FCC Radio TEST Report

FCC ID: D87-SG-ZIRC

This report concerns (check one) : ■ **Original Grant** □ **Class II Change**

Issued Date	:	Aug. 01, 2011
Project No.	:	1107C199
Equipment	:	ZIRC Z-Wave/Infra-red Audio Video Remote Control
Model Name	:	SG-ZIRC; SDS0030
Applicant	:	Sigma Designs Inc
Address	:	1778 McCarthy BLVD. Milpitas, California, United States, 95035
Manufacturer		Sigma Designs Technology Singapore Pte Ltd
Address		8 Kallang Sector, Infineon Level 10 East Wing, Singapore 349282

Tested by:
Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Jul. 22, 2011
Date of Test:
Jul. 22, 2011 ~ Jul. 29, 2011

Testing Engineer: _____
(Ivan Cao)

Technical Manager: _____
(Leo Hung)

Authorized Signatory: _____
(Steven Lu)

Neutron Engineering Inc.

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TEL : (0769) 8318-3000 FAX : (0769) 8319-6000

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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1. CERTIFICATION

Equipment:	ZIRC Z-Wave/Infra-red Audio Video Remote Control
Brand Name :	SG-ZIRC; ZiRC AV Remote Control
Model Name. :	SG-ZIRC; SDS0030
Applicant:	Sigma Designs Inc
Factory	Sigma Designs Inc
Address	1778 McCarthy BLVD. Milpitas, California, United States, 95035
Date of Test:	Jul. 22, 2011 ~ Jul. 29, 2011
Test Item:	ENGINEERING SAMPLE
Standards:	FCC Part15, Subpart C(15.249)/ ANSI C63.4 : 2003

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-1107C199) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249)			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	Note(1)
15.209	Radiated Emission	PASS	
15.249	Radiated Spurious Emission	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) The EUT used new battery.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C02/DG-CB03**at the location of No.3,Jinshagang 1st Road, ShiXia, Dalang Town,Dong Guan, China.523792
Neutron's test firm number is 319330

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
DG-C02	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
DG-CB03	CISPR	30MHz ~ 200MHz	V	2.48	
		30MHz ~ 200MHz	H	2.16	
		200MHz ~ 1,000MHz	V	2.50	
		200MHz ~ 1,000MHz	H	2.66	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	ZIRC Z-Wave/Infra-red Audio Video Remote Control
Brand Name	SG-ZIRC; ZiRC AV Remote Control
Model Name.	SG-ZIRC; SDS0030
OEM Brand/Model Name	N/A
Model Difference	Only difference is model name.
Product Description	The EUT is a ZIRC Z-Wave/Infra-red Audio Video Remote Control. Product Type: Low Power Communication Device Operation Frequency: 908.4 MHz/916.0MHz Modulation Type: GFSK/FSK Date rate: 9K6bps;40Kbps-908.4MHz 100Kbps-916MHz Number Of Channel: 2CH .Please see Note 2. Output Power: 83.93 dBuV/m (AV Max.) More details of EUT technical specification, please refer to the User's Manual.
Channel List	Please refer to the Note 2.
Power Source	DC Voltage supplied from 2*AAA size battery.
Power Rating	DC 3.0V
Connecting I/O Port(s)	Please refer to the User's Manual
Products Covered	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2.

Freqeuncy Band	Channel No.	Frequency
902~928MHz	1	908.4MHz(9K6bps;40Kbps)
	2	916.0MHz

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	908.4MHz(9K6bps)
Mode 2	908.4MHz(40Kbps)
Mode 3	916.0MHz

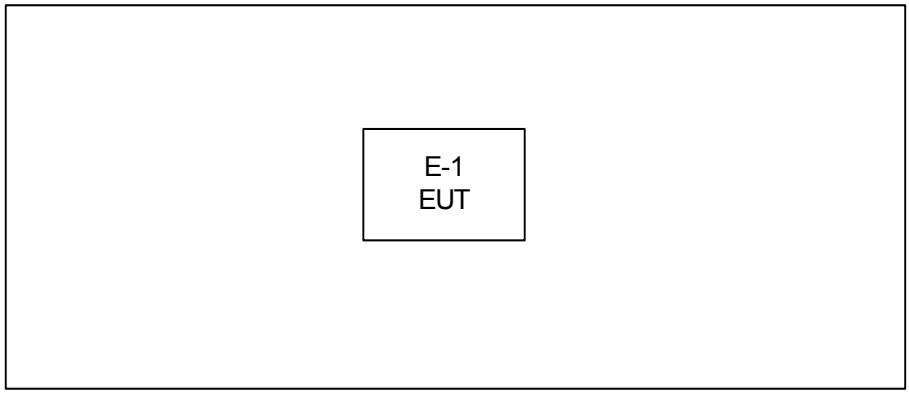
The EUT system operated these modes were found to be the worst case during the pre-scanning test as Following:

For Conducted Test	
Final Test Mode	Description
N/A	” N/A” denotes test is not applicable in this Test Report

For Radiated Test	
Final Test Mode	Description
Mode 1	908.4MHz(9K6bps)-worst case
Mode 3	916.0MHz

The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	ZIRC Z-Wave/Infra-red Audio Video Remote Control	SG-ZIRC	SG-ZIRC	D87-SG-ZIRC	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2SH	00052766	May.26.2012
2	LISN	R&S	ENV216	100526	May.26.2012
3	Test Cable	N/A	C_19	N/A	Mar.18.2012
4	EMI TEST RECEIVER	R&S	ESCI	100895	May.26.2012
5	50Ω Terminator	SHX	TF2-3G-A	08122901	May.26.2012

Remark: ” N/A” denotes No Model Name. , Serial No. or No Calibration specified.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

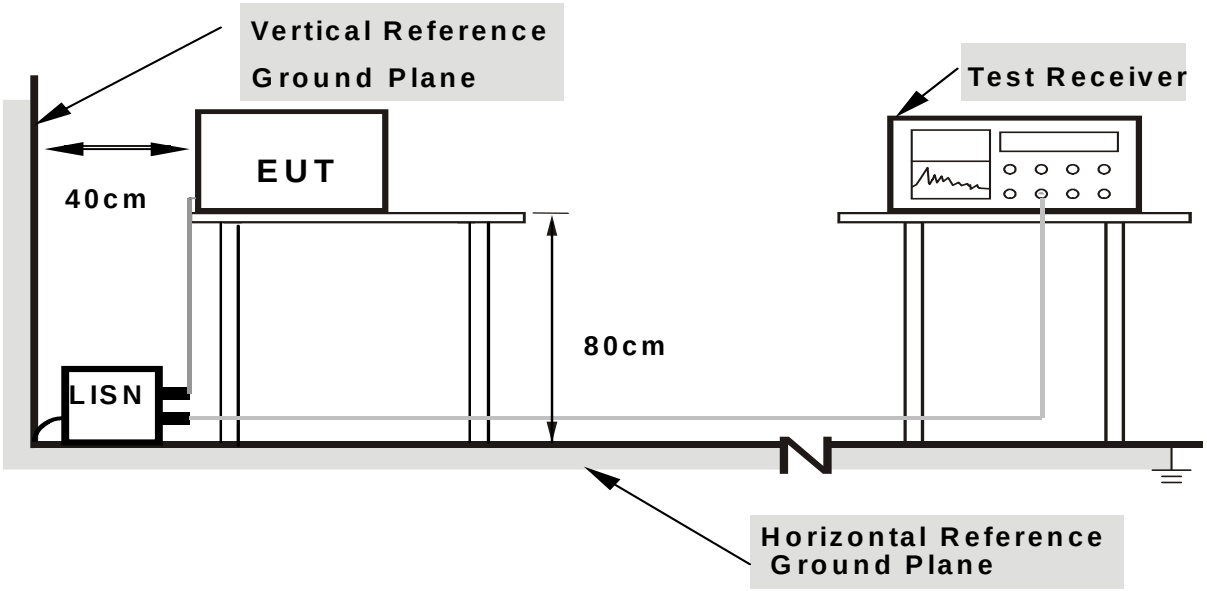
4.1.3 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.1.6 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.7 TEST RESULTS

EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	--		--
Pressure：	--		--
Test Mode ：	” N/A” denotes test is not applicable in this Test Report		

Remark

(1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn‘t perform。In this case, a “ * ” marked in AVG Mode column of Interference Voltage Measured。

(2) Measuring frequency range from 150KHz to 30MHz。

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS (FCC 15.209)

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
Above 960	500	3

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other 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 comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Note:

(1) The tighter limit applies at the band edges.

