RF Exposure Evaluation Declaration

FCC ID:	BKMAE-STI6110B
APPLICANT:	SEIKO EPSON CORPORATION
Application Type:	Certification
Product:	Streaming Media Player
Model No.:	STI6110B
Brand Name:	EPSON
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter (DSS) Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
Test Procedure(s):	KDB 447498 D01v06
Test Date:	August 01, 2021

Reviewed By: (Paddy Chen)

Approved By: (Chenz Ker)

Testing Laboratory
3261

Revision History

Report No.	Version	Description	Issue Date	Note
2106TW0004-U5	V1.0	Original report	2021-08-10	Valid

CONTENTS

Description Page

General Information

Applicant	SEIKO EPSON CORPORATION
Applicant Address	3-5, Owa 3-chome, Suwa-shi, Nagano-ken 392-8502 Japan
Manufacturer	SEIKO EPSON CORPORATION
Manufacturer Address	3-5, Owa 3-chome, Suwa-shi, Nagano-ken 392-8502 Japan
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.	291082
Test Device Serial No.	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

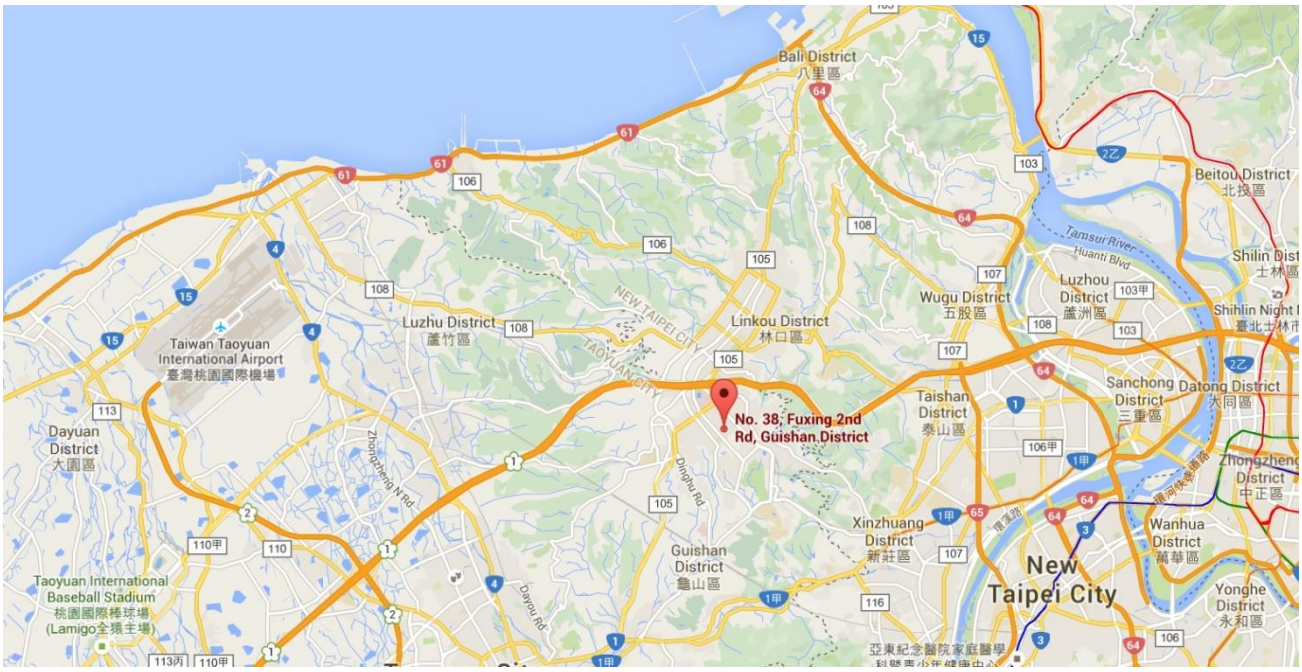
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	Streaming Media Player
Model No.:	STI6110B
Brand Name:	EPSON
Wi-Fi Specification:	802.11a/b/g/n/ac
Bluetooth Specification:	v5.1 (Dual mode)
Power Type	DC 5V

