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Report On

FCC Testing of the GENERAL TOOLS & INSTRUMENTS COMPANY LLC.

Short Range Device Wireless Video Transmitter DCS400T In accordance with FCC CFR 47 Part 15 Part C

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FCC ID: YRKDCS400T

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September 2010



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REPORT ON	FCC CRF 47 Parts 15 C: 2008 Testing of the

FCC CRF 47 Parts 15 C: 2008 Testing of the GENERAL TOOLS & INSTRUMENTS COMPANY LLC. Short Range Device Wireless Video Transmitter DCS400T

Document 57010087 Report 01 Issue 1

September 2010

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CONTENTS

1 REPORT SUMMARY 3 1.1 Introduction 4 1.2 Brief Summary of Results 5 1.3 Declaration of Build Status 6 1.4 Product Information 7 1.5 Test Conditions 9 1.6 Deviations From the Standard 9 1.7 Modification Record 9 1.8 Alternative Test Site 9 2 TEST DETAILS 10 2.1 Field Strength and Harmonics 11 2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	Section		Page No
1.2 Brief Summary of Results 5 1.3 Declaration of Build Status 6 1.4 Product Information 7 1.5 Test Conditions 9 1.6 Deviations From the Standard 9 1.7 Modification Record 9 1.8 Alternative Test Site 9 2 TEST DETAILS 10 2.1 Field Strength and Harmonics 11 2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 Test Equipment Used 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	1	REPORT SUMMARY	3
1.2 Brief Summary of Results 5 1.3 Declaration of Build Status 6 1.4 Product Information 7 1.5 Test Conditions 9 1.6 Deviations From the Standard 9 1.7 Modification Record 9 1.8 Alternative Test Site 9 2 TEST DETAILS 10 2.1 Field Strength and Harmonics 11 2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 Test Equipment Used 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	1.1	Introduction	4
1.4 Product Information 7 1.5 Test Conditions 9 1.6 Deviations From the Standard 9 1.7 Modification Record 9 1.8 Alternative Test Site 9 2 TEST DETAILS 10 2.1 Field Strength and Harmonics 11 2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	1.2		
1.5 Test Conditions. 9 1.6 Deviations From the Standard. 9 1.7 Modification Record. 9 1.8 Alternative Test Site. 9 2 TEST DETAILS. 10 2.1 Field Strength and Harmonics. 11 2.2 Radiated Spurious Emissions. 14 2.3 Occupied Bandwidth. 17 2.4 Conducted Emission on Power Line. 19 2.5 Restricted Bands Of Operation. 22 3 TEST EQUIPMENT USED. 25 3.1 Test Equipment Used. 26 3.2 Measurement Uncertainty. 27 4 DISCLAIMERS AND COPYRIGHT. 28		Declaration of Build Status	6
1.6 Deviations From the Standard. 9 1.7 Modification Record. 9 1.8 Alternative Test Site. 9 2 TEST DETAILS. 10 2.1 Field Strength and Harmonics. 11 2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth. 17 2.4 Conducted Emission on Power Line. 19 2.5 Restricted Bands Of Operation. 22 3 TEST EQUIPMENT USED. 25 3.1 Test Equipment Used. 26 3.2 Measurement Uncertainty. 27 4 DISCLAIMERS AND COPYRIGHT. 28			
1.7 Modification Record 9 1.8 Alternative Test Site 9 2 TEST DETAILS 10 2.1 Field Strength and Harmonics 11 2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28			
1.8 Alternative Test Site. 9 2 TEST DETAILS. 10 2.1 Field Strength and Harmonics. 11 2.2 Radiated Spurious Emissions. 14 2.3 Occupied Bandwidth. 17 2.4 Conducted Emission on Power Line. 19 2.5 Restricted Bands Of Operation. 22 3 TEST EQUIPMENT USED. 25 3.1 Test Equipment Used. 26 3.2 Measurement Uncertainty. 27 4 DISCLAIMERS AND COPYRIGHT. 28			-
2 TEST DETAILS 10 2.1 Field Strength and Harmonics 11 2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28			
2.1 Field Strength and Harmonics	1.8		
2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	2	TEST DETAILS	10
2.2 Radiated Spurious Emissions 14 2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	2.1	Field Strength and Harmonics	11
2.3 Occupied Bandwidth 17 2.4 Conducted Emission on Power Line 19 2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	2.2		
2.5 Restricted Bands Of Operation 22 3 TEST EQUIPMENT USED 25 3.1 Test Equipment Used 26 3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	2.3		
3 TEST EQUIPMENT USED	2.4	Conducted Emission on Power Line	19
3.1 Test Equipment Used	2.5	Restricted Bands Of Operation	22
3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	3	TEST EQUIPMENT USED	25
3.2 Measurement Uncertainty 27 4 DISCLAIMERS AND COPYRIGHT 28	3.1	Test Equipment Used	26
	3.2		
AA Bisalsia are and Constitute	4	DISCLAIMERS AND COPYRIGHT	28
4.1 Discialmers and Copyright	4.1	Disclaimers and Copyright	29



