

FCC ID TEST REPORT

for

XCEL Camera

Model: XCEL HD / XCEL HD HUNT

FCC ID: EEX-XCELCAMERA

Prepared for: G.G.Telcom
120 Rue J-Aurele-Roux, Victoriaville, Quebec, G6T 0N5 Canada

Prepared by: Shenzhen TCT Testing Technology Co.,Ltd
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Report Number: TCT130701024F2-1

Date of Test: July 05~18, 2013

Date of Report: July 18, 2013

The results detailed in this test report relate only to the specific sample(s) tested. It is the Application's responsibility to ensure that all production units are manufactured with equivalent EMC characteristics. This report is not to be reproduced except in full, without written approval from TCT Testing Technology.

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1.0 General Details

1.1 Test Lab Details

Name : Shenzhen TCT Testing Technology Co.,Ltd

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Site Listed with Federal Communication Commission

Registration Number: 572331

For 3m chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number IC: 10668A-1

For 3m chamber

1.2 Applicant Details

Applicant: G.G.Telcom

Address: 120 Rue J-Aurele-Roux, Victoriaville, Quebec, G6T 0N5 Canada

Telephone: 514 868 1811

Fax: 819-751-7000

Manufacturer: G.G.Telcom

Address: 120 Rue J-Aurele-Roux, Victoriaville, Quebec, G6T 0N5 Canada

Telephone: 514 868 1811

Fax: 819-751-7000

1.3 Description of EUT

Product: XCEL Camera
Model No.: XCEL HD / XCEL HD HUNT
Additional Model No.: N.A.
Brand Name: **XCEL**
Additional Trade Name: N.A.
Rating: DC 6V (2*3V CR2032 LITHIUM BATTERIES)
Operation Frequency: 433.92MHz
Antenna Designation: A spring antenna and the maximum gain is 2 dBi.

1.4 Statement: N.A.

1.5 Test Duration

July 05, 2013 to July 18, 2013

1.6 Test Engineer

The sample tested by



Printed name: Jack Kang

2.0 Test equipments and Associated Equipment used during the test.

2.1 Test Equipments

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	July 07, 2013	July 06, 2014
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 07, 2013	July 06, 2014
Pre-amplifier	Teseq	LAN6900	--	July 08, 2013	July 07, 2014
Pre-amplifier	Agilent	8447D	83153007374	July 08, 2013	July 07, 2014
Pre-amplifier	Agilent	8449B	3008A01738	July 08, 2013	July 07, 2014
Triple-loop antenna	ROHDE&SCHWARZ	HM020	843885/002	July 08, 2013	July 07, 2014
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	July 08, 2013	July 07, 2014
Horn Antenna	ETS LINDGREN	3117	--	July 08, 2013	July 07, 2014

2.2 AE used during the test

Equipment type	Manufacturer	Model
N.A.		

2.3. Block Diagram of EUT Configuration



3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications

Requirement	CFR 47 Section	Result	Notes
Conduction Emission, 0.15MHz to 30MHz	15.207	N.A.	N.A.
Manually Activated Transmitter	15.231(a)	PASS	Complies
Radiation Emission	15.231(b), 15.205, 15.209, 15.35	PASS	Complies
Occupied Bandwidth	15.231(c)	PASS	Complies

3.2 Test Standards

FCC Part 15:2012 Subpart C, Paragraph 15.231

4.0 EUT Modification

No modification by Shenzhen TCT Testing Technology Co., Ltd

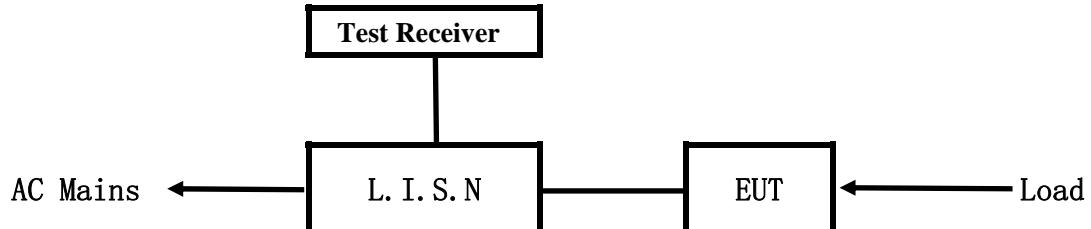
5.0 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	MU
1.	Radio Frequency	$\pm 1 \times 10^{-9}$
2.	Temperature	$\pm 0.1^\circ\text{C}$
3.	Humidity	$\pm 1.0\%$
4.	RF power, conducted	$\pm 0.34\text{dB}$
5.	RF power density, conducted	$\pm 1.45\text{dB}$
6.	Spurious emissions, conducted	$\pm 3.70\text{dB}$
7.	All emissions, radiated	$\pm 4.50\text{dB}$

Note: 1) The EUT is a XCEL Camera remote Controller. The EUT is powered by batteries only, and New Batteries were used during all tests.
 2) Working transmission frequency: 433.92MHz
 3) N.A. means Not Applicable.

