Nokia Corporation

Application
For
Certification

FCC ID: PYADT-601

Wireless Charger

Model: DT-601(HW:0.16, MW:0.12)

Transmitter

Report No.: 130531018SZN-001

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-01-12]

Prepared and Checked by:	Approved by:
Sign on file	Digitally signed by Billy Li Location: Intertek Testing Services
Leo Lai Project Engineer	Billy Li Supervisor Date: July 18, 2013

TRF No.: FCC 15C_Tx_b

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LIST OF EXHIBITS

MEASUREMENT / TECHNICAL REPORT

Nokia Corporation
MODEL: DT-601(HW: 0.16, MW: 0.12)

FCC ID: PYADT-601

July 18, 2013

This report concerns (check one:) Original Grant ___X___ Class II Change _____

Equipment Type: DCD-Low Power Transmitter Below 1705 KHz

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No ___X

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes _____ No ___X

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-01-12 Edition] provision.

Report prepared by:

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List of attached file

Exhibit Type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated photos	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
External Photo	External Photos	external photos.pdf
Internal Photo	Internal Photos	internal photos.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
Block Diagram	Block Diagram	block.pdf
ID Label / Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Letter of Agency	agency.pdf

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The equipment under test (EUT) is a Wireless Charger operating at the frequency range 135 KHz-205 KHz. The EUT is powered by AC-60U (Input: AC 100-240V, 50/60Hz, 0.2A; Output: DC 5V, 1.5A). You can charge your phone or other compatible device without the hassle of untangling charger cables. Just pop your phone on the charging plate to start charging.

Antenna Type: Integral antenna (embedded coil antenna)
For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is an application for certification of a transmitter for the Wireless Charger which is designed as a mobile device charger, and there is no corresponding unit for certification.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements was performed according to the procedures in ANSI C63.4 (2009). Radiated emission measurement was performed in Semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 242492).

EXHIBIT 2

SYSTEM TEST CONFIGURATION

2.0 System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2009).

The EUT was powered by AC 120V 60Hz during the test and only the worst data was reported in this report.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data report in Exhibit 3.0.

The EUT was centred laterally (left to right facing the tabletop) on the Tabletop with the rear of the unit flush with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on turntable, which enabled the Engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

N/A.

2.3 Special Accessories

No special accessory.

2.4 Equipment Modification

Any modifications installed previous to testing by Nokia Corporation will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch.

2.5 Measurement Uncertainty

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
Mobile Phone	Nokia	Lumia 820
AC Charger	Nokia	AC-60U

EXHIBIT 3

EMISSION RESULTS

3.0 Emission Results

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$FS = RA + AF + CF - AG + PD + AV$

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in –dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$FS = RA + AF + CF - AG + PD + AV$

Example

Assume a receiver reading of 62.0dBμV is obtained. The antenna factor of 7.4dB and cable factor of 1.6dB is added. The amplifier gain of 29dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0dB, and the resultant average factor was –10dB. The net field strength for comparison to the appropriate emission limit is 32dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0dBμV
AF = 7.4dB
CF = 1.6dB
AG = 29.0dB
PD = 0dB

AV = –10dB

$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32dB\mu V/m$

Level in μV/m = Common Antilogarithm [(32dBμV/m)/20] = 39.8μV/m

3.2 Radiated Emission Data and Configuration Photograph

Worst Case Radiated Emission
At
31.296 MHz

Judgement: Passed by 7.7 dB

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos.pdf.

TEST PERSONNEL:

Sign on file

Leo Lai, Project Engineer
Typed / Printed Name

27 June 2013
Date

Company: Nokia Corporation Date of Test: 27 June 2013
Model: DT-601(HW:0.16, MW:0.12)
Operating Mode: Transmit with Charging

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
Vertical	0.170	59.4	0.0	14.8	74.2	103.0	-28.8
Vertical	0.510	40.3	0.0	15.1	55.4	73.5	-18.1
Horizontal	31.186	36.3	20.0	8.3	24.6	40.0	-15.4
Horizontal	144.296	43.3	20.0	10.1	33.4	43.5	-10.1
Horizontal	236.913	32.5	20.0	14.4	26.9	46.0	-19.1
Vertical	31.296	37.7	20.0	14.6	32.3	40.0	-7.7
Vertical	143.664	41.4	20.0	12.1	33.5	43.5	-10.0
Vertical	159.980	43.5	20.0	9.1	32.6	43.5	-10.9

NOTES:

1. Average detector is used for 9~90 KHz, 110~490 KHz and Quasi-Peak detector is used for other frequency band.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3 meter distances were measured at 0.3- meter and an inverse proportional extrapolation was performed to compare the signal level to the 3 meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Loop Antenna was used for the frequency band below 30MHz.

