SAR Compliance Test Report

Date of Report	1/02/2024	**Client's Contact person:**	Hassan Alahi
Number of pages:	93	**Responsible Test engineer:**	Ilari Kinnunen
Testing laboratory:	**Verkotan Oy** Elektroniikkatie 17 90590 Oulu Finland	**Client:**	**Vema Venturi AB** Johan På Gårdas Gata 5A 41250 Gothenburg Sweden
Tested device	PERI InSite Construction Hub		
Related reports:	-		
Testing has been carried out in accordance with:	**47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **FCC published RF exposure KDB procedures** **RSS-102, Issue 5** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory		
Test Results:	**The EUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document		

Date and signatures:

01.02.2024

For the contents:

Miia Nurkkala

Laboratory Manager

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Device under Test (DUT):

Product:	PERI InSite Construction Hub
Manufacturer:	Vema Venturi AB
Model:	HUB-0
IMEI Number:	352709570052415, 357862090213085
FCC ID Number:	Host ID: 2A6OFPICHBM01 Contains transmitter modules 2A6OFUBX19KM01 and 2A6OF-ESP32WROOM32U
ISED ID Number:	Contains transmitter modules 28483-UBX19KM01 and 28483- ESP32WROOM32U
DUT Number:	21593, 21601
Battery Type used in testing:	NITECORE NL2150 LI-ION BATTERY
State of the Sample	Production sample

Testing information:

Testing Performed:	11.04.2022 – 27.4.2022
Notes:	-
Document ID:	FCC SAR report PERI InSite Construction Hub ID5442 01022024.docx
Document history & changes:	This report replaces test report FCC SAR report PERI InSite Construction Hub ID5442 16112023. Model number updated.
Temperature °C	22±2 / Controlled
Humidity RH%	30±20 / Controlled
Measurement performed by:	Ilari Kinnunen, Kirsi Kyllönen
FCC Test Firm Designation Number	FI0005
ISED Company Number:	22218

1.2 Maximum Results

The maximum reported* SAR values for Body-worn and Extremity-configuration for transmitting systems are shown in a table below. The device conforms to the requirements of the standards when the maximum reported SAR value is less than or equal to the limit. The SAR limit specified in FCC 47 CFR part 2 (2.1093) and Health Canada's RF exposure guideline, Safety Code 6 for Body-worn SAR1g is 1.6 W/kg and for Extremity SAR10g is 4.0 W/kg.

System	Highest Reported* SAR_{10g}(W/kg) in Extremity Condition, 0mm separation	Highest Reported* SAR_{1g}(W/kg) in Body-Worn Condition, 0mm separation	Result
LTE-M1, Band 12	**0.79**	**0.47**	**PASS**
LTE-M1, Band 13	**0.92**	**0.57**	**PASS**

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LTE-M1, Band 25	**0.86**	**0.40**	**PASS**
LTE-M1, Band 26	**0.46**	**0.23**	**PASS**
LTE-M1, Band 66	**1.30**	**0.21**	**PASS**
LTE-M1, Band 71	**1.16**	**0.23**	**PASS**
NB-IoT, Band 2	**0.96**	**0.41**	**PASS**
NB-IoT, Band 5	**0.51**	**0.31**	**PASS**
NB-IoT, Band 12	**0.84**	**0.53**	**PASS**
NB-IoT, Band 13	**0.98**	**0.52**	**PASS**
NB-IoT, Band 66	**1.94**	**0.31**	**PASS**
NB-IoT, Band 71	**0.92**	**0.29**	**PASS**
WLAN 2.4 GHz	**1.25**	**0.07**	**PASS**

* Reported SAR Values are scaled to maximum theoretical output power.

1.2.1 Simultaneous Transmission

Highest Simultaneous Transmission SAR	**Highest Reported* SAR_{10g}(W/kg) in Extremity Condition, 0mm separation distance**	**Highest Reported* SAR_{1g}(W/kg) in Body-Worn Condition, 0mm separation distance**	**Result**
Cellular + WLAN	**2.55**	**0.64**	**PASS**

1.2.2 Maximum Drift

Maximum Drift During Measurements	0.93dB*

*Drifts >5% have been considered in the scaling factor

1.2.3 Measurement Uncertainty

Expanded Uncertainty (k=2) 95 %	±22.1%

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2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The device is a second-generation Main Unit for the PERI InSite Construction Data Acquisition System that has a wide range of connection capabilities. It can connect to the Cloud based services using cable-based Ethernet or wireless uplink using LTE-M1/NB-IoT or WiFi.

Data is transmitted via radio from the Application Brick to the Hub which in turn displays the data on the screen so that the operator can monitor the concreting process. The Hub also acts as an uplink to the web portal on the Internet where the data is stored for future reference.

Cellular and WLAN antennas are located inside the handle, thus the handle part of the DUT was detached and used in SAR testing. Photos of the exact antenna location and test positions are presented in Appendix A.

Device Category	Portable
Exposure Environment	Uncontrolled

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2.1 Supported Frequency Bands and Operational Modes

	Modes of Operation	Transmitter Frequency Range (MHz)
TX Frequency bands	LTE-M1, Band 2	1850-1910
	LTE-M1, Band 4	1710-1755
	LTE-M1, Band 5	824-849
	LTE-M1, Band 12	698-716
	LTE-M1, Band 13	777-787
	LTE-M1, Band 25	1850-1915
	LTE-M1, Band 26	814-849
	LTE-M1, Band 66	1710-1780
	LTE-M1, Band 71	663-698
	NB-IoT, Band 2	1850-1910
	NB-IoT, Band 4	1710-1755
	NB-IoT, Band 5	824-849
	NB-IoT, Band 12	698-716
	NB-IoT, Band 13	777-787
	NB-IoT, Band 66	1710-1780
	NB-IoT, Band 71	663-698
	WLAN 2.4 GHz	2412-2462

2.2 SAR Test Exclusions

2.2.1 Excluded Bands from Testing

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands when the specified maximum output power, including tune-up tolerance, is less or same for the smaller band as for the larger band.
The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.

For this product:

- LTE-M1 2 band, 1850-1910 MHz, is excluded from the testing as it is fully covered by LTE-M1 25 band, 1850-1915 MHz
- LTE-M1 4 band, 1710-1755 MHz, is excluded from the testing as it is fully covered by LTE-M1 66 band, 1710-1780 MHz
- LTE-M1 5 band, 824-849 MHz is excluded as it is fully covered by LTE-M1 26 band, 814-849 MHz
- NB-IoT 4 band, 1710-1755 MHz, is excluded from the testing as it is fully covered by LTE-M1 66 band, 1710-1780 MHz

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2.3 Simultaneous Transmission

LTE-M1 or NB-IoT and WLAN 2.4GHz can be operated simultaneously.

Possible simultaneous transmissions are:

LTE-M1 & WLAN 2.4GHz
NB-IoT & WLAN 2.4GHz

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3. OUTPUT POWER

3.1 Maximum Output Power

From the Customer, maximum defined output power, including tune-up tolerance;

LTE-M1	Max Output Power [dBm]
Band 2	25
Band 4	25
Band 5	25
Band 12	25
Band 13	25
Band 25	25
Band 26	25
Band 66	25
Band 71	25

NB-IoT	Max Output Power [dBm]
Band 2	25
Band 4	25
Band 5	25
Band 12	25
Band 13	25
Band 66	25
Band 71	25

WLAN	Max Output Power [dBm]
802.11b	20
802.11n	14

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3.2 Tested conducted power

Measured conducted output power at transmitting antenna connector [dBm].

3.2.1 LTE-M1

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 18607 1850.7 MHz	CH 18900 1880.0 MHz	CH 19193 1909.3 MHz	3GPP MPR [dB]	CH 18607 1850.7 MHz	CH 18900 1880.0 MHz	CH 19193 1909.3 MHz	3GPP MPR [dB]
2 / 1.4M	1	0	22.8	22.87	23.06	0	21.52	21.6	21.88	1
	1	2	22.88	22.95	23.13	0	21.63	21.69	21.99	1
	1	5	23.08	23.15	23.32	0	21.78	21.92	22.12	1
	3	0	21.78	21.91	22.19	1	21.12	21.22	21.48	2
	3	1	21.82	21.97	22.23	1	21.08	21.26	21.55	2
	3	3	21.95	22.07	22.35	1	21.33	21.36	21.6	2
	6	0	21.01	21.15	21.37	2	23.04	23.11	23.3	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 18615 1851.5 MHz	CH 18900 1880.0 MHz	CH 19185 1918.5 MHz	3GPP MPR [dB]	CH 18615 1851.5 MHz	CH 18900 1880.0 MHz	CH 19185 1918.5 MHz	3GPP MPR [dB]
2 / 3M	1	0	22.8	22.88	23.1	0	21.51	21.65	21.93	1
	1	2	22.87	22.97	23.15	0	21.67	21.69	21.9	1
	1	5	23.07	23.15	23.41	0	21.8	21.94	22.13	1
	3	0	21.8	21.94	22.2	1	21.08	21.28	21.48	2
	3	1	21.83	21.95	22.24	1	21.15	21.26	21.54	2
	3	3	21.98	22.1	22.36	1	21.27	21.42	21.6	2
	6	0	21.03	21.19	21.4	2	23.12	23.15	23.31	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 18625 1852.5 MHz	CH 18900 1880.0 MHz	CH 19175 1907.5 MHz	3GPP MPR [dB]	CH 18625 1852.5 MHz	CH 18900 1880.0 MHz	CH 19175 1907.5 MHz	3GPP MPR [dB]
2 / 5M	1	0	22.83	22.88	23.1	0	22.74	22.78	22.95	0
	1	2	22.9	23.01	23.19	0	22.73	22.75	22.99	0
	1	5	23.08	23.17	23.35	0	22.94	23.02	23.15	0
	3	0	21.84	21.94	22.23	1	22.06	22.19	22.41	1
	3	1	21.85	21.95	22.28	1	22.07	22.23	22.44	1
	3	3	22.04	22.11	22.39	1	22.2	22.3	22.55	1
	6	0	21.89	22.04	22.27	1	22.57	22.7	22.85	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 18650 1855 MHz	CH 18900 1880.0	CH 19150 1905 MHz	3GPP MPR [dB]	CH 18650 1855 MHz	CH 18900 1880.0 MHz	CH 19150 1905 MHz	3GPP MPR [dB]
2 / 10M	1	0	22.87	22.95	23.14	0	22.7	22.75	22.93	0
	1	2	22.96	23.01	23.21	0	22.77	22.87	22.98	0
	1	5	23.14	23.19	23.37	0	22.98	23.0	23.14	0
	3	0	22.82	22.9	23.08	0	23.04	23.05	23.2	0
	3	1	22.86	22.95	23.15	0	23.08	23.08	23.22	0
	3	3	23.01	23.05	23.23	0	23.16	23.19	23.38	0
	6	0	21.92	21.99	22.31	1	22.61	22.68	22.79	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 18675 1857.5 MHz	CH 18900 1880.0	CH 19125 1902.5 MHz	3GPP MPR [dB]	CH 18675 1857.5 MHz	CH 18900 1880.0 MHz	CH 19125 1902.5 MHz	3GPP MPR [dB]
2 / 15M	1	0	22.97	23.04	23.17	0	22.78	22.82	22.95	0
	1	2	23.07	23.1	23.23	0	22.87	22.85	22.96	0
	1	5	23.25	23.27	23.41	0	23.03	23.06	23.17	0
	3	0	22.95	22.98	23.12	0	23.11	23.11	23.2	0
	3	1	22.99	23.02	23.15	0	23.17	23.14	23.25	0
	3	3	23.1	23.12	23.26	0	23.25	23.25	23.37	0
	6	0	22.98	23.01	23.13	0	22.7	22.82	22.78	0

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 18700 1860.0 MHz	CH 18900 1880.0	CH 19100 1900.0 MHz	3GPP MPR [dB]	CH 18700 1860.0 MHz	CH 18900 1880.0	CH 19100 1900.0 MHz	3GPP MPR [dB]
2 / 20M	1	0	23.04	23.11	23.22	0	22.86	22.89	23.05	0
	1	2	23.11	23.17	23.29	0	22.89	22.95	23.13	0
	1	5	23.36	23.35	23.48	0	23.09	23.16	23.3	0
	3	0	23.05	23.04	23.21	0	23.11	23.16	23.39	0
	3	1	23.08	23.1	23.26	0	23.19	23.23	23.4	0
	3	3	23.19	23.2	23.35	0	23.25	23.35	23.51	0
	6	0	23.07	23.08	23.23	0	22.79	22.84	22.95	0

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 19957 1710.7 MHz	CH 20175 1732.5 MHz	CH 20393 1754.3 MHz	3GPP MPR [dB]	CH 19957 1710.7 MHz	CH 20175 1732.5 MHz	CH 20393 1754.3 MHz	3GPP MPR [dB]
4 / 1.4M	1	0	21.82	21.91	22.1	0	20.45	20.55	20.77	1
	1	2	21.89	21.99	22.19	0	20.58	20.62	20.85	1
	1	5	22.09	22.18	22.39	0	20.75	20.83	21.06	1
	3	0	20.73	20.85	21.07	1	20.02	20.14	20.35	2
	3	1	20.77	20.9	21.1	1	20.05	20.17	20.38	2
	3	3	20.9	21.03	21.22	1	20.13	20.3	20.51	2
	6	0	19.9	20.02	20.24	2	22.05	22.14	22.32	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 19965 1711.5 MHz	CH 20175 1732.5 MHz	CH 20385 1753.5 MHz	3GPP MPR [dB]	CH 19965 1711.5 MHz	CH 20175 1732.5 MHz	CH 20385 1753.5 MHz	3GPP MPR [dB]
4 / 3M	1	0	21.87	21.92	22.1	0	20.46	20.6	20.79	1
	1	2	21.92	22.0	22.17	0	20.51	20.68	20.84	1
	1	5	22.12	22.2	22.37	0	20.71	20.89	21.05	1
	3	0	20.76	20.88	21.06	1	20.05	20.15	20.32	2
	3	1	20.8	20.92	21.1	1	20.08	20.22	20.43	2
	3	3	20.92	21.05	21.23	1	20.17	20.36	20.53	2
	6	0	19.92	20.05	20.25	2	22.11	22.17	22.34	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 19975 1711.5 MHz	CH 20175 1732.5 MHz	CH 20375 1753.5 MHz	3GPP MPR [dB]	CH 19975 1711.5 MHz	CH 20175 1732.5 MHz	CH 20375 1753.5 MHz	3GPP MPR [dB]
4 / 5M	1	0	21.82	21.9	22.1	0	21.68	21.74	21.98	0
	1	2	21.9	21.98	22.19	0	21.77	21.89	22.11	0
	1	5	22.09	22.19	22.39	0	22.07	22.1	22.27	0
	3	0	20.73	20.86	21.05	1	20.96	21.13	21.28	1
	3	1	20.77	20.91	21.1	1	21.04	21.16	21.33	1
	3	3	20.9	21.04	21.23	1	21.18	21.29	21.47	1
	6	0	20.78	20.92	21.11	1	21.48	21.58	21.83	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 20000 1715.0 MHz	CH 20175 1732.5 MHz	CH 20350 1750.0 MHz	3GPP MPR [dB]	CH 20000 1715.0 MHz	CH 20175 1732.5 MHz	CH 20350 1750.0 MHz	3GPP MPR [dB]
4 / 10M	1	0	21.83	21.91	22.07	0	21.69	21.76	21.93	0
	1	2	21.89	21.99	22.15	0	21.7	21.86	22.06	0
	1	5	22.09	22.19	22.36	0	21.94	22.04	22.22	0
	3	0	21.78	21.87	22.04	0	22.04	22.15	22.28	0
	3	1	21.82	21.92	22.08	0	22.09	22.21	22.32	0
	3	3	21.95	22.04	22.2	0	22.19	22.29	22.46	0
	6	0	20.78	20.92	21.08	1	21.47	21.56	21.9	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 20025 1717.0 MHz	CH 20175 1732.5 MHz	CH 20325 1747.5 MHz	3GPP MPR [dB]	CH 20025 1717.0 MHz	CH 20175 1732.5 MHz	CH 20325 1747.5 MHz	3GPP MPR [dB]
4 / 15M	1	0	21.86	21.91	22.08	0	21.7	21.79	21.91	0
	1	2	21.94	22.0	22.15	0	21.75	21.84	22.0	0
	1	5	22.12	22.2	22.36	0	21.99	22.05	22.18	0
	3	0	21.8	21.89	22.04	0	22.04	22.15	22.27	0
	3	1	21.84	21.93	22.08	0	22.1	22.19	22.32	0
	3	3	21.95	22.05	22.2	0	22.21	22.29	22.43	0
	6	0	21.84	21.93	22.09	0	21.48	21.53	21.76	0

