



# MEASUREMENT REPORT

## FCC PART 15C Bluetooth-LE

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**FCC ID:** XF6-M4SB

**Applicant:** Silicon Labs

**Application Type:** Class II Permissive Change

**Product:** Single Band SIP Module, Small Form Factor Single Band 802.11b/g/n, Bluetooth 5.0, Zigbee Module

**Model No.:** M4SB

**FCC Rule Part(s):** Part15 Subpart C (Section 15.247)

**Test Date:** August 19 ~ November 25, 2021

**Reviewed By:**

\_\_\_\_\_  
Jame Yuan

**Approved By:**

\_\_\_\_\_  
Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

## Revision History

Report No.	Version	Description	Issue Date	Note
2108RSU042-U4	Rev. 01	Initial Report	11-25-2021	Valid

Note: This module was used in portable host and the antenna type change from chip antenna to FPC antenna, the antenna gain changed from 1dBi to -2dBi, so we only evaluated the radiated spurious emissions item.

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#### 1.4. Product Information

Product Name	Single Band SIP Module, Small Form Factor Single Band 802.11b/g/n, Bluetooth 5.0, Zigbee Module
Model No.	M4SB
Wi-Fi Specification	802.11b/g/n
Bluetooth Version	v5.0 (single mode only for BLE)
<p>Note:</p> <p>The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.</p>	

#### 1.5. Radio Specification under Test

Bluetooth Version	v5.0 single mode (BLE Only)
Frequency Range	2400MHz~ 2483.5MHz
Channel Number	40
Type of Modulation	GFSK
Antenna Type	FPC Antenna
Antenna Gain	-2.0dBi

#### 1.6. Description of Host

Host Name	Kanega Watch
Model No.	KANEGA003
Company Name	UnaliWear, Inc.
Power Type	Battery (DC 3.8V)
Contained Modules	LTE module: Unaliwear BG77 FCC ID: 2AM4C-BG77
	BLE/Wi-Fi module: Single Band SIP Module, Small Form Factor Single Band 802.11b/g/n, Bluetooth 5.0, Zigbee Module FCC ID: XF6-M4SB
<p>Note: BLE and LTE CAT M1 can transmit simultaneously, which was declared by the host manufacturer.</p>	

### 1.7. Working Frequencies for this report

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz
03	2408 MHz	04	2410 MHz	05	2412 MHz
06	2414 MHz	07	2416 MHz	08	2418 MHz
09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz
15	2432 MHz	16	2434 MHz	17	2436 MHz
18	2438 MHz	19	2440 MHz	20	2442 MHz
21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz
27	2456 MHz	28	2458 MHz	29	2460 MHz
30	2462 MHz	31	2464 MHz	32	2466 MHz
33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz
39	2480 MHz	--	--	--	--

### 1.8. Test Mode

Test Mode	Mode 1: Transmit by Bluetooth-LE 1Mbps
	Mode 2: Transmit by Bluetooth-LE 2Mbps

### 1.9. Applied Procedure

Test Procedure: ANSI C63.10-2013

### 1.10. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

## 2. TEST EQUIPMENT CALIBRATION DATE

### Radiated Emission (WZ-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2022/01/04
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2022/08/08
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2022/08/05
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2021/09/27
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2021/12/14
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2021/11/14
Thermal Hygrometer	testo	608-H1	MRTSUE06403	1 year	2022/06/28
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2022/04/29

### Radiated Emission (WZ-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
MXE EMI Receiver	Keysight	N9038A	MRTSUE06125	1 year	2022/06/24
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2022/10/28
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2022/05/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2021/10/25
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2022/10/21
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2021/12/14
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2021/11/14
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2022/11/12
Thermal Hygrometer	Minggao	ETH529	MRTSUE06170	1 year	2021/12/08
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2022/04/29

## Radiated Emission (SIP-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2022/06/24
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2022/06/24
Loop Antenna	Schwarzbeck	FMZB 1519 B	MRTSUE06937	1 year	2022/03/09
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06645	1 year	2022/08/26
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06610	1 year	2022/08/05
Preamplifier	EMCI	EMC051845SE	MRTSUE06600	1 year	2021/11/09
Thermal Hygrometer	testo	608-H1	MRTSUE06620	1 year	2021/12/03
Anechoic Chamber	RIKEN	SIP-AC1	MRTSUE06554	1 year	2021/12/24

## Radiated Emission (SIP-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2022/06/24
MXA Signal Analyzer	Keysight	N9020B	MRTSUE06604	1 year	2021/09/26
Loop Antenna	Schwarzbeck	FMZB 1519 B	MRTSUE06937	1 year	2022/03/09
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06646	1 year	2022/08/26
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06648	1 year	2021/11/26
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06599	1 year	2021/11/26
Preamplifier	EMCI	EMC051845SE	MRTSUE06644	1 year	2021/11/09
Preamplifier	EMCI	EMC184045SE	MRTSUE06602	1 year	2021/10/12
Thermal Hygrometer	testo	608-H1	MRTSUE06624	1 year	2021/12/03
Anechoic Chamber	RIKEN	SIP-AC2	MRTSUE06781	1 year	2021/12/24

## Radiated Emission (SIP-AC3)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2022/06/09
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2022/06/24
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2022/06/24
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06646	1 year	2022/08/26
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06611	1 year	2021/09/13
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06598	1 year	2021/11/26
Preamplifier	EMCI	EMC012645SE	MRTSUE06642	1 year	2022/01/14
Thermal Hygrometer	testo	608-H1	MRTSUE06622	1 year	2021/12/03
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2021/12/24



Software	Version	Function
EMI Software	V3	EMI Test Software

### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

AC Conducted Emission Measurement - SR2	
Measurement Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ):	
9kHz~150kHz: 3.84dB	
150kHz~30MHz: 3.46dB	
Radiated Emission Measurement - AC1	
Measurement Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ):	
Horizontal:	30MHz~300MHz: 4.07dB
	300MHz~1GHz: 3.63dB
	1GHz~25GHz: 4.16dB
Vertical:	30MHz~300MHz: 4.18dB
	300MHz~1GHz: 3.60dB
	1GHz~25GHz: 4.76dB
Radiated Emission Measurement - AC2	
Measurement Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ):	
Horizontal:	30MHz~300MHz: 3.75dB
	300MHz~1GHz: 3.53dB
	1GHz~25GHz: 4.28dB
Vertical:	30MHz~300MHz: 3.86dB
	300MHz~1GHz: 3.53dB
	1GHz~25GHz: 4.33dB

## 4. TEST RESULT

### 4.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 4.2 Section 4.3

**Notes:**

- 1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
- 2) According to report (report No.: 2108RSU042-U2), the maximum output power is under Bluetooth-LE 1Mbps Frequency 2402 MHz.

## 4.2. Radiated Spurious Emission Measurement

### 4.2.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Measured Distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

### 4.2.2. Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

### 4.2.3. Test Setting

**Table 1 - RBW as a function of frequency**

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

**Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

**Peak Measurements above 1GHz**

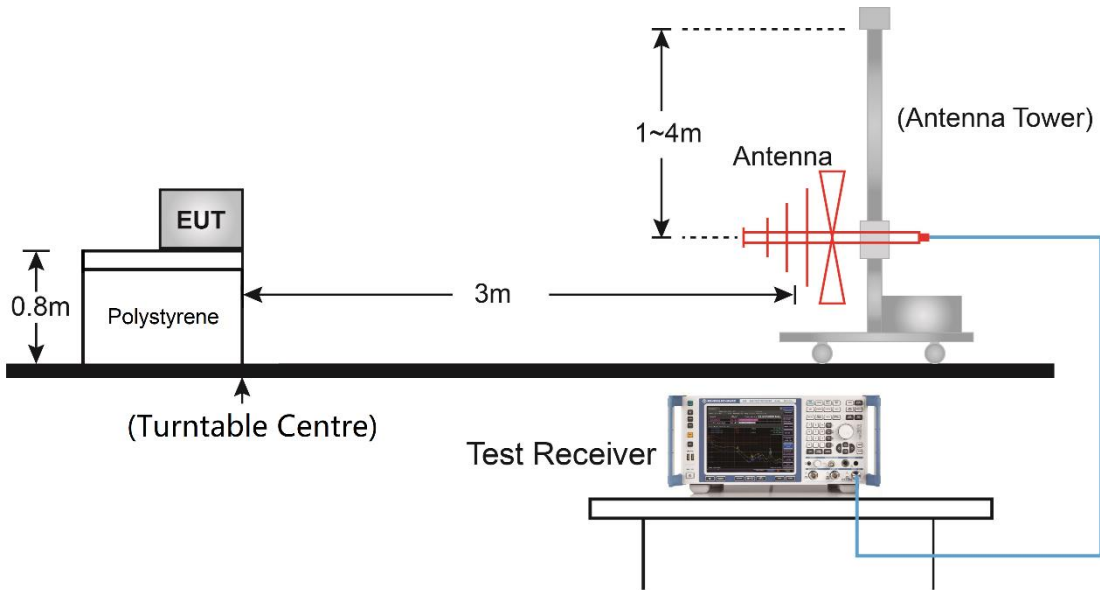
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Average Measurements above 1GHz (Method VB)**

