



Test Report

Date : 2022-08-05
No. : HMD22070006

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Applicant : PIN Genie Inc, DBA LOCKLY.
676 Transfer Rd., St. Paul, MN 55114

Supplier / Manufacturer : Smart Electronic Industrial (Dongguan) Co., Ltd
Qing Long Road, Long Jian Tian Village, Huang Jiang Town, Dong
Guan, Guang Dong, China

Description of Sample(s) : Submitted sample(s) said to be
Product: Secure Plus Deadbolt Edition with RFID
Brand Name: LOCKLY
Model No.: PGD728FC
FCC ID: 2ASIVPGD728FC

Date Samples Received : 2022-07-18

Date Tested : 2022-07-18 to 2022-07-22

Investigation Requested : Perform ElectroMagnetic Interference measurement in accordance
with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI
C63.10: 2013 for FCC Certification.

Conclusions : The submitted product COMPLIED with the requirements of Federal
Communications Commission [FCC] Rules and Regulations Part 15,
Subpart C. The tests were performed in accordance with the standards
described above and on Section 2.2 in this Test Report.

Remarks : 13.56MHz



Dr.CHAN Kwok Hung, Brian
Authorized Signatory



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1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate, New Territories, Hong Kong
Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2 Equipment Under Test [EUT]

Description of Sample(s)

Product:	Secure Plus Deadbolt Edition with RFID
Manufacturer:	Smart Electronic Industrial (Dongguan) Co., Ltd Qing Long Road, Long Jian Tian Village, Huang Jiang Town, Dong Guan, Guang Dong, China
Brand Name:	LOCKLY
Model Number:	PGD728FC
Rating:	6Vd.c.(“AA” battery *4)

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Secure Plus Deadbolt Edition with RFID. It is a transceiver operating at 13.56MHz and the RF signal was modulated by IC.

1.3 Date of Order

2022-07-15

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2022-07-15 to 2022-07-22

1.6 Country of Origin

China

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1.7 RF Module Details

Module Model Number: N/A
Module FCC ID: N/A
Modulation: ASK
Frequency Range: 13.553-13.567MHz
Test Channel: 13.56MHz

1.8 Antenna Details

Antenna Type: FPC antenna
Antenna Gain: N/A

1.9 Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	13.56		

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 Regulations and ANSI C63.10: 2013 for FCC Certification.
The device was realized by test software, there is no the power level setting.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Field strength of emissions within the band 13.110 MHz -14.010 MHz	FCC 47CFR 15.225(a)(b)(c)	ANSI C63.10: 2013	N/A	☒	☐	☐
Field strength of emissions outside of the band 13.110 MHz -14.010 MHz	FCC 47CFR 15.225(d) FCC 47CFR 15.209	ANSI C63.10: 2013	N/A	☒	☐	☐
AC Mains Conducted Emissions	FCC 47CFR 15.207	ANSI C63.10: 2013	N/A	☐	☐	☒
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	☒	☐	☐
20dB Emission bandwidth	FCC 47CFR 15.215(c)	ANSI C63.10: 2013	N/A	☒	☐	☐
The frequency tolerance of the carrier signal	FCC 47CFR 15.225(e)	ANSI C63.10: 2013	N/A	☒	☐	☐

Note: N/A - Not Applicable



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3.0 Test Results

3.1 Emission

3.1.1 Field strength of emissions within the band 13.110 MHz -14.010 MHz

Ambient temperature 25°C

Relative humidity 57%

Test Requirement:	FCC 47CFR 15.225(a)(b)(c)
Test Method:	ANSI C63.10:2013
Test Date:	2022-07-21
Mode of Operation:	Tx mode

Test Method:

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-Anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test limit:

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

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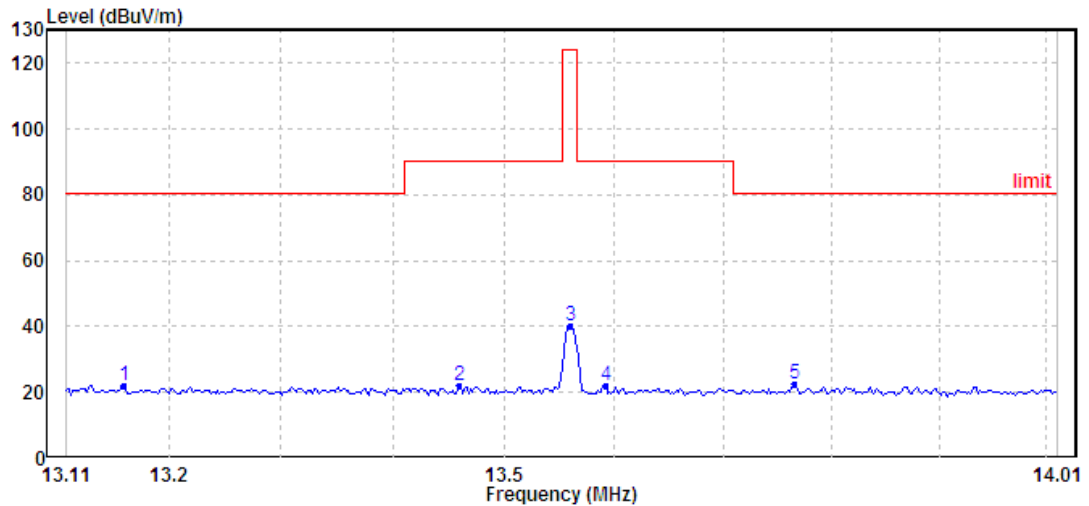
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Test Result: PASS

Emissions within the band 13.110 MHz -14.010 MHz



Ambient Temperature: 25.0C
Relative Humidity : 50.2%

	Freq	Level	Limit	Over		
	MHz	dBuV/m	Line	Limit	Remark	Pol/Phase
1	13.160	22.17	80.50	-58.33	QP	Horizontal
2	13.459	22.17	90.50	-68.33	QP	Horizontal
3	13.560	40.26	124.00	-83.74	QP	Horizontal
4	13.592	21.87	90.50	-68.63	QP	Horizontal
5	13.765	22.39	80.50	-58.11	QP	Horizontal

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3.1.2 Field strength of emissions outside of the band 13.110 MHz -14.010 MHz

Ambient temperature 25°C

Relative humidity 57%

Test Requirement:	FCC 47CFR 15.225(d) & FCC 47CFR 15.209
Test Method:	ANSI C63.10:2013
Test Date:	2022-07-21
Mode of Operation:	Tx mode

Test Method:

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

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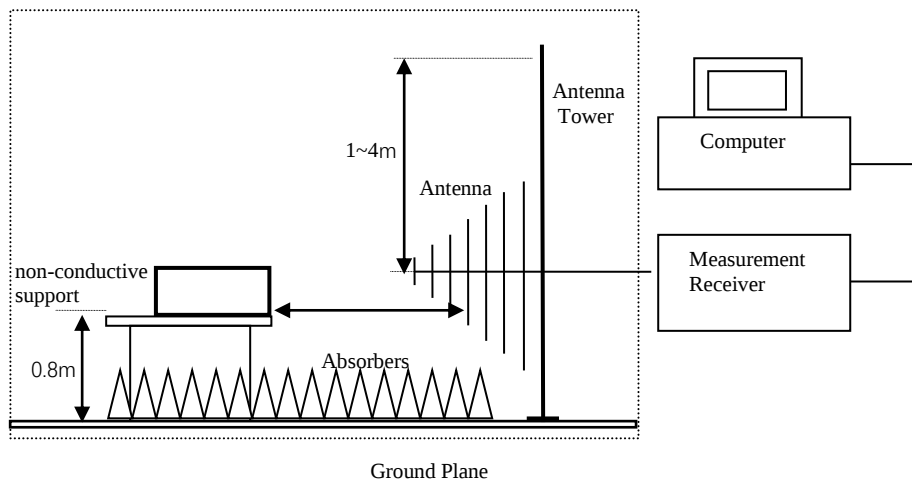
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Spectrum Analyzer Setting:

9KHz – 0.15MHz (Pk)	RBW: 200Hz VBW: 1KHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
0.15MHz – 30MHz (Pk)	RBW: 10kHz VBW: 30kHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
30MHz – 1GHz (QP)	RBW: 120kHz VBW: 120kHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
Above 1GHz (Pk & Av) (PK value with PK detector AV value with AV detector)	RBW: 1MHz VBW: 1MHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold

Test Setup:



- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used.

