

APPLICATION CERTIFICATION FCC Part 15C  
On Behalf of  
CPS Distributors, Inc

Marine amplifier  
Model No.: KMC20  
FCC ID: 2ADQM-KMC20

Prepared for : CPS Distributors, Inc  
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Report Number : ATE20142244  
Date of Test : Nov 6-21, 2014  
Date of Report : Dec 03, 2014

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## Test Report Certification

Applicant : CPS Distributors, Inc  
Manufacturer : EVERVICTORY ELECTRONIC COMPANY LIMITED  
EUT Description : Marine amplifier

- (A) MODEL NO.: KMC20
- (B) Trade Name.: N/A
- (C) POWER SUPPLY: DC 12V

Measurement Procedure Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247  
ANSI C63.4: 2009**

The EUT was tested according to DTS test procedure of Jun 05, 2014 KDB558074 D01 DTS Meas Guidance v03r02 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test :

Nov 06-Nov 21, 2014

Date of Report :

Dec 03, 2014

Prepared by :



( Eric Zhang , Engineer)

Approved & Authorized Signer :



( Sean Liu, Manager)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT : Marine amplifier

Model Number : KMC20

Frequency Range : 2402-2480MHz

Number of Channels : Bluetooth 4.0: 40

Antenna Gain : 0dBi

Power Supply : DC 12V

Modulation mode : GFSK

Applicant : CPS Distributors, Inc

Address : 6024 Parretta Drive, Kansas City, MISSOURI 64120

Manufacturer : EVERVICTORY ELECTRONIC COMPANY LIMITED

Address : Chu Chi Management District, Hu Men Town,  
Dong-Guan City, Guang-Dong Province, P.R.China

Date of sample received : Nov 6, 2014

Date of Test : Nov 6-21, 2014

### 1.2.Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channe 1	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

### 1.3.Special Accessory and Auxiliary Equipment

N/A

## 1.4. Description of Test Facility

EMC Lab	: Accredited by TUV Rheinland Shenzhen  Listed by FCC The Registration Number is 752051
	Listed by Industry Canada The Registration Number is 5077A-2
	Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	: ACCURATE TECHNOLOGY CO. LTD
Site Location	: F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

## 1.5. Measurement Uncertainty

Conducted Emission Expanded Uncertainty	= 2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	= 3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	= 4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	= 4.06dB, k=2

## 2. MEASURING DEVICE AND TEST EQUIPMENT

**Table 1: List of Test and Measurement Equipment**

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2014	Jan. 10, 2015
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2014	Jan. 10, 2015
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2014	Jan. 10, 2015
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 11, 2014	Jan. 10, 2015
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2014	Jan. 14, 2015
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 15, 2014	Jan. 14, 2015
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2014	Jan. 10, 2015
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2014	Jan. 10, 2015
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 11, 2014	Jan. 10, 2015
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 11, 2014	Jan. 10, 2015

### 3. OPERATION OF EUT DURING TESTING

#### 3.1.Operating Mode

The mode is used: **BLE Transmitting mode**

Low Channel: 2402MHz

Middle Channel: 2440MHz

High Channel: 2480MHz

#### 3.2.Configuration and peripherals

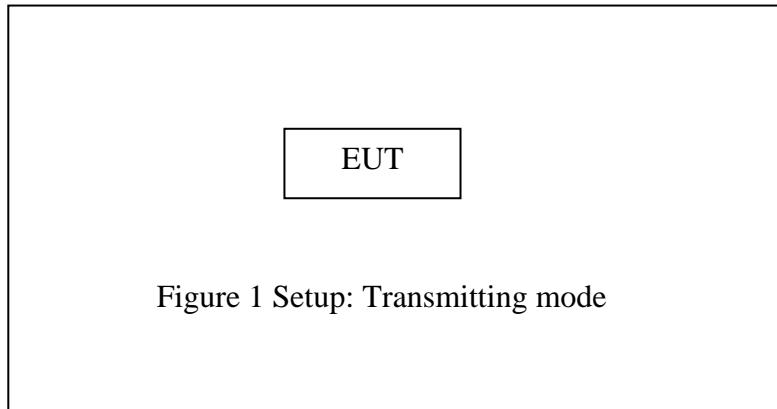


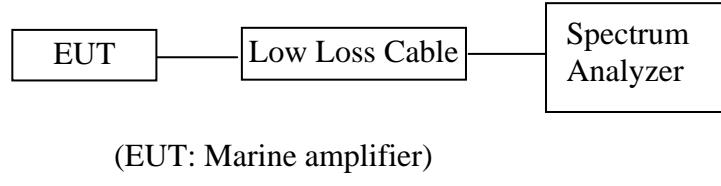
Figure 1 Setup: Transmitting mode

#### 4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Power Line Conducted Emission	Compliant
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

## 5. 6DB BANDWIDTH MEASUREMENT

### 5.1. Block Diagram of Test Setup



(EUT: Marine amplifier)

### 5.2. The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 5.3. EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

### 5.4. Operating Condition of EUT

5.4.1. Setup the EUT and simulator as shown as Section 5.1.

5.4.2. Turn on the power of all equipment.

5.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 5.5. Test Procedure

5.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

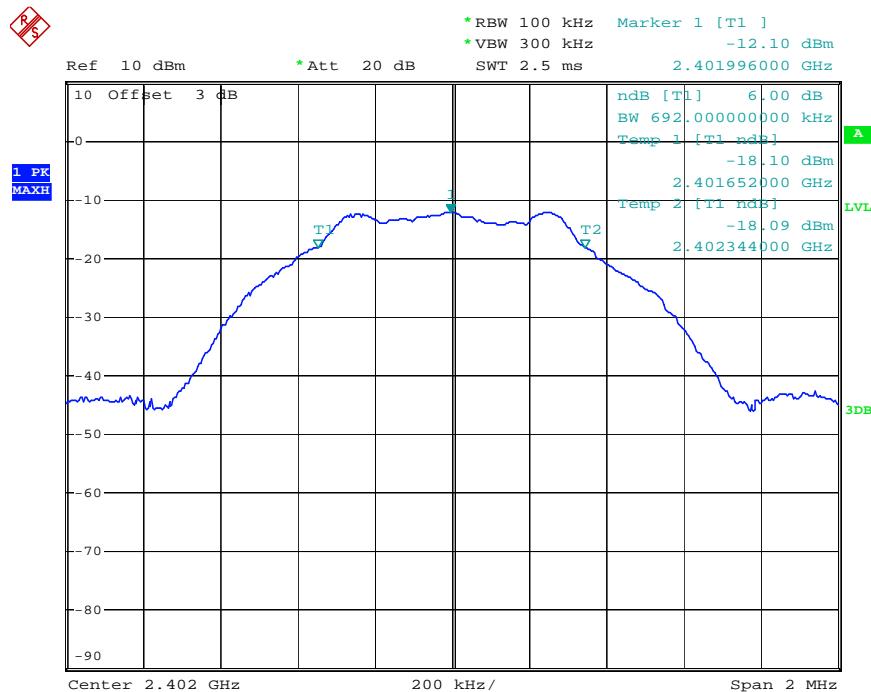
5.5.3. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

## 5.6. Test Result

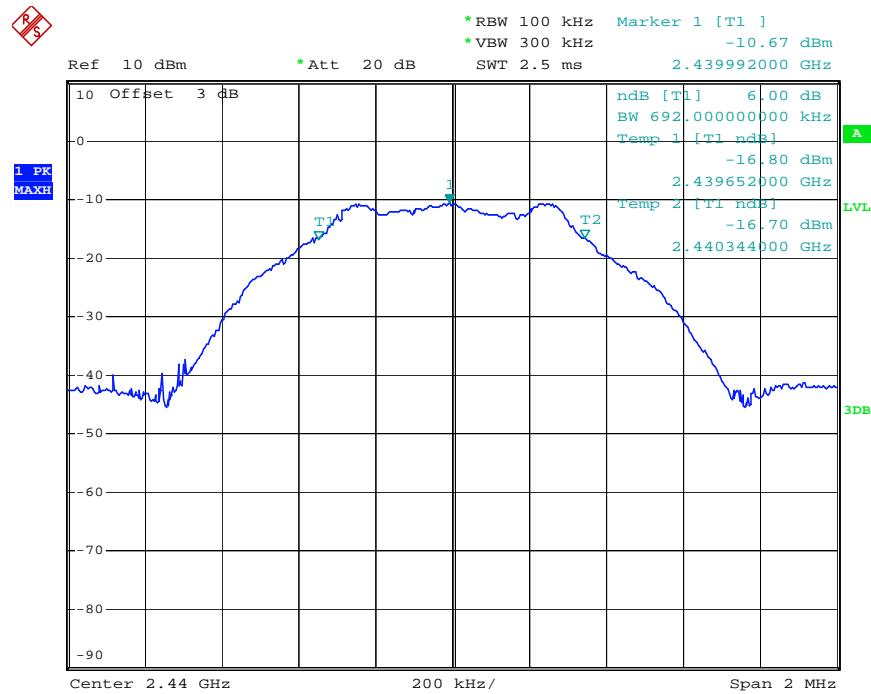
Channel	Frequency (MHz)	6 dB Bandwith (MHz)	Minimum Limit(MHz)	PASS/FAIL
0	2402	0.692	0.5	PASS
19	2440	0.692	0.5	PASS
39	2480	0.696	0.5	PASS

The spectrum analyzer plots are attached as below.

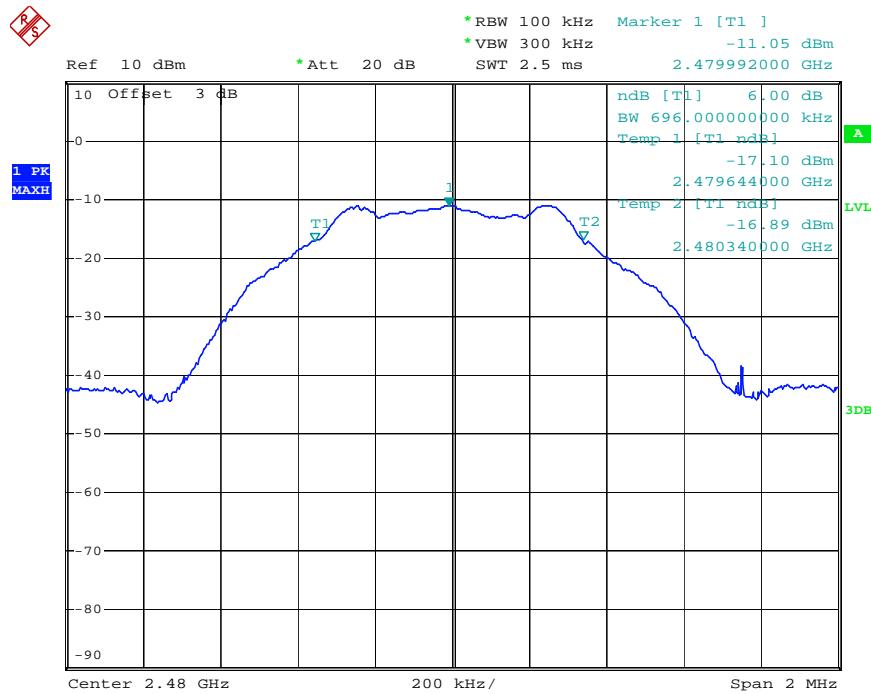
channel 0



## channel 19



## channel 39



## 6. MAXIMUM PEAK OUTPUT POWER

### 6.1. Block Diagram of Test Setup



(EUT: Marine amplifier)

### 6.2. The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

### 6.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

### 6.4. Operating Condition of EUT

6.4.1. Setup the EUT and simulator as shown as Section 6.1.

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 6.5. Test Procedure

6.5.1. Set the RBW  $\geq$  DTS bandwidth. VBW  $\geq 3 \times$  RBW.

6.5.2. Set span  $\geq 3 \times$  RBW

6.5.3. Sweep time = auto couple.

6.5.4. Detector = peak.

6.5.5. Trace mode = max hold.

6.5.6. Allow trace to fully stabilize.

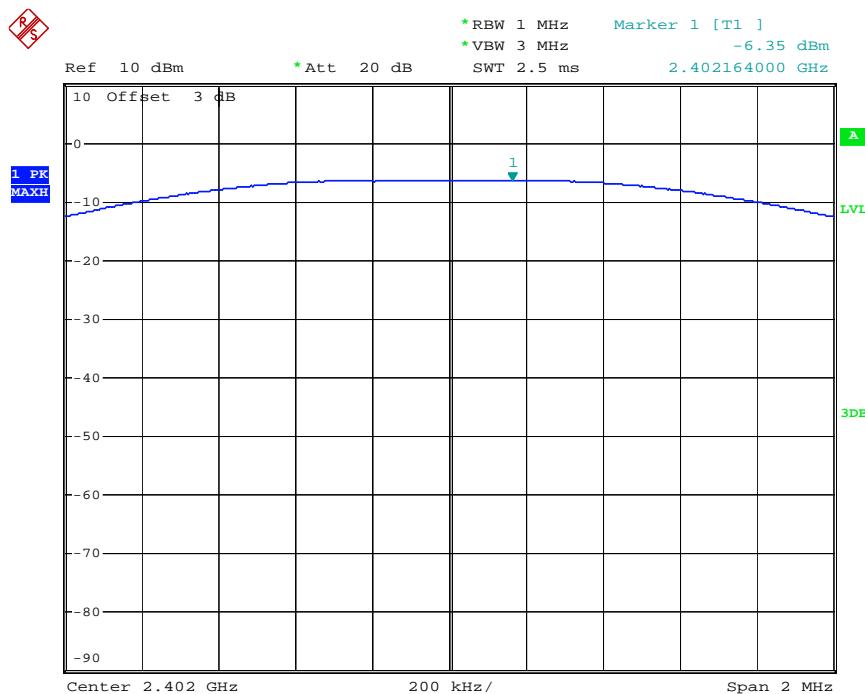
6.5.7. Use peak marker function to determine the peak amplitude level.