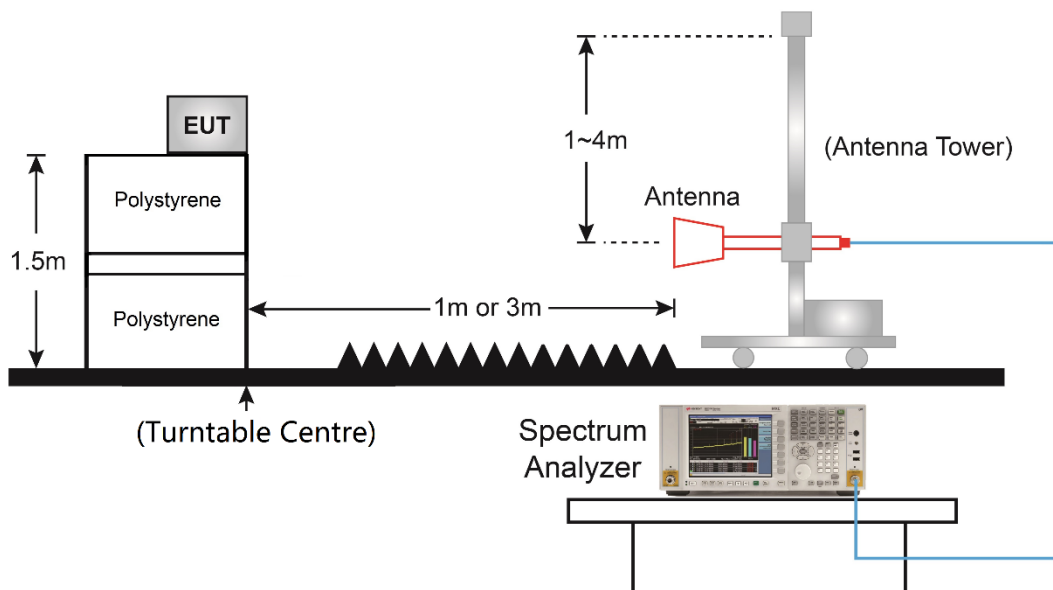
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle  $\geq 98\%$ , set VBW = 10Hz  
If the EUT duty cycle is  $< 98\%$ , set VBW  $\geq 1/T$ . T is the minimum transmission duration
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

### 4.2.4. Test Setup

#### Below 1GHz Test Setup:



#### Above 1GHz Test Setup:



**4.2.5. Test Result**

Product	KANEGA003	Temperature	26°C
Test Engineer	Kin Xia	Relative Humidity	43.3%
Test Site	SZ-AC1	Test Date	2021/09/06
Test Mode	Mode 1		
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not shown in the report.		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
<b>Channel 00</b>							
4179.000	39.31	2.03	41.34	74.00	-32.66	Peak	Horizontal
4799.500	38.07	3.97	42.04	74.00	-31.96	Peak	Horizontal
7528.000	40.42	9.28	49.70	74.00	-24.30	Peak	Horizontal
3915.500	39.36	1.20	40.56	74.00	-33.44	Peak	Vertical
4927.000	38.73	3.99	42.72	74.00	-31.28	Peak	Vertical
7434.500	38.51	9.50	48.01	74.00	-25.99	Peak	Vertical
<b>Channel 19</b>							
4272.500	39.71	2.27	41.98	74.00	-32.02	Peak	Horizontal
5080.000	38.35	4.42	42.77	74.00	-31.23	Peak	Horizontal
7502.500	38.11	9.55	47.66	74.00	-26.34	Peak	Horizontal
3915.500	40.44	1.20	41.64	74.00	-32.36	Peak	Vertical
5012.000	38.19	4.28	42.47	74.00	-31.53	Peak	Vertical
8480.000	39.20	10.50	49.70	74.00	-24.30	Peak	Vertical
<b>Channel 39</b>							
4366.000	40.14	2.51	42.65	74.00	-31.35	Peak	Horizontal
5054.500	38.35	4.38	42.73	74.00	-31.27	Peak	Horizontal
7494.000	38.55	9.55	48.10	74.00	-25.90	Peak	Horizontal
3669.000	40.31	0.64	40.95	74.00	-33.05	Peak	Vertical
5037.500	38.08	4.36	42.44	74.00	-31.56	Peak	Vertical
7468.500	38.94	9.36	48.30	74.00	-25.70	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB)

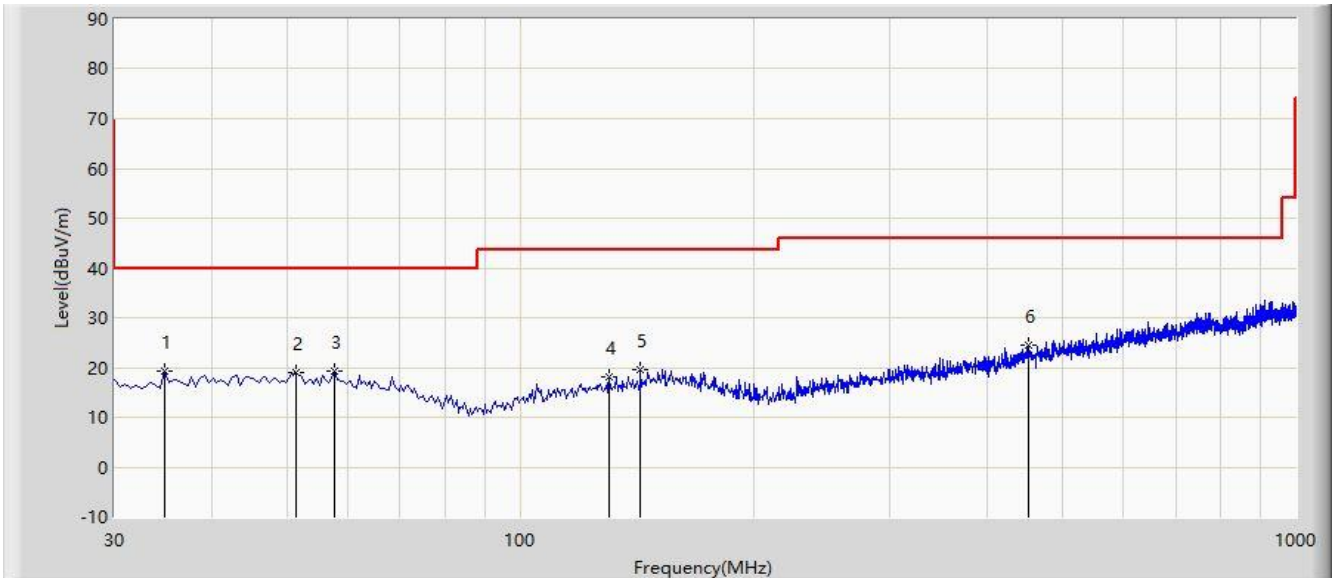
Product	KANEGA003	Temperature	26°C
Test Engineer	Kin Xia	Relative Humidity	43.3%
Test Site	SZ-AC1	Test Date	2021/09/06
Test Mode	Mode 2		
Remark	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not shown in the report.		

Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB/m)	Measure Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Polarization
Channel 00							
4323.500	39.45	2.50	41.95	74.00	-32.05	Peak	Horizontal
5054.500	39.00	4.38	43.38	74.00	-30.62	Peak	Horizontal
7409.000	38.44	9.73	48.17	74.00	-25.83	Peak	Horizontal
4102.500	38.98	1.83	40.81	74.00	-33.19	Peak	Vertical
4901.500	38.73	3.94	42.67	74.00	-31.33	Peak	Vertical
7502.500	38.26	9.55	47.81	74.00	-26.19	Peak	Vertical
Channel 19							
3881.500	39.58	1.02	40.60	74.00	-33.40	Peak	Horizontal
5122.500	38.67	4.52	43.19	74.00	-30.81	Peak	Horizontal
7502.500	38.54	9.55	48.09	74.00	-25.91	Peak	Horizontal
5054.500	38.79	4.38	43.17	74.00	-30.83	Peak	Vertical
7553.500	39.81	9.18	48.99	74.00	-25.01	Peak	Vertical
8046.500	38.49	10.23	48.72	74.00	-25.28	Peak	Vertical
Channel 39							
4077.000	40.00	1.77	41.77	74.00	-32.23	Peak	Horizontal
4816.500	38.22	3.88	42.10	74.00	-31.90	Peak	Horizontal
7545.000	38.78	9.21	47.99	74.00	-26.01	Peak	Horizontal
4332.000	38.85	2.58	41.43	74.00	-32.57	Peak	Vertical
5114.000	37.87	4.58	42.45	74.00	-31.55	Peak	Vertical
7502.500	38.71	9.55	48.26	74.00	-25.74	Peak	Vertical
Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m) Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)							



