FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RM-744_08.docx	**Date of Report:**	18-Feb-2011
Number of pages:	16	**Customer's Contact person:**	Lenaghan Alison
Testing laboratory:	TCC Nokia Tampere Laboratory P.O. Box 68 Sinitaival 5 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880	**Customer:**	Nokia Corporation Nokia House Summit Avenue, Southwood FARNBOROUGH HAMPSHIRE GU14 0NG UK Tel. +44 1252 866000 Fax. +44 1252 866001
FCC listing no.: **IC recognition no.:**	94436 661AK-1		
Tested devices/ accessories:	**Phone RM-744 / Battery BL-5CT / Charger AC-8E / Headset WH-102**		
FCC ID:	QFXRM-744	**IC:**	661Z-RM744
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:	Digitally signed by Jari Jantunen Date: 2011.02.18 13:57:25 +02'00'		

Jari Jantunen, System Manager, EMC

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

Date of receipt	25-Jan-2011
Testing completed	11-Feb-2011
The customer's contact person	Lenaghan Alison
Test Plan referred to	T:\Projects\RM-744\TestPlan\RS_testplan_RM-744.xls
Notes	-
Document name	FCC22&24_RM-744_08.docx

1.1. EUT and Accessory Information

The EUT is a 7-band (GSM850/900/1800/1900) and WCDMA Band (I/V(850)/V(850)) mobile phone with GPRS, EGPRS, HSDPA, HSUPA and Bluetooth. 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-744	004402133710883	9204	-	070.020	42469
Battery	BL-5CT	363563951191060289 2;0670555	-	-	-	42470
Charger	AC-8E	486867936131060223 0;0675387	-	-	-	42444
Headset	WH-102	0694323939454107471	-	-	-	42460

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	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	PASSED
§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

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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	PASSED
§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.

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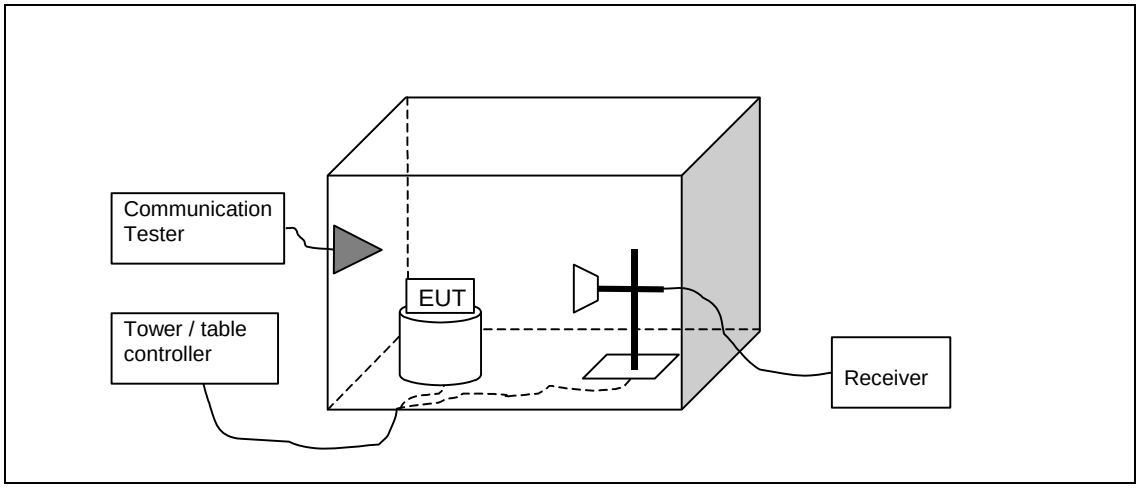
2. Radiated RF output power

(FCC §22.913(a), §24.232(b), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RM-744, DUT 42469
Accessories with DUT numbers	BL-5CT, DUT 42470
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 50 / 99.8
Date of measurements	11-Feb-2011
Measured by	Jari Jantunen

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:

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

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

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Frequency range [MHz]	Limit [W]	Limit([dBm])
824 - 849	7	38.5
1710 - 1755	1	30
1850 - 1910	2	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	27.34	0.542	-6.2	+10	-30.33	-3.39	3.4	VERTICAL	PASSED
190 / 836.6	28.38	0.689	-4.27	+10	-29.59	-3.54	3.4	VERTICAL	PASSED
251 / 848.8	29.11	0.815	-3.47	+10	-29.60	-3.62	3.4	VERTICAL	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	26.94	0.494	-6.6	+10	-30.33	-3.39	3.4	VERTICAL	PASSED
190 / 836.6	25.90	0.389	-6.75	+10	-29.59	-3.54	3.4	VERTICAL	PASSED
251 / 848.8	25.77	0.378	-6.81	+10	-29.60	-3.62	3.4	VERTICAL	PASSED

2.4. 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	31.37	1.371	-13.33	+10	-29.72	9.98	5.0	HORIZONTAL	PASSED
661 / 1880	31.79	1.510	-12.59	+10	-29.41	10.07	5.1	HORIZONTAL	PASSED
810 / 1909.8	31.32	1.355	-13.3	+10	-29.45	10.27	5.1	HORIZONTAL	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	27.73	0.593	-16.97	+10	-29.72	9.98	5.0	HORIZONTAL	PASSED
661 / 1880	28.9	0.776	-15.48	+10	-29.41	10.07	5.1	HORIZONTAL	PASSED
810 / 1909.8	28.2	0.661	-16.42	+10	-29.45	10.27	5.1	HORIZONTAL	PASSED

2.5. WCDMA 850 (Band V) 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
4132 / 826.4	19.62	0.092	-14.5	+10	-30.91	-3.39	3.4	HORIZONTAL	PASSED
4183 / 836.6	19.04	0.080	-13.72	+10	-29.70	-3.54	3.4	VERTICAL	PASSED
4233 / 846.6	19.06	0.081	-13.16	+10	-29.24	-3.62	3.4	VERTICAL	PASSED

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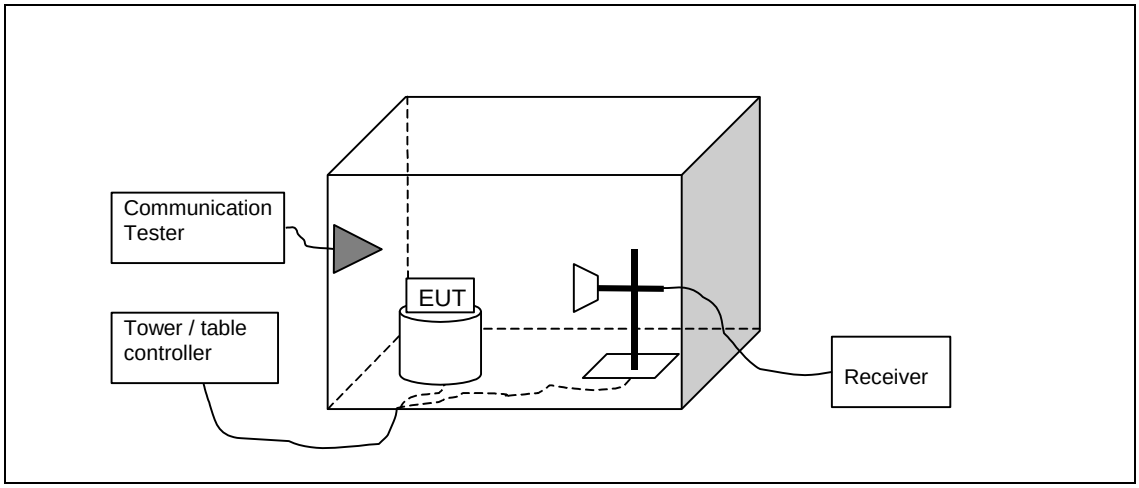
3. Band edge compliance

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

EUT with DUT number	RM-744, DUT 42469
Accessories with DUT numbers	BL-5CT, DUT 42470 ; AC-8E, DUT 42444 ; WH-102, DUT 42460
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 50 / 99.8
Date of measurements	11-Feb-2011
Measured by	Jari Jantunen

