



Test Report

Date : 2020-05-25
No. : HMD20050008

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Applicant : RMS International (USA) Inc.
4 Gill Street, STE A Woburn, MA 01801 United States

Supplier / Manufacturer : RMS International (USA) Inc.
4 Gill Street, STE A Woburn, MA 01801 United States

Description of Sample(s) : Submitted sample(s) said to be
Product: RC Car 1/6
Brand Name: RMS
Model No.: US72-0174/MEN, US72-0174, SKU#: 2799943
FCC ID: 2ATYAUS72-0174

Date Samples Received : 2020-05-20

Date Tested : 2020-05-20 to 2020-05-22

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

Remarks : ---



LEUNG Kwun Hang, Joey
Authorized Signatory



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1.0 General Details

1.1 Equipment Under Test [EUT]

Description of Sample(s)

Product: RC Car 1/6
Manufacturer: RMS International (USA) Inc.
4 Gill Street, STE A Woburn, MA 01801 United States
Brand Name: RMS
Model Number: US72-0174/MEN, US72-0174, SKU#: 2799943
Rating: 4.5Vd.c. (AA battery*3)

1.1.1 Description of EUT Operation

The Equipment Under Test (EUT) is a RC Car. It is a transceiver operating at 2408MHz~2467MHz and the RF signal was modulated by IC.

1.2 RF Module Details

Module Model Number: N/A
Module FCC ID: N/A
Modulation: GFSK
Frequency Range: 2408-2467MHz

1.3 Antenna Details

Antenna Type: Line antenna
Antenna Gain: 0dBi

1.4 Date of Order

2020-05-20

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2020-05-20 to 2020-05-22

1.7 Country of Origin

China

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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.

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	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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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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:	2020-05-20
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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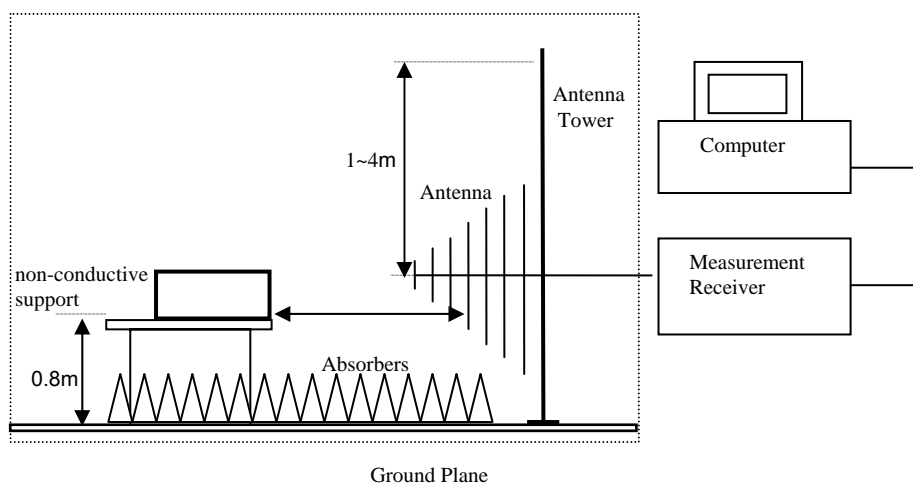
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Spectrum Analyzer Setting:

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)	RBW: 1MHz VBW: 1MHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
Above 1GHz (Av)	RBW: 1MHz VBW: 10Hz 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 15.249]:

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]

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.

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Results of Tx mode (Lowest Frequency Channel-2408 MHz): Pass

Field Strength of Fundamental Emissions						
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
2408.00	61.4	36.8	98.2	81,376.7	500,000	Vertical
2408.00	58.3	36.4	94.7	54,575.8	500,000	Horizontal

Field Strength of Fundamental Emissions						
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
2408.00	45.8	36.8	82.6	13,443.1	50,000	Vertical
2408.00	41.9	36.4	78.3	8,241.4	50,000	Horizontal

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
4816.0	15.9	41.5	57.4	737.1	5,000	Vertical
4816.0	13.3	42.4	55.7	610.2	5,000	Horizontal
7224.0	9.9	45.1	55.0	563.6	5,000	Vertical
7224.0	8.7	46.2	54.9	554.0	5,000	Horizontal
9632.0	7.8	48.0	55.8	613.1	5,000	Vertical
9632.0	6.3	48.8	55.1	565.6	5,000	Horizontal
12040.0	3.45	51.8	55.3	578.8	5,000	Vertical
12040.0	3.6	52.4	56.0	628.8	5,000	Horizontal

