



## Test Report

Product Name	Z-wave Series
Model No.	SE812-2
FCC ID.	FU5TR003-03

Applicant	EVERSPRING INDUSTRY CO., LTD
Address	7th fl. 609 Wan Shou Road Sec. 1, Kweishan, Taoyuan Hsien 333, Taiwan, R.O.C.

Date of Receipt	June 24, 2009
Issued Date	Oct. 07, 2009
Report No.	096370R-RFUSP07V01
Report Version	V1.0

The Test Results relate only to the samples tested.

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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

# Test Report Certification

Issued Date: Oct. 07, 2009

Report No. : 096370R-RFUSP07V01



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Applicant	EVERSPRING INDUSTRY CO., LTD
Address	7th fl. 609 Wan Shou Road Sec. 1, Kweishan, Taoyuan Hsien 333, Taiwan, R.O.C.
Manufacturer	Dong-Guan Li Yuan Electronics Co., Ltd
Model No.	SE812-2
FCC ID.	FU5TR003-03
EUT Rated Voltage	DC 6V (Power by Battery) AC 100-240V, 50-60Hz (by Adapter)
EUT Test Voltage	DC 6V (Power by Battery) AC 120V/ 60Hz
Trade Name	EVERSPRING
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2008 ANSI C63.4: 2003
Test Result	Complied 



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( Engineering Adm. Specialist / Rita Huang )



Tested By : Dino Chen  
( Engineer / Dino Chen )

Approved By : Vincent Lin  
( Manager / Vincent Lin )



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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Z-wave Series
Trade Name	EVERSPRING
FCC ID.	FU5TR003-03
Model No.	SE812-2
Frequency Range	908.42MHz
Type of Modulation	FSK
Number of Channels	1
Antenna Type	Monopole
Power Adapter	Ktec, KSAA0600060W1US Input: 100-240V, 50-60Hz, 0.18A Output: 6.0V, 0.6A Cable out: Non-Shielded, 1.8m

Center Frequency of Each Channel:

Channel	Frequency
Channel 1:	908.42MHz

Note:

1. The EUT is a Z-wave Series with a built-in Z-Wave transceiver module.
2. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

EMI Test Mode	Mode 1: DC Mode
	Mode 2: AC Mode

### 1.2. Operation Description

The EUT is a Z-wave Series with a built-in Z-Wave transceiver module. The EUT operation frequency is 908.42MHz. The signals modulated by FSK are transmitted from the Monopole Antenna of the EUT.

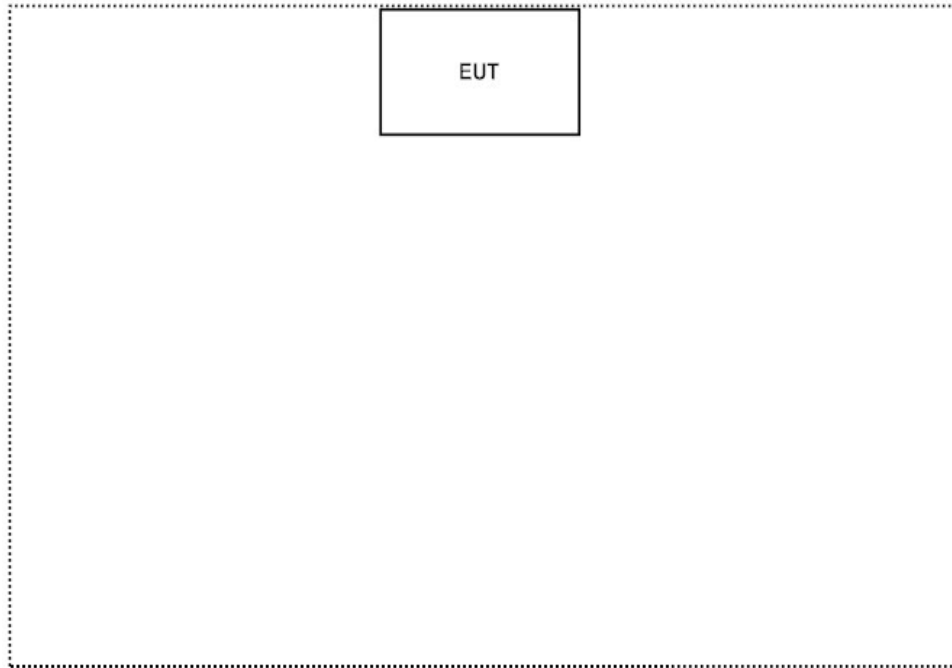
**1.3. Tested System Details**

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
N/A				

Signal Cable Type	Signal cable Description
N/A	

**1.4. Configuration of Test System**



**1.5. EUT Exercise Software**

- (1) Setup the EUT as shown in section 1.4.
- (2) Provide the EUT power source.
- (3) Starts the continuous transmit.
- (4) Verify that the EUT works correctly.

