

FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RM-823_07.docx	Date of Report:	04-Jan-2012
Number of pages:	17	Customer's Contact person:	Ronald Chernus
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FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-823		
FCC ID:	QMNRM-823	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, Engineer, EMC

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

Date of receipt	19-Dec-2011
Testing completed	03-Jan-2012
The customer's contact person	Ronald Chernus
Test Plan referred to	T:\Projects\RM-823\TestPlan\RS_testplan_RM-823.xls
Notes	-
Document name	T:\Projects\RM-823\EMC\FCC22&24_RM-823_07.docx

1.1. EUT and Accessory Information

The EUT is a 8-band mobile phone:

GSM850/900/1800/1900

WCDMA I/II(1900)/V(850)/VIII

The EUT is tested with maximum rated TX power, modulated with pseudo random bit sequence (PRBS9).

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-823	004402137440610	0202		WK49	16105
Phone	RM-823	004402137440529	0202		WK49	16109

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
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.

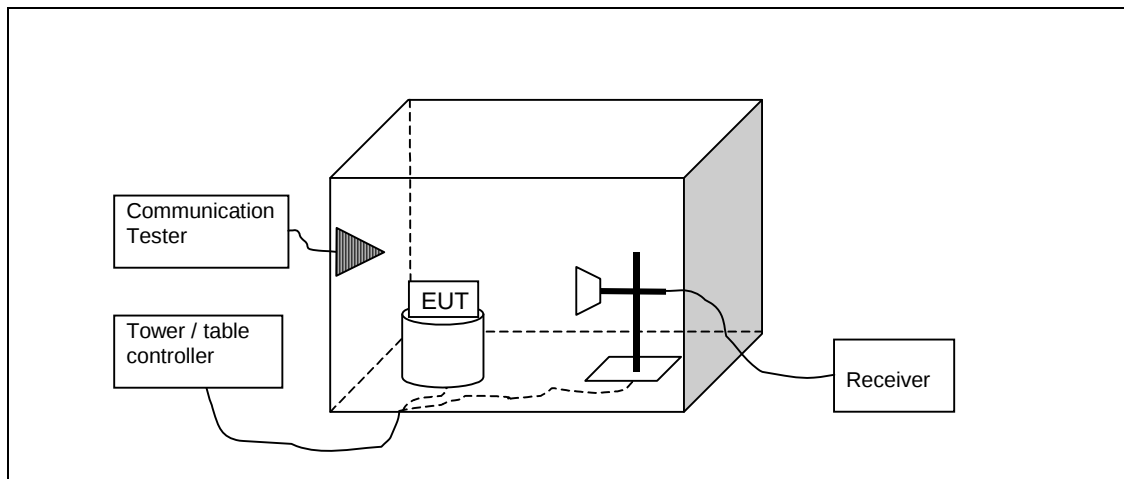
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2. Radiated RF output power (FCC §22.913(a), §24.232(b))

EUT with DUT number	RM-823, DUT 16105; RM-823, DUT 16109
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	Nominal battery voltage
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 36 / 100.1
Date of measurements	30-Dec-2011 and 02-Jan-2012
Measured by	Sami Lehtonen / Jari Keto

2.1.1 Test Setup



1.1 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:

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

Where P_{SUBST_TX} is signal generator level. P_{MEAS} is measured power level from the EUT. P_{SUBST_RX} is measured power level in substitute measurement. L_{SUBST_CABLE} is the loss of the cable between the signal generator and the substitution antenna and $G_{SUBST_TX_ANT}$ is substitution antenna gain.

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit([dBm])
704 – 716	3	34.8
824 - 849	7	38.5
1710 - 1755	1	30
1850 - 1910	2	33

2.2. 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	32.77	1.892	-13.4	-10	-51.04	10.13	5	VERTICAL	PASSED
661 / 1880	32.57	1.807	-13.72	-10	-51.11	10.28	5.1	VERTICAL	PASSED
810 / 1909.8	32.88	1.941	-13.67	-10	-51.51	10.14	5.1	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	29.98	0.995	-16.45	-10	-51.3	10.13	5	VERTICAL	PASSED
661 / 1880	29.67	0.927	-16.94	-10	-51.43	10.28	5.1	VERTICAL	PASSED
810 / 1909.8	28.66	0.735	-17.92	-10	-51.54	10.14	5.1	VERTICAL	PASSED

