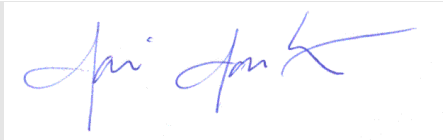
TCC Nokia

FINAS Finnish Accreditation Service T117 (EN ISO/IEC 17025)

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	Tre_FCC_0717_01.doc	**Date of Report:**	7.5.2007
Number of pages:	14	**Customer's Contact person:**	Marcus Göke
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 Rensingstrasse 15 44807 BOCHUM GERMANY Tel. +49 234 984 0
FCC listing no.: **IC recognition no.:**	94436 3608		
Tested devices/ accessories:	**GSM phone RM-179 / Battery BP-6MT, AC charger AC-6, Audio adapter AD-54 , Headset HS-45, Dummy battery SD-25**		
FCC ID:	OW3RM-179	**IC:**	661AA-RM-179
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Parts 22, 24 and 27, TIA-603-B-2002 and IC standards RSS-GEN, RSS-132 and RSS-133. 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: 2007.05.07 12:31:24 +03'00'		

Jari Jantunen, System Manager

1. Summary for FCC Part 22/24/27 Compliance Test Report

Date of receipt	19.4.2007
Testing completed	2.5.2007
The customer's contact person	Marcus Göke
Test Plan referred to	T:\Projects\
Notes	-
Document name	T:\Projects\RM-179\EMC\Results\FCC\Tre_FCC_0717_01.doc

1.1. EUT and Accessory Information

The EUT is a 5-band (GSM850/900/1800/1900 and WCDMA Band I) mobile phone with GPRS, EGPRS, Bluetooth and WLAN. The EUT is tested with maximum rated TX power, modulated with pseudo random bit sequence (PRBS9).

Product	Type	SN	HW	MV	SW	DUT
GSM phone	RM-179	004401011016165	0304	-	V01.0712.1.0.11	**41057**
GSM phone	RM-179	004401011015522	0304	-	V01.0712.1.0.11	**41058**
Battery	BP-6MT	-	-	-	-	**41059**
Battery	BP-6MT	-	-	-	-	**41060**
AC-Charger	AC-5	-	-	-	-	**41061**
Audio adapter	AD-54	45	0.5	1.5	0.1	**41043**
Headset	HS-45	-	-	-	-	**41044**
Dummy Battery	SD-25	v.2102	-	-	-	**41067**

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1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in *RSS-GEN* or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	*4.6*, 4.4	Conducted RF output power	NP
§22.913(a)	*4.6*, 4.4	Radiated RF output power	NP
§2.1049(h)	*4.4.1*	99 % occupied bandwidth	PASSED
§22.917(a)	*4.7*, 4.5	Band edge compliance	NP
§22.917(a), §2.1051	*4.7*, 4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	*4.7*, 4.5	Spurious radiated emissions	PASSED
§2.1055(a)	*4.5*, 4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	*4.5*, 4.3	Frequency stability, voltage variation	PASSED

GSM 1900:

Section in CFR 47	Section in RSS-133	Name of the test	Result
§2.1046(a)	6.2	Conducted RF output power	NP
§24.232(b)	6.2	Radiated RF output power	NP
§2.1049(h)	5.6	99 % occupied bandwidth	PASSED
§24.238(a)	6.3	Band edge compliance	NP
§24.238(a), §2.1051	6.3	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.3	Spurious radiated emissions	PASSED
§2.1055(a)	7	Frequency stability, temperature variation	PASSED
§2.1055(d)	7	Frequency stability, voltage variation	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.

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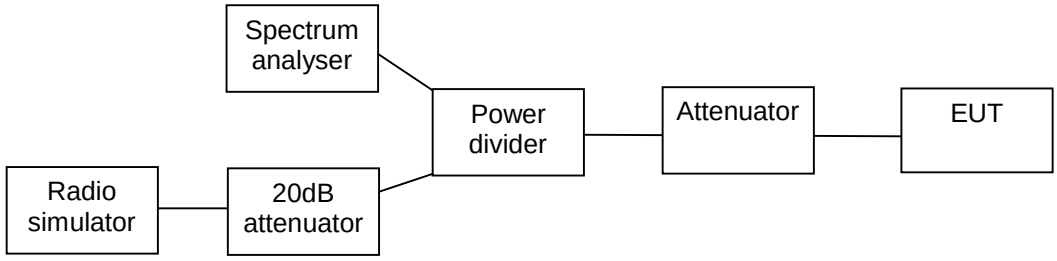
2. 99 % occupied bandwidth

