

FCC Part 15B Compliance Test Report

Test Report no.:	Document1	Date of Report:	8.12.2005
Number of pages:	13	Customer's Contact person:	Harri Vähämiko
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 P.O. Box 86 Joensuuankatu 7 FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 44277
FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM phone RM-89 / Battery BP-5L, AC charger AC-4E, Memory card Mini SD 64, Data cable CA-53, Laptop Dell Latitude C640, AC adapter ADP-90FB, Printer HP deskjet 1600CC3540A, Digital camera FUJI DS-7, Serial cable for camera, Parallel cable for printer		
FCC ID:	PYARM-89	IC:	661V-RM89
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:			

Jari Jantunen, System Manager

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	1.12.2005
Testing completed	8.12.2005
The customer's contact person	Harri Vähämiko
Test Plan referred to	\\EMC\\TESTPLAN\\
Notes	-
Document name	Document1

1.1. EUT and Accessory Information

The EUT is a five band (GSM850/900/1800/1900 and WCDMA2100) 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
GSM phone	RM-89	004400611714153	5010	-	05w42.1	40456
Battery	BP-5L	M441110399298	11	-	-	40458
AC-Charger	AC-4E	-	3.22	-	-	40460
Memory Card	Mini SD 64	-	-	-	-	40466
Data cable	CA-53	-	1.0	1.0	-	40464
Laptop	DELL Latitude C640	4F343	-	-	-	40293
AC Adapter	ADP-90FB	TH-06G356-17971-2CK-A4G0	-	-	-	40294
Printer	HP deskjet 1600CC3540A	USB8302546	-	-	-	40077
Digital camera	FUJI DS-7	7102516	-	-	-	40076
Serial cable for camera	-	-	-	-	-	40088
Parallel cable for printer	-	-	-	-	-	40087

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	NP
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	NP
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	NP

WLAN:

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 Tampere Laboratory.

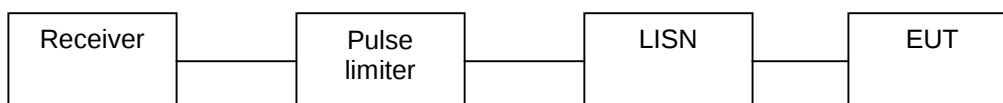
CONTENTS

1. Summary for FCC Part 15B Compliance Test Report.....	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results.....	2
2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3).....	5
2.1. Test setup	5
2.2. Test method and limit.....	5
2.3. Bluetooth Test results	6
2.4. WLAN Test results	7
3. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 6.6, RSS-133 9) 8	
3.1. Test setup	8
3.2. Test method and limit.....	8
3.3. GSM 850 Test results	9
3.4. GSM 1900 Test results	10
3.5. WLAN Test results	11
4. Test Equipment.....	13
4.1. Conducted measurements	13
4.2. Radiated measurements	13

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

EUT with DUT number	RM-89 DUT 40456
Accessories with DUT numbers	BP-5L DUT 40458, AC-4E DUT 40460, Mini SD 64 DUT 40466, CA-53 DUT 40464, DELL Latitude C640 DUT 40293, AC adapter ADP-90FB DUT 40294, HP deskjet 1600CC3540A DUT 40077, FUJI DS-7 DUT 40076, Serial cable for camera DUT 40088, Parallel cable for printer DUT 40087
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]	18-19 / 50-52 / 100.6-102.5
Date of measurements	1, 8.12.1005
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:

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

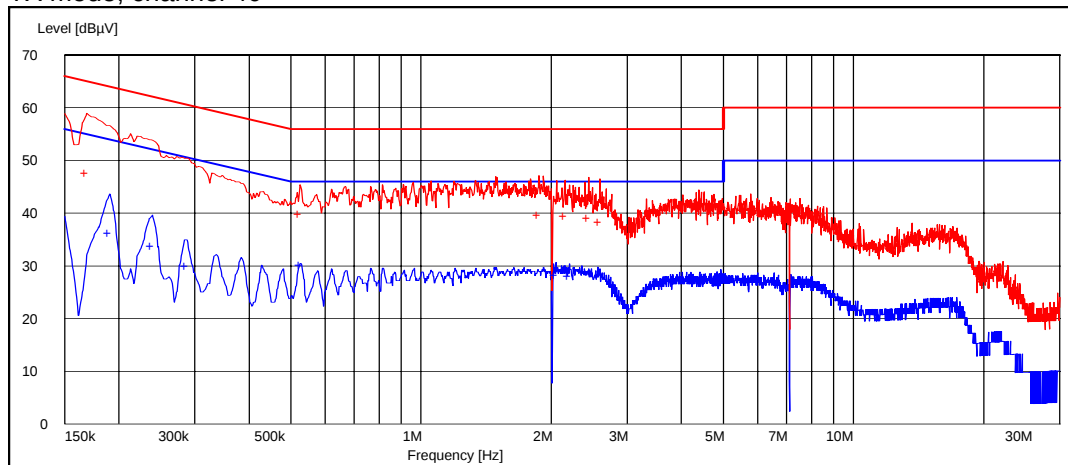
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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. Bluetooth Test results

TX mode, channel 40



Quasi peak (RBW: 9 kHz)

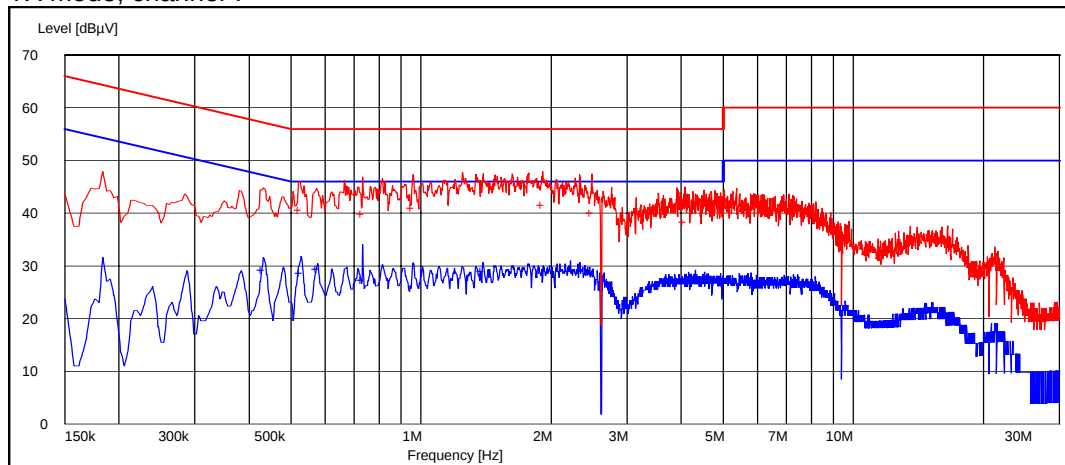
Frequency [MHz]	U [dBμV]	Line	Result
0.168537	47.60	N	PASSED
0.524449	39.90	L1	PASSED
1.873948	39.70	N	PASSED
2.156313	39.40	N	PASSED
2.444890	39.00	N	PASSED
2.589178	38.40	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.190782	36.20	N	PASSED
0.238978	33.80	L1	PASSED
0.287174	29.90	L1	PASSED
0.528156	30.20	N	PASSED
2.054108	28.30	N	PASSED
2.204409	28.00	L1	PASSED

2.4. WLAN Test results

TX mode, channel 7



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.524449	40.60	L1	PASSED
0.732064	39.80	N	PASSED
0.958216	41.00	L1	PASSED
1.911022	41.50	N	PASSED
2.480962	40.00	N	PASSED
4.080160	38.40	N	PASSED

Average (RBW: 9 kHz)

