



**Spectrum Research & Testing Lab., Inc.**

No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

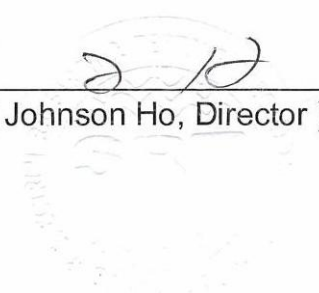
Reference No.: A17103001  
Report No.: FCCA17103001-01  
FCC ID : AHL-ALMOND3S  
Page: 1 of 36  
Date: Dec. 28, 2017

Product Name: Almond 3S  
Model No.: A3S  
Securifi Ltd.  
Applicant: 11F, No.92, Sec. 5, Nanjing E. Rd.,  
Songshan Dist., Taipei 105, Taiwan  
Date of Receipt: Oct. 30, 2017  
Finished date of Test: Dec. 14, 2017  
Applicable Standards: 47 CFR Part 15, Subpart C, 15.249  
ANSI C63.10: 2013

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By : Richard Lin , Date: 12/28/2017  
(Richard Lin)

Approved By : [Signature] , Date: 12/28/2017  
( Johnson Ho, Director )





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## Revisions History

Report No.	Issue Date	Revisions
FCCA17103001-01	Dec. 28, 2017	Initial issue



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## 1. DOCUMENT POLICY AND TEST STATEMENT

### 1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- FCC Registered Test Site Number : TW1016

### 1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source from Battery or external adapter.

### 1.3 EUT MODIFICATION

- No modification in SRT Lab.



## 2. DESCRIPTION OF EUT AND TEST MODE

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Almond 3S
<b>MODEL NO.</b>	A3S
<b>POWER SUPPLY</b>	DC power source from Battery or external adapter Brand Name: Shenzhen Gongjin Electronics Co. Ltd Model No.:S36B52-120A250-04 Input: 100~240V 50~60Hz Max 1.0A Output: 12V 2.5A
<b>CABLE</b>	NA
<b>FREQUENCY BAND</b>	2.400 GHz ~ 2.4835 GHz
<b>CARRIER FREQUENCY</b>	2.405 GHz ~ 2.480 GHz
<b>NUMBER OF CHANNEL</b>	16
<b>RATED RF OUTPUT POWER</b>	75.47 dBuV/m@2440 MHz
<b>MODULATION TYPE</b>	DSSS
<b>MODE OF OPERATION</b>	Duplex
<b>ANTENNA TYPE</b>	PIFA Antenna
<b>ANTENNA GAIN</b>	3.28 dBi

**NOTE:**

1. For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

### 2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	FCC ID / DOC	REMARK
N/A	N/A	N/A	N/A	N/A

### 2.3 DESCRIPTION OF TEST MODE

	Mode	Frequency
1	CH01 (TX1)	2405 MHz
2	CH08 (TX2)	2440 MHz
3	CH16 (TX3)	2480 MHz

**NOTE:**

1. Below 1 GHz were pre-tested in chamber and chosen the worst case for conducted and radiated emission test.
2. Above 1 GHz were tested individually.
3. The axis X,Y and Z we evaluate in chamber, the X axis is worst case.



## 2.4 EUT OPERATING CONDITION

TX1, TX2, TX3, :

1. For use customer provided continuous transmission EUT.
2. Turn on the power of all equipment and EUT.
3. Open continuous transmission Program “Ember\_Desktop”
4. Setup mode : TX1, TX2, TX3.

## 2.5 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.10:2013. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID/DOC	CABLE
1	PC	ASUS	M32AA1	R31018	1.5m unshielded power cable.
2	LCD Monitor	DELL	U2412Mb	R43002	1.8m unshielded power cable. 1.5m shielded data cable.
3	Keyboard	ASUS	AW211	D41108	1.8m unshielded data cable.
4	Mouse	ASUS	MOBTUO	R41108	1.5m unshielded data cable.
5	Printer	HP	C8991A	R33001	1.5m unshielded power cable. 1.5m shielded data cable.
6	USB 2.0 HDD	TERASYS	F12-U	4912A002	1.5m unshielded power cable.
7	USB Storage	Kingston	N/A	DoC	8GB
8	USB cable	N/A	N/A	N/A	1.2m shielded data cable.

**NOTE:** For the actual test configuration, please refer to the photos of testing.

## 2.6 CHANNEL AND FREQUENCY TABLE

Channel	Frequency	Channel	Frequency
CH 01	2405 MHz	CH 09	2445 MHz
CH 02	2410 MHz	CH 10	2450 MHz
CH 03	2415 MHz	CH 11	2455 MHz
CH 04	2420 MHz	CH 12	2460 MHz
CH 05	2425 MHz	CH 13	2465 MHz
CH 06	2430 MHz	CH 14	2470 MHz
CH 07	2435 MHz	CH 15	2475 MHz
CH 08	2440MHz	CH 16	2480 MHz



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### 3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a wireless product. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C, 15.249

ANSI C63.10: 2013

All tests have been performed and recorded as the above standards.

#### 3.1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD SECTION	TEST TYPE AND LIMIT RESULTS	RESULTS
15.203	Antenna requirement	PASS
15.207	AC Power Line Conducted Emission	N/A
15.249 (a)	Field Strength of the Fundamental signal	PASS
15.249 (a) (d) /15.209	Spurious Emissions	PASS
15.249 (d)/15.205	Band Edge	PASS



## 4. TECHNICAL CHARACTERISTICS TEST

### 4.1 CONDUCTED EMISSION TEST

#### 4.1.1 LIMIT

Frequency (MHz)	Class A (dB $\mu$ V)		Class B (dB $\mu$ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

#### 4.1.2 TEST EQUIPMENT

The following test equipment was used for the test:

EQUIPMENT/FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	JAN. 02, 2018 ETC
EMI TEST RECEIVER	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	ESHS30 / 826003/008	JAN. 09, 2018 ETC
LISN	50 $\mu$ H, 50 ohm	SOLAR	9252-50-R-24-BNC/ 951315	OCT. 30, 2018 ETC
LISN	50 $\mu$ H, 50 ohm	SCHWARZBECK	NSLK 8127/ 8127-808	DEC. 11, 2018 ETC
50 $\Omega$ BNC TYPE TERMINATOR	50 ohm	N/A	11593A/ L1TEQU005	NOV. 08, 2018 ETC
50 $\Omega$ BNC TYPE TERMINATOR	50 ohm	N/A	B00-CD-357/ L1TEQU009	MAY 17, 2018 ETC
COAXIAL CABLE	5 m	HUBER+SUHNER	RG214/U / #5M (L1TCAB013)	MAY 08, 2018 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 771	NCR
GROUND PLANE	2 m (H) x 3 m (W)	SRT	N/A	NCR
GROUND PLANE	2.5 m (H) x 3 m (W)	SRT	N/A	NCR
PULSE LIMITER	9 kHz ~ 30 MHz Insertion Loss= 10dB $\pm$ 0.3dB	ROHDE & SCHWARZ	ESH3Z2/ L1TTES009	FEB. 23, 2018 ETC
THERMO-HYGR O	15 - 40 $^{\circ}$ C, 0- 100% RH	TOP	20-A / 6644	SEP. 17, 2018 ETC

