

FCC RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the procedures in ANSI C63.10(2013).

Applicant : Shunde Advante Electron Ltd.
Address : North Second XinXi Road, LunJiao Industrial Avenue, LunJiao, Shunde, Foshan, Guangdong, China
Manufacturer/ Factory : Shunde Advante Electron Ltd.
Address : North Second XinXi Road, LunJiao Industrial Avenue, LunJiao, Shunde, Foshan, Guangdong, China
E.U.T. : Kinetic Wireless Doorbell
Brand Name : N/A
Model No. : FE, FA, FB, FNB(For model difference refer to section 1)
FCC ID : Q2I2019FE
Measurement Standard : FCC PART 15.231
Date of Receiver : September 02, 2019
Date of Test : September 03, 2019 September 28, 2019
Date of Report : December 30, 2019

This Test Report is Issued Under the Authority of :

Prepared by


Steven Wu / Engineer

Approved/Authorized Signer


Lori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

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Revision History of This Test Report

Report Number	Description	Issued Date
NTC1909016FV00	Initial Issue	2019-12-30

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

E.U.T.	: Kinetic Wireless Doorbell
Main Model Name	: FE
Additional Model name	: FA, FB, FNB
Rating	: DC 3.0V(by kinetic bell push button)
Adapter	: N/A
Test Voltage	: DC 3.0V
Cable	: N/A
I/O Port	: N/A
Hardware version	: V1.0
Software version	: V1.0
Description of model difference	: These models have the same circuitry, electrical mechanical, PCB layout and physical construction. The differences in model number and color of appearance due to trading purpose.
Note	: N/A
Remark	: According these model difference, all tests were carried on model FE.

Technical parameters

Declaring the Frequency: : 433.92MHz

Modulation : FSK

Antenna Type : Integral Antenna

Antenna Gain : 0dBi

Channelized system/
Non-channelized system : Non-channelized system

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **Q2I2019FE** filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rule.

1.3 Test Methodology

The radiated emission measurement was performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

None

1.6 Test Facility and Location

Site Description

EMC Lab : Listed by CNAS, August 13, 2018
The certificate is valid until August 13, 2024
The Laboratory has been assessed and proved to
be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017
The certificate is valid until December 31, 2021
The Laboratory has been assessed and proved to
be in compliance with ISO17025
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017
The Designation Number is CN1214
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number. Is 46405-9743
Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

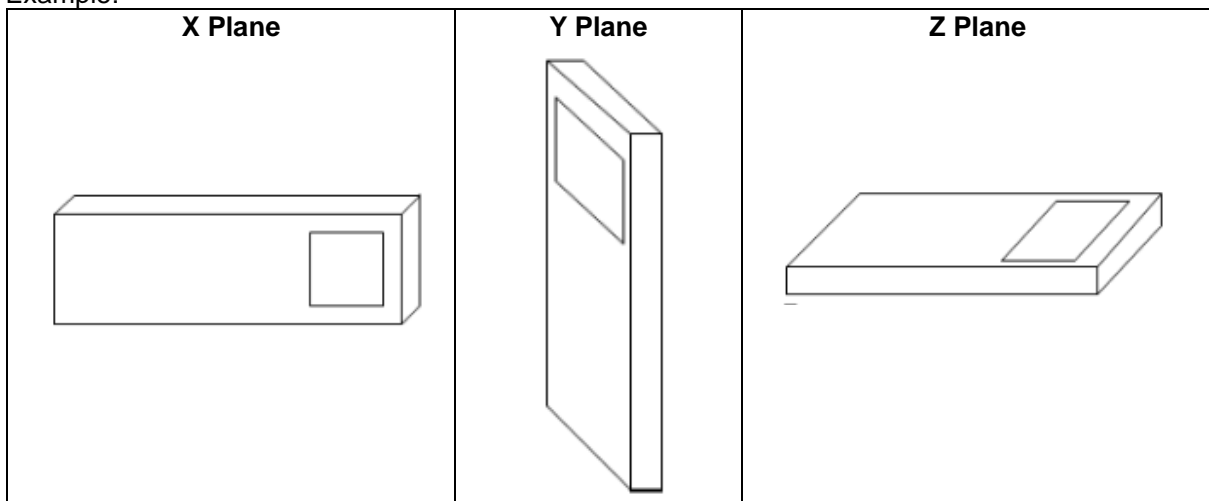
Site Location : Building D, Gaosheng Science and Technology
Park, Hongtu Road, Nancheng District, Dongguan
City, Guangdong Province, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	AC Power Conducted Emission	N/A ^{see note 2}
§15.231&15.209	Radiated Emission	Compliant
§15.231(c)	Occupied bandwidth	Compliant
§15.231(a)	Transmission time	Compliant
§15.203	Antenna Requirement	Compliant

- Note: 1. The EUT has been tested as an independent unit. And Continual transmitting in maximum power.
2. This product will not be connected to the AC mains during normal use, therefore the AC Power Conducted Emission project test is not applicable.
3. The EUT operating multiple positions, therefore the EUT shall be performed three orthogonal planes. The worst plane is X.