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 20050 1720.0 MHz	CH 20175 1732.5 MHz	CH 20300 1745.0 MHz	3GPP MPR [dB]	CH 20050 1720.0 MHz	CH 20175 1732.5 MHz	CH 20300 1745.0 MHz	3GPP MPR [dB]
4 / 20M	1	0	21.82	21.94	22.12	0	21.77	21.76	21.95	0
	1	2	21.88	22.02	22.21	0	21.86	21.88	22.1	0
	1	5	22.15	22.25	22.4	0	22.05	22.09	22.18	0
	3	0	21.82	21.91	22.08	0	22.08	22.15	22.33	0
	3	1	21.87	21.95	22.12	0	22.09	22.18	22.34	0
	3	3	22.03	22.08	22.24	0	22.25	22.33	22.49	0
	6	0	21.91	21.97	22.12	0	21.57	21.55	21.73	0

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 20407 824.7 MHz	CH 20525 836.5 MHz	CH 20643 848.3 MHz	3GPP MPR [dB]	CH 20407 824.7 MHz	CH 20525 836.5 MHz	CH 20643 848.3 MHz	3GPP MPR [dB]
5 / 1.4M	1	0	22.15	22.25	22.07	0	21.22	21.18	21.05	1
	1	2	22.26	22.2	22.07	0	21.24	21.13	20.94	1
	1	5	22.36	22.41	22.19	0	21.34	21.26	21.04	1
	3	0	21.41	21.51	21.3	1	20.6	20.47	20.49	2
	3	1	21.47	21.52	21.31	1	20.6	20.46	20.43	2
	3	3	21.47	21.44	21.36	1	20.68	20.6	20.51	2
	6	0	20.43	20.29	20.23	2	22.18	22.23	22.17	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 20415 825.5 MHz	CH 20525 836.5 MHz	CH 20635 847.5 MHz	3GPP MPR [dB]	CH 20415 825.5 MHz	CH 20525 836.5 MHz	CH 20635 847.5 MHz	3GPP MPR [dB]
5 / 3M	1	0	22.21	22.04	22.07	0	21.24	21.19	21.01	1
	1	2	22.22	22.12	22.08	0	21.18	21.17	21.05	1
	1	5	22.39	22.25	22.26	0	21.43	21.32	21.19	1
	3	0	21.43	21.34	21.3	1	20.59	20.49	20.49	2
	3	1	21.44	21.4	21.26	1	20.63	20.51	20.43	2
	3	3	21.55	21.4	21.27	1	20.68	20.56	20.54	2
	6	0	20.39	20.26	20.31	2	22.2	22.18	22.08	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 20425 826.5 MHz	CH 20525 836.5 MHz	CH 20625 846.5 MHz	3GPP MPR [dB]	CH 20425 826.5 MHz	CH 20525 836.5 MHz	CH 20625 846.5 MHz	3GPP MPR [dB]
5 / 5M	1	0	22.2	22.16	22.18	0	22.11	22.08	22.12	0
	1	2	22.25	22.16	22.22	0	22.22	22.11	22.1	0
	1	5	22.39	22.3	22.4	0	22.29	22.25	22.24	0
	3	0	21.44	21.36	21.08	1	21.78	21.68	21.35	1
	3	1	21.49	21.38	21.34	1	21.78	21.73	21.4	1
	3	3	21.5	21.49	21.31	1	21.81	21.71	21.51	1
	6	0	21.48	21.38	21.13	1	21.87	21.84	21.9	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 20450 829.0 MHz	CH 20525 836.5 MHz	CH 20600 844 MHz	3GPP MPR [dB]	CH 20450 829.0 MHz	CH 20525 836.5 MHz	CH 20600 844 MHz	3GPP MPR [dB]
5 / 10M	1	0	22.24	22.06	22.13	0	22.06	22.06	22.04	0
	1	2	22.22	22.05	22.12	0	22.07	22.07	22.02	0
	1	5	22.35	22.24	22.24	0	22.25	22.29	22.18	0
	3	0	22.09	22.01	22.03	0	22.39	22.35	22.38	0
	3	1	22.1	22.1	22.04	0	22.4	22.37	22.39	0
	3	3	22.17	22.1	22.09	0	22.51	22.5	22.47	0
	6	0	21.41	21.4	21.37	1	21.78	21.81	21.75	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 23017 699.7 MHz	CH 23095 707.5 MHz	CH 23173 715.3 MHz	3GPP MPR [dB]	CH 23017 699.7 MHz	CH 23095 707.5 MHz	CH 23173 715.3 MHz	3GPP MPR [dB]
12 / 1.4M	1	0	23.14	23.16	23.03	0	21.67	21.69	21.73	1
	1	2	23.14	23.17	23.05	0	21.75	21.61	21.68	1
	1	5	23.31	23.35	23.17	0	21.83	21.87	21.81	1
	3	0	21.93	21.93	21.94	1	21.45	21.41	21.46	2
	3	1	21.91	21.92	21.96	1	21.39	21.4	21.49	2
	3	3	22.05	22.03	22.05	1	21.5	21.58	21.56	2
	6	0	21.28	21.21	21.29	2	23.21	23.06	23.1	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 23025 700.5 MHz	CH 23095 707.5 MHz	CH 23165 714.5 MHz	3GPP MPR [dB]	CH 23025 700.5 MHz	CH 23095 707.5 MHz	CH 23165 714.5 MHz	3GPP MPR [dB]
12 / 3M	1	0	23.14	23.08	23.15	0	21.75	21.69	21.76	1
	1	2	23.18	23.02	23.17	0	21.74	21.67	21.82	1
	1	5	23.33	23.26	23.3	0	21.9	21.9	21.89	1
	3	0	21.9	21.93	22.02	1	21.48	21.48	21.48	2
	3	1	21.94	21.93	22.03	1	21.51	21.48	21.5	2
	3	3	22.08	22.05	22.12	1	21.6	21.5	21.57	2
	6	0	21.29	21.3	21.32	2	23.29	23.13	23.12	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 23035 701.5 MHz	CH 23095 707.5 MHz	CH 23155 713.5 MHz	3GPP MPR [dB]	CH 23035 701.5 MHz	CH 23095 707.5 MHz	CH 23155 713.5 MHz	3GPP MPR [dB]
12 / 5M	1	0	23.2	23.23	23.15	0	23.01	23.12	23.04	0
	1	2	23.2	23.23	23.18	0	23.09	23.09	23.04	0
	1	5	23.36	23.38	23.31	0	23.27	23.13	23.2	0
	3	0	21.95	21.97	22.01	1	22.24	22.29	22.27	1
	3	1	21.99	21.98	22.03	1	22.34	22.25	22.31	1
	3	3	22.04	22.07	22.11	1	22.33	22.35	22.36	1
	6	0	21.96	21.99	22.03	1	22.85	22.82	22.87	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 23060 704.0 MHz	CH 23095 707.5 MHz	CH 23130 711.0 MHz	3GPP MPR [dB]	CH 23060 704.0 MHz	CH 23095 707.5 MHz	CH 23130 711.0 MHz	3GPP MPR [dB]
12 / 10M	1	0	23.22	23.06	23.15	0	23.13	23.03	23.12	0
	1	2	23.19	23.23	23.18	0	23.11	23.08	23.06	0
	1	5	23.34	23.37	23.31	0	23.23	23.19	23.18	0
	3	0	23.16	23.12	23.08	0	23.4	23.38	23.39	0
	3	1	23.15	23.14	23.1	0	23.42	23.44	23.47	0
	3	3	23.25	23.22	23.19	0	23.5	23.5	23.45	0
	6	0	22.01	21.98	22.03	1	22.84	22.85	22.82	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 23205 779.5 MHz	CH 23230 782.0 MHz	CH 23255 784.5 MHz	3GPP MPR [dB]	CH 23205 779.5 MHz	CH 23230 782.0 MHz	CH 23255 784.5 MHz	3GPP MPR [dB]
13 / 5M	1	0	22.65	22.66	22.7	0	22.61	22.63	22.61	0
	1	2	22.64	22.65	22.72	0	22.62	22.64	22.63	0
	1	5	22.83	22.77	22.89	0	22.78	22.73	22.81	0
	3	0	21.93	21.96	21.93	1	22.3	22.24	22.24	1
	3	1	21.98	21.97	21.99	1	22.24	22.25	22.28	1
	3	3	22.09	22.05	22.07	1	22.38	22.37	22.36	1
	6	0	22.0	21.97	21.95	1	22.39	22.34	22.33	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			NA	CH 23230 782.0 MHz	NA	3GPP MPR [dB]	NA	CH 23230 782.0 MHz	NA	3GPP MPR [dB]
13 / 10M	1	0	22.68	22.68	22.68	0	22.53	22.53	22.53	0
	1	2	22.69	22.69	22.69	0	22.51	22.51	22.51	0
	1	5	22.81	22.81	22.81	0	22.68	22.68	22.68	0
	3	0	22.54	22.54	22.54	0	22.78	22.78	22.78	0
	3	1	22.56	22.56	22.56	0	22.92	22.92	22.92	0
	3	3	22.63	22.63	22.63	0	22.97	22.97	22.97	0
	6	0	21.88	21.88	21.88	1	22.36	22.36	22.36	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26047 1850.7 MHz	CH 26365 1882.5 MHz	CH 26683 1914.3 MHz	3GPP MPR [dB]	CH 26047 1850.7 MHz	CH 26365 1882.5 MHz	CH 26683 1914.3 MHz	3GPP MPR [dB]
25 / 1.4M	1	0	22.89	22.95	23.11	0	21.61	21.68	21.9	1
	1	2	22.97	23.09	23.17	0	21.68	21.79	21.99	1
	1	5	23.17	23.28	23.35	0	21.88	22.0	22.19	1
	3	0	21.93	22.05	22.24	1	21.13	21.28	21.42	2
	3	1	21.97	22.09	22.27	1	21.24	21.36	21.5	2
	3	3	22.1	22.21	22.39	1	21.36	21.45	21.64	2
	6	0	21.09	21.23	21.37	2	23.16	23.25	23.35	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26055 1851.5 MHz	CH 26365 1882.5 MHz	CH 26675 1913.5 MHz	3GPP MPR [dB]	CH 26055 1851.5 MHz	CH 26365 1882.5 MHz	CH 26675 1913.5 MHz	3GPP MPR [dB]
25 / 3M	1	0	22.87	23.01	23.25	0	21.55	21.69	21.95	1
	1	2	22.97	23.08	23.3	0	21.69	21.84	22.01	1
	1	5	23.15	23.27	23.48	0	21.89	22.0	22.23	1
	3	0	21.9	22.05	22.26	1	21.16	21.3	21.62	2
	3	1	21.99	22.07	22.3	1	21.27	21.34	21.62	2
	3	3	22.1	22.21	22.42	1	21.36	21.48	21.74	2
	6	0	21.11	21.23	21.52	2	23.12	23.27	23.48	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26065 1852.5 MHz	CH 26365 1882.5 MHz	CH 26665 1913.5 MHz	3GPP MPR [dB]	CH 26065 1852.5 MHz	CH 26365 1882.5 MHz	CH 26665 1913.5 MHz	3GPP MPR [dB]
25 / 5M	1	0	22.88	23.0	23.18	0	22.69	22.81	23.05	0
	1	2	22.92	23.03	23.28	0	22.76	22.9	23.11	0
	1	5	23.17	23.29	23.4	0	23.0	23.05	23.29	0
	3	0	21.93	22.04	22.26	1	22.14	22.26	22.44	1
	3	1	21.97	22.11	22.31	1	22.18	22.3	22.48	1
	3	3	22.09	22.22	22.43	1	22.29	22.42	22.6	1
	6	0	21.98	22.12	22.32	1	22.67	22.75	22.97	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26090 1855 MHz	CH 26365 1882.5 MHz	CH 26640 1910 MHz	3GPP MPR [dB]	CH 26090 1855 MHz	CH 26365 1882.5 MHz	CH 26640 1910 MHz	3GPP MPR [dB]
25 / 10M	1	0	22.93	23.01	23.14	0	22.72	22.83	23.03	0
	1	2	22.99	23.04	23.26	0	22.77	22.93	23.11	0
	1	5	23.18	23.28	23.43	0	23.0	23.07	23.24	0
	3	0	22.87	22.99	23.2	0	23.03	23.14	23.31	0
	3	1	22.92	23.03	23.21	0	23.07	23.17	23.39	0
	3	3	23.05	23.14	23.32	0	23.17	23.3	23.45	0
	6	0	22.0	22.11	22.3	1	22.67	22.72	22.88	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26115 1857.5 MHz	CH 26365 1882.5 MHz	CH 26615 1907.5 MHz	3GPP MPR [dB]	CH 26115 1857.5 MHz	CH 26365 1882.5 MHz	CH 26615 1907.5 MHz	3GPP MPR [dB]
25 / 15M	1	0	22.88	23.01	23.23	0	22.71	22.78	22.98	0
	1	2	22.99	23.09	23.26	0	22.8	22.9	23.08	0
	1	5	23.19	23.29	23.45	0	23.0	23.09	23.22	0
	3	0	22.88	22.98	23.18	0	23.05	23.12	23.3	0
	3	1	22.93	23.03	23.21	0	23.09	23.16	23.35	0
	3	3	23.04	23.13	23.32	0	23.19	23.28	23.46	0
	6	0	22.94	23.02	23.22	0	22.69	22.79	22.9	0