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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
4816.0	2.1	41.5	43.6	151.7	500	Vertical
4816.0	-1.0	42.4	41.4	118.0	500	Horizontal
7224.0	-5.7	45.1	39.4	93.2	500	Vertical
7224.0	-6.2	46.2	40.0	100.5	500	Horizontal
9632.0	-8.8	48.0	39.2	91.3	500	Vertical
9632.0	-8.9	48.8	39.9	98.4	500	Horizontal
12040.0	-11.6	51.8	40.2	102.0	500	Vertical
12040.0	-12.0	52.4	40.4	104.2	500	Horizontal

Results of Tx mode (Middle Frequency Channel- 2434MHz): Pass

Field Strength of Fundamental Emissions						
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
2434.00	60.7	36.8	97.5	75,335.6	500,000	Vertical
2434.00	57.8	36.4	94.2	51,463.6	500,000	Horizontal

Field Strength of Fundamental Emissions						
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
2434.00	45.0	36.8	81.8	12,232.1	50,000	Vertical
2434.00	41.9	36.4	78.3	8,231.9	50,000	Horizontal



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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
4868.0	15.4	41.6	57.0	705.5	5,000	Vertical
4868.0	12.5	42.5	55.0	564.3	5,000	Horizontal
7302.0	2.0	53.2	55.2	576.8	5,000	Vertical
7302.0	8.8	46.3	55.1	566.2	5,000	Horizontal
9736.0	7.2	48.1	55.3	583.4	5,000	Vertical
9736.0	6.5	48.9	55.4	585.5	5,000	Horizontal
12170.0	3.6	51.6	55.2	578.1	5,000	Vertical
12170.0	3.6	52.5	56.1	634.6	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
4868.0	0.4	41.6	42.0	126.5	500	Vertical
4868.0	-2.6	42.5	39.9	98.4	500	Horizontal
7302.0	-5.1	45.2	40.1	101.6	500	Vertical
7302.0	-7.1	46.3	39.2	91.3	500	Horizontal
9736.0	-8.5	48.1	39.6	95.9	500	Vertical
9736.0	-8.8	48.9	40.1	100.8	500	Horizontal
12170.0	-11.3	51.6	40.3	103.6	500	Vertical
12170.0	-11.3	52.5	41.2	114.6	500	Horizontal

Results of Tx mode (Highest Frequency Channel – 2467MHz): Pass

Field Strength of Fundamental Emissions						
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
2467.00	61.6	36.8	98.4	83,272.2	500,000	Vertical
2467.00	58.5	36.4	94.9	55,847.0	500,000	Horizontal



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Field Strength of Fundamental Emissions						
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
2467.00	45.6	36.8	82.4	13,122.0	50,000	Vertical
2467.00	42.4	36.4	78.8	8,679.6	50,000	Horizontal

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
4934.0	15.5	41.4	56.9	695.8	5,000	Vertical
4934.0	13.0	42.7	55.7	612.4	5,000	Horizontal
7401.0	9.7	45.6	55.3	578.8	5,000	Vertical
7401.0	8.6	46.5	55.1	569.5	5,000	Horizontal
9868.0	6.9	48.6	55.5	597.0	5,000	Vertical
9868.0	5.4	49.7	55.1	571.5	5,000	Horizontal
12335.0	3.4	51.7	55.1	569.5	5,000	Vertical
12335.0	3.1	52.7	55.8	615.9	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
4934.0	0.5	41.4	41.9	124.6	500	Vertical
4934.0	-3.2	42.7	39.5	94.0	500	Horizontal
7401.0	-6.3	45.6	39.3	92.5	500	Vertical
7401.0	-6.4	46.5	40.1	100.9	500	Horizontal
9868.0	-9.5	48.6	39.1	89.9	500	Vertical
9868.0	-10.1	49.7	39.6	95.3	500	Horizontal
12335.0	-11.7	51.7	40.0	100.5	500	Vertical
12335.0	-12.7	52.7	40.1	100.6	500	Horizontal



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Radiated Emissions Measurement:

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: RF Radiated Emissions (1GHz-26GHz) (Lowest)

Field Strength of Band-edge Compliance 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
2400.0	2.3	36.8	39.1	74.0	34.9	Horizontal +Vertical*

Field Strength of Band-edge Compliance Average 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
The PK value is less than AV limit, AV value does not need to be tested.						

Result: RF Radiated Emissions (1GHz-26GHz)

Field Strength of Band-edge Compliance 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
2384.0	10.3	36.8	47.1	74.0	26.9	Horizontal +Vertical*

Field Strength of Band-edge Compliance Average 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
The PK value is less than AV limit, AV value does not need to be tested.						



