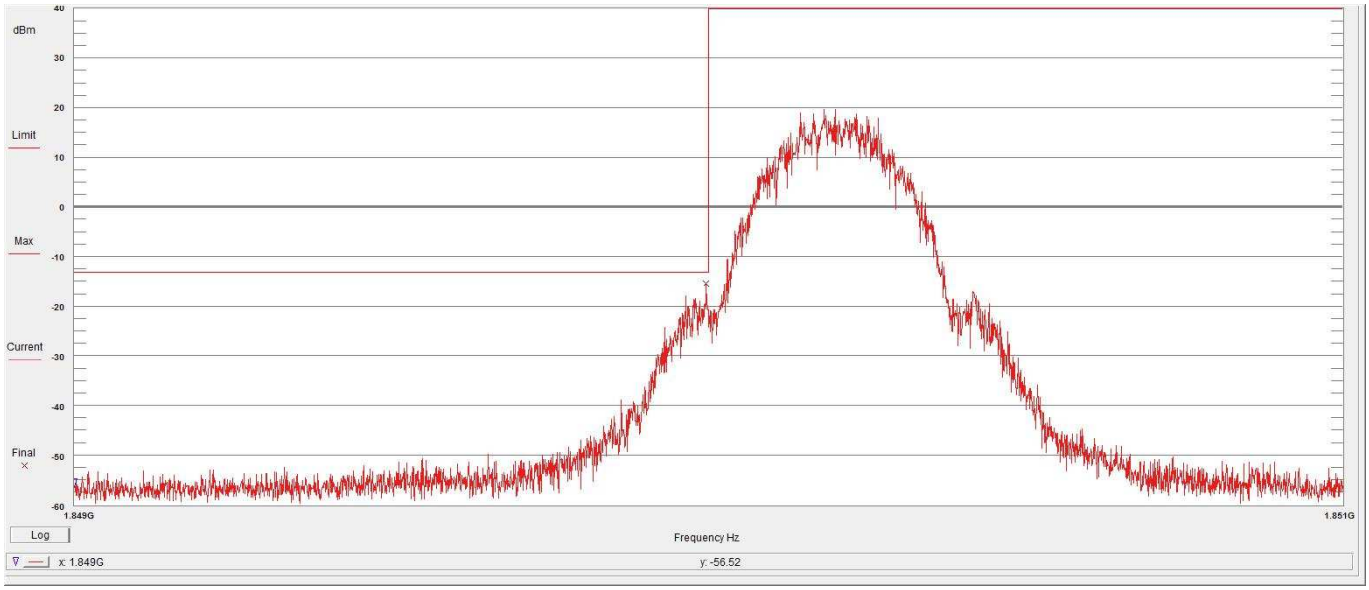
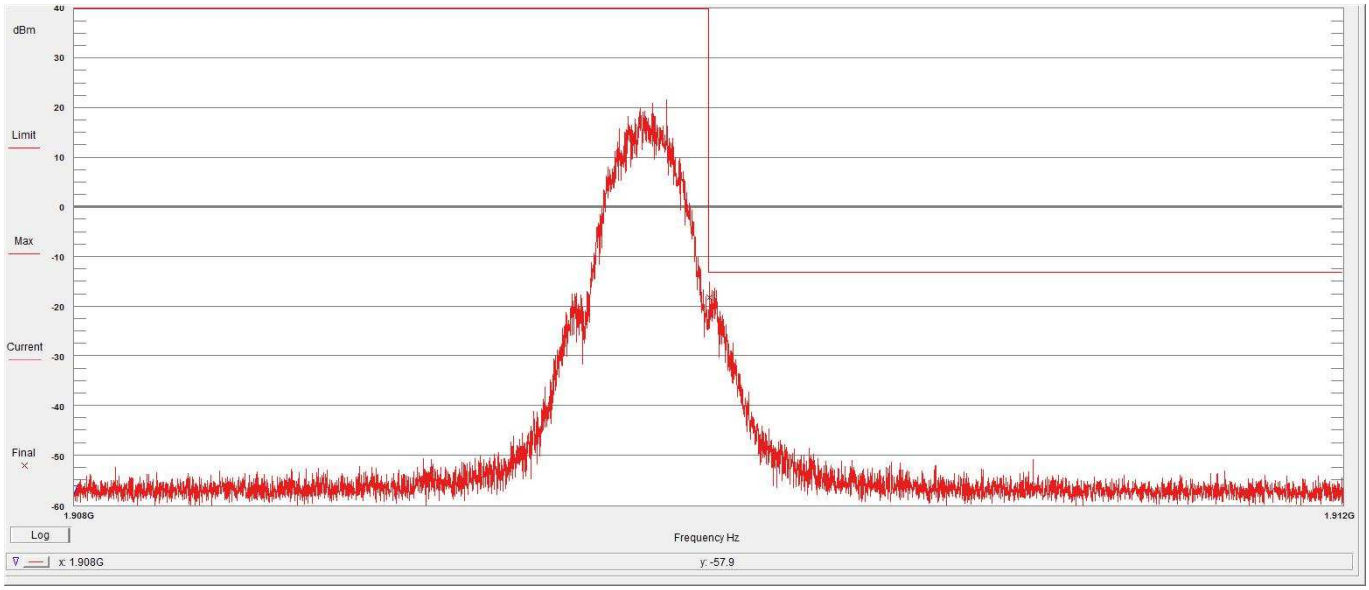
Band	Mode	BW MHz	Modulation	RB / Offset	Channel	Frequency MHz	Detector	RBW / VBW	Peak value	FCC limit	Margin dB	Verdict
				75	19125	1910	RMS	150kHz	-26.2	-13	13.2	PASS
				100	18700	1850	RMS	200kHz	-24.8	-13	11.8	PASS
			QPSK	100	19100	1910	RMS	200kHz	-24.8	-13	11.8	PASS
				100	18700	1850	RMS	200kHz	-26.2	-13	13.2	PASS
		20	16QAM	100	19100	1910	RMS	200kHz	-26.1	-13	13.1	PASS

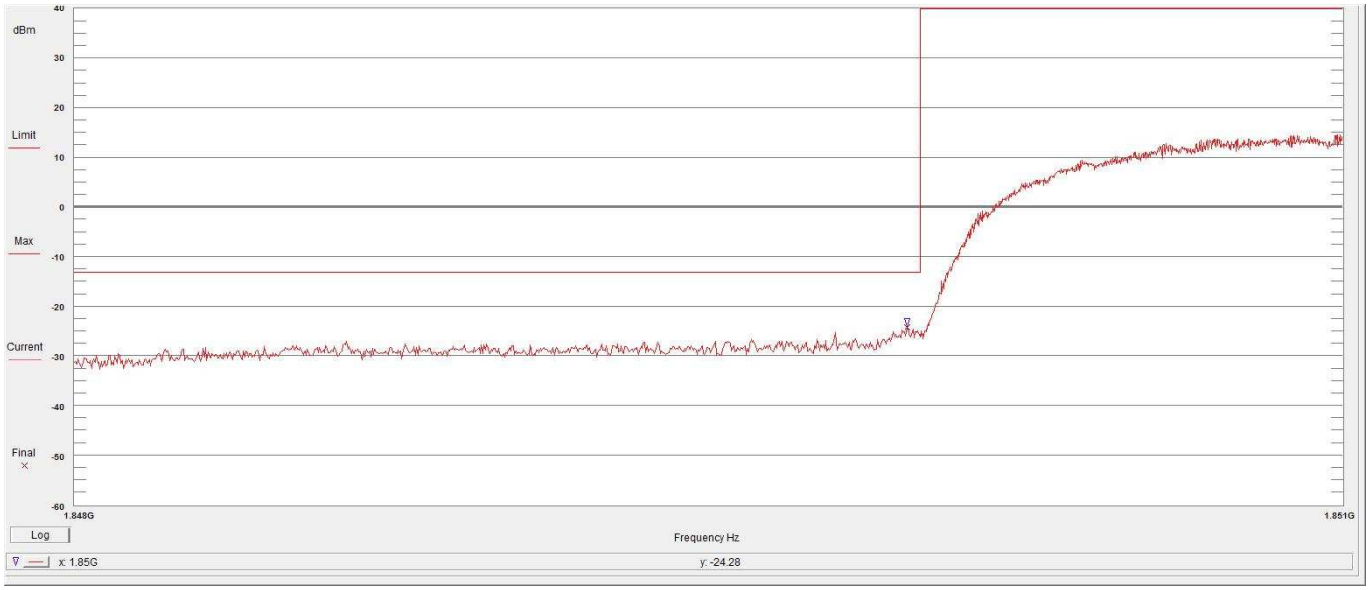
Table 17: Detailed results, Band Edge Compliance LTE FDD 2



