

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CFMTX_RM-749_22.docx	Date of Report:	12-Apr-2011
Number of pages:	15	Customer's Contact person:	Lenaghan Alison
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FCC listing no.:	99059		
IC recognition no.:	661AL-1		
Tested devices/ accessories:	Phone RM-749 / Battery BL-5K		
FCC ID:	QFXRM-749	IC:	661Z-RM749
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:			

Ruben Hansen, System Manager, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	23-Mar-2011
Testing completed	12-Apr-2011
The customer's contact person	Lenaghan Alison
Test Plan referred to	T:\Projects\RM-749\TestPlan\RS_testplan_RM-749.xls
Notes	-
Document name	T:\Projects\RM-749\EMC\FCC15CFMTX_RM-749_22.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 and FM transmitter. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-749	004402/13/500070/5	2000	-	021-005	23747
Battery	BL-5K	4181570035A10100192;0670580	-	-	-	23738

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	PASSED
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.

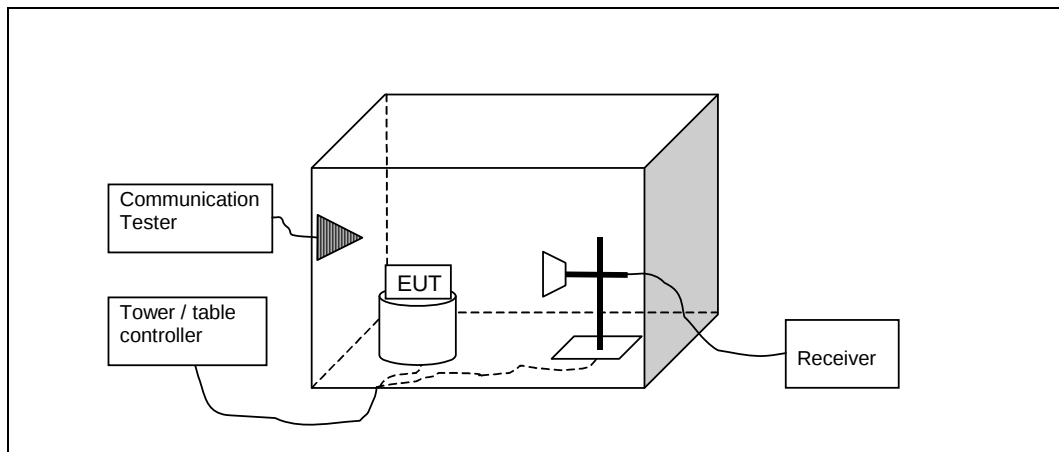
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2. Field strength of the fundamental signal (FCC §15.239(a), RSS-210 A2.8)

EUT with DUT number	RM-749, DUT 23747
Accessories with DUT numbers	BL-5K, DUT 23738
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 36 / 1016
Date of measurements	11-Apr-2011
Measured by	Ruben Hansen

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

Low channel / 88.1 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
88.129	40.64	107.609	65.24	-24.6	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
88.069	36.85	69.542	61.46	-24.61	HORIZONTAL	PASSED

Middle channel / 98.0 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
98.029	47.25	230.277	71.26	-24.01	HORIZONTAL	

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
97.969	43.97	157.943	67.98	-24.01	HORIZONTAL	

High channel / 107.9 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
107.94	44.7	171.87	68.36	-23.66	HORIZONTAL	PASSED

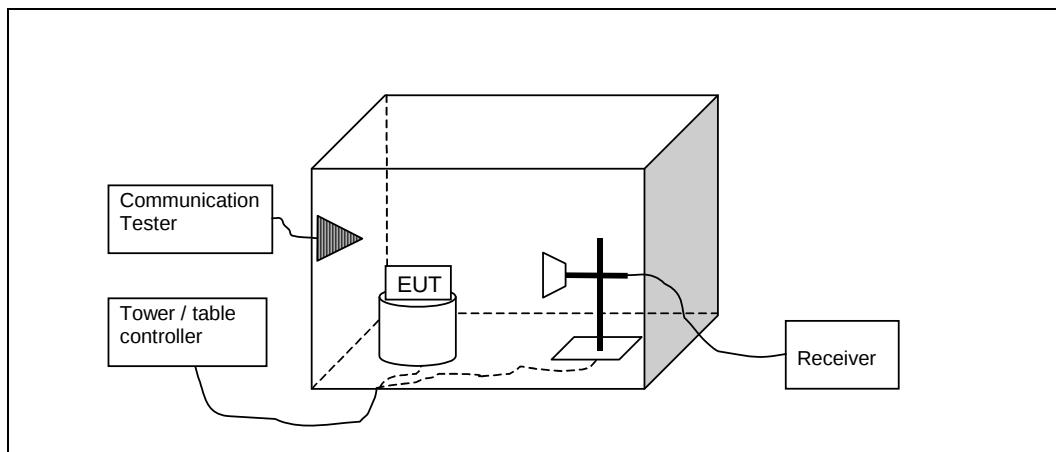
Average (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
107.88	42	125.922	65.66	-23.66	HORIZONTAL	PASSED

