



Test Report

Date : 2022-09-21
No. : HMD22090001

Page 1 of 23

Applicant : Ademco Inc
1985 Douglas Drive, Golden Valley, MN55422-3922, USA

Supplier / Manufacturer : Ansen Electronics Company
Unit C, 10/F, United Overseas Plaza, 11 Lai Yip Street, Kwun Tong, Kowloon, Hong Kong.

Description of Sample(s) : Submitted sample(s) said to be
Product: Portable Wireless Doorbell
Brand Name: Honeywell Home
Model No.: RDWL917AX2000
FCC ID: HS9-RDWL917AX-2

Date Samples Received : 2022-09-08

Date Tested : 2022-09-08 to 2022-09-14

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. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks : ---


Dr.CHAN Kwok Hung, Brian
Authorized Signatory



Test Report

Date : 2022-09-21
No. : HMD22090001

Page 2 of 23

CONTENT:

Cover	Page 1 of 23
Content	Page 2 of 23
<u>1.0 General Details</u>	
1.1 Equipment Under Test [EUT] Description of EUT operation	Page 3 of 23
1.2 RF Module Details	Page 3 of 23
1.3 Antenna Details	Page 3 of 23
1.4 Date of Order	Page 3 of 23
1.5 Submitted Sample(s)	Page 3 of 23
1.6 Test Duration	Page 3 of 23
1.7 Country of Origin	Page 3 of 23
<u>2.0 Technical Details</u>	
2.1 Investigations Requested	Page 4 of 23
2.2 Test Standards and Results Summary	Page 4 of 23
<u>3.0 Test Results</u>	
3.1 Emission	Page 5-17 of 23
<u>Appendix A</u>	
List of Measurement Equipment	Page 18 of 23
<u>Appendix B</u>	
List of Ancillary Equipment	Page 19 of 23
<u>Appendix C</u>	
Photograph(s) of Product	Page 20-23 of 23

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Test Report

Date : 2022-09-21
No. : HMD22090001

Page 3 of 23

1.0 General Details

1.1 Equipment Under Test [EUT]

Description of Sample(s)

Product: Portable Wireless Doorbell
Manufacturer: Ansen Electronics Company
Unit C, 10/F, United Overseas Plaza, 11 Lai Yip Street, Kwun Tong, Kowloon, Hong Kong.
Brand Name: Honeywell Home
Model Number: RDWL917AX2000
Rating: 6Vd.c.("AA" battery *4) or 5Vd.c. by USB port

1.1.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Portable Wireless Doorbell. It is a transceiver operating at 916.8MHz and the RF signal was modulated by IC.

1.2 RF Module Details

Module Model Number: N/A
Module FCC ID: N/A
Modulation: FSK
Frequency Range: 916.8MHz

1.3 Antenna Details

Antenna Type: Spring antenna
Antenna Gain: N/A

1.4 Date of Order

2022-09-08

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2022-09-08 to 2022-09-14

1.7 Country of Origin

Vietnam

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Test Report

Date : 2022-09-21
No. : HMD22090001

Page 4 of 23

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 Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.10: 2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions	FCC 47CFR 15.209 FCC 47CFR 15.205	ANSI C63.10: 2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC Mains Conducted Emissions	FCC 47CFR 15.207	ANSI C63.10: 2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20dB Emission bandwith	FCC 47CFR 15.215(c)	ANSI C63.10: 2013	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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Test Report

Date : 2022-09-21
No. : HMD22090001

Page 5 of 23

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Ambient temperature 25°C

Relative humidity 57%

Test Requirement: FCC 47CFR 15.249 & FCC 47CFR 15.209

Test Method: ANSI C63.10:2013

Test Date: 2022-09-08 to 2022-09-14

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.

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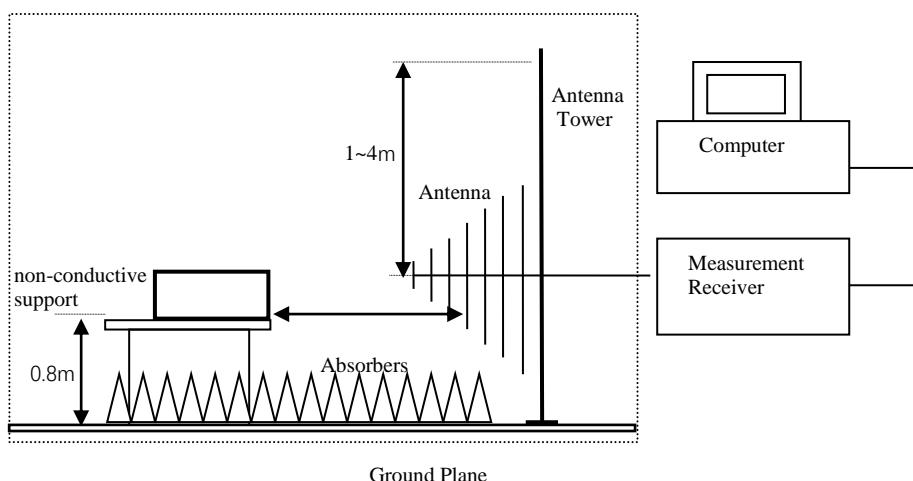
Date : 2022-09-21
 No. : HMD22090001

Page 6 of 23

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	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) (Other than Fundamental Emissions)	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.



