

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-846_48	Date of Report:	21-May-2013
Number of pages:	13	Customer's Contact person:	Paukku Juha
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-846, Battery BL-4J, Charger AC-50E, Headset WH-108, Laptop IBM Thinkpad T40, AC adapter 02K6543, Printer HP deskjet 1600CC3540A, Parallel cable for printer		
FCC ID:	PDNRM-846X	IC:	661R-RM846
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, RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009), RSS-210 (Issue 8, December 2010). 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, EMC

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	26-Oct-2012
Testing completed	30-Oct-2012
The customer's contact person	Paukku Juha
Test Plan referred to	T:\Projects\RM-846\TestPlan\RS_testplan_RM-846.xlsm
Notes	-
Document name	T:\Projects\RM-846\EMC\FCC15B_RM-846_48.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
Phone	RM-846	004402471070056	1640	-	1030.51.9200.9903.145	42929
Phone	RM-846	004402471069629	1640	-	1030.51.9200.9903.145	42928
Phone	RM-846	004402471065833	1510	-	1030.5200.9200.9903.1005	42930
Battery	BL-4J	49554022020A0108950;0670616	LG PWB ver. 2.1	-	-	42924
Battery	BL-4J	49554022630A0105584;0670616	LG PWB ver. 2.1	-	-	42925
Data Cable	CA-190CD	-	-	-	-	42918
AC charger	AC-50E	4090492023260400600;0675619	HW0.5MW0.4 PV04	-	-	42785
Headset	WH-108	-	4.0	4.0	-	42926
Laptop	IBM Thinkpad T40	99ARTGD	-	-	-	41868
AC Adapter	02K6543	-	-	-	-	40202
Printer	HP deskjet 1600CC3 540A	USB8302546	-	-	-	40077
Parallel cable for printer	-	-	-	-	-	40087

1.2. Summary of Test Results

GSM850:

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 (4.6)	Radiated emissions	PASSED

WCDMA 850 (Band V):

Section in CFR 47	Section in ICES-003 (RSS-132)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	-
15.109, a	5.5 (4.6)	Radiated emissions	-

GSM1900:

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	-
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

WCDMA 1900 (Band II):

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	-
15.109, a	5.5 (6.6)	Radiated emissions	-

WLAN:

Section in CFR 47	Section in ICES-003 (RSS-139)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	-
15.109, a	5.5 (6.6)	Radiated emissions	-

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 Laboratory.

The test results of PDNRM-846 are re-used for certification of the PDNRM-846X. The table above indicates the results, which will be re-used.

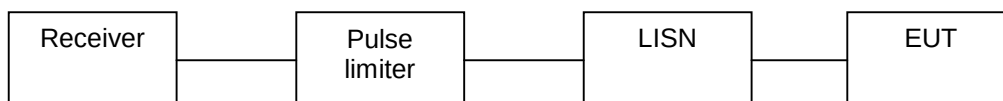
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-846, DUT 42928
Accessories with DUT numbers	BL-4J, DUT 42925 ; AC-50E DUT42785, CA-190CD, DUT 42918, IBM Thinkpad T40 DUT 41868, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, Parallel cable for printer DUT 40087
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 103
Date of measurements	24-Oct-2012
Measured by	Hannu Söderholm

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:

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

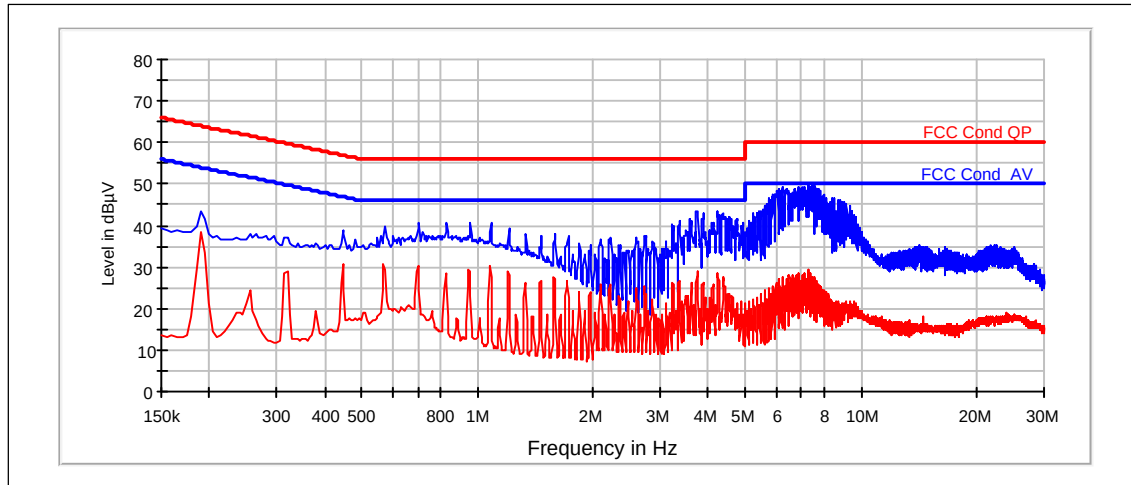
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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

