

FCC CERTIFICATION TEST REPORT FOR

Applicant	:	SHENZHEN HUBSAN INTELLIGENT COMPANY LIMITED
Address	:	13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China. 518054
Equipment under Test	:	FPV Smart Transmitter
Model No	:	H7000
Trade Mark	:	HUBSAN
FCC ID	:	2AEXY7000TX
Manufacturer	:	DONGGUAN TENGSHENG INDUSTRIAL CO., LTD
Address	:	A22# Luyi Street, Tianxin Village, Tangxia Town, Dong guan, China

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City,
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REPORT

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TEST REPORT DECLARE

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Trade mark	:	HUBSAN
FCC ID	:	2AEXY7000TX
Manufacturer	:	DONGGUAN TENGSHENG INDUSTIAL CO., LTD
Address	:	A22# Luyi Street, Tianxin Village, Tangxia Town, Dong guan, China

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart B Class B 2015; ANSI C63.4:2009.

We Declare:

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above (class B). The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC and standards.

Report No:	DDT-R15Q0608-3E4		
Date of Test:	June 1, 2015~June 4, 2015	Date of Report:	June 08, 2015

Prepared By:



Leo Liu/Engineer

Approved By:



Kevin Peng/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

1. Summary of test results

Description of Test Item	Standard	Limits	Results
Power Line Conducted Emission Test	FCC Part 15: 2015 ANSI C63.4: 2009	Class B	PASS
Radiated Emission Test	FCC Part 15: 2015 ANSI C63.4: 2009	Class B	PASS
Note: 'N/A' mean Not Applicable			

2. General test information

2.1. Description of EUT

EUT* Name	: FPV Smart Transmitter
Model Number	: H7000
EUT function description	: Please reference user manual of this device
Power supply	: DC 12V from battery
EUT Class	: Class B, intended primarily for use in the domestic environment
Maximum work frequency	: 5.8GHz
Date of Receipt	: 2016/6/1
Sample Type	: Series production

Note: EUT is the ab. of equipment under test.

2.2. Accessories of EUT

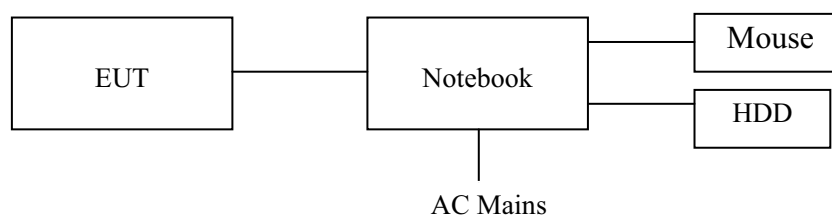
Description of Accessories	Manufacturer	Model number or Type	Serial No.	Other
/	/	/	/	/

2.3. Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Serial No.	Other
Notebook	DELL	Latitude D610	00045-534-136-300	/
Mouse	HP	M-SBF96	417441-001	
HDD	Click-free	HD425	/	

2.4. Block diagram EUT configuration for test

For Data Transmission Mode:



EUT are connected to the Notebook to transmit data by USB cable.

2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

2.6. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808 Tel: +86-0769-22891499 <http://www.dgddt.com>

FCC Registration Number: 270092.

2.7. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test	3.14 dB (Polarize: V)
	3.16 dB (Polarize: H)

