APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Shenzhen Fine Offset Electronics Co., Ltd..

Ultrasonic wind sensor

Model No.: WS80BN

FCC ID: WA5WS80BN

Prepared for	:	Shenzhen Fine Offset Electronics Co., Ltd..
Address	:	2/F., Building no.3, Ping Shan Minqi Industrial Park, Xili Town, Nanshan District, Shenzhen City, China.
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
Address	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number	:	ATE20191333
Date of Test	:	September 9-27, 2019
Date of Report	:	September 30, 2019

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Test Report Certification

Applicant	:	Shenzhen Fine Offset Electronics Co., Ltd. 2/F., Building no.3, Ping Shan Minqi Industrial Park, Xili Town, Nanshan District, Shenzhen City, China.
Manufacturer	:	Shenzhen Fine Offset Electronics Co., Ltd. 2/F., Building no.3, Ping Shan Minqi Industrial Park, Xili Town, Nanshan District, Shenzhen City, China.
Product	:	Ultrasonic wind sensor
Model No.	:	WS80BN
Trade name	:	N/A

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.249
ANSI C63.10: 2013

The EUT was tested according to FCC 47CFR 15.249 for compliance to FCC 47CFR 15.249 requirements

The device described above is tested by SHENZHEN ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.249 limits. The measurement results are contained in this test report and SHENZHEN ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of SHENZHEN ACCURATE TECHNOLOGY CO. LTD.

Date of Test : September 9-27, 2019
Date of Report: September 30, 2019

Prepared by : (Bob Wang, Engineer)

Approved & Authorized Signer : (Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

The submitted sample is a Ultrasonic wind sensor.
The sample is powered by DC 3V & DC 5V (Power by USB Port).

		Ultrasonic wind sensor
Frequency	:	915MHz
Number of Channels	:	1
Modulation Type	:	FSK
Type of Antenna	:	Integral Antenna
Max antenna gain	:	2.15dBi
Power Supply	:	DC 3V & DC 5V (Power by USB Port)

1.2.Special Accesory and Auxiliary Equipments

AC/DC Power Adapter (provided by laboratory)	:	Model:BEK-QC-001 INPUT: 120V~60Hz OUTPUT:5V/1A

1.3.Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISEDC) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.4.Measurement Uncertainty

Radiated emission expanded uncertainty (9kHz-30MHz)	:	U=2.66dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	:	U=4.28dB, k=2
Radiated emission expanded uncertainty (1G-18GHz)	:	U=4.98dB, k=2
Radiated emission expanded uncertainty (18G-26.5GHz)	:	U=5.06dB, k=2
Conduction Emission Expanded Uncertainty (Mains ports, 9kHz-30MHz)	:	U=2.72dB, k=2
Conduction Emission Expanded Uncertainty (Telecommunication ports, 150kHz-30MHz)	:	U=2.94dB, k=2
Power disturbance Expanded Uncertainty	:	U=2.92dB, k=2
Harmonic current expanded uncertainty	:	U=0.512%, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 05, 2019	1 Year
EMI Test Receiver	Rohde& Schwarz	ESR	101817	Jan. 05, 2019	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	Jan. 05, 2019	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 05, 2019	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 05, 2019	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 05, 2019	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 05, 2019	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 05, 2019	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 05, 2019	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 05, 2019	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.3	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.4	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.5	Jan. 05, 2019	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.6	Jan. 05, 2019	1 Year
Temporary antenna connector	NTGS	14AE	N/A	Jan. 21, 2019	N/A

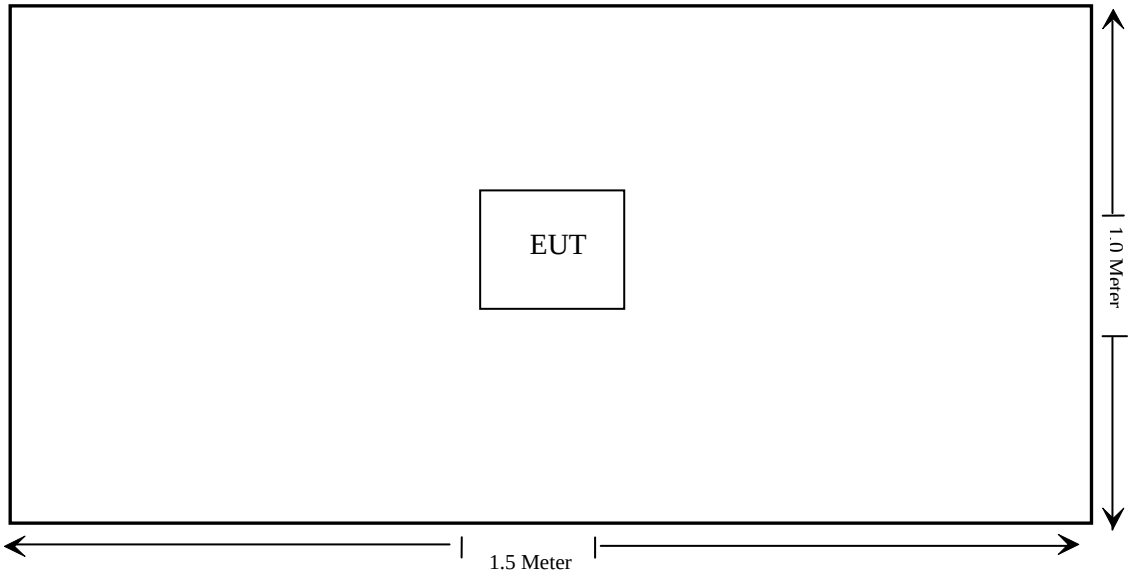
3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **Transmitting mode**
TX Channel: 915MHz

3.2.Configuration and peripherals

Block Diagram of Test Setup

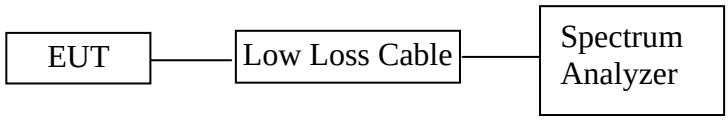


4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.215(c)	20dB Bandwidth	Compliant
Section 15.249(d)	Band Edge Compliance Test	Compliant
Section 15.205(a), Section 15.209(a), Section 15.249, Section 15.35	Radiated Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH MEASUREMENT

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.215(c)

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long-term distribution appears evenly distributed.

5.3.Operating Condition of EUT

5.3.1.Setup the EUT and simulator as shown as Section 5.1.

5.3.2.Turn on the power of all equipment.

5.3.3.Let the EUT work in TX modes measure it. The transmit frequency is 915MHz.

5.4.Test Procedure

5.4.1.Place the EUT on the table and set it in transmitting mode.

