

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CNFC_RM-877_18.docx	Date of Report:	08-Apr-2013
Number of pages:	17	Customer's Contact person:	Huhtala Tero
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 68 Sinitaival 5 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880
FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-877 / Battery BV-5XW / Charging data cable CA-190CD / Headset WH-208 / AC charger AC-60U		
FCC ID:	PDNB	IC:	661R-B
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2009), IC standards. 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:			

Hannu Söderholm, Specialist, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	12-Feb-2013
Testing completed	11-Mar-2013
The customer's contact person	Huhtala Tero
Test Plan referred to	T:\Projects\RM-877\TestPlan\RS_testplan_RM-877.xlsm
Notes	-
Document name	T:\Projects\RM-877\EMC\FCC15CNFC_RM-877_18.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:

GSM/WCDMA/WLAN/Bluetooth

The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-877	004402471264998	1000	-	3012.0000.1304.10019	42980
Phone	RM-877	00440247126557	1000	-	3012.0000.1304.10019	42979
Phone	RM-877	004402471265484	1000	-	3012.0000.1304.10019	42984
Battery	BV-5XW		LG 2.3			42971
AC charger	AC-60U	4090493047580200312;0675678	B1.0 HW0.2 MW0.2 PV02	-	-	42973
Charging data cable	CA-190CD	07304562465628	-	-	-	42976
Charging data cable	CA-190CD	0730456246628	-	-	-	42977
Headset	WH-208	1411621	-	-	-	42831

1.2. Summary of Test Results

NFC:

Section in CFR 47	Section in RSS-210	Name of the test	Result
15.209	2.6	Radiated emission below 30 MHz	PASSED
15.209	A2.6	Radiated emission above 30 MHz	PASSED
15.225(a-d)	A2.6	Field strength in the 13.56 MHz band	PASSED
	4.6.1	Occupied Bandwidth	PASSED
15.225(e)	A2.6	Frequency stability, temperature variation	PASSED
15.225(e)	A2.6	Frequency stability, voltage variation	PASSED
15.207	7.2.2	AC power line conducted emission	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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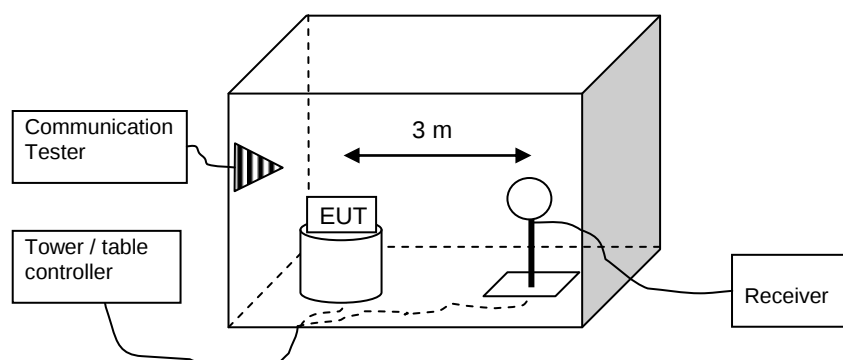
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2. Radiated Emissions 9 kHz – 30 MHz

EUT with DUT number	RM-877, DUT 42979
Accessories with DUT numbers	AC-60U, DUT 42973 ; CA-190CD, DUT 42977 ; WH-208, DUT 42831
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH]	25 / 49
Date of measurements	05-Mar-2013
Measured by	Hannu Söderholm

