

FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RM-846_36	Date of Report:	21-May-2013
Number of pages:	19	Customer's Contact person:	Paukku Juha Kalervo
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FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-846 / Battery BL-4J		
FCC ID:	PDNRM-846X	IC:	661R-RM846
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:			

Jari Jantunen, System Manager, EMC

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

Date of receipt	22-Oct-2012
Testing completed	28-Oct-2012
The customer's contact person	Pauku Juha Kalervo
Test Plan referred to	T:\Projects\RM-846\TestPlan\RS_testplan_RM-846.xlsm
Notes	-
Document name	T:\Projects\RM-846\EMC\FCC22&24_RM-846_36.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	004402/47/106998/3	1640		1030.51.9200.9903.145	16793
Battery	BL-4J	49554022020A010826300670616				16797
Phone	RM-846	004402/47/106928/0	1640		1030.51.9200.9903.145	16795
Battery	BL-4J	49554022630A010717300670616				16820

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	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	NP
§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	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	NP
§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	PASSED

§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	NP
§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	PASSED
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

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.

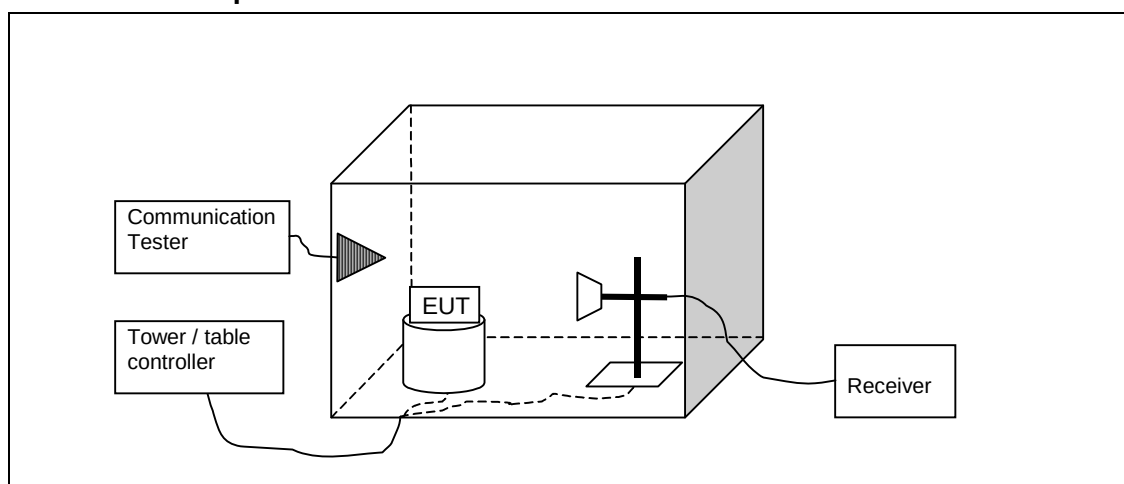
CONTENTS

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 TX test results	6
2.4. WCDMA 850 (Band V) test results	6
2.5. GSM1900 TX test results	7
2.6. WCDMA 1900 (Band II) test results	7
3. Band edge compliance (FCC §22.917(a), §24.238(a), RSS-132 4.5, RSS-133 6.5)	8
3.2. Test method and limit	8
3.3. GSM850 test results	9
3.4. GSM850-E1 test results	10
3.5. WCDMA 850 (Band V) test results	11
3.6. GSM1900 test results	13
3.7. WCDMA 1900 (Band II) test results	16
4. Test Equipment.....	18
4.1. Conducted measurements	18
4.2. Radiated measurements	18

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

EUT with DUT number	RM-846, DUT 16793, DUT 16795
Accessories with DUT numbers	BL-4J, DUT 16797, DUT 16820
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 44 / 100.2
Date of measurements	27-Oct-2012 – 28-Oct-2012
Measured by	Sami Lehtonen

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

2.3. GSM850 TX test results

GSM mode

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	28.98	0.791	-5.87	-10	-53.92	-3.39	5.68	HORIZONTAL	PASSED
190 / 836.6	29.35	0.861	-4.6	-10	-53.22	-3.54	5.73	VERTICAL	PASSED
251 / 848.8	29.05	0.804	-4.18	-10	-52.67	-3.62	5.82	HORIZONTAL	PASSED