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 / WCDMA 850	Below 824 and above 849	-13
WCDMA 1700	Below 1710 and above 1755	-13
GSM 1900 / WCDMA 1900	Below 1850 and above 1910	-13

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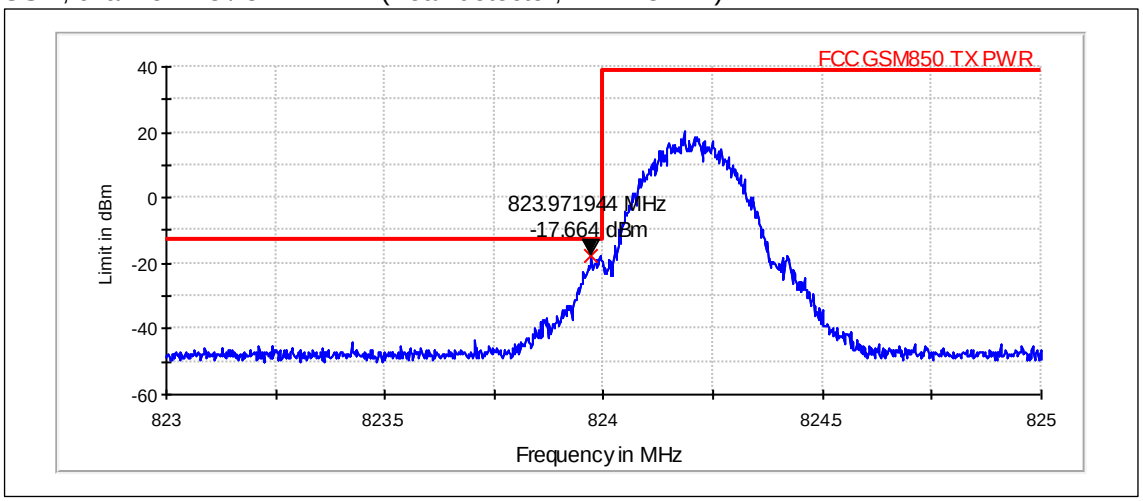
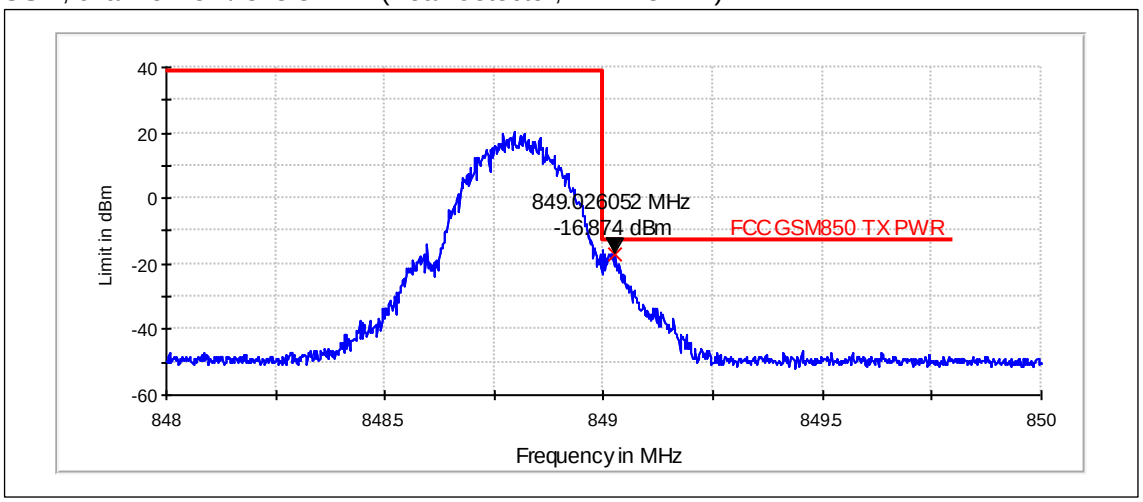
3.3. GSM850 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Level [dBm]
GSM	128 / 824.2	-17.66
GSM	251 / 848.8	-16.87
EGPRS	128 / 824.2	-18.09
EGPRS	251 / 848.8	-25.9

