FCC PART 15 SUBPART C MEASURMENT AND TEST REPORT

For

Archos S.A.

12 rue Ampère 91430 Igny France

E.U.T.: Weather Station Secondary Module US

Model Name: ACWS01AUS

Brand Name: ARCHOS

FCC ID: SOVACWS01AUS

Report Number: NTC1408112F

Test Date(s): August 25, 2014 to August 29, 2014

Report Date(s): August 29, 2014

Prepared by

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

This device is a weather station transmitter. It's powered by 2* 1.5V AA battery. For more details features, please refer to User's Manual.

Manufacturer	:	ARCHOS Technology (Shenzhen) Co., Ltd.
Address	:	7A, 1st Block, Financial Base, No.8 Kefa Road, Hi-Tech Park, Nanshan District, Shenzhen, China
Power Supply	:	DC 3V battery
Model name	:	ACWS01AUS
Note	:	None

Technical Specification

Operation Frequency	:	915MHz
Modulation Type	:	FSK
Number of channel	:	1
Antenna Type	:	Integral
Antenna Gain	:	1dBi (declaration by manufacturer)

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: SOVACWS01AUS filing to comply with Section 15.249 of the FCC Part 15 (2013), Subpart C Rule.

1.3 Test Methodology

The radiated emission measurement was performed according to the procedures in ANSI C63.4 (2009). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

None

1.6 Test Facility and Location

Listed by FCC, August 02, 2011
The Certificate Registration Number is 665078.
Listed by Industry Canada, July 01, 2011
The Certificate Registration Number is 46405-9743.

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1.7 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.249(c)	20dB Bandwidth	Compliant
§15.249(d)	Band edge test	Compliant
§15.249(a)(d), §15.209, §15.205	Radiated Emission	Compliant
§15.203	Antenna Requirement	Compliant

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

The EUT has been tested under operating condition. The Lowest, middle and highest frequencies were chosen for testing.

