

FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RX-113_07.docx	Date of Report:	31-Oct-2013
Number of pages:	14	Customer's Contact person:	Jamie Lee
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:	Device RX-113 / Headset WH-208 / AC-Charger AC-300		
FCC ID:	QMNB	IC:	-
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24 , TIA-603-C-2004 and IC standards, RSS-GEN (Issue 3, December 2010), RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009). 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, System Manager, EMC

1. Summary for FCC Part 22/24 Compliance Test Report

Date of receipt	02-Oct-2013
Testing completed	16-Oct-2013
The customer's contact person	Jamie Lee
Test Plan referred to	T:\Projects\RX-113\TestPlan\RS_testplan_RX-113.xlsm
Notes	-
Document name	T:\Projects\RX-113\EMC\FCC22&24_RX-113_07.docx

1.1. EUT and Accessory Information

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

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Device	RX-113	004402473574923	0107	-	9471.1032.1322_v1.2.2	17810
Headset	WH-208	2131731	-	-	-	17581
AC-Charger	AC-300	-	-	-	-	17632

1.2. Summary of Test Results

GSM850:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§22.917(a)	4.5	Band edge compliance	NP
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	NP

WCDMA 850 (Band V):

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§22.917(a)	4.5	Band edge compliance	NP
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	NP

GSM1900:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§24.238(a)	6.5	Band edge compliance	NP
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP

§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

WCDMA 1900 (Band II):

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§24.238(a)	6.5	Band edge compliance	NP
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	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.

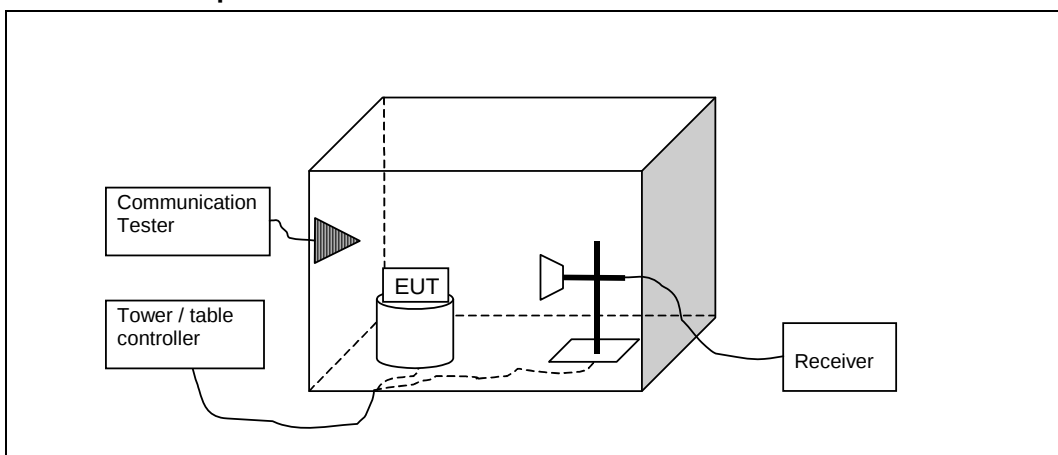
CONTENTS

1. Summary for FCC Part 22/24 Compliance Test Report	2
1.1. EUT and Accessory Information.....	2
1.2. Summary of Test Results.....	2
2. Radiated RF output power (FCC §22.913(a), §24.232(b), RSS-132 4.4, RSS-133 6.4).....	5
2.2. Test method and limit.....	5
2.3. GSM850-G1 TX test results	Error! Bookmark not defined.
2.4. GSM850-E1 TX test results.....	6
2.5. GSM1900-E1 TX test results.....	6
2.6. GSM1900-G1 TX test results	6
2.7. WCDMA 1900 (Band II) test results	7
2.8. WCDMA 850 (Band V) test results.....	7
3. Spurious radiated emissions (FCC §22.917(a), §2.1053, §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5).....	8
3.2. Test method and limit.....	8
3.3. GSM850-E1 TX test results.....	10
3.4. GSM850-G1 TX test results	10
3.5. WCDMA 1900 (Band II) test results	10
3.6. WCDMA 850 (Band V) test results.....	10
3.7. GSM1900-E1 TX test results.....	11
3.8. GSM1900-G1 TX test results	11
4. Test Equipment.....	12
4.1. Conducted measurements	12
4.2. Radiated measurements	12

2. Radiated RF output power (FCC §22.913(a), §24.232(b), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RX-113, DUT 17810
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	18 / 59 / 101.2
Date of measurements	16-Oct-2013
Measured by	Kalle Hannila

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:

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

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]
824 - 849	7 ERP	38.5
1850 - 1910	2 EIRP	33

