

# FCC Part 15 Class II Permissive Change EMI TEST REPORT of

E.U.T. : Digital Wireless Camera

Model : W VCMS10B

FCC ID : ZCPWVCMS10B201101

for

APPLICANT : TECH-CAST MFG. CORP.

ADDRESS : NO. 4-1, Fong-Teng Rd., Ta-Pei Hsiang, Yun-Lin  
Hsien, 631 Taiwan, R.O.C

Test Performed by

**ELECTRONICS TESTING CENTER, TAIWAN**

NO.34, LIN 5, DINGFU TSUEN, LINKOU SHIANG

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Report Number : 11-06-RBF-080



# TEST REPORT CERTIFICATION

Applicant : TECH-CAST MFG. CORP.  
NO. 4-1,Fong-Teng Rd.,Ta-Pei Hsiang,Yun-Lin Hsien,631  
Taiwan,R.O.C

Manufacture : TECH-CAST MFG. CORP.  
NO. 4-1,Fong-Teng Rd.,Ta-Pei Hsiang,Yun-Lin Hsien,631  
Taiwan,R.O.C

Description of Device :

a) Type of EUT : Digital Wireless Camera

b) Trade Name :  

c) Model No. : W VCMS10B

d) Power Supply : DC 12V

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.

2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Date Test Item Received : Jun. 09, 2011

Date Test Campaign Completed : Jun. 16, 2011

Date of Issue : Jun. 30, 2011

Test Engineer

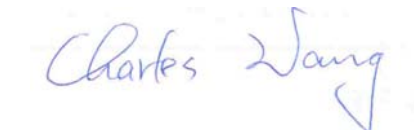
:



( Falcon Shi, Engineer )

Check By

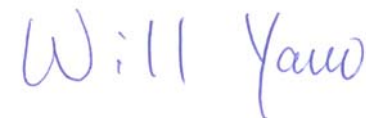
:



( Charles Wang, Supervisor )

Approve & Authorized

:



Will Yauo, Manager



EMC Dept. II of ELECTRONICS

TESTING CENTER, TAIWAN

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## 1 GENERAL INFORMATION

### 1.1 Product Description

- a) Type of EUT : Digital Wireless Camera
- b) Trade Name :  
- c) Model No. : W VCMS10B
- d) Power Supply : DC 12V
- e) Modification description :
  1. Improve the electrostatic discharge (ESD) issue.
  2. Remove the core and absorber from the camera.
  3. Change the antenna from 2dBi to 3 dBi and add collar on antenna connector with camera.

No changes have been made to the RF module.

### 1.2 Test Methodology

Both conducted and radiated emissions were performed according to the procedures illustrated in ANSI C63.4 (2003). Other required measurements were illustrated in separate sections of this test report for details.

### 1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at NO.34, LIN 5, DINGFU TSUEN, LINKOU SHIANG TAIPEI COUNTY, TAIWAN, 24442, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Aug. 05, 2008.

## 2 PROVISIONS APPLICABLE

### 2.1 Definition

**Unintentional radiator:**

A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

**Class A Digital Device:**

A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

**Class B Digital Device :**

A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

**Intentional radiator:**

A device that intentionally generates and emits radio frequency energy by radiation or induction.

## 2.2 Requirement for Compliance

### (1) Conducted Emission Requirement

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency MHz	Quasi Peak dB $\mu$ V	Average dB $\mu$ V
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

\* Decreases with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limits is same as above table.

### (2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB $\mu$ V/m	Radiated $\mu$ V/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

**(3) Antenna Requirement**

For intentional device, according to §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.

**(4) Hopping Channel Separation**

According to 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

**(5) Number of Hopping frequencies used**

According to 15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels.

**(6) Hopping Channel Bandwidth**

According to 15.247(a)(1)(ii), for frequency hopping system operating in the 5725-5850 MHz band, the maximum 20dB bandwidth of the hopping channel is 1MHz.

**(7) Dwell Time of each frequency**

According to 15.247(a)(1)(iii), for frequency hopping system operating in the 2400-2483.5 band, the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

**(8) Output Power Requirement**

According to 15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

**(9) 100 kHz Bandwidth of Frequency Band Edges Requirement**

According to 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.



