



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

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

## TEST REPORT

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
Page: 1 of 81  
Date: Jun. 19, 2017

Product Name: HyperX Cloud Flight Wireless Gaming Headset  
Model No.: Cloud Flight, \*\*\*\*\*HX-HSCF\*\*\*\*\* (the meaning of "\*" is "difference of color or shipping location" and may be alphanumeric characters or blank)  
Applicant: Kingston Digital, Inc.  
17600 Newhope Street Fountain Valley, CA 92708, U.S.A  
Date of Receipt: May. 09, 2017  
Finished date of Test: Jun. 08, 2017  
Applicable Standards: 47 CFR Part 15, Subpart C, 15.247  
ANSI C63.10: 2013  
FCC publication KDB 558074 D01 v03r03 Measurement on Digital Transmission Systems (DTS) Operating under Section 15.247 June 9, 2015

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

(Richard Lin)

Date:

6/19/2017

Approved By :

Johnson Ho

(Johnson Ho, Director)



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## Revisions History

Report No.	Issue Date	Revisions
FCCA17060701	Jun. 19, 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.

#### **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, DC 3.7V of charge battery or DC 5.0V from PC USB Port.

#### **1.3 EUT MODIFICATION**

- No modification in SRT Lab.

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**2. DESCRIPTION OF EUT AND TEST MODE****2.1 GENERAL DESCRIPTION OF EUT**

<b>PRODUCT</b>	HyperX Cloud Flight Wireless Gaming Headset
<b>MODEL NO.</b>	Cloud Flight, *****HX-HSCF***** (the meaning of “*” is “difference of color or shipping location” and may be alphanumeric characters or blank)
<b>POWER SUPPLY</b>	DC power source, DC 3.7V of charge battery or DC 5.0V from PC USB Port
<b>CABLE</b>	NA
<b>FREQUENCY BAND</b>	2.4 GHz ~ 2.4835 GHz
<b>CARRIER FREQUENCY</b>	2.401.35 GHz ~ 2.479.35 GHz
<b>NUMBER OF CHANNEL</b>	40
<b>RATED RF OUTPUT POWER</b>	0.69 dBm (1.17 mW)
<b>MODULATION TYPE</b>	Pi/4 DQPSK
<b>MODE OF OPERATION</b>	Duplex
<b>ANTENNA TYPE</b>	Printing Antenna
<b>ANTENNA GAIN</b>	Ant1 : 1.81 dBi Ant2 : 1.68 dBi
<b>OPERATING TEMPERATURE RANGE</b>	0 ~ 40°C

**NOTE:**

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**

<b>DEVICE</b>	<b>BRAND / MAKER</b>	<b>MODEL #</b>	<b>FCC ID / DOC</b>	<b>REMARK</b>
Micro USB Cable	N/A	N/A	N/A	1.m shielded power cable
AUXCable	N/A	N/A		1.3m shielded data cable.
Microphone	N/A	N/A	N/A	N/A
HyperX Cloud Flight Wireless Gaming Headset USB Dongle	Kingston	Cloud Flight	N/A	N/A

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**2.3 DESCRIPTION OF TEST MODE**

Mode		Frequency
1	Tx-1_ANT1	2401.35 MHz
2	Tx-1_ANT2	2401.35 MHz
3	Tx-2_ANT1	2439.35 MHz
4	Tx-2_ANT2	2439.35 MHz
5	Tx-3_ANT1	2479.35 MHz
6	Tx-3_ANT2	2479.35 MHz
7	Standby	N/A
8	Link	N/A

**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**

Tx-1, Tx-2, Tx3, Standby :

1. Setup the EUT and all peripheral devices .
2. Turn on the power of all equipment and EUT.
3. We will use the following programs under Windows 10 system to test EUT.
4. Open program "VMIttest-1.1.6.56". Into mode Tx-1,. Tx-2, Tx3, Standby

Link :

1. Setup the EUT and all peripheral devices .
2. Turn on the power of all equipment and EUT.
3. We will use the following programs under Windows 10 system to test EUT.
4. Play music & Use the recorder to record.

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**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	PK1100U	D41108	1.8m unshielded data cable.
4	Mouse	Acer	M-UVACR1	R41126	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.

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

**2.6 CHANNEL AND FREQUENCY TABLE**

Channel	Frequency	Channel	Frequency
CH01	2401.35 MHz	CH21	2441.35 MHz
CH02	2403.35 MHz	CH22	2443.35 MHz
CH03	2405.35 MHz	CH23	2445.35 MHz
CH04	2407.35 MHz	CH24	2447.35 MHz
CH05	2409.35 MHz	CH25	2449.35 MHz
CH06	2411.35 MHz	CH26	2451.35 MHz
CH07	2413.35 MHz	CH27	2453.35 MHz
CH08	2415.35 MHz	CH28	2455.35 MHz
CH09	2417.35 MHz	CH29	2457.35 MHz
CH10	2419.35 MHz	CH30	2459.35 MHz
CH11	2421.35 MHz	CH31	2461.35 MHz
CH12	2423.35 MHz	CH32	2463.35 MHz
CH13	2425.35 MHz	CH33	2465.35 MHz
CH14	2427.35 MHz	CH34	2467.35 MHz
CH15	2429.35 MHz	CH35	2469.35 MHz
CH16	2431.35 MHz	CH36	2471.35 MHz
CH17	2433.35 MHz	CH37	2473.35 MHz
CH18	2435.35 MHz	CH38	2475.35 MHz
CH19	2437.35 MHz	CH39	2477.35 MHz
CH20	2439.35 MHz	CH40	2479.35 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, 15.247

ANSI C63.10: 2013

FCC publication KDB 558074 D01 v03r03 Measurement on Digital Transmission Systems (DTS) Operating under Section 15.247 June 9, 2015

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 15.247(c)(1)(i)	Antenna requirement	PASS
15.207	AC Power Line Conducted Emission	N/A
15.247(a)(2)	6 dB Bandwidth	PASS
15.247(b)	Maximum Peak Conducted Output Power	PASS
15.247(d)	Band Edge Measurement:	PASS
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS
15.247(e)	Power Density: Limit: 8dBm/3kHz	PASS

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## 4. TECHNICAL CHARACTERISTICS TEST

### 4.1 CONDUCTED EMISSION TEST

#### 4.1.1 LIMIT

Frequency (MHz)	Class A (dBμV)		Class B (dBμV)	
	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:

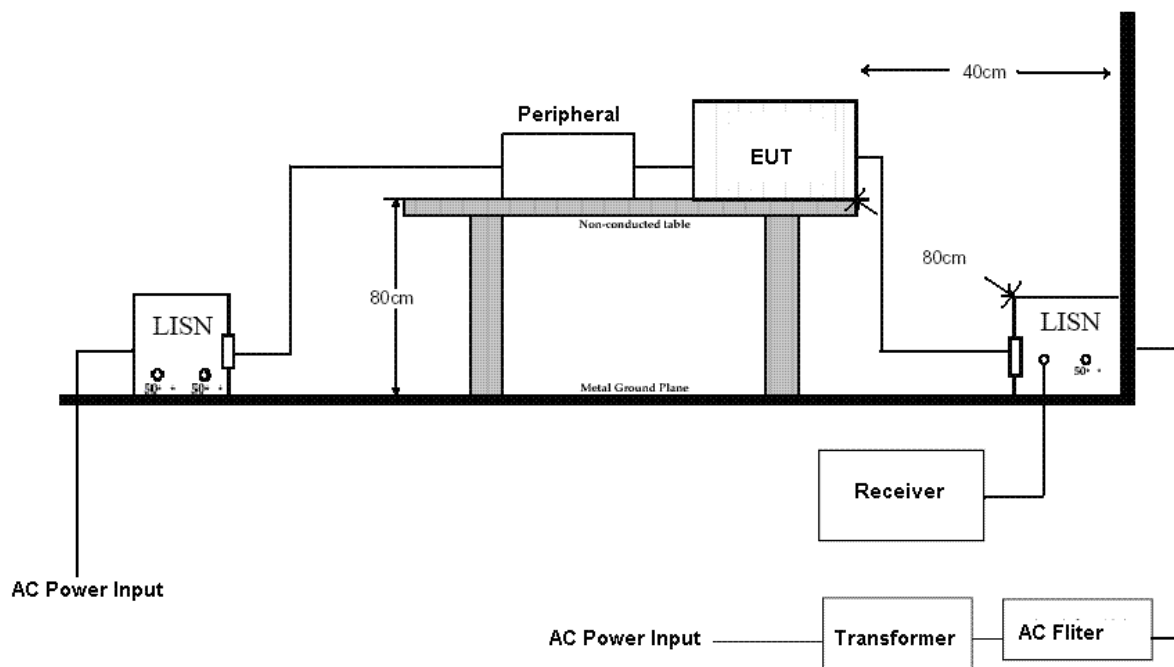
EQUIPMENT/FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	JAN. 02, 2018 ETC	<input type="checkbox"/>
EMI TEST RECEIVER	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	ESHS30 / 826003/008	JAN. 09, 2018 ETC	<input checked="" type="checkbox"/>
LISN	50 μH, 50 ohm	SOLAR	9252-50-R-24-BNC / 951315	NOV. 01, 2017 ETC	<input checked="" type="checkbox"/>
LISN	50 μH, 50 ohm	SCHWARZBECK	NSLK 8127/ 8127-808	DEC. 11, 2017 ETC	<input checked="" type="checkbox"/>
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	11593A/ L1TEQU005	NOV. 17, 2017 ETC	<input checked="" type="checkbox"/>
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	B00-CD-357/ L1TEQU009	MAY 17, 2018 ETC	<input type="checkbox"/>
COAXIAL CABLE	5 m	HUBER+SUHNER	RG214/U / #5M (L1TCAB013)	MAY 08, 2018 ETC	<input checked="" type="checkbox"/>
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 771	NCR	<input checked="" type="checkbox"/>
GROUND PLANE	2 m (H) x 3 m (W)	SRT	N/A	NCR	<input checked="" type="checkbox"/>
GROUND PLANE	2.5 m (H) x 3 m (W)	SRT	N/A	NCR	<input type="checkbox"/>
PULSE LIMITER	9 kHz ~ 30 MHz Insertion Loss= 10dB±0.3dB	ROHDE & SCHWARZ	ESH3Z2/ L1TTES009	FEB. 23, 2018 ETC	<input checked="" type="checkbox"/>
THERMO-HYGR O	15 – 40 °C, 0- 100% RH	TOP	20-A / 6644	SEP. 20, 2017 ETC	<input checked="" type="checkbox"/>

#### 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.

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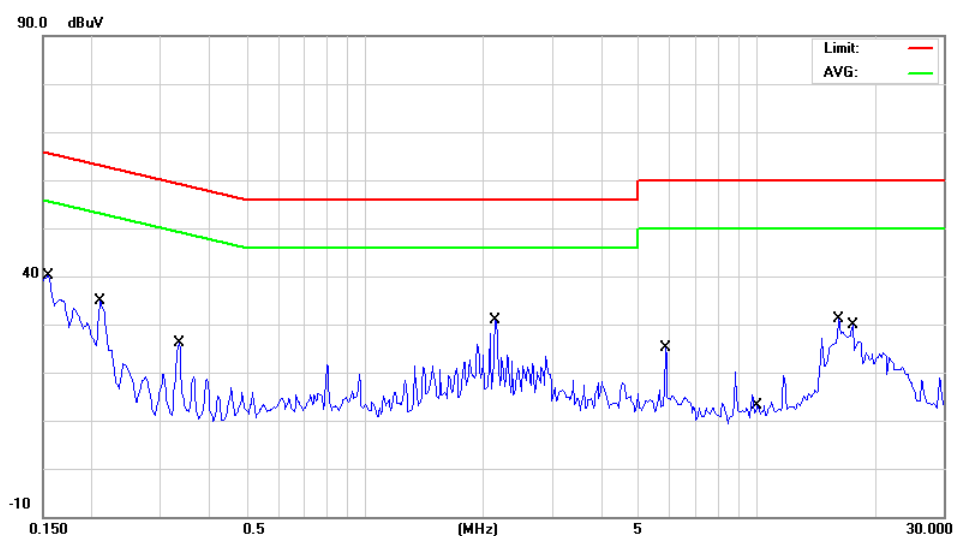
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## 4.1.5 TEST RESULT

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-1_ANT1
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

### Power Line Measured : Line



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1550	33.36	-0.12	33.24	65.73	-32.49	QP	
	2	0.1550	30.08	-0.12	29.96	55.73	-25.77	AVG	
	3	0.2100	33.74	-0.11	33.63	63.21	-29.58	QP	
*	4	0.2100	33.22	-0.11	33.11	53.21	-20.10	AVG	
	5	0.3350	25.04	-0.14	24.90	59.33	-34.43	QP	
	6	0.3350	23.15	-0.14	23.01	49.33	-26.32	AVG	
	7	2.1550	26.10	-0.05	26.05	56.00	-29.95	QP	
	8	2.1550	11.86	-0.05	11.81	46.00	-34.19	AVG	
	9	5.8600	23.92	0.14	24.06	60.00	-35.94	QP	
	10	5.8600	22.83	0.14	22.97	50.00	-27.03	AVG	
	11	10.0000	1.88	0.14	2.02	60.00	-57.98	QP	
	12	10.0000	-0.63	0.14	-0.49	50.00	-50.49	AVG	
	13	16.2000	23.76	0.38	24.14	60.00	-35.86	QP	
	14	16.2000	17.43	0.38	17.81	50.00	-32.19	AVG	
	15	17.5800	27.84	0.44	28.28	60.00	-31.72	QP	
	16	17.5800	25.10	0.44	25.54	50.00	-24.46	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.

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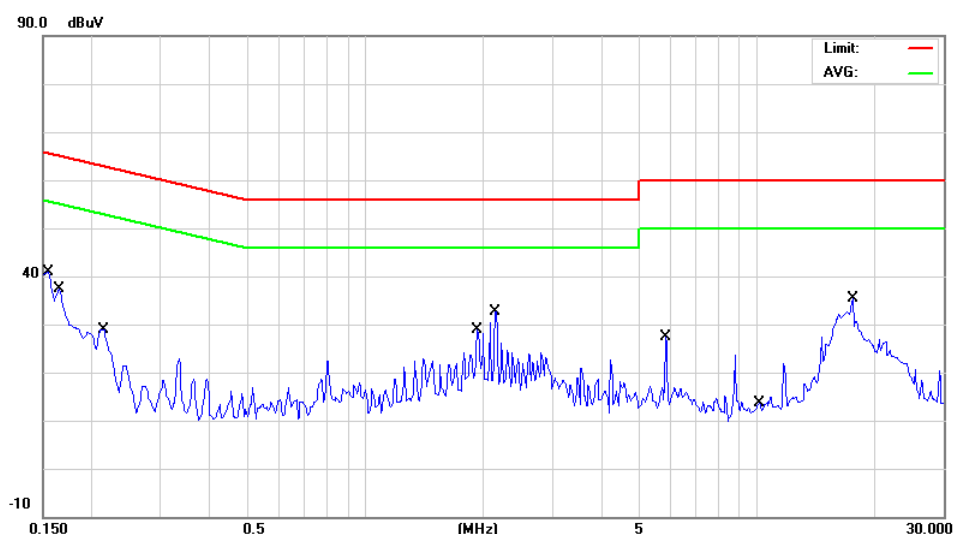
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Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-1_ANT1
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1550	33.18	0.06	33.24	65.73	-32.49	QP	
	2	0.1550	29.17	0.06	29.23	55.73	-26.50	AVG	
	3	0.1650	28.80	0.05	28.85	65.21	-36.36	QP	
	4	0.1650	24.25	0.05	24.30	55.21	-30.91	AVG	
	5	0.2150	25.38	0.00	25.38	63.01	-37.63	QP	
	6	0.2150	24.38	0.00	24.38	53.01	-28.63	AVG	
	7	1.9350	19.94	0.16	20.10	56.00	-35.90	QP	
	8	1.9350	11.26	0.16	11.42	46.00	-34.58	AVG	
	9	2.1550	27.86	0.16	28.02	56.00	-27.98	QP	
	10	2.1550	13.55	0.16	13.71	46.00	-32.29	AVG	
	11	5.8600	26.06	0.17	26.23	60.00	-33.77	QP	
	12	5.8600	25.10	0.17	25.27	50.00	-24.73	AVG	
	13	10.0000	2.64	0.32	2.96	60.00	-57.04	QP	
	14	10.0000	-0.18	0.32	0.14	50.00	-49.86	AVG	
	15	17.5800	33.20	0.50	33.70	60.00	-26.30	QP	
*	16	17.5800	30.80	0.50	31.30	50.00	-18.70	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.

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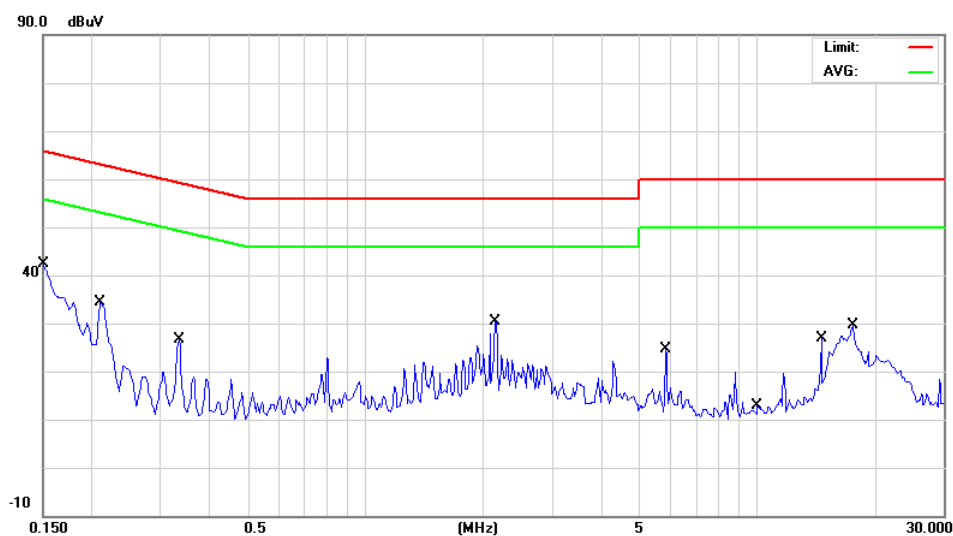
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Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-1_ANT2
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

## Power Line Measured : Line



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	35.52	-0.12	35.40	66.00	-30.60	QP	
	2	0.1500	34.18	-0.12	34.06	56.00	-21.94	AVG	
	3	0.2100	33.78	-0.11	33.67	63.21	-29.54	QP	
*	4	0.2100	33.22	-0.11	33.11	53.21	-20.10	AVG	
	5	0.3350	25.04	-0.14	24.90	59.33	-34.43	QP	
	6	0.3350	23.07	-0.14	22.93	49.33	-26.40	AVG	
	7	2.1550	26.10	-0.05	26.05	56.00	-29.95	QP	
	8	2.1550	12.00	-0.05	11.95	46.00	-34.05	AVG	
	9	5.8600	23.88	0.14	24.02	60.00	-35.98	QP	
	10	5.8600	22.83	0.14	22.97	50.00	-27.03	AVG	
	11	10.0000	1.96	0.14	2.10	60.00	-57.90	QP	
	12	10.0000	-0.55	0.14	-0.41	50.00	-50.41	AVG	
	13	14.6500	26.80	0.33	27.13	60.00	-32.87	QP	
	14	14.6500	22.99	0.33	23.32	50.00	-26.68	AVG	
	15	17.5800	28.36	0.44	28.80	60.00	-31.20	QP	
	16	17.5800	25.65	0.44	26.09	50.00	-23.91	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.**