6.0 Power Line Conducted Emission Test

6.1 Schematics of the test



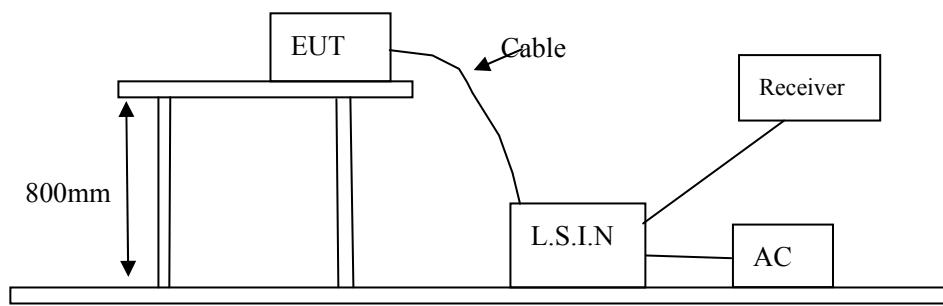
EUT: Equipment Under Test

6.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009. The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



6.3 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2009

- 1) Setup the EUT and simulators as shown on the following
- 2) Enable AF signal and confirm EUT active to normal condition

6.4 Test Equipment

Please refer to the Section 2

6.5 Conducted Emission Limit

Frequency(MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

Notes: 1) *Decreasing linearly with logarithm of frequency.
2) The tighter limit shall apply at the transition frequencies

6.6 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 52% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

The test was carried out in the following operation mode(s):

- --

6.7 Test result

Min. limit margin --

The requirements are FULFILLED

Remarks: The EUT is powered by batteries only, so this test item is not applicable.

A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT Description: --

Operation Mode: --

Tested By: --

Test date: --

Start Frequency 0.15MHz	Stop Frequency 30MHz	Step 4.5KHz	IF BW 10KHz	Detector QP+AV	Final M-Time 1s
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Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
--	--	--	--	--	--	--
--	--	--	--	--	--	--

B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT Description: --

Operation Mode: --

Tested By: --

Test Data: --

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

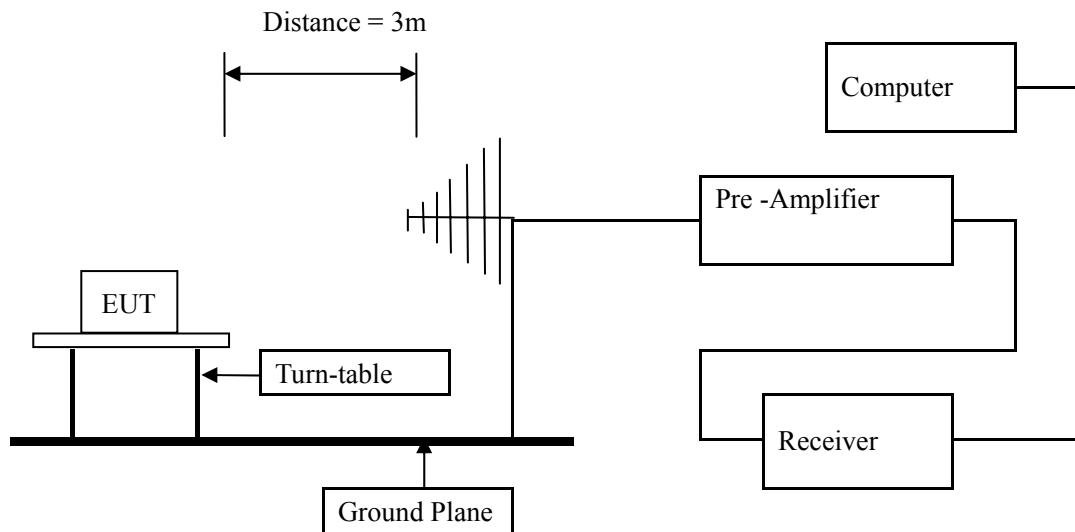
Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
--	--	--	--	--	--	--
--	--	--	--	--	--	--

7.0 Manually Activated Transmitter

7.1 Test Method and test Procedure:

- 1) The EUT was tested according to ANSI C63.10 –2009.
- 2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009.
- 3) By pressing the key on the surface of E.U.T., it can be work in transmitting mode.

