

FCC Part 27 Compliance Test Report

Test Report no.:	FCC27_RM-845_22.docx	Date of Report:	26-Sep-2012
Number of pages:	12	Customer's Contact person:	Victoria Abadilla
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, Inc. 16620 West Bernardo Drive San Diego, CA 92127 USA Tel. +1 858 831 5000 Fax. +1 858 385 1598
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-845 / Battery BP-4W / AC-Charger AC-50U / Headset WH-902		
FCC ID:	QMNRM-845	IC:	661X-RM845
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 27 , TIA-603-C-2004 and IC standards. 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:			

Kalle Hannila, Engineer, EMC

1. Summary for FCC Part 27 Compliance Test Report

Date of receipt	27-Jul-2012
Testing completed	25-Sep-2012
The customer's contact person	Victoria Abadilla
Test Plan referred to	T:\Projects\RM-845\TestPlan\RS_testplan_RM-845_LTE13_5MHz.xlsm
Notes	-
Document name	T:\Projects\RM-845\EMC\FCC27_RM-845_22.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:
GSM/CDMA/WCDMA/Bluetooth
The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-845	352875050016806	0209	-	1525.0003.8422.9710.12271	16613
Battery	BP-4W	393213215514010011960670671	-	-	-	16550
AC-Charger	AC-50U	409049215427050147660675620	-	-	-	16562
Headset	WH-902	209E2R	-	-	-	16563

1.2. Summary of Test Results

LTE700 Upper (Band 13):

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046 (a)	N/A	Conducted RF output power	NP
§27.50(b)(10)	N/A	Radiated RF output power	PASSED
§2.1049(h)	N/A	99 % occupied bandwidth	PASSED
§27.53(c)(2)(4)	N/A	Band edge compliance	NP
§27.53(c)(2)(4),(f), §2.1051	N/A	Spurious emissions at antenna terminals	NP
§27.53(c)(2)(4),(f), §2.1053	N/A	Spurious radiated emissions	PASSED
§2.1055(a)	N/A	Frequency stability, temperature variation	NP
§2.1055(d)	N/A	Frequency stability, voltage variation	NP

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 Laboratory.