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Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Remarks:

Calculated measurement uncertainty (9kHz-30MHz): 2.0dB / (30MHz – 1GHz): 4.9dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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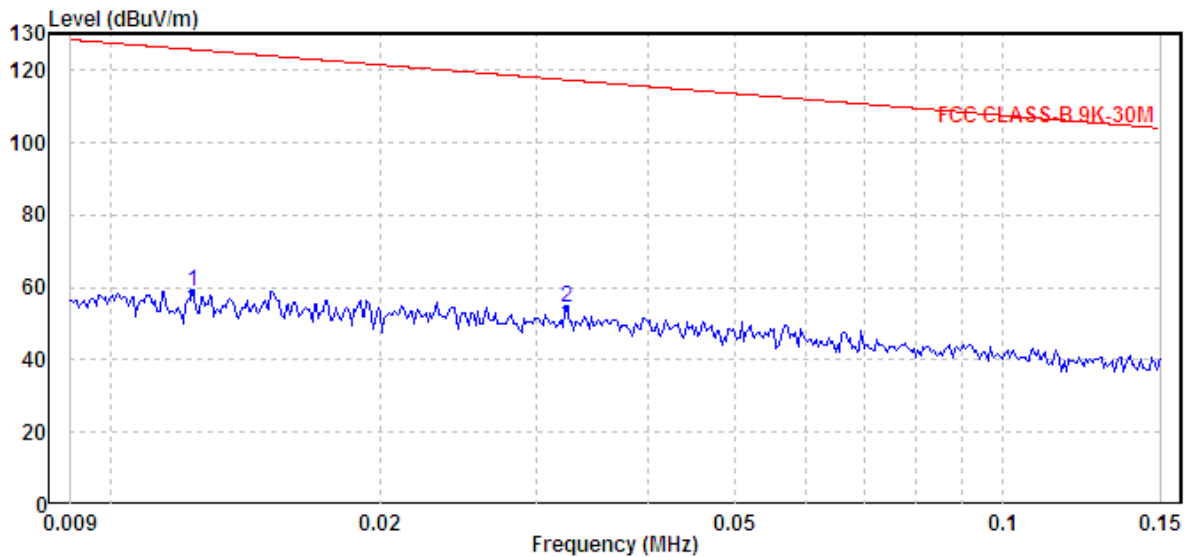


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Results of TX mode (9kHz – 150KHz): PASS



Ambient Temperature: 25.0C
Relative Humidity : 50.2%

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB		
1	0.012	58.78	125.78	-67.00	QP	Horizontal
2	0.032	54.57	117.38	-62.81	QP	Horizontal

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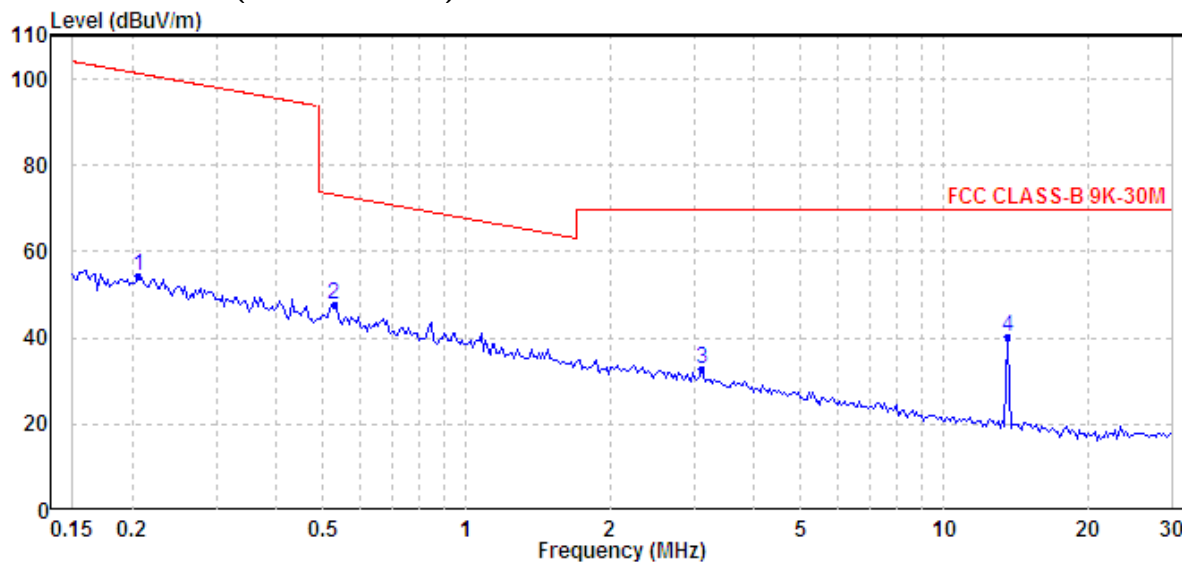


