

TECHNICAL REPORT



Report No: TW2112123-01E

File Reference No: 2022-02-28

Applicant: Eastern Times Technology Co.,Ltd

Product: WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD

Model No: K618-RGB, ET-8536, K618W-RGB

Trademark: REDRAGON

Test Standards: ETSI EN 300 440 v 2.2.1 (2018-07)

Test Result: The EMC testing has been performed on the submitted samples and found in compliance with council Radio Equipment Directive (RED) 2014/53/EU

Approved By

A handwritten signature in black ink that reads 'Terry Tang'.

Terry Tang
EMC Manager

Dated: February 28, 2022

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES.

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Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01



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1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The TIMEWAY Lab does not assume Responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the TIMEWAY Lab.

1.2 Testing Laboratory

SHENZHEN TIMEWAY TESTING LABORATORIES.

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

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Site on File With the Federal Communications and Commission – United States

Registration Number: 744189

For 3m Anechoic Chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A

For 3m Anechoic Chamber

1.3 Details of Applicant

Name: Eastern Times Technology Co.,Ltd

Address: Building D, Nan An Industrial Area, Youganpu Village, Fenggang Town, Dongguan City, Guangdong, China.

1.4 Application Details

Date of Receipt of Application: December 19, 2021

Date of Receipt of Test Item: December 19, 2021

Date of Test: December 19, 2021 ~ February 25, 2022

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1.5 Test Item

Manufacturer: Eastern Times Technology Co.,Ltd

Address: Building D, Nan An Industrial Area, Youganpu Village, Fenggang Town, Dongguan City, Guangdong, China.

Trademark: REDRAGON

Model No.: K618-RGB

Additional Model: ET-8536, K618W-RGB

Description: WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD

Additional Information

Frequency: 2403MHz-2480MHz for Keyboard/dongle Part

Channel Number: 16

Channel List (unit: MHz): 2403, 2424, 2441, 2461, 2414, 2435, 2450, 2470, 2409, 2429, 2455, 2475, 2419, 2445, 2465, 2480

Modulation Type: GFSK

Antenna Designation: PCB Printed Antenna with maximum gain -1.85dBi or keyboard part and 1.66dBi for USB dongle part

Rating: DC5V hosted from PC for USB dongle part; DC5V, 740mA or DC3.7V, 270mA for Keyboard Part

Battery: DC3.7V, 1900mAh or keyboard part (Li-ion battery)

Operation Distance: N/A

Resolution: N/A

Extreme Temp. Tolerance: -20°C to 55°C

Note: Classification according to CEPT/ERC Recommendation 70-03

1.6 Test Standards

ETSI EN 300 440 v 2.2.1 (2018-07)

Short Range Devices (SRD);

Radio equipment to be used in the 1 GHz to 40 GHz frequency range;

Harmonised Standard for access to radio spectrum

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

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2. Technical Test

2.1 Summary of Test Results

No deviations from the technical specification(s) were ascertained in the course of the tests Performed	
Final Verdict: (Only "Passed" if all Measurements are "Passed")	Pass

2.2 Test Report

Test Report Reference

List of Measurements	
Parameter to be measured	Clause
Transmitter Parameters	
Transmitter Requirements	Clause 4.2.1
Equivalent Isotropically Radiated Power (eirp)	Clause 4.2.2
Permitted Range of Operating Frequencies	Clause 4.2.3
Unwanted emissions in the spurious domain	Clause 4.2.4
Duty Cycle	Clause 4.2.5
Receiver Parameters	
Receiver Requirements	Clause 4.3
Adjacent Band Selectivity	Clause 4.3.3
Blocking or Desensitisation	Clause 4.3.4
Receiver Spurious Emissions	Clause 4.3.5

Note: The clause numbers are referenced to ETSI EN 300 440 v 2.2.1 (2018-07).

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Clause 4.2.1 Transmitter Requirements

The transmitter with a dedicated antenna.

Clause 4.2.2 Equivalent Isotropically Radiated Power (eirp)

For Transmitter

EIRP is calculated by method described under EN 300 440 sub clause 4.2.2.3

Conducted measurements

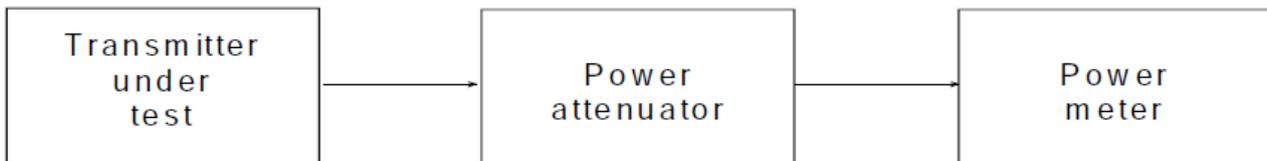


Figure 2: Measurement arrangement

For practical reasons, measurements shall be performed only at the highest power level at which the transmitter is intended to operate. The measurement arrangement in figure 2 shall be used.

The measurement shall be performed preferably in the absence of modulation.

When it is not possible to measure it in the absence of modulation, this fact shall be stated in test reports.

The transmitter shall be set in continuous transmission mode. If this is not possible, the measurements shall be carried out in a period shorter than the duration of the transmitted burst. It may be necessary to extend the duration of the burst.

The transmitter shall be connected to an artificial antenna (see clause 5.8.2) and the power delivered to this artificial antenna shall be measured.

The equivalent isotropically radiated power is then calculated from the measured value, the known antenna gain, relative to an isotropic antenna, and if applicable, any losses due to cables and connectors in the measurement system.