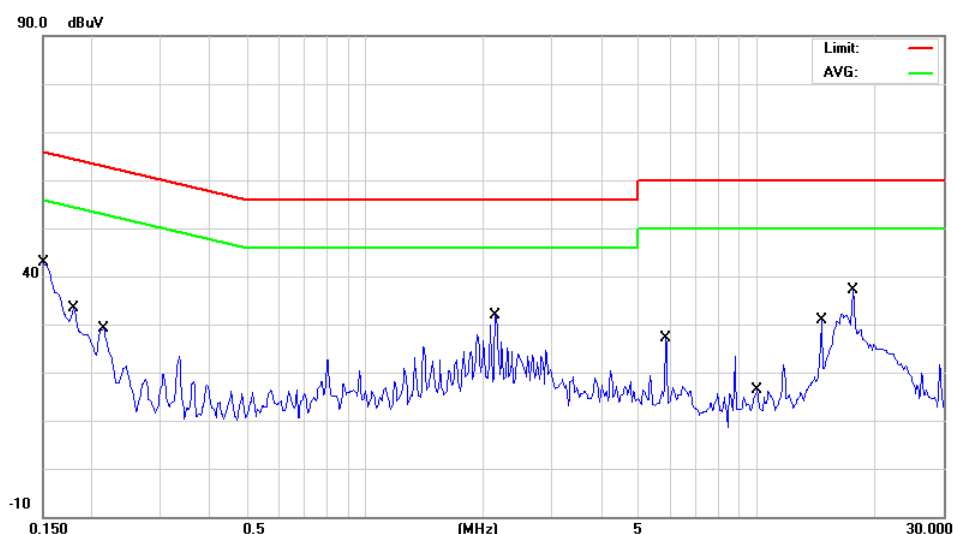
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
Page: 15 of 81  
Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-1_ANT2
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	36.06	0.07	36.13	66.00	-29.87	QP	
*	2	0.1500	34.04	0.07	34.11	56.00	-21.89	AVG	
	3	0.1800	28.16	0.02	28.18	64.49	-36.31	QP	
	4	0.1800	26.80	0.02	26.82	54.49	-27.67	AVG	
	5	0.2150	25.90	0.00	25.90	63.01	-37.11	QP	
	6	0.2150	24.91	0.00	24.91	53.01	-28.10	AVG	
	7	2.1550	27.96	0.16	28.12	56.00	-27.88	QP	
	8	2.1550	13.72	0.16	13.88	46.00	-32.12	AVG	
	9	5.8600	25.86	0.17	26.03	60.00	-33.97	QP	
	10	5.8600	24.91	0.17	25.08	50.00	-24.92	AVG	
	11	10.0000	2.50	0.32	2.82	60.00	-57.18	QP	
	12	10.0000	-0.26	0.32	0.06	50.00	-49.94	AVG	
	13	14.6500	30.42	0.44	30.86	60.00	-29.14	QP	
	14	14.6500	26.48	0.44	26.92	50.00	-23.08	AVG	
	15	17.5750	32.82	0.50	33.32	60.00	-26.68	QP	
	16	17.5750	23.68	0.50	24.18	50.00	-25.82	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.**

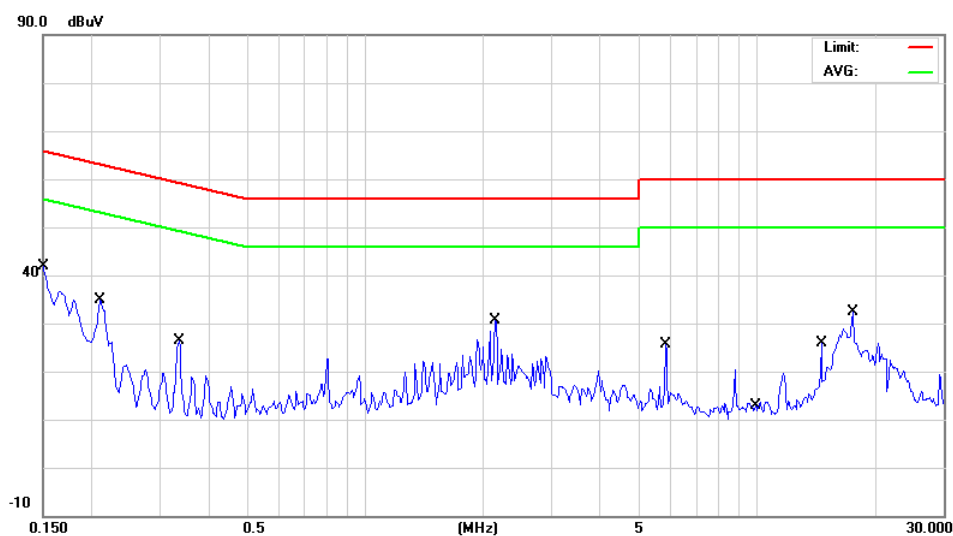
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
Page: 16 of 81  
Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-2_ANT1
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 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	35.22	-0.12	35.10	66.00	-30.90	QP	
	2	0.1500	34.11	-0.12	33.99	56.00	-22.01	AVG	
	3	0.2100	33.76	-0.11	33.65	63.21	-29.56	QP	
*	4	0.2100	33.15	-0.11	33.04	53.21	-20.17	AVG	
	5	0.3350	25.10	-0.14	24.96	59.33	-34.37	QP	
	6	0.3350	22.99	-0.14	22.85	49.33	-26.48	AVG	
	7	2.1550	27.16	-0.05	27.11	56.00	-28.89	QP	
	8	2.1550	12.93	-0.05	12.88	46.00	-33.12	AVG	
	9	5.8600	23.82	0.14	23.96	60.00	-36.04	QP	
	10	5.8600	22.50	0.14	22.64	50.00	-27.36	AVG	
	11	10.0000	1.70	0.14	1.84	60.00	-58.16	QP	
	12	10.0000	-0.55	0.14	-0.41	50.00	-50.41	AVG	
	13	14.6550	24.98	0.33	25.31	60.00	-34.69	QP	
	14	14.6550	16.05	0.33	16.38	50.00	-33.62	AVG	
	15	17.5800	29.02	0.44	29.46	60.00	-30.54	QP	
	16	17.5800	26.59	0.44	27.03	50.00	-22.97	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.**

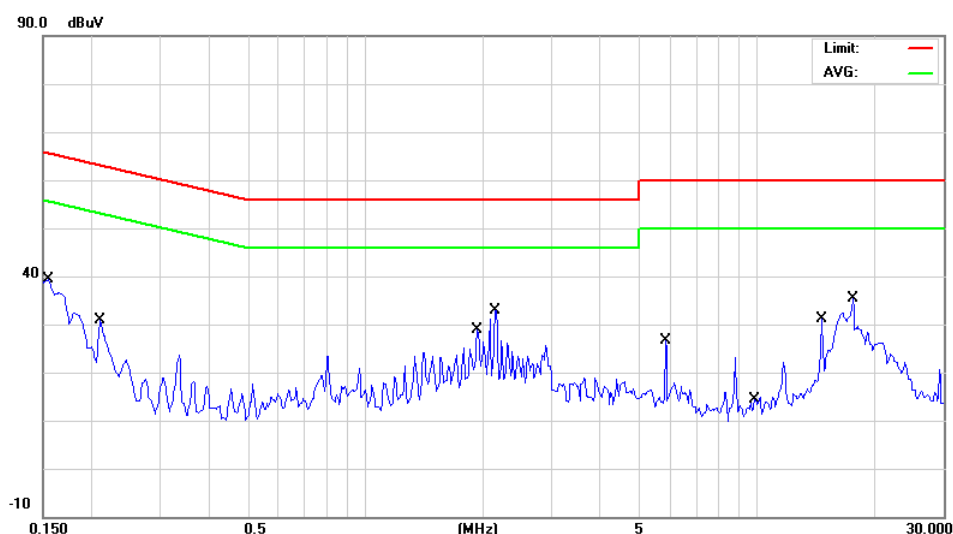
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
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Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-2_ANT1
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1550	33.52	0.06	33.58	65.73	-32.15	QP	
	2	0.1550	29.84	0.06	29.90	55.73	-25.83	AVG	
	3	0.2100	27.82	0.00	27.82	63.21	-35.39	QP	
	4	0.2100	26.85	0.00	26.85	53.21	-26.36	AVG	
	5	1.9350	20.86	0.16	21.02	56.00	-34.98	QP	
	6	1.9350	12.41	0.16	12.57	46.00	-33.43	AVG	
	7	2.1550	28.54	0.16	28.70	56.00	-27.30	QP	
	8	2.1550	14.34	0.16	14.50	46.00	-31.50	AVG	
	9	5.8600	25.96	0.17	26.13	60.00	-33.87	QP	
	10	5.8600	24.85	0.17	25.02	50.00	-24.98	AVG	
	11	10.0000	2.38	0.32	2.70	60.00	-57.30	QP	
	12	10.0000	-0.18	0.32	0.14	50.00	-49.86	AVG	
	13	14.6500	30.56	0.44	31.00	60.00	-29.00	QP	
	14	14.6500	26.05	0.44	26.49	50.00	-23.51	AVG	
	15	17.5800	33.68	0.50	34.18	60.00	-25.82	QP	
*	16	17.5800	31.56	0.50	32.06	50.00	-17.94	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.

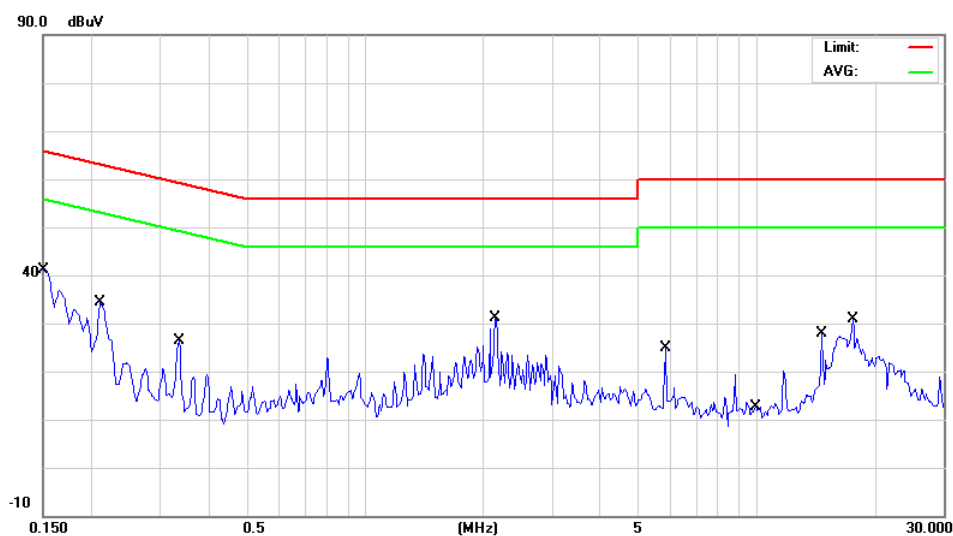
**Spectrum Research & Testing Lab., Inc.**

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

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-2_ANT2
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 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	35.26	-0.12	35.14	66.00	-30.86	QP	
	2	0.1500	34.04	-0.12	33.92	56.00	-22.08	AVG	
	3	0.2100	33.86	-0.11	33.75	63.21	-29.46	QP	
*	4	0.2100	33.22	-0.11	33.11	53.21	-20.10	AVG	
	5	0.3350	25.04	-0.14	24.90	59.33	-34.43	QP	
	6	0.3350	23.07	-0.14	22.93	49.33	-26.40	AVG	
	7	2.1550	26.98	-0.05	26.93	56.00	-29.07	QP	
	8	2.1550	12.81	-0.05	12.76	46.00	-33.24	AVG	
	9	5.8600	23.88	0.14	24.02	60.00	-35.98	QP	
	10	5.8600	22.83	0.14	22.97	50.00	-27.03	AVG	
	11	10.0000	1.92	0.14	2.06	60.00	-57.94	QP	
	12	10.0000	-0.70	0.14	-0.56	50.00	-50.56	AVG	
	13	14.6500	26.42	0.33	26.75	60.00	-33.25	QP	
	14	14.6500	22.41	0.33	22.74	50.00	-27.26	AVG	
	15	17.5800	28.80	0.44	29.24	60.00	-30.76	QP	
	16	17.5800	26.32	0.44	26.76	50.00	-23.24	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.**

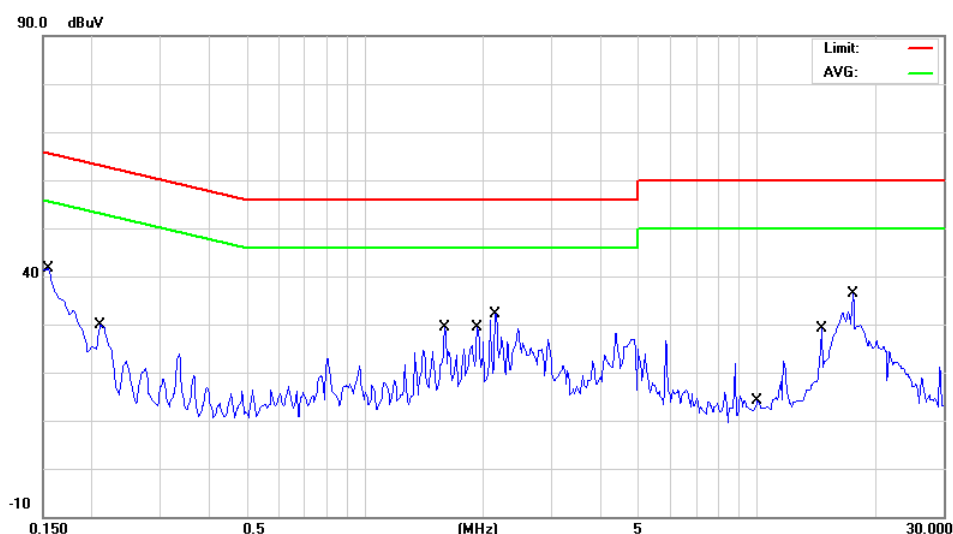
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-2_ANT2
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1550	33.28	0.06	33.34	65.73	-32.39	QP	
	2	0.1550	29.77	0.06	29.83	55.73	-25.90	AVG	
	3	0.2100	28.10	0.00	28.10	63.21	-35.11	QP	
	4	0.2100	26.95	0.00	26.95	53.21	-26.26	AVG	
	5	1.6000	12.30	0.12	12.42	56.00	-43.58	QP	
	6	1.6000	5.62	0.12	5.74	46.00	-40.26	AVG	
	7	1.9350	21.04	0.16	21.20	56.00	-34.80	QP	
	8	1.9350	12.41	0.16	12.57	46.00	-33.43	AVG	
	9	2.1550	28.74	0.16	28.90	56.00	-27.10	QP	
	10	2.1550	14.39	0.16	14.55	46.00	-31.45	AVG	
	11	10.0000	2.08	0.32	2.40	60.00	-57.60	QP	
	12	10.0000	-0.18	0.32	0.14	50.00	-49.86	AVG	
	13	14.6550	30.02	0.44	30.46	60.00	-29.54	QP	
	14	14.6550	15.91	0.44	16.35	50.00	-33.65	AVG	
	15	17.5850	33.20	0.50	33.70	60.00	-26.30	QP	
*	16	17.5850	25.93	0.50	26.43	50.00	-23.57	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.**

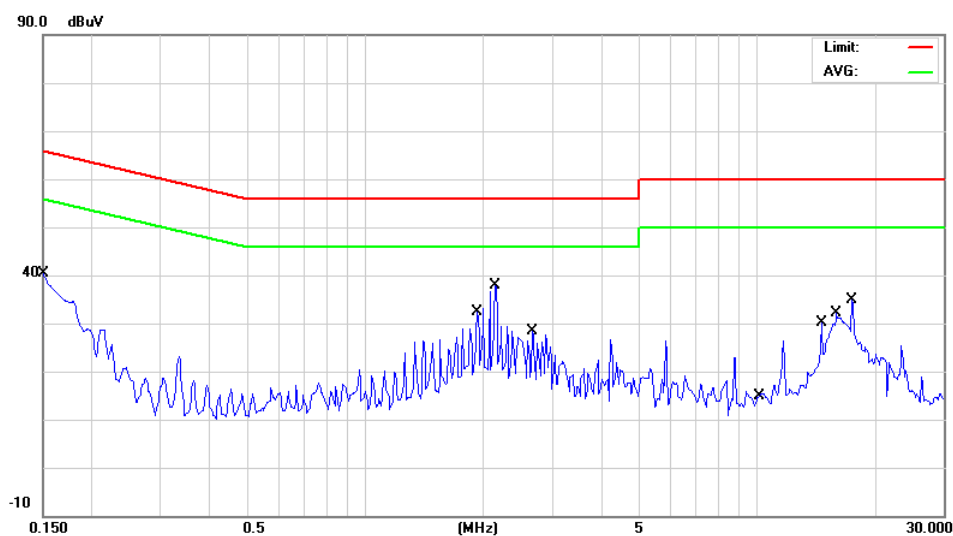
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-3_ANT1
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 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	36.16	-0.12	36.04	66.00	-29.96	QP	
	2	0.1500	34.11	-0.12	33.99	56.00	-22.01	AVG	
	3	1.9350	25.32	-0.06	25.26	56.00	-30.74	QP	
	4	1.9350	15.87	-0.06	15.81	46.00	-30.19	AVG	
	5	2.1550	33.78	-0.05	33.73	56.00	-22.27	QP	
	6	2.1550	18.63	-0.05	18.58	46.00	-27.42	AVG	
	7	2.6750	22.70	0.00	22.70	56.00	-33.30	QP	
	8	2.6750	13.89	0.00	13.89	46.00	-32.11	AVG	
	9	10.0000	2.90	0.14	3.04	60.00	-56.96	QP	
	10	10.0000	0.30	0.14	0.44	50.00	-49.56	AVG	
	11	14.6300	27.26	0.33	27.59	60.00	-32.41	QP	
	12	14.6300	23.68	0.33	24.01	50.00	-25.99	AVG	
	13	15.9700	28.78	0.38	29.16	60.00	-30.84	QP	
	14	15.9700	22.66	0.38	23.04	50.00	-26.96	AVG	
	15	17.5550	32.44	0.44	32.88	60.00	-27.12	QP	
*	16	17.5550	29.09	0.44	29.53	50.00	-20.47	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.**

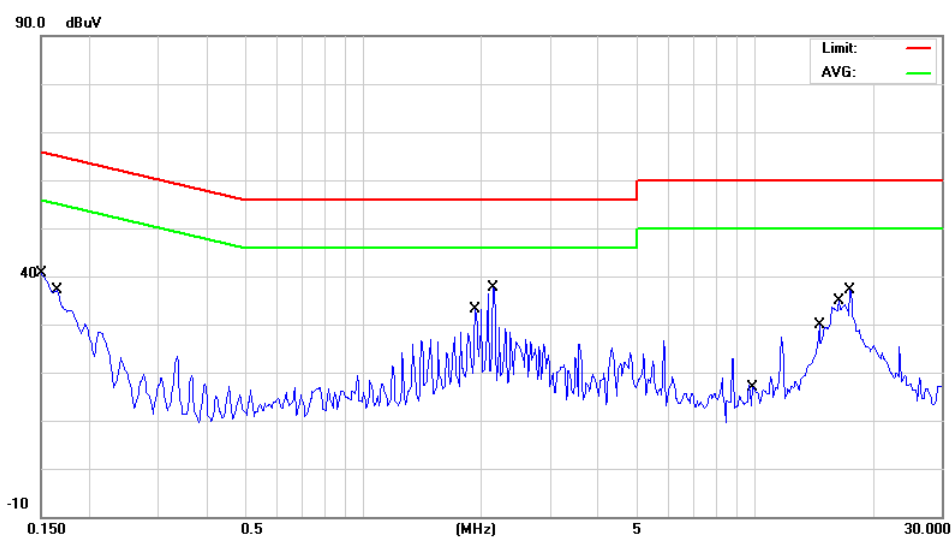
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-3_ANT1
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	36.44	0.07	36.51	66.00	-29.49	QP	
	2	0.1500	34.18	0.07	34.25	56.00	-21.75	AVG	
	3	0.1650	29.04	0.05	29.09	65.21	-36.12	QP	
	4	0.1650	24.91	0.05	24.96	55.21	-30.25	AVG	
	5	1.9350	25.18	0.16	25.34	56.00	-30.66	QP	
	6	1.9350	15.59	0.16	15.75	46.00	-30.25	AVG	
	7	2.1550	33.58	0.16	33.74	56.00	-22.26	QP	
	8	2.1550	18.43	0.16	18.59	46.00	-27.41	AVG	
	9	10.0000	3.04	0.32	3.36	60.00	-56.64	QP	
	10	10.0000	0.37	0.32	0.69	50.00	-49.31	AVG	
	11	14.6350	29.34	0.44	29.78	60.00	-30.22	QP	
	12	14.6350	22.58	0.44	23.02	50.00	-26.98	AVG	
	13	16.4200	28.98	0.48	29.46	60.00	-30.54	QP	
	14	16.4200	23.53	0.48	24.01	50.00	-25.99	AVG	
	15	17.5600	34.80	0.50	35.30	60.00	-24.70	QP	
*	16	17.5600	29.84	0.50	30.34	50.00	-19.66	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.**

