Full Power								
LTE Band 12			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3 MHz	1RB_14	714.5MHz	23.25	22.53	/	**24.5**	**23.5**	**/**
		707.5MHz	23.24	22.42	/	**24.5**	**23.5**	**/**
		700.5MHz	23.26	22.39	/	**24.5**	**23.5**	**/**
	1RB_7	714.5MHz	23.39	22.44	/	**24.5**	**23.5**	**/**
		707.5MHz	23.38	22.53	/	**24.5**	**23.5**	**/**
		700.5MHz	23.44	22.54	/	**24.5**	**23.5**	**/**
	1RB_0	714.5MHz	23.27	22.53	/	**24.5**	**23.5**	**/**
		707.5MHz	23.21	22.41	/	**24.5**	**23.5**	**/**
		700.5MHz	23.22	22.44	/	**24.5**	**23.5**	**/**
	8RB_7	714.5MHz	22.30	21.25	/	**23.5**	**22.5**	**/**
		707.5MHz	22.29	21.36	/	**23.5**	**22.5**	**/**
		700.5MHz	22.30	21.31	/	**23.5**	**22.5**	**/**
	8RB_4	714.5MHz	22.27	21.31	/	**23.5**	**22.5**	**/**
		707.5MHz	22.37	21.41	/	**23.5**	**22.5**	**/**
		700.5MHz	22.32	21.37	/	**23.5**	**22.5**	**/**
	8RB_0	714.5MHz	22.27	21.31	/	**23.5**	**22.5**	**/**
		707.5MHz	22.28	21.33	/	**23.5**	**22.5**	**/**
		700.5MHz	22.21	21.32	/	**23.5**	**22.5**	**/**
	15RB_0	714.5MHz	22.27	21.27	/	**23.5**	**22.5**	**/**
		707.5MHz	22.30	21.27	/	**23.5**	**22.5**	**/**
		700.5MHz	22.30	21.29	/	**23.5**	**22.5**	**/**

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Full Power								
LTE Band 12			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5 MHz	1RB_24	713.5MHz	23.17	22.35	/	**24.5**	**23.5**	**/**
		707.5MHz	23.17	22.39	/	**24.5**	**23.5**	**/**
		701.5MHz	23.14	22.36	/	**24.5**	**23.5**	**/**
	1RB_12	713.5MHz	23.44	22.66	/	**24.5**	**23.5**	**/**
		707.5MHz	23.44	22.60	/	**24.5**	**23.5**	**/**
		701.5MHz	23.47	22.53	/	**24.5**	**23.5**	**/**
	1RB_0	713.5MHz	23.13	22.35	/	**24.5**	**23.5**	**/**
		707.5MHz	23.09	22.28	/	**24.5**	**23.5**	**/**
		701.5MHz	23.08	22.34	/	**24.5**	**23.5**	**/**
	12RB_13	713.5MHz	22.26	21.24	/	**23.5**	**22.5**	**/**
		707.5MHz	22.28	21.26	/	**23.5**	**22.5**	**/**
		701.5MHz	22.32	21.30	/	**23.5**	**22.5**	**/**
	12RB_6	713.5MHz	22.33	21.31	/	**23.5**	**22.5**	**/**
		707.5MHz	22.31	21.29	/	**23.5**	**22.5**	**/**
		701.5MHz	22.36	21.31	/	**23.5**	**22.5**	**/**
	12RB_0	713.5MHz	22.32	21.27	/	**23.5**	**22.5**	**/**
		707.5MHz	22.28	21.29	/	**23.5**	**22.5**	**/**
		701.5MHz	22.27	21.24	/	**23.5**	**22.5**	**/**
	25RB_0	713.5MHz	22.32	21.28	/	**23.5**	**22.5**	**/**
		707.5MHz	22.25	21.30	/	**23.5**	**22.5**	**/**
		701.5MHz	22.28	21.31	/	**23.5**	**22.5**	**/**

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Full Power								
LTE Band 12			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10 MHz	1RB_49	711MHz	23.28	22.46	/	**24.5**	**23.5**	**/**
		707.5MHz	23.31	22.63	/	**24.5**	**23.5**	**/**
		704MHz	23.29	22.56	/	**24.5**	**23.5**	**/**
	1RB_24	711MHz	**23.36**	22.60	/	**24.5**	**23.5**	**/**
		707.5MHz	23.30	22.47	/	**24.5**	**23.5**	**/**
		704MHz	23.35	22.53	/	**24.5**	**23.5**	**/**
	1RB_0	711MHz	23.18	22.36	/	**24.5**	**23.5**	**/**
		707.5MHz	23.14	22.35	/	**24.5**	**23.5**	**/**
		704MHz	23.14	22.67	/	**24.5**	**23.5**	**/**
	25RB_25	711MHz	22.36	21.35	/	**23.5**	**22.5**	**/**
		707.5MHz	22.32	21.35	/	**23.5**	**22.5**	**/**
		704MHz	22.34	21.37	/	**23.5**	**22.5**	**/**
	25RB_12	711MHz	**22.39**	21.33	/	**23.5**	**22.5**	**/**
		707.5MHz	22.33	21.30	/	**23.5**	**22.5**	**/**
		704MHz	22.32	21.30	/	**23.5**	**22.5**	**/**
	25RB_0	711MHz	22.37	21.34	/	**23.5**	**22.5**	**/**
		707.5MHz	22.30	21.28	/	**23.5**	**22.5**	**/**
		704MHz	22.25	21.24	/	**23.5**	**22.5**	**/**
	50RB_0	711MHz	22.42	21.35	/	**23.5**	**22.5**	**/**
		707.5MHz	22.36	21.30	/	**23.5**	**22.5**	**/**
		704MHz	22.32	21.32	/	**23.5**	**22.5**	**/**

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Sensor on								
LTE Band 12			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4 MHz	1RB_5	715.3MHz	16.25	16.43	/	17.5	17.5	/
		707.5MHz	16.27	16.49	/	17.5	17.5	/
		699.7MHz	16.18	16.50	/	17.5	17.5	/
	1RB_3	715.3MHz	16.33	16.57	/	17.5	17.5	/
		707.5MHz	16.32	16.65	/	17.5	17.5	/
		699.7MHz	16.32	16.64	/	17.5	17.5	/
	1RB_0	715.3MHz	16.13	16.42	/	17.5	17.5	/
		707.5MHz	16.24	16.55	/	17.5	17.5	/
		699.7MHz	16.26	16.47	/	17.5	17.5	/
	3RB_3	715.3MHz	16.30	16.36	/	17.5	17.5	/
		707.5MHz	16.30	16.35	/	17.5	17.5	/
		699.7MHz	16.30	16.26	/	17.5	17.5	/
	3RB_1	715.3MHz	16.36	16.36	/	17.5	17.5	/
		707.5MHz	16.37	16.38	/	17.5	17.5	/
		699.7MHz	16.37	16.34	/	17.5	17.5	/
	3RB_0	715.3MHz	16.33	16.31	/	17.5	17.5	/
		707.5MHz	16.31	16.29	/	17.5	17.5	/
		699.7MHz	16.35	16.27	/	17.5	17.5	/
	6RB_0	715.3MHz	16.34	16.36	/	17.5	17.5	/
		707.5MHz	16.31	16.36	/	17.5	17.5	/
		699.7MHz	16.27	16.35	/	17.5	17.5	/

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Sensor on								
LTE Band 12			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3 MHz	1RB_14	714.5MHz	16.32	16.59	/	17.5	17.5	/
		707.5MHz	16.29	16.59	/	17.5	17.5	/
		700.5MHz	16.30	16.54	/	17.5	17.5	/
	1RB_7	714.5MHz	16.38	16.67	/	17.5	17.5	/
		707.5MHz	16.59	16.74	/	17.5	17.5	/
		700.5MHz	16.50	16.70	/	17.5	17.5	/
	1RB_0	714.5MHz	16.25	16.55	/	17.5	17.5	/
		707.5MHz	16.25	16.49	/	17.5	17.5	/
		700.5MHz	16.30	16.46	/	17.5	17.5	/
	8RB_7	714.5MHz	16.35	16.41	/	17.5	17.5	/
		707.5MHz	16.32	16.42	/	17.5	17.5	/
		700.5MHz	16.34	16.41	/	17.5	17.5	/
	8RB_4	714.5MHz	16.33	16.41	/	17.5	17.5	/
		707.5MHz	16.37	16.42	/	17.5	17.5	/
		700.5MHz	16.28	16.41	/	17.5	17.5	/
	8RB_0	714.5MHz	16.37	16.33	/	17.5	17.5	/
		707.5MHz	16.30	16.40	/	17.5	17.5	/
		700.5MHz	16.33	16.34	/	17.5	17.5	/
	15RB_0	714.5MHz	16.30	16.31	/	17.5	17.5	/
		707.5MHz	16.36	16.40	/	17.5	17.5	/
		700.5MHz	16.32	16.36	/	17.5	17.5	/

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Sensor on								
LTE Band 12			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5 MHz	1RB_24	713.5MHz	16.24	16.50	/	17.5	17.5	/
		707.5MHz	16.22	16.52	/	17.5	17.5	/
		701.5MHz	16.26	16.54	/	17.5	17.5	/
	1RB_12	713.5MHz	16.53	16.82	/	17.5	17.5	/
		707.5MHz	16.49	16.85	/	17.5	17.5	/
		701.5MHz	16.47	16.87	/	17.5	17.5	/
	1RB_0	713.5MHz	16.18	16.45	/	17.5	17.5	/
		707.5MHz	16.14	16.47	/	17.5	17.5	/
		701.5MHz	16.18	16.44	/	17.5	17.5	/
	12RB_13	713.5MHz	16.30	16.26	/	17.5	17.5	/
		707.5MHz	16.32	16.32	/	17.5	17.5	/
		701.5MHz	16.38	16.34	/	17.5	17.5	/
	12RB_6	713.5MHz	16.39	16.34	/	17.5	17.5	/
		707.5MHz	16.34	16.37	/	17.5	17.5	/
		701.5MHz	16.40	16.35	/	17.5	17.5	/
	12RB_0	713.5MHz	16.37	16.35	/	17.5	17.5	/
		707.5MHz	16.28	16.32	/	17.5	17.5	/
		701.5MHz	16.33	16.27	/	17.5	17.5	/
	25RB_0	713.5MHz	16.35	16.31	/	17.5	17.5	/
		707.5MHz	16.32	16.30	/	17.5	17.5	/
		701.5MHz	16.30	16.31	/	17.5	17.5	/

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Sensor on								
LTE Band 12			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10 MHz	1RB_49	711MHz	16.41	16.76	/	**17.5**	**17.5**	**/**
		707.5MHz	16.41	16.69	/	**17.5**	**17.5**	**/**
		704MHz	16.39	16.75	/	**17.5**	**17.5**	**/**
	1RB_24	711MHz	16.42	16.83	/	**17.5**	**17.5**	**/**
		707.5MHz	**16.43**	16.76	/	**17.5**	**17.5**	**/**
		704MHz	16.40	16.68	/	**17.5**	**17.5**	**/**
	1RB_0	711MHz	16.25	16.63	/	**17.5**	**17.5**	**/**
		707.5MHz	16.22	16.54	/	**17.5**	**17.5**	**/**
		704MHz	16.24	16.56	/	**17.5**	**17.5**	**/**
	25RB_25	711MHz	16.42	16.41	/	**17.5**	**17.5**	**/**
		707.5MHz	16.38	16.37	/	**17.5**	**17.5**	**/**
		704MHz	16.38	16.40	/	**17.5**	**17.5**	**/**
	25RB_12	711MHz	16.42	16.41	/	**17.5**	**17.5**	**/**
		707.5MHz	16.36	16.38	/	**17.5**	**17.5**	**/**
		704MHz	16.34	16.35	/	**17.5**	**17.5**	**/**
	25RB_0	711MHz	**16.46**	16.44	/	**17.5**	**17.5**	**/**
		707.5MHz	16.33	16.38	/	**17.5**	**17.5**	**/**
		704MHz	16.32	16.29	/	**17.5**	**17.5**	**/**
	50RB_0	711MHz	16.40	16.44	/	**17.5**	**17.5**	**/**
		707.5MHz	16.37	16.37	/	**17.5**	**17.5**	**/**
		704MHz	16.38	16.36	/	**17.5**	**17.5**	**/**

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Full Power								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4 MHz	1RB_5	1779.3MHz	22.91	22.13	/	**24.0**	**23.0**	**/**
		1745MHz	22.87	22.18	/	**24.0**	**23.0**	**/**
		1710.7MHz	22.87	22.26	/	**24.0**	**23.0**	**/**
	1RB_3	1779.3MHz	23.01	22.36	/	**24.0**	**23.0**	**/**
		1745MHz	22.99	22.29	/	**24.0**	**23.0**	**/**
		1710.7MHz	22.98	22.28	/	**24.0**	**23.0**	**/**
	1RB_0	1779.3MHz	22.91	22.17	/	**24.0**	**23.0**	**/**
		1745MHz	22.91	22.17	/	**24.0**	**23.0**	**/**
		1710.7MHz	22.85	22.24	/	**24.0**	**23.0**	**/**
	3RB_3	1779.3MHz	23.04	22.06	/	**24.0**	**23.0**	**/**
		1745MHz	23.02	22.05	/	**24.0**	**23.0**	**/**
		1710.7MHz	22.98	21.92	/	**24.0**	**23.0**	**/**
	3RB_1	1779.3MHz	23.09	22.13	/	**24.0**	**23.0**	**/**
		1745MHz	23.06	22.10	/	**24.0**	**23.0**	**/**
		1710.7MHz	23.02	22.07	/	**24.0**	**23.0**	**/**
	3RB_0	1779.3MHz	23.02	22.03	/	**24.0**	**23.0**	**/**
		1745MHz	22.99	21.98	/	**24.0**	**23.0**	**/**
		1710.7MHz	22.94	21.99	/	**24.0**	**23.0**	**/**
	6RB_0	1779.3MHz	22.08	21.18	/	**23.0**	**22.0**	**/**
		1745MHz	22.07	21.13	/	**23.0**	**22.0**	**/**
		1710.7MHz	22.00	21.09	/	**23.0**	**22.0**	**/**

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Full Power								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3 MHz	1RB_14	1778.5MHz	22.93	22.23	/	**24.0**	**23.0**	**/**
		1745MHz	22.92	22.24	/	**24.0**	**23.0**	**/**
		1711.5MHz	22.93	22.21	/	**24.0**	**23.0**	**/**
	1RB_7	1778.5MHz	23.19	22.46	/	**24.0**	**23.0**	**/**
		1745MHz	23.09	22.40	/	**24.0**	**23.0**	**/**
		1711.5MHz	23.19	22.38	/	**24.0**	**23.0**	**/**
	1RB_0	1778.5MHz	22.94	22.28	/	**24.0**	**23.0**	**/**
		1745MHz	22.99	22.20	/	**24.0**	**23.0**	**/**
		1711.5MHz	22.98	22.22	/	**24.0**	**23.0**	**/**
	8RB_7	1778.5MHz	22.04	21.17	/	**23.0**	**22.0**	**/**
		1745MHz	21.99	21.13	/	**23.0**	**22.0**	**/**
		1711.5MHz	21.99	21.11	/	**23.0**	**22.0**	**/**
	8RB_4	1778.5MHz	22.09	21.19	/	**23.0**	**22.0**	**/**
		1745MHz	22.03	21.15	/	**23.0**	**22.0**	**/**
		1711.5MHz	22.03	21.15	/	**23.0**	**22.0**	**/**
	8RB_0	1778.5MHz	22.06	21.17	/	**23.0**	**22.0**	**/**
		1745MHz	22.03	21.10	/	**23.0**	**22.0**	**/**
		1711.5MHz	22.00	21.16	/	**23.0**	**22.0**	**/**
	15RB_0	1778.5MHz	22.08	21.11	/	**23.0**	**22.0**	**/**
		1745MHz	22.05	21.06	/	**23.0**	**22.0**	**/**
		1711.5MHz	22.01	21.06	/	**23.0**	**22.0**	**/**

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Full Power								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5 MHz	1RB_24	1777.5MHz	23.07	22.14	/	**24.0**	**23.0**	**/**
		1745MHz	22.81	22.08	/	**24.0**	**23.0**	**/**
		1712.5MHz	22.79	22.15	/	**24.0**	**23.0**	**/**
	1RB_12	1777.5MHz	22.96	22.33	/	**24.0**	**23.0**	**/**
		1745MHz	23.13	22.43	/	**24.0**	**23.0**	**/**
		1712.5MHz	23.14	22.35	/	**24.0**	**23.0**	**/**
	1RB_0	1777.5MHz	22.97	22.17	/	**24.0**	**23.0**	**/**
		1745MHz	22.85	22.13	/	**24.0**	**23.0**	**/**
		1712.5MHz	22.84	22.07	/	**24.0**	**23.0**	**/**
	12RB_13	1777.5MHz	23.05	21.04	/	**23.0**	**22.0**	**/**
		1745MHz	22.05	21.01	/	**23.0**	**22.0**	**/**
		1712.5MHz	21.98	20.99	/	**23.0**	**22.0**	**/**
	12RB_6	1777.5MHz	23.06	21.10	/	**23.0**	**22.0**	**/**
		1745MHz	22.08	21.11	/	**23.0**	**22.0**	**/**
		1712.5MHz	22.06	21.06	/	**23.0**	**22.0**	**/**
	12RB_0	1777.5MHz	23.05	21.06	/	**23.0**	**22.0**	**/**
		1745MHz	22.00	20.96	/	**23.0**	**22.0**	**/**
		1712.5MHz	22.00	20.99	/	**23.0**	**22.0**	**/**
	25RB_0	1777.5MHz	22.15	21.05	/	**23.0**	**22.0**	**/**
		1745MHz	22.04	21.07	/	**23.0**	**22.0**	**/**
		1712.5MHz	22.01	21.03	/	**23.0**	**22.0**	**/**

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Full Power								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10 MHz	1RB_49	1715MHz	22.91	22.19	/	**24.0**	**23.0**	**/**
		1715MHz	22.93	22.20	/	**24.0**	**23.0**	**/**
		1715MHz	22.91	22.35	/	**24.0**	**23.0**	**/**
	1RB_24	1715MHz	23.05	22.35	/	**24.0**	**23.0**	**/**
		1715MHz	23.06	22.32	/	**24.0**	**23.0**	**/**
		1715MHz	22.97	22.40	/	**24.0**	**23.0**	**/**
	1RB_0	1715MHz	22.98	22.39	/	**24.0**	**23.0**	**/**
		1715MHz	22.98	22.39	/	**24.0**	**23.0**	**/**
		1715MHz	22.92	22.29	/	**24.0**	**23.0**	**/**
	25RB_25	1715MHz	22.12	21.13	/	**23.0**	**22.0**	**/**
		1715MHz	22.18	21.16	/	**23.0**	**22.0**	**/**
		1715MHz	22.08	21.14	/	**23.0**	**22.0**	**/**
	25RB_12	1715MHz	22.04	21.10	/	**23.0**	**22.0**	**/**
		1715MHz	22.08	21.08	/	**23.0**	**22.0**	**/**
		1715MHz	22.04	21.05	/	**23.0**	**22.0**	**/**
	25RB_0	1715MHz	22.11	21.17	/	**23.0**	**22.0**	**/**
		1715MHz	22.00	21.05	/	**23.0**	**22.0**	**/**
		1715MHz	22.11	21.08	/	**23.0**	**22.0**	**/**
	50RB_0	1715MHz	22.14	21.16	/	**23.0**	**22.0**	**/**
		1715MHz	22.11	21.16	/	**23.0**	**22.0**	**/**
		1715MHz	22.13	21.14	/	**23.0**	**22.0**	**/**