2.3. GSM850-G1 TX test results

RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST} TX [dBm]	P _{SUBST} RX [dBm]	G _{SUBST} TX ANT [dBd]	L _{SUBST} CABLE [dB]	Polarisation	Result
128 / 824.2	25.85	0.385	-9.02	-10	-51.27	-2.7	3.7	HORIZONTAL	PASSED
190 / 836.6	26.61	0.458	-8.32	-10	-51.43	-2.8	3.7	HORIZONTAL	PASSED
251 / 848.8	25.96	0.394	-7.82	-10	-50.88	-3.4	3.7	HORIZONTAL	PASSED

2.4. GSM850-E1 TX test results

RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST} TX [dBm]	P _{SUBST} RX [dBm]	G _{SUBST} TX ANT [dBd]	L _{SUBST} CABLE [dB]	Polarisation	Result
128 / 824.2	26.01	0.399	-8.86	-10	-51.27	-2.7	3.7	HORIZONTAL	PASSED
190 / 836.6	27.22	0.527	-7.71	-10	-51.43	-2.8	3.7	HORIZONTAL	PASSED
251 / 848.8	26.76	0.474	-7.02	-10	-50.88	-3.4	3.7	HORIZONTAL	PASSED

2.5. GSM1900-E1 TX test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST} TX [dBm]	P _{SUBST} RX [dBm]	G _{SUBST} TX ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
512 / 1850.2	27.96	0.625	-17.05	-10	-50.5	10.11	5.6	Horizontal	PASSED
661 / 1880	26.91	0.491	-17.59	-10	-49.98	10.22	5.7	Horizontal	PASSED
810 / 1909.8	26.65	0.462	-18.03	-10	-50.16	10.22	5.7	Horizontal	PASSED

2.6. GSM1900-G1 TX test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST} TX [dBm]	P _{SUBST} RX [dBm]	G _{SUBST} TX ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
512 / 1850.2	32.27	1.687	-12.74	-10	-50.5	10.11	5.6	Horizontal	PASSED
661 / 1880	30.34	1.081	-14.16	-10	-49.98	10.22	5.7	Horizontal	PASSED
810 / 1909.8	30.19	1.045	-14.49	-10	-50.16	10.22	5.7	Horizontal	PASSED

2.7. WCDMA 1900 (Band II) test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST} TX [dBm]	P _{SUBST} RX [dBm]	G _{SUBST} TX ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
9262 / 1852.4	24.85	0.305	-19.97	-10	-50.31	10.11	5.6	HORIZONTAL	PASSED
9400 / 1880	23.26	0.212	-21.24	-10	-49.98	10.22	5.7	HORIZONTAL	PASSED
9538 / 1907.6	23.16	0.207	-21.32	-10	-49.96	10.22	5.7	HORIZONTAL	PASSED

2.8. WCDMA 850 (Band V) test results

RMS detector

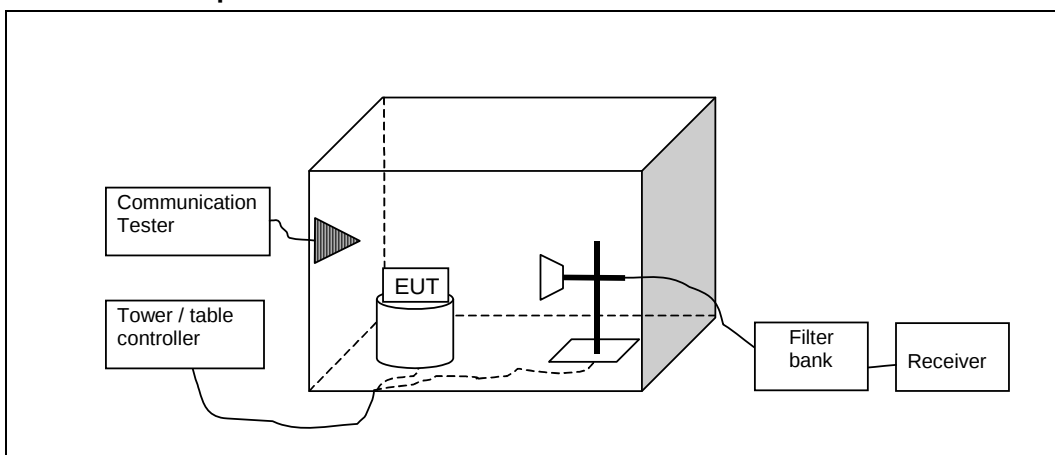
Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST} TX [dBm]	P _{SUBST} RX [dBm]	G _{SUBST} TX ANT [dBd]	L _{SUBST} CABLE [dB]	Polarisation	Result
4132 / 826.4	20.71	0.118	-14.37	-10	-51.48	-2.7	3.7	Horizontal	PASSED
4183 / 836.6	20.59	0.115	-14.34	-10	-51.43	-2.8	3.7	Horizontal	PASSED
4233 / 846.6	19.8	0.095	-13.89	-10	-50.69	-3.3	3.7	Horizontal	PASSED