**The Test Result of Radiated Emission below 1GHz:**

Site: WZ-AC1	Time: 2021/09/06
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_VULB 9168 _30-1000MHz	Polarity: Horizontal
EUT: KANEGA003	Power: By battery
Note: Test Mode 1 Channel 00	



No.	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1			34.850	19.278	2.390	-20.722	40.000	16.888	PK
2			51.340	19.079	1.110	-20.921	40.000	17.969	PK
3		*	57.645	19.380	1.708	-20.620	40.000	17.672	PK
4			130.395	18.151	1.647	-25.349	43.500	16.504	PK
5			143.005	19.488	1.851	-24.012	43.500	17.637	PK
6			452.435	24.634	2.267	-21.366	46.000	22.366	PK

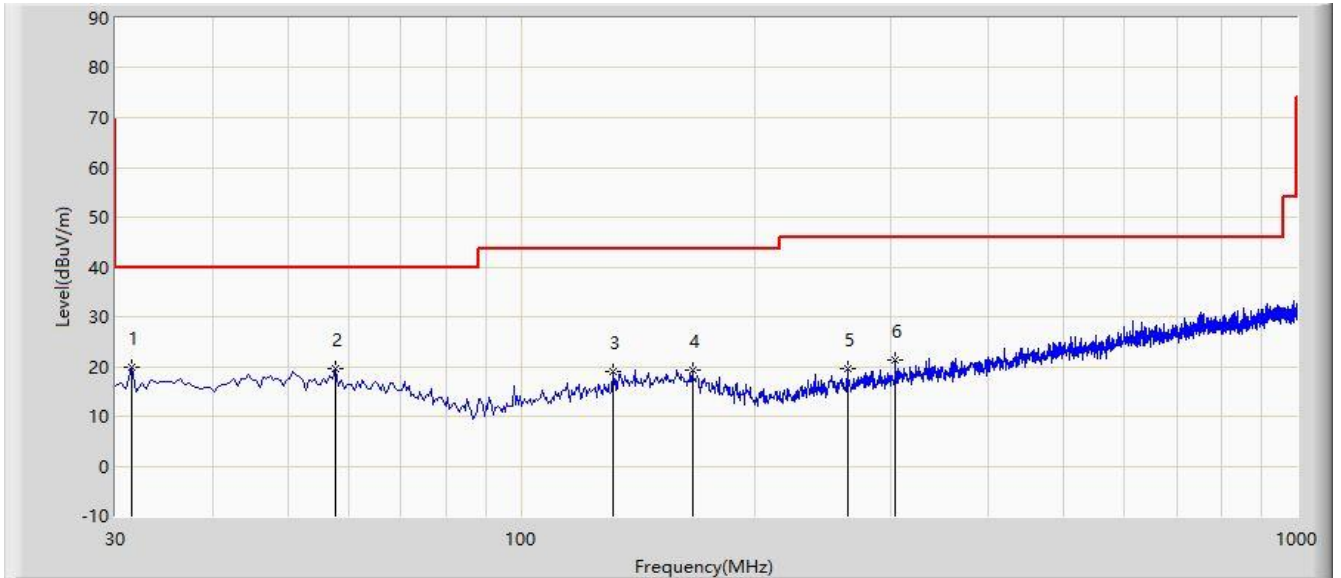
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Note 3: QP measurement was not performed if peak level lower than QP limit.

Site: WZ-AC1	Time: 2021/09/06
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_VULB 9168_30-1000MHz	Polarity: Vertical
EUT: KANEGA003	Power: By battery
Note: Test Mode 1 Channel 00	



No.	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1		*	31.455	19.885	3.212	-20.115	40.000	16.673	PK
2			57.645	19.638	1.966	-20.362	40.000	17.672	PK
3			131.365	19.067	2.460	-24.433	43.500	16.607	PK
4			166.285	19.374	1.788	-24.126	43.500	17.585	PK
5			263.285	19.436	2.490	-26.564	46.000	16.946	PK
6			304.025	21.269	2.853	-24.731	46.000	18.416	PK

Note 1: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Note 3: QP measurement was not performed if peak level lower than QP limit.

### 4.3. Radiated Restricted Band Edge Measurement

#### 4.3.1. Test Limit

**For 15.205 requirement:**

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.5252 5	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measured Distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

#### 4.3.2. Test Procedure Used

ANSI C63.10 - Section 6.3 (General Requirements)

ANSI C63.10 - Section 6.6 (Standard test method above 1GHz)

#### 4.3.3. Test Setting

##### Peak Field Strength Measurements

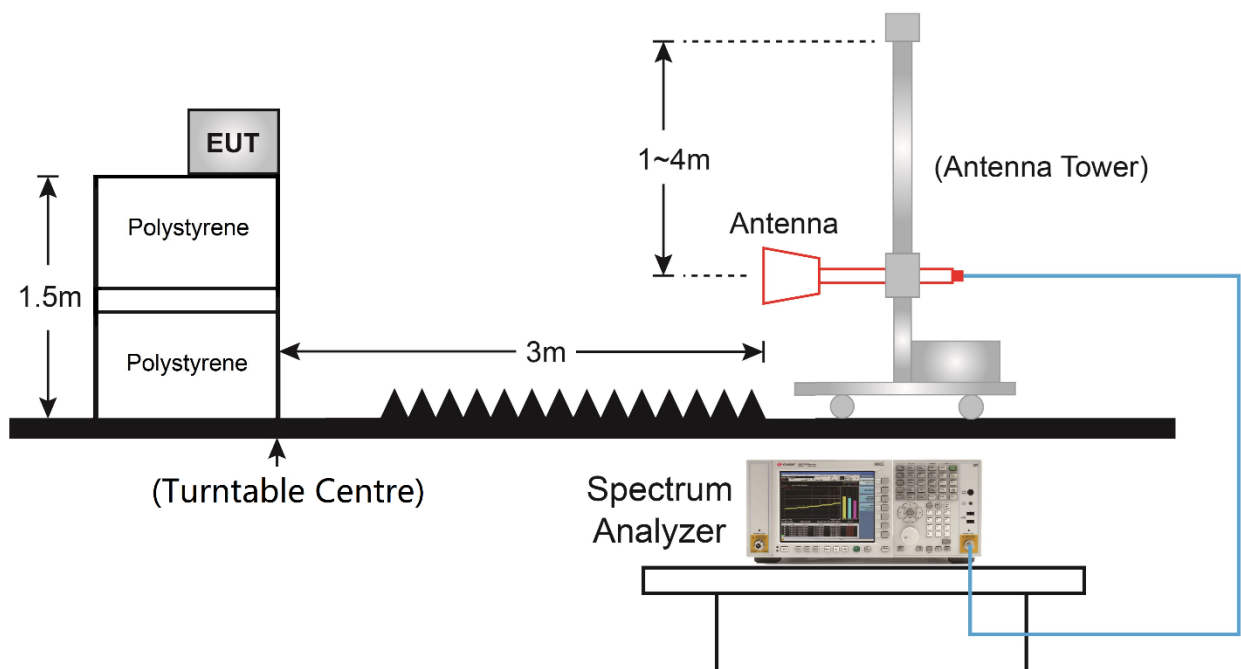
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max hold
7. Trace was allowed to stabilize

### Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle  $\geq 98\%$ , set VBW = 10Hz
4. If the EUT duty cycle is  $< 98\%$ , set VBW  $\geq 1/T$ . T is the minimum transmission duration
5. Detector = Peak
6. Sweep time = Auto
7. Trace mode = Max hold

