

FCC PART 15.247



TEST REPORT

For

**ALFA NETWORK Inc.**

4F-1, No. 106 Rueiguang Rd., Neihu District, Taipei City, Taiwan. R.O.C.

**FCC ID: UQ29280**

<b>Report Type:</b> Class II Permissive Change	<b>Product Type:</b> Surveillance transmission system
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<b>Report Number:</b>	R1DG120426001- 00A1
<b>Report Date:</b>	2012-05-10
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**Note:** This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP\*, or any agency of the Federal Government.

\* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

## **TABLE OF CONTENTS**

<b>GENERAL INFORMATION.....</b>	<b>3</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
OBJECTIVE .....	3
RELATED SUBMITTAL(S)/GRANT(S) .....	4
TEST METHODOLOGY .....	4
TEST FACILITY .....	5
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
DESCRIPTION OF TEST CONFIGURATION .....	6
EUT EXERCISE SOFTWARE .....	6
EQUIPMENT MODIFICATIONS .....	6
REMOTE SUPPORT EQUIPMENT .....	6
EXTERNAL CABLE.....	7
BLOCK DIAGRAM OF TEST SETUP .....	7
<b>SUMMARY OF TEST RESULTS .....</b>	<b>8</b>
<b>FCC §15.203 - ANTENNA REQUIREMENT.....</b>	<b>9</b>
APPLICABLE STANDARD .....	9
ANTENNA CONNECTOR CONSTRUCTION .....	9
<b>FCC §15.209, §15.205 &amp; §15.247(d) - SPURIOUS EMISSIONS.....</b>	<b>10</b>
APPLICABLE STANDARD .....	10
MEASUREMENT UNCERTAINTY .....	10
EUT SETUP .....	10
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP .....	11
TEST PROCEDURE .....	11
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	11
TEST EQUIPMENT LIST AND DETAILS.....	12
TEST RESULTS SUMMARY .....	12
TEST DATA .....	12
<b>DECLARATION LETTER.....</b>	<b>16</b>

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

The ALFA NETWORK Inc.'s product, model number: SHD36P,SHD34P,SHD27P,SHD28P,SHD69A,SHD77A (FCC ID: UQ29280) ("EUT") in this report is a Surveillance transmission system, which was measured approximately: 30.0 cm (L) x22.0cm (W) x8.0cm (H), the operating frequency is 5150~5250MHz ,5725~5850MHz, rated input voltage: DC 18V from adapter.

Adapter information: Sunny  
Model: SYS1308-2418-W2  
Input: 100-240VAC, 50-60Hz  
Output: 18V DC 1.0A

*Note: The series product, model number: SHD36P,SHD34P,SHD27P,SHD28P,SHD69A,SHD77A are electrically identical, the difference between them is just the model name, the details was explained in the attached declaration letter.*

*\* All measurement and test data in this report was gathered from production sample serial number: 120426001 (Assigned by BACL). The EUT was received on 2012-04-27.*

### Objective

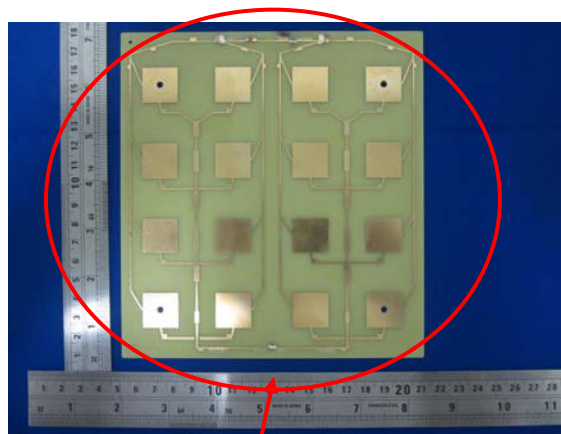
This report is prepared on behalf of ALFA NETWORK Inc. in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

