FCC Part 15C Test Report

FCC ID: 2ADWGVIS-8005

Product Name:	**Remote Control**
Trademark:	
Model Name :	**VIS-8005** **VIS-8004,ZD-OF04,ZD-MF04,ZD-QF04,ZD-DF04,ZD-HF12, ZD-NF04,ZD-LF04,ZD-FF04**
Prepared For : Address :	**FPC SECURITY CORP** 8230 NW 14ST DORAL Florida 33126 United States
Prepared By : Address :	**Shenzhen BCTC Technology Co., Ltd.** No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	**May 23 - May 24, 2015**
Date of Report :	**May 24, 2015**
Report No.:	**BCTC-15050065**

VERIFICATION OF COMPLIANCE

Applicant's name ..... :	FPC SECURITY CORP
Address ..... :	8230 NW 14ST DORAL Florida 33126 United States
Manufacture's Name ..... :	Hangzhou Zhengdian Technology Co., Ltd.
Address ..... :	No.1 building Wangshan Community Xingqiao Street Yuhang District Hangzhou,China

Product description

Product name ..... :	Remote Control
Trademark:	
Model Name:	VIS-8005
Test Procedure:	ANSI C63.10-2013
Rule:	FCC Part15.231:2014

This device described above has been tested by BCTC, 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.

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Test Result.....: **Pass**

Testing Engineer : Eric Yang

(Eric Yang)

Technical Manager : Sophie Lu

(Sophia Lee)

Authorized Signatory : Carson. Zhang

(Carson. Zhang)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical rule:

FCC Part15 (15.231) , Subpart C			
Rule Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	solely powered by battery
15.231(a)	Radiated Spurious Emission	PASS	
15.231(a)	20dB Bandwidth	PASS	
15.231(a)	Release Time	PASS	
ANSI C63.10	Duty Cycle	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

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

1.1 TEST FACILITY

Shenzhen BCTC Technology Co., Ltd.
Add.:No.101,Yousong Road,Longhua New District, Shenzhen,China
FCC Registration No.:187086

1.2 MEASUREMENT UNCERTAINTY

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** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Remote Control
Trade Name	
Model Name	VIS-8005
Serial Model	VIS-8004,ZD-OF04,ZD-MF04,ZD-QF04,ZD-DF04,ZD-HF12,ZD-NF04,ZD-LF04,ZD-FF04
Model Difference	All the same,only model name is different.
Product Description	The EUT is a transmitter. Operation Frequency: 315 MHz The Lowest Oscillator: 315 MHz Modulation Type: ASK Antenna Designation: PCB antenna Field Strenght(Radiated): 77.41dBuV/m(PK Max.) 66.94dBuV/m(AV Max.)
Battery	DC 3.0V, batteries CR2016*2
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.

2.2 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.

Test Items	Note
Radiated Emission	Continuously transmitting
20dB Bandwidth	Continuously transmitting
Duty Cycle	Continuously transmitting
Release Time	Normal operation

Note:

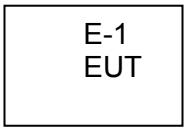
(1) During the testing procedure, the continuously transmitting mode was programmed by the customer.

(2) New battery is used during the test

(3) The EUT is considered a portable unit, and it was pre-tested on the positioned of each 3 axis:X axis, Y axis and Z axis. The worst case was found positioned on Z-plane. There for only the test data of this Z-plane were used for radiated emission measurement test.

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	Mfr/Brand	Model/Type No.	Series No.	Note
1	/	/	/	/	/

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	2014.12.22	2015.12.21	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	RF cables	R&S	R203	R20X	2014.07.06	2015.07.05	1 year

3. EMISSION TEST

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 RADIATED EMISSION LIMITS (Frequency Range 30MHz-4000MHz)

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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (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).

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

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

3.1.2 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 3 meter open area test site. 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(above 1GHz, the height was 1.5m); 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.

