

FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT

FOR

Ningbo Keyuan Instruments Co., Ltd.

Monitor-tag alarm

Model No.: KY-2074

Prepared for : Ningbo Keyuan Instruments Co., Ltd.
Address : No.72-8 Songzhaoqiao Road, Ningbo, Zhejiang, China

Prepared by : SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD.
Address : 1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd., Bao'an District, Shenzhen, Guangdong, China

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1. SUMMARY OF STANDARDS AND RESULTS

Applicant	Ningbo Keyuan Instruments Co., Ltd.
Adress	No.72-8 Songzhaoqiao Road, Ningbo, Zhejiang, China
Manufacturer	Ningbo Keyuan Instruments Co., Ltd.
Adress	No.72-8 Songzhaoqiao Road, Ningbo, Zhejiang, China
EUT	Monitor-tag alarm
Trade Mark	
Model No.	KY-2074
Serial No.	N/A
Power Supply	DC 6V
Date of Test	September 09, 2011 - September 20, 2011

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

The measurement results are contained in this test report and Shenzhen LCS Compliance Testing Laboratory Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD.

Compiled by :



Bobo Li/ File administrators

Prepared by:



Vito Cao/ Technique principal

Reviewed by:



Gavin Liang/ Manager

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	Monitor-tag alarm
Model Number	KY-2074
Power Supply	DC 6V
Modulation Technique	FSK
Central Frequency	915.61 MHz
Modulation Bandwidth	60KHz

2.2. Test Facility

Site

Description

EMC Lab.

: Accredited by CNAS, June 04, 2010
The Certificate Registration Number. is L4595.

Accredited by FCC, July 14, 2011
The Certificate Registration Number. is 899208.

Accredited by Industry Canada, May. 02, 2011
The Certificate Registration Number. is 9642A-1

Name of Firm : SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD.

Site Location : 1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd., Bao'an District, Shenzhen, Guangdong, China

2.3. Measurement Uncertainty

Radiation Uncertainty (30M~1GHz) : Ur = ± 4.26 dB
Radiation Uncertainty (1G~3GHz) : Ur = ± 2.66 dB
Radiation Uncertainty (3G~18GHz) : Ur = ± 2.83 dB
Conduction Uncertainty : Uc = ± 2.61 dB

3. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen LCS Compliance Testing Laboratory Ltd..

3.1. EUT Configuration

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

3.2. EUT Exercise

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

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209 and 15.249 under the FCC Rules Part 15 Subpart C.

3.3. General Test Procedures

3.3.1. Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

3.3.2. Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4

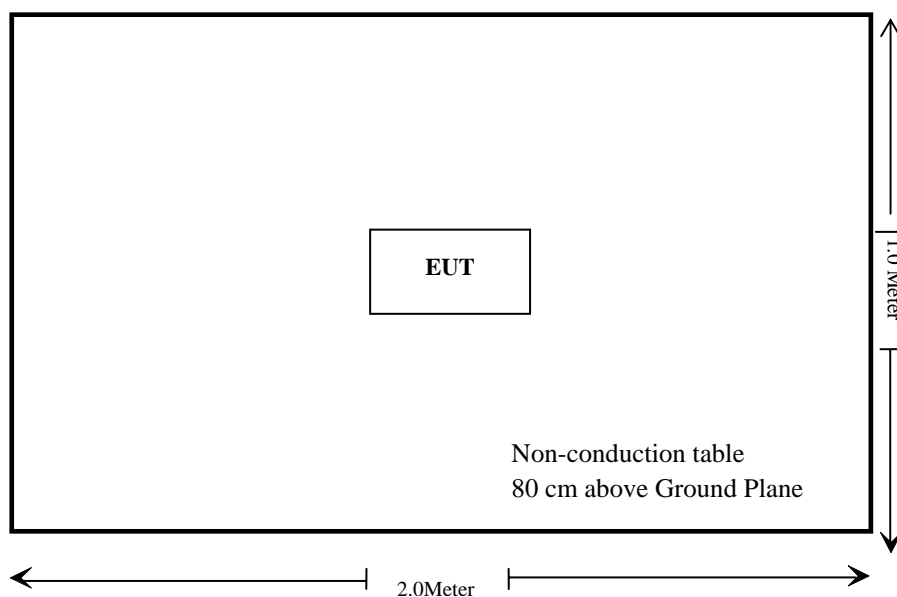
3.4. Description of Test Modes

The EUT has been tested under operating condition.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

Then, the worst case is FSK (915MHz) , these were chosen for full testing.

