

FCC - TEST REPORT

Report Number : **60.792.19.006.01R01** Date of Issue : October 15, 2019

Model : **HG05686A-US-TX, HG05686B-US-TX**

Product Type : **Temperature station LCD USA, 2 assorted**

Applicant : Lidl US, LLC

Address : 3500 South Clark Street, Arlington, VA 22202, USA

Production Facility : AOK Electronic Limited

Address : Tianxin Ind. District, Dahou, Xiegang, Dongguan, Guangdong China

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

Total pages including Appendices : 21

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2 Description of Equipment Under Test

Description of the Equipment Under Test

Product: Temperature station LCD USA, 2 assorted

Model no.: HG05686A-US-TX, HG05686B-US-TX

FCC ID: 2AJ9O-HG5686TX

Rating: 3 VDC (2 x 1.5V AAA battery)

Frequency: 433.92MHz

Antenna gain: 0 dBi

Number of operated channel: 1

Modulation: OOK(2ASK)

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
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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

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(e) 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) Transmission 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	2020-6-28
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2020-6-28
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100398	2020-7-7
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2020-7-5
Horn Antenna	Rohde & Schwarz	HF907	102294	2020-6-22
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2020-7-5
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2020-6-28
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2020-6-28
Attenuator	Agilent	8491A	MY39264334	2020-6-28
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

Conducted Emission Test – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2020-6-28
LISN	Rohde & Schwarz	ENV4200	100249	2020-6-28
LISN	Rohde & Schwarz	ENV432	101318	2020-7-19
LISN	Rohde & Schwarz	ENV216	100326	2020-6-28
ISN	Rohde & Schwarz	ENY81	100177	2020-6-28
ISN	Rohde & Schwarz	ENY81-CA6	101664	2020-6-28
High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-584	2020-6-24
RF Current Probe	Rohde & Schwarz	EZ-17	100816	2020-7-2
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2020-6-28
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

20dB Bandwidth, Transmission Time – Site 1

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2020-6-28

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 Emission 150kHz-30MHz	3.21dB
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(e) Radiated Emission	12-15	☒	☐	☐
FCC Title 47 Part 15.207 Conduct Emission (1)	NIL	☐	☐	☒
FCC Title 47 Part 15.231(c) 20dB Bandwidth	16	☒	☐	☐
FCC Title 47 Part 15.247(e) Transmission Time	17-18	☒	☐	☐

Remark:

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

6 General Remarks

Remarks

Client informs that the **HG05686B-US-TX** have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction with **Temperature station LCD USA, 2 assorted, HG05686A-US-TX**. The difference lies only in the outlook/color of the different models. (Client's conformation letter shown at appendix A)

All tests were performed on model **HG05686A-US-TX**.

This submittal(s) (test report) is intended for **FCC ID: 2AJ90-HG5686TX**, 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.

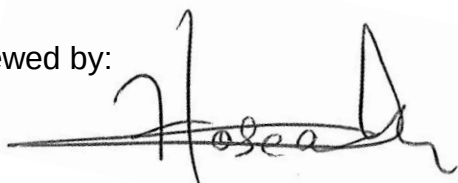
□ - **Does not** fulfill the general approval requirements.

Sample Received Date: September 4, 2019

Testing Start Date: September 7, 2019

Testing End Date: September 19, 2019

Reviewed by:



Hosea CHAN
EMC Project Engineer

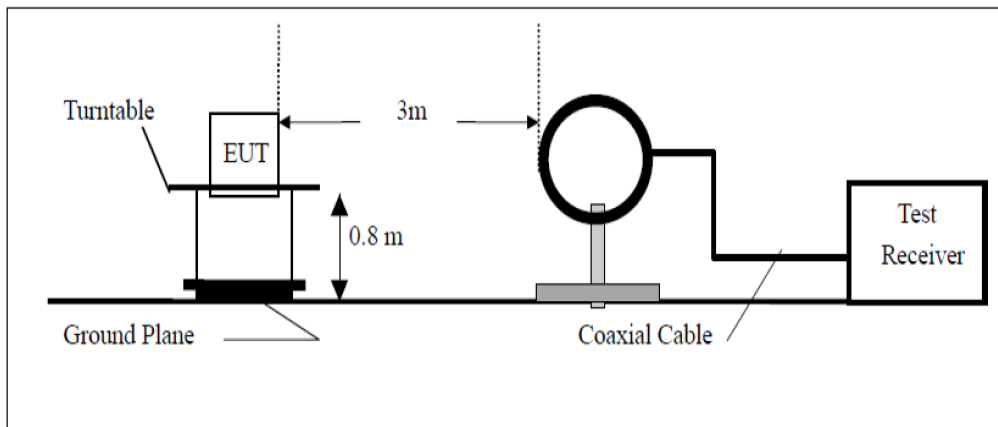
Prepared by:



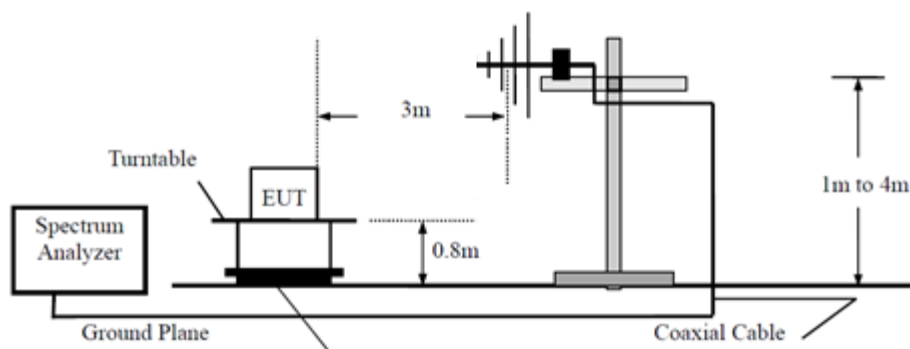
Eric LI
EMC Senior Project Engineer

7 Test Setups

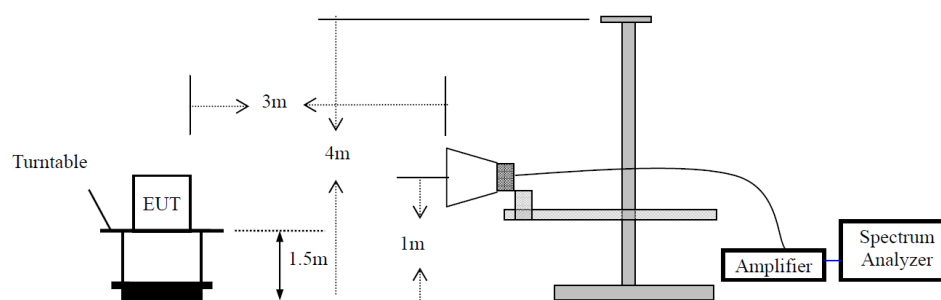
7.1 Radiated test setups 9kHz-30MHz



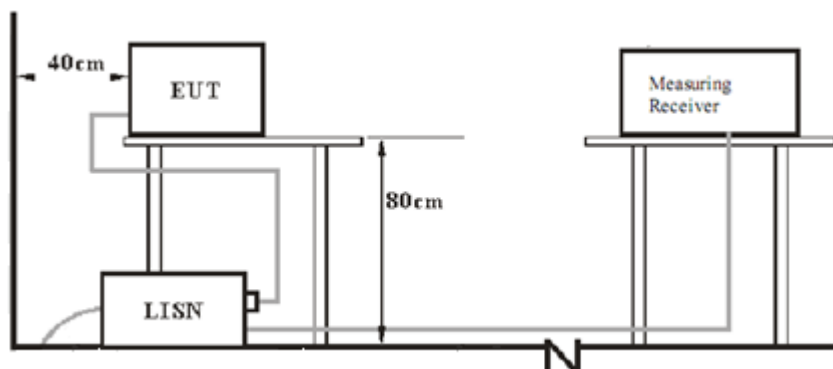
7.2 Radiated test setups Below 1GHz



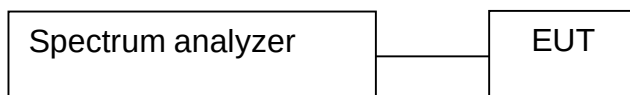
7.3 Radiated test setups Above 1GHz



7.4 AC Power Line Conducted Emission test setups



7.5 Conducted RF test setups



8 Emission Test Results

8.1 Spurious Radiated Emission

EUT: HG05686A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.205, 15.209 & 15.231(e) 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	55.46	92.87	-37.41	Peak	-23.3
867.84	34.62	72.87	-38.25	Peak	-16.0
1301.76	39.34	74.00	-34.66	Peak	-11.7
1735.68	38.70	74.00	-35.3	Peak	-9.7
2169.60	51.20	74.00	-22.8	Peak	-7.3
2603.52	54.91	74.00	-19.09	Peak	-4.2
3037.44	53.23	74.00	-20.77	Peak	-3.6
3471.36	48.21	74.00	-25.79	Peak	-0.5
3905.28	43.64	74.00	-30.36	Peak	-1.8
4339.20	42.27	74.00	-31.73	Peak	0.2

Frequency MHz	PK Result @3m dBμV/m	Duty Cycle Factor dB	AV Result @3m dBμV/m	Limit dBμV/m	Margin dB
433.92	55.46	-11.85	43.61	72.87	-29.26
867.84	34.62	-11.85	22.77	52.87	-30.10
1301.76	39.34	-11.85	27.49	54.00	-26.51
1735.68	38.70	-11.85	26.85	54.00	-27.15