SECTION 1

REPORT SUMMARY

FCC Testing of the GENERAL TOOLS & INSTRUMENTS COMPANY LLC. Short Range Device Wireless Video Transmitter DCS400T in accordance with FCC CFR 47 Part 15C

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the GENERAL TOOLS & INSTRUMENTS COMPANY LLC. Short Range Device Wireless Video Transmitter DCS400T to the requirements of FCC CFR 47 Part 15C: 2008.

Testing was carried out in support of an application for Grant of Equipment Authorisation of Short Range Device Wireless Video Transmitter DCS400T.

Objective To perform FCC Testing to determine the Equipment Under

Test's (EUT's) compliance with the Test Specification, for

the series of tests carried out.

Manufacturer GENERAL TOOLS & INSTRUMENTS COMPANY LLC.

Model Number(s) Wireless Video Transmitter DCS400T

Serial Number(s) Engineering sample

Antenna Gain 0dBi

Number of Samples Tested 1

Test Specification/Issue/Date FCC CFR 47 Part 15C: 2008

Incoming Release Declaration of Build Status

Date 24 August 2010 Start of Test 31 August 2010

Finish of Test 14 September 2010

Related Document(s) FCC CFR 47 Part 15:2008

ANSI C63.4:2003



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 15: 2008 is shown below.

Configuration	Configuration - Short Range Device Wireless Video Transmitter					
Section	FCC Clause	Test Description	Mode	Mod State	Result	Comments
2.1	15.249 (a)(c)(e)	Field Strength and Harmonics	2414MHz	0	Pass	
2.2	15.249 (c)(d)(e) 15.209	Radiated Spurious Emissions	2414MHz	0	Pass	
2.3	2.1049 (h)	Occupied Bandwidth	2414MHz	0	Pass	
2.4	15.207	Conducted Emissions on Power Line	2414MHz	0	Pass	-Charging for TX
2.5	15.205	Restricted Bands of Operation.	2414MHz	0	Pass	



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Short Range Device Wireless Video Transmitter
MANUFACTURER	GENERAL TOOLS & INSTRUMENTS COMPANY LLC.
ТҮРЕ	DCS400T
SERIAL NUMBER	Engineering sample
TRANSMITTER OPERATING RANGE	2414MHz
COUNTRY OF ORIGIN	America
ITU DESIGNATION OF EMISSION	5M26F1F
FCC ID	YRKDCS400T
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	DCS400T is a Short Range Device Wireless Video Transmitter
MANUFACTURING DESCRIPTION	The Wireless Video Transmitter DCS400T was powered by Polymer lithium battery; The batteries could be charged by the adaptor: Input: AC 100 – 240V, 50/60Hz Output: DC 5.5V 1.5A

No responsibility will be accepted by TÜV Product Service Beijing Branch as to the accuracy of the information declared in this document by the manufacturer.



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) DCS400T was a GENERAL TOOLS & INSTRUMENTS COMPANY LLC. Short Range Device Wireless Video Transmitter as shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.



Equipment Under Test

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1.4.2 Test Configuration

Configuration 1: 2.4GHz Short Range Device

The EUT was configured in accordance with FCC CFR 47 Part 15: 2008.

1.4.3 Modes of Operation

Operation Modes

Mode 1 – 2414 MHz

Information on the specific test modes utilised are detailed in the test procedure for each individual test.



1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

Modification State	Description of Modification fitted to EUT	Sample S/N
0	Initial sample supplied by customer	Engineering sample

No modifications were made to the EUT during testing.

