FCC RF Test Report

(2.4G Wi-Fi)

Report No.:	JYTSZ-R12-2200265
Applicant:	Airbits AB
Address of Applicant:	c/o Box 3686, Regeringsgatan 65, 103 59 Stockholm, Sweden
Equipment Under Test (EUT)	
Product Name:	Wingbits GeoSigner Dongle
Model No.:	GeoSigner
Trade Mark:	Wingbits
FCC ID:	2BKJ9-GEOSIGNER
Applicable Standards:	FCC CFR Title 47 Part 15C (§15.247)
Date of Sample Receipt:	26 Dec., 2024
Date of Test:	27 Dec., 2024 to 02 Jan., 2025
Date of Report Issued:	24 Jan., 2025
Test Result:	PASS

Project by:	Lyrac Ding ***Project Engineer***	***Date:***	*24 Jan., 2025*
Reviewed by:	Victor Zhou ***Senior Engineer***	***Date:***	*24 Jan., 2025*
Approved by:	Janet Wei ***Manager***	***Date:***	*24 Jan., 2025*

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

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1 Version

Version No.	Date	Description
00	*03 Jan., 2025*	*Original*
01	*24 Jan., 2025*	*Updated pages 6, 7 and page 27.*

2 Contents

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3 General Information

3.1 Client Information

Applicant:	Airbits AB
Address:	c/o Box 3686, Regeringsgatan 65, 103 59 Stockholm, Sweden
Manufacturer:	Airbits AB
Address:	c/o Box 3686, Regeringsgatan 65, 103 59 Stockholm, Sweden
Factory:	Airbits AB
Address:	c/o Box 3686, Regeringsgatan 65, 103 59 Stockholm, Sweden

3.2 General Description of E.U.T.

Product Name:	Wingbits GeoSigner Dongle
Model No.:	GeoSigner
Operation Frequency:	2412 MHz - 2462 MHz (802.11b, g, n-HT20)
	2422 MHz - 2452 MHz (802.11n-HT40)
Channel Numbers:	11 (802.11b, g, n-HT20)
	7 (802.11n-HT40)
Channel Separation:	5MHz
Modulation Technology: (IEEE 802.11b)	DSSS-DBPSK, DQPSK, CCK
Modulation Technology: (IEEE 802.11g/802.11n)	OFDM-BPSK, QPSK, 16QAM, 64QAM
Antenna Type:	PCB Antenna
Antenna Gain:	3.96 dBi (declare by applicant)
Antenna Transmit Mode:	SISO (1TX, 1RX)
Power Supply:	Input: 5.0V 0.5A (USB of computer or PS1 external adapter)
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

3.3 Test Mode and Environment

Test Mode:	
Transmitting mode:	Keep the EUT in continuous transmitting with modulation

Per-scan all kind of data rate, the follow list were the worst case:

Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n-HT20	6.5Mbps
802.11n-HT40	13.5Mbps

Remark:

1. *For AC power line conducted emission and radiated spurious emission (below 1GHz), pre-scan 802.11b, g, n modulation mode, found 802.11b modulation mode was worse case mode. The report only reflects the test data of worst mode.*
2. *Channel Low, Mid and High for each type band with rated data rate were chosen for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for these modes. Just the worst case position (H mode) shown in report.*

Operating Environment:	
Temperature:	15℃ ~ 35℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 3.70Vdc, Extreme: Low 3.50Vdc, High 4.20Vdc
Test Engineer:	Real Chen(Radiated measurement)

3.4 Description of Test Auxiliary Equipment

The EUT has been tested as an independent unit.

3.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 150kHz)	±3.0 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.4 dB
Radiated Emission (30MHz ~ 200MHz) (3m SAC)	±4.6 dB
Radiated Emission (200MHz ~ 1000MHz) (3m SAC)	±5.8 dB
Radiated Emission (30MHz ~ 1GHz) (3m FAR)	3.39 dB
Radiated Emission (1GHz ~ 18GHz) (3m FAR)	5.15 dB
Radiated Emission (18GHz ~ 40GHz) (3m FAR)	5.30 dB

Note: *All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.*

3.6 Additions to, Deviations, or Exclusions from the Method

No

3.7 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

3.9 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2026
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	01-09-2024	01-08-2025
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	01-05-2024	01-04-2025
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	12-16-2024	12-15-2025
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	12-16-2024	12-15-2025
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	12-16-2024	12-15-2025
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	12-16-2024	12-15-2025
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-17-2024	01-16-2025
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	01-17-2024	01-16-2025
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

Radiated Emission(3m FAR):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m FAR	YUNYI	9m*6m*6m	WXJ097	06-15-2023	06-14-2028
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ097-2	07-01-2024	06-30-2025
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	07-01-2024	06-30-2027
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ097-3	06-16-2024	06-15-2025
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	12-25-2024	12-24-2025
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-5	12-25-2024	12-24-2025
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-6	12-25-2024	12-24-2025
Pre-amplifier (30MHz ~ 1GHz)	YUNYI	PAM-310N	WXJ097-5	04-24-2024	04-23-2025
Pre-amplifier (1GHz ~ 18GHz)	YUNYI	PAM-118N	WXJ097-6	04-24-2024	04-23-2025
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXJ002-7	12-25-2024	12-24-2025
EMI Test Receiver	Rohde & Schwarz	ESCI3	WXJ003	12-16-2024	12-15-2025
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	12-16-2024	12-15-2025
Spectrum Analyzer	KEYSIGHT	N9020B	WXJ081-1	06-11-2024	06-10-2025
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-13M	WXG097-1	07-30-2024	07-29-2025
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG097-2	07-30-2024	07-29-2025
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG097-3	07-30-2024	07-29-2025
High Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Low Band Reject Filter Group	Tonscend	JS0806-F	WXJ097-4	N/A	
Test Software	Tonscend	TS+	Version: 5.0.0		

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESR3	WXJ003-2	06-11-2024	06-10-2025
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	12-17-2024	12-16-2025
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	12-17-2024	12-16-2025
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	01-17-2024	01-16-2025
RF Switch	TOP PRECISION	RSU0301	WXG003	N/A	
Test Software	AUDIX	E3	Version: 6.110919b		