Note:

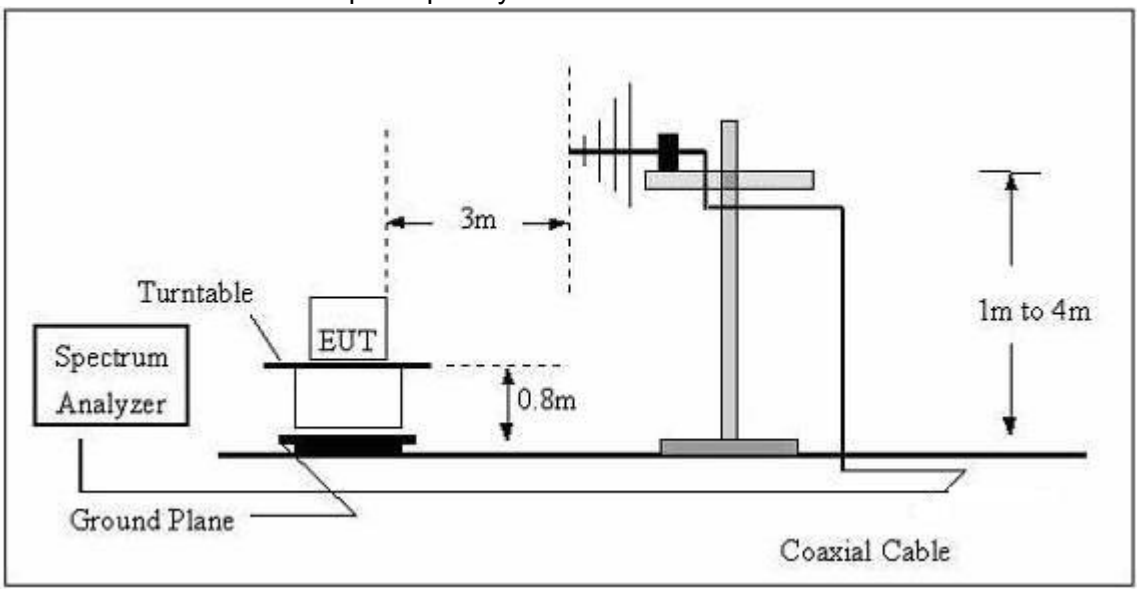
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.1.3 DEVIATION FROM TEST STANDARD

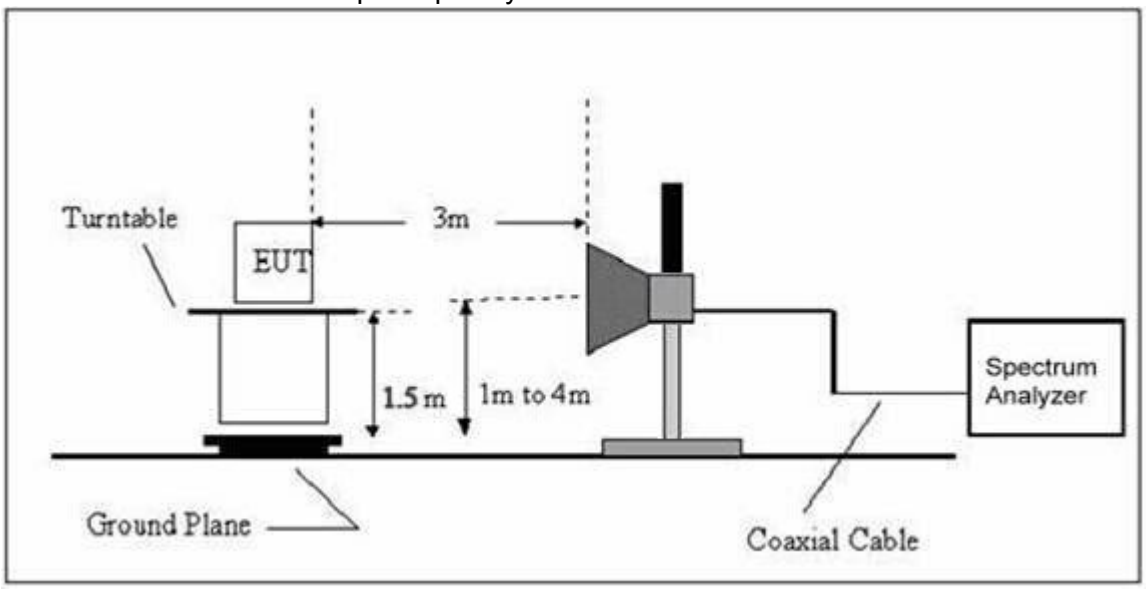
No deviation

3.1.4 TEST SETUP

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



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



3.1.5 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.