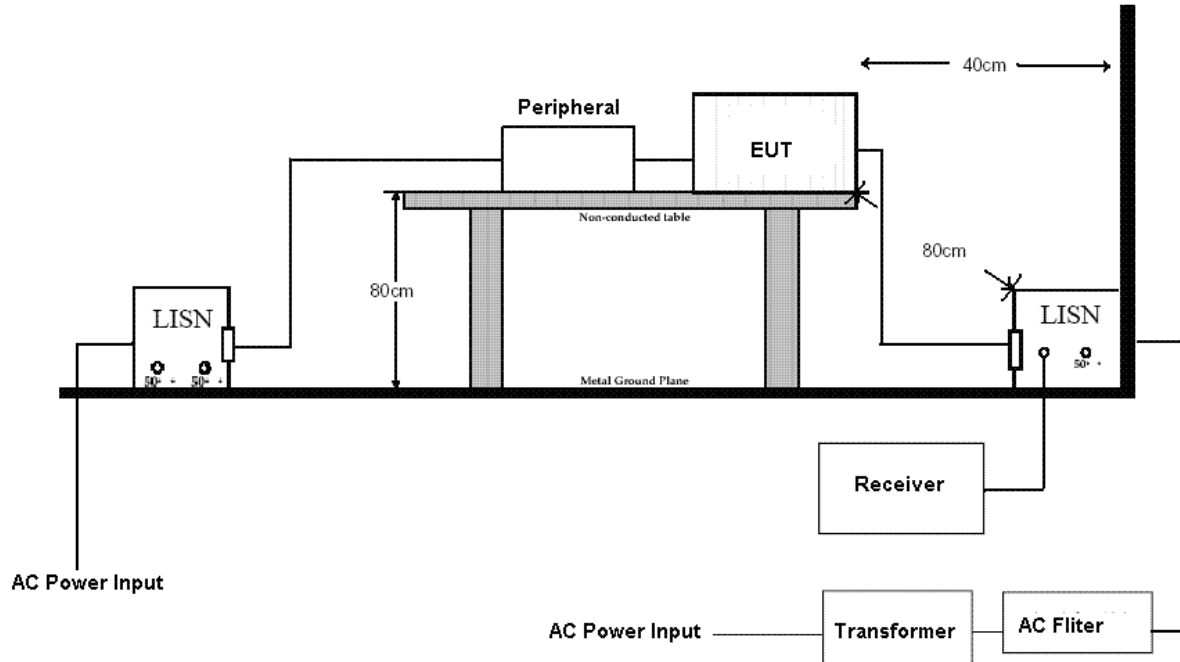
**NOTE:**

The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.





## 4.1.3 TEST SETUP



### NOTE :

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.

## 4.1.4 TEST PROCEDURE

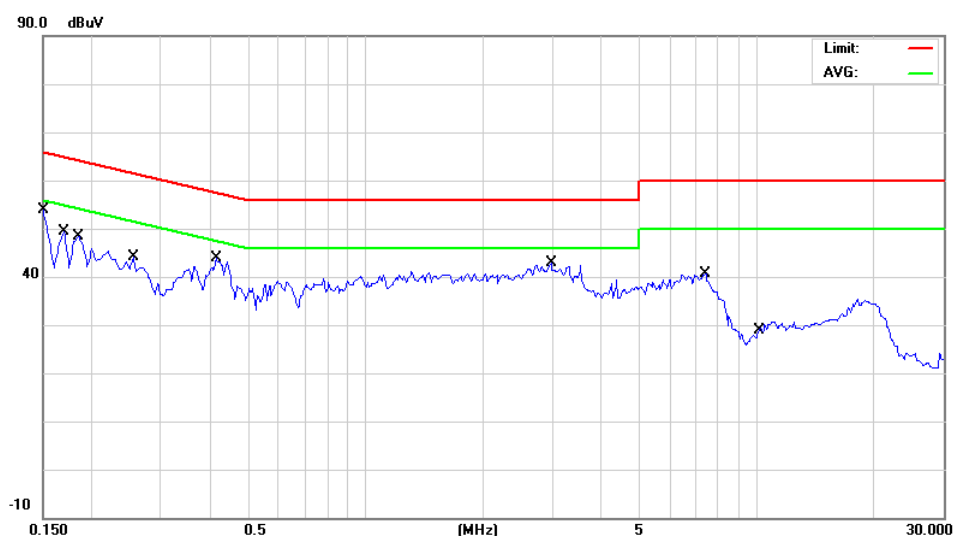
The EUT was tested according to the requirement of ANSI C63.10:2013 and CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50 $\mu$ H as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.



## 4.1.5 TEST RESULT

Temperature:	23 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	TX1
Receiver Detector:	Q.P. and AV.	Tested Date:	Nov. 01, 2017

### Power Line Measured : Line



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	50.30	-0.12	50.18	66.00	-15.82	QP	
	2	0.1500	35.59	-0.12	35.47	56.00	-20.53	AVG	
	3	0.1700	45.56	-0.12	45.44	64.96	-19.52	QP	
	4	0.1700	32.66	-0.12	32.54	54.96	-22.42	AVG	
	5	0.1850	43.50	-0.11	43.39	64.26	-20.87	QP	
	6	0.1850	31.23	-0.11	31.12	54.26	-23.14	AVG	
	7	0.2550	40.16	-0.12	40.04	61.59	-21.55	QP	
	8	0.2550	32.50	-0.12	32.38	51.59	-19.21	AVG	
	9	0.4150	40.16	-0.15	40.01	57.55	-17.54	QP	
*	10	0.4150	32.66	-0.15	32.51	47.55	-15.04	AVG	
	11	2.9800	37.32	0.03	37.35	56.00	-18.65	QP	
	12	2.9800	30.78	0.03	30.81	46.00	-15.19	AVG	
	13	7.4000	34.90	0.14	35.04	60.00	-24.96	QP	
	14	7.4000	28.68	0.14	28.82	50.00	-21.18	AVG	
	15	10.0000	24.34	0.14	24.48	60.00	-35.52	QP	
	16	10.0000	18.76	0.14	18.90	50.00	-31.10	AVG	

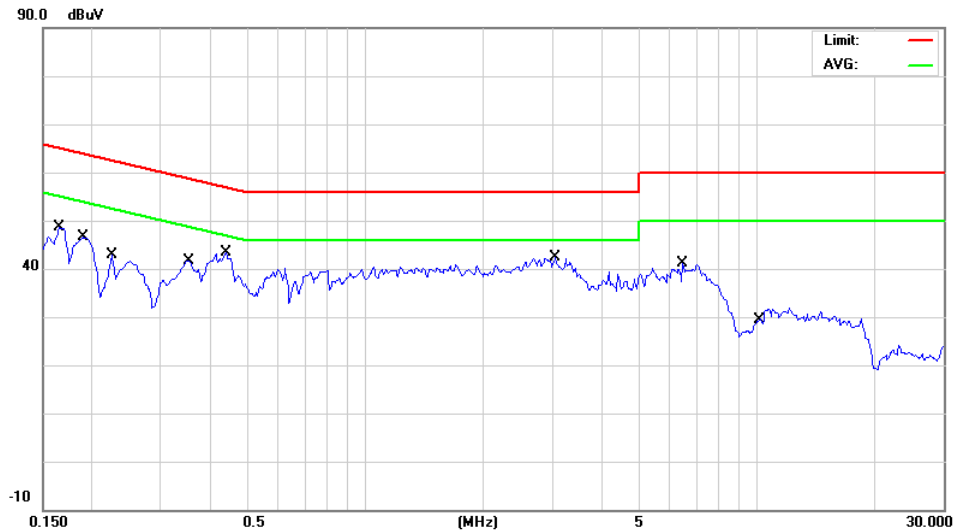
### NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN  
 Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.



Temperature:	23 °C	Humidity:	65 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	TX1
Receiver Detector:	Q.P. and AV.	Tested Date:	Nov. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1650	44.88	0.05	44.93	65.21	-20.28	QP	
	2	0.1650	29.47	0.05	29.52	55.21	-25.69	AVG	
	3	0.1900	42.82	0.01	42.83	64.04	-21.21	QP	
	4	0.1900	29.62	0.01	29.63	54.04	-24.41	AVG	
	5	0.2250	39.10	0.01	39.11	62.63	-23.52	QP	
	6	0.2250	26.64	0.01	26.65	52.63	-25.98	AVG	
	7	0.3550	38.32	0.09	38.41	58.84	-20.43	QP	
	8	0.3550	30.30	0.09	30.39	48.84	-18.45	AVG	
	9	0.4400	38.34	0.11	38.45	57.06	-18.61	QP	
	10	0.4400	29.92	0.11	30.03	47.06	-17.03	AVG	
	11	3.0600	37.42	0.14	37.56	56.00	-18.44	QP	
	* 12	3.0600	30.52	0.14	30.66	46.00	-15.34	AVG	
	13	6.4650	35.26	0.20	35.46	60.00	-24.54	QP	
	14	6.4650	28.35	0.20	28.55	50.00	-21.45	AVG	
	15	10.0000	24.70	0.32	25.02	60.00	-34.98	QP	
	16	10.0000	19.39	0.32	19.71	50.00	-30.29	AVG	

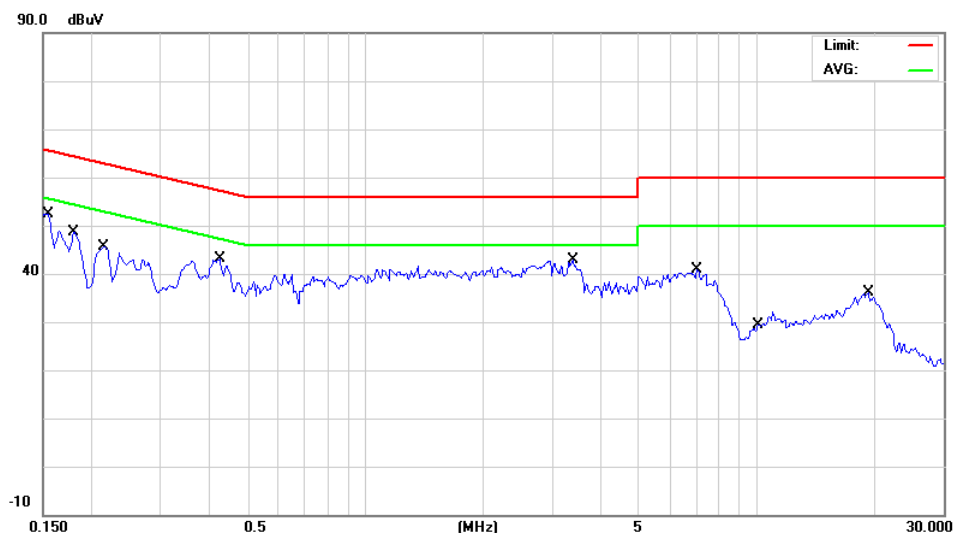
**NOTE :**

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN  
 Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.