2.1.1 Test Setup



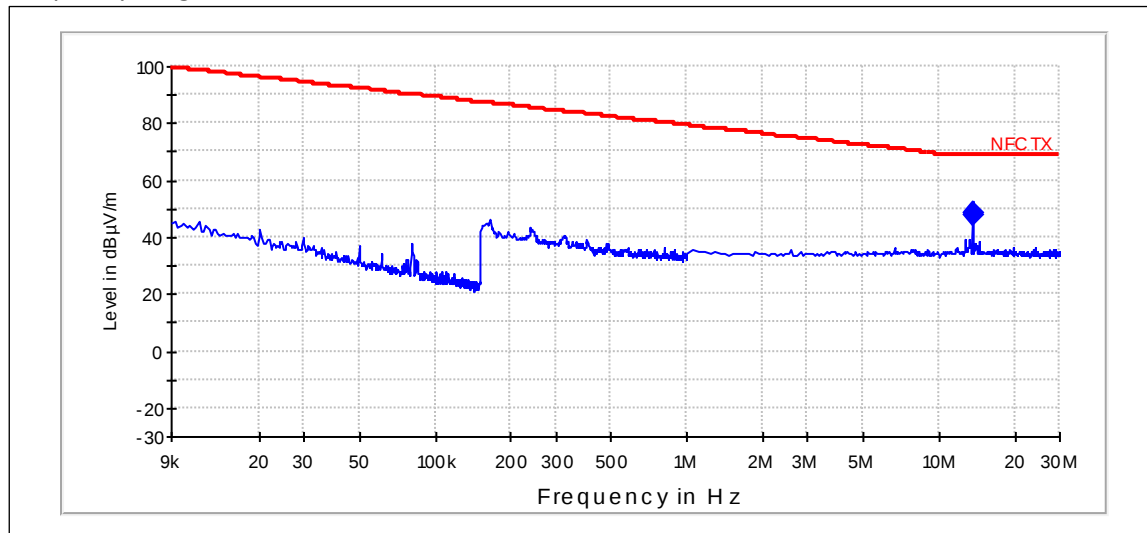
2.2. Test method and limit

The measurement is made according to FCC rules part 15.225 and IC standard RSS-210 Section 2.7
The measuring distance was 3 meter in shielded enclosure.

2.3. Test results

2.4. NFC test results

Frequency range 9 kHz...30 MHz



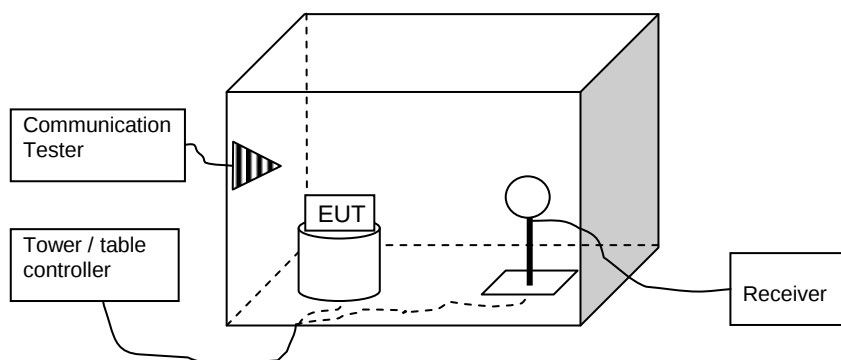
The highest values (QuasiPeak)

Frequency [MHz]	Level[dBm]	Margin[dB]	Azimuth[deg]	Elevation [deg]	Polarisation	Result
13.558	47.49	21.5	338	0	H	PASSED
13.56	48.36	20.6	338	0	H	PASSED

3. Radiated Emissions 30 - 1000MHz

EUT with DUT number	RM-877, DUT 42979
Accessories with DUT numbers	AC-60U, DUT 42973 ; CA-190CD, DUT 42977 ; WH-208, DUT 42831
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH]	25 / 49
Date of measurements	05-Mar-2013
Measured by	Hannu Söderholm

