

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CFMTX_RM-701_24.docx	Date of Report:	19-Jul-2011
Number of pages:	13	Customer's Contact person:	Juvani Jyrki
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-701 / Battery BL-4J / AC charger AC-15E		
FCC ID:	LJPRM-701	IC:	661E-RM701
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), Public Notice DA 00-705, DTS procedures KDB 558074, IC standards, 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 15C Compliance Test Report

Date of receipt	13-Apr-2011
Testing completed	20-May-2011
The customer's contact person	Juvani Jyrki
Test Plan referred to	T:\Projects\RM-701\TestPlan\RS_testplan_RM-701.xls
Notes	-
Document name	T:\Projects\RM-701\EMC\FCC15CFMTX_RM-701_24.docx

1.1. EUT and Accessory Information

The EUT is a 9-band (GSM850/900/1800/1900) and WCDMA Band (I/II(1900)/IV(1700)/V(850)/VIII/) mobile phone with GPRS, EGPRS, HSDPA, HSUPA and WLAN and Bluetooth. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-701	004402134174352	0701	-		42532
Battery	BL-4J	3820660177170701251;0670616	-	-	-	42537
AC charger	AC-15E	4090490475121203073;0675463	-	-	-	42533

1.2. Summary of Test Results

FM TX:

Section in CFR 47	Section in RSS-210	Name of the test	Result
15.239(a)	A2(0.8)	Field strength of the fundamental signal	PASSED
15.239(c)	A2(0.8)	Spurious radiated emissions	PASSED
15.207	6.6	AC powerline conducted emissions	-
15.239(a)	A2(0.8)	26dB(bandwidth)	PASSED

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.

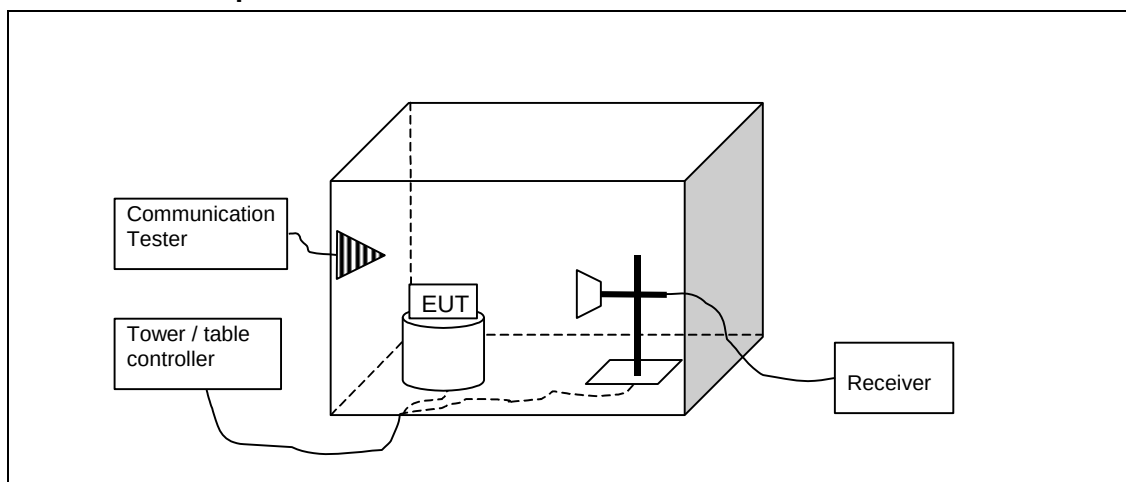
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2. Field strength of the fundamental signal (FCC §15.239(a), RSS-210 A2.8)

EUT with DUT number	RM-701, DUT 42532
Accessories with DUT numbers	BL-4J, DUT 42537 ; AC-15E, DUT 42533
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	25 / 50 / 99
Date of measurements	20-May-2011
Measured by	Hannu Söderholm