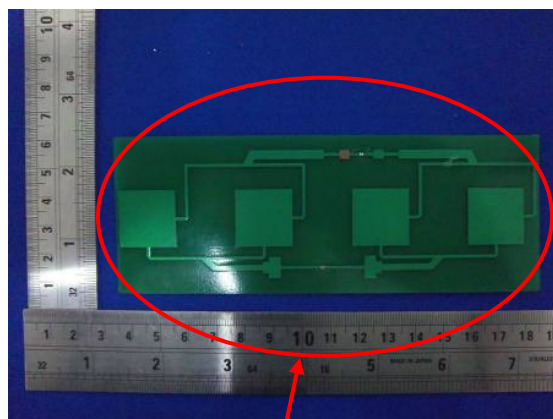
This is the C2PC application of the device. The product name, model name, appearance and antenna type were changed. The difference between the original device and the current one is as follows:

Part	Original	New
Product name	802.11an Long-Range AP/CPE	Surveillance transmission system
Model name	N5,OAP2258XS,N5PCB,N5C,Solo-N5H,Solo-N5HC,AWAP02O-N5H,AWAP02O-N5HC,WLO-25814N,RP-WAC5330,NE-WAC5330,APE-5002A-P14,RA-N5001L,WCPEn-5000-OAA-DD	SHD36P,SHD34P,SHD27P,SHD28P,SHD69A,SHD77A
Material of EUT	Plastic	Metal

The difference of appearance and antenna between the original device and the current one is as follows:



New antenna



Original antenna



Metal

New Sample



Plastic

Original Sample

For the changes made to the device, the test results of Spurious Emissions was performed.

### Related Submittal(s)/Grant(s)

Original submission with FCC ID: UQ29280 which is granted on 2012-05-07.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is  $\pm 0.96$  dB, the uncertainty of any radiation on emissions measurement is  $\pm 4.0$  dB

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

For 5G 802.11a and 802.11n20 mode, 4 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5745	2	5765
3	5785	4	5805
5	5825		

EUT was tested with Channel 1, 3 and 5.

For 802.11n40 mode, 2 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5755	2	5795

EUT was tested with Channel 1, and 2.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PSD across all data rates bandwidths, and modulations.

### EUT Exercise Software

The test was performed under “cmd.exe”.