**1.6. Test Facility**

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation’s Web Site : <http://tw.quietek.com/modules/myalbum/>  
 The address and introduction of Quietek Corporation’s laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on  
 Federal Communications Commission  
 FCC Engineering Laboratory  
 7435 Oakland Mills Road  
 Columbia, MD 21046  
 Registration Number: 92195



Accreditation on NVLAP  
 NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,  
 Lin-Kou Shiang, Taipei,  
 Taiwan, R.O.C.  
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 E-Mail : [service@quietek.com](mailto:service@quietek.com)

FCC Accreditation Number: TW1014



Testing Laboratory  
**0914**

## 2. Conducted Emission

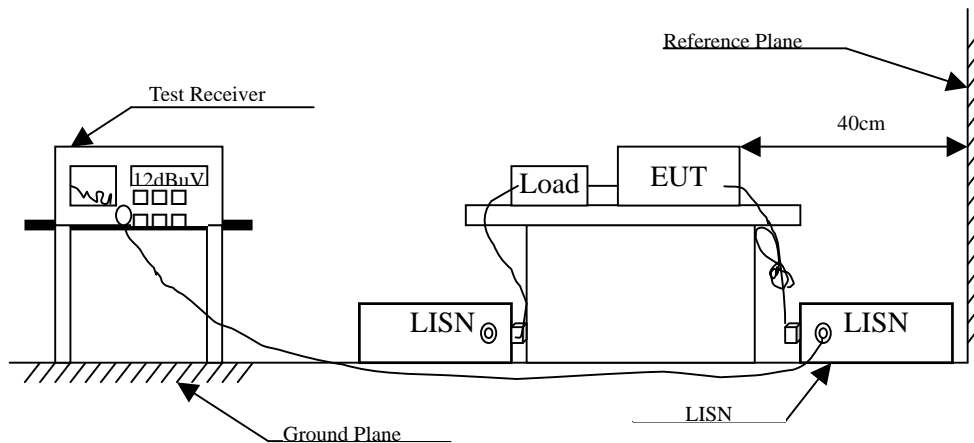
### 2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2009	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2009	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2009	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2009	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

### 2.2. Test Setup



### 2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

## 2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

## 2.5. Uncertainty

$\pm 2.26$  dB



## 2.6. Test Result of Conducted Emission

Product : Z-wave Series  
 Test Item : Conducted Emission Test  
 Power Line : Line 1  
 Test Mode : Mode 2: AC Mode

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>LINE 1</b>					
<b>Quasi-Peak</b>					
0.193	9.711	37.830	47.541	-17.230	64.771
0.334	9.650	42.450	52.100	-8.643	60.743
0.584	9.638	36.450	46.088	-9.912	56.000
1.142	9.670	30.630	40.300	-15.700	56.000
2.666	9.690	23.910	33.600	-22.400	56.000
7.302	9.760	21.800	31.560	-28.440	60.000
<b>Average</b>					
0.193	9.711	28.460	38.171	-16.600	54.771
0.334	9.650	30.620	40.270	-10.473	50.743
0.584	9.638	24.080	33.718	-12.282	46.000
1.142	9.670	16.550	26.220	-19.780	46.000
2.666	9.690	10.620	20.310	-25.690	46.000
7.302	9.760	10.470	20.230	-29.770	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Z-wave Series  
 Test Item : Conducted Emission Test  
 Power Line : Line 2  
 Test Mode : Mode 2: AC Mode