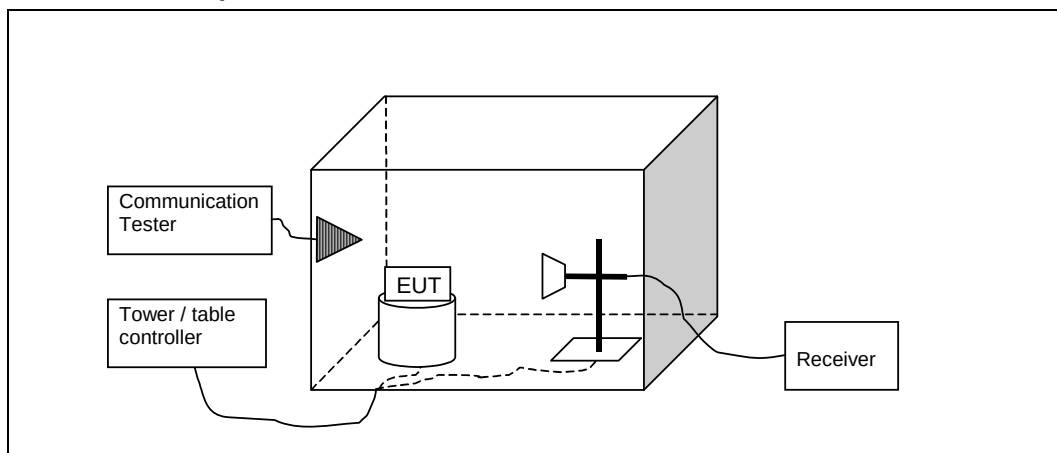
CONTENTS

1. Summary for FCC Part 27 Compliance Test Report	2
1.1. EUT and Accessory Information.....	2
1.2. Summary of Test Results.....	2
2. Radiated RF output power (FCC §24.232(b), §27.53(c)(2)(4), RSS-133 6.4).....	4
2.2. Test method and limit.....	4
2.3. LTE700 Upper (Band 13) test results.....	5
3. Band edge compliance (FCC §24.238(a), §27.53(c)(2)(4), RSS-133 6.5).....	Error! Bookmark not defined.
3.2. Test method and limit.....	Error! Bookmark not defined.
3.3. LTE700 Upper (Band 13) test results.....	Error! Bookmark not defined.
4. Spurious radiated emissions (FCC §24.238(a), §2.1053, §27.53(c)(2)(4), RSS-133 6.5).....	6
4.2. Test method and limit.....	6
4.3. LTE700 Upper (Band 13) test results.....	8
5. Test Equipment.....	11
5.1. Conducted measurements	11
5.2. Radiated measurements	11

2. Radiated RF output power (FCC §24.232(b), §27.53(c)(2)(4), RSS-133 6.4)

EUT with DUT number	RM-845, DUT 16613
Accessories with DUT numbers	BP-4W, DUT 16550
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 38 / 101.5
Date of measurements	25-Sep-2012
Measured by	Kalle Hannila / Jari Keto

2.1.1 Test setup



2.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:

The measurement is performed in the Anechoic Chamber with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system. The turntable is rotated 360 degrees and this is repeated for both horizontal and vertical receive antenna polarizations.

The EUT is placed on a nonconductive plate at 170 cm height.

The substitution method is used. The measurement results are obtained as described below:

$$P[\text{dBm}] = P_{\text{SUBST TX}} + P_{\text{MEAS}} - P_{\text{SUBST RX}} - L_{\text{SUBST CABLES}} + G_{\text{SUBST TX ANT}}$$

Where $P_{\text{SUBST TX}}$ is signal generator level. P_{MEAS} is measured power level from the EUT. $P_{\text{SUBST RX}}$ is measured power level in substitute measurement. $L_{\text{SUBST CABLE}}$ is the loss of the cable between the signal generator and the substitution antenna and $G_{\text{SUBST TX ANT}}$ is substitution antenna gain.

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
777 - 787	3 ERP	34.8

2.3. LTE700 Upper (Band 13) test results

FDD, CBW 5MHz QPSK 1RB Peak detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23205 / 779.5	24.34	0.272	-10.73	35.07	VERTICAL	PASSED
23230 / 782	22.81	0.191	-12.11	34.92	VERTICAL	PASSED
23255 / 784.5	23.39	0.218	-11.12	34.51	VERTICAL	PASSED

FDD, CBW 5MHz 16QAM 1RB Peak detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23205 / 779.5	24.6	0.289	-10.47	35.07	VERTICAL	PASSED
23230 / 782	22.81	0.191	-12.11	34.92	VERTICAL	PASSED
23255 / 784.5	23.39	0.218	-11.12	34.51	VERTICAL	PASSED

FDD, CBW 5MHz QPSK 25RB Peak detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23205 / 779.5	25.11	0.324	-9.96	35.07	VERTICAL	PASSED
23230 / 782	24.51	0.283	-10.41	34.92	VERTICAL	PASSED
23255 / 784.5	23.71	0.235	-10.8	34.51	VERTICAL	PASSED

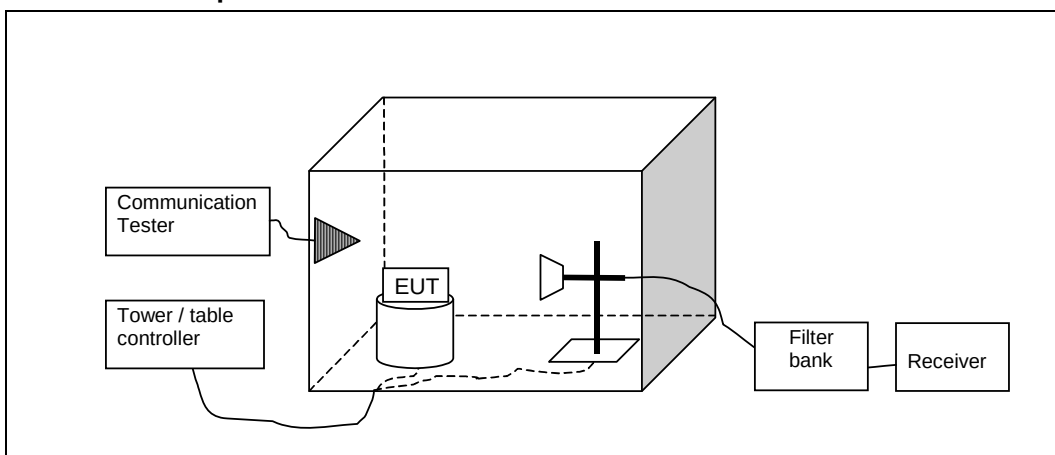
FDD, CBW 5MHz 16QAM 25RB Peak detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
23205 / 779.5	25.03	0.319	-10.04	35.07	VERTICAL	PASSED
23230 / 782	24.18	0.262	-10.74	34.92	VERTICAL	PASSED
23255 / 784.5	23.58	0.228	-10.93	34.51	VERTICAL	PASSED

