

Test report No.
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Issued date
FCC ID

: 13280770H-B-R2 : 1 of 17 : June 5, 2020 : Q6ZHWZ1000T

EMI TEST REPORT

Test Report No.: 13280770H-B-R2

Applicant : OMRON HEALTHCARE Co., Ltd.

Type of EUT : WheezeScan

Model Number of EUT : RE-W100

FCC ID : Q6ZHWZ1000T

Test regulation : FCC Part 15 Subpart B: 2019

Test Result : Complied (Refer to SECTION 3.2)

- 1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
- 2. The results in this report apply only to the sample tested.
- 3. This sample tested is in compliance with the limits of the above regulation.
- 4. The test results in this test report are traceable to the national or international standards.
- 5. This test report covers EMC technical requirements.
- It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable) 6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
- 7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.
- 8. The information provided from the customer for this report is identified in SECTION 1.
- 9. This report is a revised version of 13280770H.-B-R1 13280770H-B-R1 is replaced with this report.

Date of test:

April 5, 2020

Representative test engineer:

Hiroyuki Furutaka

Engineer

Consumer Technology Division

Approved by:

Takayuki Shimada

Leader

Consumer Technology Division



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation. *As for the range of Accreditation in NVLAP, you may refer to the WEB address,

http://japan.ul.com/resources/emc accredited/

This report contains data that are not covered by the NVLAP accreditation.

There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No.: 13280770H-B

Revision	Test report No.	Date	Page revised	Contents
-	13280770H-B	April 22, 2020	-	-
(Original)				
1	13280770H-B-R1	May 26, 2020	P. 13	Addition of the following sentence under the test data; Refer to Test Report: 13280770H-A for measurement above 13 GHz.
2	13280770H-B-R2	June 5, 2020	P.6	Correction of the Result description of Radiated emission in Clause 3.2; From "N/A" to "Complied"

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Reference: Abbreviations (Including words undescribed in this report)

Asymmetric Artificial Network ILAC International Laboratory Accreditation Conference ISED AC Alternating Current Innovation, Science and Economic Development Canada AM Amplitude Modulation ISN Impedance Stabilization Network AMN Artificial Mains Network ISO International Organization for Standardization Amp, AMP Amplifier JAB Japan Accreditation Board ANSI American National Standards Institute LAN Local Area Network Ant, ANT Antenna LCL Longitudinal Conversion Loss Access Point LIMS AP Laboratory Information Management System ASK Amplitude Shift Keying LISN Line Impedance Stabilization Network Atten., ATT Attenuator MRA Mutual Recognition Arrangement N/A ΑV Average Not Applicable **BPSK** Binary Phase-Shift Keying NIST National Institute of Standards and Technology BR Bluetooth Basic Rate NS No signal detect. ВТ Bluetooth NSA Normalized Site Attenuation BT LE Bluetooth Low Energy **NVLAP** National Voluntary Laboratory Accreditation Program BandWidth OBW Occupied Band Width BW C.F Correction Factor **OFDM** Orthogonal Frequency Division Multiplexing Cal Int Calibration Interval PK long-term flicker severity CISPR AV CAV Ргт CCK Complementary Code Keying POHC(A) Partial Odd Harmonic Current CDN Coupling Decoupling Network Pol., Pola. Polarization Ch., CH PR-ASK Phase Reversal ASK Channel Comite International Special des Perturbations Radioelectriques CISPR P_{ST} short-term flicker severity Corr. Correction QAM Quadrature Amplitude Modulation CPE QP Quasi-Peak Customer premise equipment CW Continuous Wave QPSK Quadri-Phase Shift Keying DBPSK Differential BPSK r.m.s., RMS Root Mean Square DC Direct Current RBW Resolution Band Width DET Detector RE Radio Equipment REV D-factor Distance factor Reverse maximum absolute voltage change during an observation period Radio Frequency RFID DOPSK Differential OPSK Radio Frequency Identifier DSSS Direct Sequence Spread Spectrum RSS Radio Standards Specifications EDR Enhanced Data Rate Rx e.i.r.p., EIRP Equivalent Isotropically Radiated Power SINAD Ratio of (Signal + Noise + Distortion) to (Noise + Distortion) EM clamp Electromagnetic clamp S/N Signal to Noise ratio EMC ElectroMagnetic Compatibility SA, S/A Spectrum Analyzer **EMI** ElectroMagnetic Interference SG Signal Generator SVSWR EMS ElectroMagnetic Susceptibility Site-Voltage Standing Wave Ratio EN European Norm THC(A) Total Harmonic Current e.r.p., ERP THD(%) Total Harmonic Distortion Effective Radiated Power European Union Test Receiver EUT Equipment Under Test Tx Transmitting VBW Video BandWidth Fac. Factor FCC Federal Communications Commission Vert. Vertical WLAN FHSS Frequency Hopping Spread Spectrum Wireless LAN xDSL. FM Generic term for all types of DSL technology Frequency Modulation Frequency (DSL: Digital Subscriber Line) Freq FSK Frequency Shift Keying Fundamental Fund **FWD** Forward **GFSK** Gaussian Frequency-Shift Keying **GNSS** Global Navigation Satellite System GPS Global Positioning System Hori. Horizontal **ICES** Interference-Causing Equipment Standard I/O Input/Output

