

Nemko Korea Co., Ltd.

165-51, Yurim-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 17042, Republic of Korea

TEL:+82 31 330-1700

FAX:+82 31 322 2332

FCC & IC SAR EVALUATION REPORT FOR CERTIFICATION

Project No : NK-24-R-226**Dates of receipt :** May 28, 2024**Applicant :** DRTECH Corporation**Dates of Issue :** November 12, 2024Suite No. 1,2 Floor / Suite No. 2,3 Floor 29,
Dunchon-daero 541 beon-ji, Jungwon-gu
Seongnam-si, Gyeonggi-do, 13216, Korea**Test Site :**

Nemko Korea Co., Ltd.

FCC ID:

RNH-TOP8812BU

IC :

29808-TOP8812BU

Applicant :

DRTECH Corporation

Brand Name :

DRTECH

Model :

TOP8812BU

Host Model Name:

EXPD 4343N1

Additional**Host Model(s):**EXPD 4343U1, EXPD 4343N, EXPD 4343NP, EXPD 4343NU,
EXPD 3643N1, EXPD 3643U1, EXPD 3643N, EXPD 3643NP,
EXPD 3643NU**EUT Type:**

Flat Panel Digital X-ray Detector

Classification:Digital Transmission System(DTS)
Unlicensed National Information Infrastructure(UNII)**Date of Test:**

September 2, 2024 ~ September 20, 2024

Applied Standard:FCC 47 CFR Part 2.1093
RSS-102 Issue 6

The device bearing the brand name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in IEEE 1528-2013. The client should not use it to claim product endorsement by TAF or any government agencies. The test results in the report only apply to the tested sample.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. This report is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.



Tested By : Wonhee Lee

Test Engineer



Reviewed By : Hoonpyo Lee

Technical Manager

Revision History

Rev.	Issue Date	Revisions	Revised By
00	November 12, 2024	Initial issue	Wonhee Lee

TABLE OF CONTENTS

1. INTRODUCTION	5
1.1 TEST FACILITY	5
1.2 ACCREDITATION AND LISTING	5
2. EUT INFORMATION & TEST CONDITIONS	6
2.1 EUT INFORMATION	6
2.1.1 Variants Covered By This Report(Model Distinction)	8
2.2 OPERATION DURING TEST	8
2.2.1 Operating Environment	9
2.2.2 Table of test channels	9
2.2.3 Table of test power setting	10
2.2.4 Antenna Information	12
2.2.5 Additional Information Related to Testing	12
2.3 SUPPORT EQUIPMENT	13
2.4 MAXIMUM TARGET POWER AMONG PRODUCTION UNITS	13
2.5 SAR TEST CONSIDERATION	14
2.6 SAR TESTING EUT CONFIGURATION	15
2.7 ANTENNA LOCATION	16
3. TEST METHODOLOGY	18
4. SAR MEASUREMENT SYSTEM	19
4.1 SAR MEASUREMENT SETUP	19
4.2 MEASUREMENT SYSTEM	19
4.2.1 SPEAG DASY8 System	19
4.2.2 SAR Probe	20
4.2.3 SAM Phantom	20
4.2.4 ELI Phantom	21
4.3 SIMULATING MIXTURE CHARACTERIZATION	22
4.4 DEVICE HOLDER FOR TRANSMITTERS	23
5. SAR MEASUREMENT PROCEDURE	24
5. LIMITS FOR SPECIFIC ABSORPTION RATE (SAR)	26
6. MEASUREMENT UNCERTAINTY & DECISION RULE	27
6.1 MEASUREMENT UNCERTAINTY	27
6.2 DECISION RULE	27
7. TEST EQUIPMENTS	28
8. FCC MEASUREMENT PROCEDURES	29
8.1 GENERAL DEVICE SETUP	29
8.2 2.4 GHZ SAR PROCEDURES	29
8.3 SAR TEST REQUIREMENTS FOR OFDM CONFIGURATION	29
8.4 INITIAL TEST POSITION SAR TEST REDUCTION PROCEDURE	30
8.5 SIMULTANEOUS TRANSMISSION SAR CONSIDERATIONS	30

9. OUTPUT POWER MEASUREMENT.....	31
9.1 MEASUREMENT PROCEDURES FOR OUTPUT POWER.....	31
9.2 CONDUCTED RF OUTPUT POWER	32
10. SYSTEM VERIFICATION.....	35
10.1 TISSUE VERIFICATION RESULTS.....	35
10.2 SYSTEM VERIFICATION TEST SETUP.....	37
10.3 SYSTEM VERIFICATION RESULTS	38
11. SAR MEASUREMENT RESULTS.....	39
12. CONCLUSION.....	46
APPENDIX A. PLOTS OF SAR RESULTS	47
APPENDIX B. PLOTS OF SYSTEM VERIFICATION	60
APPENDIX C. CALIBRATION REPORT OF THE PROBE.....	69
APPENDIX D. CALIBRATION REPORT OF THE DIPOLE ANTENNA.....	92

1. INTRODUCTION

1.1 Test facility

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2014), the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013) was used in determining radiated and conducted emissions emanating.

These measurement tests were conducted at **Nemko Korea Co., Ltd..**

The site address 165-51, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 17042 Republic of Korea.

1.2 Accreditation and listing

Accreditation type		Accreditation number
	CAB Accreditation for DOC	Designation No. KR0026
	KOLAS Accredited Lab. (Korea Laboratory Accreditation Scheme)	Registration No. KT155
	Canada IC Registered site	Site No. 29506
	VCCI registration site(RE/CE/Telecom CE)	Member No. 2118
	EMC CBTL	TL124
	KCC(RRL)Designated Lab.	Registration No. KR0026

2. EUT INFORMATION & TEST CONDITIONS

2.1 EUT Information

Specifications:

EUT Type	Flat Panel Digital X-ray Detector
Model Name	TOP-8812BU
Host Model Name	EXPD 4343N1
Variant Host Model Name	EXPD 3643N1, EXPD 3643U1, EXPD 3643N, EXPD 3643NP, EXPD 3643NU, EXPD 4343U1, EXPD 4343N, EXPD 4343NP, EXPD 4343NU
Brand Name	DRTECH
Frequency of Operation	<u>For DTS Band</u> 2 412 MHz to 2 462 MHz : 802.11b,n(20 MHz) 2 422 MHz to 2 452 MHz : 802.11n (40 MHz) <u>For U-NII-1 Band</u> 5 180 MHz to 5 240 MHz : 802.11a,n,ac (20 MHz) 5 190 MHz to 5 230 MHz : 802.11n,ac (40 MHz) 5 210 MHz : 802.11ac (80 MHz) <u>For U-NII-3 Band</u> 5 745 MHz to 5 805 MHz : 802.11a,n,ac (20 MHz) 5 755 MHz to 5 795 MHz : 802.11n,ac (40 MHz) 5 775 MHz : 802.11ac (80 MHz)
Hardware Version Identification Number(HVIN)	TOP8812BU
Firmware Version Identification Number(FVIN)	GEN_HW3.00.00_V3_SW0.0.01
Maximum Average Output Power (Conducted)	<u>For DTS Band</u> 802.11b : 17.24 dBm 802.11g : 13.93 dBm 802.11n(20 MHz) : 14.96 dBm 802.11n(40 MHz) : 14.13 dBm <u>For U-NII-1 Band</u> 802.11a : 14.97 dBm 802.11n(20 MHz) : 16.00 dBm 802.11n(40 MHz) : 11.90 dBm 802.11ac(20 MHz) : 15.73 dBm 802.11ac(40 MHz) : 12.26 dBm 802.11ac(80 MHz) : 10.75 dBm <u>For U-NII-3 Band</u> 802.11a : 11.05 dBm 802.11n(20 MHz) : 12.61 dBm 802.11n(40 MHz) : 9.94 dBm 802.11ac(20 MHz) : 11.71 dBm 802.11ac(40 MHz) : 9.51 dBm 802.11ac(80 MHz) : 7.27 dBm

Modulations	CCK, BPSK, QPSK, 16QAM, 64QAM, 256QAM	
Highest SAR Value (Reported)	0.777 W/kg	
Highest Simultaneous SAR Value(Reported)	1.506 W/kg	
FCC Classification	Digital Transmission System (DTS) Unlicensed National Information Infrastructure(UNII)	
Channel Number	<u>For DTS Band</u> 2 412 MHz to 2 462 MHz : 11 ch 2 422 MHz to 2 452 MHz : 7 ch <u>For U-NII-1 Band</u> 802.11a,n,ac (20 MHz) : 4 ch 802.11n,ac (40 MHz) : 2 ch 802.11ac (80 MHz) : 1 ch <u>For U-NII-3 Band</u> 802.11a,n,ac (20 MHz) : 4 ch 802.11n,ac (40 MHz) : 2 ch 802.11ac (80 MHz) : 1 ch	
Antenna Gain (peak)	APDR-600WS(Ant 1)	APDR-600WT(Ant 2)
	DTS : -3.6 dBi U-NII-1 : -0.4 dBi U-NII-3 : -0.5 dBi	DTS : -5.5 dBi U-NII-1 : 0.7 dBi U-NII-3 : 1.1 dBi
Antenna Setup	2TX / 2RX	
Remarks	1. Reference module report RF module FCC ID: RNH-TOP8812BU RF module IC No. : 29808-TOP8812BU RF module(TOP-8812BU) report No.: REP059250-1(FCCIC_DTS) REP059250-2(FCCIC_UNII) 2. SAR testing model SAR testing were performed for each dimension.(EXPD 4343N1, EXPD 3643N1)	

2.1.1 Variants Covered By This Report(Model Distinction)

EXPD 4343N1 is basic host model name. The difference between the EXPD 3643 series and EXPD 4343 series is only dimension.

Model Name	EXPD 4343N1	EXPD 4343U1	EXPD 4343N	EXPD 4343NP	EXPD 4343NU
Basic / Variant	Basic	Variant	Variant	Variant	Variant
Pixel Pitch (μm)	100		140		
Panel	Glass a-Si	Flexible a-Si	Glass a-Si	Glass IGZO	Flexible a-Si
Dimension (mm)	460 x 460 x 15.5				
Remark	And variant models are identical to basic model except for pixel pitch and panel. There are no any changes in antenna, PCB, electrical modifications to the applicable variant models.				

Model Name	EXPD 3643N1	EXPD 3643U1	EXPD 3643N	EXPD 3643NP	EXPD 3643NU
Basic / Variant	Variant	Variant	Variant	Variant	Variant
Pixel Pitch (μm)	100		140		
Panel	Glass a-Si	Flexible a-Si	Glass a-Si	Glass IGZO	Flexible a-Si
Dimension (mm)	386 x 460 x 15.5				
Remark	And variant models are identical to basic model except for pixel pitch and panel. There are no any changes in antenna, PCB, electrical modifications to the applicable variant models.				

2.2 Operation During Test

The EUT contains FCC,ISED approved RF module.

The EUT is the transceiver which is WiFi module supporting WLAN mode.

The Laptop was used to control the EUT to transmit the wanted TX channel continuously by the testing program (MPtool version 3.3.5) supported by manufacturer.

The EUT was tested at the lowest channel, middle channel and the highest channel with the maximum output power in accordance with the manufacturer's specifications. The worst data were recorded in the report.

2.2.1 Operating Environment

Parameters	Recording during test	Accepted deviation
Ambient temperature	(21.6 ~ 23.3) °C	(18.0 ~ 25.0) °C
Relative Humidity	(43.9 ~ 50.5) %	(30.0 ~ 70.0) %

2.2.2 Table of test channels

Frequency band	Modulation	Test Channel (CH)	Frequency (MHz)
2.4 GHz	802.11b,g,n(HT20)	1	2 412
		6	2 437
		11	2 462
	802.11n(HT40)	3	2 422
		6	2 437
		9	2 452
U-NII-1	802.11a,n,ac(20 MHz)	36	5 180
		44	5 220
		48	5 240
	802.11n,ac(40 MHz)	38	5 190
		46	5 230
	802.11ac(80 MHz)	42	5 210
U-NII-3	802.11a,n,ac(20 MHz)	149	5 745
		157	5 785
		161	5 805
	802.11n,ac(40 MHz)	151	5 755
		159	5 795
	802.11ac(80 MHz)	155	5 775

2.2.3 Table of test power setting

Frequency [MHz]	Mode	Power setting Level (SISO)	Power setting Level (MIMO)
2 412	802.11b	50	-
2 437		50	-
2 462		50	-
2 412	802.11g	50	-
2 437		50	-
2 462		50	-
2 412	802.11n HT20	50	50
2 437		50	50
2 462		50	50
2 422	802.11n HT40	45	45
2 437		45	45
2 452		45	45

Frequency [MHz]	Mode	Power setting Level (SISO)	Power setting Level (MIMO)
5 180	802.11a	46	-
5 220		46	-
5 240		46	-
5 180	802.11n HT20	46	46
5 220		46	46
5 240		46	46
5 180	802.11ac VHT20	46	46
5 220		46	46
5 240		46	46
5 190	802.11n HT40	40	40
5 230		40	40
5 190	802.11ac VHT40	40	40
5 230		40	40
5 210	802.11ac VHT80	38	38
5 745	802.11a	42	-
5 785		42	-
5 805		42	-
5 745	802.11n HT20	42	42
5 785		42	42
5 805		42	42
5 745	802.11ac VHT20	42	42
5 785		42	42
5 805		42	42
5 755	802.11n HT40	36	36
5 795		36	36
5 755	802.11ac VHT40	36	36
5 795		36	36
5 775	802.11ac VHT80	34	34

2.2.4 Antenna Information

Frequency band	Mode	Data rate	Antenna TX mode	Support CDD
2.4 GHz	802.11b,g	All	☒ 1TX, ☐ 2TX	☐ Yes, ☒ No
	802.11n (20MHz)	MCS 0~7	☒ 1TX, ☒ 2TX	☒ Yes, ☐ No
		MCS 8~15	☐ 1TX, ☒ 2TX	☐ Yes, ☒ No
	802.11n (40MHz)	MCS 0~7	☒ 1TX, ☒ 2TX	☒ Yes, ☐ No
		MCS 8~15	☐ 1TX, ☒ 2TX	☐ Yes, ☒ No
U-NII-1 U-NII-3	802.11a	All	☒ 1TX, ☐ 2TX	☐ Yes, ☒ No
	802.11n (20MHz)	MCS 0~7	☒ 1TX, ☒ 2TX	☒ Yes, ☐ No
		MCS 8~15	☐ 1TX, ☒ 2TX	☐ Yes, ☒ No
	802.11n (40MHz)	MCS 0~7	☒ 1TX, ☒ 2TX	☒ Yes, ☐ No
		MCS 8~15	☐ 1TX, ☒ 2TX	☐ Yes, ☒ No
	802.11ac (20MHz)	NSS1MCS0~NSS1MCS8	☒ 1TX, ☒ 2TX	☒ Yes, ☐ No
		NSS2MCS0~NSS2MCS8	☐ 1TX, ☒ 2TX	☐ Yes, ☒ No
	802.11ac (40MHz)	NSS1MCS0~NSS1MCS9	☒ 1TX, ☒ 2TX	☒ Yes, ☐ No
		NSS2MCS0~NSS2MCS9	☐ 1TX, ☒ 2TX	☐ Yes, ☒ No
	802.11ac (80MHz)	NSS1MCS0~NSS1MCS9	☒ 1TX, ☒ 2TX	☒ Yes, ☐ No
		NSS2MCS0~NSS2MCS9	☐ 1TX, ☒ 2TX	☐ Yes, ☒ No

2.2.5 Additional Information Related to Testing

RF module approved as below are installed in this device.

Product Name	Module Name	FCC ID	ISED No.
WiFi Module	TOP-8812BU	RNH-TOP8812BU	29808-TOP8812BU

This EUT does not support NFC function.

SAR testing was performed with a device-to-phantom separation distance of 0 mm according to KDB 447498 requirements.

SAR testing were performed for each dimension.(EXPD 4343N1, EXPD 3643N1)

2.3 Support Equipment

EUT	DRTECH Corporation Model : EXPD 4343N1, EXPD 3643N1	S/N: N/A
Laptop Computer	SAMSUNG Model : NT300E5Q	FCC DOC S/N : 0QR291IHC00394L
AC Adapter	CHICONY POWER TECHNOLOGY(SUZHOU) CO., LTD. Model : CPA09-004A 0.75 m unshielded power cable	FCC DOC S/N : A060R001L

2.4 Maximum Target Power among production units

Tune up tolerance is specified in operational description.

SAR values were scaled to the maximum tune-up power to determine compliance per KDB Publication 447498 D04 Interim General RF Exposure Guidance v01.

Band	Mode	Nominal Power (dB m)	Maximum Power (dB m)
DTS	802.11b	17	19
	802.11g	14	16
	802.11n(20M)	13	15
	802.11n(40M)	12	14
UNII-1	802.11a	14	16
	802.11n(20M)	14	16
	802.11ac(20M)	14	16
	802.11n(40M)	10	12
	802.11ac(40M)	10	12
	802.11ac(80M)	9	11
UNII-3	802.11a	11	13
	802.11n(20M)	11	13
	802.11ac(20M)	11	13
	802.11n(40M)	8	10
	802.11ac(40M)	8	10
	802.11ac(80M)	6	8

This device of tune-up tolerance is ± 2 dB.

2.5 SAR Test Consideration

Per FCC KDB 447498 D04 Interim General RF Exposure Guidance v01, SAR-based exemption threshold for distance ≤ 20 cm is defined by the following equation.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

f is in GHz.

d is the separation distance (cm).

Because the minimum separation distance was assumed to be 5 mm, the equation is used $ERP_{20 \text{ cm}}(d/20 \text{ cm})^x$.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
		5	10	15	20	25	30	35	40	45	50
	300	39	65	88	110	129	148	166	184	201	217
	450	22	44	67	89	112	135	158	180	203	226
	835	9	25	44	66	90	116	145	175	207	240
	1900	3	12	26	44	66	92	122	157	195	236
	2450	3	10	22	38	59	83	111	143	179	219
	3600	2	8	18	32	49	71	96	125	158	195
	5800	1	6	14	25	40	58	80	106	136	169

According to the FCC KDB 447498 D04 Interim General RF Exposure Guidance v01 Appendix B.2 Table, All of WLAN modes are required to SAR testing. Refer to the following table.

Band	Mode	Result (dBm)	Result (mW)	P_{th} (mW)	Required to FCC SAR test
DTS	802.11b mode @2412MHz	17.24	52.97	2.78	Yes
	802.11g mode @2412MHz	13.93	24.72	2.78	Yes
	802.11n20 mode @2437MHz	14.96	31.35	2.76	Yes
	802.11n40 mode @2422MHz	14.13	25.89	2.77	Yes
UNII-1	802.11a mode @5180MHz	14.97	31.41	1.51	Yes
	802.11n20 mode @5180MHz	16.00	39.83	1.51	Yes
	802.11n40 mode @5190MHz	11.90	15.50	1.50	Yes
	802.11ac20 mode @5240MHz	15.73	37.40	1.49	Yes
	802.11ac40 mode @5190MHz	12.26	16.84	1.50	Yes
	802.11ac80 mode @5210MHz	10.75	11.89	1.50	Yes
UNII-3	802.11a mode @5745MHz	11.05	12.74	1.39	Yes
	802.11n20 mode @5745MHz	12.61	18.23	1.39	Yes
	802.11n40 mode @5755MHz	9.94	9.86	1.38	Yes
	802.11ac20 mode @5745MHz	11.71	14.84	1.39	Yes
	802.11ac40 mode @5755MHz	9.51	8.93	1.38	Yes
	802.11ac80 mode @5775MHz	7.27	5.34	1.38	Yes

Per RSS-102 Issue 6, SAR exemption limit for separation distance and frequency is specified the following table.