EGPRS mode, 1 TX Slot

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	23.55	0.226	-11.3	-10	-53.92	-3.39	5.68	HORIZONTAL	PASSED
190 / 836.6	28.92	0.780	-5.03	-10	-53.22	-3.54	5.73	VERTICAL	PASSED
251 / 848.8	27.55	0.569	-5.68	-10	-52.67	-3.62	5.82	HORIZONTAL	PASSED

2.4. WCDMA 850 (Band V) test results

Peak 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	24.07	0.255	-10.78	-10	-53.92	-3.39	5.68	VERTICAL	PASSED
4183 / 836.6	23.62	0.230	-10.33	-10	-53.22	-3.54	5.73	VERTICAL	PASSED
4233 / 846.6	23.21	0.209	-10	-10	-52.65	-3.62	5.82	VERTICAL	PASSED

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	20.1	0.102	-14.75	-10	-53.92	-3.39	5.68	VERTICAL	PASSED
4183 / 836.6	19.53	0.090	-14.42	-10	-53.22	-3.54	5.73	VERTICAL	PASSED
4233 / 846.6	19.12	0.082	-14.11	-10	-52.67	-3.62	5.82	VERTICAL	PASSED

2.5. GSM1900 TX test results

GSM mode

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	26.2	0.417	-18.06	-10	-52.7	10.13	8.57	VERTICAL	PASSED
661 / 1880	27.7	0.589	-16.57	-10	-52.74	10.28	8.75	HORIZONTAL	PASSED
810 / 1909.8	30.59	1.146	-13.5	-10	-52.75	10.14	8.8	VERTICAL	PASSED

EGPRS mode, 1 TX Slot

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	21.38	0.137	-22.88	-10	-52.7	10.13	8.57	VERTICAL	PASSED
661 / 1880	22.34	0.171	-21.93	-10	-52.74	10.28	8.75	HORIZONTAL	PASSED
810 / 1909.8	23.85	0.243	-20.24	-10	-52.75	10.14	8.8	VERTICAL	PASSED

2.6. WCDMA 1900 (Band II) test results

Peak 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	22.18	0.165	-21.99	-10	-52.7	10.04	8.57	VERTICAL	PASSED
9400 / 1880	23.46	0.222	-20.57	-10	-52.74	10.04	8.75	HORIZONTAL	PASSED
9538 / 1907.6	25.72	0.373	-18.27	-10	-52.75	10.04	8.8	VERTICAL	PASSED

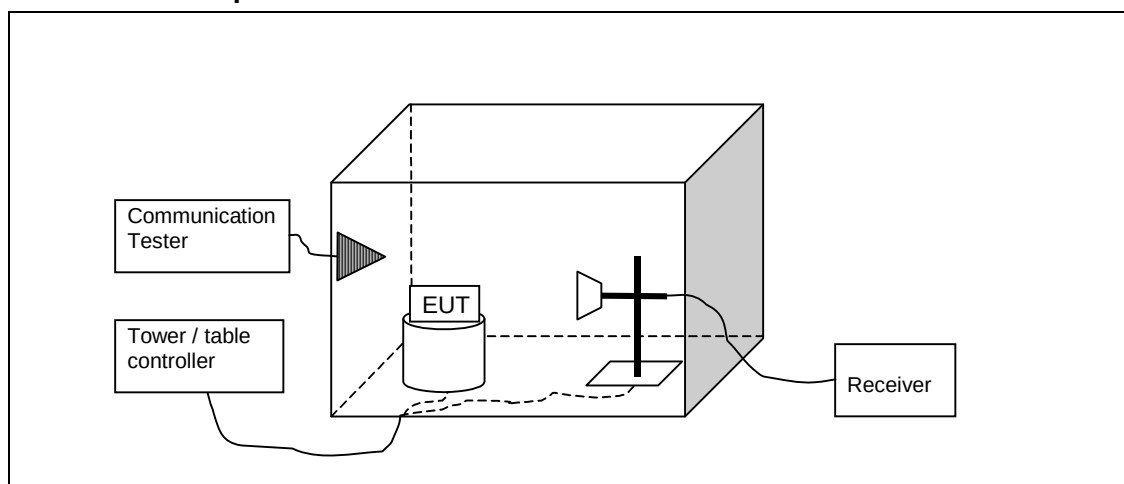
RMS Detector

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	18.56	0.072	-25.61	-10	-52.7	10.04	8.57	VERTICAL	PASSED
9400 / 1880	19.55	0.090	-24.48	-10	-52.74	10.04	8.75	HORIZONTAL	PASSED
9538 / 1907.6	21.4	0.138	-22.59	-10	-52.75	10.04	8.8	VERTICAL	PASSED

