MOTOROLA SOLUTIONS

STANDARDS MALAYSIA ACCREDITED LABORATORY
MS ISO/IEC 17025 TESTING
SAMM No.0826

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

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Date of Report: 09/14/2017
Report Revision: C

Responsible Engineer: Veeramani Veerapan
Report Author: Veeramani Veerapan
Date/s Tested: 06/20/2017 – 07/08/2017
Manufacturer: Motorola Solutions Inc.
DUT Description: Handheld Portable - APX 900 896-941 MHz, 1-3W, 12.5 kHz, LKP, display, GPS, WIFI
APX 900 896-941 MHz, 1-3W, 12.5 kHz, FKP, display, WIFI
Test TX mode(s): CW (PTT), Bluetooth, and WLAN 802.11b/g/n
Max. Power output: 3.0 W (LMR 900 MHz band), 10 mW (Bluetooth), 10 mW (Bluetooth LE), 22.4 mW (802.11b), 8.3 mW (802.11g), 12.6 mW (802.11n)
Nominal Power: 2.5 W (LMR 900 MHz band), 8.9 mW (Bluetooth), 8.9 mW (Bluetooth LE), 16.6 mW (802.11b), 6.6 mW (802.11g), 10 mW (802.11n)
Tx Frequency Bands: LMR 896-902 MHz, 935-941 MHz, Bluetooth 2.402-2480 MHz; WLAN 2412-2462 MHz
Signaling type: FM, TDMA, FHSS (Bluetooth), 802.11b/g/n (WLAN)
Model(s) Tested: H92WCF9PW6AN (PMUF1912A), H92WCH9PW7AN (PMUF1913A)
Model(s) Certified: H92WCF9PW6AN (PMUF1912A), H92WCH9PW7AN (PMUF1913A)
Serial Number(s): 837TTK1854, 837TTK1882,837TTK1983
Classification: Occupational/Controlled
FCC ID: AZ489FT7100; LMR 896-901 MHz, 935-940 MHz, Bluetooth 2.402-2.480 GHz, WLAN 802.11 b/g/n 2.412-2.462 GHz
This report contains results that are immaterial for FCC equipment approval, which are clearly identified.

IC: 109U-89FT7100; This report contains results that are immaterial for IC 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 OET Bulletin 65. The 10 grams result is not applicable to FCC filing. The test results clearly demonstrate compliance with ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz), Health Physics 74, 494-522 RF Exposure limits of 10 W/kg averaged over 10grams of contiguous tissue.

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: 2017.09.14 14:05:24 +08'00'
Tiong Nguk Ing
Deputy Technical Manager
Approval Date: 9/14/2017

Part 1 of 2

APPENDICES

Part 2 of 2

APPENDICES

Report Revision History

Date	Revision	Comments
07/24/2017	A	Initial release
09/04/2017	B	Update equipment class in Table 1 to PCF and FCC Test firm registration number
9/14/2017	C	Update equipment class in Table 1 to TNF due to remove frequency range part 24D.

1.0 Introduction

This report details the utilization, test setup, 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 H92WCF9PW6AN (PMUF1912A), H92WCH9PW7AN (PMUF1913A).These devices are 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	10g-SAR	1g-SAR	10g-SAR
TNF	896-901 MHz	1.72	1.24	1.30	0.93
	935-940 MHz	1.60	1.16	1.42	1.01
*DSS	2402-2480 MHz (Bluetooth)	NA	NA	NA	NA
DTS	2412-2462 MHz (WLAN 802.11 b/g/n)	0.018	0.008	0.028	0.016
Simultaneous Results		1.74	1.25	1.45	1.03

*Results not required per KDB (refer to sections 13.9 and 15.0)

3.0 Abbreviations / Definitions

BT: Bluetooth
CNR: Calibration Not Required
CW: Continuous Wave
DSSS: Direct Sequence Spread Spectrum
DTS: Digital Transmission System
DUT: Device Under Test
EME: Electromagnetic Energy
FHSS: Frequency Hopping Spread Spectrum
FM: Frequency Modulation
Li-Ion: Lithium-Ion
LMR: Land Mobile Radio
NA: Not Applicable
NiMH: Nickel Metal Hydride
OFDM: Orthogonal Frequency Division Multiplexing
PTT: Push to Talk
RF: Radio Frequency
SAR: Specific Absorption Rate
DSP: Digital Signal Processor
DSS: Direct Spread Spectrum

GPS: Global Positioning System
MIC: Microphone
RSM: Remote Speaker Microphone
TDMA: Time Division Multiple Access
WLAN: Wireless Local Area Network
LKP: Limited Keypad
FKP: Full Keypad

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 802.11 Wi-Fi SAR v02r02

5.0 SAR Limits

Table 2

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

6.0 Description of Device Under Test (DUT)

These portable devices operate in the LMR bands using frequency modulation (FM) and TDMA signals incorporating traditional simplex two-way radio transmission protocol. These devices also contain WLAN technology for data capabilities over 802.11 b/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 these devices operate in a half duplex system. A half duplex system only allows the user to transmit or receive. These devices 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.

These devices also incorporate Class 1 Bluetooth Low energy (LE) device which is a Frequency Hopping Spread Spectrum (FHSS) technology and LE intended to reduce power consumption. The Bluetooth radio modem is used to wireless link audio accessories.
The maximum actual transmission duty cycle is imposing by Bluetooth standard. Packet types varying duty cycles: 1-slot, 3-slots and 5-slots packets. A 5-slot packet type receives on 1-slot and transmits on 5-slots, and thus maximum duty cycle = 76.1%.

WLAN 802.11 b/g/n operate using Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency-Division Multiplexing (OFDM) accordance with the IEEE 802.11 b/g/n. With WiFi access, the radio can receive new code plug, firmware and software feature while allow users keep talking without interruption.

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

Table 3

Radio Type	Band (MHz)	Transmission	Duty Cycle (%)	Max Power (W)
LMR	896-902	FM	*50	3.00
LMR	935-941	FM	*50	3.00
BT	2402-2480	FHSS	77	0.0100
BT LE	2402-2480	DSSS	77	0.0100
WLAN	2412-2484	802.11b	100	0.0224
WLAN	2412-2484	802.11g	100	0.0083
WLAN	2412-2484	802.11n	100	0.0126

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

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

7.1 Antenna

There is only one removable antenna and an internal BT/WLAN antenna offered for these models. The Table below lists the antennas and its descriptions.

Table 4

Antenna No.	Antenna Models	Description	Selected for test	Tested
1	NAF5088B	Whip Antenna, 896-941 MHz; ½ wave; -3dBd gain	Yes	Yes
2	*AN000151A01	Antenna, Chip, Glonass BT/GPS Antenna Module; 2.400 - 2.484 GHz; ¼ wave; -4 dBi gain	Yes	Yes; only for WLAN

* Refer to sections 13.9 and 15.0 for BT low power exclusion and simultaneous transmission exclusion.

7.2 Batteries

There are optional batteries offered for these products. The Table below lists their descriptions.

Table 5

Battery No.	Battery Models	Description	Selected for test	Tested	Comments
1	NNTN8128B	IMPRES Li-Ion 2000 mAh Slim, IP67	Yes	Yes	
2	PMNN4424A	IMPRES Li-Ion 2300 mAh, Slim, IP67	Yes	Yes	
3	PMNN4448A	IMPRES 2700 mAh Li-Ion Battery	Yes	Yes	
4	PMNN4489A	IMPRES 2900 mAh, Li-Ion High Capacity Battery, Low Voltage, IP68 (TIA)	Yes	Yes	
5	PMNN4491B	IMPRES 2100 mAh, Li-Ion Slim High density Battery, IP68	Yes	Yes	Default battery for Body
6	PMNN4493A	IMPRES 3000 mAh, Li-Ion High Capacity Battery, Low Voltage, IP68	Yes	Yes	Default battery for Face

7.3 Body worn Accessories

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

Table 6

Body worn No.	Body worn Models	Description	Selected for test	Tested	Comments
1	PMLN4651A	2- Inch Spring Action Belt Clip	Yes	Yes	
2	PMLN7008A	2.5- Inch Spring Action Belt Clip	Yes	Yes	
3	PMLN5838A	Leather Carry Case with 3-Inch Fixed Belt Loop	Yes	Yes	
4	PMLN5842A	Hard Leather Case with 2.5-Inch Swivel Belt Loop	Yes	Yes	
5	PMLN5840A	Leather Carry Case with 3-Inch Swivel Belt Loop	Yes	Yes	
6	PMLN5844A	Nylon Carry Case with 3-Inch Fixed Belt Loop	Yes	Yes	

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	PMMN4062A	IMPRES Remote Speaker Microphone	Yes	Yes	Default Audio
2	*BDN6732A	3-Wire Surveillance Kit with Extra Loud Earpiece	Yes	No	
3	*BDN6783B	3.5mm Threaded Audio Adapter	Yes	No	
4	*HMN4104B	Features 8-character display, channel knob and rugged, submersible audio jack	Yes	No	
5	*RMN5116A	Unique secondary audio accessory that connects to the APX Display RSM and receives audio via bone conduction.	Yes	No	
6	*PMLN5096B	D-style earpiece with inline push-to-talk.	Yes	No	
7	*PMLN5102A	Behind-the-head, single muff adjustable headset with in-line push-to-talk	Yes	No	
8	*PMLN5275C	Headset with push-to-talk on earcup, noise reduction = 24db, Intrinsically Safe (FM, CSA). May be worn with or without a helmet.	Yes	No	
9	*PMLN6123A	IMPRES 3-Wire Surveillance Kit with translucent tube, programmable button, black	Yes	No	
10	*PMLN6129A	IMPRES 2-Wire Surveillance Kit with translucent tube, programmable button, black	Yes	No	
11	*RLN5312B	2-Wire Surveillance Kit with Translucent Tube, Black, 3.5mm Threaded.	Yes	No	
12	*ZMN6031A	3-Wire Surveillance Kit, Beige, Hirose Connector. Requires NNTN7869 Hirose Adapter	Yes	No	
13	*ZMN6038A	2-Wire Surveillance Kit, with Extra Loud Earpiece, Beige, Hirose Connector	Yes	No	
14	*NNTN7869B	6 Pin Hirose Keyload & Audio Adapter, FM/IS rated	Yes	No	
15	*PMLN5653A	D-style receive-only earpiece with 3.5mm plug.	Yes	No	
16	BDN6667A	2-Wire Surveillance Kit with Earpiece, Beige, 3.5mm Threaded	No	No	By similarity to RLN5312B
17	BDN6668A	3-wire surveillance kit, Beige	No	No	By similarity to BDN6732A
18	BDN6669A	2-wire surveillance kit with an extra-loud earpiece	No	No	By similarity to RLN5312B
19	BDN6670A	This beige, extra-loud (exceeds OHSA standards) earpiece has a separate microphone and Push-to-Talk feature.	No	No	By similarity to BDN6732A
20	BDN6729A	2-Wire Earpiece with Microphone and Push-to-Talk Combined, Black	No	No	By similarity to RLN5312B
21	BDN6730A	3-wire earpiece has a separate microphone and Push-to-Talk feature, Black	No	No	By similarity to BDN6732A
22	BDN6731A	3-Wire Receive-Only Surveillance Kit with Extra-Loud Earpiece, Black, 3.5mm Threaded	No	No	By similarity to RLN5312B
23	HMN4101B	Includes Rugged, Submersible Audio jack	No	No	By similarity to HMN4104B
24	PMLN6130A	IMPRES 2-wire beige surveillance kit allows the user to both transmit and receive discreet communications.	No	No	By similarity to PMLN6129A
25	PMLN6124A	IMPRES 3-Wire Surveillance Kit with translucent tube, programmable button, beige	No	No	By similarity to PMLN6123A
26	PMLN6127A	IMPRES 2-Wire Surveillance Kit, programmable button, black	No	No	By similarity to PMLN6129A
27	PMLN6128A	IMPRES 2-wire beige surveillance kit allows the user to both transmit and receive discreet communications.	No	No	By similarity to PMLN6129A