Example:



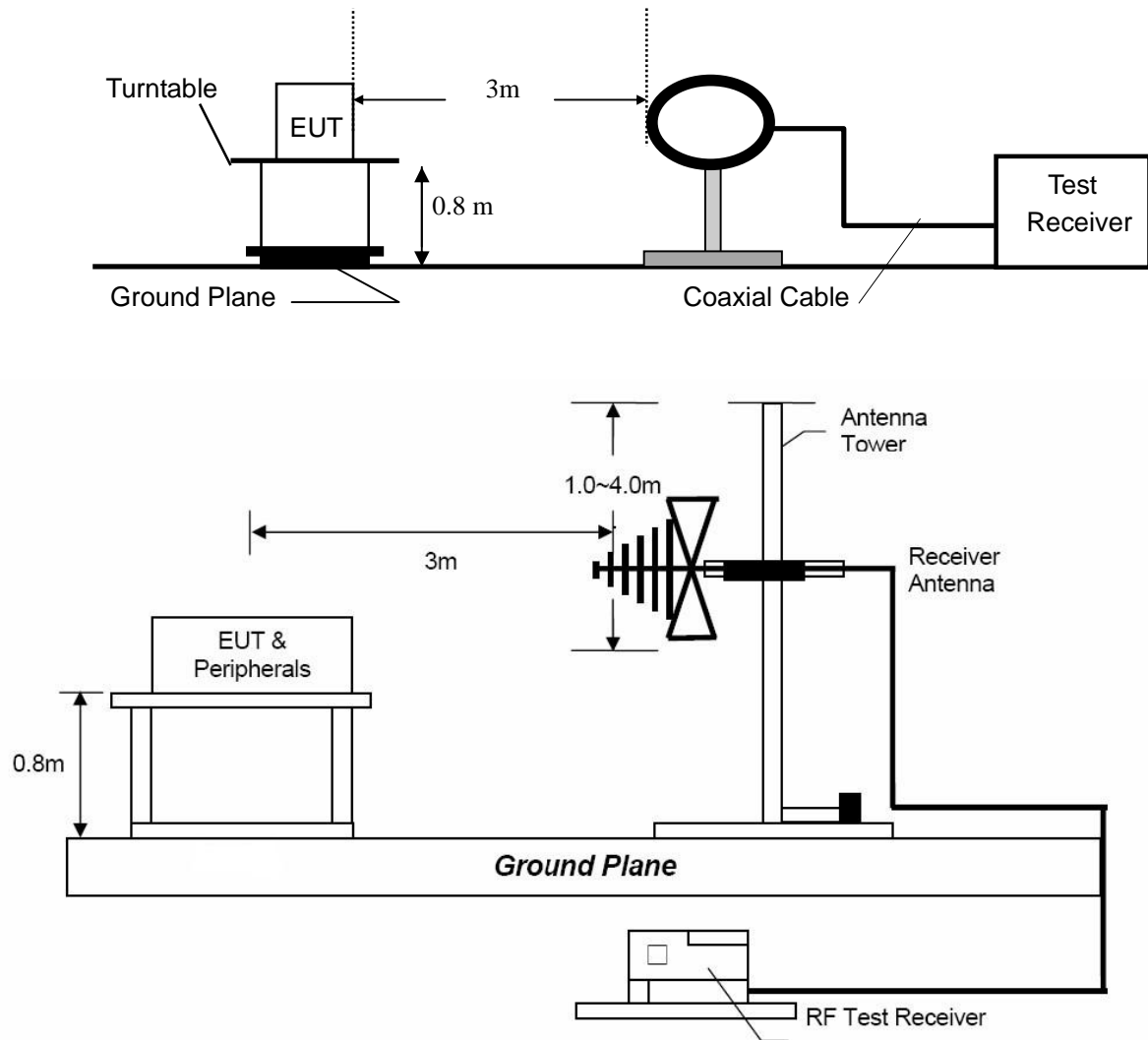
1.8 Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