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Band	Mode	Result (dBm)	Result (mW)	Exemption Limit (mW)	Required to ISED SAR test
DTS	802.11b mode_@2412MHz	17.24	52.97	3.21	Yes
	802.11g mode_@2412MHz	13.93	24.72	3.21	Yes
	802.11n20 mode_@2437MHz	14.96	31.35	3.07	Yes
	802.11n40 mode_@2422MHz	14.13	25.89	3.15	Yes
UNII-1	802.11a mode_@5180MHz	14.97	31.41	1.27	Yes
	802.11n20 mode_@5180MHz	16.00	39.83	1.27	Yes
	802.11n40 mode_@5190MHz	11.90	15.50	1.27	Yes
	802.11ac20 mode_@5240MHz	15.73	37.40	1.24	Yes
	802.11ac40 mode_@5190MHz	12.26	16.84	1.27	Yes
	802.11ac80 mode_@5210MHz	10.75	11.89	1.26	Yes
UNII-3	802.11a mode_@5745MHz	11.05	12.74	1.02	Yes
	802.11n20 mode_@5745MHz	12.61	18.23	1.02	Yes
	802.11n40 mode_@5755MHz	9.94	9.86	1.02	Yes
	802.11ac20 mode_@5745MHz	11.71	14.84	1.02	Yes
	802.11ac40 mode_@5755MHz	9.51	8.93	1.02	Yes
	802.11ac80 mode_@5775MHz	7.27	5.34	1.01	Yes

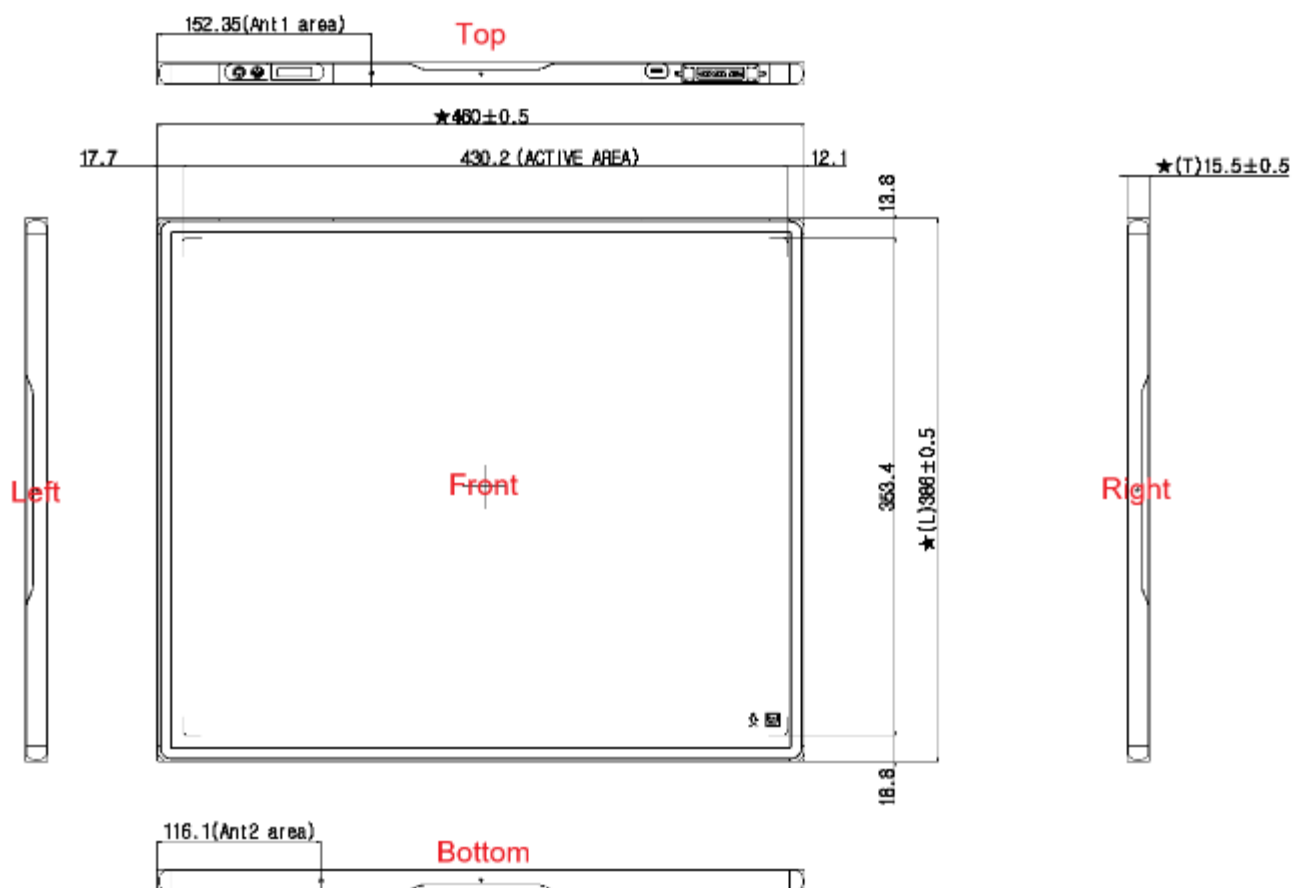
2.6 SAR testing EUT configuration

Device Type	Band/Mode	Device edge for SAR Testing					
		Front	Back	Left edge	Right edge	Top	Bottom
X ray detector	WiFi	Yes	N/A	N/A	N/A	N/A	N/A

The front side with touch configuration was tested since only the front side touched to human body in normal operation condition of this device.

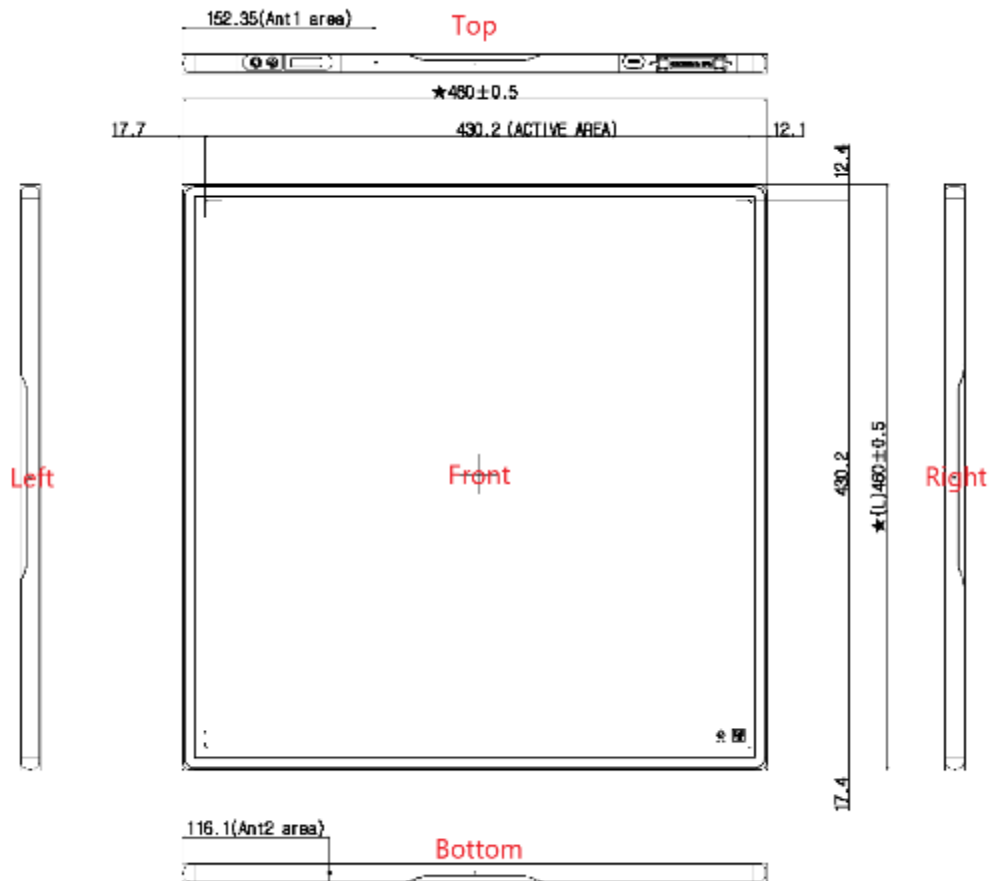
2.7 Antenna Location

EXPD 3643N1



Ant	Ant model	Top	Bottom	Front	Back	Left	Right
Ant 1	APDR-600WS	1.0 mm	384.2 mm	7.4 mm	8.1 mm	152.35 mm	307.65 mm
Ant 2	APDR-600WT	384.2 mm	1.0 mm	7.4 mm	8.1 mm	116.1 mm	343.9 mm

EXPD 4343N1



Ant	Ant model	Top	Bottom	Front	Back	Left	Right
Ant 1	APDR-600WS	1.0 mm	458.2 mm	7.4 mm	8.1 mm	152.35 mm	307.65 mm
Ant 2	APDR-600WT	458.2 mm	1.0 mm	7.4 mm	8.1 mm	116.1 mm	343.9 mm

Note :

-Exact antenna dimension and separation distances are shown in the User Manual in the FCC filing.

3. TEST METHODOLOGY

1. FCC 47 CFR Part 2 (2.1093)
2. IEEE 1528-2013
3. RSS-102 Issue 6
4. RSS-102.SAR.MEAS
5. FCC KDB Publication 447498 D04v01(Interim General RF Exposure)
6. FCC KDB Publication 248227 D01v02r02 (SAR Guidance for 802.11 Transmitter)
7. 2016 October TCB Workshop Notes (RF Exposure Procedures)
8. 2019 April TCB Workshop Notes (Tissue Simulating Liquids)
9. SPEAG DASY8 System Handbook

4.2.2 SAR Probe

The SAR measurement were conducted with dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates.

The probe is equipped with ant optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface.

Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a System maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero.

The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY8 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting.

The approach is stopped at reaching the maximum.

Model	EX3DV4 (Refer to Appendix)	
Frequency	4 MHz to 10 GHz	
Dynamic Range	10 μ W/g $\rightarrow$ 100 mW/g	
Linearity	$< \pm 0.2$ dB	
Hemispherical Isotropy	< 0.5 dB	
Position Precision	< 0.2 mm	
Dimensions	Overall length : 337 mm (tip : 20 mm) Tip diameter : 2.5 mm (body : 12 mm) Typical distance from probe tip to dipole centers : 1 mm	

4.2.3 SAM Phantom

The shells have a very tight tolerance of less than 0.2 mm, and they are fully compliant with the SAR standards and national regulations in the frequency range of 4 MHz ~ 10 GHz. Full computer-aided design (CAD) information have been predefined in the DASY8 software, enabling fast and easy usage.

In DASY8, phantoms are placed in a platform slot. The position of the slot relative to the robot is taught using the three reference points (P1, P2, P3) located on top of the phantom table.

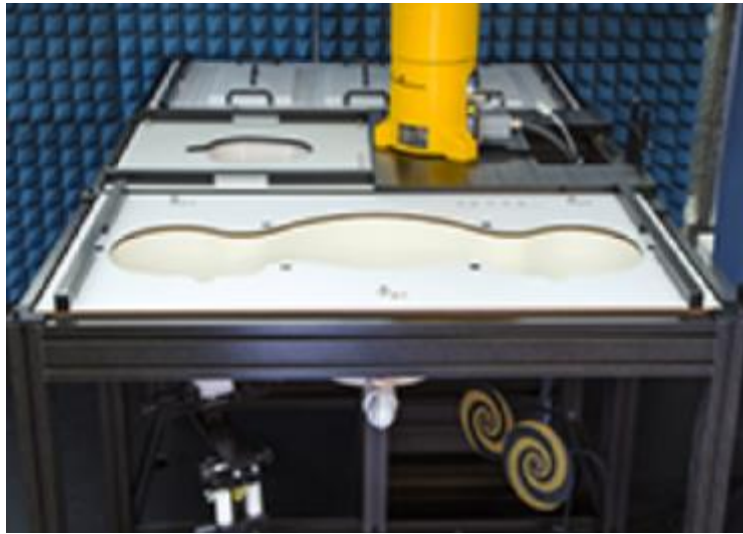


Figure 4.2.3 SAM Twin Phantom

4.2.4 ELI Phantom

The ELI phantom is optimized for compliance testing of large handheld and body-mounted wireless devices (tablets, laptops) or for evaluating transmitters operating at low frequencies.

The size of the phantom, including top plate is 1.0 x 0.5 m (1 full DASY8 platform slot). The filling volume is approximately 25 L.

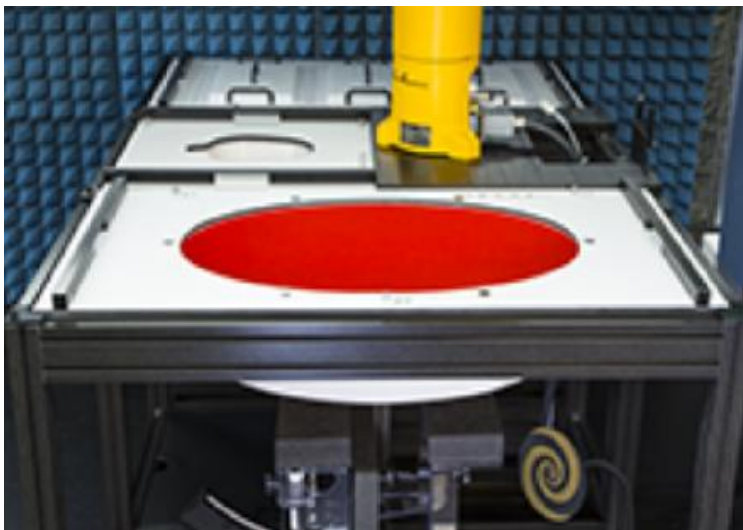
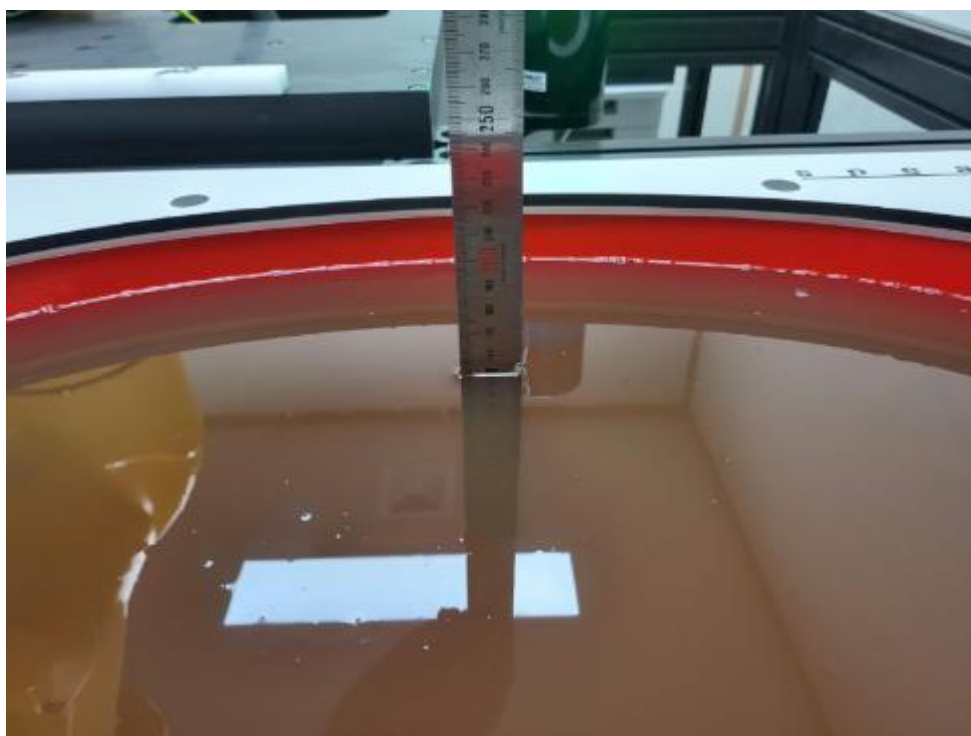


Figure 4.2.4 ELI Phantom

4.3 Simulating Mixture Characterization

TSL System	Manufacturer / Model	Freq Range (MHz)	Main Ingredients
Head Wide Band	SPEAG HBBL 600-10000	600 - 10000	Ethanediol, Sodium petroleum sulfonate / 2-Methyl-pentane-2,4-diol, Alkoxylated alcohol



600 MHz ~ 10 GHz Head Broad band Tissue Simulating Liquid, Depth: 150 mm

4.4 Device Holder for Transmitters

Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions at which the devices must be measured are defined by the standards. The DASY8 device holder along with the associated adaptors / options is designed to accommodate different types and sizes of test devices and yet provide accurate and repeatable positioning as described in the test standards.



Figure 4.4 Mounting Device for Hand-held Devices and Laptop / Body-Worn Devices

5. SAR Measurement Procedure

According to the SAR test standard, the recommended procedure for assessing the peak spatial-peak SAR value consists of the following steps:

- Power reference measurement
- Area scan
- Zoom scan
- Power drift measurement

The following procedure shall be performed for each test configuration in SAR test standard. The following table provides the measurement parameter used in the area scan and zoom scan.

- a) Measure the local SAR at a test point within 5 mm of the inner surface of the phantom where the measured local SAR exceeds the lower detection limit of the measurement system.
- b) Measure the two-dimensional SAR distribution within the phantom.
- c) From the area-scan SAR distribution, identify the position of the maximum SAR value.
- d) Measure the three-dimensional SAR distribution at each of the local maxima locations identified in step c).

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm $\pm$ 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm $\pm$ 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° $\pm$ 1°	20° $\pm$ 1°
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB Publication 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.				

5. Limits For Specific Absorption Rate (SAR)

HUMAN EXPOSURE	SAR (W/kg)	
	General Population / Uncontrolled Exposure Environment	Occupational / Controlled Exposure Environment
Spatial Peak SAR (Brain)	1.6	8.0
Spatial Average SAR (Whole Body)	0.08	0.4
Spatial Peak SAR (Hands, Wrists, Feet and Ankles)	4.0	20.0

1. This limits accord to SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6.
2. The Spatial Peak value of the SAR averaged over any 1g of tissue and over the appropriate averaging time.
3. The Spatial average value of the SAR averaged over the whole body.
4. The Spatial Peak value of the SAR averaged over any 10g of tissue and over appropriate averaging time.

6. Measurement Uncertainty & Decision Rule

6.1 Measurement Uncertainty

Per KDB 865664 D01 SAR measurement 100 MHz to 6 GHz clause 2.8.2, SAR measurement uncertainty analysis is required in SAR report only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR and ≥ 3.75 W/kg for 10-g SAR. The expanded SAR measurement uncertainty must be ≤ 30 %, for confidence interval of $k = 2$.

For this device, the highest measured 1-g SAR is less 1.5 W/kg and 10-g SAR is less 3.75 W/kg. Therefore, the measurement uncertainty table is not required in this report.

6.2 Decision Rule

The choice of whether or not to include the measurement uncertainty of the measuring system used in the test in the conformance determination.:

- ☐ Application of internal procedures used in type testing where traceability of measurement uncertainty is established.
- ☒ Applying the decision that the standard used for type testing does not require it.

7. Test Equipments

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Data	Calibration Due date
1	Shield Room	SY Corporation	NKRFS2	20220619	N/A	N/A
2	DASY8 System Robot	Stäubli	TX2-90XL	F/22/0036542/A/001	N/A	N/A
3	DASY8 Robot Controller	SPEAG	CS9spe-TX2-90	F/22/0036542/c/001	N/A	N/A
4	Vector Reflectometer	SPEAG	R140	21460035	2024-07-25	2025-07-25
5	Data Acquisition Electronics	SPEAG	DAE4	1726	2024-04-18	2025-04-18
6	E-Field probe	SPEAG	EX3DV4	3910	2024-02-19	2025-02-19
7	Oval Flat phantom ELI v8	SPEAG	QD OVA 004 A	2170	N/A	N/A
8	Dipole Antenna	SPEAG	D2450V2	774	2024-04-22	2026-04-22
9	Dipole Antenna	SPEAG	D5 GHz V2	1146	2023-01-25	2025-01-25
10	Low Pass Filter	Mini-Circuit	VLF-3000+	3 2044	2023-12-12	2024-12-12
11	Low Pass Filter	Mini-Circuit	VLF-6000+	3 2226	2023-12-12	2024-12-12
12	DUAL DIRECTIONAL COUPLER	KEYSIGHT	772D	MY52180366	2024-03-27	2025-03-27
13	Electric and Magnetic Field Probe	Speag	DAKS-3.5	1152	2024-05-23	2025-05-23
14	Dielectric Probe Stand	Speag	DAK Probe Stand	SM DAK 300-AB	N/A	N/A
15	RF Power Amplifier	EXODUS ADVANCED COMMUNICATI- ONS	AMP2027ADB	10004	2024-10-08	2025-10-08
16	Power Meter	H.P	437B	2912U01687	2024-10-08	2025-10-08
17	Power Sensor	H.P	8481A	MY41098315	2024-10-08	2025-10-08
18	Power Sensor	R&S	NRV-Z85	102407	2024-03-29	2025-03-29
19	Power Sensor	R&S	NRV-Z85	102408	2024-03-29	2025-03-29
20	10 dB Attenuator(50 W)	WEINSCHEL	47-10-43	BD0044	2024-10-08	2025-10-08
21	3 dB Attenuator	Mini-Circuit	BW-S3W20+	2224	2024-10-08	2025-10-08
22	Humidity Temperature	Lutron	MHB-382SD	40378	2024-10-16	2025-10-16
23	Vector Signal Generator	R&S	SMW200A	105755	2024-03-29	2025-03-29
24	Digital liquid Temperature	LKM electronic	DTM3000	3187	2024-10-15	2025-10-15
25	Spectrum Analyzer	Agilent	E4440A	MY44303257	2024-10-07	2025-10-07
26	DIGITAL MULTIMETER	EZ DIGITAL	DM-334	2111395	2024-10-08	2025-10-08
27	Device Holder	SPEAG	MD4HHTV5	SD 000 H01-KA	N/A	N/A

8. FCC Measurement Procedures

8.1 General Device setup

The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurements. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

8.2 2.4 GHz SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements.

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure.

- a) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
- b) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any *reported* SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configuration, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

- a) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
- b) 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 ≤ 1.2 W/kg.

8.3 SAR test requirements for OFDM configuration

When SAR measurement is required for 802.11 a/g/n/ac OFDM configurations, each standalone and aggregated frequency band is considered separately for SAR test reduction. When the same transmitter and antenna are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies.

The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band.

8.4 Initial Test position SAR test reduction procedure

- a) When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
- b) When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions are tested.
- c) For all positions/configuration tested using the initial test position and subsequent test position, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channel are tested.

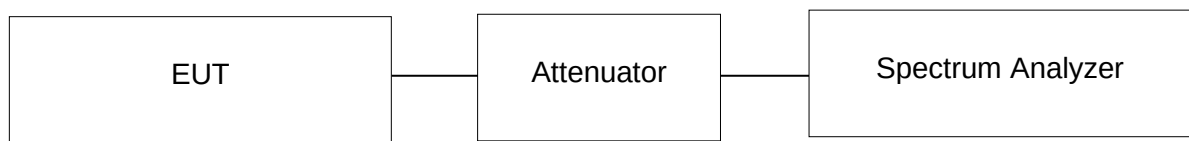
8.5 Simultaneous transmission SAR considerations

Per KDB publication 248227 D01 v02r02, the simultaneous SAR provision in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1-g single transmission chain SAR measurements is < 1.6 W/kg, no additional SAR measurements for MIMO are required.