7.2 Block diagram of Test setup



7.3 Limit

According to 15.239(b), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

7.4 Test Equipment:

Please refer to the Section 2

7.5 Test specification:

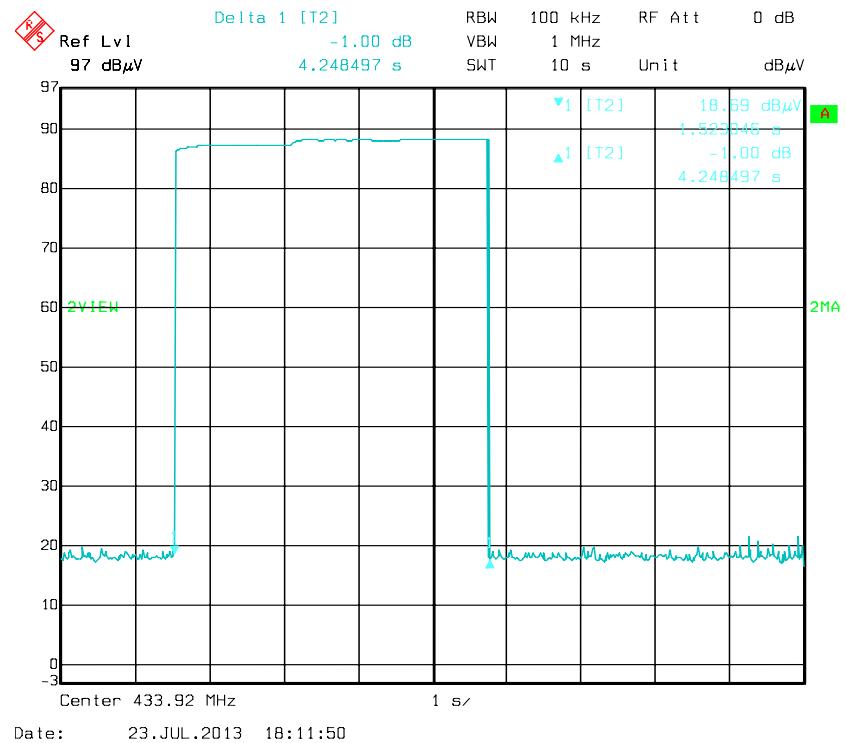
Environmental conditions: Temperature 23° C Humidity: 50% Atmospheric pressure: 103kPa

7.6 Test result

Result: Pass

Test data

Working Mode	Working Frequency(MHz)	Activate Time(s)	Limit(s)
Transmitting	433.92	4.2485	5



