



STC Test Report

Date: 2016-05-11

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No.: DM123357

Applicant: HK YYT Trading Co., Limited
Office 3A-3, 12/F, Kaiser Centre, No.18 Centre Street, Sai
Ying Pun, Hong Kong

Manufacturer: Chenghai Lishi Plastic Toys Factory
Hongchi Donghu Industrial Zone, Fengxiang Chenghai
District, Shantou City, Guangdong, China

Description of Sample(s): Submitted sample(s) said to be
Product: Remote Control Drone
Brand Name: CRAIG
Model Number: CRT713
FCC ID: 2AH3TYYT713

Date Sample(s) Received: 2016-04-26

Date Tested: 2016-05-04 to 2016-05-11

Investigation Requested: Perform ElectroMagnetic Interference measurement in
accordance with FCC 47CFR [Codes of Federal Regulations]
Part 15: 2015 and ANSI C63.10: 2013 for FCC Certification.

Conclusion(s): 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.

Remark(s): For additional model(s) details, please page 3.



LONG Yun Jian, Along
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited

STC (Dongguan) Company Limited

68 Fumin Nan Road, Dalang, Dongguan, China. (Zip Code : 523 770)
Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

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1.0 General Details

1.1 Equipment Under Test [EUT] Description of Sample(s)

Product:	Remote Control Drone
Manufacturer:	Chenghai Lishi Plastic Toys Factory Hongchi Donghu Industrial Zone, Fengxiang Chenghai District, Shantou City, Guangdong, China
Brand Name:	CRAIG
Model Number:	CRT713
Additional Brand Name:	SURGE
Additional Model Number:	AGRT713
Rating:	6Vd.c. (AA*4 battery)

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is a Remote Control Drone. It is a transceiver operating at 2413MHz~2445MHz and the RF signal was modulated by IC.

1.3 Date of Order

2016-04-26

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2016-05-04 to 2016-05-11

1.6 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: 2015 Regulations and ANSI C63.10: 2013 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.10: 2013	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	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 Radiated Emissions

Test Requirement:	FCC 47CFR 15.249 & FCC 47CFR 15.209
Test Method:	ANSI C63.10: 2013
Test Date:	2016-05-04
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, 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 STC (Dongguan) Company Ltd. 68 Fumin Nan Road, Dalang, Dongguan, Guangdong, PRC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

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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

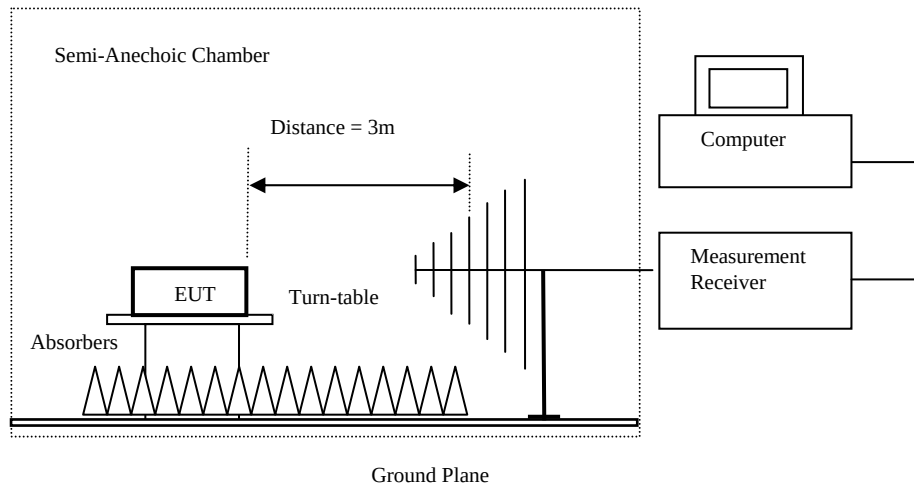
30MHz – 1GHz (QP)

RBW: 120kHz
VBW: 120kHz
Sweep: Auto
Span: Fully capture the emissions being measured
Trace: Max. hold

Above 1GHz (Pk & Av)

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, 9kHz to 30MHz loop 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]