4 Measurement Setup and Procedure

4.1 Test Channel

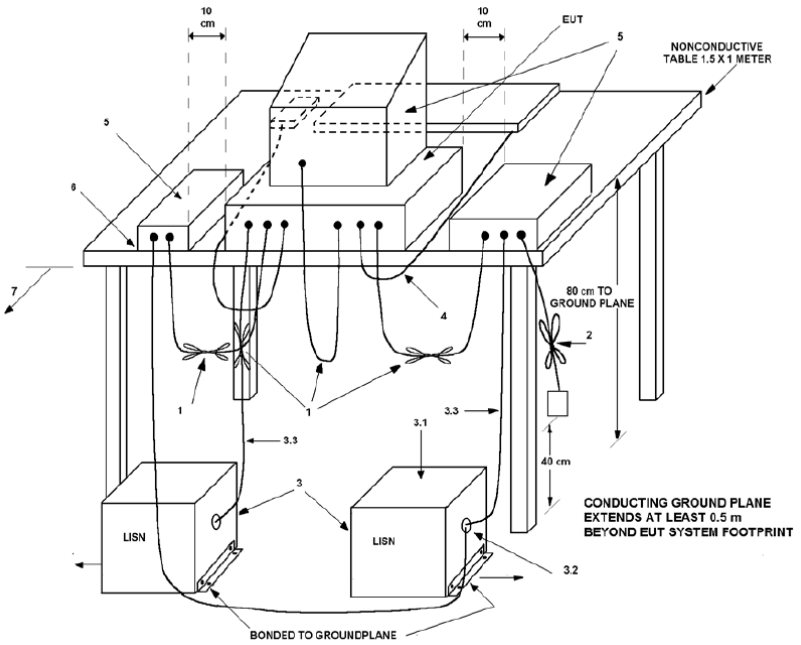
According to ANSI C63.10-2013 chapter 5.6.1 Table 4 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:

802.11b, 802.11g, 802.11n-HT20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	6	2437	11	2462

802.11n-HT40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
3	2422	6	2437	9	2452

4.2 Test Setup

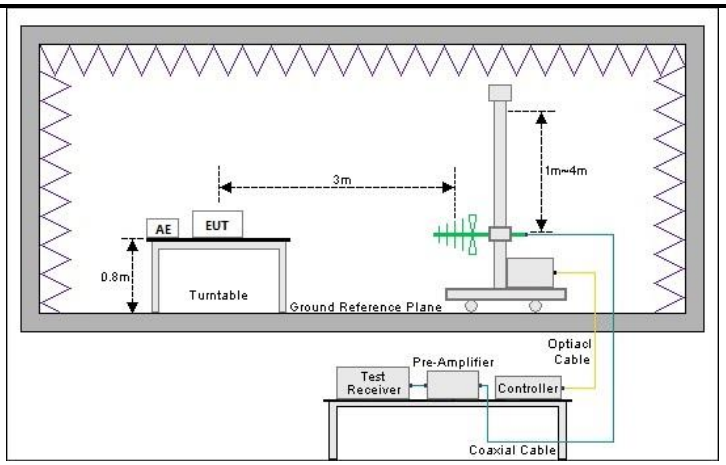
1) Conducted emission measurement:



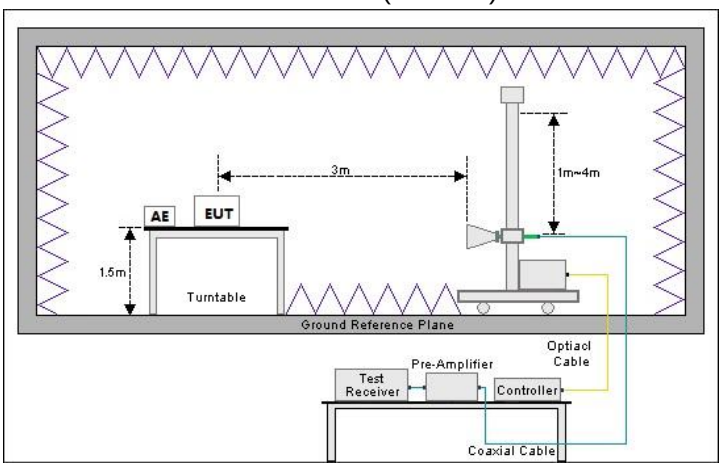
Note: The detailed descriptions please refer to Figure 8 of ANSI C63.4:2014.

2) Radiated emission measurement:

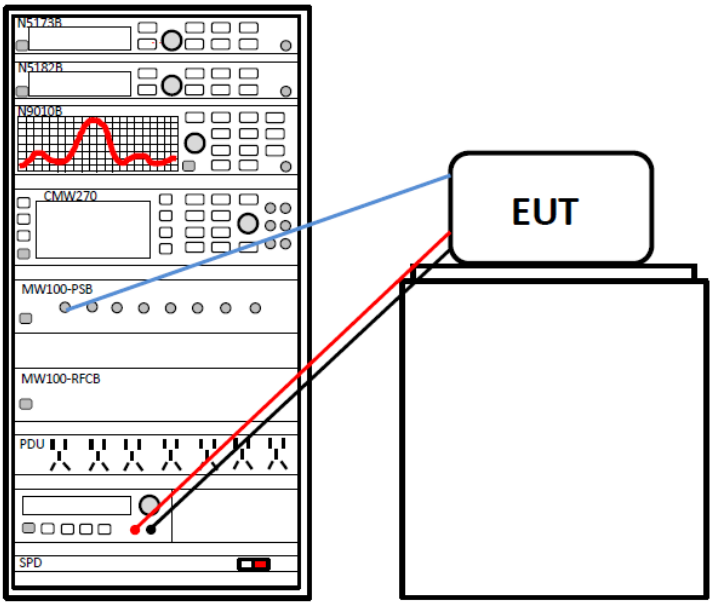
Below 1GHz (3m SAC)



Above 1GHz (3m FAR)



3) Conducted test method



4.3 Test Procedure

Test method	Test step
Conducted emission	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Radiated emission	**For below 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. **For above 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method	1. The Wi-Fi antenna port of EUT was connected to the test port of the test system through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software.