4. CONNECTION DIAGRAM OF TEST SYSTEM



5. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	N/A
§15.205(a)§15.209(a), §15.249(a), §15.249(c)	Radiated Emissions	Compliant*
§15.249(d)	Out of band emissions	Compliant

* Within the measurement uncertainty

6. §15.203 ANTENNA REQUIREMENT

6.1. Standard Applicable

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the re-sponsible party shall be used with the device. The use of a permanently attached antenna or of an an-tenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This re-quirement does not apply to carrier current devices or to devices operated under the provisions of Sec-tions 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field dis-turbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclu-sively 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 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

6.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 1.5dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

Result: Compliance.

7. §15.205 §15.209(A) §15.249(A) §15.249(C) - RADIATED EMISSIONS

7.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
902~928	50000	3
Above 960	500	3

7.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1000KHz / 1000KHz for peak

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

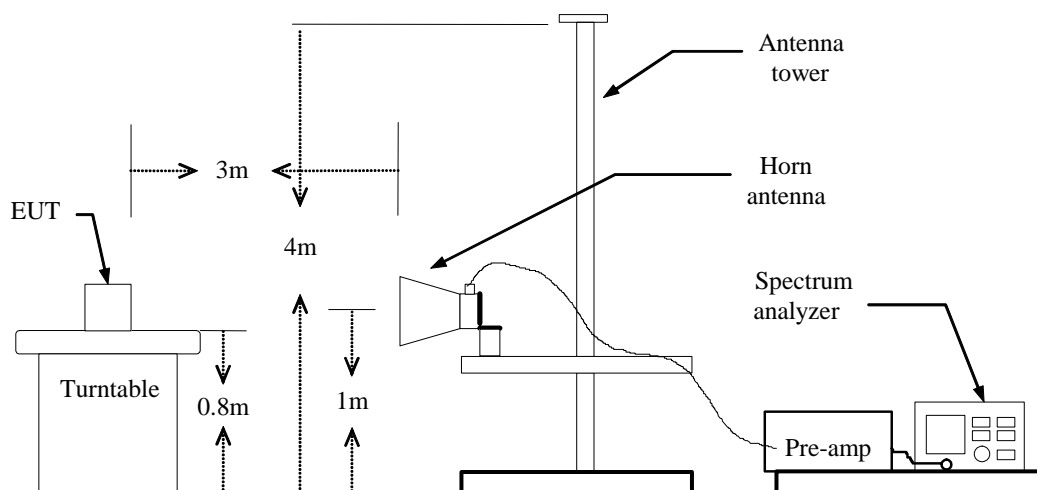
7.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 m to 4 m) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

7.4. Test Equipment List and Details

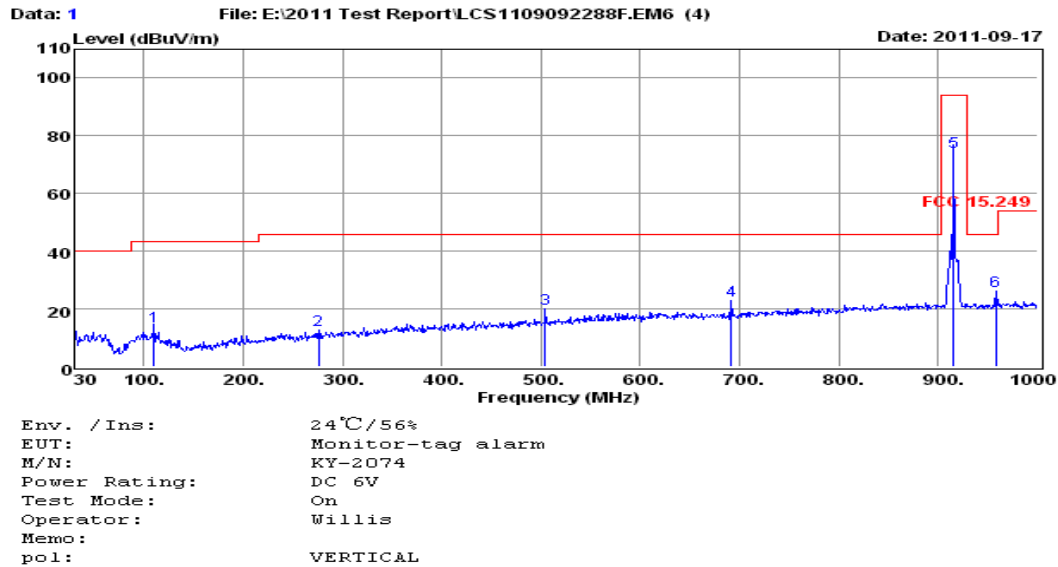
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2011/06
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	1164.6407.03	2011/06
3	Log per Antenna	ROHDE & SCHWARZ	VULB9163	9163-470	2011/06
4	Amplifier	SCHWARZBECK	PAP-0001	21002	2011/06
5	EMI Test Software	AUDIX	E3	N/A	2011/06