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26140 1860 MHz	CH 26365 1882.5 MHz	CH 26590 1905 MHz	3GPP MPR [dB]	CH 26140 1860 MHz	CH 26365 1882.5 MHz	CH 26590 1905 MHz	3GPP MPR [dB]
25 / 20M	1	0	22.88	22.98	23.2	0	22.72	22.78	22.98	0
	1	2	22.94	23.07	23.29	0	22.79	22.86	23.08	0
	1	5	23.12	23.23	23.47	0	22.91	23.06	23.29	0
	3	0	22.79	22.94	23.18	0	23.01	23.1	23.35	0
	3	1	22.86	23.02	23.24	0	23.04	23.17	23.37	0
	3	3	23.05	23.12	23.33	0	23.17	23.26	23.49	0
	6	0	22.92	23.01	23.22	0	22.64	22.8	22.88	0

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26697 814.7 MHz	CH 26865 831.5 MHz	CH 27033 848.3 MHz	3GPP MPR [dB]	CH 26697 814.7 MHz	CH 26865 831.5 MHz	CH 27033 848.3 MHz	3GPP MPR [dB]
26 / 1.4M	1	0	22.34	22.29	22.03	0	21.4	21.35	20.85	1
	1	2	22.38	22.31	22.1	0	21.5	21.38	21.01	1
	1	5	22.54	22.44	22.23	0	21.59	21.55	21.03	1
	3	0	21.65	21.54	21.32	1	20.84	20.65	20.44	2
	3	1	21.66	21.56	21.28	1	20.85	20.68	20.58	2
	3	3	21.7	21.64	21.4	1	20.94	20.81	20.59	2
	6	0	20.62	20.47	20.28	2	22.49	22.34	22.17	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26705 815.5 MHz	CH 26865 831.5 MHz	CH 27025 847.5 MHz	3GPP MPR [dB]	CH 26705 815.5 MHz	CH 26865 831.5 MHz	CH 27025 847.5 MHz	3GPP MPR [dB]
26 / 3M	1	0	22.38	22.35	22.18	0	21.49	21.38	20.81	1
	1	2	22.43	22.35	22.23	0	21.45	21.36	20.8	1
	1	5	22.6	22.48	22.31	0	21.61	21.57	21.05	1
	3	0	21.66	21.58	21.07	1	20.81	20.67	20.57	2
	3	1	21.64	21.6	21.08	1	20.84	20.72	20.61	2
	3	3	21.81	21.67	21.16	1	20.96	20.79	20.66	2
	6	0	20.68	20.49	20.39	2	22.45	22.33	22.23	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26715 816.5 MHz	CH 26865 831.5 MHz	CH 27015 846.5 MHz	3GPP MPR [dB]	CH 26715 816.5 MHz	CH 26865 831.5 MHz	CH 27015 846.5 MHz	3GPP MPR [dB]
26 / 5M	1	0	22.46	22.38	22.26	0	22.45	22.45	22.17	0
	1	2	22.58	22.36	22.3	0	22.49	22.31	22.21	0
	1	5	22.68	22.48	22.45	0	22.55	22.38	22.43	0
	3	0	21.82	21.47	21.14	1	22.1	21.85	21.42	1
	3	1	21.76	21.51	21.15	1	22.06	21.77	21.46	1
	3	3	21.91	21.58	21.26	1	22.21	21.75	21.54	1
	6	0	21.8	21.54	21.12	1	22.18	22.08	22.02	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26740 819 MHz	CH 26865 831.5 MHz	CH 26990 844 MHz	3GPP MPR [dB]	CH 26740 819 MHz	CH 26865 831.5 MHz	CH 26990 844 MHz	3GPP MPR [dB]
26 / 10M	1	0	22.46	22.34	22.29	0	22.52	22.22	22.26	0
	1	2	22.55	22.33	22.35	0	22.43	22.29	22.24	0
	1	5	22.69	22.48	22.46	0	22.59	22.38	22.36	0
	3	0	22.44	22.32	22.24	0	22.77	22.58	22.53	0
	3	1	22.47	22.29	22.25	0	22.77	22.65	22.56	0
	3	3	22.57	22.38	22.32	0	22.85	22.79	22.64	0
	6	0	21.76	21.41	21.15	1	22.14	21.99	21.91	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 26765 821.5 MHz	CH 26865 831.5 MHz	CH 26965 841.5 MHz	3GPP MPR [dB]	CH 26765 821.5 MHz	CH 26865 831.5 MHz	CH 26965 841.5 MHz	3GPP MPR [dB]
26 / 15M	1	0	22.43	22.38	22.22	0	22.42	22.31	22.11	0
	1	2	22.38	22.35	22.24	0	22.41	22.26	22.19	0
	1	5	22.51	22.56	22.41	0	22.64	22.43	22.35	0
	3	0	22.32	22.35	22.23	0	22.76	22.66	22.56	0
	3	1	22.34	22.35	22.28	0	22.76	22.65	22.56	0
	3	3	22.47	22.42	22.28	0	22.82	22.73	22.65	0
	6	0	22.47	22.35	22.24	0	22.2	21.98	21.97	0

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 131979 1710.7 MHz	CH 132322 1745.0 MHz	CH 132665 1779.3 MHz	3GPP MPR [dB]	CH 131979 1710.7 MHz	CH 132322 1745.0 MHz	CH 132665 1779.3 MHz	3GPP MPR [dB]
66 / 1.4M	1	0	21.57	22.03	22.64	0	21.35	21.83	22.2	1
	1	2	21.73	22.16	22.7	0	21.44	21.83	22.34	1
	1	5	21.97	22.4	22.9	0	21.64	21.94	22.49	1
	3	0	21.62	22.11	22.59	1	21.78	22.19	22.72	2
	3	1	21.71	22.15	22.63	1	21.85	22.25	22.78	2
	3	3	21.84	22.24	22.75	1	22.0	22.38	22.84	2
	6	0	21.67	22.13	22.63	2	21.75	22.32	22.68	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 131987 1711.5 MHz	CH 132322 1745.0 MHz	CH 132657 1778.5 MHz	3GPP MPR [dB]	CH 131987 1711.5 MHz	CH 132322 1745.0 MHz	CH 132657 1778.5 MHz	3GPP MPR [dB]
66 / 3M	1	0	21.59	21.88	22.42	0	21.41	21.58	22.07	1
	1	2	21.73	21.95	22.49	0	21.41	21.74	22.14	1
	1	5	21.95	22.17	22.67	0	21.6	21.89	22.31	1
	3	0	21.61	21.85	22.37	1	21.78	22.15	22.53	2
	3	1	21.65	22.09	22.42	1	21.84	22.14	22.53	2
	3	3	21.77	22.08	22.54	1	21.94	22.29	22.68	2
	6	0	21.67	22.0	22.42	2	21.74	22.03	22.59	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 131997 1712.5 MHz	CH 132322 1745.0 MHz	CH 132647 1777.5 MHz	3GPP MPR [dB]	CH 131997 1712.5 MHz	CH 132322 1745.0 MHz	CH 132647 1777.5 MHz	3GPP MPR [dB]
66 / 5M	1	0	21.74	21.9	22.37	0	21.59	21.77	22.27	0
	1	2	21.81	22.02	22.42	0	21.64	21.86	22.31	0
	1	5	22.02	22.21	22.64	0	21.87	22.03	22.47	0
	3	0	21.67	21.9	22.32	1	21.91	22.09	22.59	1
	3	1	21.71	21.93	22.38	1	21.94	22.16	22.65	1
	3	3	21.84	22.05	22.52	1	22.05	22.29	22.8	1
	6	0	21.72	21.95	22.43	1	21.62	21.7	22.43	2

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 132022 1715.0 MHz	CH 132322 1745.0 MHz	CH 132622 1775.0 MHz	3GPP MPR [dB]	CH 132022 1715.0 MHz	CH 132322 1745.0 MHz	CH 132622 1775.0 MHz	3GPP MPR [dB]
66 / 10M	1	0	21.66	21.96	22.38	0	21.62	21.77	22.27	0
	1	2	21.74	21.99	22.56	0	21.66	21.86	22.37	0
	1	5	22.03	22.26	22.76	0	21.9	22.03	22.59	0
	3	0	21.64	21.86	22.46	0	21.88	22.11	22.69	0
	3	1	21.74	21.94	22.51	0	21.97	22.18	22.72	0
	3	3	21.89	22.09	22.6	0	22.08	22.35	22.79	0
	6	0	21.8	21.96	22.49	1	21.36	21.86	22.52	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 132047 1717.5 MHz	CH 132322 1745.0 MHz	CH 132597 1772.5 MHz	3GPP MPR [dB]	CH 132047 1717.5 MHz	CH 132322 1745.0 MHz	CH 132597 1772.5 MHz	3GPP MPR [dB]
66 / 15M	1	0	21.65	21.95	22.57	0	21.56	21.86	22.29	0
	1	2	21.72	22.01	22.65	0	21.59	21.93	22.38	0
	1	5	21.9	22.26	22.84	0	21.82	22.06	22.56	0
	3	0	21.58	21.9	22.51	0	21.8	22.07	22.64	0
	3	1	21.63	21.96	22.55	0	21.88	22.21	22.67	0
	3	3	21.78	22.11	22.62	0	21.96	22.4	22.78	0
	6	0	21.67	21.96	22.54	0	21.57	21.92	22.38	0

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 132072 1720.0 MHz	CH 132322 1745.0 MHz	CH 132572 1770.0 MHz	3GPP MPR [dB]	CH 132072 1720.0 MHz	CH 132322 1745.0 MHz	CH 132572 1770.0 MHz	3GPP MPR [dB]
66 / 20M	1	0	21.68	21.97	22.56	0	21.55	22.05	22.31	0
	1	2	21.77	22.16	22.64	0	21.6	22.12	22.41	0
	1	5	21.97	22.37	22.84	0	21.87	22.36	22.54	0
	3	0	21.6	22.06	22.52	0	21.88	22.42	22.64	0
	3	1	21.66	22.14	22.56	0	21.96	22.42	22.65	0
	3	3	21.77	22.26	22.68	0	22.06	22.49	22.83	0
	6	0	21.68	22.17	22.57	0	21.62	22.09	22.32	0

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 133147 665.5 MHz	CH 133297 680.5 MHz	CH 133447 695.5 MHz	3GPP MPR [dB]	CH 133147 665.5 MHz	CH 133297 680.5 MHz	CH 133447 695.5 MHz	3GPP MPR [dB]
71 / 5M	1	0	22.14	22.36	22.84	0	22.01	22.15	22.8	0
	1	2	22.14	22.43	22.83	0	22.08	22.19	22.79	0
	1	5	22.26	22.67	23.07	0	22.25	22.31	23.07	0
	3	0	21.99	22.36	22.76	1	22.39	22.47	23.14	1
	3	1	22.01	22.27	22.85	1	22.44	22.51	23.16	1
	3	3	22.09	22.3	22.85	1	22.58	22.67	23.29	1
	6	0	22.02	22.2	22.83	1	22.1	21.97	22.98	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 133172 668.0 MHz	CH 133297 680.5 MHz	CH 133422 693.0 MHz	3GPP MPR [dB]	CH 133172 668.0 MHz	CH 133297 680.5 MHz	CH 133422 693.0 MHz	3GPP MPR [dB]
71 / 10M	1	0	22.14	22.34	22.96	0	22.19	22.14	22.85	0
	1	2	22.14	22.33	22.99	0	22.21	22.14	22.97	0
	1	5	22.38	22.51	23.18	0	22.31	22.29	23.09	0
	3	0	22.22	22.21	22.89	0	22.47	22.5	23.23	0
	3	1	22.32	22.23	22.97	0	22.44	22.46	23.22	0
	3	3	22.4	22.32	23.11	0	22.38	22.6	23.3	0
	6	0	22.32	22.24	22.99	1	22.07	22.46	22.92	2

LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 133197 670.5 MHz	CH 133297 680.5 MHz	CH 133397 690.5 MHz	3GPP MPR [dB]	CH 133197 670.5 MHz	CH 133297 680.5 MHz	CH 133397 690.5 MHz	3GPP MPR [dB]
71 / 15M	1	0	22.36	22.42	22.81	0	22.13	22.32	22.77	0
	1	2	22.34	22.41	22.84	0	22.21	22.33	22.74	0
	1	5	22.48	22.63	23.05	0	22.41	22.5	22.99	0
	3	0	22.21	22.34	22.75	0	22.67	22.68	23.01	0
	3	1	22.22	22.35	22.8	0	22.6	22.78	23.09	0
	3	3	22.29	22.55	22.84	0	22.75	22.9	23.16	0
	6	0	22.28	22.47	22.82	0	22.33	22.4	22.66	0

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LTE Band / BW	RB Size RBs	RB Offset RB Start	QPSK				16QAM			
			CH 133222 673.0 MHz	CH 133297 680.5 MHz	CH 133372 688.0 MHz	3GPP MPR [dB]	CH 133222 673.0 MHz	CH 133297 680.5 MHz	CH 133372 688.0 MHz	3GPP MPR [dB]
71 / 20M	1	0	22.27	22.48	22.88	0	22.08	22.26	22.66	0
	1	2	22.29	22.48	22.9	0	22.06	22.29	22.74	0
	1	5	22.43	22.64	23.05	0	22.23	22.41	22.87	0
	3	0	22.14	22.35	22.78	0	22.38	22.51	23.06	0
	3	1	22.15	22.36	22.78	0	22.35	22.61	23.03	0
	3	3	22.22	22.43	22.89	0	22.56	22.65	23.09	0
	6	0	22.15	22.34	22.81	0	22.11	22.27	22.56	0

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3.2.2 NB-IoT

NB-IoT Band	Subcarrier Spacing kHz SC Spacing	SCs SCs	Start SC Start SC	BPSK				QPSK			
				CH 18601 1850.1 MHz	CH 18900 1880 MHz	CH 19199 1909.9 MHz	3GPP MPR [dB]	CH 18601 1850.1 MHz	CH 18900 1880 MHz	CH 19199 1909.9 MHz	3GPP MPR [dB]
2	3.75	1	0	23.14	23.22	23.2	N/A	23.15	23.22	23.28	N/A
		1	47	23.19	23.25	23.21	N/A	23.21	23.26	23.34	N/A
	15	1	0	23.26	23.34	23.35	N/A	23.31	23.37	23.38	N/A
		1	11	23.3	23.37	23.4	N/A	23.36	23.43	23.43	N/A
		3	0	N/A*	N/A*	N/A*	N/A	23.14	23.21	23.23	N/A
		3	3	N/A*	N/A*	N/A*	N/A	23.12	23.19	23.21	N/A
		3	6	N/A*	N/A*	N/A*	N/A	23.14	23.24	23.22	N/A
		3	9	N/A*	N/A*	N/A*	N/A	23.18	23.28	23.27	N/A
		6	0	N/A*	N/A*	N/A*	N/A	23.18	23.25	23.25	N/A
		6	6	N/A*	N/A*	N/A*	N/A	23.2	23.29	23.25	N/A
		12	0	N/A*	N/A*	N/A*	N/A	23.24	23.34	23.33	N/A