5.4.2.Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

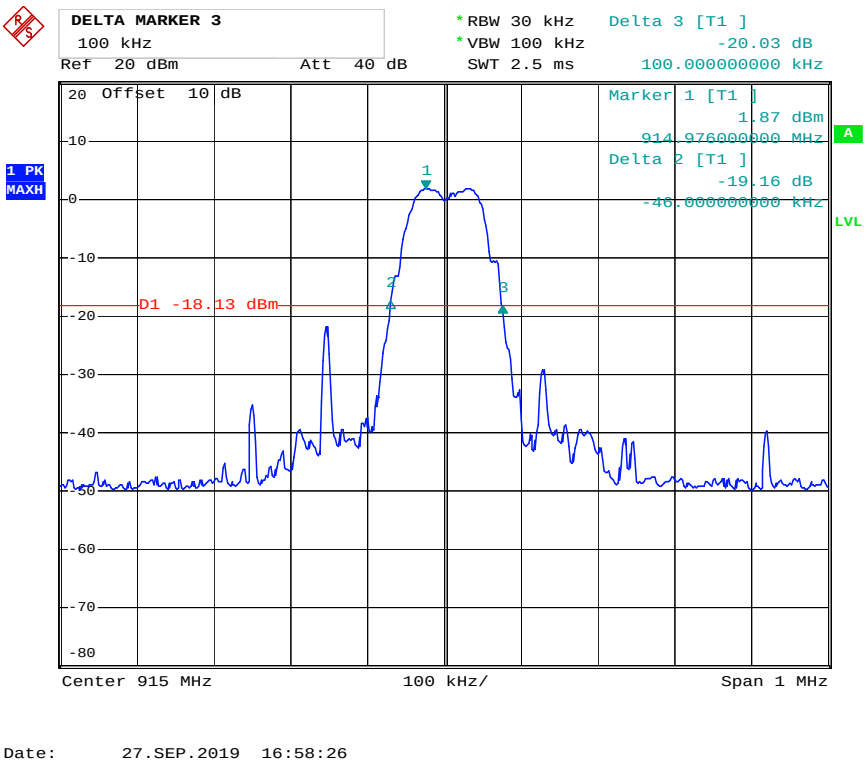
5.4.3.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz, Detector function=peak, Trace=max hold, Sweep=auto.

5.4.4.Set the measured low, middle and high frequency and test 20dB bandwidth with spectrum analyzer.

5.5.Test Result

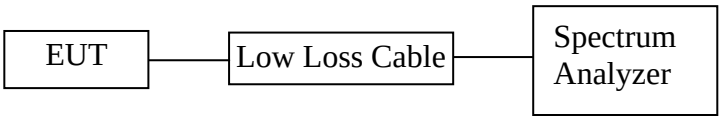
Frequency (MHz)	20 dB Bandwidth (MHz)
915	0.146

The spectrum analyzer plots are attached as below.



6. AVERAGE FACTOR MEASUREMENT

6.1.Block Diagram of Test Setup



(EUT: Ultrasonic wind sensor)

6.2.Average factor Measurement according to ANSI C63.10-2013

ANSI C63.10-2013 Section 7.5 Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 s (100 ms). In cases where the pulse train exceeds 0.1 s, the measured field strength shall be determined during a 0.1 s interval.64 The following procedure is an example of how the average value may be determined. The average field strength may be found by measuring the peak pulse amplitude (in log equivalent units) and determining the duty cycle correction factor (in dB) associated with the pulse modulation as shown in Equation (10):
Average factor in dB = 20 log (duty cycle)

6.3.EUT Configuration on Measurement

The following equipment are installed on average factor Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.3.1. Ultrasonic wind sensor

Model Number : WS80BN
Manufacturer : Shenzhen Fine Offset Electronics Co., Ltd..

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX mode measure it.

6.5. Test Procedure

6.5.1. The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation.

6.5.2. Set SPA Center Frequency = Fundamental frequency, RBW = 100 kHz, VBW = 300 kHz, Span = 0 Hz.

6.5.3. Set EUT as normal operation.

6.5.4. Set SPA View. Delta Mark time.

6.6. Measurement Result

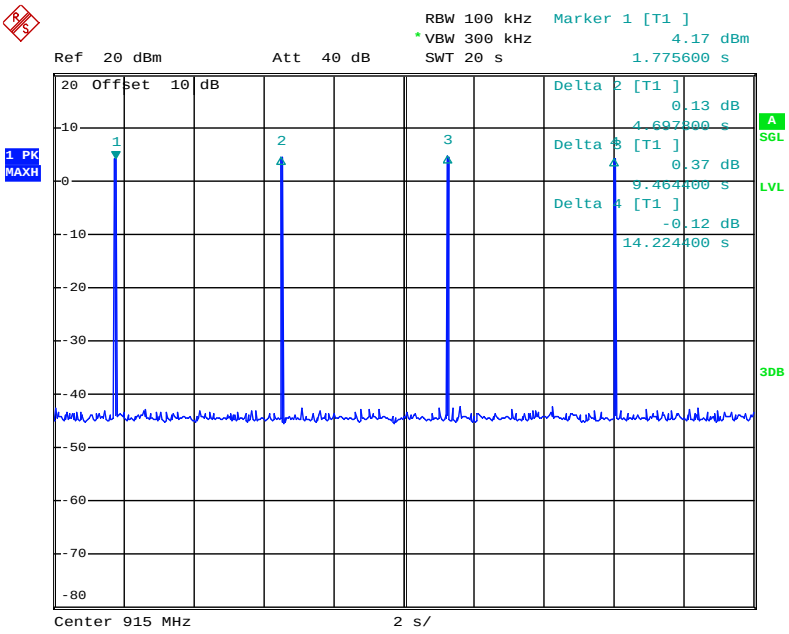
The duty cycle is simply the on time divided by the period:

The duration of one cycle = 100s

Effective period of the cycle = 16ms

DC =16ms/100ms=0.16

Therefore, the average factor is found by 20log0.16= -15.92dB



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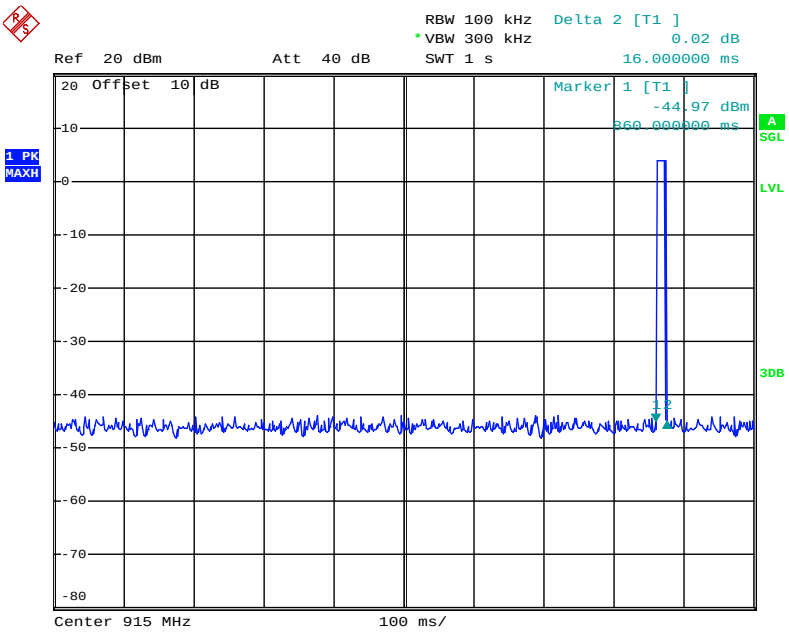
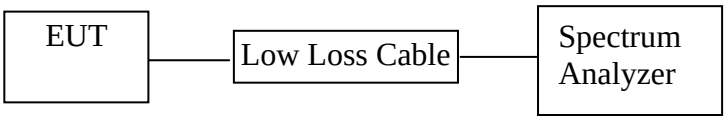


Date: 9.SEP.2019 17:16:29

7. BAND EDGE COMPLIANCE TEST

7.1.Block Diagram of Test Setup



(EUT: Ultrasonic wind sensor)

7.2.The Requirement for Section 15.249

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 A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

7.3.EUT Configuration on Measurement

The equipment is installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes measure it. The transmit frequency is 915 MHz.

