

FCC Part 15B Compliance Test Report

Test Report no.:	Tre_FCC_0814_11.doc	Date of Report:	04-Apr-2008
Number of pages:	13	Customer's Contact person:	Jyrki Juvani
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 P.O. Box 50 Elektroniikkatie 10 FIN-90571 OULU, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 47222
FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM-Phone RM-387 / Battery BP-5M / AC-Charger AC-5E / Headset HS-47		
FCC ID:	LJPRM-387	IC:	661E-RM387
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2003), ICES-003, CISPR 22 and IC standards RSS-132 (Issue 2, September 2005), RSS-133 (Issue 3, June 2005) and RSS-210 (Issue 7, June 2007). 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

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	18-Feb-2008
Testing completed	28-Feb-2008
The customer's contact person	Jyrki Juvani
Test Plan referred to	T:\Projects\RM-328\TestPlan_RS\RS_Testplan_RM-328.xls
Notes	-
Document name	T:\Projects\RM-328\EMC\Results\FCC\Tre_FCC_0808_07.doc

1.1. EUT and Accessory Information

The EUT is a 4-band (GSM850/900/1800/1900) mobile phone with GPRS, EGPRS and Bluetooth. GSM bands are tested in idle mode. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
GSM-Phone	RM-328	004401014776476	1101	-	v2.01.01	41406
AC-Charger	AC-5E	-	-	-	-	41334
Battery	BP-5M	-	-	-	-	41416
Headset	HS-47	-	-	-	-	41415

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in ICES-003 (RSS-132)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (6.6)	Radiated emissions	PASSED

GSM 1900:

Section in CFR 47	Section in ICES-003 (RSS-133)	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	PASSED
15.109, a	5.5 (9)	Radiated emissions	PASSED

Bluetooth:

Section in CFR 47	Section in ICES-003	Name of the test	Result
15.107, a	5.3	AC powerline conducted emissions	NP
15.109, a	5.5	Radiated emissions	PASSED

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 Tampere Laboratory.

The test results of LJPRM-328 are re-used for certification of the LJPRM-387. The table above indicates the results, which will be re-used.

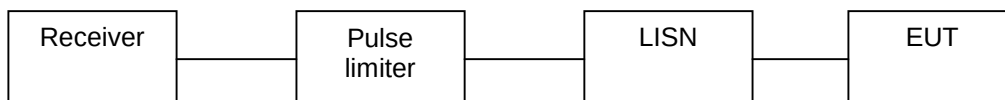
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-328 DUT 41406
Accessories with DUT numbers	BP-5M DUT 41416, AC-5E DUT 41334, HS-47 DUT, 41415
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	FM radio on, GSP receiver active
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 50 / 98.8
Date of measurements	25-Feb-2008
Measured by	Jari Jantunen

2.1. Test setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 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:

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

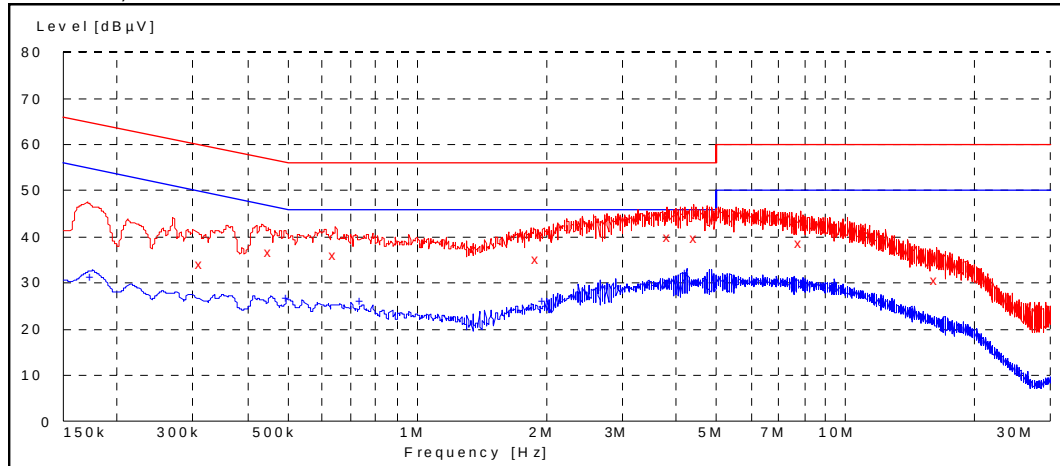
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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

2.3. GSM 850 + FM radio on test results

RX mode, channel 190 / 881.6 MHz



Quasi peak (RBW: 9 kHz)