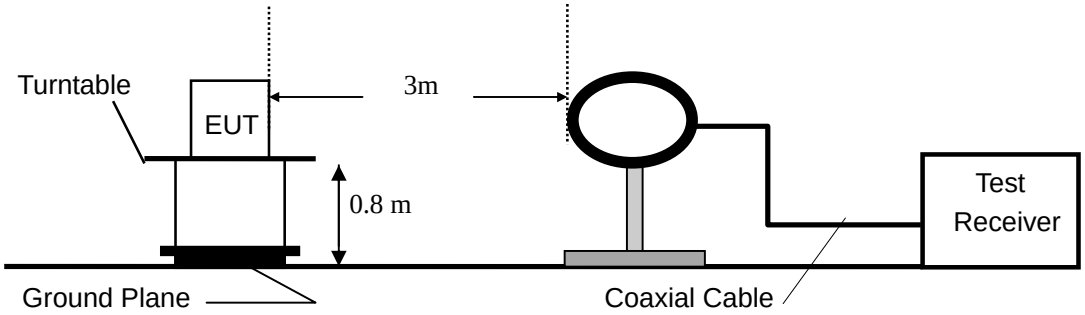
2.4 EUT Exercise

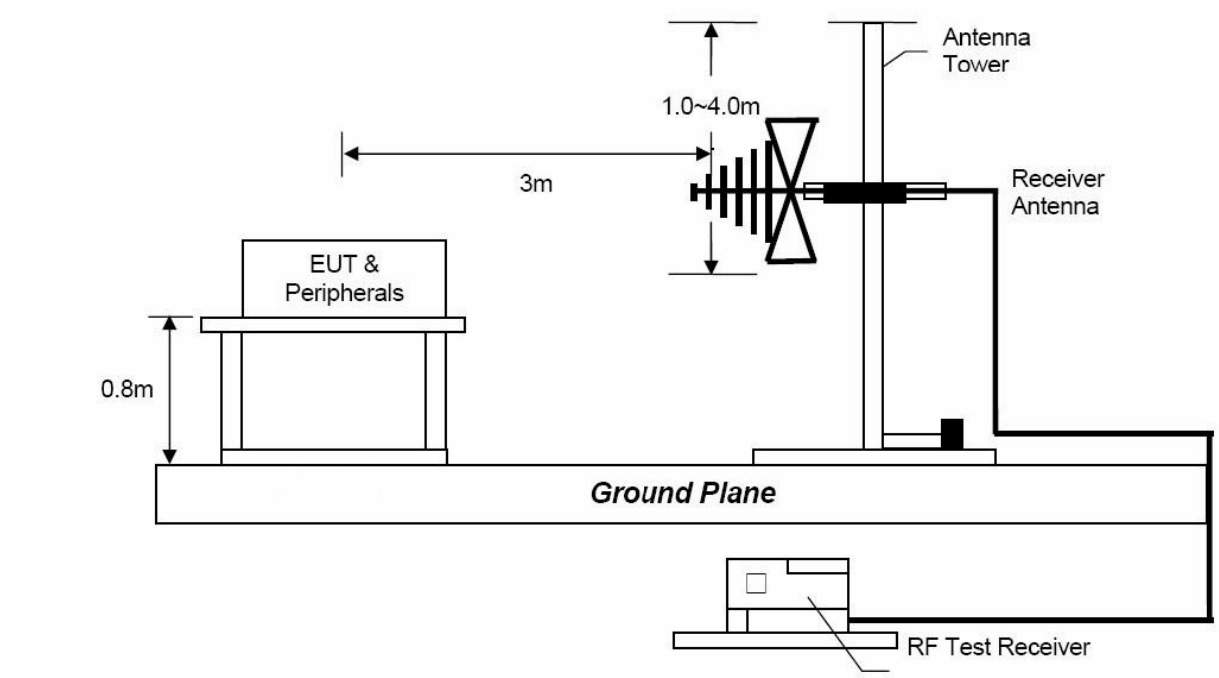
The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Radiated Emission Test

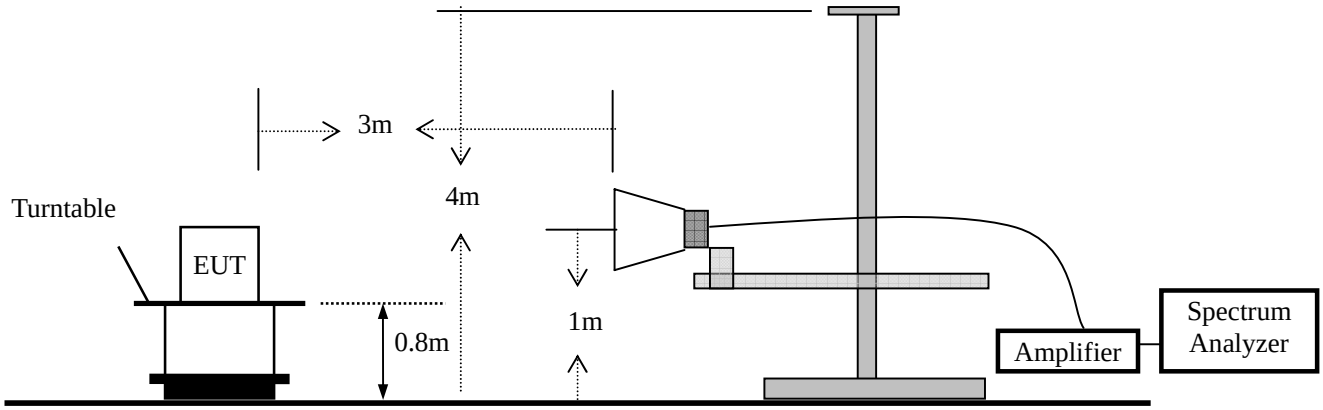
3.1 Test SET-UP (Block Diagram of Configuration)

3.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz





3.1.2 Radiated Emission Test Set-Up, Frequency above 1GHz



3.2 Measurement Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.

e. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

1. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300KHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for average detection(AV) at below at frequency above 1GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

3.3 Limit

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209) μV/m	
0.009 ~ 0.490	300	2400/F(kHz)	
0.490 ~ 1.705	30	24000/F(kHz)	
1.705 ~ 30	30	30	
30 ~ 88	3	100	
88 ~ 216	3	150	
216 ~ 960	3	200	
Above 960	3	500	
Frequency range MHz	**Distance Meters**	**Field Strengths Limit (15.249)**	
		mV/m (Field strength of fundamental)	μV/m (Field strength of Harmonics)
902 ~ 928	3	50	500
2400 ~ 2483.5	3	50	500
5725 ~ 5875	3	50	500
24000 ~ 2425000	3	250	2500

Remark：(1) Emission level (dB)μV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