7.5.Test Procedure

Conducted Band Edge:

7.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

7.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiate Band Edge:

7.5.3.The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

7.5.4.The turntable was rotated for 360 degrees to determine the position of maximum emission level.

7.5.5.EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

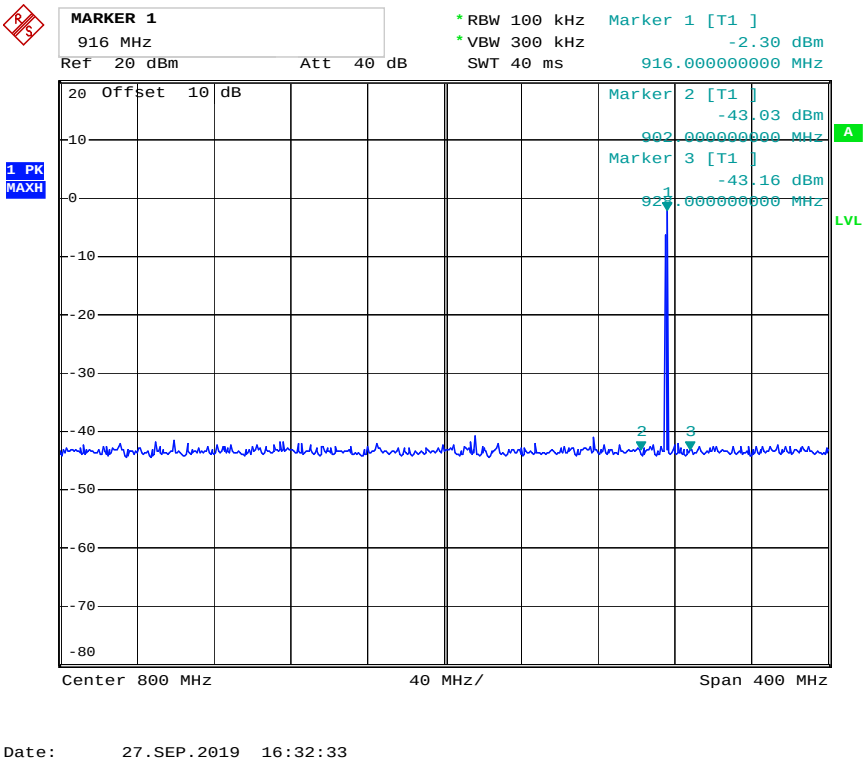
7.5.6.Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

7.5.7.RBW=1MHz, VBW=1MHz

7.5.8.The band edges was measured and recorded.

7.6.Test Result

Pass



ACCURATE TECHNOLOGY CO., LTD.
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Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
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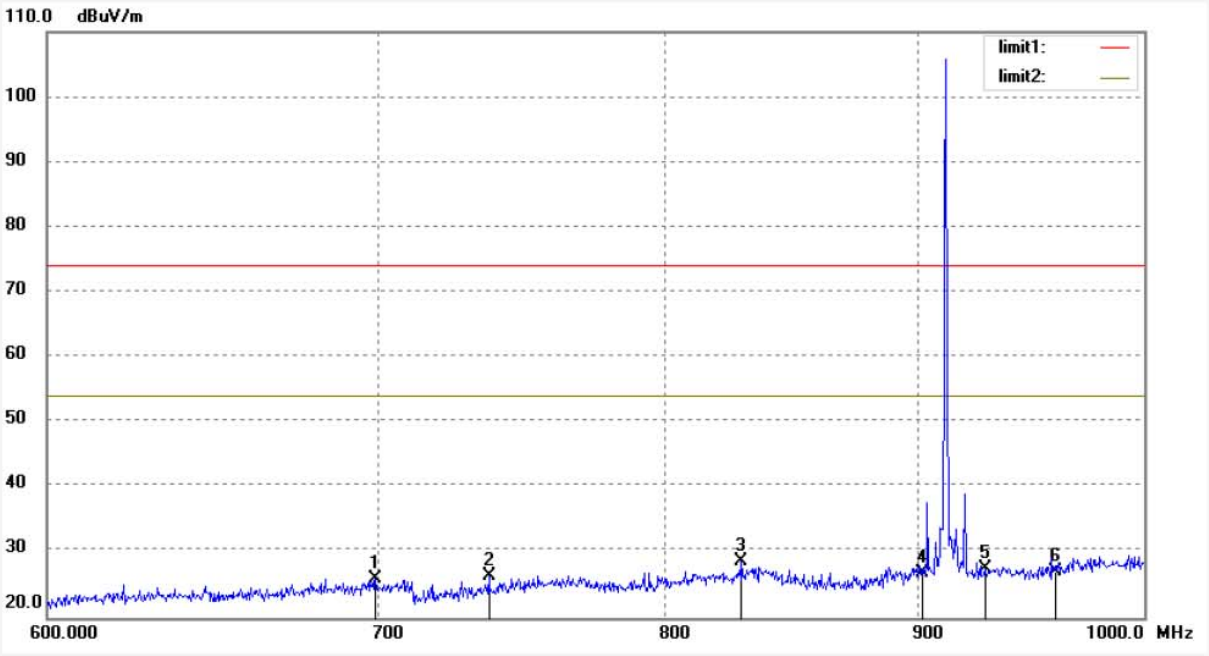
Job No.: DXP #1807
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Ultrasonic wind sensor
Mode: TX 915MHz
Model: WS80BN
Manufacturer: Fine Offset

Polarization: Vertical
Power Source: DC 3V
Date: 2019/09/27
Time: 15:42:01
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20191333



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	699.2250	37.45	-11.48	25.97	74.00	-48.03	peak	100	96	
2	737.0774	37.14	-10.62	26.52	74.00	-47.48	peak	100	126	
3	829.1644	37.06	-8.40	28.66	74.00	-45.34	peak	100	169	
4	902.0000	34.12	-7.16	26.96	74.00	-47.04	peak	100	205	
5	928.0000	34.33	-6.72	27.61	74.00	-46.39	peak	100	216	
6	960.0000	33.27	-6.07	27.20	74.00	-46.80	peak	100	296	

