

FCC Part 15B Compliance Test Report

Test Report no.:	Salo_FCC_0633_15.doc	Date of Report:	29.08.2006
Number of pages:	15	Customer's Contact person:	Jorma Hanni
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FCC listing no.:	533467		
IC recognition no.:	5385		
Tested devices/ accessories:	Phone RM-198 / Battery BL-5C, AC- Charger AC-3, Data cable CA-53, Laptop T-20 and Printer H&P LaserJet 5L C3941A		
FCC ID:	LJPRM-198	IC:	661E-RM198
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2003), ICES-003, CISPR 22 and IC standards RSS-132, RSS-133 and RSS-210. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document.		
Date and signature for the contents:			

Sami Lehtonen, System Manager

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	20.07.2006
Testing completed	21.08.2006
The customer's contact person	Jorma Hanni
Test Plan referred to	T:\Projects\RM-198\TestPlan_RS\RS_Testplan_RM-198.xls
Notes	-
Document name	T:\Projects\RM-198\EMC\Results\FCC\Salo_FCC_0633_15.doc

1.1. EUT and Accessory Information

The EUT is a quadri band (GSM850/900/1800/1900) mobile phone with GPRS, EGPRS and Bluetooth. GSM bands are tested in idle mode. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-198	004400/87/166979/0	1101	-	03.11	11375
Battery	BL-5C	0670400363807M20522CP53571	1.3	-	-	11289
AC- Charger	AC-3E	3997915374051202484;0675370	-	-	-	11386
Data Cable	CA-53	108382538401	-	-	-	11420
Laptop	T-20	55105MW009	-	-	-	11425
Printer H&P LaserJet 5L	C3941A	CNVMO55419	-	-	-	10854

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in ICES-003 (RSS-132)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

GSM 1900:

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (9)	Radiated emissions	PASSED

Bluetooth:

Section in CFR 47	Section in ICES-003	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5	Radiated emissions	PASSED

PASSED
FAILED
NP

The EUT complies with the essential requirements in the standard.
The EUT does not comply with the essential requirements in the standard.
The test was not performed by the TCC Nokia Salo Laboratory.

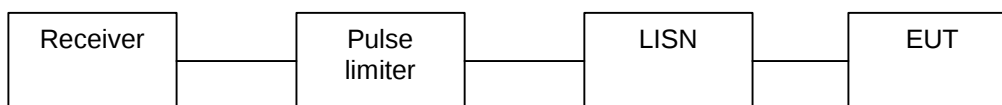
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-198, DUT 11375
Accessories with DUT numbers	BL-5C, DUT 11289; AC-3, DUT 11386; CA-53, DUT 11420; T-20, DUT 11425; C3941A, DUT 10854
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 / 100.4
Date of measurements	16.8.2006
Measured by	Jari Jantunen

2.1. Test setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$$U [dB\mu V] = U_{RX} + A_{TOT}$$

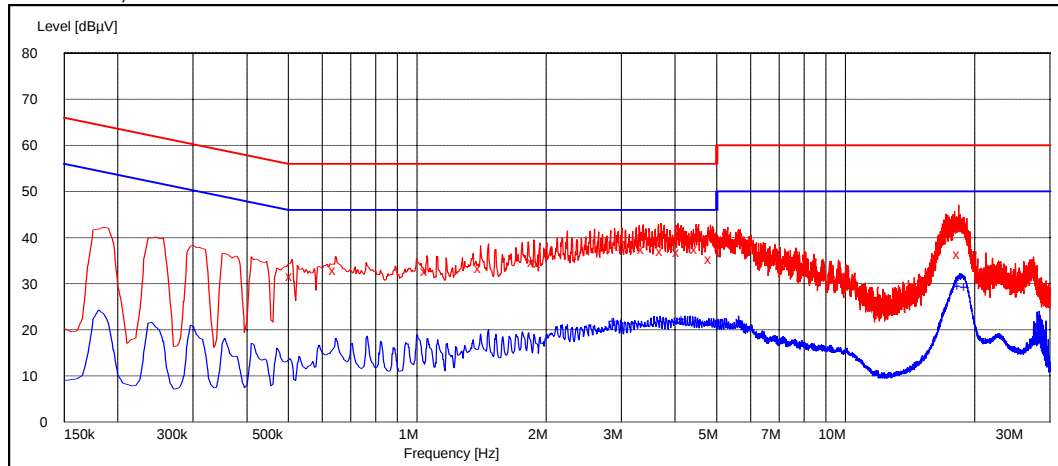
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

CISPR 22 Class B limits

Frequency range [MHz]	Quasi peak limit [dBμV]	Average limit [dBμV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

2.3. GSM 850 Test results

RX mode, channel 190 / 881.6 MHz



Quasi peak (RBW: 9 kHz)