5. The formula of limit at frequencies below 30MHz is extrapolated according to FCC part 15.31 (f) as below.
   Limit dBuV/m at 3m = Limit dBuV/m at 300m + 40log(300/3) dB
   Limit dBuV/m at 3m = Limit dBuV/m at 30m + 40log(30/3) dB

Test Engineer: Leo Lai

Company: Nokia Corporation Date of Test: 27 June 2013
Model: DT-601(HW:0.16, MW:0.12)
Operating Mode: Transfer initiation & termination mode at 175KHz

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
Vertical	0.175	59.0	0.0	14.8	73.8	102.7	-28.9
Vertical	0.350	50.6	0.0	15.1	65.7	96.7	-31.0
Horizontal	31.563	35.9	20.0	8.3	24.2	40.0	-15.8
Horizontal	144.392	45.0	20.0	10.1	35.1	43.5	-8.4
Horizontal	237.434	33.8	20.0	14.4	28.2	46.0	-17.8
Vertical	32.909	37.0	20.0	14.6	31.6	40.0	-8.4
Vertical	144.659	41.1	20.0	12.1	33.2	43.5	-10.3
Vertical	159.317	43.7	20.0	9.1	32.8	43.5	-10.7

NOTES:

1. Average detector is used for 9~90 KHz, 110~490 KHz and Quasi-Peak detector is used for other frequency band.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3 meter distances were measured at 0.3- meter and an inverse proportional extrapolation was performed to compare the signal level to the 3 meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Loop Antenna was used for the frequency band below 30MHz.

5. The formula of limit at frequencies below 30MHz is extrapolated according to FCC part 15.31 (f) as below.
   Limit dBuV/m at 3m = Limit dBuV/m at 300m + 40log(300/3) dB
   Limit dBuV/m at 3m = Limit dBuV/m at 30m + 40log(30/3) dB

Test Engineer: Leo Lai

3.3 Conducted Emission and Data Configuration Photograph

Worst Case Conducted Configuration
at
0.582 MHz

Judgement: Passed by 17.7 dB

For electronic filing, the worst case conducted emission configuration photograph is saved with filename: conducted photos.pdf.

TEST PERSONNEL:

Sign on file

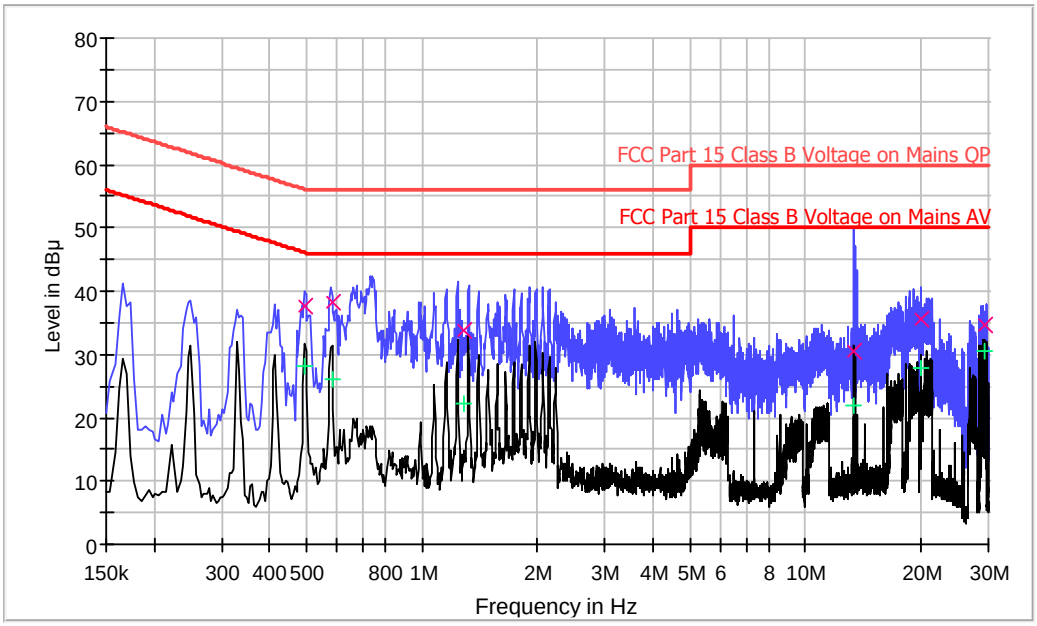
Leo Lai, Project Engineer
Typed/Printed Name

27 June 2013
Date

Applicant: Nokia Corporation
Model: DT-601(HW:0.16, MW:0.12)
Sample: 1/1
Worst Case Operating Mode: Transmit with Charging

Date of Test: 27 June 2013

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.495000	37.5	L1	9.6	18.6	56.1
0.582000	38.3	L1	9.6	17.7	56.0
1.289000	33.9	L1	9.7	22.1	56.0
13.377000	30.7	L1	10.0	29.3	60.0
19.941000	35.7	L1	10.0	24.3	60.0
29.169000	34.7	L1	10.2	25.3	60.0

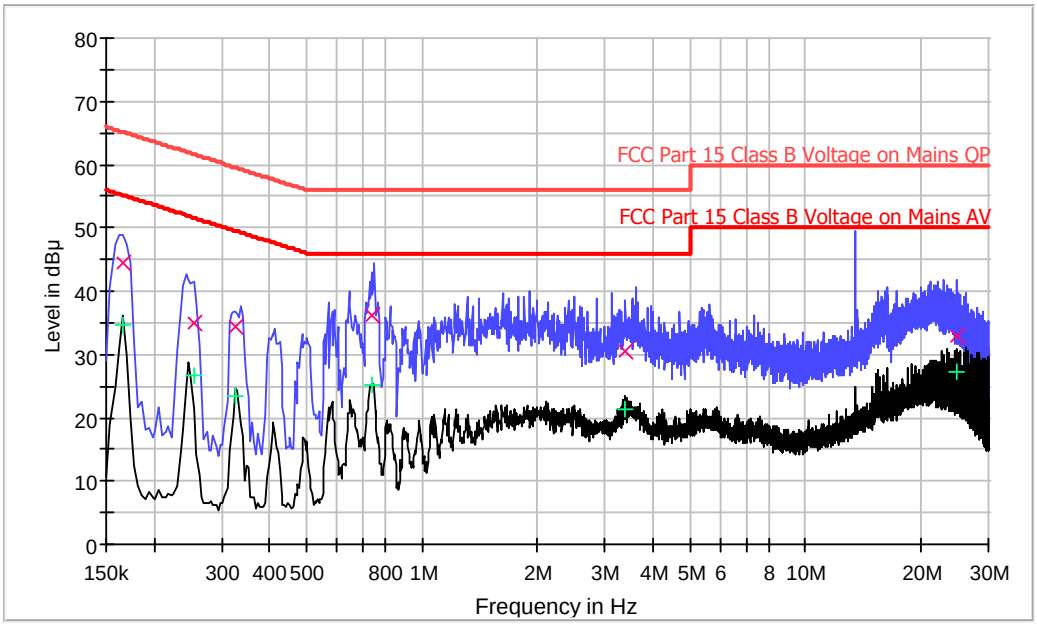
Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.495000	28.1	L1	9.6	18.0	46.1
0.582000	26.1	L1	9.6	19.9	46.0
1.289000	22.2	L1	9.7	23.8	46.0
13.377000	22.0	L1	10.0	28.0	50.0
19.941000	27.9	L1	10.0	22.1	50.0
29.169000	30.6	L1	10.2	19.4	50.0

Applicant: Nokia Corporation
Model: DT-601(HW:0.16, MW:0.12)
Sample: 1/1
Worst Case Operating Mode: Transmit with Charging

Date of Test: 27 June 2013

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.166000	44.5	N	9.6	20.7	65.2
0.254000	34.9	N	9.6	26.7	61.6
0.326000	34.5	N	9.6	25.1	59.6
0.738000	36.1	N	9.7	19.9	56.0
3.390000	30.5	N	9.8	25.5	56.0
24.721000	32.8	N	10.2	27.2	60.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.166000	34.7	N	9.6	20.5	55.2
0.254000	26.7	N	9.6	24.9	51.6
0.326000	23.5	N	9.6	26.1	49.6
0.738000	25.3	N	9.7	20.7	46.0
3.390000	21.3	N	9.8	24.7	46.0
24.721000	27.3	N	10.2	22.7	50.0

EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

4.0 Equipment Photographs

For electronic filing, photographs of the tested EUT are saved with filename: external photos.pdf and internal photos.pdf.

EXHIBIT 5

PRODUCT LABELLING

5.0 **Product Labelling**

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

EXHIBIT 6

TECHNICAL SPECIFICATIONS

6.0 Technical Specifications

For electronic filing, the block diagram of the tested EUT is saved with filename: block.pdf and circuit.pdf respectively.

EXHIBIT 7

INSTRUCTION MANUAL

7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold / leased in the United States.

EXHIBIT 8

MISCELLANEOUS INFORMATION

8.0 Miscellaneous Information

This miscellaneous information includes emission measuring procedure.

8.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitter operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 – 2009.

The Transmitter equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjust through all three orthogonal axes to obtain maximum emission levels. For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed.

The IF bandwidth used for measurement of radiated signal strength was 10 KHz for emission below 30 MHz and 120 KHz for emission from 30 MHz to 1000 MHz.

For radiated emission, the frequency range scanned is 9KHz to 1GHz. For line conducted emissions, the range scanned is 150 KHz to 30 MHz.

EXHIBIT 9

TEST EQUIPMENT LIST

9.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	BiConiLog Antenna	ETS	3142C	00066460	30-Jun-12	30-Jun-13
SZ185-01	EMI Receiver	R&S	ESCI	100547	12-Mar-13	12-Mar-14
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	13-May-13	13-May-14
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2-Mar-13	2-Mar-14
SZ062-02	RF Cable	RADIALL	RG 213U	--	26-Feb-13	26-Aug-13
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	5-Nov-12	5-Nov-13
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	5-Nov-12	5-Nov-13
SZ188-03	Shielding Room	ETS	RFD-100	4100	10-Sep-12	10-Sep-13