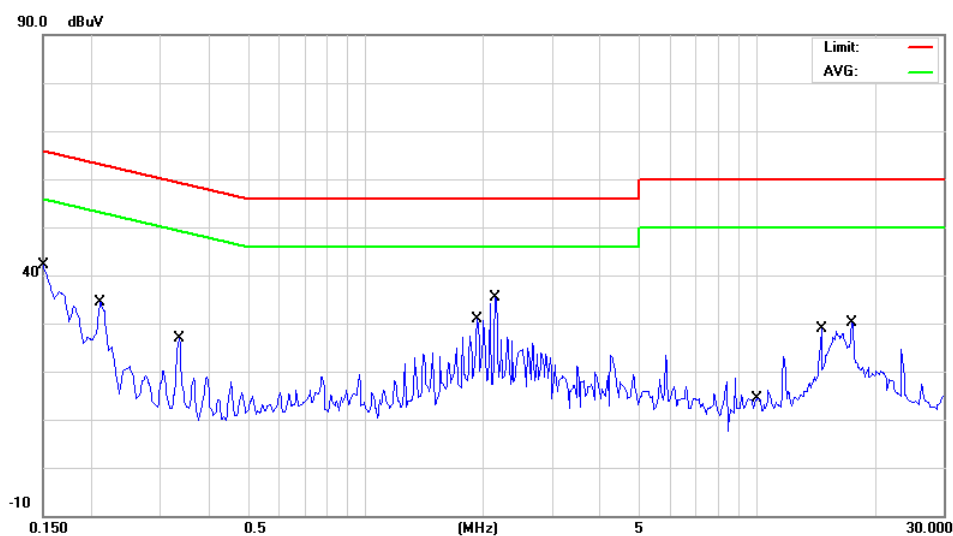
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-3_ANT2
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 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	35.92	-0.12	35.80	66.00	-30.20	QP	
	2	0.1500	34.72	-0.12	34.60	56.00	-21.40	AVG	
	3	0.2100	33.92	-0.11	33.81	63.21	-29.40	QP	
*	4	0.2100	33.45	-0.11	33.34	53.21	-19.87	AVG	
	5	0.3350	25.12	-0.14	24.98	59.33	-34.35	QP	
	6	0.3350	23.15	-0.14	23.01	49.33	-26.32	AVG	
	7	1.9350	23.08	-0.06	23.02	56.00	-32.98	QP	
	8	1.9350	13.72	-0.06	13.66	46.00	-32.34	AVG	
	9	2.1550	31.66	-0.05	31.61	56.00	-24.39	QP	
	10	2.1550	16.48	-0.05	16.43	46.00	-29.57	AVG	
	11	10.0000	2.56	0.14	2.70	60.00	-57.30	QP	
	12	10.0000	-0.11	0.14	0.03	50.00	-49.97	AVG	
	13	14.6300	25.80	0.33	26.13	60.00	-33.87	QP	
	14	14.6300	23.07	0.33	23.40	50.00	-26.60	AVG	
	15	17.5600	29.26	0.44	29.70	60.00	-30.30	QP	
	16	17.5600	21.08	0.44	21.52	50.00	-28.48	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.**

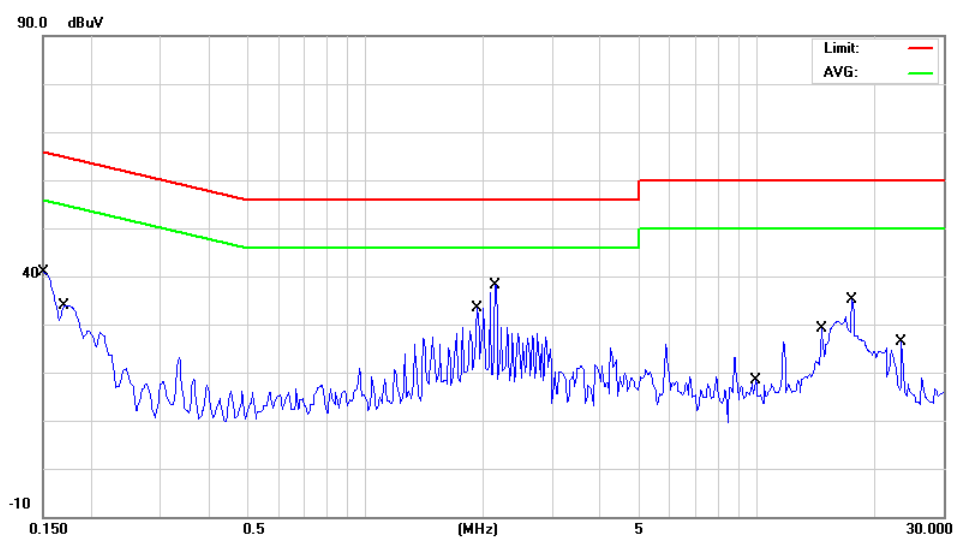
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Tx-3_ANT2
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	35.76	0.07	35.83	66.00	-30.17	QP	
	2	0.1500	33.75	0.07	33.82	56.00	-22.18	AVG	
	3	0.1700	29.18	0.04	29.22	64.96	-35.74	QP	
	4	0.1700	25.93	0.04	25.97	54.96	-28.99	AVG	
	5	1.9350	25.58	0.16	25.74	56.00	-30.26	QP	
	6	1.9350	15.87	0.16	16.03	46.00	-29.97	AVG	
	7	2.1550	34.06	0.16	34.22	56.00	-21.78	QP	
	8	2.1550	18.83	0.16	18.99	46.00	-27.01	AVG	
	9	10.0000	3.48	0.32	3.80	60.00	-56.20	QP	
	10	10.0000	0.64	0.32	0.96	50.00	-49.04	AVG	
	11	14.6250	28.60	0.44	29.04	60.00	-30.96	QP	
	12	14.6250	22.91	0.44	23.35	50.00	-26.65	AVG	
	13	17.5500	29.92	0.50	30.42	60.00	-29.58	QP	
*	14	17.5500	28.93	0.50	29.43	50.00	-20.57	AVG	
	15	23.4050	23.90	0.62	24.52	60.00	-35.48	QP	
	16	23.4050	21.03	0.62	21.65	50.00	-28.35	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.

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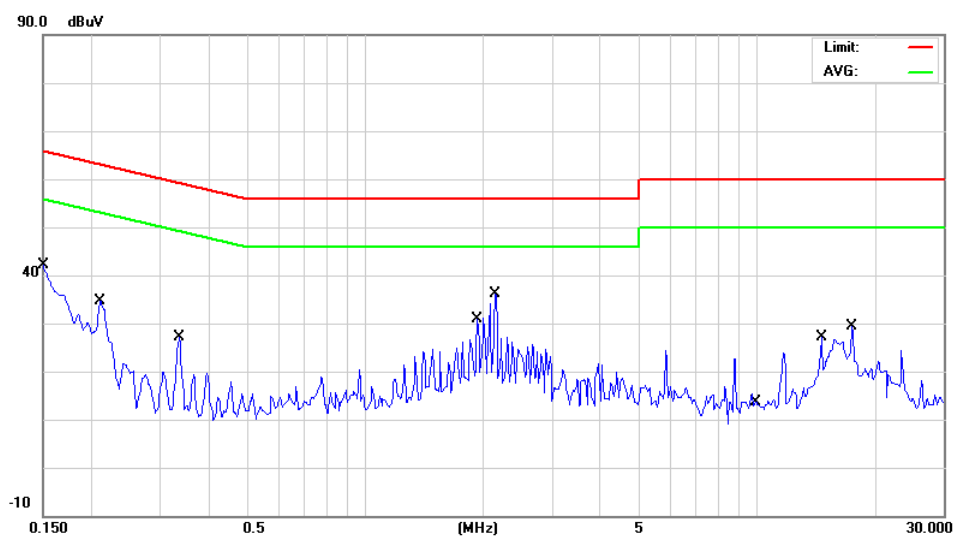
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

**TEST REPORT**

Reference No.: A17060701  
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Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Standby
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 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	35.62	-0.12	35.50	66.00	-30.50	QP	
	2	0.1500	34.32	-0.12	34.20	56.00	-21.80	AVG	
	3	0.2100	34.12	-0.11	34.01	63.21	-29.20	QP	
*	4	0.2100	33.68	-0.11	33.57	53.21	-19.64	AVG	
	5	0.3350	25.16	-0.14	25.02	59.33	-34.31	QP	
	6	0.3350	23.15	-0.14	23.01	49.33	-26.32	AVG	
	7	1.9350	23.42	-0.06	23.36	56.00	-32.64	QP	
	8	1.9350	13.89	-0.06	13.83	46.00	-32.17	AVG	
	9	2.1550	31.94	-0.05	31.89	56.00	-24.11	QP	
	10	2.1550	16.73	-0.05	16.68	46.00	-29.32	AVG	
	11	10.0000	2.24	0.14	2.38	60.00	-57.62	QP	
	12	10.0000	-0.33	0.14	-0.19	50.00	-50.19	AVG	
	13	14.6250	25.94	0.33	26.27	60.00	-33.73	QP	
	14	14.6250	20.03	0.33	20.36	50.00	-29.64	AVG	
	15	17.5500	28.56	0.44	29.00	60.00	-31.00	QP	
	16	17.5500	26.32	0.44	26.76	50.00	-23.24	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.



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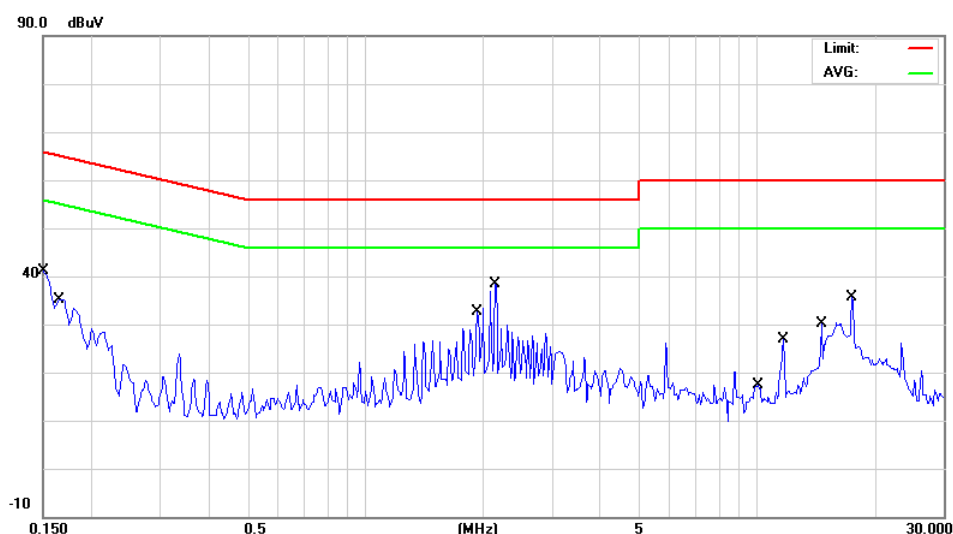
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

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Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Standby
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	35.72	0.07	35.79	66.00	-30.21	QP	
	2	0.1500	33.60	0.07	33.67	56.00	-22.33	AVG	
	3	0.1659	29.32	0.04	29.36	65.16	-35.80	QP	
	4	0.1659	25.76	0.04	25.80	55.16	-29.36	AVG	
	5	1.9350	25.40	0.16	25.56	56.00	-30.44	QP	
	6	1.9350	15.68	0.16	15.84	46.00	-30.16	AVG	
	7	2.1550	33.88	0.16	34.04	56.00	-21.96	QP	
	8	2.1550	18.63	0.16	18.79	46.00	-27.21	AVG	
	9	10.0000	2.78	0.32	3.10	60.00	-56.90	QP	
	10	10.0000	0.10	0.32	0.42	50.00	-49.58	AVG	
	11	11.7000	25.46	0.36	25.82	60.00	-34.18	QP	
	12	11.7000	23.97	0.36	24.33	50.00	-25.67	AVG	
	13	14.6300	25.62	0.44	26.06	60.00	-33.94	QP	
	14	14.6300	16.56	0.44	17.00	50.00	-33.00	AVG	
	15	17.5500	32.70	0.50	33.20	60.00	-26.80	QP	
*	16	17.5500	31.80	0.50	32.30	50.00	-17.70	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.

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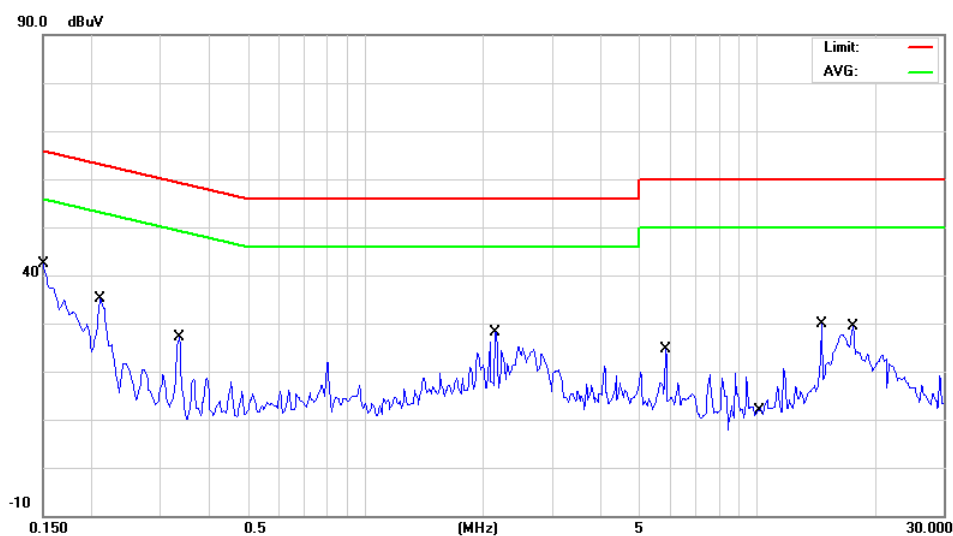
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

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Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Link
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 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	35.62	-0.12	35.50	66.00	-30.50	QP	
	2	0.1500	34.45	-0.12	34.33	56.00	-21.67	AVG	
	3	0.2100	33.84	-0.11	33.73	63.21	-29.48	QP	
*	4	0.2100	33.30	-0.11	33.19	53.21	-20.02	AVG	
	5	0.3350	25.22	-0.14	25.08	59.33	-34.25	QP	
	6	0.3350	23.30	-0.14	23.16	49.33	-26.17	AVG	
	7	2.1550	24.48	-0.05	24.43	56.00	-31.57	QP	
	8	2.1550	10.95	-0.05	10.90	46.00	-35.10	AVG	
	9	5.8600	23.80	0.14	23.94	60.00	-36.06	QP	
	10	5.8600	22.75	0.14	22.89	50.00	-27.11	AVG	
	11	10.0000	1.96	0.14	2.10	60.00	-57.90	QP	
	12	10.0000	-0.70	0.14	-0.56	50.00	-50.56	AVG	
	13	14.6600	22.94	0.33	23.27	60.00	-36.73	QP	
	14	14.6600	14.12	0.33	14.45	50.00	-35.55	AVG	
	15	17.5800	28.06	0.44	28.50	60.00	-31.50	QP	
	16	17.5800	25.04	0.44	25.48	50.00	-24.52	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.

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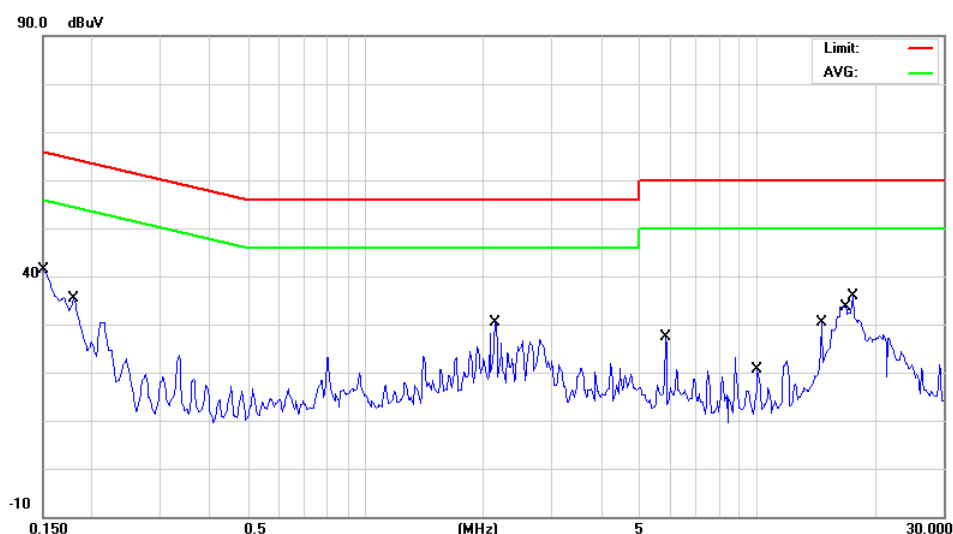
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

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Temperature:	24 °C	Humidity:	66 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	Link
Receiver Detector:	Q.P. and AV.	Modulation Type:	Pi/4 DQPSK
Tested By:	Richard Lin	Tested Date:	Jun. 01, 2017

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1500	36.34	0.07	36.41	66.00	-29.59	QP	
	2	0.1500	34.32	0.07	34.39	56.00	-21.61	AVG	
	3	0.1800	28.24	0.02	28.26	64.49	-36.23	QP	
	4	0.1800	26.85	0.02	26.87	54.49	-27.62	AVG	
	5	2.1550	26.34	0.16	26.50	56.00	-29.50	QP	
	6	2.1550	12.74	0.16	12.90	46.00	-33.10	AVG	
	7	5.8600	25.84	0.17	26.01	60.00	-33.99	QP	
	8	5.8600	24.91	0.17	25.08	50.00	-24.92	AVG	
	9	10.0000	2.38	0.32	2.70	60.00	-57.30	QP	
	10	10.0000	-0.18	0.32	0.14	50.00	-49.86	AVG	
	11	14.6500	30.38	0.44	30.82	60.00	-29.18	QP	
	12	14.6500	26.38	0.44	26.82	50.00	-23.18	AVG	
	13	16.8600	30.04	0.49	30.53	60.00	-29.47	QP	
	14	16.8600	23.60	0.49	24.09	50.00	-25.91	AVG	
	15	17.5850	33.52	0.50	34.02	60.00	-25.98	QP	
*	16	17.5850	28.77	0.50	29.27	50.00	-20.73	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.

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**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)	FIELD STRENGTH (microvolts/meter)	DISTANCE (m)	FIELD STRENGTH (dB $\mu$ V/m)
0.009 - 0.490	2400/F(kHz)	300	67.6-20log(kHz)
0.490 - 1.705	24000/F(kHz)	30	87.6-20log(kHz)
1.705 - 30	30	30	30
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
Above 960	500	3	54.0

**NOTE:**

1. 30 dBuV (in 30m) = 70 dBuV (in 3m).
2. In the emission tables above , the tighter limit applies at the band edges.
3. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.

