# FCC Report

| | |
|---|---|
| **Applicant:** | FLYSKY RC MODEL TECHNOLOGY CO., LTD |
| **Address of Applicant:** | West building3,Huangjianyuan Ind Park QIAOLI North Gate Changping Town Dongguan CN. |
| **Equipment Under Test (EUT)** | |
| Product Name: | 6CH radio controll system |
| Model No.: | FS-i6X |
| **FCC ID:** | N4ZFLYSKYI6X |
| **Applicable standards:** | FCC CFR Title 47 Part 15 Subpart C Section 15.247:2015 |
| **Date of sample receipt:** | May 18, 2016 |
| **Date of Test:** | May 19-24, 2016 |
| **Date of report issued:** | May 25, 2016 |
| **Test Result :** | PASS * |

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS or testing done by GTS in connection with, distribution or use of the product described in this report must be approved by GTS in writing.
This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *May 25, 2016* | *Original* |
| | | |
| | | |
| | | |
| | | |

| | | | |
|---|---|---|---|
| ***Prepared By:*** | Yang Liu | ***Date:*** | *May 25, 2016* |
| | ***Project Engineer*** | | |
| ***Check By:*** | Andy Wu | ***Date:*** | *May 25, 2016* |
| | ***Reviewer*** | | |

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# 4 Test Summary

| Test Item | Section | Result |
|---|---|---|
| Antenna Requirement | 15.203/15.247 (c) | Pass |
| AC Power Line Conducted Emission | 15.207 | N/A |
| Conducted Peak Output Power | 15.247 (b)(1) | Pass |
| 20dB Occupied Bandwidth | 15.247 (a)(1) | Pass |
| Carrier Frequencies Separation | 15.247 (a)(1) | Pass |
| Hopping Channel Number | 15.247 (a)(1) | Pass |
| Dwell Time | 15.247 (a)(1) | Pass |
| Pseudorandom Frequency Hopping Sequence | 15.247(b)(4) | Pass |
| Radiated Emission | 15.205/15.209 | Pass |
| Band Edge | 15.247(d) | Pass |

*Pass: The EUT complies with the essential requirements in the standard.*

*Remark: Test according to ANSI C63.10: 2013.*

## 4.1 Measurement Uncertainty

| Test Item | Frequency Range | Measurement Uncertainty | Notes |
|---|---|---|---|
| Radiated Emission | 9kHz ~ 30MHz | ± 4.34dB | (1) |
| Radiated Emission | 30MHz ~ 1000MHz | ± 4.24dB | (1) |
| Radiated Emission | 1GHz ~ 26.5GHz | ± 4.68dB | (1) |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | ± 3.45dB | (1) |
| Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. | | | |

# 5 General Information

## 5.1 Client Information

| | |
|---|---|
| Applicant: | FLYSKY RC MODEL TECHNOLOGY CO., LTD |
| Address of Applicant: | West building3,Huangjianyuan Ind Park QIAOLI North Gate Changping Town Dongguan CN. |
| Manufacturer/Factory: | FLYSKY RC MODEL TECHNOLOGY CO., LTD |
| Address of Manufacturer/ Factory: | West building3,Huangjianyuan Ind Park QIAOLI North Gate Changping Town Dongguan CN. |

## 5.2 General Description of EUT

| | |
|---|---|
| Product Name: | 6CH radio controll system |
| Model No.: | FS-i6X |
| Operation Frequency: | 2408.0MHz~2475.0MHz |
| Channel numbers: | 135 |
| Modulation technology: | GFSK |
| Antenna Type: | Integral Antenna |
| Antenna gain: | 2dBi |
| Power supply: | DC 6.0V(4*1.5V "AA" Battery) |

Remark: The system works in the frequency range of 2408.0MHz to 2475MHz. This band has been divided to 135 independent channels. Each radio system uses 16 different channels, the minimum channel separation is ≥1MHz. By using various switch-on times, hopping scheme and channel frequencies, the system can guarantee a jamming free radio transmission. The channel list is below.

| Operation Frequency each of channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 1 | 2408.00 | 36 | 2425.50 | 71 | 2443.00 | 106 | 2460.50 |
| 2 | 2408.50 | 37 | 2426.00 | 72 | 2443.50 | 107 | 2461.00 |
| 3 | 2409.00 | 38 | 2426.50 | 73 | 2444.00 | 108 | 2461.50 |
| 4 | 2409.50 | 39 | 2427.00 | 74 | 2444.50 | 109 | 2462.00 |
| 5 | 2410.00 | 40 | 2427.50 | 75 | 2445.00 | 110 | 2462.50 |
| 6 | 2410.50 | 41 | 2428.00 | 76 | 2445.50 | 111 | 2463.00 |
| 7 | 2411.00 | 42 | 2428.50 | 77 | 2446.00 | 112 | 2463.50 |
| 8 | 2411.50 | 43 | 2429.00 | 78 | 2446.50 | 113 | 2464.00 |
| 9 | 2412.00 | 44 | 2429.50 | 79 | 2447.00 | 114 | 2464.50 |
| 10 | 2412.50 | 45 | 2430.00 | 80 | 2447.50 | 115 | 2465.00 |
| 11 | 2413.00 | 46 | 2430.50 | 81 | 2448.00 | 116 | 2465.50 |
| 12 | 2413.50 | 47 | 2431.00 | 82 | 2448.50 | 117 | 2466.00 |
| 13 | 2414.00 | 48 | 2431.50 | 83 | 2449.00 | 118 | 2466.50 |
| 14 | 2414.50 | 49 | 2432.00 | 84 | 2449.50 | 119 | 2467.00 |
| 15 | 2415.00 | 50 | 2432.50 | 85 | 2450.00 | 120 | 2467.50 |
| 16 | 2415.50 | 51 | 2433.00 | 86 | 2450.50 | 121 | 2468.00 |
| 17 | 2416.00 | 52 | 2433.50 | 87 | 2451.00 | 122 | 2468.50 |
| 18 | 2416.50 | 53 | 2434.00 | 88 | 2451.50 | 123 | 2469.00 |
| 19 | 2417.00 | 54 | 2434.50 | 89 | 2452.00 | 124 | 2469.50 |
| 20 | 2417.50 | 55 | 2435.00 | 90 | 2452.50 | 125 | 2470.00 |
| 21 | 2418.00 | 56 | 2435.50 | 91 | 2453.00 | 126 | 2470.50 |
| 22 | 2418.50 | 57 | 2436.00 | 92 | 2453.50 | 127 | 2471.00 |
| 23 | 2419.00 | 58 | 2436.50 | 93 | 2454.00 | 128 | 2471.50 |
| 24 | 2419.50 | 59 | 2437.00 | 94 | 2454.50 | 129 | 2472.00 |
| 25 | 2420.00 | 60 | 2437.50 | 95 | 2455.00 | 130 | 2472.50 |
| 26 | 2420.50 | 61 | 2438.00 | 96 | 2455.50 | 131 | 2473.00 |
| 27 | 2421.00 | 62 | 2438.50 | 97 | 2456.00 | 132 | 2473.50 |
| 28 | 2421.50 | 63 | 2439.00 | 98 | 2456.50 | 133 | 2474.00 |
| 29 | 2422.00 | 64 | 2439.50 | 99 | 2457.00 | 134 | 2474.50 |
| 30 | 2422.50 | 65 | 2440.00 | 100 | 2457.50 | 135 | 2475.00 |
| 31 | 2423.00 | 66 | 2440.50 | 101 | 2458.00 | | |
| 32 | 2423.50 | 67 | 2441.00 | 102 | 2458.50 | | |
| 33 | 2424.00 | 68 | 2441.50 | 103 | 2459.00 | | |
| 34 | 2424.50 | 69 | 2442.00 | 104 | 2459.50 | | |
| 35 | 2425.00 | 70 | 2442.50 | 105 | 2460.00 | | |

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel | Frequency |
|---|---|
| The lowest channel | 2408.0MHz |
| The middle channel | 2440.0MHz |
| The Highest channel | 2475.0MHz |

## 5.3 Test mode

| | |
|---|---|
| Transmitting mode | Keep the EUT in transmitting mode. |

## 5.4 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

## 5.5 Test Location

All other tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

## 5.6 Other Information Requested by the Customer

None.

## 5.7 Description of Support Units

None.

## 5.8 Test Instruments list

| Radiated Emission: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | Mar. 27 2016 | Mar. 26 2017 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | Spectrum Analyzer | Agilent | E4440A | GTS536 | Jul. 04 2015 | Jul. 03 2016 |
| 4 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | Jul. 04 2015 | Jul. 03 2016 |
| 5 | Loop Antenna | ZHINAN | ZN30900A | GTS534 | Feb. 21 2016 | Feb. 20 2017 |
| 6 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | Feb. 21 2016 | Feb. 20 2017 |
| 7 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | 9120D-829 | GTS208 | Jul. 04 2015 | Jul. 03 2016 |
| 8 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | Mar. 27 2016 | Mar. 26 2017 |
| 9 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 10 | Coaxial Cable | GTS | N/A | GTS213 | Mar. 27 2016 | Mar. 26 2017 |
| 11 | Coaxial Cable | GTS | N/A | GTS211 | Mar. 27 2016 | Mar. 26 2017 |
| 12 | Coaxial cable | GTS | N/A | GTS210 | Mar. 27 2016 | Mar. 26 2017 |
| 13 | Coaxial Cable | GTS | N/A | GTS212 | Mar. 27 2016 | Mar. 26 2017 |
| 14 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | Jul. 04 2015 | Jul. 03 2016 |
| 15 | Amplifier(2GHz-20GHz) | HP | 8349B | GTS206 | Jul. 04 2015 | Jul. 03 2016 |
| 16 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | Jul. 04 2015 | Jul. 03 2016 |
| 17 | Band filter | Amindeon | 82346 | GTS219 | Mar. 27 2016 | Mar. 27 2016 |

# 6 Test results and Measurement Data

## 6.1 Antenna requirement

| Standard requirement: | FCC Part15 C Section 15.203 /247(c) |
|---|---|

**15.203 requirement:**

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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

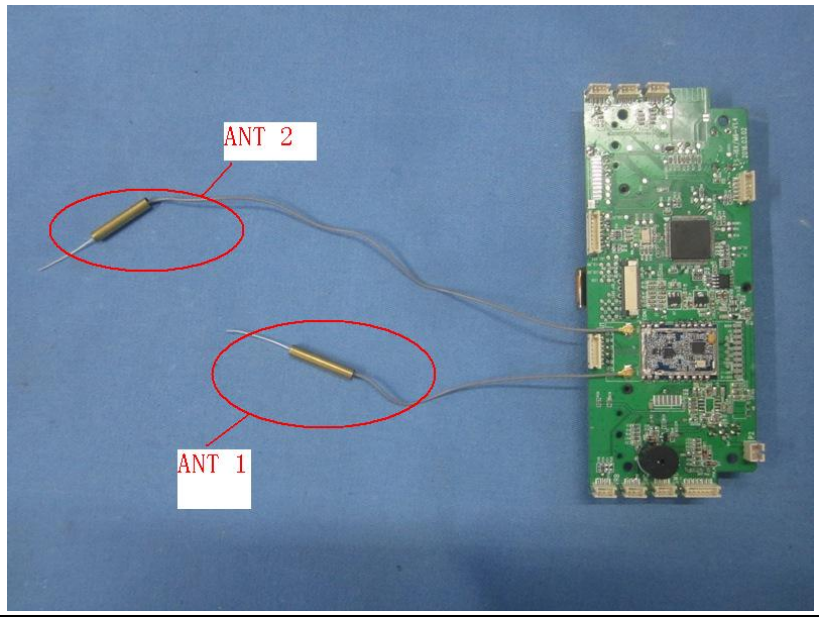
**15.247(c) (1)(i) requirement:**

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

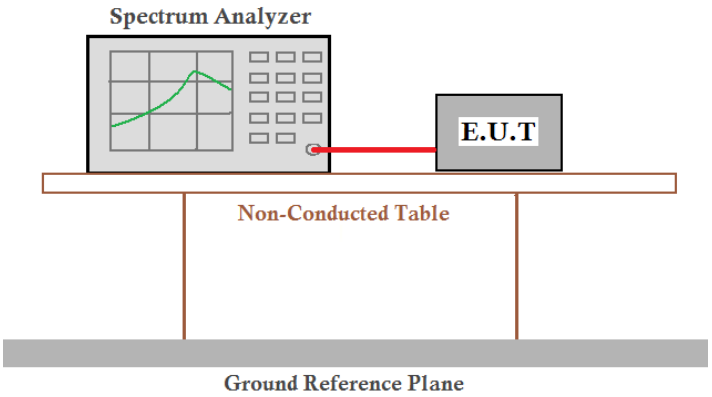
**EUT Antenna:**

*The antenna is integral Antenna, the best case gain of the antenna is 2dBi*

Two antenna can't transmit at the same time. While the ANT1 transmitting, the ANT2 act as a receiver antenna and vice versa.



## 6.2 Conducted Peak Output Power

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (b)(1) |
| Test Method: | DA 00-705, ANSI C63.10:2013 |
| Limit: | 20.97dBm |
| Test setup: |  |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

**Measurement Data**

**Antenna 1:**

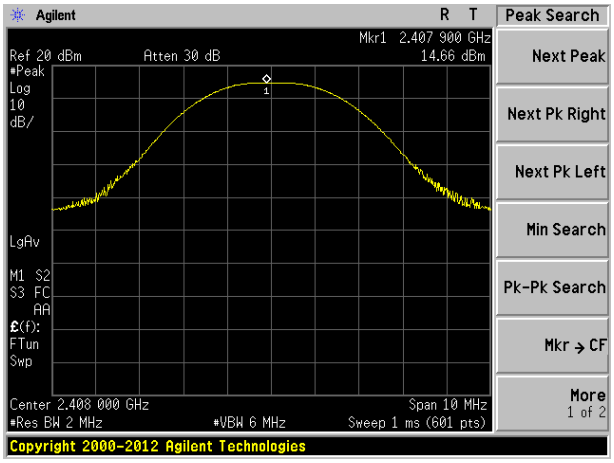
| Test channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|
| Lowest | 14.66 | 20.97 | Pass |
| Middle | 14.02 | | |
| Highest | 13.14 | | |

**Antenna 2:**

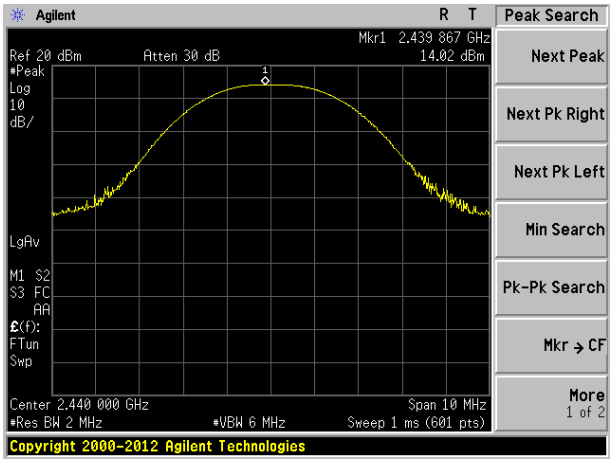
| Test channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|
| Lowest | 14.16 | 20.97 | Pass |
| Middle | 14.12 | | |
| Highest | 13.18 | | |

**Test plot as follows:**

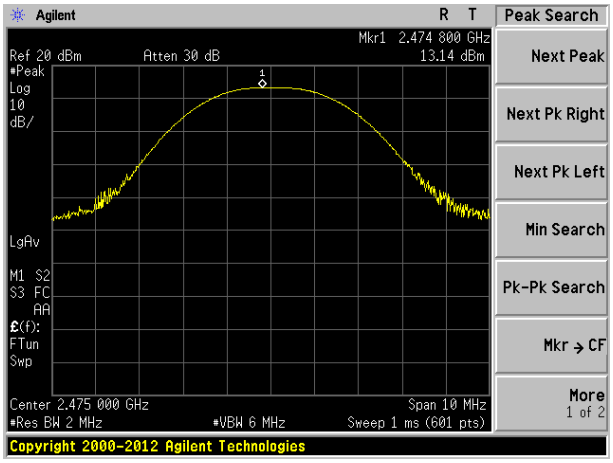
| | | Antenna: | Antenna 1 |
|---|---|---|---|