9. Output Power Measurement

9.1 Measurement procedures for Output Power

EUTs average output power was measured at low, middle, high channels with a spectrum analyzer connected to the antenna terminal while the EUTs operating at its maximum power control level.



Power measurement Test Setup

9.2 Conducted RF Output Power

DTS

Mode	Measured Frequency (MHz)	Datarate	Duty Factor	Measured Output Power (dB m)		
				SISO Ant 1	SISO Ant 2	MIMO
802.11b	2 412	1 Mbps	1.00	17.24	17.01	-
	2 437			16.69	16.33	-
	2 462			16.68	16.31	-
802.11g	2 412	6 Mbps	1.00	13.93	13.52	-
	2 437			13.78	13.31	-
	2 462			13.81	13.35	-
802.11n(20M)	2 412	MCS0	1.00	12.70	12.54	14.60
	2 437			12.97	12.68	14.96
	2 462			12.64	12.37	14.72
802.11n(40M)	2 422	MCS0	1.00	11.66	11.36	14.13
	2 437			11.72	11.46	13.26
	2 452			11.71	11.44	12.80

Note :

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- According to KDB 248227 D01 v02r02 5.2.2, output power and SAR testing is not required for 802.11 g/n channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjust SAR is ≤ 1.2 W/kg.
- Duty cycle of this device is 100 %

U-NII-1 Band

Mode	Measured Frequency (MHz)	Datarate	Duty Factor	Measured Output Power (dB m)		
				SISO Ant 1	SISO Ant 2	MIMO
802.11a	5 180	6 Mbps	1.00	14.97	14.68	-
	5 220			13.81	13.42	-
	5 240			13.40	13.22	-
802.11n(20M)	5 180	MCS0	1.00	14.13	13.82	16.00
	5 220			13.95	13.51	15.51
	5 240			12.98	12.62	15.09
802.11n(40M)	5 190	MCS0	1.00	11.29	10.75	11.90
	5 230			10.55	10.06	11.38
802.11ac(20M)	5 180	MCS0	1.00	14.00	13.52	15.24
	5 220			13.12	12.72	15.14
	5 240			13.44	13.10	15.73
802.11ac(40M)	5 190	MCS0	1.00	11.15	10.62	12.26
	5 230			10.96	10.45	12.07
802.11ac(80M)	5 210	MCS0	1.00	9.13	8.72	10.75

Note :

1. Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
2. Duty cycle of this device is 100 %

U-NII-3 Band

Mode	Measured Frequency (MHz)	Datarate	Duty Factor	Measured Output Power (dB m)		
				SISO Ant 1	SISO Ant 2	MIMO
802.11a	5 745	6 Mbps	1.00	11.05	11.03	-
	5 785			10.07	10.05	-
	5 805			10.04	10.02	-
802.11n(20M)	5 745	MCS0	1.00	10.38	10.01	12.61
	5 785			9.94	9.54	11.88
	5 805			9.69	9.23	12.18
802.11n(40M)	5 755	MCS0	1.00	7.66	7.32	9.94
	5 795			6.82	6.33	8.78
802.11ac(20M)	5 745	MCS0	1.00	10.57	10.10	11.71
	5 785			10.10	9.71	10.96
	5 805			9.98	9.56	10.99
802.11ac(40M)	5 755	MCS0	1.00	7.41	7.06	9.51
	5 795			6.88	6.49	8.72
802.11ac(80M)	5 775	MCS0	1.00	6.24	5.81	7.27

Note :

1. Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
2. Duty cycle of this device is 100 %.

10. System Verification

10.1 Tissue verification results

For the measurement of the following parameters the DAKS-3.5 was used, representing the open-ended slim form probe measurement procedure. The measured values should be within $\pm 5\%$ of the recommended values given by IEEE 1528-2013.

For DTS

Table 10.1 Measured Tissue Parameters

Date	Liquid Type	Liquid Temp. (°C)	Frequency (MHz)	Mea. relative Permittivity (ϵ)	Mea. Conductivity (S/m)	Target relative Permittivity (ϵ)	Target Conductivity (S/m)	Permittivity Error (%)	Conductivity Error (%)
Sep 09.2024	2.4G /Head	21.80	2 412	39.72	1.78	39.27	1.77	1.14	0.90
			2 437	39.67	1.80	39.22	1.79	1.15	0.62
			2 450	39.65	1.81	39.20	1.80	1.15	0.48
			2 462	39.63	1.82	39.18	1.81	1.15	0.27
Sep 11.2024	2.4G /Head	21.50	2 412	40.49	1.81	39.27	1.77	3.11	2.23
			2 437	40.45	1.82	39.22	1.79	3.13	1.99
			2 450	40.42	1.83	39.20	1.80	3.12	1.85
			2 462	40.40	1.84	39.18	1.81	3.10	1.58
Sep 19.2024	2.4G /Head	21.80	2 412	37.91	1.77	39.27	1.77	-3.45	0.15
			2 437	37.88	1.79	39.22	1.79	-3.42	-0.03
			2 450	37.86	1.80	39.20	1.80	-3.42	-0.13
			2 462	37.85	1.81	39.18	1.81	-3.40	-0.30

For U-NII-1 Band

Table 10.2 Measured Tissue Parameters

Date	Liquid Type	Liquid Temp. (°C)	Frequency (MHz)	Measured relative Permittivity (ε)	Measured Conductivity (S/m)	Target relative Permittivity (ε)	Target Conductivity (S/m)	Permittivity Error (%)	Conductivity Error (%)
Sep 09.2024	5.2G /Head	21.40	5 200	35.74	4.47	35.99	4.66	-0.69	-4.05
			5 180	35.82	4.44	36.01	4.63	-0.51	-4.22
			5 220	35.67	4.47	35.96	4.68	-0.81	-4.37
			5 240	35.67	4.48	35.94	4.70	-0.76	-4.51
Sep 11.2024	5.2G /Head	21.00	5 200	36.35	4.65	35.99	4.66	1.00	-0.17
			5 180	36.39	4.63	36.01	4.63	1.07	-0.19
			5 220	36.26	4.68	35.96	4.68	0.82	0.01
			5 240	36.20	4.71	35.94	4.70	0.73	0.20
Sep 19.2024	5.2G /Head	20.80	5 200	34.53	4.50	35.99	4.66	-4.04	-3.23
			5 180	34.59	4.49	36.01	4.63	-3.93	-3.09
			5 220	34.51	4.52	35.96	4.68	-4.05	-3.34
			5 240	34.45	4.55	35.94	4.70	-4.15	-3.18

For U-NII-3 Band

Table 10.3 Measured Tissue Parameters

Date	Liquid Type	Liquid Temp. (°C)	Frequency (MHz)	Measured relative Permittivity (ε)	Measured Conductivity (S/m)	Target relative Permittivity (ε)	Target Conductivity (S/m)	Permittivity Error (%)	Conductivity Error (%)
Sep 10.2024	5.2G /Head	21.80	5 800	35.37	5.06	35.30	5.27	0.21	-4.04
			5 745	35.47	5.07	35.36	5.21	0.29	-2.67
			5 785	35.46	5.06	35.32	5.25	0.42	-3.75
			5 805	35.37	5.05	35.29	5.28	0.22	-4.28
Sep 20.2024	5.2G /Head	21.20	5 800	33.96	5.17	35.30	5.27	-3.79	-1.86
			5 745	33.93	5.19	35.36	5.21	-4.06	-0.42
			5 785	34.03	5.17	35.32	5.25	-3.65	-1.54
			5 805	33.93	5.16	35.29	5.28	-3.86	-2.12

10.2 System Verification Test setup

The system verification is verified to the $\pm 10\%$ of the specifications at each frequency band by using the system validation kit.

1. Perform internal calibration of each equipment.
2. Cabling the system, using the verification kit equipment.
3. The input level is set to be about 100 or 250 mW from the signal generator to the dipole antenna.
4. Dipole antenna was located below the phantom.
5. System verification was performed and 1g / 10g SAR was measured.
6. The results were normalized to 1 W input power.
7. Check if the 1 W normalized value was within $\pm 10\%$ of the target value.

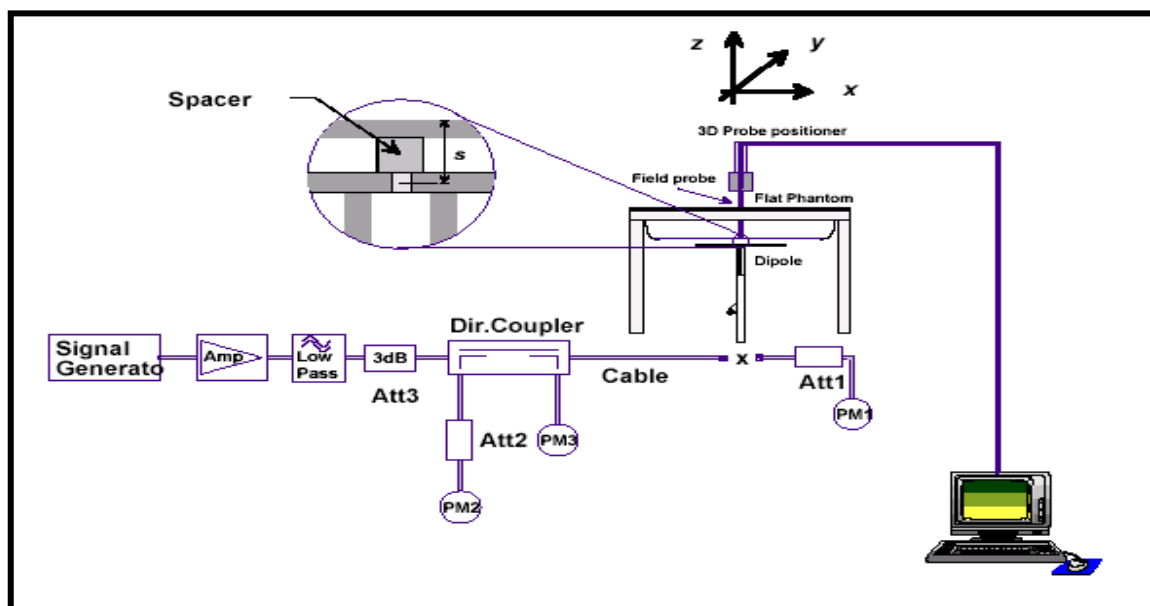


Figure 10.2 System Verification setup

10.3 System Verification Results

A complete 1 g and/or 10 g averaged SAR measurement is performed using a standard source. The input power of the standard source is adjusted to produce a 1 g and/or 10 g averaged SAR value falling in the range of 0.4 W/kg to 10 W/kg. The 1 g and/or 10g averaged SAR is measured at frequencies in Table 10.2 within the range to be used in compliance tests. The results are normalized to 1 W forward input power and compared with the reference SAR value.

Table 10.3 System Verification Results

Date	Liquid Temperature (°C)	Measured Frequency (MHz)	Targeted 1 g SAR (W/kg)	Measured 1 g SAR (W/kg)	Normalized 1 g SAR (W/kg)	Deviation (%)	Verification Kit	Plot No.
Sep 09.2024	21.80	2 450	52.40	5.17	51.70	-1.34	D2450V2 SN: 774	#V01
Sep 11.2024	21.50	2 450	52.40	5.33	53.30	1.72	D2450V2 SN: 774	#V02
Sep 19.2024	21.80	2 450	52.40	13.80	55.20	5.34	D2450V2 SN: 774	#V03
Sep 09.2024	21.40	5 200	78.90	7.38	73.80	-6.46	D5GHzV2 SN: 1146	#V04
Sep 10.2024	21.80	5 800	80.30	7.70	77.00	-4.11	D5GHzV2 SN: 1146	#V05
Sep 11.2024	21.00	5 200	78.90	7.21	72.10	-8.62	D5GHzV2 SN: 1146	#V06
Sep 19.2024	20.80	5 200	78.90	7.23	72.30	-8.37	D5GHzV2 SN: 1146	#V07
Sep 20.2024	21.20	5 800	80.30	8.05	80.50	0.25	D5GHzV2 SN: 1146	#V08

11. SAR Measurement Results

1. Per KDB 447498, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

Scaling Factor = Maximum Tune-up limit power(mW) / EUT RF Power(mW),

Where tune-up limit is the maximum rated power among all production units.

Reported SAR(W/kg) = Scaling Factor(Tune up) * Scaling Factor(Duty) * Measured SAR (W/kg)

2. Tune-up Limit power is refer to clause 2.4.

<EXPD 3643N1 SAR results>

DTS Band : Ant 1(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
2412	1	802.11b	0 mm	52.97	79.43	1.00	1.50	1.00	Front	0.147	0.220	-0.080	#S01

DTS Band : Ant 2(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
2412	1	802.11b	0 mm	50.23	79.43	1.00	1.58	1.00	Front	0.167	0.264	-0.050	#S02

DTS Band : Simultaneous Transmission SAR

EUT Position	Ant 1 (W/kg)	Ant 2 (W/kg)	Sum of 1-g SAR (W/kg)
Front	0.220	0.264	0.484

U-NII-1 Band : Ant 1(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5180	36	802.11a	0 mm	31.41	39.81	1.00	1.27	1.00	Front	0.520	0.659	-0.150	
5180	36	802.11n		25.88	39.81	1.00	1.54	1.00	Front	0.505	0.777	0.070	#S03

U-NII-1 Band : Ant 2(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5180	36	802.11a	0 mm	29.38	39.81	1.00	1.36	1.00	Front	0.437	0.592	-0.010	
5180	36	802.11n		24.10	39.81	1.00	1.65	1.00	Front	0.441	0.729	0.040	#S04

U-NII-1 Band : Simultaneous Transmission SAR

EUT Position	Ant 1 (W/kg)	Ant 2 (W/kg)	Sum of 1-g SAR (W/kg)
Front	0.777	0.729	1.506

U-NII-3 Band : Ant 1(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5745	149	802.11a	0 mm	12.74	19.95	1.00	1.57	1.00	Front	0.077	0.121	-0.040	#S05

U-NII-3 Band : Ant 2(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5745	149	802.11a	0 mm	12.68	19.95	1.00	1.57	1.00	Front	0.022	0.035	0.000	#S06

U-NII-3 Band : Simultaneous Transmission SAR

EUT Position	Ant 1 (W/kg)	Ant 2 (W/kg)	Sum of 1-g SAR (W/kg)
Front	0.121	0.035	0.156

<EXPD 4343N1 SAR results>

DTS Band : Ant 1(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
2412	1	802.11b	0 mm	52.97	79.43	1.00	1.50	1.00	Front	0.195	0.292	-0.120	#S07

DTS Band : Ant 2(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
2412	1	802.11b	0 mm	50.23	79.43	1.00	1.58	1.00	Front	0.197	0.312	-0.020	#S08

DTS Band : Simultaneous Transmission SAR

EUT Position	Ant 1 (W/kg)	Ant 2 (W/kg)	Sum of 1-g SAR (W/kg)
Front	0.292	0.312	0.604

U-NII-1 Band : Ant 1(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5180	36	802.11a	0 mm	31.41	39.81	1.00	1.27	1.00	Front	0.499	0.633	-0.060	
5180	36	802.11n		25.88	39.81	1.00	1.54	1.00	Front	0.436	0.671	-0.180	#S09

U-NII-1 Band : Ant 2(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5180	36	802.11a	0 mm	29.38	39.81	1.00	1.36	1.00	Front	0.164	0.222	-0.010	#S10

U-NII-1 Band : Simultaneous Transmission SAR

EUT Position	Ant 1 (W/kg)	Ant 2 (W/kg)	Sum of 1-g SAR (W/kg)
Front	0.671	0.222	0.893

U-NII-3 Band : Ant 1(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5745	149	802.11a	0 mm	12.74	19.95	1.00	1.57	1.00	Front	0.126	0.197	-0.080	#S11

U-NII-3 Band : Ant 2(Body SAR)

Measured Frequency		Mode	Test distance	Average Power (mW)	Maximum Tune-Up Limit pwr (mW)	Duty Cycle	Scaling Factor (Tune up)	Scaling Factor (Duty)	EUT Position	Measured SAR 1g (W/kg)	Reported SAR 1g (W/kg)	Power Drift (dB)	Plot No.
MHz	CH												
5745	149	802.11a	0 mm	12.68	19.95	1.00	1.57	1.00	Front	0.026	0.041	0.180	#S12

U-NII-3 Band : Simultaneous Transmission SAR

EUT Position	Ant 1 (W/kg)	Ant 2 (W/kg)	Sum of 1-g SAR (W/kg)
Front	0.197	0.041	0.238

SAR Test Note :

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D04.
2. Batteries are fully charged at the beginning of the SAR measurement.
3. The manufacturer has confirmed that the device tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
4. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB publication 447498 D04.
5. FCC has permitted the use of single head-tissue simulating liquid specified February 19, 2019 TCBC workshop.
6. Per KDB 447498 D04, This is limited specifically to when the reported 1-g or 10-g SAR for the mid-band or highest output power channel meets any of the following conditions:
 - a) $SAR \leq 0.8 \text{ W/kg}$ of 1-g, or $SAR \leq 2.0 \text{ W/kg}$ for 10-g, when the transmission band span is $\leq 100 \text{ MHz}$
 - b) $SAR \leq 0.6 \text{ W/kg}$ of 1-g, or $SAR \leq 1.5 \text{ W/kg}$ for 10-g, when the transmission band span is between 100 MHz and 200 MHz
 - c) $SAR \leq 0.4 \text{ W/kg}$ of 1-g, or $SAR \leq 1.0 \text{ W/kg}$ for 10-g, when the transmission band span is $\geq 200 \text{ MHz}$When the maximum output power variation across the required test channels is $> 1/2 \text{ dB}$, instead of the middle channel, the highest output power channel must be used.
7. Justification for test configuration for 802.11 transmitter per KDB publication 248227 D01v02r02 for 2.4 GHz WiFi single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM mode (2.4 GHz 802.11g/n) was not required, due to the maximum allowed powers and the highest reported DSSS SAR when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output and the adjust SAR is $\leq 1.2 \text{ W/kg}$.
8. Justification for test configuration for 802.11 transmitter per KDB publication 248227 D01v02r02 for 5 GHz WiFi single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission mode is not required, due to the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg .

12. Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. The results and statements relate only to the item(s) tested.

APPENDIX A. PLOTS OF SAR RESULTS

Measurement PLOT #S01

Measurement Report for EXPD3643N1_Ant A, FRONT, WLAN 2.4GHz, UID 10415 AAA, Channel 1 (2412.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD3643N1, DRTECH	100.0 x 100.0 x 0.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN, 2.4GHz	WLAN, 10415-AAA	2412.000, 1	7.66	1.77	37.9

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-19	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

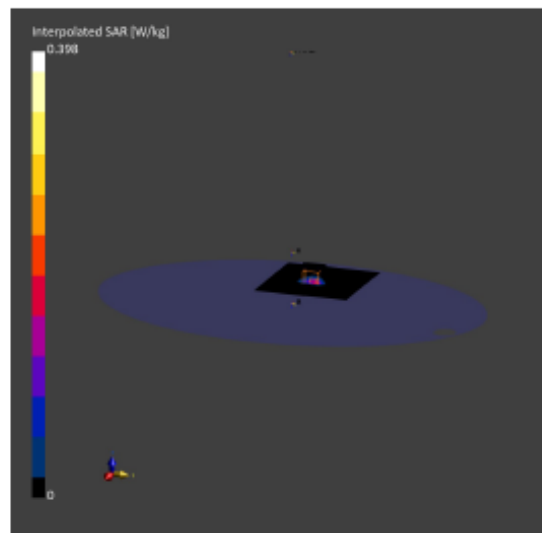
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	4.7 x 4.7 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.3
MAIA	Y	N/A
Surface Detection	All points	All points
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-19, 16:07	2024-09-19, 16:28
psSAR1g [W/kg]	0.144	0.147
psSAR10g [W/kg]	0.061	0.056
Power Drift [dB]	-0.14	-0.08
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		72.2
Dist 3dB Peak [mm]		3.3

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S02

Measurement Report for EXPD3643N1_Ant B, FRONT, WLAN 2.4GHz, UID 10012 CAB, Channel 1 (2412.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD3643N1, DRETECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN, 2.4GHz	WLAN, 10012-CAB	2412.000, 1	7.66	1.81	40.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-11	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

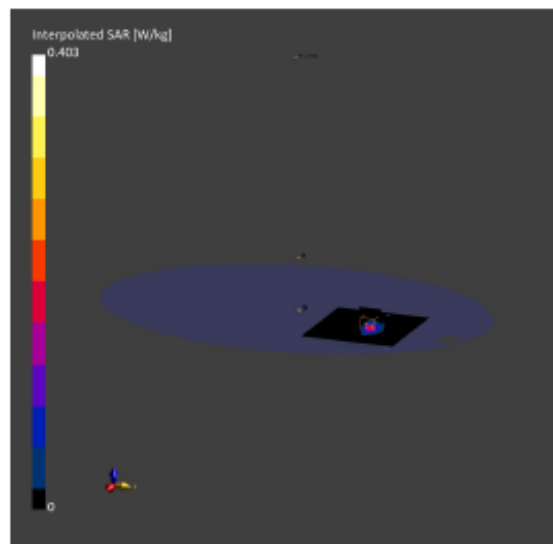
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	4.8 x 4.8 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.5
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-11, 11:31	2024-09-11, 11:44
psSAR1g [W/kg]	0.158	0.167
psSAR10g [W/kg]	0.069	0.071
Power Drift [dB]	-0.01	-0.05
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		74.3
Dist 3dB Peak [mm]		6.2

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S03

Measurement Report for EXPD3643N1_Ant A, FRONT, WLAN 5GHz, UID 10591 AAD, Channel 36 (5180.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD3643N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10591-AAD	5180.000, 36	3.4	4.49	34.6

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-19	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

