FCC Part 15C Compliance Test Report

Test Report no.:	Cph_FCC_0614_13.doc	**Date of Report:**	07-04-2006
Number of pages:	15	**Customer's Contact person:**	Raimo Ikonen
Testing laboratory:	TCC Nokia Copenhagen Laboratory Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934	**Client:**	Nokia Corporation P.O. Box 86 Joensuunkatu 7 FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 44277
FCC listing no.: **IC recognition no.:**	99059 4820 and 4820-1		
Tested devices/ accessories:	**RFID Shell; CC-244D, Phone; RM-104, Battery; BL-5B, AC-Charger; ACP-12E, Headset; HS-8**		
FCC ID:	LJPR4	**IC:**	661E-R4
Supplement reports:			
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), IC standards RSS-GEN 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 Allan Franch Henriksen DN: cn=Allan Franch Henriksen, c=DK, o=Nokia, ou=CertMT, email=allan.f.henriksen@nokia.com Date: 2006.04.21 08:30:51 +02'00'

Allan F. Henriksen, Test engineer

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	07-04-2006
Testing completed	07-04-2006
The customer's contact person	Raimo Ikonen
Test Plan referred to	\EMC\TESTPLAN\
Notes	None
Document name	T:\Projects\accessor\CC-244D\EMC\Results\FCC\Cph_FCC_0614_13.doc

1.1. EUT and Accessory Information

The EUT is a RFID device. The RFID module is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
NFC Shell (Pepi)	CC-244D	-	-	-	-	28031
Phone	RM-104	357585/00/895369/6	-	-	03.75	28032
AC-Charger	ACP-12E	0675294110333N0629F0020783	-	-	-	28034
Battery	BL-5B	0670455363807N103134075057	-	-	-	28030
Headset	HS-8	-	-	-	-	28033
Phone	RM-104	377585/00/895361/3	1903	-	03.75	28024
Battery	BL-5B	0670455363807N103134075069	-	-	-	28026
RFID	PEPI_01	build1.0	1	-	-	28025
	RM-104	377585/00/895356/3	1903	-	03.75	28027
NFC Shell (Pepi_01)	CC-244D	Build 1.0	1.0	-	-	28023
Battery	BL-5B	0670455363807N103134075058	-	-	-	28022

1.2. Summary of Test Results

Section in CFR 47	Section in RSS-210		Result
15.209	2.7	Radiated Emission	Passed
15.225 (a)	A2.6	Radiated Emission	Passed
15.225 (e)	A2.6	Frequency Stability	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.

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CONTENTS

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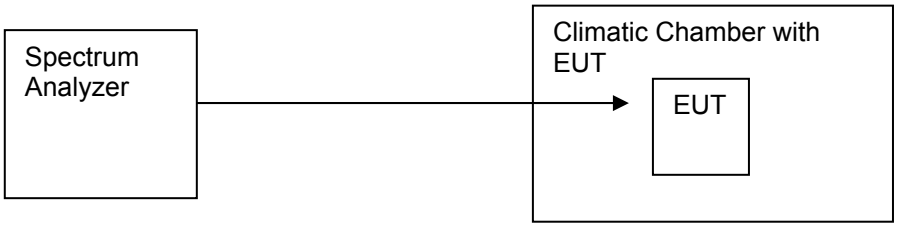
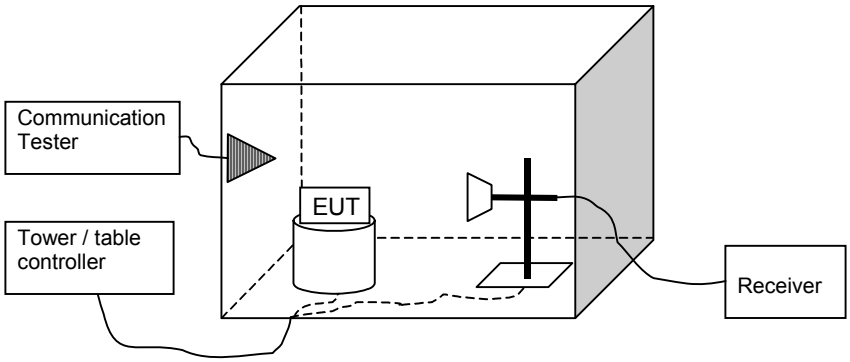
2. Test setups

