SAR TEST REPORT

The following samples were submitted and identified on behalf of the client as:

Equipment Under Test	Weight scale
Brand Name	FORA TN'G Scale 550
Model No.	TD-2555G
Family Model No.	TD-2555X(X=0~9,A~F,H~Z or blank for different product exterior color and market)
Company Name	TaiDoc Technology Corp
Company Address	6F, No. 127, Wugong 2nd Rd., Wugu Dist., 24888 New Taipei City, Taiwan
Standards	IEEE/ANSI C95.1-1992, IEEE 1528-2013
FCC ID	TM72555GLTE
Date of Receipt	Mar. 03, 2022
Date of Test(s)	Mar. 17, 2022
Date of Issue	May 05, 2022

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan Ltd. Central RF Lab or testing done by SGS Taiwan Ltd. Central RF Lab in connection with distribution or use of the product described in this report must be approved by SGS Taiwan Ltd. Central RF Lab in writing.

Signed on behalf of SGS

Clerk / Kimmy Chiou	PM / Kiki Lin	Approved By / John Yeh
Kimmy Chiou	Kiki Lin	John Yeh

Date: May 05, 2022

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
ES/2022/30002	Rev.00	Initial creation of document	May 05, 2022	Kimmy Chiou	

Note:

1. The mark " * " is the revised version of the report due to comments submitted by the certification.

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0. Guidance applied

The SAR testing method and procedure for this device is in accordance with the following standards:

IEEE/ANSI C95.1-1992
IEEE 1528-2013
KDB865664D01v01r04
KDB865664D02v01r02
KDB941225D05v02r05
KDB447498D01v06

1. General Information

1.1 Testing Laboratory

SGS Taiwan Ltd. Central RF Lab	
No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan	
FCC Designation Number	TW0027
Tel	+886-2-2299-3279
Fax	+886-2-2298-0488
Internet	http://www.tw.sgs.com/

1.2 Details of Applicant

Company Name	TaiDoc Technology Corp
Company Address	6F, No. 127, Wugong 2nd Rd., Wugu Dist., 24888 New Taipei City, Taiwan

1.3 Description of EUT

Equipment Under Test	Weight scale			
Brand Name	FORA TN'G Scale 550			
Model No.	TD-2555G			
Family Model No.	TD-2555X(X=0~9,A~F,H~Z or blank for different product exterior color and market)			
FCC ID	TM72555GLTE			
Mode of Operation	☒LTE FDD			
Duty Cycle	LTE FDD	1		
TX Frequency Range (MHz)	LTE FDD Band 2	1850	–	1910
	LTE FDD Band 4	1710	–	1755
	LTE FDD Band 12	699	–	716
	LTE FDD Band 66	1710	–	1780
Channel Number (ARFCN)	LTE FDD Band 2	18607	–	19193
	LTE FDD Band 4	19957	–	20393
	LTE FDD Band 12	23017	–	23173
	LTE FDD Band 66	131979	–	132665

Max. SAR (10 g) (Unit: W/Kg)				
Band	Measured	Reported	Channel	Position
LTE Band 2	0.92	0.92	18900	Front Surface
LTE Band 4	0.89	0.96	20300	Front Surface
LTE Band 12	1.05	1.13	23060	Front Surface
LTE Band 66	0.94	1.03	132322	Front Surface

LTE FDD Band 2 / Band 4 / Band 12 / Band 66 power table :

LTE Band 2								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1860	1880	1900		
Channel				18700	18900	19100		
20	QPSK	1	0	22.98	22.99	22.96	23.00	0
		1	50	22.86	22.86	22.94	23.00	0
		1	99	22.82	22.86	22.84	23.00	0
		50	0	21.82	21.85	21.84	22.00	1
		50	25	21.84	21.80	21.77	22.00	1
		50	50	21.78	21.86	21.81	22.00	1
		100	0	21.82	21.88	21.81	22.00	1
20	16-QAM	1	0	21.82	21.85	21.85	22.00	1
		1	50	21.94	21.92	21.84	22.00	1
		1	99	21.92	21.84	21.89	22.00	1

LTE Band 2								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1857.5	1880	1902.5		
Channel				18675	18900	19125		
15	QPSK	1	0	22.88	22.94	22.93	23.00	0
		1	36	22.86	22.78	22.94	23.00	0
		1	74	22.87	22.79	22.80	23.00	0
		36	0	21.85	21.87	21.93	22.00	1
		36	18	21.89	21.92	21.86	22.00	1
		36	37	21.93	21.90	21.91	22.00	1
		75	0	21.88	21.86	21.77	22.00	1
15	16-QAM	1	0	21.84	21.87	21.89	22.00	1
		1	36	21.90	21.81	21.92	22.00	1
		1	74	21.93	21.87	21.91	22.00	1

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LTE Band 2								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1855	1880	1905		
Channel				18650	18900	19150		
10	QPSK	1	0	22.88	22.81	22.89	23.00	0
		1	25	22.86	22.75	22.77	23.00	0
		1	49	22.82	22.95	22.93	23.00	0
		25	0	21.85	21.76	21.91	22.00	1
		25	12	21.93	21.89	21.91	22.00	1
		25	25	21.82	21.84	21.75	22.00	1
		50	0	21.90	21.81	21.85	22.00	1
10	16-QAM	1	0	21.90	21.80	21.93	22.00	1
		1	25	21.84	21.77	21.91	22.00	1
		1	49	21.88	21.80	21.91	22.00	1
		25	0	20.92	20.85	20.88	21.00	2
		25	12	20.94	20.89	20.80	21.00	2
		25	25	20.85	20.90	20.80	21.00	2

LTE Band 2								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1852.5	1880	1907.5		
Channel				18625	18900	19175		
5	QPSK	1	0	22.75	22.94	22.77	23.00	0
		1	12	22.87	22.89	22.90	23.00	0
		1	24	22.94	22.91	22.81	23.00	0
		12	0	21.85	21.82	21.93	22.00	1
		12	6	21.78	21.76	21.76	22.00	1
		12	13	21.77	21.76	21.82	22.00	1
		25	0	21.76	21.92	21.79	22.00	1
5	16-QAM	1	0	21.78	21.80	21.90	22.00	1
		1	12	21.75	21.90	21.88	22.00	1
		1	24	21.76	21.79	21.81	22.00	1
		12	0	20.81	20.88	20.91	21.00	2
		12	6	20.86	20.91	20.88	21.00	2
		12	13	20.91	20.92	20.91	21.00	2
		25	0	20.93	20.83	20.89	21.00	2

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LTE Band 2								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1851.5	1880	1908.5		
Channel				18615	18900	19185		
3	QPSK	1	0	22.90	22.81	22.92	23.00	0
		1	7	22.78	22.81	22.90	23.00	0
		1	14	22.79	22.81	22.77	23.00	0
		8	0	21.81	21.95	21.77	22.00	1
		8	4	21.79	21.93	21.83	22.00	1
		8	7	21.87	21.82	21.88	22.00	1
		15	0	21.88	21.90	21.84	22.00	1
3	16-QAM	1	0	21.83	21.92	21.82	22.00	1
		1	7	21.75	21.91	21.84	22.00	1
		1	14	21.76	21.94	21.86	22.00	1
		8	0	20.78	20.92	20.76	21.00	2
		8	4	20.84	20.90	20.89	21.00	2
		8	7	20.90	20.83	20.80	21.00	2
		15	0	20.80	20.84	20.77	21.00	2