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

EUT with DUT number	RM-749, DUT 23747
Accessories with DUT numbers	BL-5K, DUT 23738
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 36 / 1016
Date of measurements	11-Apr-2011
Measured by	Ruben Hansen

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

Middle channel / 98.0 MHz

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

Frequency [MHz]	E [dB $\mu V/m$]	E [$\mu V/m$]	U_{RX} [dB μV]	A_{TOT} [dB]	Polarisation	Result
30	17.3	7.325	24.44	-7.14	VERTICAL	PASSED
30	17.21	7.252	24.35	-7.14	VERTICAL	PASSED
30.24	23.89	15.642	31.17	-7.28	VERTICAL	PASSED
30.54	18.2	8.125	25.65	-7.45	VERTICAL	PASSED
30.75	22.57	13.446	30.14	-7.57	VERTICAL	PASSED
31.62	22.02	12.621	30.1	-8.08	VERTICAL	PASSED
31.904	18.2	8.127	26.44	-8.24	VERTICAL	PASSED
31.955	23.09	14.271	31.36	-8.27	VERTICAL	PASSED
32.004	23.48	14.928	31.78	-8.3	VERTICAL	PASSED
32.104	23.08	14.256	31.44	-8.36	VERTICAL	PASSED

Low channel / 88.1 MHz

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

Frequency [MHz]	E [dB $\mu V/m$]	E [$\mu V/m$]	U_{RX} [dB μV]	A_{TOT} [dB]	Polarisation	Result
176.2	14.19	5.121	33.78	-19.59	VERTICAL	PASSED
264.3	14.16	5.104	30.24	-16.08	HORIZONTAL	PASSED
352.4	13.99	5.007	27.35	-13.36	HORIZONTAL	PASSED

High channel / 107.9 MHz

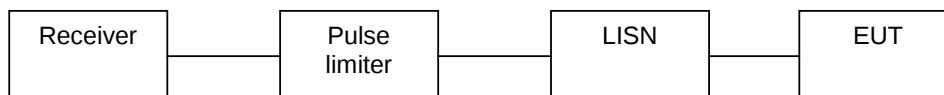
Quasi peak (RBW: 120 kHz, VBW: 300 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
215.8	10.77	3.454	28.58	-17.81	HORIZONTAL	PASSED
323.7	13.2	4.569	27.17	-13.97	HORIZONTAL	PASSED
431.6	15.95	6.271	27.23	-11.28	HORIZONTAL	PASSED

4. AC powerline conducted emissions (FCC §15.207, RSS-210 6.6)

EUT with DUT number	RM-749, DUT 23750
Accessories with DUT numbers	BL-5K, DUT 23736 ; AC-10E, DUT 24012
Operation Voltage [V] / [Hz]	115V / 60Hz
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 33 / 1016
Date of measurements	12-Apr-2011
Measured by	Ruben Hansen

4.1. Test Setup



4.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-GEN 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:

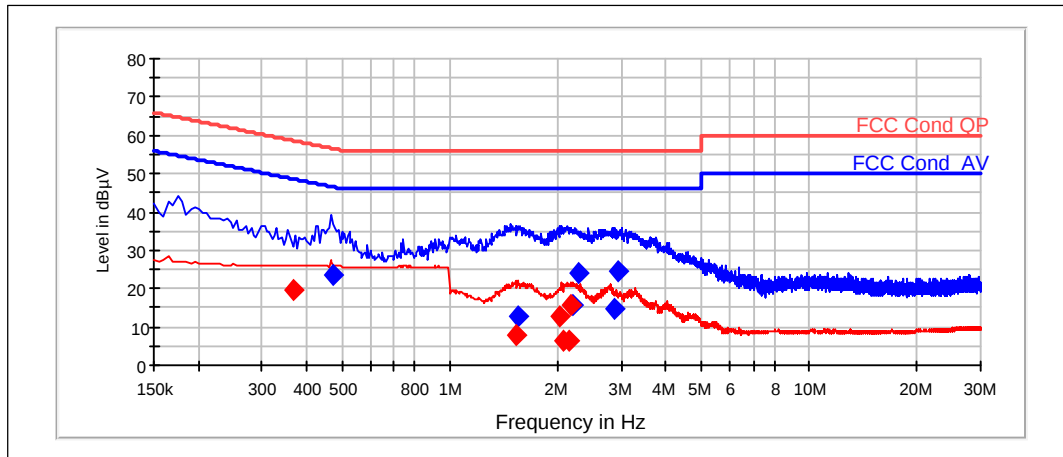
$$U [dB\mu V/m] = U_{RX} + A_{TOT}$$

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

4.3. FM TX Test results



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.475	23.4	L1	PASSED
1.555	12.78	L1	PASSED
2.19	15.48	L1	PASSED
2.275	23.9	L1	PASSED
2.87	14.79	L1	PASSED
2.94	24.63	L1	PASSED

