

# Test Report No. 7191145445-EEC16/05

dated 28 Sep 2016



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## FORMAL REPORT ON TESTING IN ACCORDANCE WITH 47 CFR FCC Parts 15B & C OF A MARITIME COMMUNICATION SYSTEM [ Model : SATLINK FLEETONE ] [ FCC ID : XGW-SLFLTONE ]

### TEST FACILITY

TÜV SÜD PSB Pte Ltd  
Electrical & Electronics Centre (EEC), Product Services,  
No. 1 Science Park Drive, Singapore 118221 Or

### FCC REG. NO.

99142 (3m and 10m Semi-Anechoic Chamber, Science Park)

### IND. CANADA REG. NO.

2932I-1 (3m and 10m Semi-Anechoic Chamber, Science Park)

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### QUOTATION NUMBER

2191039334 & 2191046940

### JOB NUMBER

7191136534 & 7191145445

### TEST PERIOD

25 Apr 2016 – 16 Jun 2016

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LA-2007-0380-A  
LA-2007-0381-F  
LA-2007-0382-B  
LA-2007-0383-G  
LA-2007-0384-G  
LA-2007-0385-E  
LA-2007-0386-C  
LA-2010-0464-D

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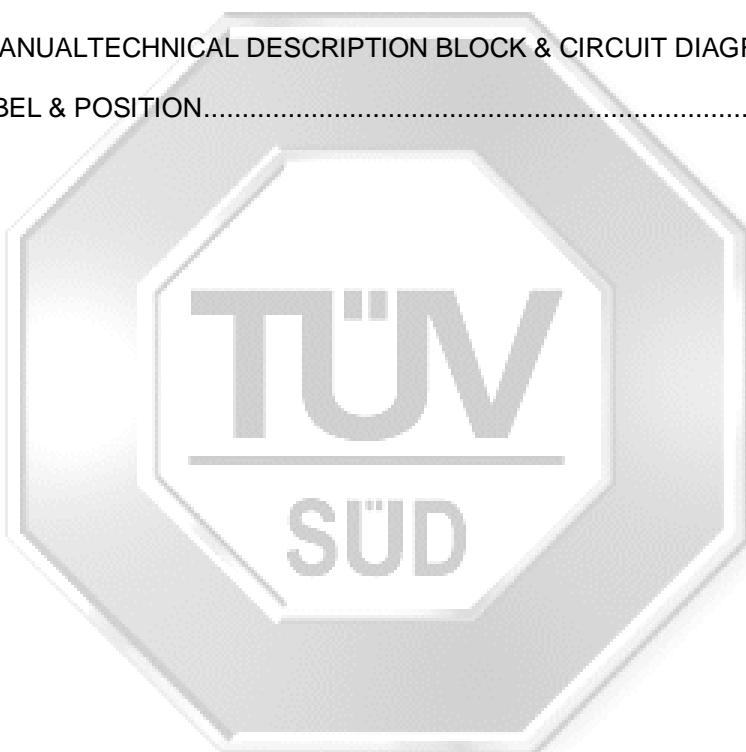
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## TEST SUMMARY

The product was tested in accordance with the customer's specifications.

### Test Results Summary

Test Standard	Description	Pass / Fail
47 CFR FCC Part 15		
15.107(a), 15.207	Conducted Emissions	Not Applicable *See Note 6
15.109(a), 15.205, 15.209	Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)	Pass
15.247(a)(2)	Spectrum Bandwidth (6dB Bandwidth Measurement)	Not Tested *See Note 8
15.247(b)(3)	Maximum Peak Power	Not Tested *See Note 8
15.247(d)	RF Conducted Spurious Emissions (Non-Restricted Bands)	Not Tested *See Note 8
15.247(d)	RF Conducted Spurious Emissions (Restricted Bands)	Not Tested *See Note 8
15.247(d)	Band Edge Compliance (Conducted)	Not Tested *See Note 8
15.247(d)	Band Edge Compliance (Radiated)	Not Tested *See Note 8
15.247(e)	Peak Power Spectral Density	Not Tested *See Note 8
1.1310	Maximum Permissible Exposure	Not Tested *See Note 8