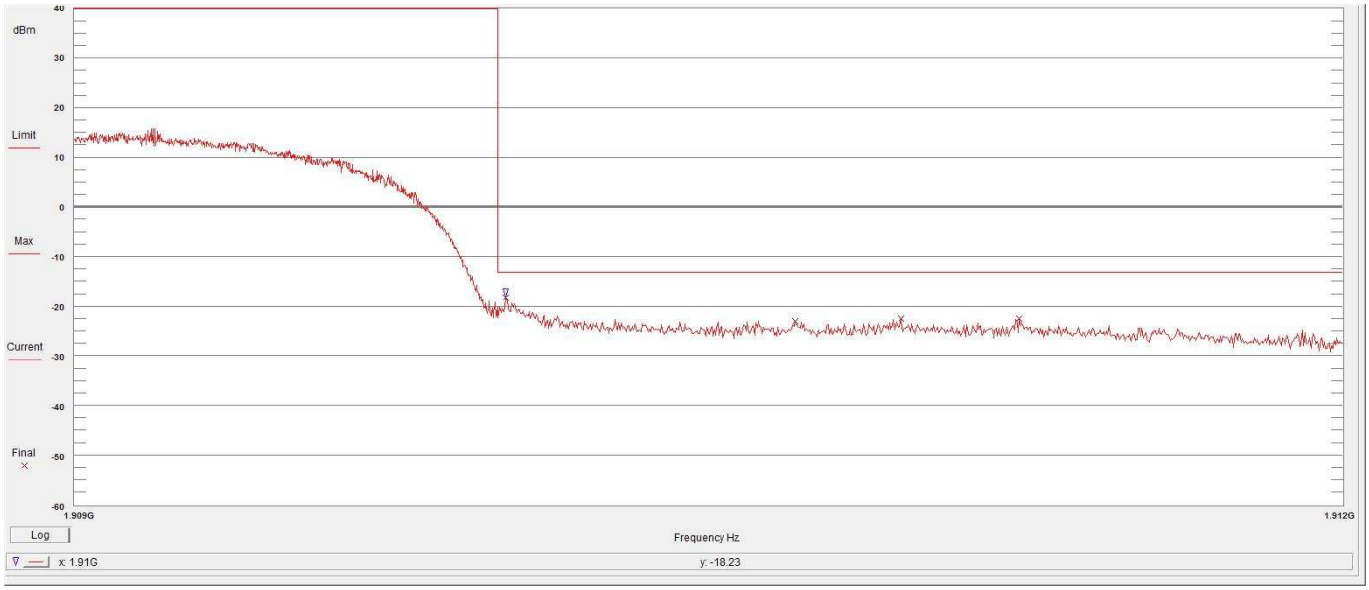
Picture 42: GSM 1900 Band Edge, Ch512



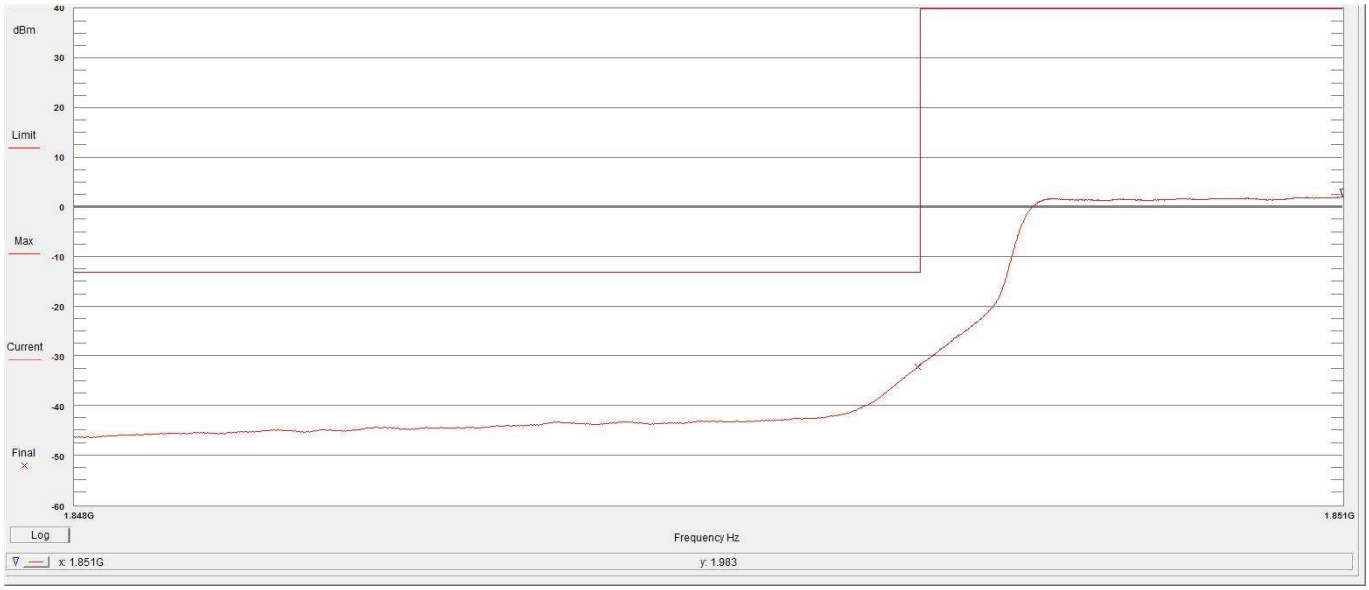
Picture 43: GSM 1900 Band Edge, Ch810



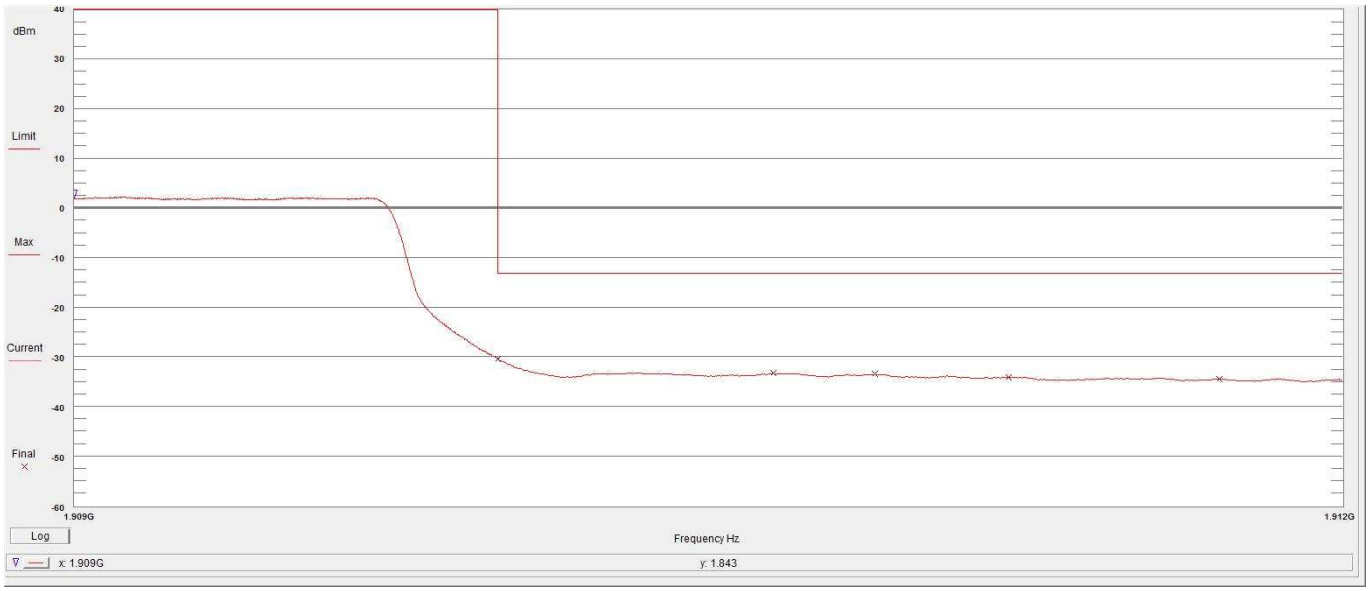
Picture 44: WCDMA FDD 2, Band Edge, Ch9262



Picture 45: WCDMA FDD 2, Band Edge, Ch9538



Picture 46: LTE FDD 2, 16-QAM, Band Edge, Ch18625



Picture 47: LTE FDD 2, 16-QAM, Band Edge, Ch19175

8.3 FCC Part 2 and 27

8.3.1 RF power output §2.1046, §27.250

Result: Passed

Setup: Conducted setup, Cond_2 EUT

Test specification: FCC part 2 and part 27

V27SD-41 reference data: MDE_ELEKT_1502_FCCg, page 83 (WCDMA FDD4)

MDE_ELEKT_1502_FCCh, page 52 (LTE FDD4)

Note: Testing has been done according to KDB 971168 D01.
Equation for determining the EIRP is: $EIRP = P_{Meas} + G_T - L_C$
Where P_{Meas} = measured transmitter output power (dBm)
G_T = gain of the transmitting antenna (dBi)
L_C = signal attenuation in the connecting cable between the transmitter and antenna (negligible)
G_T used to calculate EIRP for WCDMA FDD4 and LTE FDD4 is -1dBi.

Band	Mode	Channel	Frequency (MHz)	RMS Conducted power (dBm)	FCC EIRP limit (dBm)	Calculated EIRP (dBm)	Verdict
FDD 4	WCDMA	Low	1712.4	24.64	30	23.64	PASS
		Mid	1732.4	23.83	30	22.83	PASS
		High	1752.6	23.5	30	22.5	PASS

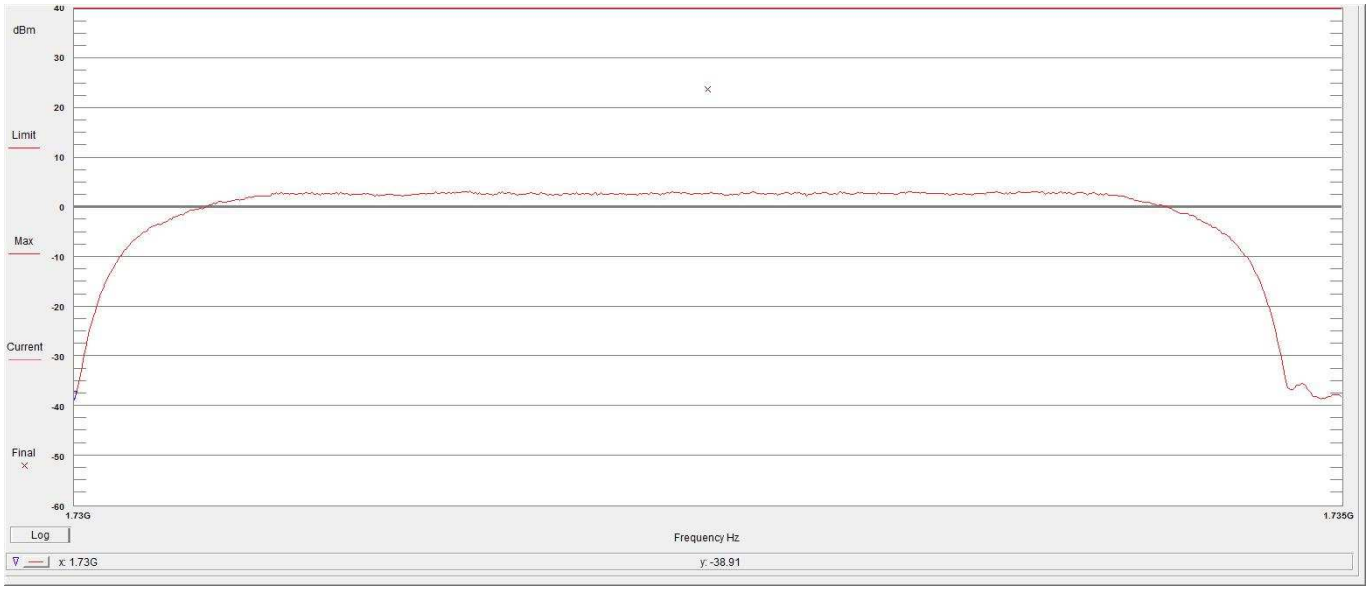
Table 18: Detailed results WCDMA FDD 4, RF power output

Band	Bandwidth	Channel	Modulation	RB	RMS Conducted power (dBm)	FCC EIRP limit (dBm)	Calculated EIRP (dBm)	Verdict
LTE FDD4	1.4 MHz	19957	QPSK	1	24.07	30	23.07	PASS
			QPSK	3	23.94	30	22.94	PASS
			QPSK	6	22.92	30	21.92	PASS
			16QAM	1	22.9	30	21.9	PASS
			16QAM	6	21.82	30	20.82	PASS
		20175	QPSK	1	23.21	30	22.21	PASS
			QPSK	3	23.19	30	22.19	PASS

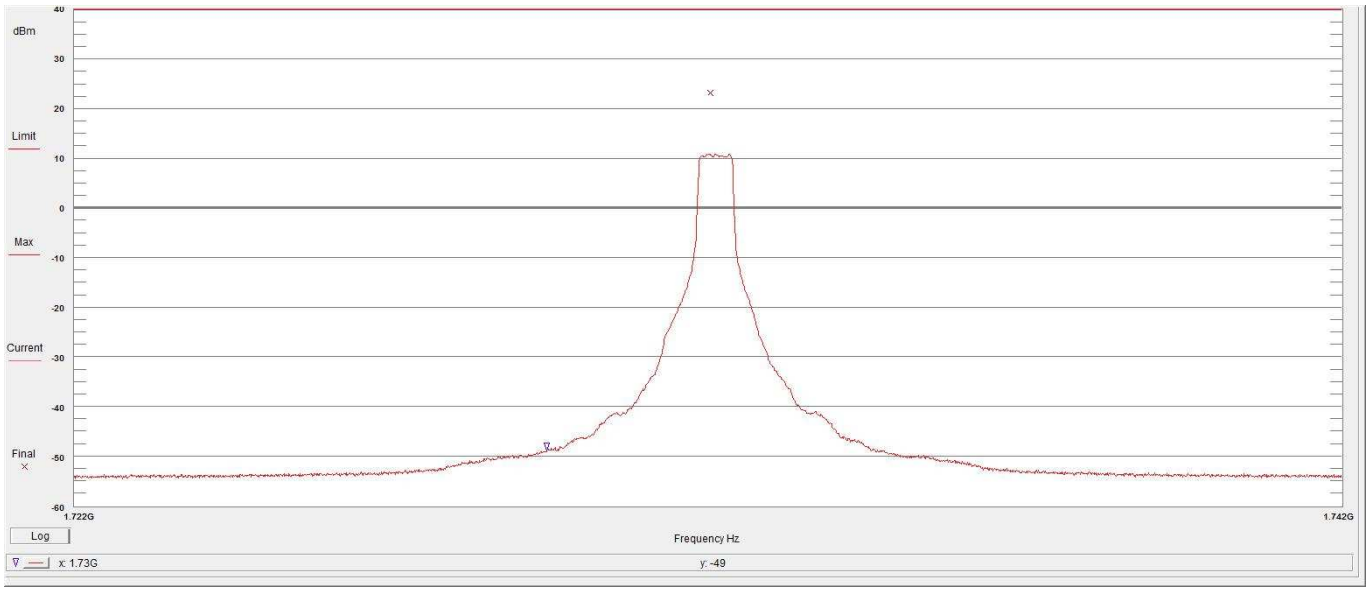
Band	Bandwidth	Channel	Modulation	RB	RMS Conducted power (dBm)	FCC EIRP limit (dBm)	Calculated EIRP (dBm)	Verdict
			QPSK	6	22.3	30	21.3	PASS
			16QAM	1	22.54	30	21.54	PASS
			16QAM	6	21.45	30	20.45	PASS
			QPSK	1	23.69	30	22.69	PASS
			QPSK	3	23.73	30	22.73	PASS
			QPSK	6	22.88	30	21.88	PASS
			16QAM	1	22.76	30	21.76	PASS
		20393	16QAM	6	21.75	30	20.75	PASS
			QPSK	1	24.09	30	23.09	PASS
			QPSK	15	22.98	30	21.98	PASS
			16QAM	1	22.86	30	21.86	PASS
		19965	16QAM	15	21.92	30	20.92	PASS
			QPSK	1	23.25	30	22.25	PASS
			QPSK	15	22.38	30	21.38	PASS
			16QAM	1	22.54	30	21.54	PASS
		20175	16QAM	15	21.47	30	20.47	PASS
			QPSK	1	23.67	30	22.67	PASS
			QPSK	15	22.86	30	21.86	PASS
			16QAM	1	22.74	30	21.74	PASS
LTE FDD4	3 MHz	20385	16QAM	15	21.78	30	20.78	PASS
			QPSK	1	24.03	30	23.03	PASS
			QPSK	12	22.89	30	21.89	PASS
			QPSK	25	22.97	30	21.97	PASS
			16QAM	1	22.81	30	21.81	PASS
		19975	16QAM	25	21.92	30	20.92	PASS
			QPSK	1	23.23	30	22.23	PASS
			QPSK	12	22.41	30	21.41	PASS
			QPSK	25	22.47	30	21.47	PASS
			16QAM	1	22.54	30	21.54	PASS
		20175	16QAM	25	21.5	30	20.5	PASS
			QPSK	1	23.73	30	22.73	PASS
			QPSK	12	22.87	30	21.87	PASS
			QPSK	25	22.81	30	21.81	PASS
			16QAM	1	22.73	30	21.73	PASS
LTE FDD4	5 MHz	20375	16QAM	25	21.84	30	20.84	PASS
			QPSK	1	24.06	30	23.06	PASS
			QPSK	50	23.02	30	22.02	PASS
LTE FDD4	10 MHz	20000	16QAM	1	22.86	30	21.86	PASS

Band	Bandwidth	Channel	Modulation	RB	RMS Conducted power (dBm)	FCC EIRP limit (dBm)	Calculated EIRP (dBm)	Verdict
			16QAM	50	21.92	30	20.92	PASS
			QPSK	1	23.16	30	22.16	PASS
			QPSK	50	22.38	30	21.38	PASS
			16QAM	1	22.45	30	21.45	PASS
		20175	16QAM	50	21.44	30	20.44	PASS
			QPSK	1	23.59	30	22.59	PASS
			QPSK	50	22.74	30	21.74	PASS
			16QAM	1	22.74	30	21.74	PASS
		20350	16QAM	50	21.72	30	20.72	PASS
			QPSK	1	24.03	30	23.03	PASS
			QPSK	36	22.95	30	21.95	PASS
			QPSK	75	22.76	30	21.76	PASS
			16QAM	1	22.84	30	21.84	PASS
		20025	16QAM	75	21.81	30	20.81	PASS
			QPSK	1	23.14	30	22.14	PASS
			QPSK	36	22.4	30	21.4	PASS
			QPSK	75	22.37	30	21.37	PASS
			16QAM	1	22.45	30	21.45	PASS
		20175	16QAM	75	21.42	30	20.42	PASS
			QPSK	1	23.61	30	22.61	PASS
			QPSK	36	22.73	30	21.73	PASS
			QPSK	75	22.81	30	21.81	PASS
			16QAM	1	22.74	30	21.74	PASS
LTE FDD4	15 MHz	200325	16QAM	75	21.78	30	20.78	PASS
			QPSK	1	24.02	30	23.02	PASS
			QPSK	100	22.43	30	21.43	PASS
			16QAM	1	22.88	30	21.88	PASS
		20050	16QAM	100	21.47	30	20.47	PASS
			QPSK	1	23.17	30	22.17	PASS
			QPSK	100	22.34	30	21.34	PASS
			16QAM	1	22.5	30	21.5	PASS
		20175	16QAM	100	21.37	30	20.37	PASS
			QPSK	1	23.53	30	22.53	PASS
			QPSK	100	22.81	30	21.81	PASS
			16QAM	1	22.71	30	21.71	PASS
LTE FDD4	20 MHz	20300	16QAM	100	21.76	30	20.76	PASS