(2) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.209)

FREQUENCY (MHz)	(dBuV/m) (at 3m)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)

FCC Part15 (15.249) , Subpart C	
Limit	Frequency Range (MHz)
Field strength of fundamental 50000 μV/m (94 dBμV/m) @ 3 m	902-928
Field strength of harmonics 500 μV/m (54 dBμV/m) @ 3 m	Above 1000

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Horn Antenna	ETS	3115	00075789	May.26.2012
2	Amplifier	Agilent	8449B	3008A02274	Nov.26.2011
3	Spectrum	Agilent	E4408B	US39240143	Nov.15.2011
4	Test Cable	HUBER+SUHNER	CB03 High Fre	N/A	Apr.06.2012
5	Bi-log Antenna	Schwarbeck	VULB9160	9160-3232	Jun .07.2012
6	Amplifier	HP	8447D	2944A09673	May.26.2012
7	Test Receiver	R&S	ESCI	100895	May.26.2012
8	Test Cable	N/A	C-01_CB03	N/A	Jul.04.2012
9	Controller	CT	SC100	N/A	N/A
10	Triple Loop Antenna	R&S	HFH2-Z2	830749/020	May.26.2012
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Aug.16.2011
12	Band Reject Filter	Wainwright	WRCG 880/915-860/935-60/9SS	14	May. 26, 2012

Remark: ” N/A” denotes No Model Name. / Serial No. and No Calibration specified.

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

Receiver 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

4.2.3 TEST PROCEDURE

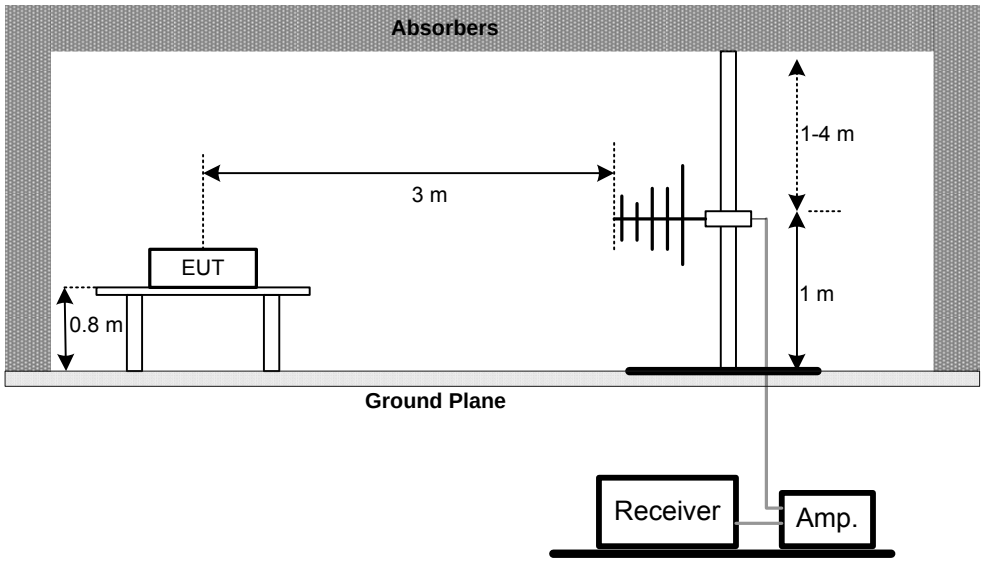
a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.4 DEVIATION FROM TEST STANDARD

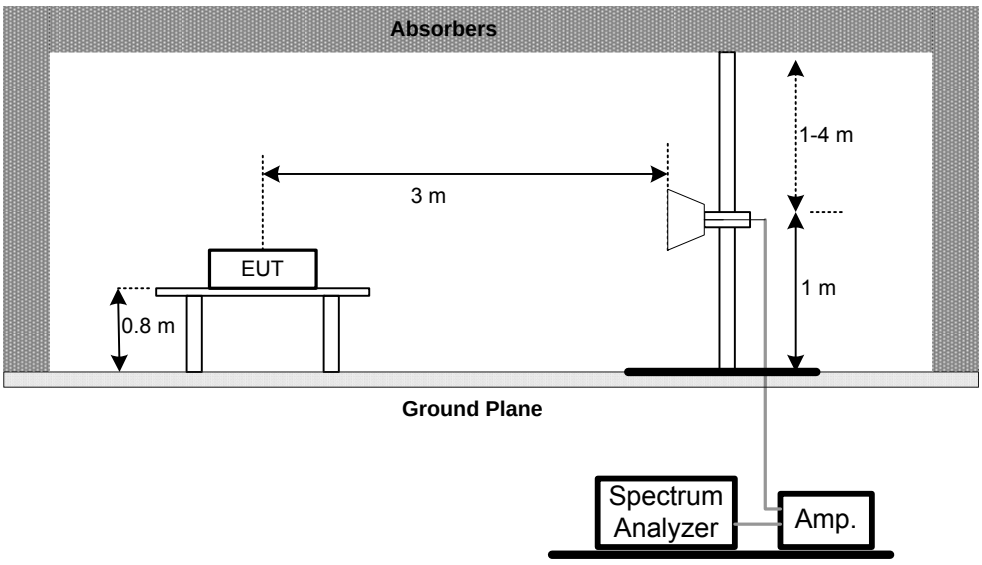
No deviation

4.2.5 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



4.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.7 TEST RESULTS (BETWEEN 30 – 1000 MHz)

EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX 908.4MHz		
Note：	Radiated emissions measured with Band Reject Filter		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
587.75	V	39.68	-4.57	35.11	46.00	- 10.89	
653.23	V	40.27	-3.33	36.94	46.00	- 9.06	
677.48	V	40.06	-3.25	36.81	46.00	- 9.19	
725.98	V	39.25	-2.85	36.40	46.00	- 9.60	
842.38	V	40.39	-1.03	39.36	46.00	- 6.64	
878.75	V	40.21	-0.41	39.80	46.00	- 6.20	

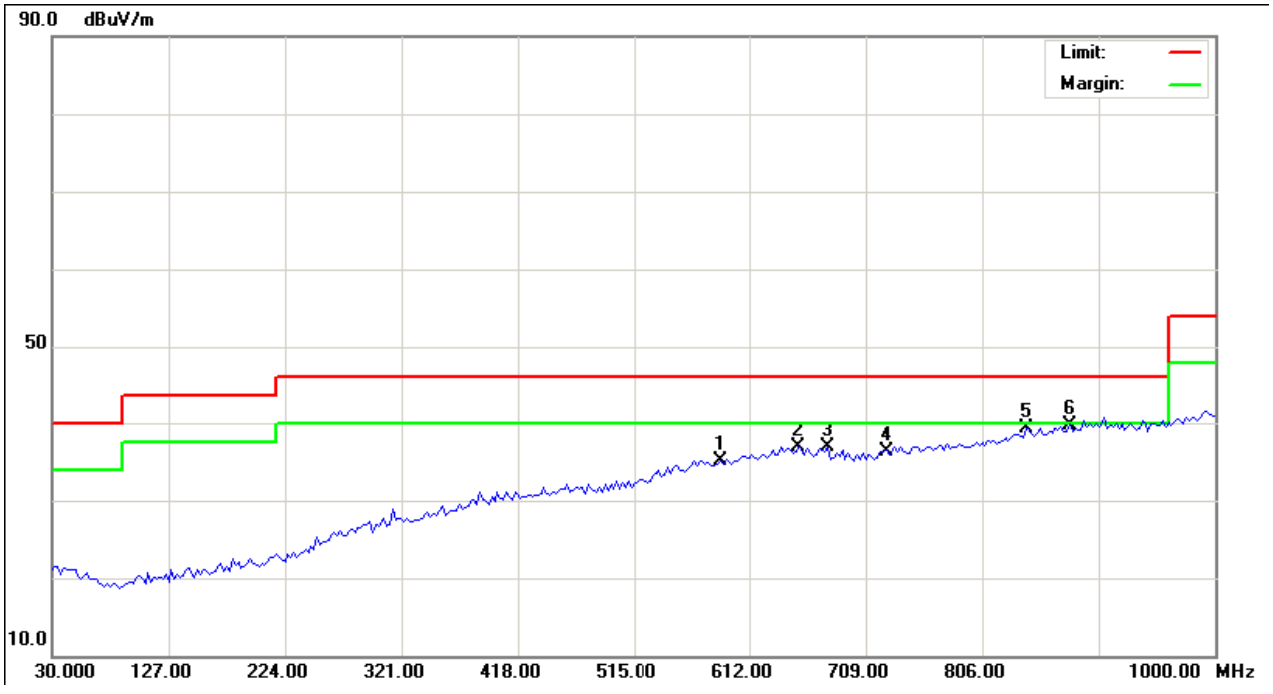
Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.

