Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14014821 001**		**Seite 1 von 13** *Page 1 of 13*
Auftraggeber: *Client:*	**Inova Products Inc.** **1851 Vista Del Sur** **Gilroy** **California** **U.S.A.**		
Gegenstand der Prüfung: *Test Item:*	**Low Power Transmitter (315MHz)**		
Bezeichnung: *Identification:*	**Series A**	**Serien-Nr.:** *Serial No.:*	**Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**061227015-2**	**Eingangsdatum:** *Date of Receipt:*	**27.12.2006**
Prüfort: *Testing Location:*	**TÜV Rheinland Hong Kong Ltd.** 9th Floor, Oriental News Building, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong **Hong Kong Productivity Council** HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong		
Prüfgrundlage: *Test Specification:*	**FCC Part 15, Subpart C** **ANSI C63.4-2003** **CISPR 22:1997**		
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*		
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 9th Floor, Oriental News Building, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong		

geprüft / *tested by:*			**kontrolliert** / *reviewed by:*		
05.01.2007	Hugo Wan Project Engineer		09.01.2007	Thomas Berns Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges / *Other Aspects:*

FCC ID: UV2ACTIVENT-RTC

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

Test Summary

Periodic Operation Device

Result: Pass

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

Bandwidth Measurement

Result: Pass

Contents

List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Kind of Equipment	Manufacturer	Type	S/N
Test Receiver	Rohde & Schwarz	ESVS30	842807/009
Active Loop Antenna	EMCO	6502	9107-2651
Biconical Antenna	Rohde & Schwarz	HK116	841489/015
Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/017
Double Ridge Horn Antenna	EMCO	3115	9002-3347
Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a remote control louver system operating at 315 MHz. The EUT have 3 operating modes: 1) always open, 2) always close, 3) AUTO mode which controls the opening of the louver (receiver) by the RTC slider setting the desired room temperature.

The transmitter meets the requirement on periodic transmission as specified in Part 15.231 (a). For details, please refer to Appendix 1 page 1.

FCC ID: UV2ACTIVENT-RTC

Models	Product descriptions
Series A	Activent

Ratings and System Details

		Transmitter
Operated Frequency	:	315 MHz
Number of channels	:	5 dip switches (using same frequency with different identification scheme depends on dip switch pattern)
Type of antenna	:	Integral antenna
Power supply	:	4 x AAA size battery, operated at 6.0V
Ports	:	none
Protection Class	:	III
Equipment Class	:	B

It was verified that changing of dip switch pattern did not affect significantly the output power and transmission duration. Hence only one set of dip switch pattern was tested.

Independent Operation Modes

The basic operation modes are:

- Transmitting control signal to the corresponding receiver.

For further information refer to User Manual

Submitted Documents

The submitted documents are listed as follow:

- User manual
- FCC ID label

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Test Operation and Test Software

Test operation should refer to test methodology.

- There was no special software to exercise the device.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- none

Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the Circuit Diagram or the Technical Construction File. No additional measures were employed to achieve compliance.

Test Methodology

Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2003.

The equipment under test (EUT) was placed at the middle of the 80 cm height turntable, and the turntable is 3 meters far from the measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360 ˚, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in section 7.1.1 and 7.1.2 of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

FS = R + AF + CF + FA – PA

System Factor = CF + FA – PA.

Where FS = Peak Value of Field Strength in dBuV/m at 3 meters.
R = Peak Reading of Spectrum Analyzer in dBuV.
AF = Antenna Factor in dB.
CF = Cable Attenuation Factor in dB.
FA = Filter Attenuation Factor in dB.
PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Average value of FS = FS –Average factor.

Average Factor = 20 log duty cycle.

Test Results

Periodic Operation Device — Section 15.231(a)

RESULT: **Pass**

The transmitter consists of a manual switch and an auto switch. Both switches only transmit “open” or “close” signals. The transmission duration was tested to comply with 15.231 (a) requirement.

For details, please refer to Appendix 1 page 1-2.

Radiated Emission of Carrier Frequency — Section 15.231(b)

RESULT: **Pass**

Test Specification	:	FCC Part 15 Section 15.231(b)
Test Method	:	ANSI 63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Measurement Distance	:	3m
Detector Function	:	CISPR quasi-peak
Measurement BW	:	120 kHz
Supply Voltage	:	DC 6.0V
Tested channel	:	One dip switch pattern

Polarization: Vertical

Detector	Frequency (MHz)	Field Strength at 3m (dBµV/m)	Limit (dBµV/m)	Delta to Limit (dB)
QP	314.998	58.7	75.6	-16.9
Average	N/A	--	--	--

Polarization: Horizontal

Detector	Frequency (MHz)	Field Strength at 3m (dBµV/m)	Limit (dBµV/m)	Delta to Limit (dB)
QP	314.998	67.6	75.6	-8.0
Average	N/A	--	--	--

Remark: During the transmission, there is no pulse or blanking interval in between. Hence average value of emission is not applicable.