LTE Band 2								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1850.7	1880	1909.3		
Channel				18607	18900	19193		
1.4	QPSK	1	0	22.83	22.88	22.78	23.00	0
		1	2	22.93	22.86	22.80	23.00	0
		1	5	22.87	22.86	22.80	23.00	0
		3	0	22.81	22.80	22.87	23.00	0
		3	2	22.86	22.79	22.91	23.00	0
		3	3	22.76	22.85	22.75	23.00	0
		6	0	21.81	21.93	21.89	22.00	1
1.4	16-QAM	1	0	21.85	21.81	21.79	22.00	1
		1	2	21.91	21.91	21.80	22.00	1
		1	5	21.87	21.89	21.89	22.00	1
		3	0	21.93	21.95	21.84	22.00	1
		3	2	21.93	21.91	21.78	22.00	1
		3	3	21.93	21.93	21.88	22.00	1
		6	0	20.79	20.80	20.91	21.00	2

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LTE Band 4								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1720	1732.5	1745		
Channel				20050	20175	20300		
20	QPSK	1	0	22.17	23.15	23.19	23.50	0
		1	50	23.02	22.96	23.11	23.50	0
		1	99	23.11	23.10	22.97	23.50	0
		50	0	22.14	22.07	22.06	22.50	1
		50	25	22.05	22.12	22.05	22.50	1
		50	50	22.09	22.00	22.14	22.50	1
		100	0	21.98	22.15	22.05	22.50	1
20	16-QAM	1	0	22.03	22.02	22.09	22.50	1
		1	50	21.97	22.08	21.95	22.50	1
		1	99	22.05	22.02	21.96	22.50	1

LTE Band 4								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
Channel				20025	20175	20325		
15	QPSK	1	0	23.10	23.08	23.14	23.50	0
		1	36	22.97	22.95	23.08	23.50	0
		1	74	22.98	22.98	23.02	23.50	0
		36	0	22.06	21.95	22.04	22.50	1
		36	18	21.97	22.00	22.07	22.50	1
		36	37	22.01	21.99	22.09	22.50	1
		75	0	22.14	22.12	22.07	22.50	1
15	16-QAM	1	0	22.04	22.13	22.05	22.50	1
		1	36	22.04	22.11	22.05	22.50	1
		1	74	21.99	22.02	21.96	22.50	1

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LTE Band 4								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1715	1732.5	1750		
Channel				20000	20175	20350		
10	QPSK	1	0	23.13	23.08	23.08	23.50	0
		1	25	23.02	23.14	22.96	23.50	0
		1	49	23.01	23.10	22.97	23.50	0
		25	0	22.08	21.99	21.97	22.50	1
		25	12	22.10	22.10	22.08	22.50	1
		25	25	22.05	21.97	21.99	22.50	1
		50	0	22.01	22.11	22.11	22.50	1
10	16-QAM	1	0	22.06	22.07	21.96	22.50	1
		1	25	22.08	22.14	22.12	22.50	1
		1	49	21.97	21.96	22.00	22.50	1
		25	0	21.05	21.11	20.95	21.50	2
		25	12	21.01	20.99	20.95	21.50	2
		25	25	21.14	20.99	20.96	21.50	2

LTE Band 4								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
Channel				19975	20175	20375		
5	QPSK	1	0	23.10	23.14	23.14	23.50	0
		1	12	22.99	23.06	22.98	23.50	0
		1	24	23.14	22.98	23.10	23.50	0
		12	0	22.14	22.12	22.00	22.50	1
		12	6	22.11	22.04	22.00	22.50	1
		12	13	22.10	21.98	21.98	22.50	1
		25	0	21.97	22.11	22.00	22.50	1
5	16-QAM	1	0	22.13	21.95	22.06	22.50	1
		1	12	22.12	21.98	22.09	22.50	1
		1	24	22.04	22.11	22.03	22.50	1
		12	0	21.11	21.02	21.04	21.50	2
		12	6	20.99	21.03	21.14	21.50	2
		12	13	21.08	21.09	21.13	21.50	2
		25	0	20.97	21.11	21.02	21.50	2

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LTE Band 4								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
Channel				19965	20175	20385		
3	QPSK	1	0	23.02	23.04	23.10	23.50	0
		1	7	23.10	23.02	23.08	23.50	0
		1	14	23.08	23.12	23.13	23.50	0
		8	0	22.15	22.14	21.96	22.50	1
		8	4	22.01	22.02	22.08	22.50	1
		8	7	22.15	21.98	22.02	22.50	1
		15	0	21.95	22.04	22.05	22.50	1
3	16-QAM	1	0	22.12	22.13	22.11	22.50	1
		1	7	22.13	21.96	21.96	22.50	1
		1	14	22.08	21.96	22.15	22.50	1
		8	0	21.05	21.03	21.09	21.50	2
		8	4	21.03	21.13	21.15	21.50	2
		8	7	21.05	21.12	21.10	21.50	2
		15	0	21.01	21.06	21.02	21.50	2

LTE Band 4								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
Channel				19957	20175	20393		
1.4	QPSK	1	0	23.02	23.06	23.12	23.50	0
		1	2	22.99	23.01	23.12	23.50	0
		1	5	23.07	23.01	22.96	23.50	0
		3	0	23.14	23.08	23.01	23.50	0
		3	2	22.96	23.10	23.04	23.50	0
		3	3	23.03	23.10	22.95	23.50	0
		6	0	22.11	22.10	22.13	22.50	1
1.4	16-QAM	1	0	22.08	22.10	22.06	22.50	1
		1	2	21.95	22.13	21.99	22.50	1
		1	5	22.05	21.98	22.13	22.50	1
		3	0	21.98	21.96	21.96	22.50	1
		3	2	22.14	22.00	22.02	22.50	1
		3	3	21.99	22.03	22.00	22.50	1
		6	0	21.12	21.09	21.04	21.50	2

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LTE Band 12								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				704	707.5	711		
Channel				23060	23095	23130		
10	QPSK	1	0	23.69	23.66	23.65	24.00	0
		1	25	23.59	23.62	23.50	24.00	0
		1	49	23.51	23.52	23.59	24.00	0
		25	0	22.50	22.62	22.54	23.00	1
		25	12	22.49	22.60	22.47	23.00	1
		25	25	22.52	22.64	22.57	23.00	1
		50	0	22.53	22.50	22.52	23.00	1
10	16-QAM	1	0	22.60	22.58	22.52	23.00	1
		1	25	22.59	22.56	22.52	23.00	1
		1	49	22.49	22.51	22.62	23.00	1
		25	0	21.58	21.51	21.50	22.00	2
		25	12	21.53	21.59	21.48	22.00	2
		25	25	21.65	21.56	21.49	22.00	2

LTE Band 12								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				701.5	707.5	713.5		
Channel				23035	23095	23155		
5	QPSK	1	0	23.55	23.47	23.49	24.00	0
		1	12	23.56	23.47	23.58	24.00	0
		1	24	23.46	23.49	23.45	24.00	0
		12	0	22.46	22.54	22.52	23.00	1
		12	6	22.46	22.51	22.65	23.00	1
		12	13	22.51	22.58	22.61	23.00	1
		25	0	22.59	22.49	22.50	23.00	1
5	16-QAM	1	0	22.48	22.49	22.61	23.00	1
		1	12	22.60	22.53	22.63	23.00	1
		1	24	22.54	22.63	22.63	23.00	1
		12	0	21.56	21.46	21.58	22.00	2
		12	6	21.50	21.65	21.52	22.00	2
		12	13	21.46	21.47	21.50	22.00	2
		25	0	21.56	21.46	21.50	22.00	2