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

Table 7 Continued

Audio No.	Audio Acc. Models	Description	Selected for test	Tested	Comments
28	HMN4103B	Features 8-character display and rugged, submersible audio jack	No	No	By similarity to HMN4104B
29	PMLN5101A	IMPRES Temple Transducer with boom microphone and inline PTT	No	No	By similarity to PMLN5275C
30	PMMN4065A	Includes volume control, orange button, and one programmable button.	No	No	By similarity to PMMN4062A
31	PMMN4069A	Windporting microphone with audio jack	No	No	By similarity to PMMN4062A
32	RMN5058A	Single ear, lightweight headset for comfortable, convenient communications.	No	No	By similarity to PMLN5275C
33	ZMN6032A	2-Wire Surveillance Kit, Beige, Hirose Connector	No	No	By similarity to ZMN6031A
34	ZMN6039A	3-Wire Surveillance Kit, with Extra Loud Earpiece, Beige, Hirose Connector	No	No	By similarity to ZMN6031A

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	ES3DV3 (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

Ingredients	900MHz		2450MHz	
	Head	Body	Head	Body
Sugar	56.5	44.9	0	0
Diacetin	0	0	51.00	34.50
De ionized –Water	40.95	53.06	48.75	65.20
Salt	1.45	0.94	0.15	0.20
HEC	1	1	0	0
Bact.	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	ES3DV3	3196	5/17/2017	5/17/2018
Speag DAE	DAE4	684	5/12/2017	5/12/2018
Signal Generator (Vector ESG 250KHz-6GHz)	E4438C	MY42081753	4/8/2017	4/8/2018
Bi-directional Coupler	3020A	41935	9/2/2016	9/2/2017
Bi-directional Coupler	3022	81639	10/19/2016	10/19/2017
Amplifier	10W1000C	312859	CNR	CNR
Amplifier	5S1G4	312988	CNR	CNR
Power Sensor	E93018	MY55210003	7/27/2017	7/27/2018
Power Sensor	E4412A	US37183007	5/19/2017	5/19/2018
Power Sensor	E4416A	MY50001037	5/22/2017	5/22/2019
Power Meter	E9301B	MY55210006	11/6/2016	11/6/2017
Power Meter	E4419B	MY45103725	5/22/2017	5/22/2019
Power Meter	E418B	MY45101917	5/22/2017	5/22/2019
Broadband Power Sensor	NRP-Z11	121252	2/6/2017	2/6/2019
Temperature Probe	80PK-22	06032017	3/24/2017	3/24/2018
Temperature Probe	JHSS-18U-RSC-6	AGIL700129	12/02/2016	12/02/2017
Thermometer	HH202A	35881	12/2/2016	12/2/2017
Thermometer	HH202A	18801	1/25/2017	1/25/2018
Dickson Temperature Recorder	TM320	06153216	8/2/2016	8/2/2017
Dickson Temperature Recorder	TM320	12253047	10/20/16	10/20/17
Dielectric Assessment Kit	DAK-3.5	1156	10/11/2016	10/11/2017
Network Analyzer	E5071B	MY42403147	11/15/2016	11/15/2017
Network Analyzer	E5071B	MY42403218	8/15/2016	8/15/2017
Speag Dipole	D900V2	1d026	1/18/2017	1/18/2019
Speag Dipole	D2450V2	782	2/15/2017	2/15/2019

10.0 SAR Measurement System Validation and Verification

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

10.1 System Validation

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

Table 12

Dates	Probe Calibration Point		Probe SN	Measured Tissue Parameters		Validation		
				σ	ϵ_r	Sensitivity	Linearity	Isotropy
CW								
05/31/2017	Body	900	3196	1.09	52.6	Pass	Pass	Pass
05/31/2017	Head	900		1.00	40.8	Pass	Pass	Pass
06/05/2017	Body	2450		2.03	50.1	Pass	Pass	Pass
06/01/2017	Head	2450		1.82	37.4	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
3196	FCC Body	SPEAG D900V2 / 1d026	11.00 +/- 10%	2.57	10.28	6/20/2017*
				2.52	10.08	6/21/2017*
				2.63	10.52	6/23/2017
				2.68	10.72	6/29/2017
				2.77	11.08	6/30/2017
				2.80	11.20	7/3/2017
				2.75	11.00	7/4/2017
	IEEE/IEC Head		10.90 +/- 10%	2.52	10.08	6/22/2017
				2.68	10.72	7/4/2017
	FCC Body	SPEAG D2450V2/ 782	50.50 +/- 10%	13.60	54.40	7/5/2017
				13.50	54.00	7/6/2017
				12.90	51.60	7/7/2017*
	IEEE/IEC Head		50.50 +/- 10%	13.30	53.20	7/8/2017

Note: * System performance check cover next testing day (within 24 hours)

10.3 Equivalent Tissue Test Results

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

Table 14

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
896	FCC Body	1.05 (0.99-1.10)	55.0 (52.3-57.8)	1.08	52.6	6/20/2017*
				1.08	52.8	6/21/2017*
				1.08	56.9	6/30/2017
	IEEE/ IEC Head	0.97 (0.92-1.01)	41.5 (39.4-43.6)	0.97	40.2	6/22/2017
899	FCC Body	1.05 (1.00-1.10)	55.0 (52.3-57.8)	1.06	55.3	7/4/2017
901	FCC Body	1.05 (1.00-1.10)	55.0 (52.3-57.8)	1.06	55.3	7/4/2017
935	FCC Body	1.07 (1.02-1.12)	55.0 (52.2-57.7)	1.11	52.4	6/23/2017
				1.12	56.4	6/29/2017
				1.12	56.6	6/30/2017
				1.12	56.2	7/3/2017
	IEEE/ IEC Head	0.99 (0.94-1.04)	41.5 (39.4-43.5)	1.01	39.7	6/22/2017
938	IEEE/ IEC Head	0.99 (0.94-1.04)	41.5 (39.4-43.5)	1.03	40.1	7/4/2017
940	IEEE/ IEC Head	0.99 (0.94-1.04)	41.5 (39.4-43.5)	1.03	40.1	7/4/2017
900	FCC Body	1.05 (1.00-1.10)	55.0 (52.3-57.8)	1.08	52.6	6/20/2017
				1.08	52.8	6/21/2017*
				1.07	52.7	6/23/2017
				1.08	56.8	6/29/2017
				1.08	56.8	6/30/2017
				1.09	56.5	7/3/2017
				1.06	55.3	7/4/2017
	IEEE/ IEC Head	0.97 (0.92-1.02)	41.5 (39.4-43.6)	0.97	40.1	6/22/2017
				0.99	40.5	7/4/2017
2437	FCC Body	1.94 (1.84-2.03)	52.7 (47.4-58.0)	1.99	48.0	7/5/2017
				1.97	47.7	7/6/2017
				1.99	47.6	7/7/2017
	IEEE/ IEC Head	1.79 (1.70-1.88)	39.2 (35.3-43.1)	1.85	35.6	7/8/2017
2450	FCC Body	1.95 (1.85-2.05)	52.7 (47.4-58.0)	2.01	48.0	7/5/2017
				1.99	47.6	7/6/2017
				2.00	47.6	7/7/2017
	IEEE/ IEC Head	1.80 (1.71-1.89)	39.2 (35.3-43.1)	1.86	35.6	7/8/2017

Note: * This tissue date covered for next test day (within 24 hours)

11.0 Environmental Test Conditions

The EME Laboratory's ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/ - 2^{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: 18.3 – 23.1˚C Avg. 20.6 ˚C
Tissue Temperature	NA	Range: 20.5 – 21.4˚C Avg. 21.0˚C

Relative humidity target range is a recommended target

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

12.3 Measurements

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

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

Table 16

<table>
<tr><th colspan="2">Description</th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="2">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="2">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="2" rowspan="2">Maximum area scan spatial resolution: ΔxArea, ΔyArea</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="2">Maximum zoom scan spatial resolution: ΔxZoom, ΔyZoom</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td>Maximum zoom scan spatial resolution, normal to phantom surface</td><td>uniform grid: ΔzZoom(n)</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td colspan="4">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

12.4 DUT Configuration(s)

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

12.5 DUT Positioning Procedures

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

12.5.1 Body

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

12.5.2 Head

Not applicable.

12.5.3 Face

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

12.6 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

12.7 SAR Result Scaling Methodology

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

12.8 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.

Standalone and simultaneous BT testing were assessed in sections 13.9 and 15.0 per the guidelines of KDB 447498.

WLAN tests were performed in 802.11b mode using a duty cycle of 99.8% with results scaled to 100% as per guidelines of KDB 248227.

13.0 DUT Test Data

13.1 LMR assessments at the Body for 896-901 MHz band

Battery PMNN4491B was selected as the default battery for assessments at the Body because it is the thinnest battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (896-901 MHz) which are listed in Table 17. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 17

Test Freq (MHz)	Power (W)
896.000	2.92
899.000	2.89
901.000	2.89

Assessments at the Body with Body worn PMLN4651A

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 F.