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Result: RF Radiated Emissions (1GHz-26GHz) (Highest)

Field Strength of Band-edge Compliance 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
2483.5	1.2	36.4	37.6	74.0	36.5	Horizontal +Vertical*

Field Strength of Band-edge Compliance Average 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
The PK value is less than AV limit, AV value does not need to be tested.						

-* : The test results are accumulated in both vertical and horizontal directions.

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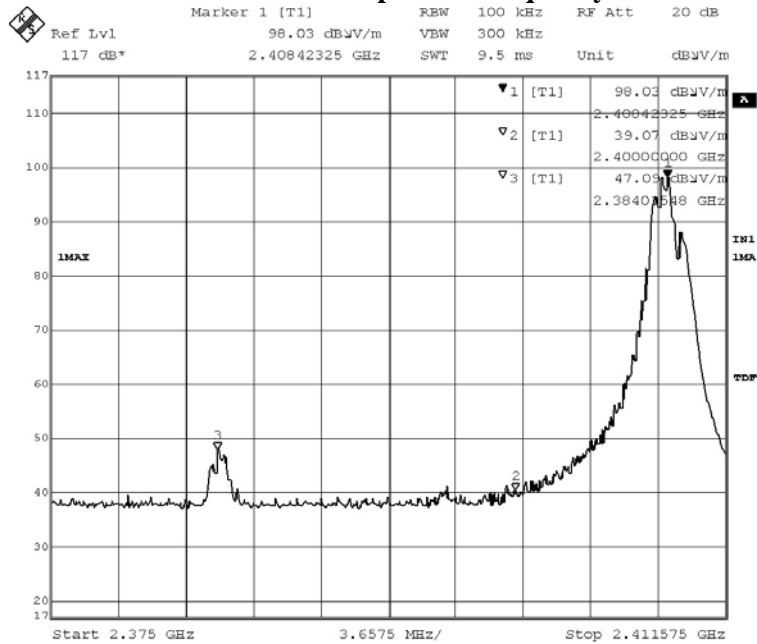
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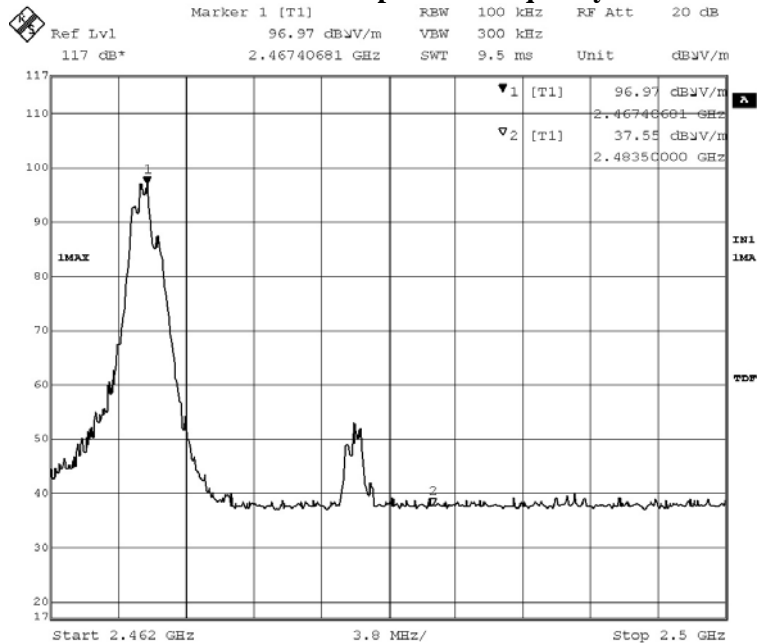
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Emissions radiated outside of the specified frequency bands: 2408MHz



Emissions radiated outside of the specified frequency bands: 2467MHz





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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:

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.

