

FCC - TEST REPORT

Report Number : **60.792.19.004.01R01** Date of Issue : June 28, 2019

Model : **HG04522A-US-TX, HG04522B-US-TX**

Product Type : **Wireless Doorbell**

Applicant : Lidl US, LLC

Address : 3500 S Clark Street, ARLINGTON VA 22202

Production Facility : PUTIAN DIOR INDUSTRIAL CO., LTD.

Address : Linan Industrial Area, Xianyou County, Putian, Fujian, China

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : 18

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2 Description of Equipment Under Test

Description of the Equipment Under Test

Product:	Wireless Doorbell
Model no.:	HG04522A-US-TX, HG04522B-US-TX
FCC ID:	2AJ9O-HG04522TX
Rating:	3 VDC (1 x CR2302 battery)
Frequency:	433.92MHz(Tx)
Antenna gain:	0 dBi
Number of operated channel:	1
Modulation:	OOK(2ASK)

3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C 10-1-18 Edition Federal Communications Commission, PART 15 — Radio Frequency Devices, Subpart C — Unintentional Radiators

All the tests were performed using the procedures from ANSI C63.4(2014) and ANSI C63.10 (2013).

4 Details about the Test Laboratory

Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13 Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2,
Shenzhen 518052, P.R.China
FCC Registration Number: 514049

Emission Tests	
Test Item	Test Site
FCC Part 15 Subpart C	
FCC Title 47 Part 15.205, 15.209 & 15.231(b) Radiated Emission	Site1
FCC Title 47 Part 15.207 Conduct Emission	NIL
FCC Title 47 Part 15.231(c) 20dB Bandwidth	Site 1
FCC Title 47 Part 15.247(e) Deactivation Time	Site 1

4.1 Test Equipment Site List

Radiated emission Test – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2019-7-6
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2019-7-6
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2019-6-28
Horn Antenna	Rohde & Schwarz	HF907	102294	2019-6-28
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2019-7-12
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2019-7-6
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2019-7-6
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2019-7-6
Attenuator	Agilent	8491A	MY39264334	2019-7-6
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

20dB Bandwidth, Deactivation Time – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2019-7-6

4.2 Measurement System Uncertainty

Measurement System Uncertainty Emissions

System Measurement Uncertainty	
Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.46dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz	Horizontal: 4.80dB; Vertical: 4.79dB;
Uncertainty for Conducted RF test	2.13dB
Uncertainty for Frequency RF test	0.6×10^{-7}

5 Summary of Test Results

Emission Tests				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
FCC Title 47 Part 15.205, 15.209 & 15.231(b) Radiated Emission	10-13	☒	☐	☐
FCC Title 47 Part 15.207 Conduct Emission (1)	NIL	☐	☐	☒
FCC Title 47 Part 15.231(c) 20dB Bandwidth	14	☒	☐	☐
FCC Title 47 Part 15.247(a) Deactivation Time	15	☒	☐	☐

Remark:

1) Conducted Emission testing is not applicable for battery operated device.

6 General Remarks

Remarks

Client informs that the **HG04522B-US-TX** have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction with **Wireless Doorbell, HG04522A-US-TX**. The difference lies only on the different color of the different models. (Client's conformation letter shown at appendix A)

All tests were performed on model **HG04522A-US-TX**.

This submittal(s) (test report) is intended for **FCC ID: 2AJ90-HG04522TX**, complies with Section 15.205, 15.207, 15.209, 15.231 of the FCC Part 15, Subpart C rules.

The TX frequency is 433.92MHz.

SUMMARY:

- All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

- The Equipment Under Test

■ - **Fulfills** the general approval requirements.

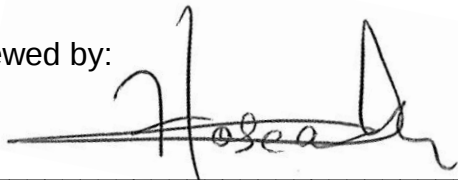
□ - **Does not** fulfill the general approval requirements.