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
<b>LINE 2</b>					
<b>Quasi-Peak</b>					
0.197	9.719	24.170	33.889	-30.768	64.657
0.334	9.660	29.370	39.030	-21.713	60.743
0.439	9.647	27.470	37.117	-20.626	57.743
0.591	9.644	29.490	39.134	-16.866	56.000
1.087	9.670	22.740	32.410	-23.590	56.000
8.138	9.780	17.420	27.200	-32.800	60.000
<b>Average</b>					
0.197	9.719	18.390	28.109	-26.548	54.657
0.334	9.660	12.780	22.440	-28.303	50.743
0.439	9.647	15.150	24.797	-22.946	47.743
0.591	9.644	13.080	22.724	-23.276	46.000
1.087	9.670	9.870	19.540	-26.460	46.000
8.138	9.780	6.510	16.290	-33.710	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### 3. Radiated Emission

#### 3.1. Test Equipment

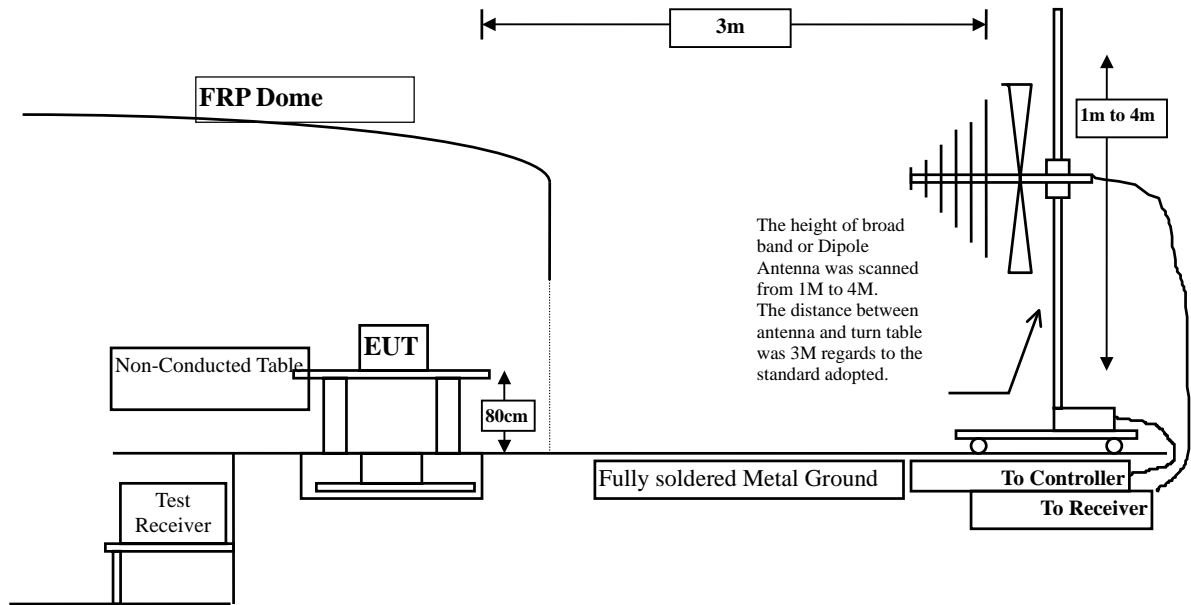
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> Site # 1		Test Receiver	R & S	ESVS 10 / 834468/003	May, 2009
		Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2009
		Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2009
		Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2009
<input type="checkbox"/> Site # 2		Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2009
		Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2009
		Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2009
		Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2009
		Horn Antenna	ETS	3115 / 0005-6160	Sep., 2009
		Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2009
<input checked="" type="checkbox"/> Site # 3	X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2009
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2009
	X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2009
	X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2009
	X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2009
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2009
	X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2009