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IEC

IEEE

IF

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Intermediate Frequency

International Electrotechnical Commission

Institute of Electrical and Electronics Engineers

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SECTION 1: Customer information

Company Name : OMRON HEALTHCARE Co., Ltd.

Address : 53, Kunotsubo, Terado-cho, Muko, KYOTO, 617-0002 Japan

Telephone Number : +81-75-925-2045 Facsimile Number : +81-75-925-2046 Contact Person : Yoshinori Tsurumi

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (EUT) other than the Receipt Date
- SECTION 4: Operation of EUT during testing
- * The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type : WheezeScan Model Number : RE-W100

Serial Number : Refer to SECTION 4.2

Rating : DC 3.0 V Receipt Date : March 23, 2020

Country of Mass-production : China

Condition : Production prototype

(Not for Sale: This sample is equivalent to mass-produced items.)

Modification of EUT : No Modification by the test lab

2.2 Product Description

Model: RE-W100 (referred to as the EUT in this report) is a WheezeScan.

Radio Specification

Radio Type : Transceiver

Frequency of Operation : 2402 MHz - 2480 MHz

Modulation : GFSK
Antenna type : Chip Antenna
Antenna Gain : 5.05 dBi
Clock frequency (Maximum) : 26 MHz

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B

FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019

except 15.258

Title : FCC 47CFR Part15 Radio Frequency Device

Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin	Result	Remarks
Conducted emission	FCC: ANSI C63.4: 2014 7. AC power - line conducted emission measurements	FCC:Part 15 Subpart B 15.107(a)	N/A	N/A	N/A	*1)
	ISED: RSS-Gen 7.1	ISED: RSS-Gen 7.2				
Radiated emission	FCC: ANSI C63.4: 2014 8. Radiated emission measurements	FCC: Part 15 Subpart B 15.109(a)	N/A	15.14 dB 818.848 MHz,	N/A *1 MHz, Complied -	-
	ISED: RSS-Gen 7.1	ISED: RSS-Gen 7.2 014 FCC: Part 15 Subpart B 15.14 dB 15.109(a) N/A 818.848 MHz, Complied				

^{*}Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420.

a) Refer to APPENDIX 1 (data of Radiated Emission)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

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^{*1)} The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

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3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor k = 2.