3.4 Measurement Results

Operation Mode:	TX		
Frequency Range:	9KHz~1GHz	Temperature :	27 ℃
Test Result:	PASS	Humidity :	55 %
Measured Distance:	3m	Test By:	Sance
Test Date :	Aug. 27, 2014		

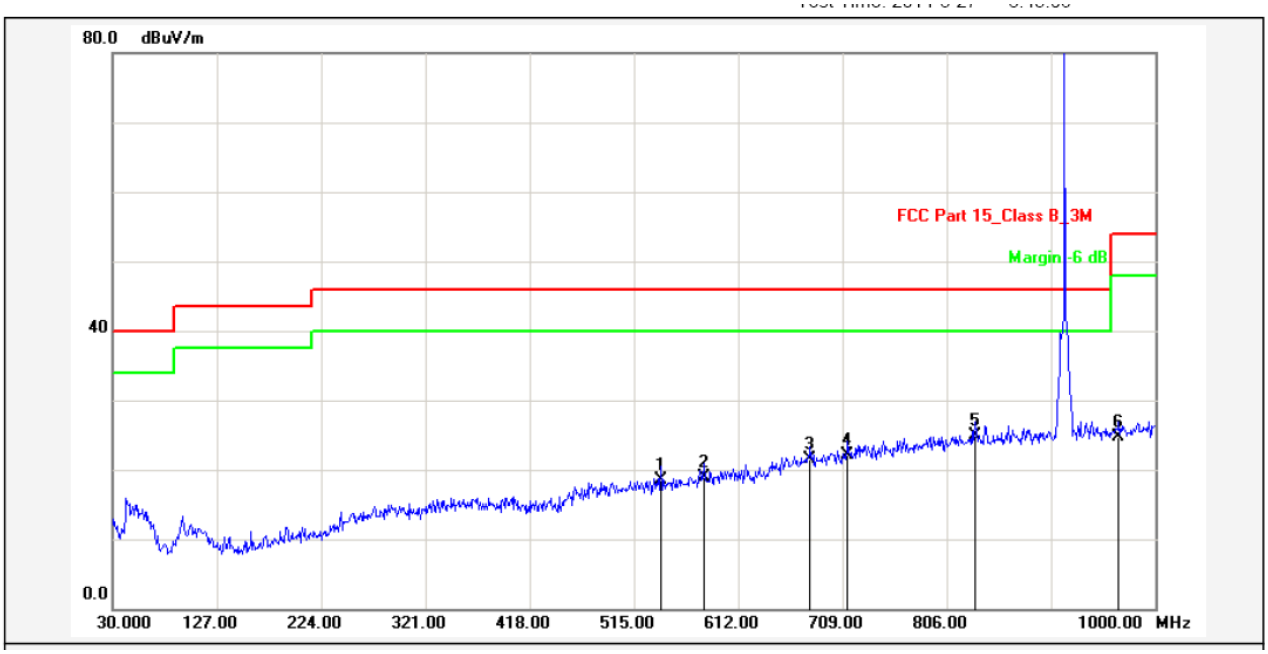
Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
678.9300	V	21.50	46.00	-24.50	QP
713.8500	V	22.20	46.00	-23.80	QP
832.1900	V	24.90	46.00	-21.10	QP