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Full Power								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
15 MHz	1RB_74	1772.5MHz	22.82	22.22	/	**24.0**	**23.0**	**/**
		1745MHz	22.81	22.16	/	**24.0**	**23.0**	**/**
		1717.5MHz	22.83	22.26	/	**24.0**	**23.0**	**/**
	1RB_37	1772.5MHz	22.93	22.26	/	**24.0**	**23.0**	**/**
		1745MHz	22.95	22.66	/	**24.0**	**23.0**	**/**
		1717.5MHz	22.93	22.30	/	**24.0**	**23.0**	**/**
	1RB_0	1772.5MHz	22.89	22.18	/	**24.0**	**23.0**	**/**
		1745MHz	22.90	22.34	/	**24.0**	**23.0**	**/**
		1717.5MHz	22.80	22.25	/	**24.0**	**23.0**	**/**
	36RB_38	1772.5MHz	22.04	21.05	/	**23.0**	**22.0**	**/**
		1745MHz	22.08	21.07	/	**23.0**	**22.0**	**/**
		1717.5MHz	22.03	21.02	/	**23.0**	**22.0**	**/**
	36RB_19	1772.5MHz	22.08	21.04	/	**23.0**	**22.0**	**/**
		1745MHz	22.08	21.06	/	**23.0**	**22.0**	**/**
		1717.5MHz	22.04	21.03	/	**23.0**	**22.0**	**/**
	36RB_0	1772.5MHz	22.12	21.13	/	**23.0**	**22.0**	**/**
		1745MHz	22.03	21.05	/	**23.0**	**22.0**	**/**
		1717.5MHz	22.06	21.06	/	**23.0**	**22.0**	**/**
	75RB_0	1772.5MHz	22.11	21.12	/	**23.0**	**22.0**	**/**
		1745MHz	22.02	21.04	/	**23.0**	**22.0**	**/**
		1717.5MHz	22.00	21.06	/	**23.0**	**22.0**	**/**

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Full Power								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
20 MHz	1RB_99	1770MHz	22.66	21.96	/	**24.0**	**23.0**	**/**
		1745MHz	22.58	21.91	/	**24.0**	**23.0**	**/**
		1720MHz	22.65	21.95	/	**24.0**	**23.0**	**/**
	1RB_50	1770MHz	23.01	22.32	/	**24.0**	**23.0**	**/**
		1745MHz	22.97	22.24	/	**24.0**	**23.0**	**/**
		1720MHz	**23.02**	22.26	/	**24.0**	**23.0**	**/**
	1RB_0	1770MHz	22.69	21.89	/	**24.0**	**23.0**	**/**
		1745MHz	22.71	21.94	/	**24.0**	**23.0**	**/**
		1720MHz	22.69	21.93	/	**24.0**	**23.0**	**/**
	50RB_50	1770MHz	21.99	21.02	/	**23.0**	**22.0**	**/**
		1745MHz	22.12	21.12	/	**23.0**	**22.0**	**/**
		1720MHz	21.93	20.96	/	**23.0**	**22.0**	**/**
	50RB_25	1770MHz	22.04	21.11	/	**23.0**	**22.0**	**/**
		1745MHz	22.07	21.06	/	**23.0**	**22.0**	**/**
		1720MHz	22.02	21.06	/	**23.0**	**22.0**	**/**
	50RB_0	1770MHz	**22.18**	21.20	/	**23.0**	**22.0**	**/**
		1745MHz	21.96	21.02	/	**23.0**	**22.0**	**/**
		1720MHz	22.03	21.06	/	**23.0**	**22.0**	**/**
	100RB_0	1770MHz	22.04	21.09	/	**23.0**	**22.0**	**/**
		1745MHz	22.00	21.02	/	**23.0**	**22.0**	**/**
		1720MHz	21.96	20.99	/	**23.0**	**22.0**	**/**

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Sensor on								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4 MHz	1RB_5	1779.3MHz	15.49	15.71	/	**16.5**	**16.5**	**/**
		1745MHz	15.44	15.68	/	**16.5**	**16.5**	**/**
		1710.7MHz	15.46	15.65	/	**16.5**	**16.5**	**/**
	1RB_3	1779.3MHz	15.65	15.82	/	**16.5**	**16.5**	**/**
		1745MHz	15.53	15.78	/	**16.5**	**16.5**	**/**
		1710.7MHz	15.49	15.73	/	**16.5**	**16.5**	**/**
	1RB_0	1779.3MHz	15.46	15.65	/	**16.5**	**16.5**	**/**
		1745MHz	15.44	15.75	/	**16.5**	**16.5**	**/**
		1710.7MHz	15.42	15.76	/	**16.5**	**16.5**	**/**
	3RB_3	1779.3MHz	15.55	15.59	/	**16.5**	**16.5**	**/**
		1745MHz	15.57	15.57	/	**16.5**	**16.5**	**/**
		1710.7MHz	15.58	15.57	/	**16.5**	**16.5**	**/**
	3RB_1	1779.3MHz	15.67	15.66	/	**16.5**	**16.5**	**/**
		1745MHz	15.65	15.58	/	**16.5**	**16.5**	**/**
		1710.7MHz	15.63	15.58	/	**16.5**	**16.5**	**/**
	3RB_0	1779.3MHz	15.59	15.67	/	**16.5**	**16.5**	**/**
		1745MHz	15.54	15.55	/	**16.5**	**16.5**	**/**
		1710.7MHz	15.51	15.56	/	**16.5**	**16.5**	**/**
	6RB_0	1779.3MHz	15.59	15.71	/	**16.5**	**16.5**	**/**
		1745MHz	15.55	15.62	/	**16.5**	**16.5**	**/**
		1710.7MHz	15.54	15.67	/	**16.5**	**16.5**	**/**

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Sensor on								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3 MHz	1RB_14	1778.5MHz	15.51	15.90	/	16.5	16.5	/
		1745MHz	15.45	15.74	/	16.5	16.5	/
		1711.5MHz	15.47	15.75	/	16.5	16.5	/
	1RB_7	1778.5MHz	15.67	16.04	/	16.5	16.5	/
		1745MHz	15.70	15.96	/	16.5	16.5	/
		1711.5MHz	15.66	15.86	/	16.5	16.5	/
	1RB_0	1778.5MHz	15.53	15.88	/	16.5	16.5	/
		1745MHz	15.51	15.74	/	16.5	16.5	/
		1711.5MHz	15.51	15.69	/	16.5	16.5	/
	8RB_7	1778.5MHz	15.58	15.65	/	16.5	16.5	/
		1745MHz	15.58	15.64	/	16.5	16.5	/
		1711.5MHz	15.52	15.63	/	16.5	16.5	/
	8RB_4	1778.5MHz	15.60	15.67	/	16.5	16.5	/
		1745MHz	15.58	15.64	/	16.5	16.5	/
		1711.5MHz	15.54	15.67	/	16.5	16.5	/
	8RB_0	1778.5MHz	15.60	15.66	/	16.5	16.5	/
		1745MHz	15.49	15.63	/	16.5	16.5	/
		1711.5MHz	15.52	15.64	/	16.5	16.5	/
	15RB_0	1778.5MHz	15.54	15.60	/	16.5	16.5	/
		1745MHz	15.53	15.59	/	16.5	16.5	/
		1711.5MHz	15.53	15.56	/	16.5	16.5	/

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Sensor on								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5 MHz	1RB_24	1777.5MHz	15.35	15.72	/	16.5	16.5	/
		1745MHz	15.33	15.68	/	16.5	16.5	/
		1712.5MHz	15.35	15.69	/	16.5	16.5	/
	1RB_12	1777.5MHz	15.71	16.00	/	16.5	16.5	/
		1745MHz	15.70	15.92	/	16.5	16.5	/
		1712.5MHz	15.64	16.00	/	16.5	16.5	/
	1RB_0	1777.5MHz	15.40	15.72	/	16.5	16.5	/
		1745MHz	15.41	15.71	/	16.5	16.5	/
		1712.5MHz	15.35	15.70	/	16.5	16.5	/
	12RB_13	1777.5MHz	15.57	15.54	/	16.5	16.5	/
		1745MHz	15.54	15.52	/	16.5	16.5	/
		1712.5MHz	15.48	15.45	/	16.5	16.5	/
	12RB_6	1777.5MHz	15.60	15.62	/	16.5	16.5	/
		1745MHz	15.55	15.59	/	16.5	16.5	/
		1712.5MHz	15.56	15.58	/	16.5	16.5	/
	12RB_0	1777.5MHz	15.54	15.54	/	16.5	16.5	/
		1745MHz	15.50	15.56	/	16.5	16.5	/
		1712.5MHz	15.54	15.53	/	16.5	16.5	/
	25RB_0	1777.5MHz	15.52	15.54	/	16.5	16.5	/
		1745MHz	15.54	15.52	/	16.5	16.5	/
		1712.5MHz	15.50	15.47	/	16.5	16.5	/

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Sensor on								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
10 MHz	1RB_49	1715MHz	15.48	15.86	/	16.5	16.5	/
		1715MHz	15.48	15.86	/	16.5	16.5	/
		1715MHz	15.47	15.81	/	16.5	16.5	/
	1RB_24	1715MHz	15.59	16.00	/	16.5	16.5	/
		1715MHz	15.61	15.98	/	16.5	16.5	/
		1715MHz	15.55	15.97	/	16.5	16.5	/
	1RB_0	1715MHz	15.53	15.90	/	16.5	16.5	/
		1715MHz	15.53	15.88	/	16.5	16.5	/
		1715MHz	15.49	15.81	/	16.5	16.5	/
	25RB_25	1715MHz	15.52	15.60	/	16.5	16.5	/
		1715MHz	15.64	15.60	/	16.5	16.5	/
		1715MHz	15.55	15.54	/	16.5	16.5	/
	25RB_12	1715MHz	15.56	15.58	/	16.5	16.5	/
		1715MHz	15.59	15.59	/	16.5	16.5	/
		1715MHz	15.56	15.56	/	16.5	16.5	/
	25RB_0	1715MHz	15.64	15.69	/	16.5	16.5	/
		1715MHz	15.64	15.59	/	16.5	16.5	/
		1715MHz	15.60	15.62	/	16.5	16.5	/
	50RB_0	1715MHz	15.60	15.60	/	16.5	16.5	/
		1715MHz	15.63	15.61	/	16.5	16.5	/
		1715MHz	15.58	15.59	/	16.5	16.5	/

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Sensor on								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
15 MHz	1RB_74	1772.5MHz	15.42	15.65	/	16.5	16.5	/
		1745MHz	15.34	15.57	/	16.5	16.5	/
		1717.5MHz	15.37	15.65	/	16.5	16.5	/
	1RB_37	1772.5MHz	15.53	15.80	/	16.5	16.5	/
		1745MHz	15.52	15.80	/	16.5	16.5	/
		1717.5MHz	15.48	15.75	/	16.5	16.5	/
	1RB_0	1772.5MHz	15.42	15.72	/	16.5	16.5	/
		1745MHz	15.48	15.78	/	16.5	16.5	/
		1717.5MHz	15.41	15.69	/	16.5	16.5	/
	36RB_38	1772.5MHz	15.52	15.52	/	16.5	16.5	/
		1745MHz	15.55	15.54	/	16.5	16.5	/
		1717.5MHz	15.49	15.53	/	16.5	16.5	/
	36RB_19	1772.5MHz	15.56	15.60	/	16.5	16.5	/
		1745MHz	15.57	15.59	/	16.5	16.5	/
		1717.5MHz	15.56	15.54	/	16.5	16.5	/
	36RB_0	1772.5MHz	15.64	15.61	/	16.5	16.5	/
		1745MHz	15.56	15.58	/	16.5	16.5	/
		1717.5MHz	15.54	15.56	/	16.5	16.5	/
	75RB_0	1772.5MHz	15.62	15.59	/	16.5	16.5	/
		1745MHz	15.53	15.56	/	16.5	16.5	/
		1717.5MHz	15.52	15.50	/	16.5	16.5	/

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Sensor on								
LTE Band 66			Actual output Power (dBm)			Tune up		
Band -width	RB No. / RB offset	Frequency	Modulation			Modulation		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
20 MHz	1RB_99	1770MHz	15.19	15.58	/	**16.5**	**16.5**	**/**
		1745MHz	15.14	15.53	/	**16.5**	**16.5**	**/**
		1720MHz	15.15	15.36	/	**16.5**	**16.5**	**/**
	1RB_50	1770MHz	**15.57**	15.78	/	**16.5**	**16.5**	**/**
		1745MHz	**15.53**	15.73	/	**16.5**	**16.5**	**/**
		1720MHz	**15.56**	15.95	/	**16.5**	**16.5**	**/**
	1RB_0	1770MHz	15.24	15.43	/	**16.5**	**16.5**	**/**
		1745MHz	15.23	15.58	/	**16.5**	**16.5**	**/**
		1720MHz	15.24	15.50	/	**16.5**	**16.5**	**/**
	50RB_50	1770MHz	15.41	15.49	/	**16.5**	**16.5**	**/**
		1745MHz	15.59	15.56	/	**16.5**	**16.5**	**/**
		1720MHz	15.42	15.46	/	**16.5**	**16.5**	**/**
	50RB_25	1770MHz	15.57	15.59	/	**16.5**	**16.5**	**/**
		1745MHz	15.57	15.65	/	**16.5**	**16.5**	**/**
		1720MHz	15.53	15.55	/	**16.5**	**16.5**	**/**
	50RB_0	1770MHz	**15.69**	15.70	/	**16.5**	**16.5**	**/**
		1745MHz	**15.59**	15.59	/	**16.5**	**16.5**	**/**
		1720MHz	**15.61**	15.65	/	**16.5**	**16.5**	**/**
	100RB_0	1770MHz	15.53	15.57	/	**16.5**	**16.5**	**/**
		1745MHz	**15.57**	15.55	/	**16.5**	**16.5**	**/**
		1720MHz	15.49	15.51	/	**16.5**	**16.5**	**/**

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10.4. Bluetooth and WLAN Measurement result

Table 10.5: The conducted Power measurement results for Bluetooth

Bluetooth	Tune up	Averaged Power (dBm)		
Mode		Ch.0 (2402MHz)	Ch.39 (2441MHz)	Ch.78 (2480MHz)
GFSK	**10.5**	9.38	9.12	9.65
EDR2M-4_DQPSK	**10.0**	8.63	8.43	8.98
EDR3M-8DPSK	**10.0**	8.64	8.43	8.99
/	**/**	Ch.0 (2402MHz)	Ch.19 (2440MHz)	Ch.39 (2480MHz)
BLE(1M)	**-2.0**	-3.33	-2.91	-3.17
BLE(2M)	**-2.0**	-3.37	-2.96	-3.19

Table 10.6: The conducted Power measurement results for WLAN 2.4G

WLAN 2.4GHz	Tune up	Averaged Power (dBm) Duty Cycle: **100%**		
Mode		Ch.1 (2412MHz)	Ch.6 (2437Mhz)	Ch.11 (2462MHz)
802.11b	**11.5**	10.35	10.58	10.44
802.11g	**11.5**	10.19	10.42	10.28
802.11n(20MHz)	**11.5**	10.04	10.38	10.12
802.11n(40MHz)	**/**	Ch.3 (2422MHz)	Ch.6 (2437Mhz)	Ch.9 (2452MHz)
	11.5	10.32	10.45	10.38

Table 10.7: The conducted Power measurement results for WLAN 5G

Averaged Power (dBm) Duty Cycle: **100%**								
Mode	802.11a	802.11n -20MHz	802.11ac -20MHz	Mode	802.11n -40MHz	802.11ac -40MHz	Mode	802.11ac -80MHz
Channel	6Mbps	MCS0	MCS0	Channel	MCS0	MCS0	Channel	MCS0
<U-NII-1>								
Tune up	**10.5**	**10.5**	**10.5**	/	**10.4**	**10.4**	/	**10.4**
36(5180MHz)	9.51	9.47	9.42	38(5190MHz)	9.34	9.25	42(5210MHz)	9.33
40(5200MHz)	9.60	9.54	9.57	46(5230MHz)	9.48	9.35	/	/
44(5220MHz)	9.65	9.61	9.55	/	/	/	/	/
48(5240MHz)	9.71	9.67	9.62	/	/	/	/	/
<U-NII-2A>								
Tune up	**10.5**	**10.5**	**10.5**	/	**10.4**	**10.4**	/	**10.4**
52(5260MHz)	9.65	9.62	9.60	54(5270MHz)	9.48	9.36	58(5290MHz)	9.56
56(5280MHz)	9.75	9.67	9.66	62(5310MHz)	9.56	9.45	/	/
60(5300MHz)	9.76	9.71	9.69	/	/	/	/	/
64(5320MHz)	**9.78**	9.74	9.73	/	/	/	/	/
<U-NII-3>								
Tune up	**8.5**	**8.5**	**8.5**	/	**8.4**	**8.4**	/	**8.4**
149(5745MHz)	7.91	7.75	7.72	151(5755MHz)	7.55	7.51	155(5775MHz)	7.47
157(5785MHz)	7.87	7.77	7.74	159(5795MHz)	7.54	7.49	/	/
165(5825MHz)	**7.92**	7.73	7.75	/	/	/	/	/

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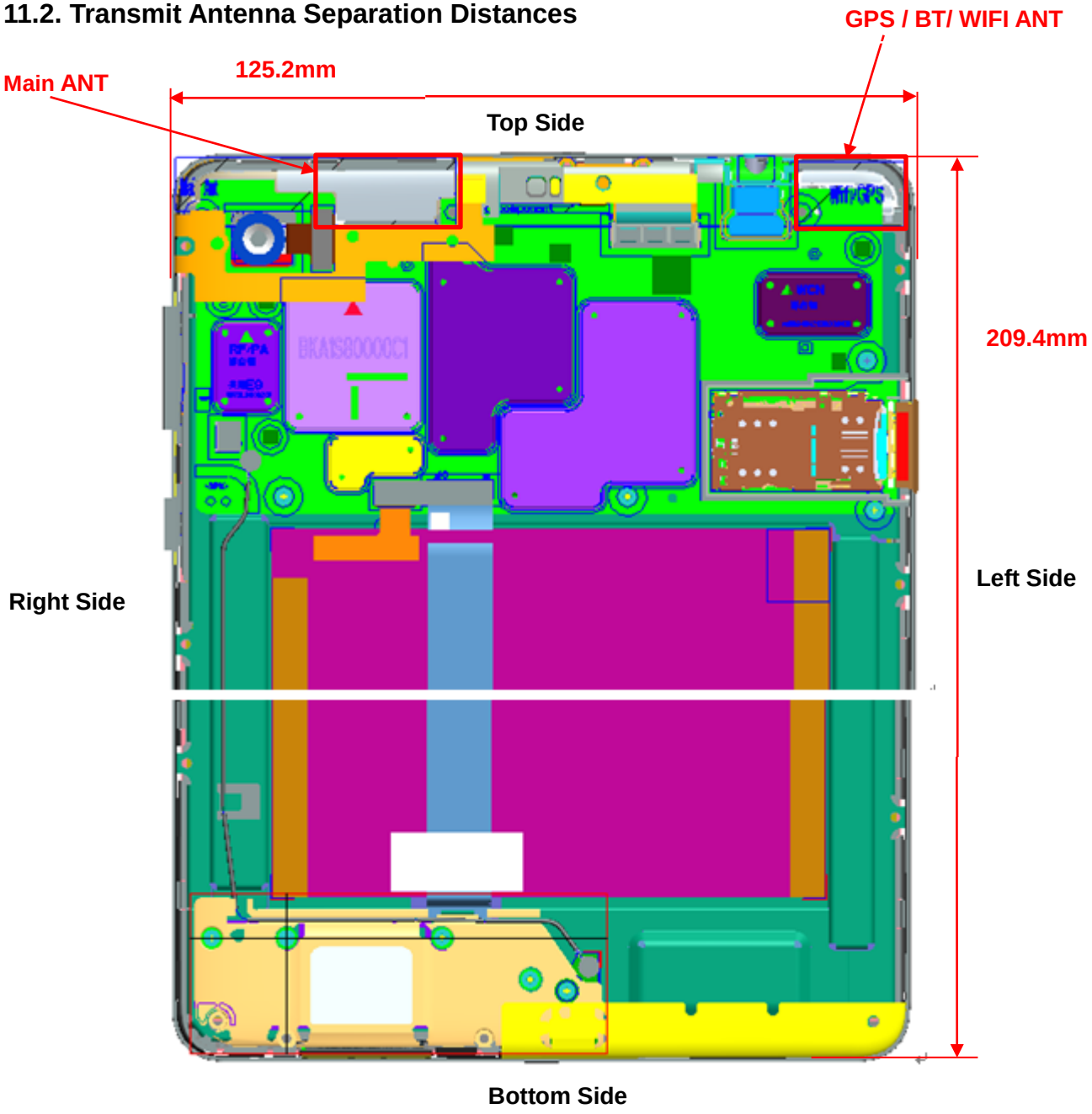
11. Simultaneous TX SAR Considerations

11.1. Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.
For this device, the BT and WLAN can transmit simultaneous with other transmitters.