3. Spurious radiated emissions (FCC §24.238(a), §2.1053, §27.53(c)(2)(4), RSS-133 6.5)

EUT with DUT number	RM-845, DUT 16613
Accessories with DUT numbers	BP-4W, DUT 16550 ; AC-50U, DUT 16562 ; WH-902, DUT 16563
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 38 / 101.4
Date of measurements	25-Sep-2012
Measured by	Kalle Hannila / Jari Keto

3.1.1 Test setup



3.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:
The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

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 substitution method is used.

The measurement results are obtained as described below:

$$P [\text{dBm}] = P_{\text{SUBST TX}} + G_{\text{SUBST TX ANT}} - L_{\text{SUBST CABLE}}$$

Where $P_{\text{SUBST TX}}$ is signal generator level, which produces the same receiver reading P_{MEAS} in dBm as EUT. $G_{\text{SUBST TX ANT}}$ is substitution antenna gain and $L_{\text{SUBST CABLE}}$ is the loss of the cable between the signal generator and the substitution antenna.

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
LTE 700 Upper	30 – 8000	-13 (RBW = 100 kHz, ERP)
	763-775 and 793-805	-35 (RBW = 6.25 kHz, ERP)
	1559 – 1610	-40 (RBW = 1 MHz)
	1559 – 1610	-50 (RBW = 700 Hz)

3.3. LTE700 Upper (Band 13) test results

Channel 23230 / 782 MHz

FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
30	-61.58	0.00069	-96.54	34.96	HORIZONTAL	PASSED
752.024	-41.45	0.07163	-75.33	33.88	HORIZONTAL	PASSED
769.5	-71.04	8E-05	-107	35.96	VERTICAL	PASSED
804.976	-70.86	8E-05	-107	36.14	HORIZONTAL	PASSED
1564.501	-67.63	0.00017	-73.03	5.4	HORIZONTAL	PASSED
1582.826	-67.89	0.00016	-73.32	5.43	HORIZONTAL	PASSED
2346.541	-71.18	8E-05	-80.98	9.8	VERTICAL	PASSED
3118	-76.3	2E-05	-84.5	8.2	HORIZONTAL	PASSED
7450.2	-63.33	0.00046	-84.51	21.18	VERTICAL	PASSED

Channel 23230 / 782 MHz

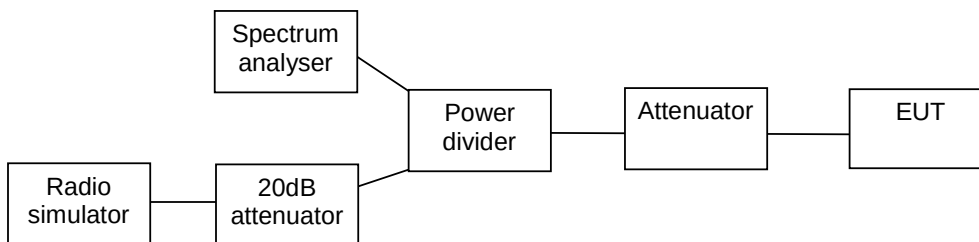
FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
749.058	-39.97	0.10072	-73.32	33.35	VERTICAL	PASSED
763.09	-72.77	5E-05	-107	34.23	VERTICAL	PASSED
804.976	-71.99	6E-05	-107	35.01	HORIZONTAL	PASSED
897.612	-58.17	0.00152	-93.03	34.86	HORIZONTAL	PASSED
1573.719	-69.05	0.00012	-73.32	4.27	HORIZONTAL	PASSED
1609.038	-68.62	0.00014	-73.31	4.69	HORIZONTAL	PASSED
1884.99	-75.19	3E-05	-81.74	6.55	HORIZONTAL	PASSED
2356	-73.11	5E-05	-82.57	9.46	HORIZONTAL	PASSED
3128.581	-75.92	3E-05	-77.96	2.04	HORIZONTAL	PASSED