3.1.1 Test Setup



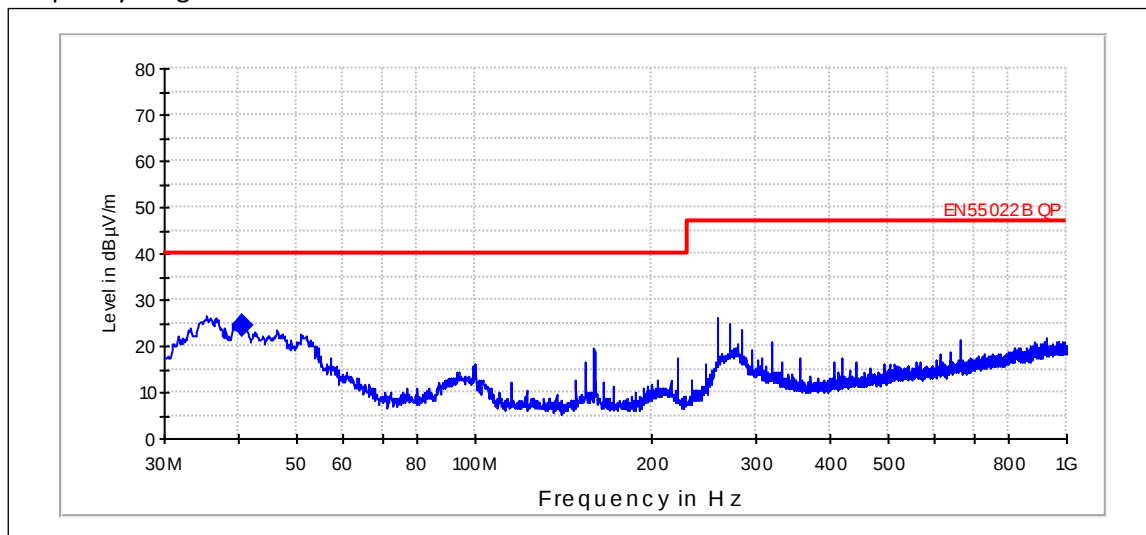
3.2. Test method and limit

The measurement is made according to FCC rules part 15.225 and IC standard RSS-210 Section 2.7

3.3. Test results

3.4. NFC test results

Frequency range 30...1000 MHz



QuasiPeak

Frequency [MHz]	QuasiPeak [dBμV/m]	Bandwidth [kHz]	Height [cm]	Polarization	Azimuth [deg]	Margin - QPK	Limit - QPK	Results
40.66	24.514	120	99	V	16	15.5	40	PASSED

4. Field strength in the 13.56 MHz band

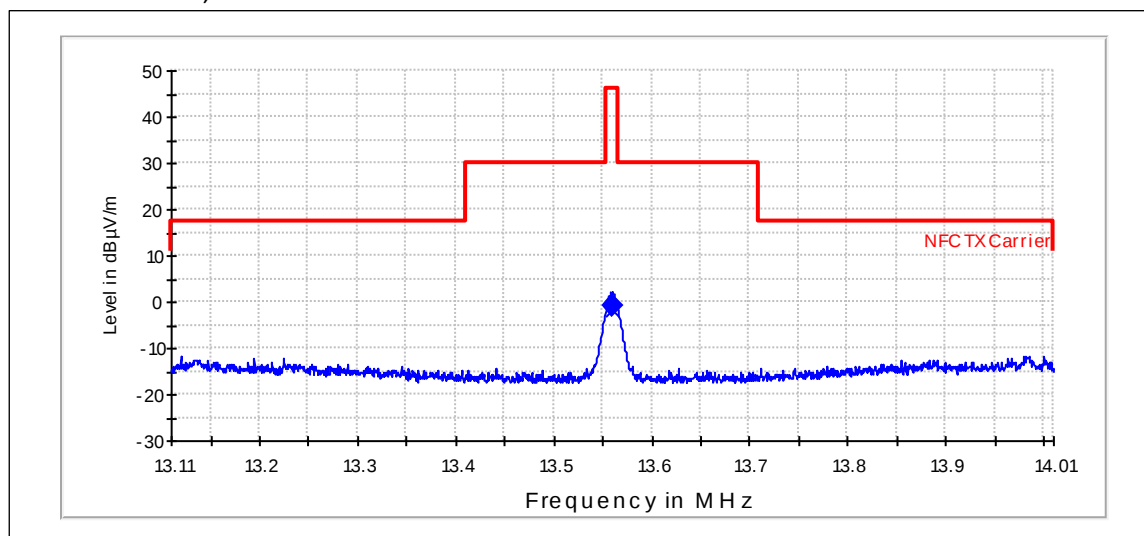
EUT with DUT number	RM-877, DUT 42979
Accessories with DUT numbers	AC-60U, DUT 42973 ; CA-190CD, DUT 42977 ; WH-208, DUT 42831
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH]	25 / 49
Date of measurements	05-Mar-2013, 25-Mar-2013
Measured by	Hannu Söderholm

4.1. Test method and limit

The measurement is made according to EN 302 291-01, Section 7.1.1
The measuring distance was 3 meter in shielded enclosure.