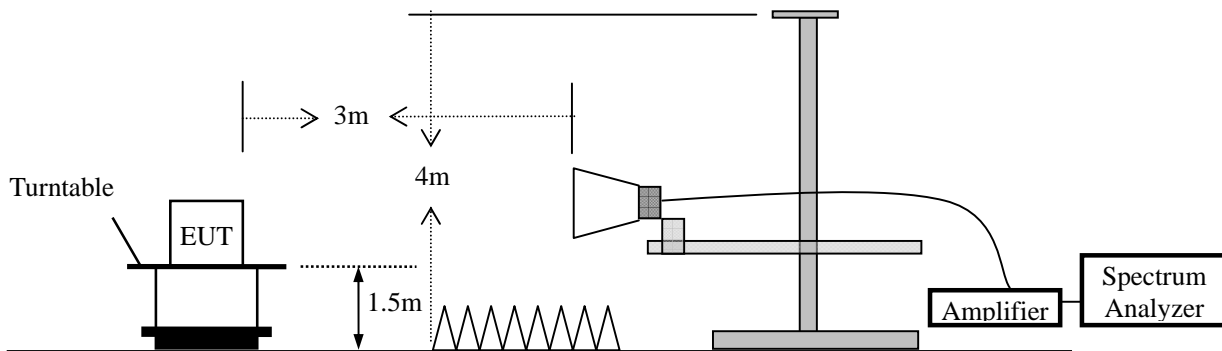
2. Radiated Emission Test

2.1 Test SET-UP (Block Diagram of Configuration)

(1) Radiated Emission Test Set-Up, Frequency Below 30MHz



(2) Radiated Emission Test Set-Up, Frequency above 1GHz



2.2 Measurement Procedure

- Blow 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- For the radiated emission test above 1GHz:
The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	Peak+ AV Factor	

2.3 Limit

Table A [0.009MHz~1GHz]

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)
		$\mu\text{V/m}$
0.009 ~ 0.490	300	$2400/F(\text{kHz})$
0.490 ~ 1.705	30	$24000/F(\text{kHz})$
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

- Remark :
- (1) Emission level (dB) μV = 20 log Emission level $\mu\text{V/m}$
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 - (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

Table B

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious Emissions	
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
40.66-40.70	2250	67.04	225	47.04
70-130	1250	61.94	125	41.94
130-174	1250-3370**	61.9-70.55	125-375**	41.94-51.48
174-260	3750	71.48	375	51.48
260-470	3750-12500**	71.48-81.94	375-1250**	51.48-61.94
Above 470	12500	81.94	1250	61.94

**) Linear interpolations

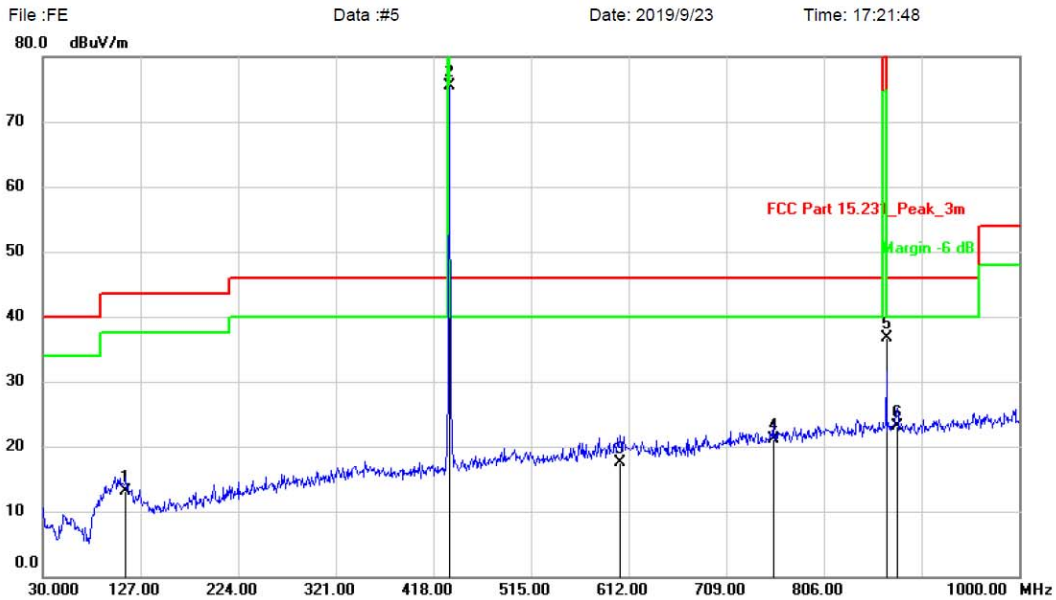
2.4 Measurement Results

- Note: (1) Emission Level= Reading Level+Probe Factor +Cable Loss
 (2) Factor= Antenna Gain + Cable Loss – Amplifier Gain
 (3) Measurement uncertainty: $\pm 4.60\text{dB}$
 (4) Emission (the row indicated by bold) within the restricted band meets the requirement of FCC part 15 Section 15.205.
 (5) Horn antenna used for the emission over 1000MHz.



