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EMI VERIFICATION REPORT

Nokia, Inc.

**12278 Scripps Summit Drive, San Diego,
CA 92131**

Date of Issue: April 30, 2009

Test Report No.: HCT-EF09-0404-4

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

**FCC ID:
IC:**

**QMNRM-464
661X-RM464**

Classification / Standard(s) : FCC PART 15 Subpart B / CISPR 22 Class B
: ICES-003 Issue 4_ February 2004, RSS-Gen Issue 2_June 2007,
RSS-129 Issue 2_September 25. 1999, RSS-133 Issue 5_February 2009
Equipment type : Dual-band CDMA phone with BT2.1+EDR
Trade name / Model(s) : Nokia, Inc. / RM-464
Port / Connector(s) : DC input port / Ear phone port
FCC listing No : 90661
IC recognition No : IC 5944A-1

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003. (See test report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Report prepared by
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Test Report Revision History

Test report NO.	Date	Description
HCT-EF09-0404	April 10, 2009	Separated the certification report and verification report
HCT-EF09-0404	April 20, 2009	Add the HW/SW versions, measurement uncertainty, IC ID
HCT-EF09-0404-1	April 24, 2009	Version control update
HCT-EF09-0404-2	April 27, 2009	Change the Conducted test Configuration Section 2 Change the equipment list Section 7
HCT-EF09-0404-3	April 29, 2009	Version control update Change from "IC ID" to "IC"
HCT-EF09-0404-4	April 30, 2009	Version control update Add the version for IC rule.

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product description

The **Nokia, Inc. RM-464, Dual-band CDMA phone with BT2.1+EDR.**

Its basic purpose is used for communications. It transmits from CDMA 850 (824.70 MHz to 848.31 MHz), PCS 1 900 (1851.25 MHz to 1908.75 MHz), Bluetooth (2 402 MHz to 2 480 MHz) and receives from CDMA 850 (869.70 MHz to 893.31 MHz), PCS 1 900 (1931.25 MHz to 1988.75 MHz), Bluetooth (2 402 MHz to 2 480 MHz).

Model	RM-464
FCC ID	QMNRM-464
IC	661X-RM464
E.U.T NO	A0000001593C24
E.U.T type	Dual-band CDMA phone with BT2.1+EDR
HW Version	4200
SW Version	ST_4020T11_VZW_116
TX frequency	824.70 MHz to 848.31 MHz (CDMA 850) 1851.25 MHz to 1908.75 MHz (PCS 1 900) 2 402 MHz to 2 480 MHz (Bluetooth)
RX frequency	869.70 MHz to 893.31 MHz (CDMA 850) 1931.25 MHz to 1988.75 MHz (PCS 1 900) 2 402 MHz to 2 480 MHz (Bluetooth)
Channel	Middle: 384 (CDMA 850) Middle: 600 (PCS 1 900)

1.2 Related submittal(s) / Grant(s)

Original submittal only.

1.3 Tested system details

All equipment descriptions used in the tested system (including inserted cards) are:

Device type	Manufacturer	Model number/ Part number	FCC ID / DoC	Connected to
Dual-band CDMA phone with BT 2.1 +EDR	Nokia	RM-464	QMNRM-464	Laptop, TA
Travel adaptor	SALCOMP	AC-6U	-	E.U.T
Headset	-	HS-9	-	E.U.T

1.4 Cable description

Product name	Port	Power cord shielded (Y/N)	I/O cable shielded (Y/N)	Length (M)
Dual-band CDMA phone with BT 2.1 +EDR	DC in	N	-	(P)1.8
	Headset jack	-	N	(D)1.3

* The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

1.5 Noise suppression parts on cable. (I/O cable)

Product name	Port	Ferrite bead (Y/N)	Location	Metal hood (Y/N)	Location
Dual-band CDMA phone with BT 2.1 +EDR	DC in	N	-	Y	E.U.T end
	Headset jack	N	-	Y	E.U.T end

1.6 Test methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at an antenna to E.U.T distance of 3 m

1.7 Test facility

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-ri, Hobup-myun, Icheon-si, Kyungki-do, 467-701, Korea. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the commission and accepted dated July 6, 2006(Registration Number: 90661)

1.8 Frequency range of radiated measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table

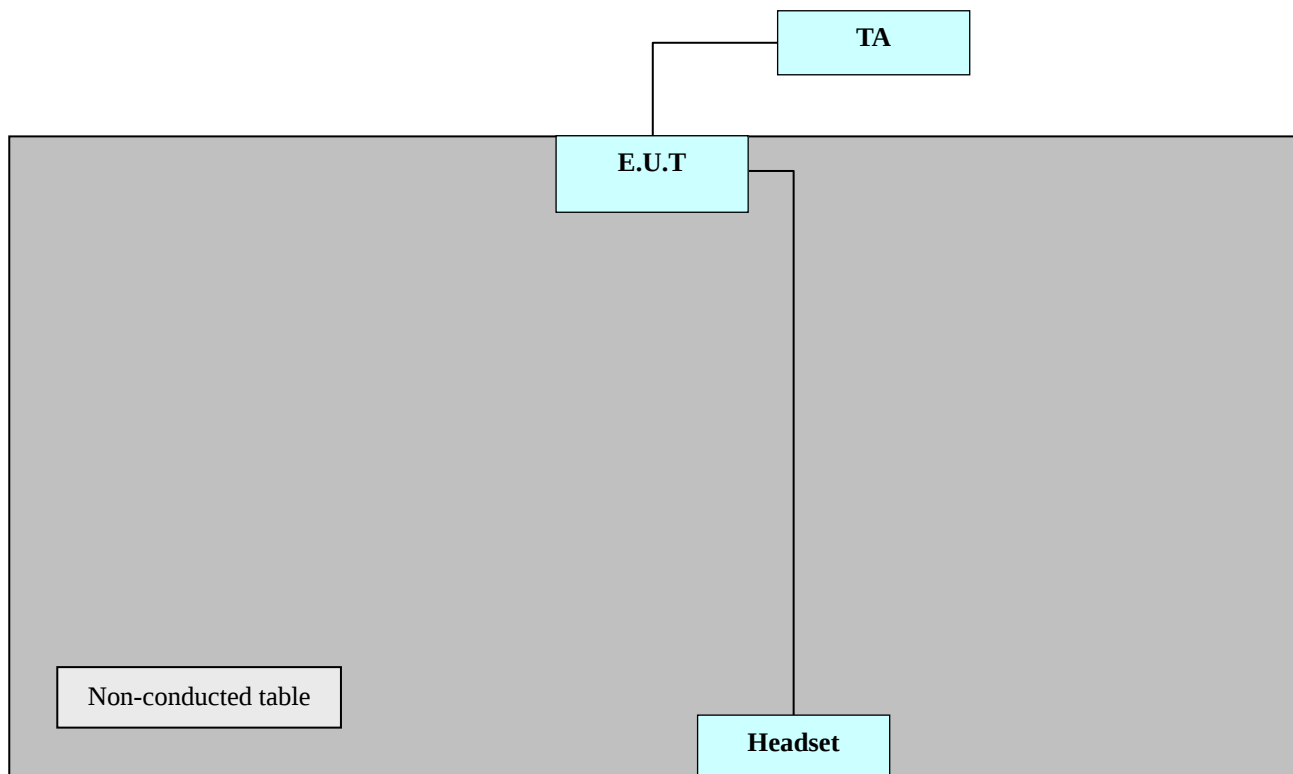
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

2. SYSTEM TEST CONFIGURATION

2.1 Configuration of test system

- Power Line Conducted test : E.U.T was connected to LISN.
Preliminary Power Line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.
- Radiated Emission test : Preliminary Radiated Emission tests were performed by using the procedure in ANSI C63.4/2003 8.3.1.1 to determine the worst operating condition. Final Radiated Emission tests were performed at 3 m open area test site.

[Configuration of tested system]



Power Line: 110 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission test

During preliminary tests, the following operating mode was investigated.

Operation mode	The worst operating condition
CDMA Idle (850, 1900)	
Camera	○
Bluetooth	

3. 2 Radiated Emission test

During preliminary test, the following operation mode was investigated.

Operation mode	The worst operating condition
CDMA Idle (850, 1900)	
Camera	○
Bluetooth	

4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit apply to	: CISPR 22 Class B
Result	: Passed by 13.4 dB
Operating condition	: Camera mode
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Temperature	: 11.2 °C
Humidity level	: 32.3 %
Test date	: March 30, 2009

Power Line Conducted Emissions			CISPR 22 Class B		
Frequency (MHz)	Amplitude (dB μ V)	Conductor	Result	Limit (dB μ V)	Margin (dB)
0.1626	49.6	HOT	Quasi-Peak	65.0	15.7
0.1626	35.0	HOT	Average	55.0	20.4
0.1576	52.2	NEUTRAL	Quasi-Peak	66.0	13.4
0.1651	37.5	NEUTRAL	Average	55.0	17.7

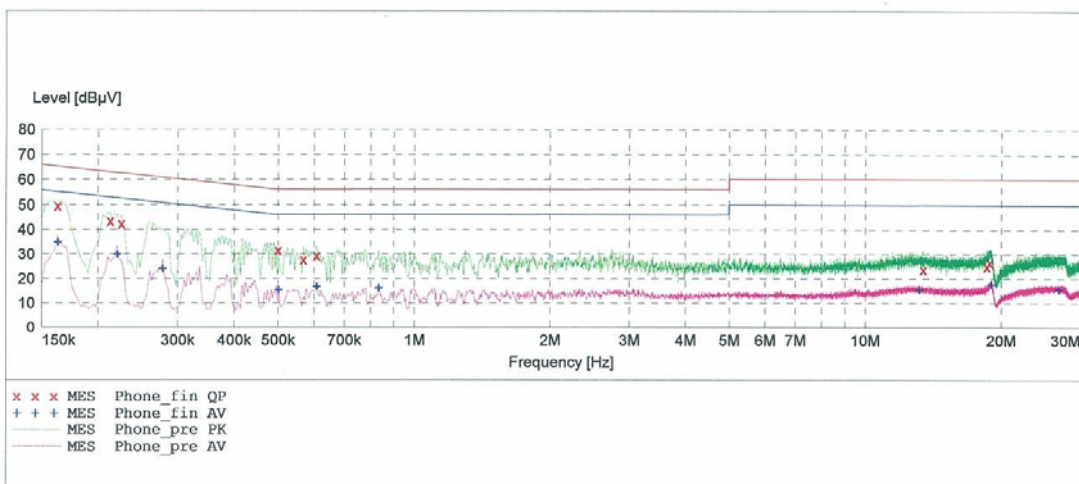
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EMC TEST LAB.

EUT: RM-464
Manufacturer: Nokia
Operating Condition: Camera Mode
Test Site: SHIELD ROOM
Operator: YH, LEE
Test Specification: CISPR 22 CLASS B
Comment: H

SCAN TABLE: "CISPR 22 Voltage"

Short Description:			CISPR 22 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "Phone_fin QP"

3/30/2009 5:22PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.162600	49.60	10.1	65	15.7	---	---
0.212600	43.40	10.1	63	19.7	---	---
0.225100	42.40	10.1	63	20.2	---	---
0.500000	31.50	10.2	56	24.5	---	---
0.568000	27.60	10.2	56	28.4	---	---
0.608000	29.20	10.2	56	26.8	---	---
13.412000	23.70	11.7	60	36.3	---	---
18.572000	25.00	12.3	60	35.0	---	---
18.836000	26.70	12.3	60	33.3	---	---

MEASUREMENT RESULT: "Phone_fin AV"

3/30/2009 5:22PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.162600	35.00	10.1	55	20.4	---	---
0.220100	29.90	10.1	53	22.9	---	---
0.277600	24.20	10.1	51	26.7	---	---
0.500000	15.30	10.2	46	30.7	---	---
0.608000	16.80	10.2	46	29.2	---	---
0.832000	16.10	10.2	46	29.9	---	---
13.124000	15.70	11.6	50	34.3	---	---
18.984000	17.90	12.4	50	32.1	---	---
26.784000	15.80	12.9	50	34.2	---	---

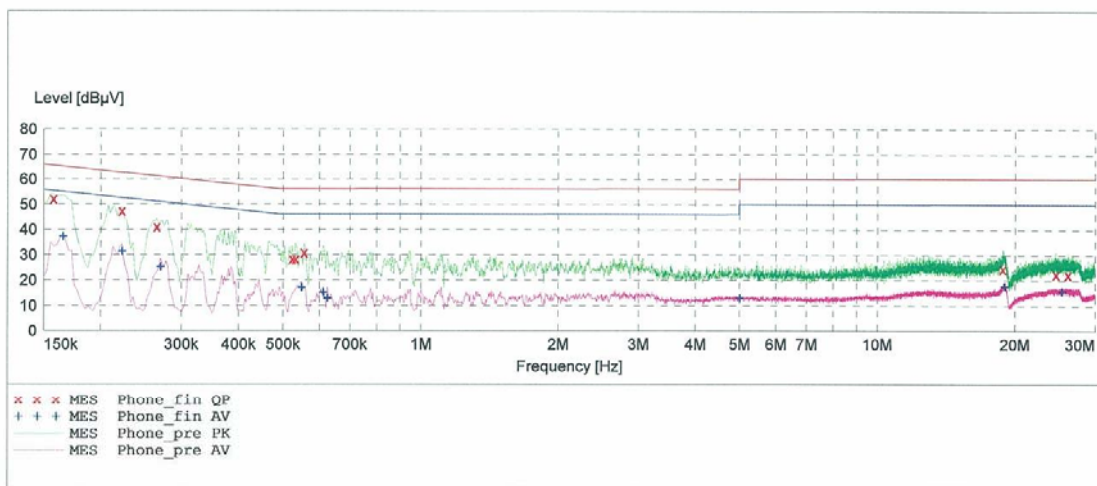
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EMC TEST LAB.

EUT: RM-464
Manufacturer: Nokia
Operating Condition: Camera Mode
Test Site: SHIELD ROOM
Operator: YH, LEE
Test Specification: CISPR 22 CLASS B
Comment: N

SCAN TABLE: "CISPR 22 Voltage"

Short Description:			CISPR 22 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "Phone_fin QP"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.157600	52.20	10.1	66	13.4	---	---
0.222600	47.40	10.1	63	15.4	---	---
0.265100	41.10	10.1	61	20.2	---	---
0.524000	28.40	10.2	56	27.6	---	---
0.532000	28.40	10.2	56	27.6	---	---
0.556000	31.00	10.2	56	25.0	---	---
18.816000	24.70	12.3	60	35.3	---	---
24.604000	22.50	12.8	60	37.5	---	---
26.128000	22.30	12.9	60	37.7	---	---

MEASUREMENT RESULT: "Phone_fin AV"

3/30/2009 5:19PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.165100	37.50	10.1	55	17.7	---	---
0.222600	31.60	10.1	53	21.1	---	---
0.270100	25.50	10.1	51	25.6	---	---
0.548000	17.20	10.2	46	28.8	---	---
0.612000	15.30	10.2	46	30.7	---	---
0.624000	13.10	10.2	46	32.9	---	---
5.000000	13.00	10.7	46	33.0	---	---
18.976000	17.90	12.4	50	32.1	---	---
25.368000	15.90	12.9	50	34.1	---	---

4.2 Radiated Emission test

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Limit apply to	: FCC PART 15 Subpart B
Result	: Passed by 10.9 dB
Operating condition	: Camera mode
Detector	: Quasi-Peak (6 dB Bandwidth: 120 kHz)
Temperature	: 10.9 °C
Humidity level	: 32.3 %
Test date	: March 30, 2009

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
35.0	16.2	11.5	1.4	V	29.1	40.0	10.9
192.0	14.1	10.6	3.3	V	28.0	43.5	15.5
192.0	12.6	10.6	3.3	H	26.5	43.5	17.0
280.2	13.8	12.4	4.0	H	30.2	46.0	15.8
385.2	12.1	15.0	4.6	H	31.7	46.0	14.3
490.3	10.8	17.1	5.2	V	33.1	46.0	12.9
560.3	7.0	18.5	5.5	V	31.0	46.0	15.0

Note)

For measurement over 1 GHz, noise level was more than 10 dB below the limit.

5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the antenna factor and cable factor.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dB μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB μ V/m value is mathematically converted to its corresponding level in μ V/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dB}\mu\text{V/m}$$

[Radiated Emission limits]

Frequency of emission (MHz)	Field strength	
	μ V/m	dB μ V/m
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

6. SYSTEM MEASUREMENT UNCERTAINTY

For a 95 % confidence level, the measurement uncertainties for defined system.

6.1 Emissions test

- Radiated Emissions tests : $\pm 5.6 \text{ dB } (k = 2)$
(30 MHz ~ 1 GHz)

- Conducted Emissions tests : $\pm 3.7 \text{ dB } (k = 2)$
(150 kHz ~ 30 MHz)

7. TEST EQUIPMENT

<u>Type</u>	<u>Manufacture</u>	<u>Model number</u>	<u>Next CAL date</u>
EMI Test Receiver	Rohde & Schwarz	ESI40	2009.10.31
EMI Test Receiver	Rohde & Schwarz	ESCI	2009.06.01
LISN	EMCO	703125	2009.05.04
Attenuator	Rohde & Schwarz	ESH3-Z2	2009.10.30
Trilog Antenna	Schwarzbeck	VULB9160	2010.12.18
Communication Antenna	TDK	LPDA-0802	-
Antenna Position Tower	HD	240/520/00	-
Base Station	Rohde & Schwarz	CMU 200	2010.02.17
Horn Antenna	Schwarzbeck	BBHA 9120D	2010.03.26
RF-Amplifier	MITEQ	AMF-6D-00101800-35.20P.PS	2010.04.25
Bluetooth Base Station	TESCOM	TC-3000A	2010.01.09

8. CONCLUSION

The data collected shows that the **Nokia, Inc. Model: RM-464, Dual-band CDMA phone with BT2.1+EDR. FCC ID: QMNRM-464, IC: 661X-RM464** complies with §15.107 and §15.109 of the FCC rules.