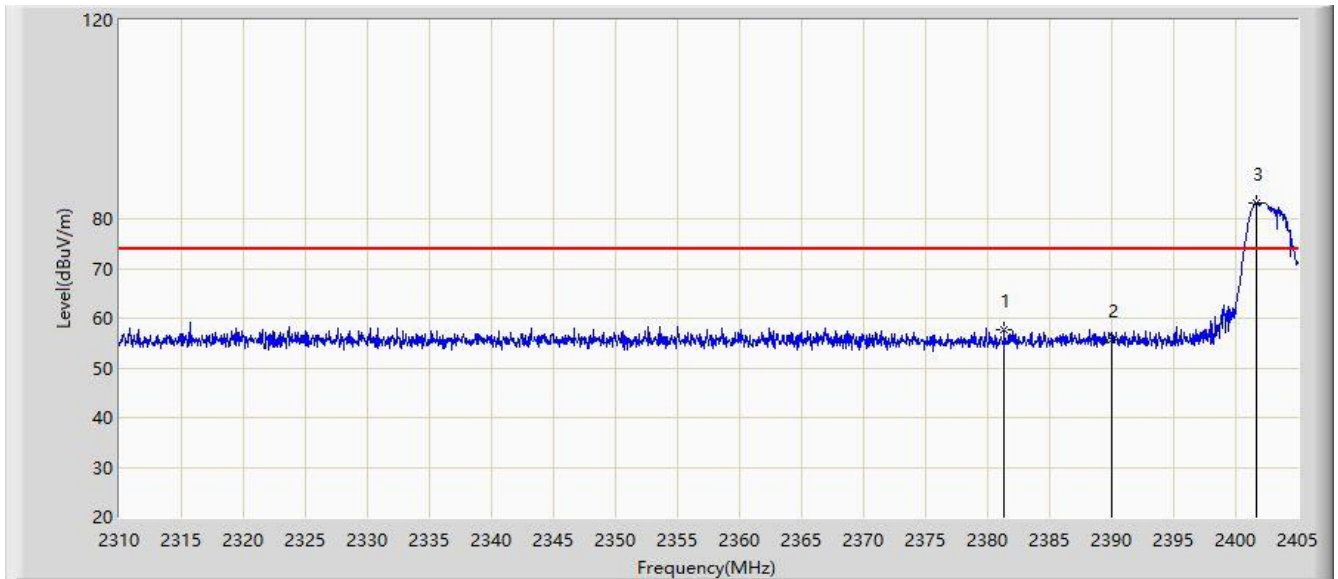
Trace was allowed to stabilize

#### 4.3.4. Test Setup



### 4.3.5. Test Result

Site: WZ-AC1	Time: 2021/09/01
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By battery
Note: Transmit by Bluetooth-LE 1Mbps Frequency 2402 MHz	

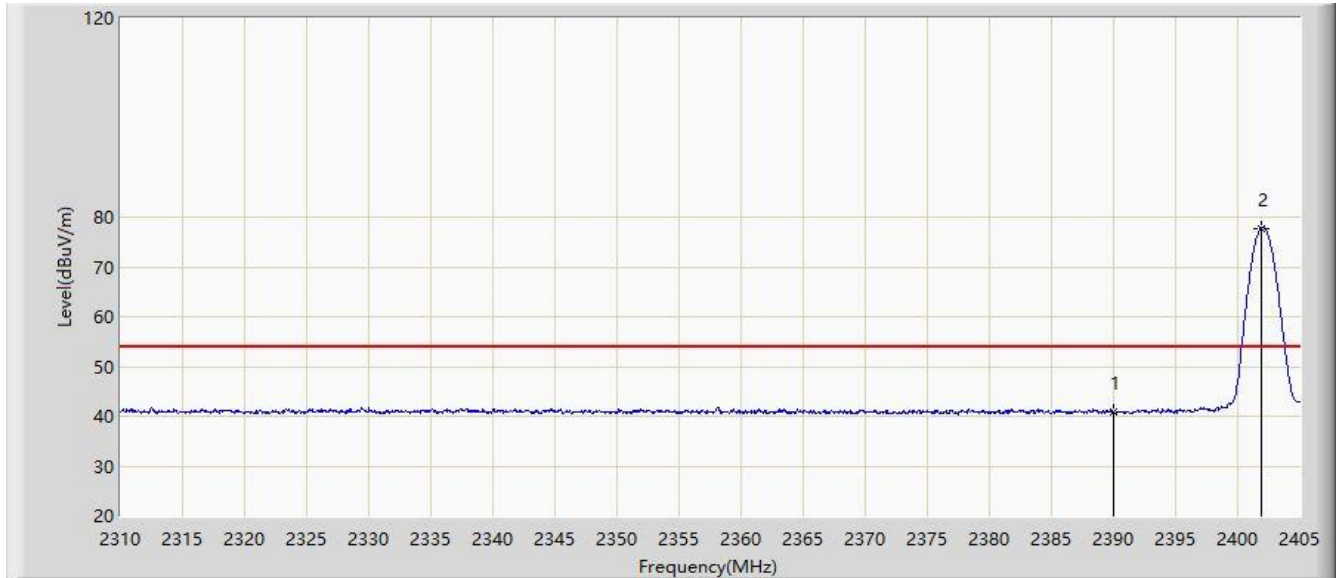


No.	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2381.345	57.825	26.784	-16.175	74.000	31.041	PK
2			2390.000	55.541	24.508	-18.459	74.000	31.034	PK
3		*	2401.627	83.204	52.195	N/A	N/A	31.009	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC1	Time: 2021/09/01
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By battery
Note: Transmit by Bluetooth-LE 1Mbps Frequency 2402 MHz	

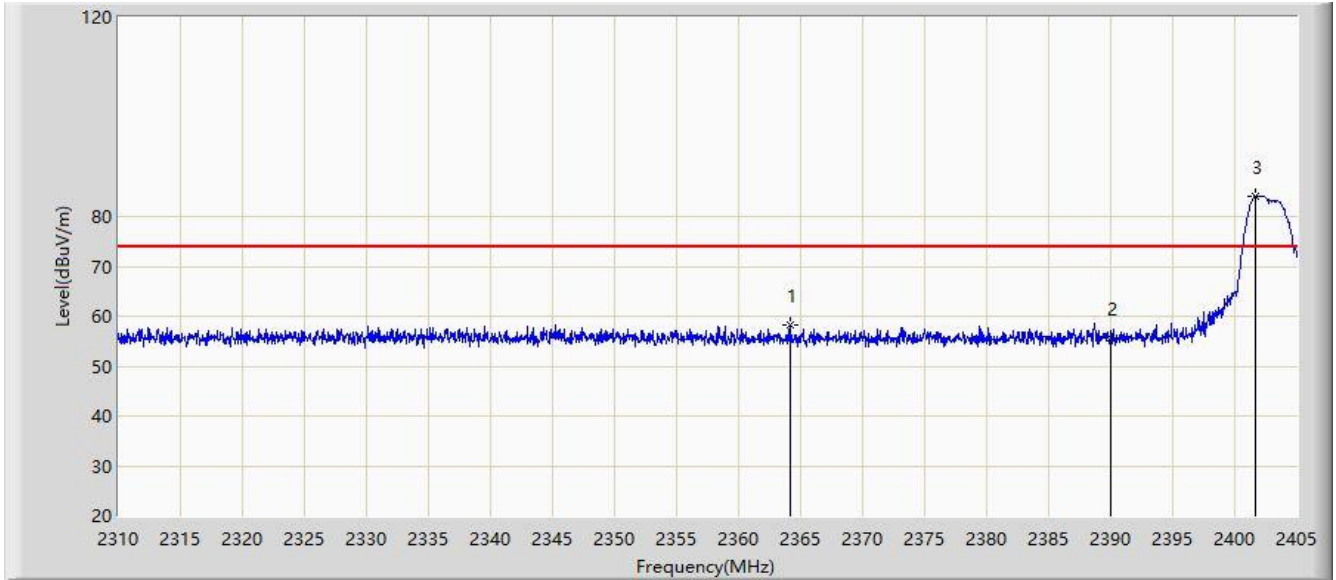


No.	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2390.000	40.939	9.906	-13.061	54.000	31.034	AV
2		*	2401.865	77.690	46.681	N/A	N/A	31.009	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC1	Time: 2021/09/01
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By battery
Note: Transmit by Bluetooth-LE 1Mbps Frequency 2402 MHz	



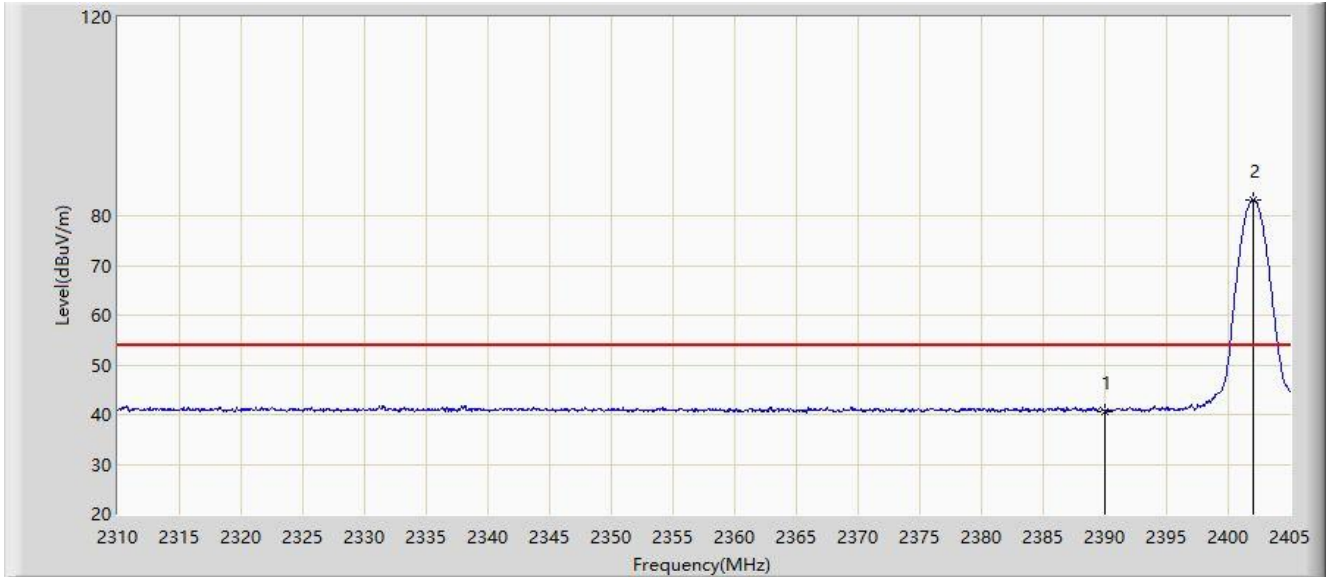
No.	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2364.150	58.358	27.288	-15.642	74.000	31.070	PK
2			2390.000	55.706	24.673	-18.294	74.000	31.034	PK
3		*	2401.675	84.077	53.068	N/A	N/A	31.009	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)