FCC Part 15, Section15.35(b) limit of radiated emission for frequency above 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

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## 4.2.2 TEST EQUIPMENT

Below 1 GHz The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC	■
LOOP ANTENNA	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	HFH2-Z2 / 860605/002	FEB. 24, 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, 2017 ETC	■
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2017 ETC	■
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 29, 2017 ETC	■
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	NOV. 17, 2017 SRT	■
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	NOV. 20, 2017 ETC	■
RF CABLE	UP TO 26.5 GHz 3.5 m	EMCI	EMC104-SM-SM-3 500 / 150601	AUG. 28, 2017 ETC	■
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK2 52 /MY2611/2	FEB. 23, 2018 ETC	■
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF102/2*11SK252 /MY3331/2	OCT. 03, 2017 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR	■
THERMO-HYGRO	15 - 40 °C, 0- 100% RH	TOP	20-A / 7685	SEP. 20, 2017 ETC	■
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC	■

**NOTE:** The Open Area Test Site (SRT-1) is registered by FCC with No. 90957

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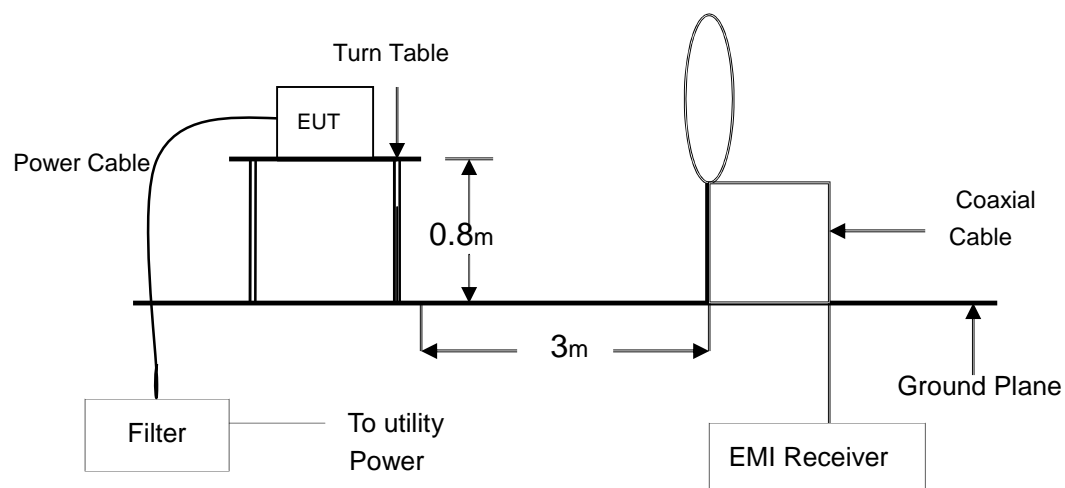
Above 1 GHz The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC	■
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2017 ETC	■
HORN ANTENNA	18 ~ 40 GHZ	ETS-LINDGREN	3116 /00032255	DEC. 25, 2017 ETC	■
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 29, 2017 ETC	■
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 17, 2017 SRT	■
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK2 52 /MY2611/2	FEB. 28, 2017 ETC	■
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF102/2*11SK252 /MY3331/2	OCT. 03, 2017 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR	■
THERMO-HYGRO	15 - 40 °C, 0- 100% RH	TOP	20-A / 7685	SEP. 20, 2017 ETC	■
TEST SOFTWARE	---	EZ-EMC	SRT-03A1	NCR	■

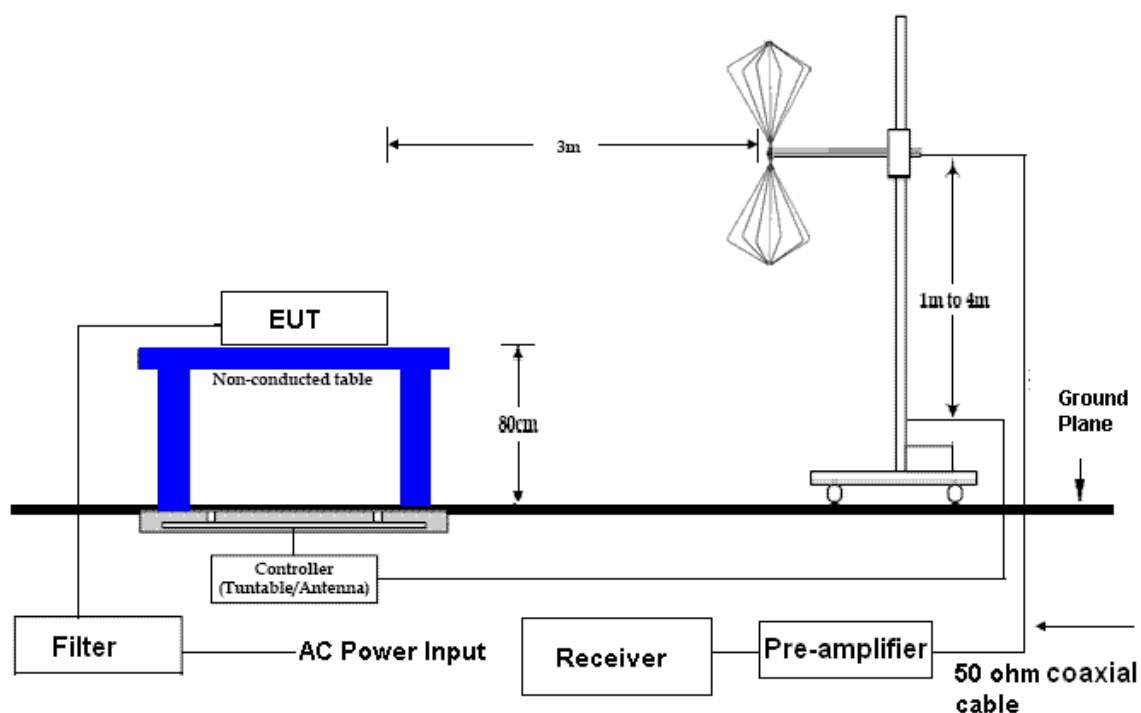


## 4.2.3 TEST SET-UP

### 9KHz ~ 30MHz

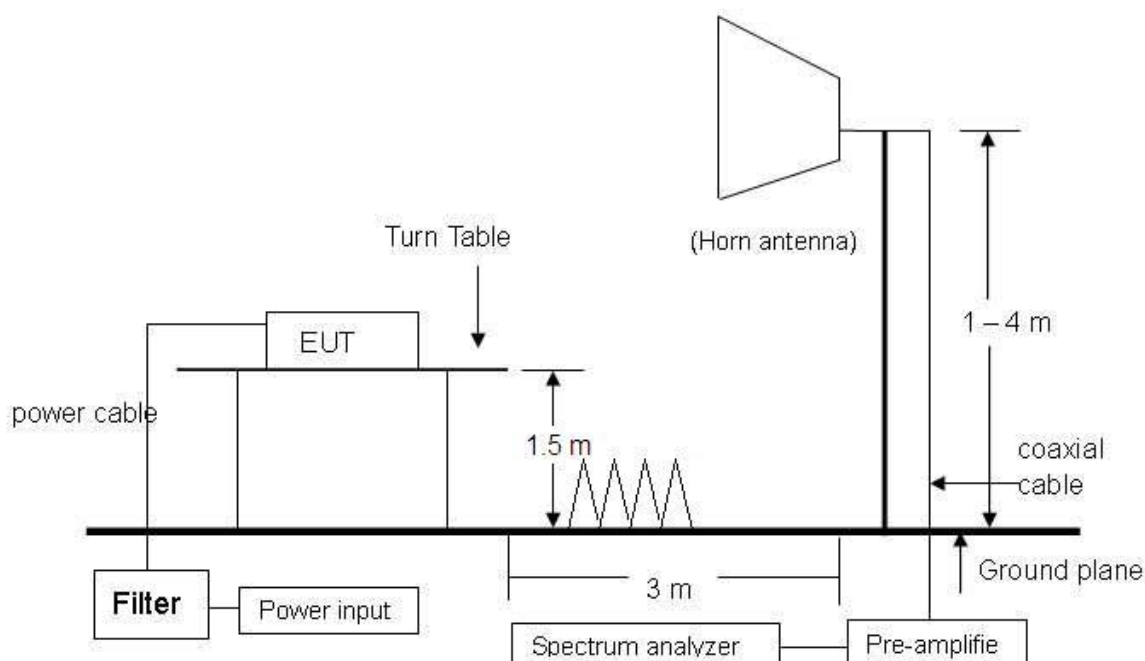


### 30 MHz ~ 1 GHz





## Above 1 GHz



**NOTE:** The EUT system was put on a wooden table with 0.8m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.

### 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 9 kHz to 30 MHz, then use antenna is a loop 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 9kHz to 30MHz and 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.



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**4.2.5 TEST RESULT**

Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-1_ANT1
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
12.97	1.34	21.19	6.71	29.23	70.00	-40.77
15.32	1.41	21.49	5.93	28.83	70.00	-41.17
19.18	1.52	21.99	6.44	29.94	70.00	-40.06
21.24	1.55	22.15	5.58	29.28	70.00	-40.72
26.65	1.67	22.37	7.03	31.07	70.00	-38.93
28.04	1.73	22.42	6.84	31.00	70.00	-39.00

Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-1_ANT2
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
10.88	1.27	20.91	6.60	28.78	70.00	-41.22
18.32	1.49	21.87	7.13	30.50	70.00	-39.50
22.54	1.57	22.20	5.94	29.71	70.00	-40.29
23.29	1.58	22.23	6.08	29.89	70.00	-40.11
24.46	1.59	22.28	6.35	30.22	70.00	-39.78
28.85	1.77	22.45	7.00	31.22	70.00	-38.78

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Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-2_ANT1
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
13.51	1.35	21.26	6.21	28.82	70.00	-41.18
15.67	1.42	21.53	5.78	28.73	70.00	-41.27
22.17	1.57	22.19	6.04	29.79	70.00	-40.21
23.92	1.59	22.26	7.11	30.95	70.00	-39.05
28.65	1.76	22.45	6.53	30.74	70.00	-39.26
29.54	1.80	22.48	6.29	30.57	70.00	-39.43

Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-2_ANT2
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
10.49	1.26	20.86	5.81	27.93	70.00	-42.07
17.73	1.48	21.80	5.94	29.21	70.00	-40.79
18.74	1.50	21.93	6.22	29.65	70.00	-40.35
19.17	1.52	21.98	6.01	29.51	70.00	-40.49
26.35	1.66	22.35	5.73	29.74	70.00	-40.26
27.60	1.71	22.40	6.48	30.60	70.00	-39.40

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

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

**TEST REPORT**

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Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-3_ANT1
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
10.75	1.26	20.90	5.54	27.70	70.00	-42.30
13.48	1.35	21.25	6.23	28.83	70.00	-41.17
17.02	1.46	21.70	6.01	29.17	70.00	-40.83
19.38	1.52	22.01	7.12	30.65	70.00	-39.35
21.94	1.56	22.18	6.88	30.62	70.00	-39.38
28.09	1.74	22.42	5.94	30.10	70.00	-39.90

Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-3_ANT2
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
17.65	1.47	21.79	7.21	30.47	70.00	-39.53
20.34	1.54	22.11	7.03	30.69	70.00	-39.31
21.28	1.56	22.15	5.68	29.39	70.00	-40.61
25.24	1.61	22.31	5.99	29.91	70.00	-40.09
26.80	1.68	22.37	6.24	30.29	70.00	-39.71
28.43	1.75	22.44	6.09	30.28	70.00	-39.72

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

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

**TEST REPORT**

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Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Standby
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
17.56	1.47	21.78	6.39	29.64	70.00	-40.36
20.11	1.54	22.10	6.00	29.65	70.00	-40.35
23.38	1.58	22.24	6.78	30.60	70.00	-39.40
23.90	1.59	22.26	5.42	29.26	70.00	-40.74
26.98	1.69	22.38	7.30	31.37	70.00	-38.63
28.14	1.74	22.43	7.15	31.31	70.00	-38.69

Temperature:	23 °C	Humidity:	60 %RH
Frequency Range:	9 kHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Link
Tested By:	Richard Lin	Tested Date:	Jun. 23, 2017

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
12.63	1.32	21.14	6.23	28.70	70.00	-41.30
17.18	1.46	21.73	5.26	28.45	70.00	-41.55
19.35	1.52	22.01	5.68	29.21	70.00	-40.79
20.84	1.55	22.13	5.96	29.64	70.00	-40.36
26.30	1.66	22.35	7.21	31.22	70.00	-38.78
27.52	1.71	22.40	6.33	30.44	70.00	-39.56

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

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Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-1_ANT1
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
238.10	3.34	11.96	27.40	47.76	35.66	46	-10.34	135	3.34
287.86	3.67	13.91	27.19	50.14	40.52	46	-5.48	299	3.21
335.92	4.01	15.47	27.40	45.91	37.99	46	-8.01	164	3.02
383.37	4.37	16.36	27.75	45.30	38.27	46	-7.73	50	2.97
479.29	4.89	18.21	28.27	46.28	41.11	46	-4.89	110	2.65
526.45	5.17	18.81	28.39	42.01	37.60	46	-8.40	318	2.44

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
72.64	2.28	6.60	28.09	48.09	28.88	40	-11.12	62	1.12
287.12	3.67	13.91	27.19	48.08	38.46	46	-7.54	44	1.73
335.39	4.01	15.47	27.40	44.89	36.97	46	-9.03	175	1.95
383.49	4.37	16.36	27.75	45.78	38.75	46	-7.25	93	2.08
479.32	4.89	18.21	28.27	39.30	34.13	46	-11.87	58	2.34
520.82	5.13	18.74	28.38	39.35	34.84	46	-11.16	217	2.66

**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.

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

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

**TEST REPORT**

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Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-1_ANT2
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
352.74	4.14	15.31	27.52	38.82	30.74	46	-15.26	115	3.02
423.98	4.60	17.26	27.99	34.84	28.71	46	-17.29	97	2.75
438.15	4.67	17.56	28.07	36.34	30.50	46	-15.50	283	2.66
516.30	5.11	18.69	28.38	35.91	31.33	46	-14.67	181	2.51
777.46	6.57	22.22	28.05	30.24	30.98	46	-15.02	58	1.73
805.18	6.72	22.21	27.95	32.55	33.53	46	-12.47	129	1.62

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
38.27	2.08	15.82	28.19	37.33	27.04	40	-12.96	41	1.05
305.19	3.80	15.21	27.18	39.64	31.47	46	-14.53	173	1.68
352.43	4.14	15.31	27.52	42.07	33.99	46	-12.01	318	1.99
364.02	4.23	15.86	27.61	40.55	33.03	46	-12.97	99	2.05
498.97	5.00	19.11	28.36	39.71	35.46	46	-10.54	142	2.43
805.61	6.72	22.21	27.95	30.54	31.52	46	-14.48	318	3.42

**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.

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

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

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Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-2_ANT1
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
198.39	3.07	13.12	27.57	45.45	34.08	44	-9.42	106	3.42
287.64	3.67	13.91	27.19	50.44	40.82	46	-5.18	257	3.20
335.19	4.01	15.47	27.40	46.36	38.44	46	-7.56	319	3.07
383.22	4.37	16.36	27.75	45.72	38.69	46	-7.31	44	2.92
479.73	4.89	18.21	28.27	42.95	37.78	46	-8.22	296	2.65
526.96	5.17	18.81	28.39	42.87	38.46	46	-7.54	55	2.43

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
72.83	2.28	6.60	28.09	48.16	28.95	40	-11.05	136	1.12
287.01	3.67	13.91	27.19	48.33	38.71	46	-7.29	192	1.70
335.94	4.01	15.47	27.40	45.82	37.90	46	-8.10	287	1.94
383.25	4.37	16.36	27.75	45.55	38.52	46	-7.48	138	2.07
479.76	4.89	18.21	28.27	40.21	35.04	46	-10.96	39	2.33
526.28	5.17	18.81	28.39	39.78	35.37	46	-10.63	188	2.59

**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.

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

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

**TEST REPORT**

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Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-2_ANT2
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
305.24	3.80	15.21	27.18	37.22	29.05	46	-16.95	162	3.16
363.16	4.22	15.84	27.61	36.41	28.86	46	-17.14	270	2.95
439.93	4.67	17.58	28.07	34.29	28.47	46	-17.53	298	2.72
493.05	4.97	18.64	28.34	34.32	29.60	46	-16.40	54	2.51
774.69	6.55	22.19	28.06	29.13	29.82	46	-16.18	112	1.70
805.24	6.72	22.21	27.95	32.26	33.24	46	-12.76	327	1.61

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
281.54	3.62	13.73	27.22	42.42	32.55	46	-13.45	51	1.57
306.98	3.80	15.25	27.18	40.75	32.62	46	-13.38	123	1.88
352.23	4.14	15.31	27.52	43.56	35.48	46	-10.52	78	2.01
516.77	5.11	18.69	28.38	39.29	34.71	46	-11.29	335	2.53
692.09	6.08	21.56	28.33	33.31	32.61	46	-13.39	63	3.04
805.46	6.72	22.21	27.95	32.32	33.30	46	-12.70	83	3.45

**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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Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-3_ANT1
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
198.41	3.07	13.12	27.57	44.11	32.74	44	-10.76	42	3.43
287.76	3.67	13.91	27.19	49.99	40.37	46	-5.63	270	3.20
335.29	4.01	15.47	27.40	46.00	38.08	46	-7.92	151	3.07
383.13	4.37	16.36	27.75	44.28	37.25	46	-8.75	93	2.92
479.89	4.89	18.21	28.27	42.33	37.16	46	-8.84	296	2.65
526.47	5.17	18.81	28.39	41.20	36.79	46	-9.21	74	2.43

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
51.52	2.21	11.31	28.16	42.92	28.28	40	-11.72	53	1.08
84.09	2.33	6.84	28.05	45.92	27.04	40	-12.96	339	1.16
287.34	3.67	13.91	27.19	47.23	37.61	46	-8.39	351	1.82
335.22	4.01	15.47	27.40	44.32	36.40	46	-9.60	172	1.99
383.81	4.37	16.36	27.75	44.66	37.63	46	-8.37	245	2.07
526.75	5.17	18.81	28.39	39.18	34.77	46	-11.23	32	2.53

**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.

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

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

**TEST REPORT**

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Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-3_ANT2
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
305.34	3.80	15.21	27.18	37.40	29.23	46	-16.77	241	3.17
354.92	4.15	15.42	27.54	37.06	29.09	46	-16.91	299	3.02
437.01	4.66	17.54	28.06	35.83	29.97	46	-16.03	59	2.79
490.79	4.95	18.36	28.32	37.17	32.16	46	-13.84	71	2.54
774.86	6.55	22.19	28.06	31.41	32.10	46	-13.90	132	1.71
805.57	6.72	22.21	27.95	32.87	33.85	46	-12.15	308	1.63

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
256.52	3.45	12.74	27.32	43.07	31.94	46	-14.06	345	1.69
282.93	3.63	13.76	27.22	41.38	31.55	46	-14.45	90	1.88
305.17	3.80	15.21	27.18	40.84	32.67	46	-13.33	176	1.90
352.80	4.14	15.31	27.52	41.89	33.81	46	-12.19	225	2.05
776.66	6.57	22.21	28.05	31.78	32.50	46	-13.50	317	3.18
804.42	6.71	22.13	27.95	30.94	31.83	46	-14.17	41	3.39

**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.

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

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Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Standby
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
198.69	3.07	13.12	27.57	44.95	33.58	44	-9.92	33	3.46
287.33	3.67	13.91	27.19	51.44	41.82	46	-4.18	158	3.20
335.07	4.01	15.47	27.40	46.38	38.46	46	-7.54	281	3.09
383.25	4.37	16.36	27.75	47.62	40.59	46	-5.41	192	2.93
479.16	4.89	18.21	28.27	42.30	37.13	46	-8.87	50	2.62
526.82	5.17	18.81	28.39	41.62	37.21	46	-8.79	179	2.45

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
51.12	2.21	11.31	28.16	42.44	27.80	40	-12.20	66	1.08
72.40	2.28	6.60	28.09	48.07	28.86	40	-11.14	322	1.15
287.68	3.67	13.91	27.19	47.87	38.25	46	-7.75	185	1.83
335.34	4.01	15.47	27.40	45.69	37.77	46	-8.23	97	1.99
383.95	4.37	16.36	27.75	45.68	38.65	46	-7.35	64	2.07
526.07	5.17	18.81	28.39	39.72	35.31	46	-10.69	114	2.54

**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.

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

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

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	26 °C	Humidity:	70 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Link
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Richard Lin	Tested Date:	May. 24, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
197.31	3.07	13.58	27.57	44.60	33.67	44	-9.83	146	3.43
287.40	3.67	13.91	27.19	51.44	41.82	46	-4.18	209	3.25
335.85	4.01	15.47	27.40	44.86	36.94	46	-9.06	77	3.01
383.56	4.37	16.36	27.75	44.46	37.43	46	-8.57	158	2.93
479.72	4.89	18.21	28.27	41.21	36.04	46	-9.96	69	2.65
526.93	5.17	18.81	28.39	41.88	37.47	46	-8.53	192	2.41

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Pre-Amp (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
70.82	2.27	6.70	28.10	47.84	28.71	40	-11.29	61	1.14
287.05	3.67	13.91	27.19	47.52	37.90	46	-8.10	83	1.82
334.77	4.00	15.47	27.39	44.07	36.15	46	-9.85	179	1.99
383.16	4.37	16.36	27.75	42.41	35.38	46	-10.62	53	2.15
526.85	5.17	18.81	28.39	39.14	34.73	46	-11.27	49	2.37
623.54	5.69	20.47	28.40	36.89	34.65	46	-11.35	190	2.98

**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.

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

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

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1_ANT1
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1831.70	-32.08	27.49	45.34	34.81	40.75	30.22	74	54	-33.25	-23.78	320	2.26
2247.29	-31.60	28.30	46.49	35.97	43.19	32.67	74	54	-30.81	-21.33	156	2.14
2732.45	-31.28	29.34	45.94	35.36	43.99	33.41	74	54	-30.01	-20.59	219	1.97
3669.28	-30.31	31.51	43.82	33.38	45.02	34.58	74	54	-28.98	-19.42	77	1.72
4238.92	-29.81	32.45	43.02	32.51	45.66	35.15	74	54	-28.34	-18.85	102	1.52
5163.88	-28.83	33.83	42.67	32.19	47.67	37.19	74	54	-26.33	-16.81	61	1.26

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1849.39	-32.05	27.56	44.58	34.02	40.09	29.53	74	54	-33.91	-24.47	135	1.18
2177.22	-31.66	28.24	44.15	33.68	40.73	30.26	74	54	-33.27	-23.74	303	1.37
2953.04	-31.17	30.13	43.68	33.15	42.64	32.11	74	54	-31.36	-21.89	119	1.62
3708.87	-30.28	31.62	43.31	32.82	44.65	34.16	74	54	-29.35	-19.84	41	1.85
4074.10	-29.98	32.49	43.56	33.01	46.06	35.51	74	54	-27.94	-18.49	207	1.97
5611.94	-28.75	34.26	42.10	31.69	47.60	37.19	74	54	-26.40	-16.81	96	2.36

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.