## (10) Out-of-Band Conducted Emission Requirement

According to 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

## 2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

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	2655-2900	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	3360-4400	Above 38.6
13.36-13.41			

\*\* : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

## 2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## 2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

### 3 SYSTEM TEST CONFIGURATION

#### 3.1 Justification

For both radiated and conducted emissions, the system was configured for testing in a typical fashion as a customer would normally use it. The peripherals other than EUT were connected in normally standing by situation. Three highest emissions were verified with varying placement of the transmitting antenna connected to EUT (if applicable) to maximize the emission from EUT.

For conducted and radiated emissions, whichever RF channel is operated, the digital circuits' function identically. As the reason, measurement of emissions from digital circuits is performed with the highest, middle and the lowest channel by transmitting mode.

#### 3.2 Devices for Tested System

Device	Manufacture	Model / FCC ID.	Description
Digital Wireless Camera *	TECH-CAST MFG. CORP.	W VCMS10B/ ZCPWVCMS10B20110 1	----

Remark “\*” means equipment under test.

## 4 RADIATED EMISSION MEASUREMENT

### 4.1 Applicable Standard

For unintentional radiator, the radiated emission shall comply with §15.109(a).

For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and direct sequence spread spectrum, and the out band emission shall be comply with §15.247 (c)

### 4.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.
7. Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

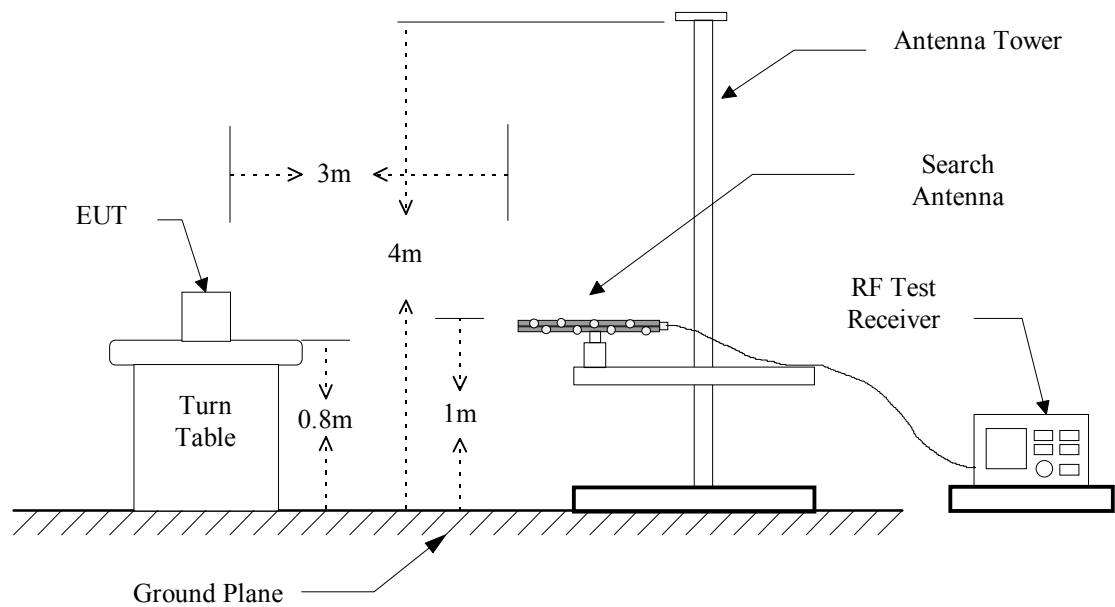
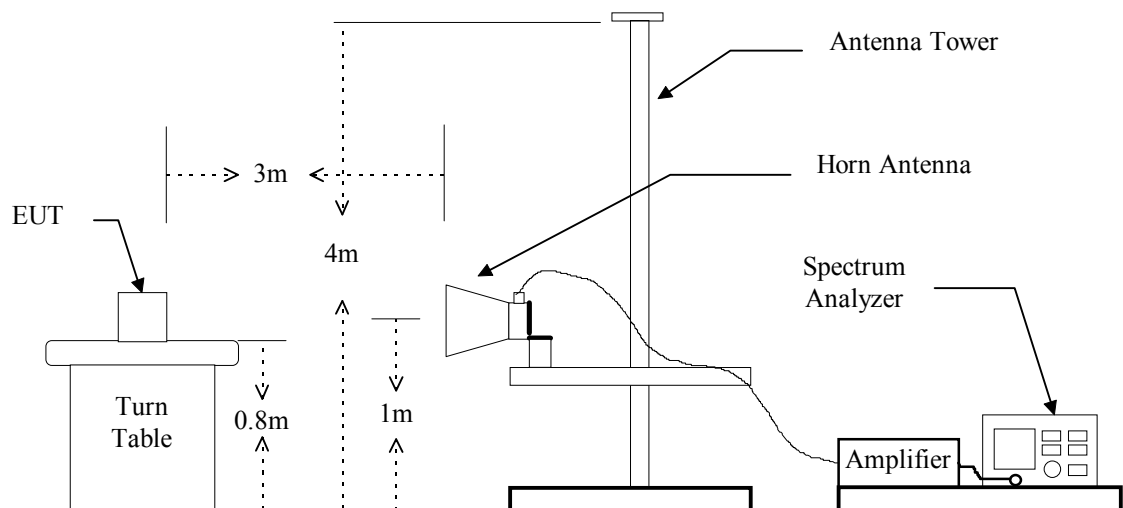