Table 19: Detailed results LTE FDD 4, RF power output



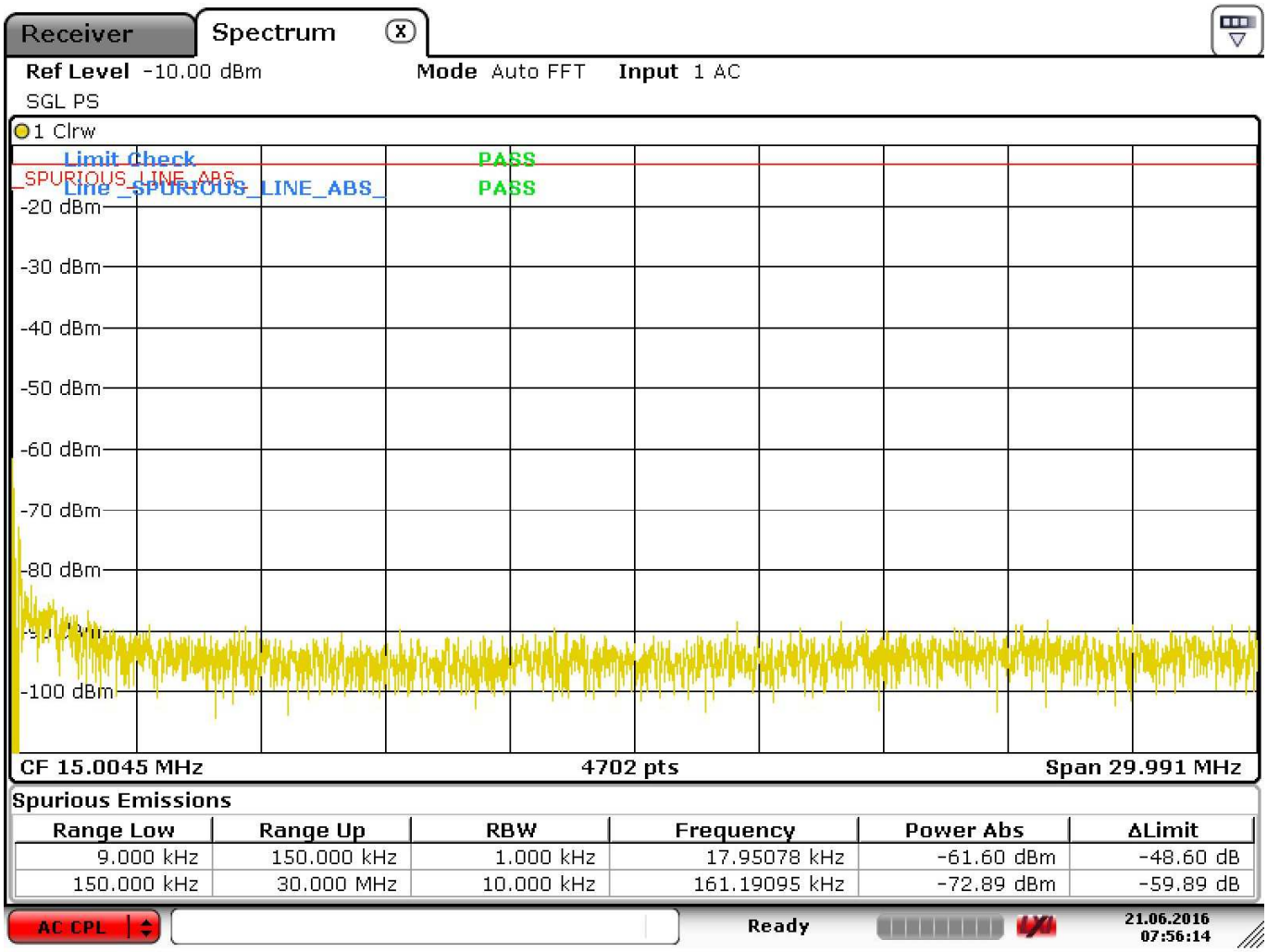
Picture 48: WCDMA FDD 4, Ch1412, RF power output, RBW 30 kHz, VBW 300 kHz



Picture 49: LTE FDD 4, QPSK, BW 5 MHz, Ch. 20175, RF power output, RBW 30 kHz, VBW 300 kHz

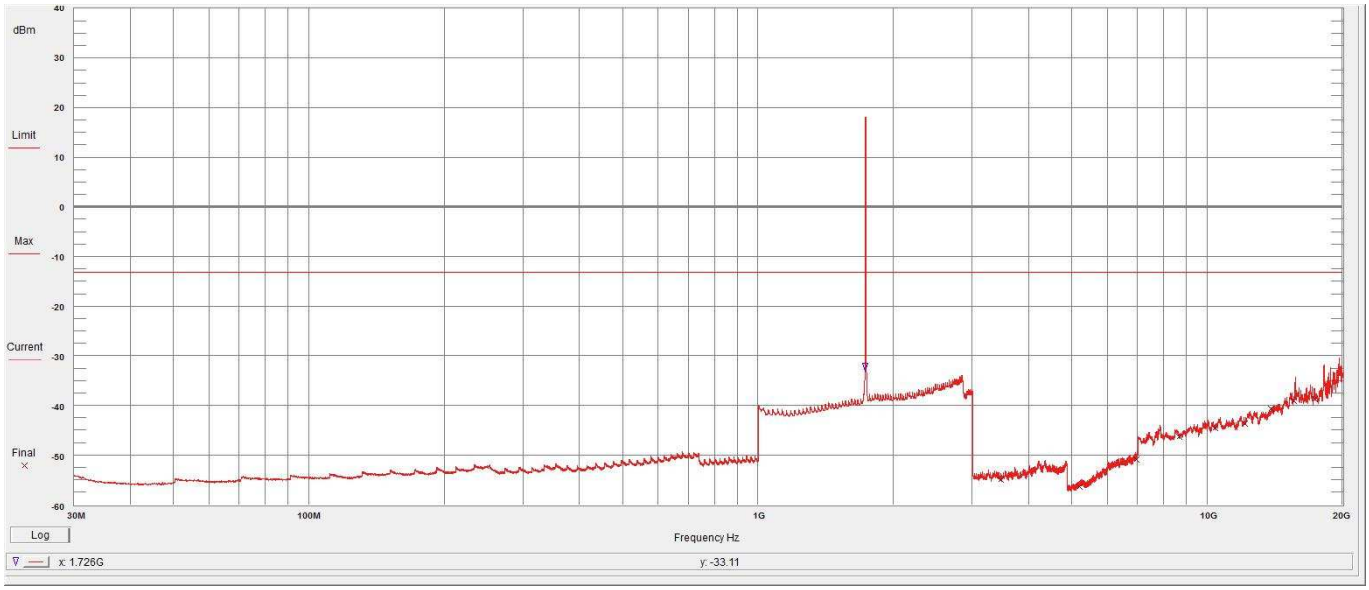
8.3.2 Spurious emissions at antenna terminals §2.1051, §27.53

Result:	Passed, there were no peaks with a margin less than 20 dB
Setup:	Conducted setup, Cond_2 EUT
Test specification	FCC part 2 and part 27
V27SD-41 reference data:	MDE_ELEKT_1502_FCCg, page 94 (WCDMA FDD4)
	MDE_ELEKT_1502_FCCh, page 63 (LTE FDD4)

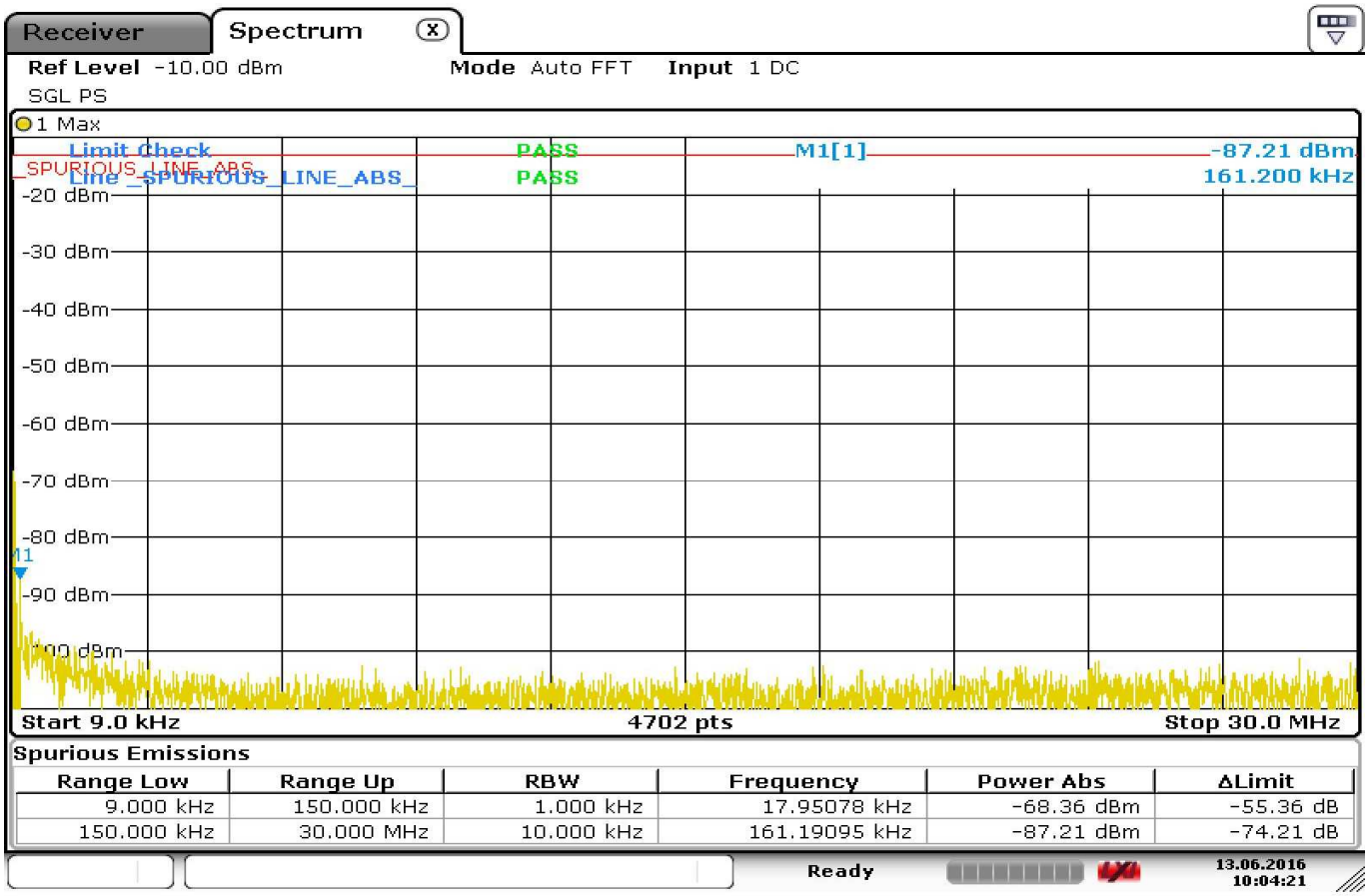


Date: 21.JUN.2016 07:56:14

Picture 50:WCDMA FDD 4, Ch1412, spurious emissions at antenna terminal, 9 kHz – 30 MHz

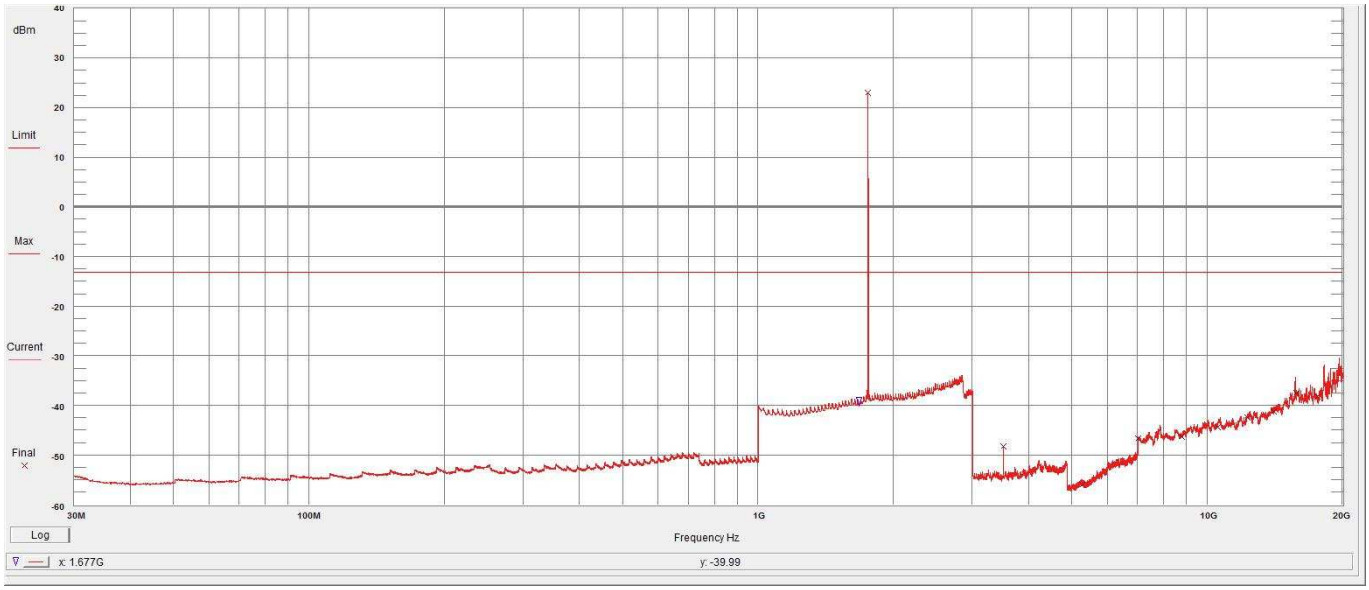


Picture 51: WCDMA FDD 4, Ch1412, spurious emissions at antenna terminal, 30 MHz – 20 GHz, peak is fundamental, RBW 100 kHz, VBW 300 kHz (freq<1GHz), RBW 1MHz, VBW 3MHz (freq >1 GHz)