2.1. Voltage Stability test setup



2.2. Radiated Emission 30 to 1000 MHz



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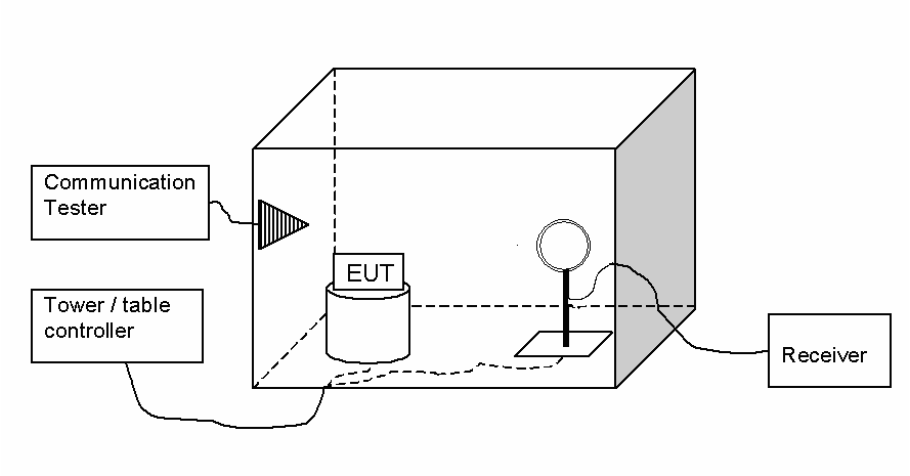
2.3. Radiated Emission 9 kHz to 30 MHz



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3. Radiated Emissions 9 kHz – 30 MHz

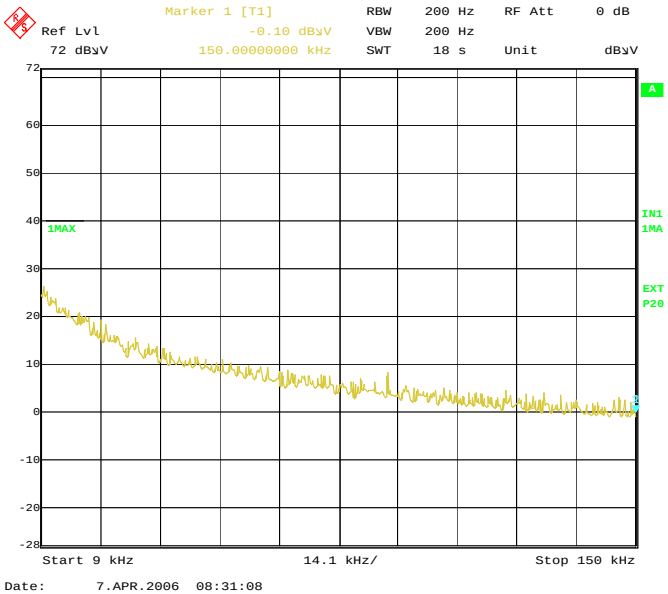
EUT with DUT number	CC-244D dut 28023
Accessories with DUT numbers	RM-104 dut 28027, BL-5B dut 28022
Operation Voltage [V] / [Hz]	-
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.1 / 42.5 1012,5
Date of measurements	07-04-2006
Measured by	Ruben Hansen

3.1. Test method and limit

The measurement is made according to FCC rules part 15.225 and IC standard RSS-210 Section 2.7.

Radiated Emission 9 kHz – 30 MHz, 3 meter distance

Frequency [MHz]	Reading [dBµV]	Correction [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]
13.56	34.19	20.0	54.19	124	69.81



