ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

UN-INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART B and INDSTRY CANADA RSS-GEN, ICES-003 CERTIFICATION REQUIREMENT

OF

Product Name:	**RH-120**
Brand Name:	**Nokia**
Model Name:	**RH-120**
Report No.:	**EI/2008/90012**
Issue Date:	**Sep. 25, 2008**
FCC Rule Part:	**Part 15 B, Class B**
IC Rule Part:	**ICES-003: Issue 4, 2004** **RSS-GEN: Issue 2, 2007**
Filing Type:	**Certification**
Prepared for:	**Nokia Inc.** **12278 Scripps Summit Dr.** **San Diego, CA 92131, USA**
Prepared by:	**SGS Taiwan Ltd.** **Electronics & Communication Laboratory** **No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan**

VERIFICATION OF COMPLIANCE

Applicant:	Nokia Inc. 12278 Scripps Summit Dr., San Diego, CA 92131, USA
Manufacturer:	Compal Communications (Nanjing) Co. Ltd Nanjing Jiangning Export Processing Zone (South Area) No.68-2 Suyuan Street
Product Name:	RH-120
Brand Name:	Nokia
Model Name:	RH-120
Model Difference:	N/A
File Number:	EI/2008/90012
Date of test:	Sep. 19, 2008 ~ Sep. 25, 2008
Date of EUT Receive:	Sep. 19, 2008

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15B, Class B and IC ICES-003 issue 4: 2004, RSS-GEN: Issue 2, 2007. The test results of this report relate only to the tested sample identified in this report.

Test By:	Willis Chen	***Date:***	Oct. 06, 2008
	Willis Chen/Senior Supervisor		
Prepared By:	Eva Kao	***Date:***	Oct. 06, 2008
	Eva Kao / Asst. Supervisor		
Approved By:	Vincent Su	***Date:***	Oct. 06, 2008
	Vincent Su/Manager		

Version

Version No.	Date	Description
00	Sep. 25, 2008	Initial creation of document
01	Oct. 06, 2008	According to Applicant's comments. Test report comments (3).doc
02	Oct. 08, 2008	According to Applicant's comments. Test_Reports_Comments-SGS_Answer_V1

Table of Contents

1. GENERAL INFORMATION

1.1 General:

Type Name:	RH-120	
Brand Name:	Nokia	
Model Name:	RH-120	
Model Difference:	N/A	
USB Data Cable:	One provided; Model: CA-101, Supplier: CHENG UEI PRECISION IND.CO., LTD	
Power Supply:	3.7 Vdc re-chargeable battery or 5Vdc by AC/DC power adapter	
	Battery	Model:BL-4C, Supplier: SANYO

CDMA:

DUT Standards And Power:	CDMA2000	Frequency Range		Maximum Output Power	
	Cellular	TX:	824 ~ 849 MHz	24.09	dBm
		RX:	869 ~ 894 MHz		
	AWS	TX:	1710 ~ 1755 MHz	23.86	dBm
		RX:	2110 ~ 2155 MHz		
	PCS	TX:	1850 ~ 1910 MHz	23.97	dBm
		RX:	1930 ~ 1990 MHz		
Type of Emission		1M28F9W			
MEID:		A0000001591F93D			
Software Version		GB_1700T_GEN			
Hardware Version		3000			
Antenna Type		PIFA Antenna			

Bluetooth:

Bluetooth Version	☐ V1.1 (GFSK) ☐ V1.2 (GFSK) ☐ V2.0 (GFSK) ☒ V2.0 + EDR (GFSK + π/4DQPSK + 8DPSK) ☐ V2.1 + EDR (GFSK + π/4DQPSK + 8DPSK)
Frequency Range	2402 – 2480MHz
Channel number	79 channels max.
Rated Power	3.11 dBm (Peak)
Modulation type	Frequency Hopping Spread Spectrum
Antenna Designation	PIFA Antenna / -3.5dBi.
Type of Emission	1M20F1D

The EUT is compliance with Bluetooth 2.0 with EDR.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: QMNRH-120** filing to comply with Part15 Subpart B, class B of the FCC CFR 47 Rules and **IC: 661X-RH120** filing to comply with Industry Canada ICES-003: Issue 4, 2004, RSS-GEN: Issue 2, 2007.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2003) and RSS-Gen. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county,which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Nokia CDMA2000 Phone FCC ID: QMNRH-120 and IC: 661X-RH120 was tested with a notebook computer connected via USB interface port. The Phone drivers were installed on the computer to be able to communicate with the phone by continuously sending a querying text file (AT commands) to the phone using HyperTerminal . For more information please see section 5.4 and section 6.5 for test data and APPENDIX 1 for set-up photographs.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.4-2003.

