



FCC RADIO TEST REPORT

FCC ID: 2ADPW-HM-R01RC

Product : Remote Controller

Trade Name : N/A

Model No : HM-R01-RC

Serial Model : N/A

Applicant's : Hanma Company Limited
name

Address : No.8 Jianye Middle Road, Taihe Town, Baiyun District, Guangzhou, China

Prepared By : Nowd Testing Services Co.,Ltd.
No. 606, FuerYuanjian Business Centre, 25 Zone, Bao'an District,
Shenzhen, Guandong

Tel : (86) 755-27830065

Fax : (86) 755-27830095

Report No. : NTS141205017R

Date of Test : Dec.05, 2014

Date of Rep. : Dec.19, 2014

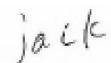
TEST REPORT DECLARATION

Applicant : Hanma Company Limited
Address : No.8 Jianye Middle Road, Taihe Town, Baiyun District, Guangzhou, China
Manufacturer : Hanma Company Limited
Address : No.8 Jianye Middle Road, Taihe Town, Baiyun District, Guangzhou, China
EUT Description : Remote Controller
Trademark : N/A
Model No. : HM-R01-RC
Serial Model : N/A
Power Supply : DC 12.0V
Standards : FCC Part15.231
Test procedure : ANSI C63.4-2009

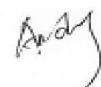
This device described above has been tested by Nowd Testing Services Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of Nowd Testing Services Co., Ltd., this document may be altered or revised by ShenZhen Nowd Testing Services Co., Ltd., personal only, and shall be noted in the revision of the document.

Date of Test: Dec. 19, 2014



Prepared by: Jack Wu
Testing Engineer



Reviewed by: Andy Xie
Technical Manager



Approved by: somnus
Authorized Signatory

Table of Contents

	Page
1 . SUMMARY OF TEST RESULTS	5
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
2 . GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.2 DESCRIPTION OF TEST MODES	8
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	10
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	11
3 . EMC EMISSION TEST	12
3.1 CONDUCTED EMISSION MEASUREMENT	12
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	12
3.1.2 TEST PROCEDURE	13
3.1.3 DEVIATION FROM TEST STANDARD	13
3.1.4 TEST SETUP	13
3.1.5 EUT OPERATING CONDITIONS	13
3.1.6 TEST RESULTS	14
3.2 RADIATED EMISSION MEASUREMENT	15
3.2.1 RADIATED EMISSION LIMITS	15
3.2.2 TEST PROCEDURE	16
3.2.3 DEVIATION FROM TEST STANDARD	16
3.2.4 TEST SETUP	17
3.2.5 EUT OPERATING CONDITIONS	18
3.2.6 TEST RESULTS (BELOW 30 MHZ)	19
3.2.7 TEST RESULTS (BETWEEN 30M – 1000 MHZ)	20
4 . BANDWIDTH TEST	23
4.1 TEST PROCEDURE	23
4.2 DEVIATION FROM STANDARD	23
4.3 TEST SETUP	23
4.4 TEST RESULTS	24
5 . TRANSMITTER TIMEOUT	25
5.1 REQUIREMENTS	25
6 . ANTENNA REQUIREMENT	26
6.1 STANDARD REQUIREMENT	26
6.2 EUT ANTENNA	26

Table of Contents

	Page
7 . EUT TEST PHOTO APPENDIX-PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS	27

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.231)			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	Note(1)
15.203	Antenna Requirement	Pass	
15.231	Radiated Spurious Emission	Pass	
15.231	Occupied Bandwidth	Pass	
15.231	Transmitter Timeout	Pass	

NOTE:

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

1.1 TEST FACILITY

Nowd Testing Services Co.,Ltd.

Add. : No. 606, FuerYuanjian Business Centre, 25 Zone, Bao'an District,
Shenzhen, Guandong
FCC Registration No.:230614;

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, 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 %** .