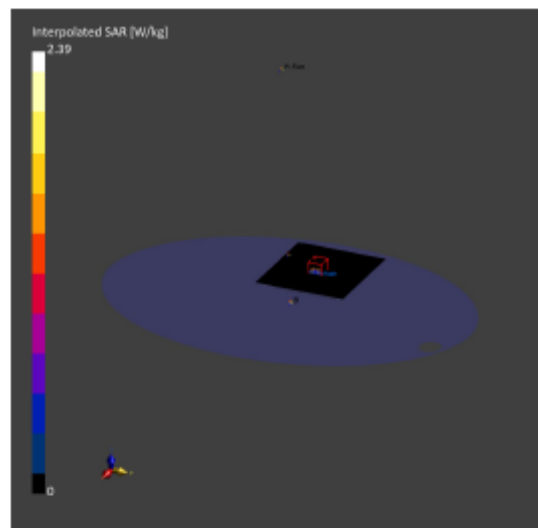
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	3.4 x 3.4 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	Y	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-20, 00:17	2024-09-20, 00:30
psSAR1g [W/kg]	0.339	0.303
psSAR10g [W/kg]	0.111	0.122
Power Drift [dB]	0.09	0.07
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		61.3
Dist 3dB Peak [mm]		4.4

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S04

Measurement Report for EXPD3643N1_Ant B, FRONT, WLAN 5GHz, UID 10591 AAD, Channel 36 (5180.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD3643N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10591-AAD	5180.000, 36	3.4	4.63	36.4

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-11	EX3DV4 - SIN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

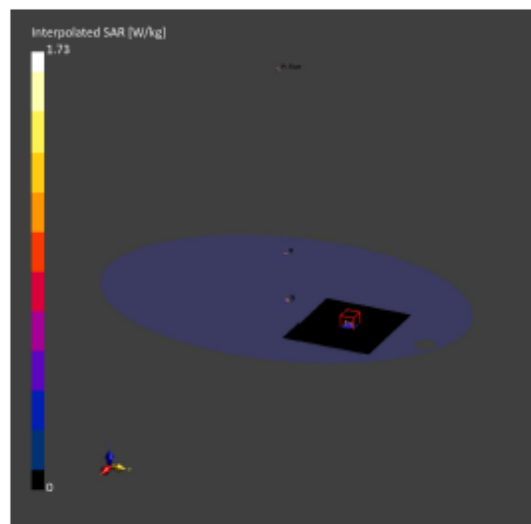
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-11, 19:17	2024-09-11, 19:27
psSAR1g [W/kg]	0.413	0.441
psSAR10g [W/kg]	0.112	0.113
Power Drift [dB]	-0.01	0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		67.0
Dist 3dB Peak [mm]		4.8

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S05

Measurement Report for EXPD3643N1_Ant A, FRONT, WLAN 5GHz, UID 10417 AAD, Channel 149 (5745.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD3643N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10417-AAD	5745.000, 149	4.74	5.19	33.9

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-20	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

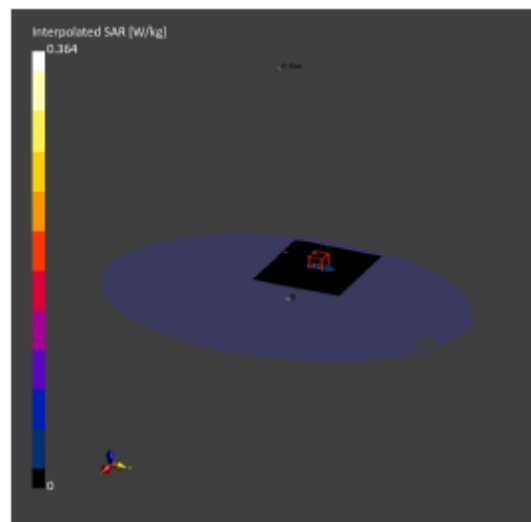
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-20, 12:20	2024-09-20, 12:30
psSAR1g [W/kg]	0.082	0.077
psSAR10g [W/kg]	0.025	0.018
Power Drift [dB]	-0.14	-0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		55.4
Dist 3dB Peak [mm]		4.1

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S06

Measurement Report for EXPD3643N1_Ant B, FRONT, WLAN 5GHz, UID 10062 CAE, Channel 149 (5745.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD3643N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10062-CAE	5745.000, 149	4.74	3.07	35.5

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	H8BL-600-10000 Charge:xxxx, 2024-Sep-10	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

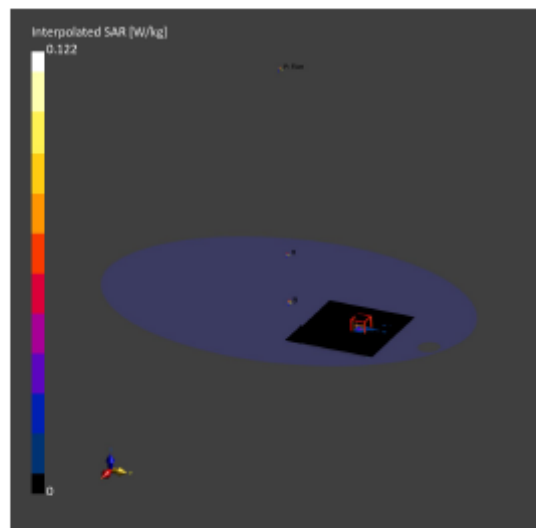
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	2.6 x 2.6 x 1.2
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.2
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-10, 21:14	2024-09-10, 21:40
psSAR1g [W/kg]	0.028	0.022
psSAR10g [W/kg]	0.008	0.003
Power Drift [dB]	N/A	N/A
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		58.6
Dist 3dB Peak [mm]		5.2

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		psSAR10g below noise threshold.
Error(s)		



Measurement PLOT #S07

Measurement Report for EXPD4343N1_Ant A, FRONT, WLAN 2.4GHz, UID 10415 AAA, Channel 1 (2412.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions (mm)	IMEI	DUT Type
EXPD4343N1, DRTECH	100.0 x 100.0 x 0.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance (mm)	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 2.4GHz	WLAN, 10415-AAA	2412.000, 1	7.66	1.77	37.9

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-19	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

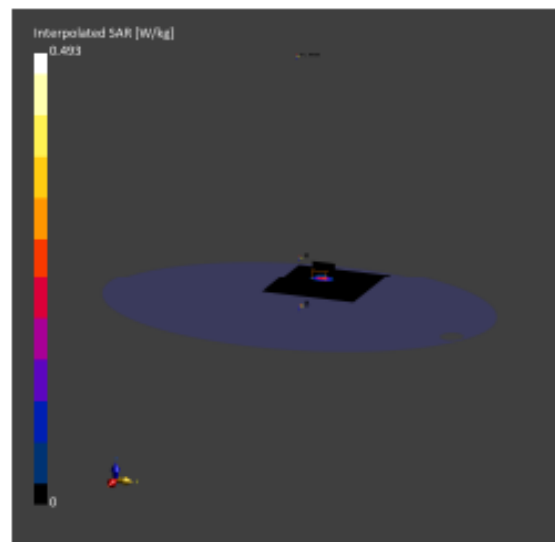
	Area Scan	Zoom Scan
Grid Extents (mm)	140.0 x 140.0	30.0 x 30.0 x 30.0
Grid Steps (mm)	10.0 x 10.0	4.9 x 4.9 x 1.5
Sensor Surface (mm)	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.5
MAIA	Y	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-19, 15:16	2024-09-19, 15:29
psSAR1g [W/kg]	0.189	0.195
psSAR10g [W/kg]	0.081	0.077
Power Drift (dB)	-0.13	-0.12
Power Scaling	Disabled	Disabled
Scaling Factor (dB)		
TSL Correction	No correction	No correction
M2/M1 (%)		74.9
Dist 3dB Peak (mm)		6.6

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S08

Measurement Report for EXPD4343N1_Ant B, FRONT, WLAN 2.4GHz, UID 10012 CAB, Channel 1 (2412.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD4343N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN, 2.4GHz	WLAN, 10012-CAB	2412.000, 1	7.66	1.78	39.7

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-09	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

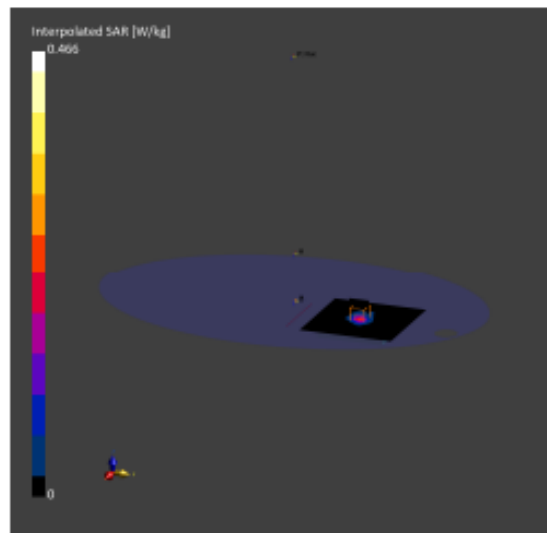
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.5
MAIA	Y	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-09, 15:06	2024-09-09, 15:16
psSAR1g [W/kg]	0.188	0.197
psSAR10g [W/kg]	0.089	0.083
Power Drift [dB]	-0.02	-0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		76.5
Dist 3dB Peak [mm]		7.9

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S09

Measurement Report for EXPD4343N1_Ant A, FRONT, WLAN 5GHz, UID 10591 AAD, Channel 36 (5180.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions (mm)	IMEI	DUT Type
EXPD4343N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance (mm)	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10591-AAD	5180.000, 36	5.4	4.49	34.6

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-19	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

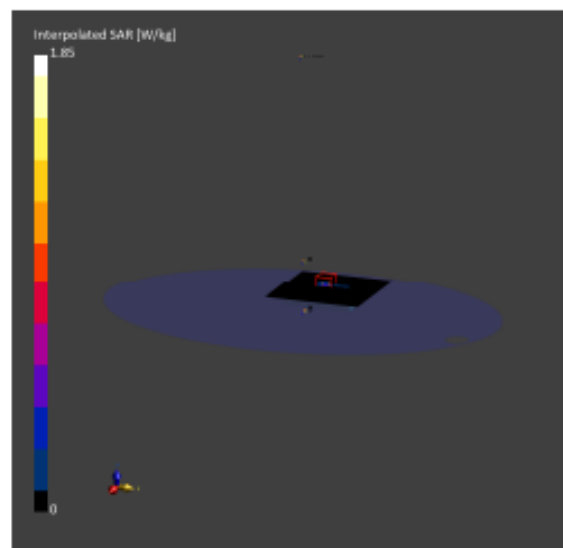
	Area Scan	Zoom Scan
Grid Extents (mm)	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps (mm)	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface (mm)	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-19, 21:33	2024-09-19, 21:43
psSAR1g [W/kg]	0.407	0.436
psSAR10g [W/kg]	0.102	0.109
Power Drift [dB]	0.04	-0.18
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		65.4
Dist 3dB Peak (mm)		4.1

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S10

Measurement Report for EXPD4343N1_Ant B, FRONT, WLAN 5GHz, UID 10062 CAE, Channel 36 (5180.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD4343N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10062-CAE	5180.000, 36	5.4	4.44	35.8

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-09	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

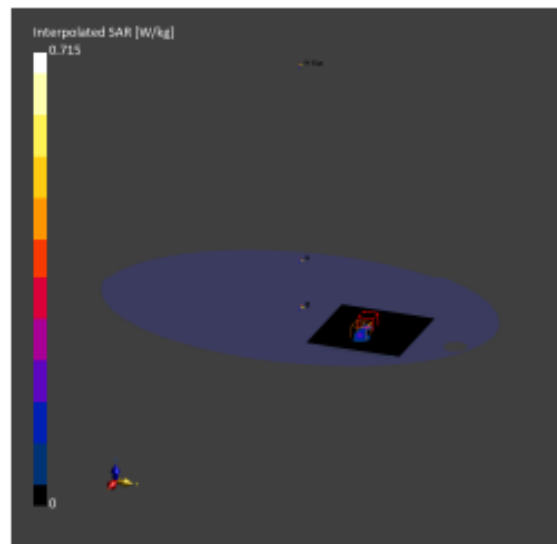
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	3.6 x 3.6 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-09, 20:46	2024-09-09, 20:59
psSAR1g [W/kg]	0.170	0.164
psSAR10g [W/kg]	0.052	0.038
Power Drift [dB]	-0.19	-0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		62.6
Dist 3dB Peak [mm]		4.9

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S11

Measurement Report for EXPD4343N1_Ant A, FRONT, WLAN 5GHz, UID 10417 AAD, Channel 149 (5745.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD4343N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10417-AAD	5745.000, 149	4.74	5.19	33.9

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-20	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

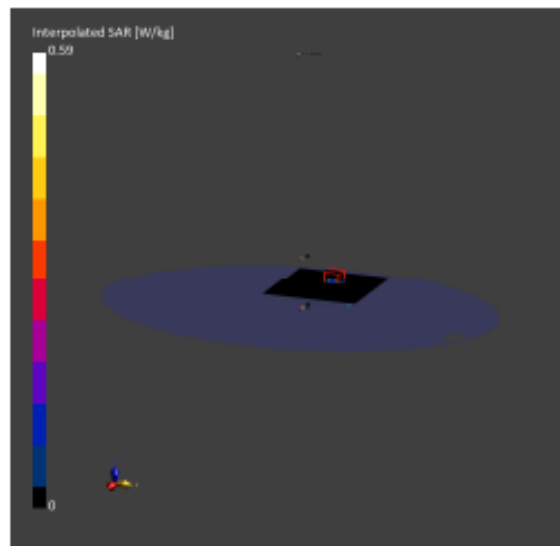
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	3.5 x 3.5 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-20, 10:29	2024-09-20, 10:42
psSAR1g [W/kg]	0.100	0.126
psSAR10g [W/kg]	0.032	0.029
Power Drift [dB]	0.17	-0.08
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		58.7
Dist 3dB Peak [mm]		4.7

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #S12

Measurement Report for EXPD4343N1_Ant B, FRONT, WLAN 5GHz, UID 10417 AAD, Channel 149 (5745.000MHz)

Device under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
EXPD4343N1, DRTECH	100.0 x 100.0 x 10.0		Phone

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 0.00	WLAN 5GHz	WLAN, 10417-AAD	5745.000, 149	4.74	5.19	33.9

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-20	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

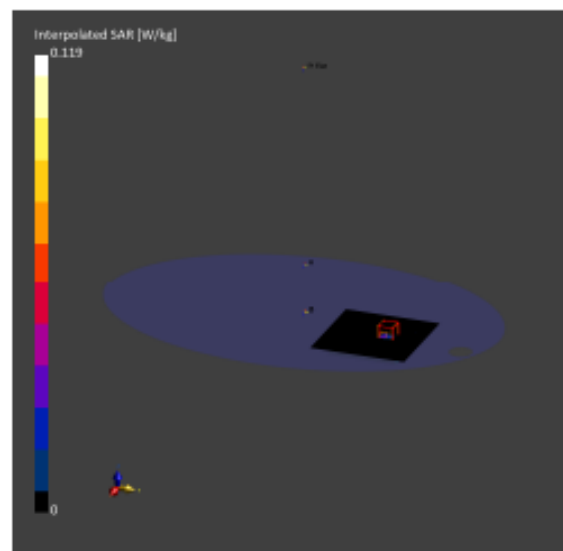
	Area Scan	Zoom Scan
Grid Extents [mm]	140.0 x 140.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-20, 14:00	2024-09-20, 14:10
psSAR1g [W/kg]	0.029	0.026
psSAR10g [W/kg]	0.007	0.004
Power Drift [dB]	0.17	0.18
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		64.8
Dist 3dB Peak [mm]		6.1

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		psSAR10g below noise threshold.
Error(s)		



APPENDIX B. PLOTS OF SYSTEM VERIFICATION

Measurement PLOT #V01 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
D2450V2 - SN774	2450.0	HSL	20.0	-1.3	-2.1	6.8	2.3

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0-	2450.000, 0	7.66	1.81	39.7

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
EUI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-09	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

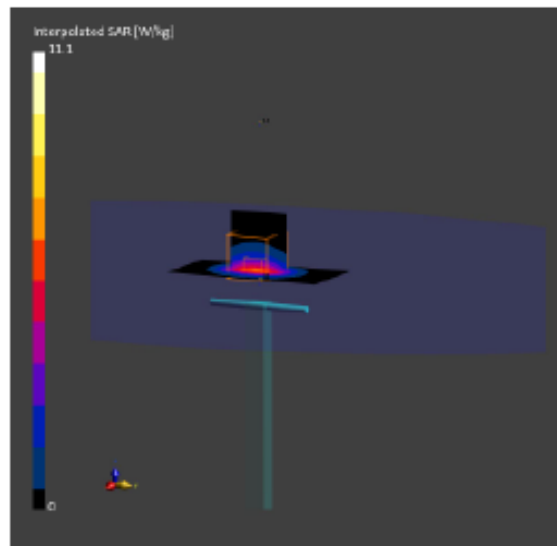
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-09, 09:22	2024-09-09, 09:31
psSAR1g [W/Kg]	5.13	5.17
psSAR10g [W/Kg]	2.46	2.40
Power Drift [dB]	0.00	0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #V02 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
D2450V2 - SN774	2450.0	HSL	20.0	1.6	2.1	8.7	2.4

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0-	2450.000, 0	7.66	1.83	40.4

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-11	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

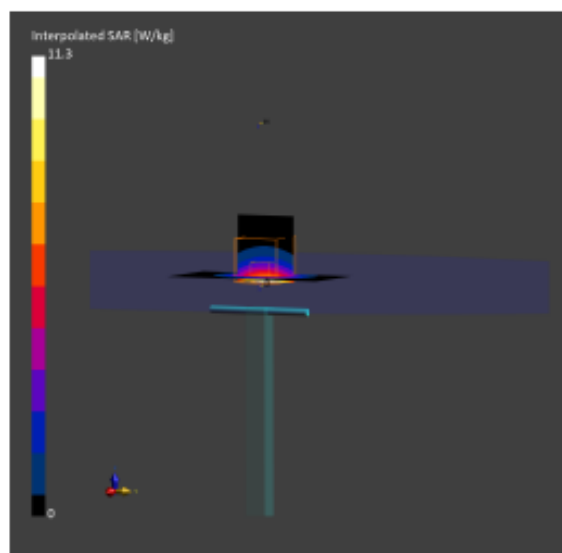
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-11, 08:48	2024-09-11, 08:58
psSAR 1g [W/kg]	5.11	5.33
psSAR 10g [W/kg]	2.54	2.50
Power Drift [dB]	-0.00	0.01
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #V03 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
D2450V2 - SN774	2450.0	HSL	24.0	3.8	3.4	12.3	1.0

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0-	2450.000, 0	7.66	1.80	37.9

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 21.70	HBBL-600-10000 Charge:xxxx, 2024-Sep-19	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

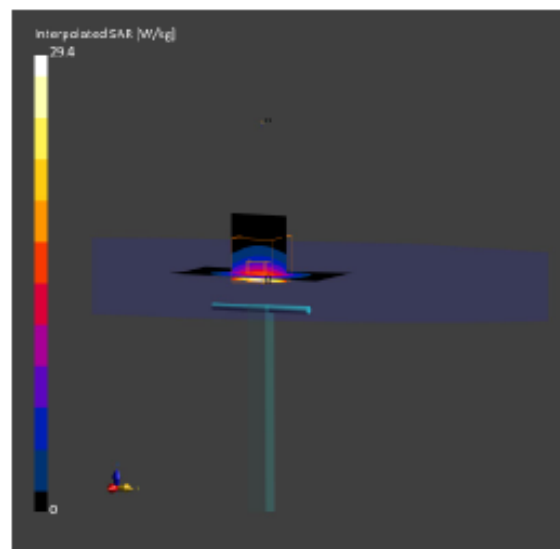
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-19, 12:15	2024-09-19, 12:24
psSAR 1g [W/Kg]	13.5	13.8
psSAR 10g [W/Kg]	6.59	6.39
Power Drift [dB]	0.03	0.03
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #V04 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
D5GHz V2 - SN1146	5200.0	HSL	20.0	-6.6	4.2	-13.5	1.9

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0-	5200.000, 0	5.4	4.47	35.7

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-09	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

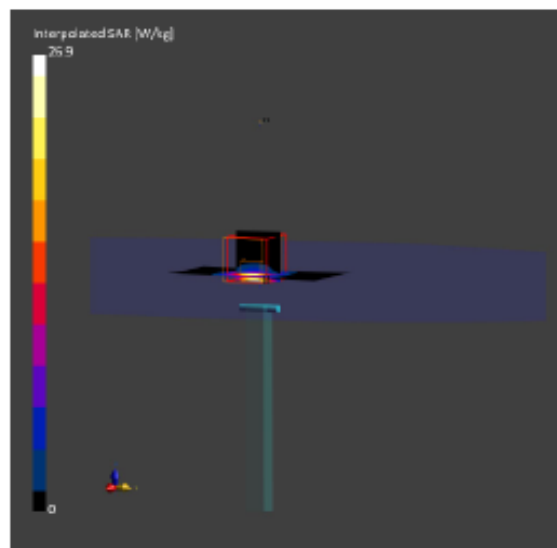
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-09, 19:58	2024-09-09, 20:08
psSAR1g [W/Kg]	6.81	7.38
psSAR10g [W/Kg]	2.29	2.35
Power Drift [dB]	0.02	0.03
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #V05 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
D5GHz V2 - SN1146	5800.0	HSL	20.0	-4.3	-1.3	-5.5	2.4

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0-	5800.000, 0	4.74	5.06	35.4

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 21.70	HBBL-600-10000 Charge:xxxx, 2024-Sep-10	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