Sample Received Date: May 8, 2019

Testing Start Date: May 10, 2019

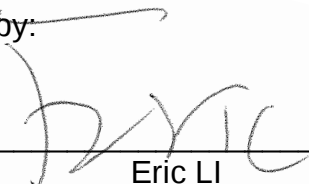
Testing End Date: June 28, 2019

Reviewed by:



Hosea CHAN
EMC Project Engineer

Prepared by:



Eric LI
EMC Senior Project Engineer

7 Emission Test Results

7.1 Spurious Radiated Emission

EUT: HG04522A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.205, 15.209 & 15.231(b) Antenna: Horizontal
 Comment: 3 VDC
 Remark: 9kHz to 5GHz

Test Result	
☒	Passed
☐	Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Corr. (dB)
433.92	87.91	100.83	-12.92	Peak	-23.3
867.84	62.58	80.83	-18.25	Peak	-16.0
1301.76	39.85	74.00	-34.15	Peak	-11.7
2169.60	48.13	80.83	-32.70	Peak	-7.3
2603.52	41.56	80.83	-39.27	Peak	-4.2
3037.44	60.62	80.83	-20.21	Peak	-3.6
3471.36	61.25	80.83	-19.58	Peak	-0.5
3905.28	53.15	80.83	-27.68	Peak	-1.8
4339.20	46.24	80.83	-34.59	Peak	1.2

Duty cycle factor=-11.36

Average value = Peak value + Duty cycle factor

Frequency MHz	PK Result @3m dBμV/m	Duty Cycle Factor dB	AV Result @3m dBμV/m	Limit dBμV/m	Margin dB
433.92	87.91	-11.36	76.55	80.83	-4.28
867.84	62.58	-11.36	51.22	60.83	-9.61
1301.76	39.85	-11.36	28.49	54.00	-25.51
2169.60	48.13	-11.36	36.77	60.83	-24.06
2603.52	41.56	-11.36	30.20	60.83	-30.63
3037.44	60.62	-11.36	49.26	60.83	-11.57
3471.36	61.25	-11.36	49.89	60.83	-10.94
3905.28	53.15	-11.36	41.79	60.83	-19.04
4339.20	46.24	-11.36	34.88	60.83	-25.95

Spurious Radiated Emission

EUT: HG04522A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.205, 15.209 & 15.231(b) Antenna: Vertical
 Comment: 3 VDC
 Remark: 9kHz to 5GHz

Test Result	
☒	Passed
☐	Not Passed

Frequency MHz	Result dBμV/m	Limit dBμV/m	Margin dB	Detector PK/QP/AV	Corr. (dB)
433.92	74.33	100.83	-26.50	Peak	-23.2
867.84	47.83	80.83	-33.00	Peak	-15.9
2169.60	44.18	80.83	-36.65	Peak	-7.3
3037.44	54.97	80.83	-25.86	Peak	-3.8
3471.36	54.71	80.83	-26.12	Peak	-0.5
3905.28	46.20	80.83	-34.63	Peak	-1.8

Duty cycle factor=-11.36

Average value = Peak value + Duty cycle factor

Frequency MHz	PK Result @3m dBμV/m	Duty Cycle Factor dB	AV Result @3m dBμV/m	Limit dBμV/m	Margin dB
433.92	74.33	-11.36	62.97	80.83	-17.86
867.84	47.83	-11.36	36.47	60.83	-24.36
2169.60	44.18	-11.36	32.82	60.83	-28.01
3037.44	54.97	-11.36	43.61	60.83	-17.22
3471.36	54.71	-11.36	43.35	60.83	-17.48
3905.28	46.20	-11.36	34.84	60.83	-25.99