Test Report

Date : 2022-09-21
No. : HMD22090001

Page 7 of 23

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	50,000 [Quasi-Peak]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

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:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

Calculated measurement uncertainty
(9kHz-30MHz): 2.0dB
(30MHz -1GHz): 4.9dB
(1GHz -6GHz): 4.02dB
(6GHz -26.5GHz): 4.03dB

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

Results of TX mode (9kHz – 30MHz): PASS

Emissions detected are more than 20 dB below the FCC Limits

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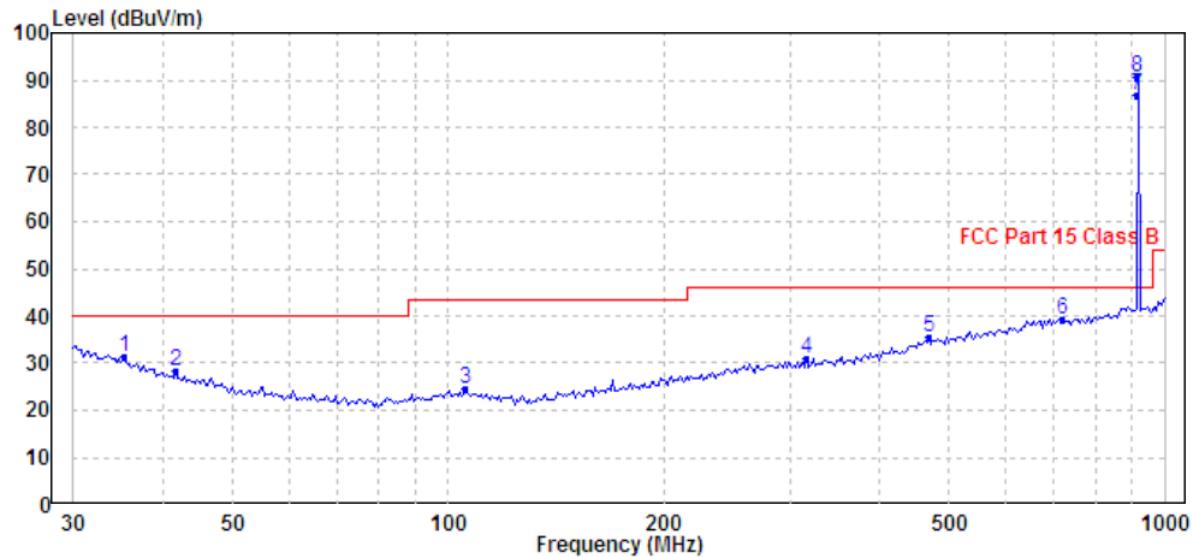
Date : 2022-09-21

No. : HMD22090001

Page 8 of 23

Results of TX mode (30MHz – 1GHz)(916.8MHz): PASS

Horizontal



Ambient Temperature: 25C

Relative Humidity : 50%

Freq	Level	Limit		Over	Remark	Pol/Phase
		Line	Limit			
1	35.251	31.16	40.00	-8.84	QP	Horizontal
2	41.713	28.30	40.00	-11.70	QP	Horizontal
3	106.013	24.64	43.50	-18.86	QP	Horizontal
4	316.589	31.01	46.00	-14.99	QP	Horizontal
5	468.876	35.53	46.00	-10.47	QP	Horizontal
6	719.200	39.30	46.00	-6.70	QP	Horizontal
7	916.800	86.80	94.00	-7.20	Average	Horizontal
8	916.800	90.54	114.0	-23.46	Peak	Horizontal