For Transmitter:

Keyboard Part

Test Conditions		-6 dB transmitter bandwidth		
		Low Freq. 2403MHz	Mid Freq. 2441MHz	High Freq. 2480MHz
T _{nor} (25°C)	V _{nor} (3.7V)	1323kHz	1313kHz	1303kHz

USB Dongle Part

Test Conditions		-6 dB transmitter bandwidth		
		Low Freq. 2403MHz	Mid Freq. 2441MHz	High Freq. 2480MHz
T _{nor} (25°C)	V _{nor} (230V)	1316MHz	1302MHz	1289MHz

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For Transmitter:
Keyboard Part

Test Conditions		Transmitter Power (Limit 10dBm) EIRP					
		Low Freq. 2403MHz		Mid Freq. 2441MHz		High Freq. 2480MHz	
T _{nor} (25°C)	V _{nor} (3.7V)	Pk	-3.24	Pk	-3.18	Pk	-3.99
T _{min} (-10°C)	V _L (4.2V)	Pk	-3.22	Pk	-3.16	Pk	-3.97
T _{max} (+55°C)	V _L (4.2V)	Pk	-3.20	Pk	-3.14	Pk	-3.95
T _{min} (-20°C)	V _H (3.3V)	Pk	-3.29	Pk	-3.23	Pk	-4.04
T _{max} (+55°C)	V _H (3.3V)	Pk	-3.27	Pk	-3.21	Pk	-4.02

Dongle Part

Test Conditions		Transmitter Power (Limit 10dBm) EIRP					
		Low Freq. 2403MHz		Mid Freq. 2441MHz		High Freq. 2480MHz	
T _{nor} (25°C)	V _{nor} (230V)	Pk	-3.12	Pk	-3.09	Pk	-3.79
T _{min} (-10°C)	V _L (207V)	Pk	-3.17	Pk	-3.14	Pk	-3.84
T _{max} (+55°C)	V _L (207V)	Pk	-3.15	Pk	-3.12	Pk	-3.82
T _{min} (-10°C)	V _H (253V)	Pk	-3.10	Pk	-3.07	Pk	-3.77
T _{max} (+55°C)	V _H (253V)	Pk	-3.08	Pk	-3.05	Pk	-3.75

Note:

- (1) The EUT is a stand-alone radio device. The keyboard part is powered Li-ion battery. The USB dongle part is powered by PC, so the ac source is the power.
- (2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.
- (3) EIRP=Reading + Loss + Antenna Gain

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Limits: EN 300 440, Clause 4.2.2.4

Table 2: Maximum radiated peak power (e.i.r.p.)

Frequency Bands	Power	Application	Notes
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Non-specific short range devices	
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Radio determination devices	
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Non-specific short range devices	
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radio determination devices	
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radio determination devices	
10,5 GHz to 10,6 GHz	500 mW e.i.r.p.	Radio determination devices	
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radio determination devices	
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radio determination devices	See annex F
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Non-specific short range devices and Radio determination devices	

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Clause 4.2.3 Permitted Range of Operating Frequencies

For Transmitter:

Keyboard Part

Test Conditions		Frequency (MHz) at which-30 dBm occurs	
		Low Frequency (f_L) 2403MHz	High Frequency (f_H) 2480MHz
T_{nor} (25°C)	V_{nor} (3.7V)	2401.65230	2481.20741
T_{min} (-10°C)	V_L (4.2V)	2401.65251	2481.20762
T_{max} (+55°C)	V_L (4.2V)	2401.65225	2481.20736
T_{min} (-10°C)	V_H (3.3V)	2401.65217	2481.20755
T_{max} (+55°C)	V_H (3.3V)	2401.65219	2481.20760

USB Dongle Part

Test Conditions		Frequency (MHz) at which-30 dBm occurs	
		Low Frequency (f_L) 2403MHz	High Frequency (f_H) 2480MHz
T_{nor} (25°C)	V_{nor} (230V)	2401.65142	2481.20598
T_{min} (-20°C)	V_L (207V)	2401.65129	2481.20587
T_{max} (+55°C)	V_L (207V)	2401.65137	2481.20592
T_{min} (-20°C)	V_H (253V)	2401.65133	2481.20605
T_{max} (+55°C)	V_H (253V)	2401.65128	2481.20588

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Keyboard Part

Test Conditions		Frequency (MHz) at which 99%BW occurs	
		Low Frequency (f _L) 2403MHz	High Frequency (f _H) 2480MHz
T _{nor} (25°C)	V _{nor} (3.7V)	2401.90281	2481.03707
T _{min} (-10°C)	V _L (4.2V)	2401.90293	2481.03703
T _{max} (+55°C)	V _L (4.2V)	2401.90286	2481.03712
T _{min} (-10°C)	V _H (3.3V)	2401.90275	2481.03705
T _{max} (+55°C)	V _H (3.3V)	2401.90290	2481.03712

USB Dongle Part

Test Conditions		Frequency (MHz) at which 99%BW occurs	
		Low Frequency (f _L) 2403MHz	High Frequency (f _H) 2480MHz
T _{nor} (25°C)	V _{nor} (230V)	2401.90106	2481.03589
T _{min} (-20°C)	V _L (207V)	2401.90095	2481.03596
T _{max} (+40°C)	V _L (207V)	2401.90097	2481.03588
T _{min} (-20°C)	V _H (253V)	2401.90109	2481.03593
T _{max} (+40°C)	V _H (253V)	2401.90112	2481.03598

Note:

- (1) The EUT is a stand-alone radio device. The Keyboard part is powered Li-ion battery. The USB dongle part is powered by PC, so the ac source is the power.
- (2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.

Limits EN 300 440 Clause 4.2.3.5

Under Normal Test Conditions	F _L >2400MHz, f _H <2483.5
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**Clause 4.2.4 Spurious Emissions
(Radiated)**

Product	WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD	Test Mode	Low and High Channel
Test Item	Spurious Emissions data	Temperature	25°C
Test Voltage	DC5V(Dongle), DC3.7V (keyboard)	Humidity	56%RH
Test Result	Pass	Model:	K618-RGB

Note:

1. Measurements were done on low & high channels, the worst case are submitted in the report.
2. The spurious emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges.
3. The test frequency range is from 25M-25G and please see clause 4.2.4.3.3 of EN 300 440 for the test method.