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Remote Controller															
Trade Name	N/A															
Model Name	HM-R01-RC															
Serial Model	N/A															
Model Difference	N/A															
Product Description	<p>The EUT is a Remote Controller</p> <table border="1"><tr><td>Product Type</td><td>Remote Control</td></tr><tr><td>Operation Frequency:</td><td>433.92MHz</td></tr><tr><td>Modulation Type:</td><td>ASK</td></tr><tr><td>Number Of Channel</td><td>1CH.</td></tr><tr><td>Antenna Designation:</td><td>Built-in antenna</td></tr><tr><td>Antenna Gain(Peak)</td><td>0.5dBi</td></tr><tr><td>Output Power:</td><td>76.83 dBuV/m</td></tr></table>		Product Type	Remote Control	Operation Frequency:	433.92MHz	Modulation Type:	ASK	Number Of Channel	1CH.	Antenna Designation:	Built-in antenna	Antenna Gain(Peak)	0.5dBi	Output Power:	76.83 dBuV/m
Product Type	Remote Control															
Operation Frequency:	433.92MHz															
Modulation Type:	ASK															
Number Of Channel	1CH.															
Antenna Designation:	Built-in antenna															
Antenna Gain(Peak)	0.5dBi															
Output Power:	76.83 dBuV/m															
	<p>Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an Short-range wireless transmission Device. More details of EUT technical specification, please refer to the User's Manual.</p>															
Channel List	Please refer to the Note 2.															
Adapter	/															
Battery	Rated Voltage: 12.0V															
Connecting I/O Port(s)	Please refer to the User's Manual															

Note:

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

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Integration antenna	N/A	0.5	Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base 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	TX

For Conducted Emission	
Final Test Mode	Description
Mode 4	TX

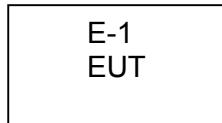
For Radiated Emission	
Final Test Mode	Description
Mode 1	TX

Note:

- (1) The EUT use new battery.
- (2) The EUT work in TX mode, Long press the SOS button keep for emission
- (3) this EUT is a portable device, it will have three XYZ directions, which test results are the test results in the X direction.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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	Brand	Model/Type No.	Series No.	Note
E-1	Remote Controller	N/A	HM-R01-RC	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.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.06	2015.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2014.06.07	2015.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.06	2015.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.07	2015.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2014.06.07	2015.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.06	2015.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2013.12.22	2014.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2014.07.06	2015.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2014.07.06	2015.07.05	1 year
12	Coaxial cables	AOTS	N/A	N/A	2014.06.08	2015.06.07	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2014.06.06	2015.06.05	1 year
2	LISN	R&S	ENV216	101313	2014.08.24	2015.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2014.08.24	2015.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2014.06.07	2015.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2014.06.07	2015.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2014.06.08	2015.06.07	1 year
7	Coaxial cables	AOTS	N/A	N/A	2014.06.08	2015.06.07	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 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.