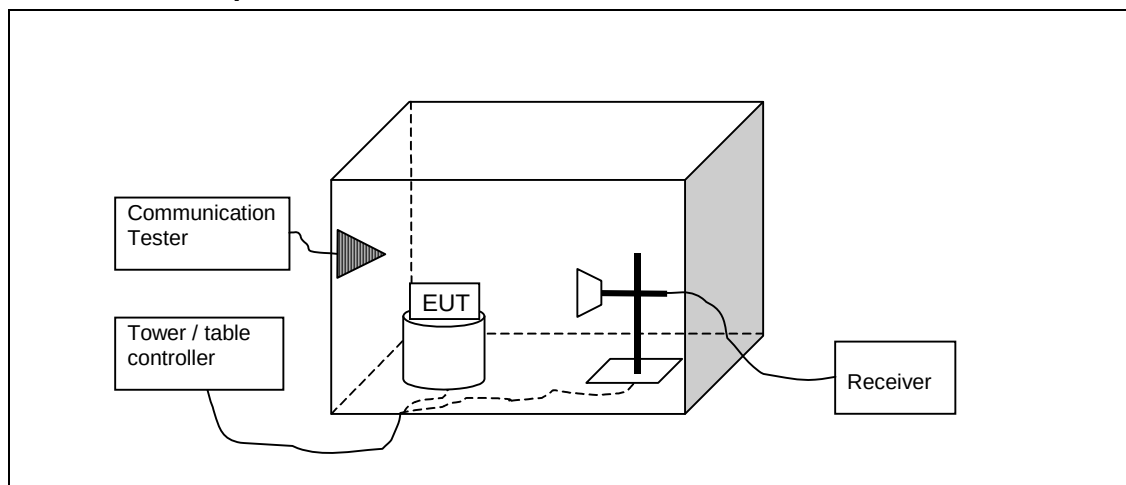
Channel 190 / 836.6 MHz



3. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 4.6, RSS-133 6.6)

EUT with DUT number	RM-846, DUT 42929
Accessories with DUT numbers	BL-4J, DUT 42924 ; T40, DUT 41868 ; CA-190CD, DUT 42918
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 100.3
Date of measurements	30-Oct-2012
Measured by	Hannu Söderholm

3.1.1 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:

$$E [dB\mu V/m] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

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. GSM850 test results, Data setup

RX mode, channel 128 / 869.2 MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3477.3	39.26	91.812	43.91	-4.65	34.7	74	PASSED
6954.6	47.77	244.737	47.21	0.56	26.2	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3477.3	26.43	20.963	31.08	-4.65	27.6	54	PASSED
6954.6	34.8	54.954	34.24	0.56	19.2	54	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
99.87	28.94	27.977	63.81	-34.87	14.6	43.5	PASSED
133.136	27.06	22.537	61.12	-34.06	16.4	43.5	PASSED
159.69	37.62	76.006	72.98	-35.36	5.9	43.5	PASSED
196.594	32.77	43.481	69.68	-36.91	10.7	43.5	PASSED
198.81	30.9	35.071	67.86	-36.96	12.6	43.5	PASSED
226.092	33.91	49.579	69.78	-35.87	12.1	46	PASSED
257.064	38.36	82.775	73.39	-35.03	7.6	46	PASSED
314.559	36.22	64.684	69.47	-33.25	9.8	46	PASSED
501.332	35.44	59.143	64.57	-29.13	10.6	46	PASSED
800.992	38.63	85.408	62.9	-24.27	7.4	46	PASSED