Results of Tx mode (Lowest Frequency Channel-2413 MHz): Pass

Field Strength of Fundamental Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2413.00	53.7	36.8	90.5	33,496.5	500,000	Vertical
2413.00	51.9	36.4	88.3	26,001.6	500,000	Horizontal

Field Strength of Fundamental Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2413.00	41.6	36.8	78.4	8,317.6	50,000	Vertical
2413.00	39.7	36.4	76.1	6,382.6	50,000	Horizontal

Field Strength of Harmonics Emission Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4826.0	19.1	41.5	60.6	1,071.5	5,000	Vertical
4826.0	22.1	42.4	64.5	1,678.8	5,000	Horizontal
7229.0	7.4	45.1	52.5	421.7	5,000	Vertical
7229.0	6.9	46.2	53.1	451.9	5,000	Horizontal
9652.0	7.7	48.0	55.7	609.5	5,000	Vertical
9652.0	6.1	48.8	54.9	555.9	5,000	Horizontal

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Field Strength of Harmonics Emission						
Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4826.0	4.2	41.5	45.7	192.8	500	Vertical
4826.0	8.2	42.4	50.6	338.8	500	Horizontal
7229.0	-8.0	45.1	37.1	71.6	500	Vertical
7229.0	-8.0	46.2	38.2	81.3	500	Horizontal
9652.0	-9.6	48.0	38.4	83.2	500	Vertical
9652.0	-10.9	48.8	37.9	78.5	500	Horizontal

Results of Tx mode (Middle Frequency Channel- 2429MHz): Pass

Field Strength of Fundamental Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2429.00	52.5	36.8	89.3	29,174.3	500,000	Vertical
2429.00	54.6	36.4	91.0	35,481.3	500,000	Horizontal

Field Strength of Fundamental Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2429.00	40.5	36.8	77.3	7,328.2	50,000	Vertical
2429.00	42.7	36.4	79.1	9,015.7	50,000	Horizontal

Field Strength of Harmonics Emission						
Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4858.0	25.0	41.6	66.6	2,138.0	5,000	Vertical
4858.0	22.9	42.5	65.4	1,862.1	5,000	Horizontal
7287.0	7.2	45.2	52.4	416.9	5,000	Vertical
7287.0	7.4	46.3	53.7	484.2	5,000	Horizontal
9716.0	6.4	48.1	54.5	530.9	5,000	Vertical
9716.0	5.2	48.9	54.1	507.0	5,000	Horizontal

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Field Strength of Harmonics Emission						
Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4858.0	10.3	41.6	51.9	393.6	500	Vertical
4858.0	9.0	42.5	51.5	375.8	500	Horizontal
7287.0	-7.7	45.2	37.5	75.0	500	Vertical
7287.0	-8.4	46.3	37.9	78.5	500	Horizontal
9716.0	-10.1	48.1	38.0	79.4	500	Vertical
9716.0	-11.1	48.9	37.8	77.6	500	Horizontal

Results of Tx mode (Highest Frequency Channel – 2445MHz): Pass

Field Strength of Fundamental Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2445.00	50.7	36.8	87.5	23,713.7	500,000	Vertical
2445.00	52.4	36.4	88.8	27,542.3	500,000	Horizontal

Field Strength of Fundamental Emissions						
Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
2445.00	38.6	36.8	75.4	5,888.4	50,000	Vertical
2445.00	40.2	36.4	76.6	6,760.8	50,000	Horizontal

Field Strength of Harmonics Emission						
Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
4890.0	20.7	41.4	62.1	1,273.5	5,000	Vertical
4890.0	21.4	42.7	64.1	1,603.2	5,000	Horizontal
7335.0	5.5	45.6	51.1	358.9	5,000	Vertical
7335.0	6.0	46.5	52.5	421.7	5,000	Horizontal
9780.0	4.3	48.6	52.9	441.6	5,000	Vertical
9780.0	3.5	49.7	53.2	457.1	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
4890.0	6.6	41.4	48.0	251.2	500	Vertical
4890.0	7.5	42.7	50.2	323.6	500	Horizontal
7335.0	-8.9	45.6	36.7	68.4	500	Vertical
7335.0	-9.7	46.5	36.8	69.2	500	Horizontal
9780.0	-11.2	48.6	37.4	74.1	500	Vertical
9780.0	-11.8	49.7	37.9	78.5	500	Horizontal