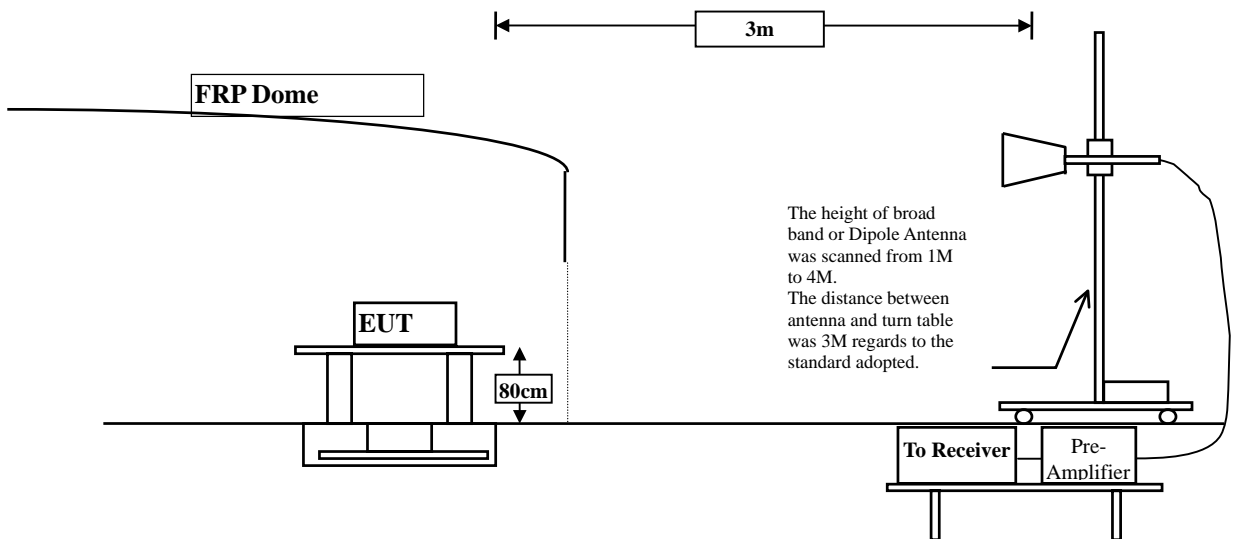
- Note:
1. All equipments are calibrated every one year.
  2. Test equipments marked by "X" are used to measure the final test results.

### 3.2. Test Setup

Below 1GHz



Above 1GHz



### 3.3. Limits

#### ➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBuV/m @3m)	(uV/m @3m)	(dBuV/m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
  2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

#### ➤ General Radiated Emission Limits

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

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
  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 closed point of any part of the device or system.

### 3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The measurement frequency range form 30MHz - 10th Harmonic of fundamental was investigated.

### 3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

### 3.6. Test Result of Radiated Emission

Product : Z-wave Series  
 Test Item : Fundamental Radiated Emission  
 Test Site : No.3OATS  
 Test Mode : Mode 1: DC Mode

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
908.396	26.947	65.100	92.046	-1.954	94.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Z-wave Series  
 Test Item : Fundamental Radiated Emission  
 Test Site : No.3OATS  
 Test Mode : Mode 1: DC Mode

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Vertical</b>					
<b>Peak Detector:</b>					
908.440	28.639	57.000	85.639	-8.361	94.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Z-wave Series  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: DC Mode

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector:</b>					
1816.840	-4.025	46.000	41.975	-32.025	74.000
2725.260	0.525	47.690	48.215	-25.785	74.000
3633.680	0.488	44.680	45.168	-28.832	74.000
4542.100	3.020	43.230	46.249	-27.751	74.000
5450.520	4.414	42.580	46.994	-27.006	74.000
<b>Average Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the too weak instrument of signal is unable to test.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product : Z-wave Series  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: DC Mode

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level	dB	dBuV/m
	dB	dBuV	dBuV/m		
<b>Vertical</b>					
<b>Peak Detector:</b>					
1816.840	-3.025	49.790	46.765	-27.235	74.000
2725.260	-0.018	45.740	45.722	-28.278	74.000
3633.680	0.617	45.130	45.747	-28.253	74.000
4542.100	3.765	43.620	47.385	-26.615	74.000
5450.520	5.776	43.040	48.816	-25.184	74.000
<b>Average</b>					
<b>Detector:</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ \* ”, means this data is the too weak instrument of signal is unable to test.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Z-wave Series  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: DC Mode

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
41.640	-6.267	34.686	28.419	-11.581	40.000
400.540	0.780	25.630	26.410	-19.590	46.000
472.320	2.790	29.303	32.093	-13.907	46.000
544.100	4.151	25.706	29.857	-16.143	46.000
577.080	2.983	26.765	29.748	-16.252	46.000
602.300	3.558	24.917	28.475	-17.525	46.000
<b>Vertical</b>					
55.220	-11.053	45.127	34.074	-5.926	40.000
82.380	-4.415	35.896	31.481	-8.519	40.000
159.980	-5.222	32.300	27.077	-16.423	43.500
305.480	-4.171	33.704	29.533	-16.467	46.000
369.500	-0.612	39.501	38.889	-7.111	46.000
604.240	1.964	24.641	26.606	-19.394	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Z-wave Series  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: AC Mode