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

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320, Taiwan (R.O.C.)

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1_ANT1 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2401.35 (F)	-31.48	28.42	96.22	83.41	93.16	80.35	114	94	-20.84	-13.65	144	1.51
4802.70	-29.13	33.12	41.75	31.29	45.75	35.29	74	54	-28.25	-18.71	293	1.56
7204.05	-28.07	35.85	40.97	30.41	48.75	38.19	74	54	-25.25	-15.81	51	1.59
9605.40	-27.21	37.68	41.03	30.54	51.50	41.01	74	54	-22.50	-12.99	178	1.43
12006.75	-26.25	39.30	39.84	29.33	52.89	42.38	74	54	-21.11	-11.62	311	1.61
14408.10	-23.86	42.24	31.77	21.26	50.15	39.64	74	54	-23.85	-14.36	342	1.48

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2401.35 (F)	-31.48	28.42	95.38	82.30	92.32	79.24	114	94	-21.68	-14.76	57	1.57
4802.70	-29.13	33.12	41.29	30.76	45.29	34.76	74	54	-28.71	-19.24	96	1.63
7204.05	-28.07	35.85	40.78	30.29	48.56	38.07	74	54	-25.44	-15.93	136	1.49
9605.40	-27.21	37.68	41.06	30.59	51.53	41.06	74	54	-22.47	-12.94	228	1.55
12006.75	-26.25	39.30	40.01	29.58	53.06	42.63	74	54	-20.94	-11.37	276	1.52
14408.10	-23.86	42.24	31.75	21.22	50.13	39.60	74	54	-23.87	-14.40	40	1.59

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.

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

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**TEST REPORT**

Reference No.: A17060701  
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Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1_ANT2
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 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.		
1638.97	-32.39	26.80	45.93	35.46	40.33	29.86	74	54	-33.67	-24.14	320	2.33
2254.13	-31.60	28.30	46.27	35.78	42.98	32.49	74	54	-31.02	-21.51	164	2.11
2612.05	-31.34	28.90	45.29	34.71	42.85	32.27	74	54	-31.15	-21.73	217	2.03
3663.78	-30.32	31.49	43.43	33.92	44.60	35.09	74	54	-29.40	-18.91	105	1.76
4239.29	-29.81	32.45	43.54	33.01	46.19	35.66	74	54	-27.81	-18.34	91	1.54
5524.46	-28.77	34.29	41.95	31.48	47.47	37.00	74	54	-26.53	-17.00	133	1.15

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.		
1724.64	-32.25	27.11	45.79	35.23	40.64	30.08	74	54	-33.36	-23.92	84	1.23
2181.35	-31.66	28.24	45.52	35.06	42.11	31.65	74	54	-31.89	-22.35	196	1.36
2619.08	-31.34	28.93	45.71	35.22	43.30	32.81	74	54	-30.70	-21.19	325	1.48
3828.19	-30.19	31.98	43.29	32.78	45.08	34.57	74	54	-28.92	-19.43	75	1.83
4677.22	-29.29	32.82	42.79	32.24	46.32	35.77	74	54	-27.68	-18.23	128	2.11
5212.48	-28.82	33.90	41.73	31.29	46.80	36.36	74	54	-27.20	-17.64	49	2.29

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.

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**TEST REPORT**

Reference No.: A17060701  
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Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1_ANT2 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2401.35 (F)	-31.48	28.42	97.01	84.23	93.95	81.17	114	94	-20.05	-12.83	119	1.59
4802.70	-29.13	33.12	41.04	30.55	45.04	34.55	74	54	-28.96	-19.45	305	1.63
7204.05	-28.07	35.85	40.78	30.29	48.56	38.07	74	54	-25.44	-15.93	348	1.60
9605.40	-27.21	37.68	40.85	30.39	51.32	40.86	74	54	-22.68	-13.14	71	1.52
12006.75	-26.25	39.30	39.66	29.10	52.71	42.15	74	54	-21.29	-11.85	156	1.51
14408.10	-23.86	42.24	31.42	20.91	49.80	39.29	74	54	-24.20	-14.71	258	1.47

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2401.35 (F)	-31.48	28.42	93.45	80.67	90.39	77.61	114	94	-23.61	-16.39	229	1.59
4802.70	-29.13	33.12	41.49	30.97	45.49	34.97	74	54	-28.51	-19.03	41	1.51
7204.05	-28.07	35.85	40.95	30.40	48.73	38.18	74	54	-25.27	-15.82	167	1.44
9605.40	-27.21	37.68	41.01	30.56	51.48	41.03	74	54	-22.52	-12.97	302	1.48
12006.75	-26.25	39.30	39.48	28.96	52.53	42.01	74	54	-21.47	-11.99	97	1.52
14408.10	-23.86	42.24	31.52	21.06	49.90	39.44	74	54	-24.10	-14.56	278	1.56

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



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**TEST REPORT**

Reference No.: A17060701  
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Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2_ANT1
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1687.30	-32.31	26.97	46.10	35.67	40.76	30.33	74	54	-33.24	-23.67	310	2.30
2119.72	-31.70	28.20	45.49	34.97	41.98	31.46	74	54	-32.02	-22.54	229	2.17
3106.98	-31.00	30.45	44.26	33.78	43.71	33.23	74	54	-30.29	-20.77	53	1.89
3588.15	-30.37	31.26	43.74	33.22	44.63	34.11	74	54	-29.37	-19.89	102	1.71
4269.33	-29.77	32.45	42.72	32.29	45.39	34.96	74	54	-28.61	-19.04	70	1.53
5437.94	-28.78	34.21	42.27	31.70	47.70	37.13	74	54	-26.30	-16.87	254	1.18

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1591.17	-32.47	26.63	45.97	35.42	40.13	29.58	74	54	-33.87	-24.42	40	1.19
1767.05	-32.18	27.26	45.22	34.76	40.30	29.84	74	54	-33.70	-24.16	139	1.24
2864.44	-31.22	29.81	44.27	33.76	42.86	32.35	74	54	-31.14	-21.65	66	1.55
3662.97	-30.32	31.49	43.48	32.91	44.65	34.08	74	54	-29.35	-19.92	319	1.82
4265.32	-29.78	32.45	43.07	32.58	45.74	35.25	74	54	-28.26	-18.75	81	1.97
5623.81	-28.75	34.25	43.19	32.62	48.69	38.12	74	54	-25.31	-15.88	280	2.36

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.

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**TEST REPORT**

Reference No.: A17060701  
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Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2_ANT1 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2439.35 (F)	-31.45	28.45	94.87	82.25	91.87	79.25	114	94	-22.13	-14.75	177	1.51
4878.70	-29.02	33.31	40.50	30.01	44.78	34.29	74	54	-29.22	-19.71	325	1.53
7318.05	-27.98	36.10	40.76	30.22	48.88	38.34	74	54	-25.12	-15.66	196	1.63
9757.40	-27.16	37.81	40.61	30.11	51.25	40.75	74	54	-22.75	-13.25	240	1.60
12196.75	-25.79	39.22	38.21	27.76	51.64	41.19	74	54	-22.36	-12.81	229	1.58
14636.10	-23.90	41.84	30.79	20.27	48.73	38.21	74	54	-25.27	-15.79	297	1.61

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2439.35 (F)	-31.45	28.45	95.34	82.71	92.34	79.71	114	94	-21.66	-14.29	19	1.59
4878.70	-29.02	33.31	41.81	31.36	46.09	35.64	74	54	-27.91	-18.36	62	1.52
7318.05	-27.98	36.10	40.88	30.38	49.00	38.50	74	54	-25.00	-15.50	95	1.47
9757.40	-27.16	37.81	40.53	30.09	51.17	40.73	74	54	-22.83	-13.27	152	1.49
12196.75	-25.79	39.22	38.25	27.72	51.68	41.15	74	54	-22.32	-12.85	273	1.51
14636.10	-23.90	41.84	31.09	20.56	49.03	38.50	74	54	-24.97	-15.50	40	1.56

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.

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

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

**TEST REPORT**

Reference No.: A17060701  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2_ANT2
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1799.88	-32.13	27.38	45.41	34.97	40.66	30.22	74	54	-33.34	-23.78	321	2.27
2286.43	-31.57	28.33	45.55	35.02	42.31	31.78	74	54	-31.69	-22.22	226	2.13
2758.75	-31.27	29.43	45.44	34.91	43.60	33.07	74	54	-30.40	-20.93	215	1.96
3816.08	-30.20	31.95	43.63	33.15	45.38	34.90	74	54	-28.62	-19.10	107	1.65
4157.22	-29.89	32.47	43.05	32.55	45.63	35.13	74	54	-28.37	-18.87	101	1.51
5091.31	-28.84	33.73	42.34	31.86	47.22	36.74	74	54	-26.78	-17.26	35	1.28

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1161.99	-33.64	25.55	48.38	37.84	40.29	29.75	74	54	-33.71	-24.25	49	1.06
2123.46	-31.70	28.20	44.95	34.48	41.45	30.98	74	54	-32.55	-23.02	338	1.33
3013.79	-31.13	30.32	44.00	33.57	43.19	32.76	74	54	-30.81	-21.24	116	1.61
3662.25	-30.32	31.49	43.86	33.36	45.03	34.53	74	54	-28.97	-19.47	204	1.82
4274.09	-29.77	32.45	42.93	32.40	45.61	35.08	74	54	-28.39	-18.92	300	1.97
5542.84	-28.76	34.28	41.87	31.39	47.39	36.91	74	54	-26.61	-17.09	288	2.39

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.

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

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

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2_ANT2 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2439.35 (F)	-31.45	28.45	95.22	83.01	92.22	80.01	114	94	-21.78	-13.99	162	1.52
4878.70	-29.02	33.31	40.89	30.42	45.17	34.70	74	54	-28.83	-19.30	198	1.57
7318.05	-27.98	36.10	41.02	30.56	49.14	38.68	74	54	-24.86	-15.32	241	1.66
9757.40	-27.16	37.81	40.67	30.12	51.31	40.76	74	54	-22.69	-13.24	207	1.60
12196.75	-25.79	39.22	38.60	28.18	52.03	41.61	74	54	-21.97	-12.39	339	1.49
14636.10	-23.90	41.84	30.88	20.39	48.82	38.33	74	54	-25.18	-15.67	61	1.47

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2439.35 (F)	-31.45	28.45	95.01	82.39	92.01	79.39	114	94	-21.99	-14.61	52	1.51
4878.70	-29.02	33.31	40.66	30.14	44.94	34.42	74	54	-29.06	-19.58	179	1.53
7318.05	-27.98	36.10	40.82	30.31	48.94	38.43	74	54	-25.06	-15.57	97	1.58
9757.40	-27.16	37.81	40.75	30.25	51.39	40.89	74	54	-22.61	-13.11	102	1.59
12196.75	-25.79	39.22	38.56	28.03	51.99	41.46	74	54	-22.01	-12.54	325	1.66
14636.10	-23.90	41.84	31.27	20.73	49.21	38.67	74	54	-24.79	-15.33	77	1.63

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.

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

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

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3_ANT1
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1588.63	-32.48	26.62	45.44	34.97	39.58	29.11	74	54	-34.42	-24.89	331	2.34
2124.02	-31.70	28.20	45.02	34.51	41.52	31.01	74	54	-32.48	-22.99	264	2.17
3307.54	-30.71	30.73	44.17	33.68	44.19	33.70	74	54	-29.81	-20.30	201	1.82
3949.97	-30.10	32.35	42.62	32.14	44.87	34.39	74	54	-29.13	-19.61	108	1.60
4711.82	-29.25	32.91	42.75	32.29	46.41	35.95	74	54	-27.59	-18.05	75	1.38
5668.30	-28.74	34.23	41.48	30.90	46.97	36.39	74	54	-27.03	-17.61	192	1.11

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1616.39	-32.43	26.72	46.17	35.62	40.46	29.91	74	54	-33.54	-24.09	43	1.19
1823.12	-32.09	27.46	45.76	35.27	41.13	30.64	74	54	-32.87	-23.36	133	1.26
3139.57	-30.95	30.49	43.86	33.36	43.40	32.90	74	54	-30.60	-21.10	92	1.65
3740.93	-30.26	31.72	43.55	33.01	45.01	34.47	74	54	-28.99	-19.53	201	1.88
4762.20	-29.18	33.03	43.03	32.59	46.88	36.44	74	54	-27.12	-17.56	76	2.14
5771.68	-28.73	34.19	42.07	31.53	47.53	36.99	74	54	-26.47	-17.01	285	2.44

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.

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

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

**TEST REPORT**

Reference No.: A17060701  
Report No.: FCCA17060701  
FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3_ANT1 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2479.35 (F)	-31.42	28.48	95.03	82.25	92.10	79.32	114	94	-21.90	-14.68	162	1.52
4958.70	-28.92	33.50	40.58	30.06	45.16	34.64	74	54	-28.84	-19.36	223	1.55
7438.05	-27.88	36.36	40.76	30.29	49.24	38.77	74	54	-24.76	-15.23	57	1.51
9917.40	-27.11	37.93	41.32	30.89	52.15	41.72	74	54	-21.85	-12.28	198	1.63
12396.75	-25.31	39.14	39.30	28.83	53.13	42.66	74	54	-20.87	-11.34	315	1.60
14876.10	-23.91	41.02	31.47	20.93	48.58	38.04	74	54	-25.42	-15.96	346	1.49

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2479.35 (F)	-31.42	28.48	95.17	82.29	92.24	79.36	114	94	-21.76	-14.64	91	1.48
4958.70	-28.92	33.50	41.02	30.57	45.60	35.15	74	54	-28.40	-18.85	105	1.53
7438.05	-27.88	36.36	41.13	30.63	49.61	39.11	74	54	-24.39	-14.89	177	1.58
9917.40	-27.11	37.93	41.48	30.96	52.31	41.79	74	54	-21.69	-12.21	42	1.61
12396.75	-25.31	39.14	39.22	28.73	53.05	42.56	74	54	-20.95	-11.44	253	1.54
14876.10	-23.91	41.02	31.59	21.08	48.70	38.19	74	54	-25.30	-15.81	18	1.51

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.


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

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# TEST REPORT

Reference No.: A17060701  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3_ANT2
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1738.29	-32.23	27.16	45.72	35.21	40.65	30.14	74	54	-33.35	-23.86	320	2.26
2124.40	-31.70	28.20	45.19	34.68	41.69	31.18	74	54	-32.31	-22.82	175	2.15
2759.93	-31.27	29.43	44.71	34.25	42.87	32.41	74	54	-31.13	-21.59	47	1.93
3776.85	-30.23	31.83	42.95	32.46	44.55	34.06	74	54	-29.45	-19.94	108	1.68
4782.66	-29.15	33.08	42.40	31.98	46.32	35.90	74	54	-27.68	-18.10	95	1.35
5531.51	-28.77	34.29	42.92	32.44	48.44	37.96	74	54	-25.56	-16.04	32	1.15

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1617.42	-32.43	26.72	45.87	35.33	40.16	29.62	74	54	-33.84	-24.38	134	1.17
2281.76	-31.58	28.32	45.34	34.86	42.09	31.61	74	54	-31.91	-22.39	238	1.36
3028.53	-31.11	30.34	43.79	33.27	43.02	32.50	74	54	-30.98	-21.50	53	1.65
3796.97	-30.22	31.89	43.53	33.01	45.20	34.68	74	54	-28.80	-19.32	207	1.87
4697.22	-29.27	32.87	42.73	32.29	46.34	35.90	74	54	-27.66	-18.10	88	2.09
5609.18	-28.75	34.26	42.58	32.08	48.08	37.58	74	54	-25.92	-16.42	248	2.36

## NOTE:

1. Measurement uncertainty is 4.04 dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



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

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

# TEST REPORT

Reference No.: A17060701  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3_ANT2 (Fundamental and Harmonics)
Detector:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2479.35 (F)	-31.42	28.48	95.71	82.37	92.78	79.44	114	94	-21.22	-14.56	196	1.59
4958.70	-28.92	33.50	40.07	29.51	44.65	34.09	74	54	-29.35	-19.91	217	1.51
7438.05	-27.88	36.36	40.52	30.07	49.00	38.55	74	54	-25.00	-15.45	274	1.55
9917.40	-27.11	37.93	41.04	30.59	51.87	41.42	74	54	-22.13	-12.58	135	1.54
12396.75	-25.31	39.14	39.17	28.66	53.00	42.49	74	54	-21.00	-11.51	62	1.55
14876.10	-23.91	41.02	31.52	21.06	48.63	38.17	74	54	-25.37	-15.83	41	1.65

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2479.35 (F)	-31.42	28.48	96.12	83.41	93.19	80.48	114	94	-20.81	-13.52	188	1.61
4958.70	-28.92	33.50	41.02	30.54	45.60	35.12	74	54	-28.40	-18.88	330	1.57
7438.05	-27.88	36.36	40.88	30.32	49.36	38.80	74	54	-24.64	-15.20	175	1.50
9917.40	-27.11	37.93	41.36	30.81	52.19	41.64	74	54	-21.81	-12.36	254	1.47
12396.75	-25.31	39.14	39.11	28.62	52.94	42.45	74	54	-21.06	-11.55	293	1.62
14876.10	-23.91	41.02	31.56	21.01	48.67	38.12	74	54	-25.33	-15.88	82	1.60

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



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

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**TEST REPORT**Reference No.: A17060701  
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FCC ID : ZME-CF  
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Date: Jun. 19, 2017

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Standby
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2751.72	-31.27	29.40	44.96	34.45	43.09	32.58	74	54	-30.91	-21.42	205	2.13
3238.14	-30.81	30.63	44.17	33.67	43.99	33.49	74	54	-30.01	-20.51	241	1.90
3772.55	-30.23	31.82	43.08	32.51	44.66	34.09	74	54	-29.34	-19.91	86	1.68
4399.29	-29.64	32.42	43.32	32.89	46.10	35.67	74	54	-27.90	-18.33	100	1.45
4657.70	-29.32	32.78	42.76	32.24	46.22	35.70	74	54	-27.78	-18.30	341	1.33
5458.23	-28.78	34.24	41.61	31.17	47.07	36.63	74	54	-26.93	-17.37	39	1.17

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2708.24	-31.30	29.25	43.90	33.48	41.85	31.43	74	54	-32.15	-22.57	115	1.52
2961.45	-31.17	30.16	44.35	33.87	43.34	32.86	74	54	-30.66	-21.14	75	1.67
3544.92	-30.41	31.13	43.19	32.62	43.92	33.35	74	54	-30.08	-20.65	102	1.83
4279.08	-29.76	32.44	42.77	32.25	45.45	34.93	74	54	-28.55	-19.07	90	1.99
4922.15	-28.96	33.41	42.37	31.86	46.82	36.31	74	54	-27.18	-17.69	196	2.16
5603.79	-28.75	34.26	42.25	31.70	47.76	37.21	74	54	-26.24	-16.79	268	2.34

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.