Low Channel (2403MHz) for keyboard Part

Horizontal			Vertical		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
181.43	100	-70.4	99.44	100	-70.6
4804	1000	-46.2	4804	1000	-47.1
Measurement Uncertainty		4. 7dB			

High Channel (2480MHz) for keyboard Part

Horizontal			Vertical		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
164.24	100	-71.2	120.61	100	-70.1
4960	1000	-45.9	4960	1000	-46.5
Measurement Uncertainty		4. 7dB			

Low Channel for USB Dongle Part

Lowest Frequency			Highest Frequency		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
236.87	100	-70.3	-	-	NF
Measurement Uncertainty		4. 7dB			

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High Channel for USB Dongle Part

Lowest Frequency			Highest Frequency		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
251.70	100	-71.2	-	-	NF
Measurement Uncertainty		4.7dB			

Limits EN 300 440, Clause 4.2.4.4

Table 3: Spurious emissions

Frequency ranges	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1 000 MHz	Frequencies > 1 000 MHz
State			
Operating	4 nW	250 nW	1 μW
Standby	2 nW	2 nW	20 nW

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**Clause 4.2.5 Duty Cycle
For Transmitter**

The EUT is WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD intends to use in household and office or related application, It's declared by the manufacturer as a duty ratio up to 100%

Product	WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD	Test Mode	Low, High and Middle Channel
Test Item	Duty Cycle	Temperature	25°C
Test Voltage	DC5V(Dongle), DC3.7V (keyboard)	Humidity	56%RH
Test Result	Pass	Model:	K618-RGB

X = Duty Cycle Ratio, Up to 100%

Limits EN 300 440-1, Clause 4.2.5.4

Table 4: Duty cycle limits

Frequency Band	Duty cycle	Application	Notes
2 400 MHz to 2 483,5 MHz	No Restriction	Generic use	
2 400 MHz to 2 483,5 MHz	No Restriction	Radiodetermination	
(a) 2 446 MHz to 2 454 MHz	No Restriction	RFID	Limits shown in Annex G shall apply
(b) 2 446 MHz to 2 454 MHz	≤ 15 %	RFID	Limits shown in Annex G shall apply
5 725 MHz to 5 875 MHz	No Restriction	Generic use	
9 200 MHz to 9 500 MHz	No Restriction	Radiodetermination	
9 500 MHz to 9 975 MHz	No Restriction	Radiodetermination	
10,5 GHz to 10,6 GHz	No Restriction	Radiodetermination	
13,4 GHz to 14,0 GHz	No Restriction	Radiodetermination	
17,1 GHz to 17,3 GHz	DAA or equivalent techniques	Radiodetermination, limited to GBSAR detecting and movement and alert applications	Limits shown in Annex I shall apply
24,0 GHz to 24,25 GHz	No Restriction	Generic use and for radiodetermination	

NOTE: The spectrum ranges in some entries are not harmonised throughout all EU territory, specifically entries 4, 9, and 11 have been identified as such. Implementers are cautioned to refer to CEPT/ERC Recommendation 70-03 [i.2] as well as current National Radio plans to verify acceptance within intended regions of use.

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Clause 4.3 Receiver Requirements

For Receiver

Receiver Classification, Table 2 of EN300 440

Table 5: Receiver categories

Receiver category	Relevant receiver clauses	Risk assessment of receiver performance
1	4.3.3, 4.3.4 and 4.3.5	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person).
2	4.3.4 and 4.3.5	Medium reliable SRD communication media e.g. causing inconvenience to persons, which cannot simply be overcome by other means.
3	4.3.5	Standard reliable SRD communication media e.g. Inconvenience to persons, which can simply be overcome by other means (e.g. manual).

Note: The EUT (Rx Part) belongs to Class 3

Clause 4.3.3 Adjacent Band Selectivity

For Receiver

Product	WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD	Test Mode	Low and High Channel
Test Item	Adjacent Band Selectivity	Temperature	25°C
Test Voltage	DC5V(Dongle), DC3.7V (keyboard)	Humidity	56%RH
Test Result	Pass	Model:	K618-RGB

Keyboard under receiving mode

Low Channel-2403MHz

Adjacent channel selectivity	Limit
-30.5	-38.83

High Channel-2480MHz

Adjacent channel selectivity	Limit
-29.1	-39.04

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USB Dongle under receiving mode

Low Channel-2403MHz

Adjacent channel selectivity	Limit
-31.3	-38.81

High Channel-2480MHz

Adjacent channel selectivity	Limit
-31.6	-38.99

Limit

The adjacent channel selectivity of the equipment under specified conditions shall not be less than $-30 \text{ dBm} + k$.

The correction factor, k , is as follows:

$$k = -20 \log f - 10 \log BW$$

Where:

- f is the frequency in GHz;
- BW is the channel bandwidth in MHz.

The factor k is limited within the following:

$$-40 < k < 0 \text{ dB.}$$

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Clause 4.3.4 Blocking or Desensitization

For Receiver

Product	WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD	Test Mode	Low and High Channel
Test Item	Blocking or Desensitization	Temperature	25°C
Test Voltage	DC5V for USB dongle part, DC3.7V for keyboard Part	Humidity	56%RH
Test Result	Pass	Model:	K618-RGB

Keyboard under receiving mode

Low Channel-2403MHz

Wanted Signal (MHz)	Unwanted Signal (MHz)	Blocking Level (dBm)	Limit	Result
2403	2403-10	-49.2	-68.83	Pass
2403	2403-20	-43.4	-68.83	Pass
2403	2403-50	-35.8	-68.83	Pass

High Channel-2480MHz

Wanted Signal (MHz)	Unwanted Signal (MHz)	Blocking Level (dBm)	Limit	Result
2480	2480+10	-50.1	-69.04	Pass
2480	2480+20	-42.4	-69.04	Pass
2480	2480+50	-35.2	-69.04	Pass

Note: the receive channel bandwidth is 2MHz

USB Dongle under receiving mode

Low Channel-2403MHz

Wanted Signal (MHz)	Unwanted Signal (MHz)	Blocking Level (dBm)	Limit	Result
2403	2403-10	-50.4	-68.81	Pass
2403	2403-20	-44.3	-68.81	Pass
2403	2403-50	-39.7	-68.81	Pass

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High Channel-2480MHz

Wanted Signal (MHz)	Unwanted Signal (MHz)	Blocking Level (dBm)	Limit	Result
2480	2480+10	-49.7	-68.99	Pass
2480	2480+20	-44.5	-68.99	Pass
2480	2480+50	-38.1	-68.99	Pass

Note: the receive channel bandwidth is 1MHz

Limit

The blocking level, for any frequency within the specified ranges, shall not be less than the values given in table 6, except at frequencies on which spurious responses are found.