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
<b>Horizontal</b>					
39.719	1.091	24.021	25.112	-14.888	40.000
286.593	-7.875	25.655	17.780	-28.220	46.000
447.936	-0.691	25.459	24.768	-21.232	46.000
640.381	4.170	26.755	30.925	-15.075	46.000
877.535	4.360	26.541	30.901	-15.099	46.000
941.683	4.999	27.737	32.736	-13.264	46.000
<b>Vertical</b>					
41.663	-9.016	40.440	31.424	-8.576	40.000
144.689	-7.442	35.418	27.976	-15.524	43.500
183.567	-4.716	30.106	25.390	-18.110	43.500
243.828	-3.119	25.016	21.897	-24.103	46.000
514.028	-1.230	24.491	23.261	-22.739	46.000
877.535	4.842	26.218	31.060	-14.940	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

## 4. Band Edge

### 4.1. Test Equipment

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786/004	May, 2009
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2009
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2009
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2009
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2009
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2009
X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2009

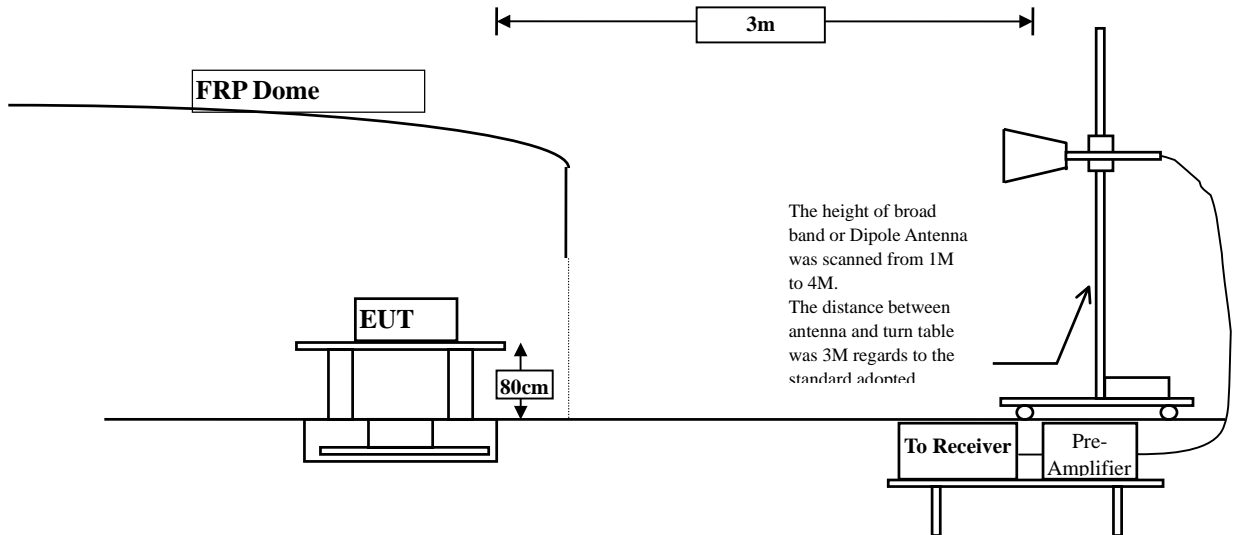
OATS No.3

- Note:
1. All equipments are calibrated every one year.
  2. The test equipments marked by "X" are used to measure the final test results.

## 4.2. Test Setup

### RF Radiated Measurement:

Above 1GHz



## 4.3. Limit

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

#### 4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30 )is 120 kHz, above 1GHz are 1 MHz.

#### 4.5. Uncertainty

Conducted is  $\pm 1.27$  dB

Radiated is  $\pm 3.9$  dB.