Temperature:	<u>23 °C</u>	Humidity:	<u>65 %RH</u>
Frequency Range:	<u>0.15 – 30 MHz</u>	Tested Mode:	<u>TX2</u>
Receiver Detector:	<u>Q.P. and AV.</u>	Tested Date:	<u>Nov. 01, 2017</u>

Power Line Measured : Line



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1550	46.60	-0.12	46.48	65.73	-19.25	QP	
	2	0.1550	30.88	-0.12	30.76	55.73	-24.97	AVG	
	3	0.1800	43.68	-0.11	43.57	64.49	-20.92	QP	
	4	0.1800	31.80	-0.11	31.69	54.49	-22.80	AVG	
	5	0.2150	42.06	-0.11	41.95	63.01	-21.06	QP	
	6	0.2150	28.93	-0.11	28.82	53.01	-24.19	AVG	
	7	0.4250	39.70	-0.15	39.55	57.35	-17.80	QP	
*	8	0.4250	32.99	-0.15	32.84	47.35	-14.51	AVG	
	9	3.3850	38.16	0.07	38.23	56.00	-17.77	QP	
	10	3.3850	30.83	0.07	30.90	46.00	-15.10	AVG	
	11	7.0250	35.66	0.13	35.79	60.00	-24.21	QP	
	12	7.0250	29.01	0.13	29.14	50.00	-20.86	AVG	
	13	10.0000	24.60	0.14	24.74	60.00	-35.26	QP	
	14	10.0000	18.95	0.14	19.09	50.00	-30.91	AVG	
	15	19.2950	30.76	0.50	31.26	60.00	-28.74	QP	
	16	19.2950	25.47	0.50	25.97	50.00	-24.03	AVG	

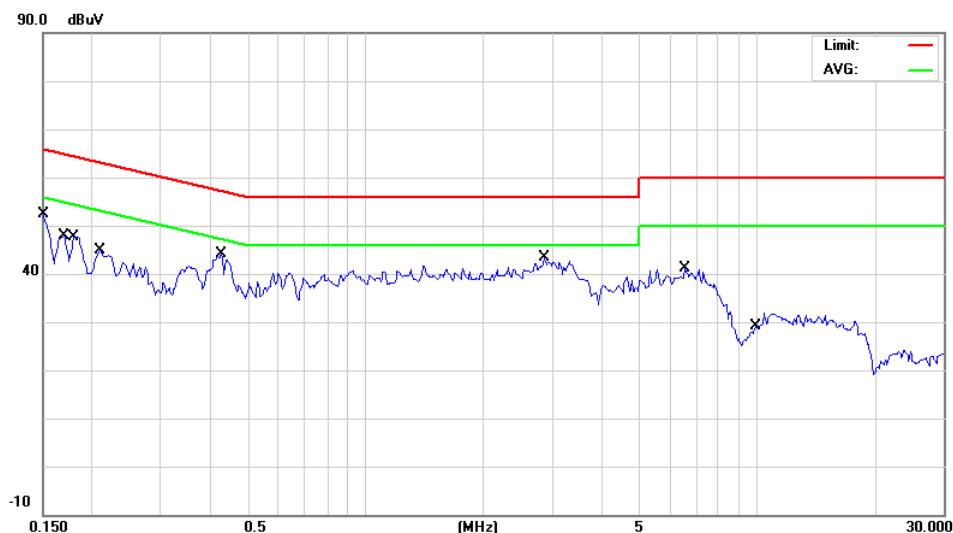
**NOTE :**

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN  
 Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.



Temperature:	<u>23 °C</u>	Humidity:	<u>65 %RH</u>
Frequency Range:	<u>0.15 – 30 MHz</u>	Tested Mode:	<u>TX2</u>
Receiver Detector:	<u>Q.P. and AV.</u>	Tested Date:	<u>Nov. 01, 2017</u>

### Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	50.62	0.07	50.69	66.00	-15.31	QP	
	2	0.1500	35.65	0.07	35.72	56.00	-20.28	AVG	
	3	0.1700	45.42	0.04	45.46	64.96	-19.50	QP	
	4	0.1700	31.47	0.04	31.51	54.96	-23.45	AVG	
	5	0.1800	43.30	0.02	43.32	64.49	-21.17	QP	
	6	0.1800	30.46	0.02	30.48	54.49	-24.01	AVG	
	7	0.2100	41.16	0.00	41.16	63.21	-22.05	QP	
	8	0.2100	28.04	0.00	28.04	53.21	-25.17	AVG	
	9	0.4300	39.06	0.12	39.18	57.25	-18.07	QP	
*	10	0.4300	32.15	0.12	32.27	47.25	-14.98	AVG	
	11	2.8650	36.76	0.14	36.90	56.00	-19.10	QP	
	12	2.8650	30.19	0.14	30.33	46.00	-15.67	AVG	
	13	6.5550	35.34	0.20	35.54	60.00	-24.46	QP	
	14	6.5550	28.60	0.20	28.80	50.00	-21.20	AVG	
	15	10.0000	24.82	0.32	25.14	60.00	-34.86	QP	
	16	10.0000	19.33	0.32	19.65	50.00	-30.35	AVG	

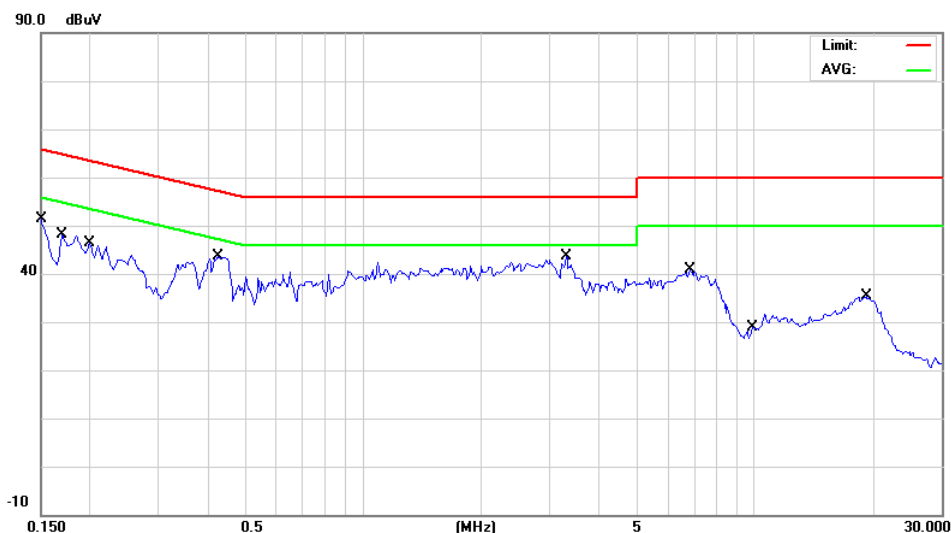
### NOTE :

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN  
 Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.