5 Test Results

5.1 Summary

5.1.1 Clause and Data Summary

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203 15.247 (b)(4)	See Section 5.2	Pass
AC Power Line Conducted Emission	15.207	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2
Duty Cycle	ANSI C63.10-2013	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2
Conducted Output Power	15.247 (b)(3)	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2
Power Spectral Density	15.247 (e)	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2
Band-edge Emission Conduction Spurious Emission	15.247 (d)	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2	Please refer to FCC ID:2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2
Emissions in Restricted Frequency Bands	15.205 15.247 (d)	See Section 5.3	Pass
Emissions in Non-restricted Frequency Bands	15.209 15.247(d)	See Section 5.4	Pass

Remark:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*
4. *Please refer to FCC ID: 2AC7Z-ESPC3MINI1, report No.: R2103A0270-R1V2 is issued by TA Technology (Shanghai) co., Ltd.*

Test Method:	*ANSI C63.10-2013* *KDB 558074 D01 15.247 Meas Guidance v05r02*

5.1.2 Test Limit

<table>
<tr><th>Test items</th><th>Limit</th></tr>
<tr><td>AC Power Line Conducted Emission</td><td>
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV)</th></tr>
<tr><th>Quasi-Peak</th><th>Average</th></tr>
<tr><td>0.15 – 0.5</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr>
<tr><td>0.5 – 5</td><td>56</td><td>46</td></tr>
<tr><td>5 – 30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">Note 1: The limit level in dBµV decreases linearly with the logarithm of frequency.
Note 2: The more stringent limit applies at transition frequencies.</td></tr>
</table>
</td></tr>
<tr><td>Conducted Output Power</td><td>For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.</td></tr>
<tr><td>6dB Emission Bandwidth</td><td>The minimum 6 dB bandwidth shall be at least 500 kHz.</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>N/A</td></tr>
<tr><td>Power Spectral Density</td><td>For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.</td></tr>
<tr><td>Band-edge Emission

Conduction Spurious Emission</td><td>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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).</td></tr>
<tr><td>Emissions in Restricted Frequency Bands

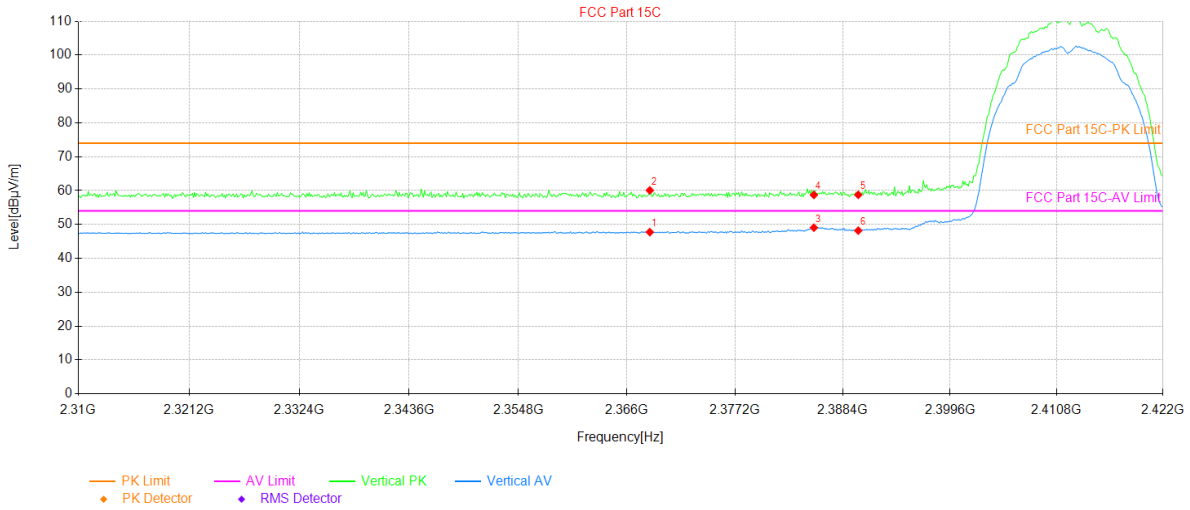
Emissions in Non-restricted Frequency Bands</td><td>
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV/m)</th><th rowspan="2">Detector</th></tr>
<tr><th>@ 3m</th><th>@ 10m</th></tr>
<tr><td>30 – 88</td><td>40.0</td><td>30.0</td><td>Quasi-peak</td></tr>
<tr><td>88 – 216</td><td>43.5</td><td>33.5</td><td>Quasi-peak</td></tr>
<tr><td>216 – 960</td><td>46.0</td><td>36.0</td><td>Quasi-peak</td></tr>
<tr><td>960 – 1000</td><td>54.0</td><td>44.0</td><td>Quasi-peak</td></tr>
<tr><td colspan="4">Note: The more stringent limit applies at transition frequencies.</td></tr>
<tr><th rowspan="2">Frequency</th><th colspan="3">Limit (dBµV/m) @ 3m</th></tr>
<tr><th>Average</th><th colspan="2">Peake</th></tr>
<tr><td>Above 1 GHz</td><td colspan="2">54.0</td><td>74.0</td></tr>
<tr><td colspan="4">Note: The measurement bandwidth shall be 1 MHz or greater.</td></tr>
</table>
</td></tr>
</table>

5.2 Antenna Requirement

Standard Requirement:	FCC Part 15 C Section 15.203/15.247 (b)(4)
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 (b)(4) requirement:** The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The Wi-Fi antenna is a PCB antenna which cannot replace by end-user, the best case gain of the antenna is 3.96 dBi. See product internal photos for details.	

5.3 Emissions in Restricted Frequency Bands spot test

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11b Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	DC 5V		



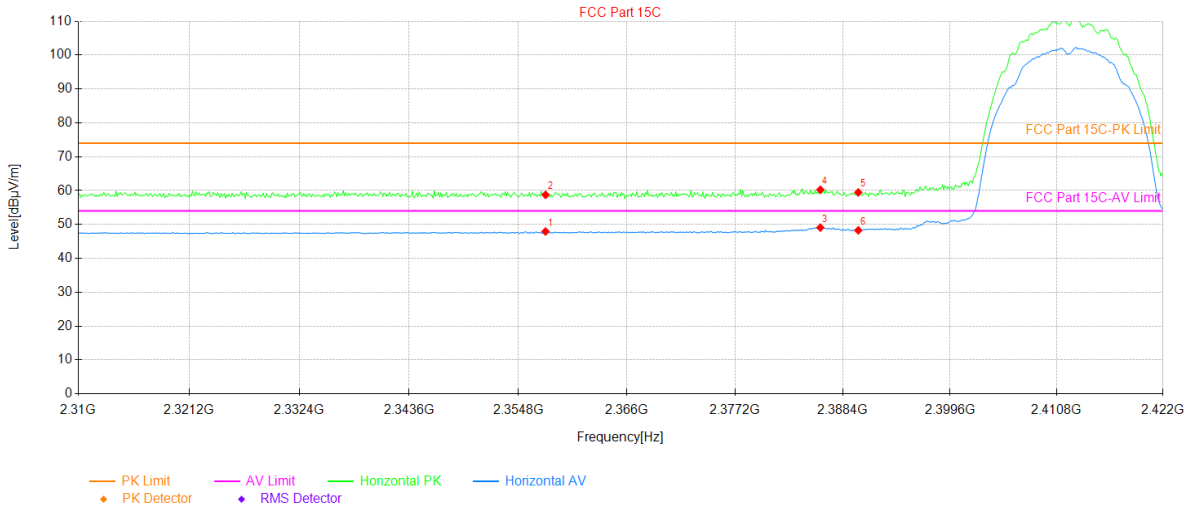
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2368.35	11.38	36.37	47.75	54.00	6.25	91	AV	PASS	Vertical
2	2368.35	23.70	36.37	60.07	74.00	13.93	252	PK	PASS	Vertical
3	2385.38	12.61	36.45	49.06	54.00	4.94	94	AV	PASS	Vertical
4	2385.38	22.28	36.45	58.73	74.00	15.27	113	PK	PASS	Vertical
5	2390.00	22.28	36.47	58.75	74.00	15.25	79	PK	PASS	Vertical
6	2390.00	11.72	36.47	48.19	54.00	5.81	91	AV	PASS	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11b Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	DC 5V		



