



Report No. : BLA-RF-201806-A11

TEST REPORT

Product Name : Cube Tracker
Trade mark : CUBE
Mode No. : Cube Pro
Add Model No. : C7002
Report Number : BLA-RF-201806-A11
Date of Issue : June. 20, 2018
Test standard : Item 19 of Article 2 Paragraph 1
Test result : PASS

Prepared for:

Cube Tracker LLC

46980, 86th Ave, Decatur, MI 49045 , US

Prepared by:

Qianhai BlueAsia of Technical Services(Shenzhen) Co.,Ltd.

5 Floor, 6 Building, Second Guanlong Industrial Park , Xili Town, Nanshan

District, Shenzhen, China

TEL: +86-755-2305 9481

FAX: +86-755-2305 9481

Compiled by:

Joon m

Review by:

Brand - Wei

Approved by:

Emen - li

Date: June. 20, 2018





2 Version

Version No.	Date	Description
00	June. 20, 2018	Original

3 Test Summary

Test	Test Requirement	Limit/Severity	Result
Antenna Requirement	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43,B-1 (1)&(2)	PASS
Test frequency	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43, A-3	PASS
Frequency Error	Item 19 of Article 2 Paragraph 1	± 50 PPM or less	PASS
Occupied Bandwidth	Item 19 of Article 2 Paragraph 1	83.5 MHz or less	PASS
Spread-spectrum Bandwidth	Item 19 of Article 2 Paragraph 1	500 kHz or more	PASS
Antenna Power	Item 19 of Article 2 Paragraph 1	Designated value: (1)FH, FH+DS , FH+OFDM 3mW/MHz (Used in the range of 427-2470.75MHz) (2) OFDM , DS other than (1) : 10mW/MHz (3) Other than (1) & (2) 10mW Tolerance: +20%,-80%	PASS
Spurious Emission of Tx	Item 19 of Article 2 Paragraph 1	(1) Below 2387 MHz : -26dBm (2) 2387 to 2400 MHz : -16dBm (3) 2483.5 through 2496.5 MHz : -16dBm (4) Over 2496.5 MHz : -26dBm	PASS
Pseudorandom Frequency Hopping Sequence	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43, 44, 45	PASS
Interference prevention capability	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43, 44, 45	PASS
RF accessibility	Item 19 of Article 2 Paragraph 1	Notice 88 Appendix 43, 44, 45	PASS
Spurious Emission of Rx	Item 19 of Article 2 Paragraph 1	(1) Below 1 GHz: -54dBm (2) 1GHz or higher: -47dBm	PASS

Remark:

Model No.: Cube Pro、C7002

Only the model Cube Pro was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being model name.

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means the product in transmitting status.

Rx: In this whole report Rx (or rx) means the product in receiving status.

RF: In this whole report RF means Radiated Frequency.

4 Contents

2	VERSION	2
3	TEST SUMMARY	3
4	CONTENTS	4
5	GENERAL INFORMATION	5
5.1	CLIENT INFORMATION	5
5.2	GENERAL DESCRIPTION OF EUT	5
5.3	DESCRIPTION OF SUPPORT UNITS	5
5.4	TEST LOCATION	5
6	EQUIPMENT LIST	6
7	RADIO TECHNICAL REQUIREMENTS SPECIFICATION	7
7.1	TRANSMITTER REQUIREMENTS	8
7.1.1	EUT test voltage and Frequency	8
7.1.2	Antenna Requirement	10
7.1.3	Frequency Error	11
7.1.4	Occupied Bandwidth (99%)	17
7.1.5	Spread spectrum Bandwidth (90%)	23
7.1.6	Antenna Power	29
7.1.7	Spurious Emissions of Tx	35
7.1.8	Interference prevention function	55
7.1.9	RF accessibility	56
7.2	RECEIVER REQUIREMENTS	57
7.2.1	Spurious Emissions of Rx	57
8	PHOTOGRAPHS	68
8.1	EUT CONSTRUCTIONAL DETAILS	68



5 General Information

5.1 Client Information

Applicant:	Cube Tracker LLC
Address of Applicant:	46980, 86th Ave, Decatur, MI 49045 , US
Manufacturer:	Shenzhen Intellink Technology Co.,Ltd
Address of Manufacturer:	#919, 9/F, Tianjian Chuangye Mansion, 7 Shangbao Road, Futian, Shenzhen,Guangdong, China

5.2 General Description of EUT

Product Name:	Cube Tracker
Model No.:	Cube Pro
Add Model No.:	C7002
Trade Mark:	CUBE
Operating Frequency:	2402 MHz to 2480 MHz
Conducted rated power:	F1D: 0.30mW
Number of Channels:	40 Channels
Type of Modulation:	GFSK
Channel Separation:	2 MHz
Dwell time	N/A
Antenna Type:	Integral antenna
Antenna gain:	0dBi from 2402~2480MHz
Sample Type:	Portable production
Power Supply:	DC3.0V
Sample Received Date:	June 08, 2018
Sample tested Date:	June 08, 2018 to June 19, 2018

5.3 Description of Support Units

The EUT has been tested stand-alone.

5.4 Test Location

All tests were performed at:

Qianhai BlueAsia of Technical Services(Shenzhen) Co.,Ltd.

5 Floor, 6 Building, Second Guanlong Industrial Park , Xili Town, Nanshan District, Shenzhen, China

Telephone: TEL: +86-755-2305 9481 FAX: +86-755-2305 9481

No tests were sub-contracted.

6 Equipment List

Equipment	Manufacturer	Model	Serial No.	Due Date	Calibration body	Classification
Signal Generator	Agilent	E8257D	MY44320250	2019.5.23	GRGT	(c)
Communication test set test set	Anritsu	MT8852B	0814003	2019.5.23	GRGT	(c)
Spectrum Analyzer	Keysight	N9030A	MY52350152	2019.5.23	GRGT	(c)
Spectrum Analyzer	R&S	FSP40	100817	2018.8.28	GRGT	(c)
Signal Generator	Agilent	E4438C	MY45092582	2019.5.23	GRGT	(c)

Remark:

- (a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) in Japan (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1) in JRL.
- (b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No. 51 of 1992) .
- (c) Calibration conducted in countries except Japan, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
- (d) Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No. 3, which shall have been given any type of calibration, etc. listed above from (a) to (C)

From JRL Article 24-2, paragraph 4, Item 2

Notice: Calibration duration for above equipments is 1 year.