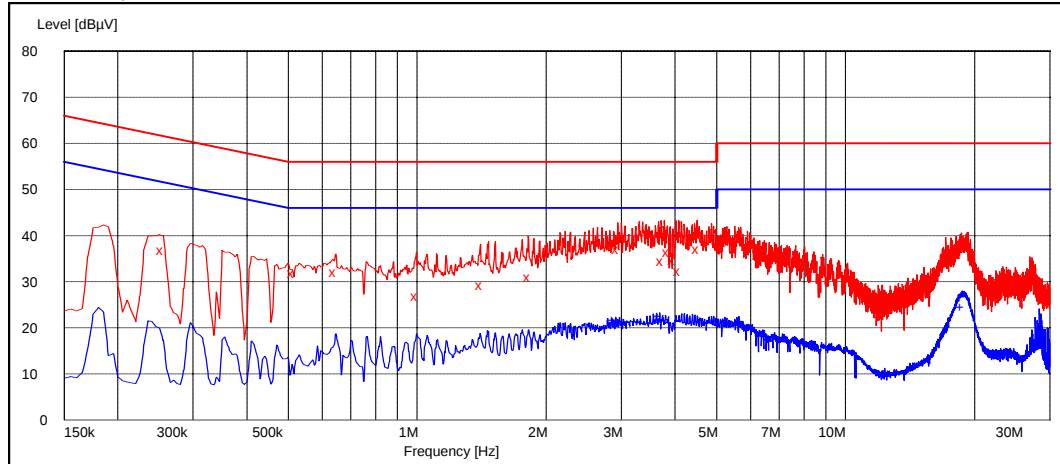
Frequency [MHz]	U [dBμV]	Line	Result
0.510000	31.70	N	PASSED
0.645000	32.90	L1	PASSED
1.055000	32.70	L1	PASSED
1.405000	33.30	L1	PASSED
1.875000	34.60	L1	PASSED
1.935000	34.40	L1	PASSED
3.375000	37.50	L1	PASSED
3.730000	37.10	L1	PASSED
4.085000	36.90	L1	PASSED
4.505000	37.40	L1	PASSED
4.855000	35.30	L1	PASSED
18.425000	36.50	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
2.895000	21.90	N	PASSED
4.195000	22.40	N	PASSED
4.960000	21.30	N	PASSED
18.490000	29.60	N	PASSED
19.105000	29.40	N	PASSED

2.4. GSM 1900 Test results

RX mode, channel 661 / 1960.0 MHz



Quasi peak (RBW: 9 kHz)

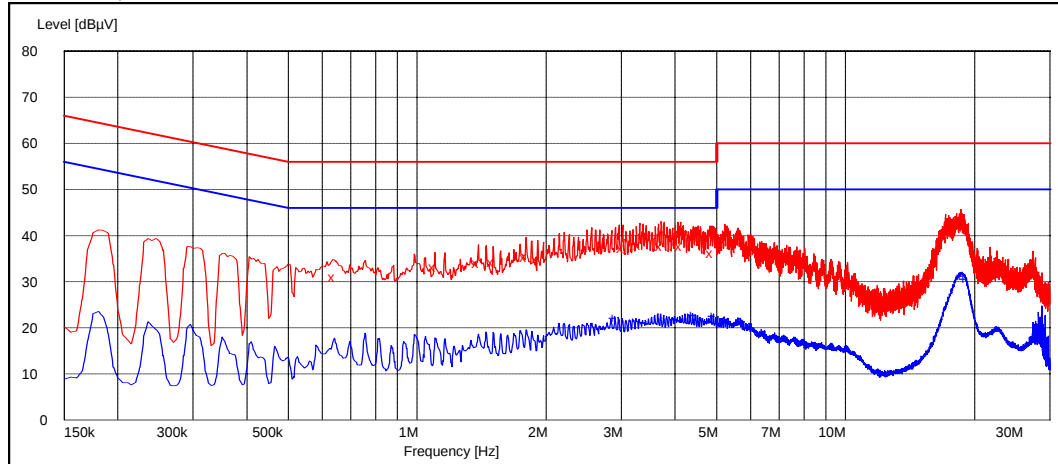
Frequency [MHz]	U [dBμV]	Line	Result
0.255000	36.80	L1	PASSED
0.515000	31.90	N	PASSED
0.645000	32.10	L1	PASSED
1.000000	26.90	N	PASSED
1.415000	29.20	N	PASSED
1.830000	30.90	L1	PASSED
2.950000	37.00	N	PASSED
3.740000	34.40	L1	PASSED
3.860000	36.40	N	PASSED
3.985000	34.60	L1	PASSED
4.100000	32.40	L1	PASSED
4.525000	37.10	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
2.890000	21.70	N	PASSED
3.675000	22.50	N	PASSED
5.000000	21.40	N	PASSED
18.760000	24.40	N	PASSED