Site: WZ-AC1	Time: 2021/09/01
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By battery
Note: Transmit by Bluetooth-LE 1Mbps Frequency 2402 MHz	

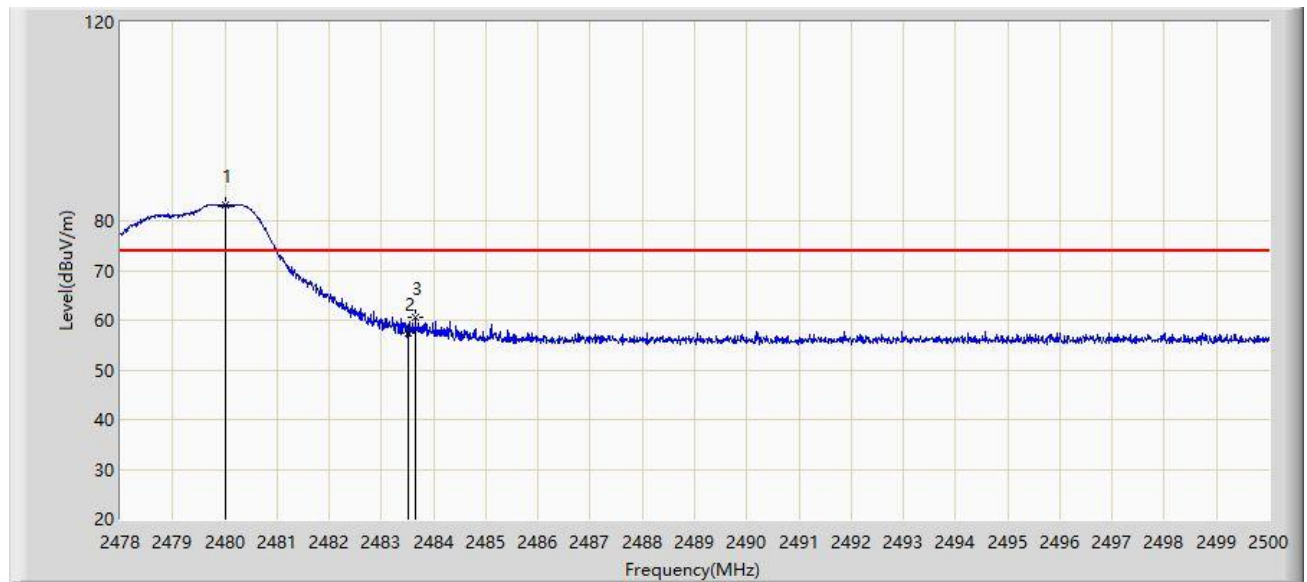


No.	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2390.000	40.664	9.631	-13.336	54.000	31.034	AV
2		*	2402.008	83.199	52.191	N/A	N/A	31.008	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15_Band Edge(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 1M at Channel 2480MHz	

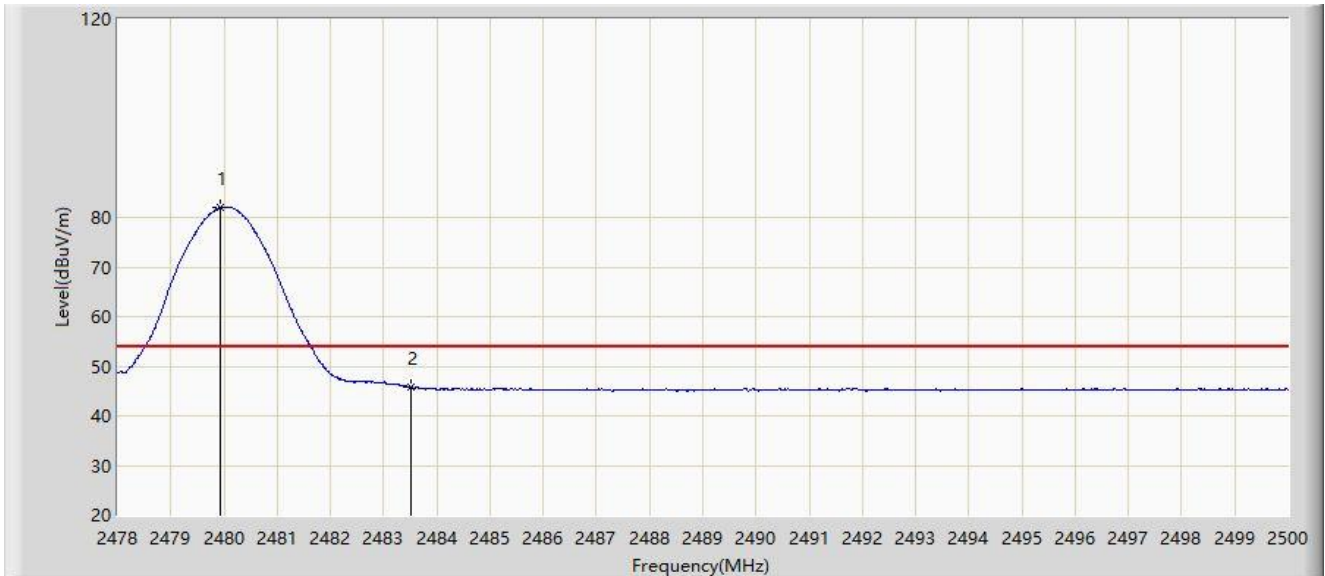


No.	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1		*	2480.013	83.199	51.280	N/A	N/A	31.919	PK
2			2483.500	57.334	25.422	-16.666	74.000	31.912	PK
3			2483.654	60.500	28.588	-13.500	74.000	31.911	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 1M at Channel 2480MHz	

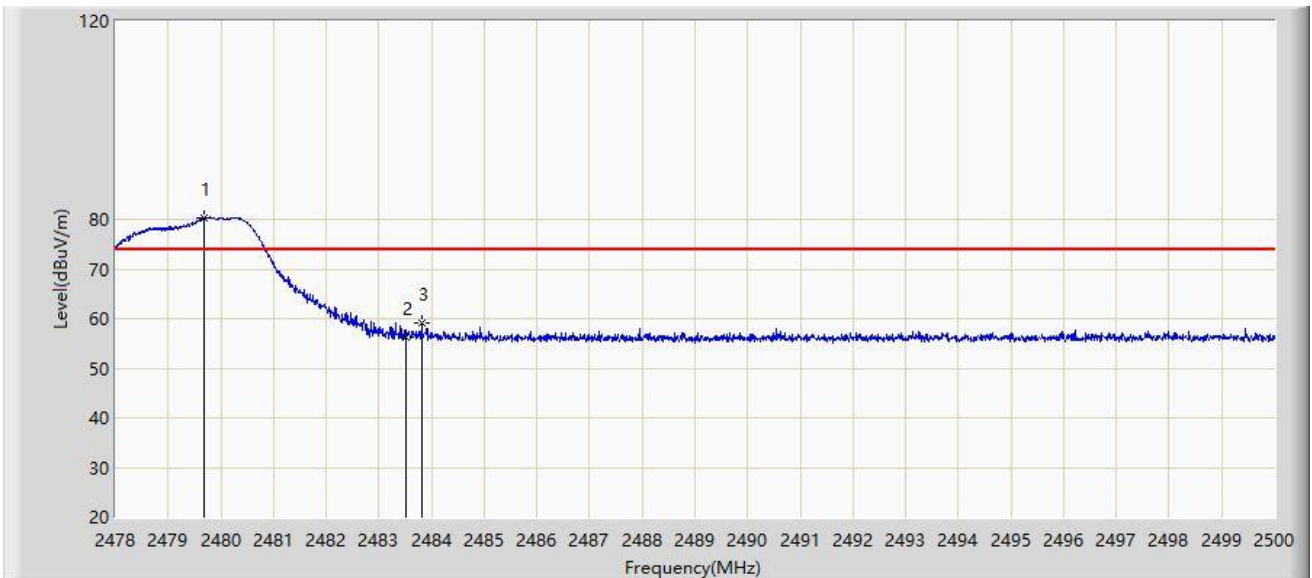


No.	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2479.936	81.984	50.065	27.984	54.000	31.919	AV
2			2483.500	45.815	13.903	N/A	N/A	31.912	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By battery
Note: Transmit by Bluetooth-LE 1Mbps Frequency 2480 MHz	