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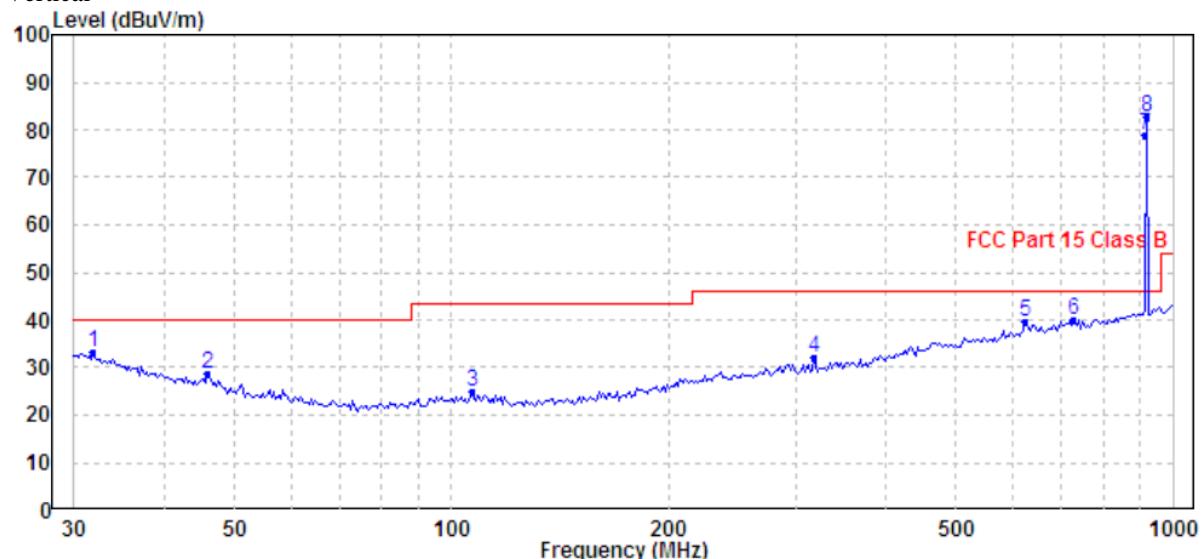
Test Report

Date : 2022-09-21
No. : HMD22090001

Page 9 of 23

Results of TX mode (30MHz – 1GHz) (916.8MHz): PASS

Vertical



Ambient Temperature: 25C

Relative Humidity : 50%

Freq	Level	Limit	Over	Remark	Pol/Phase
		Line	Limit		
1	31.955	33.20	40.00	-6.80	QP
2	46.016	28.50	40.00	-11.50	QP
3	106.759	24.78	43.50	-18.72	QP
4	318.817	31.89	46.00	-14.11	QP
5	625.078	39.52	46.00	-6.48	QP
6	729.358	39.91	46.00	-6.09	QP
7	916.800	78.99	94.00	-15.01	Average
8	919.287	82.71	114.0	-31.29	Peak

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Test Report

Date : 2022-09-21

No. : HMD22090001

Page 10 of 23

Results of TX mode (1GHz – 10GHz) (916.8MHz): PASS

Field Strength of Harmonics Emission Peak Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
1833.6	53.6	-6.2	47.4	234.4	5,000	Vertical
1833.6	52.8	-5.9	46.9	221.3	5,000	Horizontal
2750.4	51.9	-3.7	48.2	257.0	5,000	Vertical
2750.4	51.2	-3.8	47.4	234.4	5,000	Horizontal
3667.2	46.3	-1.1	45.2	182.0	5,000	Vertical
3667.2	47.2	-1.3	45.9	197.2	5,000	Horizontal
4584.0	46.1	1.8	47.9	248.3	5,000	Vertical
4584.0	45.7	1.9	47.6	239.9	5,000	Horizontal

Field Strength of Harmonics Emission Average Value						
Frequency MHz	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
1833.6	44.5	-6.2	38.3	82.2	500	Vertical
1833.6	45.1	-5.9	39.2	91.2	500	Horizontal
2750.4	43.9	-3.7	40.2	102.3	500	Vertical
2750.4	42.8	-3.8	39.0	89.1	500	Horizontal
3667.2	41.5	-1.1	40.4	104.7	500	Vertical
3667.2	40.9	-1.3	39.6	95.5	500	Horizontal
4584.0	38.9	1.8	40.7	108.4	500	Vertical
4584.0	39.2	1.9	41.1	113.5	500	Horizontal

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Test Report

Date : 2022-09-21

No. : HMD22090001

Page 11 of 23

Emissions radiated outside of the specified frequency bands:

Limit :

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Result: PASS

RF Radiated Emissions (916.8MHz)

Field Strength of Band-edge Compliance Quasi Peak Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
902.0	10.3	26.1	36.4	46.0	9.6	Vertical
902.0	9.5	26.6	36.1	46.0	9.9	Horizontal
928.0	11.1	26.2	37.3	46.0	8.7	Vertical
928.0	10.5	26.9	37.4	46.0	8.6	Horizontal

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Test Report

Date : 2022-09-21
 No. : HMD22090001

Page 12 of 23

3.1.2 AC Mains Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.10:2013
Test Date:	2022-09-13
Mode of Operation:	TX mode
Test Voltage:	120V a.c. 60Hz