Table 18

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN4651A	PMMN4062A	896.000	2.87	-0.73	2.42	1.75	**1.50**	**1.08**	FD(AM)-AB-170620-03
				899.000							
				901.000							

Table 18 Continued

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN4651A	PMMN4062A	896.000	2.87	-0.54	2.37	1.71	1.40	1.01	FD(AM)-AB-170620-04
				899.000							
				901.000							
NAF5088B	PMNN4424A	PMLN4651A	PMMN4062A	896.000	2.95	-0.80	1.84	1.33	1.12	0.81	FD(AM)-AB-170620-07
				899.000							
				901.000							
NAF5088B	PMNN4448A	PMLN4651A	PMMN4062A	896.000	2.90	-0.70	1.85	1.35	1.12	0.82	FD(AM)-AB-170620-08
				899.000							
				901.000							
NAF5088B	PMNN4489A	PMLN4651A	PMMN4062A	896.000	2.87	-0.62	1.83	1.33	1.10	0.80	KKL-AB-170620-09
				899.000							
				901.000							
NAF5088B	PMNN4493A	PMLN4651A	PMMN4062A	896.000	2.93	-0.45	1.64	1.20	0.93	0.68	KKL-AB-170620-10
				899.000							
				901.000							

Assessments at the Body with Body worn PMLN5838A

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 F.

Table 19

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5838A	PMMN4062A	896.000	2.88	-0.69	0.46	0.34	**0.28**	**0.21**	KKL-AB-170620-11
				899.000							
				901.000							

Table 19 Continued

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5838A	PMMN4062A	896.000	2.91	-0.42	0.47	0.35	0.27	0.20	ZR(FAZ)-AB-170620-12
				899.000							
				901.000							
NAF5088B	PMNN4424A	PMLN5838A	PMMN4062A	896.000	2.90	-0.75	0.41	0.31	0.25	0.19	ZR(FAZ)-AB-170620-13
				899.000							
				901.000							
NAF5088B	PMNN4448A	PMLN5838A	PMMN4062A	896.000	2.91	-0.67	0.44	0.33	0.27	0.20	ZR(FAZ)-AB-170620-14
				899.000							
				901.000							
NAF5088B	PMNN4489A	PMLN5838A	PMMN4062A	896.000	2.95	-0.63	0.41	0.31	0.24	0.18	ZR(FAZ)-AB-170621-01#
				899.000							
				901.000							
NAF5088B	PMNN4493A	PMLN5838A	PMMN4062A	896.000	2.88	-0.63	0.41	0.31	0.25	0.18	ZR(FAZ)-AB-170621-02#
				899.000							
				901.000							

Assessments at the Body with Body worn PMLN5840A

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 F.

Table 20

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5840A	PMMN4062A	896.000	2.85	-0.69	0.34	0.26	**0.21**	**0.16**	ZR(FAZ)-AB-170621-03
				899.000							
				901.000							

Table 20 Continued

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5840A	PMMN4062A	896.000	2.90	-0.49	0.33	0.25	0.19	0.14	ZR(FAZ)-AB-170621-04#
				899.000							
				901.000							
NAF5088B	PMNN4424A	PMLN5840A	PMMN4062A	896.000	2.89	-0.72	0.31	0.24	0.19	0.14	ZR(FAZ)-AB-170621-05#
				899.000							
				901.000							
NAF5088B	PMNN4448A	PMLN5840A	PMMN4062A	896.000	2.98	-0.63	0.34	0.26	0.20	0.15	ZR(FAZ)-AB-170621-06#
				899.000							
				901.000							
NAF5088B	PMNN4489A	PMLN5840A	PMMN4062A	896.000	2.85	-0.47	0.35	0.26	0.20	0.15	FD(AM)-AB-170621-08
				899.000							
				901.000							
NAF5088B	PMNN4493A	PMLN5840A	PMMN4062A	896.000	2.91	-0.51	0.35	0.27	0.21	0.15	FD(AM)-AB-170621-09
				899.000							
				901.000							

Assessments at the Body with Body worn PMLN5842A

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 F.

Table 21

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5842A	PMMN4062A	896.000	2.90	-0.75	0.34	0.25	**0.21**	**0.15**	FD(AM)-AB-170621-10
				899.000							
				901.000							

Table 21 Continued

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5842A	PMMN4062A	896.000	2.98	-0.50	0.34	0.25	0.19	0.14	FD(AM)-AB-170621-11
				899.000							
				901.000							
NAF5088B	PMNN4424A	PMLN5842A	PMMN4062A	896.000	2.88	-0.68	0.32	0.24	0.19	0.15	FD(AM)-AB-170621-12
				899.000							
				901.000							
NAF5088B	PMNN4448A	PMLN5842A	PMMN4062A	896.000	2.96	-0.65	0.33	0.25	0.20	0.15	FD(AM)-AB-170621-13
				899.000							
				901.000							
NAF5088B	PMNN4489A	PMLN5842A	PMMN4062A	896.000	2.85	-0.58	0.33	0.25	0.20	0.15	FD(AM)-AB-170621-14
				899.000							
				901.000							
NAF5088B	PMNN4493A	PMLN5842A	PMMN4062A	896.000	2.99	-0.74	0.33	0.25	0.19	0.15	FD(AM)-AB-170621-15
				899.000							
				901.000							

Assessments at the Body with Body worn PMLN5844A

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 F.

Table 22

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5844A	PMMN4062A	896.000	2.94	-0.80	1.59	1.17	0.98	0.72	FD(AM)-AB-170621-16
				899.000							
				901.000							

Table 22 Continued

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5844A	PMMN4062A	896.000	2.98	-0.53	1.72	1.26	**0.98**	**0.72**	FD(AM)-AB-170621-17
				899.000							
				901.000							
NAF5088B	PMNN4424A	PMLN5844A	PMMN4062A	896.000	2.95	-0.68	1.56	1.14	0.93	0.68	FD(AM)-AB-170621-18
				899.000							
				901.000							
NAF5088B	PMNN4448A	PMLN5844A	PMMN4062A	896.000	2.98	-0.65	1.60	1.17	0.94	0.68	FD(AM)-AB-170621-19
				899.000							
				901.000							
NAF5088B	PMNN4489A	PMLN5844A	PMMN4062A	896.000	2.86	-0.50	1.53	1.12	0.90	0.66	TLC(FAZ)-AB-170621-20
				899.000							
				901.000							
NAF5088B	PMNN4493A	PMLN5844A	PMMN4062A	896.000	2.87	-0.54	1.44	1.06	0.85	0.63	TLC(FAZ)-AB-170621-21
				899.000							
				901.000							

Assessments at the Body with Body worn PMLN7008A

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 F.

Table 23

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN7008A	PMMN4062A	896.000	2.98	-0.73	2.26	1.65	**1.35**	**0.98**	TLC(FAZ)-AB-170621-22
				899.000							
				901.000							

Table 23 Continued

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN7008A	PMMN4062A	896.000	2.96	-0.61	2.28	1.65	1.33	0.96	TLC(FAZ)-AB-170621-23
				899.000							
				901.000							
NAF5088B	PMNN4424A	PMLN7008A	PMMN4062A	896.000	2.90	-0.79	1.74	1.28	1.08	0.79	TLC(FAZ)-AB-170621-24
				899.000							
				901.000							
NAF5088B	PMNN4448A	PMLN7008A	PMMN4062A	896.000	2.98	-0.71	1.78	1.30	1.06	0.77	TLC(FAZ)-AB-170621-25
				899.000							
				901.000							
NAF5088B	PMNN4489A	PMLN7008A	PMMN4062A	896.000	2.86	-0.62	1.62	1.19	0.98	0.72	TLC(FAZ)-AB-170622-01#
				899.000							
				901.000							
NAF5088B	PMNN4493A	PMLN7008A	PMMN4062A	896.000	2.98	-0.45	1.70	1.24	0.95	0.69	TLC(FAZ)-AB-170622-02#
				899.000							
				901.000							

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 F.

Table 24

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN4651A	None(BT)	896.000	2.90	-0.78	2.78	2.01	**1.72**	**1.24**	TLC(FAZ)-AB-170622-03#
				899.000							
				901.000							

13.2 LMR assessments at the Body for 935-940 MHz band

Battery PMNN4491B was selected as the default battery for assessments at the Body because it is the thinnest battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (935-940 MHz) which are listed in Table 25. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 25

Test Freq (MHz)	Power (W)
935.000	2.89
938.000	2.88
940.000	2.89

Assessments at the Body with Body worn PMLN4651A

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 25 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 26

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN4651A	PMMN4062A	935.000	2.93	-0.85	2.33	1.68	**1.45**	**1.05**	TLC(FAZ)-AB-170623-02
				938.000							
				940.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN4651A	PMMN4062A	935.000	2.90	-0.53	2.21	1.59	1.29	0.93	TLC(FAZ)-AB-170623-03
				938.000							
				940.000							
NAF5088B	PMNN4424A	PMLN4651A	PMMN4062A	935.000	2.98	-0.79	1.85	1.34	1.12	0.81	TLC(FAZ)-AB-170623-04
				938.000							
				940.000							
NAF5088B	PMNN4448A	PMLN4651A	PMMN4062A	935.000	2.97	-0.83	1.81	1.31	1.11	0.80	TLC(FAZ)-AB-170623-05
				938.000							
				940.000							
NAF5088B	PMNN4489A	PMLN4651A	PMMN4062A	935.000	2.93	-0.67	1.70	1.23	1.02	0.73	FD(AM)-AB-170623-06
				938.000							
				940.000							

Table 26 Continued

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4493A	PMLN4651A	PMMN4062A	935.000	2.88	-0.41	1.78	1.29	1.02	0.74	FD(AM)-AB-170623-07
				938.000							
				940.000							

Assessments at the Body with Body worn PMLN5838A

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 25 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in F.