Remarks:

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

Calculated measurement uncertainty (9kHz - 30MHz): 3.3dB

(30MHz – 1GHz): 4.6dB

(1GHz - 26GHz): 4.4dB

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

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
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

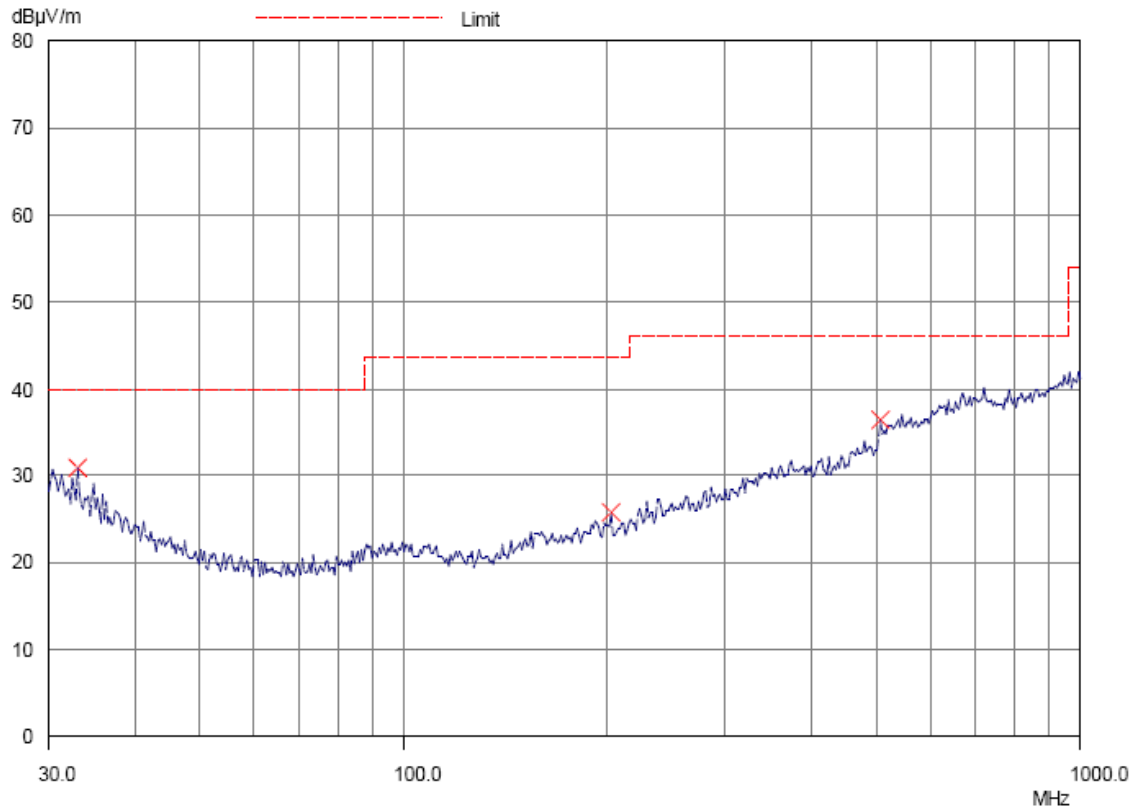
The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

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

Emissions detected are more than 20 dB below the FCC Limits

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

Horizontal



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

Radiated Emissions					
Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
33.0	Horizontal	31.0	40.0	35.5	100
202.0	Horizontal	25.7	43.5	19.3	150
504.8	Horizontal	36.5	46.0	66.8	200

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

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
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