1.8 ALTERNATIVE TEST SITE

The testing was conducted at following site registrations:

FCC Accreditation 800392 QuieTek Technology (Suzhou) Co., Ltd. No.99 Hongye RD.Suzhou Industrial Park Loufeng Hi-New-Tech Development Area,Suzhou,China



SECTION 2

TEST DETAILS

FCC Testing of the GENERAL TOOLS & INSTRUMENTS COMPANY LLC. Short Range Device Wireless Video Transmitter DCS400T in accordance with FCC CFR 47 Part 15C



2.1 FIELD STRENGTH AND HARMONICS

2.1.1 Specification Reference

FCC CFR 47 Part 15: 2008, Subpart C, Clause 15.249(a)(c)(e)

2.1.2 Equipment Under Test

Short Range Device Wireless Video Transmitter DCS400T

2.1.3 Date of Test and Modification State

31 August 2010 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15: 2008.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Emissions identified within the range 2.4GHz – 2.4385GHz were formally measured using Peak and Average Dectectors, as propriate.

The measurements were performed at a 3m distance unless otherwise stated.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration1 - Mode 1

2.1.6 Environmental Conditions

31 August 2010

Ambient Temperature 23.2°C Relative Humidity 24.1%



2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15: 2008 for Field Strength and Harmonics.

The test results are shown below.

Configuration 1 - Mode 1

Fundamental Frequencies

Fundamental Frequency	Polarisation (Vertical/	Reading Level	Factor	Field Strength	Over Limit	Limit		Туре
(MHz)	Horizontal)	(dBuV)	(dB)	dBµV/m	(dB)	dBµV/m	mV/m	AV/PK
2414	Н	78.892	-5.937	72.955	-21.045	94.0	50	AV
	Н	93.566	-5.942	87.624	-26.376	114.0	500	PK
2414	V	77.039	-5.936	71.103	-22.897	94.0	50	AV
	V	89.450	-5.938	83.512	-30.488	114.0	500	PK

Note: Field Strength = Measurement Level = Reading Level + Factor(Probe+Cable-Amp).



Harmonic Frequencies

Harmonic Frequency	Polarisation (Vertical/	Reading Level	Factor	Field Strength	Over Limit	Limit		Туре
(MHz)	Horizontal)	(dBuV)	(dB)	dBµV/m	(dB)	dBµV/m	μV/m	AV/PK
4825.000	Н	54.325	0.466	54.791	-19.209	74.0	5000	PK
4828.000	Н	41.743	0.465	42.208	-11.792	54.0	500	AV
7239.000	Н	41.649	6.863	48.512	-25.488	74.0	5000	PK
7242.000	Н	29.091	6.877	35.968	-18.032	54.0	500	AV
9656.000	Н	39.068	8.596	47.664	-26.336	74.0	5000	PK
12070.000	Н	35.885	11.896	47.782	-26.218	74.0	5000	PK
14484.000	Н	36.563	16.359	52.922	-21.078	74.0	5000	PK
16898.000	Н	36.736	15.022	51.758	-22.242	74.0	5000	PK
4825.000	V	58.599	0.466	59.065	-14.935	74.0	5000	PK
4828.000	V	48.264	0.465	48.729	-5.271	54.0	500	AV
7239.000	V	44.693	6.863	51.556	-22.444	74.0	5000	PK
7242.000	V	34.364	6.877	41.241	-12.759	54.0	500	AV
9656.000	V	38.207	8.596	46.803	-27.197	74.0	5000	PK
12070.000	V	35.560	11.896	47.457	-26.543	74.0	5000	PK
14484.000	V	36.748	16.359	53.107	-20.893	74.0	5000	PK
16898.000	V	36.649	15.022	51.671	-22.329	74.0	5000	PK

Note: Field Strength = Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

	Fundamental : ≤50mV/m or ≤94dBµV/m(AV)
1 5 16	≤500mV/m or ≤114dBµV/m(PK)
Limit	Harmonics: ≤500 μV/m or ≤54dBμV/m(AV)
	≤5000 μV/m or ≤74dBμV/m(PK)

Remarks

The field strength of emissions from the intentional radiator operated in the 2400MHz to 2483.5MHz band did not exceed 50mV/m or 94dB μ V/m (Average) & 500mV/m or 114dB μ V/m (Peak) for the fundamental, 500 μ V/m or 54dB μ V/m (Average) & 5000 μ V/m or 74dB μ V/m (Peak) for harmonics.



2.2 RADIATED SPURIOUS EMISSIONS

2.2.1 Specification Reference

FCC CFR 47 Part 15: 2008, Subpart C, Clause 15.249(c)(d)(e),15.209

2.2.2 Equipment Under Test

Short Range Device Wireless Video Transmitter DCS400T

2.2.3 Date of Test and Modification State

31 August 2010 - Modification State 0

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15: 2008.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations.