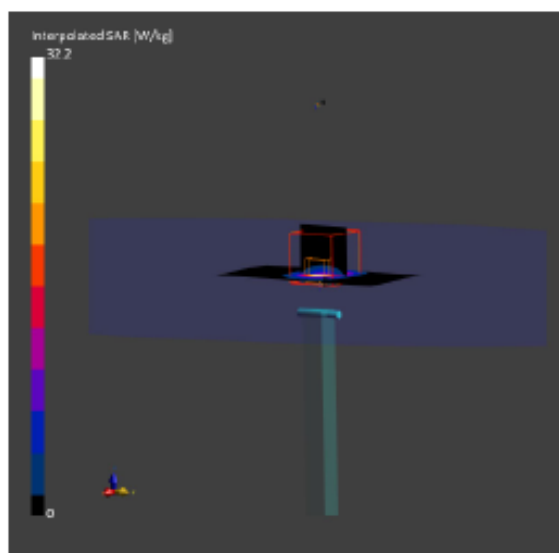
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-10, 09:24	2024-09-10, 09:33
psSAR 1g [W/kg]	7.11	7.70
psSAR 10g [W/kg]	2.15	2.23
Power Drift [dB]	0.01	0.03
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #V06 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
D5GHz V2 - SN1146	5200.0	HSL	20.0	-8.4	3.0	-15.9	2.1

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0=	5200.000, 0	5.4	4.65	36.3

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 21.70	HBBL-600-10000 Charge:xxxx, 2024-Sep-11	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

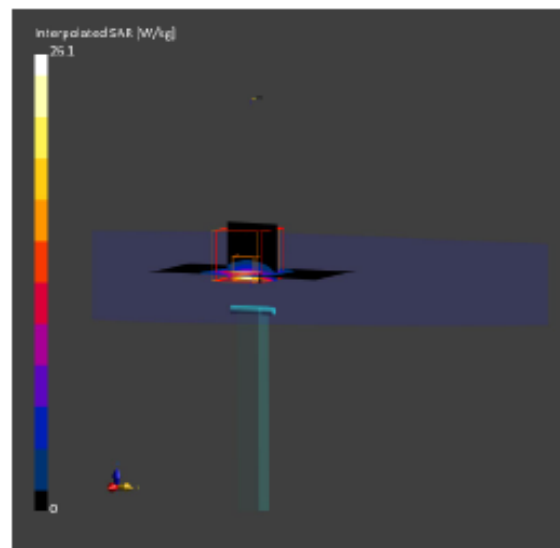
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-11, 16:14	2024-09-11, 16:23
psSAR 1g [W/Kg]	6.64	7.21
psSAR 10g [W/Kg]	2.21	2.31
Power Drift [dB]	0.04	0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		Extrapolated SAR deviation above 15%.
Error(s)		



Measurement PLOT #V07 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
DSGHz V2 - SN1146	5200.0	HSL	20.0	-9.2	-0.9	-15.0	1.1

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0-	5200.000, 0	5.4	4.50	34.5

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 2170	HBBL-600-10000 Charge:xxxx, 2024-Sep-19	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

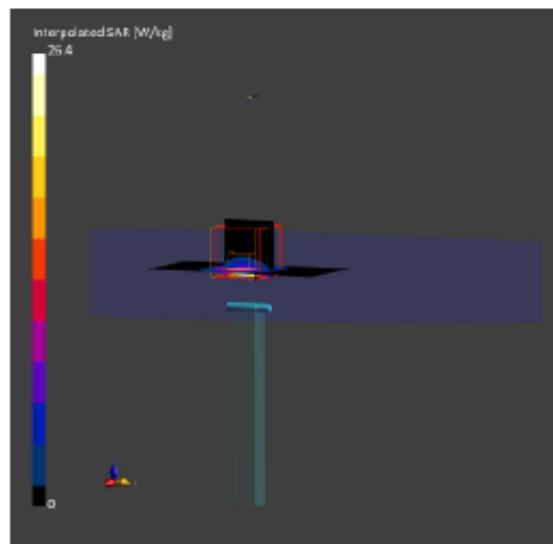
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-19, 19:00	2024-09-19, 19:09
psSAR 1g [W/Kg]	6.74	7.23
psSAR 10g [W/Kg]	2.13	2.26
Power Drift [dB]	0.03	0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



Measurement PLOT #V08 (System Verification Results)

System Performance Check Report

Summary

Dipole	Frequency [MHz]	TSL	Power [dBm]	Dev. 1g [%]	Dev. 10g [%]	Dev. Peak [%]	Iso. Error [%]
D5GHz V2 - SN1146	5800.0	HSL	20.0	0.6	2.7	-3.1	-1.8

Exposure Conditions

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	10		CW, 0-	5800.000, 0	4.74	5.17	34.0

Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
ELI V8.0 (20deg probe tilt) - 21.70	HBBL-600-10000 Charge:xxxx, 2024-Sep-20	EX3DV4 - SN3910, 2024-02-19	DAE4 Sn1726, 2024-04-18

Scan Setup

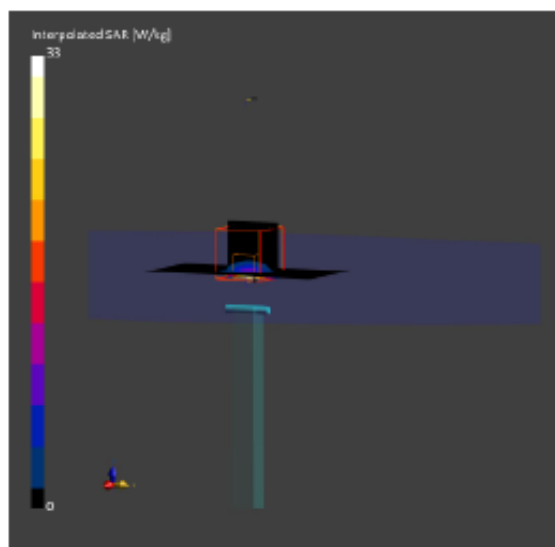
	Area Scan	Zoom Scan
Grid Extents [mm]	40.0 x 80.0	22.0 x 22.0 x 22.0
Grid Steps [mm]	10.0 x 10.0	4.0 x 4.0 x 1.4
Sensor Surface [mm]	3.0	1.4
Graded Grid	N/A	Yes
Grading Ratio	N/A	1.4
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2024-09-20, 09:14	2024-09-20, 09:23
psSAR1g [W/Kg]	7.08	8.05
psSAR10g [W/Kg]	2.20	2.35
Power Drift [dB]	0.02	0.08
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction

Warning(s) / Error(s)

Details	Area Scan	Zoom Scan
Warning(s)		
Error(s)		



APPENDIX C. CALIBRATION REPORT OF THE PROBE

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



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

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

Accreditation No.: SCS 0108

Client **Nemko**
Gyeonggi-do, Republic of Korea

Certificate No. **EX-3910_Feb24**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3910**

Calibration procedure(s) **QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,
QA CAL-25.v8
Calibration procedure for dosimetric E-field probes**

Calibration date **February 19, 2024**

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 NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
CCP DAK-3.5 (weighted)	SN: 1249	05-Oct-23 (CCP-DAK3.5-1249_Oct23)	Oct-24
CCP DAK-12	SN: 1016	05-Oct-23 (CCP-DAK12-1016_Oct23)	Oct-24
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
QME4	SN: 660	16-Mar-23 (No. DAE4-660_Mar23)	Mar-24
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	08-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41060477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by	Jeffrey Katzman	Laboratory Technician	
Approved by	Sven Köhn	Technical Manager	
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			
Issued: February 22, 2024			

Certificate No: EX-3910_Feb24

Page 1 of 22

Calibration Laboratory of

Schmid & Partner
Engineering AG

Zughausstrasse 43, 8004 Zurich, Switzerland



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

Accredited by the Swiss Accreditation Service (SAS)

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

Accreditation No.: SCS 0108

Glossary

TSL	tissue simulating liquid
$NORM_{x,y,z}$	sensitivity in free space
$ConvF$	sensitivity in TSL / $NORM_{x,y,z}$
DCP	diode compression point
CF	crest factor (1/duty cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ 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:

- IEC/IEEE 62209-1526, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1526: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

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

EX3DV4 - SN:3910

February 19, 2024

Parameters of Probe: EX3DV4 - SN:3910

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k = 2)
Norm: $(\mu W/(V/m)^2)^A$	0.44	0.50	0.56	$\pm 10.1\%$
DCP (mV) ^B	106.2	102.8	103.0	$\pm 4.7\%$

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB/μV	C	D dB	VR mV	Max dev.	Max Unc ^C k = 2
0	CW	X	0.00	0.00	1.00	0.00	144.0	$\pm 0.9\%$	$\pm 4.7\%$
		Y	0.00	0.00	1.00		146.9		
		Z	0.00	0.00	1.00		132.5		
10352	Pulse Waveform (200Hz, 10%)	X	11.23	63.31	18.95	15.00	60.0	$\pm 2.7\%$	$\pm 9.6\%$
		Y	20.00	94.38	23.40		60.0		
		Z	20.00	95.34	24.17		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	20.00	90.04	19.64	6.99	60.0	$\pm 1.2\%$	$\pm 9.6\%$
		Y	20.00	95.14	22.81		60.0		
		Z	20.00	95.96	23.33		60.0		
10354	Pulse Waveform (200Hz, 40%)	X	20.00	91.25	18.78	3.88	95.0	$\pm 1.1\%$	$\pm 9.6\%$
		Y	20.00	99.46	23.67		95.0		
		Z	20.00	98.93	23.32		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	20.00	94.74	19.22	2.22	120.0	$\pm 1.2\%$	$\pm 9.6\%$
		Y	20.00	107.22	26.10		120.0		
		Z	20.00	104.04	24.36		120.0		
10387	QPSK Waveform, 1 MHz	X	1.76	66.39	15.36	1.00	150.0	$\pm 1.9\%$	$\pm 9.6\%$
		Y	1.85	66.64	15.73		150.0		
		Z	1.77	65.77	15.07		150.0		
10388	QPSK Waveform, 10 MHz	X	2.35	68.79	16.08	0.00	150.0	$\pm 0.9\%$	$\pm 9.6\%$
		Y	2.47	69.25	16.47		150.0		
		Z	2.34	68.18	15.75		150.0		
10398	64-QAM Waveform, 100 kHz	X	3.47	73.02	19.72	3.01	150.0	$\pm 0.7\%$	$\pm 9.6\%$
		Y	3.36	72.38	19.72		150.0		
		Z	3.14	70.69	18.84		150.0		
10399	64-QAM Waveform, 40 MHz	X	3.59	67.61	15.96	0.00	150.0	$\pm 0.7\%$	$\pm 9.6\%$
		Y	3.67	67.73	16.15		150.0		
		Z	3.62	67.35	15.85		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.97	65.99	15.63	0.00	150.0	$\pm 1.8\%$	$\pm 9.6\%$
		Y	4.86	65.34	15.41		150.0		
		Z	4.84	65.19	15.27		150.0		

Note: For details on UID parameters see Appendix

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

^A The uncertainties of Norm X,Y,Z do not affect the E₂-field uncertainty inside 15% (see Pages 5 and 6).

^B Linearization parameter uncertainty for maximum specified field strength.

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

EX3DV4 - SN:3910

February 19, 2024

Parameters of Probe: EX3DV4 - SN:3910

Sensor Model Parameters

	C1 IF	C2 IF	α V^{-1}	T1 $ms V^{-2}$	T2 $ms V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
x	51.6	371.94	33.42	16.45	0.91	5.00	1.56	0.25	1.01
y	54.6	400.33	34.55	25.14	0.32	5.10	1.40	0.26	1.01
z	55.3	408.80	34.97	21.51	0.66	5.10	0.81	0.38	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle	-13.5°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	8 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3-4 mm for an Area Scan job

EX3DV4 - SN:3910

February 19, 2024

Parameters of Probe: EX3DV4 - SN:3910

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc (k = 2)
835	41.5	0.90	9.74	8.81	9.45	0.36	1.27	±11.0%
900	41.5	0.97	9.12	8.30	8.78	0.36	1.27	±11.0%
1810	40.0	1.40	8.53	7.76	8.01	0.28	1.27	±11.0%
1850	40.0	1.40	8.30	7.61	7.68	0.29	1.27	±11.0%
2450	39.2	1.80	7.66	6.97	7.29	0.29	1.27	±11.0%
5200	36.0	4.66	5.40	4.94	5.19	3.33	1.60	±13.1%
5300	35.9	4.76	5.16	4.75	4.92	3.34	1.63	±13.1%
5520	36.8	4.96	5.02	4.57	4.79	3.38	1.61	±13.1%
5600	35.5	5.07	4.90	4.41	4.64	3.38	1.67	±13.1%
5800	35.3	5.27	4.74	4.29	4.51	3.37	1.78	±13.1%

^C Frequency validity above 300 MHz or ±100 MHz only applies for UASZ v4.4 and higher (see Page 2), also 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 900 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 8 MHz is 4–8 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ' and σ by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

^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 3–8 GHz at any distance larger than half the probe-to-diameter from the boundary.

EX3DV4 - SN:3910

February 19, 2024

Parameters of Probe: EX3DV4 - SN:3910

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity ^F (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unc {k = 2}
6500	34.5	8.07	5.03	4.53	4.74	0.20	2.50	+18.6%

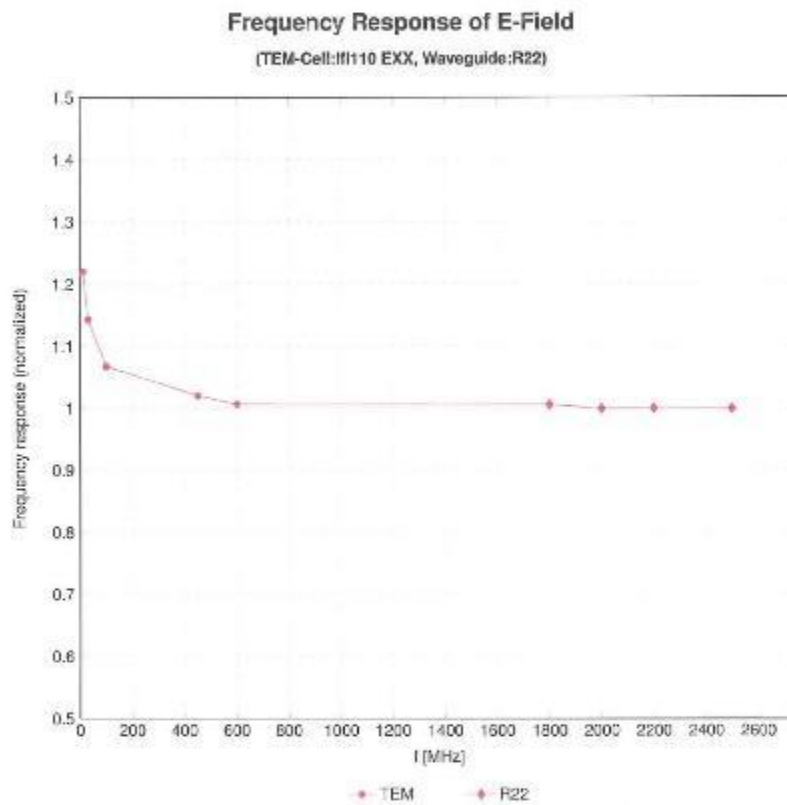
^C Frequency validity at 6.5 GHz is ~600~100 MHz, and ~300 MHz or above 7 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F The probes are calibrated using tissue simulating liquids (TSL) that deviate for ϵ and σ by less than $\pm 10\%$ from the target values (typically better than $\pm 6\%$) and are valid for TSL with deviations of up to $\pm 15\%$.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than $\pm 1\%$ for frequencies below 3 GHz; below $\pm 2\%$ for frequencies between 3~6 GHz; and below $\pm 4\%$ for frequencies between 6~10 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4 - SN:3910