Date: 13.JUN.2016 10:04:21

Picture 52: LTE FDD 4, Ch20175, spurious at antenna terminal, 9 kHz – 30 MHz

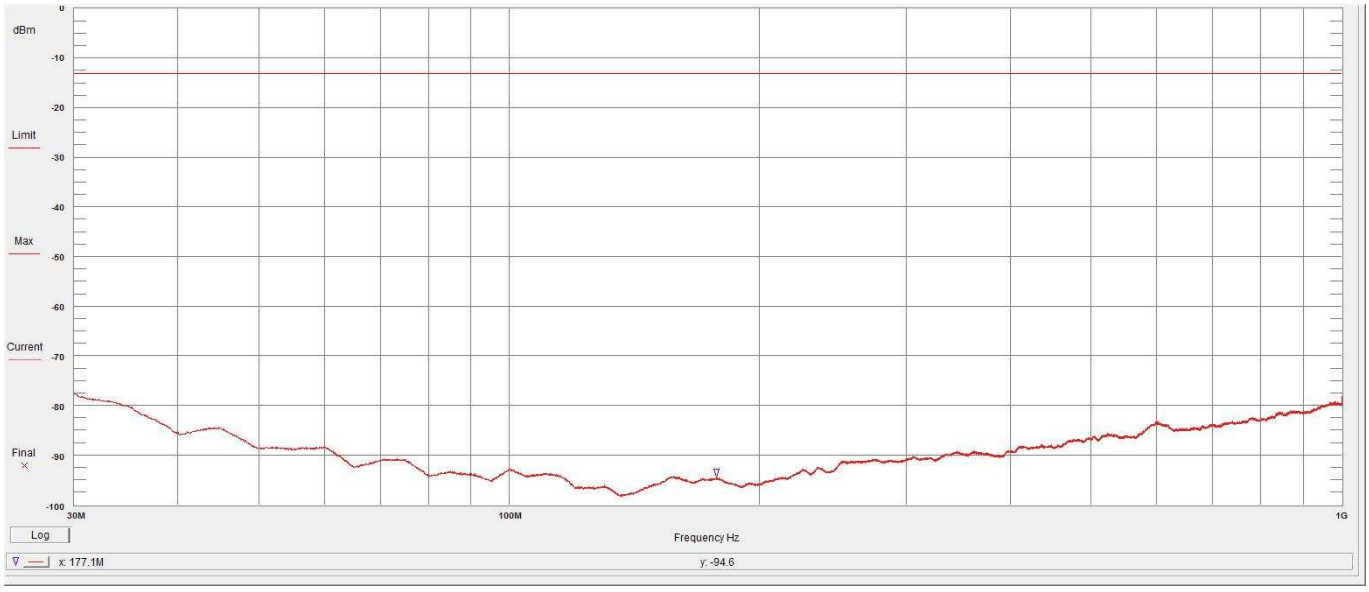


Picture 53: LTE FDD 4, Ch20175, QPSK, spurious emissions at antenna terminal, 30 MHz – 20 GHz, peak is fundamental, RBW 100 kHz, VBW 300 kHz (freq<1GHz), RBW 1MHz, VBW 3MHz (freq >1 GHz)

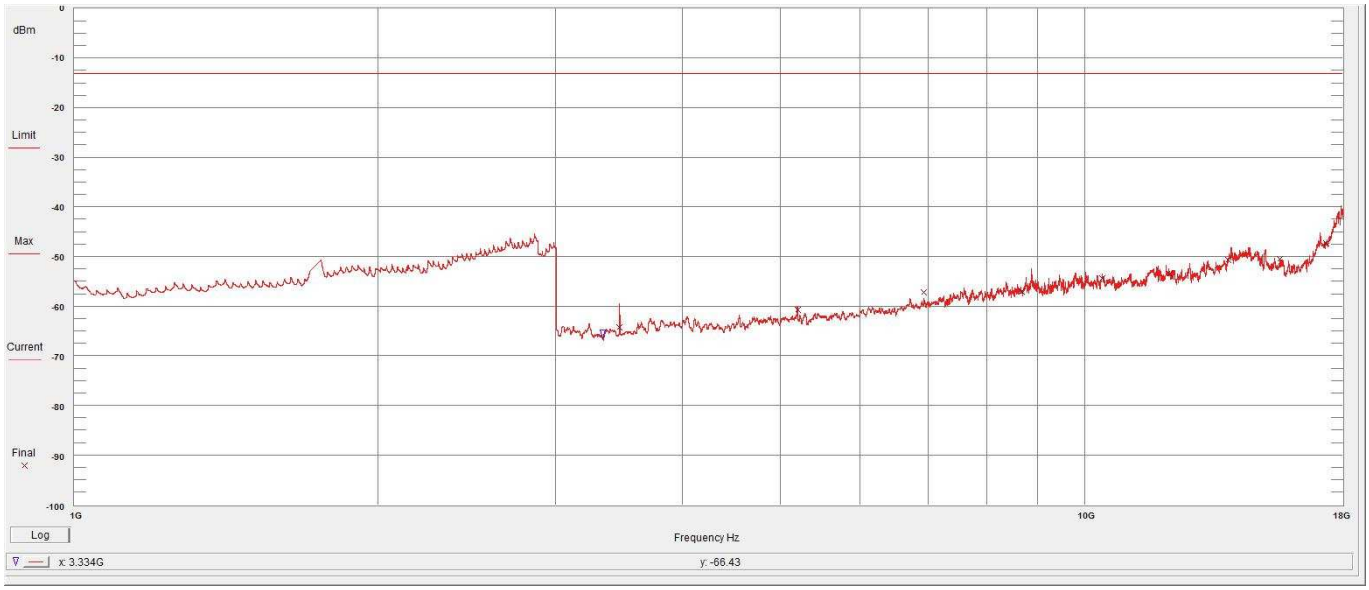
8.3.3 Field strength of spurious radiation §2.1053, 27.53

Result:	Passed, at pre-tests there were no peaks with a margin less than 20 dB with all measured channels (low, mid, high)
Setup:	Radiated pre-test setup, Rad_1 EUT
Test specification	FCC part 2 and part 27
V27SD-41 reference data:	MDE_ELEKT_1502_FCCg, page 96 (WCDMA FDD4)
	MDE_ELEKT_1502_FCCh, page 70 (LTE FDD4)

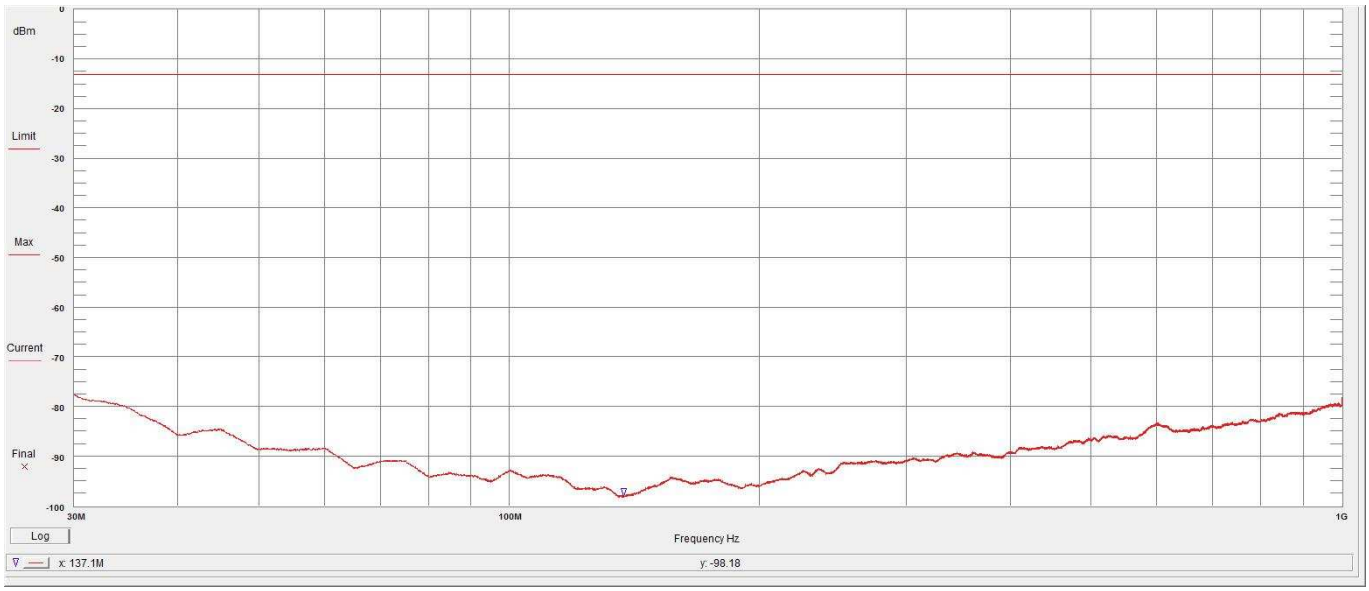
Limit = 43+log10(P) = -13dBm



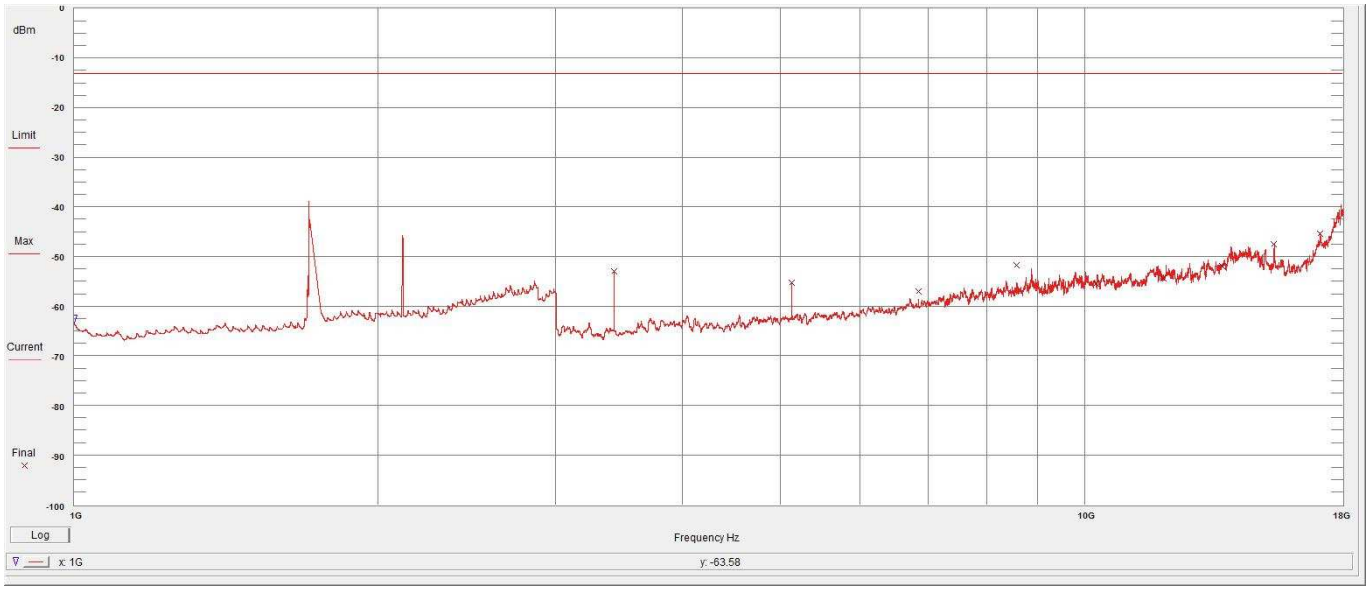
Picture 54: WCDMA FDD 4, Field strength of spurious radiation, Ch. 1412, 30 – 1000 MHz, RBW 100 kHz, VBW 300 kHz.



Picture 55: WCDMA FDD 4, Field strength of spurious radiation, Ch. 1412, 1 – 18 GHz, RBW 1 MHz, VBW 3 MHz



Picture 56: LTE FDD 4, Field strength of spurious radiation, Ch. 20175, BW 5 MHz, 1 RB, 30 – 1000 MHz, RBW 100 kHz, VBW 300 kHz.