(3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission 。

(4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX 908.4MHz		
Note：	Radiated emissions measured with Band Reject Filter		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
541.68	H	40.64	-5.80	34.84	46.00	- 11.16	
602.30	H	40.73	-4.23	36.50	46.00	- 9.50	
677.48	H	39.83	-3.25	36.58	46.00	- 9.42	
762.35	H	40.05	-2.39	37.66	46.00	- 8.34	
820.55	H	40.32	-1.47	38.85	46.00	- 7.15	
864.20	H	40.48	-0.65	39.83	46.00	- 6.17	

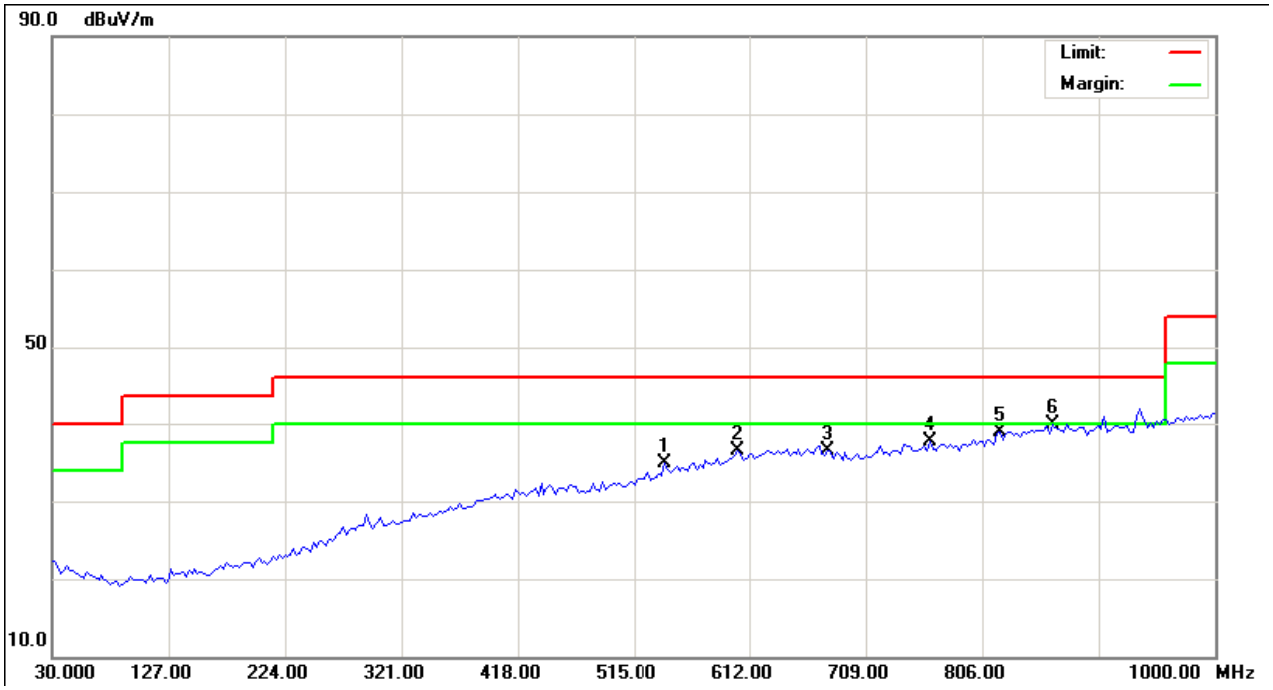
Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.

(3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission 。

(4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



4.2.8 TEST RESULTS (ABOVE 1000 MHz)

EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX 908.4MHz(9K6bps)		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
902.00	V	20.76	*	-3.65	17.11	*	46.00	*	X/E
908.40	**V**	**68.22**	**66.89**	**-3.31**	**64.91**	**63.58**	**114.00**	**94.00**	**X/F**
1814.00	V	48.20	45.14	-1.94	46.26	43.20	74.00	54.00	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。

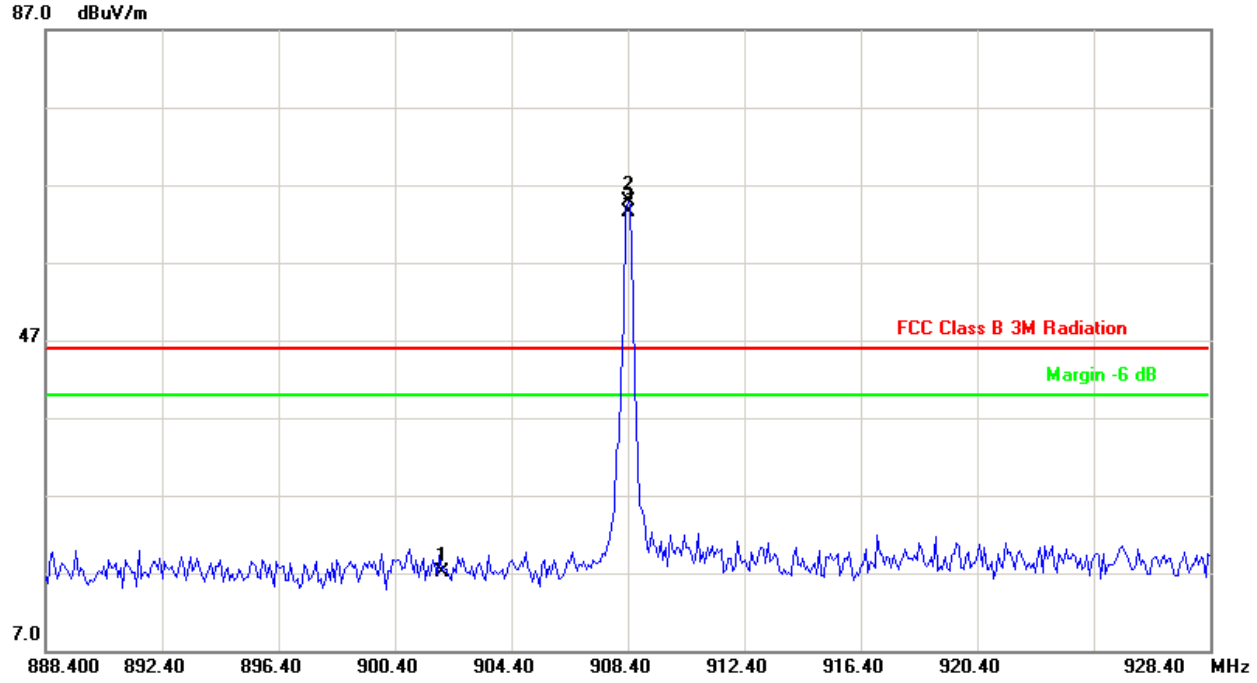
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

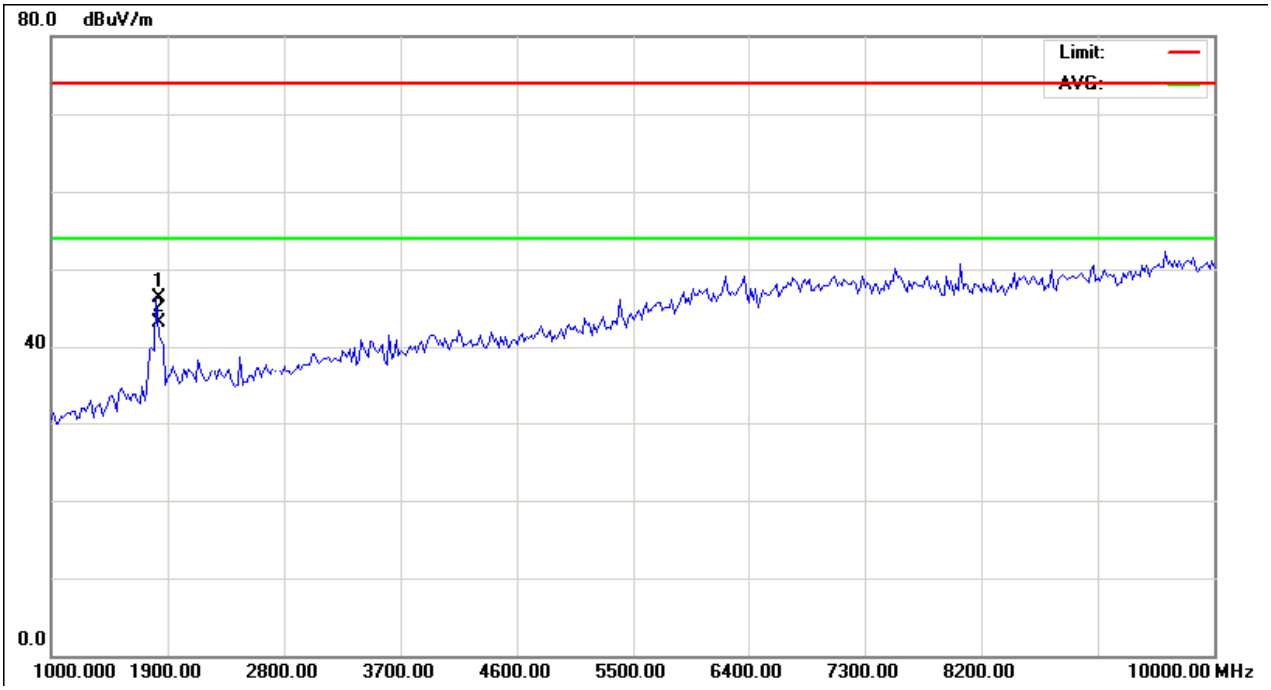
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Orthogonal Axis：X
TX 908.4MHz(9K6bps) (Above 1000 MHz, Vertical)





EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX 908.4MHz(9K6bps)		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
902.00	H	24.53	*	-3.65	20.88	*	46.00	*	X/E
908.40	**H**	**86.97**	**84.58**	**-3.31**	**83.66**	**81.27**	**114.00**	**94.00**	**X/F**
1814.00	H	45.87	42.03	-1.94	43.93	40.09	74.00	54.00	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。

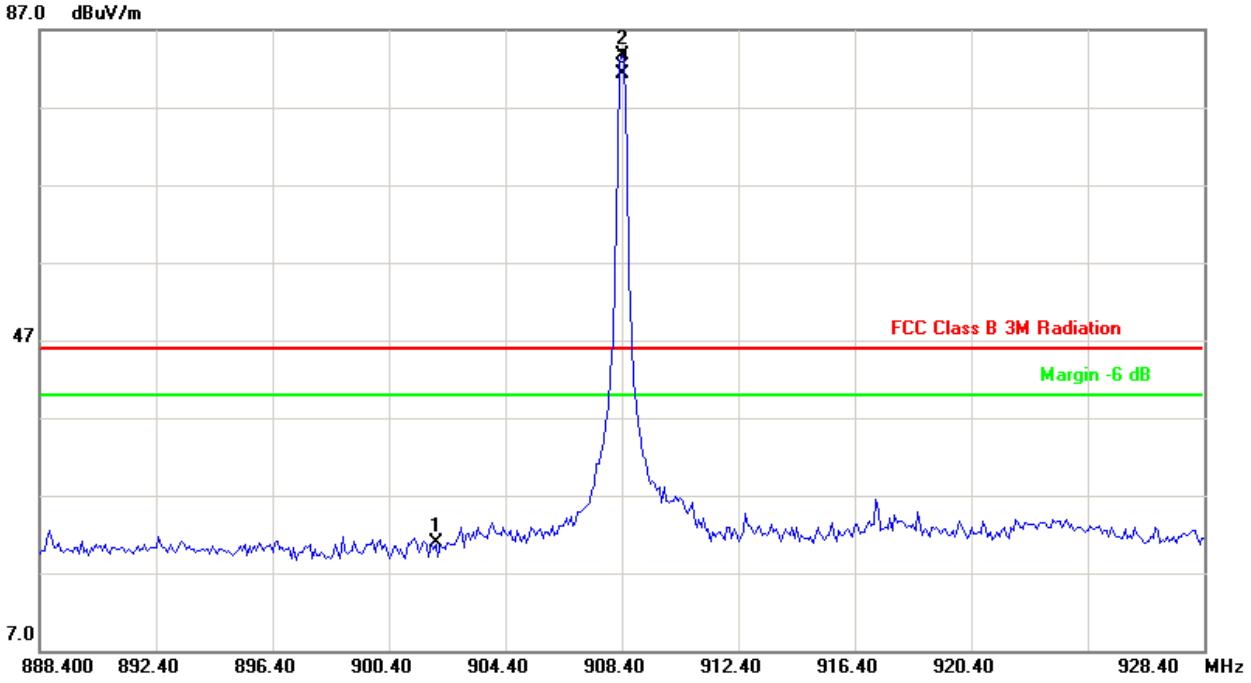
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

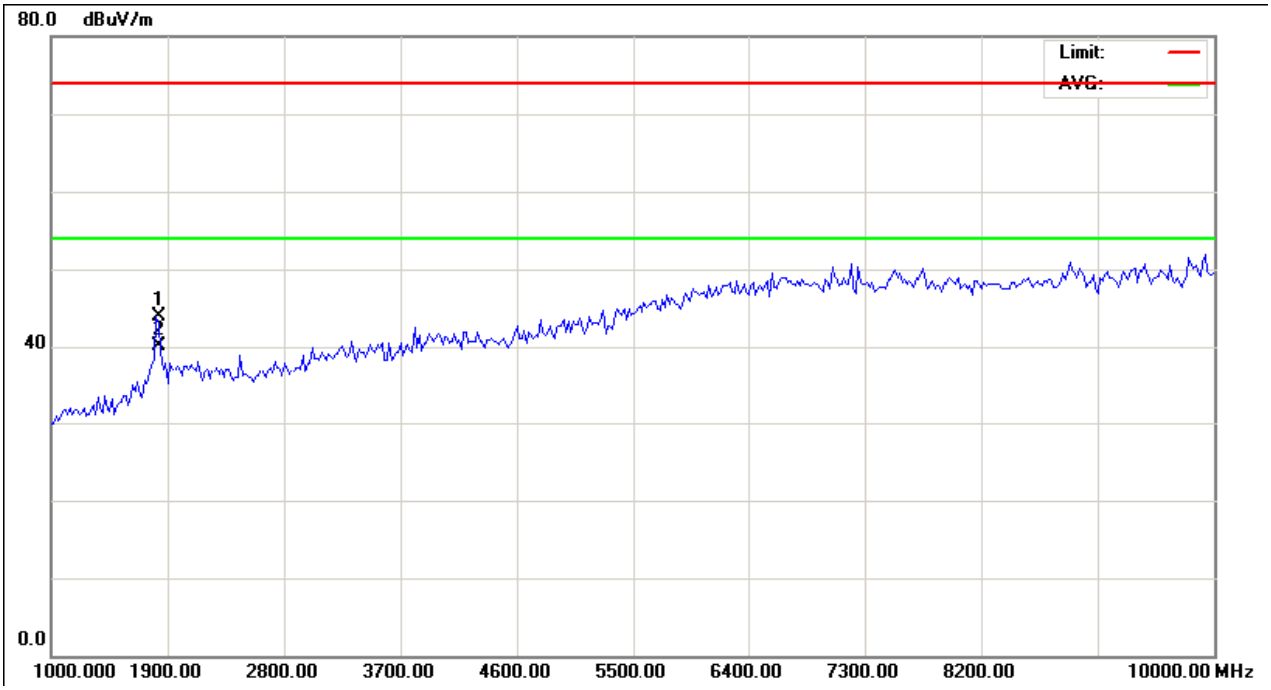
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Orthogonal Axis：X
TX 908.4MHz(9K6bps) (Above 1000 MHz, Horizontal)





EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX 916.0MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
916.00	**V**	**66.56**	**64.93**	**-2.90**	**63.66**	**62.03**	**114.00**	**94.00**	**X/E**
924.00	V	28.12	*	-2.46	25.66	*	46.00	*	X/F
1834.00	V	47.78	43.61	-1.72	46.06	41.89	74.00	54.00	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。

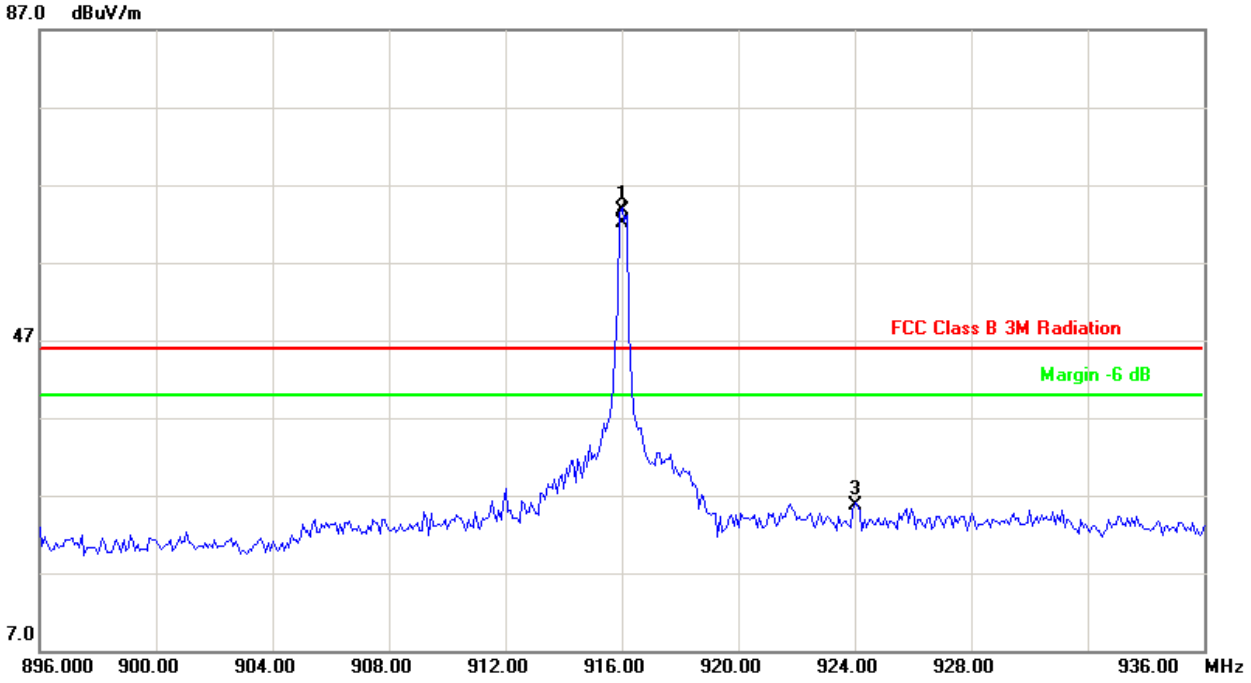
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

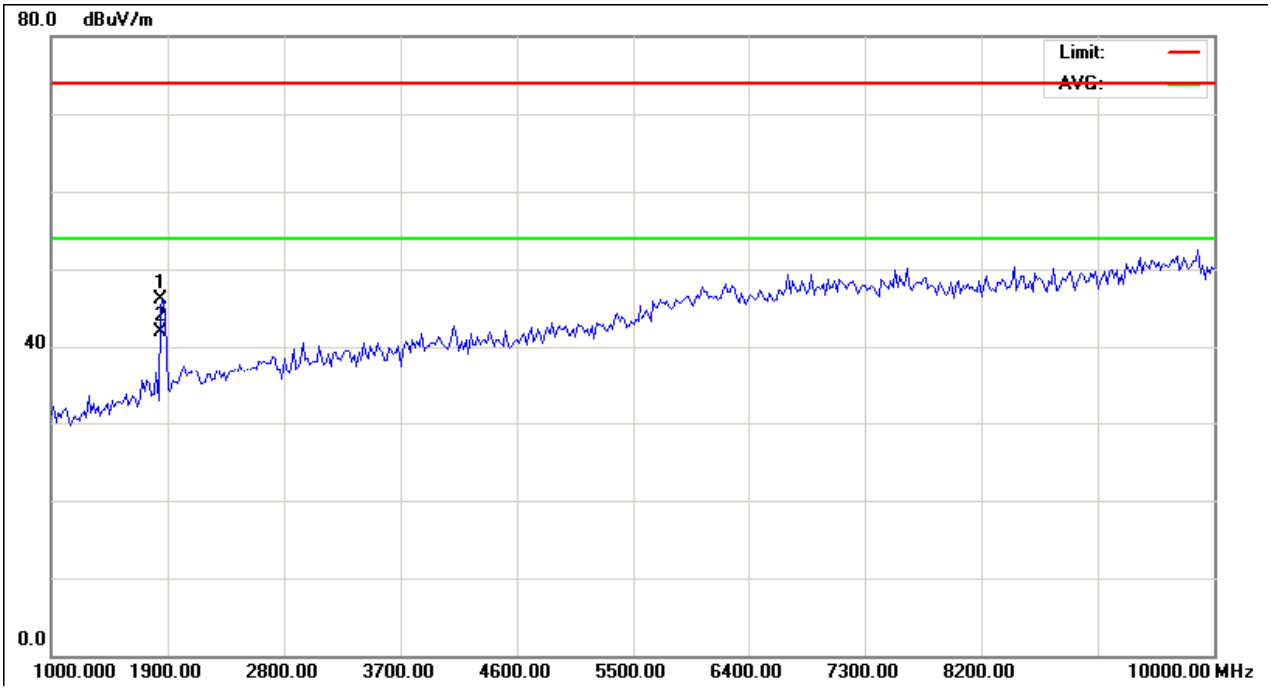
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Orthogonal Axis：X
TX 916.0MHz (Above 1000 MHz, Vertical)





EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	23℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX 916.0MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
916.00	**H**	**86.93**	**86.83**	**-2.90**	**84.03**	**83.93**	**114.00**	**94.00**	X/E
924.00	**H**	**28.53**	*****	**-2.46**	**26.07**	*****	**46.00**	*****	**X/F**
1836.00	H	44.44	41.42	-1.70	42.74	39.72	74.00	54.00	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。

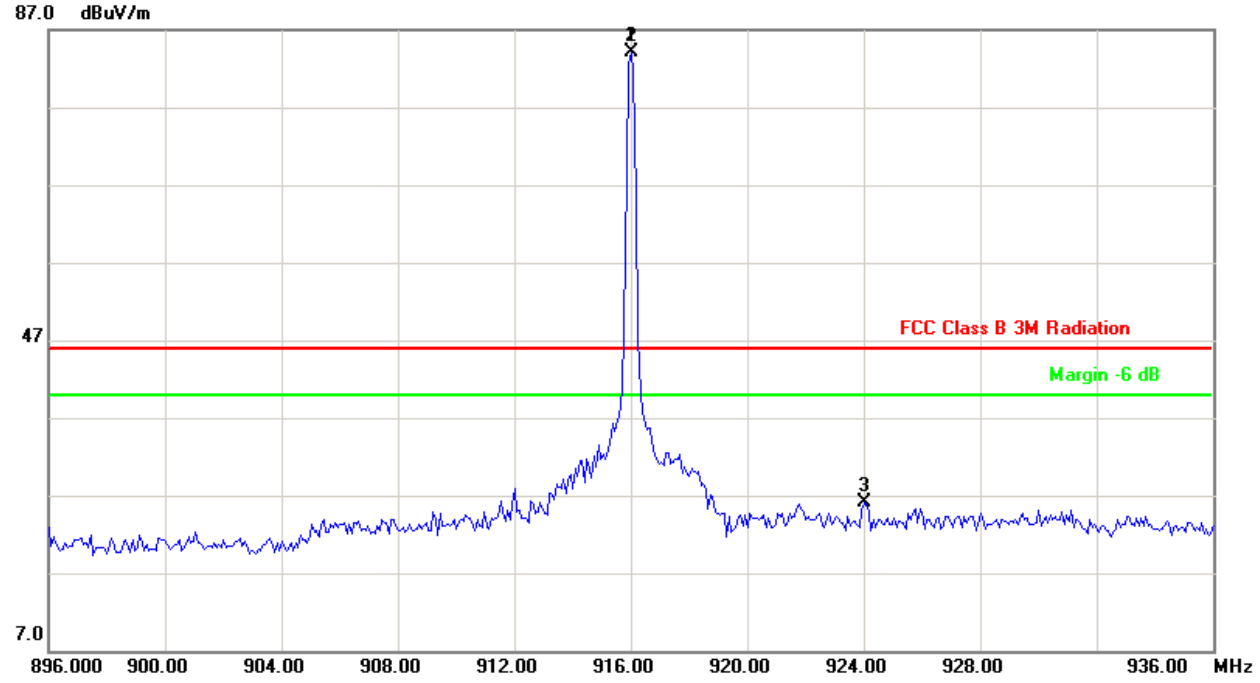
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

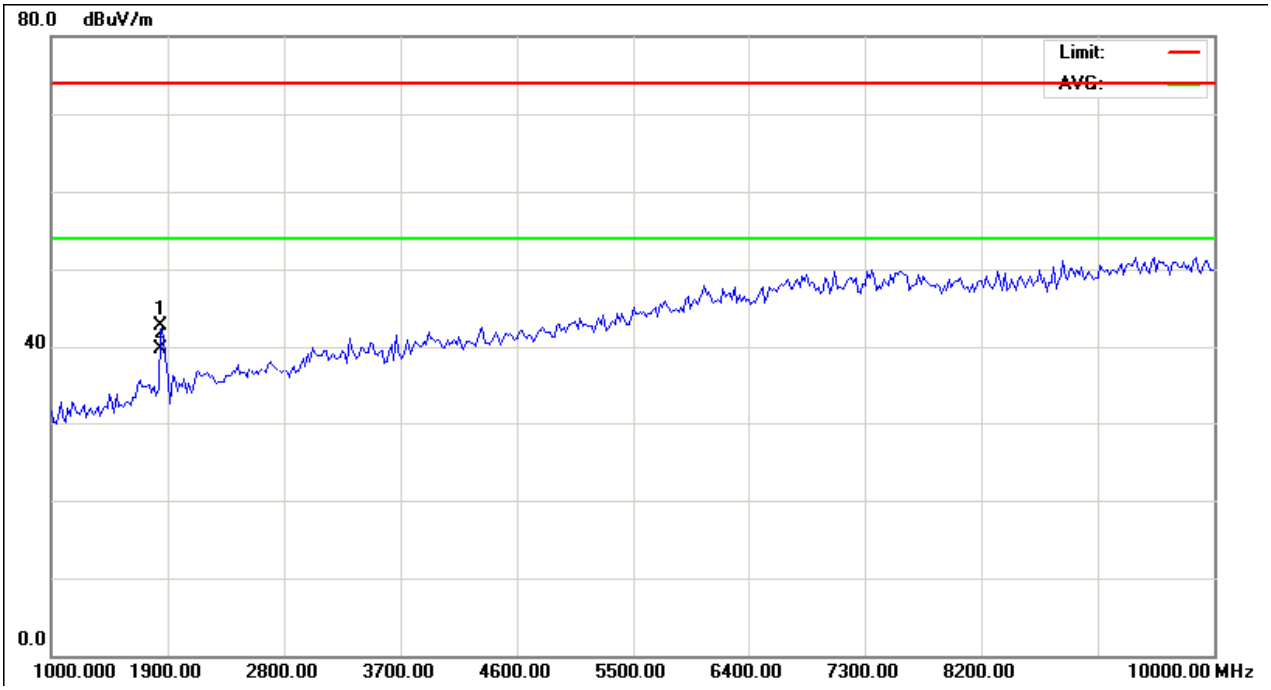
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

Orthogonal Axis：X
TX 916.0MHz (Above 1000 MHz, Horizontal)





4.2.9 TEST RESULTS (2400 – 2483.5 MHz)

EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	23℃	Relative Humidity：	51%
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX CH 908.4MHz(9K6bps) / 916.0MHz		

		Peak	AV		Peak	AV	Peak	AV	
Freq.	Ant. Pol.	Reading		Ant./CL/	Actual FS		Limit3m		
(MHz)	(H/V)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	NOTE
908.40	V	68.22	66.89	-3.31	64.91	63.58	114.00	94.00	CH01
908.40	H	86.97	84.58	-3.31	83.66	81.27	114.00	94.00	CH01
916.00	V	66.56	64.93	-2.90	63.66	62.03	114.00	94.00	CH02
916.00	H	86.93	86.83	-2.90	84.03	83.93	114.00	94.00	CH02

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(2) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。

(3) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(4) EUT Orthogonal Axis：

"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

5. BANDWIDTH TEST

5.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.26.2011

Remark: ” N/A” denotes No Model Name. , Serial No. or No Calibration specified.

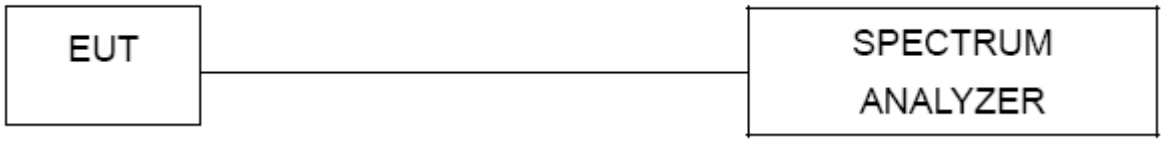
5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 20 ms.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

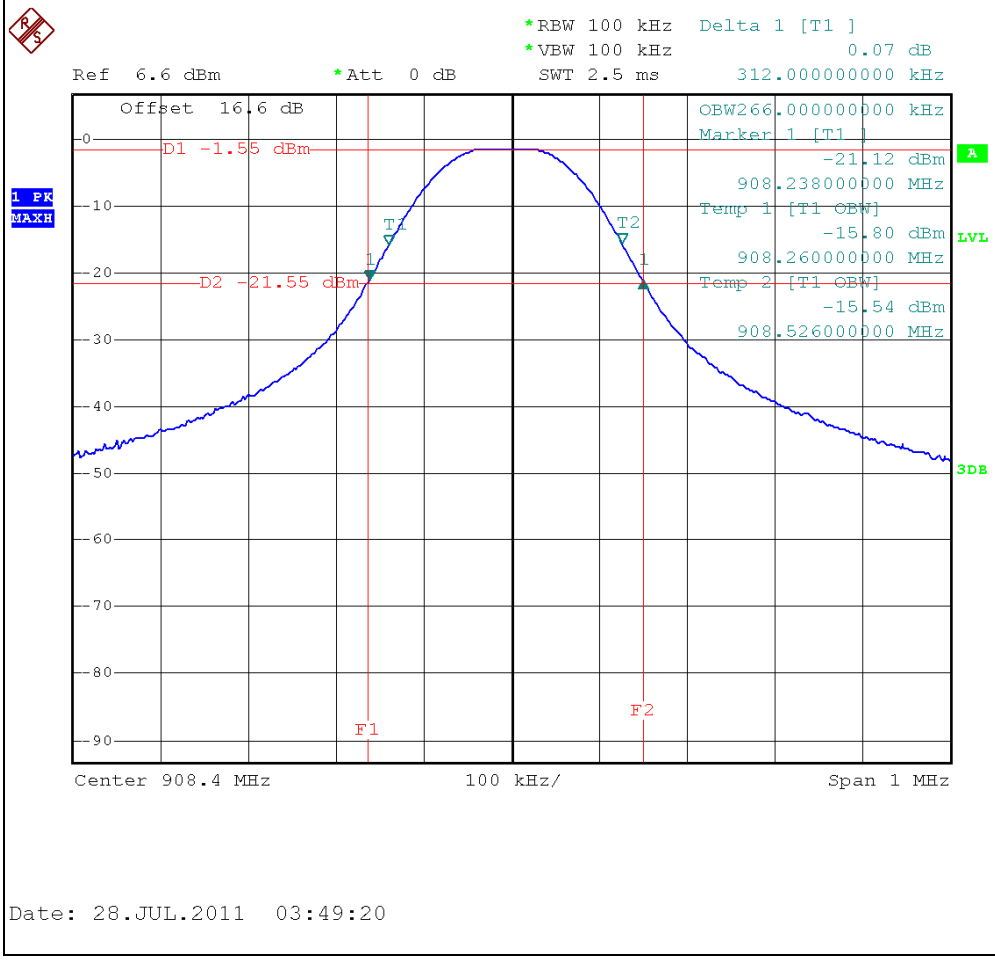
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

