130.0	
10504-AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.14	67.5	21.1	8.31	137.2	±2.2 %
		Y	6.87	66.3	20.4		132.2	
		Z	7.23	67.3	21.0		136.2	
10506-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.52	67.0	20.6	7.74	135.6	±2.2 %
		Y	6.22	65.7	19.9		130.7	
		Z	6.58	66.8	20.5		134.7	
10507-AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.51	67.6	21.2	8.36	143.2	±2.5 %
		Y	7.18	66.3	20.5		136.8	
		Z	7.60	67.5	21.1		142.4	
10509-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.13	67.6	21.0	7.99	142.3	±2.2 %
		Y	6.77	66.2	20.2		135.7	
		Z	7.19	67.4	20.8		140.7	

10510-AAC	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.81	67.2	21.0	8.49	127.4	±2.7 %
		Y	7.65	66.7	20.7		142.8	
		Z	8.10	67.9	21.3		149.2	
10512-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	6.85	67.5	20.8	7.74	140.3	±2.2 %
		Y	6.47	66.0	20.0		134.0	
		Z	6.92	67.4	20.7		138.9	
10513-AAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.90	68.0	21.4	8.42	149.2	±2.7 %
		Y	7.51	66.5	20.6		141.7	
		Z	7.98	67.9	21.3		148.2	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	2.60	67.3	17.6	1.58	148.3	±0.5 %
		Y	2.34	65.5	16.7		144.3	
		Z	2.33	64.5	15.8		146.7	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	9.52	68.1	20.9	8.25	139.8	±2.5 %
		Y	9.38	67.6	20.7		135.0	
		Z	9.62	68.1	20.9		139.4	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	2.74	67.6	17.9	1.99	144.5	±0.7 %
		Y	2.41	65.4	16.8		140.2	
		Z	2.49	65.1	16.3		143.1	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	2.75	68.0	18.1	1.99	143.9	±0.7 %
		Y	2.49	66.1	17.2		140.1	
		Z	2.45	64.9	16.1		142.5	
10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	9.61	68.1	21.2	8.59	136.8	±2.7 %
		Y	9.46	67.6	20.9		131.7	
		Z	9.70	68.0	21.1		136.5	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	9.62	68.1	21.2	8.60	136.4	±3.0 %
		Y	9.45	67.6	20.9		131.2	
		Z	9.72	68.1	21.2		136.0	
10591-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	9.75	68.2	21.2	8.63	138.7	±3.3 %
		Y	9.58	67.7	20.9		133.7	
		Z	9.85	68.1	21.2		138.1	
10592-AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	9.92	68.4	21.4	8.79	138.7	±3.0 %
		Y	9.73	67.8	21.1		133.9	
		Z	10.00	68.3	21.4		138.3	
10599-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	10.36	68.7	21.5	8.79	146.7	±2.7 %
		Y	10.11	68.0	21.1		140.1	
		Z	10.43	68.7	21.5		146.1	
10600-AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	10.44	68.9	21.6	8.88	146.2	±3.3 %
		Y	10.20	68.2	21.3		140.6	
		Z	10.52	68.8	21.6		145.9	

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