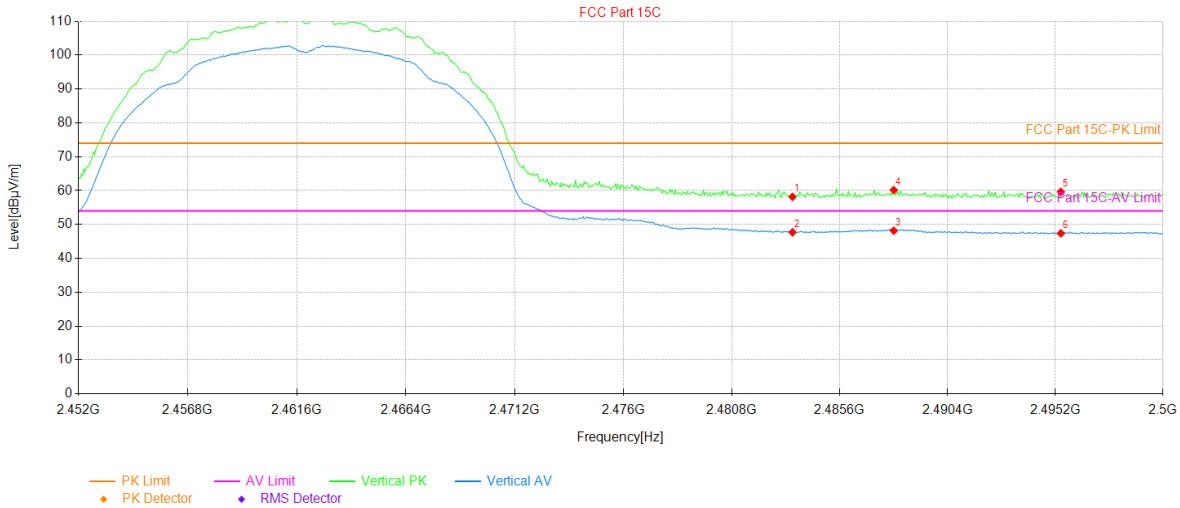
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2357.60	11.61	36.31	47.92	54.00	6.08	152	AV	PASS	Horizont
2	2357.60	22.44	36.31	58.75	74.00	15.25	0	PK	PASS	Horizont
3	2386.05	12.63	36.45	49.08	54.00	4.92	156	AV	PASS	Horizont
4	2386.05	23.81	36.45	60.26	74.00	13.74	235	PK	PASS	Horizont
5	2390.00	22.99	36.47	59.46	74.00	14.54	145	PK	PASS	Horizont
6	2390.00	11.81	36.47	48.28	54.00	5.72	164	AV	PASS	Horizont

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11b Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 5V		



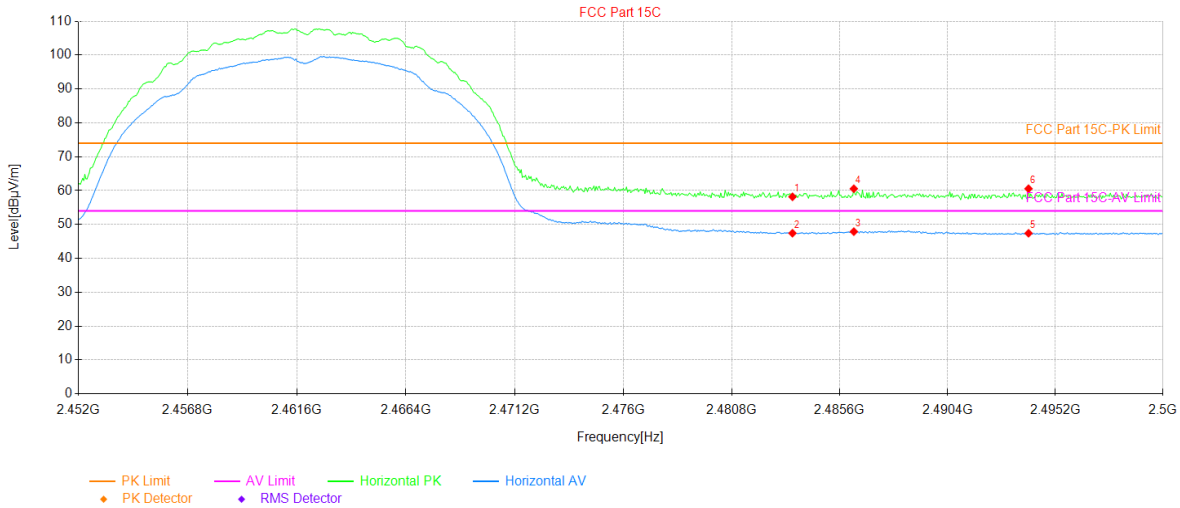
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2483.50	22.05	36.11	58.16	74.00	15.84	208	PK	PASS	Vertical
2	2483.50	11.58	36.11	47.69	54.00	6.31	204	AV	PASS	Vertical
3	2488.00	12.04	36.13	48.17	54.00	5.83	212	AV	PASS	Vertical
4	2488.00	24.02	36.13	60.15	74.00	13.85	204	PK	PASS	Vertical
5	2495.44	23.47	36.16	59.63	74.00	14.37	197	PK	PASS	Vertical
6	2495.44	11.23	36.16	47.39	54.00	6.61	204	AV	PASS	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11b Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 5V		



