

FCC Part 15B Compliance Test Report

Test Report no.:	Cph_FCC_0608_01.doc	Date of Report:	03.03.2006
Number of pages:	13	Customer's Contact person:	Jukka Pekkala
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FCC listing no.:	99059		
IC recognition no.:	4820 and 4820-1		
Tested devices/ accessories:	Phone; RM-115 (HW: 0500), Battery; BL-4C, AC-Charger; AC-3E, Headset; HS-23, Data Cable; CA-53, IBM Laptop; T43		
FCC ID:	PPIRM-115	IC:	661U-RM115
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:			

Allan F. Henriksen, Engineer

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	13-02-2006
Testing completed	03.03.2006
The customer's contact person	Jukka Pekkala
Test Plan referred to	T:\Projects\RM-115\TestPlan_RS\RM-115_RS_testplan.xls
Notes	None
Document name	T:\Projects\RM-115\EMC\Results\FCC\Cph_FCC_0608_01.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-115	004400/85/172231/2	0500	-	3.08.1	28096
Phone	RM-115	004400/85/172303/9	0500	-	3.08.1	29028
Battery	BL-4C	067038610717244111	-	-	-	28097
AC-Charger	AC-3E	3997915413051200037;0675370	-	-	-	28103
Data Cable	CA-53	108382523301	-	-	-	28101

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 Copenhagen Laboratory.

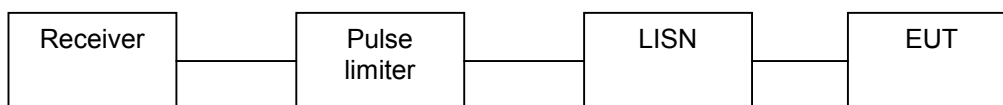
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-115 Dut # 28096
Accessories with DUT numbers	BL-4C Dut # 28097 + AC-3E Dut # 28103 + CA-53 Dut # 28101
Operation Voltage [V] / [Hz]	115 / 60
Result	Passed
Remarks	BT Tested with GFSK modulation. "Continuous data transfer was active between the phone and the computer during the test."
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	22.0 / 41.5 1029.8
Date of measurements	21-02-2006
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:

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

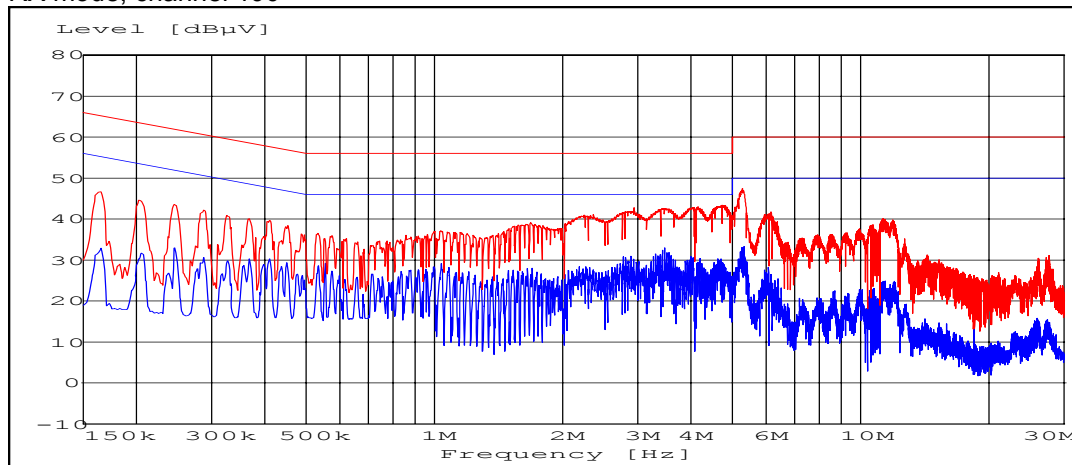
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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