2.5. Bluetooth Test results

TX mode, channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.640000	31.00	N	PASSED
1.100000	33.20	L1	PASSED
1.390000	34.00	L1	PASSED
1.505000	34.10	L1	PASSED
1.795000	35.30	L1	PASSED
1.910000	34.90	L1	PASSED
3.025000	37.30	L1	PASSED
3.315000	38.00	L1	PASSED
3.725000	37.80	L1	PASSED
4.130000	37.70	L1	PASSED
4.890000	36.30	L1	PASSED

Average (RBW: 9 kHz)

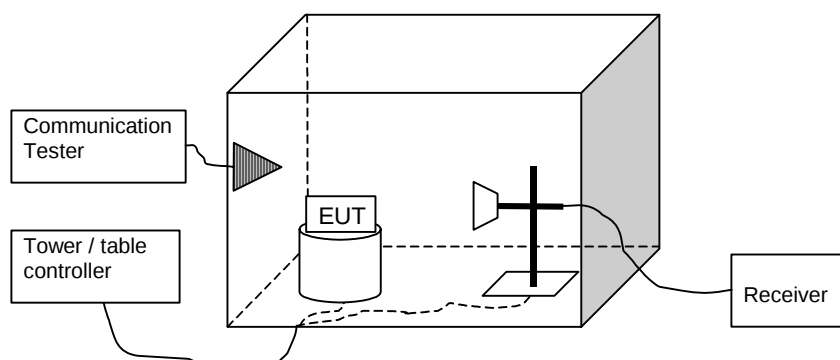
Frequency [MHz]	U [dBμV]	Line	Result
2.900000	22.20	N	PASSED
4.410000	22.90	N	PASSED
4.935000	22.60	N	PASSED
18.700000	31.30	L1	PASSED
19.075000	30.50	L1	PASSED

3. Radiated emissions

(FCC §15.109, ICES-003 section 5.5, RSS-132 6.6, RSS-133 9)

EUT with DUT number	RM-198, DUT 11375
Accessories with DUT numbers	BL-5C, DUT 11289; AC-3, DUT 11386; CA-53, DUT 11420; T-20, DUT 11425; C3941A, DUT 10854
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 55 / 100.9
Date of measurements	21.8.2006
Measured by	Sami Lehtonen

3.1. Test setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$$E [\mu\text{V/m}] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

Frequency range [MHz]	Quasi peak limit [dBμV/m]	Average limit [dBμV/m]	Peak limit [dBμV/m]
30 – 230	40	-	-
230 – 1000	47	-	-
Above 1000	-	54	74

3.3. GSM 850 Test results

RX mode, channel 128 / 869.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	45.30	184.08	46.90	-1.60	HORIZONTAL	PASSED
6953.600000	50.30	327.34	47.00	3.30	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	31.30	36.73	32.90	-1.60	VERTICAL	PASSED
6953.600000	36.20	64.57	32.90	3.30	HORIZONTAL	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
34.428657	26.50	21.13	43.50	-17.00	VERTICAL	PASSED
40.821643	34.10	50.70	54.80	-20.70	VERTICAL	PASSED
105.651503	36.90	69.98	63.70	-26.80	HORIZONTAL	PASSED
134.509218	28.50	26.61	57.00	-28.50	VERTICAL	PASSED
896.493587	29.00	28.18	46.70	-17.70	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
7052.604208	49.00	281.84	46.10	2.90	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2945.389780	33.30	46.24	36.00	-2.70	VERTICAL	PASSED
7052.604208	15.80	6.17	12.90	2.90	HORIZONTAL	PASSED
7948.389780	35.10	56.89	29.40	5.70	HORIZONTAL	PASSED

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	45.10	179.89	48.20	-3.10	HORIZONTAL	PASSED
7150.400000	51.30	367.28	48.60	2.70	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	30.30	32.73	33.40	-3.10	HORIZONTAL	PASSED
7150.400000	36.20	64.57	33.50	2.70	HORIZONTAL	PASSED