Emissions identified within the range 30MHz – 1GHz were then formally meausred using a Peak and Quasi-Peak detector, as propriate.

The measurements were performed at a 3m distance unless otherwise stated.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.2.6 Environmental Conditions

31 August 2010

Ambient Temperature 23.2°C Relative Humidity 24.1%

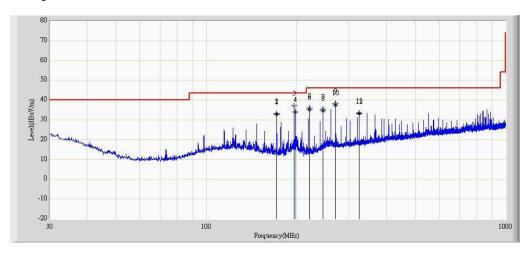


2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15: 2008 Radiated Spurious Emissions.

The test results are shown below.

Configuration 1 - Mode 1

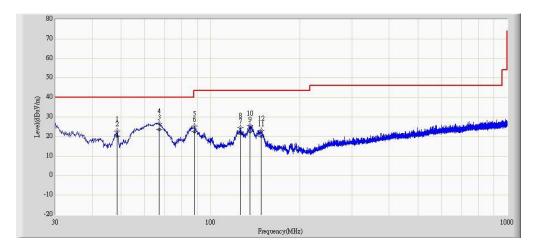


Frequency	Polarisation (Vertical/	Reading Level	Factor	Field Strength	Over Limit	Limit	Туре
(MHz)	Horizontal)	(dBuV)	(dB)	dBµV/m	(dB)	dBµV/m	QP/PK
171.900	Н	23.130	9.672	32.802	-10.698	43.500	QP
171.984	Н	23.609	9.664	33.273	-10.227	43.500	PK
196.476	Н	27.253	9.92	37.173	-6.327	43.500	PK
198.400	Н	24.080	9.85	33.930	-9.570	43.500	QP
221.090	Н	26.487	9.68	36.167	-9.833	46.000	PK
221.100	Н	25.550	9.681	35.231	-10.769	46.000	QP
245.583	Н	22.692	12.712	35.404	-10.596	46.000	PK
245.600	Н	21.850	12.715	34.565	-11.435	46.000	QP
270.196	Н	24.805	13.599	38.404	-7.596	46.000	PK
270.200	Н	23.730	13.599	37.329	-8.671	46.000	QP
323.600	Н	18.610	14.973	33.583	-12.417	46.000	QP
323.668	Н	18.294	14.974	33.268	-12.732	46.000	PK

Note: Field Strength = Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

.





Frequency	Polarisation (Vertical/	Reading Level	Factor	Field Strength	Over Limit	Limit	Туре
(MHz)	Horizontal)	(dBuV)	(dB)	dBµV/m	(dB)	dBµV/m	QP/PK
48.309	V	13.774	8.98	22.754	-17.246	40.000	PK
48.400	V	11.340	8.946	20.286	-19.714	40.000	QP
67.200	V	17.740	6.04	23.780	-16.220	40.000	QP
67.224	V	20.741	6.039	26.780	-13.220	40.000	PK
88.200	V	16.557	8.9	25.457	-18.043	43.500	PK
88.200	V	13.500	8.9	22.400	-21.100	43.500	QP
126.100	V	9.200	12.428	21.628	-21.872	43.500	QP
126.151	V	12.229	12.427	24.656	-18.844	43.500	PK
135.800	V	10.600	12.027	22.627	-20.873	43.500	QP
135.851	V	13.665	12.022	25.687	-17.813	43.500	PK
148.200	V	9.300	10.798	20.098	-23.402	43.500	QP
148.219	V	12.354	10.796	23.150	-20.350	43.500	PK

Note: Field Strength = Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

<u>Limit</u>

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance (meters)
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

Remarks

The EUT does not exceed the limit at the measured frequency.



2.3 OCCUPIED BANDWIDTH

2.3.1 Specification Reference

FCC CFR 47 Part 2: 2008, Clause 2.1049(h)

2.3.2 Equipment Under Test

Short Range Device Wireless Video Transmitter DCS400T

2.3.3 Date of Test and Modification State

31 August 2010 - Modification State 0

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 2: 2008.

Connect EUT's antenna terminal to the spectrum analyser via a low loss cable with transmitting mode.

Adjust the centre frequency of the spectrum analyser on the frequency be measured, and set for peak detector mode; max hold trace mode RBW=100 KHz and VBW=300 KHz.