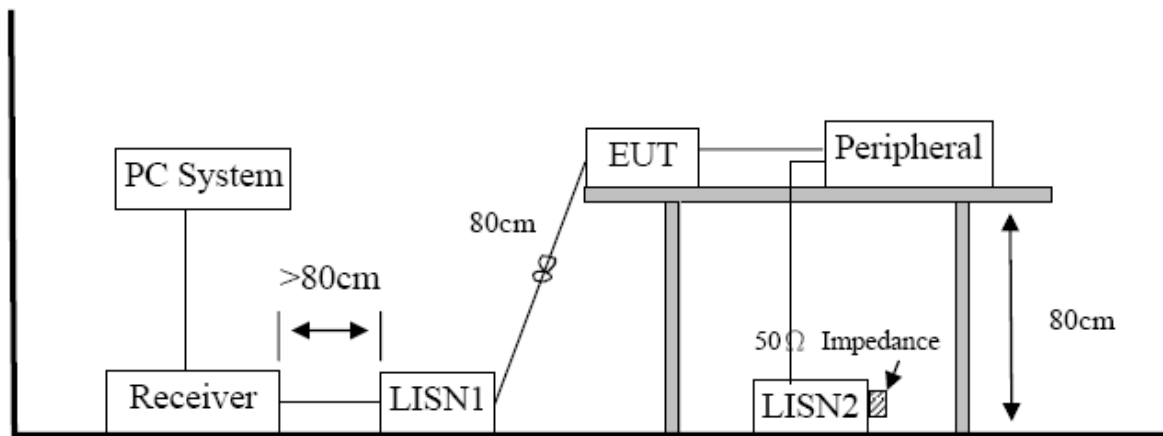
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Power Line Conducted Emission Test

3.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R&S	ESU8	100316	2014/10/25	1 Year
2	LISN 1	R&S	ENV216	101109	2014/10/25	1 Year
3	LISN 2	R&S	ESH2-Z5	100309	2014/10/25	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	101242	2014/10/25	1 Year
5	RF Cable	R&S	R01	10403	2014/10/25	1 Year

3.2. Block diagram of test setup



3.3. Power Line Conducted Emission Limits(Class B)

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

3.4. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 10cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 3.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second AMN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

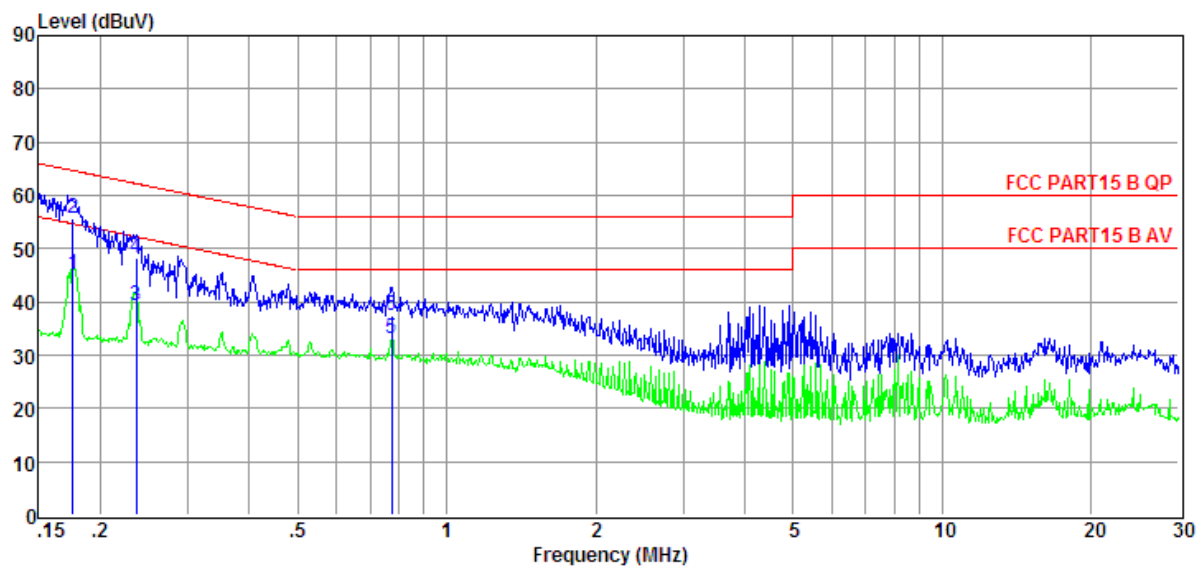
3.5. Test Result

Test Result: Pass.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2015 report data\feiji\CE.EM6**
Test Date : 2015-06-02 **Tested By** : Jerry
EUT : FPV Smart Transmitter **Model Number** : H7000
Power Supply : DC 8.4V from battery **Test Mode** : Data Transmission
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **LISN** : 2014 ENV216/LINE
Memo :