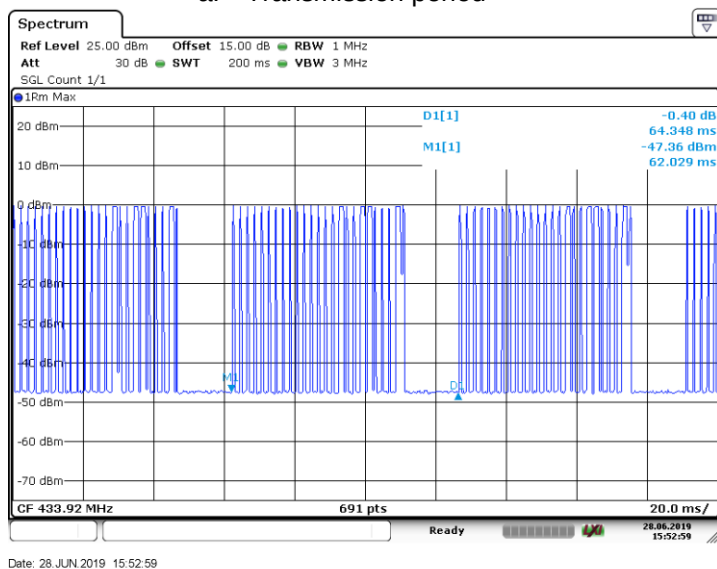
Spurious Radiated Emission

EUT: HG04522A-US-TX
Op Condition: Operated, TX Mode (433.92MHz)
Test Specification: FCC15.205, 15.209 & 15.231(b)
Comment: 3 VDC
Remark: Duty Cycle Factor Calculation

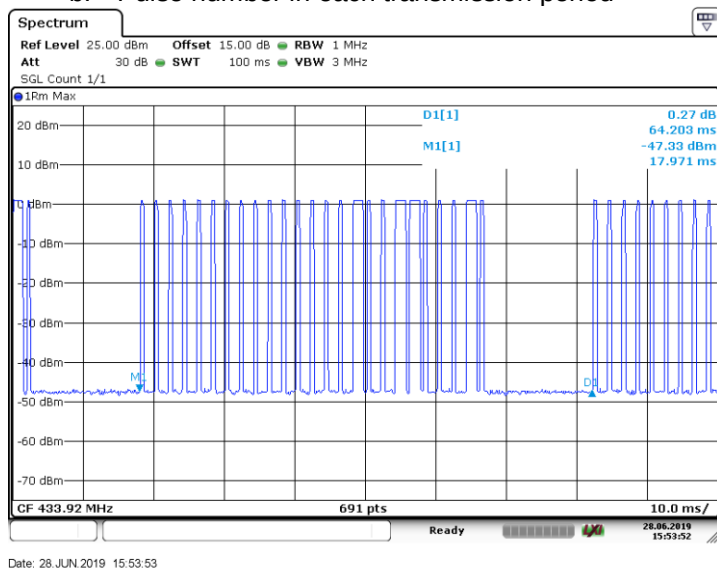
Test Result

☒ Passed
☐ Not Passed

a. Transmission period



b. Pulse number in each transmission period



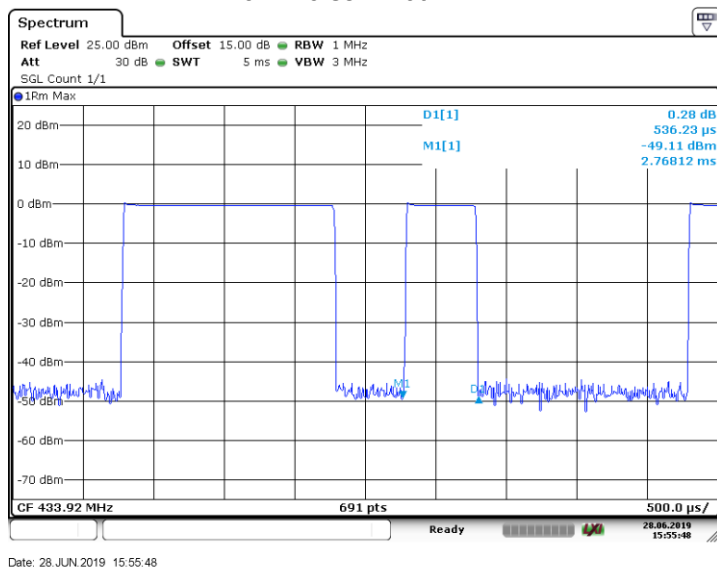
Spurious Radiated Emission

EUT: HG04522A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.205, 15.209 & 15.231(b)
 Comment: 3 VDC
 Remark: Duty Cycle Factor Calculation