### Equipment Modifications

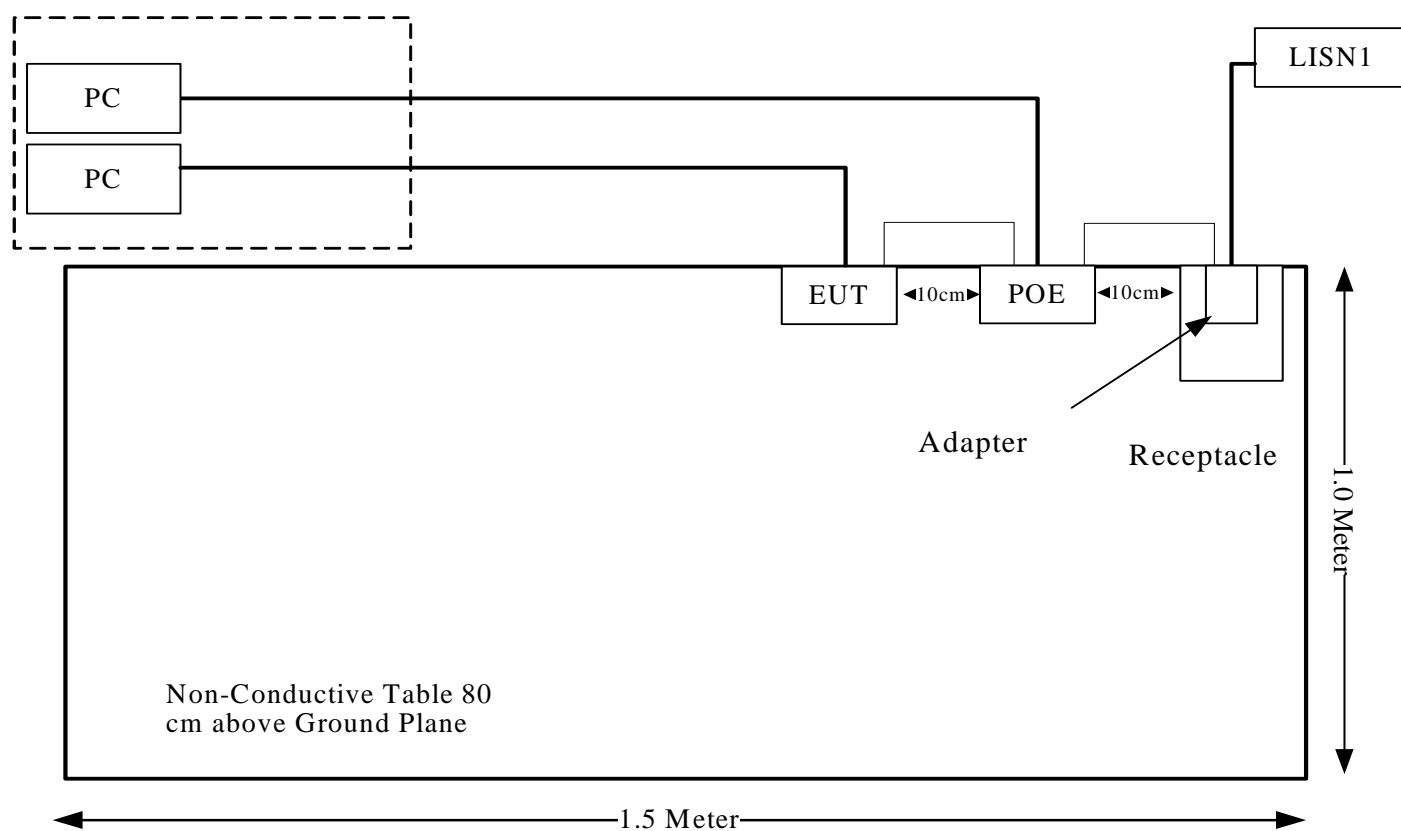
No modification was made to the EUT tested.

### Remote Support Equipment

Manufacturer	Description	Model	Serial Number
DELL	PC	DCNE	CK2Z891
DELL	PC	DCNE	CK2Z677

**External Cable**

Cable Description	Length (m)	From/Port	To
Un shielded detachable RJ45 cable	1	EUT	Adapter
Un shielded detachable RJ45 cable	10	EUT	PC
Un shielded detachable RJ45 cable	10	POE	PC
Unshielded Power cable	1.8	Adapter	POE

**Block Diagram of Test Setup**

## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible exposure (MPE)	Compliance*
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance*
§15.247(d)	Spurious Emissions at Antenna Port	Compliance*
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance*
§15.247(b)(3)	Maximum Peak Output Power	Compliance*
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance*
§15.247(e)	Power Spectral Density	Compliance*

\*Note : The test result is compliance, please refer to the test report No.: R1DG120228003-00A Rev.A.



## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
  - b. Antenna must use a unique type of connector to attach to the EUT.
- Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

### **Antenna Connector Construction**

The EUT has High Gain Directional Panel Antenna antennas, which complied with 15.203, the maximum gain is 11dBi, please refer to the internal photos.