(FCC §2.1049(h), RSS-GEN 4.4.1, RSS-133 5.6)

EUT with DUT number	RM-179 DUT 41058
Accessories with DUT numbers	BP-6MT DUT 41060, HS-45 DUT 41044, AD-54 DUT 41043
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21/45/101.6
Date of measurements	23.4.2007
Measured by	Petteri Suni

2.1. Test setup



2.2. Test method and limit

The measurement is made according to FCC rules part 22, 24 and 27 and IC standards RSS-GEN and RSS-133.

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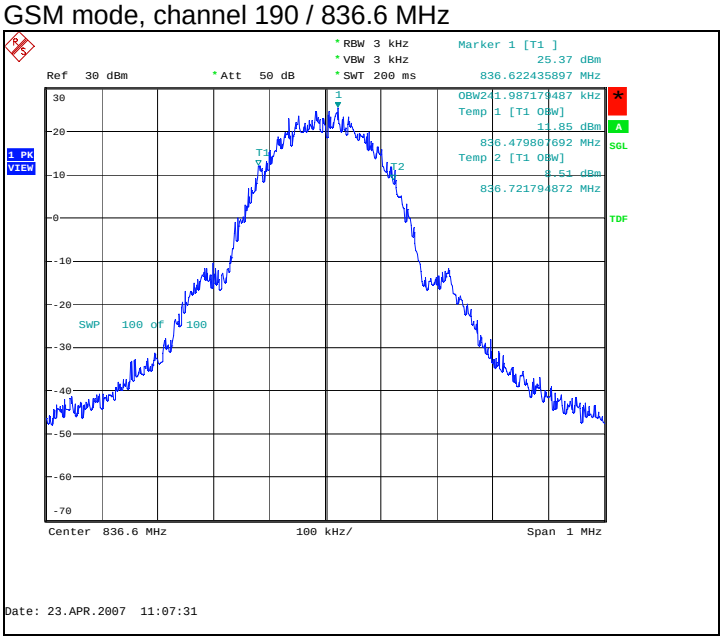
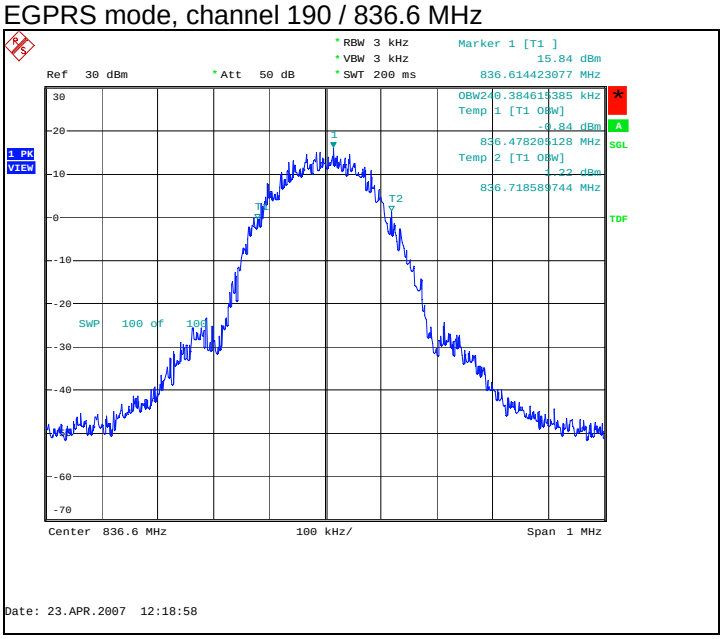
2.3. GSM 850 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
GSM	241.987
EGPRS	240.385