2169.60	51.20	-11.85	39.35	54.00	-14.65
2603.52	54.91	-11.85	43.06	54.00	-10.94
3037.44	53.23	-11.85	41.38	54.00	-12.62
3471.36	48.21	-11.85	36.36	54.00	-17.64
3905.28	43.64	-11.85	31.79	54.00	-22.21
4339.20	42.27	-11.85	30.42	54.00	-23.58

Average value = Peak value + Duty cycle factor

Spurious Radiated Emission

EUT: HG05686A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.205, 15.209 & 15.231(e) 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	72.90	92.87	-19.97	Peak	-23.2
867.84	44.29	72.87	-28.58	Peak	-15.9
2169.60	44.41	74.00	-29.59	Peak	-7.3
2603.52	47.57	74.00	-26.43	Peak	-4.9
3037.44	50.09	74.00	-23.91	Peak	-3.8
3471.36	45.51	74.00	-28.49	Peak	-0.5
3905.28	38.67	74.00	-35.33	Peak	-1.8

Frequency MHz	PK Result @3m dBμV/m	Duty Cycle Factor dB	AV Result @3m dBμV/m	Limit dBμV/m	Margin dB
433.92	72.90	-11.85	61.05	72.87	-11.82
867.84	44.29	-11.85	32.44	52.87	-20.43
2169.60	44.41	-11.85	32.56	54.00	-21.44
2603.52	47.57	-11.85	35.72	54.00	-18.28
3037.44	50.09	-11.85	38.24	54.00	-15.76
3471.36	45.51	-11.85	33.66	54.00	-20.34
3905.28	38.67	-11.85	26.82	54.00	-27.18

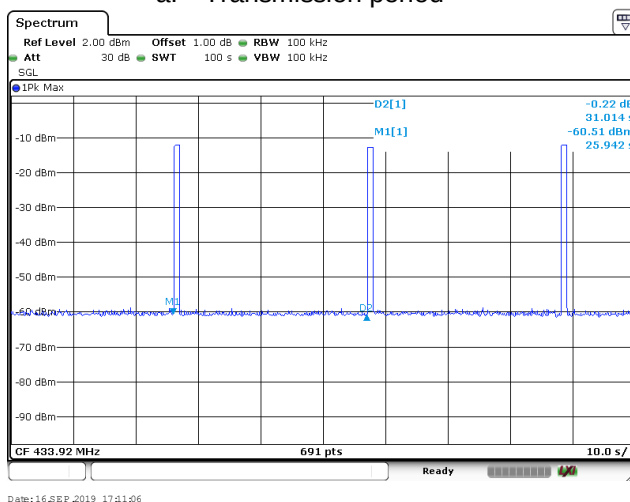
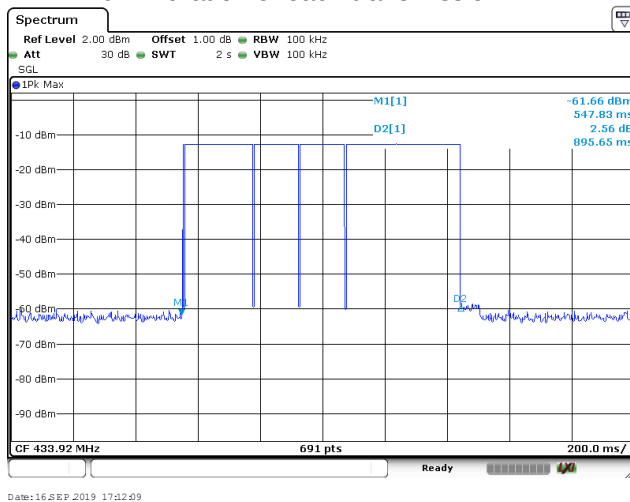
Average value = Peak value + Duty cycle factor