Radiated Emission 9 – 150 kHz

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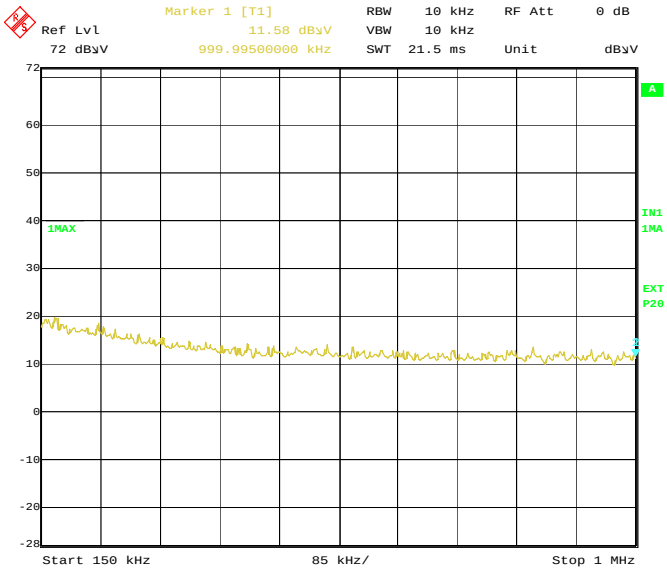

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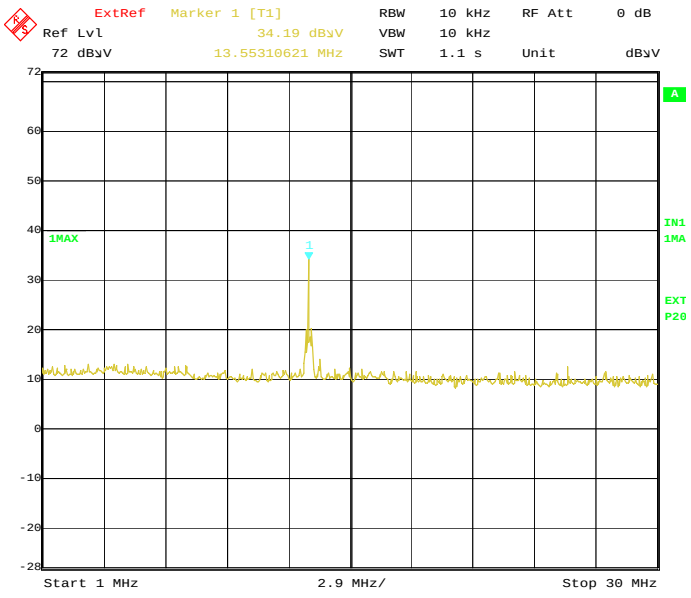
Radiated Emission 150 – 1000 kHz



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Radiated Emission 1 - 30 MHz

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4. Radiated Emissions 30-1000 MHz

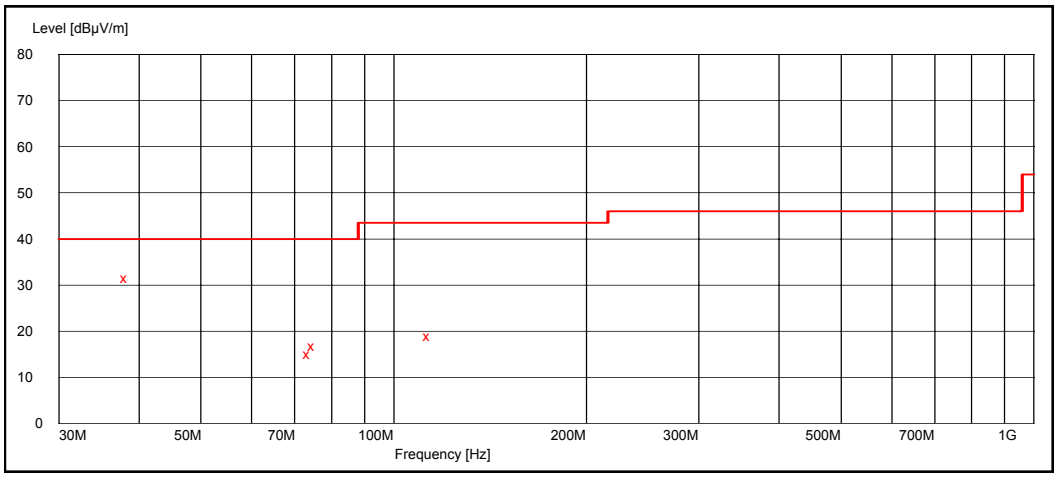
EUT with DUT number	CC-244D dut 28023, RM-104 dut 28027
Accessories with DUT numbers	BL-5B dut 28022,HS- # ,AC-12 #
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.1 / 42.5 1012,5
Date of measurements	07-04-2006
Measured by	Ruben Hansen