3.1.6 TEST RESULTS

Radiated Spurious Emission (Between 30MHz – 4GHz)

EUT：	Remote Control	Model Name ：	VIS-8005
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Polarization：	
Test Voltage ：	Batteries DC 3.0V		
Test Mode ：	TX		

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Level	FCC Part 15.231/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)
315.00	46.87	PK	285	1.5	H	15.67	62.54	95.62	-33.08
315.00	50.39	PK	212	1.8	V	15.67	66.06	95.62	-29.56
110.23	19.35	QP	331	1.6	H	14.17	33.52	43.50	-9.98
110.23	24.40	QP	263	1.0	V	14.17	38.57	43.50	-4.93
630.00	14.12	PK	157	1.6	H	23.48	37.60	74.00	-36.40
630.00	13.61	PK	157	1.8	V	23.48	37.09	74.00	-36.91
945.00	11.42	PK	141	1.5	H	29.21	40.63	74.00	-33.37
945.00	11.87	PK	148	1.2	V	29.21	41.08	74.00	-32.92
1260.00	49.63	PK	48	1.9	H	-16.75	32.88	74.00	-41.12
1260.00	52.42	PK	342	1.6	V	-16.75	35.67	74.00	-38.33
1575.00	53.20	PK	16	1.5	H	-15.08	38.12	74.00	-35.88
1575.00	49.19	PK	244	1.4	V	-15.08	34.11	74.00	-39.89

Note:
1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. Measurements were made using a peak detector. Any emission falling within the restricted bands of FCC Part 15 Section 15.205 were compliance with the emission limit of FCC Part 15 Section 15.209.
3. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:
   Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss – Amplifier Gain

Frequency	PK Level	Polar	Duty cycle Factor	AV Level	FCC Part 15.231/209/205	
					Limit	Margin
(MHz)	(dBμV/m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
315.00	62.54	H	-9.71	52.83	75.62	-22.79
315.00	66.06	V	-9.71	56.35	75.62	-19.27
630.00	37.60	H	-9.71	27.89	54.00	-26.11
630.00	37.09	V	-9.71	27.38	54.00	-26.62
945.00	40.63	H	-9.71	30.92	54.00	-23.08
945.00	41.08	V	-9.71	31.37	54.00	-22.63
1260.00	32.88	H	-9.71	23.17	54.00	-30.83
1260.00	35.67	V	-9.71	25.96	54.00	-28.04
1575.00	38.12	H	-9.71	28.41	54.00	-25.59
1575.00	34.11	V	-9.71	24.40	54.00	-29.60

Note:

1. Average value= PK value + Average Factor (duty factor)
2.Duty cycle level please see clause 6.
3. Pulse Desensitization Correction Factor
   Pulse Width (PW) = 25ms
   2/PW = 2/25ms = 0.008kHz
   RBW (100 kHz) > 2/PW (0.008kHz)
   Therefore PDCF is not needed

4. 20DB BANDWIDTH TEST

4.1 APPLIED PROCEDURES / LIMIT

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. So the emission bandwidth limits have been calculated in below table.

Fundamental Frequency(MHz)	20 dB Bandwidth Limits (MHz)
315	0.7875

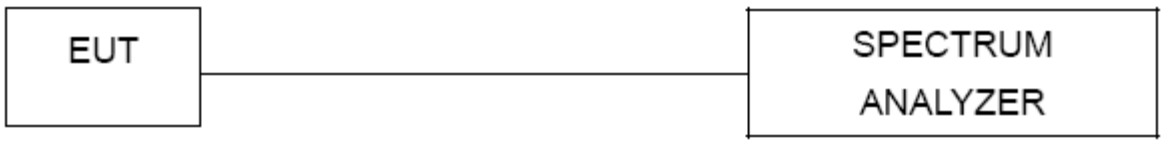
4.1.1 TEST PROCEDURE

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= 1% of the 20 dB bandwidth, VBW≥ RBW, Sweep time = Auto.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



