

FCC Part 15B Compliance Test Report

Test Report no.:	Tre_FCC_0618_04.doc	Date of Report:	24.5.2006
Number of pages:	15	Customer's Contact person:	Harri Vähämiko
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FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM phone RM-170 / Battery BL-5C, AC charger AC-4, Data cable CA-53, Laptop IBM Thinkpad T22, AC adapter 02K6543, Printer HP deskjet 1600CC3540A, Digital camera FUJI DS-7, Serial cable for camera, Parallel cable for printer		
FCC ID:	PDNRM-170	IC:	661R-RM170
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, RSS-133 and RSS-210. 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	18.4.2006
Testing completed	4.5.2006
The customer's contact person	Harri Vähämiko
Test Plan referred to	\\EMC\\TESTPLAN\\
Notes	-
Document name	T:\\Projects\\RM-170\\EMC\\Results\\FCC\\Tre_FCC_0618_04.doc

1.1. EUT and Accessory Information

The EUT is a quadri 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-170	004400811713625	5002	-	V06.12(2)	40621
Battery	BL-5C	-	18	-	-	40625
AC-Charger	AC-4	-	1.1	-	-	40627
Data cable	CA-53	-	-	4.0	-	40629
Laptop	IBM Thinkpad T22	555V2PT	-	-	-	40201
AC Adapter	02K6543	-	-	-	-	40202
Printer	HP deskjet 1600CC3540A	USB8302546	-	-	-	40077
Digital camera	FUJI DS-7	7102516	-	-	-	40076
Serial cable for camera	-	-	-	-	-	40088
Parallel cable for printer	-	-	-	-	-	40087

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	PASSED
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.

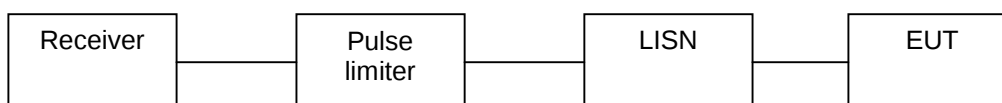
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2. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-170 DUT 40621
Accessories with DUT numbers	BL-5C DUT 40626, AC-4 DUT 40627, CA-53 DUT 40629, IBM Thinkpad T22 DUT 40201, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, FUJI DS-7 DUT 40076, Serial cable for camera DUT 40088, Parallel cable for printer DUT 40087
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 48 / 103.7
Date of measurements	4.5.2006
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:

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

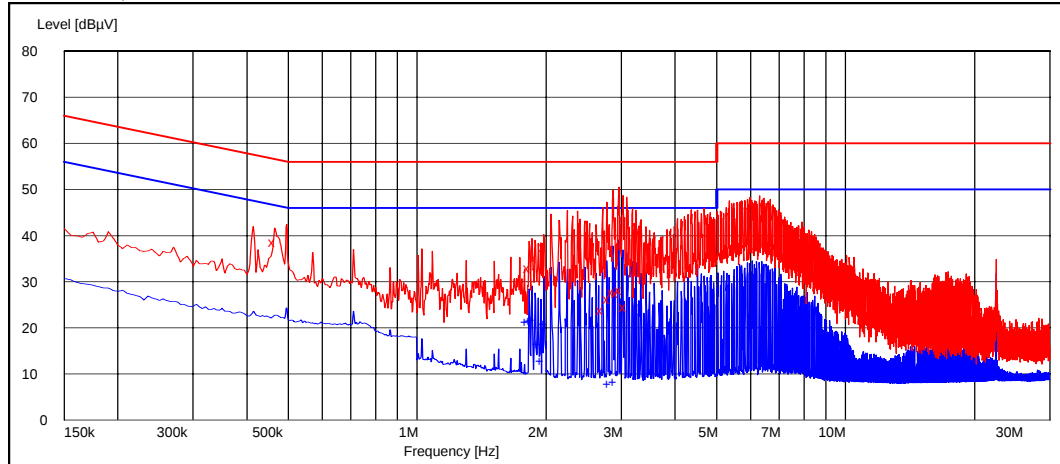
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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 Test results

RX mode, channel 190 / 881.6 MHz



Quasi peak (RBW: 9 kHz)