## 6.6. Test Result

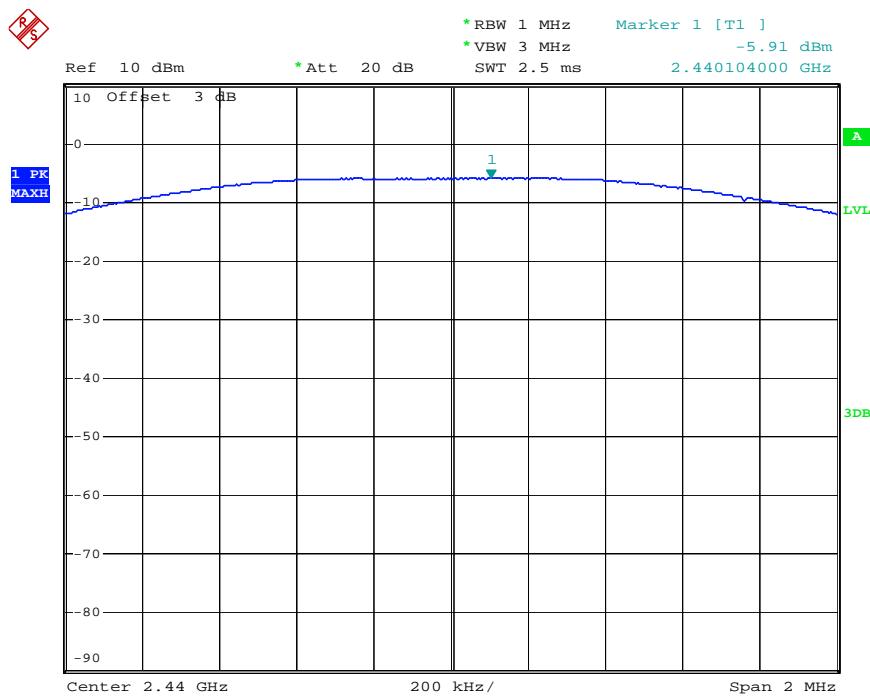
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
0	2402	-6.35	30	PASS
19	2440	-5.91	30	PASS
39	2480	-5.18	30	PASS

The spectrum analyzer plots are attached as below.

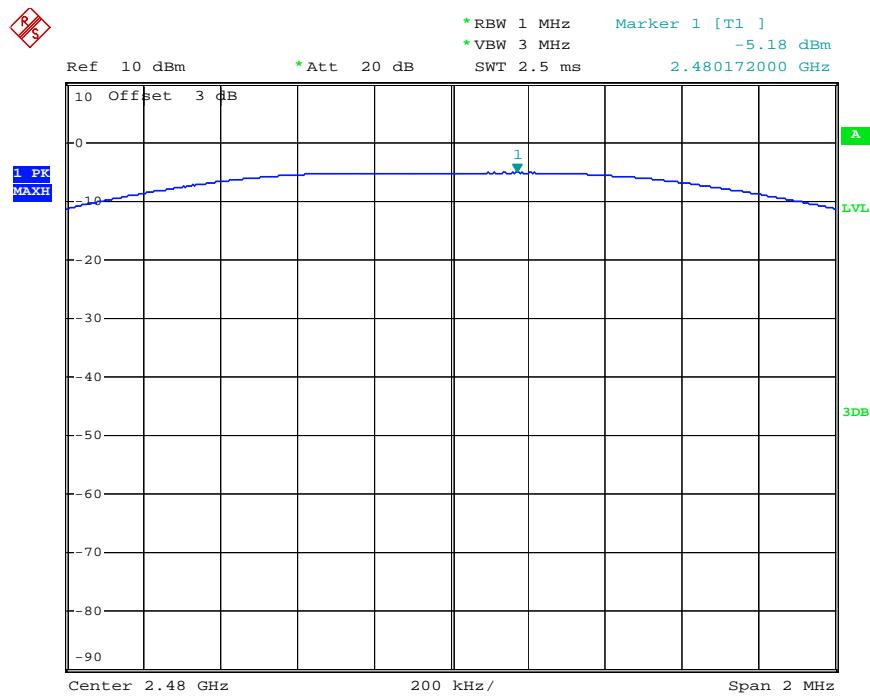
channel 0



## channel 19

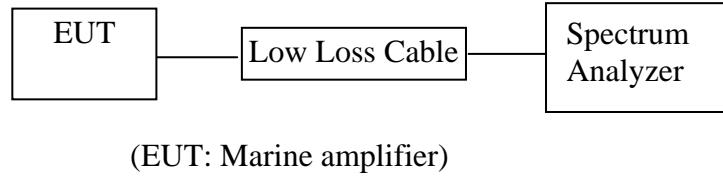


## channel 39



## 7. POWER SPECTRAL DENSITY MEASUREMENT

### 7.1. Block Diagram of Test Setup



### 7.2. The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 7.3. EUT Configuration on Measurement

The equipment is installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

### 7.4. Operating Condition of EUT

7.4.1. Setup the EUT and simulator as shown as Section 8.1.

7.4.2. Turn on the power of all equipment.

7.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 7.5. Test Procedure

7.5.1. The EUT was tested according to DTS test procedure of KDB558074 D01 DTS Meas Guidance v03r02 for compliance to FCC 47CFR 15.247 requirements.

7.5.2. The transmitter output was connected to the spectrum analyzer through a low loss cable.

### 7.5.3. Measurement Procedure PKPSD:

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

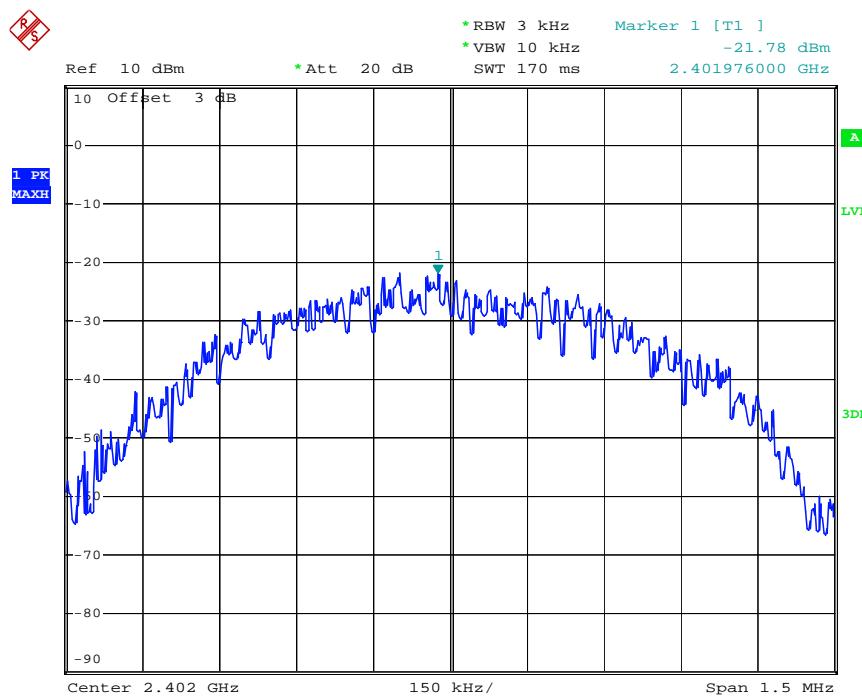
### 7.5.4. Measurement the maximum power spectral density.

## 7.6. Test Result

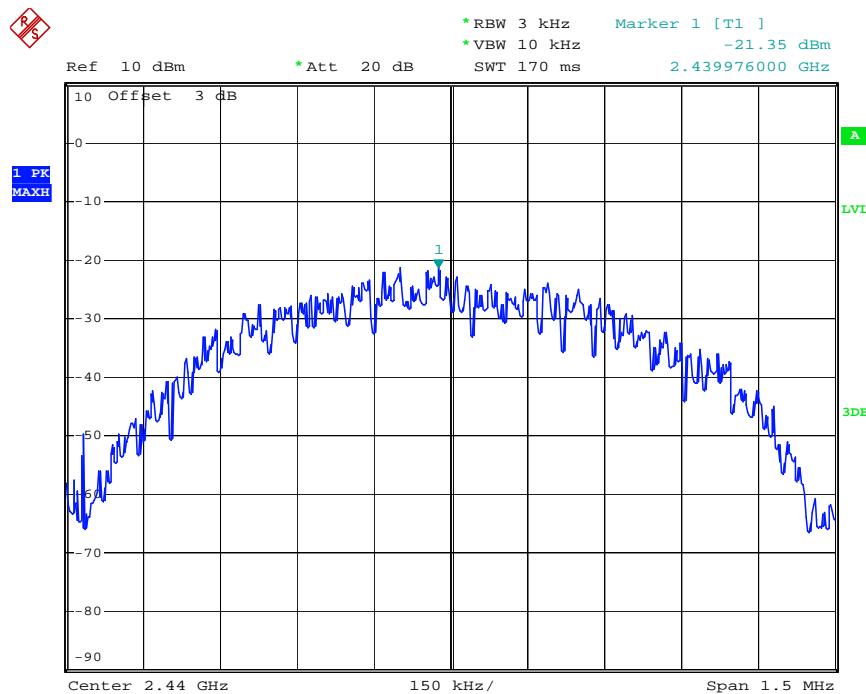
CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/3KHz)	LIMIT (dBm/3KHz)	PASS/FAIL
0	2402	-21.78	8	PASS
19	2440	-21.35	8	PASS
39	2480	-20.68	8	PASS

The spectrum analyzer plots are attached as below.

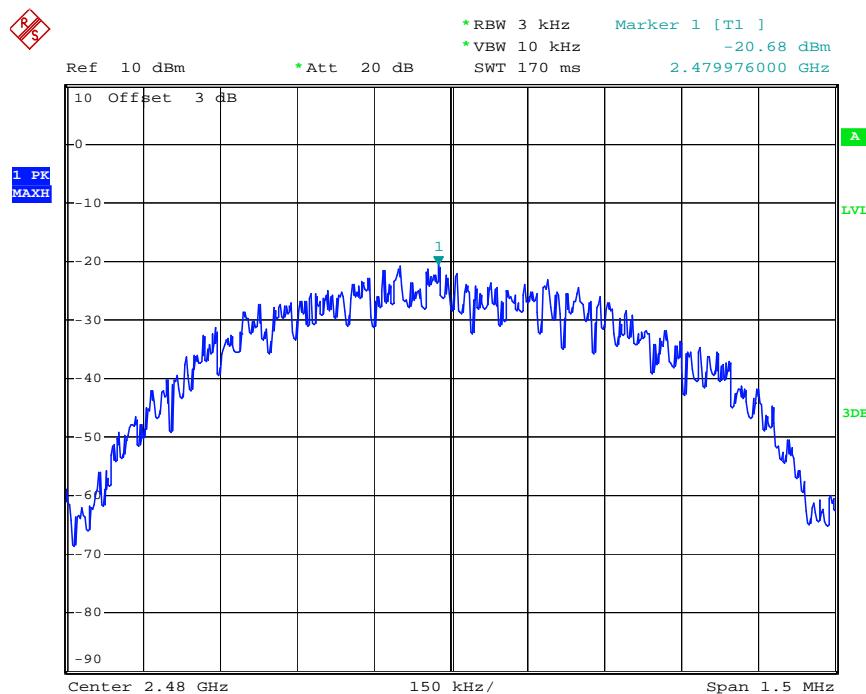
*channel 0*



## channel 19

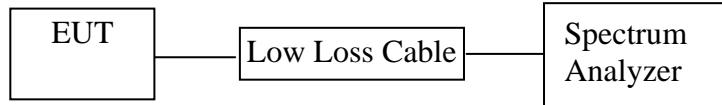


## channel 39



## 8. BAND EDGE COMPLIANCE TEST

### 8.1. Block Diagram of Test Setup



(EUT: Marine amplifier)

### 8.2. The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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).

### 8.3. EUT Configuration on Measurement

The equipment is installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 9.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

## 8.5.Test Procedure

Conducted Band Edge:

8.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

8.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiate Band Edge:

8.5.3. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

8.5.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

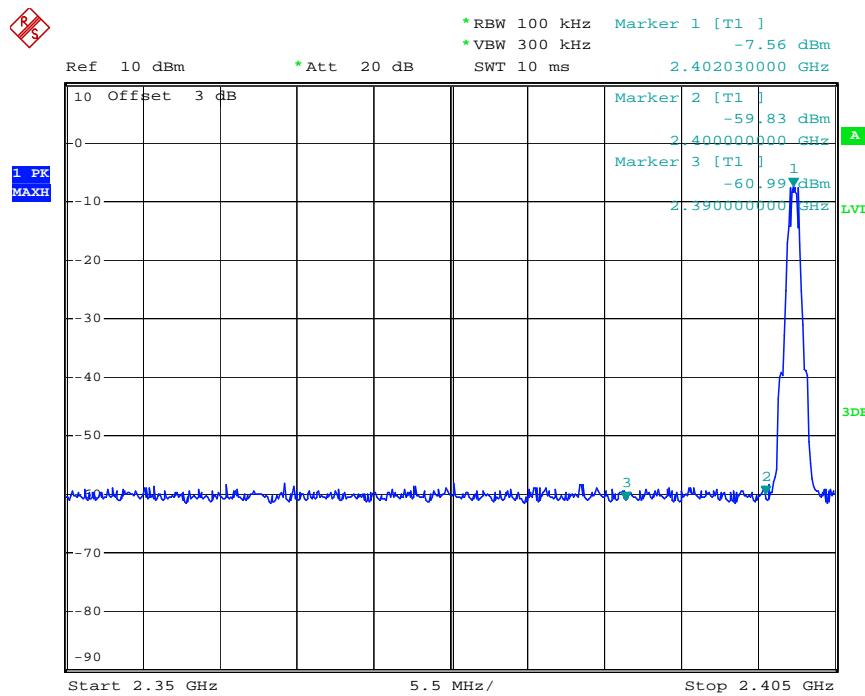
8.5.7.The band edges was measured and recorded.