Figure 2 : Frequencies measured above 1 GHz configuration



### 4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement:

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Test Receiver	Rohde & Schwarz	ESVS30	2011/05/13	2012/05/12
Spectrum	Advantest	R3162	2011/03/03	2012/03/01
Bi-Log Antenna	Schaffner	CBL 6111	2011/05/20	2012/05/19
Log-periodic Antenna	EMCO	3146	2010/10/11	2011/10/10
Biconical Antenna	EMCO	3110B	2010/10/11	2011/10/10
Double Ridged Antenna	EMCO	3115	2011/05/10	2012/05/09
Amplifier	HP	8449B	2010/12/29	2011/12/28
Amplifier	HP	83051A	2011/05/12	2012/05/11
Amplifier	HP	8447D	2011/05/09	2012/05/08
Spectrum	Rohde & Schwarz	FSP40	2010/09/17	2011/09/16

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

## 4.4 Radiated Emission Data

### 4.4.1 Tx Portion

#### A. Channel Low ant 1

Operation Mode : Transmitting

Fundamental Frequency : 2403.000 MHz

Test Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
4806.120	52.8	---	52.7	---	0.9	53.7	---	74.0	54.0	-0.3	67	1.10
7209.240	---	---	---	---	5.7	---	---	74.0	54.0	---	---	---
9612.360	---	---	---	---	7.2	---	---	74.0	54.0	---	---	---
12015.480	---	---	---	---	9.2	---	---	74.0	54.0	---	---	---
14418.600	---	---	---	---	11.6	---	---	74.0	54.0	---	---	---
16821.720	---	---	---	---	11.8	---	---	74.0	54.0	---	---	---
19224.840	---	---	---	---	8.9	---	---	74.0	54.0	---	---	---
21627.960	---	---	---	---	9.8	---	---	74.0	54.0	---	---	---
24031.080	---	---	---	---	10.3	---	---	74.0	54.0	---	---	---

Operation Mode : Receiving

Fundamental Frequency : Local Frequency : 2403.000 MHz

Test Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
* 2403.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 4806.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 7209.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 9612.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 12015.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Remark “\*” means the local oscillator frequency and its harmonics.
5. Item “Margin” referred to Average limit while there is only peak result.
6. The expanded uncertainty of the radiated emission tests is 3.53 dB.