Temperature:	<u>23 °C</u>	Humidity:	<u>65 %RH</u>
Frequency Range:	<u>0.15 – 30 MHz</u>	Tested Mode:	<u>TX3</u>
Receiver Detector:	<u>Q.P. and AV.</u>	Tested Date:	<u>Nov. 01, 2017</u>

Power Line Measured : Line



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	51.06	-0.12	50.94	66.00	-15.06	QP	
	2	0.1500	36.32	-0.12	36.20	56.00	-19.80	AVG	
	3	0.1700	45.52	-0.12	45.40	64.96	-19.56	QP	
	4	0.1700	32.11	-0.12	31.99	54.96	-22.97	AVG	
	5	0.2000	42.70	-0.11	42.59	63.61	-21.02	QP	
	6	0.2000	29.32	-0.11	29.21	53.61	-24.40	AVG	
	7	0.4250	40.04	-0.15	39.89	57.35	-17.46	QP	
*	8	0.4250	33.22	-0.15	33.07	47.35	-14.28	AVG	
	9	3.3100	38.26	0.06	38.32	56.00	-17.68	QP	
	10	3.3100	31.18	0.06	31.24	46.00	-14.76	AVG	
	11	6.8300	36.00	0.14	36.14	60.00	-23.86	QP	
	12	6.8300	29.01	0.14	29.15	50.00	-20.85	AVG	
	13	10.0000	24.58	0.14	24.72	60.00	-35.28	QP	
	14	10.0000	19.08	0.14	19.22	50.00	-30.78	AVG	
	15	19.2650	30.76	0.50	31.26	60.00	-28.74	QP	
	16	19.2650	25.47	0.50	25.97	50.00	-24.03	AVG	

**NOTE :**

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN  
 Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.



**Spectrum Research & Testing Lab., Inc.**

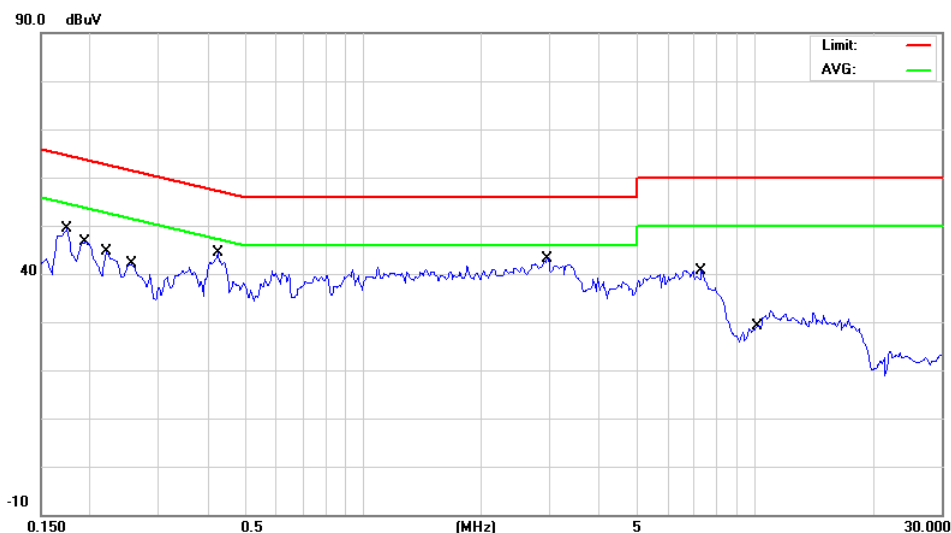
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A17103001  
Report No.: FCCA17103001-01  
FCC ID : AHL-ALMOND3S  
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Date: Dec. 28, 2017

Temperature:	<u>23 °C</u>	Humidity:	<u>65 %RH</u>
Frequency Range:	<u>0.15 – 30 MHz</u>	Tested Mode:	<u>TX3</u>
Receiver Detector:	<u>Q.P. and AV.</u>	Tested Date:	<u>Nov. 01, 2017</u>

### Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1750	44.56	0.03	44.59	64.72	-20.13	QP	
	2	0.1750	31.23	0.03	31.26	54.72	-23.46	AVG	
	3	0.1950	42.74	0.00	42.74	63.82	-21.08	QP	
	4	0.1950	29.32	0.00	29.32	53.82	-24.50	AVG	
	5	0.2200	40.78	0.00	40.78	62.82	-22.04	QP	
	6	0.2200	27.68	0.00	27.68	52.82	-25.14	AVG	
	7	0.2550	39.22	0.03	39.25	61.59	-22.34	QP	
	8	0.2550	30.98	0.03	31.01	51.59	-20.58	AVG	
	9	0.4250	39.46	0.12	39.58	57.35	-17.77	QP	
	* 10	0.4250	32.50	0.12	32.62	47.35	-14.73	AVG	
	11	2.9600	37.26	0.13	37.39	56.00	-18.61	QP	
	12	2.9600	30.46	0.13	30.59	46.00	-15.41	AVG	
	13	7.3250	35.30	0.22	35.52	60.00	-24.48	QP	
	14	7.3250	29.01	0.22	29.23	50.00	-20.77	AVG	
	15	10.0000	24.90	0.32	25.22	60.00	-34.78	QP	
	16	10.0000	19.45	0.32	19.77	50.00	-30.23	AVG	

**NOTE :**

1. Measurement uncertainty is 2.92 dB.
2. Result = Reading + Correction factor.
3. Corrected Factor = Cable loss + Insertion loss of LISN  
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
4. Margin = Result – Limit.



## 4.2 RADIATED EMISSION TEST

### 4.2.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (dBmV/m)
0.009 - 0.490	300	2400/F(KHz)
0.490 - 1.705	30	24000/F(KHz)
1.705 - 30	30	30
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

FCC Part15, Subpart C Section 15.249 limit of radiated emission for frequency below1000MHz (Average).

FREQUENCY (MHz)	FIELD STRENGTH OF FUNDAMENTAL (millivolts/meter)	FIELD STRENGTH OF HARMONICS (millivolts/meter)
902 - 928	50	500
2400 - 2483.5	50	500
5725 - 5875	50	500
24000 - 24250	250	2500

#### NOTE:

1. In the emission tables above , the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. 50mV = 94dBuV





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## 4.2.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

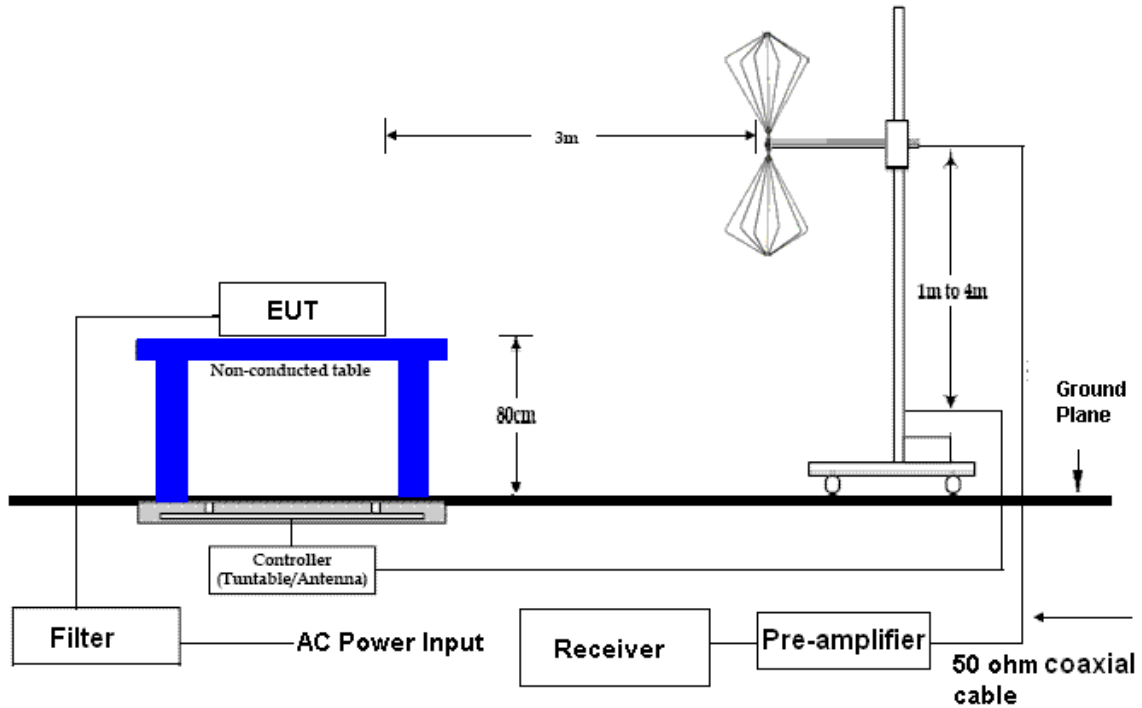
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	JAN. 02, 2018 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC
BICONICAL ANTENNA	30 MHz ~ 200 MHz	EMCO	3110/ 11966C	MAY 14, 2018 ETC
LOG PERIODIC ANTENNA	200 MHz ~ 1 GHz	EMCO	3146/ 9002-2686	OCT. 27, 2018 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2018 ETC
HORN ANTENNA	18 ~ 40 GHZ	ETS-LINDGREN	3116 /00032255	DEC. 25, 2018 ETC
PRE-AMPLIFIER	0.1 MHz ~ 1.3 GHz	HP	8447D / 2944A06746	NOV. 14, 2018 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 29, 2018 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2018 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	SEP. 13, 2018 SRT
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M(L1TCAB014)	MAY 08, 2018 ETC
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK 252 /MY2611/2	FEB. 23, 2018 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF102/2*11SK252 /MY3331/2	SEP. 28, 2018 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR
THERMO-HYGR O	15 - 40 °C, 0- 100% RH	TOP	20-A / 7685	SEP. 17, 2018 ETC