Table 6: Limits for blocking or desensitization

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	-60 dBm + k

The correction factor, k, is as follows:

$$k = -20 \log f - 10 \log BW$$

Where:

- f is the frequency in GHz;
- BW is the channel bandwidth in MHz.

The factor k is limited within the following:

$$-40 \text{dB} < k < 0 \text{dB}$$

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**Clause 4.3.5 Receiver Spurious Emissions
 (Radiated)**

Product	WIRED/2.4G/BT MECHANICAL GAMING KEYBOARD	Test Mode	Low and High Channel
Test Item	Spurious Emissions data	Temperature	25°C
Test Voltage	DC5V for USB dongle part and DC 3.7V for keyboard Part	Humidity	56%RH
Test Result	Pass	Model:	K618-RGB

Note:

1. Measurements were done on low & high channels, the worst case are submitted in the test report.
2. The receiver spurious emissions were done with different settings, using the relevant and pre-amplifiers for the relevant frequency ranges.

Low Channel (2403MHz) for keyboard Part

Horizontal			Vertical		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
230.25	100	-71.7	260.32	100	-71.7
Measurement Uncertainty		4. 7dB			

High Channel (2480MHz) for keyboard Part

Horizontal			Vertical		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
132.72	100	-72.4	169.43	100	-72.8
Measurement Uncertainty		4. 7dB			

Low Channel (2403MHz) for USB Dongle Part

Horizontal			Vertical		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
357.21	100	-70.5	276.74	100	-71.3
Measurement Uncertainty		4. 7dB			

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High Channel (2480MHz) for USB Dongle Part

Horizontal			Vertical		
F(MHz)	Band-Width(kHz)	Level (dBm)	F(MHz)	Band-Width(kHz)	Level(dBm)
203.52	100	-71.4	89.33	100	-71.2
Measurement Uncertainty		4.7dB			

- Note: 1. All reading are peak; Scan form 25MHz to 25GHz; find the maximum radiation frequency to measure.
2. Both the Keyboard and USB dongle under receiving mode
3. Worse case is recorded

Limits EN 300 440, Clause 4.3.5.4

The power of any spurious emission shall not exceed 2 nW in the range 25 MHz to 1 GHz and shall not exceed 20 nW on frequencies above 1 GHz.

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3.0 Product Labelling

CE Mark label specification

Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



Mark Location: Rear enclosure



4. Photographs – Test Setup

Spurious Radiated emission test view



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Spurious Radiated emission test view



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5.0 Photographs – EUT

Outside View- keyboard



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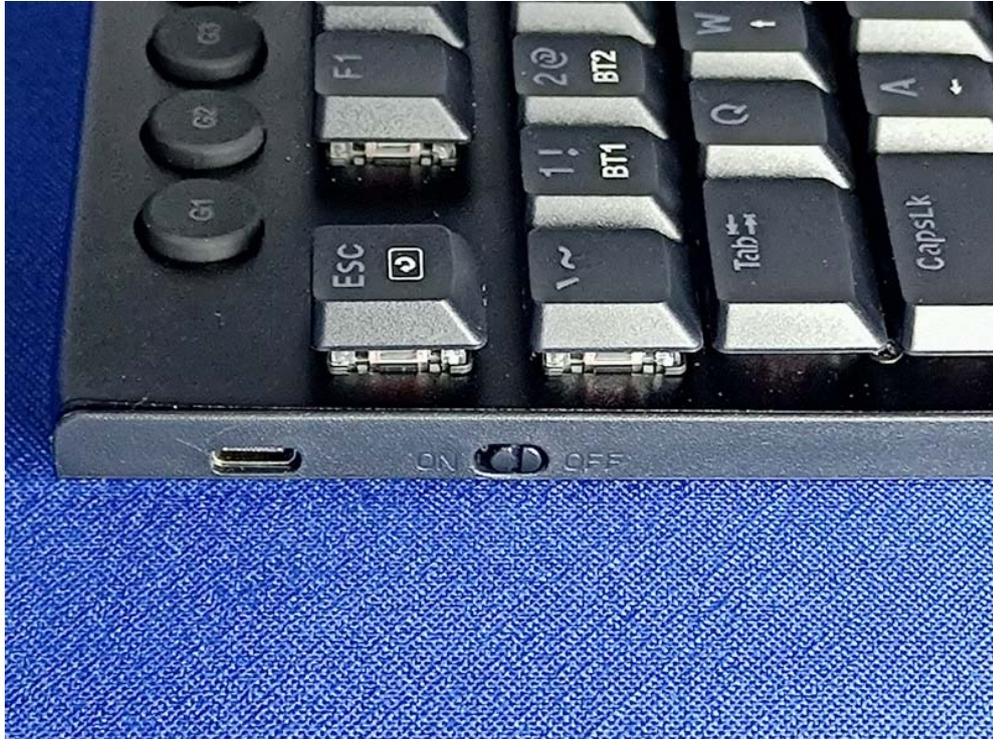
Outside View- keyboard



