

FCC Part 15B Compliance Test Report

Test Report no.:	Salo_FCC_0815_08.doc	Date of Report:	12-May-2008
Number of pages:	14	Customer's Contact person:	Stephen Walmsley
Testing laboratory:	TCC Nokia Salo Laboratory P.O. Box 86 Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220	Customer:	Nokia Corporation 9200 Glenlyon Parkway BURNABY, BRITISH COLUMBIA CANADA V5J 5J8 Tel. +1 604 456 5400 Fax. +1 604 456 5454
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-247 / Battery BL-5F, Audio Adapter AD-54, Headset HS-45 and AC-Charger AC-5E		
FCC ID:	QEYRM-247	IC:	661L-RM247
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 (Issue 2, September 2005), RSS-133 (Issue 4, February 2008), RSS-139 (Issue 1, February 2008) and RSS-210 (Issue 7, June 2007). 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, Test System Manager

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	28-Mar-2008
Testing completed	15-Apr-2008
The customer's contact person	Stephen Walmsley
Test Plan referred to	T:\Projects\RM-247\TestPlan_RS\RS_Testplan_RM-247.xls
Notes	
Document name	T:\Projects\RM-247\EMC\Results\FCC\Salo_FCC_0815_08.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band I/VIII) mobile phone with GPRS, EGPRS, Bluetooth and WLAN. GSM bands are tested in idle mode. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-247	004401018148284	0510_A	-	V0.0810.0.0.019	12812
Battery	BL-5F	3635637363520601840;0670498	-	-	-	12813
Audio Adapter	AD-54	07508387352J2108137	-	-	-	12704
Headset	HS-45	-	-	-	-	12705
AC-Charger	AC-5E	3943497117090624005;0675540	-	-	-	12814
Phone	RM-247	004401018148391	0510_A	-	V0.0810.0.0.019	12648
Battery	BL-5F	000008025140100013;0670498	-	-	-	12633
Audio adapter	AD-54	07508387295J100116	0.6	1.7	-	12436
Headset	HS-45	06942357301K1900958	2	0.5	-	12435
AC-Charger	AC-5E	3820667325270111862;0670523;	1.9	1.9	-	12613

1.2. Summary of Test Results

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 (6.6)	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.

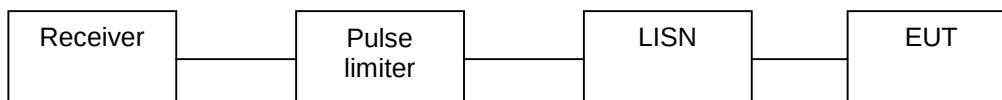
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-247, DUT 12812
Accessories with DUT numbers	BL-5F, DUT 12813; AD-54, DUT 12704; HS-45, DUT 12705; AC-5E, DUT 12814
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 41 / 101
Date of measurements	15-Apr-2008
Measured by	Anni Manninen

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:

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

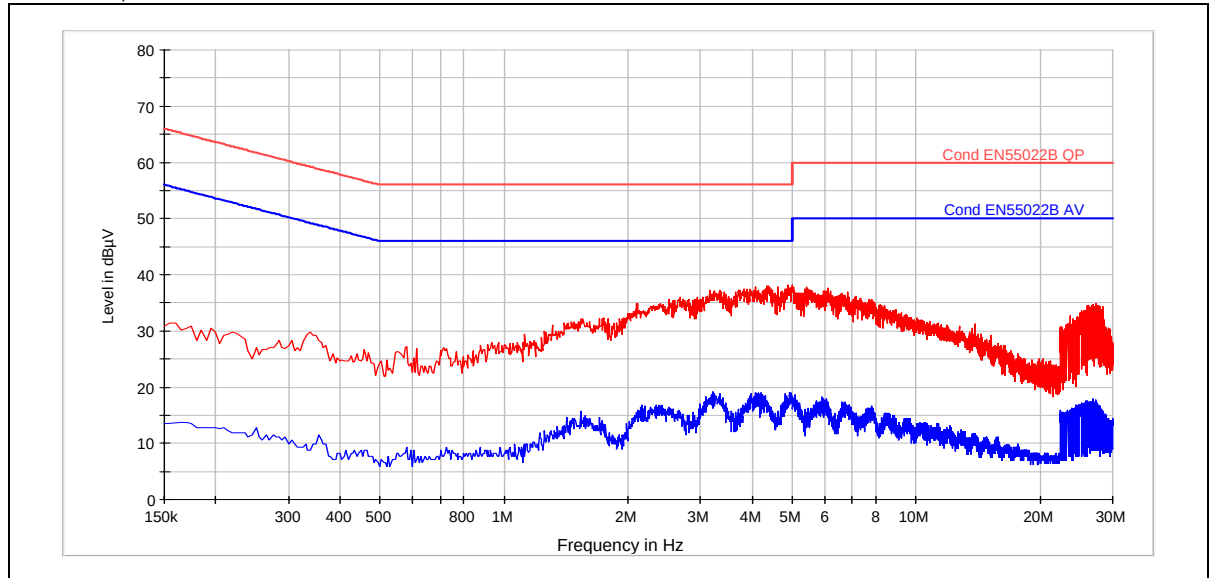
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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

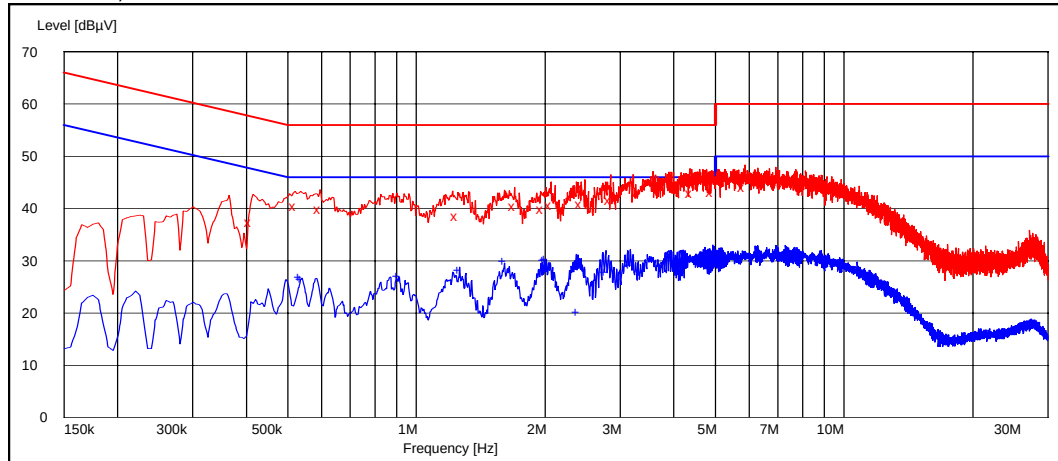
2.3. GSM 1900 Test results

RX mode, channel 661 / 1960.0 MHz



2.4. Bluetooth Test results

TX mode, channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.410000	37.50	L1	PASSED
0.520000	40.50	L1	PASSED
0.595000	39.90	L1	PASSED
1.245000	38.50	L1	PASSED
1.695000	40.50	L1	PASSED
1.970000	39.90	L1	PASSED
2.065000	40.70	L1	PASSED
2.430000	40.90	L1	PASSED
2.845000	41.60	L1	PASSED
4.405000	42.90	L1	PASSED
4.915000	43.10	L1	PASSED
5.830000	44.10	L1	PASSED

Average (RBW: 9 kHz)

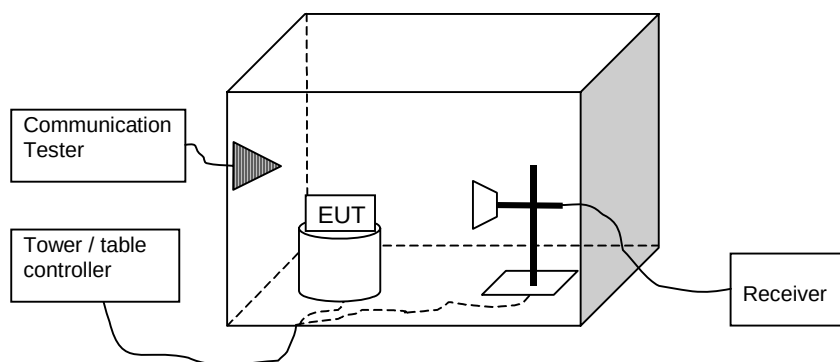
Frequency [MHz]	U [dBμV]	Line	Result
0.535000	26.80	L1	PASSED
0.540000	26.50	L1	PASSED
0.910000	27.10	L1	PASSED
1.260000	28.20	L1	PASSED
1.605000	29.90	L1	PASSED
1.995000	30.10	L1	PASSED
2.015000	30.20	L1	PASSED
2.385000	20.20	L1	PASSED
2.775000	27.90	L1	PASSED
3.165000	29.20	L1	PASSED
4.770000	29.50	L1	PASSED
4.975000	28.90	L1	PASSED

3. Radiated emissions

(FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6, RSS-139 6.6)

EUT with DUT number	RM-247, DUT 12648
Accessories with DUT numbers	BL-5F, DUT 12633; AD-54, DUT 12436; HS-45, DUT 12435; AC-5E, DUT 12613
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	GSM 1900 tested slide closed mode and BT tested slide open mode.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	18 / 42 / 100.7
Date of measurements	09-Apr-2008
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 1900 Test results

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	41.90	124.45	45.80	-3.9	VERTICAL	PASSED
7720.000000	46.70	216.27	43.50	3.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	27.90	24.83	31.80	-3.9	VERTICAL	PASSED
7720.000000	33.80	48.98	30.60	3.2	VERTICAL	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
31.761924	24.90	17.58	36.00	-11.1	VERTICAL	PASSED
33.288176	28.50	26.61	40.50	-12.0	VERTICAL	PASSED
46.514629	15.00	5.62	34.60	-19.6	VERTICAL	PASSED
48.297996	12.80	4.37	33.50	-20.7	VERTICAL	PASSED
929.657715	24.20	16.22	34.40	-10.2	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2947.889780	52.80	436.52	48.20	4.6	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2940.889780	39.90	98.86	35.50	4.4	VERTICAL	PASSED
7499.497996	34.70	54.33	30.80	3.9	VERTICAL	PASSED
7968.943888	35.10	56.89	30.20	4.9	VERTICAL	PASSED

RX mode, channel 810 / 1989.8 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
3980.000000	41.20	114.82	44.70	-3.5	VERTICAL	PASSED
7960.000000	47.30	231.74	42.50	4.8	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
3980.000000	28.20	25.70	31.70	-3.5	VERTICAL	PASSED
7960.000000	34.50	53.09	29.70	4.8	VERTICAL	PASSED

3.4. Bluetooth Test results

3.4.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	43.50	149.62	43.30	0.2	VERTICAL	PASSED
7206.000000	46.30	206.54	44.10	2.2	VERTICAL	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	30.30	32.73	30.10	0.2	VERTICAL	PASSED
7206.000000	33.00	44.67	30.80	2.2	VERTICAL	PASSED

Channel 40 / 2442 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
37.595391	21.80	12.30	42.00	-20.2	VERTICAL	PASSED
114.508818	14.70	5.43	41.00	-26.3	HORIZONTAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.147295	43.20	144.54	42.70	0.5	VERTICAL	PASSED
12516.024048	53.00	446.68	42.50	10.5	VERTICAL	PASSED
13367.227455	54.20	512.86	40.80	13.4	VERTICAL	PASSED
15399.797595	52.50	421.70	37.10	15.4	VERTICAL	PASSED
15901.307615	54.50	530.88	37.60	16.9	VERTICAL	PASSED
16194.384770	55.40	588.84	37.90	17.5	VERTICAL	PASSED
17921.343687	56.40	660.69	37.40	19.0	VERTICAL	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4823.147295	30.10	31.99	29.60	0.5	VERTICAL	PASSED
12513.524048	39.40	93.33	28.90	10.5	VERTICAL	PASSED
13366.227455	40.70	108.39	27.30	13.4	VERTICAL	PASSED
15399.797595	40.00	100.00	24.60	15.4	VERTICAL	PASSED
15905.307615	41.50	118.85	24.70	16.8	VERTICAL	PASSED
16190.384770	42.20	128.82	24.80	17.4	VERTICAL	PASSED
17924.343687	43.90	156.68	24.80	19.1	VERTICAL	PASSED

Channel 78 / 2480 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	44.20	162.18	44.60	-0.4	HORIZONTAL	PASSED
7440.000000	46.50	211.35	43.40	3.1	VERTICAL	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	30.00	31.62	30.40	-0.4	VERTICAL	PASSED
7440.000000	34.00	50.12	30.90	3.1	VERTICAL	PASSED

3.4.2 GFSK modulation, PRBS packet type, GPS is active

TX mode, channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	43.30	146.22	43.10	0.2	HORIZONTAL	PASSED
7206.000000	46.10	201.84	43.90	2.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	30.60	33.88	30.40	0.2	HORIZONTAL	PASSED
7206.000000	32.90	44.16	30.70	2.2	VERTICAL	PASSED

TX mode, 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
30.861924	16.50	6.68	33.00	-16.5	VERTICAL	PASSED
37.676353	13.70	4.84	33.90	-20.2	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4828.153307	43.50	149.62	42.90	0.6	VERTICAL	PASSED
12512.528056	53.20	457.09	42.70	10.5	VERTICAL	PASSED
13271.545090	53.20	457.09	40.60	12.6	VERTICAL	PASSED
15495.483968	52.20	407.38	36.70	15.5	VERTICAL	PASSED
15896.787575	54.50	530.88	37.70	16.8	VERTICAL	PASSED
16180.352705	55.10	568.85	37.90	17.2	VERTICAL	PASSED
17921.837675	56.50	668.34	37.50	19.0	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4826.653307	30.10	31.99	29.60	0.5	VERTICAL	PASSED
12518.028056	39.50	94.41	29.00	10.5	VERTICAL	PASSED

13276.045090	40.70	108.39	28.10	12.6	VERTICAL	PASSED
15487.983968	39.70	96.61	24.30	15.4	VERTICAL	PASSED
15895.287575	41.00	112.20	24.20	16.8	VERTICAL	PASSED
16172.852705	41.60	120.23	24.60	17.0	VERTICAL	PASSED
17920.837675	43.30	146.22	24.30	19.0	VERTICAL	PASSED

TX mode, 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	42.80	138.04	43.20	-0.4	VERTICAL	PASSED
7440.000000	46.50	211.35	43.40	3.1	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
4960.000000	30.10	31.99	30.50	-0.4	VERTICAL	PASSED
7440.000000	33.90	49.55	30.80	3.1	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	GPIO Switch 2 to 1	-	National Instruments	15C, 15B
2347	Digital Radio Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24/27, 15C
2359	Temperature Test system	VT4002	Vötsch Industrietechnik	22/24/27
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24/27
2362	Power Supply	NGPX 70/5	R&S	22/24/27
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1749	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24/27, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24/27, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24/27, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24/27, 15C
2006	Radiation Reference Source	VSQ	MEB	22/24/27, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24/27, 15C, 15B
2019	Multimeter	34401A	HP	22/24/27, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24/27, 15C, 15B
2043	Band Reject Filter	WRCA824/849-0.2-6SS	Wainwright	22, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	24, 15C, 15B
2048	Band Reject Filter	WRCC1700/1800-0.2-10SS	Wainwright	27, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24/27, 15C
2057	Log. per. Antenna	HL025	R&S	22/24/27, 15C
2109	Power Supply	PL330QMD	THURLBY	22/24/27, 15C, 15B
2110	Multimeter	34401A	HP	22/24/27, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24/27, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24/27, 15C, 15B
2133	Power Meter	NRVS	R&S	22/24/27, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24/27, 15C
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2138	Ultra Broadband Antenna	HL562	R&S	22/24/27, 15C, 15B
2140	Biconical Antenna	EMCO93110B	EMCO	22/24/27, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24/27, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24/27, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24/27, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24/27, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24/27, 15C, 15B
2334	GPIB Switch 2 to 1	-	National Instruments	22/24/27, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24/27, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24/27, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24/27, 15C
2361	Anechoic chamber	3 meter semi/full anechoic chamber	Euroshield	22/24/27, 15C, 15B
2398	Horn antenna	HF906	R&S	22/24/27, 15C
2363	Band Reject Filter	WRCG 832/838-825/845/5SS	Wainwright	22/24/27
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	22/24/27
2365	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2366	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22/24/27
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B