

RF Exposure Evaluation Report

Product Name : Realtime radio module

Model No. : TM4969

FCC ID : 2AHCI-TM4969

Applicant : TOYOTA TECHNICAL DEVELOPMENT CORPORATION

Address : 1-9 Imae, Hanamoto-cho, Toyota Aichi, 470-0334 Japan

Date of Receipt : Jan. 25, 2021

Date of Declaration : Mar. 10, 2021

Report No. : 2110805R-E3082100013

Report Version : V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

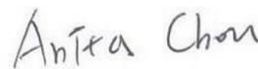
Issued Date: Mar. 10, 2021

Report No.: 2110805R-E3082100013



Product Name	Realtime radio module	
Applicant	TOYOTA TECHNICAL DEVELOPMENT CORPORATION	
Address	1-9 Imae,Hanamoto-cho,Toyota Aichi, 470-0334 Japan	
Manufacturer	Keitsu Electronic Co., Ltd.	
Model No.	TM4969	
FCC ID.	2AHCI-TM4969	
Trade Name	TTDC	
Applicable Standard	KDB 447498 D01 v06	<input checked="" type="checkbox"/> Minimum test separation distance ≥ 20 cm <input type="checkbox"/> For low power devices
Test Result	Complied	

Documented By :



(Senior Engineering Adm. Specialist / Anita Chou)

Tested By :



(Senior Engineer / Wen Lee)

Approved By :



(Director / Vincent Lin)

Revision History

Report No.	Version	Description	Issued Date
2110805R-E3082100013	V1.0	Initial issue of report.	Mar. 10, 2021

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Realtime radio module
Trade Name	TTDC
Model No.	TM4969
FCC ID.	2AHCI-TM4969
Frequency Range	2402 – 2479MHz
Channel Number	78
Type of Modulation	GFSK
Channel Control	Auto
Antenna Type	Patch Antenna
Antenna Gain	Refer to the table “Antenna List”

1.2. Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	NATEC	PA2409S	Patch Antenna	8.1dBi for 2.4 GHz

2. RF Exposure Evaluation

2.1. Standard Applicable

According to KDB 447498 D01 (7.1), A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits.

2.2. 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

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

2.3. Test Result of RF Exposure Evaluation

Product : Realtime radio module
Test Item : RF Exposure Evaluation

Antenna 1-WLAN 2.4G Peak Gain: 8.1dBi

Channel	Frequency	Conducted Peak Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mWc/m ²)	Pass/Fail
01	2402	4.3	2.692	0.0035	1	Pass

Antenna 2-WLAN 2.4G Peak Gain: 8.1dBi

Channel	Frequency	Conducted Peak Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mWc/m ²)	Pass/Fail
01	2402	4.5	2.818	0.0054	1	Pass

Note: The conducted output power is refer to report No.: 2110805R-E3032700115 from the DEKRA.