**TEST SUMMARY**

**Notes**

1. The channels as listed below, under the different configurations were tested for 802.11b WLAN.

Transmit Channel	Frequency (GHz)	Modulation	Data Rate
Channel 1 (Lower Channel)	2.412	DBPSK	1Mbps
Channel 6 (Middle Channel)	2.437	DBPSK	1Mbps
Channel 11 (Upper Channel)	2.462	DBPSK	1Mbps
Channel 1 (Lower Channel)	2.412	DQPSK	2Mbps
Channel 6 (Middle Channel)	2.437	DQPSK	2Mbps
Channel 11 (Upper Channel)	2.462	DQPSK	2Mbps
Channel 1 (Lower Channel)	2.412	CCK	11Mbps
Channel 6 (Middle Channel)	2.437	CCK	11Mbps
Channel 11 (Upper Channel)	2.462	CCK	11Mbps

2. The channels as listed below, under the different configurations were tested for 802.11g WLAN.

Transmit Channel	Frequency (GHz)	Modulation	Data Rate
Channel 1 (Lower Channel)	2.412	BPSK	9Mbps
Channel 6 (Middle Channel)	2.437	BPSK	9Mbps
Channel 11 (Upper Channel)	2.462	BPSK	9Mbps
Channel 1 (Lower Channel)	2.412	QPSK	18Mbps
Channel 6 (Middle Channel)	2.437	QPSK	18Mbps
Channel 11 (Upper Channel)	2.462	QPSK	18Mbps
Channel 1 (Lower Channel)	2.412	16QAM	36Mbps
Channel 6 (Middle Channel)	2.437	16QAM	36Mbps
Channel 11 (Upper Channel)	2.462	16QAM	36Mbps
Channel 1 (Lower Channel)	2.412	64QAM	54Mbps
Channel 6 (Middle Channel)	2.437	64QAM	54Mbps
Channel 11 (Upper Channel)	2.462	64QAM	54Mbps

3. The channels as listed below, under the different configurations were tested for 802.11n WLAN.

Transmit Channel	Frequency (GHz)	Modulation	Data Rate
Channel 1 (Lower Channel)	2.412	BPSK	6.5Mbps
Channel 6 (Middle Channel)	2.437	BPSK	6.5Mbps
Channel 11 (Upper Channel)	2.462	BPSK	6.5Mbps
Channel 1 (Lower Channel)	2.412	QPSK	19.5Mbps
Channel 6 (Middle Channel)	2.437	QPSK	19.5Mbps
Channel 11 (Upper Channel)	2.462	QPSK	19.5Mbps
Channel 1 (Lower Channel)	2.412	16QAM	39Mbps
Channel 6 (Middle Channel)	2.437	16QAM	39Mbps
Channel 11 (Upper Channel)	2.462	16QAM	39Mbps
Channel 1 (Lower Channel)	2.412	64QAM	65Mbps
Channel 6 (Middle Channel)	2.437	64QAM	65Mbps
Channel 11 (Upper Channel)	2.462	64QAM	65Mbps

## TEST SUMMARY

### Notes (Continued)

4. The EUT is a Class B device when in non-transmitting state and meets the 47 CFR FCC Part15B Class B requirements.
5. All test measurement procedures are according to ANSI C63.4: 2014, ANSI C63.10: 2013 and KDB 558074 D01 DTS Measurement Guidance V03R05.
6. The Equipment Under Test (EUT) is a battery operated device / DC operated device and contains no provision for public utility connections.
7. The EUT was tested using fully charged batteries with DC voltage of 12.8V.
8. As per Addvalue Innovation Pte Ltd's declaration, the Embedded WiFi Module, HF-A21-SMT (FCC ID: 2ACSV-HF-A21-SMT) from High-Flying Electronics Technology Co., Ltd. was integrated to Maritime Communication System, Fleet One V2 without any hardware or software modifications. No changes were made to the WiFi module in integrating to this product.