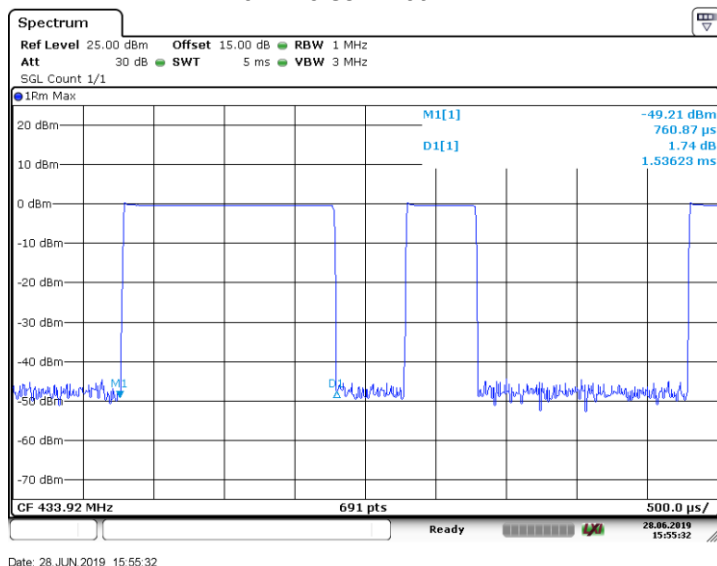
Test Result

☒ Passed
☐ Not Passed

c. Pulse1 width



d. Pulse2 width



Calculation:

$T_p = 64.348 \text{ ms}$

Number of pulse1 in 1 period = 21, Pulse1 width = 0.5362 ms

Number of pulse2 in 1 period = 4, Pulse2 width = 1.5362 ms

$T_{on} = \text{Pulse1 width} \times \text{Number of pulses in 1 period} + \text{Pulse2 width} \times \text{Number of pulses in 1 period}$
 $= 17.405 \text{ ms}$

Duty cycle factor = $20 \times \log(T_{on}/T_p) = -11.36$

7.2 20dB Bandwidth

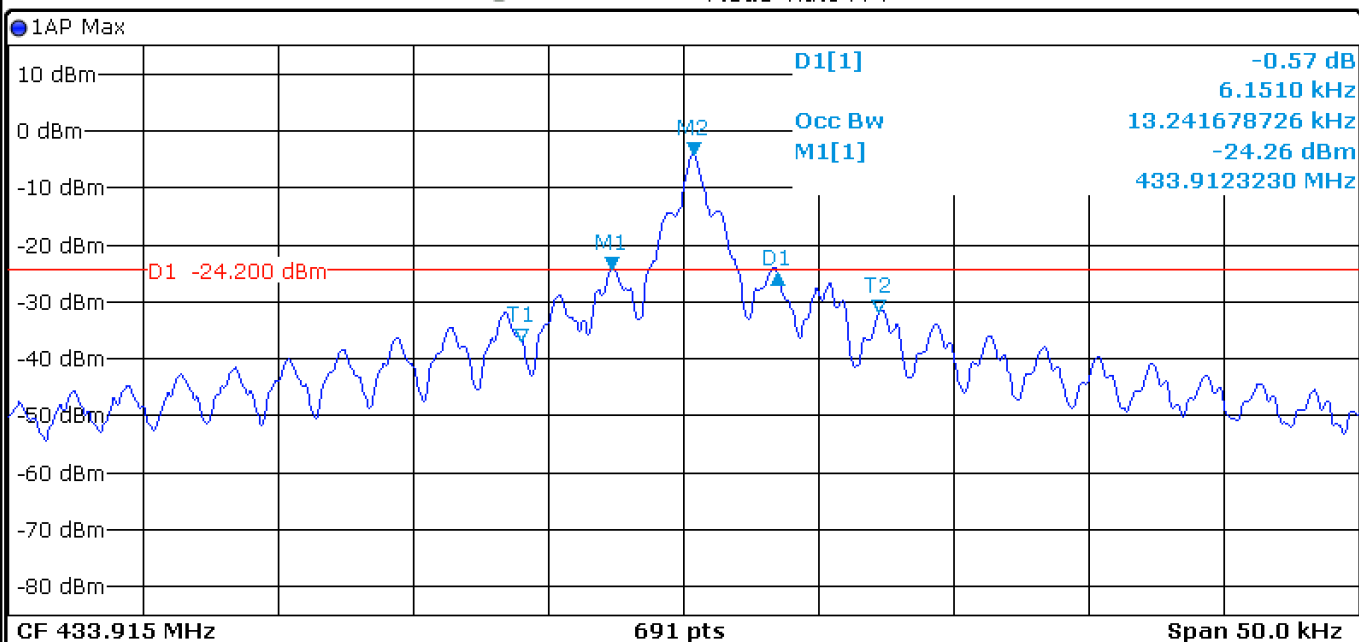
EUT: HG04522A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.231(c) 20dB Bandwidth
 Comment: 3 VDC