4.2. Test Results

Radiated H-Field, 3 meter distance



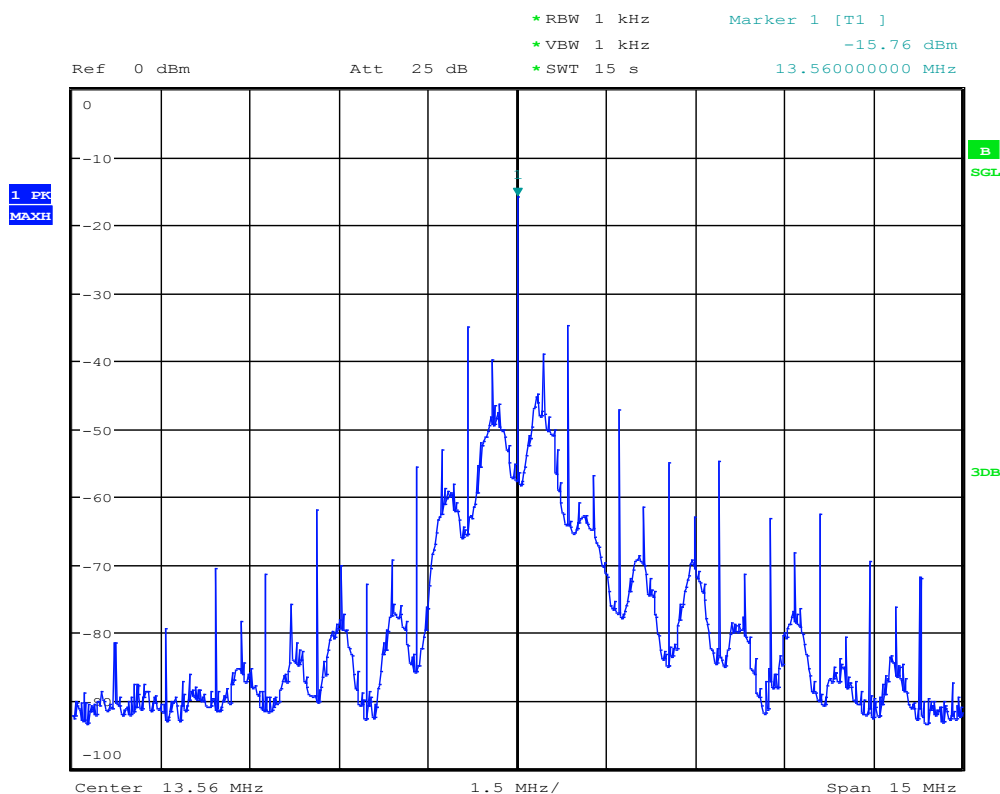
QuasiPeak

Frequency [MHz]	Reading [dBμV]	Correction [dB]	Result [dBμA/m]	Limit [dBμA/m]	Margin [dB]	Result
13.56	-30.7	-31.5	-0.8	46	-46.8	PASSED

*Correction = -51.5(Conversion dBμV -> dBμA) + 20dB (Antenna Gain)

4.3. Sidebands

Measurements of sidebands were performed using a small magnetic loop antenna close to the EUT. The result values on the graphics are therefore relative. The correct peak value is -0.8 dBμA/m, as can be seen in paragraph 'Radiated H-Field'. The limit at 13.56 MHz is 25 dBμA/m at 10 meter distance. All sidebands are well below limits.



Date: 25.MAR.2013 12:03:32

5. Occupied bandwidth

EUT with DUT number	RM-877, DUT 42980
Accessories with DUT numbers	BV-5XW, DUT 42971 ; CA-190CD, DUT 42977 ; WH-208, DUT 42831 ; AC-60U, DUT 42973
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 99.8
Date of measurements	06-Mar-2013
Measured by	Timo Raiskio

5.1. Test Setup

A small whip antenna was placed close to the EUT, and connected to the measuring Spectrum Analyzer.