Table 27

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5838A	PMMN4062A	935.000	2.96	-0.42	0.41	0.30	0.23	0.17	FD(AM)-AB-170623-08
				938.000							
				940.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5838A	PMMN4062A	935.000	2.90	-0.43	0.40	0.30	0.23	0.17	FD(AM)-AB-170623-09
				938.000							
				940.000							
NAF5088B	PMNN4424A	PMLN5838A	PMMN4062A	935.000	2.99	-0.75	0.37	0.28	0.22	0.16	FD(AM)-AB-170623-10
				938.000							
				940.000							
NAF5088B	PMNN4448A	PMLN5838A	PMMN4062A	935.000	2.87	-0.71	0.38	0.28	0.24	0.17	FD(AM)-AB-170623-11
				938.000							
				940.000							
NAF5088B	PMNN4489A	PMLN5838A	PMMN4062A	935.000	2.91	-0.61	0.41	0.30	**0.24**	**0.18**	FD(AM)-AB-170623-12
				938.000							
				940.000							
NAF5088B	PMNN4493A	PMLN5838A	PMMN4062A	935.000	2.87	-0.62	0.35	0.26	0.21	0.16	KKL(FAZ)-AB-170629-02
				938.000							
				940.000							

Assessments at the Body with Body worn PMLN5840A

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 25 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 28

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5840A	PMMN4062A	935.000	2.87	-0.77	0.23	0.17	0.14	0.11	KKL(FAZ)-AB-170629-03
				938.000							
				940.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5840A	PMMN4062A	935.000	2.96	-0.38	0.24	0.18	0.13	0.10	KKL(FAZ)-AB-170629-04
				938.000							
				940.000							
NAF5088B	PMNN4424A	PMLN5840A	PMMN4062A	935.000	2.89	-0.70	0.22	0.17	0.14	0.10	KKL(FAZ)-AB-170629-05
				938.000							
				940.000							
NAF5088B	PMNN4448A	PMLN5840A	PMMN4062A	935.000	2.97	-0.67	0.24	0.18	0.14	0.11	KKL(FAZ)-AB-170629-06
				938.000							
				940.000							
NAF5088B	PMNN4489A	PMLN5840A	PMMN4062A	935.000	2.86	-0.60	0.26	0.19	**0.16**	**0.12**	KKL(FAZ)-AB-170629-07
				938.000							
				940.000							
NAF5088B	PMNN4493A	PMLN5840A	PMMN4062A	935.000	2.90	-0.68	0.25	0.19	0.15	0.11	KKL(FAZ)-AB-170629-08
				938.000							
				940.000							

Assessments at the Body with Body worn PMLN5842A

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 25 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 29

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5842A	PMMN4062A	935.000	2.99	-0.86	0.24	0.18	0.15	0.11	KKL(AM)-AB-170629-09
				938.000							
				940.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5842A	PMMN4062A	935.000	2.95	-0.45	0.25	0.19	0.14	0.11	KKL(AM)-AB-170629-10
				938.000							
				940.000							
NAF5088B	PMNN4424A	PMLN5842A	PMMN4062A	935.000	2.99	-0.81	0.24	0.18	0.14	0.11	KKL(AM)-AB-170629-11
				938.000							
				940.000							
NAF5088B	PMNN4448A	PMLN5842A	PMMN4062A	935.000	2.96	-0.63	0.25	0.19	0.15	0.11	KKL(AM)-AB-170629-12
				938.000							
				940.000							
NAF5088B	PMNN4489A	PMLN5842A	PMMN4062A	935.000	2.87	-0.62	0.25	0.19	0.15	0.11	KKL(AM)-AB-170629-13
				938.000							
				940.000							
NAF5088B	PMNN4493A	PMLN5842A	PMMN4062A	935.000	2.87	-0.71	0.25	0.19	**0.16**	**0.12**	KKL(AM)-AB-170629-14
				938.000							
				940.000							

Assessments at the Body with Body worn PMLN5844A

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 25 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 30

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN5844A	PMMN4062A	935.000	2.95	-0.81	1.36	1.00	0.83	0.61	KKL(AM)-AB-170629-15
				938.000							
				940.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN5844A	PMMN4062A	935.000	2.92	-0.51	1.48	1.08	**0.86**	**0.62**	KKL(AM)-AB-170629-16
				938.000							
				940.000							
NAF5088B	PMNN4424A	PMLN5844A	PMMN4062A	935.000	2.98	-0.83	1.32	0.96	0.80	0.59	KKL(AM)-AB-170629-17
				938.000							
				940.000							
NAF5088B	PMNN4448A	PMLN5844A	PMMN4062A	935.000	2.97	-0.72	1.16	0.85	0.69	0.50	KKL(FAZ)-AB-170630-02
				938.000							
				940.000							
NAF5088B	PMNN4489A	PMLN5844A	PMMN4062A	935.000	2.89	-0.63	1.11	0.82	0.67	0.49	KKL(FAZ)-AB-170630-03
				938.000							
				940.000							
NAF5088B	PMNN4493A	PMLN5844A	PMMN4062A	935.000	2.87	-0.78	1.36	0.99	0.85	0.62	KKL(FAZ)-AB-170630-04
				938.000							
				940.000							

Assessments at the Body with Body worn PMLN7008A

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 25 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 31

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN7008A	PMMN4062A	935.000	2.87	-0.87	2.06	1.50	**1.32**	**0.96**	KKL(FAZ)-AB-170630-05
				938.000							
				940.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	PMLN7008A	PMMN4062A	935.000	2.89	-0.52	2.03	1.47	1.19	0.86	KKL(FAZ)-AB-170630-06
				938.000							
				940.000							
NAF5088B	PMNN4424A	PMLN7008A	PMMN4062A	935.000	2.93	-0.75	1.55	1.13	0.94	0.69	KKL(FAZ)-AB-170630-07
				938.000							
				940.000							
NAF5088B	PMNN4448A	PMLN7008A	PMMN4062A	935.000	2.98	-0.80	1.53	1.11	0.93	0.67	KKL(FAZ)-AB-170630-08
				938.000							
				940.000							
NAF5088B	PMNN4489A	PMLN7008A	PMMN4062A	935.000	2.87	-0.71	1.67	1.22	1.03	0.75	KKL(FAZ)-AB-170630-09
				938.000							
				940.000							
NAF5088B	PMNN4493A	PMLN7008A	PMMN4062A	935.000	2.90	-0.46	1.60	1.17	0.92	0.67	KKL(AM)-AB-170630-10
				938.000							
				940.000							

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 F.

Table 32

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN4651A	None(BT)	935.000	2.92	-0.92	2.52	1.82	**1.60**	**1.16**	FD(FAZ)-AB-170703-03
				938.000							
				940.000							

13.3 WLAN assessment at the Body for 802.11 b/g/n

The tables below represent the output power measurements for WLAN 2.4 GHz 802.11b/g/n for assessments at the Body using battery PMNN4491B 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 33. The channel with the highest conducted power will be identified as the default channel per KDB 248227 D01.

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.

Table 33

Mode	Channel #	Channel Frequency	Modulation	Battery: PMNN4491B Antenna port[mW]	Antenna Max Power [mW]
802.11b (1Mbps)	1	2412	DSSS	16.7	22.4
	6	2437		20.8	
	11	2462		20.4	
802.11g (6Mbps)	1	2412	OFDM	6.3	8.3
	6	2437		7.2	
	11	2462		7.3	
802.11n (MCS0)	1	2412	OFDM	9.8	12.6
	6	2437		10.7	
	11	2462		10.5	

802.11b was chosen over 802.11 g & n for testing because it has the highest max power

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 all offered body worn. Refer to Table 33 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 34

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (mW)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
AN000151A01 WiFi Ant	PMNN4491B	PMLN4651A	None	2437	20.80	-2.55	0.010	0.004	**0.018**	**0.008**	AZ(AM)-AB-170706-02#
AN000151A01 WiFi Ant	PMNN4491B	PMLN5838A	None	2437	20.80	3.97	0.003	0.001	0.003	0.001	AZ(AM)-AB-170706-03#
AN000151A01 WiFi Ant	PMNN4491B	PMLN5840A	None	2437	20.80	-3.47	0.004	0.002	0.010	0.004	FIE(FAZ)-AB-170706-06
AN000151A01 WiFi Ant	PMNN4491B	PMLN5842A	None	2437	20.80	2.82	0.002	0.001	0.003	0.001	TLC(AM)-AB-170707-01#
AN000151A01 WiFi Ant	PMNN4491B	PMLN5844A	None	2437	20.80	0.00	0.002	0.001	0.003	0.001	TLC(AM)-AB-170707-02#
AN000151A01 WiFi Ant	PMNN4491B	PMLN7008A	None	2437	20.80	0.77	0.009	0.004	0.010	0.005	TLC(AM)-AB-170707-04#
Assessment of additional Batteries											
AN000151A01 WiFi Ant	NNTN8128B	PMLN4651A	None	2437	20.80	-1.04	0.009	0.004	0.012	0.005	KKL(FAZ)-AB-170707-06#
AN000151A01 WiFi Ant	PMNN4424A	PMLN4651A	None	2437	21.10	-0.16	0.008	0.004	0.009	0.004	KKL(FAZ)-AB-170707-07#
AN000151A01 WiFi Ant	PMNN4448A	PMLN4651A	None	2437	20.90	1.65	0.008	0.004	0.008	0.004	FD(FAZ)-AB-170708-01#
AN000151A01 WiFi Ant	PMNN4489A	PMLN4651A	None	2437	20.90	3.72	0.005	0.002	0.005	0.002	FD(FAZ)-AB-170708-02#
AN000151A01 WiFi Ant	PMNN4493A	PMLN4651A	None	2437	20.90	-0.85	0.007	0.003	0.010	0.005	FD(FAZ)-AB-170708-03#

13.4 LMR assessments at the Face for 896-901 MHz band

Battery PMNN4493A was selected as the default battery for assessments at the Face 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 (896-901 MHz) which are listed in Table 35. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 35

Test Freq (MHz)	Power (W)
896.000	2.96
899.000	2.92
901.000	2.93

Assessments with radio facing the Face

DUT assessment with offered antenna, 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 35 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 36

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4493A	Radio @ Front	None	896.000	2.88	-0.53	2.20	1.58	1.29	0.93	FD(AM)-FACE-170622-06
				899.000							
				901.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	Radio @ Front	None	896.000	2.90	-0.51	2.20	1.58	1.28	0.92	FD(AM)-FACE-170622-07
				899.000							
				901.000							
NAF5088B	PMNN4424A	Radio @ Front	None	896.000	2.91	-0.68	2.02	1.45	1.22	0.87	FD(AM)-FACE-170622-08
				899.000							
				901.000							
NAF5088B	PMNN4448A	Radio @ Front	None	896.000	2.95	-0.59	2.12	1.52	1.23	0.89	FD(AM)-FACE-170622-09
				899.000							
				901.000							
NAF5088B	PMNN4489A	Radio @ Front	None	896.000	2.85	-0.63	2.13	1.53	**1.30**	**0.93**	FD(AM)-FACE-170622-10
				899.000							
				901.000							
NAF5088B	PMNN4491B	Radio @ Front	None	896.000	2.94	-0.25	2.20	1.56	1.19	0.84	FD(AM)-FACE-170622-11
				899.000							
				901.000							