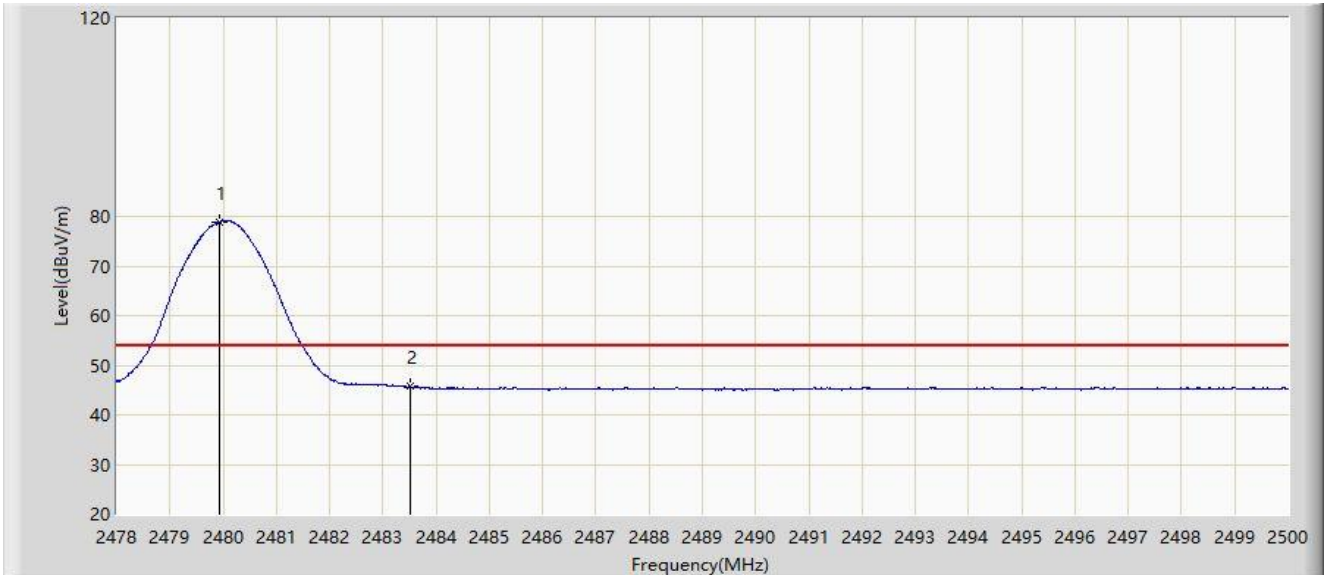


No.	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		*	2479.683	80.256	48.336	N/A	N/A	31.920	PK
2			2483.500	56.239	24.327	-17.761	74.000	31.912	PK
3			2483.808	59.133	27.222	-14.867	74.000	31.911	PK

Note: Measure Level (dBµV/m) = Reading Level (dBµV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC1	Time: 2021/09/01
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC1_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By battery
Note: Transmit by Bluetooth-LE 1Mbps Frequency 2480MHz	

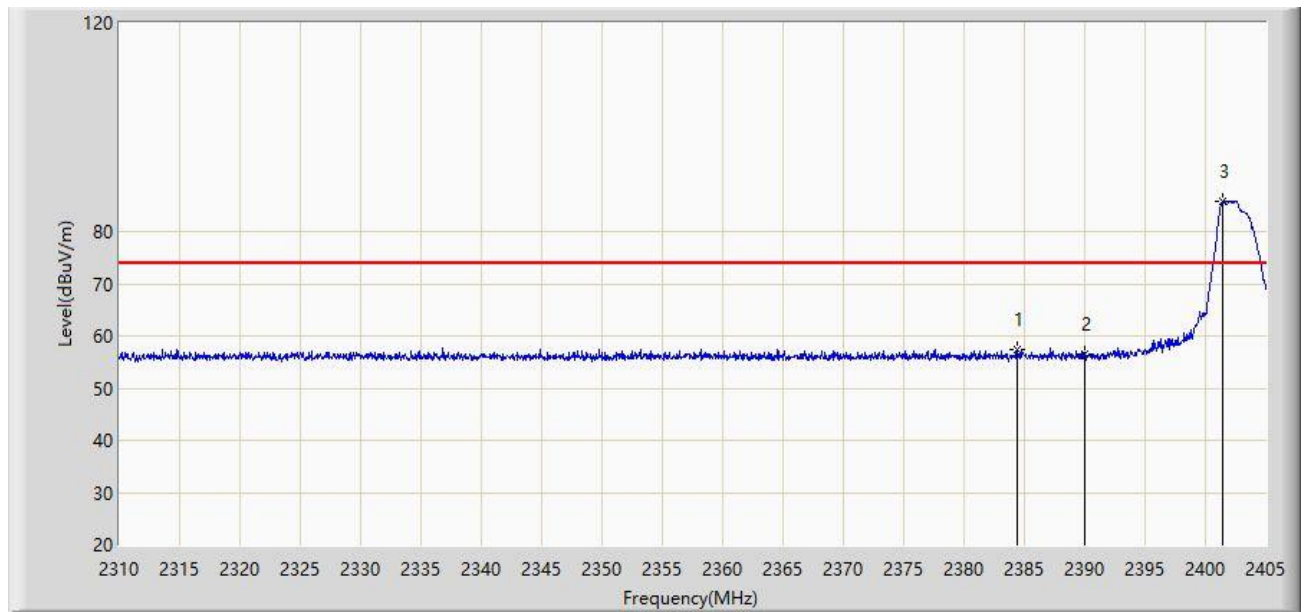


No.	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1		*	2479.925	78.878	46.959	24.878	54.000	31.919	AV
2			2483.500	45.732	13.820	N/A	N/A	31.912	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2402MHz	

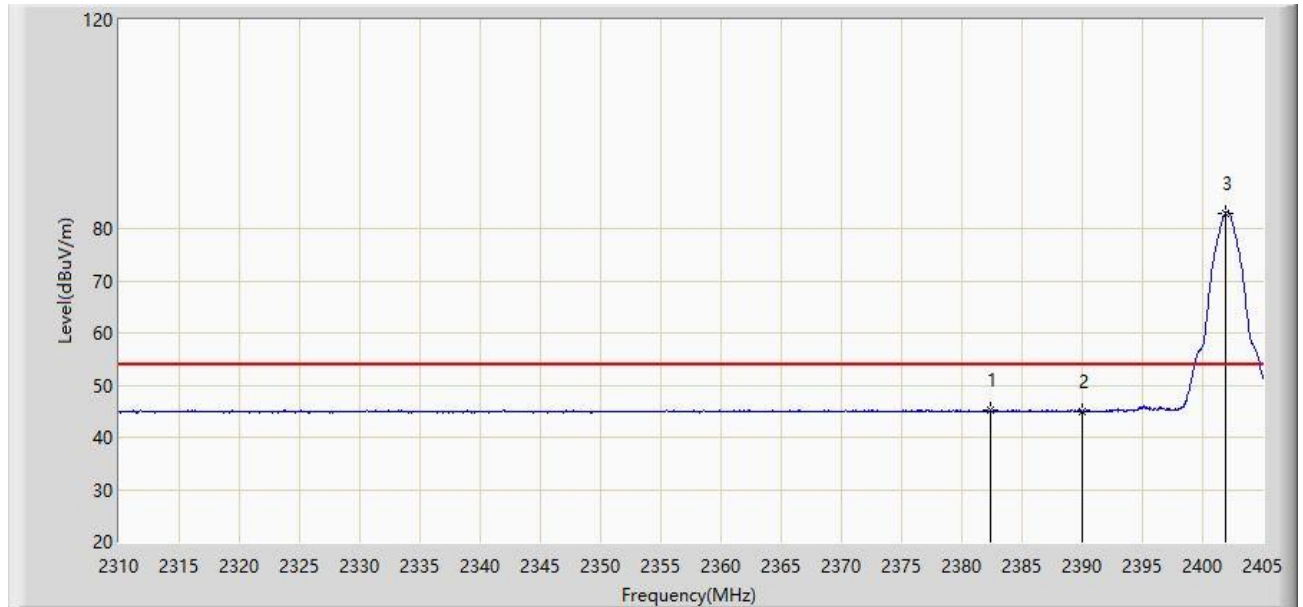


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2384.385	57.436	25.419	-16.564	74.000	32.017	PK
2			2390.000	56.526	24.523	-17.474	74.000	32.003	PK
3		*	2401.485	85.841	53.854	N/A	N/A	31.987	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2402MHz	

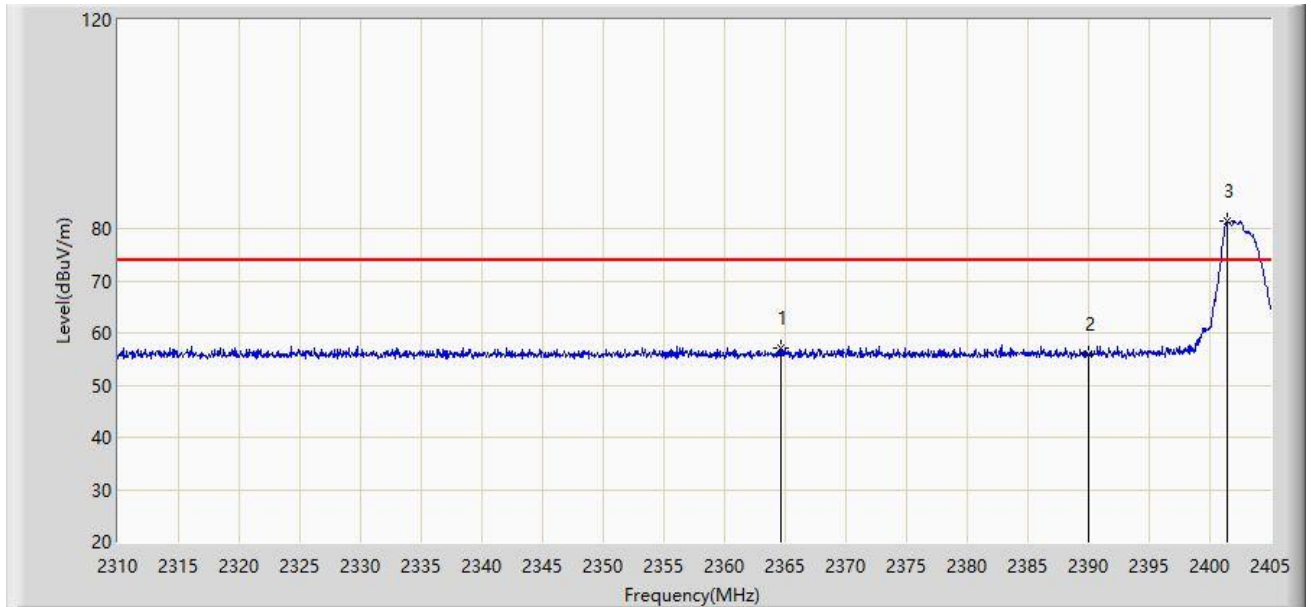


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2382.437	45.191	13.174	-8.809	54.000	32.017	AV
2			2390.000	44.999	12.996	-9.001	54.000	32.003	AV
3		*	2401.913	82.997	51.011	N/A	N/A	31.986	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2402MHz	



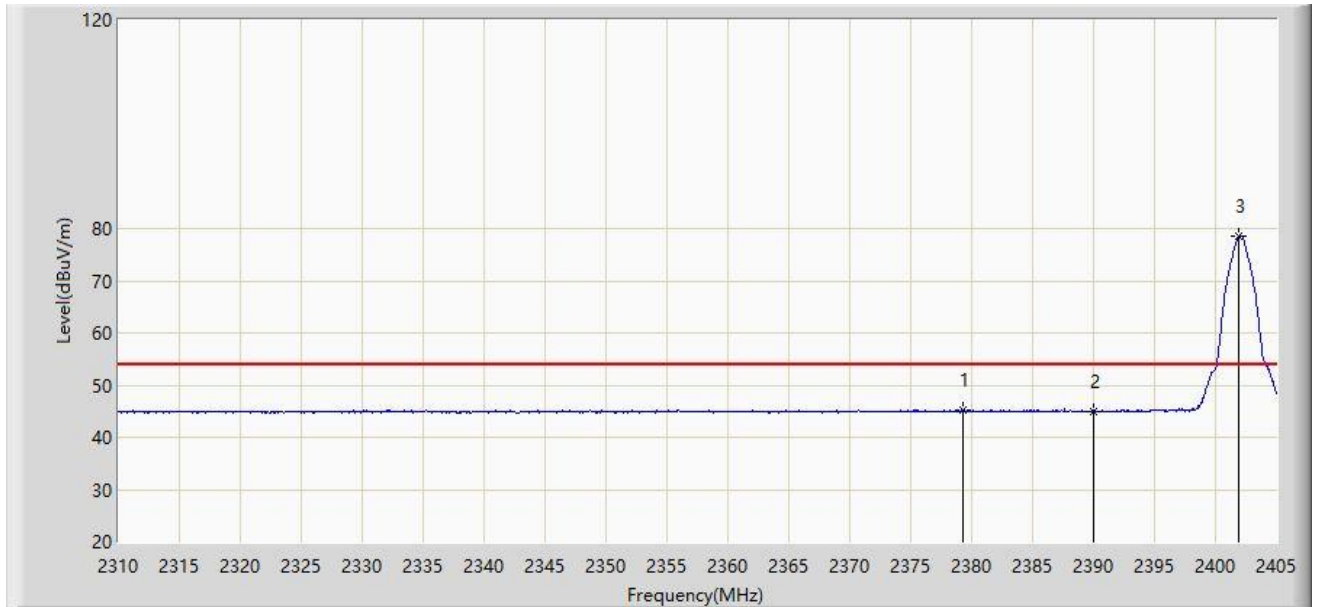
No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2364.625	57.177	25.161	-16.823	74.000	32.016	PK
2			2390.000	55.901	23.898	-18.099	74.000	32.003	PK
3		*	2401.485	81.309	49.322	N/A	N/A	31.987	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)



Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2402MHz	

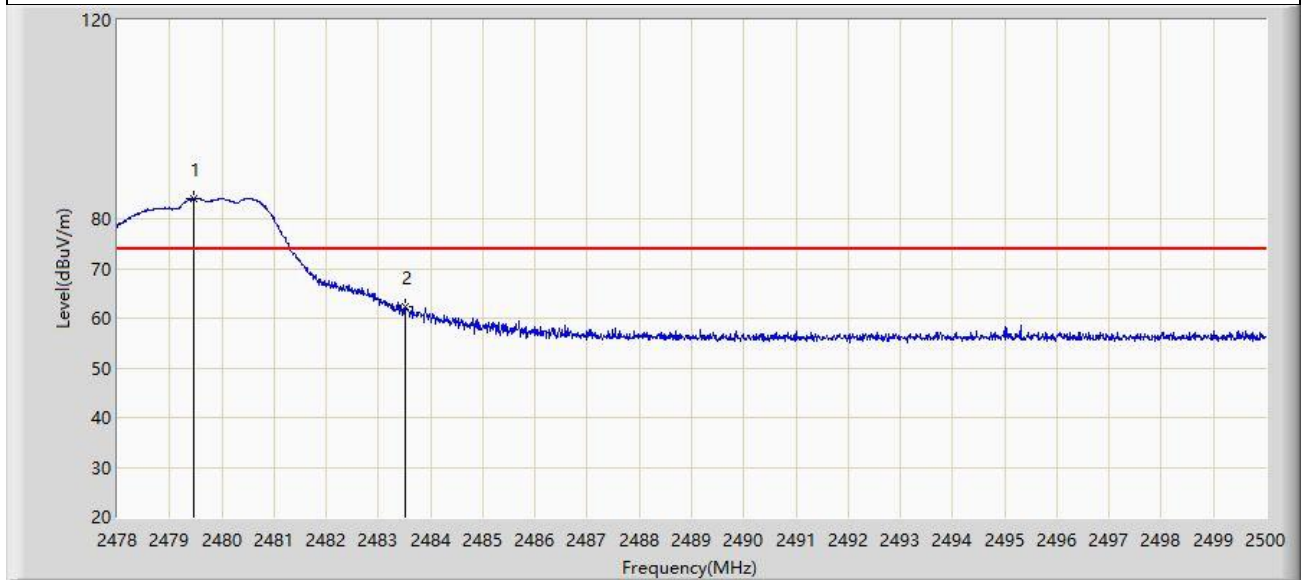


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2379.255	45.281	13.267	-8.719	54.000	32.014	AV
2			2390.000	44.897	12.894	-9.103	54.000	32.003	AV
3		*	2401.960	78.576	46.590	N/A	N/A	31.986	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2480MHz	

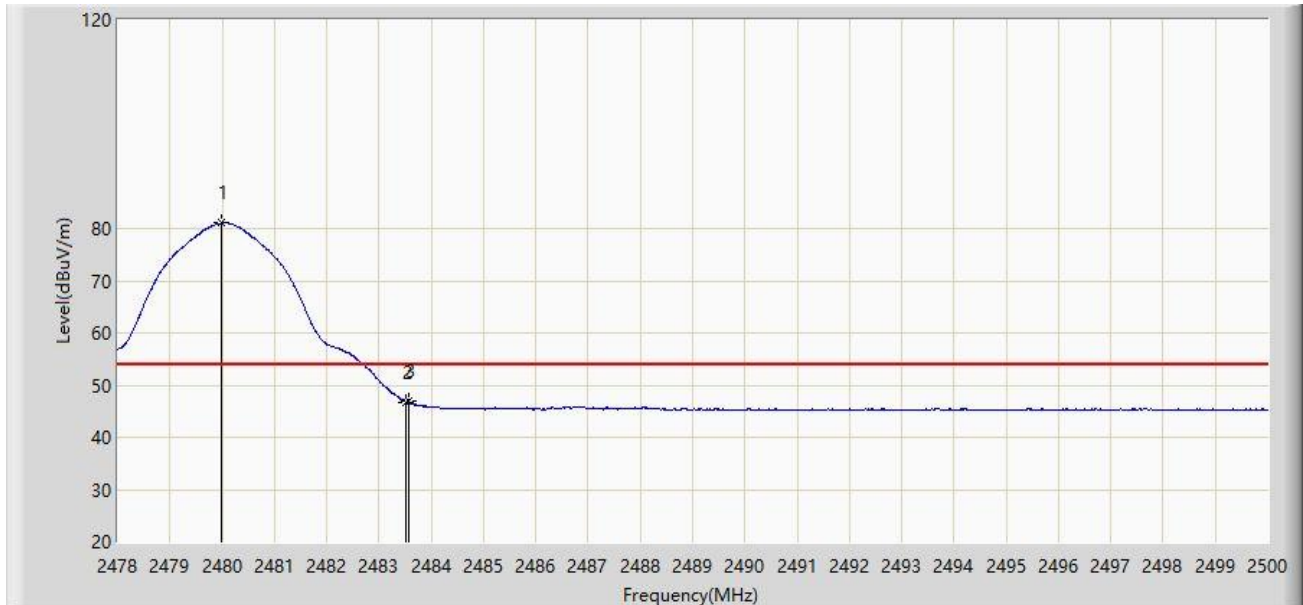


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2479.463	84.185	52.265	N/A	N/A	31.921	PK
2			2483.500	62.365	30.453	-11.635	74.000	31.912	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25 - 20:19
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2480MHz	

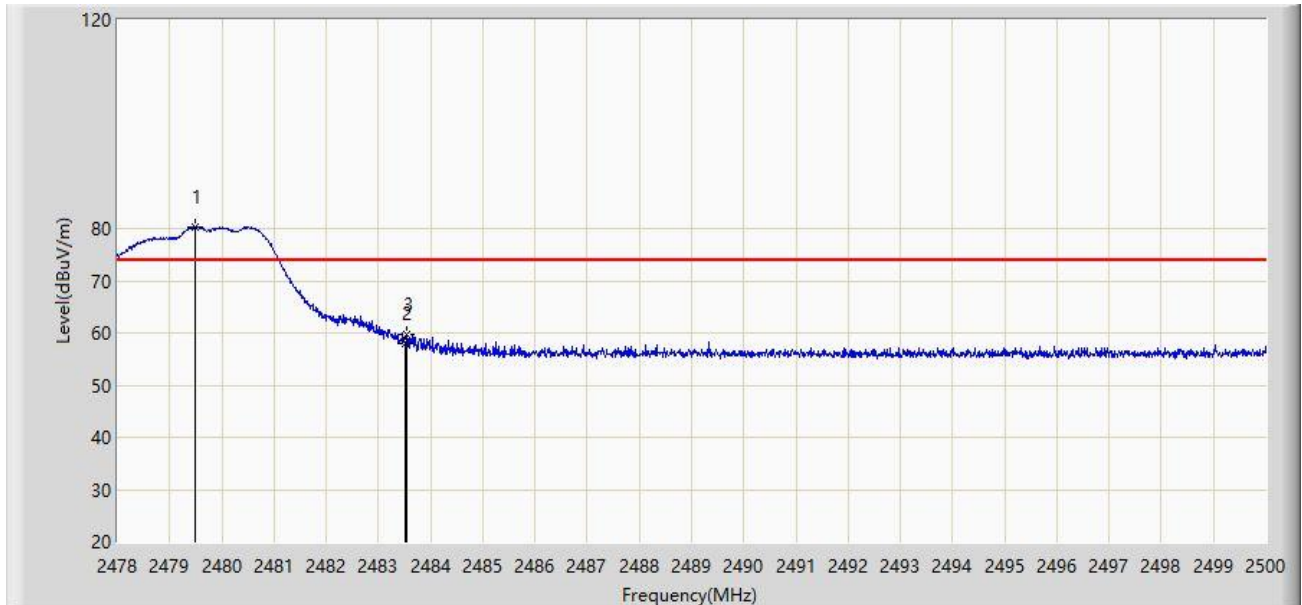


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2479.980	81.064	49.145	N/A	N/A	31.919	AV
2			2483.500	46.811	14.899	-7.189	54.000	31.912	AV
3			2483.566	46.857	14.945	-7.143	54.000	31.911	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2480MHz	

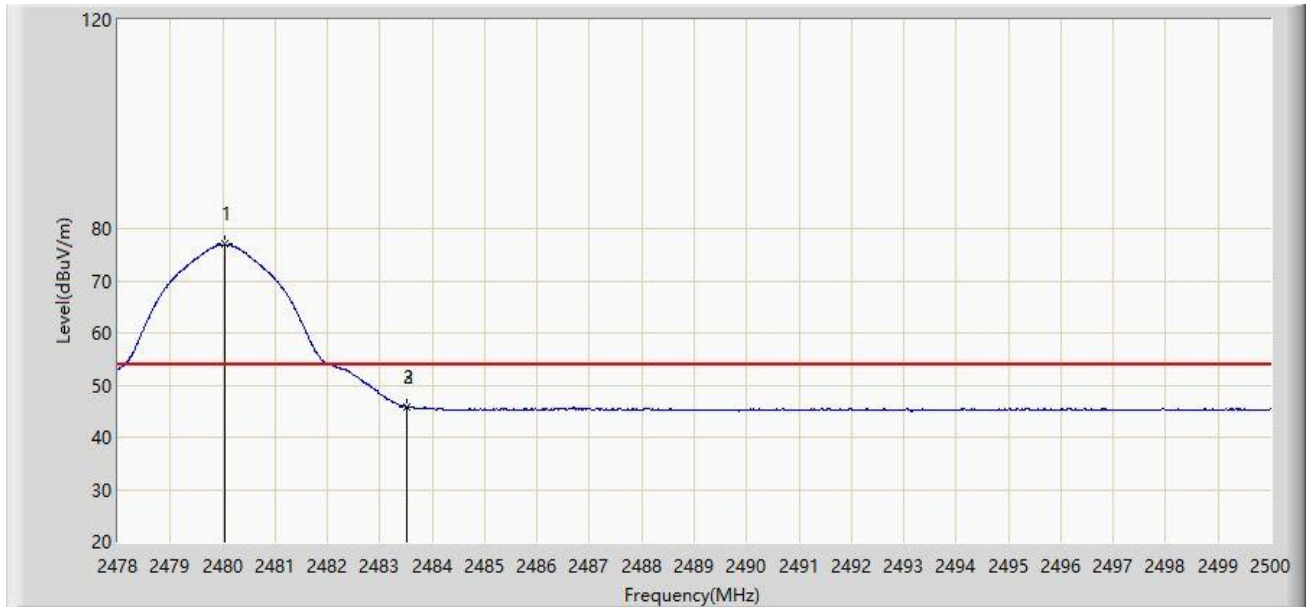


No	Flag	Mark	Frequency (MHz)	Measure Level (dB $\mu$ V/m)	Reading Level (dB $\mu$ V)	Margin (dB)	Limit (dB $\mu$ V/m)	Factor (dB/m)	Type
1		*	2479.496	80.379	48.459	N/A	N/A	31.921	PK
2			2483.500	57.996	26.084	-16.004	74.000	31.912	PK
3			2483.544	59.674	27.762	-14.326	74.000	31.911	PK

Note: Measure Level (dB $\mu$ V/m) = Reading Level (dB $\mu$ V) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/25
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: KANEGA003	Power: By Battery
Test Mode: Transmit by Bluetooth-LE 2M at Channel 2480MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2480.046	76.964	45.045	N/A	N/A	31.919	AV
2			2483.500	45.857	13.945	-8.143	54.000	31.912	AV
3			2483.511	45.864	13.952	-8.136	54.000	31.911	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

## 5. CONCLUSION

The data collected relate only the item(s) tested and show that the device is in compliance with Part 15C of the FCC rules.

\_\_\_\_\_ The End \_\_\_\_\_

## Appendix A - Test Setup Photograph

Refer to "2108RSU042-UT-1" file.

## **Appendix B - EUT Photograph**

Refer to "2108RSU042-UE" file.