ACCURATE TECHNOLOGY CO., LTD.
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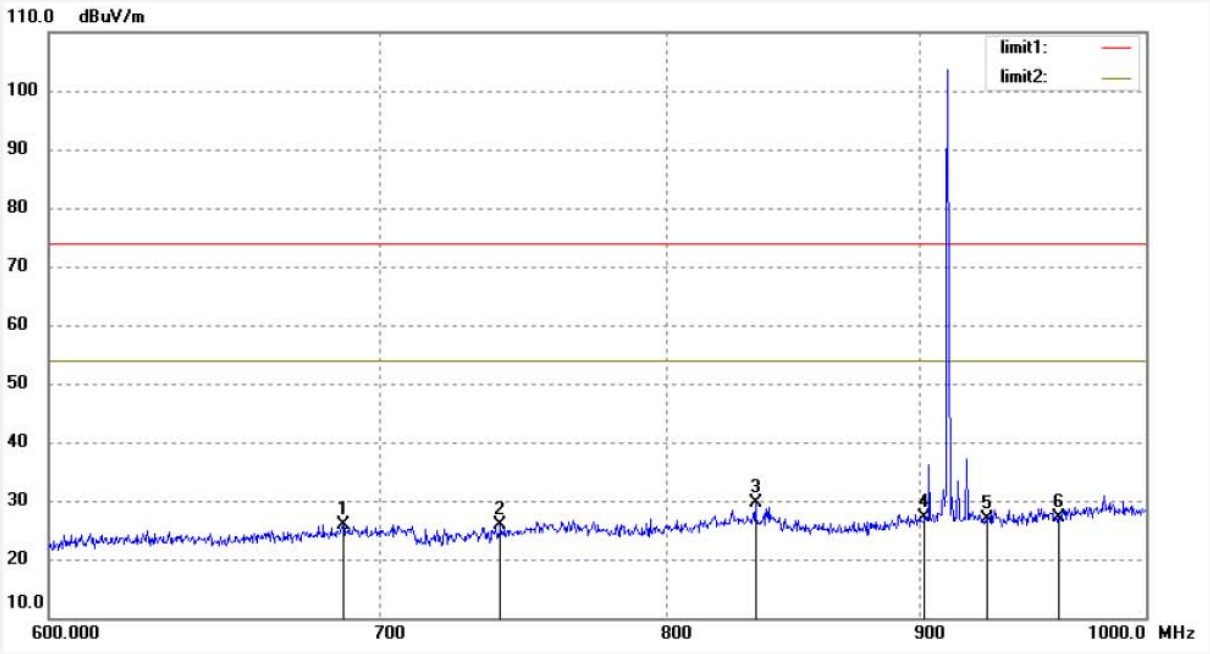
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: DXP #1808	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 2019/09/27
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 15:44:20
EUT: Ultrasonic wind sensor	Engineer Signature:
Mode: TX 915MHz	Distance: 3m
Model: WS80BN	
Manufacturer: Fine Offset	

Note: Report NO.:ATE20191333



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	688.2177	37.68	-11.73	25.95	74.00	-48.05	peak	200	68	
2	740.4808	36.32	-10.54	25.78	74.00	-48.22	peak	200	96	
3	833.8459	37.98	-8.32	29.66	74.00	-44.34	peak	200	106	
4	902.0000	34.22	-7.16	27.06	74.00	-46.94	peak	200	186	
5	928.0000	33.69	-6.72	26.97	74.00	-47.03	peak	200	201	
6	960.0000	33.10	-6.07	27.03	74.00	-46.97	peak	200	263	

Note:

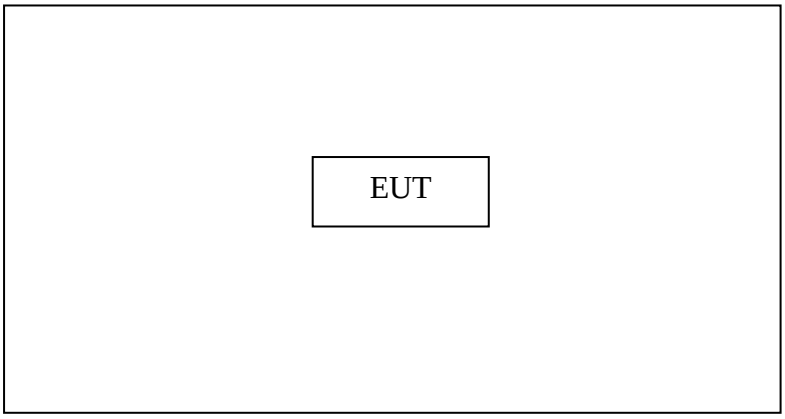
1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

8. RADIATED SPURIOUS EMISSION TEST

8.1.Block Diagram of Test Setup

8.1.1.Block diagram of connection between the EUT and peripherals

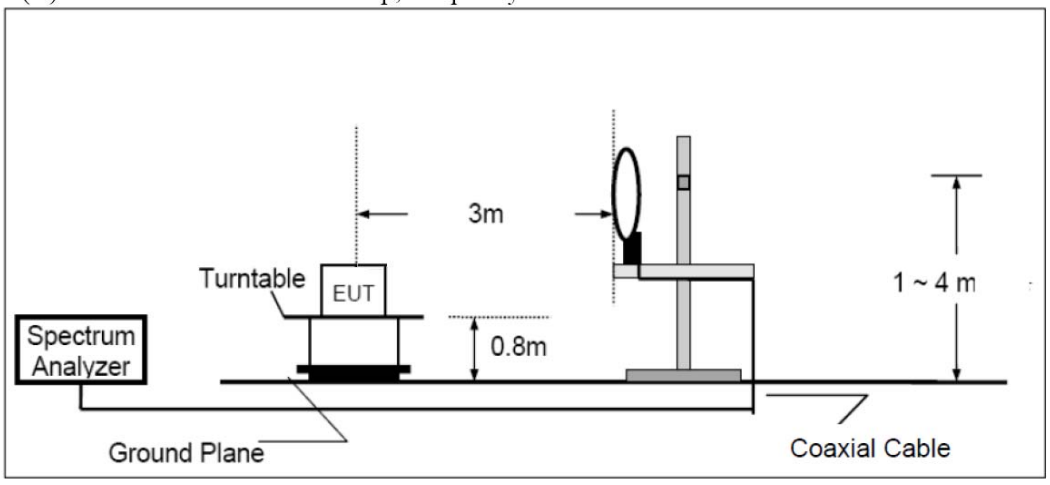


Setup: Transmitting mode

(EUT: Ultrasonic wind sensor)

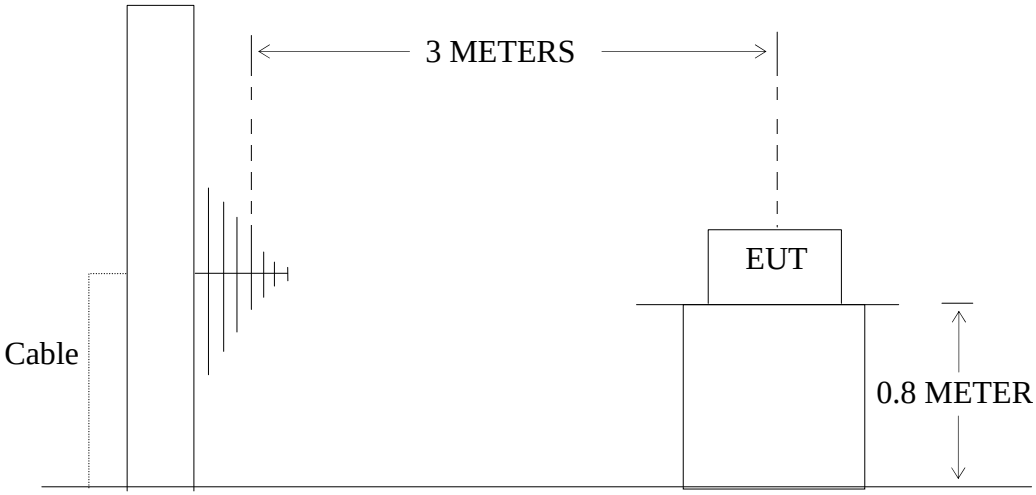
8.2.Semi-Anechoic Chamber Test Setup Diagram