**B. Channel Middle ant 1**Operation Mode : TransmittingFundamental Frequency : 2439.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V			(dBuV/m)		(dBuV/m)				
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
4878.110	52.1	---	52.5	---	1.1	53.6	---	74.0	54.0	-0.4	33	1.10
7317.220	---	---	---	---	5.9	---	---	74.0	54.0	---	---	---
9756.330	---	---	---	---	7.3	---	---	74.0	54.0	---	---	---
12195.440	---	---	---	---	9.3	---	---	74.0	54.0	---	---	---
14634.550	---	---	---	---	11.6	---	---	74.0	54.0	---	---	---
17073.660	---	---	---	---	13.2	---	---	74.0	54.0	---	---	---
19512.770	---	---	---	---	8.5	---	---	74.0	54.0	---	---	---
21951.880	---	---	---	---	9.9	---	---	74.0	54.0	---	---	---
24390.990	---	---	---	---	10.7	---	---	74.0	54.0	---	---	---

Operation Mode : ReceivingFundamental Frequency : Local Frequency : 2439.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V			(dBuV/m)		(dBuV/m)				
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
* 2439.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 4878.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 7317.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 9756.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 12196.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Remark “\*” means the local oscillator frequency and its harmonics.
5. Item “Margin” referred to Average limit while there is only peak result.
6. The expanded uncertainty of the radiated emission tests is 3.53 dB.



**C. Channel High ant 1**Operation Mode : TransmittingFundamental Frequency : 2478.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
4956.110	51.1	---	51.3	---	1.4	52.7	---	74.0	54.0	-1.3	66	1.10
7434.220	---	---	---	---	6.1	---	---	74.0	54.0	---	---	---
9912.330	---	---	---	---	7.4	---	---	74.0	54.0	---	---	---
12390.440	---	---	---	---	9.4	---	---	74.0	54.0	---	---	---
14868.550	---	---	---	---	11.5	---	---	74.0	54.0	---	---	---
17346.660	---	---	---	---	15.1	---	---	74.0	54.0	---	---	---
19824.770	---	---	---	---	8.6	---	---	74.0	54.0	---	---	---
22302.880	---	---	---	---	10.1	---	---	74.0	54.0	---	---	---
24780.990	---	---	---	---	11.0	---	---	74.0	54.0	---	---	---

Operation Mode : ReceivingFundamental Frequency : Local Frequency : 2478.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
* 2478.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 4956.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 7434.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 9911.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 12390.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*\*" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Remark "\*" means the local oscillator frequency and its harmonics.
5. Item "Margin" referred to Average limit while there is only peak result.
6. The expanded uncertainty of the radiated emission tests is 3.53 dB.

**D. Channel Low ant 2**Operation Mode : TransmittingFundamental Frequency : 2403.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBUV)				Factor (dB) Corr.	Result @3m (dBUV/m)		Limit @3m (dBUV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
4805.960	51.3	---	52.7	---	0.9	53.6	---	74.0	54.0	-0.4	33	1.00
7208.920	---	---	---	---	5.7	---	---	74.0	54.0	---	---	---
9611.880	---	---	---	---	7.2	---	---	74.0	54.0	---	---	---
12014.840	---	---	---	---	9.2	---	---	74.0	54.0	---	---	---
14417.800	---	---	---	---	11.6	---	---	74.0	54.0	---	---	---
16820.760	---	---	---	---	11.8	---	---	74.0	54.0	---	---	---
19223.720	---	---	---	---	8.9	---	---	74.0	54.0	---	---	---
21626.680	---	---	---	---	9.8	---	---	74.0	54.0	---	---	---
24029.640	---	---	---	---	10.3	---	---	74.0	54.0	---	---	---

Operation Mode : ReceivingFundamental Frequency : Local Frequency : 2403.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBUV)				Factor (dB) Corr.	Result @3m (dBUV/m)		Limit @3m (dBUV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
* 2403.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 4806.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 7209.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 9612.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 12015.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Remark "\*" means the local oscillator frequency and its harmonics.
5. Item "Margin" referred to Average limit while there is only peak result.
6. The expanded uncertainty of the radiated emission tests is 3.53 dB.

**E. Channel Middle ant 2**Operation Mode : TransmittingFundamental Frequency : 2439.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V									
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
4878.210	51.9	---	52.0	---	1.1	53.1	---	74.0	54.0	-0.9	54	1.00
7317.420	---	---	---	---	5.9	---	---	74.0	54.0	---	---	---
9756.630	---	---	---	---	7.3	---	---	74.0	54.0	---	---	---
12195.840	---	---	---	---	9.3	---	---	74.0	54.0	---	---	---
14635.050	---	---	---	---	11.6	---	---	74.0	54.0	---	---	---
17074.260	---	---	---	---	13.2	---	---	74.0	54.0	---	---	---
19513.470	---	---	---	---	8.5	---	---	74.0	54.0	---	---	---
21952.680	---	---	---	---	9.9	---	---	74.0	54.0	---	---	---
24391.890	---	---	---	---	10.7	---	---	74.0	54.0	---	---	---