The WiFi Module, HF-A21-SMT from High-Flying Electronics Technology Co., Ltd. was tested and reported in R011506375 issued by Anbotek Compliance Laboratory Limited on 24 Jul 2015.

9. Refer to below declaration from Manufacturer

### Product Equality & Identical Electronic module – Manufacturer Declaration

We Addvalue Innovation Pte Ltd sole manufacturer and certification owner of MARITIME COMMUNICATION SYSTEM FleetOne V2 product, here by declaring that the **Fleet One V2** and **Satlink FleetOne** are Equally same in terms of its functionality, construction, operational performance and using identically same electronic module internal. However the only difference is the new product name is under our OEM client named Satlink a Spanish company shall be marketing brand name of Satlink FleetOne , So the Silkscreen logo appear on the Enclosure as per below image and applicable changes shall appear in the product rating label as per below artwork.



MODEL: Fleet One V2  
Order Code: FLV2-9TU00-01  
POWER: DC 12V, 6A /24V, 3A (Max. 72 watts)



Made in Malaysia      Designed in Singapore

Model: Satlink FleetOne  
Order Code: SLF1-9TU00-01  
Power: DC 12V, 6A /24V, 3A (Max. 72 watts)



Made in Malaysia      Designed in Singapore



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**TEST SUMMARY**

**Modifications**

No modifications were made.





## PRODUCT DESCRIPTION

Description	: The Equipment Under Test (EUT) is a <b>MARITIME COMMUNICATION SYSTEM</b> named as <b>Satlink FleetOne</b> . It consists of i. Below Deck Unit (BDU) ii. Above Deck unit (ADU) iii. Satlink FleetOne Primary Handset (PHS)
Applicant	: Addvalue Innovation Pte Ltd 8 Tai Seng Link, Level 5 (Wing 2) Singapore 534158
Manufacturer	: Satlink A/S Avda. de la Industria, 53 28108 Alcobendas – Madrid (SPAIN)
Factory (ies)	: Beyonics Technology (Senai) Sdn Bhd No. 96 (Plot 128), Jalan i-Park 1/10, Kawasan Perindustrian i-Park, 81000 Bandar Indahpura, Kulaijaya, Johor, Malaysia
Brand	: Satlink A/S
Model Number	: Satlink FleetOne
FCC ID	: XGW-SLFLTONE
Serial Number	: Nil
Microprocessor	: OMAP L138
Operating / Transmitting Frequency	: <u>Satellite Transmitting</u> 1626.5 MHz – 1660.5 MHz  <u>Satellite Receiving</u> 1518.0 MHz – 1559.0 MHz  <u>GPS Receiving</u> 1575.42MHz
Clock / Oscillator Frequency	: <u>Baseband Board</u> 32.768KHz, 4.9152MHz, 24MHz, 25MHz, 16.384MHz <u>RF Board</u> 4.0MHz, 24.192MHz
Modulation / Emissions Designator	: pi/4QPSK and 16QAM (Satellite Transmit) pi/4QPSK and 16QAM (Satellite Receive) QPSK (GPS)
Antenna Gain	: WLAN Antenna Monopole , 2dBi Satellite antenna, 10 dBi
Port / Connectors	: 1xRJ45 LAN Port 1xCircular Connector for Primary Handset 1xRJ11 Phone Port 1xRS232 serial Port GPS output NMEA 0183 1x10pin I/O Connector port for External devices
Rated Input Power	: 12Vdc / 24Vdc via Battery Satlink A/S



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#### **SUPPORTING EQUIPMENT DESCRIPTION**

The EUT was tested as a stand-alone unit without any supporting equipment.