2.1.1 Test Setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4 and IC standard RSS-210.

Limits for field strength of the fundamental signal measurements (3 m measurement distance)

Limit [$\mu\text{V/m}$]	Limit [$\text{dB}\mu\text{V/m}$]	Detector
250	48	Average
2500	68	Peak

2.3. FMTX Test results

Middle channel / 98.0 MHz

Peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
98.155	45.5	188.343	81.05	-35.55	HORIZONTAL	PASSED

Average (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
98.095	44.81	174.02	80.37	-35.56	HORIZONTAL	PASSED

Low channel / 88.1 MHz

Low channel / 88.1 MHz

Peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
88.2	46.89	221.055	83.23	-36.34	HORIZONTAL	PASSED

Average(RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
88.08	45.69	192.42	82.04	-36.35	HORIZONTAL	PASSED

High channel / 107.9 MHz

Peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
107.887	48.75	273.842	82.47	-33.72	VERTICAL	PASSED

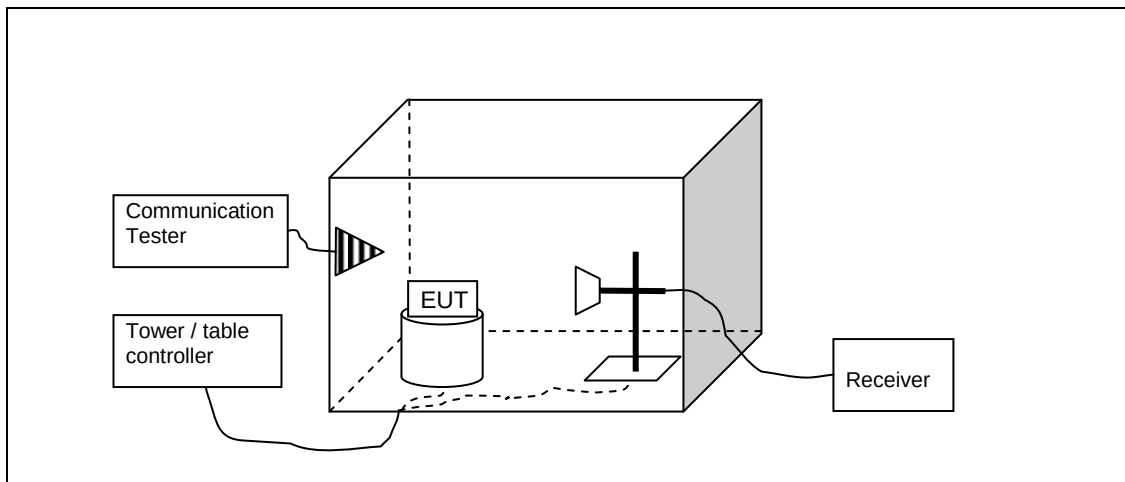
Average(RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
107.887	47.52	237.547	81.24	-33.72	VERTICAL	PASSED

3. Spurious radiated emissions (FCC §15.239(c), RSS-210 A2.8)

EUT with DUT number	RM-701, DUT 42532
Accessories with DUT numbers	BL-4J, DUT 42537 ; AC-15E, DUT 42533
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	25 / 50 / 99
Date of measurements	20-May-2011
Measured by	Hannu Söderholm

3.1.1 Test Setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4 and IC standard RSS-210 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 measurement results are obtained as described below:

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

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

Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz]	Limit [$\mu V/m$]	Limit [dB $\mu V/m$]	Detector
30 - 88	100	40	Quasi peak
88 - 216	150	43.5	Quasi peak
216 - 960	200	46	Quasi peak
960 - 1000	500	54	Quasi peak
1000 - 1100	500	54	Average
1000 - 1100	5000	74	Peak

Spurious radiated emissions shall not exceed the field strength of the fundamental signal at any frequencies.