Operation Mode : ReceivingFundamental Frequency : Local Frequency : 2439.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V			Peak	Ave	Peak	Ave			
	Peak	Ave	Peak	Ave								
* 2439.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 4878.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 7317.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 9756.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 12196.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Remark “\*” means the local oscillator frequency and its harmonics.
5. Item “Margin” referred to Average limit while there is only peak result.
6. The expanded uncertainty of the radiated emission tests is 3.53 dB.

**F. Channel High ant 2**Operation Mode : TransmittingFundamental Frequency : 2478.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBUV)				Factor (dB) Corr.	Result @3m (dBUV/m)		Limit @3m (dBUV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
4959.860	50.8	---	51.1	---	1.4	52.5	---	74.0	54.0	-1.5	54	1.00
7441.720	---	---	---	---	6.1	---	---	74.0	54.0	---	---	---
9923.580	---	---	---	---	7.4	---	---	74.0	54.0	---	---	---
12405.440	---	---	---	---	9.4	---	---	74.0	54.0	---	---	---
14887.300	---	---	---	---	11.5	---	---	74.0	54.0	---	---	---
17369.160	---	---	---	---	15.3	---	---	74.0	54.0	---	---	---
19851.020	---	---	---	---	8.6	---	---	74.0	54.0	---	---	---
22332.880	---	---	---	---	10.2	---	---	74.0	54.0	---	---	---
24814.740	---	---	---	---	11.1	---	---	74.0	54.0	---	---	---

Operation Mode : ReceivingFundamental Frequency : Local Frequency : 2478.000 MHzTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %

Frequency (MHz)	Reading (dBUV)				Factor (dB) Corr.	Result @3m (dBUV/m)		Limit @3m (dBUV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H Peak	V Ave	H Peak	V Ave		Peak	Ave	Peak	Ave			
* 2478.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 4956.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 7434.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 9911.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---
* 12390.000	---	---	---	---	---	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*\*" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Remark "\*" means the local oscillator frequency and its harmonics.
5. Item "Margin" referred to Average limit while there is only peak result.
6. The expanded uncertainty of the radiated emission tests is 3.53 dB.

**4.4.2 Radiated Emissions in Restricted Bands**Operation Mode : TransmittingTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %**Operation Mode : CH Low ant 1 Restricted Frequency band : 2310MHz-2390MHz**

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V			(dBuV/m)		(dBuV/m)				
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
2378.940	55.1	---	52.3	---	-6.4	48.7	---	74.0	54.0	-5.3	53	1.20
2388.610	53.8	---	53.1	---	-6.4	47.4	---	74.0	54.0	-6.6	68	1.00

**Operation Mode : CH High ant 1 Restricted Frequency band : 2483.5MHz-2500MHz**

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V			(dBuV/m)		(dBuV/m)				
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
2484.962	54.0	---	53.9	---	-6.1	47.9	---	74.0	54.0	-6.1	37	1.10
2488.520	52.8	---	53.0	---	-6.1	46.9	---	74.0	54.0	-7.1	11	1.00

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Item “Margin” referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Operation Mode : TransmittingTest Date : Jul. 19, 2011 Temperature : 24 °C Humidity : 55 %**Operation Mode :CH Low ant 2 Restricted Frequency band : 2310MHz-2390MHz**

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V			(dBuV/m)		(dBuV/m)				
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
2380.120	56.1	---	55.3	---	-6.4	49.7	---	74.0	54.0	-4.3	39	1.00
2387.560	54.0	---	54.1	---	-6.4	47.7	---	74.0	54.0	-6.3	72	1.10