2.3. WCDMA 1900 (Band II) TX 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	27.71	0.590	-18.39	-10	-50.97	10.13	5	VERTICAL	PASSED
9400 / 1880	27.72	0.592	-18.57	-10	-51.11	10.28	5.1	VERTICAL	PASSED
9538 / 1907.6	26.65	0.462	-19.84	-10	-51.45	10.14	5.1	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	23.07	0.203	-23.03	-10	-50.97	10.13	5	VERTICAL	PASSED
9400 / 1880	23.54	0.226	-22.75	-10	-51.11	10.28	5.1	VERTICAL	PASSED
9538 / 1907.6	22.04	0.160	-24.45	-10	-51.45	10.14	5.1	VERTICAL	PASSED

2.4. GSM850 TX Test results

GSM mode

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST} TX	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT	L _{SUBST} CABLE	Polarisation	Result
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				[dBm]		[dBd]	[dB]		
128 / 824.2	29.63	0.918	-5.28	-10	-51.73	-3.42	3.4	VERTICAL	PASSED
190 / 836.6	29.91	0.979	-4.38	-10	-51.46	-3.77	3.4	VERTICAL	PASSED
251 / 848.8	30.93	1.239	-3.49	-10	-51.31	-3.49	3.4	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	22.07	0.161	-13.21	-10	-52.1	-3.42	3.4	VERTICAL	PASSED
190 / 836.6	25.71	0.372	-8.65	-10	-51.53	-3.77	3.4	VERTICAL	PASSED
251 / 848.8	26.16	0.413	-7.51	-10	-50.56	-3.49	3.4	HORIZONTAL	PASSED

2.5. WCDMA 850 (Band V) TX 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	23.18	0.208	-11.87	-10	-51.87	-3.42	3.4	VERTICAL	PASSED
4183 / 836.6	23.23	0.210	-11.26	-10	-51.66	-3.77	3.4	VERTICAL	PASSED
4233 / 846.6	23.01	0.200	-11.28	-10	-51.18	-3.49	3.4	HORIZONTAL	PASSED

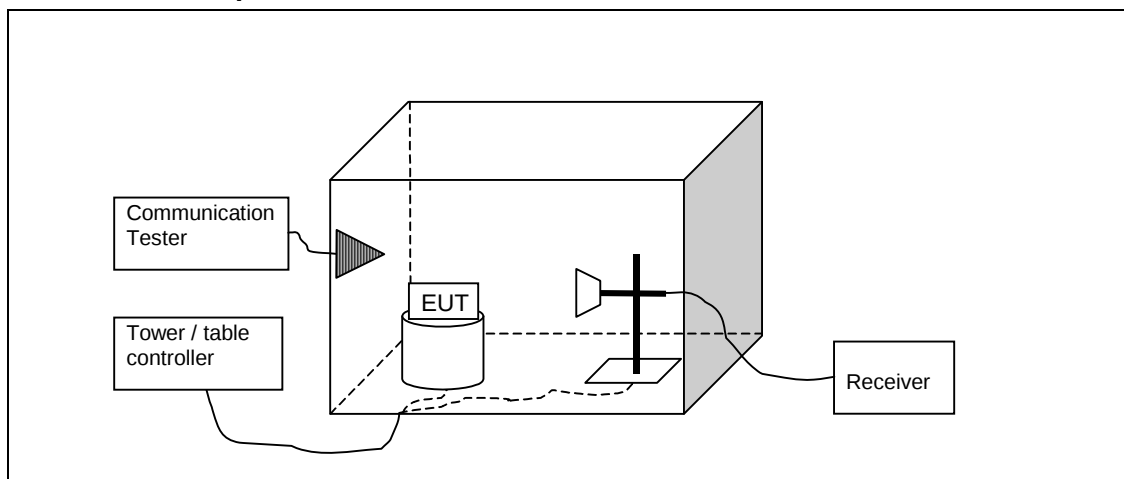
RMS Detector

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	19.52	0.090	-15.53	-10	-51.87	-3.42	3.4	VERTICAL	PASSED
4183 / 836.6	19.39	0.087	-15.1	-10	-51.66	-3.77	3.4	VERTICAL	PASSED
4233 / 846.6	18.99	0.079	-15.3	-10	-51.18	-3.49	3.4	VERTICAL	PASSED

3. Band edge compliance (FCC §22.917(a), §24.238(a))

EUT with DUT number	RM-823, DUT 16105; RM-823, DUT 16109
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	Nominal voltage
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 36 / 100.1
Date of measurements	30-Dec-2011 and 02-Jan-2012
Measured by	Sami Lehtonen / Jari Keto

3.1.1 Test Setup



3.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24.