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#### EUT OPERATING CONDITIONS

##### 47 CFR FCC Part 15

###### 1. Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)

The EUT was exercised by operating in maximum continuous transmission in test mode, i.e transmitting at lower, middle and upper channels respectively at one time.



**RADIATED EMISSION TEST**

**47 CFR FCC Part 15.205 Restricted Bands**

<b>MHz</b>	<b>MHz</b>	<b>MHz</b>	<b>GHz</b>
0.090	-	0.110	16.42
0.495	-	0.505	16.69475
2.1735	-	2.1905	16.80425
4.125	-	4.128	25.5
4.17725	-	4.17775	37.5
4.20725	-	4.20775	73
6.215	-	6.218	74.8
6.26775	-	6.26825	108
6.31175	-	6.31225	123
8.291	-	8.294	149.9
8.362	-	8.366	156.52475
8.37625	-	8.38675	156.7
8.41425	-	8.41475	162.0125
12.29	-	12.293	167.72
12.51975	-	12.52025	240
12.57675	-	12.57725	322
13.36	-	13.41	335.4
			410
			614
			1240
			1427
			1626.5
			1646.5
			1710
			1722.2
			2300
			2390
			2483.5
			2500
			2690
			2900
			3260
			3267
			3332
			3339
			3345.8
			3358
			3600
			4400
			Above 38.6

**47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Limits**

<b>Frequency Range (MHz)</b>	<b>Quasi-Peak Limit Values (dB<math>\mu</math>V/m)</b>
0.009 - 0.490	20 log [2400 / F (kHz)] @ 300m
0.490 - 1.705	20 log [24000 / F (kHz)] @ 30m
1.705 - 30.0	30.0 @ 30m
30 - 88	40.0 @ 3m
88 - 216	43.5 @ 3m
216 - 960	46.0 @ 3m
Above 960	54.0* @ 3m

\* For frequency bands 9kHz – 90kHz, 110kHz – 490kHz and above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.

**47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Instrumentation**

<b>Instrument</b>	<b>Model</b>	<b>S/No</b>	<b>Cal Due Date</b>
R&S Test Receiver – ESI1	ESI40	100010	14 Jul 2016
TDK-RF Horn Antenna	HRN-0118	130256	18 Sep 2016
Schaffner Bilog Antenna -(30MHz-2GHz) BL4	CBL6112B	2593	15 Dec 2016
R&S Preamplifier (1GHz -18GHz)	SCU18	102191	11 Mar 2017
Com-Power Preamplifier (1MHz-1GHz)	PAM-103	441096	09 Oct 2016
ETS Horn Antenna(18GHz-40GHz)(Ref)	3116	0004-2474	14 Oct 2016
Toyo Preamplifier (26.5GHz-40GHz)	HAP26-40W	00000005	14 Oct 2016
Agilent Preamplifier(1GHz-26.5GHz) (PA18)	8449D	3008A02305	06 Oct 2016
EMCO Loop Ant (ext)_red_00134413	6502	134413	01 Oct 2016
K&L Microwave Tunable Band Reject Filter	3TNF-1000/2000-N/N	436	Output Monitor
Micro-tronics Bandstop Filter (2.4GHz)	BRM50701-02	007	13 Aug 2016

## RADIATED EMISSION TEST

### **47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Setup**

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table for measurement up to 1GHz. For measurement above 1GHz, 1.5m height table was used.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

### **47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Method**

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
  - a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
  - b. The EUT was then rotated to the direction that gave the maximum emission.
  - c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point in the range of 9kHz – 90kHz, 110kHz – 490kHz and above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from the lowest radio frequency signal generated from the EUT, without going below 9kHz to 10<sup>th</sup> harmonics of the EUT fundamental frequency, using the loop antenna for frequency below 30MHz, Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