Spurious Radiated Emission

EUT: HG05686A-US-TX
Op Condition: Operated, TX Mode (433.92MHz)
Test Specification: FCC15.205, 15.209 & 15.231(e)
Comment: 3 VDC
Remark: Duct Cycle Factor Calculation

Test Result

☒ Passed
☐ Not Passed

Duct Cycle Factor Calculation**a. Transmission period****b. Duration of each transmission**

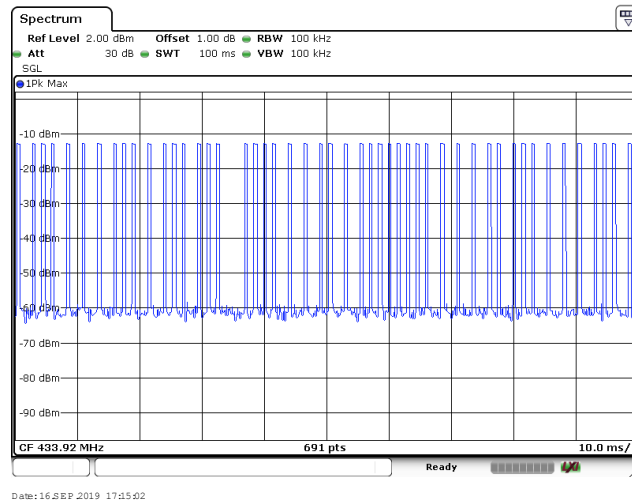
Spurious Radiated Emission

EUT: HG05686A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.205, 15.209 & 15.231(e)
 Comment: 3 VDC
 Remark: Duct Cycle Factor Calculation

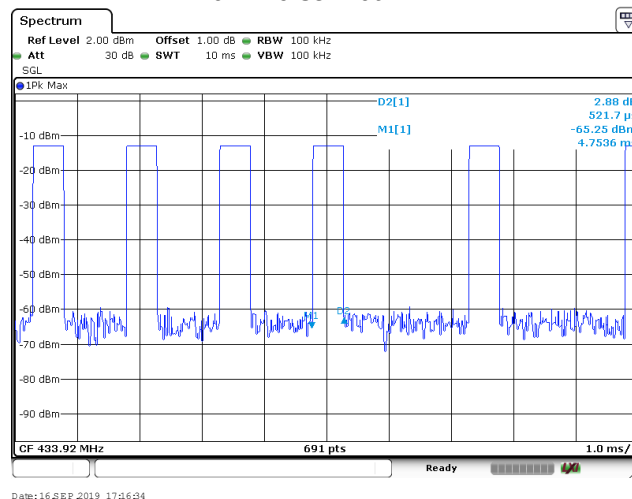
Test Result

☒ Passed☐ Not Passed

c. Pulse number in 100ms



d. Pulse width



Calculation:

$T_p = 100\text{ms}$ (Max. allowed T_p for calculation)

Number of pulse in $T_p = 49$,

Pulse width = 0.5217ms

$T_{on} = \text{Pulse width} \times \text{Number of pulses in } T_p$
 $= 25.5633\text{ ms}$