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Results of TX mode (150KHz - 30MHz): PASS



Ambient Temperature: 25.0C
Relative Humidity : 50.2%

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB		
1	0.206	54.58	101.32	-46.74	QP	Horizontal
2	0.529	47.65	73.13	-25.48	QP	Horizontal
3	3.107	32.67	69.54	-36.87	QP	Horizontal
4	13.551	40.41	69.54	-29.13	QP	Horizontal

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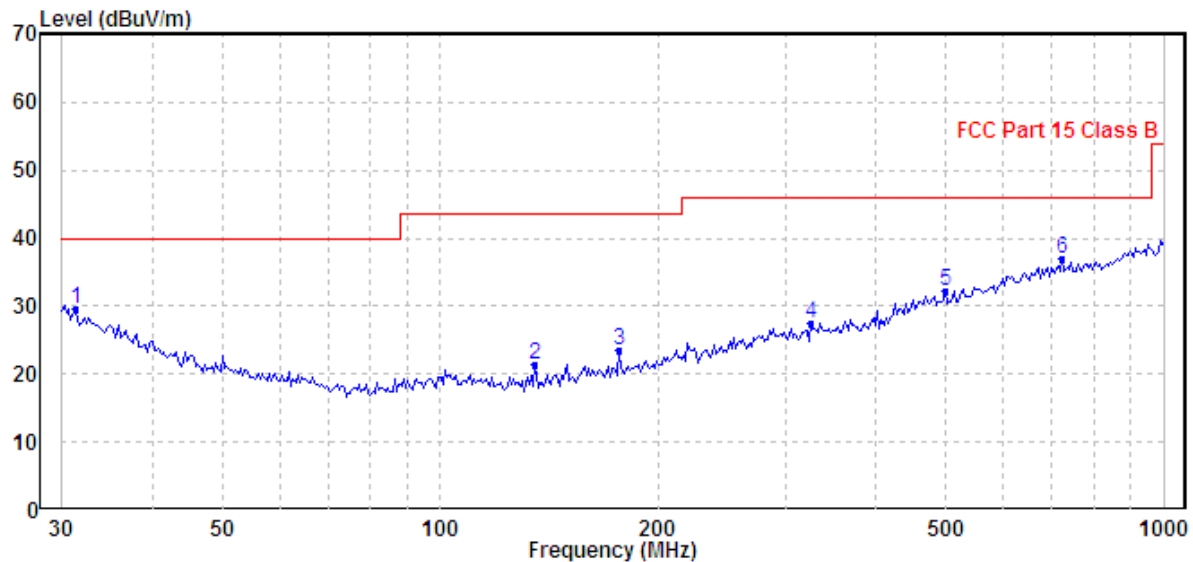
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Results of TX mode (30MHz – 1GHz): PASS

Horizontal



Ambient Temperature: 25C
Relative Humidity : 50%

	Freq	Level	Limit	Over		
	MHz	dBuV/m	Line	Limit	Remark	Pol/Phase
1	31.289	29.54	40.00	-10.46	QP	Horizontal
2	135.506	21.38	43.50	-22.12	QP	Horizontal
3	176.888	23.49	43.50	-20.01	QP	Horizontal
4	325.596	27.46	46.00	-18.54	QP	Horizontal
5	499.425	32.14	46.00	-13.86	QP	Horizontal
6	724.261	37.06	46.00	-8.94	QP	Horizontal