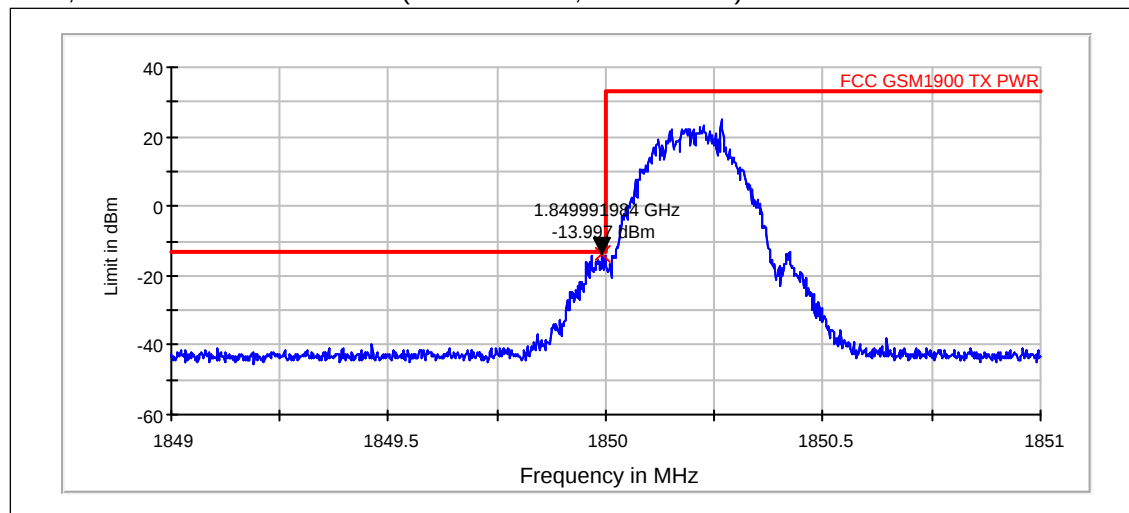
Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850 / WCDMA 850	Below 824 and above 849	-13
GSM 1900 / WCDMA 1900	Below 1850 and above 1910	-13

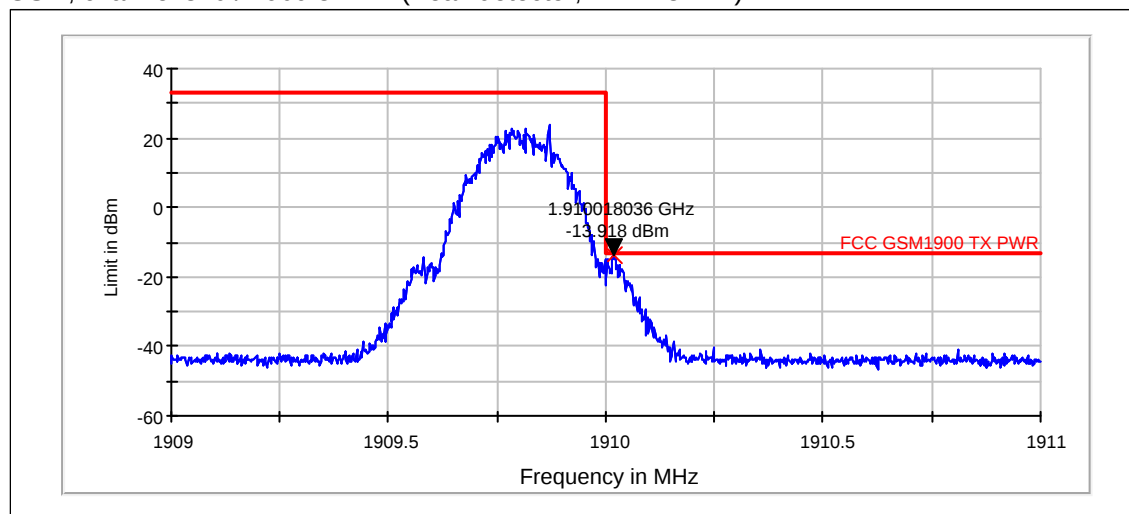
3.3. GSM1900 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
GSM	810 / 1909.8	-13.92	PASSED
GSM	512 / 1850.2	-14	PASSED