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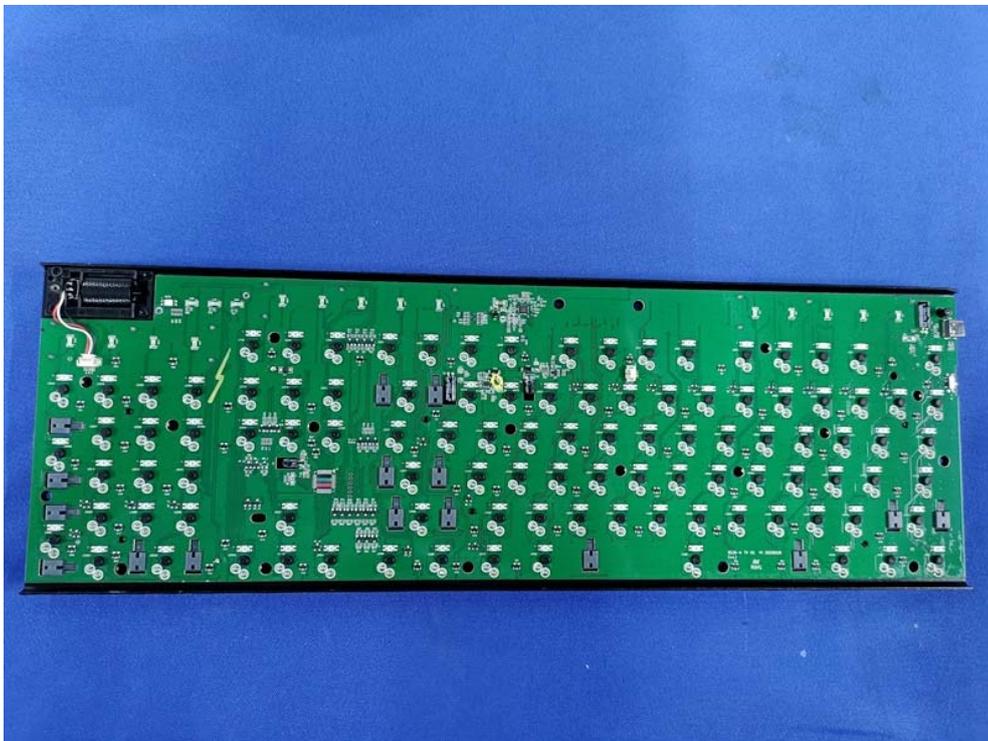
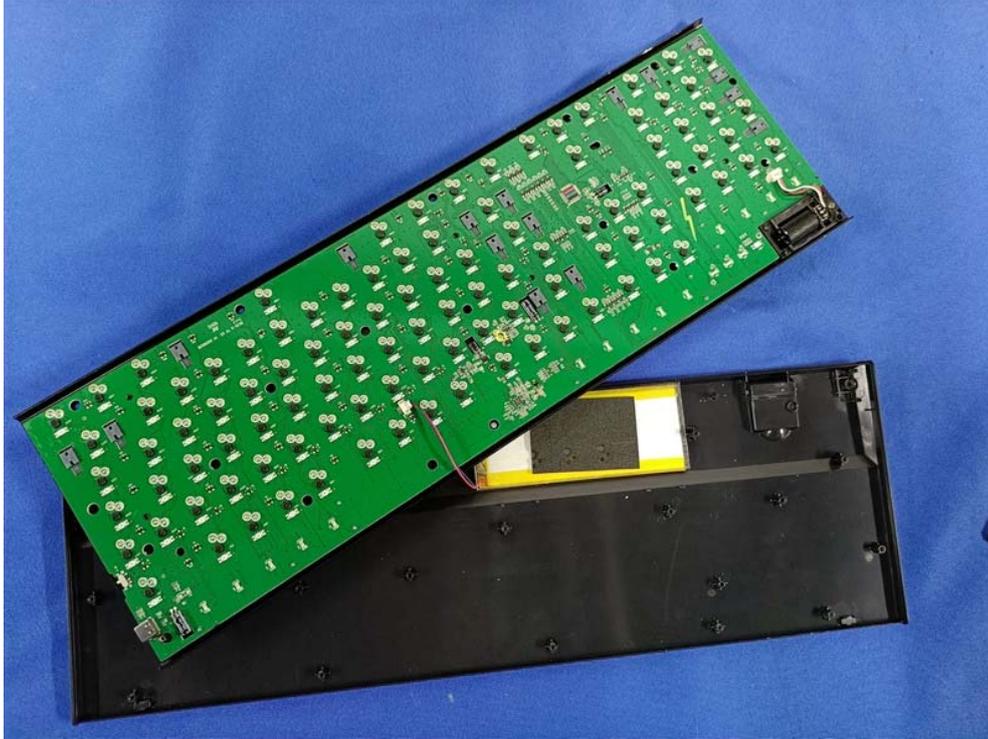
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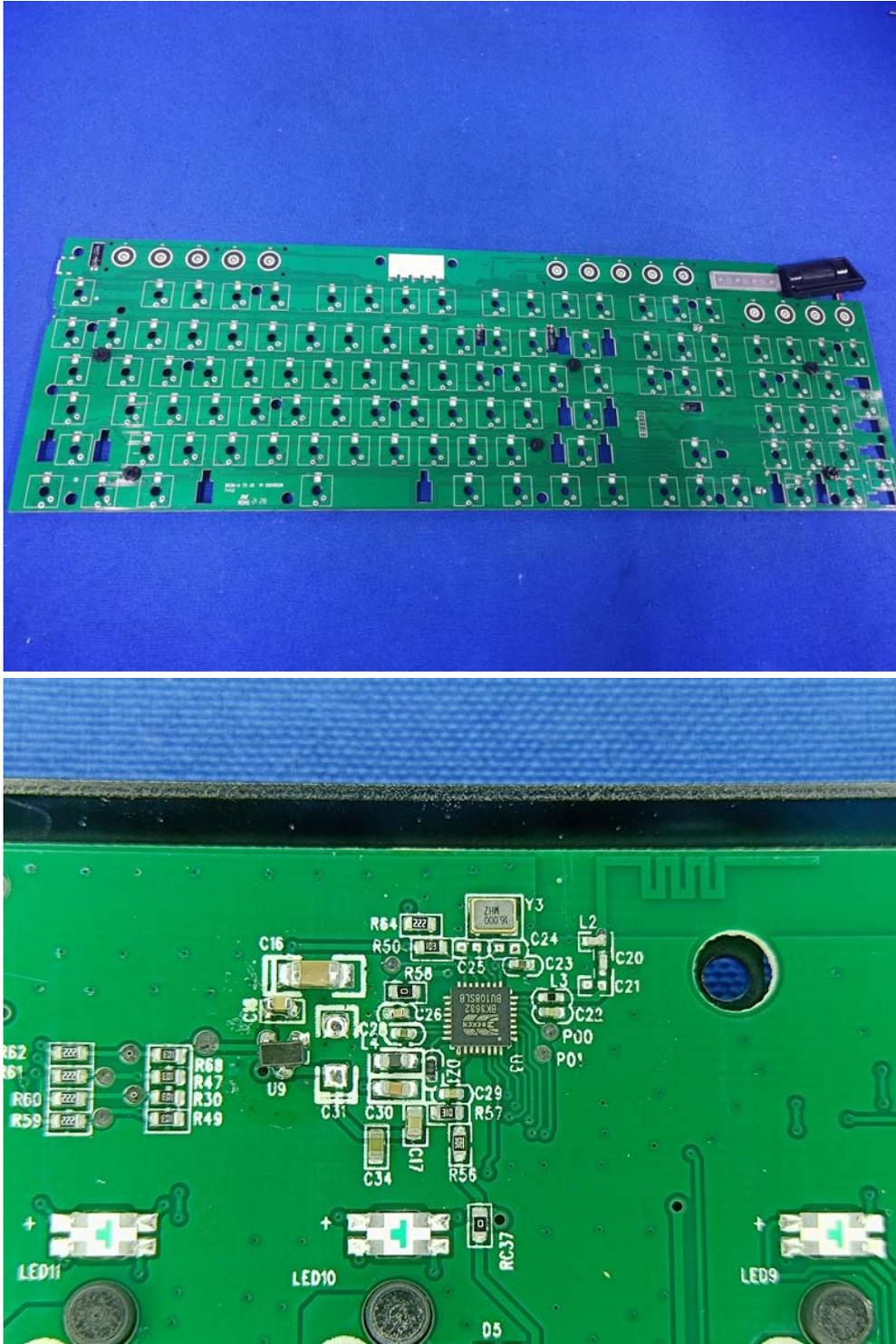
Inside View- keyboard