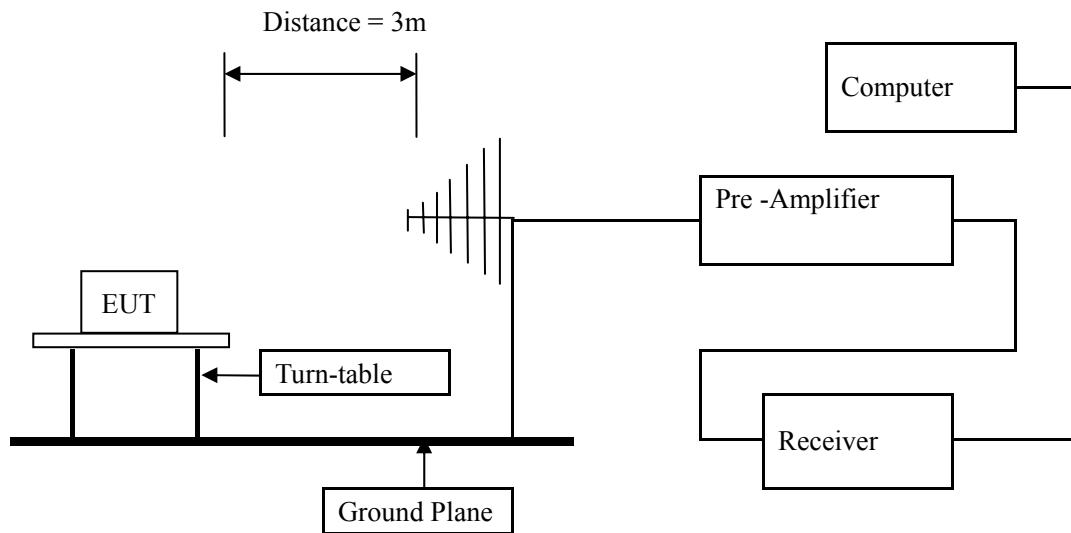
8.0 Radiated Emission Test

8.1 Test Method and test Procedure:

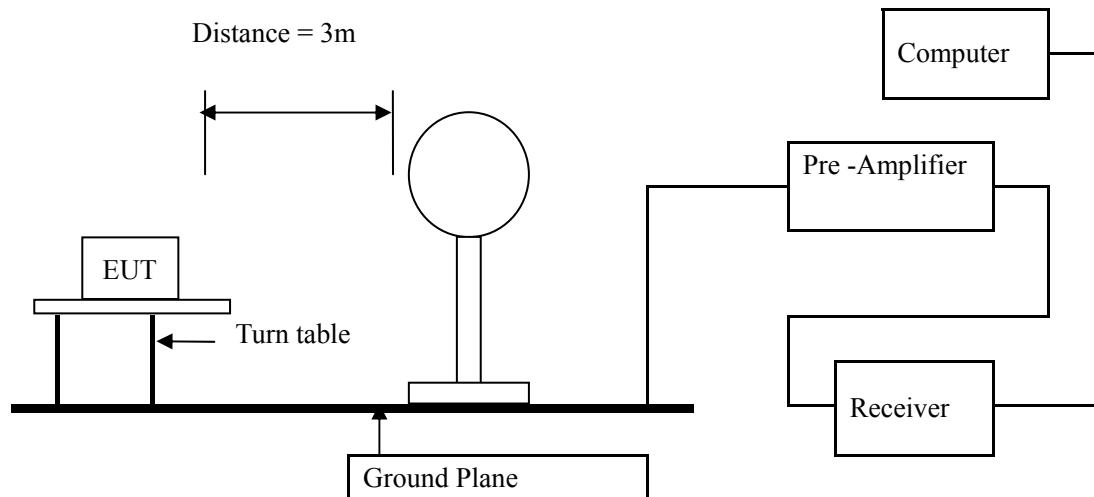
- 1) The EUT was tested according to ANSI C63.10 –2009.
- 2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2009.
- 3) The frequency spectrum from 9kHz to 5GHz was investigated. All readings from 9kHz to 30MHz are quasi-peak values with a resolution bandwidth of 10 kHz, measured with loop antenna. All readings from 30MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz, measured with Bi-log antenna. All readings are above 1 GHz are peak values with a resolution bandwidth of 1 MHz, measured with horn antenna.
- 4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for above 30MHz each frequency. The antenna high is 1 m to find the maximum emission for each frequency below 30MHz
- 5) Tested distance: 3 meters
- 6) The antenna polarization: Vertical polarization and Horizontal polarization.
- 7) Each azimuth of E.U.T will be tested.

8.2 Block diagram of Test setup

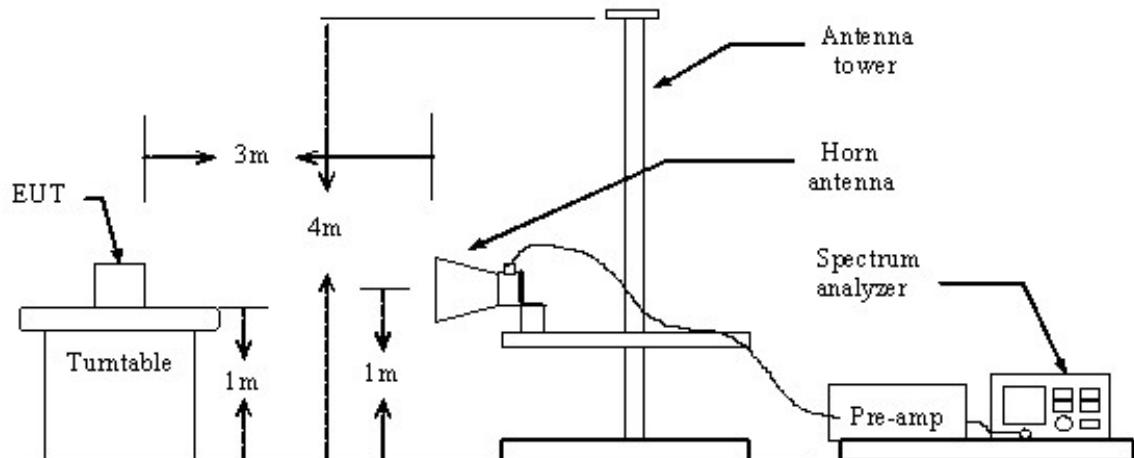
Block diagram of Test setup for frequency 30-1000MHz



Block diagram of Test setup for frequency below 30MHz



Block diagram of Test setup for frequency above 1GHz



8.3 Limit

According to 15.231(b) requirements, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following

Fundamental Frequency (MHz)	Filed Strength of Fundamental (microvolts/meter)	Filed Strength of Spurious Emission (microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750*	125 to 375*
174-260	3750	375
260-470	3750 to 12500*	375 to 1250*
Above 470	12500	1250

*Linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m} = 56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m} = 41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

For this E.U.T

Working Frequency(MHz)	Filed Strength of Fundamental(dB $\mu\text{V/m}$)	Filed Strength of Spurious Emission(dB $\mu\text{V/m}$)
433.92	80.8	60.8

Intentional radiators operating under the provisions of this Section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions.

According to 15.35, on any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test.