(A)Radiated Emission Test Set-Up, Frequency below 30MHz



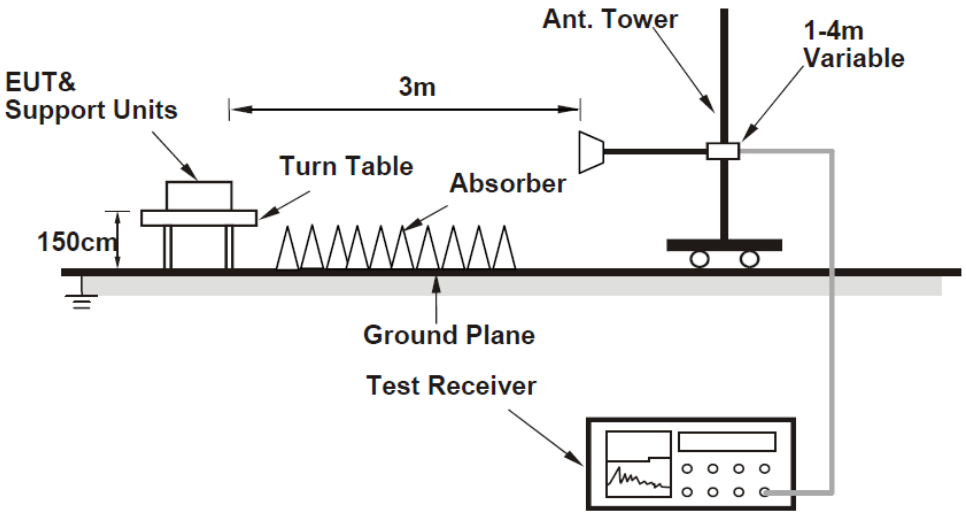
Radiated emission test setup, test frequency from 30MHz to 1GHz

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



GROUND PLANE

Radiated emission test setup, test frequency above 1GHz



8.3.The Limit for the field strength of emissions from intentional radiators

Fundamental frequency	Field strength of fundamental (millivolts/ meter)	Field strength of harmonics (microvolts/ meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

8.4.Restricted bands of operation

8.4.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

8.5.Configuration of EUT on Measurement

The equipment is installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.6.Operating Condition of EUT

8.6.1.Setup the EUT and simulator as shown as Section 8.1.

8.6.2.Turn on the power of all equipment.

8.6.3.Let the EUT work in TX modes measure it. The transmit frequency is 915MHz.

8.7.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 10GHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

8.8. The Field Strength of Radiation Emission Measurement Results

PASS.

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

The QP value of fundamental frequency is:
QP Reading = Peak value + 20log(Duty cycle), QP=Peak-15.92

Frequency (MHz)	Polarity (H/V)	Peak value (dBμV/m)	QP value (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
915	H	106.67	90.75	94.0	-3.25	PASS
915	V	107.54	91.62	94.0	-2.38	PASS

The AV value of harmonics frequency is:
AV Reading = Peak value + 20log(Duty cycle), AV=Peak-15.92

Frequency (MHz)	Polarity (H/V)	Peak value (dBμV/m)	AV value (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
1830.0	H	66.42	50.50	54.0	-3.50	PASS
1830.0	V	67.07	51.15	54.0	-2.85	PASS

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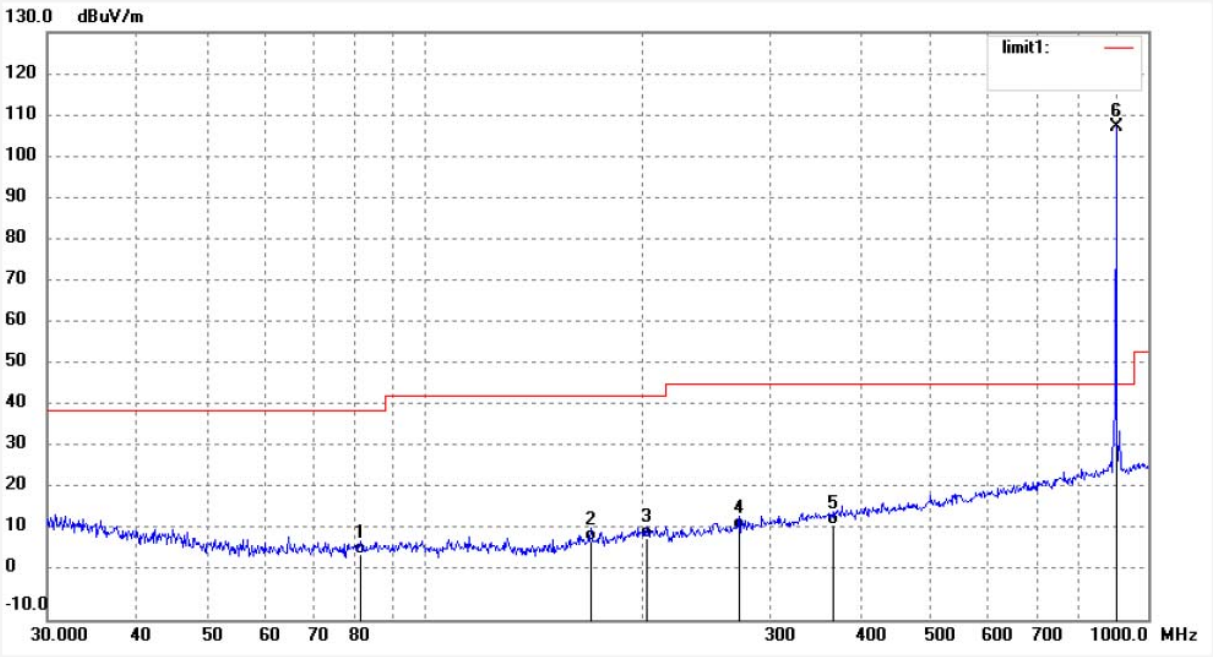
Job No.: DXP #1809	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2019/09/27
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 15:50:21
EUT: Ultrasonic wind sensor	Engineer Signature:
Mode: TX 915MHz	Distance: 3m
Model: WS80BN	
Manufacturer: Fine Offset	

Note: Report NO.:ATE20191333



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	81.3739	33.11	-27.41	5.70	40.00	-34.30	QP	100	63	
2	169.5919	34.94	-26.04	8.90	43.50	-34.60	QP	100	126	
3	202.1630	33.68	-24.28	9.40	43.50	-34.10	QP	100	163	
4	271.5686	34.12	-22.52	11.60	46.00	-34.40	QP	100	202	
5	366.0865	31.43	-18.83	12.60	46.00	-33.40	QP	100	215	
6	915.0000	114.68	-7.14	107.54			peak	100	263	