3.4. GSM 1900 Test results

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
3860.000000	44.90	175.79	48.30	-3.40	HORIZONTAL	PASSED
7720.000000	49.90	312.61	45.80	4.10	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
3860.000000	30.00	31.62	33.40	-3.40	HORIZONTAL	PASSED
7720.000000	34.00	50.12	29.90	4.10	VERTICAL	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
30.000000	21.30	11.61	36.30	-15.00	VERTICAL	PASSED
39.138277	33.10	45.19	52.70	-19.60	VERTICAL	PASSED
104.008617	32.30	41.21	59.00	-26.70	HORIZONTAL	PASSED
133.004409	34.50	53.09	62.90	-28.40	VERTICAL	PASSED
441.783768	25.50	18.84	51.00	-25.50	HORIZONTAL	PASSED
897.695591	28.50	26.61	46.20	-17.70	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
7839.679359	50.50	334.97	45.60	4.90	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
1430.867735	24.80	17.38	35.50	-10.70	VERTICAL	PASSED
1448.389780	25.10	17.99	35.50	-10.40	VERTICAL	PASSED
2943.889780	33.30	46.24	36.00	-2.70	HORIZONTAL	PASSED
7840.179359	36.20	64.57	31.30	4.90	VERTICAL	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	46.70	216.27	49.60	-2.90	HORIZONTAL	PASSED
7960.000000	51.80	389.05	46.00	5.80	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	31.00	35.48	33.90	-2.90	HORIZONTAL	PASSED
7960.000000	35.30	58.21	29.50	5.80	VERTICAL	PASSED

3.5. Bluetooth Test results

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	44.30	164.06	43.60	0.70	VERTICAL	PASSED
7206.000000	46.30	206.54	43.40	2.90	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	31.40	37.15	30.70	0.70	HORIZONTAL	PASSED
7206.000000	32.70	43.15	29.80	2.90	VERTICAL	PASSED

Channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
32.083367	15.60	6.03	31.80	-16.20	VERTICAL	PASSED
38.095391	14.60	5.37	33.40	-18.80	VERTICAL	PASSED
82.624850	14.10	5.07	41.30	-27.20	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4848.693387	44.50	167.88	43.10	1.40	VERTICAL	PASSED
7386.767535	46.00	199.53	42.20	3.80	VERTICAL	PASSED
7621.234469	46.00	199.53	41.70	4.30	VERTICAL	PASSED
17988.983968	55.20	575.44	36.10	19.10	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4849.193387	31.80	38.90	30.40	1.40	VERTICAL	PASSED
7383.267535	33.70	48.42	29.90	3.80	VERTICAL	PASSED
17991.483968	42.70	136.46	23.50	19.20	HORIZONTAL	PASSED

Channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4960.000000	43.80	154.88	43.80	0.00	HORIZONTAL	PASSED
7440.000000	46.50	211.35	42.50	4.00	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4960.000000	31.20	36.31	31.20	0.00	VERTICAL	PASSED
7440.000000	33.00	44.67	29.00	4.00	VERTICAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1742	EMI Test Receiver	ESMI	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1872	Thermo- Hygrograph	00.02520.150700	Lambrecht	15C, 15B
1916	Radio Communication tester	CMTA84	R&S	15C, 15B
2039	Power Supply	PL330QMD	THURLBY	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN-Antenna line	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2111	Multimeter	TX3	Tektronix	15C, 15B
2156	Digital Radio Communication Tester	CMU200	R&S	15C, 15B
2206	Signal generator	SMX	R&S	15C, 15B
2335	GPIB Switch 2 to 1	-	National Instruments	15C, 15B
2347	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24, 15C
2359	Temperature Test system	VT4002	Vötsch Industrietechnik	22/24
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24
2362	Power Supply	NGPX 70/5	R&S	22/24
-	RF Emission Software	ES-K1 v.1.60	R&S	15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24, 15C
1749	Log. per. Antenna	HL025	R&S	22/24, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24, 15C
2006	Radiation Reference Source	VSQ	MEB	22/24, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24, 15C, 15B
2019	Multimeter	34401A	HP	22/24, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24, 15C
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22/24, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	22/24, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24, 15C
2057	Log. per. Antenna	HL025	R&S	22/24, 15C
2109	Power Supply	PL330QMD	THURLBY	22/24, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2110	Multimeter	34401A	HP	22/24, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24, 15C, 15B
2133	Power Meter	NRVS	R&S	22/24, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24, 15C
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2138	Ultra Broadband Antenna	HL562	R&S	22/24, 15C, 15B
2140	Biconical Antenna	EMCO93110B	EMCO	22/24, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24, 15C, 15B
2334	GPIB Switch 2 to 1	-	National Instruments	22/24, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24, 15C
2361	Anechoic chamber	3 meter semi/full anechoic chamber	Euroshield	22/24, 15C, 15B
2398	Horn antenna	HF906	R&S	22/24, 15C
2363	Band Reject Filter	WRCG 832/838-825/845/5SS	Wainwright	22/24
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	22/24
2365	Relay Switch Unit	TS-RSP	R&S	22/24, 15C, 15B
2366	Relay Switch Unit	TS-RSP	R&S	22/24, 15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24, 15C, 15B