*Not supported

NB-IoT Band	Subcarrier Spacing kHz SC Spacing	SCs SCs	Start SC Start SC	BPSK				QPSK			
				CH 19951 1710.1 MHz	CH 20175 1732.5 MHz	CH 20399 1754.9 MHz	3GPP MPR [dB]	CH 19951 1710.1 MHz	CH 20175 1732.5 MHz	CH 20399 1754.9 MHz	3GPP MPR [dB]
4	3.75	1	0	22.05	22.21	22.45	N/A	21.96	22.2	22.44	N/A
		1	47	22.09	22.23	22.48	N/A	22.01	22.38	22.5	N/A
	15	1	0	22.09	22.27	22.49	N/A	22.15	22.31	22.51	N/A
		1	11	22.16	22.29	22.5	N/A	22.2	22.36	22.55	N/A
		3	0	N/A*	N/A*	N/A*	N/A	22.07	22.19	22.46	N/A
		3	3	N/A*	N/A*	N/A*	N/A	22.07	22.18	22.45	N/A
		3	6	N/A*	N/A*	N/A*	N/A	22.09	22.2	22.45	N/A
		3	9	N/A*	N/A*	N/A*	N/A	22.15	22.24	22.51	N/A
		6	0	N/A*	N/A*	N/A*	N/A	22.2	22.28	22.55	N/A
		6	6	N/A*	N/A*	N/A*	N/A	22.24	22.34	22.57	N/A
		12	0	N/A*	N/A*	N/A*	N/A	22.21	22.3	22.55	N/A

*Not supported

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NB-IoT Band	Subcarrier Spacing kHz SC Spacing	SCs SCs	Start SC Start SC	BPSK				QPSK			
				CH 20401 824.1 MHz	CH 20525 836.5 MHz	CH 20649 848.9 MHz	3GPP MPR [dB]	CH 20401 824.1 MHz	CH 20525 836.5 MHz	CH 20649 848.9 MHz	3GPP MPR [dB]
5	3.75	1	0	22.93	22.71	22.78	N/A	22.95	22.71	22.78	N/A
		1	47	22.94	22.71	22.78	N/A	22.97	22.73	22.81	N/A
	15	1	0	23.0	22.56	22.62	N/A	22.95	22.78	22.76	N/A
		1	11	23.03	22.6	22.74	N/A	23.12	22.56	22.69	N/A
		3	0	N/A*	N/A*	N/A*	N/A	22.64	22.58	22.45	N/A
		3	3	N/A*	N/A*	N/A*	N/A	22.61	22.43	22.42	N/A
		3	6	N/A*	N/A*	N/A*	N/A	22.65	22.57	22.44	N/A
		3	9	N/A*	N/A*	N/A*	N/A	22.69	22.65	22.49	N/A
		6	0	N/A*	N/A*	N/A*	N/A	22.76	22.56	22.58	N/A
		6	6	N/A*	N/A*	N/A*	N/A	22.77	22.57	22.57	N/A
		12	0	N/A*	N/A*	N/A*	N/A	22.72	22.51	22.52	N/A

*Not supported

NB-IoT Band	Subcarrier Spacing kHz SC Spacing	SCs SCs	Start SC Start SC	BPSK				QPSK			
				CH 23012 699.2 MHz	CH 23095 707.5 MHz	CH 23178 715.8 MHz	3GPP MPR [dB]	CH 23012 699.2 MHz	CH 23095 707.5 MHz	CH 23178 715.8 MHz	3GPP MPR [dB]
12	3.75	1	0	23.37	23.53	23.29	N/A	23.42	23.54	23.32	N/A
		1	47	23.39	23.53	23.45	N/A	23.46	23.54	23.37	N/A
	15	1	0	23.45	23.35	23.6	N/A	23.55	23.46	23.59	N/A
		1	11	23.5	23.43	23.55	N/A	23.61	23.49	23.63	N/A
		3	0	N/A*	N/A*	N/A*	N/A	23.42	23.28	23.11	N/A
		3	3	N/A*	N/A*	N/A*	N/A	23.56	23.27	23.09	N/A
		3	6	N/A*	N/A*	N/A*	N/A	23.36	23.28	23.12	N/A
		3	9	N/A*	N/A*	N/A*	N/A	23.34	23.34	23.18	N/A
		6	0	N/A*	N/A*	N/A*	N/A	23.45	23.41	23.13	N/A
		6	6	N/A*	N/A*	N/A*	N/A	23.45	23.42	23.15	N/A
		12	0	N/A*	N/A*	N/A*	N/A	23.42	23.4	23.09	N/A

*Not supported

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NB-IoT Band	Subcarrier Spacing kHz SC Spacing	SCs SCs	Start SC Start SC	BPSK				QPSK			
				CH 23181 777.1 MHz	CH 23230 782 MHz	CH 23279 786.9 MHz	3GPP MPR [dB]	CH 23181 777.1 MHz	CH 23230 782 MHz	CH 23279 786.9 MHz	3GPP MPR [dB]
13	3.75	1	0	23.46	23.49	23.31	N/A	23.47	23.49	23.31	N/A
		1	47	23.47	23.48	23.31	N/A	23.5	23.52	23.4	N/A
	15	1	0	23.07	23.28	23.22	N/A	23.2	23.41	23.39	N/A
		1	11	23.56	23.65	23.34	N/A	23.25	23.45	23.43	N/A
		3	0	N/A*	N/A*	N/A*	N/A	23.05	23.08	23.04	N/A
		3	3	N/A*	N/A*	N/A*	N/A	23.02	23.08	23.03	N/A
		3	6	N/A*	N/A*	N/A*	N/A	23.02	23.07	23.06	N/A
		3	9	N/A*	N/A*	N/A*	N/A	23.18	23.26	23.1	N/A
		6	0	N/A*	N/A*	N/A*	N/A	23.15	23.2	23.05	N/A
		6	6	N/A*	N/A*	N/A*	N/A	23.01	23.2	23.2	N/A
		12	0	N/A*	N/A*	N/A*	N/A	23.06	23.0	23.0	N/A

*Not supported

NB-IoT Band	Subcarrier Spacing kHz SC Spacing	SCs SCs	Start SC Start SC	BPSK				QPSK			
				CH 131973 1710.1 MHz	CH 132322 1745 MHz	CH 132671 1779.9 MHz	3GPP MPR [dB]	CH 131973 1710.1 MHz	CH 132322 1745 MHz	CH 132671 1779.9 MHz	3GPP MPR [dB]
66	3.75	1	0	22.04	22.29	22.81	N/A	22.08	22.44	22.86	N/A
		1	47	22.09	22.4	22.85	N/A	22.1	22.39	22.98	N/A
	15	1	0	22.06	22.41	22.93	N/A	22.17	22.43	22.91	N/A
		1	11	22.21	22.41	22.91	N/A	22.13	22.47	22.97	N/A
		3	0	N/A*	N/A*	N/A*	N/A	22.01	22.33	22.82	N/A
		3	3	N/A*	N/A*	N/A*	N/A	21.99	22.3	22.82	N/A
		3	6	N/A*	N/A*	N/A*	N/A	22.0	22.33	22.83	N/A
		3	9	N/A*	N/A*	N/A*	N/A	22.05	22.38	22.87	N/A
		6	0	N/A*	N/A*	N/A*	N/A	22.13	22.45	22.78	N/A
		6	6	N/A*	N/A*	N/A*	N/A	22.14	22.47	22.82	N/A
		12	0	N/A*	N/A*	N/A*	N/A	22.12	22.43	22.8	N/A

*Not supported

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NB-IoT Band	Subcarrier Spacing kHz SC Spacing	SCs SCs	Start SC Start SC	BPSK				QPSK			
				CH 133124 663.2 MHz	CH 133297 680.5 MHz	CH 133470 697.8 MHz	3GPP MPR [dB]	CH 133124 663.2 MHz	CH 133297 680.5 MHz	CH 133470 697.8 MHz	3GPP MPR [dB]
71	3.75	1	0	22.69	22.91	23.01	N/A	22.77	23.01	23.04	N/A
		1	47	22.71	23.0	23.26	N/A	22.67	23.16	23.21	N/A
	15	1	0	22.92	23.22	23.45	N/A	23.01	23.0	23.5	N/A
		1	11	22.91	23.07	23.42	N/A	23.09	23.14	23.54	N/A
		3	0	N/A*	N/A*	N/A*	N/A	22.77	22.68	23.36	N/A
		3	3	N/A*	N/A*	N/A*	N/A	22.77	22.66	23.36	N/A
		3	6	N/A*	N/A*	N/A*	N/A	22.79	22.69	23.37	N/A
		3	9	N/A*	N/A*	N/A*	N/A	22.82	22.73	23.42	N/A
		6	0	N/A*	N/A*	N/A*	N/A	22.91	22.86	23.35	N/A
		6	6	N/A*	N/A*	N/A*	N/A	22.97	22.88	23.13	N/A
		12	0	N/A*	N/A*	N/A*	N/A	22.95	22.86	23.08	N/A

*Not supported

WLAN 2.4GHz

Standard	Data Rate [Mbps]	Channel	Frequency [MHz]	Conducted Power [dBm]
802.11b	1	1	2412	19.27
802.11b	1	6	2437	19.14
802.11b	1	11	2462	19.03

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4. TEST EQUIPMENT

Dasy52 near field scanning systems, manufactured by SPEAG were used for SAR testing. The test system consists of high precision robotics system (Staubli), robot controller, computer, near-field probe, probe alignment sensor, and a phantom containing the tissue equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location of maximum electromagnetic field.

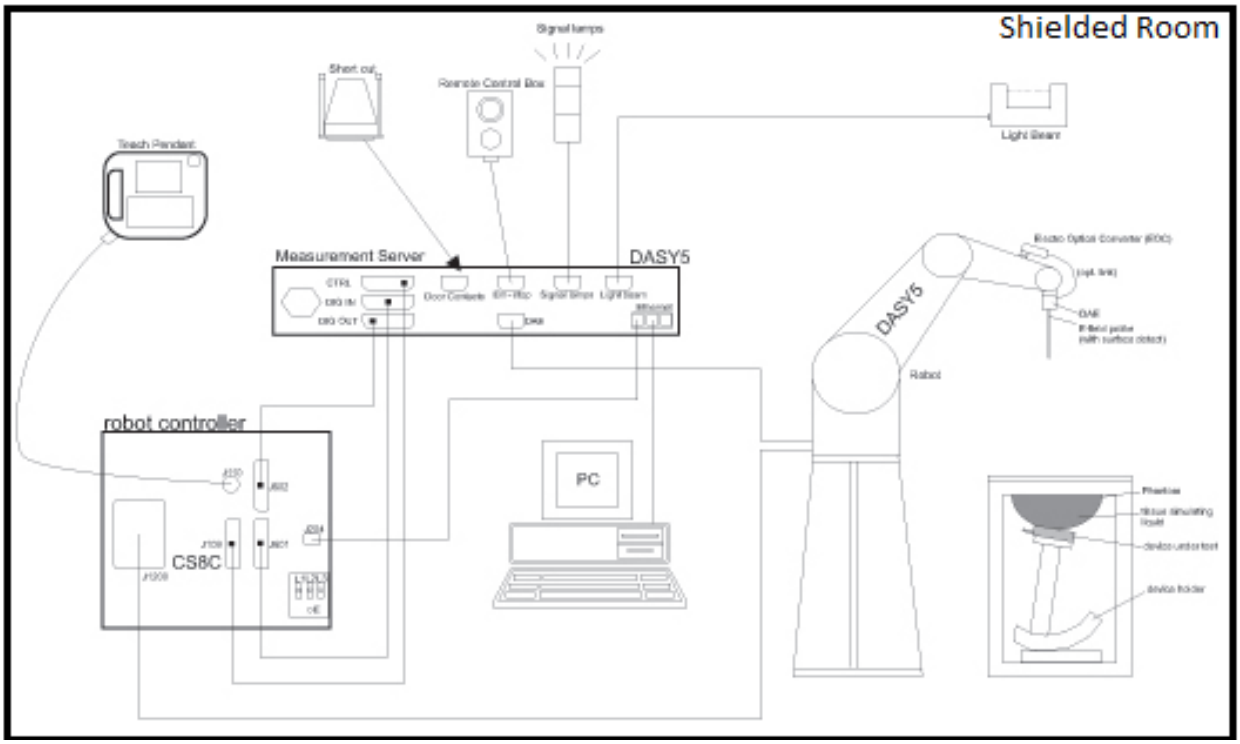

Figure 1 Schematic Laboratory Picture

4.1 Test Equipment List

Main used test system components are listed below. For full equipment list and calibration intervals, please contact the testing laboratory.

Test Equipment	Model	Serial Number	Calibration Date
DAE	DAE4	1332	02.2022
DAE	DAE4	705	04.2022
Probe	EX3DV4	7447	02.2022
Probe	EX3DV4	3892	04.2022
Dipole	DIP 0G750	635	12.2021
Dipole	D835V2	448	03.2020
Dipole	D1800V2	2d075	12.2020
Dipole	D1900V2	511	03.2020
Dipole	D2450V2	758	03.2020
DASY5 Software	52.8.8.1258	-	NA

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Signal generator	Agilent E4438C	MY42082527	NA
Signal generator	Anritsu MG3710A	6261911026	02.2022
Amplifier	Ophir 5163F	1022	NA
Amplifier	AR 10S1G4A	320421	NA
Inline Peak Power Sensor	Anritsu MA24105A	2102058	11.2021
Radio Communication Tester	R&S CMW500	1201.002K50-159661-pb	03.2022

Dipole calibration period supporting data:

		Measured on 09/2021			Calibrated		
Dipole / Serial number	**Frequency (MHz)**	**Return loss (dB)**	**Impedance (Ω)**		**Return loss (dB)**	**Impedance (Ω)**	
D835V2 / 448	835	-25.2	49.2	-5.4	-29.93	52.2	-2.3
D1800V2 / 2D075	1800	-28.8	52.2	3	-35.87	48.8	-1.1
D1900V2 / 511	1900	-25.4	49.4	5.3	-21.37	52.9	8
D2450V2 / 758	2450	-28.7	46.7	-1.3	-35*	49.9	-0.5

4.1.1 Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix D
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (30 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
Dimensions	Overall length: 330 mm Tip length: 10 mm Body diameter: 12 mm Tip diameter: 2.5 mm Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

The Triple Modular Phantom consists of three identical modules that can be installed and removed separately without emptying the liquid. It is used for compliance testing of small wireless devices in body-worn configurations. The phantom conforms to the requirements of IEEE 1528 and FCC published RF Exposure KDB Procedures. The shell thickness of the bottom plate is 2±0.2mm. The dimensions are 308x192x182mm and filling volume is 9.2 liters giving a filling height of 155mm.