Data: 2



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.18	25.55	9.62	0.02	9.85	45.04	54.68	-9.64	Average	LINE
2	0.18	36.19	9.62	0.02	9.85	55.68	64.68	-9.00	QP	LINE
3	0.24	19.71	9.62	0.02	9.85	39.20	52.22	-13.02	Average	LINE
4	0.24	28.70	9.62	0.02	9.85	48.19	62.22	-14.03	QP	LINE
5	0.78	13.52	9.62	0.08	9.86	33.08	46.00	-12.92	Average	LINE
6	0.78	17.89	9.62	0.08	9.86	37.45	56.00	-18.55	QP	LINE

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

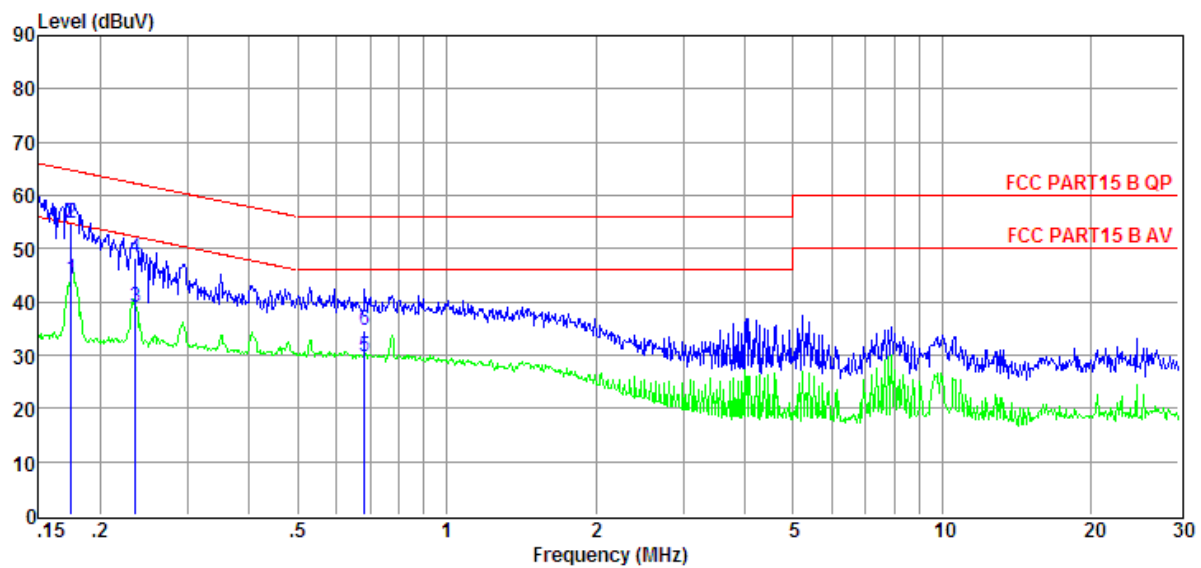
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

TR-4-E-010 Conducted Emission Test Result

Test Site : DDT 1# Shield Room **E:\2015 report data\feiji\CE.EM6**
Test Date : 2015-06-02 **Tested By** : Jerry
EUT : FPV Smart Transmitter **Model Number** : H7000
Power Supply : DC 8.4V from battery **Test Mode** : Data Transmission
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **LISN** : 2014 ENV216/NEUTRAL
Memo :

Data: 4



Item	Freq	Read Level	LISN Factor	Cable Loss	Pulse Limiter Factor	Result Level	Limit Line	Over Limit	Detector	Phase
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)		
1	0.17	24.78	9.59	0.02	9.85	44.24	54.72	-10.48	Average	NEUTRAL
2	0.17	35.30	9.59	0.02	9.85	54.76	64.72	-9.96	QP	NEUTRAL
3	0.24	19.55	9.59	0.02	9.85	39.01	52.26	-13.25	Average	NEUTRAL
4	0.24	28.73	9.59	0.02	9.85	48.19	62.26	-14.07	QP	NEUTRAL
5	0.68	10.23	9.62	0.06	9.85	29.76	46.00	-16.24	Average	NEUTRAL
6	0.68	15.14	9.62	0.06	9.85	34.67	56.00	-21.33	QP	NEUTRAL