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

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

**TEST REPORT**Reference No.: A17060701  
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Date: Jun. 19, 2017

Temperature: 28 °C

Humidity: 69 %RH

Frequency Range: 1 GHz – 25 GHz

Tested Mode: Link

Detector: PK. and AV.

IF Bandwidth: 1 MHz

VBW: 3 MHz

Tested Date: Jun. 07, 2017

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1682.72	-32.32	26.96	46.30	35.88	40.93	30.51	74	54	-33.07	-23.49	130	2.31
2124.09	-31.70	28.20	45.19	34.61	41.69	31.11	74	54	-32.31	-22.89	255	2.18
2851.52	-31.22	29.76	45.06	34.52	43.60	33.06	74	54	-30.40	-20.94	77	1.95
4288.33	-29.75	32.44	43.02	32.57	45.71	35.26	74	54	-28.29	-18.74	106	1.53
4732.05	-29.22	32.96	43.21	32.76	46.95	36.50	74	54	-27.05	-17.50	67	1.36
5504.91	-28.77	34.30	42.61	32.11	48.14	37.64	74	54	-25.86	-16.36	183	1.14

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1681.36	-32.32	26.95	45.44	34.97	40.07	29.60	74	54	-33.93	-24.40	231	1.23
2274.62	-31.58	28.32	44.10	33.67	40.84	30.41	74	54	-33.16	-23.59	40	1.39
2953.00	-31.17	30.13	44.09	33.50	43.05	32.46	74	54	-30.95	-21.54	119	1.57
3101.83	-31.01	30.44	43.90	33.46	43.33	32.89	74	54	-30.67	-21.11	335	1.69
4087.95	-29.97	32.48	42.50	31.99	45.01	34.50	74	54	-28.99	-19.50	82	1.98
5114.47	-28.84	33.76	42.70	32.28	47.62	37.20	74	54	-26.38	-16.80	269	2.21

**NOTE:**

1. Measurement uncertainty is 4.04 dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.

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**4.3 6dB Bandwidth****4.3.1 LIMIT**

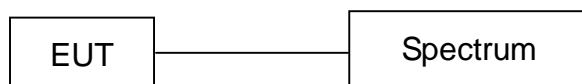
FCC Part15, Subpart C Section 15.247 (a)(2). The minimum 6dB bandwidth shall be at least 500 kHz.

**4.3.2 TEST EQUIPMENT**

The following test equipment was used during the test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 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.

**4.3.3 TEST SET-UP**

The EUT was connected to a spectrum through a 50Ω RF cable.

**4.3.4 TEST PROCEDURE**

The EUT was operated in hopping mode or any specific channel.  
Printed out the test result from the spectrum by hard copy function.

**4.3.5 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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# TEST REPORT

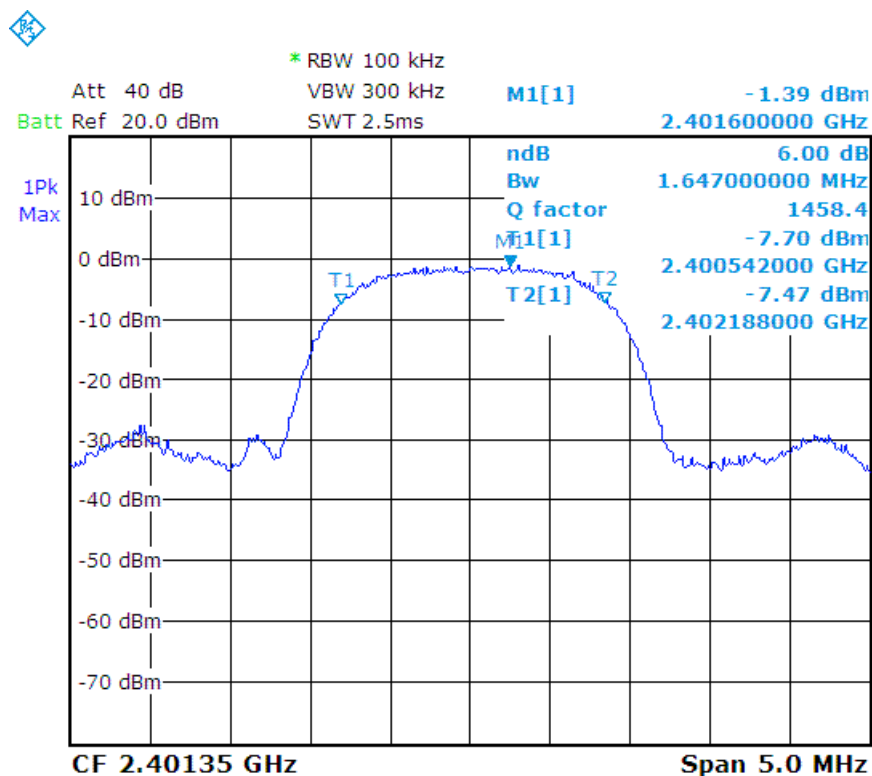
Reference No.: A17060701  
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## 4.3.6 TEST RESULT

Temperature:	23 °C	Humidity:	62 %RH
Detector:	Peak	Test Mode:	Tx-1, Tx-2, Tx-3
RBW:	100 kHz	VBW:	300 kHz
Tested By:	Richard Lin	Tested Date:	Jun. 08, 2017

Channel Number	Channel Frequency (MHz)	6dB Down Bandwidth (MHz)	Limit (kHz)	Pass/Fail
CH01	2401.35	1.647	> 500	Pass
CH20	2439.35	1.647	> 500	Pass
CH40	2479.35	1.657	> 500	Pass

CH01 :





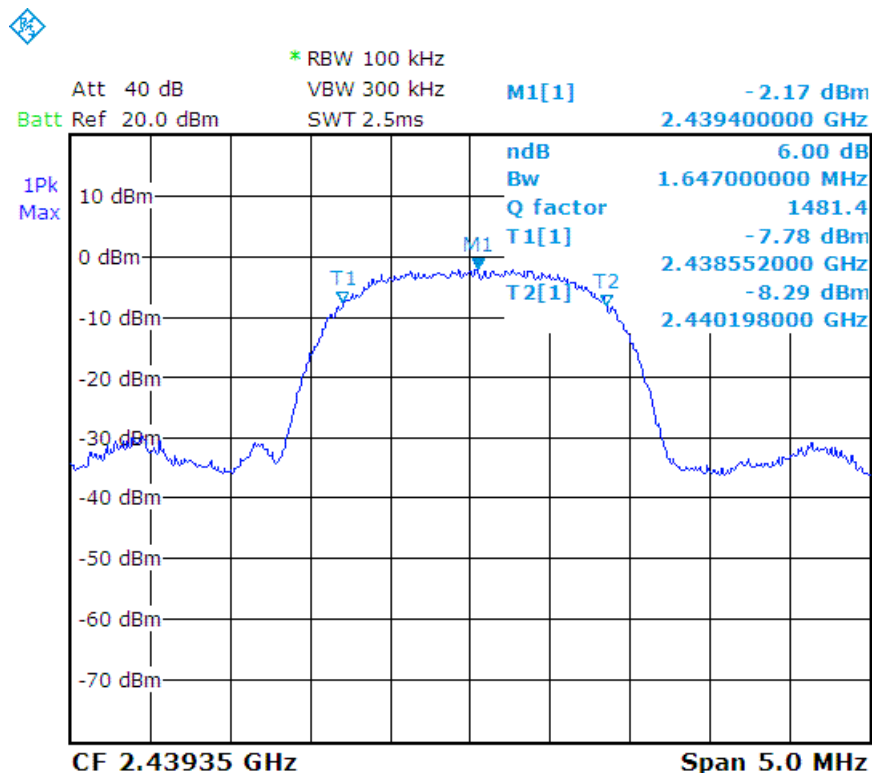
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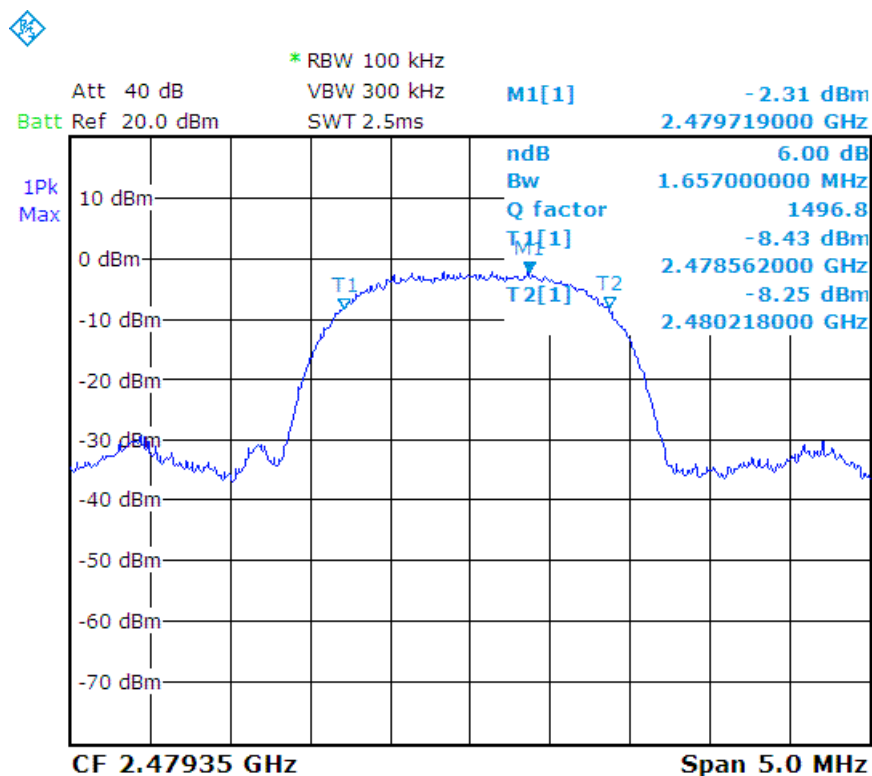
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CH20 :



CH40 :



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#### 4.4 PEAK POWER TEST

##### 4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247(b).

Frequency Range (MHz)	Limit(W)				
	Quantity of Hopping Channel	50	25	15	75
902-928		1(30 dBm)	0.125(21 dBm)	NA	NA
2400-2483.5		NA	NA	0.125( 21dBm)	1(30 dBm)
5725-5850		NA	NA	NA	1(30 dBm)

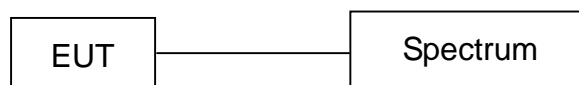
##### 4.4.2 TEST EQUIPMENT

The following test equipment was used during the test :

EQUIPMENT/FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 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.

##### 4.4.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

##### 4.4.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.

Printed out the test result from the spectrum by hard copy function.

##### 4.4.5 EUT OPERATING CONDITION

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

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# TEST REPORT

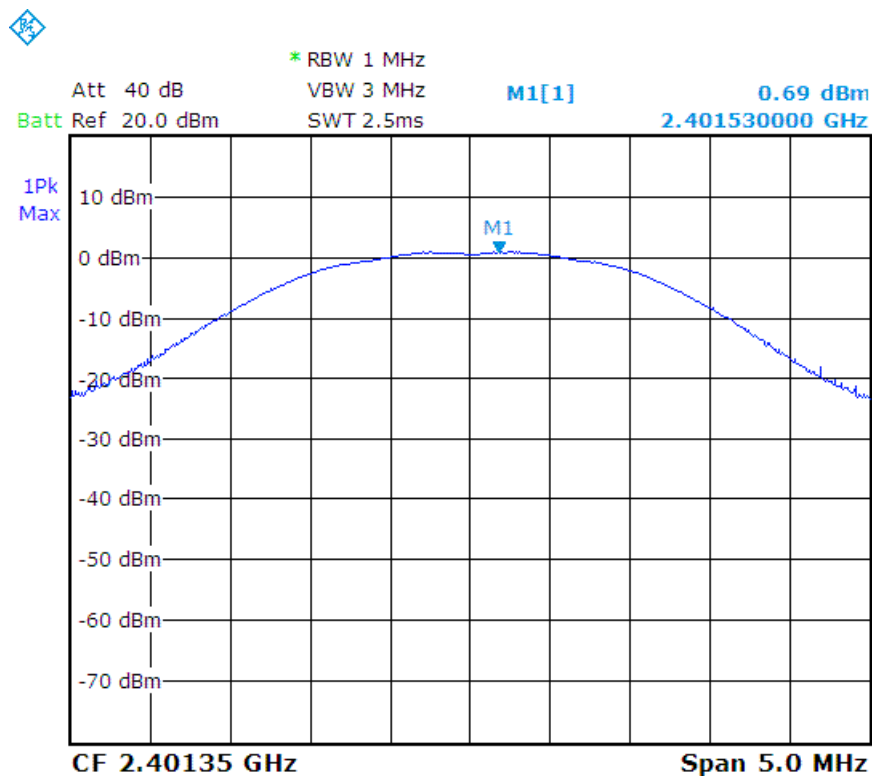
Reference No.: A17060701  
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## 4.4.6 TEST RESULT

Temperature:	23 °C	Humidity:	62 %RH
Spectrum Detector:	PK.	Test Mode:	Tx-1, Tx-2, Tx-3
RBW:	1 MHz	VBW:	3 MHz
Tested By:	Richard Lin	Tested Date:	Jun. 08, 2017

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
CH01_ANT1	2401.35	0.69	21
CH01_ANT2	2401.35	0.50	21
CH20_ANT1	2439.35	0.04	21
CH20_ANT2	2439.35	0.67	21
CH40_ANT1	2479.35	-0.11	21
CH40_ANT2	2479.35	0.31	21

CH01\_ANT1 :





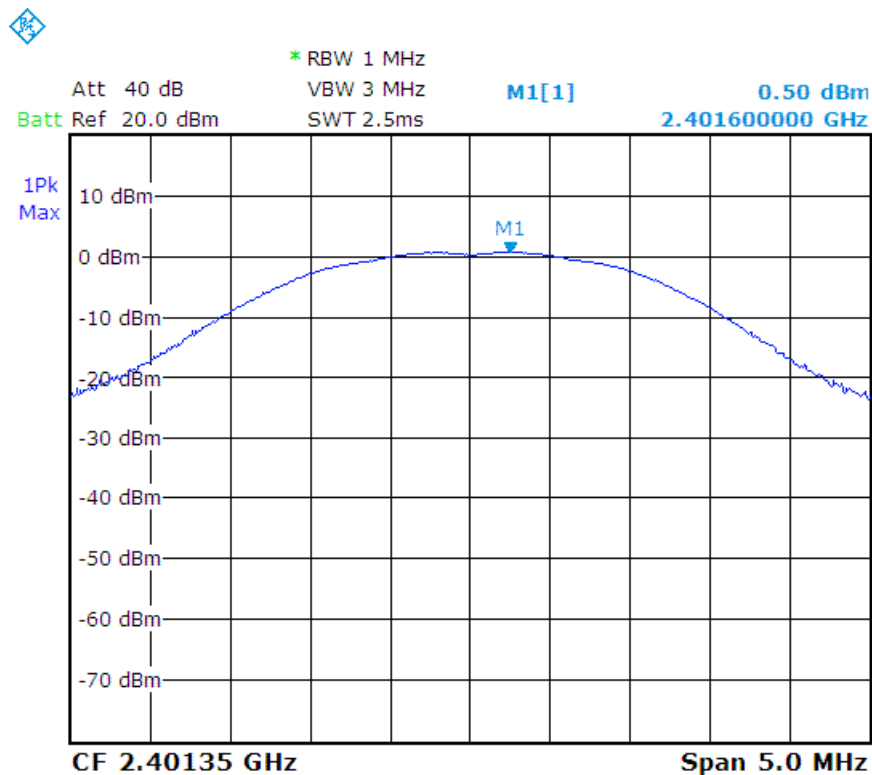
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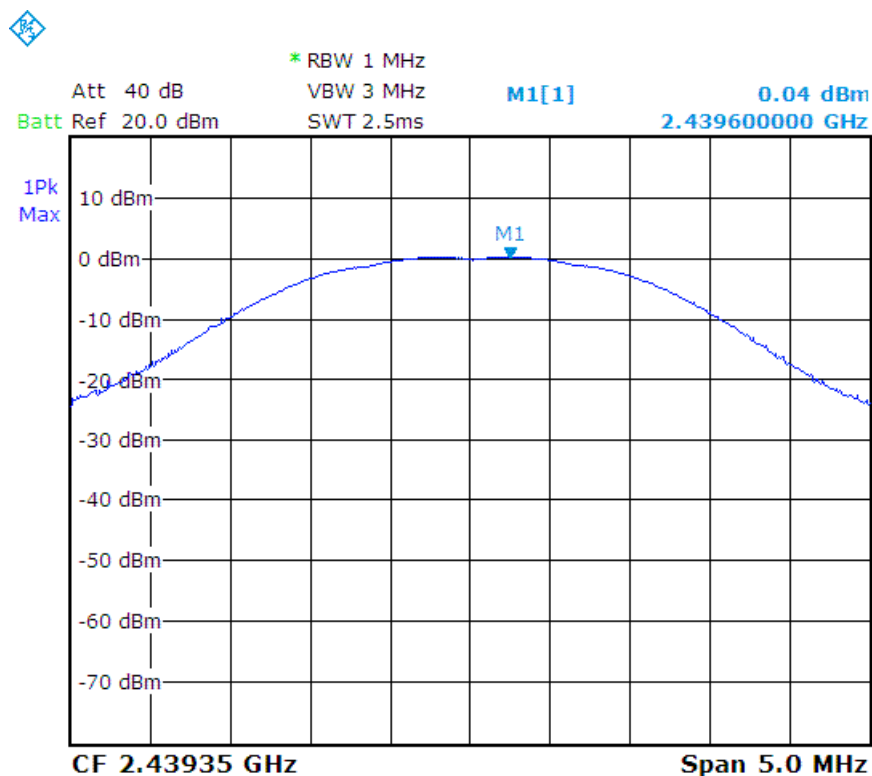
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CH01\_ANT2 :



CH20\_ANT1 :







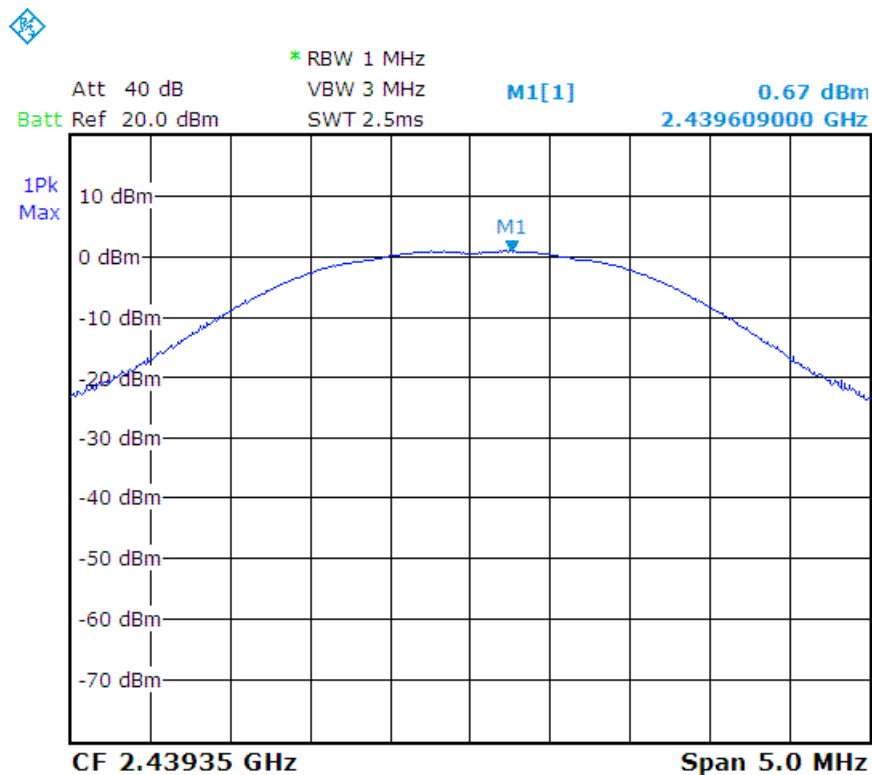
**Spectrum Research & Testing Lab., Inc.**