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4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 and FCC published RF Exposure KDB Procedures. The dielectric parameters of the used tissue simulants were within ±10% of the recommended values in all frequencies used. A liquid compensation algorithm was used in DASY5 with which measured peak average SAR values were corrected for the deviation of used liquid. Depth of the tissue simulant was at least 15.0 cm from the inner surface of the flat phantom.

Head 600-3000 MHz tissue simulant liquid Ingredients
Deionized Water, Tween, Salt

4.4 System Validation Status

Frequency [MHz]	Dipole Type / SN	Probe Type / SN	Calibrated Signal Type	DAE Unit / SN	Dielectric Constant [ε] Head tissue simulant	Conductivity σ [S/m] Head tissue simulant	Validation Done
							Head tissue simulant
750	DIP G750 / 653	EX3DV4 / 7447	CW/FDD	DAE 4 / 1332	41.9	0.89	03.2022
835	DIP 0G835 / 473	EX3DV4 / 7447	CW/GMSK	DAE 4 / 710	39.62	0.89	03.2022
1800	D1800V2 / 2D075	EX3DV4 / 7447	CW/GMSK	DAE 4 / 710	38.81	1.36	03.2022
1900	D1900V2 / 5D004	EX3DV4 / 7447	CW/FDD	DAE 4 / 1332	38.86	1.42	03.2022
2450	D2450V2 / 758	EX3DV4 / 3892	CW/DSSS	DAE 4 / 705	39.13	1.70	04.2022

4.5 System Check

Date	Tissue Type	Tissue Temp. [°C]	Frequency [MHz]	Input Power [mW]	Measured SAR_{1g} [W/kg]	1 W Target SAR_{1g} [W/kg]	1 W Normalized SAR_{1g} [W/kg]	Deviation [%]	Plot #
11.4.2022	WB Head	22	835	250	2.23	9.38	8.92	-4.9	1
12.4.2022	WB Head	22	750	250	2.03	8.9	8.12	-8.8	2
13.4.2022	WB Head	22	1900	250	9.29	37.1	37.16	0.2	3
14.4.2022	WB Head	22	1800	250	9.38	39.44	37.52	-4.9	4
19.4.2022	WB Head	22	750	250	2.02	8.9	8.08	-9.2	5
20.4.2022	WB Head	22	835	250	2.3	9.38	9.2	-1.9	6
21.4.2022	WB Head	22	1800	250	9.22	39.44	36.88	-6.5	7
21.4.2022	WB Head	22	1900	250	9.11	37.1	36.44	-1.8	8
26.4.2022	WB Head	22	2450	250	12.8	55.34	51.2	-7.5	9

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4.5.1 Tissue Simulant Verification

				Target		Measured		Deviation	
Date	Tissue Type	Tissue Temp [°C]	Frequency [MHz]	Dielectric Constant [ε] Target	Conductivity σ [S/m] Target	Dielectric Constant [ε]	Conductivity σ [S/m]	ε (%)	σ (%)
11.04.2022	WB Head	22	779.5	41.76	0.89	40.23	0.82	-3.7	-7.7
11.04.2022	WB Head	22	782	41.75	0.89	40.22	0.83	-3.7	-7.7
11.04.2022	WB Head	22	784.5	41.74	0.89	40.21	0.83	-3.7	-7.6
11.04.2022	WB Head	22	821.5	41.56	0.9	40.03	0.84	-3.7	-6.4
11.04.2022	WB Head	22	831.5	41.52	0.9	39.98	0.84	-3.7	-6.1
11.04.2022	WB Head	22	835	41.5	0.9	39.97	0.85	-3.7	-6.0
11.04.2022	WB Head	22	839.5	41.5	0.9	39.96	0.85	-3.7	-6.3
11.04.2022	WB Head	22	841.5	41.5	0.91	39.95	0.85	-3.7	-6.5
11.04.2022	WB Head	22	847	41.5	0.91	39.93	0.85	-3.8	-6.9
11.04.2022	WB Head	22	857	41.5	0.92	39.88	0.85	-3.9	-7.5
12.04.2022	WB Head	22	704	42.15	0.89	44.74	0.85	6.2	-3.8
12.04.2022	WB Head	22	707.5	42.13	0.89	44.72	0.85	6.2	-3.7
12.04.2022	WB Head	22	711	42.11	0.89	44.7	0.86	6.2	-3.5
12.04.2022	WB Head	22	713	42.1	0.89	44.69	0.86	6.2	-3.5
12.04.2022	WB Head	22	725.5	42.03	0.89	44.63	0.86	6.2	-3.1
12.04.2022	WB Head	22	740.5	41.95	0.89	44.57	0.87	6.2	-2.6
12.04.2022	WB Head	22	750	41.9	0.89	44.52	0.87	6.2	-2.3
12.04.2022	WB Head	22	779.5	41.76	0.89	44.36	0.88	6.2	-1.5
12.04.2022	WB Head	22	782	41.75	0.89	44.34	0.88	6.2	-1.4
12.04.2022	WB Head	22	784.5	41.74	0.89	44.33	0.88	6.2	-1.4
12.04.2022	WB Head	22	821.5	41.56	0.9	44.2	0.9	6.4	-0.3
12.04.2022	WB Head	22	831.5	41.52	0.9	44.17	0.9	6.4	0.0
12.04.2022	WB Head	22	841.5	41.5	0.91	44.14	0.9	6.4	-0.4
13.04.2022	WB Head	22	1720	40.11	1.35	41.48	1.29	3.4	-4.5
13.04.2022	WB Head	22	1745	40.08	1.37	41.46	1.31	3.4	-4.4
13.04.2022	WB Head	22	1770	40.04	1.38	41.39	1.32	3.4	-4.6
13.04.2022	WB Head	22	1775	40.04	1.39	41.38	1.32	3.4	-4.5
13.04.2022	WB Head	22	1800	40	1.4	41.31	1.34	3.3	-4.4
13.04.2022	WB Head	22	1860	40	1.4	41.25	1.37	3.1	-2.3
13.04.2022	WB Head	22	1882.5	40	1.4	41.19	1.38	3.0	-1.2
13.04.2022	WB Head	22	1900	40	1.4	41.15	1.39	2.9	-0.4
13.04.2022	WB Head	22	1905	40	1.4	41.13	1.4	2.8	-0.2
13.04.2022	WB Head	22	1930	40	1.4	41.09	1.41	2.7	0.8
13.04.2022	WB Head	22	1950	40	1.4	41.06	1.42	2.6	1.4
13.04.2022	WB Head	22	1975	40	1.4	41.0	1.44	2.5	2.7
19.04.2022	WB Head	22	663.2	42.36	0.88	43.7	0.82	3.2	-7.8
19.04.2022	WB Head	22	669.2	42.33	0.88	43.67	0.82	3.2	-7.7
19.04.2022	WB Head	22	673	42.31	0.88	43.67	0.82	3.2	-7.6
19.04.2022	WB Head	22	680.5	42.27	0.89	43.64	0.82	3.2	-7.3
19.04.2022	WB Head	22	688	42.23	0.89	43.57	0.82	3.2	-7.0
19.04.2022	WB Head	22	697.8	42.18	0.89	43.52	0.83	3.2	-6.7
19.04.2022	WB Head	22	703.1	42.15	0.89	43.48	0.83	3.2	-6.6
19.04.2022	WB Head	22	707.5	42.13	0.89	43.46	0.83	3.2	-6.4
19.04.2022	WB Head	22	715.8	42.08	0.89	43.41	0.83	3.2	-6.2
19.04.2022	WB Head	22	725.5	42.03	0.89	43.37	0.84	3.2	-5.9
19.04.2022	WB Head	22	749.9	41.9	0.89	43.24	0.84	3.2	-5.1
19.04.2022	WB Head	22	750	41.9	0.89	43.24	0.84	3.2	-5.1
19.04.2022	WB Head	22	777.1	41.77	0.89	43.11	0.86	3.2	-4.2
19.04.2022	WB Head	22	782	41.75	0.89	43.07	0.86	3.2	-4.2
19.04.2022	WB Head	22	786.9	41.73	0.89	43.06	0.86	3.2	-4.1
20.04.2022	WB Head	22	824.1	41.55	0.9	42.99	0.89	3.5	-1.2
20.04.2022	WB Head	22	832.1	41.51	0.9	42.94	0.89	3.4	-0.9
20.04.2022	WB Head	22	835	41.5	0.9	42.94	0.89	3.5	-0.8
20.04.2022	WB Head	22	836.5	41.5	0.9	42.93	0.89	3.4	-0.9
20.04.2022	WB Head	22	839.5	41.5	0.9	42.92	0.89	3.4	-1.2
20.04.2022	WB Head	22	847	41.5	0.91	42.92	0.9	3.4	-1.6
20.04.2022	WB Head	22	848.9	41.5	0.91	42.9	0.9	3.4	-1.8
20.04.2022	WB Head	22	857	41.5	0.92	42.86	0.9	3.3	-2.4
20.04.2022	WB Head	22	861.9	41.5	0.93	42.85	0.9	3.2	-2.8

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20.04.2022	WB Head	22	880.1	41.5	0.95	42.79	0.91	3.1	-4.0
20.04.2022	WB Head	22	885	41.5	0.95	42.77	0.91	3.1	-4.3
20.04.2022	WB Head	22	897.5	41.5	0.97	42.72	0.92	2.9	-5.2
20.04.2022	WB Head	22	910	41.48	0.97	42.68	0.92	2.9	-5.2
20.04.2022	WB Head	22	914.9	41.47	0.98	42.66	0.92	2.9	-5.3
21.04.2022	WB Head	22	1710.1	40.13	1.35	40.21	1.26	0.2	-6.2
21.04.2022	WB Head	22	1745	40.08	1.37	40.15	1.28	0.2	-6.3
21.04.2022	WB Head	22	1747.5	40.08	1.37	40.14	1.28	0.2	-6.3
21.04.2022	WB Head	22	1779.9	40.03	1.39	40.08	1.3	0.1	-6.3
21.04.2022	WB Head	22	1784.9	40.02	1.39	40.07	1.3	0.1	-6.3
21.04.2022	WB Head	22	1800	40	1.4	40.04	1.31	0.1	-6.4
21.04.2022	WB Head	22	1850.1	40	1.4	39.96	1.34	-0.1	-4.4
21.04.2022	WB Head	22	1880	40	1.4	39.91	1.35	-0.2	-3.2
21.04.2022	WB Head	22	1900	40	1.4	39.88	1.36	-0.3	-2.5
21.04.2022	WB Head	22	1909.9	40	1.4	39.85	1.37	-0.4	-2.2
21.04.2022	WB Head	22	1920.1	40	1.4	39.84	1.37	-0.4	-1.8
21.04.2022	WB Head	22	1950	40	1.4	39.79	1.39	-0.5	-0.6
21.04.2022	WB Head	22	1979.9	40	1.4	39.75	1.41	-0.6	0.6
26.04.2022	WB Head	22	2412	39.27	1.77	38.61	1.72	-1.7	-2.7
26.04.2022	WB Head	22	2437	39.22	1.79	38.57	1.73	-1.7	-3.1
26.04.2022	WB Head	22	2442	39.21	1.79	38.56	1.74	-1.7	-3.1
26.04.2022	WB Head	22	2450	39.2	1.8	38.55	1.74	-1.6	-3.2
26.04.2022	WB Head	22	2462	39.18	1.81	38.54	1.75	-1.7	-3.5
26.04.2022	WB Head	22	2472	39.17	1.82	38.52	1.76	-1.7	-3.7

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5. TEST PROCEDURE

Testing was carried out in accordance with FCC KDB Publications 447498 D01 and Industry Canada RSS-102. KDB 941225 D05 was used to select LTE-M1 and NB-IoT test modes for SAR testing. Since the antennas are located inside the handle of the device, the handle part of the DUT was detached and used in SAR testing.

The DUT was set to transmit with full power by using communication tester for cellular technologies.

According to the customer, the maximum operation duty cycle of the DUT is 50%. For LTE-M1 was measured with 30% duty cycle and was scaled up to 50%. NB-IoT was measured with 33% duty cycle and was scaled up to 50%.

A control software was used for WLAN to set the DUT to transmit at maximum power.

The WLAN transmission modes for testing were selected according to power, largest channel bandwidth configuration, lowest order modulation and lowest data rate. 2.4GHz WLAN was tested with 802.11b standard with data rate of 1Mbit/s.

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

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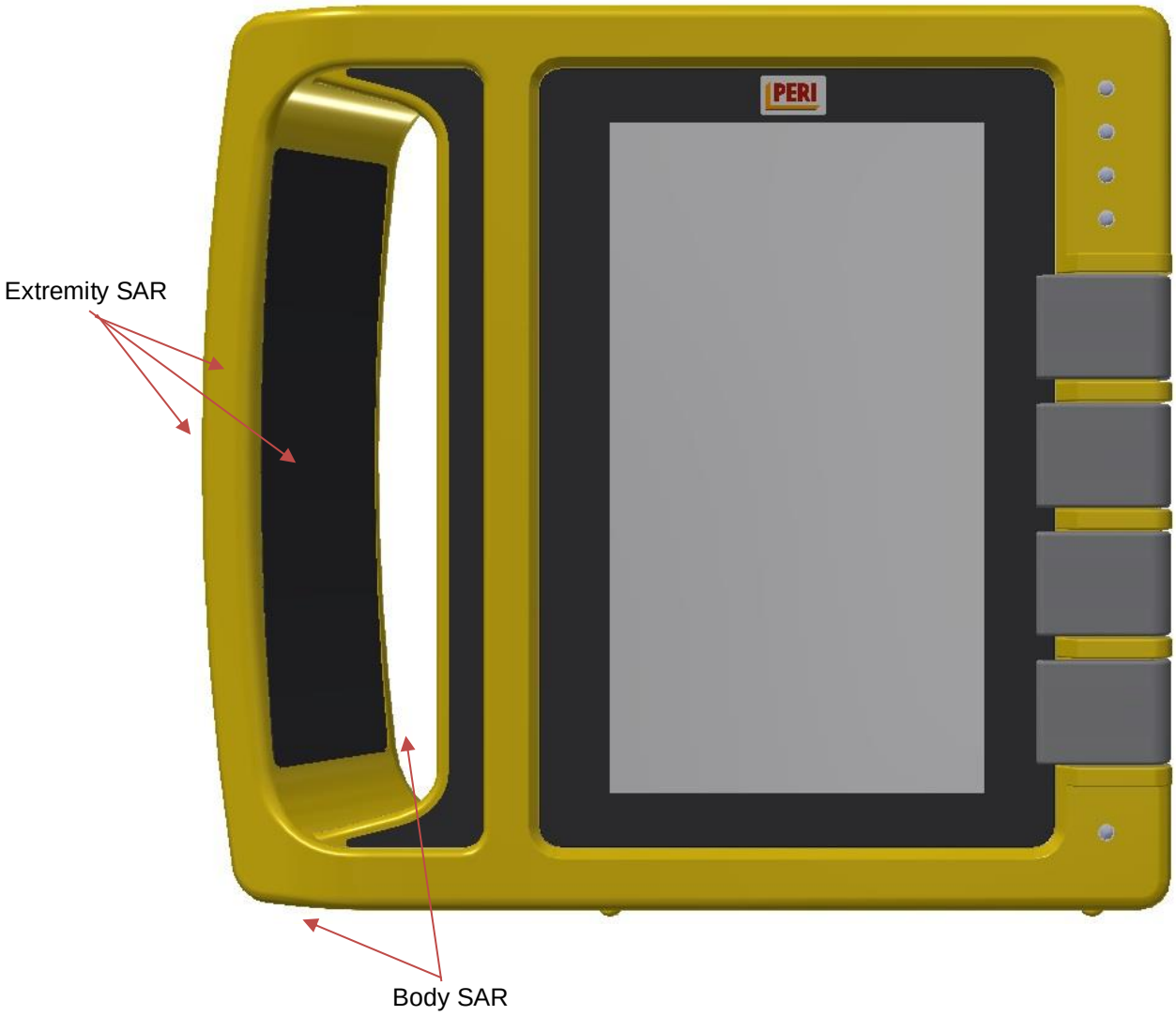
5.2 Test Positions

5.2.1 Extremity/Body-worn Configuration, 0mm separation distance

The device was placed on the SPEAG holder and lifted towards the phantom until the distance between the phantom and the device was 0mm. Five sides of the device were tested. Front, Left and Right sides were measured for Limb SAR. Back and bottom sides were measured for Body SAR as the DUT may be held in lap.