895.2400	H	29.20	46.00	-16.80	QP
945.6800	H	27.20	46.00	-18.80	QP
955.3800	H	30.80	46.00	-15.20	QP

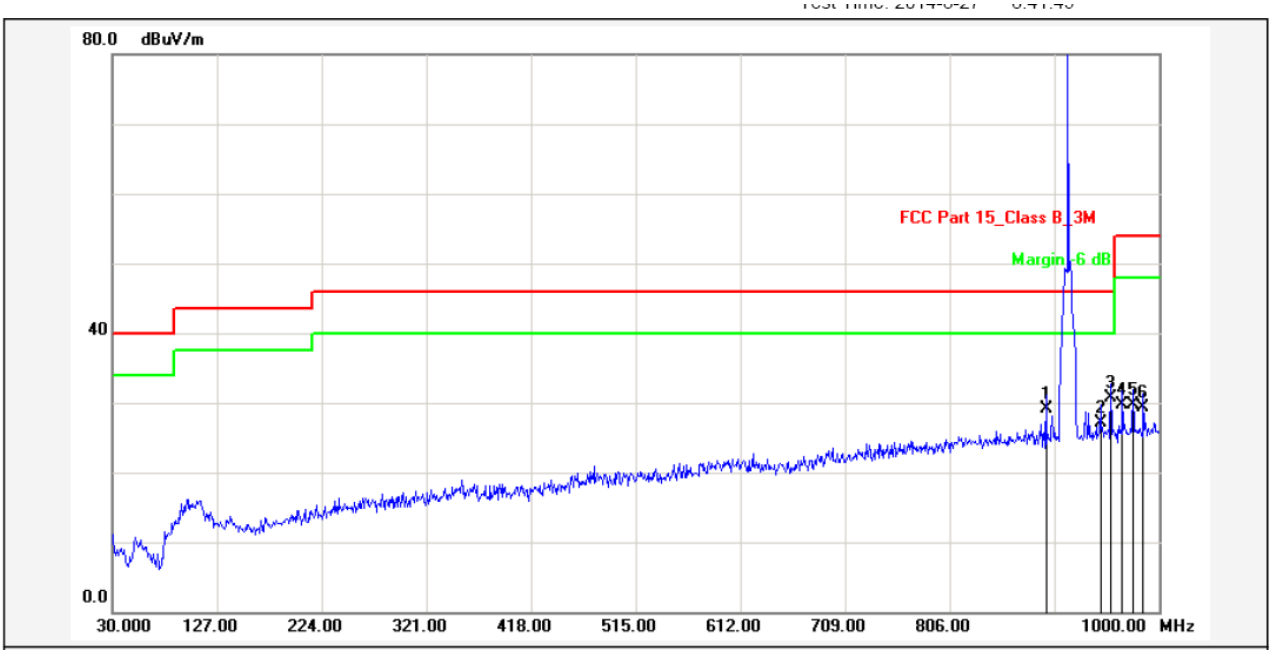
Other emissions are lower than 10dB below the allowable limit.

Note: (1) Emission Level= Reading Level + Factor
(2) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(3) Measurement uncertainty : ±3.4dB
(4) Loop antenna used for the emission below 30MHz.
(5) Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.

Vertical



Horizontal



Operation Mode:	TX Mode	Temperature :	27 ℃
Test Date :	Aug. 27, 2014	Humidity :	55 %
Test Result:	PASS	Test By:	Sance
Measured Distance:	3m		

Freq. (MHz)	Ant. Pol.	Emission Level (dBuV)		Limit 3m (dBuV/m)		Margin (dB)	
		QP		QP		QP	
915	V	83.29		94.00		-10.71	
		Peak	AV	Peak	AV	Peak	AV
1830	V	51.20	47.50	74.00	54.00	-22.80	-6.50
2745	V	42.49	32.26	74.00	54.00	-31.51	-21.74

		QP		QP		QP	
915	H	85.22		94.00		-8.78	
		Peak	AV	Peak	AV	Peak	AV
1830	H	55.38	44.25	74.00	54.00	-18.62	-9.75
2745	H	42.21	32.66	74.00	54.00	-31.79	-21.34

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level + Factor
(3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(4) Data of measurement within this frequency range shown " ---" in the table above means there is no emission can be found.
(5) Measurement uncertainty : ±3.7dB.
(6) Horn antenna used for the emission over 1000MHz.

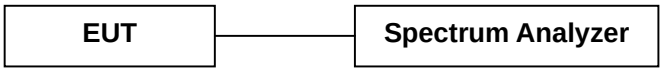
4. 20dB Bandwidth

4.1 Measurement Procedure

Maximum 20dB RF Bandwidth, FCC Rule 15.249:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