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

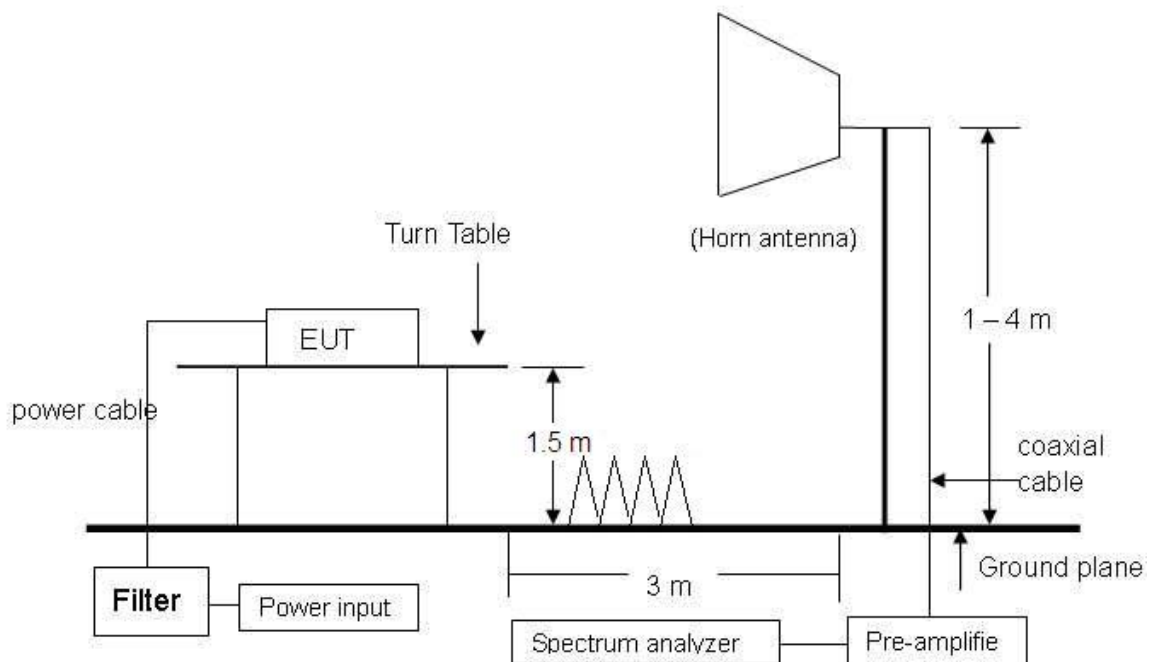


## 4.2.3 TEST SET-UP

### 30 MHz ~ 1 GHz



### Above 1 GHz



**NOTE:** The EUT system was put on a wooden table with 1.5m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.



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## 4.2.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.10:2013 and CISPR 22:2003. When the frequency spectrum measured started from 30 MHz to 1 GHz, then use antenna is a BICONICAL ANTENNA & LOG PERIODIC ANTENNA. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.



## 4.2.5 TEST RESULT

Temperature:	24 °C	Humidity:	61 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	TX1
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard	Tested Date:	Nov. 27, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
197.31	3.07	13.58	27.57	39.49	28.56	44	-14.94	11	3.44
240.86	3.36	12.00	27.39	41.97	29.94	46	-16.06	312	3.35
314.95	3.86	15.43	27.24	43.57	35.62	46	-10.38	202	3.12
335.02	4.01	15.47	27.40	37.20	29.28	46	-16.72	41	3.06
456.77	4.75	17.72	28.15	34.62	28.94	46	-17.06	28	2.68
749.52	6.42	21.73	28.15	32.25	32.25	46	-13.75	152	1.67

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
76.44	2.29	6.40	28.08	53.89	34.50	40	-5.50	48	1.13
198.56	3.07	13.12	27.57	39.79	28.42	44	-15.08	35	1.52
311.80	3.84	15.42	27.22	42.04	34.08	46	-11.92	140	1.87
328.63	3.96	15.46	27.35	39.54	31.61	46	-14.39	67	1.92
374.92	4.30	16.12	27.69	38.36	31.10	46	-14.90	27	2.07
713.04	6.20	21.85	28.27	30.02	29.80	46	-16.20	229	3.05

**NOTE :**

1. Measurement uncertainty is 4.20 dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.



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# TEST REPORT

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Temperature:	24 °C	Humidity:	61 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	TX2
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard	Tested Date:	Nov. 27, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
59.16	2.25	8.99	28.13	45.57	28.68	40	-11.32	45	3.68
94.73	2.40	8.84	28.02	46.45	29.67	44	-13.83	190	3.60
187.50	2.99	16.65	27.62	39.93	31.95	44	-11.55	219	3.51
199.88	3.08	12.66	27.56	45.43	33.61	44	-9.89	42	2.44
315.01	3.87	15.43	27.25	44.69	36.74	46	-9.26	122	2.13
513.26	5.09	18.66	28.38	37.91	33.28	46	-12.72	90	1.51

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
76.68	2.29	6.40	28.08	52.53	33.14	40	-6.86	185	1.17
199.52	3.08	12.66	27.56	41.06	29.24	44	-14.26	128	1.52
311.97	3.84	15.42	27.22	39.87	31.91	46	-14.09	76	1.87
336.01	4.02	15.47	27.41	38.86	30.94	46	-15.06	264	1.95
490.83	4.95	18.36	28.32	35.92	30.91	46	-15.09	22	2.43
715.42	6.21	21.86	28.27	36.87	36.68	46	-9.32	138	3.25

**NOTE :**

1. Measurement uncertainty is 4.20 dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.



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# TEST REPORT

Reference No.: A17103001  
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Temperature:	24 °C	Humidity:	61 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	TX3
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard	Tested Date:	Nov. 27, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
58.43	2.25	9.28	28.13	43.34	26.73	40	-13.27	215	3.62
186.01	2.99	16.60	27.62	38.33	30.29	44	-13.21	129	3.52
200.98	3.09	12.20	27.56	44.75	32.48	44	-11.02	111	2.47
245.34	3.38	12.25	27.37	43.76	32.02	46	-13.98	190	2.33
315.27	3.87	15.43	27.25	44.99	37.04	46	-8.96	169	2.12
749.56	6.42	21.73	28.15	30.93	30.93	46	-15.07	86	1.77

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
73.36	2.28	6.55	28.09	38.58	19.32	40	-20.68	6	1.18
139.80	2.75	14.26	27.83	41.08	30.26	44	-13.24	12	1.34
199.17	3.08	12.66	27.56	39.73	27.91	44	-15.59	147	1.52
310.22	3.83	15.42	27.21	40.74	32.78	46	-13.22	4	1.87
327.65	3.95	15.45	27.34	38.20	30.27	46	-15.73	108	1.99
495.03	4.98	18.83	28.35	37.81	33.28	46	-12.72	24	2.58

**NOTE :**

1. Measurement uncertainty is 4.20 dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.



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# TEST REPORT

Reference No.: A17103001  
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Temperature:	25 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	TX1
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Nov. 03, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2144.03	-31.53	28.07	46.35	35.65	42.89	32.19	74	54	-31.11	-21.81	339	2.17
3413.89	-30.39	30.90	44.20	33.38	44.70	33.88	74	54	-29.30	-20.12	297	1.78
4108.51	-29.75	32.60	44.14	33.64	46.99	36.49	74	54	-27.01	-17.51	149	1.57
4609.06	-29.18	32.88	43.93	33.83	47.63	37.53	74	54	-26.37	-16.47	190	1.42
5042.37	-28.65	33.93	42.98	32.04	48.26	37.32	74	54	-25.74	-16.68	28	1.29
5597.56	-28.55	34.30	43.04	32.08	48.79	37.83	74	54	-25.21	-16.17	115	1.12