Photos of the test positions are presented in appendix A.

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5.3 Scan Procedures

First, area scans were used for determination of the field distribution. Next, a zoom scan was performed around the highest E-field value to determine the averaged SAR value. Power drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy52 are all based on the modified Quadratic Shepard's method (Robert J. Renka," Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).
The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighboring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

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6. MEASUREMENT UNCERTAINTY

DASY5 Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 300MHz - 3GHz range)								
Symbol	Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)
Measurement System Errors								
CF	Probe Calibration	±12.0%	N	√2	1	1	±6.0%	±6.0%
CFdrift	Probe Calibration Drift	±1.7%	R	√3	1	1	±1.0%	±1.0%
LIN	Probe Linearity	±4.7%	R	√3	1	1	±2.7%	±2.7%
BBS	Broadband Signal	±3.0%	R	√3	1	1	±1.7%	±1.7%
ISO	Probe Isotropy	±7.6%	R	3	1	1	±4.4%	±4.4%
DAE	Data Acquisition	±0.3%	N	1	1	1	±0.3%	±0.3%
AMB	RF Ambient	±1.8%	N	1	1	1	±1.8%	±1.8%
Δsys	Probe Positioning	±3.9%	N	1	0.14	0.14	±0.5%	±0.5%
DAT	Data Processing	±1.2%	N	1	1	1	±1.2%	±1.2%
Phantom and Device Errors								
LIQ(σ)	Conductivity (meas.)[DAK]	±2.5%	N	√1	0.78	0.71	±2.0%	±1.8%
LIQ(T_σ)	Conductivity (temp.)[BB]	±3.3%	R	√3	0.78	0.71	±1.5%	±1.4%
EPS	Phantom Permittivity	±14.0%	R	3	0	0	±0%	±0%
DIS	Distance DUT - TSL	±2.0%	N	1	2	2	±4.0%	±4.0%
Dxyz	Device Positioning (±0.5mm)	±1.0%	N	1	1	1	±1.0%	±1.0%
H	Device Holder	±3.6%	N	√1	1	1	±3.6%	±3.6%
MOD	DUT Modulation[m]	±2.4%	R	√3	1	1	±1.4%	±1.4%
TAS	Time-average SAR	±2.6%	R	3	1	1	±1.5%	±1.5%
RFdrift	DUT drift	±2.5%	N	1	1	1	±2.5%	±2.5%
VAL	Val Antenna Unc.[val]	±0.0%	N	1	1	1	±0%	±0%
RF_{in}	Unc. Input Power[val]	±0.0%	N	1	1	1	±0%	±0%
Correction to the SAR results								
C(ε, σ)	Deviation to Target	±1.9%	N	√1	1	0.84	±1.9%	±1.6%
C(R)	SAR scaling[p]	±0%	R	3	1	1	±0%	±0%
u(ΔSAR)	Combined Uncertainty						±11.0%	±10.9%
U	**Expanded Uncertainty**						±22.1%	±21.9%

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7. TEST RESULTS

7.1 SAR Results for Extremity/Body-Worn Condition with 0 mm separation distance:

Band	Channel	Modulation/ BW [MHz]	RB Size	RB Offset	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
LTE-M1 12	23095	QPSK / 10	1	5	25	23.37	Left	-	0.265	-0.03	50%	1.46	-	0.64	
LTE-M1 12	23095	QPSK / 10	3	3	25	23.22	Left	-	0.258	-0.07	50%	1.51	-	0.65	
LTE-M1 12	23095	QPSK / 10	1	5	25	23.37	Front	-	0.19	-0.09	50%	1.46	-	0.46	
LTE-M1 12	23095	QPSK / 10	3	3	25	23.22	Front	-	0.186	-0.01	50%	1.51	-	0.47	
LTE-M1 12	23095	QPSK / 10	1	5	25	23.37	Right	-	0.243	-0.07	50%	1.46	-	0.59	
LTE-M1 12	23095	QPSK / 10	3	3	25	23.22	Right	-	0.235	0	50%	1.51	-	0.59	
LTE-M1 12	23095	QPSK / 10	1	5	25	23.37	Back	0.192	-	-0.04	50%	1.46	0.47	-	
LTE-M1 12	23095	QPSK / 10	3	3	25	23.22	Back	0.188	-	-0.11	50%	1.51	0.47	-	
LTE-M1 12	23095	QPSK / 10	1	5	25	23.37	Bottom	0.00156	-	0.64*	50%	1.69	0.004	-	
LTE-M1 12	23095	QPSK / 10	3	3	25	23.22	Bottom	0.00161	-	-0.19	50%	1.51	0.004	-	
LTE-M1 12	23060	QPSK / 10	1	5	25	23.34	Left	-	0.322	-0.06	50%	1.47	-	0.79	10
LTE-M1 12	23130	QPSK / 10	1	5	25	23.31	Left	-	0.225	-0.02	50%	1.48	-	0.55	

*Larger than 5% drifts included to scaling factor

Band	Channel	Modulation/ BW [MHz]	RB Size	RB Offset	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
LTE-M1 13	23230	QPSK / 10	1	5	25	22.81	Left	-	0.179	0.29*	50%	1.77	-	0.53	
LTE-M1 13	23230	QPSK / 10	3	3	25	22.63	Left	-	0.238	0.55*	50%	1.96	-	0.78	
LTE-M1 13	23230	QPSK / 10	1	5	25	22.81	Front	-	0.18	-0.04	50%	1.66	-	0.50	
LTE-M1 13	23230	QPSK / 10	3	3	25	22.63	Front	-	0.175	-0.06	50%	1.73	-	0.50	
LTE-M1 13	23230	QPSK / 10	1	5	25	22.81	Right	-	0.139	-0.04	50%	1.66	-	0.38	
LTE-M1 13	23230	QPSK / 10	3	3	25	22.63	Right	-	0.137	-0.05	50%	1.73	-	0.39	
LTE-M1 13	23230	QPSK / 10	1	5	25	22.81	Back	0.199	-	-0.13	50%	1.66	0.55	-	
LTE-M1 13	23230	QPSK / 10	3	3	25	22.63	Back	0.197	-	-0.08	50%	1.73	0.57	-	
LTE-M1 13	23230	QPSK / 10	1	5	25	22.81	Bottom	0.00437	-	-0.3	50%	1.77	0.01	-	
LTE-M1 13	23230	QPSK / 10	3	3	25	22.63	Bottom	0.0041	-	-0.55*	50%	1.96	0.01	-	
LTE-M1 13	23205	QPSK / 5	1	5	25	22.83	Left	-	0.325	-0.04	50%	1.65	-	0.89	
LTE-M1 13	23255	QPSK / 5	1	5	25	22.89	Left	-	0.338	-0.04	50%	1.63	-	0.92	11

*Larger than 5% drifts included to scaling factor

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Band	Channel	Modulation/ BW [MHz]	RB Size	RB Offset	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
LTE-M1 25	26590	QPSK / 20	1	5	25	23.47	Left	-	0.355	-0.06	50%	1.42	-	0.84	
LTE-M1 25	26590	QPSK / 20	3	3	25	23.33	Left	-	0.35	-0.06	50%	1.47	-	0.86	12
LTE-M1 25	26590	QPSK / 20	1	5	25	23.47	Front	-	0.228	-0.08	50%	1.42	-	0.54	
LTE-M1 25	26590	QPSK / 20	3	3	25	23.33	Front	-	0.223	-0.09	50%	1.47	-	0.55	
LTE-M1 25	26590	QPSK / 20	1	5	25	23.47	Right	-	0.19	-0.08	50%	1.42	-	0.45	
LTE-M1 25	26590	QPSK / 20	3	3	25	23.33	Right	-	0.186	-0.09	50%	1.47	-	0.46	
LTE-M1 25	26590	QPSK / 20	1	5	25	23.47	Back	0.168	-	-0.14	50%	1.42	0.40	-	
LTE-M1 25	26590	QPSK / 20	3	3	25	23.33	Back	0.153	-	-0.01	50%	1.47	0.37	-	
LTE-M1 25	26590	QPSK / 20	1	5	25	23.47	Bottom	0.00346	-	0.42*	50%	1.57	0.01	-	
LTE-M1 25	26590	QPSK / 20	3	3	25	23.33	Bottom	0.00335	-	-0.41*	50%	1.61	0.01	-	
LTE-M1 25	26140	QPSK / 20	1	5	25	23.12	Left	-	0.329	0.04	50%	1.54	-	0.85	
LTE-M1 25	26365	QPSK / 20	1	5	25	23.23	Left	-	0.324	-0.05	50%	1.50	-	0.81	

*Larger than 5% drifts included to scaling factor

Band	Channel	Modulation/ BW [MHz]	RB Size	RB Offset	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
LTE-M1 26	26865	QPSK / 15	1	5	25	22.56	Left	-	0.115	-0.09	50%	1.75	-	0.34	
LTE-M1 26	26865	QPSK / 15	3	3	25	22.42	Left	-	0.112	-0.06	50%	1.81	-	0.34	
LTE-M1 26	26865	QPSK / 15	1	5	25	22.56	Front	-	0.0534	-0.06	50%	1.75	-	0.16	
LTE-M1 26	26865	QPSK / 15	3	3	25	22.42	Front	-	0.0517	-0.09	50%	1.81	-	0.16	
LTE-M1 26	26865	QPSK / 15	1	5	25	22.56	Right	-	0.0763	-0.08	50%	1.75	-	0.22	
LTE-M1 26	26865	QPSK / 15	3	3	25	22.42	Right	-	0.0742	-0.13	50%	1.81	-	0.22	
LTE-M1 26	26865	QPSK / 15	1	5	25	22.56	Back	0.0798	-	-0.07	50%	1.75	0.23	-	
LTE-M1 26	26865	QPSK / 15	3	3	25	22.42	Back	0.0776	-	-0.03	50%	1.81	0.23	-	
LTE-M1 26	26865	QPSK / 15	1	5	25	22.56	Bottom	0.000281	-	N/A**	50%	1.75	0.001	-	
LTE-M1 26	26865	QPSK / 15	3	3	25	22.42	Bottom	0.000336	-	N/A**	50%	1.81	0.001	-	
LTE-M1 26	26765	QPSK / 15	1	5	25	22.51	Left	-	0.157	-0.09	50%	1.77	-	0.46	13
LTE-M1 26	26965	QPSK / 15	1	5	25	22.41	Left	-	0.122	-0.1	50%	1.82	-	0.37	

*Larger than 5% drifts included to scaling factor
**Due to low e-field generated by DUT at the location of drift measurement, the measurements are not applicable

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Band	Channel	Modulation/ BW [MHz]	RB Size	RB Offset	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
LTE-M1 66	132572	QPSK / 20	1	5	25	22.84	Left	-	0.47	-0.15	50%	1.64	-	1.29	
LTE-M1 66	132572	QPSK / 20	3	3	25	22.68	Left	-	0.458	-0.09	50%	1.71	-	1.30	14
LTE-M1 66	132572	QPSK / 20	1	5	25	22.84	Front	-	0.248	-0.06	50%	1.64	-	0.68	
LTE-M1 66	132572	QPSK / 20	3	3	25	22.68	Front	-	0.241	-0.06	50%	1.71	-	0.69	
LTE-M1 66	132572	QPSK / 20	1	5	25	22.84	Right	-	0.356	-0.13	50%	1.64	-	0.98	
LTE-M1 66	132572	QPSK / 20	3	3	25	22.68	Right	-	0.345	-0.06	50%	1.71	-	0.98	
LTE-M1 66	132572	QPSK / 20	**1**	5	25	22.84	Back	0.0769	-	-0.1	50%	1.64	0.21	-	
LTE-M1 66	132572	QPSK / 20	**3**	3	25	22.68	Back	0.0735	-	-0.08	50%	1.71	0.21	-	
LTE-M1 66	132572	QPSK / 20	**1**	5	25	22.84	Bottom	0.000736	-	-0.75*	50%	1.95	0.002	-	
LTE-M1 66	132572	QPSK / 20	**3**	3	25	22.68	Bottom	0.00073	-	0.32*	50%	1.84	0.002	-	
LTE-M1 66	132072	QPSK / 20	1	5	25	21.97	Left	-	0.386	-0.21	50%	2.01	-	1.29	
LTE-M1 66	132322	QPSK / 20	1	5	25	22.37	Left	-	0.312	0.14	50%	1.83	-	0.95	

*Larger than 5% drifts included to scaling factor

Band	Channel	Modulation/ BW [MHz]	RB Size	RB Offset	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
LTE-M1 71	133372	QPSK / 20	1	5	25	23.05	Left	-	0.438	-0.07	50%	1.57	-	1.14	
LTE-M1 71	133372	QPSK / 20	3	3	25	22.89	Left	-	0.429	-0.08	50%	1.63	-	1.16	15
LTE-M1 71	133372	QPSK / 20	1	5	25	23.05	Front	-	0.265	-0.32*	50%	1.69	-	0.74	
LTE-M1 71	133372	QPSK / 20	3	3	25	22.89	Front	-	0.257	-0.09	50%	1.63	-	0.70	
LTE-M1 71	133372	QPSK / 20	1	5	25	23.05	Right	-	0.222	-0.05	50%	1.57	-	0.58	
LTE-M1 71	133372	QPSK / 20	3	3	25	22.89	Right	-	0.214	-0.09	50%	1.63	-	0.58	
LTE-M1 71	133372	QPSK / 20	**1**	5	25	23.05	Back	0.0886	-	-0.04	50%	1.57	0.23	-	
LTE-M1 71	133372	QPSK / 20	**3**	3	25	22.89	Back	0.0859	-	-0.04	50%	1.63	0.23	-	
LTE-M1 71	133372	QPSK / 20	**1**	5	25	23.05	Bottom	0.0000232	-	-0.84*	50%	1.90	0.0001	-	
LTE-M1 71	133372	QPSK / 20	**3**	3	25	22.89	Bottom	0.0000233	-	N/A**	50%	1.63	0.0001	-	
LTE-M1 71	133222	QPSK / 20	1	5	25	22.43	Left	-	0.21	-0.15	50%	1.81	-	0.63	
LTE-M1 71	133297	QPSK / 20	1	5	25	22.64	Left	-	0.347	0	50%	1.72	-	1.00	