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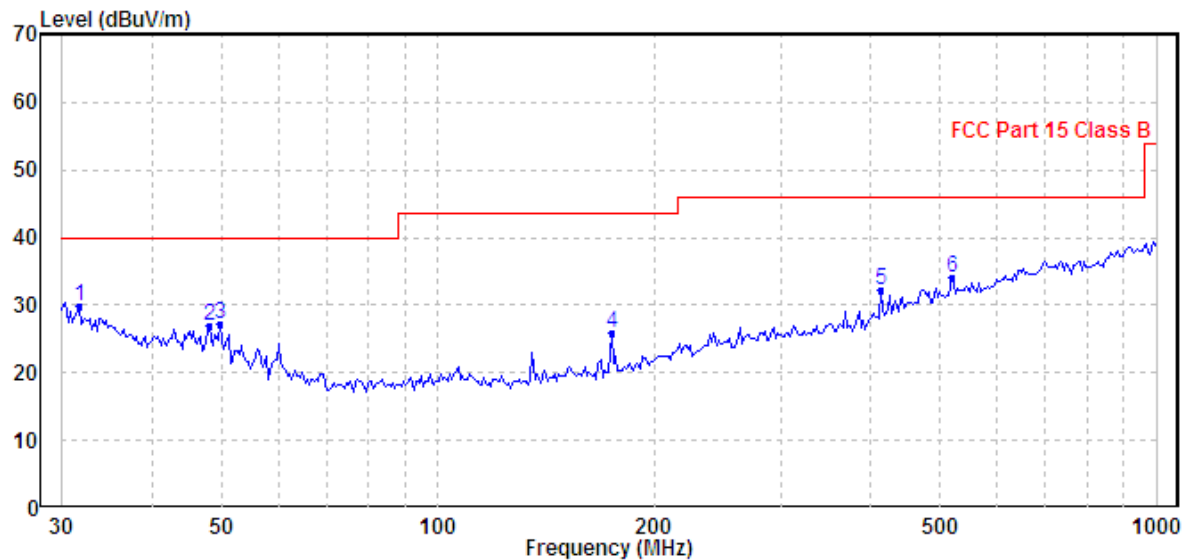
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Results of TX mode (30MHz – 1GHz): PASS

Vertical



Ambient Temperature: 25C
Relative Humidity : 50%

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB		
1	31.731	29.98	40.00	-10.02	QP	Vertical
2	47.994	26.85	40.00	-13.15	QP	Vertical
3	49.707	27.33	40.00	-12.67	QP	Vertical
4	174.424	25.98	43.50	-17.52	QP	Vertical
5	413.271	32.19	46.00	-13.81	QP	Vertical
6	520.888	33.96	46.00	-12.04	QP	Vertical

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3.1.3 Antenna Requirement

Ambient temperature 25°C

Relative humidity 57%

Test Requirements: § 15.203

Test Specification:

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 shall be considered sufficient to comply with the provisions of this section. 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.

Test Results:

This is FPC antenna. There is no external antenna. User is unable to remove or changed the Antenna.

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3.1.4 20dB Bandwidth of Fundamental Emission

Ambient temperature 25°C

Relative humidity 57%

Test Requirement: FCC 47 CFR 15.215(c)
Test Method: ANSI C63.10:2013
Test Date: 2022-07-25
Mode of Operation: Tx mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