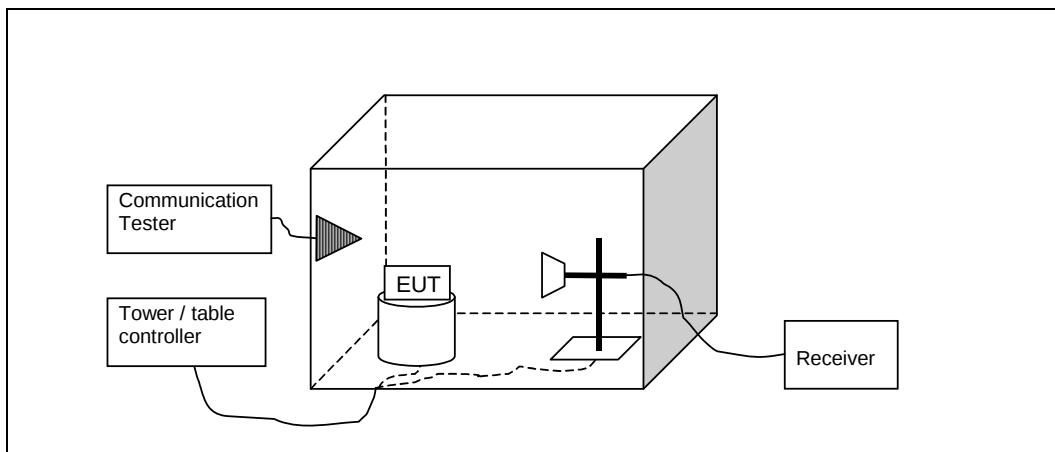
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.365	19.69	L1	PASSED
1.525	7.92	L1	PASSED
2.01	12.62	N	PASSED
2.07	6.55	L1	PASSED
2.145	6.47	L1	PASSED
2.175	15.56	L1	PASSED

5. 26dB bandwidth (FCC §15.239(a), RSS-210 A2.8)

EUT with DUT number	RM-749, DUT 23747
Accessories with DUT numbers	BL-5K, DUT 23738
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 36 / 1016
Date of measurements	11-Apr-2011
Measured by	Ruben Hansen