*Larger than 5% drifts included to scaling factor
**Due to low e-field generated by DUT at the location of drift measurement, the measurements are not applicable

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Band	Channel	Modulation/ SC Spacing [kHz]	Sub carriers	Subcarrier Start	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
NB-IoT 2	18900	QPSK/15	1	11	Left	25	23.43	-	0.372	-0.12	50%	1.44	-	0.81	
NB-IoT 2	18900	QPSK/15	1	11	Front	25	23.43	-	0.247	0.06	50%	1.44	-	0.54	
NB-IoT 2	18900	QPSK/15	1	11	Right	25	23.43	-	0.248	0.05	50%	1.44	-	0.54	
NB-IoT 2	18900	QPSK/15	1	11	Back	25	23.43	0.188	-	0.06	50%	1.44	0.41	-	
NB-IoT 2	18900	QPSK/15	1	11	Bottom	25	23.43	0.000508	-	N/A**	50%	1.44	0.001	-	
NB-IoT 2	18601	QPSK/15	1	11	Left	25	23.36	-	0.433	0.01	50%	1.46	-	0.96	16
NB-IoT 2	19199	QPSK/15	1	11	Left	25	23.43	-	0.385	-0.11	50%	1.44	-	0.84	

**Due to low e-field generated by DUT at the location of drift measurement, the measurements are not applicable

Band	Channel	Modulation/ SC Spacing [kHz]	Sub carriers	Subcarrier Start	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
NB-IoT 5	20401	QPSK/15	1	11	Left	25	23.12	-	0.18	-0.2	50%	1.54	-	0.42	
NB-IoT 5	20401	QPSK/15	1	11	Front	25	23.12	-	0.0946	0	50%	1.54	-	0.22	
NB-IoT 5	20401	QPSK/15	1	11	Right	25	23.12	-	0.133	-0.08	50%	1.54	-	0.31	
NB-IoT 5	20401	QPSK/15	1	11	Back	25	23.12	0.133	-	0.07	50%	1.54	0.31	-	
NB-IoT 5	20401	QPSK/15	1	11	Bottom	25	23.12	0.00178	-	0.33*	50%	1.66	0.004	-	
NB-IoT 5	20525	QPSK/15	1	0	Left	25	22.78	-	0.159	0.2	50%	1.67	-	0.40	
NB-IoT 5	20649	QPSK/15	1	0	Left	25	22.81	-	0.19	-0.32*	50%	1.78	-	0.51	17

*Larger than 5% drifts included to scaling factor

Band	Channel	Modulation/ SC Spacing [kHz]	Sub carriers	Subcarrier Start	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
NB-IoT 12	23178	QPSK/15	1	11	Left	25	23.63	-	0.269	-0.24*	50%	1.45	-	0.59	
NB-IoT 12	23178	QPSK/15	1	11	Front	25	23.63	-	0.165	0.12	50%	1.37	-	0.34	
NB-IoT 12	23178	QPSK/15	1	11	Right	25	23.63	-	0.299	0.05	50%	1.37	-	0.62	
NB-IoT 12	23178	QPSK/15	1	11	Back	25	23.63	0.256	-	-0.08	50%	1.37	0.53	-	
NB-IoT 12	23178	QPSK/15	1	11	Bottom	25	23.63	0.000397	-	N/A**	50%	1.37	0.001	-	
NB-IoT 12	23012	QPSK/15	1	11	Right	25	23.61	-	0.243	-0.16	50%	1.38	-	0.51	
NB-IoT 12	23095	QPSK/15	1	11	Right	25	23.49	-	0.37	-0.27*	50%	1.51	-	0.84	18

*Larger than 5% drifts included to scaling factor
**Due to low e-field generated by DUT at the location of drift measurement, the measurements are not applicable

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Band	Channel	Modulation/ SC Spacing [kHz]	Sub carriers	Subcarrier Start	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
NB-IoT 13	23230	QPSK/15	1	11	Left	25	23.45	-	0.413	-0.42*	50%	1.57	-	0.98	19
NB-IoT 13	23230	QPSK/15	1	11	Front	25	23.45	-	0.222	-0.16	50%	1.43	-	0.48	
NB-IoT 13	23230	QPSK/15	1	11	Right	25	23.45	-	0.244	-0.46*	50%	1.59	-	0.59	
NB-IoT 13	23230	QPSK/15	1	11	Back	25	23.45	0.242	-	-0.01	50%	1.43	0.52	-	
NB-IoT 13	23230	QPSK/15	1	11	Bottom	25	23.45	0.00343	-	0.1	50%	1.43	0.01	-	
NB-IoT 13	23181	QPSK/15	1	11	Left	25	23.25	-	0.365	0.11	50%	1.50	-	0.80	
NB-IoT 13	23279	QPSK/15	1	11	Left	25	23.43	-	0.371	0.08	50%	1.44	-	0.87	

*Larger than 5% drifts included to scaling factor

Band	Channel	Modulation/ SC Spacing [kHz]	Sub carriers	Subcarrier Start	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
NB-IoT 66	132671	QPSK/15	1	11	Left	25	22.97	-	0.486	0.02	50%	1.60	-	1.18	20
NB-IoT 66	132671	QPSK/15	1	11	Front	25	22.97	-	0.258	0.11	50%	1.60	-	0.62	
NB-IoT 66	132671	QPSK/15	1	11	Right	25	22.97	-	0.372	0.05	50%	1.60	-	0.90	
NB-IoT 66	132671	QPSK/15	1	11	Back	25	22.97	0.119	-	0.35*	50%	1.73	0.31	-	
NB-IoT 66	132671	QPSK/15	1	11	Bottom	25	22.97	0.000948	-	0.93*	50%	1.98	0.003	-	
NB-IoT 66	131973	QPSK/15	1	0	Left	25	22.17	-	0.365	0.07	50%	1.92	-	1.06	
NB-IoT 66	132322	QPSK/15	1	11	Left	25	22.47	-	0.371	-0.01	50%	1.79	-	1.01	

*Larger than 5% drifts included to scaling

Band	Channel	Modulation/ SC Spacing [kHz]	Sub carriers	Subcarrier Start	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Measured SAR10g [W/kg]	Power Drift [dB]	Maximum operation duty cycle	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
NB-IoT 71	133470	QPSK/15	1	11	Left	25	23.54	-	0.432	0.04	50%	1.40	-	0.92	21
NB-IoT 71	133470	QPSK/15	1	11	Front	25	23.54	-	0.244	-0.17	50%	1.40	-	0.52	
NB-IoT 71	133470	QPSK/15	1	11	Right	25	23.54	-	0.376	0.03	50%	1.40	-	0.80	
NB-IoT 71	133470	QPSK/15	1	11	Back	25	23.54	0.137	-	-0.03	50%	1.40	0.29	-	
NB-IoT 71	133470	QPSK/15	1	11	Bottom	25	23.54	0.000023	-	N/A**	50%	1.40	0.00005	-	
NB-IoT 71	133124	QPSK/15	1	11	Left	25	23.09	-	0.204	0.13	50%	1.55	-	0.48	
NB-IoT 71	133297	QPSK/15	1	11	Left	25	23.14	-	0.367	-0.11	50%	1.53	-	0.85	

**Due to low e-field generated by DUT at the location of drift measurement, the measurements are not applicable

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Band	Standard	Channel	Frequency [MHz]	Data Rate	Test Position	Maximum Power [dBm]	Conducted Power [dBm]	Measured SAR1g [W/kg]	Measured SAR10g [W/kg]	Power Drift* [dB]	Scaling Factor	Reported SAR1g [W/kg]	Reported SAR10g [W/kg]	Plot #
WLAN 2.4GHz	802.11b	1	2412	1Mbps	Left	20	19.27	-	0.798	-0.11	1.18	-	0.94	
WLAN 2.4GHz	802.11b	1	2412	1Mbps	Front	20	19.27	-	0.167	-0.21	1.18	-	0.20	
WLAN 2.4GHz	802.11b	1	2412	1Mbps	Right	20	19.27	-	0.293	-0.51*	1.33	-	0.39	
WLAN 2.4GHz	802.11b	1	2412	1Mbps	Back	20	19.27	0.0559	-	-0.24	1.25	0.07	-	
WLAN 2.4GHz	802.11b	1	2412	1Mbps	Bottom	20	19.27	0.0132	-	-0.38	1.29	0.02	-	
WLAN 2.4GHz	802.11b	6	2437	1Mbps	Left	20	19.14	-	0.791	-0.35*	1.32	-	1.05	
WLAN 2.4GHz	802.11b	11	2462	1Mbps	Left	20	19.03	-	1	-0.03	1.25	-	1.25	22

*Larger than 5% drifts included to scaling factor

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7.2 Simultaneous Transmission Analysis

Simultaneous transmission analysis for maximum cellular SAR and maximum WLAN 2.4GHz SAR is in a table below. Direct summation of SAR results is performed.

7.2.1 Extremity SAR10g

	Exposure Condition	Extremity SAR_{10g} [W/kg]		
	Test Position	**Left**	**Front**	**Right**
Cellular	LTE-M1, Band 12	0.79	0.47	0.59
	LTE-M1, Band 13	0.92	0.50	0.39
	LTE-M1, Band 25	0.86	0.55	0.46
	LTE-M1, Band 26	0.46	0.16	0.22
	LTE-M1, Band 66	1.30	0.69	0.98
	LTE-M1, Band 71	1.16	0.74	0.58
	NB-IoT, Band 2	0.96	0.54	0.54
	NB-IoT, Band 5	0.51	0.22	0.31
	NB-IoT, Band 12	0.84	0.34	0.84
	NB-IoT, Band 13	0.98	0.48	0.59
	NB-IoT, Band 66	1.18	0.62	0.90
	NB-IoT, Band 71	0.92	0.52	0.80
Maximum Cellular SAR		**1.30**	**0.74**	**0.98**
Maximum WLAN 2.4GHz SAR		**1.25**	**0.20**	**0.39**
SAR Summation		**2.55**	**0.94**	**1.37**

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7.2.2 Body SAR1g

	Exposure Condition	Body SAR_{1g} [W/kg]	
	Test Position	**Back**	**Bottom**
Cellular	LTE-M1, Band 12	0.47	0.004
	LTE-M1, Band 13	0.57	0.01
	LTE-M1, Band 25	0.40	0.01
	LTE-M1, Band 26	0.23	0.01
	LTE-M1, Band 66	0.21	0.002
	LTE-M1, Band 71	0.23	0.0001
	NB-IoT, Band 2	0.41	0.001
	NB-IoT, Band 5	0.31	0.004
	NB-IoT, Band 12	0.53	0.001
	NB-IoT, Band 13	0.52	0.01
	NB-IoT, Band 66	0.31	0.003
	NB-IoT, Band 71	0.29	0.00005
Maximum Cellular SAR		**0.57**	**0.01**
Maximum WLAN 2.4GHz SAR		**0.07**	**0.02**
SAR Summation		**0.64**	**0.03**

7.3 IEC 62209-2 AMD1:2019

According to IEC 62209-2 AMD1:2019, the zoom scan complies if the peak spatial-average SAR is below 0.1 W/kg, or if the following criteria is met:

1. The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak is larger than the horizontal grid step.
2. Ratio of SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the x-y location of the measured maximum is at least 30%.

Zoom scan compliance according to IEC 62209-2 AMD1:2019 is automatically verified by DASY5 software and all zoom scans in this test report do pass the criteria. The smallest horizontal distance and Ratio between measurement points M2 and M1 of the highest SAR results is available in Appendix C.

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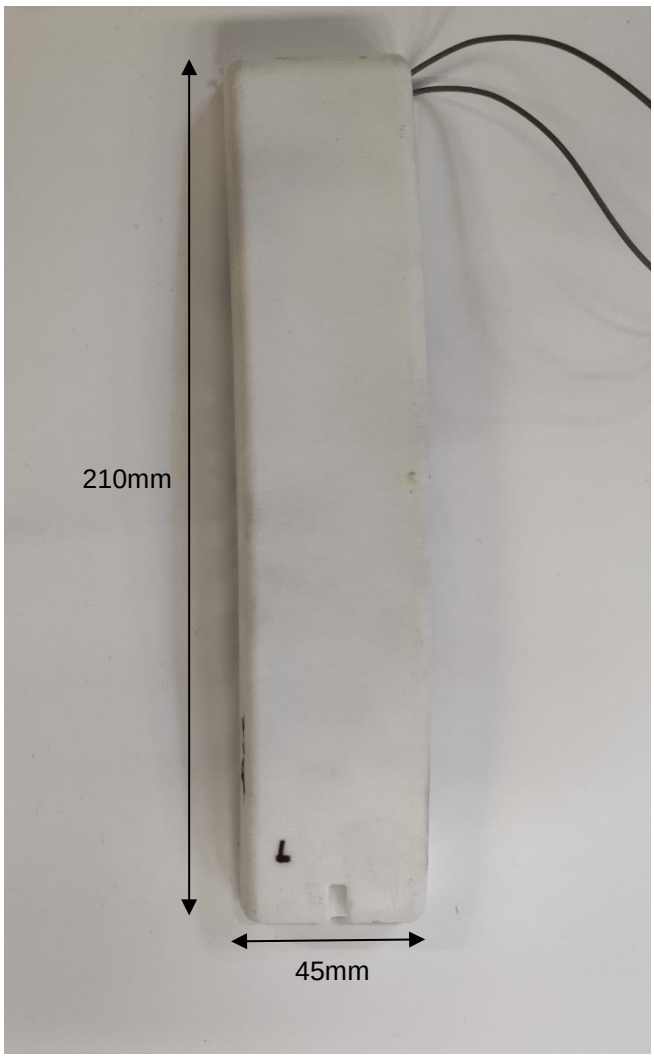
APPENDIX A: PHOTOS OF THE DUT