The span of the analyzer approximately 2 to 3 times the channel bandwidth shall be set to capture all products of the modulation process, including the emission skirts. Use the marker-to-peak function to set the marker to the peak of the emission.

Use the OBW function to measure 99% emission bandwidth.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.3.6 Environmental Conditions

31 August 2010

Ambient Temperature 23.6°C Relative Humidity 24.3%



2.3.7 Test Results

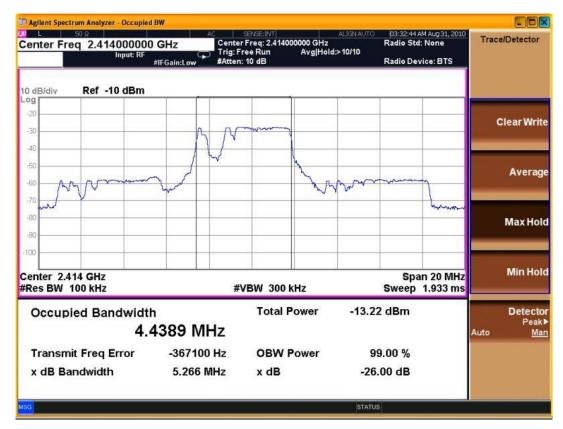
For the period of test the EUT met the requirements of FCC CFR 47 Part 2: 2008 for Occupied Bandwidth.

Configuration 1 - Mode 1

Frequency (MHz)	Occupied bandwidth (MHz)
2414	5.266

The plot of test result are shown below.

Configuration 1 - Mode 1





2.4 CONDUCTED EMISSION ON POWER LINE

2.4.1 Specification Reference

FCC CFR 47 Part 15: 2008, Subpart C, Clause 15.207

2.4.2 Equipment Under Test

Short Range Device Wireless Video Transmitter DCS400T

2.4.3 Date of Test and Modification State

31 August 2010 - Modification State 0

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15: 2008.

The EUT was placed 0.4 meters from the conducting wall of the shield room with the power mains 120V/60Hz through an artificical mains network (AMN). The distance between the computer and AMN was 80cm.

Emissions were formally measured using a Quasi-Peak and Average Detectors, which meet the CISPR requirements. The details of the worst-case emissions for the Live and Neutral Lines are presented in the tables below.

Conducted Emission were measured on Live and Neutral Lines in turn.

Measurements were made over the frequency range 0.15MHz to 30MHz.

The EUT was supplied from a AC/DC Adatptor.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.4.6 Environmental Conditions

31 August 2010

Ambient Temperature 23.3°C Relative Humidity 24.4%



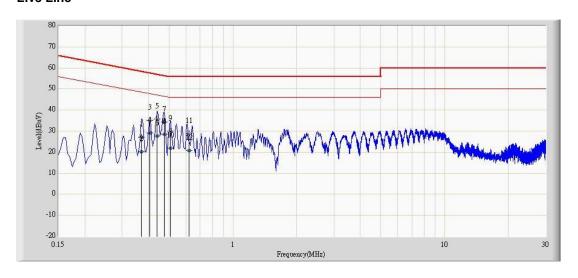
2.4.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15: 2008 for Conducted Emissions on Power Line.

The plots of test results are shown below.

Configuration 1 - Mode 1

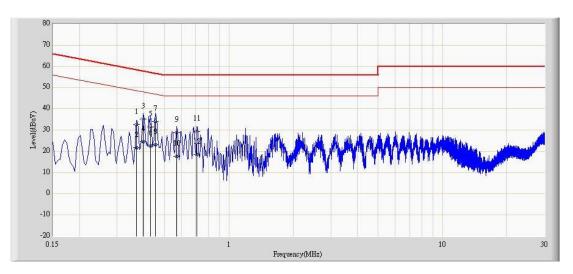
Live Line



	Measure Level	Margin	Limit	Туре
Emission Frequency (MHz)	dΒμV	dB	dΒμV μV	AV/QP
0.370	27.143	-31.358	58.501	QP
0.370	20.186	-28.315	48.501	AV
0.406	35.138	-22.591	57.730	QP
0.406	29.065	-18.665	47.730	AV
0.438	35.811	-21.289	57.100	QP
0.438	27.817	-19.282	47.100	AV
0.474	34.364	-22.079	56.444	QP
0.474	28.505	-17.939	46.444	AV
0.506	30.090	-25.910	56.000	QP
0.506	21.901	-24.099	46.000	AV
0.620	28.990	-27.010	56.000	QP
0.620	20.890	-25.110	46.000	AV