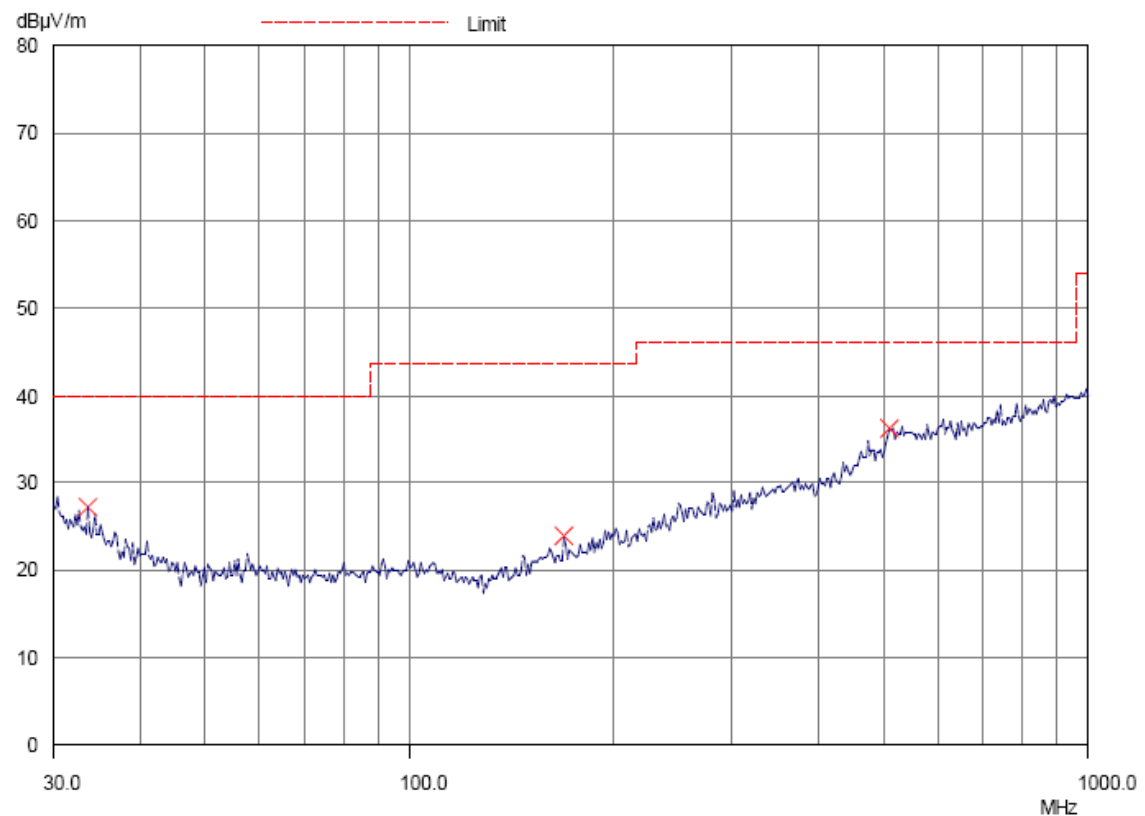
The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

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

Emissions detected are more than 20 dB below the FCC Limits

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

Vertical



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

Radiated Emissions					
Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
33.6	Vertical	27.2	40.0	22.9	100
169.4	Vertical	23.8	43.5	15.5	150
507.4	Vertical	36.3	46.0	65.3	200

Remarks:

Calculated measurement uncertainty (9kHz - 30MHz): 3.3dB
 (30MHz – 1GHz): 4.6dB
 (1GHz - 26GHz): 4.4dB

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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3.1.2 Antenna Requirement

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

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3.2 20dB Bandwidth of Fundamental Emission