Test Result

☒ Passed☐ Not Passed

Spectrum

Ref Level 15.00 dBm Offset 1.00 dB RBW 300 Hz
 Att 30 dB SWT 6.3 ms VBW 1 kHz Mode Auto FFT



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	433.912323 MHz	-24.26 dBm		
T1		1	433.9089942 MHz	-36.88 dBm	Occ Bw	13.241678726 kHz
T2		1	433.9222359 MHz	-31.85 dBm		
D1	M1	1	6.151 kHz	-0.57 dB		
M2		1	433.915362 MHz	-4.20 dBm		

Measuring...

16.05.2019
11:16:01

Date: 16.MAY.2019 11:16:01

Bandwidth	Measured Value	Limit
20dB bandwidth	6.15 kHz	≤ 1084.8 kHz
Limit=0.25%*Center Frequency=0.25%*433.92MHz=1084.8kHz		

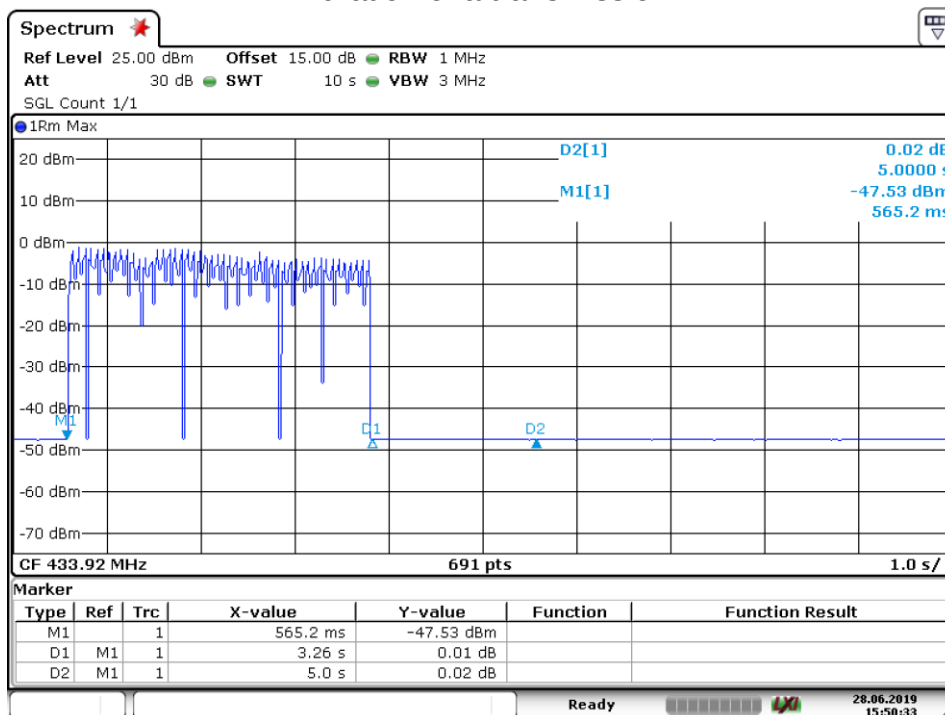
7.3 Deactivation Time

EUT: HG04522A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.231(a)
 Comment: 3 VDC