### **Sample Calculation Example**

At 300 MHz

Q-P limit (Class B) = 46.0 dB $\mu$ V/m

Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB

Q-P reading obtained directly from EMI Receiver = 40.0 dB $\mu$ V/m  
(Calibrated level including antenna factors & cable losses)

Therefore, Q-P margin = 46.0 - 40.0 = 6.0

i.e. 6.0 dB below Q-P limit



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**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Test Input Power	12Vdc	Temperature	22°C
Test Distance	3m ( $\geq$ 30MHz – 25GHz)	Relative Humidity	52%
Data Speed	IEEE 802.11b 11Mbps (Worst)	Atmospheric Pressure	1030mbar
		Tested By	Dylan Lin

Spurious Emissions ranging from 9kHz – 30MHz (for 9kHz – 90kHz, 110kHz – 490kHz) \*See Note 3

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
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Spurious Emissions ranging from 9kHz – 30MHz \*See Note 3

Frequency (MHz)	Q-P Value (dB $\mu$ V/m)	Q-P Limit (dB $\mu$ V/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Channel
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Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dB $\mu$ V/m)	Q-P Limit (dB $\mu$ V/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Channel
61.4130	34.6	40.0	5.4	300	74	H	1
181.1760	32.4	43.5	11.1	100	304	V	1
483.5280	27.3	46.0	18.7	202	260	H	1
499.2350	28.0	46.0	18.0	300	257	H	1
864.4140	31.3	46.0	14.7	100	19	V	1
952.7640	34.9	46.0	11.1	100	19	V	1



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**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Test Input Power	12Vdc	Temperature	22°C
Test Distance	3m ( $\geq$ 30MHz – 25GHz)	Relative Humidity	52%
Data Speed	IEEE 802.11b 11Mbps (Worst)	Atmospheric Pressure	1030mbar
		Tested By	Dylan Lin

**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
3.6009	51.5	74.0	22.5	44.3	54.0	9.7	100	82	H	1
4.8255	55.8	74.0	18.2	44.6	54.0	9.4	400	236	H	1
7.2144	65.0	74.0	9.0	47.0	54.0	7.0	200	174	V	1
12.0479	55.5	74.0	18.5	50.9	54.0	3.1	400	359	V	1
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**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
4.8761	56.9	74.0	17.1	45.5	54.0	8.5	400	241	H	6
5.9488	51.8	74.0	22.2	46.7	54.0	7.3	400	74	V	6
7.2873	67.2	74.0	6.8	49.1	54.0	4.9	300	359	V	6
12.1693	55.8	74.0	18.2	51.2	54.0	2.8	300	168	V	6
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**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
4.9267	56.3	74.0	17.7	44.8	54.0	9.2	300	326	V	11
7.3844	65.3	74.0	8.7	47.1	54.0	6.9	200	10	V	11
12.3150	54.2	74.0	19.8	49.7	54.0	4.3	200	168	V	11
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**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Test Input Power	12Vdc	Temperature	22°C
Test Distance	3m ( $\geq$ 30MHz – 25GHz)	Relative Humidity	52%
Data Speed	IEEE 802.11g 54Mbps (Worst)	Atmospheric Pressure	1030mbar
		Tested By	Dylan Lin

**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
7.2351	60.5	74.0	13.5	45.0	54.0	9.0	186	12	V	1
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**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
7.3130	61.5	74.0	12.5	46.0	54.0	8.0	153	11	V	6
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**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
7.3849	62.0	74.0	12.0	46.5	54.0	7.5	259	359	V	11
7.4672	62.7	74.0	11.3	49.1	54.0	4.9	203	12	V	11
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**RADIATED EMISSION TEST**

**47 CFR FCC Parts 15.109(a), 15.205 and 15.209 Radiated Emission Results**

Test Input Power	12Vdc	Temperature	22°C
Test Distance	3m ( $\geq$ 30MHz – 25GHz)	Relative Humidity	52%
Data Speed	IEEE 802.11n MCS12 (Worst)	Atmospheric Pressure	1030mbar
		Tested By	Dylan Lin