The measurement bandwidth settings are RBW = 1 kHz
VBW = 3 kHz

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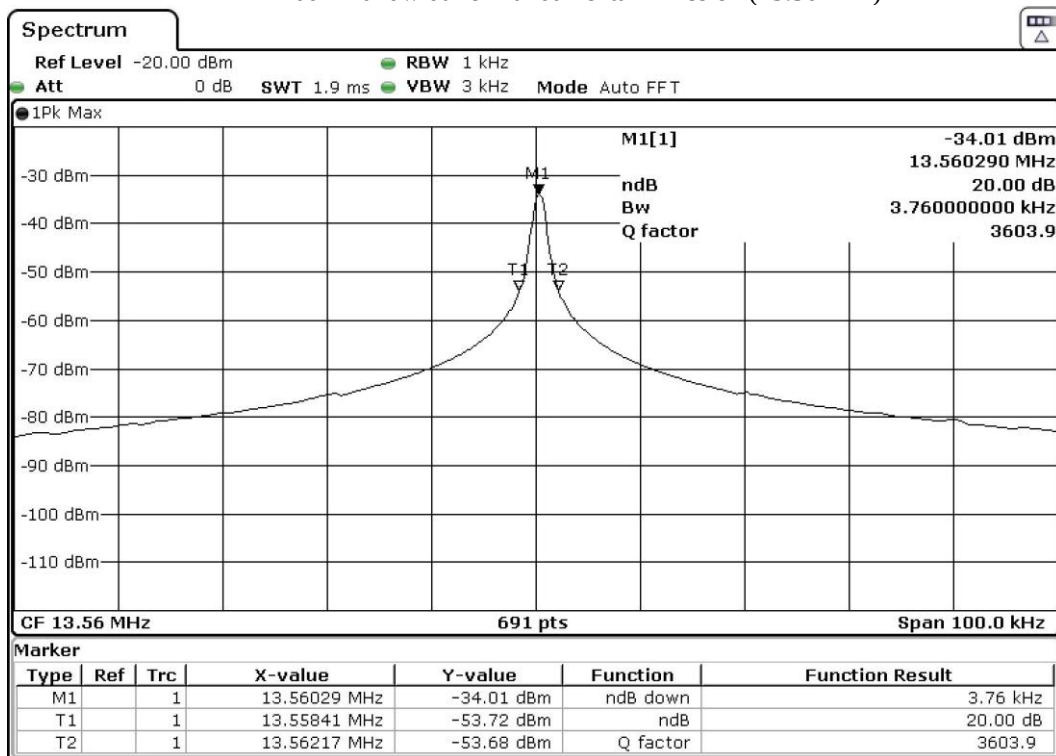
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Limits for 20dB Bandwidth of Fundamental Emission (13.56MHz):

Frequency [MHz]	20dB Bandwidth [kHz]	Flow – 20dB [MHz]	Fhigh – 20dB [MHz]	Limit [MHz]	Result
13.56	3.76	13.55841	13.56217	13.553-13.567	PASS

20dB Bandwidth of Fundamental Emission (13.56MHz)



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3.1.5 The frequency tolerance of the carrier signal

Ambient temperature 20°C

Relative humidity 57%

Test Requirement: FCC 47 CFR 15.215(c)
Test Method: ANSI C63.10:2013
Test Date: 2022-07-22
Mode of Operation: Tx mode

Test Method:

The measurement bandwidth settings are RBW = 1 kHz
VBW = 3 kHz

Limit:

±0.01% of the operating frequency (=100ppm)

Test Results:

Operating frequency (MHz)	Test Condition	Measured frequency (MHz)	Frequency Drift (ppm)	Limit (ppm)	
13.56	Tnom:50°C, Unom: 6Vd.c.	13.56035	25.81121	100	PASS
	Tnom:40°C, Unom: 6Vd.c.	13.56040	29.49853	100	PASS
	Tnom:30°C, Unom: 6Vd.c.	13.56037	27.28614	100	PASS
	Tnom:20°C, Unom: 6Vd.c.	13.56033	24.33628	100	PASS
	Tnom:10°C, Unom: 6Vd.c.	13.56039	28.76106	100	PASS
	Tnom:0°C, Unom: 6Vd.c.	13.56032	23.59882	100	PASS
	Tnom:-10°C, Unom: 6Vd.c.	13.56044	32.44838	100	PASS
	Tnom:-20°C, Unom: 6Vd.c.	13.56041	30.23599	100	PASS
	Tnom:20°C, Unom: 6Vd.c.	13.56043	31.71091	100	PASS
	Tnom:20°C, Low: 5.1Vd.c.	13.56033	24.33628	100	PASS
	Tnom:20°C, High: 6.9Vd.c.	13.56030	22.12389	100	PASS