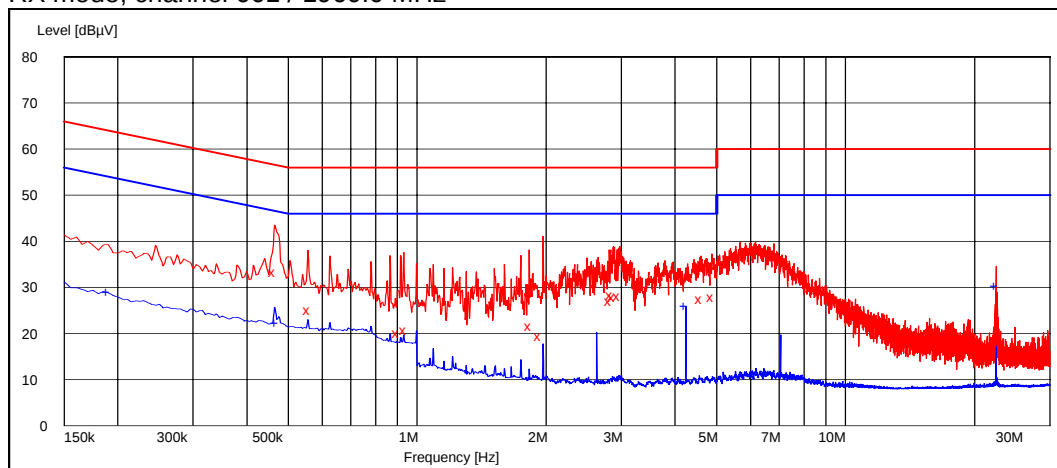
Frequency [MHz]	U [dBμV]	Line	Result
0.465000	38.60	N	PASSED
1.830000	33.00	N	PASSED
1.895000	35.20	N	PASSED
1.990000	37.40	N	PASSED
2.710000	23.90	N	PASSED
2.805000	26.30	N	PASSED
2.875000	27.80	N	PASSED
2.940000	27.60	N	PASSED
3.000000	28.20	N	PASSED
3.065000	24.50	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.805000	21.20	N	PASSED
1.840000	21.40	N	PASSED
1.865000	21.60	N	PASSED
1.925000	16.40	L1	PASSED
1.955000	12.90	L1	PASSED
1.990000	20.80	L1	PASSED
2.810000	7.80	N	PASSED
2.900000	8.30	N	PASSED

2.4. GSM 1900 Test results

RX mode, channel 661 / 1960.0 MHz



Quasi peak (RBW: 9 kHz)

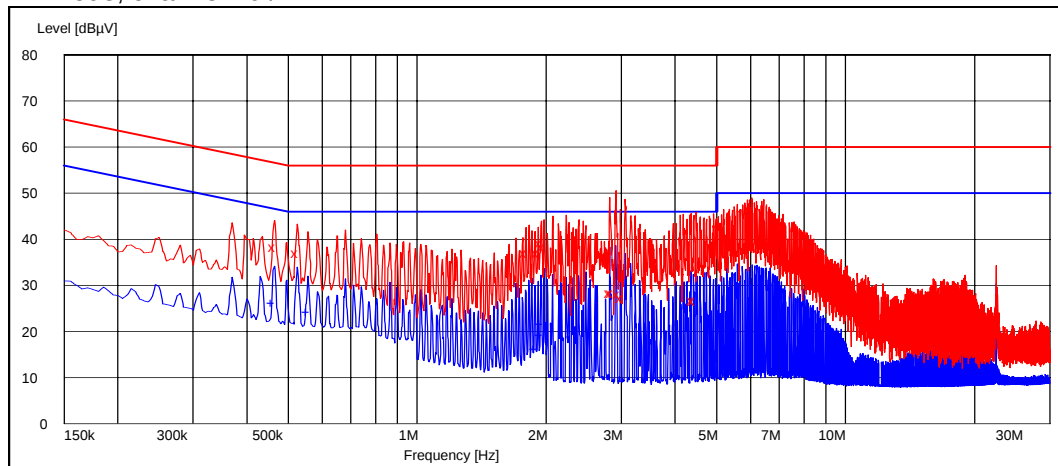
Frequency [MHz]	U [dBμV]	Line	Result
0.465000	33.30	N	PASSED
0.560000	25.10	L1	PASSED
0.905000	20.20	N	PASSED
0.940000	20.80	N	PASSED
1.840000	21.60	N	PASSED
1.940000	19.50	N	PASSED
2.830000	27.00	N	PASSED
2.850000	28.30	N	PASSED
2.885000	27.90	N	PASSED
2.960000	28.00	N	PASSED
4.605000	27.50	N	PASSED
4.905000	27.90	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.190000	29.00	L1	PASSED
0.470000	22.20	N	PASSED
4.240000	26.00	N	PASSED
22.500000	30.40	N	PASSED