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



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



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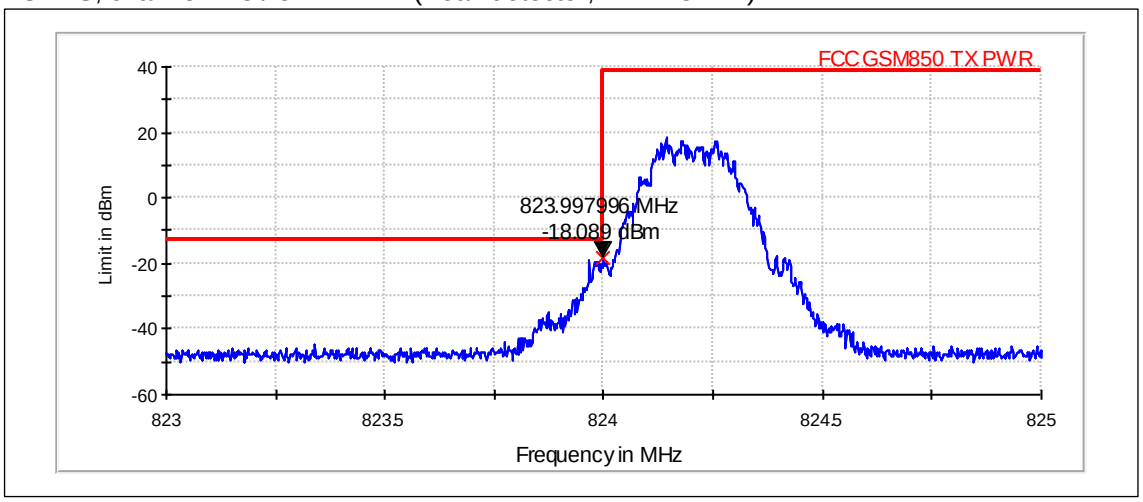
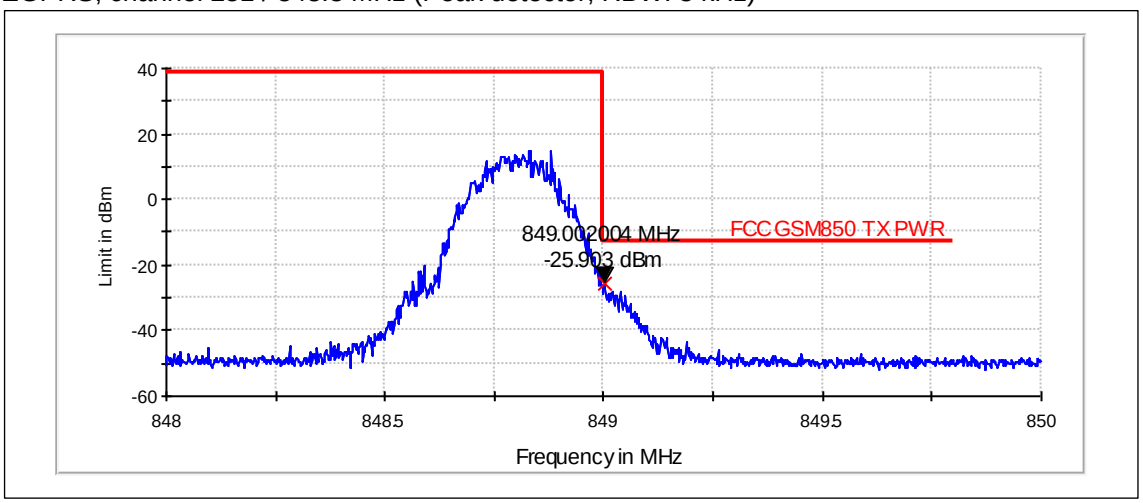
EGPRS, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz)