## 8.6.Test Result

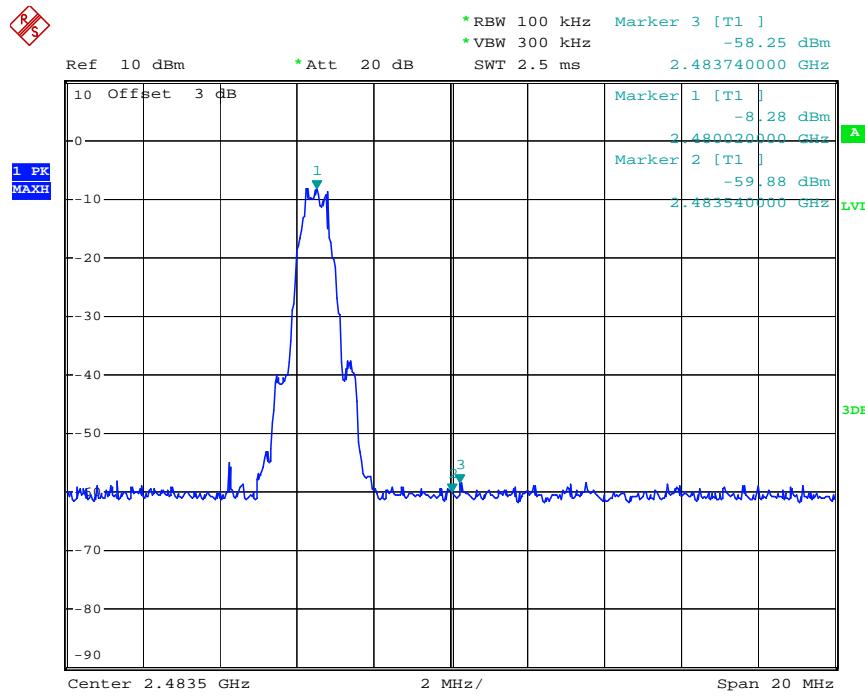
**Pass**

Channel	Frequency	Delta peak to band emission	Limit(dBc)
0	2390.0MHz	53.43	20
39	2484.5MHz	49.97	20

## channel 0



## channel 39



## Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:  
Result = Reading + Corrected Factor
3. Display the measurement of peak values.



ACCURATE TECHNOLOGY CO., LTD.

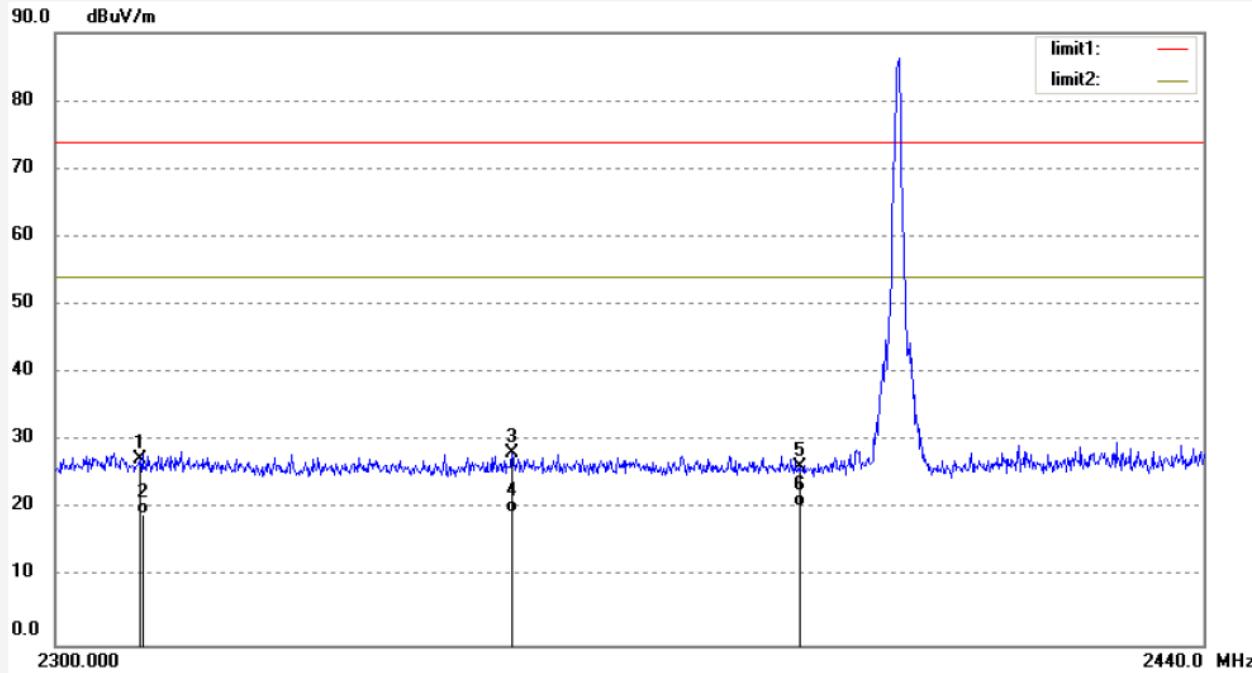
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: STAR #3015	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 12V
Test item: Radiation Test	Date: 14/11/15/
Temp.( C)/Hum.(%) 25 C / 55 %	Time: 14/25/37
EUT: Marine amplifier	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: KMC20	
Manufacturer: EVERVICTORY	
Note: Report No.:ATE20142244	



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	34.27	-6.99	27.28	74.00	-46.72	peak			
2	2310.000	26.25	-6.99	19.26	54.00	-34.74	AVG			
3	2354.740	35.04	-6.88	28.16	74.00	-45.84	peak			
4	2354.740	26.41	-6.88	19.53	54.00	-34.47	AVG			
5	2390.000	33.03	-6.78	26.25	74.00	-47.75	peak			
6	2390.000	27.20	-6.78	20.42	54.00	-33.58	AVG			



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Site: 1# Chamber  
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Fax:+86-0755-26503396

Job No.: STAR #3016

Polarization: Vertical

Standard: FCC PK

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 14/29/06

EUT: Marine amplifier

Engineer Signature:

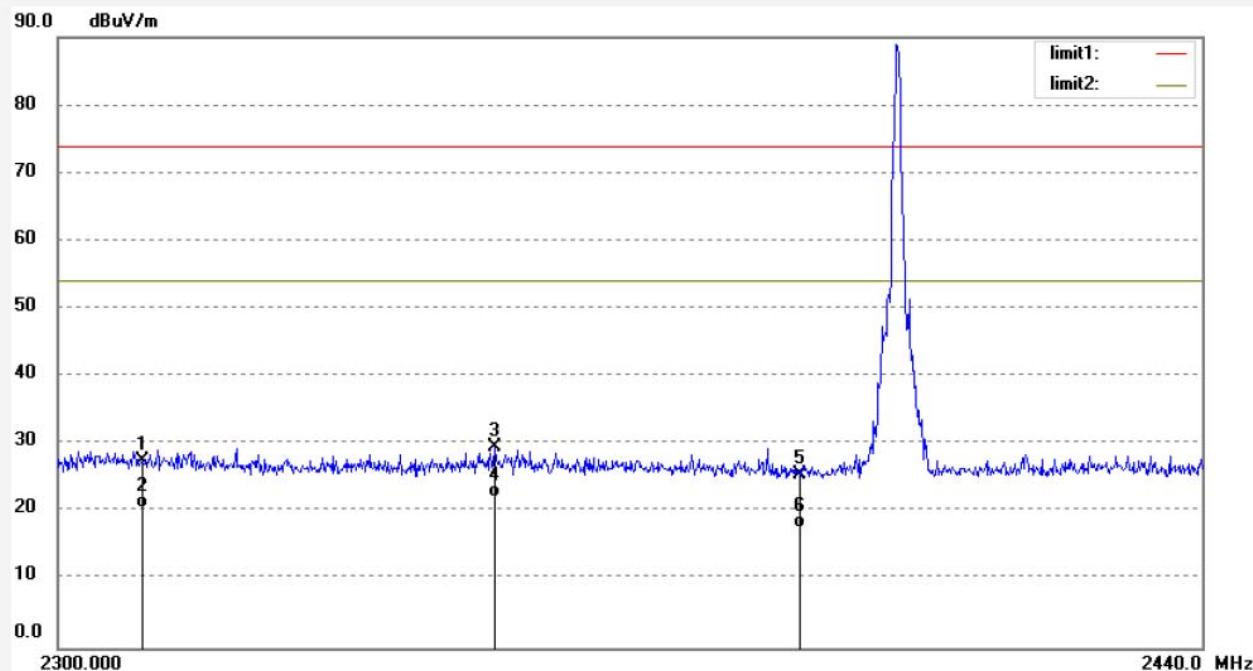
Mode: TX 2402MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	34.53	-6.99	27.54	74.00	-46.46	peak			
2	2310.000	27.58	-6.99	20.59	54.00	-33.41	AVG			
3	2352.640	36.54	-6.88	29.66	74.00	-44.34	peak			
4	2352.640	28.93	-6.88	22.05	54.00	-31.95	AVG			
5	2390.000	32.43	-6.78	25.65	74.00	-48.35	peak			
6	2390.000	24.55	-6.78	17.77	54.00	-36.23	AVG			



## ACCURATE TECHNOLOGY CO., LTD.

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Fax:+86-0755-26503396

Job No.: STAR #3017

Polarization: Vertical

Standard: FCC PK

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp. ( C)/Hum.(%) 25 C / 55 %

Time: 14/32/02

EUT: Marine amplifier

Engineer Signature:

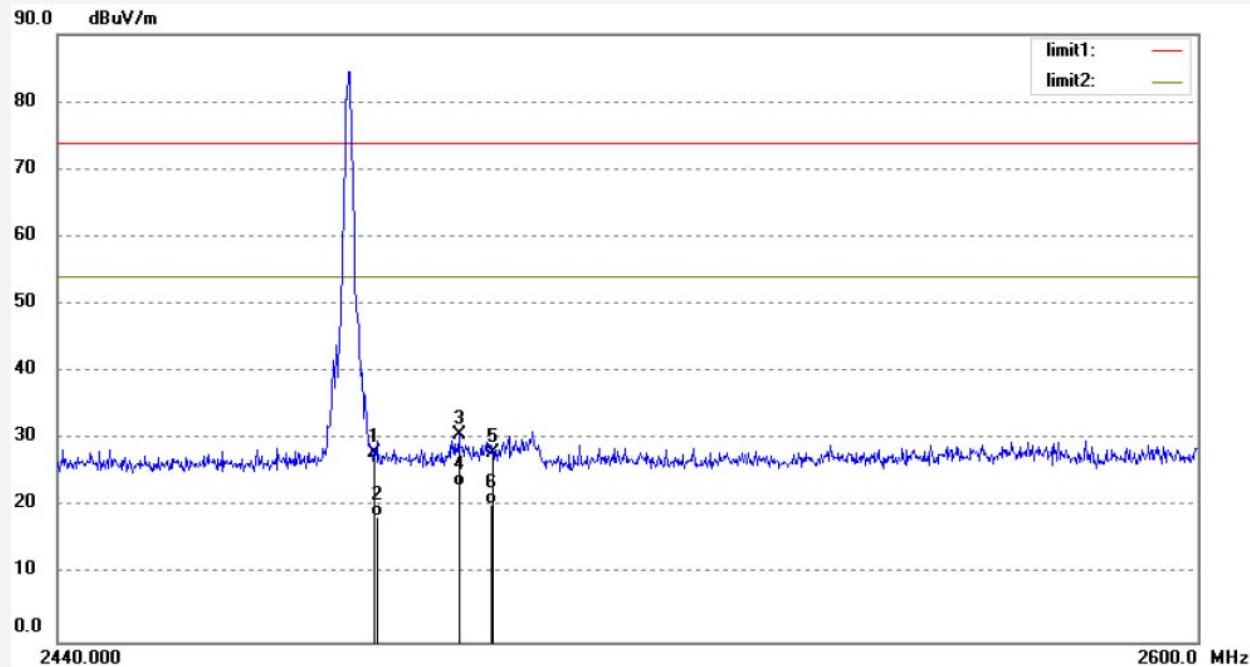
Mode: TX 2480MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	34.48	-6.54	27.94	74.00	-46.06	peak			
2	2483.500	25.17	-6.54	18.63	54.00	-35.37	AVG			
3	2495.200	37.21	-6.50	30.71	74.00	-43.29	peak			
4	2495.200	29.50	-6.50	23.00	54.00	-31.00	AVG			
5	2500.000	34.56	-6.50	28.06	74.00	-45.94	peak			
6	2500.000	26.93	-6.50	20.43	54.00	-33.57	AVG			

Job No.: STAR #3018

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 14/36/21

EUT: Marine amplifier

Engineer Signature:

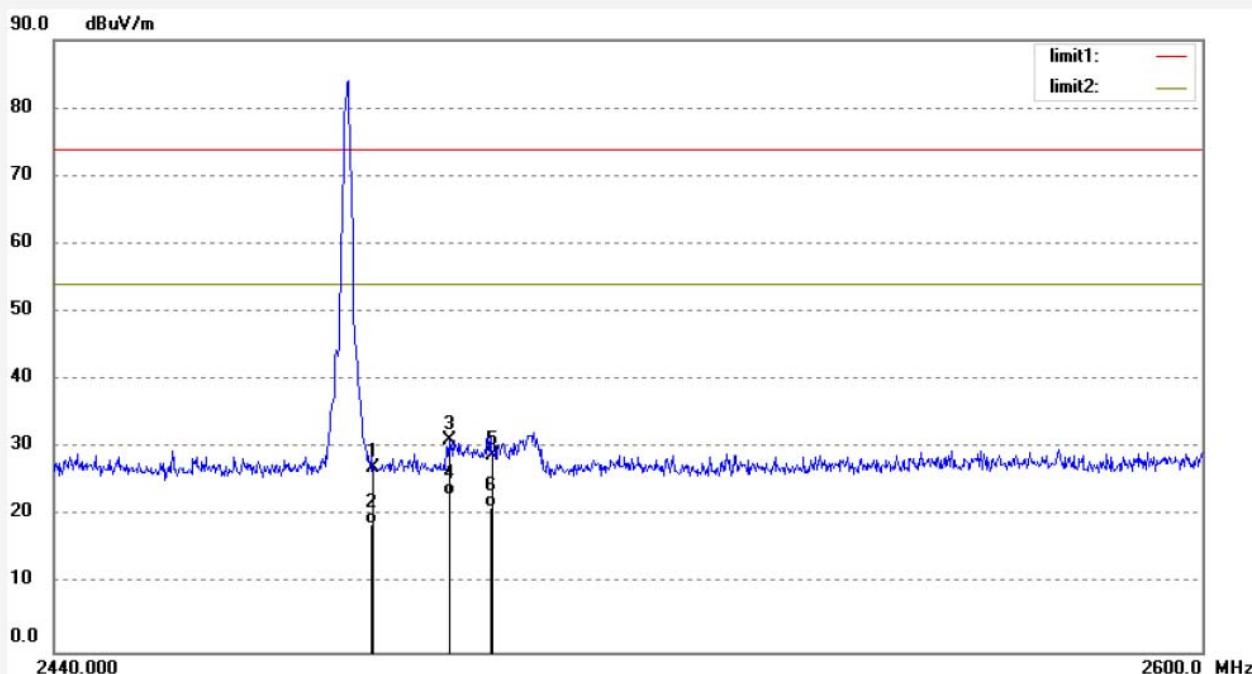
Mode: TX 2480MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244

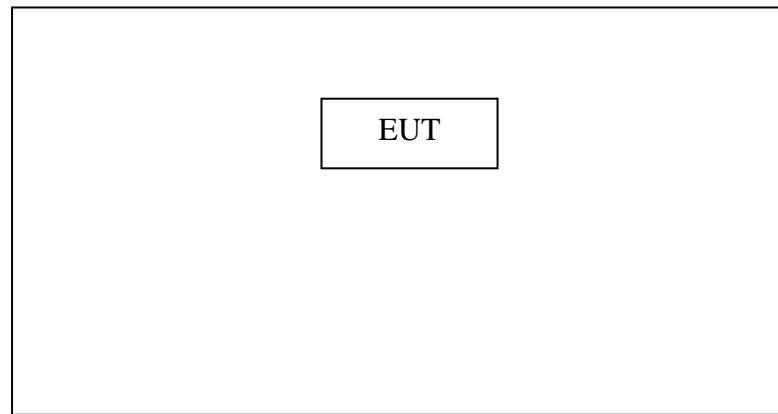


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	33.60	-6.54	27.06	74.00	-46.94	peak			
2	2483.500	25.40	-6.54	18.86	54.00	-35.14	AVG			
3	2493.920	37.76	-6.51	31.25	74.00	-42.75	peak			
4	2493.920	29.50	-6.51	22.99	54.00	-31.01	AVG			
5	2500.000	35.31	-6.50	28.81	74.00	-45.19	peak			
6	2500.000	27.80	-6.50	21.30	54.00	-32.70	AVG			

## 9. RADIATED SPURIOUS EMISSION TEST

### 9.1. Block Diagram of Test Setup

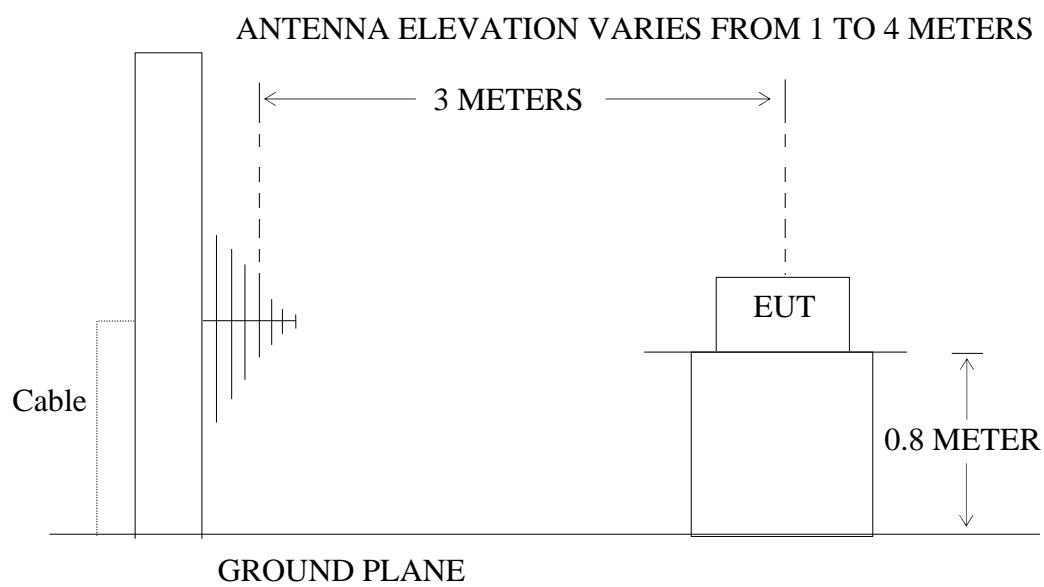
#### 9.1.1. Block diagram of connection between the EUT and peripherals



Setup: Transmitting mode

(EUT: Marine amplifier)

#### 9.1.2. Semi-Anechoic Chamber Test Setup Diagram



## 9.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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).

## 9.3.Restricted bands of operation

### 9.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	( <sup>2</sup> )
13.36-13.41			

<sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510

<sup>2</sup>Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

## 9.4. Configuration of EUT on Measurement

The equipment is installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 9.5. Operating Condition of EUT

9.5.1. Setup the EUT and simulator as shown as Section 10.1.

9.5.2. Turn on the power of all equipment.

9.5.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 9.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector. When average radiated emissions measurements are specified there is also a limit on the peak emissions level which is 20 dB above the applicable maximum permitted average emission limit

RBW (120 kHz), VBW (300 kHz) for QP detector below 1GHz

Peak detector above 1GHz

RBW (1 MHz), VBW (3MHz) for Peak measurement

RBW (1 MHz), VBW (10Hz) for AV measurement

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

## 9.7.The Field Strength of Radiation Emission Measurement Results

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. The EUT is tested radiation emission at Low, Middle, High channel in three axes. The worst emissions are reported in all channels. The fundamental radiated emissions were reduced by Band Reject Filter in the attached plots.

3. The radiation emissions from 18-25GHz are not reported, because the test values lower than the limits of 20dB.

4. The average measurement was not performed when peak measured data under the limit of average detection.



**ACCURATE TECHNOLOGY CO., LTD.**

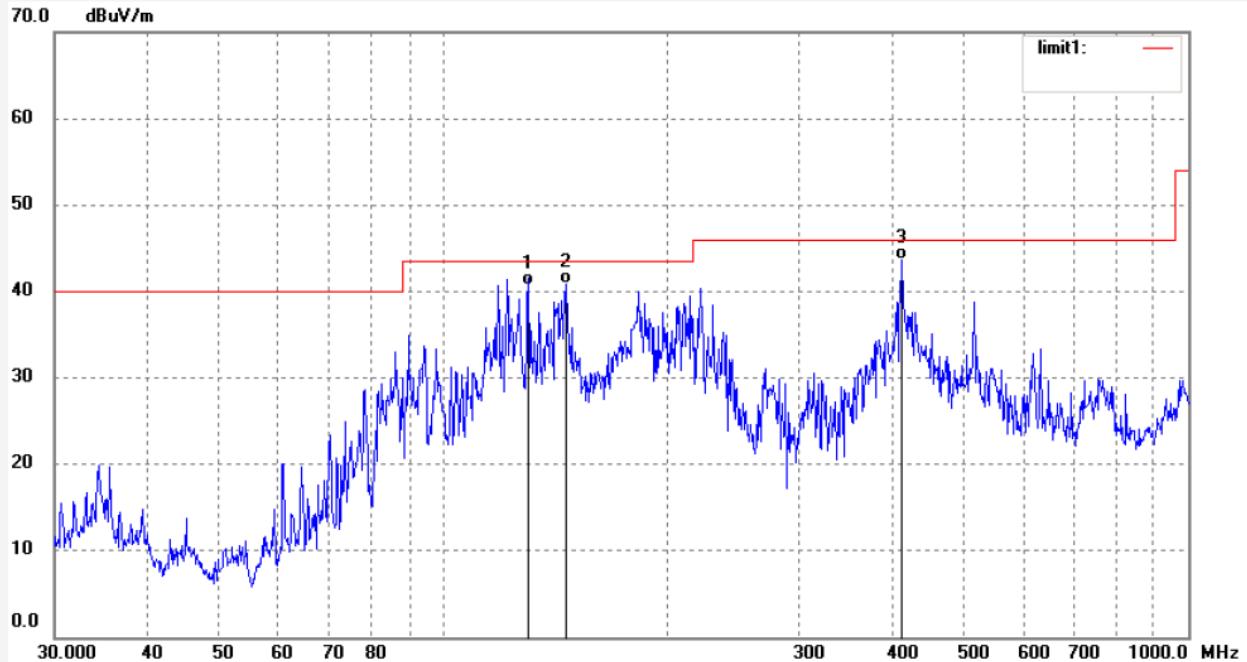
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: star2014 #1825	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 12V
Test item: Radiation Test	Date: 2014/11/15
Temp.( C)/Hum.(%) 25 C / 55 %	Time: 13:59:33
EUT: Marine amplifier	Engineer Signature: STAR
Mode: TX 2402MHz	Distance: 3m
Model: KMC20	
Manufacturer: EVERVICTORY	
Note: Report No.:ATE20142244	



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	129.9226	63.70	-23.03	40.67	43.50	-2.83	QP			
2	145.8611	64.52	-23.72	40.80	43.50	-2.70	QP			
3	411.8240	59.18	-15.45	43.73	46.00	-2.27	QP			

Job No.: star2014 #1826

Polarization: Horizontal

Standard: FCC Class B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 2014/11/15