GSM, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



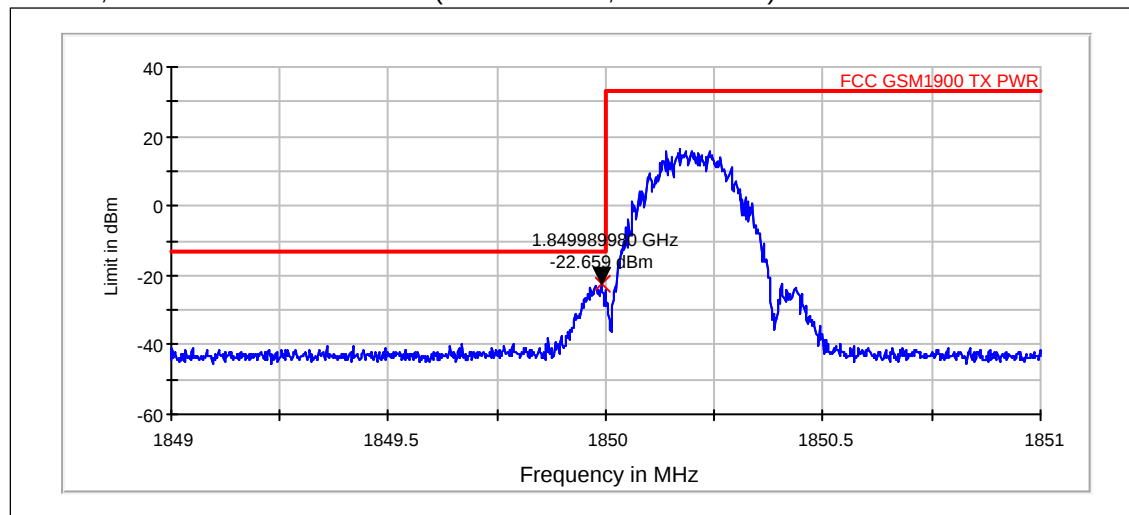
GSM, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



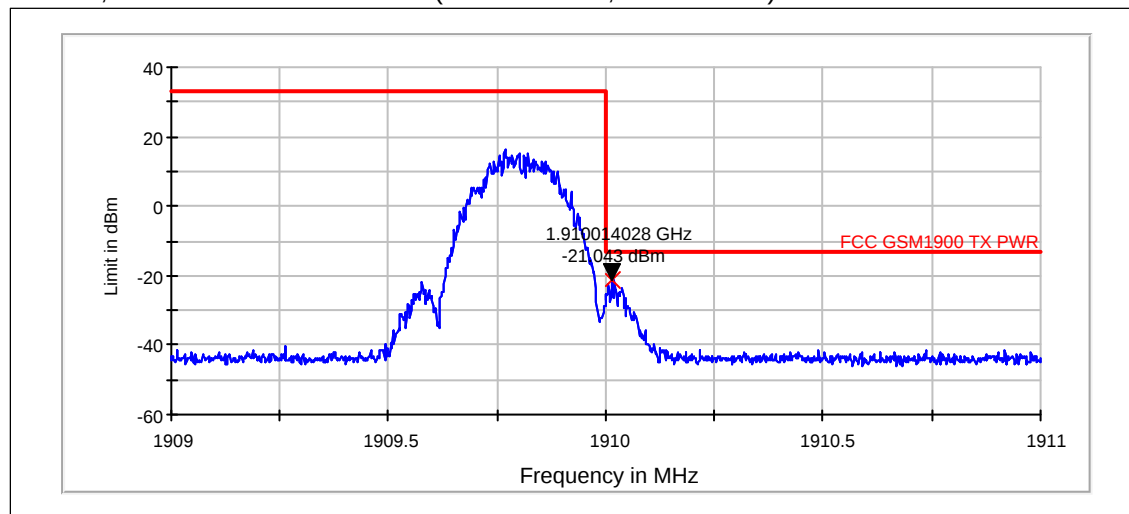
3.4. GSM1900-E1 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
EGPRS	512 / 1850.2	-22.66	PASSED
EGPRS	810 / 1909.8	-21.04	PASSED