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



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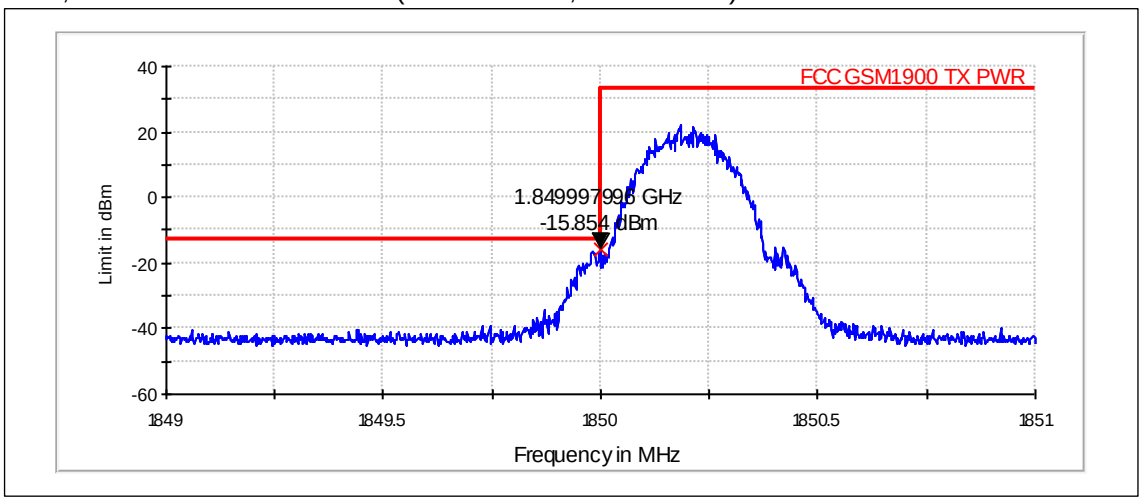
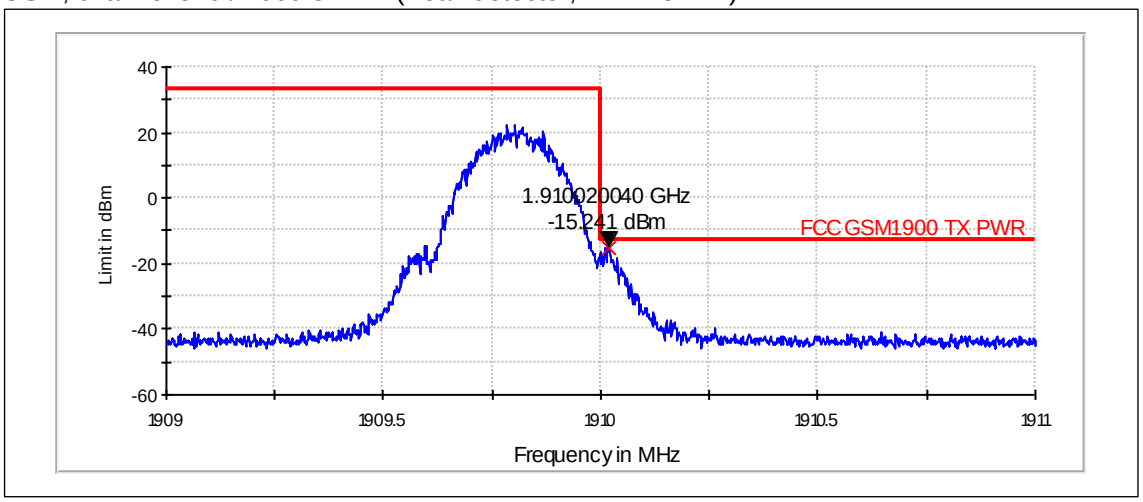
3.4. GSM1900 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Level [dBm]
GSM	512 / 1850.2	-15.85
GSM	810 / 1909.8	-15.24
EGPRS	512 / 1850.2	-22.72
EGPRS	810 / 1909.8	-19.78