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

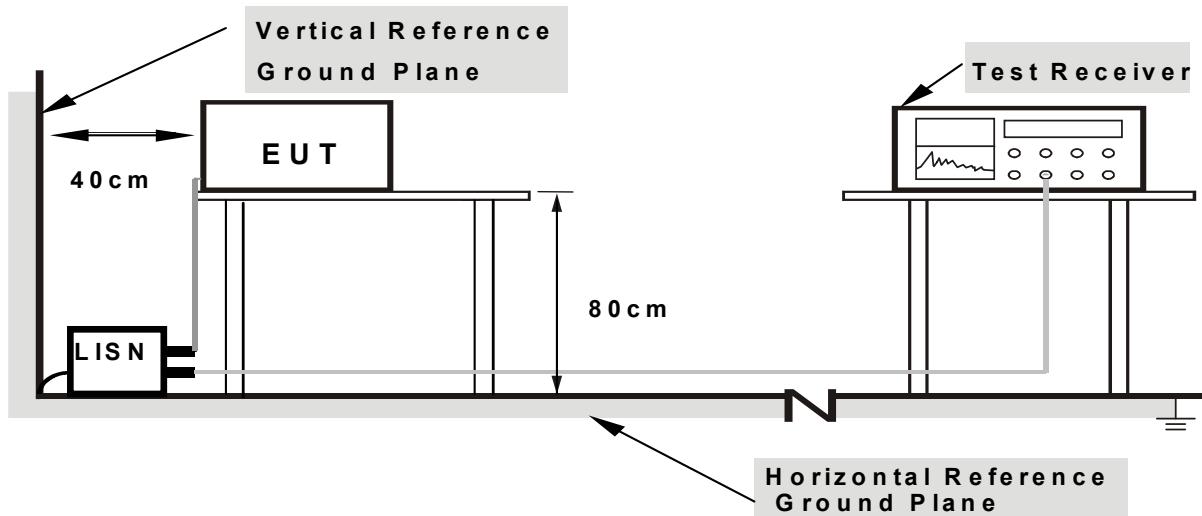
3.1.2 TEST PROCEDURE

- 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.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 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 cm from other units and other metal planes

3.1.5 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.

3.1.6 TEST RESULTS

EUT :	Remote Controller	Model Name :	HM-R01-RC
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N/A
Test Voltage :	N/A	Test Mode :	N/A

Note: Due to this EUT is powered by batteries only, this test is not applicable.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

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
Above 960	500	3

According to §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750 **	125 to 375 **
174 - 260	3,750	375
260 - 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12,500	1,250

** linear interpolations

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	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).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

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

3.2.2 TEST PROCEDURE

- 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.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

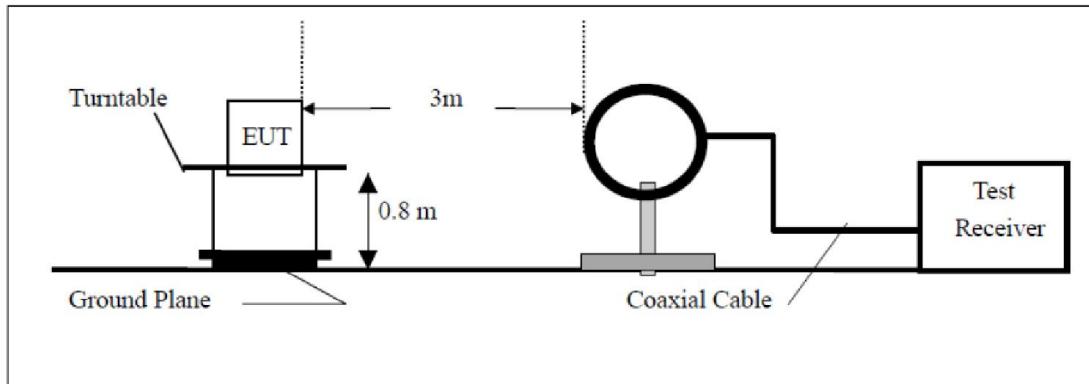
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