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1593.21	-32.33	26.52	46.71	36.49	40.90	30.68	74	54	-33.10	-23.32	90	1.15
3118.67	-30.81	30.54	44.18	33.34	43.91	33.07	74	54	-30.09	-20.93	340	1.64
4264.15	-29.58	32.60	43.91	33.28	46.93	36.30	74	54	-27.07	-17.70	177	1.98
4611.32	-29.18	32.89	43.81	32.97	47.52	36.68	74	54	-26.48	-17.32	334	2.08
5077.94	-28.65	33.96	43.78	33.26	49.10	38.58	74	54	-24.90	-15.42	354	2.22
5529.51	-28.56	34.30	42.72	32.15	48.46	37.89	74	54	-25.54	-16.11	330	2.33

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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# TEST REPORT

Reference No.: A17103001  
 Report No.: FCCA17103001-01  
 FCC ID : AHL-ALMOND3S  
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 Date: Dec. 28, 2017

Temperature: 25 °C Humidity: 68 %RH  
 TX1  
 Frequency Range: 1 GHz – 25 GHz Tested Mode: (Fundamental and Harmonics)  
 Detector: PK. and AV. IF Bandwidth: 1 MHz  
 Tested By: Richard Lin Tested Date: Nov. 03, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2405.00 (F)	-31.32	28.39	74.34	64.17	71.41	61.24	114	94	-42.59	-32.76	184	1.45
4810.00	-28.91	33.41	42.83	32.03	47.32	36.52	74	54	-26.68	-17.48	88	1.50
7215.00	-27.85	35.82	41.84	31.61	49.81	39.58	74	54	-24.19	-14.42	99	1.45
9620.00	-26.99	37.77	41.56	31.04	52.34	41.82	74	54	-21.66	-12.18	93	1.55
12025.00	-26.00	39.30	40.38	29.62	53.68	42.92	74	54	-20.32	-11.08	23	1.59
14430.00	-23.64	42.32	32.26	21.47	50.93	40.14	74	54	-23.07	-13.86	277	1.55

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2405.00 (F)	-31.32	28.39	75.07	64.50	72.14	61.57	114	94	-41.86	-32.43	254	1.57
4810.00	-28.91	33.41	42.96	32.72	47.45	37.21	74	54	-26.55	-16.79	205	1.56
7215.00	-27.85	35.82	41.87	31.23	49.84	39.20	74	54	-24.16	-14.80	195	1.58
9620.00	-26.99	37.77	42.02	31.21	52.80	41.99	74	54	-21.20	-12.01	284	1.43
12025.00	-26.00	39.30	39.64	29.07	52.94	42.37	74	54	-21.06	-11.63	80	1.49
14430.00	-23.64	42.32	31.24	20.81	49.91	39.48	74	54	-24.09	-14.52	184	1.56

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.





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# TEST REPORT

Reference No.: A17103001  
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Temperature:	25 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	TX2
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Nov. 03, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1998.20	-31.65	27.89	45.04	34.46	41.28	30.70	74	54	-32.72	-23.30	299	2.12
2296.72	-31.41	28.26	45.57	35.17	42.42	32.02	74	54	-31.58	-21.98	285	2.01
2984.45	-30.99	30.34	44.82	34.70	44.17	34.05	74	54	-29.83	-19.95	86	1.90
3789.81	-30.04	31.92	44.28	33.64	46.17	35.53	74	54	-27.83	-18.47	350	1.66
4166.33	-29.69	32.60	44.01	33.08	46.92	35.99	74	54	-27.08	-18.01	152	1.55
5147.92	-28.63	34.02	42.85	32.41	48.23	37.79	74	54	-25.77	-16.21	154	1.16

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1999.33	-31.65	27.90	44.12	33.20	40.36	29.44	74	54	-33.64	-24.56	180	1.25
2319.67	-31.39	28.28	44.43	34.09	41.32	30.98	74	54	-32.68	-23.02	355	1.40
3024.31	-30.95	30.43	43.91	33.68	43.39	33.16	74	54	-30.61	-20.84	303	1.61
4120.98	-29.74	32.60	43.87	33.20	46.73	36.06	74	54	-27.27	-17.94	177	1.94
5085.34	-28.64	33.97	42.81	32.36	48.13	37.68	74	54	-25.87	-16.32	167	2.23
5777.93	-28.52	34.30	42.62	31.87	48.40	37.65	74	54	-25.60	-16.35	56	2.34

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	25 °C	Humidity:	68 %RH
			TX2
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	(Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Nov. 03, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2440.00 (F)	-31.29	28.43	78.33	67.58	75.47	64.72	114	94	-38.53	-29.28	103	1.50
4880.00	-28.82	33.59	43.12	32.26	47.89	37.03	74	54	-26.11	-16.97	332	1.42
7320.00	-27.76	36.07	40.94	30.57	49.24	38.87	74	54	-24.76	-15.13	327	1.58
9760.00	-26.94	37.86	41.52	30.57	52.43	41.48	74	54	-21.57	-12.52	199	1.41
12200.00	-25.58	39.26	39.69	28.94	53.37	42.62	74	54	-20.63	-11.38	95	1.41
14640.00	-23.67	41.78	31.59	20.73	49.71	38.85	74	54	-24.29	-15.15	239	1.60

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2440.00 (F)	-31.29	28.43	75.75	65.13	72.89	62.27	114	94	-41.11	-31.73	235	1.42
4880.00	-28.82	33.59	42.45	32.27	47.22	37.04	74	54	-26.78	-16.96	23	1.56
7320.00	-27.76	36.07	41.14	30.70	49.44	39.00	74	54	-24.56	-15.00	86	1.49
9760.00	-26.94	37.86	41.46	30.59	52.37	41.50	74	54	-21.63	-12.50	127	1.41
12200.00	-25.58	39.26	39.06	28.86	52.74	42.54	74	54	-21.26	-11.46	89	1.43
14640.00	-23.67	41.78	31.31	20.33	49.43	38.45	74	54	-24.57	-15.55	337	1.55

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	25 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	TX3
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Nov. 03, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1998.38	-31.65	27.89	45.37	34.66	41.61	30.90	74	54	-32.39	-23.10	6	2.19
2396.70	-31.33	28.38	45.80	35.31	42.85	32.36	74	54	-31.15	-21.64	11	2.08
3611.96	-30.18	31.36	44.57	34.38	45.74	35.55	74	54	-28.26	-18.45	151	1.72
4287.25	-29.56	32.60	43.79	33.04	46.83	36.08	74	54	-27.17	-17.92	58	1.51
4816.11	-28.91	33.42	43.70	32.82	48.22	37.34	74	54	-25.78	-16.66	46	1.36
5569.98	-28.56	34.30	42.65	32.62	48.39	38.36	74	54	-25.61	-15.64	177	1.13

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1996.17	-31.66	27.89	44.98	34.84	41.21	31.07	74	54	-32.79	-22.93	319	1.23
2292.93	-31.41	28.25	44.98	34.57	41.82	31.41	74	54	-32.18	-22.59	102	1.39
3168.24	-30.74	30.60	45.02	34.48	44.88	34.34	74	54	-29.12	-19.66	243	1.65
4241.50	-29.61	32.60	43.93	33.30	46.92	36.29	74	54	-27.08	-17.71	32	1.97
5073.88	-28.65	33.96	43.78	33.09	49.09	38.40	74	54	-24.91	-15.60	181	2.14
5554.36	-28.56	34.30	42.96	32.61	48.70	38.35	74	54	-25.30	-15.65	96	2.28

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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# TEST REPORT

Reference No.: A17103001  
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Temperature: 25 °C Humidity: 68 %RH  
 TX3  
 Frequency Range: 1 GHz – 25 GHz Tested Mode: (Fundamental and Harmonics)  
 Detector: PK. and AV. IF Bandwidth: 1 MHz  
 Tested By: Richard Lin Tested Date: Nov. 03, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00 (F)	-31.26	28.48	76.20	67.39	73.42	64.61	114	94	-40.58	-29.39	221	1.42
4960.00	-28.71	33.80	42.00	31.11	47.08	36.19	74	54	-26.92	-17.81	355	1.41
7440.00	-27.67	36.36	41.79	30.84	50.48	39.53	74	54	-23.52	-14.47	3	1.56
9920.00	-26.89	37.95	42.28	31.33	53.34	42.39	74	54	-20.66	-11.61	172	1.42
12400.00	-25.09	39.22	39.99	29.30	54.12	43.43	74	54	-19.88	-10.57	41	1.48
14880.00	-23.68	40.73	31.59	21.42	48.64	38.47	74	54	-25.36	-15.53	185	1.51