GSM mode, channel 190 / 836.6 MHz



EGPRS mode, channel 190 / 836.6 MHz



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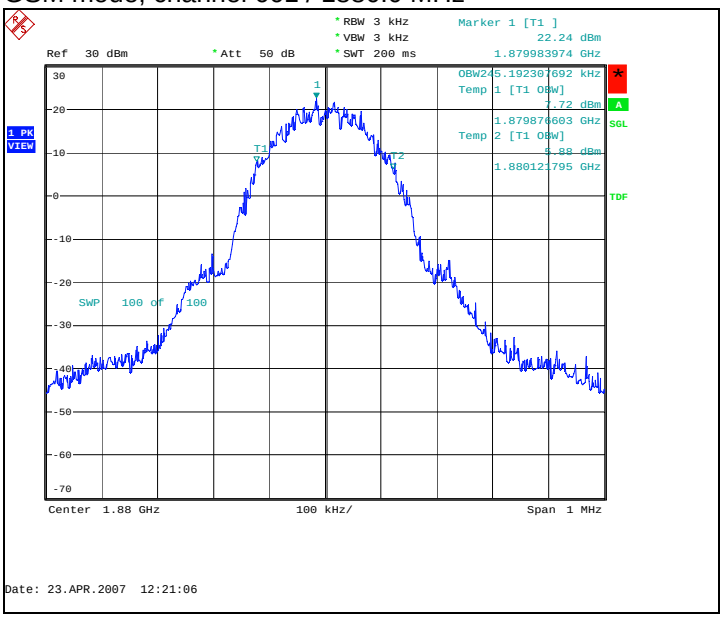
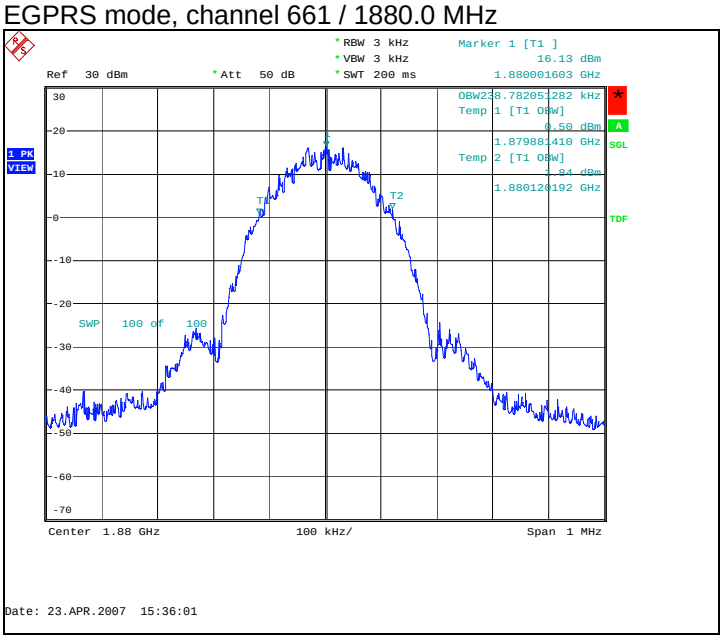
2.4. GSM 1900 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
GSM	245.192
EGPRS	238.782

GSM mode, channel 661 / 1880.0 MHz



EGPRS mode, channel 661 / 1880.0 MHz



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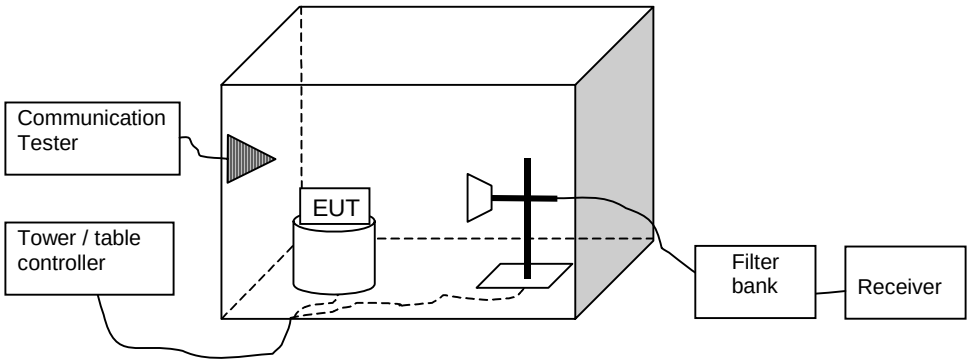
3. Spurious radiated emissions

(FCC §22.917(a), §24.238(a), §27.53(g), §2.1053, RSS-GEN 4.7, RSS-132 4.5, RSS-133 6.3)

EUT with DUT number	RM-179 DUT 41057
Accessories with DUT numbers	BP-6MT DUT 41059, AC-5 DUT 41061, AD-54 DUT 41043, HS-45 DUT 41044
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide open/close
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 46 / 100.7
Date of measurements	2.5.2007
Measured by	Jari Jantunen

3.1. Test setup



3.2. Test method and limit

The measurement is made according to TIA-603-B-2002 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.