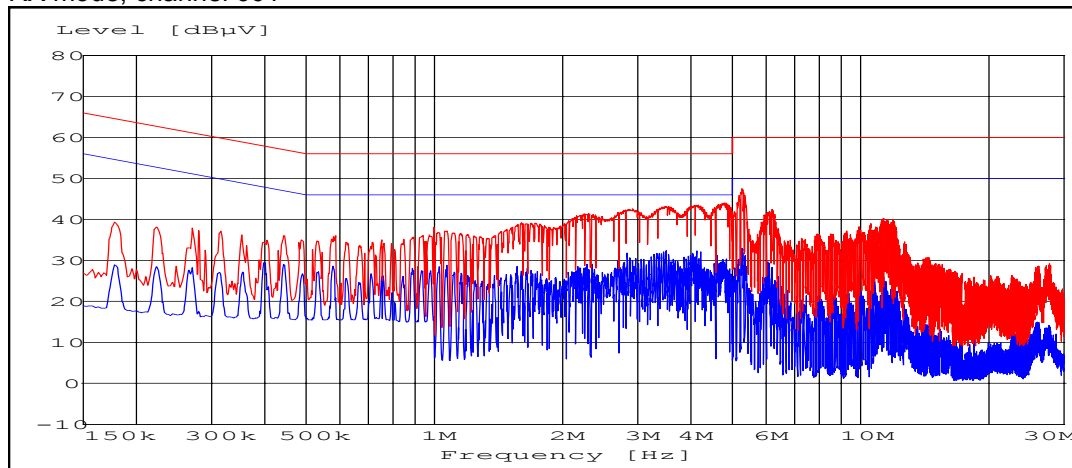
2.3. GSM 850 Test results

RX mode, channel 190



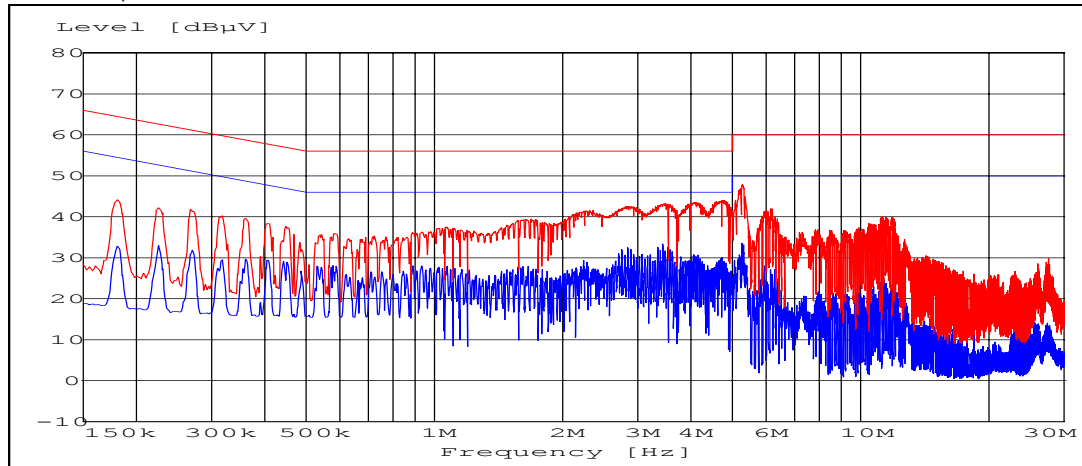
2.4. GSM 1900 Test results

RX mode, channel 661



2.5. Bluetooth Test results

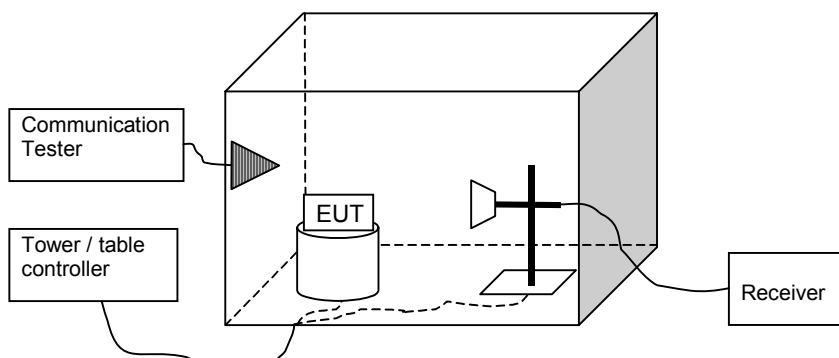
RX mode, channel 40



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

EUT with DUT number	RM-115 # 29028
Accessories with DUT numbers	BL-4C # 28097, AC-3E # 28103, CA-53 # 28101
Operation Voltage [V] / [Hz]	115 / 60
Result	Passed
Remarks	BT Tested with GFSK modulation. "Continuous data transfer was active between the phone and the computer during the test."
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21.5 / 40.5 1020.8
Date of measurements	24.02.2006
Measured by	Juho Tuohino

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 below 3 GHz and 1.6 m above that.

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

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	39.80	97.72	41.30	-1.50	VERTICAL	Passed
6953.600000	46.00	199.53	38.90	7.10	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	26.50	21.13	28.00	-1.50	VERTICAL	Passed
6953.600000	32.80	43.65	25.70	7.10	VERTICAL	Passed

RX mode, channel 190

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
48.517034	25.50	18.84	47.70	-22.20	VERTICAL	Passed
104.930060	27.00	22.39	49.10	-22.10	VERTICAL	Passed
115.811222	27.70	24.27	49.40	-21.70	VERTICAL	Passed
257.415230	32.30	41.21	52.80	-20.50	HORIZONTAL	Passed
425.951703	28.20	25.70	43.50	-15.30	VERTICAL	Passed

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3526.400000	42.50	133.35	44.00	-1.50	HORIZONTAL	Passed
7052.800000	46.20	204.17	38.50	7.70	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3526.400000	28.60	26.92	30.10	-1.50	HORIZONTAL	Passed