3. Band edge compliance (FCC §22.917(a), §24.238(a), RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RM-846, DUT 16793, DUT 16795
Accessories with DUT numbers	BL-4J, DUT 16797, DUT 16820
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 44 / 100.2
Date of measurements	27-Oct-2012 – 28-Oct-2012
Measured by	Sami Lehtonen

3.1.1 Test setup



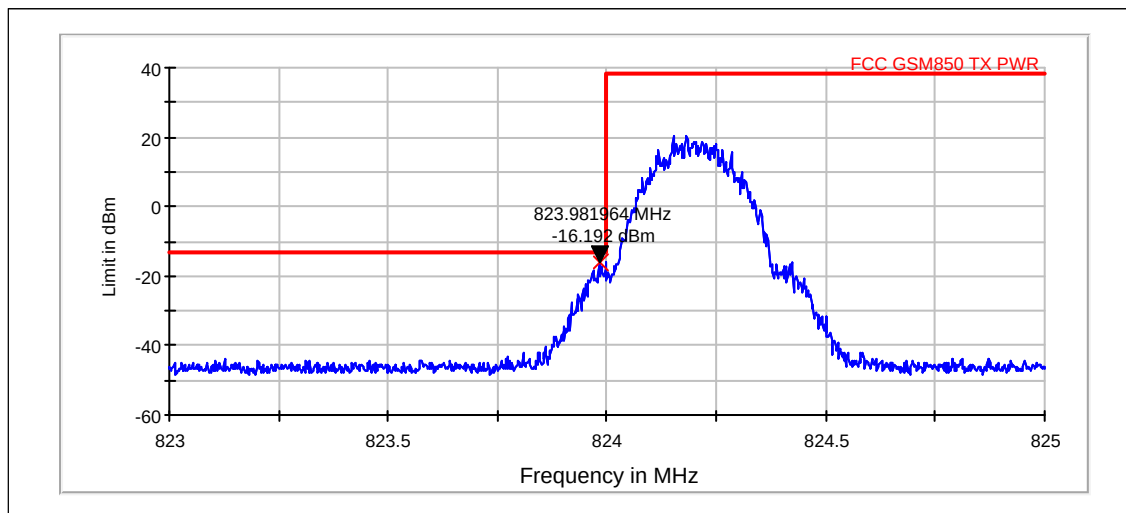
3.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24 and IC standards , RSS-132, RSS-133.

Limits for band edge compliance measurements

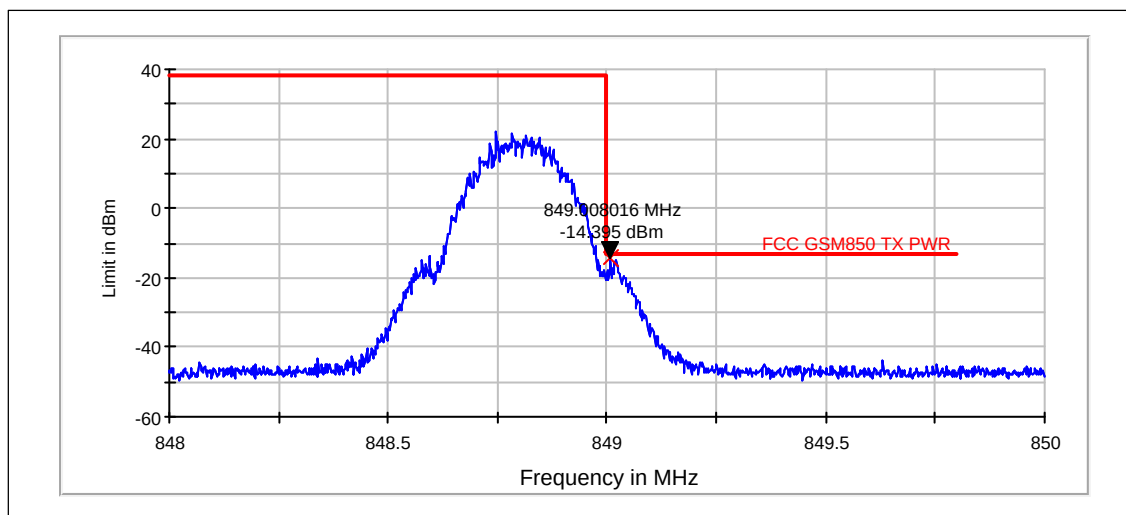
Operation band	Frequency range [MHz]	Limit [dBm]
GSM850 / WCDMA850	Below 824 and above 849	-13
GSM1900 / WCDMA1900	Below 1850 and above 1910	-13