2.2. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T_X Paths	Antenna Gain (dBi)		CDD Directional Gain (dBi)	
			Ant 1	Ant 2	For Power	For PSD
Wi-Fi Antenna						
PCB Antenna	2412 ~ 2462	2	1.8	1.6	1.8	4.81
	5150 ~ 5250	2	6.4	7.1	7.1	10.11
	5725 ~ 5850	2	3.0	2.2	3.0	6.01
Bluetooth Antenna						
PCB Antenna	2402 ~ 2480	1	--	1.6	--	--

Note:

The EUT supports SISO (802.11b only) and Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

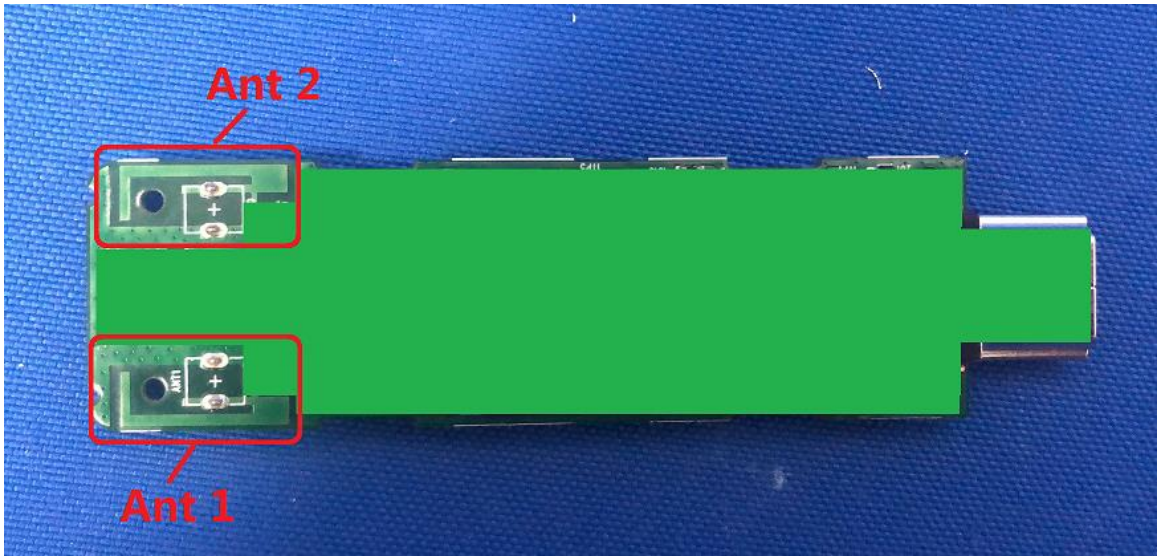
For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,
  Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;
- For power measurements on IEEE 802.11 devices,
  Array Gain = 0 dB for $N_{ANT} \leq 4$;

2.3. Description of Antenna RF Port

Wi-Fi & Bluetooth Antenna RF Port		
Software Control Port	Ant 1 (Wi-Fi)	Ant 2 (Wi-Fi & Bluetooth)



3. RF Exposure Evaluation

3.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where
Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
r = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

3.2. Test Result of RF Exposure Evaluation

Product	Streaming Media Player
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 2.2.

Test Mode	Frequency Band (MHz)	Max Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)
Bluetooth	2402 ~ 2480	12.06	1.6	13.66
802.11b/g/n	2412 ~ 2462	22.09	1.8	23.89
802.11a/n/ac	5180 ~ 5240	18.63	7.1	25.73
	5745 ~ 5825	19.66	3.0	22.66

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)
Bluetooth	2402 ~ 2480	13.66	0.0046	1
802.11b/g/n	2412 ~ 2462	23.89	0.0487	1
802.11a/n/ac	5180 ~ 5240	25.73	0.0744	1
	5745 ~ 5825	22.66	0.0367	1

CONCLUSION:

Due to WLAN 2.4GHz Band or WLAN 5GHz Band can transmit simultaneously with Bluetooth.

The max Power Density at R (20 cm) = $0.0046mW/cm^2 + 0.0744mW/cm^2 = 0.0790mW/cm^2 < 1mW/cm^2$.

So the safety distance is 20cm for **Streaming Media Player** installed without any other radio equipment.

The End

Appendix A - External Photograph

Refer to “ 2106TW0004-External Photo” file.

Appendix B - Internal Photograph

Refer to “ 2106TW0004-Internal Photo” file.