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LTE Band 12								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				700.5	707.5	714.5		
Channel				23025	23095	23165		
3	QPSK	1	0	23.51	23.57	23.53	24.00	0
		1	7	23.59	23.49	23.57	24.00	0
		1	14	23.58	23.59	23.50	24.00	0
		8	0	22.65	22.60	22.65	23.00	1
		8	4	22.65	22.59	22.54	23.00	1
		8	7	22.55	22.54	22.47	23.00	1
		15	0	22.48	22.56	22.49	23.00	1
3	16-QAM	1	0	22.46	22.46	22.63	23.00	1
		1	7	22.56	22.61	22.61	23.00	1
		1	14	22.50	22.57	22.58	23.00	1
		8	0	21.54	21.50	21.51	22.00	2
		8	4	21.62	21.50	21.65	22.00	2
		8	7	21.56	21.58	21.64	22.00	2
		15	0	21.63	21.47	21.47	22.00	2

LTE Band 12								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				699.7	707.5	715.3		
Channel				23017	23095	23173		
1.4	QPSK	1	0	23.54	23.59	23.48	24.00	0
		1	2	23.55	23.52	23.55	24.00	0
		1	5	23.50	23.55	23.52	24.00	0
		3	0	23.64	23.57	23.51	24.00	0
		3	2	23.55	23.52	23.48	24.00	0
		3	3	23.57	23.55	23.48	24.00	0
		6	0	22.60	22.54	22.45	23.00	1
1.4	16-QAM	1	0	22.62	22.50	22.61	23.00	1
		1	2	22.53	22.63	22.57	23.00	1
		1	5	22.56	22.61	22.61	23.00	1
		3	0	22.52	22.58	22.59	23.00	1
		3	2	22.47	22.55	22.64	23.00	1
		3	3	22.62	22.56	22.63	23.00	1
		6	0	21.54	21.49	21.45	22.00	2

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LTE Band 66								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1720	1745	1770		
Channel				132072	132322	132572		
20	QPSK	1	0	23.06	23.10	23.09	23.50	0
		1	50	22.96	23.00	22.96	23.50	0
		1	99	22.93	23.05	22.98	23.50	0
		50	0	21.96	22.03	21.91	22.50	1
		50	25	21.86	21.96	21.90	22.50	1
		50	50	22.03	21.99	21.87	22.50	1
		100	0	21.98	21.86	21.93	22.50	1
20	16-QAM	1	0	21.98	21.92	21.90	22.50	1
		1	50	21.94	21.99	21.94	22.50	1
		1	99	21.90	22.01	21.96	22.50	1

LTE Band 66								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1717.5	1745	1772.5		
Channel				132047	132322	132597		
15	QPSK	1	0	22.99	23.05	23.02	23.50	0
		1	36	22.94	22.94	22.97	23.50	0
		1	74	22.93	22.93	23.03	23.50	0
		36	0	21.92	21.92	21.93	22.50	1
		36	18	22.04	21.90	21.87	22.50	1
		36	37	21.97	21.90	21.97	22.50	1
		75	0	21.96	22.02	21.93	22.50	1
15	16-QAM	1	0	21.97	21.88	22.03	22.50	1
		1	36	21.91	21.86	21.85	22.50	1
		1	74	21.91	21.88	21.90	22.50	1

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LTE Band 66								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1715	1745	1775		
Channel				132022	132322	132622		
10	QPSK	1	0	22.87	22.87	22.85	23.50	0
		1	25	23.01	22.85	22.86	23.50	0
		1	49	23.00	23.00	22.94	23.50	0
		25	0	22.01	21.90	22.02	22.50	1
		25	12	21.94	21.99	21.98	22.50	1
		25	25	21.85	21.98	22.00	22.50	1
		50	0	22.02	21.89	21.95	22.50	1
10	16-QAM	1	0	22.05	22.02	21.93	22.50	1
		1	25	22.02	22.01	22.05	22.50	1
		1	49	21.93	21.92	22.04	22.50	1
		25	0	20.93	21.02	20.98	21.50	2
		25	12	21.04	20.99	20.87	21.50	2
		25	25	20.91	20.99	20.90	21.50	2

LTE Band 66								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1712.5	1745	1777.5		
Channel				131997	132322	132647		
5	QPSK	1	0	22.86	22.88	22.97	23.50	0
		1	12	22.96	22.91	22.95	23.50	0
		1	24	22.95	22.99	22.96	23.50	0
		12	0	21.99	21.93	21.89	22.50	1
		12	6	21.86	21.90	21.97	22.50	1
		12	13	21.96	21.90	21.86	22.50	1
		25	0	22.04	21.92	21.89	22.50	1
5	16-QAM	1	0	22.04	21.93	22.00	22.50	1
		1	12	21.91	21.88	22.03	22.50	1
		1	24	21.92	21.94	22.04	22.50	1
		12	0	20.91	20.91	20.92	21.50	2
		12	6	20.86	20.93	20.94	21.50	2
		12	13	21.03	20.94	20.94	21.50	2
		25	0	21.03	20.87	20.98	21.50	2

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LTE Band 66								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1711.5	1745	1778.5		
Channel				131987	132322	132657		
3	QPSK	1	0	22.90	22.96	23.03	23.50	0
		1	7	23.02	23.01	23.04	23.50	0
		1	14	22.92	22.92	23.05	23.50	0
		8	0	21.87	21.99	21.91	22.50	1
		8	4	21.89	21.96	21.96	22.50	1
		8	7	21.94	21.93	21.89	22.50	1
		15	0	21.92	21.86	21.99	22.50	1
3	16-QAM	1	0	22.01	21.85	22.00	22.50	1
		1	7	21.96	22.02	22.01	22.50	1
		1	14	22.02	21.92	21.98	22.50	1
		8	0	20.99	21.04	20.86	21.50	2
		8	4	20.96	20.87	20.86	21.50	2
		8	7	20.89	20.99	20.99	21.50	2
		15	0	20.90	21.04	20.96	21.50	2

LTE Band 66								
BW(MHz)	Modulation	RB Size	RB Offset	Conducted power (dBm)			Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
Frequency (MHz)				1710.7	1745	1779.3		
Channel				131979	132322	132665		
1.4	QPSK	1	0	22.95	23.05	22.89	23.50	0
		1	2	23.04	22.86	22.94	23.50	0
		1	5	22.93	22.88	22.87	23.50	0
		3	0	22.89	22.89	22.90	23.50	0
		3	2	22.92	23.01	22.85	23.50	0
		3	3	22.87	23.02	22.97	23.50	0
		6	0	22.04	21.93	21.90	22.50	1
1.4	16-QAM	1	0	22.00	22.03	21.92	22.50	1
		1	2	21.95	21.93	21.89	22.50	1
		1	5	22.03	21.94	22.00	22.50	1
		3	0	21.98	21.97	21.96	22.50	1
		3	2	21.99	22.05	21.94	22.50	1
		3	3	22.00	22.03	21.98	22.50	1
		6	0	20.95	21.03	20.87	21.50	2

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1.4 Test Environment

Ambient Temperature: 22±2° C
Tissue Simulating Liquid: 22±2° C

1.5 Operation Description

1. Use chipset specific software to control the EUT, and makes it transmit in maximum power.

2. Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s). The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.

3. During the SAR testing, the DASY 5 system checks power drift by comparing the e-field strength of one specific location measured at the beginning with that measured at the end of the SAR testing.

4. Extremity SAR is measured with the front surface of the device touch against the flat phantom to demonstrate compliance.

5. LTE modes test according to KDB 941225D05v02r05.

   a. Per Section 5.2.1, the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation.

   - Using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
   - When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.
   - When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

   b. Per Section 5.2.2, the largest channel bandwidth and measure SAR for QPSK with 50% RB allocation

   - The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.