3.3. GSM850 test results



Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

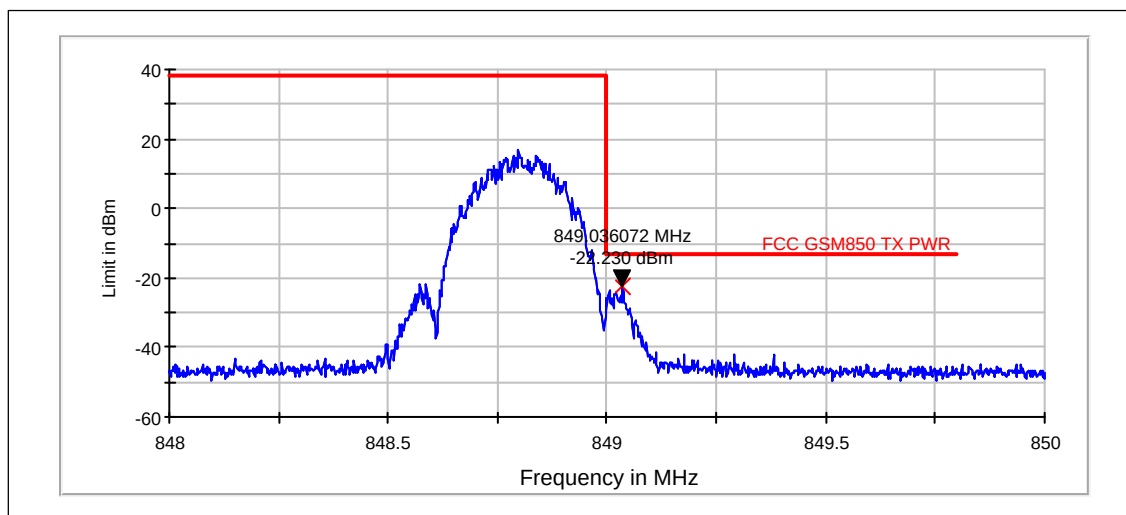
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
GSM	128 / 824.2	-16.19	PASSED



Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

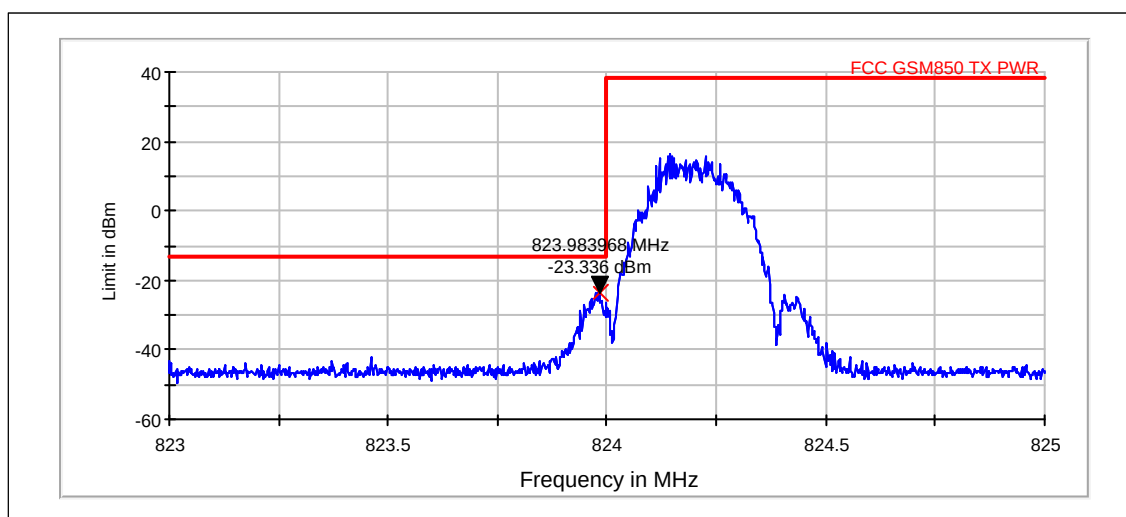
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
GSM	251 / 848.8	-14.4	PASSED