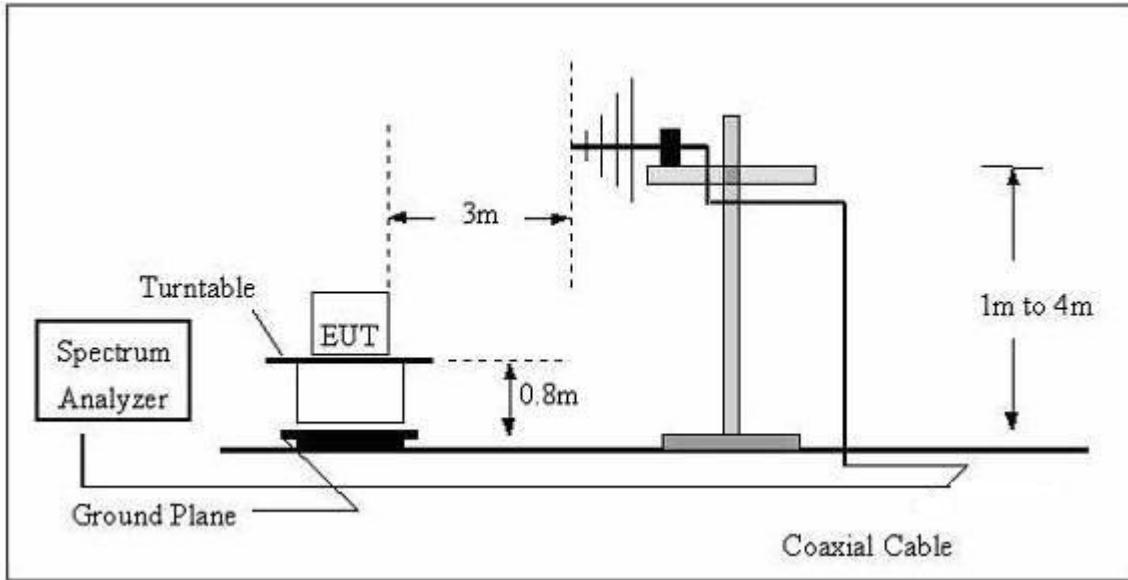
No deviation

3.2.4 TEST SETUP

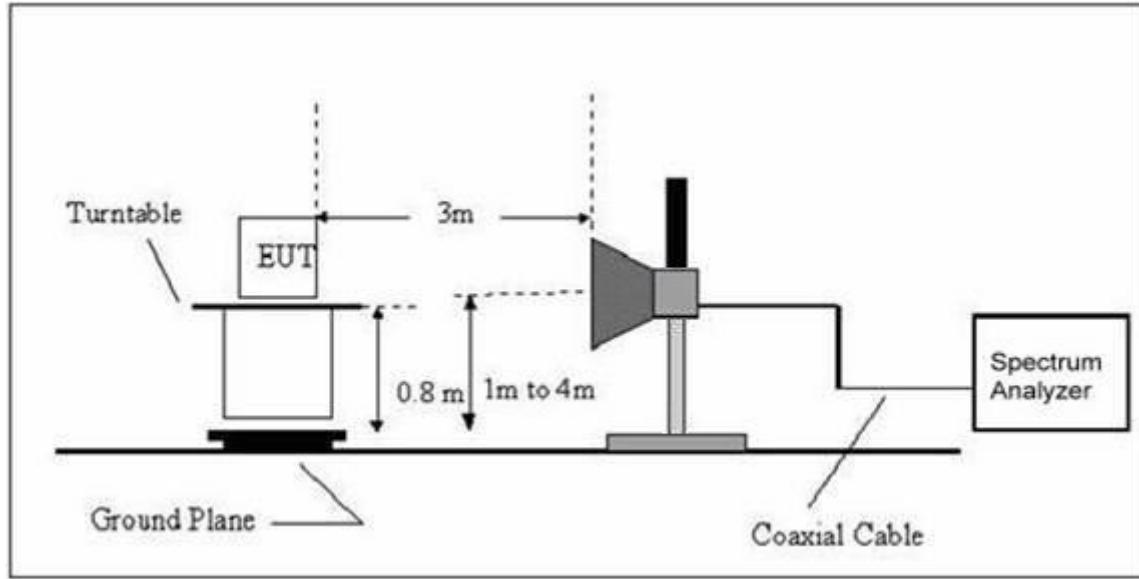
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BELOW 30 MHZ)

EUT :	Remote Controller	Model Name :	HM-R01-RC
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 12.0V
Test Mode :	TX	Polarization :	---

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State
--	--	--	--	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);
Limit line = specific limits(dBuV) + distance extrapolation factor.

3.2.7 TEST RESULTS (BETWEEN 30M – 1000 MHZ)

EUT :	Remote Controller	Model Name :	HM-R01-RC
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	Horizontal
Test Voltage :	DC 12.0V	Test Mode :	TX

Frequency	Average Factor	Field Strength	Field Strength	Limit(PK)	Limit(AV)	State
MHz	dB	dBuV/m (PK)	dBuV/m (AV)	dBuV/m	dBuV/m	
433.920	-6.19	83.02	76.83	100.83	80.83	pass
867.8400	-6.19	43.54	37.35	80.83	60.83	pass
1301.221	-6.19	47.16	--	74.00	54.00	pass
2167.236	-6.19	52.45	--	74.90	54.00	pass

EUT :	Remote Controller	Model Name :	HM-R01-RC
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	Vertical
Test Voltage :	DC 12.0V	Test Mode :	TX