7.5. Test Setup



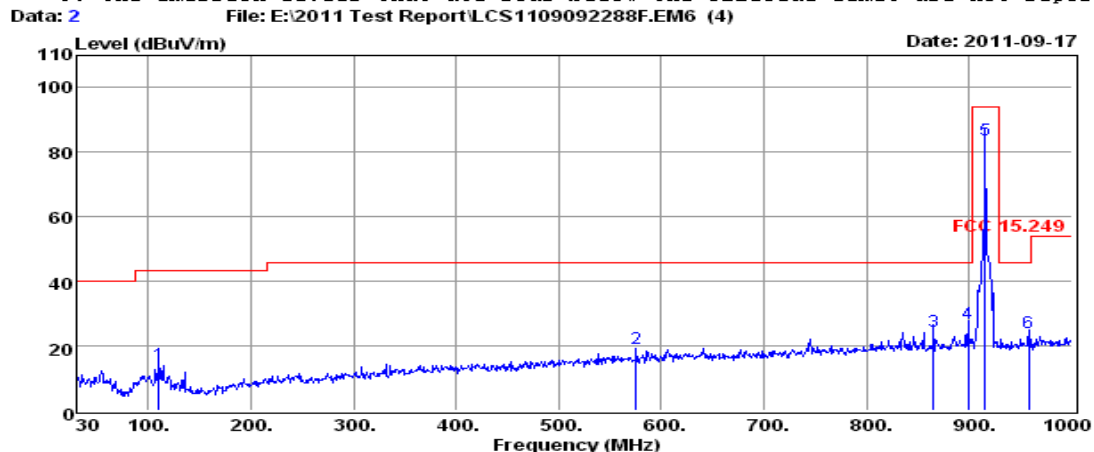
7.6. Test Data

The test result please refer to the next page.



Freq.	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1 110.51	40.35	0.61	12.16	39.20	13.92	43.50	-29.58	QP
2 276.38	38.35	1.00	12.56	39.16	12.75	46.00	-33.25	QP
3 504.33	41.18	1.29	16.66	39.05	20.08	46.00	-25.92	QP
4 691.54	41.63	1.66	18.78	39.05	23.02	46.00	-22.98	QP
5 915.61	90.47	2.04	21.19	39.10	74.60	94.00	-19.40	QP
6 958.29	42.03	1.90	21.47	39.10	26.30	46.00	-19.70	QP

Note: 1. All readings are Quasi-peak values.
2. Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3. The emission levels that are 20dB below the official limit are not reported.



Freq.	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1 110.51	40.55	0.61	12.16	39.20	14.12	43.50	-29.38	QP
2 575.14	38.81	1.49	17.99	39.01	19.28	46.00	-26.72	QP
3 865.17	41.26	1.80	20.73	39.10	24.69	46.00	-21.31	QP
4 899.12	43.06	1.88	21.08	39.10	26.92	46.00	-19.08	QP
5 915.61	99.70	2.04	21.19	39.10	83.83	94.00	-10.17	QP
6 958.29	39.87	1.90	21.47	39.10	24.14	46.00	-21.86	QP

Note: 1. All readings are Quasi-peak values.
2. Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.
3. The emission levels that are 20dB below the official limit are not reported.