3.3. FMTX Test results

Low channel / 88.1 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
176.2	13.34	4.643	41.66	-28.32	VERTICAL	PASSED
264.3	11.59	3.796	39.15	-27.56	HORIZONTAL	PASSED
352.4	13.31	4.631	38.16	-24.85	HORIZONTAL	PASSED

Middle channel / 98.0 MHz

Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
35.27	14.86	5.536	38.36	-23.5	VERTICAL	PASSED
35.56	16.1	6.383	39.72	-23.62	VERTICAL	PASSED
35.692	16.11	6.388	39.78	-23.67	VERTICAL	PASSED
35.852	15.65	6.058	39.39	-23.74	VERTICAL	PASSED
35.86	26.57	21.308	50.31	-23.74	VERTICAL	PASSED
36.101	16.71	6.844	40.55	-23.84	VERTICAL	PASSED
36.141	25.77	19.422	49.63	-23.86	VERTICAL	PASSED
36.211	26.64	21.481	50.52	-23.88	VERTICAL	PASSED
37.022	23.25	14.529	47.47	-24.22	VERTICAL	PASSED
37.122	25.48	18.797	49.74	-24.26	VERTICAL	PASSED

High channel / 107.9 MHz

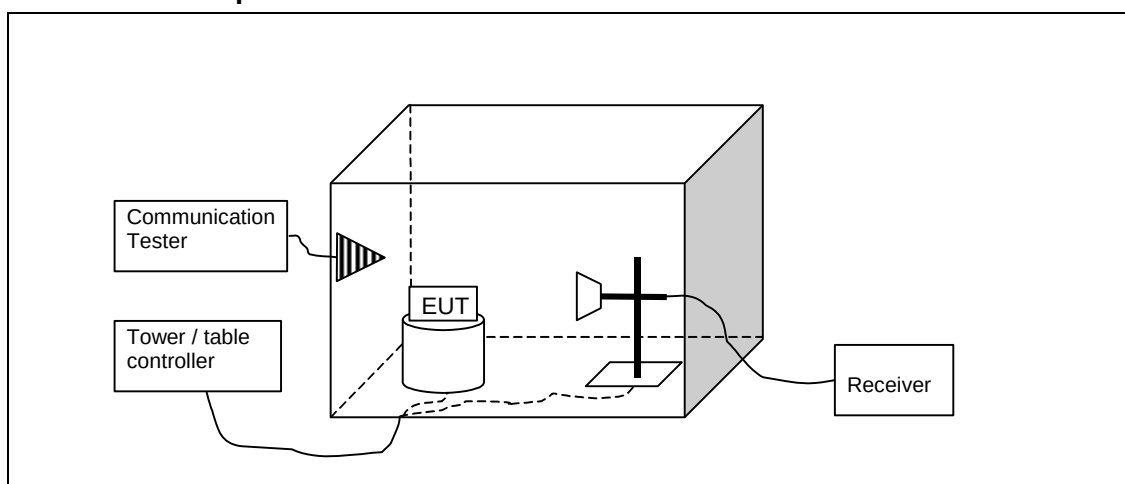
Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
215.8	17.47	7.475	47.26	-29.79	VERTICAL	PASSED
323.7	16.1	6.38	41.49	-25.39	HORIZONTAL	PASSED
431.6	15.15	5.718	38.1	-22.95	HORIZONTAL	PASSED

4. 26dB bandwidth (FCC §15.239(a), RSS-210 A2.8)

EUT with DUT number	RM-701, DUT 42532
Accessories with DUT numbers	BL-4J, DUT 42537 ; AC-15E, DUT 42533
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	25 / 50 / 99
Date of measurements	20-May-2011
Measured by	Hannu Söderholm