**Result:** Compliance.

## FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

### Applicable Standard

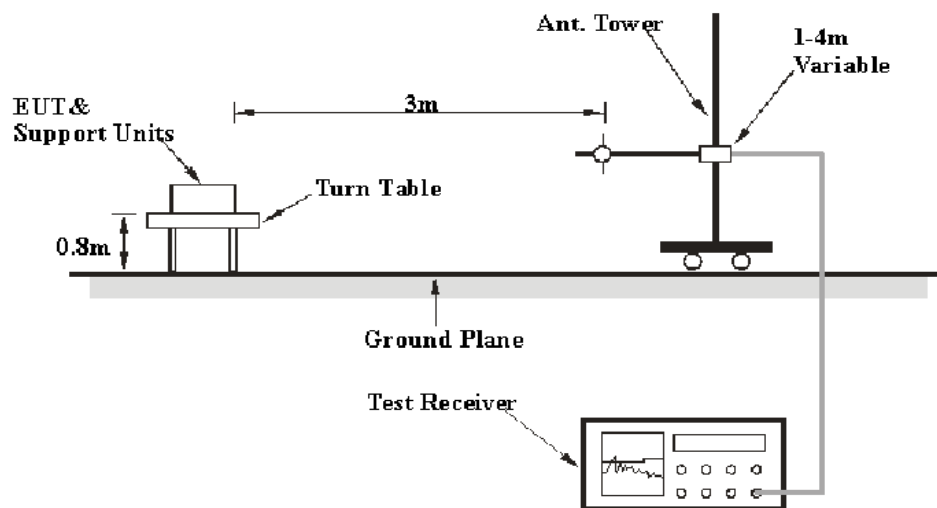
FCC §15.247 (d); §15.209; §15.205;

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB(k=2, 95% level of confidence) .

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i><b>Frequency Range</b></i>	<i><b>RBW</b></i>	<i><b>Video B/W</b></i>	<i><b>Detector</b></i>
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 40 GHz	1 MHz	3 MHz	PK
1000 MHz – 40 GHz	1 MHz	10 Hz	Ave.

## Test Procedure

During the radiated emission test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-07-05	2012-07-04
Mini-circuits	Amplifier	ZVA-213+	T-E27H	2011-11-24	2012-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-12-01	2012-11-30
HP	Spectrum Analyzer	8593A	2919A00242	2011-07-09	2012-07-08
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Rohde & Schwarz	Spectrum Analyzer	FSP38	100479	2011-05-27	2012-05-26

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Section 15.205, 15.209 and 15.247, with the worst margin reading of:

**6.98 dB at 11570 MHz in the Vertical polarization (802.11n 20 mode)**

## Test Data

### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

*The testing was performed by Ares Liu from 2012-05-08.*

**1) 30MHz-40GHz***Mode: Transmitting*

802.11a Mode:

Frequency	S.A.	Detector	Polar	Correction	Cord.	Limit	Margin	Comment
(MHz)	Reading (dBμV)	(PK/QP/Ave.)	(H/V)	Factor (dB/m)	Amp. (dBμV/m)	(dBμV/m)	(dB)	
Low Channel (5745MHz)								
11490	13.78	Ave.	V	30.81	44.59	54	9.41	Harmonic
11490	13.67	Ave.	H	30.81	44.48	54	9.52	Harmonic
610	39.54	QP	H	-5.62	33.92	46	12.08	spurious
610	38.34	QP	V	-5.62	32.72	46	13.28	spurious
11490	29.54	PK	V	30.81	60.35	74	13.65	Harmonic
11490	28.93	PK	H	30.81	59.74	74	14.26	Harmonic
5725	14.44	Ave.	V	20.87	35.31	54	18.69	spurious
5725	14.44	Ave.	H	20.87	35.31	54	18.69	spurious
5725	33.34	PK	V	20.87	54.21	74	19.79	spurious
5725	32.42	PK	H	20.87	53.29	74	20.71	spurious
5745	80.32	PK	H	20.61	100.93	N/A	N/A	Fundamental
5745	69.39	Ave.	H	20.61	90	N/A	N/A	Fundamental
5745	78.21	PK	V	20.61	98.82	N/A	N/A	Fundamental
5745	68.51	Ave.	V	20.61	89.12	N/A	N/A	Fundamental
Middle Channel (5785MHz)								
11570	13.93	Ave.	V	31.69	45.62	54	8.38	Harmonic
11570	13.63	Ave.	H	31.69	45.32	54	8.68	Harmonic
610	39.09	QP	H	-5.62	33.47	46	12.53	spurious
11570	28.93	PK	V	31.69	60.62	74	13.38	Harmonic
11570	28.71	PK	H	31.69	60.4	74	13.6	Harmonic
610	37.71	QP	V	-5.62	32.09	46	13.91	spurious
5785	78.69	PK	H	20.74	99.43	N/A	N/A	Fundamental
5785	68.36	Ave.	H	20.74	89.1	N/A	N/A	Fundamental
5785	78.4	PK	V	20.74	99.14	N/A	N/A	Fundamental
5785	68.04	Ave.	V	20.74	88.78	N/A	N/A	Fundamental
High Channel (5825MHz)								
11650	14.4	Ave.	V	32.1	46.5	54	7.5	Harmonic
11650	14.23	Ave.	H	32.1	46.33	54	7.67	Harmonic
11650	30.36	PK	H	32.1	62.46	74	11.54	Harmonic
11650	29.48	PK	V	32.1	61.58	74	12.42	Harmonic
610	39.18	QP	H	-5.62	33.56	46	12.44	spurious
610	38.06	QP	V	-5.62	32.44	46	13.56	spurious
5850	14.7	Ave.	H	20.96	35.66	54	18.34	spurious
5850	14.69	Ave.	V	20.96	35.65	54	18.35	spurious
5850	32.08	PK	H	20.96	53.04	74	20.96	spurious
5850	31.89	PK	V	20.96	52.85	74	21.15	spurious
5825	78.11	PK	H	20.8	98.91	N/A	N/A	Fundamental
5825	68.65	Ave.	H	20.8	89.45	N/A	N/A	Fundamental
5825	78.12	PK	V	20.8	98.92	N/A	N/A	Fundamental
5825	67.62	Ave.	V	20.8	88.42	N/A	N/A	Fundamental