Ambient Temperature: 25°C Relative Humidity: 51% Atmospheric Pressure: 101 kPa

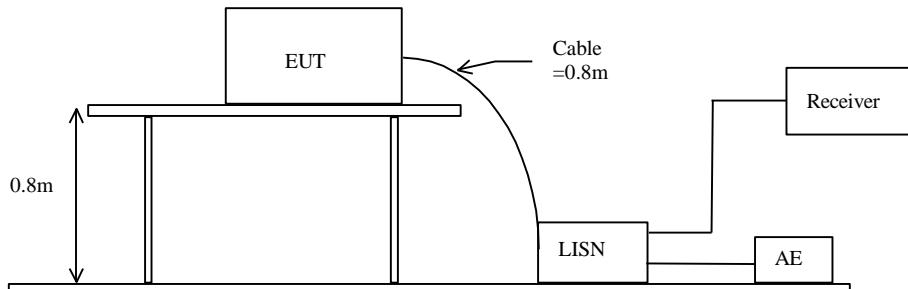
Test Method:

The test was performed in accordance with ANSI C63.10:2013, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Receiver Setting:

Bandw. = 9 kHz, Meas. Time= 10.0 ms, Step Width = 5.0kHz
 Detector = MaxPeak and CISPR AV

Test Setup:



Limits for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Remarks:

Calculated measurement uncertainty (0.15MHz – 30MHz): 3.25dB

-* - Emission(s) that is far below the corresponding limit line.

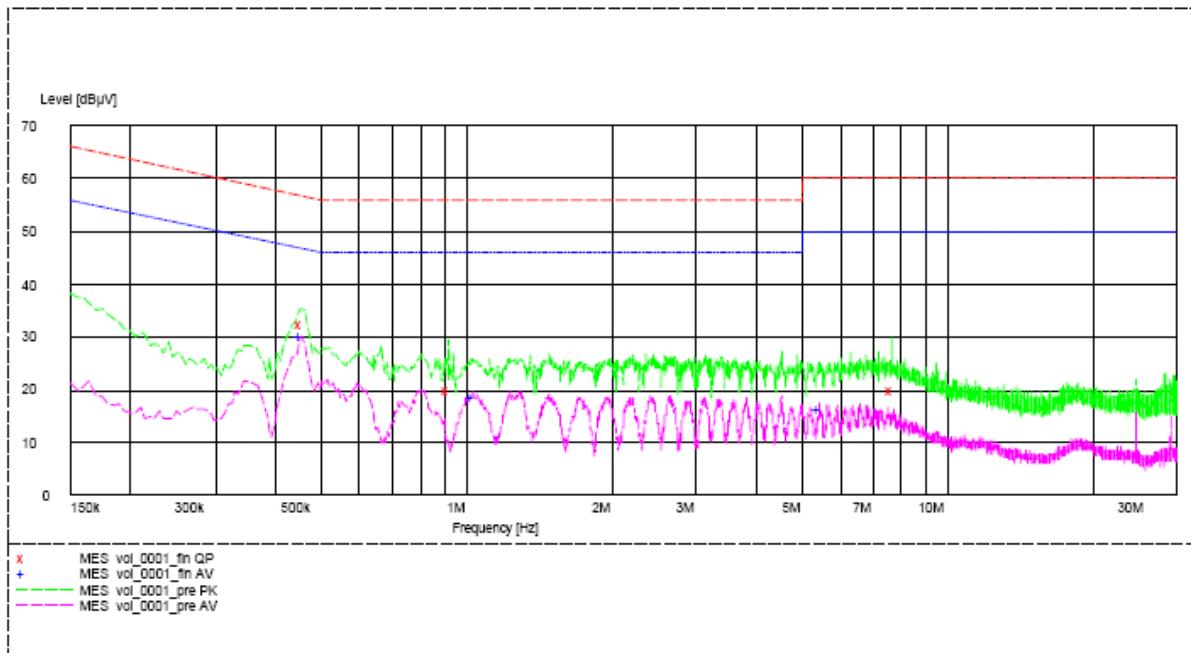
Test Report

Date : 2022-09-21
 No. : HMD22090001

Page 13 of 23

Results of TX mode (L): PASS

Please refer to the following diagram for individual results.