8. §15.249(d) – Out of band emissions

8.1. Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

8.2. Test Procedures

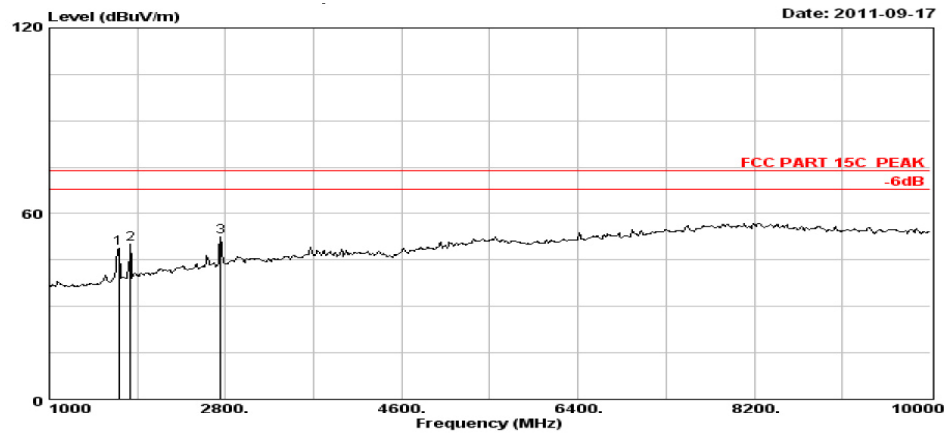
- 8.2.1 Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 8.2.2 Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 8.2.3 Set the RBW to 1 MHz and VBW of spectrum analyzer to 3 MHz for PK Detector, Set the RBW to 1 MHz and VBW of spectrum analyzer to 10 Hz for AV Detector with a convenient frequency span including the specified frequencies of band edges.
- 8.2.4 Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 8.2.5 Repeat above procedures until all measured frequencies were complete.

8.3. Test Equipment List and Details

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2011/06
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	1164.6407.03	2011/06
3	Spectrum	Agilent	E4407B	MY41440292	2011/06
4	Antenna	EMCO	3115	9607-4877	2011/06
5	Log per Antenna	ROHDE & SCHWARZ	VULB9163	9163-470	2011/06
6	Amplifier	SCHWARZBECK	PAP-0001	21002	2011/06
7	EMI Test Software	AUDIX	E3	N/A	2011/06
8	Amplifier	HP	8449B	3008A00277	2011/06
9	Horn Antenna	Sunol Sciences	DRH-118	A052604	2011/06

8.4. Test Data

The test result please refer to the next page.

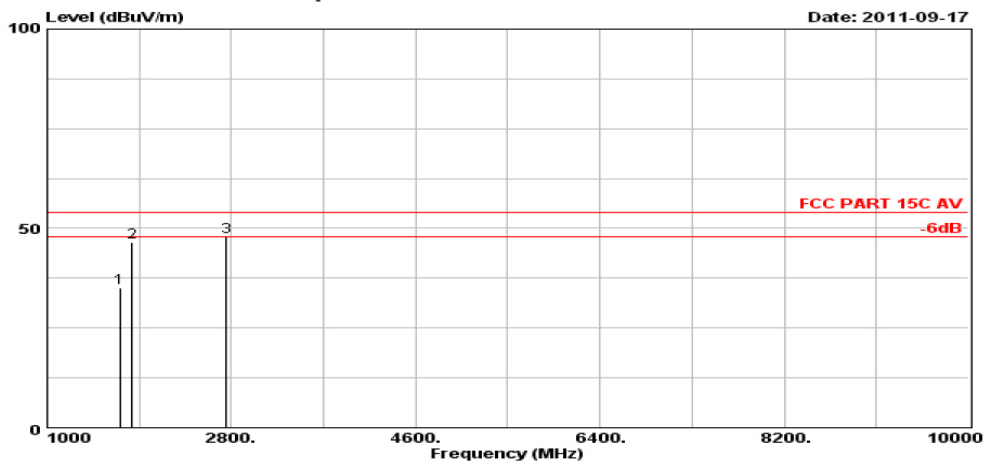


Site : 3m chamber
Condition : FCC 15.249 3m VULB-9163 HORIZONTAL

Env. /Ins. : 24°C/56%
EUT : Monitor-tag alarm
M/N : KY-2074
Power Rating: DC 6V
Test Mode : On
Operator : Willis
Memo :

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1711.00	26.54	5.07	35.57	52.80	48.84	74.00	25.16	Peak
2	1832.00	27.16	5.27	35.46	53.05	50.02	74.00	23.98	Peak
3	2749.00	30.11	6.77	35.08	50.80	52.60	74.00	21.40	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

