



Test Report No. : DR50110211L

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<b>SYNOS CO.,LTD</b>	
Applicant	: 802, Tong kwang B/D, #20, 4-Ga Sungbuk-Gu, Bomun-Dong, Seoul Korea.
<b>SYNOS CO.,LTD</b>	
Manufacturer	: 802, Tong kwang B/D, #20, 4-Ga, Bomun-Dong, Sungbuk-Gu, Seoul Korea.
Test Item	: <b>Portable MP3CD Player</b>
FCC ID	<b>QRRSM-C200</b>
Model No.	: <b>SM-C200</b>
Test Specification	: ANSI C 63.4:2001 FCC Part 15C Class B
Tested Date	: November 21 - 23, 2002
Issued Date	: November 27, 2002
Test Result	: <b>Passed</b>
Tested by :	Reviewed by :
	
K.T.LEE	
Name	Signature
	
C.H.AHN	
Name	Signature
Other Aspects :	
Abbreviations : OK, Pass = passed , Fail = failed , N/A = not applicable	
<p>This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by NVLAP or any agency of the U.S.Government.</p>	

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NVLAP LAB CODE 200559-0

**FCC ID: QRRSM-C200**



## TEST SUMMARY

The data collected shows that the **SYNOS CO.,LTD. (Model NO.: SM-C200) Portable MP3CD Player** complies with §15.207 §15.209 and § 15.239 of the FCC Rules.

The highest emission observed, with a minimum margin to the specifications, was at 25.642MHz for conducted emissions with a margin of 5.0dB, and at 120.60MHz for radiated emissions (Pol.: Horizontal, EUT Angle : 108degree , ANT. Height : 100cm)with a margin of 3.97dB.

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report accdg. to NIS 81 / 5 1994.”.

### 5.1 ANTENNA REQUIREMENT

**RESULT : Pass**

### 5.2 CONDUCTED EMISSIONS

**RESULT : Pass**

### 5.3 RADIATED POWER OUTPUT & OCCUPIED BANDWIDTH

**RESULT : Pass**

### 5.4 RADIATED EMISSIONS

**RESULT : Pass**



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## 1. General Remarks

This Report describes the emission characteristics of the tested product.

If the product will be used with additional equipment other than those mentioned in this report or if the tested product will be used against the manufacture's specifications, the compliance with the relevant standards for the system has to be ensured.

## 2. Test Facility

### 2.1 Test Laboratory

Quality control in the testing laboratory is implemented as per ISO/IEC 17025, which is the "General requirements for the competents of calibration and testing laboratory".

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

DIGITAL EMC CO., LTD.

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### 2.2 Measurement Instruments

Refer to each item.



### 3. General Product Information

**QRRSM-C200**

Kind of Equipment	: Portable MP3CD Player
FCC ID	: QRRSM-C200
Model Number	: SM-C200
Serial No.	: N/A
Rating Power Supply	: 1. Use the Adaptor Model No. – SJ-045050V Manufacture – SEUNG JIN ELECTRONICS CO.,LTD Input – AC 120V, 60Hz 7W Output – DC 4.5V, 500mA 2. Use the Battery NiMH 1.2V, 145Ma *2EA
RF Frequency range	: 88.1 ~ 92.5MHz
Dimension	: 134(W) * 140(L) * 16.8(H)mm
Tested Power Supply	: 1 phase 120Vac 60Hz
Applicant	: <b>SYNOS CO.,LTD.</b>
Manufacturer	: <b>SYNOS CO.,LTD.</b>
Date of Receipt of Sample	: 2002-11-20



## 4. Test Set-up and operation modes

### 4.1 Principle of Configuration Selection

**Emission** : The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Test Operation modes

1KHz Signal CD Player Mode.

### 4.3 Support Equipment Used

TYPE	MANUFACTURER	MODEL NO.	SERIAL NO.	Cable
-	-	-	-	-

#### NOTE

- See "photographs" for actual system test setup



## 5. Test Results EMISSION

### 5.1 §15.203 Antenna Requirement

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

--- The antenna Type : PCB Pattern antenna



## 5.2 Conducted Emissions

RESULT : Pass

### 5.2.1 Measurement Procedure

In the range of 0.45MHz to 30MHz the Conducted Emission was measured in accordance with ANSI C 63.4:2001. The test set-up was made according to ANSI C 63.4:2001. A 1m. x 1.5m. wooden table 80cm. high is placed 40cm. away from the vertical wall and 1.5m away from the side wall of the shielded room. Kyoritsu Model KNW-407 and KNW-242(10kHz-30MHz) 50Ω/50uH Line-Impedance Stabilization Networks(LISNs) are bonded to the shielded room. The EUT is powered from the KNW-242 LISN and the support equipment is powered from the KNW-407 LISN. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission. For further description of the configuration refer to the picture of the test set-up.

### 5.2.2 List of Test and Measurement Instruments

Conducted Emission				
Name of Instrument	Model No	Serial No	Manufacturer	Next Cal. Date
Spectrum Analyzer	E4411B	US41062735	Agilent Technologies	2003.04
RFI/Field intensity Meter	KNW-2402	4N-170-3	Kyoritsu Electrical Works	2003.07
LISN	KNW-407	8-317-8	Kyoritsu Electrical Works	2003.06
LISN	KNW-242	8-654-15	Kyoritsu Electrical Works	2003.06

**5.2.3 Conducted Test Data**

1) Test Data: November 23, 2002      Humidity: 45 %  
Temperature: 20 °C      Barometric: 993 mbar

2) Measurement uncertainty (95%, Confidence level, k=2) : +2.2dB / -2.21dB

3) Result

Frequency (MHz)	LISN Pol.	Q.P. Reading [dB $\mu$ V]	A.V Reading [dB $\mu$ V]	Final Result [dB $\mu$ V]	Q.P. Limit [dB $\mu$ V]	Margin [dB]
0.474	N	31.1	-	31.3	48.0	16.7
1.040	N	24.3	-	24.9	48.0	23.1
5.523	N	23.1	-	23.9	48.0	24.1
11.674	N	28.6	-	29.6	48.0	18.4
24.645	N	38.8	-	41.2	48.0	6.8
0.464	L1	36.8	-	37.0	48.0	11.0
1.048	L1	31.5	-	32.1	48.0	15.9
11.584	L1	25.0	-	25.8	48.0	22.2
19.610	L1	31.6	-	33.7	48.0	14.3
23.612	L1	39.6	-	41.7	48.0	6.3
<b>25.642</b>	<b>L1</b>	<b>40.8</b>	<b>-</b>	<b>43.0</b>	<b>48.0</b>	<b>5.0</b>

Table 1: Conducted Test Data

**NOTES:**

1. All modes of operation were investigated and the worst-case emissions are reported.
2. L1 = Phase; N = Neutral
3. See "APPENDIX 1 Conducted measurement Graph"
4. Margin = Q.P. Limit - Q.P. Result
5. Measurement Data's kept in DIGITAL EMC.
6. Result = Cable loss + insertion loss + Reading value
7. If the amplitude measured in the quasi-peak mode is at least 6dB higher than the amplitude measured in the average mode, the level measured in the quasi-peak mode may be reduced by 13dB before comparing it to the limit.



## 5.3 Radiated Power Output & Occupied Bandwidth

RESULT :

Pass

### 5.3.1 Measurement Procedure

The field strength of emissions from intentional radiators operated within the bands 88 ~108MHz was measured in accordance with FCC Part 15C §15.239. The test set-up was made according to ANSI C 63.4:2001.

On open test site, which allows a 3m-distance measurement. The EUT was placed in the center of a wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization (high:1-4m). The turntable has been fully rotated. The highest radiation of the equipment has been recorded. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission. For further description of the configuration refer to the picture of the test set-up.

### 5.3.2 List of Test and Measurement Instruments

Radiated Emission (OATS)				
Name of Instrument	Model No	Serial No	Manufacturer	Next Cal. Date
RFI/Field intensity Meter	KNM-504D	4N-161-4	Kyoritsu Electrical Work	2003.07
Frequency Converter	KCV-604C	4-230-3	Kyoritsu Electrical Work	2003.07
Spectrum Analyzer	E4404B	US41061134	Agilent	2003.04
Biconical antenna	VHA9103	VHA91031946	SCHWARZBECK	2004.10
Biconical antenna	VHA9103	VHA91031946	SCHWARZBECK	2004.10
Amplifier (25dB)	8447D	2944A10144	Agilent	2003.04
Amplifier (30dB)	8449B	3008A01590	Agilent	2003.05
Position Controller	5902T2	14173	TOKIN	N/A
DRIVER	5902T2	14174	TOKIN	N/A
SWITCH	MP59B	6100097292	ANRITSU	N/A

**5.3.3 Radiated Test Data**

1) Test Data: November 22, 2002      Humidity: 31 %  
Temperature: 19 °C      Barometric: 998 mbar

2) Measurement uncertainty(95%, Confidence level, k=2) : +3.42dB / -4.14dB

3) Result ;

Frequency [MHz]	ANT Pol.	Reading [dB $\mu$ V]	T.F [dB(1/m)]	Results [dB $\mu$ V/m]	Limits [dB $\mu$ V/m]	Margin [dB]
88.10	H	30.2	9.0	39.2	48	8.8
<b>92.50</b>	<b>H</b>	<b>30.3</b>	<b>9.8</b>	<b>40.1</b>	<b>48</b>	<b>8.7</b>

Table 2 : Radiated Test Data-general requirement

NOTES:

1. Up to the 10<sup>th</sup> harmonics were investigated according to §15.239 and the worst-case emissions are reported.
2. H = Horizontal; V = Vertical; RBW=120kHz; Margin = Limit – Result
3. T.F : Correction Factors(Cable loss + Antenna factor) – AMP Gain
4. Refer to "Photographs" for actual system test setup.
5. Measurement Data's kept in DIGITAL EMC

**§15.239 limit**

<b>Fundamental Frequency (MHz)</b>	<b>Field strength of fundamental microvolts/meter (dB<math>\mu</math>V/m)</b>
88~108	250 (48)

**5.3.4 Radiated Test Data**

1) Test Data: November 22, 2002      Humidity: 31 %  
Temperature: 19 °C      Barometric: 998 mbar

2) Measurement uncertainty(95%, Confidence level, k=2) : +3.42dB / -4.14dB

3) Result ;

Frequency [MHz]	ANT Pol.	Bandwidth [kHz]	Limits [kHz]	Margin [kHz]
<b>88.10</b>	<b>H</b>	<b>87.74</b>	<b>200</b>	<b>112.26</b>
92.50	H	87.06	200	112.94

Table 3 : Bandwidth Measurements

## NOTES:

1. Emissions from the intentional radiator shall be confined within a band 200kHz wide centered on the operating frequency.
2. The 200kHz band shall lie wholly within the frequency range of 88-108MHz.
3. See "APPENDIX 2 Occupied Bandwidth"
4. Measurement Data's kept in DIGITAL EMC

**§15.239(c) limit**

<b>Fundamental Frequency (MHz)</b>	<b>Bandwidth of the emission (kHz)</b>
88~108	200



## 5.4 Radiated Emission

RESULT :

Pass

### 5.4.1 Measurement Procedure

In the range of 30MHz to 1GHz the Electric Field strength was measured in accordance with ANSI C 63.4:2001. The test set-up was made according to ANSI C 63.4:2001.

On open test site, which allows a 3m-distance measurement. The EUT was placed in the center of a wooden turntable. The height of this table was 0.8m. The measurement was conducted with both horizontal and vertical antenna polarization (high:1-4m). The turntable has been fully rotated. The highest radiation of the equipment has been recorded. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission. For further description of the configuration refer to the picture of the test set-up.

### 5.4.2 List of Test and Measurement Instruments

Radiated Emission (OATS)				
Name of Instrument	Model No	Serial No	Manufacturer	Next Cal. Date
RFI/Field intensity Meter	KNM-504D	4N-161-4	Kyoritsu Electrical Work	2003.07
Frequency Converter	KCV-604C	4-230-3	Kyoritsu Electrical Work	2003.07
Spectrum Analyzer	E4404B	US41061134	Agilent	2003.04
BICONICAL ANT.	VHA9103	VHA91031946	SCHWARZBECK	2004.10
LOG-PERIODIC ANT.	UHALP9108-A1	1098	SCHWARZBECK	2004.10
Amplifier (25dB)	8447D	2944A10144	Agilent	2003.04
Position Controller	5902T2	14173	TOKIN	N/A
DRIVER	5902T2	14174	TOKIN	N/A
SWITCH	MP59B	6100097292	ANRITSU	N/A
Radiated Emission (ANECHOIC CHAMBER-PRE TESTING)				
Spectrum Analyzer	E4404B	US41061134	Agilent	2003.04
Amplifier (25dB)	8447D	2443A03690	Agilent	2003.04
BILOG ANTENNA	CBL6112B	2737	SCHAFFNER	2003.01
CONTROLLER	5900	N/A	TOKIN	N/A

**5.4.3 Radiated Test Data**

1) Test Data: November 21, 2002      Humidity: 31 %  
Temperature: 22 °C      Barometric: 999 mbar

2) Measurement uncertainty(95%, Confidence level, k=2) : +3.42dB / -4.14dB

**3) Result**

Frequency [MHz]	ANT Pol.	Reading [dB $\mu$ V]	T.F [dB(1/m)]	Results [dB $\mu$ V/m]	Limits [dB $\mu$ V/m]	Margin [dB]
101.57	H	52.49	-15.36	37.13	43.5	6.37
<b>120.60</b>	<b>H</b>	<b>52.00</b>	<b>-12.47</b>	<b>39.53</b>	<b>43.5</b>	<b>3.97</b>
169.33	H	47.00	-8.42	38.58	43.5	4.92
237.07	H	48.50	-6.03	37.47	46.0	8.53
270.94	H	42.50	-4.27	38.23	46.0	7.77
914.43	H	30.50	3.30	33.80	46.0	12.2
117.62	V	50.99	-12.89	38.10	43.5	5.4
120.60	V	50.50	-12.47	38.03	43.5	5.47
270.95	V	43.00	-4.27	38.73	46.0	7.27
372.52	V	41.50	-6.33	35.17	46.0	10.83
508.01	V	41.00	-3.43	37.57	46.0	8.43
778.98	V	33.00	-0.32	32.68	46.0	13.32

- No values due to local oscillator less than 20dB for the limit was measured during radiated disturbance.

Table 4 : Radiated Test Data

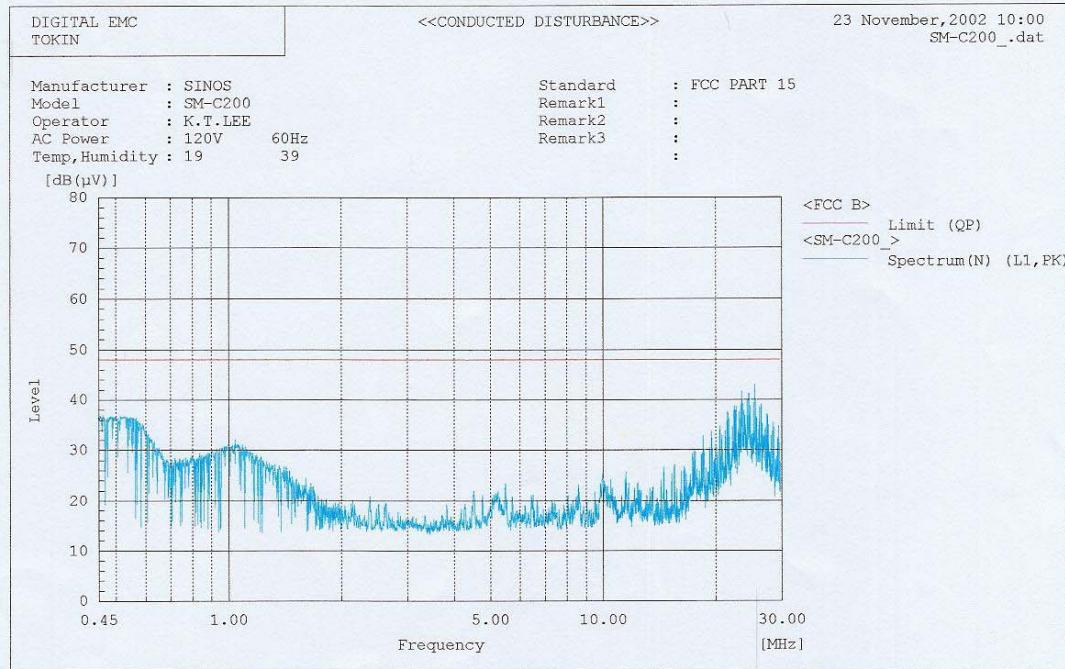
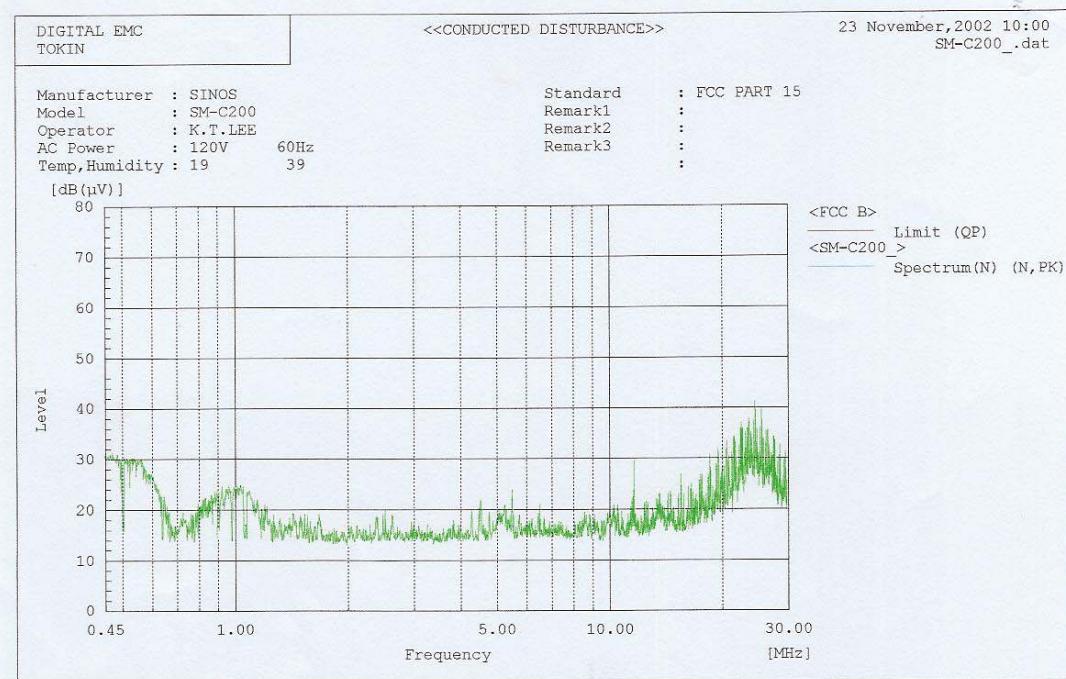
## NOTES:

1. All modes of operation were investigated and the worst-case emissions are reported.
2. H = Horizontal; V = Vertical; RBW=120kHz
3. Margin = Limit – Result
4. T.F : Correction Factors(Cable loss + Antenna factor) – AMP Gain
5. Measurement Data's kept in DIGITAL EMC
6. Sample calculation ;

At Frequency : 120.60MHz

Result = Reading + T.F.=52.00 + (-12.47) = 39.53[dB $\mu$ V/m]

## APPENDIX 1

**CONDUCTED MEASUREMENT GRAPH**


## APPENDIX 2

## OCCUPIED BANDWIDTH