11.2. Transmit Antenna Separation Distances



Picture 11.1 Antenna Locations (Back View)

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11.3. SAR Measurement Positions

SAR measurement positions					
Antenna	Rear	Left edge	Right edge	Top edge	Bottom edge
WWAN	Yes	Yes	No	Yes	No
WLAN	Yes	No	Yes	Yes	No

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where

f(GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

2. Per KDB 447498 D01v06, For 100 MHz to 6 GHz and *test separation distances* > 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following

1) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

11.4. Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Table 11.1: Standalone SAR test exclusion considerations

Band/Mode	f(GHz)	Position	SAR test exclusion threshold (mW)	RF output power		SAR test exclusion
				dBm	mW	
Bluetooth	2.4	Body	10.0	10.5	11.22	No
WLAN 2.4GHz	2.4	Body	10.0	11.5	14.13	No
WLAN 5GHz	5.2	Body	7.0	10.5	11.22	No
	5.3	Body	7.0	10.5	11.22	No
	5.8	Body	6.0	8.5	7.08	No

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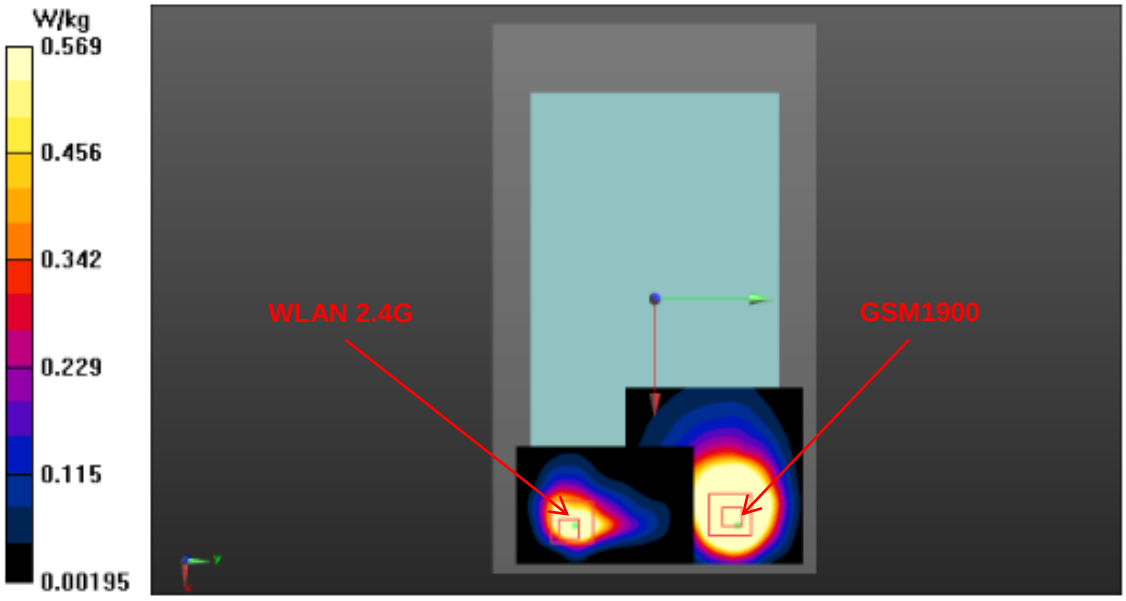
12. Evaluation of Simultaneous

According to the KDB 447498 D01, when the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio. The ratio is determined by $(SAR1 + SAR2)^{1.5}/Ri$, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

The sum of SAR values for Main Antenna and WLAN

Position	Main Antenna (W/kg)		WLAN 2.4G (W/kg)	Sum (W/kg)	SPLSR
Rear	GSM1900	1.21	0.62	1.83	Yes
	WCDMA B4	1.17	0.62	1.79	Yes
	LTE B2	1.00	0.62	1.62	Yes
	LTE B66	1.10	0.62	1.72	Yes
Position	**Main Antenna (W/kg)**		**WLAN 5G (W/kg)**	**Sum (W/kg)**	**SPLSR**
Rear	GSM1900	1.21	0.67	1.88	Yes
	WCDMA B4	1.17	0.67	1.84	Yes
	LTE B2	1.00	0.67	1.67	Yes
	LTE B66	1.10	0.67	1.77	Yes

Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
GSM1900	Rear	1.21	0	0.116	0.042	-0.171	90.4	1.83	0.027	**Not required**
WLAN 2.4G		0.62	0	0.108	-0.048	-0.169				



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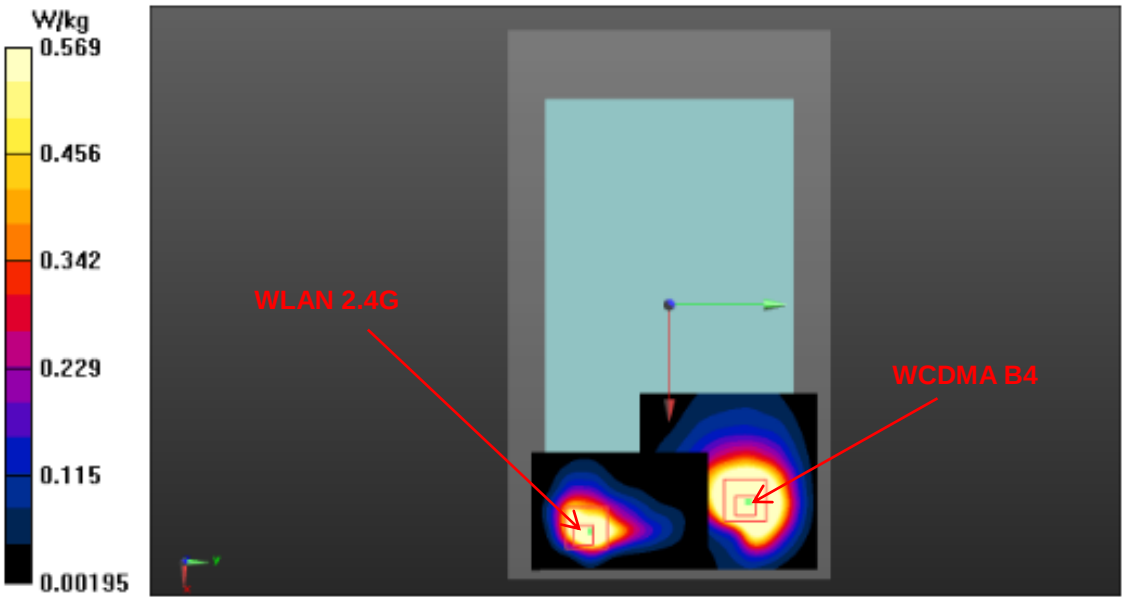
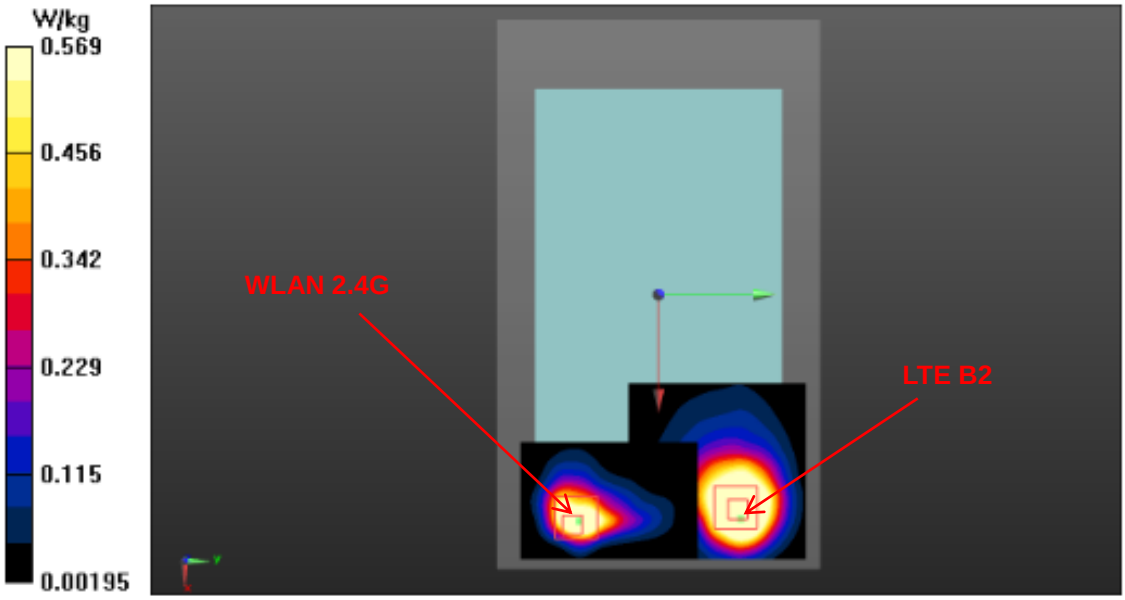
Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
WCDMA B4	Rear	1.17	0	0.109	0.0405	-0.171	88.5	1.79	0.027	**Not required**
WLAN 2.4G		0.62	0	0.108	-0.048	-0.169				



Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
LTE B2	Rear	1.00	0	0.114	0.042	-0.171	90.2	1.62	0.023	**Not required**
WLAN 2.4G		0.62	0	0.108	-0.048	-0.169				



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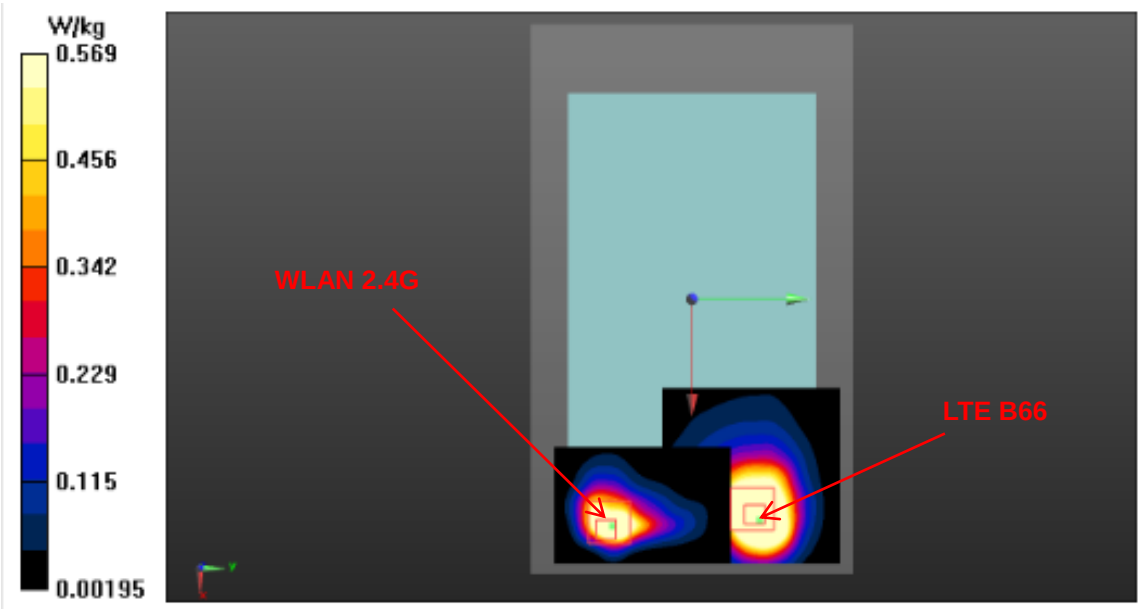
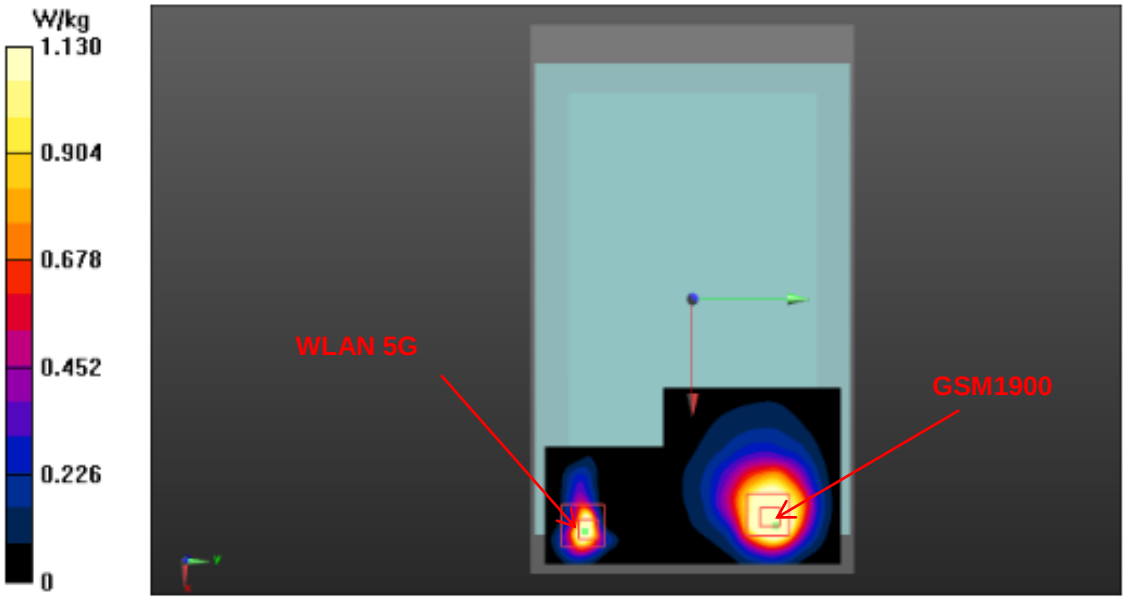
Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
LTE B66	Rear	1.10	0	0.113	0.0345	-0.171	82.7	1.72	0.027	**Not required**
WLAN 2.4G		0.62	0	0.108	-0.048	-0.169				



Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
GSM1900	Rear	1.21	0	0.116	0.042	-0.171	96.6	1.88	0.027	**Not required**
WLAN 5G		0.67	0	0.118	-0.0546	-0.171				



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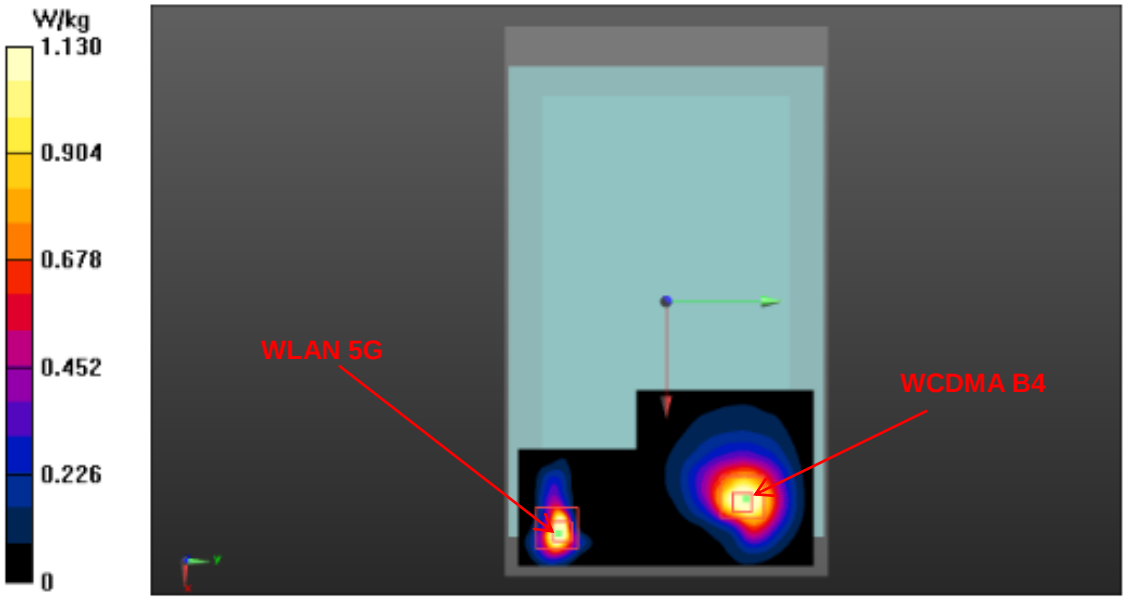
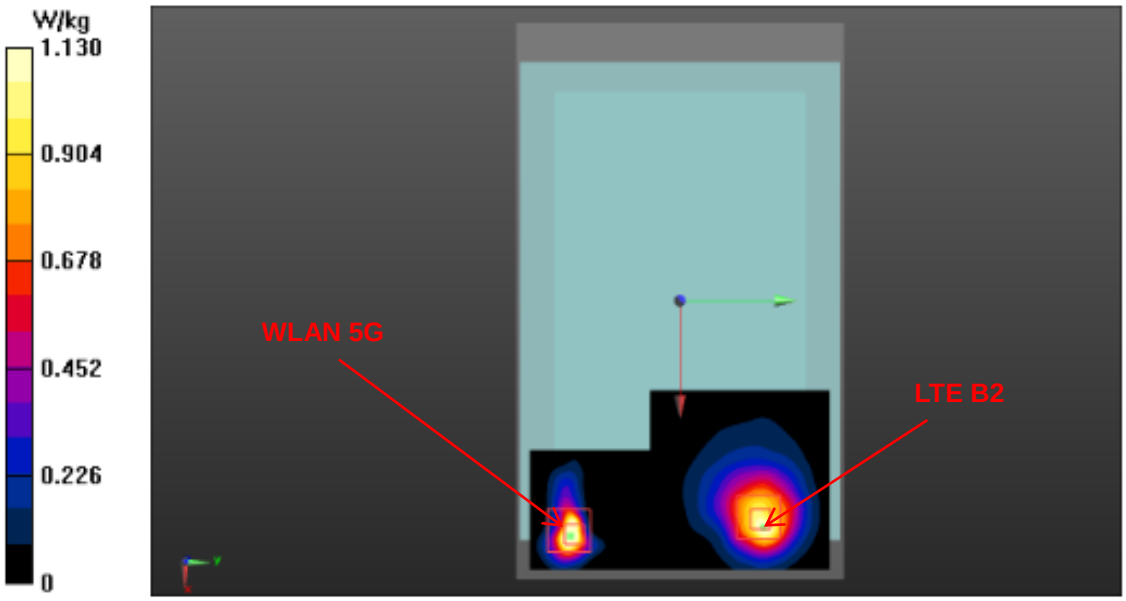
Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
WCDMA B4	Rear	1.17	0	0.109	0.0405	-0.171	95.5	1.84	0.026	**Not required**
WLAN 5G		0.67	0	0.118	-0.0546	-0.171				



Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
LTE B2	Rear	1.00	0	0.114	0.042	-0.171	96.7	1.67	0.022	**Not required**
WLAN 5G		0.67	0	0.118	-0.0546	-0.171				



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Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
				X	Y	Z				
LTE B66	Rear	1.10	0	0.113	0.0345	-0.171	89.2	1.77	0.026	**Not required**
WLAN 5G		0.67	0	0.118	-0.0546	-0.171				

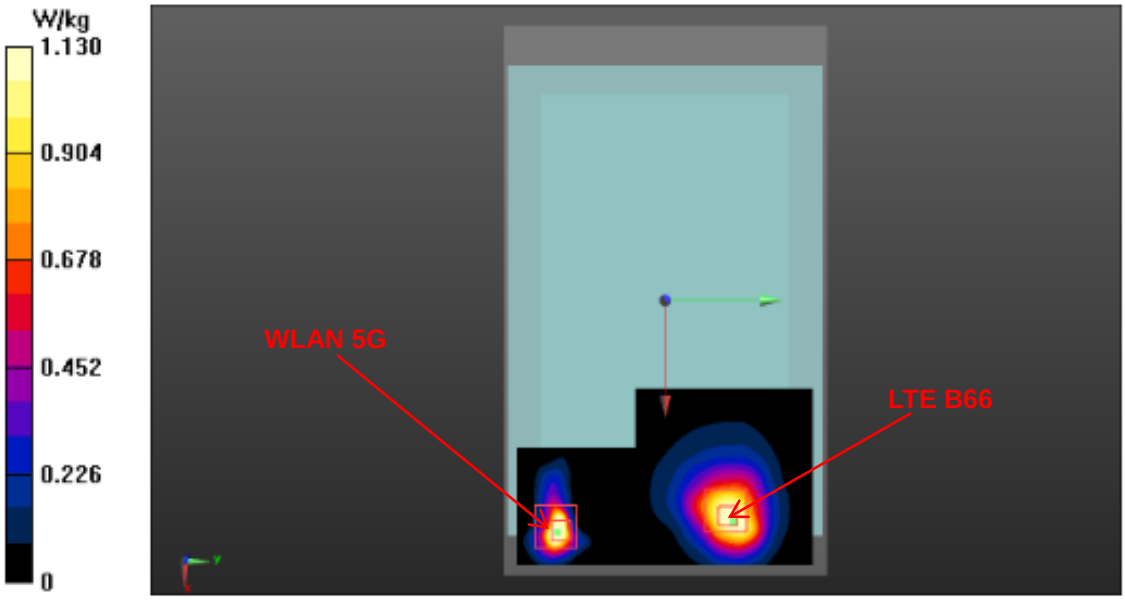

Table 12.1: The sum of reported SAR values for main antenna and WLAN

/	Position	Main Antenna (W/kg)	WLAN (W/kg)	Sum (W/kg)
Highest reported SAR value for Body	Rear	0.85	0.67	1.52

Note: the test positions of above tables are for the worse case that has been evaluated.

Table 12.2: The sum of reported SAR values for main antenna and Bluetooth

/	Position	Main Antenna (W/kg)	Bluetooth (W/kg)	Sum (W/kg)
Highest reported SAR value for Body	Rear	1.21	0.24	1.45

Note: the test positions of above tables are for the worse case that has been evaluated.

Conclusion:

According to the above tables, the sum of reported SAR values is 1.52 W/kg. So the simultaneous transmission SAR with volume scans is not required.

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13. Summary of Test Results

According to the client's decision rule in the test registration form, which is "based on the measurement results as the basis of the conformity statement", the test conclusion of this report meets the limit requirements.

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{Target} - P_{Measured})/10}$$

Where P_{Target} is the power of manufacturing upper limit;

$P_{Measured}$ is the measured power in chapter 10.

Duty Cycle

Mode	**Duty Cycle**
GPRS for GSM850/1900	1:4
GPRS for GSM850/1900 (Sensor-on mode)	1:2
WCDMA Band 2/4/5	1:1
FDD_LTE Band 2/5/7/12/66	1:1
Bluetooth 2.4G	1:1

13.1. Testing Environment

Temperature:	18°C~25°C
Relative humidity:	30%~70%
Ground system resistance:	<4Ω
Ambient noise & Reflection:	< 0.012 W/kg

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13.2. SAR results

Table 13.1: SAR Values (GSM 850 - Body)

Ambient Temperature: 22.0°C Liquid Temperature: 21.5°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
128	824.2	GPRS	Rear	**1**	22.53	23.5	0.612	**0.77**	0.11
128	824.2	GPRS	Top	/	22.53	23.5	0.376	**0.47**	-0.01
128	824.2	GPRS	Right	/	22.53	23.5	0.202	**0.25**	0.05
Sensor off Test Data									
128	824.2	GPRS	Rear	14mm	31.08	32.0	0.060	**0.07**	0.11
128	824.2	GPRS	Top	14mm	31.08	32.0	0.361	**0.45**	-0.08
128	824.2	GPRS	Right	6mm	31.08	32.0	0.243	**0.30**	-0.09

Table 13.2: SAR Values (GSM 1900 - Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.3°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
810	1909.8	GPRS	Rear	**2**	19.63	20.0	**1.110**	**1.21**	0.08
810	1909.8	GPRS	Top	/	19.63	20.0	0.619	**0.67**	0.09
810	1909.8	GPRS	Right	/	19.63	20.0	0.214	**0.23**	0.07
661	1880	GPRS	Rear	/	19.25	20.0	0.875	**1.04**	0.04
512	1850.2	GPRS	Rear	/	18.68	20.0	0.632	**0.86**	0.17
Sensor off Test Data									
810	1909.8	GPRS	Rear	14mm	28.79	29.5	0.075	**0.09**	0.07
810	1909.8	GPRS	Top	14mm	28.79	29.5	0.378	**0.45**	0.00
810	1909.8	GPRS	Right	6mm	28.79	29.5	0.058	**0.07**	0.05

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Table 13.3: SAR Values (WCDMA Band 2 - Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.3°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
9400	1880	RMC	Rear	**3**	16.40	17.0	**0.718**	**0.82**	0.10
9400	1880	RMC	Top	/	16.40	17.0	0.440	**0.51**	-0.01
9400	1880	RMC	Right	/	16.40	17.0	0.157	**0.18**	0.03
9538	1907.6	RMC	Rear	/	16.30	17.0	0.679	**0.80**	0.01
9262	1852.4	RMC	Rear	/	16.40	17.0	0.663	**0.76**	0.02
Sensor off Test Data									
9400	1880	RMC	Rear	14mm	23.90	24.5	0.094	**0.11**	0.09
9400	1880	RMC	Top	14mm	23.90	24.5	0.505	**0.58**	-0.09
9400	1880	RMC	Right	6mm	23.90	24.5	0.078	**0.09**	0.05

Table 13.4: SAR Values (WCDMA Band 4 - Body)

Ambient Temperature: 22.2°C Liquid Temperature: 21.7°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
1413	1732.6	RMC	Rear	/	16.00	17.0	0.924	**1.16**	0.02
1413	1732.6	RMC	Top	/	16.00	17.0	0.356	**0.45**	0.16
1413	1732.6	RMC	Right	/	16.00	17.0	0.234	**0.29**	-0.05
1513	1752.6	RMC	Rear	/	16.00	17.0	0.908	**1.14**	0.11
1312	1712.4	RMC	Rear	**4**	16.00	17.0	**0.931**	**1.17**	0.01
Sensor off Test Data									
1413	1732.6	RMC	Rear	14mm	23.50	24.5	0.109	**0.14**	0.17
1413	1732.6	RMC	Top	14mm	23.50	24.5	0.511	**0.64**	0.03
1413	1732.6	RMC	Right	6mm	23.50	24.5	0.087	**0.11**	0.06

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Table 13.5: SAR Values (WCDMA Band 5 -Body)

Ambient Temperature: 22.0°C Liquid Temperature: 21.5°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
4182	836.4	RMC	Rear	**5**	16.20	17.0	**0.529**	**0.64**	0.09
4182	836.4	RMC	Top	/	16.20	17.0	0.277	**0.33**	0.07
4182	836.4	RMC	Right	/	16.20	17.0	0.120	**0.14**	0.06
Sensor off Test Data									
4182	836.4	RMC	Rear	14mm	23.70	24.5	0.091	**0.11**	0.08
4182	836.4	RMC	Top	14mm	23.70	24.5	0.451	**0.54**	-0.01
4182	836.4	RMC	Right	6mm	23.70	24.5	0.047	**0.06**	0.12

Table 13.6: SAR Values (LTE Band 2 - Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.3°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
18700	1860	1RB50	Rear	**6**	16.52	17.5	**0.787**	**0.99**	0.06
18700	1860	50RB25	Rear	/	16.46	17.5	0.783	**0.99**	0.05
18700	1860	1RB50	Top	/	16.52	17.5	0.441	**0.55**	-0.01
18700	1860	50RB25	Top	/	16.46	17.5	0.420	**0.53**	0.10
18700	1860	1RB50	Right	/	16.52	17.5	0.174	**0.22**	0.03
18700	1860	50RB25	Right	/	16.46	17.5	0.173	**0.22**	0.18
19100	1900	1RB50	Rear	/	16.45	17.5	0.775	**0.99**	0.05
18900	1880	1RB50	Rear	/	16.42	17.5	0.774	**0.99**	0.02
19100	1900	50RB25	Rear	/	16.45	17.5	0.771	**0.98**	0.01
18900	1880	50RB25	Rear	/	16.39	17.5	0.777	**1.00**	0.02
18700	1860	100RB	Rear	/	16.46	17.5	0.772	**0.98**	0.07
Sensor off Test Data									
19100	1900	1RB50	Rear	14mm	23.37	24.5	0.489	**0.63**	0.06
18700	1860	50RB50	Rear	14mm	22.45	23.5	0.395	**0.50**	-0.04
19100	1900	1RB50	Top	14mm	23.37	24.5	0.088	**0.11**	0.04
18700	1860	50RB50	Top	14mm	22.45	23.5	0.086	**0.11**	0.07
19100	1900	1RB50	Right	6mm	23.37	24.5	0.081	**0.11**	0.12
18700	1860	50RB50	Right	6mm	22.45	23.5	0.087	**0.11**	0.02

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Table 13.7: SAR Values (LTE Band 5 - Body)

Ambient Temperature: 22.0°C Liquid Temperature: 21.5°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
20450	829	1RB24	Rear	**7**	16.60	17.5	**0.684**	**0.84**	0.11
20525	836.5	25RB12	Rear	/	16.52	17.5	0.681	**0.85**	0.03
20450	829	1RB24	Top	/	16.60	17.5	0.377	**0.46**	-0.02
20525	836.5	25RB12	Top	/	16.52	17.5	0.365	**0.46**	0.03
20450	829	1RB24	Right	/	16.60	17.5	0.123	**0.15**	0.02
20525	836.5	25RB12	Right	/	16.52	17.5	0.126	**0.16**	0.18
20600	844	1RB24	Rear	/	16.44	17.5	0.661	**0.84**	0.03
20525	836.5	1RB24	Rear	/	16.53	17.5	0.673	**0.84**	0.04
20600	844	25RB12	Rear	/	16.43	17.5	0.651	**0.83**	-0.09
20450	829	25RB12	Rear	/	16.47	17.5	0.664	**0.84**	0.11
20450	829	50RB	Rear	/	16.49	17.5	0.668	**0.84**	0.07
Sensor off Test Data									
20450	829	1RB24	Rear	14mm	23.39	24.5	0.413	**0.53**	-0.12
20525	836.5	25RB12	Rear	14mm	22.43	23.5	0.336	**0.43**	-0.01
20450	829	1RB24	Top	14mm	23.39	24.5	0.381	**0.49**	0.05
20525	836.5	25RB12	Top	14mm	22.43	23.5	0.312	**0.40**	0.03
20450	829	1RB24	Right	6mm	23.39	24.5	0.268	**0.35**	0.06
20525	836.5	25RB12	Right	6mm	22.43	23.5	0.224	**0.29**	0.05

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Table 13.8: SAR Values (LTE Band 7 - Body)

Ambient Temperature: 22.3°C Liquid Temperature: 21.8°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
21350	2560	1RB50	Rear	/	11.46	12.5	0.566	**0.72**	0.15
21350	2560	50RB50	Rear	/	11.49	12.5	0.565	**0.71**	0.12
21350	2560	1RB50	Top	/	11.46	12.5	0.865	**1.10**	0.01
21350	2560	50RB50	Top	/	11.49	12.5	0.844	**1.06**	0.06
21350	2560	1RB50	Right	/	11.46	12.5	0.074	**0.09**	-0.06
21350	2560	50RB50	Right	/	11.49	12.5	0.071	**0.09**	-0.10
21100	2535	1RB50	Top	/	11.17	12.5	0.723	**0.98**	0.05
20850	2510	1RB50	Top	/	11.20	12.5	0.672	**0.91**	-0.18
21100	2535	50RB50	Top	/	11.29	12.5	0.826	**1.09**	0.14
20850	2510	50RB50	Top	/	11.31	12.5	0.679	**0.89**	0.13
21350	2560	100RB	Top	/	11.48	12.5	0.857	**1.08**	-0.17
Sensor off Test Data									
21350	2560	1RB50	Rear	14mm	21.89	22.5	0.785	**0.90**	0.09
21350	2560	50RB25	Rear	14mm	20.93	21.5	0.623	**0.71**	0.02
21350	2560	1RB50	Top	**8**/14mm	21.89	22.5	**1.030**	**1.19**	0.00
21350	2560	50RB25	Top	14mm	20.93	21.5	0.825	**0.94**	0.13
21350	2560	1RB50	Right	6mm	21.89	22.5	0.315	**0.36**	0.13
21350	2560	50RB25	Right	6mm	20.93	21.5	0.251	**0.29**	0.14
21100	2535	1RB50	Rear	14mm	21.73	22.5	0.726	**0.87**	0.15
20850	2510	1RB50	Rear	14mm	21.70	22.5	0.648	**0.78**	0.05
21350	2560	100RB	Rear	14mm	20.82	21.5	0.619	**0.72**	0.04
21100	2535	1RB50	Top	14mm	21.73	22.5	0.907	**1.08**	0.09
20850	2510	1RB50	Top	14mm	21.70	22.5	0.757	**0.91**	0.20
21100	2535	50RB25	Top	14mm	20.74	21.5	0.721	**0.86**	0.02
20850	2510	50RB25	Top	14mm	20.68	21.5	0.597	**0.72**	0.07
21350	2560	100RB	Top	14mm	20.82	21.5	0.856	**1.00**	0.06

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Table 13.9: SAR Values (LTE Band 12 - Body)

Ambient Temperature: 22.7°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
23095	707.5	1RB24	Rear	/	16.43	17.5	0.546	**0.70**	0.01
23130	711	25RB0	Rear	**9**	16.46	17.5	**0.573**	**0.73**	0.16
23095	707.5	1RB24	Top	/	16.43	17.5	0.265	**0.34**	0.07
23130	711	25RB0	Top	/	16.46	17.5	0.278	**0.35**	0.06
23095	707.5	1RB24	Right	/	16.43	17.5	0.074	**0.09**	0.06
23130	711	25RB0	Right	/	16.46	17.5	0.073	**0.09**	0.03
Sensor off Test Data									
23130	711	1RB24	Rear	14mm	23.36	24.5	0.265	**0.34**	0.01
23130	711	25RB12	Rear	14mm	22.39	23.5	0.213	**0.28**	0.01
23130	711	1RB24	Top	14mm	23.36	24.5	0.242	**0.31**	0.01
23130	711	25RB12	Top	14mm	22.39	23.5	0.195	**0.25**	0.02
23130	711	1RB24	Right	6mm	23.36	24.5	0.032	**0.04**	0.04
23130	711	25RB12	Right	6mm	22.39	23.5	0.033	**0.04**	0.08

Note: SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

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Table 13.10: SAR Values (LTE Band 66 - Body)

Ambient Temperature: 22.2°C Liquid Temperature: 21.7°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
132572	1770	1RB50	Rear	/	15.57	16.5	0.843	**1.04**	0.03
132572	1770	50RB0	Rear	/	15.69	16.5	0.883	**1.06**	0.05
132572	1770	1RB50	Top	/	15.57	16.5	0.301	**0.37**	0.09
132572	1770	50RB0	Top	/	15.69	16.5	0.300	**0.36**	0.11
132572	1770	1RB50	Right	/	15.57	16.5	0.203	**0.25**	0.11
132572	1770	50RB0	Right	/	15.69	16.5	0.213	**0.26**	0.09
132322	1745	50RB0	Rear	/	15.53	16.5	0.822	**1.03**	0.05
132072	1720	50RB0	Rear	/	15.56	16.5	0.870	**1.08**	0.12
132322	1745	50RB0	Rear	/	15.59	16.5	0.835	**1.03**	0.03
132072	1720	50RB0	Rear	/	15.61	16.5	0.877	**1.08**	-0.04
132322	1745	100RB	Rear	**10**	15.57	16.5	**0.885**	**1.10**	0.09
Sensor off Test Data									
132072	1720	1RB50	Rear	14mm	23.02	24.0	0.076	**0.10**	0.09
132572	1770	50RB0	Rear	14mm	22.18	23.0	0.080	**0.10**	0.05
132072	1720	1RB50	Top	14mm	23.02	24.0	0.454	**0.57**	0.04
132572	1770	50RB0	Top	14mm	22.18	23.0	0.347	**0.42**	0.03
132072	1720	1RB50	Right	6mm	23.02	24.0	0.464	**0.58**	-0.10
132572	1770	50RB0	Right	6mm	22.18	23.0	0.426	**0.51**	0.00

Note: SAR for LTE Band 4 is covered by LTE Band 66 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

Table 13.11: SAR Values (Bluetooth 2.4G - Body)

Ambient Temperature: 22.4°C Liquid Temperature: 21.9°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
78	2480	GFSK	Rear	**11**	9.65	10.5	**0.196**	**0.24**	0.08
78	2480	GFSK	Top	/	9.65	10.5	0.118	**0.14**	-0.02
78	2480	GFSK	Left	/	9.65	10.5	0.091	**0.11**	0.09

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13.3. WLAN Evaluation for 2.4G

According to the KDB248227 D01, SAR is measured for 2.4GHz 802.11b DSSS using the initial test position procedure.