Radiated emission

Measurement distance	Frequency	Uncertainty (+/-)	
3 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	5.0 dB
	200 MHz to 1000 MHz	(Horizontal)	5.2 dB
		(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB
		(Vertical)	4.8 dB
	200 MHz to 1000 MHz	(Horizontal)	5.0 dB
		(Vertical)	5.0 dB
3 m	1 GHz to 6 GHz		4.9 dB
	6 GHz to 18 GHz		5.2 dB
1 m	10 GHz to 26.5 GHz		5.5 dB
	26.5 GHz to 40 GHz		5.5 dB
10 m	1 GHz to 18 GHz		5.2 dB

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3.5 Test Location

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*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

	Width x Depth x	Size of reference ground plane (m) /		M aximum
Test site	Height (m)	horizontal conducting plane	Other rooms	measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

^{*} Size of vertical conducting plane (for Conducted Emission test): $2.0 \times 2.0 \text{ m}$ for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of EUT during testing

4.1 **Operating Mode(s)**

Mode	Remarks
1) Normal Operation mode	-

Software : Wheeze

Ver. 01.00.04

4.2 Configuration and peripherals

A

Description of EUT

No.	Item	Item Model number Serial number		Manufacturer	Remarks
A	WheezeScan RE-W100		201910000016U	OMRON HEALTHCARE	EUT
				Co., Ltd.	

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^{*} Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

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SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.4 semi anechoic chamber (Below 1GHz)

No.2 semi anechoic chamber (Above 1GHz)

Temperature : See data Humidity : See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The EUT was set on the center of the tabletop.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Photographs of the set up are shown in Appendix 3.

5.3 Test conditions

Frequency range : 30 MHz - 200 MHz (Biconical antenna) / 200 MHz - 1000 MHz (Logperiodic antenna)

1000 MHz - 13000 MHz (Horn antenna)

Test distance : 3 m

EUT position : Table top

EUT operation mode : See Clause 4.1

5.4 Test procedure

The height of the measuring antenna varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver.

The radiated emission measurements were made with the following detector function of the Test Receiver.

For above 1 GHz, test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

Frequency	Below 1GHz	Above 1GHz *1)
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CISPR AV: BW 1 MHz

^{*1)} The measurement data was adjusted to a 3 m distance using the following Distance Factor. Distance Factor: See Figure 2

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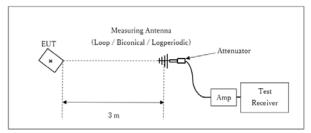
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Figure 2: Test Setup

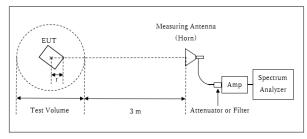
Below 1 GHz



Test Distance: 3 m

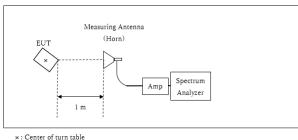
× : Center of turn table

1 GHz - 10 GHz



- r : Radius of an outer periphery of EUT
- ×: Center of turn table

10 GHz - 13 GHz



Distance Factor: $20 \times \log (3.75 \text{ m}^*/3.0 \text{ m}) = 1.94 \text{ dB}$ * Test Distance: (3 + Test Volume /2) - r = 3.75 m

Test Volume: 1.5m

(Test Volume has been calibrated based on CISPR 16-1-4.)

r = 0.0 m

* The test was performed with r = 0.0 m since EUT is small and it was the rather conservative condition.

Distance Factor: $20 \times \log (1.0 \text{ m}^* / 3.0 \text{ m}) = -9.54 \text{ dB}$

*Test Distance: 1 m

- The noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

5.5 Test result

Summary of the test results: Pass

The limit is rounded down to one decimal place.

The test result is rounded off to one or two decimal places, so some differences might be observed.

Date: April 5, 2020 Test engineer: Hiroyuki Furutaka

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APPENDIX 1: Test data

Radiated Emission

Report No. 13280770H Test place Ise EMC Lab.