**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
4.8237	58.5	74.0	15.5	41.9	54.0	12.1	398	236	H	1
7.2346	67.2	74.0	6.8	51.0	54.0	3.0	227	173	V	1
12.0576	55.6	74.0	18.4	39.1	54.0	14.9	400	0	V	1
--	--	--	--	--	--	--	--	--	--	--
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--	--	--	--	--	--	--	--	--	--	--

**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
4.8743	58.6	74.0	15.4	42.0	54.0	12.0	376	244	H	6
7.3060	67.5	74.0	6.5	50.5	54.0	3.5	225	359	V	6
12.1796	58.1	74.0	15.9	39.8	54.0	14.2	337	164	V	6
--	--	--	--	--	--	--	--	--	--	--
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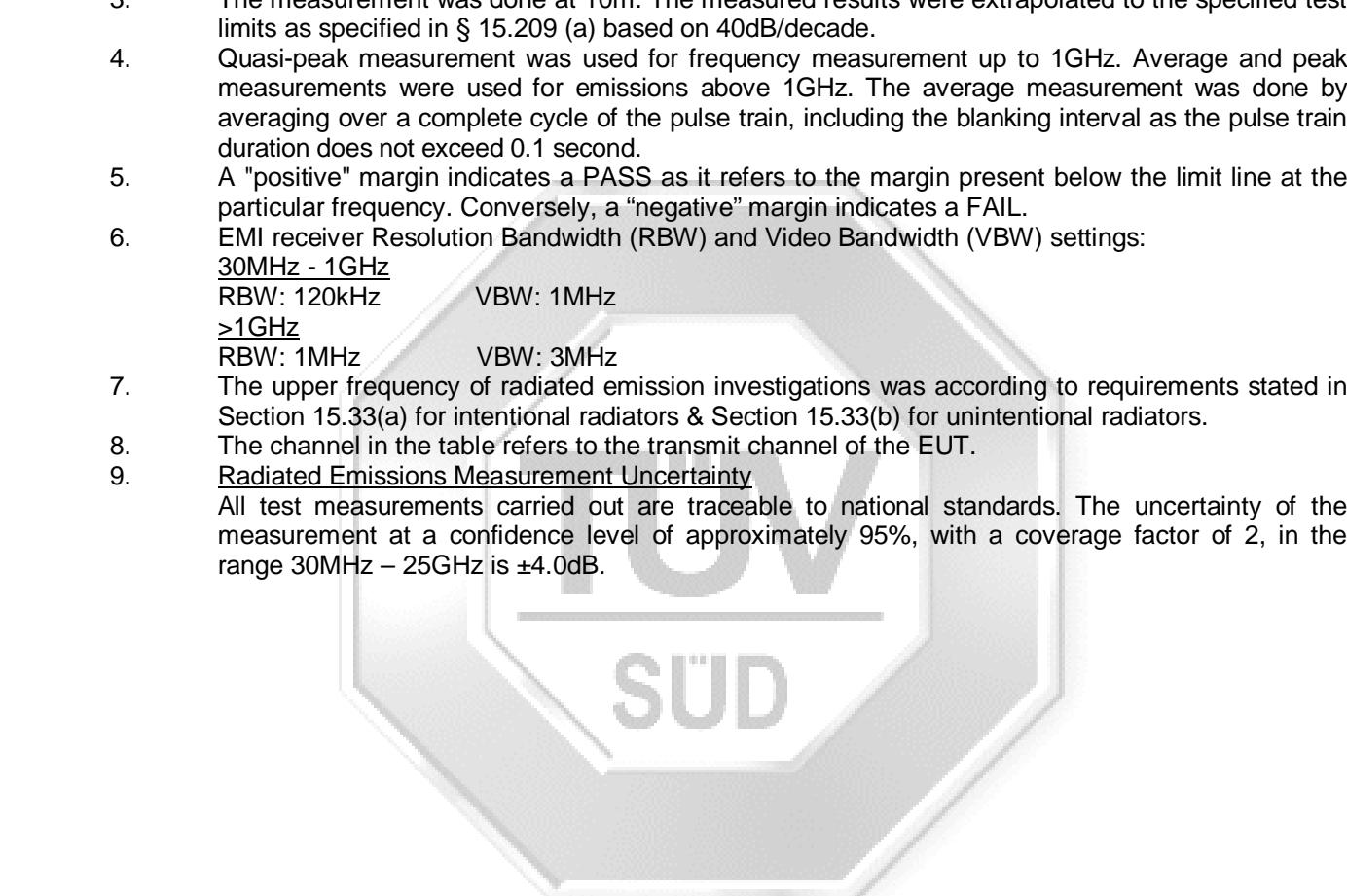
**Spurious Emissions above 1GHz – 25GHz**