Table 13.12: SAR Values (WLAN 2.4G - Body)

Ambient Temperature: 22.4°C Liquid Temperature: 21.9°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
0mm Test Data									
6	2437	802.11b	Rear	**12**	10.58	11.5	**0.505**	**0.62**	0.08
6	2437	802.11b	Top	**/**	10.58	11.5	0.223	**0.28**	-0.02
6	2437	802.11b	Left	**/**	10.58	11.5	0.137	**0.17**	0.09
14mm Test Data									
6	2437	802.11b	Rear	**/**	10.58	11.5	0.043	**0.05**	0.00
6	2437	802.11b	Top	**/**	10.58	11.5	0.050	**0.06**	-0.05

Note1: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

Table 13.13: SAR Values (WLAN - Body) – 802.11b (Scaled Reported SAR)

Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
Ch.	MHz					
6	2437	Rear	100%	100%	0.62	**0.62**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

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13.4. WLAN Evaluation for 5G

Table 13.14: SAR Values (WLAN 5G - Body)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
Ch.	MHz								
U-NII-2A - 0mm Test Data									
64	5320	802.11a	Rear	**13**	9.78	10.5	**0.565**	**0.67**	0.09
64	5320	802.11a	Top	/	9.78	10.5	0.279	**0.33**	0.05
64	5320	802.11a	Left	/	9.78	10.5	0.369	**0.44**	0.09
U-NII-2A - 14mm Test Data									
64	5320	802.11a	Rear	/	9.78	10.5	0.041	**0.05**	0.03
64	5320	802.11a	Top	/	9.78	10.5	0.043	**0.05**	0.09
U-NII-3 - 0mm Test Data									
165	5825	802.11a	Rear	/	7.92	8.5	**0.544**	**0.62**	0.09
165	5825	802.11a	Top	/	7.92	8.5	0.201	**0.23**	0.05
165	5825	802.11a	Left	/	7.92	8.5	0.083	**0.09**	0.04
U-NII-3 - 14mm Test Data									
165	5825	802.11a	Rear	/	7.92	8.5	0.031	**0.04**	0.09
165	5825	802.11a	Top	/	7.92	8.5	0.018	**0.02**	0.09

Note1: U-NII-1 and U-NII-2A bands have the same specified maximum output and tolerance; SAR is measured for U-NII-2A band first. Adjusted SAR of U-NII-2A band is ≤ 1.2W/kg, SAR is not required for U-NII-1 band.

Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

Table 13.15: SAR Values (WLAN - Body) – 802.11a (Scaled Reported SAR)

Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
Ch.	MHz					
64	5320	Rear	100%	100%	0.67	**0.67**

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14. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) 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).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Table 14.1: SAR Measurement Variability for Body – GSM1900

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
Ch.	MHz		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
810	1909.8	Rear	1.10	1.06	1.04	/

Table 14.2: SAR Measurement Variability for Body – WCDMA Band 4

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
Ch.	MHz		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1312	1712.4	Rear	0.931	0.915	1.02	/

Table 14.3: SAR Measurement Variability for Body – LTE Band 7

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
Ch.	MHz		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
21350	2560	Top	1.03	0.997	1.03	/

Table 14.4: SAR Measurement Variability for Body – LTE Band 66

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
Ch.	MHz		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
132322	1745	Rear	0.885	0.872	1.01	/

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15. Measurement Uncertainty

15.1. Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	12	N	2	1	1	6.0	6.0	∞
2	Axial isotropy	B	4.7	R	$\sqrt{3}$	√0.5	√0.5	4.3	4.3	∞
3	Hemispherical isotropy	B	9.6	R	$\sqrt{3}$	1	1	4.8	4.8	∞
4	Boundary effect	B	1.1	R	$\sqrt{3}$	1	1	0.6	0.6	∞
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
6	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
7	Modulation response	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
8	Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
9	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
10	Integration time	B	1.7	R	$\sqrt{3}$	1	1	1.0	1.0	∞
11	RF ambient conditions-noise	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	RF ambient conditions-reflection	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Probe positioned mech. restrictions	B	0.35	R	$\sqrt{3}$	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
15	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
16	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	5
17	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
18	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
19	Phantom uncertainty	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
20	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas.)	A	1.3	N	1	0.64	0.43	0.83	0.56	9
22	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
23	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	0.96	0.78	9
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{23} c_i^2 u_i^2}$						11.3	11.2	95.5
Expanded uncertainty (Confidence interval of 95 %)		$u_e = 2u_c$						22.6	22.4	

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15.2. Measurement Uncertainty for Normal SAR Tests (3GHz~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	13	N	2	1	1	6.5	6.5	∞
2	Axial isotropy	B	4.7	R	$\sqrt{3}$	√0.5	√0.5	4.3	4.3	∞
3	Hemispherical isotropy	B	9.6	R	$\sqrt{3}$	1	1	4.8	4.8	∞
4	Boundary effect	B	2.3	R	$\sqrt{3}$	1	1	1.3	1.3	∞
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
6	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
7	Modulation response	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
8	Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
9	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
10	Integration time	B	1.7	R	$\sqrt{3}$	1	1	1.0	1.0	∞
11	RF ambient conditions-noise	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	RF ambient conditions-reflection	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Probe positioned mech. restrictions	B	0.71	R	$\sqrt{3}$	1	1	0.4	0.4	∞
14	Probe positioning with respect to phantom shell	B	5.7	R	$\sqrt{3}$	1	1	3.3	3.3	∞
15	Post-processing	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Test sample related										
16	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	5
17	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
18	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
19	Phantom uncertainty	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
20	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas.)	A	1.3	N	1	0.64	0.43	0.83	0.56	9
22	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
23	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	0.96	0.78	9
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{23} c_i^2 u_i^2}$						12.2	12.1	95.5
Expanded uncertainty (Confidence interval of 95 %)		$u_e = 2u_c$						24.4	24.2	

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16. Main Test Instruments

Table 16.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46103759	2020-11-15	One year
02	Dielectric probe	85070E	MY44300317	/	/
03	Power meter	E4418B	MY50000366	2020-12-13	One year
04	Power sensor	E9304A	MY50000188		
05	Power meter	NRP	101460	2021-01-15	One year
06	Power sensor	NRP-Z91	100553		
07	Signal Generator	E8257D	MY47461211	2021-01-15	One year
08	Amplifier	VTL5400	0404	/	/
09	E-field Probe	EX3DV4	3633	2020-04-01	One year
10	DAE	DAE4	1527	2020-11-06	One year
11	Dipole Validation Kit	D750V3	1163	2019-09-03	Three year
12	Dipole Validation Kit	D835V2	4d057	2018-10-09	Three year
13	Dipole Validation Kit	D1750V2	1152	2019-08-30	Three year
14	Dipole Validation Kit	D1900V2	5d088	2018-10-24	Three year
15	Dipole Validation Kit	D2450V2	873	2018-10-26	Three year
16	Dipole Validation Kit	D2550V2	1058	2018-08-24	Three year
17	Dipole Validation Kit	D5GHzV2	1238	2019-08-29	Three year
18	Radio Communication Analyzer	MT8820C	6201341853	2021-01-15	One year
19	BTS	CMW500	158344	2020-07-17	One year
20	BTS	E5515C	GB46110722	2021-01-15	One year
21	Software	DASY5	52.8.8.1222	/	/

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ANNEX A: Graph Results

GSM850 Body

Date: 2021-3-3

Electronics: DAE4 Sn1527

Medium: Head 835MHz

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.902 S/m; ε_r = 40.768; ρ = 1000 kg/m^3

Communication System: UID 0, GPRS 4Txslot (0) Frequency: 824.2 MHz Duty Cycle: 1:2

Probe: EX3DV4 – SN3633 ConvF (9.59, 9.59, 9.59);

Rear Side Middle/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

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

Reference Value = 1.751 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.67 W/kg

SAR(1 g) = 0.612 W/kg; SAR(10 g) = 0.285 W/kg

Maximum value of SAR (measured) = 1.06 W/kg

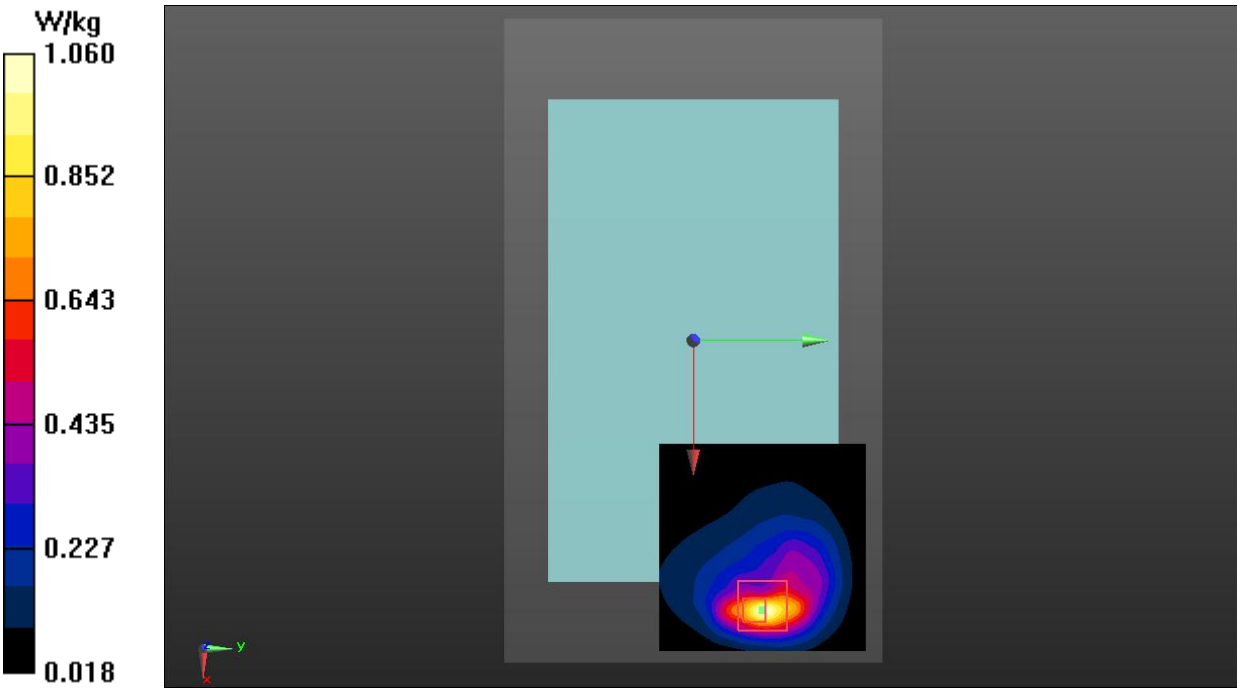

Fig.1 GSM 850 Body

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GSM1900 Body

Date: 2021-3-6

Electronics: DAE4 Sn1527

Medium: Head 1900MHz

Medium parameters used: f = 1910 MHz; σ = 1.394 S/m; ε_r = 40.284; ρ = 1000 kg/m^3

Communication System: UID 0, GPRS 4Txslot (0) Frequency: 1909.8 MHz Duty Cycle: 1:2

Probe: EX3DV4 – SN3633 ConvF (7.76, 7.76, 7.76);

Rear Side High/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.77 W/kg

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

Reference Value = 1.046 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 2.15 W/kg

SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.604 W/kg

Maximum value of SAR (measured) = 1.55 W/kg

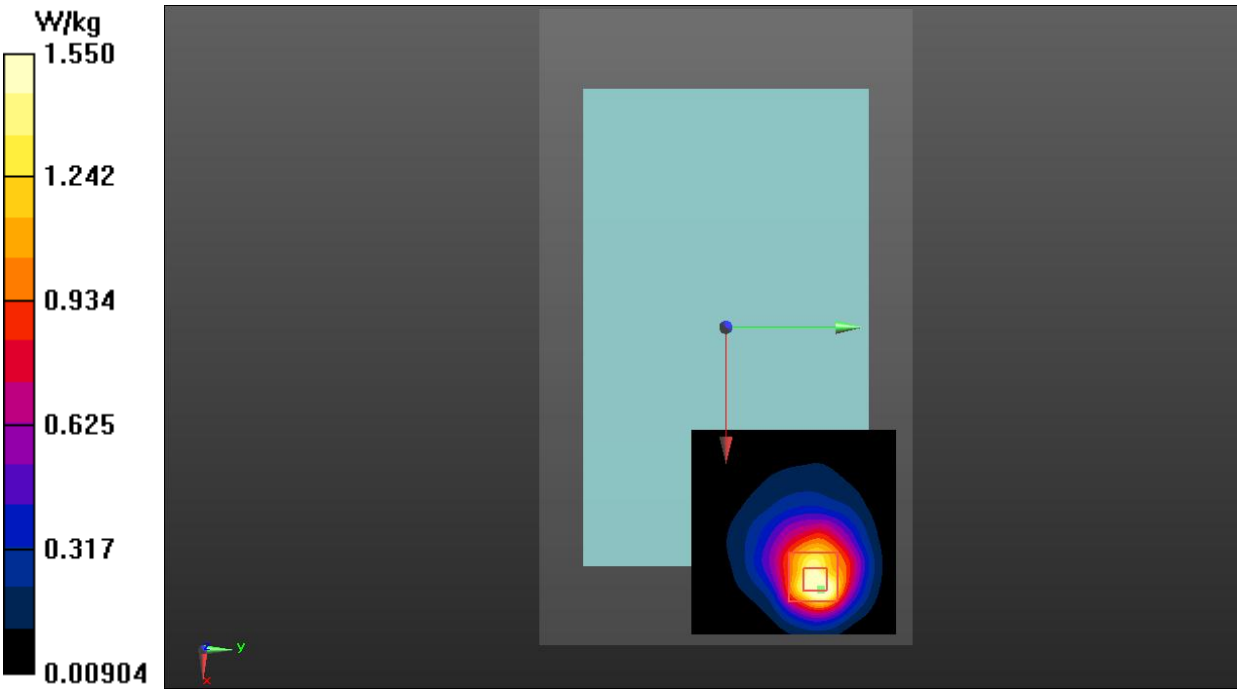

Fig.2 GSM 1900 Body

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WCDMA Band 2 Body

Date: 2021-3-6

Electronics: DAE4 Sn1527

Medium: Head 1900MHz

Medium parameters used: f = 1880 MHz; σ = 1.367 S/m; ε_r = 40.401; ρ = 1000 kg/m^3

Communication System: UID 0, WCDMA (0) Frequency: 1880 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.76, 7.76, 7.76);

Rear Side Middle/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.11 W/kg

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

Reference Value = 0.8720 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.718 W/kg; SAR(10 g) = 0.393 W/kg

Maximum value of SAR (measured) = 1.01 W/kg

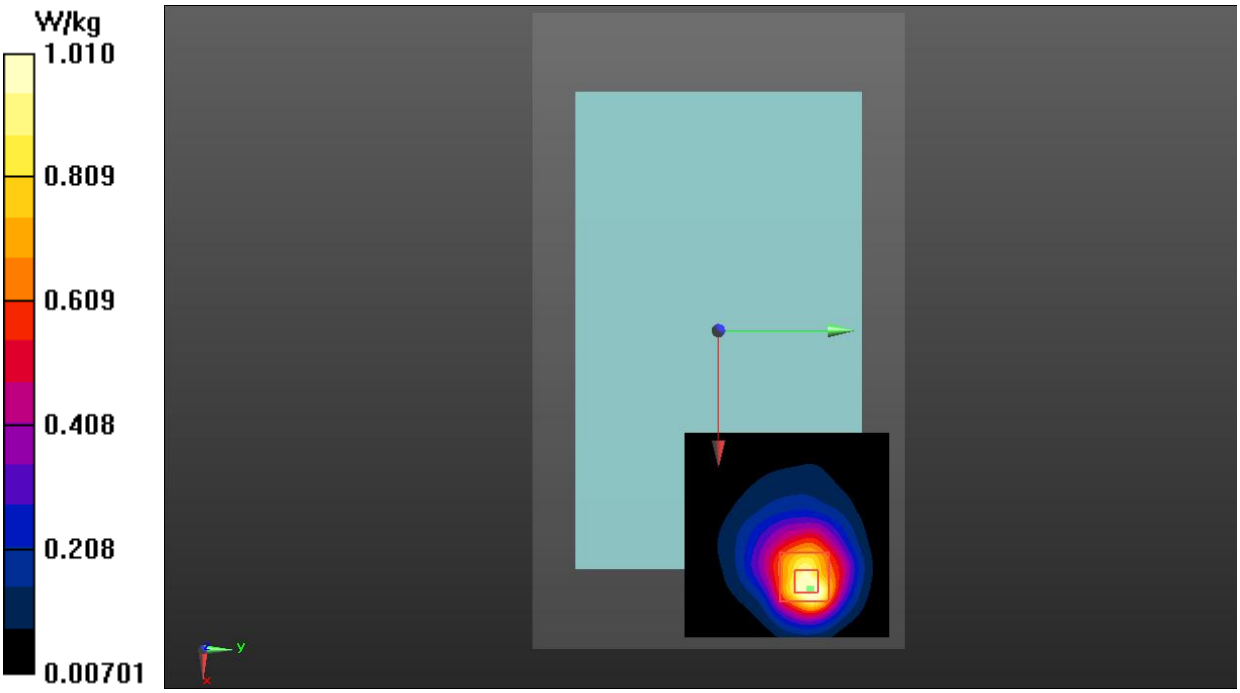

Fig.3 WCDMA Band 2 Body

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WCDMA Band 4 Body

Date: 2021-3-10

Electronics: DAE4 Sn1527

Medium: Head 1750MHz

Medium parameters used (interpolated): f = 1712.4 MHz; σ = 1.328 S/m; ε_r = 40.932; ρ = 1000 kg/m^3

Communication System: UID 0, WCDMA (0) Frequency: 1712.4 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (8.09, 8.09, 8.09);

Rear Side Low/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.28 W/kg

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

Reference Value = 1.237 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.71 W/kg