Semi Anechoic Chamber No.4

Date April 5, 2020
Temperature / Humidity Engineer Hiroyuki Furutaka (Below 1 GHz)

Mode Mode 1

Limit: FCC_Part 15 Subpart B(15.109)_Class B

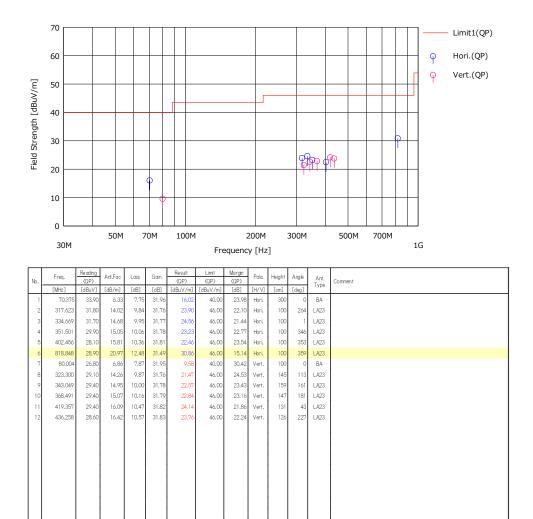


CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATT) - GAIN(AMP)

Except for the above table: adequate margin data below the limits.

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Radiated Emission

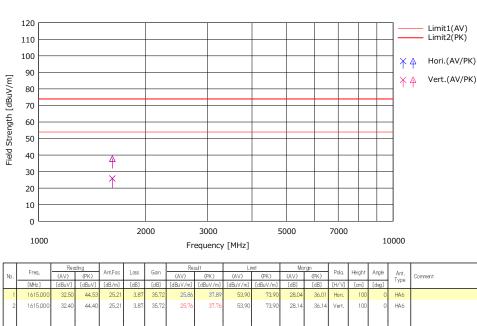
Report No. 13280770H Test place Ise EMC Lab.

Semi Anechoic Chamber No.2

April 5, 2020 Temperature / Humidity 23 deg. C / 41 % RH Engineer Hiroyuki Furutaka (Above 1 GHz)

Mode 1 Mode

Limit: FCC_Part 15 Subpart B(15.109)_Class B



No	Freq.	(AV)	(PK)	Ant Fac	Loss	Gan	(AV)	(PK)	(AV)	(PK)	(AV)	(PK)	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]	[cm]	[deg]	Type	
	1615,000	32.50	44.53	25.21	3.87	35.72	25.86	37.89	53.90	73.90	28.04	36.01	Hori.	100	0	HA6	
	2 1615,000	32.40	44.40	25.21	3.87	35.72	25.76	37.76	53.90	73.90	28.14	36.14	Vert.	100	0	HA6	
\vdash	<u> </u>				$\overline{}$												

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + D-factor) - GAIN(AMP)

Except for the above table: adequate margin data below the limits.

* No signal was detected above 10 GHz.

*Refer to Test Report: 13280770H-A for measurement above 13 GHz.

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APPENDIX 2: Test instruments

Test equipment

Test equ Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	MAEC-02	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	06/29/2018	24
RE	MOS-41	192300	Thermo-Hygrometer	CUSTOM	CTH-201	0013	12/19/2019	12
RE	MMM-01	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/20/2019	12
RE	MJM-27	142228	Measure	KOMELON	KMC-36	-	-	-
	COTS-ME MI-02	178648	EMI measurement program	TSJ	TEPTO-DV	-	_	-
	MAEC-02- SVSWR	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	04/01/2019	24
RE	MHA-06	141512	Horn Antenna 1-18GHz	Schwarzbeck Mess - Elektronik	BBHA9120D	254	09/03/2019	12
RE	MCC-216	141392	Microwave Cable	Junkosha	MWX221	1604S253(1 m) / 537073/126E(5 m)	02/18/2020	12
RE	MPA-10	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	01/07/2020	12
RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	06/28/2018	24
RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM	CTH-201	0010	01/07/2020	12
RE	MMM-10	141545	DIGITAL HITESTER	Hioki	3805	51201148	01/06/2020	12
RE	МЈМ-26	142227	Measure	KOMELON	KMC-36	-	-	-
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	02/05/2020	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess - Elektronik	VHA9103+ BBA9106	1302	08/24/2019	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	03/24/2020	12
RE	MLA-23	141267	Logperiodic Antenna(200-1000MHz)	Schwarzbeck Mess - Elektronik	VUSLP9111B	9111B-192	08/24/2019	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	02/18/2020	12
RE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	03/10/2020	12

^{*}Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:

RE: Radiated emission

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