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c. Per Section 5.2.3, the largest channel bandwidth and measure SAR for QPSK with 100% RB allocation

- For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 5.2.1 and 5.2.2 are ≤ 0.8 W/kg.
- Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

d. Per Section 5.2.4, Higher order modulations

- For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 5.2.1, 5.2.2 and 5.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

e. Per Section 5.3, other channel bandwidth standalone SAR test requirements: For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 5.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg. The equivalent channel configuration for the RB allocation, RB offset and modulation etc. is determined for the smaller channel bandwidth according to the same number of RB allocated in the largest channel bandwidth.

6. According to KDB447498 D01, testing of other required channels is not required when the reported 1-g SAR for the highest output channel is ≤ 0.8 W/kg (or the reported 10-g SAR for the highest output channel is ≤ 2 W/kg), when the transmission band is ≤ 100MHz.

7. According to KDB865664 D01, SAR measurement variability must be assessed for each frequency band. When the original highest measured SAR is ≥ 0.8 W/kg, repeated that measurement once. Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45

W/kg (~10% from the 1-g SAR limit). The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

1.6 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY 5 professional system). The model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ ($|Ei|^2$)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

The DASY 5 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage intissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

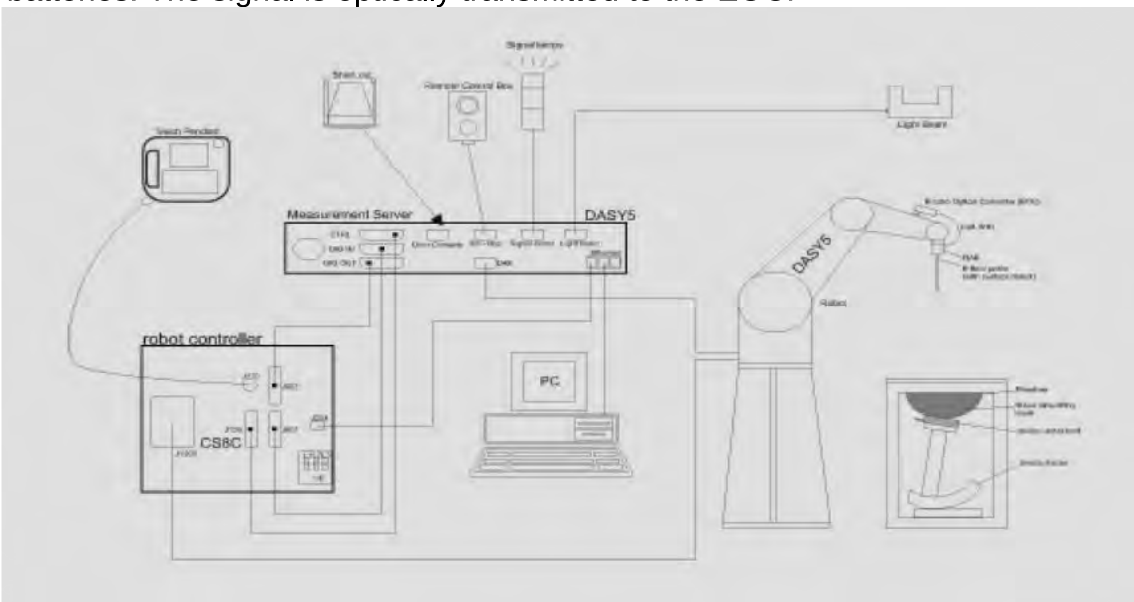

Fig. a The block diagram of SAR system

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4. The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
5. The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
6. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
7. A computer operating Windows 7.
8. DASY 5 software.
9. Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
13. Validation dipole kits allowing to validate the proper functioning of the system.

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1.7 System Components

EX3DV4 E-Field Probe

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 750/1750/1900MHz Additional CF for other liquids and frequencies upon request	
Frequency	10 MHz to > 6 GHz	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)	
Dimensions	Tip diameter: 2.5 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

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PHANTOM

Model	ELI	
Construction	The ELI phantom is used for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.	
Shell Thickness	2 ± 0.2 mm	
Filling Volume	Approx. 30 liters	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	

DEVICE HOLDER

Construction	The device holder (Supporter) for Notebook is made by POM (polyoxymethylene resin) , which is non-metal and non-conductive. The height can be adjusted to fit varies kind of notebooks.	 Device Holder

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1.8 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. These tests were done at 750/1750/1900MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). The liquid depth above the ear reference points was ≥ 15 cm ± 5 mm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

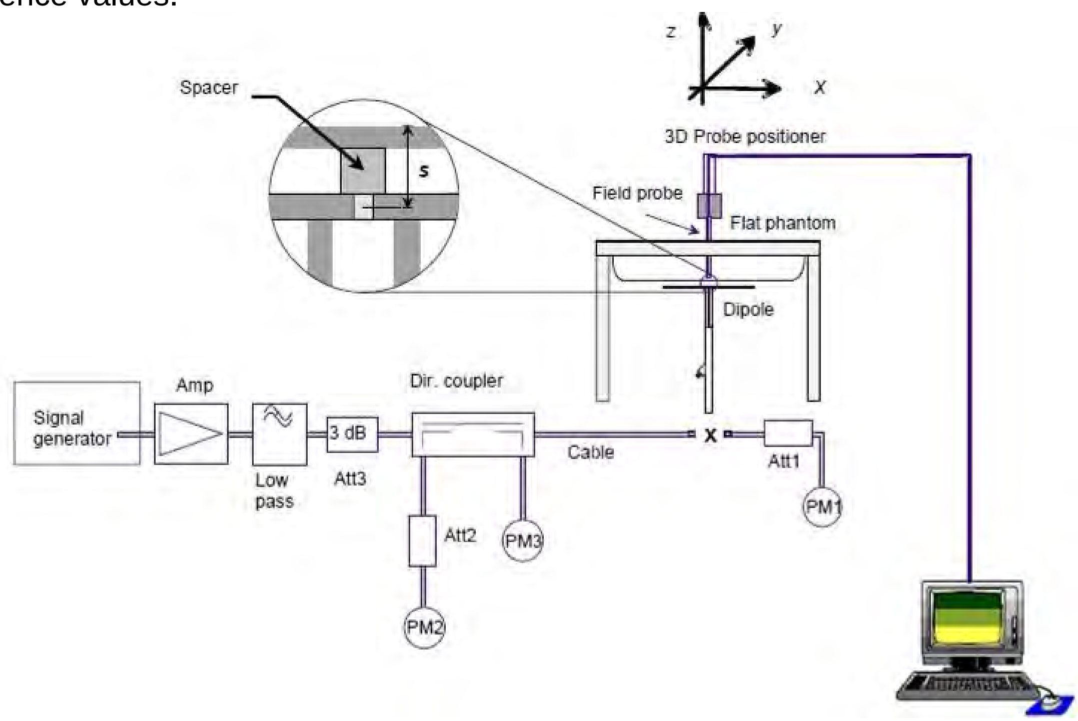

Fig. b The block diagram of system verification

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Validation Kit	S/N	Frequency (MHz)		1W Target SAR-10g (mW/g)	pin=250mW Measured SAR-10g (mW/g)	Measured SAR-10g normalized to 1W (mW/g)	Deviation (%)	Measured Date
D750V3	1015	750	Head	5.59	1.38	5.52	-1.25%	Mar. 17, 2022
D1750V2	1008	1750	Head	19.20	4.85	19.40	1.04%	Mar. 17, 2022
D1900V2	5d173	1900	Head	20.50	5.22	20.88	1.85%	Mar. 17, 2022

Table 1. Results of system verification

1.9 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this Head-simulant fluid were measured by using the SPEAG Dielectric Assessment Kit (DAKS-3.5).