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

Emissions detected are more than 20 dB below the FCC Limits

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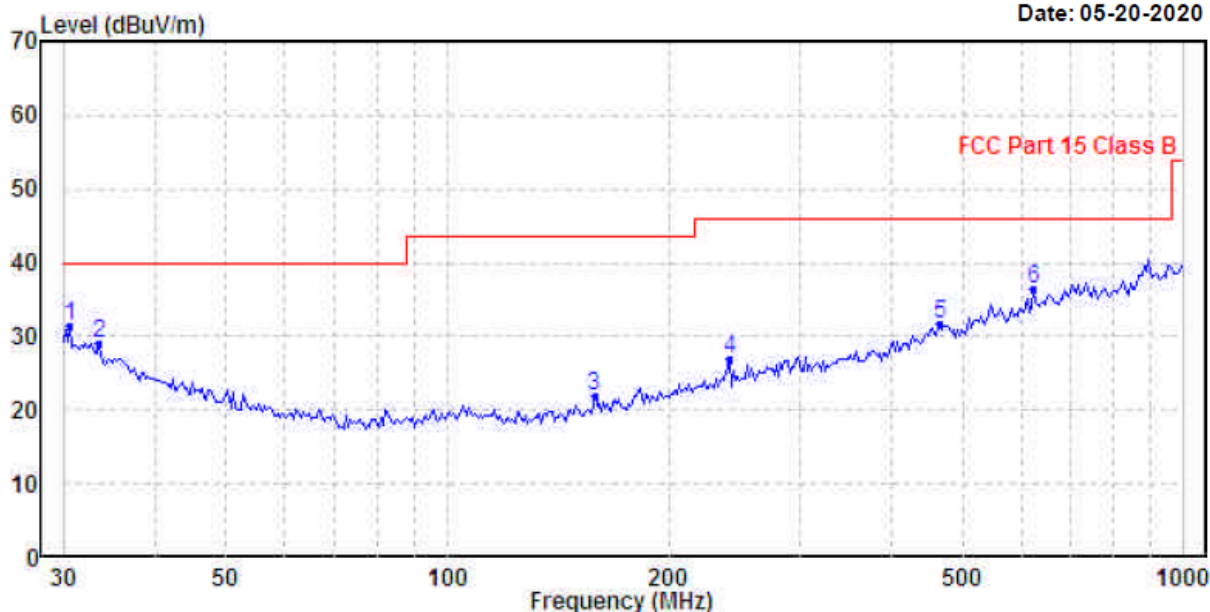
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Results of TX mode (30MHz – 1GHz)(2408MHz worst case): PASS

Horizontal

Date: 05-20-2020



Ambient Temperature: 25C
 Relative Humidity : 50%

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB		
1	30.638	31.40	40.00	-8.60	QP	Horizontal
2	33.562	29.10	40.00	-10.90	QP	Horizontal
3	158.112	21.80	43.50	-21.70	QP	Horizontal
4	240.830	27.10	46.00	-18.90	QP	Horizontal
5	465.599	31.60	46.00	-14.40	QP	Horizontal
6	625.078	36.30	46.00	-9.70	QP	Horizontal

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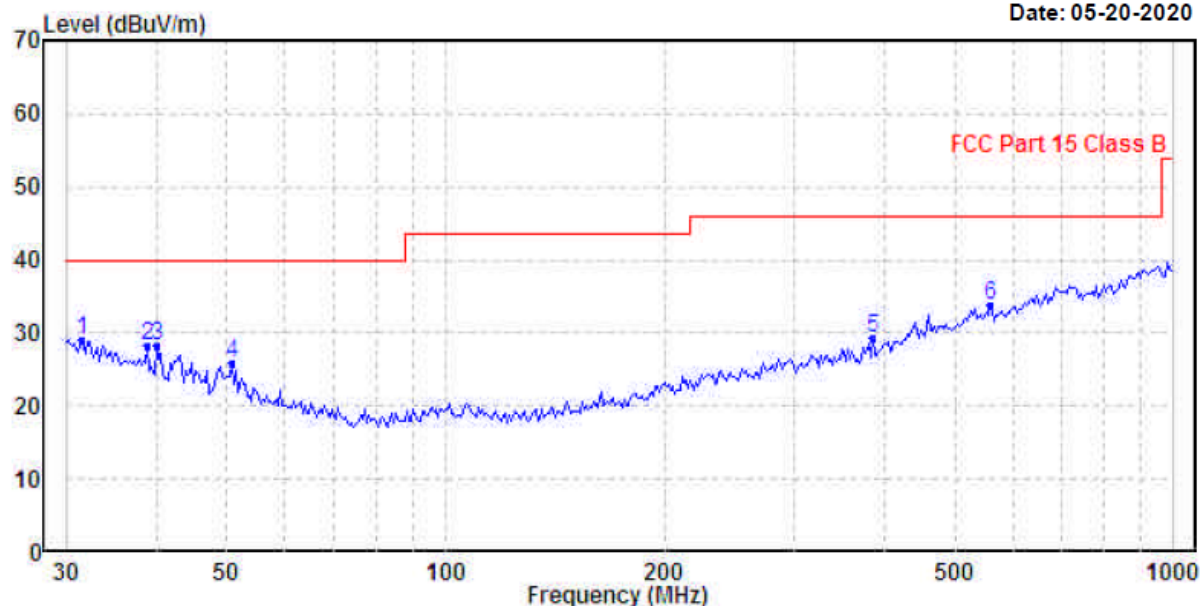
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Results of TX mode (30MHz – 1GHz) (2408MHz worst case): PASS

Vertical

Date: 05-20-2020



Ambient Temperature: 25C
 Relative Humidity : 50%

	Freq	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB		
1	31.510	28.90	40.00	-11.10	QP	Vertical
2	38.888	28.20	40.00	-11.80	QP	Vertical
3	39.994	28.20	40.00	-11.80	QP	Vertical
4	50.764	25.80	40.00	-14.20	QP	Vertical
5	385.281	29.20	46.00	-16.80	QP	Vertical
6	558.730	33.60	46.00	-12.40	QP	Vertical



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3.1.2 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 line antenna. There is no external antenna, the antenna gain =0dBi. User is unable to remove or changed the Antenna.

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3.1.3 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: 2020-05-21
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.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

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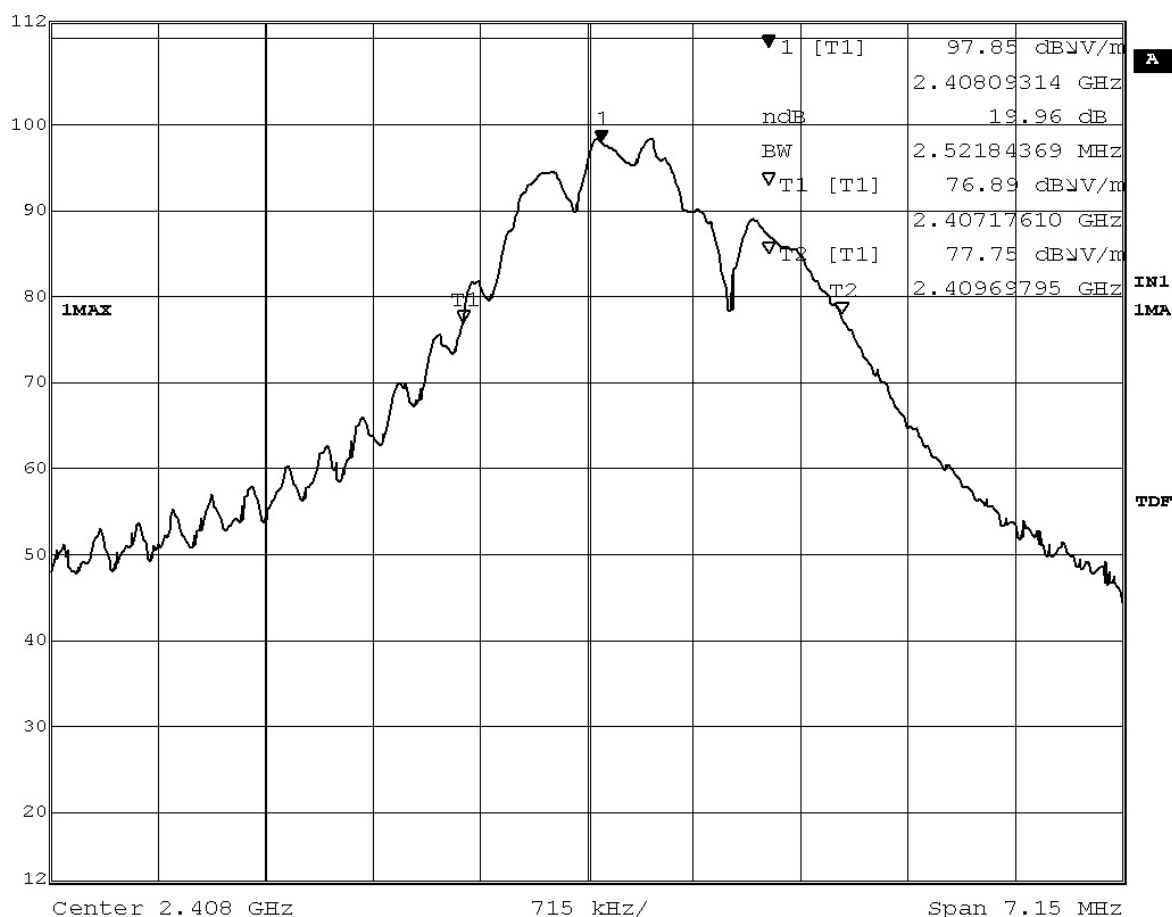
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Limits for 20dB Bandwidth of Fundamental Emission (Low Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2408.0	2.5218

20dB Bandwidth of Fundamental Emission (2408MHz)

	Marker 1 [T1 ndB]	RBW	100 kHz	RF Att	20 dB
	Ref Lvl	ndB	19.96 dB	VBW	300 kHz
	112 dB*	BW	2.52184369 MHz	SWT	5 ms
				Unit	dB μ V/m





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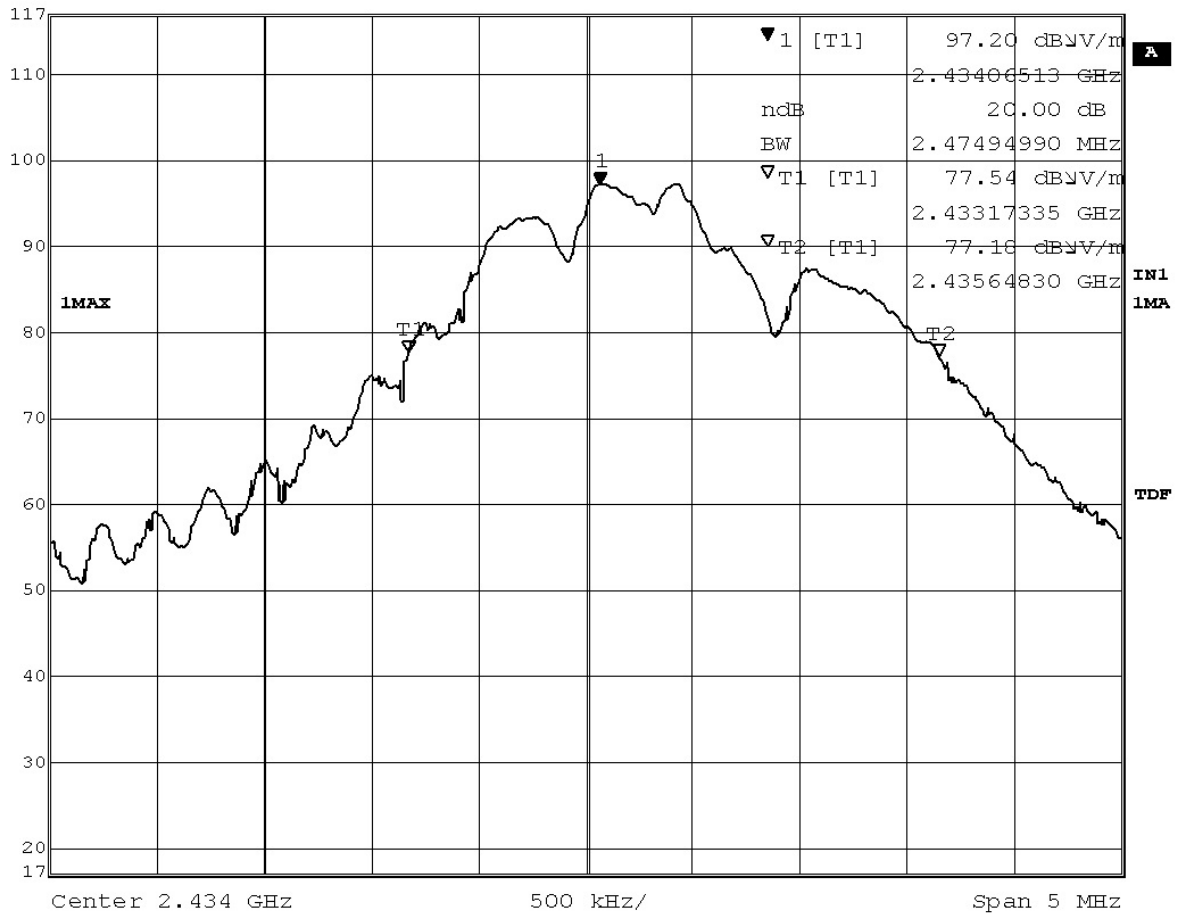
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Limits for 20dB Bandwidth of Fundamental Emission (Middle Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2434.0	2.4749

20dB Bandwidth of Fundamental Emission (2434MHz)

	Marker 1 [T1 ndB]	RBW 100 kHz	RF Att 20 dB			
Ref Lvl	ndB 20.00 dB	VBW 300 kHz				
117 dB*	BW 2.47494990 MHz	SWT 5 ms	Unit dBµV/m			





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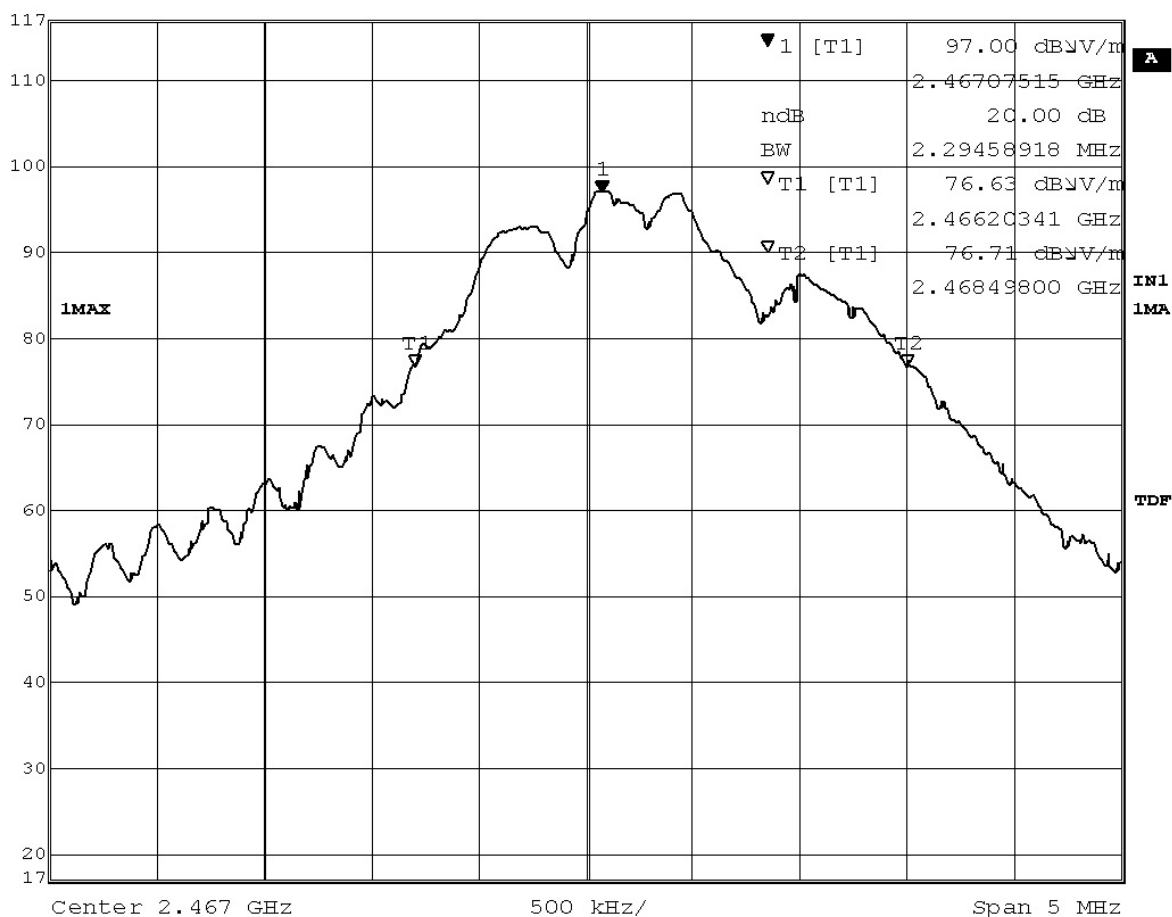
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Limits for 20dB Bandwidth of Fundamental Emission (High Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2467.0	2.2946

20dB Bandwidth of Fundamental Emission (2467MHz)

	Marker 1 [T1 ndB]	RBW 100 kHz	RF Att 20 dB			
Ref Lvl	ndB 20.00 dB	VBW 300 kHz				
117 dB*	BW 2.29458918 MHz	SWT 5 ms	Unit	dB μ V/m		





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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	--	2020/04/20	2021/04/20
EM356	ANTENNA POSITIONING TOWER	ETS-LINDGREN	2171B	00150346	N/A	N/A
EM336	PRECISION CONICAL DIPOLE	SEIBERSDORF LABORATORIES	PCD 3100	6236/M	2018/06/28	2020/06/28
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2020/05/13	2021/05/13
EM276	BROADBAND HORN ANTENNA	A-INFOMW	JTXLB- 10180-SF	J203109090300 7	2019/03/20	2021/03/29
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2020/04/28	2022/04/28
EM301	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-10	00130988	2020/04/28	2022/04/28
EM022	LOOP ANTENNA	ETS_LINDGREN	6502	00206533	2019/11/30	2021/11/30
EM045	POWER METER	ROHDE & SCHWARZ	NRVD	843246/028	2018/06/01	2020/06/01

Remarks:-

N/A Not Applicable or Not Available

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Appendix B

Photographs of EUT

View of the product



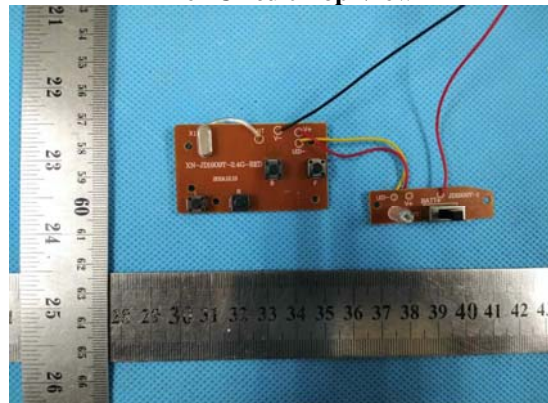
View of the product



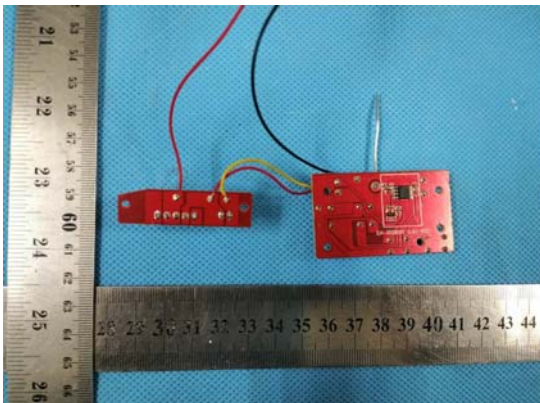
Inside View of the product



Inner Circuit Top View



Inner Circuit Bottom View



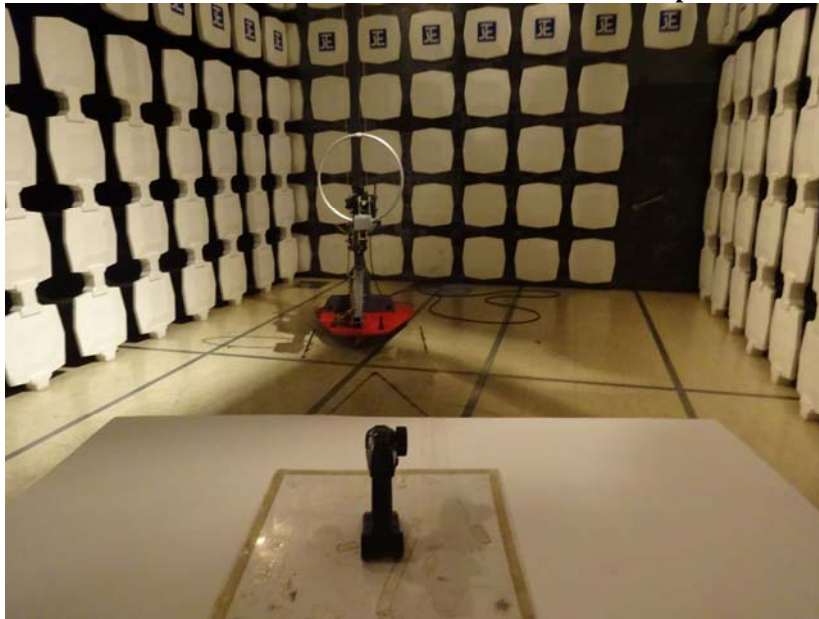
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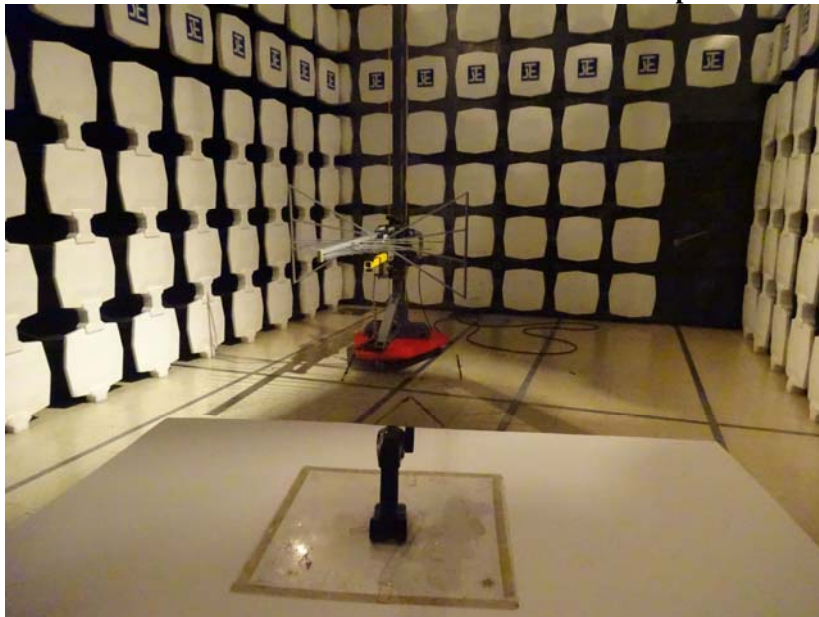
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



Measurement of Radiated Emission Test Set Up



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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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

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