802.11n 20Mode:

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/QP/Ave.)	Polar (H/V)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (5745MHz)								
11490	15.57	Ave.	H	30.81	46.38	54	7.62	Harmonic
11490	15.02	Ave.	V	30.81	45.83	54	8.17	Harmonic
610	38.23	QP	H	-5.62	32.61	46	13.39	spurious
11490	29.03	PK	V	30.81	59.84	74	14.16	Harmonic
610	37.03	QP	V	-5.62	31.41	46	14.59	spurious
11490	28.24	PK	H	30.81	59.05	74	14.95	Harmonic
5725	15.38	Ave.	V	20.87	36.25	54	17.75	spurious
5725	14.88	Ave.	H	20.87	35.75	54	18.25	spurious
5725	34.11	PK	H	20.87	54.98	74	19.02	spurious
5725	34.03	PK	V	20.87	54.9	74	19.1	spurious
5745	79.54	PK	H	20.61	100.15	N/A	N/A	Fundamental
5745	68.58	Ave.	H	20.61	89.19	N/A	N/A	Fundamental
5745	77.9	PK	V	20.61	98.51	N/A	N/A	Fundamental
5745	68.2	Ave.	V	20.61	88.81	N/A	N/A	Fundamental
Middle Channel (5785MHz)								
11570	15.33	Ave.	V	31.69	47.02	54	6.98	Harmonic
11570	14.86	Ave.	H	31.69	46.55	54	7.45	Harmonic
610	38.83	QP	H	-5.62	33.21	46	12.79	spurious
11570	28.67	PK	V	31.69	60.36	74	13.64	Harmonic
11570	28.45	PK	H	31.69	60.14	74	13.86	Harmonic
610.67	37.45	QP	V	-5.62	31.83	46	14.17	spurious
5785	78.25	PK	H	20.74	98.99	N/A	N/A	Fundamental
5785	68.04	Ave.	H	20.74	88.78	N/A	N/A	Fundamental
5785	78.14	PK	V	20.74	98.88	N/A	N/A	Fundamental
5785	67.78	Ave.	V	20.74	88.52	N/A	N/A	Fundamental
High Channel (5825MHz)								
11650	13.62	Ave.	V	32.1	45.72	54	8.28	Harmonic
11650	13.62	Ave.	H	32.1	45.72	54	8.28	Harmonic
11650	30.39	PK	H	32.1	62.49	74	11.51	Harmonic
11650	29.51	PK	V	32.1	61.61	74	12.39	Harmonic
610	38.5	QP	H	-5.62	32.88	46	13.12	spurious
610	37.68	QP	V	-5.62	32.06	46	13.94	spurious
5850	15.09	Ave.	V	20.96	36.05	54	17.95	spurious
5850	14.42	Ave.	H	20.96	35.38	54	18.62	spurious
5850	32.92	PK	V	20.96	53.88	74	20.12	spurious
5850	32.7	PK	H	20.96	53.66	74	20.34	spurious
5825	77.68	PK	H	20.8	98.48	N/A	N/A	Fundamental
5825	67.51	Ave.	H	20.8	88.31	N/A	N/A	Fundamental
5825	77.82	PK	V	20.8	98.62	N/A	N/A	Fundamental
5825	67.46	Ave.	V	20.8	88.26	N/A	N/A	Fundamental