Picture 57: LTE FDD 4, Field strength of spurious radiation, Ch. 20175, BW 5 MHz, 1 RB, 1 – 18 GHz, RBW 1 MHz, VBW 3 MHz

8.3.4 Band edge compliance §2.1053, §27.53

Result: Passed

Setup: Conducted setup, Cond_2 EUT

Test specification FCC part 2 and part 27

V27SD-41 reference data: MDE_ELEKT_1502_FCCg, page 106 (WCDMA FDD4)

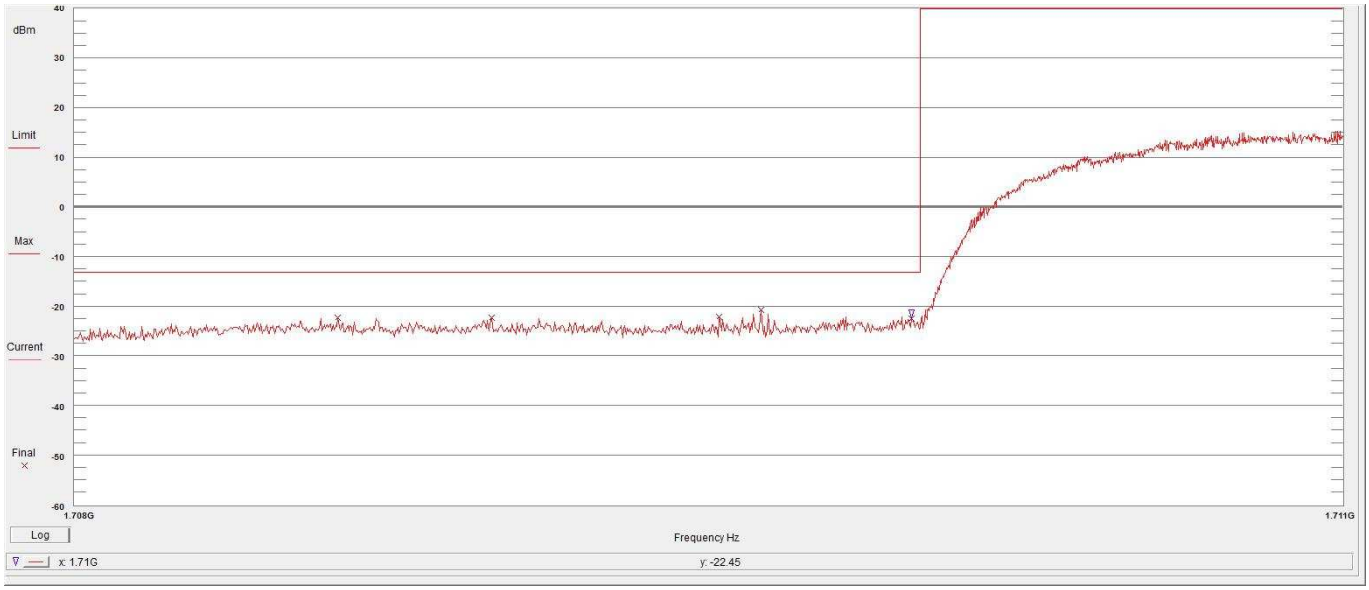
MDE_ELEKT_1502_FCCh, page 86 (LTE FDD4)

Band	Mode	Channel	Detector	RBW/VBW	Frequency MHz	Peak value (dBm)	FCC limit (dBm)	Margin (dB)	Verdict
		1312	Peak	50kHz	1712.4	-22.4	-13	9.44	PASS
FDD 4	WCDMA	1513	Peak	50kHz	1752.6	-22.7	-13	9.76	PASS

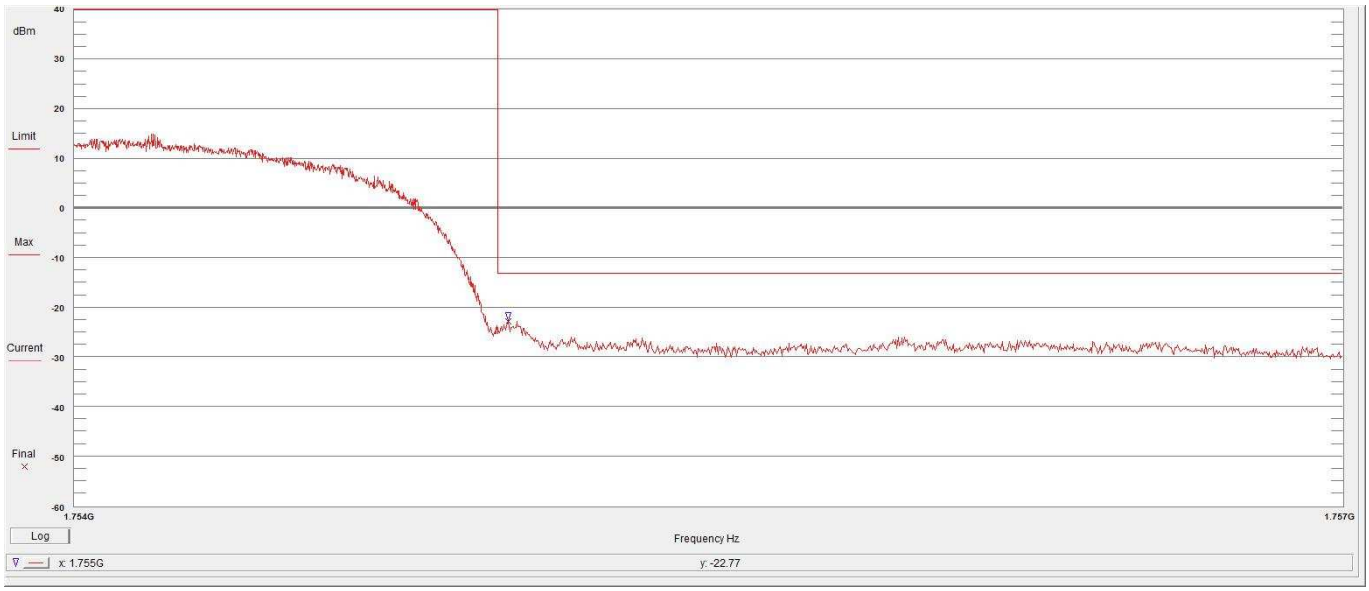
Table 20: Detailed results, Band Edge Compliance WCDMA FDD 4

Band	Mode	BW MHz	Modulation	RB / Offset	Channel	Frequency MHz	Detector	RBW / VBW	Peak value	FCC limit	Margin dB	Verdict
				6	19957	1710	RMS	30kHz	-27.8	-13	14.8	PASS
			QPSK	6	20393	1755	RMS	30kHz	-26.7	-13	13.7	PASS
				6	19957	1710	RMS	30kHz	-29.5	-13	16.5	PASS
		1.4	16QAM	6	20393	1755	RMS	30kHz	-27.3	-13	14.3	PASS
				15	19965	1710	RMS	30kHz	-29.3	-13	16.3	PASS
			QPSK	15	20385	1755	RMS	30kHz	-28.1	-13	15.1	PASS
				15	19965	1710	RMS	30kHz	-30.7	-13	17.7	PASS
		3	16QAM	15	20385	1755	RMS	50kHz	-28.9	-13	15.9	PASS
				25	19975	1710	RMS	50kHz	-28.9	-13	15.9	PASS
			QPSK	25	20375	1755	RMS	50kHz	-28.3	-13	15.3	PASS
				25	19975	1710	RMS	50kHz	-30.2	-13	17.2	PASS
FDD 4	LTE	5	16QAM	25	20375	1755	RMS	50kHz	-29.8	-13	16.8	PASS
				50	20000	1710	RMS	100kHz	-26.9	-13	13.9	PASS
			QPSK	50	20350	1755	RMS	100kHz	-28.8	-13	15.8	PASS
				50	20000	1710	RMS	100kHz	-28.5	-13	15.5	PASS
		10	16QAM	50	20350	1755	RMS	100kHz	-29.3	-13	16.3	PASS
				75	20025	1710	RMS	150kHz	-24.8	-13	11.8	PASS
			QPSK	75	20325	1755	RMS	150kHz	-26.3	-13	13.3	PASS
				75	20025	1710	RMS	150kHz	-26	-13	13	PASS
		15	16QAM	75	20325	1755	RMS	150kHz	-27	-13	14	PASS
				100	20050	1710	RMS	200kHz	-26.4	-13	13.4	PASS
			QPSK	100	20300	1755	RMS	200kHz	-27	-13	14	PASS
				100	20050	1710	RMS	200kHz	-27.4	-13	14.4	PASS
		20	16QAM	100	20300	1755	RMS	200kHz	-27.8	-13	14.8	PASS

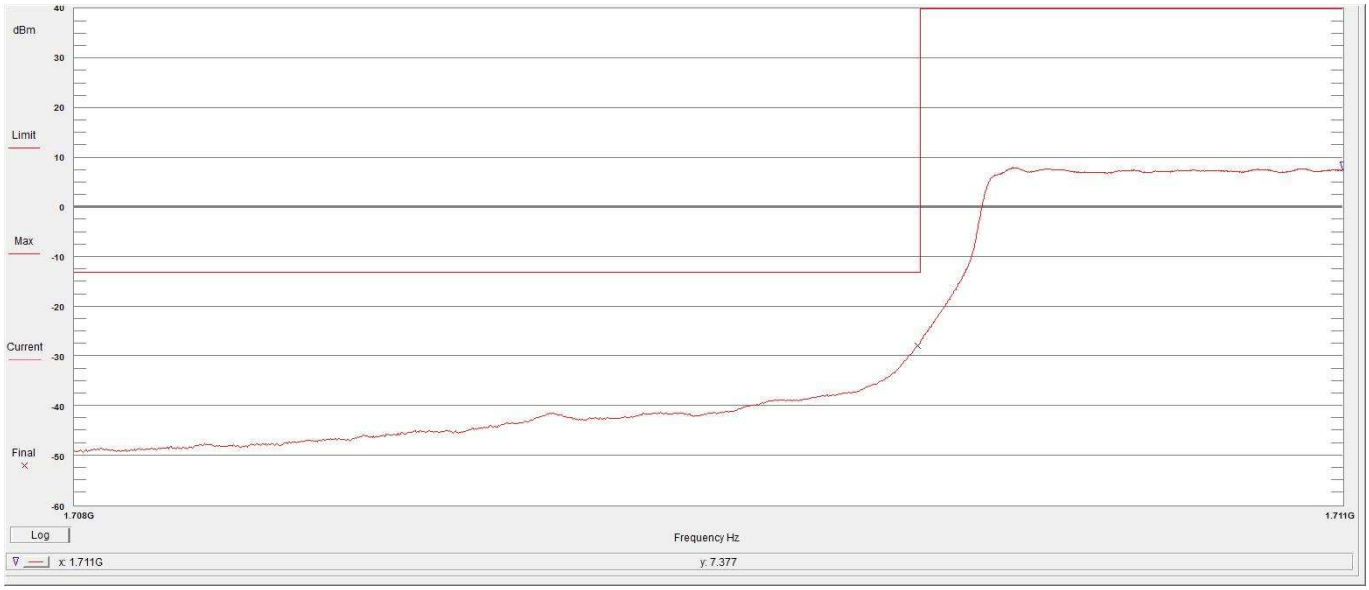
Table 21: Detailed results, Band Edge Compliance LTE FDD 4



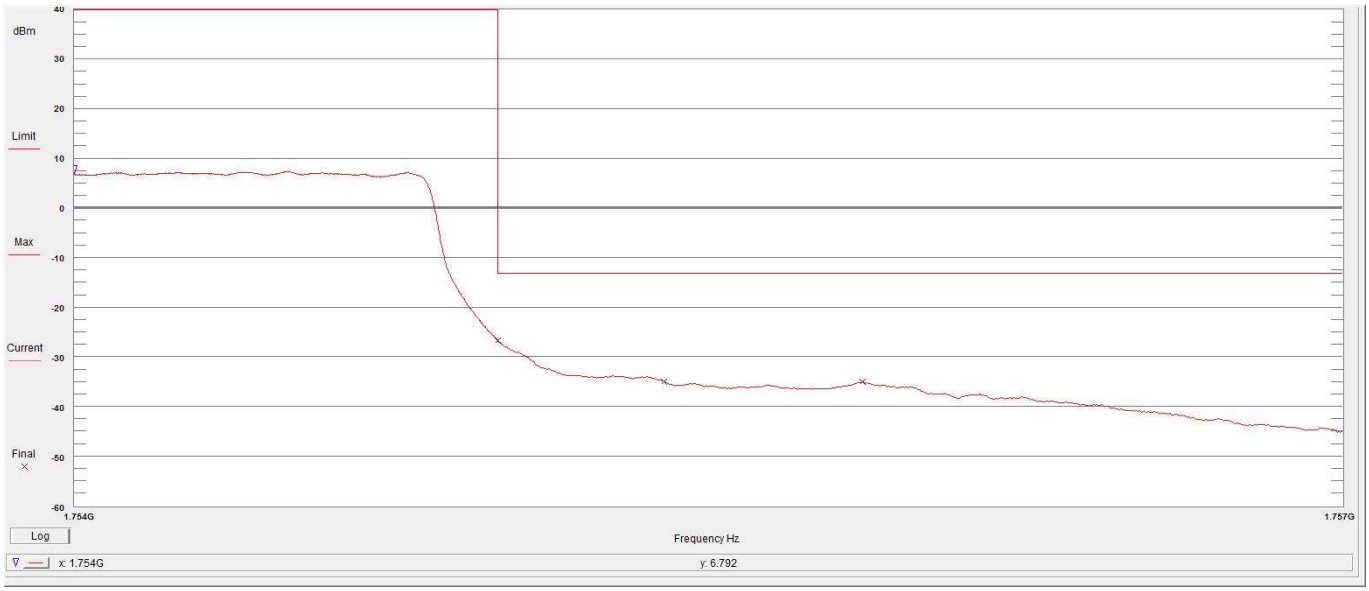
Picture 58: WCDMA FDD 4, Band edge compliance, Ch. 1312



Picture 59: WCDMA FDD 4, Band edge compliance, Ch. 1513



Picture 60: LTE FDD 4, Band edge compliance, BW 1.4 MHz, Ch. 19957, QPSK



Picture 61: LTE FDD 4, Band edge compliance, BW 1.4 MHz, Ch. 20993, QPSK

8.4 FCC Part 2 and 90

8.4.1 Maximum Channel Power, §2.1046, §90.205 & §90.542

Result: Passed

Setup: Conducted setup, Cond_2 EUT

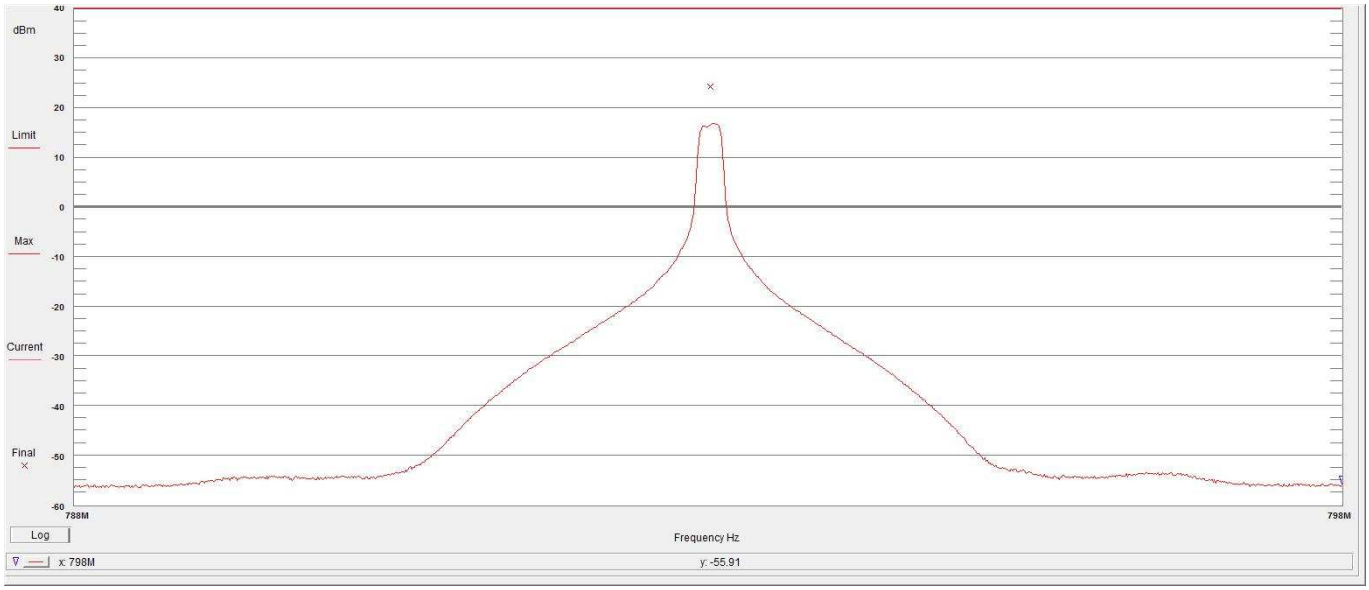
Test specification: FCC part 2 and part 90

V27SD-41 reference data: MDE_ELEKT_1502_FCCi, page 9 (LTE FDD14)

Note: Testing has been done according to KDB 971168 D01.
Equation for determining the ERP is: $ERP = P_{Meas} + G_T - L_C$
Where P_{Meas} = measured transmitter output power (dBm)
G_T = gain of the transmitting antenna (dBd)
L_C = signal attenuation in the connecting cable between the transmitter and antenna (negligible)
G_T used to calculate ERP for LTE FDD14 is -6.15dBd (-4dBi).