Freq (GHz)	Peak Value (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)	Peak Margin (dB)	AV Value (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)	Ch
4.9252	58.2	74.0	15.8	41.2	54.0	12.8	301	330	V	11
7.3862	67.2	74.0	6.8	50.4	54.0	3.6	218	12	V	11
12.3076	58.0	74.0	16.0	40.1	54.0	13.9	178	166	V	11
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## RADIATED EMISSION TEST

### Notes

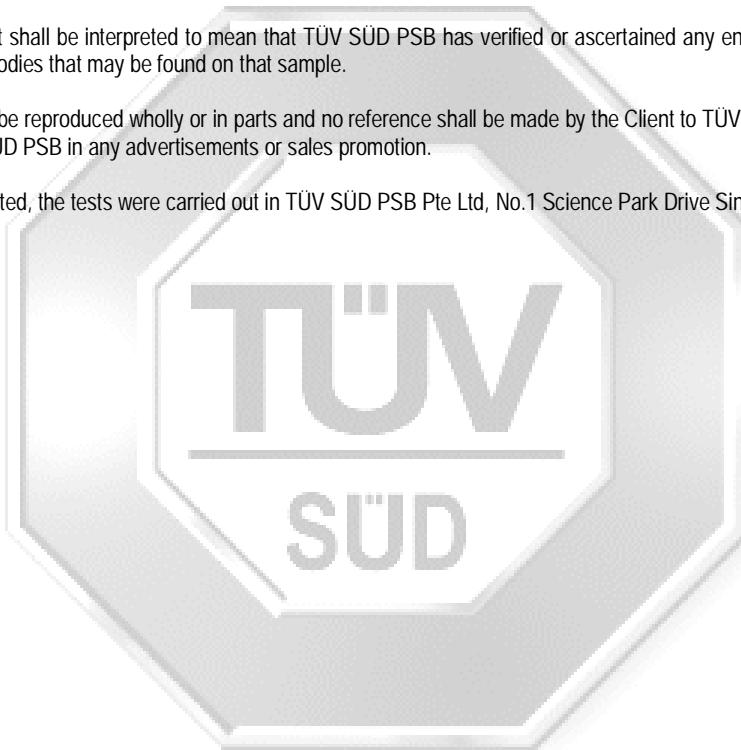
1. All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. "--" indicates no emissions were found and shows compliance to the limits.
3. The measurement was done at 10m. The measured results were extrapolated to the specified test limits as specified in § 15.209 (a) based on 40dB/decade.
4. Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by averaging over a complete cycle of the pulse train, including the blanking interval as the pulse train duration does not exceed 0.1 second.
5. A "positive" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative" margin indicates a FAIL.
6. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:  
30MHz - 1GHz  
RBW: 120kHz      VBW: 1MHz  
>1GHz  
RBW: 1MHz      VBW: 3MHz
7. The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
8. The channel in the table refers to the transmit channel of the EUT.
9. Radiated Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is  $\pm 4.0\text{dB}$ .