SAR(1 g) = 0.931 W/kg; SAR(10 g) = 0.495 W/kg

Maximum value of SAR (measured) = 1.25 W/kg

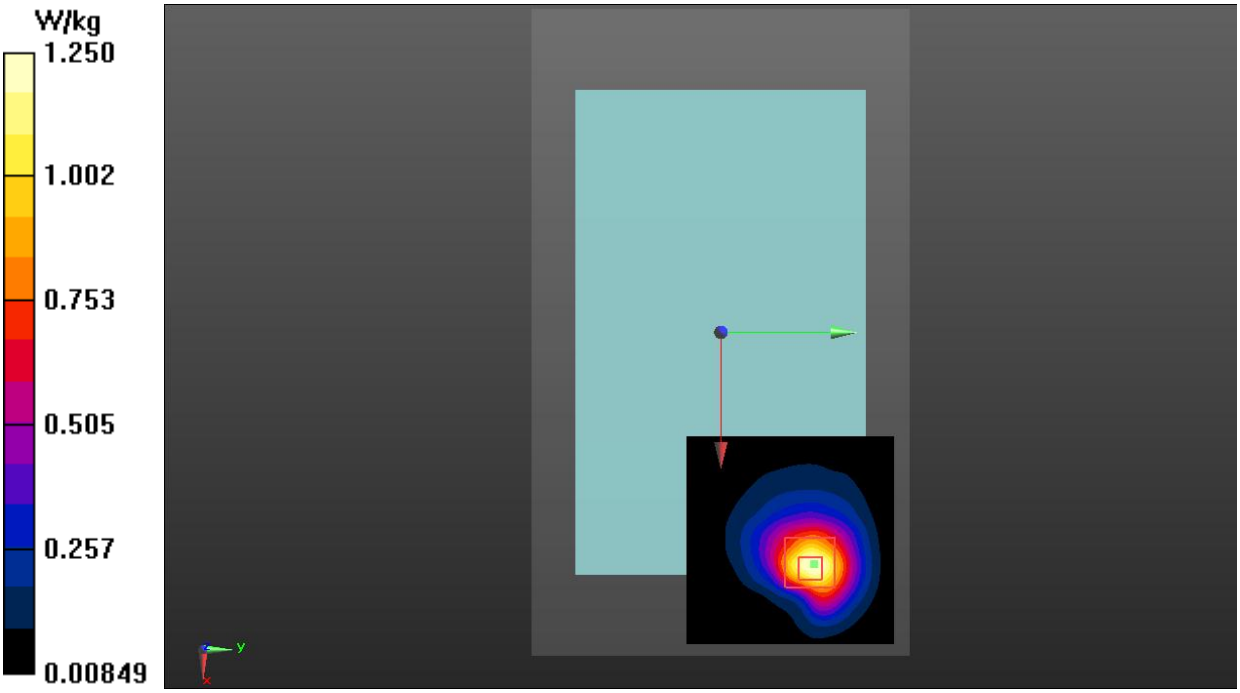

Fig.4 WCDMA Band 4 Body

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WCDMA Band 5 Body

Date: 2021-3-3

Electronics: DAE4 Sn1527

Medium: Head 835MHz

Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.913 S/m; ε_r = 40.621; ρ = 1000 kg/m^3

Communication System: UID 0, WCDMA (0) Frequency: 836.4 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (9.59, 9.59, 9.59);

Rear Side Middle/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.666 W/kg

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

Reference Value = 1.897 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 0.529 W/kg; SAR(10 g) = 0.258 W/kg

Maximum value of SAR (measured) = 0.869 W/kg

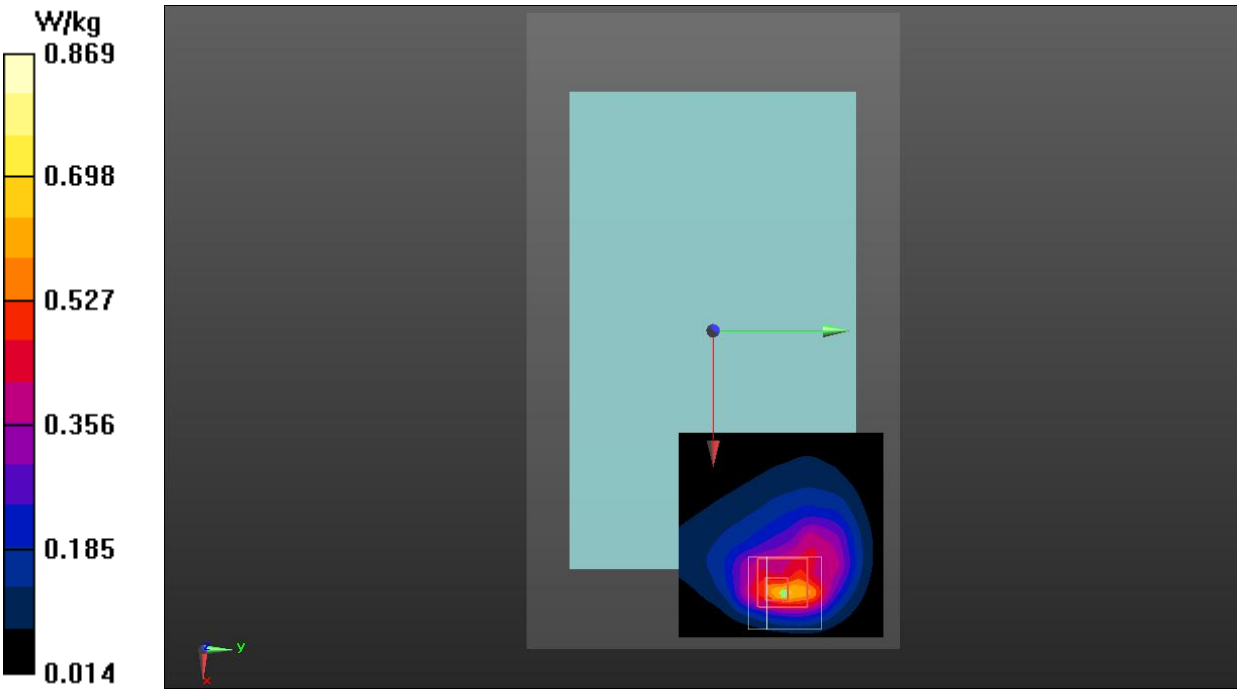

Fig.5 WCDMA Band 5 Body

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LTE Band 2 Body

Date: 2021-3-6

Electronics: DAE4 Sn1527

Medium: Head 1900MHz

Medium parameters used: f = 1860 MHz; σ = 1.35 S/m; ε_r = 40.479; ρ = 1000 kg/m^3

Communication System: UID 0, LTE_FDD (0) Frequency: 1860 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.76, 7.76, 7.76);

Rear Side Low 1RB50/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.15 W/kg

Rear Side Low 1RB50/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.590 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 0.787 W/kg; SAR(10 g) = 0.426 W/kg

Maximum value of SAR (measured) = 1.11 W/kg

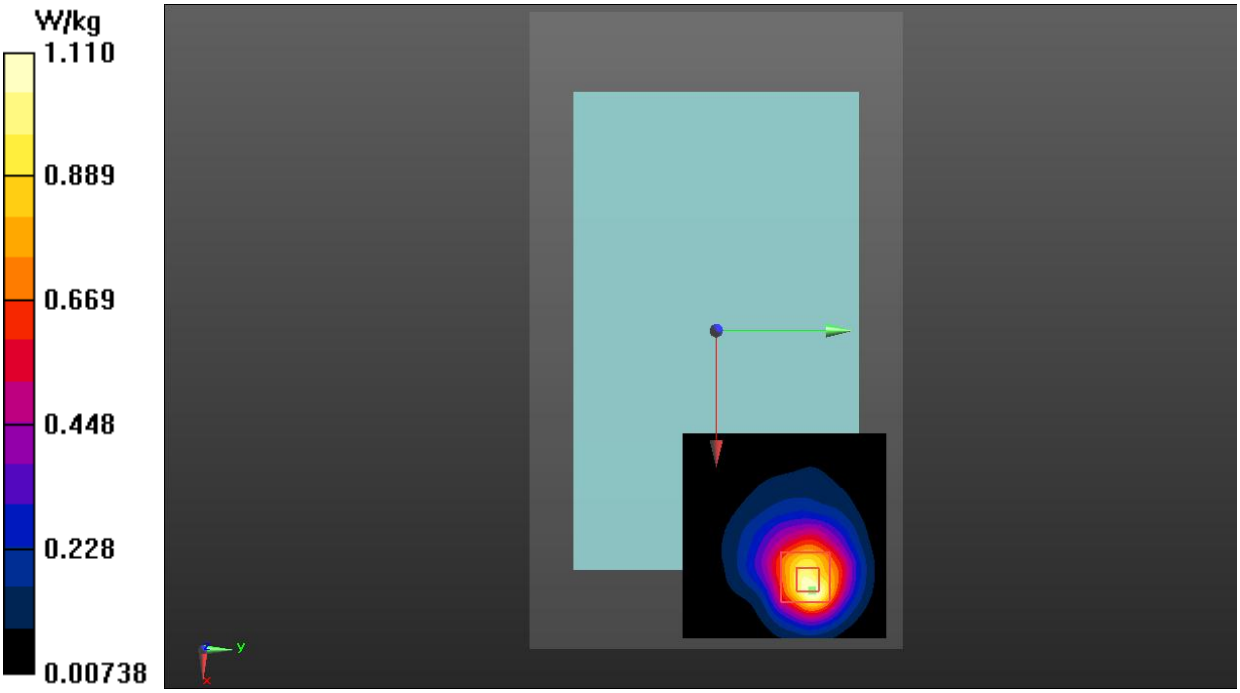

Fig.6 LTE Band 2 Body

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LTE Band 5 Body

Date: 2021-3-3

Electronics: DAE4 Sn1527

Medium: Head 835MHz

Medium parameters used (interpolated): f = 829 MHz; σ = 0.907 S/m; ε_r = 40.71; ρ = 1000 kg/m^3

Communication System: UID 0, LTE_FDD (0) Frequency: 829 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (9.59, 9.59, 9.59);

Rear Side Low 1RB24/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.937 W/kg

Rear Side Low 1RB24/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.533 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.43 W/kg

SAR(1 g) = 0.684 W/kg; SAR(10 g) = 0.387 W/kg

Maximum value of SAR (measured) = 0.892 W/kg

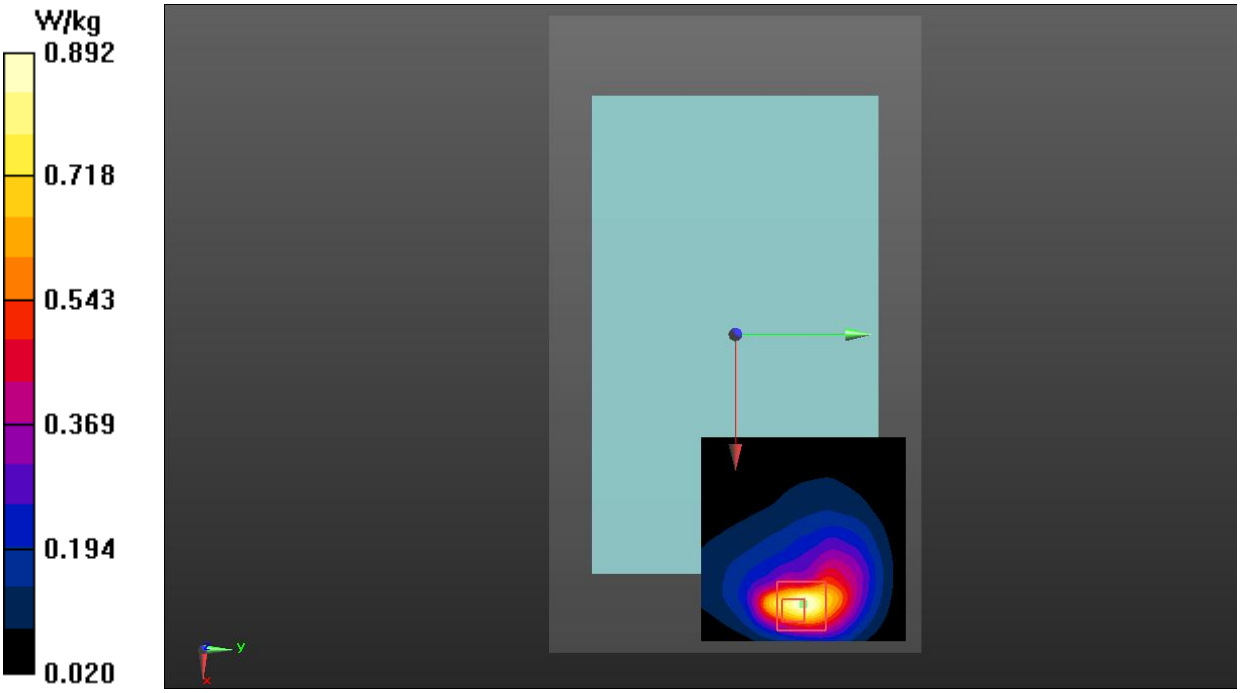

Fig.7 LTE Band 5 Body

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LTE Band 7 Body

Date: 2021-3-16

Electronics: DAE4 Sn1527

Medium: Head 2550MHz

Medium parameters used: f = 2560 MHz; σ = 1.956 S/m; ε_r = 38.274; ρ = 1000 kg/m^3

Communication System: UID 0, LTE_FDD (0) Frequency: 2560 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.20, 7.20, 7.20);

Top Side High 1RB50/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.53 W/kg

Top Side High 1RB50/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.13 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 1.96 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.527 W/kg

Maximum value of SAR (measured) = 1.49 W/kg

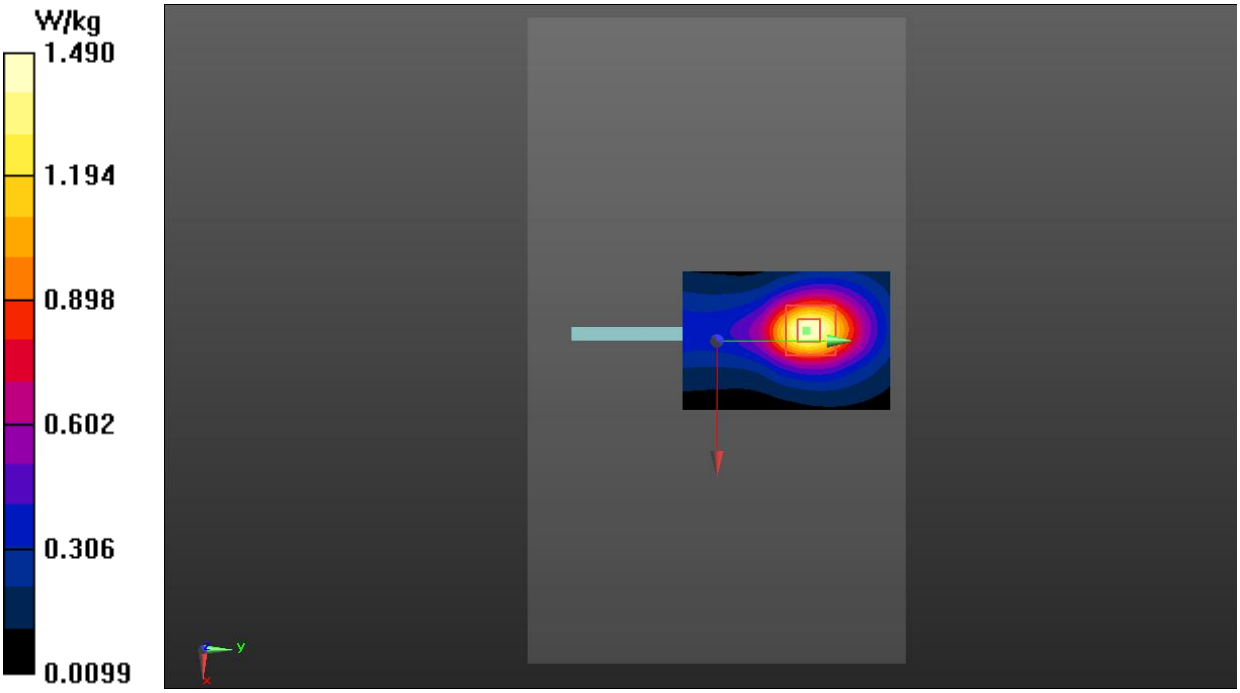

Fig.8 LTE Band 7 Body

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LTE Band 12 Body

Date: 2021-3-9

Electronics: DAE4 Sn1527

Medium: Head 750MHz

Medium parameters used (interpolated): f = 711 MHz; σ = 0.878 S/m; ε_r = 41.62; ρ = 1000 kg/m^3

Communication System: UID 0, LTE_FDD (0) Frequency: 711 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (9.59, 9.59, 9.59);

Rear Side High 25RB0/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

Rear Side High 25RB0/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.112 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.66 W/kg

SAR(1 g) = 0.573 W/kg; SAR(10 g) = 0.263 W/kg

Maximum value of SAR (measured) = 1.00 W/kg

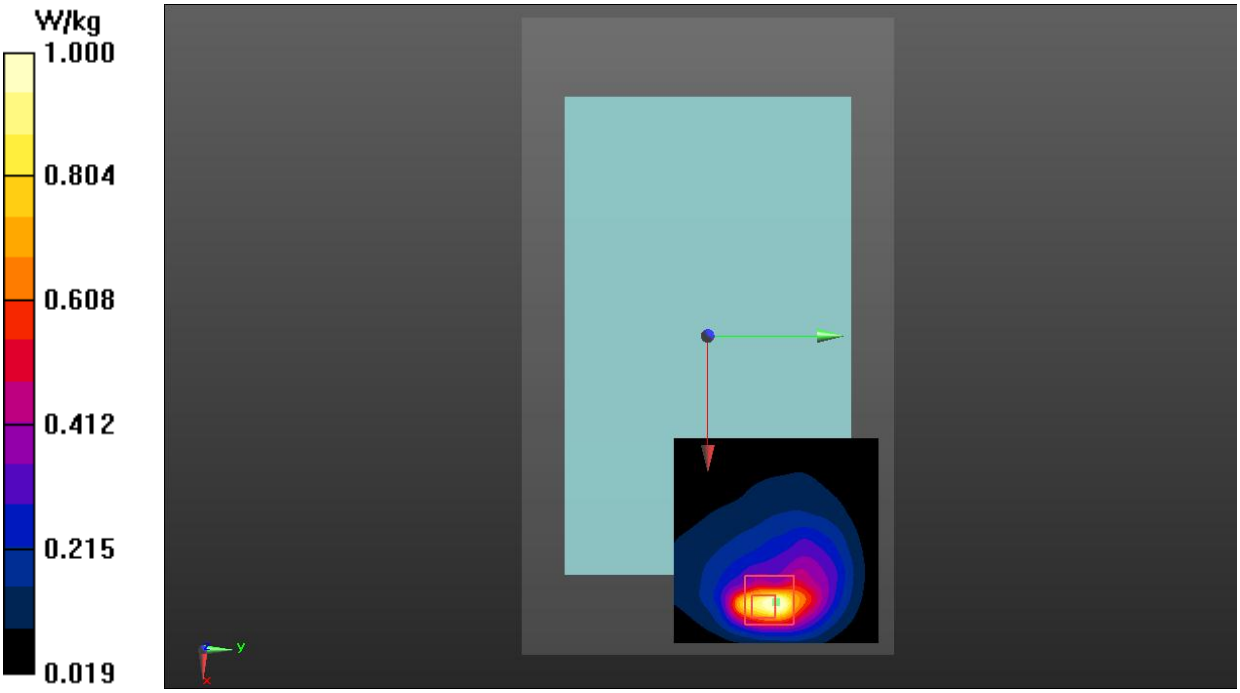

Fig.9 LTE Band 12 Body

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LTE Band 66 Body

Date: 2021-3-10

Electronics: DAE4 Sn1527

Medium: Head 1750MHz

Medium parameters used: f = 1745 MHz; σ = 1.357 S/m; ε_r = 40.805; ρ = 1000 kg/m^3

Communication System: UID 0, LTE_FDD (0) Frequency: 1745 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (8.09, 8.09, 8.09);

Rear Side Middle 100RB/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.22 W/kg

Rear Side Middle 100RB/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.8760 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 0.885 W/kg; SAR(10 g) = 0.473 W/kg