**Operation Mode :CH High ant 2 Restricted Frequency band : 2483.5MHz-2500MHz**

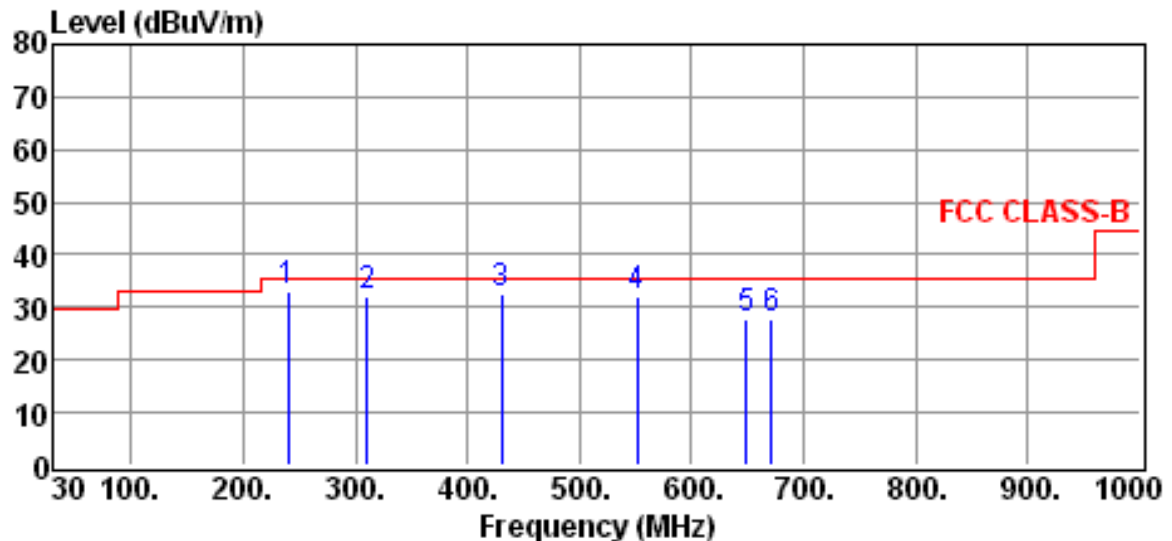
Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H		V			(dBuV/m)		(dBuV/m)				
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
2484.610	54.0	---	53.1	---	-6.1	47.9	---	74.0	54.0	-6.1	44	1.00
2485.360	54.1	---	53.9	---	-6.1	48.0	---	74.0	54.0	-6.0	58	1.10

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Item “Margin” referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

### 4.4.3 Other Emissions

#### a) Emission frequencies below 1 GHz

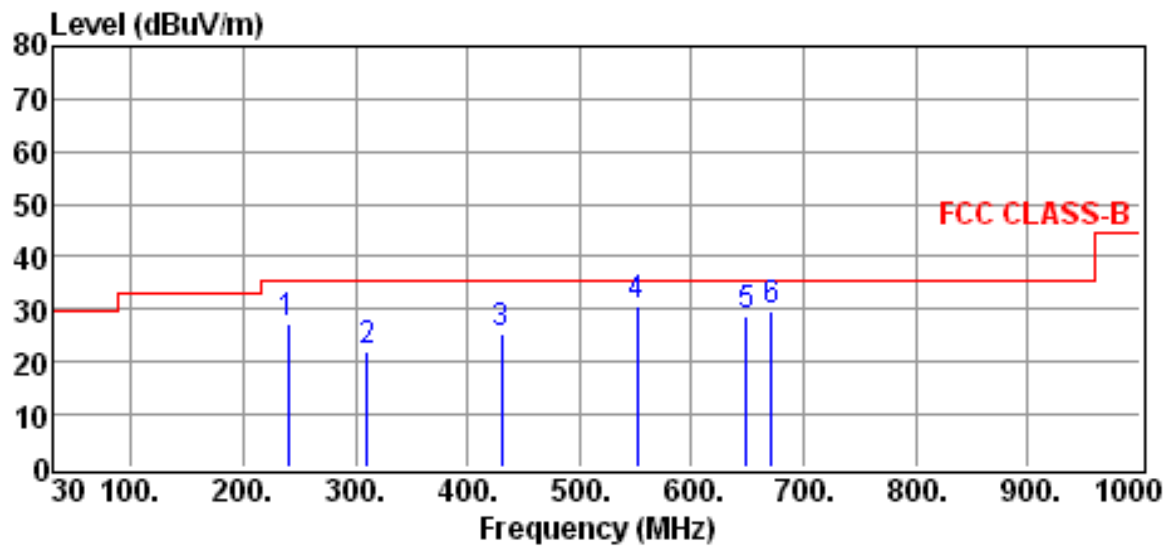


Site	:Open site #2	Date	:2011-07-18
EUT	:WVCMS10B	Ant. Pol.	:HORIZONTAL
Model	:	Detector	:Q.P.
Power Rating	:	Engineer	:
Limit	:FCC CLASS-B	Temp.	:24 °C
Memo	:ANT 1 (LONG)	Humi.	:72 %