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



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



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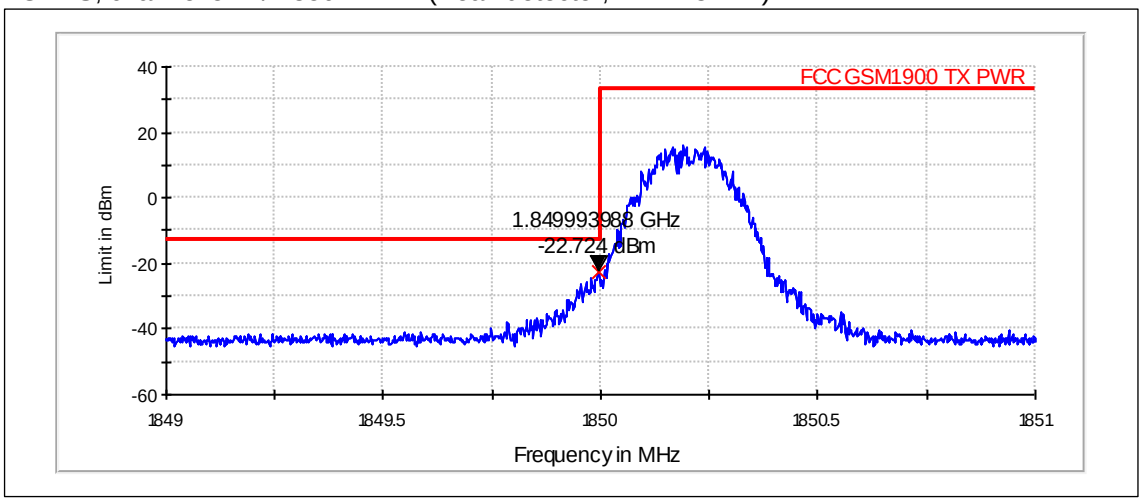
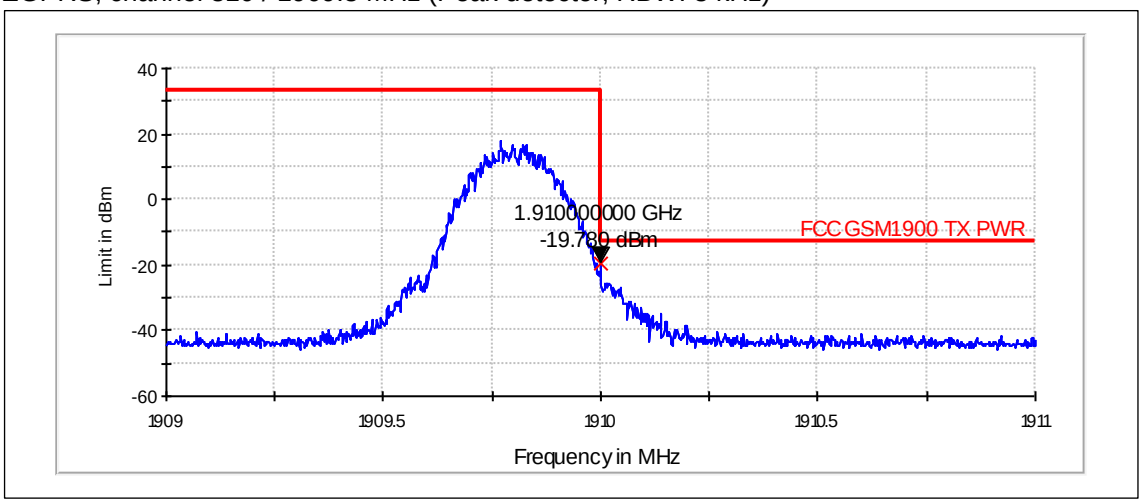
EGPRS, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