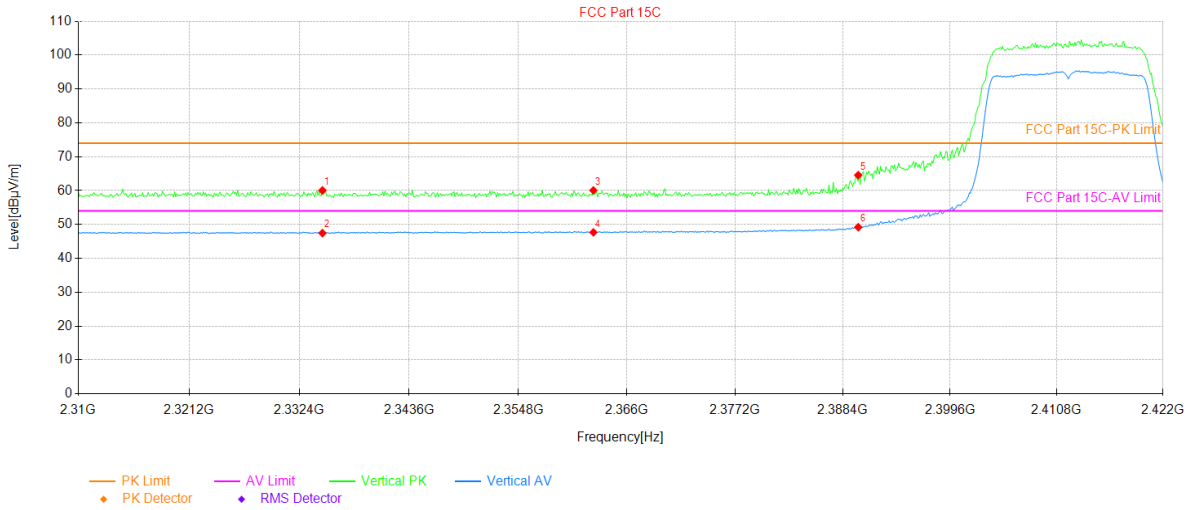
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2483.50	22.06	36.11	58.17	74.00	15.83	246	PK	PASS	Horizont
2	2483.50	11.31	36.11	47.42	54.00	6.58	64	AV	PASS	Horizont
3	2486.22	11.77	36.12	47.89	54.00	6.11	141	AV	PASS	Horizont
4	2486.22	24.43	36.12	60.55	74.00	13.45	144	PK	PASS	Horizont
5	2494.00	11.26	36.15	47.41	54.00	6.59	141	AV	PASS	Horizont
6	2494.00	24.41	36.15	60.56	74.00	13.44	141	PK	PASS	Horizont

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11g Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	DC 5V		



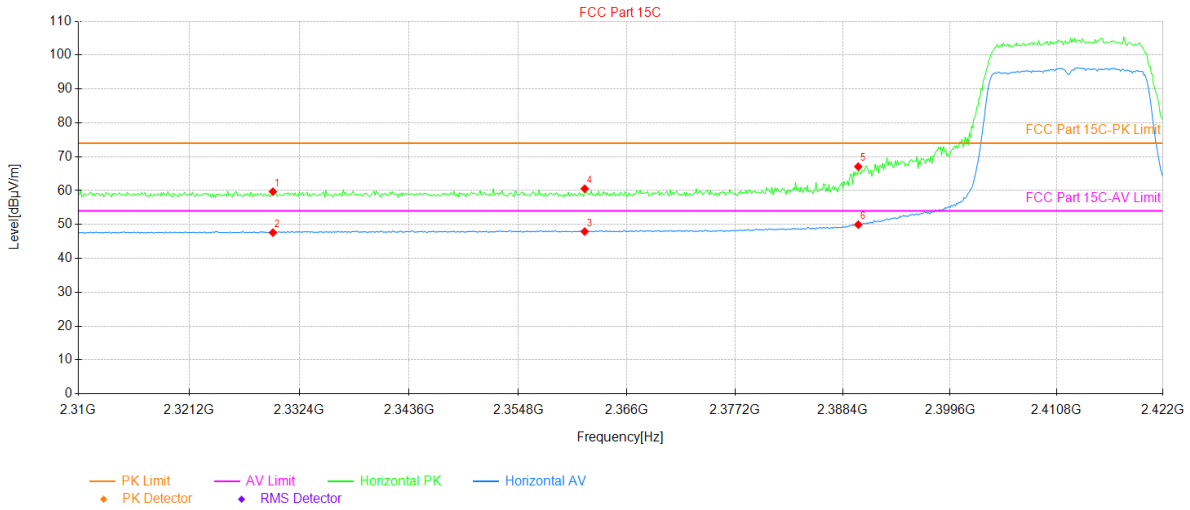
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2334.75	23.90	36.16	60.06	74.00	13.94	2	PK	PASS	Vertical
2	2334.75	11.30	36.16	47.46	54.00	6.54	251	AV	PASS	Vertical
3	2362.53	23.72	36.34	60.06	74.00	13.94	233	PK	PASS	Vertical
4	2362.53	11.33	36.34	47.67	54.00	6.33	137	AV	PASS	Vertical
5	2390.00	28.09	36.47	64.56	74.00	9.44	156	PK	PASS	Vertical
6	2390.00	12.72	36.47	49.19	54.00	4.81	156	AV	PASS	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11g Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	DC 5V		