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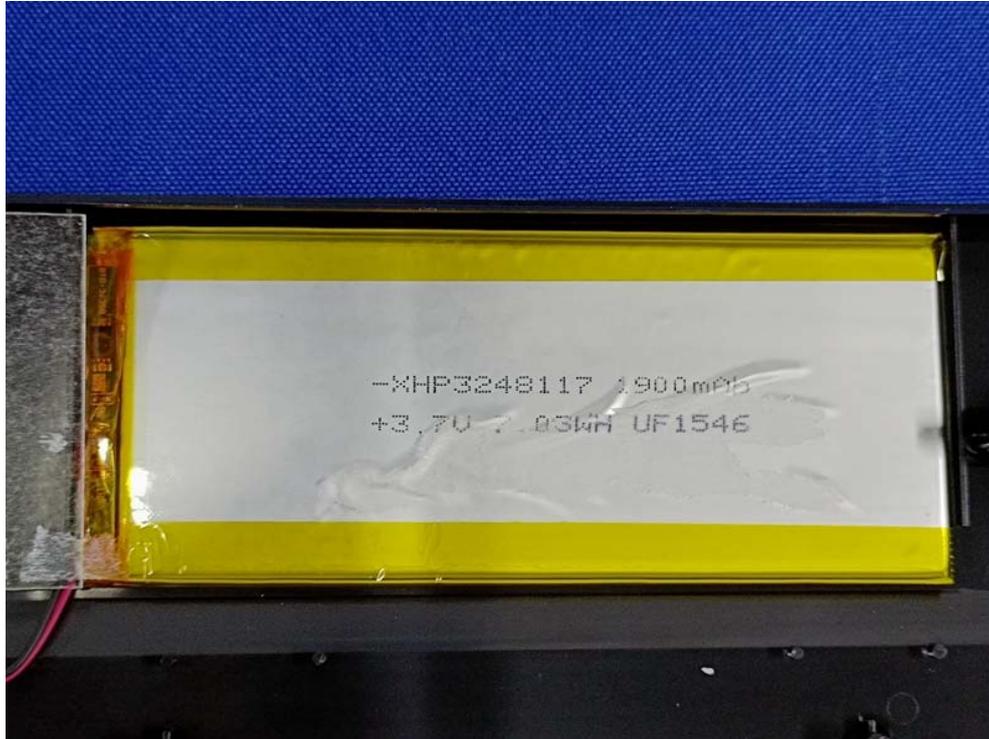
Inside View- keyboard