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00 (F)	-31.26	28.48	75.74	65.66	72.96	62.88	114	94	-41.04	-31.12	27	1.54
4960.00	-28.71	33.80	42.97	32.02	48.05	37.10	74	54	-25.95	-16.90	354	1.54
7440.00	-27.67	36.36	41.91	31.00	50.60	39.69	74	54	-23.40	-14.31	130	1.48
9920.00	-26.89	37.95	41.75	31.34	52.81	42.40	74	54	-21.19	-11.60	131	1.53
12400.00	-25.09	39.22	40.01	29.66	54.14	43.79	74	54	-19.86	-10.21	89	1.59
14880.00	-23.68	40.73	32.01	21.59	49.06	38.64	74	54	-24.94	-15.36	144	1.41

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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## 4.3 BAND EDGE TEST

### 4.3.1 TEST EQUIPMENT

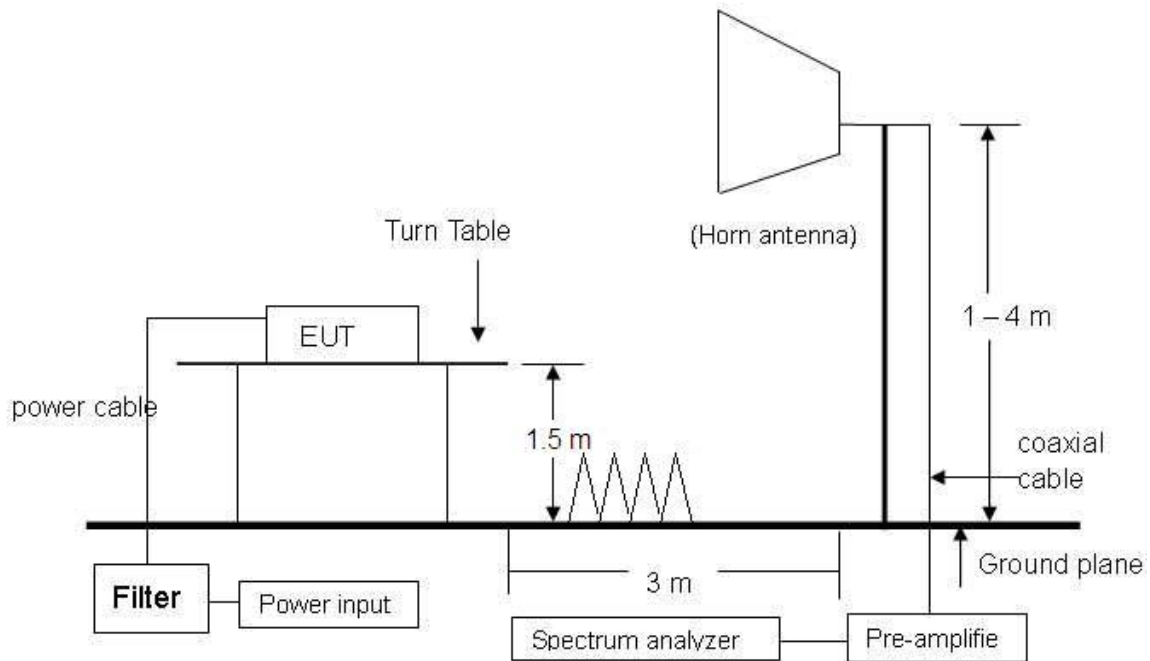
The following test equipment was used during the test:

EQUIPMENT/FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9 kHz ~ 40 GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 2018 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2018 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 29, 2018 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2018 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	SEP. 13, 2018 SRT
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNER	SF102-46/2*11SK252 /MY2611/2	FEB. 23, 2018 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNER	SF102/2*11SK252 /MY3331/2	SEP. 28, 2018 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



## 4.3.2 TEST SETUP



**NOTE:** The EUT system was put on a wooden table with 1.5m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.



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### 4.3.3 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.10:2013 and CISPR 22:2003. When the frequency spectrum measured started from 30 MHz to 1 GHz, then use antenna is a BICONICAL ANTENNA & LOG PERIODIC ANTENNA. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

### 4.3.4 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.



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## 4.3.5 TEST RESULT

Below 2400MHz (CH01)

Temperature:	19 °C	Humidity:	72 %RH
Frequency Range:	2.30 GHz – 2.41 GHz	Tested Mode:	TX1
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Dec. 14, 2017

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB/m)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dB)	
				PK	AV	PK	AV	PK	AV	PK	AV
2398.31	-31.26	28.38	H	46.66	36.11	43.78	33.23	74.00	54.00	-30.22	-20.77
2395.19	-31.26	28.37	V	45.96	35.43	43.07	32.54	74.00	54.00	-30.93	-21.46
2400.00	-31.26	28.38	H	44.58	34.08	41.70	31.20	74.00	54.00	-32.30	-22.80
2400.00	-31.26	28.38	V	44.70	34.29	41.82	31.41	74.00	54.00	-32.18	-22.59

Above 2483.5MHz (CH16)

Temperature:	19 °C	Humidity:	72 %RH
Frequency Range:	2.47 GHz – 2.60 GHz	Tested Mode:	TX3
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Dec. 14, 2017

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB/m)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dB)	
				PK	AV	PK	AV	PK	AV	PK	AV
2483.50	-31.19	28.48	H	43.43	32.96	40.72	30.25	74.00	54.00	-33.28	-23.75
2483.50	-31.19	28.48	V	42.85	32.34	40.14	29.63	74.00	54.00	-33.86	-24.37
2491.54	-31.19	28.49	H	45.56	35.02	42.86	32.32	74.00	54.00	-31.14	-21.68
2499.70	-31.18	28.50	V	45.99	35.47	43.31	32.79	74.00	54.00	-30.69	-21.21





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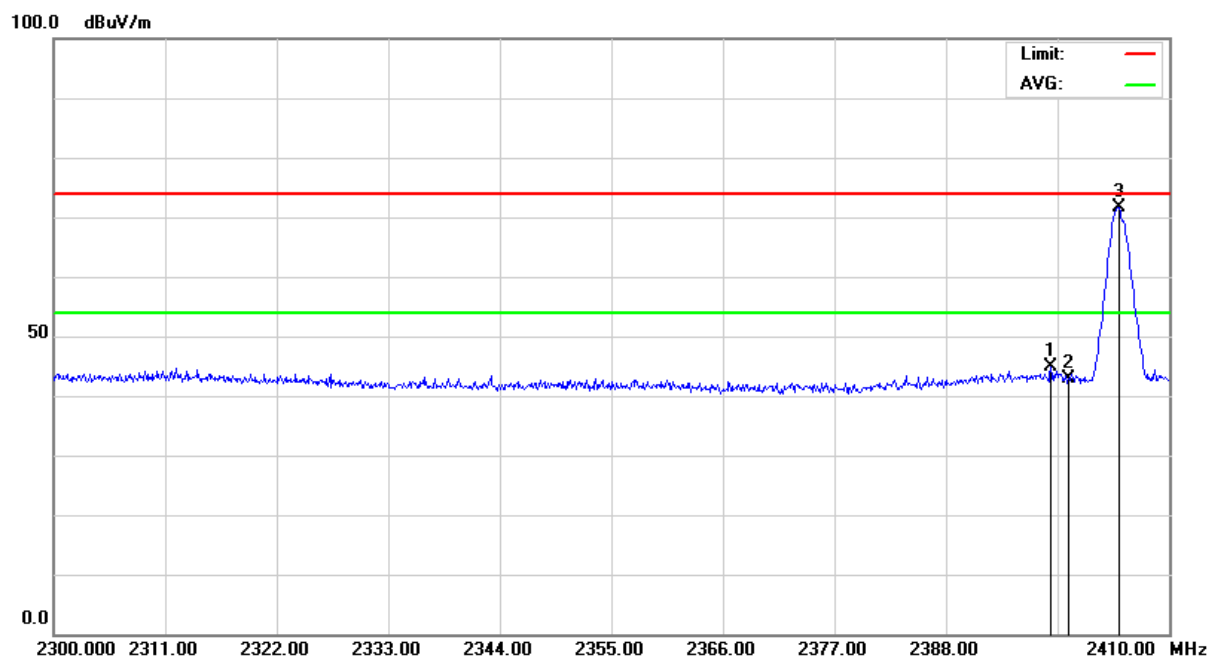
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