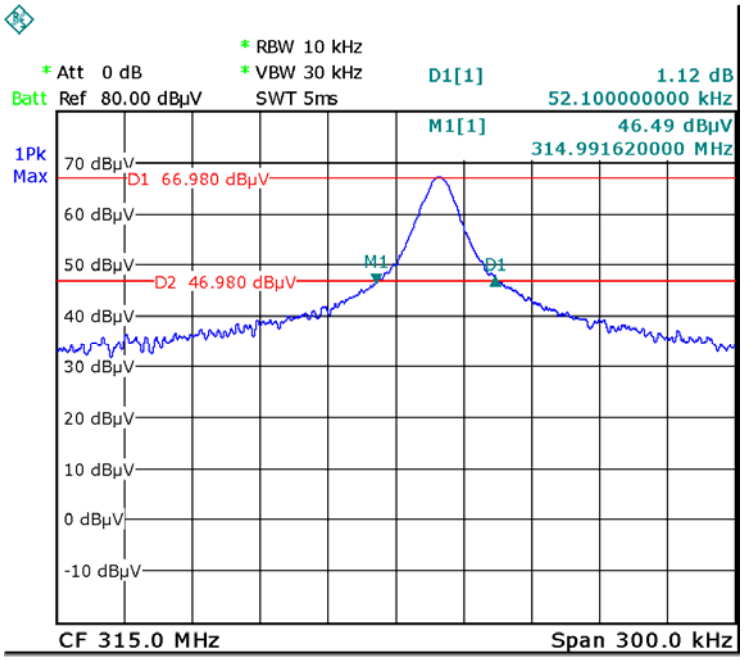
4.1.4 EUT OPERATION CONDITIONS

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.

4.1.5 TEST RESULTS

EUT：	Remote Control	Model Name ：	VIS-8005
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa		
Test Voltage ：	Batteries DC 3.0V		
Test Mode ：	TX		

The 20dB bandwidth is 52.10KHz.



5. RELEASE TIME TEST

5.1 APPLIED PROCEDURES / LIMIT

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

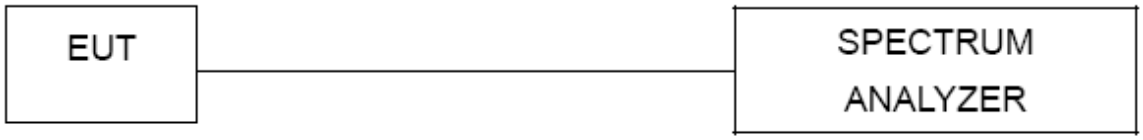
5.1.1 TEST PROCEDURE

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=300KHz, Span=0,Sweep time = 5s.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



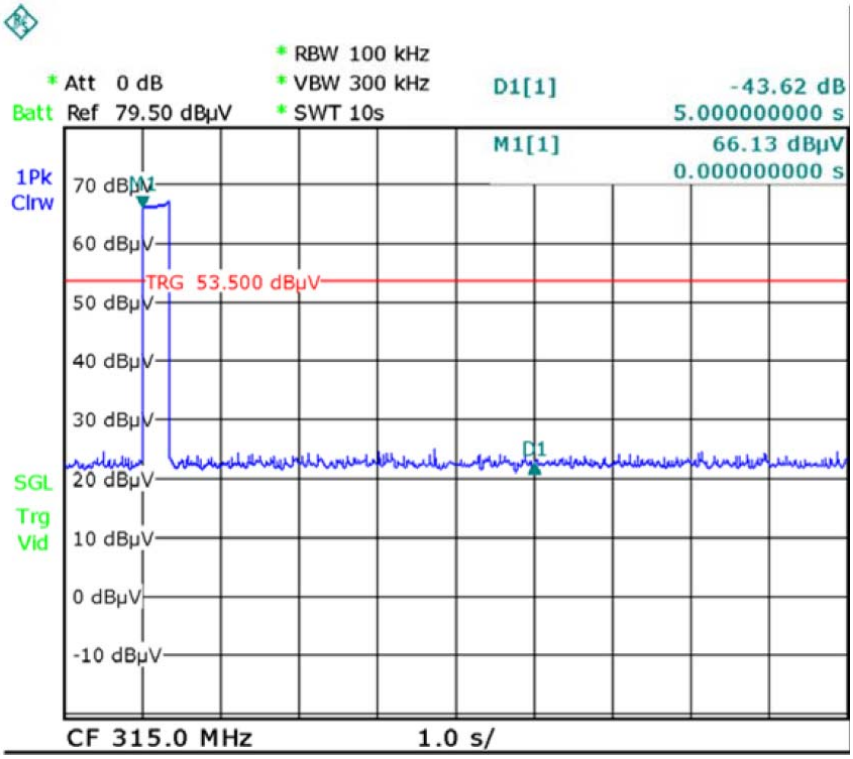
5.1.4 EUT OPERATION CONDITIONS

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.

