

MEASUREMENT REPORT

FCC PART 15.231(e)

FCC ID: 2AJ90-FGT433A2

APPLICANT: LIDL US LLC.

Application Type: Certification

Product: Wireless digital thermometer

Model No.: FGT433A2, WDJ7060, WDJ7011, WDJ7050,
WDJ7051, WDJ7052, WDJ7053, WDJ7055, WDJ7056,
WDJ7057, WDJ7058, WDJ7059

FCC Classification: FCC Part 15 Security/Remote Control Transmitter
(DSC)

FCC Rule Part(s): Part 15.231(e)

Test Procedure(s): ANSI C63.10-2013

Test Date: December 21, 2017 ~ February 01, 2018

Reviewed By : *Sunny Sun*
(Sunny Sun)

Approved By : *Robin Wu*
(Robin Wu)



The test results relate only to the samples tested.

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

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

Revision History

Report No.	Version	Description	Issue Date	Note
1811RSU010-U1	Rev. 01	Initial Report	11-06-2018	Valid

Note: This report is based on report (1712RSU03401) from MRT to change FCC ID and model name.

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§2.1033 General Information

Applicant:	LIDL US LLC.			
Applicant Address:	3500 S. Clark St, Arlington, VA 22202 USA			
Manufacturer:	Zhejiang Shunkang Technology Industry Co., Ltd.			
Manufacturer Address:	No.2, 3 Lane Fuxiang North Road Yuyao, Zhejiang, 315400 P.R.China			
Test Site:	MRT Technology (Suzhou) Co., Ltd			
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China			
FCC Registration No.:	893164			
Test Device Serial No.:	N/A	<input type="checkbox"/> Production	<input checked="" type="checkbox"/> Pre-Production	<input type="checkbox"/> Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.



1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Wireless digital thermometer
Model No.	FGT433A2, WDJ7060, WDJ7011, WDJ7050, WDJ7051, WDJ7052, WDJ7053, WDJ7055, WDJ7056, WDJ7057, WDJ7058, WDJ7059
Frequency Range	433.92 MHz
Type of modulation	ASK
Antenna Type	Integral Antenna
Device Category	Portable Device

2.2. Test Standards

The following report is prepared on behalf of the LIDL US LLC. in accordance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commission rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

2.3. Test Methodology

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013).

Deviation from measurement procedure.....None

2.4. EUT Setup and Test Mode

The EUT was operated at continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode	Description	Remark
Mode 1	Transmitting	With modulation

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the **Wireless digital thermometer** is permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATA

Radiated Disturbance - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2018/08/18
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2018/11/17
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2018/10/21
Broad Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2018/11/18
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2018/11/20
RF Cable	HUBER+SUHNER	Cable 01	N/A	1 year	2018/12/09
Digital Thermometer & Hygrometer	Minggao	ETH529	MRTSUE06170	1 year	2018/12/12
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2018/05/09

20dB Bandwidth, Release Time, Duty Cycle - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2018/08/18
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2018/10/21
RF Cable	HUBER+SUHNER	Cable 01	N/A	1 year	2018/12/09
Digital Thermometer & Hygrometer	Minggao	ETH529	MRTSUE06170	1 year	2018/12/12
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2018/05/09

Software	Version	Function
e3	V8.3.5	EMI Test Software

5. MEASUREMENT UNCERTAINTY

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

Radiated Emission Measurement - AC2

Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$):

9kHz ~ 1GHz: 4.18dB

1GHz ~ 18GHz: 4.76dB

6. TEST RESULT

6.1. Summary

Company Name: Wireless digital thermometer

FCC ID: 2AJ90-FGT433A2

FCC Part Section(s)	Test Description	Test Condition	Test Result
15.205, 15.231(e)	Radiated Spurious Emissions	Radiated	Pass
15.231(c)	20dB Bandwidth / 99% Bandwidth		Pass
15.231(e)	Transmission Time		Pass
15.231(e)	Duty Cycle		Pass
15.207	Conducted Emissions Measurement	Conducted	N/A

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

6.2. Radiated Emissions

6.2.1. Standard Applicable

According to §15.231(e), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	1000	100
70 - 130	500	50
130 - 174	500 to 1500 ¹	50 to 150 ¹
174 - 260	1500	150
260 - 470	1500 to 5000 ¹	150 to 500 ¹
Above 470	5000	500

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements start below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

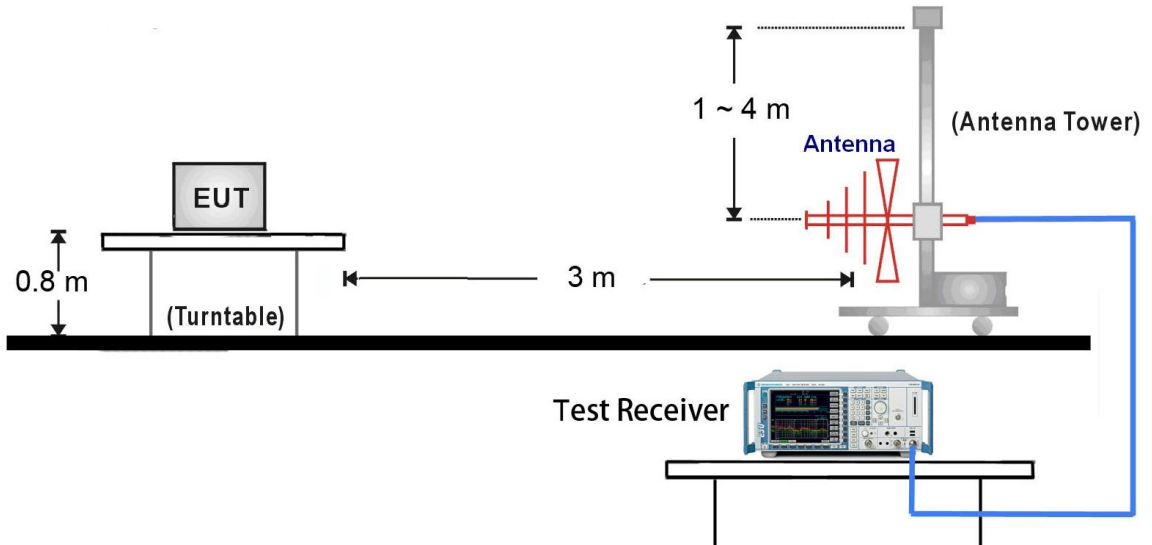
6.2.2. Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(e) and FCC Part 15.209 Limit.

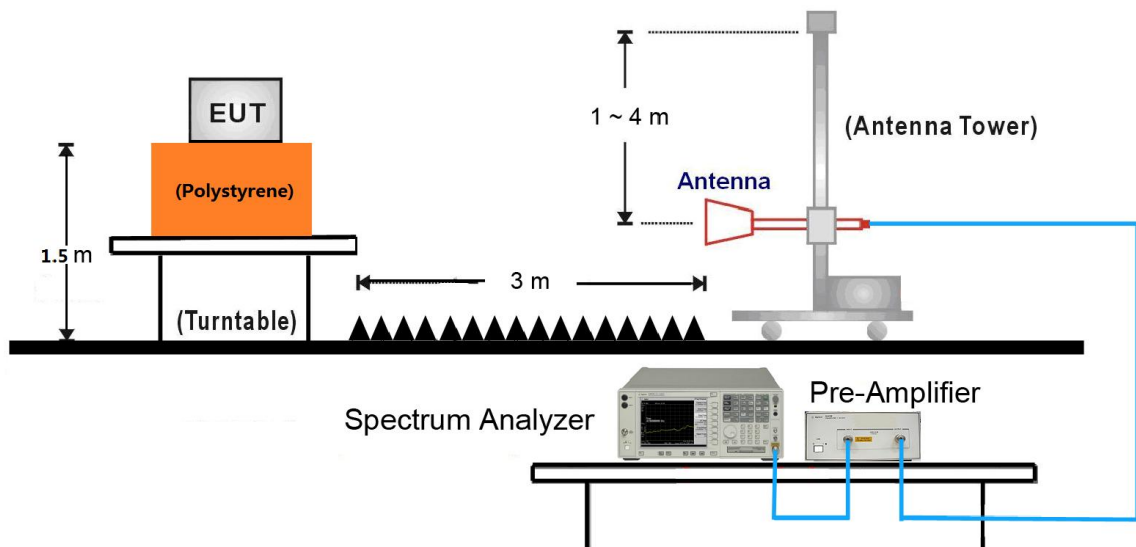
6.2.3. Test Setup

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(e) and FCC Part 15.209 Limit.

30MHz ~ 1GHz Test Setup:

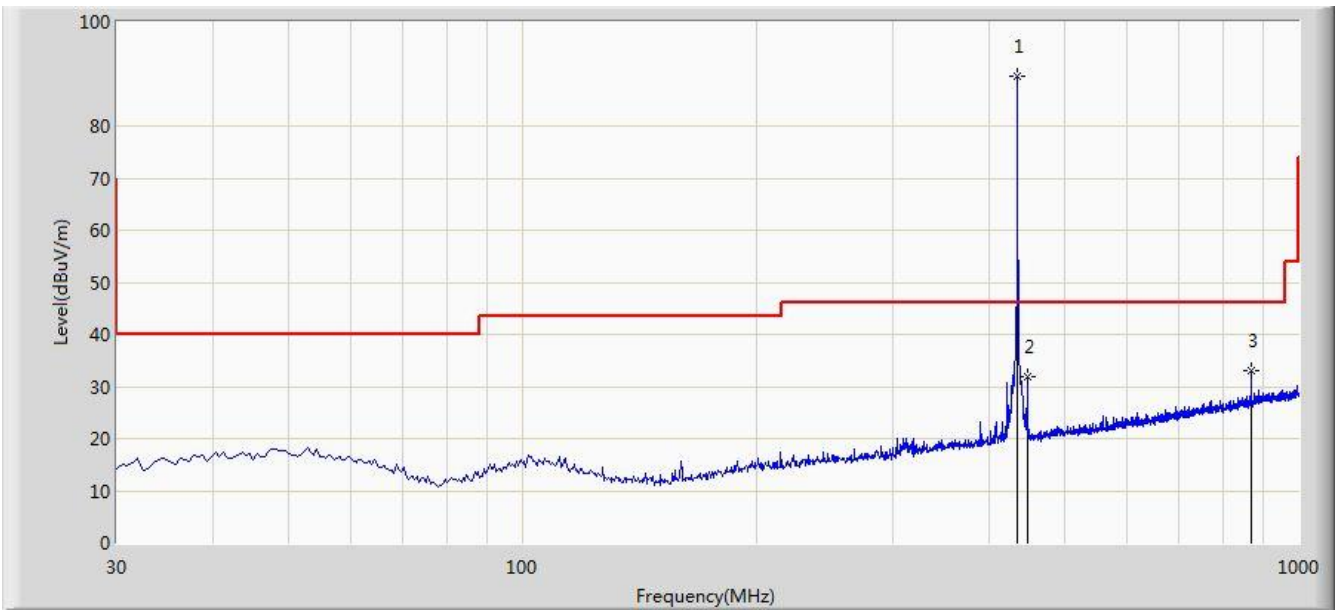


1GHz ~ 5GHz Test Setup:



6.2.4. Test Results

Site: AC2	Time: 2017/12/23 - 16:40
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Wireless digital thermometer	Power: By Battery
Test Mode: Transmit	



No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	434.005	72.194	17.515	N/A	89.709	92.866	-3.157	PK
	434.005	72.194	17.515	17.230	72.479	72.866	-0.387	AV
2	447.100	14.067	17.707	N/A	31.774	46.000	-14.226	PK
3	867.595	8.681	24.267	N/A	32.948	72.866	-39.918	PK
	867.595	8.681	24.267	17.230	15.718	52.866	-37.148	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

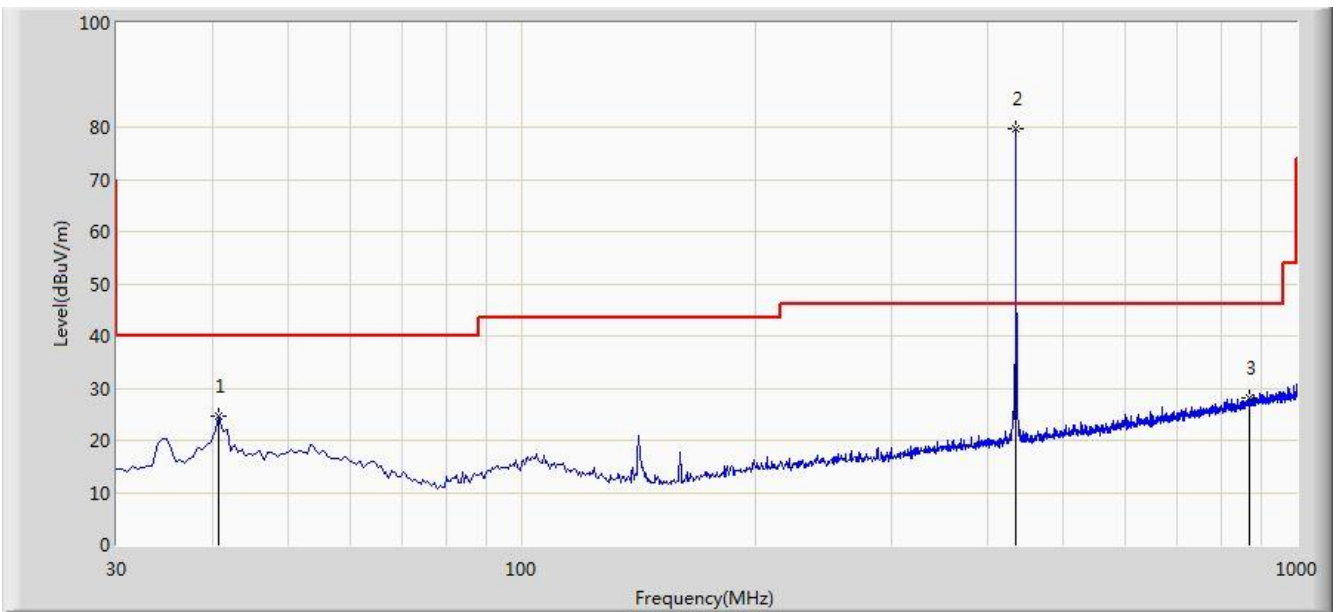
Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB).

AV Measure Level = Peak Measure Level + Duty Cycle Factor.

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

Site: AC2	Time: 2017/12/23 - 16:50
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Wireless digital thermometer	Power: By Battery
Test Mode: Transmit	



No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	40.670	10.592	14.098	N/A	24.690	40.000	-15.310	PK
2	434.005	62.122	17.515	N/A	79.637	92.866	-13.229	PK
	434.005	62.122	17.515	17.230	62.407	72.866	-10.459	AV
3	867.595	3.746	24.267	N/A	28.013	72.866	-44.853	PK
	867.595	3.746	24.267	17.230	10.783	52.866	-42.083	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

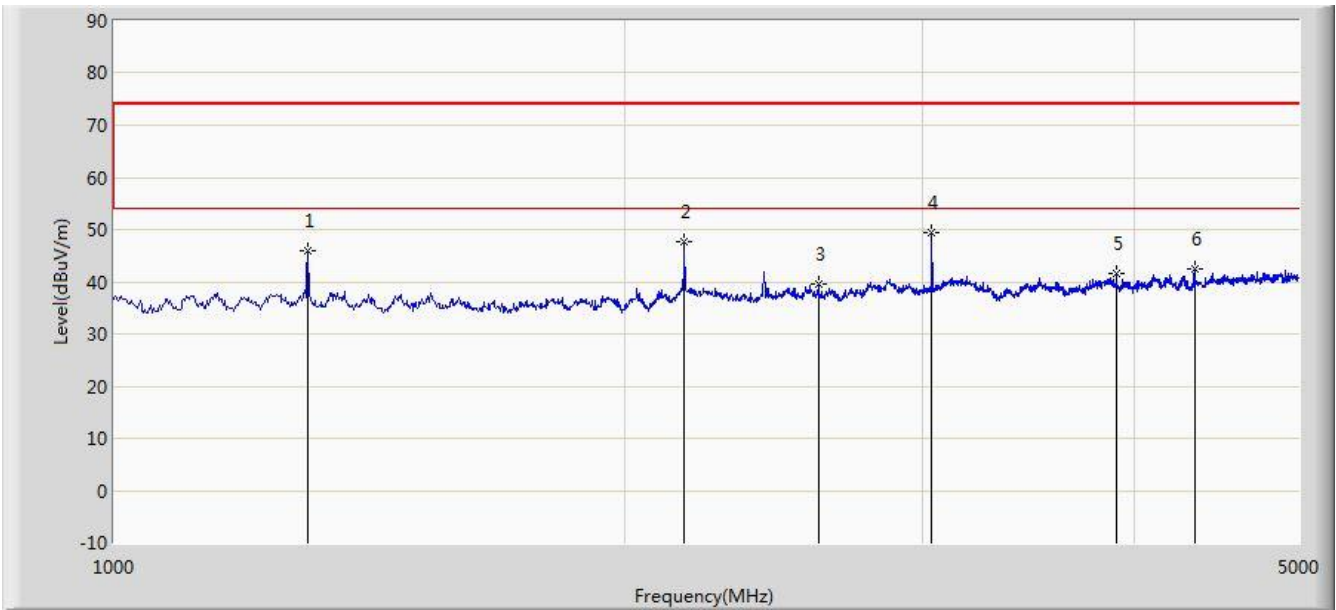
Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB).

AV Measure Level = Peak Measure Level + Duty Cycle Factor.

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

Site: AC2	Time: 2017/12/23 - 16:11
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Wireless digital thermometer	Power: By Battery
Test Mode: Transmit	



No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	1302.000	48.958	-2.966	N/A	45.992	72.866	-26.874	PK
	1302.000	48.958	-2.966	17.230	28.762	52.866	-24.104	AV
2	2170.000	48.145	-0.325	N/A	47.820	72.866	-25.046	PK
	2170.000	48.145	-0.325	17.230	30.590	52.866	-22.276	AV
3	2604.000	39.925	-0.235	N/A	39.690	72.866	-33.176	PK
	2604.000	39.925	-0.235	17.230	22.460	52.866	-30.406	AV
4	3038.000	49.321	0.104	N/A	49.425	72.866	-23.441	PK
	3038.000	49.321	0.104	17.230	32.195	52.866	-20.671	AV
5	3904.000	39.173	2.415	N/A	41.588	72.866	-31.278	PK
	3904.000	39.173	2.415	17.230	24.358	52.866	-28.508	AV
6	4340.000	38.552	4.031	N/A	42.583	72.866	-30.283	PK
	4340.000	38.552	4.031	17.230	25.353	52.866	-27.513	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

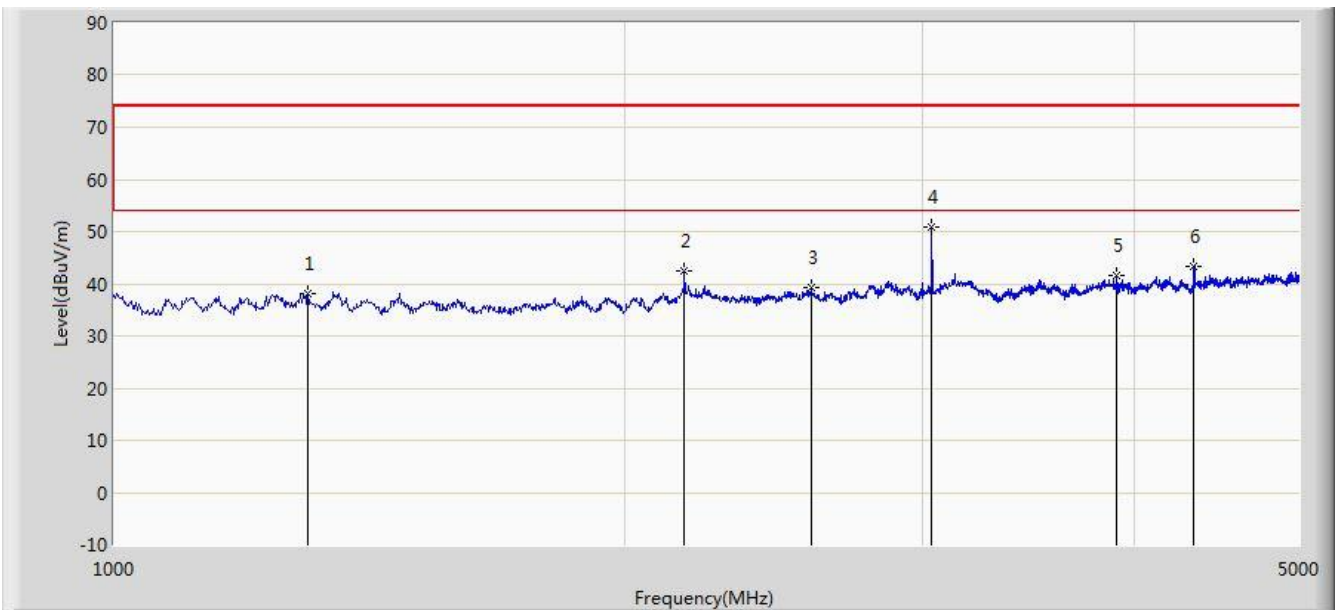
Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB).

AV Measure Level = Peak Measure Level - Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Site: AC2	Time: 2017/12/23 - 16:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Jone Zhang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Wireless digital thermometer	Power: By Battery
Test Mode: Transmit	



No	Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Type
1	1302.000	41.087	-2.966	N/A	38.121	72.866	-34.745	PK
	1302.000	41.087	-2.966	17.230	20.891	52.866	-31.975	AV
2	2170.000	42.871	-0.325	N/A	42.546	72.866	-30.320	PK
	2170.000	42.871	-0.325	17.230	25.316	52.866	-27.550	AV
3	2578.000	39.668	-0.357	N/A	39.311	72.866	-33.555	PK
	2578.000	39.668	-0.357	17.230	22.081	52.866	-30.785	AV
4	3038.000	50.750	0.104	N/A	50.854	72.866	-22.012	PK
	3038.000	50.750	0.104	17.230	33.624	52.866	-19.242	AV
5	3906.000	39.206	2.411	N/A	41.617	72.866	-31.249	PK
	3906.000	39.206	2.411	17.230	24.387	52.866	-28.479	AV
6	4338.000	39.295	4.041	N/A	43.336	72.866	-29.530	PK
	4338.000	39.295	4.041	17.230	26.106	52.866	-26.760	AV

Note 1: Testing is carried out with frequency rang 9 kHz to the tenth harmonics. There is the ambient noise within frequency range 9 kHz ~ 30 MHz, the permissible value is not show in the report.

Note 2: The fundamental frequency is 433.92MHz, so the fundamental and spurious emissions radiated limit base on the operating frequency 433.92MHz.

Note 3: Peak Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB).

AV Measure Level = Peak Measure Level - Duty Cycle Factor.

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

6.3. 20dB Bandwidth

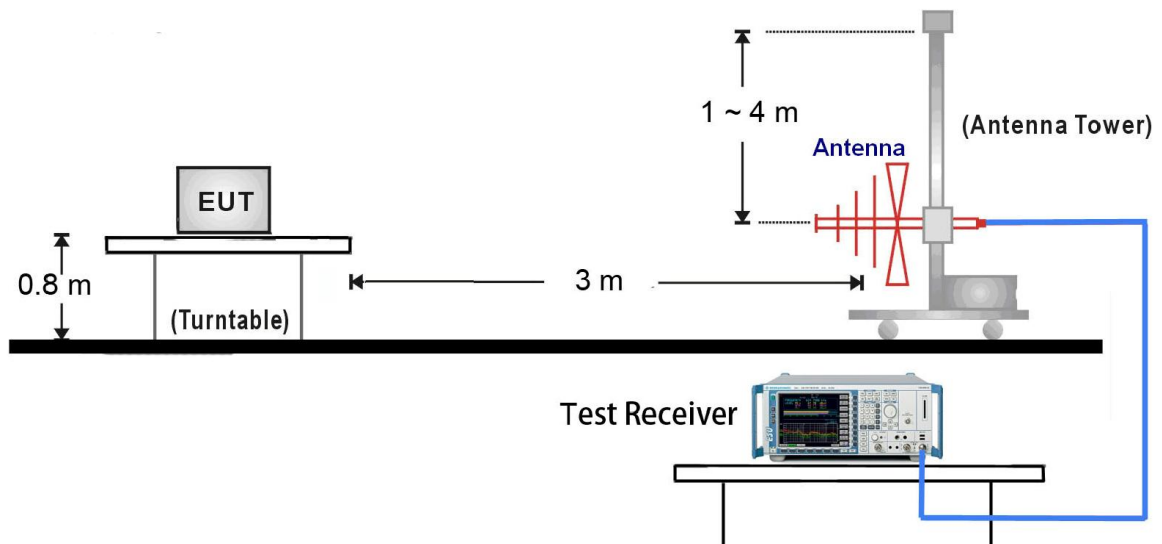
6.3.1. Standard Applicable

According to FCC Part 15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

6.3.2. Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

6.3.3. Test Setup

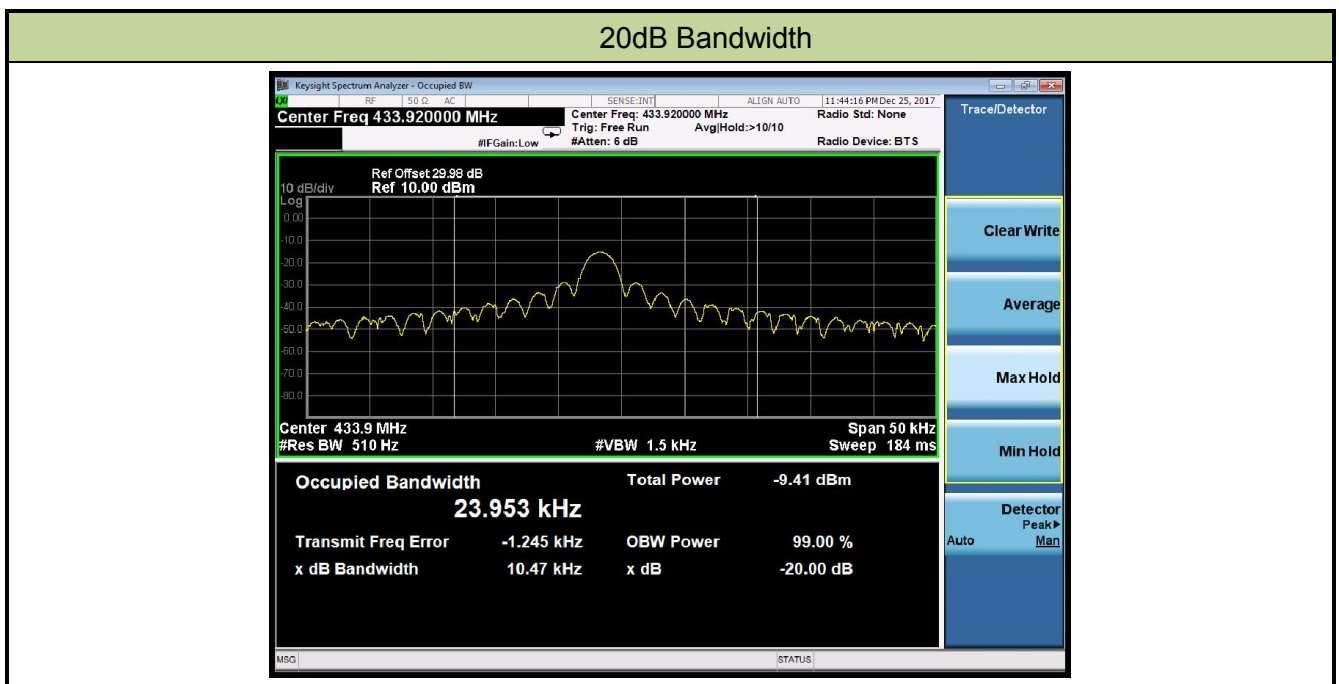


6.3.4. Test Result

Product	Wireless digital thermometer	Temperature	24°C
Test Engineer	Jone Zhang	Relative Humidity	45%
Test Site	AC2	Test Date	2017/12/25

Test Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
433.92	10.47	≤ 1084.80	Pass

Limit = Fundamental Frequency * 0.25% = 433.92 MHz * 0.25% = 1084.80 kHz



6.4. Transmission Time

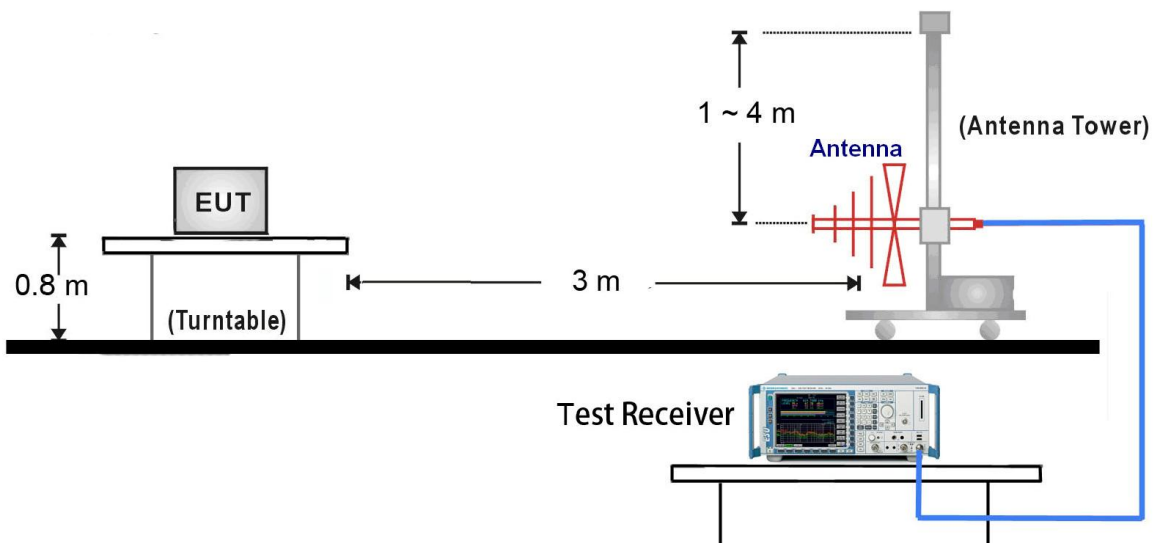
6.4.1. Standard Applicable

According to FCC 15.231(e), devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

6.4.2. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

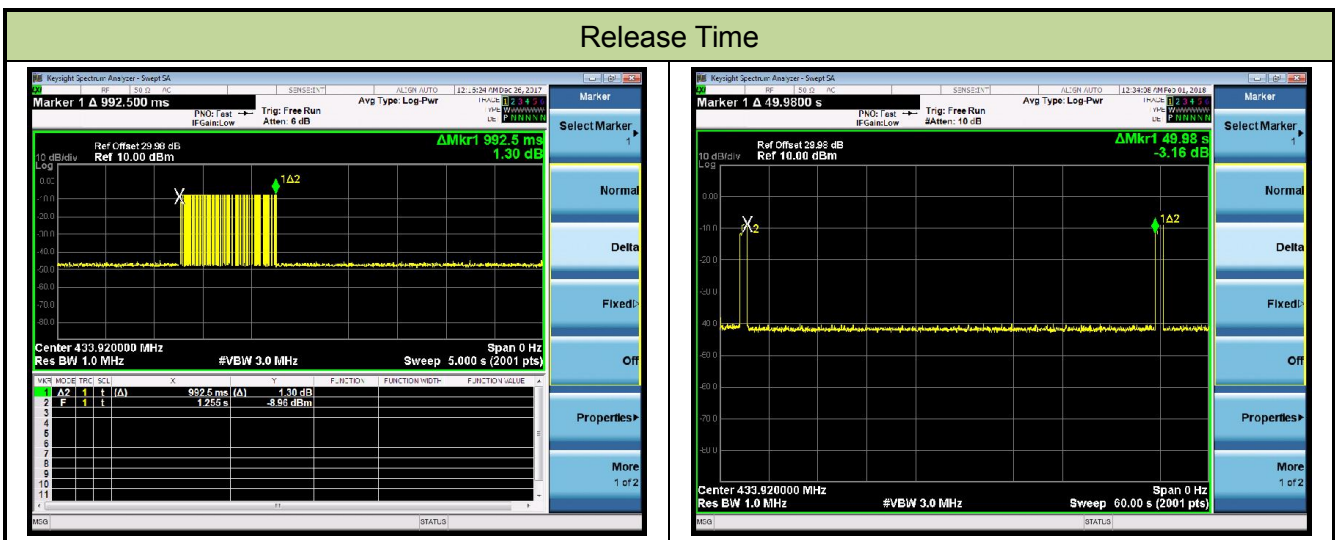
6.4.3. Test Setup



6.4.4. Test Result

Product	Wireless digital thermometer	Temperature	24°C
Test Engineer	Jone Zhang	Relative Humidity	45%
Test Site	AC2	Test Date	2017/12/25

Test Frequency (MHz)	Test Item	Measured Value	Limit	Result
433.92	Transmission Time(T_{on})	992.5 ms	≤ 1 s	Pass
	Silent Time	49.98 s	≥ 10 s	Pass
	Silent Time/Transmission Time	50.36	≥ 30 times	Pass



6.5. Duty Cycle

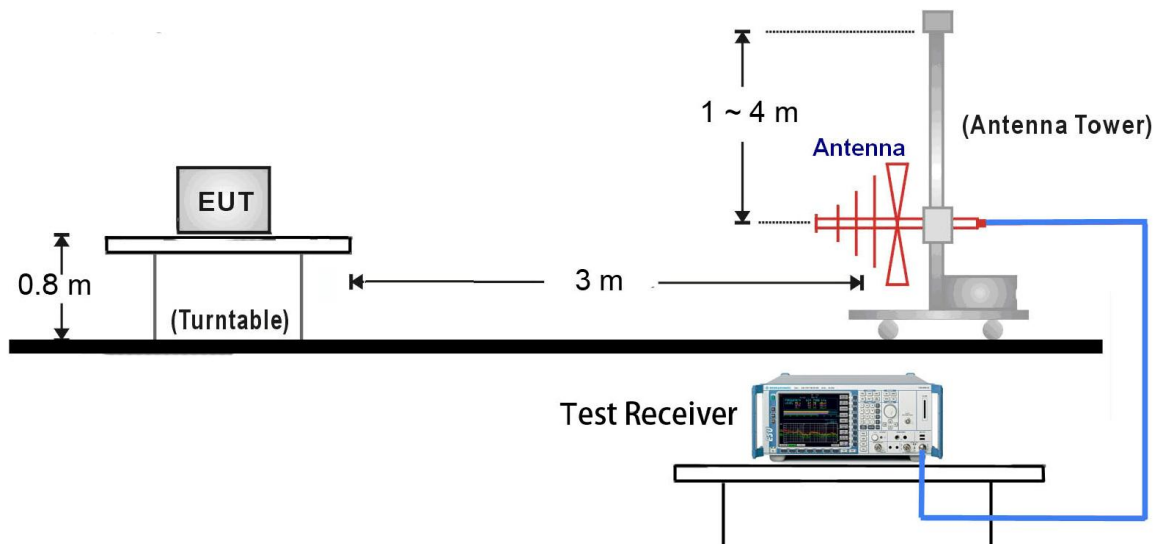
6.5.1. Standard Applicable

According to FCC Part 15.231(b) and 15.35(c), for pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

6.5.2. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

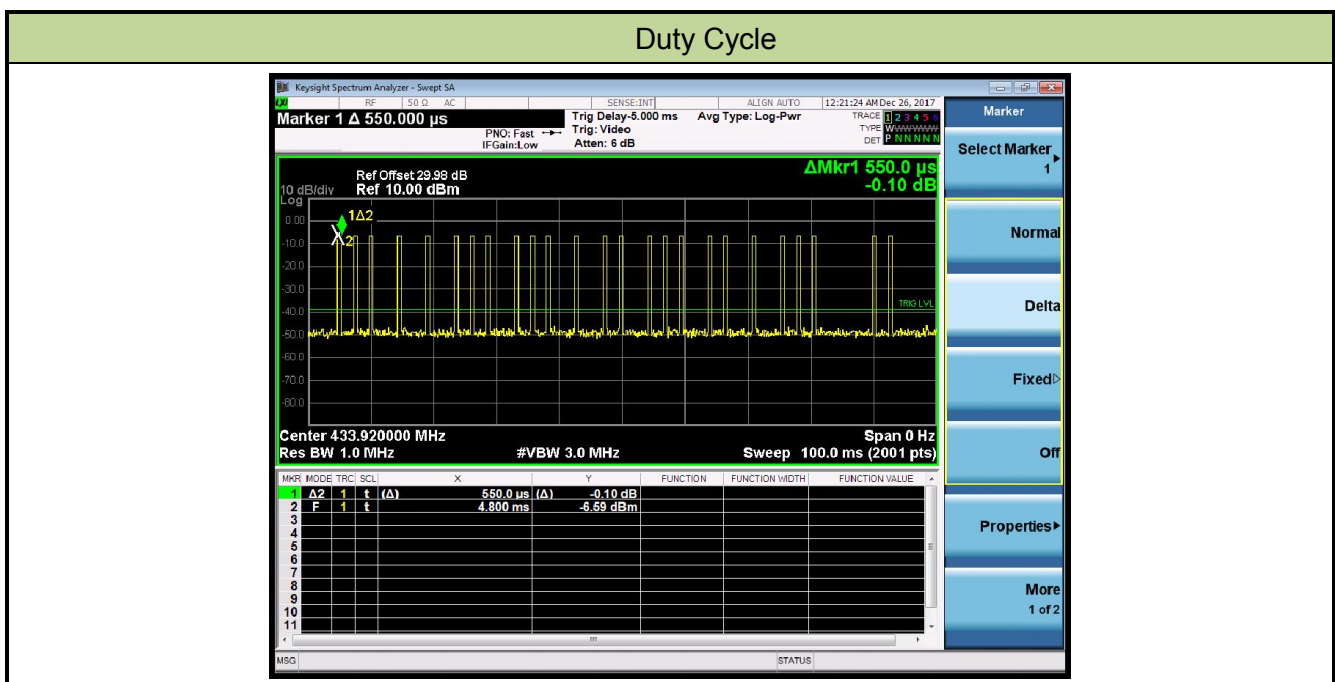
6.5.3. Test Setup



6.5.4. Test Result

Product	Wireless digital thermometer	Temperature	24°C
Test Engineer	Jone Zhang	Relative Humidity	45%
Test Site	AC2	Test Date	2017/12/25

Test Frequency (MHz)	Total Time (Ton) (ms)	The duration of one cycle (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
433.92	13.75	100	13.75	17.23



Note 1: Total Time (Ton)(ms) / 100 ms = 0.55*25 =13.75(ms)

Note 2: Note: Duty Cycle Factor = 20*Log(1/Duty Cycle).

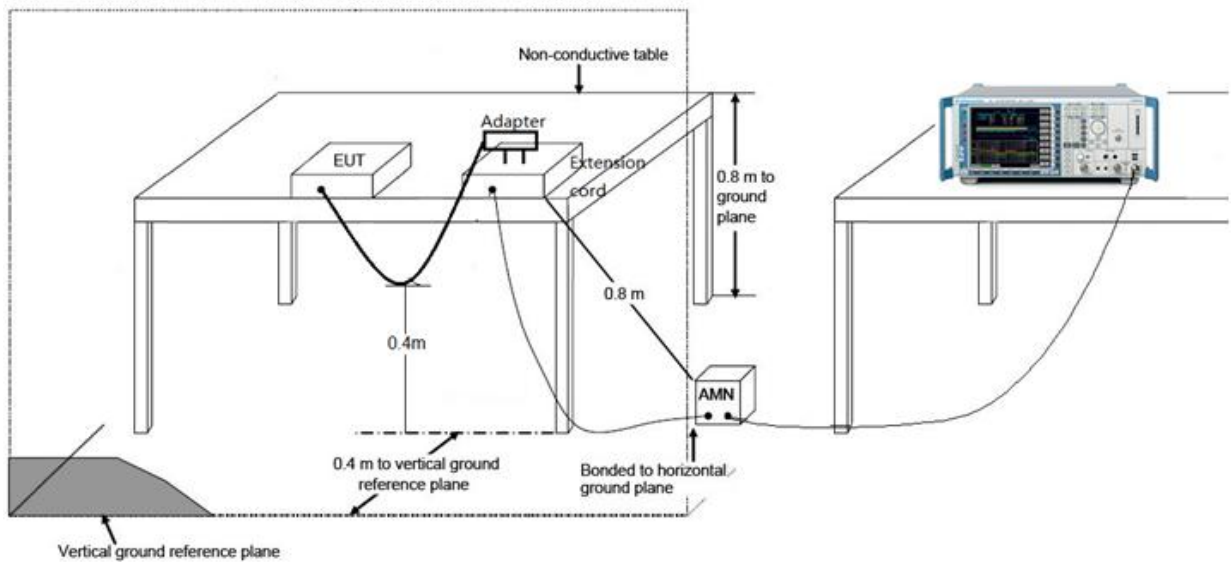
6.6. AC Conducted Emissions Measurement

6.6.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.
 Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.6.2. Test Setup



6.6.3. Test Result

The device powered by dry cell, not applicable with this test item.

7. CONCLUSION

The data collected relate only the item(s) tested and show that the **Wireless digital thermometer** **FCC ID: 2AJ90-FGT433A2** is in compliance with FCC Part 15.231 of the FCC Rules.

_____ The End _____