MEASUREMENT RESULT: "vol_0001_fin AV"

9/13/2022 5:21PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.455000	29.90	9.6	47	16.9	L1	GND
1.035000	18.60	9.6	46	27.4	L1	GND
5.420000	16.30	9.7	50	33.7	L1	GND

MEASUREMENT RESULT: "vol_0001_fin QP"

9/13/2022 5:21PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.455000	32.40	9.6	57	24.4	L1	GND
0.920000	19.80	9.6	56	36.2	L1	GND
7.665000	19.90	9.8	60	40.1	L1	GND

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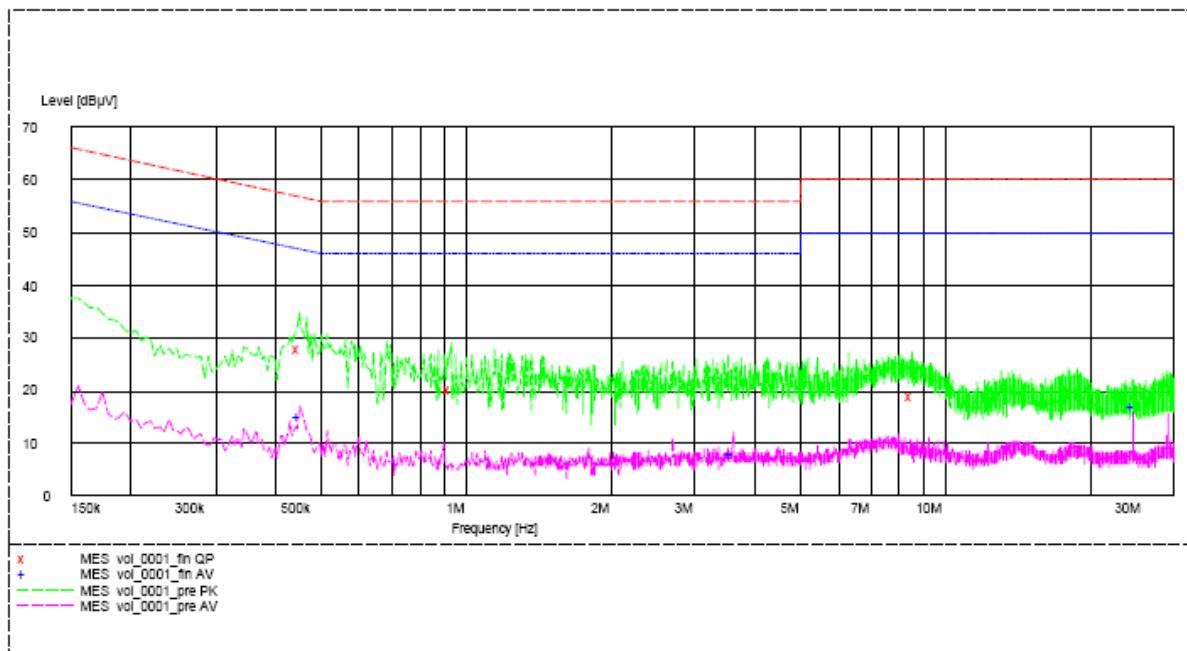
Test Report

Date : 2022-09-21
 No. : HMD22090001

Page 14 of 23

Results of TX mode (N): PASS

Please refer to the following diagram for individual results.



MEASUREMENT RESULT: "vol_0001_fin AV"

9/13/2022 / 5:24PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.450000	15.40	9.6	47	31.5	N	GND
3.605000	8.20	9.7	46	37.8	N	GND
24.575000	16.90	10.1	50	33.1	N	GND

MEASUREMENT RESULT: "vol_0001_fin QP"

9/13/2022 / 5:24PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.450000	27.80	9.6	57	29.1	N	GND
0.930000	20.10	9.6	56	35.9	N	GND
8.545000	19.00	9.8	60	41.0	N	GND



Test Report

Date : 2022-09-21
No. : HMD22090001

Page 15 of 23

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



Test Report

Date : 2022-09-21
No. : HMD22090001

Page 16 of 23

3.1.4 20dB Bandwidth of Fundamental Emission

Ambient temperature 25°C

Relative humidity 57%

Test Requirement: FCC 47 CFR 15.249
Test Method: ANSI C63.10:2013
Test Date: 2022-09-09
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

Test Setup:

As Test Setup of clause 3.1.1 in this test report.