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The measured conductivity and permittivity are all within ± 5% of the target values.

Tissue Type	Measurement Date	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	% dev εr	% dev σ
Head	Mar. 17, 2022	704	42.181	0.890	42.539	0.897	0.85%	0.81%
		707.5	42.162	0.890	42.521	0.899	0.85%	1.00%
		711	42.144	0.890	42.469	0.900	0.77%	1.09%
		750	41.942	0.893	42.260	0.903	0.76%	1.08%
		1720	40.126	1.354	39.934	1.349	-0.48%	-0.35%
		1732.5	40.107	1.361	39.898	1.356	-0.52%	-0.36%
		1745	40.087	1.368	39.894	1.362	-0.48%	-0.45%
		1750	40.079	1.371	39.891	1.365	-0.47%	-0.44%
		1770	40.047	1.383	39.859	1.377	-0.47%	-0.41%
		1860	40.000	1.400	39.822	1.391	-0.44%	-0.64%
		1880	40.000	1.400	39.820	1.393	-0.45%	-0.50%
		1900	40.000	1.400	39.816	1.394	-0.46%	-0.43%

Table 2. Dielectric Parameters of Tissue Simulant Fluid

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The composition of the brain tissue simulating liquid is:

Simulating Liquids for 600MHz-10 GHz, Manufactured by SPEAG:

Broad-band head tissue simulating liquids	SPEAG Product	Frequency range (MHz)	Main Ingredients
	HBBL600-10000V6	600 - 10000	Water, Oil

Table 3. Recipes for tissue simulating liquid

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1.10 Evaluation Procedures

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1g and 10g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within –2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements.

The measured volume of 30x30x30mm contains about 30g of tissue.

The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

1.11 Probe Calibration Procedures

For the calibration of E-field probes in lossy liquids, an electric field with an accurately known field strength must be produced within the measured liquid. For standardization purposes it would be desirable if all measurements which are necessary to assess the correct field strength would be traceable to standardized measurement procedures. In the following two different calibration techniques are summarized:

1.11.1 Transfer Calibration with Temperature Probes

In lossy liquids the specific absorption rate (SAR) is related both to the electric field (E) and the temperature gradient ($\delta T / \delta t$) in the liquid.

$$SAR = \frac{\sigma}{\rho}\left|E\right|^2 = c\frac{\delta T}{\delta t}$$

whereby σ is the conductivity, ρ the density and c the heat capacity of the liquid.

Hence, the electric field in lossy liquid can be measured indirectly by measuring the temperature gradient in the liquid. Non-disturbing temperature probes (optical probes or thermistor probes with resistive lines) with high spatial resolution (<1-2 mm) and fast reaction time (<1 s) are available and can be easily calibrated with high precision [1]. The setup and the exciting source have no influence on the calibration; only the relative positioning uncertainties of the standard temperature probe and the E-field probe to be calibrated must be considered. However, several problems limit the available accuracy of probe calibrations with temperature probes:

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1. The temperature gradient is not directly measurable but must be evaluated from temperature measurements at different time steps. Special precaution is necessary to avoid measurement errors caused by temperature gradients due to energy equalizing effects or convection currents in the liquid. Such effects cannot be completely avoided, as the measured field itself destroys the thermal equilibrium in the liquid. With a careful setup these errors can be kept small.
2. The measured volume around the temperature probe is not well defined. It is difficult to calculate the energy transfer from a surrounding gradient temperature field into the probe. These effects must be considered, since temperature probes are calibrated in liquid with homogeneous temperatures. There is no traceable standard for temperature rise measurements.
3. The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and heat capacity can be measured accurately with standardized procedures (~ 2% for c; much better for ρ) , there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed ±5%.
4. Temperature rise measurements are not very sensitive and therefore are often performed at a higher power level than the E-field measurements. The nonlinearities in the system (e.g., power measurements, different components, etc.) must be considered.

Considering these problems, the possible accuracy of the calibration of E-field probes with temperature gradient measurements in a carefully designed setup is about ±10% (RSS) [2]. Recently, a setup which is a combination of the waveguide techniques and the thermal measurements was presented in [3]. The estimated uncertainty of the setup is ±5% (RSS) when the same liquid is used for the calibration and for actual measurements and ±7-9% (RSS) when not, which is in good agreement with the estimates given in [2].

1.11.2 Calibration with Analytical Fields

In this method a technical setup is used in which the field can be calculated analytically from measurements of other physical magnitudes (e.g., input power). This corresponds to the standard field method for probe calibration in air; however, there is no standard defined for fields in lossy liquids.

When using calculated fields in lossy liquids for probe calibration, several points must be considered in the assessment of the uncertainty:

1. The setup must enable accurate determination of the incident power.
2. The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.

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3. Due to the small wavelength in liquids with high permittivity, even small setups might be above the resonant cutoff frequencies. The field distribution in the setup must be carefully checked for conformity with the theoretical field distribution.

References

1. N. Kuster, Q. Balzano, and J.C. Lin, Eds., *Mobile Communications Safety*, Chapman & Hall, London, 1997.
2. K. Meier, M. Burkhardt, T. Schmid, and N. Kuster, \Broadband calibration of E-field probes in lossy media", *IEEE Transactions on Microwave Theory and Techniques*, vol. 44, no. 10, pp. 1954{1962, Oct. 1996.
3. K. Jokela, P. Hyysalo, and L. Puranen, \Calibration of specific absorption rate (SAR) probes in waveguide at 900 MHz", *IEEE Transactions on Instrumentation and Measurements*, vol. 47, no. 2, pp. 432{438, Apr. 1998.

1.12 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (‘‘SAR’’) in Section 4.2 of ‘‘IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,’’ ANSI/IEEE C95.1, By the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in ‘‘Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,’’ NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

1. Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube).
2. Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.
3. Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of

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tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section. (Table 4.)

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR (Brain)	1.60 W/Kg	8.00 W/Kg
Spatial Average SAR (Whole Body)	0.08 W/Kg	0.40 W/Kg
Spatial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 W/Kg	20.00 W/Kg

Table 4. RF exposure limits

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

2. Summary of Results

2.1 Decision rules

Reported measurement data comply with IEEE 1528-2013:
Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.2 Summary of Results