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

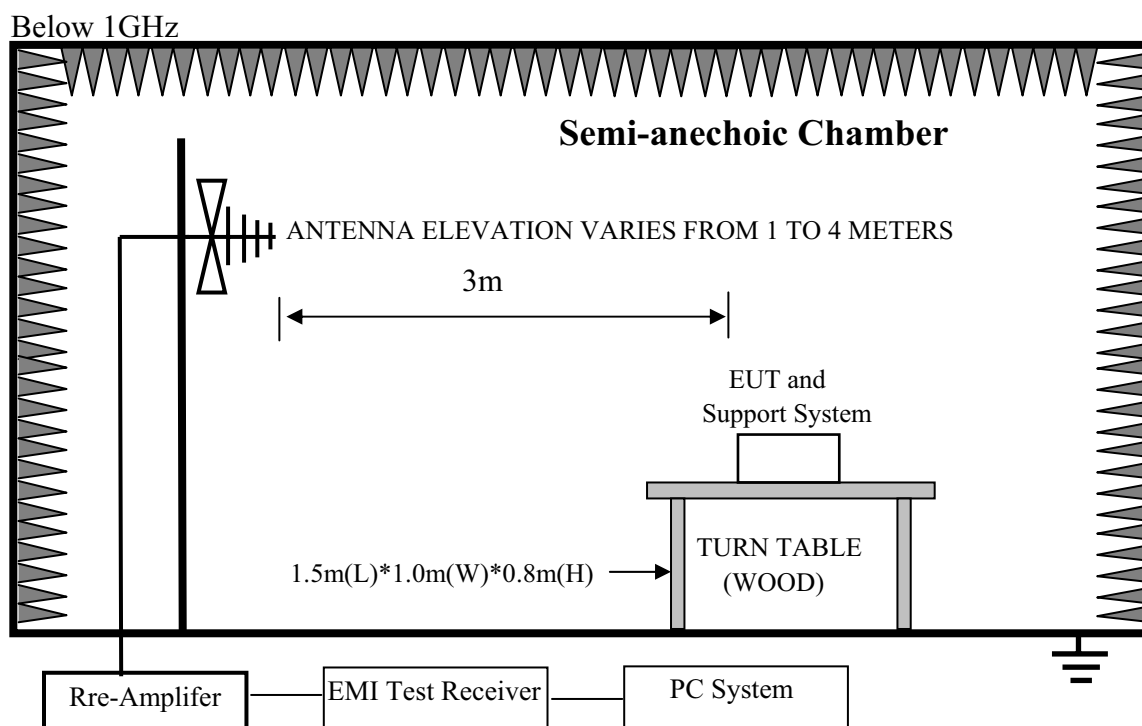
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