Size of the device is: 210 × 45 × 15 mm



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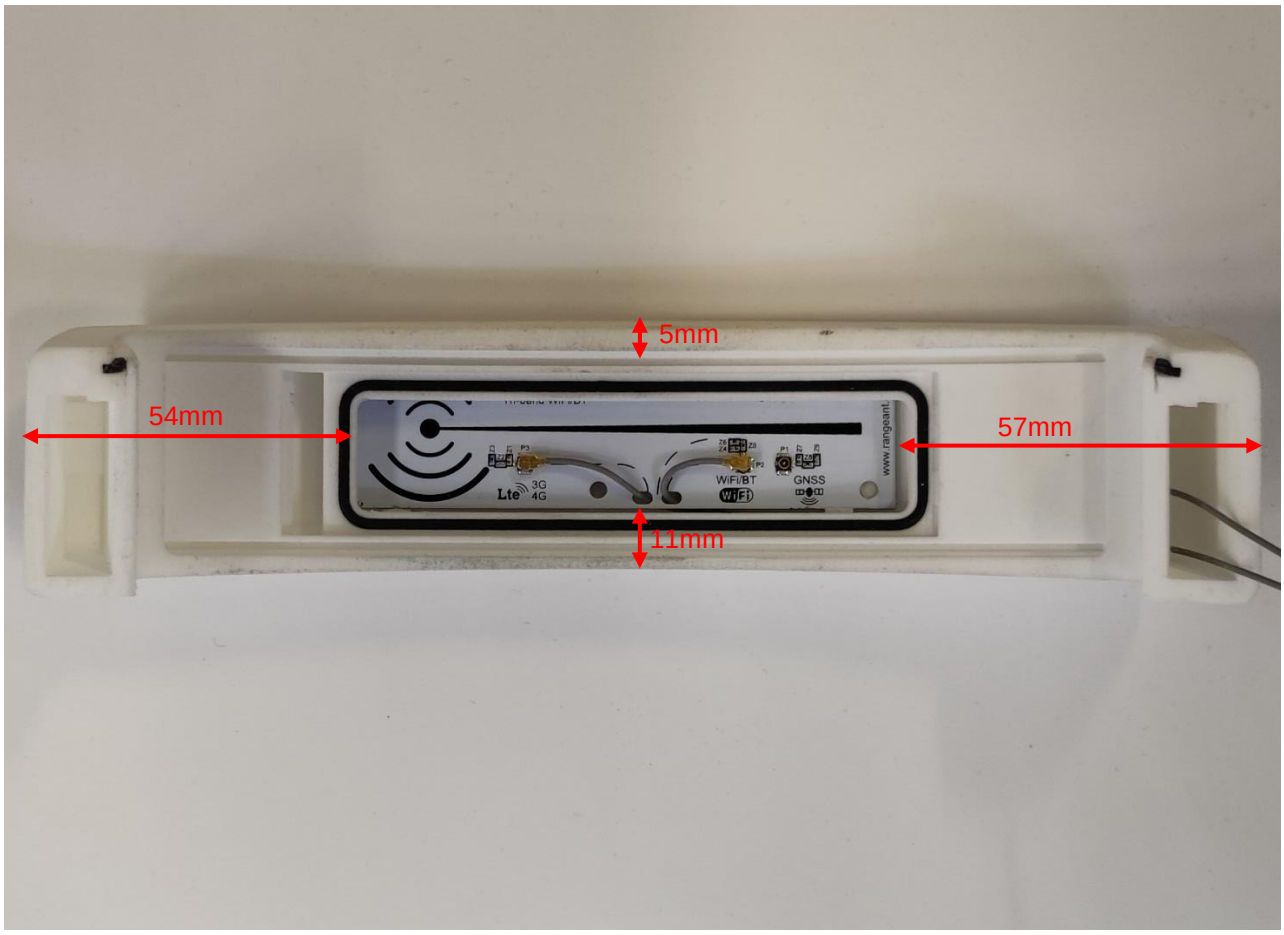

Figure 2 Antenna location and dimensions to the edges

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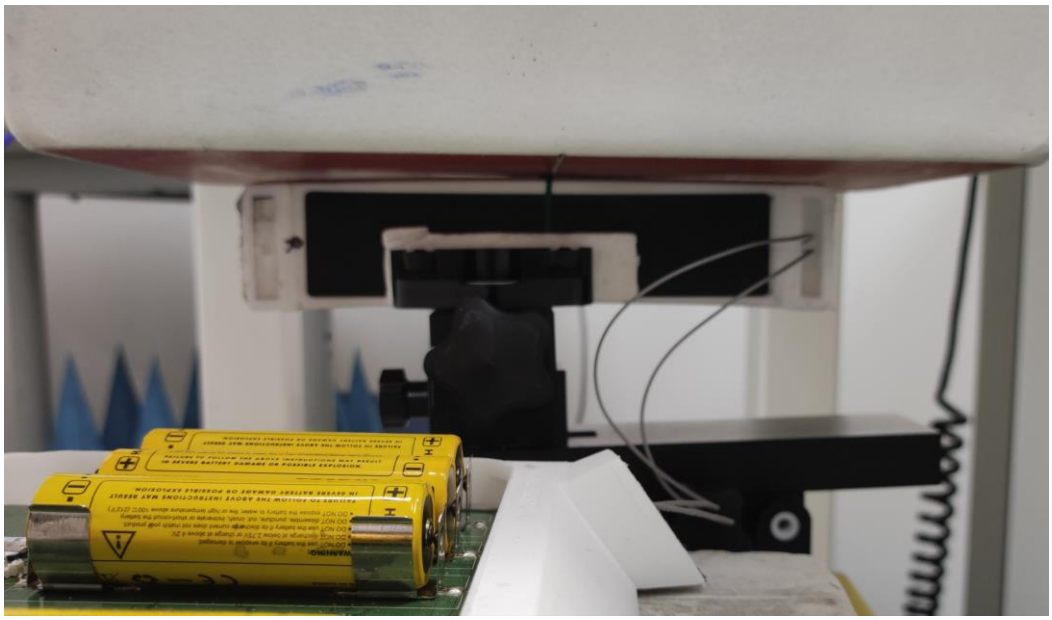

Figure 3 Front test position, 0mm separation distance

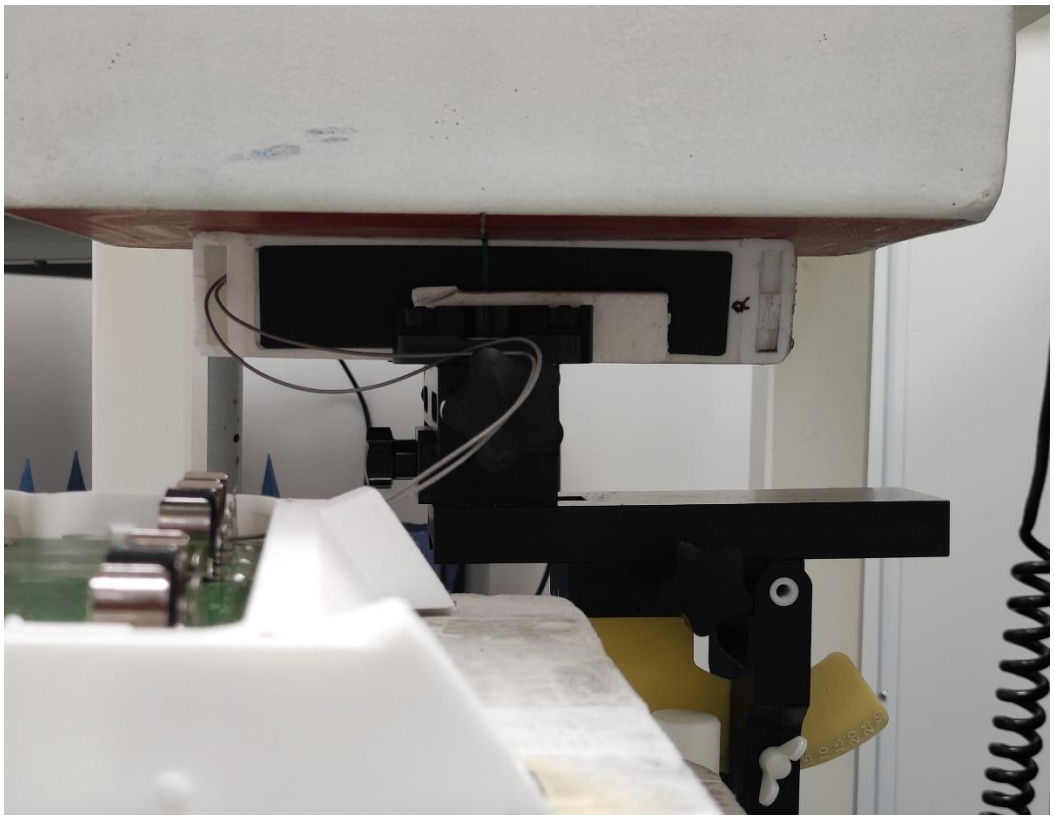

Figure 4 Back test position, 0mm separation distance

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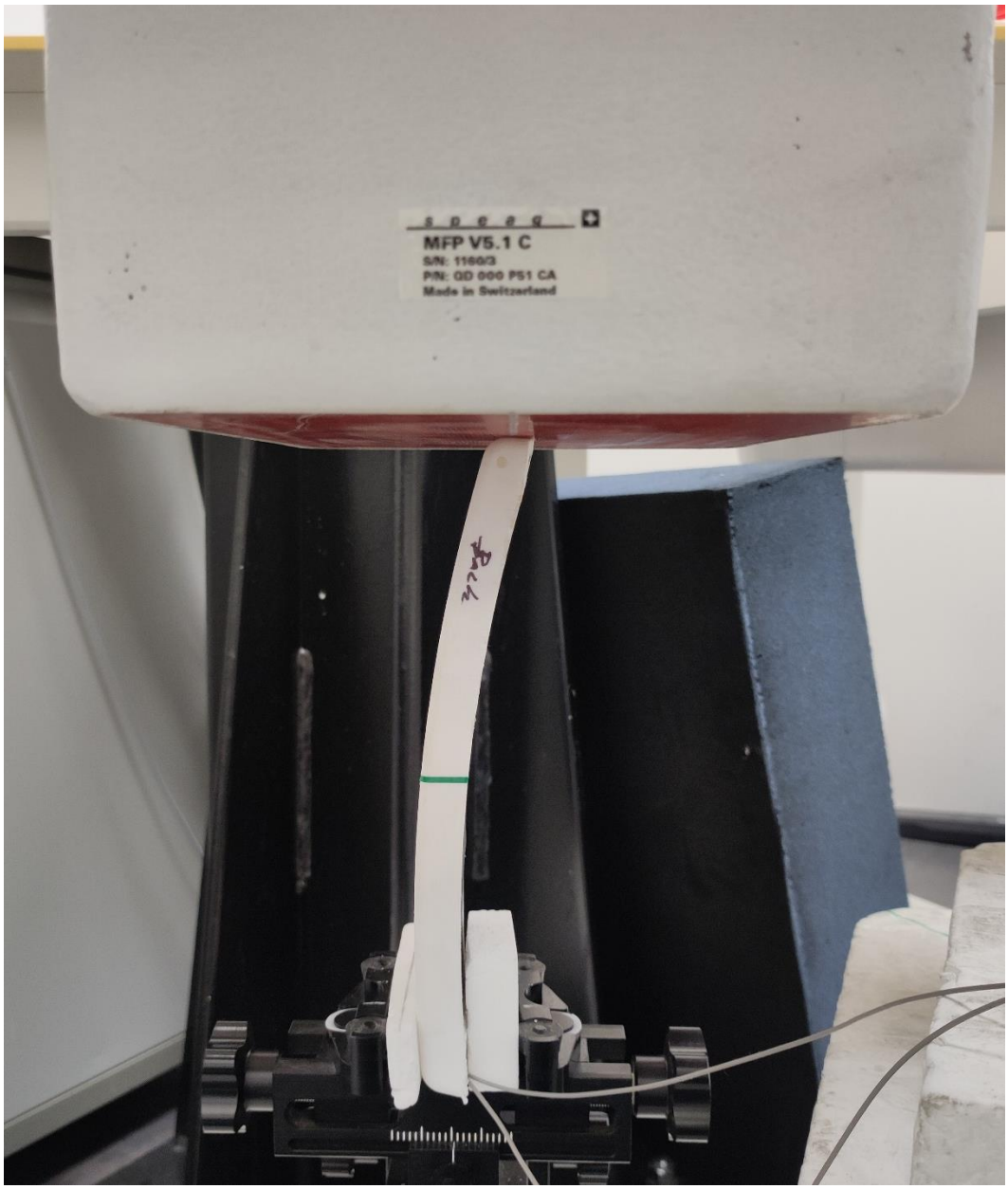

Figure 5 Bottom test position, 0mm separation distance

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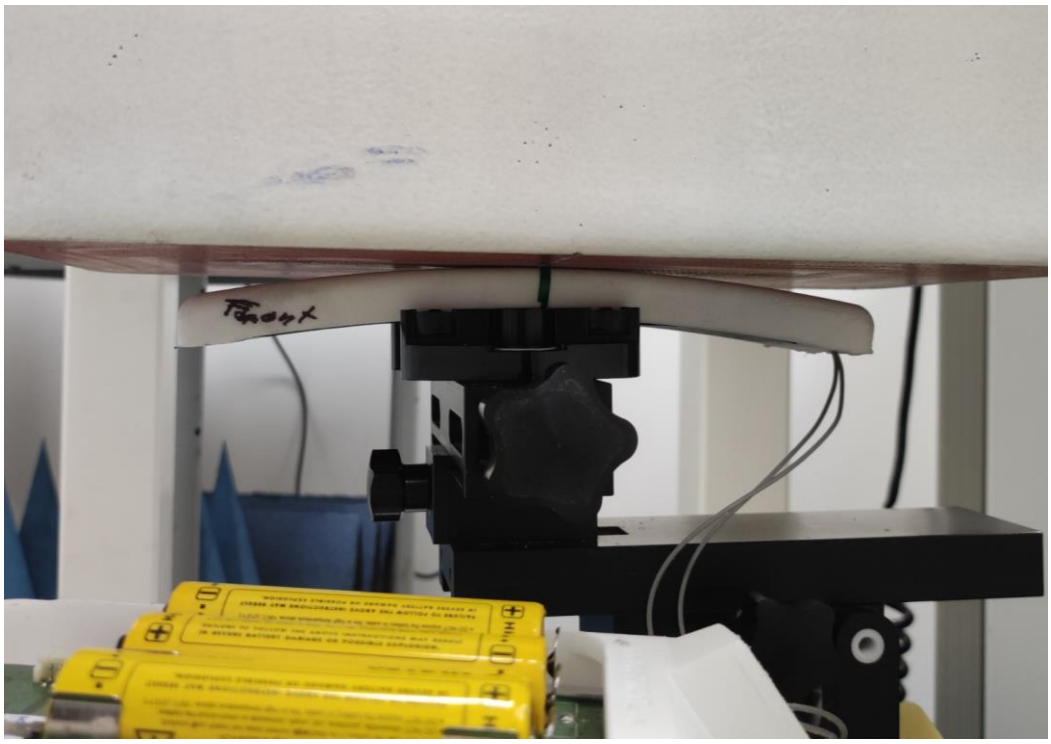

Figure 6 Left test position, 0mm separation distance

Figure 7 Right test position, 0mm separation distance

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