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB
240.0600	18.09	15.01	33.10	46.00	-12.90
310.0500	14.76	17.34	32.10	46.00	-13.90
430.9000	11.08	21.32	32.40	46.00	-13.60
551.3000	7.21	24.79	32.00	46.00	-14.00
648.6600	1.51	26.29	27.80	46.00	-18.20
671.7200	1.34	26.56	27.90	46.00	-18.10

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result



Site : Open site #2  
 EUT : WVCMS10B  
 Model :  
 Power Rating :  
 Limit : FCC CLASS-B  
 Memo : ANT 1 (LONG)

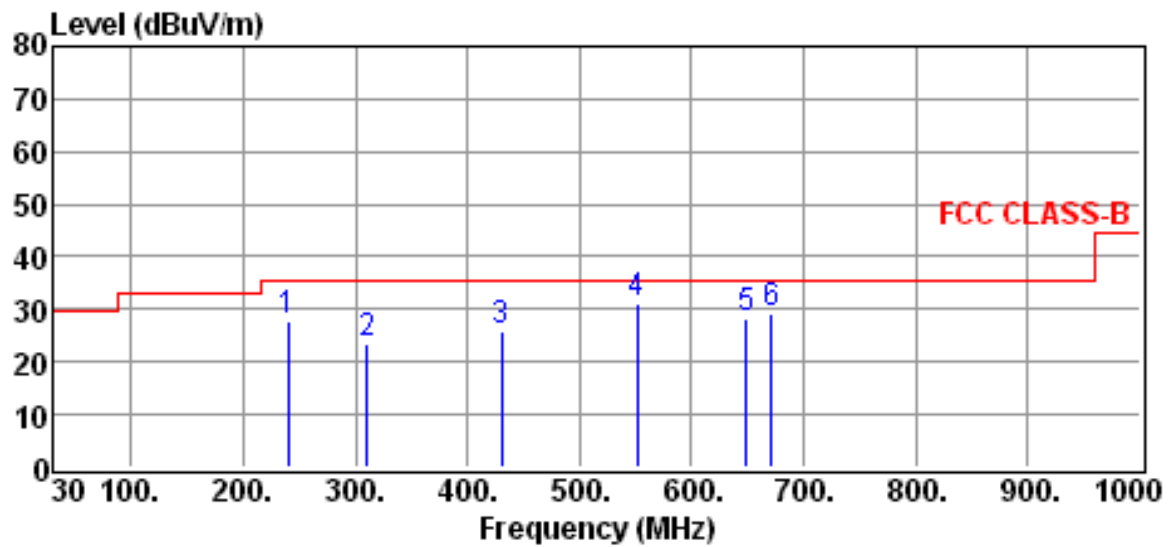
Date : 2011-07-18  
 Ant. Pol. : VERTICAL  
 Detector : Q.P.  
 Engineer :  
 Temp. : 24 °C  
 Humi. : 72 %

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB
240.0600	12.39	15.01	27.40	46.0	-18.60
310.0500	4.66	17.34	22.00	46.0	-24.00
430.9000	4.28	21.32	25.60	46.0	-20.40
551.3000	5.91	24.79	30.70	46.0	-15.30
648.6600	2.41	26.29	28.70	46.0	-17.30
671.7200	3.24	26.56	29.80	46.0	-26.20