4.1. Test method and limit

The measurement is made according to FCC rules part 15.225 and IC standard RSS-210 Section 2.7

4.2. RFID Test results

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
38.235872	31.50	37.58	49.70	-18.20	VERTICAL	Passed
73.746092	15.10	5.69	42.20	-27.10	HORIZONTAL	Passed
74.969940	16.80	6.92	43.80	-27.00	HORIZONTAL	Passed
113.827856	18.90	8.81	44.30	-25.40	VERTICAL	Passed



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5. AC powerline conducted emissions
(FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	CC-244D Dut # 28031
Accessories with DUT numbers	RM-104 Dut # 28032 + BL-5B Dut # 28032 + ACP-12E Dut # 28034 + HS-8 Dut # 28033
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	RFID active TX, Phone in Idle mode, allocated on a CH
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	23.8 / 37.0 1012
Date of measurements	07-04-2006
Measured by	Allan F. Henriksen

5.1. Test method and limit

The measurement is made according to FCC rules part 15.207 and IC standard RSS-GEN 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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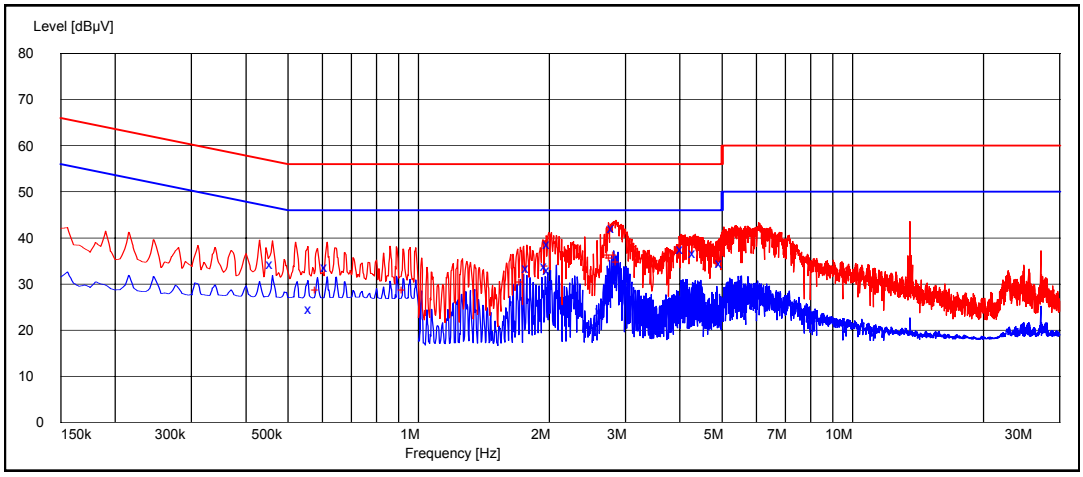
5.2. Test results



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.460000	34.40	L1	Passed
0.565000	24.60	L1	Passed
0.615000	33.60	L1	Passed
1.790000	33.50	N	Passed
1.970000	34.00	L1	Passed
2.000000	33.00	L1	Passed
2.000000	38.70	L1	Passed
2.645000	24.20	L1	Passed
2.820000	42.20	N	Passed
4.065000	37.60	L1	Passed
4.345000	36.80	L1	Passed
4.995000	34.50	L1	Passed

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.585000	28.70	N	Passed
0.925000	28.70	N	Passed
1.730000	30.40	N	Passed
1.980000	33.80	N	Passed
2.755000	36.20	N	Passed
2.785000	35.60	N	Passed
2.850000	36.20	N	Passed
2.880000	34.80	N	Passed

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6. Frequency stability, temperature variation

FCC 47 CFR Part 15 section 15.225 (e) [2] and RSS-210 A2.6

EUT with DUT number	CC-244D Dut # 28025, RM-104 dut 28024, BL-5B dut 28026
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.1 / 42.5 1012.5
Date of measurements	07-04-2006
Measured by	Jan Engelbrechtsen

6.1. Test set-up

The EUT was placed in a Climatic Chamber. A small whip antenna was placed close to the EUT, and connected to the measuring Spectrum Analyzer.