4. Radiated emission test

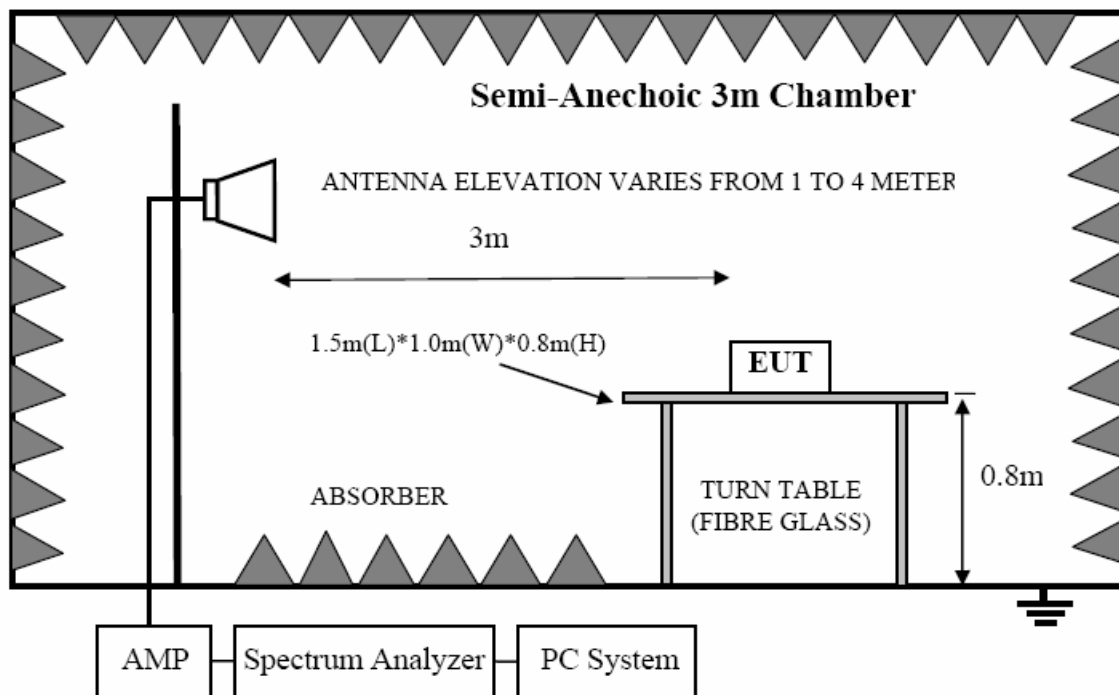
4.1. Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2014/10/25	1 Year
2	Spectrum analyzer	R&S	FSU	1166.1660.26	2014/10/25	1 Year
3	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2015/04/12	1 Year
4	Double Ridged Horn Antenna	R&S	HF907	100276	2014/11/01	1 Year
5	Pre-amplifier	A.H.	PAM0-0118	360	2014/10/25	1 Year
6	RF Cable	R&S	R01	10403	2014/10/25	1 Year
7	RF Cable	R&S	R02	10512	2014/10/25	1 Year

4.2. Block diagram of test setup



Above 1GHz



4.3. Radiated emission limit(Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits dB(μ V)/m
30--88	3	40.0
88--216	3	43.5
216--960	3	46.0
960--1000	3	54.0
Above 1000	3	74 for Peak, 54 for Average

Note: (1) The smaller limit shall apply at the cross point between two frequency bands.

(2) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

4.4. Test Procedure

Procedure of Preliminary Test

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 4.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The test mode(s) described in clause 2.4 were scanned during the preliminary test:

After the preliminary scan, we found the test mode producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

The test data of the worst-case condition(s) was recorded.

The bandwidth setting of the test receiver is 120 kHz.

For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz VBW is set at 3MHz.

4.5. Test result

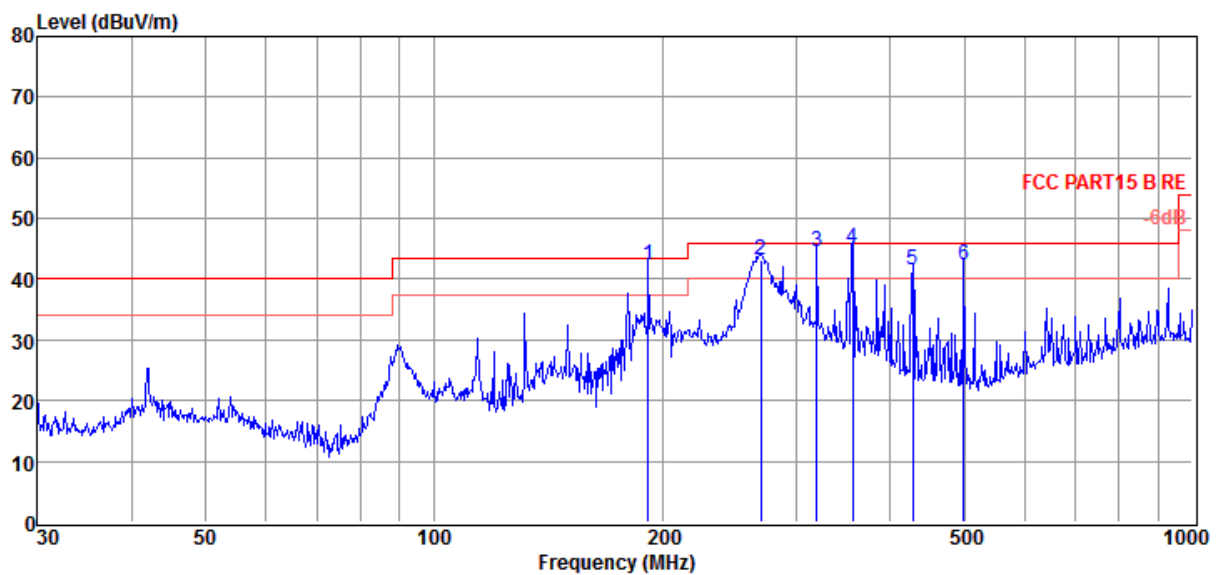
PASS. (See below detailed test result)