Test Result

☒ Passed☐ Not Passed

Duration of a transmission



Date: 28.JUN.2019 15:50:33

Frequency	Duration of a transmission	Limit
433.92MHz	3.26s	< 5s

8 Appendix A - General Product Information

Radiofrequency radiation exposure evaluation

FCCID: 2AJ9O-HG04522TX

According to KDB 447498 D01v06 section 4.3.1, For frequencies between 100 MHz to 6GHz and test separation distances ≤ 50 mm, the Numeric threshold is determined as:

Step a)

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR

>> The fundamental frequency of the EUT is 433.92MHz, the test separation distance is $\leq 5\text{mm}$ & $\leq 20\text{mm}$.

(Manufacturer specified the separation distance is: 20mm)

Step a.1)

>> Numeric threshold, $\text{mW} / 5 \text{ mm} \cdot \sqrt{0.43392\text{GHz}} \leq 3.0$

Numeric threshold $\leq 22.771\text{mW}$

Step a.2)

>> Numeric threshold, $\text{mW} / 20 \text{ mm} \cdot \sqrt{0.43392\text{GHz}} \leq 3.0$

Numeric threshold $\leq 91.084\text{mW}$

>> The power of EUT measured is: $-0.63\text{dBm} = 0.865\text{mW}$

Which is smaller than the Numeric threshold.

Therefore, the device is exempt from stand-alone SAR test requirements.

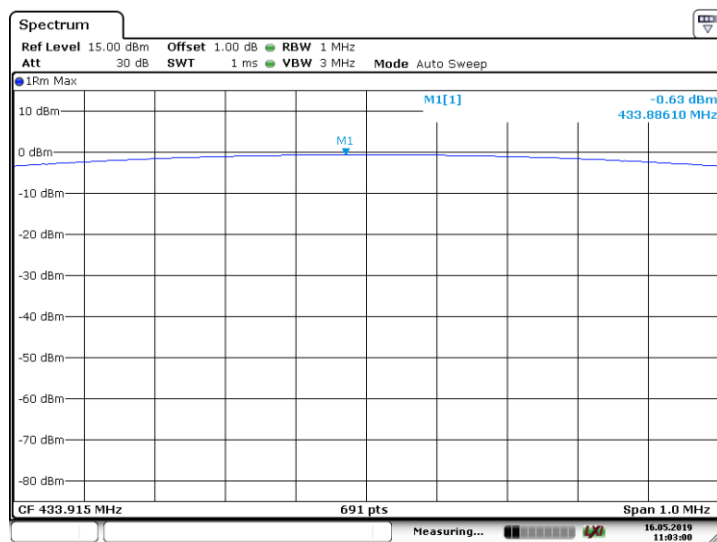
Appendix A - Conducted power

EUT: HG04522A-US-TX
Op Condition: Operated, TX Mode
Comment: 3 VDC
Remark: NA

Test Result

☒ Passed

☐ Not Passed



Date: 16 MAY.2019 11:03:00

Appendix A Declaration letter of model difference

To: TÜV SÜD HKG Ltd.

Attention:

From:

Fax No:

Date: July 9, 2019

Total Page (Cover Included): 1

Declaration Letter

Subject:

We:

Officially notify TÜV SÜD HKG Ltd. that the << HG04522B-US>> have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with Wireless door bell KAT, 2 assorted , HG04522A-US. The difference lies only in color and model of the different models.

<<Additional Model >>: HG04522B-US

<<Main Test Model >>: HG04522A-US

<<Product>>: Wireless Doorbell

Applicant: Lidl US, LLC

9-Jul, 2019
(Date)



(Applicant's authorized signature and company Chop)