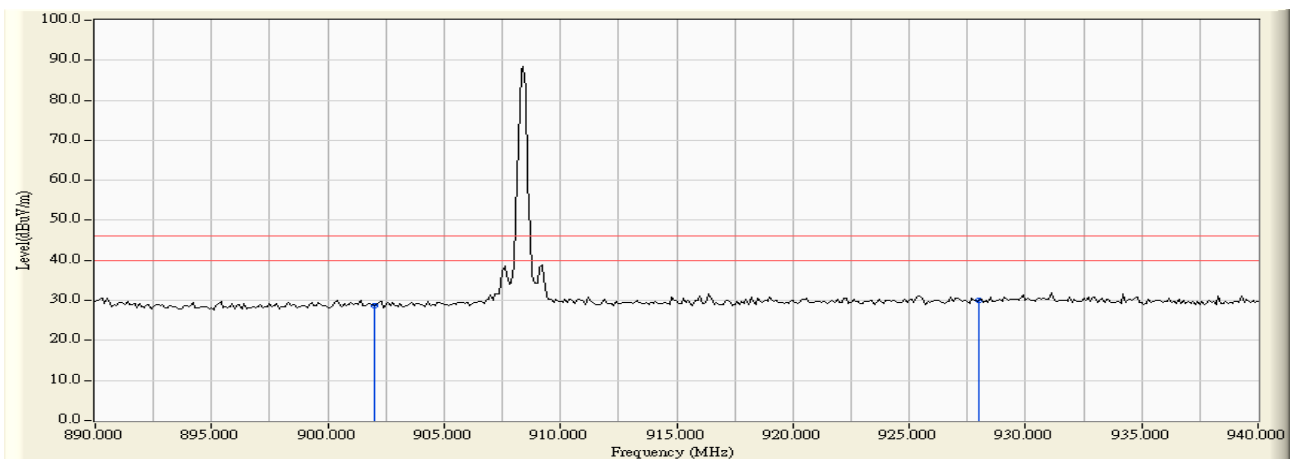
#### 4.6. Test Result of Band Edge

Product : Z-wave Series  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: DC Mode

#### RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	902.000	5.169	23.565	28.734	54.000	Pass
01(Quasi-Peak)	928.000	6.365	23.780	30.145	54.000	Pass

**Figure Channel 01: Horizontal (Quasi-Peak)**



Note:

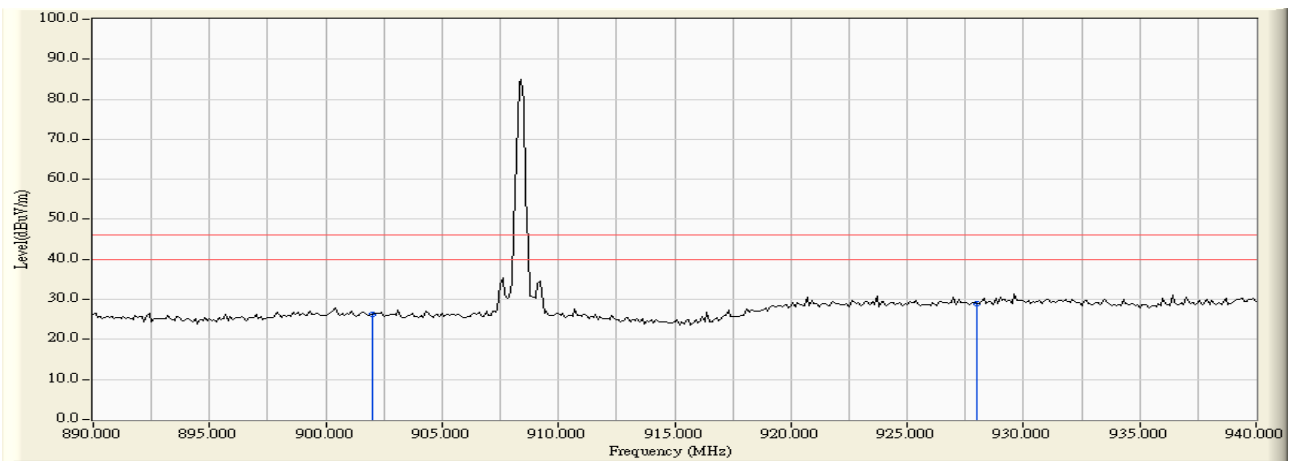
1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : Z-wave Series  
 Test Item : Band Edge Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: DC Mode

**RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Result
01(Quasi-Peak)	902.000	2.696	23.471	26.167	54.000	Pass
01(Quasi-Peak)	928.000	5.677	23.334	29.011	54.000	Pass