Duty cycle factor = $20 \times \log(T_{on}/T_p) = -11.85\text{dB}$

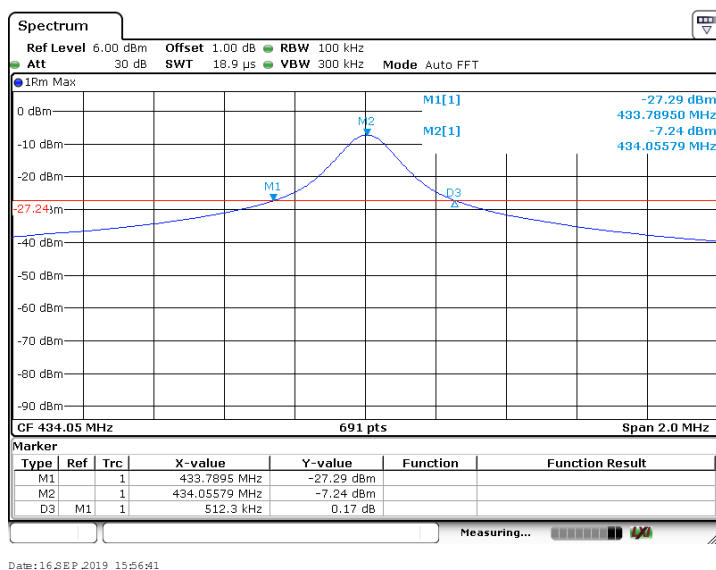
8.2 20dB Bandwidth

EUT: HG05686A-US-TX
 Op Condition: Operated, TX Mode (433.92MHz)
 Test Specification: FCC15.231(c) 20dB Bandwidth
 Comment: 3 VDC

Test Result

☒ Passed

☐ Not Passed



Bandwidth	Measured Value	Limit
20dB bandwidth	512.3 kHz	<= 1084.8 kHz
Limit=0.25%*Center Frequency=0.25%*433.92MHz=1084.8kHz		

8.3 Transmission Time

EUT: HG05686A-US-TX
Op Condition: Operated, TX Mode (433.92MHz)
Test Specification: FCC15.231(e)
Comment: 3 VDC

Test Result

☒ Passed☐ Not Passed

Frequency	Duration of each transmission	Limit	Silent period	Limit
433.92MHz	895.65ms	< 1s	30.12s	$\geq 26.8695s$

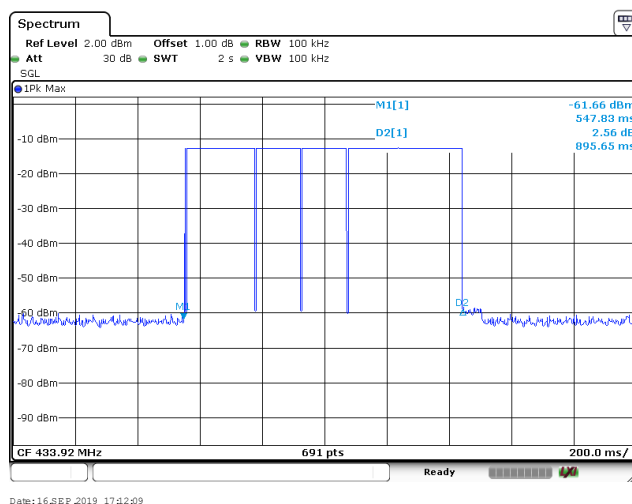
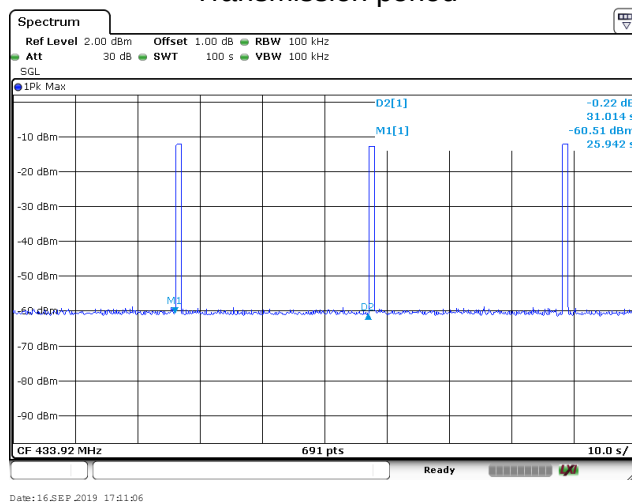
1. Silent period=Transmission period - Duration of each transmission
 $=31.014-0.89565s=30.11835s\approx 30.12s$
2. Silent period should be at least 30 times the duration of the transmission but in no case less than 10 seconds

Transmission Time

EUT: HG05686A-US-TX
Op Condition: Operated, TX Mode (433.92MHz)
Test Specification: FCC15.231(e)
Comment: 3 VDC