13.5 LMR assessments at the Face for 935-940 MHz band

Battery PMNN4493A was selected as the default battery for assessments at the Face 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 (935-940 MHz) which are listed in Table 37. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 37

Test Freq (MHz)	Power (W)
935.000	2.92
938.000	2.90
940.000	2.91

Assessments with radio facing the Face

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 37 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 38

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4493A	Radio @ Front	None	935.000	2.94	-0.25	2.32	1.64	1.25	0.89	FD(AM)-FACE-170622-12
				938.000							
				940.000							
Assessment of Additional Batteries											
NAF5088B	NNTN8128B	Radio @ Front	None	935.000	3.00	-0.76	2.22	1.58	1.32	0.94	FD(AM)-FACE-170622-13
				938.000							
				940.000							
NAF5088B	PMNN4424A	Radio @ Front	None	935.000	2.95	-0.69	2.07	1.47	1.23	0.88	FD(AM)-FACE-170622-14
				938.000							
				940.000							
NAF5088B	PMNN4448A	Radio @ Front	None	935.000	2.98	-0.79	2.27	1.61	1.37	0.97	TLC(FAZ)-FACE-170622-15
				938.000							
				940.000							
NAF5088B	PMNN4489A	Radio @ Front	None	935.000	2.93	-0.68	2.29	1.63	1.37	0.98	TLC(FAZ)-FACE-170622-16
				938.000							
				940.000							
NAF5088B	PMNN4491B	Radio @ Front	None	935.000	2.90	-0.75	2.31	1.64	**1.42**	**1.01**	TLC(FAZ)-FACE-170622-17
				938.000							
				940.000							

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

The tables below represent the output power measurements for WLAN 2.4 GHz 802.11b/g/n for assessments at the Face using battery PMNN4493A because it is 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 (2.412-2.462GHz) which are listed in Table 39. The channel with the highest conducted power will be identified as the default channel per KDB 248227 D01.

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.

Table 39

Mode	Channel #	Channel Frequency	Modulation	Battery: PMNN4493A	Antenna Max Power [mW]
				Antenna port[mW]	
802.11b (1Mbps)	1	2412	DSSS	18.3	22.4
	6	2437		20.9	
	11	2462		18.7	
802.11g (6Mbps)	1	2412	OFDM	6.3	8.3
	6	2437		7.3	
	11	2462		6.5	
802.11n (MCS0)	1	2412	OFDM	9.8	12.6
	6	2437		10.8	
	11	2462		10.7	

DUT assessment with WLAN internal antenna with front of the DUT
2.5cm from phantom with all offered batteries. Refer to Table 39 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 40

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
AN000151A01 WiFi Ant	PMNN4493A	Radio @ Front	None	2437.000	20.90	0.23	0.023	0.013	0.025	0.014	FD(FAZ)-FACE-170708-05
Assessment of Additional Batteries											
AN000151A01 WiFi Ant	NNTN8128B	Radio @ Front	None	2437.000	20.80	-0.01	0.024	0.014	0.026	0.015	ZR(AM)-FACE-170708-06
AN000151A01 WiFi Ant	PMNN4424A	Radio @ Front	None	2437.000	21.10	0.34	0.024	0.014	0.026	0.015	ZR(AM)-FACE-170708-07
AN000151A01 WiFi Ant	PMNN4448A	Radio @ Front	None	2437.000	20.90	0.15	0.024	0.014	0.026	0.015	ZR(AM)-FACE-170708-08
AN000151A01 WiFi Ant	PMNN4489A	Radio @ Front	None	2437.000	20.90	-0.07	0.026	0.015	**0.028**	**0.016**	ZR(AM)-FACE-170708-09
AN000151A01 WiFi Ant	PMNN4491B	Radio @ Front	None	2437.000	20.80	0.32	0.025	0.014	0.027	0.015	ZR(AM)-FACE-170708-10

13.7 Assessment at outside FCC US Part 90

Not applicable.

13.8 Assessment for ISED, Canada

Based on the assessment results for body and face per KDB643646, additional tests were not required for ISED Canada frequency range (896-940 MHz) as testing performed is in compliance with ISED Canada frequency range.

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 Table 41 below. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 41

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
Body											
NAF5088B	PMNN4491B	PMLN4651A	None(BT)	896.0000	2.90	-0.78	2.78	2.01	**1.72**	**1.24**	TLC(FAZ)-AB-170622-03#
				899.0000	2.86	-0.57	2.51	1.83	1.50	1.09	KKL(FAZ)-AB-170704-07
				901.0000	2.86	-0.72	2.32	1.69	1.44	1.05	KKL(FAZ)-AB-170704-08
Face											
NAF5088B	PMNN4491B	Radio @ front	None	935.0000	2.90	-0.75	2.31	1.64	**1.42**	**1.01**	TLC(FAZ)-FACE-170622-17
				938.0000	2.87	-0.79	2.12	1.50	1.33	0.94	KKL(FAZ)-FACE-170704-03
				940.0000	2.91	-0.38	2.18	1.55	1.23	0.87	KKL(FAZ)-FACE-170704-04

13.9 Assessment at the Bluetooth band

13.9.1 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 = 7.7mW (10mW*77% 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.

13.9.2 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:
= 10 mW * 77%
= 7.7 mW or 8.87 dBm

Equivalent isotropically radiated power (EIRP):
= Maximum conducted power, dBm + Antenna gain, dBi
= 8.87 dBm - 4.00 dBi
=4.87 dBm or 3.07 mW

Higher output power level, maximum conducted power 7.7 mW was below the threshold power level 20 mW. Hence SAR test was not required for Bluetooth band.

14.0 Shortened Scan Assessment

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

Table 42

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAF5088B	PMNN4491B	PMLN4651A	None(BT)	896.000	2.87	-0.32	2.77	2.00	1.56	1.13	KKL(AM)-AB-170630-13

15.0 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 = 7.7mW (10mW*77% 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.

16.0 Simultaneous Transmission between LMR, WLAN and BT

These devices 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 15.0. The maximum sourced-based-time-averaged output power for 802.11 b is 22.4mW while BT is 7.7mW. 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 43

		LMR Band
	Freq. (MHz)	900 MHz
WLAN Band	2412 - 2462	√

17.0 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 and 10-gram average SAR values found for this filing:

Table 44

Technologies	Frequency band (MHz)	Max Calc at Body (W/kg)		Max Calc at Face (W/kg)	
		1g-SAR	10g-SAR	1g-SAR	10g-SAR
FCC US					
LMR	896-901	1.72	1.24	1.30	0.93
LMR	935-940	1.60	1.16	1.42	1.01
WLAN	2412-2462	0.018	0.008	0.028	0.016
ISED Canada					
LMR	896-901	1.72	1.24	1.30	0.93
LMR	935-940	1.60	1.16	1.42	1.01
WLAN	2412-2462	0.018	0.008	0.028	0.016
Overall					
LMR	896-902	1.72	1.24	1.30	0.93
LMR	935-941	1.60	1.16	1.42	1.01
WLAN	2412-2484	0.018	0.008	0.028	0.016

All results are scaled to the maximum output power.

The highest combined 1g-SAR results for simultaneous is indicated in the following Table:

Table 45

Designator	Frequency bands	Combined 1g-SAR (W/kg)	Combined 10g-SAR (W/kg)
Body			
FCC US	LMR (896-901MHz) and WLAN band	1.74	1.25
	LMR (935-940MHz) and WLAN band	1.62	1.17
ISED Canada	LMR (896-901MHz) and WLAN band	1.74	1.25
	LMR (935-940MHz) and WLAN band	1.62	1.17
Overall	LMR (896-902MHz) and WLAN band	1.74	1.25
	LMR (935-941MHz) and WLAN band	1.62	1.17
Face			
FCC	LMR (896-901MHz) and WLAN band	1.33	0.95
	LMR (935-940MHz) and WLAN band	1.45	1.03
ISED Canada	LMR (896-901MHz) and WLAN band	1.33	0.95
	LMR (935-940MHz) and WLAN band	1.45	1.03
Overall	LMR (896-902MHz) and WLAN band	1.33	0.95
	LMR (935-941MHz) and WLAN band	1.45	1.03

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 OET Bulletin 65. The 10 grams result is not applicable to FCC filing.

18.0 Variability Assessment

Per the guidelines in KDB 865664 SAR variability assessment is not required because SAR results are below 4.0 W/kg (Occupational).

19.0 System Uncertainty

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

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

Appendix A
Measurement Uncertainty Budget

TABLE A.1: Uncertainty Budget for Device Under Test, for 800 MHz to 3 GHz

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	∞
Modulation Response	E2.5	1.9	R	1.73	1	1	1.1	1.1	∞
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	

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

TABLE A.2: Uncertainty Budget for System Validation (dipole & flat phantom) for 800 MHz to 3 GHz

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	∞
Modulation Response	E2.5	1.9	R	1.73	1	1	1.1	1.1	∞
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 Certificates

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 MY**

Certificate No: **ES3-3196_May17**

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3196

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: 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

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

Certificate No: ES3-3196_May17 Page 1 of 18

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

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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, "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 ES3DV3

SN:3196

Manufactured: June 16, 2008
Calibrated: May 17, 2017

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3196

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.25	1.26	1.30	± 10.1 %
DCP (mV)[B]	101.5	100.5	99.8	

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	191.9	±3.5 %
		Y	0.0	0.0	1.0		203.8	
		Z	0.0	0.0	1.0		204.9	

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: ES3DV3 - SN:3196

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	7.46	7.46	7.46	0.08	1.25	± 13.3 %
300	45.3	0.87	7.36	7.36	7.36	0.12	1.60	± 13.3 %
450	43.5	0.87	7.11	7.11	7.11	0.20	1.60	± 13.3 %
750	41.9	0.89	6.82	6.82	6.82	0.71	1.27	± 12.0 %
835	41.5	0.90	6.63	6.63	6.63	0.53	1.40	± 12.0 %
900	41.5	0.97	6.45	6.45	6.45	0.74	1.20	± 12.0 %
1450	40.5	1.20	5.78	5.78	5.78	0.74	1.15	± 12.0 %
1810	40.0	1.40	5.58	5.58	5.58	0.42	1.62	± 12.0 %
1900	40.0	1.40	5.42	5.42	5.42	0.71	1.26	± 12.0 %
2100	39.8	1.49	5.44	5.44	5.44	0.78	1.22	± 12.0 %
2300	39.5	1.67	5.00	5.00	5.00	0.74	1.27	± 12.0 %
2450	39.2	1.80	4.74	4.74	4.74	0.65	1.38	± 12.0 %
2600	39.0	1.96	4.60	4.60	4.60	0.75	1.25	± 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: ES3DV3 - SN:3196