6.2. Test method and limit

The measurement is made according to FCC rules FCC 47 CFR Part 15 section 15.225 (e) [2] and RSS-210 A2.6

a) The EUT is placed in the chamber in transmit mode.
b) The climate chamber temperature is set to the maximum value and allowed to stabilize.
c) The transmit frequency is measured.
d) Temperature is lowered to the next temperature value and allowed to stabilize.
e) The steps c - d is repeated for each temperature.

Limits for frequency stability, temperature variation measurements

Frequency deviation [%]
± 0.01

6.3. RFID Test results

Continuous transmission 13.56 MHz

Temperature [°C]	Frequency [MHz]	Deviation [KHz]	Deviation [%]
50	13.560180	+ 0.18	-0.00132
40	13.560176	+ 0.176	-0.00129
30	13.560188	+ 0.188	-0.00138
20	13.560192	+ 0.192	-0.00141
10	13.560232	+ 0.232	-0.00171
0	13.560240	+ 0.240	-0.00177
-10	13.560228	+ 0.228	-0.00168
-20	13.560180	+ 0.180	-0.00132

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6.4. Frequency stability, voltage variation

FCC 47 CFR Part 15 section 15.225 (e) [2] and RSS-210 A2.6

EUT with DUT number	CC-244D Dut # 28025, RM-104 dut 28024
Accessories with DUT numbers	Dummy battery, DC power Supply
Operation Voltage [V] / [Hz]	-
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.1 / 42.5 1012.5
Date of measurements	07-04-2006
Measured by	Jan Engelbrechtsen

6.5. Test method and limit

The EUT battery was replaced with an adjustable power supply. The frequency stability was measured at nominal voltage and at the battery cut-off point.

Limits for frequency stability, voltage variation measurements

Frequency deviation [%]
± 0.01

6.6. Test results

Continuous transmission at 13.560 MHz

Voltage level [V]	Deviation [Hz]	Deviation [%]
Nominal / 3.7	+ 196	0.00145
Battery cut-off point / 3.25	+ 208	0.00153

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7. Occupied bandwidth

EUT with DUT number	CC-244D Dut # 28025, RM-104 dut 28024, BL-5B dut 28026
Accessories with DUT numbers	None
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [mBar]	24.1 / 42.5 1012.5
Date of measurements	07-04-2006
Measured by	Jan Engelbrechtsen

7.1. Test setup

The EUT was connected to a Spectrum analyzer.

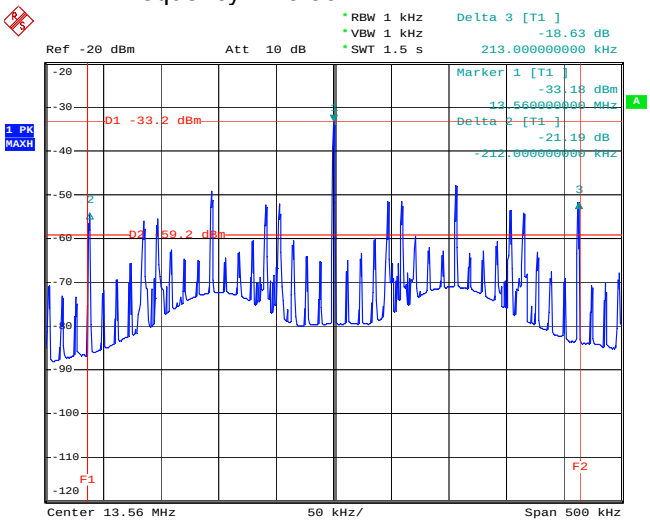
7.2. Test method and limit

The Test was carried out with the EUT in Test mode with modulation on.

7.3. RFID Test results

Operation mode (TX on)	occupied bandwidth [kHz]
RFID, modulated	426

RFID TX Frequency = 13.56 MHz



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8. Test Equipment

8.1. 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

8.2. 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	HL025	Rohde&Schwarz	15B,15C,22,24

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Eq. No	Equipment	Type	Manufacturer	Used in
	GHz			
18860	Ultra Broadband Antenna Ultralog 30-3000MHz	HL562	Rohde&Schwarz	15B,15C,22,24
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
19966	Magnetic Loop Antenna 9 kHz - 30 MHz	HFH2-Z2	Rohde&Schwarz	15C

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