7 Radio Technical Requirements Specification

Table 1: Radio Technical Requirements Specification for 2.4 GHz band wide-band low-power data communication system (Item 19 of Article 2 Paragraph 1)

Items	Technical standard
Assigned frequency or designated frequency	2400-2483.5MHz
Communication method	One-way communication, simplex, semi-duplex, or duplex operation of digital signal transmission including spread spectrum
Tolerance of frequency ($\times 10^{-6}$)	± 50 PPM
Tolerance of occupied bandwidth	FH: 83.5MHz or less FH + OFDM: 83.5MHz or less Others: 26MHz or less FH + DS: 83.5MHz or less OFDM: 38MHz or less
Antenna power	Designated value (1) FH, FH+DS, FH+OFDM: 3mW/MHz (used in the range of 2427 - 2470.75 MHz) (2) OFDM, DS other than (1): 10mW/MHz (3) Other than (1) & (2): 10mW Tolerance : +20%,-80%
Antenna gain	1) 12.14 dBi or less in principle 2) In case of directional antenna (1) FH, FH+DS or FH+OFDM using 2427-2470.75 MHz EIRP \leq 16.91 dBm/MHz (2) OFDM or DS other than (1) EIRP \leq 22.14 dBm/MHz (3) Other than (1) and (2): 22.14 dBm or less (4) OFDM OBW 26 - 38MHz: 19.14dBm/MHz (5) Half-power angle of directional antenna (e) in case of the item 2): $e \leq 360/A$ (The A is 10 in maximum.)
Tolerance of spurious emission intensity	(1) Below 2387 MHz: 2.5 μ W (2) 2387 to 2400 MHz: 25 μ W (3) 2483.5 through 2496.5 MHz: 25 μ W (4) Over 2496.5 MHz: 2.5 μ W
Spreading bandwidth	500kHz or more
Limit of secondary radiated emissions	(1) Below 1 GHz: 4nW (2) 1 GHz or higher: 20nW
Interference prevention function	Shall have the function of automatic transmission and reception of identification sign.
Structure	Shall be of the structure that the RF and modulator sections excluding antenna cannot easily be opened.
Note	DS: Direct spread FH: Frequency hopping OFDM: Orthogonal frequency division multiplexing

Note: The Technical Standards described here do not cover all of the regulated items.

7.1 Transmitter Requirements

7.1.1 EUT test voltage and Frequency

7.1.1.1 EUT test voltage	
Power Supply:	DC 3.0V
Test voltage require:	The power supply is by DC 3.0V .

7.1.1.2 Test frequency

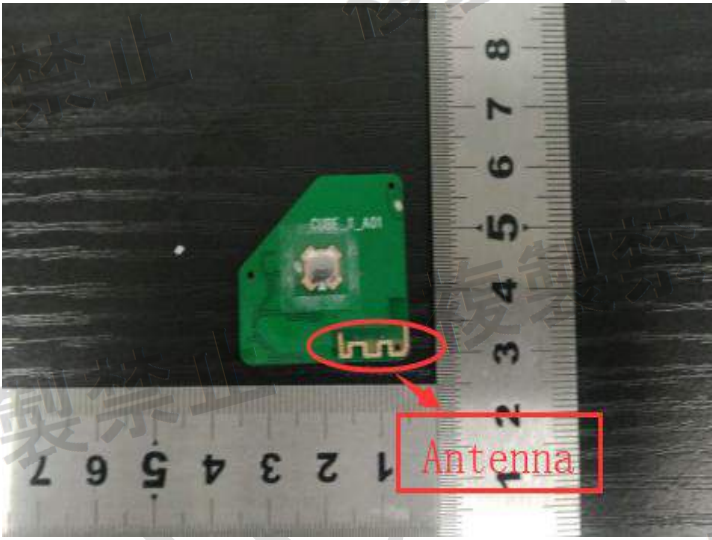
Test frequencies:	If the EUT can be set to 3 or more different (carrier) frequencies in 1 allocated band, testing shall be performed using the Lowest, Middle and the Highest frequency (L,M and H). If there are 2 or fewer frequencies, testing shall be performed with the available frequencies.		
	Frequency range over which device operates	Number of frequencies	Location in the range of operation
	1 MHz or less	1	Middle
	1 to 10 MHz	2	1 near top and 1 near bottom
	More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

Test frequencies are the lowest channel: 0 channel (2402 MHz), Middle channel, 19 channel (2440 MHz) and highest channel: 39 channel (2480 MHz).

7.1.2 Antenna Requirement

Standard requirement
<p>Applicable for equipment with an antenna terminal, including testing terminals) If an antenna connector is available, all relevant tests will be carried out conducted. If not, tests will be carried out in an anechoic room or with a suitable test-fixture.</p>
EUT Antenna
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.</p> 
<p>Result: An antenna connector is available; all relevant tests will be carried out conducted.</p>

7.1.3 Frequency Error

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 55%	Press.: 1010 mbar
Test Status:	Test the EUT in transmitting mode without modulation. Test in Channel lowest (2402MHz), middle (2440MHz) and highest (2480MHz), keep in continuously transmitting status.		
Test Configuration:			
<div><div>EUT</div><div>Spectrum Analyzer</div></div>			
Test Conditions:	Frequency Counter or Spectrum Analyzer is used for measurement.		
EUT conditions:	Modulation/Spread/Hopping off, CW Tx If EUT does not accept “Modulation OFF” mode in the measurement, you may use “Modulation ON” mode. In that case you can use the Max power Frequency as the measuring results.		
Spectrum Analyzer conditions:	Frequency: Test Frequency Span 1MHz RBW 10KHz (Modulation ON), VBW 10KHz (Modulation ON), Sweep Time Auto Detector mode Positive peak Indication mode Max hold		
Technical standard:	Tolerance of frequency: $\pm 50 \times 10^{-6}$		
Test result:	PASS		

Measurement Record:
Uncertainty: $\pm 10\text{Hz}$
Test Result:

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		DC 3.0V	DC 3.3V	DC 2.7V		
Lowest	2402.0	2401.967	2401.967	2401.968	MHz	$\pm 50\text{ PPM}$ or less
		-13.74	-13.74	-13.32	PPM	
Middle	2440.0	2439.967	2439.967	2439.967	MHz	
		-13.52	-13.52	-13.52	PPM	
Highest	2480.0	2479.966	2479.966	2479.966	MHz	
		-13.71	-13.71	-13.71	PPM	

Note: The nominal frequency shall be confirmed by the applicant and test lab.

Result plot as follows:
Normal Voltage

Channel 0: 2.402 GHz:



Channel 19: 2.440 GHz



Channel 39: 2.480 GHz



High Voltage

Channel 0: 2.402 GHz:



Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



Low Voltage

Channel 0: 2.402 GHz:



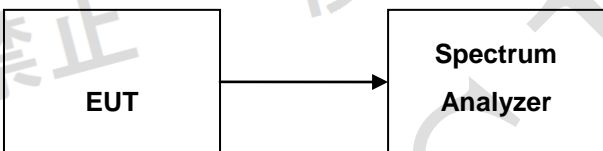
Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



7.1.4 Occupied Bandwidth (99%)

Test Requirement:	Item 19 of Article 2 Paragraph 1
Test Method:	MIC Notice No.88 Appendix No.43
EUT Operation:	
Ambient:	Temp.: 24.0°C Humid.: 55% Press.: 1010mbar
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	 <pre> graph LR EUT[EUT] --> SA[Spectrum Analyzer] </pre>
EUT conditions:	Modulation/Spread/Hopping on, Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.
Spectrum Analyzer conditions:	Frequency: Test Frequency Span 40MHz RBW 1MHz VBW 1MHz Sweep Time Auto detector mode Positive peak Indication mode Max hold OBW 99%
Technical standard:	83.5MHz
Test result:	PASS

Measurement Record:
Uncertainty: $\pm 10\text{KHz}$
Test Result:

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		DC 3.0V	DC 3.3V	DC 2.7V		
Channel 0	2402.0	4.9605	5.0547	5.1766	MHz	83.50 MHz or less
Channel 19	2440.0	5.5565	5.2066	5.3453	MHz	83.50 MHz or less
Channel 39	2480.0	4.9281	4.9781	5.0424	MHz	83.50 MHz or less

Result plot as follows:

Normal Voltage

Channel 0



Channel 19



Channel 39



High Voltage

Channel 0: 2.402 GHz:



Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



Low Voltage

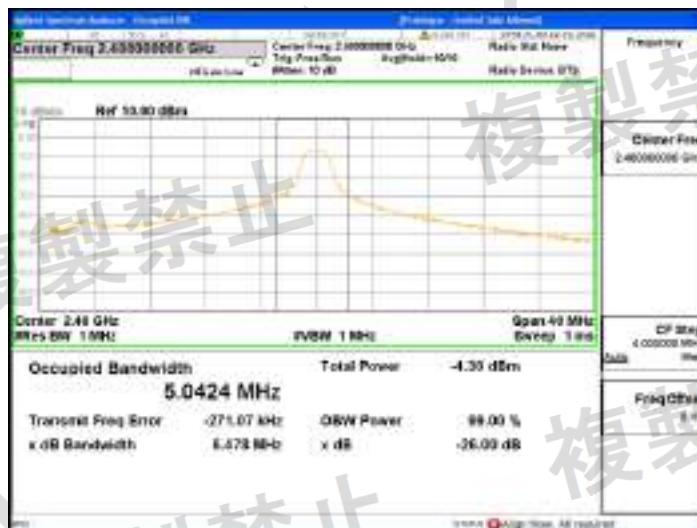
Channel 0: 2.402 GHz:



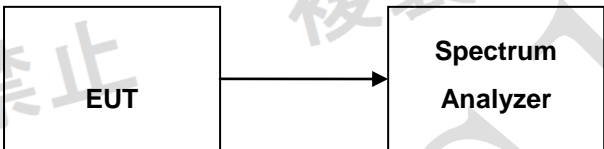
Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



7.1.5 Spread spectrum Bandwidth (90%)

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24.0°C	Humid.: 55%	Press.: 1010 mbar
Test Status:	Pre-Scan has been conducted to determine the worst-case mode formal possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	 <pre> graph LR EUT[EUT] --> SA[Spectrum Analyzer] </pre>		
EUT conditions:	Modulation/Spread/Hopping on, Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.		
Spectrum Analyzer conditions:	Frequency: Test Frequency Span 40MHz RBW 1MHz VBW 1MHz Sweep Time Auto detector mode Positive peak Indication mode Max hold OBW 90%		
Technical standard:	500kHz or more		
Test result:	PASS		

Measurement Record:
Uncertainty: $\pm 10\text{KHz}$
Test Result:

Test channel	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		DC 3.0V	DC 3.3V	DC 2.7V		
Channel 0	2402.0	1.8622	1.8508	1.8557	MHz	500 kHz or more
Channel 19	2440.0	1.8753	1.8713	1.8744	MHz	500 kHz or more
Channel 39	2480.0	1.8802	1.8701	1.8663	MHz	500 kHz or more

Result plot as follows:

Normal Voltage

Channel 0



Channel 19



Channel 39



High Voltage

Channel 0: 2.402 GHz:



Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



Low Voltage

Channel 0: 2.402 GHz:



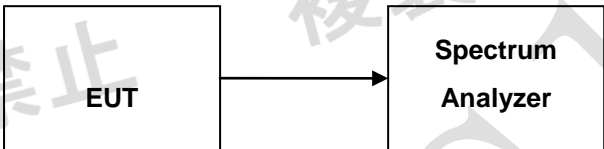
Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



7.1.6 Antenna Power

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 55%	Press.: 1010mbar
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	 <pre> graph LR EUT[EUT] --> SA[Spectrum Analyzer] </pre>		
EUT conditions:	Modulation/Spread/Hopping on, PN9 Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.		
Spectrum Analyzer conditions(FHSS):	Frequency: Test Frequency Span 40MHz RBW 10MHz VBW 10MHz Sweep Time Auto Detector mode Positive peak Indication mode Max hold		
Technical standard:	Antenna Power (1) FH, FH+DS , FH+OFDM 3mW/MHz or less (used in the range of 2427-2470.75 MHz) (2) OFDM , DS other than (1) 10mW/MHz or less (3) Other than (1) & (2) 10mW or less Tolerance: +20% -80%		
Test result:	PASS		

Measurement Record:
Uncertainty: ± 10 kHz / ± 1 dB
Test Result:
GFSK:

Test channels	Test Frequency (MHz)	Test Result			Unit	Limit
		Normal Voltage	High Voltage	Low Voltage		
		DC 3.0V	DC 3.3V	DC 2.7V		
Channel 0	2402	0.334	0.333	0.334	mW	3 mW or less Error +20%~ -80%
		11.33	11.00	11.33	%	
Channel 19	2440	0.248	0.248	0.248	mW	
		-17.33	-17.33	-17.33	%	
Channel 39	2480	0.293	0.294	0.295	mW	
		-2.33	-2.00	-1.67	%	

Remark:

Conducted rated power: 0.30mW

Tolerance (%) : $[(\text{test value} - \text{rate power}) / \text{rater power}] * 100$
Result plot as follows:
Normal Voltage

GFSK

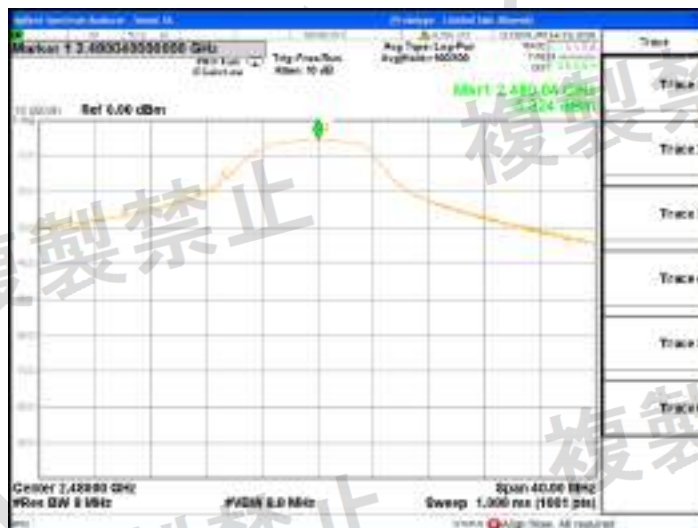
Channel 0 (2402 MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



High Voltage

Channel 0: 2.402 GHz:



Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



Low Voltage

Channel 0: 2.402 GHz:



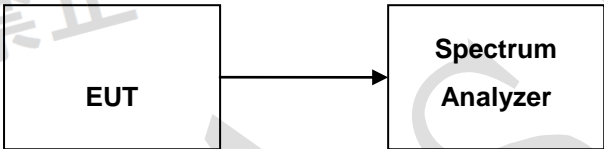
Channel 19: 2.440 GHz:



Channel 39: 2.480 GHz:



7.1.7 Spurious Emissions of Tx

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 55%	Press.: 1010 mbar
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	 <pre> graph LR EUT[EUT] --> SA[Spectrum Analyzer] </pre>		
EUT conditions:	Modulation/Spread/Hopping on, PN9 Modulation Tx For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.		
Measurement Procedure:	Step1 All spurious are measured from 30MHz to 13GHz by peak mode. Step2 IF the value measured by Step1 is 2dB or less, measure in average mode.		
Spectrum Analyzer conditions(Step 1):	Frequency: 30MHz – 2400MHz , 2483.5MHz –13GHz RBW 1000kHz (30 – 1GHz) , 1000KHz (over 1GHz) VBW 1000kHz (30 – 1GHz) , 1000KHz (over 1GHz) Sweep Time Auto detector mode Positive peak Indication mode Max hold		
Spectrum Analyzer conditions(Step 2):	Frequency: Spurious Frequency Span 0Hz RBW 1MHz VBW 1MHz Sweep Time Auto Detector mode Sample Indication mode Max hold		
Technical standard:	(1) Below 2387 MHz : 2.5μW/MHz (2) 2387 to 2400 MHz : 25μW/MHz (3) 2483.5 through 2496.5 MHz : 25μW/MHz (4) Over 2496.5 MHz : 2.5μW/MHz		
Test result:	PASS		

Measurement Record:
Uncertainty: $\pm 1\text{dB}$
Test Result
GFSK:

Test channel	Test Result						Unit	Limit
	Normal Voltage		High Voltage		Low Voltage			
	DC 3.0V		DC 3.3V		DC 2.7V			
Channel (2402MHz)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	dBm	(1) Below 2387 MHz: -26dBm/MHz (2) 2387 to 2400 MHz :-16dBm/MHz (3) 2483.5 through 2496.5 MHz : -16dBm/MHz (4)Over 2496.5 MHz: -26dBm/MHz
	2387.000	-43.300	2387.000	-43.276	2387.000	-43.271		
	2399.974	-25.404	2399.935	-26.664	2399.948	-26.395		
	2490.520	-63.587	2484.397	-63.633	2484.787	-63.685		
	2591.000	-54.764	2591.000	-56.106	2591.000	-55.424		

Test channel	Test Result						Unit	Limit
	Normal Voltage		High Voltage		Low Voltage			
	DC 3.0V		DC 3.3V		DC 2.7V			
Channel (2440MHz)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	Frequen cy (MHz)	Level (dBm)	dBm	(1) Below 2387 MHz: -26dBm/MHz (2) 2387 to 2400 MHz :-16dBm/MHz (3) 2483.5 through 2496.5 MHz : -16dBm/MHz (4)Over 2496.5 MHz: -26dBm/MHz
	2247.900	-58.844	2250.300	-58.525	2247.900	-58.903		
	2399.896	-56.792	2399.987	-56.635	2399.402	-56.916		
	2483.565	-60.761	2484.566	-60.726	2483.760	-60.634		
	2633.000	-53.427	2633.000	-54.528	2633.000	-53.729		

Test channel	Test Result						Unit	Limit
	Normal Voltage		High Voltage		Low Voltage			
	DC 3.0V		DC 3.3V		DC 2.7V			
Channel (2480MHz)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	dBm	(1) Below 2387 MHz: -26dBm/MHz (2) 2387 to 2400 MHz :-16dBm/MHz (3) 2483.5 through 2496.5 MHz : -16dBm/MHz (4)Over 2496.5 MHz: -26dBm/MHz
	2280.900	-59.664	2288.000	-59.637	2285.600	-59.128		
	2399.610	-67.301	2400.000	-67.810	2399.571	-68.619		
	2483.539	-33.003	2483.500	-33.286	2483.513	-32.972		
	2497.000	-46.339	2497.000	-46.217	2497.000	-46.596		

Result plot as follows:

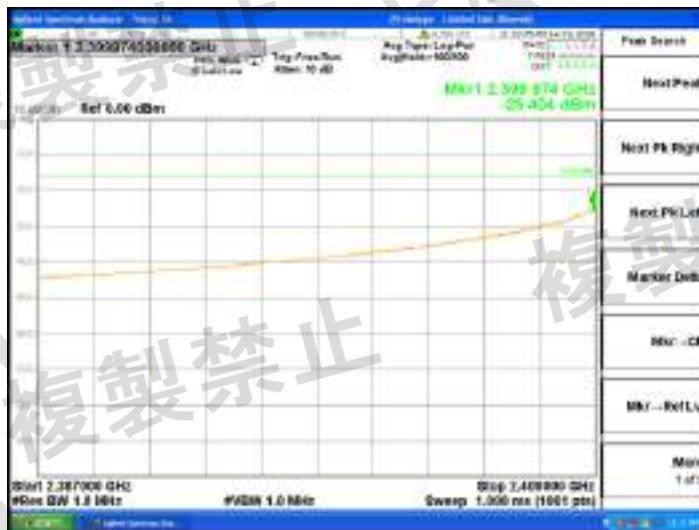
GFSK(Normal Voltage)

Channel 0 (2.402 GHz)

30MHz-2.387GHz:



2.387GHz-2.4GHz:



2.4835GHz-2.4965GHz:



2.4965GHz-13GHz:



Channel 19 (2.440 GHz)

30MHz-2.387GHz:



2.387GHz-2.4GHz:



2.4835GHz-2.4965GHz:



2.4965GHz-13GHz:



Channel 39 (2.480 GHz)

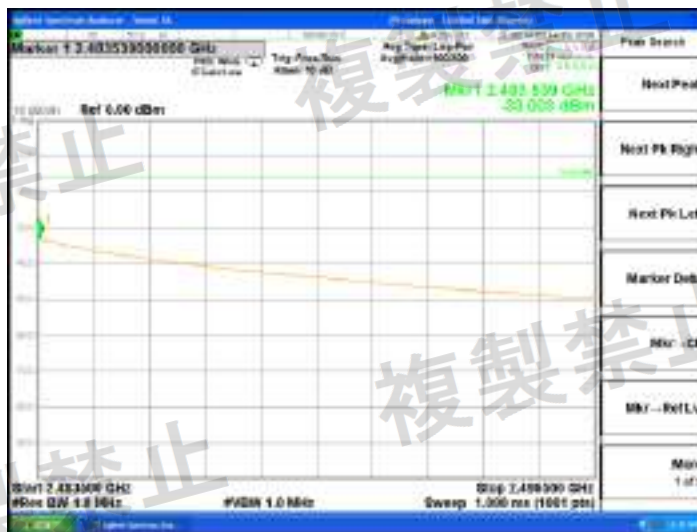
30MHz-2.387GHz:



2.387GHz-2.4GHz:



2.4835GHz-2.4965GHz:



2.4965GHz-13GHz:



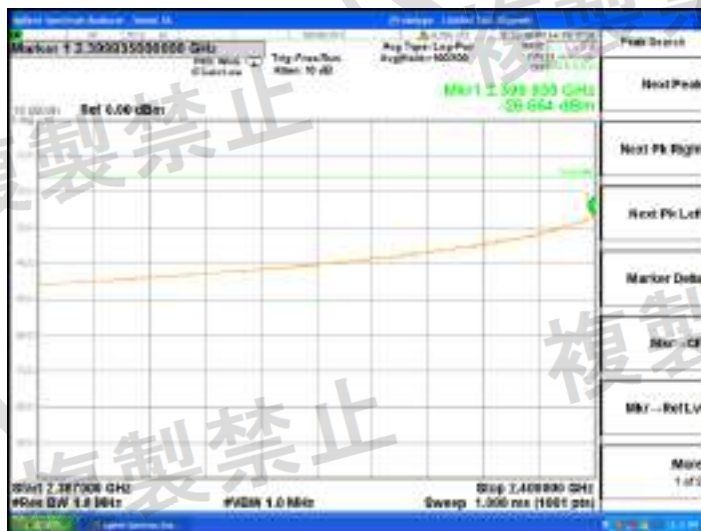
High Voltage

Channel 0: 2.402 GHz:

30MHz-2.387GHz:



2.387GHz-2.4GHz:



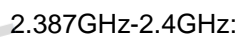
2.4835GHz-2.4965GHz:



2.4965GHz-13GHz:



30MHz-2.387GHz:



The screenshot shows a Spectrum Analyzer interface with the following details:

- Top Bar:**
 - Left: "Signal Spectrum Analyzer - Vector M..."
 - Right: "Frequency Limited Ref. Source"
- Marker Data (Top Left):**
 - Marker 1: 2.433458658888 GHz
 - Unit: dBm
 - Value: -60.726
 - Label: dBm
- Measurement Data (Top Right):**
 - Peak Search: Next Peak
 - Next Peak: 2.433458658888 GHz
 - Next Peak: -60.726 dBm
- Grid and Trace:**
 - The main display area shows a grid with a horizontal trace at approximately -60 dBm.
 - A single green marker is visible on the trace at the frequency 2.433458 GHz.
- Bottom Bar:**
 - Center: "2.433458 GHz" and "1.0 MHz"
 - Left: "2.433458 GHz" and "1.0 MHz"
 - Right: "2.433458 GHz" and "1.0 MHz"

The image shows a Keysight Spectrum Analyzer interface. At the top, there are several control panels:

- Left Panel:** Includes "Marker F 2.483045500000 GHz" and "Ref 0.00 dBm".
- Middle Panel:** Shows "Avg Type: Log-Pow" and "Expander: NONE".
- Right Panel:** Displays "FREQ Start: 2.482 GHz", "STOP: 2.492 GHz", and "OFF". It also has a green label "WAT 1.833 GHz" and "FS 0.26 dBm".

The main display area is a grid-based plot of power spectral density. The x-axis represents frequency, and the y-axis represents power level in dBm. The plot shows a relatively flat line around -60 dBm.

At the bottom, the following parameters are displayed:

- CENT 2.487 GHz
- FREQ BW 1.0 MHz
- SPAN 10.000 MHz
- Sweep 17.52 ms (1000 pts)

A large, semi-transparent watermark reading "複製禁止" (No Copying) is oriented vertically across the center of the screen.

Channel 39: 2.480 GHz:

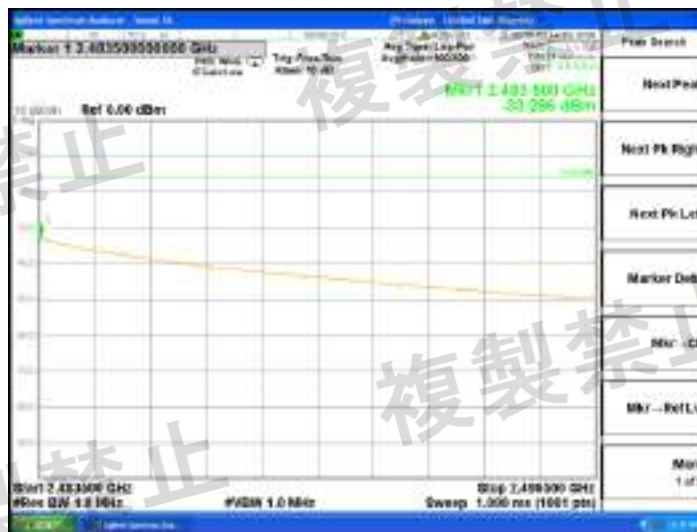
30MHz-2.387GHz:



2.387GHz-2.4GHz:



2.4835GHz-2.4965GHz:



2.4965GHz-13GHz:



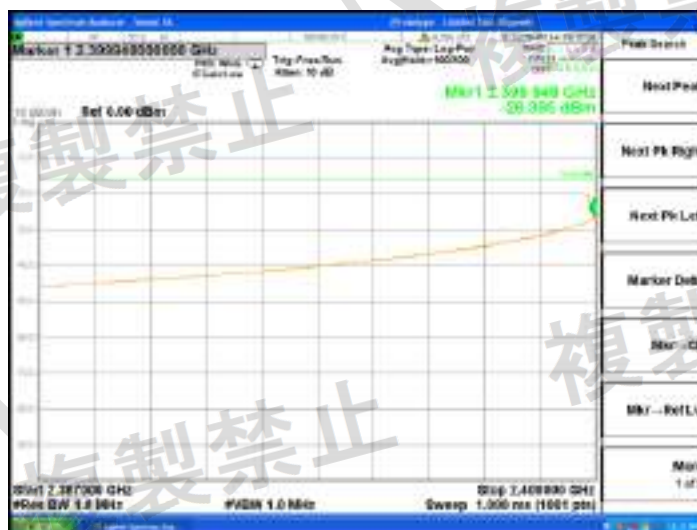
Low Voltage

Channel 0: 2.402 GHz:

30MHz-2.387GHz:



2.387GHz-2.4GHz:



2.4835GHz-2.4965GHz:



2.4965GHz-13GHz:



Channel 19: 2.440 GHz:

30MHz-2.387GHz:



2.387GHz-2.4GHz:



2.4835GHz-2.4965GHz:



2.4965GHz-13GHz:



Channel 39: 2.480 GHz:

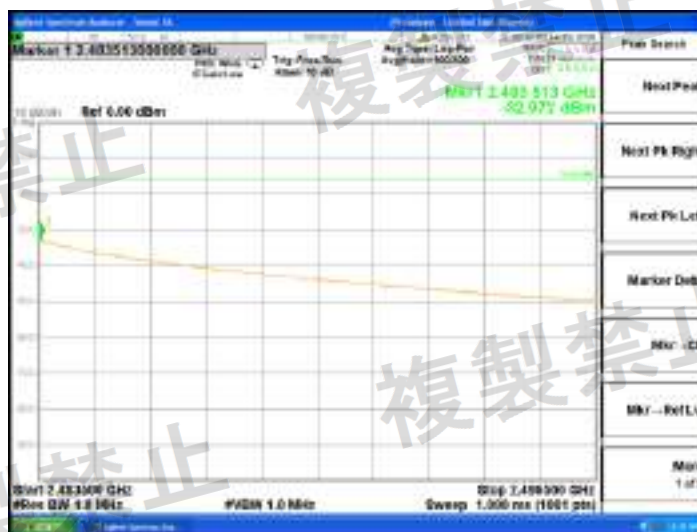
30MHz-2.387GHz:



2.387GHz-2.4GHz:



2.4835GHz-2.4965GHz:



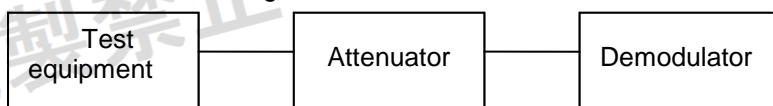
2.4965GHz-13GHz:



7.1.8 Interference prevention function

1) Measurement system diagram

(1) When transmitting identification code



2) Condition of measuring instrument

(1) Demodulator must be able to demodulate the transmitting signal emitted by test equipment and to indicate the identification code.

3) Condition of test equipment The mode of normal use.

4) Measuring operation procedure

(1) When test equipment has the function to transmit identification code automatically:

A) Transmit the predetermined identification code from test equipment.

B) Confirm the transmitted identification code by demodulator.



5) Test result: The unit does meet the requirements (Good).

Test result: PASS

7.1.9 RF accessibility

Standard requirement

Article 49-20, paragraph 1 (a)

The EUT shall be constructed in such a way that sensitive RF parts, (like modulation and oscillator parts) cannot be reached easily by the user. These parts shall be covered by soldered metal caps or glue or by other mechanical covers. If the covers are fixed with screws, these shall be not the common type(s) like a Phillips, but special versions like Torx, so that the user cannot open the device with common tools.

PCB board is made using the surface mount technology.



7.2 Receiver Requirements

7.2.1 Spurious Emissions of Rx

Test Requirement:	Item 19 of Article 2 Paragraph 1		
Test Method:	MIC Notice No.88 Appendix No.43		
EUT Operation:			
Ambient:	Temp.: 24°C	Humid.: 55%	Press.: 1010 mbar
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.		
Test Configuration:	 <pre> graph LR EUT[EUT] --> SA[Spectrum Analyzer] </pre>		
EUT conditions:	Rx		
Measurement Procedure:	Step1 All spurious are measured from 30MHz to 13 GHz by peak mode. Step2 If the value measured by Step1 is 2dB or less, measure in average mode.		
Spectrum Analyzer conditions(Step 1):	Frequency: 30MHz – 2400MHz , 2483.5MHz –13GHz RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz) VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz) Sweep Time Auto detector mode Positive peak Indication mode Max hold		
Spectrum Analyzer Conditions(Step 2):	Frequency: Spurious Frequency Span 0 Hz RBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz) VBW 100 kHz (30 – 1GHz) , 1 MHz (over 1GHz) Sweep Time Auto detector mode Sample Indication mode Max hold		
Technical standard:	(1) Below 1 GHz : 4 nW or less (2) 1 GHz and over : 20 nW or less		
Test result:	PASS		

Test Result
GFSK:

Test channel	Test Result						Unit	Limit
	Normal Voltage		High Voltage		Low Voltage			
	DC 3.0V		DC 3.3V		DC 2.7V			
Channel (2402)MHz	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	dBm	(1) Below 1 GHz :-54dBm (2) 1 GHz to 13 GHz : -47dBm
	71.710	-74.831	71.710	-76.599	71.710	-75.358		
	12772.000	-64.145	12712.000	-63.937	12760.000	-64.036		

Test channel	Test Result						Unit	Limit
	Normal Voltage		High Voltage		Low Voltage			
	DC 3.0V		DC 3.3V		DC 2.7V			
Channel (2440)MHz z	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	dBm	(1) Below 1 GHz :-54dBm (2) 1 GHz to 13 GHz : -47dBm
	71.710	-77.237	71.710	-76.063	71.710	-76.249		
	12760.000	-63.175	12748.000	-63.131	12748.000	-62.634		

Test channel	Test Result						Unit	Limit
	Normal Voltage		High Voltage		Low Voltage			
	DC 3.0V		DC 3.3V		DC 2.7V			
Channel (2480)MHz	Frequency (MHz)	Level (dBm)	Frequenc y(MHz)	Level (dBm)	Frequency (MHz)	Level (dBm)	dBm	(1) Below 1 GHz :-54dBm (2) 1 GHz to 13 GHz : - 47dBm
	71.710	-76.456	71.710	-76.989	71.710	-76.765		
	4960.000	-62.397	4960.000	-62.859	4960.000	-62.800		

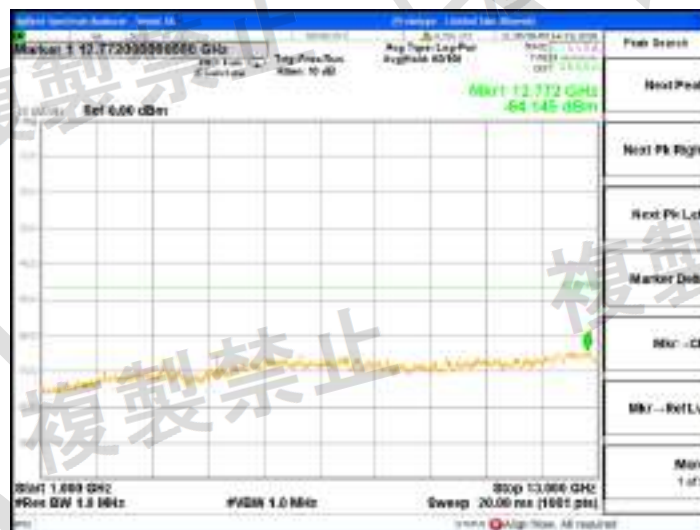
Result plot as follows:

GFSK (Normal Voltage)

30MHz to 1 GHz:



1GHz -13GHz



Channel 19 (2.440 GHz)

30MHz to 1 GHz:



1GHz -13GHz:



Channel 39 (2.480 GHz)

30MHz to 1 GHz:



1GHz -13GHz:



High Voltage

Channel 0: 2.402 GHz:

30MHz to 1 GHz:



1GHz -13GHz:



Channel 19: 2.440 GHz:

30MHz to 1 GHz:



1GHz -13GHz:



Channel 39: 2.480 GHz:

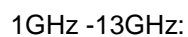
30MHz to 1 GHz:



1GHz -13GHz:



30MHz to 1 GHz:



Channel 19: 2.440 GHz:

30MHz to 1 GHz:



1GHz -13GHz:



Channel 39: 2.480 GHz:

30MHz to 1 GHz:

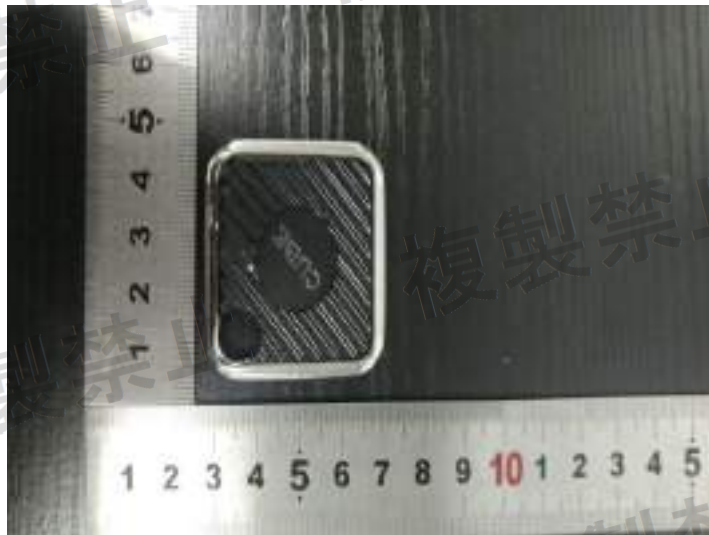


1GHz -13GHz:

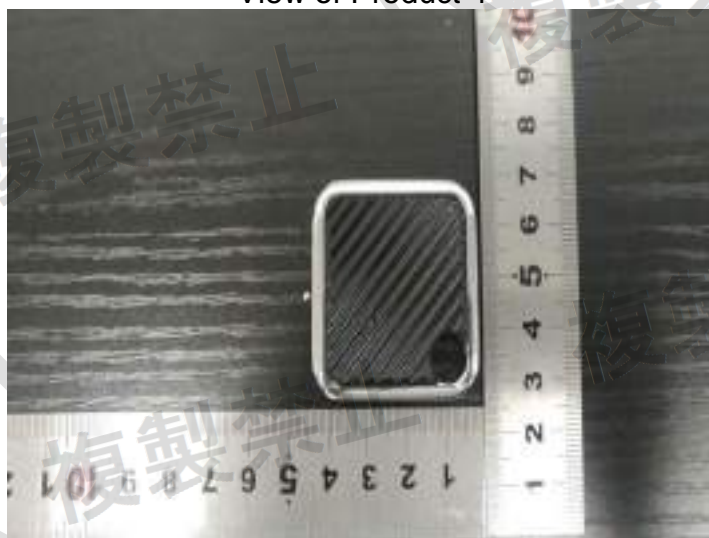


8 Photographs

8.1 EUT Constructional Details



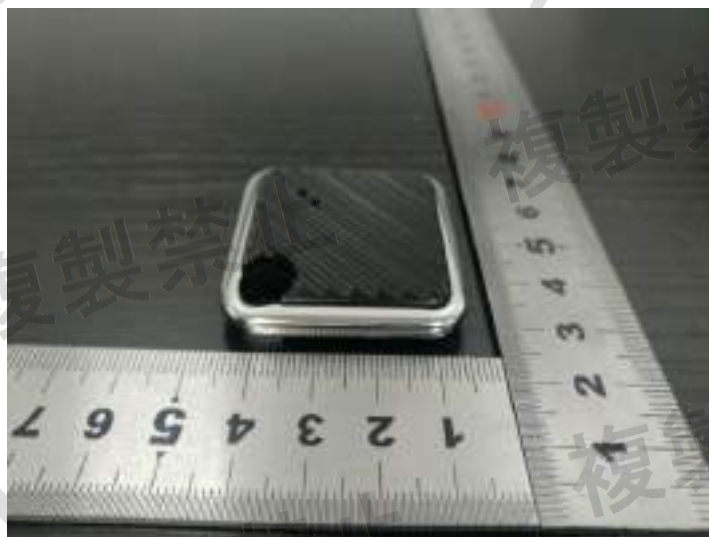
View of Product-1



View of Product-2



View of Product-3



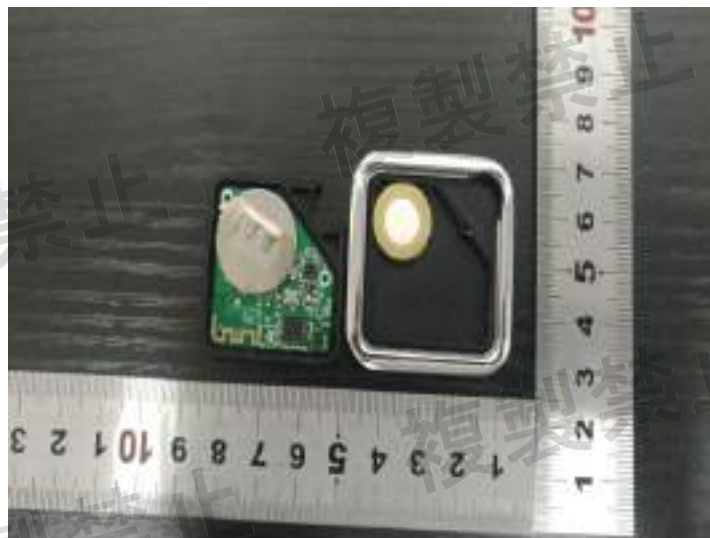
View of Product-4



View of Product-5



View of Product-6



View of Product-7



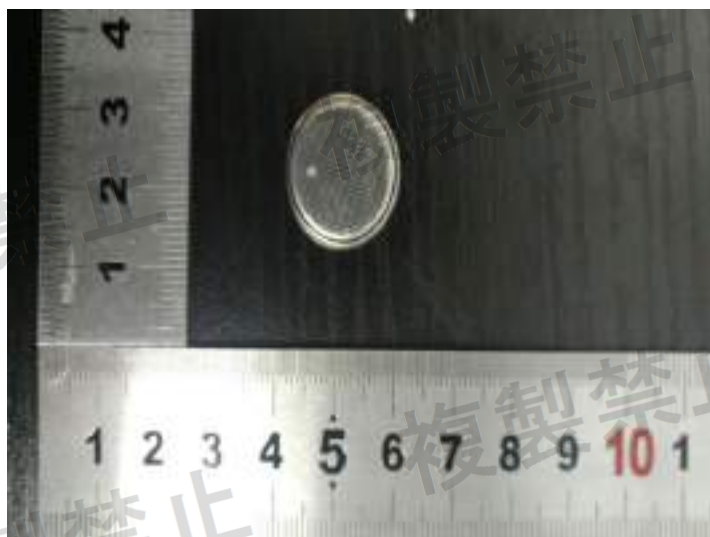
View of Product-8



View of Product-9



View of Product-10



View of Product-11



View of Product-12

*** End of Report ***

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of BlueAsia, this report can't be reproduced except in full.