4.2 Test SET-UP (Block Diagram of Configuration)

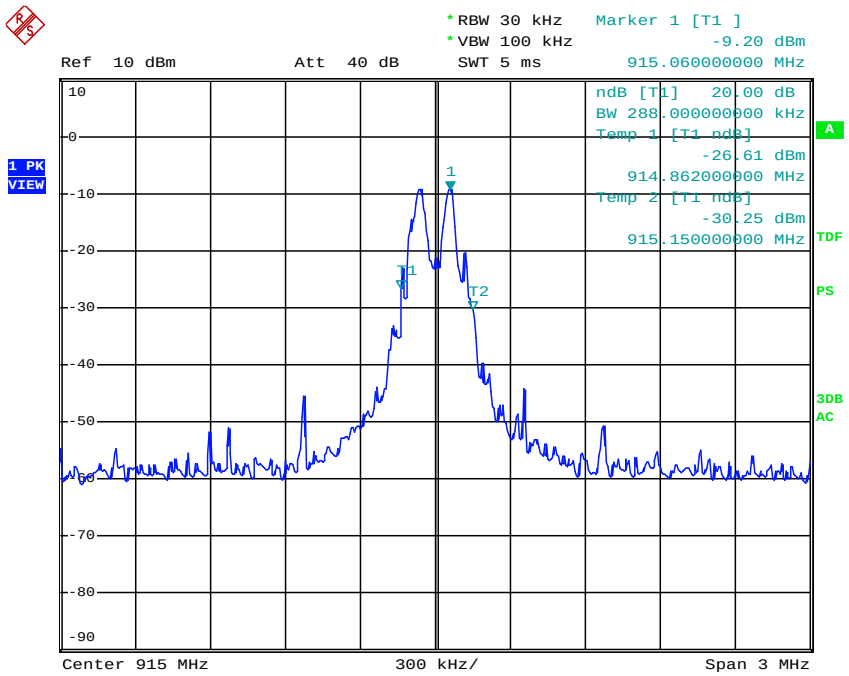


4.3 Measurement Results

Refer to attached data chart.

RBW:	30KHz	VBW:	100KHz
Packet:	DH5	Spectrum Detector:	PK
Test By:	Sance	Test Date :	Aug. 28, 2014
Temperature :	27 ℃	Humidity :	55 %
Test Result:	PASS		

Channel frequency (MHz)	20dB Down BW(kHz)
915	288



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5. Band Edge

5.1 Measurement Procedure

Out of Band Conducted Emissions, FCC Rule 15.249:

The transmitter output is connected to spectrum analyzer. The resolution bandwidth is set to100KHz, and the video bandwidth set to 300KHz.

A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

1. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300KHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for average detection(AV) at below at frequency above 1GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

5.2 Limit

15.249 In any 100KHz 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 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.3 Measurement Results

Please see below test table.
For Radiated Emission

Freq. (MHz)	Ant. Pol.	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)
		QP	QP	QP
901.4900	H	35.20	46.00	-10.80
901.3300	V	34.17	46.00	-11.83
928.5100	H	37.66	46.00	-8.34
928.4300	V	37.50	46.00	-8.50

Note: (1) Emission Level= Reading Level + Factor
(2) Factor= Antenna Gain + Cable Loss – Amplifier Gain
(3) Horn antenna used for the emission over 1000MHz.

6. Antenna Application

6.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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, 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.
Systems operating in the 902~928MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

6.2 Measurement Results

The antenna is integrated on the main Integral and no consideration of replacement, and the best case gain of the antenna is 1.0dBi. So, the antenna is consider meet the requirement.

7. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Nov. 25, 2013	Nov. 24, 2014
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Nov. 28, 2013	Nov. 27, 2014
Positioning Controller	UC	UC 3000	N/A	0~360°, 1-4m	N/A	N/A
Color Monitor	SUNSPO	SP-140A	N/A	N/A	N/A	N/A
Single Phase Power Line Filter	SAEMC	PF201A-32	110210	32A	N/A	N/A
3 Phase Power Line Filter	SAEMC	PF401A-200	110318	200A	N/A	N/A
DC Power Filter	SAEMC	PF301A-200	110245	200A	N/A	N/A
Cable	Huber+Suhner	CBL2-NN-1M	22390001	9KHz~7GHz	Nov. 09, 2013	Nov. 08, 2014
Cable	Huber+Suhner	CIL02	N/A	9KHz~7GHz	Nov. 09, 2013	Nov. 08, 2014
Power Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Nov. 09, 2013	Nov. 08, 2014
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	15GHz~26.5GHz	Oct.24, 2013	Oct.23, 2014
Horn Antenna	Com-Power	AH-118	071078	1GHz~18GHz	Nov. 07, 2013	Nov. 06, 2014
Loop antenna	Daze	ZA30900A	0708	9KHz~30MHz	Oct.11, 2013	Oct.10, 2014
Spectrum Analyzer	Agilent	E4408B	MY414407D	9KHz~26.5GHz	Nov. 05, 2013	Nov. 04, 2014
Pre-Amplifier	Agilent	8449B	3008A02964	1GHz~26.5GHz	Nov. 05, 2013	Nov. 04, 2014

---End of report---