5.1.5 TEST RESULTS

EUT：	Remote Control	Model Name ：	VIS-8005
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa		
Test Voltage ：	Batteries DC 3.0V		
Test Mode ：	TX		

Release time=1.37s



6. DUTY CYCLE TEST

6.1 APPLIED PROCEDURES / LIMIT

N/A

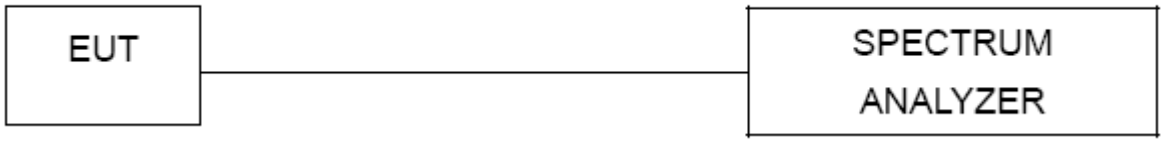
6.1.1 TEST PROCEDURE

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=300KHz, Span=0.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION 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.

6.1.5 TEST RESULTS

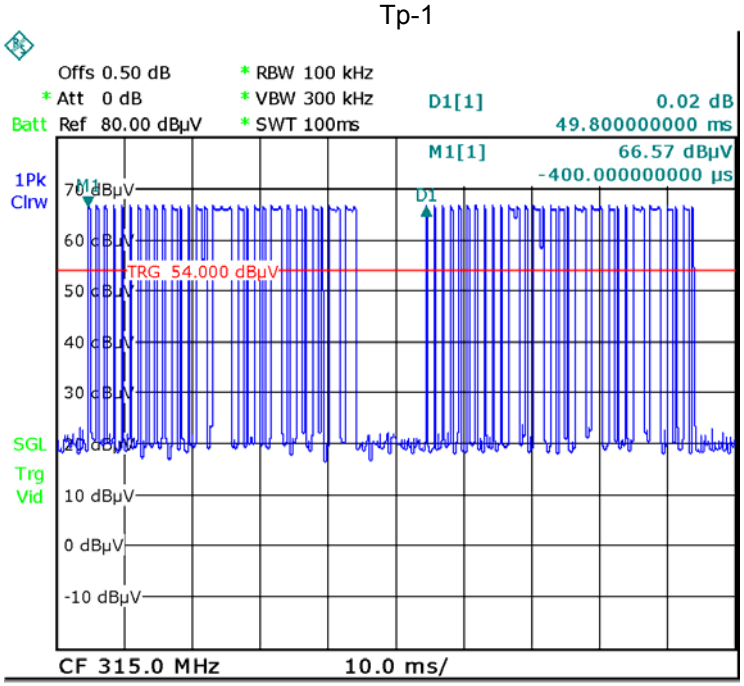
EUT：	Remote Control	Model Name ：	VIS-8005
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa		
Test Voltage ：	Batteries DC 3.0V		
Test Mode ：	TX		

Duty Cycle(%)=Total On interval in a complete pulse train/ Length of a complete pulse train *100 %
Duty Cycle Correction Factor(dB)=20 * Log_{10}(Duty Cycle(%))