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The emissions less than 20 dB below the permissible value are reported.
The substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.

The substitution corrections are obtained as described below:

$$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$$

Where A_{SUBST} is the final substitution correction including receive antenna gain. P_{SUBST_TX} is signal generator level, P_{SUBST_RX} is receiver level, L_{SUBST_CABLES} is cable losses including both TX and RX cables and $G_{SUBST\_TX\_ANT}$ is substitution antenna gain.

The measurement results are obtained as described below:

$$P\ [dBm] = P_{MEAS} + A_{TOT}$$

Where P_{MEAS} is receiver reading in dBm and A_{TOT} is total correction factor including cable loss, preamplifier gain and substitution correction ($A_{TOT} = L_{CABLES} - G_{PREAMP} + A_{SUBST}$).

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

3.3. GSM 850 Test results

GSM mode, Slide open, channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
1673.143287	-26.20	2.39883	- 20.40	- 5.80	HORIZONTAL	PASSED
2509.820641	-21.80	6.60693	- 23.50	1.70	VERTICAL	PASSED
3346.189379	-29.80	1.04713	- 33.60	3.80	VERTICAL	PASSED
4182.864729	-29.90	1.02329	- 36.10	6.20	HORIZONTAL	PASSED
5855.715431	-36.90	0.20417	- 45.70	8.80	VERTICAL	PASSED

EGPRS mode, channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
1673.143287	-47.80	0.01660	- 42.00	- 5.80	HORIZONTAL	PASSED
2509.820641	-54.60	0.00347	- 56.30	1.70	VERTICAL	PASSED
3340.689379	-60.00	0.00100	- 63.70	3.70	VERTICAL	PASSED

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3.4. GSM 1900 Test results

GSM mode, Slide closed, channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3760.023046	-34.20	0.38019	- 42.50	8.30	HORIZONTAL	PASSED
5640.282565	-38.30	0.14791	- 49.30	11.00	HORIZONTAL	PASSED
5652.798597	-51.80	0.00661	- 62.70	10.90	VERTICAL	PASSED
7520.042084	-41.00	0.07943	- 56.00	15.00	HORIZONTAL	PASSED

EGPRS mode, channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3760.023046	-37.20	0.19055	- 45.50	8.30	HORIZONTAL	PASSED
5640.282565	-46.40	0.02291	- 57.40	11.00	HORIZONTAL	PASSED
5652.798597	-51.90	0.00646	- 62.80	10.90	VERTICAL	PASSED
7520.042084	-46.00	0.02512	- 61.00	15.00	HORIZONTAL	PASSED

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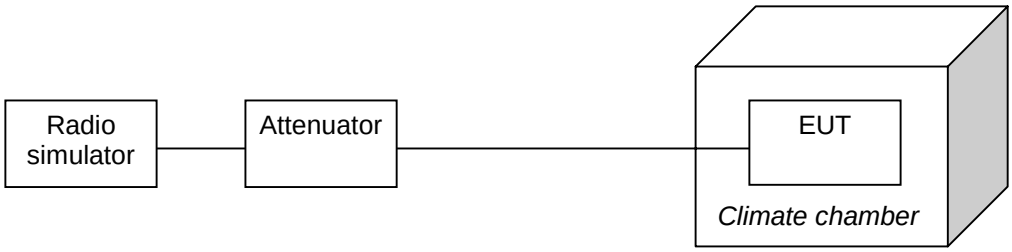
4. Frequency stability, temperature variation

(FCC §2.1055(a), §2.1055(a), RSS-GEN 4.5, RSS-132 4.3, RSS-133 7)

EUT with DUT number	RM-179 DUT 41058
Accessories with DUT numbers	BP-6MT DUT 41060, HS-45 DUT 41044, AD-54 DUT 41043
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21/45/101.6
Date of measurements	23.4.2007
Measured by	Petteri Suni

4.1. Test setup



4.2. Test method and limit

The measurement is made according to FCC rules part 22, 24 and 27 and IC standards RSS-GEN, RSS-132 and RSS-133 as follows:

a) The climate chamber temperature is set to the maximum value and the temperature is allowed to stabilize.
b) The EUT is placed in the chamber.
c) The EUT is set in idle mode for 15 minutes.
d) The EUT is set to transmit.
e) The transmit frequency error was measured immediately.
f) The steps c - e were repeated for each temperature.