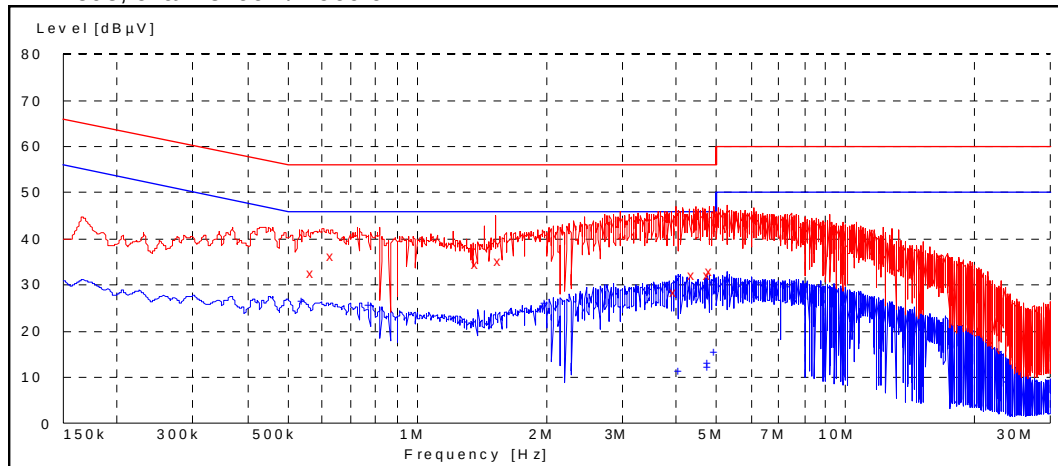
Frequency [MHz]	U [dBμV]	Line	Result
0.315000	34.00	L1	PASSED
0.455000	36.70	L1	PASSED
0.645000	36.00	L1	PASSED
1.920000	35.30	L1	PASSED
3.865000	39.90	L1	PASSED
4.460000	39.70	L1	PASSED
7.885000	38.50	L1	PASSED
16.350000	30.70	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.175000	31.10	L1	PASSED
0.500000	26.60	L1	PASSED
0.740000	26.00	L1	PASSED
1.980000	26.10	L1	PASSED
3.935000	30.40	L1	PASSED
4.240000	32.00	L1	PASSED
8.010000	30.20	L1	PASSED

2.4. GSM 1900 + GPS receiver active test results

RX mode, channel 661 / 1960.0 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.570000	32.50	N	PASSED
0.635000	36.20	L1	PASSED
1.385000	34.70	L1	PASSED
1.560000	35.10	L1	PASSED
4.020000	28.30	L1	PASSED
4.440000	32.20	L1	PASSED
4.800000	32.10	L1	PASSED
4.890000	32.90	L1	PASSED

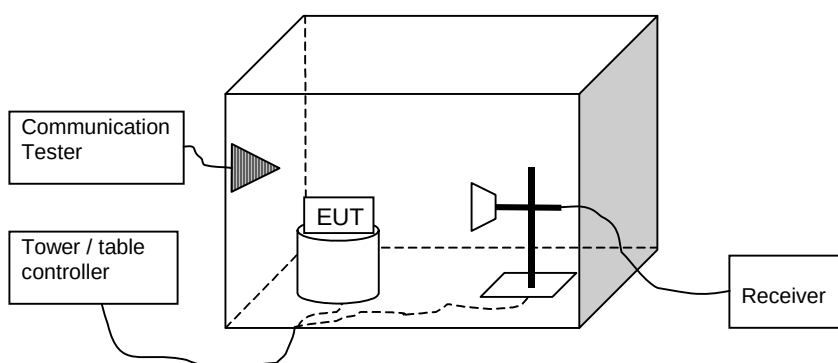
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.545000	26.30	L1	PASSED
0.780000	25.50	L1	PASSED
1.995000	26.20	L1	PASSED
4.095000	11.40	N	PASSED
4.795000	13.30	L1	PASSED
4.830000	12.40	L1	PASSED
4.970000	15.30	L1	PASSED

3. Radiated emissions (FCC §15.109, ICES-003 section 5.5, RSS-132 6.6, RSS-133 9)

EUT with DUT number	RM-328 DUT 41406
Accessories with DUT numbers	BP-5M DUT 41416, AC-5E DUT 41334, HS-47 DUT, 41415
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	FM radio on, GSP receiver active
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 46 / 99.6
Date of measurements	28-Feb-2008
Measured by	Jari Jantunen

3.1. Test setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4-2003as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

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:

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

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

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

Frequency range [MHz]	Quasi peak limit [dBμV/m]	Average limit [dBμV/m]	Peak limit [dBμV/m]
30 – 230	40	-	-
230 – 1000	47	-	-
Above 1000	-	54	74

3.3. GSM 850 + FM radio on test results

RX mode, channel 128 / 869.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	41.00	112.20	46.30	-5.3	HORIZONTAL	PASSED
6953.600000	44.30	164.06	42.70	1.6	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	26.70	21.63	32.00	-5.3	VERTICAL	PASSED
6953.600000	31.00	35.48	29.40	1.6	VERTICAL	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
34.188176	36.70	68.39	64.20	-27.5	VERTICAL	PASSED
60.881563	17.30	7.33	56.50	-39.2	VERTICAL	PASSED
98.156112	21.30	11.61	56.90	-35.6	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3526.552104	40.60	107.15	45.70	-5.1	HORIZONTAL	PASSED
7052.800000	46.10	201.84	44.30	1.80	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2976.457916	32.20	40.74	36.50	-4.3	VERTICAL	PASSED
3526.052104	26.50	21.13	31.60	-5.1	HORIZONTAL	PASSED
7052.800000	30.00	31.62	28.20	1.80	VERTICAL	PASSED