EGPRS, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



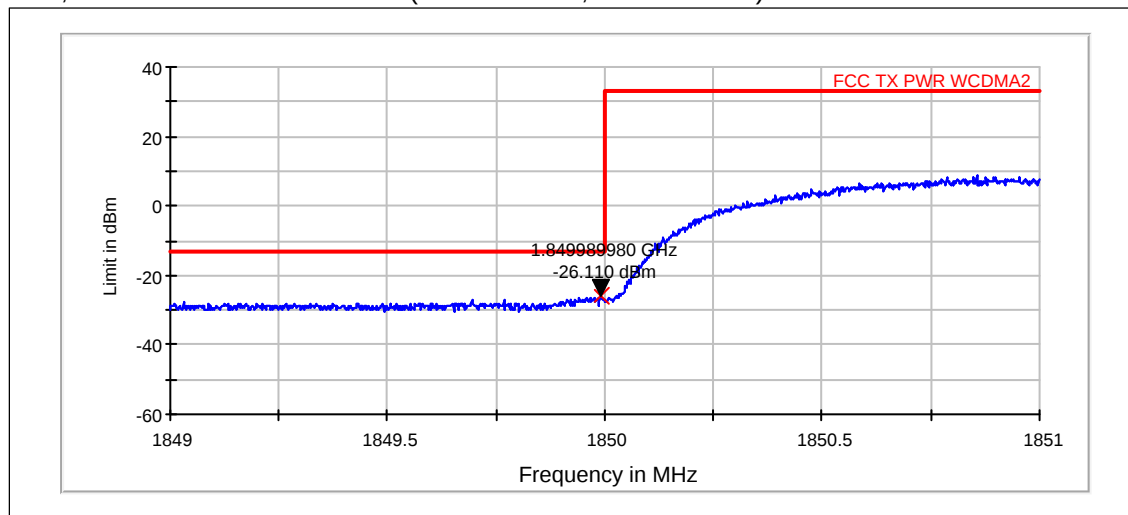
EGPRS, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



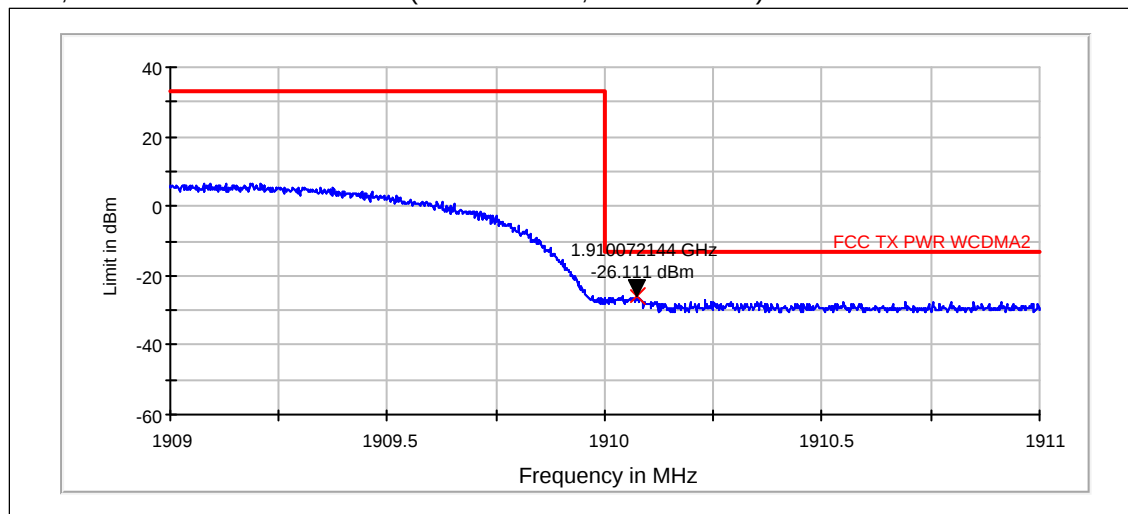
3.5. WCDMA 1900 (Band II) Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
FDD	9262 / 1852.4	-26.11	PASSED
FDD	9538 / 1907.6	-26.11	PASSED

FDD, channel 9262 / 1852.4 MHz (RMS detector, RBW: 50 kHz)



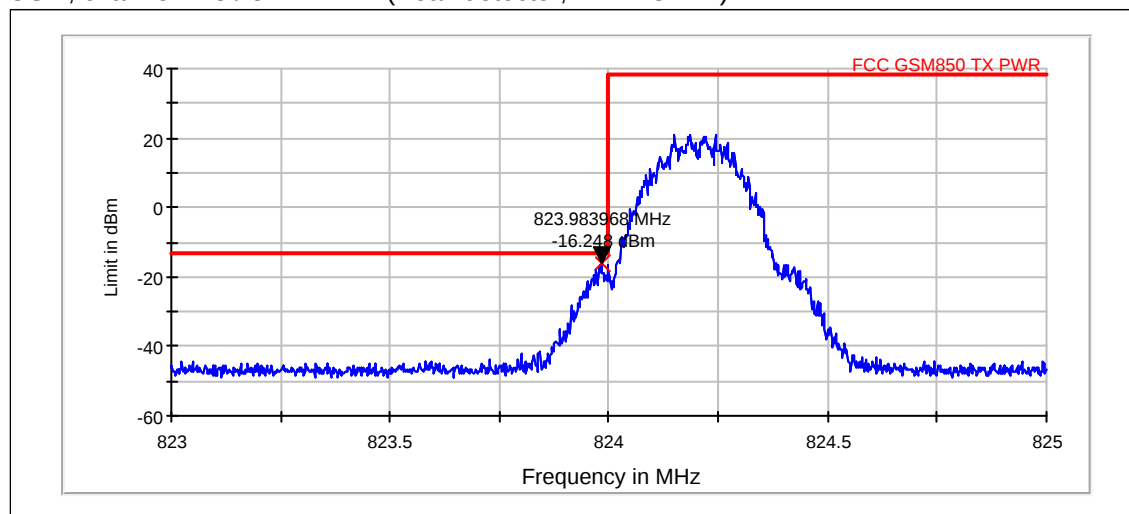
FDD, channel 9538 / 1907.6 MHz (RMS detector, RBW: 50 kHz)