Limits for frequency stability, temperature variation measurements

Frequency deviation [ppm]
± 2.5

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4.3. GSM 850 Test results

GSM mode, channel 190 / 836.6 MHz

Temperature [°C]	Deviation [Hz]	Deviation [ppm]
50	22	0.0263
40	-19	- 0.0227
30	19	0.0227
20	12	0.0143
10	-18	- 0.0215
0	-16	- 0.0191
-10	-16	- 0.0191
-20	-16	- 0.0191
-30	-16	- 0.0191

4.4. GSM 1900 Test results

GSM mode, channel 661 / 1880.0 MHz

Temperature [°C]	Deviation [Hz]	Deviation [ppm]
50	-47	- 0.0250
40	-42	- 0.0223
30	-52	- 0.0277
20	-58	- 0.0309
10	-64	- 0.0340
0	-47	- 0.0250
-10	-45	- 0.0239
-20	-57	- 0.0303
-30	-54	- 0.0287

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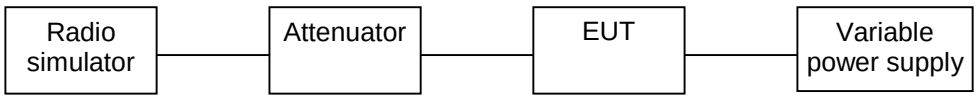
5. Frequency stability, voltage variation

(FCC §2.1055(d), RSS-GEN 4.5, RSS-132 4.3, RSS-133 7)

EUT with DUT number	RM-179 DUT 41058
Accessories with DUT numbers	SD-25 DUT 41067
Operation Voltage [V] / [Hz]	4.10 VDC and 3.45 VDC
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21/45/101.9
Date of measurements	24.4.2007
Measured by	Petteri Suni

5.1. Test setup



5.2. Test method and limit

The measurement is made according to FCC rules part 22, 24 and 27 and IC standards RSS-GEN, RSS-132 and RSS-133 as follows:

The EUT battery was replaced with an adjustable power supply. The frequency stability was measured at nominal voltage and at the battery cut-off point.

Limits for frequency stability, voltage variation measurements

Frequency deviation [ppm]
± 2.5

5.3. GSM 850 Test results

GSM mode, channel 190 / 836.6 MHz

Voltage level [V]	**Deviation [Hz]**	**Deviation [ppm]**
Battery cut-off point / 3.45	13	0.0155
Nominal / 4.10	15	0.0179

5.4. GSM 1900 Test results

GSM mode, channel 661 / 1880.0 MHz

Voltage level [V]	**Deviation [Hz]**	**Deviation [ppm]**
Battery cut-off point / 3.45	-53	- 0.0282
Nominal / 4.10	-50	- 0.0266

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6. Test Equipment

6.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	22/24, 15C
TM37678	Radio communication tester	CMU-200	R&S	22/24, 15C
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	22/24, 15C
TM37499	Power splitter	11667A	Agilent	22/24, 15C
	Temperature chamber	VT4002	Vötsch	22/24, 15C
TM38112	DC power supply	6632A	Agilent	22/24, 15C
TM38111	Multimeter	34401A	Agilent	22/24, 15C
	EMI Test receiver	ESPC	R&S	15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	15C, 15B
TM38631	Signal generator	83640L	Agilent	15C, 15B
TM38114	DC power supply	6632A	Agilent	15C, 15B
TM22835	Multimeter	87	Fluke	15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15C, 15B
TM30636	LISN 50 µH	L2-16/	PMM	15C, 15B

6.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24
TM37502	Dipole antenna	3125-1880	EMCO	22/24
TM37773	Radio communication tester	CMU-200	R&S	22/24, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24, 15C, 15B
	High pass filter	WHK2010-10SS	Trilithic	22/24, 15C, 15B
	Low pass filter	WLK1750-10SS	Trilithic	22/24, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Turntable controller	HD-100	Deisel	22/24, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24, 15C, 15B
TM22835	Multimeter	87	Fluke	22/24, 15C, 15B

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