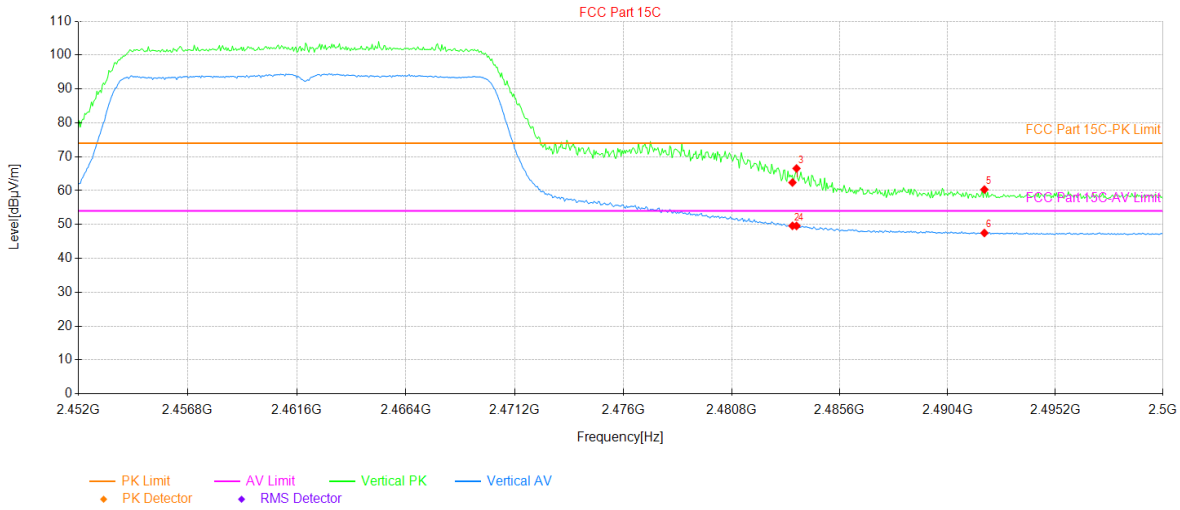
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2329.71	23.56	36.13	59.69	74.00	14.31	95	PK	PASS	Horizont
2	2329.71	11.47	36.13	47.60	54.00	6.40	174	AV	PASS	Horizont
3	2361.63	11.59	36.32	47.91	54.00	6.09	171	AV	PASS	Horizont
4	2361.63	24.23	36.32	60.55	74.00	13.45	110	PK	PASS	Horizont
5	2390.00	30.61	36.47	67.08	74.00	6.92	144	PK	PASS	Horizont
6	2390.00	13.49	36.47	49.96	54.00	4.04	140	AV	PASS	Horizont

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11g Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 5V		



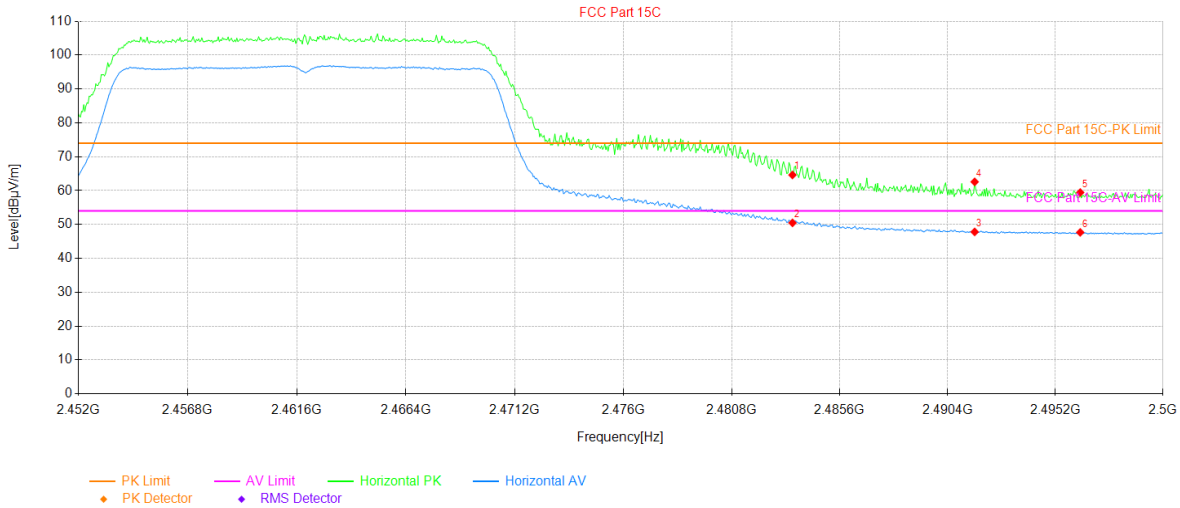
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2483.50	26.27	36.11	62.38	74.00	11.62	126	PK	PASS	Vertical
2	2483.50	13.49	36.11	49.60	54.00	4.40	130	AV	PASS	Vertical
3	2483.68	30.43	36.11	66.54	74.00	7.46	73	PK	PASS	Vertical
4	2483.68	13.46	36.11	49.57	54.00	4.43	130	AV	PASS	Vertical
5	2492.03	24.16	36.14	60.30	74.00	13.70	232	PK	PASS	Vertical
6	2492.03	11.35	36.14	47.49	54.00	6.51	130	AV	PASS	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11g Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 5V		



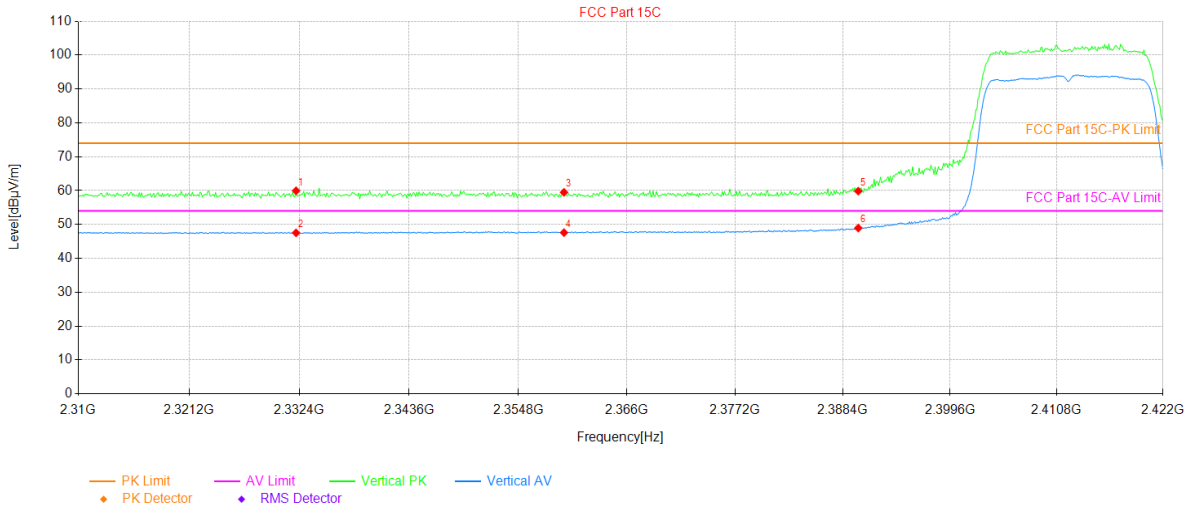
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2483.50	28.50	36.11	64.61	74.00	9.39	163	PK	PASS	Horizont
2	2483.50	14.37	36.11	50.48	54.00	3.52	156	AV	PASS	Horizont
3	2491.60	11.67	36.14	47.81	54.00	6.19	156	AV	PASS	Horizont
4	2491.60	26.45	36.14	62.59	74.00	11.41	160	PK	PASS	Horizont
5	2496.30	23.27	36.16	59.43	74.00	14.57	156	PK	PASS	Horizont
6	2496.30	11.51	36.16	47.67	54.00	6.33	156	AV	PASS	Horizont