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Radiated Emission Measurement



Site: 3m Chamber

Polarization: **Horizontal**

Temperature: 26

Limit: FCC Part 15.231_Peak_3m

Power: DC 3V

Humidity: 47 %

EUT: Kinetic Wireless Doorbell

Distance: 3m

M/N: FE

Mode: TX

Note:

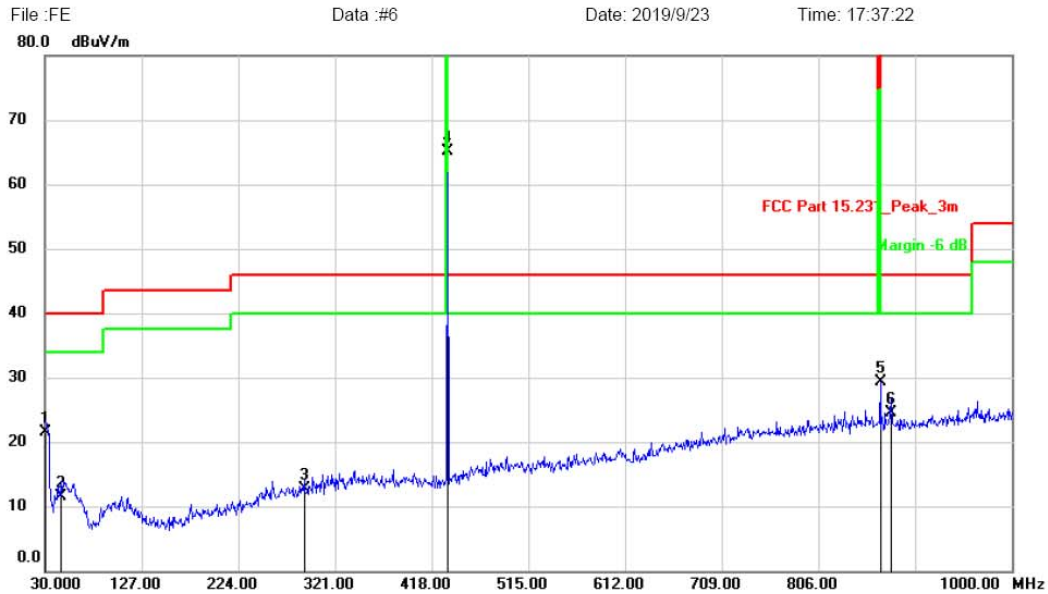
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table
		MHz	Level	Factor	ment			Height	Degree
			dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree
1		112.4500	25.77	-12.57	13.20	43.50	-30.30	QP	
2		433.5200	83.80	-8.35	75.45	100.80	-25.35	peak	
3		603.2700	22.60	-5.00	17.60	46.00	-28.40	QP	
4		755.5600	23.72	-2.52	21.20	46.00	-24.80	QP	
5		867.8400	37.74	-1.12	36.62	80.80	-44.18	peak	
6	*	878.7500	24.34	-1.14	23.20	46.00	-22.80	QP	

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.



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Radiated Emission Measurement



Site: Polarization: **Vertical** Temperature: 26
Limit: FCC Part 15.231_Peak_3m Power: DC 3V Humidity: 47 %
EUT: Kinetic Wireless Doorbell Distance: 3m
M/N: FE
Mode: TX
Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	30.9700	37.43	-15.83	21.60	40.00	-18.40	QP			
2		46.4900	25.20	-13.60	11.60	40.00	-28.40	QP			
3		289.9600	25.56	-12.76	12.80	46.00	-33.20	QP			
4		433.9200	76.49	-11.35	65.14	100.80	-35.66	peak			
5		868.0800	30.39	-1.12	29.27	80.80	-51.53	peak			
6		878.7500	25.74	-1.14	24.60	46.00	-21.40	QP			

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.



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Radiated Emission Measurement