4.1.1 Test Setup



4.2. Test method and limit

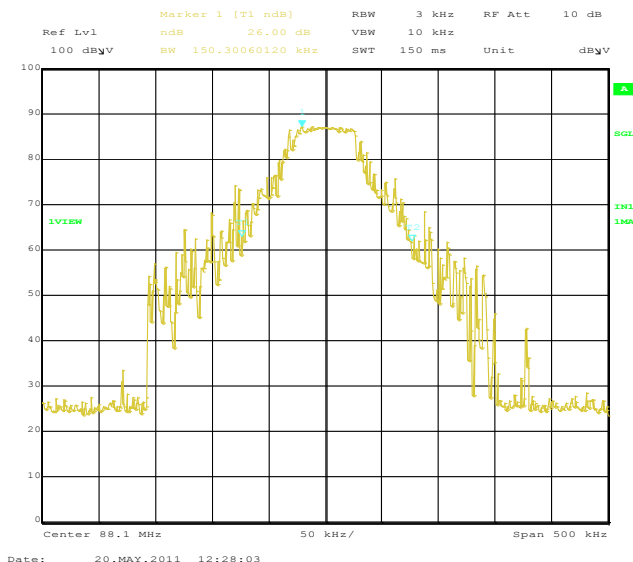
The measurement is made according to ANSI C63.4 and IC standard RSS-210.

Limits for 26 dB bandwidth measurements

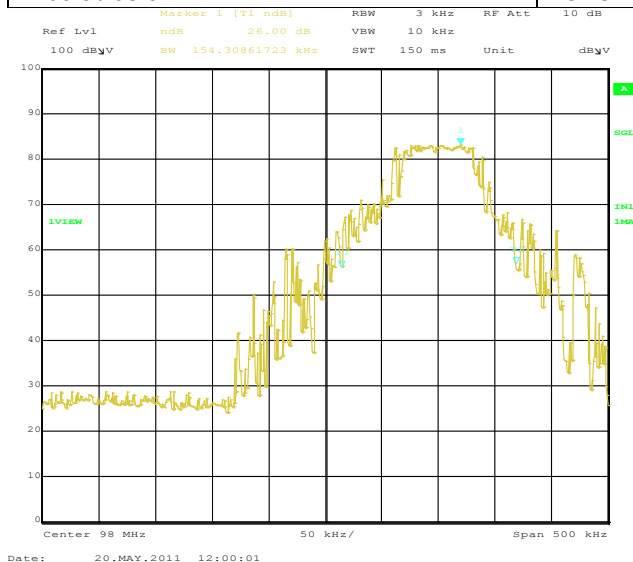
Limit [kHz]
<200

4.3. FMTX Test results

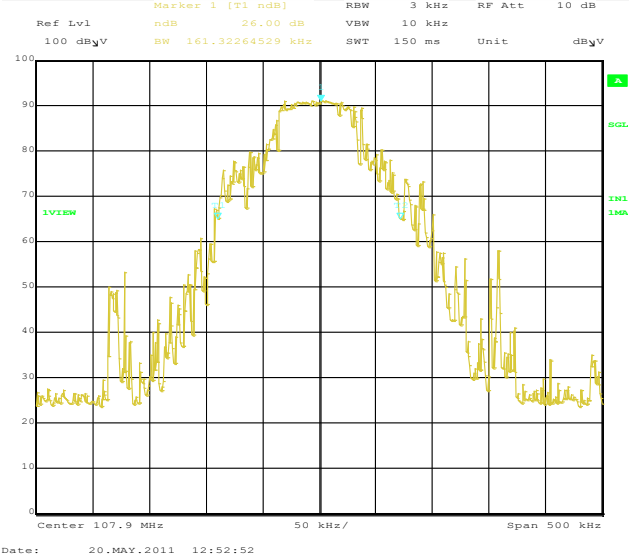
Channel / f_c [MHz]	26 dB bandwidth [kHz]	Result
Low / 88.1	150.3	PASSED



Channel / f_c [MHz]	26 dB bandwidth [kHz]	Result
Middle / 98.0	154.3	PASSED



Channel / f _c [MHz]	26 dB bandwidth [kHz]	Result
High / 107.9	161.3	PASSED



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
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E

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 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
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	WHKX 1.6/15G-12SS	Wainwright	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