2.5. Bluetooth Test results

TX mode, channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.465000	38.20	N	PASSED
0.525000	37.10	N	PASSED
1.795000	37.00	N	PASSED
1.920000	37.00	N	PASSED
1.950000	39.30	N	PASSED
1.980000	38.20	N	PASSED
2.830000	28.20	N	PASSED
2.860000	28.30	N	PASSED
2.965000	28.10	N	PASSED
3.010000	27.30	N	PASSED
4.410000	26.90	N	PASSED
4.440000	26.70	N	PASSED

Average (RBW: 9 kHz)

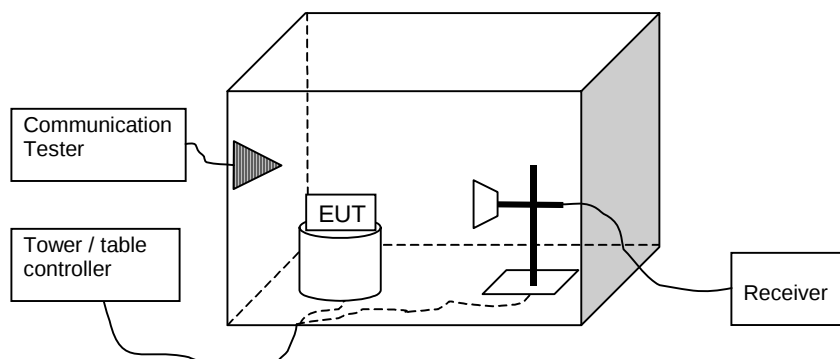
Frequency [MHz]	U [dBμV]	Line	Result
0.460000	26.10	N	PASSED
0.555000	24.30	L1	PASSED
1.890000	16.30	L1	PASSED
1.945000	19.20	L1	PASSED
1.950000	21.70	N	PASSED

3. Radiated emissions

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

EUT with DUT number	RM-170 DUT 40621
Accessories with DUT numbers	BL-5C DUT 40626, AC-4 DUT 40627, CA-53 DUT 40629, IBM Thinkpad T22 DUT 40201, 02K6543 DUT 40202, HP deskjet 1600CC3540A DUT 40077, FUJI DS-7 DUT 40076, Serial cable for camera DUT 40088, Parallel cable for printer DUT 40087
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Continuous data transfer was active between the phone and the computer during the test.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 47 / 103.7
Date of measurements	4.5.2006
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 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	39.00	89.13	43.90	-4.90	HORIZONTAL	PASSED
6953.600000	43.70	153.11	42.70	1.00	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3476.800000	26.50	21.13	31.40	-4.90	VERTICAL	PASSED
6953.600000	30.70	34.28	29.70	1.00	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
30.200000	24.20	16.22	50.00	-25.80	VERTICAL	PASSED
52.224248	29.80	30.90	66.50	-36.70	VERTICAL	PASSED
546.894188	18.50	8.41	46.00	-27.50	VERTICAL	PASSED
645.892585	17.30	7.33	43.00	-25.70	VERTICAL	PASSED
863.227455	25.80	19.50	48.90	-23.10	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3526.400000	39.40	93.33	44.20	-4.80	HORIZONTAL	PASSED
7052.800000	42.10	127.35	40.80	1.30	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
1094.190381	29.10	28.51	49.60	-20.50	VERTICAL	PASSED
1205.410822	34.30	51.88	54.20	-19.90	VERTICAL	PASSED
1260.019038	35.40	58.88	54.70	-19.30	VERTICAL	PASSED
1294.589178	32.80	43.65	51.40	-18.60	VERTICAL	PASSED
2933.365731	31.70	38.46	37.00	-5.30	VERTICAL	PASSED
3526.400000	26.60	21.38	31.40	-4.80	VERTICAL	PASSED
7052.800000	29.20	28.84	27.90	1.30	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	39.20	91.20	44.00	-4.80	HORIZONTAL	PASSED
7150.400000	42.70	136.46	40.70	2.00	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3575.200000	26.20	20.42	31.00	-4.80	VERTICAL	PASSED
7150.400000	29.80	30.90	27.80	2.00	VERTICAL	PASSED