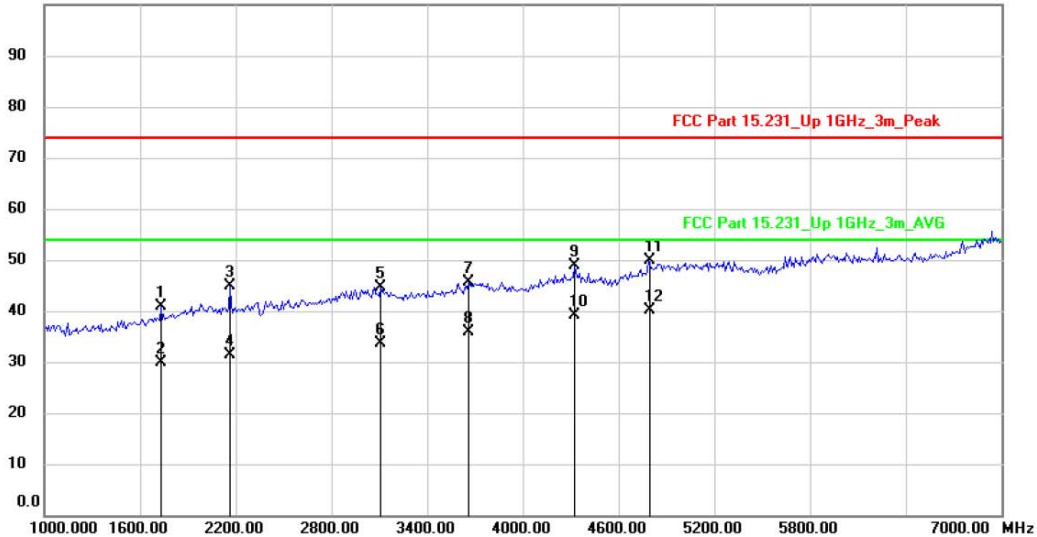
File :FE

Data :#7

Date: 2019/9/23

Time: 17:45:02

100.0 dBuV/m



Site

Polarization: **Horizontal**

Temperature: 26

Limit: FCC Part 15.231_Up 1GHz_3m_Peak

Power: DC 3V

Humidity: 47 %

EUT: Kinetic Wireless Doorbell

Distance: 3m

M/N: FE

Mode: TX

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		1730.769	48.43	-7.56	40.87	74.00	-33.13	peak		
2		1730.769	37.34	-7.56	29.78	54.00	-24.22	AVG		
3		2163.461	49.89	-4.91	44.98	74.00	-29.02	peak		
4		2163.461	36.40	-4.91	31.49	54.00	-22.51	AVG		
5		3105.769	46.01	-1.38	44.63	74.00	-29.37	peak		
6		3105.769	34.92	-1.38	33.54	54.00	-20.46	AVG		
7		3663.461	45.69	-0.11	45.58	74.00	-28.42	peak		
8		3663.461	35.89	-0.11	35.78	54.00	-18.22	AVG		
9		4326.923	47.00	1.77	48.77	74.00	-25.23	peak		
10		4326.923	37.44	1.77	39.21	54.00	-14.79	AVG		
11		4788.462	45.99	3.98	49.97	74.00	-24.03	peak		
12	*	4788.462	36.25	3.98	40.23	54.00	-13.77	AVG		

Other emissions are lower than 20dB below the allowable limit. And according to FCC rule, they had not recorded in the report.



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Radiated Emission Measurement

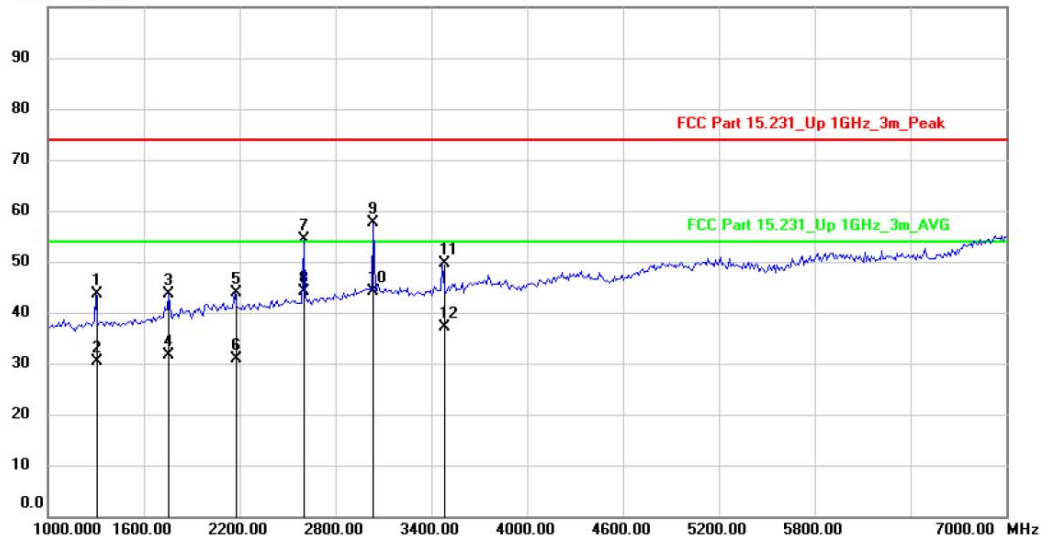
File :FE

Data :#8

Date: 2019/9/23

Time: 17:59:21

100.0 dBuV/m



Site

Polarization: **Vertical**

Temperature: 26

Limit: FCC Part 15.231_Up 1GHz_3m_Peak

Power: DC 3V

Humidity: 47 %

EUT: Kinetic Wireless Doorbell

Distance: 3m

M/N: FE

Mode: TX

Note:

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	1298.077	53.57	-10.04	43.53	74.00	-30.47	peak		
2	1298.077	40.32	-10.04	30.28	54.00	-23.72	AVG		
3	1759.615	50.84	-7.32	43.52	74.00	-30.48	peak		
4	1759.615	38.88	-7.32	31.56	54.00	-22.44	AVG		
5	2173.077	48.79	-4.88	43.91	74.00	-30.09	peak		
6	2173.077	35.66	-4.88	30.78	54.00	-23.22	AVG		
7	2605.769	57.70	-3.35	54.35	74.00	-19.65	peak		
8 *	2605.769	47.55	-3.35	44.20	54.00	-9.80	AVG		
9	3038.461	58.99	-1.44	57.55	74.00	-16.45	peak		
10	3038.461	45.61	-1.44	44.17	54.00	-9.83	AVG		
11	3471.154	50.34	-0.67	49.67	74.00	-24.33	peak		
12	3471.154	37.88	-0.67	37.21	54.00	-16.79	AVG		

Other emissions are lower than 20dB below the allowable limit. And according to FCC rule, they had not recorded in the report.

For Duty Cycle

Average should be determined by duty cycle factor.

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

The duration of one cycle = 6.100ms <100ms

Effective period of the cycle =

$Ton1 * Number = 4.500 * 16.5 = 74.25ms$

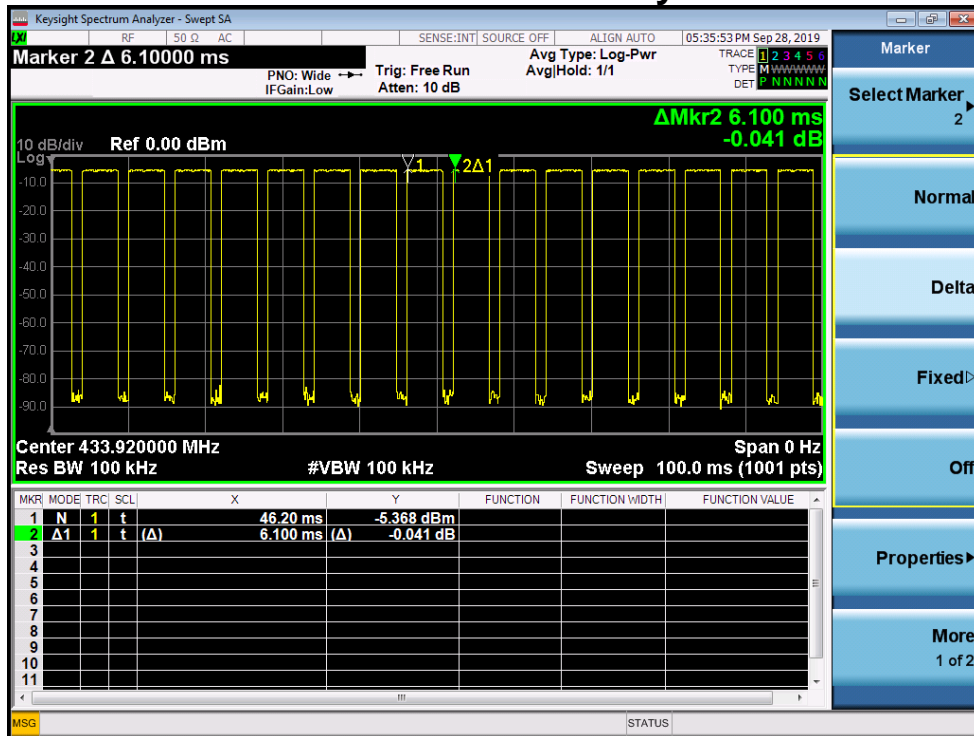
Duty cycle = $74.25 / 100 = 74.25\%$

AV Factor = $20 \log 0.7425 = -2.586$

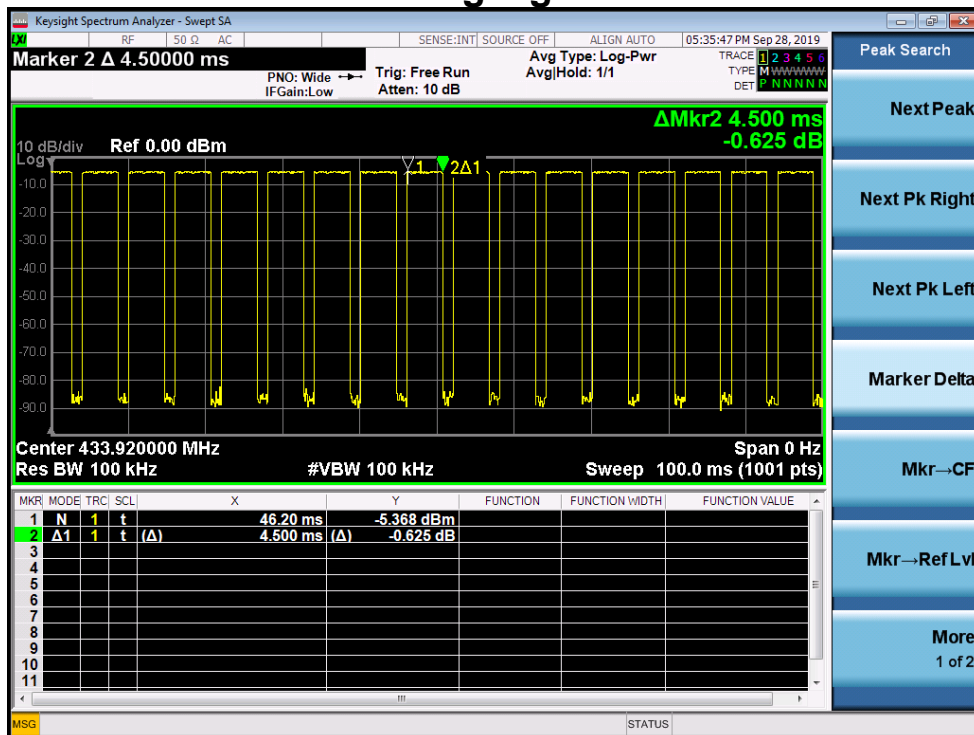
The value of Average = The value of Peak + AV Factor.