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value = Limit - Result



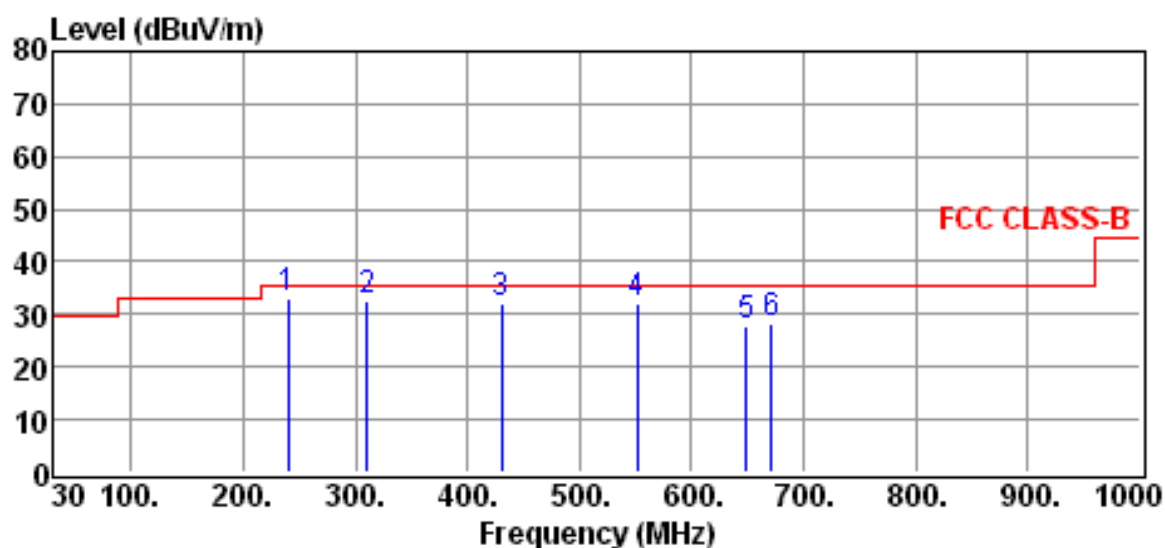


Site	:Open site #2	Date	:2011-07-18
EUT	:WVCMS10B	Ant. Pol.	:VERTICAL
Model	:	Detector	:Q.P.
Power Rating	:	Engineer	:
Limit	:FCC CLASS-B	Temp.	:24 °C
Memo	:ANT 2 (DIPOLE)	Humi.	:72 %

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB
240.0600	12.79	15.01	27.80	46.00	-18.20
310.0500	6.06	17.34	23.40	46.00	-22.60
430.9000	4.78	21.32	26.10	46.00	-19.90
551.3000	6.21	24.79	31.00	46.00	-15.00
648.6600	2.11	26.29	28.40	46.00	-17.60
671.7200	2.84	26.56	29.40	46.00	-16.60

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result



Site	:Open site #2	Date	:2011-07-18
EUT	:WVCMS10B	Ant. Pol.	:HORIZONTAL
Model	:	Detector	:Q.P.
Power Rating	:	Engineer	:
Limit	:FCC CLASS-B	Temp.	:24 °C
Memo	:ANT 2 (DIPOLE)	Humi.	:72 %

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB
240.0600	17.99	15.01	33.00	46.00	-13.00
310.0500	15.16	17.34	32.50	46.00	-13.50
430.9000	10.78	21.32	32.10	46.00	-13.90
551.3000	7.51	24.79	32.30	46.00	-13.70
648.6600	1.71	26.29	28.00	46.00	-18.00
671.7200	1.74	26.56	28.30	46.00	-17.70

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result

**b) Emission frequencies above 1 GHz**

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

**4.5 Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss (if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

$$\textbf{Result} = \textbf{Reading} + \textbf{Corrected Factor}$$

where Corrected Factor

$$= \text{Antenna FACTOR} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$

## 4.6 Photos of Radiation Measuring Setup

ant 1



ant 2



## **5 CONDUCTED EMISSION MEASUREMENT**

### **5.1 Description**

This EUT is excused from investigation of conducted emission, for it is powered by DC only. According to §15.207 (d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

## **6 ANTENNA REQUIREMENT**

### **6.1 Standard Applicable**

For intentional device, according to 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.

### **6.2 Antenna Construction**

Change the antenna from 2dBi to 3 dBi omni-directional antenna and add collar on antenna connector with camera. By adding a unique type of screw the antenna was fixed on the EUT and there is no consideration of replacement.

Please see antenna specifications submitted in Exhibit.