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11n-HT20 Tx mode
Test Channel:	Lowest channel	Polarization:	Vertical
Test Voltage:	DC 5V		



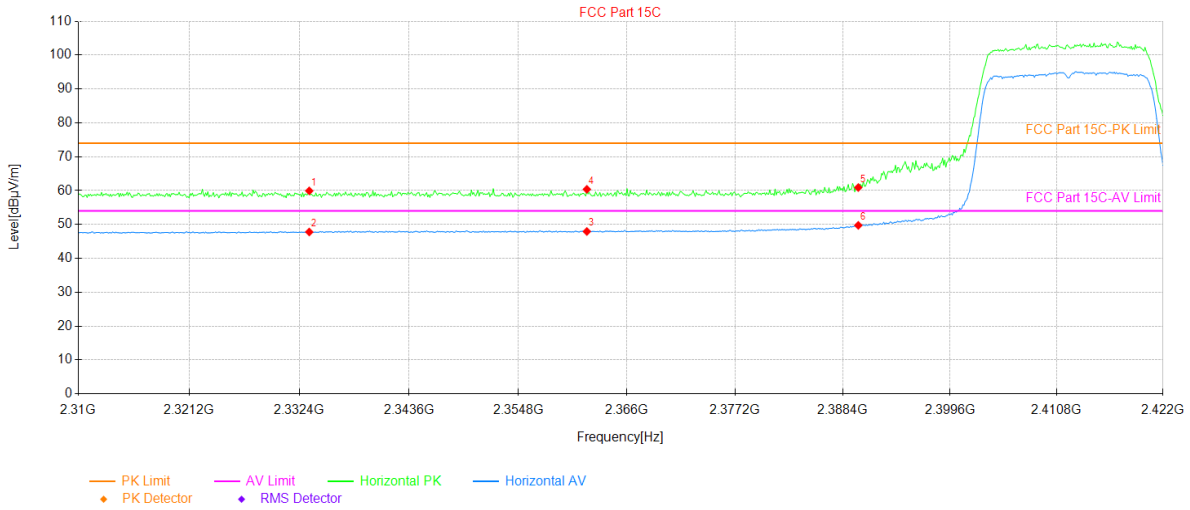
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2332.06	23.80	36.15	59.95	74.00	14.05	194	PK	PASS	Vertical
2	2332.06	11.38	36.15	47.53	54.00	6.47	265	AV	PASS	Vertical
3	2359.50	23.17	36.32	59.49	74.00	14.51	50	PK	PASS	Vertical
4	2359.50	11.28	36.32	47.60	54.00	6.40	250	AV	PASS	Vertical
5	2390.00	23.37	36.47	59.84	74.00	14.16	235	PK	PASS	Vertical
6	2390.00	12.48	36.47	48.95	54.00	5.05	137	AV	PASS	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11n-HT20 Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	DC 5V		



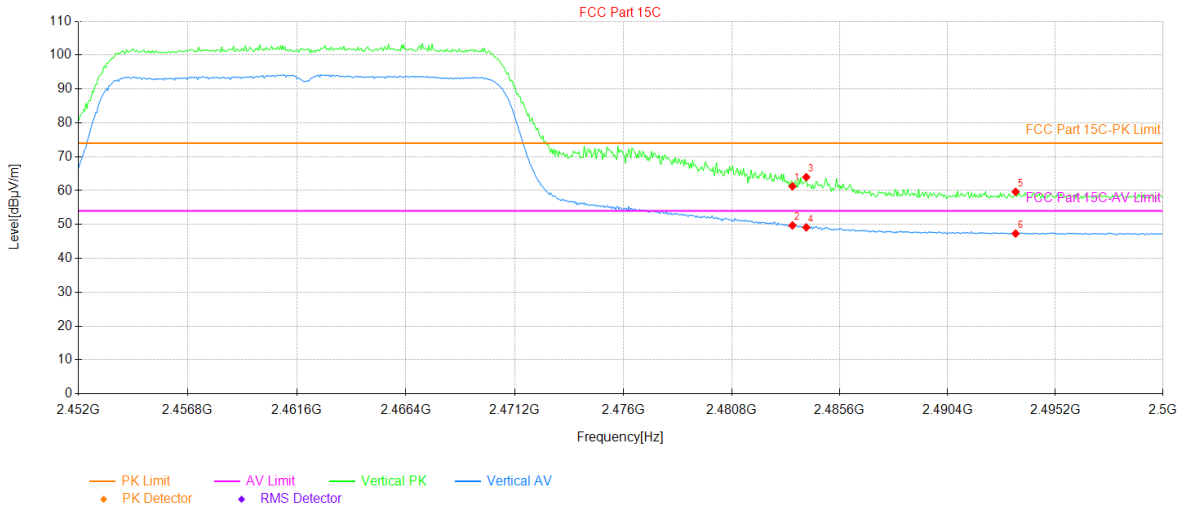
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2333.41	23.78	36.15	59.93	74.00	14.07	5	PK	PASS	Horizont
2	2333.41	11.64	36.15	47.79	54.00	6.21	169	AV	PASS	Horizont
3	2361.86	11.61	36.33	47.94	54.00	6.06	158	AV	PASS	Horizont
4	2361.86	24.05	36.33	60.38	74.00	13.62	97	PK	PASS	Horizont
5	2390.00	24.44	36.47	60.91	74.00	13.09	74	PK	PASS	Horizont
6	2390.00	13.27	36.47	49.74	54.00	4.26	93	AV	PASS	Horizont

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11n-HT20 Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	DC 5V		