Band	Bandwidth	Channel	Modulation	RB	RMS Conducted power (dBm)	FCC ERP limit (dBm)	Calculated ERP (dBm)	Verdict
LTE FDD14	5 MHz	23305	QPSK	1	24.37	34.77	18.22	PASS
			QPSK	12	23.35	34.77	17.2	PASS
			QPSK	25	23.33	34.77	17.18	PASS
			16QAM	1	23.13	34.77	16.98	PASS
			16QAM	25	22.38	34.77	16.23	PASS
		23330	QPSK	1	24.37	34.77	18.22	PASS
			QPSK	12	23.32	34.77	17.17	PASS
			QPSK	25	23.32	34.77	17.17	PASS
			16QAM	1	23.12	34.77	16.97	PASS
			16QAM	25	22.41	34.77	16.26	PASS
		23355	QPSK	1	24.39	34.77	18.24	PASS
			QPSK	12	23.15	34.77	17	PASS
			QPSK	25	23.23	34.77	17.08	PASS
			16QAM	1	23.08	34.77	16.93	PASS
			16QAM	25	22.3	34.77	16.15	PASS
LTE FDD14	10 MHz	18900	QPSK	1	24.36	34.77	18.21	PASS
			QPSK	50	23.19	34.77	17.04	PASS
			16QAM	1	23.13	34.77	16.98	PASS
			16QAM	50	22.26	34.77	16.11	PASS

Table 22: Detailed results, Maximum channel power LTE FDD 14



Picture 62: LTE FDD 14, BW 5 MHz, Ch. 20330, QPSK, 1 RB, Maximum channel power, RBW 30 kHz, VBW 300 kHz

8.4.2 Occupied Bandwidth, §2.1046, §90.209

Result: Passed

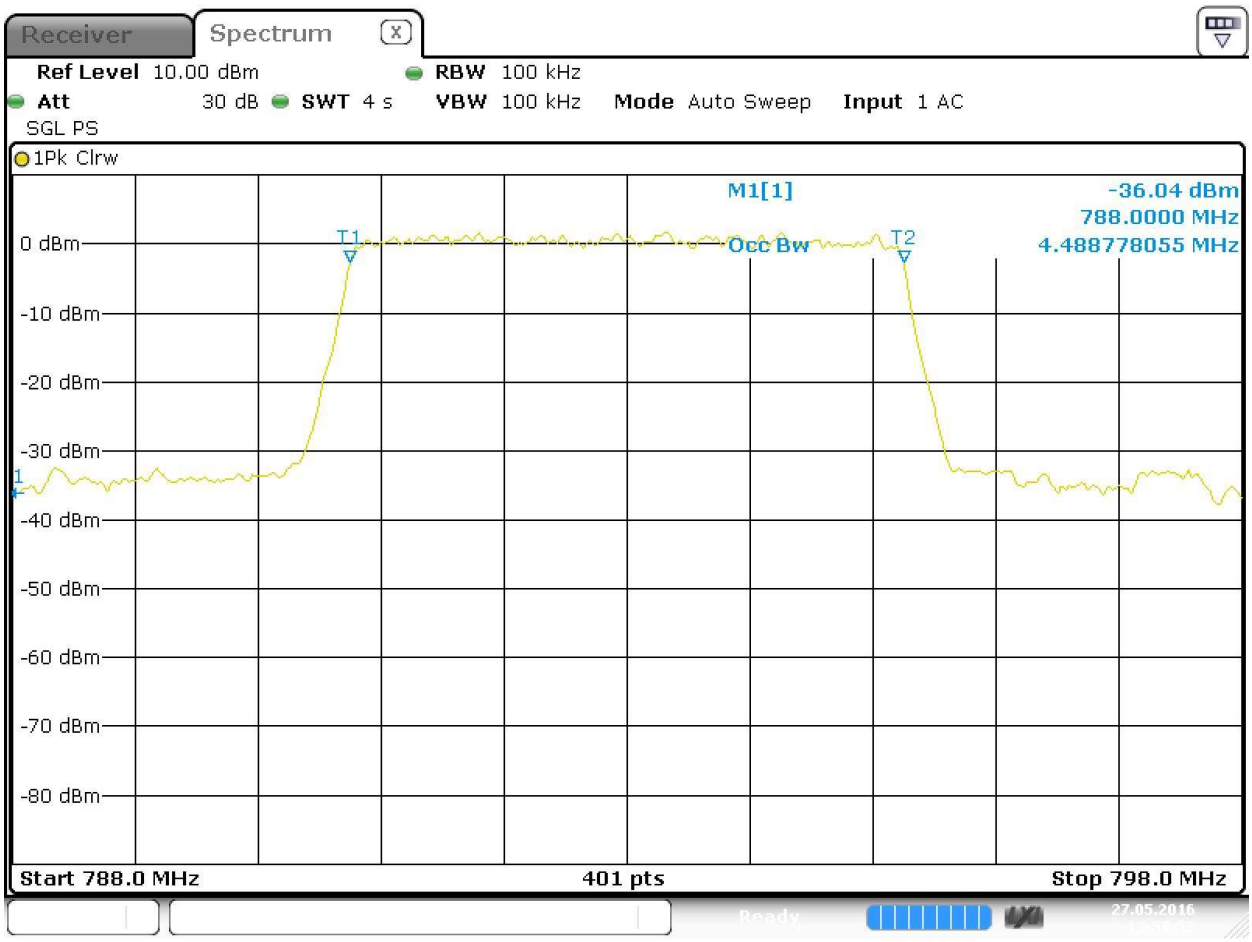
Setup: Conducted setup, Cond_2 EUT

Test specification FCC part 2 and part 90

V27SD-41 reference data: MDE_ELEKT_1502_FCCi, page 12 (LTE FDD14)

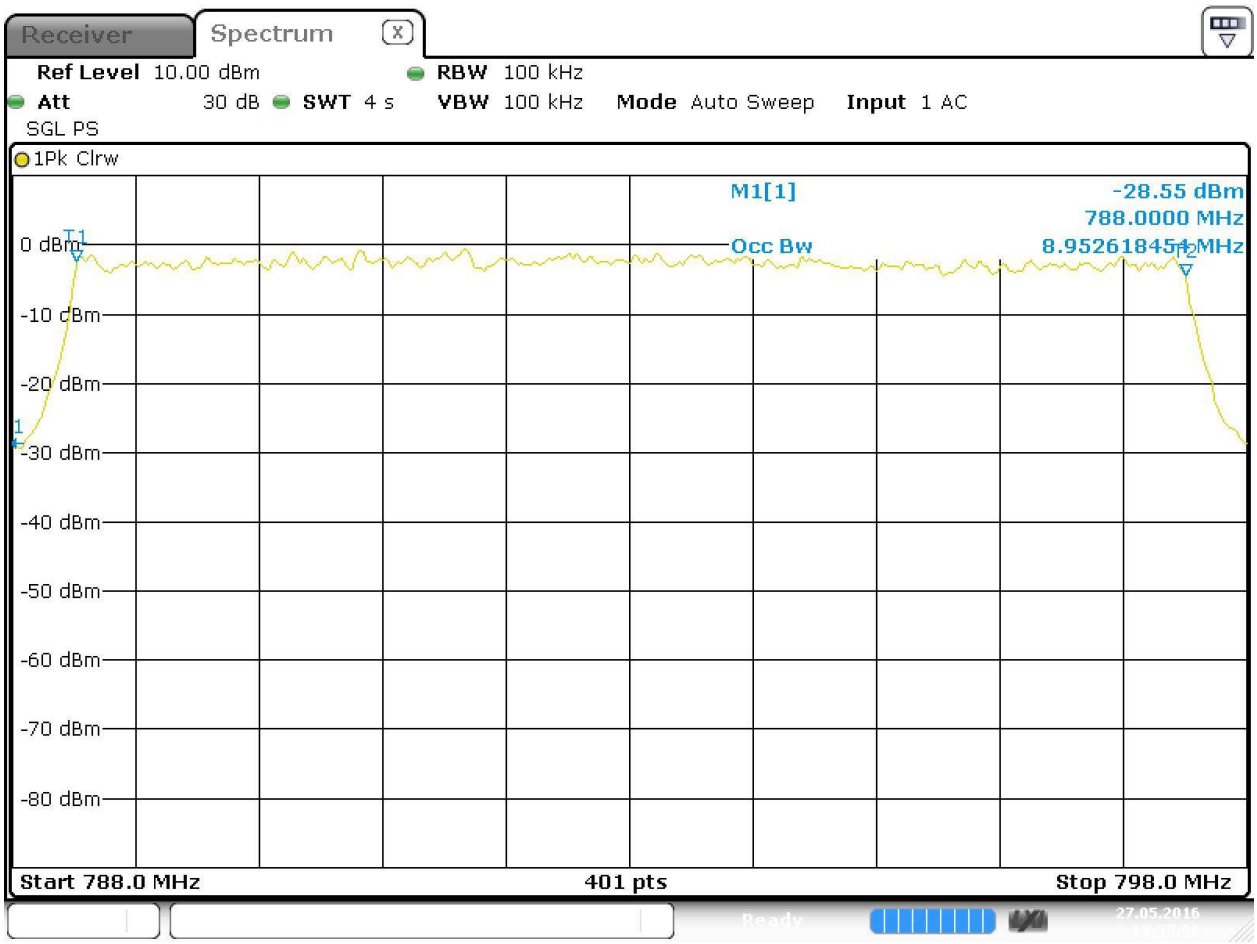
Band	Bandwidth	Channel Frequency (MHz)	Modulation	99% BW (MHz)
LTE FDD14	5 MHz	23305 790.5	QPSK	4.5
			16QAM	4.5
		23330 793	QPSK	4.5
			16QAM	4.5
		23355 795.5	QPSK	4.5
			16QAM	4.5
	10 MHz	23330 793	QPSK	8.9
			16QAM	8.9

Table 23: Detailed results, Occupied BW, LTE FDD 14



Date: 27.MAY.2016 13:58:52

Picture 63: LTE FDD 14, Occupied BW, BW 5 MHz, Ch. 23330, QPSK



Date: 27.MAY.2016 13:59:00

Picture 64: LTE FDD 14, Occupied BW, BW 10 MHz, Ch. 23330, QPSK

8.4.3 Frequency stability, §2.1055, §90.230

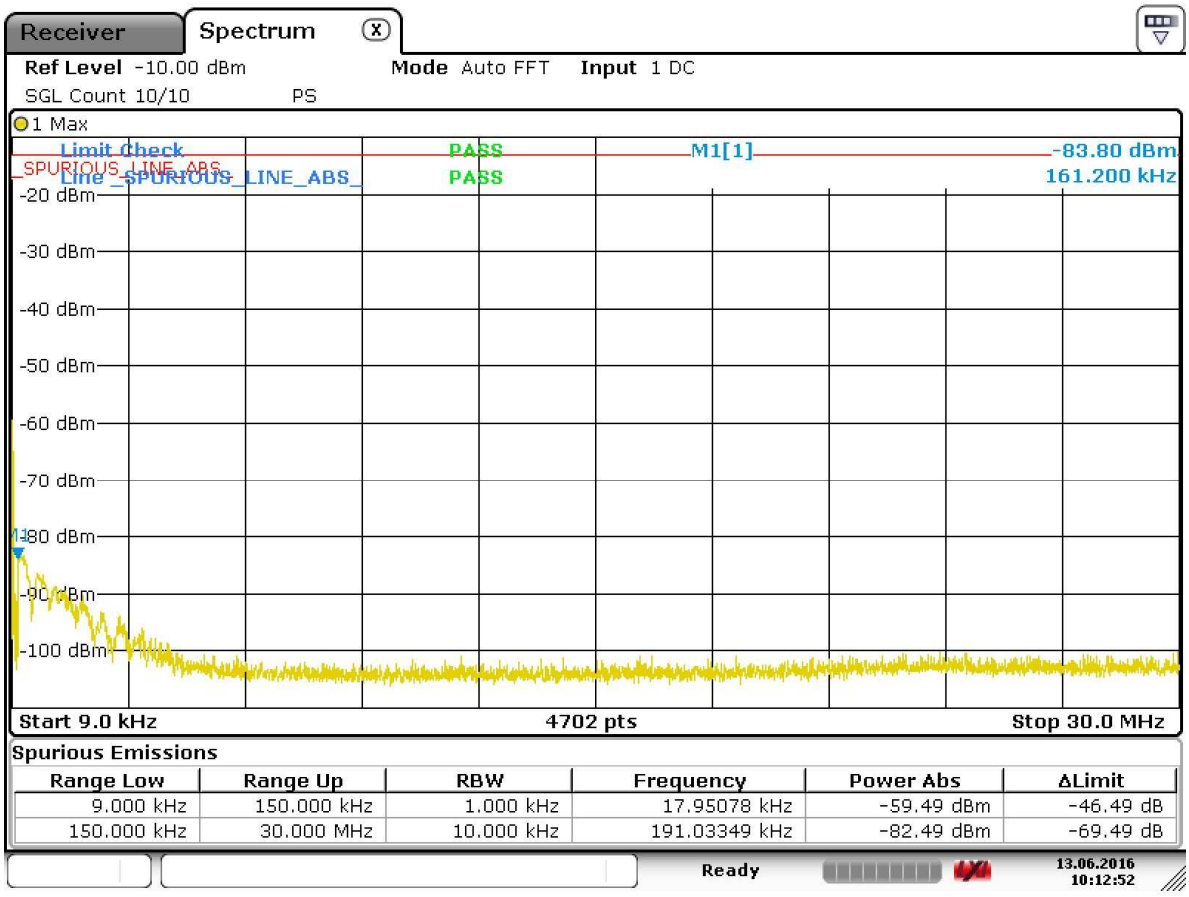
Result:	Passed
Setup:	Conducted setup, Cond_3 EUT
Test specification	FCC part 2 and part 90
V27SD-41 reference data:	MDE_ELEKT_1502_FCCi, page 20 (LTE FDD14)