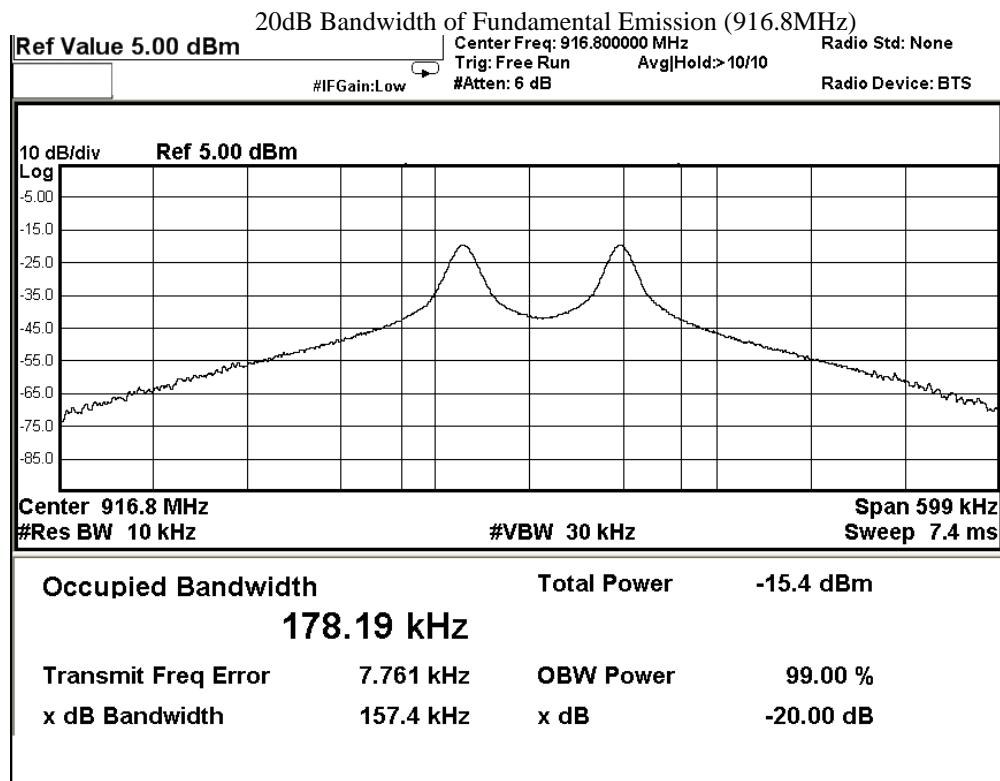
Test Report

Date : 2022-09-21
No. : HMD22090001

Page 17 of 23

Limits for 20dB Bandwidth of Fundamental Emission (916.8MHz):

Frequency Range [MHz]	20dB Bandwidth [KHz]
916.8.0	157.4



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Test Report

Date : 2022-09-21
No. : HMD22090001

Page 18 of 23

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	2023/09/10
EM355	Biconilog Antenna	ETS-Lindgren	3143B	00094856	2020/06/17	2023/09/17
EM200	DUAL CHANNEL POWER METER	R & S	NRVD	100592	2019/10/11	2023/10/11
EM012	PRE-AMPLIFIER	HP	HP8448B	3008A00262	2019/11/08	2022/11/08
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM232	LISN	SCHAFFNER	NNB41	04/100082	2021/07/20	2023/07/20
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2022/05/30	2023/05/30
EM233	PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	100314	2021/01/18	2023/01/18
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2022/02/02	2027/02/02
N/A	MEASUREMENT AND EVALUATION SOFTWARE	ROHDE & SCHWARZ	BSIB-K1	V1.20	N/A	N/A

Remarks:-

N/A Not Applicable or Not Available

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Test Report

Date : 2022-09-21

No. : HMD22090001

Page 19 of 23

Appendix B

List of Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	REMARK
1	Adapter	YH-12WA050200EU	Provided by the laboratory