According to 15.231(b) , The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.490	3	$20\log 2400/F$ (kHz) + 80
0.490-1.705	3	$20\log 24000/F$ (kHz) + 40
1.705-30	3	$20\log 30 + 40$
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1) RF Voltage (dBuV) = $20 \log$ RF Voltage (uV)
- 2) In the Above Table, the tighter limit applies at the band edges.
- 3) Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4) The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.
- 5) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula $Ld1 = Ld2 * (d2/d1)$

8.4 Test Equipment:

Please refer to the Section 2

8.5 Test specification:

Environmental conditions: Temperature 23° C Humidity: 50% Atmospheric pressure: 103kPa

8.6 Test result

Result: Pass

A Fundamental Radiated Emission

Frequency (MHz)	Emission Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)	Remark
433.92	82.67	H	100.8	Peak
433.92	82.60	V	100.8	Peak

Frequency (MHz)	Peak Emission Level@3m (dB μ V/m)	AV Factor (dB)	AV Emission Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)	Remark
433.92	82.67	-6.11	76.56	H	80.8	AV
433.92	82.60	-6.11	76.49	V	80.8	AV

B Harmonics and spurious Radiated Emission

Frequency (MHz)	Emission Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)	Remark
617.0540	47.98	H	80.8	Peak
867.8425	50.60	H	80.8	Peak
1301.8545	42.38	H	74	Peak
615.1102	45.68	V	80.8	Peak
867.8485	38.83	V	80.8	Peak
1301.8854	40.23	V	74	Peak

Frequency (MHz)	Peak Emission Level@3m (dB μ V/m)	AV Factor (dB)	AV Emission Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)	Remark
617.0540	47.98	-6.11	41.87	H	60.8	AV
867.8425	50.60	-6.11	44.49	H	60.8	AV
1301.8545	42.38	-6.11	36.27	H	54	AV
615.1102	45.68	-6.11	39.57	V	60.8	AV
867.8485	38.83	-6.11	32.72	V	60.8	AV
1301.8854	40.23	-6.11	34.22	V	54	AV

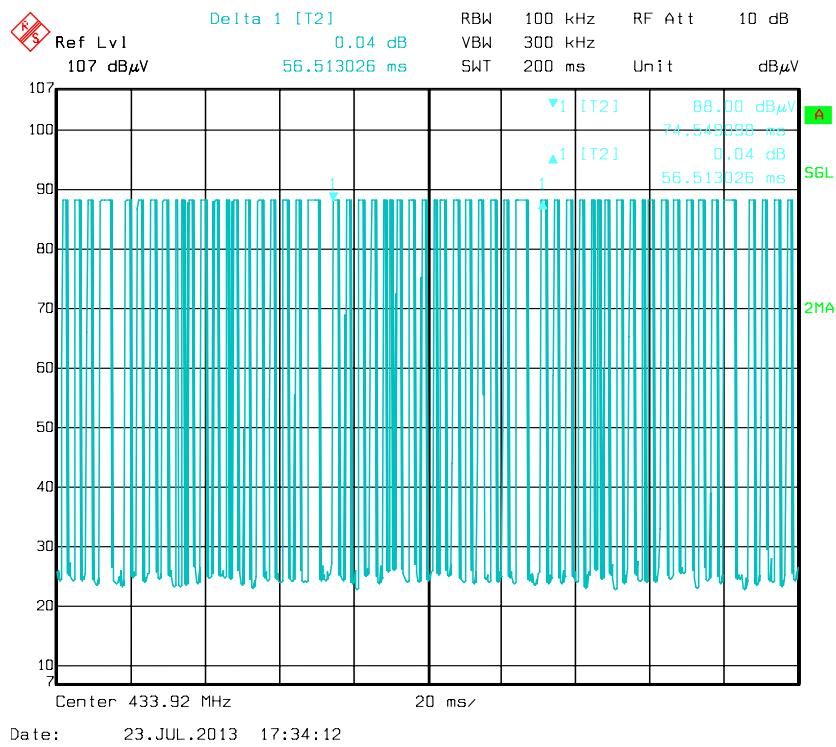
Note:

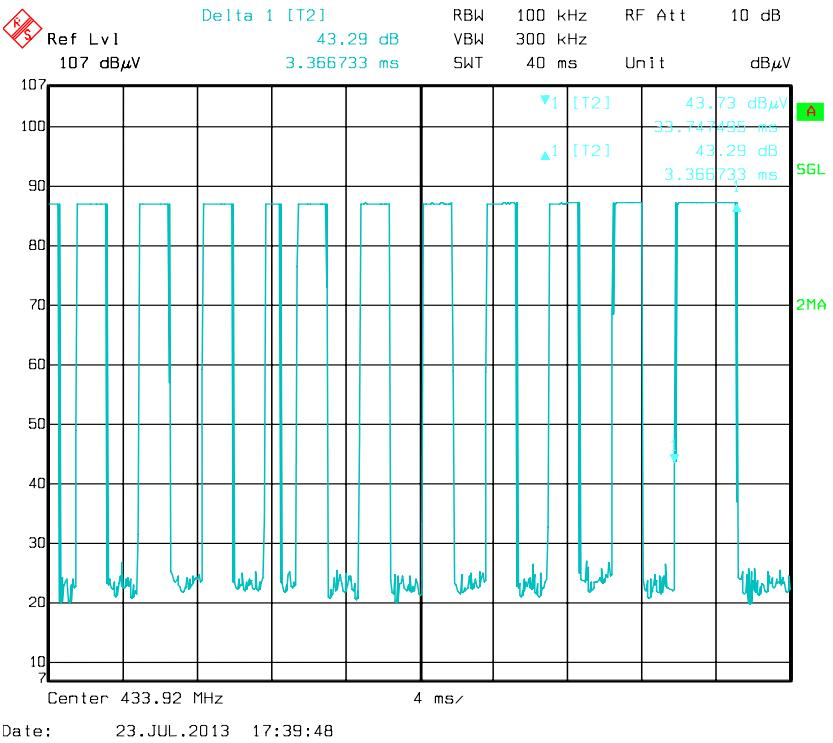
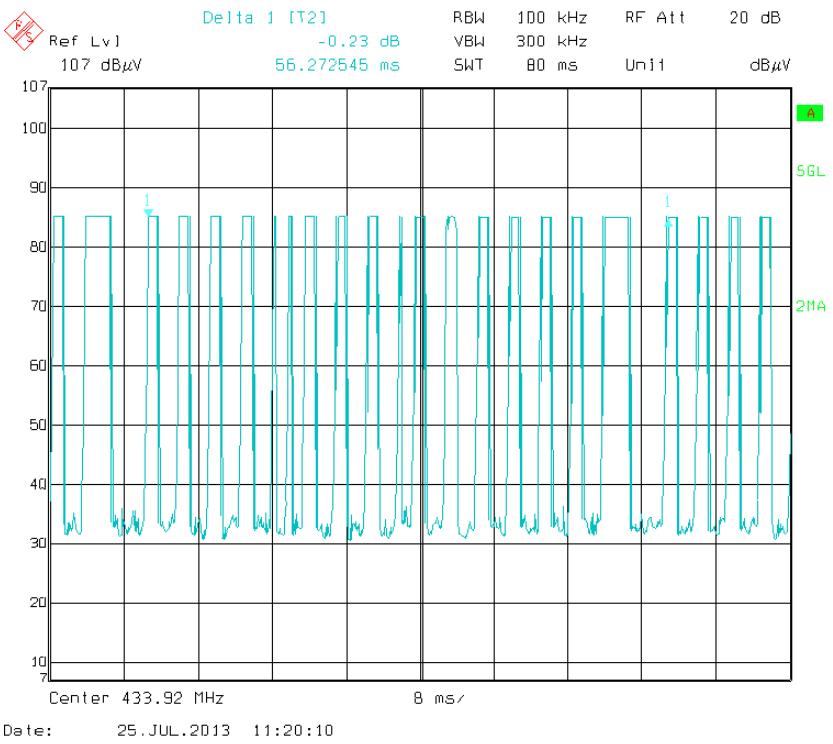
- 1) Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor
- 2) Test Frequency from 9kHz to 5GHz, the emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement
- 3) AV=Average
- 4) AV Emission level = Peak Emissions level +AV Factor
- 5) AV Factor = $20 \log(\text{Duty Cycle})$