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	40.90	110.92	45.80	-4.9	HORIZONTAL	PASSED
7150.400000	45.40	186.21	43.00	2.4	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	26.90	22.13	31.80	-4.9	HORIZONTAL	PASSED
7150.400000	30.20	32.36	27.80	2.4	VERTICAL	PASSED

3.4. GSM 1900 + GPS receiver active test results

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	39.90	98.86	42.60	-2.7	HORIZONTAL	PASSED
7720.000000	43.10	142.89	39.40	3.7	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	27.20	22.91	29.90	-2.7	HORIZONTAL	PASSED
7720.000000	30.30	32.73	26.60	3.7	HORIZONTAL	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
36.473948	36.70	68.39	65.20	-28.5	VERTICAL	PASSED
61.983968	20.00	10.00	59.20	-39.2	VERTICAL	PASSED
92.544088	23.80	15.49	59.80	-36.0	VERTICAL	PASSED
97.215631	22.10	12.74	57.80	-35.7	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3920.000000	39.80	97.72	42.30	-2.50	VERTICAL	PASSED
7840.000000	43.30	146.22	39.70	3.60	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2993.489980	32.10	40.27	36.30	-4.2	VERTICAL	PASSED
3920.000000	27.10	22.65	29.60	-2.50	HORIZONTAL	PASSED
7840.000000	30.20	32.36	26.60	3.60	VERTICAL	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
3980.000000	40.30	103.51	42.90	-2.6	VERTICAL	PASSED
7960.000000	43.80	154.88	39.60	4.2	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
3980.000000	27.60	23.99	30.20	-2.6	HORIZONTAL	PASSED
7960.000000	31.00	35.48	26.80	4.2	HORIZONTAL	PASSED

3.5. Bluetooth + GPS receiver active test results

TX mode, channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4804.000000	38.20	81.28	40.00	-1.8	VERTICAL	PASSED
7206.000000	42.10	127.35	39.50	2.6	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4804.000000	25.90	19.72	27.70	-1.8	HORIZONTAL	PASSED
7206.000000	29.20	28.84	26.60	2.6	HORIZONTAL	PASSED

TX mode, channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
37.533467	24.10	16.03	38.60	-14.5	VERTICAL	PASSED
38.095391	25.80	19.50	40.70	-14.9	VERTICAL	PASSED
74.548497	17.00	7.08	42.40	-25.4	HORIZONTAL	PASSED
74.969940	17.10	7.16	42.50	-25.4	VERTICAL	PASSED

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4884.000000	39.10	90.16	40.90	-1.80	HORIZONTAL	PASSED
7326.000000	43.90	156.68	40.90	3.00	VERTICAL	PASSED
7415.839679	43.20	144.54	39.50	3.7	VERTICAL	PASSED
17892.789579	53.40	467.74	33.80	19.6	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4884.000000	26.40	20.89	28.20	-1.80	HORIZONTAL	PASSED
7281.559118	30.30	32.73	27.30	3.0	HORIZONTAL	PASSED
7326.000000	30.10	31.99	27.10	3.00	HORIZONTAL	PASSED
7311.125251	30.10	31.99	27.10	3.0	HORIZONTAL	PASSED
7421.339679	30.50	33.50	26.80	3.7	VERTICAL	PASSED
17896.789579	40.50	105.93	20.90	19.6	VERTICAL	PASSED

TX mode, channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	39.90	98.86	41.20	-1.3	HORIZONTAL	PASSED
7440.000000	43.80	154.88	40.20	3.6	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	26.90	22.13	28.20	-1.3	HORIZONTAL	PASSED
7440.000000	30.30	32.73	26.70	3.6	VERTICAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30597	Power splitter	11667A	Agilent	22/24/27, 15C
TM37499	Power splitter	11667A	Agilent	22/24/27, 15C
TM38111	Multimeter	34401A	Agilent	22/24/27, 15C
TM38112	DC power supply	6632A	Agilent	22/24/27, 15C
TM22901	Attenuator	8496A	Agilent	22/24/27, 15C
TM30636	Artificial mains net	L2-16	PMM	15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum analyzer	FSU	R&S	22/24/27, 15C
TM22835	Multimeter	87	Fluke	15C, 15B
TM37500	Microwave switch system	7116-MSW	Keithley	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transmatic	22/24/27, 15C, 15B
	Temperature chamber	VT4002	Vötsch	22/24/27, 15C
2058	EMI Test receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24/27, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24/27, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24/27, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24/27, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24/27, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24/27, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24/27
TM37502	Dipole antenna	3125-1880	EMCO	22/24/27
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24/27
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24/27
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Mast/Turntable controller	HD-100	Deisel	22/24/27, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24/27, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24/27, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transmatic	22/24/27, 15C, 15B
TM23892	Yaesu controller	G-1000SDX	Yaesu	22/24/27, 15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B