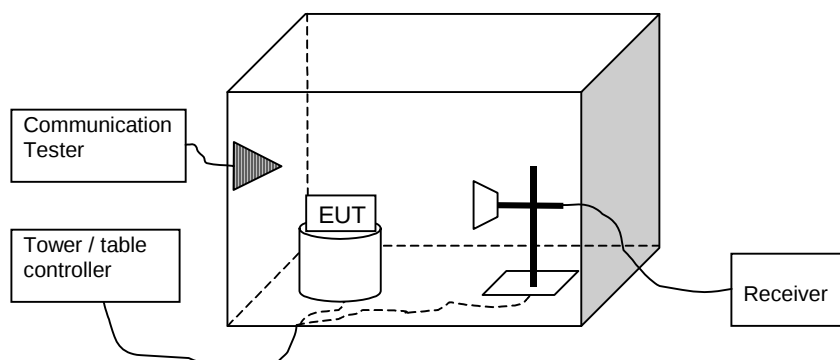
Frequency [MHz]	U [dBμV]	Line	Result
0.431764	29.20	N	PASSED
0.528156	28.70	L1	PASSED
0.576353	29.40	N	PASSED
0.732064	27.20	L1	PASSED
1.388277	29.10	N	PASSED
2.216433	29.00	N	PASSED

3. Radiated emissions

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

EUT with DUT number	RM-89 DUT 40456
Accessories with DUT numbers	BP-5L DUT 40458, AC-4E DUT 40460, Mini SD 64 DUT 40466, CA-53 DUT 40464, DELL Latitude C640 DUT 40293, AC adapter ADP-90FB DUT 40294, HP deskjet 1600CC3540A DUT 40077, FUJI DS-7 DUT 40076, Serial cable for camera DUT 40088, Parallel cable for printer DUT 40087
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]	23 / 46 / 100.6
Date of measurements	1.12.2005
Measured by	Jari Jantunen

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 [dB μ V/m]	Average limit [dB μ V/m]	Peak limit [dB μ V/m]
30 - 230	40	-	-
230 - 1000	47	-	-
Above 1000	-	54	74

3.3. GSM 850 Test results

RX mode, channel 128

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
3476.800000	38.50	84.14	43.30	-4.80	VERTICAL	PASSED
6953.600000	50.40	331.13	48.90	1.50	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
3476.800000	26.50	21.13	31.30	-4.80	VERTICAL	PASSED
6953.600000	36.80	69.18	35.30	1.50	VERTICAL	PASSED

RX mode, channel 190

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
34.288176	28.70	27.23	56.50	-27.80	VERTICAL	PASSED
34.769138	25.30	18.41	53.30	-28.00	VERTICAL	PASSED
35.071543	29.90	31.26	58.00	-28.10	VERTICAL	PASSED
35.350100	24.20	16.22	52.50	-28.30	VERTICAL	PASSED
35.792986	26.50	21.13	54.90	-28.40	VERTICAL	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
3523.552104	38.40	83.18	43.20	-4.80	VERTICAL	PASSED
7052.800000	43.80	154.88	43.60	0.20	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3526.552104	25.80	19.50	30.60	-4.80	VERTICAL	PASSED
7988.477956	32.30	41.21	27.40	4.90	VERTICAL	PASSED

RX mode, channel 251

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	40.00	100.00	44.60	-4.60	HORIZONTAL	PASSED
7150.400000	44.60	169.82	42.00	2.60	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	26.80	21.88	31.40	-4.60	HORIZONTAL	PASSED
7150.400000	32.60	42.66	30.00	2.60	VERTICAL	PASSED

3.4. GSM 1900 Test results

RX mode, channel 512

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	41.10	113.50	43.40	-2.30	VERTICAL	PASSED
7720.000000	54.50	530.88	50.30	4.20	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	27.90	24.83	30.20	-2.30	VERTICAL	PASSED
7720.000000	34.90	55.59	30.70	4.20	VERTICAL	PASSED

RX mode, channel 661

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
34.407214	17.20	7.24	45.00	-27.80	VERTICAL	PASSED
85.170140	17.00	7.08	53.90	-36.90	VERTICAL	PASSED
98.896593	14.90	5.56	50.60	-35.70	VERTICAL	PASSED
113.044489	23.10	14.29	57.60	-34.50	VERTICAL	PASSED
120.301804	18.10	8.04	52.00	-33.90	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3920.000000	42.20	128.82	44.20	-2.00	HORIZONTAL	PASSED
7840.181363	58.60	851.14	54.00	4.60	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
1959.919840	57.50	749.89	70.30	-12.80	VERTICAL	PASSED
1959.921844	57.60	758.58	70.40	-12.80	VERTICAL	PASSED
7424.343687	32.00	39.81	27.50	4.50	HORIZONTAL	PASSED
7840.179359	42.30	130.32	37.70	4.60	VERTICAL	PASSED
7840.181363	42.30	130.32	37.70	4.60	VERTICAL	PASSED