Voltage (VDC)	Temp (°C)	Time	Modulation	Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (Hz)
4.2	-30	1minute	QPSK	793	-1.53	-0.001929382	1983
4.2	-30	5minute	QPSK	793	-1.2	-0.001513241	1983
4.2	-30	10minute	QPSK	793	-0.96	-0.001210593	1983
4.2	-20	1minute	QPSK	793	-0.34	-0.000428752	1983
4.2	-20	5minute	QPSK	793	-0.51	-0.000643127	1983
4.2	-20	10minute	QPSK	793	-0.21	-0.000264817	1983
4.2	-10	1minute	QPSK	793	-0.33	-0.000416141	1983
4.2	-10	5minute	QPSK	793	-0.67	-0.000844893	1983
4.2	-10	10minute	QPSK	793	-1.23	-0.001551072	1983
4.2	0	1minute	QPSK	793	-0.33	-0.000416141	1983
4.2	0	5minute	QPSK	793	-0.39	-0.000491803	1983
4.2	0	10minute	QPSK	793	-1.22	-0.001538462	1983
4.2	10	1minute	QPSK	793	-1.09	-0.001374527	1983
4.2	10	5minute	QPSK	793	-0.11	-0.000138714	1983
4.2	10	10minute	QPSK	793	-0.27	-0.000340479	1983
4.2	20	1minute	QPSK	793	-0.34	-0.000428752	1983
4.2	20	5minute	QPSK	793	-0.6	-0.00075662	1983
4.2	20	10minute	QPSK	793	-0.53	-0.000668348	1983
4.2	30	1minute	QPSK	793	-0.37	-0.000466583	1983
4.2	30	5minute	QPSK	793	-0.1	-0.000126103	1983
4.2	30	10minute	QPSK	793	-1.5	-0.001891551	1983
4.2	40	1minute	QPSK	793	-1.2	-0.001513241	1983
4.2	40	5minute	QPSK	793	-1.6	-0.002017654	1983
4.2	40	10minute	QPSK	793	-2.42	-0.003051702	1983
4.2	50	1minute	QPSK	793	-1.49	-0.001878941	1983
4.2	50	5minute	QPSK	793	-0.4	-0.000504414	1983
4.2	50	10minute	QPSK	793	-1.5	-0.001891551	1983
3.6	20	1minute	QPSK	793	-1.43	-0.001803279	1983
4.2	20	1minute	QPSK	793	-2.03	-0.001803279	1983

Table 24: Detailed results, Frequency stability, LTE FDD 14

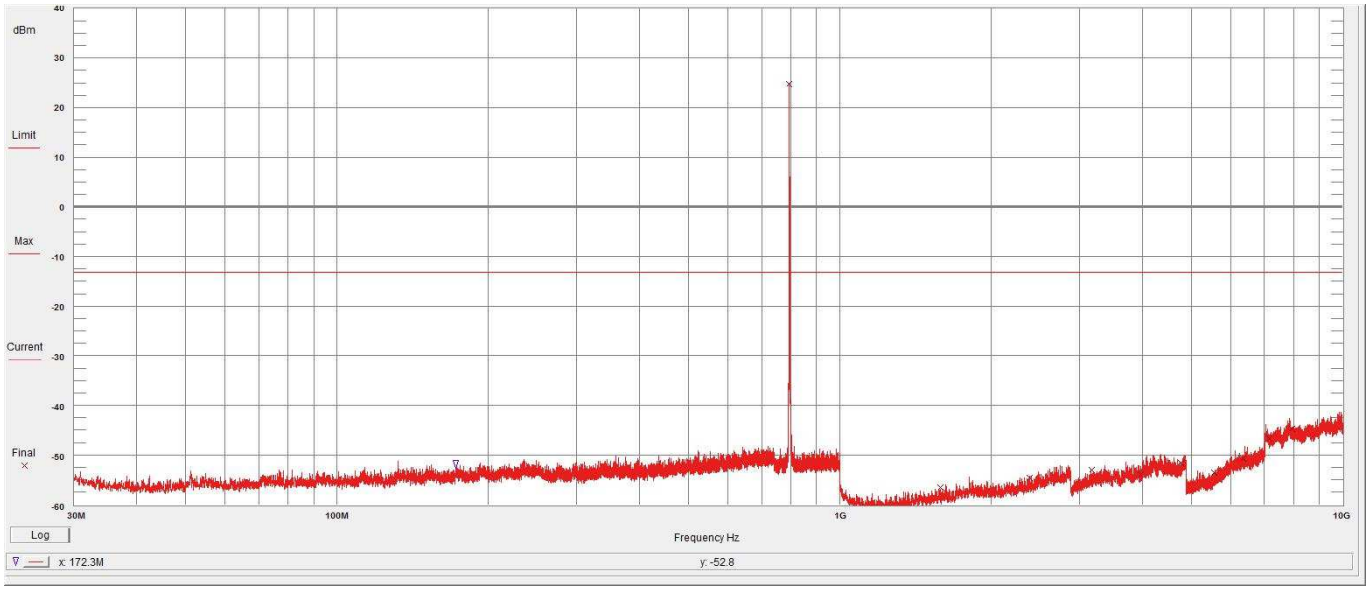
8.4.4 Spurious emissions at antenna terminals §2.1051, §90.210 & §90.543

Result:	Passed, there were no peaks with a margin less than 20 dB with all measured channels (low, mid, high)
Setup:	Conducted setup, Cond_2 EUT
Test specification	FCC part 2 and part 90
V27SD-41 reference data:	MDE_ELEKT_1502_FCCi, page 15 (LTE FDD14)



Date: 13.JUN.2016 10:12:52

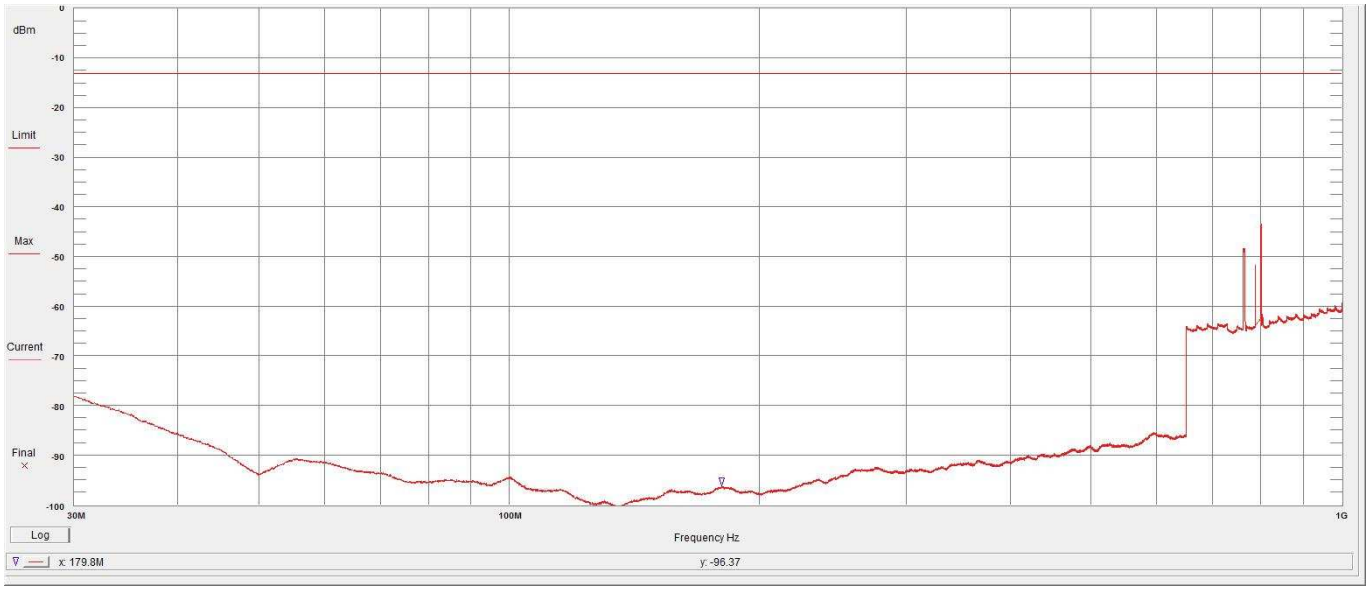
Picture 65: LTE FDD 14, Spurious emissions at antenna terminals, BW 5 MHz, Ch. 23330, QPSK, 9 kHz – 30 MHz



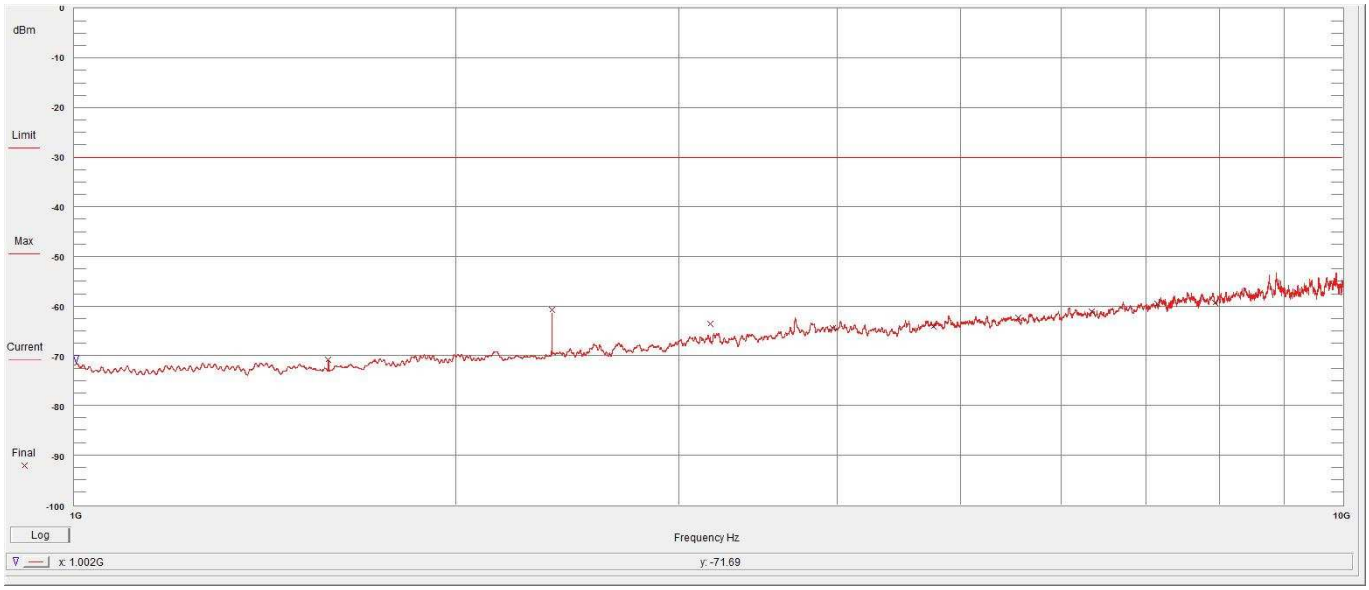
Picture 66: LTE FDD 14, Spurious emissions at antenna terminals, BW 5 MHz, Ch. 23330, QPSK, 30 MHz – 10 GHz, peak is fundamental, RBW 100 kHz, VBW 300 kHz (freq<1GHz), RBW 1MHz, VBW 3MHz (freq >1 GHz)

8.4.5 Radiated spurious emission, §2.1053, §90.210

Result:	Passed, at pre-tests there were no peaks with a margin less than 20 dB with all measured channels (low, mid, high)
Setup:	Radiated pre-test setup. Rad_1 EUT
Test specification	FCC part 2 and part 90
V27SD-41 reference data:	MDE_ELEKT_1502_FCCi, page 17 (LTE FDD14)



Picture 67: LTE FDD 14, Radiated spurious emissions, BW 5 MHz, Ch. 23330, QPSK, 30 MHz – 1 GHz, RBW 100 kHz, VBW 300 kHz.