Example: For 433.92MHz, $AV = 75.45(\text{Peak}) - 2.586(\text{AV factor}) = 72.864$ Details please see the following plots.

The duration of one cycle



16long signals



3. Occupied Bandwidth

3.1 Measurement Procedure

Same as section 2.2.

3.2 Test SET-UP (Block Diagram of Configuration)

Same as section 2.1.

3.3 Limit

Please refer section 15.231

According to 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.

$$\text{Limit} = 433.92 * 0.25\% = 1.08 \text{ MHz}$$

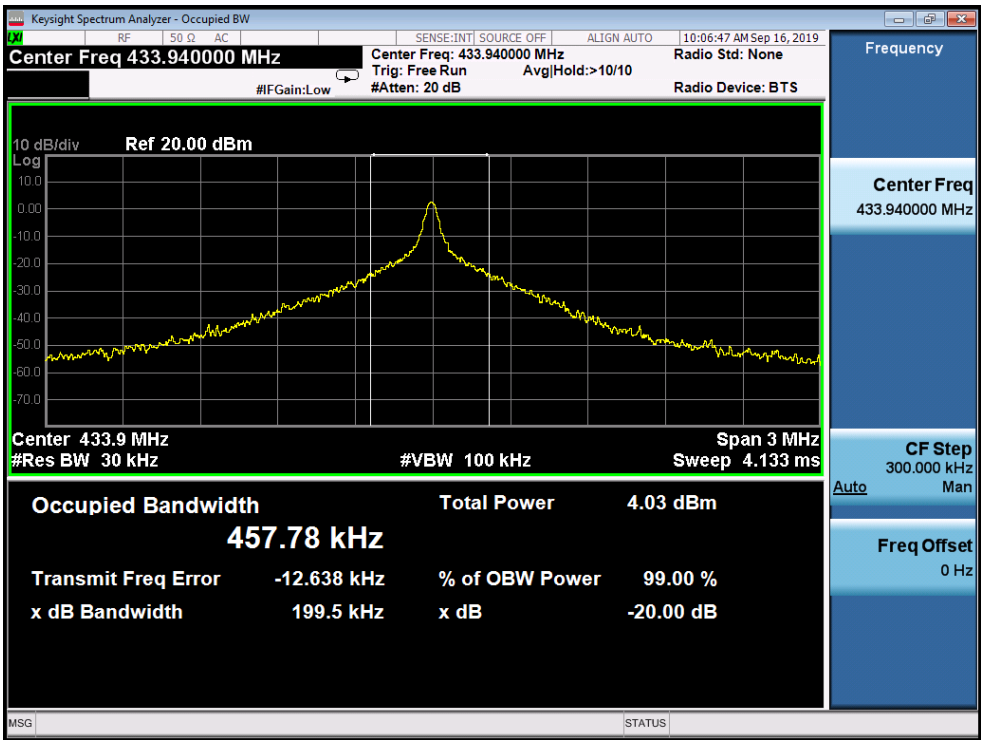
3.4 Measurement Results

20dB Bandwidth	Limit
199.5KHz	1.08MHz

Please refer to the following plot.



20dB Bandwidth



4 Transmission Time

4.1 Measurement Procedure

Same as section 2.2.

4.2 Test SET-UP (Block Diagram of Configuration)

Same as section 2.1.

4.3 Limit

According to 15.231(a)(2), A transmitter activated automatically shall cease transmission within 5 seconds after activation.