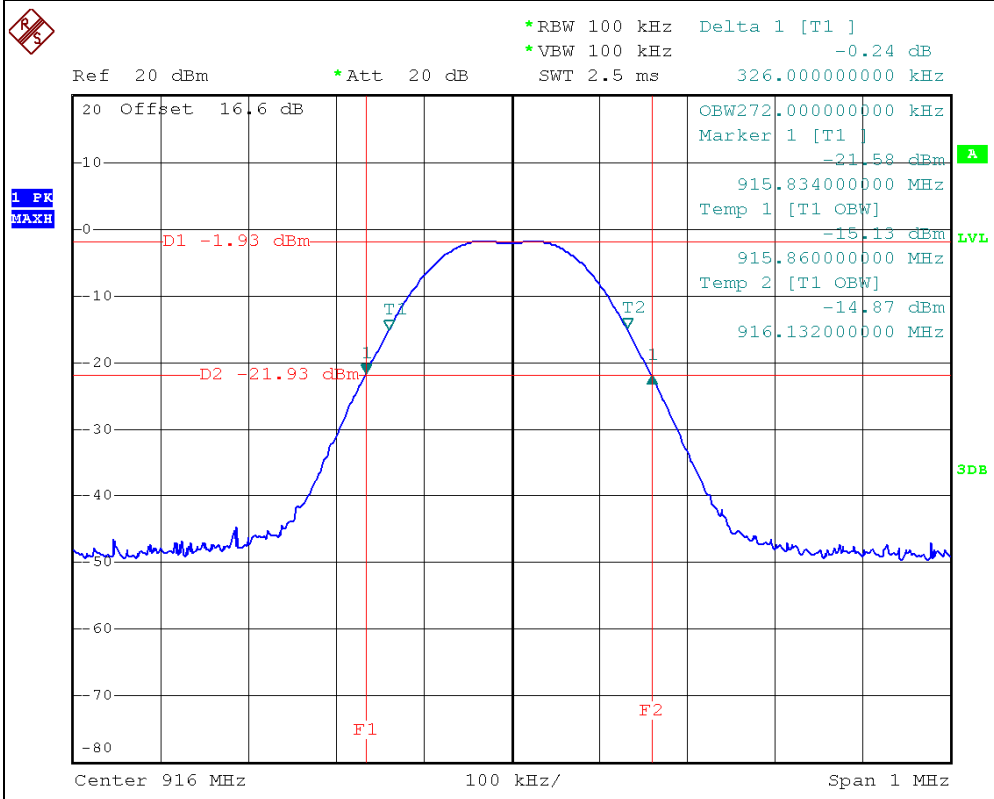
EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	20℃	Relative Humidity：	55 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX CH 01		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)	99% occupied Bandwidth(MHz)
CH01	908.40	0.31	0.27
CH02	916.00	0.33	0.27

TX CH01



TX CH02


*RBW 100 kHz
*VBW 100 kHz
SWT 2.5 ms
Delta 1 [T1]
-0.24 dB
326.000000000 kHz
Ref 20 dBm
*Att 20 dB
20 Offset 16.6 dB
OBW272.000000000 kHz
Marker 1 [T1]
-21.58 dBm
915.834000000 MHz
Temp 1 [T1 OBW]
-15.13 dBm
915.860000000 MHz
Temp 2 [T1 OBW]
-14.87 dBm
916.132000000 MHz
1 PK
MAXH
A
LVL
3DB
D1 -1.93 dBm
D2 -21.93 dBm
T1
T2
F1
F2
Center 916 MHz
100 kHz/
Span 1 MHz
Date: 28.JUL.2011 03:40:16

6. ANTENNA CONDUCTED SPURIOUS EMISSION

6.1 APPLIED PROCEDURES / LIMIT

50dBc 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
Above 960	500	3

6.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.26.2011

Remark: ” N/A” denotes No Model Name. , Serial No. or No Calibration specified.

6.1.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.

6.1.3 DEVIATION FROM STANDARD

No deviation.

6.1.4 TEST SETUP

6.1.5 EUT OPERATION CONDITIONS

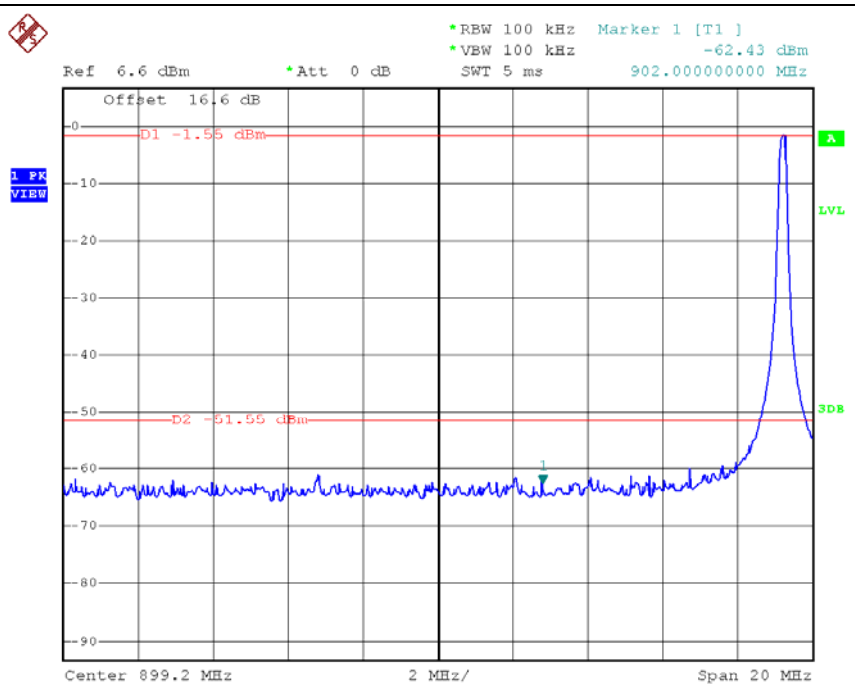
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.6 TEST RESULTS

EUT：	ZIRC Z-Wave/Infra-red Audio Video Remote Control	Model Name. ：	SG-ZIRC
Temperature：	25℃	Relative Humidity：	51 %
Pressure：	1009 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX CH01/CH02		

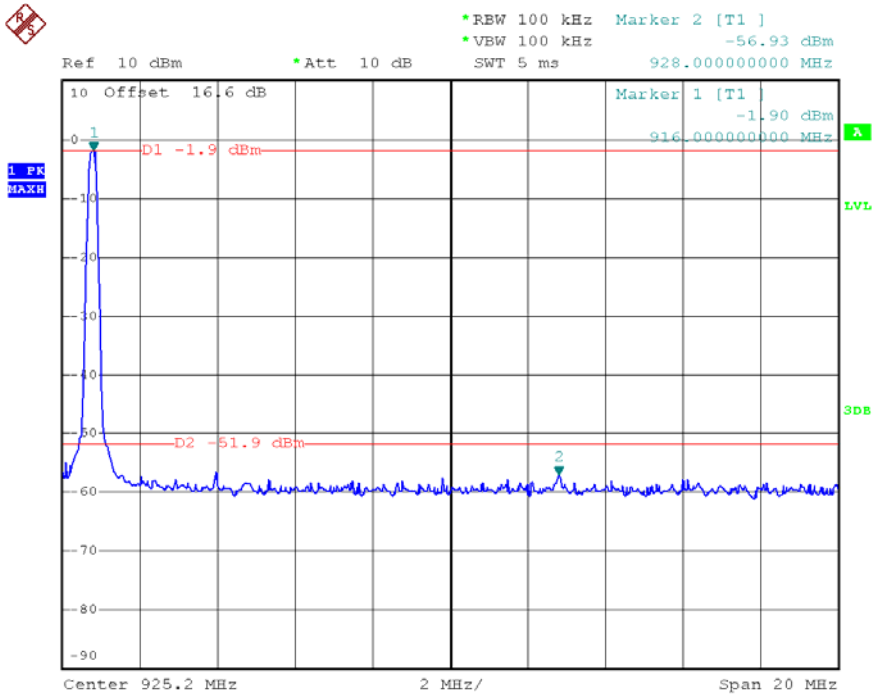
Channel of Worst Data: CH02			
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
902.00	-62.43	928.00	-56.93
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 50dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.			