Temp. ( C )/Hum.(%) 25 C / 55 %

Time: 14:00:20

EUT: Marine amplifier

Engineer Signature: STAR

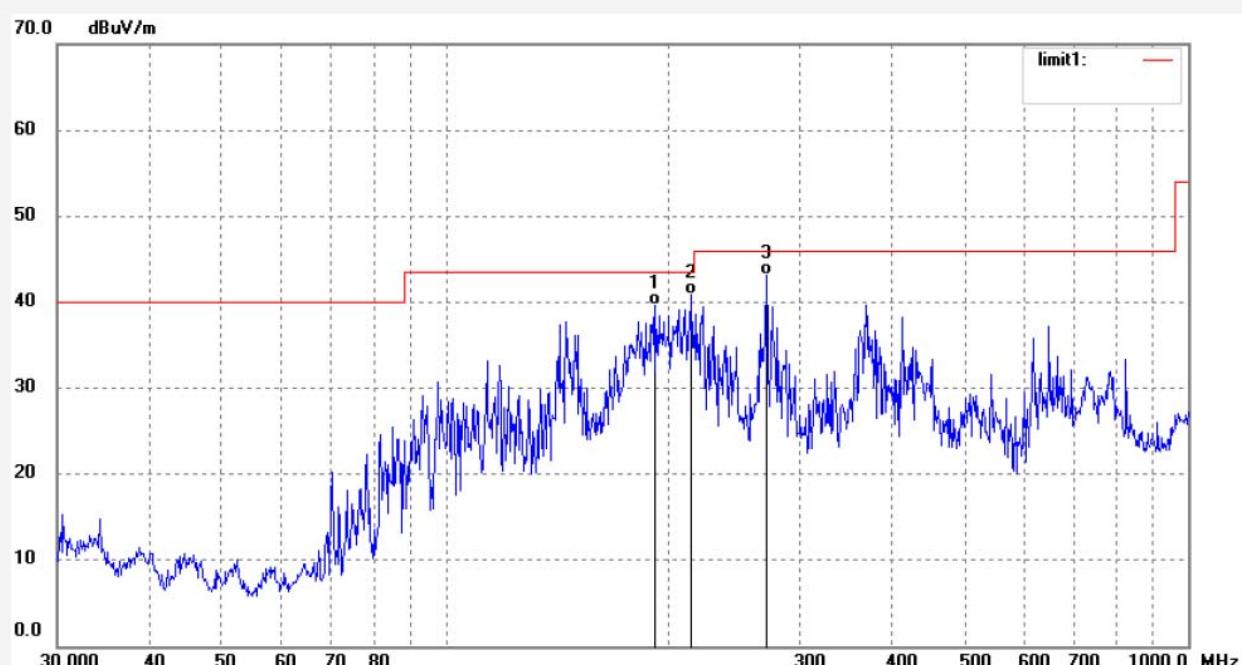
Mode: TX 2402MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	191.7450	60.40	-20.80	39.60	43.50	-3.90	QP			
2	214.5143	60.82	-19.97	40.85	43.50	-2.65	QP			
3	270.3748	61.81	-18.68	43.13	46.00	-2.87	QP			

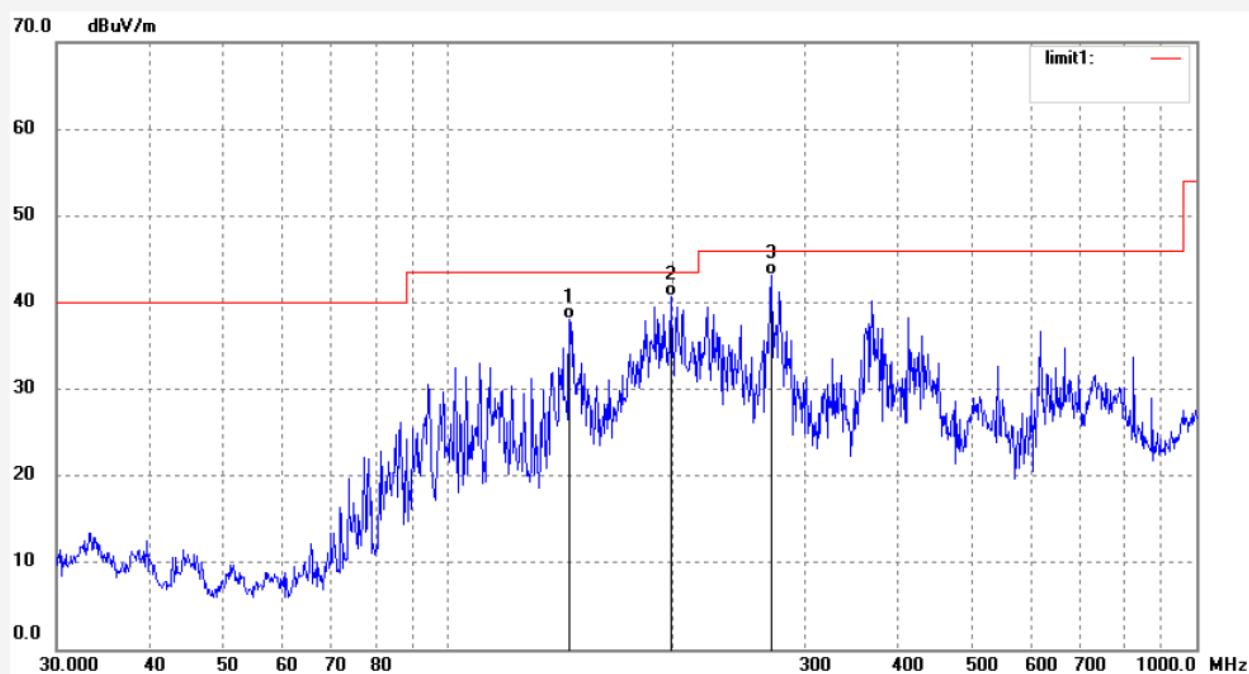
## ACCURATE TECHNOLOGY CO., LTD.

 F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
 Science & Industry Park,Nanshan Shenzhen,P.R.China

 Site: 1# Chamber  
 Tel:+86-0755-26503290  
 Fax:+86-0755-26503396

Job No.: star2014 #1827	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 12V
Test item: Radiation Test	Date: 2014/11/15
Temp.( C)/Hum.(%) 25 C / 55 %	Time: 14:01:01
EUT: Marine amplifier	Engineer Signature: STAR
Mode: TX 2440MHz	Distance: 3m
Model: KMC20	
Manufacturer: EVERVICTORY	

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	145.3505	61.76	-23.70	38.06	43.50	-5.44	QP			
2	198.5879	61.03	-20.32	40.71	43.50	-2.79	QP			
3	270.3747	61.83	-18.68	43.15	46.00	-2.85	QP			

Job No.: star2014 #1828

Polarization: Vertical

Standard: FCC Class B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 2014/11/15

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 14:01:50

EUT: Marine amplifier

Engineer Signature: STAR

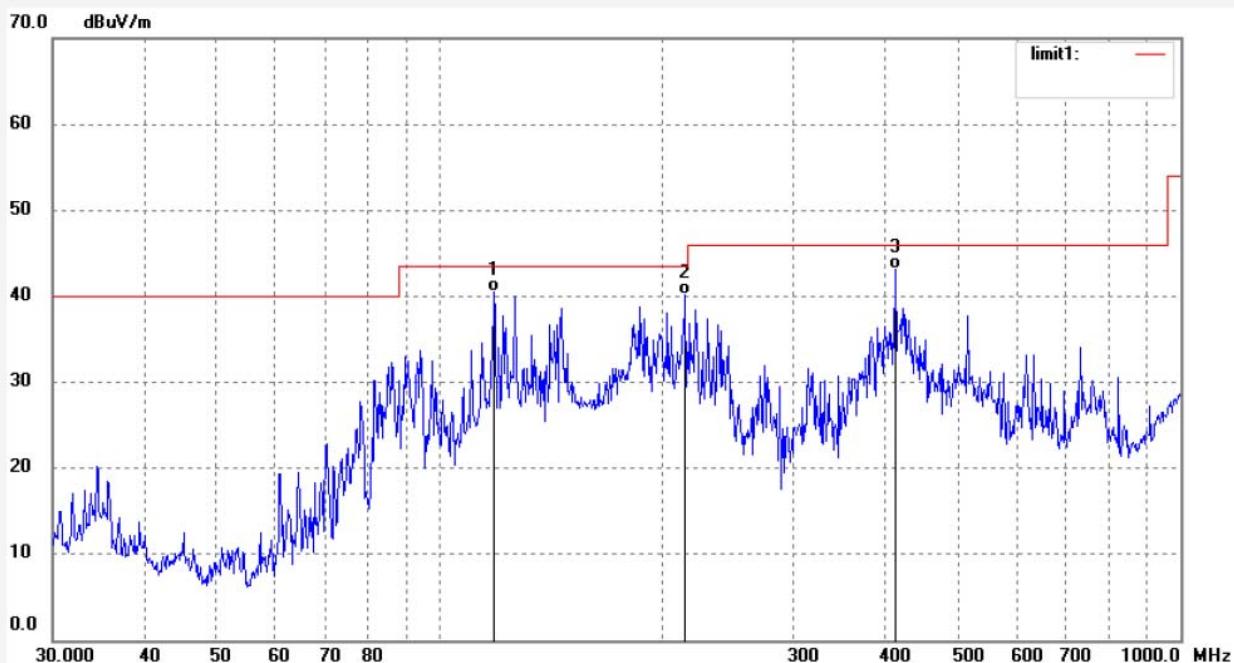
Mode: TX 2440MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	118.1861	62.91	-22.46	40.45	43.50	-3.05	QP			
2	214.5142	60.20	-19.97	40.23	43.50	-3.27	QP			
3	411.8240	58.58	-15.45	43.13	46.00	-2.87	QP			

Job No.: star2014 #1829

Polarization: Vertical

Standard: FCC Class B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 2014/11/15

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 14:02:29

EUT: Marine amplifier

Engineer Signature: STAR

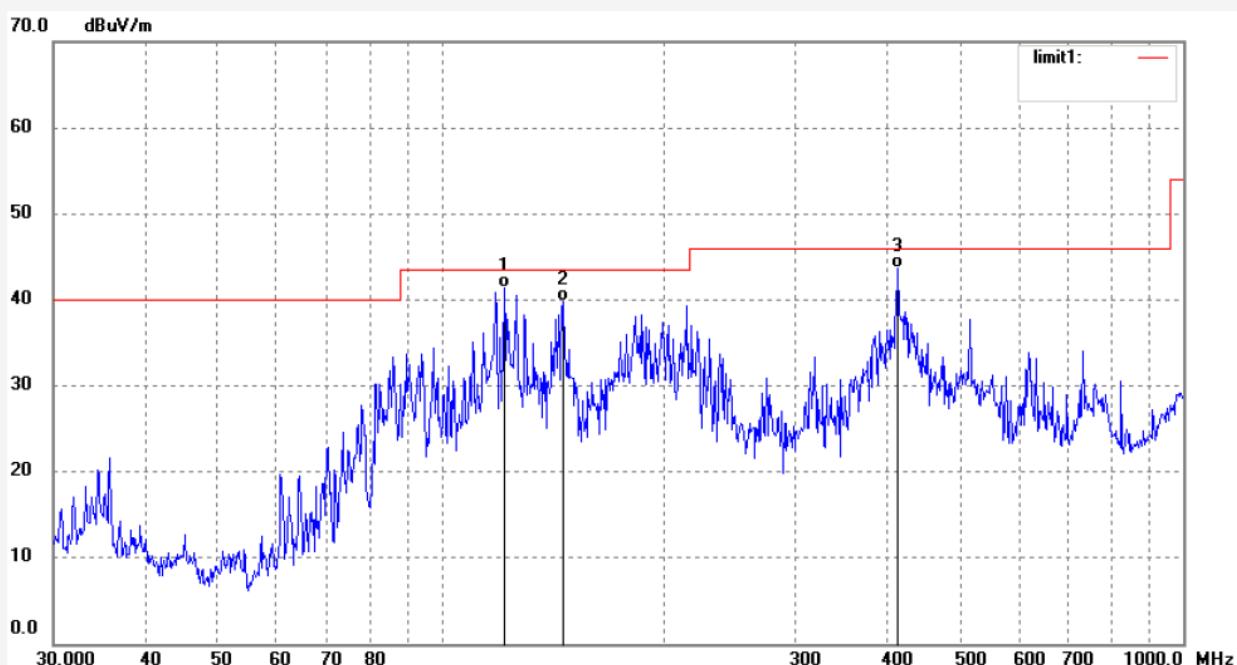
Mode: TX 2480MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	121.5486	64.05	-22.61	41.44	43.50	-2.06	QP			
2	145.8611	63.45	-23.72	39.73	43.50	-3.77	QP			
3	411.8240	59.08	-15.45	43.63	46.00	-2.37	QP			

Job No.: star2014 #1830

Polarization: Horizontal

Standard: FCC Class B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 2014/11/15