5.1.1 Test Setup



5.2. Test method and limit

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

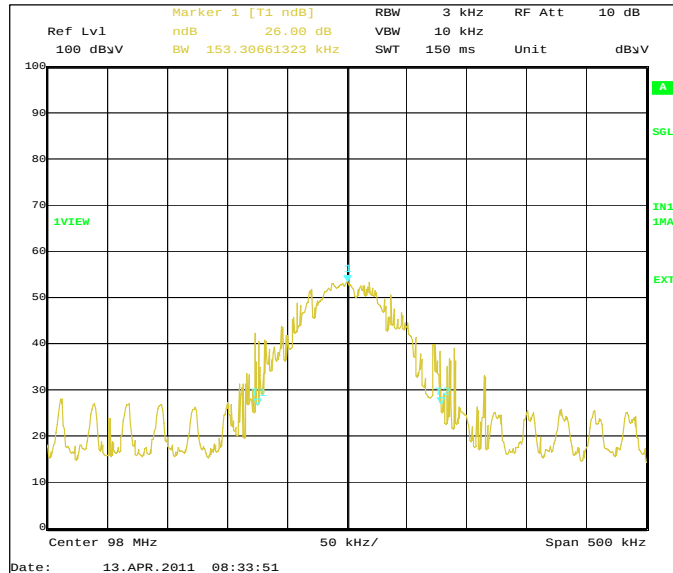
Limits for 26 dB bandwidth measurements

Limit [kHz]
<200

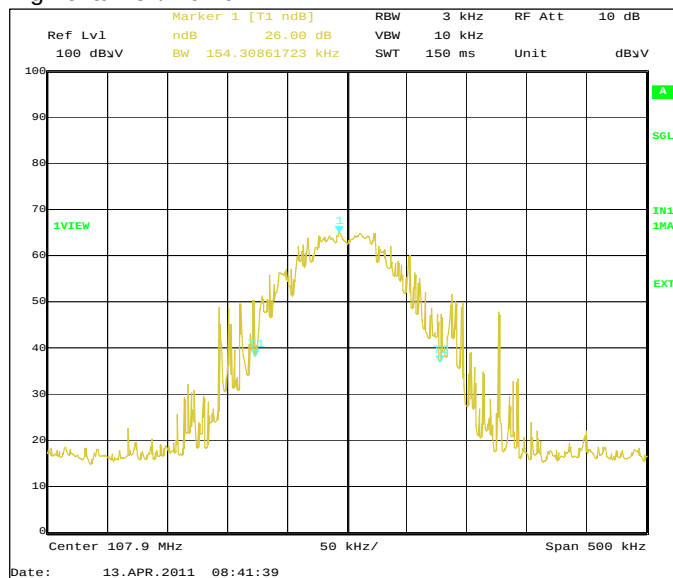
5.3. FMTX Test results

Channel / f _c [MHz]	26 dB bandwidth [kHz]	Result
Middle / 98.0	153.306	PASSED
Low / 88.1	179.358	PASSED
High / 107.9	154.308	PASSED

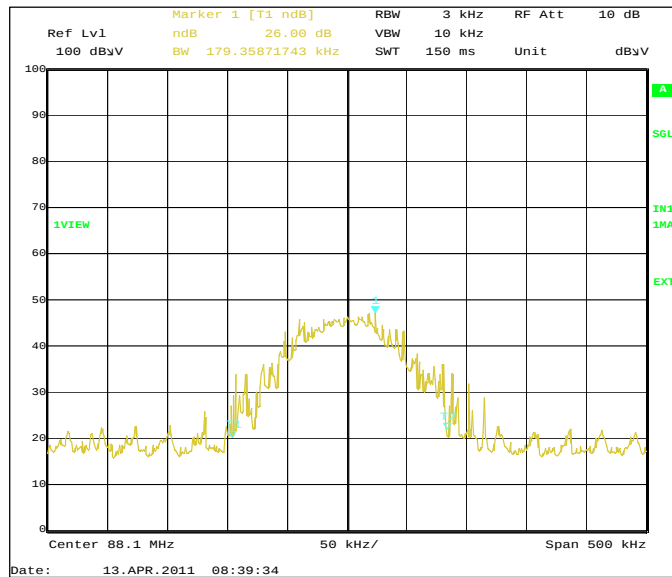
Middle channel / 98.0 MHz



High channel / 107.9 MHz



Low channel / 88.1 MHz



6. Test Equipment

6.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15C, 15B
13357	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
13513	Pulse Limiter	ESH3Z2	Rohde&Schwarz	15C, 15B
13666	Receiver	ESPC	Rohde&Schwarz	15C, 15B
13935	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
20682	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
16601	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
19116	Power splitter	-	various	22/24/27, 15C, 15B
19171	Communication Tester	CMU200	Rohde&Schwarz	15C, 15B
19625	Climatic Chamber	VT4002EMC	Vötsch	22/24/27, 15C, 15B
19678	Spectrum Analyzer	FSP	Rohde&Schwarz	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20739	Communication Tester	CMU200	Rohde&Schwarz	15C, 15B

6.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13077	Power Supply	EA-3016	-	22/24/27, 15C, 15B
13799	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
13936	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24/27, 15C, 15B
13937	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24/27, 15C, 15B
14021	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B
14114	Highpass Filter	WHK1000-12SS	Wainwright Instruments	22/24/27, 15C, 15B
14187	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
14188	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright	22/24/27, 15C, 15B
14900	Antenna Controller	HD100	HD GmbH	22/24/27, 15C, 15B
15191	Turntable Contoller Unit	G-800SDX	YAESU	22/24/27, 15C, 15B
15742	Programmable Relay Switching System	-----	Pickering	22/24/27, 15C, 15B
16633	Band reject filter	WRCD1880.0-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
16948	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16949	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
17644	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
18416	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
18773	Anechoic chamber	RFD-100	ETS-Lindgren	22/24/27, 15C, 15B
18774	Anechoic chamber	RFSD-F/A-100	ETS-Lindgren	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
18792	Mast/turntable controller	2090	ETS-EMCO	22/24/27, 15C, 15B
18860	Antenna	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
19151	High Pass Filter	WHJS3000-10SS	Wainwright	22/24/27, 15C, 15B
19587	Band reject filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24/27, 15C, 15B
19966	Antenna	HFH2-Z2	Rohde&Schwarz	15C, 15B
20078	Relay 2x6 Chnl μ Wave Mux	10-785B-522	Pickering	22/24/27, 15C, 15B
20114	Band reject filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	22/24/27, 15C, 15B
20115	Band reject filter	-	Wainwright	22/24/27, 15C, 15B
20116	Band reject filter	WRCG832/83/-825/845-40/5SS	Wainwright	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20698	Antenna	BBHA 9120 D	SCHWARZBECK	22/24/27, 15C, 15B
-	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B