Lowest channel

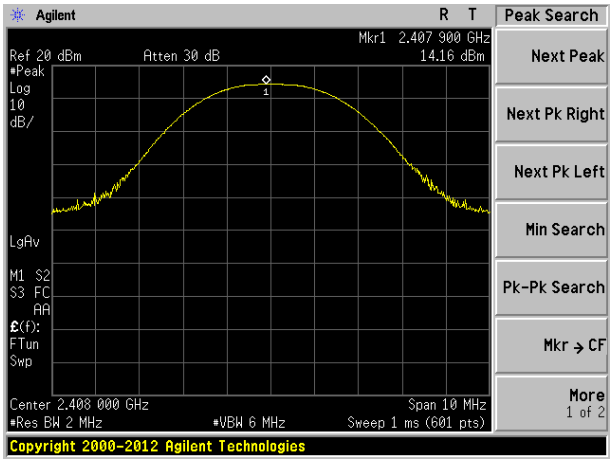



Middle channel

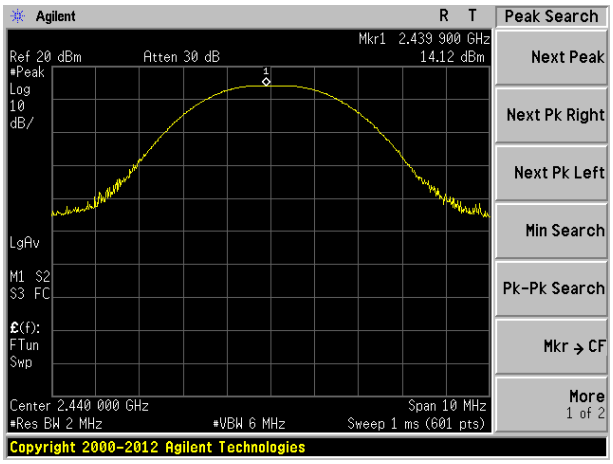



Highest channel

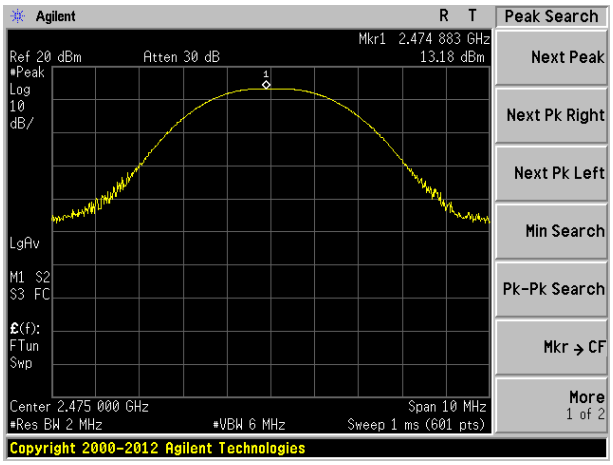
| | | Antenna: | Antenna 2 |
|---|---|---|---|




Lowest channel

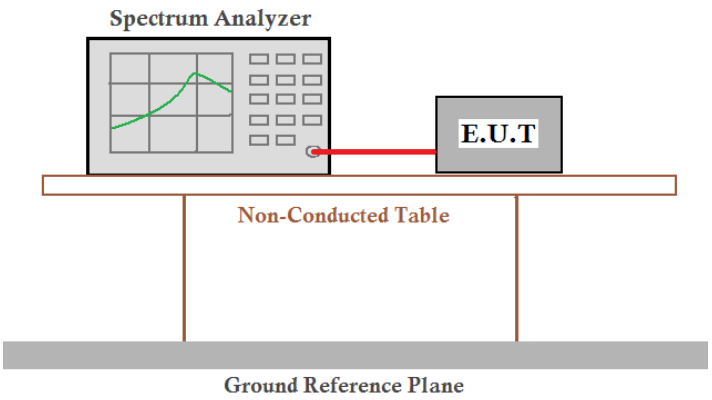



Middle channel




Highest channel

## 6.3 20dB Emission Bandwidth

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) |
| Test Method: | DA 00-705, ANSI C63.10:2013 |
| Limit: | N/A |
| Test setup: |  |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

**Measurement Data**

**Antenna 1:**

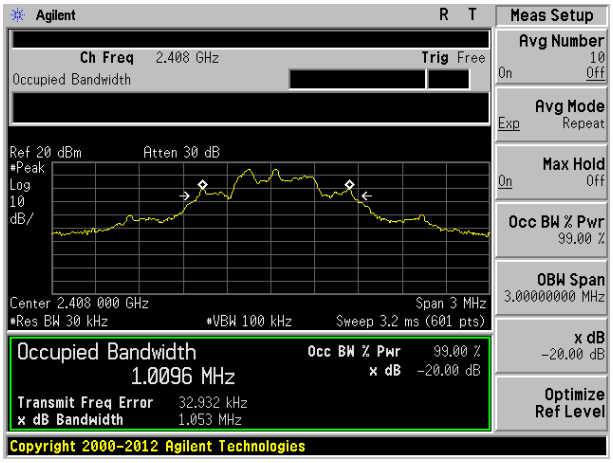
| Test channel | 20dB Emission Bandwidth (MHz) | Result |
|---|---|---|
| Lowest | 1.053 | Pass |
| Middle | 1.053 | |
| Highest | 1.047 | |

**Antenna 2:**

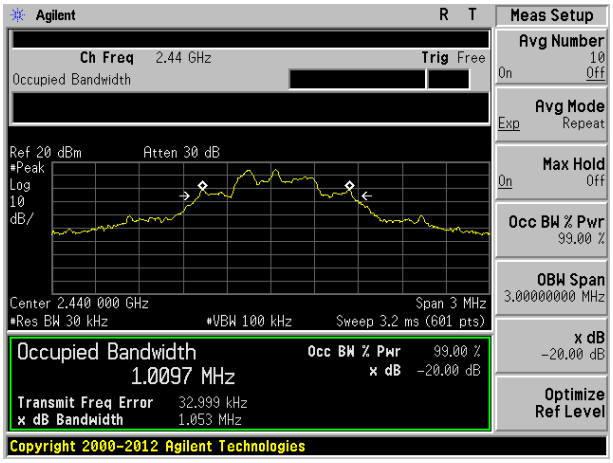
| Test channel | 20dB Emission Bandwidth (MHz) | Result |
|---|---|---|
| Lowest | 1.054 | Pass |
| Middle | 1.055 | |
| Highest | 1.048 | |

**Test plot as follows:**

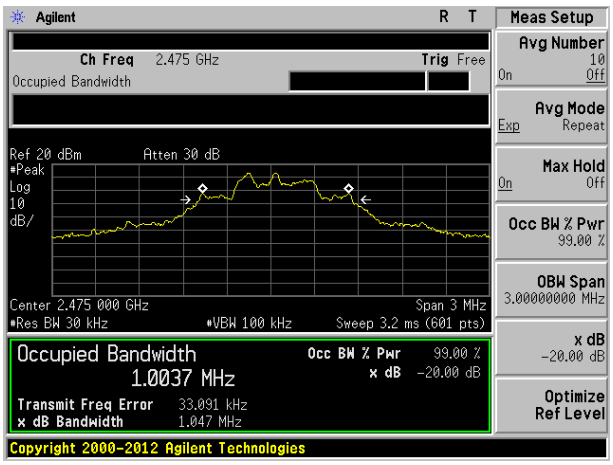
| | | Antenna: | Antenna 1 |
|---|---|---|---|




Lowest channel

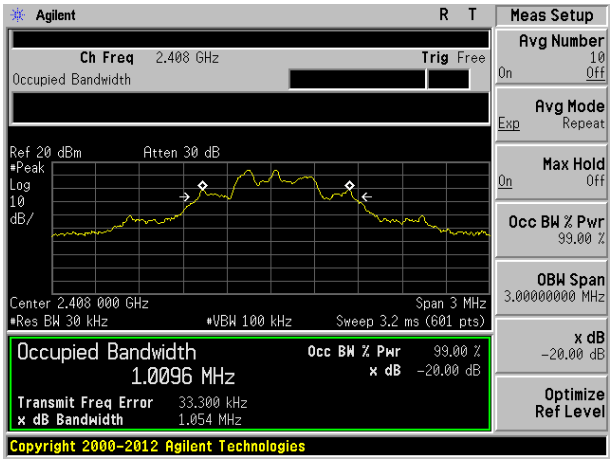



Middle channel

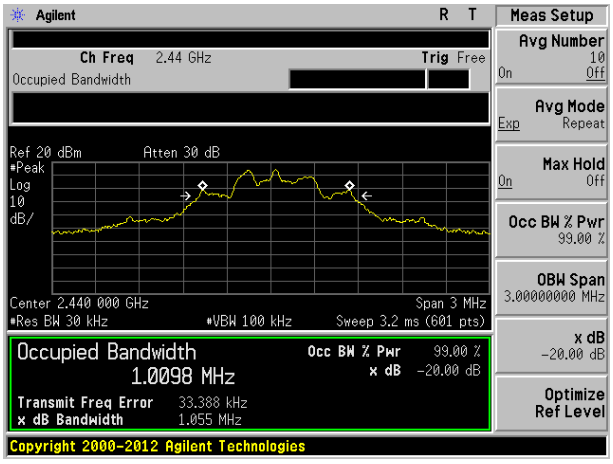



Highest channel

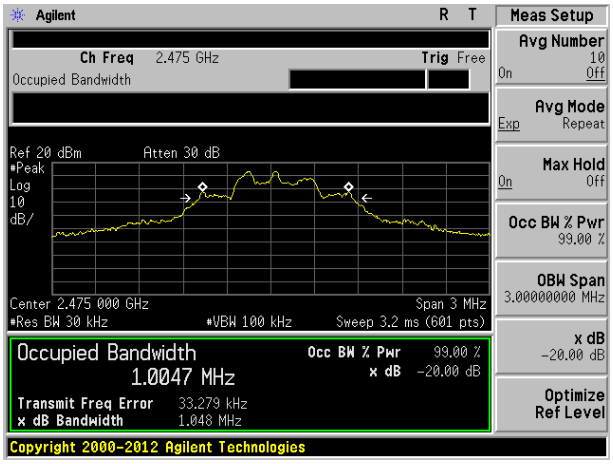
| | | Antenna: | Antenna 2 |
|---|---|---|---|




Lowest channel

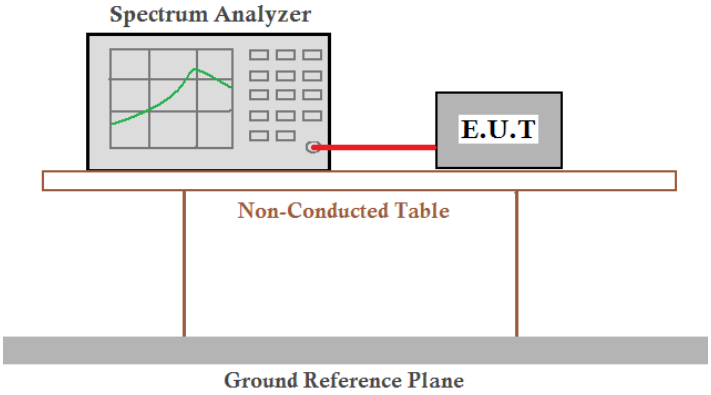



Middle channel




Highest channel

## 6.4 Carrier Frequencies Separation

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) |
| Test Method: | DA 00-705, ANSI C63.10:2013 |
| Receiver setup: | RBW=100KHz, VBW=300KHz, detector=Peak |
| Limit: | 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater) |
| Test setup: |  |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

**Measurement Data**

**Antenna 1:**

| Test channel | Carrier Frequencies Separation (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| Lowest | 2507 | *703* | Pass |
| Middle | 2017 | *703* | Pass |
| Highest | 2008 | *703* | Pass |

*Note: According to section 6.3*

| *Mode* | *20dB bandwidth (kHz) (worse case)* | *Limit (kHz) (Carrier Frequencies Separation)* |
|---|---|---|
| *GFSK* | *1053* | *703* |

**Antenna 2:**

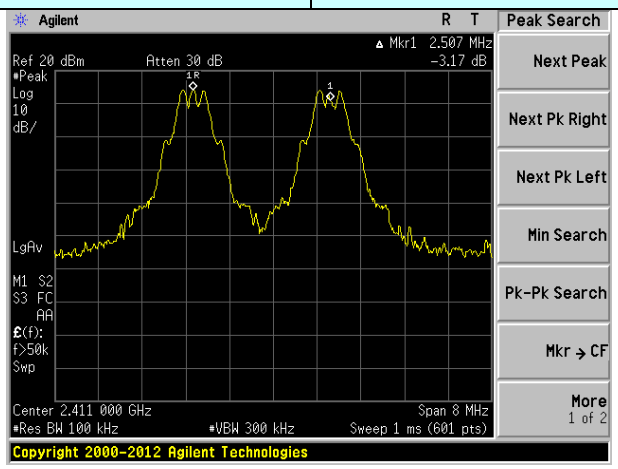
| Test channel | Carrier Frequencies Separation (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| Lowest | 2507 | *702* | Pass |
| Middle | 2008 | *702* | Pass |
| Highest | 2033 | *702* | Pass |

*Note: According to section 6.3*

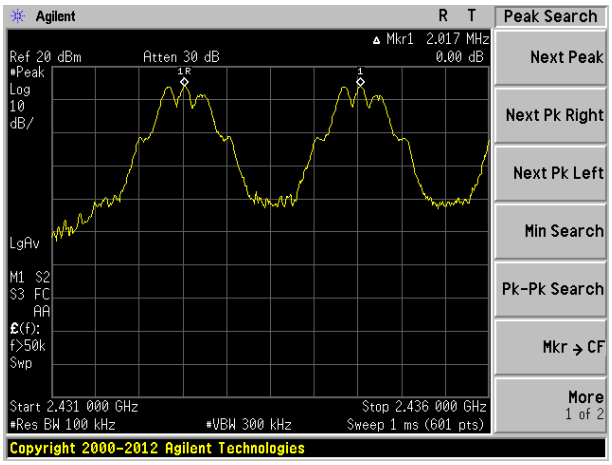
| *Mode* | *20dB bandwidth (kHz) (worse case)* | *Limit (kHz) (Carrier Frequencies Separation)* |
|---|---|---|
| *GFSK* | *1055* | *702* |

**Test plot as follows:**

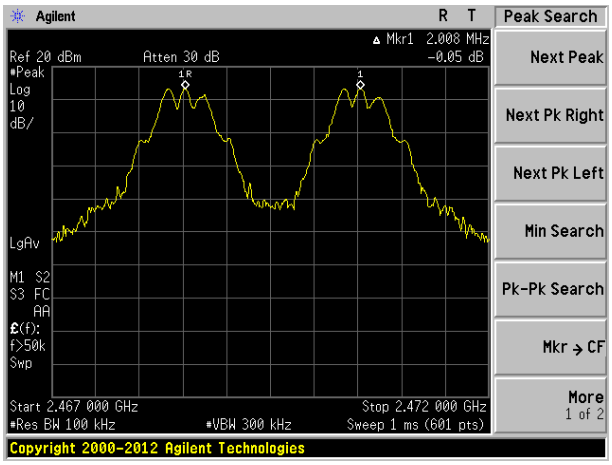
| | | Antenna: | Antenna 1 |
|---|---|---|---|