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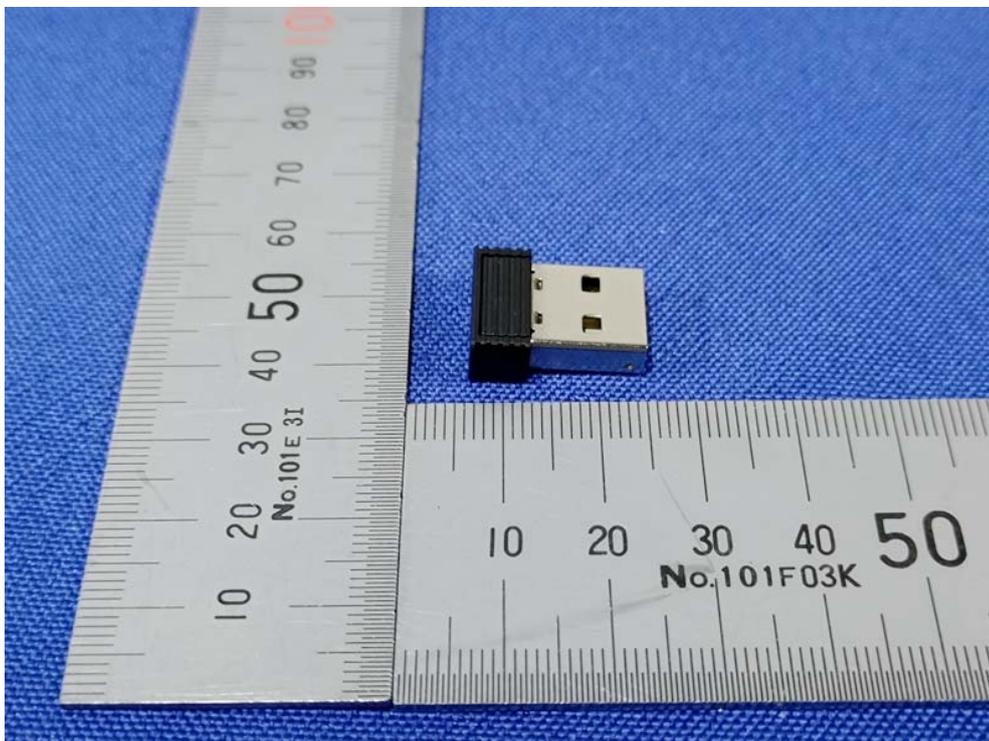
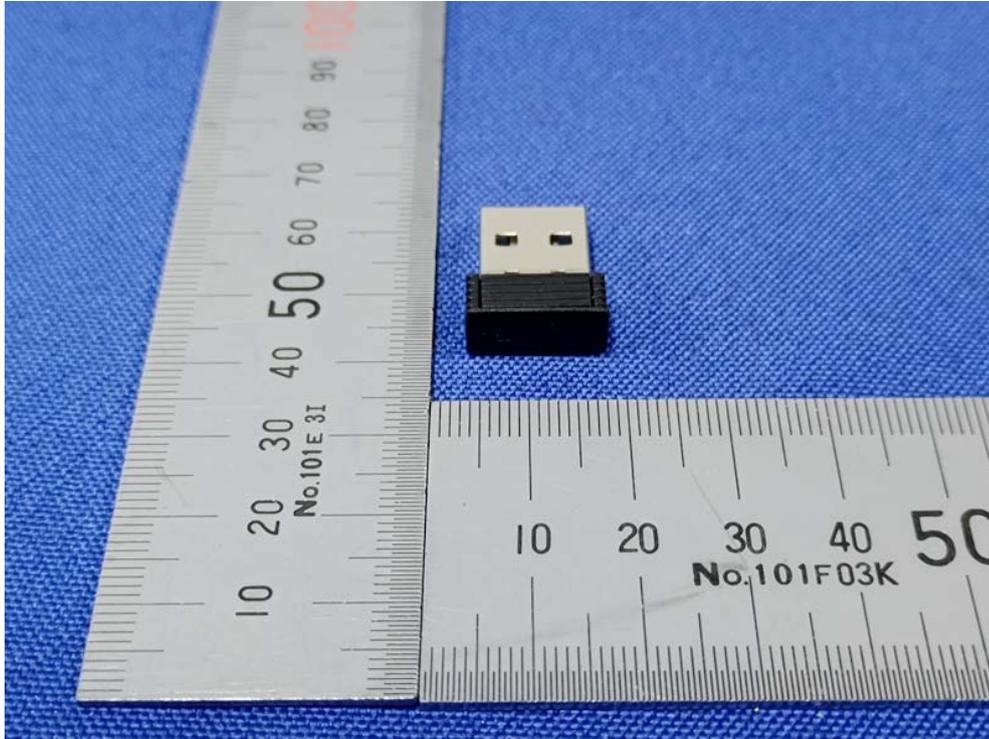
Inside View- keyboard



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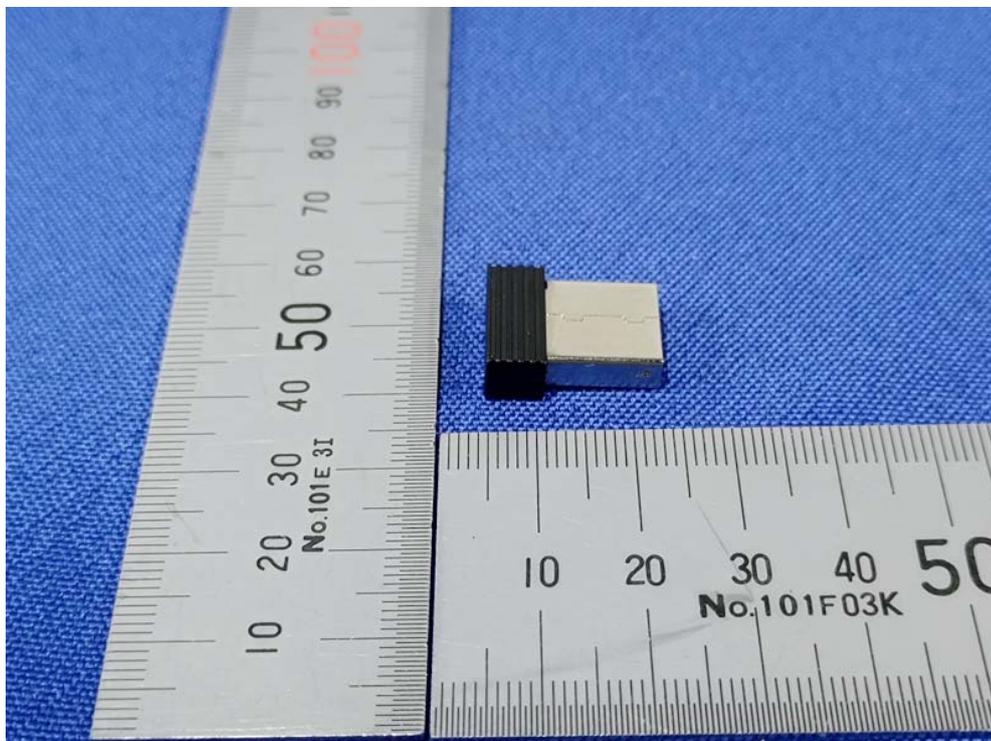
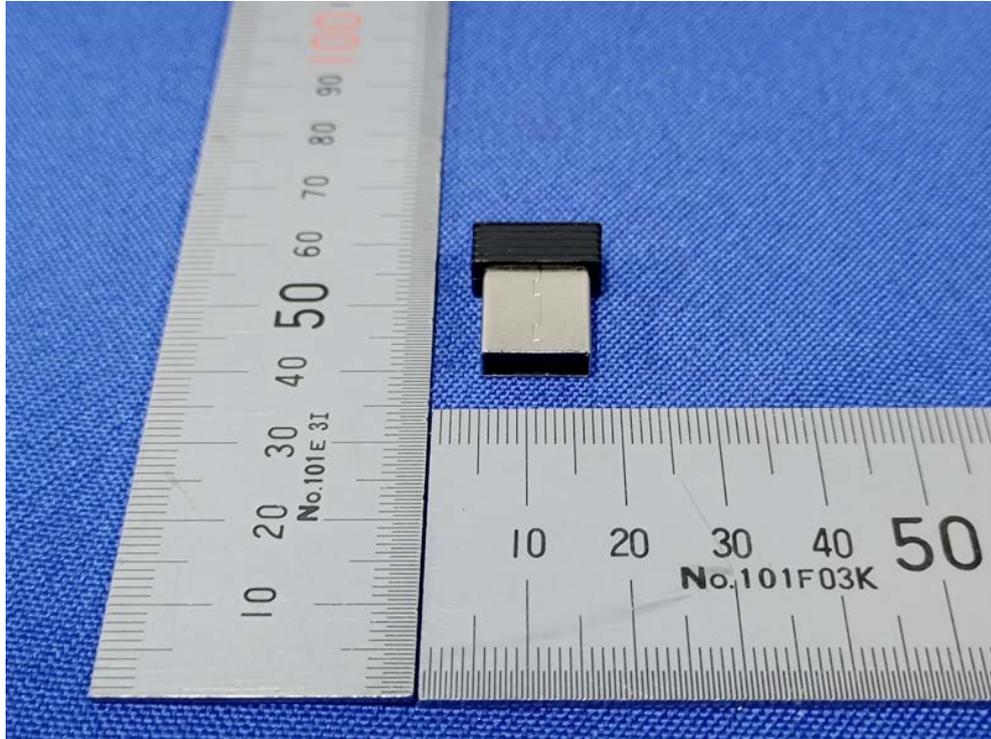
Outside View-Dongle



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Outside View-Dongle



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Inside View-Dongle



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6.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2021-06-18	2022-06-17
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2021-06-18	2022-06-17
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2021-06-18	2022-06-17
Ultra Broadband ANT	R&S	HL562	100157	2021-06-18	2022-06-17
ESVB Test Receiver	R&S	ESVB	826156/011	2021-06-18	2022-06-17
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2021-06-18	2022-06-17
5K VA AC Power Source	California Instruments	500iX	56060	2021-06-18	2022-06-17
CDN	EM TEST	CDN M2/M3	-	2021-06-18	2022-06-17
Attenuation	EM TEST	ATT6/75	-	2021-06-18	2022-06-17
Resistance	EM TEST	R100	-	2021-06-18	2022-06-17
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2021-06-18	2022-06-17
Inductive Components	EM TEST	MC2630	-	2021-06-18	2022-06-17
Antenna	EM TEST	MS100	-	2021-06-18	2022-06-17
Signal Generator	ROHDE&SCHW ARZ	SMT03	100029	2021-06-18	2022-06-17
Power Amplifier	AR	150W1000	300999	2021-06-18	2022-06-17
Field probe	Holaday	HI-6005	105152	2021-06-18	2022-06-17
Bilog Antenna	Chase	CBL6111C	2576	2021-06-18	2022-06-17
Loop Antenna	EMCO	6507	00078608	2021-06-18	2024-06-17
Test Receiver	ROHDE&SCHW ARZ	ESI26	838786/013	2021-06-18	2022-06-17
966 Chamber	YIHENG	--	N/A	2021-07-02	2022-07-01
Vector Signal Generator	AGILENT	E4438C	MY49070163	2022-01-14	2023-01-13
Splitter	Mini-Circuits	ZAP-50W	NN25640042 4	2022-01-14	2023-01-13
Directional Coupler	AGILENT	87300C	MY44300299	2022-01-14	2023-01-13
vector Signal Generator	AGILENT	E4438C	US44271917	2022-01-14	2023-01-13

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4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	AGILENT	U2531A	TW54063507	2022-01-14	2023-01-13
4 Ch.Simultaneous Sampling 14 Bits 2 MS/s	AGILENT	U2531A	TW54063513	2022-01-14	2023-01-13
Splitter	Mini	PS3-7	4463	2022-01-14	2023-01-13
Spectrum Analyzer	AGILENT	E7405A	US44210471	2022-01-14	2023-01-13
Attenuator	Resnet	20dB	(n.a)	2022-01-14	2023-01-13
Signal Analyzer	AGILENT	N9010A	MY48030494	2022-01-14	2023-01-13
ESD Simulator	NoiseKen	ESS-2002	ESS06Y6394	2021-06-18	2022-06-17
Continuous Wave Simulator	EM TEST	CWS 500N	0704-05	2021-06-18	2022-06-17
Ultra Compact Simulator	EM TEST	UCS 500 M4	0304-42	2021-06-18	2022-06-17
Pre-Amplifier	HP	8447B	--	2021-07-02	2022-07-01
Horn Antenna	SchwarzBeck	BBHA9120D	01919	2021-07-02	2024-07-01
BiConiLog Antenna	SchwarzBeck	9163	1139	2021-07-02	2024-07-01
Pre-Amplifier	SchwarzBeck	BBV 9743	#218	2021-06-18	2022-06-17

The report refers only to the sample tested and does not apply to the bulk.
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7.0 Measurement Uncertainty

Test Item	Uncertainty
Radio frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 2.5\text{dB}$
Radiated emission of transmitter, valid to 26,5 GHz	$\pm 6\text{dB}$
Radiated emission of transmitter, valid between 26,5 GHz and 66 GHz	$\pm 8\text{dB}$
Radiated emission of receiver, valid to 26,5 GHz	$\pm 6\text{dB}$
Radiated emission of receiver, valid between 26,5 GHz and 66 GHz	$\pm 8\text{dB}$
RF level uncertainty for a given BER	$\pm 1.5\text{dB}$
Occupied Bandwidth	$\pm 10\%$
Temperature	$\pm 2.5^{\circ}\text{C}$
Humidity	$\pm 5\%$
Voltage (DC)	$\pm 1\%$
Voltage (AC, < 10 kHz)	$\pm 2\%$

End of the Report

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