RX mode, channel 810

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	45.30	184.08	47.00	-1.70	HORIZONTAL	PASSED
7960.000000	58.60	851.14	53.80	4.80	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	28.80	27.54	30.50	-1.70	VERTICAL	PASSED
7960.000000	36.50	66.83	31.70	4.80	VERTICAL	PASSED

3.5. WLAN Test results

TX mode, channel 1

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	48.70	272.27	49.30	-0.60	HORIZONTAL	PASSED
7236.000000	44.40	165.96	41.20	3.20	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	36.60	67.61	37.20	-0.60	HORIZONTAL	PASSED
7236.000000	34.80	54.95	31.60	3.20	VERTICAL	PASSED

TX mode, channel 7

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
4884.265531	45.80	194.98	46.50	-0.70	HORIZONTAL	PASSED
7329.153307	45.70	192.75	42.10	3.60	VERTICAL	PASSED
17987.469940	56.50	668.34	34.60	21.90	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
4883.765531	32.40	41.69	33.10	-0.70	HORIZONTAL	PASSED
7325.153307	32.70	43.15	29.30	3.40	VERTICAL	PASSED
17987.469940	43.30	146.22	21.40	21.90	VERTICAL	PASSED

TX mode, channel 11

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
4924.000000	51.90	393.55	52.50	-0.60	HORIZONTAL	PASSED
7386.000000	48.80	275.42	44.50	4.30	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
4924.000000	40.00	100.00	40.60	-0.60	HORIZONTAL	PASSED
7386.000000	36.40	66.07	32.10	4.30	VERTICAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	15C,22/24
TM37678	Radio communication tester	CMU-200	R&S	15C,22/24
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	15C,22/24
TM22901	Step attenuator 110dB	8496A	Agilent	15C,22/24
TM37499	Power splitter	11667A	Agilent	15C,22/24
	Temperature chamber	VT4002	Vötsch	15C,22/24
TM38112	DC power supply	6632A	Agilent	15C,22/24
TM38111	Multimeter	34401A	Agilent	15C,22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C
TM37773	Radio communication tester	CMU-200	R&S	15B,15C
TM38631	Signal generator	83640L	Agilent	15B,15C
TM38114	DC power supply	6632A	Agilent	15B,15C
TM22835	Multimeter	87	Fluke	15B,15C
TM30600	Pulse Limiter	ESH3-Z2	R&S	15B,15C
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15B,15C
TM30636	LISN 50 µH	L2-16/	PMM	15B,15C

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	15B,15C, 22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C, 22/24
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	15B,15C, 22/24
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	15B,15C, 22/24
TM37516	Biconilog antenna	HL562	R&S	15B,15C, 22/24
TM26496	Double ridged waveguide antenna	3115	EMCO	15B,15C, 22/24
TM39158	Horn antenna	3116	EMCO	15B,15C, 22/24
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	15B,15C, 22/24
TM37501	Dipole antenna	3125-870	EMCO	22/24
TM37502	Dipole antenna	3125-1880	EMCO	22/24
TM37773	Radio communication tester	CMU-200	R&S	15B,15C, 22/24
TM38631	Signal generator	83640L	Agilent	15B,15C, 22/24
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	15B,15C, 22/24
	High pass filter	WHK2010-10SS	Trilithic	15B,15C, 22/24
	Low pass filter	WLK1750-10SS	Trilithic	15B,15C, 22/24
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Turntable controller	HD-100	Deisel	15B,15C, 22/24
TM26500	Turntable	DS412	Deisel	15B,15C, 22/24
TM38842	Antenna mast controller	2090	EMCO	15B,15C, 22/24
TM38843	Antenna mast	2075	EMCO	15B,15C, 22/24
TM38114	DC power supply	6632A	Agilent	15B,15C, 22/24
TM22835	Multimeter	87	Fluke	15B,15C, 22/24