Lowest channel

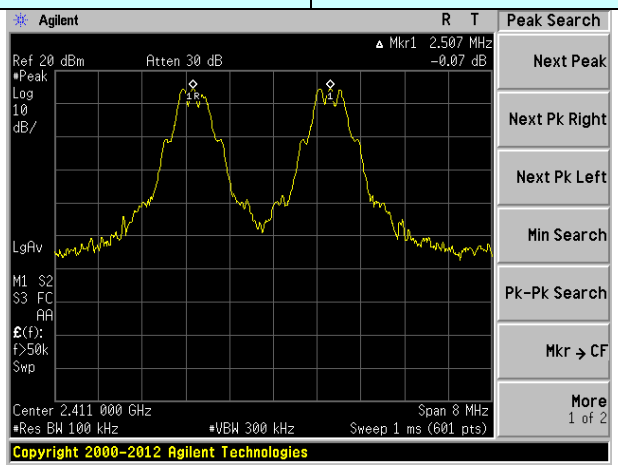



Middle channel

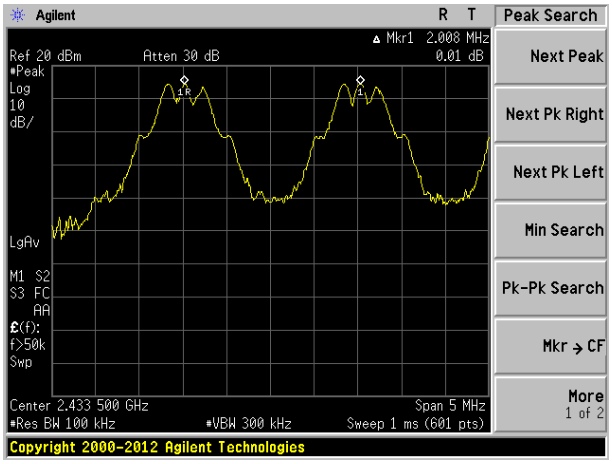



Highest channel

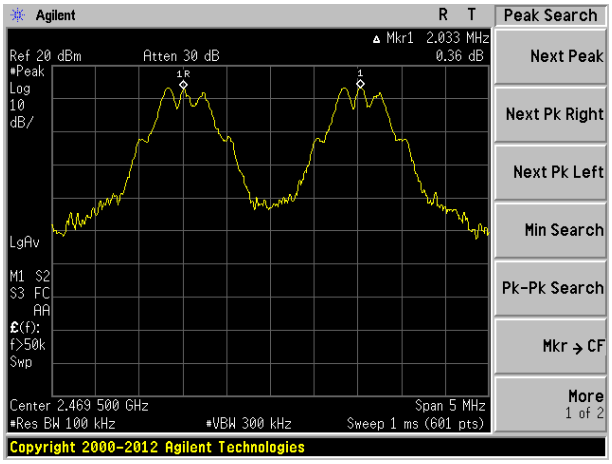
| | | Antenna: | Antenna 2 |
|---|---|---|---|




Lowest channel

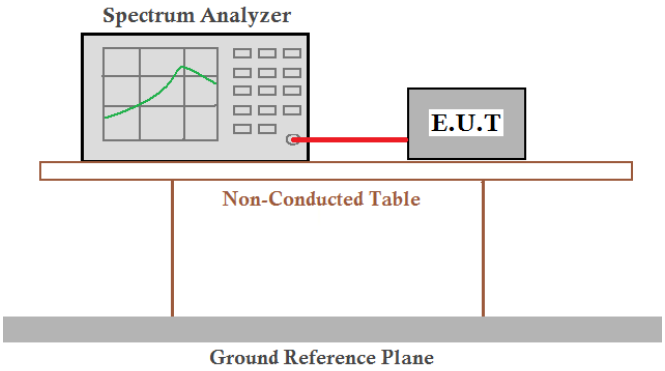



Middle channel




Highest channel

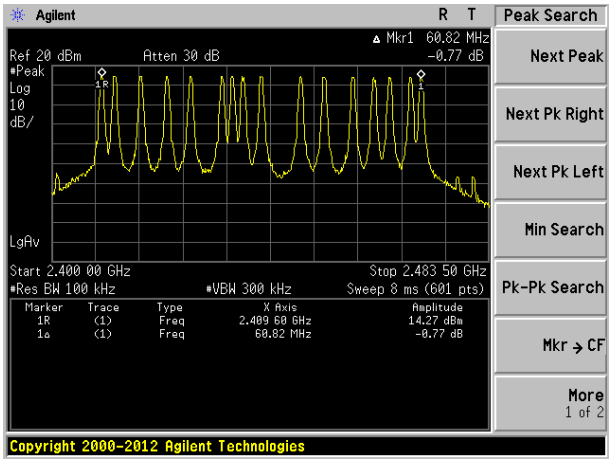
## 6.5 Hopping Channel Number

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1)(iii) |
| Test Method: | DA 00-705, ANSI C63.10:2013 |
| Receiver setup: | RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak |
| Limit: | 15 channels |
| Test setup: |  |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

**Measurement Data:**

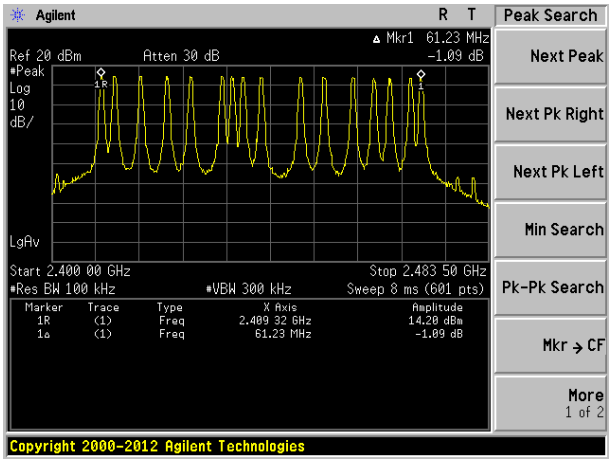
**Antenna 1:**

| Hopping channel numbers | Limit | Result |
|---|---|---|
| 16 | 15 | Pass |

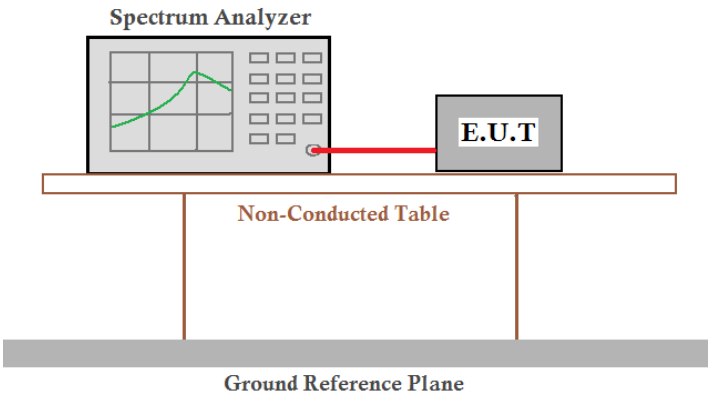



**Antenna 2:**

| Hopping channel numbers | Limit | Result |
|---|---|---|
| 16 | 15 | Pass |



## 6.6 Dwell Time

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1)(iii) |
| Test Method: | DA 00-705, ANSI C63.10:2013 |
| Receiver setup: | RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak |
| Limit: | 0.4 Second |
| Test setup: |  |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

**Measurement Data**

**Antenna 1:**

| Frequency | Ton (ms) | Dwell time(ms) | Limit(ms) | Result |
|---|---|---|---|---|
| 2.408GHz | 1.295 | 74.59 | 400 | Pass |
| 2.440GHz | 1.295 | 66.30 | 400 | Pass |
| 2.475GHz | 1.295 | 66.30 | 400 | Pass |

The formula as below:

2408MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.295ms*9*0.4*16=74.59ms

2440MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.295ms*8*0.4*16=66.30ms

2475MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.295ms*8*0.4*16=66.30ms

**Antenna 2:**

| Frequency | Ton (ms) | Dwell time(ms) | Limit(ms) | Result |
|---|---|---|---|---|
| 2.408GHz | 1.295 | 74.59 | 400 | Pass |
| 2.440GHz | 1.295 | 66.30 | 400 | Pass |
| 2.475GHz | 1.295 | 66.30 | 400 | Pass |

The formula as below:

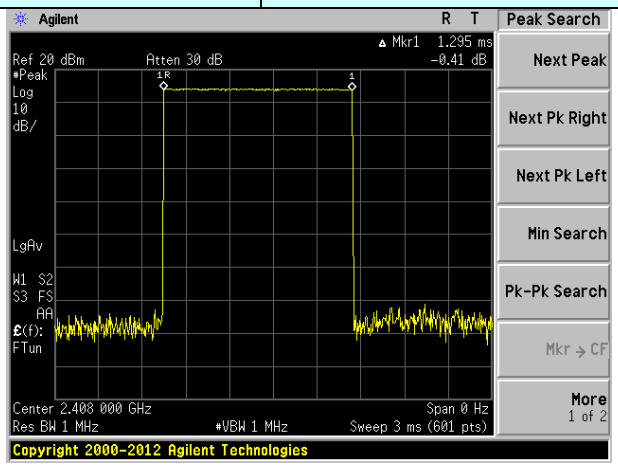
2408MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.295ms*9*0.4*16=74.59ms

2440MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.295ms*8*0.4*16=66.30ms

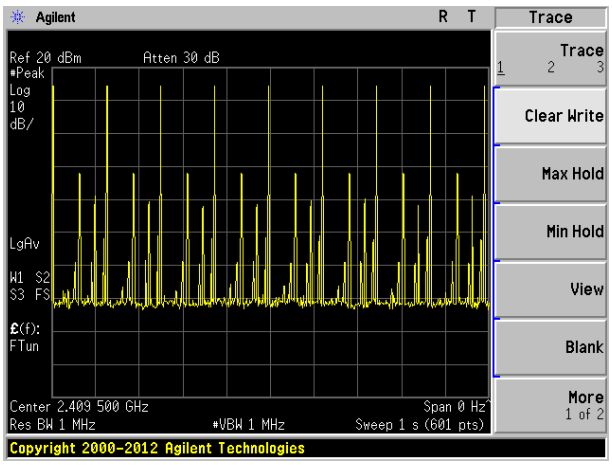
2475MHz: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=1.295ms*8*0.4*16=66.30ms