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
												Measured	Reported	
LTE Band 2	20MHz	QPSK	1	0	Front Surface	0	18700	1860	23.00	22.98	100.46%	0.902	0.906	-
			1	0	Front Surface	0	18900	1880	23.00	22.99	100.23%	0.916	0.918	38
			1	0	Front Surface	0	19100	1900	23.00	22.96	100.93%	0.883	0.891	-
			50	25	Front Surface	0	18700	1860	22.00	21.84	103.75%	0.728	0.755	-
			50	50	Front Surface	0	18700	1860	22.00	21.86	103.28%	0.733	0.757	-
			50	0	Front Surface	0	18700	1860	22.00	21.84	103.75%	0.742	0.770	-
			100RB		Front Surface	0	18900	1880	22.00	21.88	102.80%	0.726	0.746	-
LTE Band 4	20MHz	QPSK	1	99	Front Surface	0	20050	1720	23.50	23.11	109.40%	0.827	0.905	-
			1	0	Front Surface	0	20175	1732.5	23.50	23.15	108.39%	0.844	0.915	-
			1	0	Front Surface	0	20300	1745	23.50	23.19	107.40%	0.889	0.955	39
			50	0	Front Surface	0	20050	1720	22.50	22.14	108.64%	0.692	0.752	-
			50	25	Front Surface	0	20175	1732.5	22.50	22.12	109.14%	0.665	0.726	-
			50	50	Front Surface	0	20300	1745	22.50	22.14	108.64%	0.704	0.765	-
			100RB		Front Surface	0	20175	1732.5	22.50	22.15	108.39%	0.685	0.742	-
LTE Band 12	10MHz	QPSK	1	0	Front Surface	0	23060	704	24.00	23.69	107.40%	1.050	1.128	40
			1	0	Front Surface	0	23095	707.5	24.00	23.66	108.14%	0.985	1.065	-
			1	0	Front Surface	0	23130	711	24.00	23.65	108.39%	0.974	1.056	-
			25	25	Front Surface	0	23060	704	23.00	22.52	111.69%	0.851	0.950	-
			25	25	Front Surface	0	23095	707.5	23.00	22.64	108.64%	0.882	0.958	-
			25	25	Front Surface	0	23130	711	23.00	22.57	110.41%	0.837	0.924	-
			50RB		Front Surface	0	23060	704	23.00	22.53	111.43%	0.828	0.923	-
LTE Band 66	20MHz	QPSK	1	0	Front Surface	0	132072	1720	23.50	23.06	110.66%	0.925	1.024	-
			1	0	Front Surface	0	132322	1745	23.50	23.10	109.65%	0.940	1.031	41
			1	0	Front Surface	0	132572	1770	23.50	23.09	109.90%	0.878	0.965	-
			50	50	Front Surface	0	132072	1720	22.50	22.03	111.43%	0.755	0.841	-
			50	0	Front Surface	0	132322	1745	22.50	22.03	111.43%	0.730	0.813	-
			50	0	Front Surface	0	132572	1770	22.50	21.91	114.55%	0.728	0.834	-
			100RB		Front Surface	0	132072	1720	22.50	21.98	112.72%	0.711	0.801	-

Note:

$$\text{Scaling} = \frac{\text{reported SAR}}{\text{measured SAR}} = \frac{P2(mW)}{P1(mW)} = 10^{\left(\frac{P_2-P_1}{10}\right)(dBm)}$$

Reported SAR = measured SAR * (scaling)
Where P2 is maximum specified power, P1 is measured conducted power

2.3 Reporting statements of conformity

The conformity statement in this report is based solely on the test results, measurement uncertainty is excluded.

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3. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
SPEAG	Dosimetric E-Field Probe	EX3DV4	7686	Oct.05,2021	Oct.04,2022
SPEAG	System Validation Dipole	D750V3	1015	Oct.14,2021	Oct.13,2022
		D1750V2	1008	Oct.19,2021	Oct.18,2022
		D1900V2	5d173	Apr.15,2021	Apr.14,2022
SPEAG	Data acquisition Electronics	DAE4	877	Mar.22,2021	Mar.21,2022
SPEAG	Software	DASY 52 V52.10.4	N/A	Calibration not required	Calibration not required
SPEAG	Phantom	ELI	N/A	Calibration not required	Calibration not required
SPEAG	Dielectric Assessment Kit	DAKS-3.5	1053	Feb.28,2022	Feb.27,2023
Agilent	Dual-directional coupler	772D	MY46151242	Aug.16,2021	Aug.15,2022
		778D	MY48220468	Aug.16,2021	Aug.15,2022
Agilent	Signal Generator	N5181A	MY50141235	May.30,2021	May.29,2022
Anritsu	Power Meter	E4417A	MY51410006	Mar.23,2021	Mar.22,2022
Anritsu	Power Sensor	E9301H	MY51470001	Mar.23,2021	Mar.22,2022
			MY51470002	Mar.23,2021	Mar.22,2022
TECPEL	Digital thermometer	DTM-303A	TP130074	Apr.26,2021	Apr.25,2022
Anritsu	Radio Communication Test	MT8820C	6201061049	May.14,2021	May.13,2022

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4. Measurements

Date: 2022/3/17

Report No. :ES/2022/30002

LTE Band 2 (20MHz)_Extremity_Front Surface_CH 18900_QPSK_1-0_0mm

Communication System: LTE-FDD; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1880 MHz; σ = 1.393 S/m; ε_r = 39.82; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient temperature: 22.4°C; Liquid temperature: 22.7°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7686; ConvF(8.83, 8.83, 8.83); Calibrated: 2021/10/05
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn877; Calibrated: 2021/03/22
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (101x131x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.43 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.951 V/m; Power Drift = 0.01 dB

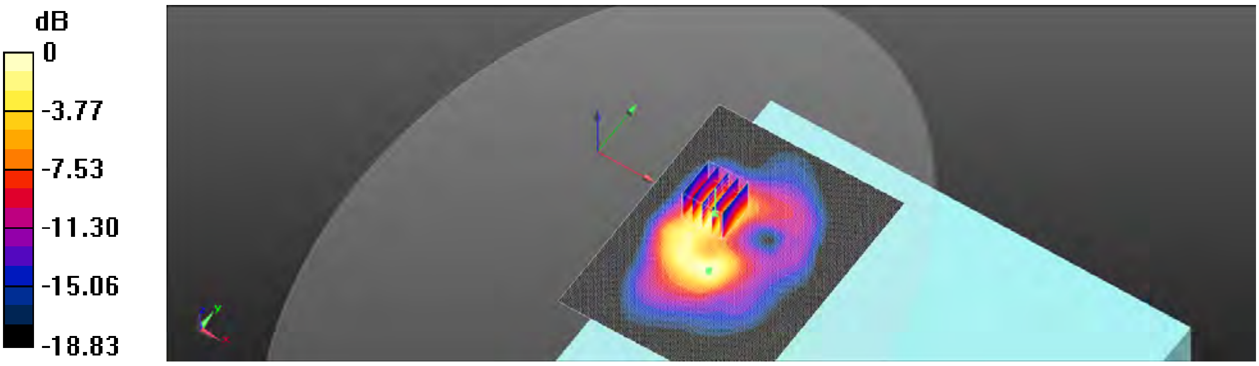
Peak SAR (extrapolated) = 3.16 W/kg

SAR(1 g) = 1.77 W/kg; SAR(10 g) = 0.916 W/kg

Smallest distance from peaks to all points 3 dB below = 11.2 mm

Ratio of SAR at M2 to SAR at M1 = 57.9%

Maximum value of SAR (measured) = 2.48 W/kg



0 dB = 2.48 W/kg = 3.95 dBW/kg

Date: 2022/3/17

Report No. :ES/2022/30002

LTE Band 4 (20MHz)_Extremity_Front Surface_CH 20300_QPSK_1-0_0mm

Communication System: LTE-FDD; Frequency: 1745 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1745 MHz; σ = 1.362 S/m; ε_r = 39.894; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient temperature: 22.4°C; Liquid temperature: 22.6°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7686; ConvF(9.16, 9.16, 9.16); Calibrated: 2021/10/05
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn877; Calibrated: 2021/03/22
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (101x131x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.30 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.093 V/m; Power Drift = 0.11 dB