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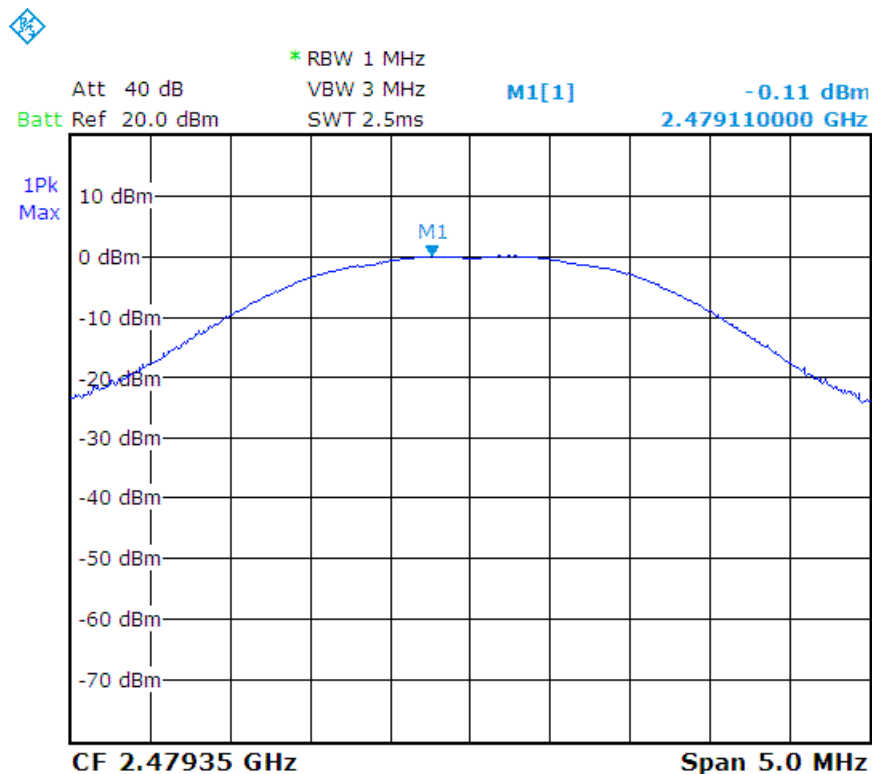
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CH20\_ANT2 :



CH40\_ANT1 :





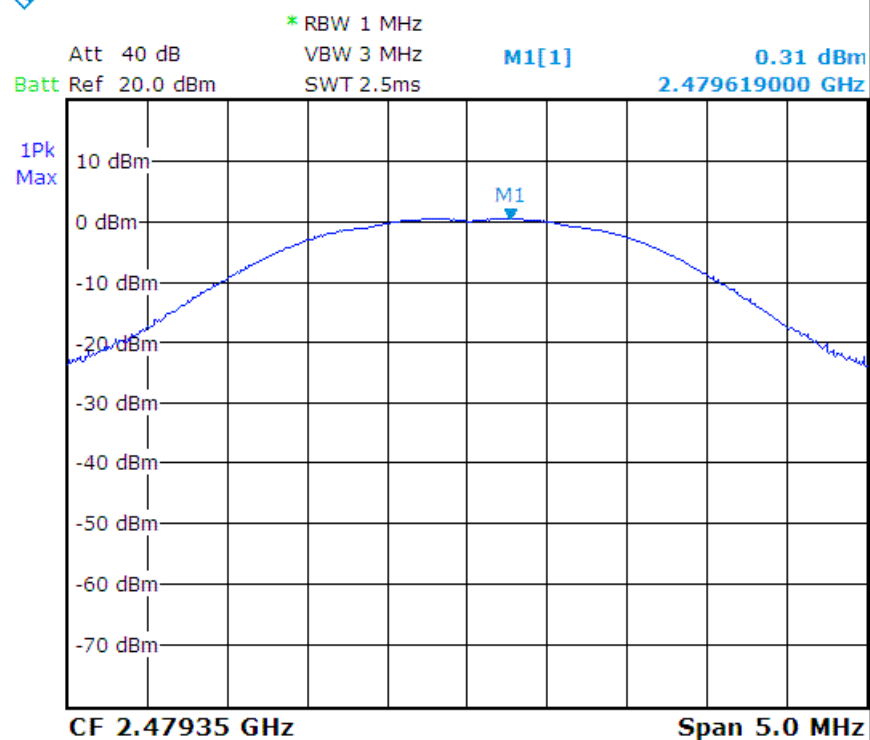
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CH40\_ANT2 :



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**4.5 BAND EDGE TEST****4.5.1 LIMIT**

FCC Part15, Subpart C Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

OPERATING FREQUENCY RANGE (MHz)	SPURIOUS EMISSION FREQUENCY (MHz)	LIMIT	
		Peak power ration to emission(dBc)	Emission level(dBuV/m)
902 - 928	< 902	> 20	N/A
	> 928	> 20	N/A
	960-1240	N/A	54
2400 - 2483.5	< 2400	> 20	N/A
	> 2483.5-2500	N/A	54

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## 4.5.2 TEST EQUIPMENT

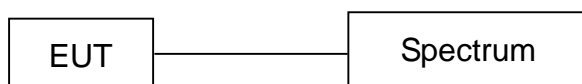
The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER	FINAL TEST BE USED
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	JAN. 02, 2018 ETC	■
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	NOV. 24, 2017 ETC	■
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 29, 2017 ETC	■
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	NOV. 17, 2017 SRT	■
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK2 52 /MY2611/2	FEB. 23, 2018 ETC	■
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF102/2*11SK252 /MY3331/2	OCT. 03, 2017 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR	■

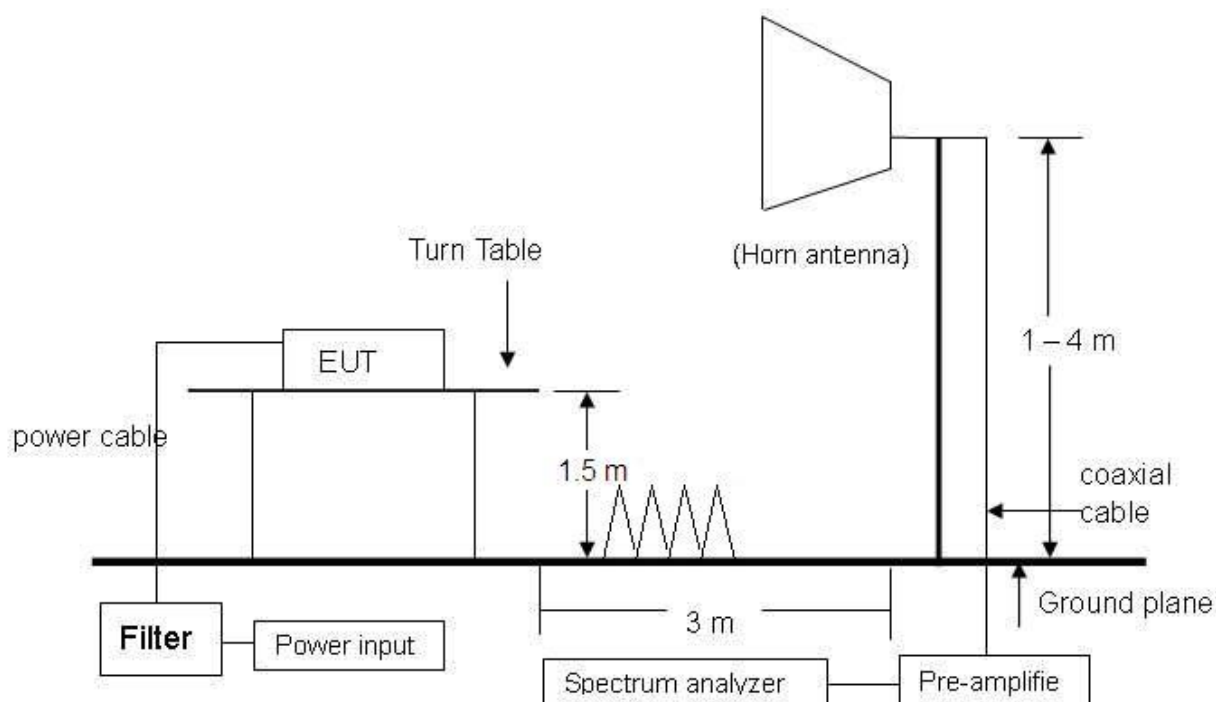


## 4.5.3 TEST SETUP

### FOR RF CONDUCTED TEST (dBc)



The EUT was connected to a spectrum through a 50Ω RF cable.



**NOTE:** The EUT system was put on a wooden table with 0.8m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.



## 4.5.4 TEST PROCEDURE

1. The EUT was operating in continuous transmission mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.
2. The EUT was tested according to the requirement of ANSI C63.10:2013 and CISPR 22. 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. Under 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 and 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.

## 4.5.5 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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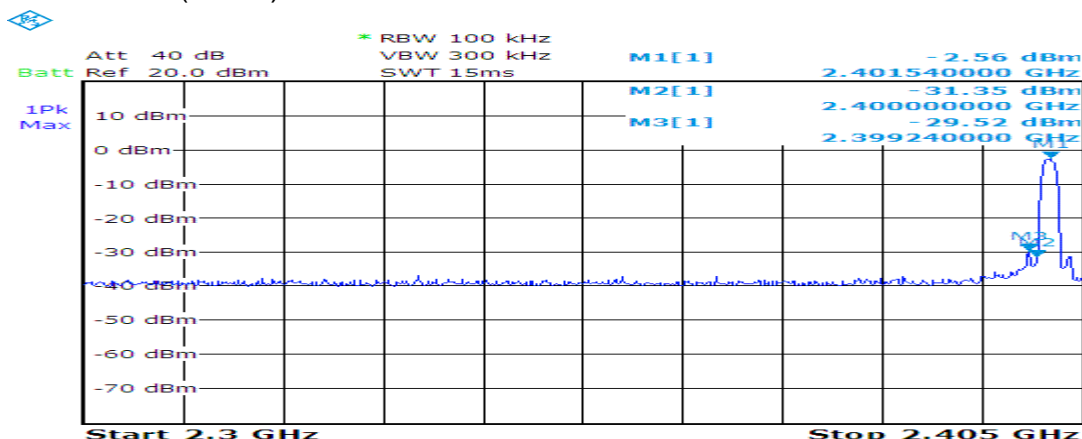
**4.5.6 TEST RESULT**

Temperature:	23°C	Humidity:	62%RH
Spectrum Detector:	PK.	Tesr Mode:	Tx-1, Tx-3
RBW:	100 kHz	VBW:	300 kHz
Tested By:	Richard Lin	Tested Date:	Jun. 08, 2016

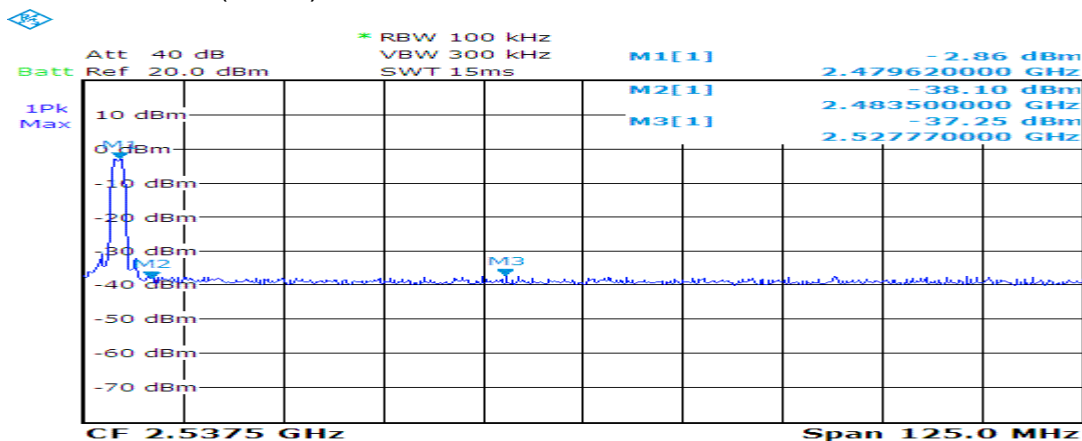
**1. Conducted test**

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-2.56	-29.52	26.96	> 20 dBc
> 2483.5	-2.86	-37.25	34.39	> 20 dBc

Below 2400MHz (CH01) :



Above 2483.5 MHz (CH40) :



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**2. Radiated emission test :**

Below 2400MHz (CH01)

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	2.3 GHz – 2.41 GHz	Tested Mode:	Tx-1
Receiver Detector:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Jun. 07, 2017

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2399.48	-31.48	28.42	H	58.11	47.65	55.05	44.59	74.00	54.00	-18.95	-9.41
2399.34	-31.48	28.42	V	57.12	46.62	54.06	43.56	74.00	54.00	-19.94	-10.44
2400.00	-31.48	28.42	H	59.15	48.69	56.09	45.63	74.00	54.00	-17.91	-8.37
2400.00	-31.48	28.42	V	53.43	42.91	50.37	39.85	74.00	54.00	-23.63	-14.15

Above 2483.5MHz (CH40)

Temperature:	28 °C	Humidity:	69 %RH
Frequency Range:	2.47 GHz – 2.6 GHz	Tested Mode:	Tx-3
Receiver Detector:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Richard Lin	Tested Date:	Jun. 07, 2017

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2483.50	-31.41	28.49	H	45.41	34.97	42.48	32.04	74.00	54.00	-31.52	-21.96
2483.50	-31.41	28.49	V	40.95	30.42	38.02	27.49	74.00	54.00	-35.98	-26.51
2484.62	-31.41	28.49	H	45.66	35.17	42.73	32.24	74.00	54.00	-31.27	-21.76
2484.67	-31.41	28.49	V	44.67	34.19	41.74	31.26	74.00	54.00	-32.26	-22.74





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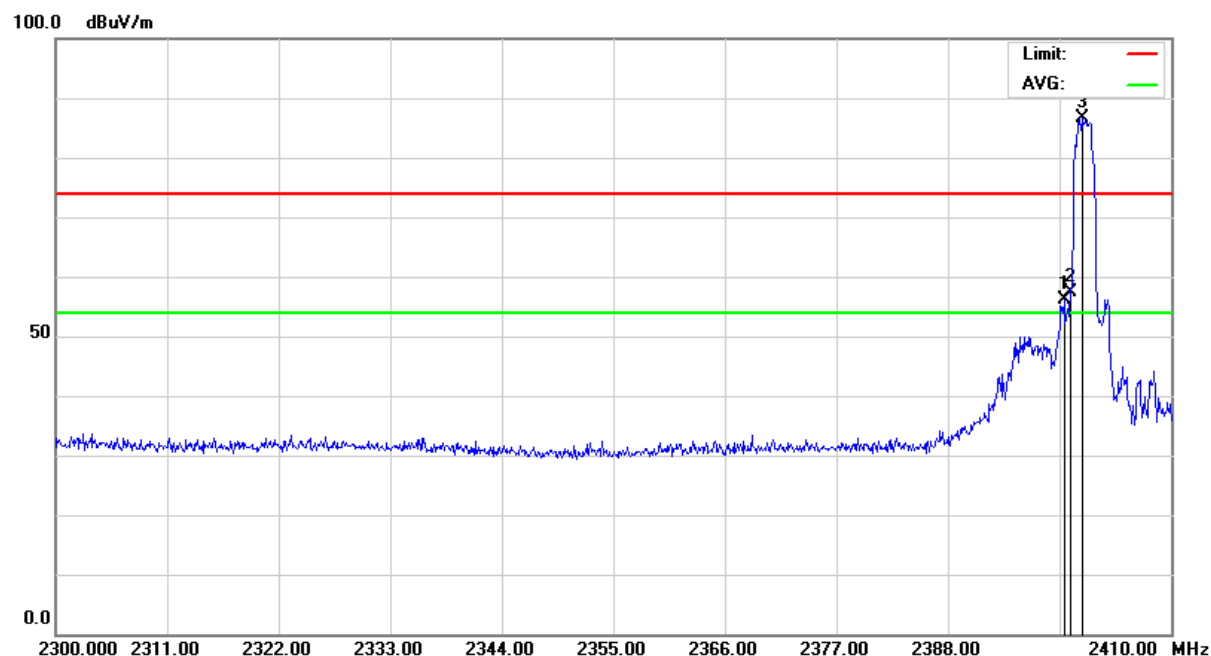
No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

# TEST REPORT

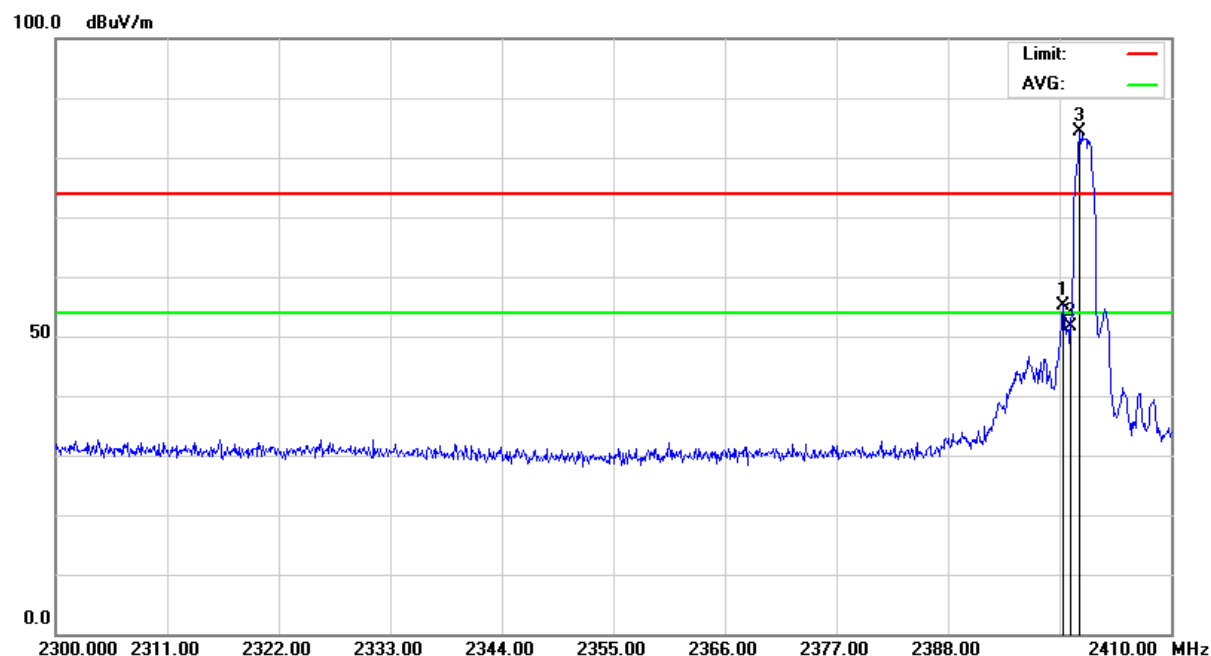
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## Below 2400MHz (CH01)

Antenna Polarization : Horizontal



Antenna Polarization : Vertical





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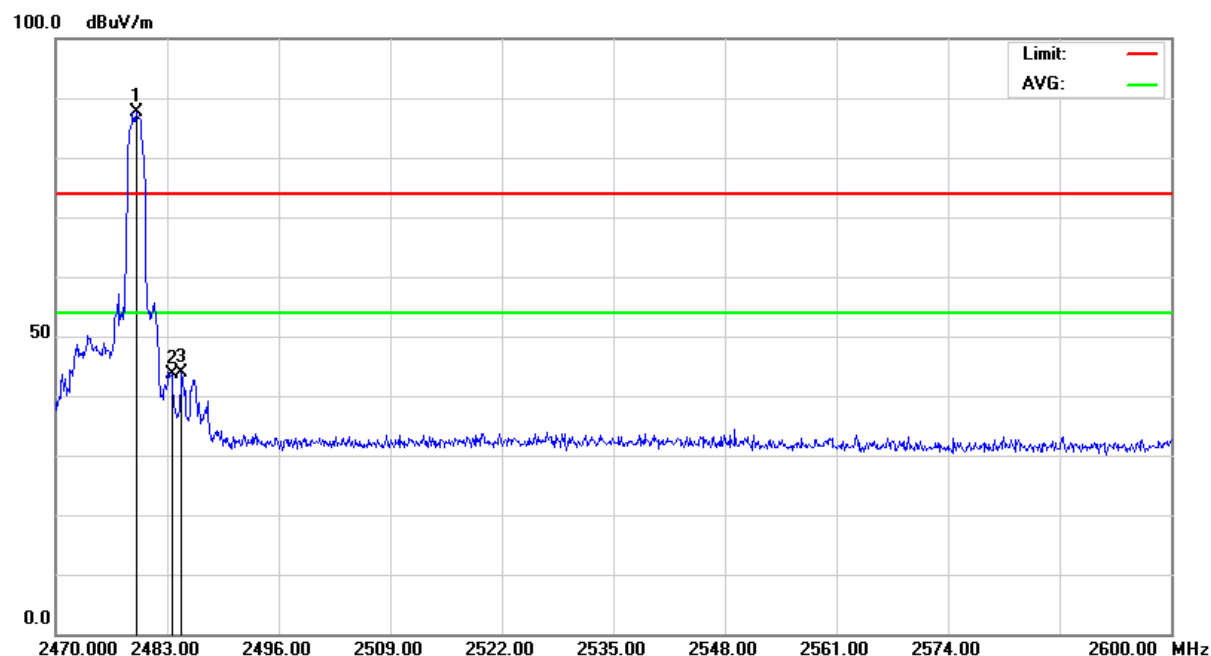
No.167,Ln. 780, Shan-Tong  
Rd.,Ling 8, Shan-Tong Li,  
Chung-Li Dist., Taoyuan City  
320, Taiwan (R.O.C.)