2.4 Limitation

(1) Conducted Emission

According to section 15.107(a), ICES-003, RSS-GEN, Section 7.2.2. Conducted Emission Class B Limits is as following.

Frequency range MHz	Class B Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

According to section 15.109(a), ICES-003, RSS-GEN, Section 7.2.3 Radiated Emission Class B Limits is as following:

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of 3 meters.

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Data Link Mode)

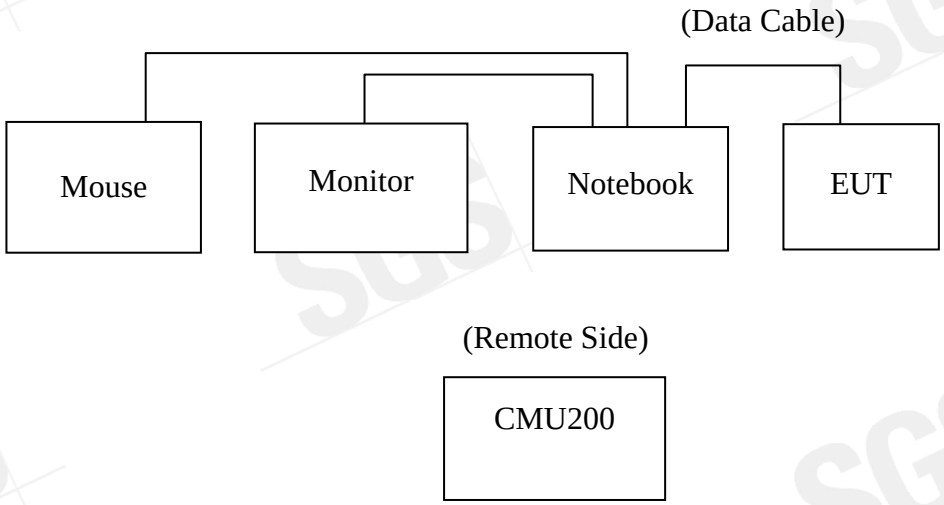


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	EUT	Nokia	RH-120	N/A	N/A	N/A
2.	Battery	NOKIA	BL-4C	N/A	N/A	N/A
3.	USB Cable	NOKIA	CA-101	N/A	shielded	N/A

Table 2-2 Support Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook PC	IBM	T60	L3DK794	Shielded	Un-shielded
2.	USB Mouse	BENQ	M106-C2W	99Q3188C2W48C044 22SA0000	Shielded,	N/A
3.	Monitor	HP	Vf51	TWTFG1092	Shielded	Un-shielded
4.	Radio Communication Analyzer	R&S	CMU200	102189	Shielded	Un-shielded

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.107	Conducted Emission Class B	Compliant
§15.109	Radiated Emission Class B	Compliant

4. Description of test modes

The EUT was stayed in normal operation mode with CMU200.

The data cable was connected to notebook PC and data transferred by program.

Test Plan
Conducted Emission
1. Data link with NB

Radiated Emission
1. Data link with NB

Mid channel of cellular band was worst case for both Conducted Emission and Radiated Emission test.