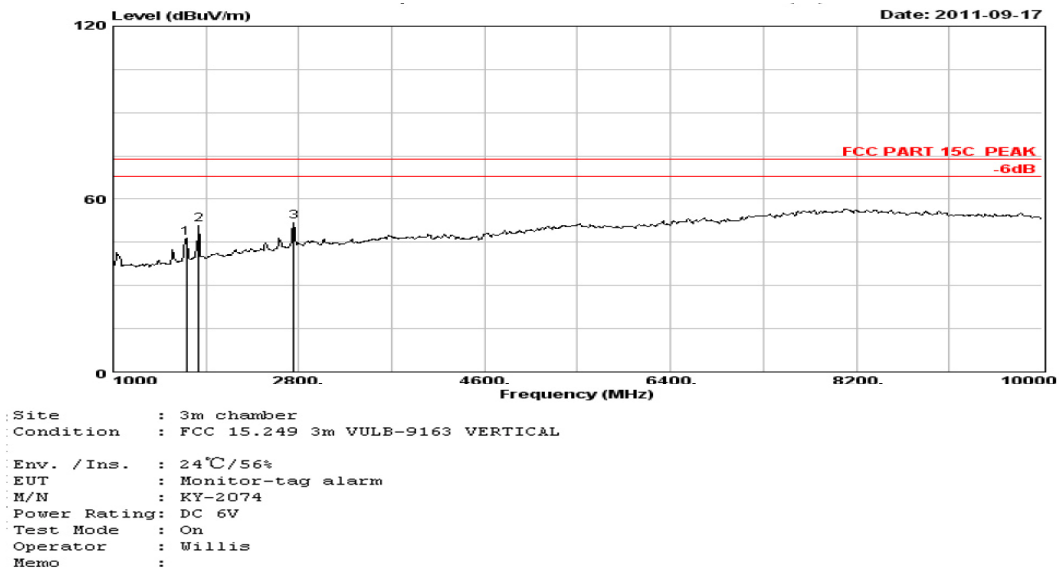


Site : 3m chamber
Condition : FCC 15.249 3m VULB-9163 HORIZONTAL

Env. /Ins. : 24°C/56%
EUT : Monitor-tag alarm
M/N : KY-2074
Power Rating: DC 6V
Test Mode : On
Operator : Willis
Memo :

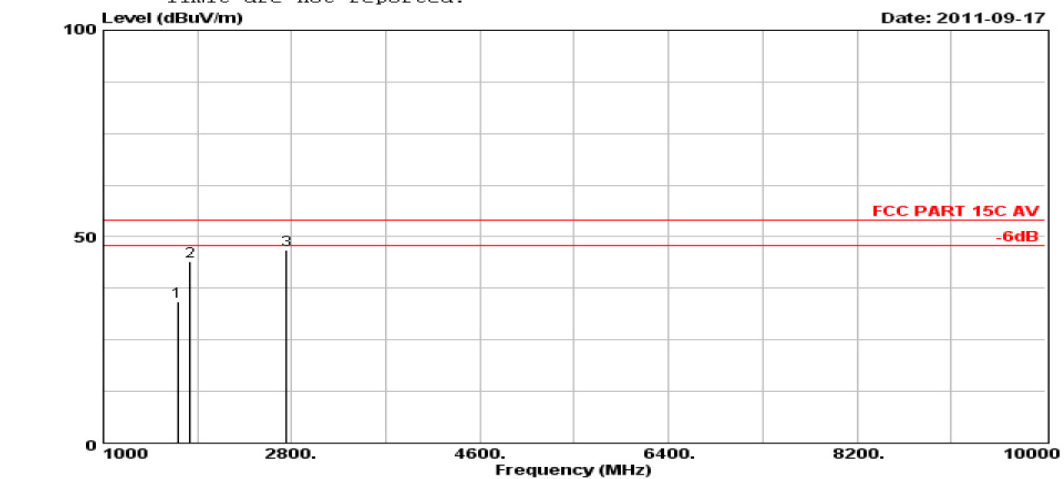
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1711.00	26.54	5.07	35.57	39.18	35.22	54.00	18.78	Average
2	1832.00	27.16	5.27	35.46	49.58	46.55	54.00	7.45	Average
3	2749.00	30.11	6.77	35.08	45.98	47.78	54.00	6.22	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1711.00	26.54	5.07	35.57	50.58	46.62	74.00	27.38	Peak
2	1832.00	27.16	5.27	35.46	54.10	51.07	74.00	22.93	Peak
3	2749.00	30.11	6.77	35.08	50.35	52.15	74.00	21.85	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1711.00	26.54	5.07	35.57	38.11	34.15	54.00	19.85	Average
2	1832.00	27.16	5.27	35.46	47.10	44.07	54.00	9.93	Average
3	2749.00	30.11	6.77	35.08	45.11	46.91	54.00	7.09	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

9. MANUFACTURER/ APPROVAL HOLDER DECLARATION

The following identical model(s):

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Belong to the tested device:

Product description : Monitor-tag alarm

Model name : KY-2074

No additional models were tested.

-----THE END OF REPORT-----