7052.800000 31.50 37.58 23.80 7.70 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	43.00	141.25	44.30	-1.30	HORIZONTAL	Passed
7150.400000	46.80	218.78	38.50	8.30	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	28.70	27.23	30.00	-1.30	HORIZONTAL	Passed
7150.400000	31.70	38.46	23.40	8.30	HORIZONTAL	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	45.80	194.98	45.20	0.60	HORIZONTAL	Passed
7720.000000	46.80	218.78	37.00	9.80	HORIZONTAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3920.000000	31.20	36.31	30.80	0.40	HORIZONTAL	Passed
7840.000000	34.60	53.70	23.90	10.70	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
48.617034	25.30	18.41	47.60	-22.30	VERTICAL	Passed
102.787174	26.80	21.88	48.80	-22.00	VERTICAL	Passed
116.292184	27.60	23.99	49.30	-21.70	VERTICAL	Passed
257.415230	35.20	57.54	55.70	-20.50	HORIZONTAL	Passed
425.951703	28.70	27.23	44.00	-15.30	VERTICAL	Passed
688.476754	26.60	21.38	36.00	-9.40	HORIZONTAL	Passed

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3920.000000	46.50	211.35	46.10	0.40	HORIZONTAL	Passed
7840.000000	49.20	288.40	38.50	10.70	HORIZONTAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3920.000000	31.20	36.31	30.80	0.40	HORIZONTAL	Passed
7840.000000	34.60	53.70	23.90	10.70	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	46.10	201.84	45.60	0.50	HORIZONTAL	Passed
7960.000000	46.90	221.31	36.30	10.60	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	30.50	33.50	30.00	0.50	HORIZONTAL	Passed
7960.000000	32.30	41.21	21.70	10.60	VERTICAL	Passed

3.5. Bluetooth Test results

RX mode, channel 0

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	39.70	96.61	37.70	2.00	HORIZONTAL	Passed
7206.000000	42.70	136.46	34.10	8.60	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	27.20	22.91	25.20	2.00	VERTICAL	Passed
7206.000000	29.50	29.85	20.90	8.60	VERTICAL	Passed

RX mode, channel 40

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
121.623246	21.90	12.45	42.80	-20.90	VERTICAL	Passed
125.692385	21.30	11.61	42.80	-21.50	VERTICAL	Passed
257.414629	34.70	54.33	55.20	-20.50	VERTICAL	Passed
283.868136	23.30	14.62	42.50	-19.20	VERTICAL	Passed
402.004409	32.50	42.17	48.10	-15.60	VERTICAL	Passed

Peak (RBW: 1 MHz)

Frequency	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT}	Polarisation	Result
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[MHz]				[dB]		
2313.926854	51.70	384.59	40.90	10.80	VERTICAL	Passed
2484.000000	83.80	15,488.17	38.90	44.90	HORIZONTAL	Passed
2898.825651	55.00	562.34	39.60	15.40	VERTICAL	Passed
4917.829659	40.80	109.65	38.10	2.70	VERTICAL	Passed
7338.177355	43.50	149.62	34.60	8.90	HORIZONTAL	Passed
7416.337675	44.30	164.06	35.20	9.10	HORIZONTAL	Passed
14485.473948	52.50	421.70	31.70	20.80	VERTICAL	Passed
14496.000000	53.40	467.74	32.50	20.90	HORIZONTAL	Passed
16949.901804	53.20	457.09	32.10	21.10	HORIZONTAL	Passed
17458.917836	55.50	595.66	31.30	24.20	VERTICAL	Passed
17804.101202	62.20	1,288.25	31.60	30.60	VERTICAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2315.926854	38.10	80.35	27.30	10.80	VERTICAL	Passed
2899.825651	42.10	127.35	26.70	15.40	VERTICAL	Passed
4911.329659	28.00	25.12	25.40	2.60	VERTICAL	Passed
7342.677355	30.70	34.28	21.70	9.00	HORIZONTAL	Passed
7415.837675	31.50	37.58	22.40	9.10	HORIZONTAL	Passed
14486.973948	40.00	100.00	19.20	20.80	VERTICAL	Passed
14500.000000	40.00	100.00	19.10	20.90	HORIZONTAL	Passed
16953.401804	39.20	91.20	18.10	21.10	HORIZONTAL	Passed
17460.417836	41.80	123.03	17.50	24.30	VERTICAL	Passed
17799.601202	48.60	269.15	18.10	30.50	VERTICAL	Passed

RX mode, channel 78

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	41.10	113.50	38.70	2.40	VERTICAL	Passed
7440.000000	43.40	147.91	34.20	9.20	HORIZONTAL	Passed

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	28.10	25.41	25.70	2.40	VERTICAL	Passed
7440.000000	30.70	34.28	21.50	9.20	VERTICAL	Passed

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

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