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



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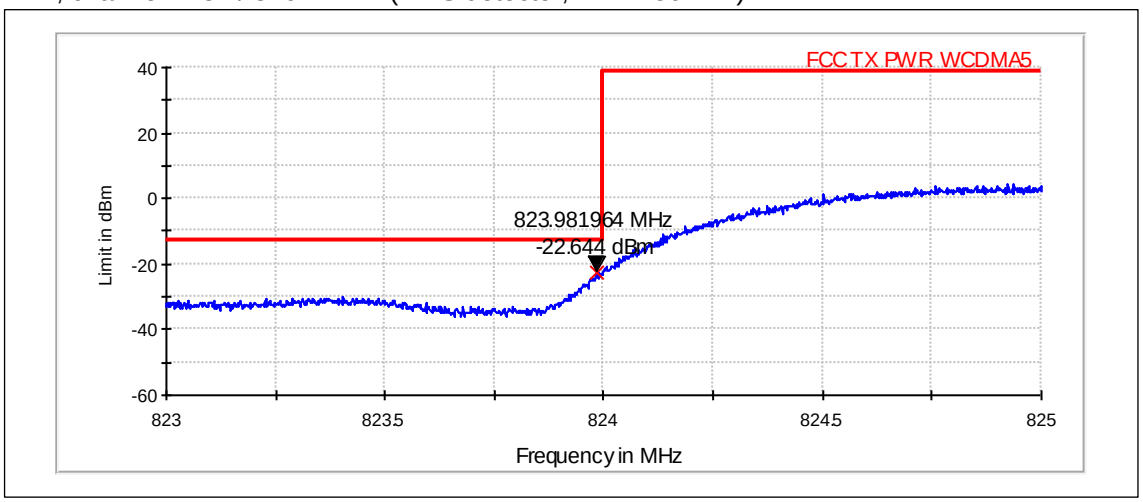
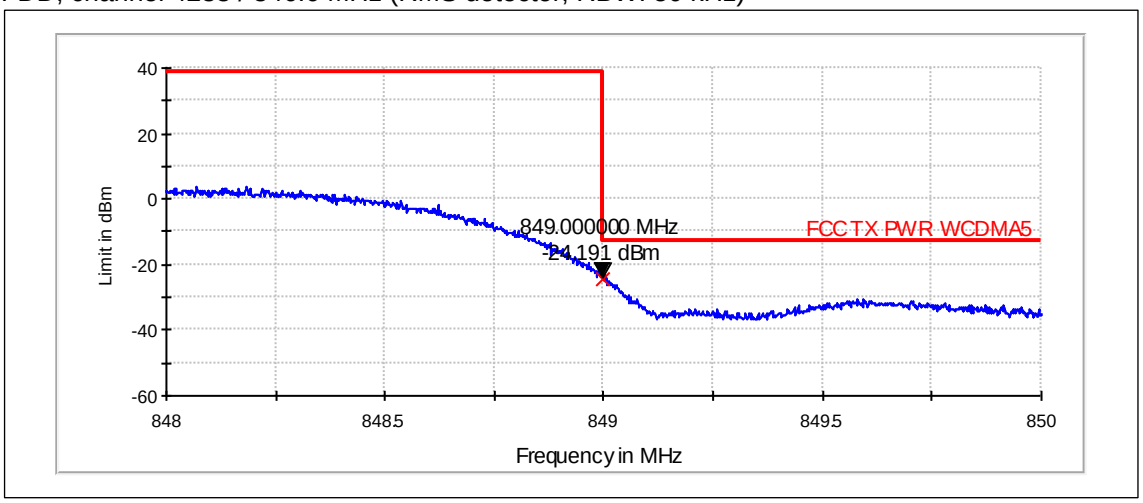
3.5. WCDMA 850 (Band V) Test results

Operation mode (TX on)	Channel / f_C [MHz]	Level [dBm]
FDD	4132 / 826.4	-22.64
FDD	4233 / 846.6	-24.19

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



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



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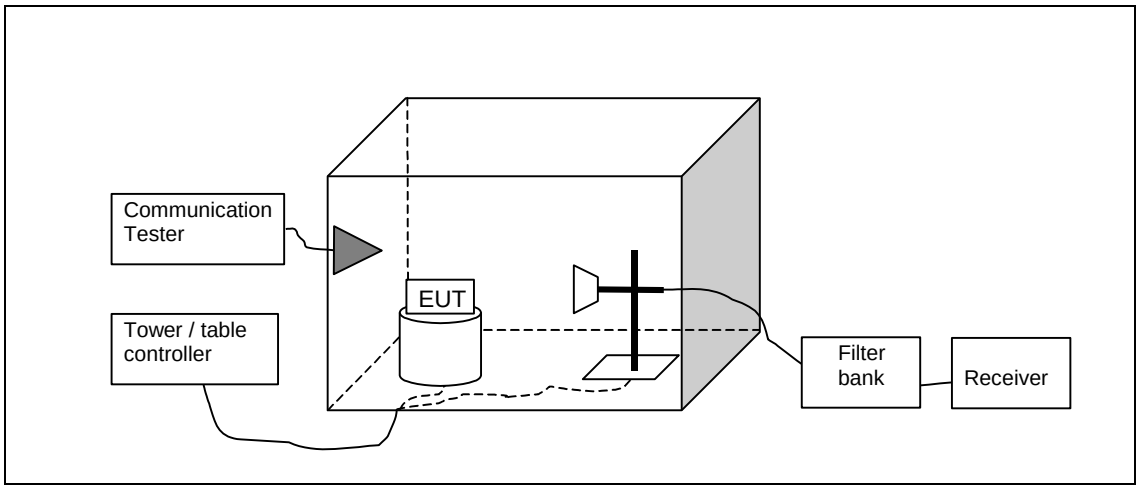
4. Spurious radiated emissions