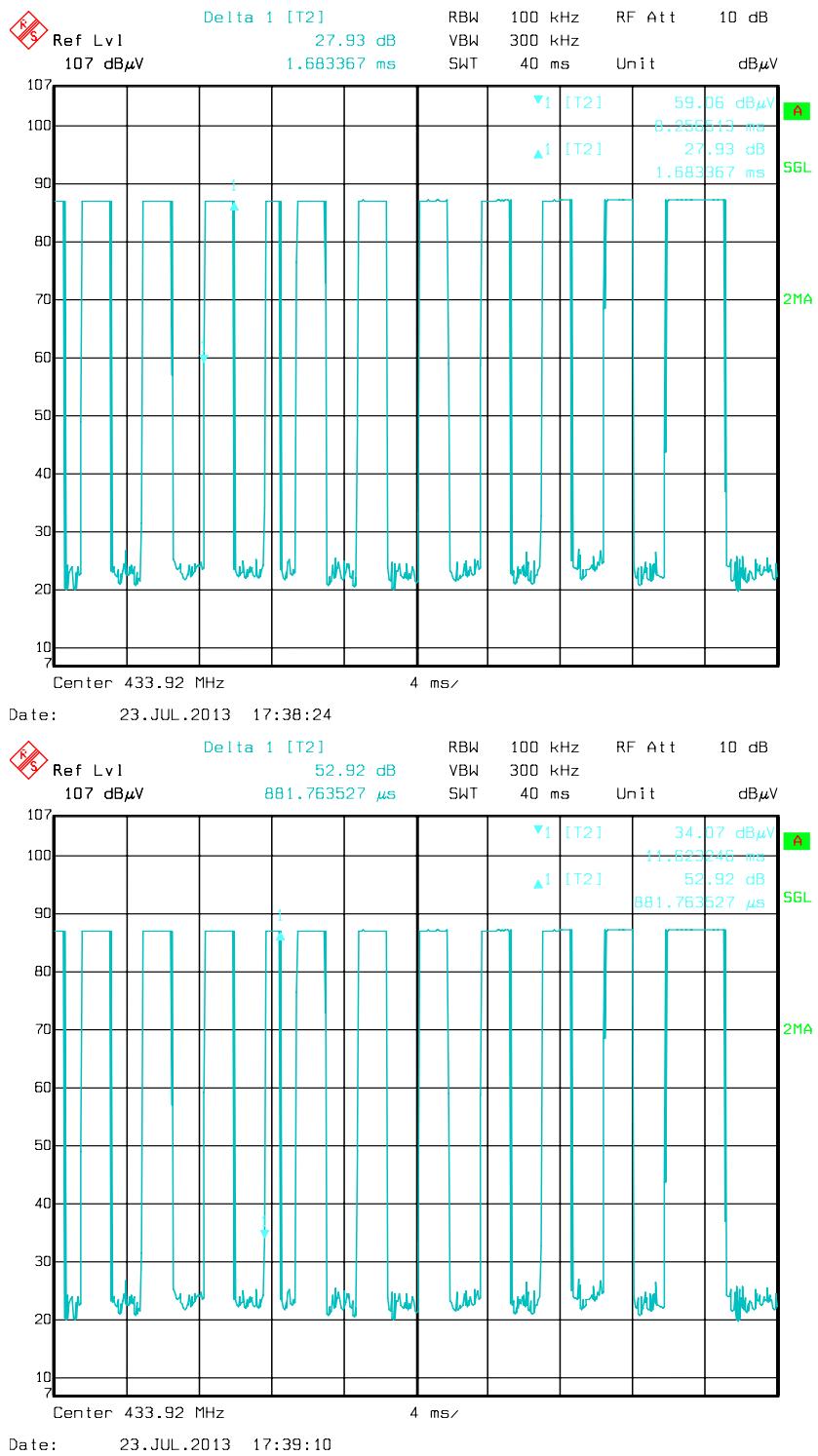
Duty cycle test data as follows

Total time one cycle	Effective time one cycle	Duty Cycle	AV Factor(dB)
56.273	27.858	0.493	-6.11

Note: Effective time one cycle= $3.366*1+1.683*13+0.881*3=27.858\text{ms}$







9.0 Occupied Bandwidth

9.1 Test Equipment

Please refer to the Section 2

9.2 Test Specification:

Environmental conditions: Temperature 22° C Humidity: 50% Atmospheric pressure: 103kPa

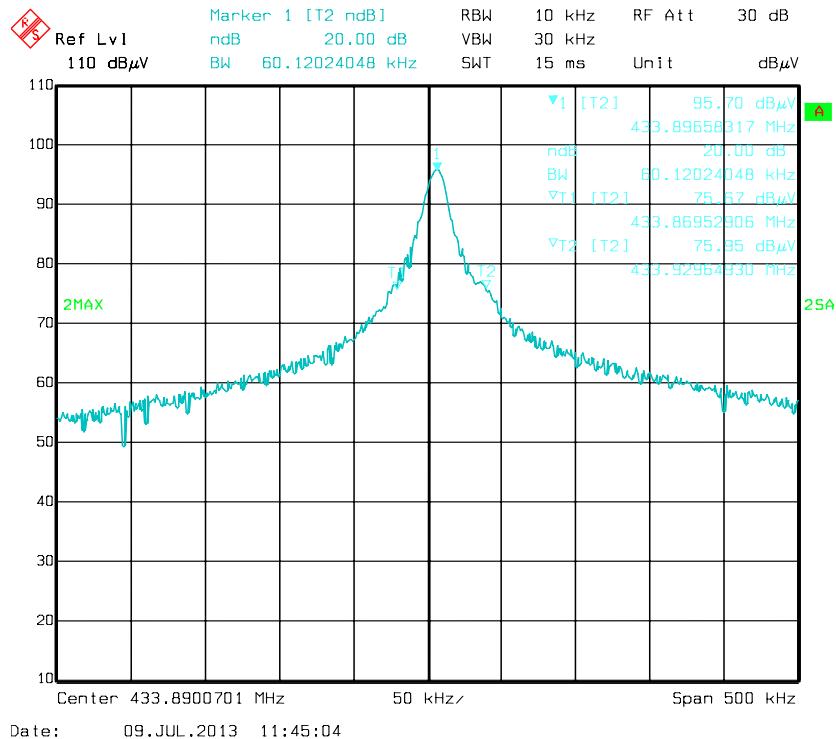
9.3 Limit

According to 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

9.4 Test Result:

Channel	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
(Low)	60.12	1084.8	PASS