**Figure Channel 01: Vertical (Quasi-Peak)**



**Note:**

1. Quasi-Peak measurements: RBW=100kHz,VBW=1MHz,Sweep: Auto.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.



## 5. Duty Cycle

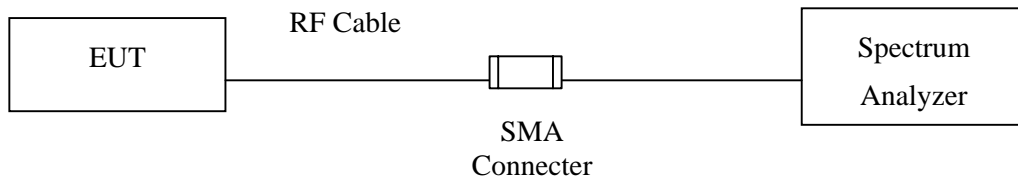
### 5.1. Test Equipment

The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100339	Jun, 2009
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2009
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009

- Note:
1. All equipments are calibrated every one year.
  2. The test equipments marked by "X" are used to measure the final test results.

### 5.2. Test Setup

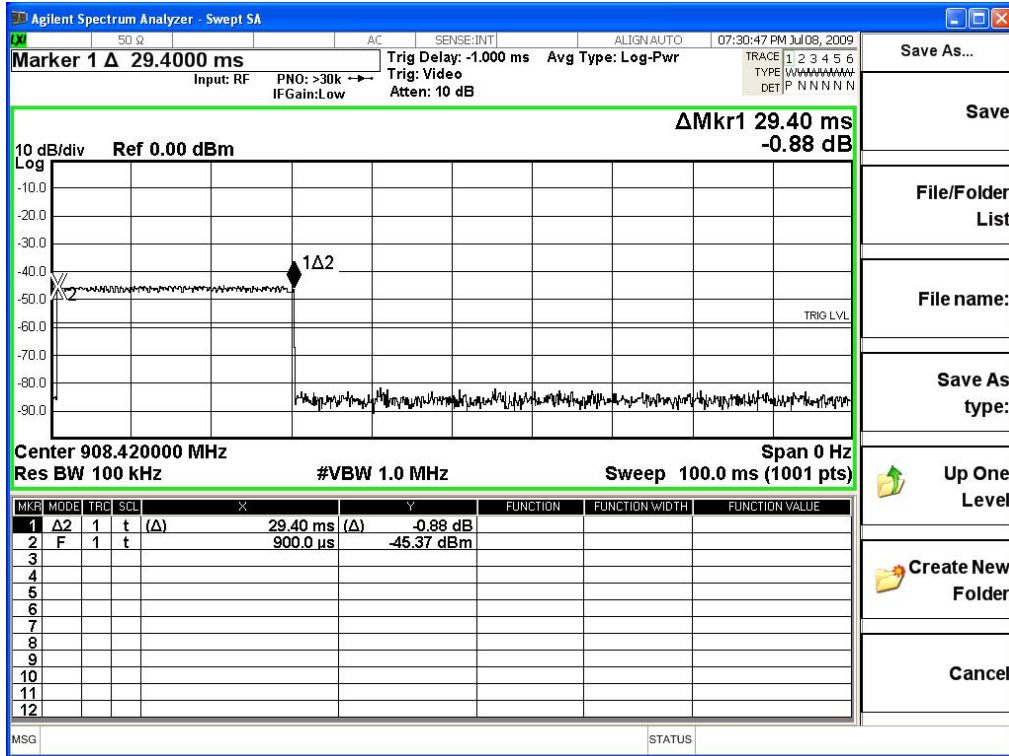


### 5.3. Uncertainty

$\pm 150\text{Hz}$

### 5.4. Test Result of Duty Cycle

Product : Z-wave Series  
 Test Item : Duty Cycle Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: DC Mode



Time On of 100ms = 29.4ms

Duty Cycle= 29.4ms / 100ms= 0.294

Duty Cycle correction factor= 20 LOG 0.294 = -10.633 dB

<b>Duty Cycle correction factor</b>	<b>-10.633</b>	<b>dB</b>
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Remark:

1. If Duty Cycle is smaller than -20dB, based on FCC part15 the duty cycle correction factor is -20dB for calculating average emission.

## **6. EMI Reduction Method During Compliance Testing**

No modification was made during testing.