**Test plot as follows:**

| Frequency: | 2408MHz | Antenna: | Antenna 1 |
|---|---|---|---|

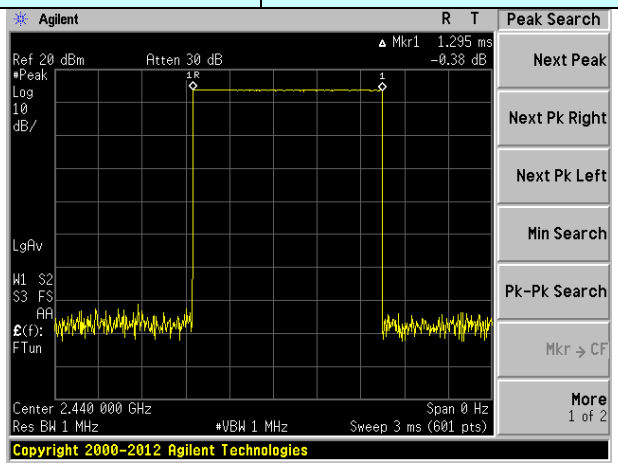



Ton

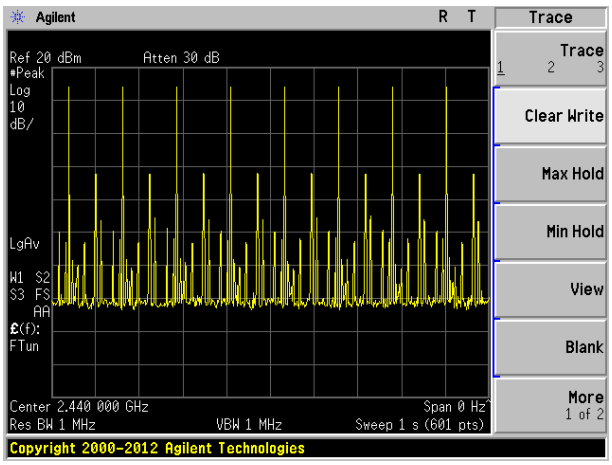



Ton times in 1s

| Frequency: | 2440MHz | Antenna: | Antenna 1 |
|---|---|---|---|

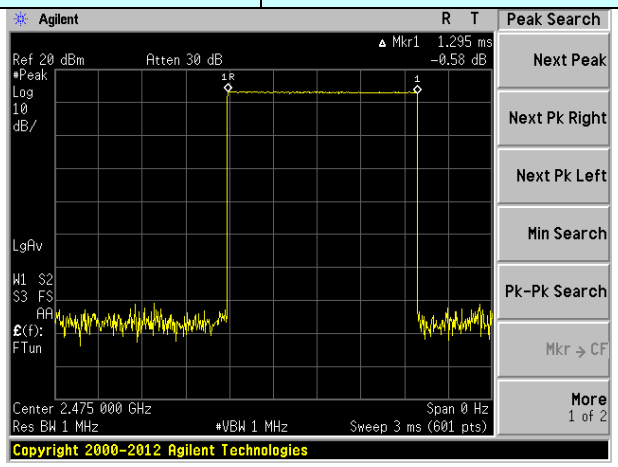



Ton

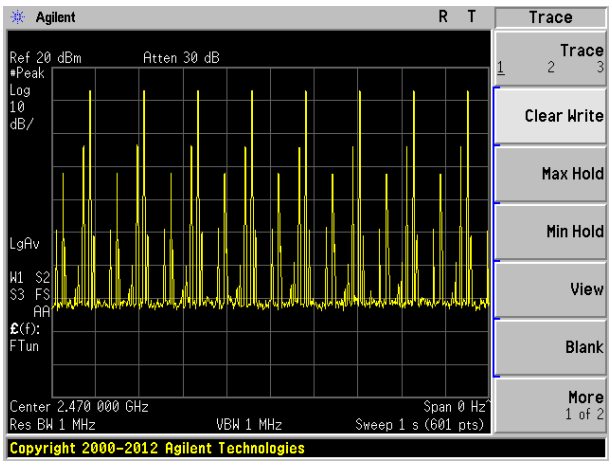



Ton times in 1s

| Frequency: | 2475MHz | Antenna: | Antenna 1 |
|---|---|---|---|

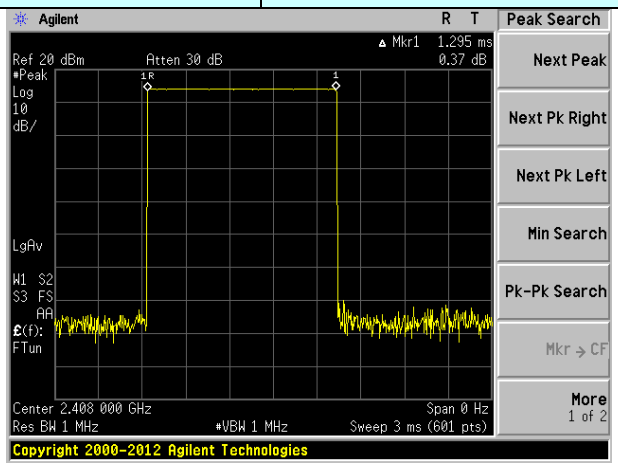



Ton

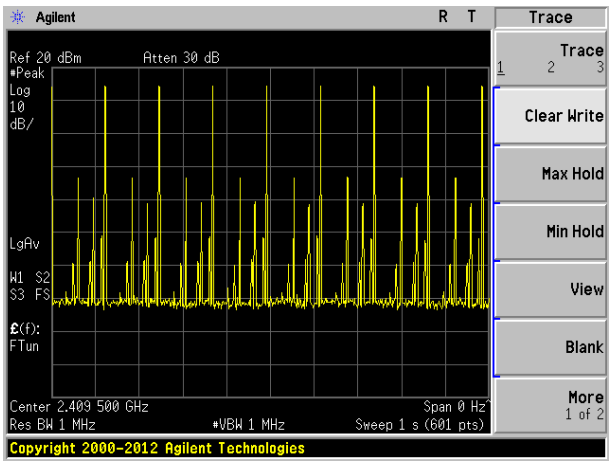



Ton times in 1s

| Frequency: | 2408MHz | Antenna: | Antenna 2 |
|---|---|---|---|

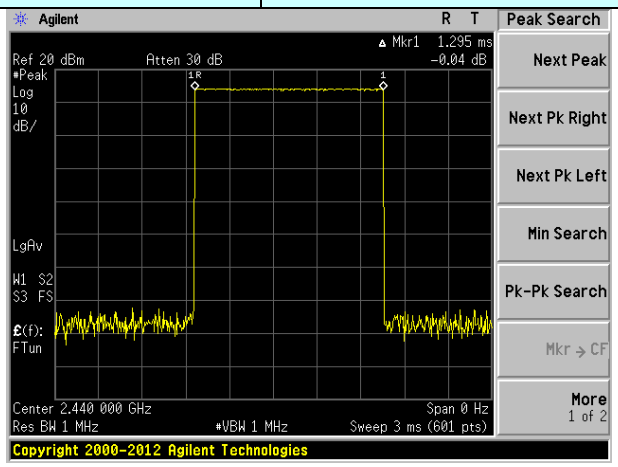



Ton

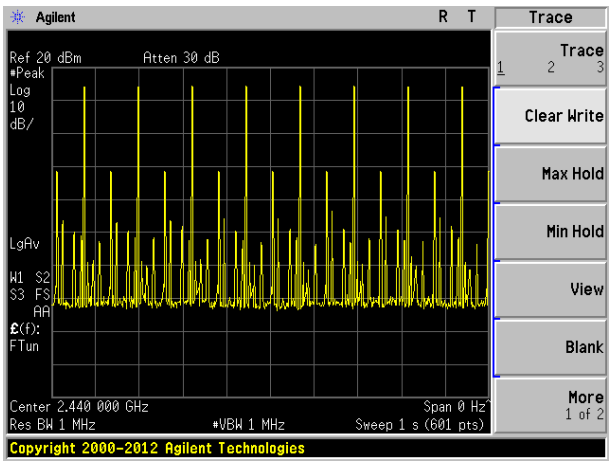



Ton times in 1s

| Frequency: | 2440MHz | Antenna: | Antenna 2 |
|---|---|---|---|

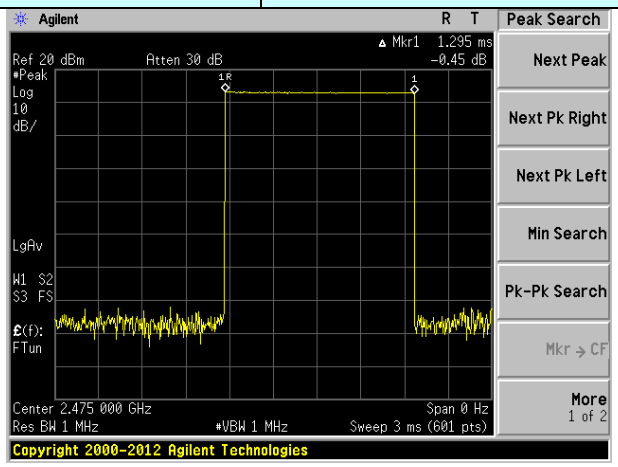



Ton

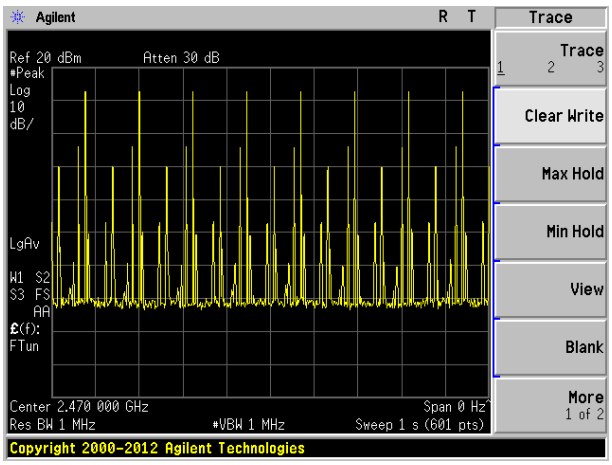



Ton times in 1s

| Frequency: | 2475MHz | Antenna: | Antenna 2 |
|---|---|---|---|




Ton




Ton times in 1s

## 6.7 Pseudorandom Frequency Hopping Sequence

| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) requirement: |
|---|---|

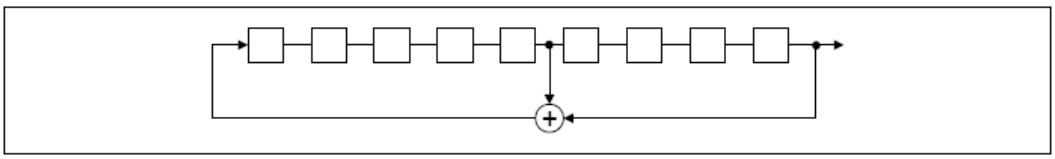
*Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.*

*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. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.*

**EUT Pseudorandom Frequency Hopping Sequence**

*The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.*

- *Number of shift register stages: 9*
- *Length of pseudo-random sequence: $2^9$ -1 = 511 bits*
- *Longest sequence of zeros: 8 (non-inverted signal)*



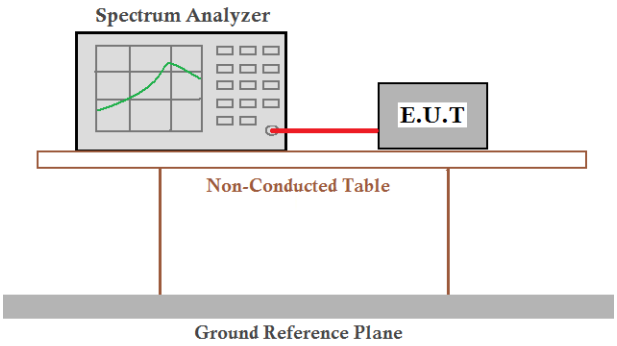
*Linear Feedback Shift Register for Generation of the PRBS sequence*

*Each frequency used equally on the average by each transmitter.*

*The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.*

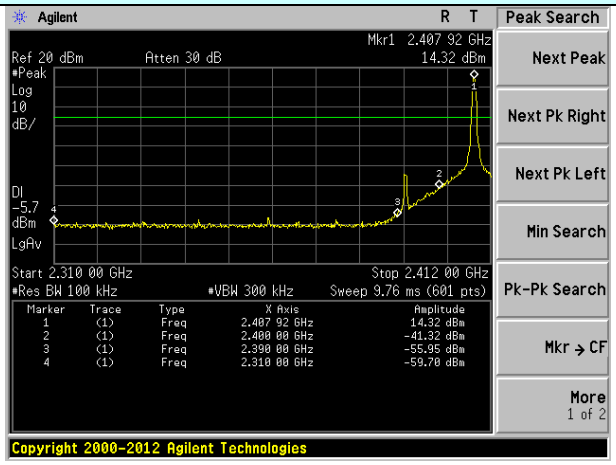
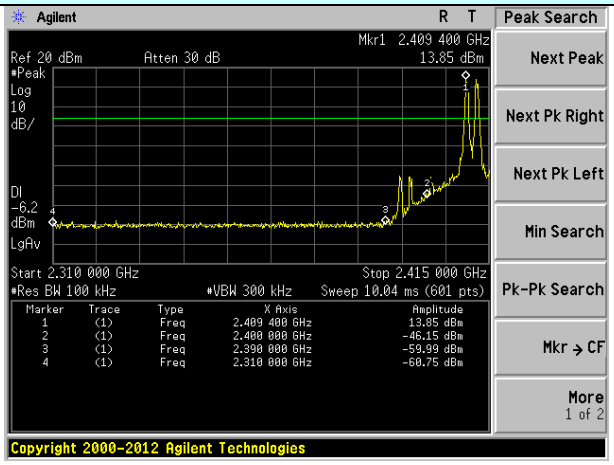
## 6.8 Band Edge

### 6.8.1 Conducted Emission Method

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d) |
| Test Method: | DA 00-705, ANSI C63.10:2013 |
| Receiver setup: | RBW=100kHz, VBW=300kHz, Detector=Peak |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |
| Test setup: |  |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

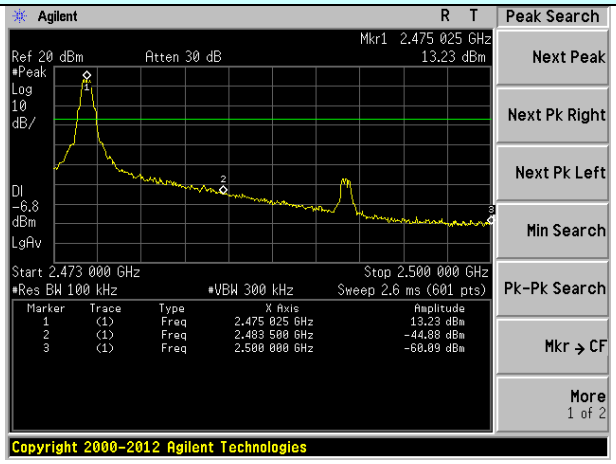
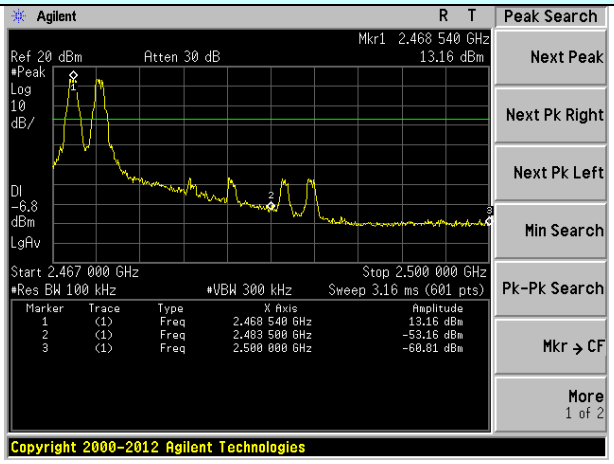
**Test plot as follows:**

**Antenna 1:**

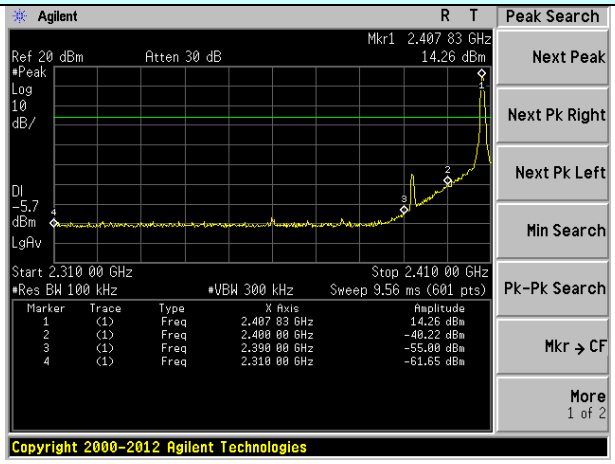
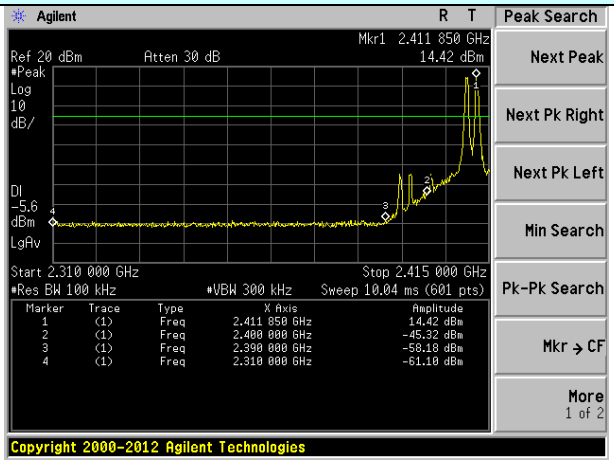
| Test channel: | Lowest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |





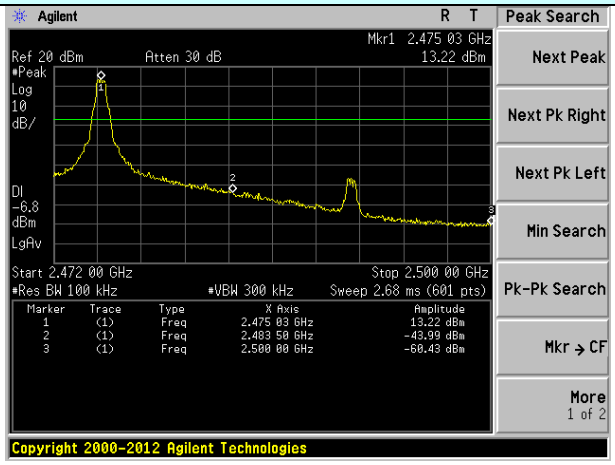
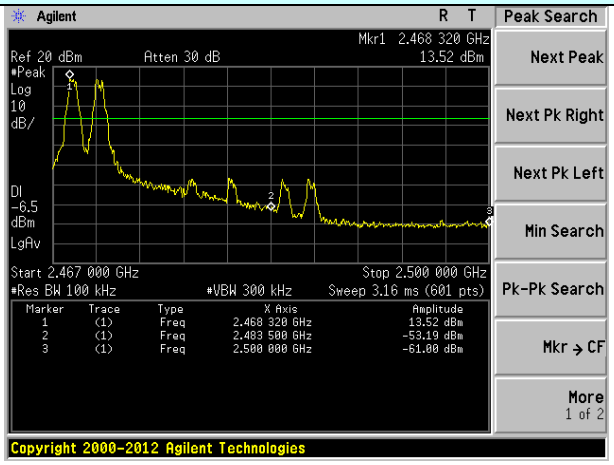
| Test channel: | Highest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

**Antenna 2:**

| Test channel: | Lowest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |





| Test channel: | Highest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

### 6.8.2 Radiated Emission Method

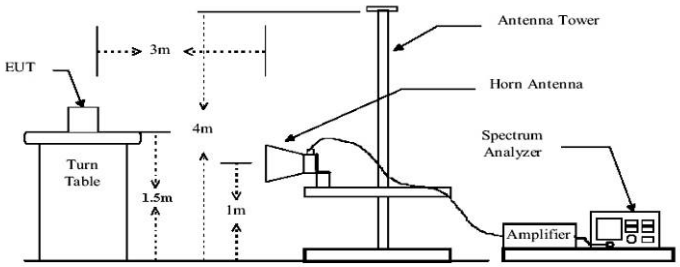
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.209 and 15.205 |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | All restriction band have been tested, and 2.3GHz to 2.5GHz band is the worse case |
| Test site: | Measurement Distance: 3m |
| Receiver setup: | |

| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | Peak | 1MHz | 10Hz | Average Value |

Limit:

| Frequency | Limit (dBuV/m @3m) | Remark |
|---|---|---|
| Above 1GHz | 54.00 | Average Value |
| | 74.00 | Peak Value |

Test setup:




Test Procedure:

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

| | |
|---|---|
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

*Remark:*

1. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*
2. *Two antenna were tested and found the antenna2 is worse. So only the data of antenna2 is reported.*

**Antenna 2:**

| Test channel: | Lowest |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2390.00 | 48.58 | 27.59 | 5.38 | 34.01 | 47.54 | 74.00 | -26.46 | Vertical |
| 2400.00 | 60.05 | 27.58 | 5.39 | 34.01 | 59.01 | 74.00 | -14.99 | Vertical |
| 2390.00 | 45.86 | 27.59 | 5.38 | 34.01 | 44.82 | 74.00 | -29.18 | Horizontal |
| 2400.00 | 51.26 | 27.58 | 5.39 | 34.01 | 50.22 | 74.00 | -23.78 | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2390.00 | 35.45 | 27.59 | 5.38 | 34.01 | 34.41 | 54.00 | -19.59 | Vertical |
| 2400.00 | 42.35 | 27.58 | 5.39 | 34.01 | 41.31 | 54.00 | -12.69 | Vertical |
| 2390.00 | 34.39 | 27.59 | 5.38 | 34.01 | 33.35 | 54.00 | -20.65 | Horizontal |
| 2400.00 | 36.5 | 27.58 | 5.39 | 34.01 | 35.46 | 54.00 | -18.54 | Horizontal |

| Test channel: | Highest |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2483.50 | 53.97 | 27.53 | 5.47 | 33.92 | 53.05 | 74.00 | -20.95 | Vertical |
| 2500.00 | 46.85 | 27.55 | 5.49 | 33.9 | 45.99 | 74.00 | -28.01 | Vertical |
| 2483.50 | 47.74 | 27.53 | 5.47 | 33.92 | 46.82 | 74.00 | -27.18 | Horizontal |
| 2500.00 | 45.73 | 27.55 | 5.49 | 33.9 | 44.87 | 74.00 | -29.13 | Horizontal |

**Average value:**

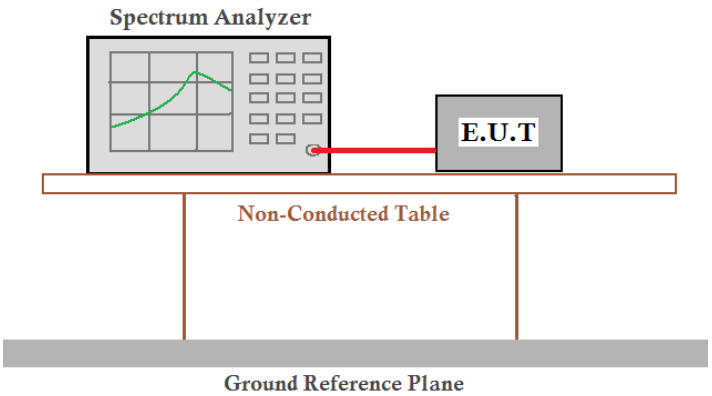
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2483.50 | 38.42 | 27.53 | 5.47 | 33.92 | 37.5 | 54.00 | -16.5 | Vertical |
| 2500.00 | 34.33 | 27.55 | 5.49 | 33.9 | 33.47 | 54.00 | -20.53 | Vertical |
| 2483.50 | 35.29 | 27.53 | 5.47 | 33.92 | 34.37 | 54.00 | -19.63 | Horizontal |
| 2500.00 | 34.26 | 27.55 | 5.49 | 33.9 | 33.4 | 54.00 | -20.6 | Horizontal |

*Remark:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

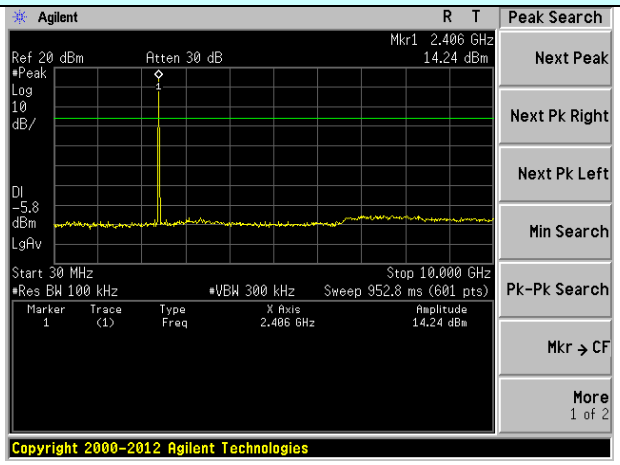
## 6.9 Spurious Emission

### 6.9.1 Conducted Emission Method

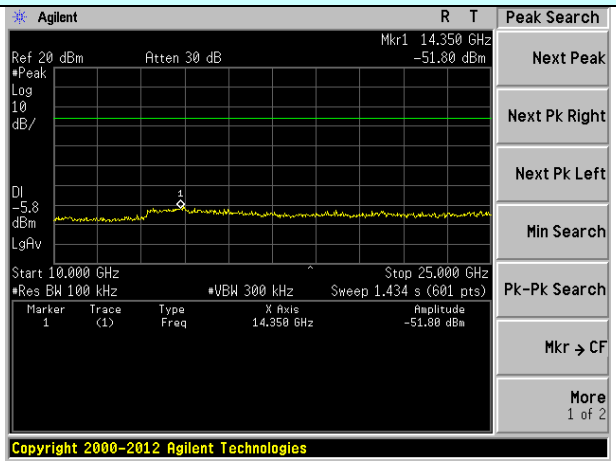
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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. |
| Test setup: |  |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

**Antenna 1:**

| Test channel: | Lowest channel |
|---|---|

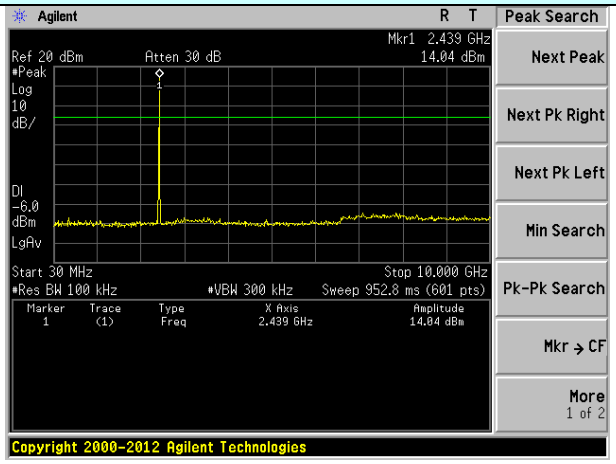



30MHz~10GHz

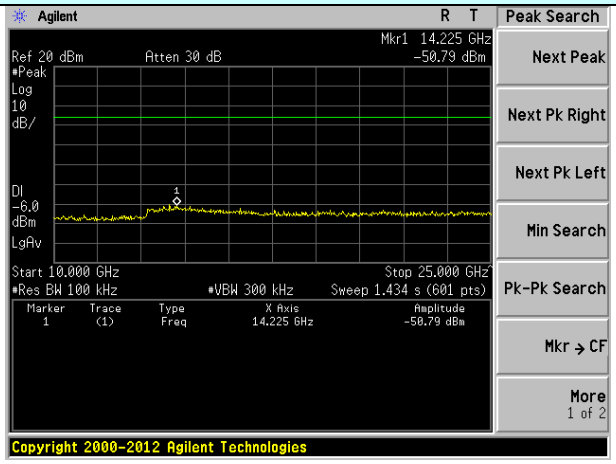



10GHz~25GHz

| Test channel: | Middle channel |
|---|---|

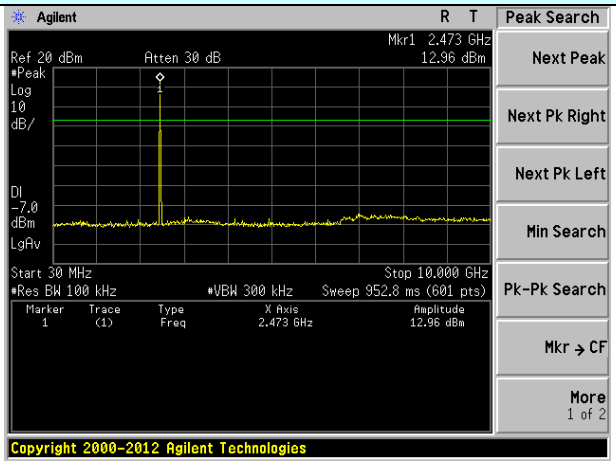



30MHz~10GHz

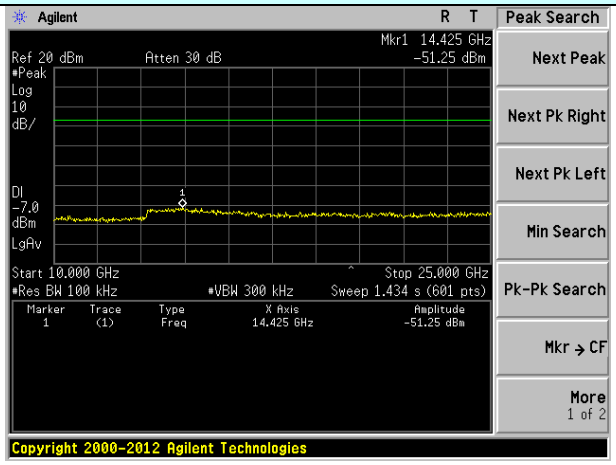



10GHz~25GHz

| Test channel: | Highest channel |
|---|---|



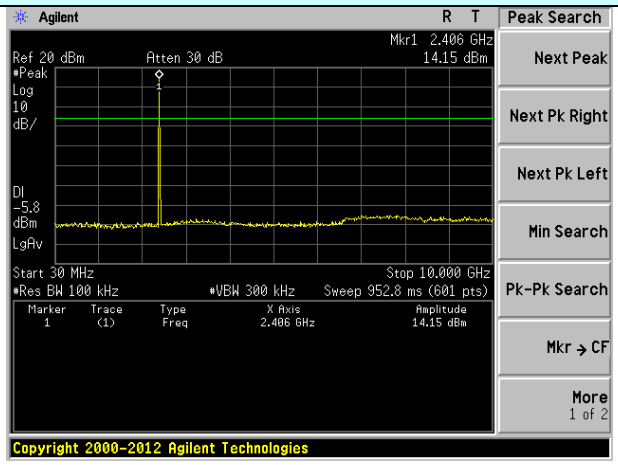

30MHz~10GHz



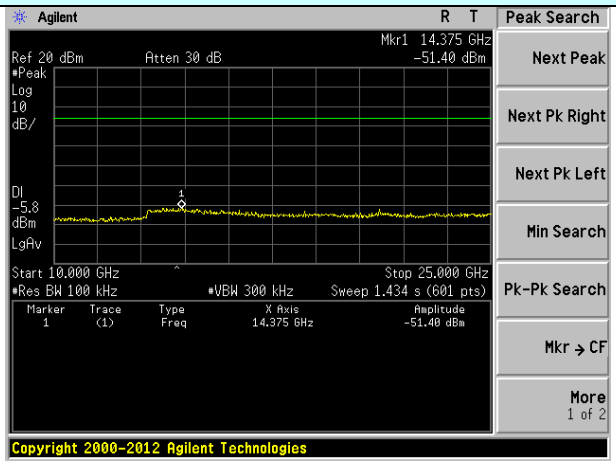

10GHz~25GHz

**Antenna 2:**

| Test channel: | Lowest channel |
|---|---|

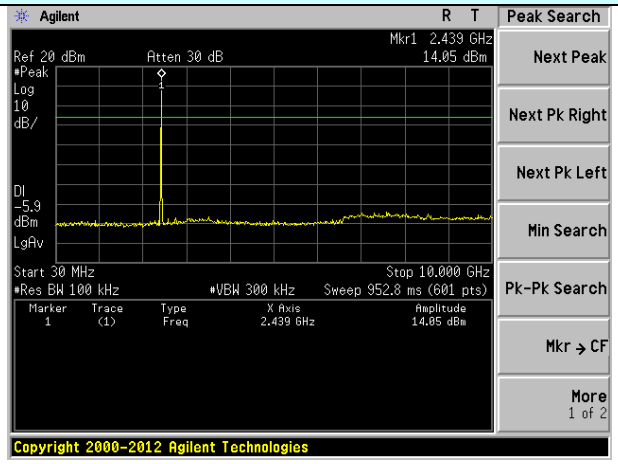



30MHz~10GHz

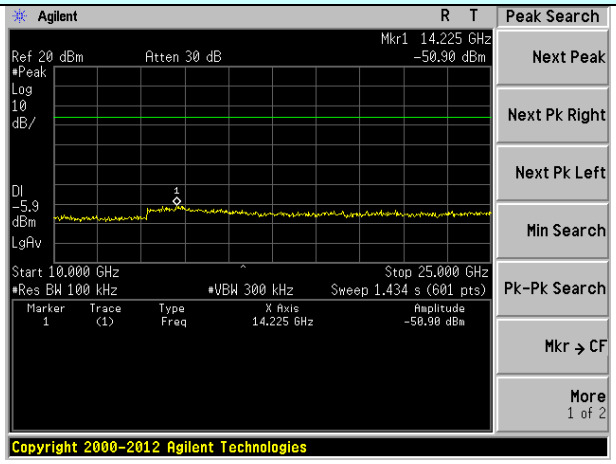



10GHz~25GHz

| Test channel: | Middle channel |
|---|---|

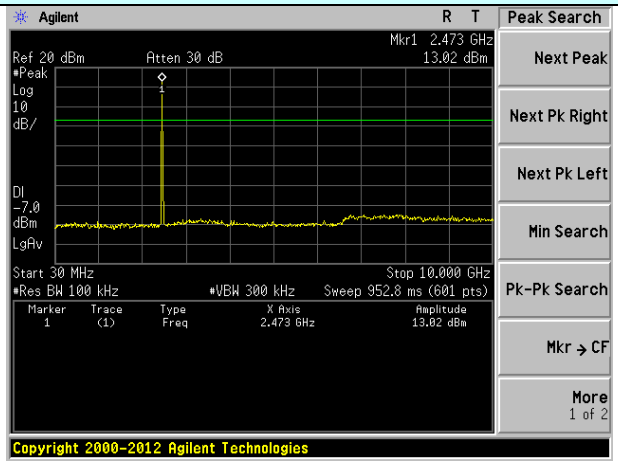



30MHz~10GHz

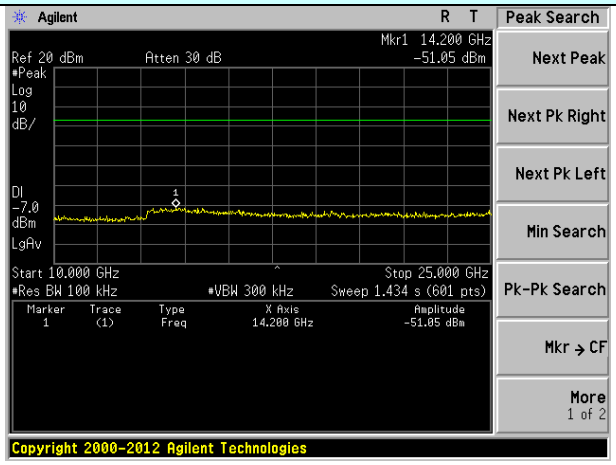



10GHz~25GHz

| Test channel: | Highest channel |
|---|---|




30MHz~10GHz




10GHz~25GHz

### 6.9.2 Radiated Emission Method

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.209 |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | 9kHz to 25GHz |
| Test site: | Measurement Distance: 3m |

Receiver setup:

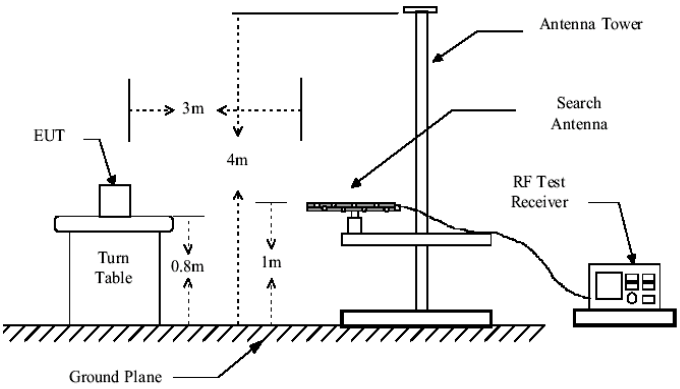
| Frequency | Detector | RBW | VBW | Value |
|---|---|---|---|---|
| 9KHz-10KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 100KHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

Limit:
(Spurious Emissions)

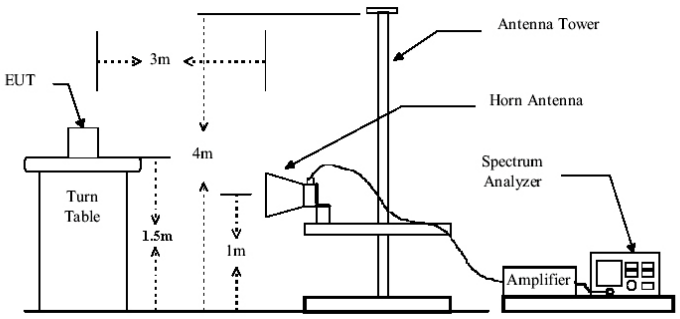
| Frequency | Limit (uV/m) | Value | Measurement Distance |
|---|---|---|---|
| 0.009MHz-0.490MHz | 2400/F(KHz) | QP | 300m |
| 0.490MHz-1.705MHz | 24000/F(KHz) | QP | 300m |
| 1.705MHz-30MHz | 30 | QP | 30m |
| 30MHz-88MHz | 100 | QP | 3m |
| 88MHz-216MHz | 150 | QP | |
| 216MHz-960MHz | 200 | QP | |
| 960MHz-1GHz | 500 | QP | |
| Above 1GHz | 500 | Average | |
| | 5000 | Peak | |

Test setup:

Below 1GHz




Above 1GHz

| | |
|---|---|
| |  |
| Test Procedure: | 1. The EUT was placed on the top of a rotating table (0.8 meters for below 1GHz and 1.5meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

*Remark:*

*1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

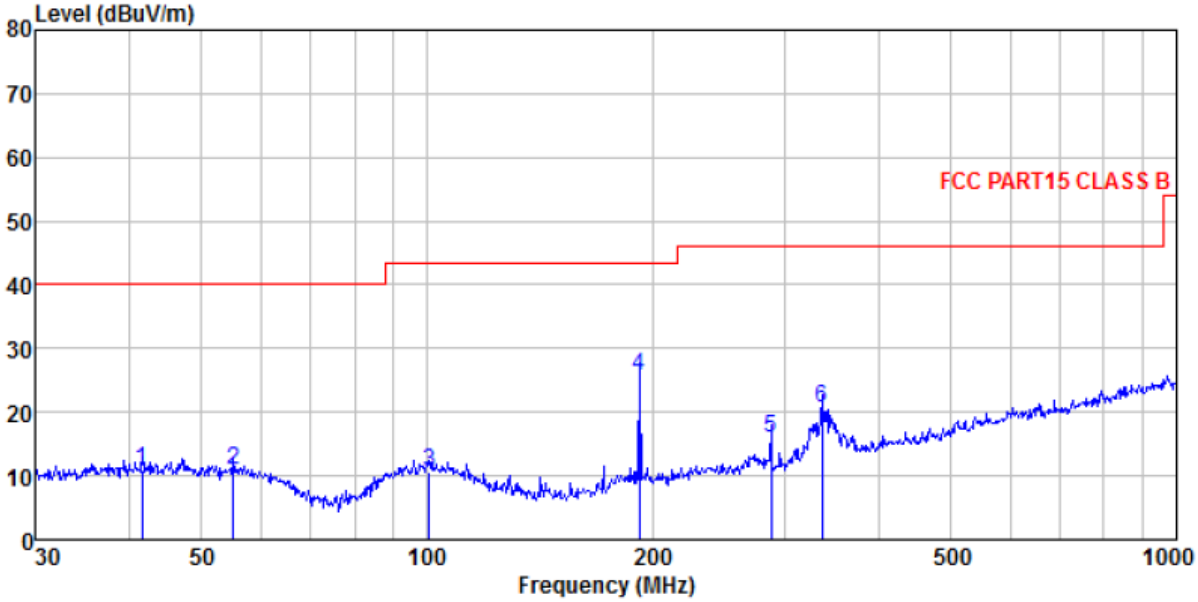
*2. The measured filed strength at frequencies below 30MHz are lower than the limit over 30dB. So the data isn't reported.*

*3. Two antenna were tested and found the antenna2 is worse. So only the data of antenna2 is reported.*

**Measurement data:**

■ **30MHz ~ 1GHz**

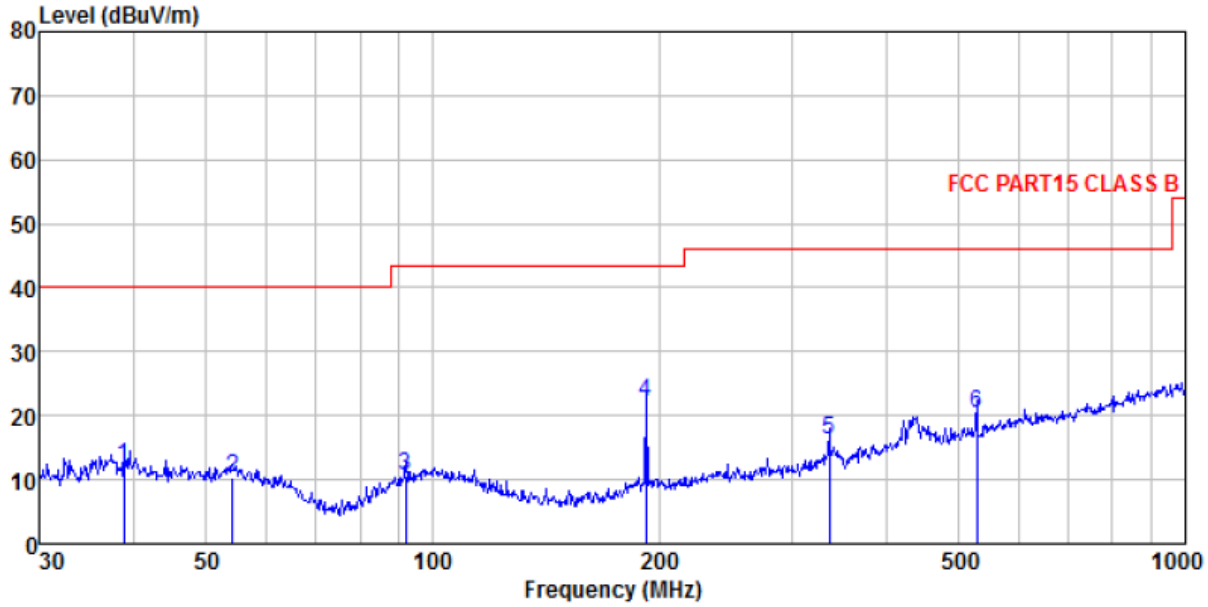
Horizontal:




Site : 3m chamber
Condition : FCC PART15 CLASS B VULB9163-2013M HORIZONTAL
Job No. : 0060
Test Mode : Transmitting mode
Test Engineer: Ben

| | Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 41.713 | 24.66 | 15.57 | 0.68 | 30.04 | 10.87 | 40.00 | -29.13 | QP |
| 2 | 55.221 | 24.95 | 15.00 | 0.82 | 29.96 | 10.81 | 40.00 | -29.19 | QP |
| 3 | 100.581 | 23.93 | 15.11 | 1.19 | 29.70 | 10.53 | 43.50 | -32.97 | QP |
| 4 | 191.745 | 40.50 | 12.56 | 1.80 | 29.23 | 25.63 | 43.50 | -17.87 | QP |
| 5 | 287.990 | 28.64 | 14.84 | 2.31 | 29.92 | 15.87 | 46.00 | -30.13 | QP |
| 6 | 336.035 | 31.96 | 15.99 | 2.55 | 29.80 | 20.70 | 46.00 | -25.30 | QP |

Vertical：




Site : 3m chamber
Condition : FCC PART15 CLASS B VULB9163-2013M VERTICAL
Job No. : 0060
Test Mode : Transmitting mode
Test Engineer: Ben

| | Freq | ReadAntenna Level | Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 38.888 | 26.26 | 15.30 | 0.65 | 30.05 | 12.16 | 40.00 | -27.84 | QP |
| 2 | 54.261 | 24.46 | 15.05 | 0.81 | 29.96 | 10.36 | 40.00 | -29.64 | QP |
| 3 | 92.139 | 25.02 | 14.33 | 1.13 | 29.74 | 10.74 | 43.50 | -32.76 | QP |
| 4 | 191.745 | 36.89 | 12.56 | 1.80 | 29.23 | 22.02 | 43.50 | -21.48 | QP |
| 5 | 336.035 | 27.35 | 15.99 | 2.55 | 29.80 | 16.09 | 46.00 | -29.91 | QP |
| 6 | 528.246 | 27.04 | 19.15 | 3.43 | 29.30 | 20.32 | 46.00 | -25.68 | QP |

■ **Above 1GHz**

| Test channel: | Lowest |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 4816.00 | 32.90 | 31.79 | 8.61 | 32.09 | 41.21 | 74.00 | -32.79 | Vertical |
| 7224.00 | 27.95 | 36.19 | 11.66 | 31.99 | 43.81 | 74.00 | -30.19 | Vertical |
| 9632.00 | 26.83 | 38.01 | 14.16 | 31.58 | 47.42 | 74.00 | -26.58 | Vertical |
| 12040.00 | * | | | | | 74.00 | | Vertical |
| 14440.00 | * | | | | | 74.00 | | Vertical |
| 4816.00 | 35.35 | 31.79 | 8.61 | 32.09 | 43.66 | 74.00 | -30.34 | Horizontal |
| 7224.00 | 33.18 | 36.19 | 11.66 | 31.99 | 49.04 | 74.00 | -24.96 | Horizontal |
| 9632.00 | 30.41 | 38.01 | 14.16 | 31.58 | 51.00 | 74.00 | -23.00 | Horizontal |
| 12040.00 | * | | | | | 74.00 | | Horizontal |
| 14440.00 | * | | | | | 74.00 | | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 4816.00 | 21.36 | 31.79 | 8.61 | 32.09 | 29.67 | 54.00 | -24.33 | Vertical |
| 7224.00 | 17.46 | 36.19 | 11.66 | 31.99 | 33.32 | 54.00 | -20.68 | Vertical |
| 9632.00 | 15.92 | 38.01 | 14.16 | 31.58 | 36.51 | 54.00 | -17.49 | Vertical |
| 12040.00 | * | | | | | 54.00 | | Vertical |
| 14440.00 | * | | | | | 54.00 | | Vertical |
| 4816.00 | 24.92 | 31.79 | 8.61 | 32.09 | 33.23 | 54.00 | -20.77 | Horizontal |
| 7224.00 | 22.62 | 36.19 | 11.66 | 31.99 | 38.48 | 54.00 | -15.52 | Horizontal |
| 9632.00 | 19.75 | 38.01 | 14.16 | 31.58 | 40.34 | 54.00 | -13.66 | Horizontal |
| 12040.00 | * | | | | | 54.00 | | Horizontal |
| 14440.00 | * | | | | | 54.00 | | Horizontal |

*Remark:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

| Test channel: | Middle |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 4880.00 | 48.54 | 31.85 | 8.66 | 32.12 | 56.93 | 74 | -17.07 | Vertical |
| 7320.00 | 29.89 | 36.37 | 11.72 | 31.89 | 46.09 | 74 | -27.91 | Vertical |
| 9760.00 | 29.62 | 38.35 | 14.25 | 31.59 | 50.63 | 74 | -23.37 | Vertical |
| 12200.00 | * | | | | | 74.00 | | Vertical |
| 14640.00 | * | | | | | 74.00 | | Vertical |
| 4880.00 | 48.54 | 31.85 | 8.66 | 32.12 | 56.93 | 74 | -17.07 | Horizontal |
| 7425.00 | 29.89 | 36.37 | 11.72 | 31.89 | 46.09 | 74 | -27.91 | Horizontal |
| 9900.00 | 29.62 | 38.35 | 14.25 | 31.59 | 50.63 | 74 | -23.37 | Horizontal |
| 12200.00 | * | | | | | 74.00 | | Horizontal |
| 14640.00 | * | | | | | 74.00 | | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 4880.00 | 38.70 | 31.85 | 8.66 | 32.12 | 47.09 | 54 | -6.91 | Vertical |
| 7320.00 | 19.30 | 36.37 | 11.72 | 31.89 | 35.50 | 54 | -18.50 | Vertical |
| 9760.00 | 19.09 | 38.35 | 14.25 | 31.59 | 40.10 | 54 | -13.90 | Vertical |
| 12200.00 | * | | | | | 54.00 | | Vertical |
| 14640.00 | * | | | | | 54.00 | | Vertical |
| 4880.00 | 40.95 | 31.85 | 8.66 | 32.12 | 49.34 | 54 | -4.66 | Horizontal |
| 7320.00 | 20.28 | 36.37 | 11.72 | 31.89 | 36.48 | 54 | -17.52 | Horizontal |
| 9760.00 | 18.37 | 38.35 | 14.25 | 31.59 | 39.38 | 54 | -14.62 | Horizontal |
| 12200.00 | * | | | | | 54.00 | | Horizontal |
| 14640.00 | * | | | | | 54.00 | | Horizontal |

*Remark:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

| Test channel: | Highest |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 4950.00 | 50.23 | 31.91 | 8.71 | 32.16 | 58.69 | 74 | -15.31 | Vertical |
| 7425.00 | 29.20 | 36.56 | 11.79 | 31.8 | 45.75 | 74 | -28.25 | Vertical |
| 9900.00 | 28.37 | 38.81 | 14.35 | 31.85 | 49.68 | 74 | -24.32 | Vertical |
| 12375.00 | * | | | | | 74.00 | | Vertical |
| 14850.00 | * | | | | | 74.00 | | Vertical |
| 4950.00 | 49.23 | 31.91 | 8.71 | 32.16 | 57.69 | 74 | -16.31 | Horizontal |
| 7425.00 | 28.74 | 36.56 | 11.79 | 31.8 | 45.29 | 74 | -28.71 | Horizontal |
| 9900.00 | 28.09 | 38.81 | 14.35 | 31.85 | 49.40 | 74 | -24.60 | Horizontal |
| 12375.00 | * | | | | | 74.00 | | Horizontal |
| 14850.00 | * | | | | | 74.00 | | Horizontal |

**Average value:**

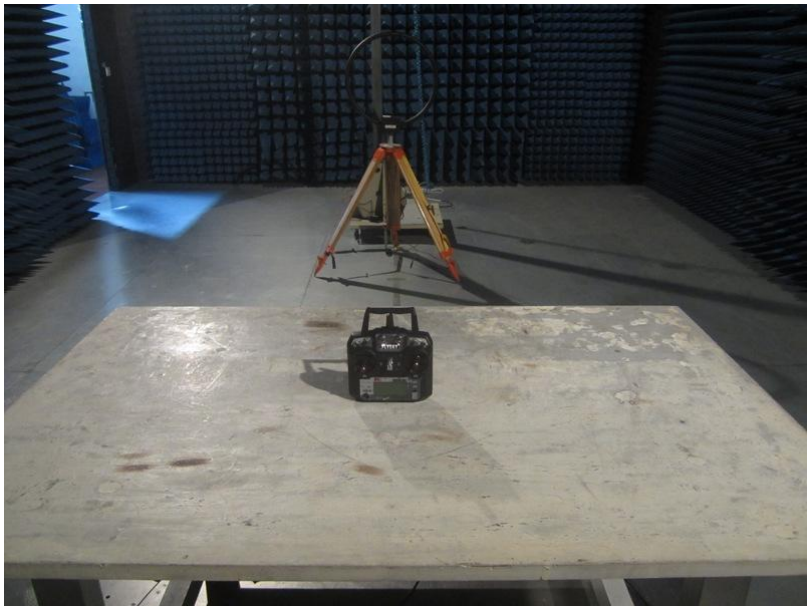
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 4950.00 | 39.93 | 31.91 | 8.71 | 32.16 | 48.39 | 54 | -5.61 | Vertical |
| 7425.00 | 20.16 | 36.56 | 11.79 | 31.8 | 36.71 | 54 | -17.29 | Vertical |
| 9900.00 | 18.80 | 38.81 | 14.35 | 31.85 | 40.11 | 54 | -13.89 | Vertical |
| 12375.00 | * | | | | | 54.00 | | Vertical |
| 14850.00 | * | | | | | 54.00 | | Vertical |
| 4950.00 | 38.91 | 31.91 | 8.71 | 32.16 | 47.37 | 54 | -6.63 | Horizontal |
| 7425.00 | 20.07 | 36.56 | 11.79 | 31.8 | 36.62 | 54 | -17.38 | Horizontal |
| 9900.00 | 17.76 | 38.81 | 14.35 | 31.85 | 39.07 | 54 | -14.93 | Horizontal |
| 12375.00 | * | | | | | 54.00 | | Horizontal |
| 14850.00 | * | | | | | 54.00 | | Horizontal |

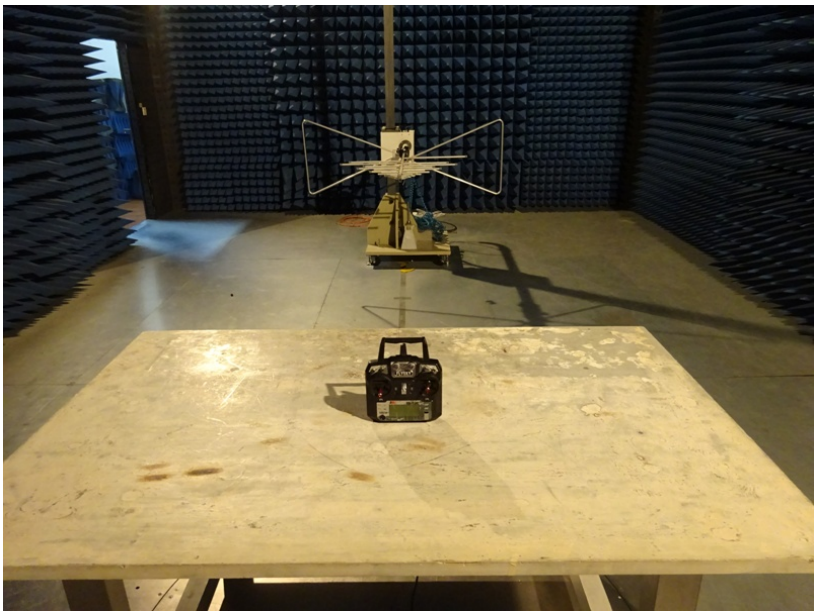
*Remark:*

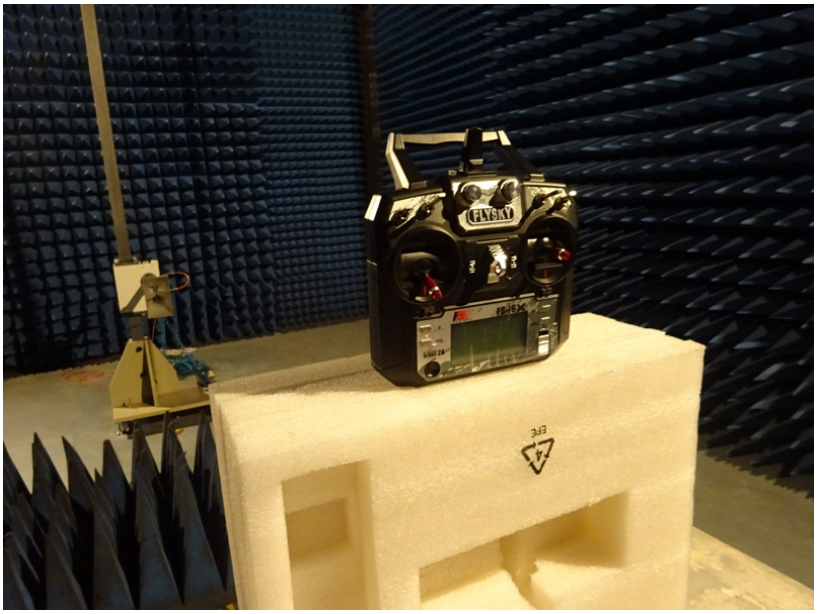
1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

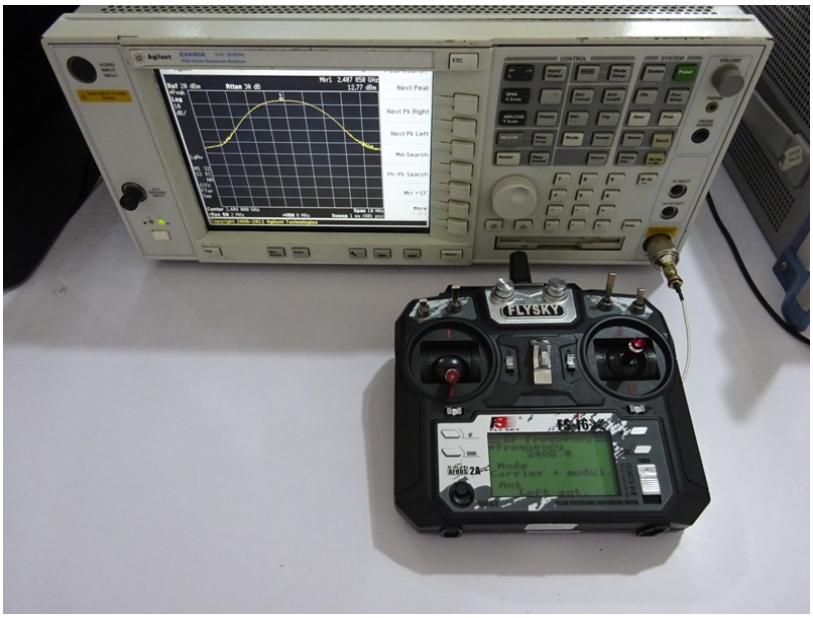
# 7 Test Setup Photo

Radiated Emission

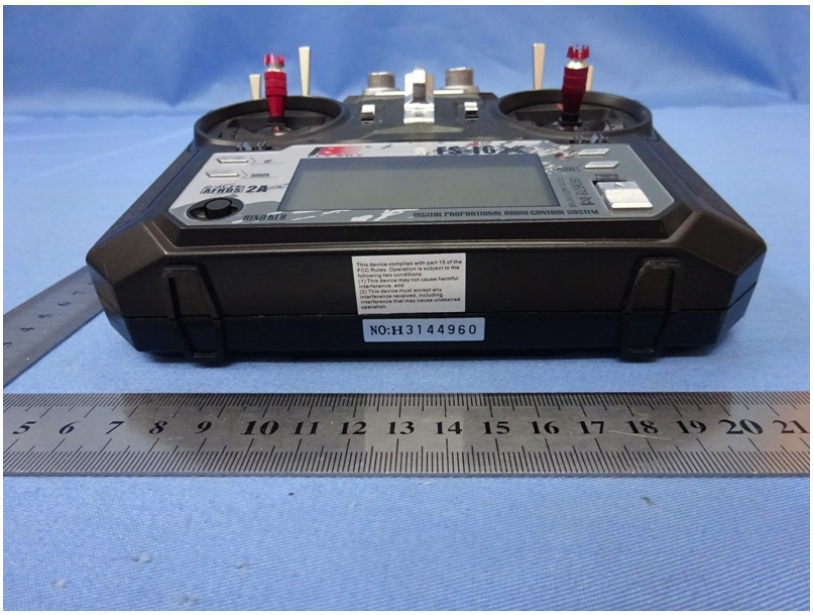


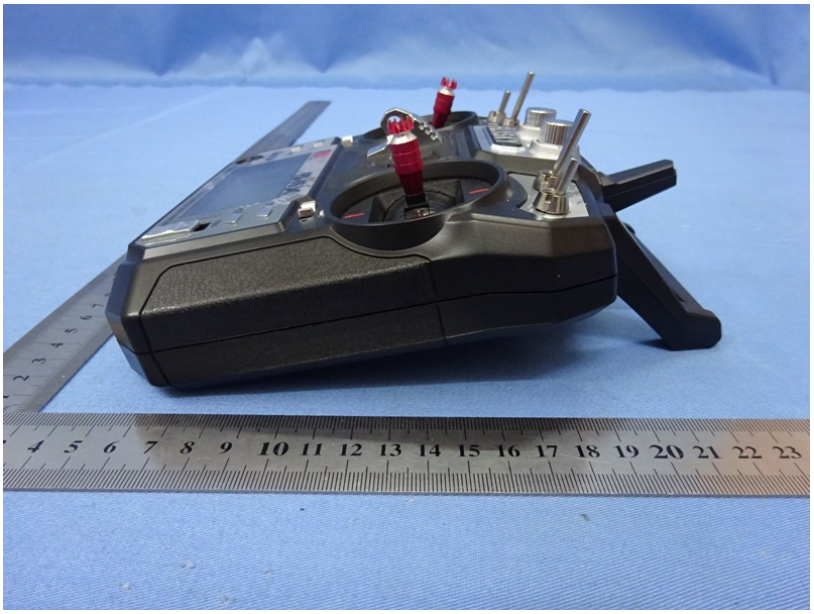


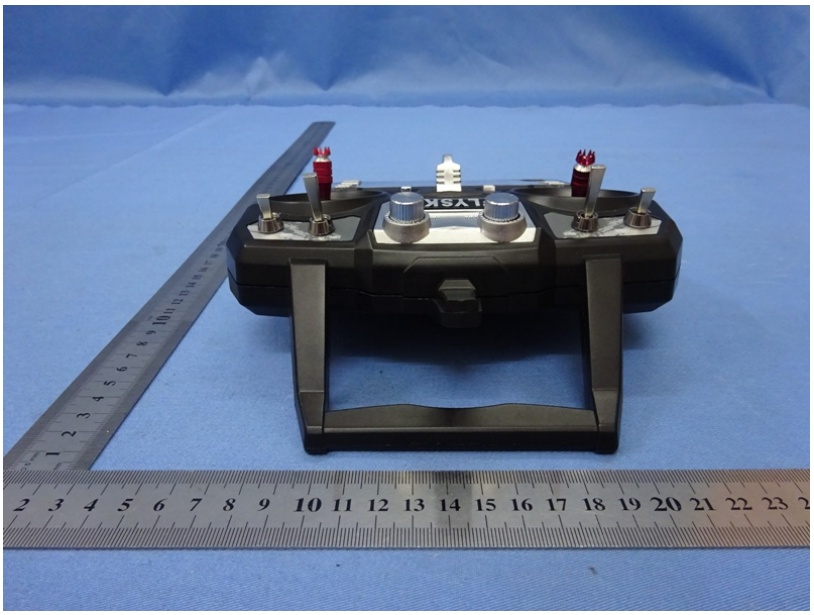

FLYSKY

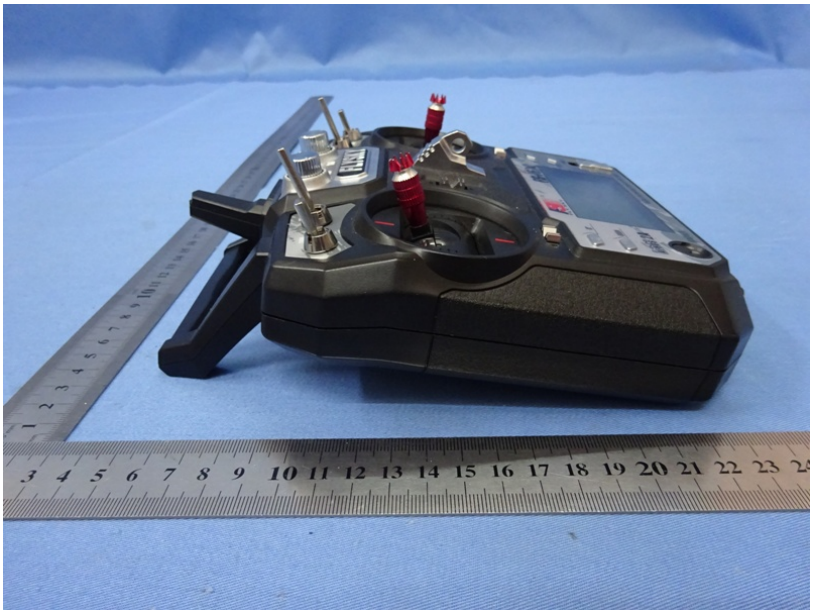

FLYSKY

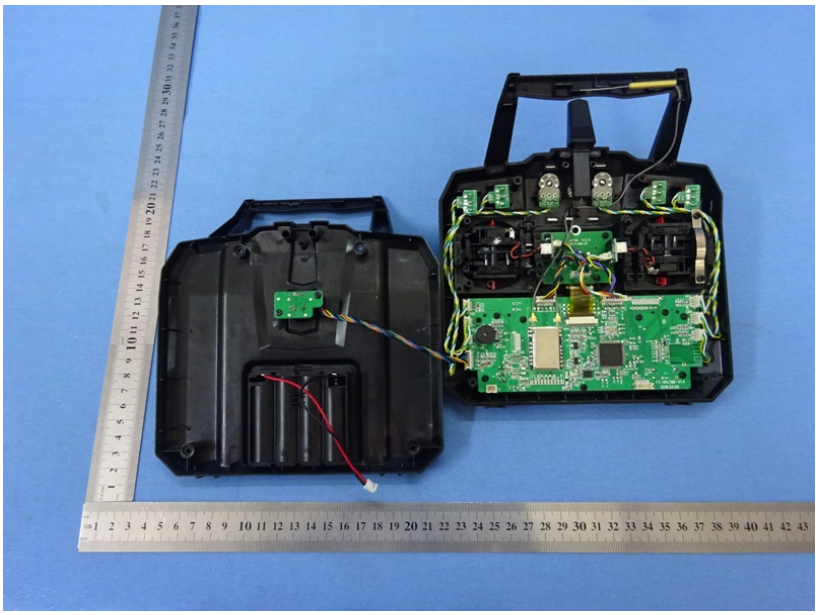
# 8 EUT Constructional Details

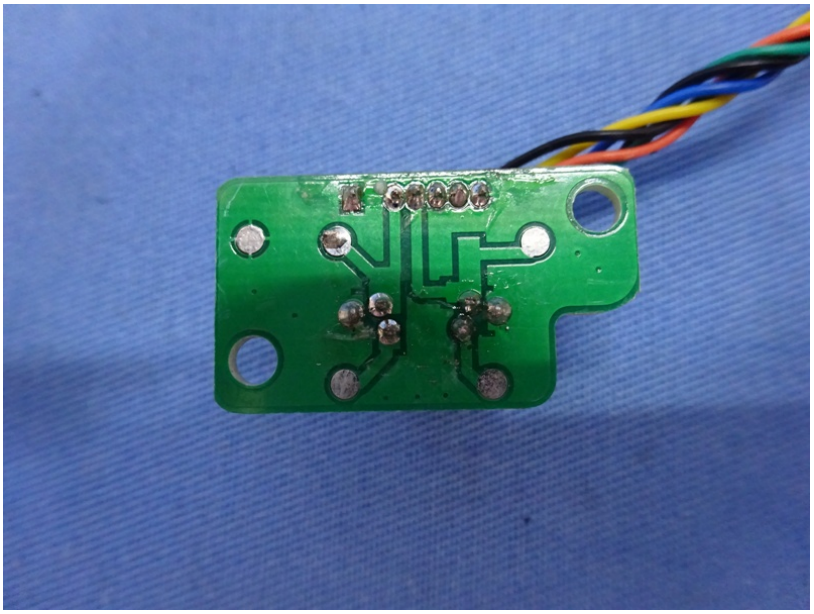


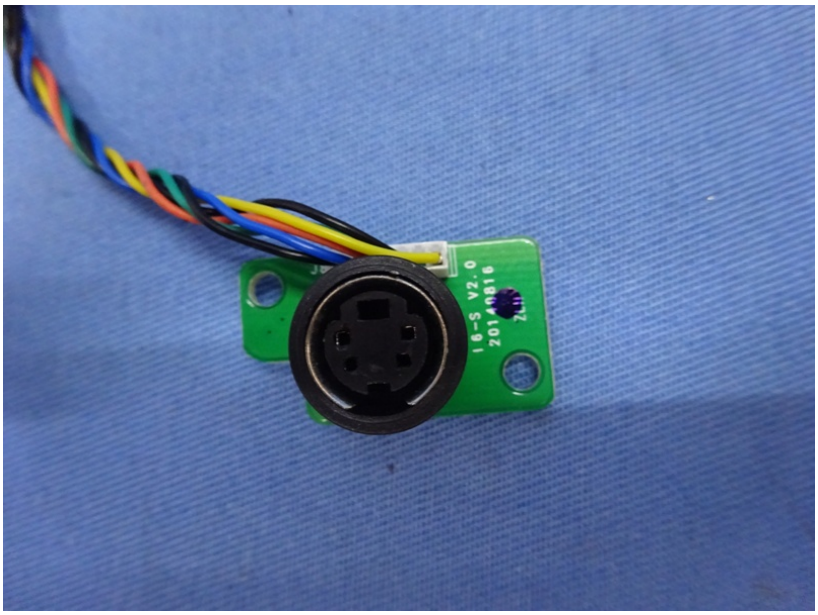








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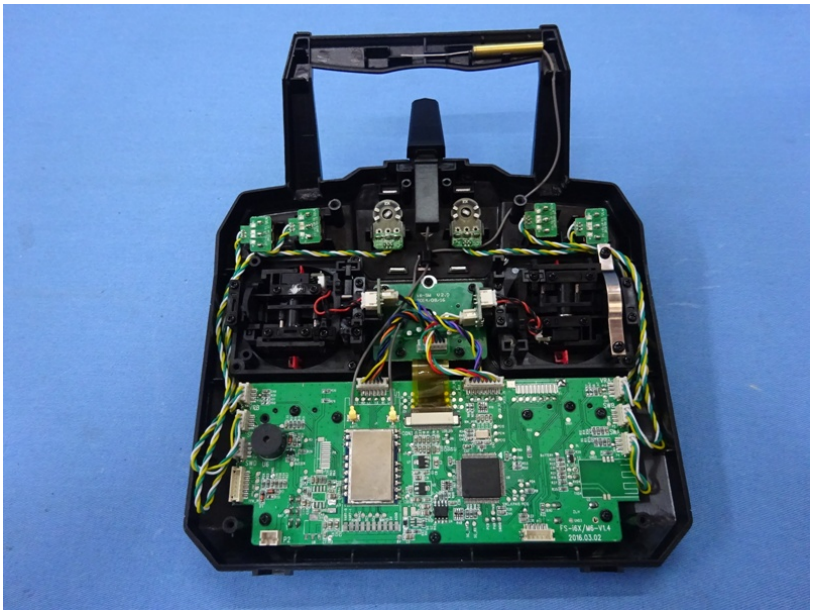

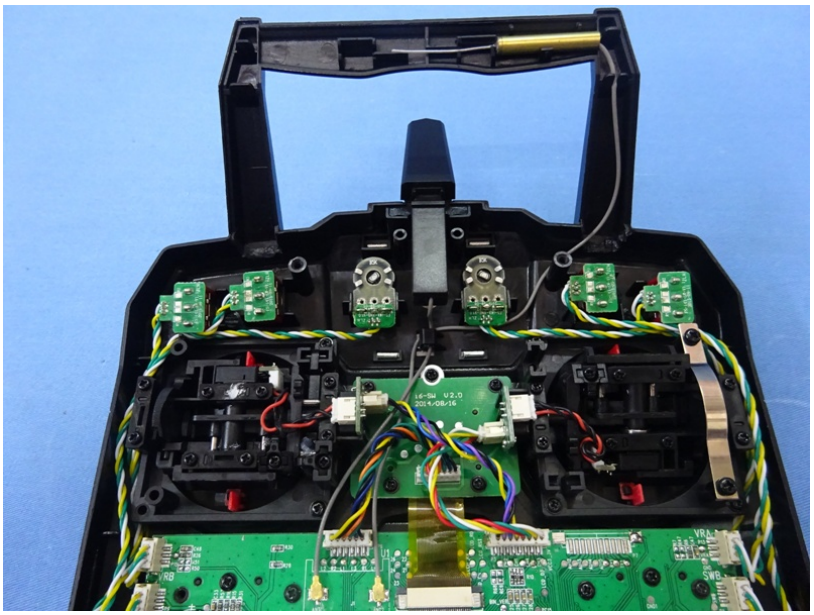

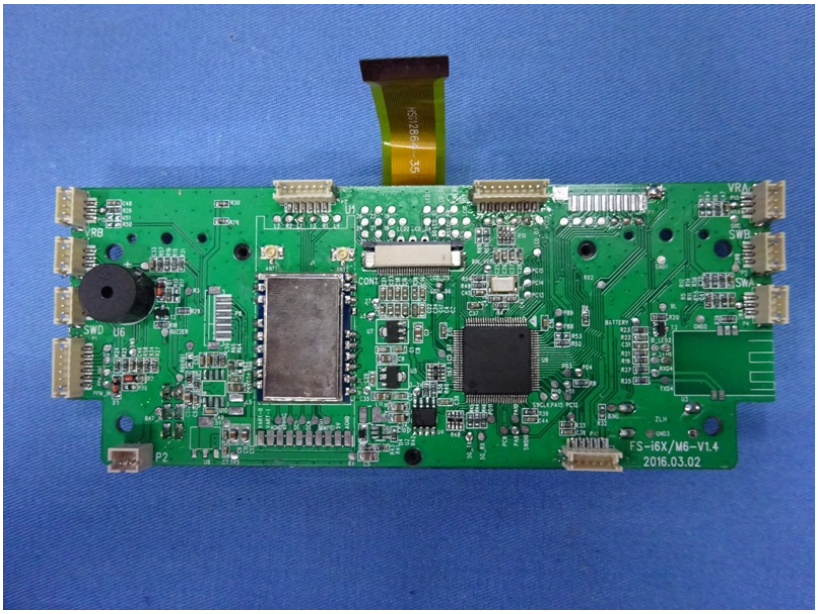
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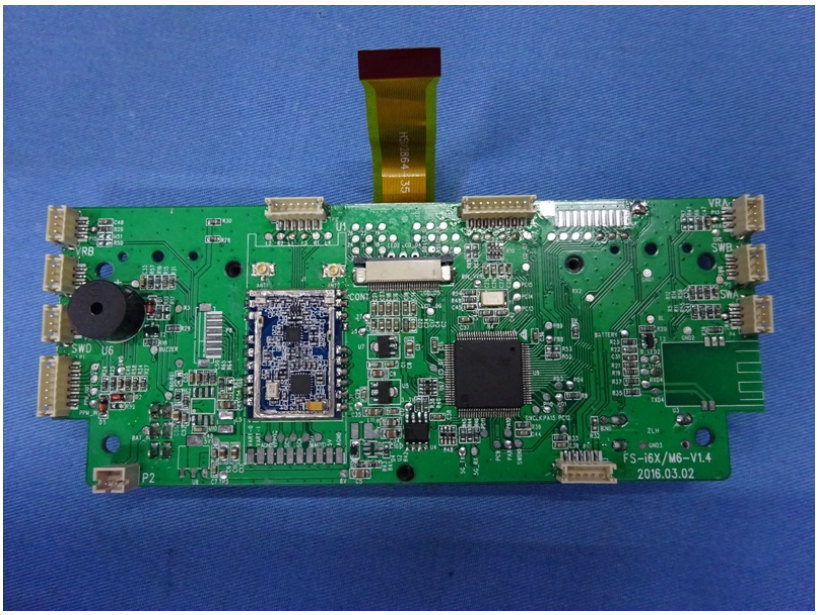
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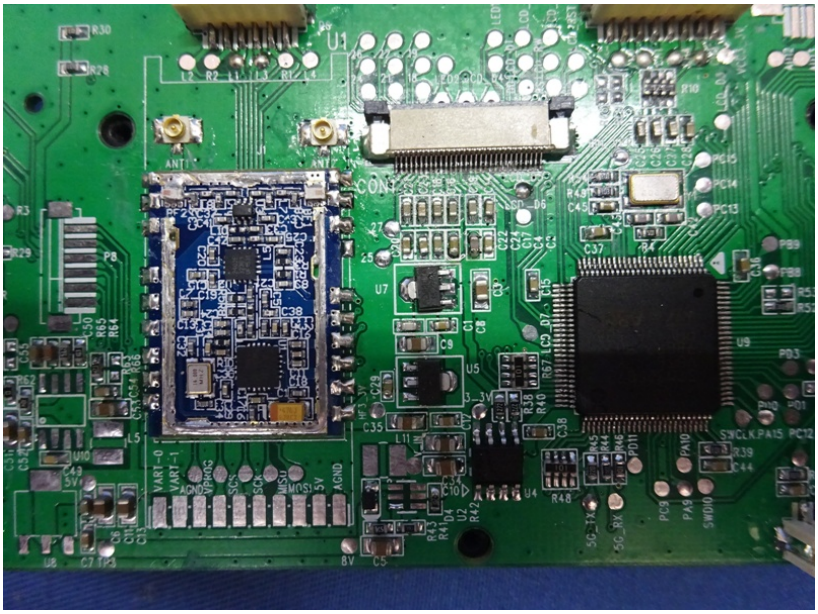

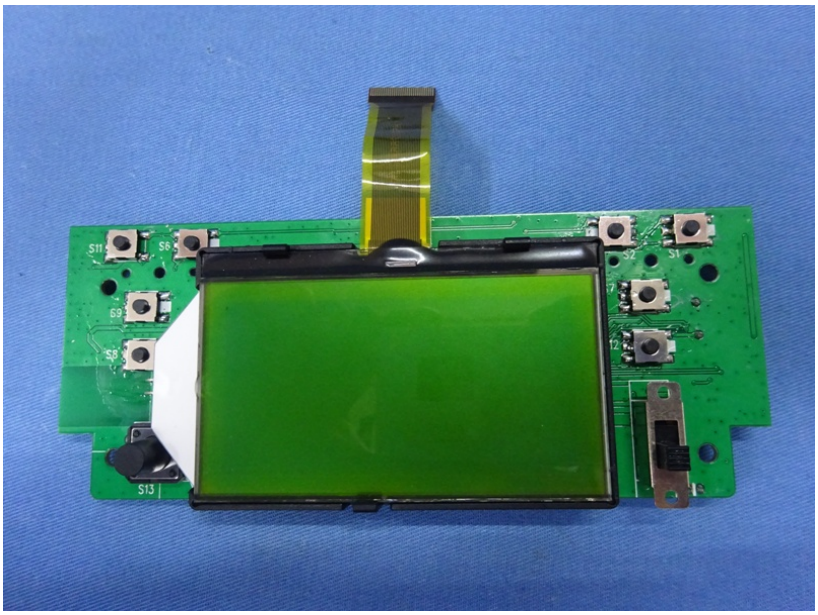

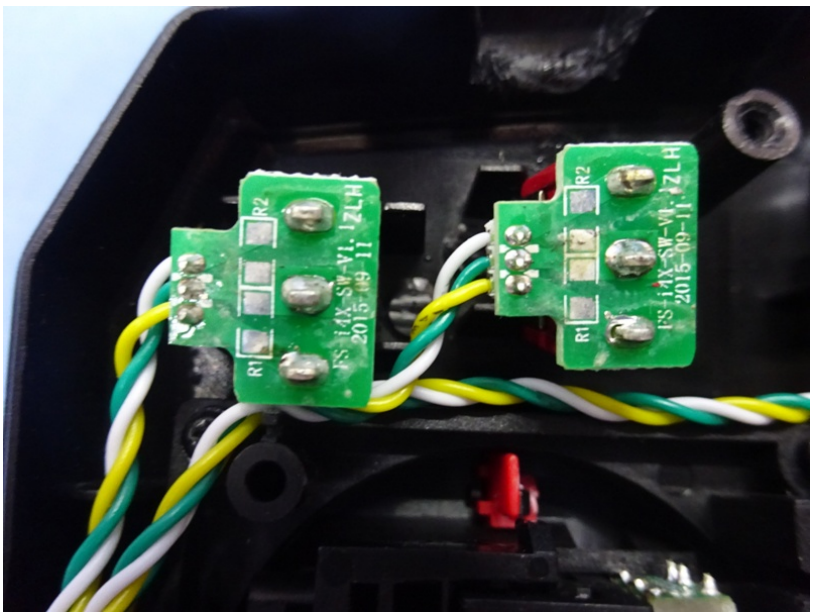
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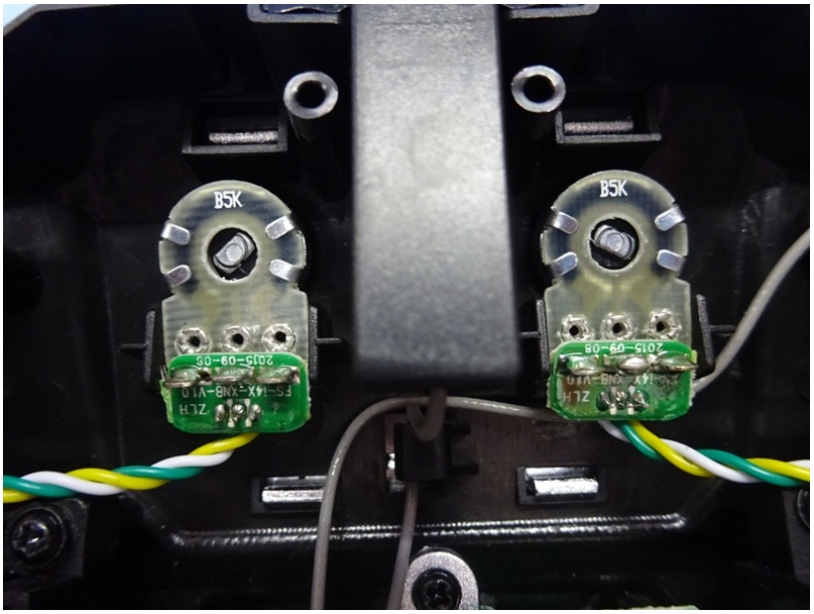
R2
R1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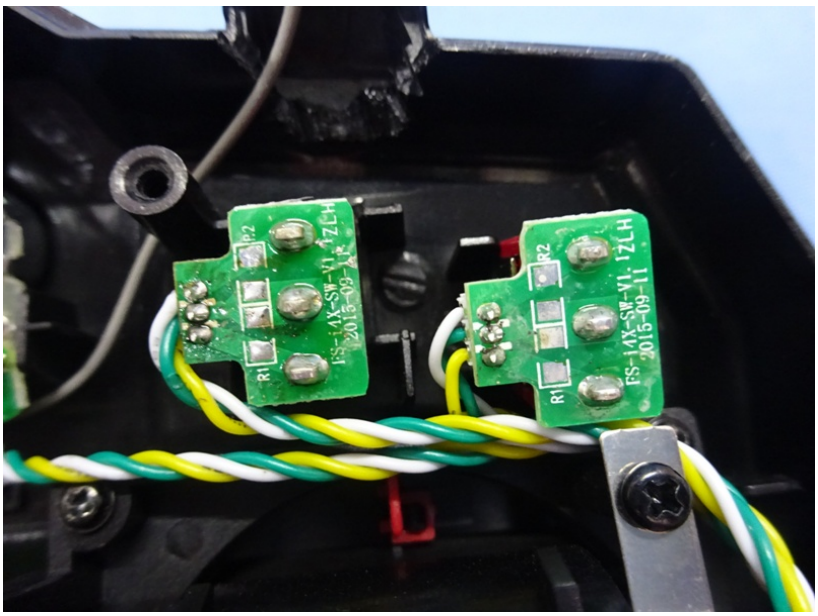
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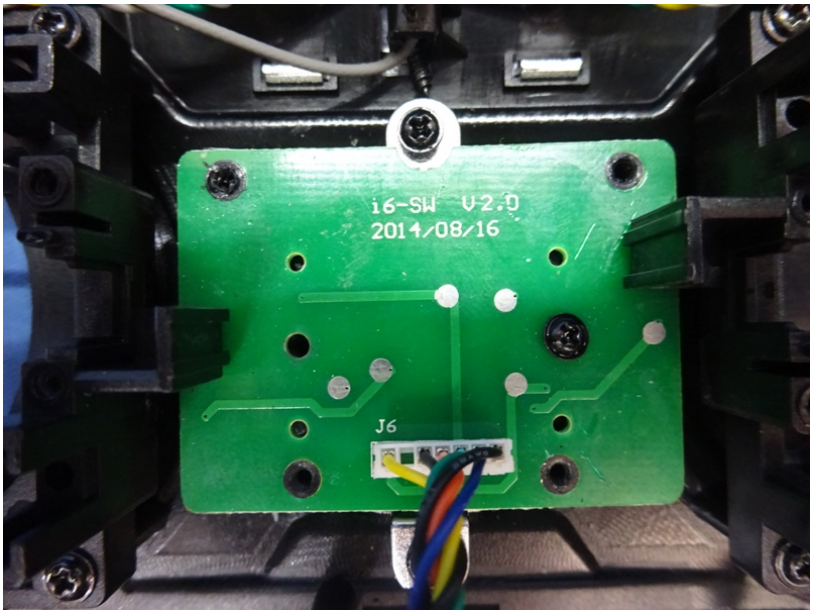
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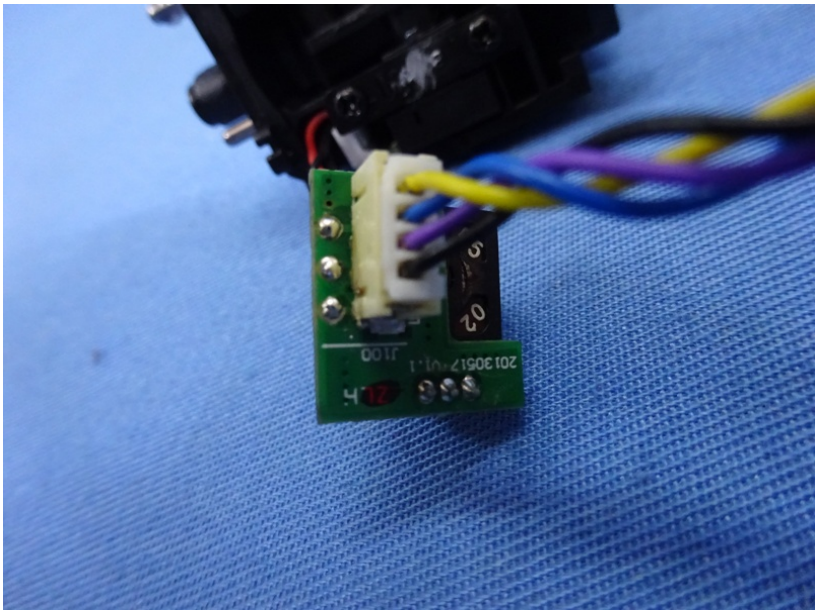

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