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 14:03:17

EUT: Marine amplifier

Engineer Signature: STAR

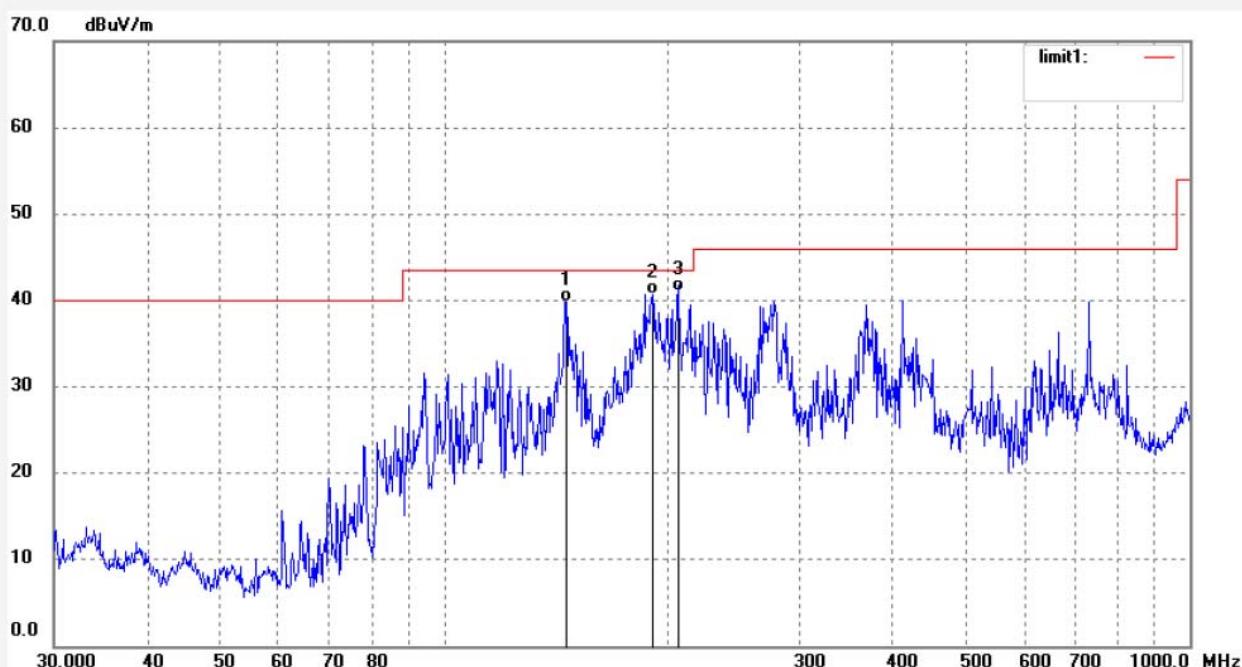
Mode: TX 2480MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	145.8611	63.56	-23.72	39.84	43.50	-3.66	QP			
2	190.4050	61.65	-20.93	40.72	43.50	-2.78	QP			
3	206.3976	60.99	-20.04	40.95	43.50	-2.55	QP			

Job No.: star2014 #816

Polarization: Vertical

Standard: FCC PART 15B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp. ( C )/Hum.(%) 25 C / 55 %

Time: 11/12/43

EUT: Marine amplifier

Engineer Signature: STAR

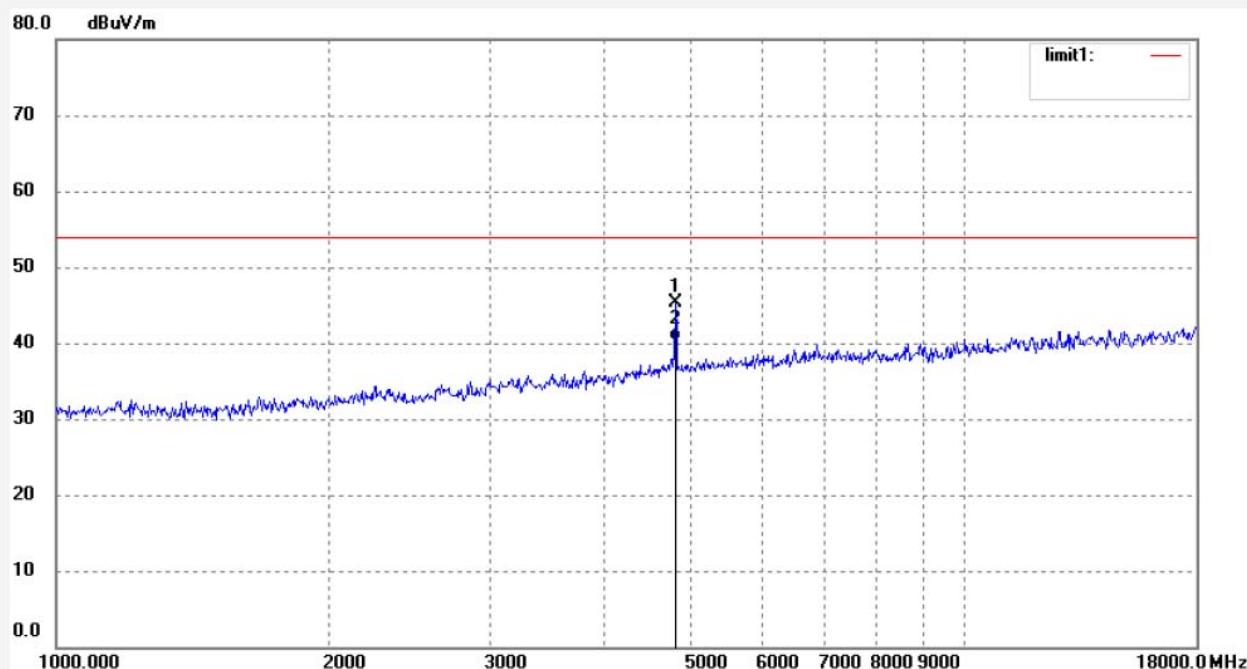
Mode: TX 2402MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.110	46.93	-1.59	45.34	54.00	-8.66	peak			
2	4804.110	41.87	-1.59	40.28	54.00	-13.72	AVG			

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: star2014 #817

Polarization: Horizontal

Standard: FCC PART 15B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 11/16/36

EUT: Marine amplifier

Engineer Signature: STAR

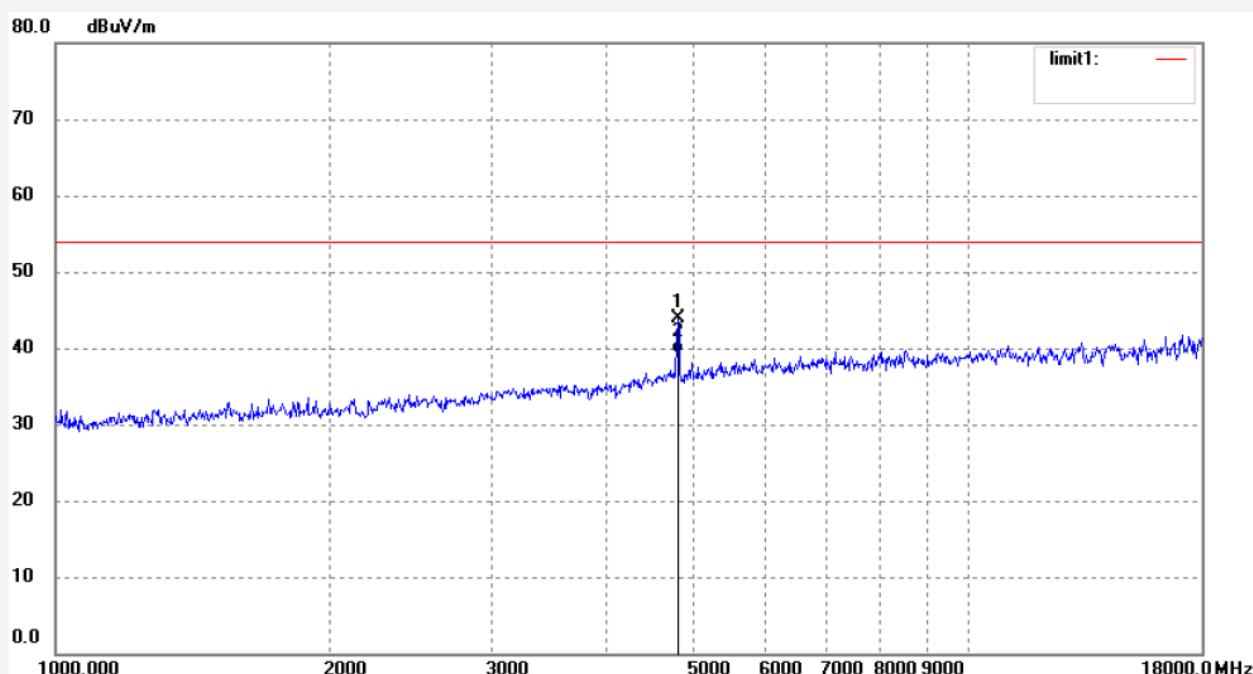
Mode: TX 2402MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.110	45.42	-1.59	43.83	54.00	-10.17	peak			
2	4804.110	40.85	-1.59	39.26	54.00	-14.74	AVG			

Job No.: star2014 #818

Polarization: Horizontal

Standard: FCC PART 15B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp. ( C)/Hum.(%) 25 C / 55 %

Time: 11/21/54

EUT: Marine amplifier

Engineer Signature: STAR

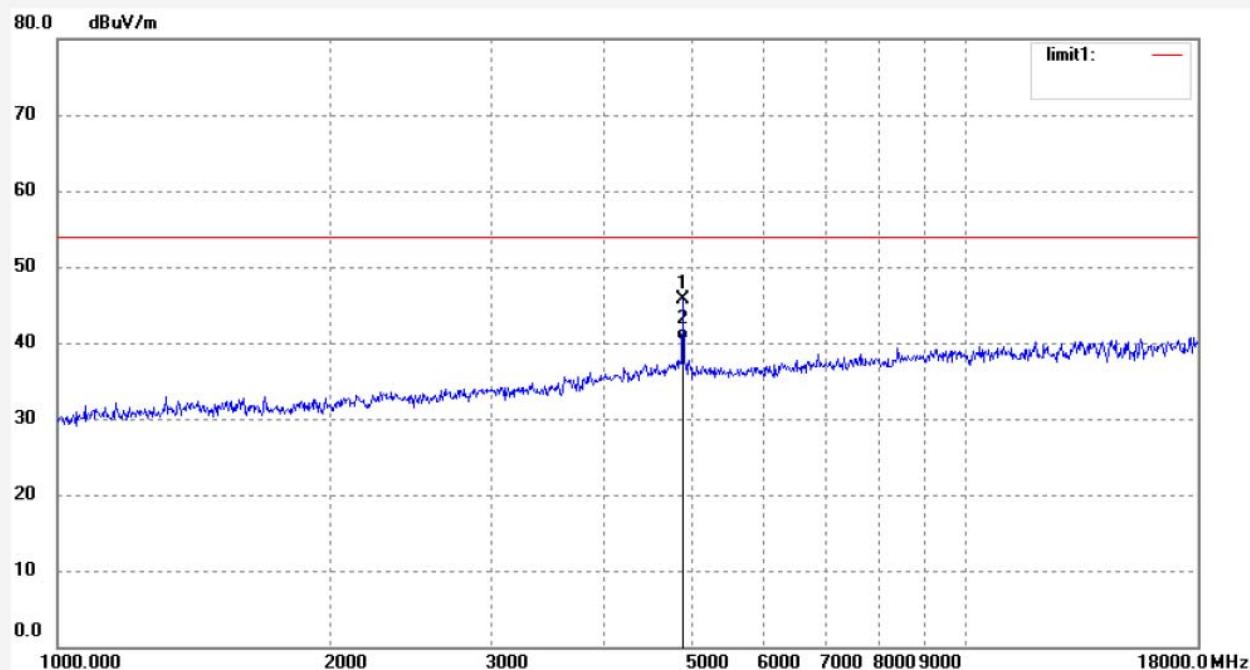
Mode: TX 2440MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4888.151	46.98	-1.33	45.65	54.00	-8.35	peak			
2	4888.151	41.71	-1.33	40.38	54.00	-13.62	AVG			

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: star2014 #819

Polarization: Vertical

Standard: FCC PART 15B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 11/26/49