3.4. GSM 1900 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	40.90	110.92	43.60	-2.70	HORIZONTAL	PASSED
7720.000000	43.40	147.91	40.20	3.20	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3860.000000	27.60	23.99	30.30	-2.70	HORIZONTAL	PASSED
7720.000000	30.30	32.73	27.10	3.20	VERTICAL	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
50.019439	16.80	6.92	52.20	-35.40	VERTICAL	PASSED
52.405210	23.10	14.29	59.90	-36.80	VERTICAL	PASSED
54.129058	26.20	20.42	63.80	-37.60	VERTICAL	PASSED
697.696794	28.70	27.23	53.40	-24.70	VERTICAL	PASSED
754.609018	21.10	11.35	45.00	-23.90	VERTICAL	PASSED
936.773747	21.80	12.30	43.80	-22.00	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
1293.589178	46.90	221.31	65.50	-18.60	VERTICAL	PASSED
3920.000000	41.90	124.45	44.20	-2.30	HORIZONTAL	PASSED
7840.000000	43.80	154.88	40.50	3.30	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
1204.910822	35.30	58.21	55.20	-19.90	VERTICAL	PASSED
1261.019038	28.00	25.12	47.30	-19.30	VERTICAL	PASSED
1297.589178	25.50	18.84	44.00	-18.50	VERTICAL	PASSED
1666.332665	30.80	34.67	46.50	-15.70	VERTICAL	PASSED
1959.919840	49.90	312.61	62.80	-12.90	VERTICAL	PASSED
2933.365731	31.60	38.02	36.90	-5.30	VERTICAL	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	41.10	113.50	43.10	-2.00	VERTICAL	PASSED
7960.000000	43.30	146.22	39.60	3.70	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
3980.000000	28.60	26.92	30.60	-2.00	VERTICAL	PASSED
7960.000000	30.70	34.28	27.00	3.70	HORIZONTAL	PASSED

3.5. Bluetooth Test results

TX mode, channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	39.70	96.61	41.00	-1.30	HORIZONTAL	PASSED
7206.000000	41.90	124.45	39.90	2.00	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	27.20	22.91	28.50	-1.30	HORIZONTAL	PASSED
7206.000000	29.20	28.84	27.20	2.00	VERTICAL	PASSED

TX mode, channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
74.567535	20.90	11.09	46.70	-25.80	VERTICAL	PASSED
270.040481	29.60	30.20	52.10	-22.50	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4884.000000	40.40	104.71	42.00	-1.60	VERTICAL	PASSED
7277.557114	43.30	146.22	40.60	2.70	VERTICAL	PASSED
7279.555110	43.50	149.62	40.80	2.70	HORIZONTAL	PASSED
7404.313627	43.50	149.62	40.20	3.30	HORIZONTAL	PASSED
7426.859719	43.30	146.22	40.10	3.20	HORIZONTAL	PASSED
17945.889780	55.30	582.10	33.90	21.40	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4884.000000	27.60	23.99	29.20	-1.60	VERTICAL	PASSED
7279.555110	30.50	33.50	27.80	2.70	HORIZONTAL	PASSED
7281.057114	30.50	33.50	27.80	2.70	VERTICAL	PASSED
7404.813627	30.60	33.88	27.30	3.30	HORIZONTAL	PASSED
7433.859719	30.60	33.88	27.40	3.20	HORIZONTAL	PASSED
17945.389780	42.50	133.35	21.10	21.40	HORIZONTAL	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	41.30	116.14	42.30	-1.00	HORIZONTAL	PASSED

7440.000000 42.90 139.64 39.70 3.20 HORIZONTAL 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
4960.000000	28.00	25.12	29.00	-1.00	VERTICAL	PASSED
7440.000000	30.40	33.11	27.20	3.20	HORIZONTAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	15C,22/24
TM37678	Radio communication tester	CMU-200	R&S	15C,22/24
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	15C,22/24
TM22901	Step attenuator 110dB	8496A	Agilent	15C,22/24
TM37499	Power splitter	11667A	Agilent	15C,22/24
	Temperature chamber	VT4002	Vötsch	15C,22/24
TM38112	DC power supply	6632A	Agilent	15C,22/24
TM38111	Multimeter	34401A	Agilent	15C,22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C
TM37773	Radio communication tester	CMU-200	R&S	15B,15C
TM38631	Signal generator	83640L	Agilent	15B,15C
TM38114	DC power supply	6632A	Agilent	15B,15C
TM22835	Multimeter	87	Fluke	15B,15C
TM30600	Pulse Limiter	ESH3-Z2	R&S	15B,15C
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15B,15C
TM30636	LISN 50 µH	L2-16/	PMM	15B,15C

4.2. Radiated measurements

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