Limit **Section 15.231(b)**

Frequency within the band (MHz)	Peak Emission		Average Emission	
	(µV/m)	(dBµV/m)	(µV/m)	(dBµV/m)
315	60417.72	95.6	6041.6772	75.6

According to section 15.35(b), when average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

Spurious Radiated Emissions — Section 15.231(b)

RESULT: **Pass**

Test Specification	:	FCC Part 15 Section 15.231(b)
Test Method	:	ANSI 63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Measurement Distance	:	3m
Detector Function	:	30MHz – 1GHz: CISPR quasi-peak QP 1GHz – 4GHz: PK / AV
Measurement BW	:	30MHz – 1GHz: 120 kHz 1GHz – 4GHz: 1MHz
Supply Voltage	:	DC 6.0V
Measuring Frequency Range	:	30-4000MHz
Tested channel	:	One dip switch pattern

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBµV/m)	Detector (QP / PK / AV)	Limit at 3m (dBµV/m)	Delta to Limit (dB)
629.996	32.30	QP	55.62	-23.32
944.994	38.30	QP	55.62	-17.32
1259.880	40.39	PK	75.62	-35.23
	38.45	AV	55.62	-17.17
*1574.960	45.22	PK	73.98	-28.76
	44.92	AV	53.98	-9.06
1890.140	40.71	PK	75.62	-34.91
	39.04	AV	55.62	-16.58
*2205.020	30.54	PK	73.98	-43.44
	25.58	AV	53.98	-28.40
2519.900	32.33	PK	75.62	-43.29
	27.78	AV	55.62	-27.84
*2834.980	28.13	PK	73.98	-45.85
	21.78	AV	53.98	-32.20
3150.040	34.39	PK	75.62	-41.23
	22.97	AV	55.62	-32.65

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBµV/m)	Detector (QP / PK / AV)	Limit at 3m (dBµV/m)	Delta to Limit (dB)
629.996	28.80	QP	55.62	-26.82
944.994	53.90	QP	55.62	-1.72
1260.000	33.23	PK	75.62	-42.39
	29.10	AV	55.62	-26.52
*1575.020	36.58	PK	73.98	-37.40
	35.36	AV	53.98	-18.62
1889.940	36.75	PK	75.62	-38.87
	33.32	AV	55.62	-22.30
*2204.580	30.73	PK	73.98	-43.25
	26.83	AV	53.98	-27.15
2519.960	33.73	PK	75.62	-41.89
	30.48	AV	55.62	-25.14
*2835.040	28.84	PK	73.98	-45.14
	22.79	AV	53.98	-31.19
3150.080	33.65	PK	75.62	-41.97
	23.58	AV	55.62	-32.04

Remark: (1) ' * ' indicates the frequency of the emissions fall into the restricted band.
(2) There is no spurious emission found between lowest oscillating frequency to 30 MHz.
(3) Within the frequency range 30-4000MHz, other than harmonics, there are no other spurious emissions found in the measurement.

Limit **Section 15.231(b)**

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
315	604.168	20*log(604.168) = 55.6	3

Section 15.209

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), was also comply with the radiated emission limits specified in Section 15.209.

Limit **Section 15.209**

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
30-88	100	20*log(100) = 40.00	3
88-216	150	20*log(150) = 43.52	3
216-960	200	20*log(200) = 46.02	3
960-2500	500	20*log(500) = 53.98	3

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing an average detector.

Bandwidth Measurement — Section 15.231(c)

RESULT: **Pass**

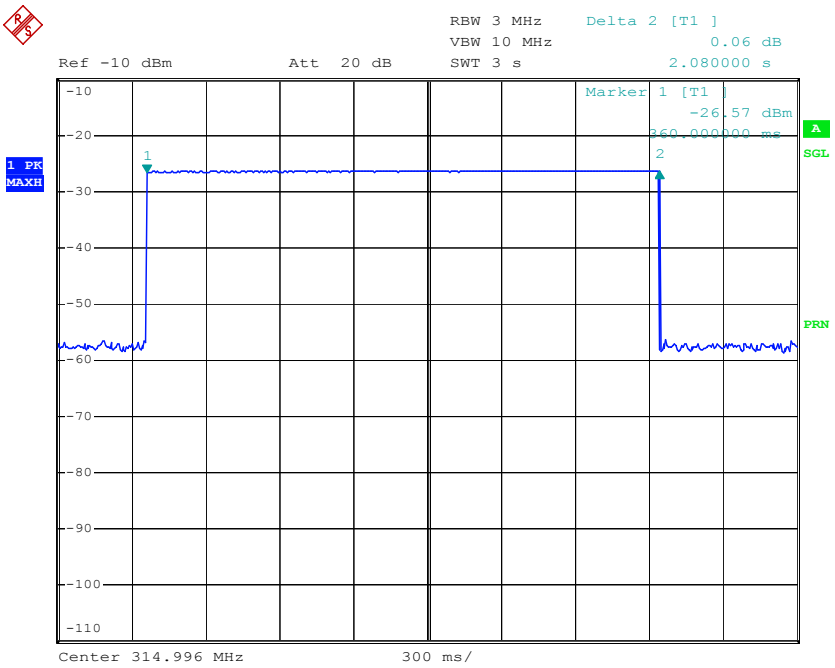
Test Specification	:	FCC Part 15 section 15.231(c)
Port of Testing	:	Coupling device
Detector Function	:	Peak
Supply Voltage	:	DC 6.0V

Refer to the data graph, the 20dB points at lower edge and at higher edge are 49.0kHz and 68kHz respectively apart from the centre modulated carrier, the bandwidth of the emission is 0.037 % of the centre frequency. Therefore, the EUT meets the requirement of section 15.231(c).