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

EUT with DUT number	RM-744, DUT 42469
Accessories with DUT numbers	BL-5CT, DUT 42470 ; AC-8E, DUT 42444 ; WH-102, DUT 42460
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 48 / 99.7
Date of measurements	10-Feb-2011
Measured by	Jari Jantunen

4.1.1 Test Setup



4.2. 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 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

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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]
GSM 850 / WCDMA 850	30 - 8500	-13
GSM 1900 / WCDMA 1700 / WCDMA 1900	30 - 18000	-13

4.3. GSM850 TX Test results

GSM mode, channel 190 / 836.6 MHz

Frequency [MHz]	P[dBm]	P [µW]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBd]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
1673.303	-45.13	0.03069	-38.00	-48.5	7.8	4.43	VERTICAL	PASSED
2509.739	-42.31	0.05875	-42.65	-45.2	8.43	5.54	VERTICAL	PASSED
3346.653	-53.41	0.00456	-54.02	-56.1	10.32	7.63	VERTICAL	PASSED

EGPRS mode, channel 190 / 836.6 MHz

Frequency [MHz]	P[dBm]	P [µW]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBd]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
1663.246	-64.93	0.00032	-53.13	-68.3	7.8	4.43	VERTICAL	PASSED
2509.84	-44.61	0.03459	-44.39	-47.5	8.43	5.54	VERTICAL	PASSED
3350.441	-66.51	0.00022	-62.38	-69.2	10.32	7.63	VERTICAL	PASSED

4.4. GSM1900 TX Test results

GSM mode, channel 661 / 1880.0 MHz

Frequency [MHz]	P[dBm]	P [µW]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBi]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
3780.681	-64.28	0.00037	-62.59	-69.2	12.32	7.4	VERTICAL	PASSED
5639.96	-50.44	0.00904	-56.37	-54.5	13.16	9.1	HORIZONTAL	PASSED
7588.818	-66.15	0.00024	-64.51	-66.9	11.15	10.4	VERTICAL	PASSED

EGPRS mode, channel 661 / 1880.0 MHz

Frequency [MHz]	P[dBm]	P [µW]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBi]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
3760.06	-60.81	0.00083	-59.12	-65.73	12.32	7.4	VERTICAL	PASSED
5639.9	-53.62	0.00435	-59.55	-57.68	13.16	9.1	HORIZONTAL	PASSED
7550.401	-65.77	0.00026	-64.13	-66.52	11.15	10.4	VERTICAL	PASSED

4.5. WCDMA 850 (Band V) TX Test results

Channel 4175 / 835.0 MHz

Frequency [MHz]	P[dBm]	P [µW]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBd]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
1658.427	-65.44	0.00029	-53.24	-68.80	7.79	4.43	VERTICAL	PASSED
2508.557	-48.01	0.01581	-48.92	-52.90	10.43	5.54	HORIZONTAL	PASSED
3334.99	-59.55	0.00111	-58.24	-63	10.35	6.9	VERTICAL	PASSED

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5. Test Equipment

5.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
OM06312	Signal Generator	E4422B	Agilent	22/24
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 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
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
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27
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

5.2. 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, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 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 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	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

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Eq. No	Equipment	Type	Manufacturer	Used in
TM39180	Laser distance meter	Disto Pro	Leica	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, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
-	High pass filter	F-90-1500-6-R	RLC Electronics	22/24/27, 15C, 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	22/24/27, 15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27, 15C

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