Frequency	Average Factor	Field Strength	Field Strength	Limit(PK)	Limit(AV)	State
MHz	dB	dBuV/m (PK)	dBuV/m (AV)	dBuV/m	dBuV/m	
433.920	-6.19	76.26	70.07	100.83	80.83	pass
867.8400	-6.19	38.35	32.16	80.83	60.83	pass
1301.221	-6.19	44.65	--	74.00	54.00	pass
2167.236	-6.19	53.08	--	74.90	54.00	pass

Note: 1. *Calculate Average value based on Duty Cycle correction factor:

$$\text{Duty Cycle} = \text{Ton}/(\text{Ton}+\text{Toff}) = (5.05*1+0.65*20+1.425*20)/94.12 = 0.49 \text{ms} = 49\%$$

$$\text{Duty Cycle factor} = 20 \lg(\text{Duty Cycle}) = 20 \lg(0.49) = -6.19 \text{dB}$$

$$\text{Average} = \text{Peak} + \text{Duty Cycle factor}$$

2. Pulse Desensitization Correction Factor

$$\text{Pulse Width(PW)} = 46.55 \text{ms}$$

$$1/\text{PW} = 1/46.55 = 0.0215 \text{kHz}$$

$$\text{RBW}(100 \text{kHz}) > 1/\text{PW} (0.0215 \text{kHz})$$

Therefore PDCF is not needed

3.3 DUTY CYCLE

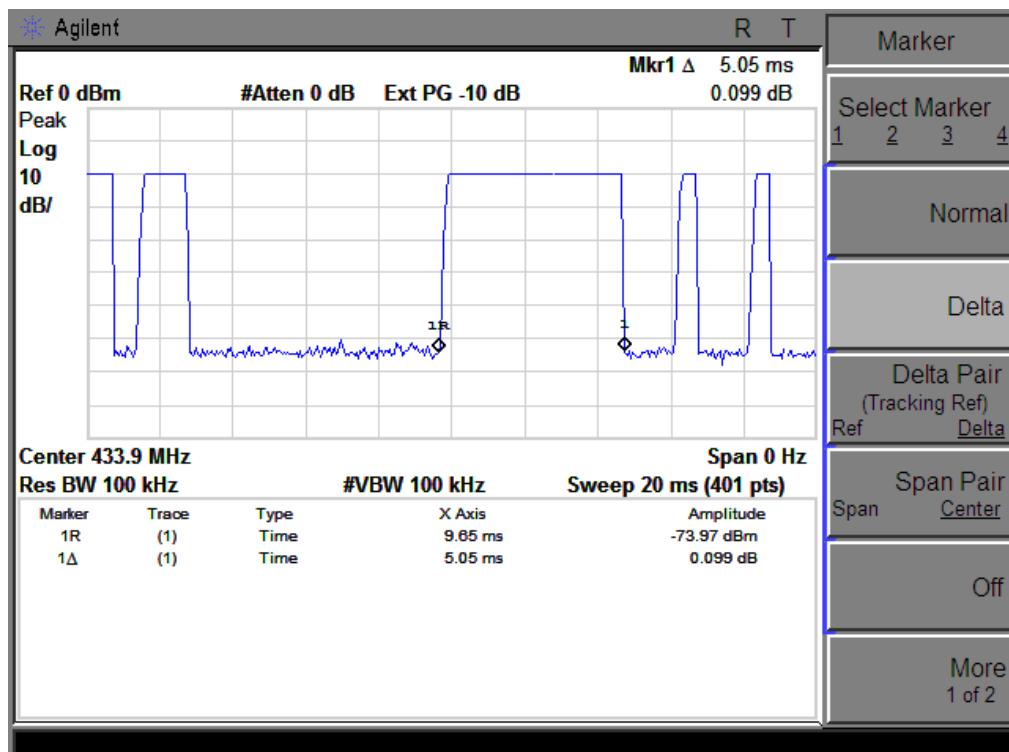
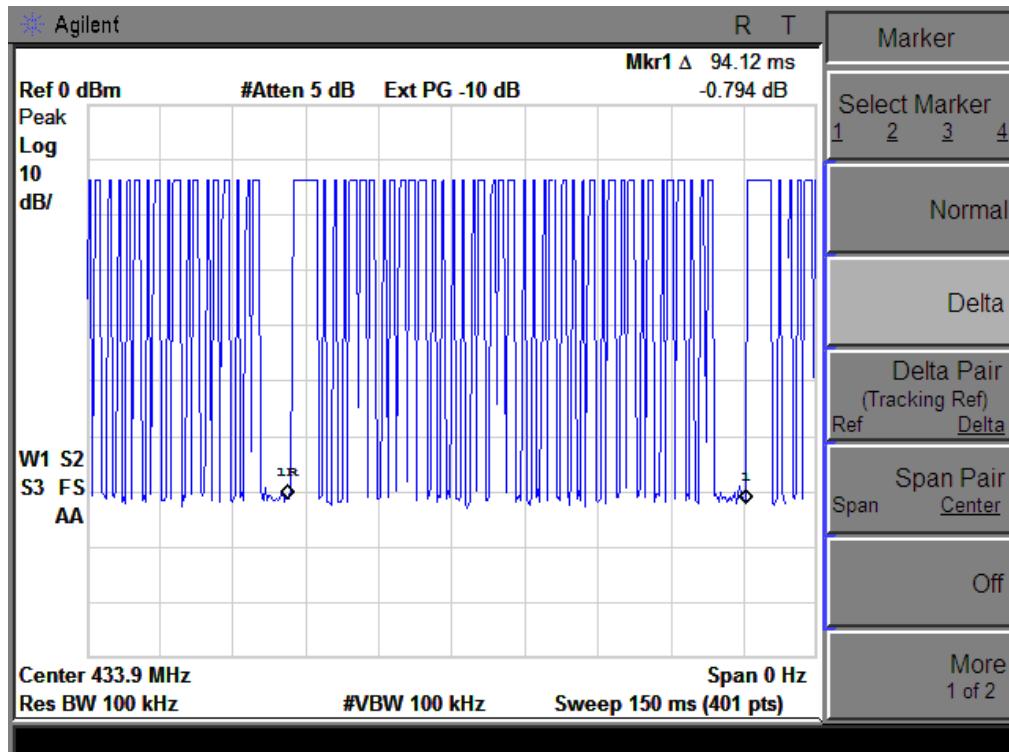
The duty cycle is simply the on time divided by the period:

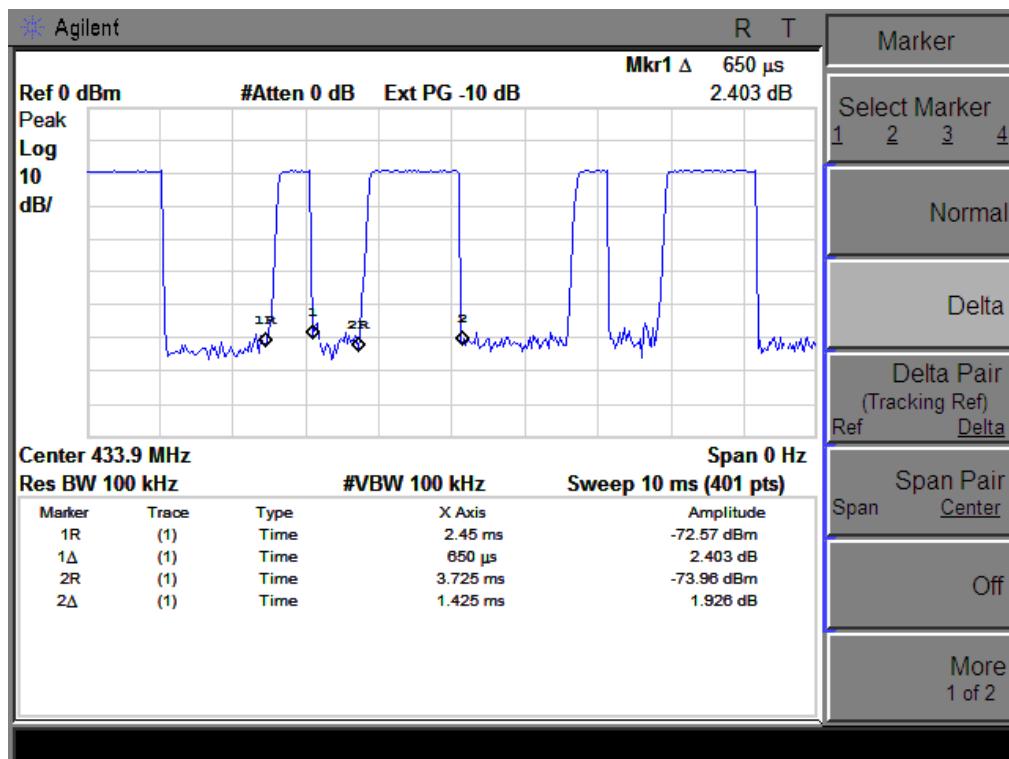
The duration of one cycle = 94.12ms

Effective period of the cycle = $5.05*1+0.65*20+1.425*20=46.55\text{ms}$

Duty Cycle = $46.55/94.12 = 0.49$

The duration of one cycle





4. BANDWIDTH TEST

4.1 TEST PROCEDURE

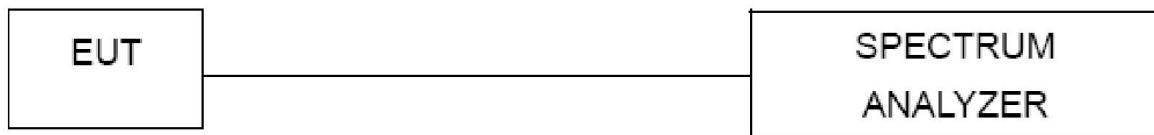
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Limit: $433.92\text{MHz} \times 0.25\% = 1084.8\text{KHz}$

4.2 DEVIATION FROM STANDARD

No deviation.