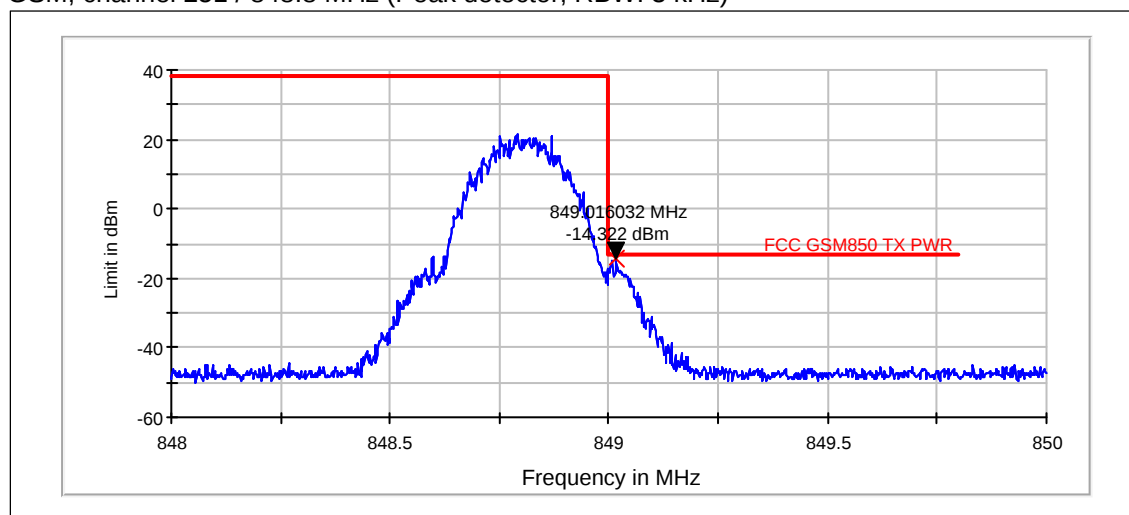
3.6. GSM850 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
GSM	128 / 824.2	-16.25	PASSED
GSM	251 / 848.8	-14.32	PASSED

GSM, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz)



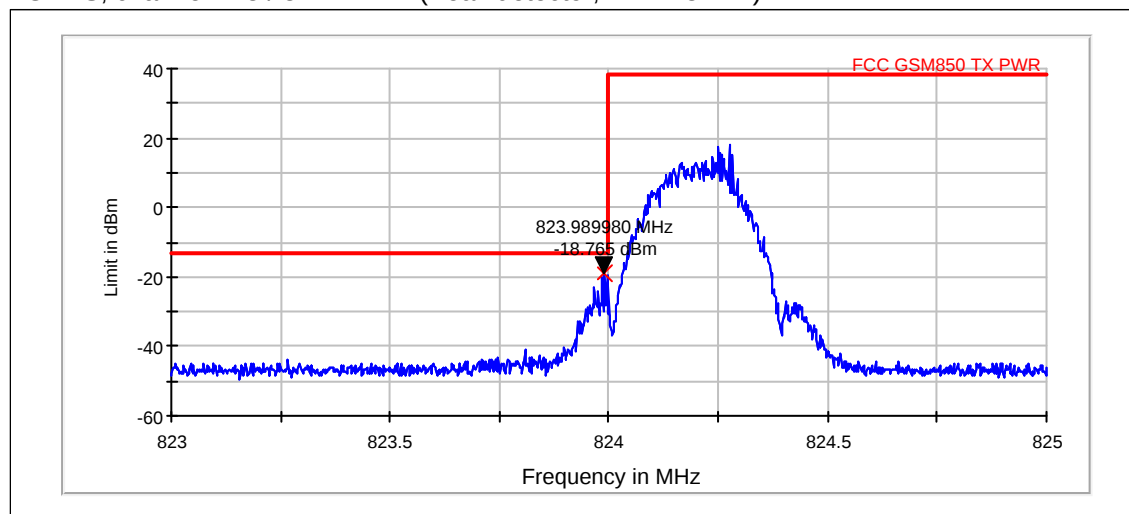
GSM, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



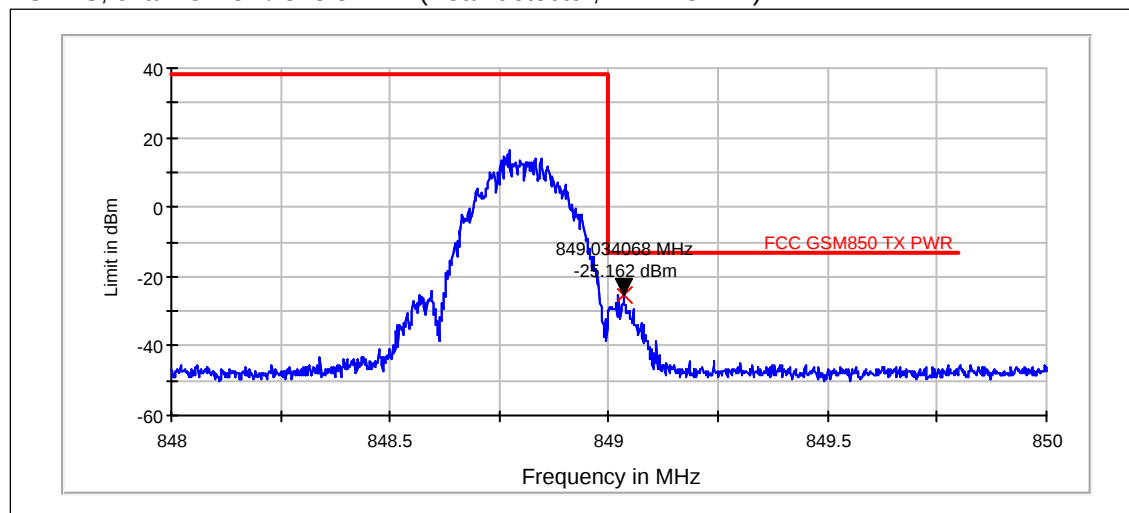
3.7. GSM850-E1 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
EGPRS	128 / 824.2	-18.76	PASSED
EGPRS	251 / 848.8	-25.16	PASSED

EGPRS, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz)



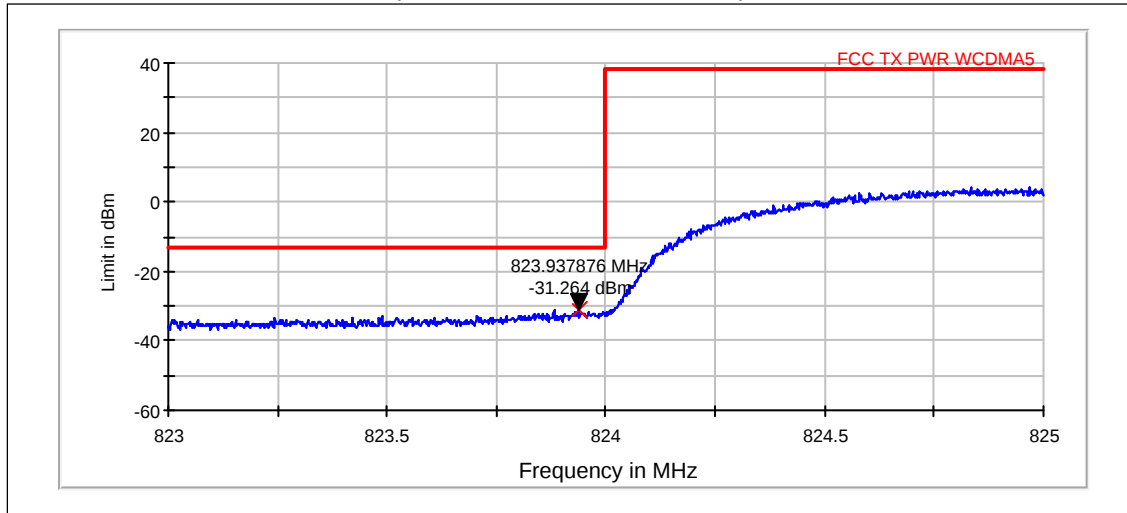
EGPRS, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