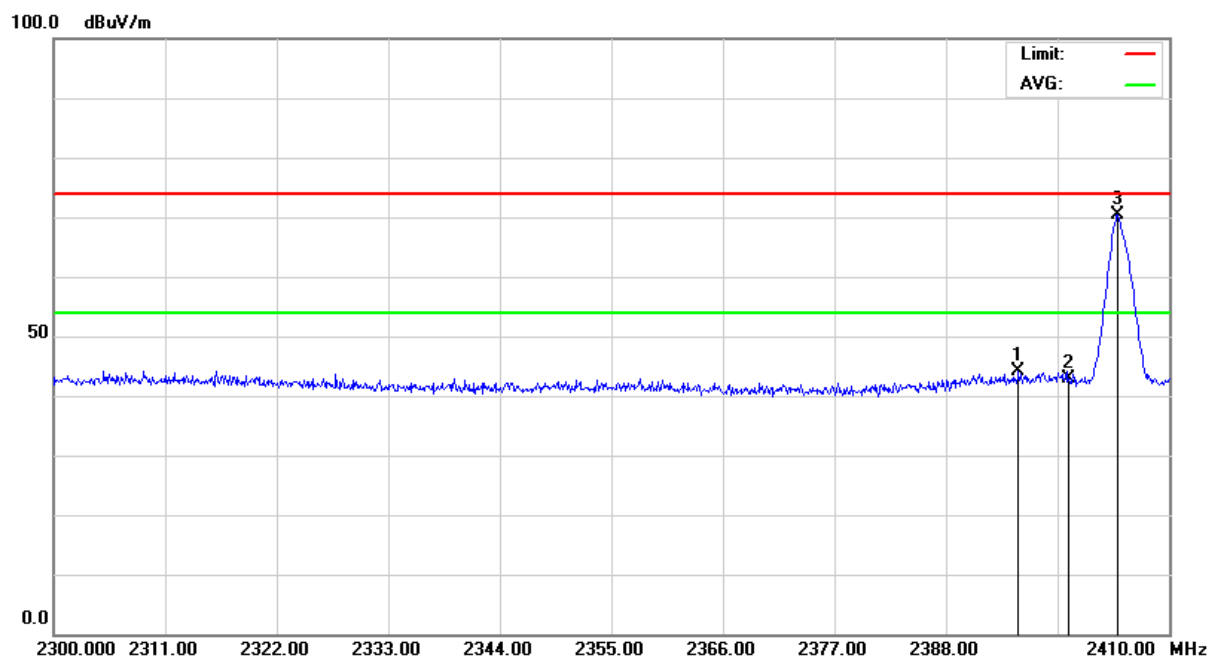
Reference No.: A17103001  
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## Below 2400MHz (CH01)

Antenna Polarization : Horizontal



Antenna Polarization : Vertical





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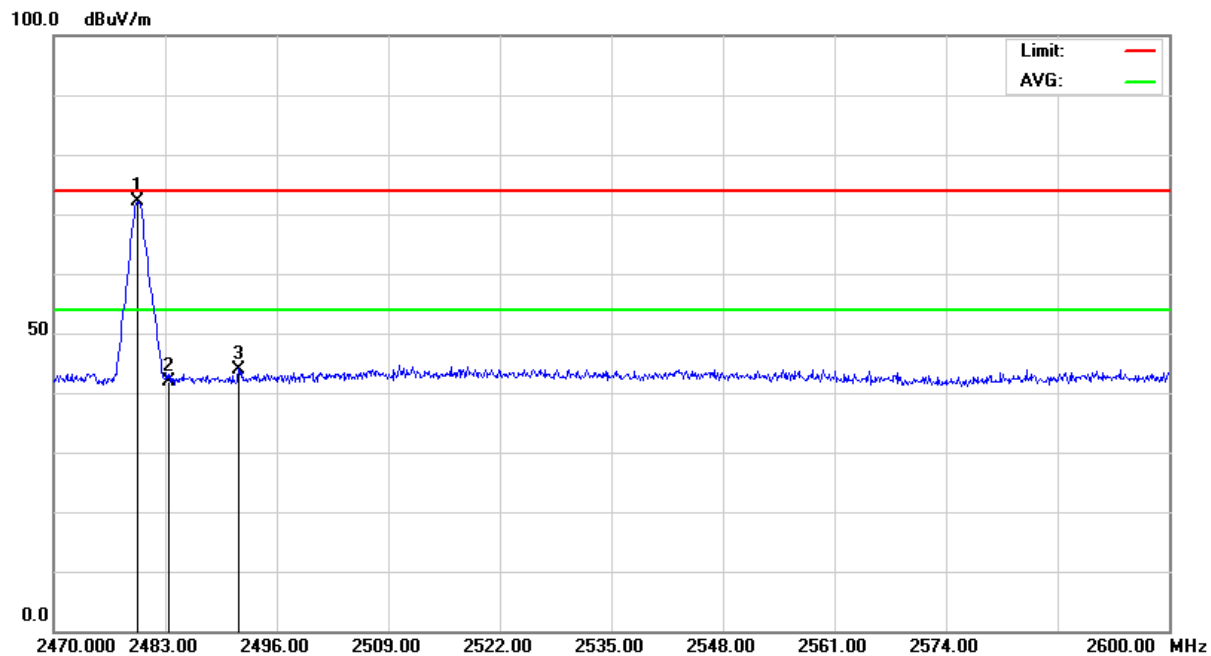
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

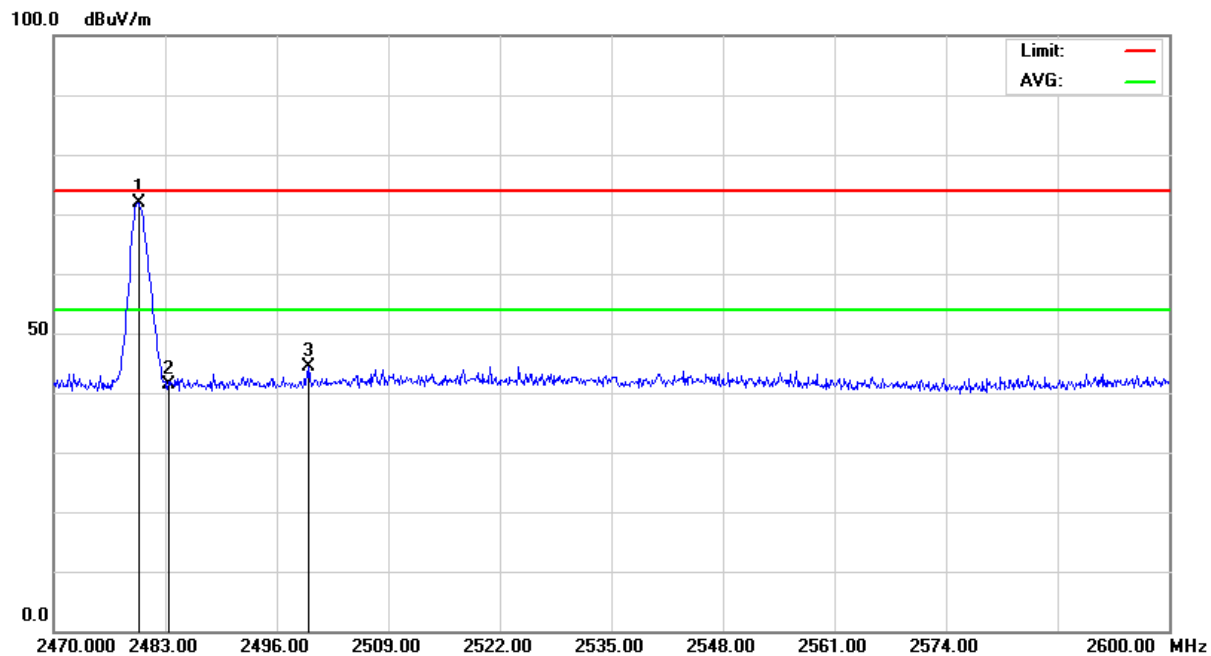
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### Above 2483.5MHz (CH16)

Antenna Polarization : Horizontal



Antenna Polarization : Vertical





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### **5. Antenna application**

#### **5.1 Antenna requirement**

The EUT's antenna is met the requirement of FCC Part 15C section 15.203.

#### **5.2 Result**

The EUT's antenna used a PIFA Antenna. Gain of antenna types is 3.28 dBi that meet the requirement.



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## 6. TERMS OF ABBREVIATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction