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## EMI CERTIFICATION REPORT

### SHARP CORPORATION

22-22 Nagaike-cho, Abeno-ku, Osaka  
545-8522 Japan

Date of Issue: January 22, 2010

Test Report No.: HCTE1001FE03

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

**APYNAR0068**

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B / CISPR 22 Class B  
Equipment (EUT) Type : Slide GSM/UMTS Phone with Bluetooth  
Trade Name / Model(s) : SHARP CORPORATION / STX-2  
Port / Connector(s) : DC Input Port / USB Data Port / Headset Port

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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Manager of EMC Tech. Part

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## 1. GENERAL INFORMATION

### 1.1 Product Description

**The SHARP CORPORATION, Model: STX-2, Slide GSM/UMTS Phone with Bluetooth.**

Its basic purpose is used for communications. It transmits from GSM 850 (824.20 MHz to 848.80 MHz), GSM 1 900 (1 850.20 MHz to 1 909.80 MHz), WCDMA 850 (826.40 MHz to 846.60 MHz), WCDMA 1 900 (1 852.40 MHz to 1 907.60 MHz) and receives from GSM 850 (869.20 MHz to 893.80 MHz), GSM 1 900 (1 930.20 MHz to 1 989.80 MHz), WCDMA 850 (871.40 MHz to 891.60 MHz) WCDMA 1 900 (1 932.40 MHz to 1 987.60 MHz).

<b>Model</b>	STX-2
<b>FCC ID</b>	APYNAR0068
<b>E.U.T Type</b>	Slide GSM/UMTS Phone with Bluetooth
<b>TX Frequency</b>	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 826.40 MHz to 846.60 MHz (WCDMA 850) 1 852.40 MHz to 1 907.60 MHz (WCDMA 1 900)
<b>RX Frequency</b>	869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 871.40 MHz to 891.60 MHz (WCDMA 850) 1 932.40 MHz to 1 987.60 MHz (WCDMA 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:

<b>Device Type</b>	<b>Manufacturer</b>	<b>Model Number/ Part Number</b>	<b>FCC ID / DoC</b>	<b>Connected To</b>
Slide GSM/UMTS Phone with Bluetooth	Sharp	STX-2	APYNAR0068	TA
Travel adaptor	Sharp	CNRUSB2	-	E.U.T
Notebook PC	Sam-Sung	NT-R519	DoC	E.U.T
Notebook PC adaptor	DELTA	ADP-60ZH D AD-6019R	-	Notebook PC
Mouse	Microsoft	Intellimouse optical USB and PS/2 compatible	DoC	Notebook PC
USB cable	-	-	-	E.U.T Notebook PC
Ear phone	-	-	-	E.U.T

## 1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
Slide GSM/UMTS Phone with Bluetooth	DC in	Y	-	(P)1.4
	Headset jack	-	N	(D)1.2
	USB data	Y	Y	(P,D)1.4
Notebook PC	USB (Mouse)	-	Y	(D)1.8

\* 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
Slide GSM/UMTS Phone with Bluetooth	DC in	N	-	Y	E.U.T End
	Headset jack	N	-	Y	E.U.T End
	USB data	N	-	Y	Both End
Notebook PC	USB (Mouse)	Y	Notebook PC End	Y	Notebook PC 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, Ichon-si, Kyoungki-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 June 10, 2009. (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

<b>Highest frequency generated or used in the device or on which the device operates or tunes (MHz)</b>	<b>Upper frequency of measurement range (MHz)</b>
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 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

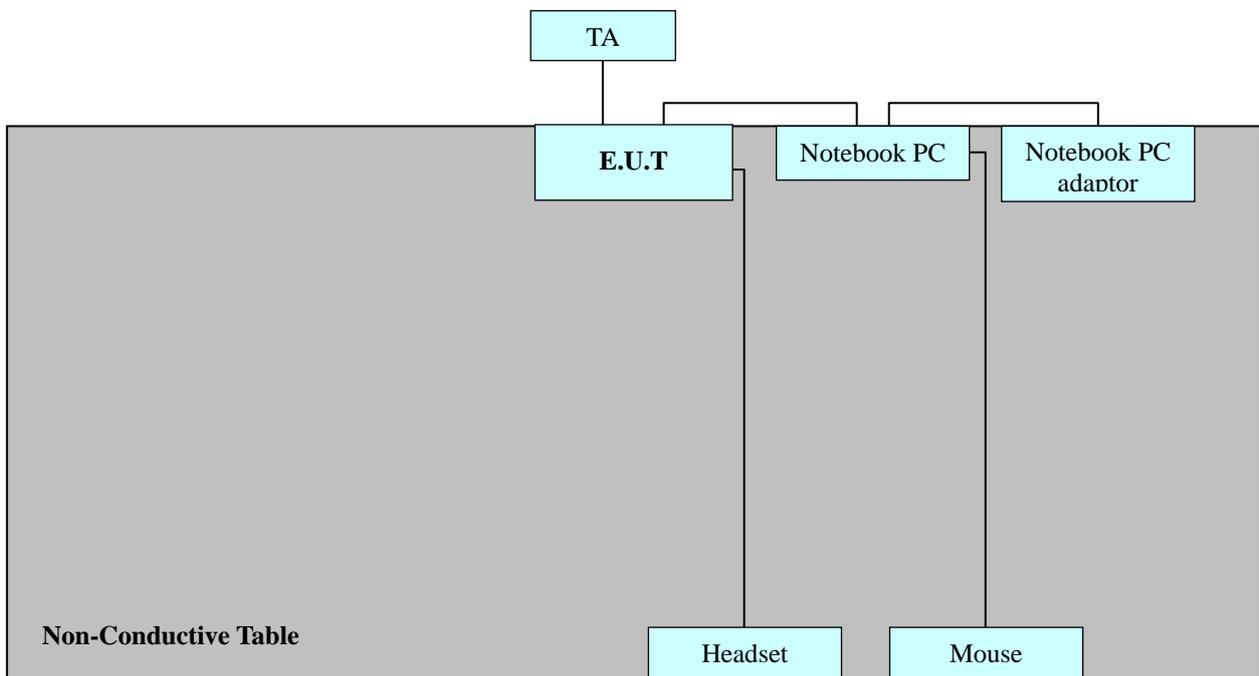
## 2. SYSTEM TEST CONFIGURATION

### 2.1 Configuration of Test System

Power Line Conducted test : E.U.T was connected to LISN, all other peripheral equipment were connected to another 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
GSM Idle (850, 1 900)	
WCDMA Idle (850, 1 900)	
Data Communication	○

#### 3. 2 Radiated Emission Test

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
GSM Idle (850, 1 900)	
WCDMA Idle (850, 1 900)	
Data Communication	○

## 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 10.2 dB
Operating condition	: Data Communication mode
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Temperature	: 22.0 °C
Humidity level	: 38.0 %
Test date	: January 05, 2010

Power Line Conducted Emissions			CISPR 22 Class B		
Frequency (MHz)	Amplitude (dB $\mu$ V)	Conductor	Result	Limit (dB $\mu$ V)	Margin (dB)
0.5520	33.1	HOT	Average	46.0	12.9
0.6240	45.0	NEUTRAL	Quasi-Peak	56.0	11.0
0.6400	45.8	HOT	Quasi-Peak	56.0	10.2
2.6400	31.3	NEUTRAL	Average	46.0	14.7

※ **NOTE:** Refer to page 10 to page 13 for details.

1. All modes of operation were investigated, and the worst-case emissions are reported.
2. Line H = Hot, Line N = Neutral

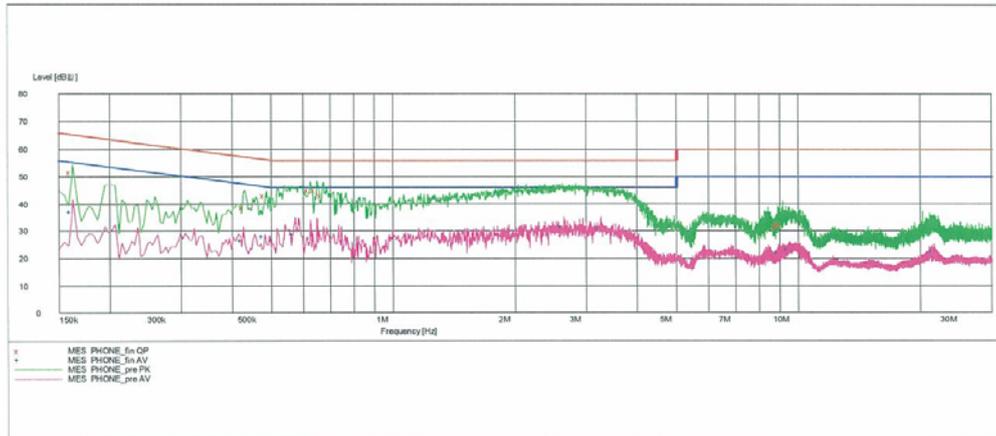
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EMC

EUT : STX-2  
 Manufacturer : SHARP CORPORATION  
 Operating Condition : DATA COMMUNICATION MODE  
 Test Site : SHIELD ROOM  
 Operator : GS-KIM  
 Test Specification : CISPR22 CLASS B  
 Comment : H

**SCAN TABLE: "EN 55022 Voltage"**

Short Description:	EN 55022 Voltage					
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.1 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16
Average						
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16
Average						
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16



**MEASUREMENT RESULT: "PHONE\_fin OP"**

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Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.162100	51.70	10.0	65	13.6	1	---
0.430100	38.60	10.0	57	18.6	1	---
0.486100	43.00	10.0	56	13.2	1	---
0.624000	45.00	10.0	56	11.0	1	---
0.648000	45.00	10.1	56	11.0	1	---
0.672000	43.00	10.1	56	13.0	1	---
8.904000	31.60	10.7	60	28.4	1	---
8.996000	32.40	10.7	60	27.6	1	---
9.140000	32.10	10.7	60	27.9	1	---

**MEASUREMENT RESULT: "PHONE\_fin AV"**

1/5/2010 10:40AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.162100	36.90	10.0	55	18.5	1	---
0.426100	26.30	10.0	47	21.0	1	---

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MEASUREMENT RESULT: "PHONE\_fin AV"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.482100	27.90	10.0	46	18.4	1	---
0.572000	28.50	10.0	46	17.5	1	---
2.640000	31.30	10.2	46	14.7	1	---
3.252000	30.80	10.2	46	15.2	1	---
8.980000	22.00	10.7	50	28.0	1	---
9.464000	23.20	10.7	50	26.8	1	---
21.608000	22.40	11.5	50	27.6	1	---

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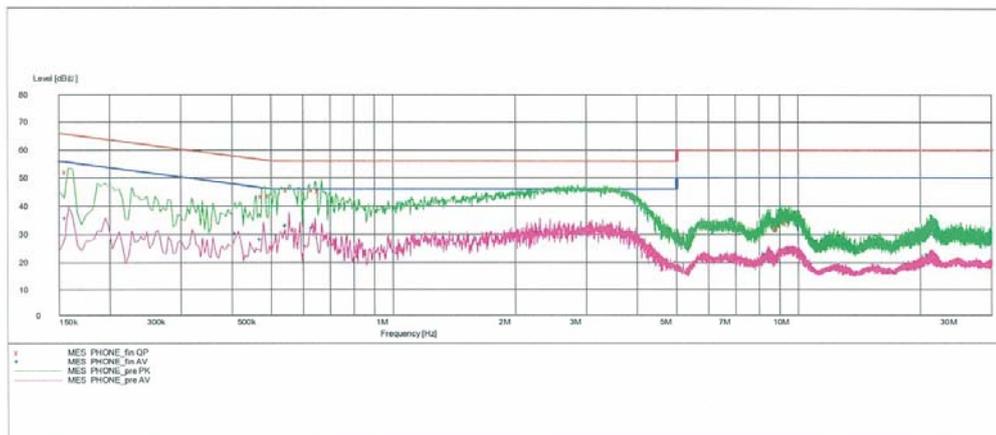
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**EMC**

EUT : STX-2  
 Manufacturer : SHARP CORPORATION  
 Operating Condition : DATA COMMUNICATION MODE  
 Test Site : SHIELD ROOM  
 Operator : GS-KIM  
 Test Specification : CISPR22 CLASS B  
 Comment : N

**SCAN TABLE: "EN 55022 Voltage"**

Short Description:	EN 55022 Voltage					
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width	MaxPeak			
150.1 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16
Average						
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16
Average						
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16



**MEASUREMENT RESULT: "PHONE\_fin QP"**

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Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB		
0.158100	52.10	10.0	66	13.4	1	---
0.482100	43.50	10.0	56	12.8	1	---
0.500000	43.60	10.0	56	12.4	1	---
0.556000	45.70	10.0	56	10.3	1	---
0.640000	45.80	10.1	56	10.2	1	---
0.664000	45.30	10.1	56	10.7	1	---
8.964000	32.00	10.7	60	28.0	1	---
9.032000	32.10	10.7	60	27.9	1	---
9.444000	33.90	10.7	60	26.1	1	---

**MEASUREMENT RESULT: "PHONE\_fin AV"**

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Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB		
0.158100	35.60	10.0	56	19.9	1	---
0.414100	30.20	10.0	48	17.4	1	---

1/5/2010 10:45AM HCT Lab.

MEASUREMENT RESULT: "PHONE\_fin AV"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.478100	28.20	10.0	46	18.2	1	---
0.552000	33.10	10.0	46	12.9	1	---
0.640000	32.30	10.1	46	13.7	1	---
2.300000	30.70	10.2	46	15.3	1	---
8.436000	23.10	10.6	50	26.9	1	---
9.620000	24.90	10.7	50	25.1	1	---
21.112000	22.90	11.5	50	27.1	1	---

1/5/2010 10:45AM HCT Lab.

## 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 4.0 dB  
 Operating condition : Data Communication mode  
 Detector : Quasi-Peak (6 dB Bandwidth: 120 kHz)  
 Temperature : 10.0 °C  
 Humidity level : 60.3 %  
 Test date : January 05, 2010

Frequency	Reading	Ant. Factor	Cable Loss	Ant. POL	Total	Limit	Margin
MHz	dB $\mu$ V	dB/m	dB	(H/V)	dB $\mu$ V/m	dB $\mu$ V/m	dB
82.3	26.6	8.4	1.0	H	36.0	40.0	4.0
140.0	18.5	12.4	1.3	H	32.2	43.5	11.3
235.9	25.4	11.0	1.7	H	38.1	46.0	7.9
296.7	20.3	13.0	1.9	H	35.2	46.0	10.8
307.4	17.1	13.2	1.9	H	32.2	46.0	13.8
396.7	17.7	15.3	2.2	H	35.2	46.0	10.8

## 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 $\mu$ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB $\mu$ V/m value is mathematically converted to its corresponding level in  $\mu$ 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	
	$\mu$ V/m	dB $\mu$ 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. TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Next CAL Date</u>
<b><u>Conducted Emission</u></b>			
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	2010.06.02
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	2010.02.06
<input type="checkbox"/> LISN	Rohde & Schwarz	ENV216	2010.04.01
<input checked="" type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	2010.10.30
<b><u>Radiated Emission</u></b>			
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	2010.10.30
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	2010.12.18
<input checked="" type="checkbox"/> Antenna Master	HD	MA240	-
<input checked="" type="checkbox"/> Turn Table	EMCO	1060	-
<input type="checkbox"/> Communication Antenna	TDK	LPDA-0802	-
<input type="checkbox"/> Antenna Position Tower	HD	240/520/00	-
<input type="checkbox"/> Base Station	Rohde & Schwarz	CMU 200	2010.02.17
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	2010.03.26
<input checked="" type="checkbox"/> RF-Amplifier	MITEQ	AMF-6D-00101800-35. 20P.PS	2010.04.25
<input type="checkbox"/> Bluetooth Base Station	TESCOM	TC-3000A	2011.01.07

## 7. CONCLUSION

The data collected shows that the **SHARP CORPORATION, Model: STX-2, Slide GSM/UMTS Phone with Bluetooth. FCC ID: APYNAR0068** complies with §15.107 and §15.109 of the FCC rules.