Picture 68: LTE FDD 14, Radiated spurious emissions, BW 5 MHz, Ch. 23330, QPSK, 1 – 10 GHz, RBW 1 MHz, VBW 3 MHz

8.4.6 Band edge compliance §2.1053, §90.543

Result: Passed

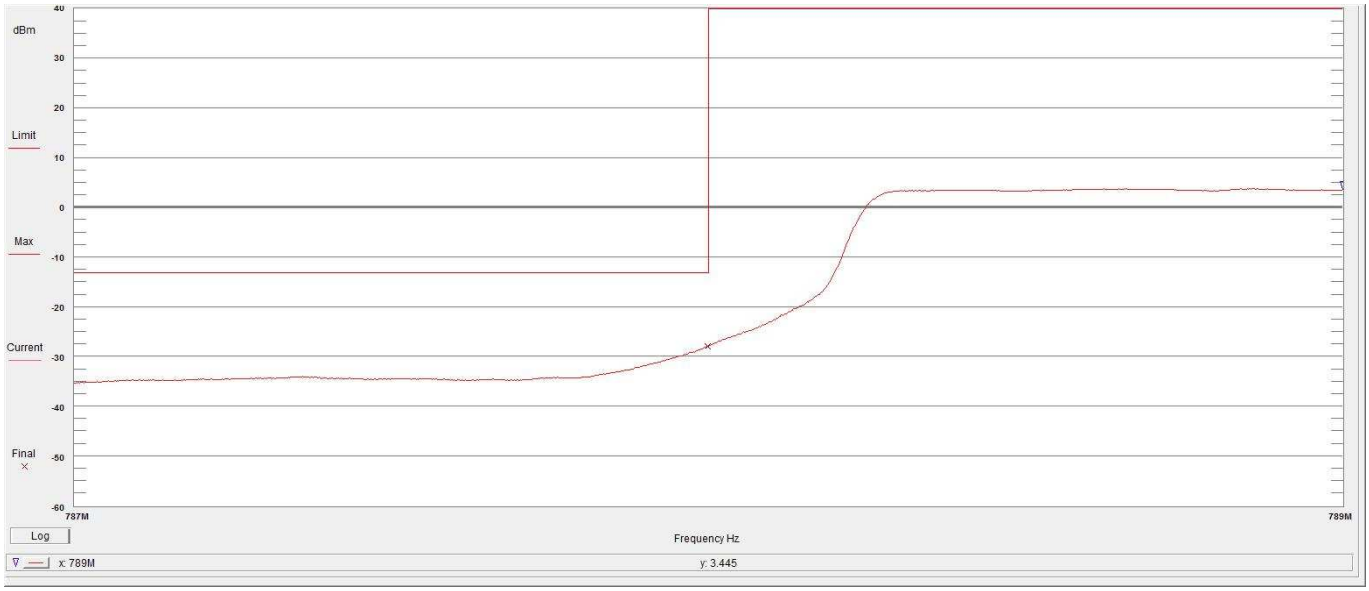
Setup: Conducted setup, Cond_2 EUT

Test specification FCC part 2 and part 90

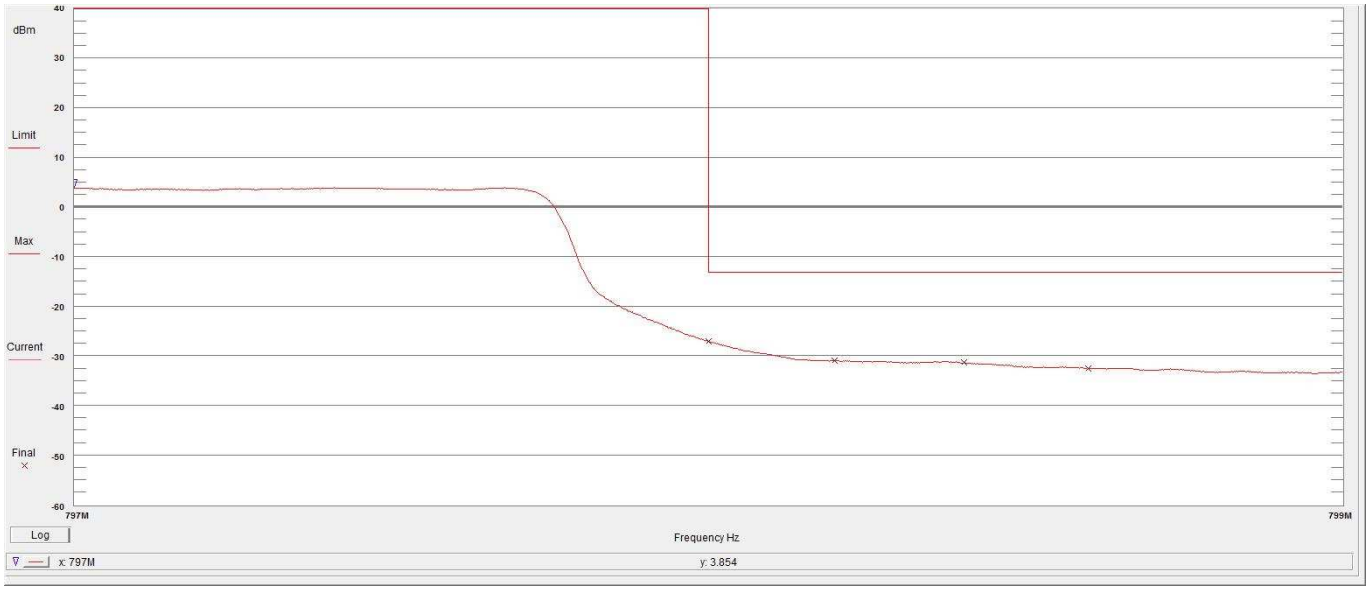
V27SD-41 reference data: MDE_ELEKT_1502_FCCi, page 13 (LTE FDD14)

Band	Mode	BW MHz	Modulation	RB / Offset	Channel	Frequency MHz	Detector	RBW / VBW	Peak value	FCC limit	Margin dB	Verdict
FDD14	LTE	5	QPSK	25	23305	788	RMS	50kHz	-27.9	-13	14.9	PASS
				25	23355	798	RMS	50kHz	-26.9	-13	14.1	PASS
			16QAM	25	23305	788	RMS	50kHz	-29.1	-13	16.1	PASS
				25	23355	798	RMS	50kHz	-28.8	-13	15.8	PASS
		10	QPSK	50	23330	788	RMS	100kHz	-25.1	-13	12.1	PASS
				50	23330	798	RMS	100kHz	-25.8	-13	12.8	PASS
			16QAM	50	23330	788	RMS	100kHz	-26.3	-13	13.3	PASS
				50	23330	798	RMS	100kHz	-27.2	-13	14.2	PASS

Table 25: Detailed results, Band edge compliance, LTE FDD 14



Picture 69: LTE FDD 14, Band edge, BW 5 MHz, Ch. 23305, QPSK



Picture 70: LTE FDD 14, Band edge, BW 5 MHz, Ch. 23355, QPSK

References

[1] FCC CFR47 part 2	
Location:	https://www.fcc.gov/general/rules-regulations-title-47
Owner:	FCC

[2] FCC CFR47 part 22	
Location:	https://www.fcc.gov/general/rules-regulations-title-47
Owner:	FCC

[3] FCC CFR47 part 24	
Location:	https://www.fcc.gov/general/rules-regulations-title-47
Owner:	FCC

[4] FCC CFR47 part 27	
Location:	https://www.fcc.gov/general/rules-regulations-title-47
Owner:	FCC

[5] FCC CFR47 part 90	
Location:	https://www.fcc.gov/general/rules-regulations-title-47
Owner:	FCC

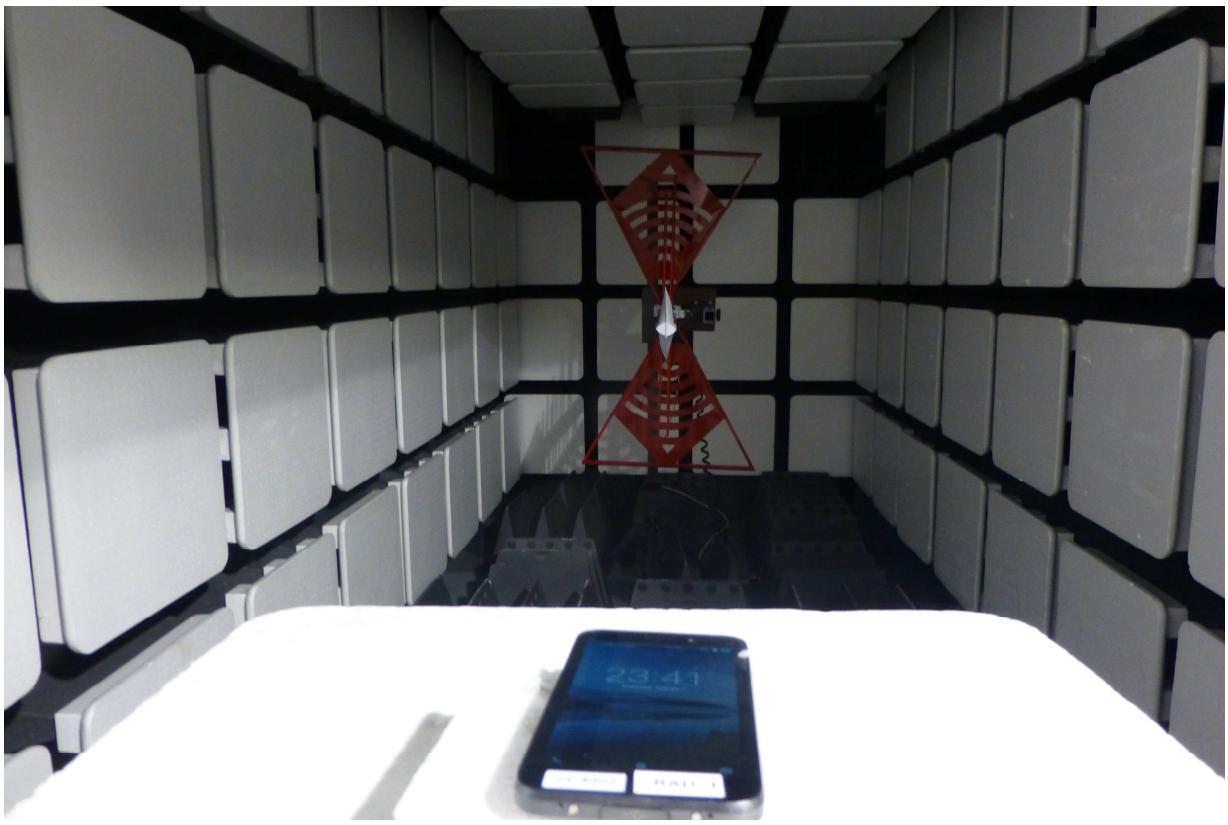
[6] MDE_ELEKT_1502_FCCg	
Location:	https://apps.fcc.gov/eas/GetApplicationAttachment.html?id=2833207
Owner:	FCC

[7] MDE_ELEKT_1502_FCCh	
Location:	https://apps.fcc.gov/eas/GetApplicationAttachment.html?id=2833208
Owner:	FCC
[8] MDE_ELEKT_1502_FCCi	
Location:	https://apps.fcc.gov/eas/GetApplicationAttachment.html?id=2833209
Owner:	FCC

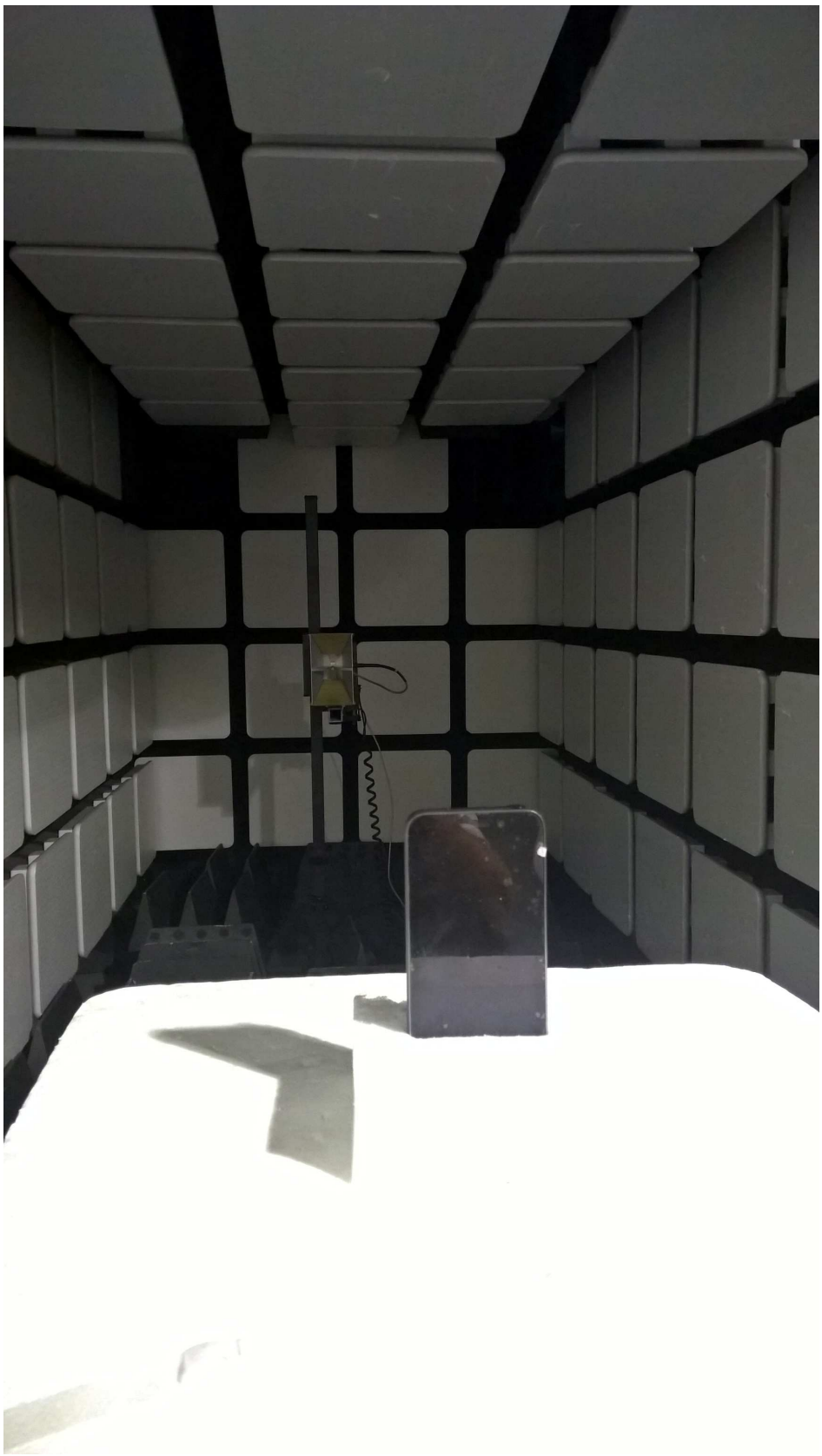
Appendix / Appendices

A.1 Test setup photos

Radiated test setup 30 – 1000 MHz, EUT vertical



Radiated test setup 30 – 1000 MHz, EUT Horizontal



Radiated test setup 1 – 18 GHz, EUT vertical

Radiated test setup 1 – 18 GHz, EUT horizontal