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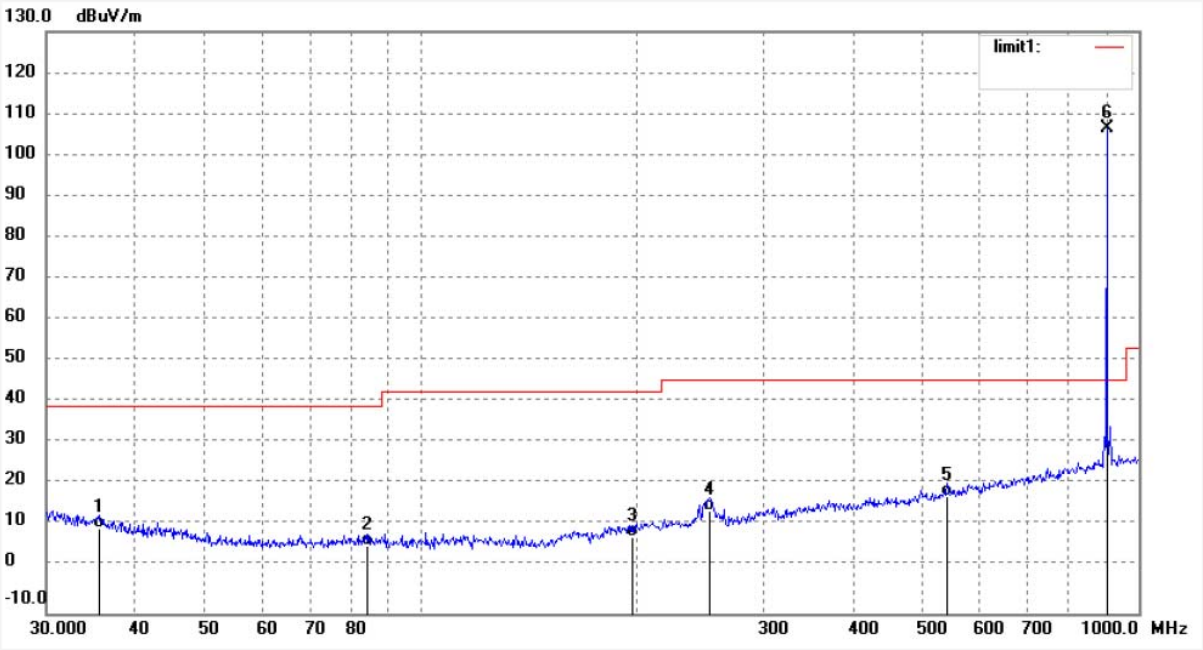
Job No.: DXP #1810	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2019/09/27
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 15:51:17
EUT: Ultrasonic wind sensor	Engineer Signature:
Mode: TX 915MHz	Distance: 3m
Model: WS80BN	
Manufacturer: Fine Offset	

Note: Report NO.:ATE20191333



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	35.5112	32.26	-21.66	10.60	40.00	-29.40	QP	200	78	
2	84.2839	33.64	-27.44	6.20	40.00	-33.80	QP	200	102	
3	196.5595	32.86	-24.56	8.30	43.50	-35.20	QP	200	136	
4	252.2521	38.21	-23.51	14.70	46.00	-31.30	QP	200	196	
5	540.7068	33.29	-15.09	18.20	46.00	-27.80	QP	200	216	
6	915.0000	113.81	-7.14	106.67			peak	200	305	

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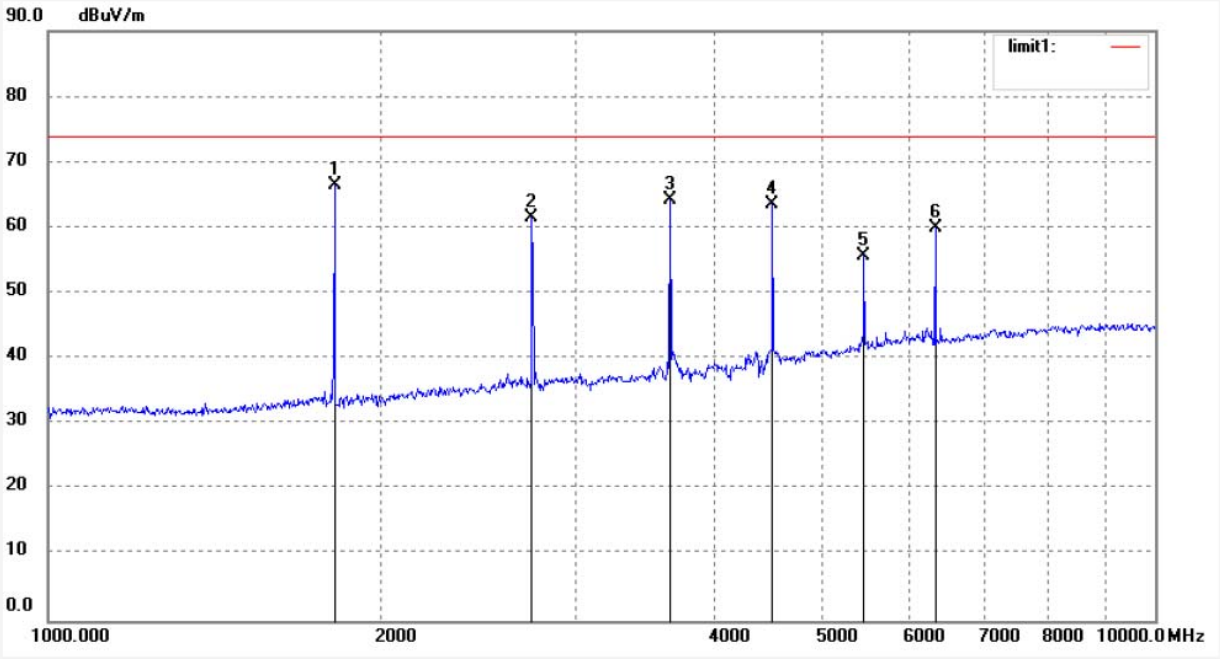
Job No.: DXP #1804
Standard: FCC Part 15C 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Ultrasonic wind sensor
Mode: TX 915MHz
Model: WS80BN
Manufacturer: Fine Offset

Polarization: Horizontal
Power Source: DC 3V
Date: 2019/09/27
Time: 15:20:41
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20191333



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1830.000	75.27	-8.85	66.42	74.00	-7.58	peak			
2	2745.000	66.05	-4.58	61.47	74.00	-12.53	peak			
3	3660.000	65.68	-1.47	64.21	74.00	-9.79	peak			
4	4575.000	63.81	-0.24	63.57	74.00	-10.43	peak			
5	5490.000	53.26	2.40	55.66	74.00	-18.34	peak			
6	6405.000	56.06	3.92	59.98	74.00	-14.02	peak			