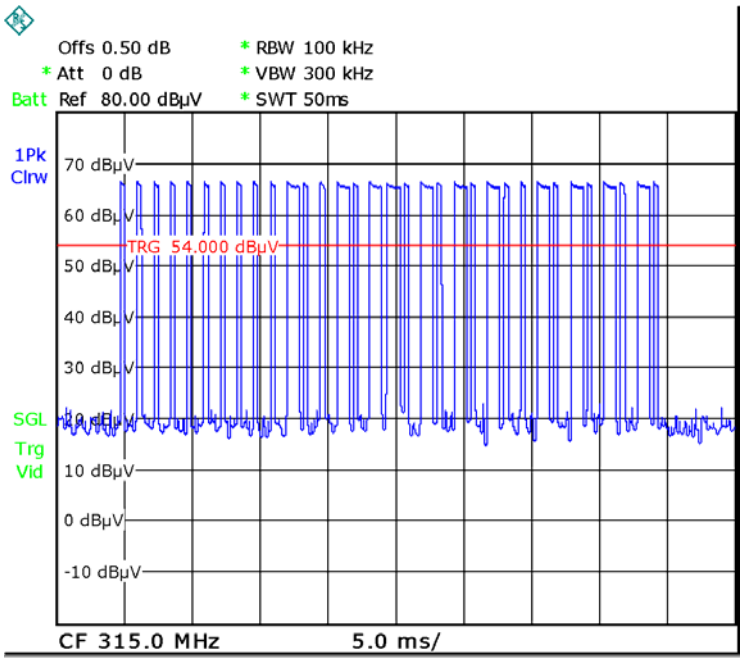
Total transmission time(ms)	49.8
Length of a complete transmission period(ms)	0.92*11+0.28*22=16.28
Duty Cycle(%)	32.7
Duty Cycle Correction Factor(dB)	-9.71

Refer to the duty cycle plot (as below),This device meets the FCC requirement.
Length of a complete pulse train:
Remark: FCC part15.35(c) required that a complete pulse train is more than 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