Neutral Line



	Measure Level	Margin	Limit	Туре
Emission Frequency (MHz)	dΒμV	dB	dΒμV μV	AV/QP
0.370	32.628	-25.873	58.501	QP
0.370	21.714	-26.787	48.501	AV
0.398	35.095	-22.800	57.895	QP
0.398	24.570	-23.325	47.895	AV
0.430	31.391	-25.861	57.253	QP
0.430	22.509	-24.744	47.253	AV
0.454	33.961	-22.841	56.802	QP
0.454	23.083	-23.719	46.802	AV
0.570	28.751	-27.249	56.000	QP
0.570	17.657	-28.343	46.000	AV
0.710	29.566	-26.434	56.000	QP
0.710	18.401	-27.599	46.000	AV

<u>Limit</u>

Emission Frequency	LimitdBμV				
(MHz)	QP		А	verage	
0.150.5	*	66 to 56	❖ 56 to 46		
0.55		56		46	
530		60	50		
*	Decreases with the logarithm of the frequency			quency	



2.5 RESTRICTED BANDS OF OPERATION

2.5.1 Specification Reference

FCC CFR 47 Part 15: 2008, Subpart C, Clause 15.205

2.5.2 Equipment Under Test

Short Range Device Wireless Video Transmitter DCS400T

2.5.3 Date of Test and Modification State

31 August 2010 - Modification State 0

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15: 2008.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

The measurements were performed at a 3m distance.

The test was performed with the EUT in the transmitting mode.

RBW=1MHz, VBW=3MHz, Maxhold, Average Dectectors.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

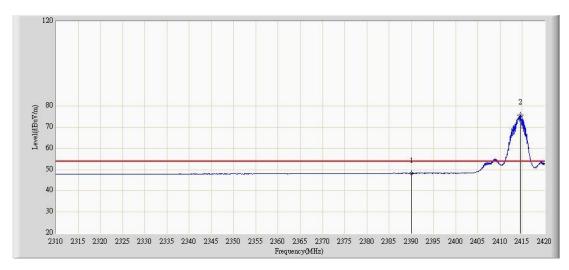
2.5.6 Environmental Conditions

31 August 2010

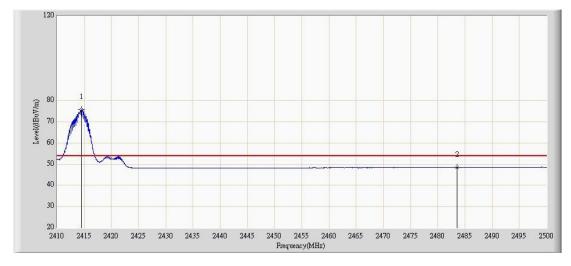
Ambient Temperature 23.3°C Relative Humidity 24.4%



2.5.7 Test Results



Frequency	Measure Level	Reading Level	Over Limit	Limit	Factor	Tuno
(MHz)	(dBuV/m)	(dBuV)	(dB)	(dBuV/m)	(dB)	Туре
2390.000	48.294	17.382	-5.706	54.000	30.911	AV



Frequency	Measure Level	Reading Level	Over Limit	Limit	Factor	Turna
(MHz)	(dBuV/m)	(dBuV)	(dB)	(dBuV/m)	(dB)	Туре
2483.500	48.421	17.487	-5.579	54.000	30.934	AV

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<u>Limit</u>

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

The EUT is operating on 2412 MHz, this falls between the restricted bands of 2310--- 2390 MHz and 2483.5 - 2500 MHz



SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	Serial No.	Calibration Date				
3m Semi-Anechoic Chamber (AC2)								
EMI Test Receiver	R&S	ESCI	100573	2010.04.23				
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2009.11.12				
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2010.05.05				
	3m Semi-Anechoic Chamber (AC5)							
Spectrum Analyzer	Agilent	N9010A	MY48030494	2010.04.23				
Preamplifier	QuieTek	AP-180C	CHM- 0602013	2010.05.05				
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2010.06.11				
Conducted Emisision Testing Room (TR1)								
EMI Test Receiver	R&S	ESCI	100906	2010.01.15				
Two-Line V-Network	R&S	ENV 216	101043	2010.06.18				



3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU			
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*			
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*			
Worst case error for both Time and Frequency measurement 12 parts in 10 ⁶ .					

^{*} In accordance with CISPR 16-4



SECTION 4

DISCLAIMERS AND COPYRIGHT



4.1 DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

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