4. 99% occupied bandwidth (FCC §2.1049(h), RSS-GEN 4.6.1)

EUT with DUT number	RM-845, DUT 16546
Accessories with DUT numbers	BP-4W, DUT 16547 ; WH-902, DUT 16564 ; AC-50U, DUT 16558
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 101
Date of measurements	20-Jul-2012
Measured by	Sami Lehtonen

4.1. Test Setup



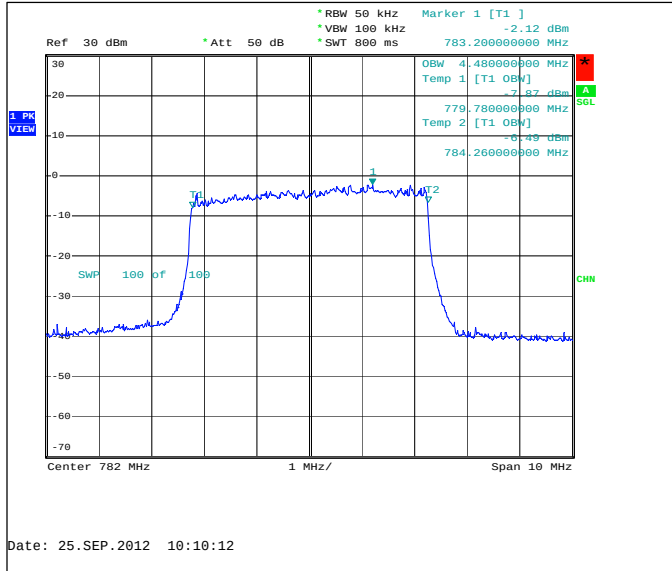
4.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24, 27 and IC standard RSS-GEN.

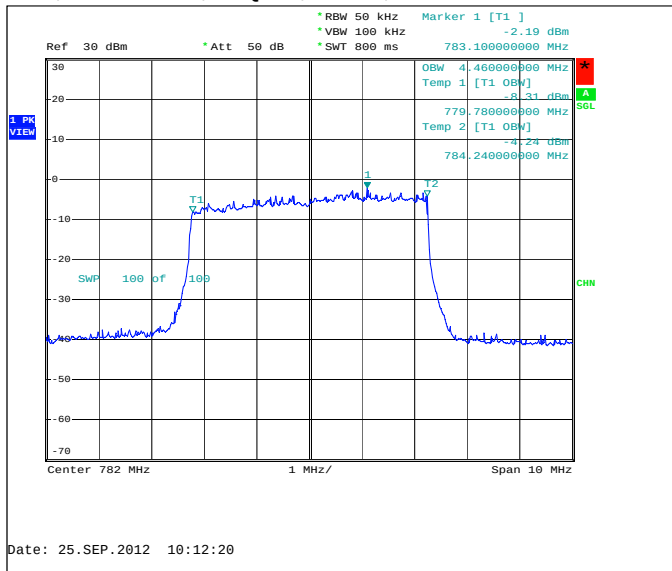
4.3. LTE700 Upper (Band 13) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4480
FDD, CBW 5MHz, 16QAM, 25 RB	4460