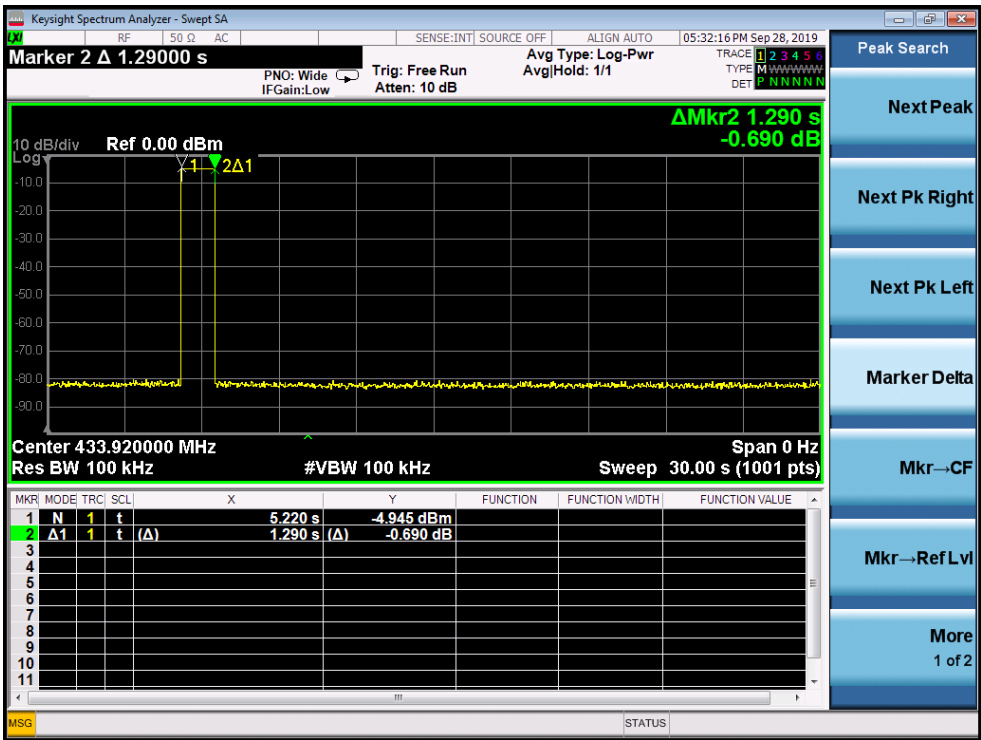
4.4 Measurement Results

Transmission Time	Limit
1.290s	5s

Please refer to the following plot.



Transmission Time



5. Antenna Application

5.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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.

5.2 Measurement Results

The antenna is integral antenna and no consideration of replacement, and the best case gain of the antenna is 0dBi. So, the antenna is consider meet the requirement.

6. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Mar. 13, 2019	Mar. 12, 2020
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Mar. 14, 2019	Mar. 13, 2020
Cable	Huber+Suhner	CBL2-NN-1M	22390001	9KHz~7GHz	Mar. 13, 2019	Mar. 12, 2020
Cable	Huber+Suhner	CIL02	N/A	9KHz~7GHz	Mar. 13, 2019	Mar. 12, 2020
RF Cable	Huber+Suhner	SF-104	MY16559/4	9KHz~25GHz	Apr. 25, 2019	Apr. 25, 2020
Power Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Mar. 13, 2019	Mar. 12, 2020
Horn Antenna	Schwarzbeck	BBHA9170	9170-242	15GHz~40GHz	Mar. 13, 2019	Mar. 12, 2020
Horn Antenna	Com-Power	AH-118	071078	1GHz~18GHz	Mar. 14, 2019	Mar. 13, 2020
RF Cable	Huber+Suhner	SF-104	N/A	9KHz~40GHz	Apr. 25, 2019	Apr. 24, 2020
Loop antenna	Daze	ZA30900A	0708	9KHz~30MHz	Apr. 25, 2019	Apr. 24, 2020
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	20Hz~26.5GHz	Apr. 25, 2019	Apr. 24, 2020
Spectrum Analyzer	Rohde & Schwarz	FSV40	101003	10Hz~40GHz	Apr. 06, 2019	Apr. 05, 2020
Pre-Amplifier	EMCI	EMC 184045	980102	18GHz~40GHz	Nov. 03, 2019	Nov. 02, 2020
Pre-Amplifier	Agilent	8449B	3008A02964	1GHz~26.5GHz	Apr. 25, 2019	Apr. 24, 2020
L.I.S.N.	Rohde & Schwarz	ENV 216	101317	9KHz~30MHz	Mar. 13, 2019	Mar. 12, 2020
Temporary antenna connector	TESCOM	SS402	N/A	9KHz-25GHz	N/A	N/A
Power Meter	Anritsu	ML2495A	1139001	100k-65GHz	Nov. 03, 2019	Nov. 02, 2020
Power Sensor	Anritsu	MA2411B	100345	300M-40GHz	Nov. 03, 2019	Nov. 02, 2020

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

---End---