3.4. GSM850-E1 test results



Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

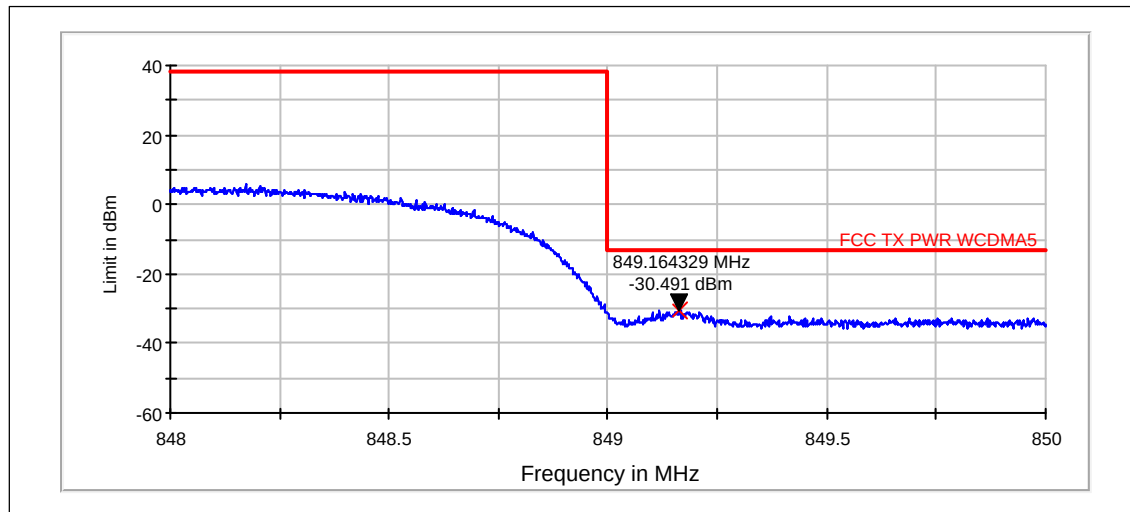
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
E-GPRS (MSC9)	251 / 848.8	-22.23	PASSED



Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

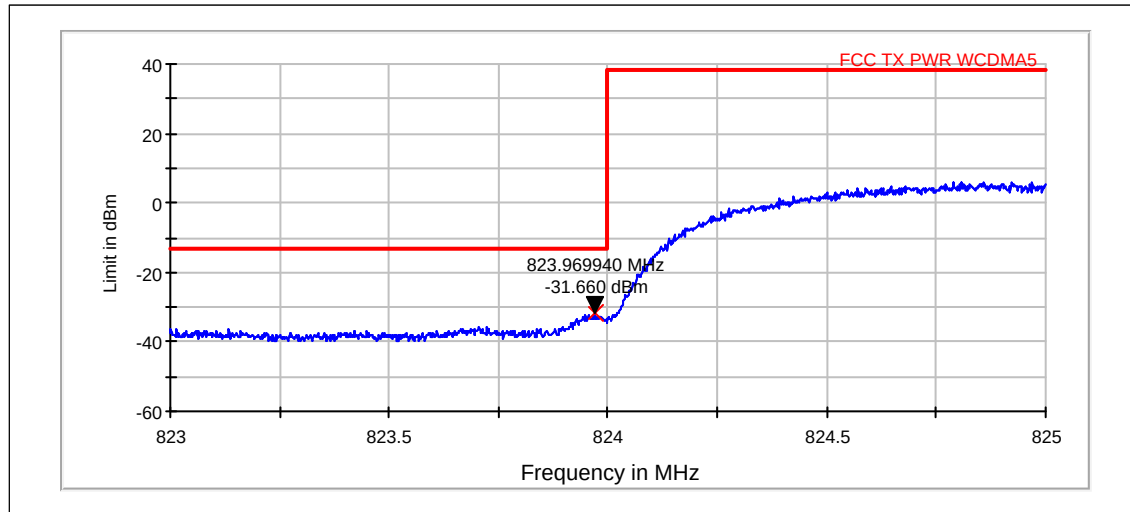
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
E-GPRS (MSC9)	128 / 824.2	-23.34	PASSED