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	7.06	7.06	7.06	0.09	1.25	± 13.3 %
300	58.2	0.92	6.92	6.92	6.92	0.10	1.60	± 13.3 %
450	56.7	0.94	7.00	7.00	7.00	0.13	1.60	± 13.3 %
750	55.5	0.96	6.44	6.44	6.44	0.80	1.13	± 12.0 %
835	55.2	0.97	6.31	6.31	6.31	0.50	1.47	± 12.0 %
900	55.0	1.05	6.27	6.27	6.27	0.52	1.47	± 12.0 %
1450	54.0	1.30	5.40	5.40	5.40	0.71	1.19	± 12.0 %
1810	53.3	1.52	5.11	5.11	5.11	0.40	1.83	± 12.0 %
1900	53.3	1.52	4.91	4.91	4.91	0.60	1.47	± 12.0 %
2100	53.2	1.62	5.24	5.24	5.24	0.60	1.49	± 12.0 %
2300	52.9	1.81	4.72	4.72	4.72	0.80	1.27	± 12.0 %
2450	52.7	1.95	4.58	4.58	4.58	0.80	1.13	± 12.0 %
2600	52.5	2.16	4.40	4.40	4.40	0.80	1.20	± 12.0 %

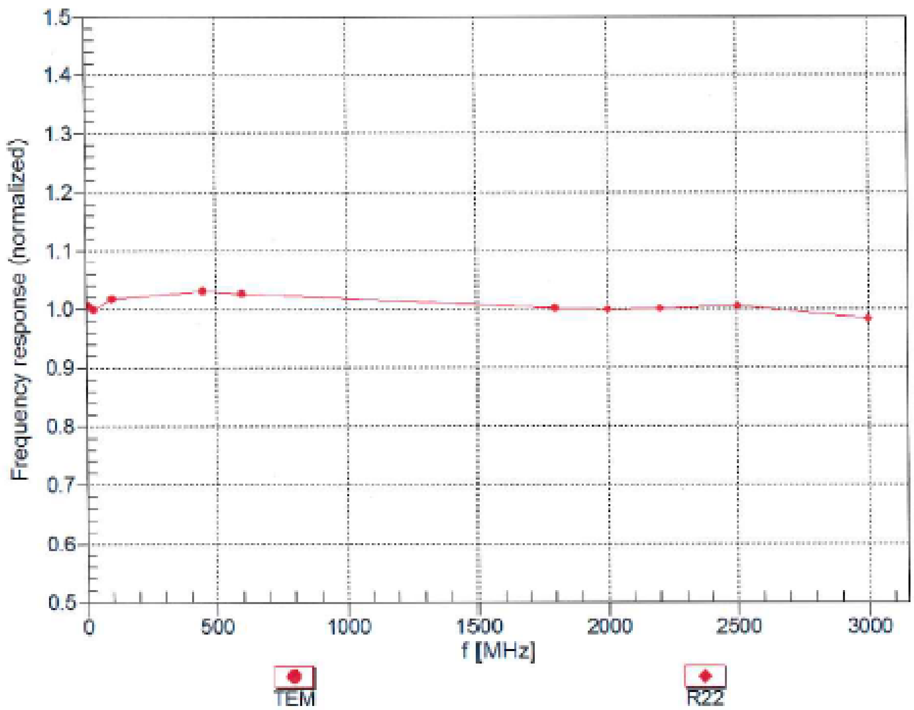
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz 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.

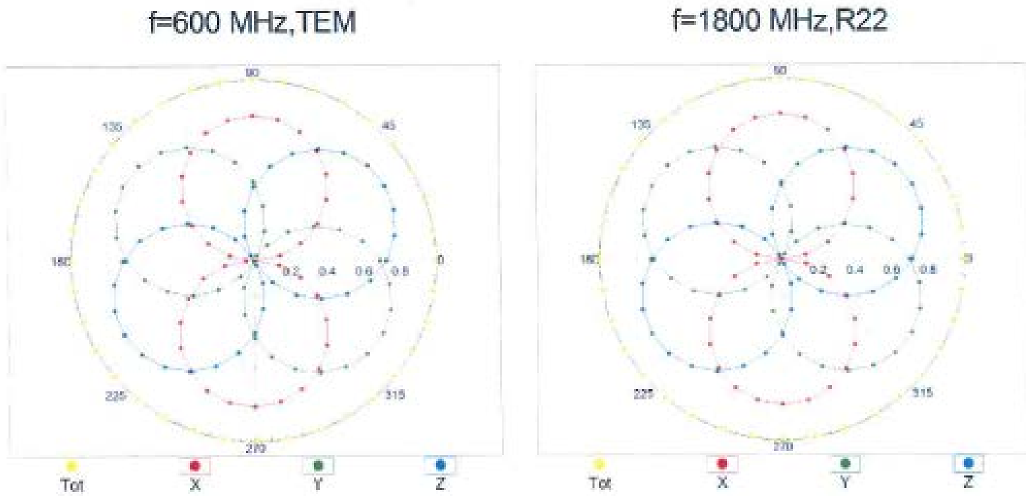
Frequency Response of E-Field

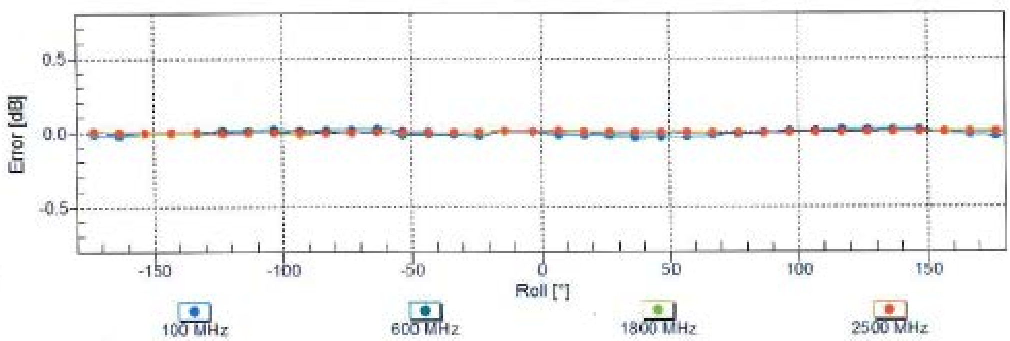
(TEM-Cell:ifi110 EXX, Waveguide: R22)



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

Receiving Pattern (ϕ), ϑ = 0°

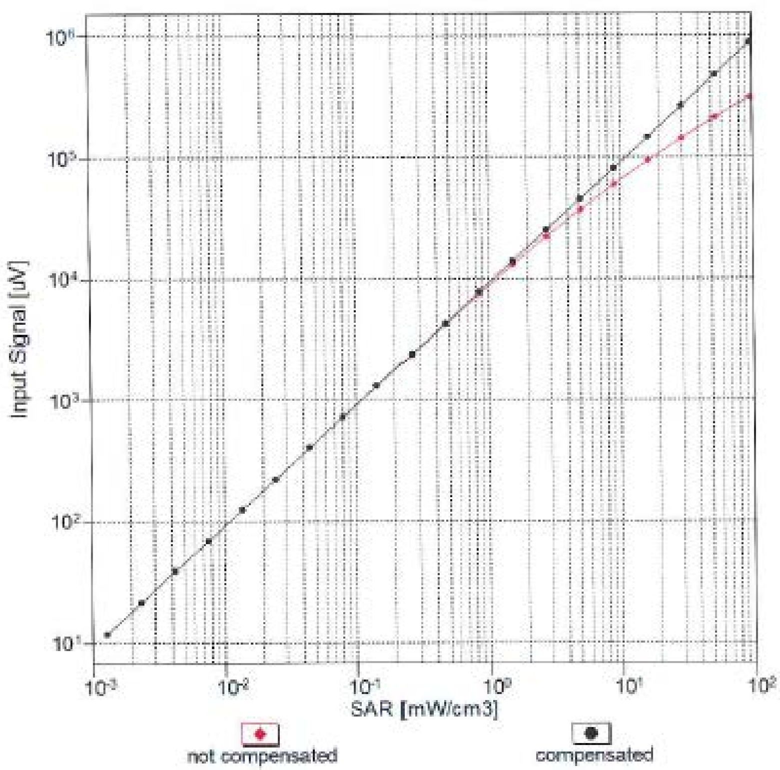


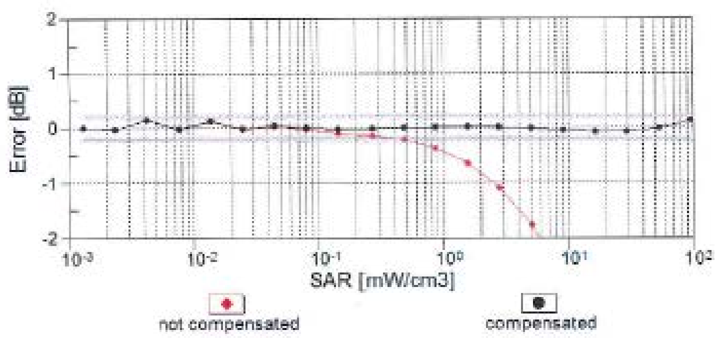


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

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

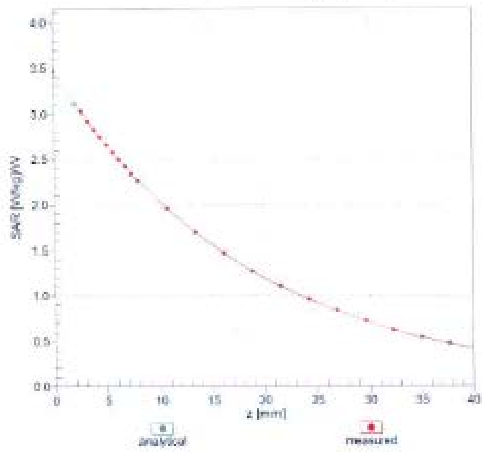




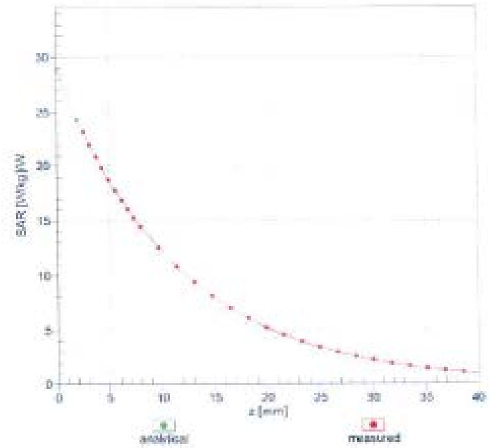
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