Note: All emissions not reported below are too low against the prescribed limits.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2015 Report Data\H7 ID.EM6**
Test Date : 2015-06-02 **Tested By** : Jerry
EUT : FPV Smart Transmitter **Model Number** : H7000
Power Supply : DC 8.4V from battery **Test Mode** : Data Transmission
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2014 VULB 9163/3m/HORIZONTAL
Memo :

Data: 1



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	191.75	29.71	10.53	2.12	42.36	43.50	-1.14	QP	HORIZONTAL
2	269.43	27.16	13.40	2.59	43.15	46.00	-2.85	QP	HORIZONTAL
3	319.94	27.94	13.78	2.76	44.48	46.00	-1.52	QP	HORIZONTAL
4	356.68	27.18	14.88	3.04	45.10	46.00	-0.90	QP	HORIZONTAL
5	428.02	22.28	15.92	3.31	41.51	46.00	-4.49	QP	HORIZONTAL
6	499.43	22.66	16.00	3.67	42.33	46.00	-3.67	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

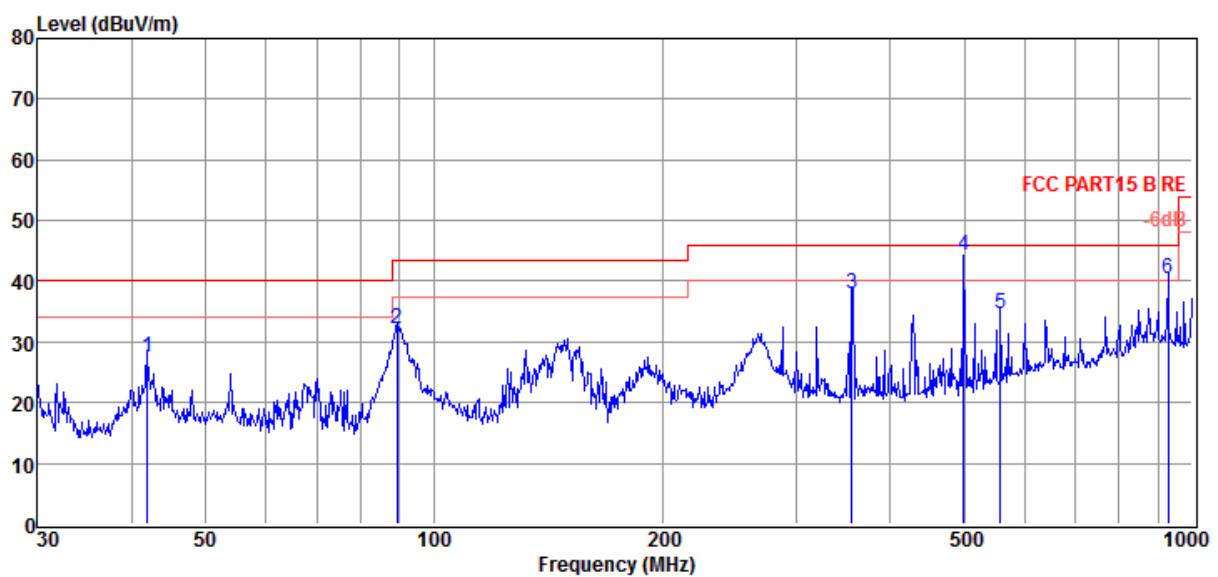
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:\2015 Report Data\H7 ID.EM6**
Test Date : 2015-06-02 **Tested By** : Jerry
EUT : FPV Smart Transmitter **Model Number** : H7000
Power Supply : DC 8.4V from battery **Test Mode** : Data Transmission
Condition : Temp:24.5°C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2014 VULB 9163/3m/VERTICAL
Memo :