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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2019/04/16	2024/04/16
EM356	ANTENNA POSITIONING TOWER	ETS-LINDGREN	2171B	00150346	N/A	N/A
EM293	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	N9020A	MY50510152	2020/11/25	2022/11/25
EM299	BROADBAND HORN ANTENNA	ETS-LINDGREN	3115	00114120	2020/11/24	2022/11/24
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2020/11/25	2022/11/25
EM301	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-10	00130988	2020/11/25	2022/11/25
EM353	LOOP ANTENNA	ETS_LINDGREN	6502	00206533	2020/06/10	2022/09/10
EM355	Biconilog Antenna	ETS-Lindgren	3143B	00094856	2020/06/17	2022/09/17
EM200	DUAL CHANNEL POWER METER	R & S	NRVD	100592	2019/10/11	2022/10/11
EM012	PRE-AMPLIFIER	HP	HP8448B	3008A00262	2019/11/08	2022/11/08
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A

Remarks: -

N/A Not Applicable or Not Available

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Appendix B Photographs of EUT

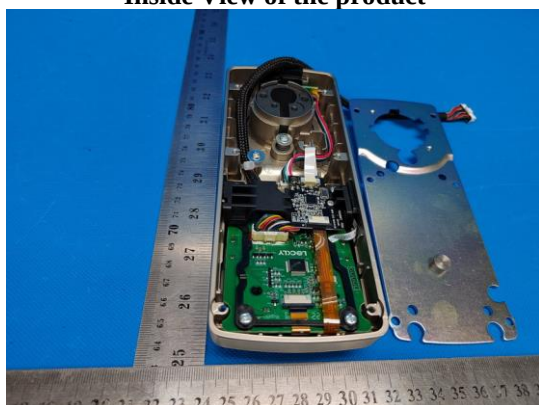
View of the product