February 19, 2024

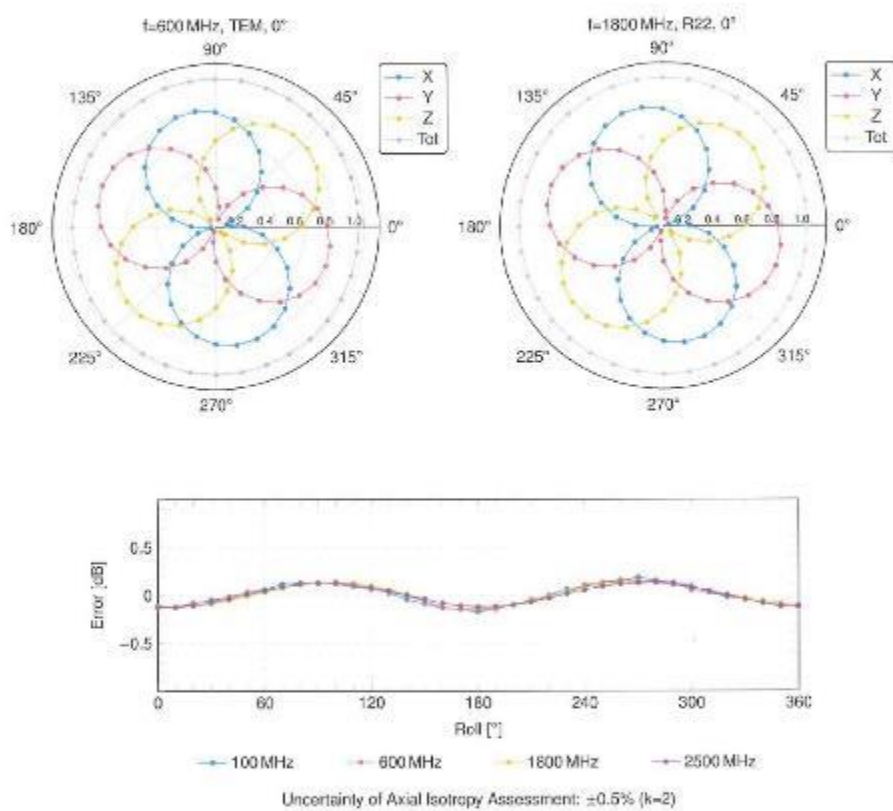


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

EX3DV4 - SN:3910

February 19, 2024

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

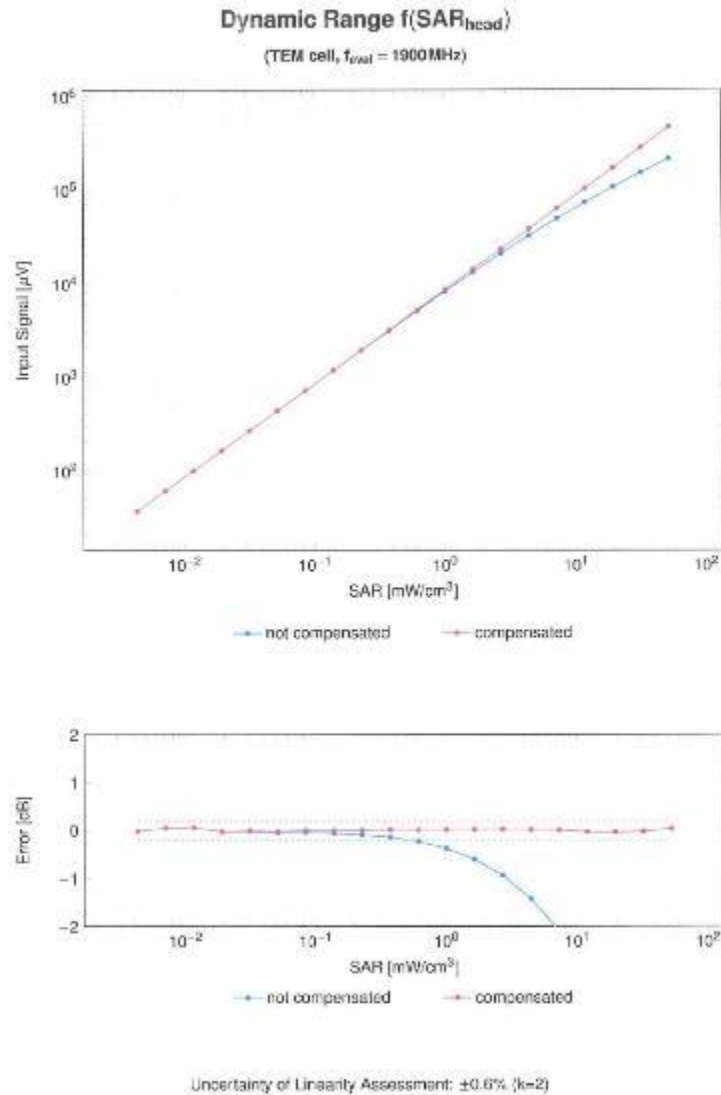


Certificate No: EX-9910_Feb24

Page 8 of 22

EX3DV4 - SN:3910

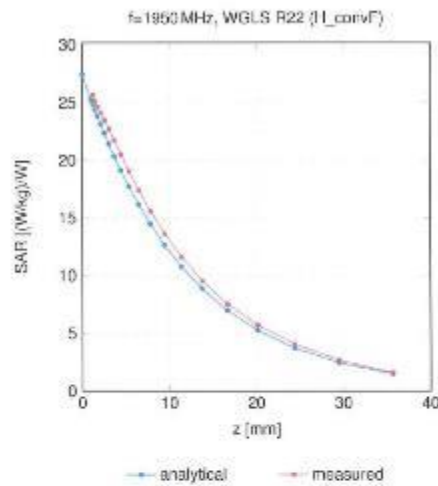
February 19, 2024



EX3DV4 - SN:3910

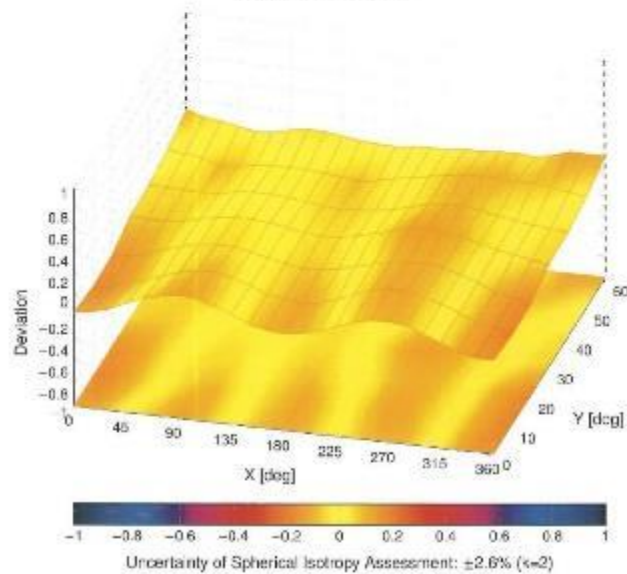
February 19, 2024

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$



Certificate No: EX-3910_Feb24

Page 10 of 22

EX3DV4 - SN:3910

February 19, 2024

Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^o k = 2
0		CW	CW	0.03	±4.7
10010	CAR	SAR Validation (Square, 100 ms, 10ms)	Test	10.00	±9.8
10011	CAC	UMTS-FDD (WCDMA)	WCDMA	2.91	±9.8
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	±9.6
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	±9.6
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	±9.6
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	±9.6
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	±9.6
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.68	±9.6
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.58	±9.6
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	±9.6
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.36	±9.6
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	±9.6
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, D1)	Bluetooth	5.30	±9.6
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, D1H)	Bluetooth	1.67	±9.6
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, D1S)	Bluetooth	1.16	±9.6
10033	CAA	IEEE 802.15.1 Bluetooth (Pi4-DQPSK, D1)	Bluetooth	7.74	±9.6
10034	CAA	IEEE 802.15.1 Bluetooth (Pi4-DQPSK, D1S)	Bluetooth	4.53	±9.6
10035	CAA	IEEE 802.15.1 Bluetooth (Pi4-DQPSK, D1H)	Bluetooth	3.83	±9.6
10036	CAA	IEEE 802.15.1 Bluetooth (8-PSK, D1)	Bluetooth	8.01	±9.6
10037	CAA	IEEE 802.15.1 Bluetooth (8-PSK, D1S)	Bluetooth	4.77	±9.6
10038	CAA	IEEE 802.15.1 Bluetooth (8-PSK, D1H)	Bluetooth	4.10	±9.6
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	±9.6
10042	CAB	IS-54 / IS-136 FDD (TMA/FDM, Pi4-DQPSK, Fullrate)	AMPS	7.78	±9.6
10044	CAA	IS-97/IS-TIA-553 FDS (FDMA, F1)	AMPS	6.06	±9.6
10045	CAA	DECT (TDD, TMA/FDM, G-SSK, Full Slot, 24)	DECT	13.92	±9.6
10046	CAA	DECT (TDD, TMA/FDM, G-SSK, Double Slot, 12)	DECT	10.75	±9.6
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mbps)	TD-SCDMA	11.01	±9.6
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	±9.6
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	±9.6
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	±9.6
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	±9.6
10062	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	3.85	±9.6
10063	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.83	±9.6
10064	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	±9.6
10065	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	±9.6
10066	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	±9.6
10067	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6
10068	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	±9.6
10069	CAE	IEEE 802.11a WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	±9.6
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 8 Mbps)	WLAN	9.83	±9.6
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps)	WLAN	9.52	±9.6
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps)	WLAN	9.94	±9.6
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps)	WLAN	10.30	±9.6
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps)	WLAN	10.77	±9.6
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps)	WLAN	10.94	±9.6
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps)	WLAN	11.00	±9.6
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	±9.6
10082	CAR	IS-54 / IS-136 FDD (TMA/FDM, Pi4-DQPSK, Fullrate)	AMPS	4.77	±9.6
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	±9.6
10097	CAC	UMTS-FDD (HSDPA)	WCDMA	3.98	±9.6
10098	CAC	UMTS-FDD (HSUPA, Subslot 2)	WCDMA	3.98	±9.6
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	±9.6
10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	±9.6
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 15-QAM)	LTE-FDD	6.42	±9.6
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6
10103	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	±9.6
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 15-QAM)	LTE-TDD	9.97	±9.6
10105	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	±9.6
10106	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.50	±9.6
10109	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 15-QAM)	LTE-FDD	6.43	±9.6
10110	CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	±9.6
10111	CAE	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	±9.6

Certificate No: EX-3910_Feb24

Page 11 of 22

EX3DV4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^F k=2
10112	CAH	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	5.92	±0.8
10113	CAH	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	5.62	±0.6
10114	CAE	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	6.10	±0.6
10115	CAE	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	5.45	±0.6
10116	CAE	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	5.15	±0.6
10117	CAE	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	6.07	±0.6
10118	CAE	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	5.59	±0.6
10119	CAE	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	5.13	±0.6
10140	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±0.6
10141	CAF	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	±0.6
10142	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±0.6
10143	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.36	±0.6
10144	CAF	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.55	±0.6
10145	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.78	±0.6
10146	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±0.6
10147	CAG	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	±0.6
10149	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±0.6
10150	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.90	±0.6
10151	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	±0.6
10152	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.82	±0.6
10153	CAH	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	±0.6
10154	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	±0.6
10155	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	5.43	±0.6
10156	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	±0.6
10157	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	5.49	±0.6
10158	CAH	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	±0.6
10159	CAH	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.66	±0.6
10160	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.62	±0.6
10161	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.48	±0.6
10162	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	±0.6
10166	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	±0.6
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	±0.6
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.75	±0.6
10169	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±0.6
10170	CAF	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	±0.6
10172	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±0.6
10173	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	±0.6
10174	CAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±0.6
10175	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±0.6
10176	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10177	CAJ	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±0.6
10178	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10179	CAH	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10180	CAH	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10181	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±0.6
10182	CAF	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10183	AAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10184	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±0.6
10185	CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±0.6
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10187	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	±0.6
10188	CAG	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	±0.6
10189	AAE	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	±0.6
10190	CAE	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	6.09	±0.6
10191	CAE	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	5.12	±0.6
10192	CAE	IEEE 802.11n (HT Greenfield, 56 Mbps, 64-QAM)	WLAN	5.21	±0.6
10193	CAE	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	6.10	±0.6
10194	CAE	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	5.13	±0.6
10195	CAE	IEEE 802.11n (HT Mixed, 56 Mbps, 64-QAM)	WLAN	5.27	±0.6
10218	CAE	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	6.03	±0.6
10220	CAE	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	6.13	±0.6
10221	CAE	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	6.27	±0.6
10222	CAE	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	6.06	±0.6
10223	CAE	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	6.48	±0.6
10224	CAE	IEEE 802.11n (HT Mixed, 120 Mbps, 64-QAM)	WLAN	6.08	±0.6

Certificate No: EX-3910_Feb24

Page 12 of 22

EX3DV4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PA1 (dB)	Unc ¹ R = 2
10226	CAC	UMTS-FDD (HSPA+)	WCDMA	5.97	±0.9
10226	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	5.49	±0.8
10227	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.25	±0.6
10228	CAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	±0.6
10229	CAE	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	±0.6
10230	CAE	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	±0.6
10231	CAE	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	±0.6
10232	CAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	±0.6
10233	CAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	±0.6
10234	CAH	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	±0.6
10235	CAH	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	±0.6
10236	CAI	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	±0.6
10237	CAH	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	±0.6
10238	CAG	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	±0.6
10239	CAG	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	±0.6
10240	CAG	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	±0.6
10241	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.52	±0.6
10242	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.96	±0.6
10243	CAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.48	±0.6
10244	CAE	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	±0.6
10245	CAE	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	±0.6
10246	CAE	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	±0.6
10247	CAH	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	±0.6
10248	CAH	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	±0.6
10249	CAI	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	±0.6
10250	CAH	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	±0.6
10251	CAH	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	±0.6
10252	CAH	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	±0.6
10253	CAG	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	±0.6
10254	CAG	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	±0.6
10255	CAG	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	±0.6
10256	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	±0.6
10257	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.00	±0.6
10258	CAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	±0.6
10259	CAE	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.58	±0.6
10260	CAE	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	±0.6
10261	CAE	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	±0.6
10262	CAH	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	±0.6
10263	CAH	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	±0.6
10264	CAH	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	±0.6
10265	CAH	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	±0.6
10266	CAH	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	±0.6
10267	CAH	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	±0.6
10268	CAG	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	±0.6
10269	CAG	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	±0.6
10270	CAG	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.56	±0.6
10274	CAC	UMTS-FDD (HSPA, Subtest 5, 3GPP Rel10)	WCDMA	4.87	±0.6
10275	CAC	UMTS-FDD (HSPA, Subtest 5, 3GPP Rel14)	WCDMA	3.98	±0.6
10277	CAH	PHS (QPSK)	PHS	11.81	±0.6
10278	CAH	PHS (QPSK, BW 884 MHz, Roll-off 0.5)	PHS	11.81	±0.6
10279	CAH	PHS (QPSK, BW 884 MHz, Roll-off 0.35)	PHS	12.18	±0.6
10280	AAB	CDMA2000, RC1, SC85, Full Rate	CDMA2000	3.91	±0.6
10281	AAB	CDMA2000, RC3, SC85, Full Rate	CDMA2000	3.46	±0.6
10282	AAB	CDMA2000, RC3, SC82, Full Rate	CDMA2000	3.39	±0.6
10283	AAB	CDMA2000, RC3, SC8, Full Rate	CDMA2000	3.59	±0.6
10285	AAB	CDMA2000, RC1, SC8, 1/8th Rate 25 fr.	CDMA2000	12.49	±0.6
10287	AAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	±0.6
10288	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	±0.6
10289	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.38	±0.6
10300	AAE	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	±0.6
10301	AAA	IEEE 802.16e WiMAX (25-15, 5 ms, 10 MHz, QPSK, PUSC)	WiMAX	12.03	±0.6
10302	AAA	IEEE 802.16e WiMAX (25-15, 5 ms, 10 MHz, QPSK, PUSC, 3 CTRL symbols)	WiMAX	12.57	±0.6
10303	AAA	IEEE 802.16e WiMAX (31-15, 5 ms, 10 MHz, 64QAM, PUSC)	WiMAX	12.52	±0.6
10304	AAA	IEEE 802.16e WiMAX (25-15, 5 ms, 10 MHz, 64QAM, PUSC)	WiMAX	11.96	±0.6
10305	AAA	IEEE 802.16e WiMAX (31-15, 10 ms, 10 MHz, 64QAM, PUSC, 16 symbols)	WiMAX	15.21	±0.6
10306	AAA	IEEE 802.16e WiMAX (25-15, 10 ms, 10 MHz, 64QAM, PUSC, 18 symbols)	WiMAX	14.67	±0.6

Certificate No: EX-3910_Feb24

Page 13 of 22

EX3DV4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^o k = 2
10307	AAA	IEEE 802.16e WiMAX (2019, 10ms, 10 MHz, QPSK, PUSC, 18 symbols)	WiMAX	14.49	±0.6
10308	AAA	IEEE 802.16e WiMAX (2019, 10ms, 10 MHz, 16QAM, PUSC)	WiMAX	14.48	±0.6
10309	AAA	IEEE 802.16e WiMAX (2019, 10ms, 10 MHz, 16QAM, AMC 2x3, 18 symbols)	WiMAX	14.53	±0.6
10310	AAA	IEEE 802.16e WiMAX (2019, 10ms, 10 MHz, QPSK, AVC 2x3, 18 symbols)	WiMAX	14.57	±0.6
10311	AAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.95	±0.6
10313	AAE	DEN 1.5	CDN	10.51	±0.6
10314	AAE	DEN 1.5	CDN	13.48	±0.6
10315	AAB	IEEE 802.11n WiFi 2.4 GHz (DSSS, 1 Mbps, 95pc duty cycle)	WLAN	1.71	±0.8
10316	AAB	IEEE 802.11n WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 95pc duty cycle)	WLAN	0.35	±0.6
10317	AAE	IEEE 802.11n WiFi 5 GHz (OFDM, 6 Mbps, 95pc duty cycle)	WLAN	0.35	±0.6
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	±0.8
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.98	±0.8
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	±0.6
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	±0.6
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	±0.6
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	±0.6
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	±0.6
10389	AAA	64-QAM Waveform, 100 kHz	Generic	5.27	±0.6
10390	AAA	64-QAM Waveform, 40 MHz	Generic	5.27	±0.6
10400	AAE	IEEE 802.11ac WiFi (20 MHz, 64-QAM, 95pc duty cycle)	WLAN	5.37	±0.6
10401	AAE	IEEE 802.11ac WiFi (40 MHz, 64-QAM, 95pc duty cycle)	WLAN	5.60	±0.6
10402	AAE	IEEE 802.11ac WiFi (80 MHz, 64-QAM, 95pc duty cycle)	WLAN	6.53	±0.6
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.78	±0.6
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	±0.6
10406	AAB	CDMA2000, RCH, SC32, RCH, Full Rate	CDMA2000	5.28	±0.6
10410	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe 2,3,4,7,8,9, Subframe Cont=4)	LTE-TDD	7.82	±0.6
10414	AAA	WLAN CCDF, 64-QAM, 40 MHz	Generic	0.54	±0.6
10415	AAA	IEEE 802.11n WiFi 2.4 GHz (DSSS, 1 Mbps, 95pc duty cycle)	WLAN	1.54	±0.6
10416	AAA	IEEE 802.11n WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 95pc duty cycle)	WLAN	0.25	±0.6
10417	AAE	IEEE 802.11n WiFi 5 GHz (OFDM, 6 Mbps, 95pc duty cycle)	WLAN	0.25	±0.6
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 80pc duty cycle, Long preamble)	WLAN	0.14	±0.6
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 80pc duty cycle, Short preamble)	WLAN	0.18	±0.6
10420	AAE	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	0.38	±0.6
10421	AAE	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	0.47	±0.6
10424	AAE	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	0.40	±0.6
10425	AAE	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	0.41	±0.6
10426	AAE	IEEE 802.11n (HT Greenfield, 30 Mbps, 16-QAM)	WLAN	0.45	±0.6
10427	AAE	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	0.41	±0.6
10430	AAE	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	0.28	±0.6
10431	AAE	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	0.38	±0.6
10432	AAE	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	0.34	±0.6
10433	AAE	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	0.34	±0.6
10434	AAB	WCDMA (BS Test Model 1, 34 DPCX)	WCDMA	0.60	±0.6
10435	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe 2,3,4,7,8,9)	LTE-TDD	7.82	±0.6
10447	AAE	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	±0.6
10448	AAE	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.53	±0.6
10449	AAE	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±0.6
10450	AAE	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	±0.6
10461	AAB	WCDMA (BS Test Model 1, 34 DPCX, Clipping 44%)	WCDMA	7.59	±0.6
10463	AAE	Validator (Square, 10 ms, 1 ms)	Test	10.00	±0.6
10456	AAE	IEEE 802.11ac WiFi (150 MHz, 64-QAM, 95pc duty cycle)	WLAN	0.63	±0.6
10457	AAB	UMTS-FDD (DC-HS-PA)	WCDMA	0.62	±0.6
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	0.55	±0.6
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	0.25	±0.6
10460	AAB	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	±0.6
10461	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe 2,3,4,7,8,9)	LTE-TDD	7.82	±0.6
10462	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe 2,3,4,7,8,9)	LTE-TDD	0.30	±0.6
10463	AAC	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe 2,3,4,7,8,9)	LTE-TDD	0.56	±0.6
10464	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe 2,3,4,7,8,9)	LTE-TDD	7.82	±0.6
10465	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe 2,3,4,7,8,9)	LTE-TDD	0.32	±0.6
10466	AAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe 2,3,4,7,8,9)	LTE-TDD	0.57	±0.6
10467	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe 2,3,4,7,8,9)	LTE-TDD	7.82	±0.6
10468	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe 2,3,4,7,8,9)	LTE-TDD	0.30	±0.6
10469	AAG	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe 2,3,4,7,8,9)	LTE-TDD	0.56	±0.6
10470	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe 2,3,4,7,8,9)	LTE-TDD	7.82	±0.6
10471	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe 2,3,4,7,8,9)	LTE-TDD	0.32	±0.6

EX30V4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ¹ # = 2
10472	AAG	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±0.6
10473	AAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.62	±0.6
10474	AAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±0.6
10475	AAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±0.6
10477	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	±0.6
10478	AAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	±0.6
10479	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±0.6
10480	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.16	±0.6
10481	AAC	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	±0.6
10482	AAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.71	±0.6
10483	AAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.09	±0.6
10484	AAD	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.47	±0.6
10485	AAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.59	±0.6
10486	AAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.38	±0.6
10487	AAG	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.60	±0.6
10488	AAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	±0.6
10489	AAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.21	±0.6
10490	AAG	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	±0.6
10491	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±0.6
10492	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.41	±0.6
10493	AAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	±0.6
10494	AAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±0.6
10495	AAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.27	±0.6
10496	AAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	±0.6
10497	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	±0.6
10498	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.40	±0.6
10499	AAC	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.68	±0.6
10500	AAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	±0.6
10501	AAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.44	±0.6
10502	AAD	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.52	±0.6
10503	AAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.72	±0.6
10504	AAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	±0.6
10505	AAG	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	±0.6
10506	AAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±0.6
10507	AAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.36	±0.6
10508	AAG	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	±0.6
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.99	±0.6
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.46	±0.6
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.51	±0.6
10512	AAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±0.6
10513	AAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.42	±0.6
10514	AAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	±0.6
10515	AAW	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90% duty cycle)	WLAN	1.58	±0.6
10516	AAW	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90% duty cycle)	WLAN	1.57	±0.6
10517	AAW	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90% duty cycle)	WLAN	1.55	±0.6
10518	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 90% duty cycle)	WLAN	8.23	±0.6
10519	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 12 Mbps, 90% duty cycle)	WLAN	8.39	±0.6
10520	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 18 Mbps, 90% duty cycle)	WLAN	8.12	±0.6
10521	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 24 Mbps, 90% duty cycle)	WLAN	7.97	±0.6
10522	AAF	IEEE 802.11a WiFi 5 GHz (OFDM, 36 Mbps, 90% duty cycle)	WLAN	8.45	±0.6
10523	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 48 Mbps, 90% duty cycle)	WLAN	8.05	±0.6
10524	AAD	IEEE 802.11a WiFi 5 GHz (OFDM, 54 Mbps, 90% duty cycle)	WLAN	8.27	±0.6
10525	AAD	IEEE 802.11ac WiFi (20 MHz, MCS0, 90% duty cycle)	WLAN	8.35	±0.6
10526	AAD	IEEE 802.11ac WiFi (20 MHz, MCS1, 90% duty cycle)	WLAN	8.42	±0.6
10527	AAD	IEEE 802.11ac WiFi (20 MHz, MCS2, 90% duty cycle)	WLAN	8.21	±0.6
10528	AAD	IEEE 802.11ac WiFi (20 MHz, MCS3, 90% duty cycle)	WLAN	8.38	±0.6
10529	AAD	IEEE 802.11ac WiFi (20 MHz, MCS4, 90% duty cycle)	WLAN	8.30	±0.6
10531	AAD	IEEE 802.11ac WiFi (20 MHz, MCS6, 90% duty cycle)	WLAN	8.43	±0.6
10532	AAD	IEEE 802.11ac WiFi (20 MHz, MCS7, 90% duty cycle)	WLAN	8.25	±0.6
10533	AAD	IEEE 802.11ac WiFi (20 MHz, MCS8, 90% duty cycle)	WLAN	8.35	±0.6
10534	AAD	IEEE 802.11ac WiFi (40 MHz, MCS0, 90% duty cycle)	WLAN	8.45	±0.6
10535	AAD	IEEE 802.11ac WiFi (40 MHz, MCS1, 90% duty cycle)	WLAN	8.45	±0.6
10536	AAD	IEEE 802.11ac WiFi (40 MHz, MCS2, 90% duty cycle)	WLAN	8.32	±0.6
10537	AAD	IEEE 802.11ac WiFi (40 MHz, MCS3, 90% duty cycle)	WLAN	8.44	±0.6
10538	AAD	IEEE 802.11ac WiFi (40 MHz, MCS4, 90% duty cycle)	WLAN	8.54	±0.6
10540	AAD	IEEE 802.11ac WiFi (40 MHz, MCS6, 90% duty cycle)	WLAN	8.39	±0.6