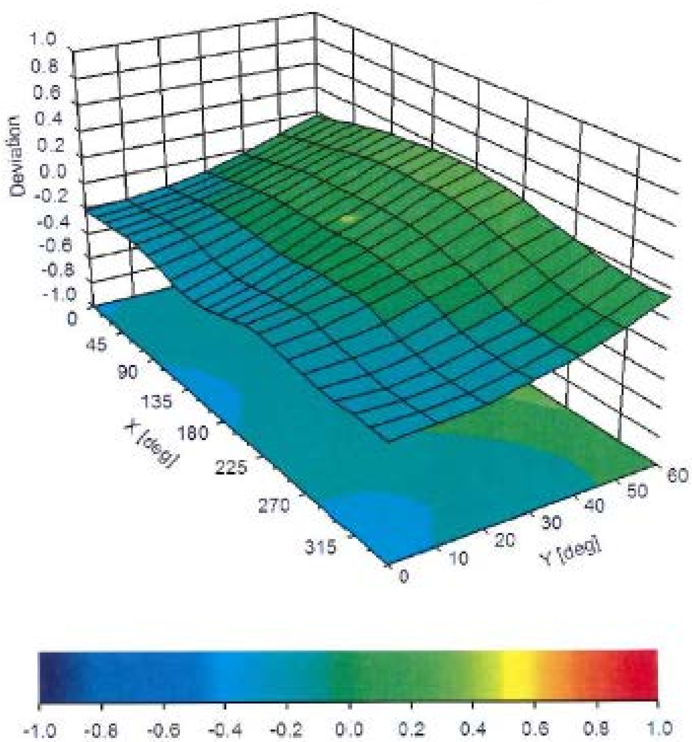


f = 1900 MHz,WGLS R22 (H_convF)



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: ES3DV3 - SN:3196

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	6.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 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	191.9	±3.5 %
		Y	0.0	0.0	1.0		203.8	
		Z	0.0	0.0	1.0		204.9	
10011-CAB	UMTS-FDD (WCDMA)	X	3.15	66.2	18.1	2.91	131.3	±0.7 %
		Y	3.25	66.4	17.9		143.9	
		Z	3.34	67.3	18.9		144.4	
10097-CAB	UMTS-FDD (HSDPA)	X	4.57	66.5	18.5	3.98	141.0	±0.9 %
		Y	4.44	65.6	17.9		129.2	
		Z	4.57	66.5	18.7		131.2	
10098-CAB	UMTS-FDD (HSUPA, Subtest 2)	X	4.63	66.8	18.7	3.98	141.2	±0.9 %
		Y	4.48	65.8	18.0		129.6	
		Z	4.56	66.4	18.7		130.5	
10100-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.64	68.4	20.3	5.67	148.8	±1.4 %
		Y	6.31	66.9	19.3		134.7	
		Z	6.47	67.7	20.0		137.4	
10101-CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	X	7.41	67.5	20.1	6.42	132.2	±1.9 %
		Y	7.45	67.4	19.8		144.4	
		Z	7.62	68.2	20.6		147.4	
10108-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.50	67.9	20.2	5.80	144.9	±1.4 %
		Y	6.20	66.5	19.1		132.7	
		Z	6.38	67.4	20.0		134.5	
10109-CAD	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	X	7.19	67.3	20.0	6.43	128.8	±1.7 %
		Y	7.22	67.1	19.7		141.7	
		Z	7.36	67.8	20.5		143.1	
10110-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.14	67.1	19.8	5.75	140.8	±1.4 %
		Y	5.93	66.1	19.0		128.6	
		Z	6.05	66.8	19.7		131.2	
10111-CAD	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	X	7.21	68.0	20.5	6.44	148.8	±1.7 %
		Y	6.96	66.8	19.6		137.4	
		Z	7.09	67.5	20.3		138.9	
10117-CAB	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	X	10.47	69.6	21.8	8.07	135.7	±2.7 %
		Y	10.30	69.0	21.3		145.6	
		Z	10.27	69.1	21.6		124.4	
10140-CAC	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	X	7.66	67.8	20.3	6.49	133.4	±1.7 %
		Y	7.64	67.6	20.0		145.3	
		Z	7.83	68.4	20.7		148.8	
10142-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	X	5.97	67.0	19.8	5.73	137.4	±1.7 %
		Y	5.99	66.8	19.4		149.4	
		Z	5.87	66.5	19.6		128.3	
10143-CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	X	6.96	67.8	20.4	6.35	145.0	±1.4 %
		Y	6.67	66.5	19.4		130.6	
		Z	6.87	67.4	20.3		135.1	

10145-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	X	5.66	66.4	19.5	5.76	132.2	±1.4 %
		Y	5.72	66.4	19.3		145.5	
		Z	5.83	67.1	20.0		146.9	
10146-CAD	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	X	6.59	67.3	20.2	6.41	134.3	±1.7 %
		Y	6.70	67.5	20.1		148.7	
		Z	6.57	67.3	20.2		128.0	
10149-CAC	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	X	7.42	68.1	20.5	6.42	148.9	±1.7 %
		Y	7.16	66.9	19.7		137.3	
		Z	7.32	67.6	20.4		139.9	
10154-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.08	66.9	19.7	5.75	135.0	±1.4 %
		Y	5.91	66.0	19.0		128.3	
		Z	6.02	66.6	19.7		129.1	
10155-CAD	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	X	7.10	67.6	20.3	6.43	144.0	±1.7 %
		Y	6.93	66.7	19.6		135.0	
		Z	7.06	67.4	20.3		136.1	
10156-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	X	5.86	66.6	19.6	5.79	132.5	±1.4 %
		Y	5.94	66.6	19.4		148.0	
		Z	6.04	67.3	20.1		149.4	
10157-CAD	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	X	6.88	67.5	20.3	6.49	139.1	±1.4 %
		Y	6.70	66.6	19.6		130.0	
		Z	6.83	67.3	20.3		131.8	
10160-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	X	6.52	67.4	19.9	5.82	139.8	±1.4 %
		Y	6.31	66.4	19.2		131.6	
		Z	6.47	67.2	19.9		134.3	
10161-CAC	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	X	7.46	68.0	20.5	6.43	147.9	±1.7 %
		Y	7.28	67.2	19.8		139.9	
		Z	7.40	67.8	20.4		141.3	
10166-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	X	5.26	67.0	19.8	5.46	146.2	±1.2 %
		Y	5.10	65.9	18.9		137.5	
		Z	5.20	66.6	19.7		140.5	
10167-CAD	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	X	6.21	68.0	20.5	6.21	147.9	±1.4 %
		Y	6.11	67.3	19.9		141.5	
		Z	6.20	67.9	20.6		145.1	
10169-CAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	5.11	67.1	20.0	5.73	137.1	±1.2 %
		Y	4.97	66.1	19.2		128.7	
		Z	5.09	66.9	20.1		134.8	
10170-CAC	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	X	6.01	68.6	21.2	6.52	140.6	±1.7 %
		Y	5.76	67.1	20.0		128.6	
		Z	5.90	68.0	21.0		135.3	
10175-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	5.08	67.0	19.9	5.72	138.1	±1.7 %
		Y	5.19	67.1	19.8		149.2	
		Z	5.09	66.9	20.1		135.6	
10176-CAD	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	X	5.98	68.5	21.1	6.52	139.5	±1.7 %
		Y	5.72	67.0	20.0		127.8	
		Z	5.92	68.1	21.0		136.1	

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10177-CAF	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	X	5.09	67.0	20.0	5.73	137.8	±1.7 %
		Y	5.15	66.9	19.7		149.7	
		Z	5.09	66.9	20.1		135.5	
10178-CAD	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	X	5.96	68.4	21.0	6.52	139.4	±1.4 %
		Y	5.74	67.0	20.0		128.0	
		Z	5.93	68.2	21.1		135.7	
10181-CAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	X	5.08	67.0	20.0	5.72	137.3	±1.4 %
		Y	5.15	66.9	19.7		149.8	
		Z	5.08	66.9	20.0		136.0	
10182-CAC	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	X	5.99	68.5	21.1	6.52	140.2	±1.4 %
		Y	5.75	67.1	20.1		128.3	
		Z	5.92	68.1	21.0		136.0	
10184-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	X	5.08	67.0	20.0	5.73	137.5	±1.4 %
		Y	5.13	66.8	19.6		149.7	
		Z	5.08	66.8	20.0		135.5	
10185-CAD	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	X	5.99	68.5	21.1	6.51	140.4	±1.4 %
		Y	5.77	67.2	20.1		128.7	
		Z	5.95	68.3	21.1		135.9	
10187-CAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	X	5.10	67.0	20.0	5.73	137.7	±1.2 %
		Y	4.94	65.9	19.1		127.3	
		Z	5.11	66.9	20.1		135.0	
10188-CAD	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	X	5.99	68.5	21.1	6.52	141.3	±1.7 %
		Y	5.75	67.1	20.1		129.1	
		Z	5.94	68.2	21.0		136.0	
10196-CAB	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	X	10.32	69.9	22.1	8.10	149.3	±2.5 %
		Y	9.93	68.6	21.2		136.9	
		Z	10.25	69.7	22.1		144.6	
10225-CAB	UMTS-FDD (HSPA+)	X	6.96	66.8	19.5	5.97	126.9	±1.4 %
		Y	7.05	67.0	19.4		142.8	
		Z	7.10	67.3	19.9		144.5	
10274-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	X	6.05	67.2	19.2	4.87	146.9	±1.2 %
		Y	5.88	66.4	18.5		136.3	
		Z	6.02	67.0	19.2		140.4	
10275-CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	X	4.38	66.5	18.7	3.96	128.6	±0.9 %
		Y	4.48	66.7	18.6		141.5	
		Z	4.53	67.1	19.2		146.6	
10297-AAB	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.39	67.4	20.0	5.81	134.6	±1.4 %
		Y	6.16	66.3	19.1		126.6	
		Z	6.34	67.1	19.9		130.2	
10298-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	X	5.70	66.4	19.5	5.72	128.8	±1.4 %
		Y	5.79	66.5	19.4		144.2	
		Z	5.89	67.2	20.1		146.6	
10299-AAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	X	6.71	67.5	20.2	6.39	135.5	±1.4 %
		Y	6.54	66.6	19.5		127.4	
		Z	6.64	67.2	20.2		129.0	