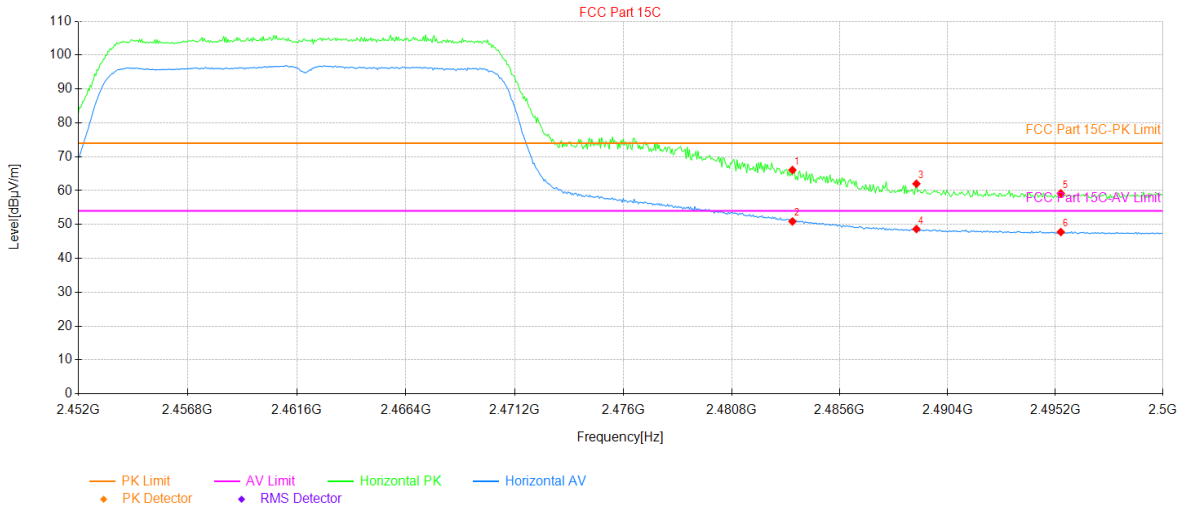
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2483.50	25.15	36.11	61.26	74.00	12.74	145	PK	PASS	Vertical
2	2483.50	13.61	36.11	49.72	54.00	4.28	130	AV	PASS	Vertical
3	2484.11	27.87	36.11	63.98	74.00	10.02	130	PK	PASS	Vertical
4	2484.11	13.04	36.11	49.15	54.00	4.85	126	AV	PASS	Vertical
5	2493.42	23.49	36.15	59.64	74.00	14.36	130	PK	PASS	Vertical
6	2493.42	11.17	36.15	47.32	54.00	6.68	149	AV	PASS	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

Product Name:	GeoSigner	Product Model:	WINGBITS
Test By:	Real Chen	Test mode:	802.11n-HT40 Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	DC 5V		



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict	Polarity
1	2483.50	29.96	36.11	66.07	74.00	7.93	154	PK	PASS	Horizont
2	2483.50	14.78	36.11	50.89	54.00	3.11	161	AV	PASS	Horizont
3	2489.01	25.89	36.13	62.02	74.00	11.98	158	PK	PASS	Horizont
4	2489.01	12.53	36.13	48.66	54.00	5.34	158	AV	PASS	Horizont
5	2495.44	23.01	36.16	59.17	74.00	14.83	139	PK	PASS	Horizont
6	2495.44	11.61	36.16	47.77	54.00	6.23	158	AV	PASS	Horizont

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor)

5.4 Emissions in Non-restricted Frequency Bands spot test

Above 1GHz

802.11b						
Test channel: Lowest channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4824.00	63.66	-7.92	55.74	74.00	18.26	Vertical
4824.00	63.71	-7.92	55.79	74.00	18.21	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4824.00	56.10	-7.92	48.18	54.00	5.82	Vertical
4824.00	55.09	-7.92	47.17	54.00	6.83	Horizontal
Test channel: Middle channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4874.00	63.65	-7.55	56.10	74.00	17.90	Vertical
4874.00	64.08	-7.55	56.53	74.00	17.47	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4874.00	56.00	-7.55	48.45	54.00	5.55	Vertical
4874.00	55.39	-7.55	47.84	54.00	6.16	Horizontal
Test channel: Highest channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4924.00	64.05	-7.21	56.84	74.00	17.16	Vertical
4924.00	63.99	-7.21	56.78	74.00	17.22	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4924.00	56.11	-7.21	48.90	54.00	5.10	Vertical
4924.00	55.32	-7.21	48.11	54.00	5.89	Horizontal

Remark:

1. *Level = Reading + Factor.*
2. *Test Frequency up to 25GHz, and the emission levels of other frequencies are lower than the limit 20dB, not show in test report.*

802.11g						
Test channel: Lowest channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4824.00	63.55	-7.92	55.63	74.00	18.37	Vertical
4824.00	63.32	-7.92	55.40	74.00	18.60	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4824.00	56.48	-7.92	48.56	54.00	5.44	Vertical
4824.00	55.21	-7.92	47.29	54.00	6.71	Horizontal
Test channel: Middle channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4874.00	63.16	-7.55	55.61	74.00	18.39	Vertical
4874.00	63.76	-7.55	56.21	74.00	17.79	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4874.00	55.67	-7.55	48.12	54.00	5.88	Vertical
4874.00	55.33	-7.55	47.78	54.00	6.22	Horizontal
Test channel: Highest channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4924.00	64.25	-7.21	57.04	74.00	16.96	Vertical
4924.00	63.52	-7.21	56.31	74.00	17.69	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4924.00	56.38	-7.21	49.17	54.00	4.83	Vertical
4924.00	55.67	-7.21	48.46	54.00	5.54	Horizontal

Remark:

1. *Level = Reading + Factor.*
2. *Test Frequency up to 25GHz, and the emission levels of other frequencies are lower than the limit 20dB, not show in test report.*

802.11n-HT20						
Test channel: Lowest channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4824.00	63.98	-7.92	56.06	74.00	17.94	Vertical
4824.00	63.52	-7.92	55.60	74.00	18.40	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4824.00	56.46	-7.92	48.54	54.00	5.46	Vertical
4824.00	55.07	-7.92	47.15	54.00	6.85	Horizontal
Test channel: Middle channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4874.00	63.08	-7.55	55.53	74.00	18.47	Vertical
4874.00	63.35	-7.55	55.80	74.00	18.20	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4874.00	55.45	-7.55	47.90	54.00	6.10	Vertical
4874.00	55.79	-7.55	48.24	54.00	5.76	Horizontal
Test channel: Highest channel Detector: Peak Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4924.00	64.17	-7.21	56.96	74.00	17.04	Vertical
4924.00	63.04	-7.21	55.83	74.00	18.17	Horizontal
Detector: Average Value						
Frequency (MHz)	Read Level (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
4924.00	56.29	-7.21	49.08	54.00	4.92	Vertical
4924.00	56.09	-7.21	48.88	54.00	5.12	Horizontal

Remark:

1. *Level = Reading + Factor.*
2. *Test Frequency up to 25GHz, and the emission levels of other frequencies are lower than the limit 20dB, not show in test report.*

------End of report------