For test results refer to Appendix 1, page 3.

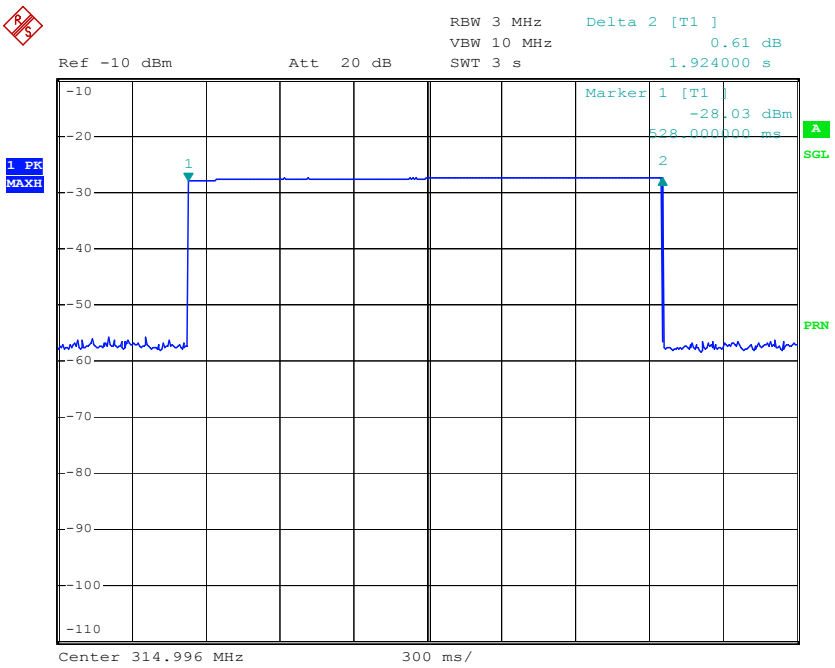
Limit **Section 15.231(c)**

The bandwidth of the emission shall be no wider than 0.25% if the center frequency for devices operating above 70MHz and below 900MHz.



Date: 21.DEC.2006 17:54:13

Manual switch at “always open”



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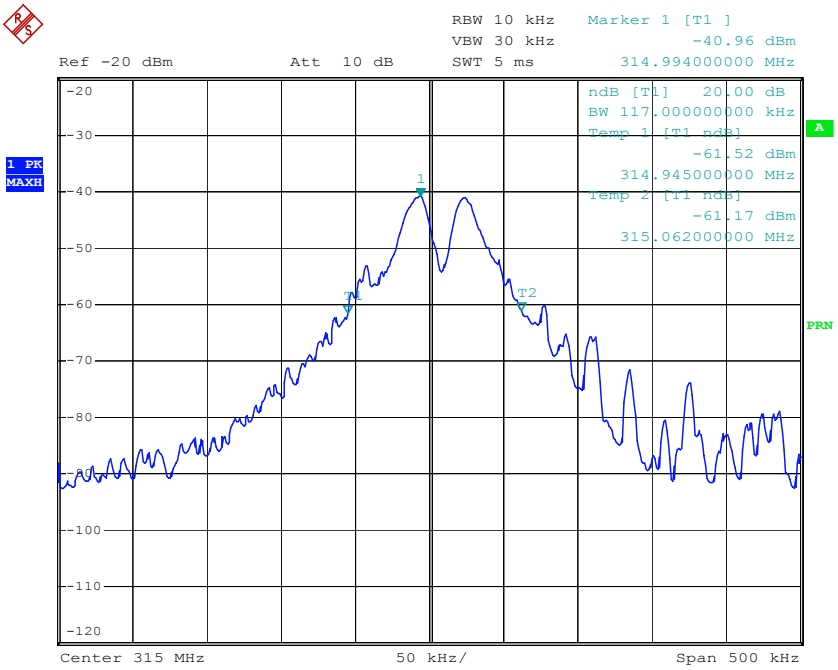
Manual switch at “always close”

Part 15.231 (a) requirement

Manual operated		Measured time (second(s))	Limit (second(s))
Duration of transmission	switch “open”	2.08	≤ 5
	switch “close”	1.92	
	switch “AUTO”	*	

* In the AUTO mode, the transmit signal was tested with only two patterns either “open” or “close”. These two patterns transmission duration is coherent with the one tested in above table. In addition, the transmit signal was tested to cease transmission within 5 seconds after automatic activation.

Hence the transmission duration of this EUT complies with Part 15.231 (a) (1) and (a) (2) requirement for manual switch operation.



Bandwidth measurement.