EUT: Marine amplifier

Engineer Signature: STAR

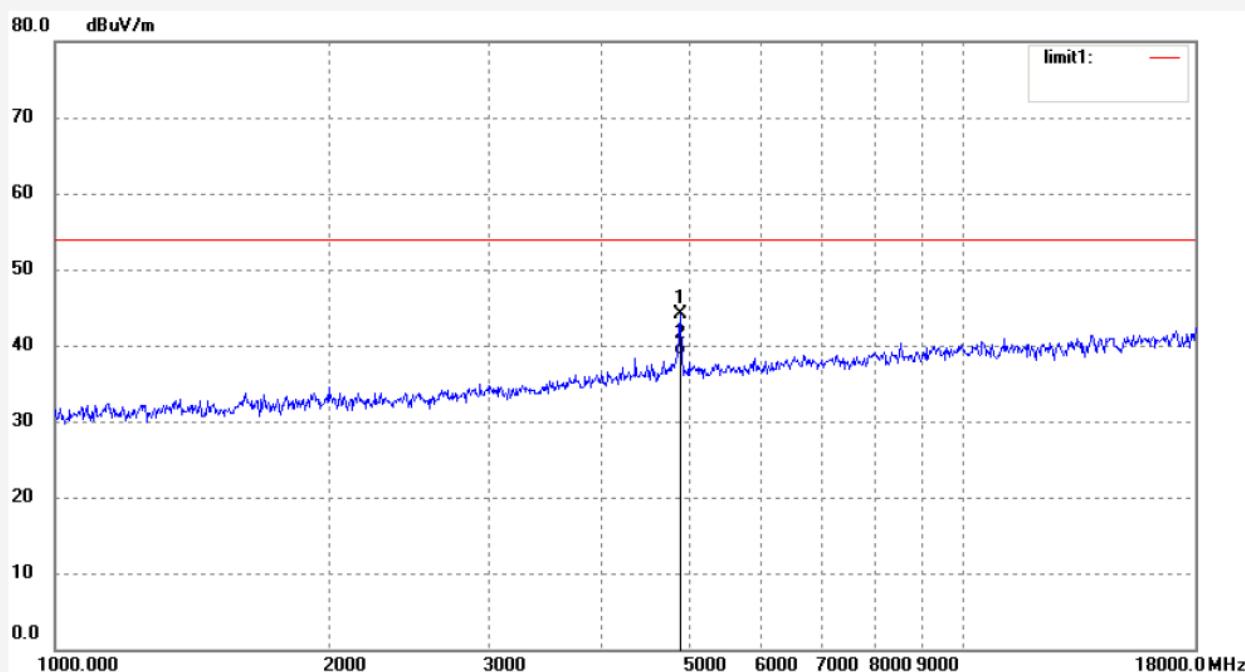
Mode: TX 2440MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

Note: Report No.:ATE20142244



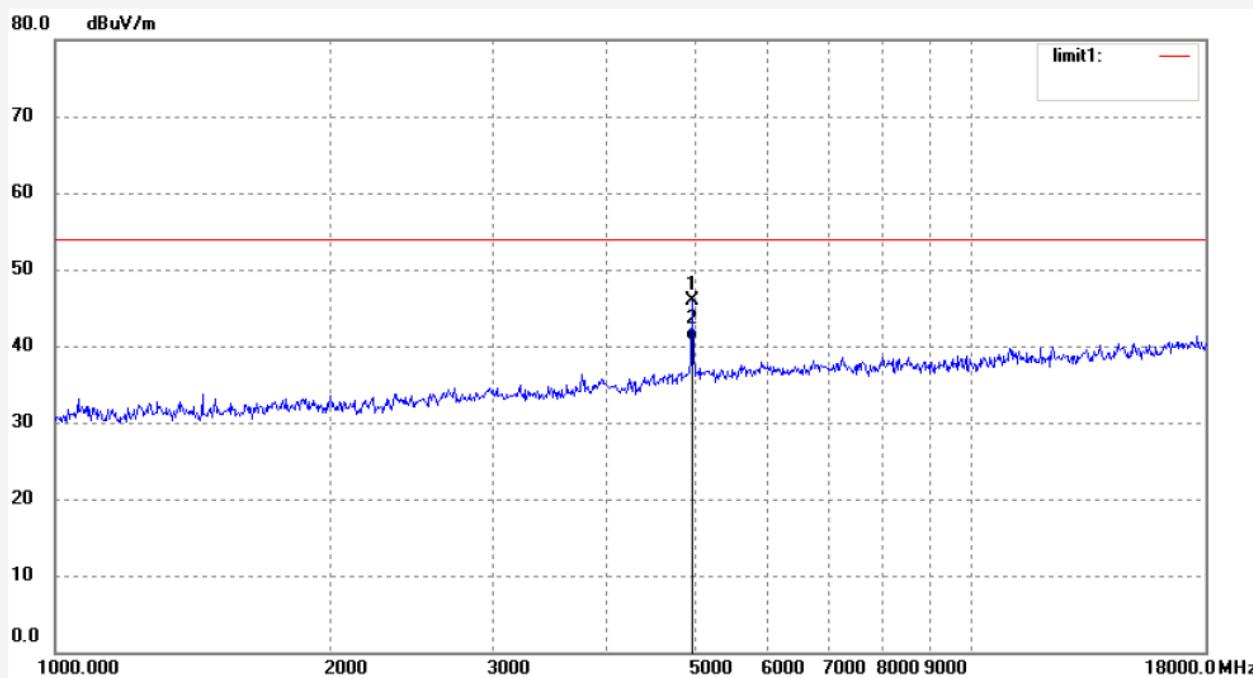
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4874.042	45.50	-1.37	44.13	54.00	-9.87	peak			
2	4874.042	40.10	-1.37	38.73	54.00	-15.27	AVG			

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.:	star2014 #820	Polarization:	Vertical
Standard:	FCC PART 15B 3M Radiated	Power Source:	DC 12V
Test item:	Radiation Test	Date:	14/11/15/
Temp.( C)/Hum.(%)	25 C / 55 %	Time:	11/31/42
EUT:	Marine amplifier	Engineer Signature:	STAR
Mode:	TX 2480MHz	Distance:	3m
Model:	KMC20		
Manufacturer:	EVERVICTORY		
Note:	Report No.:ATE20142244		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4959.307	46.95	-1.12	45.83	54.00	-8.17	peak			
2	4959.307	41.89	-1.12	40.77	54.00	-13.23	AVG			

Job No.: star2014 #821

Polarization: Horizontal

Standard: FCC PART 15B 3M Radiated

Power Source: DC 12V

Test item: Radiation Test

Date: 14/11/15/

Temp.( C)/Hum.(%) 25 C / 55 %

Time: 11/35/53

EUT: Marine amplifier

Engineer Signature: STAR

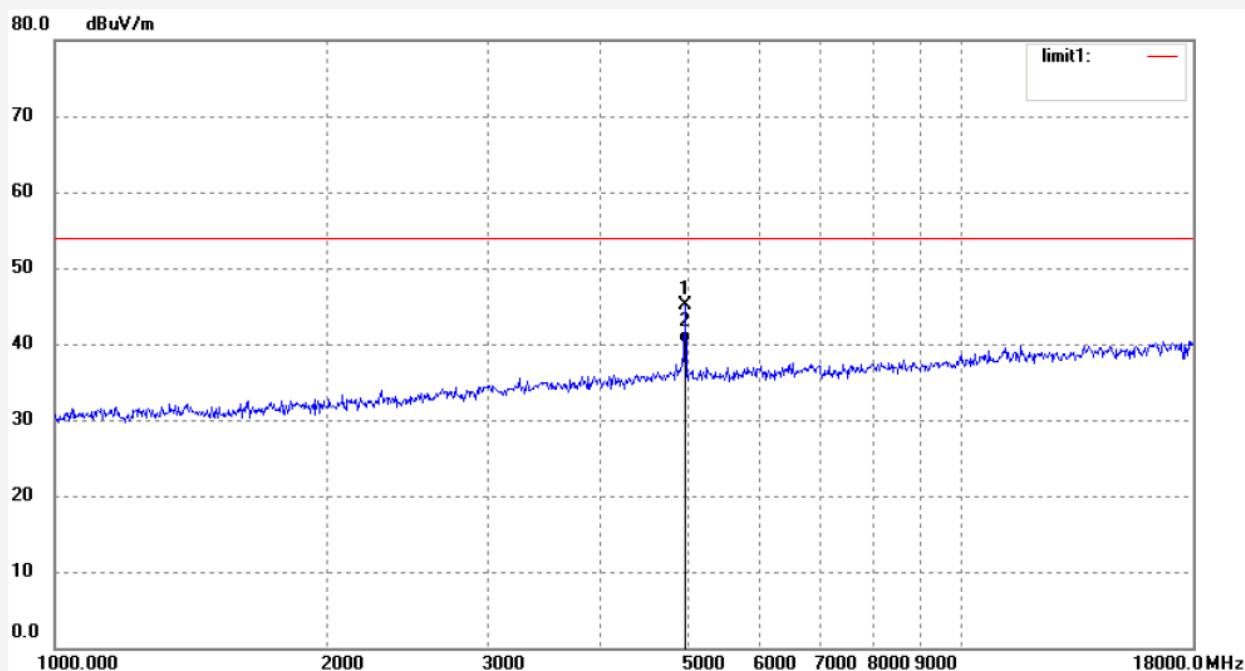
Mode: TX 2480MHz

Distance: 3m

Model: KMC20

Manufacturer: EVERVICTORY

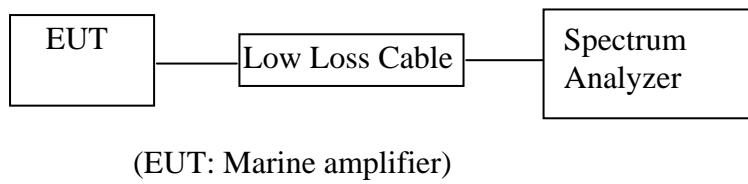
Note: Report No.:ATE20142244



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4959.307	46.24	-1.12	45.12	54.00	-8.88	peak			
2	4959.307	41.14	-1.12	40.02	54.00	-13.98	AVG			

## 10. CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

### 10.1. Block Diagram of Test Setup



### 10.2. The Requirement of Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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).

### 10.3. EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 10.4.Operating Condition of EUT

10.4.1.Setup the EUT and simulator as shown as Section 11.1.

10.4.2.Turn on the power of all equipment.

10.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 10.5.Test Procedure

10.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

10.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz

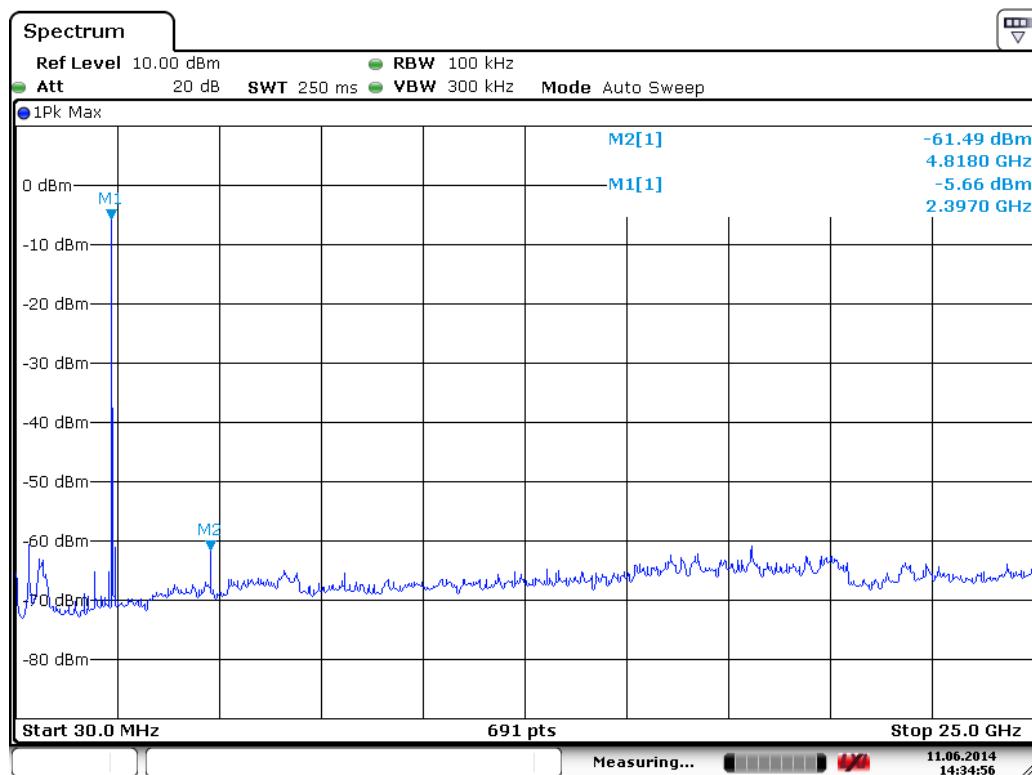
10.5.3.The Conducted Spurious Emission was measured and recorded.