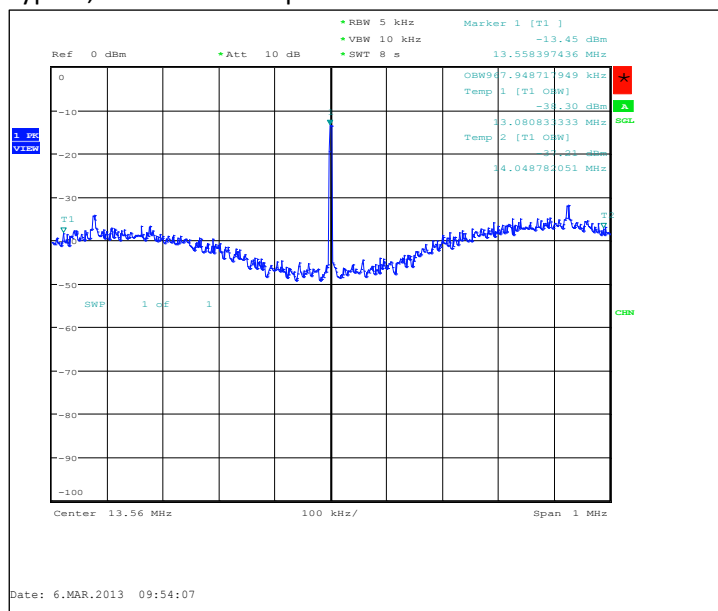
Test method and limit

The Test was carried out with the EUT in Test mode with modulation on.

5.2. NFC Test results

NFC TX Frequency = 13.56 MHz

Type A, datarate 424Kbps



Operation mode (TX on)	Occupied bandwidth [kHz]
NFC, modulated	967.9

6. Frequency stability, temperature variation (FCC §15.225 (e) [2], RSS-210 A2.6)

EUT with DUT number	RM-877, DUT 42980
Accessories with DUT numbers	BV-5XW, DUT 42971 ; CA-190CD, DUT 42977 ; WH-208, DUT 42831 ; AC-60U, DUT 42973
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 99.8
Date of measurements	06-Mar-2013
Measured by	Timo Raiskio

6.1. Test Setup

The EUT was placed in a Climatic Chamber. A small whip antenna was placed close to the EUT, and connected to the measuring Spectrum Analyzer. Measurement performed without modulation on TX.

6.2. Test method and limit

The measurement is made according to FCC rules FCC 47 CFR Part 15 section 15.225 (e) [2] and RSS-210 A2.6

- The EUT is placed in the chamber in transmit mode.
- The climate chamber temperature is set to the maximum value and allowed to stabilize.
- The transmit frequency is measured.
- Temperature is lowered to the next temperature value and allowed to stabilize.
- The steps c - d is repeated for each temperature.

Limits for frequency stability, temperature variation measurements

Frequency deviation [%]
+/- 0.01

6.3. NFC Test results

NFC TX Frequency = 13.56 MHz

Temperature [°C]	Frequency [MHz]	Deviation [kHz]	Deviation [%]	Result
50	13.559862	-0.138	-0.001018	PASSED
40	13.55988	-0.120	-0.000885	PASSED
30	13.559933	-0.067	-0.000494	PASSED
20	13.559974	-0.026	-0.000192	PASSED
10	13.560019	0.019	0.000140	PASSED
0	13.56005	0.050	0.000369	PASSED
-10	13.560044	0.044	0.000324	PASSED
-20	13.560039	0.039	0.000288	PASSED
-30	13.560044	0.044	0.000324	PASSED

7. Frequency stability, voltage variation (FCC §15.225 (e) [2], RSS-210 A2.6)

EUT with DUT number	RM-877, DUT 42980
Accessories with DUT numbers	BV-5XW, DUT 42971 ; CA-190CD, DUT 42977 ; WH-208, DUT 42831 ; AC-60U, DUT 42973
Operation Voltage [V] / [Hz]	3.5V / 4.1V / 4.2V
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 99.8
Date of measurements	06-Mar-2013
Measured by	Timo Raiskio

7.1. Test Setup

A small whip antenna was placed close to the EUT, and connected to the measuring Spectrum Analyzer.