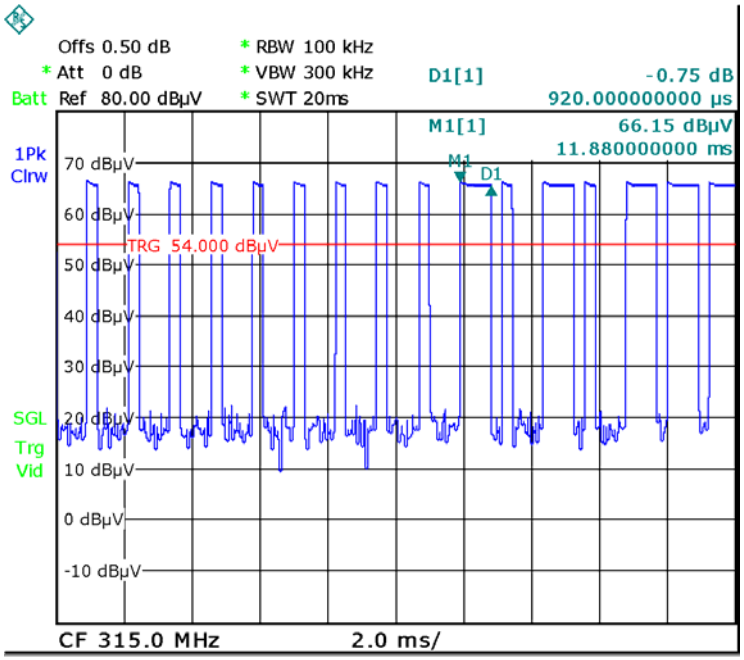
Tp-1



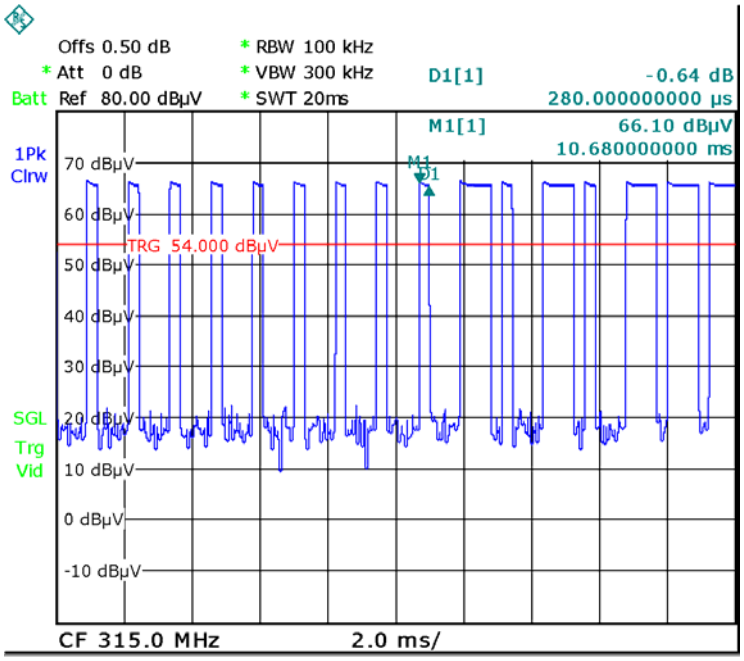
TP-2


Offs 0.50 dB
* RBW 100 kHz
* Att 0 dB
* VBW 300 kHz
Batt Ref 80.00 dBµV
* SWT 50ms
1Pk
Clrw
70 dBµV
60 dBµV
TRG 54.000 dBµV
50 dBµV
40 dBµV
30 dBµV
SGL
Trg
Vid
10 dBµV
0 dBµV
-10 dBµV
CF 315.0 MHz
5.0 ms/

Ton-1


Offs 0.50 dB
* RBW 100 kHz
* Att 0 dB
* VBW 300 kHz
D1[1] -0.75 dB
Batt Ref 80.00 dBµV
* SWT 20ms
920.000000000 µs
M1[1] 66.15 dBµV
11.880000000 ms
1Pk
Clrw
M1
D1
70 dBµV
60 dBµV
TRG 54.000 dBµV
50 dBµV
40 dBµV
30 dBµV
SGL
Trg
Vid
10 dBµV
0 dBµV
-10 dBµV
CF 315.0 MHz
2.0 ms/

Ton-2


Offs 0.50 dB
* RBW 100 kHz
* Att 0 dB
* VBW 300 kHz
Batt Ref 80.00 dBµV
* SWT 20ms
D1[1] -0.64 dB
280.000000000 µs
M1[1] 66.10 dBµV
10.680000000 ms
1Pk
Clrw
70 dBµV
60 dBµV
TRG 54.000 dBµV
50 dBµV
40 dBµV
30 dBµV
SGL
Trg
Vid
20 dBµV
10 dBµV
0 dBµV
-10 dBµV
CF 315.0 MHz
2.0 ms/

7. ANTENNA REQUIREMENT

7.1 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.

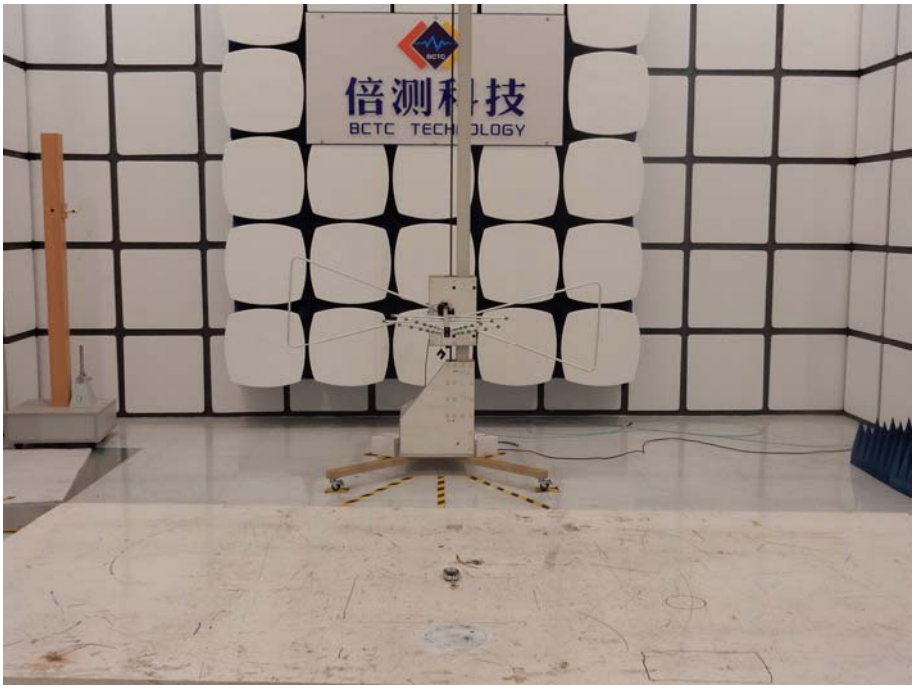
7.2 EUT ANTENNA

The EUT antenna is PCB antenna. It comply with the standard requirement.

8. EUT TEST PHOTO

Radiated Measurement Photos

30MHz-1GHz



Above 1GHz