TX CH01



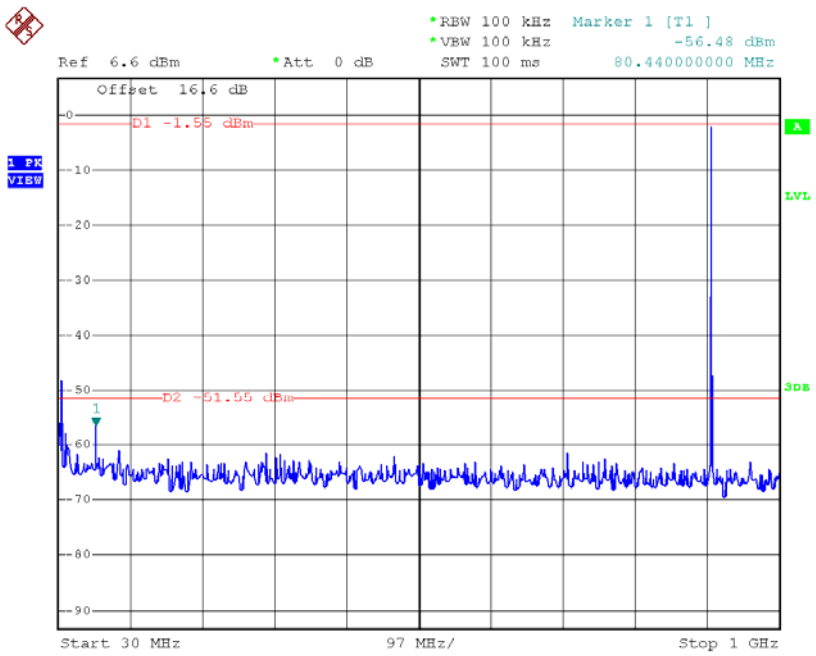
Date: 28.JUL.2011 03:50:45

TX CH02



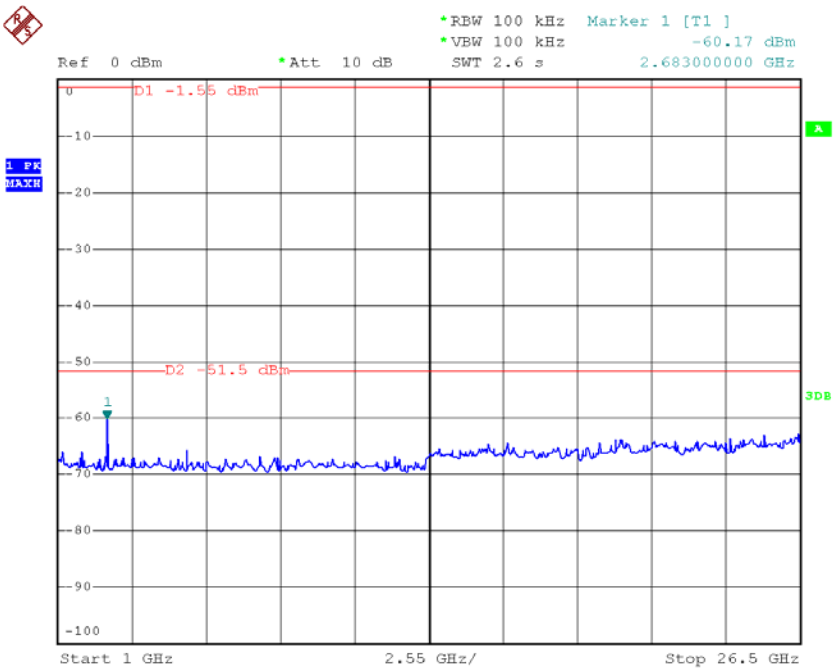
Date: 28.JUL.2011 03:42:31

TX CH01(30MHz~1GHz)



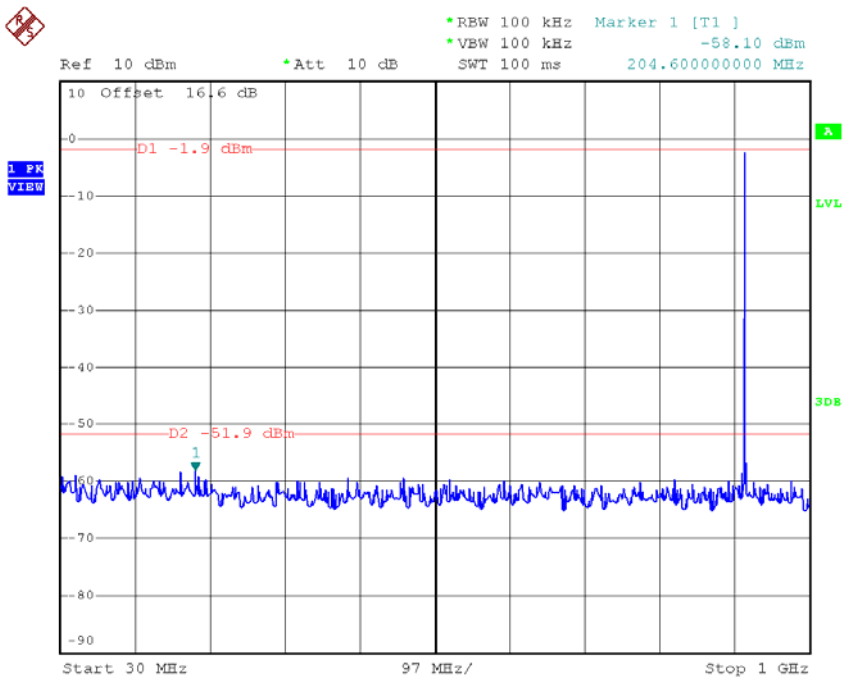
Date: 28.JUL.2011 03:53:29

TX CH 01(1GHz～10th Harmonic)



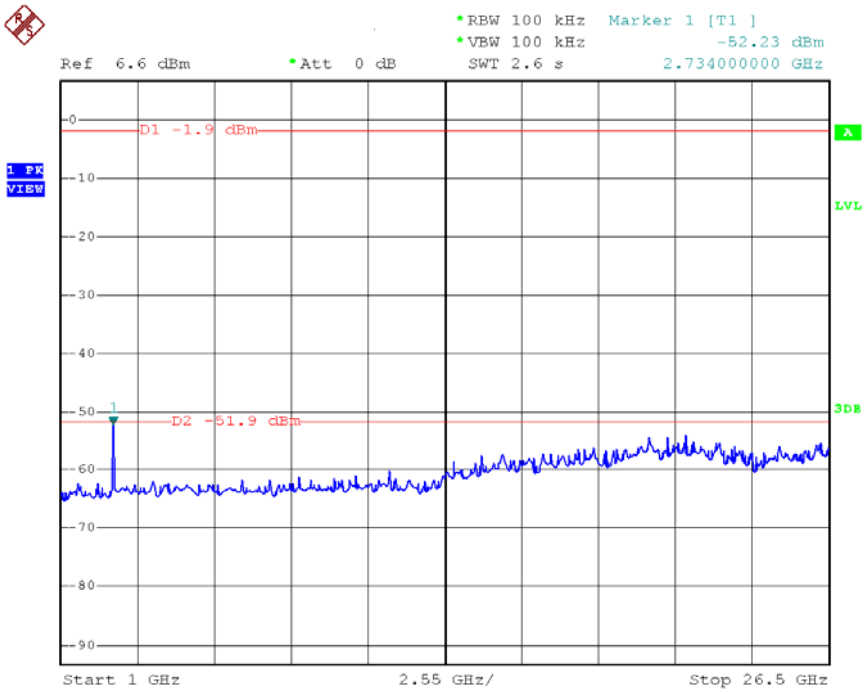
Date: 28.JUL.2011 03:55:33

TX CH02(30MHz~1GHz)



Date: 28.JUL.2011 03:43:24

TX CH 02(1GHz～10th Harmonic)



Date: 28.JUL.2011 03:45:18

7. EUT TEST PHOTO

Radiated Measurement Photos