Please note that this Report is issued under the following terms :

1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.
2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.
3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.
4. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.
5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

July 2011



## RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

FCC ID: **2ACSV-HF-A21-SMT**

### EUT Specification

EUT	<b>SPORT DVR</b>
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <input type="checkbox"/> Others _____
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	17.29dBm (0.054W)
<b>Antenna gain (Max)</b>	2.07 dBi
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm <sup>2</sup> )	Average Time
<b>(A) Limits for Occupational/Control Exposures</b>				
<b>300-1500</b>	--	--	<b>F/300</b>	<b>6</b>
<b>1500-100000</b>	--	--	<b>5</b>	<b>6</b>
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
<b>300-1500</b>	--	--	<b>F/1500</b>	<b>6</b>
<b>1500-100000</b>	--	--	<b>1</b>	<b>30</b>

$$\text{Friis transmission formula: } P_d = (P_{out} * G) / (4 * \pi * R^2)$$

Where

$P_d$ = Power density in  $\text{mW/cm}^2$

$P_{out}$ =output power to antenna in  $\text{mW}$

$G$ = gain of antenna in linear scale

$\pi=3.1416$

$R$ = distance between observation point and center of the radiator in  $\text{cm}$

$P_d$  the limit of MPE,  $1\text{mW/cm}^2$ . If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

## Measurement Result

Operating Mode	Channel Frequency (MHz)	Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm ( $\text{mW/cm}^2$ )	Power density Limits ( $\text{mW/cm}^2$ )
802.11b	2412	16.91	16.91±1	17.91	2.07	0.01980	1
	2437	17.03	17.03±1	18.03	2.07	0.02037	1
	2462	17.29	17.29±1	18.29	2.07	0.02161	1
802.11g	2412	14.63	14.63±1	15.63	2.07	0.01171	1
	2437	14.77	14.77±1	15.77	2.07	0.01210	1
	2462	14.48	14.48±1	15.48	2.07	0.01132	1
802.11n (HT20)	2412	14.18	14.18±1	15.18	2.07	0.01056	1
	2437	14.17	14.17±1	15.17	2.07	0.01054	1
	2462	14.30	14.30±1	15.30	2.07	0.01086	1
802.11n (HT40)	2422	16.38	16.38±1	17.38	2.07	0.01753	1
	2437	16.33	16.33±1	17.33	2.07	0.01733	1
	2452	16.56	16.56±1	17.56	2.07	0.01827	1

**TCB****GRANT OF EQUIPMENT  
AUTHORIZATION****TCB****Certification****Issued Under the Authority of the  
Federal Communications Commission****By:**

**Siemic Inc.  
775 Montague Expressway  
Milpitas, CA 95035**

**Date of Grant: 08/10/2015****Application Dated: 08/10/2015**

**High-Flying Electronics Technology Co., Ltd.  
Room 1002, Building 1, No.3000, Longdong Avenue,  
Pudong New Area,  
Shanghai, 201203  
China**

**Attention: Sen Xie , General Manager**

**NOT TRANSFERABLE**

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

<b>FCC IDENTIFIER:</b>	2ACSV-HF-A21-SMT
<b>Name of Grantee:</b>	High-Flying Electronics Technology Co., Ltd.
<b>Equipment Class:</b>	Digital Transmission System
<b>Notes:</b>	Embedded Wi-Fi Module
<b>Modular Type:</b>	Single Modular
<b>Grant Notes</b>	<b>FCC Rule Parts</b>
	15C
	<b>Frequency Range (MHz)</b>
	2412.0 - 2462.0
	<b>Output Watts</b>
	0.054
	<b>Frequency Tolerance</b>
	<b>Emission Designator</b>

Single Modular Approval for Mobile platform.

Power listed is the maximum conducted output power. Device contains 20 and 40 MHz signal bandwidth.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi- transmitter product procedures. End-Users must be provided with transmitter operation conditions for satisfying RF exposure compliance