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10311-AAB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	X	7.01	68.2	20.4	6.06	141.6	±1.7 %
		Y	6.76	67.1	19.6		133.7	
		Z	6.92	67.8	20.3		135.3	
10415-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	X	2.59	67.8	18.6	1.54	148.4	±0.7 %
		Y	2.50	66.6	17.5		141.3	
		Z	2.62	68.0	19.0		142.7	
10418-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	X	10.26	69.8	22.1	8.14	147.2	±2.5 %
		Y	9.97	68.8	21.4		139.1	
		Z	10.18	69.6	22.1		141.7	
10430-AAA	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	X	9.52	69.2	22.0	8.28	133.2	±1.9 %
		Y	9.19	68.0	21.1		124.7	
		Z	9.46	69.0	22.0		127.4	
10431-AAA	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	X	10.13	69.7	22.3	8.38	141.6	±2.5 %
		Y	9.84	68.7	21.5		133.3	
		Z	10.08	69.6	22.3		136.1	
10432-AAA	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	X	10.35	69.9	22.3	8.34	145.3	±2.5 %
		Y	10.06	68.8	21.5		137.2	
		Z	10.28	69.7	22.3		139.8	
10433-AAA	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	X	10.59	70.1	22.4	8.34	149.7	±2.5 %
		Y	10.26	69.0	21.5		139.9	
		Z	10.53	69.9	22.4		144.9	
10434-AAA	W-CDMA (BS Test Model 1, 64 DPCH)	X	9.81	69.7	22.5	8.60	132.3	±2.2 %
		Y	9.51	68.5	21.6		125.0	
		Z	9.78	69.6	22.5		129.2	
10435-AAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.19	72.9	24.2	7.82	127.6	±2.2 %
		Y	7.59	73.8	24.4		147.3	
		Z	7.07	72.3	24.1		124.7	
10457-AAA	UMTS-FDD (DC-HSDPA)	X	8.35	67.3	20.1	6.62	139.7	±1.4 %
		Y	8.12	66.5	19.4		128.3	
		Z	8.32	67.2	20.1		135.4	
10460-AAA	UMTS-FDD (WCDMA, AMR)	X	2.90	68.0	19.1	2.39	143.8	±0.9 %
		Y	2.85	67.4	18.5		132.5	
		Z	2.99	68.8	19.7		138.4	
10461-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.38	73.6	24.6	7.82	132.5	±3.0 %
		Y	7.55	73.6	24.3		145.4	
		Z	7.23	72.9	24.4		126.5	
10462-AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.72	73.8	24.9	8.30	128.2	±2.7 %
		Y	8.15	74.7	25.1		140.6	
		Z	8.45	76.2	26.4		149.1	
10464-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.27	73.2	24.4	7.82	127.9	±2.5 %
		Y	7.46	73.4	24.2		140.3	
		Z	7.79	75.0	25.6		148.8	

10465-AAA	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	7.64	73.4	24.7	8.32	124.5	±3.0 %
		Y	8.16	74.7	25.1		140.5	
		Z	8.38	75.9	26.3		147.0	
10467-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.11	72.6	24.1	7.82	125.3	±2.5 %
		Y	7.44	73.3	24.2		139.5	
		Z	7.82	75.2	25.6		149.0	
10468-AAB	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.57	76.6	26.4	8.32	149.6	±3.0 %
		Y	8.14	74.6	25.1		140.9	
		Z	8.46	76.3	26.4		149.0	
10470-AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.89	75.4	25.6	7.82	148.3	±2.7 %
		Y	7.51	73.6	24.3		140.6	
		Z	7.81	75.1	25.6		148.1	
10471-AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.51	76.4	26.3	8.32	149.0	±3.0 %
		Y	8.14	74.6	25.1		141.1	
		Z	8.44	76.2	26.4		148.4	
10473-AAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.86	75.3	25.5	7.82	148.1	±2.7 %
		Y	7.48	73.5	24.3		141.1	
		Z	7.76	74.9	25.5		147.8	
10474-AAB	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.51	76.4	26.3	8.32	149.1	±3.0 %
		Y	8.13	74.6	25.1		141.7	
		Z	8.40	76.0	26.3		147.9	
10477-AAB	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.57	76.7	26.5	8.32	148.4	±3.0 %
		Y	8.17	74.7	25.2		142.2	
		Z	8.39	76.0	26.3		148.1	
10479-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.41	72.1	23.7	7.74	130.6	±2.7 %
		Y	7.11	70.5	22.6		126.0	
		Z	7.44	72.1	23.9		130.3	
10480-AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.20	73.1	24.4	8.18	136.4	±3.0 %
		Y	7.90	71.6	23.3		130.3	
		Z	8.19	73.0	24.5		134.3	
10482-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.16	73.0	24.1	7.71	142.7	±3.3 %
		Y	7.79	71.3	22.9		136.9	
		Z	8.07	72.6	24.1		140.2	
10483-AAA	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.56	71.7	23.7	8.39	127.2	±2.7 %
		Y	9.01	72.7	24.0		148.0	
		Z	9.13	73.5	24.9		148.2	
10485-AAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.29	73.3	24.2	7.59	148.2	±2.5 %
		Y	7.91	71.7	23.0		140.3	
		Z	8.08	72.6	24.0		141.9	
10486-AAB	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.60	71.9	23.9	8.38	130.9	±2.7 %
		Y	9.04	72.2	23.7		149.2	
		Z	8.62	71.3	23.6		125.3	
10488-AAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.12	71.6	23.3	7.70	128.9	±2.7 %
		Y	8.42	72.1	23.3		147.2	
		Z	8.65	73.3	24.4		147.8	

10489-AAB	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	9.11	72.0	23.9	8.31	137.4	±2.7 %
		Y	8.58	70.0	22.4		127.9	
		Z	8.95	71.5	23.6		130.3	
10491-AAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.67	72.3	23.5	7.74	135.2	±2.5 %
		Y	8.08	70.0	22.1		125.2	
		Z	8.48	71.6	23.3		128.7	
10492-AAB	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	9.70	72.6	24.1	8.41	144.0	±2.7 %
		Y	9.18	70.6	22.8		135.3	
		Z	9.54	72.0	23.9		138.6	
10494-AAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.68	72.5	23.7	7.74	133.9	±2.5 %
		Y	8.08	70.2	22.2		124.5	
		Z	8.51	71.9	23.5		127.7	
10495-AAB	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	9.60	72.5	24.1	8.37	142.9	±2.7 %
		Y	9.17	70.8	22.9		135.6	
		Z	9.48	72.1	23.9		137.9	
10497-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.00	72.9	24.1	7.67	144.0	±3.0 %
		Y	7.60	71.0	22.7		136.2	
		Z	7.89	72.4	24.0		139.2	
10498-AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.34	71.4	23.6	8.40	124.4	±3.0 %
		Y	8.78	72.3	23.8		144.6	
		Z	8.94	73.3	24.8		145.4	
10500-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	7.79	71.1	23.1	7.67	125.5	±2.5 %
		Y	8.03	71.5	23.0		140.7	
		Z	8.44	73.3	24.4		146.1	
10501-AAA	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	8.98	72.0	24.0	8.44	133.9	±2.7 %
		Y	8.50	70.0	22.6		125.3	
		Z	8.84	71.5	23.8		128.5	
10503-AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.11	71.6	23.3	7.72	128.9	±2.5 %
		Y	8.46	72.3	23.4		147.4	
		Z	8.77	73.7	24.6		149.9	
10504-AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	9.12	72.1	23.9	8.31	137.9	±3.0 %
		Y	8.56	69.9	22.4		127.3	
		Z	8.98	71.6	23.7		132.5	
10506-AAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	8.66	72.5	23.7	7.74	133.6	±2.2 %
		Y	8.00	70.0	22.1		122.6	
		Z	8.54	72.0	23.6		129.3	
10507-AAB	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	9.56	72.4	24.0	8.36	142.4	±3.0 %
		Y	9.00	70.3	22.6		132.3	
		Z	9.54	72.3	24.1		139.8	
10509-AAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.43	73.2	24.1	7.99	139.9	±2.7 %
		Y	8.75	70.8	22.6		128.7	
		Z	9.34	72.9	24.1		135.9	

10510-AAB	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	9.51	71.0	23.2	8.49	122.3	±2.7 %
		Y	9.71	71.2	23.1		140.2	
		Z	10.19	72.9	24.4		147.3	
10512-AAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	X	9.02	72.8	23.7	7.74	135.0	±2.5 %
		Y	8.41	70.7	22.3		126.5	
		Z	9.01	72.8	23.8		133.0	
10513-AAB	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	X	10.08	73.0	24.3	8.42	147.1	±2.7 %
		Y	9.44	70.8	22.8		136.6	
		Z	10.02	72.8	24.3		144.2	
10515-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	X	2.69	68.5	18.9	1.58	145.5	±0.7 %
		Y	2.62	67.5	18.1		139.0	
		Z	2.73	68.7	19.3		143.9	
10564-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	X	10.41	69.9	22.3	8.25	146.6	±2.2 %
		Y	10.14	68.9	21.5		136.8	
		Z	10.38	69.8	22.3		142.6	
10571-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	X	3.47	71.3	20.1	1.99	145.7	±0.7 %
		Y	3.22	69.4	19.0		137.8	
		Z	3.47	71.3	20.4		142.7	
10572-AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	X	3.56	71.9	20.4	1.99	144.9	±0.7 %
		Y	3.39	70.5	19.4		138.7	
		Z	3.52	71.7	20.6		142.1	
10575-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	X	10.63	70.6	22.9	8.59	146.0	±2.7 %
		Y	10.51	69.5	22.0		140.4	
		Z	10.78	70.4	22.9		142.4	
10576-AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	X	10.68	70.7	22.9	8.60	147.2	±2.7 %
		Y	10.55	69.6	22.1		139.9	
		Z	10.79	70.5	22.9		141.6	
10591-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	X	10.96	70.7	22.9	8.63	148.2	±2.7 %
		Y	10.64	69.6	22.0		142.7	
		Z	10.91	70.5	22.9		144.1	
10592-AAA	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	X	11.14	70.9	23.1	8.79	147.7	±2.7 %
		Y	10.84	69.8	22.3		143.1	
		Z	11.11	70.8	23.1		144.3	
10599-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	X	11.15	70.1	22.5	8.79	126.8	±2.5 %
		Y	10.76	69.0	21.7		121.6	
		Z	11.13	70.1	22.6		124.8	
10600-AAA	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	X	11.22	70.2	22.6	8.88	126.7	±2.2 %
		Y	10.85	69.1	21.8		122.4	
		Z	11.24	70.2	22.7		124.7	

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