Maximum value of SAR (measured) = 1.22 W/kg

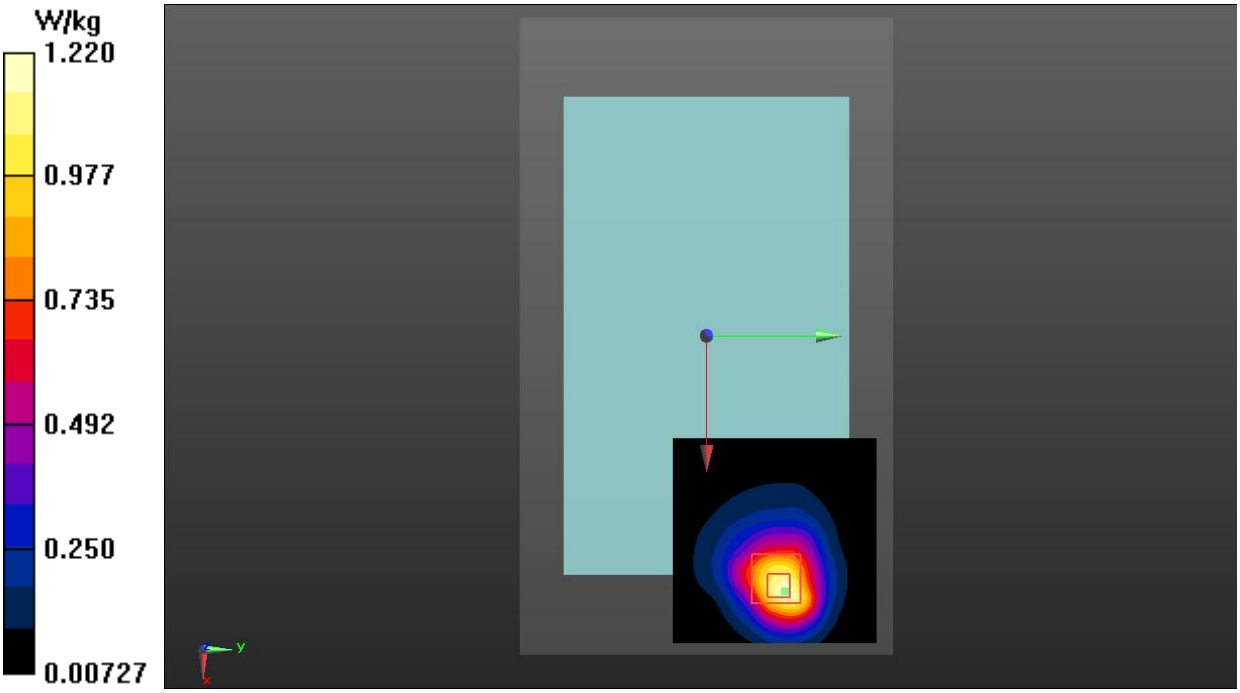

Fig.10 LTE Band 66 Body

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Bluetooth Body

Date: 2021-3-14

Electronics: DAE4 Sn1527

Medium: Head 2450MHz

Medium parameters used: f = 2480 MHz; σ = 1.861 S/m; ε_r = 38.485; ρ = 1000 kg/m^3

Communication System: UID 0, BT (0) Frequency: 2480 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3633 ConvF (7.43, 7.43, 7.43)

Rear Side High/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.282 W/kg

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

Reference Value = 0.567 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.411 W/kg

SAR(1 g) = 0.196 W/kg; SAR(10 g) = 0.115 W/kg

Maximum value of SAR (measured) = 0.297 W/kg

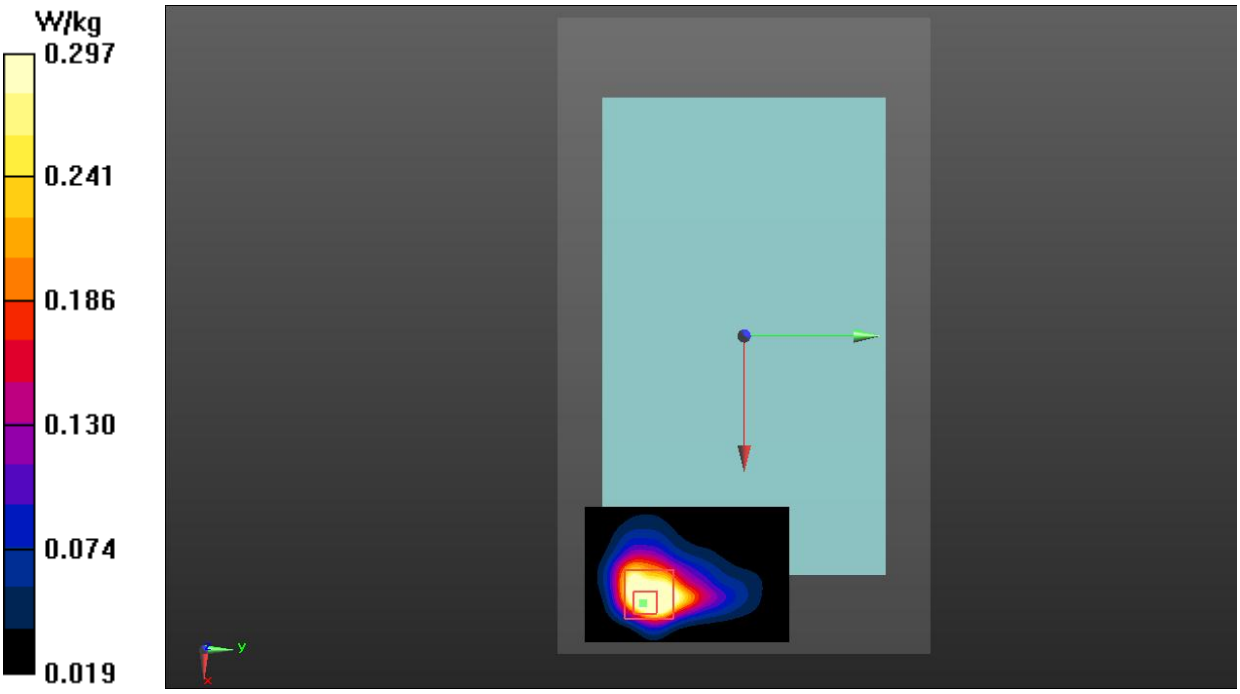

Fig.11 Bluetooth Body

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WLAN 2.4G Body

Date: 2021-3-14

Electronics: DAE4 Sn1527

Medium: Head 2450MHz

Medium parameters used (interpolated): f = 2437 MHz; σ = 1.811 S/m; ε_r = 38.627; ρ = 1000 kg/m^3

Communication System: UID 0, WiFi (0) Frequency: 2437 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN3633 ConvF (7.43, 7.43, 7.43)

Rear Side Middle/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.08 W/kg

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

Reference Value = 0.268 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.505 W/kg; SAR(10 g) = 0.233 W/kg

Maximum value of SAR (measured) = 0.569 W/kg

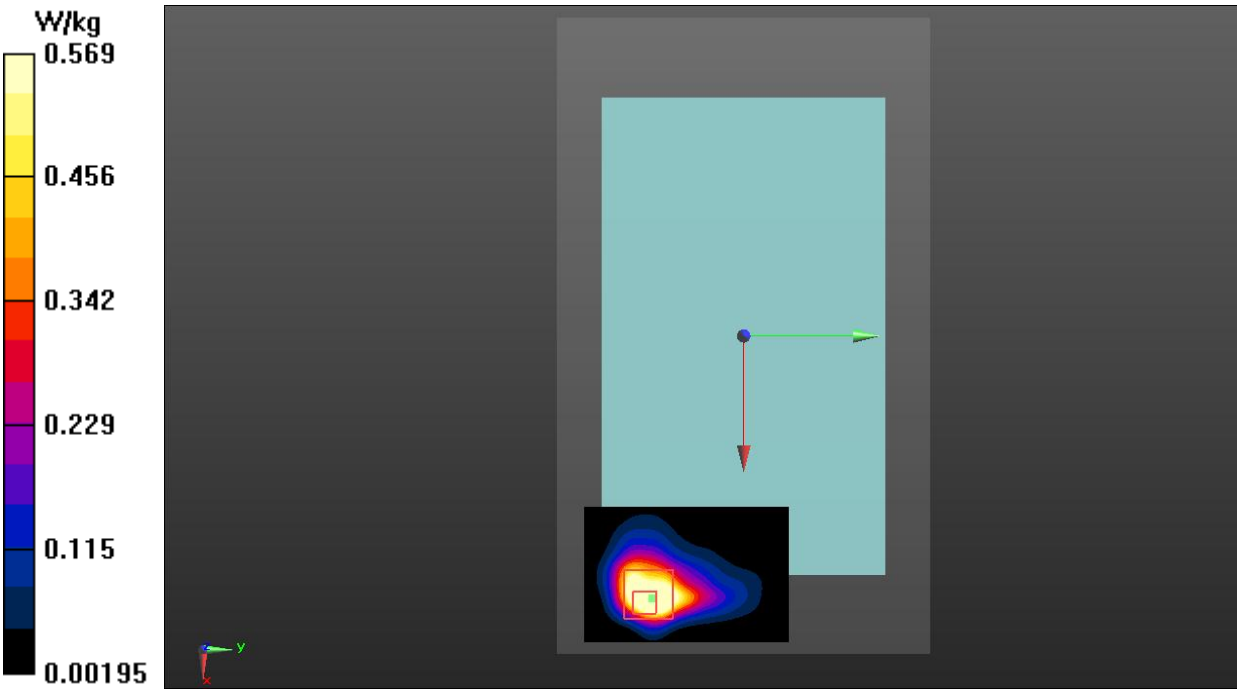

Fig.12 WLAN 2.4G Body

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WLAN 5G Body

Date: 2021-3-15

Electronics: DAE4 Sn1527

Medium: Head 5250MHz

Medium parameters used: f = 5320 MHz; σ =4.854 S/m; ε_r = 35.073; ρ = 1000 kg/m^3

Communication System: UID 0, WiFi (0) Frequency: 5320 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (5.47, 5.47, 5.47);

Rear Side CH64/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.46 W/kg

Rear Side CH64/Zoom Scan (8x8x21)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 0.164 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 2.80 W/kg

SAR(1 g) = 0.565 W/kg; SAR(10 g) = 0.161 W/kg

Maximum value of SAR (measured) = 1.13 W/kg

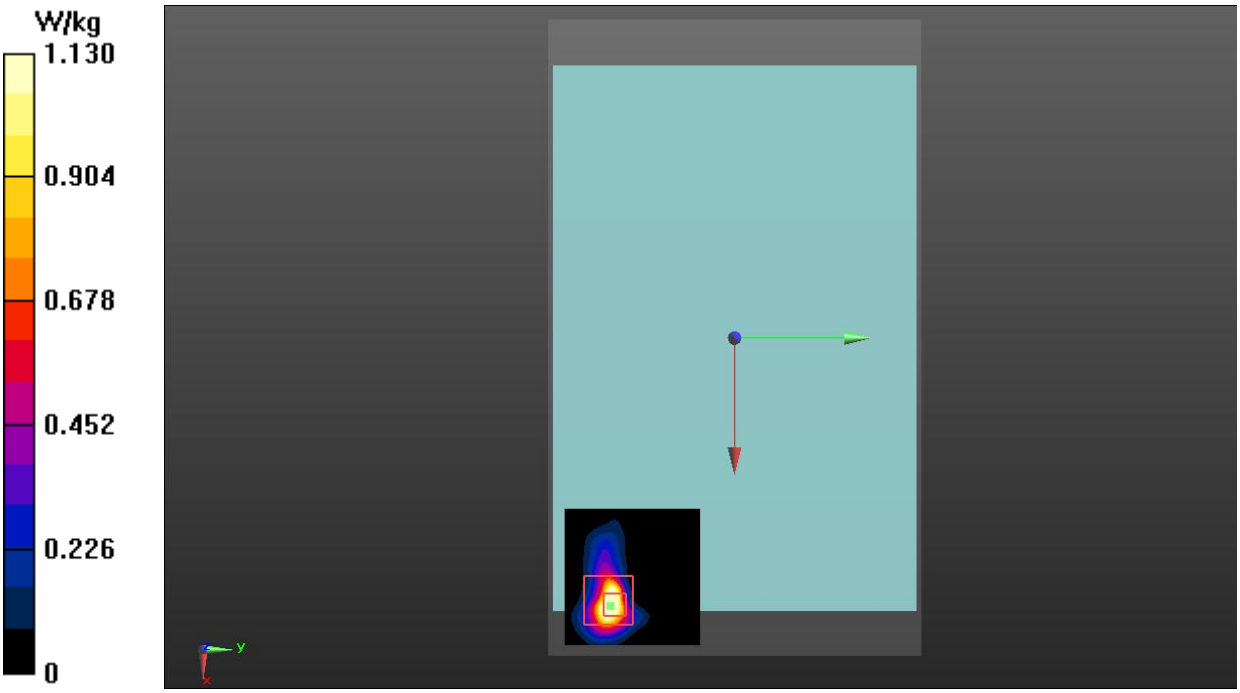

Fig.13 WLAN 5G Body

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ANNEX B: SystemVerification Results

750MHz

Date: 2021-3-9

Electronics: DAE4 Sn1527

Medium: Head 750MHz

Medium parameters used: f = 750 MHz; σ = 0.903 S/m; ε_r = 41.152; ρ = 1000 kg/m^3

Communication System: CW_TMC Frequency: 750 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (9.59, 9.59, 9.59);

System Validation/Area Scan (81x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 60.855 V/m; Power Drift = 0.02 dB

SAR(1 g) = 2.19 W/kg; SAR(10 g) = 1.45 W/kg

Maximum value of SAR (interpolated) = 2.82 W/kg

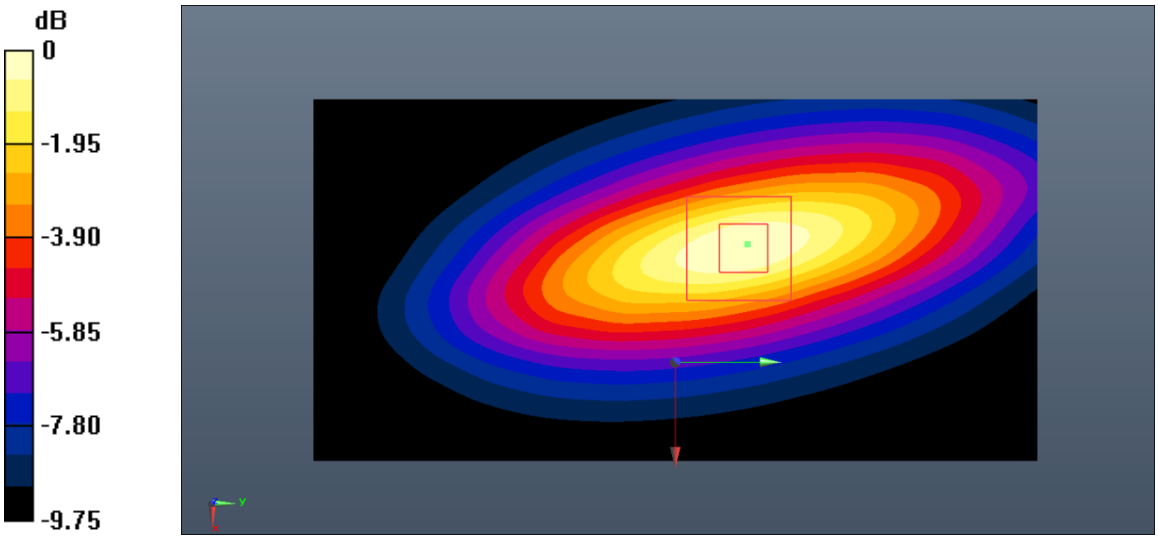
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 60.855 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.27 W/kg

SAR(1 g) = 2.22 W/kg; SAR(10 g) = 1.46 W/kg

Maximum value of SAR (measured) = 2.88 W/kg



0 dB = 2.88 W/kg = 4.59 dB W/kg

Fig.B.1. Validation 750MHz 250mW

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835MHz

Date: 2021-3-3

Electronics: DAE4 Sn1527

Medium: Head 835MHz

Medium parameters used: f = 835 MHz; σ = 0.912 S/m; εr = 40.638; ρ = 1000 kg/m^3

Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (9.59, 9.59, 9.59);

System Validation/Area Scan (91x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 61.914 V/m; Power Drift = 0.08 dB

SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.57 W/kg

Maximum value of SAR (interpolated) = 3.56 W/kg

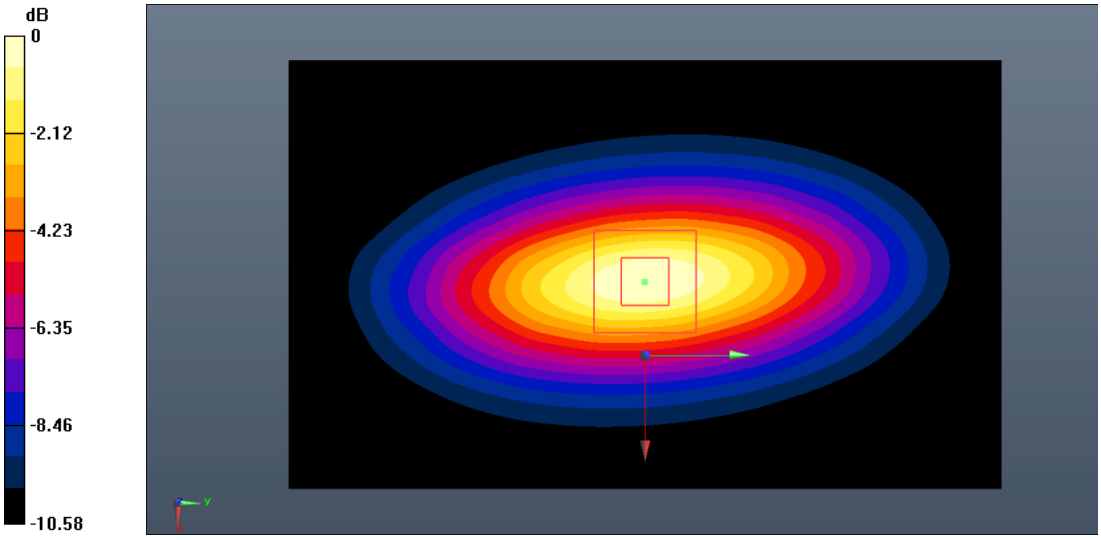
System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 61.914 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 4.22 W/kg

SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 3.61 W/kg



0 dB = 3.61 W/kg = 5.58 dB W/kg

Fig.B.2. Validation 835MHz 250mW

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1750MHz

Date: 2021-3-10

Electronics: DAE4 Sn1527

Medium: Head 1750MHz

Medium parameters used: f = 1750 MHz; σ = 1.361 S/m; ε_r = 40.785; ρ = 1000 kg/m^3

Communication System: CW_TMC Frequency: 1750 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (8.09, 8.09, 8.09);

System Validation/Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 76.963 V/m; Power Drift = -0.03 dB