Data: 2



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	41.86	12.57	14.00	1.01	27.58	40.00	-12.42	QP	VERTICAL
2	89.28	19.13	11.60	1.43	32.16	43.50	-11.34	QP	VERTICAL
3	355.43	20.11	14.88	3.02	38.01	46.00	-7.99	QP	VERTICAL
4	499.43	24.54	16.00	3.67	44.21	46.00	-1.79	QP	VERTICAL
5	558.73	13.48	17.39	3.87	34.74	46.00	-11.26	QP	VERTICAL
6	929.01	13.41	21.89	4.98	40.28	46.00	-5.72	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

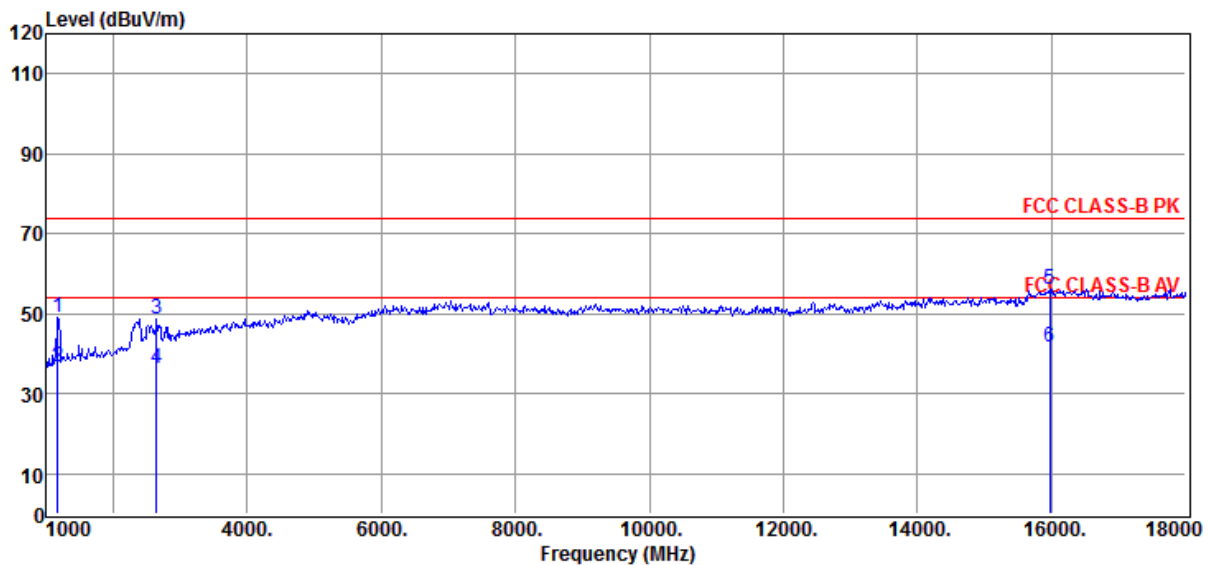
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2015 Report Data\H7H ID.EM6
Test Date : 2015-06-02 **Tested By** : Jerry
EUT : FPV Smart Transmitter **Model Number** : H7000
Power Supply : DC 8.4V from battery **Test Mode** : Data Transmission
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2014 HF907/3m/VERTICAL
Memo :