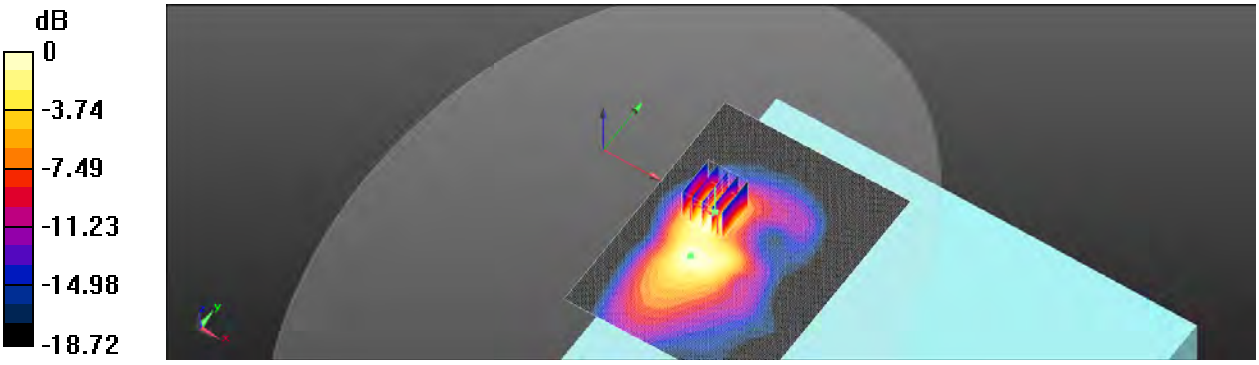
Peak SAR (extrapolated) = 2.90 W/kg

SAR(1 g) = 1.69 W/kg; SAR(10 g) = 0.889 W/kg

Smallest distance from peaks to all points 3 dB below = 10.1 mm

Ratio of SAR at M2 to SAR at M1 = 61.2%

Maximum value of SAR (measured) = 2.27 W/kg



0 dB = 2.27 W/kg = 3.56 dBW/kg

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Date: 2022/3/17

Report No. :ES/2022/30002

LTE Band 12 (10MHz)_Extremity_Front Surface_CH 23060_QPSK_1-0_0mm

Communication System: LTE-FDD; Frequency: 704 MHz; Duty Cycle: 1:1

Medium parameters used: f = 704 MHz; σ = 0.897 S/m; ε_r = 42.539; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient temperature: 22.5°C; Liquid temperature: 22.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7686; ConvF(10.73, 10.73, 10.73); Calibrated: 2021/10/05
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn877; Calibrated: 2021/03/22
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (101x131x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.03 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.231 V/m; Power Drift = 0.18 dB

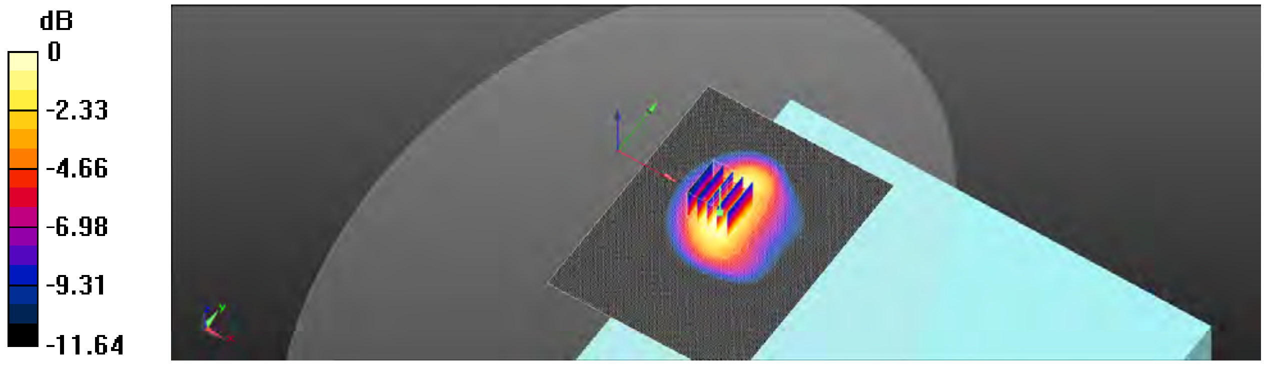
Peak SAR (extrapolated) = 2.52 W/kg

SAR(1 g) = 1.62 W/kg; SAR(10 g) = 1.05 W/kg

Smallest distance from peaks to all points 3 dB below = 16.3 mm

Ratio of SAR at M2 to SAR at M1 = 65.4%

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



0 dB = 2.10 W/kg = 3.23 dBW/kg

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Date: 2022/3/17

Report No. :ES/2022/30002

LTE Band 66 (20MHz)_Extremity_Front Surface_CH 132322_QPSK_1-0_0mm

Communication System: LTE-FDD; Frequency: 1745 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1745 MHz; σ = 1.362 S/m; ε_r = 39.894; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient temperature: 22.4°C; Liquid temperature: 22.6°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7686; ConvF(9.16, 9.16, 9.16); Calibrated: 2021/10/05
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn877; Calibrated: 2021/03/22
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (101x131x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.43 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.743 V/m; Power Drift = 0.11 dB

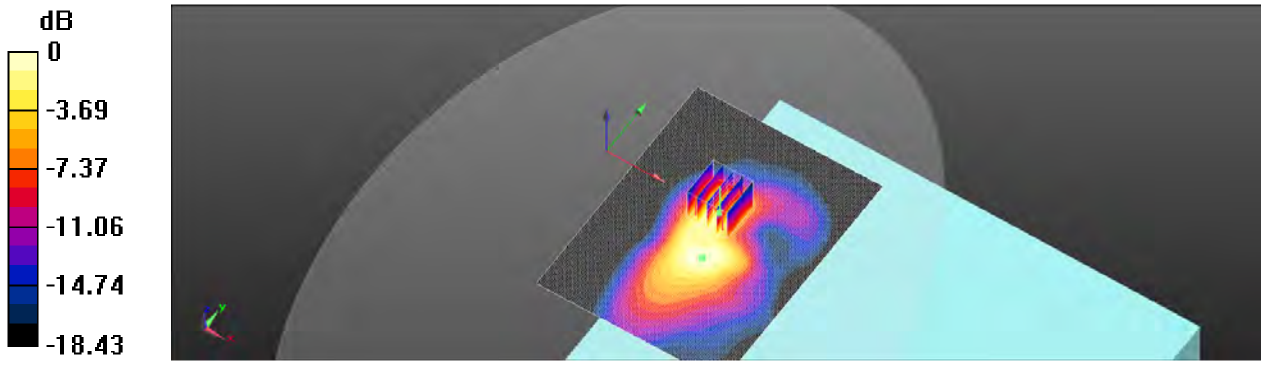
Peak SAR (extrapolated) = 3.02 W/kg

SAR(1 g) = 1.78 W/kg; SAR(10 g) = 0.940 W/kg

Smallest distance from peaks to all points 3 dB below = 11.2 mm

Ratio of SAR at M2 to SAR at M1 = 61.1%

Maximum value of SAR (measured) = 2.43 W/kg



0 dB = 2.43 W/kg = 3.86 dBW/kg

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5. SAR System Performance Verification

Date: 2021/3/17

Report No. :ES/2022/30002

Dipole 750 MHz_SN:1015

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.903 S/m; ε_r = 42.26; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient temperature: 22.5°C; Liquid temperature: 22.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7686; ConvF(10.73, 10.73, 10.73); Calibrated: 2021/10/05
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn877; Calibrated: 2021/03/22
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (41x141x1): Interpolated grid: dx=15 mm, dy=15 mm

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

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 46.60 V/m; Power Drift = -0.09 dB