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Test Report

Date : 2022-09-21
No. : HMD22090001

Page 20 of 23

Appendix C

Photographs of EUT

View of the product



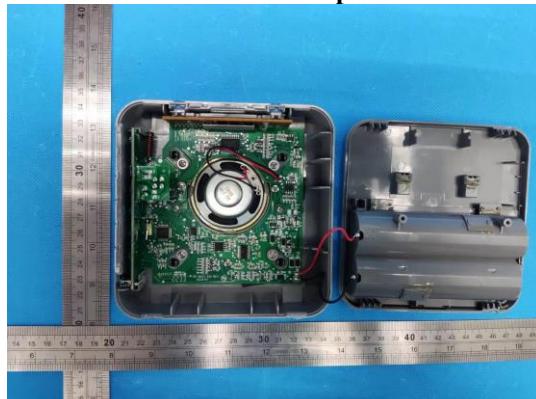
View of the product



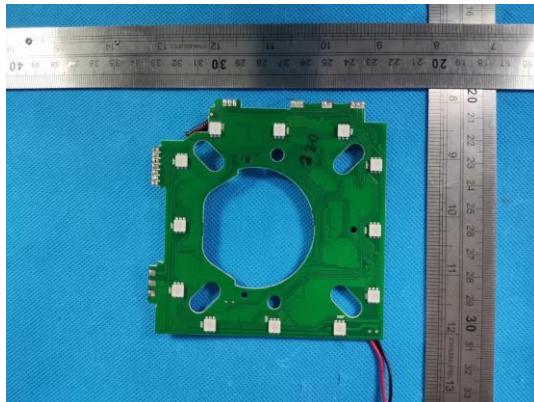
Inside View of the product



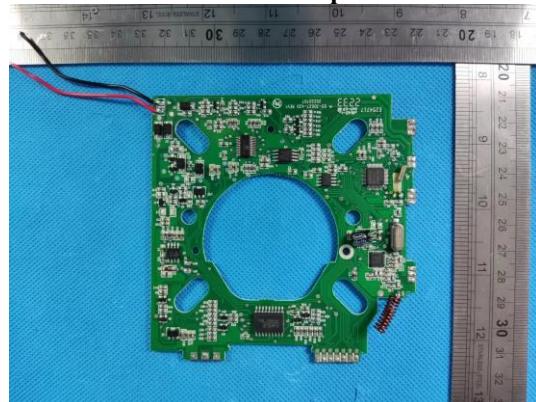
Inside View of the product



Inner Circuit Bottom View



Inner Circuit Top View



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Test Report

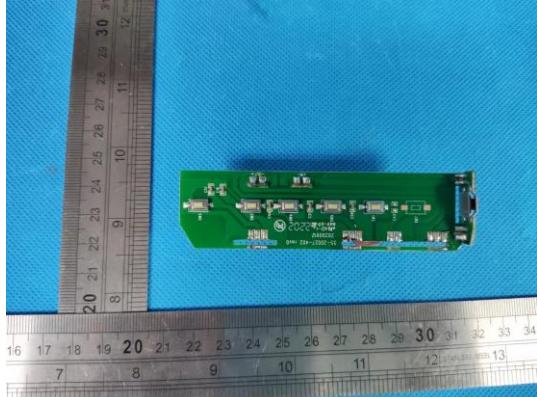
Date : 2022-09-21

No. : HMD22090001

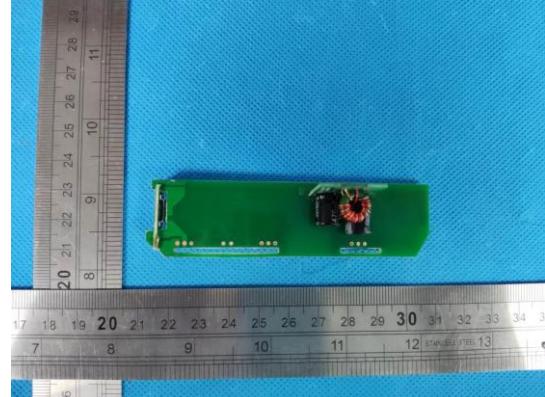
Page 21 of 23

Photographs of EUT

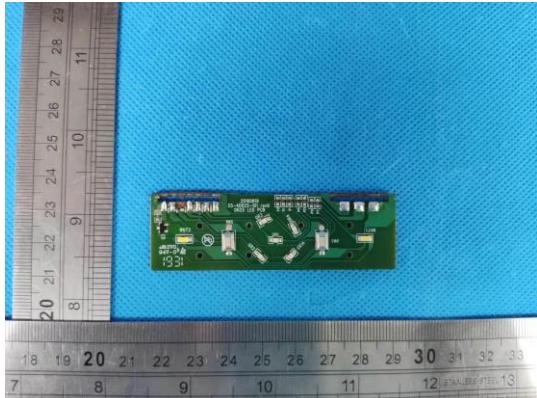
Inner Circuit Bottom View



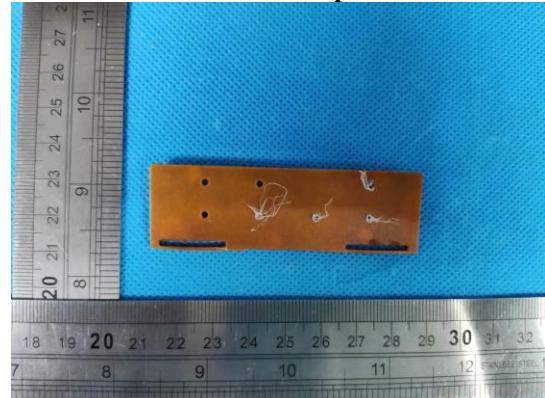
Inner Circuit Top View