SAR(1 g) = 8.91 W/kg; SAR(10 g) = 4.79 W/kg

Maximum value of SAR (interpolated) = 10.3 W/kg

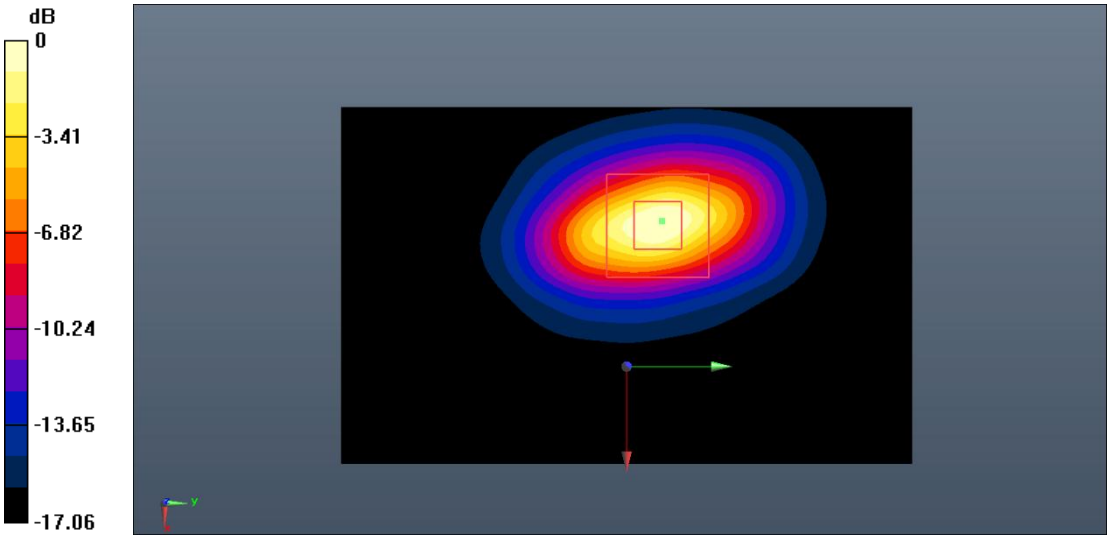
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 76.963 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 19.7 W/kg

SAR(1 g) = 8.78 W/kg; SAR(10 g) = 4.74 W/kg

Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 10.1 W/kg = 10.04 dB W/kg

Fig.B.3. Validation 1750MHz 250mW

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1900MHz

Date: 2021-3-6

Electronics: DAE4 Sn1527

Medium: Head 1900MHz

Medium parameters used: f = 1900 MHz; σ = 1.385 S/m; ε_r = 40.323; ρ = 1000 kg/m^3

Communication System: CW_TMC Frequency: 1900 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.76, 7.76, 7.76);

System Validation/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 82.346 V/m; Power Drift = -0.06 dB

SAR(1 g) = 9.95 W/kg; SAR(10 g) = 5.23 W/kg

Maximum value of SAR (interpolated) = 11.8 W/kg

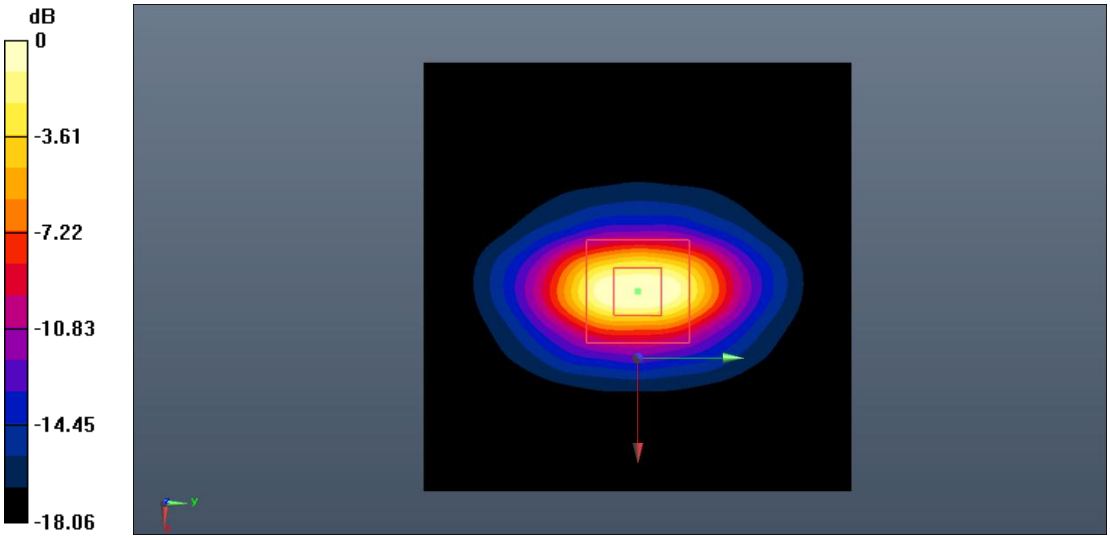
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 82.346 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 23.1 W/kg

SAR(1 g) = 9.73 W/kg; SAR(10 g) = 5.15 W/kg

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



0 dB = 11.5 W/kg = 10.61 dB W/kg

Fig.B.4. Validation 1900MHz 250mW

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2450MHz

Date: 2021-3-14

Electronics: DAE4 Sn1527

Medium: Head 2450MHz

Medium parameters used: f = 2450 MHz; σ = 1.826 S/m; ε_r = 38.584; ρ = 1000 kg/m^3

Communication System: CW_TMC Frequency: 2450 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.43, 7.43, 7.43);

System Validation/Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 89.042 V/m; Power Drift = 0.02 dB

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.08 W/kg

Maximum value of SAR (interpolated) = 15.1 W/kg

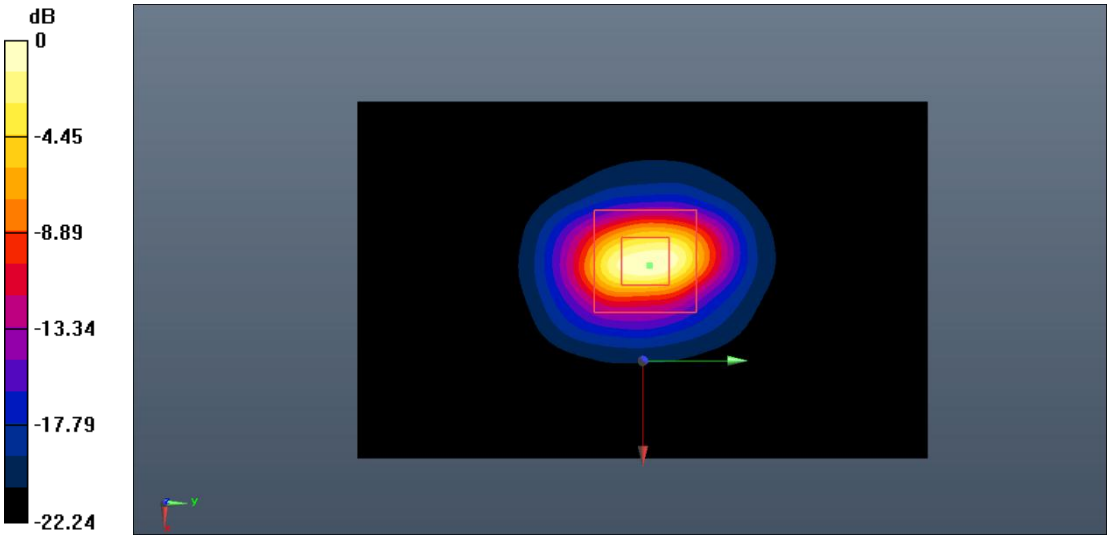
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.042 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 30.5 W/kg

SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.18 W/kg

Maximum value of SAR (measured) = 15.4 W/kg



0 dB = 15.4 W/kg = 11.88 dB W/kg

Fig.B.5. Validation 2450MHz 250mW

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2550MHz

Date: 2021-3-16

Electronics: DAE4 Sn1527

Medium: Head 2550MHz

Medium parameters used: f = 2550 MHz; σ = 1.944 S/m; ε_r = 38.307; ρ = 1000 kg/m^3

Communication System: CW_TMC Frequency: 2550 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.20, 7.20, 7.20);

System Validation/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 93.205 V/m; Power Drift = 0.11 dB

SAR(1 g) = 14.6 W/kg; SAR(10 g) = 6.58 W/kg

Maximum value of SAR (interpolated) = 16.7 W/kg

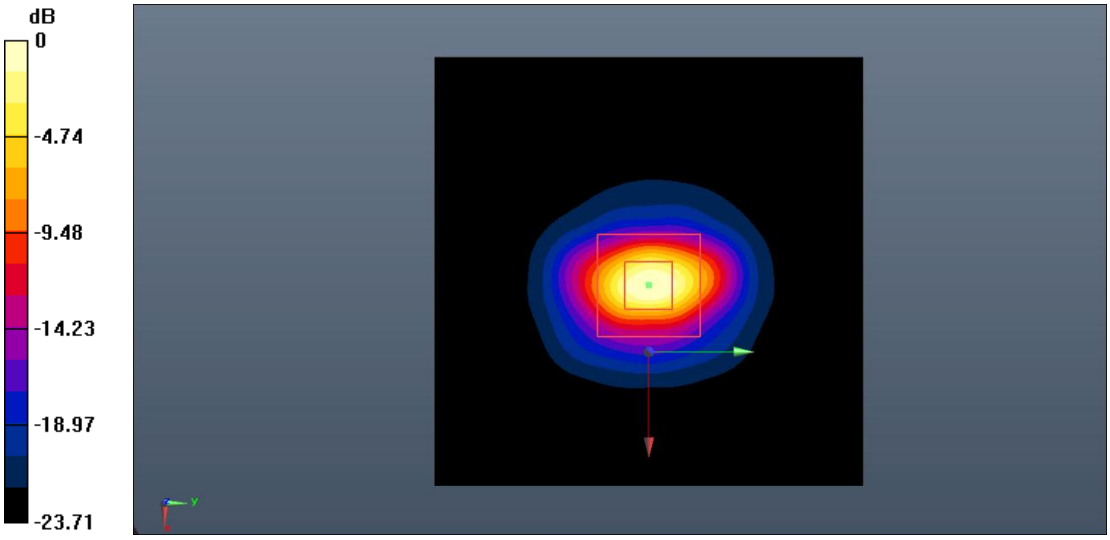
System Validation/Zoom Scan (7x7x7)/Cube0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.205 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 35.4 W/kg

SAR(1 g) = 14.8 W/kg; SAR(10 g) = 6.72 W/kg

Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dB W/kg

Fig.B.6. Validation 2550MHz 250mW

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5250MHz

Date: 2021-3-15

Electronics: DAE4 Sn1527

Medium: Head 5250MHz

Medium parameters used: f = 5250 MHz; σ = 4.759 S/m; ε_r = 35.262; ρ = 1000 kg/m^3

Communication System: CW Frequency: 5250 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (5.47, 5.47, 5.47);

System Validation/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 66.129 V/m; Power Drift = 0.05 dB

SAR(1 g) = 7.88 W/kg; SAR(10 g) = 2.22 W/kg

Maximum value of SAR (interpolated) = 9.93 W/kg

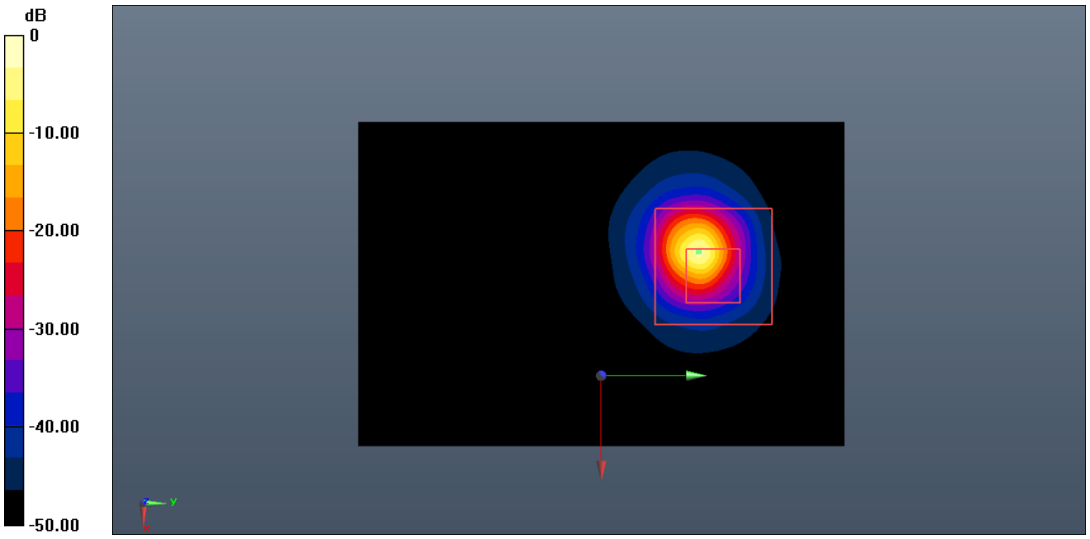
System Validation/Zoom Scan (8x8x21)/Cube0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.129 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 26.2 W/kg

SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.28 W/kg

Maximum value of SAR (measured) = 10.2 W/kg



0 dB = 10.2 W/kg = 10.09 dB W/kg

Fig.B.7. Validation 5250MHz 100mW

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5750MHz

Date: 2021-3-15

Electronics: DAE4 Sn1527

Medium: Head 5750 MHz

Medium parameters used: f = 5750 MHz; σ = 5.142 S/m; ε_r = 35.969; ρ = 1000 kg/m^3

Communication System: CW Frequency: 5750 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (4.73, 4.73, 4.73);

System Validation/Area Scan (61x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 62.828 V/m; Power Drift = -0.12 dB

SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.21 W/kg

Maximum value of SAR (interpolated) = 9.85 W/kg

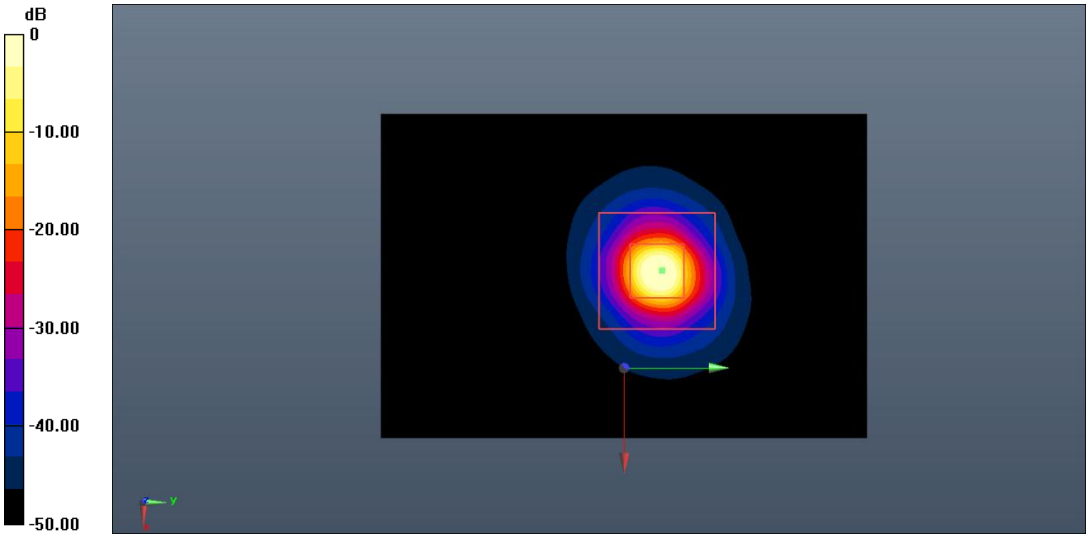
System Validation/Zoom Scan (8x8x21)/Cube0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62.828 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 22.4 W/kg

SAR(1 g) = 7.57 W/kg; SAR(10 g) = 2.19 W/kg

Maximum value of SAR (measured) = 9.76 W/kg



0 dB = 9.76 W/kg = 9.89 dB W/kg

Fig.B.8. Validation 5750MHz 100mW

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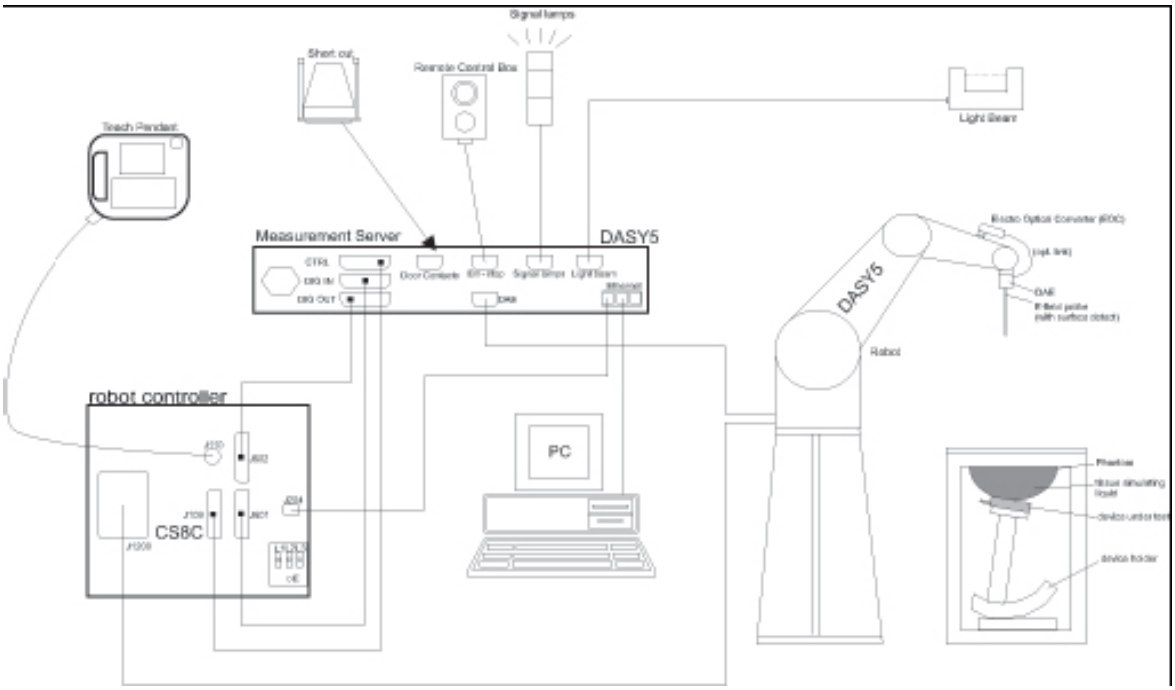
ANNEX C: SAR Measurement Setup

C.1. Measurement Set-up

DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture C.1 SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- 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.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- 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.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as
- warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

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C.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection durning a software approach and looks for the maximum using 2ndord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model: ES3DV3, EX3DV4
Frequency Range: 10MHz — 6.0GHz(EX3DV4)
10MHz — 4GHz(ES3DV3)
Calibration: In head and body simulating tissue at Frequencies from 835 up to 5800MHz
Linearity: ± 0.2 dB(30 MHz to 6 GHz) for EX3DV4
± 0.2 dB(30 MHz to 4 GHz) for ES3DV3
Dynamic Range: 10 mW/kg — 100W/kg
Probe Length: 330 mm
Probe Tip Length: 20 mm
Body Diameter: 12 mm
Tip Diameter: 2.5 mm (3.9 mm for ES3DV3)
Tip-Center: 1 mm (2.0mm for ES3DV3)
Application: SAR Dosimetry Testing
Compliance tests of mobile phones
Dosimetry in strong gradient fields

Picture C.2 Near-field Probe

Picture C.3 E-field Probe

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C.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and inn a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/ cm^2.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where:

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

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