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# **FCC Test Report**

**DONGGUAN TOGRAN ELECTRONICS Applicant** 

TECHNOLOGY CO.,LTD.

No. 110, Shidan Mid Rd, Shijie Town, Dongguan **Address** 

city, China

Wireless Ergonomic Keyboard **Product Name** 

: May 27, 2024 **Report Date** 

Shenzhen Anbotek Con Anbotek



ce Laboratory Limited









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| Report No.: 18220WC40088101 F                 | -CC ID: 2AGLG-1K50FG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Page 3 of 34   |
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# TEST REPORT

Applicant : DONGGUAN TOGRAN ELECTRONICS TECHNOLOGY CO.,LTD.

Manufacturer : DONGGUAN TOGRAN ELECTRONICS TECHNOLOGY CO.,LTD.

Product Name : Wireless Ergonomic Keyboard

Test Model No. : TK50FG

Reference Model No. : ST62603, ST62635, ST62636

Trade Mark : Staples, TOGRAN

Rating(s) : Input: 3V by "AAA" battery

Test Standard(s) 47 CFR Part 15.247 ANSI C63.10-2020

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with above listed standard(s) requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

| Date of Receipt.        |                      | Api.          | 20, 2024        |             |
|-------------------------|----------------------|---------------|-----------------|-------------|
|                         |                      |               |                 |             |
| Date of Test:           |                      | Apr. 28, 2024 | to May 11, 2024 |             |
|                         | k Anbotek Anbo       | Ella          | Diane           | ipotek Aupo |
| Prepared By:            | Die Wir.             | Anboter Anb   | J. J. J.        | Aupor A     |
|                         |                      |               | a Liang)        |             |
|                         |                      | Tolwo         | ird pan         |             |
| Approved & Authorized S | ligner: And offerAnd | ack abolek    | Aupo.           | otek Anbot  |
|                         |                      | (Edw          | ard Pan)        |             |





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### **Revision History**

|     | Report Version      | Description             | Issued Date         |
|-----|---------------------|-------------------------|---------------------|
|     | Anbore R00 potek An | Original Issue.         | May 27, 2024        |
| ξΘ  | k Aupotek Aupotek   | Anbotek Anbotek Anbotek | Anbotek Anbotek Anb |
| (10 | ore Anbotek Anbotek | Anbotek Anbotek Anbot   | tek Anbotek Anbotek |





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### 1. General Information

### 1.1. Client Information

| V U P                                                               | ~/~ | No. Ye Was No.                                            |  |
|---------------------------------------------------------------------|-----|-----------------------------------------------------------|--|
| Applicant                                                           |     | DONGGUAN TOGRAN ELECTRONICS TECHNOLOGY CO.,LTD.           |  |
| Address : No. 110, Shidan Mid Rd, Shijie Town, Dongguan city, China |     |                                                           |  |
| Manufacturer                                                        | :   | DONGGUAN TOGRAN ELECTRONICS TECHNOLOGY CO.,LTD.           |  |
| Address                                                             | :   | No. 110, Shidan Mid Rd, Shijie Town, Dongguan city, China |  |
| Factory                                                             | :   | DONGGUAN TOGRAN ELECTRONICS TECHNOLOGY CO.,LTD.           |  |
| Address                                                             | :   | No. 110, Shidan Mid Rd, Shijie Town, Dongguan city, China |  |

### 1.2. Description of Device (EUT)

| - V                    | O |                                                                                                                           |
|------------------------|---|---------------------------------------------------------------------------------------------------------------------------|
| Product Name           | : | Wireless Ergonomic Keyboard                                                                                               |
| Test Model No.         | : | TK50FG                                                                                                                    |
| Reference Model<br>No. | : | ST62603, ST62635, ST62636 (Note: All samples are the same except the model number, so we prepare "TK50FG" for test only.) |
| Trade Mark             | : | Staples, TOGRAN                                                                                                           |
| Test Power Supply      | : | DC 3V battery inside                                                                                                      |
| Test Sample No.        | : | 1-2-1(Normal Sample), 1-2-2(Engineering Sample)                                                                           |
| Adapter                | : | N/A Anbotek Anbotek Anbotek Anbotek Anbotek                                                                               |
| RF Specification       |   |                                                                                                                           |
| Operation<br>Frequency | : | 2408~2474MHz                                                                                                              |
| Number of Channel      | : | 34 Anbotek Anbotes Anbotek Anbotek Anbotek                                                                                |
| Modulation Type        | : | GFSK Anbotek Anbotek Anbotek Anbotek                                                                                      |
| Antenna Type           | : | PCB Antenna                                                                                                               |
| Antenna Gain(Peak)     | : | -2dBi Anbotek Anbotek Anbotek Anbotek                                                                                     |

#### Remark:

- (1) All of the RF specification are provided by customer.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.







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### 1.3. Auxiliary Equipment Used During Test

| Title           | Manufacturer     | Model No.        | Serial No.    |  |
|-----------------|------------------|------------------|---------------|--|
| Potek   Aupoter | And stek anbotek | Anbo. A Am botek | Anbote. / Anb |  |

### 1.4. Operation channel list

Operation Band:

| Operation E |                    | V                    | 20. Pr.            | 0.0       | 700                |            | - Va-              |
|-------------|--------------------|----------------------|--------------------|-----------|--------------------|------------|--------------------|
| Channel     | Frequency<br>(MHz) | Channel              | Frequency<br>(MHz) | Channel   | Frequency<br>(MHz) | Channel    | Frequency<br>(MHz) |
| Ant 01      | 2408               | 111 N                | 2428               | 21.0      | 2448               | And 31 tek | 2468               |
| 02          | 2410               | 12                   | 2430               | 22,01ek   | 2450               | 32         | 2470               |
| 03/20/18    | 2412               | 13 <sub>Anbote</sub> | 2432               | 23        | 2452               | 33         | 2472 nbote         |
| lek 04 Anbo | 2414               | otek 14 Anb          | 2434               | 24        | 2454 And           | 34         | 2474 And           |
| botek05 N   | 2416               | , e15                | 2436               | 25        | 2456               | 10010 - A  | hotek l            |
| 06          | 2418               | 16                   | 2438               | 26        | 2458               | Vupote     | Pur Potek          |
| 07          | 2420               | 17 tek               | 2440               | Andrew 27 | 2460               | Aupo,      | -boiek             |
| 08          | 2422               | 18                   | 2442               | 28        | 2462               | Anbor      | ek - spoje         |
| ek 09 Anbo  | 2424               | 19                   | 2444 (1001)        | 29        | 2464               | ek - Vupo  | Tek - nb           |
| otek 10 Ar  | 2426 Andrew        | 20                   | 2446               | 30        | 2466               | potek - Ar | loo. Stelk         |

### 1.5. Description of Test Modes

| Pretest Modes       |         | Descriptions                                                  |
|---------------------|---------|---------------------------------------------------------------|
| ek abote TM1 Arbote |         | Keep the EUT in continuously transmitting mode (non-hopping). |
| TM2                 | Aupoter | Keep the EUT in continuously transmitting mode (hopping).     |

### 1.6. Measurement Uncertainty

| Parameter                                | Uncertainty                                               |
|------------------------------------------|-----------------------------------------------------------|
| Conducted emissions (AMN 150kHz~30MHz)   | 3.4dB                                                     |
| Occupied Bandwidth                       | 925Hz                                                     |
| Conducted Output Power                   | 0.76dB Anborek Anborek                                    |
| Conducted Spurious Emission              | 1.24dB                                                    |
| Radiated spurious emissions (above 1GHz) | 1G-6GHz: 4.78dB;<br>6G-18GHz: 4.88dB<br>18G-40GHz: 5.68dB |
| Radiated emissions (Below 30MHz)         | 3.53dB                                                    |







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Radiated spurious emissions (30MHz~1GHz) Horizontal: 3.92dB; Vertical: 4.52dB

The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.





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### 1.7. Test Summary

| Test Items                                  | Test Modes        | Status           |
|---------------------------------------------|-------------------|------------------|
| Antenna requirement                         | Anbotek / Anbote  | And Potek        |
| Conducted Emission at AC power line         | Anborek / Anbores | N                |
| Occupied Bandwidth                          | Mode1             | P PART           |
| Maximum Conducted Output Power              | Mode1             | P                |
| Channel Separation                          | Mode2             | nbox Pk          |
| Number of Hopping Frequencies               | Mode2             | Anb P rek        |
| Dwell Time                                  | Mode2             | P                |
| Emissions in non-restricted frequency bands | Mode1,2           | P <sup>Anb</sup> |
| Band edge emissions (Radiated)              | Mode1             | P An             |
| Emissions in frequency bands (below 1GHz)   | Mode1             | upore P          |
| Emissions in frequency bands (above 1GHz)   | Mode1             | Anboy Page       |
| Note: P: Pass N: N/A pot applicable         | Anbotek Anbotek   | Aupote           |

N: N/A, not applicable





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#### 1.8. Description of Test Facility

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

#### FCC-Registration No.:434132

Shenzhen Anbotek Compliance Laboratory Limited, 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. 434132.

#### ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

#### **Test Location**

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.

#### 1.9. Disclaimer

- The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- 2. The test report is invalid if there is any evidence and/or falsification.
- 3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- 4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
- Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- 6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.







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### 1.10. Test Equipment List

| Cond      | ucted Emission at A                                | C power line     |           |                  |            |              |
|-----------|----------------------------------------------------|------------------|-----------|------------------|------------|--------------|
| Item      | Equipment                                          | Manufacturer     | Model No. | Serial No.       | Last Cal.  | Cal.Due Date |
| . 1       | L.I.S.N. Artificial<br>Mains Network               | Rohde & Schwarz  | ENV216    | 100055           | 2024-01-18 | 2025-01-17   |
| otek<br>2 | Three Phase V-<br>type Artificial<br>Power Network | CYBERTEK         | EM5040DT  | E215040D<br>T001 | 2024-01-17 | 2025-01-16   |
| 30t       | Software Name<br>EZ-EMC                            | Farad Technology | ANB-03A   | N/A              | Alootek    | Auport Losek |
| 4         | EMI Test Receiver                                  | Rohde & Schwarz  | ESPI3     | 100926           | 2023-10-12 | 2024-10-11   |

Occupied Bandwidth

Maximum Conducted Output Power

Channel Separation

Number of Hopping Frequencies

**Dwell Time** 

Emissions in non-restricted frequency bands

| Item        | Equipment                                   | Manufacturer    | Model No.      | Serial No.      | Last Cal.  | Cal.Due Date |
|-------------|---------------------------------------------|-----------------|----------------|-----------------|------------|--------------|
| 1           | Constant<br>Temperature<br>Humidity Chamber | ZHONGJIAN       | ZJ-<br>KHWS80B | ootek<br>N/A    | 2023-10-16 | 2024-10-15   |
| 2           | DC Power Supply                             | IVYTECH         | IV3605         | 1804D360<br>510 | 2023-10-20 | 2024-10-19   |
| An3ote      | Spectrum<br>Analyzer                        | Rohde & Schwarz | FSV40-N        | 101792          | 2023-05-26 | 2024-05-25   |
| <b>4</b> nb | MXA Spectrum<br>Analysis                    | KEYSIGHT        | N9020A         | MY505318<br>23  | 2024-02-22 | 2025-02-21   |
| 5           | Oscilloscope                                | Tektronix       | MDO3012        | C020298         | 2023-10-12 | 2024-10-11   |
| 6           | MXG RF Vector<br>Signal Generator           | Agilent         | N5182A         | MY474206<br>47  | 2024-02-04 | 2025-02-03   |

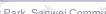
Hotline



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|                   | edge emissions (Ra<br>sions in frequency ba |                  | Aupotek              | Anborek         | Aupotek    | Anborek      |
|-------------------|---------------------------------------------|------------------|----------------------|-----------------|------------|--------------|
| Item              | Equipment                                   | Manufacturer     | Model No.            | Serial No.      | Last Cal.  | Cal.Due Date |
| 1 0.0             | EMI Test Receiver                           | Rohde & Schwarz  | ESR26                | 101481          | 2024-01-23 | 2025-01-22   |
| 2                 | EMI Preamplifier                            | SKET Electronic  | LNPA-<br>0118G-45    | SKET-PA-<br>002 | 2024-01-17 | 2025-01-16   |
| 3                 | Double Ridged<br>Horn Antenna               | SCHWARZBECK      | BBHA<br>9120D        | 02555           | 2022-10-16 | 2025-10-15   |
| nbole 4           | EMI Test Software<br>EZ-EMC                 | SHURPLE          | N/A                  | N/A             | Anbotek    | Aupolek      |
| 5                 | Horn Antenna                                | A-INFO           | LB-180400-<br>KF     | J21106062<br>8  | 2023-10-12 | 2024-10-11   |
| 6                 | Spectrum<br>Analyzer                        | Rohde & Schwarz  | FSV40-N              | 101792          | 2023-05-26 | 2024-05-25   |
| *e <sup>1</sup> 7 | Amplifier                                   | Talent Microwave | TLLA18G40<br>G-50-30 | 23022802        | 2023-05-25 | 2024-05-24   |

| Emissions in frequency bands (below 1GHz) |                             |                 |               |            |            |              |  |  |  |  |
|-------------------------------------------|-----------------------------|-----------------|---------------|------------|------------|--------------|--|--|--|--|
| Item                                      | Equipment                   | Manufacturer    | Model No.     | Serial No. | Last Cal.  | Cal.Due Date |  |  |  |  |
| 1                                         | EMI Test Receiver           | Rohde & Schwarz | ESR26         | 101481     | 2024-01-23 | 2025-01-22   |  |  |  |  |
| 2                                         | Pre-amplifier               | SONOMA          | 310N          | 186860     | 2024-01-17 | 2025-01-16   |  |  |  |  |
| 34                                        | Bilog Broadband<br>Antenna  | Schwarzbeck     | VULB9163      | 345        | 2022-10-23 | 2025-10-22   |  |  |  |  |
| Antotel                                   | Loop Antenna (9K-<br>30M)   | Schwarzbeck     | FMZB1519<br>B | 00053      | 2023-10-12 | 2024-10-11   |  |  |  |  |
| 5,00                                      | EMI Test Software<br>EZ-EMC | SHURPLE         | N/A           | N/A        | y Aupon    | k Anbotek    |  |  |  |  |





Shenzhen Anbotek Compliance Laboratory Limited



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### 2. Antenna requirement

Test Requirement:

Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### 2.1. Conclusion

The antenna is a PCB antenna which permanently attached, and the best case gain of the antenna is -2dBi. It complies with the standard requirement.





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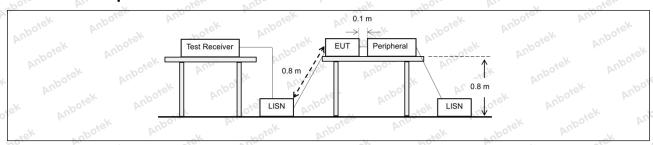
# 3. Conducted Emission at AC power line

| Test Requirement: | Refer to 47 CFR 15.207(a), Except section, for an intentional radiator public utility (AC) power line, the reback onto the AC power line on ar band 150 kHz to 30 MHz, shall no measured using a 50 µH/50 ohms (LISN).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | that is designed to be con<br>adio frequency voltage tha<br>ny frequency or frequencie<br>t exceed the limits in the f | nnected to the<br>at is conducted<br>as, within the<br>ollowing table, as |  |  |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--|--|
| shotek Anbore     | Frequency of emission (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Conducted limit (dBµV)                                                                                                 |                                                                           |  |  |
| Yu. sok spotek    | Anbore Anbore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Quasi-peak                                                                                                             | Average                                                                   |  |  |
| Aupor Air         | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 66 to 56*                                                                                                              | 56 to 46*                                                                 |  |  |
| Test Limit:       | 0.5-5 tek nibote Am                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 56 boyer An                                                                                                            | 46                                                                        |  |  |
| Ans both          | 5-30 And State of Sta | 60                                                                                                                     | 50 ren And                                                                |  |  |
| k Anbors K        | *Decreases with the logarithm of t                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | he frequency.                                                                                                          | bi.                                                                       |  |  |
| Test Method:      | ANSI C63.10-2020 section 6.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Projek Aupole                                                                                                          | And                                                                       |  |  |
| Procedure:        | Refer to ANSI C63.10-2020 section line conducted emissions from unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                        |                                                                           |  |  |

# 3.1. EUT Operation

| Operating Envi | ronment:   |              |             |               |             | o'ek    |            | Vupo. |
|----------------|------------|--------------|-------------|---------------|-------------|---------|------------|-------|
| Test mode:     | 1: TX (Non | -Hopping): I | Keep the EU | T in continuo | ously trans | mitting | mode (non- | aupo, |
| rest mode.     | hopping).  | , vo.        | ek aupor    |               | .ek         | aboter  |            |       |

# 3.2. Test Setup



#### 3.3. Test Data

| Temperature: | 24.5 °C | Humidity: | 57 % | Atmospheric Pressure: | 101 kPa |
|--------------|---------|-----------|------|-----------------------|---------|
| 700          | V       | V         | .0   | VO0                   | V       |

Not applicable for equipment operated with DC power supply.





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# 4. Occupied Bandwidth

| Test Requirement:                                                                                                                                               | 47 CFR 15.215(c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Limit:                                                                                                                                                     | Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Test Method:                                                                                                                                                    | ANSI C63.10-2020, section 7.8.6, For occupied bandwidth measurements, use the procedure in 6.9.3. Frequency hopping shall be disabled for this test.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Anbotek | The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:  a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.  b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement.  c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2.  d) Step a) through step c) might require iteration to adjust within the specified range.  e) Video averaging is not permitted. Where practical, a sample detection and |
| Anbotek Anbote                                                                                                                                                  | single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                 | f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. g) If the instrument does not have a 99% power bandwidth function, then the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                 | trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.  h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                 | division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

# 4.1. EUT Operation

|                 | Operating Envir | onment:   |             |             |              |                |               | anbote |
|-----------------|-----------------|-----------|-------------|-------------|--------------|----------------|---------------|--------|
| Xe <sup>X</sup> | Test mode:      | -21       | opping): Ke | eep the EUT | in continuou | sly transmitti | ng mode (non- |        |
| L               | root injour.    | hopping). | VII.        | k hotel     | Aupo         | P*             | rek abore     | Dir.   |

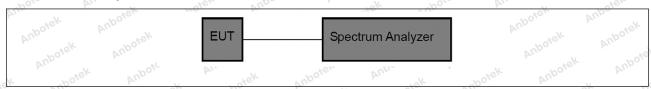






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#### 4.2. Test Setup



#### 4.3. Test Data

| 10 | Tomporaturo  | 25.5 °C | Humidity  | 47 %  | Atmospheric Pressure: | 101 kPa |
|----|--------------|---------|-----------|-------|-----------------------|---------|
|    | Temperature: | 25.5 6  | Humidity: | 47 70 | Aunosphenc Flessure.  | 101 kPa |





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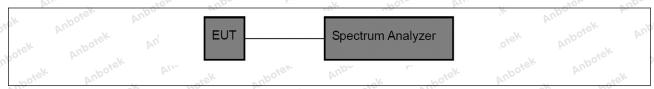
# 5. Maximum Conducted Output Power

| Test Requirement:               | 47 CFR 15.247(b)(1)                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Limit: ek Anborek          | Refer to 47 CFR 15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. |
| Test Method:                    | ANSI C63.10-2020, section 7.8.5                                                                                                                                                                                                                                                                                  |
| Anbotek Anbotek Anbotek Anbotek | This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. Frequency hopping shall be disabled for this test. Use the following spectrum analyzer settings: |
| tek Anbotek Anb                 | <ul><li>a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.</li><li>b) RBW &gt; 20 dB bandwidth of the emission being measured.</li></ul>                                                                                                                                      |
| Aupotek Aupotek                 | c) VBW ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak.                                                                                                                                                                                                                          |
| Procedure:                      | f) Trace: Max-hold. g) Allow trace to stabilize. h) Use the marker-to-peak function to set the marker to the peak of the                                                                                                                                                                                         |
| ek Anbotek Anb                  | emission.  i) The indicated level is the peak output power, after any corrections for external attenuators and cables.                                                                                                                                                                                           |
| Anbotek Anbotek                 | j) A spectral plot of the test results and setup description shall be included in the test report.                                                                                                                                                                                                               |
| Anbotek Anbotek                 | NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.                                                                                               |

# 5.1. EUT Operation

| Operating Envi | ronment:                     | Vur            | Anbotek     | Anbo "ek       | hotek         | Anbore      |
|----------------|------------------------------|----------------|-------------|----------------|---------------|-------------|
| Test mode:     | 1: TX (Non-Hopp<br>hopping). | ing): Keep the | EUT in cont | tinuously tran | smitting mode | (non-Anbore |

#### 5.2. Test Setup



### 5.3. Test Data

| Temperature: | 25.5 °C | Humidity: 47 % | Atmospheric Pressure: | 101 kPa |
|--------------|---------|----------------|-----------------------|---------|
|--------------|---------|----------------|-----------------------|---------|









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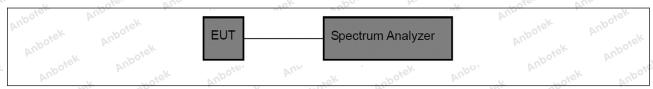
# 6. Channel Separation

| Test Requirement:                                                                  | 47 CFR 15.247(a)(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Limit:                                                                        | Refer to 47 CFR 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. |
| Test Method:                                                                       | ANSI C63.10-2020, section 7.8.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Anborek Anborek Anborek Anborek Procedure: Anborek Anborek Anborek Anborek Anborek | The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:  a) Span: Wide enough to capture the peaks of two adjacent channels. b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. c) Video (or average) bandwidth (VBW) ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow the trace to stabilize.                            |
| botek Anbotek                                                                      | Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A spectral plot of the data shall be included in the test report.                                                                                                                                                                                                                                                                            |

# 6.1. EUT Operation

| -   | Operating Envir | ronment:     | Anboies      | Ande          | nbotek         | Aupore        | bur          | Aupo,e, |
|-----|-----------------|--------------|--------------|---------------|----------------|---------------|--------------|---------|
| 516 | Test mode:      | 2: TX (Hoppi | ng): Keep th | ne EUT in con | tinuously tran | smitting mode | e (hopping). | Ano     |

# 6.2. Test Setup



### 6.3. Test Data

| 10 | Temperature: | 25.5 °C | Humidity: | 47 % | Atmospheric Pressure: | 101 kPa |  |
|----|--------------|---------|-----------|------|-----------------------|---------|--|
|    |              |         |           |      |                       |         |  |







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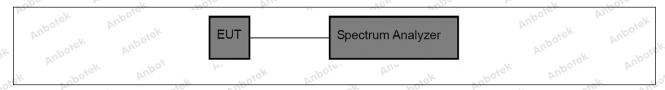
# 7. Number of Hopping Frequencies

| Test Requirement:                                                                                                       | 47 CFR 15.247(a)(1)(iii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Limit:  Anbotek  Anbotek  Anbotek  Anbotek  Anbotek                                                                | Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.                                                                                                                                                                                                         |
| Test Method:                                                                                                            | ANSI C63.10-2020, section 7.8.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Anborek | The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:  a) Span: The frequency band of operation. Depending on the number of channels the device supports, it could be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.  b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.  c) VBW ≥ RBW.  d) Sweep: No faster than coupled (auto) time.  e) Detector function: Peak.  f) Trace: Max-hold.  g) Allow the trace to stabilize. |
|                                                                                                                         | It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A spectral plot of the data shall be included in the test report.                                                                                                                                                                                                                                                                                                                                                         |

### 7.1. EUT Operation

| Operating Environment: | ek bojek          | Aupole       | Aug            | Anbotek      | Anbo. ak   | b.,     |
|------------------------|-------------------|--------------|----------------|--------------|------------|---------|
| Test mode: 2: TX (H    | opping): Keep the | EUT in conti | nuously transn | nitting mode | (hopping). | Υ<br>Vi |

### 7.2. Test Setup



### 7.3. Test Data

|  | Temperature: | 25.5 °C | otek. | Humidity: | 47 % | Atmospheric Pressure: | 101 kPa |
|--|--------------|---------|-------|-----------|------|-----------------------|---------|
|--|--------------|---------|-------|-----------|------|-----------------------|---------|







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### 8. Dwell Time

| Aupo, V.                                                 | Tupoter And And Andrew Andrew Andrew                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement:                                        | 47 CFR 15.247(a)(1)(iii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test Limit:  Anbotek  Anbotek  Anbotek  Anbotek  Anbotek | Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.                                                                                                                    |
| Test Method:                                             | ANSI C63.10-2020, section 7.8.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Anbotek Anbotek Anbotek Anbotek Anbotek Anbotek          | The dwell time per hop on a channel is the time from the start of the first transmission to the end of the last transmission for that hop. If the device has a single transmission per hop then the dwell time is the duration of that transmission. If the device has a multiple transmissions per hop then the dwell time is measured from the start of the first transmission to the end of the last transmission.                                                                                                                                                |
|                                                          | The time of occupancy is the total time that the device dwells on a channel over an observation period specified in the regulatory requirement. To determine the time of occupancy the spectrum analyzer will be configured to measure both the dwell time per hop and the number of times the device transmits on a specific channel in a given period.                                                                                                                                                                                                             |
| procedure:                                               | The EUT shall have its hopping function enabled. Compliance with the requirements shall be made with the minimum and with the maximum number of channels enabled. If the dwell time per channel does not vary with the number of channels than compliance with the requirements may be based on the minimum number of channels. If the device supports different dwell times per channel (example Bluetooth devices can dwell on a channel for 1, 3 or 5 time slots) then measurements can be limited to the longest dwell time with the minimum number of channels. |
| otek Anbotek Anbotek Anbotek Anbotek Anbotek Anbotek     | Use the following spectrum analyzer settings to determine the dwell time per hop:  a) Span: Zero span, centered on a hopping channel. b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop.                                                                                                                                                                                                                                                                                            |
|                                                          | c) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period =                                                                                                                                                                                                                                                                                                                                 |
|                                                          | 1/hopping rate) should achieve this. d) Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel.                                                                                                                                                                                                                                                                                 |
| Anbotek Anbotek Anbotek Anbotek                          | e) Detector function: Peak. f) Trace: Clear-write, single sweep. g) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between                                                                                                                                                                                                                                                                                                                                          |









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these two markers.

To determine the number of hops on a channel in the regulatory observation period repeat the measurement using a longer sweep time. When the device uses a single hopping sequence the period of measurement should be sufficient to capture at least 2 hops. When the device uses a dynamic hopping sequence, or the sequence varies, the period of measurement may need to capture multiple hops to better determine the average time of occupancy. Count the number of hops on the channel across the sweep time.

The average number of hops on the same channel within the regulatory observation period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and the regulatory observation period is 10 s, then the number of hops in that ten seconds is  $3/0.5 \times 10$ , or 60 hops.

The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.

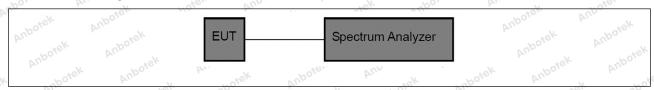
#### 8.1. EUT Operation

Operating Environment:

Test mode:

2: TX (Hopping): Keep the EUT in continuously transmitting mode (hopping).

#### 8.2. Test Setup



#### 8.3. Test Data

| - V - 0101   | 05.500  |           | 47.00 | AL LE DE ME           | MOALD   |
|--------------|---------|-----------|-------|-----------------------|---------|
| Temperature: | 25.5 °C | Humidity: | 47 %  | Atmospheric Pressure: | 101 KPa |

Please Refer to Appendix for Details.



Hotline o



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# 9. Emissions in non-restricted frequency bands

| Test Requirement:                                                                                       | 47 CFR 15.247(d), 15.209, 15.205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Limit: Anborek                                                                                     | Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. |
| Test Method:                                                                                            | ANSI C63.10-2020 section 7.8.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| nbotek Anbotek Anbotek Anbotek Anbotek Anbotek Anbotek Anbotek                                          | 7.8.7.1 General considerations To demonstrate compliance with the relative out-of-band emissions requirements conducted spurious emissions shall be measured for the transmit frequencies, per 5.5 and 5.6, and at the maximum transmit powers. Frequency hopping shall be disabled for this test with the exception of measurements at the allocated band-edges which shall be repeated with hopping enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| tek Anbotek                     | Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The frequency range of testing shall span 30 MHz to 10 times the operating frequency and this may be done in a single sweep or, to aid resolution, across a number of sweeps. The resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector.                                                                                                                                                                                                                                                                                                                                                                 |
| ek upotek Anbo                                                                                          | The limit is based on the highest in-band level across all channels measured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Procedure:                                                                                              | using the same instrument settings (resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector). To help clearly demonstrate compliance a display line may be set at the required offset (typically 20 dB) below the highest in-band level. Where the highest in-band level is not clearly identified in the out-of-band                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Anbotek Anbo                                                                                            | measurements a separate spectral plot showing the in-band level shall be provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Anbotek | When conducted measurements cannot be made (for example a device with integrated, non-removable antenna) radiated measurements shall be used. The reference level for determining the limit shall be established by maximizing the field strength from the highest power channel and measuring using the resolution and video bandwidth settings and peak detector as described above. The field strength limit for spurious emissions outside of restricted-bands shall then be set at the required offset (typically 20 dB) below the highest in-band level. Radiated measurements will follow the standards measurement procedures described in Clause 6 with the exception that the resolution bandwidth shall be 100 kHz, video bandwidth                                                                                                                          |









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300 kHz, and a coupled sweep time with a peak detector. Note that use of wider measurement bandwidths are acceptable for measuring the spurious emissions provided that the peak detector is used and that the measured value of spurious emissions are compared to the highest in-band level measured with the 100 kHz / 300 kHz bandwidth settings to determine compliance.

#### 7.8.7.2 Band-edges

Compliance with a relative limit at the band-edges (e.g., -20 dBc) shall be made on the lowest and on the highest channels with frequency hopping disabled and repeated with frequency hopping enabled. For the latter test the hopping sequence shall include the lowest and highest channels.

For measurements with the hopping disabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of the allocated band-edge.

For measurements with the hopping enabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of both of the allocated band-edges. This could require separate spectral plots for each band-edge.

#### 9.1. EUT Operation

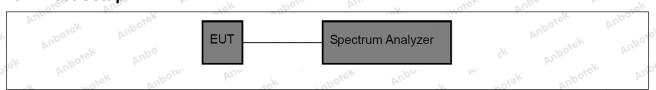
**Operating Environment:** 

Test mode:

1: TX (Non-Hopping): Keep the EUT in continuously transmitting mode (non-hopping).

2: TX (Hopping): Keep the EUT in continuously transmitting mode (hopping).

#### 9.2. Test Setup



#### 9.3. Test Data

| Temperature: 25.5 | 5 °C Humidity: | 47 % Atm | ospheric Pressure: | 101 kPa |  |
|-------------------|----------------|----------|--------------------|---------|--|
|-------------------|----------------|----------|--------------------|---------|--|





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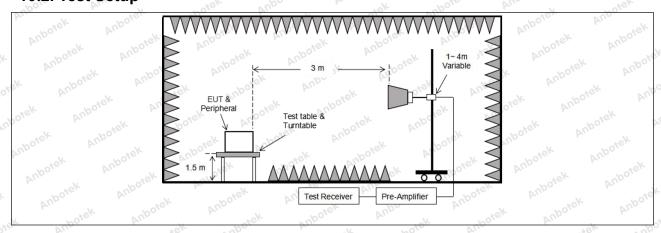
# 10. Band edge emissions (Radiated)

| tek Anbotek Anbot                                 | Frequency (MHz)                                                                                                           | Field strength (microvolts/meter)                                                                                                                                                                                    | Measurement distance (meters)                      |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| hbotek Anbotek                                    | 0.009-0.490<br>0.490-1.705<br>1.705-30.0                                                                                  | 2400/F(kHz)<br>24000/F(kHz)<br>30                                                                                                                                                                                    | 300<br>30<br>30                                    |
|                                                   | 30-88<br>88-216<br>216-960                                                                                                | 100 **<br>150 **<br>200 **                                                                                                                                                                                           | 3<br>3                                             |
| Test Limit: orek Anborek                          | intentional radiators operat<br>frequency bands 54-72 MH<br>However, operation within t<br>sections of this part, e.g., § | 500<br>ragraph (g), fundamental emissi<br>ing under this section shall not b<br>Iz, 76-88 MHz, 174-216 MHz or a<br>these frequency bands is permitt<br>§ 15.231 and 15.241.<br>e, the tighter limit applies at the b | e located in the<br>470-806 MHz.<br>ed under other |
| Anbotek Anbotek  Anbotek Anbotek  Anbotek Anbotek | The emission limits shown employing a CISPR quasi-p<br>90 kHz, 110–490 kHz and a                                          | in the above table are based on<br>beak detector except for the freq<br>above 1000 MHz. Radiated emis<br>ed on measurements employing                                                                                | measurements<br>uency bands 9–<br>sion limits in   |
| Test Method:                                      | ANSI C63.10-2020 section                                                                                                  | 6.10ek Anbox abox                                                                                                                                                                                                    | ak Aupore                                          |
| V.I.,                                             | - 25                                                                                                                      |                                                                                                                                                                                                                      |                                                    |

# 10.1. EUT Operation

| Operating Envir | onment:           | Auporo      | Aris botek  | Anborek      | Anbo       | otek      | Anbotek    | Vupo, |
|-----------------|-------------------|-------------|-------------|--------------|------------|-----------|------------|-------|
| Test mode:      | 1: TX (Non-ling). | Hopping): K | eep the EUT | in continuou | sly transm | nitting m | node (non- | An    |

### 10.2. Test Setup





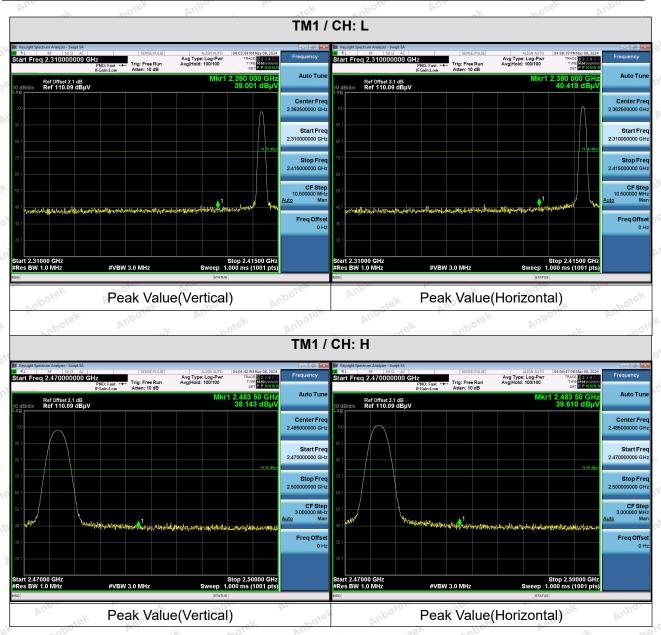




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#### 10.3. Test Data

Temperature: 25.5 °C Humidity: 47 % Atmospheric Pressure: 101 kPa



#### Remark

1. When the PK measure result value is less than the AVG limit value, the AV measure result values test not applicable.



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# 11. Emissions in frequency bands (below 1GHz)

| tek Anbotek An                                                    | Frequency (MHz)                                                                                                                                                                                                         | Field strength (microvolts/meter)                                                                                                                                                                                                                                                                                                      | Measurement distance (meters)                                                                                  |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
|                                                                   | 0.009-0.490                                                                                                                                                                                                             | 2400/F(kHz)                                                                                                                                                                                                                                                                                                                            | 300                                                                                                            |
|                                                                   | 0.490-1.705<br>1.705-30.0                                                                                                                                                                                               | 24000/F(kHz)<br>30                                                                                                                                                                                                                                                                                                                     | 30 Anadrek                                                                                                     |
| Anbotek Anbote                                                    | 30-88<br>88-216                                                                                                                                                                                                         | 150 **                                                                                                                                                                                                                                                                                                                                 | ANDOY                                                                                                          |
|                                                                   | 216-960<br>Above 960                                                                                                                                                                                                    | 200 **<br>500                                                                                                                                                                                                                                                                                                                          | 3 stek                                                                                                         |
| Test Limit:  Anborek  Anborek  Anborek  Anborek  Anborek  Anborek | intentional radiators oper<br>frequency bands 54-72<br>However, operation with<br>sections of this part, e.g<br>In the emission table ab<br>The emission limits show<br>employing a CISPR qua<br>90 kHz, 110–490 kHz an | paragraph (g), fundamental emise rating under this section shall not MHz, 76-88 MHz, 174-216 MHz on these frequency bands is permined, §§ 15.231 and 15.241. The tighter limit applies at the winder in the above table are based of asi-peak detector except for the free above 1000 MHz. Radiated empassed on measurements employing | be located in the r 470-806 MHz. itted under other band edges. n measurements equency bands 9-ission limits in |
| Ansabotek                                                         | detector.                                                                                                                                                                                                               | Anbore And tek abore                                                                                                                                                                                                                                                                                                                   |                                                                                                                |
| Test Method:                                                      | (A)                                                                                                                                                                                                                     | ion 6.6.4                                                                                                                                                                                                                                                                                                                              | otek Aupotek                                                                                                   |

# 11.1. EUT Operation

| Operating Envi | ronment:    | Anbo.        | w. spoyek     | Aupore       | Anz            | Anborek    | Anbo |
|----------------|-------------|--------------|---------------|--------------|----------------|------------|------|
| Test mode:     | 1: TX (Non- | Hopping): Ke | ep the EUT ir | continuously | y transmitting | mode (non- | Ank  |
| lest mode.     | hopping).   | -k hote      | k Aupo,       | b.,          | ek abote       | AUD        |      |

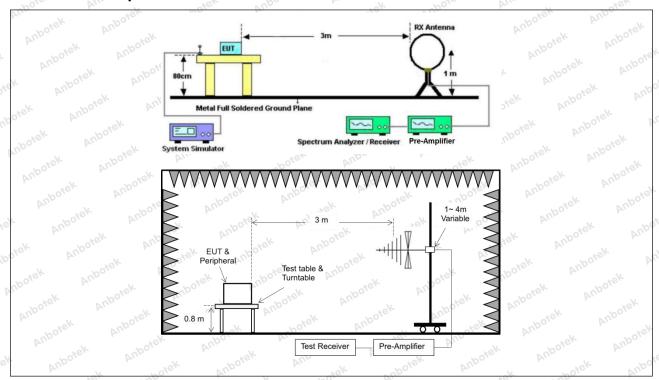






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### 11.2. Test Setup





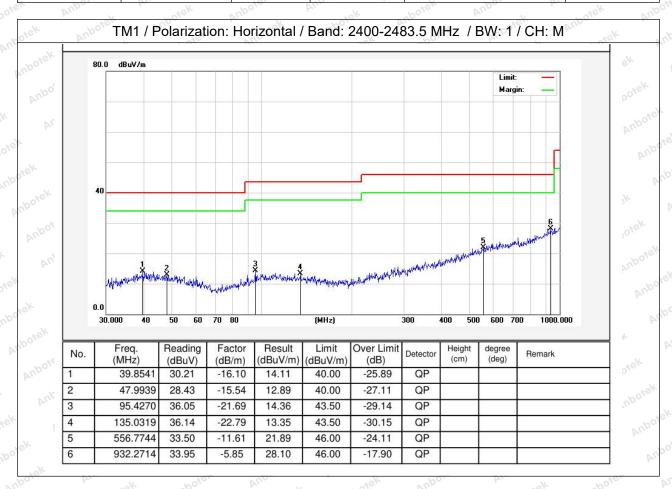


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#### 11.3. Test Data

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

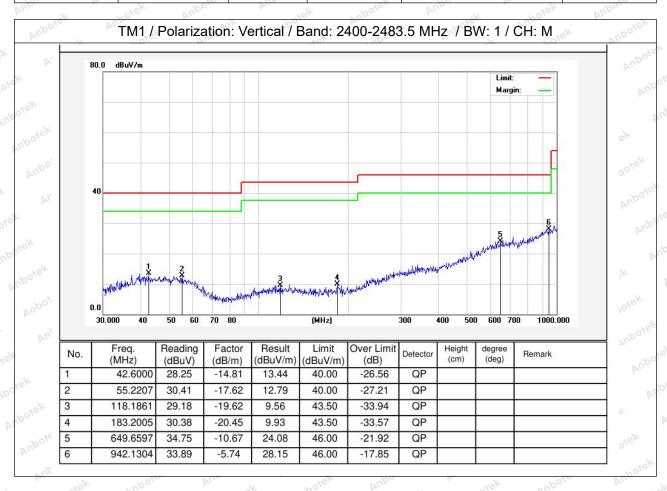
|  | Temperature: | 20.3 °C | DU, | Humidity: | 46% | A | tmospheric Pressure: | 101 kPa |
|--|--------------|---------|-----|-----------|-----|---|----------------------|---------|
|--|--------------|---------|-----|-----------|-----|---|----------------------|---------|





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Temperature: 20.3 °C Humidity: 46 % Atmospheric Pressure: 101 kPa







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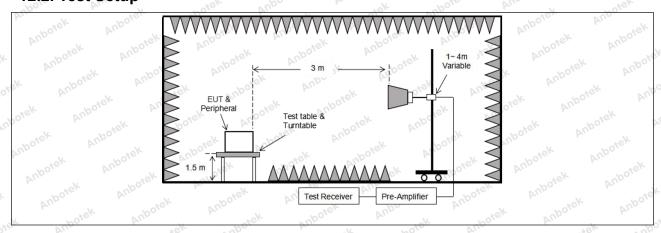
# 12. Emissions in frequency bands (above 1GHz)

| Test Requirement: |                                                                                                                                                                                               | ons which fall in the restricted by omply with the radiated emission $\overline{b}(c)$ .                                                                                                                                                                                    |                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| k Aupotek Aupo,   | Frequency (MHz)                                                                                                                                                                               | Field strength (microvolts/meter)                                                                                                                                                                                                                                           | Measurement distance (meters)                                                       |
|                   | 0.009-0.490                                                                                                                                                                                   | 2400/F(kHz)                                                                                                                                                                                                                                                                 | 300 Mbore                                                                           |
| nboten And        | 0.490-1.705                                                                                                                                                                                   | 24000/F(kHz)                                                                                                                                                                                                                                                                | 30                                                                                  |
|                   | 1.705-30.0                                                                                                                                                                                    | 30                                                                                                                                                                                                                                                                          | 30                                                                                  |
| Anbo k hotek      | 30-88                                                                                                                                                                                         | 100 **                                                                                                                                                                                                                                                                      | 3,ek Anbore                                                                         |
|                   | 88-216                                                                                                                                                                                        | 150 **                                                                                                                                                                                                                                                                      | 3                                                                                   |
|                   | 216-960                                                                                                                                                                                       | 200 **                                                                                                                                                                                                                                                                      | 3 pore Ant                                                                          |
|                   | Above 960                                                                                                                                                                                     | 500 Notes Andre                                                                                                                                                                                                                                                             | 3 304                                                                               |
|                   | frequency bands 54-72 MH However, operation within t sections of this part, e.g., § In the emission table above The emission limits shown employing a CISPR quasi-p 90 kHz, 110–490 kHz and a | ing under this section shall not be z, 76-88 MHz, 174-216 MHz or hese frequency bands is permitted in the tighter limit applies at the being the above table are based on beak detector except for the frequency above 1000 MHz. Radiated emisted on measurements employing | 470-806 MHz. ted under other oand edges. measurements uency bands 9–ssion limits in |
| 10,00             | 11121 000 14 0000 11                                                                                                                                                                          | ok spoker Fun                                                                                                                                                                                                                                                               |                                                                                     |
| Test Method:      | ANSI C63.10-2020 section                                                                                                                                                                      | 6.6.4                                                                                                                                                                                                                                                                       |                                                                                     |

# 12.1. EUT Operation

| Operating Envir | onment:   | Aupo.        | P. Polek      | Anbore.     | Ans              | upotek     | Aupo |
|-----------------|-----------|--------------|---------------|-------------|------------------|------------|------|
| Test mode:      | 707       | Hopping): Ke | ep the EUT ir | continuousl | y transmitting ı | mode (non- | PU   |
| ek abov         | hopping). | k hoje       | V. VUD.       |             | ek upo,          | br.        | -V   |

### 12.2. Test Setup









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#### 12.3. Test Data

| Temperature: 25.5 °C | Humidity: 47 % | Atmospheric Pressure: | 101 kPa |
|----------------------|----------------|-----------------------|---------|
|----------------------|----------------|-----------------------|---------|

| h                         | POLC. VILL        |                  | tek vopo.          |                        | ok hoje            | Arr               |
|---------------------------|-------------------|------------------|--------------------|------------------------|--------------------|-------------------|
|                           |                   |                  | TM1 / CH: L        |                        |                    |                   |
| Peak value:               |                   |                  |                    |                        |                    |                   |
| Frequency<br>(MHz)        | Reading<br>(dBuV) | Factor<br>(dB/m) | Result<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over Limit<br>(dB) | polarization      |
| 4816.00                   | 31.03             | 15.27            | 46.30              | 74.00                  | -27.70             | Vertical          |
| 7224.00                   | 32.08             | 18.09            | 50.17              | 74.00                  | -23.83             | Vertical          |
| 9632.00                   | 33.76             | 23.76            | 57.52              | 74.00                  | -16.48             | Vertical          |
| 12040.00                  | Aupote * At       | 49:              | abotek Anb         | 74.00                  | otek Anbote        | Vertical          |
| 14448.00                  | "Upo*sk           | Aupo             | hojek b            | 74.00                  | iek ont            | Vertical          |
| 4816.00                   | 31.35             | 15.27            | 46.62              | 74.00                  | -27.38             | Horizontal        |
| 7224.00                   | 31.92             | 18.09            | 50.01              | 74.00                  | -23.99             | Horizontal        |
| 9632.00                   | 30.31             | 23.76            | 54.07              | 74.00                  | -19.93             | Horizontal        |
| 12040.00                  | otek * Aupo       | -k 20            | ick Aupole         | 74.00                  | . nbotek           | Horizontal        |
| 14448.00                  | woick* An         | boye Vun         | sek spo            | 74.00                  | K hore             | Horizontal        |
| Average value:  Frequency | Reading           | Factor           | Result             | Limit                  | Over Limit         | polarizatior      |
| (MHz)<br>4816.00          | (dBuV)<br>20.41   | (dB/m)           | (dBuV/m)<br>35.68  | (dBuV/m)<br>54.00      | (dB)<br>-18.32     | Vertical          |
| 7224.00                   | 21.11             | 18.09            | 39.20              | 54.00                  | -14.80             | Vertical          |
| 9632.00                   | 22.78             | 23.76            | 46.54              | 54.00                  | -7.46              | Vertical          |
| 12040.00                  | **                | LONG AN          | 2010 40.04 AND     | 54.00                  | PUPO.              | Vertical Vertical |
| 14448.00                  | Anbore *          | 711.             | Anbotek An         | 54.00                  | botek Anbe         | Vertical          |
| 4816.00                   | 19.70             | 15.27            | 34.97              | 54.00                  | -19.03             | Horizontal        |
| 7224.00                   | 20.98             | 18.09            | 39.07              | 54.00                  | -14.93             | Horizontal        |
| 9632.00                   | 19.62             | 23.76            | 43.38              | 54.00                  | -10.62             | Horizontal        |
| 12040.00                  | * *               | otek Anbott      | P. 10:000          | 54.00                  | Aupo-              | Horizontal        |
| 14448.00                  | Upoter *          | iotek Ant        | otek Mupo,         | 54.00                  | ek Aupoter         | Horizontal        |



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|                    |                   |                  | ГМ1 / CH: M        |                        |                    |              |
|--------------------|-------------------|------------------|--------------------|------------------------|--------------------|--------------|
| Peak value:        |                   |                  |                    |                        |                    |              |
| Frequency<br>(MHz) | Reading<br>(dBuV) | Factor<br>(dB/m) | Result<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over Limit<br>(dB) | polarization |
| 4880.00            | 31.05             | 15.42            | 46.47              | 74.00                  | -27.53             | Vertical     |
| 7320.00            | 31.93             | 18.02            | 49.95              | 74.00                  | -24.05             | Vertical     |
| 9760.00            | 32.77             | 23.80            | 56.57              | 74.00                  | -17.43             | Vertical     |
| 12200.00           | ek * spojek       | Anborr           | but hotek          | 74.00                  | And                | Vertical     |
| 14640.00           | * * *             | tek Wipose       | Pur Viel           | 74.00                  | Aupo               | Vertical     |
| 4880.00            | 31.05             | 15.42            | 46.47              | 74.00                  | -27.53             | Horizontal   |
| 7320.00            | 31.91             | 18.02            | 49.93              | 74.00                  | -24.07             | Horizontal   |
| 9760.00            | 30.01             | 23.80            | 53.81              | 74.00                  | -20.19             | Horizontal   |
| 12200.00           | * otek            | Aupole.          | Aug                | 74.00                  | YUPO'S BU          | Horizontal   |
| 14640.00           | Arthur dek        | nbotek           | Aupo               | 74.00                  | Anboro             | Horizontal   |
| Average value:     |                   |                  |                    |                        |                    |              |
| Frequency<br>(MHz) | Reading<br>(dBuV) | Factor<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m)      | Over Limit (dB)    | polarization |
| 4880.00            | 20.14             | 15.42            | 35.56              | 54.00                  | -18.44             | Vertical     |
| 7320.00            | 21.21             | 18.02            | 39.23              | 54.00                  | -14.77             | Vertical     |
| 9760.00            | 22.64             | 23.80            | 46.44              | 54.00                  | -7.56              | Vertical     |
| 12200.00           | k *upor           | N. Siek          | anbotek            | 54.00                  | boiek              | Vertical     |
| 14640.00           | otek * Anboti     | Anb              | ek abotek          | 54.00                  | Di.                | Vertical     |
| 4880.00            | 19.61             | 15.42            | 35.03              | 54.00                  | -18.97             | Horizontal   |
| 7320.00            | 20.54             | 18.02            | 38.56              | 54.00                  | -15.44             | Horizontal   |
| 9760.00            | 20.13             | 23.80            | 43.93              | 54.00                  | 10.07 And          | Horizontal   |
| 12200.00           | Anbotek           | Anbo             | abotek             | 54.00                  | "Otek D            | Horizontal   |
| 14640.00           | * ~ ~ ~ ~ ~ ~     | VUPO.            | Zi.                | 54.00                  | AUD                | Horizontal   |





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| VUD.               | , arek            | "upo,            | VII.               | hoter                  | AUD                | riek         |
|--------------------|-------------------|------------------|--------------------|------------------------|--------------------|--------------|
|                    |                   | ٦                | ГМ1 / CH: H        |                        |                    |              |
| Peak value:        |                   |                  |                    |                        |                    |              |
| Frequency<br>(MHz) | Reading<br>(dBuV) | Factor<br>(dB/m) | Result<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over Limit<br>(dB) | polarization |
| 4948.00            | 31.32             | 15.58            | 46.90              | 74.00                  | -27.10 m           | Vertical     |
| 7422.00            | 31.94             | 17.93            | 49.87              | 74.00                  | -24.13             | Vertical     |
| 9896.00            | 33.32             | 23.83            | 57.15              | 74.00                  | -16.85             | Vertical     |
| 12370.00           | * wotek           | anbore.          | Anti-              | 74.00                  | Anbo.              | Vertical     |
| 14844.00           | * Vue             | iek upotel       | Anbo               | 74.00                  | Anbore.            | Vertical     |
| 4948.00            | 31.12             | 15.58            | 46.70              | 74.00                  | -27.30             | Horizontal   |
| 7422.00            | 31.94             | 17.93            | 49.87              | 74.00                  | -24.13             | Horizontal   |
| 9896.00            | 30.69             | 23.83            | 54.52              | 74.00                  | -19.48             | Horizontal   |
| 12370.00           | Anb * *ek         | abotek           | Aupo, k            | 74.00                  | Iupose, Vu         | Horizontal   |
| 14844.00           | M.Aport           | hotek            | Anbores            | 74.00                  | abotek             | Horizontal   |
| Average value:     |                   |                  |                    |                        |                    |              |
| Frequency<br>(MHz) | Reading<br>(dBuV) | Factor<br>(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m)      | Over Limit<br>(dB) | polarization |
| 4948.00            | 21.26             | 15.58            | 36.84              | 54.00                  | -17.16             | Vertical     |
| 7422.00            | 22.22             | 17.93            | 40.15              | 54.00                  | 3001-13.85 Anh     | Vertical     |
| 9896.00            | 23.19             | 23.83            | 47.02              | 54.00                  | -6.98              | Vertical     |
| 12370.00           | k * spotek        | Aupor            | hotek              | 54.00                  | Aug                | Vertical     |
| 14844.00           | * * *             | k Aupole         | Aug Mek            | 54.00                  | Aupo,              | Vertical     |
| 4948.00            | 21.05             | 15.58 NO         | 36.63              | 54.00                  | -17.37             | Horizontal   |
| 7422.00            | 21.91             | 17.93            | 39.84 M            | 54.00                  | -14.16°°           | Horizontal   |
| 9896.00            | 20.03             | 23.83            | 43.86              | 54.00 And              | ±10.14             | Horizontal   |
| 12370.00           | * totek           | Anbores          | Aur Stek           | 54.00                  | 100. br.           | Horizontal   |
| 14844.00           | Array at ex       | "Upotek          | Anbo               | 54.00                  | Aupole             | Horizontal   |

#### Remark:

- 1. Result =Reading + Factor
- 2. "\*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.







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#### APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph\_RF

#### APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

#### APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

----- End of Report -----