# TEST REPORT

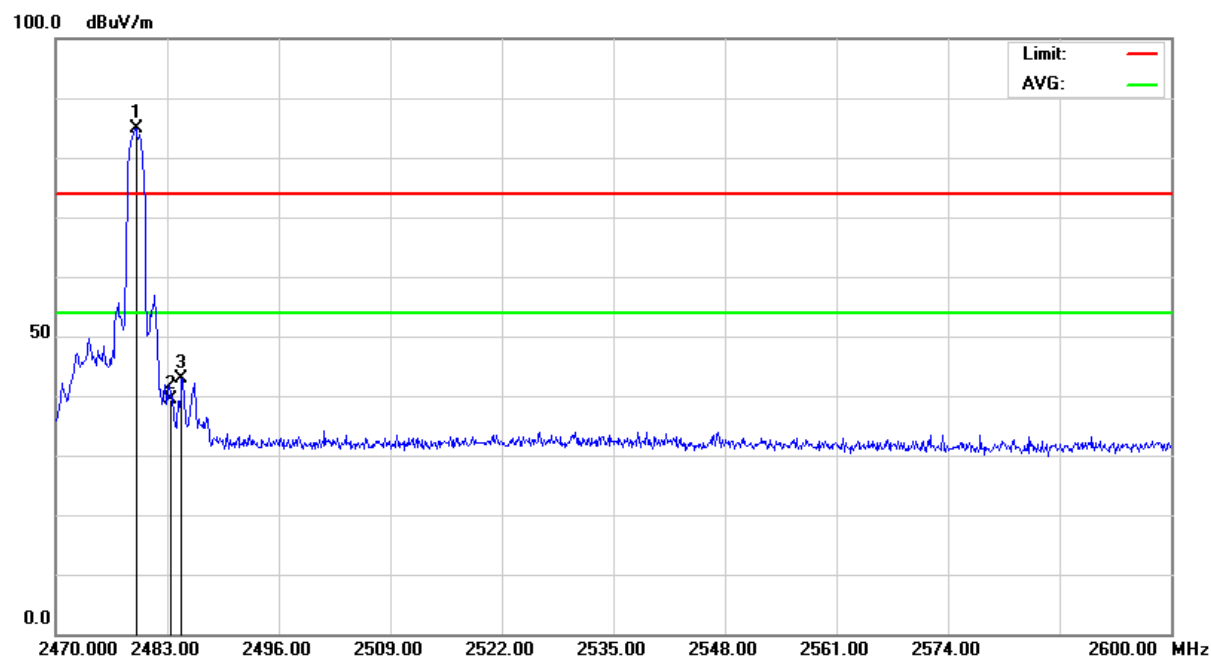
Reference No.: A17060701  
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## Above 2483.5MHz (CH40)

Antenna Polarization : Horizontal



Antenna Polarization : Vertical



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**4.6 POWER DENSITY TEST****4.6.1 LIMIT**

FCC Part15, Subpart C Section 15.247(e)

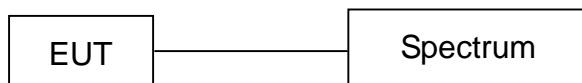
<b>FREQUENCY RANGE (MHz)</b>	<b>Limit (dBm / kHz)</b>
902-928	8 dBm / 3 kHz
2400-2483.5	
5725-5850	

**4.6.2 TEST EQUIPMENT**

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

<b>EQUIPMENT/ FACILITIES</b>	<b>SPECIFICATIONS</b>	<b>MANUFACTURER</b>	<b>MODEL#/ SERIAL#</b>	<b>DUE DATE OF CAL. &amp; CAL. CENTER</b>
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAY 21, 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.

**4.6.3 TEST SET-UP**

The EUT was connected to a spectrum through a 50Ω RF cable.

**4.6.4 TEST PROCEDURE**

The EUT was operating in transmitter mode and could be controlled its channel.

Printed out the test result from the spectrum by hard copy function.

**4.6.5 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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**TEST REPORT**

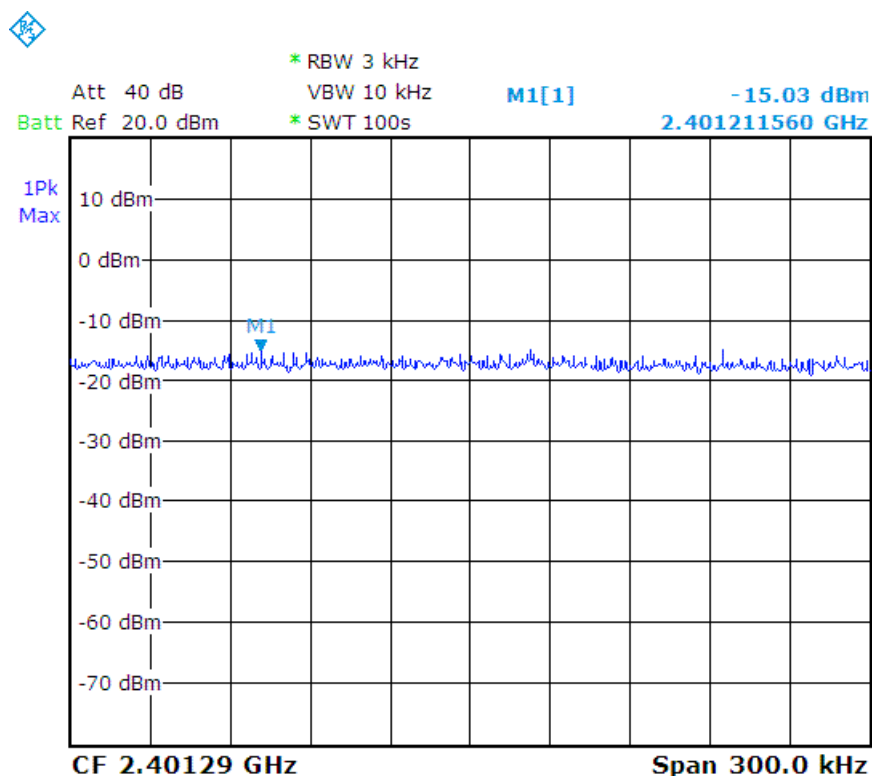
Reference No.: A17060701  
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**4.6.6 TEST RESULT**

Temperature:	23 °C	Humidity:	62 %RH
Spectrum Detector:	PK.	Tesr Mode:	Tx-1, Tx-2, Tx-3
RBW:	3 kHz	VBW:	10 kHz
Tested By:	Richard Lin	Tested Date:	Jun. 08, 2017

Channel Number	Channel Frequency (MHz)	RF Power Level in 3 KHz BW (dBm/3kHz)	Maximum Limit (dBm/3kHz)
CH01_ANT1	2401.35	-15.03	8
CH01_ANT2	2401.35	-15.35	8
CH20_ANT1	2439.35	-16.16	8
CH20_ANT2	2439.35	-14.89	8
CH40_ANT1	2479.35	-16.67	8
CH40_ANT2	2479.35	-15.77	8

CH01\_ANT1 :





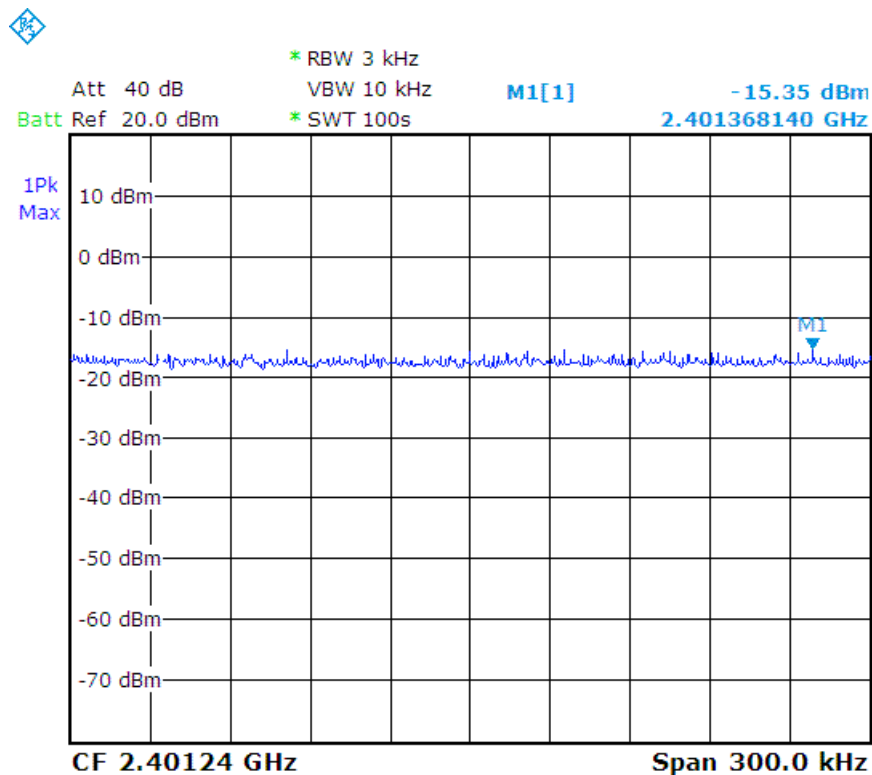
**Spectrum Research & Testing Lab., Inc.**

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

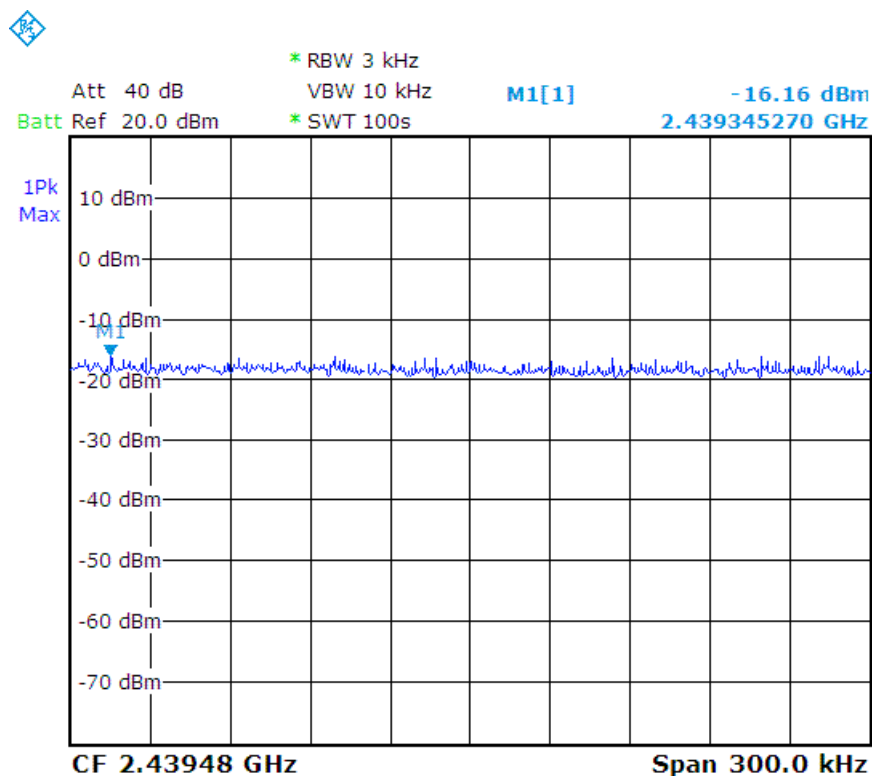
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CH01\_ANT2 :



CH20\_ANT1 :





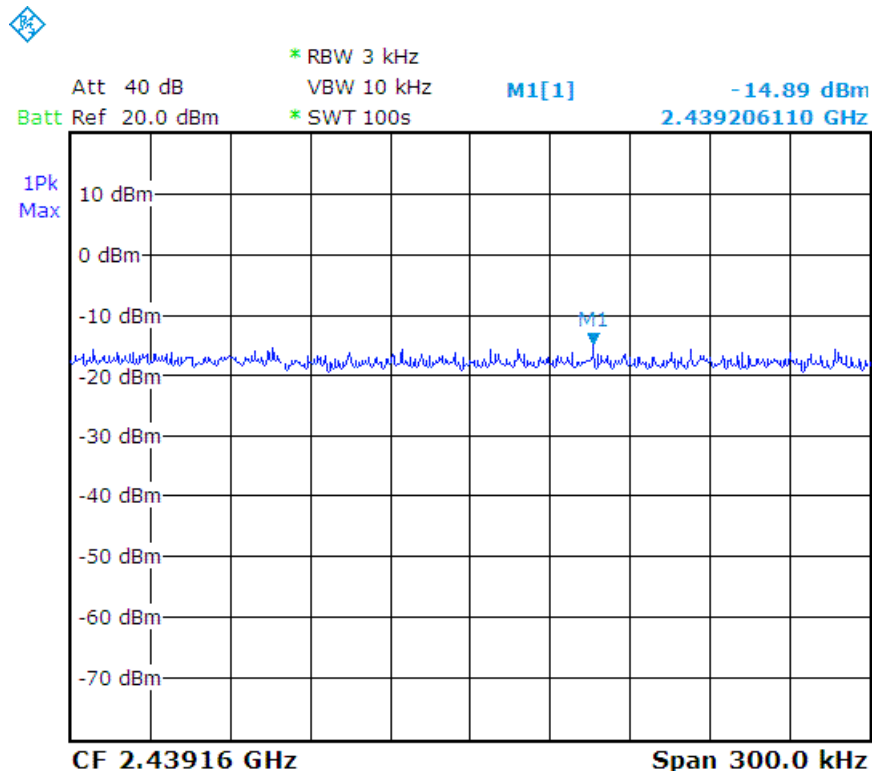
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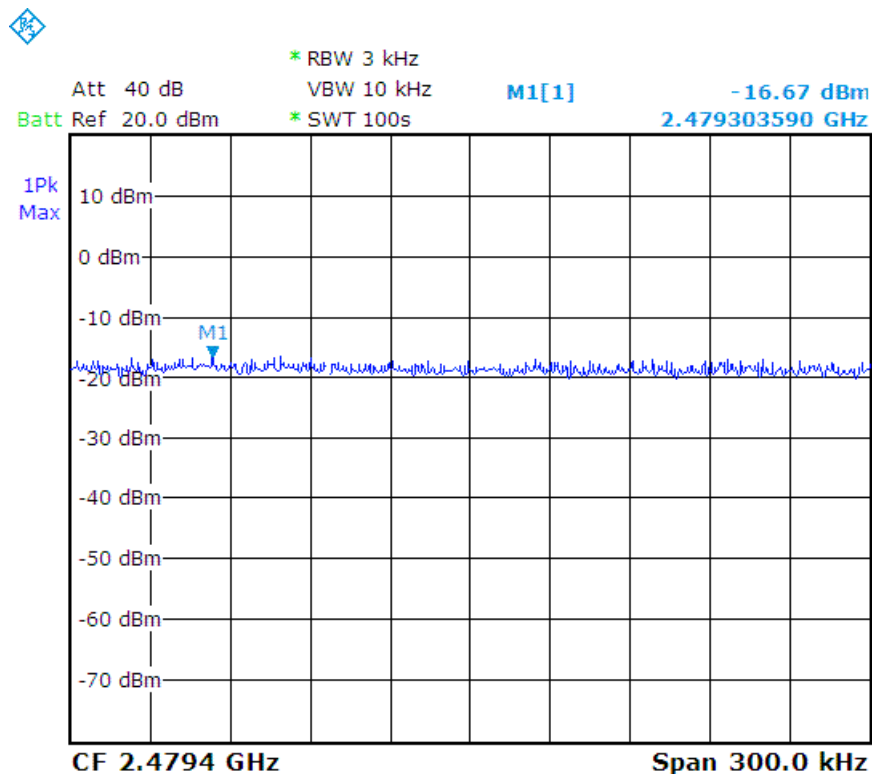
# TEST REPORT

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CH20\_ANT2 :



CH40\_ANT1 :





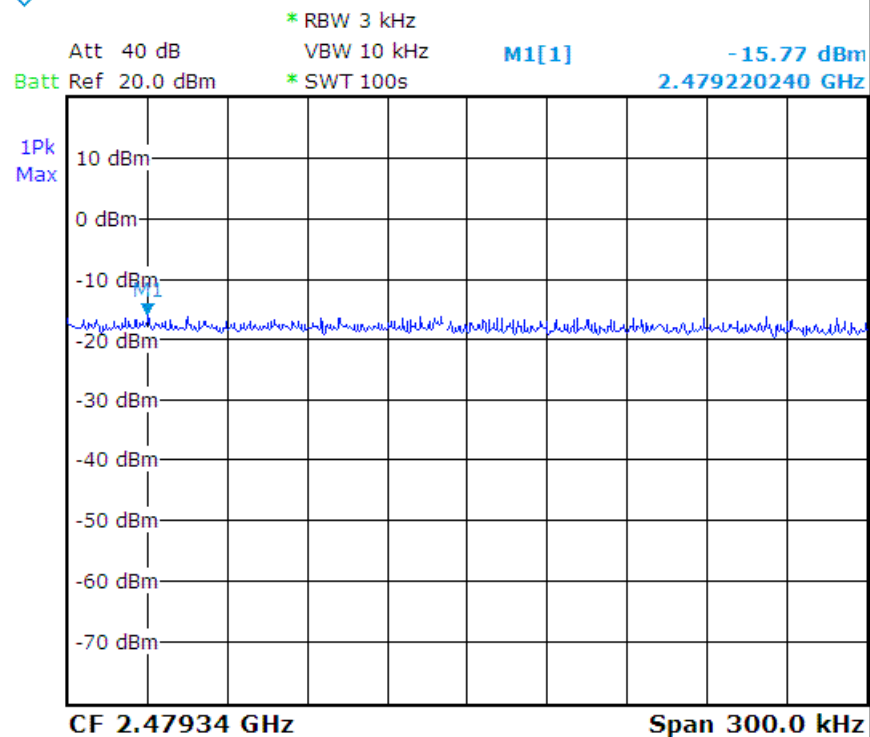
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CH40\_ANT2 :





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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.

FCC part15C section15.247 requirement:

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### 5.2 Result

The EUT's antenna used a Printing Antenna. Gain of antenna types is ANT1 : 1.81 dBi & ANT2 : 1.68 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