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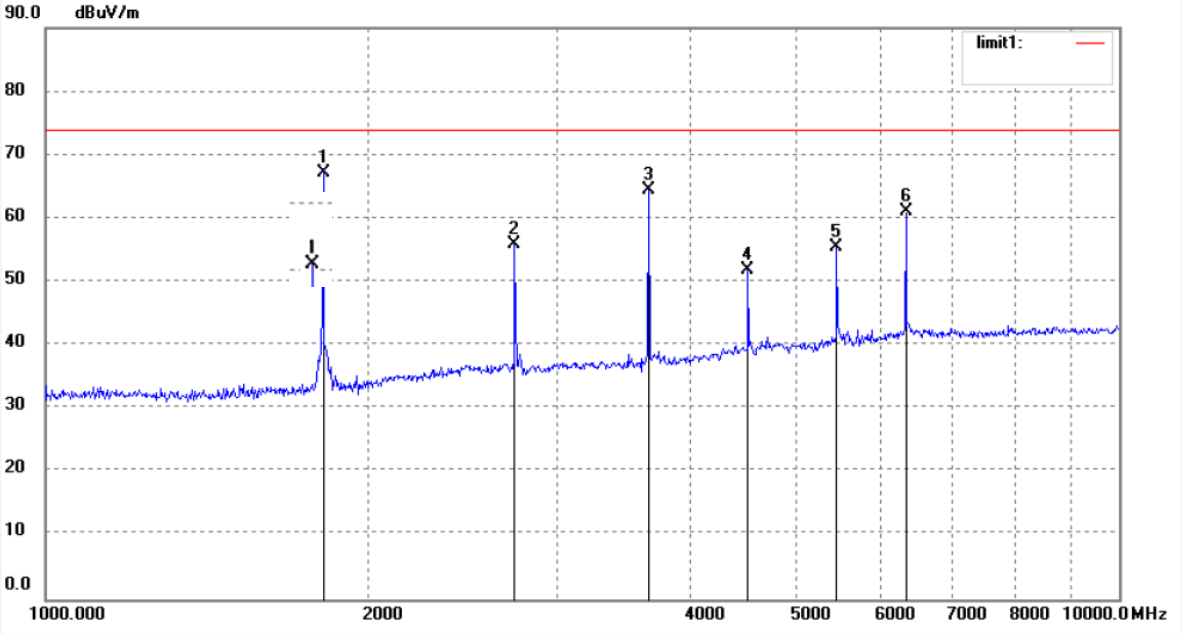
Job No.: DXP #1806	Polarization: Vertical
Standard: FCC Part 15C 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2019/09/27
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 15:23:25
EUT: Ultrasonic wind sensor	Engineer Signature:
Mode: TX 915MHz	Distance: 3m
Model: WS80BN	
Manufacturer: Fine Offset	

Note: Report NO.:ATE20191333

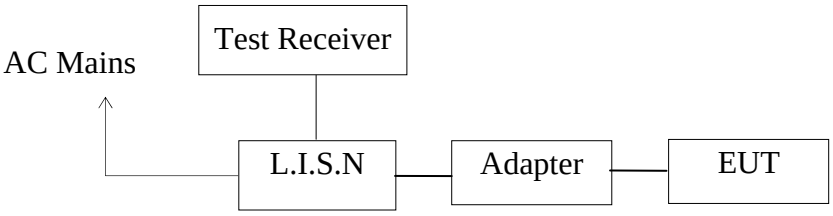


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1830.000	75.92	-8.85	67.07	74.00	-6.93	peak			
2	2745.000	60.51	-4.58	55.93	74.00	-18.07	peak			
3	3660.000	65.97	-1.47	64.50	74.00	-9.50	peak			
4	4575.000	52.04	-0.24	51.80	74.00	-22.20	peak			
5	5490.000	53.05	2.40	55.45	74.00	-18.55	peak			
6	6405.000	57.25	3.92	61.17	74.00	-12.83	peak			

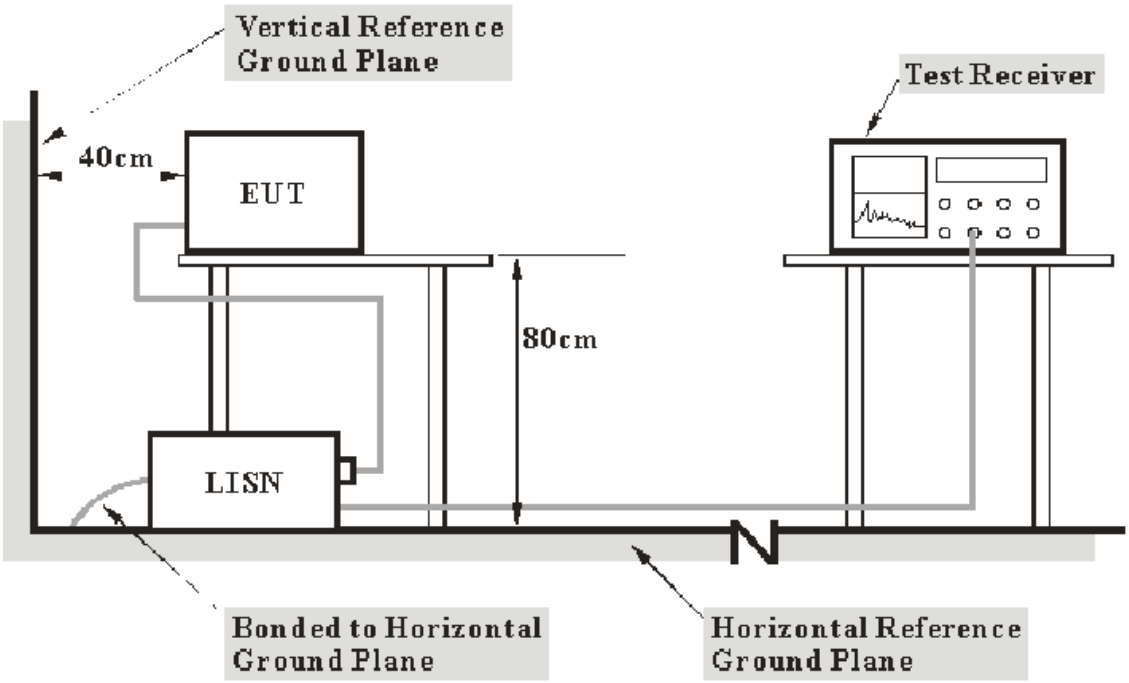
9. AC POWER LINE CONDUCTED EMISSION TEST

9.1.Block Diagram of Test Setup

9.1.1. Block diagram of connection between the EUT and simulators



9.1.2. Test System Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

9.2.Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

9.3.Configuration of EUT on Measurement

The equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

9.4.Operating Condition of EUT

9.4.1. Setup the EUT and simulator as shown as Section 9.1.

9.4.2. Turn on the power of all equipment.

9.4.3. Let the EUT work in test mode and measure it.

9.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

9.6.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dBμV)	Average Level (dBμV)	QuasiPeak Limit (dBμV)	Average Limit (dBμV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.6	25.3	17.0	59.0	49.0	33.4	31.7	Pass

Frequency(MHz) = Emission frequency in MHz
Transducer value(dB) = Insertion loss of LISN + Cable Loss
Level(dBμV) = Quasi-peak Reading/Average Reading + Transducer value
Limit (dBμV) = Limit stated in standard
Margin = Limit (dBμV) - Level (dBμV)

Calculation Formula:
Margin = Limit (dBμV) - Level (dBμV)

9.7.Test Results

Pass.
Test Lab: 3m Anechoic chamber
Test Engineer: Ben

The frequency range from 150kHz to 30MHz is checked.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.
Emissions attenuated more than 20 dB below the permissible value are not reported.

All data was recorded in the Quasi-peak and average detection mode.

The spectral diagrams are attached as below.

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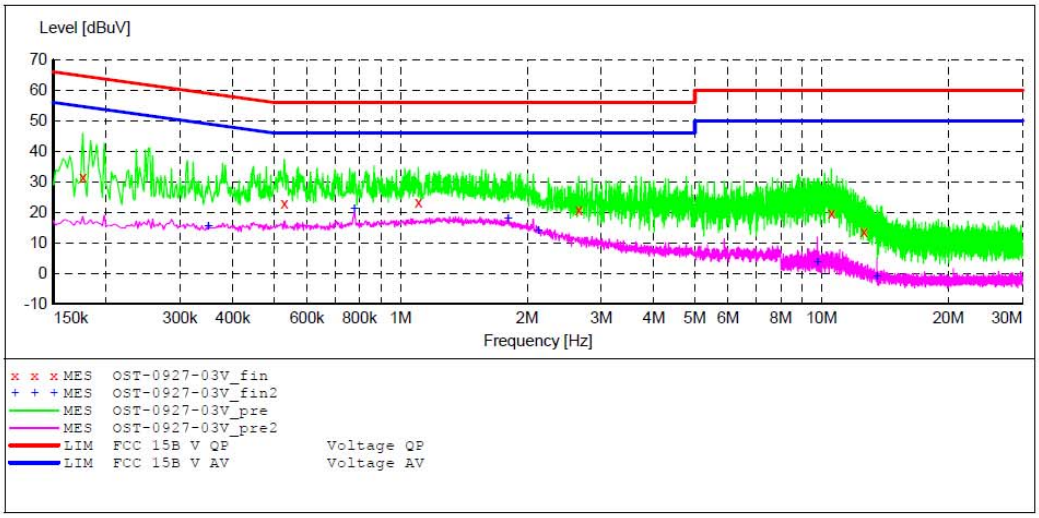
CONDUCTED EMISSION STANDARD FCC PART 15C

```
EUT:                  Ultrasonic wind sensor M/N:WS80BN
Manufacturer:         Fine Offset
Operating Condition:  CHARGING
Test Site:            2#Shielding Room
Operator:             Ben
Test Specification:   L   120V 60Hz
Comment:              Report NO.:ATE20191333
Start of Test:        2019-9-27 / 14:43:04
```

SCAN TABLE: "V 150K-30MHz fin"

```
  Short Description:            _SUB_STD_VTERM2 1.70
  Start      Stop       Step      Detector  Meas.     IF       Transducer
  Frequency  Frequency  Width               Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz   QuasiPeak 1.0 s     9 kHz    NSLK8126 2008
                                  Average
```



MEASUREMENT RESULT: "OST-0927-03V_fin"

2019-9-27 14:44

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.176000	31.70	10.8	65	33.0	QP	L1	GND
0.530000	22.90	11.0	56	33.1	QP	L1	GND
1.104000	23.50	11.2	56	32.5	QP	L1	GND
2.650000	20.90	11.3	56	35.1	QP	L1	GND
10.550000	19.90	11.6	60	40.1	QP	L1	GND
12.615000	13.90	11.6	60	46.1	QP	L1	GND

MEASUREMENT RESULT: "OST-0927-03V_fin2"

2019-9-27 14:44

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.350000	15.60	10.9	49	33.4	AV	L1	GND
0.778000	21.40	11.1	46	24.6	AV	L1	GND
1.800000	18.10	11.2	46	27.9	AV	L1	GND
2.125000	14.10	11.3	46	31.9	AV	L1	GND
9.770000	3.80	11.6	50	46.2	AV	L1	GND
13.525000	-1.10	11.6	50	51.1	AV	L1	GND

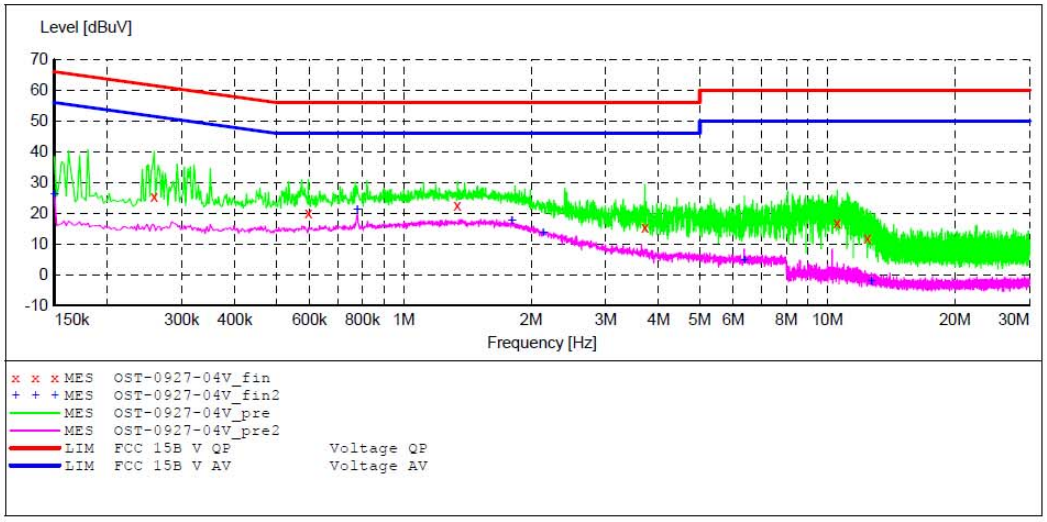
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15C

```
EUT:                 Ultrasonic wind sensor M/N:WS80BN
Manufacturer:        Fine Offset
Operating Condition: CHARGING
Test Site:           2#Shielding Room
Operator:            Ben
Test Specification:  N   120V 60Hz
Comment:             Report NO.:ATE20191333
Start of Test:       2019-9-27 / 14:45:21
```

SCAN TABLE: "V 150K-30MHz fin"

```
  Short Description:            _SUB_STD_VTERM2 1.70
  Start      Stop       Step      Detector  Meas.     IF      Transducer
  Frequency  Frequency  Width               Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz   QuasiPeak 1.0 s     9 kHz   NSLK8126 2008
                                  Average
```



MEASUREMENT RESULT: "OST-0927-04V_fin"

2019-9-27 14:47

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.258000	25.40	10.9	62	36.1	QP	N	GND
0.596000	20.10	11.0	56	35.9	QP	N	GND
1.340000	22.60	11.2	56	33.4	QP	N	GND
3.710000	15.50	11.4	56	40.5	QP	N	GND
10.545000	16.90	11.6	60	43.1	QP	N	GND
12.425000	11.90	11.6	60	48.1	QP	N	GND

MEASUREMENT RESULT: "OST-0927-04V_fin2"

2019-9-27 14:47

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	26.20	10.8	56	29.8	AV	N	GND
0.778000	21.10	11.1	46	24.9	AV	N	GND
1.800000	17.70	11.2	46	28.3	AV	N	GND
2.135000	13.60	11.3	46	32.4	AV	N	GND
6.370000	4.90	11.5	50	45.1	AV	N	GND
12.690000	-2.00	11.6	50	52.0	AV	N	GND

10. ANTENNA REQUIREMENT

10.1. The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 2.15dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.

Antenna