Test Requirement:	FCC 47 CFR 15.249
Test Method:	ANSI C63.10: 2013
Test Date:	2016-05-04
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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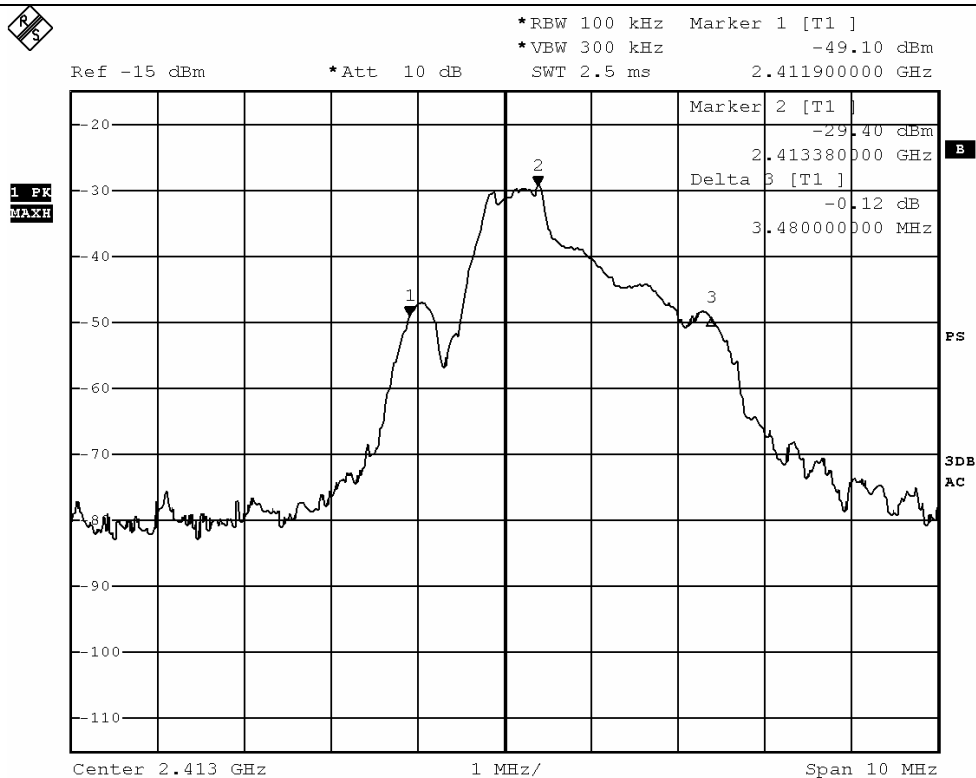
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Limits for 20dB Bandwidth of Fundamental Emission (Low Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2413	3.48

20dB Bandwidth of Fundamental Emission



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Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org

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STC Test Report

Date: 2016-05-11

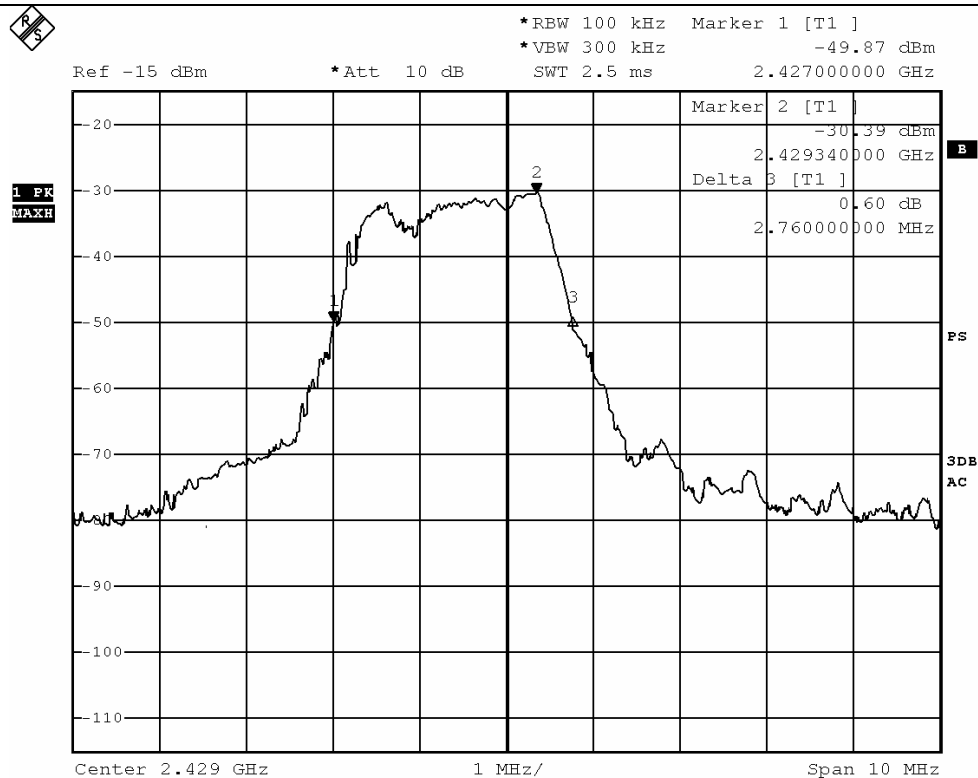
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Limits for 20dB Bandwidth of Fundamental Emission (Middle Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2429	2.76