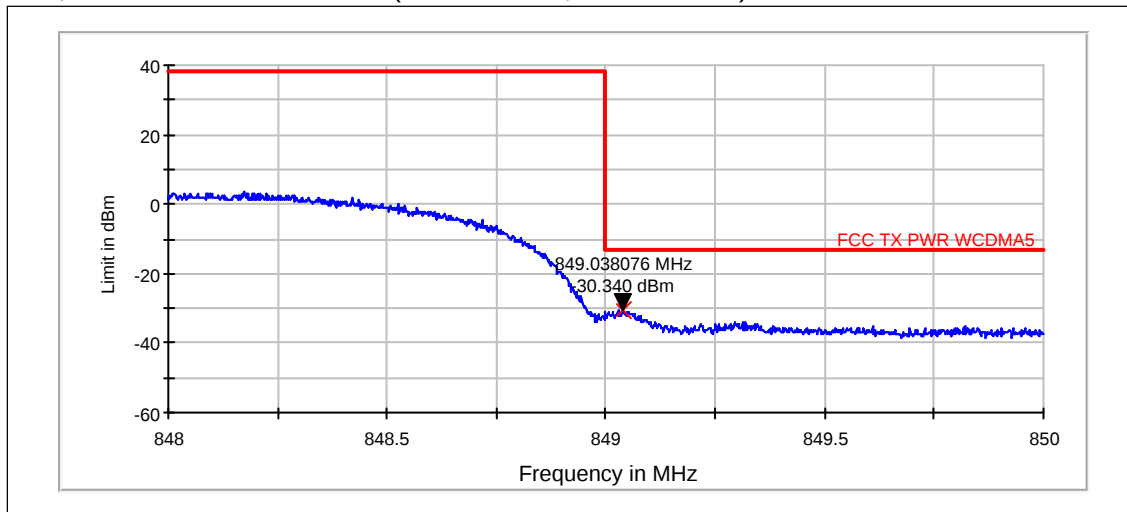
3.8. WCDMA 850 (Band V) Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
FDD	4132 / 826.4	-31.26	PASSED
FDD	4233 / 846.6	-30.34	PASSED

FDD, channel 4132 / 826.4 MHz (RMS detector, RBW: 50 kHz)



FDD, channel 4233 / 846.6 MHz (RMS detector, RBW: 50 kHz)



4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1916	Communication Tester	CMTA84	R&S	15B
1992	Signal Generator	83630B	Agilent	15C, 15B
1999	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2039	Power Supply	PL330QMD	Thurlby	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2156	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2206	Signal Generator	SMX	R&S	15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2352	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C
2359	Temperature Test Chamber	VT4002	Vötsch	22/24/27
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24/27
2362	Power Supply	NGPX 70/5	R&S	22/24/27
2388	Bluetooth Tester	CBT	R&S	15B
2389	Signal Generator	SMJ 100A	R&S	15B
2390	Directional Coupler	DC2600	AR	-
6009	GPS Antenna	SA-700	Chronos	15C
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	15C
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	15C
6012	CDN	CDN USB/c	Teseq	-
6015	Receiver	ESI	R&S	22/24, 15C, 15B
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B
6036	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B
2059	V-network	ESH3-Z6	R&S	-
6044	V-network	ESH3-Z6	R&S	-
6045	Power splitter	11667B	Agilent	22/24/27, 15C
6046	Attenuator 10dB	8493C	Agilent	22/24/27, 15C
6047	Attenuator 20dB	8493C	Agilent	22/24/27, 15C

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1917	Communication Tester	CMTA84	R&S	15B
1988	Antenna	HL562	R&S	22/24/27, 15C, 15B
1989	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2009	Signal Generator	SMP 22	R&S	22/24/27, 15C, 15B
2027	CDN	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	CDN	M3 (modified) DC2	MEB	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2029	Power Supply	PL330	Thurlby	22/24/27, 15C
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	24
2051	High Pass Filter	4HC1700-1-KK	R&S	22
2109	Power Supply	PL330QMD	Thurlby	22/24/27, 15C, 15B
2116	Controller	EMCO 2090	ETS	22/24/27, 15C, 15B
2135	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2150	High Pass Filter	F-15041	RLC	22/24/27, 15C
2156	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2176	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2348	Controller	G-1000DXC	Yaesu	22/24/27, 15C, 15B
2349	Computer Controller	GS-232B	Yaesu	22/24/27, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	Miteq	22/24/27, 15C, 15B
2353	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	15C
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	22/24/27, 15C, 15B
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2366	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22
2388	Bluetooth Tester	CBT	R&S	15B
2389	Signal Generator	SMJ 100A	R&S	15B
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
6009	GPS Antenna	SA-700	Chronos	15C
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	15C
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	15C
6014	Substitute Calibration Cable	Sucoflex 104PB	Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
6037	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B