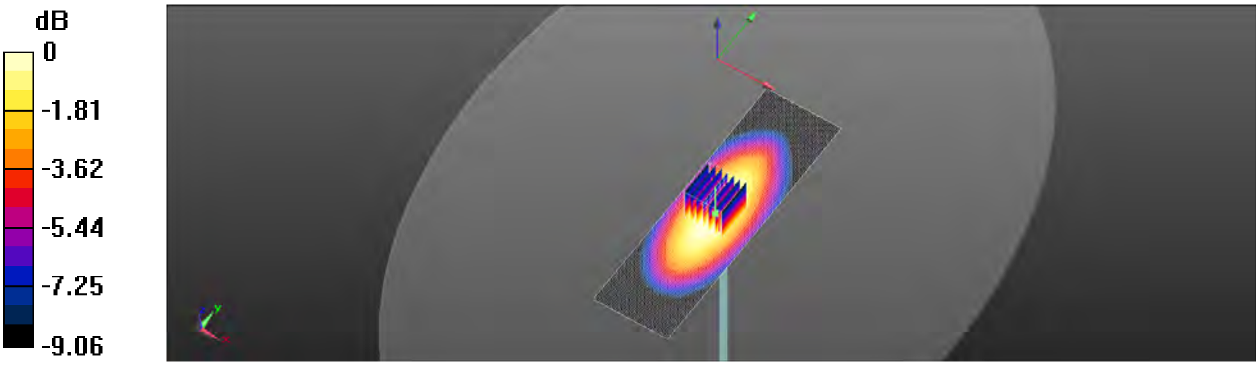
Peak SAR (extrapolated) = 2.22 W/kg

SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.38 W/kg

Smallest distance from peaks to all points 3 dB below = 10.5 mm

Ratio of SAR at M2 to SAR at M1 = 71.6%

Maximum value of SAR (measured) = 1.94 W/kg



0 dB = 1.94 W/kg = 2.88 dBW/kg

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Date: 2021/3/17

Report No. :ES/2022/30002

Dipole 1750 MHz_SN:1008

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.365 S/m; ε_r = 39.891; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient temperature: 22.4°C; Liquid temperature: 22.6°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7686; ConvF(9.16, 9.16, 9.16); Calibrated: 2021/10/05
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn877; Calibrated: 2021/03/22
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (51x81x1): Interpolated grid: dx=15 mm, dy=15 mm

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

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.94 V/m; Power Drift = -0.04 dB

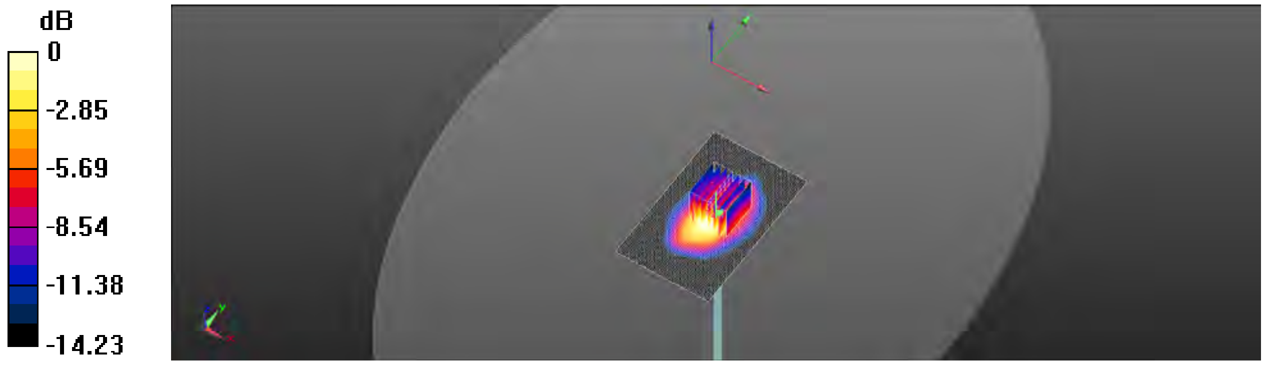
Peak SAR (extrapolated) = 13.0 W/kg

SAR(1 g) = 9.24 W/kg; SAR(10 g) = 4.85 W/kg

Smallest distance from peaks to all points 3 dB below = 10.2 mm

Ratio of SAR at M2 to SAR at M1 = 65.3%

Maximum value of SAR (measured) = 11.0 W/kg



0 dB = 11.0 W/kg = 10.43 dBW/kg

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Date: 2021/3/17

Report No. :ES/2022/30002

Dipole 1900 MHz_SN:5d173

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.394 S/m; ε_r = 39.816; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient temperature: 22.4°C; Liquid temperature: 22.7°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7686; ConvF(8.83, 8.83, 8.83); Calibrated: 2021/10/05
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn877; Calibrated: 2021/03/22
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (51x91x1): Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 15.6 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.8 V/m; Power Drift = 0.01 dB

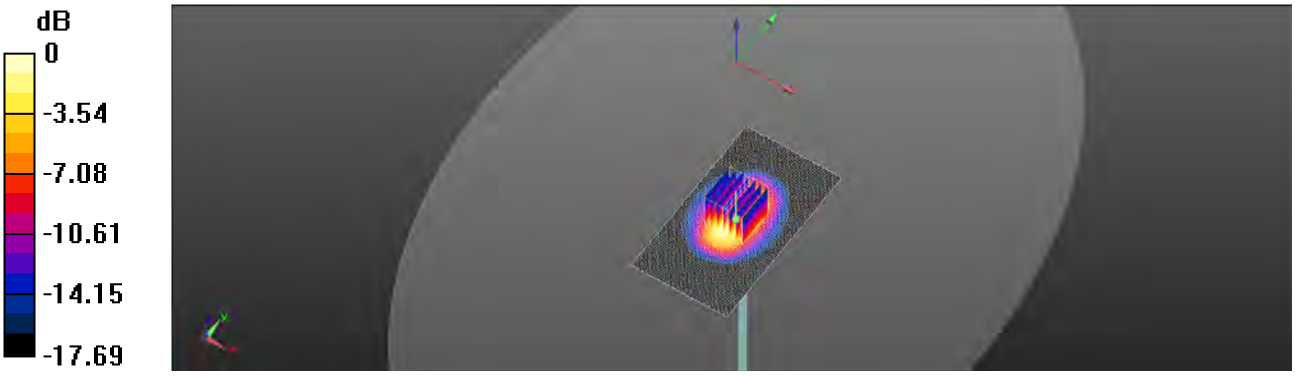
Peak SAR (extrapolated) = 19.2 W/kg

SAR(1 g) = 9.91 W/kg; SAR(10 g) = 5.22 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 54%

Maximum value of SAR (measured) = 14.9 W/kg



0 dB = 14.9 W/kg = 11.73 dBW/kg

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6. Uncertainty Budget

Measurement Uncertainty evaluation template for DUT SAR test (0.3-3G)

A	c	D	e		f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty	Probability	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration	6.00%	N	1	1	1	1	6.00%	6.00%	∞
Isotropy , Axial	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
Isotropy, Hemispherical	9.60%	R	√3	1.732	1	1	5.54%	5.54%	∞
Modulation Response	2.40%	R	√3	1.732	1	1	1.40%	1.40%	∞
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)	1.75%	R	√3	1.732	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	√3	1.732	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom	2.90%	R	√3	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	∞
Liquid permittivity (mea.)	0.85%	N	1	1	0.64	0.43	0.54%	0.37%	M
Liquid Conductivity (mea.)	1.09%	N	1	1	0.6	0.49	0.65%	0.53%	M
Combined standard uncertainty		RSS					11.45%	11.43%	

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Appendixes

<u>Refer to separated files for the following appendixes.</u>

ES202230002 SAR_Appendix A Photographs

ES202230002 SAR_Appendix B DAE & Probe Cal. Certificate

ES202230002 SAR_Appendix C Phantom Description & Dipole Cal. Certificate

- End of Report -

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