FDD, CBW 5MHz, QPSK, 25 RB, Channel 23230 / 782.0 MHz



FDD, CBW 5MHz, 16QAM, 25 RB, Channel 23230 / 782.0 MHz



5. Test Equipment

5.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
6038	Data Logger	Testo 580	Testo	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
2389	Signal Generator	SMJ 100A	R&S	-
6009	GPS Antenna	SA-700	Chronos	-
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	-
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	-
6015	Receiver	ESI	R&S	-
2059	V-network	ESH3-Z6	R&S	-
6044	V-network	ESH3-Z6	R&S	-
1759	LISN 50 µH	ESH3-Z5	R&S	-
2390	Directional Coupler	DC2600	AR	-
1916	Communication Tester	CMTA84	R&S	-
6012	CDN	CDN USB/c	Teseq	-
2388	Bluetooth Tester	CBT	R&S	-
6046	Attenuator 10dB	8493C	Agilent	-
6047	Attenuator 20dB	8493C	Agilent	-
6036	Data Logger	175-H2	Testo	-
6045	Power Splitter	11667B	Agilent	-
6039	USB Interface	5541765	Testo	-
10479	Communication Tester	CMW500	R&S	-
6094	Communication Tester	CMW500	R&S	-
6096	EMC Analyzer	E7405A	HP	-
6098	Signal Generator	8648C	Agilent	-
6103	Bluetooth tester	CBT	R&S	-
6113	Signal Generator	SMF100A	R&S	-
6120	Thermal Chamber	WT 20/40	Weiss	-
6121	Power Splitter	HP11667B	Agilent	-
6122	Power Splitter	HP11667B	Agilent	-
6134	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	-
6136	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	-
2359	Temperature Test Chamber	VT4002	Vötsch	-
2347	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2156	Communication Tester	CMU200	R&S	-
1999	Receiver	ESIB26	R&S	-
2352	Spectrum Analyzer	FSP-30	R&S	-
2097	Pulse Limiter	ESH3-Z2	R&S	-
2039	Power Supply	PL330QMD	Thurlby	-
1992	Signal Generator	83630B	Agilent	-
2206	Signal Generator	SMX	R&S	-

5.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
6038	Data Logger	Testo 580	Testo	-
6014	Substitute Calibration Cable	Sucoflex 104PB	Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
2389	Signal Generator	SMJ 100A	R&S	-
6009	GPS Antenna	SA-700	Chronos	-

Eq. No	Equipment	Type	Manufacturer	Used in
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	-
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	-
1988	Antenna	HL562	R&S	-
-	RF immunity / Emission Software	EMC32	R&S	-
1917	Communication Tester	CMTA84	R&S	-
2388	Bluetooth Tester	CBT	R&S	-
6037	Data Logger	175-H2	Testo	-
6039	USB Interface	5541765	Testo	-
6087	Antenna	BBHA 9120D	Scharzbeck	-
6088	Antenna	VUBA 9117	Scharzbeck	-
6089	Antenna	HFH2-Z2	R&S	-
10479	Communication Tester	CMW500	R&S	-
6094	Communication Tester	CMW500	R&S	-
6103	Bluetooth tester	CBT	R&S	-
6113	Signal Generator	SMF100A	R&S	-
6115	Open switch and control unit	OSP 130	R&S	-
6116	Open switch and control unit	OSP 150	R&S	-
6130	Notch Filter	WRCD1880-1.1.25/50-10SS	Wainwright	-
6131	Notch Filter	WRCT902.4-0.4/40-8SS	Wainwright	-
6135	Notch Filter	WRCJV2531/2539-2523/2547-60/12SS	Wainwright	-
2140	Antenna	EMCO93110B	EMCO	-
2142	Antenna	3146	EMCO	-
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	-
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22
2347	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2156	Communication Tester	CMU200	R&S	-
2176	CDN	CDN 801-M3	Lüthi	-
2027	CDN	M2 (modified) DC1	MEB	-
2028	CDN	M3 (modified) DC2	MEB	-
1984	Antenna	BBHA 9120 D	Schwarzbeck	-
6017	Antenna	SBA 9113	Schwarzbeck	-
2009	Signal Generator	SMP 22	R&S	-
2029	Power Supply	PL330	Thurlby	-
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	-
2353	Receiver	ESIB26	R&S	-
2135	CDN	CDN 801-M3	Lüthi	-