3. Spurious radiated emissions

(FCC §22.917(a), §2.1053, §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RX-113, DUT 17810
Accessories with DUT numbers	WH-208, DUT 17581 ; AC-300, DUT 17632
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 59 / 101.2
Date of measurements	15-Oct-2013
Measured by	Kalle Hannila

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:

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

Where $P_{SUBST\ TX}$ is signal generator level, which produces the same receiver reading P_{MEAS} in dBm as EUT. $G_{SUBST\ TX\ ANT}$ is substitution antenna gain and $L_{SUBST\ CABLE}$ 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]
GSM850 / WCDMA850	30 - 8500	-13
GSM1900 / WCDMA1900	30 - 18000	-13

3.3. GSM850-E1 TX test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
1673.1	-54.43	0.00361	-60.84	6.41	VERTICAL	PASSED
2509.82	-33.35	0.46249	-45.31	11.96	HORIZONTAL	PASSED

3.4. GSM850-G1 TX test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
1673.38	-55.18	0.00303	-60.57	5.39	HORIZONTAL	PASSED
2509.7	-27.78	1.66763	-39.74	11.96	HORIZONTAL	PASSED

3.5. WCDMA 1900 (Band II) test results

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
9315.491	-41.26	0.07485	-64.29	23.03	VERTICAL	PASSED
9352.084	-43.33	0.04646	-65.69	22.36	VERTICAL	PASSED
9453.968	-43.18	0.0481	-65.46	22.28	VERTICAL	PASSED
9680.862	-42.91	0.05119	-65.76	22.85	VERTICAL	PASSED
9749.038	-42.63	0.05456	-65.78	23.15	VERTICAL	PASSED
9937.375	-42.32	0.05865	-65.52	23.2	VERTICAL	PASSED

3.6. WCDMA 850 (Band V) test results

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
848.161	-42.95	0.05071	-77.5	34.55	HORIZONTAL	PASSED
848.239	-44.94	0.03204	-79.49	34.55	HORIZONTAL	PASSED
956.954	-40.19	0.09572	-80.17	39.98	HORIZONTAL	PASSED
958.677	-39.19	0.12064	-79.36	40.17	HORIZONTAL	PASSED
959.419	-40.55	0.08813	-80.79	40.24	HORIZONTAL	PASSED
963.216	-40.22	0.09497	-80.11	39.89	HORIZONTAL	PASSED

3.7. GSM1900-E1 TX test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
3753.367	-56.01	0.00251	-63.23	7.22	VERTICAL	PASSED
5648.958	-51.31	0.00739	-62.41	11.1	VERTICAL	PASSED

3.8. GSM1900-G1 TX test results

MaxPeak

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
3760.06	-34.32	0.37	-41.6	7.28	VERTICAL	PASSED
5639.78	-36.23	0.23812	-47.1	10.87	VERTICAL	PASSED

4. Test Equipment

4.1. 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	ESIB 40	R&S	-
2059	V-network	ESH3-Z6	R&S	-
6044	V-network	ESH3-Z6	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	-
6016	ESD Gun	PESD1610	Haefely	-
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	11667B	Agilent	-
6122	Power Splitter	11667B	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	-
2060	LISN 50 µH	ESH3-Z5	R&S	-
1759	LISN 50 µH	ESH3-Z5	R&S	-
2039	Power Supply	PL330QMD	Thurlby	-
1992	Signal Generator	83630B	Agilent	-
2206	Signal Generator	SMX	R&S	-
2156	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2347	Communication Tester	CMU200	R&S	-
6094	Communication Tester	CMW500	R&S	-
10479	Communication Tester	CMW500	R&S	-

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
6038	Data Logger	Testo 580	Testo	-

Eq. No	Equipment	Type	Manufacturer	Used in
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	-
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	-
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
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	-
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	-
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
6158	Band Reject Filter	WRCT836.6-0.4/40-8SS	Wainwright	-
6159	Band Reject Filter	WRCD1747.8-0.4/40-5SS	Wainwright	-
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	-
2140	Antenna	EMCO93110B	EMCO	-
2142	Antenna	3146	EMCO	-
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	-
2027	CDN	M2 (modified) DC1	MEB	-
2028	CDN	M3 (modified) DC2	MEB	-
2176	CDN	CDN 801-M3	Lüthi	-
2135	CDN	CDN 801-M3	Lüthi	-
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	-
2348	Controller	G-1000DXC	Yaesu	-
2349	Computer Controller	GS-232B	Yaesu	-

Eq. No	Equipment	Type	Manufacturer	Used in
6160	Probe	NRP-Z22	R&S	-
6161	Probe	NRP-Z22	R&S	-
6212	Antenna Array system	-	TCC	-
2156	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2347	Communication Tester	CMU200	R&S	-
6094	Communication Tester	CMW500	R&S	-
10479	Communication Tester	CMW500	R&S	-