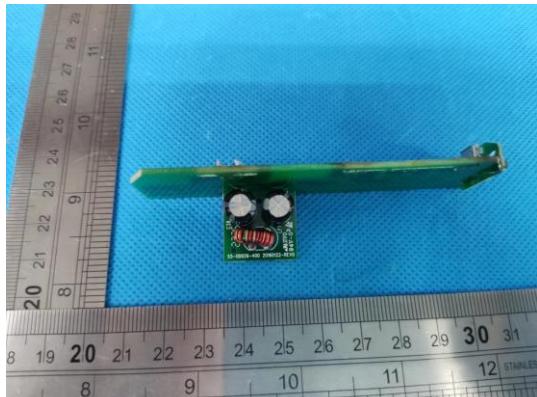
Inner Circuit Bottom View



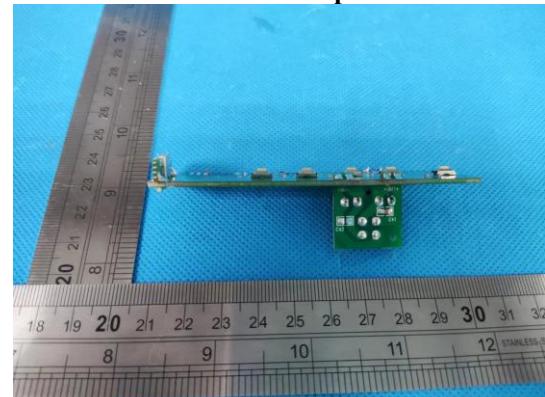
Inner Circuit Top View



Inner Circuit Bottom View



Inner Circuit Top View



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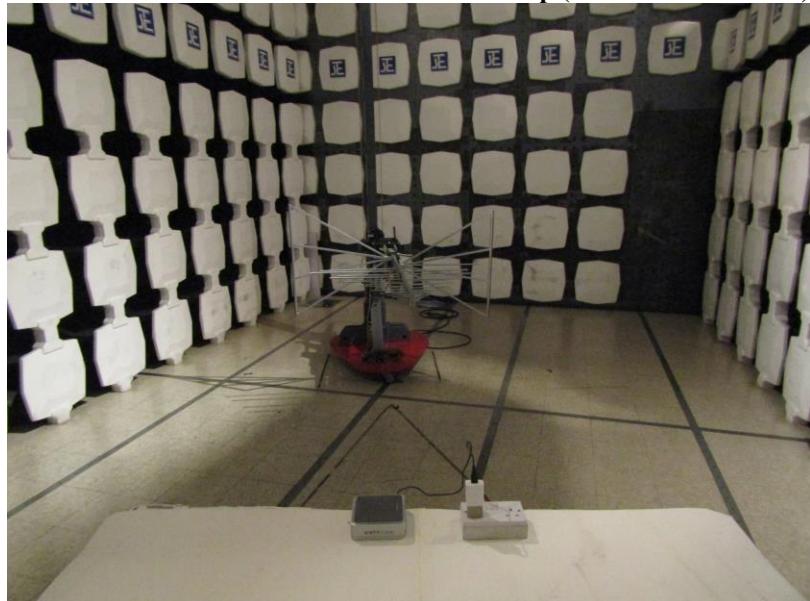
Page 22 of 23

Photographs of EUT

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



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



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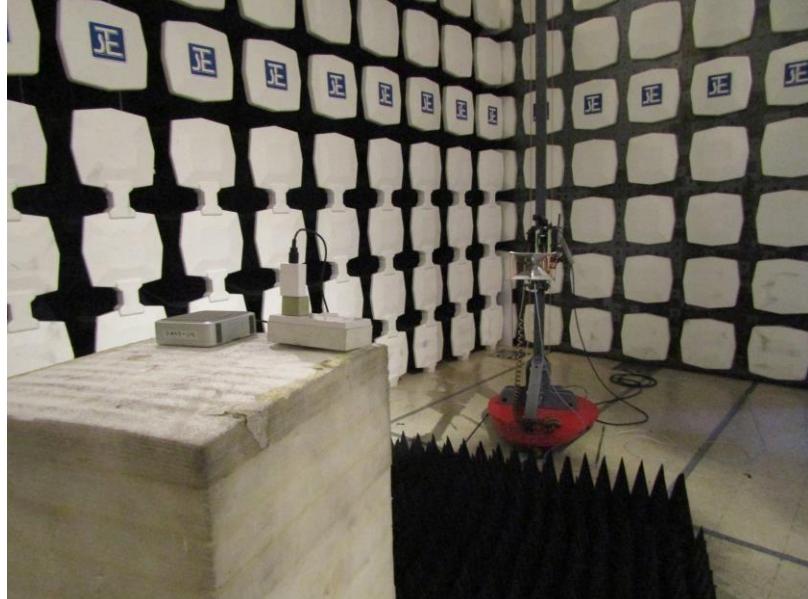
Date : 2022-09-21

No. : HMD22090001

Page 23 of 23

Photographs of EUT

Measurement of Radiated Emission Test Set Up (Above 1000MHz)



Measurement of Conducted Emission Test Set Up



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

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