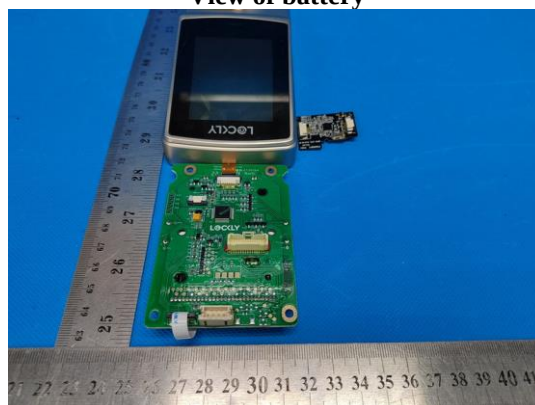
View of the product



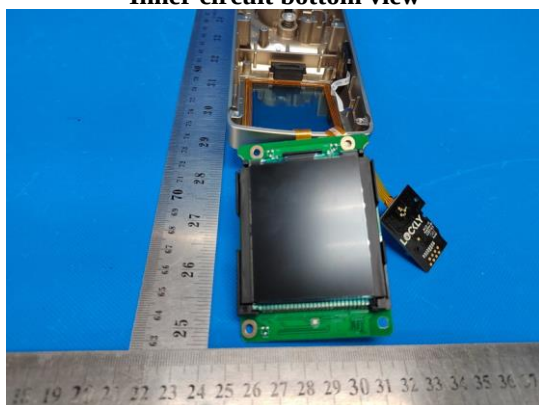
Inside View of the product



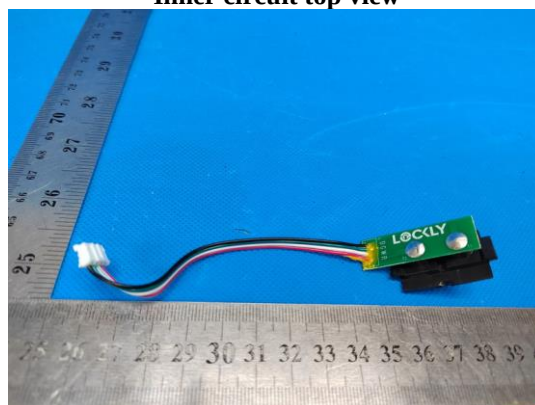
View of battery



Inner circuit bottom view



Inner circuit top view



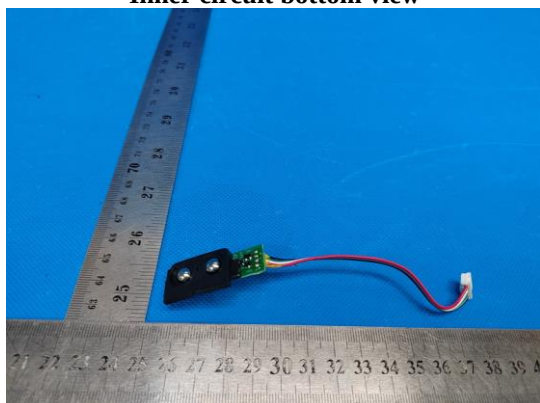
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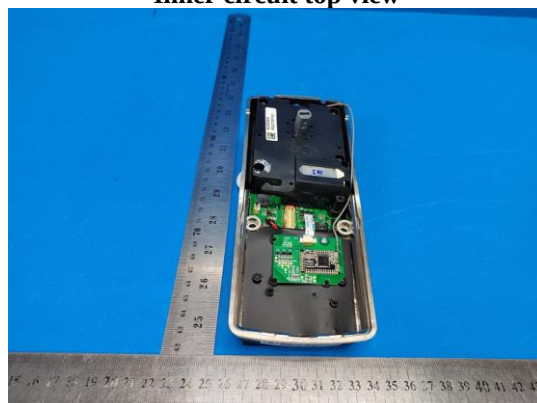
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Photographs of EUT

Inner circuit bottom view



Inner circuit top view



Inner circuit bottom view



Inner circuit top view



Inner circuit bottom view



Inner circuit top view



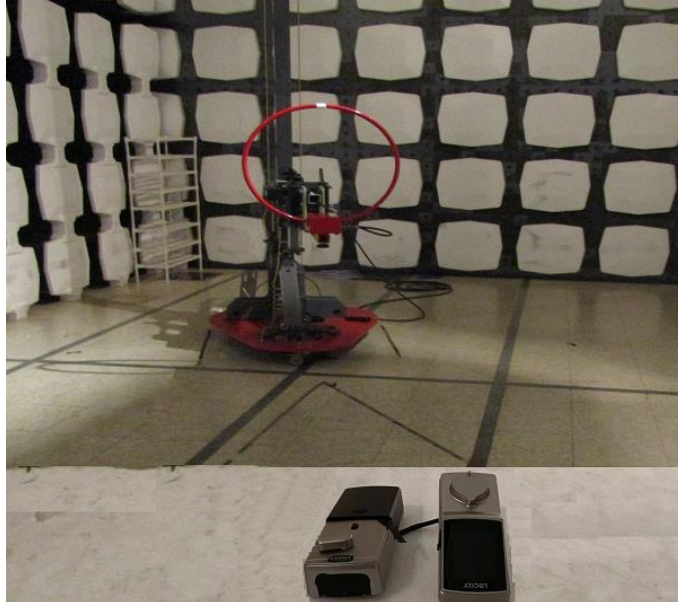
Test Report

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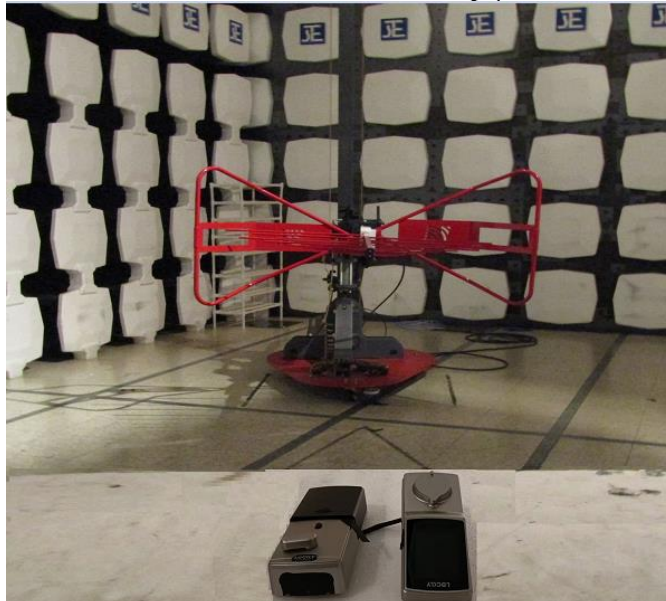
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Photographs of EUT

Measurement of Radiated Emission Test Set Up (9kHz to 30MHz)



Measurement of Radiated Emission Test Set Up (30MHz to 1000MHz)



******* End of Test Report *******

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