20dB Bandwidth of Fundamental Emission



BMP

Date: 4.MAY.2016 17:18:50

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Date: 2016-05-11

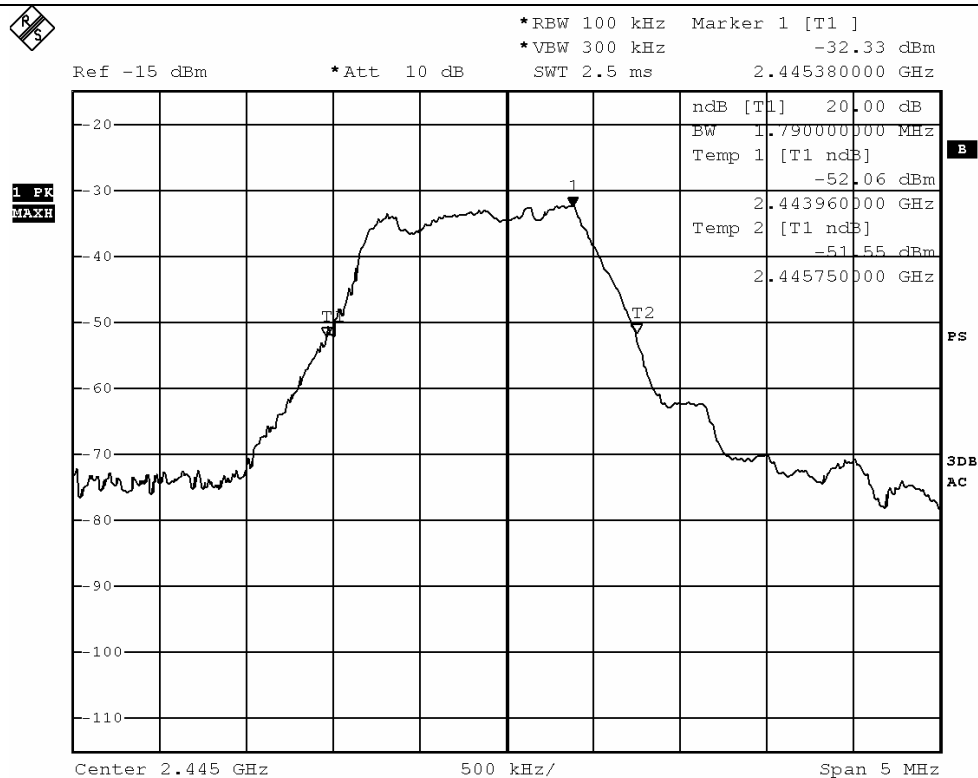
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Limits for 20dB Bandwidth of Fundamental Emission (High Frequency Channel):

Frequency Range [MHz]	20dB Bandwidth [MHz]
2445	1.79

20dB Bandwidth of Fundamental Emission



BMP

Date: 4.MAY.2016 16:07:45

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RF Radiated Emissions Measurement:

Limit :

Emissions radiated outside of the specified frequency bands, except t 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) (worse data) (Lowest)

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2390.0	3.9	36.8	40.7	74.0	33.3	Vertical

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2390.0	-4.8	36.8	32.0	54.0	22.0	Vertical

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

Field Strength of Band-edge Compliance Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2483.5	4.0	36.4	40.4	74.0	33.6	Horizontal

Field Strength of Band-edge Compliance Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2483.5	-2.9	36.4	33.5	54.0	20.5	Horizontal

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Appendix A

List of Measurement Equipment

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD004	LISN	ROHDE & SCHWARZ	ESH3-Z5	100102	2016.03.29	2017.03.29
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100314	2016.03.29	2017.03.29
EMD035	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100441	2016.03.29	2017.03.29
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB 26	100388	2016.03.29	2017.03.29
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2016.03.29	2017.03.29
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2014.11.29	2016.11.29
EMD062	Double-Ridged Waveguide (1GHz – 18GHz)	ETS.LINDGREN	3117	00075933	2014.11.15	2016.11.15
EMD084	MULTI-DVICE CONTROLLER	ETS.LINDGREN	2090	00060107	N/A	N/A
EMD088	Video Contol Unit	ETS.LINDGREN	Y21953A	2601073	N/A	N/A
EMD093	Monitor	ViewSonic	VA9036	Q8X064201876	N/A	N/A
EMD102	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707454	N/A	N/A
EMD103	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707455	N/A	N/A
EMD105	FACT-3 EMC Chamber	ETS.LINDGREN	FACT-3	3803	N/A	N/A
EMD106	Shielding Room #1	ETS.LINDGREN	RFD-100	3802	N/A	N/A
	100V Insertion Unit	ROHDE & SCHWARZ	URV5-Z4	100464	2016.03.29	2017.03.29
EMD113	Pre-Amplifier	ROHDE & SCHWARZ	N/A	1129588	2016.03.29	2017.03.29
EMD124	Loop Antenna	ETS-Lindgren	6502	00104905	2014.04.28	2016.04.28
EMD131	Standard Gain Horn Antenna (18GHz – 26.5GHz)	Chengdu AINFO Inc.	JTXLB-42-15-C-KF	J2021100721001	2015.06.27	2017.06.27

Remarks:-

N/A Not Applicable or Not Available

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Appendix B

Photographs of EUT

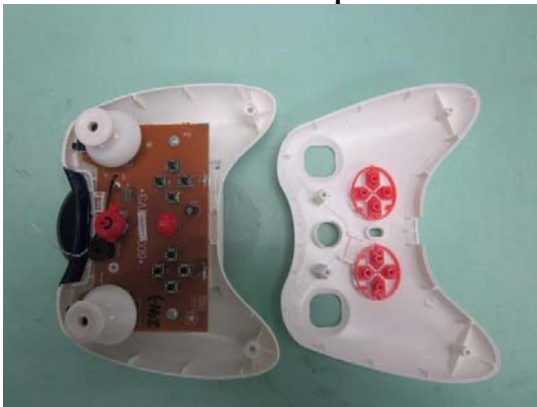
Front View of the product



Rear View of the product



Inside View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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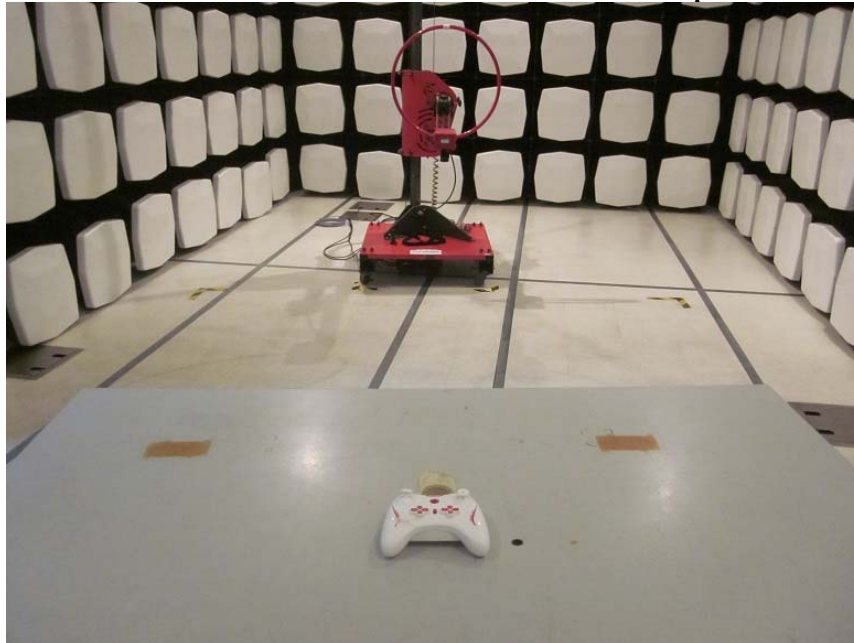
Date: 2016-05-11

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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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Date: 2016-05-11

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No.: DM123357

Photographs of EUT

Measurement of Radiated Emission Test Set Up



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

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