3.5. WCDMA 850 (Band V) test results



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

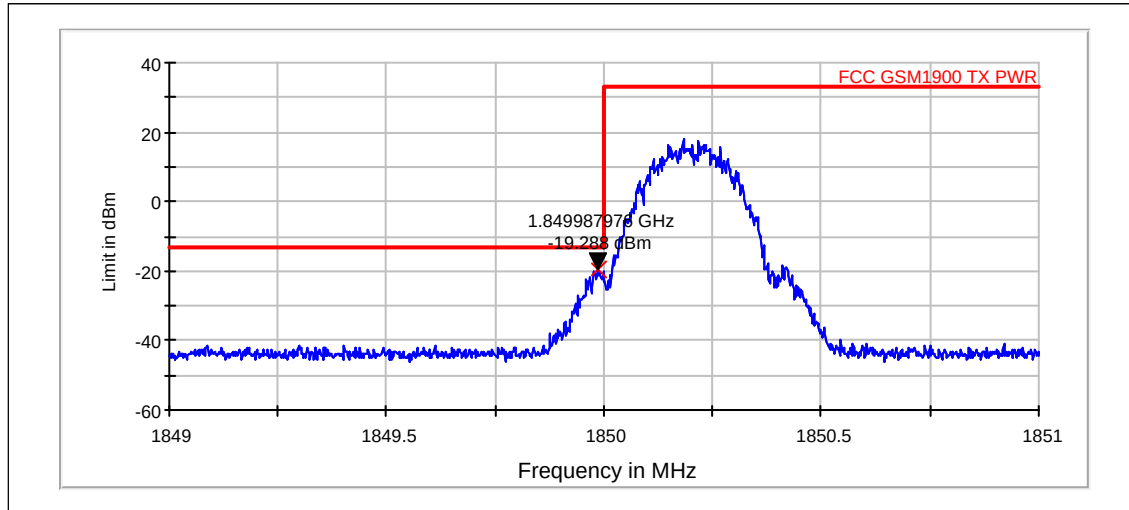
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD	4233 / 846.6	-30.49	PASSED



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

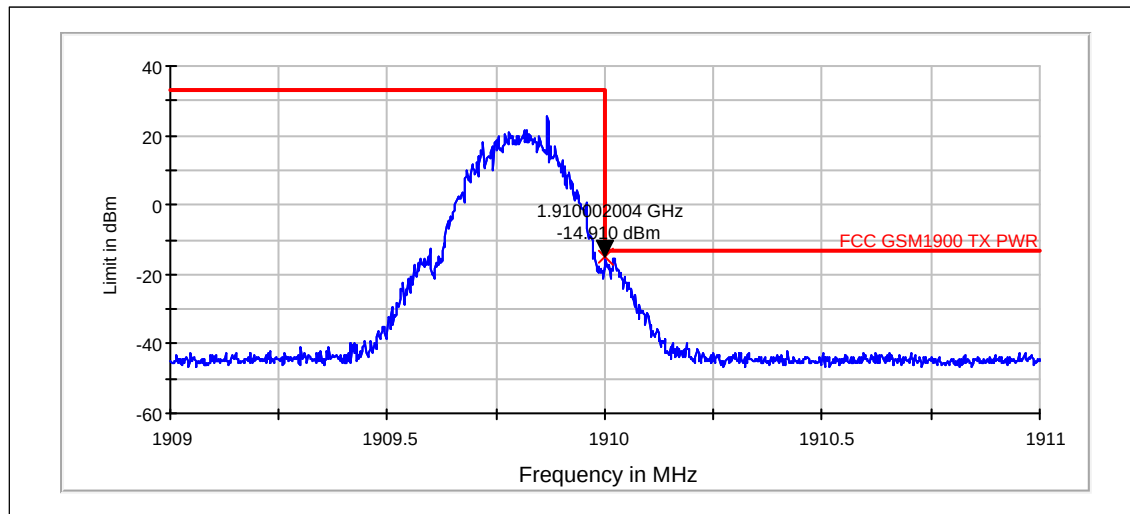
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD	4132 / 826.4	-31.66	PASSED