Certificate No: EX-3910_Feb24

Page 15 of 22

EX3DW4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^F k = 2
10541	AAD	IEEE 802.11ac WiFi (40 MHz, MCS7, 98pc duty cycle)	WLAN	8.46	+0.6
10542	AAD	IEEE 802.11ac WiFi (40 MHz, MCS8, 98pc duty cycle)	WLAN	8.65	+0.6
10543	AAD	IEEE 802.11ac WiFi (40 MHz, MCS9, 98pc duty cycle)	WLAN	8.65	+0.6
10544	AAD	IEEE 802.11ac WiFi (80 MHz, MCS0, 98pc duty cycle)	WLAN	8.47	+0.6
10545	AAD	IEEE 802.11ac WiFi (80 MHz, MCS1, 98pc duty cycle)	WLAN	8.55	+0.6
10546	AAD	IEEE 802.11ac WiFi (80 MHz, MCS2, 98pc duty cycle)	WLAN	8.35	+0.6
10547	AAD	IEEE 802.11ac WiFi (80 MHz, MCS3, 98pc duty cycle)	WLAN	8.49	+0.6
10548	AAD	IEEE 802.11ac WiFi (80 MHz, MCS4, 98pc duty cycle)	WLAN	8.37	+0.6
10550	AAD	IEEE 802.11ac WiFi (80 MHz, MCS6, 98pc duty cycle)	WLAN	8.38	+0.6
10551	AAD	IEEE 802.11ac WiFi (80 MHz, MCS7, 98pc duty cycle)	WLAN	8.50	+0.6
10552	AAD	IEEE 802.11ac WiFi (80 MHz, MCS8, 98pc duty cycle)	WLAN	8.42	+0.6
10553	AAD	IEEE 802.11ac WiFi (80 MHz, MCS9, 98pc duty cycle)	WLAN	8.45	+0.6
10554	AAD	IEEE 802.11ac WiFi (160 MHz, MCS0, 98pc duty cycle)	WLAN	8.48	+0.6
10555	AAD	IEEE 802.11ac WiFi (160 MHz, MCS1, 98pc duty cycle)	WLAN	8.47	+0.6
10556	AAD	IEEE 802.11ac WiFi (160 MHz, MCS2, 98pc duty cycle)	WLAN	8.50	+0.6
10557	AAD	IEEE 802.11ac WiFi (160 MHz, MCS3, 98pc duty cycle)	WLAN	8.52	+0.6
10558	AAD	IEEE 802.11ac WiFi (160 MHz, MCS4, 98pc duty cycle)	WLAN	8.61	+0.6
10560	AAD	IEEE 802.11ac WiFi (160 MHz, MCS6, 98pc duty cycle)	WLAN	8.73	+0.6
10561	AAD	IEEE 802.11ac WiFi (160 MHz, MCS7, 98pc duty cycle)	WLAN	8.56	+0.6
10562	AAD	IEEE 802.11ac WiFi (160 MHz, MCS8, 98pc duty cycle)	WLAN	8.69	+0.6
10563	AAD	IEEE 802.11ac WiFi (160 MHz, MCS9, 98pc duty cycle)	WLAN	8.77	+0.6
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.25	+0.6
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.45	+0.6
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.13	+0.6
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.00	+0.6
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.37	+0.6
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.10	+0.6
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.30	+0.6
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	WLAN	1.99	+0.6
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	WLAN	1.99	+0.6
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 3.5 Mbps, 90pc duty cycle)	WLAN	1.98	+0.6
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	WLAN	1.86	+0.6
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.09	+0.6
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	+0.6
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	+0.6
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	+0.6
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	+0.6
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	+0.6
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	+0.6
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	+0.6
10583	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 8 Mbps, 90pc duty cycle)	WLAN	8.58	+0.6
10584	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.50	+0.6
10585	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	+0.6
10586	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	+0.6
10587	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	+0.6
10588	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	+0.6
10589	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	+0.6
10590	AAD	IEEE 802.11ah WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	+0.6
10591	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS0, 90pc duty cycle)	WLAN	8.63	+0.6
10592	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS1, 90pc duty cycle)	WLAN	8.78	+0.6
10593	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS2, 90pc duty cycle)	WLAN	8.64	+0.6
10594	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS3, 90pc duty cycle)	WLAN	8.74	+0.6
10595	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS4, 90pc duty cycle)	WLAN	8.74	+0.6
10596	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS5, 90pc duty cycle)	WLAN	8.71	+0.6
10597	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS6, 90pc duty cycle)	WLAN	8.72	+0.6
10598	AAD	IEEE 802.11n (HT Mixed, 20 MHz, MCS7, 90pc duty cycle)	WLAN	8.50	+0.6
10599	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS0, 90pc duty cycle)	WLAN	8.79	+0.6
10600	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS1, 90pc duty cycle)	WLAN	8.88	+0.6
10601	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS2, 90pc duty cycle)	WLAN	8.62	+0.6
10602	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS3, 90pc duty cycle)	WLAN	8.94	+0.6
10603	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS4, 90pc duty cycle)	WLAN	9.03	+0.6
10604	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS5, 90pc duty cycle)	WLAN	8.78	+0.6
10605	AAD	IEEE 802.11n (HT Mixed, 40 MHz, MCS6, 90pc duty cycle)	WLAN	8.97	+0.6
10606	AAD	IEEE 802.11ac WiFi (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.60	+0.6
10607	AAD	IEEE 802.11ac WiFi (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.64	+0.6
10608	AAD	IEEE 802.11ac WiFi (20 MHz, MCS9, 90pc duty cycle)	WLAN	8.77	+0.6

Certificate No: EX-3910_Feb24

Page 16 of 22

EX3DV4 - SN:3610

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^F k = 2
10509	AAD	IEEE 802.11ac WiFi (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.57	±9.6
10510	AAD	IEEE 802.11ac WiFi (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.78	±9.6
10511	AAD	IEEE 802.11ac WiFi (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6
10512	AAD	IEEE 802.11ac WiFi (20 MHz, MCS5, 90pc duty cycle)	WLAN	9.77	±9.6
10513	AAD	IEEE 802.11ac WiFi (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.94	±9.6
10514	AAD	IEEE 802.11ac WiFi (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.59	±9.6
10515	AAD	IEEE 802.11ac WiFi (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6
10516	AAD	IEEE 802.11ac WiFi (40 MHz, MCS9, 90pc duty cycle)	WLAN	9.82	±9.6
10517	AAD	IEEE 802.11ac WiFi (40 MHz, MCS1, 90pc duty cycle)	WLAN	8.81	±9.6
10518	AAD	IEEE 802.11ac WiFi (40 MHz, MCS2, 90pc duty cycle)	WLAN	8.58	±9.6
10519	AAD	IEEE 802.11ac WiFi (40 MHz, MCS3, 90pc duty cycle)	WLAN	8.96	±9.6
10520	AAD	IEEE 802.11ac WiFi (40 MHz, MCS4, 90pc duty cycle)	WLAN	8.87	±9.6
10521	AAD	IEEE 802.11ac WiFi (40 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
10522	AAD	IEEE 802.11ac WiFi (40 MHz, MCS6, 90pc duty cycle)	WLAN	8.88	±9.6
10523	AAD	IEEE 802.11ac WiFi (40 MHz, MCS7, 90pc duty cycle)	WLAN	8.82	±9.6
10524	AAD	IEEE 802.11ac WiFi (40 MHz, MCS8, 90pc duty cycle)	WLAN	8.96	±9.6
10525	AAD	IEEE 802.11ac WiFi (80 MHz, MCS9, 90pc duty cycle)	WLAN	8.96	±9.6
10526	AAD	IEEE 802.11ac WiFi (80 MHz, MCS0, 90pc duty cycle)	WLAN	8.63	±9.6
10527	AAD	IEEE 802.11ac WiFi (80 MHz, MCS1, 90pc duty cycle)	WLAN	8.86	±9.6
10528	AAD	IEEE 802.11ac WiFi (80 MHz, MCS2, 90pc duty cycle)	WLAN	8.71	±9.6
10529	AAD	IEEE 802.11ac WiFi (80 MHz, MCS3, 90pc duty cycle)	WLAN	8.85	±9.6
10530	AAD	IEEE 802.11ac WiFi (80 MHz, MCS4, 90pc duty cycle)	WLAN	8.72	±9.6
10531	AAD	IEEE 802.11ac WiFi (80 MHz, MCS5, 90pc duty cycle)	WLAN	8.81	±9.6
10532	AAD	IEEE 802.11ac WiFi (80 MHz, MCS6, 90pc duty cycle)	WLAN	8.74	±9.6
10533	AAD	IEEE 802.11ac WiFi (80 MHz, MCS7, 90pc duty cycle)	WLAN	8.83	±9.6
10534	AAD	IEEE 802.11ac WiFi (80 MHz, MCS8, 90pc duty cycle)	WLAN	8.80	±9.6
10535	AAD	IEEE 802.11ac WiFi (80 MHz, MCS9, 90pc duty cycle)	WLAN	8.81	±9.6
10536	AAE	IEEE 802.11ac WiFi (160 MHz, MCS0, 90pc duty cycle)	WLAN	8.83	±9.6
10537	AAE	IEEE 802.11ac WiFi (160 MHz, MCS1, 90pc duty cycle)	WLAN	8.79	±9.6
10538	AAE	IEEE 802.11ac WiFi (160 MHz, MCS2, 90pc duty cycle)	WLAN	8.88	±9.6
10539	AAE	IEEE 802.11ac WiFi (160 MHz, MCS3, 90pc duty cycle)	WLAN	8.85	±9.6
10540	AAE	IEEE 802.11ac WiFi (160 MHz, MCS4, 90pc duty cycle)	WLAN	8.90	±9.6
10541	AAE	IEEE 802.11ac WiFi (160 MHz, MCS5, 90pc duty cycle)	WLAN	8.96	±9.6
10542	AAE	IEEE 802.11ac WiFi (160 MHz, MCS6, 90pc duty cycle)	WLAN	8.98	±9.6
10543	AAE	IEEE 802.11ac WiFi (160 MHz, MCS7, 90pc duty cycle)	WLAN	8.98	±9.6
10544	AAE	IEEE 802.11ac WiFi (160 MHz, MCS8, 90pc duty cycle)	WLAN	8.96	±9.6
10545	AAE	IEEE 802.11ac WiFi (160 MHz, MCS9, 90pc duty cycle)	WLAN	8.91	±9.6
10546	AAH	LTE-TDD (SC-FDMA, 1 RB, 5MHz, QPSK, UL Subframe 2,7)	LTE-TDD	11.58	±9.6
10547	AAH	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe 2,7)	LTE-TDD	11.90	±9.6
10548	AAA	CDMA2000 (1x Advantec)	CDMA2000	8.46	±9.6
10552	AAF	LTE-TDD (OFDMA, 5MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	±9.6
10553	AAF	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	±9.6
10554	AAF	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.98	±9.6
10555	AAF	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	±9.6
10558	AAB	Pulse Waveform (200Hz, 10%)	Test	10.00	±9.6
10559	AAB	Pulse Waveform (200Hz, 20%)	Test	6.95	±9.6
10560	AAB	Pulse Waveform (200Hz, 40%)	Test	3.98	±9.6
10561	AAB	Pulse Waveform (200Hz, 60%)	Test	2.22	±9.6
10562	AAB	Pulse Waveform (200Hz, 80%)	Test	0.92	±9.6
10570	AAA	Bluetooth Low Energy	Bluetooth	2.13	±9.6
10571	AAC	IEEE 802.11ax (20 MHz, MCS0, 90pc duty cycle)	WLAN	9.05	±9.6
10572	AAC	IEEE 802.11ax (20 MHz, MCS1, 90pc duty cycle)	WLAN	8.57	±9.6
10573	AAC	IEEE 802.11ax (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.76	±9.6
10574	AAC	IEEE 802.11ax (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.74	±9.6
10575	AAC	IEEE 802.11ax (20 MHz, MCS4, 90pc duty cycle)	WLAN	8.90	±9.6
10576	AAC	IEEE 802.11ax (20 MHz, MCS5, 90pc duty cycle)	WLAN	8.77	±9.6
10577	AAC	IEEE 802.11ax (20 MHz, MCS6, 90pc duty cycle)	WLAN	8.73	±9.6
10578	AAC	IEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle)	WLAN	8.78	±9.6
10579	AAC	IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle)	WLAN	8.89	±9.6
10580	AAC	IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle)	WLAN	8.80	±9.6
10581	AAC	IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle)	WLAN	8.62	±9.6
10582	AAC	IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle)	WLAN	8.63	±9.6
10583	AAC	IEEE 802.11ax (20 MHz, MCS12, 90pc duty cycle)	WLAN	8.42	±9.6
10584	AAC	IEEE 802.11ax (20 MHz, MCS1, 90pc duty cycle)	WLAN	8.25	±9.6
10585	AAC	IEEE 802.11ax (20 MHz, MCS2, 90pc duty cycle)	WLAN	8.33	±9.6
10586	AAC	IEEE 802.11ax (20 MHz, MCS3, 90pc duty cycle)	WLAN	8.28	±9.6

Certificate No: EX-3910_Feb24

Page 17 of 22

EX3DV4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^k k = 2
10687	AAC	IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)	WLAN	8.45	±9.6
10688	AAC	IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)	WLAN	8.29	±9.6
10689	AAC	IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)	WLAN	8.55	±9.6
10690	AAC	IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle)	WLAN	8.20	±9.6
10691	AAC	IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)	WLAN	8.25	±9.6
10692	AAC	IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)	WLAN	8.29	±9.6
10693	AAC	IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)	WLAN	8.25	±9.6
10694	AAC	IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)	WLAN	8.57	±9.6
10695	AAC	IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)	WLAN	8.76	±9.6
10696	AAC	IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)	WLAN	8.81	±9.6
10697	AAC	IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)	WLAN	8.61	±9.6
10698	AAC	IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)	WLAN	8.89	±9.6
10699	AAC	IEEE 802.11ax (40MHz, MCS4, 99pc duty cycle)	WLAN	8.89	±9.6
10700	AAC	IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)	WLAN	8.73	±9.6
10701	AAC	IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)	WLAN	8.86	±9.6
10702	AAC	IEEE 802.11ax (40MHz, MCS7, 99pc duty cycle)	WLAN	8.70	±9.6
10703	AAC	IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)	WLAN	8.82	±9.6
10704	AAC	IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)	WLAN	8.56	±9.6
10705	AAC	IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)	WLAN	8.89	±9.6
10706	AAC	IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)	WLAN	8.86	±9.6
10707	AAC	IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)	WLAN	8.32	±9.6
10708	AAC	IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)	WLAN	8.56	±9.6
10709	AAC	IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)	WLAN	8.39	±9.6
10710	AAC	IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)	WLAN	8.59	±9.6
10711	AAC	IEEE 802.11ax (40MHz, MCS4, 99pc duty cycle)	WLAN	8.38	±9.6
10712	AAC	IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)	WLAN	8.57	±9.6
10713	AAC	IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)	WLAN	8.33	±9.6
10714	AAC	IEEE 802.11ax (40MHz, MCS7, 99pc duty cycle)	WLAN	8.26	±9.6
10715	AAC	IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)	WLAN	8.45	±9.6
10716	AAC	IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)	WLAN	8.30	±9.6
10717	AAC	IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)	WLAN	8.48	±9.6
10718	AAC	IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)	WLAN	8.24	±9.6
10719	AAC	IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)	WLAN	8.81	±9.6
10720	AAC	IEEE 802.11ax (80MHz, MCS1, 99pc duty cycle)	WLAN	8.87	±9.6
10721	AAC	IEEE 802.11ax (80MHz, MCS2, 99pc duty cycle)	WLAN	8.76	±9.6
10722	AAC	IEEE 802.11ax (80MHz, MCS3, 99pc duty cycle)	WLAN	8.55	±9.6
10723	AAC	IEEE 802.11ax (80MHz, MCS4, 99pc duty cycle)	WLAN	8.78	±9.6
10724	AAC	IEEE 802.11ax (80MHz, MCS5, 99pc duty cycle)	WLAN	8.50	±9.6
10725	AAC	IEEE 802.11ax (80MHz, MCS6, 99pc duty cycle)	WLAN	8.74	±9.6
10726	AAC	IEEE 802.11ax (80MHz, MCS7, 99pc duty cycle)	WLAN	8.72	±9.6
10727	AAC	IEEE 802.11ax (80MHz, MCS8, 99pc duty cycle)	WLAN	8.68	±9.6
10728	AAC	IEEE 802.11ax (80MHz, MCS9, 99pc duty cycle)	WLAN	8.65	±9.6
10729	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc duty cycle)	WLAN	8.64	±9.6
10730	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc duty cycle)	WLAN	8.67	±9.6
10731	AAC	IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)	WLAN	8.42	±9.6
10732	AAC	IEEE 802.11ax (80MHz, MCS1, 99pc duty cycle)	WLAN	8.46	±9.6
10733	AAC	IEEE 802.11ax (80MHz, MCS2, 99pc duty cycle)	WLAN	8.40	±9.6
10734	AAC	IEEE 802.11ax (80MHz, MCS3, 99pc duty cycle)	WLAN	8.22	±9.6
10735	AAC	IEEE 802.11ax (80MHz, MCS4, 99pc duty cycle)	WLAN	8.33	±9.6
10736	AAC	IEEE 802.11ax (80MHz, MCS5, 99pc duty cycle)	WLAN	8.27	±9.6
10737	AAC	IEEE 802.11ax (80MHz, MCS6, 99pc duty cycle)	WLAN	8.35	±9.6
10738	AAC	IEEE 802.11ax (80MHz, MCS7, 99pc duty cycle)	WLAN	8.42	±9.6
10739	AAC	IEEE 802.11ax (80MHz, MCS8, 99pc duty cycle)	WLAN	8.25	±9.6
10740	AAC	IEEE 802.11ax (80MHz, MCS9, 99pc duty cycle)	WLAN	8.45	±9.6
10741	AAC	IEEE 802.11ax (80MHz, MCS10, 99pc duty cycle)	WLAN	8.40	±9.6
10742	AAC	IEEE 802.11ax (80MHz, MCS11, 99pc duty cycle)	WLAN	8.43	±9.6
10743	AAC	IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)	WLAN	8.94	±9.6
10744	AAC	IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)	WLAN	9.16	±9.6
10745	AAC	IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)	WLAN	8.93	±9.6
10746	AAC	IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)	WLAN	9.11	±9.6
10747	AAC	IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)	WLAN	8.96	±9.6
10748	AAC	IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)	WLAN	8.93	±9.6
10749	AAC	IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)	WLAN	8.90	±9.6
10750	AAC	IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)	WLAN	8.79	±9.6
10751	AAC	IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)	WLAN	8.82	±9.6
10752	AAC	IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)	WLAN	8.81	±9.6

Certificate No: EX-3910_Feb24

Page 18 of 22

EX3DV4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ⁰ k = 2
10753	AAC	IEEE 802.11ax (160 MHz, MCS10, 80ps duty cycle)	WLAN	9.00	±9.6
10754	AAC	IEEE 802.11ax (160 MHz, MCS11, 80ps duty cycle)	WLAN	8.94	±9.6
10755	AAC	IEEE 802.11ax (160 MHz, MCS0, 96ps duty cycle)	WLAN	8.84	±9.6
10756	AAC	IEEE 802.11ax (160 MHz, MCS1, 96ps duty cycle)	WLAN	8.77	±9.6
10757	AAC	IEEE 802.11ax (160 MHz, MCS2, 96ps duty cycle)	WLAN	8.77	±9.6
10758	AAC	IEEE 802.11ax (160 MHz, MCS3, 96ps duty cycle)	WLAN	8.59	±9.6
10759	AAC	IEEE 802.11ax (160 MHz, MCS4, 96ps duty cycle)	WLAN	8.58	±9.6
10760	AAC	IEEE 802.11ax (160 MHz, MCS5, 96ps duty cycle)	WLAN	8.49	±9.6
10761	AAC	IEEE 802.11ax (160 MHz, MCS6, 96ps duty cycle)	WLAN	8.58	±9.6
10762	AAC	IEEE 802.11ax (160 MHz, MCS7, 96ps duty cycle)	WLAN	8.49	±9.6
10763	AAC	IEEE 802.11ax (160 MHz, MCS8, 96ps duty cycle)	WLAN	8.53	±9.6
10764	AAC	IEEE 802.11ax (160 MHz, MCS9, 96ps duty cycle)	WLAN	8.54	±9.6
10765	AAC	IEEE 802.11ax (160 MHz, MCS10, 80ps duty cycle)	WLAN	8.64	±9.6
10766	AAC	IEEE 802.11ax (160 MHz, MCS11, 80ps duty cycle)	WLAN	8.61	±9.6
10767	AAE	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	7.99	±9.6
10768	AAE	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6
10769	AAE	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.01	±9.6
10770	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10771	AAE	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10772	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.23	±9.6
10773	AAE	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.09	±9.6
10774	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.02	±9.6
10775	AAE	5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
10776	AAE	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.6
10777	AAE	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.30	±9.6
10778	AAE	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.34	±9.6
10779	AAE	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.42	±9.6
10780	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10781	AAE	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.38	±9.6
10782	AAE	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.43	±9.6
10783	AAE	5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.31	±9.6
10784	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.29	±9.6
10785	AAE	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.40	±9.6
10786	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.35	±9.6
10787	AAE	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.44	±9.6
10788	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.6
10789	AAE	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.37	±9.6
10790	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)	5G NR FR1 TDD	8.39	±9.6
10791	AAE	5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.83	±9.6
10792	AAE	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.92	±9.6
10793	AAE	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.95	±9.6
10794	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±9.6
10795	AAE	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.84	±9.6
10796	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.82	±9.6
10797	AAE	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.01	±9.6
10798	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.88	±9.6
10799	AAE	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.90	±9.6
10800	AAE	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.89	±9.6
10801	AAE	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.87	±9.6
10802	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.90	±9.6
10803	AAE	5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10804	AAE	5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.37	±9.6
10805	AAE	5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10806	AAE	5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10807	AAE	5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±9.6
10808	AAE	5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±9.6
10809	AAE	5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.34	±9.6
10810	AAE	5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.33	±9.6
10811	AAE	5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.30	±9.6
10812	AAE	5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10813	AAE	5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10814	AAE	5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.36	±9.6
10815	AAE	5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.39	±9.6
10816	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.41	±9.6
10817	AAE	5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.42	±9.6
10818	AAE	5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	±9.6
10819	AAE	5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	8.43	±9.6

