TCC Nokia

FINAS Finnish Accreditation Service T117 (EN ISO/IEC 17025)

FCC Part 15B Compliance Test Report

Test Report no.:	Tre_FCC_0634_01.doc	**Date of Report:**	23.8.2006
Number of pages:	12	**Customer's Contact person:**	Thomas Reitmayer
Testing laboratory:	TCC Nokia Tampere Laboratory P.O. Box 68 Sinitaival 5 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880	**Client:**	Nokia Corporation Lise Meitner Strasse 10 89081 ULM GERMANY Tel. +49 731 1754 0 Fax. +49 731 1754 6800
FCC listing no.: **IC recognition no.:**	94436 3608		
Tested devices/ accessories:	**Phone; RM-181 Battery; BL-5B, AC-Charger; AC-3E, Headset; HS-47, Data Cable; DKE-2, Multi Media Card; MU-27**		
FCC ID:	PPIRM-181	**IC:**	661U-RM181
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:	 Digitally signed by Jari Jantunen Date: 2006.08.23 14:49:33 +03'00'		

Jari Jantunen, System Manager

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1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	03-07-2006
Testing completed	14-06-2006
The customer's contact person	Thomas Reitmayer
Test Plan referred to	\EMC\TESTPLAN\
Notes	None
Document name	T:\Projects\RM-147\EMC\Results\FCC\Cph_FCC_0627_01.doc

1.1. EUT and Accessory Information

The EUT is a triple band (GSM850/1800/1900) 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-147	004400/91/160545/7	0419	-	Vp cs3.07	27889
Battery	BL-5B	0670528417535N131H10109964	-	-	-	27894
AC-Charger	AC-3E	409049610517100762O;0675370	-	-	-	27893
Headset	HS-47	-	3.1	3.0	-	27895
Multi Media Card	MU-27	8524910000/5A992	-	-	-	27891
Data Cable	DKE-2	108882553108	-	-	-	27890

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

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

The test results of PPIRM-147 are re-used for certification of the PPIRM-181. The table above indicates the results, which will be re-used.

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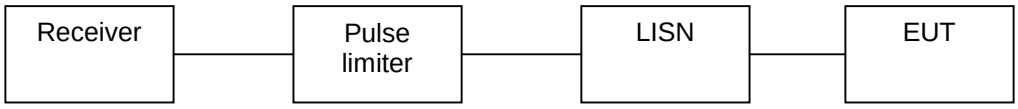
2. AC powerline conducted emissions

(FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-147 Dut # 27889
Accessories with DUT numbers	BL-5B Dut # 27894 + AC-3E Dut # 27893 + HS-47 Dut # 27895 + MU-27 Dut # 27891 + DKE-2 Dut # 27890
Operation Voltage [V] / [Hz]	115/50
Result	Passed
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	23.4 / 50.0 1026.8
Date of measurements	04-07-2006
Measured by	Allan F. Henriksen

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

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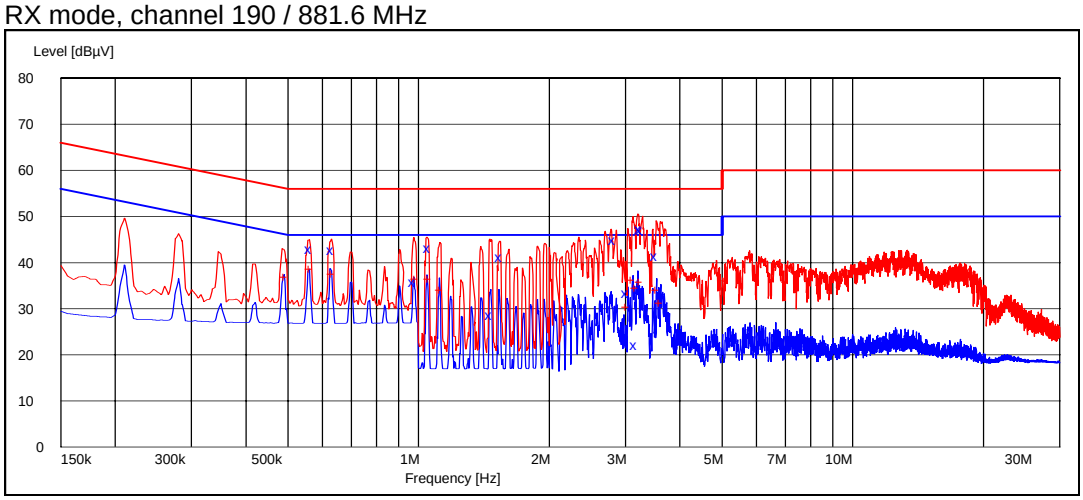
2.3. GSM 850 Test results

RX mode, channel 190 / 881.6 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.565000	43.00	L1	Passed
0.635000	42.70	L1	Passed
0.980000	35.80	N	Passed
1.060000	43.10	N	Passed
1.470000	28.70	N	Passed
1.555000	41.30	N	Passed
2.830000	44.90	N	Passed
3.030000	33.40	N	Passed
3.170000	22.10	N	Passed
3.255000	47.30	N	Passed
3.275000	47.10	N	Passed
3.540000	41.40	N	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.495000	36.80	N	Passed
0.565000	38.60	N	Passed
0.635000	37.50	N	Passed
0.990000	36.40	N	Passed
1.060000	36.40	N	Passed
1.130000	34.00	N	Passed
3.035000	30.30	N	Passed
3.120000	36.20	N	Passed
3.185000	34.40	N	Passed
3.260000	35.80	N	Passed
3.555000	33.90	N	Passed
3.620000	31.30	N	Passed

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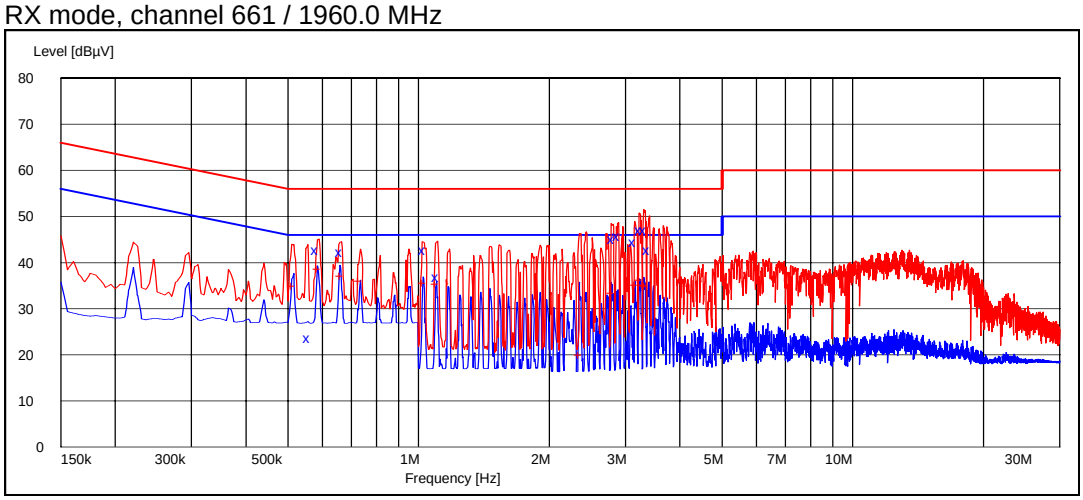
2.4. GSM 1900 Test results

RX mode, channel 661 / 1960.0 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.560000	23.70	L1	Passed
0.585000	42.80	N	Passed
0.665000	42.40	N	Passed
1.035000	42.70	N	Passed
1.110000	36.80	L1	Passed
2.820000	45.10	N	Passed
2.900000	45.70	N	Passed
3.160000	44.40	N	Passed
3.260000	47.00	N	Passed
3.340000	47.00	N	Passed
3.395000	42.70	N	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.515000	34.80	L1	Passed
0.590000	38.60	N	Passed
0.665000	37.10	N	Passed
0.735000	35.90	N	Passed
1.030000	35.60	N	Passed
1.105000	35.30	N	Passed
2.360000	20.00	N	Passed
2.800000	33.30	N	Passed
3.170000	35.00	N	Passed
3.245000	36.30	N	Passed
3.325000	35.10	N	Passed
3.350000	34.80	N	Passed

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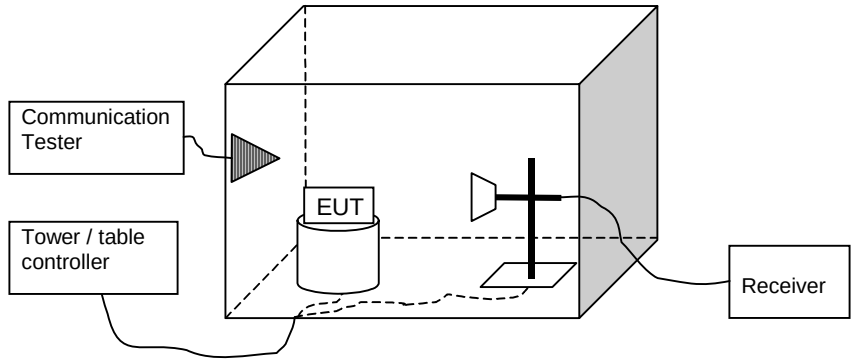
3. Radiated emissions

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

EUT with DUT number	RM-147 Dut # 27889
Accessories with DUT numbers	BL-5B Dut # 27894 + AC-3E Dut # 27893 + HS-47 Dut # 27895 + MU-27 Dut # 27891 + DKE-2 Dut # 27890
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23.4 / 50.0 1026.8
Date of measurements	13-07-2006
Measured by	Christian Andersen

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.

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The measurement results are obtained as described below:

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

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	39.60	95.50	44.00	-4.40	VERTICAL	Passed
6953.600000	48.90	278.61	46.10	2.80	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3476.800000	25.50	18.84	29.90	-4.40	VERTICAL	Passed
6953.600000	33.70	48.42	30.90	2.80	VERTICAL	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
37.095391	25.60	19.05	43.10	-17.50	VERTICAL	Passed
53.948096	29.30	29.17	58.30	-29.00	VERTICAL	Passed
796.693186	20.80	10.96	34.10	-13.30	HORIZONTAL	Passed
835.271343	16.80	6.92	29.50	-12.70	HORIZONTAL	Passed
881.663527	53.40	467.74	65.70	-12.30	VERTICAL	Passed

*881.6 MHz frequency is coming from communication tester and thus ignored.

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3527.052104	37.60	75.86	42.00	-4.40	VERTICAL	Passed
7053.104208	48.90	278.61	46.00	2.90	VERTICAL	Passed
7839.177355	43.90	156.68	37.90	6.00	VERTICAL	Passed

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Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
2295.089178	36.60	67.61	37.10	-0.50	VERTICAL	Passed
2905.809619	35.00	56.23	30.50	4.50	VERTICAL	Passed
3526.052104	24.80	17.38	29.20	-4.40	VERTICAL	Passed
7052.604208	33.00	44.67	30.10	2.90	VERTICAL	Passed
7842.677355	29.70	30.55	23.60	6.10	VERTICAL	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	39.00	89.13	42.90	-3.90	HORIZONTAL	Passed
7150.400000	48.30	260.02	44.30	4.00	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3575.200000	25.30	18.41	29.20	-3.90	HORIZONTAL	Passed
7150.400000	32.70	43.15	28.70	4.00	VERTICAL	Passed

3.4. 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	42.10	127.35	44.80	-2.70	VERTICAL	Passed
7720.000000	45.40	186.21	40.20	5.20	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3860.000000	27.40	23.44	30.10	-2.70	VERTICAL	Passed
7720.000000	28.60	26.92	23.40	5.20	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
37.495391	25.90	19.72	43.70	-17.80	VERTICAL	Passed
53.929058	28.00	25.12	57.00	-29.00	VERTICAL	Passed
300.200000	18.20	8.13	41.50	-23.30	HORIZONTAL	Passed
326.050501	15.80	6.17	38.20	-22.40	HORIZONTAL	Passed
754.809018	15.30	5.82	29.20	-13.90	VERTICAL	Passed
799.299198	20.60	10.72	33.80	-13.20	HORIZONTAL	Passed

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Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1959.919840	61.30	1,161.45	64.20	-2.90	VERTICAL	Passed
3919.839679	42.80	138.04	45.80	-3.00	VERTICAL	Passed
7839.679359	47.50	237.14	41.50	6.00	VERTICAL	Passed
7839.681363	48.50	266.07	42.50	6.00	VERTICAL	Passed

*1960 MHz frequency is coming from communication tester and thus ignored.

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
1959.919840	60.30	1,035.14	63.20	-2.90	VERTICAL	Passed
2295.589178	35.20	57.54	35.80	-0.60	VERTICAL	Passed
2903.811623	34.90	55.59	30.50	4.40	VERTICAL	Passed
3919.839679	27.90	24.83	30.90	-3.00	VERTICAL	Passed
7840.179359	32.90	44.16	26.90	6.00	VERTICAL	Passed
7840.181363	32.90	44.16	26.90	6.00	VERTICAL	Passed

*1960 MHz frequency is coming from communication tester and thus ignored.

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	41.40	117.49	44.20	-2.80	HORIZONTAL	Passed
7960.000000	46.00	199.53	40.70	5.30	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
3980.000000	26.80	21.88	29.60	-2.80	VERTICAL	Passed
7960.000000	28.90	27.86	23.60	5.30	VERTICAL	Passed

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4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15B,15C
13513	Pulse Limiter 9KHz-30MHz	ESH3Z2	Rohde&Schwarz	15B,15C
13666	EMI Test Reciever 9KHz-2,5GHz	ESPC	Rohde&Schwarz	15B,15C
13935	Two Lines Artificial Mains Network	ESH3-Z5	Rohde&Schwarz	15B,15C
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15B,15C
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15B,15C
19171	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	15B,15C
11386	System DC Power Supply	HP6632A	Hewlett Packard	22.24
11487	Network analyzer 300KHz-3,0GHz	HP8753A	Hewlett Packard	22.24
11584	Spectrum analyzer 50Hz-6,5GHz	HP8561B	Hewlett Packard	22.24
13134	Tracking generator	HP85645A	Hewlett Packard	22.24
13302	Spectrum Analyzer 9KHz-12.8GHz	HP8596E	Hewlett Packard	22.24
13371	Temperature Chamber	S-1,2C	Thermotron	22.24
13524	Digital Radiocomm. Tester	CMD55	Rohde&Schwarz	22.24
14807	S - Parameter Test Set 300KHz-6GHz	HP85047A	Hewlett Packard	22.24
15859	Digital Radio Communication Test Set	4201S	Wavetek	22.24
17277	Multimeter Digital 6 1/2 Digit	AT34401A	Agilent Technologies	22.24
17796	Radio Communication Test Set	4400M	Wavetek	22.24
19374	Resonant Dipole Antenna 850MHz SMA m Conn.	-	NMP Cph	22.24
19375	Resonant Dipole Antenna 1900MHz SMA m Conn.	-	NMP Cph	22.24
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15B,15C

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
14020	Programmable Relay Switching System	-	Pickering	15B,15C,22,24
18792	Multi Device Controller	2090	ETS-EMCO	15B,15C,22,24
13829	Turntable Controller	4630-100	Comtest	15B,15C,22,24
14963	RF Preamplifier 100MHz-4GHz (Metal Chassis)	AFS3-00100400	Miteq/NMP Cph	15B,15C,22,24
13668	BiLog Antenna 30-2000MHz	BiLog-CBL6112A	Chase	15B,15C,22,24
18861	EMI Test Receiver 20Hz-26,5GHz	ESI	Rohde&Schwarz	15B,15C,22,24
12679	Dual Log Periodic Antenna 1-18 GHz	HL025	Rohde&Schwarz	15B,15C,22,24
18860	Ultra Broadband Antenna	HL562	Rohde&Schwarz	15B,15C,22,24

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Eq. No	Equipment	Type	Manufacturer	Used in
	Ultralog 30-3000MHz			
18773	Shielded Chamber	RFD-100	ETS-Lindgren	15B,15C,22,24
18774	Shielded Chamber	RFSD-F/A-100	ETS-Lindgren	15B,15C,22,24
18324	High Pass Filter 3GHz SMA f Conn	WHJS3000-10SS	Wainwright	15B,15C,22,24
14114	Highpass Filter 1000MHz-4500MHz	WHK1000-12SS	Wainwright	15B,15C,22,24
13918	Highpass Filter 2000-4000MHz 50OHM SMA Conn	WHKS2000-10SS	Wainwright Instruments	15B,15C,22,24
13937	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright Instruments	15B,15C,22,24
13936	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	15B,15C,22,24
13917	Highpass Filter 1000-3000MHz 50OHM SMA Conn	WHKS1000-10SS	Wainwright Instruments	15B,15C,22,24
14188	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright	15B,15C,22,24
14187	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright	15B,15C,22,24
16633	Ultra Stable Notch Filter 1880,0MHz	WRCD1880.0-0.2/40-10SS	Wainwright	15B,15C,22,24
18323	Band reject filter 1947-1953MHz 40dB	WRCG1947/1953-1940/1960-40/6SS	Wainwright	15B,15C,22,24
15190	Infra Red Remote Control Unit	4630	Emco	22,24,15B,15C
14993	EMI Test Receiver 9KHz-2750MHz	ESCS30	Rohde&Schwarz	22,24,15B,15C
15191	Turntable Contoller Unit	G-800SDX	YAESU	22,24,15B,15C
14900	Antenna Controller	HD100	HD GmbH	22,24,15B,15C

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