Test Result

☒ Passed
☐ Not Passed

Duration of each transmission**Transmission period**

9 Appendix A - General Product Information

Radiofrequency radiation exposure evaluation

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)

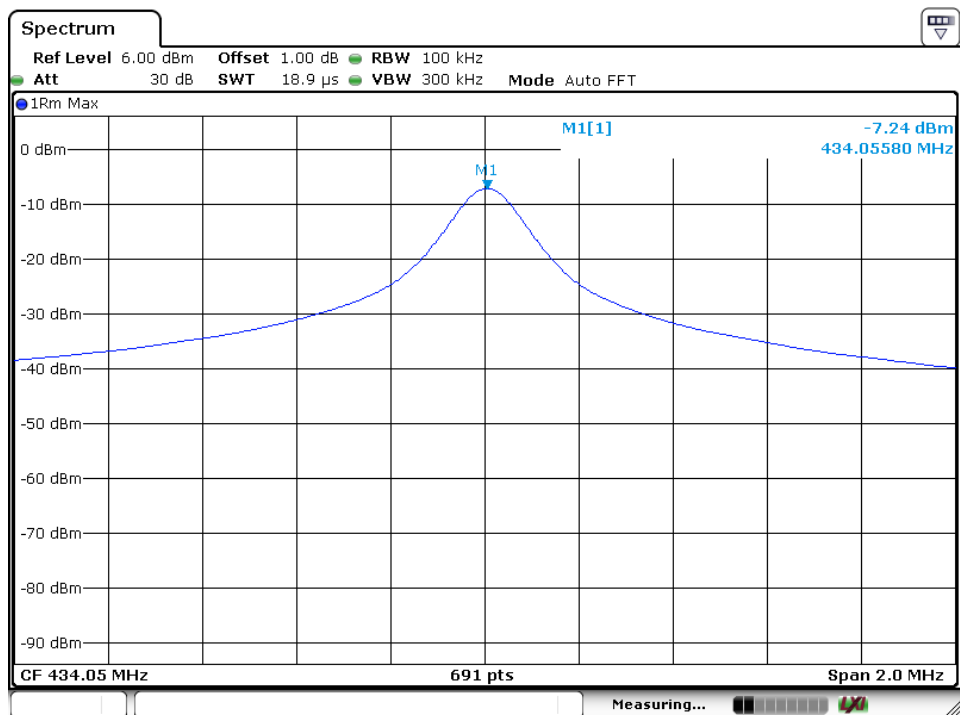
>> Numeric threshold, $\text{mW} / 20 \text{ mm} \cdot \sqrt{0.43392\text{GHz}} \leq 3.0$
Numeric threshold $\leq 91.084\text{mW}$

>> The power of EUT measured is: $-7.24\text{dBm} = 0.189\text{mW}$
Which is smaller than the Numeric threshold.
Therefore, the device is exempt from stand-alone SAR test requirements.

Appendix A - Conducted power

EUT: HG05686A-US-TX
Op Condition: Operated, TX Mode
Comment: 3 VDC
Remark: NA

Test Result	
☒	Passed
☐	Not Passed



Date: 16 SEP 2019 15:52:45

Appendix A Declaration letter of model difference

Declaration letter of model difference

Lidl US LLC.

To: TÜV SÜD Hong Kong Limited

Attention: Edmond Fung

From:

Date: October 11, 2019

Fax No:

Total Page (Cover Included): 1

Project No.:

Subject: **Declaration letter**

We: **Company Name:** Lidl US LLC.

Address: 3500 S. Clark Street, Arlington, Virginia, United States.

Officially notify TÜV SÜV Hong Kong Limited that the <<Model A>> have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction, with <<PRODUCT>>, <<Model B>>. The difference lies only in the outlook/color of the different models.

<<Model A>>: HG05686A-US-TX, HG05686A-US-RX

<<Model B>>: HG05686B-US-TX, HG05686B-US-RX

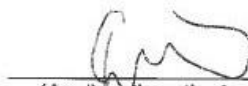
<<Product>>: Temperature station LCD USA, 2 assorted

Applicant: Lidl US LLC.

10/11/2019
(Date)


(Applicant's authorized signature and company Chop)

10/11/2019
(Date)


(Applicant's authorized signature and company Chop)