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
7834.068	45.12	180.323	42.34	2.78	28.9	74	PASSED
7858.116	45.42	186.616	42.6	2.82	28.6	74	PASSED
7866.83	46.26	205.66	43.38	2.88	27.7	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
7834.068	32.45	41.928	29.67	2.78	21.5	54	PASSED
7858.116	32.69	43.122	29.87	2.82	21.3	54	PASSED
7866.83	32.83	43.803	29.95	2.88	21.2	54	PASSED

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3573.2	39.26	91.844	43.9	-4.64	34.7	74	PASSED
7151.4	44.24	162.873	42.73	1.51	29.8	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3573.2	26.38	20.855	31.02	-4.64	27.6	54	PASSED
7151.4	31.1	35.88	29.59	1.51	22.9	54	PASSED

RX mode, channel 128 / 869.2 MHz

3.4. GSM850 test results, GPS Active, DUT 42929

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3475.9	38.83	87.408	43.48	-4.65	35.2	74	PASSED
6953.8	47.16	227.955	46.58	0.58	26.8	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3475.9	25.9	19.729	30.55	-4.65	28.1	54	PASSED
6953.8	34.67	54.131	34.09	0.58	19.3	54	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
30.36	23.71	15.336	49.62	-25.91	16.3	40	PASSED
911.152	14.9	5.561	37.91	-23.01	31.1	46	PASSED

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
7818.64	45.32	184.48	42.57	2.75	28.7	74	PASSED
7836.471	45.22	182.327	42.44	2.78	28.8	74	PASSED
7842.287	45.34	184.884	42.57	2.77	28.7	74	PASSED
7847.997	45.29	183.95	42.57	2.73	28.7	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
7818.64	32.26	40.997	29.51	2.75	21.7	54	PASSED
7836.471	32.26	40.997	29.48	2.78	21.7	54	PASSED
7842.287	32.26	41.002	29.49	2.77	21.7	54	PASSED
7847.997	32.36	41.481	29.64	2.73	21.6	54	PASSED

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3574.7	38.94	88.461	43.62	-4.68	35.1	74	PASSED
7148.7	44.72	172.167	43.22	1.5	29.3	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3574.7	26	19.946	30.68	-4.68	28	54	PASSED
7148.7	30.83	34.786	29.33	1.5	23.2	54	PASSED

3.5. GSM1900 test results, GPS Active, DUT 42929

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3861.8	40.32	103.765	43.75	-3.43	33.7	74	PASSED
7718.5	44.81	174.02	42.44	2.37	29.2	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3861.8	27.41	23.456	30.84	-3.43	26.6	54	PASSED
7718.5	31.71	38.499	29.34	2.37	22.3	54	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
30.15	12.15	4.05	37.97	-25.82	27.9	40	PASSED

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
7821.941	45.22	182.369	42.44	2.78	28.8	74	PASSED
7843.387	45.18	181.489	42.44	2.74	28.8	74	PASSED
7848.194	45.08	179.411	42.32	2.76	28.9	74	PASSED
7859.816	45.15	180.863	42.32	2.83	28.9	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
7821.941	32.19	40.677	29.41	2.78	21.8	54	PASSED
7843.387	32.22	40.837	29.48	2.74	21.8	54	PASSED
7848.194	32.38	41.581	29.62	2.76	21.6	54	PASSED
7859.816	32.49	42.141	29.66	2.83	21.5	54	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3979.3	40.14	101.648	43.21	-3.07	33.9	74	PASSED
7962	44.88	175.408	41.93	2.95	29.1	74	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
3979.3	27.28	23.129	30.35	-3.07	26.7	54	PASSED
7962	32.53	42.301	29.58	2.95	21.5	54	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15E, 15B
TM37678	Communication Tester	CMU200	R&S	15C, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24/27
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27, 15C
2009	LISN 50 µH	ENV216	R&S	15C, 15B
2010	LISN 50 µH	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2021	Communication Tester	CMW500	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15E, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15E, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15E, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chambre	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
-	Band reject filter	WRCG832/838-825/848-40/5SS	Wainwright	22
TM23892	Controller	G-1000SDX	Yaesu	22/24/27
2001	Bluetooth tester	CBT	R&S	15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
2021	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C