Note: Limit = 433.92MHz *0.25% = 1084.8 kHz



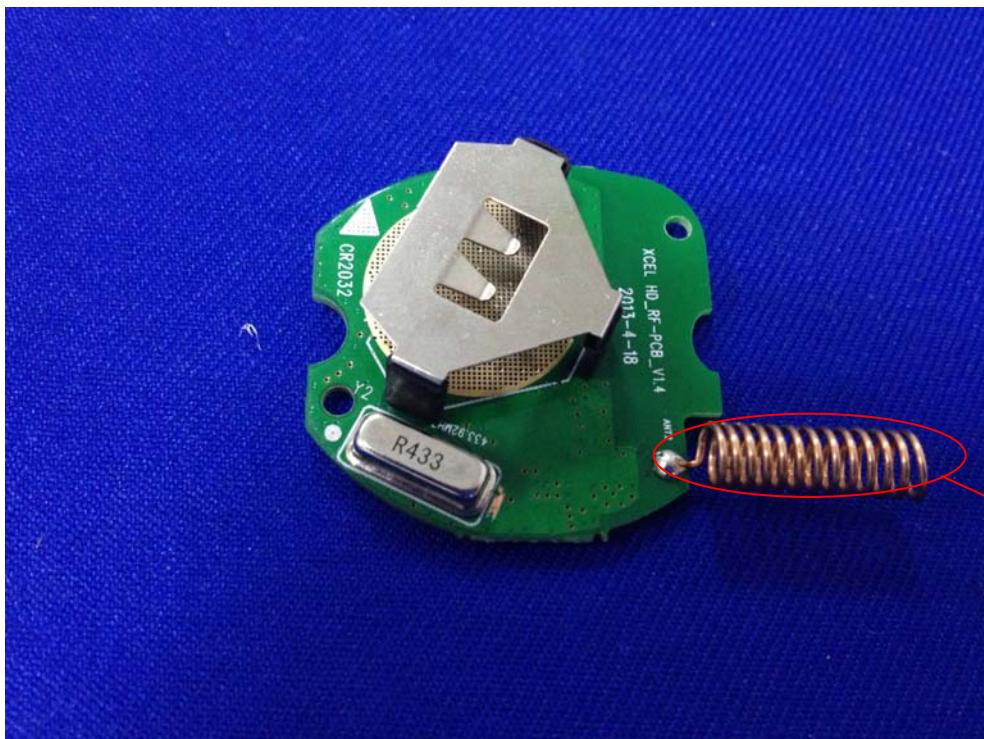
10.0 Antenna Requirement

10.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

10.2 Antenna Specification

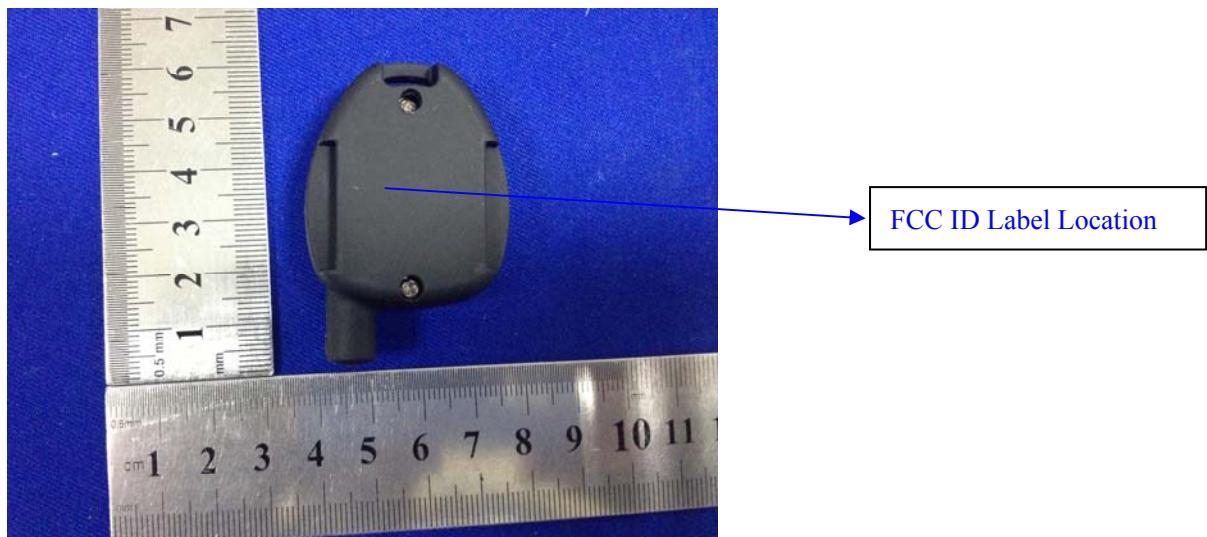
According to the manufacturer declared, the EUT has a spring antenna; the directional gain of antenna is 2 dBi, and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.



Antenna

11.0 FCC ID Label**FCC ID: EEX-XCELCAMERA**

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:**--End of the report--**