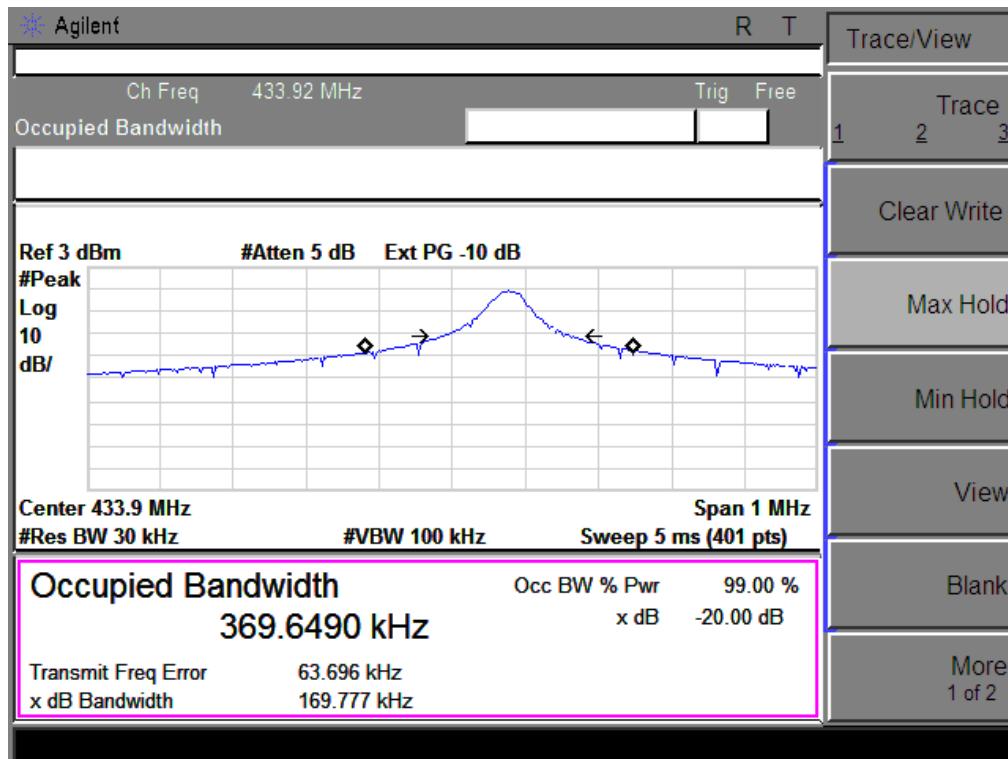
4.3 TEST SETUP



4.4 TEST RESULTS

EUT :	wireless thermometer	Model Name :	HM-R01-RC
Temperature :	26 °C	Relative Humidity :	53%
Pressure :	1020 hPa	Test Power :	DC 12.0V
Test Mode :	TX		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (kHz)	Limit (kHz)
CH01	433.92	169.77	1084.8



5. TRANSMITTER TIMEOUT

5.1 REQUIREMENTS

1 A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Result: The EUT has a manually activated transmitter, please refer to below detail data

2 A transmitter activated automatically shall cease transmission within 5 seconds after activation.

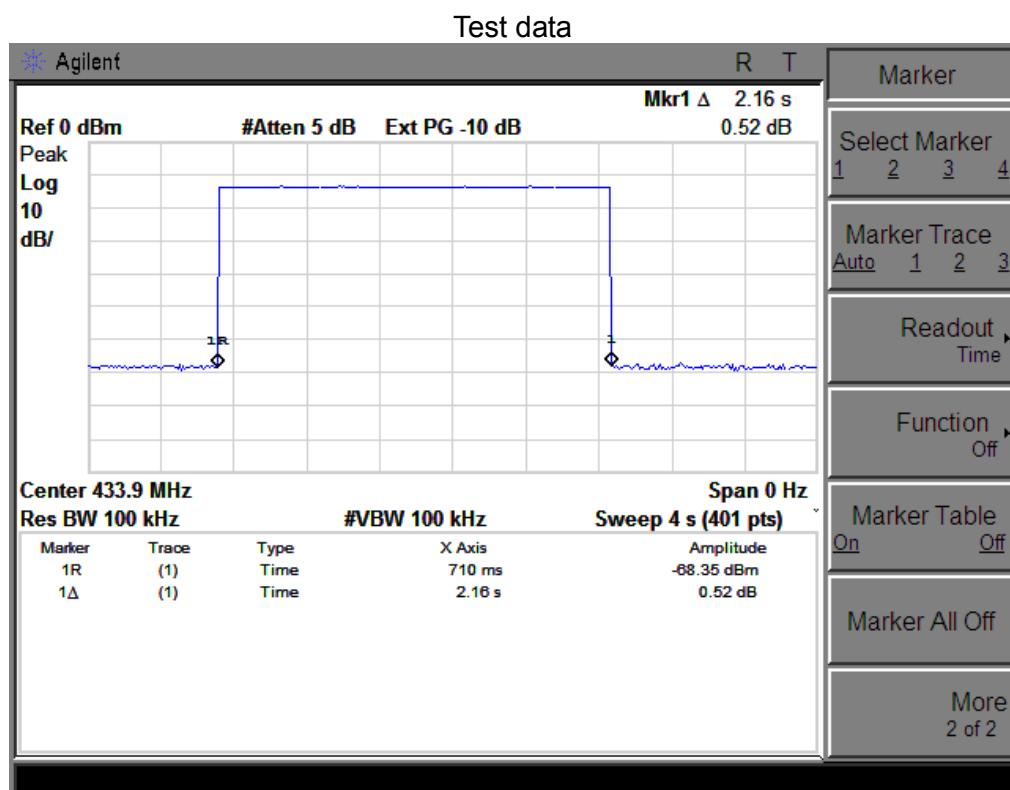
Result: The EUT does not have a automatically activated transmitter

3 Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour

Result: The EUT does not employ periodic transmission.

4 Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

Result: The section is not applicable to EUT.



THE DURATION OF EACH TRANSMISSION	LIMIT	RESULT
2.16s	<5s	PASS

6. ANTENNA REQUIREMENT

6.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

6.2 EUT ANTENNA

The EUT antenna is integral Antenna. It comply with the standard requirement.

7. EUT TEST PHOTO**Radiated Measurement Photos**