3.6. GSM1900 test results



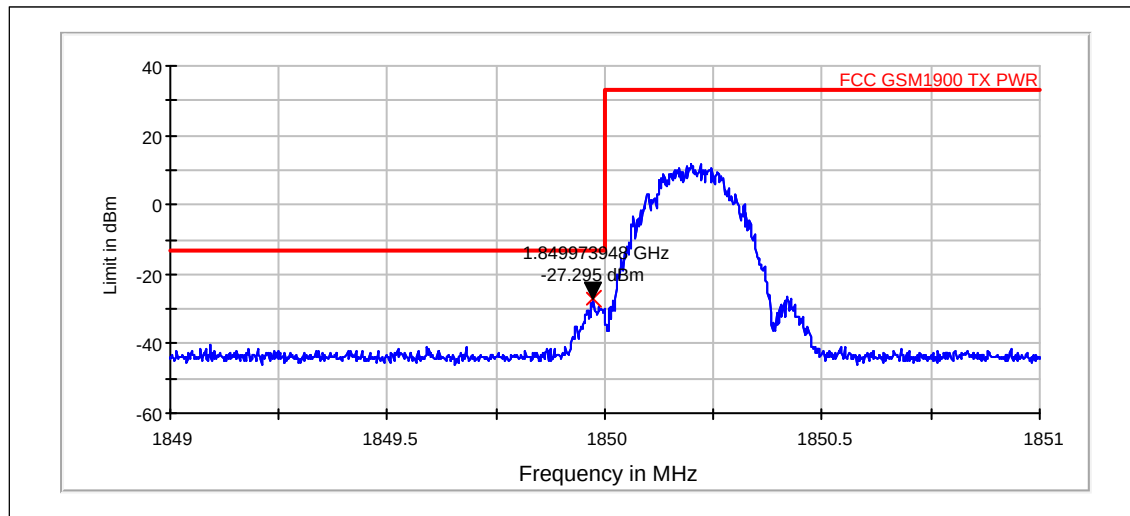
Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
GSM	512 / 1850.2	-19.29	PASSED



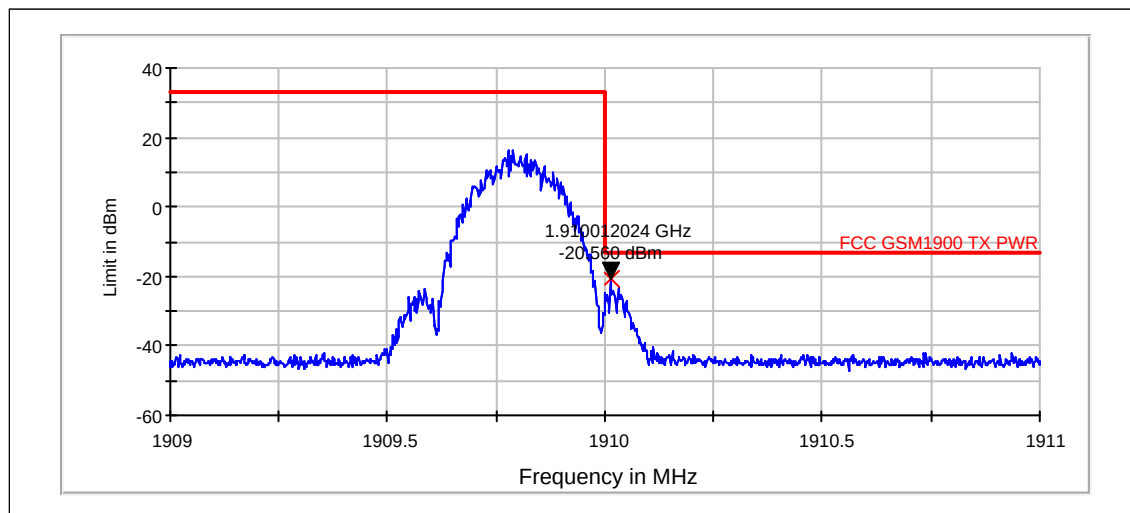
Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
GSM	810 / 1909.8	-14.91	PASSED



Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

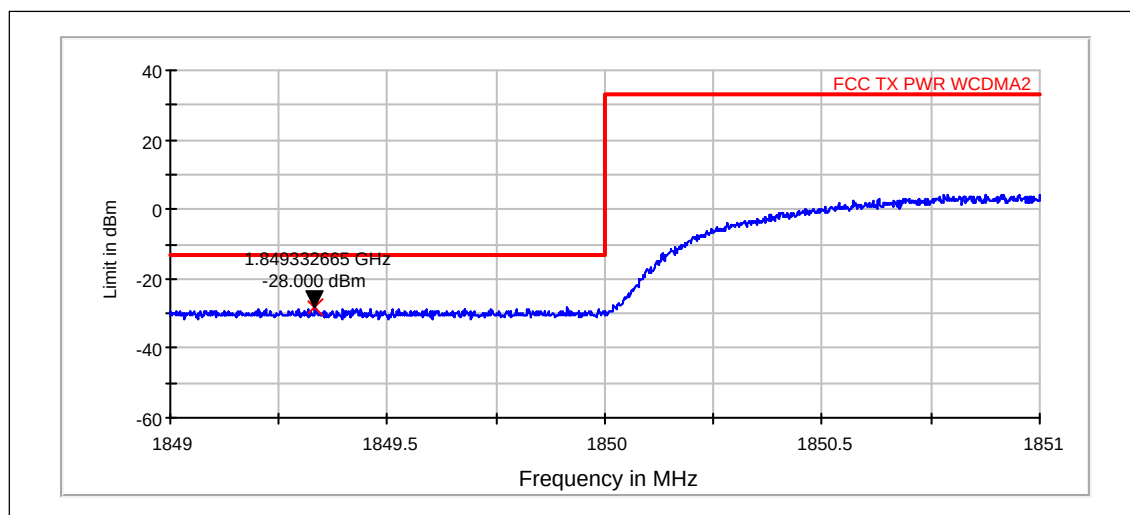
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
E-GPRS (MSC9)	512 / 1850.2	-27.3	PASSED



Peak (RBW: 3 kHz, VBW: 3 kHz, Max hold)

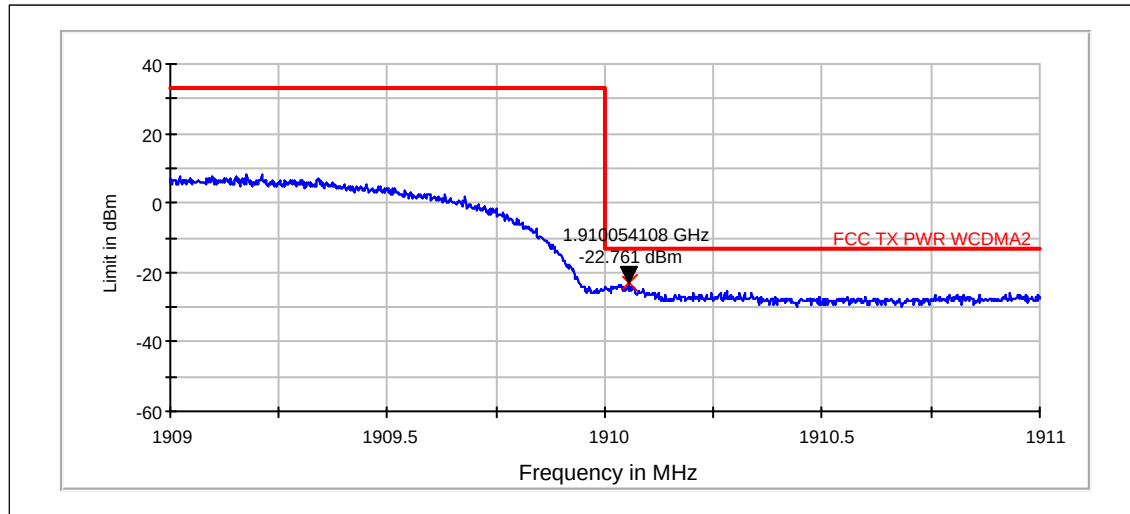
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
E-GPRS (MSC9)	810 / 1909.8	-20.56	PASSED

3.7. WCDMA 1900 (Band II) test results



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD	9262 / 1852.4	-28	PASSED



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD	9538 / 1907.6	-22.76	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	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	-

4.2. 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	-