802.11n 40 Mode:

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/QP/Ave.)	Polar (H/V)	Correction Factor (dB/m)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (5755MHz)								
11510	14.64	Ave.	H	30.81	45.45	54	8.55	Harmonic
11510	14.51	Ave.	V	30.81	45.32	54	8.68	Harmonic
610.67	38.34	QP	H	-5.62	32.72	46	13.28	spurious
11510	28.88	PK	V	30.81	59.69	74	14.31	Harmonic
11510	29.22	PK	H	30.81	60.03	74	13.97	Harmonic
610.67	36.88	QP	V	-5.62	31.26	46	14.74	spurious
5725	14.55	Ave.	V	20.87	35.42	54	18.58	spurious
5725	13.89	Ave.	H	20.87	34.76	54	19.24	spurious
5725	32.87	PK	V	20.87	53.74	74	20.26	spurious
5725	32.01	PK	H	20.87	52.88	74	21.12	spurious
5755	76.11	PK	H	20.61	96.72	N/A	N/A	Fundamental
5755	66.88	Ave.	H	20.61	87.49	N/A	N/A	Fundamental
5755	76.84	PK	V	20.61	97.45	N/A	N/A	Fundamental
5755	67.2	Ave.	V	20.61	87.81	N/A	N/A	Fundamental
High Channel (5795MHz)								
11590	14.78	Ave.	V	31.69	46.47	54	7.53	Harmonic
11590	14.5	Ave.	H	31.69	46.19	54	7.81	Harmonic
610.67	39.69	QP	H	-5.62	34.07	46	11.93	spurious
11590	29.7	PK	V	31.69	61.39	74	12.61	Harmonic
11590	29.56	PK	H	31.69	61.25	74	12.75	Harmonic
610.67	38.92	QP	V	-5.62	33.3	46	12.7	spurious
5850	14.47	Ave.	V	20.96	35.43	54	18.57	spurious
5850	14.39	Ave.	H	20.96	35.35	54	18.65	spurious
5850	30.35	PK	H	20.96	51.31	74	22.69	spurious
5850	29.62	PK	V	20.96	50.58	74	23.42	spurious
5795	75.03	PK	H	20.74	95.77	N/A	N/A	Fundamental
5795	65.02	Ave.	H	20.74	85.76	N/A	N/A	Fundamental
5795	75.05	PK	V	20.74	95.79	N/A	N/A	Fundamental
5795	65.93	Ave.	V	20.74	86.67	N/A	N/A	Fundamental

## DECLARATION LETTER



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### Product Similarity Declaration

To Whom It May Concern,

We, ALFA NETWORK Inc., hereby declare that our Surveillance transmission system, Model Number: SHD36P, SHD34P, SHD27P, SHD28P, SHD77A are electrically identical with the Model Number: SHD69A that was certified by BACL. The only difference is the product name and model number.  
The rest are the same.

Please contact me if you have any question.

Signature:

Print Name:

Jackie Wen

Title: Product Manager

Date: 2012-4-28

\*\*\*\*\* END OF REPORT \*\*\*\*\*