Test method and limit

The EUT battery was replaced with an adjustable power supply. The frequency stability was measured at nominal voltage and at +5% and -15%. Measurement performed without modulation on TX.

Limits for frequency stability, voltage variation measurements

Frequency deviation [%]
+/- 0.01

7.2. NFC Test results

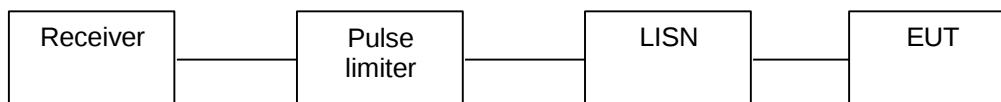
NFC TX Frequency = 13.56 MHz

Voltage [V]	Frequency [MHz]	Deviation [kHz]	Deviation [%]	Result
4.2	13.559963	-0.037	-0.000273	PASSED
3.5	13.559963	-0.037	-0.000273	PASSED
4.1	13.559962	-0.038	-0.000280	PASSED

8. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-877, DUT 42984
Accessories with DUT numbers	BV-5XW, DUT 42971 ; AC-60U, DUT 42973 ; CA-190CD, DUT 42976 ; WH-208, DUT 42831
Operation Voltage [V] / [Hz]	120 / 115
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 100.9
Date of measurements	11-Mar-2013
Measured by	Jari Jantunen

8.1. Test Setup



8.2. Test method and limit

FCC15CNFC_RM-877_18.docx 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:

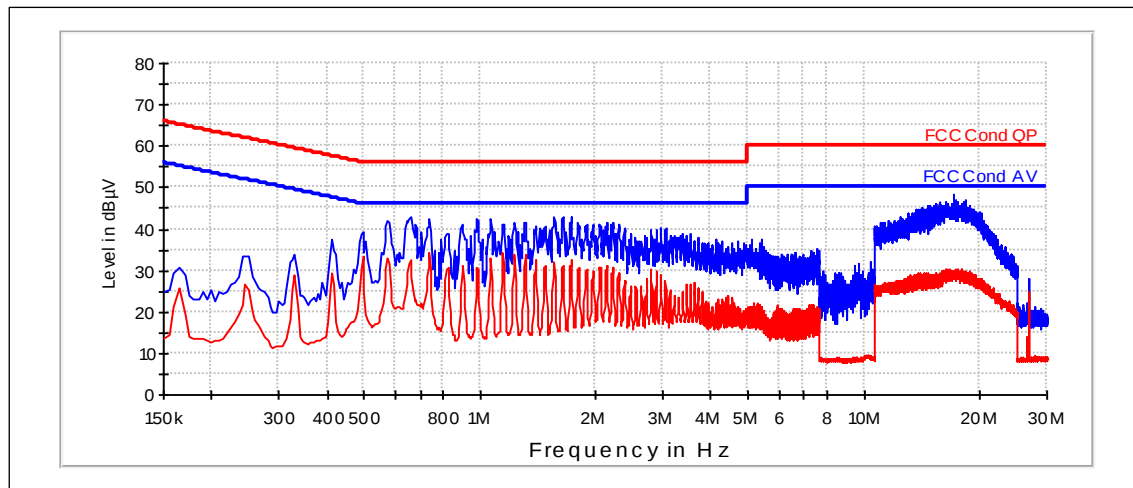
$$U [dB\mu V] = U_{RX} + A_{TOT}$$

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

8.3. NFC Test results



9. Test Equipment

9.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15E, 15B
TM37678	Communication Tester	CMU200	R&S	15C, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
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	22/24/27
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27, 15C
2009	LISN 50 μ H	ENV216	R&S	15C, 15B
2010	LISN 50 μ H	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
2021	Communication Tester	CMW500	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C

9.2. 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, 15E, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15E, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15E, 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
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, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C, 15E, 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	15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
2021	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C