## 10.6.Test Result

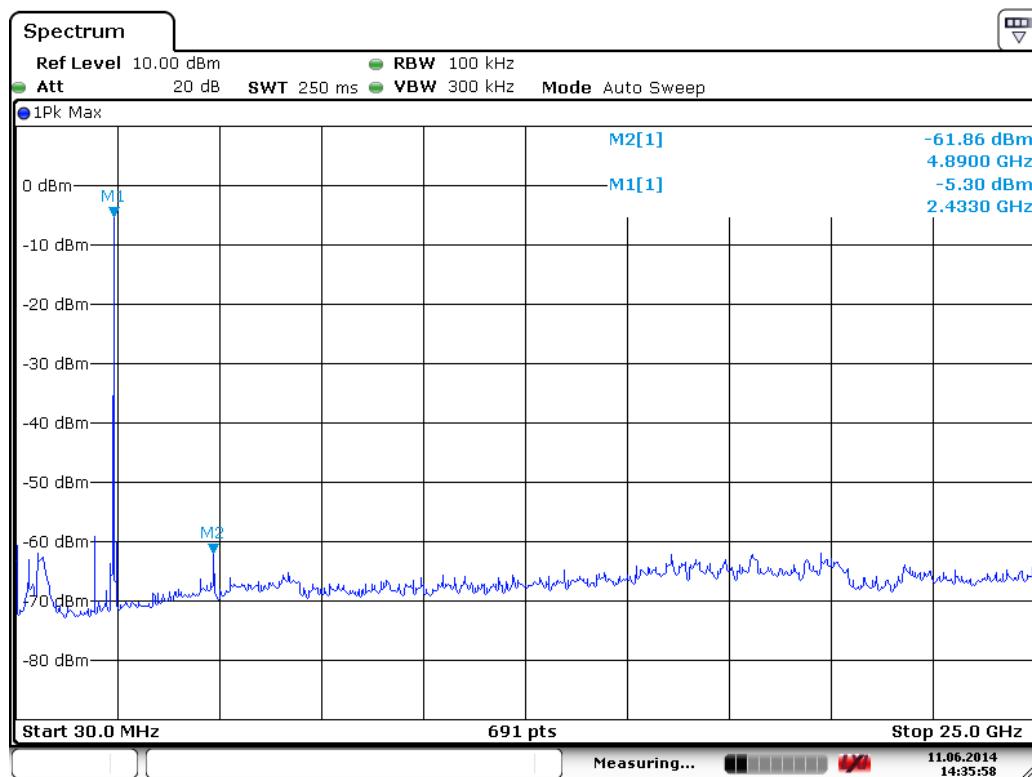
**Pass.**

The spectrum analyzer plots are attached as below.

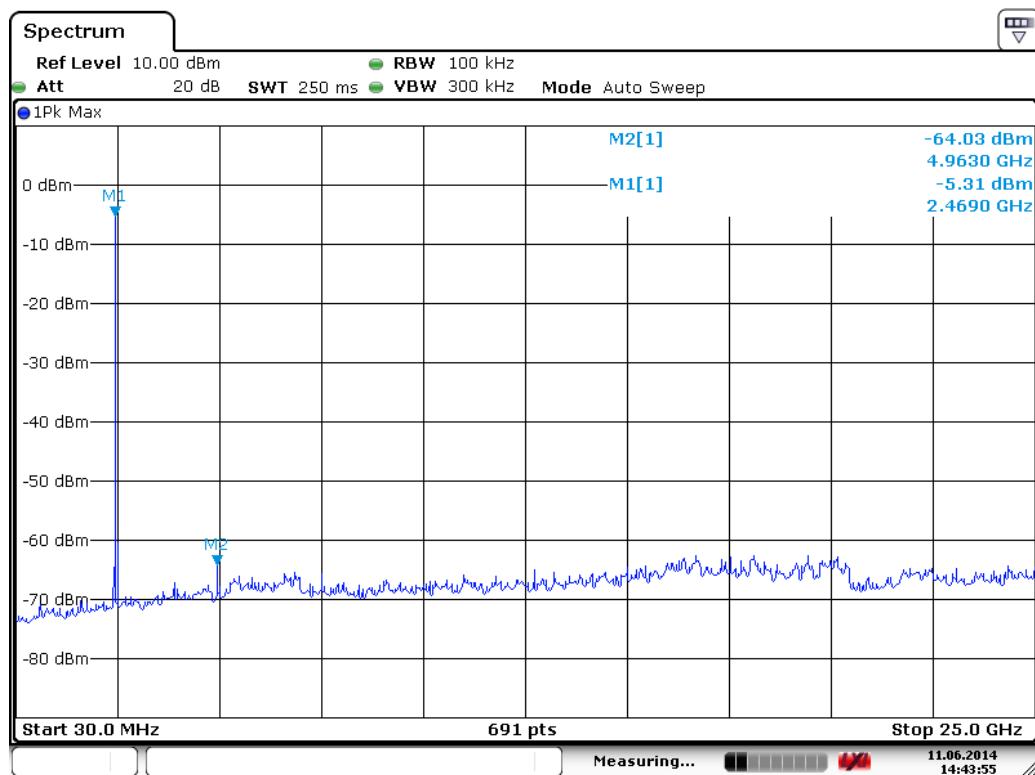
## BLE Channel Low 2402MHz



## BLE Channel Middle 2440MHz

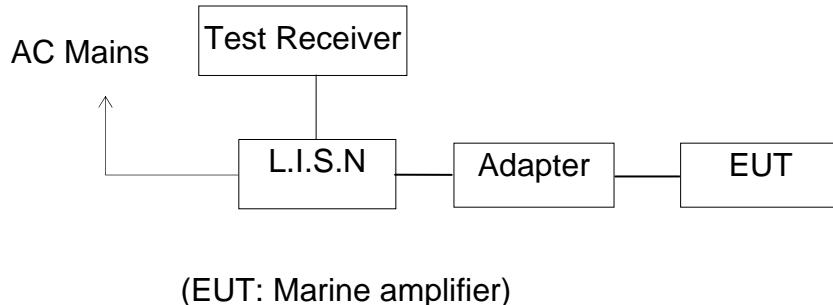


## BLE Channel High 2480MHz



## 11. POWER LINE CONDUCTED MEASUREMENT

### 11.1. Block Diagram of Test Setup



### 11.2. Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB( $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0

NOTE1: The lower limit shall apply at the transition frequencies.  
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

### 11.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

### 11.4. Operating Condition of EUT

11.4.1. Setup the EUT and simulator as shown as Section 5.1.

11.4.2. Turn on the power of all equipment.

11.4.3. Let the EUT work in test mode and measure it.

### 11.5. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2009 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

### 11.6. Power Line Conducted Emission Measurement Results

**PASS.**

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.

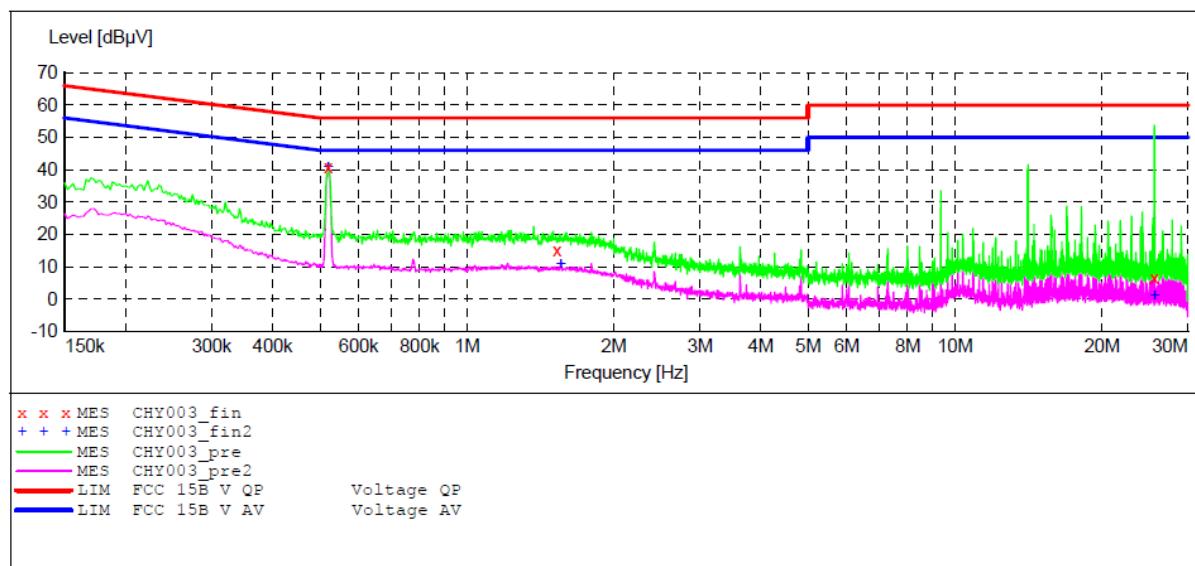
ACCURATE TECHNOLOGY CO., LTD

## CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Marine amplifier M/N:KMC20  
 Manufacturer: EVERVICTORY  
 Operating Condition: ON  
 Test Site: 2#Shielding Room  
 Operator: star  
 Test Specification: N DC 12V  
 Comment: Report NO.:ATE20142244  
 Start of Test: 2014-11-13 / 16:10:45

## SCAN TABLE: "V 150K-30MHz fin"

Short Description: SUB STD\_VTERM2 1.70  
 Start Stop Step Detector Meas. IF Transducer  
 Frequency Frequency Width Time Bandw.  
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz LISN(ESH3-Z5)  
 Average



## MEASUREMENT RESULT: "CHY003\_fin"

2014-11-13 16:13

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.520000	40.80	11.5	56	15.2	QP	N	GND
1.532000	15.00	11.6	56	41.0	QP	N	GND
25.625000	46.50	12.0	60	13.5	QP	N	GND

## MEASUREMENT RESULT: "CHY003\_fin2"

2014-11-13 16:13

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.520000	40.80	11.5	46	5.2	AV	N	GND
1.558000	10.90	11.6	46	35.1	AV	N	GND
25.625000	31.00	12.0	50	19.0	AV	N	GND

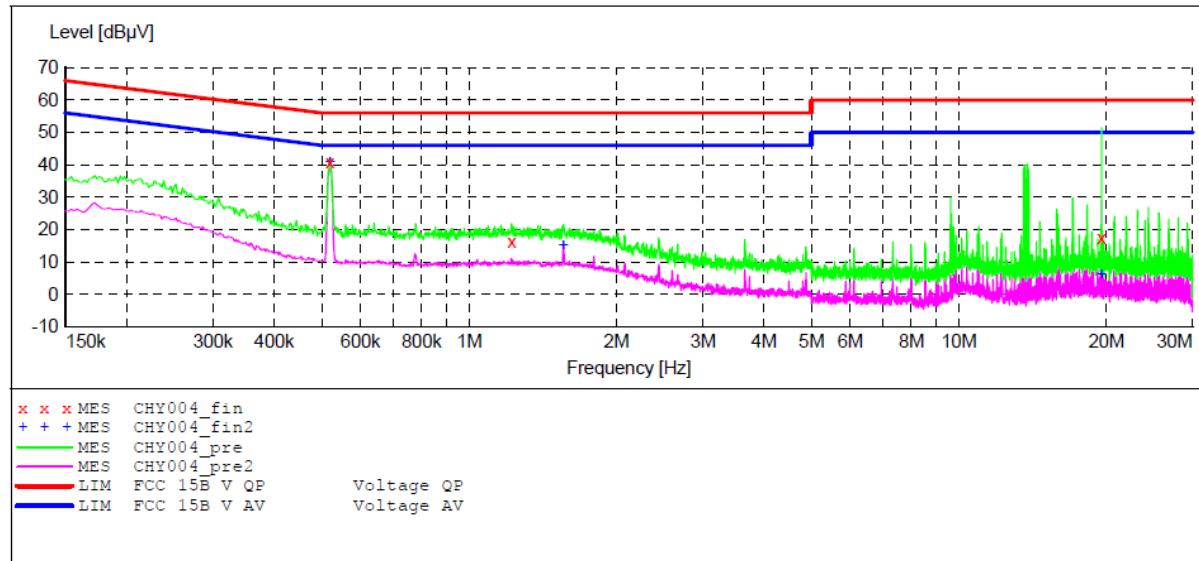
ACCURATE TECHNOLOGY CO., LTD

## CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Marine amplifier M/N:KMC20  
 Manufacturer: EVERVICTORY  
 Operating Condition: ON  
 Test Site: 2#Shielding Room  
 Operator: star  
 Test Specification: L DC 12V  
 Comment: Report NO.:ATE20142244  
 Start of Test: 2014-11-13 / 16:14:41

## SCAN TABLE: "V 150K-30MHz fin"

Short Description: SUB\_STD\_VTERM2 1.70  
 Start Stop Step - Detector Meas. IF Transducer  
 Frequency Frequency Width Time Bandw.  
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz LISN (ESH3-Z5)  
 Average



## MEASUREMENT RESULT: "CHY004\_fin"

2014-11-13 16:17

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.520000	40.70	11.5	56	15.3	QP	L1	GND
1.222000	16.40	11.6	56	39.6	QP	L1	GND
19.563500	47.40	11.9	60	12.6	QP	L1	GND

## MEASUREMENT RESULT: "CHY004\_fin2"

2014-11-13 16:17

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.520000	40.70	11.5	46	5.3	AV	L1	GND
1.558000	14.90	11.6	46	31.1	AV	L1	GND
19.563500	36.20	11.9	50	13.8	AV	L1	GND

## 12. ANTENNA REQUIREMENT

### 12.1. The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 12.2. Antenna Construction

Device is equipped with a permanent attached antenna, which isn't displaced by other antenna, it cannot be removed and the gain is 0 dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.