5. Conducted Emissions Test

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

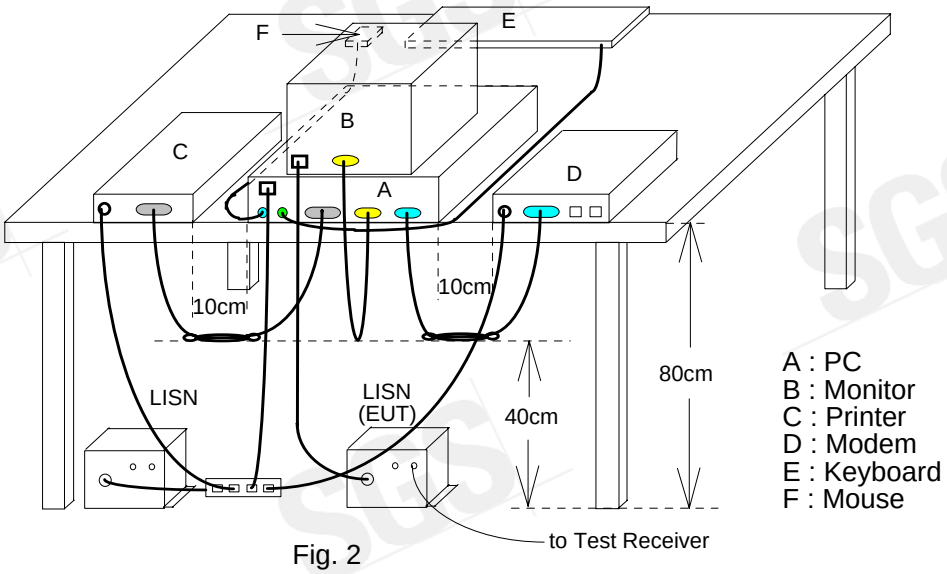


Fig. 2

5.3 Measurement Equipment Used:

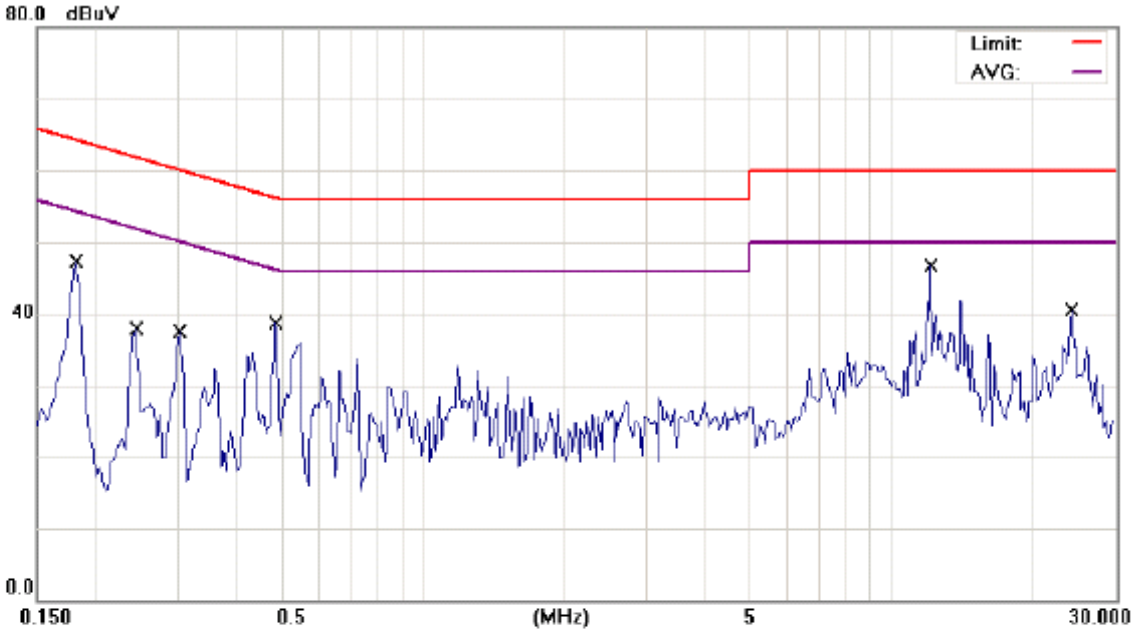
Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCS30	828985/004	09/16/2008	09/15/2009
LISN	Rolf-Heine	NNB-2/16Z	99012	02/18/2008	02/17/2009
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/18/2008	02/17/2009
Coaxial Cables	N/A	WK CE Cable	N/A	10/30/2007	10/29/2008

5.4 Measurement Result

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Data LINK with NB			Test Date:	Sep. 23, 2008
Temperature:	26 ℃	Humidity:	62 %	Test By:	Willis

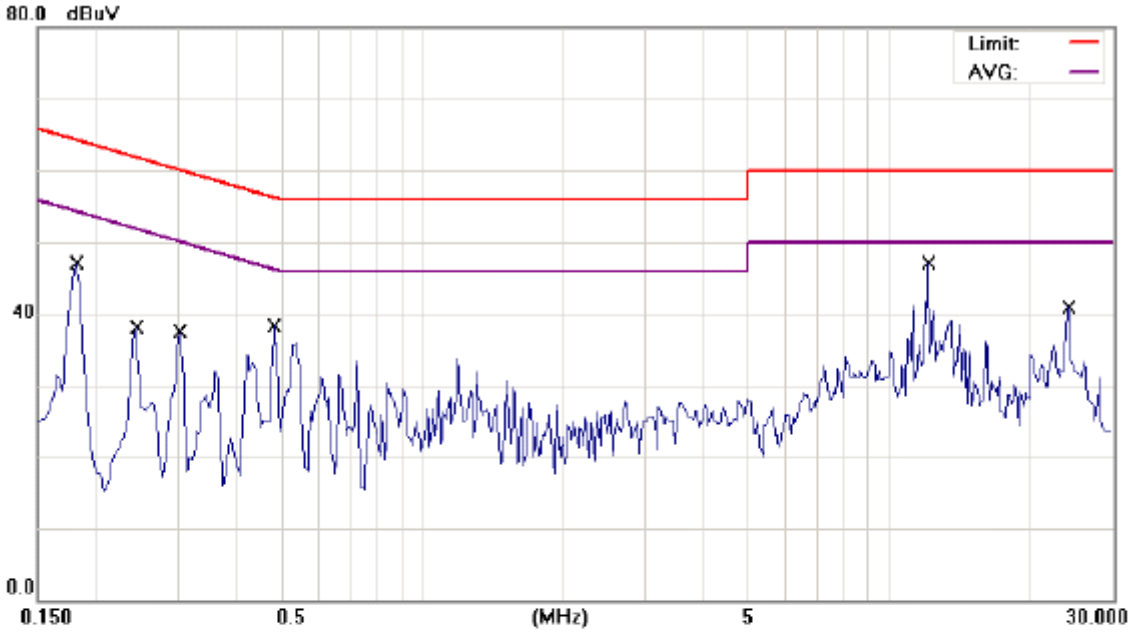


Site SGS CONDUCTED #1
Limit: FCC Class B Conduction(QP)
EUT: CDMA2000 Mobile Phone
M/N: RH-120
Note: DATA link

Phase: L1
Power: AC 120V/60Hz
Distance:

Temperature: 26 ℃
Humidity: 62 %
Air Pressure: hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1812	46.96	0.26	47.22	64.43	-17.21	QP	
2		0.2437	37.67	0.14	37.81	61.97	-24.16	QP	
3		0.3023	37.37	0.12	37.49	60.18	-22.69	QP	
4		0.4859	38.61	0.06	38.67	56.24	-17.57	QP	
5	*	12.1406	46.65	0.12	46.77	60.00	-13.23	QP	
6		24.2734	40.21	0.24	40.45	60.00	-19.55	QP	



Site SGS CONDUCTED #1 Phase: N Temperature: 26 ℃
Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 62 %
EUT: CDMA2000 Mobile Phone Distance: Air Pressure: hpa
M/N: RH-120
Note: DATA link

No.	Mk.	Freq.	Reading Level	Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1812	46.94	0.24	47.18	64.43	-17.25	QP	
2		0.2437	37.91	0.13	38.04	61.97	-23.93	QP	
3		0.3023	37.35	0.11	37.46	60.18	-22.72	QP	
4		0.4820	38.21	0.06	38.27	56.30	-18.03	QP	
5	*	12.1367	46.92	0.21	47.13	60.00	-12.87	QP	
6		24.2695	40.61	0.24	40.85	60.00	-19.15	QP	

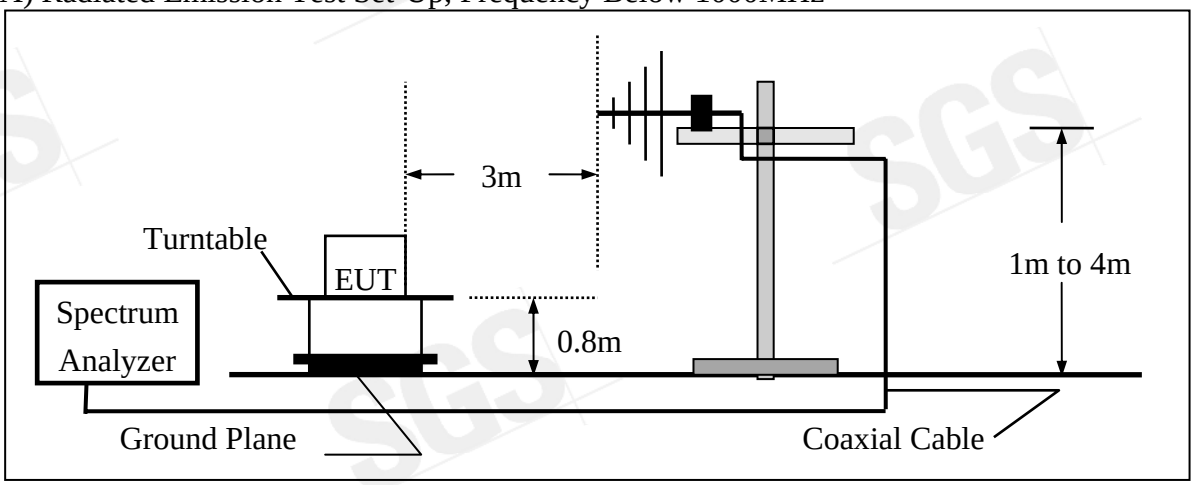
6. Radiated Emission Test

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E7405A	US40240202	07/04/2007	07/03/2009
Loop Antenna	Messtec	FLA30	03/10086	06/06/2007	06/05/2009
Bilog Antenna	SCHWAZBECK	VULB9160	3158	11/29/2007	11/28/2008
Pre-Amplifier	HP	8447F	3113A06892	01/04/2008	01/03/2009
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2008	01/04/2009
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2008	01/04/2009
Site NSA	SGS	966 chamber	N/A	10/01/2007	9/30/2008

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

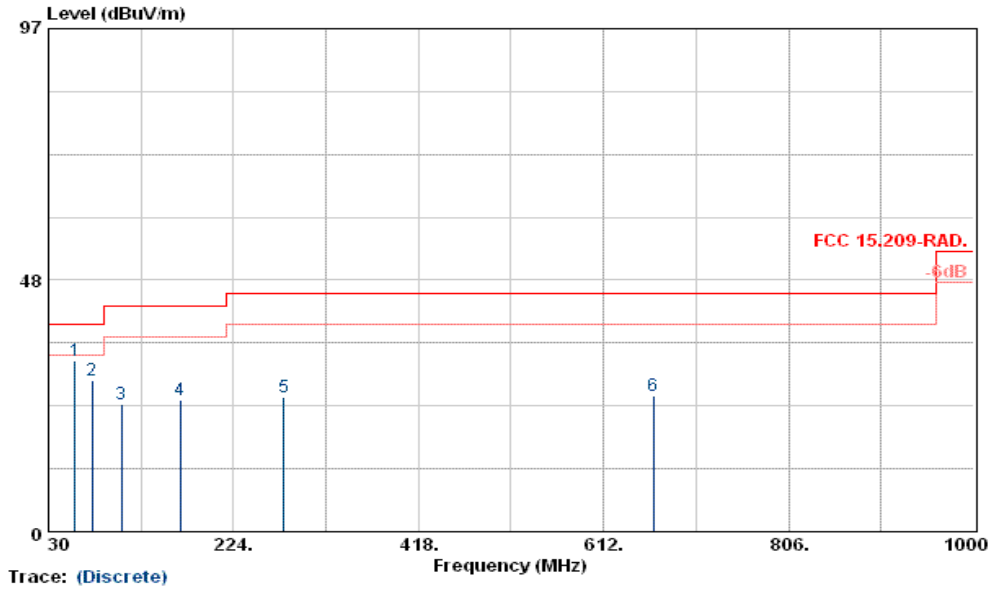
Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.5 Measurement Result

Test Mode: Data Link, CDMA Cellular, Mid Channel Test Date : Sep. 25, 2008

Frequency Range: 30MHz-10GHz Test By: Willis

Temperature : 25 ℃ Humidity : 65 %



Trace: (Discrete)

Site	: RF SITE
Condition	: FCC 15.209-RAD. 3m VULB9160 VERTICAL 149cm 0deg
Project No.	: EI/2008/90012
Applicant	: Nokia
EUT Description	: CDMA2000 Mobile Phone
EUT Model	: RH-120
Test Mode	: Data Link CDMA Callular. Mid
Temp./Humid.	: 25/65
Operator	: Willis

	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Factor	Level	Limit Line	Over Limit	Remar
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	58.13	47.96	12.56	28.06	0.62	-14.88	33.08	40.00	-6.92	Peak
2	75.59	46.68	9.65	27.74	0.70	-17.39	29.29	40.00	-10.71	Peak
3	106.63	41.43	10.74	28.34	0.80	-16.80	24.63	43.50	-18.87	Peak
4	167.74	39.75	12.66	27.93	1.00	-14.27	25.48	43.50	-18.02	Peak
5	276.38	39.78	12.61	27.85	1.37	-13.87	25.91	46.00	-20.09	Peak
6	664.38	31.92	19.79	27.66	2.09	-5.78	26.14	46.00	-19.86	Peak

Remark：

(1) Measuring frequencies from 30 MHz to the 10GHz。

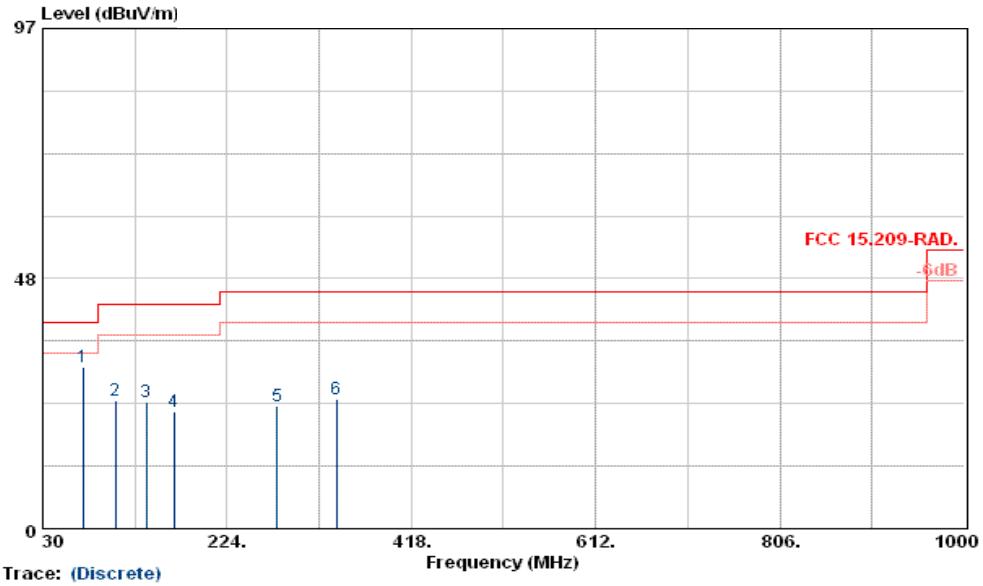
(2) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurement as necessary.

(3) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz and 1GHz to 10GHz was 1MHz

Test Mode: Data Link, CDMA Cellular, Mid Channel Test Date : Sep. 25, 2008

Frequency Range: 30MHz-10GHz Test By: Willis

Temperature : 25 ℃ Humidity : 65 %



Trace: (Discrete)

Site	: RF SITE
Condition	: FCC 15.209-RAD. 3m VULB9160 HORIZONTAL 149cm 359deg
Project No.	: EI/2008/90012
Applicant	: Nokia
EUT Description	: CDMA2000 Mobile Phone
EUT Model	: RH-120
Test Mode	: Data Link CDMA Callular. Mid
Temp./Humid.	: 25/65
Operator	: Willis

	Freq	ReadAntenna Level	Factor	Preamp Factor	Cable Loss	Factor	Level	Limit Line	Over Limit	Remar
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	72.68	48.34	10.32	27.90	0.68	-16.90	31.44	40.00	-8.56	Peak
2	106.63	41.79	10.74	28.34	0.80	-16.80	24.99	43.50	-18.51	Peak
3	138.64	38.71	13.11	28.20	0.93	-14.16	24.55	43.50	-18.95	Peak
4	167.74	37.07	12.66	27.93	1.00	-14.27	22.80	43.50	-20.70	Peak
5	276.38	37.62	12.61	27.85	1.37	-13.87	23.75	46.00	-22.25	Peak
6	339.43	37.70	14.07	28.17	1.50	-12.60	25.10	46.00	-20.90	Peak

Remark：

(1) Measuring frequencies from 30 MHz to the 10GHz。

(2) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurement as necessary.

(3) The IF bandwidth of SPA 30MHz to 1GHz was 100KHz and 1GHz to 10GHz was 1MHz