Data: 3



Item (Mark)	Freq (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	1170.00	47.95	25.19	27.45	3.44	49.13	74.00	-24.87	Peak	VERTICAL
2	1170.00	35.59	25.19	27.45	3.44	36.77	54.00	-17.23	Average	VERTICAL
3	2649.00	42.81	30.81	30.32	5.55	48.85	74.00	-25.15	Peak	VERTICAL
4	2649.00	30.20	30.81	30.32	5.55	36.24	54.00	-17.76	Average	VERTICAL
5	15977.00	35.82	43.04	36.45	13.69	56.10	74.00	-17.90	Peak	VERTICAL
6	15977.00	21.20	43.04	36.45	13.69	41.48	54.00	-12.52	Average	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

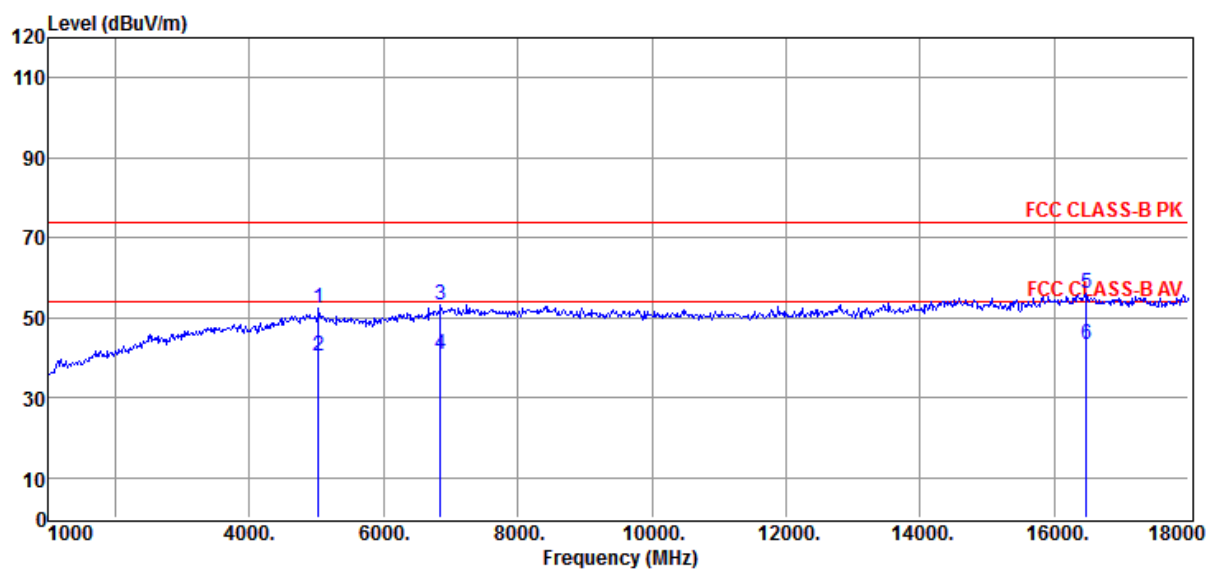
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber **E:** \2015 Report Data\H7H ID.EM6
Test Date : 2015-06-02 **Tested By** : Jerry
EUT : FPV Smart Transmitter **Model Number** : H7000
Power Supply : DC 8.4V from battery **Test Mode** : Data Transmission
Condition : Temp:24.5'C,Humi:55%,
 Press:100.1kPa **Antenna/Distance** : 2014 HF907/3m/HORIZONTAL
Memo :

Data: 4



Item (Mark)	Freq (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	5029.00	37.67	35.67	29.02	8.22	52.54	74.00	-21.46	Peak	HORIZONTAL
2	5029.00	25.60	35.67	29.02	8.22	40.47	54.00	-13.53	Average	HORIZONTAL
3	6848.00	36.01	36.82	29.40	9.78	53.21	74.00	-20.79	Peak	HORIZONTAL
4	6848.00	23.60	36.82	29.40	9.78	40.80	54.00	-13.20	Average	HORIZONTAL
5	16470.00	35.37	43.66	36.63	13.76	56.16	74.00	-17.84	Peak	HORIZONTAL
6	16470.00	22.59	43.66	36.63	13.76	43.38	54.00	-10.62	Average	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.