Certificate No: EX-3910_Feb24

Page 19 of 22

EX3DV4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ² k-2
10825	AAF	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	7.40	+9.6
10826	AAE	5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.83	+9.6
10831	AMD	5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.73	+9.6
10832	AAE	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.74	+9.6
10833	AAE	5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	+9.6
10834	AAE	5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.75	+9.6
10835	AAF	5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	+9.6
10836	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.65	+9.6
10837	AAF	5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.65	+9.6
10838	AAF	5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.70	+9.6
10840	AAE	5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.67	+9.6
10841	AAF	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	7.71	+9.6
10845	AAE	5G NR (CP-OFDM, 5% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.49	+9.6
10844	AAE	5G NR (CP-OFDM, 5% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	+9.6
10846	AAE	5G NR (CP-OFDM, 5% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10854	AAE	5G NR (CP-OFDM, 10% RB, 10 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	+9.6
10855	AAE	5G NR (CP-OFDM, 10% RB, 15 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	+9.6
10856	AAE	5G NR (CP-OFDM, 10% RB, 20 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	+9.6
10857	AAE	5G NR (CP-OFDM, 10% RB, 25 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.35	+9.6
10858	AAE	5G NR (CP-OFDM, 10% RB, 30 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.36	+9.6
10859	AAF	5G NR (CP-OFDM, 10% RB, 40 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.34	+9.6
10860	AAE	5G NR (CP-OFDM, 10% RB, 50 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10861	AAF	5G NR (CP-OFDM, 10% RB, 60 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.40	+9.6
10863	AAF	5G NR (CP-OFDM, 10% RB, 80 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10864	AAE	5G NR (CP-OFDM, 10% RB, 90 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.37	+9.6
10865	AAF	5G NR (CP-OFDM, 10% RB, 100 MHz, QPSK, 60 kHz)	5G NR FR1 TDD	8.41	+9.6
10866	AAF	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.60	+9.6
10868	AAF	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.89	+9.6
10869	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.75	+9.6
10870	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.88	+9.6
10871	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.75	+9.6
10872	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	5.82	+9.6
10873	AAE	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	+9.6
10874	AAE	5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	+9.6
10875	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.78	+9.6
10876	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.38	+9.6
10877	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	7.96	+9.6
10878	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.41	+9.6
10879	AAE	5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.12	+9.6
10880	AAE	5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.38	+9.6
10881	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.70	+9.6
10882	AAF	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	5.86	+9.6
10883	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.57	+9.6
10884	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	6.53	+9.6
10885	AAE	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.61	+9.6
10886	AAE	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	6.65	+9.6
10887	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	7.75	+9.6
10888	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)	5G NR FR2 TDD	8.35	+9.6
10889	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.02	+9.6
10890	AAE	5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)	5G NR FR2 TDD	8.40	+9.6
10891	AAE	5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.13	+9.6
10892	AAF	5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)	5G NR FR2 TDD	8.41	+9.6
10897	AAE	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.65	+9.6
10898	AAC	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	+9.6
10899	AAB	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.67	+9.6
10900	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	+9.6
10901	AAD	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.85	+9.6
10902	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10903	AAD	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10904	AAC	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10905	AAD	5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.68	+9.6
10906	AAD	5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.88	+9.6
10907	AAE	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.78	+9.6
10908	AAC	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.93	+9.6
10909	AAB	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.96	+9.6
10910	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)	5G NR FR1 TDD	5.83	+9.6

Certificate No: EX 3910_Feb24

Page 20 of 22

EX3DV4 - SN:3910

February 19, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^F k = 2
10911	AAB	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.93	±9.6
10912	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.84	±9.6
10913	AAD	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.64	±9.6
10914	AAC	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.85	±9.6
10915	AAD	5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.83	±9.6
10916	AAD	5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.87	±9.6
10917	AAD	5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.94	±9.6
10918	AAE	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.86	±9.6
10919	AAC	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.88	±9.6
10920	AAD	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.87	±9.6
10921	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.84	±9.6
10922	AAB	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.82	±9.6
10923	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.84	±9.6
10924	AAD	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.84	±9.6
10925	AAC	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.95	±9.6
10926	AAD	5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.84	±9.6
10927	AAD	5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30kHz)	5G NR FR1 TDD	5.94	±9.6
10928	AAD	5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.52	±9.6
10929	AAD	5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.52	±9.6
10930	AAC	5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.52	±9.6
10931	AAC	5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.51	±9.6
10932	AAC	5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.51	±9.6
10933	AAC	5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.51	±9.6
10934	AAC	5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.51	±9.6
10935	AAD	5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.51	±9.6
10936	AAD	5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.80	±9.6
10937	AAD	5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.77	±9.6
10938	AAC	5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.80	±9.6
10939	AAC	5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.82	±9.6
10940	AAC	5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.88	±9.6
10941	AAC	5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.83	±9.6
10942	AAC	5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.85	±9.6
10943	AAD	5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.95	±9.6
10944	AAD	5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.81	±9.6
10945	AAD	5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.85	±9.6
10946	AAC	5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.83	±9.6
10947	AAC	5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.87	±9.6
10948	AAC	5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.94	±9.6
10949	AAC	5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.87	±9.6
10950	AAC	5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.94	±9.6
10951	AAD	5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15kHz)	5G NR FR1 FDD	5.92	±9.6
10952	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15kHz)	5G NR FR1 FDD	8.25	±9.6
10953	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15kHz)	5G NR FR1 FDD	8.15	±9.6
10954	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15kHz)	5G NR FR1 FDD	8.23	±9.6
10955	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15kHz)	5G NR FR1 FDD	8.42	±9.6
10956	AAA	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30kHz)	5G NR FR1 FDD	8.14	±9.6
10957	AAA	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30kHz)	5G NR FR1 FDD	8.31	±9.6
10958	AAA	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30kHz)	5G NR FR1 FDD	8.51	±9.6
10959	AAA	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30kHz)	5G NR FR1 FDD	8.39	±9.6
10960	AAE	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15kHz)	5G NR FR1 TDD	9.32	±9.6
10961	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15kHz)	5G NR FR1 TDD	9.38	±9.6
10962	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15kHz)	5G NR FR1 TDD	9.40	±9.6
10963	AAC	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15kHz)	5G NR FR1 TDD	9.56	±9.6
10964	AAE	5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30kHz)	5G NR FR1 TDD	9.29	±9.6
10965	AAC	5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30kHz)	5G NR FR1 TDD	9.37	±9.6
10966	AAB	5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30kHz)	5G NR FR1 TDD	9.55	±9.6
10967	AAC	5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30kHz)	5G NR FR1 TDD	9.42	±9.6
10968	AAD	5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30kHz)	5G NR FR1 TDD	9.49	±9.6
10972	AAC	5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15kHz)	5G NR FR1 TDD	11.59	±9.6
10973	AAD	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30kHz)	5G NR FR1 TDD	9.08	±9.6
10974	AAD	5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30kHz)	5G NR FR1 TDD	10.28	±9.6
10975	AAA	U.L.A. BDR	ULLA	1.16	±9.6
10975	AAA	U.L.A. HER4	ULLA	5.55	±9.6
10980	AAA	U.L.A. HER8	ULLA	10.32	±9.6
10981	AAA	U.L.A. HER16	ULLA	3.19	±9.6
10982	AAA	U.L.A. HER32	ULLA	3.43	±9.6

Certificate No: EX-3910_Feb24

Page 21 of 22

EX3DV4 - SN:3910

February 18, 2024

UID	Rev	Communication System Name	Group	PAR (dB)	Unc ^E k = 2
10983	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.31	±0.5
10984	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	9.42	±0.5
10985	AAC	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.54	±0.5
10986	AAB	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.50	±0.5
10987	AAC	5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.53	±0.5
10988	AAB	5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.35	±0.5
10989	AAC	5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.33	±0.5
10990	AAB	5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	9.52	±0.5
11000	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 TDD	10.24	±0.5
11004	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 TDD	10.75	±0.5
11005	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.70	±0.5
11006	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.55	±0.5
11007	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.45	±0.5
11008	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz)	5G NR FR1 FDD	8.51	±0.5
11009	AAA	5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.76	±0.5
11010	AAA	5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.85	±0.5
11011	AAA	5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.86	±0.5
11012	AAA	5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz)	5G NR FR1 FDD	8.68	±0.5
11013	AAB	IEEE 802.11be (320 MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±0.5
11014	AAB	IEEE 802.11be (320 MHz, MCS2, 99pc duty cycle)	WLAN	8.45	±0.5
11015	AAB	IEEE 802.11be (320 MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±0.5
11016	AAB	IEEE 802.11be (320 MHz, MCS4, 99pc duty cycle)	WLAN	8.44	±0.5
11017	AAB	IEEE 802.11be (320 MHz, MCS5, 99pc duty cycle)	WLAN	8.41	±0.5
11018	AAB	IEEE 802.11be (320 MHz, MCS6, 99pc duty cycle)	WLAN	8.40	±0.5
11019	AAB	IEEE 802.11be (320 MHz, MCS7, 99pc duty cycle)	WLAN	8.29	±0.5
11020	AAB	IEEE 802.11be (320 MHz, MCS8, 99pc duty cycle)	WLAN	8.27	±0.5
11021	AAB	IEEE 802.11be (320 MHz, MCS9, 99pc duty cycle)	WLAN	8.45	±0.5
11022	AAB	IEEE 802.11be (320 MHz, MCS10, 99pc duty cycle)	WLAN	8.36	±0.5
11023	AAB	IEEE 802.11be (320 MHz, MCS11, 99pc duty cycle)	WLAN	8.02	±0.5
11024	AAB	IEEE 802.11be (320 MHz, MCS12, 99pc duty cycle)	WLAN	8.42	±0.5
11025	AAB	IEEE 802.11be (320 MHz, MCS13, 99pc duty cycle)	WLAN	8.37	±0.5
11026	AAB	IEEE 802.11be (320 MHz, MCS14, 99pc duty cycle)	WLAN	8.30	±0.5

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

APPENDIX D. CALIBRATION REPORT OF THE DIPOLE ANTENNA

Dipole Antenna 2 450 MHz(SN: 774)

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



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

Accreditation No.: SCS 0108

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

Client: Nemko
Gyeonggi-do, Republic of Korea

Certificate No.: D2450V2-774_Apr24

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:774

Calibration procedure(s): QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: April 22, 2024

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 Data (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	26-Mar-24 (No. 217-04036/04037)	Mar-25
Power sensor NRP-Z91	SN: 103244	26-Mar-24 (No. 217-04038)	Mar-25
Power sensor NRP-Z91	SN: 103245	26-Mar-24 (No. 217-04037)	Mar-25
Reference 20 dB Attenuator	SN: BH8394 (20k)	26-Mar-24 (No. 217-04048)	Mar-25
Type-N mismatch combination	SN: 310982 / 06327	26-Mar-24 (No. 217-04047)	Mar-25
Reference Probe EX3DV4	SN: 7349	03-Nov-23 (No. EX3-7349_Nov23)	Nov-24
DAE4	SN: 601	30-Jan-24 (No. DAE4-601_Jan24)	Jan-25
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: US37282783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41033315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator R&S SMT-08	SN: 100872	15-Jun-15 (in house check Oct-22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by:	Name Joanna Llesha	Function Laboratory Technician	Signature 
Approved by:	Name Sven Kühn	Function Technical Manager	Signature 

Issued: April 23, 2024

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

Certificate No: D2450V2-774_Apr24

Page 1 of 6

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

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



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

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.0 $\pm$ 6 %	1.87 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.4 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.5 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$55.8 \Omega + 2.8 j\Omega$
Return Loss	- 24.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------

DASY5 Validation Report for Head TSL

Date: 22.04.2024

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:774

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.87$ S/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96) @ 2450 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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

Reference Value = 118.1 V/m; Power Drift = 0.03 dB

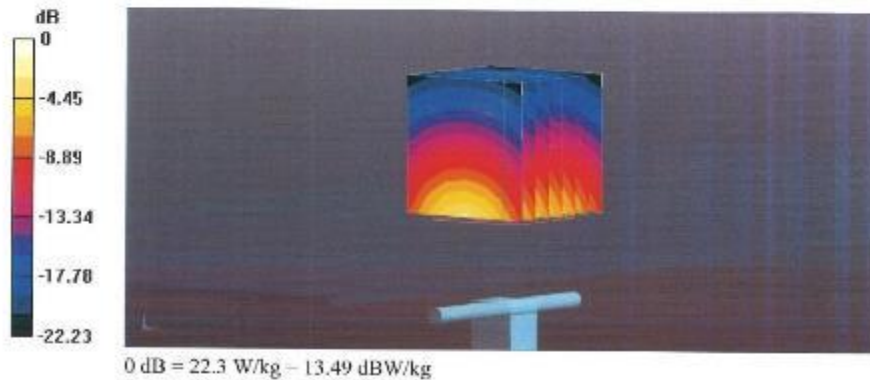
Peak SAR (extrapolated) = 27.0 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.22 W/kg

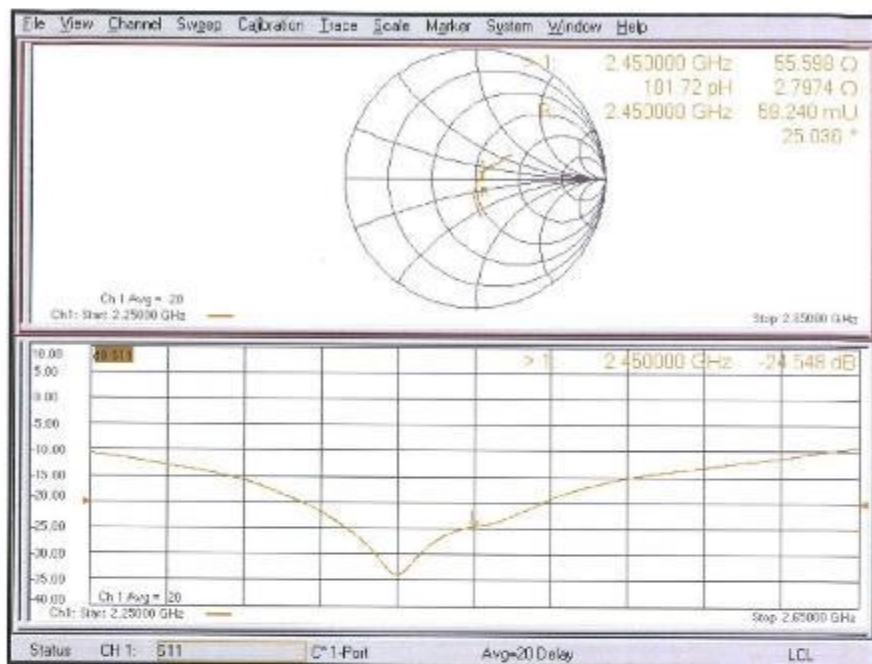
Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 49.9%

Maximum value of SAR (measured) = 22.3 W/kg



Impedance Measurement Plot for Head TSL



Dipole Antenna 5 GHz(SN:1146)

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



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

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

Accreditation No.: SCS 0108

Client **Nemko Korea (Dymstec)**

Certificate No: D5GHzV2-1146_Jan23

CALIBRATION CERTIFICATE

Object: **D5GHzV2 - SN:1146**

Calibration procedure(s): **QA CAL-22.v7**
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: **January 25, 2023**

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-22 (No. 217-03525/03526)	Apr-23
Power sensor NRP-Z61	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z61	SN: 103246	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9384 (20k)	01-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310862 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe LX3DV4	SN: 3503	08-Mar-22 (No. EX3-3503_Mar22)	Mar 23
DAE4	SN: 601	19-Dec 22 (No. DAE4 601 Dec22)	Dec-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: G539512475	30-Oct-14 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: LS37292783	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
Power sensor HP 8481A	SN: MY41033315	07-Oct-15 (in house check Oct-22)	In house check: Oct-24
RF generator T&S SMT-08	SN: 100972	15 Jun 15 (in house check Oct 22)	In house check: Oct-24
Network Analyzer Agilent E8358A	SN: LS41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

Calibrated by:	Name Paulo Pina	Function Laboratory Technician	Signature 
Approved by:	Sven Kuhn	Technical Manager	

Issued: January 26, 2023

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

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



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

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

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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

Measurement Conditions

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	$dx, dy = 4.0 \text{ mm}, dz = 1.4 \text{ mm}$	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz $\pm$ 1 MHz 5300 MHz $\pm$ 1 MHz 5500 MHz $\pm$ 1 MHz 5600 MHz $\pm$ 1 MHz 5800 MHz $\pm$ 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	35.7 $\pm$ 6 %	4.58 mho/m $\pm$ 8 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.90 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	78.9 W/kg $\pm$ 19.9 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.5 W/kg $\pm$ 19.5 % (k=2)

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.6 ± 6 %	4.72 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	81.7 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.3 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.5 ± 6 %	4.95 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.49 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.8 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.2 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.57 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.4 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	83.1 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.6 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	5.15 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.3 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	50.5 Ω - 8.4 j Ω
Return Loss	- 21.6 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	49.7 Ω - 4.3 j Ω
Return Loss	- 27.3 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	53.4 Ω - 3.4 j Ω
Return Loss	- 26.6 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	57.3 Ω - 0.9 j Ω
Return Loss	- 23.2 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	57.7 Ω - 2.2 j Ω
Return Loss	- 22.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.188 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
-----------------	-------

DASY5 Validation Report for Head TSL

Date: 25.01.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1146

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.58$ S/m; $\epsilon_r = 35.7$; $\rho = 1000$ kg/m³

Medium parameters used: $f = 5300$ MHz; $\sigma = 4.72$ S/m; $\epsilon_r = 35.6$; $\rho = 1000$ kg/m³

Medium parameters used: $f = 5500$ MHz; $\sigma = 4.95$ S/m; $\epsilon_r = 35.5$; $\rho = 1000$ kg/m³

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.03$ S/m; $\epsilon_r = 35.4$; $\rho = 1000$ kg/m³

Medium parameters used: $f = 5800$ MHz; $\sigma = 5.18$ S/m; $\epsilon_r = 35.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.8, 5.8, 5.8) @ 5200 MHz, ConvF(5.49, 5.49, 5.49) @ 5300 MHz, ConvF(5.25, 5.25, 5.25) @ 5500 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.01, 5.01, 5.01) @ 5800 MHz; Calibrated: 08.03.2022
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 73.93 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 7.90 W/kg; SAR(10 g) = 2.26 W/kg

Smallest distance from peaks to all points 3 dB below = 7.4 mm

Ratio of SAR at M2 to SAR at M1 = 69.5%

Maximum value of SAR (measured) = 18.0 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.60 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 28.9 W/kg

SAR(1 g) = 8.19 W/kg; SAR(10 g) = 2.34 W/kg

Smallest distance from peaks to all points 3 dB below = 7.4 mm

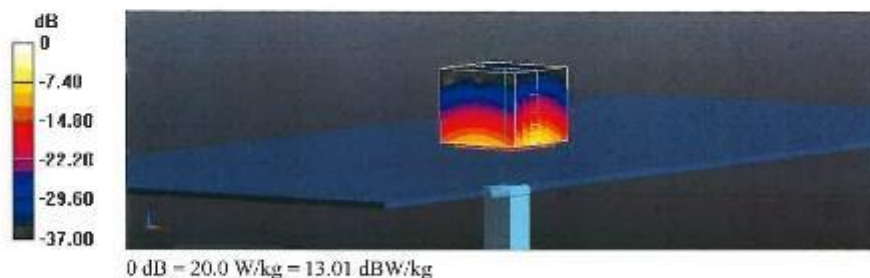
Ratio of SAR at M2 to SAR at M1 = 69.4%

Maximum value of SAR (measured) = 18.9 W/kg

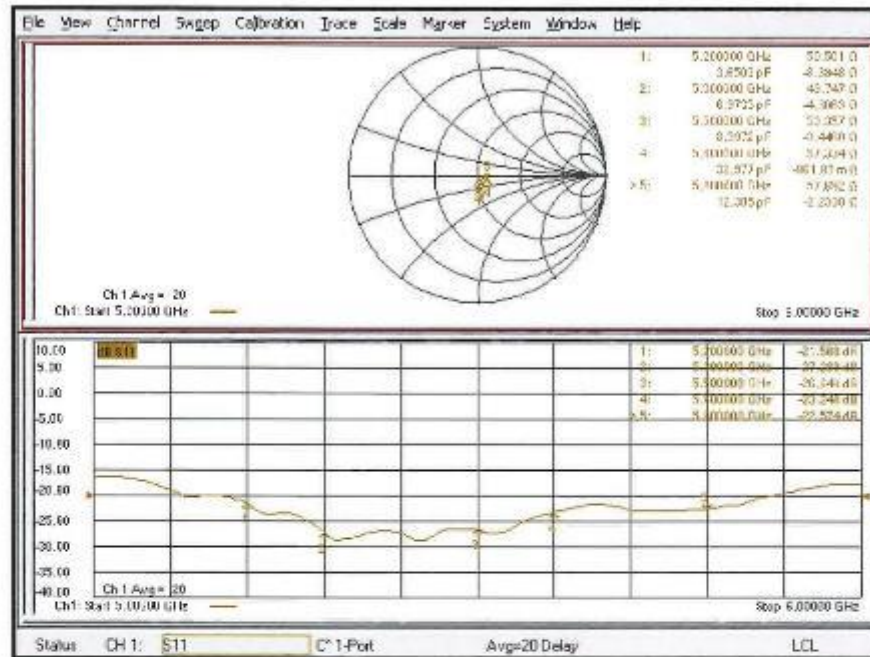
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 74.56 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 8.49 W/kg; SAR(10 g) = 2.42 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 66.9%
Maximum value of SAR (measured) = 20.0 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 75.28 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 8.32 W/kg; SAR(10 g) = 2.36 W/kg
Smallest distance from peaks to all points 3 dB below = 7.5 mm
Ratio of SAR at M2 to SAR at M1 = 67.9%
Maximum value of SAR (measured) = 19.5 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.63 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 31.8 W/kg
SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.27 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 65.7%
Maximum value of SAR (measured) = 19.3 W/kg



Impedance Measurement Plot for Head TSL



- END REPORT -